



REFRIGERATION AND  
AIR CONDITIONING

# Instructions

## EKC 531D1



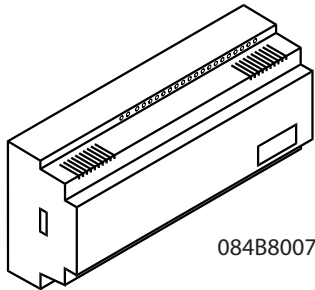
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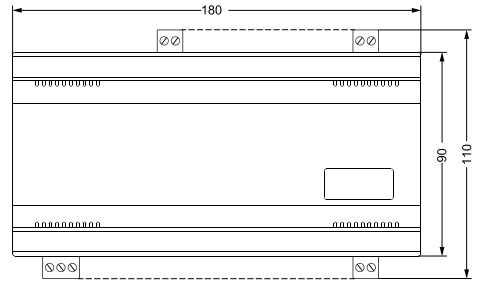
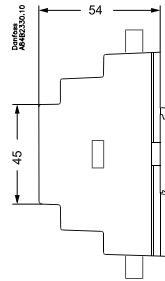


### Identification

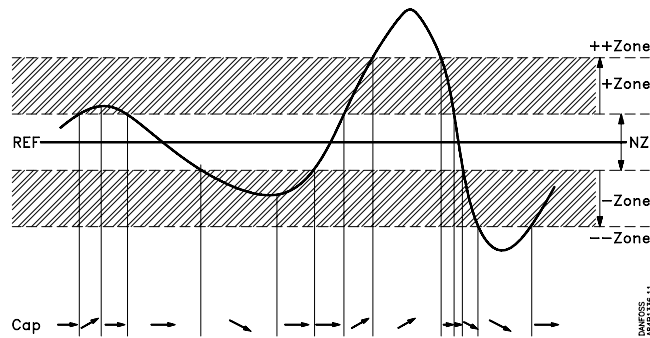
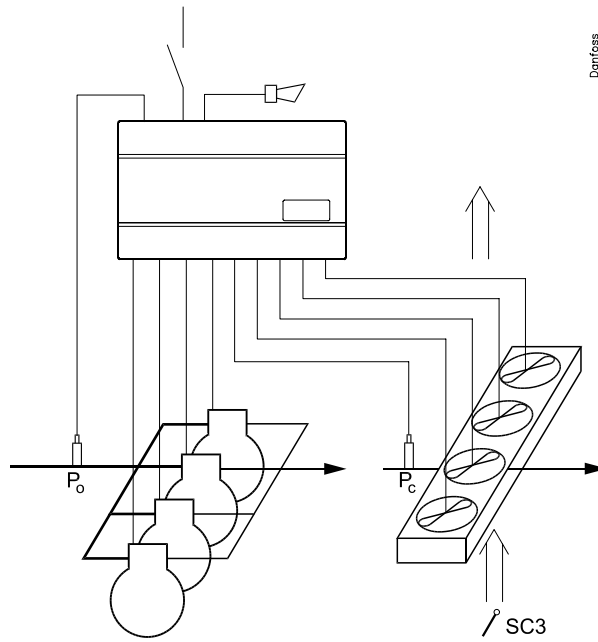


