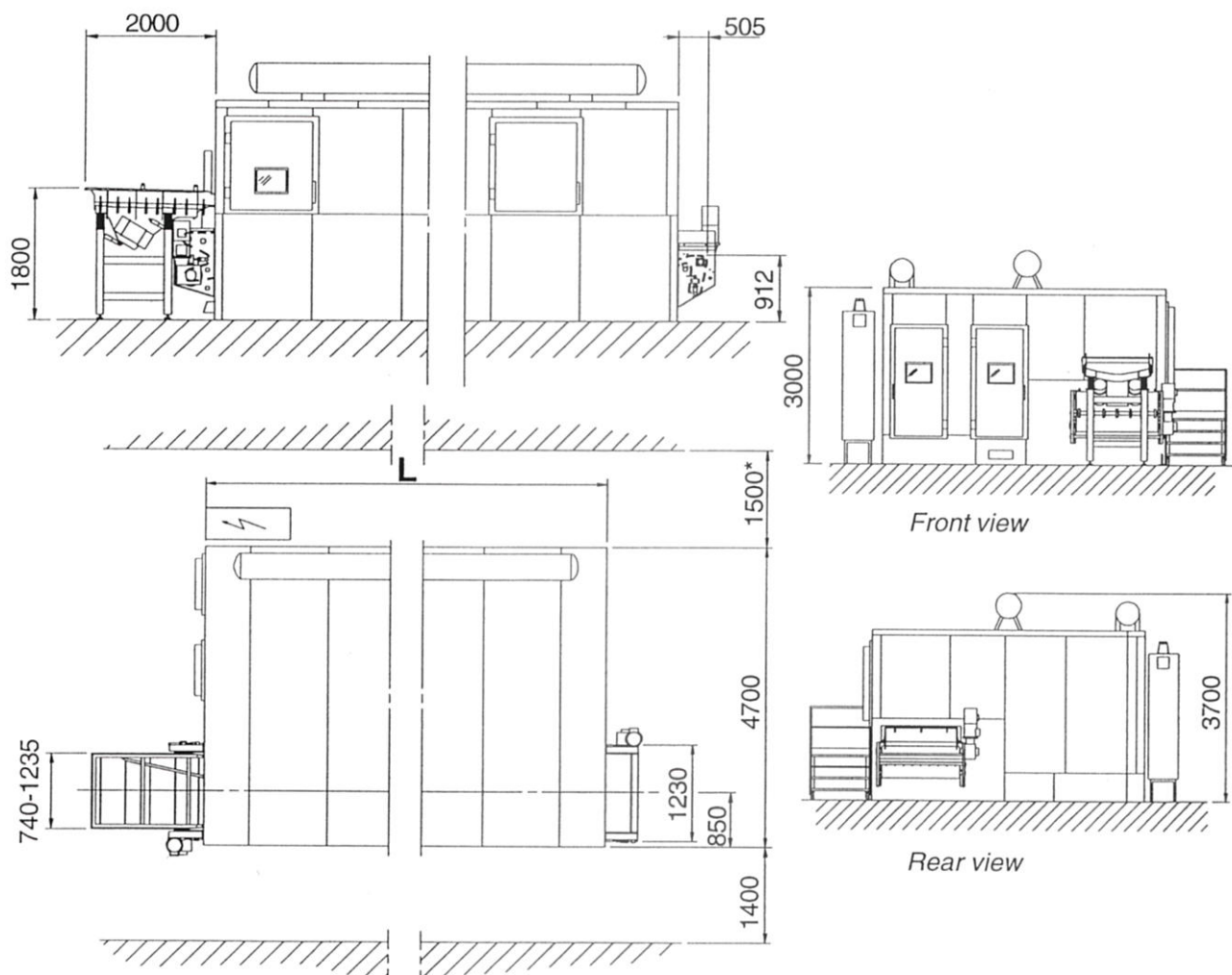


MAIN DIMENSIONS (SI-SYSTEM)

FLoFREEZE® MX 02 freezer



Model	L
MX 32	3800
MX 42	5000
MX 52	6200
MX62	7400
MX72	8600
MX 82	9800
MX 92	11000
MX 102	12200

All sizes available in right or left hand model.
Shown: right hand model

* 500 mm without control panel on this side.

