

# Refrigeration and deep-freezing units with electronic control

**TectoRefrigo WMC2**

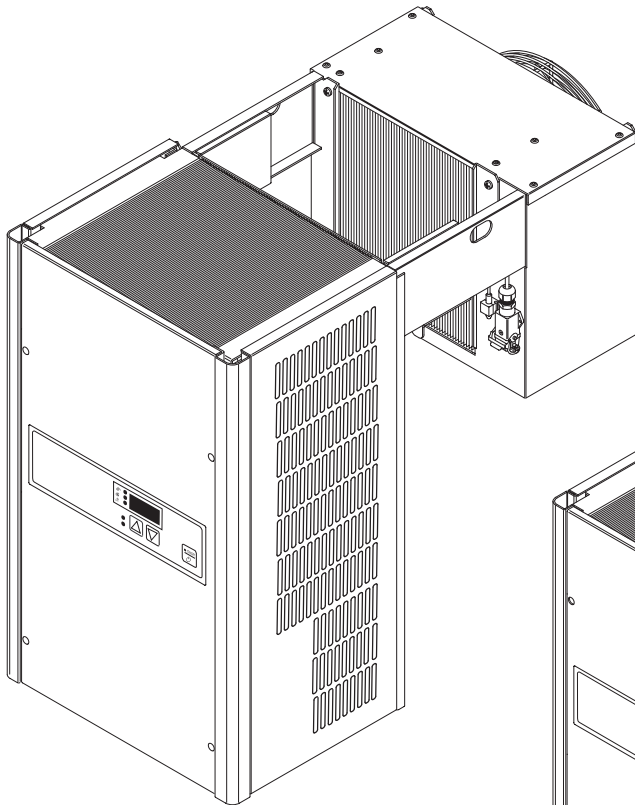
**TectoRefrigo WMF2**

**TectoRefrigo WSC1**

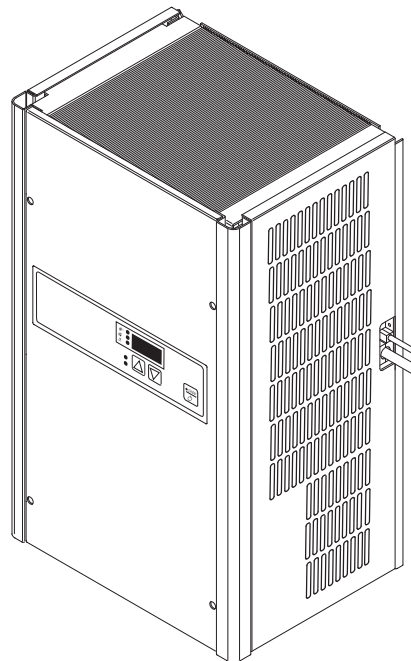
**TectoRefrigo WSF1**

**VIESSMANN** **GB**

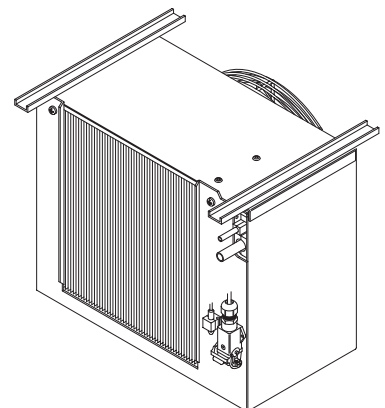
Installation and  
Operating Instructions  
6006645-02 GB



**TectoRefrigo WMC2**  
**TectoRefrigo WMF2**



**TectoRefrigo WSC1**  
**TectoRefrigo WSF1**



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## Ensure compliance with the following instructions prior to beginning work on the Refrigeration unit:

Installation, cleaning maintenance and repair work must be performed only by a refrigeration specialist company.

Technical modifications and manipulation are prohibited.

Non-compliance will result in forfeiture of all warranty claims.

Work on the Refrigeration unit is authorised only when the mains plug has been removed. The Refrigeration unit must be protected against unauthorized activation by appropriate means (e.s. warning sign). The directives, VDE 0105 Part 1, for working on electrical equipment must be complied with.

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General notice (liability): the details of this technical documents serve for description. Consents regarding the availability of certain features or regarding a certain purpose always require a special written agreement.

## 1. Description

- 1.1 Deep-freeze unit  
TectoRefrigo WMF2 0900, 1400, 1800, 2400  
TectoRefrigo WSF1 0900, 1400, 1800, 2400
- 1.2 Refrigeration unit  
TectoRefrigo WMC2 0500, 0900, 1300, 2000, 2800  
TectoRefrigo WSC1 0500, 0900, 1300, 2000, 2800

## 2. General information

- 2.1 Excepts from our Warranty conditions
- 2.2 Standards and regulations
- 2.3 Requirements for the installation room
- 2.4 Transport
- 2.5 Delivery condition for Wall-hanging units
- 2.6 Delivery condition for Split units
- 2.7 Unpacking and handling
- 2.8 Energy conservation

## 3. Cleaning and maintenance of the Refrigeration unit

- 3.1 Disposal of cooling agent

## 4. Installation of a Wall-hanging unit in a Viessmann cold storage cell

- 4.1 Connecting a remote control unit (SD Control)

## 5. Installation of a Split unit in a Viessmann cold storage cell

- 5.1 Installation of the condenser unit
  - 5.1.1 Drill template for attachment of the large condenser unit
  - 5.1.2 Drill template for attachment of the small condenser unit
- 5.2 Installation of the evaporator unit
  - 5.2.1 Drill template for attachment of the large evaporator unit
  - 5.2.2 Drill template for attachment of the small evaporator unit
- 5.3 Layout and installation of the pipelines
- 5.4 Layout and installation of the electrical lines
- 5.5 Installation of the defrost water drain hose

## 6. Drainage of defrost water

## 7. Coldroom electrical power supply

- 7.1 Connecting the door contact switch
  - 7.1.1 Refrigeration unit with electronic SD Control unit
- 7.2 Connecting the Fault report contact
- 7.3 Power supply connection and commissioning
  - 7.3.1 CEE mains plug  
(only on Refrigeration units WMF2 1800, 2400 and TectoRefrigo WSF1 1800, 2400)

## 8. Operating the SD Control unit

- 8.1 Normal operation
- 8.2 Parameter entry
  - 8.2.1 Entry of nominal temperatures
  - 8.2.2 Entry of defrosting times
  - 8.2.3 Selection of coldroom humidity
  - 8.2.4 Selection of language for display indications
  - 8.2.5 Password and keyboard lock
  - 8.2.6 Access levels for the System operator
- 8.3 Fault report
- 8.4 Decommissioning of the Refrigeration unit
- 8.5 Operating mode parameters  
(for refrigeration specialist company)
  - 8.5.1 Parameter list
  - 8.5.2 Description of operating modes and the respective parameters

## 9. Drawings

- 9.1 Refrigeration circulation schematic
- 9.2 Electrical circuit diagram for  
TectoRefrigo WMC2 0500, 0900, 1300, 2000, 2400  
TectoRefrigo WSC1 0500, 0900, 1300, 2000, 2800  
TectoRefrigo WMF2 0900, 1400  
TectoRefrigo WSF1 0900, 1400
- 9.3 Electrical circuit diagram for  
TectoRefrigo WMF2 1800, 2400  
TectoRefrigo WSF1 1800, 2400

## 10. Faults

- 10.1 Malfunction codes
- 10.2 Emergency operation
- 10.3 Fault rectification

## 11. Favourable storage specifications

- 11.1 Cold storage
- 11.2 Deep-freeze storage

**1. Description**

The units are designed for the prescribed temperature ranges. If they are operated outside the prescribed temperature range for several days, the possibility of a serious defect on the refrigerating unit cannot be discounted.

**1.1 Deep-freeze unit**

**TectoRefrigo WMF2 0900, 1400, 1800, 2400**  
**TectoRefrigo WSF1 0900, 1400, 1800, 2400**

The units are designed for the cooling of rooms, in which goods are stored at temperatures of -25°C to -1°C.

**1.2 Refrigeration unit**

**TectoRefrigo WMC2 0500, 0900, 1300, 2000, 2300**  
**TectoRefrigo WSC1 0500, 0900, 1300, 2000, 2800**

The units are designed for the cooling of rooms, in which goods are stored at temperatures of -5°C to +19°C.

**2. General information**

**2.1 Excepts from our Warranty conditions**

The warranty is valid for 1 year. The period of entitlement begins on the day of delivery, which must be verified by the Bill of delivery or Invoice. Within the period of warranty, functional defects attributed to faulty design or material defect will be rectified at no charge.

Claims in excess of these, in particular those related to consequential damage, are excluded.

We will accept no liability for damages, which result from improper or unauthorised utilisation, faulty installation or commissioning on the part of the customer or a third-party, natural wear and tear, faulty or negligent handling, chemical, electro-chemical or electrical influences, as long as the fault cannot be attributed back to actions taken on our part, non-compliance with Installation, Operating and Maintenance Instructions, improper modifications or repair work on the part of the customer or a third-party, as well as the influence of replacement parts from third-party origin.

Warranty entitlement is forfeited, as well, if the refrigeration circuit has been opened by unauthorised personnel, access has been made to the system assembly, or the serial number has been changed or made unrecognisable.

**2.2 Standards and regulations**

The Wall-hanging unit has been built and inspected according to the standards and regulations valid at the time of manufacture.

It complies with the EMC Directive 2004/108/EC, machinery directive 2006/42/EG.

The unit has been inspected at the factory for refrigeration circulation leakage and for function.

**2.3 Requirements for installation area / Intended use**

The Refrigeration unit must not be assembled outdoors.

The Refrigeration unit must be setup to ensure the free intake and discharge of air. In the event the use of air ducts is unavoidable, project planning must be made by a refrigeration specialist company.

Sufficient free space must be provided for in front of the Refrigeration unit intake and discharge openings in order to warrant a good air flow:

**- minimum 250 mm in front of all intake and exhaust openings**

If it is not possible to maintain this clearance, then sufficient air flow must be warranted by means of suitable measures (air deflector, air ducts, additional ventilators).

The unit must not be deployed in areas where strong strong magnetic interfering impulses are anticipated or in the vicinity of transmitting antennas.

The unit must not be setup in an explosive atmosphere!

The unit must not be setup in a fire-endangered operating site!

According to DIN VDE 0100-482 (VDE 0100 Part 482), this is:

1997-08

*Rooms or locations in rooms or in the open, in which, with respect to the local and operational circumstances, the danger exists that highly inflammable materials could come so close to the electrical equipment at such hazardous levels that the higher temperatures of this electrical equipment or electric arcing create a fire hazard.*

*This includes: Working, dry and storage rooms or sections of rooms, as well as similar outside locations, such as paper, textile and wood processing operations, hay, straw, jute or flax storage yards.*

- According to BGR 500, chapter 2.35 or local regulations for operation and maintenance. (qualified staff)

## 2.4 Transport

The Refrigeration unit must be transported in its operating position due to oil in the compressor. For possible further transport, only the original packaging may be used.

## 2.5 Delivery condition for Wall-hanging units

The Wall-hanging unit is delivered in a carton, operationally ready and wired for immediate plug-in.

## 2.6 Delivery condition for Split units

The Split unit is delivered in a carton and wired for immediate plug-in.

## 2.7 Unpacking and handling

- Prior to and during the unpacking of the Refrigeration unit, a visual inspection should be made in to determine whether possible damage has occurred during transport.
- Please pay attention to loose parts, dents, scratches visible oil loss, etc.
- Before disposing of the packing material, a check of it should be made to ensure that no loose parts are hidden in it.
- In order to process warranty claims, please provide an exact description of the deficiency (with picture if possible), as well as information as to unit model designation and serial number.
- In order to protect the unit from damage, it must only be transported in its operating position. It must be ensured that the evaporator and condenser units have not been damaged. Non-compliance will result in forfeiture of the warranty entitlement.

## 2.8 Energy conservation

Direct sunlight will raise the consumption of electricity. Avoid any unnecessary or too lengthy opening of the door.

Monitor the storage temperature. Regularly clean the Refrigeration unit. A clean unit saves energy and has a longer service life.

Observe cleaning intervals (see Chapter "Cleaning and maintenance of the Refrigeration unit"). Regular maintenance increases the service life.

