GOVI® GmbH

EN **Operation Manual - Arktik 3000P**

arktik® 3000 P

Trailer refrigeration unit

arktik®

The cooling diamond

Please read this manual before you install and operate the trailer refrigeration unit.

After reading the operating manual, keep it in a safe place for future reference.

Contents

1. General points

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

Unauthorised modification or manipulation of the trailer refrigeration unit will immediately void GOVI's warranty, obligations, unless GOVI has granted express written consent in advance.
Use only original spare parts or parts approved by GOVI. Please note that spare parts and accessories not supplied by GOVI are neither tested nor approved. GOVI can accept no responsibility or warranty liability for loss or damage arising from the use of non-original spare parts.

All persons engaged to work on the trailer refrigeration unit as described in this operating manual must be suitably trained and qualified, and able to assess the work to be carried out and identify possible hazards.

GOVI shall accept no liability for personal injury or material damage resulting from unauthorised modification. To ensure the durability of GOVI products, please follow the instructions in this manual.

1.1 Disposal of the unit

Incorrect dismantling of the trailer refrigeration unit may result in personal-injury hazard or danger to the environment.
Engage only trained and qualified specialists to disassemble the trailer refrigeration unit.
Take special care when handling the refrigerant.

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

Tab. 1-1 List of materials

Designation	Material
Structure	Sheet steel, ferrous materials
Condenser, evaporator	Aluminium, copper
Electrical components	Copper, PVC, miscellaneous materials
Compressor	Ferrous materials, copper and other materials
Refrigerant (standard)	R452A
Refrigerant amount	1750 g
Coating	Epoxide compound

When you eventually scrap the trailer refrigeration unit, follow the corresponding local waste-disposal regulations, and engage, if necessary, the services of a specialist organisation.

2. Safety instructions

2.1 Safety messages and safety-alert symbols

DANGER

Failure to observe these instructions is likely to result in irreversible, or even fatal, injury.

WARING

Failure to observe these instructions may result in irreversible, or even fatal, injury.

CAUTION

Failure to observe these instructions may result in personal injury and/ or damage to equipment or the environment.

2.2 Other terms and symbols

“Note” texts do not contain any safety-related items.

Note
Items marked “Note” contain helpful tips, as well as additional information.

2.3 Safety and hazard precautions

WARNING

Electrical hazard
Work on the trailer refrigeration unit only when the main plug is disconnected.
Make sure the trailer refrigeration unit is not restarted 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
Strictly observe the following safety rules when working on the trailer refrigeration unit's electrical system:

- **Switch OFF.**
- **Block the switch to prevent accidental reactivation.**
- **Disconnect the power supply.**
- **Connect to earth (ground) and short-circuit.**
- **Cover or isolate all nearby live components.**

Electrical connection of the trailer refrigeration unit must be carried out by a qualified electrician.

WARNING

Toxic gas hazard
The fluorocarbon refrigerants contained in the refrigeration unit may produce toxic fumes if exposed to a naked flame or an electrical spark. These fumes are severe respiratory irritants, potentially capable of causing death.
The refrigerant tends to displace air and can cause oxygen depletion, which may result in death by suffocation.

Take special care when working on the trailer refrigeration unit, particularly in an enclosed or confined space with a limited supply of fresh air.

WARNING

Fire and explosion hazard from flammable materials.
DO NOT expose to naked flames, electrical sparks or other sources of ignition. Do not smoke.
Observe fire/explosion-prevention measures.

WARNING

Danger arising from unauthorised modification.
DO NOT drill any extra holes into the trailer refrigeration unit, as this may damage important components.

Accidental drilling to electrical wiring or refrigerant conduits may cause a fire.

WARNING

Risk of damage to health from leaking refrigerant.
During maintenance or repair work on the refrigerant circuit, refrigerant emissions may occur. These emissions can be liquid or gaseous and pose a threat to humans and the environment.

Always use suitable personal protective equipment (including goggles, respiratory mask and protective gloves) if leaking refrigerant is present.

CAUTION

Burn hazard.
Certain parts of the trailer refrigeration unit (e.g. the condenser, evaporator and tubes) may still be hot after operation.
Let the components cool off before working on the trailer refrigeration unit.

CAUTION

Risk of long-term damage to the environment.
The operating materials (refrigerant and refrigerant oil) are NOT biodegradable. Observe the safety data sheets or operating instructions supplied with the materials used.

Observe the corresponding local environmental regulations when disposing of items that have been contaminated with operating materials.

CAUTION

Risk of injury from rotating parts
Keep your distance from rotating fan blades.
Contact with the sharp edges of fan blades can result in injury.

2.4 Refrigerant-handling precautions

Although hydrofluorocarbon refrigerants are classed as “safe”, you should still observe certain precautions during the handling, installation and maintenance of the trailer refrigeration unit. Liquid hydrofluorocarbon refrigerants evaporate rapidly when released into the atmosphere, and quickly ice up everything that they touch. Skin contact can lead to severe, frostbite-like injury. Hydrofluorocarbon refrigerants may produce toxic fumes if exposed to a naked flame or an electrical spark. These fumes are severe respiratory irritants, potentially capable of causing death.

2.4.1 First aid

In the event of frostbite, protect the affected area from further injuries, avoiding contact with the refrigerant and additional measures.

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 water (for at least 15 minutes) and get prompt medical attention.

Skin frostbite:

- Remove refrigerant-contaminated clothing and footwear.
- Thoroughly rinse off the refrigerant with abundant lukewarm water.
- DO NOT apply heat (e.g. by rubbing or with a hot-water bottle).
- Seek medical attention immediately. While you are waiting for help to arrive, cover the affected area as loosely as possible with a large sterile dressing.

Inhalation of refrigerant:

Seek medical attention immediately and bring the injured person into the fresh air. Administer artificial respiration if required.

2.4.2 Environmental regulations

GOVI trailer refrigeration units are shipped with a suitable charge of refrigerant R452A.
If you detect any fault in the refrigerant circuit, or signs of leakage from the trailer refrigeration unit, have the device examined and repaired by a qualified specialist. DO NOT allow refrigerant to escape into the open air. Please read the safety instructions and hazard warnings in section ***2.3 Safety and hazard precautions***, as well as the manufacturer’s data sheet for the refrigerant R452A. Dispose of defective refrigeration units and drained-off refrigerant in accordance with applicable environmental regulations.

2.5 Intended use

This trailer refrigeration unit is designed for use in refrigerated trailers that are not exposed to any explosion or fire hazard. For that purpose, the trailer refrigeration unit is mounted stationary at the front wall of the refrigerated trailer by a mechanical fasting system (not included).

At outside temperatures between -20 °C and +38 °C the trailer refrigeration unit enables inside temperatures from -20 °C to 10 °C.

- The trailer refrigeration unit is not designed for operation in locations classed as AP.PE EEx (explosion hazard).
- The trailer refrigeration unit is not designed for use in places exposed to fire hazard.
- The trailer refrigeration unit is not equipped with reinforced electrical or mechanical protective elements to withstand aggressive weather conditions.

Ensure the trailer refrigeration unit is properly ventilated when placing the trailer. Ensure adequate air circulation and sufficient space for proper maintenance access. DO NOT expose the trailer refrigeration unit to direct sunlight. Ensure proper air circulation when placing items inside the trailer, and be careful not to block the evaporator. DO NOT place heat-emitting items in the refrigerated unit.

