

Parameter description - Continuation

d12 = Fan & defrosting control probe

sd1 = ambient probe.
sd2 = defrosting probe
sd3 = product probe

d13 = Intelligent defrosting

off = disabled
Jup = skip defrosts
Cic = vary defrosting cycle

d14 = Units to count the defrosting cycle

rt = according to the time of working of the controller.

ct = according to the time of working of the compressor.

d15 = minimum evaporator set

If evaporator temperature is above d15 the time for defrosting cycle is not counted. Only enabled if d3 is not set to off.

d16 = maximum defrost time %

Percentage of d2 set as normal defrosting time.

d17 = Cycle time variation

Value of increment or decrement of d8

Hde = Hour(Hde):Minutes(Mde) of next defrost

Mde = Hour(Hde):Minutes(Mde) of next defrost

if d14=ct or d13 different of off Hde:Mde is the time until next defrost

JdF = Smart defrost information

d13 = Jup Defrosts to skip

d13 = Cic increment of d8

PROBES (Pro)

P0 = °C or °F, Temperature scale

P1 = Ambient probe calibration

Degrees shift of the ambient probe.

P2 = Defrosting probe calibration

Degrees shift of the defrosting probe.

P3 = Product probe calibration

Degrees shift of the product probe.

P4 = Decimal point

P5 = Probe to be viewed normally on the display.

sd1 = ambient probe.

sd2 = defrosting probe.

sd3 = product probe

P6 = Probe 2 Defrosting present.

If there is a probe 2 connected to thermostat

P7 = Probe 3 Product present.

If there is a probe 3 connected to thermostat

ALARMS(ALA)

A0 = Fan & alarm differential.

This is the temperature difference between the on and off cycle of the alarms and fan

A1 = Maximum alarm.

High alarm ON at Set+A1. High alarm OFF at Set+A1-A0.

A2 = Minimum alarm.

Low alarm ON at Set-A2. Low alarm OFF at Set-A2+A0.

A3 = Digital Input alarm time validation.

If E0=In or E0=Al, time since the situation occurs, until it is given.

A4 = Temperature alarm exclusion time after defrosting.

During the defrosting, and this time after it, temperature alarms will be ignored.

A5 = Temperature alarm exclusion time after opening the door.

While the door is open (if A5>0) and time A5 after closing it, alarms will be ignored.

A6 = Temperature alarm exclusion after connection.

Until this time has elapsed since the connection, temperature alarms will be ignored.

A7 = Temperature alarm time validation.

Time since the alarm situation occurs, until it is given.

A8 = Probe Alarm.

sd1 = ambient probe

sd2 = defrosting probe

sd3 = product probe

INITIALIZATION (INI)

Hor = Hour Min = Minutes

E0 = Digital input configuration.

Off = Digital input disabled.

Al = External alarm. There is an alarm if input is short-circuited.

In = Door open if input is short-circuited.

def = Order to initiate a defrost if input is short-circuited.

ndf = No defrosting will be made if input is short-circuited.

rst = If input is short-circuited Set Point becomes Set+r4

H0 = Factory Configuration. Record Factory Configuration.

H1 = Master/Slave

H1=Master. The thermostat issues defrosting orders to slave connected thermostats through the digital input

H1=Slave. The thermostat performs defrosting ordered by the master connected to its digital input.

In both cases the input must be Eo=def

H2 = Keyboard protection.

Yes = Keyboard protected. To modify Set, activate/de-activate defrosting and activate/de-activate continuous cycle we have to enter the code and then quit. The protection is removed momentarily. It is activated again 1 minute after the last key is pressed.

No = Keyboard not protected.

H3 = Delay time on connecting.

Until this time has elapsed since turning-on power, the compressor will not start-up.

H4 = Address for serial communication.

This code is set to 00 from factory.

H5 = Input code to parameters.

H6 = Type of Probe

PTC or NTC

H7 = Configuration 2 Relay and H8 = Configuration Relay 3

We can choose that it is Light (Li), Fan (Fan), Alarm (ALA) or Defrosting (dEF)

H11 = HACCP

Enables temperature alarm recording.

dat = Date Day, month, year

td = Display refresh time

If the measures temperature increases over 1 degree in this time, displayed temperature only will be increased 1 degree.