### 3. Cleaning and maintenance of the Refrigeration unit



#### Attention!

**The mains plug must be removed from the socket and protected against re-insertion for all cleaning and maintenance work.**

Following commissioning, the Refrigeration unit should be checked periodically and cleaned as necessary. The time span between the checks or cleaning should be established based on the level of contamination.

The time interval for cleaning is dependent on the ambient conditions. Yet, at least one maintenance inspection should be performed annually.

The evaporator unit should be cleaned, either with a soft cleaning brush, with compressed air or, in case of heavy grease deposits, with an industrial cleaner. Do not use any sharp or sharp edged object for cleaning. It must also be ensured that the thin lamella fins are not bent or damaged during the cleaning process.

**Do not spray the unit with water or steam!**

#### 3.1 Disposal of cooling agent

If the Refrigeration unit must be replaced with a new unit, ensure that the Refrigeration unit pipelines are not damaged to the point that the cooling agent leaks out.

Defective Refrigeration units or extracted cooling agent must be disposed of in a manner compatible to the environment and in accordance with applicable regulations.

#### 4. Installation of a Wall-hanging unit in a Viessmann cold storage cell

Sufficient free space must be provided for in front of the Refrigeration unit intake and discharge openings in order to warrant a good air flow:

A wall element can be delivered by us with the respective cut-outs and bore holes for installation in the cold storage cell.

**Otherwise, the required bores holes and cut-outs should be made on location by a refrigeration technician using installation templates or the dimensional drawings.**

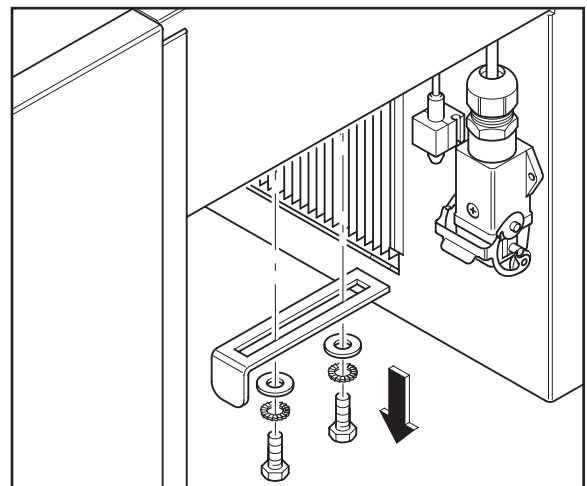
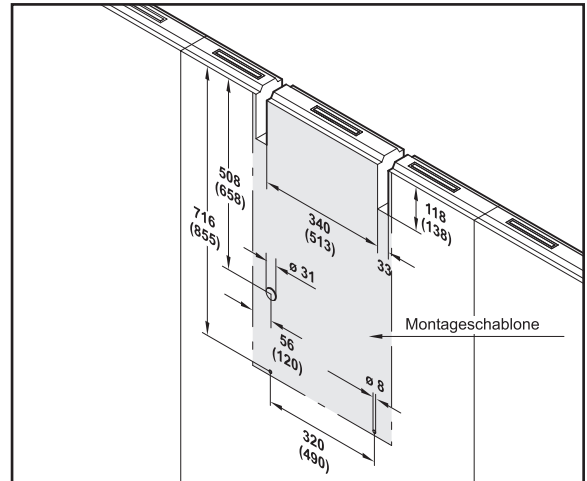
**The cutting edges and bore holes must be protected against corrosion with zinc primer paint.**



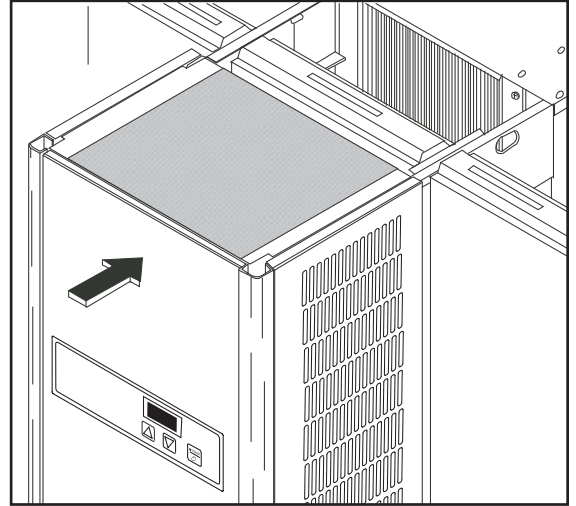
**Attention!**

**The electrical power supply should first be connected at commissioning after installation has been completed -Risk of life!**

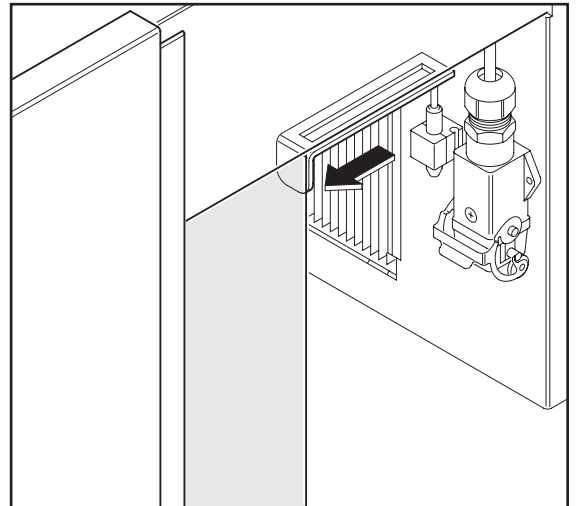
Loosen the holding angle from the unit.



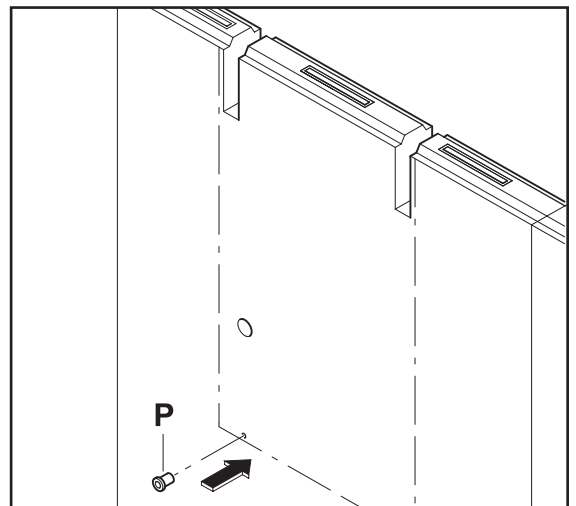
Hang the unit on the storage cell wall while pushing against it from the outside.



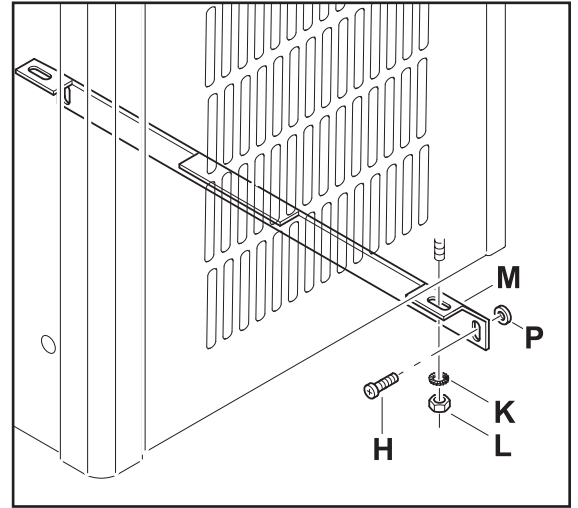
Slide the holding angle against the inside cell wall and tighten it securely with one or two bolts.



Insert the enclosed blind-rivet nuts (P) in the bore holes (d = 8 mm).

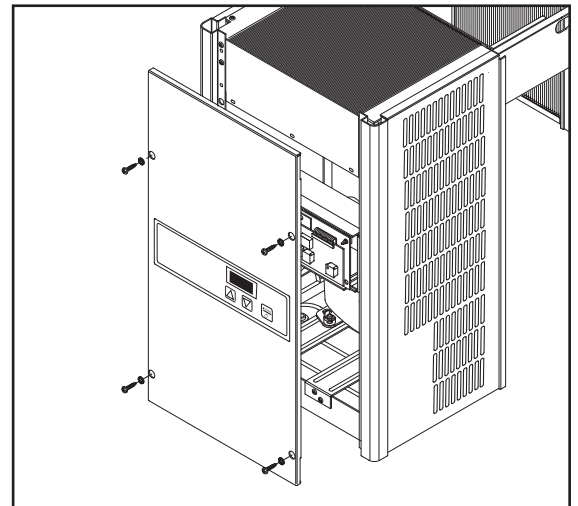


Bolt the enclosed holding angle (M) to the unit housing together with storage cell wall (M4 x 15 bolts (H) for attachment to the blind-rivet nuts (P) in the storage cell wall and hexagonal nuts (L) with washers (K) for attachment to the housing).

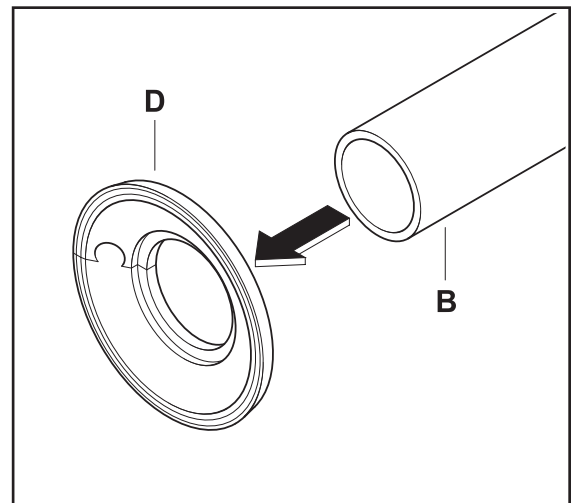


Loosen the locking screws (4 ea.) on the front access cover. Be careful to ensure that the serrated lock washers are not displaced.

Slide the front access cover slightly upwards and pull forward to remove.

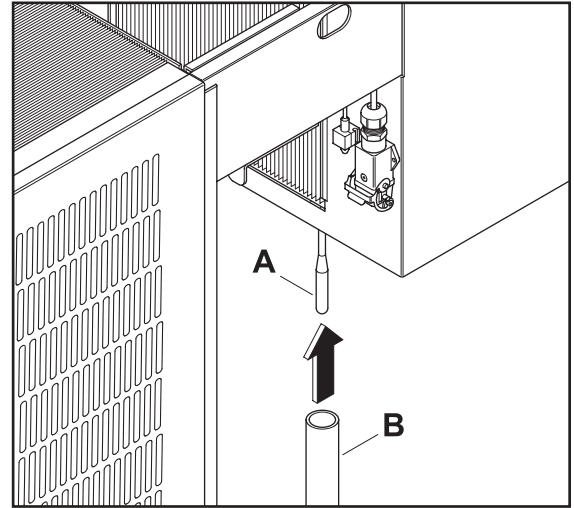


Slide the enclosed plastic collar (D) over the defrost water drain hose (B).





For units with electric defrosting, insert the defrost water drain heating into the defrost water drain hose (B); pull the defrost water drain hose (B) as straight as possible to ease the insertion process.



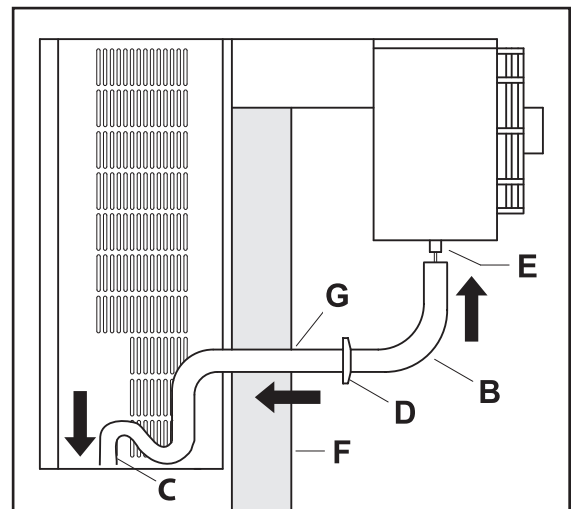
Siphon (C) only for deep-freezing units.

