

OPERATION MANUAL

SERVE-OVER

NDL ELISA VISION QB



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	
	Made in Lithuania	

Customer	
Installation date	
Installation place	
Start of the product operation	



The commercial refrigeration equipment NDL ELISA VISION QB is labelled with a technical data sticker. The sticker is attached on the back side of the unit. The sticker provides information about the model, voltage, and product code. It is strongly recommended to read the sticker information before starting any work with the refrigeration equipment (**Fig. 1.**).

FREOR LT, UAB Katiliskiu St. 92 LT-02212 Vilnius, Lithuania freor@freor.com www.freor.com			
Product: Year: Product code: Serial no:			
Rated current (cooling), [A]: Rated current (defrost), [A]: Rated current (frame heater), [A]: Rated voltage, [V]/[Hz]/[phase]: Refrigeration line maximum allowable pressure LP side (PS), [Bar]: Refrigeration line maximum allowable pressure HP side (PS), [Bar]: Glycol line maximum allowable pressure (PS), [Bar]:		Protection class: Climate class (ISO 23953-2): Weight [kg]:	
Refrigerant:		GWP:	
Quantity of refrigerant, [kg]:			
CO ₂ equivalent mass of the refrigerant, [t]:			
			

Fig. 1. Example of the sticker

- The intention of this document is to provide information about the maintenance and operation of NDL ELISA VISION QB.
- 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 ELISA VISION QB must be kept at the place of operation. It must be available to technical personnel, service personnel, and repair specialists at any time.
- This appliance is intended for use up to a maximum height of 2000 meters above sea level.

1.2. Dimensions

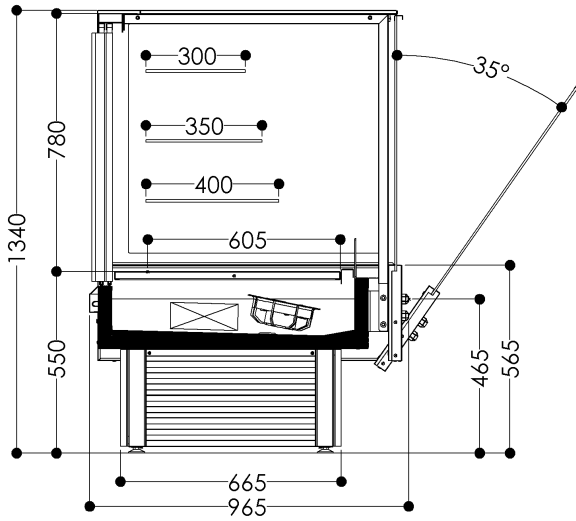
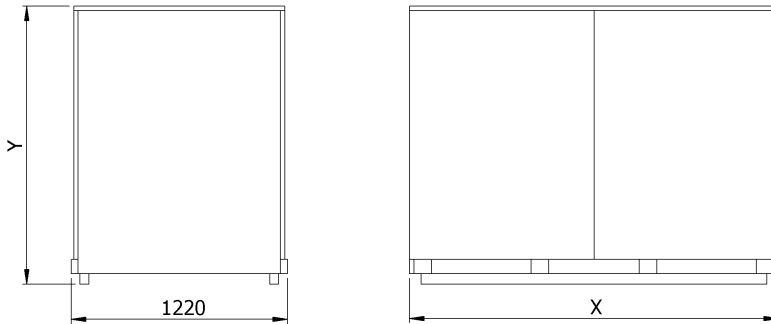


Fig. 2. NDL ELISA VISION QB

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 (Y)
3750 (mm)	3950 (mm)	1565 (mm)
2500 (mm)	2700 (mm)	1565 (mm)
1880 (mm)	2080 (mm)	1565 (mm)
1250 (mm)	1450 (mm)	1565 (mm)

2. SAFETY

2.1. Dangers due to misuse



gas.

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

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



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

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 approx. 2 litres of water.
- It is prohibited to cover any ventilation openings of the unit. A safe minimum distance must be kept (between units) to ensure sufficient air access.
- Do not use any mechanical devices or other means (e.g., ice scrapers) to accelerate the defrosting.
- 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 lowered rooms.
- Do not damage the refrigerant circuit.
- Do not expose the unit to temperatures above 55°C during transportation and 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 carry out work on the refrigerant circuit.
- Only open the refrigerant circuit and remove the refrigerant in well-ventilated rooms outside store business hours (when customers are not present) or outdoors.
- Disconnect the unit before all maintenance, service, or repair work.
- Disposal of the unit must be performed following 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 CO₂ (R744) or F-gas refrigerant



Refrigerant R744 (CO₂) 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 CO₂ 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 and Hydroloop Hybrid system



Refrigeration equipment suited with a Hydroloop Glycol or Hydroloop Hybrid system comes with flexible stainless steel 3/4" 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 the average climate temperature, we recommend 40 vol. % concentrate.
- 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

2.5. Material damage during a prolonged shutdown

- Operate the unit in a stable operating position (horizontal alignment).
- Operate the unit only on the designated leveling legs.
- Read the installation notes if needed.
- Do not operate the unit above the climate class specified on the technical data sticker.
- Check that the unit is in proper condition. Any damage must be repaired immediately.
- In the event of a power failure, stored products must be inspected by the operating company (temperature check).
- Check the area in which the products are placed for foreign objects. Immediately remove incorrectly stored products.
- Do not set up or store the unit outdoors. To ensure good air circulation, maintain a minimum distance to 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 when unpacking and during setup and installation.
- Protection from contact with liquid in the event of leakage in the refrigerant circuit.
- Protection from low temperature during loading and cleaning.
- For removing glass parts and splinters in case of glass breakage.