For more detailed information and connections, see layout drawing for each model.

TECHNICAL DATA - (SI-SYSTEM)

Model		MX 32	MX 42	MX 52	MX 62	MX 72	MX 82	MX 92	MX 102
Capacity ¹⁾	kg/h	1800	2400	3000	3600	4200	4800	5400	6000
Infeed temperature	°C	+ 15							
Outfeed temperature	°C	- 18							
Refrigeration									
Standard design ²⁾		R717 (Ammonia). Pump circulation ratio: 4-6 times evaporation.							
Evaporation temperature	°C	- 40 °C at coil							
Base load	kW	56	69	83	97	110	123	137	152
Base load	Kcal/h	48200	59400	71400	83400	94600	105800	117800	130700
Required capacity ³⁾	kW	232	303	376	449	520	592	665	738
	Kcal/h	199500	260500	323300	386100	447100	509000	571800	634600
Coil volume (litre)	litre	310	440	570	620	750	880	1010	1140
Electrical data									
Voltage		3 x 400 V, 3 x 415 V; 50 Hz or 3 x 440 V; 60 Hz							
Normal power consumption	kW	42	55	69	82	95	108	122	136
Max. power requirement ⁴⁾	kVa	67	84	100	116	133	149	166	182
Motors of more than 1 kW rating 30 °C(installed power)	at -	3x13.2 +2x4.0	4x13.2 +2x4.0	5x13.2 +2x4.0	6x13.2 +2x4.0	7x13.2- + 2x4.0	8x13.2 +2x4.0	9x13.2 +2x4.0	10x13.2 +2x4.0
Defrosting									
Water consumption during defrost ⁵⁾	lit/min	360	465	595	360 +360	360 +465	465 +465	465 +595	595 +595
Track rinser ⁶⁾	lit/min	3 x 52							
Required air volumes									
ADF - air defroster ⁷⁾	lit/sec	22	22	33	33	33	33	45	45
TDF - track defroster ⁸⁾	lit/sec	22	22	22	22	22	22	22	22
Required air capacity (lit/sec)	lit/sec	44	44	55	55	55	55	67	67
Noise emissions According to Machinery Directive 89/392/EEC, 1.7.4 (f)									
Along freezer walls		Maximum 90 dB(A)							
During TDF-shot, In front of in- and outfeed openings		Maximum 102 dB(A)							
During ADF-shot, along evaporator wall		Maximum 98 dB(A)							
1) Based on green peas. For other products see manualsheet "Product capacity".									
2) As there are orifice plates in the coil circuits, there must be a filter in front of the connection (not del. by FSE). See Manual shee t"Freezer connections" (Only before installation).									
3) To compensate for fluctuations in processing line production capacity, a 10 % margin has to be added. For more detailed information please contact Frigoscandia.									
4) Value for dimensioning of power supply cables/fuses. Valid for 50 Hz system.									
5) 150 kPa (1,5 bar) at connection point and at rated flow. Spraying time ~ 15 min. Water temperature +50 °C, gives two hours turn around time, colder water temperature gives longer turn around time. For more information please contact Frigoscandia Application Group.									
6) 150 kPa (1,5 bar) at connection point and at rated flow.									
7) Temperature max 30 °C and 700 kPa (7 bar).									
8) 400 kPa (4 bar), free of oil and water, 5 sec. interval.									