Guide the defrost water drain hose (B) through the bore hole (G,  $\varnothing$  31 mm) in the cell wall (F) from the inside. Lubricant can be used if necessary.

Connect the defrost water drain hose (B) to the drain port (E) on the evaporator condensate tray.

Insert the defrost water drain into the defrost water tray on Refrigeration and Deep-freeze units.

Cover the cut-out (G) for the defrost water drain hose (B) with the plastic collar (D).



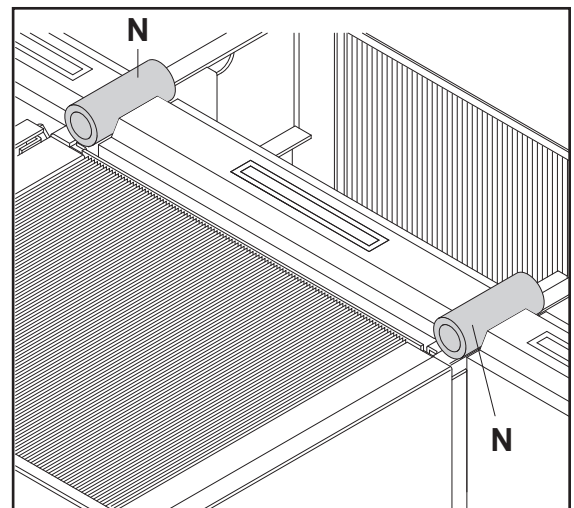
Fill out the area above the Refrigeration unit hanging rail with the enclosed Armaflex hoses (N) as sealing material.

Remount the front access cover, securing it to the unit with the enclosed sheet-metal screws ST 3.9 x 19 and serrated lock washers A 4.3.



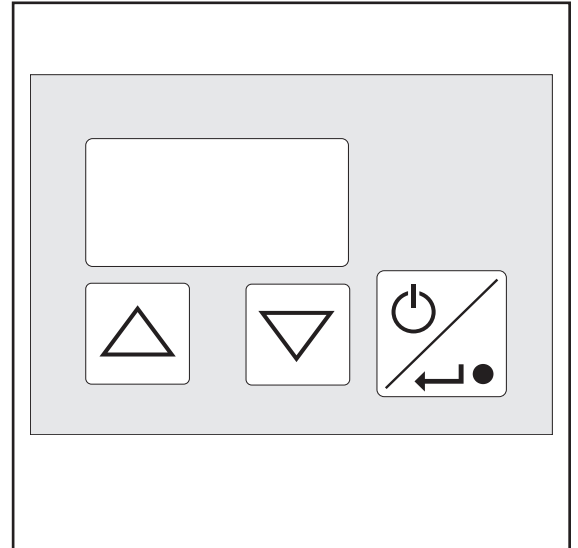
**Attention!**

**If cable ducts or the like are to be installed next to the Refrigeration unit, a space of 30mm must be maintained between the cable duct and the unit to ensure that the unit sidewall can be removed for maintenance work.**



#### 4.1 Connecting a remote control unit (SD Control)

In case the unit has been ordered with a remote control, attach the remote control at the designated location and plug in the adapter via the 10-pole flat ribbon cable to the back side of the control unit. Attach the adapter with the enclosed cable binders to the rear wall of the control housing. (with bus control, see Bus control manual)



## 5. Installation of a Split unit in a Viessmann cold storage cell

### 5.1 Installation of the condenser unit

The condenser unit is installed outside the cold storage cell. The length of the electric lines on the condenser unit, including plug, is 15 m. This is also the maximum distance between the condenser unit and the evaporator unit.

The minimum distance to the room ceiling must be at least 250 mm in order to warrant a good air flow.



**Attention!**

**This minimum distance must be checked prior to installation of the condenser unit!**



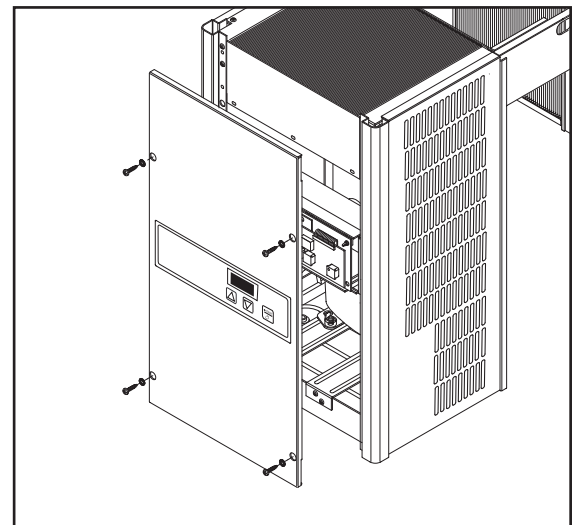
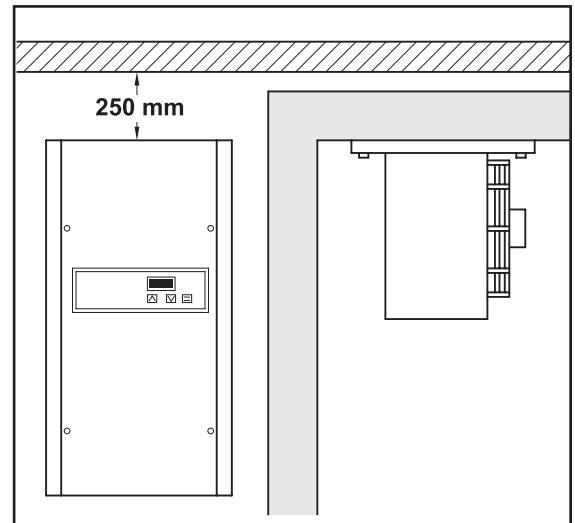
**Attention!**

**Assembly and installation of the Refrigeration unit in the split version must be carried out by a refrigeration specialist company according to applicable refrigeration-related regulations!**

Loosen the locking screws (4 ea.) on the front access cover.

Remove the front access cover by pulling upwards and forward.

Attach the condenser unit to the wall through the prescribed bore holes on the back-side of the unit, using the attachment materials included in the enclosed accessory kit.



### 5.1.1 Drill template for attachment of the large condenser unit

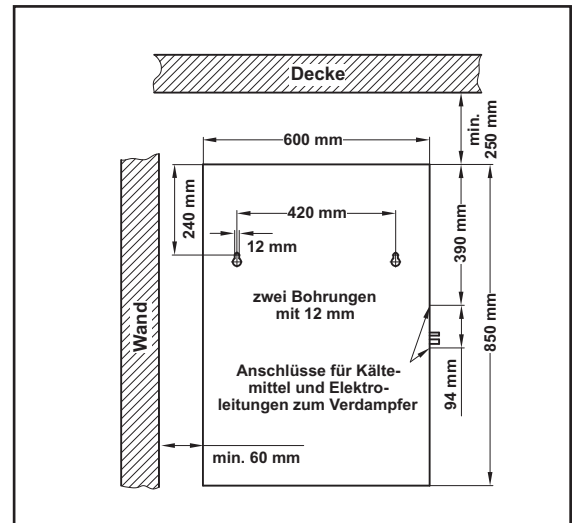
**TectoRefrigo WMC2 2000, 2800**

**TectoRefrigo WSC1 2000, 2800**

**TectoRefrigo WMF2 1400, 1800, 2400**

**TectoRefrigo WSF1 1400, 1800, 2400**

Distance to wall - 60 mm.



### 5.1.2 Drill template for attachment of the small condenser unit

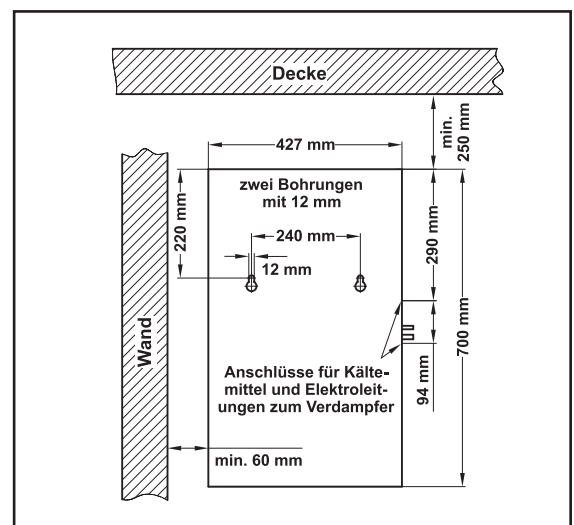
**TectoRefrigo WMC2 0500, 0900, 1300**

**TectoRefrigo WSC1 0500, 0900, 1300**

**TectoRefrigo WMF2 0900**

**TectoRefrigo WSF1**

Distance to wall - 60 mm.



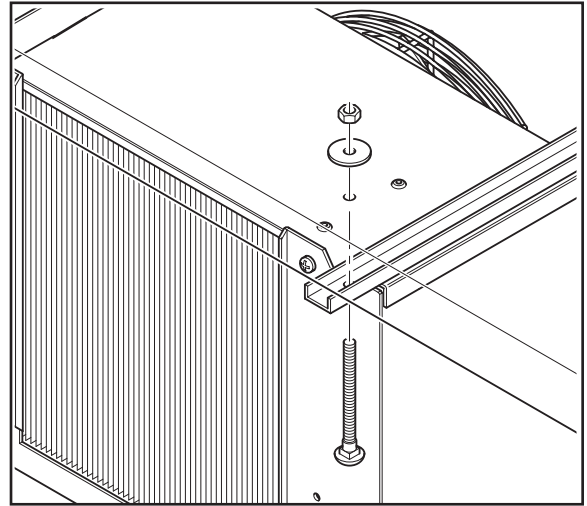
## 5.2 Installation of the evaporator unit

The evaporator unit is mounted to the ceiling on the inside of the cold storage cell.

Four bore holes should be made in the cell ceiling according to dimensional drawings 2.2.1 and 2.2.2.

Protect the cutting edges against rust.

Attach the evaporator unit to the U-profile on the cell ceiling with the enclosed plastic locking screws.



### 5.2.1 Drill template for attachment of the large evaporator unit

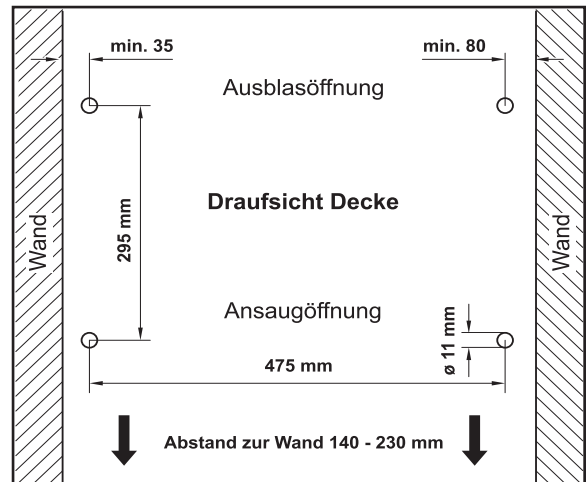
**TectoRefrigo WMC2 2000, 2800**

**TectoRefrigo WSC1 2000, 2800**

**TectoRefrigo WMF2 1400, 1800, 2400**

**TectoRefrigo WSF1 1400, 1800, 2400**

Distance to wall 140 mm with a wall thickness of 150 mm. Distance to wall 230 mm with a wall thickness of 60 mm.



### 5.2.2 Drill template for attachment of the small evaporator unit

**TectoRefrigo WMC2 0500, 0900, 1300**

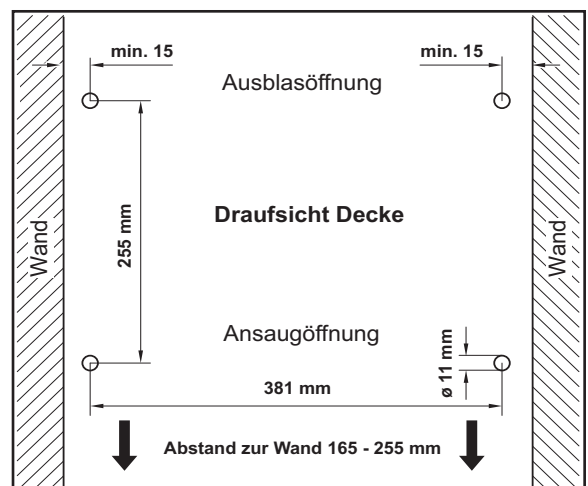
**TectoRefrigo WSC1 0500, 0900, 1300**

**TectoRefrigo WMF2 0900**

**TectoRefrigo WSF1 0900**

Distance to wall 165 mm with a wall thickness of 150 mm.