Use eye protection:

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

Wear protective clothing:

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

2.7. Electrical voltage



Only qualified staff may carry out 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 to ensure safety devices are correctly installed and working.
- Do not remove protective devices and 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 sticker.
- Only trained operating 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 in such a way that it cannot be 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 basic cleaning.
- Do not damage concealed electrical parts. The operator must not drill into the unit or carry out any other work on it.

2.8. Refrigerant circuit



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

2.9. Improper installation of hooked shelves

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

The shelf brackets must snap completely into the openings provided when being attached.

2.10. Opening/closing the doors

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

- When opening/closing the doors, do not reach into the opening gap, especially on the hinge side.
- Look out for other people when opening/closing the doors.

2.11. Recommended working conditions and ambient temperature

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

- Ambient temperature must not fall below +16°C and not 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 up to 0.2 m/s (strong airflow can harm the internal circulation of the open unit).
- It is forbidden to exceed the maximum allowable loading of the unit shelves.
- Recommended arrangement of the shelves is specified in the main layout.
- It is forbidden to cover air circulation channels (the placement of goods should be logical and consistent).

2.12. Purpose of use

NDL ELISA VISION QB is intended to be used for the presentation of chilled packaged products. It is not intended for storing products without packaging, such as vegetables. For non-packaged foods, the evaporator on the unit should be chosen with a special coating suited for such product storage. NDL ELISA VISION QB provides an average operating temperature (0...+10°C) in the inner space of the unit.

It is forbidden to load the unit with warm goods (temperature of goods lower or higher than the NDL ELISA VISION QB operating temperature).

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

≤+10 °C	Fruits, vegetables, butter, cheese, and cheese products
≤+8 °C	Pasteurized products, sour milk

$\leq +7\text{ }^{\circ}\text{C}$	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
$\leq +4\text{ }^{\circ}\text{C}$	Household poultry, minced meat, and products, rabbit meat, wild hare meat
$\leq +3\text{ }^{\circ}\text{C}$	By-products
$\leq +2\text{ }^{\circ}\text{C}$	Pre-packed minced meat and fresh fish (on ice)

The manufacturer is not liable for any damages caused by the unintended purpose use of NDL ELISA VISION QB and is exempted from warranty obligations.

3. MAXIMUM LOAD

NDL ELISA VISION QB is equipped with shelves with a maximum allowable load which may be specified in the main layout sticker (**Fig. 3**). It is forbidden to exceed the indicated maximum loads. At the bottom it **cannot be greater than 135 kg/m²** and hooked shelf maximum load **cannot exceed 50 kg/m²**.

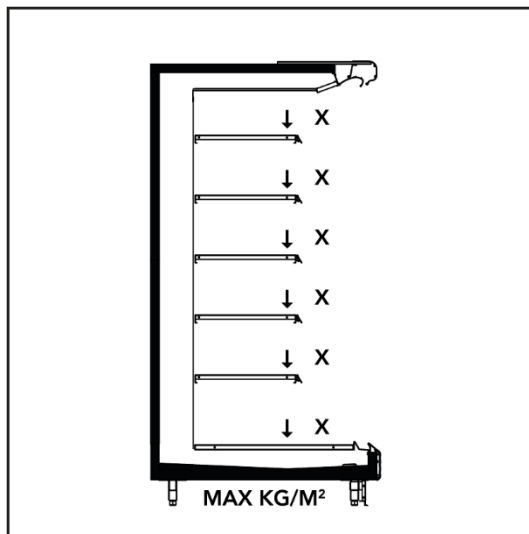


Fig. 3. Example of the maximum allowable load sticker

4. UNPACKING



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

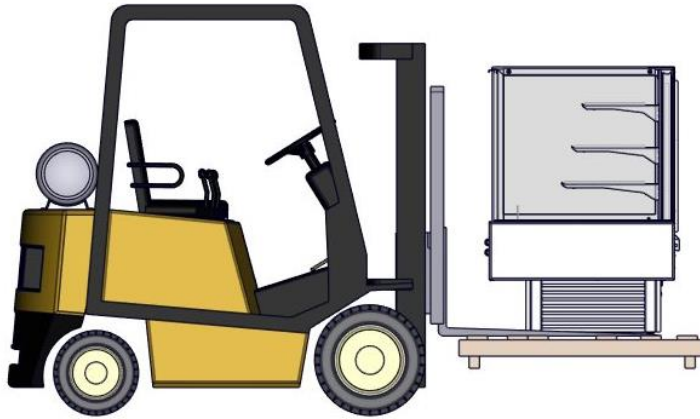
- Observe transport routes for other forklifts.
- Secure transported units.
- Only trained personnel may operate industrial trucks.
- Note the unit's centre of gravity for safe lifting with the forklift. Information is provided on the front and back of the unit packaging.