The trailer refrigeration unit is not intended for any use other than as described above. All other usage shall be considered improper, and is either prohibited or requires the approval/permission of the manufacturer. “Intended use” also includes compliance with specified maintenance and repair-work requirements. ***See section 10 Maintenance.***

3. Technical data

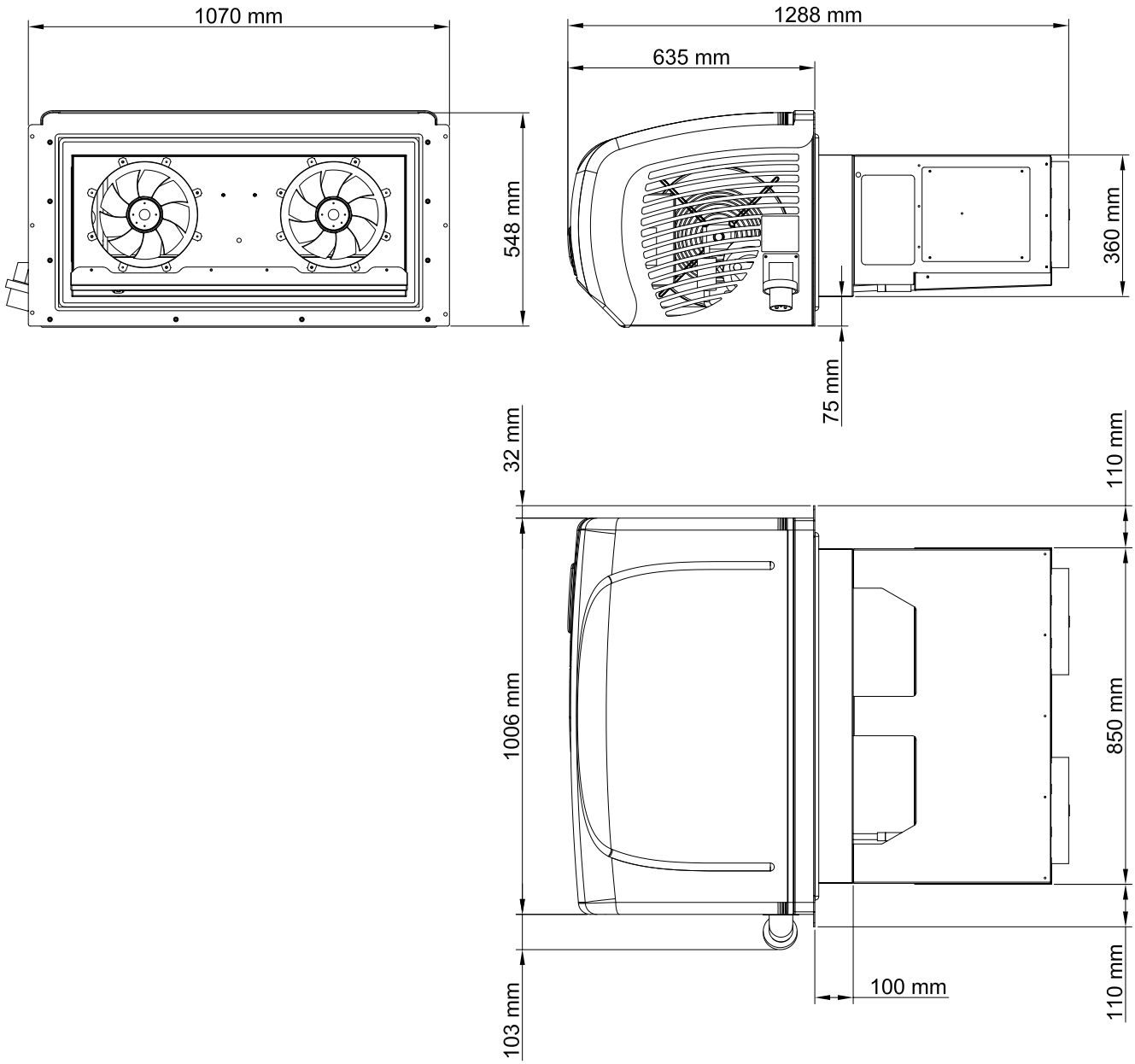
The trailer refrigeration unit consists of a self-supporting chassis made of galvanized sheet metal and a front cover made of coated ABS with standard colour RAL7024.

Fig. 3-1 Nameplate

The nameplate carries the serial number of the trailer refrigeration unit, together with other important technical data.
The nameplate is on the right-hand side, near the electrical connection point.

Always have the serial number of the trailer refrigeration unit to hand when contacting us, as this will ensure the fast and smooth processing of your enquiry.

Fig. 3-2 Dimensions



Tab. 3-1 Technical data

Designation	arktik 3000P
Inside temperature of the refrigerated trailer	-20 °C to 10 °C
Max. ambient temperature	+38°C
Max. room volume	14 m³
Power supply	230 V
Frequency	50 Hz
Refrigeration capacity	2300 / 3800 W
Power consumption	1950 / 2390 W
Current consumption LRA	46 A
Current consumption FLA	13,75 A
Defrosting	Hot gas
Air quantity evaporator	2200 m³/h
Air quantity condenser	2250 m³/h
Protection class, digital thermostat side	IP54
Refrigerant	R452A
Refrigerant amount	1750 g
Weight	124 Kg
Colour RAL	9010 / 7024

The refrigeration capacity is based on the following operating conditions: Temperature setting -20 °C, 30 °C outside temperature, relative humidity 50%.

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

4. Packing, transport and storage

4.1 Package

The trailer refrigeration unit is secured in a pallet-mounted packing case for safe transportation.

CAUTION

Refrigerant leaks from damaged equipment can cause skin injuries and material damage.
In the event of severe external damage to the packing material and/or the trailer refrigeration unit itself, contact your local GOVI representative immediately.

DO NOT try to install the trailer refrigeration unit. DO NOT attempt to start it up.

Fig. 4-1 Accompanying items

1. Operating manual
2. Eye bolt
3. Coupling

1. Place the pallet on a flat surface. Examine the packing material and trailer refrigeration unit for transport damage.
2. Inform the carrier of any damage detected.
3. Take photographs of the damage, and add a corresponding note to the transport documents.
4. Check accompanying items for completeness.
5. Before disposing of the packing material, check for loose items forming part of the delivery.

4.2 Transport

CAUTION

Risk of equipment damage
The trailer refrigeration unit must be transported horizontally.

Leave the trailer refrigeration unit horizontally for at least six hours before starting it up for the first time.

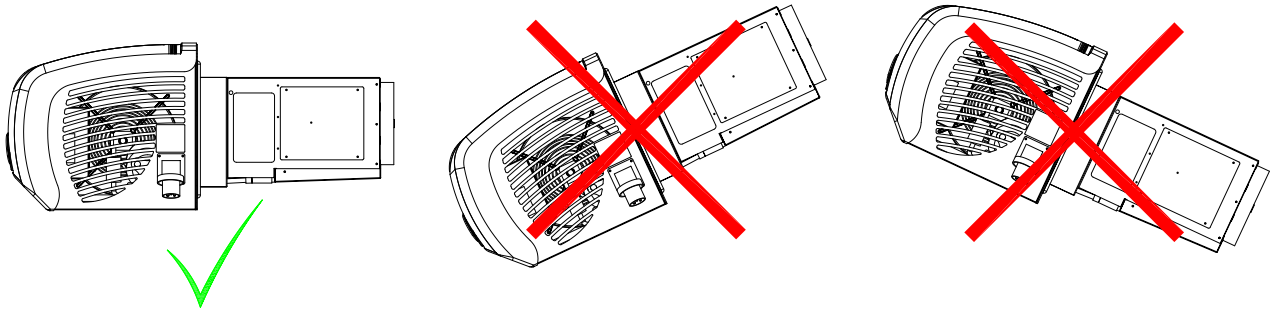


Fig. 4-2 Transport and storage

- Only use suitable lifting equipment for lifting and transport of the trailer refrigeration unit. For information about the weight see ***section 3 Technical data.***