Distance to wall 255 mm with a wall thickness of 60 mm.



**5.3 Layout and installation of the pipelines**

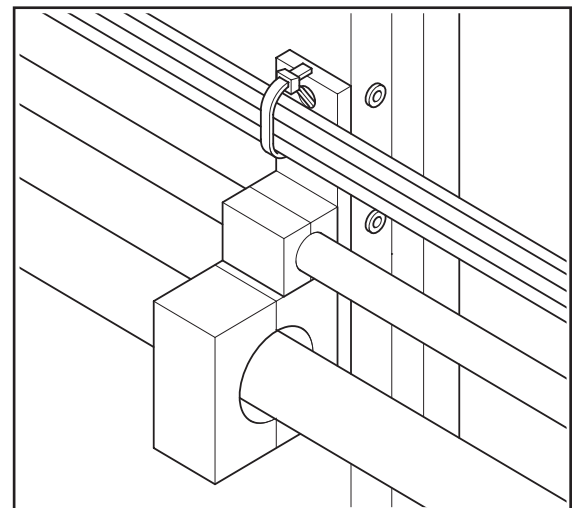
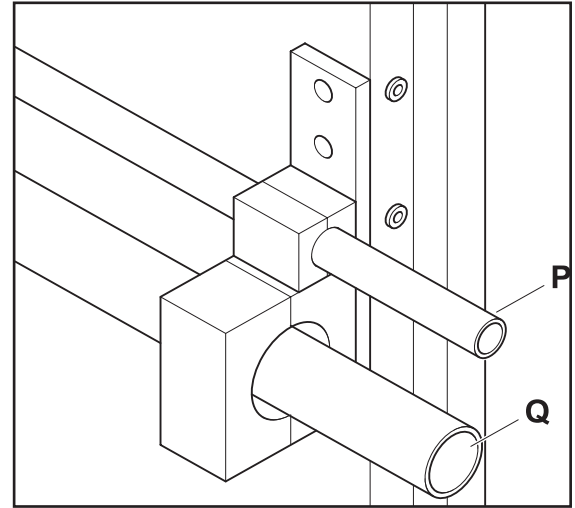
Solder the solder connections (P and Q) on the Refrigeration unit to the solder connections on the evaporator unit by means of a suitable copper pipeline.

Check all solder points for leak-tightness!

**The length of the pipeline must not exceed 15 m!**

Pipe diameter in mm				
Unit	WMC2 0500 WSC1 0500	WMC2 0900 WSC1 0900	WMC2 1300 WSC1 1300	WMC2 2800 WSC1 2800
Fluid line (P)	6	6	6	10
Suction line (Q)	10	12	12	16

Pipe diameter in mm				
Unit	WMF2 0900 WSF1 0900	WMF2 1400 WSF1 1400	WMF2 1800 WSF1 1800	WMF2 2400 WSF1 2400
Fluid line (P)	6	6	10	10
Suction line (Q)	12	12	16	16



**5.4 Layout and installation of the electrical lines**

For practical purposes, the Layout and installation of the electrical lines takes place along the pipeline.

Insert the electrical connector plug into the appropriate plug adapter on the Refrigeration unit circuit board.

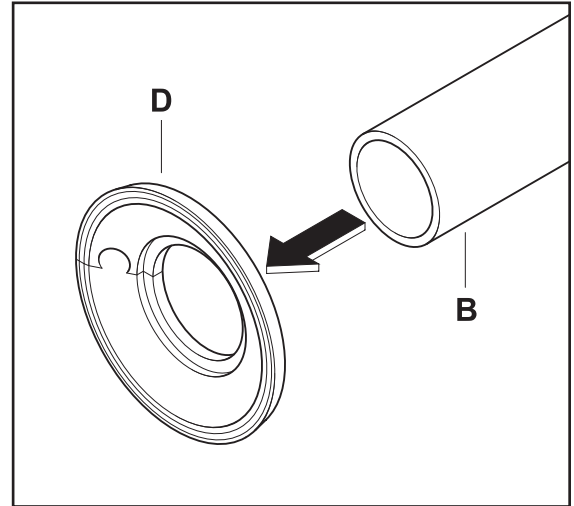


**Attention!**

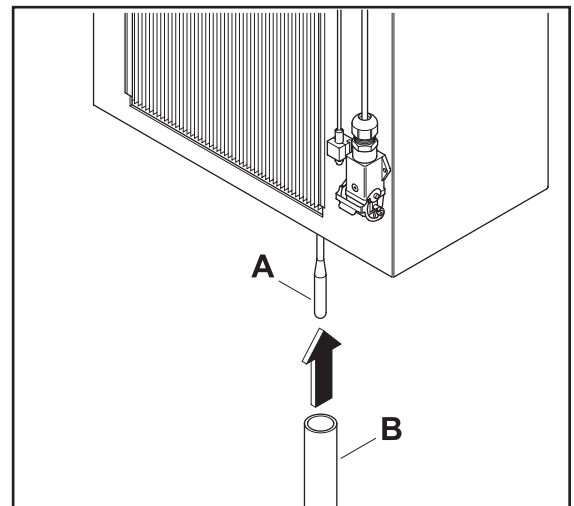
**The electrical power supply should first be connected at commissioning - Risk of life!**

## 5.5 Installation of the defrost water drain hose

Slide the enclosed plastic collar (D) over the defrost water drain hose (B).



Insert the defrost water drain heating (A) into the defrost water drain hose (B), pulling the defrost water drain hose (B) as straight as possible to ease the insertion process.

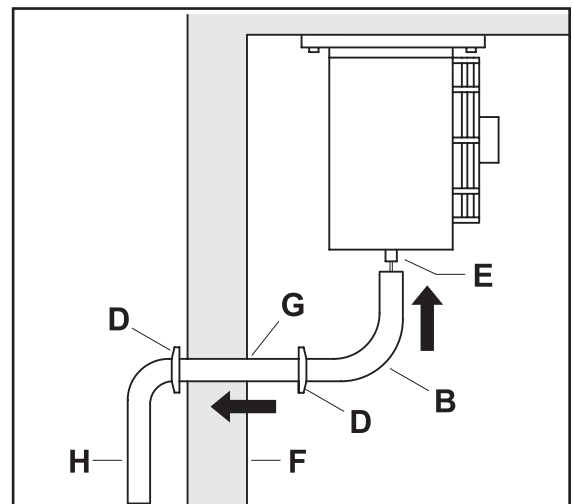


Guide the defrost water drain hose (B) through the bore hole G,  $\varnothing$  31 mm) in the cell wall (F) from the inside. Lubricant can be used if necessary.

Connect the defrost water drain hose (B) to the drain port (E) on the evaporator condensate tray.

Cover the cut-out (G) for the defrost water drain hose (B) with the plastic collar (D).

See the separate defrost water drain installation instructions for all Split units.



## 6. Drainage of defrost water

We recommend using the defrost water drain accessory pack, available as an option, for an optimal drainage of defrost water accumulation.

The accessory pack can be used for all Viessmann FS- and CS- series Refrigeration units.

## 7. Coldroom electrical power supply

A 4-pole socket outlet is located on the intake-side of the Refrigeration evaporator unit for the electrical power supply to the loads attached to the coldroom, with a total power capacity of max. 250 Watts (lighting, door frame heating). The door contact switch can also be connected to this socket outlet.

### 7.1 Connecting the door contact switch

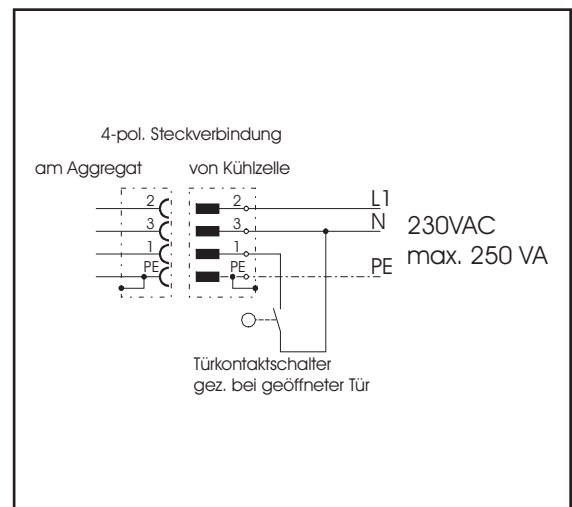
The evaporator ventilator should be switched off when the cold storage cell is opened. For this reason, we recommend the installation of an potential-free door contact switch (switching capacity 230VAC, min. 0.5 A).

Connection takes place via the 4-pole socket outlet mounted on the intake-side of the evaporator unit.

In its delivered condition, the unit is functionally ready for service without an external door contact switch. The door contact switch is not included within the scope of delivery of the unit.

#### 7.1.1 Refrigeration unit with electronic SD Control unit

If a door contact switch is connected to the unit, then the control unit parameter P29 must be changed to "1" (see 8.5.1, Parameter list).





**7.2 Connecting the Fault report contact**

The electronic SD Control unit is outfitted with a potential-free Fault report contact for connection to the on-site Fault reporting equipment (max. 10A, 230VAC).

In the event of a fault, contacts C and NC are closed.

The connection is located on the circuit board (plug connector A3 orange).

**7.3 Power supply connection and commissioning**



**Attention!**

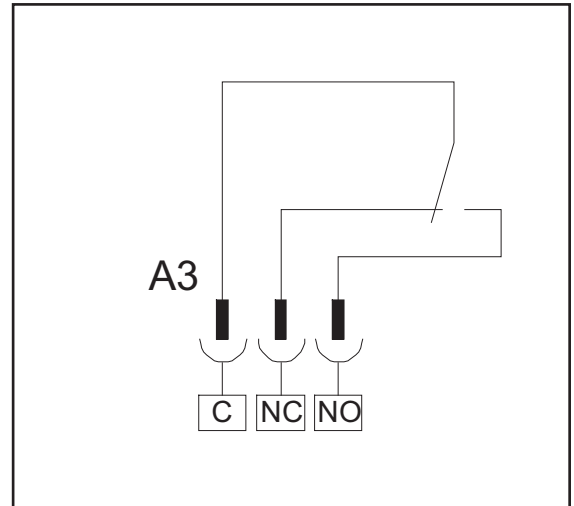
**The electrical power supply should first be connected at commissioning - Risk of life!**

Work on the power supply connector and protection devices must be carried out by a specialist company, in accordance with IEC 364, local regulations and the connection conditions of the respective energy supply company!

Insert the mains plug into the approved and properly grounded socket (230 VAC or 400 VAC, 50 Hz, 16A slow-blow).

**Electronic SD Control unit**

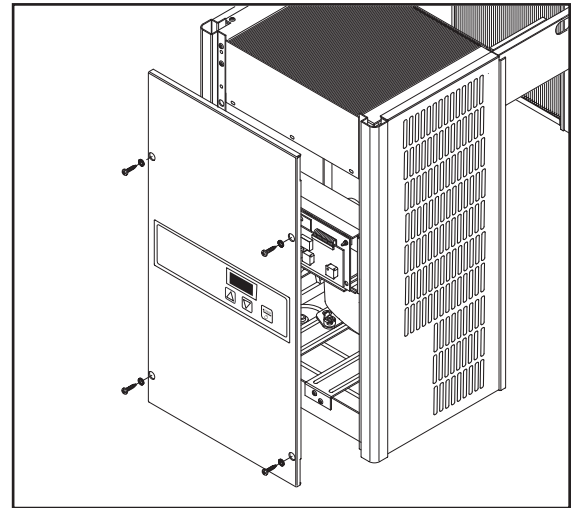
The unit starts after the Control unit self-test function and after run-out of an approx. 3 minute delay time (adjustable via parameter P34). During the initial switch-on, this time delay can be bypassed by switching the unit off, then by switching it subsequently back on by means of the Start/Stop key. The "Stop-Start-Enter" key must be actuated for approx. 3 sec. in order to switch off the unit.



### 7.3.1 CEE mains plug (only on Refrigeration units TectoRefrigo WMF2 1800, 2400 and TectoRefrigo WSF1 1800, 2400)

Loosen the locking screws (4 ea.) on the front access cover. Be careful to ensure that the serrated lock washers are not displaced.