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DESCRIPTION

THE FLoFREEZE® MX FREEZER CONCEPT

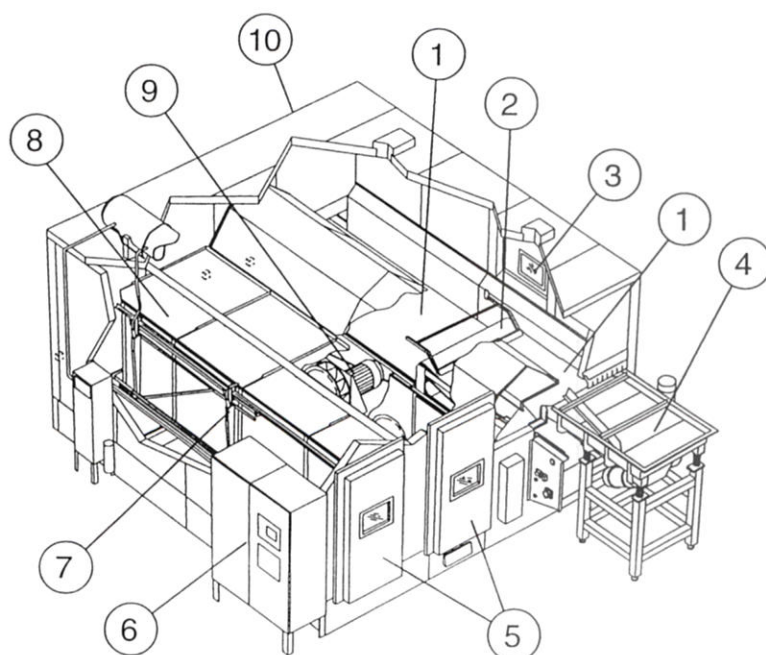
The FLoFREEZE MX freezer is based on a unique Frigoscandia patent of the fluidization principle. This means fast, gentle and hygienic freezing along with individual quick freezing (IQF) of a wide range of products. The FLoFREEZE MX freezer is fully integrated with the production line.

The FLoFREEZE MX freezer can process a wider range of products than has ever before been handled by this type of equipment. The FLoFREEZE MX system has greater flexibility as all-in-one freezer, with its unique IQF Track, a new patented concept from Frigoscandia. It is possible to select optimum freezing conditions for every product, regardless of size, shape or consistency, and to switch from one product to another in a matter of minutes.

A typical product for this freezer is vegetables: including peas, cut and sliced beans, diced and sliced carrots, whole and sliced mushrooms, brussel sprouts and cut corn. It is ideal for a variety of fruits as well, including strawberries, blueberries, red currants, sliced apples, sliced pineapple. Many other delicate products like French fries, shrimp, shredded cheese, pasta, diced meat and chicken parts are well suited to the FLoFREEZE MX freezer.

The FLoFREEZE MX freezer is USDA approved.

The fluidization principle means that the product is exposed to an upward directed air stream that supports and conveys the product through the freezer. This is achieved only by the Frigoscandia design and ensures a superior separation of product particles.



1. IQF- tracks
2. Weir
3. Inspection hatch
4. Infeed shaker
5. Access doors
6. Control panel
7. Air defroster (ADF)
8. Evaporator
9. Fans
10. Outfeed

DESCRIPTION

IQF Track and product zone

The heart of the FLoFREEZE MX freezer is the unique IQF Track. The IQF Track concept gives an unprecedented combination of flexibility, simplicity and product quality.

Mounted at a convenient working height above the plenum chamber, the robust, hygienic IQF Track offers a whole new approach to adjustment and control of the two freezing zones. It provides optimized airflow through the product bed to ensure perfect results over a vast range of IQF products and capacities - all in a single freezer.

The IQF Track allows multiple modes of operation, i.e. forward drive, agitation, drive and agitation, or drive in one zone only. With the drive disengaged, the track acts as a stationary bed for full fluidization of all IQF products. The first zone is flat with a weir at the end, and the second zone is flat with a raised end serving as weir.

Engaging the drive converts the track into a conveyor for products that are too heavy to float on the polar air cushion.

The "agitation" mode of operation simply means that the drive has a "reciprocating action" that can be selected to separate wet and sticky products or tumble long, thin pieces for uniform exposure to the air blast.

In addition, the geometry of the track can be adjusted either by sliding the movable side wall in or out or by adjusting the weir and thereby controlling the depth of the product bed and the velocity of the airflow.

