User Guide

Refrigeration controller
Type **EETc** and **EETa** series

Enhanced Electronic Thermostat

Contents

Introduction

The EET Series is the next generation of Electronic Thermostats which is a direct replacement of the Mechanical Thermostat (and timer) and Danfoss ETC series. It comes in two variants: EETc (Enhanced Electronic Thermostat, compact) which has one and two output model options for controlling compressor and fan/defrost heater and EETa (Enhanced Electronic Thermostat, advanced) which has two and three output model options for controlling compressor, fan, defrost heater or light. With the EETc and the EETa, we continue building on the electronification legacy by bringing a high number of new features and capabilities to increase performance and flexibility, while keeping the familiar form factor and installation method.

Variants

EET Compact (EETc):
- EETc 11: 1 output, 120 V
- EETc 12: 1 output, 230 V
- EETc 21: 2 outputs, 120 V
- EETc 22: 2 outputs, 230 V

EET Advanced (EETa):
- EETa 2W: 2 outputs, wide voltage (100 – 240 V)
- EETa 3W: 3 outputs, wide voltage (100 – 240 V)

Applications

- Glass door merchandisers
- Beverage coolers
- Commercial freezers and refrigerators
- Preparation tables, under counters
- Dual compressor refrigerators (EETa only)
- Anti-freeze applications requiring auto heat control (EETa only)
- Applications requiring dual defrost control (EETa only)

Key features

Table 1: Key features

Key features	EETc	EETa
Common interface for easy transition from ETC series and Mechanical Thermostat	Yes	Yes
Moisture protected design for cold space installation	Yes	Yes
Zero cross technology for longer relay life	Yes	Yes
Compressor protection from voltage fluctuations.	Yes	Yes
Compressor protection from condenser overheat	Yes	Yes
Advanced fan control	Yes	Yes
Economy mode (Eco mode) for energy saving	Yes	Yes
Initial pull down for faster cooling at power up.	Yes	Yes
Test mode for quick checking of output function	Yes	Yes
Emergency mode in case of sensor and potentiometer failure	Yes	Yes
Parameter programmable at production site with direct programming key access	Yes	Yes
Refrigerant leakage detection	No	Yes
Wide Voltage Power supply	No	Yes
Holiday mode for energy saving	No	Yes
Dual evaporator defrost	No	Yes
Dual compressor control	No	Yes
Automatic Pull down for faster cooling	No	Yes
Anti-freeze function for low ambient conditions	No	Yes
Onsite firmware update capability	No	Yes

Functions

Voltage protection

The voltage protection feature protects the compressor against high and low voltage fluctuations by limiting the compressor operation within specified voltage limits. Whenever the supply voltage goes beyond the defined voltage limits set in the controller, it will switch the compressor OFF, and resume the operation when the voltage falls under the operating range.

Figure 1: Voltage protection
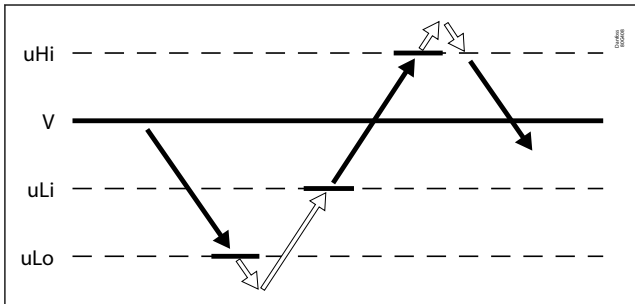
uHi	Maximum voltage limit above which the compressor is switched off
V	Supply voltage
uLo	Minimum voltage limit below which the compressor is switched off
uLi	Minimum voltage limit above which the compressor can start

Compressor protection against short cycling

This feature protects the compressor from short ON-OFF cycles. The EET controller ensures that the compressor is switched ON and OFF for a minimum time specified under Minimum run time (Crt) and Minimum stop time (cSt) except during voltage and condenser protection.

Figure 2: Compressor protection against short cycling
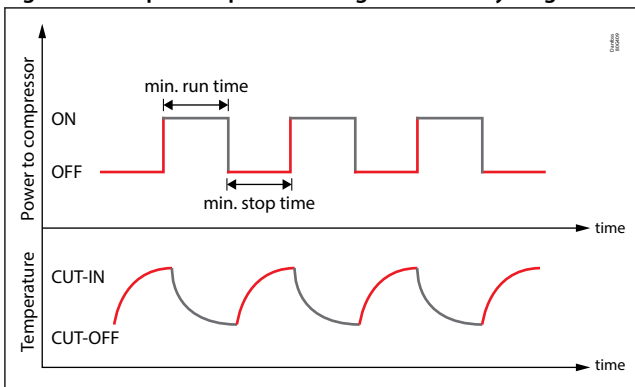
Zero Cross Technology

The Zero Cross Technology controls the relay's switching time by ensuring that the relays switch ON or OFF close to the 0th position of the voltage curve. This ensures reduced relay contact welding, increased relay life and reduced switching noise. This feature should only be used when the compressor is directly driven by the EET relay and no external contactor is used.

Figure 3: Zero Cross Technology
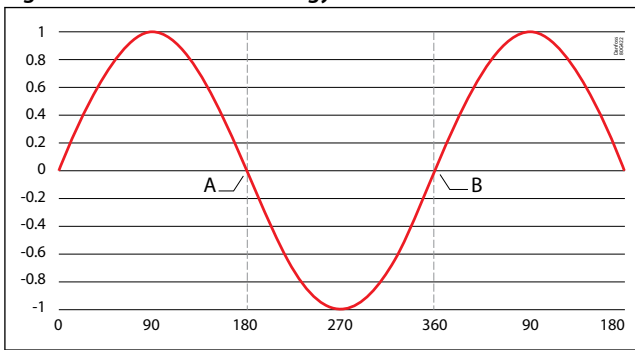
A	Break on negative edge
B	Break on positive edge

Compressor protection against high condensing temperature

If the condenser is blocked due to dirt / dust and the condenser is unable to cool down the refrigerant properly due to lack of proper heat exchange, it will affect its performance and greatly reduces system life. This feature will protect the system and compressor via a two-step protection mechanism. The controller can be configured to set an early warning temperature by the user, when the compressor can keep running, and then a second level of condenser temperature beyond which the compressor is switched off until the temperature comes down to an acceptable limit. This would help to improve the compressor life by running within the allowed operating envelope of the compressor.

Figure 4: Compressor protection against high condensing temperature
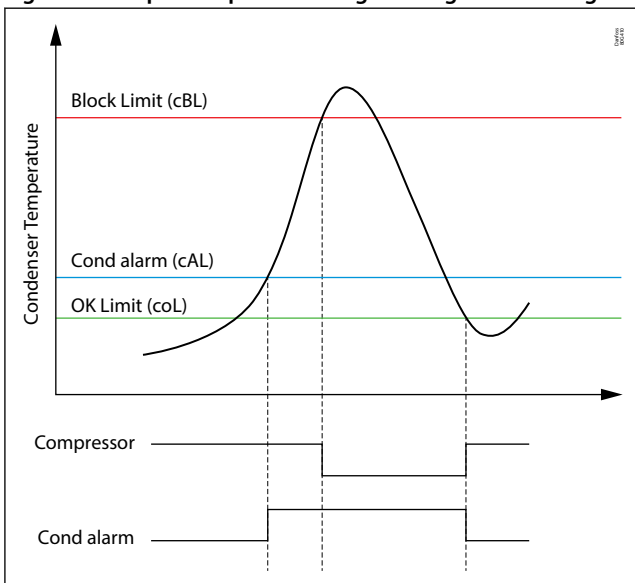
Advanced Fan control

Advanced Fan control helps maintain a uniform cooling by switching fan ON and OFF during the compressor OFF cycle. This feature reduces the overall energy consumption while maintaining a uniform temperature in the cabinet.

Figure 5: Advanced Fan control
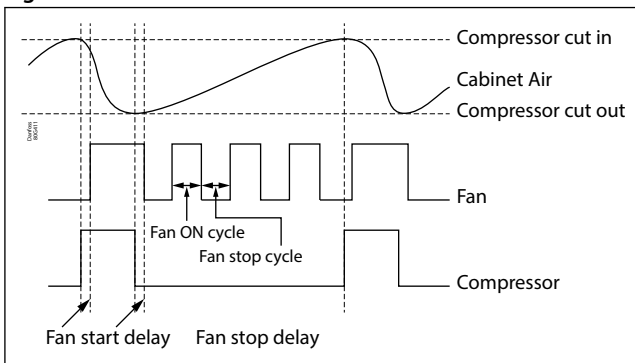
Initial pull down

If the cabinet temperature is very high at power up, the controller detects the need for faster cooling and enters into Initial pull down mode. In this mode, the controller adjusts the defrost interval by skipping it to a later time than its scheduled intervals until the desired cabinet temperature is achieved.

Figure 6: Initial pull down
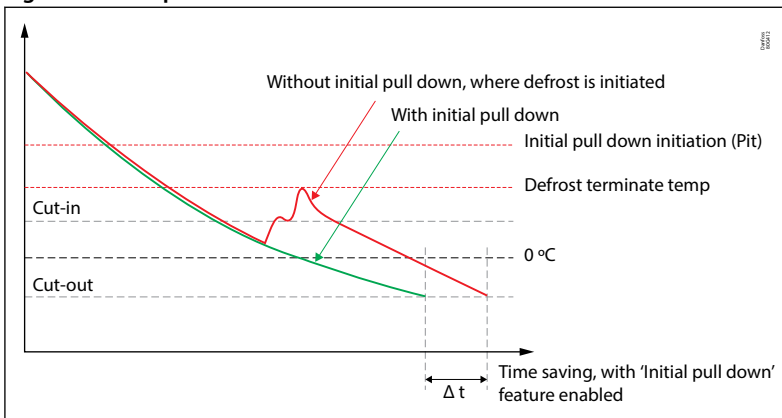
This ensures faster cooling by achieving the required cabinet temperature in the shortest period possible.

Automatic Pull down (applicable for EETa only)

This feature helps to achieve faster and extra cooling when there is an increase in the cabinet temperature due to frequent door opening or fresh food products being placed in the cabinet. The faster and extra cooling is achieved by adjusting the temperature set point and defrost intervals until the desired setpoint range is achieved. The controller detects this mode by monitoring the cabinet temperature behaviour, also it is possible to trigger this mode manually via a digital input switch.

