# GRAM $CO_2$ storage refrigerator and freezer cabinets

***IC (integrated controller)***

**Danfoss controller (AKCC550A)**
**or**
**Carel Controller (MPXpro)**

***NC (No controller)***

**controller chosen and fitted by external technician**

Installation- and service manual

GRAM

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# Contents

## English

Thank you for choosing a Gram Commercial $CO_2$ product.

This manual is made to aid the following:

- The installer when integrating the Gram $CO_2$ product into a remote $CO_2$ installation.
- The service technician when servicing the cabinet.

BE AWARE:
Only technicians who have the right skill level regarding how to work on a $CO_2$ system and who have the sufficient knowledge regarding the chosen controller, are allowed to carry out the installation regarding connecting to the external system and adapting the controller parameters to fit the installation.

In order to make sure that the cabinet is connected and used as it is intended the below points must be taken into consideration:

- Not to exceed PS on neither of the system sides (PS limits to be secured by the installer/safety valves):
    - $PS_{LP\text{-}side}$ = 60 bar
    - $PS_{HP\text{-}side}$ = 90 bar

- Be aware of and instruct the end user only to use the cabinet as described under intended use.
- If the controller parameters are not adapted/adjusted correctly it can lead to severe damage to the refrigeration system. This is the reason why sufficiently skilled personal is needed in order to be able to correct/adapt the controller settings, making the cabinet and the external system run in harmony. (All controller parameters should be checked by the installer prior to starting up the product).

## Intended use

This product is intended for professional use, meaning storing packed food stuff at a constant temperature.

The product may not be used to chill or freeze food stuff. For that purpose, use a blast-chiller or a blast-freezer.

The product is only to be used for the purpose it was designed for (storing already chilled or frozen food stuff, which is packed or in closed containers).

Any unintended use can result in the food stuff inside the product, not being kept at the right temperature.

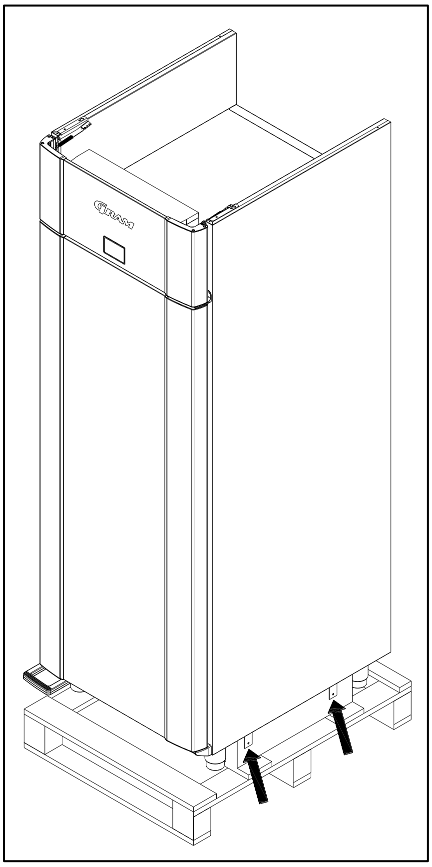
## Location

When receiving the product, check the packaging material for damage.

If any damage occurs at the packaging material, it should be considered if the product might have been damaged too. If the damage is substantial, please contact your dealer.

The transport pallet can be removed by loosening the screws that fasten the pallet to the product (see the below illustration).

⚠ This task requires at least 2 persons. The heaviest part of the product is at the top. Be aware of this, when removing the transport pallet.

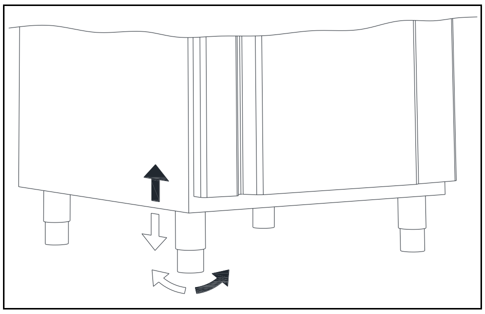


- Because of the heavy weight of the product, the floor might be damaged or scratched when moving the product.
- Correct set up gives the most effective operation.
  The product should be placed in a dry and adequately ventilated room.
- To ensure efficient operation, it may not be placed in direct sunlight or against heat-emitting surfaces. The product is designed to operate in an ambient temperature between +16°C and +40°C.
- Avoid placement of the product in a chlorine/acid-containing environment (swimming bath etc.) due to risk of corrosion.
- The product and parts of the interior is equipped with a protecting film, which should be removed before use.
- Clean the product with a mild soap solution before use.

The set-up place must be level and horizontal.

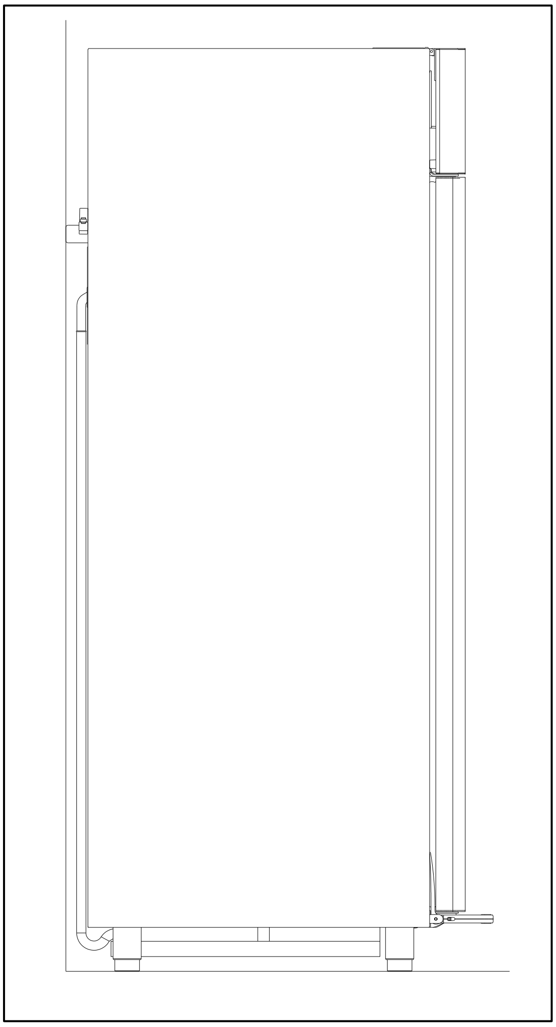
It is very important to adjust the legs of the cabinet in order to make sure that the product stands level and upright.

In order to avoid tensions in the cabinet construction, it is crucial to make sure that all legs make proper contact with the floor, so that the stress to the cabinet is distributed evenly.

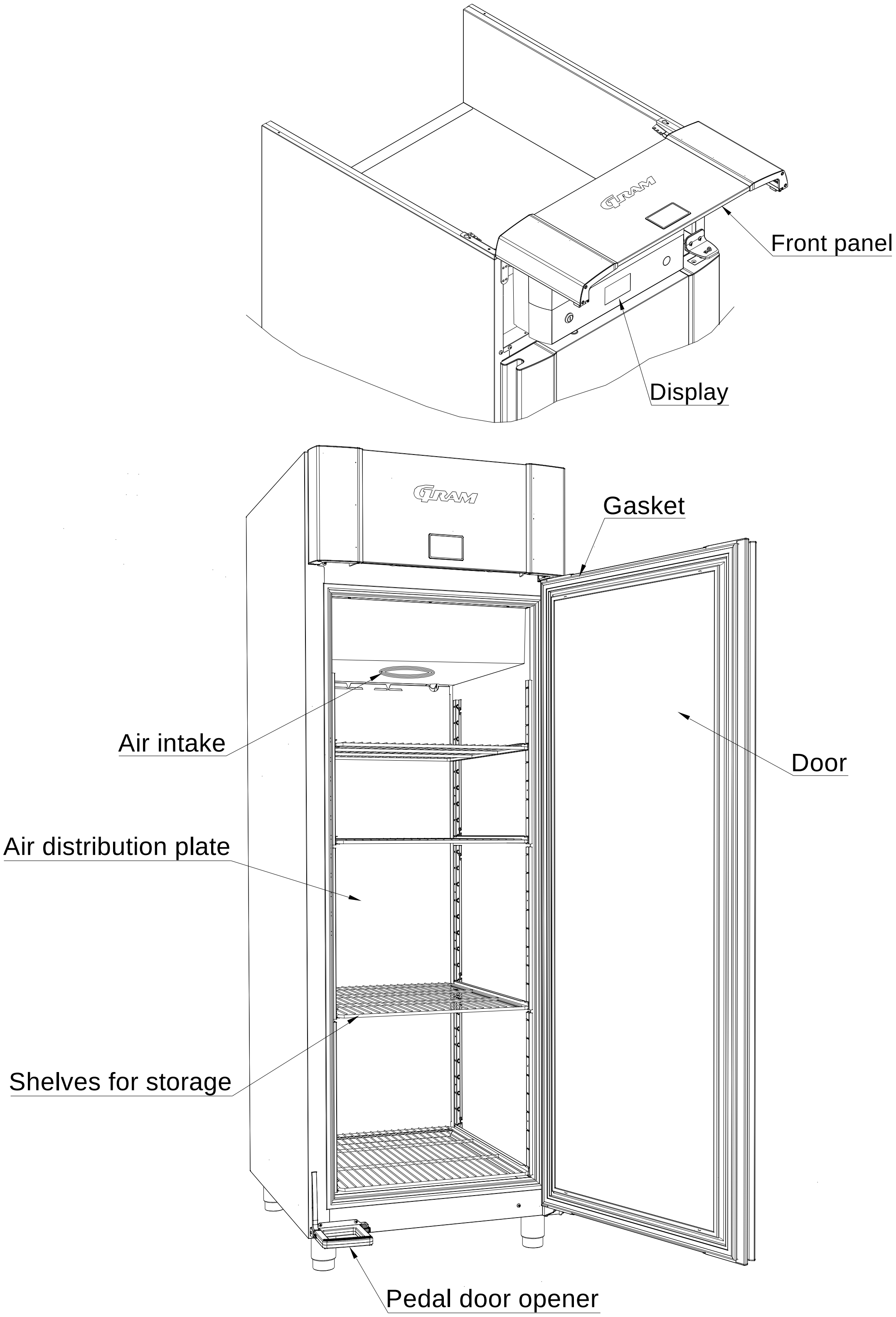


There must always be 20 cm of free space above the product, to allow for service.

The product should be placed as close as possible up against the wall.



## General description



## Electrical connection

Read the text below thoroughly before electrical connection.

The product is intended for connection to alternating current. The connection voltage (V) and frequency (Hz) is shown on the name plate in the cabinet (see Fig. 8). Do only connect the product to the power supply which is stated on the product name plate. Only the supplied or similar cord is to be used.

Never use an extension cord for this appliance!
If a wall socket is placed further away than the length of the supplied power cord, contact an electrician to establish a wall socket within the range of the supplied power cord.

If the product is defective, it should be examined by the company which has connected the product to the remote system. As a minimum, servicing and troubleshooting must be carried out by a skilled service technician knowing the installed controller and experienced in servicing a $CO_2$ cabinet.

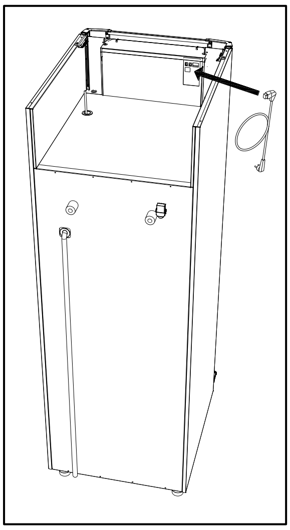


Fig. 5

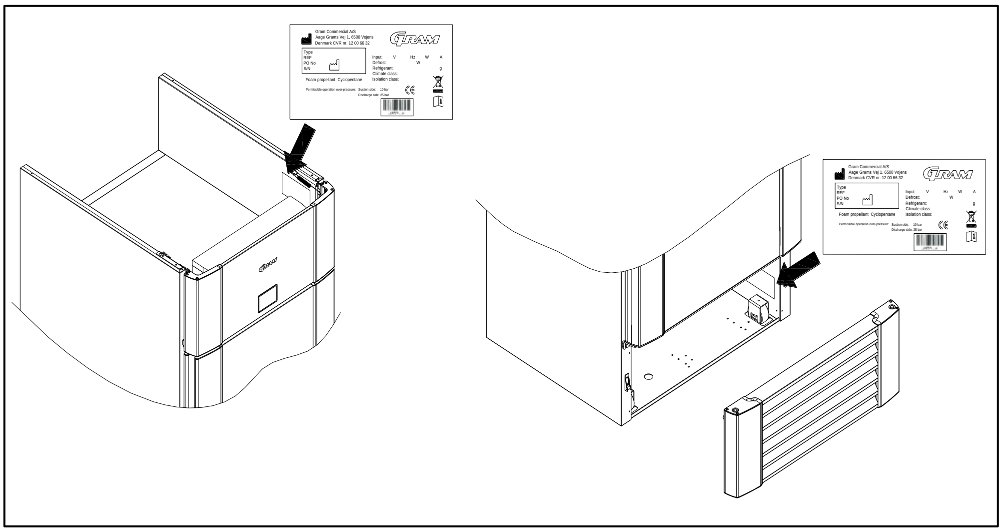


Fig. 8

Always disconnect the power if interruptions in power supply occur, and when electrical parts are removed/put on, and before cleaning and maintenance of the product.

Do not re-connect the cabinet to the power supply until all covers have been re-installed in order to make sure that no rotating, hot or live parts can be accessed/touched.

The product may not be installed/used outdoor.

All earthing requirements stipulated by the local electricity authorities must be observed. The plug and wall socket should then give correct earthing. In case of any doubt, contact an electrician.

Make sure the product is switched off at the socket or that the kettle plug is disconnected (Fig.5), before service is performed on electrical parts. It is not sufficient to switch off the product at the controller.

If service is to be carried out on electrical parts the main power supply of the cabinet must be disconnect. This can be done by pulling the plug out of the wall socket or by pulling the kettle plug on the rear or the left side of the main control box (depending on model). It is **not** enough to turn off the power supply on the 2-pole main switch, as there will still be power on the appliance inlet inside the control box.

## How to connect the IC product to the $CO_2$ system

These products have been designed, constructed and built to minimize the time which the installer must use before and after connecting them to the remote $CO_2$ – installation. On cabinets referred to as **IC,** with a built-in controller (either Danfoss AKCC 550A or Carel MPXpro), every electrical component is already connected to the controller and the controller is configured accordingly. All controller parameter setups have been made in cooperation with the two controller manufacturers (Danfoss and Carel), in order to make sure that the cabinet will run when connected. There might of cause be settings which need to be changed/adapted in order to optimize performance according to the remote system.

**A few examples:**

Solid door cabinets are delivered with a universal set point range +12 to -25°C, which means that the cabinets can be installed as a fridge or as a freezer. The reason for this is that all solid door cabinets are delivered as a freezer configuration, including electrical defrost heater, door frame heater etc. for maximum flexibility during installation.

If the cabinet is to run as a refrigerator it will most likely be connected to a remote system which will run a suction pressure no lower than -10°C (often even higher). in this case it is recommendable to raise the minimum allowed set point to approx. +2°C. which does mean that the adjustment range will be +2 to +12°C.

If the same universal cabinet is to run as a freezer, connected to a remote freeze system, the range should be narrowed to e.g. -10 to -22°C or similar, to suite the settings of the remote system.

The difference between controller minimum setpoint temperature and the minimum suction pressure should never be less than 7K.

**IMPORTANT!**
**People installing these products, should have the right skill level.**

**This does relate to all aspects. (physical installation as well as adapting the controller settings of the chosen controller, in order to avoid problems or potentially dangerous situations)**

**Always make sure that the cabinet is properly leveled when positioned on the installation location. This should be done prior to connecting the pipe work to the remote $CO_2$ system**

<u>Commonly used parts on all **IC** upright storage cabinets:</u>

The refrigeration system on the cabinet consists of:
- An evaporator coil (PS = 60bar)
- A Danfoss AKVP 10-1 electronic expansion valve with coil and the cobber pipes used to connect the system.
- 3 temperature sensors Danfoss PT1000 marked according to Danfoss standard - room sensor (S3) and super-heat sensors (S2) are AKS11, Evaporator/defrost sensor (S5) is AKS12.
- A Carel suction line pressure transmitter (0-5V radiometric type (0-45 bar $_{gauge}$) female connection = ¼” SAE) Only connected electrically – To be fitted on the suction line by the installer.

After assembly, the system is pressure tested with 1,43 x PS (in the factory).

Recommended installation of the pressure transmitter is horizontally in the suction line (Done by the installer)

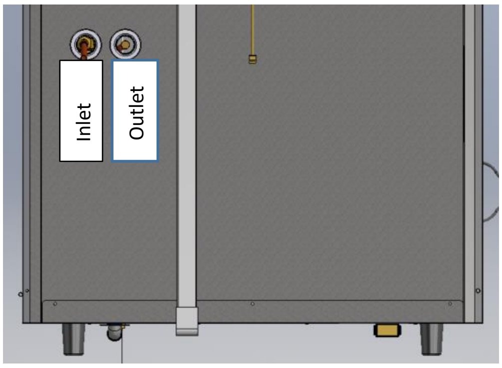
All parts are assembled and fitted on the cabinet, so that the installer does not need to access the evaporator compartment or the controller box, during installation.

Exception: it will be necessary to open the controller box:
- in order to connect the cabinet controller to an external surveillance system. (Done by the installer)
- if e.g. drain line heater needs to be disconnected, when connection to an external drain solution.

**On PLUS, TWIN and EURO products** the pipe ends for connecting to a remote system are in the top compartment (shown on the below fig. 1 – 3). Both pipes are clearly marked in order to avoid connecting the cabinet wrongly. Both connection pipes coming out of the cabinet are 3/8".

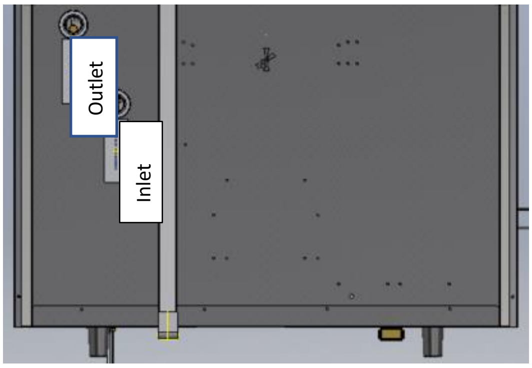
The pressure transmitter, which must be connected to the suction line, by the installer, is lying in the top compartment. This transmitter is connected to a detachable connection wire, which is connected inside the controller box. (length approx. 1,5 meter out of the controller box)

**Fig. 1**
**Top view** showing pipe connections on ECO **PLUS** cabinets



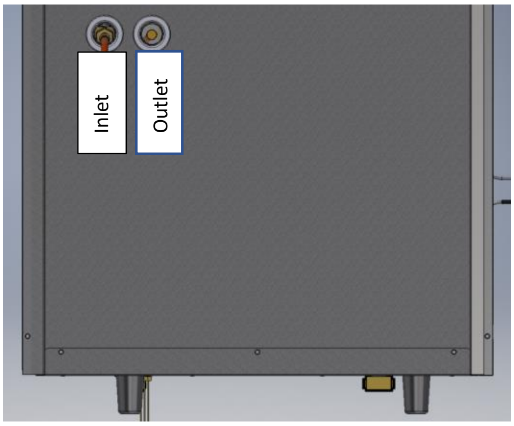

BACK OF CABINET

**Fig. 2**
**Top view** showing pipe connections on ECO **TWIN** cabinets




BACK OF CABINET

**Fig. 3**
**Top view** showing pipe connections on ECO **EURO** cabinets



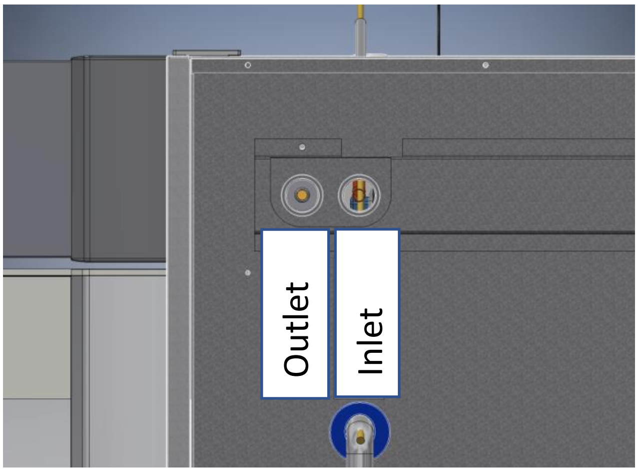

BACK OF CABINET

Drain water on **PLUS, TWIN** and **EURO** products

These cabinets are delivered with a re-evaporation tray with an electrical heater (100 Watt), positioned underneath the cabinet. The heaater is controlled by the main controller. This is done so that the cabinets can be used where there is no external drain available. If there is an external drain available or there is a possibility of connecting the cabinet drain outlet to an external drain pump, one of these solutions is always recommendable in order to save energy. If the cabinet drain water outlet can be connected to one of the two alternative solutions, the tray and the 100 Watt heater should be removed prior to installing the cabinet. As a minimum the heater must be disconnected in the controller box.

**On MIDI products** the pipe ends for connecting to a remote system are on the rear of the cabinet (shown on the below fig. 4). Both pipes are clearly marked in order to avoid connecting the cabinet wrongly. Both connection pipes coming out of the cabinet are 3/8".
The pressure transmitter, which must be connected to the suction line, by the installer, is lying in the bottom compartment. This transmitter is connected to a detachable connection wire, which is connected inside the controller box. (length approx. 2,5 meter out of the controller box).

**Fig. 4**
**Rear view** showing pipe connections on ECO **MIDI** cabinets




Drain water on **MIDI** products
These cabinets are delivered with a re-evaporation tray with an electrical heater (60 Watt) and a float switch which does control the operation of the heater related to water level inside the tray. This system is positioned inside the bottom compartment of the cabinet on the right side seen from the front. This is done so that the cabinets can be used where there is no external drain available. If there is an external drain available or there is a possibility of connecting the cabinet drain outlet to an external drain pump, one of these solutions is always recommendable in order to save energy. If the cabinet drain water outlet is connected to one of the two alternative solutions, the complete tray including 60 Watt heater, float switch, junction box, connection wire and brackes, should be removed prior to installing the cabinet. As a minimum the re-evporation system must be disconnected in the controller box.

## How to connect the NC product to the $CO_2$ system

These products have been designed, constructed and built to minimize the time which the installer must use before and after connecting them to the remote $CO_2$ – installation. On cabinets without controller known as **NC,** every electrical component is already fitted and connected to a connection plinth inside the control box. Inside the control box a DIN rail is fitted in order to ease mounting of any controller.

When installing the controller of your choice, you should take into consideration, that solid door cabinets are delivered equipped with components which makes the product capable of running with a temperature set point range between +12 and -25°C. This means that the cabinets can be built as a fridge or as a freezer. The reason for this is the desire of leaving maximum flexibility to the installer/refrigeration company when building the product needed.
This fact does also mean that the following heaters are included:

Electrical defrost heater, drain line heater, re-evaporation heater and door frame heater. These heaters are not necessarily to be used if a refrigerator is to be configured.

If the cabinet is to run as a refrigerator it will most likely be connected to a remote system which will run a suction pressure no lower than -10°C. in this case it is recommendable to raise the minimum allowed set point to no lower than +2°C. which does mean that the adjustment range will be +2 to +12°C.

The difference between controller minimum setpoint temperature and the minimum suction pressure should never be less than 7K.

If the **NC** cabinet is to run as a freezer the set point temperature range should be narrowed according to the performance of the freezer system to which it is connected. E.g. -10 to -22°C or similar.

**IMPORTANT!**
**People installing these products, should have the right skill level.**

**This does relate to all aspects. (physical installation as well as adapting the controller settings of the chosen controller, in order to avoid problems or potentially dangerous situations)**

**Always make sure that the cabinet is properly leveled when positioned on the installation location. This should be done prior to connecting the pipe work to the remote $CO_2$ system.**

Commonly used parts on all **NC** upright storage cabinets:
The refrigeration system on the cabinet consists of the following:

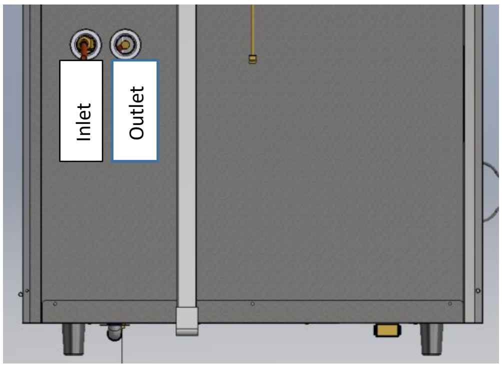
- An evaporator coil (PS = 60bar)
- A Danfoss AKVP 10-1 electronic expansion valve with coil and the cobber pipes used to connect the system.
- 3 temperature sensors Danfoss PT1000 sensors marked according to Danfoss standard room sensor (S3) and super-heat sensors (S2) are AKS11, Evaporator/defrost sensor is AKS12 (S5).

After assembly, the complete system is pressure tested with 1,43 x PS (in the factory).

All parts are assembled and fitted on the cabinet, so that the installer does not need to access the evaporator compartment, during installation, unless the sensors need to be changed due to the fact that the controller chosen, is not suitable for PT1000 sensors.

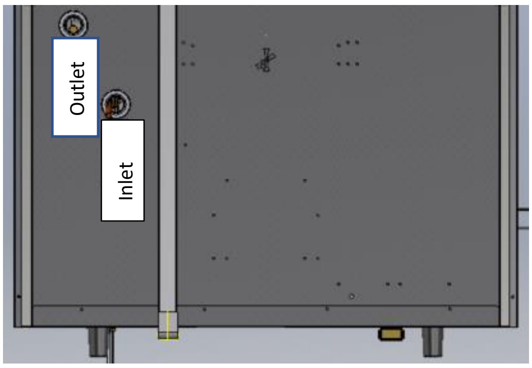
**On PLUS, TWIN and EURO products** the pipe ends for connecting to a remote system are in the top compartment (shown on the below fig. 1 – 3). Both pipes are clearly marked in order to avoid connecting the cabinet wrongly. Both connection pipes coming out of the cabinet are 3/8".