The IQF Track itself is made of specially designed plastic material which increases the possibility of freezing more sticky products without clumping.

Specially designed stainless steel tray sides prevent overflow of light products. This adds to the flexibility of running different products.

An air mixer is installed to equalize the frost buildup on the evaporator front.

Floor and internal structure

A complete freezer consists of a central module with plenum chamber modules arranged along one side and evaporator modules along the other - up to ten of each according to the capacity required. All modules are prefabricated and made of thin gauge stainless steel - sturdy, hygienic and quick to attain temperature equilibrium. The interior, with its easily drained inclined floors, provides easy access for cleaning, inspection and maintenance. Each plenum chamber module contains a high-efficiency plug fan unit with a direct-coupled, energy-efficient electric motor.

DESCRIPTION

Evaporators

The evaporators are finned-tube style. They use ammonia as a refrigerant and are designed for pump circulation. Progressive fin spacing ensures uniform frost buildup with minimum restriction of the airflow.

Enclosure

The enclosure is made of prefabricated sandwich panels of CFC-free, polyurethane insulation clad with stainless steel. It has two access doors with electrically heated seals and windows at the infeed end. Doors with inspection windows in the side wall nearest the IQF Track provide a clear view of the freezing process; the number of windows depends on the size of the unit.

External platform

A moveable external platform of aluminium used at the side walls, inspection hatches and infeed shaker during freezing or cleaning process

Electrical control panel

The electrical control panel is located on the outside of the insulated enclosure. It contains the main isolating switch and all other switches, fuses, starters and pilot lamps for the motors, the door heaters, the lighting, the failure indicating lamps and terminals for audible alarm.

Foundation

The freezer requires a prepared concrete base. Electrical cable for floor heating is supplied with the freezer. The base can be prepared directly on the factory floor or excavated if required.

Air defroster (ADF)

The air defroster (ADF) is a patented system that uses short supersonic blasts of compressed air to continuously remove frost from the evaporators, eliminating the need for high-energy heating and extending operation time between defrosts.

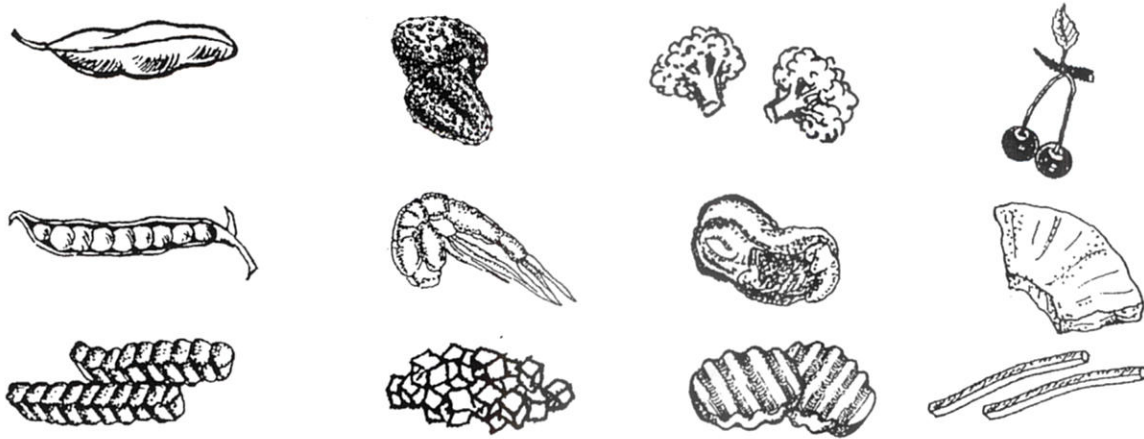
Options

As option pulsator and/or air modulators can be added to the first freezing zone, in order to handle more delicate products.

DESCRIPTION

Applications

The FLoFREEZE MX freezer is a very versatile freezer for a wide range of particulate products. The unique fluidization principle allows for the freezing of soft, sticky and delicate products.



Installation

The FLoFREEZE MX freezer is conveniently delivered in ready-made modules.

