OPERATION MANUAL

FREEZER

NDL LEDA

freor

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1. GENERAL INFORMATION

1.1. Manufacturer information

Manufacturer, address	FREOR LT, UAB Katiliskiu St. 92, LT - 02212 Vilnius, Lithuania +370 5 232 9188; info@freor.com	CE EN
	Made in Lithuania	

Customer	
Installation date	
Installation place	
Start of the product operation	

[PLACE FOR PRODUCT LABEL]

The commercial refrigeration equipment, NDL LEDA, is labelled with a technical data label. The label provides information about the model, voltage, and product code. It is strongly recommended to read the label information before starting any work on the refrigeration equipment. **Fig. 1**.

Fig. 1 Example of the label

- The intention of this document is to provide information about the maintenance and operation of NDL LEDA.
- In accordance with the EU Directive EN 60335-1 or the EU Directive EN 378-1;2;3;4 - the refrigeration unit is an electrical refrigeration machine; therefore, the focus is to ensure safety during operation.
- The operation manual of NDL LEDA must be kept at the place of operation. It must be available to technical personnel, service personnel, and repair specialists at any time.

1.2. Dimensions

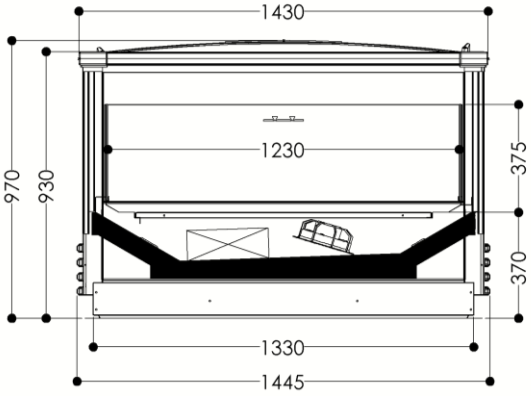


Fig. 2 NDL LEDA PUSH

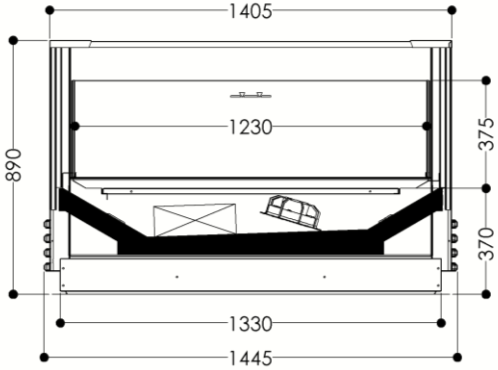
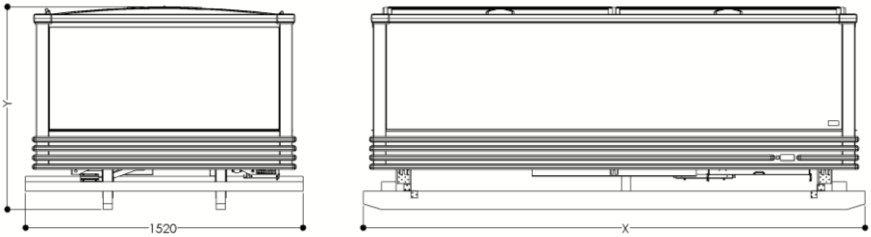


Fig. 3 NDL LEDA OP

For more information on different-sized refrigeration equipment, please visit our website at **www.freor.com**.

1.3. Package dimensions



Length of the unit	Package length (X)	Package height variant PUSH (Y)	Package height variant OP (Y)
3750 (mm)	4000 (mm)	1110 (mm)	1025 (mm)
2500 (mm)	2750 (mm)	1110 (mm)	1025 (mm)
1880 (mm)	2125 (mm)	1110 (mm)	1025 (mm)

Table 1 NDL LEDA package dimensions

Note: Package height might slightly vary depending on the unit configuration.

2. SAFETY

2.1. Dangers due to misuse

- Only start up and operate the refrigeration equipment once it has been properly set up and installed, and once it has no obvious defects.
- Do not make any technical changes to the refrigeration equipment.
- Do not store explosive substances, such as aerosol containers with flammable propellant gas, in the refrigeration equipment.

2.2. Safety guidelines of refrigeration equipment operating with propane (R290) refrigerant

Refrigerant R290 (propane gas) is classified as a refrigerant in safety group A3. Based on the refrigerant commonly used in commercial systems, the system design and risk analysis comply with explosion protection regulations (defined by standard EN 378-1, EN IEC 60335-2-89, and the Pressure Equipment Directive [PED]).

Safety guidelines:

- Keep ignition sources away (heat, sparks, open flames, hot surfaces).
- Use a damp cloth or sponge to clean and remove condensation water. Keep dry materials from electrical parts to avoid electrical shock.
- Before turning on the refrigeration equipment, fill the drain with approximately 2 litres of water.
- It is prohibited to cover any ventilation openings of the unit. A safe minimum distance must be maintained (between units) to ensure sufficient air access.
- Do not use any mechanical devices or other means (e.g., ice scrapers) to accelerate the defrosting process.
- Do not use steam or high-pressure cleaners for basic cleaning.
- Only install the units in well-ventilated rooms.
- Do not install the units in cellars or below-ground rooms.
- Do not damage the refrigerant circuit.
- Do not expose the unit to temperatures above 55°C during transportation or storage.
- Avoid transmitting pulsations and vibrations to the unit.
- Do not allow external forces to act on the unit, e.g., careless handling with a forklift or floor cleaning machine.
- Do not crush or bend pipes.
- Only qualified maintenance personnel may work on the refrigerant circuit.
- Only open the refrigerant circuit and remove the refrigerant in well-ventilated rooms outside of business hours (when customers are not present) or outdoors.
- Disconnect the unit before performing any maintenance, service, or repair work.
- Disposal of the unit must comply with Waste & Disposal-Recycling Regulation requirements.

Failure to comply with safety requirements could lead to potential health and safety risks.

2.3. Safety guidelines of refrigeration equipment operating with CO_2 (R744) or F-gas refrigerant

Refrigerant R744 (CO_2) and F-gas are classified as a refrigerant of safety group A1. Based on the refrigerant commonly used in commercial systems, the system design and risk analysis are in accordance with the protection regulations (defined by standard EN IEC 60335-2-89).

Hydraulic circuits of remote CO_2 and F-gas units are filled with nitrogen gas with a pressure of 5 bars at the factory. Before installing the units, it is necessary to check and make sure that the system is airtight. Nitrogen gas must be safely removed from the system before any hydraulic circuit connection work is performed.

2.4. Safety guidelines of refrigeration equipment operating in Hydroloop Glycol system

Refrigeration equipment equipped with a Hydroloop Glycol comes with flexible ¾" stainless steel female connections on the pipelines.

Safety guidelines:

- It is recommended to use propylene glycol.
- The pressure of the glycol system should not exceed the designated pressure of 6 bars.
- For average climate temperatures, we recommend a 40 vol. % concentration of glycol.
- Glycol operating temperatures should not exceed 150 °C (boiling point).

Freezing temperatures on average environmental conditions:

TYFOCOR L Concentrate	Antifreeze	Density at 20 °C	Refraction index nD20
25 vol. %	–10.7 °C	1024 kg/m^3	1.3618
30 vol. %	–14.0 °C	1029 kg/m^3	1.3677
35 vol. %	–17.6 °C	1034 kg/m^3	1.3734
40 vol. %	–21.5 °C	1039 kg/m^3	1.3792
45 vol. %	–26.0 °C	1043 kg/m^3	1.3847
50 vol. %	–32.4 °C	1047 kg/m^3	1.3901

55 vol. %	–40.4 °C	1050 kg/m^3	1.3955
60 vol. %	–48.4 °C	1053 kg/m^3	1.4001

Table 2 Antifreeze Effect, Density, Refraction index

2.5. Material damage during a prolonged shutdown

- Operate the unit in a stable position (horizontal alignment).
- Operate the unit only on the designated leveling legs.
- Read the installation notes if necessary.
- Do not operate the unit above the climate class specified on the technical data label.
- Ensure the unit is in proper condition. Any damage must be repaired immediately.
- In the event of a power failure, the operating company must inspect the stored products (temperature check).
- Check the area where the products are placed for foreign objects. Immediately remove incorrectly stored products.
- Do not set up or store the unit outdoors. To ensure proper air circulation, maintain a minimum distance from the surrounding walls and other units.
- Do not attach stickers or films to glass surfaces.
- Do not operate the unit if there is any glass damage (cracks, breaks).