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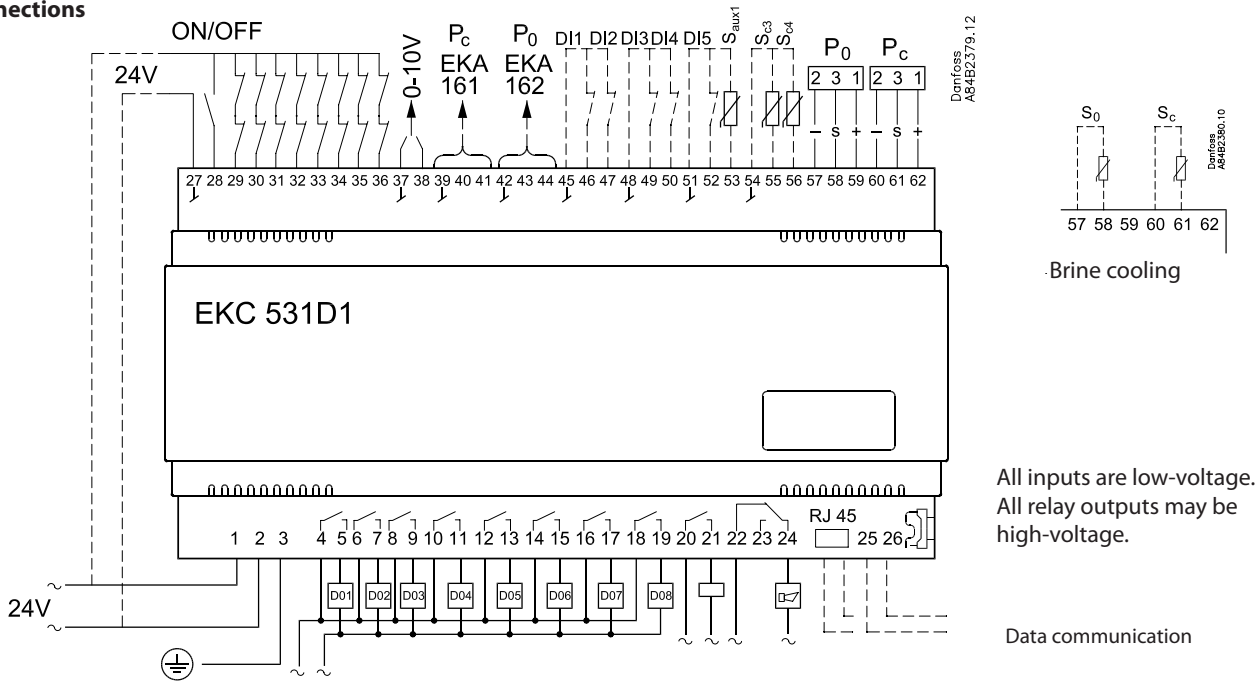
### Dimensions



### Principle



## Connections



All inputs are low-voltage.  
All relay outputs may be high-voltage.

Data communication

## Necessary connections

Terminals:

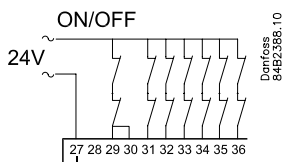
- 1-2 Supply voltage 24 V a.c.
- 4- 19 Relay outputs for either compressors, unloaders or fan motors
- 22-24 Alarm relay \*  
There is connection between 22 and 24 in alarm situations and when the controller is dead
- 27-28 24 V signal to start / stop of regulation
- 27-29 24 V signal from the safety circuit compressor 1
- 27-30 24 V signal from the safety circuit compressor 2
- 27-31 24 V signal from the safety circuit compressor 3
- 27-32 24 V signal from the safety circuit compressor 4
- 27-33 24 V signal from the safety circuit compressor 5
- 27-34 24 V signal from the safety circuit compressor 6
- 27-35 24 V signal from the safety circuit compressor 7
- 27-36 24 V signal from the safety circuit compressor 8
- 57-59 Suction pressure. Voltage signal from AKS 32R \*\*
- 60-62 Condenser pressure. Voltage signal from AKS 32R \*\*
- 54-55 Out temperature (Sc3). Sensor signal from AKS 11, AKS 12 or EKS 111

## Application dependent connections

- 20-21 Inject On function \*  
The relay cuts out when all compressor relays are cut out. The signal must be received by evaporator controls.
- 37-38 Voltage signal to external condenser control
- 39-41 Possibility of connecting an external display type EKA 161 for display of Pc
- 42-44 Possibility of connecting an external display type EKA 161 for display of P0, or EKA 162 for operation and display of P0
- 45-46 Contact function for alarm signal
- 45-47 Contact function for alarm signal
- 48-49 Contact function for alarm signal
- 48-50 Contact function for displacement of the suction pressure reference or for alarm signal.
- 51-52 Contact function for displacement of the condenser pressure reference or for alarm signal.
- 51-53 Separate sensor Saux1. Sensor signal fra AKS 11, AKS 12 or EKS 111
- 54-56 Air temperature at condenser outlet. Sensor signal from AKS 11, AKS 12 or EKS 111

## Data communication

- 25-26 Mount only, if a data communication module has been mounted.  
For ethernet communication the plug connection RJ45 must be used. (LON FTT10 can also be connected in this way.  
It is important that the installation of the data communication cable be done correctly. Cf. separate literature No. RC.8A.C...



If an output is used for an unloader, the unloader's safety signal must be downloaded from the compressor's safety circuit.

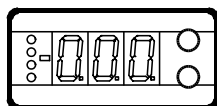
\*) Relays DO9 and DO10 may in special cases be reconfigured so that they can be used as fan relays.

\*\*) In brine systems temperature measurement at terminals 57-58 and 60-61 may be used instead of pressure measurement with AKS 32R. See also o06.