Model Table

	Defrost Probe	Third Probe	Compressor Relay 16A=1HP 20A=2HP	Second Relay 8A	Third Relay 5A	Heat or Cooling Control	Digital Input	Smart defrosting	Buzzer	Real Time Clock
EKT511			16A			*				
EKT511I			16A			*	*			
EKT511IB			16A			*	*	*	*	
EKT512	*		16A			*	*			
EKT512I	*		16A			*	*	*	*	
EKT512IB	*		16A			*	*	*	*	*
EKT511H			20A			*	*			
EKT511HI			20A			*	*	*	*	
EKT511HIB			20A			*	*	*	*	*
EKT512H	*		20A			*	*			
EKT512HI	*		20A			*	*	*	*	
EKT512HIB	*		20A			*	*	*	*	*
EKT522I	*		16A	*		*	*	*	*	*
EKT522IB	*		16A	*		*	*	*	*	*
EKT522IR	*		16A	*		*	*	*	*	*
EKT523I	*	*	16A	*		*	*	*	*	*
EKT523IB	*	*	16A	*		*	*	*	*	*
EKT523IR	*	*	16A	*		*	*	*	*	*
EKT532I	*		16A	*	*	*	*	*	*	*
EKT532IB	*		16A	*	*	*	*	*	*	*
EKT532IR	*		16A	*	*	*	*	*	*	*
EKT533I	*	*	16A	*	*	*	*	*	*	*
EKT533IB	*	*	16A	*	*	*	*	*	*	*
EKT533IR	*	*	16A	*	*	*	*	*	*	*



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ETDT1513I_090505



Description

EKT5 series controllers have been specifically designed for refrigeration applications. Friendly use thanks to the display with symbols and 5 keys to make it easy to program the parameter and access to functions such as turning on/off the light or forcing defrost.

Models up to 3 relays are available. First relay drives the compressor and the other two can be configured to drive defrost, fan, light or alarm. It also includes 3 temperature probe inputs and 1 configurable digital input.

NTC/PTC probe and °C / °F scale can be set by the parameters.

The control features defrost synchronization among several thermostats, intelligent defrost to reduce the power consumption, night set, error indication and alarms through the display and the buzzer, communication and real-time clock.

It also features HACCP logging to record temperature and time of alarms because of temperatures or power fails.

SLINK multipurpose input allows to connect a KLKEY to easily program the parameters or a communication module.

Model references

The model reference is given by: EKT5XDYZ

Each suffix can take the following values:

X Model depending on table
D Probe PTC/NTC selectable by parameter
Y Color R:Red, G:Green, B:Blue
Z Supply voltage 230=230Vac, 110=115Vac, 24=24Vac/dc, 12=12Vac/dc

Installation

The thermostat must be located in a place protected from vibrations, impacts, water and corrosive gasses.

It will be made a 71x29mm panel cut/out to insert the thermostat (use the gasket or apply silicone to make it leaktight). Slide the strip along the thermostat to fix it properly.

Wiring

Avoid installing the cables of the probes and the digital input in the proximity of any power cables.

Maintenance

After the installation there are no maintenance tasks required.

Clean the surface of the controller with a soft, damp cloth.

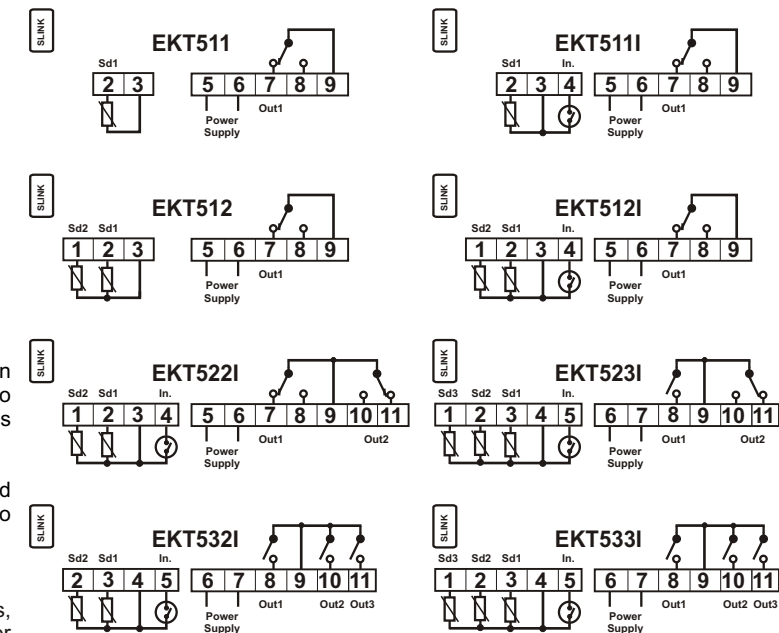
Never use abrasive detergents, petrol, alcohol or solvents.