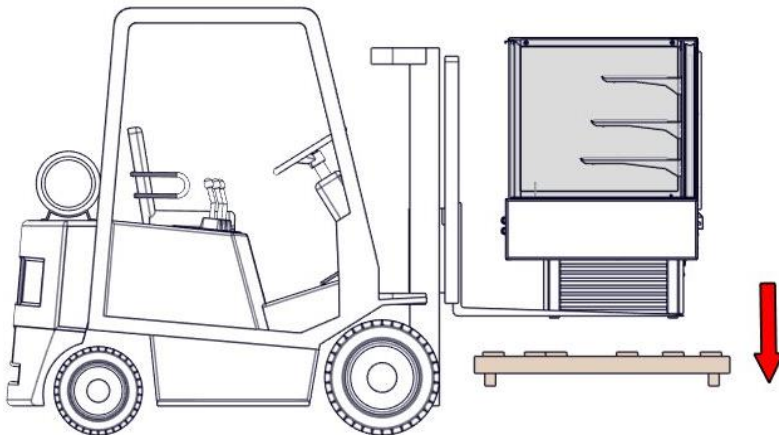
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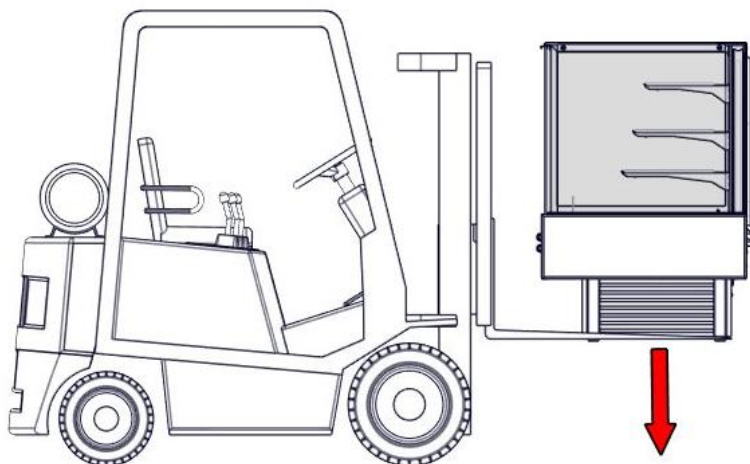
15 min.



Use appropriate equipment for unit transportation (refer to unit weight and dimension information).



Lift the unit. Remove the pallet screws. 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 (air outlet, etc.) (**Fig. 4**).
- Keep a sufficient distance around the unit. It must be possible to open the doors without any obstructions.
 - The airflow from the condenser must be able to escape freely from the top of the unit.
 - If the unit has a plug-in with direct condensation or Hydroloop Hybrid system, the minimum clearance from ceiling should be no less than 500 mm. Lower minimum clearance must be approved by the manufacturer.
 - If the unit has a remote or a Hydroloop Glycol system, the minimum clearance should be enough for maintenance work or repairs. Lower minimum clearance must be approved by the manufacturer.
 - Superstructures or false ceilings directly on top of the unit should only be installed after consultation with the manufacturer.
- If the unit is equipped with a plug-in with direct condensation or Hydroloop Hybrid system it is essential to allow warm air to escape by leaving sufficient gaps around the unit.

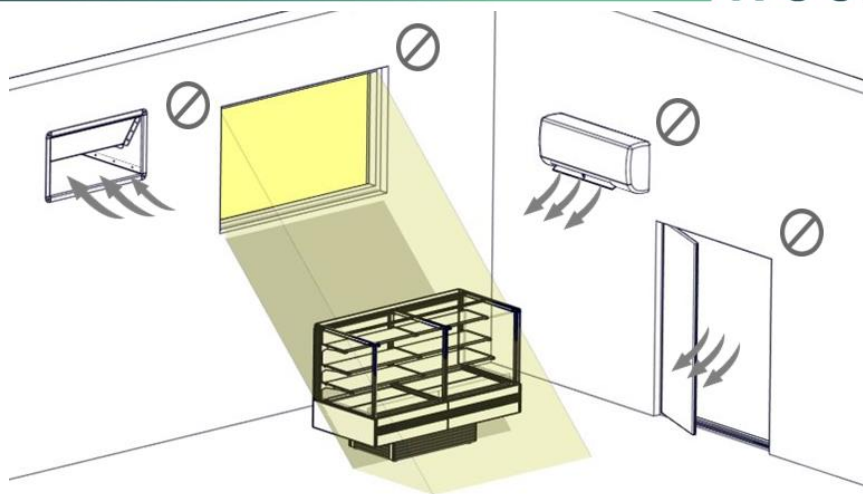
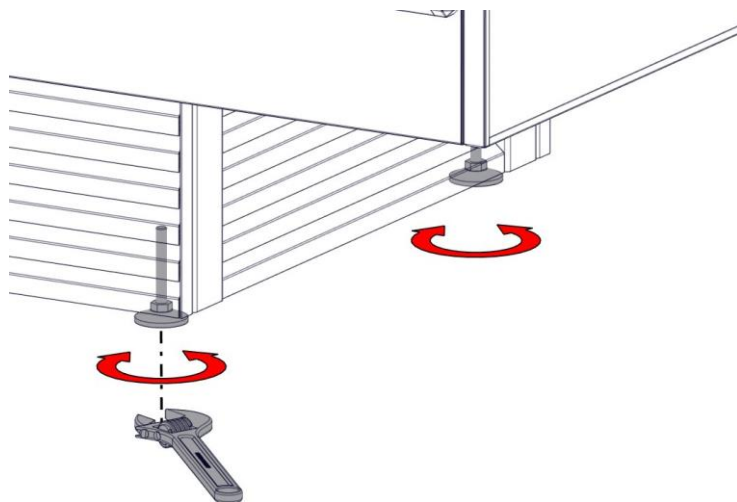