2.6. Personal protective equipment

Use hand protection:

- Protection from heavy equipment parts during transport, unpacking, installation, and disposal.
- Protection from sharp edges during unpacking, setup, and installation.
- Protection from contact with liquid in the event of a refrigerant circuit leak.
- Protection from low temperatures during loading and cleaning.
- Protection for removing glass parts and splinters in the event of glass breakage.

Use eye protection:

- Protection from contact with liquid in the event of a refrigerant circuit leak.

Wear protective clothing:

- Wear appropriate clothing (cold protection) when loading products into the unit.

2.7. Electrical voltage

Only qualified staff may perform work on the electrical system. In the event of fault messages or damage to the refrigeration equipment, contact the maintenance service.

Electrical safety guidelines:

- Do not connect damaged refrigeration equipment or damaged parts (such as connecting cables) to the power supply.
- Check that safety devices are correctly installed and functioning.
- Do not remove protective devices or covers attached to the unit.
- Note the following before connecting to the power supply:
    - Applicable local electrical safety regulations.
    - Applicable standards and safety instructions.
    - The power supply voltage and frequency must match the specifications on the technical data label.
    - When a magnetic circuit breaker is used, it must be a type B breaker.
- Only trained personnel may disconnect the unit.
- Observe the following safety rules if the unit is damaged during operation or before maintenance:
    - Disconnect the unit (switch off all sources of electrical power).
    - Secure the unit to prevent it from being connected to the power supply and mark it with a safety sign.
- Only qualified staff may replace damaged parts (e.g., connecting cables, lights).
- Do not use extension cords or multiple socket strips.
- Do not use steam or high-pressure cleaners for routine cleaning.
- Do not damage concealed electrical parts. The operator must not drill into the unit or perform any other work on it.

2.8. Refrigerant circuit

Only qualified staff may perform work on the refrigerant circuit. In the event of fault messages or damage to the unit, contact maintenance service.

2.9. Improper installation of hooked shelves

There is a risk of injury due to shelves holding products falling.

The shelf brackets must snap completely into the openings provided when attaching the shelves.

2.10. Opening/closing the doors

Hands or other body parts may become caught in the door hinge or on the handle.

- When opening or closing the doors, do not reach into the gap, especially on the hinge side.
- Be aware of other people when opening or closing the doors.

2.11. Recommended working conditions and ambient temperature

The refrigeration equipment must be operated under suitable ambient conditions (climate class 3):

- The ambient temperature must not fall below +16°C or exceed +25°C (improper temperature can affect the operation of the refrigeration equipment).
- Relative humidity should not exceed 60% (excess humidity can affect the dew point parameters).
- External airflow rates should not exceed 0.2 m/s (strong airflow can disrupt the internal circulation of the open unit).
- Do not exceed the maximum allowable load on the unit shelves.
- The recommended arrangement of the shelves is specified in the main layout.
- Do not block air circulation channels (the placement of goods should be logical and consistent).

2.12. Purpose of use

NDL LEDA is designed for the presentation of chilled packaged products. It is not intended for storing unpackaged products, such as vegetables. For non-packaged foods, the evaporator in the unit should be selected with a special coating suitable for such product storage. NDL LEDA maintains an average medium operating temperature of -1°C to +12°C and an average low operating temperature of -15°C to -24°C in the unit's interior.

It is forbidden to load the unit with warm goods (goods with temperatures lower or higher than the NDL LEDA operating temperature).

The recommended temperature for loaded goods is specified by the DIN 10508 standard. The temperature requirements for loaded goods are provided below:

≤+10 °C	Fruits, vegetables, butter, cheese, and cheese products
≤+8 °C	Pasteurized products, sour milk
≤+7 °C	Milk and dairy products, delicacies, ready-made food, snacks, sandwiches, green salad, game, salad with mayonnaise sauce, cooked meat products, eggs and their products, sauces
≤+4 °C	Household poultry, minced meat, and products, rabbit meat, wild hare meat
≤+3 °C	By-products
≤+2 °C	Pre-packed minced meat and fresh fish (on ice)

Table 3 Medium temperature requirements

≤-18 °C	Ice cream, prepacked in blocks
≤-15 °C	Frozen products, except ice cream

Table 4 Low temperature requirements

The manufacturer is not liable for any damages caused by the unintended use of NDL LEDA and is exempt from warranty obligations.

3. MAXIMUM LOAD

NDL LEDA is equipped with shelves with a maximum allowable load, specified on the main layout label **Fig. 4**. Exceeding the indicated maximum loads is prohibited.

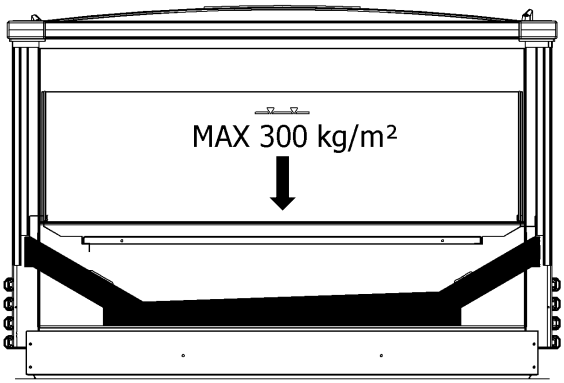


Fig. 4 Example of the maximum allowable load label

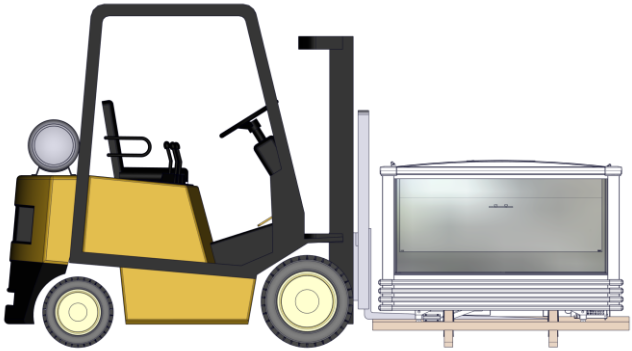
4. UNPACKING

Note the following to prevent any risk of injury to personnel when transporting units with a forklift:

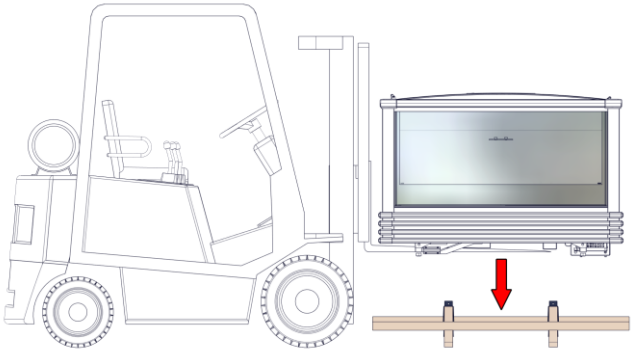
- Observe transport routes for other forklifts.
- Secure transported units.
- Only trained personnel may operate industrial trucks.
- Note the unit's centre of gravity for safe lifting with the forklift. Information is provided on the front and back of the unit packaging.

2x

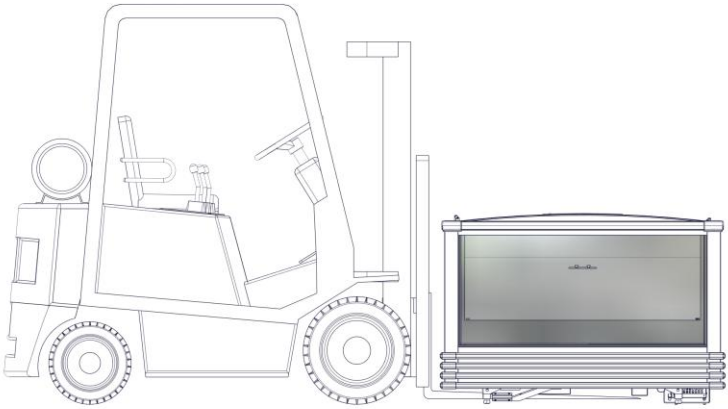
15 min



Use appropriate equipment to transport the unit (refer to the unit's weight and dimensions).