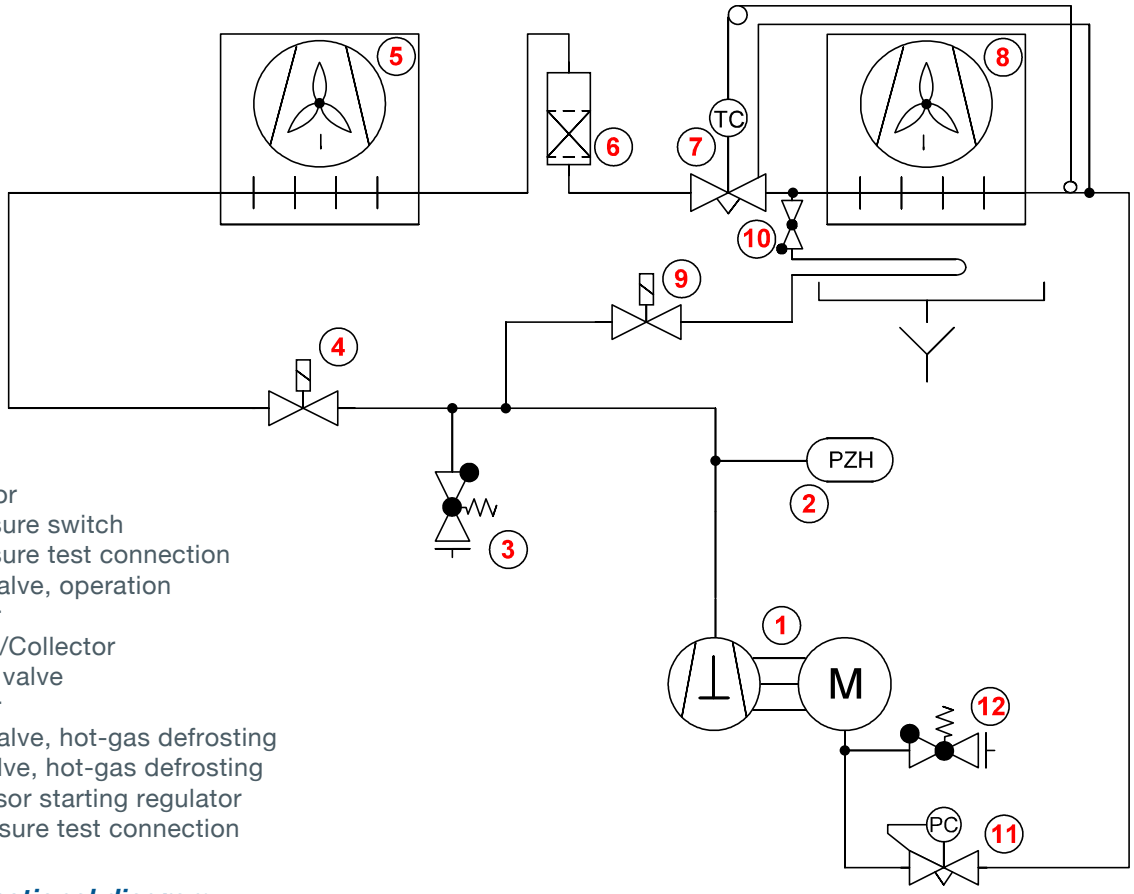
- Lift the trailer refrigeration unit according to ***section 6.4 Installation of the trailer refrigeration unit.***

4.3 Storage

Please observe the following points when placing the trailer refrigeration unit into storage:

- The trailer refrigeration unit must be stored horizontally, see ***Fig. 4-2***.
- The storage temperature must not exceed 60 °C
- DO NOT store the trailer refrigeration unit near corrosive substances of any kind.
- Use a storage location away from direct sunlight.

5. System description

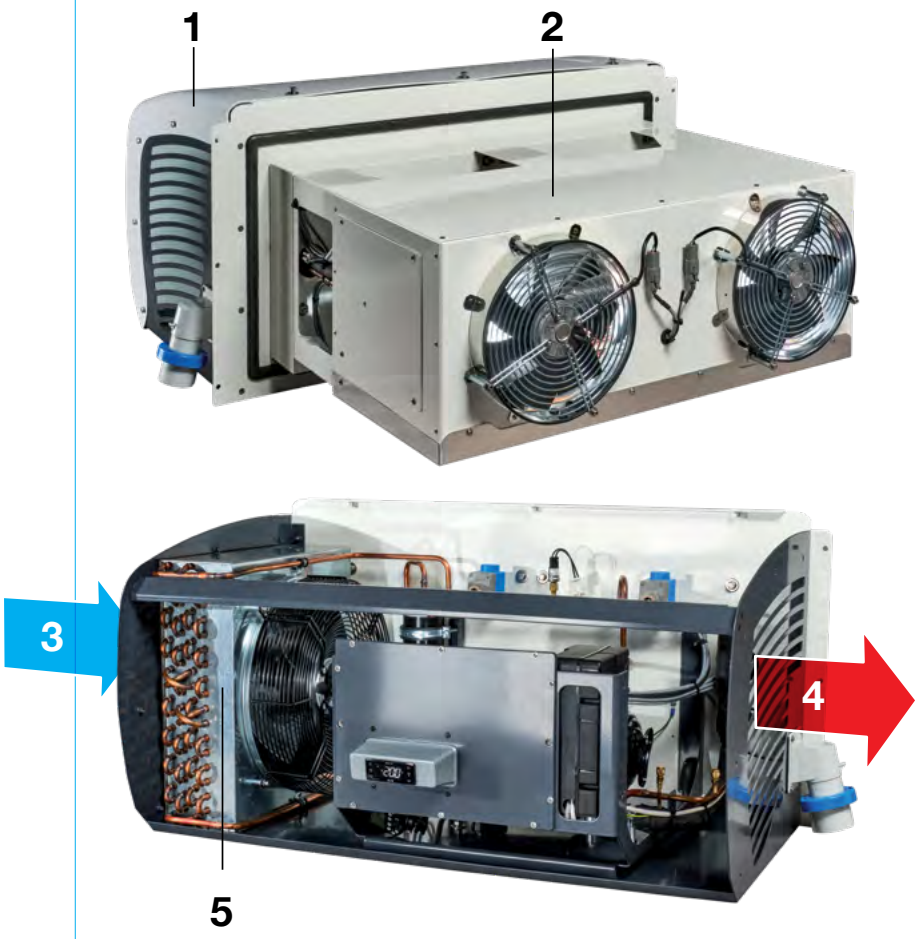


1. Compressor
2. High-pressure switch
3. High-pressure test connection
4. Solenoid valve, operation
5. Condenser
6. Filter dryer/Collector
7. Expansion valve
8. Evaporator
9. Solenoid valve, hot-gas defrosting
10. Check valve, hot-gas defrosting
11. Compressor starting regulator
12. Low-pressure test connection

Fig. 5-1 Functional diagram

The process 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 pressurized by an electrically-driven compressor, fluidized in the condenser, atomized 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
2. Evaporator (with refrigerant in the system)
3. Air intake (do not obstruct)
4. Air outlet (do not obstruct)
5. Condenser

Fig. 5-2 Overview of the trailer refrigeration unit

Main cover (1)

The main cover (1) covers the components outside the refrigerated trailer.

Evaporator (2) and condenser (5)

In the evaporator (2) heat is absorbed by the refrigerant, which is released again in the condenser (5).

Protection cover and setting of nominal temperature

The protection cover shields the control unit from harsh weather and impedes unintended changes of the settings. Set the nominal temperature, see ***section 9.2 Setting the nominal temperature.***

Air intake (3) and air outlet (4)

Keep the air intake (3) and outlet (4) clear at all times. They must not be covered or obstructed.

6. Installation

6.1 Installation requirements

1. Read through the operating manual carefully in order to carry out installation correctly.
2. Verify that the trailer refrigeration unit has been delivered according to your order specifications, and that it is in good condition with no visible signs of damage.
3. Check to ensure that none of the necessary tools and additional items are missing, and that they are in proper operating condition.
4. Verify that the installation site of the trailer refrigeration unit provides a plane surface without unevenness, which may cause vibrations.
5. Ensure also that the supporting elements of the trailer refrigeration unit are strong enough to support its weight.
6. Make sure that the crane hoist and lifting gear are of the right size to support the load of the trailer refrigeration unit. For details of its weight, see ***section 3 Technical data***.
7. NB: Do not connect the power supply of the trailer refrigeration unit before first completing the installation of the unit and its accessories.
8. Protect 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 before starting the installation process:

6 threaded bolts
of appropriate length and strength. The appropriate length depends on the thickness of the wall onto which you mount the trailer refrigeration unit. The bolts must be strong enough to carry the dynamic weight of the unit.

12 washers (depending on the threaded bolts)

12 self-locking nuts (depending on the threaded bolts)

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

6.3 Preparatory activities

6.3.1 General preparation

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

1. PU seal

1. Place the refrigerated trailer and trailer refrigeration unit side by side on a dry and clean flat surface.
2. Make sure that the trailer is in horizontal position.
3. Ensure that the mating surface between the trailer end wall and the trailer refrigeration unit room is level and free of impurities.
4. Remove all obstacles from the installation area.
5. Prepare all the required installation tools and other equipment and keep them to hand.
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