**Fig. 1**
**Top view** showing pipe connections on ECO **PLUS** cabinets



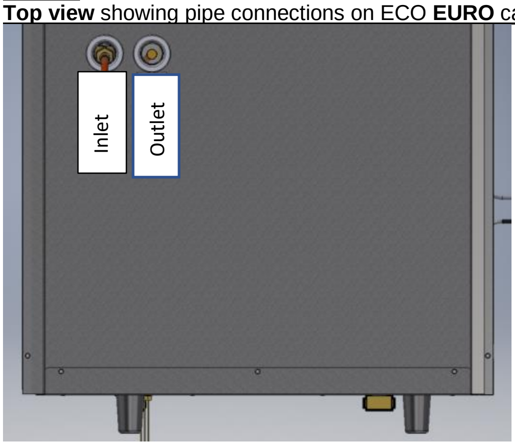

BACK OF CABINET

**Fig. 2**
**Top view** showing pipe connections on ECO **TWIN** cabinets




BACK OF CABINET

**Fig. 3**
**Top view** showing pipe connections on ECO **EURO** cabinets




BACK OF CABINET

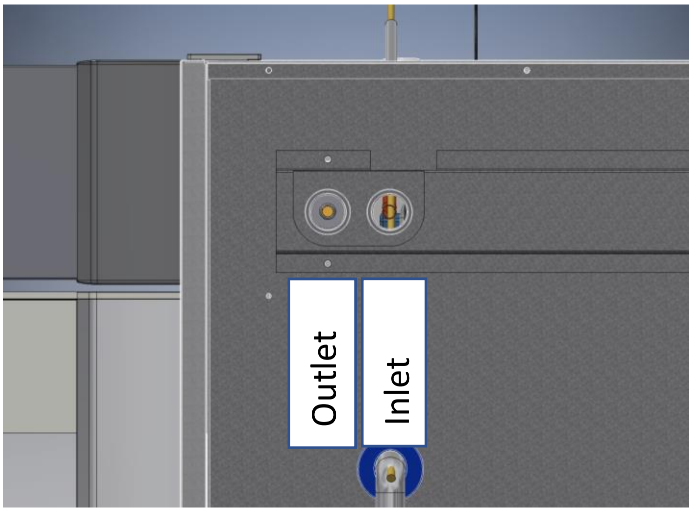
Drain water on **PLUS, TWIN** and **EURO** products

These cabinets are delivered with a re-evaporation tray with an electrical heater inside (100 Watt), positioned underneath the cabinet. The heater should be controlled by the main controller. This re- evaporation system is installed as a standard, so that the cabinets can be used where there is no external drain available.
If there is an external drain available or there is a possibility of connecting the cabinet drain outlet to an external drain pump, one of these solutions is always recommendable, in order to save energy and reduce maintenance costs. If the cabinet drain water outlet can be connected to one of the two alternative solutions, the tray and the 100 Watt heater should be removed prior to installing the cabinet. As a minimum the heater must not be connected to power in the controller box.

**On MIDI products** the pipe ends for connecting to a remote system are on the rear of the cabinet (shown on the below fig. 4). Both pipes are clearly marked in order to avoid connecting the cabinet wrongly. Both connection pipes coming out of the cabinet are 3/8”.

**Fig. 4**

**Rear view** showing pipe connections on ECO **MIDI** cabinets

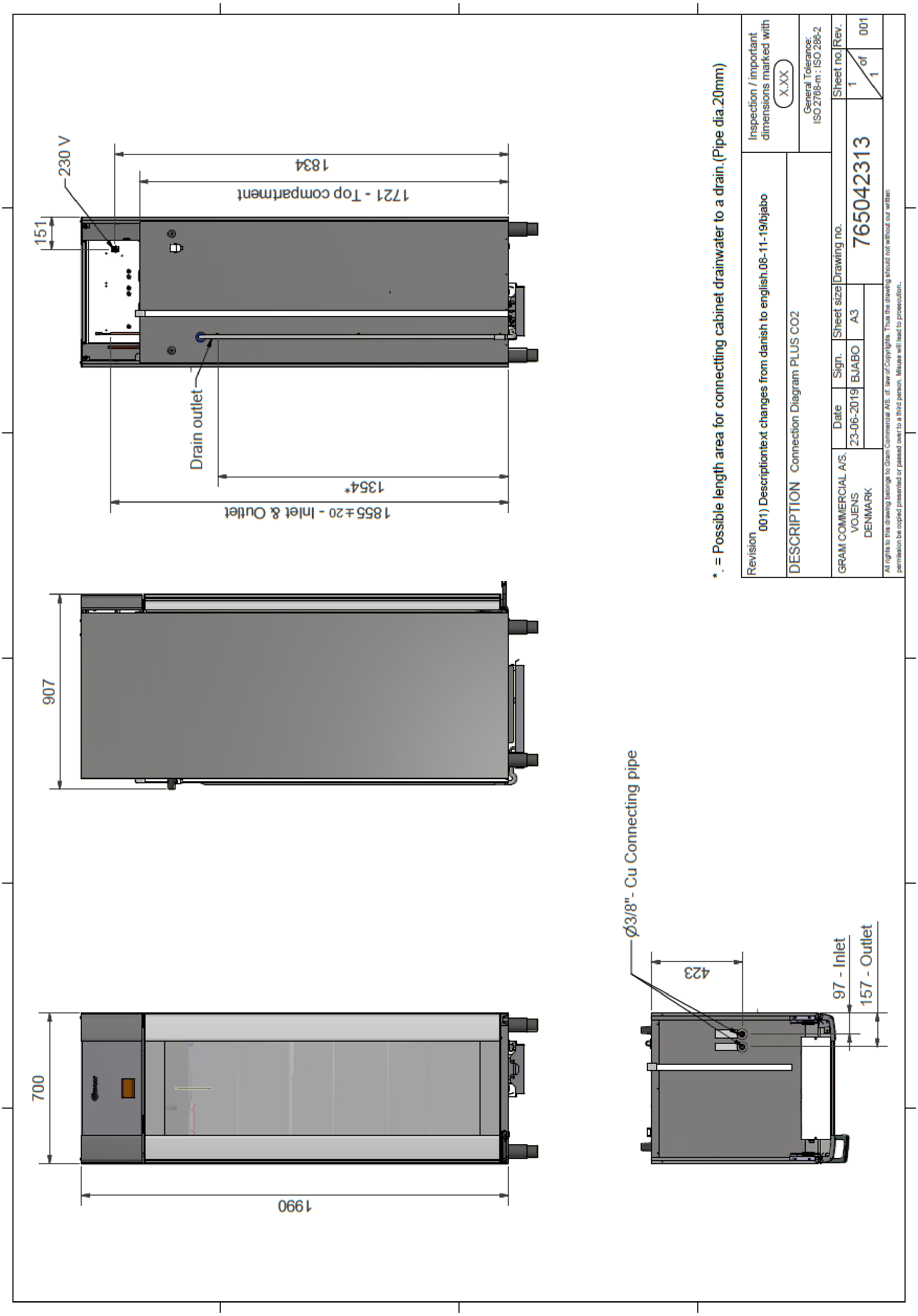



Drain water on **MIDI** products
These cabinets are delivered with a re-evaporation tray with an electrical heater (60 Watt) and a float switch which does control the operation of the heater related to water level inside the tray. This system is positioned inside the bottom compartment of the cabinet on the right side seen from the front. This is done so that the cabinets can be used where there is no external drain available.
If there is an external drain available or there is a possibility of connecting the cabinet drain outlet to an external drain pump, one of these solutions is always recommendable in order to save energy. If the cabinet drain water outlet is connected to one of the two alternative solutions, the complete tray including 60 Watt heater, float switch, junction box, connection wire and brackes, should be removed prior to installing the cabinet. As a minimum the re-evaporation system must must not be connected to power in the controller box.

## Connection diagrams for $CO_2$ cabinets

In order to ease the planning/positioning of pipe work, external drain work and electrical installations related to installing the Gram $CO_2$ products, the drawings on the next four pages have been created.

PLUS



230 V
1834
1721 - Top compartment
151
Drain outlet
1354*
1855±20 - Inlet & Outlet
907
700
1990
Ø3/8"- Cu Connecting pipe
423
97 - Inlet
157 - Outlet
* = Possible length area for connecting cabinet drainwater to a drain.(Pipe dia.20mm)
Revision
001) Descriptiontext changes from danish to english.08-11-19/bjabo
Inspection / important dimensions marked with
X.XX
DESCRIPTION Connection Diagram PLUS CO2
General Tolerance: ISO 2768-m : ISO 2862-2
GRAM COMMERCIAL A/S. VOJENS DENMARK
Date
23-06-2019
Sign.
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Sheet size
A3
Drawing no.
765042313
Sheet no.
1 of 1
Rev.
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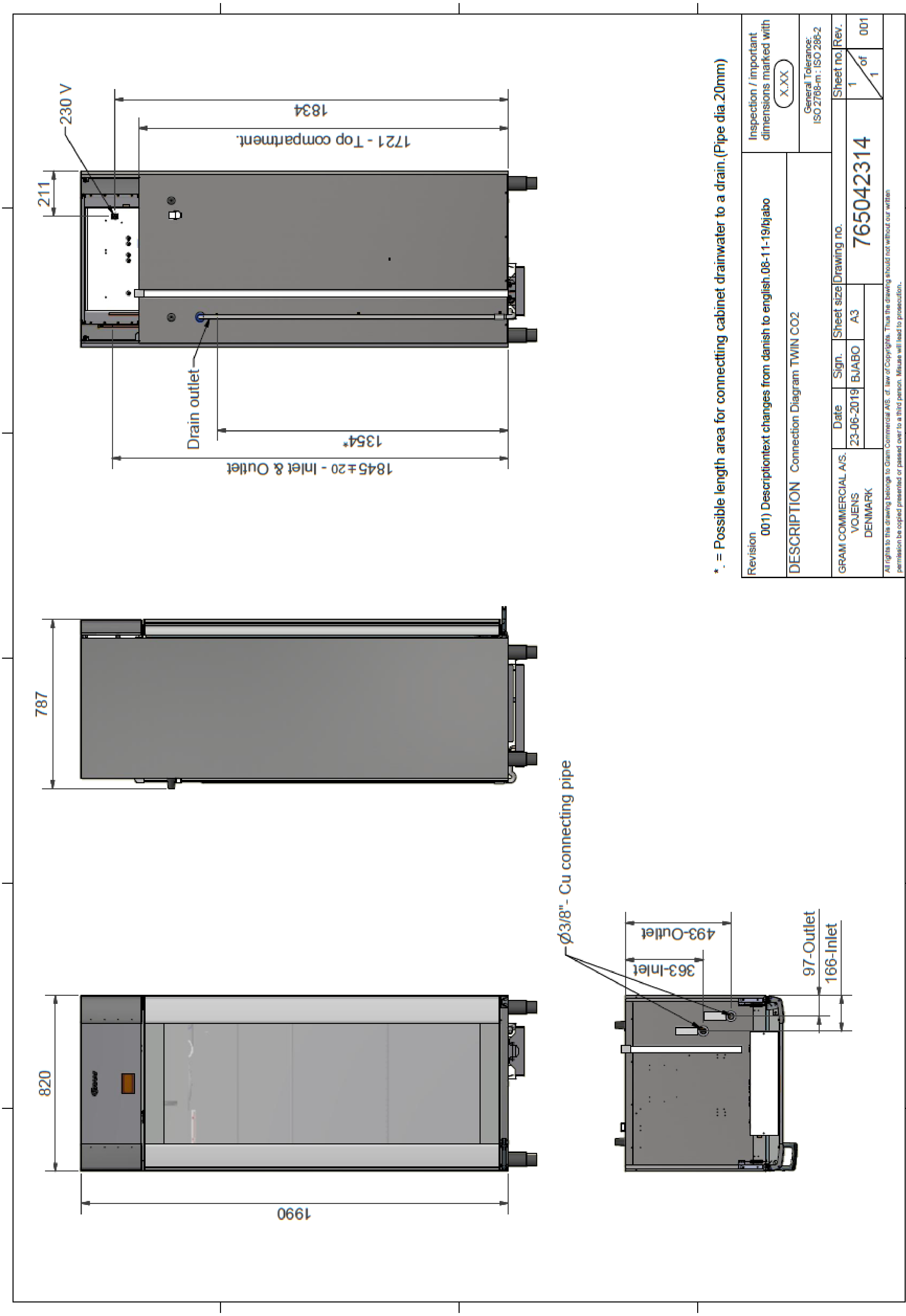
All rights to this drawing belongs to Gram Commercial A/S. cf. law of Copyrights. Thus the drawing should not without our written permission be copied presented or passed over to a third person. Misuse will lead to prosecution.

TWIN


230 V
1834
1721 - Top compartment.
211
Drain outlet
1354*
1845±20 - Inlet & Outlet
787
820
1990
Ø3/8"- Cu connecting pipe
493-Outlet
363-Inlet
97-Outlet
166-Inlet
*. = Possible length area for connecting cabinet drainwater to a drain.(Pipe dia.20mm)
Inspection / important dimensions marked with
X.XX
General Tolerance: ISO 2768-m : ISO 286-2
Revision
001) Descriptiontext changes from danish to english.08-11-19/bjabo
DESCRIPTION Connection Diagram TWIN CO2
GRAM COMMERCIAL A/S. VOJENS DENMARK
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Sheet no.
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Rev.
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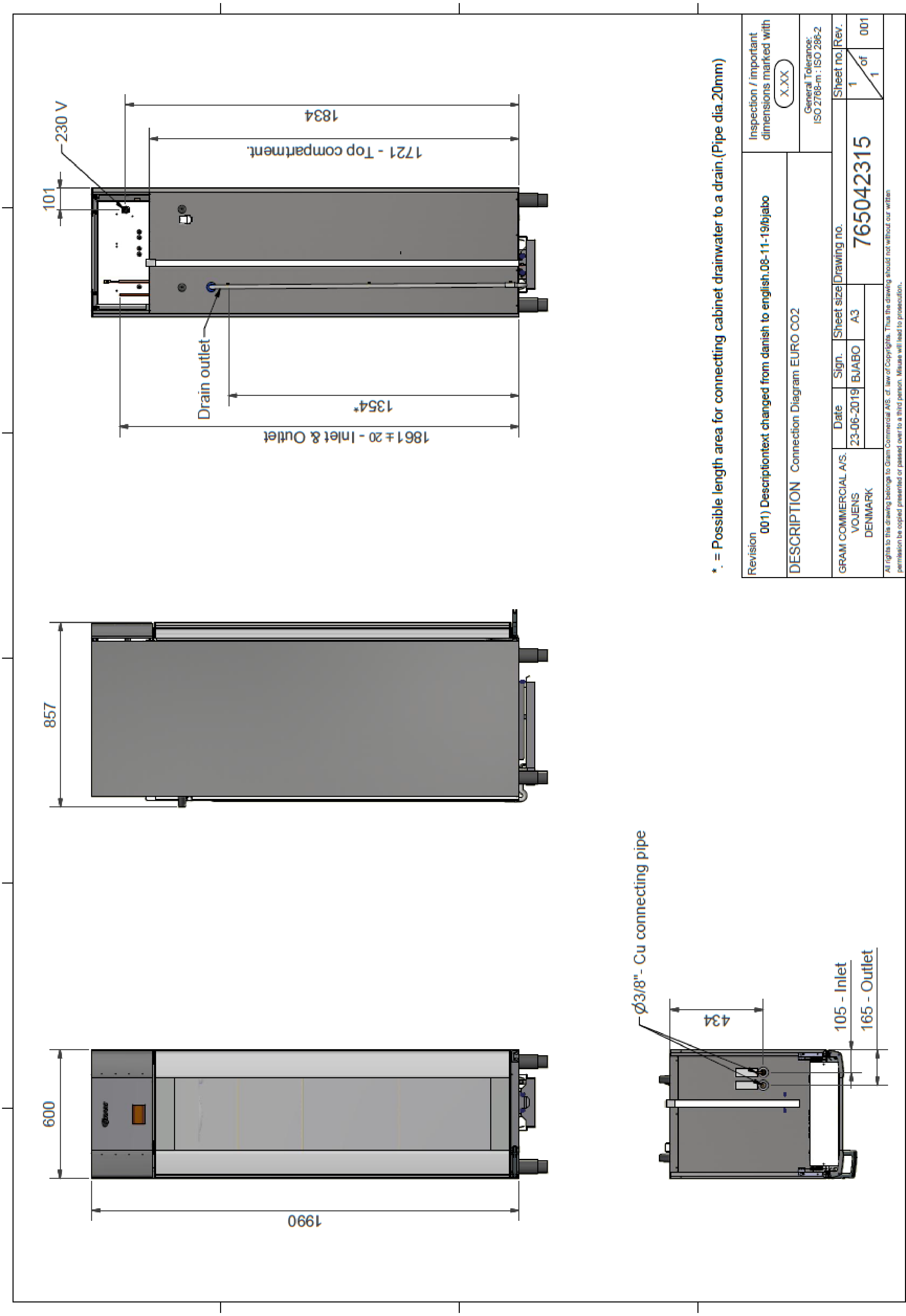
EURO


230 V
101
1834
1721 - Top compartment.
Drain outlet
1354*
1861 ± 20 - Inlet & Outlet
857
600
1990
Ø3/8"- Cu connecting pipe
434
105 - Inlet
165 - Outlet
* = Possible length area for connecting cabinet drainwater to a drain.(Pipe dia.20mm)
Inspection / important dimensions marked with
X.XX
General Tolerance: ISO 2768-m : ISO 288-2
Revision
001) Descriptiontext changed from danish to english.08-11-19/bjabo
DESCRIPTION Connection Diagram EURO CO2
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1 of 1
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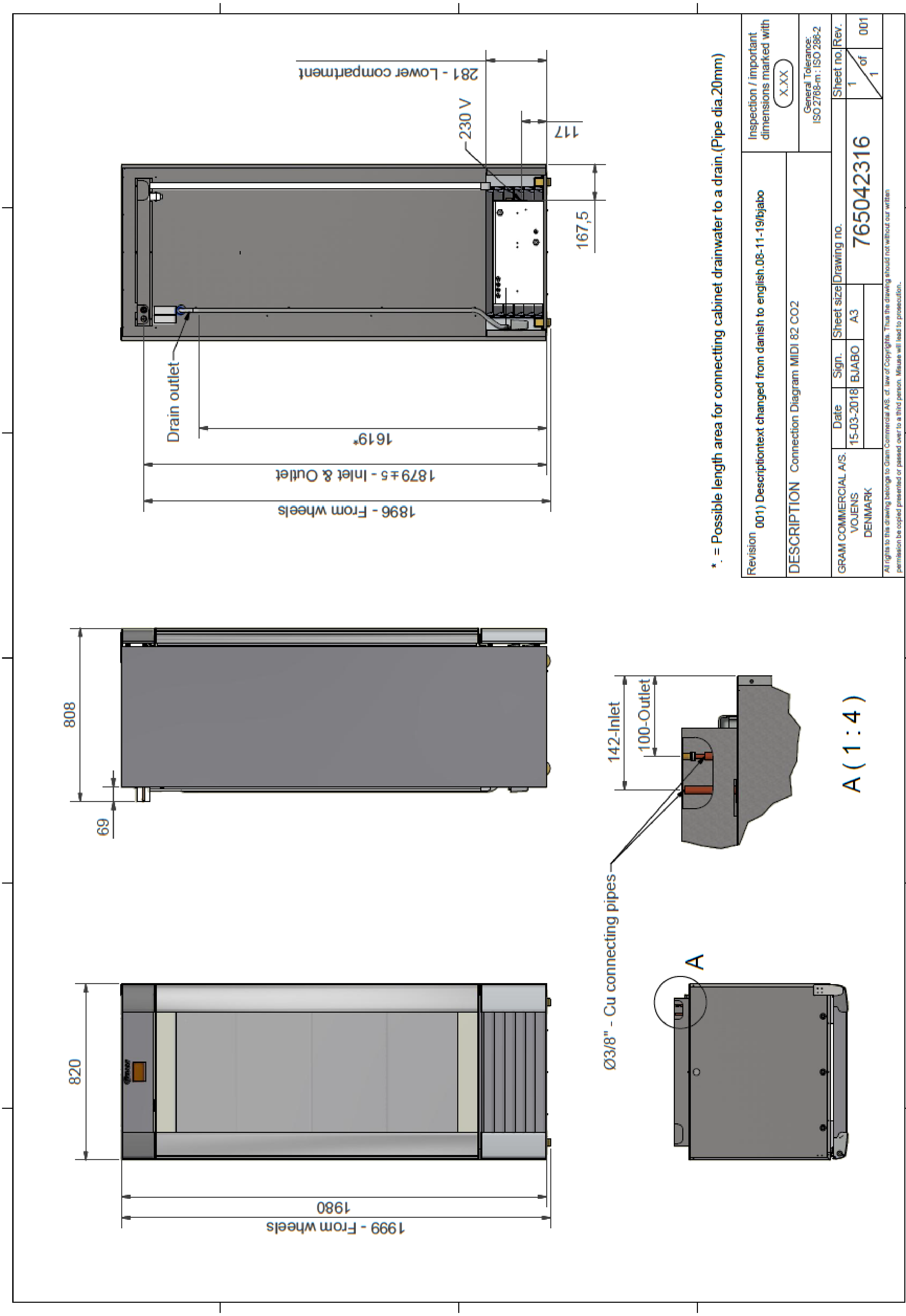
MIDI



281 - Lower compartment
230 V
117
167,5
Drain outlet
1619*
1879±5 - Inlet & Outlet
1896 - From wheels
808
69
142-Inlet
100-Outlet
A ( 1 : 4 )
Ø3/8" - Cu connecting pipes
A
820
1980
1999 - From wheels
* = Possible length area for connecting cabinet drainwater to a drain.(Pipe dia.20mm)
Revision
001) Descriptiontext changed from danish to english.08-11-19/bjabo
Inspection / important dimensions marked with
X.XX
General Tolerance: ISO 2768-m : ISO 286-2
DESCRIPTION Connection Diagram MIDI 82 CO2
GRAM COMMERCIAL A/S. VOJENS DENMARK
Date
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Sheet size
A3
Drawing no.
765042316
Sheet no.
1 of 1
Rev.
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## How to operate the product

The end user is not allowed to access very many parameters in the controller. This fact does however demand more of the installer in terms of adapting the controller settings to meet the needs of the end user, as well as adapting the controller settings to operate in harmony with the remote refrigeration installation.

In terms of knowing the Gram factory settings which have been made to the controller installed, the following appendixes have been added at the end of this document (see table of contents)

- Appendix I related to Gram settings of the Danfoss AKCC-550A controller.
- Appendix II related to Gram settings of the Carel MPX-pro controller.

These appendixes show all the settings which have been made as a default, in order to make sure the product will run as desired when delivered. The hardware configuration of the cabinet does however allow the cabinet to run as:

- A standard U-cabinets (solid door) setpoint +12 to -25°C (default) To be adapted to customer needs and system limitations.
- As a glass door refrigerator KG-cabinet +12 to +2°C (default not to be changed for lower settings)
- As a Glass door freezer (only MIDI) -5 to -22°C. (Default)

IMPORTANT:
Know that refrigerator cabinets with glass door (KG), cannot be changed to run as freezers, due to the fact that the refrigerator glass doors, does not include a heating element needed on the freezer in order to avoid condensation.

It is <u>very important</u> always to check all the parameters in the controller, in order to verify the settings in terms of correctness and suitability related to demands and refrigeration installation. The settings which are made from the factory are not necessarily suitable for the system which the cabinet is to be integrated into.

## Operating the product (Danfoss Controller AKCC 550A)

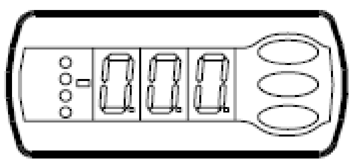
**<u>Starting up</u>**:

Plug in the appliance.

Make sure that the 2 - pole main switch is turned on.

The display part is placed behind the top panel and can be accessed by opening the top panel.

Display explanation:



The above shown display part has a three-digit read-out.

On the left side of the read out, three LEDs are placed. These three LEDs have the following purpose.

 = Cooling on (when this LED is lid, the cooling is on)

 = Defrost on (when this LED is lid, a defrost cycle is ongoing)

 = Inside fan running (when this LED is lid, the internal fan is on)

If all three LEDs are flashing, this is an indication for an ongoing alarm or error.

The 3 buttons placed on the right side of the display read-out, are used to access and adjust different parameters.

Buttons:
The upper button:

- if pushed shortly during normal operation the controller will cancel and display any error(s) occurring. If more than one alarm does occur, use the uppermost or lowermost button to scan the different alarms.
- if pushed and kept pushed during normal operation until the display shows r01 the main parameters of the controller are accessed. This is only used by the end-user when switching the controller on and off.
- If pushed being in a set menu (either change of a setting or moving from one parameter to another the value will be increased)

The centre button: ***(*Adjusting the cabinet temperature set point)**

- if pushed and kept pushed during normal operation until the display starts flashing, the cabinet temperature set-point can be adjusted using the upper and lower button.
- If pushed after changing a value the controller does save the new value and return to the previous level.

The lower button:

- if pushed shortly during normal operation the controller will display the actual temperature of the evaporator probe.
- if pushed and kept pushed for more than 4 seconds, during normal operation, an ongoing defrost cycle will be cancelled or a manual defrost cycle will be started.
- If pushed being in a set menu (either change of a setting or moving from one parameter to another the value will be decreased)

The temperature alarm limits desired by the end user, must be set in the controller by the installer. Please be aware of this in order to leave a good impression with the customer.

The parameters in question are e.g.:

A13 and A14

**As an end-user it should only be possible to make the following adjustments:**

- **Adjusting the cabinet temperature set point (as explained above)**
- **Turning the cabinet controller on/off**
- **Switching the internal light (Only on MIDI KG/FG products)**

<u>**Turning the cabinet on/off**</u>

**As default setting the cabinet controller is delivered turned off.**
**This means that the display will show oFF, when power supply is connected. Please also check that the main switch, placed on the control box is turned on.**
**The following is done in order turn the controller on. The same approach is used when turning the controller off (Setting r12 to 0).**

- Push the upper button and keep it pushed during normal operation until the display does show r01.

- Push the upper or the lower button until r12 is displayed.
- Push the centre button.
- Push the lower or the upper button in order to switch between the settings 0 and 1 (-1 is only for service).
    - Setting 0 means the cabinet is OFF.
    - Setting 1 means the cabinet is ON.
- Confirm the new setting by pushing the centre button.

**In order to skip the r01 parameter, the controller does only need to be left untouched for approx. 30 seconds. This will make the controller fall back to the normal operation mode, meaning that the cabinet will either be in OFF – mode or be running.**

**Cabinet light**

On all cabinets, besides the MIDI glass door cabinets with internal light, the cabinet light is placed on the cabinet outside, above the door. This light is operated by the main controller which means that the way it works cannot be changed.

When the cabinet door is opened the light above the door is turned on. When closing the door again, the cabinet light above the door will remain on for two minutes. These two minutes are a main function in the Danfoss controller which cannot be adjusted. Two minutes after closing the door the light will switch off.

**Switching the internal light (Only on MIDI Glass door products - KG/FG)**

On a Midi glass door cabinet, the cabinet LED lights are placed on the left and the right front wall rails inside the cabinet storage room. The light can be operated in two different ways:

1. When the cabinet door is opened the internal light is turned on. When closing the door again, the cabinet internal light will remain on for two minutes. These two minutes are a main function in the Danfoss controller which cannot be adjusted. Two minutes after closing the door the light will switch off.

2. By switching the light toggle  switch in the left front of the top control box, placed behind the top panel, to the position showing a light bulb, the internal light will be turned on constantly (not affected by opening and closing the door).