Lift the unit, remove the pallet screws, and then remove the pallet.



Lower the unit.

5. INSTALLATION

5.1. Requirements for the installation of the unit

Installation of the unit must be performed by qualified personnel following these requirements:

- The unit must be aligned horizontally (both depth and length) and installed in a stable position.
- Set up the unit only on the designated adjustable legs.
- It is forbidden to install the unit close to any heating equipment or any HVAC elements (e.g., air outlets) **Fig. 5**.

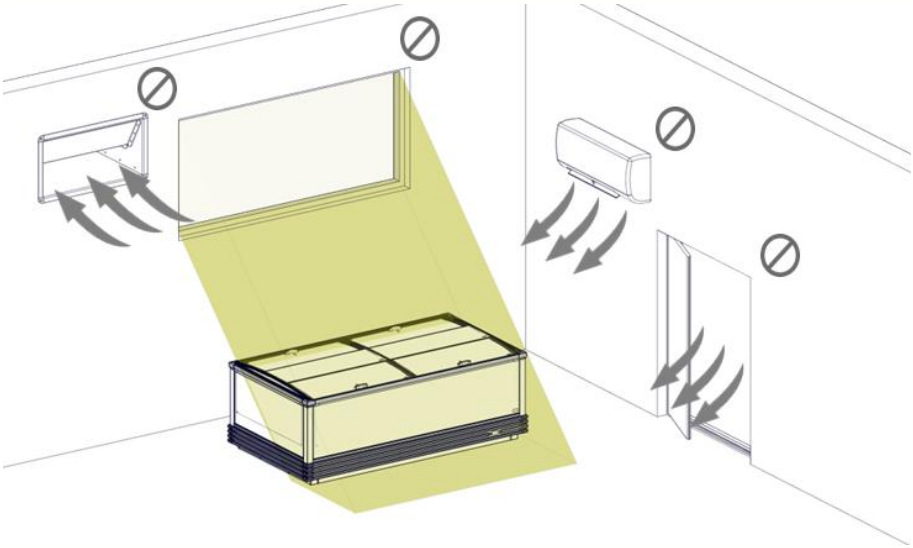
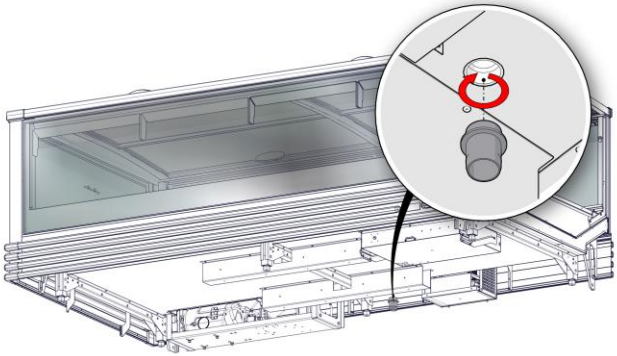


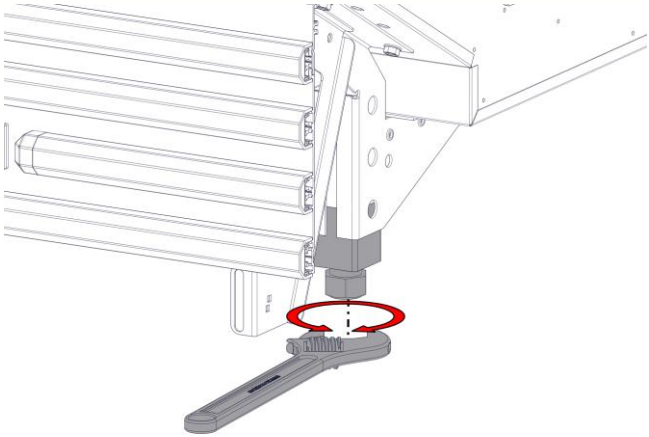
Fig. 5 Example of unsuitable ambient conditions

5.2. Installation of the unit

2x

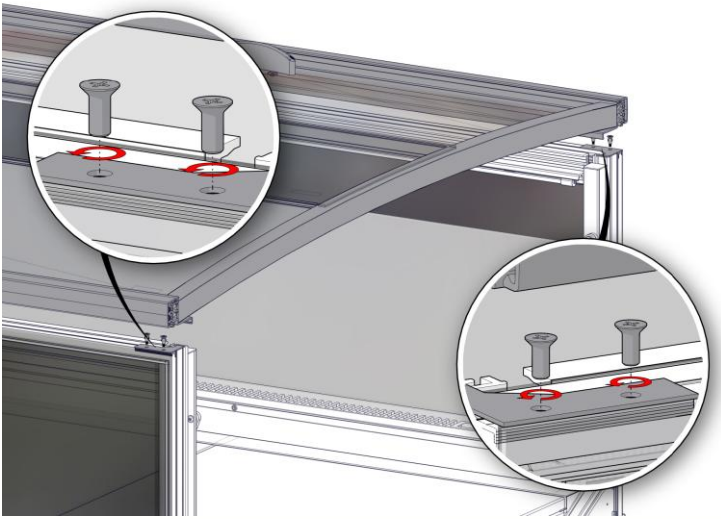


Apply silicone and screw the nozzle into the drain opening.

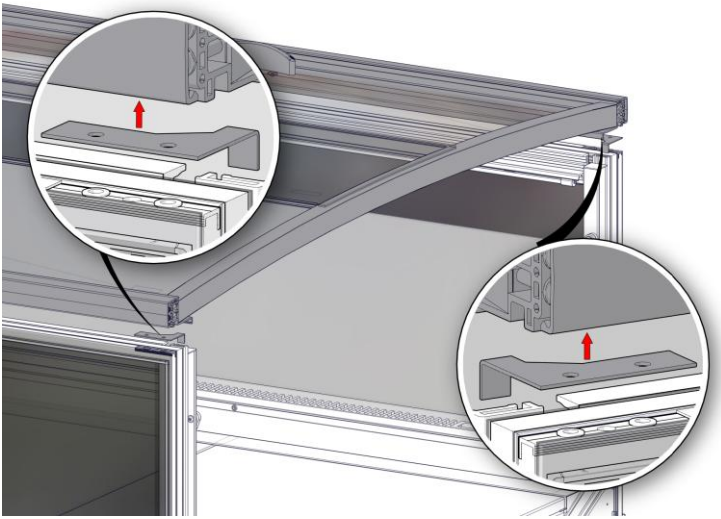


Using the front and rear legs, perform the horizontal and vertical alignment of the unit. The legs are adjustable up to 5 cm.

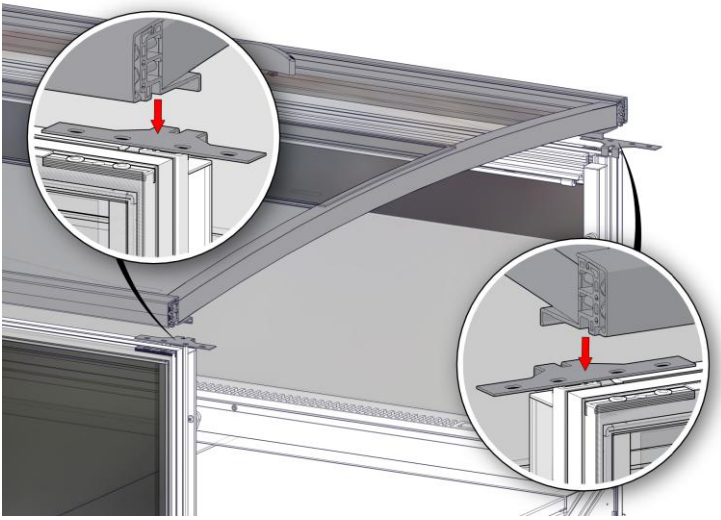
Using a level, perform the final horizontal and vertical alignment of the unit. Leave the middle legs raised 3-4 mm above the floor.