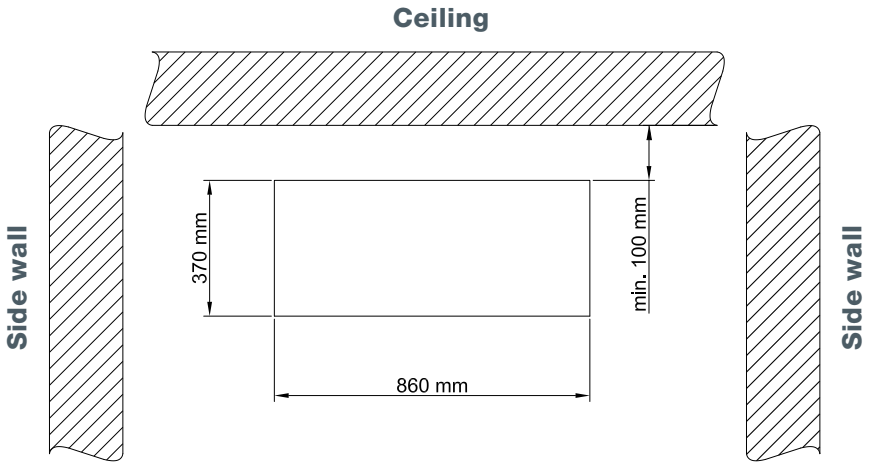


Fig. 6-2 Wall opening dimensions of the trailer

7. Prepare the wall opening together with 6 drill holes for the fastening elements in the middle of the trailer's front wall. Make sure to be complying with the minimum dimensions for the trailer refrigeration unit to work properly, ***siehe Fig. 6 2.***

6.4 Installation of the trailer refrigeration unit

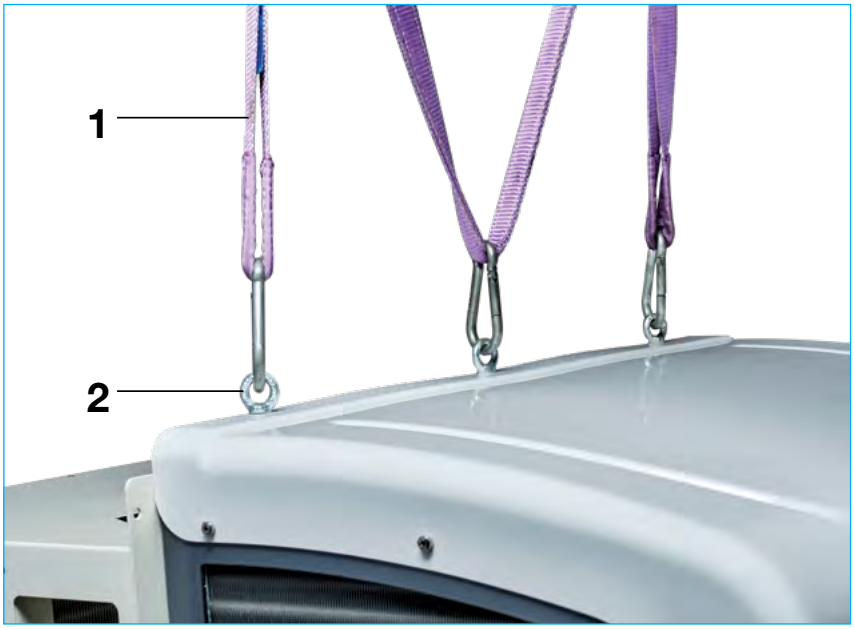


Fig. 6-3 Attachment points of the trailer refrigeration unit

1.Carrying ropes
2.Eye bolts

CAUTION

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

Leave the main cover during installation.

1. Remove the hexagon head screws, one by one, from the mounting holes of the main cover on the top of the trailer refrigeration unit. Then insert in each free hole one eye bolt (2) from the provided accompanying items, ***see Fig. 4 1.***

WARNING

Injury hazard.
The weight of the trailer refrigeration unit is approximately 124 kg. Always wear a helmet when lifting and positioning it.
Use only suitable and approved tools.
Use all three lifting points.

2. Attach 3 properly-sized carrying ropes (1) to both eye bolts (2).

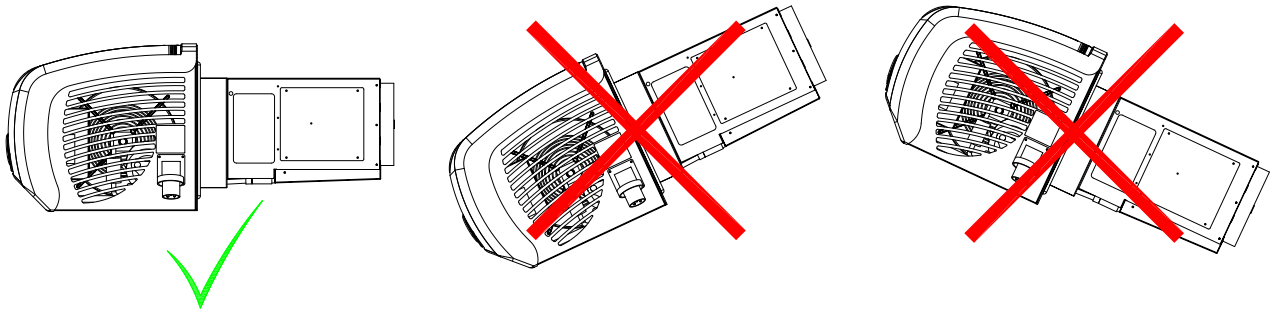


Fig. 6-4 Mounting alignment

CAUTION

Risk of equipment damage.
The trailer refrigeration unit must be transported horizontally.

Leave the trailer refrigeration unit horizontally for at least six hours before starting it up for the first time.

3. Keep the refrigeration unit in a horizontal position at all times during installation, including lifting operations.

4. Position the trailer refrigeration unit in front of the installation opening at its front wall using an adequate lifting device or loading crane.

Fig. 6-5 Fastening the trailer refrigeration unit

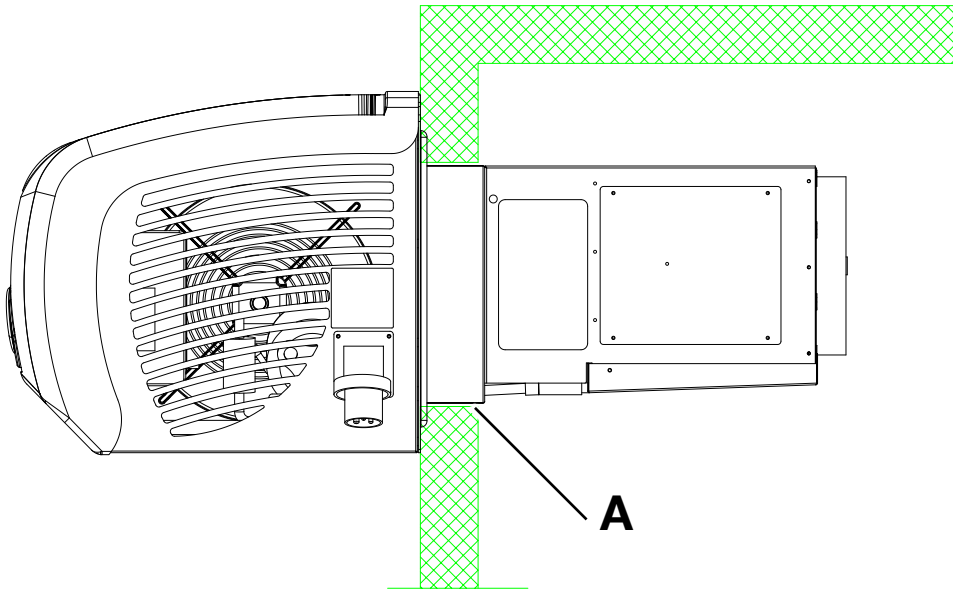
1. Mounting holes
2. PU seal
3. Main cover

5. Place the trailer refrigeration unit in the mounting area and make sure that the PU seal (2) does not get damaged.

6. Fasten the trailer refrigeration unit using threaded bolts, washers and self-locking nuts (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 hexagon head screws.

Fig. 6-6 Sealing inside the trailer



A. Gap

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 positioned in an inclined way, see ***section 6.2 Additional parts and equipment.***

6.5 Installation of accessories

As an option, a light inside the trailer can be connected to the trailer refrigeration unit and operated from it, ***see section 6.2 Additional parts and equipment***

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

7. Operating elements

Fig. 7-1 Operating elements

1. Display
2. Control switch
3. Light switch

1. Display

The display (1) serves to choose and to show the selected temperature (nominal temperature).

2. Control button

The control button (2) enables to switch on and off the control voltage of the trailer refrigeration unit.

3. Light button

The light button (3) allows to switch on and off the light inside the refrigeration unit.