## Operation

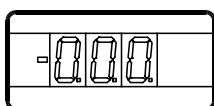
### Display

The values will be shown with three digits, and with a setting you can determine whether the pressures are to be shown in °C or i °F.



EKA 162

For operation and display of evaporating pressure. The light-emitting diodes on the left-hand side flash when there is an alarm.



EKA 161

For display of condensing pressure.

### 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

### Operation

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

### Quick- start

If you wish to start the system in a hurry so that refrigeration can be commenced you can set the following eight parameters: r23 – r28 – c08 – c09 – c16 – c29 – o30, and finally r12.

When regulation has then started you can go through the remaining parameters and adjust these.

### Literature survey:

Manual EKC 531D1

Installation guide, Data communication link

RS.8D.D.--

RC.8A.C.--

### 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

## Menu survey EKC 531D1

SW: 1.2x

Function	Parameter	Min.	Max.	Factory setting
<b>Normal display</b>				
Shows P0 in EKA 162 (display with buttons)	-	°C		
Shows Pc in EKA 161	-	°C		
<b>P0 reference</b>				
Neutral zone	r01	0.1 °C	20 °C	4.0
Correction of signal from P0 sensor	r04	-10 °C	10 °C	0.0
Select unit (0=bar and °C, 1=Psig and °F)	r05	0	1	0
Start/Stop of regulation	r12	OFF	ON	1
Reference offset for P0	r13	-20 °C	20 °C	0.0
Set regulation setpoint for P0	r23	-99 °C	30 °C	0.0
Shows total P0 reference	r24		°C	0.0
Limitation: P0 reference max. value *	r25	-99 °C	30 °C	30.0
Limitation: P0 reference min. value *	r26	-99 °C	0 °C	-99.9
Displacement of P0 (ON=active "r13")	r27	OFF	ON	0
<b>Pc reference</b>				
Set regulation setpoint for Pc	r28	-25 °C	75 °C	35
Shows total Pc reference	r29		°C	10
Limitation: Pc referencen max. value	r30	-99 °C	99 °C	10
Limitation: Pc referencen min. value	r31	-99 °C	99 °C	-10
Correction of signal from Pc sensor	r32	-10 °C	10 °C	0.0
Pc reference variation.1 and 2 are PI-regulation 1: Fixed reference. "r28" is used 2: Variable reference. Outdoor temperature (Sc3) included in the reference 3: As 1, but with P-regulation (Xp-band) 4: As 2, but with P-regulation (Xp-band) 5: As 2, and with heat recovery 6: As 4 and with heat recovery	r33	1	6	1
Reference offset for Pc	r34	-20 °C	20 °C	10
<b>Capacity</b>				
Min. ON time for relays	c01	0 min	30 min.	0
Min. time period between cutins of same relay	c07	0 min.	60 min	4
Definition of regulation mode 1: Sequential (step mode / FILO) 2: Cyclic (step mode / FIFO) 3: Binary and cyclic	c08	1	3	1
If a regulation mode with unloaders is selected, the relay must be defined to: 0: Cut in when more capacity is required 1: Cut out when more capacity is required	c09	0	1	0
Regulation parameter for + Zone	c10	0.1 K	2 K	5.0
Regulation parameter for + Zone min.	c11	0.1 min	60 min	5.0
Regulation parameter for ++ Zone seconds	c12	0.1 min.	3.0 min	1.0
Regulation parameter for - Zone	c13	0.1 K	2 K	2.0
Regulation parameter for - Zone min.	c14	0.1 min.	60 min	1.0
Regulation parameter for -- Zone seconds	c15	0.1 min.	10 min	0.5
Definition of compressor connections. See options on page 10.	c16	0	26	0
The following "c17" to "c28" is only relevant if "c16" has been selected to 0. A code will then have to be set for the relays that are to be ON at the different steps: Step 1 (M&M operation) Step 2 (M&M operation)	c17	0	15	0
	c18	0	15	0

\* also applies to regulation with reference displacement

Continues...