Fig. 4. Example of unsuitable ambient conditions

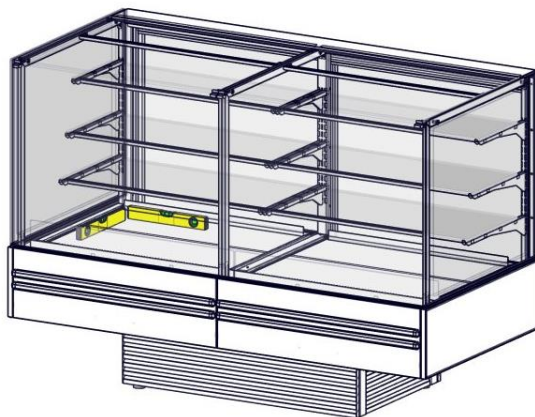
5.2. Installation of the unit



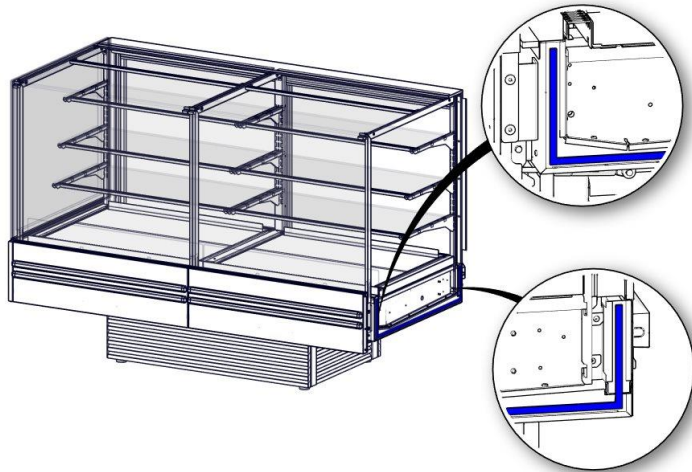
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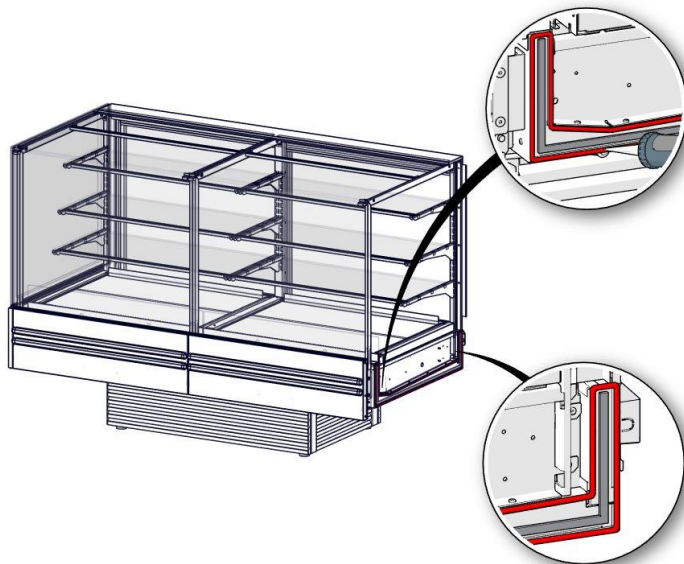
Using the front and rear legs, perform horizontal and vertical pre-adjustment of the unit.



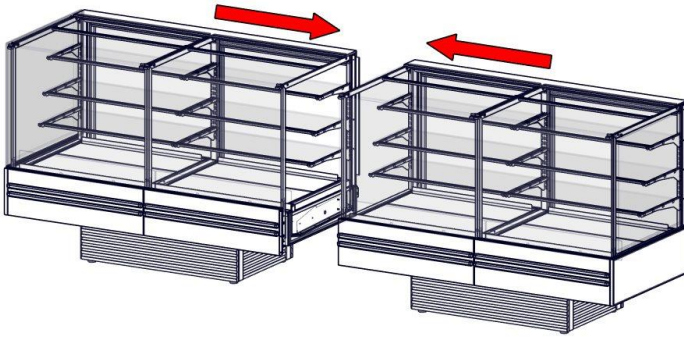
Using the level tool, perform pre-adjustment of the unit.