All the repairs must be carried out by authorised people.

EKT5 Digital Temperature Controller

Specification and Operating Instructions

Wiring Diagram



Technical Data

Supply voltage	230Vac+/-10%, 115Vac+/-10%, 24Vac/dc +/-10%, 12Vac/dc +/-10%
Supply powers	3.6VA (230V) 1.5VA (12V)
Storage temperature	from -20°C to 80°C (from -4°F to 176°F)
Operating temperature	from 0°C to 55°C (from 32°F to 131°F)
Temperature probe	PTC / NTC
Probe range	PTC from -50°C to 150°C (from -58 to 302°F) NTC from -50°C to 110°C (-58 to 230°F)
Accuracy	Better than 1% of full scale
Resolution	0.1°
Display	3-digits plus sign
SLINK	For KLKEY and Communication
Outputs	
OUT 1 EKT511, EKT512, EKT522	SPDT Relay Resistive Load 16A 1HP 240Vac -- 10FLA, 60LRA 240Vac
EKT511H, EKT512H	SPDT Relay Resistive Load 20A 2HP 240Vac -- 12FLA, 72LRA 240Vac
EKT523, EKT532, EKT533	SPST Relay Resistive Load 16A 1HP 240Vac -- 10FLA, 60LRA 240Vac
OUT 2 EKT52	SPDT Relay Resistive Load 8A 240Vac
EKT53	SPST Relay Resistive Load 8A 240Vac
OUT 3 EKT53	SPST Relay Resistive Load 5A 240Vac
Maximum current per position	20A
Dimensions	78 x 37 x 62 mm (3.07 x 1.46 x 2.44 in)
Front Protection	IP65

ETDT1513I_090505

Front Operation

Set Point Setup

- Press key **Set** The Set label appears.
- Press **Set** again. Current set point value appears blinking.
- Press **▲** or **▼**o increase or decrease the value.
- Press **Set** to confirm the new value.
- Press **Set** and **▼** to exit

Time programming

- Press key **Set**. The Set label appears.
- Press **▲** or **▼** to go to Hour or Minute
- Press **Set** to see the value.
- With **▲**and **▼**set the desired new value.
- Press **Set**. For 8 seconds, Pro will appear on the display once the time has been correctly programmed
- Press **Set** and **▼** to quit or wait for 1 minute (keyboard timeout).

Parameter programming

- The parameters are grouped in the menus COM, DEF, PRO, ALA, INI, HAC
- Press **Set** for 8 seconds. Value 00 appears blinking.
- Set the code with **▲**and **▼** (it is set to 00 from factory).
- Press **Set** to confirm the code. If it is right, the label of the first menu will appear.
- With **▲**and **▼**go to the desired menu.
- Press **Set**, the label of the first parameter of menu will appear.
- With **▲**and **▼**go to the desired parameter label of the list of parameters.
- Press **Set** to see the value.
- With **▲**and **▼**set the desired new value.
- Press **Set** to confirm it and exit to the parameter label.
- Press **Set** + **▼** to go to menu list.
- Press **Set** + **▼** to quit programming or wait 1 minute (keyboard timeout).

Date programming

- Access to parameter as explained in Parameter programming, select **INI** menu and **dat** parameter.
- Press key **Set**. The day (d00) appears.
- Press **▲** or **▼** to go to Day or Month or Year.(d00, M00, Y00)
- Press **Set**. for 8 seconds, display will blink.
- With **▲**and **▼**set the desired new value.
- Press **Set**. for 8 seconds, Pro will appear on the display.

To record a standard configuration

- Access to parameter H0 as explained in Parameter programming.

EKT51: H0 = 0; EKT52: H0 = 1; EKT53: H0 = 2

- Press **Set** for 8 seconds, and the thermostat will be reset.

Manual Defrost.

Pressing **⚡** key for 8 seconds defrost is activated. Repeating the operation is deactivated.