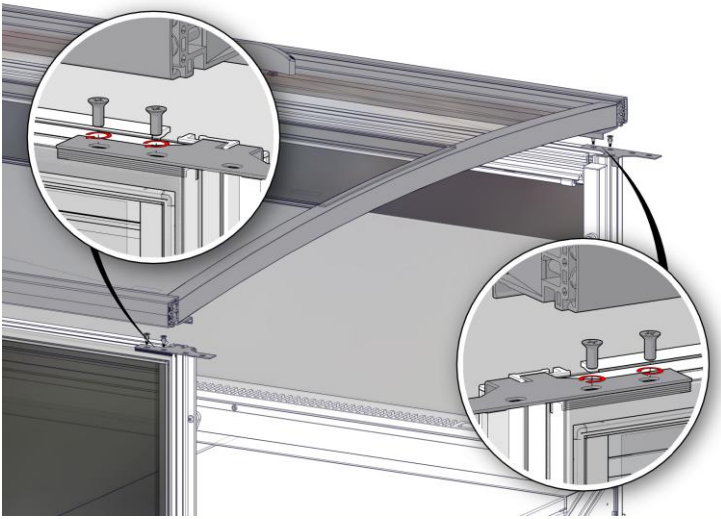
Slightly lift the glass assembly and remove the screws securing the transportation brackets.



Remove the transportation brackets.

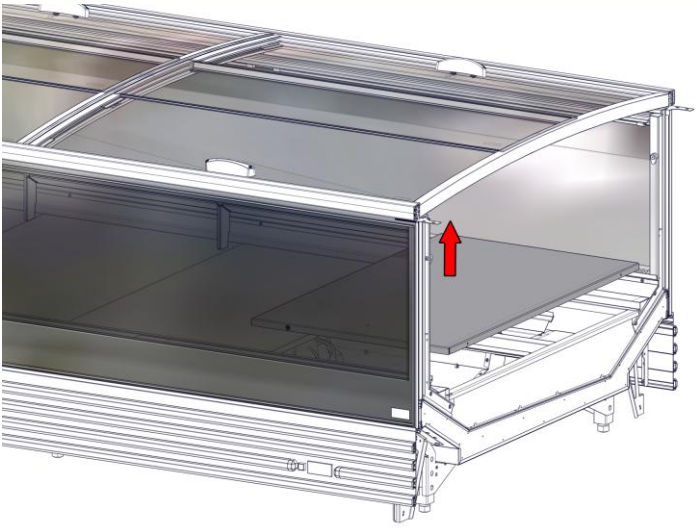


Install the connection brackets.

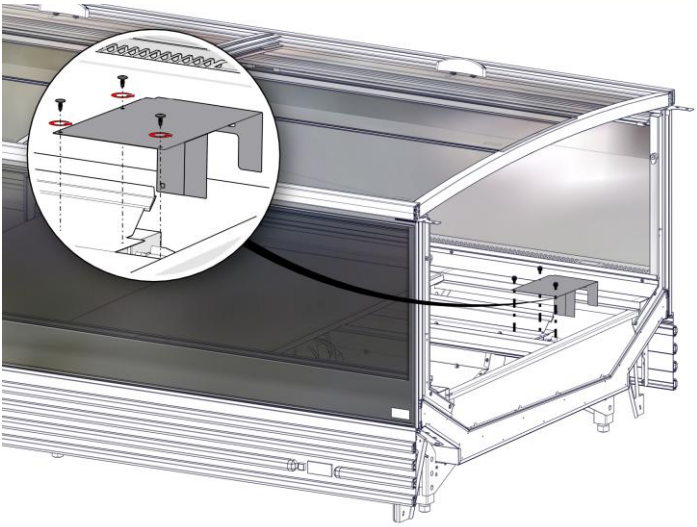


Install and tighten the screws to secure the connection bracket so that the two units can be joined.

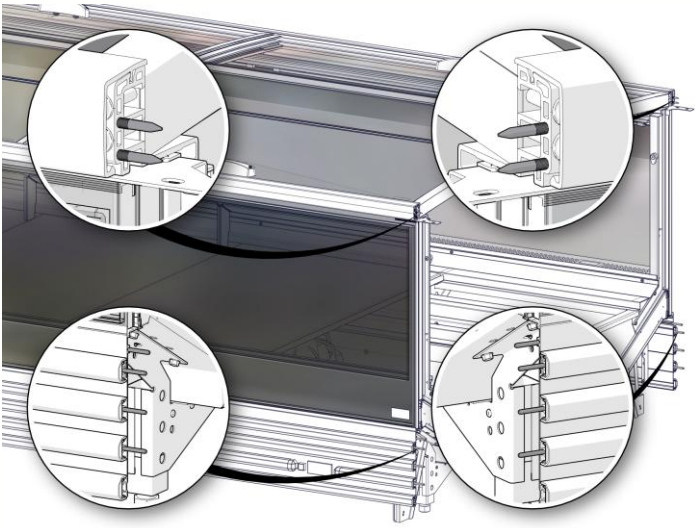
Lower the glass assembly back into place.



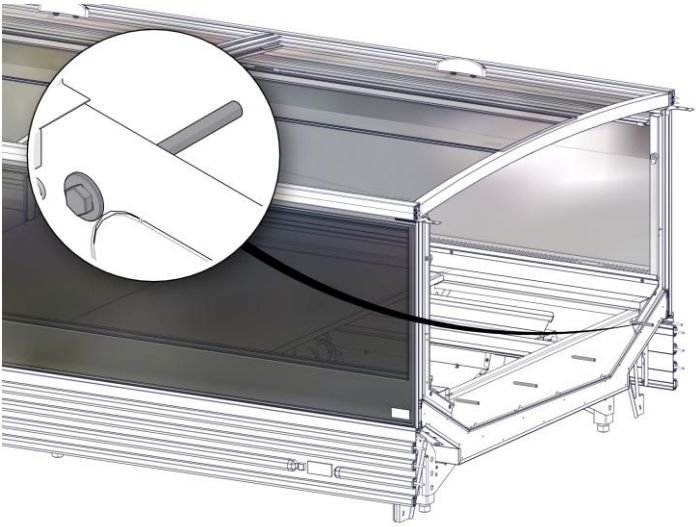
Remove the bottom shelf closest to the side where the units will be connected.



Remove the screws and the evaporator covers.



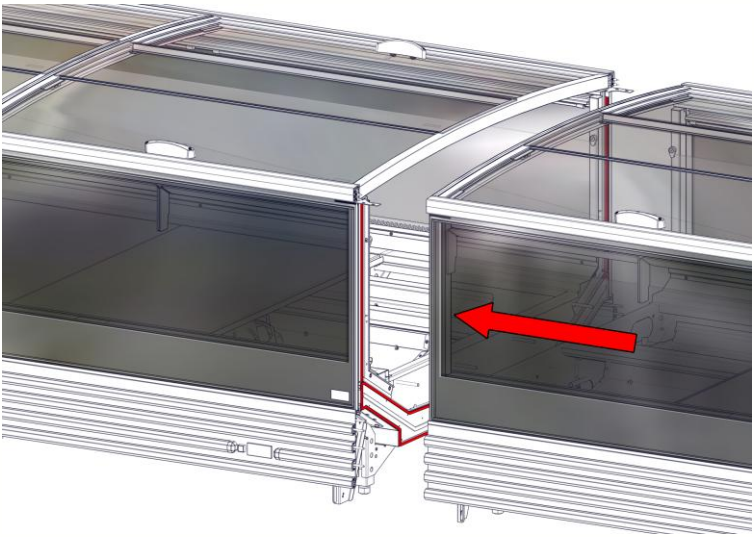
Insert the guide pins as shown in the figure.



Insert the bolts and washers.