Figure 7: Pull down/Super cool mode
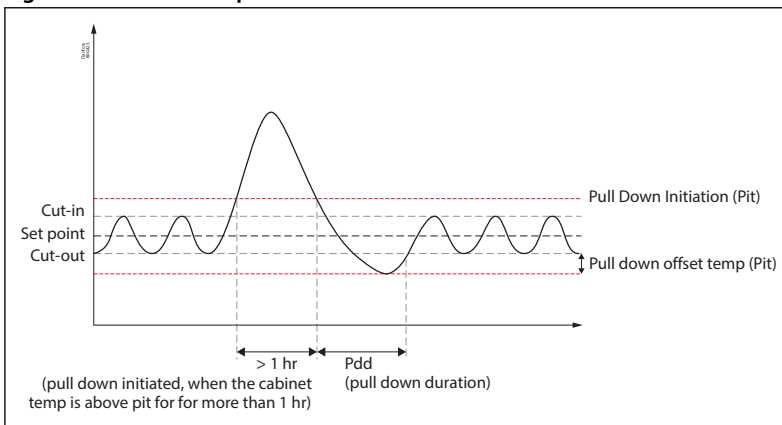
Economy mode

This feature helps save energy by increasing the setpoint when the normal cooling demand is not required. ECO mode is triggered when the door is closed for more than the time specified by the parameter 'Edd'. ECO mode can also be triggered manually via Di input. In some cases, this feature is meant to decrease the setpoint and thereby enabling extra cooling when the power is cheaper at night time.

Figure 8: Eco mode
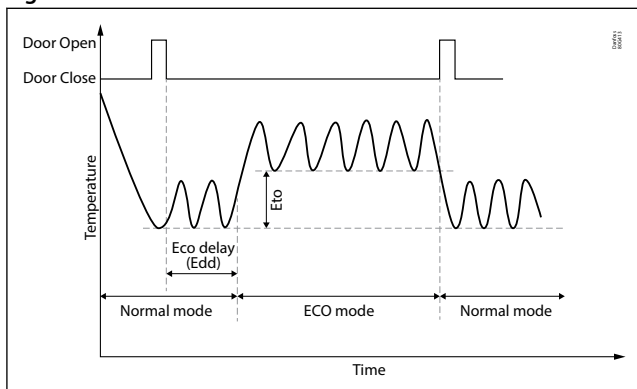
Holiday mode (applicable for EETa only)

This feature allows for more energy savings during vacation/ Holiday period by off-setting the setpoint when there is no usage for a prolonged period. If there is no door activity detected after entering ECO mode for the period that has been configured under parameter "Holiday length", it enters into Holiday mode. The entry into Holiday mode happens by time passing by and is exited by door action. Holiday mode can also be triggered manually via digital input.

Figure 9: Holiday mode
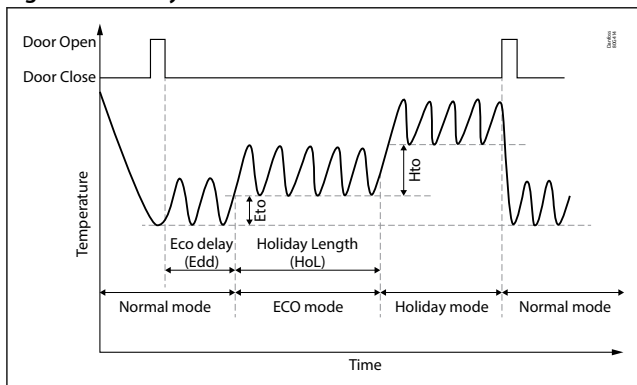
Dual evaporator defrost (applicable for EETa only)

The EETa can control refrigeration cabinets with two defrost heaters and two evaporator sensors in combination. This feature provides more flexibility to the refrigeration system design and provides the most efficient defrost handling. The controller can control defrost with both a single heater and two evaporator sensor inputs as well as two heaters with two evaporator sensor inputs.

Dual compressor control (applicable for EETa only)

Certain refrigeration systems need more than one refrigeration circuit to handle the cooling requirements of the cabinet while meeting other statutory requirements (for ex: Flammable Refrigerant qty). The EETa controller comes with a feature that can handle two compressors which can be operated with time delay (Scd).

ⓘ **NOTE:**
The second compressor can be configured to any of the auxiliary relays and might require an external relay, if the rated current of the second compressor is more than the auxiliary relay ratings.

Figure 10: Dual compressor support
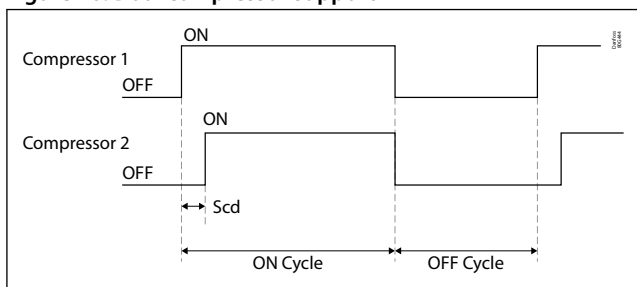
Anti Freeze function (applicable for EETa only)

This feature protects the bottle coolers from freezing, if they are installed outdoor with low ambient temperature. The controller automatically switches between cooling and heating mode if the cabinet air temperature goes below the allowed limit, thus preventing the freezing of stored products. This feature can be activated only when the defrost type used is electrical.

Figure 11: Automatic heater control for Anti Freezing applications
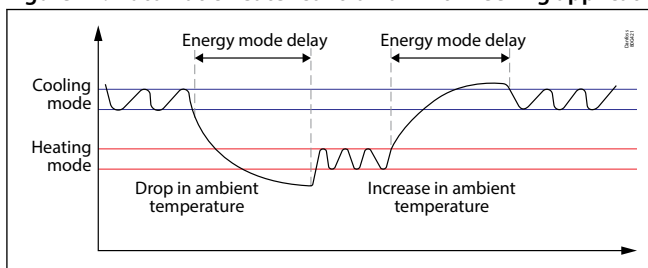
Quick Test mode

This feature helps test all the outputs of the controller instantly when connected to an actual application in the OEM Production line or during field service. The feature can be used when connected to KoolProg or by using MODBUS commands (please contact the Danfoss support team for info about MODBUS commands).

Sensor Error handling

In the event of cabinet sensor error/ failure, cabinet temperature can be controlled in EET controller using two methods to avoid food spoilage until the failed sensor is replaced.

1. Manual Error handling: Run the compressor for fixed ON and OFF time by defining error run time and error stop time.
2. Auto Error handling: Smart self-learning feature of EET controller, controls the compressor cycle based on past compressor cycles.

Potentiometer Error handling

Potentiometer error handling automatically sets the cabinet temperature to smart default setting to avoid food spoilage in the event of a potentiometer failure.

Installation

Dimensions

Figure 12: EETc
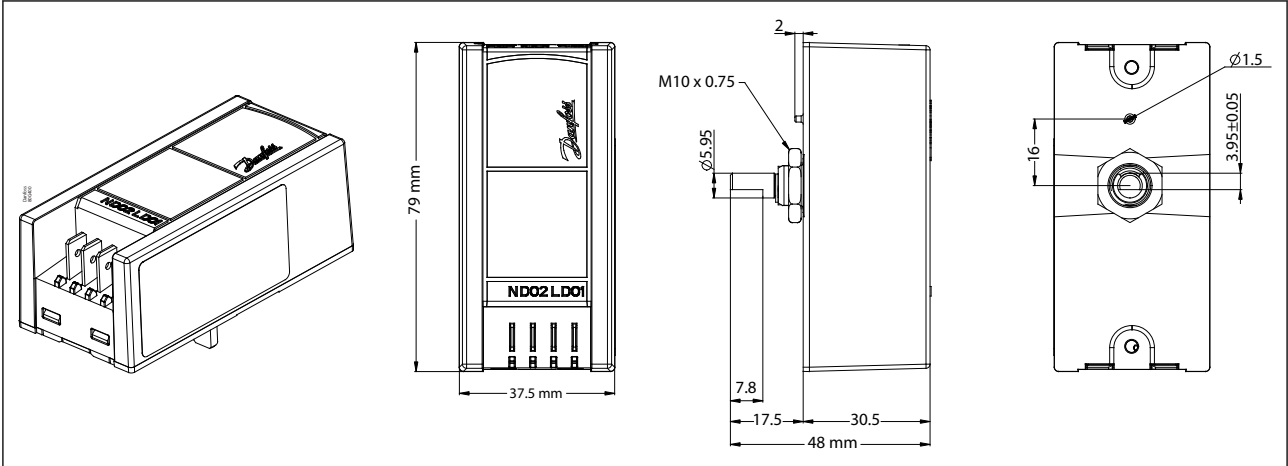
Figure 13: EETa
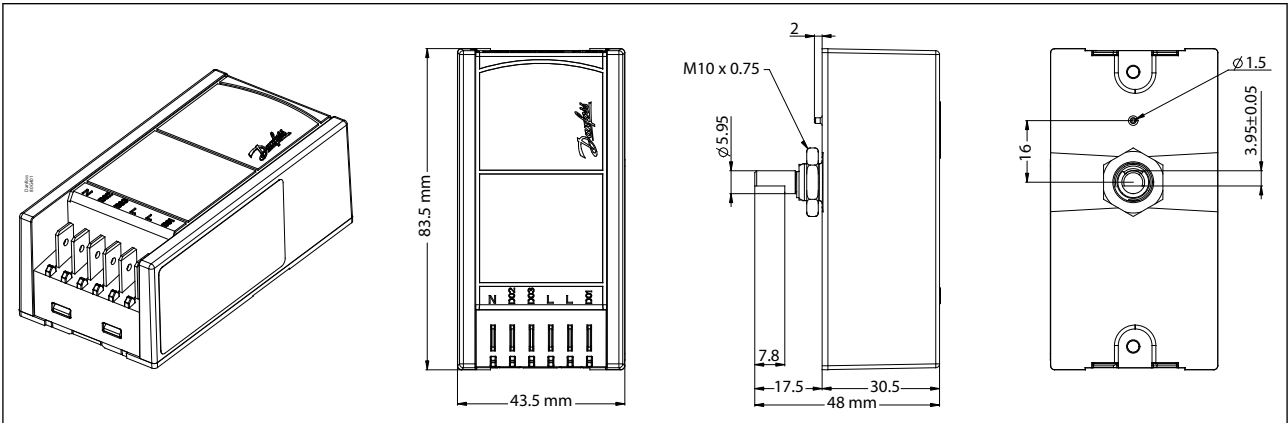
M10 x 0.75 is supplied loose.

