



REFRIGERATION AND  
AIR CONDITIONING

# Instructions

## EKC 313



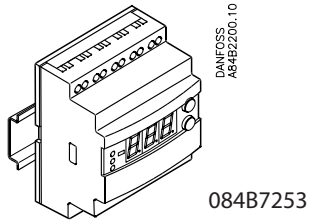
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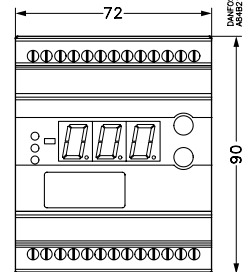
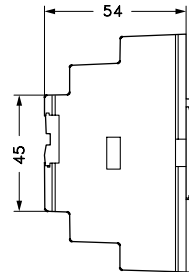
R18PB252



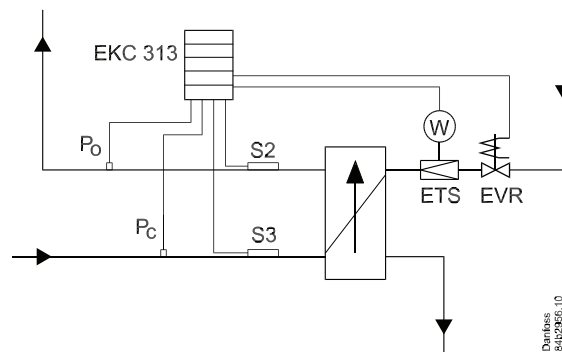
### Identification



### Dimensions



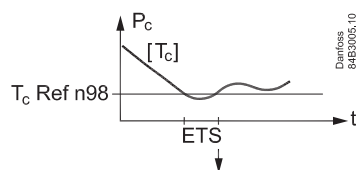
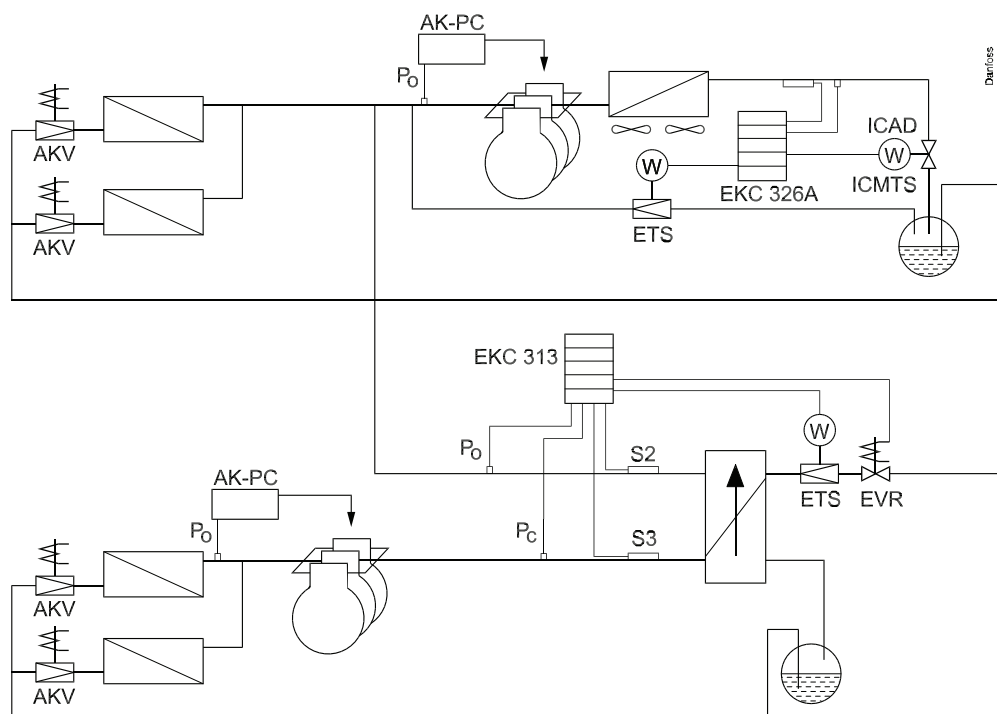
### Principle