8. Commissioning

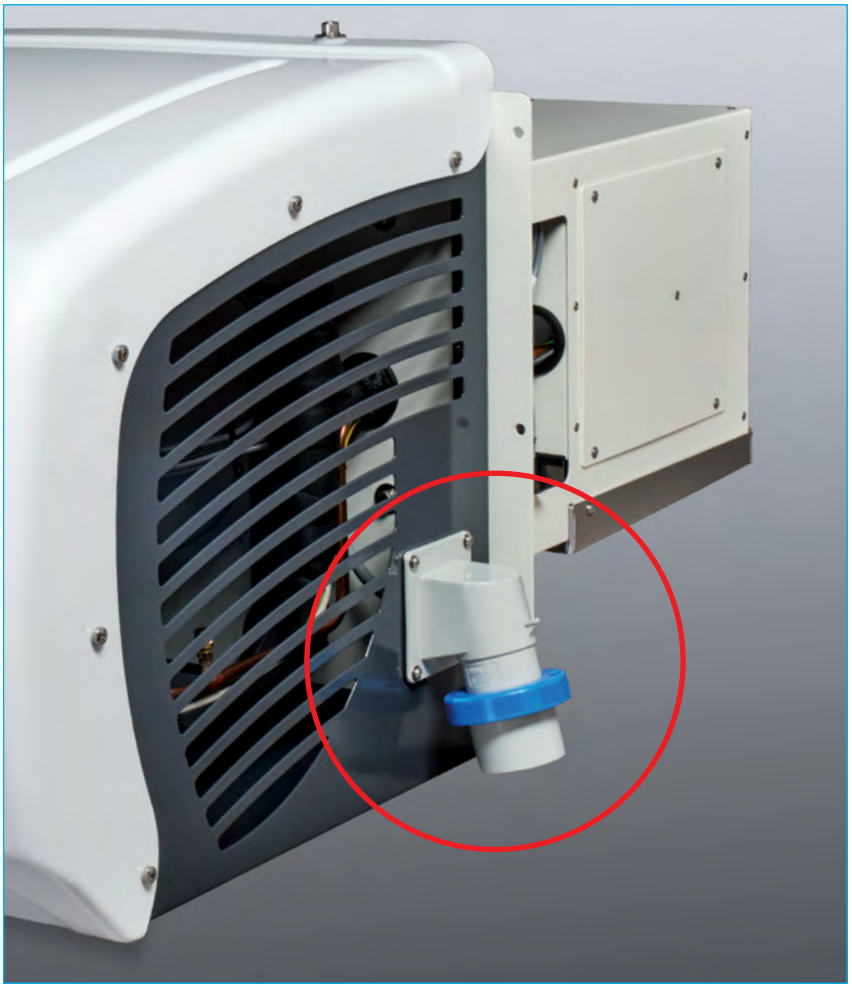


Fig. 8-1 Commissioning

1. Remove the 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.

CAUTION

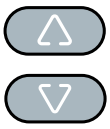
Switch the trailer refrigeration unit off immediately if you detect smoke, unusual smells or noises coming from the unit.

Contact GOVI Technical Service before restarting.

4. Press the control button (2) to start the trailer refrigeration unit.
The current temperature appears on the display. (1)

1. Press SET once shortly. The display shows “SET”.

2. Press SET again. The display (1) shows the currently-set nominal temperature.



3. Adjust the nominal temperature by pressing UP for a higher temperature or DOWN for a lower temperature.
The value changes by intervals of 0.1 °C when you press for less than 1 second.
When you press and hold the button, the value increases or decreases reaching a maximum temperature of 10 °C.

4. Press SET again. The selected nominal temperature is saved. The display (1) shows the current temperature inside the trailer.

5. Make sure that:

- the installation opening and drill holes on the trailer wall are airtight,
- the air intakes and outlets on the condenser and evaporator are not obstructed or blocked,
- 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 is operating correctly.

9. Operation

CAUTION

Switch the trailer refrigeration unit off immediately if you detect smoke, unusual smells or noises coming from the unit.

Contact GOVI Technical Service before restarting.

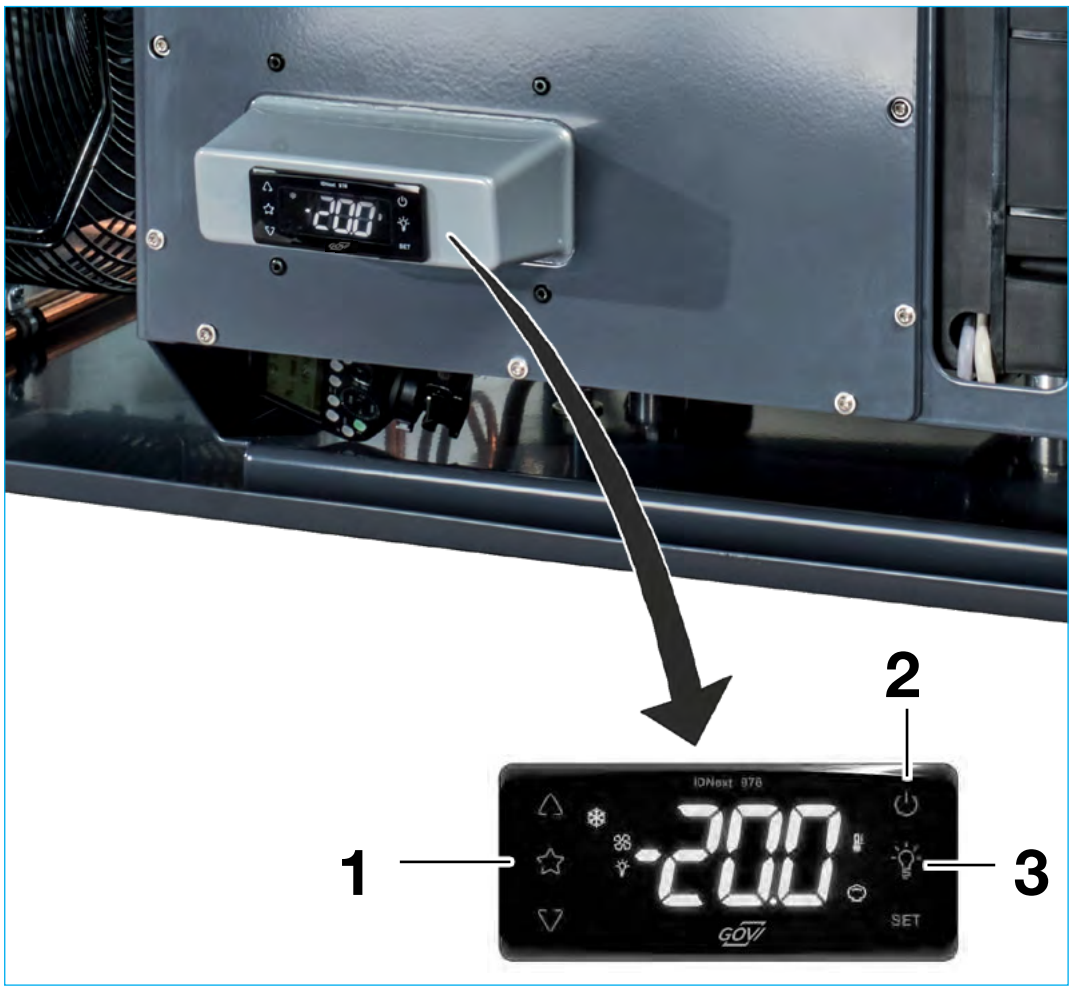


Fig. 9. 1. Operation

1. Display
2. Control button
3. Light button

9.1 Switching the trailer refrigeration unit on and off

1. Unlock the latch (5) and open the protection cover.
2. Press the control button (2) to switch the trailer refrigeration unit on.
3. Press the control button (2) to switch the trailer refrigeration unit off.

9.2 Setting the nominal temperature

1. Press SET once shortly. The display shows “SET”.

2. Press SET again. The display (1) shows the currently-set nominal temperature.

3. Adjust the nominal temperature by pressing UP for a higher temperature or DOWN for a lower temperature.
The value changes by intervals of 0.1 °C when you press for less than 1 second.
When you press and hold the button, the value increases or decreases reaching a maximum temperature of 10 °C.

4. Press SET again. The selected nominal temperature is saved.
The display (1) shows the current temperature inside the trailer.

9.3 Switching the light on and off in the refrigerated trailer

1. Press light button (3) to switch off the light in the trailer.
2. Press light button (3) to switch off the light in the trailer.

9.4 Manual defrost

While the trailer refrigeration unit is in use, the evaporator coils will gradually get covered with frost. Defrosting must be regularly carried out in order to avoid losses in the cooling capacity and air flow. Defrosting takes place with a hot refrigerant released through 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 not active.

1. Open the protection cover.

2. Press "UP" for more than 5 seconds. Manual defrosting (defrosting procedure) is now started.

10. Maintenance

Maintain the trailer refrigeration unit
- Carry out maintenance every six months, or
- after a long period of time without operation, or
- after operation in a dusty or damp environment.