Continuous cold cycle.

Pressing **▼**key for 8 seconds a continuous cold cycle begins. Repeating the operation the cycle finalizes.

Setting keyboard code to zero

The keyboard code can be programmed to zero by turning off the controller, and turning it on again, while the key **Set** is pressed.

Alarm validation

An active alarm can be validated (the alarm output will be turned off) pressing the **Set** + **▼** keys simultaneously.

ON OFF Light

If we have a relay setup as light, pressing keys **⏻** for 3 seconds the thermostat will turn-on or turn-off the light

Led Indications

- ❄️** it indicates Compressor connected. It blinks when a continuous cold cycle has to be initiated and has to wait until the minimum compressor stoppage time is over.
- 💧** it indicates that a defrost is running
- 🌀** it indicates that fan is connected
- 🔔** it indicates error or alarm. It is blinking when the alarm is validated for user
- 📄** it indicates HACCP record is activated

HACCP

Display Messages

In normal operation the probe temperature selected by P5 will be displayed. The following messages can also appear :

- **Err** Memory reading error.
- **ErP1, ErP2, ErP3** Probe1 ,2 or 3 error
- **Eri** Internal parameter error. In this case, enter the standard configuration, as it is indicated in “To record a standard configuration”.
- **ALH** High temperature alarm.
- **ALL** Low temperature alarm.
- **ALE** External alarm.
- **AEH** High temperature and external alarm.
- **AEL** Low temperature and external alarm.
- **ooo** Open probe.
- **---** Short-circuited probe.
- **DON** Defrosting activated.
- **DOF** Defrosting de-activated or cannot be done.
- **CON** Continuous cold cycle activated.
- **COF** Continuous cold cycle de-activated or cannot be done.
- **-d-** Thermostat on defrosting.

To view the probe not chosen by P5, press **Set+▲**

The display blinks when there is an error recording a parameter in memory or when awaiting confirmation of a value.

Operation in Error Case

If the ambient probe fails, the thermostat will connect the compressor according to parameters c2 and c3, being able to perform defrosting and continuous cold cycles. If the memory fails the thermostat will connect the compressor ON for 5 minutes and OFF for 5 minutes, not being able to perform defrosting or continuous cold cycles.

HACCP

If this option is activated, the thermostat registers up to 5 alarms of the types High, Low, and blackout. These alarms can be seen in the menu Registry of Alarms (HAC). To access to this menu, proceed as for the parameters menu.

The first value that appears is the number of registered alarms. Afterwards, for each alarm (if it has existed), the value of the temperature, the time and date (only models with real time clock) and elapsed time of the alarm. For the disconnection alarm, the temperature, the time and date (only models with real time clock) when returning the connection is registered, as well as the time until the correct values are reached. (Probe<Set+A1-A0)
When the elapsed time is showed it will appear xxd (days).Pressing **▲** xxH (Hours) will be shown, and pressing **▲** again, xxn (Minutes) will be displayed. When located over a temperature of alarm or time, pressing **▲+▼** during 2 seconds, both recorded data of the alarm (time and temperature value) are deleted.

In the HAC menu, and pressing **▲+▼** keys during 2 seconds, all the recorded data of alarms are deleted.

Defrosting Cycles

The cycles of defrosting can be performed counting total time (d14= rt) or counting the time only when the compressor is connected (d14= ct).
If d14= rt, first defrosting will be always made at the hour d3 and the others with the cycle given by d8.
If d14= ct, defrosting will be always made with the cycle given by d8.
Manual defrosting do not modify the programmed.

Intelligent Defrosting

By d13 parameter the time between defrost cycles can vary. The time is only counted if defrost probe is below the evaporator set d15.

Selecting d13=jup some of the defrosts will be skipped. After a defrost the following JdF defrosts will be ignored. JdF is initially 0. If a defrost ends before a time d16*d2 then JdF is incremented, otherwise is decremented. Maximum value for JdF is 3. When JdF is 3 if the next defrost ends before a time d16*d2 then JdF is set to 1, otherwise is set to 0.

Selecting d13=Cic the defrosting cycle can vary.
If a defrost ends before a time d16*d2 then time between defrosts is incremented d17 minutes, otherwise is decremented. The initial and minimum value for time between defrost is d8. The number of times that it is incremented it can be seen in JdF.