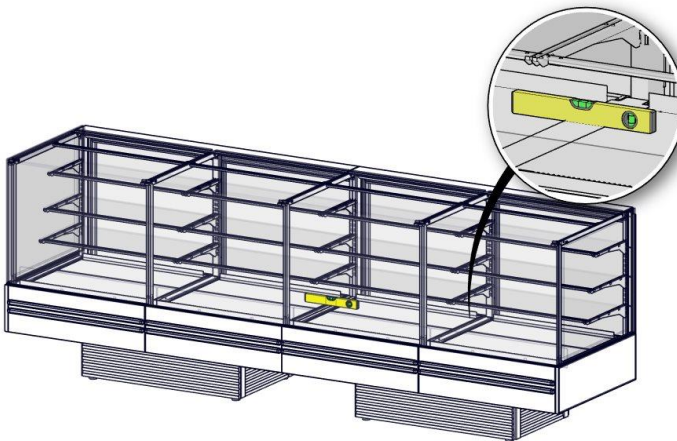
Seal connection gaps using adhesive foam tape.



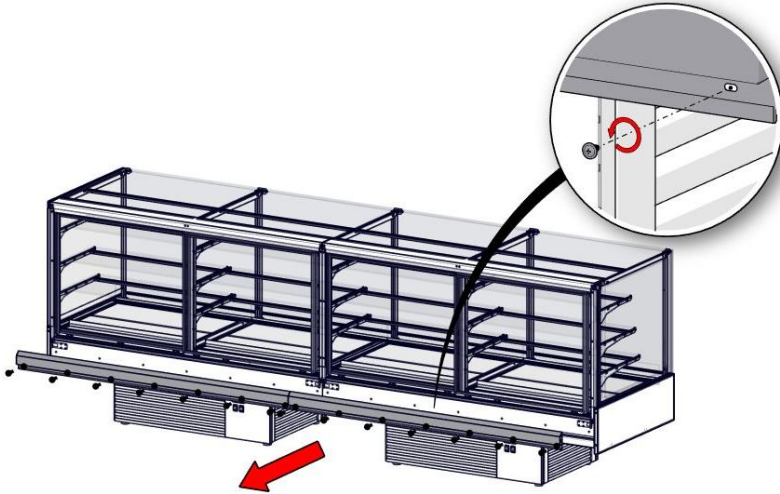
Apply silicone, as shown in the picture, to seal the joint.



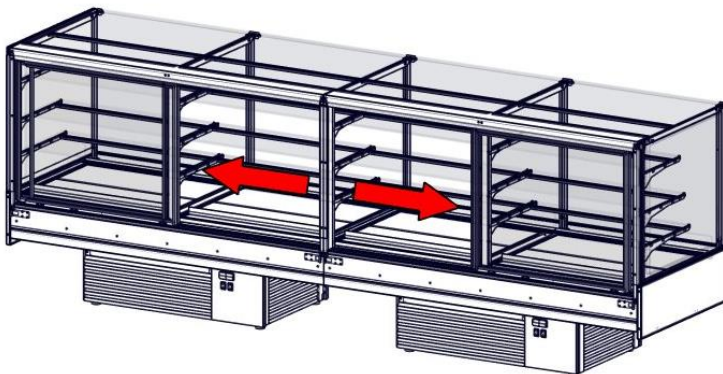
Perform the final match and join the units.



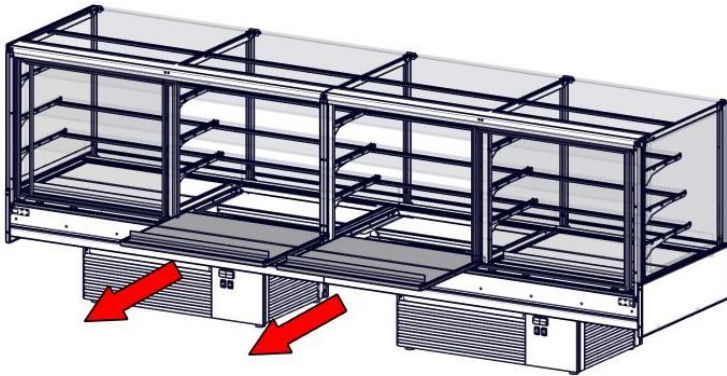
Using the level tool, check if both units are horizontal.



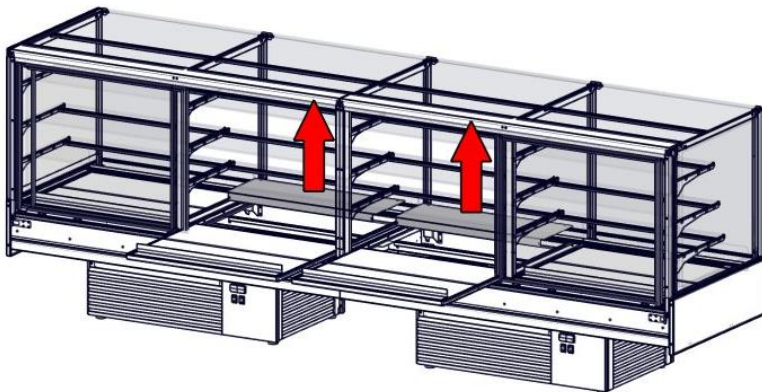
Unscrew and remove the back decorations.