The unique design simplifies the installation, maintaining high quality through the installation phase up to a functional freezer.

Lighting

Recommended lighting in production premises:

- 200 lux in general.
- 300 lux at place of work.

Use of FLoFREEZE MX freezer

Other use of FLoFREEZE MX freezer than those mentioned in the Manual is not allowed.

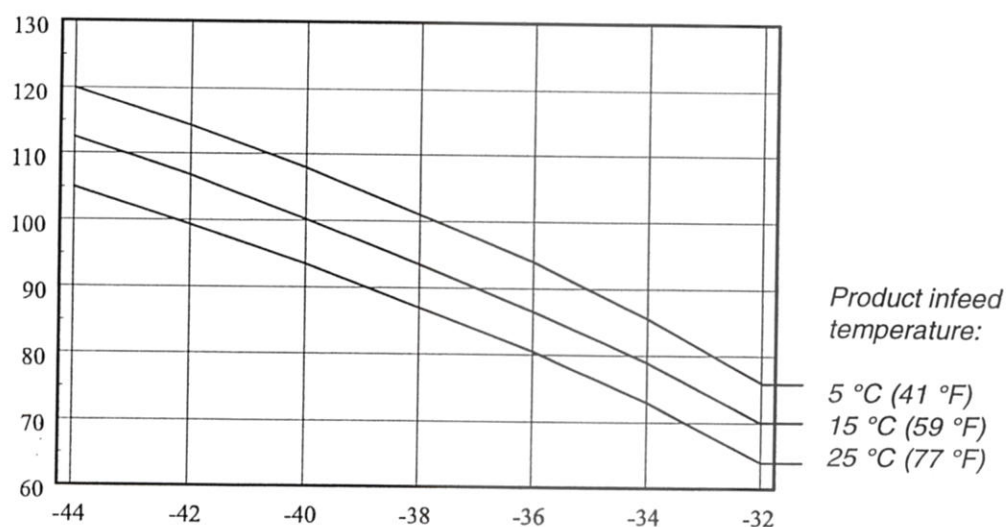
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## RELATIVE CAPACITY CHART

### FLoFREEZE® M and MX freezers

Capacity as function of evaporation temperature (ammonia) in freezer evaporator and product infeed temperature.

*Relative capacity (%)*



*Evaporation temperature, ammonia (°C)*

This graph applies to a product outfeed temperature of -18°C (+-0°F) and should be considered as a guideline.

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DELIVERY FCA HELSINGBORG

FLoFREEZE® MX freezer

Standard delivery includes:*

CE- approved freezer in stainless steel design.

Internal structure

- Plenum wall with doors, support and sheeting.
- Two separate pressure chambers.

Evaporator units

- Hot dip galvanised evaporator.
- Pipe and nozzles for water defrosting.
- Evaporator support and covers.

Fans

- Unhoused centrifugal fans with direct connected electrical motors. (Fan wheels galvanised and motors painted.)

Product zone

- Perforated plastic IQF track with movable side wall, adjustable from outside. Adjustable weir on first track.
- Drive and agitating track mechanism on first track and drive only on second track.

Product infeed shaker with one insert type

Insulated floor modules with slope and water drainage.

Insulated enclosure

- Panels with stainless steel facing (inside and outside).
- Operating doors with heating and inspection windows.
- Internal lighting accessible from outside.

Electrical control panel

For electrical supply 3x360 V- 440 V, 50/60 Hz, including transformer for internal lighting and door heating. Instruments for monitoring of freezer operation. Transient protection.

Main components in control panel **

- PLC
- I/O-relays
- Frequency converters
- Push buttons
- Electromech. power switching components

External moveable platform in aluminium, for inspection and cleaning.

* Extent of delivery to FS Inc. varies from this, see page 3 "US delivery, deductions from standard" .

** For more detailed information see Manual sheet "Electrical standard".

DELIVERY INFORMATION

ADF-unit.