Errors and alarms

| Fault message | | |
|---|---|---|
| In an error situation the LED's on the front will flash and the alarm relay will be activated. If you push the top button in this situation you can see the alarm report in the display.<br>There are two kinds of error reports - it can either be an alarm occurring during the daily operation, or there may be a defect in the installation.<br>A-alarms will not become visible until the set time delay has expired.<br>E-alarms, on the other hand, will become visible the moment the error occurs.<br>(An A alarm will not be visible as long as there is an active E alarm).<br>Here are the messages that may appear: | | |
| **Code / Alarm text via data communication** | **Description** | **Alarm relay groups (P41)** |
| A1/--- High t.alarm | High temperature alarm | 1 |
| A2/--- Low t. alarm | Low temperature alarm | 2 |
| A4/--- Door alarm | Door alarm | 8 |
| A5/--- Max hold time | The "o16" function is activated during a coordinated defrost | 16 |
| A10/--- Inject prob. | Control problem | 64 |
| A11/--- No Rfg. sel. | No refrigerant selected | 64 |
| A13/--- High temp S6 | Temperature alarm. High S6 | 1 |
| A14/--- Low temp S6 | Temperature alarm. Low S6 | 2 |
| A15/--- DI1 alarm | DI1 alarm | 8 |
| A16/--- DI2 alarm | DI2 alarm | 8 |
| A45/--- Standby mode | Standby position (stopped refrigeration via r12 or DI input) | - |
| A59/--- Case clean | Appliance cleaning. Signal from DI input | - |
| --- AD fault | Error in the adaptive defrost function | 16 |
| --- AD Iced | Evaporator is iced up. Reduction of air flow | 16 |
| --- AD not defr. | Defrost of evaporator is not satisfactory | 16 |
| --- AD flashgas | Flash gas is formed at the valve | 16 |
| E1/--- Ctrl. error | Faults in the controller | 32 |
| E6/--- RTC error | Check clock | 32 |
| E20/--- Pe error | Error on pressure transmitter Pe | 64 |
| E24/--- S2 error | Error on S2 sensor | 4 |
| E25/--- S3 error | Error on S3 sensor | 4 |
| E26/--- S4 error | Error on S4 sensor | 4 |
| E27/--- S5 error | Error on S5 sensor | 4 |
| E28/--- S6 error | Error on S6 sensor | 4 |
| E34/--- S3 error B | Error on S3B sensor (appl. 10 only) | 4 |
| E37/--- S5 error B | Error on S5B sensor | 4 |
| ---/--- Max Def.Time | Defrost stopped based on time instead of, as wanted, on temperature | 16 |

**Data communication**

The importance of individual alarms can be defined with a setting. The setting must be carried out in the group "Alarm destinations"

| Settings from System manager | Settings from AKM (AKM destination) | Log | Alarm relay | | | Send via Network |
|---|---|---|---|---|---|---|
| | | | Non | High | Low-High | |
| High | 1 | X | | X | X | X |
| Middle | 2 | X | | | X | X |
| Low | 3 | X | | | X | X |
| Log only | | X | | | | |
| Disabled | | | | | | |

User menu

<u>User menu overview:</u>

For information on user menu please see manual over the selected CO2 controller

## Operating the product (Carel MPXpro controller)

**Starting up**

Plug in the appliance

Default setting of the cabinet controller is that it is delivered turned on.
This means that the controller will start regulating, when power supply is connected, and the main switch is in the on position.

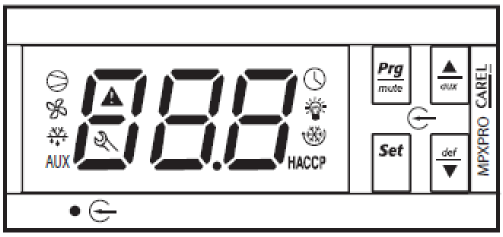
Turning the cabinet on/off

To turn the cabinet on/off the 2-pole main switch, on the left side of the main control box, placed in “the compressor compartment” is used.

**The display**

The display, used for adjusting settings and displaying temperature or alarm codes, is placed behind the top panel and can be accessed by opening the top panel.

Display layout/explanation:




The above shown display has a three-digit read-out.

Within the read-out area, several LEDs are placed. These LEDs give the following indications.

In general = When a LED is flashing the activation is delayed or limited.

 = Cooling on (when this LED is lit, cooling is on)

 = Inside fan running (when this LED is lit, the internal/evaporator fan is on)

 = Defrost on (when this LED is lit, a defrost cycle is ongoing)

 = If the LED is flashing, this is an indication for the door being open or an ongoing alarm or error.

**HACCP** = When this LED is lit, a HACCP alarm is ongoing. When this LED is flashing there is a saved HACCP alarm.

**Buttons:**

The 4 buttons placed on the right side of the display, are used to access and adjust different parameters. These buttons can be pressed alone or in combination in order to operate the controller.

The below explained settings are the only once which should be changed by the end user. The end user should not modify any parameters which are not explained here. All other settings should be done by a skilled technician.

## USER SETTINGS

### Adjusting the cabinet temperature set-point

- Press and hold Set during normal operation until the display starts flashing, the cabinet temperature set-point can be adjusted using up and down .
- When the set point has been adjusted to the desired temperature, Set is pressed briefly, in order to save the new value and to return to normal operation.

### How to perform a manual defrost

- Press and hold def for more than 5 sec. during normal operation, in order to perform a manual defrost, if the evaporator probe temperature is cold enough.
- When the defrost symbol is lit, it does indicate that a defrost is ongoing.
- if def is pressed and held for more than 5 seconds when a defrost cycle is ongoing, the defrost will be deactivated.

### How to mute acoustic alarms

- When the controller is in alarm mode, you will hear an acoustic signal. The alarm can be muted by pushing Prg/mute .

**Setting the temperature alarm limits**

- Press and hold Prg/mute for more than 5 sec. during normal operation, in order to open the parameter list. The display will show **/c1**
- Press Prg/mute . The first category of parameters, “Pro”, is shown
- Press UP until reaching category “ALn”, indicated by the icon being lit on the display.
- Press Set parameter AA will be displayed.
- Press UP until reaching A1
- Press Set in order to adjust if AL (**A**larm **L**ow temperature threshold) and AH (**A**larm **H**igh temperature threshold) settings shall be (0 = relative to the cabinet temperature setpoints) or (1 = absolute) default setting = 1
- Press Set in order to store the chosen setting and return to A1
- Press UP until reaching AL (**A**larm **L**ow temperature threshold)
- Press Set to make it possible to adjust AL using up and down (adjustable between -50 and +50) Default setting = -50°C
- press Set in order to store the chosen setting and return to AL
- press UP until reaching AH (**A**larm **H**igh temperature threshold)
- press Set to make it possible to adjust AH using up and down (adjustable between -50 and +50) Default setting = +50°C
- press Set in order to store the chosen setting and return to AH
- press UP until reaching Ad (**A**larm **D**elay time for AL and AH)
- press Set to make it possible to adjust Ad using up and down (adjustable between 0 and 240 minutes) Default setting = 120 minutes.
- press Set in order to store the chosen setting and return to Ad
- Push and hold Prg/mute for more than 5 sec. in order to save changes, and the revert to the main menu.

In order to create temperature alarm thresholds and alarm delay time suitable for a refrigerator or a freezer the below alarm setting examples can be suggested:

| | Setpoint | A1 | AL | AH | Ad |
|---|---|---|---|---|---|
| Refrigerator | +5°C | 1 | +1°C | 8°C | 120 minutes |
| Freezer | -18°C | 1 | -50°C | -15°C | 120 minutes |

**How to display the alarm log**

• Press Prg/mute and Set and hold for 5 seconds;
• enter the password: 44
• Press Set to access a submenu where UP and DOWN are used to scroll the various alarms, HS0 to HS9;

• Select an alarm and press Set to display the code, hour, minutes and Duration.

• From any of the sub parameters, pressing Prg/mute will make the controller return to the parent parameter “HSx”;
• Press Prg/mute for 5 seconds to return to the standard display.

Example:

‘HI’ -> ‘h17’ -> ‘m23’ -> ‘65’
indicates that alarm ‘HI’ (high temperature alarm) was activated at 17:23 and lasted 65 minutes.

**HACCP ALARMS**
Two types of HACCP events are managed:
• type HA alarms, high temperature during the operation.
• type HF alarms, high temperature after power failure (blackout).

When an alarm is recorded, the HACCP LED flashes, the display shows the alarm code, the alarm is saved, and the alarm relay and buzzer are activated.

### How to display the HA and HF alarms

- Press Prg/mute and DOWN simultaneously
- Scroll the list of alarms pressing UP and DOWN
- Press Set to select the required alarm
- Use UP or DOWN to see the description of the alarm: year, month, day, hours, minutes and duration in minutes of the selected alarm
- Press Prg/mute again to return to the previous list.

In addition, the HACCP alarm menu allows the following operations:

### How to delete a HACCP alarm

- Press Set & DOWN for 5 seconds when displaying the list of alarms.

This causes the HACCP to flash, the display
shows the message rES and the monitoring of HACCP alarms is
reinitialised

### How to delete the entire memory of HACCP alarms

- Press Set & UP & DOWN for 5 seconds.

This procedure displays the message rES, deletes the entire memory of alarms and reinitialises the monitoring of the
HACCP alarms.

In order to be able to use the HACCP alarms, it is necessary that the real time clock has been adjusted by the installing company prior to handing over the cabinet to the end user. These adjustments are protected by an access code and can therefore not be made by the end user.

**Cabinet light**

On all cabinets, besides the MIDI glass door cabinets with internal light, the cabinet light is placed on the cabinet outside, above the door. This light is operated by the main controller in co-operation with the door input.

When the cabinet door is opened the light above the door is turned on. When closing the door, the cabinet light above the door will turn off.

**Switching the internal light (Only on MIDI Glass door products - KG/FG)**

On a Midi glass door cabinet, the cabinet LED lights are placed on the left and the right front wall rails inside the cabinet storage room. The light can be operated in two different ways:

1. When the cabinet door is opened the internal light is turned on. When closing the door again, the internal cabinet light will be turned off.

2. By switching the light toggle  switch in the left front of the top control box, placed behind the top panel, to the position showing a light bulb, the internal light will be turned on constantly (not affected by opening and closing the door).

# Errors and alarms

### Table of alarms

| Display code | Cause of the alarm | Icon flash on display | Alarm relay | Buzzer | Reset | Compressor | Defrost | Evaporator fans | Continuous cycle | Signalled on tLAN | Network solenoid valve |
|---|---|---|---|---|---|---|---|---|---|---|---|
| rE | Control probe fault | 🔧 | ON | ON | automatic | duty setting(c4) | unchanged | unchanged | unchanged | √ | - |
| E1 | Probe S1 fault | 🔧 | OFF | OFF | automatic | duty setting(c4) | unchanged | unchanged | unchanged | √ | - |
| E2 | Probe S2 fault | 🔧 | OFF | OFF | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| E3 | Probe S3 fault | 🔧 | OFF | OFF | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| E4 | Probe S4 fault | 🔧 | OFF | OFF | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| E5 | Probe S5 fault | 🔧 | OFF | OFF | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| E6 | Probe S6 fault | 🔧 | OFF | OFF | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| E7 | Probe S7 fault | 🔧 | OFF | OFF | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| E8 | Serial probe S8 not updated | 🔧 | OFF | OFF | automatic | duty setting(c4) | unchanged | unchanged | unchanged | √ | - |
| E9 | Serial probe S9 not updated | 🔧 | OFF | OFF | automatic | duty setting(c4) | unchanged | unchanged | unchanged | √ | - |
| E10 | Serial probe S10 not updated | 🔧 | OFF | OFF | automatic | duty setting(c4) | unchanged | unchanged | unchanged | √ | - |
| E11 | Serial probe S11 not updated | 🔧 | OFF | OFF | automatic | duty setting(c4) | unchanged | unchanged | unchanged | √ | - |
| LO | Low temperature alarm | ⚠ | ON | ON | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| HI | High temperature alarm | ⚠ | ON | ON | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| LO2 | Low temperature alarm | ⚠ | ON | ON | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| HI2 | High temperature alarm | ⚠ | ON | ON | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| IA | Immediate alarm from external contact | ⚠ | ON | ON | automatic | duty setting(A6) | unchanged | unchanged | unchanged | √ | - |
| dA | Delayed alarm from external contact | ⚠ | ON | ON | automatic | duty setting(A6) if A7≠0 | unchanged | unchanged | unchanged | √ | - |
| dor | Door open for too long alarm | ⚠ | ON | ON | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| Etc | Real time clock fault | 🕓 | OFF | OFF | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| LSH | Low superheat alarm | ⚠ | OFF | OFF | automatic | OFF | unchanged | unchanged | unchanged | √ | √ |
| LSA | Low suction temperature alarm | ⚠ | OFF | OFF | automatic / manual | OFF (paragraph 6.10) | unchanged | unchanged | unchanged | √ | √ |
| MOP | Maximum evaporation pressure alarm | ⚠ | OFF | OFF | automatic | OFF | unchanged | unchanged | unchanged | √ | √ |
| LOP | Low evaporation temperature alarm | ⚠ | OFF | OFF | automatic | unchanged | unchanged | unchanged | unchanged | √ | √ |
| bLo | Valve blocked alarm | ⚠ | OFF | OFF | manual/ disabled with P14=0 | unchanged | unchanged | unchanged | unchanged | √ | - |
| Edc | Communication error with stepper driver | 🔧 | ON | ON | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| EFS | Stepper motor broken/not connected | 🔧 | ON | ON | automatic | unchanged | unchanged | unchanged | unchanged | √ | - |
| EE | Flash unit parameter error | 🔧 | OFF | OFF | automatic | OFF | not performed | OFF | not performed | √ | - |
| EF | EEPROM operating parameter error | 🔧 | OFF | OFF | automatic | OFF | not performed | OFF | not performed | √ | - |
| HA | Type HA HACCP alarm | HACCP | OFF | OFF | manual | unchanged | unchanged | unchanged | unchanged | √ | - |
| HF | Type HF HACCP alarm | HACCP | OFF | OFF | manual | unchanged | unchanged | unchanged | unchanged | √ | - |
| MA | Communication error with Master (only on Slave) | 🔧 | ON | ON | automatic | unchanged | unchanged | unchanged | unchanged | - | - |
| u1...u5 | Communication error with Slave (only on Master) | 🔧 | ON | ON | automatic | unchanged | unchanged | unchanged | unchanged | - | - |
| n1...n5 | Alarm on unit 1 to 5 in the network | ⚠ | ON | ON | automatic | unchanged | unchanged | unchanged | unchanged | - | - |
| up1...up5 | Upload procedure with errors on unit 1 to 5 | ⚠ | OFF | OFF | - | unchanged | unchanged | unchanged | unchanged | - | - |
| GPE | Error in custom gas parameters | 🔧 | ON | ON | automatic | OFF | not performed | OFF | not performed | √ | - |

## Appendix:

<u>Additional settings for the technician:</u>

On the last pages of this manual the Gram settings for the MPXpro can be found. For information on additional menus and settings please look in the manual related to the selected CO2 controller Carel MPXpro, on the Carel web side.

# Troubleshooting

## Noise:

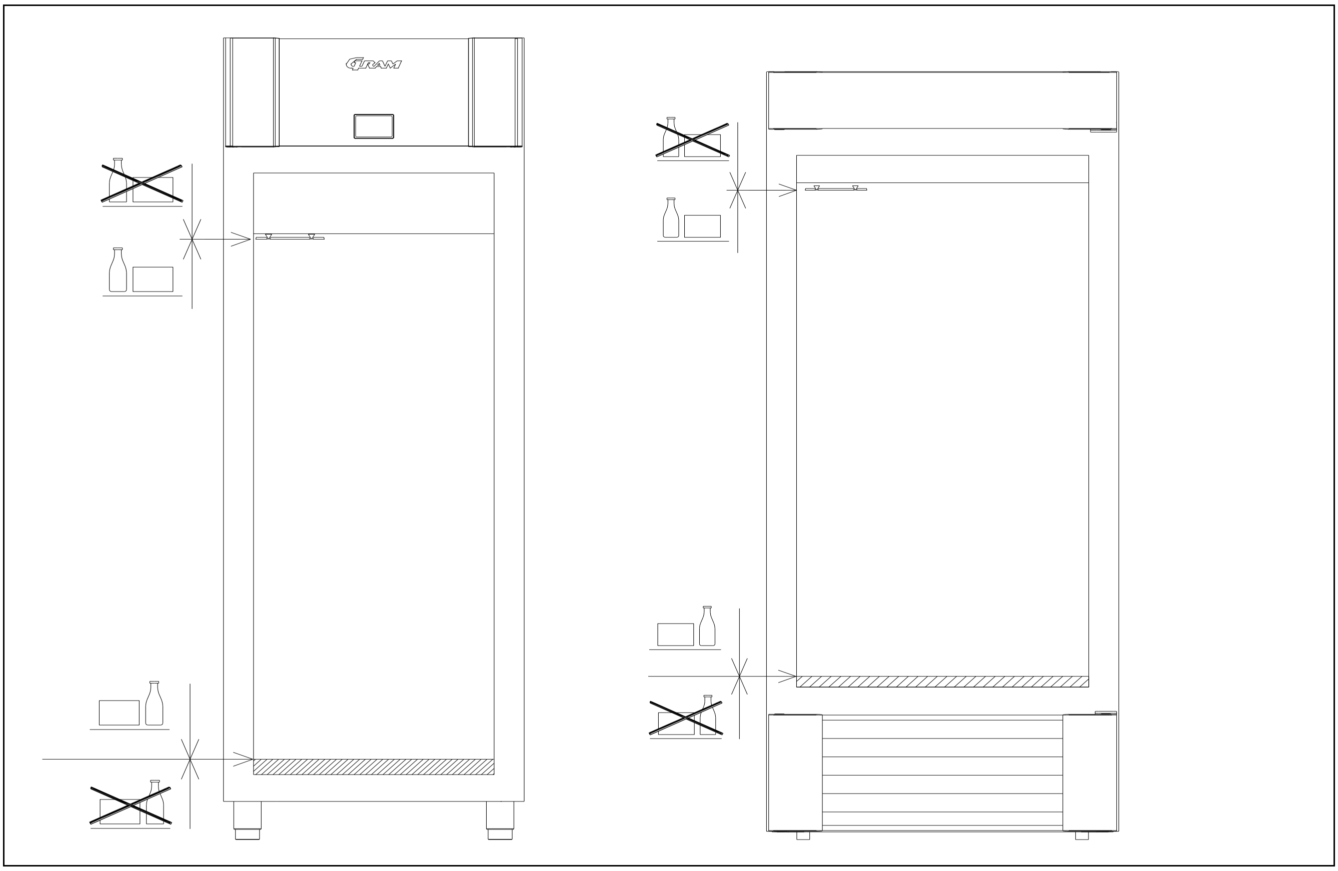
- If abnormal noise occurs, request service assistance.
- Operating sounds due to air distribution from the interior/evaporator fan are normal.
- If sheet metal parts, front panels or panels in front of the “compressor” compartment are noisy due to vibrations, these might be open. Close the panels.

## Frosting inside compartment:

- Ambient humidity too high.
- The door is opened too often.
- The door is left open for too long.
- Damaged door gasket. Check it thoroughly for damages.

## Poor cooling performance:

- Ambient temperature too high.
- The door is opened too often and/or open for too long.
- The door is left open.
- Damaged door gasket.
- Temperature set point adjusted too high.
- Product is too packed with food - air inlet/outlet blocked.
- Shelving not placed as intended, resulting in poor air circulation.
- Always mount a shelve in the lowest possible position. No food below the lowest shelve or above the upper load limitation.



- Warm or hot foods inside the product (not intended use).
- Defrost in progress. The cabinet temperature may rise temporarily during the defrost cycle, but it will not affect the food inside. The defrost symbol of the controller is displayed.

**Some of the food is frozen:**

- Cabinet too packed with foods - air inlet/outlet blocked.
- Temperature set point adjusted too low.
- Evaporator fan might be defective.

**Condensation around the door:**

- Ambient humidity too high.
- The door is not closed tightly.
- Damaged door gasket.

**Too high energy consumption:**

- Ambient temperature too high.
- The door is opened too often and/or open for too long.
- The door is left open.
- Damaged door gasket.
- Temperature setpoint too low.
- Product is too packed with food - air inlet/outlet blocked.
- Warm or hot food is placed inside the product.
- Product is placed in direct sunlight or close to heat-emitting surfaces.
- The default settings have been changed.

## Defrosting

Defrosting is automatically performed (default 4) times every 24 hours, related to the settings made in the controller under the defrost-parameters. If the product is operating under severe load (frequent door opening and frequent replenishment), manual defrosting can become necessary.

In order to start a manual defrosting cycle or to stop an ongoing defrost cycle the following must be done:

Danfoss AKCC550A:

- If the lower button is pushed for more than 4 seconds, during normal operation, an ongoing defrost cycle will be cancelled or a manual defrost cycle will be started.

During defrost the control LED is lid.

Carel MPXpro:

- Press and hold def for more than 5 sec. during normal operation, in order to perform a manual defrost, if the evaporator probe temperature is cold enough.
- When the defrost symbol is lit, it does indicate that a defrost is ongoing.
- if def is pressed and held for more than 5 seconds when a defrost cycle is ongoing, the defrost will be deactivated.

Do not use sharp or pointed objects to accelerate the defrosting process.

## Defrost water

PLUS/TWIN/EURO cabinets

The product produces water during defrosting, which is led into a defrost water pipe going to the rear bottom of the cabinet. The cabinet is mounted with a re-evaporation tray, with a heating element underneath the cabinet as a standard. This heating element is operated in parallel with the ongoing refrigeration cycle. In case this tray does overflow the heating element can be connected to 100% line (main supply in the control box). This will however make the heater run constantly. It is always advisable to connect the drain line to an external drain or an external drain pump if possible. In order to do so the tray and the heating element must be disconnected and should be removed.

MIDI cabinets

On Midi cabinets the re-evaporation tray including a heater operated by a level switch, is placed inside the lower compartment on the right side. It is always advisable to connect the drain line to an external drain or an external drain pump if possible. In order to do so the tray and the heating element should be disconnected and removed.

IN GENERAL: It is recommended to clean the re-evaporation tray and corresponding parts at least once a year, if used. Remember to disconnect the cabinet before cleaning. Make sure the heating element has had time to cool, before performing the cleaning of the tray.
Be careful not to damage the heating element and the water level switch (if fitted) during cleaning.

## Door closing mechanism

The door is equipped with a self-closing system. If the door is opened less than 90°, it will self-close. If the door is opened more than 90°, it will stay open.

The door can be opened by using the pedal door opener (Not on Midi). This leaves both hands free when placing foodstuff inside the cabinet.

In order to ensure proper self-closing of the door it is of great importance that the cabinet is levelled correctly.

## Power failure

In the event of a power failure, the control remembers the temperature setting and restarts the product when power is restored.

## Cleaning

Insufficient cleaning will cause the product not to work at optimum performance, or eventually it can result in a higher failure rate.

Before cleaning, the product main power supply should always be disconnected.

Do not flush the product with water, do not use water jet or steam hose as this may cause short-circuits in the electrical system.

Cleansing agents containing chlorine or compounds of chlorine as well as other corrosive means, **are not to be used**, as they might cause corrosion to the stainless panels of the cabinet and the evaporator.

For the external maintenance – use stainless steel care intended specifically for this purpose (not polish).

The product should be cleaned internally with a mild soap solution at suitable intervals and checked thoroughly before it is put into operation again.

## Door gaskets

This part deals with the importance of a well-functioning door gasket.

Door gaskets are an important part of a refrigerator/freezer. Gaskets with reduced functionality, reduces the tightness of the cabinet. Reduced tightness might cause increased humidity, internal icing, an iced-up evaporator (leading to reduced refrigeration capacity), and in worst case reduced lifecycle of the cabinet.

Therefore, it is important to be aware of the condition of the gasket. Regular inspection is recommended.

The gasket should be cleaned regularly with a mild soap solution.

If a gasket needs replacement, contact your supplier.

## Long term storage

In case the product is taken out of operation, and needs to be prepared for long-term storage, it is necessary to:
clean the inside compartment, the door and the door gasket thoroughly with a hot soapy damp cloth.
Eventual remnants of food will create mold. Keep the door open until the complete cabinet inside has drier totally. If possible, make sure the door remains open at all time during storage. This is the best way of minimizing the risk of mold or bad smell when wanting to put the cabinet back into service. Clean cabinet inside, before use of a cabinet after long term storage.

# Service

The refrigerating system on the product does not require heavy maintenance - it merely must be kept clean. It is always recommended to perform service at least on an annual basis, in order to monitor e.g. wear and tear of the evaporator and other part related to the refrigeration system etc. During annual service it is advisable to remove the drip water tray underneath the evaporator, in order to clean the tray as well as the parts covered by the tray. Be aware of sharp edges in this area (evaporator fins etc.)

If refrigeration fails, first investigate whether the unit has been unintentionally disconnected or switched off at the socket or at the 2-pole main switch, or whether a fuse has blown.

If it is not possible to find the cause of the refrigeration failure, please contact your supplier.

If you need to contact your service organization, please make sure to take a photo of the nameplate. If this is not possible the minimum of needed info is the cabinet type and the serial number (S/N). This information is stated on the name plate, see Fig. 8.