Figure 14: Mounting plate dimensionfor EETc and EETa
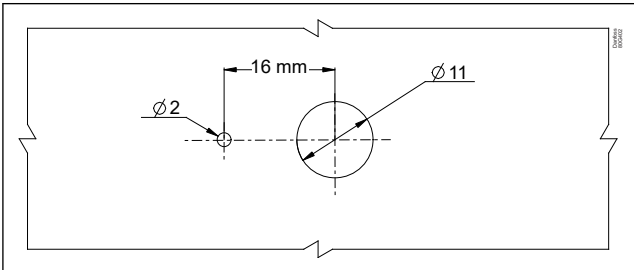
Recommended Mounting Plate Hole Center

Figure 15: Operation (Spindle operation) for EETc and EETa
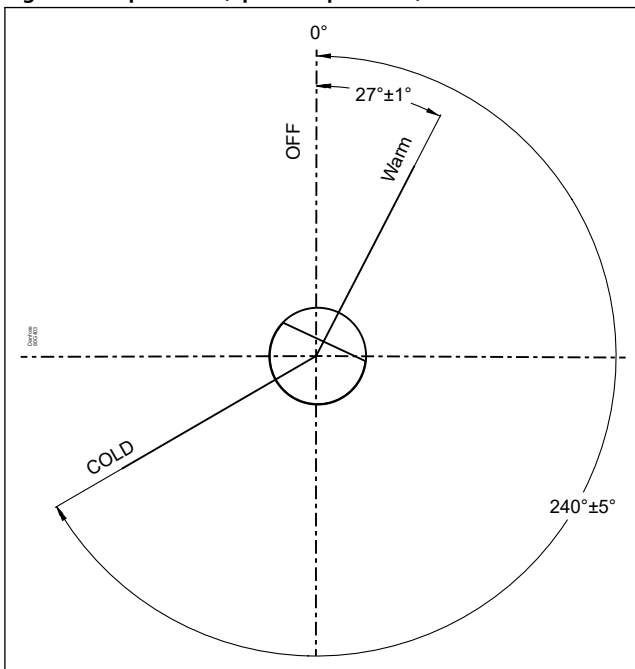
Spindle shown in "Warm" position.

Connections

⚠️ **IMPORTANT:**

1. The inputs are not galvanic isolated and are connected directly to the mains supply! Door-switches, sensors as well as the cables must fulfill the reinforced insulation requirements.
2. Do not fit power supply wiring and signal wiring (probes/sensors and digital inputs) in the same raceways or ducts.
3. Separate as much as possible the probe and digital input signal cables from the cables carrying inductive loads and power cables to avoid possible electromagnetic disturbance.
4. Suitably fasten the output connection cables to avoid any unintentional contact.
5. The electrical connections must only be completed by a qualified electrician.
6. The customer must only use the product in the manner described in the documentation relating to the installation and product application.

Figure 16: EETc11, EETc12
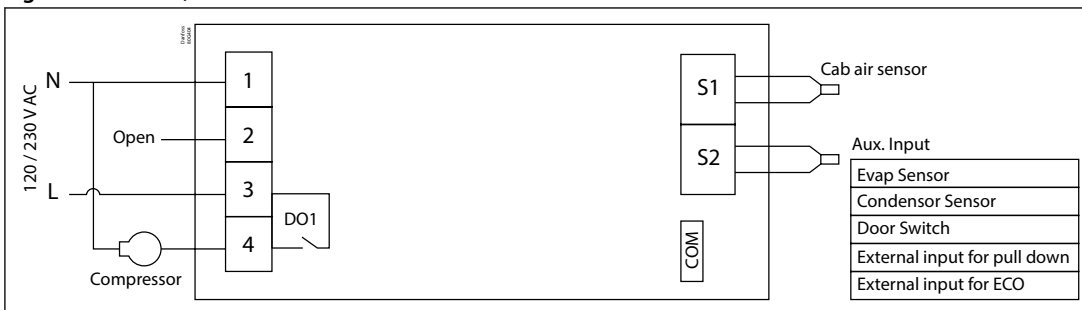
Figure 17: EETc21, EETc22
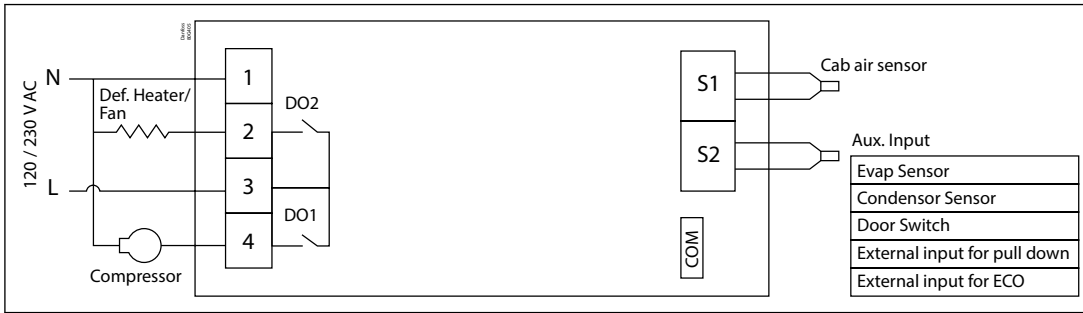
Figure 18: EETa 2W
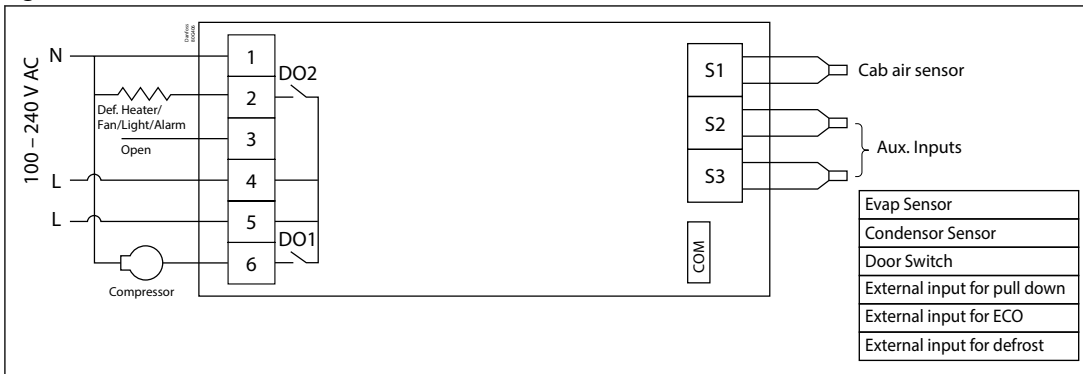
Figure 19: EETa 3W
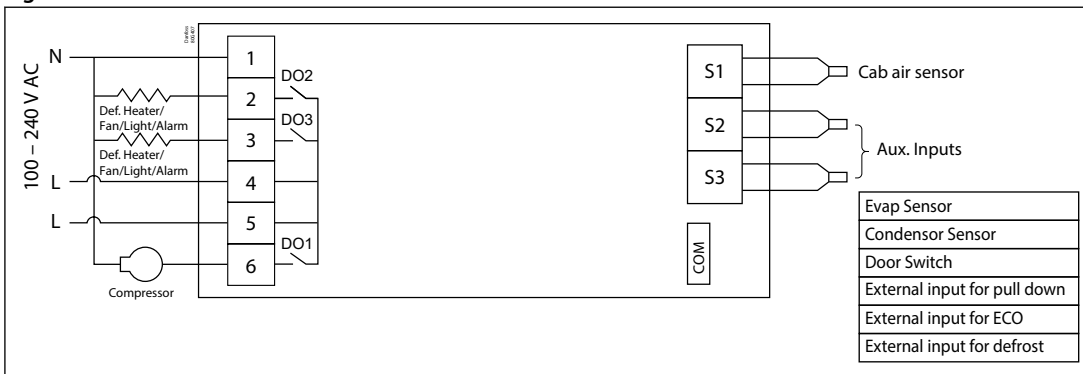
Mounting

Figure 20: Mounting
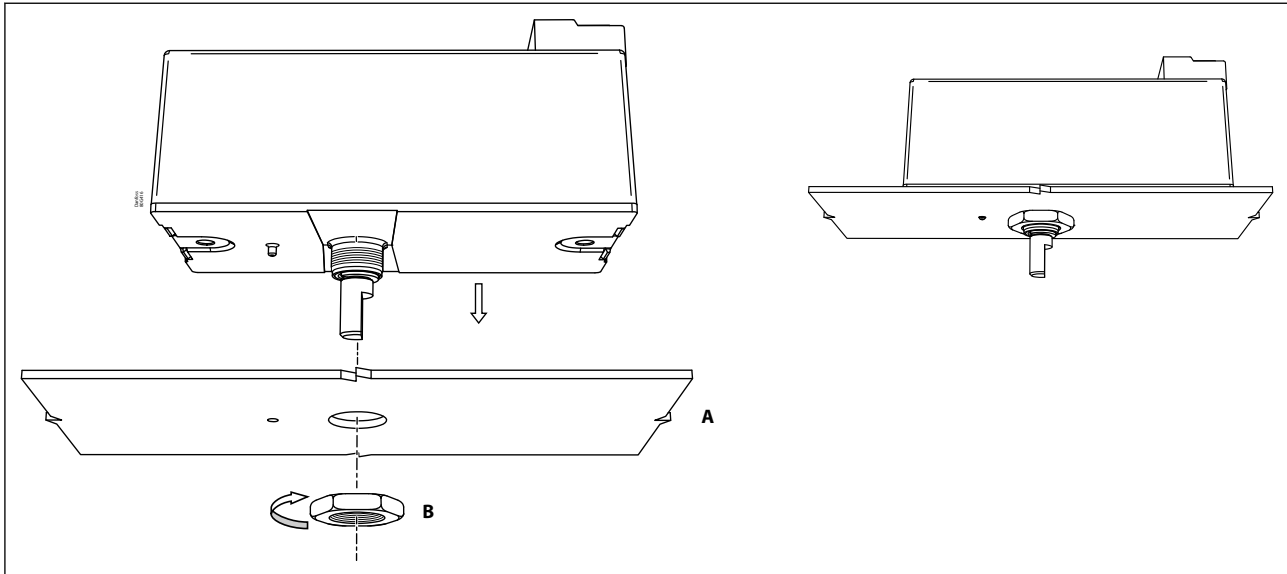
A	Mounting plate thickness = 0.5 – 2.5 mm
B	Torque 100 N-cm max.