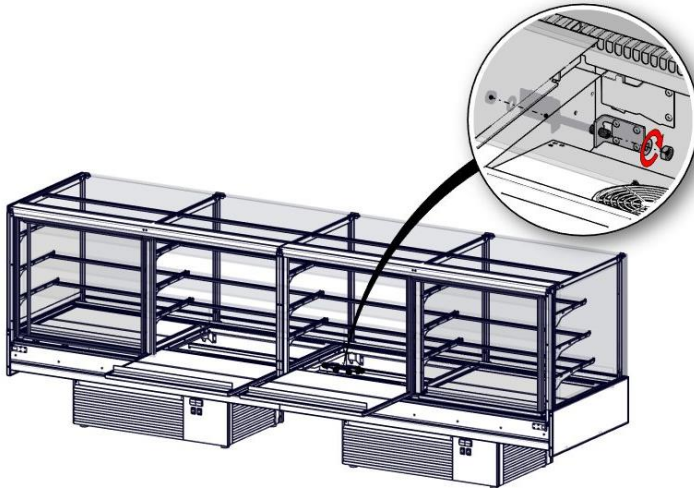
Slide open the back doors.



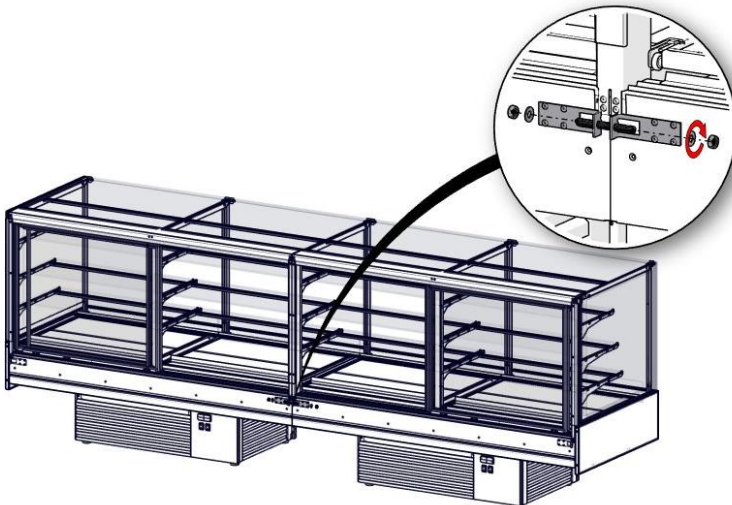
Pull out the bottom shelves.



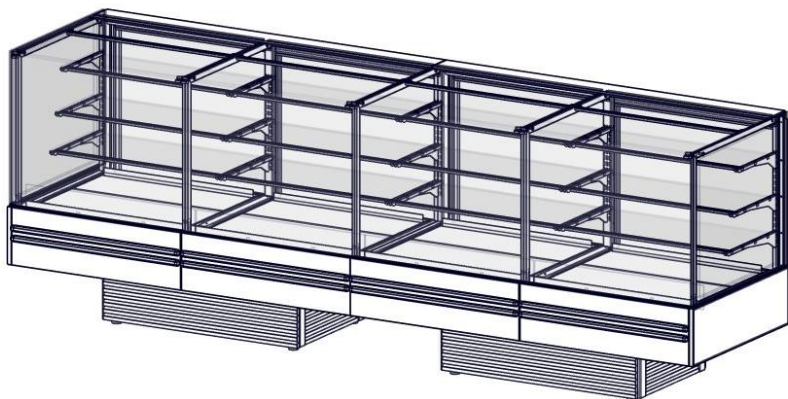
Remove the fan covers.



Assemble the inner front connection to secure the units. Connection slots are fixed together with a threaded pin – M10x90 ISO 7985.



Assemble the back connection to secure the units. Connection slots are fixed together with a threaded pin – M10x90 ISO 7985.



Install all the previously removed parts.