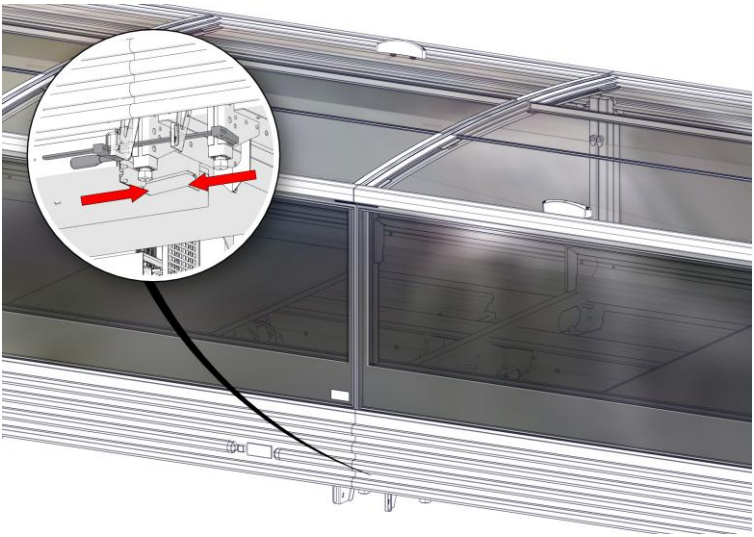
Seal the connection gaps using adhesive foam tape.

Apply silicone as shown in the illustration to seal the joint.

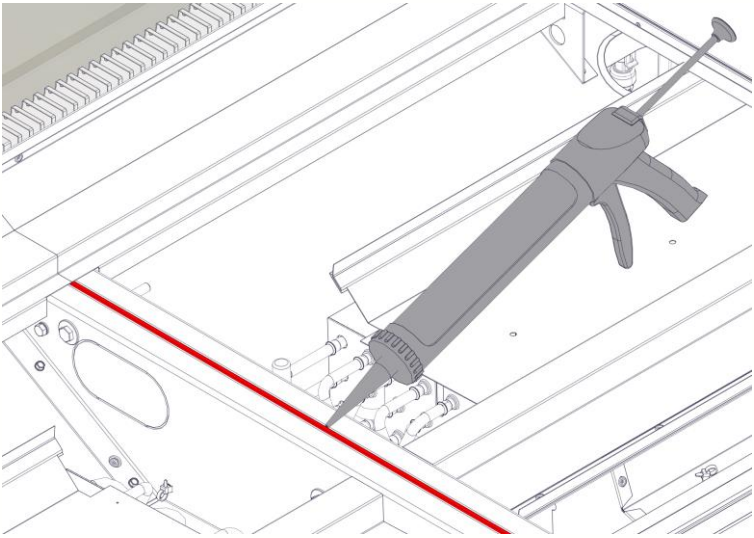


Perform the final alignment using the guide pins and join the units.

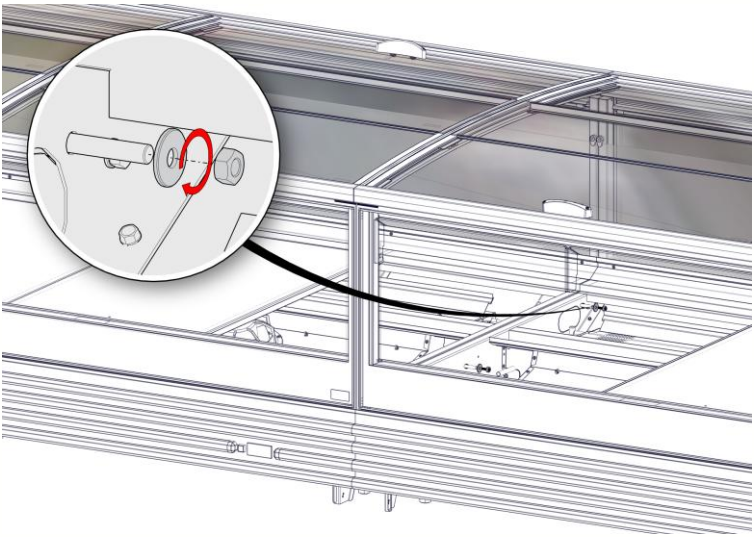
Slightly lift the glass assembly of the adjoining unit and secure the connection bracket with the screws. Then lower the glass assembly back into place.



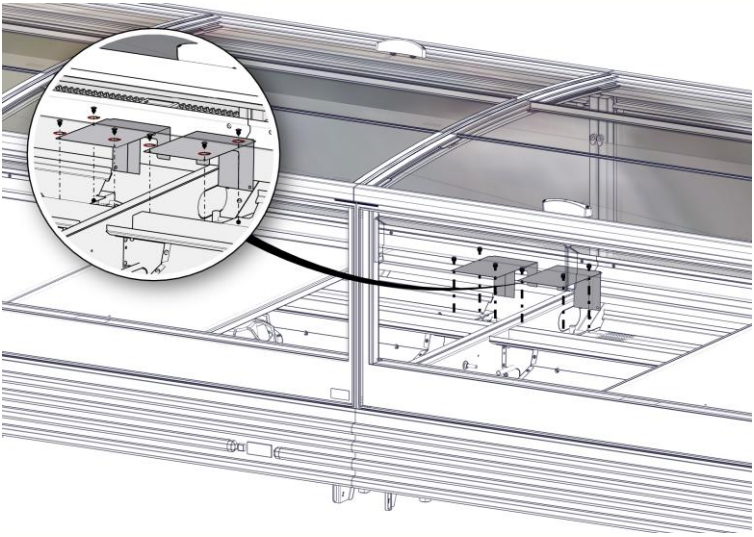
To achieve a stronger connection, tighten the cabinet legs.



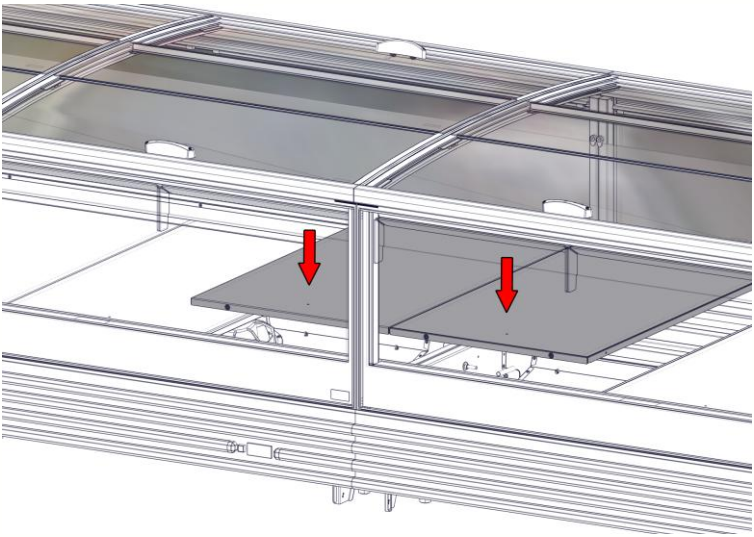
Seal the bottom joint with silicone.



Secure the unit connection using washers and nuts.

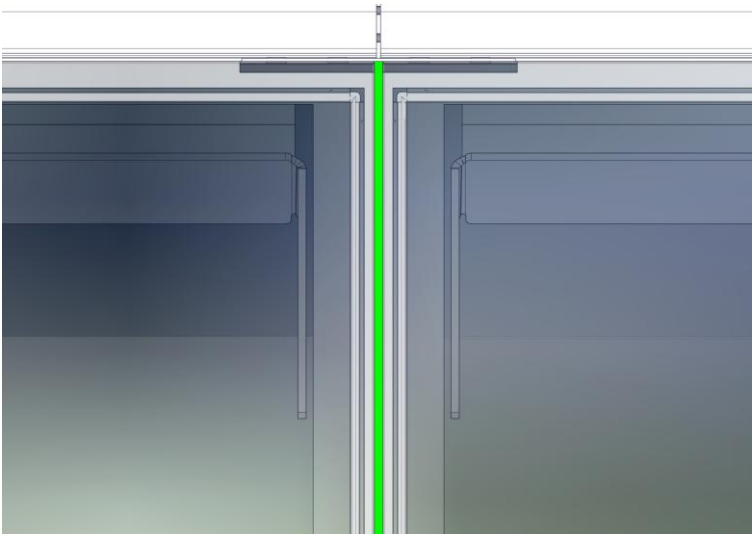


Install the evaporator covers and secure them with the screws.