Wire routing

Figure 21: Wire routing
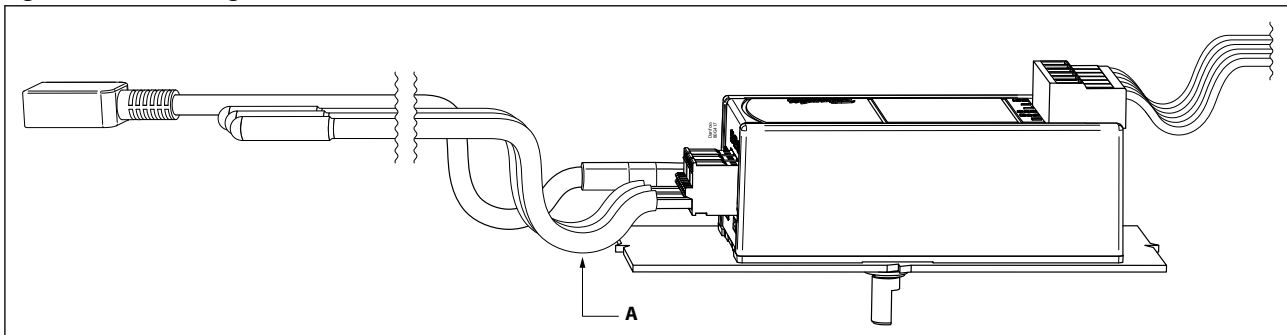
A	Recommended to provide U-loop to avoid any water droplet entering into the controller due to capillary action.

Accessories

KoolKey

KoolKey (EKA 200): Acts as a gateway to connect PC tool KoolProg and also a programming key.

Figure 22: KoolKey (EKA 200) as gateway
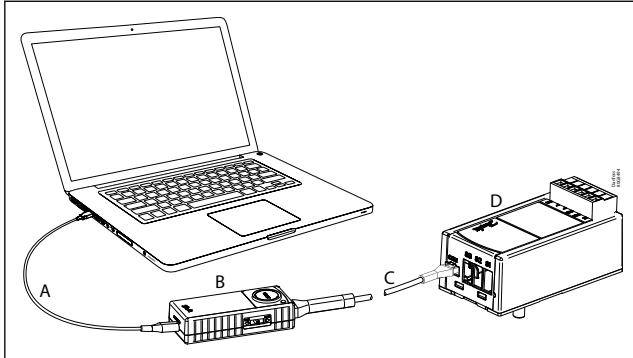
A	Standard Micro-USB cable
B	KoolKey
C	Interface cable
D	Controller

Figure 23: KoolKey (EKA 200) as programming key
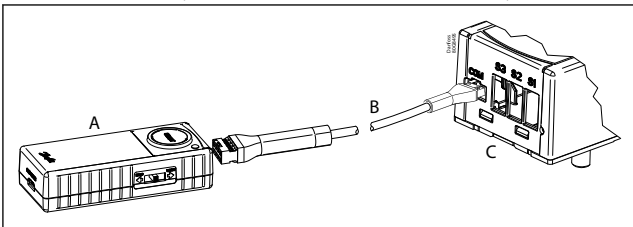
A	Koolkey
B	Interface cable
C	Controller

Refer to the KoolKey installation guide for detailed instructions.

Mass Programming Key (EKA 201)

Mass Programming Key (EKA 201) - only for EETa controllers: Simple Programming key for programming the controller in production assembly line.

Figure 24: Mass Programming Key (EKA 201)
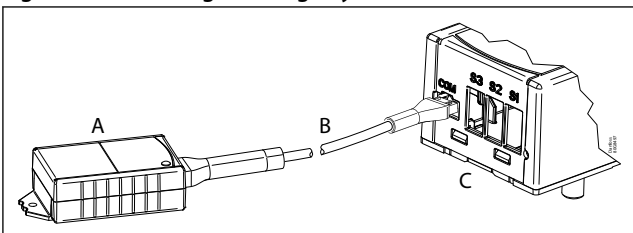
A	EKA 201
B	Interface cable
C	Controller

Refer to the EKA 201 installation guide for detailed instructions.

Product specification

Technical specification

Table 2: Electronic temperature control, type EETc 11, 12, 21 and 22

Product specification	EETc 11, EETc 21	EETc 12, EETc 22
Purpose of control	Operating temperature sensing control suitable for incorporation into commercial air-conditioning and refrigeration applications	
Construction of control	Incorporated control	
Voltage	120 V, 50/60 Hz, Non-Isolated	230 V, 50/60 Hz, Non-Isolated
Types/Models	EETc 11 (One relay 120 V) EETc 21 (Two relay 120 V)	EETc 12 (One relay 230 V) EETc 22 (Two relay 230 V)
Power supply	120 V AC +10%/-15%, 50/60 Hz	230 V AC +10%/-15%, 50/60 Hz
Relay ratings	DO1 (Relay 1) **UL 60730:** 16 A Resistive, 100k cycles 16 FLA, 72 LRA, 30k cycles **EN 60730:** 16 A Resistive, 100k cycles 16 A (break) (0.75 – 0.8 p.f.), 72 A (make) (0.4 – 0.5 p.f.), 30k cycles	DO1 (Relay 1) **UL 60730:** 16 A Resistive, 100k cycles 10 FLA, 60 LRA, 30k cycles **EN 60730:** 16 A Resistive, 100k cycles 10 A (break) (0.75 – 0.8 p.f.), 60 A (make) (0.4 – 0.5 p.f.), 30k cycles
	DO2 (Relay 2) **UL 60730:** 5 A Resistive, 30k cycles 2 FLA, 12 LRA, 30k cycles **EN 60730:** 5 A Resistive, 30k cycles	DO2 (Relay 2) **UL 60730:** 5 A Resistive, 30k cycles 2 FLA, 12 LRA, 30k cycles **EN 60730:** 5 A Resistive, 30k cycles
Product dimension	Length: 79 mm Width: 37.5 mm Height: 30.5 mm	
Temperature control	Potentiometer with Spindle	
Number of inputs	2 (1 Analogue + 1 Analogue / Digital)	
Supported sensor types	NTC 5K (Beta value 3980 @ 25/100 °C) NTC 10K (Beta Value 3980 @ 25/100 °C)	
Measuring accurancy	±1 K below -35 °C ±0.5 K between -35 – +25 °C ±1 K above 25 °C	
Measurement range	-40 – +80 °C	
Number of outputs	One relay version: Compressor relay Two relay version: Compressor relay + Aux relay (Defrost heater / Evaporator fan)	
Input connector type	Plug & Header type	
Output connector type	Tab connector	
Communication	TTL (MODBUS)	
Operating temperature range	-25 – +55 °C	
Humidity range	93% RH, Condensing	
Installation	Spindle mounted Cold Space Installability	
Relay switching	Zero cross technology (All relays)	
Overvoltage category	III: 230 V supply version (CE, UL recognized) III: 115 V supply version (UL recognized)	
Surge Protection	4 KV	

Table 3: Electronic temperature control, type EETa 2W and EETa 3W

Product specification	EETa 2W	EETa 3W
Purpose of control	Operating temperature sensing control suitable for incorporation into commercial air-conditioning and refrigeration applications	
Construction of control	Incorporated control	
Power supply	100 – 240 V AC +/- 10%, 50/60 Hz, Non isolated	

Product specification	EETa 2W	EETa 3W
Relay ratings	DO1 (Relay 1): **UL 60730:** 16 A Resistive, 100k cycles 16 FLA, 72 LRA, 30k cycles @ 120 V AC 10 FLA, 60 LRA, 30k cycles @ 240 V AC **EN 60730:** 16 A Resistive, 100k cycles 16 A (break) (0.75 – 0.8 p.f.), 72 A (make) (0.4 – 0.5 p.f.), 30k cycles @ 115 V AC 10 A (break) (0.75 – 0.8 p.f.), 60 A (make) (0.4 – 0.5 p.f.), 30k cycles @ 230 V AC DO2 (Relay 2): **UL 60730:** 8 A Resistive, 30k cycles 2 FLA, 12 LRA, 100k cycles **EN 60730:** 8 A Resistive, 30k cycles	DO1 (Relay 1): **UL 60730:** 16 A Resistive, 100k cycles 16 FLA, 72 LRA, 30k cycles @ 120 V AC 10 FLA, 60 LRA, 30k cycles @ 240 V AC **EN 60730:** 16 A Resistive, 100k cycles 16 A (break) (0.75 – 0.8 p.f.), 72 A (make) (0.4 – 0.5 p.f.), 30k cycles @ 115 V AC 10 A (break) (0.75 – 0.8 p.f.), 60 A (make) (0.4 – 0.5 p.f.), 30k cycles @ 230 V AC DO2 (Relay 2): **UL 60730:** 8 A Resistive, 30k cycles 2 FLA, 12 LRA, 100k cycles **EN 60730:** 8 A Resistive, 30k cycles DO3 (Relay 3) **UL 60730:** 5 A Resistive, 30k cycles 2 FLA, 12 LRA, 30k cycles **EN 60730:** 5 A Resistive, 30k cycles
Product dimension	Length: 83.5 mm Width: 43.5 mm Height: 30.5 mm	
Temperature control	Potentiometer with Spindle	
Number of inputs	3 (1 Analogue, 2 Analogue / Digital)	
Supported sensor types	NTC 5K (Beta value 3980 @ 25/100 °C) NTC 10K (Beta value 3980 @25/100 °C) PTC 990 ohms @ 25 °C	
Measuring accurancy	±1 K below -35 °C ±0.5 K between -35 – +25 °C ±1 K above +25 °C	
Measurement range	NTC 5K: -40 – +80 °C NTC 10K: -40 – +80 °C PTC 990: -55 – +100 °C	
Output configuration	DO1: Compressor DO2: Def. Heater/Fan/Light/Second comp/Alarm	DO1: Compressor DO2 and DO3: Def. Heater/Fan/Light/Second comp/Alarm
Input connector type	Plug & Header type	
Output connector type	Tab connector	
Communication	TTL (MODBUS)	
Operating temperature range	-25 – +55 °C	
Humidity range	93% RH, Condensing	
Installation	Spindle mounted Cold Space Installability	
Relay switching	Zero cross technology (all relays)	
Overvoltage category	Ill: 100 – 240 V (CE, UL recognized)	
Surge Protection	4 KV	

Parameters

EETc 11, 12, 21 and 22

Assignment

Table 4: Assignment

Parameter name	Code	Default value	Min.	Max.	Description
Assignment	**ASi**				
Sensor Type		NTC10K	NTC5K	NTC10K	Sensor type (all sensors must be of same type) NTC5K – NTC 5000 Ohm at 25 °C (Beta value=3980 @ 25/100 °C) NTC10K – NTC 10000 Ohm at 25 °C (Beta Value 3980 @ 25/100 °C)
S2 Configuration	S2C	EuA	nC	dES	Desired configuration for S2 port nC - Not used/configured Con - Condenser Sensor EuA - Defrost/evaporator Sensor doC - Door Sensor (Normally closed type) doo - Door Sensor (Normally open type) ESP - Eco Switch - Push button type ESt - ECO Switch - Toggle type dES - Defrost switch - Push Button type only
Relay 2 Configuration *(applicable only for EETc 2x series)*	o2C	dEF	nC	Fan	Desired configuration for relay 2 nC - Not Connected dEF - Configured for defrost heater or defrost valve Fan - Configured for evaporator fan