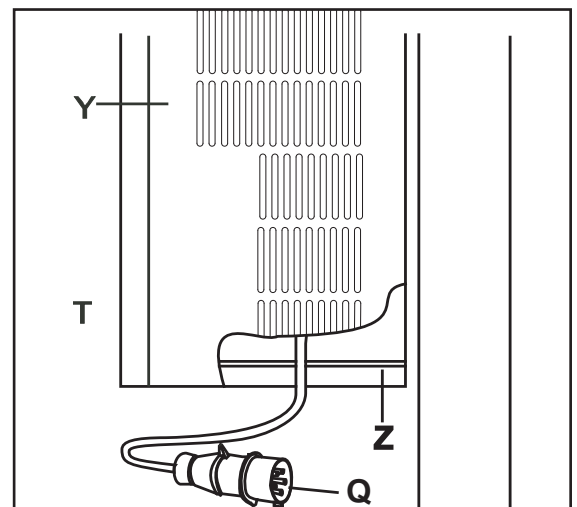
Slide the front access cover slightly upwards and pull forward to remove.



Loosen the lateral inside positioned attachments screws on the right side-section, slide the side-section (Y) upwards and remove.

Guide the main connector cable with CEE mains plug (Q) to the outside. Re-hang side-section (Y), slide downwards and secure with the attachment screws.

Insert the CEE mains plug into the on-site CEE socket (3+N+PE, AC 400V, 16A, 50 Hz).



Remount the front access cover, securing it to the unit with the enclosed sheet-metal screws ST 3.9 x 19 and serrated lock washers A 4.3.

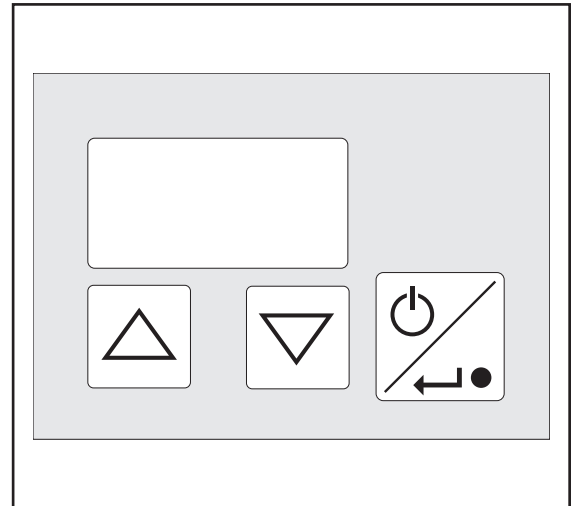
## 8.1 Normal operation

The current coldroom temperature is shown on the display. If one of the buttons is activated [▲] or [▼] the current temperature setting is shown. The right decimal point on the display lights up. If there is not further activation of the button within ten seconds, the room temperature is shown again.

By pressing the „Stop-Start-Enter“ button, the unit can be switched off or on again. In the switched-off state, the display shows „OFF“.

If, in the switched-off state, the two buttons [▲] and [▼] are pressed and held, and the button „Stop-Start-Enter“ is subsequently activated, the unit will begin a defrosting cycle. If the two buttons [▲] and [▼] are not activated on starting the unit, the unit will begin refrigeration. If a defrosting cycle has been started prior to this, it will be interrupted.

**Do not activate the buttons with pointed objects such as pens or screwdrivers.**



### Display during operation:

Function	German	English	French
StandBy	OFF		
Defrost	Abt.	dEF.	dEg.
Display with Button Activation and Active Key-Lock	Bo.L		
Fault (x= fault number)	F.x	E.x	d.x
Version Display	„Sd“ -> „5.13“		

## 8.2 Parameter entry

If both keys [▲] and [▼] are actuated simultaneously during operation, the Parameter function will be accessed.

In this function, the nominal temperature and the defrost times can be entered or changed. Likewise, the mode of operation of the evaporator fan for high or low air humidity in the coldroom can be set.

The designation of the selected parameter appears in the display, while the yellow LED in the "Stop-Start-Enter" key illuminates; in this case, the "Stop-Start" function is switched off.

By actuating the "Stop-Start-Enter" key, the display can be switched between the parameter designation and the parameter value.

By using the keys [▲] or [▼], the parameter address or the parameter value can be changed within the prescribed limits.

The parameters can be protected against unauthorised changes by means of a password (P07 <> x2). In order to access the parameters released by the System operator in this case, the following procedure should be undertaken:

Depress both keys [▲] and [▼] simultaneously during operation, P01 appears in the display, the yellow LED in the "Stop-Start-Enter" key illuminates simultaneously.

Depress the "Stop-Start-Enter" key  
- 1 is indicated in the display.

Select the value 5 with the keys [▲] or [▼].

Depress the "Stop-Start-Enter" key  
- P01 is indicated in the display.

By using the keys [▲] or [▼], the desired parameters P02 - P09, or P02 - P23 as appropriate (see 8.2.6), can now be selected.

Parameter entry will be ended automatically after 10 sec. if a key has not been actuated. It will also be ended if the value 0 is entered into parameter P01.

### 8.2.1 Entry of nominal temperatures

Following entry of the password, select parameter P02 (indication in display SL.t.), depress the Enter key, the current nominal temperature is indicated in °C. It can be changed within the range released for respective unit model (normal cooler -5°C to 20°C; deep -freezer -25°C to -5°C) by using the keys [▲] or [▼].

### 8.2.2 Entry of defrosting times

#### Defrosting according to specified cycle times - Entry of the defrost pause:

Following entry of the password, select parameter P03 (indication in display Ab.h.), depress the Enter key, the current defrost pause time will be indicated in hours. It can be changed within the range of 1 to 24 hrs. by using the keys [▲] or [▼].

The defrost pause should be shortened if the air humidity in the coldroom is so high that the evaporator is completely iced over.

#### Defrosting at definite specified times

If a DCF radio receiver is connected to the control unit, 12 switching points can be entered into the parameters P12 to P23, at which times the defrosting process will be started. For this, the parameter P30 must be set accordingly (only by a refrigeration specialist company).

Following entry of the password, select parameters P12 to P23 (indication in display t.01 .. t.12), depress the Enter key, the current switching point for starting the defrosting process will be indicated in format hh.m(x10). It can be changed within the range of 00.0 to 23.5 or set to "OFF" by using the keys [▲] or [▼]. The numbers in front of the decimal point indicate the hours, while the digit after the decimal point indicates the minutes in values of ten.

### Entry of defrosting duration:

Following entry of the password, select parameter P04 (indication in display Ab.d.), depress the Enter key, the current defrosting duration time will be indicated in minutes. It can be changed within the range of 5 to 60 min. by using the keys [▲] or [▼].

The defrosting process will be ended prior to expiration of "Defrosting duration" if the evaporator exceeds 10°C.

The defrosting duration time should be extended if the evaporator has not been completely defrosted by the end of the defrosting time.

### 8.2.3 Selection of coldroom humidity

Following entry of the password, select parameter P05 (indication in display rF.), depress the Enter key, the current mode of operation of the evaporator fan is indicated.

Using key [▲], the evaporator fan begins continuous operation (high rel. humidity), (indication in display HI); Using the key [▼], the fan runs with the compressor (low rel. humidity), (indication in display LO).

### 8.2.4 Selection of language for display indications

Following entry of the password, select parameter P06, depress the Enter key, the selected language will be indicated (d=German, gb=English, f=French). This can be changed by using the keys [▲] or [▼].

### 8.2.5 Password and keyboard lock

If the value 0 is entered into parameter P07, then the keys [▲] and [▼] and the Start-Stop key will be locked. This function can be used if there is a danger that the control unit can be adjusted by unauthorised persons.

The keyboard lock is active if the indication "Bo.L" appears in the display when a key is actuated.

Activation or deactivation of the keyboard lock:

Depress keys [▲] and [▼] simultaneously

P01 appears

Depress the Enter key

Select value 5

Depress the Enter key

Select P07

Depress the Enter key

By using the keys [▲] or [▼], select one of the following functions:

P07 = 0 : Keyboard lock is switched on

P07 = 1 : Keyboard is released

P07 = 2 : The parameters P02 to P09 can be processed without a password. Following actuation of both keys [▲] and [▼], the nominal temperature parameter address appears immediately.

#### Switching off indications on SD Control unit:

The keyboard lock is also active if a value  $\geq 10$  is entered into parameter P07. In this case, the temperature indication will be also switched off on the SD Control unit. The decimal point shifts back and forth to that the unit is operating.

Fault reports and defrosting status will be indicated. The temperature will continue to be indicated on a remote control unit if connected.

This function is useful if a remote control unit is connected to the Control unit and the unit can be accessed by unauthorised persons.

Parameter levels P02 to P23 can be accessed if password 5 or the password for the operating mode parameter is selected in parameter P01. If parameter P07 has the value 2, this parameter level is accessible without a password.

*Parameters depicted in italics cannot be changed.*

Indication of the selected parameters in the display during parameter entry.						
Function	Parameter	German	English	French	Unit	Range
Password	P01	P01	P01	P01		0-99
Nominal temperature	P02	SL.t.	n.t.	t.n.	°C	P31...P32
Defrosting cycle [hr]	P03	Ab.h	dE.C	c.dE	hours	1...24
Defrosting duration [min]	P04	Ab.d	dE.t	d.dE	minutes	5...60
Humidity (evaporator fan operating mode) LO=run time w. condenser (low rel. humidity) HI=continuous run (high rel. humidity)	P05	r.F.	HU.	HU.		
Language d = German e = English f = French	P06	P06	P06	P06		
Keyboard release P07 = 0 : Keyboard lock is switched on P07 = 1 : Keyboard is released P07 = 2 : The parameters P02 to P09 can be processed without password. P07 = 3 : The nominal temperature can be processed without password.	P07	tA.F	bo.E	bo.E		0...3; 10...13
<i>Display of evaporator temperature</i>	<i>P08</i>	<i>P08</i>	<i>P08</i>	<i>P08</i>	°C	<i>-50...50/OFF</i>
<i>Display of condenser temperature</i>	<i>P09</i>	<i>P09</i>	<i>P09</i>	<i>P09</i>	°C	<i>0...99/OFF</i>
The following parameters are indicated only if the value x2 is set in P30 and a DCF radio clock receiver is connected.						
<i>current time [hr]</i>	<i>P10</i>	<i>P10</i>	<i>P10</i>	<i>P10</i>	<i>hours</i>	<i>0...23</i>
<i>current time [min]</i>	<i>P11</i>	<i>P11</i>	<i>P11</i>	<i>P11</i>	<i>minutes</i>	<i>0...59</i>
Defrosting time 1	P12	t.01	t.01	t.01	hh.m (x10)	00.0...23.5
Defrosting time 2	P13	t.02	t.02	t.02	hh.m (x10)	00.0...23.5
Defrosting time 3	P14	t.03	t.03	t.03	hh.m (x10)	00.0...23.5
Defrosting time 4	P15	t.04	t.04	t.04	hh.m (x10)	00.0...23.5
Defrosting time 5	P16	t.05	t.05	t.05	hh.m (x10)	00.0...23.5
Defrosting time 6	P17	t.06	t.06	t.06	hh.m (x10)	00.0...23.5
Defrosting time 7	P18	t.07	t.07	t.07	hh.m (x10)	00.0...23.5
Defrosting time 8	P19	t.08	t.08	t.08	hh.m (x10)	00.0...23.5
Defrosting time 9	P20	t.09	t.09	t.09	hh.m (x10)	00.0...23.5
Defrosting time 10	P21	t.10	t.10	t.10	hh.m (x10)	00.0...23.5
Defrosting time 11	P22	t.11	t.11	t.11	hh.m (x10)	00.0...23.5
Defrosting time 12	P23	t.12	t.12	t.12	hh.m (x10)	00.0...23.5
Access levels for the refrigeration specialist company: Access to the levels beyond P29 (access levels for the refrigeration specialist company) is possible only if the password for the Operating mode parameter has been selected in parameter P01 (see special Parameter list).						

If a new key actuation does not take place within 10 sec., parameter entry will be ended and the coldroom temperature will be indicated. The yellow LED in the "Stop-Start-Enter" key goes out; this key takes over the "Stop-Start" function.