Step 3 (M&M operation)	c19	0	15	0
Step 4 (M&M operation)	c20	0	15	0
Step 5 (M&M operation)	c21	0	15	0
Step 6 (M&M operation)	c22	0	15	0
Step 7 (M&M operation)	c23	0	15	0
Step 8 (M&M operation)	c24	0	15	0
Step 9 (M&M operation)	c25	0	15	0
Step 10 (M&M operation)	c26	0	15	0
Step 11 (M&M operation)	c27	0	15	0
Step 12 (M&M operation)	c28	0	15	0
Definition of condenser: <b>1-8:</b> Total number of fan relays <b>9:</b> Only via analog output and start of frequency converter	c29	0/OFF	9	0
Proportional band Xp for (P= 100/Xp) condenser regulation	n04	0.2 K	40 K	10
I: Integration time Tn for condenser regulation	n05	30 s	600 s	150
<b>Alarm</b>				
Delay time for a "Saux1" alarm	A03	0 min.	90 min	30
Low alarm and safety limit for PC	A11	-1 bar	40 bar	-40
Delay time for a DI1 alarm	A27	0 s	600 s /off	600
Delay time for a DI2 alarm	A28	0 s	600 s /off	600
Delay time for a DI3 alarm	A29	0 s	600 s /off	600
Upper alarm and safety limit for Pc	A30	0 °C	99 °C	60.0
Upper alarm limit for sensor "Saux1"	A32	0 °C /off	99°C	0.0
<b>Miscellaneous</b>				
Controllers address	o03*	1	60	
On/off switch (service-pin message)	o04*	-	-	
Access code	o05	off(-1)	100	
Used sensor type for Sc3, Sc4 and "Saux1" <b>0</b> =PT1000, <b>1</b> =PTC1000 2-7=variations with temperature sensor on P0 and Pc. See earlier in the manual.	o06	0	7	0
Set supply voltage frequency	o12	50 Hz	60 H	0
Manual control of outputs: <b>0:</b> No override <b>1-10:</b> 1 will cut in relay 1, 2 relay 2, etc. <b>11-18:</b> Gives voltage signal on the analog output. (11 gives 1.25 V, and so on in steps of 1.25 V	o18	0	18	0
P0 pressure transmitter's working range - min. value	o20	-1 bar	0 bar	-1.0
P0 pressure transmitter's working range - max. value	o21	1 bar	40 bar	12.0
Use of DI4-input <b>0</b> =not used. <b>1</b> =P0 displacement. <b>2</b> =alarm function. Alarm="A31"	o22	0	2	0
Operating hours of relay 1 (value time 1000)	o23			h 0.0
Operating hours of relay 2 (value time 1000)	o24			h 0.0
Operating hours of relay 3 (value time 1000)	o25			h 0.0
Operating hours of relay 4 (value time 1000)	o26			h 0.0
Setting of refrigerant 1=R12. 2=R22. 3=R134a. 4=R502. 5=R717. 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	o30	0	30	0
Use of DI5-input <b>0</b> =not used. <b>1</b> =Pc displacment. <b>2</b> =alarm function. Alarm="A32"	o37	0	2	0

Pc pressure transmitter's working range - min. value	o47	-1 bar	0 bar	-1.0
Pc pressure transmitter's working range - max. value	o48	1 bar	60 bar	34.0
Read temperature at sensor "Saux1"	o49		°C	22.3
Operating hours of relay 5 (value time 1000)	o50		h	
Operating hours of relay 6 (value time 1000)	o51		h	
Operating hours of relay 7 (value time 1000)	o52		h	
Operating hours of relay 8 (value time 1000)	o53		h	
<b>Service</b>				
Read temperature at sensor "Sc3"	u44		°C	41.1
Read temperature at sensor "Sc4"	u45		°C	20.1

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

The controller can give the following messages		
E1	<b>Error message</b>	Fault in controller
E2		Regulation is outside the range, or the control signal is defective
A2	<b>Alarm message</b>	Low P0
A11		Refrigerant not selected
A17		High Pc
A19		Compressor 1 alarm. Terminal 29 is open
A20		Compressor 2 alarm. Terminal 30 is open
A21		Compressor 3 alarm. Terminal 31 is open
A22		Compressor 4 alarm. Terminal 32 is open
A23		Compressor 5 alarm. Terminal 33 is open
A24		Compressor 6 alarm. Terminal 34 is open
A25		Compressor 7 alarm. Terminal 35 is open
A26		Compressor 8 alarm. Terminal 36 is open
A27		Room temperature alarm (housing temp.)
A28		DI 1 alarm. Terminal 46 interrupted
A29		DI 2 alarm. Terminal 47 interrupted
A30		DI 3 alarm. Terminal 49 interrupted
A31		DI 4 alarm. Terminal 50 interrupted
A32	DI 5 alarm. Terminal 52 interrupted	
A45	Regulation stopped	
S2	<b>Status message</b>	Wait for "c01"
S5		Wait for "c07"
S8		Wait for "c11" or "c12"
S9		Wait for "c14" or "c15"
S10		Refrigeration stopped by the internal or external start/stop function