Location of the name plate:

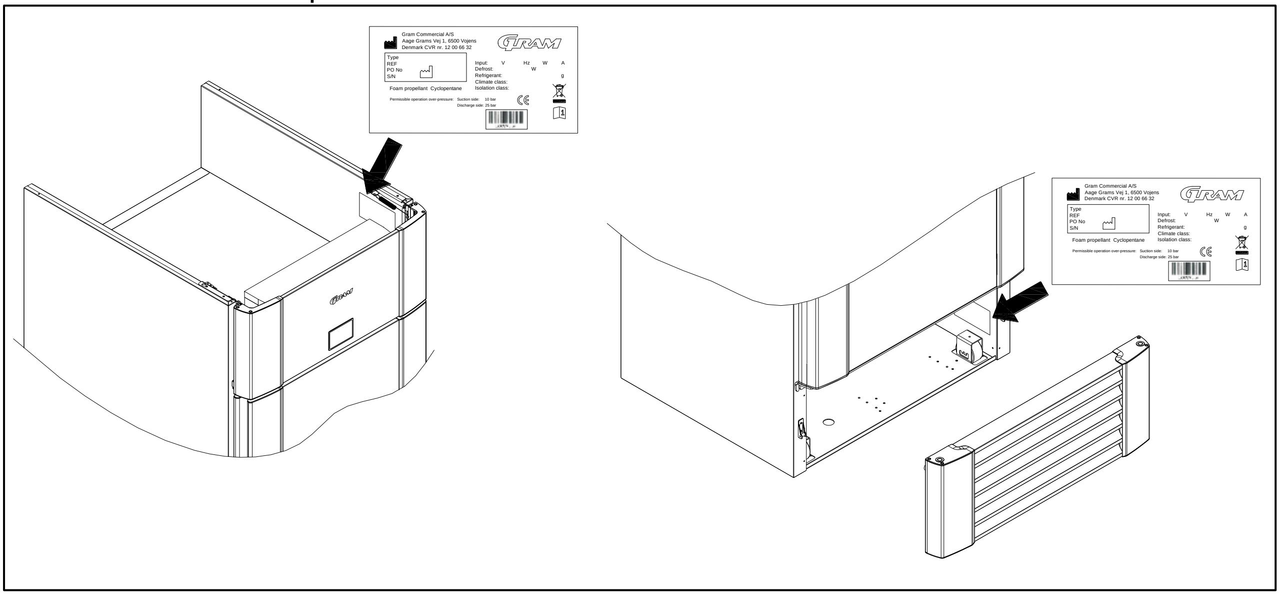
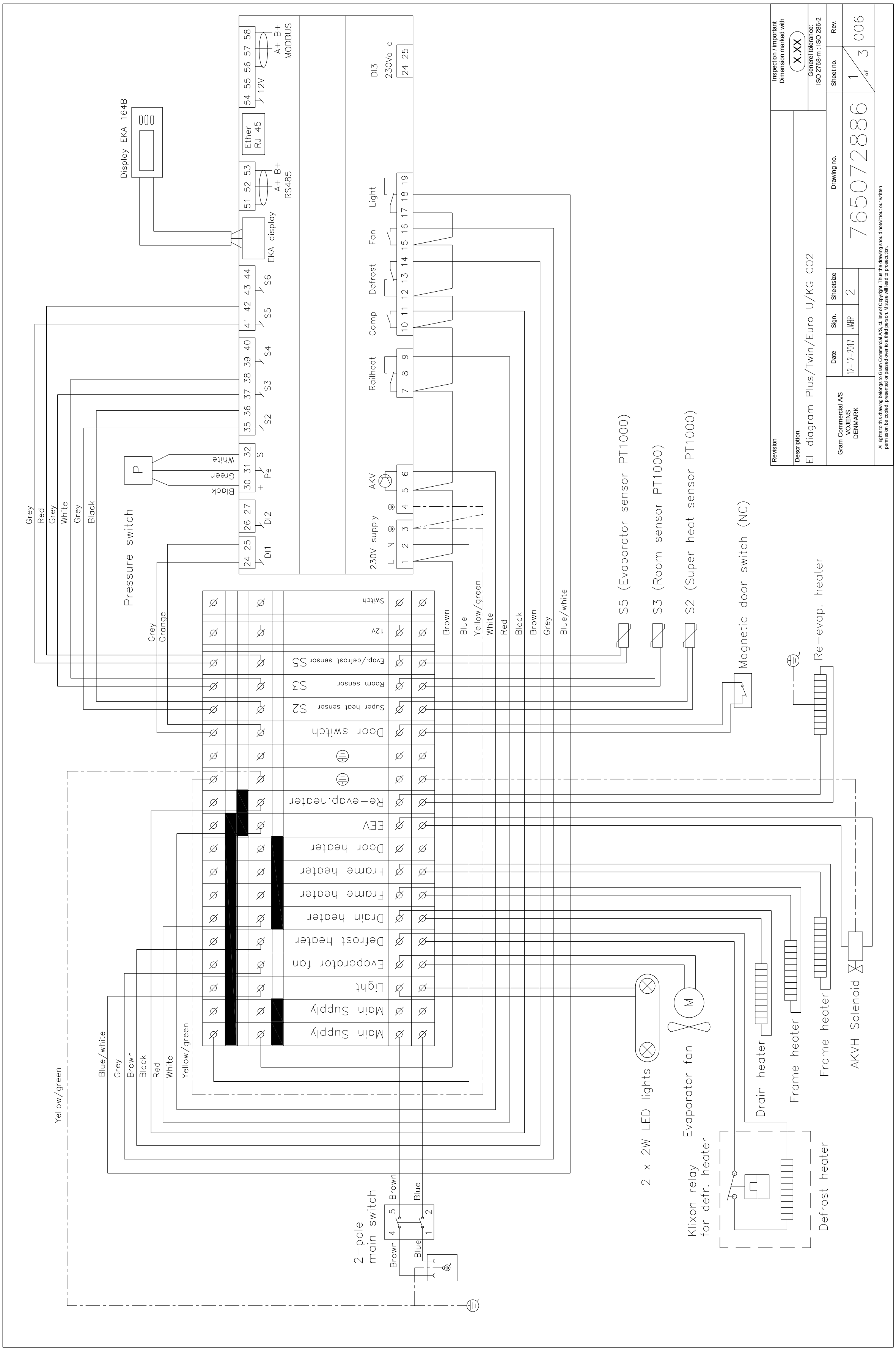
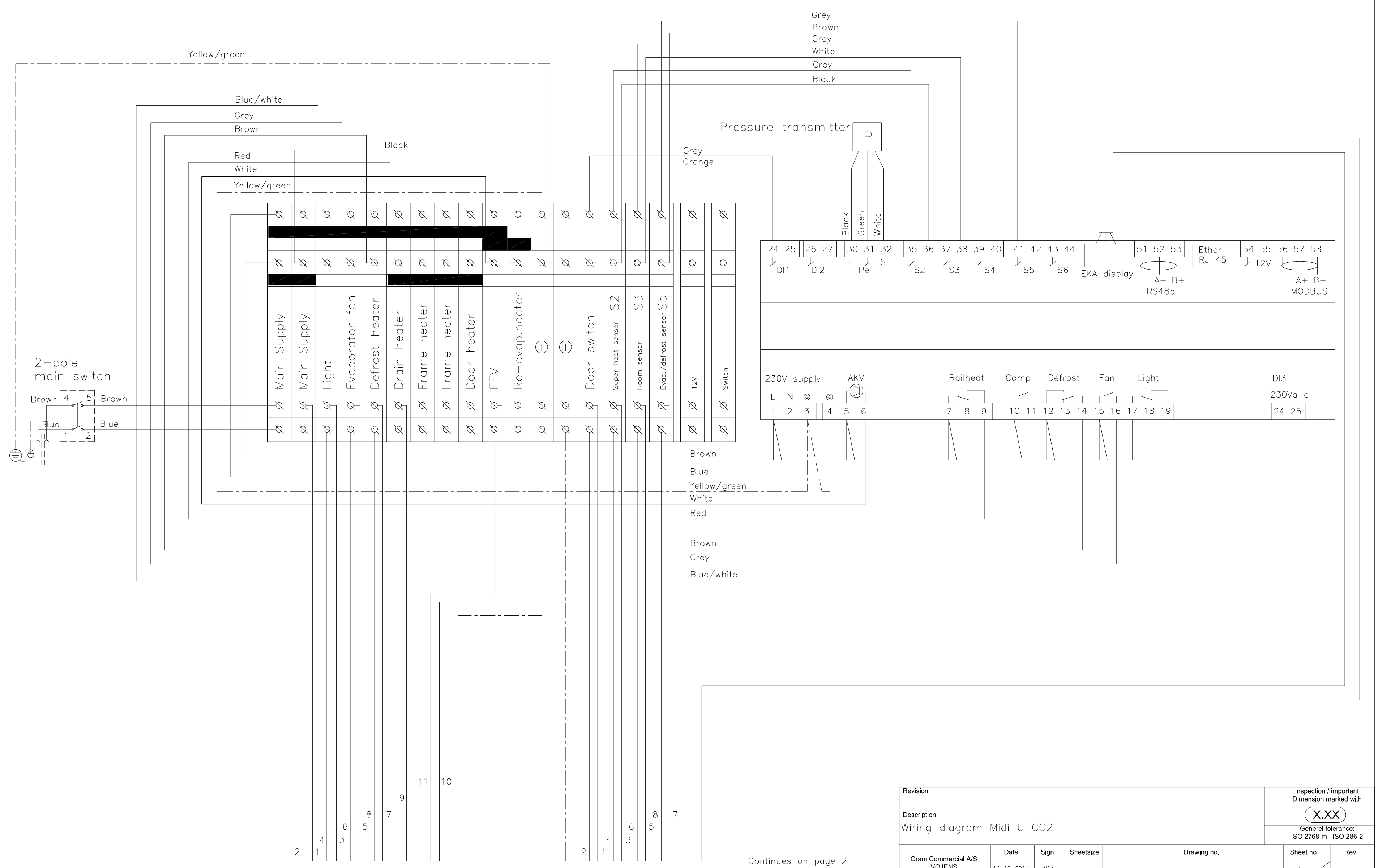



Fig.8

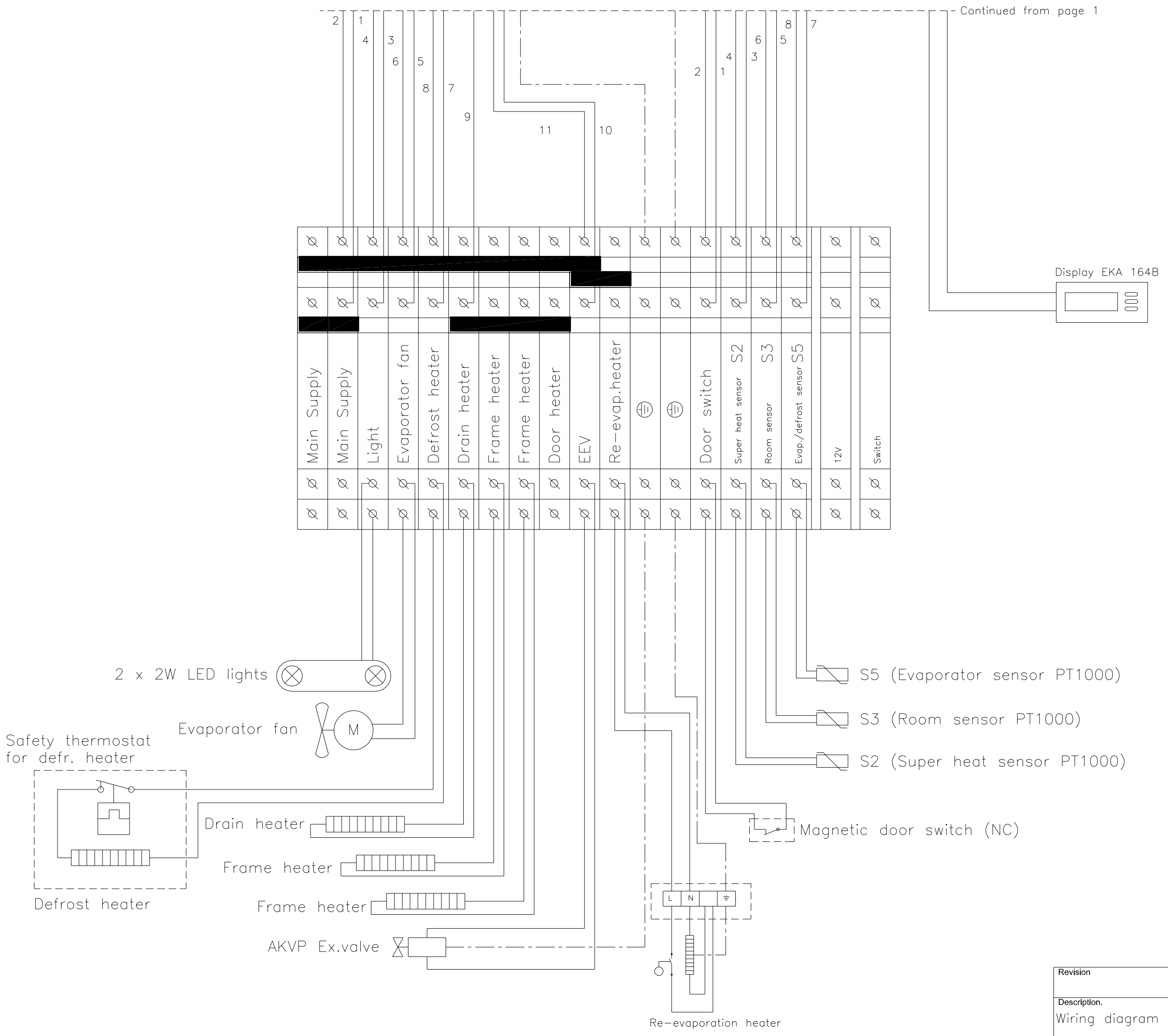
# Wiring diagrams Danfoss AKCC 550A






Continues on page 2

| Revision | | | | | Inspection / important Dimension marked with X.XX |
|---|---|---|---|---|---|
| Description. Wiring diagram Midi U CO2 | | | | | Generel tolerance: ISO 2768-m : ISO 286-2 |
| Gram Commercial A/S VOJENS DENMARK | Date | Sign. | Sheetsize | Drawing no. | Sheet no. | Rev. |
| | 13-12-2017 | JABP | | 765072887 | 1 of 4 | 005 |

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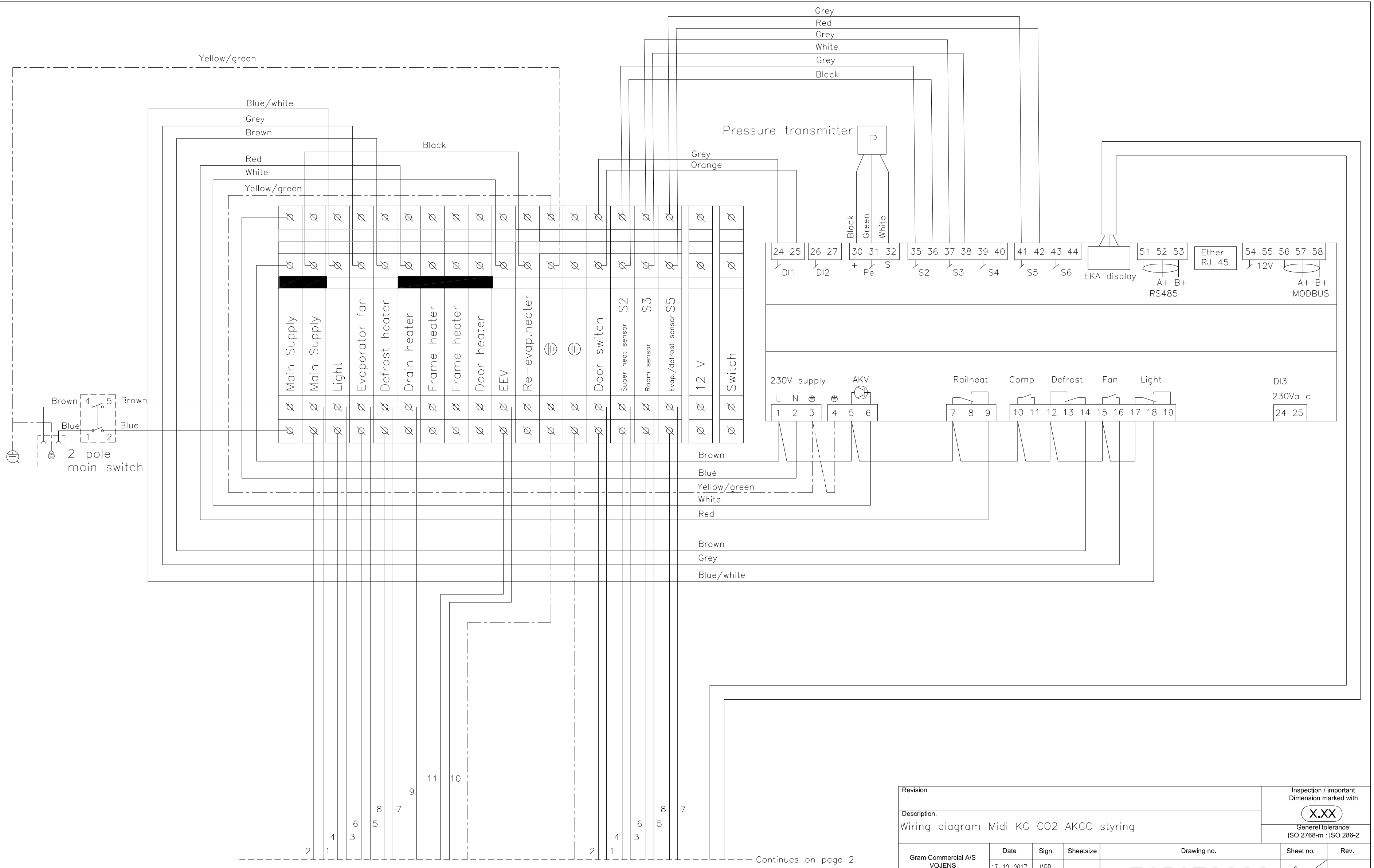
| | 13-12-2017 | JABP | | 765072887 | 2 of 4 | 005 |

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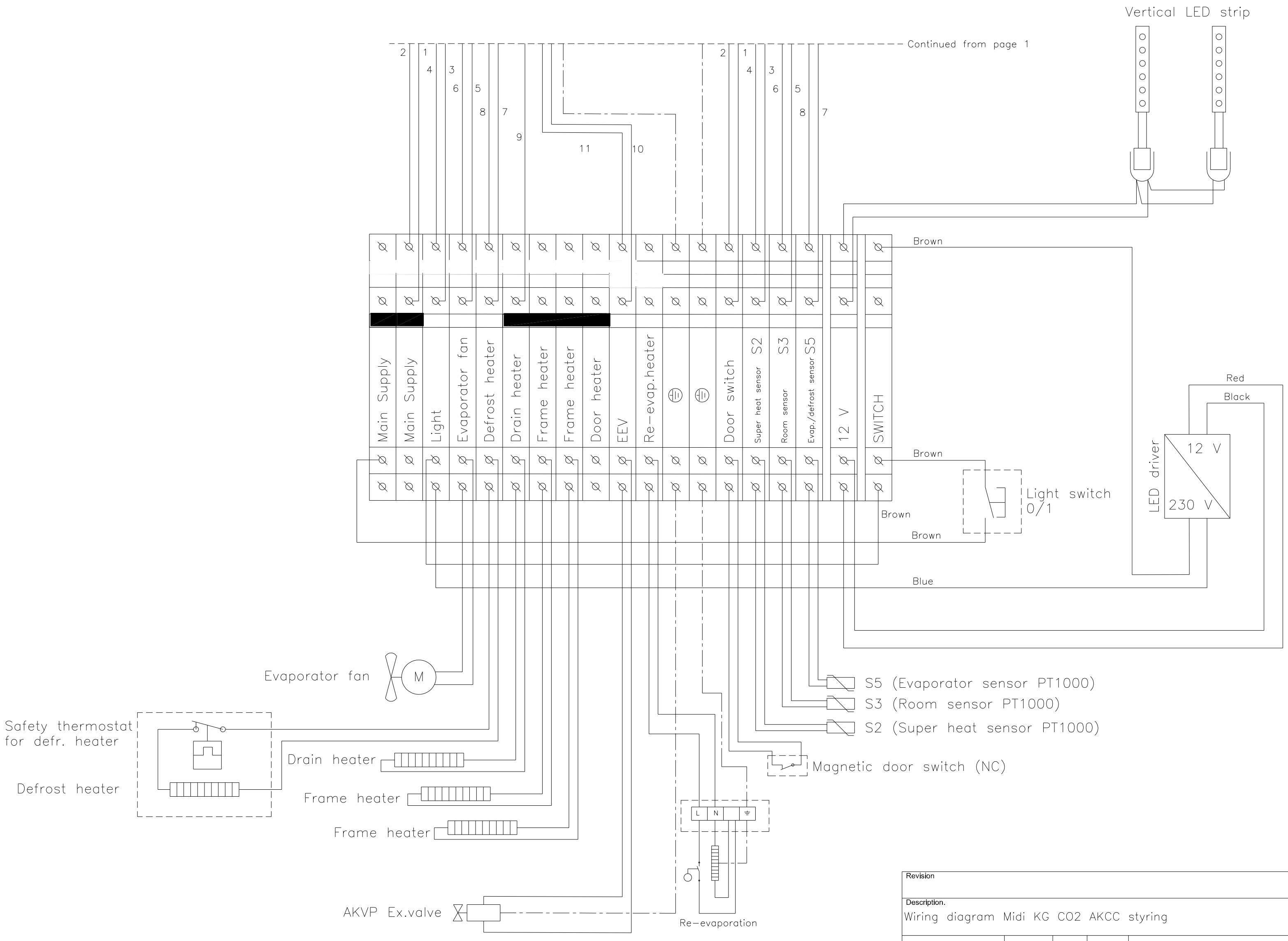
| Revision | | | | | Inspection / important Dimension marked with X.XX |
| Description. Wiring diagram Midi KG CO2 AKCC styring | | | | | Generel tolerance: ISO 2768-m : ISO 286-2 |
| Gram Commercial A/S VOJENS DENMARK | Date | Sign. | Sheetsize | Drawing no. | Sheet no. | Rev. |
| | 13-12-2017 | JABP | | 765072888 | 1 of 4 | 007 |




Revision

Description.
Wiring diagram Midi KG CO2 AKCC styring

Inspection / Important
Dimension marked with
X.XX
Generel tolerance:
ISO 2768-m : ISO 286-2

| Gram Commercial A/S VOJENS DENMARK | Date | Sign. | Sheetsize | Drawing no. | Sheet no. | Rev. |
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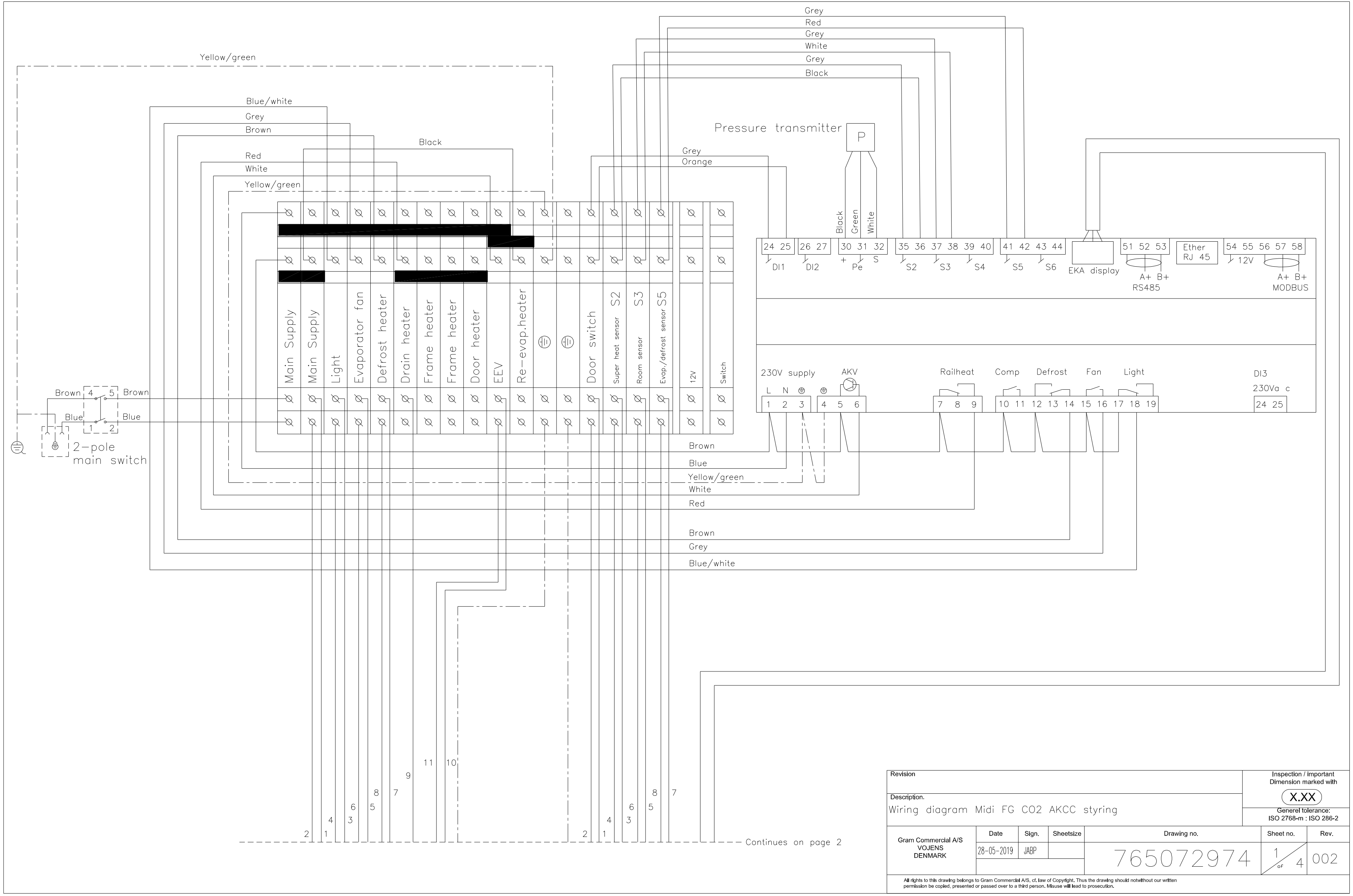
| | 13-12-2017 | JABP | | 765072888 | 2 of 4 | 007 |

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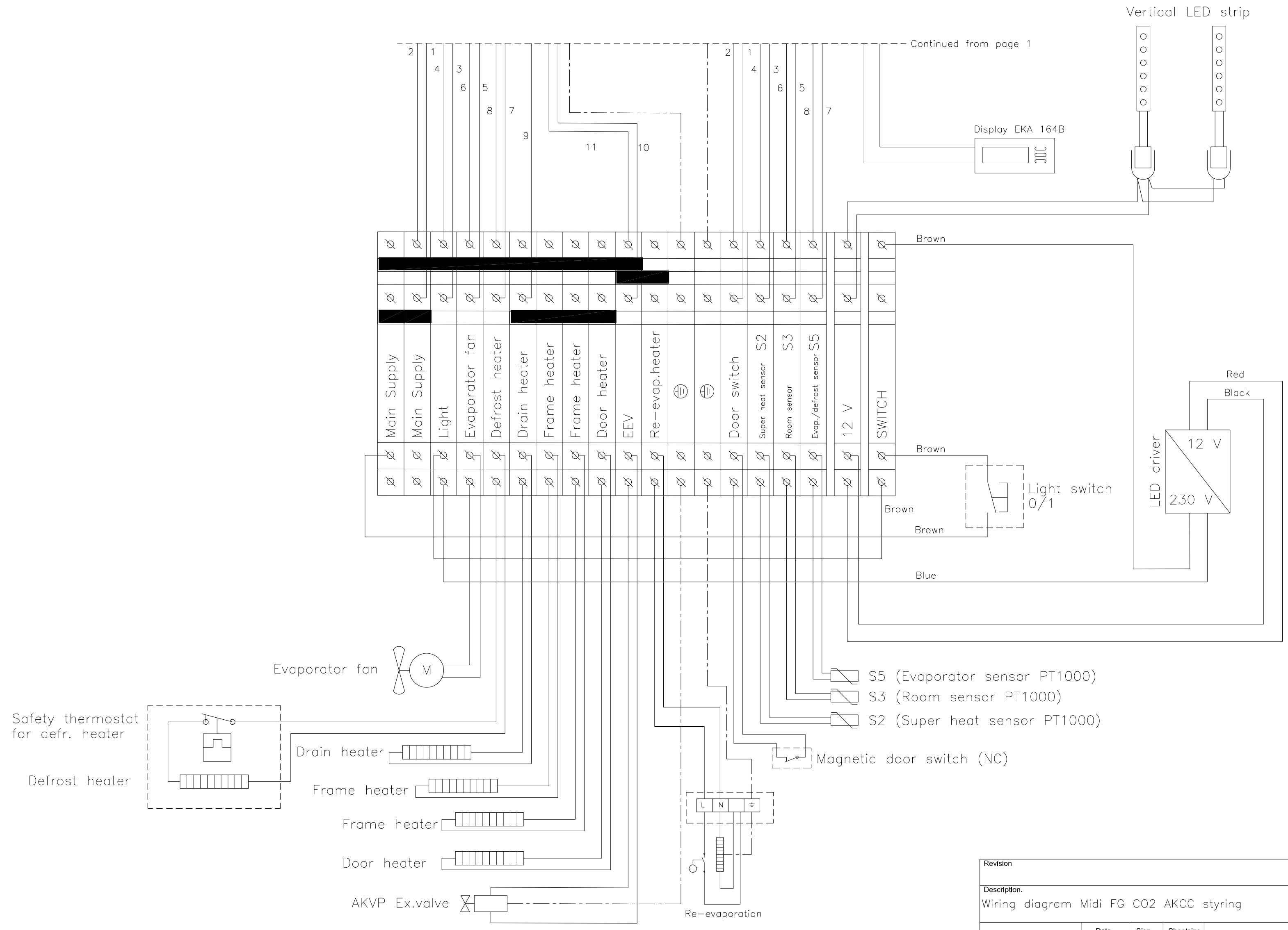