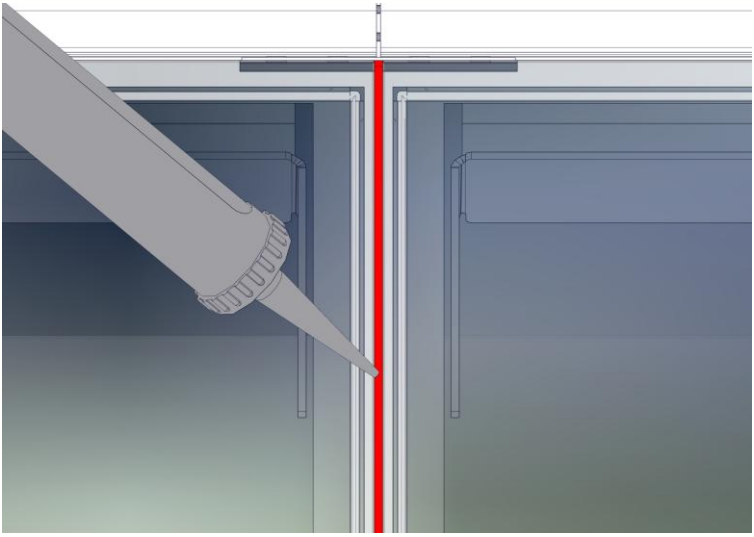


Reinstall the bottom shelves if they were removed. If there is a gap between the shelves, distribute it evenly along the entire line.

Units connected in a line. There should be approximately a 4 mm gap between the glass assemblies of adjacent units.

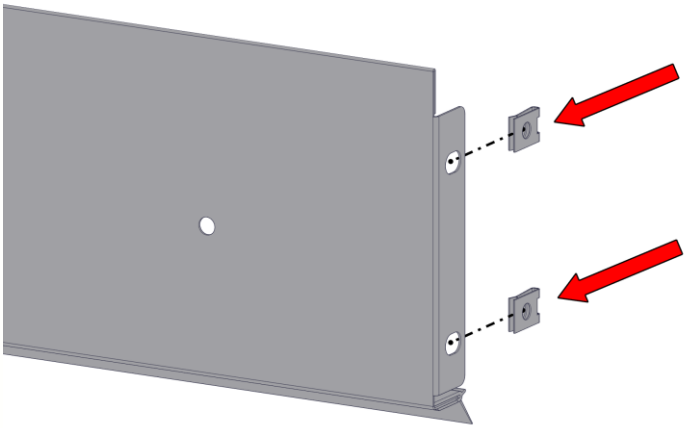


Install the round seals on both sides of the joint between the glass assemblies.

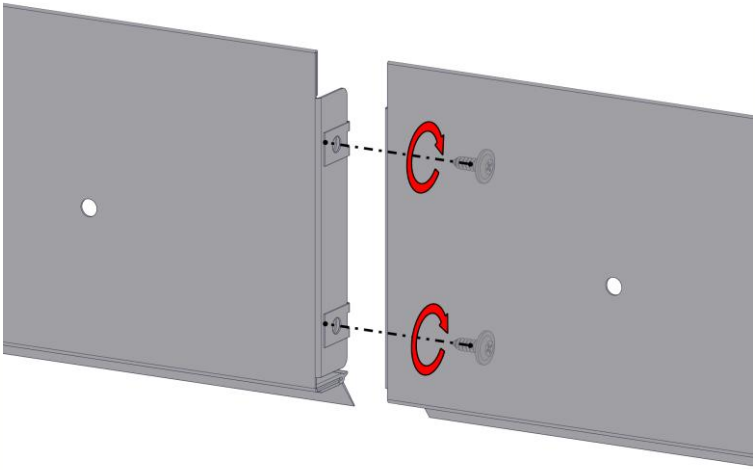


Apply silicone on both sides between the glass assemblies.

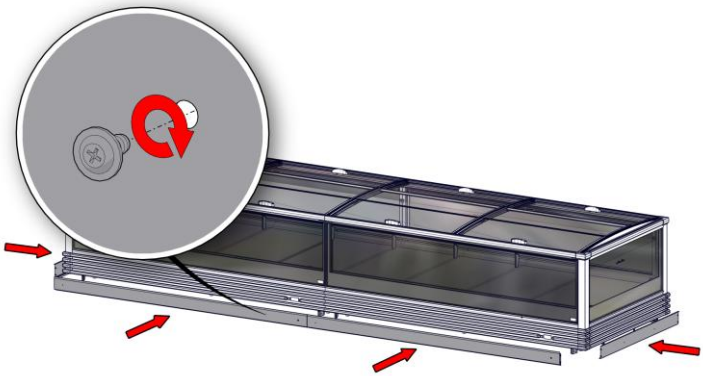
Note: Before applying silicone, use an isopropyl alcohol-based cleaner and masking tape to achieve a cleaner finish.



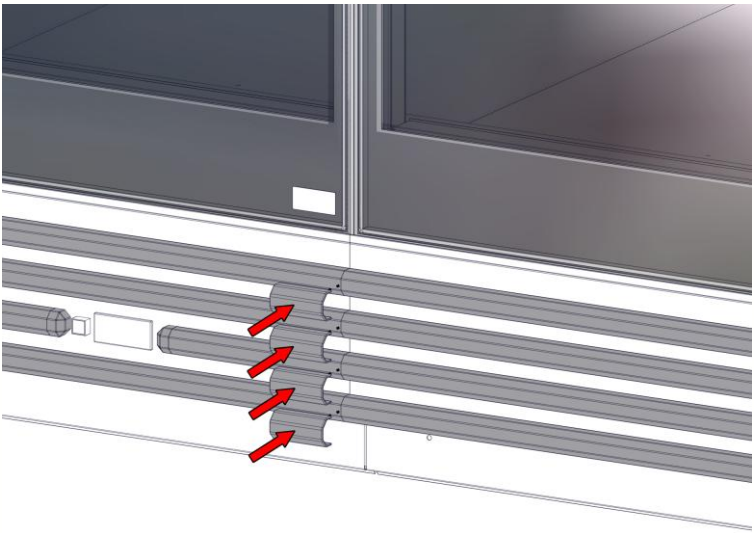
Secure the dust cover clip-ons.



Join the dust covers using the self-tapping screws.



Install the dust covers and secure them with the self-tapping screws.



Install the bumper connection covers on both sides.

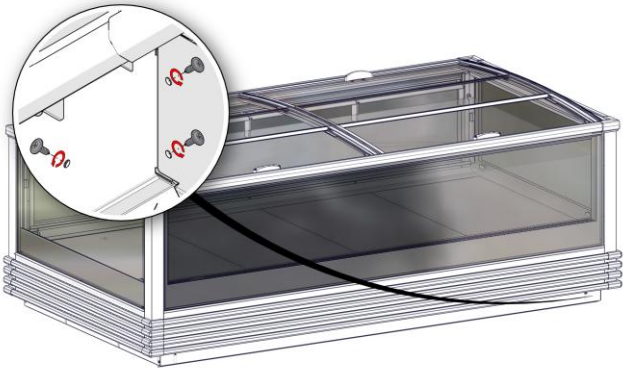
Example of an installed NDL LEDA.

Example of a unit in the open configuration.