Failure to carry out proper maintenance can lead to malfunctioning of, and damage to, the trailer refrigeration unit.

10.1 Manual defrost during maintenance

See section 9.4 Manual defrost.

10.2 Cleaning procedure

10.2.1 Cleaning procedure inside the refrigerated unit

WARNING

Danger of fire and explosion.
DO NOT use flammable solvents such as alcohol, benzene or thinners for cleaning.

Fig. 10-1 Cleaning procedure inside the refrigeration unit

1 Evaporator

1. Unload the trailer.

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 of external components

Fig. 10-2 Cleaning of external components

1. Main cover
2. Condenser

1. Disconnect the trailer refrigeration unit from the power supply by pulling the main plug.

2. Loosen and remove the three hexagon head screws on the upper side of the trailer refrigeration unit and take off the main cover (1).

3. Clean the condenser (2) by blowing in compressed air through the cooling fins, working from the left to the right keeping an appropriate distance. If necessary, align the fins after the cleaning procedure.

4. Fasten again the main cover (1) using the three hexagon head screws.

5. Connect again the trailer refrigeration unit to the power supply by inserting the main plug.

11. Troubleshooting

Tab. 11-1 Troubleshooting

Error or fault	Problem	Solution
The trailer refrigeration unit does not start.	No power supply.	1. Check that the control switch is on. 2. Check the connection to the power supply.
	The fuses of the power line are blown.	Contact GOVI Technical Service.
The trailer refrigeration unit does not provide cooling; the fan inside the refrigerated trailer does not work.	No power supply.	1. Check that the control switch is on. 2. Check the connection to the power supply.
The trailer refrigeration unit does not provide cooling; the fan inside the refrigeration unit works.	Nominal temperature too high.	Set the nominal temperature to the desired temperature.
	Thermostat is defective.	Contact GOVI Technical Service.
	High-pressure switch triggered.	1. Make sure that the condenser is clean and that the outer fan is turning. 2. Make sure that the main cover is mounted correctly. 3. Contact GOVI Technical Service.
The trailer refrigeration unit does not provide sufficient cooling.	Surrounding temperature too high.	1. Check the refrigeration unit for leaks. 2. Choose a colder location for the refrigeration unit.
	Leaking refrigerant.	Contact GOVI Technical Service.
	Condenser is blocked.	Clean the condenser.
	Fans not working.	Contact GOVI Technical Service..
	Air circulation blocked on the outside (condenser area) of the trailer refrigeration unit.	1. Make sure that there is sufficient space for proper air circulation in the trailer refrigeration unit. 2. Remove all loose obstacles likely to obstruct air circulation.
	Insufficient air circulation inside the refrigerated trailer.	Check the position of items inside the refrigerated trailer. Position them in such a way that they do not impede air circulation.
The trailer refrigeration unit switches itself on and off automatically.	No nominal temperature has been set.	Set the nominal temperature to the desired temperature.
	Temperature sensor is defective.	Contact GOVI Technical Service.
Water leaks out of the trailer refrigeration unit.	Drain hose blocked.	Blow out drain hose with compressed air to remove impurities.
Ice build-up on evaporator.	Trailer door open.	Close the door of the refrigerated trailer.
	Fan inside the trailer is defective.	Contact GOVI Technical Service.
	Hot-gas defrost not working.	Contact GOVI Technical Service.
Light inside the trailer doesn't work.	No power supply.	1.Check that the light switch is on. 2.Check that the control switch is on. 3.Check that the bulb in the refrigeration trailer works. 4.Check the power supply to the lighting. 5.Contact GOVI Technical Service.

12. Summary

Summary of figures

Summary of Tables

13. Appendices

13.1 Operating manual

The operating manual is located inside the control flap.

Fig. 13-1 Operating manual

Operating manual EN

SET **SET-Button** | **ON/OFF**

UP | **DOWN**

Light button

Unlocking the user interface:
Press and hold the button **DOWN** for 3 seconds.

Turning on/off the light:
Briefly press the **LIGHT** button.

Turning on/off the device:
Press and hold the button **ON/OFF** for 5 seconds.

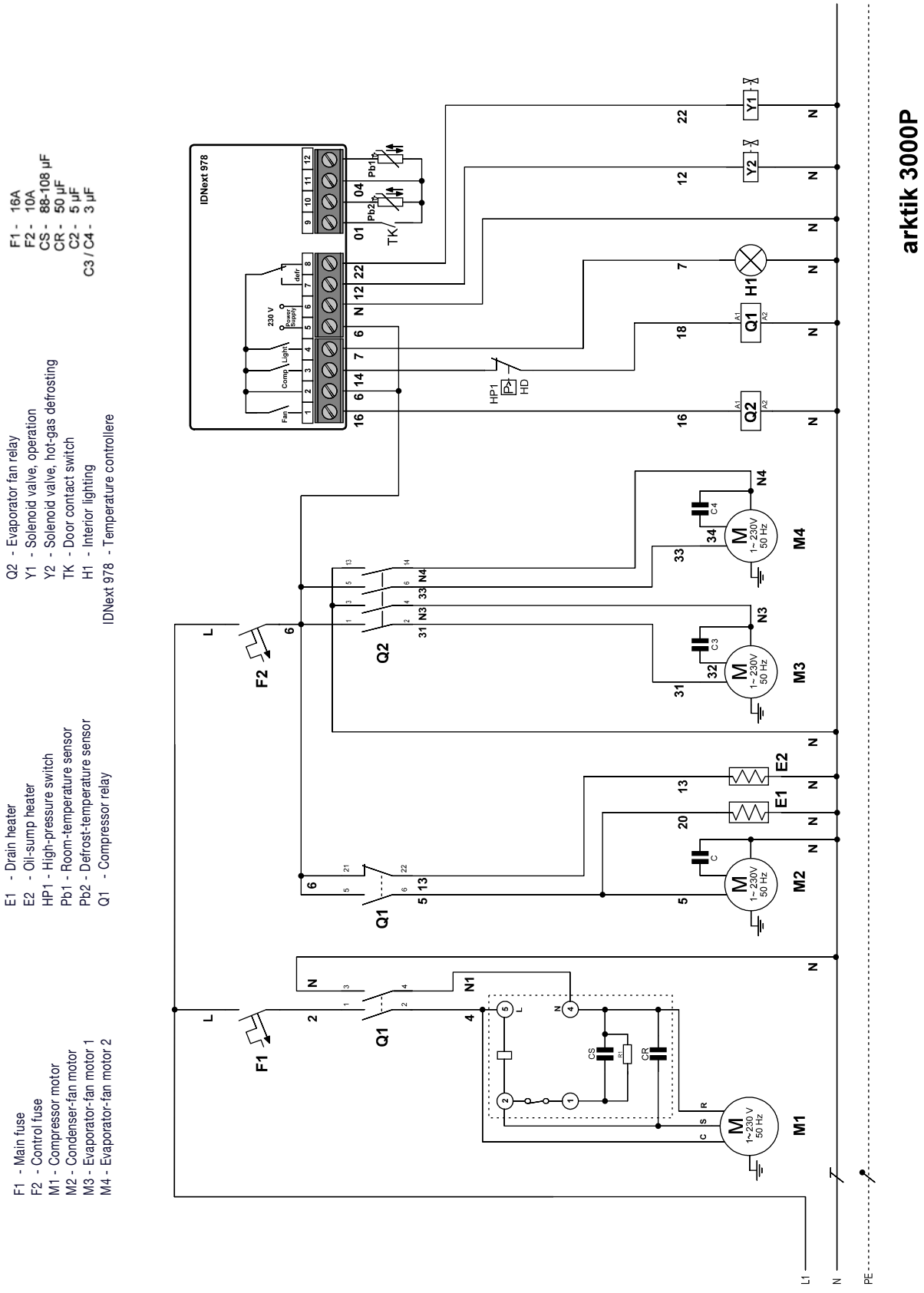
Initiating manual defrosting:
Press and hold the button **UP** for 5 seconds.

Setting the room temperature:
Briefly press twice the **SET** button.
The display shows the preset nominal temperature.
To change the nominal value, press the **UP** or **DOWN** buttons.