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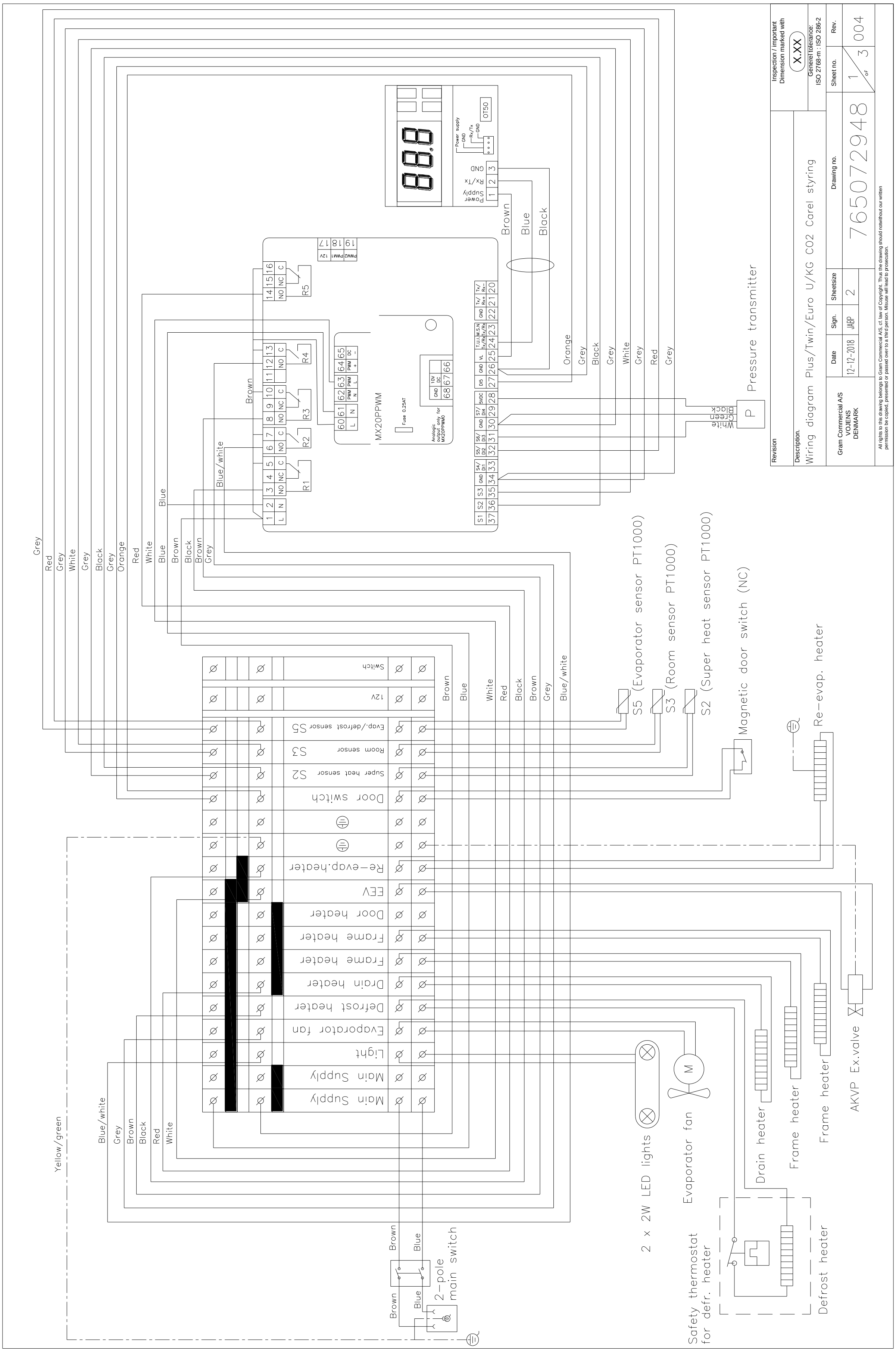
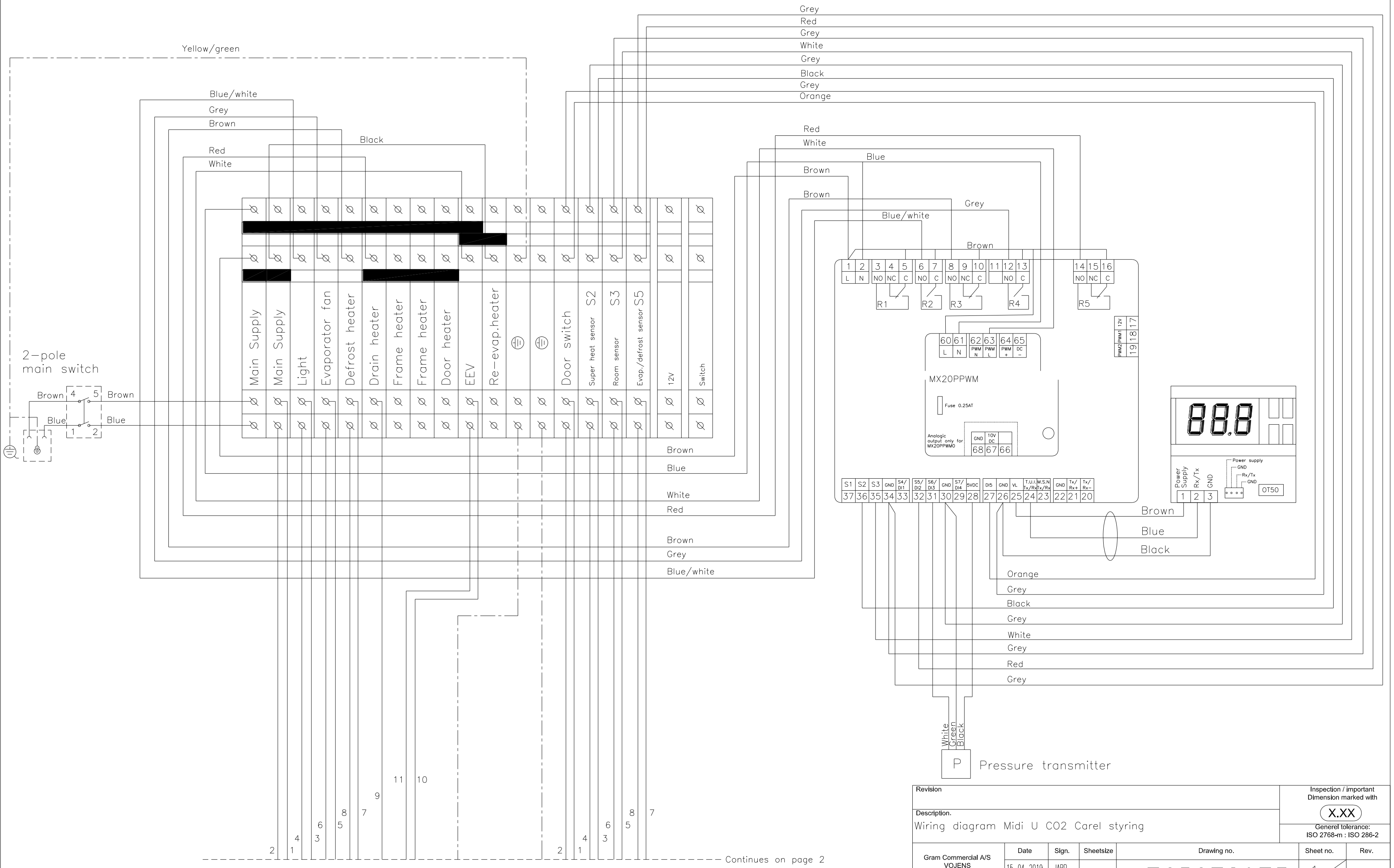
| Gram Commercial A/S VOJENS DENMARK | Date: 28-05-2019 | Sign.: JABP | Sheetsize | Drawing no.: 765072974 | Sheet no.: 2 of 4 | Rev.: 002 |

# Wiring diagrams Carel MPXpro



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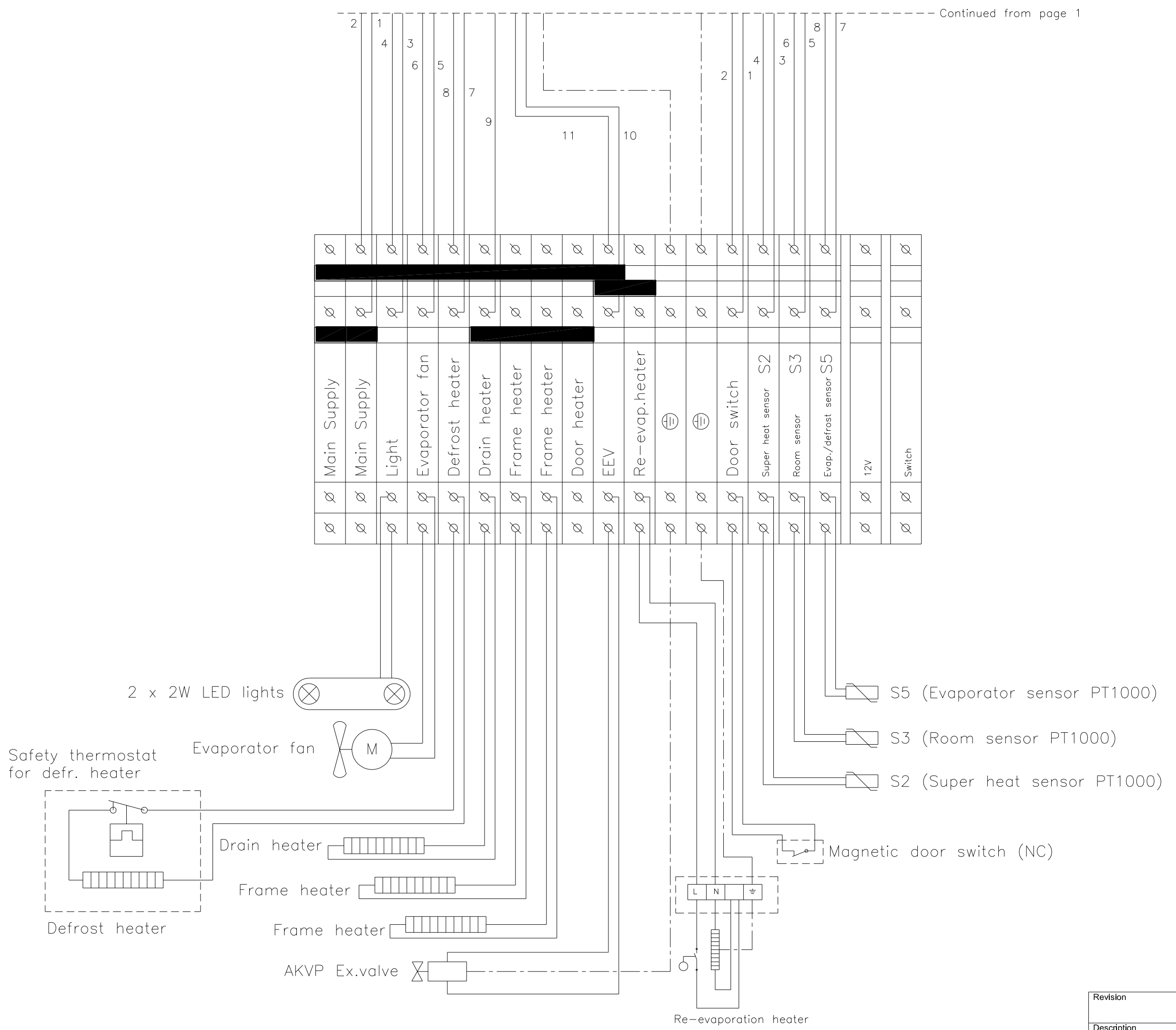
| Gram Commercial A/S VOJENS DENMARK | Date | Sign. | Sheetsize | Drawing no. | Sheet no. / Rev. |
| | 15-04-2019 | JABP | | 765072973 | 1 of 4 / 004 |

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| Gram Commercial A/S VOJENS DENMARK | Date 15-04-2019 | Sign. JABP | Sheetsize | Drawing no. 765072973 | 

| Sheet no. | Rev. |
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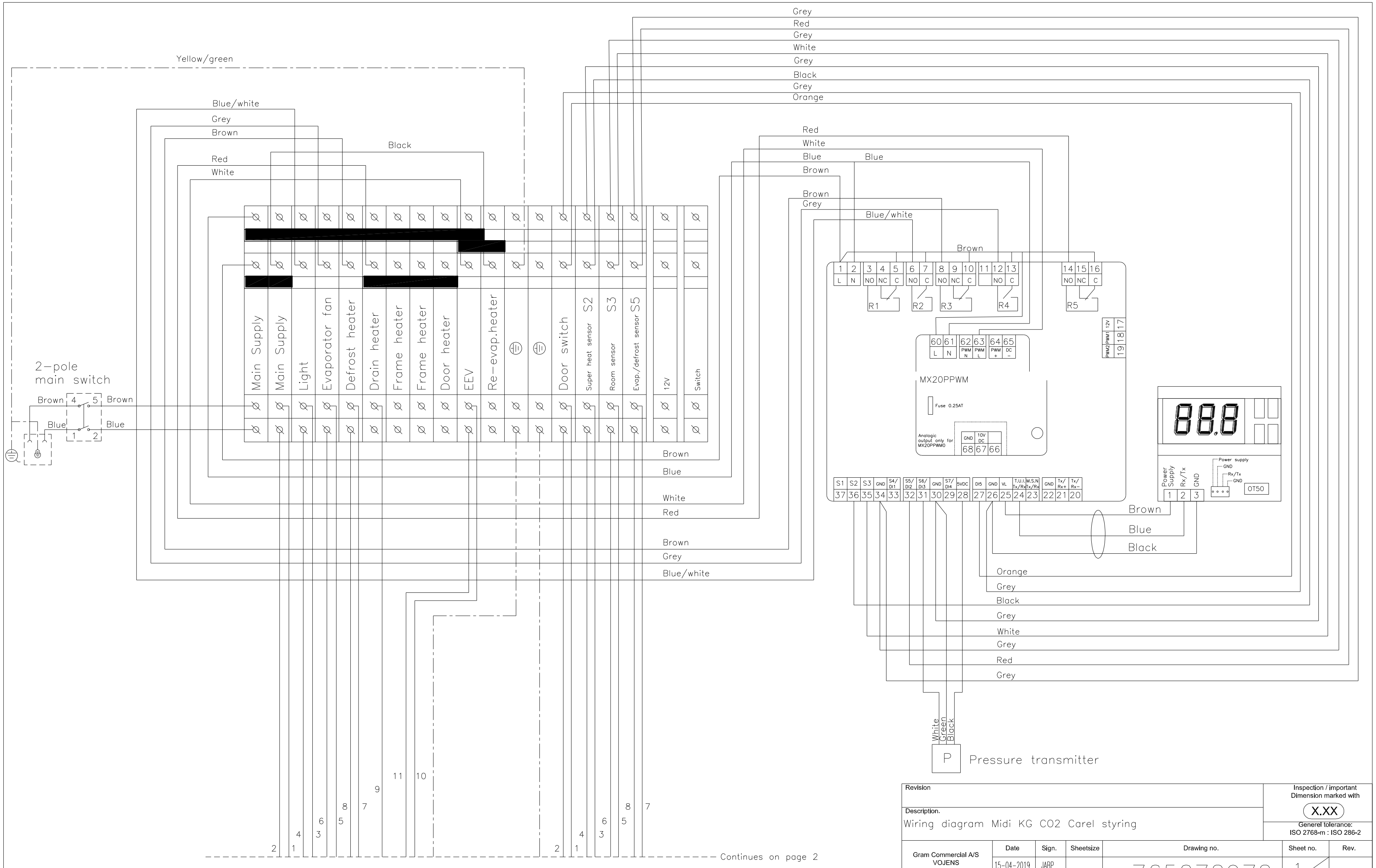
| 2 of 4 | 004 |



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| Revision | Inspection / important Dimension marked with X.XX |
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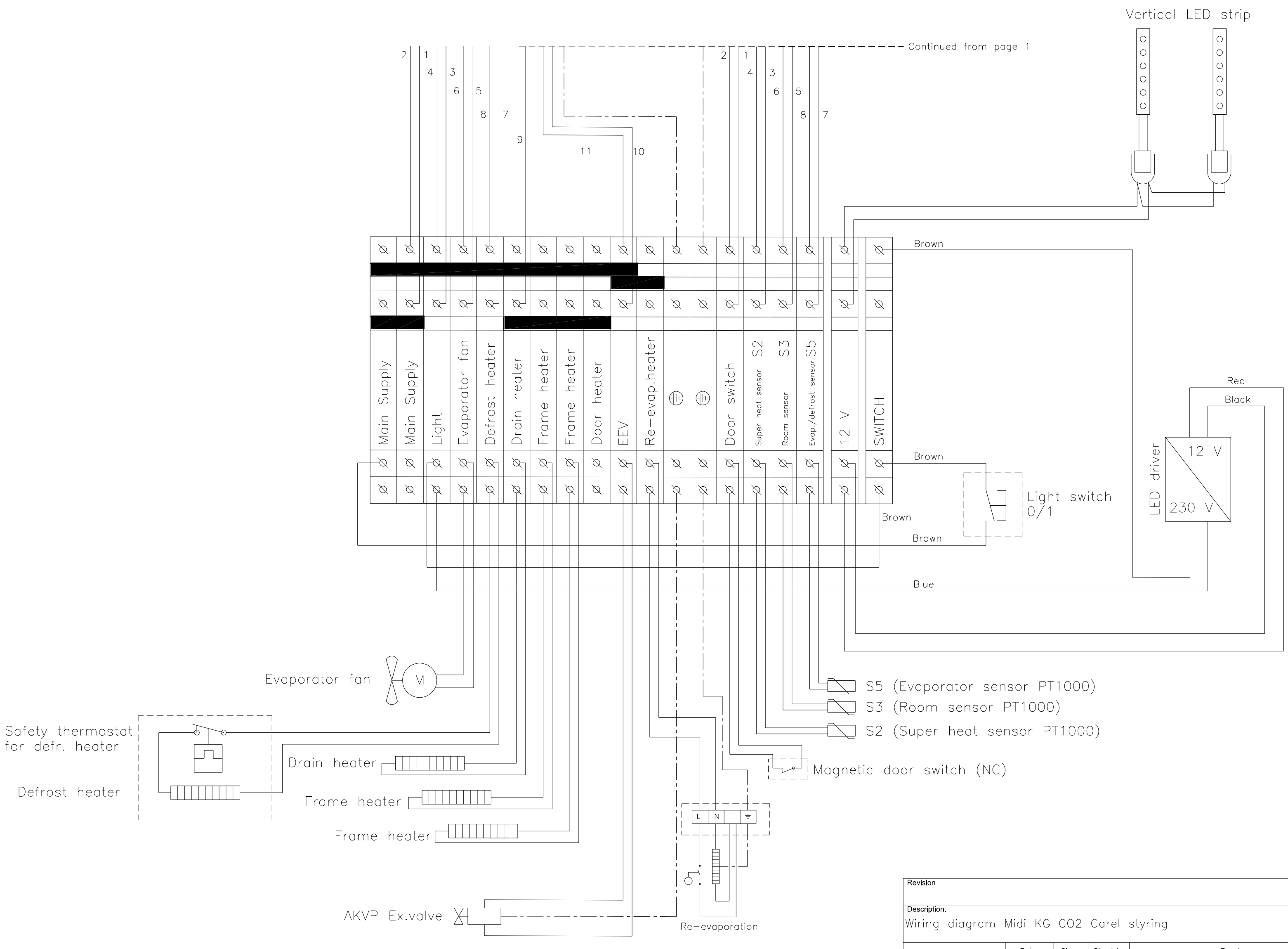


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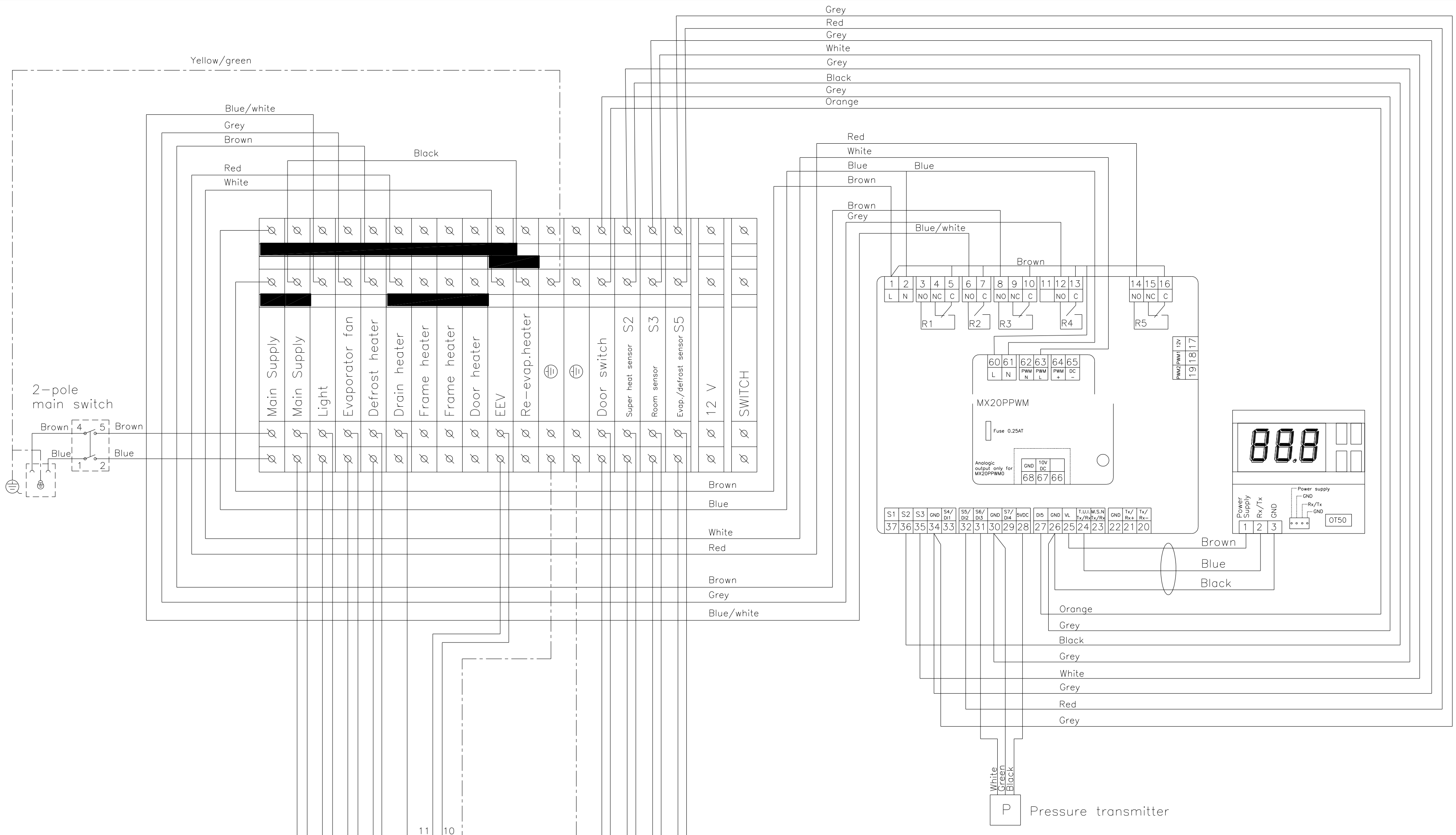


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| Revision | Inspection / important Dimension marked with X.XX |
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| Gram Commercial A/S VOJENS DENMARK | Date | Sign. | Sheetsize | Drawing no. | Sheet no. | Rev. |
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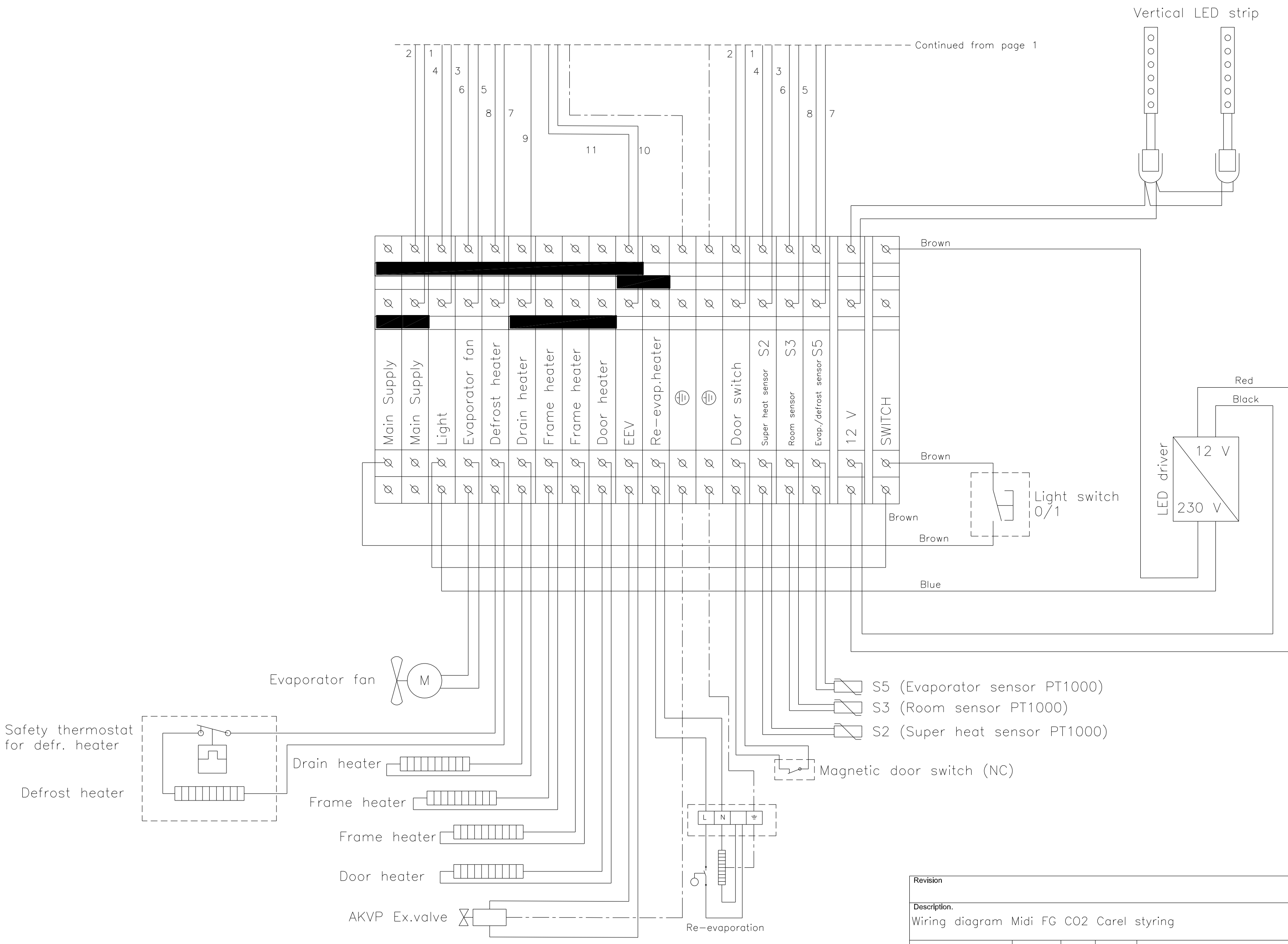
| | 03-06-2019 | JABP | | 765072975 | 1 of 4 | 002 |