6. MAINTENANCE OF THE COMPRESSOR

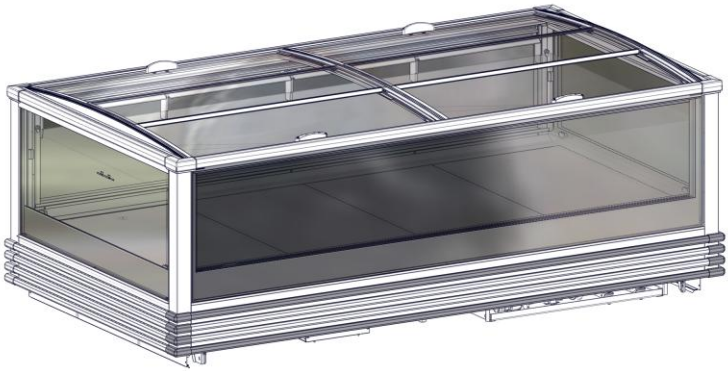
2x

15 min

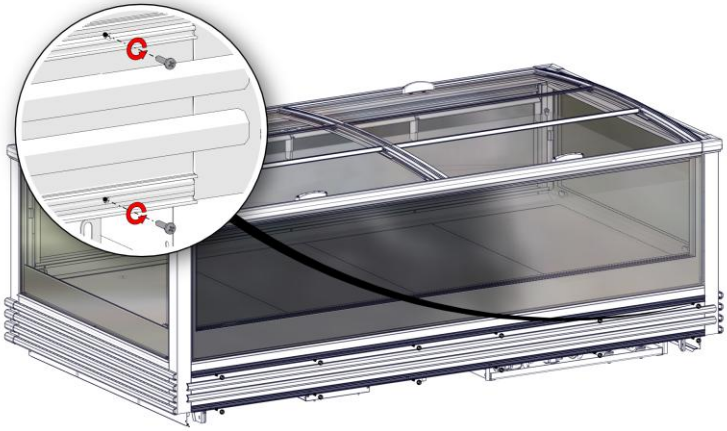


Remove the self-tapping screws securing the dust cover.

Remove the dust cover.

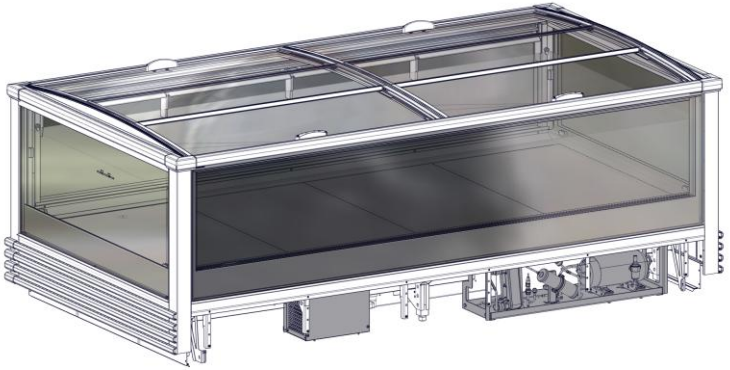


Remove the upper and lower bumpers and all corner connection covers.



Remove all bolts.

Remove the bumper base.

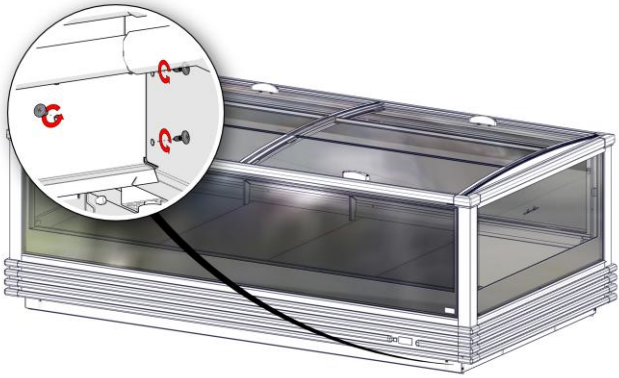


The aggregate is now accessible.

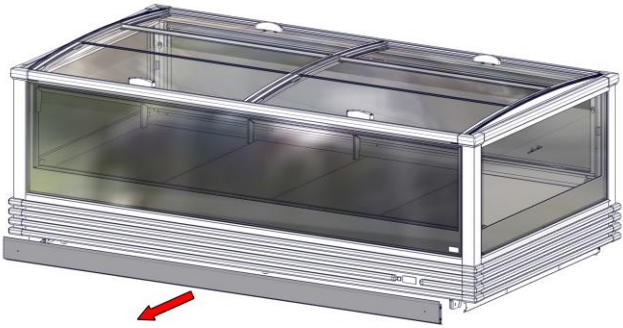
7. MAINTENANCE OF ELECTRICAL BOX

2x

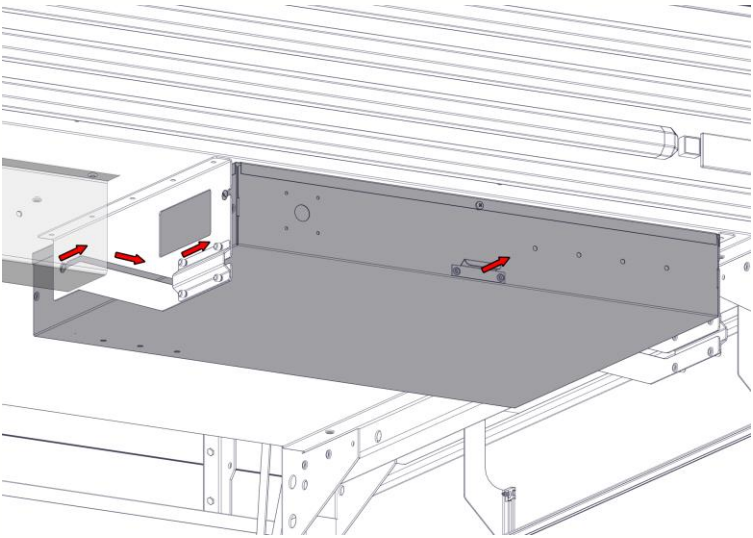
15 min



Remove the self-tapping screws securing the dust cover.



Remove the dust cover.



Pull out the electrical box to gain access to it.

8. ELECTRICAL CONNECTION

8.1. Connecting the unit to the power supply

Connection of the unit to the power supply must be carried out only by qualified personnel.

Note the following before connecting the unit:

- Applicable local electrical safety regulations must be followed.
- The power supply voltage and frequency must match the specifications on the technical data label.
- Do not connect a damaged unit or damaged parts (such as electrical cables) to the power supply.
- Only connect the unit to the main circuit with protective grounding.
- Do not use extension cords or multiple socket strips.

9. DRAINAGE

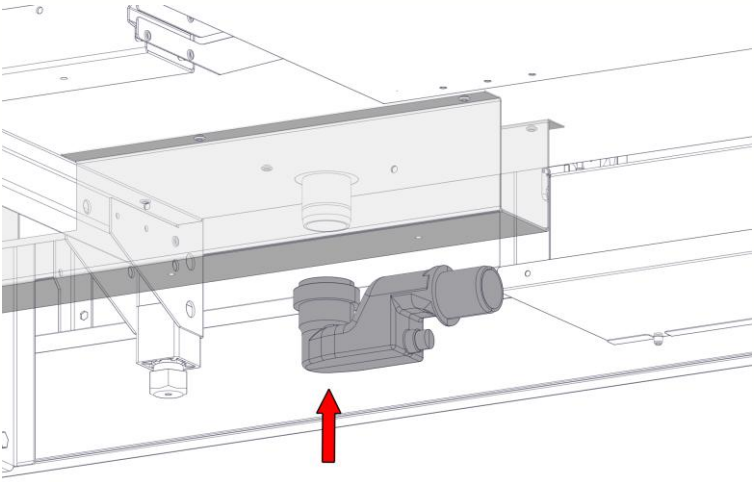
9.1. Drainage system

NDL LEDA must be equipped with a suitable drainage system. The condensate can be drained into the tub through the drainage siphon.

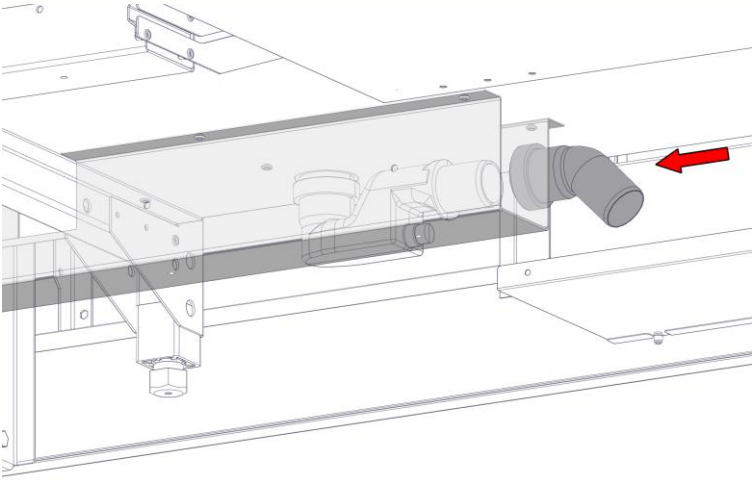
The condensate tub must be connected to an external electrical outlet, which should be protected from current drain.