Thermostat

Table 5: Thermostat

Parameter name	Code	Default value	Min.	Max.	Description
Thermostat	**THE**				
Lowest Temperature Limit (°C)	LSE	0	-100	120	Cut-out temperature at coldest position of the spindle (thermostat knob)
Highest Temperature Limit (°C)	HSE	10	-100	120	Cut-out temperature at warmest position of the spindle (thermostat knob)
Lowest Temperature Differential (K)	Ldi	2	1	50	The difference between the cut-out and the cut-in at coldest position of the thermostat.
Highest Temperature Differential (K)	Hdi	2	1	50	The difference between the cut-out and the cut-in at warmest position of the thermostat.
Initial pull down ON/OFF	IPE	OFF	OFF	ON	Initial Pull down OFF - Disable ON - Enable Initial Pull Down (IPD) provides faster cooling when the cabinet is powered up with warmer inside temperature. During IPD, defrost will be skipped until the cabinet air temperature reaches the cut-out temperature or the IPD duration expires. IPD operates only during power-up and can be enabled/disabled using this parameter.
Initial Pull down duration (Hrs)	IPD	0	0	120	Maximum time initial pull down can run. Initial pull down will terminate as soon as this time expires regardless of the cabinet air temperature
Initial pull down initiate temperature (°C)	Pit	50	-50	120	It indicates the temperature at which initial pull down will be initiated. • At Power-up: If the cabinet air temp. > Pit for more than 5 minutes, this will trigger the Initial pull down.

Compressor

Table 6: Compressor

Parameter name	Code	Default value	Min.	Max.	Description
Compressor	**COP**				
Min Run time (Sec.)	Crt	0	0	1800	To prevent the compressor from frequent cut-outs, it ensures that the compressor runs for at least the specified time. It overrides the cut-out temperature. (Tip: Setting it too high could lead to unneccessary deep temperatures)
Min Stop time (Sec.)	CSt	120	0	1800	To prevent the compressor from frequent cut-ins, the parameter ensures that the compressor remains off for at least the specified time under this parameter. It overrides the cut-in temperatures. (Tip: Setting it too high could lead to unneccessary warm temperatures)

Parameter name	Code	Default value	Min.	Max.	Description
Compressor stop delay on door open (Sec.)	Cdd	0	0	999	It sets the delay in stopping the compressor when the door is opened. If set to "0", the compressor stops immediately. If set to 999 it will disable the function and does-not stop the compressor
System Resume after door open (Mins)	Srt	0	0	60	If the door is kept open for a long time, the compressor and fan will resume after this time if they are switched off due to open door. (Note : 'Srt' must be always great-er than' Cdd' and 'Fdt') If Srt=0, the system resume feature is disabled and the sys-tem will resume only when the door is closed.
Power On Delay (Sec.)	Pod	120	0	300	This is the delay in seconds between power-on and the output relays being activa-ted.

Alarm

Table 7: Alarm

Parameter name	Code	Default value	Min.	Max.	Description
Alarm	**ALA**				
Low temp alarm limit (°C)	LAt	-5	-100	120	If the cabinet air temperature goes below this value, a low temperature alarm will be raised (all these alarm statuses can be viewed only in KoolProg)
High temp alarm limit (°C)	HAt	15	-100	120	If the cabinet air temperature goes above this value, a low temperature alarm will be raised
Low temp alarm delay (Mins)	Ltd	0	0	240	Time delay to raise alarm once low temperature alarm limit is reached
High temp alarm delay (Mins)	Htd	30	0	240	Time delay to raise alarm once high temperature alarm limit is reached
Alarm Door open delay (Mins)	dod	2	0	60	Time delay to raise alarm if the door is kept open. If the door is closed before the delay time, no alarm will be raised
Alarm delay during Pull Down/ Power up /defrost (Mins)	Pdd	60	0	960	Time delay to raise high temperature alarm during pull down, power-up and defrost in order to avoid wrong alarm signal during these conditions.

Defrost

Table 8: Defrost

Parameter name	Code	Default value	Min.	Max.	Description
Defrost	**dEF**				
Defrost type	dFt	nAt	no	Hgd	**EETc 11, 12** It defines the required type of defrost: "no" : defrost function is disabled "nAt" : natural defrost (OFF-cycle defrost) **EETc 21, 22** It defines the required type of defrost: "no" : defrost function is disabled "nAt" : natural defrost (OFF-cycle defrost) "EL" : electrical defrost "Hgd" : hot gas defrost
Minimum defrost Interval (Mins)	dii	360	1	4320	Defines the minimum time period between the start of two defrost cycles. If the evaporator temperature goes below the defrost start temperature (dEt), the control-ler triggers the defrost after this period. It not, it triggers the defrost at the Maxi-mum defrost interval (dAi)
Maximum defrost Interval (Mins)	dAi	420	1	4320	Maximum time period between the start of two defrost cycles.
Minimum defrost time (Mins)	dit	5	0	240	Defines the minimum duration of a defrost cycle. During this period, the controller will not check the temperature. Once the minimum time has expired, the tempera-ture will be checked and if the terminate temperature "dtt" has been reached, the defrost cycle will end. If "dtt" has not been reached, defrost will continue until the maximum defrost time "dAt" is reached
Maximum defrost Time (Mins)	dAt	30	0	480	Maximum duration of a defrost cycle. The controller will terminate the defrost after this time, even if the evaporator sensor is configured and the evaporator tempera-ture is less than terminate temperature (dtt).
Defrost Terminate Temp (°C)	dtt	6	0	50	It defines the evaporator temperature at which defrost must be terminated. The controller will terminate the defrost based on the defrost terminate temperature (dtt) or the Maximum defrost time (dAt). If no evaporator sensor is used, defrost will be terminated based on the maximum defrost time (dAt)
Defrost On accumulated Compres-sor Run Time	dCt	No	No	Yes	If it is set to "Yes", the defrost interval is calculated based on the total time the com-pressor has been running. If it is set to "No", then defrost interval is based on the elapsed time, regardless of compressor ON time.
Defrost Start by Evaporator Temp (°C)	dEt	-100	-100	0	Evaporator Temperature at which the defrost will be triggered after a minimum de-frost interval to avoid excess frost on the evaporator (only active if the evaporator sensor is configured)
Drip Off time (Mins)	dot	2	0	60	Defines the time delay to start the compressor after terminating defrost. This feature is to ensure no water droplet on the evaporator before starting the cooling cycle

Parameter name	Code	Default value	Min.	Max.	Description
Fan Delay After Defrost (Sec.) *(applicable only for EETc 2x series)*	Fdd	0	0	960	Defines delay in switching "ON" the fan from compressor start after defrost to avoid warm air circulation
Fan Start Temperature after defrost (°C) *(applicable only for EETc 2x series)*	Ftd	25	-25	25	It determines at what evaporator temperature the fan will start after a defrost cycle. If the time set in "Fdd" occurs before the temperature set in "Ftd", the fan will start in line with "Fdd". If the temperature set in "Ftd" occurs first, then the fan will start in line with "Ftd"
Fan ON during Defrost *(applicable only for EETc 2x series)*	dFa	no	no	Yes	Defines the status of the fan during defrost. Set to "Yes", the fan will run during defrost cycles and set to "No", the fan will be kept off during defrost cycles
Initial Defrost Interval (Mins)	idi	180	0	4320	The initial defrost interval determines the time for first defrost after power-up. The initial defrost is mainly intended for factory testing of the defrost functionality and can be set to expire after a number compressor cycles according to the setting of parameter idd.
Initial defrost duration (Cycles)	idd	0	0	999	The initial defrost duration is the number of compressor cycles after which initial defrost is deactivated. "0" : No initial defrost "1-998" : number of compressor cycles before deactivation "999" : initial defrost always active.

Fan

Table 9: Fan (applicable only for EETc 2x series)

Parameter name	Code	Default value	Min.	Max.	Description
Fan *(applicable only for EETc 2x series)*	**Fan**				
Fan Control Method	FCt	FAo	FAo	FPL	Defines the fan control method: "FAo" : fan always on "FFc" : fan follows compressor (fan runs only when compressor is ON) "FPL" : fan cycling (fan cycling during compressor off cycle)
Fan ON Delay (Sec.)	Fod	0	0	240	Time delay to start the fan after compressor cut-in
Fan Stop Delay (Sec.)	FSd	0	0	240	Time delay to stop the fan after compressor cut-out
Fan On Cycle (Sec.)	FoC	0	0	960	If fan control method is selected as "FPL", it defines the fan ON time during compressor OFF cycle.
Fan Stop Cycle (Sec.)	FSc	0	0	960	If fan control method is selected as "FPL", it defines the fan OFF time during compressor OFF cycle.
Fan stop delay on door open (Sec.)	Fdt	0	0	999	The delay to stop the fan after the door has been opened: "0" : fan stop immediately when door opens "1-998" : delay for fan stop after door opens "999" : fan keep running all the time, fan does not stop while door is opened
Fan Minimum Stop Time (Sec.)	FSt	10	0	960	Minimum time that the fan must stop whenever it is switched off.
Fan Limit Temperature (°C)	FLt	50	0	50	This function prevents the evaporator fan from operating if the evaporator temperature is above the fan limit temperature. If the defrost sensor registers a higher temperature than the one set here, the fan will be stopped to avoid the warm air circulation in the cabinet. The fan will restart when the evaporator temperature goes 2 °C less than FLt (FLt - 2 °C). It is active only when the evaporator sensor is configured.

ECO Management

Table 10: ECO Management

Parameter name	Code	Default value	Min.	Max.	Description
ECO Management	**ECO**				
ECO Mode enable	ECO	No	No	Yes	ECO mode is active or not. If "No" is selected all other settings related to ECO mode are not active.
ECO Offset (K)	Eto	4	-25	25	Defines offset temperature during ECO mode. Offset can be positive or negative. ECO setpoint = setpoint + Eto
ECO Door Delay (Mins)	Edd	180	0	360	Controller will enter ECO mode, if the door are not opened for a time longer than Edd.