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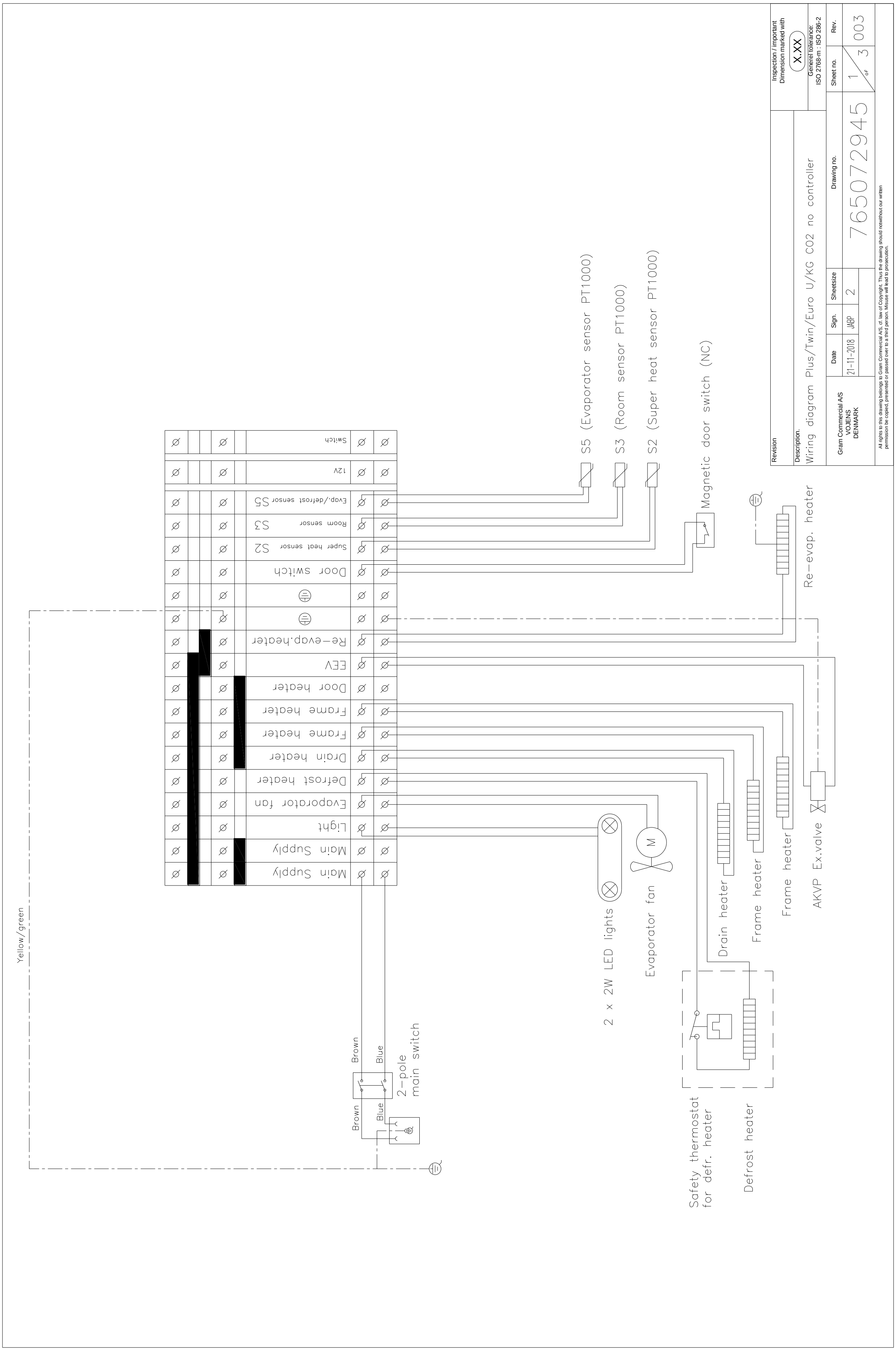
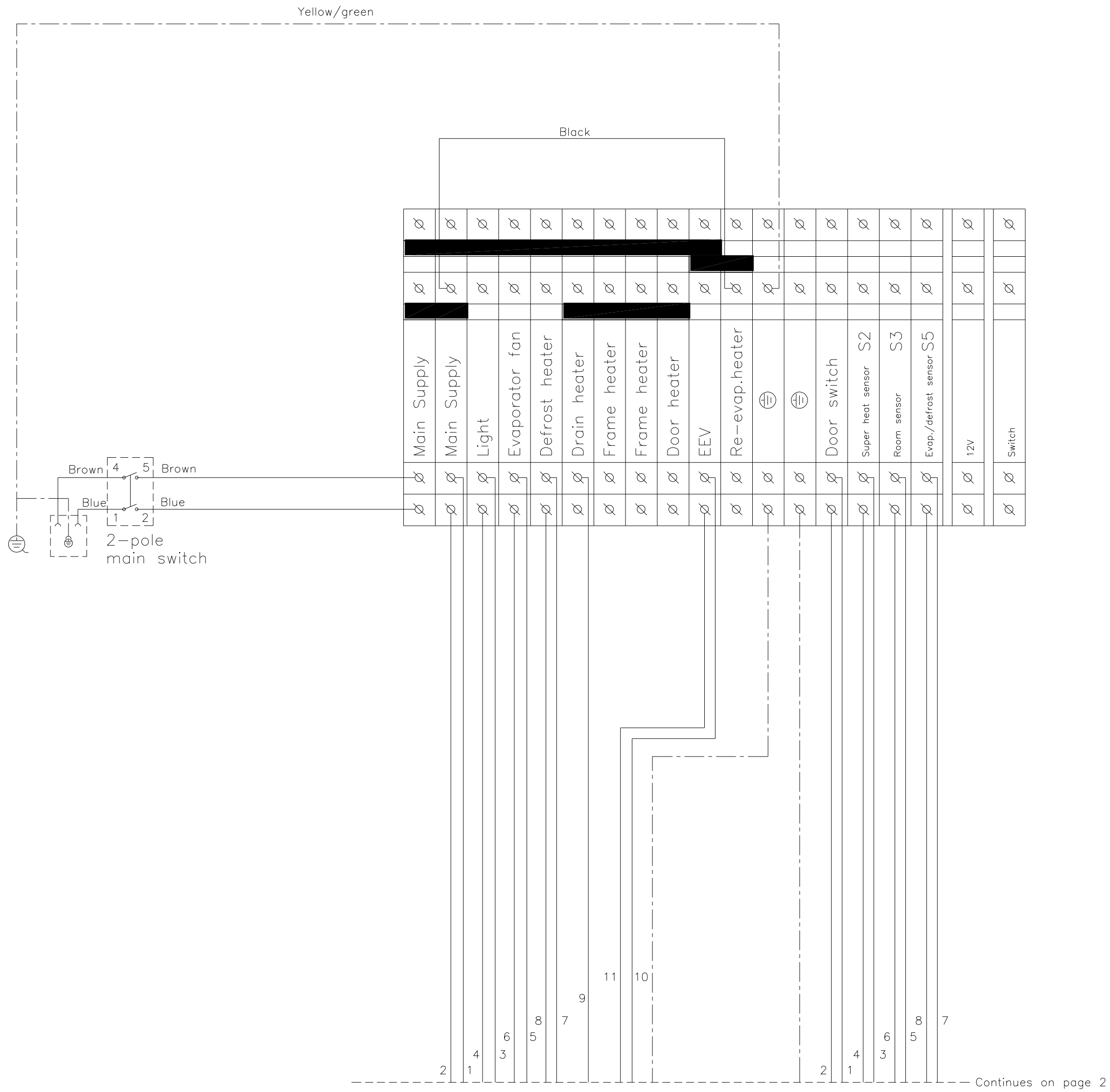
| Description. Wiring diagram Midi FG CO2 Carel styring | | | | | |
| Gram Commercial A/S VOJENS DENMARK | Date | Sign. | Sheetsize | Drawing no. | Sheet no. | Rev. |
| | 03-06-2019 | JABP | | 765072975 | 2 of 4 | 002 |

# Wiring diagrams – no controller



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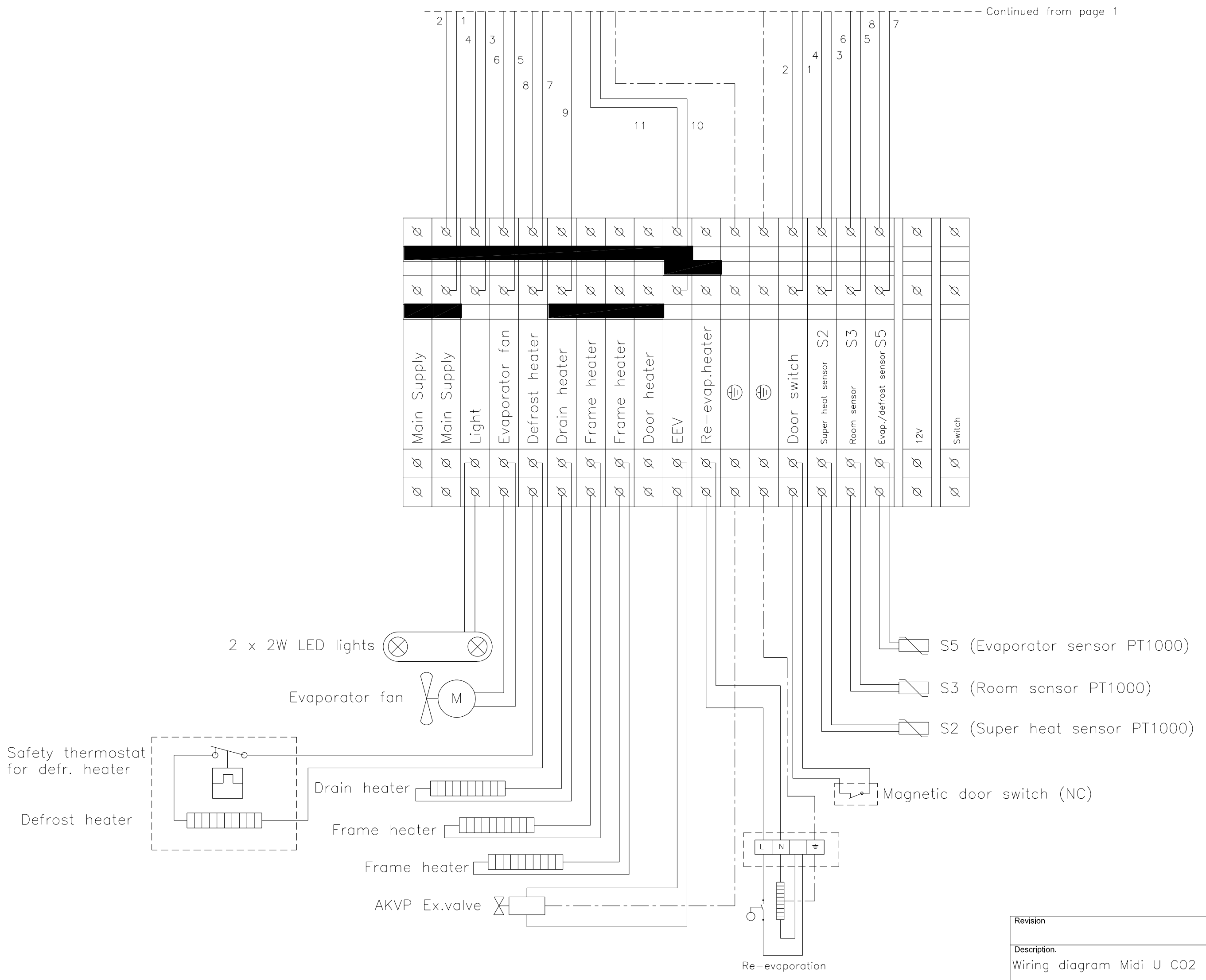
| | 08-03-2019 | JABP | | 765072960 | 1 of 4 | 003 |



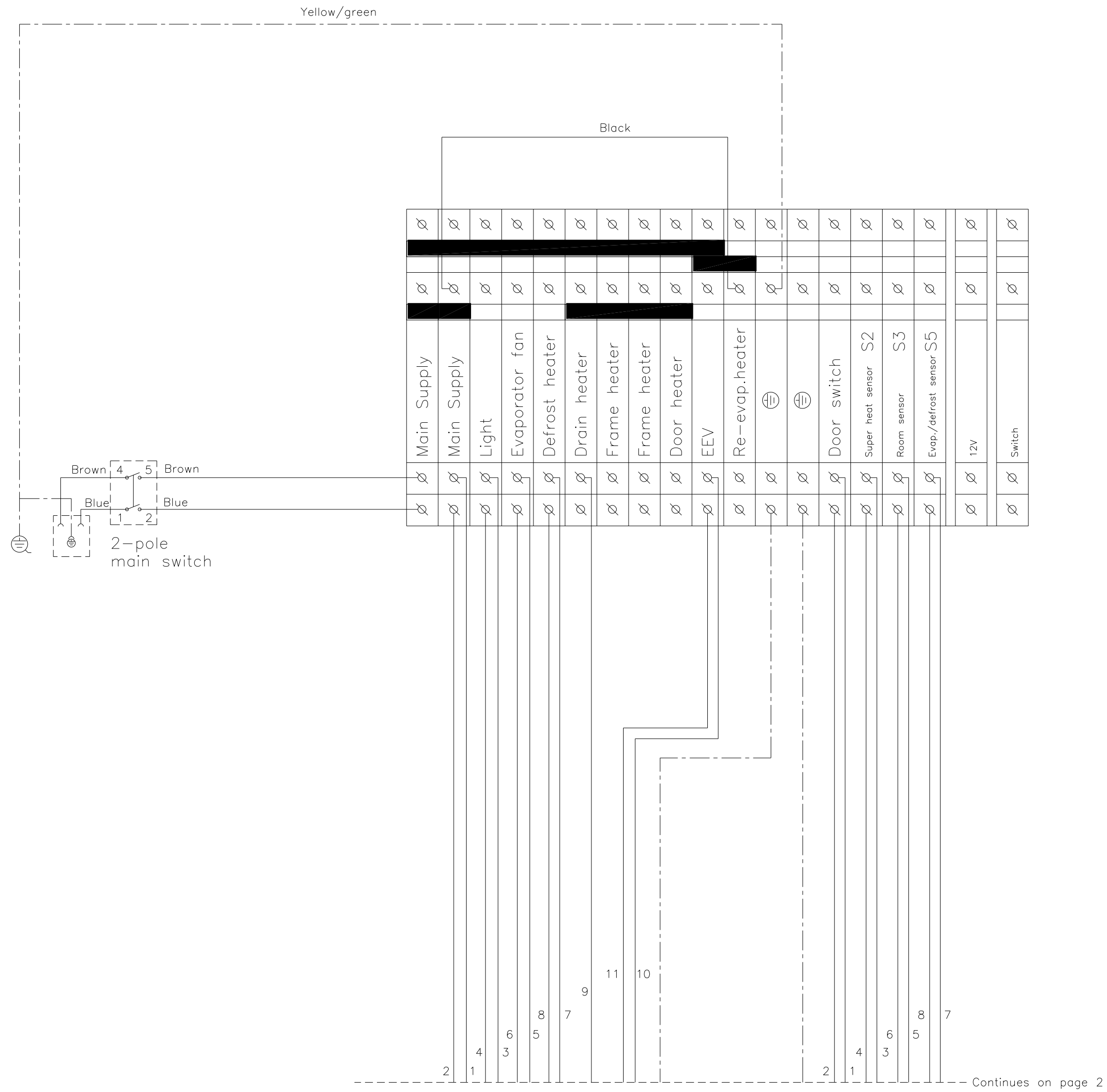

Revision

Description.
Wiring diagram Midi U CO2 no controller

Inspection / important Dimension marked with X.XX

Generel tolerance: ISO 2768-m : ISO 286-2

| | Date | Sign. | Sheetsize | Drawing no. | Sheet no. | Rev. |
|---|---|---|---|---|---|---|
| Gram Commercial A/S<br>VOJENS<br>DENMARK | 08-03-2019 | JABP | | 765072960 | 2 of 4 | 003 |




| Revision | | | | | Inspection / important Dimension marked with X.XX |
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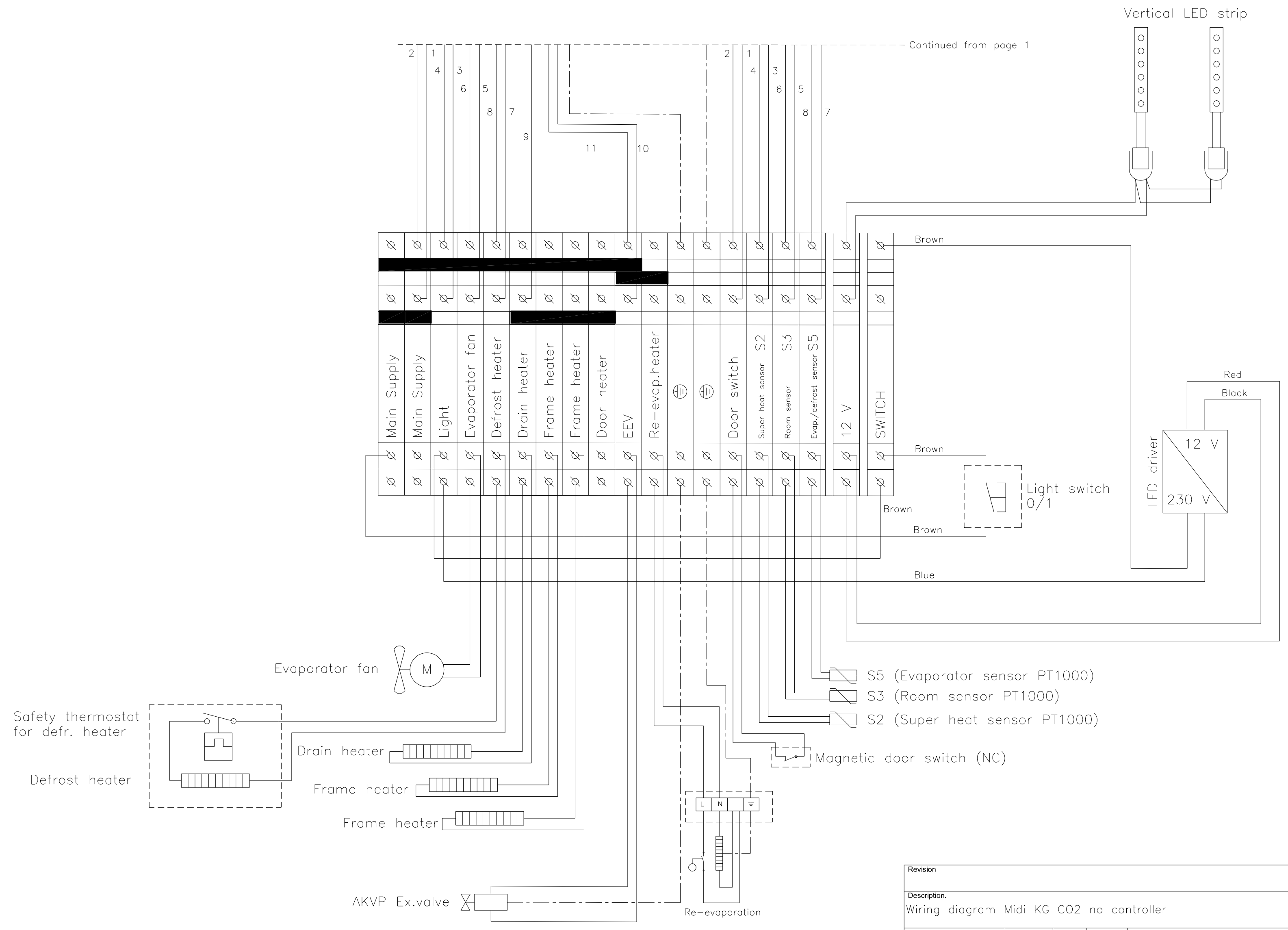


| Revision | | | | | Inspection / important Dimension marked with X.XX |
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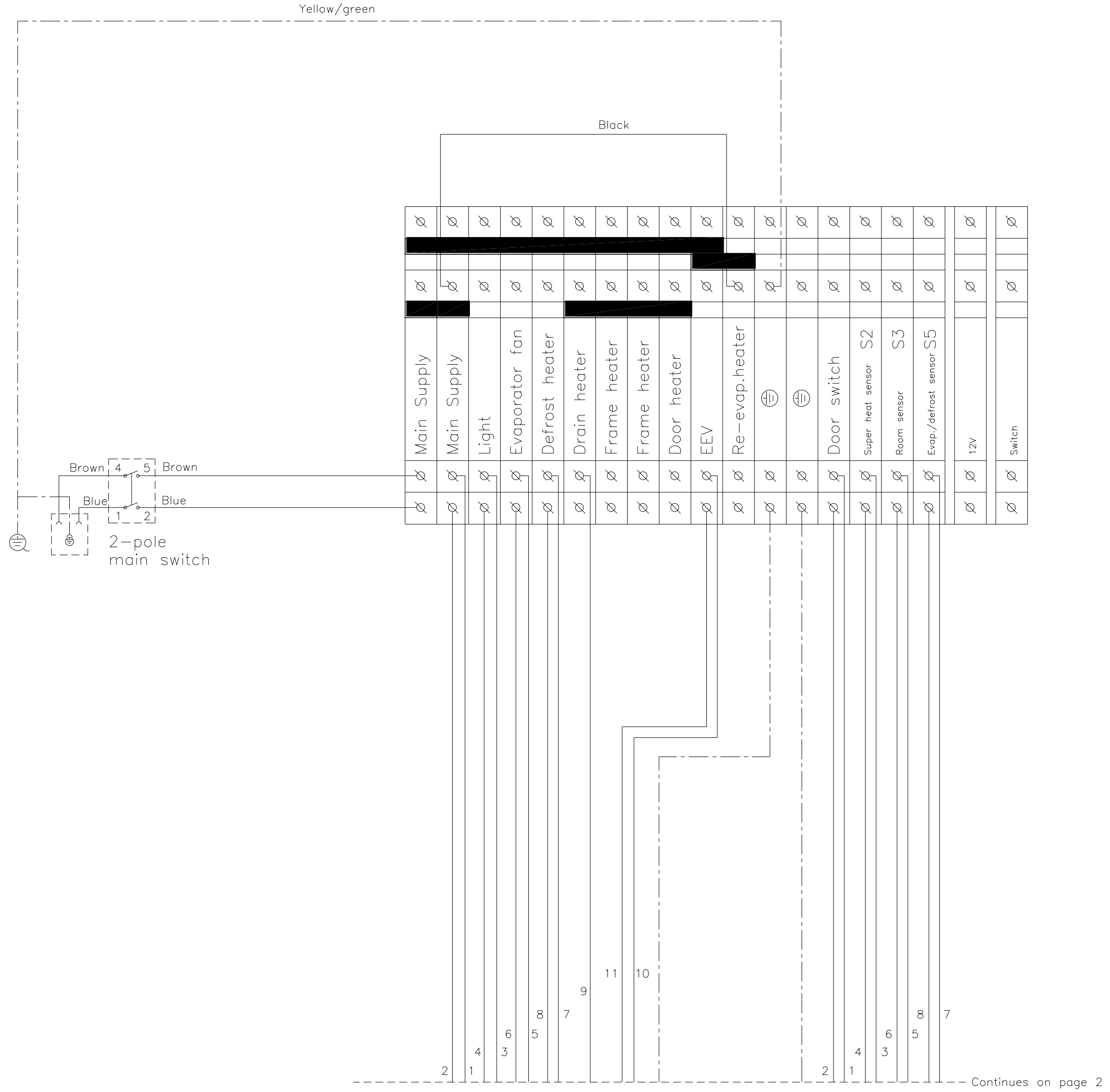

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|---|---|---|---|---|---|---|
| Revision | | | | | | Inspection / important Dimension marked with X.XX |
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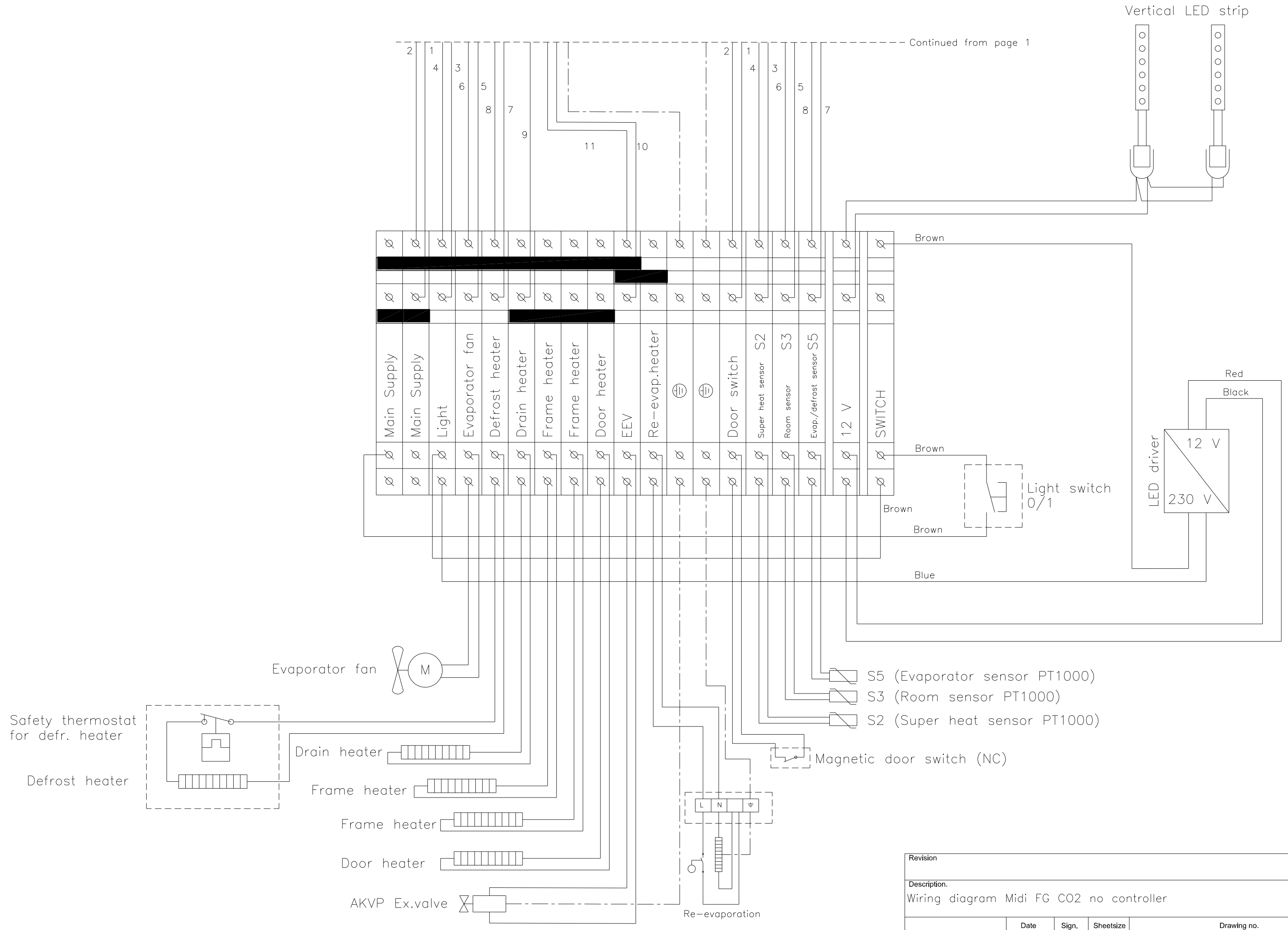
| Gram Commercial A/S VOJENS DENMARK | Date | Sign. | Sheetsize | Drawing no. | Sheet no. | Rev. |
| | 03-06-2019 | JABP | | 765072976 | 1 of 4 | 002 |




| Revision | | | | | Inspection / Important Dimension marked with X.XX |
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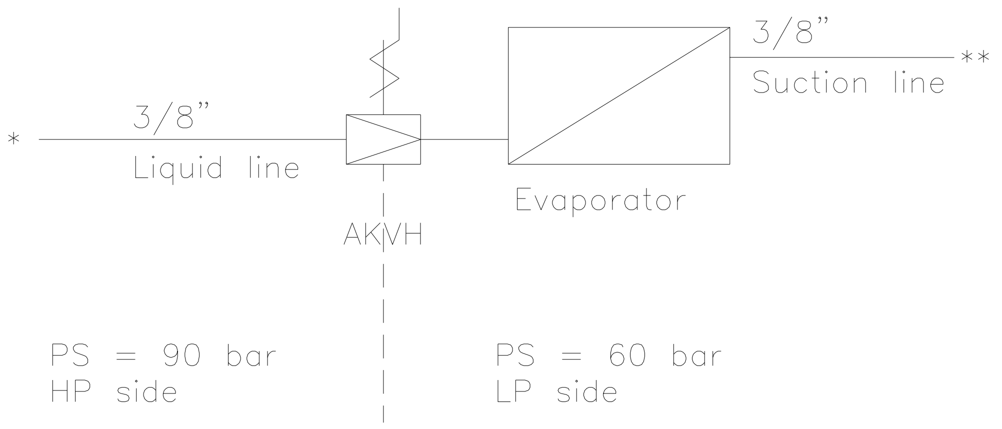
| Gram Commercial A/S VOJENS DENMARK | Date | Sign. | Sheetsize | Drawing no. | Sheet no. / Rev. |
| | 03-06-2019 | JABP | | 765072976 | 2 of 4 / 002 |

# Piping diagrams




* Mounted with servicevalve for delivery. (to be cut off before installation)

** Soldered tight for delivery.

| | |
|---|---|
| Revision | Inspection / important<br>Dimension marked with<br>X.XX |
| Description.<br>Piping diagram CO2 cabinets | Generel tolerance:<br>ISO 2768-m : ISO 286-2 |

| | Date | Sign. | Sheetsize | Drawing no. | Sheet no. | Rev. |
|---|---|---|---|---|---|---|
| Gram Commercial A/S<br>VOJENS<br>DENMARK | 13-12-2017 | JABP | 4 | 765042194 | 1 of 1 | 0000 |

# Declaration of incorporation of partly completed machinery

**Producer**

Name: Gram Commercial A/S
Address: Aage Grams Vej 1, 6500 Vojens

Tel.: +45 73 20 12 00

**Product**

Model: Eco Plus U/KG 70, Eco Twin U/KG 82, Eco Euro U/KG 60
Eco Midi U/KG/FG 82

Refrigerant: R744 ($CO_2$)

PS: $HP_{side}$: 90 bars
$LP_{side}$ : 60 bars

Year: December 2017

**Directives**

The product is in compliance with all the essential health- and safety requirements and provisions in:

**Directive for Machinery 2006/42/EF (MD)**

**Pressure Equipment 97/23/EF (PED)**

The product is where relevant in compliance with the following other directives:

**FCM regulation 2002/72/EF**

RoHS - 2011/65/EU

**Standards**

The following standards are used to the extent necessary to comply with the relevant directives:

**DS/EN 12100:2011** - Safety of machinery -- General principles for design -- Risk assessment and risk reduction

**DS/EN 60335-1:2012** – Household and similar electrical appliances. Safety. General requirements

**DS/EN 60335-2-89:2010** – Household and similar electrical appliances. Safety. Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor

**Documentation**

Refer to the name plate of the product and operating instructions.