### EKC 313

Additional information	Manual	RS8FZ---	www.danfoss.com
Weitere Information	Manual	RS8FZ---	
Renseignements supplémentaires:	Manual	RS8FZ---	
Yderligere information:	Manual	RS8FZ---	

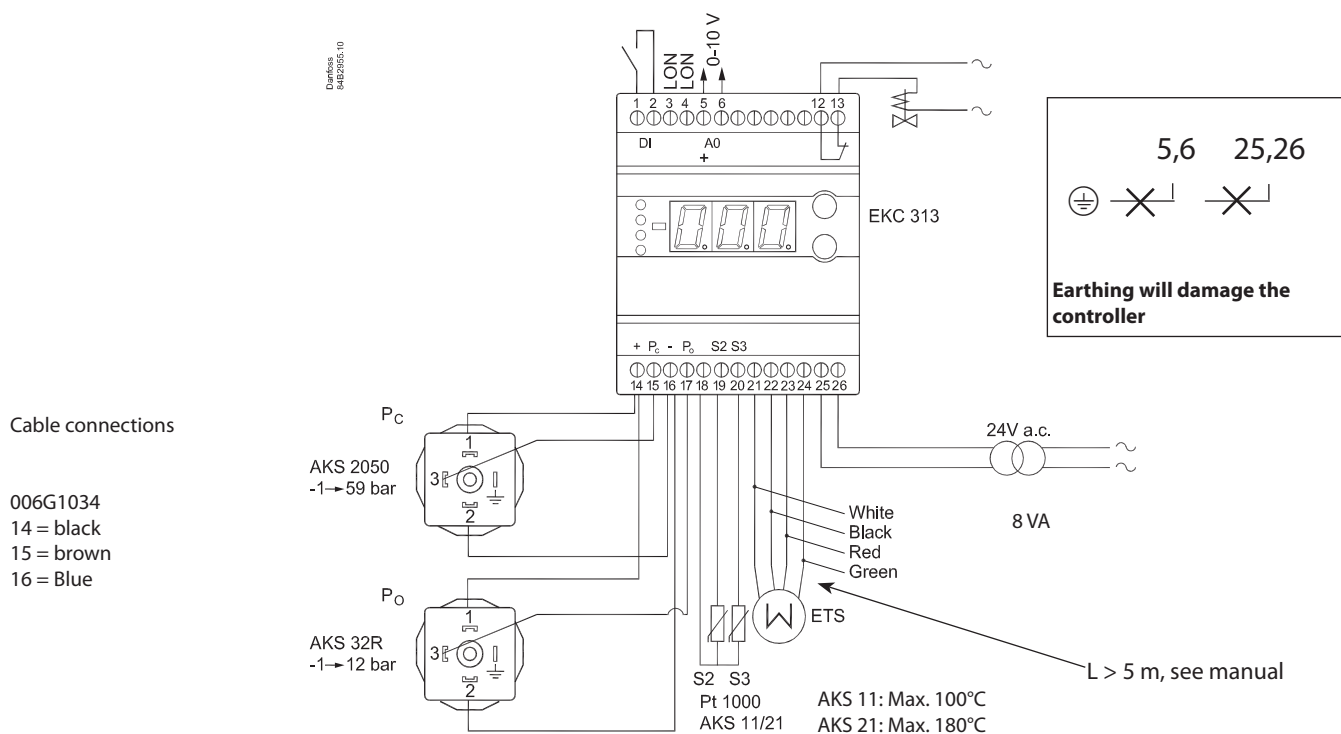
Example



Optimised superheat regulation with limit if the condensing pressure is low.

Optimised superheat regulation is used when the condensing pressure is above the set value. If the condensing pressure falls below the set value, the optimised superheat regulation ceases and the ETS valve closes gradually until the pressure rises above the value.