System protection

Table 11: System protection

Parameter name	Code	Default value	Min.	Max.	Description
System Protection	**SyP**				
Voltage Protection function	uPt	No	No	Yes	This feature protects the compressor if the line voltage goes beyond the operating range.
Minimum Cut-in Voltage 110 V (230 V)	uLi	100	70	230	The lowest voltage at which the compressor is allowed to cut in.
Minimum Cut out Voltage 110 V (230 V)	uL0	95	70	225	If the voltage goes below this value when the compressor is running, the compressor will be switched off. It is meant to avoid sudden switching on and off of compressor due to voltage fluctuations. This cut-off voltage will override compressor minimum run time.
Maximum cut out Voltage 110V (230V)	uHi	260	110	270	When the compressor is running, it will be switched OFF if the voltage exceeds this value. If the compressor is already stopped, it will remain switched off.
Condenser Alarm Limit (°C)	CAL	80	0	120	It sets the condenser temperature at which an alarm will be generated
Condenser Block Limit (°C)	CbL	85	0	120	It sets the compressor switched off due to high condenser temperature.
Condenser OK Limit (°C)	CoL	60	0	120	It sets the compressor to switch on again after it has been switched off due to high condenser temperature, respecting minimum compressor stop time.
Control sensor error handling type	EHd	Aut	no	Aut	Method to control the cooling cycle in case of cabinet air sensor error: "no" : no sensor error handling "SEt" : follow configured error run and stop time. "Aut" : control automatically based on past cycles time.
Error Run Time (Mins)	Ert	0	0	60	Cooling cycle ON time in case of cabinet sensor error (active only if EHd=Set)
Error Stop Time (Mins)	Est	0	0	60	Cooling cycle OFF time in case of cabinet sensor error (active only if EHd=Set)
Zero Cross Config	ZC	Yes	No	Yes	It enhances the relay life and avoids relay sparks during relay ON and OFF. If "Yes" is selected, the relays will be switched ON and OFF when the line-voltage is closeer to zero.

Test Mode

Table 12: Test Mode

Parameter name	Code	Default value	Min.	Max.	Description
Test Mode	**tst**				
Operating mode	tSt	Normal	Manual	Normal	Normal mode - Normal operation mode of the controller Manual mode- In this mode, output relays can be switched ON and OFF irrespective of temperature conditions.

Service

Table 13: Service

Parameter name	Code	Default value	Min.	Max.	Description
Service	**Ser**				
Parameter Version	Par	0	0	65535	OEM/Customer can use it to assign Parameter version
Software Version	Fir		0	65535	Software /Firmware version of the controller
Code number	onL		0	65535	Last four digits of the FG code number of the controller
OEM low	oEL		0	65535	OEM/customer can use it to assign their code number for their various applications
OEM High	oEH		0	65535	OEM/customer can use it to assign their code number for their various applications
Thermostat cut in temperature (°C)	CTi		-100	200	Thermostat cut-in temperature at current spindle position
Themostat cut out temperature (°C)	CTO		-100	200	Thermostat cut-out temperature at current spindle position
Cabinet Air Temperature (°C)	Cab		-100	200	Cabinet Air temperature
Evaporator Temperature (°C)	Eva		-100	200	Evaporator Temp
Condenser Temperature (°C)	Con		-100	200	Condenser Temp
Door Status	Dor		Open	Not configured	Status of the door switch Close: door is closed Open: door is open Not Configured: door switch is not configured
Di Switch Status	Di1		Open	Not configured	Status of Digital input: Open: deactivated Close: activated Not Configured: Di switch not configured
Spindle position (%)	uSp		0	100	Current position of the spindle Warm - 0% Cold -100%

Parameter name	Code	Default value	Min.	Max.	Description
Compressor Relay Status	CPS		OFF	ON	Status of relay configured for compressor
Fan Relay Status *(applicable only for EETc 2x series)*	FFS		OFF	ON	Status of relay configured for fan
Defrost Relay status *(applicable only for EETc 2x series)*	dfs		OFF	ON	Status of relay configured for defrost heater/defrost bypass valve
Thermostat status	thS		1	7	Thermostat Operating status: 1 - Initial state 2 - Serving 3 - Eco Mode 4 - Initial Pull Down (IPD) 6 - Emergency Mode 7 - Main Switch Off
Defrost status (stages)	dES		1	4	Stages during defrost: 1 - Idle 2 - Ice off 3 - Drip off 4 - Cooling Preperation
Defrost interval counter - Comp. run time	InC		0	32767	Defrost interval counter based on accumulated compressor runtime
Defrost Interval counter - Elapsed time	Int		0	32767	Defrost interval counter based on elapsed time
Main Voltage	uAC		1	300	Supply voltage

EETa 2W and EETa 3W

Assignment

Table 14: Assignment

Parameter name	Code	Default value	Min.	Max.	Description
Assignment	**ASi**				
Sensor Type	SEn	NTC10K	NTC5K	PTC	Sensor type (all sensors must be of same type): NTC5K - NTC 5000 Ohm at 25 °C (Beta value=3980 @ 25/100 °C) NTC10K - NTC 10000 Ohm at 25 °C (Beta Value 3980 @ 25/100 °C) PTC - PTC 990
S2 Configuration	S2C	EuA	nC	dES	Desired configuration for S2 port: nC - Not used/configured Con - Condenser sensor EuA - Defrost/evaporator sensor doC - Door sensor (Normally closed type) doo - Door sensor (Normally open type) ESP - Eco switch - Push button type ESt - Eco switch - Toggle type Pud - Pull down switch - Push button type only dES - Defrost switch - Push button type only
S3 Configuration	S3C	nC	nC	dES	Desired configuration for S3 port: nC - Not used/configured Con - Condenser sensor EuA - Defrost/evaporator sensor doC - Door sensor (Normally closed type) doo - Door sensor (Normally open type) ESP - Eco switch - Push button type ESt - Eco switch - Toggle type Pud - Pull down switch - Push button type only dES - Defrost switch - Push button type only
Relay 2 Config	o2C	dEF	nC	Scc	Desired configuration for relay 2: nC - Not Connected dEF - Configured for defrost heater or defrost valve FAn - Configured for evaporator fan Llg - Configured for Cabinet Light ALA - Configured for External Alarm Scc - Second compressor
Relay 3 Config (nC) *(applicable only for EETa 3W)*	o3C	Fan	nC	Scc	Desired configuration for relay 3: nC - Not Connected dEF - Configured for defrost heater or defrost valve FAn - Configured for evaporator fan Llg - Configured for Cabinet Light ALA - Configured for External Alarm Scc - Second compressor

Thermostat

Table 15: Thermostat

Parameter name	Code	Default value	Min.	Max.	Description
Thermostat	**THE**				
Lowest Temperature Limit (°C)	LSE	0	-100	120	Cut-out temperature at coldest position of the spindle (thermostat kNob)
Highest Temperature Limit (°C)	HSE	10	-100	120	Cut-out temperature at warmest position of the spindle (thermostat kNob)
Lowest Temperature Differential (K)	Ldi	2	1	50	It the difference between the cut-out and the cut-in at coldest position of thermostat
Highest Temperature Differential (K)	Hdi	2	1	50	It the difference between the cut-out and the cut-in at warmest position of thermostat
Initial pull down ON/OFF	IPE	OFF	OFF	ON	Initial Pull Down: OFF - Disable ON - Enable Initial Pull Down (IPD) can be used for providing faster cooling when the cabinet is powered up with warmer inside temperature. During IPD, defrost will be skipped until the cabinet air temperature reaches cut-out temperature or the IPD duration expires. IPD operates only during power-up and can be enabled/disabled using it.
Initial pull down and pull down duration (Hrs)	IPD	0	0	120	Maximum time IPD and Pull Down can run. IPD and Pull Down will terminate as soon as this time expires, regardless of the cabinet air temperature.
Initial pull down and pull down initiate temperature (°C)	Pit	50	-50	120	It indicates the temperature at which IPD or Pull Down will be initiated: • At Power up: If the cabinet air temp. > Pit for more than 5 minutes it will trigger the Initial Pull Down • During Normal operation: if the cabinet air temp stays above Pit>1hr it will trigger the Pull Down
Pull Down Offset temperature (°C)	PLt	0	0	20	This parameter sets the cut out temperature offset during Pull-down cycle to achieve more cooling. When set as "0" pull down feature is disabled.

Compressor

Table 16: Compressor

Parameter name	Code	Default value	Min.	Max.	Description
Compressor	**COP**				
Min Run time (Sec.)	Crt	0	0	1800	To prevent the compressor from frequent cut-outs, it ensures that the compressor runs for at least the specified time. It overrides the cut-out temperature. (Tip: setting it too high could lead to unneccessary deep temperatures)
Min Stop time (Sec.)	CSt	120	0	1800	To prevent the compressor from frequent cut-ins, it ensures that the compressor remains off for at least the specified time under this parameter. It overrides the cut-in temperatures. (Tip: setting it too high could lead to unneccessary warm temperatures)
Compressor stop delay on door open (Sec.)	Cdd	0	0	999	It sets the delay in stopping the compressor when the door is opened. If set to "0", the compressor stops immediately. If set to "999", the function will be disabled and the compressor will not be stopped
System Resume after door open (Mins)	Srt	0	0	60	If the door is kept open for a long time, the compressor and the fan will resume after this time, if they switched off due to an open door. (Note: 'Srt' must be always greater than' Cdd' and 'Fdt'). If Srt=0, the system resume feature is disabled and the system will resume only when the door is closed.
Second Compressor start delay (Sec.)	Scd	15	0	960	Delay time for starting the second compressor in dual compressor control
Power On Delay (Sec.)	Pod	120	0	300	This is the delay in seconds between power-on and the output relays being activated

Alarm

Table 17: Alarm

Parameter name	Code	Default value	Min.	Max.	Description
Alarm	**ALA**				
Low temp Alarm limit (°C)	LAt	-5	-100	120	If the cabinet air temperature goes below this value, a low temperature alarm will be raised (all these alarm statuses can be viewed only in KoolProg)
High temp Alarm limit (°C)	HAt	15	-100	120	If the cabinet air temperature goes above this value, a low temperature alarm will be raised
Low temp Alarm delay (Mins)	Ltd	0	0	240	Time delay to raise alarm once the low temperature alarm limit is reached
High temp Alarm delay (Mins)	Htd	30	0	240	Time delay to raise alarm once the high temperature alarm limit is reached

Parameter name	Code	Default value	Min.	Max.	Description
Alarm Door open delay (Mins)	dod	2	0	60	Time delay to raise alarm if the door is kept open. If the door is closed before the delay time, no alarm will be raised
Alarm delay during Pull Down/ Power up /defrost (Mins)	Pdd	60	0	960	Time delay to raise high temperature alarm during Pull Down, power-up and defrost in order to avoid wrong alarm signal during these conditions
Leakage Alarm Compressor Run Time (Hrs)	LEA	0	0	96	If the compressor operates continuously for more than the time configured in this parameter a leakage alarm will be triggered. Generally this value must be set higher than the Pull down duration "Pdd". "0": disable