Further documentation will be sent on request by relevant authorities.

**Commissioning**

The product must not be used until the finished machine for which it is to be incorporated in, has been declared as complying with the relevant provisions of the Machinery Directive.

**Person responsible for technical dossier**

Company: Gram Commercial A/S
address: Aage Grams Vej 1
Name: John Lund

**Signature**

Vojens 11/12-2017 R&D Manager

John Lund

# Appendix I (Danfoss AKCC550A settings)

## Menu survey

SW = 1.9x

| Parameter | | Gram default settings U models (Solid door) | Gram default settings KG models (Glass door) | Gram default settings MIDI FG models (Glass door) | X = Parameters to be considered/set by installer |
|---|---|---|---|---|---|
| **Function** | Code | | | | |
| **Normal operation** | | | | | |
| Temperature (setpoint) | - - - | 2 | 2 | -18 | X |
| **Thermostat** | | | | | |
| Differential | r01 | 2 | 2 | 2 | |
| Max. limitation of setpoint setting | r02 | 12 | 12 | -5 | X |
| Min. limitation of setpoint setting | r03 | -25 | 1 | -22 | X |
| Adjustment of temperature indication | r04 | 0 | 0 | 0 | |
| Temperature unit (°C/°F) | r05 | °C | °C | °C | |
| Correction of the signal from S4 | r09 | 0 | 0 | 0 | |
| Correction of the signal from S3 | r10 | 0 | 0 | 0 | |
| Manual service, stop regulation, start regulation (-1, 0, 1) | r12 | 1 | 1 | 1 | |
| Displacement of reference during night operation | r13 | 0 | 0 | 0 | |
| Define thermostat function<br>1=ON/OFF, 2=Modulating | r14 | 1 | 1 | 1 | |
| Definition and weighting, if applicable, of thermostat sensors - S4% (100%=S4, 0%=S3) | r15 | 0 | 0 | 0 | |
| Time between melt periods | r16 | 0 | 0 | 0 | |
| Duration of melt periods | r17 | 0 | 0 | 0 | |
| Temperature setting for thermostat band 2. As differential use r01 | r21 | 2 | 2 | 2 | |
| Correction of the signal from S6 | r59 | 0 | 0 | 0 | |
| Definition and weighting, if applicable, of thermostat sensors when night cover is on. (100%=S4, 0%=S3) | r61 | 0 | 0 | 0 | |
| Heat function<br>Neutral zone between refrigeration and heat function | r62 | N/A | N/A | N/A | |
| Time delay at switch between refrigeration and heat function | r63 | N/A | N/A | N/A | |
| **Alarms** | | | | | |
| Delay for temperature alarm | A03 | 60 | 60 | 60 | |
| Delay for door alarm | A04 | 5 | 5 | 5 | |
| Delay for temperature alarm after defrost | A12 | 90 | 90 | 90 | |
| High alarm limit for thermostat 1 | A13 | 35 | 35 | 35 | X |
| Low alarm limit for thermostat 1 | A14 | -35 | -35 | -35 | X |
| High alarm limit for thermostat 2 | A20 | 35 | 35 | 35 | |
| Low alarm limit for thermostat 2 | A21 | -35 | -35 | -35 | |
| High alarm limit for sensor S6 at thermostat 1 | A22 | 8 | 8 | 8 | |
| Low alarm limit for sensor S6 at thermostat 1 | A23 | -30 | -30 | -30 | |
| High alarm limit for sensor S6 at thermostat 2 | A24 | 8 | 8 | 8 | |
| Low alarm limit for sensor S6 at thermostat 2 | A25 | -30 | -30 | -30 | |
| S6 alarm time delay<br>With setting = 240 the S6 alarm will be omitted | A26 | 240 | 240 | 240 | |
| Alarm time delay or signal on the DI1 input | A27 | 5 | 5 | 5 | |
| Alarm time delay or signal on the DI2 input | A28 | 30 | 30 | 30 | |
| Signal for alarm thermostat. S4% (100%=S4, 0%=S3) | A36 | 0 | 0 | 0 | |
| Delay for S6 (product sensor alarm) after defrost | A52 | 90 | 90 | 90 | |
| **Compressor** | | | | | |
| Min. ON-time | c01 | 0 | 0 | 0 | |

| | | | | | |
|---|---|---|---|---|---|
| Min. OFF-time | c02 | 0 | 0 | 0 | |
| Time delay for cut in of comp.2 | c05 | N/A | N/A | N/A | |
| **Defrost** | | | | | |
| Defrost method: 0=Off, 1= EL, 2= Gas | d01 | EL | EL | EL | |
| Defrost stop temperature | d02 | 6 | 6 | 6 | |
| Interval between defrost starts | d03 | 6 | 6 | 6 | |
| Max. defrost duration | d04 | 30 | 30 | 30 | |
| Displacement of time on cut in of defrost at start-up | d05 | 0 | 0 | 0 | |
| Drip off time | d06 | 4 | 4 | 4 | |
| Delay for fan start after defrost | d07 | 0 | 0 | 0 | |
| Fan start temperature | d08 | -1 | -1 | -1 | |
| Fan cutin during defrost<br>0: Stopped<br>1: Running<br>2: Running during pump down and defrost | d09 | 0 | 0 | 0 | |
| Defrost sensor: 0 =Stop on time, 1=S5, 2=S4, 3=Sx<br>(Application 1-8 and 10: both S5 and S6.<br>Application 9: S5 and S5B) | d10 | 1 | 1 | 1 | |
| Pump down delay | d16 | 0 | 0 | 0 | |
| Drain delay (used at hot gas defrost only) | d17 | N/A | N/A | N/A | |
| Max. aggregate refrigeration time between two defrosts | d18 | 0 | 0 | 0 | |
| Heat in drip tray. Time from defrosting stops to heating in the drip tray is switched off | d20 | N/A | N/A | N/A | |
| Adaptive defrost:<br>0=not active, 1=monitoring only, 2=skip allowed day, 3=skip allowed both day and night, 4=own assessment<br>+ all schedules | d21 | 0 | 0 | 0 | |
| Time delay before opening of hot gas valve | d23 | N/A | N/A | N/A | |
| Rail heat during defrost 0=off. 1=on. 2=Pulsating | d27 | 0 | 0 | 0 | |
| Max. duration of -d- in display | d40 | 30 | 30 | 30 | |

## Appendix I Gram factory settings for AKCC550A (U/KG/FG cabinets)

## Menu survey

SW = 1.9x

| Parameter: Function | Code | Gram default settings U models (Solid door) | Gram default settings KG models (Glass door) | Gram default settings MIDI FG models (Glass door) | X = Parameters to be considered/set by installer |
|---|---|---|---|---|---|
| **Injection control function** | | | | | |
| Max. value of superheat reference | n09 | 8 | 8 | 8 | |
| Min. value of superheat reference | n10 | 4 | 4 | 4 | |
| MOP temperature. Off if MOP temp. = 15.0 °C | n11 | 15 | 15 | 15 | X |
| Period time of AKV pulsation<br>Only for trained personnel | n13 | 6 | 6 | 6 | |
| **Fan** | | | | | |
| Fan stop temperature (S5) | F04 | 35 | 35 | 35 | |
| Pulse operation on fans: 0=No pulse operation, 1=At thermostat cuts out only, 2= Only at thermostat cut outs during night operation | F05 | 0 | 0 | 0 | |
| Period time for fan pulsation (on-time + off-time) | F06 | 5 | 5 | 5 | |
| On-time in % of period time | F07 | 100 | 100 | 100 | |
| **Real time clock** | | | | | |
| Six start times for defrost. Setting of hours.<br>0=OFF | t01 - t06 | 0 | 0 | 0 | |
| Six start times for defrost. Setting of minutes.<br>0=OFF | t11 - t16 | 0 | 0 | 0 | |
| Clock - Setting of hours | t07 | | | | X |
| Clock - Setting of minute | t08 | | | | X |
| Clock - Setting of date | t45 | | | | X |
| Clock - Setting of month | t46 | | | | X |
| Clock - Setting of year | t47 | | | | X |
| **Miscellaneous** | | | | | |
| Delay of output signals after start-up | o01 | 5 | 5 | 5 | |
| Input signal on DI1. Function:<br>0=not used. 1=status on DI1. 2=door function with alarm when open. 3=door alarm when open. 4=defrost start (pulse-signal). 5=ext.main switch. 6=night operation 7=thermostat band changeover (activate r21). 8=alarm function when closed. 9=alarm function when open.<br>10=case cleaning (pulse signal). 11=forced cooling at hot gas defrost, 12=night cover. 15=case shut down | o02 | 2 | 2 | 2 | |
| Network address (0 = off) | o03 | 0 | 0 | 0 | |
| On/Off switch (Service Pin message) IMPORTANT! o61 **must** be set prior to o04<br>(used at LON 485 and DANBUSS only) | o04 | 0 | 0 | 0 | |
| Access code 1 (all settings) | o05 | 0 | 0 | 0 | |
| Used sensor type: 0=Pt1000, 1=Ptc1000, | o06 | Pt1000 | Pt1000 | Pt1000 | |
| Read out of software version | o08 | | | | |
| Max hold time after coordinated defrost | o16 | 0 | 0 | 0 | |
| Select signal for display view. S4% (100%=S4, 0%=S3) | o17 | 0 | 0 | 0 | |
| Pressure transmitter working range – min. value | o20 | 0 | 0 | 0 | |
| Pressure transmitter working range – max. value | o21 | 45 | 45 | 45 | |
| Refrigerant setting:<br>3=R134a. 5=R717. 13=User defined. 14=R32. 15=R227. 16=R401A. 17=R507. 18=R402A. 19=R404A. 20=R407C. 21=R407A. 22=R407B. 23=R410A. 24=R170. 25=R290. 26=R600. 27=R600a. 28=R744. 29=R1270. 30=R417A. 31=R422A. 32=R413A. 33=R422D. 34=R427A. 35=R438A.36=XP10. 37=R407F. 38=R1234ze. 39=R1234yf. 40=R448A. 41=R449A. 42=R452A | o30 | 28 | 28 | 28 | |

## Appendix I Gram factory settings for AKCC550A (U/KG/FG cabinets)

| | | | | | |
|---|---|---|---|---|---|
| Input signal on DI2. Function:<br>(0=not used. 1=status on DI2. 2=door function with alarm when open. 3=door alarm when open. 4=defrost start (pulse-signal). 5=ext. main switch 6=night operation 7=thermostat band changeover (activate r21). 8=alarm function when closed. 9=alarm function when open.<br>10=case cleaning (pulse signal). 11=forced cooling at hot gas defrost.). 12=night cover, 13=coordinated defrost).<br>15=case shut down | o37 | 0 | 0 | 0 | |
| Configuration of light function: 1=Light follows day /night operation, 2=Light control via data communication via 'o39', 3=Light control with a DI-input, 4=As "2", but light switch on and night cover will open if the network cut out for more than 15 minutes. | o38 | 3 | 3 | 3 | |
| Activation of light relay (only if o38=2) On=light | o39 | OFF | OFF | OFF | |
| Rail heat on time during day operations | o41 | 0 | 0 | 100 | |
| Rail heat on time during night operations | o42 | 0 | 0 | 100 | |
| Rail heat period time (On time + Off time) | o43 | 10 | 10 | 10 | |
| Case cleaning. 0=no case cleaning. 1=Fans only. 2=All output Off. | o46 | 0 | 0 | 0 | |
| Selection of EL diagram. See overview page 2 and 3 | o61 | **2** | **2** | **2** | **DO NOT CHANGE** |
| Download a set of predetermined settings. See overview page 7. | o62 | 0 | 0 | 0 | |
| Access code 2 (partial access) | o64 | 0 | 0 | 0 | |
| Replace the controller factory settings with the present settings | o67 | OFF | OFF | OFF | |
| Input signal on DI3. Function: (high voltage input)<br>(0=not used. 1=status on DI2. 2=door function with alarm when open. 3=door alarm when open. 4=defrost start (pulse-signal). 5=ext. main switch 6=night operation, 7=thermostat band changeover (activate r21). 8=Not used. 9=Not used.<br>10=case cleaning (pulse signal). 11=forced cooling at hot gas defrost, 12=night cover. 13=Not used. 14=Refrigeration stopped (forced closing)). 15=case shut down | o84 | 0 | 0 | 0 | X<br>(if forced closing is to be used) |
| Rail heat control<br>0=not used, 1=pulse control with timer function (o41 and o42), 2=pulse control with dew point function | o85 | 0 | 0 | 0 | |
| Dew point value where the rail heat is minimum | o86 | 8 | 8 | 8 | |
| Dew point value where the rail heat is 100% on | o87 | 17 | 17 | 17 | |
| Lowest permitted rail heat effect in % | o88 | 30 | 30 | 30 | |
| Time delay from "open door" refrigeration is started | o89 | 30 | 30 | 30 | |
| Fan operation at stopped cooling (forced closing): 0= Stopped (defrost allowed)<br>1= Running (defrost allowed)<br>2= Stopped (defrost not allowed) 3= Running (defrost not allowed) | o90 | 1 | 1 | 1 | |
| Definition of readings on lower button: 1=defrost stop temperature, 2=S6 temperature,<br>3=S5_B temperature (application 9), 4=S3B (application 10) | o92 | 1 | 1 | 1 | |
| Display of temperature 1= u56 Air temperature<br>2= u36 product temperature | o97 | 1 | 1 | 1 | |
| Light and night blinds defined<br>0: Light is switch off and night blind is open when the main switch is off<br>1: Light and night blind is independent of main switch | o98 | 1 | 1 | 1 | |

Appendix I  Gram factory settings for AKCC550A (U/KG/FG cabinets)

## Menu survey

SW = 1.9x

| Parameter | | Gram default settings U models (Solid door) | Gram default settings KG models (Glass door) | Gram default settings MIDI FG models (Glass door) | X = Parameters to be considered/set by installer |
|---|---|---|---|---|---|
| **Function** | Code | | | | |
| Configuration of alarm relay<br>The alarm relay will be activated upon an alarm signal from the following groups:<br>1 - High temperature alarms 2 - Low temperature alarms 4 - Sensor error<br>8 - Digital input enabled for alarm 16 - Defrosting alarms<br>32 - Miscellaneous 64 - Injection alarms<br>The groups that are to activate the alarm relay must be set by using a numerical value which is the sum of the groups that must be activated.<br>(E.g.: a value of 5 will activate all high temperature alarms and all sensor error and 0 will cancel the relay function). | P41 | 111 | 111 | 111 | |
| **Service** | | | | | |
| Temperature measured with S5 sensor | u09 | | | | |
| Status on DI1 input. on/1=closed | u10 | | | | |
| Actual defrost time (minutes) | u11 | | | | |
| Temperature measured with S3 sensor | u12 | | | | |
| Status on night operation (on or off) 1=on | u13 | | | | |
| Temperature measured with S4 sensor | u16 | | | | |
| Thermostat temperature | u17 | | | | |
| Run time of thermostat (cooling time) in minutes | u18 | | | | |
| Temperature of evaporator outlet temp. | u20 | | | | |
| Superheat across evaporator | u21 | | | | |
| Reference of superheat control | u22 | | | | |
| Opening degree of AKV valve | u23 | | | | |
| Evaporating pressure Po (relative) | u25 | | | | |
| Evaporator temperature To (Calculated) | u26 | | | | |
| Temperature measured with S6 sensor (product temperature) | u36 | | | | |
| Status on DI2 output. on/1=closed | u37 | | | | |
| Air temperature . Weighted S3 and S4 | u56 | | | | |
| Measured temperature for alarm thermostat | u57 | | | | |
| Status on relay for cooling | u58 | | | | |
| Status on relay for fan | u59 | | | | |
| Status on relay for defrost | u60 | | | | |
| Status on relay for rail heat | u61 | | | | |
| Status on relay for alarm | u62 | | | | |
| Status on relay for light | u63 | | | | |
| Status on relay for valve in suction line | u64 | | | | |
| Status on relay for compressor 2 | u67 | | | | |
| Temperature measured with S5B sensor | u75 | | | | |
| Temperature measured with S3B sensor | u76 | | | | |
| Status on relay for hot gas- / drain valve | u80 | | | | |
| Status on relay for heating element in drip tray | u81 | | | | |
| Status on relay for night blinds | u82 | | | | |
| Status on relay for defrost B | u83 | | | | |
| Status on relay for heat function | u84 | | | | |
| Readout of the actual rail heat effect | u85 | | | | |

| | |
|---|---|
| 1: Thermostat 1 operating, 2: Thermostat 2 operating | u86 |
| Status on high voltage input DI3 | u87 |
| Readout of thermostats actual cut in value | u90 |
| Readout of thermostats actual cut out value | u91 |
| Readout of status on the adaptive defrost<br>0: Off. Function is not activated and are zero set 1: Sensor error or S3/S4 are reversed.<br>2: Tuning is in progress 3: Normal<br>4: Light build-up of ice<br>5: Medium build-up of ice 6: Heavy build-up of ice | U01 |
| Number of defrosts carried out since the initial power up or since the resetting of the function | U10 |
| Number of defrosts skipped since the initial power up or since the resetting of the function | U11 |

Full English Danfoss Manual software 1.9x please see the Danfoss web side.

# Appendix II (Carel MPXpro settings)

On the following pages you will find Appendix II. This appendix does include the Gram factory settings for the Carel MPXpro (U/KG/FG cabinets).

Know that some parameters might need adjustment in order to fit with the specific features and specifications of the refrigeration system to which the product is connected.

# 8. TABLE OF PARAMETERS

Parameter levels: F = frequent, C=configuration (password=22), A=advanced (password=33)

| Par | Description | Gram U | Gram KG | Gram FG | UoM | Type |
|---|---|---|---|---|---|---|
| | /Pro (=PROBES) | | | | | |
| /2 | Analogue probe measurement stability | 4 | 4 | 4 | - | A |
| /4 | Virtual probe composition<br>0 = Outlet probe<br>Sm 100 = Intake | 100 | 100 | 100 | % | C |
| /5 | Temperature unit of measure<br>0 = Disabled, 1 = Enabled | 0 | 0 | 0 | - | A |
| /6 | Display decimal point<br>0 = Enabled, 1 = Disabled | 0 | 0 | 0 | - | A |
| rHS | Virtual probe composition for glass temperature probe estimate<br>0 = Outlet probe<br>Sm 100 = Intake | 100 | 100 | 100 | % | NV |
| /t | Display signals / alarms on remote display<br>0 = Disabled, 1 = Enabled | 0 | 0 | 0 | - | A |
| /t1 | Display on user terminal<br>0 = User terminal disabled; 8 = Serial probe 8<br>1 = Probe 1; 9 = Serial probe 9<br>2 = Probe 2; 10 = Serial probe 10<br>3 = Probe 3; 11 = Serial probe 11<br>4 = Probe 4; 12 = Control probe<br>5 = Probe 5; 13 = Virtual probe<br>6 = Probe 6; 14 = Set point<br>7 = Probe 7 | 3 | 3 | 3 | - | C |
| /t2 | Display on remote display<br>0 = Remote display disabled; 8 = Serial probe 8<br>1 = Probe 1; 9 = Serial probe 9<br>2 = Probe 2; 10 = Serial probe 10<br>3 = Probe 3; 11 = Serial probe 11<br>4 = Probe 4; 12 = Control probe<br>5 = Probe 5; 13 = Virtual probe<br>6 = Probe 6; 14 = Set point<br>7 = Probe 7 | 0 | 0 | 0 | - | A |
| /P1 | Type of probe, group 1 (S1, S2, S3)<br>0 = NTC Standard Range –50T90°C<br>1 = PTC Standard Range –50T150 °C<br>2 = PT1000 Standard Range –50T150 °C | 2 | 2 | 2 | - | A |
| /P2 | Type of probe, group 2 (S4, S5)<br>0 = NTC Standard Range –50T90 °C<br>1 = PTC Standard Range –50T150 °C<br>2 = PT1000 Standard Range –50T150 °C | 2 | 2 | 2 | - | A |
| /P3 | Type of probe, group 3 (S6)<br>0 = NTC Standard Range –50T90 C<br>1 = PTC Standard Range –50T150°C<br>2 = PT1000 Standard Range –50T150 C<br>3 = NTC L243 Standard Range –50T90 °C<br>4 = 0 to 5 V ratiometric probe | 4 | 4 | 4 | - | A |
| /P4 | Type of probe, group 4 (S7)<br>0 = NTC Standard Range –50T90 °C 1 = PTC Standard Range –50150 °C<br>2 = PT1000 Standard Range –50T150 °C<br>3 = NTC L243 Standard Range –50T90 °C<br>4 = 0 to 5 V ratiometric probe<br>5 = 0 to 10 V input | 2 | 2 | 2 | - | A |
| /P5 | Type of probe, group 5: serial probes (S8 to S11) | 0 | 0 | 0 | - | A |
| /FA | Assign outlet temperature probe (Sm)<br>0 = Function disabled; 6 = Probe S6<br>1 = Probe S1; 7 = Probe S7<br>2 = Probe S2; 8 = Serial probe S8<br>3 = Probe S3; 9 = Serial probe S9<br>4 = Probe S4; 10 = Serial probe S10<br>5 = Probe S5; 11 = Serial probe S11 | 0 | 0 | 0 | - | C |
| /Fb | Assign defrost temperature probe (Sd) - See /FA | 5 | 5 | 5 | - | C |
| /Fc | Assign intake temperature probe (Sr) - See /FA | 3 | 3 | 3 | - | C |
| /Fd | Assign superheated gas temperature probe (tGS) - See /FA | 2 | 2 | 2 | - | A |
| /FE | Assign saturated evaporation pressure/temperature probe (PEu/tEu) - See /FA | 6 | 6 | 6 | - | A |
| /FF | Assign defrost temperature probe 2 (Sd2) - See /FA | 0 | 0 | 0 | - | A |
| /FG | Assign auxiliary temperature probe 1 (Saux1) - See /FA | 0 | 0 | 0 | - | A |
| /FH | Assign auxiliary temperature probe 2 (Saux2) - See /FA | 0 | 0 | 0 | - | A |
| /FI | Assign ambient temperature probe (SA) - See /FA | 0 | 0 | 0 | - | A |
| /FL | Assign ambient humidity probe (SU) - See /FA | 0 | 0 | 0 | - | A |
| /FM | Assign glass temperature probe (Svt) - See /FA | 0 | 0 | 0 | - | A |

| Par. | Description | Gram U | Gram KG | Gram FG | UoM | Type |
|---|---|---|---|---|---|---|
| /Fn | Assign dewpoint value (SdP) to a serial probe<br>0 = Function disabled; 3 = Serial probe S10<br>1 = Serial probe S8; 4 = Serial probe S11<br>2 = Serial probe S9 | 0 | 0 | 0 | - | A |
| /c1 | Probe 1 calibration | 0,0 | 0,0 | 0,0 | (°C/°F | F |
| /c2 | Probe 2 calibration | 0,0 | 0,0 | 0,0 | (°C/°F | F |
| /c3 | Probe 3 calibration | 0,0 | 0,0 | 0,0 | (°C/°F | F |
| /c4 | Probe 4 calibration | 0,0 | 0,0 | 0,0 | (°C/°F | A |
| /c5 | Probe 5 calibration | 0,0 | 0,0 | 0,0 | (°C/°F | A |
| /c6 | Probe 6 calibration | 0,0 | 0,0 | 0,0 | (°C/° F/ ba | A |
| /c7 | Probe 7 calibration | 0,0 | 0,0 | 0,0 | (°C/° F/ ba | A |
| /U6 | Maximum value of probe 6 | 45,0 | 45 | 45 | bar | A |
| /L6 | Minimum value of probe 6 | 0,0 | 0,0 | 0,0 | bar | A |
| /U7 | Maximum value of probe 7 | 9.3 | 9.3 | 9.3 | bar g/ R | A |
| /L7 | Minimum value of probe 7 | -1.0 | -1.0 | -1.0 | bar g/ R | A |