- Air buffer tank (SA-approval) with safety valve, manometer, main valve and ADF-valves. Connection hose between buffer tank and adsorption drier.
- Adsorption drier, complete with liquid and dust filter.
- Support frame with drive wheels and drive mechanism.
- Air distributor complete with nozzles and hoses.

Track defrosting unit.

- Air buffer tank (SA-approval) with manometer, main valve and safety valve. Connection hose between buffer tank and air distributor.
- For each track, one air distributor complete with nozzles and valve.

Crating

- Suitable for trailer transport and loading onto trailer.

Customer drawings:

- Layout with connections, subfloor, curb and in- and outfeed units.

Subfloor heating cable.

Owners manual including electrical drawings.

Installation materials.

Standard delivery does not include:

- Subfloor and curb.
- Site installation.
- Refrigeration valves and refrigeration pipe connections to FLoFREEZE evaporators.
- Water valves and pipe connections for evaporator defrost and track cleaning.
- Compressed air valves and pipe connections for ADF and track defrosters. Air drier for track defroster.
- Compressor arrangement with after coolers for ADF and/or track defroster.
- Approvals on evaporators, ADF and track defrost receivers.
- PLC program documentation.
- Any item not mentioned in the specification.

Following optionals can be supplied by Frigoscandia at extra cost:

- Spare parts, standard or extended set.
- Heavy export crating for conventional sea transport.
- Other electrical supply (voltage) than above.
- Site supervision of installation (according to General Conditions 188 + Addendum) and start-up.
- Agitating drive on second track.
- Local evaporator approval.
- Electrical installation material.
- Compressor arrangement with after cooler for ADF and/or track defroster.
- Air drier for track defroster.
- Signal to refrigeration plant.
- Pulsator on track 1.
- White enclosure (in- and outside).
- Air modulators under track 1.
- Alternative shaker inserts.
- Installation material that can be classified as "dangerous goods".
- Drawings for support frame for freezer.
- Infeed conveyor.

US delivery, deductions from standard

- Galvanised evaporators (replaced by aluminium).
- Electrical control panel including frequency converters.
- Lighting fixtures and lamps.
- Heating cable and pipes for subfloor heating.
- ADF - receivers. (This creates some extra work on site for mounting valves and details on tank).
- Adsorption drier, complete with liquid and dust filter.
- Track defroster receiver.
- Installation material that can be classified as "dangerous goods", such as:
Sealing compound, soap liquid, galvocoat, ethanol 99,6%, foam OCF, stainless steel cleaner and anti-seize compound.
- If the freezer is delivered with spare parts
- All electrical parts to control panel.

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*DELIVERY INFORMATION*

## DELIVERY INFORMATION

### STANDARD SPARE PART SET (OPTIONAL)

#### FLoFREEZE® MX freezer

This Standard Spare Part List shows the approximate content of a Standard Spare Part Set. The final content can vary slightly depending on the freezer size etc.

#### Qty Description

##### Product track and zone

|        |                          |
|--------|--------------------------|
| 0,5 m  | IQF - Track              |
| 20 pcs | Plastic rods             |
| 11 pcs | Drive sprocket IQF-Track |
| 6 m    | Rubber                   |

##### ADF

|       |              |
|-------|--------------|
| 2 pcs | ADF membrane |
| 1 pc  | ADF nut      |

##### Electrical equipment

|       |                              |
|-------|------------------------------|
| 1 pc  | Micro switch                 |
| 2 pcs | Relay, 1 pol, 24 V DC        |
| 2 pcs | Socket, 1 pol                |
| 2 pcs | Relay, 2 pol, 24 V DC        |
| 2 pcs | Socket, 2 pol                |
| 2 pcs | Relay, 4 NO, 220 V           |
| 1 pc  | Aux.contact, 2 NO - 2 NC     |
| 1 pc  | Aux. contact, 4 NO           |
| 1 pc  | Motor circuit breaker, 1 A   |
| 1 pc  | Motor circuit breaker, 6.3 A |
| 1 pc  | Motor circuit breaker, 16 A  |
| 1 pc  | Aux. contact                 |
| 1 pc  | Motor circuit breaker fan    |
| 1 pc  | Circuit breaker, 10 A        |
| 1 pc  | Circuit breaker, 6 A         |
| 2 pcs | Push button + pilot lamp     |
| 3 pcs | Lenses yellow                |
| 2 pcs | Lenses red                   |
| 1 pcs | Lenses green                 |
| 5 pcs | Bulb, 24 V DC                |
| 1 pc  | Pilot lamp                   |
| 2 pcs | Flourescent lamps            |