The Control unit functions can be monitored continuously via several parameters. In this case, the yellow LED in the "Stop-Start-Enter" key blinks. By actuating the "Stop-Start-Enter" key, the LED goes to continuous operation for 10 sec.; the indication then jumps back to normal operation.

General notice (liability): the details of this technical documents serve for description. Consents regarding the availability of certain features or regarding a certain purpose always require a special written agreement.

**8.3 Fault report**

Indication in Display	Meaning
F01	Room sensor short circuit
F02	Room sensor probe break
F03	Pressostat fault
F04	Coldroom temperature too high
F05	Coldroom door open
F06	Coldroom temperature too low
F08	Evaporator sensor defective
F09	Condenser sensor defective
F10	Emergency run switch ON
F11	EEPROM fault

**8.4 Decommissioning of the Refrigeration unit**

The unit should be taken out of service by disconnection the mains plug if a lengthy downtime, cleaning or maintenance work is projected. A short-term decommissioning of the Refrigeration unit can be undertaken by depressing the Start/Stop key for approx. 3 sec. (Standby mode).

The Refrigeration unit and its connected loads are not potential-free in the Standby mode.



Note:

The set parameters will retain their setting following an interruption of power.



**Attention!**

**If the unit is taken out of service and is to be stored in an area, in which a frost hazard exists, it must be ensured that the heat exchanger water has been completely drained, as this unit can otherwise be destroyed.**

**This is possible by loosening the lower bolting on the condenser unit.**

## 8.5.1 Parameter list

**Attention!**

The following parameters decisively influence the operation of the Refrigeration unit. They may be changed only by specialist personnel. For this reason, it is recommended that the password for the Operating mode parameter be made unrecognisable.

If parameters are changed, the change should be entered into the column "Altered values".

Operating mode parameter (release when password P01 = 22)

The following parameters are pre-allocated as operating mode parameters for normal or deep freezer refrigeration. They can be adapted. If necessary, they can be reset to the factory settings via P50 and P51.

Parameter	Description	Unit	Range	Altered values	Specification			
					CT	FT	CS	FS
P28	Signal display from DCF antenna	sec.	0-59					
P29	Door contact switch (0=without DC; 1=with DC)		0-1		0	0	0	0
P30	Defrosting operating mode		00-03; 10-13		0	0	0	0
	x0 = according to specified cycle times							
	x1 = according to specified cycle times, yet dependent on compressor run time							
	x2 = dependent on specified switch points (only with DCF antenna)							
	x3 = demand defrosting							
	0y = "Start defrosting" via door contact switched off							
1y = "Start defrosting" via door contact switched on								
P31	Max. admissible room temperature	°C	-50...+50		20	-5	20	-5
P32	Min. admissible room temperature	°C	-50...+50		-5	-25	-5	-25
P33	Room temperature difference	K	-8...-1 +1...+8		+2	-2	+2	-2
P34	Min. compressor standing time	min.	3-10		3	3	3	3
P35	Evaporator fan start-up delay	min.	0-10		3	3	3	3
P36	Evaporator fan run-down time	min.	0-20		0	0	0	0
P37	Switch point for air circulation defrosting	°C	3-40		20	20	3	3
P38	Temperature difference for switch-on of demand defrosting	K	10-40		25	25	25	25
P39	Defrosting limiting temperature	°C	+5...+50		20	20	20	20
P40	Evaporator dripping time	min.	0-10		3	3	3	3
P41	Evaporator fan start-temperature	°C	-20...+10		-5	-15	-5	-15
P42	Temperature alarm delay time	min.	0-99		60	60	60	60
P43	Upper alarm temperature (nominal value + P43)	K	0-20		10	10	10	10
P44	Lower alarm temperature (nominal value - P44)	K	0-20		5	5	5	5
P45	Door contact alarm delay time	min.	0-99		4	4	4	4
P46	Condenser nominal temp. for turning speed regulator	°C	20-60		20	20	20	20
P47	Condenser fan turning speed in %		OFF/10 - 100					
P48	Minimum condenser fan turning speed in %		10...100		40	40	40	40
P49	Condenser fan slew-rate turning speed regulator		1-100		10	10	10	10

General notice (liability): the details of this technical documents serve for description. Consents regarding the availability of certain features or regarding a certain purpose always require a special written agreement.



Parameter	Description	Unit	Range	Altered values
P50	Unit model CT = Normal refrigeration ceiling unit FT = Deep-freezer ceiling unit CS = Normal refrigeration wall-hanging unit FS = Deep-freezer wall-hanging unit		C.t., F.t., C.S., F.S.	
P51	Reset to factory settings (P = 78)			
P52	Compressor run time, last cycle [hours]	hrs.		
P53	Compressor run time, last cycle [minutes]	min.		
P54	Compressor run time, second to last cycle [hours]	hrs.		
P55	Compressor run time, second to last cycle [minutes]	min.		
P56	Compressor run time, third to last cycle [hours]	hrs.		
P57	Compressor run time, third to last cycle [minutes]	min.		
P58	Compressor run time, fourth to last cycle [hours]	hrs.		
P59	Compressor run time, fourth to last cycle [minutes]	min.		
P60	Compressor standing time, last cycle [hours]	hrs.		
P61	Compressor standing time, last cycle [minutes]	min.		
P62	Compressor standing time, second to last cycle [hours]	hrs.		
P63	Compressor standing time, second to last cycle [minutes]	min.		
P64	Compressor standing time, third to last cycle [hours]	hrs.		
P65	Compressor standing time, third to last cycle [minutes]	min.		
P66	Compressor standing time, fourth to last cycle [hours]	hrs.		
P67	Compressor standing time, fourth to last cycle [minutes]	min.		
P68	Compressor average run time, 4 cycles [hours]	hrs.		
P69	Compressor average run time, 4 cycles [minutes]	min.		
P70	Compressor average standing time, 4 cycles [hours]	hrs.		
P71	Compressor average standing time, 4 cycles [minutes]	min.		
P72	Compressor switch-on count (xxyy00-xxyy99)			
P73	Compressor switch-on count (xx00zz-xx99zz)			
P74	Compressor switch-on count (00yyzz-99yyzz)			
P75	Switch-on count after restart (xxyy00-xxyy99)			
P76	Switch-on count after restart (xx00zz-xx99zz)			
P77	Switch-on count after restart (00yyzz-99yyzz)			
P78	Pressostat fault count (xxyy00-xxyy99)			
P79	Pressostat fault count (xx00zz-xx99zz)			
P80	Pressostat fault count (00yyzz-99yyzz)			
P81	Compressor run time after end of defrosting process	hrs.		
P82	Compressor run time after end of defrosting process	min.		
P83	Current bus address			
P84	Cont. defrosting pause time or pause-time [hours]	hrs.		
P85	Cont. defrosting pause time or pause-time [minutes]	min.		

General notice (liability): the details of this technical documents serve for description. Consents regarding the availability of certain features or regarding a certain purpose always require a special written agreement.

Parameter	Description	Unit	Range	Altered values
P86	Room sensor calibration	K	-20...+20	
P87	Evaporator sensor calibration	K	-20...+20	
P88	Condenser sensor calibration	K	-20...+20	
P90	Room sensor -50° adjustment			
P91	Room sensor slew-rate			
P92	Evaporator sensor -50° adjustment			
P93	Evaporator sensor slew-rate			
P94	Condenser sensor -50° adjustment			
P95	Condenser sensor slew-rate			
P96	Switch-on delay after door contact switch closed	min.	[0...20]	
P97	Mains power frequency	Hz	50, 60	
P98	Door contact evaluation signal from bus 0 = As soon as the unit's door contact at the bus system opens, the unit is switched off. 1 = Only its own door contact signal is evaluated (description, see Bus control manual)		0, 1	
P101	<i>Nominal temperature + 50</i>			
P102	<i>Status byte 1</i>			
P103	<i>Status byte 2</i>			
P104	<i>Status byte 3</i>			
P105	<i>Marker byte 7</i>			
P106	<i>Selected unit number (only with remote control)</i>			
P107	<i>Number of units at the bus</i>			

## 8.5.2 Description of Operating modes and their respective parameters

### Defrosting:

During the defrosting process, Abt. or dEF. or dEg. appears in the display.

Defrosting takes place via electrical heating. After defrosting has ended, the compressor switches on after the dripping time entered into P40. The evaporator fan starts running when the evaporator temperature exceeds the value entered into P41 or if the time set into P35 has run out after the compressor has been switched on.

The evaporator temperature can be displayed in P08. If no temperature sensor is connected to the evaporator, "OFF" will be displayed in P08.

### Defrosting operating mode:

The defrosting cycle can be selected via parameter P30:

### Defrosting is initiated in definite cycles:

P30 = x0

Defrosting is initiated when the time from the last point for beginning defrosting, as entered into P03, has expired.

Defrosting is ended when the evaporator temperature exceeds the value entered into P39 or when the defrosting duration value entered into P04 is exceeded.

### Defrosting is initiated, dependent upon the run time of the compressor:

P30 = x1

The run time of the compressor will be reset to 0 at the end of the defrosting process. If the run time of the compressor reaches the value entered into P03, then defrosting will be initiated.

Defrosting is ended when the evaporator temperature exceeds the value entered into P39 or when the defrosting duration value entered into P04 is exceeded.

### Defrosting will be initiated at specific points of time:

P30 = x2

Defrosting will be initiated when the internal clock reaches one of the switch times entered into parameters P12 - P23. If the value OFF has been entered into one of the parameters P12 - P23, then this switch point is locked.

Defrosting is ended when the evaporator temperature exceeds the value entered into P39 or when the defrosting duration value entered into P04 is exceeded.

This parameter is released only when a DCF radio clock receiver is connected to the Control unit.

### Defrosting is initiated, dependent upon the state of evaporator icing:

(only with an evaporator sensor connected)

P30 = x3

Defrosting is initiated when the evaporator temperature is lower than the room temperature minus the value entered into P38.

Example:

Room temperature = 5°C, P38 = 25

Defrosting is initiated when the evaporator temperature falls below -20°C.

As a precaution, defrosting will be initiated when the run time of the compressor exceeds the value entered into P03. For this reason, it is recommended that the value entered into P03 be approx. 10 hrs.

Defrosting is ended when the evaporator temperature exceeds the value entered into P39 or when the defrosting duration value entered into P04 is exceeded.

### **Additional defrosting will be initiated when the cold-room door is open for longer than 4 min.:**

P30 = 1y

Defrosting will be initiated in addition to the operating mode entered in value Y when the Fault report "Coldroom door open" occurs.

### **Air circulation defrosting:**

If the nominal temperature lies above the value set into P37, defrosting will take place via air circulation. In this case, the evaporator fan is switched on during the defrosting process and the defroster heating is off.

### **Hysteresis**

The hysteresis between switch-on and switch-off temperature can be set via P33.

If the value of P33 is negative, the unit switches off when the coldroom temperature has reached the value of the nominal temperature minus the absolute hysteresis value. It switches on when the coldroom temperature reaches the nominal temperature again.

Example: Nominal temperature -20°C,  
Hysteresis -2K

Unit off at -22°C,  
Unit on at -20°C.

If the value of P33 is positive, the unit switches off when the coldroom temperature reaches the nominal temperature. It switches on when the coldroom temperature reaches the nominal temperature + hysteresis value.

Example: Nominal temperature +5°C,  
Hysteresis +2K

Unit off at +5°C,  
Unit on at +7°C.

### **Condenser fan (on units with air cooled condenser and turning speed regulator):**

The condenser fan is outfitted with a turning speed regulator on some unit models. In this case, the condenser temperature is detected by means of a temperature sensor located at the condenser outlet pipe. If the sensor has not been installed for economical reasons, the turning speed regulator function is bridged via a relay and the fan will run at full turning speed.

The condenser temperature can be displayed in P09. If turning speed regulator is not active or if a temperature sensor is not connected to the condenser, "OFF" will be displayed in P09.

If the turning speed regulator fails, the high-pressure Pressostat will activate any fans, which are not running. As this is recognised as a fault situation, the fan will be switched on via the relay. As an activation of the high-pressure switch is possible under other circumstances, as well, the turning speed regulator will be reactivated after a one-hour run time of the unit. If the high-pressure switch is activated again within the next hour, then the turning speed regulator will be bridged and a Fault report will be generated. The Fault report can be acknowledged by a short actuation of the keys [▲] or [▼]. The turning speed regulator remains bridged so as long as the unit power supply voltage is switched of and back on.

