Danfoss AK-RC 113 Cold Storage Room Controller Installation Guide

Installation Guide
Optyma™ control
AK-RC 111, AK-RC 113

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AK-RC 113 Cold Storage Room Controller

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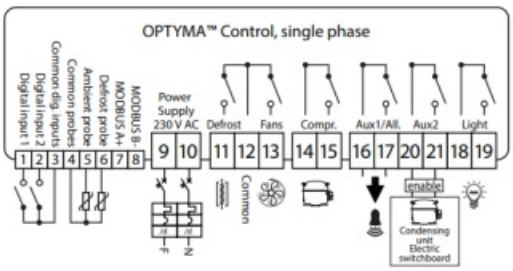

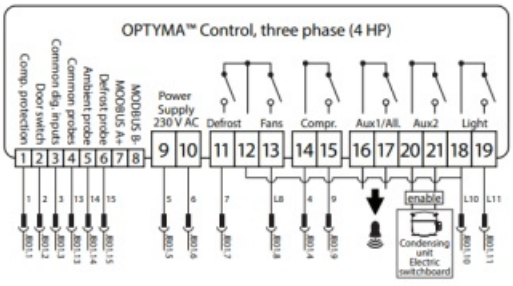

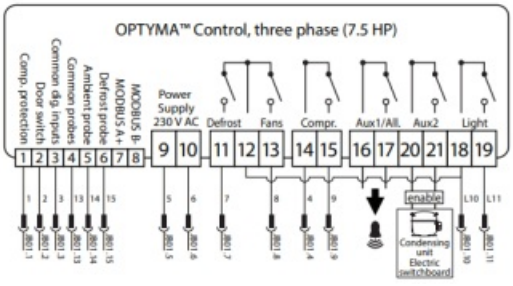

Function	Press
View set point	
Change set point	
Change menu “User level”	
Return	
Change menu “Installer level”	
Return	

List of level 1 variables (user level)

Variables	Meaning	Value	Default
r0	**Temperature difference** compared to main SETPOINT	0.2 – 10 °C	2 °C
d0	**Defrost interval** (hours) If d0 = 0 cyclical defrosts Off	0 – 24 hours	4 hours
d2	**End-of-defrost setpoint.** Defrost is not executed if the temperature read by the defrost sensor is greater than d2. (If the sensor is faulty defrosting is timed)	-35 – 45 °C	15 °C
d3	**Max defrost duration** (minutes)	1 – 240 min	25 min
d7	**Drip duration** (minutes) At the end of defrost the compressor and fans remain at standstill for time d7, the defrost LED on the front panel flashes.	0 – 10 min	0 min
F5	**Fan pause after defrost** (minutes) Allows fans to be kept at standstill for a time F5 after dripping. This time begins at the end of dripping. If no dripping has been set the fan pause starts directly at the end of defrost.	0 – 10 min	0 min
A1	**Minimum temperature alarm** Allows user to define a minimum temperature for the room being refrigerated. Below value A1 an alarm trips: the alarm LED flashes, displayed temperature flashes and the buzzer sounds to indicate the problem.	-45 – (A2-1) °C	-45 °C
A2	**Maximum temperature alarm** Allows user to define a maximum temperature for the room being refrigerated. Above value A2 an alarm trips: the alarm LED flashes, displayed temperature flashes and the buzzer sounds to indicate the problem.	(A1+1) – 99 °C	99 °C
tEu	**Evaporator sensor temperature display** (displays nothing if dE =1)	Evaporator temperature	read only

List of level 2 variables (installer level)