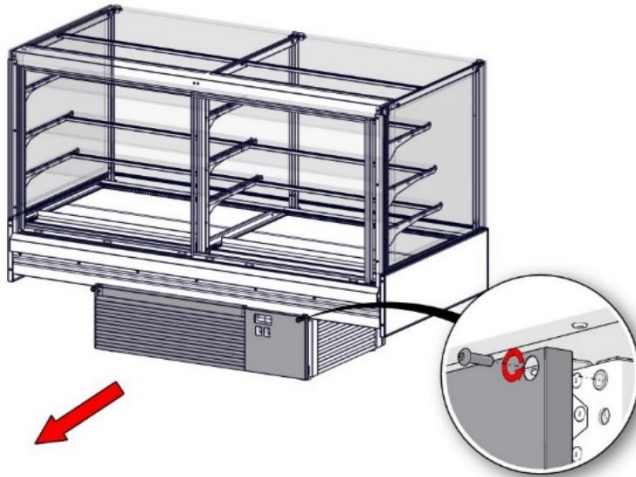
6. MAINTENANCE OF THE COMPRESSOR



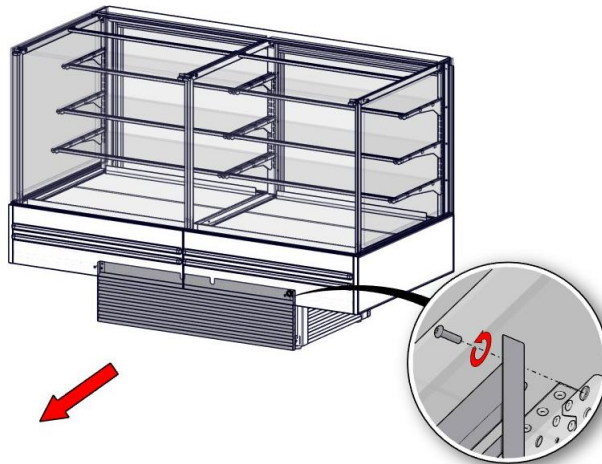
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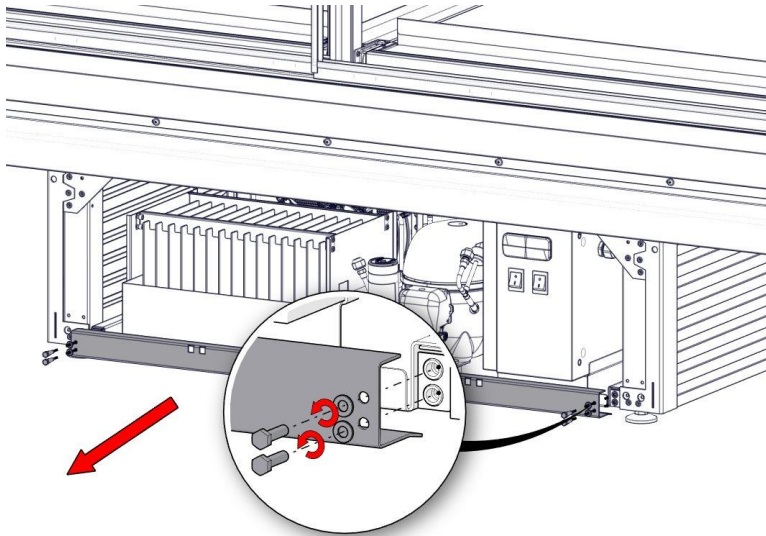
15 min



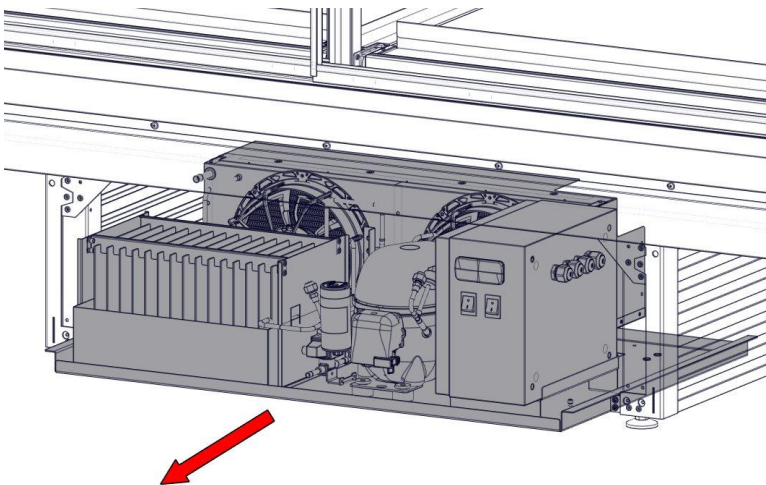
Remove the rear panel.



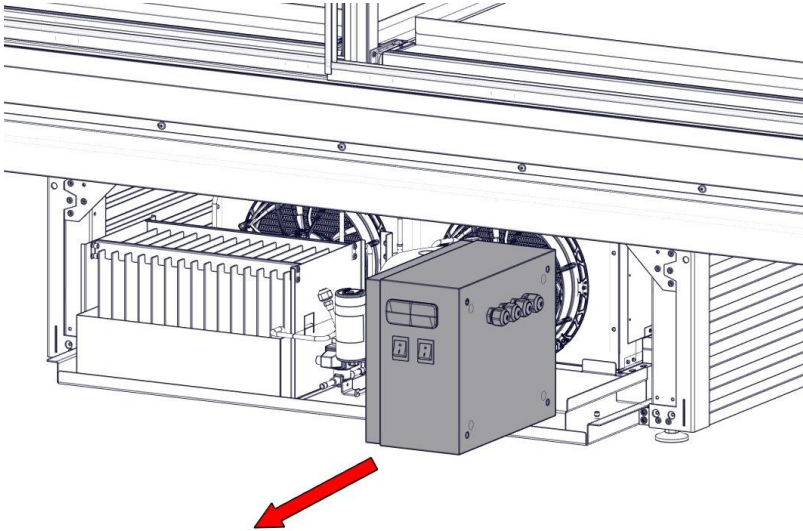
(Optional) Remove the front panel.



Unscrew the indicated screws to be able to gain access to the compressor.



Pull out the pad containing the compressor.



(Optional) Pull out the electrical panel for maintenance.