## Connections



### Necessary connections

#### Terminals:

- 25-26 Supply voltage 24 V a.c.
- 18-19 Pt 1000 sensor at the heat exchanger discharge on the cool side (S2)
- 18-20 Pt 1000 sensor at the heat exchanger input on the warm side (S3)
- 14,15,16 Type AKS 2050\* pressure transmitter, -1 to 59 bar. Mounted at the heat exchanger's inlet on the warm side (Pc)
- 14,16,17 Type AKS 32R\* pressure transmitter, -1 to 12 bar. Mounted at the heat exchanger discharge on the cold side (Po)

### Application dependent connections

#### Terminals:

- 1-2 DI input for external main switch (also see r12). If no switch is mounted, the terminals should be short circuited.
- 12-13 Relay for controlling solenoid valve in liquid line or the relay can be used as alarm relay (see o36).  
Valve control: 12 and 13 are connected under normal operating conditions and interrupted supply voltage. Disconnects when regulation requires a low valve opening degree.  
Alarm relay: 12 and 13 are connected under normal operating conditions and disconnected in case of alarm.
- 21,22,23,24 Connecting an ETS valve. (Terminals 21 through 24 should not be used when using an ICMTS valve instead of an ETS valve. ICMTS valves should be controlled via the 0-10 V signal on terminals 5 and 6.)
- 5-6 Voltage output 0-10 V. Can be used for the valve's opening degree signal or to control an ICMTS valve. (For a special use with a solid state relay and AKV, the output will pulse with 10 V on/off)
- 3-4 Data communication  
Mount only, if a data communication module has been mounted.  
It is important that the installation of the data communication cable be done correctly. Cf. separate literature No. RC8AC...

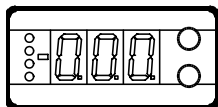
\*) For explosive applications an intrinsically safe pressure transmitter can be used. Connection is shown in manual page 12.

## Operation

### Display

The values will be shown with three digits.

Temperature are shown in °C and pressure in bar.



### Light-emitting diodes (LED) on front panel

All 4 light-emitting diodes will flash when there is an error in the regulation.

In this situation you can upload the error code on the display and cancel the alarm by giving the uppermost button a brief push.


The controller can give the following messages:		
E1	Error message	Fault in controller
E15		Cut-out S2 sensor
E16		Shortcircuited S2 sensor
E17		Cut-out S3 sensor
E18		Shortcircuited S3 sensor
E20		Fault on signal from Pc
E39	Alarm message	Fault on signal from P0
A11		No refrigerant has been selected
A43		Step motor fault. Output or phase
A45		Regulation stopped. Main switch r12 = off
A92		No regulation parameters has been selected

### The buttons

When you want to change a setting, the two buttons will give you a higher or lower value depending on the button you are pushing. But before you change the value, you must have access to the menu. You obtain this by pushing the upper button for a couple of seconds - you will then enter the column with parameter codes. Find the parameter code you want to change and push the two buttons simultaneously. When you have changed the value, save the new value by once more pushing the two buttons simultaneously.

 Gives access to the menu (or cutout an alarm)

 Gives access to changes

 Saves a change

### Examples of operations

#### Set of a menu

1. Push the upper button until a parameter is shown
2. Push one of the buttons and find the parameter you want to change
3. Push both buttons simultaneously until the parameter value is shown
4. Push one of the buttons and select the new value
5. Push both buttons again to conclude the setting

\*) This setting will only be possible if a data communication module has been installed in the controller.

\*\*) The display on the controller can show 3 digits only, but the setting value has 4 digits. Only the 3 most important will be shown. It means fx. 250 will give a setting of 2500.