Variables	Meaning	Value	Default
F3	**Fan status with compressor off**	0 = Fans run continuously 1 = Fans only run when compressor is working 2 = Fans disabled	1
F4	**Fan pause during defrost**	0 = Fans run during defrost 1 = Fans do not run during defrost	1
F6	**Evaporator fans activation for air recirculation.** The fans activate for a time defined by F7 if they have not started working for the F6 time. If activation time coincides with the defrosting time, end of defrosting is awaited.	0 – 240 min 0 = (function not activated)	0 min
F7	**Evaporator fans duration for air recirculation.** Fans working time for F6	0 – 240 sec	10 sec
dE	**Sensor presence** If the evaporator sensor is disabled defrosts are carried out cyclically with period d0: defrosting ends when an external device trips and closes the remote defrost contact or when time d3 expires.	0 = evaporator sensor present 1 = no evaporator sensor	0
d1	**Defrost type**, cycle inversion (hot gas) or with heater elements	0 = heating element 1 = hot gas 2 = heater with temperature control	0
dPo	**Defrost at Power On**	0 = disabled 1 = defrost at power-on (if possible)	0
dSE	**Smart defrost**	0 = disabled 1 = enabled	0
dSt	**Smart defrost Setpoint (if dSE=1)** The counting of the time between the defrost is incremented only if the compressor is ON and the evaporator temperature is less than dSt.	-30 – 30 °C	1 °C

Variables	Meaning	Value	Default
dFd	**Display viewing during Defrost**	0 = current temperature 1 = temperature at the start of the defrost 2 = “DEF”	1
Ad	**Modbus Network address**	0 – 247	0

Bdr	**Modbus baudrate**	0 = 300 baud 1 = 600 baud 2 = 1200 baud 3 = 2400 baud 4 = 4800 baud 5 = 9600 baud 6 = 14400 baud 7 = 19200 baud 8 = 38400 baud	8
Prt	**Modbus parity check**	0 = none 1 = even 2 = odd	1
Ald	**Minimum and maximum temperature** signalling and alarm display delay	0 – 240 min	120 min
C1	Minimum time between shutdown and **subsequent switching on of the compressor**	0 – 15 min	0 min
CAL	**Cold room sensor value correction**	-10 – 10 °C	0 °C
CE1	**Duration of compressor ON time in the case of faulty ambient probe** (emergency mode). If CE1=0 the emergency mode in the presence of error E0 remains disabled, the compressor remains off and defrosting is prevented in order to conserve the remaining cold.	0 – 240 min 0 = disabled	0 min
CE2	**Duration of compressor OFF time in the case of faulty ambient probe** (emergency mode).	5 – 240 min	5 min
doC	**Compressor safety time for door switch:** when the door is opened the evaporator fans shut down and the compressor will continue working for time doC, after which it will shut down.	0 – 5 min	0 min
tdo	**Compressor restart time after door opening.** When the door is opened and after tdo time, it's setted back the normal functioning giving door open alarm (Ed) If the door switch is closed and the light stays on for a longer time than tdo light cell alarm is signaled (E9). With tdo=0 the parameter is disabled.	0 – 240 min 0 = disabled	0 min
Fst	**FAN shutdown TEMPERATURE** The fans will stop if the temperature value read by the **evaporator** sensor is higher than this value.	-45 – 99 °C	99 °C
Fd	**Fst differential**	1 – 10 °C	2 °C
LSE	**Minimum value attributable to setpoint.**	-45 – (HSE-1) °C	-45 °C
HSE	**Maximum value attributable to setpoint.**	(LSE+1) – 99°C	99 °C

AU1	**Auxiliary/alarm relay 1 control**	-6 (NC) = relay de-energised during stand-by. -5 (NC) = Contact for casing element control (AUX relay closed with compressor output inactive). -4 (NC) = pump down function(NC, see CHAP 5.16). -3 (NC) = automatic auxiliary relay managed by StA temp. setting with 2°C differential (NC). -2 (NC) = manual auxiliary relay controlled via AUX key (NC). -1 (NC) = alarm relay (NC). 0 = relay deactivated. 1 (NO) = alarm relay (NO). 2 (NO) =manual auxiliary relay controlled via AUX key (NO). 3 (NO) = automatic auxiliary relay managed by StA temp. setting with 2°C differential (NO). 4 (NO) = pump down function (NO, see CHAP 5.16). 5 (NO) = free voltage contact for condensing unit (AUX relay and compressor relay in parallel). 6 (NO) = relay excited during stand-by.	-1
AU2	**Auxiliary/alarm relay 2 control**	(like AU1)	5
StA	**Temperature setting for auxiliary relay**	-45 – 99 °C	0 °C
nSC	**Correction factor for the SET button during night operation** (energy saving) (with In1 or In2 = 8 or -8) During night operation the control set is: Set Control = Set + nSC In night mode decimal point flashes.	-20 – 20 °C	0 °C