### **Parameterisation of the turning speed regulator:**

Parameters P46 to P49 are decisive for turning speed regulation. The condensation temperature, which should be maintained via the turning speed regulator is established in P46.

Minimum turning speed in % is established in P48. P49 establishes the regulator slew-rate. The lower the value is, the slower the turning speed regulator will react to a change in temperature; it reacts quicker with a higher value.

### **Resetting the parameter to factory setting:**

The unit model is selected in P50

CS = Normal refrigeration wall-hanging unit  
FS = Deep-freezer wall-hanging unit  
CT = Normal refrigeration ceiling unit  
FT = Deep-freezer ceiling unit

If the value 78 is selected in P51, then parameters P29 to P49 will be set to the respective factory settings for the unit model.

### **DCF signal (radio clock):**

With a DCF antenna connected, the DCF signal can be observed via parameter P28.

The display shows the running seconds, with the the 100th-placed decimal point blinking with the applied signal.

When the clock time is correctly identified 2 time in a row, then "dCF" appears momentarily in the display and the clock time is taken over.

The display will not be reset during the display of the DCF signal.

The current clock time can be read in the parameters P10 [hrs] and P11 [min].

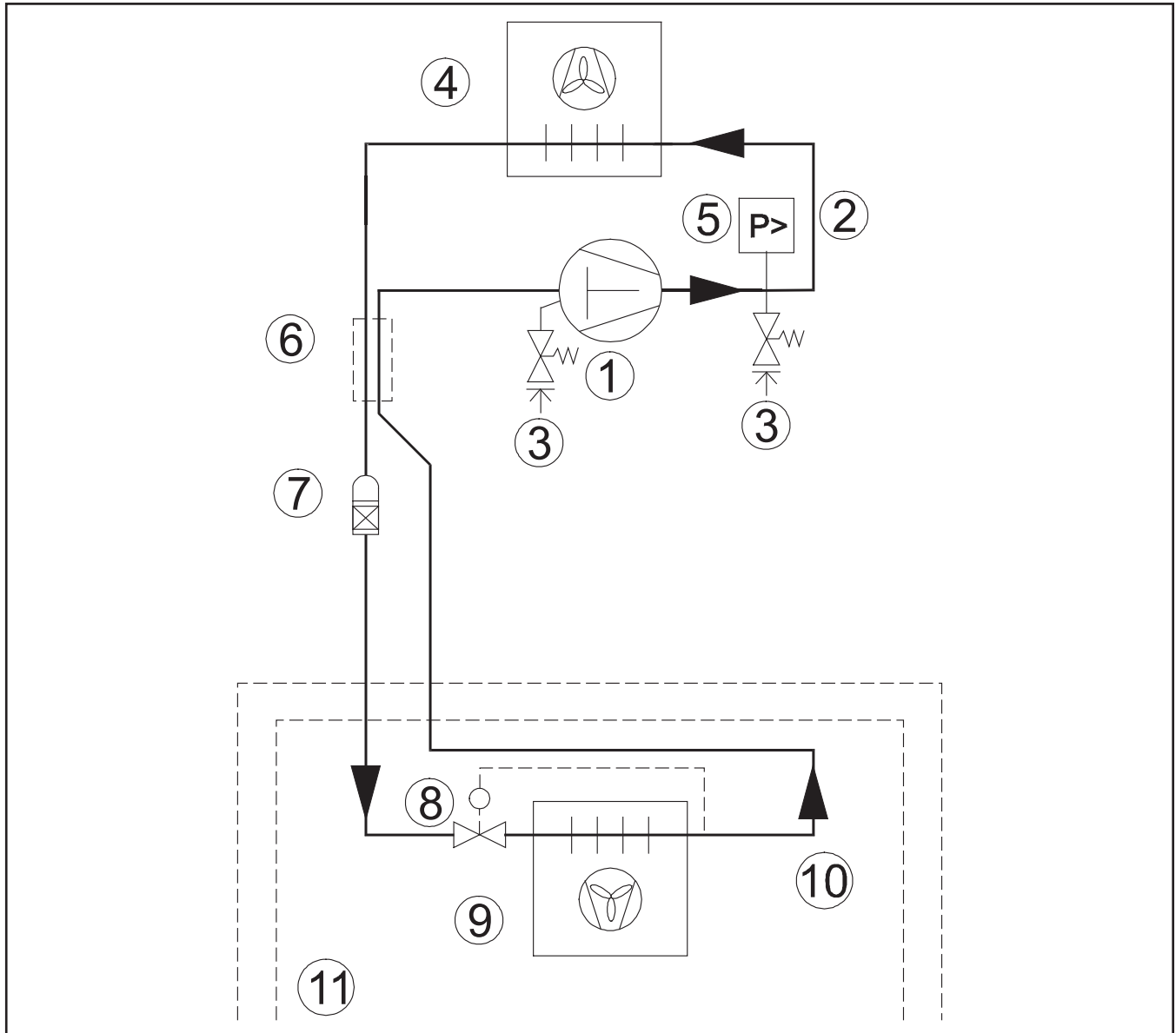
### **Temperature sensor adaptation:**

The temperature sensor can be aligned via the parameters P86 to P88.

Example:

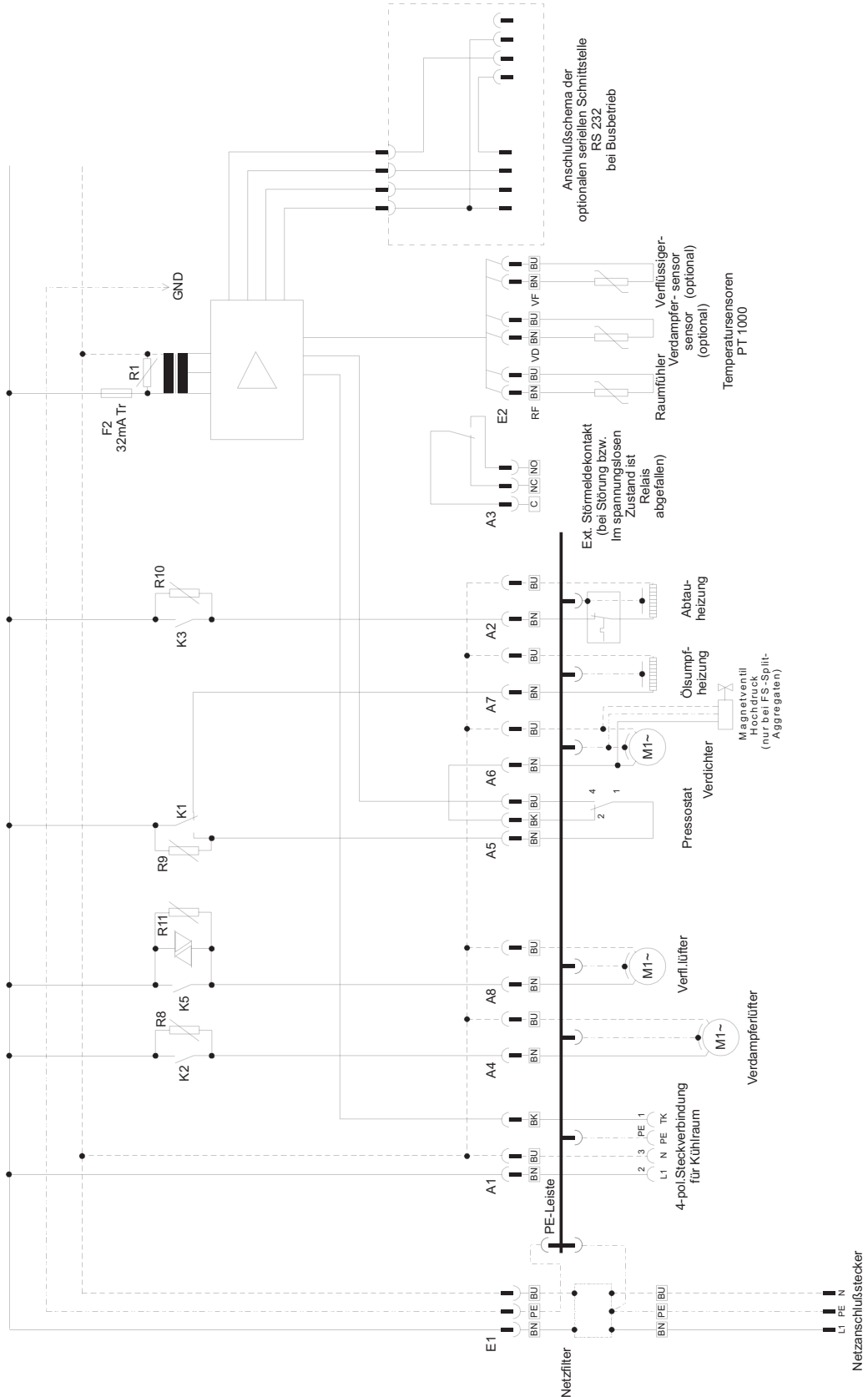
The coldroom temperature indicated in the display is -15°C, while the measured coldroom value is -18°C; this means the display must indicate 3K less. Accordingly, the value of parameter P86 must be reduced by 3. If the display is lower than the indicated value, then P86 must be increased by the difference.

## 9.1 Refrigeration circulation schematic



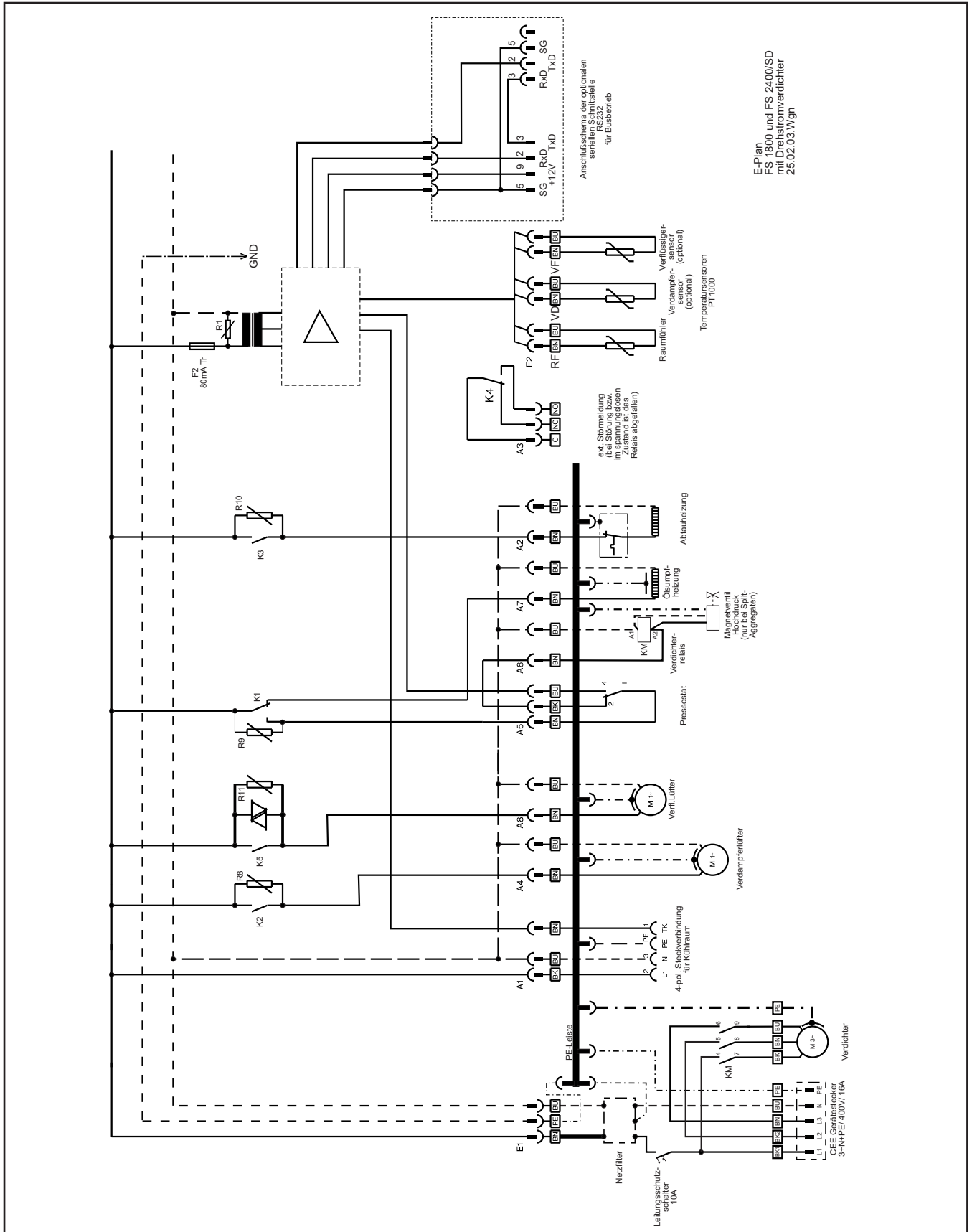
- 1 Compressor
- 2 Pressure line
- 3 Schrader test connections
- 4 Air cooled condenser
- 5 High-pressure switch
- 6 Heat exchanger
- 7 Collector/Dryer
- 8 Thermal expansion valve
- 9 Evaporator
- 10 Suction line
- 11 Coldroom

**9.2 Electrical circuit diagram for**  
**TectoRefrigo WMC2 0500, 0900, 1300, 2000, 2800**  
**TectoRefrigo WSC1 0500, 0900, 1300, 2000, 2800**  
**TectoRefrigo WMF2 0900, 1400**  
**TectoRefrigo WSF1 0900, 1400**



General notice (liability): the details of this technical documents serve for description. Consents regarding the availability of certain features or regarding a certain purpose always require a special written agreement.