Defrost

Table 18: Defrost

Parameter name	Code	Default value	Min.	Max.	Description
Defrost	**dEF**				
Defrost type	dFt	nAt	no	Hgd	It defines the required type of defrost: "no" : defrost function is disabled "nAt" : Natural defrost (OFF-cycle defrost) "EL" : electrical defrost "Hgd" : hot gas defrost
Minimum defrost Interval (Mins)	dii	360	1	4320	Defines the minimum time period between the start of two defrost cycles. If the evaporator temperature goes below the defrost start temperature (dEt), the controller triggers the defrost after this period. If not, the defrost will be triggered at Maximum defrost interval (dAi)
Maximum defrost Interval (Mins)	dAi	420	1	4320	Maximum time period between the start of two defrost cycles
Minimum defrost time (Mins)	dit	5	0	240	Defines the minimum duration of a defrost cycle. During this period, the controller will not check the temperature. Once the minimum time has expired, the temperature will be checked and if the terminate temperature "dtt" has been reached, the defrost cycle will end. If "dtt" has not been reached, defrost will continue until maximum defrost time "dAt" is reached.
Maximum defrost Time (Mins)	dAt	30	0	480	Maximum duration of a defrost cycle. The controller will terminate the defrost after this time, even if the evaporator sensor is configured and the evaporator temperature is less than the defrost terminate temperature (dtt)
Defrost Terminate Temp (°C)	dtt	6	0	50	It defines the evaporator temperature at which defrost must be terminated. The controller will terminate the defrost based on the defrost terminate temperature (dtt) or Maximum defrost time (dAt). If no evaporator sensor is used, defrost will be terminated based on the maximum defrost time (dAt)
Defrost on accumulated Compressor Run Time	dCt	No	No	Yes	If it is set to "Yes", the defrost interval is calculated based on the total time the compressor has been running. If it is set to "No", then defrost interval is based on the elapsed time, regardless of the compressor ON time
Defrost Start by Evaporator Temp (°C)	dEt	-100	-100	0	Evaporator temperature at which the defrost will be triggered after a minimum defrost interval in order to avoid excess frost on the evaporator (active only if the evaporator sensor is configured)
Drip Off time (Mins)	dot	2	0	60	Defines the time delay before starting the compressor after terminating defrost. This feature is to ensure no water droplet on the evaporator before starting the cooling cycle
Fan Delay After Defrost (Sec.)	Fdd	0	0	960	Defines the delay before switching on the fan from compressor start after defrost to avoid warm air circulation
Fan Start Temperature after defrost (°C)	Ftd	25	-25	25	It determines at what evaporator temperature the fan will start after a defrost cycle. If the time set in "Fdd" occurs before the temperature set in "Ftd", the fan will start in line with "Fdd". If the temperature set in "Ftd" occurs first, then the fan will start in line with "Ftd"
Fan ON during Defrost	dFa	No	No	Yes	Defines the status of the fan during defrost. Set to "Yes", the fan will run during defrost cycles and set to "No", the fan will be kept off during defrost cycles
Initial Defrost Interval (Mins)	idi	180	0	4320	The initial defrost interval determines the time for first defrost after power-up. The initial defrost is mainly intended for factory testing of the defrost functionality and can be set to expire after a number of compressor cycles according to the setting of parameter idd
Initial Defrost duration (Cycles)	idd	0	0	999	The initial defrost duration is the number of compressor cycles after which initial defrost is deactivated: "0" : no initial defrost "1-998" : number of compressor cycles before deactivation "999" : initial defrost always active

Fan

Table 19: Fan

Parameter name	Code	Default value	Min.	Max.	Description
Fan	**Fan**				
Fan Control Method	FCt	FAo	FAo	FPL	Defines the Fan Control Method: "FAo" : fan always on "FFc" : fan follows compressor (fan runs only when compressor is "ON") "FPL" : Fan Cycling (fan cycling during compressor off cycle)
Fan ON Delay (Sec.)	Fod	0	0	240	Time delay to start the fan after compressor cut-in
Fan Stop Delay (Sec.)	FSd	0	0	240	Time delay to stop the fan after compressor cut-out
Fan On Cycle (Sec.)	Foc	0	0	960	If Fan Control Method is selected as "FPL", it defines the fan "ON" time during compressor OFF cycle
Fan Stop Cycle (Sec.)	FSc	0	0	960	If Fan Control Method is selected as "FPL", it defines the fan "OFF" time during compressor OFF cycle
Fan stop delay on door open (Sec.)	Fdt	0	0	999	The delay to stop the fan after the door has been opened: "0" : fan stops immediately when the door opens "1-998" : delay for fan stop after the door opens "999" : fan keeps running all the time, fan does not stop while door is opened
Fan Minimum Stop Time (Sec.)	FSt	10	0	960	Minimum time that the fan must stop whenever it is switched off
Fan Limit Temperature (°C)	FLt	50	0	50	This function prevents the evaporator fan from operating if the evaporator temperature is above the fan limit temperature. If the defrost sensor registers a higher temperature than the one set here, the fan will be stopped to avoid the warm air circulation in the cabinet. The fan will restart when the evaporator temperature goes 2 °C less than FLt (FLt - 2 °C). It is active only when the evaporator sensor is configured

Light

Table 20: Light

Parameter name	Code	Default value	Min.	Max.	Description
Light	**Lig**				
Cabinet Light Control (Normal mode)	CLC	ON	ON	dor	ON : always "ON" (this button is default to control light for all these options) OFF : always "OFF" dor : door sensor only
Cabinet Light Control (ECO mode)	ELC	OFF	ON	dor	ON : always "ON" (this button is default to control light for all these options) OFF : always "OFF" dor : door sensor only
Light OFF delay (Sec.)	Lod	0	0	300	Delay to turn off the cabinet light after closing of the door

ECO Strategy

Table 21: ECO Strategy

Parameter name	Code	Default value	Min.	Max.	Description
ECO Strategy	**ECO**				
ECO Mode Enable	Eco	No	No	Yes	ECO mode is active or not. If "NO" is selected, all other settings related to ECO mode are not active
ECO Offset (K)	Eto	4	-25	25	Defines the offset temperature during ECO mode. Offset can be positive or negative. ECO set point = set point + Eto
ECO Door Delay (Mins)	Edd	180	0	360	Controller will enter ECO mode, if the door are not opened for a time longer than Edd.
Holiday Mode	HLY	No	No	Yes	Holiday mode is active or not. If "NO" is selected, all other settings related to holiday mode are not active
Holiday Length (Hrs)	HoL	72	0	999	Criteria for entering Holiday Mode based on the number of hours of no activity in ECO mode. If the controller does not detect any door opening after entering ECO mode for these many hours, it will trigger the Holiday Mode and set the temperature as per Holiday offset
Holiday Temperature offset (K)	Hto	6	-25	25	Defines the offset temperature during Holiday Mode. Offset can be positive or negative

Automatic Heater Control

Table 22: Automatic Heater Control

Parameter name	Code	Default value	Min.	Max.	Description
Automatic Heater Control	**AHC**				
Automatic Heater Control Mode	AuH	No	No	Yes	Automatic Heater Control / dual mode protects food items stored in cabinets installed outdoors from freezing during winter. Automatic Heater Control uses the defrost heater to increase the cabinet temperature when it goes below the cut-out temperature during Cooling mode. No: this feature is disabled Yes: this feature is active
Heater low set point (°C)	CHI	-100	-100	120	Heater cut-out temperature at coldest position of the spindle (thermostat knob) auto heating.
Heater high set point (°C)	WHI	-100	-100	120	Heater cut-out temperature at warmest position of the spindle (thermostat knob) auto heating.
Heater low differential (K)	CDH	2	1	50	It the difference between the heater cut-out and cut-in at the coldest position of thermostat for auto heating.
Heater high differential (K)	WDH	2	1	50	It the difference between the heater cut-out and cut-in at the warmest position of thermostat for auto heating.
Energy mode delay (Mins)	End	60	0	360	This is the delay in minutes between the heater and the compressor operation. The heater is not allowed to start until the number of minutes has expired after the compressor has cut out and vice versa.

System protection

Table 23: System protection

Parameter name	Code	Default value	Min.	Max.	Description
System Protection	**SyP**				
Voltage Protection function	uPt	No	No	Yes	This feature protects the compressor if the line voltage goes beyond the operating range
Minimum Cut-in Voltage	uLi	100	70	230	The lowest voltage at which the compressor is allowed to cut-in
Minimum Cut out Voltage	uL0	90	70	225	If the voltage goes below this value when the compressor is running, the compressor will be switched off. It is to avoid sudden switching on and off of the compressor due to voltage fluctuations. This cut-off voltage will override the compressor minimum run time
Maximum cut out Voltage	uHi	260	110	270	When the compressor is running, it will be switched off if the voltage exceeds this value, if the compressor is already stopped, it will remain switched off
Condenser Alarm Limit (°C)	CAL	80	0	120	It sets the condenser temperature at which an alarm will be generated
Condenser Block Limit (°C)	CbL	85	0	120	It sets the compressor switched off due to high condenser temperature
Condenser OK Limit (°C)	CoL	60	0	120	It sets the compressor to switch on again after having been switched off due to high condenser temperature, respecting the minimum compressor stop time
Control sensor error handling type	EHd	Aut	no	Aut	Method to control the cooling cycle in case of cabinet air sensor error: "No" : no sensor error handling "SEt" : follow configured error run and stop time "Aut" : control automatically based on past cycles time
Error Run Time (Mins)	Ert	0	0	60	Cooling cycle ON time in case of cabinet sensor error (active only if EHd=SEt)
Error Stop Time (Mins)	Est	0	0	60	Cooling cycle OFF time in case of cabinet sensor error (active only if EHd=SEt)
Zero Cross Config	ZC	Yes	No	Yes	It enhances the relay life and avoids relay sparks during relay ON and OFF. If "Yes" is selected, relays will be switched ON and OFF when the line voltage is closer to zero

Test Mode

Table 24: Test Mode

Parameter name	Code	Default value	Min.	Max.	Description
Test Mode	**tst**				
Operating mode	tSt	Normal	Manual	Selt test	Normal mode: normal operation mode of the controller Manual mode: in this mode, output relays can be switched ON and OFF irrespective of temperature conditions Self test: self diagnostic test mode, where the controller will run self-diagnostic test to check the connected sensors and refrigeration components configured to the output relays. When this option is selected, the controller will run the test by switching on and off the relay in a certain sequence
Relay 1		OFF	OFF	ON	
Relay 2		OFF	OFF	ON	
Relay 3 *(applicable only for EETa 3W)*		OFF	OFF	ON	