13.2 Wiring diagrams

Fig. 13-2 Wiring diagrams

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



13.3 Safety data sheets

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This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Opteon™ XP44 (R-452A) Refrigerant
Tradename/Synonym	:	Opteon（TM) 452A R-452A 452A XP44
Product Grade/Type	:	ASHRAE Refrigerant Number Designation: R-452A
Product Use	:	Refrigerant, For professional users only.
Restrictions on use	:	Consumer use
Manufacturer/Supplier	:	The Chemours Company FC, LLC 1007 Market Street Wilmington, DE 19899 United States of America
Product Information	:	1-844-773-CHEM (outside the U.S. 1-302-773-1000)
Medical Emergency	:	1-866-595-1473 (outside the U.S. 1-302-773-2000)
Transport Emergency	:	CHEMTREC: +1-800-424-9300 (outside the U.S. +1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION

Product hazard category

Gases under pressure Liquefied gas

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Label content

Pictogram :

Signal word : Warning

Hazardous warnings : Contains gas under pressure; may explode if heated.

Hazardous prevention measures : Protect from sunlight. Store in a well-ventilated place.

Other hazards

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing., Rapid evaporation of the liquid may cause frostbite., Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects., May cause cardiac arrhythmia.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
Pentafluoroethane (HFC-125)	354-33-6	59 %
2,3,3,3-Tetrafluoropropene (HFO-1234yf)	754-12-1	30 %

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Difluoromethane (HFC-32)	75-10-5	11 %

SECTION 4. FIRST AID MEASURES

General advice	:	When symptoms persist or in all cases of doubt seek medical advice.
Inhalation	:	Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.
Skin contact	:	Take off contaminated clothing and shoes immediately. Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.
Eye contact	:	Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.
Ingestion	:	Is not considered a potential route of exposure.
Most important symptoms/effects, acute and delayed	:	Anaesthetic effects Light-headedness irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness
Protection of first-aiders	:	If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Notes to physician	:	Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

SECTION 5. FIREFIGHTING MEASURES

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Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment., Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Unsuitable extinguishing media	:	No applicable data available.
Specific hazards	:	The product is not flammable.
Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire.
Further information	:	Cool containers/tanks with water spray.

SECTION 6. ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Safeguards (Personnel)	:	Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect. Refer to protective measures listed in sections 7 and 8.
Environmental precautions	:	Should not be released into the environment.
Spill Cleanup	:	Evaporates.
Accidental Release Measures	:	Avoid open flames and high temperatures. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

SECTION 7. HANDLING AND STORAGE

Handling (Personnel) : Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing.

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Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.
Handle in accordance with good industrial hygiene and safety practice.

Handling (Physical Aspects) : The product should not be mixed with air for leak testing or used with air for any other purpose above atmospheric pressure. Contact with chlorine or other strong oxidizing agents should also be avoided.

Dust explosion class : Not applicable

Storage : Do not drag, slide or roll cylinders. Never attempt to lift cylinder by its cap. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Keep at temperature not exceeding 52°C. Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from contamination. Protect cylinders from damage. Keep away from direct sunlight. Store only in approved containers.
The product has an indefinite shelf life when stored properly.

Storage period : > 10 yr

Storage temperature : < 52 °C (< 126 °F)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls : Ensure adequate ventilation, especially in confined areas.

Personal protective equipment
Respiratory protection : For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Hand protection : Additional protection: Impervious gloves

Eye protection : Wear safety glasses or coverall chemical splash goggles. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

Skin and body protection : Where there is potential for skin contact have available and wear as appropriate impervious gloves, apron, pants, and jacket.

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Exposure Guidelines
Exposure Limit Values

no data available

This product does not contain any exposure limits that require disclosure according to OSHA Hazard Communication Standard 2012.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Physical state : gaseous
Form : Liquefied gas
Color : clear, colourless

Odor : slight, ether-like

Odor threshold : No applicable data available.

pH : neutral

Melting point/range : No applicable data available.

Boiling point/boiling range : Boiling point
< -47.00 °C (-52.60 °F)

Flash point : does not flash

Evaporation rate : > 1
(CCL4=1.0)

Flammability (solid, gas) : The product is not flammable.

Upper explosion limit : Method: None per ASTM E681

Lower explosion limit : Method: None per ASTM E681

Vapor pressure : 13,159 hPa at 25 °C (77 °F)

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Vapor density : 3.64 at 25 °C (77 °F)
(Air = 1.0)

Specific gravity (Relative density) : 1.13 at 25 °C (77 °F)

Water solubility : No applicable data available.

Solubility(ies) : No applicable data available.

Partition coefficient: n-octanol/water : No applicable data available.

Auto-ignition temperature : No applicable data available.

Decomposition temperature : No applicable data available.

Viscosity, kinematic : No applicable data available.

Viscosity, dynamic : No applicable data available.

% Volatile : 100 %

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Decomposes on heating.

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

Possibility of hazardous reactions : Polymerization will not occur.

Conditions to avoid : Avoid open flames and high temperatures.

Incompatible materials : Strong bases
Alkaline earth metals
finely divided metal powders such as, Aluminium, Magnesium, Zinc, or strong oxidizers

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Hazardous decomposition products : Decomposition products are hazardous., This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride., These materials are toxic and irritating., Avoid contact with decomposition products

SECTION 11. TOXICOLOGICAL INFORMATION

Opteon™ XP44 (R-452A) Refrigerant
Further information : Avoid skin contact with leaking liquid (danger of frostbite).May cause cardiac arrhythmia.

Pentafluoroethane (HFC-125)
Inhalation 4 h LC50 : > 800000 ppm , Rat

Inhalation No Observed Adverse Effect Concentration : 75000 ppm , Dog
Cardiac sensitization

Inhalation Low Observed Adverse Effect Concentration (LOAEC) : 100000 ppm , Dog
Cardiac sensitization

Skin sensitization : Does not cause respiratory sensitisation., human

Repeated dose toxicity : Inhalation
Rat
-
gas
No toxicologically significant effects were found.

Carcinogenicity : Not classifiable as a human carcinogen.
Overall weight of evidence indicates that the substance is not carcinogenic.

Mutagenicity : Animal testing did not show any mutagenic effects.
Evidence suggests this substance does not cause genetic damage in cultured mammalian cells.
Did not cause genetic damage in cultured bacterial cells.

Reproductive toxicity : No toxicity to reproduction
Animal testing showed no reproductive toxicity.

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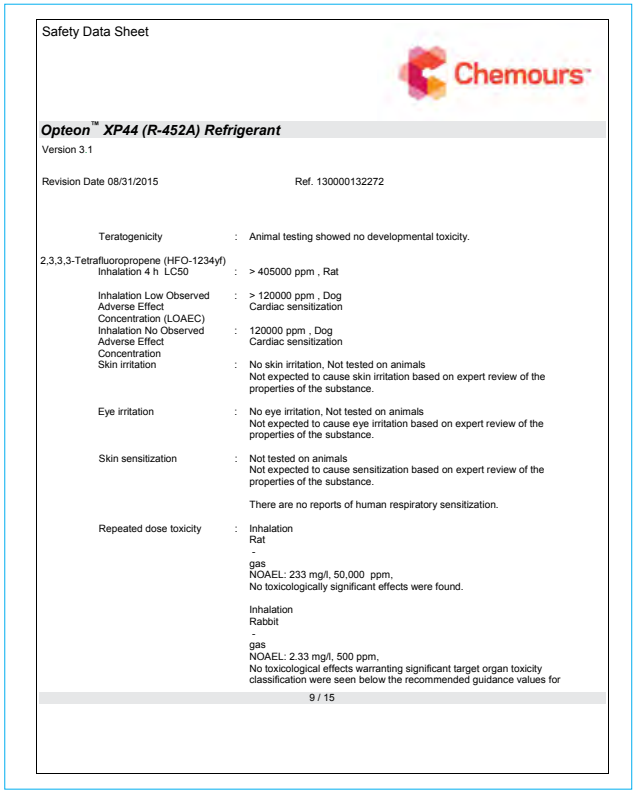

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Teratogenicity : Animal testing showed no developmental toxicity.

2,3,3,3-Tetrafluoropropene (HFO-1234yf)
Inhalation 4 h LC50 : > 405000 ppm , Rat

Inhalation Low Observed Adverse Effect Concentration (LOAEC) : > 120000 ppm , Dog
Cardiac sensitization

Inhalation No Observed Adverse Effect Concentration : 120000 ppm , Dog
Cardiac sensitization

Skin irritation : No skin irritation, Not tested on animals
Not expected to cause skin irritation based on expert review of the properties of the substance.

Eye irritation : No eye irritation, Not tested on animals
Not expected to cause eye irritation based on expert review of the properties of the substance.