Alternatively, the condensate drainage can be connected to the common sewerage system. The drainage connection points are indicated in the furniture layouts.

Assembly of the drainage system:



Attach the siphon to the condensate drain nozzle.



Attach the drain elbow to the siphon.

10. MAINTENANCE

10.1. Information on temperatures

Before loading the products into the unit, if the temperature on the thermometer is higher than needed, check the temperature settings on the controller. The temperature should be suitable for displaying the products. Recommended temperatures are listed in Chapter 2.12. The actual temperature is shown in the thermometer of the unit. Products can only be loaded into the unit when it has reached its working temperature.

10.2. Shelves of the unit

Before loading products, check the arrangement of the shelves.

Note: check the maximum allowed weight.

10.3. Defrosting

Depending on the configuration, the unit regularly and automatically cycles through defrosting. During defrosting, the temperature on the thermometer may temporarily be higher than the set temperature on the controller.

10.4. Cleaning

The unit must be regularly cleaned by trained personnel, as food products are sensitive to bacteria and microorganisms.

Recommended cleaning table	
Regular cleaning	Once per week
Deep cleaning	Once every 4 weeks
Condenser grill cleaning (dirent condesation models only)	Once every 4 months

Table 5 Cleaning schedule

Regular cleaning:

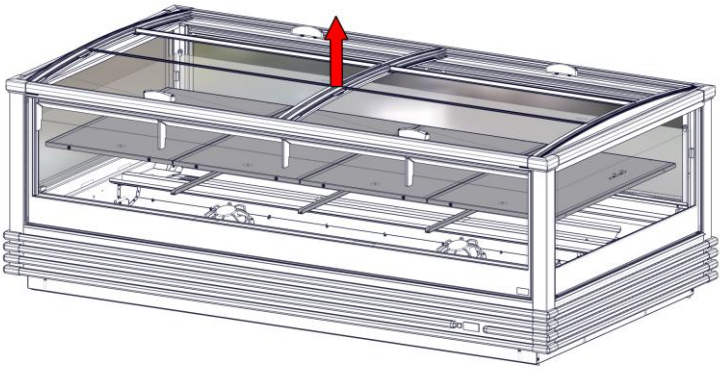
- The unit must be cleaned at least once per week. If contamination is detected, the unit must be cleaned more frequently.
- The unit's inner space, shelves, interior and exterior plastic parts, and glass components must be thoroughly cleaned, as well as the floor where the unit is standing.
- Cleaning of the plastic parts must be performed using warm water and a non-abrasive cleaning agent specifically designed for plastics.
- Metal components such as steel, copper, and aluminium must be cleaned using warm water and a non-aggressive, corrosion-free cleaning agent. After cleaning, any moisture residue must be removed, and the surface should be dried. Chromed surfaces must be cleaned with appropriate cleaning agents, then dried with a soft cloth that does not leave lint.
- Painted components must be cleaned with liquid cleaning agents free from abrasives. Special detergents designed for painted surfaces are recommended. The surfaces must be thoroughly dried after cleaning. Damaged paint can lead to metal corrosion in areas scratched during improper cleaning.
- Glass parts can be cleaned using household window cleaning agents.
- Some units have a wooden finish. Wood and wooden surface products must be cleaned dry. Wood polishers can also be used. If necessary, surfaces can be cleaned with a damp cloth and then thoroughly dried.
- Protect electrical installations from moisture during cleaning.
- The drainage system must be checked regularly.
- Washing the unit with high-pressure washers is strictly prohibited.
- Remove the air intake grille and bottom shelves. Clean the bottom.

Deep cleaning

2x

Deep cleaning of the unit must be performed once every 4 weeks by qualified personnel. The unit must be cleaned and disinfected to eliminate pathogenic microorganisms.

- Disconnect electrical appliances.
- Remove the products from the unit and temporarily place them in a cooled storage room.
- Remove the bottom shelves, air circulation grids, and evaporator covers.
- Clean the ventilator of the unit from plaque. Remove foreign bodies from the structures of the evaporator and ventilators.
- Ensure that the drainage openings are not clogged and that the condensate drains freely.
- Remove dust, any residue from food products, and condensate residue from surfaces.
- Disinfect the interior of the unit.
- Clean and disinfect detached parts, then dry them.
- Reassemble the detached components into the structure.
- Switch the power supply to the unit.
- When the temperature in the internal space reaches the set value on the controller, return the cooled products to the unit.



Remove the bottom shelves and the shelf brackets, then clean the bottom of the unit.

10.5. Maintenance

The unit must be regularly maintained by qualified personnel.

Maintenance table	
Electrical compartment inspection	Once every 12 months
Refrigerant leakage inspection for propape (R290) units	Once every 12 months
Refrigerant leakage inspection for remote CO_2 (R744) and F-gas units	As often as the countries regulations require

Table 6 Maintenance schedule

Electrical compartment inspection

Inspect electrical components, the wiring terminal blocks in the electrical box, and the inverter for discolorations. Inspect all wiring in the terminal blocks to ensure that all connections are secure. Tighten the wiring in the terminal blocks if necessary. Check the device for electrical leakage. If any electrical leakage is identified, it should be immediately addressed. **Maintenance should only be performed by trained refrigeration technicians**

Refrigerant leakage inspection

Use an electronic refrigerant detector or dedicated foam to inspect potential leakage spots. If leakage is detected, immediately repair it. **Before and after repairing the leakage, the system must be vacuumed.**

The plug-in system unit should be filled with the required type and amount of refrigerant, as specified on the unit's label. **Work with R290 systems should follow general flammable refrigerant safety guidelines.**

Maintenance should only be performed by trained refrigerant technicians.

11. ENERGY SAVING

The unit can be supplied with doors or mechanical night curtains. These options are available upon request. During non-business hours, the unit should be closed with night curtains (if present). Ensure that the product arrangement does not obstruct the curtains. If the unit has doors, ensure that they are fully closed. It is recommended to turn off the lighting when it is not needed.

12. DISPOSAL

A used unit can be restored and reused. If it is necessary to completely stop the operation of the refrigeration equipment, the following steps must be taken by qualified personnel:

- Disconnect the power supply.
- Disconnect the glycol piping **(Note: depending on the application).**
- Collect the refrigerant from the freezing coil **(Note: depending on the application).**

The components of the refrigeration equipment require specific disposal. Therefore, it is necessary to contact specialized organizations that handle the disposal of certain materials.

13. STORAGE

If temporary storage and subsequent use of the unit are expected (e.g., during repairs to the premises or a change in the unit's location), the equipment must be stored in a well-ventilated room with a temperature above 0°C but not exceeding 55°C. It is forbidden to leave the unit outdoors. The unit must be covered, or other protective structures should be used to safeguard it against external damage.

14. TESTING

Each unit is factory-tested. During testing, the following checks are carried out:

- Hermetic tightness.
- Pressure tests of the freezing coil.
- Electrical installation checks.
- Load tests.

After installation, each unit and the overall system must be inspected before startup.

15. ACCESSORIES

A variety of special accessories are available upon request, including partitions, tabs, price holders, drainage collection tubs, evaporation baths, safety bumpers, and more. For more information, please contact FREOR LT or our sales partners.

16. TECHNICAL DATA

16.1. Electrical layouts

The layout drawings are located inside the electrical box.

16.2. Failures and troubleshooting

Repair to the internal cooling circuit, refrigerant quantity adjustments, and part replacements may only be carried out by a specialist qualified to work with F, OAM, or natural refrigerant gases.

Only an electrician with the appropriate qualifications may inspect and repair the electrical installation.

The description of controller errors can be found in the instruction manual provided by the controller manufacturer.

17. MEANINGS OF SYMBOLS

Symbol	Meaning
	Qualified specialist
	Work clothing
	Protective gloves
	Brittle surfaces
	Wrench
	Screwdriver
	Rubber hammer
	Protective goggles
	Silicone pistol
	Clamp

Date	Work	Name

Date	Work	Name

FREOR LT, UAB

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