##### Enclosure

|      |                   |
|------|-------------------|
| 1 pc | Rubber door seal  |
| 1 pc | Rubber hatch seal |

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DELIVERY INFORMATION

EXTENDED SPARE PART SET (OPTIONAL)

FLoFREEZE® MX freezer

This Extended Spare Part List shows the approximate content of an Extended Spare Part Set. The final content can vary slightly depending on the freezer size etc.

Qty Description

Enclosure

1	pc	Outside door handle
1	pc	Inside door handle
1	pc	Rubber door seal
1	pc	Rubber hatch seal

Product track and zone

1	m	IQF Track
20	pcs	Plastic rods
11	pcs	Drive sprockets
6	m	Rubber
1	pc	Repair set infeed shaker
1	pc	Track drive motor
1	pc	Bearing

Fan

1	pc	Fan motor
1	pc	Fan wheel

Air Defroster - ADF

6	pcs	ADF membrane
1	pc	ADF nut

Electrical equipment

See next page

DELIVERY INFORMATION

Qty	Description
Electrical equipment	
1 pc	Frequency converter
2 pcs	Micro switch
4 pcs	Relay, 1 pol, 24 V DC
4 pcs	Socket, 1 pol
4 pcs	Relay, 2 pol, 24 V DC
4 pcs	Socket, 2 pol
4 pcs	Relay, 4 NO, 220 V
2 pcs	Aux. contact, 2 NO-2 NC
2 pcs	Aux. contact, 4 NO
2 pcs	Motor circuit breaker, 1 A
2 pcs	Motor circuit breaker, 6,3 A
2 pcs	Motor circuit breaker, 16 A
2 pcs	Aux. contact
2 pcs	Motor circuit breaker, fan
2 pcs	Motor circuit breaker, 10 A
2 pcs	Motor circuit breaker, 6 A
4 pcs	Push button+pilot lamp
6 pcs	Lenses yellow
4 pcs	Lenses red
2 pcs	Lenses green
10 pcs	Bulb, 24 V DC
2 pcs	Pilot lamps
4 pcs	Fluorescent lamps

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## ELECTRICAL STANDARD

### FLoFREEZE® MX freezer

| Components                 | Manufacturer                  |
|----------------------------|-------------------------------|
| Enclosure                  | Rittal                        |
| Main isolator              | Strömberg                     |
| Transformers               | TRAMO                         |
| DC power supply            | TRAMO                         |
| Frequency converters       | Scandialogic SL4000/SL18000   |
| PLC - system               | SIEMENS 95                    |
| Output relays              | OMRON                         |
| Contactors                 | Telemacanique                 |
| Auxiliary relays           | Telemacanique                 |
| Timers                     | Telemacanique                 |
| Circuit breakers           | Telemacanique                 |
| Current relays             | ELECTROMATIC                  |
| Temperature transducers    | TILLQUIST/<br>KAMSTRUP METRO  |
| Alarms                     | TOLEKA                        |
| Emergency stop relays      | DUELCO/JOCAB                  |
| Emergency stop pushbuttons | ABB                           |
| Push buttons               | eao - Lumitas/Telemecanique   |
| Terminals                  | Telemecanique                 |
| Switches                   | KRAUS & NAIMER                |
| Limit switches             | Honeywell                     |
| Drive motors               | Brook Crompton/Rhein Getriebe |
| Fan motors                 | ABB                           |

### Standard documentation

Circuit diagrams  
Panel layout  
Parts list  
Interconnection table  
Location drawing

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