SLINK

This input allows to connect a programming key to read or to write the parameters. It also admits a clock module so that the hour of the thermostat goes with a real time clock.
If the system is managed with a PC it can be connected it to the thermostat through this input with a communication module

COn	Description	Units	Range	Factory
Set	Set point	Degrees	r1 to r2	3.0
r0	Differential or hysteresis	Degrees	0,1 to 20	1.0
r1	Minimum value for set point	Degrees	-99,9 to r2	-50.0
r2	Maximum value for set point	Degrees	r1 to 302	150
r4	Night Set Point Variation	Degrees	-20.0 to 20.0	0.0
r6	Fan operation	Range	off /on /con	con
F0	Fan stoppage temperature	Degrees	-99.9 to 302	28.0
F1	Fan/compressor stop if door opened	Option	no/yes/Con/Fan	yes
c0	Minimum compressor stoppage time	Minutes	0 to 240	1
c1	Continuous cycle time	h - m	0.0 to 18	1.0
c2	ON time of fault cycle	Minutes	0 to 999	5
c3	OFF time of fault cycle	Minutes	0 to 999	5
c4	Minimum ON time of the compressor	Minutes	0 to 240	0
c5	Minimum time between two connections of the compressor	Minutes	0 to 240	1

DEF	Description	Units	Range	Factory
d0	Type of defrosting(EKT52, EKT53)	Range	re/in	re
d0	Heat or Cooling (EKT51)	Range	re/in	re
d1	Temperature at which defrosting will stop	Degrees	-99.9 to 302	80.0
d2	Maximum defrosting time	Minutes	0 to 240	30
d3	First Hour of Day for Defrosting	h-m	00,0 to 18,0	00.0
d4	Delay of first defrosting	Minutes	0 to 999	0
d5	Display on defrosting	Range	off/on/-d-	-d-
d6	Display return limit.	Minutes	0 to 240	15
d7	Compressor drip time.	Minutes	0 to 240	0
d8	Interval between defrosting.	h - m	00,0 to 18,0	8.0
d9	Fan works on defrosting.	Range	no/yes	no
d10	Fan drip time	Minutes	0 to 240	0
d11	Minimum Defrosting time	Minutes	0 to 240	0
d12	Fan/defrosting control probe	Range	sd1/sd2/sd3	sd2
d13	Smart Defrosting	Option	off / Jup / Cic	off
d14	Units to count the defrosting Cycle	Option	rt / ct	rt

d15	Evaporator set	Degrees	-50.0 to 20.0	-10.0
d16	d2 maximum time %	Numeric	0 to 100	50
d17	CiC time variation	Minutes	0 to 120	10
HdE	Next defrost time(hours)	Hours	(read only)	
MdE	Next defrost time (minutes)	Minutes	(read only)	
JdF	Defrosts to skip	Numeric	(read only)	

Pro	Description	Units	Range	Factory
P0	Temperature scale	Option	°C/°F	°C
P1	Ambient probe 1 calibration	Degrees	-20,0 to 20,0	0.0
P2	Defrosting probe 2 calibration	Degrees	-20,0 to 20,0	0.0
P3	Product probe 3 calibration	Degrees	-20,0 to 20,0	0.0
P4	Decimal point	Option	no/yes	yes
P5	Probe to display	Range	sd1/sd2/sd3	sd1
P6	Probe 2 present	Option	no/yes	yes
P7	Probe 3 present	Option	no/yes	no

ALA	Description	Units	Range	Factory
A0	Fan and alarm differential	Degrees	0.1 to 20.0	4.0
A1	Maximum alarm temperature (1)	Degrees	0.1 to 99.9	8.0
A2	Minimum alarm temperature (1)	Degrees	0.1 to 99.9	8.0
A3	Digital Input alarm time validation	Minutes	0 to 999	10
A4	Time without temperature alarm after defrosting	h - m	0.0 to 18.0	1.1
A5	Time without temperature alarm after opening the door	h - m	0.0 to 18.0	1.1
A6	Time without temperature alarm after connection	h - m	0.0 to 18.0	1.1
A7	Alarm verification time	h - m	0.0 to 18.0	1.1
A8	Probe for alarm	Range	sd1/sd2/sd3	sd1