7. ELECTRICAL CONNECTION

7.1. 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.
- The power supply voltage and frequency must match the specifications on the technical data sticker.
- 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.

8. DRAINAGE

8.1. Drainage system



NDL ELISA VISION QB 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 the external electrical outlet, which is protected from the current drain.

Also, condensate drainage can be connected to the common sewerage system. Drainage connection points are indicated on the furniture layouts.

9. MAINTENANCE

9.1. Information on temperatures

Before loading the products into the unit, if the temperature seen on the thermometer is higher than needed, check the temperature settings in the controller. The temperature should be suitable for the display of the products. Recommended temperatures are listed in Chapter 2.11. The actual temperature is shown in the thermometer of the unit. Products can only be loaded into the unit when it has reached it's working temperature.

9.2. Shelves/brackets (hooks) of the unit

Before loading products, check the arrangement of the shelves. The position and arrangement of the shelves can be adjusted according to the customer's needs. The shelves of each unit are equipped with price tags or price holders. Prices can be inserted or replaced at any time. **Note: check the maximum allowed weights.**

9.3. Defrosting

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

9.4. Cleaning



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

Maintenance table

Regular cleaning	Once per week
Deep cleaning	Once every 4 weeks

Condenser grill cleaning (direct condensation models only)	Once every 4 months
Refrigerant leakage inspection for propene (R290) units	Once every 6 months
Electrical compartment inspection	Once every 6 months
Refrigerant leakage inspection for remote CO ₂ (R744) and F-gas units	As often as the countries regulations require

Regular cleaning:

- The unit must be cleaned at least once per week. If needed, when contamination is detected, the unit must be cleaned more often.
- The unit's inner space, shelves, interior and exterior plastic, and glass parts of the unit must be thoroughly cleaned, as the floor where the unit is standing must be washed.
- Cleaning of the plastic parts must be performed using warm water and a non-abrasive cleaning agent dedicated 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, it is necessary to remove any moisture residue and dry the surface. Chromed surfaces must be cleaned with suitable cleaning agents. After cleaning, they must be dried with a soft cloth that does not leave dust.
- Painted components must be cleaned with liquid cleaning agents without abrasive materials. It is recommended to use special detergents purposed for painted surfaces. The surfaces must be well-dried after cleaning. Damaged paint can cause metal corrosion on spots that were scratched during incorrect 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. Also, wood polishers can be used. If necessary, surfaces can be cleaned with a damp cloth and then dried thoroughly.
- Protect electrical installations from moisture during cleaning.
- It is necessary to check the drainage system regularly.
- Washing the unit with high-pressure washers is strictly forbidden.
- Remove the air intake grille and bottom shelves. Clean the bottom.

Deep cleaning



x 2



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 into 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.
- Make sure that the drainage openings are not clogged, and that the condensate drains freely.
- Remove dust, possible residue of food products, and the condensate residue from surfaces.
- Disinfect the internal space of the unit.
- Clean and disinfect detached parts and dry them.
- Assemble the detached components into the structure.
- Switch the power supply to the unit.
- When the temperature in the internal space reaches the one that is specified in the control, bring cooled products back into the unit.

Electrical compartment inspection



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

Refrigerant leakage inspection



Use an electronic refrigerant detector or dedicated foam to perform an inspection of potential leakage spots. If a leakage is detected, immediately remove it. After removing the leakage, the system should be filled with the specific refrigerant type and amount needed for the unit (the required refrigerant type and amount is on the unit's label). After identifying and removing the leak the system must be vacuumed and if the unit is suited with a plug-in system, it should be filled with the specific used gas. **Maintenance should only be performed by trained refrigerant technicians.**

10. ENERGY SAVING

The unit is supplied with doors. During non-business hours of the shop make sure that the doors are fully closed. It is recommended for the lighting to be turned off whenever they are not needed.

11. 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 elements of the refrigeration equipment require specific disposal; therefore, it is necessary to contact specific organizations that dispose of certain types of materials.

12. STORAGE

If temporary storage and subsequent use of the unit is expected (during repair of the shopping premise or change location of the unit), the equipment must be stored in a well-ventilated room with a temperature higher than 0°C but not more than 55°C. It is forbidden to leave the unit outdoors. It is necessary to put a cover on the unit or make other structures to protect the unit against external damage.

13. TESTING

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

- Hermetic tightness.
- Pressure tests of the freezing coil.
- Checks of electrical installation.
- Load tests.

After the units are installed, each unit and the overall system must be inspected before their start-up.

14. ACCESSORIES

A variety of special accessories are available on request, such as: partitions, tabs, price holders, a drainage collection tub, evaporation baths, safety bumpers, etc. For more information, please contact FREOR LT or our sales partners.

15. TECHNICAL DATA

15.1. Electrical layouts

The layouts are in the electrical console.

15.2. Failures and troubleshooting




Repair of the internal cooling circuit of the unit, the refrigerant amount, and replacement of the parts may only be carried out by a specialist qualified to work with F, OAM, or natural refrigerant gases.

Only an electrician with respective qualifications may carry out inspection and repair of electrical installation.

The description of controller errors can be found in the instructional manual of the controller manufacturer.

16. 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



FREOR LT, UAB

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