Service

Table 25: Service

Parameter name	Code	Default value	Min.	Max.	Description
Service	**Ser**				
Parameter Version	Par	0	0	65535	The OEM/customer can use it to assign Parameter Version
Software Version	Fir		0	65535	Controller Software Version
Code number	onL		0	65535	Danfoss controller code number
OEM code low	oEL	0	0	65535	The OEM/customer can use it to assign their code number for their various applications
OEM code High	oEH	0	0	65535	The OEM/customer can use it to assign their code number for their various applications
Thermostat cut in temperature (°C)	CTi		-100	200	Thermostat cut-in temperature at current spindle position
Themostat cut out temperature (°C)	CTO		-100	200	Thermostat cut-out temperature at current spindle position
Cabinet Air temperature (°C)	att		-100	200	Temperature of Cabinet Air sensor
Evaporator 1 temperature (°C)	Et1		-100	200	Temperature of Evaporator 1 sensor
Evaporator 2 temperature (°C)	Et2		-100	200	Temperature of Evaporator 2 Sensor
Condenser temperature (°C)	Ct1		-100	200	Temperature of condenser sensor
Door Status on S2	dr1		Close	Not Configured	Status of the door switch configured on S2 Port: Close: Door is closed Open: Door is open Not Configured: Door switch is not configured to this port
Door Status on S3	dr2		Close	Not Configured	Status of the door switch configured on S3 Port: Close: Door is closed Open: Door is open Not Configured: Door switch is not configured to this port
Di Switch Status on S2	Di1		Open	Not Configured	Status of the digital input configured on S2 Port: Open: Deactivated Close: Activated Not Configured: Di switch is not configured to this port
Di Switch Status on S3	Di2		Open	Not Configured	Status of the digital input configured on S3 Port: Open: Deactivated Close: Activated Not Configured: Di switch is not configured to this port
Spindle position (%)	uSp		0	100	Current position of the spindle: Warm- 0% Cold-100%
Relay 1 Status	R1S		OFF	ON	It displays the status of Relay 1 (ON / OFF)
Relay 2 Status	R2S		OFF	ON	It displays the status of Relay 2 (ON / OFF)
Relay 3 Status *(applicable only for EETa 3W)*	R3S		OFF	ON	It displays the status of Relay 3 (ON / OFF)

Parameter name	Code	Default value	Min.	Max.	Description
Thermostat status	thS		1	10	Controller operating status: 1: Initial state 2: Serving 3: Eco Mode 4: Initial Pull down (IPD) 5: Pull down /Super cool Mode 6: Emergency Mode 7: Main Switch Off 8: Holiday mode 9: Automatic Heater Control mode 10: Energy mode delay
Defrost status (stages)	dES		1	4	1: Idle 2: Ice off 3: Drip off 4: Cooling Preperation
Defrost interval counter - Comp. run time (Mins)	InC		0	32767	Defrost interval counter based on accumulated compressor runtime
Defrost Interval counter - Elapsed time (Mins)	Int		0	32767	Defrost interval counter based on elapsed time
Main Voltage	uAC		1	300	Main power supply voltage

Troubleshooting and Alarms

Troubleshooting

Table 26: Troubleshooting

| Problem	Probable cause	Remedy
Compressor does not start	Spindle is in "OFF" position Waiting for power on delay Cabinet air temperature is less than compressor cut-in temp. Defrost is in progress Line voltage is too low or too high High condenser temperature	Change spindle position by rotating clockwise. Check and wait untill "Pod" expiries. Check cabinet air sensor temp. "att" Check and wait untill dAt and dot expires. Check line voltages are within low and high voltage limits specified under uLi, uLo and uHo. Check for condenser sensor temp 'ct1' and configured condenser block limit 'cbL'.
Fan does not start	Door is open or door contact is defective	Check "Fdt" and door status. Check that door contact is ok
	Fan stopped due to high evaporator temp.	Check evaporator sensor temp. "Et1/Et2" and FLt.
	Fan start delay and temp. after defrost	Check for 'Fdd' and "Ftd" parameters' configuration
Defrost does not start	Controller in Initial Pull Down or Pull-down mode	Defrost is skipped during pull-down. Check the thermostat status and configured pull-down duration.
Alarm does not sound	Alarm delay	Check alarm delay for temperature 'Ltd /Htd' and door 'dod'
Does not maintain correct cabinet temperature	Cabinet air sensor fault	Check the S1 sensor and sensor alarm status
	Potentiometer fault	Check the controller potentimeter function
Frost is not fully melted during defrost	Evaporator sensor position not proper Too long defrost intervals Configured defrost time is too short	Check the position and fitting of the evaporator sensor Check for configured dii, dAi, dit and dAt values

Alarms

Alarms (advanced version only) Indication

The EET controller indicates the fault or failure in the refrigeration system via an LED flashing pattern, sending a message via MODBUS to KoolProg or any other tools. Below the LED blinking pattern for various alarms are stated:

Table 27: Alarms

No.	Fault	No. of flashes (Block 1)	No. of flashes (Block 2)
1	Low and High temperature alarm	1	1
2	Line Voltage Alarm	1	2
3	Condenser alarm	1	3
4	Sensor error	2	1
5	Potentiometer error	2	2
6	Leakage alarm	3	1

Figure 25: Indication of Line Voltage Alarm

ℹ **NOTE:**
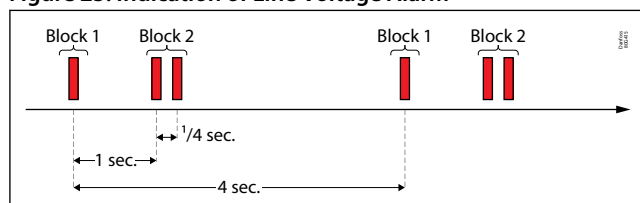
1. LED blinking every one second indicates power ON status and **no alarm** conditions.
2. Alarms to be interpreted as per block1 and block 2 blinking pattern as given in the table. After block 1 and Block 2 blinking there is about 2.5 seconds gap.
3. If there are multiple alarms, LED blinking pattern shows the alarm raised first, next active alarm will be displayed only when the first raised alarm is fixed.

Ordering

Table 28: EET series

Type	I-Pack	
	Qty.	Code no.
EETc 12 - EET Compact, 1 relay, 230 V, 50/60 Hz	150	080N0010
EETc 22 - EET Compact, 2 relay, 230 V, 50/60 Hz	150	080N0011
EETc 11 - EET Compact, 1 relay, 120 V, 50/60 Hz	150	080N0012
EETc 21 - EET Compact, 2 relay, 120 V, 50/60 Hz	150	080N0013
EETa 2W - EET Advanced, 2 relays, wide voltage (120 – 230 V), 50/60 Hz	150	080N0014
EETa 3W - EET Advanced, 3 relays, wide voltage (120 – 230 V), 50/60 Hz	150	080N0015

Table 29: Temperature sensors

Type	I-Pack	
	Qty.	Code no.
-40 – +80 °C, PVC Standard, NTC 10K, Cabinet Sensor		
S1, 1000 mm	150	080N0300
S1, 1500 mm	150	080N0301
S1, 2000 mm	150	080N0302
S1, 3000 mm	150	080N0303
S1, 4000 mm	150	080N0332
-40 – +80 °C, PVC Standard NTC 10K, Defrost Sensor		
S2, 1500 mm, 2 Blue Stripes	150	080N0304
S2, 2000 mm, 2 Blue Stripes	150	080N0305
S2, 3000 mm, 2 Blue Stripes	150	080N0306
S2, 4000 mm, 2 Blue stripes	150	080N0333
-40 – +80 °C, PVC Standard, NTC 10K, Condenser Sensor		
S3, 1000 mm, 1 Blue Stripe	150	080N0307
S3, 3000 mm, 1 Blue Stripe	150	080N0308

Table 30: Programming tools and other accessories

Type	I-Pack	
	Qty.	Code no.
Magnetic door sensor		
2000 mm	150	080N0311
3000 mm	150	080N0312
Cable door sensor		
2000 mm	150	080N0313
4000 mm	150	080N0314
Hand knob		
Black	480	077F8562
Washer		
Black with white print 0-9	480	077F8577
Power plug[1]		
4-pole with screw	50	080N0310
6-pole with screw	54	080G3357
Programming tools		
KoolKey (EKA200)	NA	080N0020
Mass programming Key	NA	080N0021
Cables for Programming tools		
Cable for EET, 1 m	NA	080N0324
Cable for EET, 0.5 m	NA	080N0325

[1] The connectors are rated for 28 Amps max.

Certificates, declarations, and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Table 31: Certificates, declarations, and approvals

Regulatory and Compliance	Directive / Document topic	Standards	Country - Marking
Electrical Safety (Incorporated Control for use in Class I or Class II equipment)	Low Voltage Directive: 2014/35/EU	IEC 60730-2-9:2015, AMD1:2018 in conjunction with IEC 60730-1:2013, AMD1:2015	Europe - CE
Electrical Safety (control is validated to use as Incorporated)	Recognized Component	UL 60730-1, UL 60730 2-9 (US)	United States - $_C$UR$_{US}$
Electrical Safety (control is validated to use as Incorporated)	Recognized Component	CAN/CSA-E60730-1, CAN/CSA-E60730 2-9 (CAN)	Canada - $_C$UR$_{US}$
Electrical Safety (Incorporated Control for use in Class I or Class II equipment)	-	GB 14536.1:2022, GB 14536.10:2022	China - CQC
Electrical Safety & Electromagnetic Compatibility	-	EN 60730-1:2015, EN 60730 2-9:2017, EN 610006-2:2015 & EN 61000-6-3:2015	Ukraine - UA
Radiocommunication Standard (EMC): 2017	Supplier Declaration of Conformity (SDoC)	CISPR 11:2009 +A1:2010)	AUS/NZ - RCM
Electromagnetic Compatibility	EMC Directive: 2014/30/EU	EN 610006-2:2015 & EN 61000-6-3:2015	Europe - CE
RoHS	RoHS Directive: 2011/65/EU & 2015/863/EU	EN IEC 63000:2018	Europe - CE
Food Safety	Food Equipment	NSF/ANSI 2	United States
Approved for use in Flammable Refrigerants	Enclosed Break Device / sealed device nC (Relays)	Sealed Device nC IEC 600079-15:2017, Enclosed-Break device IEC 60079-15:2005, clause 33.4	Europe
Approved for use in Flammable Refrigerants	Enclosed Break Device (Relays)	UL 471, UL 60335 2-24, UL 60079-15 ed.4 of clause 22.4	US
Enclosure Material Flammable Class	-	UL 94, V-0	US
Certification and Manufacturer Declarations on Conformity	CE, $_C$UR$_{US}$, CQC, UA, NSF, RCM, RoHS		

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