Variables	**Meaning**	**Value**	**Default**

In1	**INP-1 input setting**	8 = Night mode digital input (e nergy saving, N.O.) 7 = Stop defrosting remotely (N.O.) (reads rising edge of imp ulse) 6 = Start defrosting remotely (N.O.) (reads rising edge of imp ulse) 5 = Stand-by remotely (N.O.) (In order to indicate Stand-By mode, the display shows 'In5' alternating with the current vie w) 4 = Pump-down pressure switc h (N.O.) 3 = Man-in-room alar m (N.O.) 2 = Compressor protection (N. O.) 1 = Door switch (N.O.) 0 = disabled -1 = Door switch (N.C.) -2 = Compressor protection (N .C.) -3 = Man-in-room alarm (N.C.) -4 = Pump-down pressure swit ch (N.C.) -5 = Stand-by remotely (N.C.) (In order to indicate Stand-By mode, the display shows 'In5' alternating with the current vie w) -6 = Start defrosting remotely (N.C.) (reads falling edge of im pulse) -7 = Stop defrosting remotely (N.C.) (reads falling edge of im pulse) -8 = Night mode digital input (e nergy saving, N.C.)	2
In2	**INP-2 input setting**	(like In1)	1
bEE	**Buzzer enable**	0 = disabled 1 = enabled	1
mOd	**Thermostat functioning mode**	0 = Cold function 1 = Hot function (in this mode defrosting and fan disable Fst are excluded)	0
P1	**Password type of protection** (active when PA is not equal 0)	0 = only display set point 1 = display set point, AUX, ligh t access 2 = access in programming not permitted 3 = access in second level pro gramming not permitted	3
PA	**Password** (see P1 for the type of protection)	0…999 0 = not active	0

reL	**Release software**	indicates software version	read only

Troubleshooting

Alarm code	Possible cause	Solution
E0	Cold room temperature sensor not working properly	• Check that cold room temperature sensor i s working properly • If the problem persists replace the sensor
E1	Defrost sensor not working properly (in this case defros ts will last time d3)	• Check that defrost sensor is working proper ly • If the problems persists replace the sensor
E2	Eeprom alarm An EEPROM memory alarm has been detected (All out puts except the alarm one are deactivated)	• Switch unit off and back on
E8	Man in cold room alarm	• Reset the alarm input inside the cold room
Ec	Compressor protection tripped (e.g. thermal protection or max pressure switch) (All outputs except the alarm one – where applicable – are deactivated)	• Check that compressor is working properly • Check compressor absorption • If the problem persists contact the technical assistance service
Ed	Open door Alarm. When the door is opened and after t do time, it's setted back the normal functioning giving d oor open alarm (Ed)	• Check door switch status • Check door switch connections • If the problem persists contact the technical assistance service
E9	Cell light alarm. The light of the cell has been on for a time greater than tdo.	• Turn off the light
EH	Maximum temperature alarm. The temperature inside the cold room has exceeded th e max. temperature alarm setting (see variables A2, us er programming level)	• Check that the compressor is working prop erly. • Sensor not reading temperature properly or compressor start/stop control not working.
EL	Minimum temperature alarm. The temperature inside the cold room has exceeded th e min. temperature alarm setting (see variables A1, use r programming level)	• Check that the compressor is working prop erly. • Sensor not reading temperature properly or compressor start/stop control not working.

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Documents / Resources

	**Danfoss AK-RC 113 Cold Storage Room Controller** [pdf] Installation Guide AK-RC 113 Cold Storage Room Controller, AK-RC 113, Cold Storage Room Controller, Storage Room Controller, Room Controller

References

- **User Manual**