## Menu survey

SW =2.0x

Function	Parameter	Min.	Max.	Fac.setting
<b>Normal display</b>				
Displays either the valve's current opening degree or the current superheat value. (Can be set in o17)				
Briefly pushing the bottom button will display one of the two readings. Briefly pushing both buttons will display the superheat reference (u22).				
<b>Start / stop</b>				
Start / stop af regulation	r12	OFF (0)	On (1)	On (1)
<b>Regulating parameters</b>				
Select valve type:				
0=ETS 12,5 & 25 / CCM10 & CCM20				
1=ETS 50 / CCM30, 2=ETS 100 / CCM40				
3=ETS 250, 4=ETS 400,				
5=User defined (set : n37 and n38)				
6=0-10 V's output must control ICAD actuator				
7=0-10 V's output must on/off control a solid state relay.				
I: Integration time Tn	n05	5 s	600 s	90
D: Differentiation time Td	n06	0 s	60 s	0
Max. value of superheat reference	n09	3 K	60 K	40
Min. value of superheat reference	n10	3 K	40 K	10
MOP (max. = Off)	n11	0 bar	60 bar	60
Signal reliability during start-up. Time for safety. Should only be changed by trained staff	n15	0 s	240 s	0
Signal reliability during start-up – Opening degree's start value. Should only be changed by trained staff.	n17	0%	100%	0
Damping of amplification around reference value	n19	0	30	3
Changes should only be made by trained staff				
Amplification factor for superheat	n20	0	30	5
Changes should only be made by trained staff				
Max. opening degree of valve	n32	0%	100%	100
Number of steps from 0-100% opening degree (x10) **	n37	0	500	263
Number of steps per second	n38	0	300	250
Max. Kp factor for PID-regulation	n95	0	30	5
Calculation factor for superheat SH	n96	10	100	50
Changes should only be made by trained staff				
Filter constant for SH reference	n97	5 s	600 s	60
Changes should only be made by trained staff				
Lower limit value for the condensing pressure	n98	-30°C	10°C	-5
<b>Miscellaneous</b>				
Controller's address (0 = off)	o03*	0	119	0
ON/OFF switch (service-pin message)	o04*	-	-	-
Set supply voltage frequency	o12	50Hz (0)	60 Hz (1)	0
Select display view for the "normal display"				
1: Opening degree of the valve	o17	1	2	1
2: Superheat				
Manual control of outputs:				
0: Normal regulation	o18	0	1	0
1: Overriding. Manual control permitted				
Pressure transmitter selection				
1: AKS 32R / AKS 2050	o10	1	3	1
2: Pressure transmitter with 0-10 V				
3: Pressure transmitter with 1-5 V				
Working range for pressure transmitter Pc - min.	o20	-1 bar	5 bar	-1
Working range for pressure transmitter Pc - max.	o21	6 bar	199 bar	59
Refrigerant setting for P0 circuit				
1=R12. 2=R22. 3=R134a. 4=R502. 5=R717.	o30	0	35	0
6=R13. 7=R13b1. 8=R23. 9=R500. 10=R503.				
11=R114. 12=R142b. 13=User defined.				
14=R32. 15=R227. 16=R401A. 17=R507.				
18=R402A. 19=R404A. 20=R407C. 21=R407A.				
22=R407B. 23=R410A. 24=R170. 25=R290.				
26=R600. 27=R600a. 28=R744. 29=R1270.				
30=R417A. 31=R422A. 32=R413A. 33=R422D.				
34=R427A. 35=R438A				
Relay application: 0=Alarm relay. 1=EVR valve i liquid line	o36	0	1	0
Forced control of the valves opening degree. (Only if o18 is set to manual)	o45	0	100%	0

Working range for pressure transmitter P0 - min.	o47	-1 bar	5 bar	-1
Working range for pressure transmitter P0 - max.	o48	6 bar	199 bar	12
Refrigerant for Pc circuit Can only be changed via AKM / service tool	----	0	35	28

#### Factory setting

If you need to return to the factory-set values, it can be done in this way:

- Cut out the supply voltage to the controller
- Keep both buttons depressed at the same time as you reconnect the supply voltage

Service		
Read status of input DI	u10	on/off
Temperature at S3 sensor	u12	°C
Temperature at S2 sensor	u20	°C
Read actual superheat SH	u21	K
Read actual superheat reference	u22	K
Read ETS valves opening degree	u24	%
Read pressure at pressure transmitter P0	u25	bar
Read P0 converted to temperature	u26	°C
Read calculated SH closing value	U19	K
Read Pc converted to temperature	U20	°C
Read pressure at pressure transmitter Pc	U21	bar