Skin sensitization : Not tested on animals
Not expected to cause sensitization based on expert review of the properties of the substance.

There are no reports of human respiratory sensitization.

Repeated dose toxicity : Inhalation
Rat
-
gas
NOAEL: 233 mg/l, 50,000 ppm,
No toxicologically significant effects were found.

Inhalation
Rabbit
-
gas
NOAEL: 2.33 mg/l, 500 ppm,
No toxicological effects warranting significant target organ toxicity classification were seen below the recommended guidance values for

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classification.

Inhalation
Mini-pig
-
gas
NOAEL: 50 mg/l, 10,000 ppm,
No toxicologically significant effects were found.

Carcinogenicity : Not classifiable as a human carcinogen.
Sufficient data are available to conclude that the substance is not expected to be carcinogenic.

Mutagenicity : Animal testing did not show any mutagenic effects.
Did not cause genetic damage in cultured mammalian cells.
Experiments showed mutagenic effects in cultured bacterial cells.

Reproductive toxicity : No toxicity to reproduction
Animal testing showed no reproductive toxicity.

Teratogenicity : Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity.

Difluoromethane (HFC-32)
Inhalation 4 h LC50 : > 520000 ppm , Rat

Inhalation Low Observed Adverse Effect Concentration (LOAEC) : > 350000 ppm , Dog
Cardiac sensitization

Inhalation No Observed Adverse Effect Concentration : 350000 ppm , Dog
Cardiac sensitization

Skin irritation : No skin irritation, Not tested on animals
Not expected to cause skin irritation based on expert review of the properties of the substance.

Eye irritation : No eye irritation, Not tested on animals
Not expected to cause eye irritation based on expert review of the properties of the substance.

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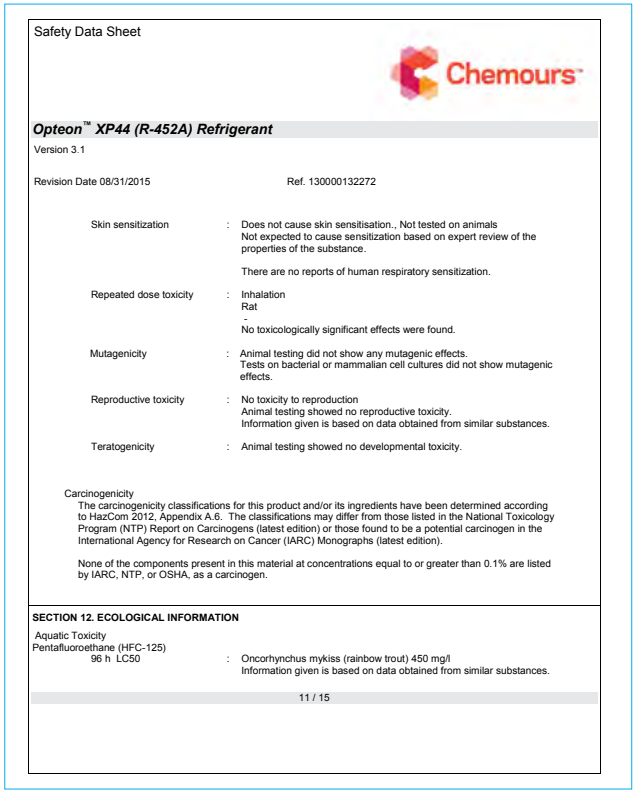

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Skin sensitization : Does not cause skin sensitisation., Not tested on animals
Not expected to cause sensitization based on expert review of the properties of the substance.

There are no reports of human respiratory sensitization.

Repeated dose toxicity : Inhalation
Rat
-
No toxicologically significant effects were found.

Mutagenicity : Animal testing did not show any mutagenic effects.
Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

Reproductive toxicity : No toxicity to reproduction
Animal testing showed no reproductive toxicity.
Information given is based on data obtained from similar substances.

Teratogenicity : Animal testing showed no developmental toxicity.

Carcinogenicity
The carcinogenicity classifications for this product and/or its ingredients have been determined according to HazCom 2012, Appendix A.6. The classifications may differ from those listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or those found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition).

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

SECTION 12. ECOLOGICAL INFORMATION

Aquatic Toxicity
Pentafluoroethane (HFC-125)
96 h LC50 : Oncorhynchus mykiss (rainbow trout) 450 mg/l
Information given is based on data obtained from similar substances.

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96 h ErC50 : Algae 142 mg/l
Information given is based on data obtained from similar substances.

72 h NOEC : Pseudokirchneriella subcapitata (green algae) 13.2 mg/l
Information given is based on data obtained from similar substances.

48 h EC50 : Daphnia magna (Water flea) 980 mg/l
Information given is based on data obtained from similar substances.

2,3,3,3-Tetrafluoropropene (HFO-1234yf)
96 h LC50 : Cyprinus carpio (Carp) > 197 mg/l

72 h NOEC : Algae > 100 mg/l

48 h EC50 : Daphnia magna (Water flea) > 100 mg/l

Difluoromethane (HFC-32)
96 h LC50 : Fish 1,507 mg/l

96 h EC50 : Algae 142 mg/l

48 h EC50 : Daphnia (water flea) 652 mg/l

30 d : NOEC Fish (unspecified species) 65.8 mg/l

Environmental Fate
Difluoromethane (HFC-32)
Biodegradability : 5 % OECD Test Guideline 301D
Not readily biodegradable.

Additional ecological information : IPCC - AR4 (Fourth Assessment Report of the Intergovernmental Panel on Climate Change) - 2007

SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal methods - Product : Can be used after re-conditioning. If re-conditioning is not practicable, dispose of in compliance with local regulations.

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Contaminated packaging : Empty pressure vessels should be returned to the supplier.

SECTION 14. TRANSPORT INFORMATION

DOT	UN number	: 1078
	Proper shipping name	: Refrigerant gases, n.o.s. (Pentafluoroethane, 2,3,3,3-Tetrafluoropropene)
	Class	: 2.2
	Labelling No.	: 2.2
IATA_C	UN number	: 1078
	Proper shipping name	: Refrigerant gas, n.o.s. (Pentafluoroethane, 2,3,3,3-Tetrafluoropropene)
	Class	: 2.2
	Labelling No.	: 2.2
IMDG	UN number	: 1078
	Proper shipping name	: REFRIGERANT GAS, N.O.S. (Pentafluoroethane, 2,3,3,3-Tetrafluoropropene)
	Class	: 2.2
	Labelling No.	: 2.2

SECTION 15. REGULATORY INFORMATION

TSCA 5E : This material contains one or more substances which are subject to a TSCA Section 5 Consent Order or Significant New Use Rule (SNUR).

: 2,3,3,3-Tetrafluoropropene
PMN Number: P-07-0601 (Honeywell)

TSCA 12B This material contains one or more substances which requires export notification under TSCA Section 12(b) and 40 CFR Part 707 Subpart D:

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2,3,3,3-Tetrafluoropropene
PMN Number: P-07-0601 (Honeywell)

The approved uses are: refrigerant in motor vehicle air conditioning systems.

Processors and users of this substance must also comply with the applicable general SNUR requirements set forth in 40 CFR 721 subpart A, including export notification requirements if applicable (40 CFR 721.20), and the applicable record keeping requirements set forth at 40 CFR 721.125.

Contact your local Chemours sales or technical representative for more information.

SARA 313 Regulated Chemical(s) : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

PA Right to Know Regulated Chemical(s) : Substances on the Pennsylvania Hazardous Substances List present at a concentration of 1% or more (0.01% for Special Hazardous Substances): Difluoromethane

NJ Right to Know Regulated Chemical(s) : Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): Difluoromethane

California Prop. 65 : Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

SECTION 16. OTHER INFORMATION

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Before use read Chemours safety information.
For further information contact the local Chemours office or nominated distributors.

Revision Date : 08/31/2015

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Significant change from previous version is denoted with a double bar.

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13.4 Installation checklist

	⊘	✓
• The installation opening in the trailer wall and the boreholes are well sealed to prevent the formation of moisture or an exchange of air.		
• The air inlet and air outlet openings of both the condenser and the evaporator are not blocked by any materials or objects		
• The cover of the refrigeration unit is fastened, and the four screws are well tightened.		
• The drain hose is firmly connected to the drain.		
• The eye bolts on top of the refrigeration unit have been replaced with stainless steel bolts.		
• All bolts and screws are firmly tightened		
• The device has been checked for leaks.		
• The device works perfectly.		

• Checked by: _____

• Date: _____

13.5 Notes

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