## CtL (Control)

| Par. | Description | Gram U | Gram KG | Gram FG | UoM | Type |
|---|---|---|---|---|---|---|
| OFF | ON/OFF control<br>0 = ON; 1 = OFF; | 0 | 0 | 0 | - | A |
| St | Set point | 5,0 | 5,0 | -18 | °C/°F | F |
| St2 | Intake probe set point with "Double thermostat" | 50 | 50 | 50 | °C/°F | A |
| rd | Set point differential St | 4,0 | 4,0 | 4,0 | °C/°F | F |
| rd2 | Set point differential St2 with "Double thermostat"<br>0.0 = function disabled | 0,0 | 0,0 | 0,0 | °C/°F | A |
| r1 | Minimum set point | -25 | +1 | -22 | °C/°F | A |
| r2 | Maximum set point | 12 | 12 | -10 | °C/°F | A |
| r3 | End defrost signal by timeout<br>0 = disabled, 1 = enabled | 0 | 0 | 0 | - | A |
| r4 | Automatic night-time set point variation | 0,0 | 0,0 | 0,0 | °C/°F | C |
| r6 | Probe for night-time control<br>0 = virtual probe Sv; 1 = intake probe Sr | 0 | 0 | 0 | - | C |
| ro | Control offset with probe error | 0.0 | 0.0 | 0.0 | °C/°F | A |
| r7 | Master solenoid valve configuration<br>0 = local valve; 1 = network valve (connected to Master) | 0 | 0 | 0 | - | C |
| rSu | Suction valve closure delay in normal regolation mode | 0 | 0 | 0 | sec | C |
| rMu | Minimum opening % for refrigerant control | 0 | 0 | 0 | % | A |
| CLt | Maximum time for Clean status | 0 | 0 | 0 | min | A |
| Stt | Maximum time for Standby status | 0 | 0 | 0 | min | A |

## CMP (compressor)

| Par. | Description | Gram U | Gram KG | Gram FG | UoM | Type |
|---|---|---|---|---|---|---|
| c0 | Delay enable compressor and evaporator fans on power-up | 0 | 0 | 0 | min | A |
| c1 | Minimum time between successive starts | 0 | 0 | 0 | min | A |
| c2 | Minimum OFF time | 0 | 0 | 0 | min | A |
| c3 | Minimum ON time | 0 | 0 | 0 | min | A |
| c4 | ON time for duty setting operation (Toff = 15 minutes fixed)<br>0 = compressor/valve always OFF; 100 = compressor/valve always ON | 0 | 0 | 0 | min | A |
| cc | Running time in continuous cycle | 1 | 1 | 1 | hour | A |
| c6 | Low temperature alarm bypass time after continuous cycle | 60 | 60 | 60 | min | A |
| c7 | Defrost priority over continuous cycle 0 = no, 1= yes | 1 | 1 | 1 | - | A |

## dEF (defrost)

| Par. | Description | Gram U | Gram KG | Gram FG | UoM | Type |
|---|---|---|---|---|---|---|
| d0 | Type of defrost<br>0 = heater by temperature; 4 = heater by time with temp. control<br>1 = hot gas by temperature; 5 = multiplexed hot gas by temperature<br>2 = heater by time; 6 = multiplexed hot gas by time<br>3 = hot gas by time | 4 | 4 | 4 | - | C |
| d2 | End defrost synchronized by Master<br>0 = not synchronized; 1 = synchronized | 1 | 1 | 1 | - | A |
| d3 | Disable send network defrost control (for Master); 0: disabled; 1:enabled<br>Ignore network defrost control (for Slave); 0: disabled; 1:enabled | 0 | 0 | 0 | - | A |
| dI | Maximum interval between consecutive defrosts | 6 | 6 | 6 | hour | C |
| dt1 | End defrost temperature (read by Sd) | 6,0 | 6,0 | 6,0 | °C/°F | F |
| dt2 | End defrost temperature (read by Sd2) | 8,0 | 8,0 | 8,0 | °C/°F | A |
| dP1 | Maximum defrost duration | 30 | 30 | 30 | min | F |
| dP2 | Maximum secondary evaporator defrost duration | 45 | 45 | 45 | min | A |
| d4 | Defrost on power-up<br>0 = disabled; 1 = enabled<br>(Master = network defrost; Slave = local defrost) | 0 | 0 | 0 | - | A |

| Par. | Description | Gram U | Gram KG | Gram FG | UoM | |
|---|---|---|---|---|---|---|
| d5 | Defrost delay on power-up or (for Slave) after control from<br>Master 0 = delay disabled | 0 | 0 | 0 | min | A |
| d6 | Display on terminals during defrost<br>0 = temperature alternating<br>with 'dEF' 1 = freeze display 2 = | 2 | 2 | 2 | - | C |
| dd | Dripping time after defrost<br>(fans off) 0 = no dripping | 2 | 2 | 2 | min | A |
| d7 | Skip defrost<br>0 = disabled; 1 = enabled; | 0 | 0 | 0 | - | A |
| d8 | Bypass high temperature alarm time after defrost | 90 | 90 | 90 | min | C |
| d9 | Defrost priority over compressor protection times<br>0 = protection times observed; 1 = protection times not observed | 1 | 1 | 1 | - | A |
| Sd1 | Defrost probe | - | - | - | °C/°F | F |
| Sd2 | Secondary evaporator defrost probe | - | - | - | °C/°F | A |
| dC | Time base for defrost<br>0 = dI in hours, dP1, dP2 and ddP in min; 1 = dI in minutes ,dP1, dP2 and ddP in seconds | 0 | 0 | 0 | - | A |
| d10 | Defrost time in "Running<br>time" mode 0 = function | 0 | 0 | 0 | min | A |
| d11 | Defrost temperature threshold in "Running time" mode | -30 | -30 | -30 | °C/°F | A |
| d12 | Pressure probe alarm management during defrost<br>– probe error / update supervisor<br>0 disabled / enabled<br>1 enabled / enabled<br>2 disabled / disabled<br>3 enabled / disabled | 0 | 0 | 0 | - | A |
| dS1 | Compressor off time in "Sequential stop" defrost<br>mode 0 = function disabled | 0 | 0 | 0 | min | A |
| dS2 | Compressor operating time in "Sequential stop" defrost mode | 120 | 120 | 120 | min | A |
| ddt | Additional end defrost temperature delta in "Power defrost" mode | 0.0 | 0.0 | 0.0 | °C/°F | A |
| ddP | Additional maximum defrost time delta in "Power defrost" mode | 0 | 0 | 0 | min | A |
| dn | Nominal "Skip defrost" duration | 75 | 75 | 75 | % | A |
| d1S | Number of daily defrosts (td1)<br>0 = Disabled; 5 = 4 hours 48 minutes; 10 = 2 hours 24 minutes<br>1 = 24 hours 0 minutes; 6 = 4 hours 0 minutes; 11 = 2 hours 11 minutes<br>2 = 12 hours 0 minutes; 7 = 3 hours 26 minutes; 12 = 2 hours 0 minutes<br>3 = 8 hours 0 minutes; 8 = 3 hours 0 minutes; 13 = 1 hour 0 minutes<br>4 = 6 hours 0 minutes; 9 = 2 hours 40 minutes; 14 = 30 minutes | 0 | 0 | 0 | - | C |
| d2S | Number of daily defrosts (td2) see d1S | 0 | 0 | 0 | - | C |
| dH1 | Pump down phase<br>duration 0 = pump | 0 | 0 | 0 | s | A |
| dHG | Type of multiplexed hot gas<br>defrost 0 = equalizing valve | 0 | 0 | 0 | - | A |
| dSb | Valve position during defrost:<br>0: valve positioned as defined by the type of defrost<br>selected; 1: valve forced closed; | 0 | 0 | 0 | % | A |

## ALM (Alarm)

| | | | | | | |
|---|---|---|---|---|---|---|
| AA | Assign probe for high (AH) and low (AL) temperature alarms<br>1 = control (Sreg); 8 = auxiliary defrost (Sd2)<br>2 = virtual (Sv); 9 = auxiliary (Saux)<br>3 = outlet (Sm); 10 = auxiliary 2 (Saux2)<br>4 = defrost (Sd); 11 = ambient temperature (SA)<br>5 = intake (Sr); 12 = ambient humidity (SU)<br>6 = superheated gas (tGS); 13 = glass temperature (Svt)<br>7 = saturated evaporation temp. (tEu); 14 = dewpoint (SdP) | 5 | 5 | 5 | - | F |
| AA2 | Assign probe for high (AH2) and low (AL2) temperature alarms (see AA) | 5 | 5 | 5 | - | A |
| A0 | High and low temperature alarm reset differential | 2.0 | 2.0 | 2.0 | °C/°F | F |
| A1 | Alarm thresholds (AL, AH) relative to the set point St or absolute<br>0 = relative; 1 = absolute | 1 | 1 | 1 | - | F |
| A2 | Alarm thresholds (AL2, AH2) relative to the set point St2 or absolute<br>0 = relative; 1 = absolute | 0 | 0 | 0 | - | A |
| AL | Low temperature alarm threshold | -50 | -50 | -50 | °C/°F | F |
| AH | High temperature alarm threshold | 50 | 50 | 50 | °C/°F | F |
| AL2 | Low temperature alarm 2 threshold | 0,0 | 0,0 | 0,0 | °C/°F | A |
| AH2 | High temperature alarm 2 threshold | 0,0 | 0,0 | 0,0 | °C/°F | A |
| Ad | Delay time for high and low temperature alarms (AH, AL) | 120 | 120 | 120 | min | F |
| Ad2 | Delay time for high and low temperature alarms (AH2, AL2) | 120 | 120 | 120 | min | C |
| A4 | Configure digital input DI1 on S4<br>0 = input not active; 7 = curtain switch<br>1 = immediate external alarm; 8 = start/stop continuous cycle<br>2 = delayed external alarm; 9 = monitor input status<br>3 = enable defrost; 10 = timed digital input<br>4 = start defrost; 11 = switch in Standby status<br>5 = door switch with compressor and evaporator fans OFF; 12 = switch in Clean status<br>6 = remote ON/OFF; 13 = change working set<br>14 = door switch without stopping control | 0 | 0 | 0 | - | C |
| A5 | Configure digital input DI2 on S5 see A4 | 0 | 0 | 0 | - | C |
| A6 | Configure solenoid/compressor control during external alarm (immediate or delayed)<br>with fixed 15 min OFF time 0 = always OFF; 100 = always ON | 0 | 0 | 0 | min | A |
| A7 | Delay time for delayed external alarm | 0 | 0 | 0 | min | C |
| A8 | Configure function of virtual digital input see A4 | 0 | 0 | 0 | - | A |

| Par. | Description | Gram U | Gram KG | Gram FG | UoM | Type |
|---|---|---|---|---|---|---|
| A9 | Select digital input propagated from Master to Slaves (only on Master)<br>0 = from supervisor \| 3 = DI3<br>1 = DI1 \| 4 = DI4<br>2 = DI2 \| 5 = DI5 | 0 | 0 | 0 | - | A |
| A10 | Configure function of digital input DI3 on S6 see A4 | 0 | 0 | 0 | - | C |
| A11 | Configure function of digital input DI4 on S7 see A4 | 0 | 0 | 0 | - | C |
| A12 | Configure function of digital input DI5 see A4 | 5 | 0 | 0 | - | C |
| Ar | Signal alarms from Slave to Master: 0 = not enabled; 1 = enabled | 1 | 1 | 1 | - | A |
| A13 | Hot gas safety procedure for Slave offline: 0 = not enabled; 1 = enabled | 0 | 0 | 0 | - | A |
| Add | High temperature alarm bypass time for door open | 30 | 30 | 30 | min | C |

## Fan (Evaporator fans)

| Par. | Description | Gram U | Gram KG | Gram FG | UoM | Type |
|---|---|---|---|---|---|---|
| F0 | Evaporator fan management<br>0 = always on<br>1 = activation based on Sd – Sv (or Sd - Sm in double thermostat) 2 = activation based on Sd | 2 | 2 | 2 | - | C |
| F1 | Evaporator fan activation threshold (only if F0 = 1 or 2) | -1.0 | -1.0 | -1.0 | °C/°F | F |
| F2 | Evaporator fans with compressor off<br>0 = see F0; 1 = always off | 0 | 0 | 0 | - | C |
| F3 | Evaporator fans during defrost<br>0 = on; 1= off | 1 | 1 | 1 | - | C |
| Fd | Post dripping time after defrost (fans off with control active) | 0 | 0 | 0 | min | C |
| Frd | Fan activation differential (including variable speed) | 2.0 | 2.0 | 2.0 | °C/°F | F |
| F5 | Evaporator fan cut-off temperature (hysteresis 1°C) | 50.0 | 50.0 | 50.0 | °C/°F | F |
| F6 | Maximum evaporator fan speed | 100 | 100 | 100 | % | A |
| F7 | Minimum evaporator fan speed | 0 | 0 | 0 | % | A |
| F8 | Evaporator fan peak time<br>0 = function disabled | 0 | 0 | 0 | s | A |
| F9 | Select fan control with output PWM1/2 (with phase cutting speed control)<br>0 = by pulse; 1 = by duration | 1 | 1 | 1 | - | A |
| F10 | Evaporator fan forcing time at maximum speed<br>0 = Eud function disabled | 0 | 0 | 0 | min | A |

## Eud (Electronic valve)

| Par. | Description | Gram U | Gram KG | Gram FG | UoM | Type |
|---|---|---|---|---|---|---|
| P1 | Electronic valve 0 = not present; 1 = PWM valves; 2 = CAREL E2V valve<br>3 = 0-10V modulation for refrigerant control<br>4 = PWM valve modulation for refrigerant control<br>5 = Carel E2V valve modulation for refrigerant control | 1 | 1 | 1 | - | A |
| P3 | Superheat set point | 13.0 | 13.0 | 13.0 | K | F |
| P4 | Proportional gain | 20,0 | 20,0 | 20,0 | - | A |
| P5 | Integration time<br>0 = function disabled | 400 | 400 | 400 | s | A |
| P6 | Derivative time<br>0 = function disabled | 5.0 | 5.0 | 5.0 | s | A |
| P7 | LowSH: low superheat threshold | 4.0 | 4.0 | 4.0 | K | F |
| P8 | LowSH: integration time<br>0 = function disabled | 15.0 | 15.0 | 15.0 | s | A |
| P9 | LowSH: alarm delay<br>0 = alarm disabled | 600 | 600 | 600 | s | A |
| P10 | Enable close solenoid valve for low superheat (LowSH) and/or low suction temperature (LSA)<br>1 = closing enabled | 1 | 1 | 1 | - | A |
| P11 | LSA: low suction temperature threshold | -45.0 | -45.0 | - | °C/°F | A |
| P12 | LSA: alarm delay<br>0 = alarm disabled | 600 | 600 | 600 | s | A |
| P13 | LSA: alarm differential (°C)<br>0 = reset always automatic | 10.0 | 10.0 | 10.0 | °C/°F | A |
| P14 | Enable valve alarm at end travel ('blo')<br>1 = signal enabled | 1 | 1 | 1 | - | A |
| P15 | Support saturated temperature for pressure probe error | -15.0 | -15.0 | - | °C/°F | A |
| PH | Type of refrigerant<br>0 = Custom \| 5 = R410A \| 10 = R717 \| 15 = R422D \| 20 = R427A \| 25 = HTR02<br>1 = R22 \| 6 = R507A \| 11 = R744 \| 16 = R413A \| 21= R245Fa<br>2 = R134a \| 7 = R290 \| 12 = R728 \| 17 = R422A \| 22 = R407F<br>3 = R404A \| 8 = R600 \| 13 = R1270 \| 18 = R423A \| 23 = R32<br>4 = R407C \| 9 = R600a \| 14 = R417A \| 19 = R407A \| 24 = HTR01 | 11 | 11 | 11 | - | A |
| OSH | Superheat offset for modulating thermostat<br>0 = function disabled | 0.0 | 0.0 | 0.0 | K | A |
| Phr | Enable fast update of the valve parameters to supervisor<br>0 = fast update disabled | 0 | 0 | 0 | - | A |
| PM1 | MOP: maximum saturated evaporation temperature threshold | 50.0 | 50.0 | 50.0 | °C/°F | A |
| PM2 | MOP: integration time | 10.0 | 10.0 | 10.0 | s | A |
| PM3 | MOP: alarm delay<br>0 = function disabled | 0 | 0 | 0 | s | A |
| PM4 | MOP: delay activation of function when starting control | 2 | 2 | 2 | s | A |
| PM5 | MOP: enable close solenoid valve<br>0 = closing disabled; 1 = closing enabled | 0 | 0 | 0 | - | A |
| PL1 | LOP: minimum saturated evaporation temperature threshold | -50.0 | -50.0 | -50.0 | °C/°F | A |
| PL2 | LOP: integration time | 0.0 | 0.0 | 0.0 | s | A |
| PL3 | LOP: alarm delay<br>0 = function disabled | 0 | 0 | 0 | s | A |
| SH | Superheat | - | - | - | K | F |
| PPU | Valve opening percentage | - | - | - | % | F |
| tGS | Superheated gas temperature | - | - | - | °C/°F | F |
| tEu | Saturated evaporation temperature | - | - | - | °C/°F | F |

| Par. | Description | Gram U | Gram KG | Gram FG | UoM | T |
|---|---|---|---|---|---|---|
| /cE | Saturated evaporation temperature calibration | 0.0 | 0.0 | 0.0 | °C/°F | A |
| Po6 | PWM expansion valve Ton+Toff period | 6 | 6 | 6 | s | A |
| cP1 | Initial valve position when control starts | 30 | 30 | 30 | % | A |
| Pdd | Initial valve position maintenance time after defrost | 10 | 10 | 10 | min | A |
| PSb | Valve standby position | 0 | 0 | 0 | step | A |
| PF | Valve opening steps (supervisor) | - | - | - | step | N |
| PMP | Enable manual expansion valve positioning 0 = disabled; 1 = enabled | 0 | 0 | 0 | - | A |
| PMu | Manual valve position | - | - | - | step | A |
| Phc | Enable high current valve driving | 0 | 0 | 0 | - | A |
| PSM | Smooth Lines - Enable function | 0 | 0 | 0 | - | A |
| PLt | Smooth Lines - Offset to stop control below set point | 2.0 | 2.0 | 2.0 | °C/° | A |
| PHS | Smooth Lines - Maximum superheat offset | 20.0 | 20.0 | 20.0 | K | A |
| PSd | Control derivative time (Smooth Lines or liquid control) | 0 | 0 | 0 | s | N |
| PSI | Control integral time (Smooth Lines or liquid control) | 120 | 120 | 120 | s | A |
| PSP | Control prop. coefficient (Smooth Lines or liquid control) | 5 | 5 | 5 | - | A |

## AUX CnF (Configuration)

| Par. | Description | Gram U | Gram KG | Gram FG | UoM | T |
|---|---|---|---|---|---|---|
| In | Type of unit 0 = Slave; 1 = Master | 1 | 1 | 1 | - | C |
| Sn | Number of slaves in the local network 0 = no Slave | 0 | 0 | 0 | - | C |
| H0 | Serial or Master Slave network address | 199 | 199 | 199 | - | C |
| H1 | Configure function of output AUX1<br>0 = No function / 7 = Auxiliary evaporator defrost<br>1 = Normally de-energized alarm / 8 = Evaporator fans<br>2 = Normally energized alarm / 9 = Anti-sweat heaters<br>3 = Auxiliary / 10 = Suction valve<br>4 = Auxiliary serving MASTER on the Slaves / 11 = Equalizing valve.<br>5 = Light / 12 = Solenoid valve.<br>6 = Light serving the Master on the Slaves / 13 = Output associated with timer function<br>14 = Condensate drain heaters | 8 | 8 | 8 | - | C |
| H2 | Disable keypad and remote control functions<br>1 = keypad and remote control enabled | 1 | 1 | 1 | - | A |
| H3 | Remote control enabling code 0 = programming from remote control without code | 0 | 0 | 0 | - | A |
| H4 | Terminal buzzer (if present) 0 = enabled; 1 = disabled | 0 | 0 | 0 | - | A |
| H5 | Configure function of output AUX2 see H1 | 12 | 12 | 12 | - | C |
| H6 | Terminal keypad lock configuration | 0 | 0 | 0 | - | A |
| H7 | Configure function of output AUX3 see H1 | 5 | 5 | 5 | - | C |
| H8 | Output switched with time bands<br>0 = Light; 1 = AUX | 1 | 1 | 1 | - | C |
| H9 | Select function associated with the "aux" button on the user terminal<br>0 = Light; 1 = AUX. | 0 | 0 | 0 | - | C |
| H10 | Configure compressor digital output logic<br>0 = direct logic; 1 = reverse logic | 0 | 0 | 0 | - | A |
| H11 | Configure evaporator fan digital output logic<br>0 = direct logic; 1 = reverse logic | 0 | 0 | 0 | - | A |
| H13 | Configure function of output AUX4 see H1 | 12 | 12 | 12 | - | C |
| Hdn | Number of default parameter sets available | 0 | 0 | 0 | - | N |
| Htc | Clock fitted<br>0 = not fitted | 1 | 1 | 1 | - | A |
| rHu | Manual anti-sweat heater activation percentage (of period 'rHt')<br>0 = function disabled | 70 | 70 | 70 | % | A |
| rHt | Manual anti-sweat heater activation period<br>0 = function disabled | 5 | 5 | 5 | min | A |
| rHo | Offset for anti-sweat heater modulation | 2.0 | 2.0 | 2.0 | °C/°F | A |
| rHd | Differential for anti-sweat heater modulation | 0.0 | 0.0 | 0.0 | °C/°F | A |
| rHL | Type of PWM output load for anti-sweat heater modulation<br>0 = resistive; 1 = inductive | 0 | 0 | 0 | - | A |
| dIt | Timer duration (timed input) | 0 | 0 | 0 | min | A |
| HSc | Select the set of parameters used | 1 | 1 | 1 | - | N |
| HSS | Set of parameters in use (+0.1 if subsequently modified) | 1.1 | 1.1 | 1.1 | - | A |
| H14 | Time light stays on after closing the door | 0 | 0 | 0 | min | C |
| Hr1 | Reverse logic for digital input 1 | 0 | 0 | 0 | - | A |
| Hr2 | Reverse logic for digital input 2 | 0 | 0 | 0 | - | A |
| Hr3 | Reverse logic for digital input 3 | 0 | 0 | 0 | - | A |
| Hr4 | Reverse logic for digital input 4 | 0 | 0 | 0 | - | A |
| Hr5 | Reverse logic for digital input 5 | 0 | 0 | 0 | - | A |
| POM | Unit cooling capacity indication | 0.0 | 0.0 | 0.0 | - | A |
| rHA | Coefficient A for glass temperature probe estimate | 2 | 2 | 2 | °C/°F | N |
| rHb | Coefficient B for glass temperature probe estimate | 22 | 22 | 22 | - | N |

## HSt (Alarm log)

| Par. | Description | Gram U | Gram KG | Gram FG | UoM | T |
|---|---|---|---|---|---|---|
| HS0 to | Alarm 0 to 9 (press Set) | - | - | - | - | A |
| --- | Alarm 0 to 9 - Code | - | - | - | - | * |
| h__ | Alarm 0 to 9 - Hours | 0 | 0 | 0 | hour | * |
| n__ | Alarm 0 to 9 – Minutes | 0 | 0 | 0 | min | * |
| --- | Alarm 0 to 9 - Duration | 0 | 0 | 0 | min | * |

| Par | Description | Gram U | Gram KG | Gram FG | UoM | Type |
|---|---|---|---|---|---|---|

### HACCP HcP (HACCP Alarms)

| Par | Description | Gram U | Gram KG | Gram FG | UoM | Type |
|---|---|---|---|---|---|---|
| Ht0 | HACCP alarms present | 0 | 0 | 0 | - | NV |
| HAn | Number of type HA alarms | 0 | 0 | 0 | - | A |
| HA to HA2 | Type HA HACCP alarms activated (press Set) | - | - | - | - | A |
| y__ | Alarm 1 to 3 - Year | 0 | 0 | 0 | year | * |
| M__ | Alarm 1 to 3 - Month | 0 | 0 | 0 | month | * |
| d__ | Alarm 1 to 3 – Day of the month | 0 | 0 | 0 | day | * |
| h__ | Alarm 1 to 3 – Hours | 0 | 0 | 0 | hour | * |
| n__ | Alarm 1 to 3 – Minutes | 0 | 0 | 0 | min | * |
| --- | Alarm 1 to 3 – Duration | 0 | 0 | 0 | min | * |
| HFn | Number of type HF alarms | 0 | 0 | 0 | - | A |
| HF to | Type HF HACCP alarms activated (press Set) | - | - | - | - | A |
| y__ | Alarm 1 to 3 - Year | 0 | 0 | 0 | year | * |
| M__ | Alarm 1 to 3 - Month | 0 | 0 | 0 | month | * |
| d__ | Alarm 1 to 3 – Day of the month | 0 | 0 | 0 | day | * |
| h__ | Alarm 1 to 3 – Hours | 0 | 0 | 0 | hour | * |
| n__ | Alarm 1 to 3 – Minutes | 0 | 0 | 0 | min | * |
| --- | Alarm 1 to 3 – Duration | 0 | 0 | 0 | min | * |
| Htd | HACCP alarm delay<br>0 = monitoring disabled | 0 | 0 | 0 | min | A |

### rtc (Real Time Clock)

| Par | Description | Gram U | Gram KG | Gram FG | UoM | Type |
|---|---|---|---|---|---|---|
| td1 to 8 | Defrost 1 to 8 (press Set) | - | - | - | - | C |
| d__ | Defrost 1 to 8 – day<br>0 = event disabled; 9 = Monday to Saturday<br>1 to 7 = Monday to Sunday; 10 = Saturday to Sunday<br>8 = Monday to Friday; 11 = every day | 0 | 0 | 0 | day | * |
| h__ | Defrost 1 to 8 – hours | 0 | 0 | 0 | hour | * |
| n__ | Defrost 1 to 8 – minutes | 0 | 0 | 0 | min | * |
| P__ | Defrost 1 to 8 – enable Power defrost<br>0 = normal; 1 = Power defrost | 0 | 0 | 0 | - | * |
| tS1 to 8 | Start time band 1 to 8 day (press Set) | - | - | - | - | C |
| d | Start time band 1 to 8 day: day | 0 | 0 | 0 | day | * |
| h | Start time band 1 to 8 day: hours | 0 | 0 | 0 | hour | * |
| n | Start time band 1 to 8 day: minutes | 0 | 0 | 0 | min | * |
| tE1 to 8 | End time band 1 to 8 day (press Set) | - | - | - | - | C |
| d | End time band 1 to 8 day: day | 0 | 0 | 0 | day | * |
| h | End time band 1 to 8 day: hours | 0 | 0 | 0 | hour | * |
| n | End time band 1 to 8 day: minutes | 0 | 0 | 0 | min | * |
| tc | Date/time (Press Set) | - | - | - | - | C |
| y__ | Date/time: year | 0 | 0 | 0 | year | * |
| M__ | Date/time: month | 1 | 1 | 1 | month | * |
| d__ | Date/time: day of the month | 1 | 1 | 1 | day | * |
| u__ | Date/time: day of the week | 6 | 6 | 6 | day | * |
| h__ | Date/time: hours | 0 | 0 | 0 | hour | * |
| n__ | Date/time: minutes | 0 | 0 | 0 | min | * |

Tab. 8.a