Ini	Description	Units	Range	Factory
Hor	Hour	Hours	0..23	0
Min	Minutes	Minutes	00..59	0
E0	Configure digital input	Range	off/Al/In/def/rst	def
H0	Factory Settings	Range	0 to 2	
H1	Master/Slave	Range	Mst/Slv	MSt
H2	Keypad protection	Option	no/yes	no
H3	Delay time on connecting	Seconds	0 to 240	0
H4	Address for serial communication	Numeric	0 to 999	0
H5	Keyboard code	Numeric	0 to 999	0
H6	Type of probe	Option	ptc / ntc	ptc
H7	Relay 2 Setup	Option	Lit/FAn/ALA/dEF	dEF
H8	Relay 3 Setup	Option	Lit/FAn/ALA/dEF	FAn
H11	HACCP Activated	Option	no/yes	no
dat	Date	Day/Month/Year		1.1.0
td	Display refresh time	Seconds	0 to 999	0

Some of the parameters may not be present depending on the model.

Hour/Minutes Parameters H-M

It is a way to show hours and minutes in 3 digits

The two first digits are the hours and the third the tens of minutes. E.g.

2.4 2 hours 40 minutes

8.0 8 hours 0 minutes

10.3 10 hours 30 minutes

Parameter description

Compressor (CON)

SET = Work set point.

Temperature we wish to maintain the machine. Variable between r1 and r2.

r0 = Differential.

For EKT51 with d0= re and EKT52, EKT53

When ambient probe temperature >= Set+r0 : Out ON

When ambient probe temperature <= Set : Out OFF

For EKT51 with d0= in

When ambient probe temperature =< Set-r0 : Out ON

When ambient probe temperature >= Set : Out OFF

r4 = Night Set Point Variation

When the digital input is closed the Set Point is incremented r4. On this purpose set E0= rst.

r6 = Fan operation on regulation.

Off = Fan does not connect on regulation.

On = Fan is always connected on regulation.

Con= Fan linked to compressor start-up.

(Fan ON if allowed by the temperature given by F0)

F0 = Fan temperature limit.

Fan OFF on regulation when probe temperature setup in d12is >= F0.

Fan ON on regulation, when temperature is <= F0-A0.

The operation of the fan on regulation is determined also by r6.

F1 = Fan stop if door opened.

On regulation and continuous cycle when opening the door

No = The fan and compressor do not stop.

Yes = Both stop.

Con = The compressor stops.

Fan = The fan stops.

c0 = Minimum compressor stop time

Minimum time since compressor stops until it starts again.

c1 = Continuous cycle time.

Duration of a continuous cold cycle.

c2 = ON time of fault cycle, when ambient probe is broken

c3 = OFF time of fault cycle, when ambient probe is broken

c4 = Minimum time of working of the compressor

Minimum time since compressor starts until it stops.

c5 = Minimum time between two connections of the compressor

Minimum time since compressor starts until it starts again.

Defrosting (DEF)

d0 = Type of defrosting. (EKT52,EKT53)

re= defrosting without connecting the compressor.

in= defrosting by connecting the compressor.

d0 = Cold/Heat (EKT51)

re = Cold

in = Heat

d1 = End of defrosting temperature.

When this temperature is reached the defrosting will end.

d2 = Maximum defrosting time.

The defrosting will stop when this time is reached.

If it is zero there will be no defrosting.

d3 = first Hour defrosting of the day

From 00:00 hours the first defrosting is at d3 hours.

Until this time no defrosting is performed

d4 = Delay first defrosting.

Time without defrosting after turning the thermostat on.

d5 = Display during the defrosting.

Off = The current temperature will be shown during defrosting.

On = The temperature at defrost beginning is frozen on display until the end of defrosting and until the current temperature is equal or lower than the initial one, or until d6 time elapses.

def = Label -d- is displayed during defrosting, until the end of defrosting and until the current temperature is equal or lower than the initial one, or until d6 time elapses.

d6 = Display return limit.

Maximum time before viewing the current temperature again after defrosting.

d7 = Compressor drip time.

Time since defrosting ends until the compressor can be connected.

d8 = Interval between defrosting.

Time between the start of a defrosting and the start of the following one.

If it is zero defrosting is not done automatically by time.

D9 = Fan operation during defrosting time.

It determines if the fan is connected or not during defrosting.

d10 = Fan drip time.

Time since defrosting ends until fan can be connected.

d11 = Minimum Time duration defrosting

Once defrosting begins it stays at least during this time