9.3 Electrical circuit diagram for  
TectoRefrigo WMF2 1800, 2400  
TectoRefrigo WSF1 1800, 2400



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## 10. Faults (SD Control)

A fault code appears in the display with a fault occurrence.

The fault reporting relay falls off if the unit is not in cooling mode and not in defrosting mode. A relaying of the report is possible via the potential-free contact.

### 10.1. Fault codes (SD Control)

see Operation of the SD Control 8.3 Fault reports

### 10.2. Emergency operation (SD Control)

Continued operation of the Refrigeration unit with a failure or fault is possible in Emergency operation.

The Emergency operation switch is located on the lower side of the Control unit below the key [▲].



**Attention!**

**The mains plug must be removed from the socket and protected against re-insertion.**

The switch can be actuated after removal of the front plate.

For this, loosen the locking screws (4 ea.) on the front cover. Be careful to ensure that the serrated lock washers are not displaced.

Slide the front access cover slightly upwards and pull forward to remove.

An opening is located on the lower side of the Control unit housing, through which the switch can be reached. In order to switch Emergency operation on, this switch should be positioned to the right; position it to the left to switch it off.

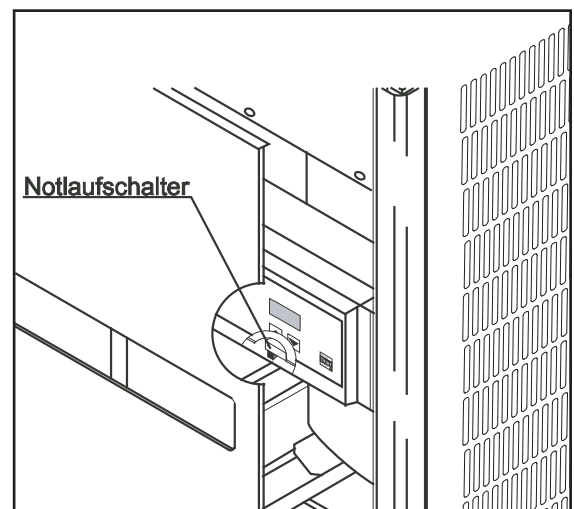
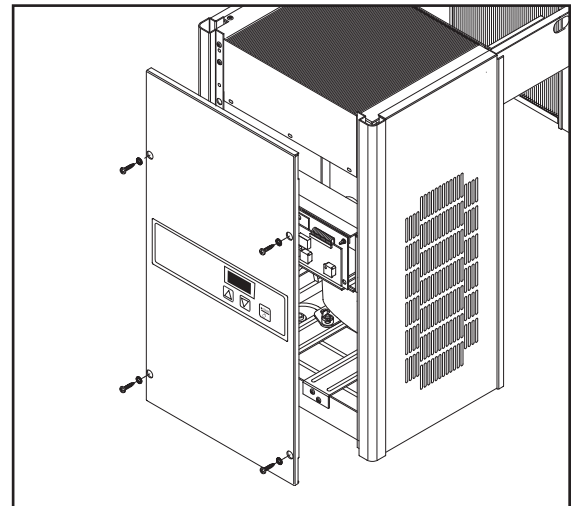
By actuation of this switch, the outlet relays for the compressor and the fans will be activated directly. The unit will go into continuous operation. The function of the Pressostat as a safety device is maintained. When switching on Emergency operation, fault code "F10" appears in the display.

In the event that the Control unit is in Standby mode, "OFF" appears in the display.

The Emergency operation must be monitored, as the coldroom temperature is not regulated and the automatic defrosting is not in operation. The coldroom temperature must be regulated manually by intermittent interruption of the electrical supply to the unit.

Remount the front access cover, securing it to the unit with the enclosed sheet-metal screws ST 3.9 x 19 and serrated lock washers A 4.3.

Re-insert the mains plug in the socket outlet.



Fault	Cause	Remedy
Unit not running	Mains plug not plugged in; Electrical power supply interrupted	Check the mains plug and circuit protectors; if a defect cannot be detected, contact a specialist company
	Regulator defective	Emergency operation switch actuated, see 10.2 Emergency operation. If the unit does not run despite actuation of the Emergency operation switch, then a safety fuse on the regulator circuit board is defective Replace safety fuse (80mA slow blow 5x20mm)
	Supply voltage too low	Supply voltage must be 230 V ± 10%, 50 Hz
Fault report F01 or F02	Coldroom temperature sensor defective	Replace room sensor With a nominal temp. ≥ 4°C, the unit is switched off With a nominal temp. < 4°C, the compressor runs with the last run and standing time
Fault report F03	High-pressure Pressostat has activated	Check cooling water circulation  The report in the display is maintained; it can be deleted by depressing one of the two keys [▲] or [▼].
Unit running continuously Fault report F04		The coldroom temperature will be indicated again by depressing one of the two keys [▲] or [▼]. The Temperature alarm is on when the nominal temperature, time delayed by the value set into P43, is exceeded. If the temperature is still too high after the time period set into P42, the Fault report will be displayed once again
	Evaporator fan not running	Check to ensure that all plug connections on the evaporator fan unit are connected
	Heavy loading of the coldroom with stored goods. Store fewer goods or store them at a higher temperature	Consider the storage data and storage duration of the cooled goods.
	The goods placed in storage were too many or were too warm	Place fewer goods in storage at any one time or cool down warm goods before placing them in storage
	Cooling water circulation is faulty	Check cooling water circulation
Unit running continuously and evaporator iced up Fault report F04	Long periods with door opened Uncovered liquids in the coldroom	Keep periods with door opened short, cover liquids, initiate manual defrosting (see Control unit operating instructions) Reduce the defrosting pause time as necessary (see Control unit operating instructions)
	The defrosting function switches off prior to expiration of the set defrosting time; the evaporator is not free of ice	Increase the defrosting limiting temperature (P39).
	The evaporator is not free of ice following expiration of the set defrosting time	Increase defrosting duration (P04).
Fault report F05	Door contact switch is not connected.	Set parameter P29 to 0.
	Coldroom door is open longer than the value set into P45.	Close the door.
Fault report F06	Coldroom temperature too low	The coldroom temperature will be indicated again by depressing one of the two keys [▲] or [▼]. The Temperature alarm is on when the nominal temperature, time delayed by the value set into P44, is under-run If the temperature is still too low after the time period set into P42, the Fault report will be displayed once again
		Compressor relay defective

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Fault	Cause	Remedy
Fault report F07	Refrigeration capacity too low	By depressing one of the two keys [▲] or [▼], the cold-room temperature will be indicated again. The Fault report appears if the evaporator temperature does not reach the temperature set in P41, after the compressor is switched on following the time set into P35. A renewed Fault report is suppressed for 24 hours.
Fault report F08	Evaporator sensor defective	Replace evaporator sensor. The Refrigeration unit continues running. However, the evaporator temperature is no longer detected. Defrosting may be impaired because of this.
Fault report F09	Condenser sensor defective	Replace condenser sensor. The Refrigeration unit continues running. The condenser fan runs at full turning speed.
Fault report F10	Emergency operation switch actuated	see 10.2 Emergency operation
Fault report F11	EEPROM fault	Fault at the Control unit. Your set values may have changed following a power outage. The report can be deleted by depressing one of the two keys [▲] or [▼]. Replace Control unit
Evaporator fan does not start-up following expiration of the set delay (P35).	The plug connector on the evaporator fan unit is loose or not plugged in.	Plug in or secure the plug connector to the evaporator fan unit.
Water or ice droplets are forming on the cold-room ceiling in the vicinity of the evaporator fan outlet	The evaporator fan draws in water droplets accumulated on the evaporator lamella fins.	Extend the evaporator fan start-up delay (P35) so that remaining water droplets will freeze on the evaporator.
Sheets of ice are lying on the cell floor beneath the evaporator intake opening	The evaporator ices up on the intake-side too heavily, the ice dislodges during the defrosting process and falls on the cell floor.	Reduce the defrosting pause time (see Control unit operating instructions) so that ice formation is reduced.
The Control unit cannot be operated; when actuating any Control unit key, the indication "Bo.L" appears in the display	The keyboard lock is switched on so that the Control unit is secured against unauthorised operation.	Switch off the keyboard lock (see 8.2.5 Password and keyboard lock).
The Control unit cannot be operated; there is no temperature indication in the display and the decimal point moves back and forth. When actuating any Control unit key, the indication "Bo.L" appears in the display	The keyboard lock is switched on and the temperature display is switched off so that the Control unit is secured against unauthorised operation.	Release the display and keyboard as appropriate (see 8.2.5 Password and keyboard lock)

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# 11. Favourable storage specifications (non-binding guidelines)

## 11.1 Cold storage

Chilled goods	Temperature in °C	Relative humidity in %
<b>Meat products</b>		
Meat, fresh	-1/+1	85-90
Cooked sausage	+1/+3	80-85
Poultry, fresh	-1/+1	85-90
Venison, fresh	-2/+2	70-85
<b>Fish</b>		
Fish, fresh from ice	0/+1	90-100
Fish, canned	0/+1	75-80
<b>Milk and dairy products</b>		
Milk	0/+2	80-85
Butter	-1/+4	75-80
Soft cheese	0/+2	80-85
Swiss cheese	+2/+4	70
<b>Vegetables</b>		
Lettuce	0/+1	85-90
Cauliflower	-1/0	90
Tomatoes, ripe	0/+1	80-90
Spinach	-1	90
Pickles	0/+4	85
Asparagus	+1	85-90
<b>Fruit</b>		
Apples	-1/+3	90-95
Pears	-1/+2	85-90
Cherries	-1/+1	90
Strawberries	-1/+1	90
Bananas	+12	85

## 11.2 Deep-freeze storage

Chilled goods	Temperature in °C	Relative humidity in %
<b>Meat products</b>		
Frozen meat	-15 / -18	85 - 90
Entrails, frozen	-15/-18	80-85
Bacon, fresh (green)	-18/-22	85-90
Sausage	-18	90
Venison	-12/-18	80-90
Poultry, disembowelled	-12	85-90
<b>Fish</b>		
Fatty fish, frozen	-23/-25	90-95
Lean fish, frozen	-20	90-95
Filet, frozen	-23/-25	80-90
<b>Butter, long-term storage</b>	-10/-20	80-85
<b>Frozen vegetables</b>	-18/-23	85
<b>Fruit</b>	-23/-25	80-90
<b>Bread</b>		
Bread	-18	90
Bread rolls	-18/-20	80
Cakes	-18	85-90
Cookies	-18	85-90
Cream pies	-18	85-90

Values taken from Pohlmann,  
Taschenbuch der Kältetechnik Bd. 2  
(Refrigeration Handbook, 2nd ed.);  
Breitenbach, Der Kälteanlagenbauer Bd. 1  
(The Refrigeration Technician, 1st ed.)



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