MAKING MODERN LIVING POSSIBLE

Collection of Instructions

Instructions for Danfoss
Refrigeration & Air conditioning Controls

REFRIGERATION &
AIR CONDITIONING DIVISION

Catalogue

Electronic Controls and Valves

Instruction

For making Bump test on
Danfoss Gas Leak Detectors
types GDA and GDC

148R9544

148R9544

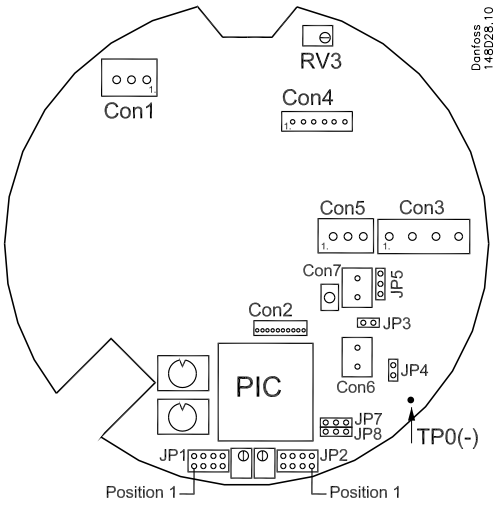


Fig. 1

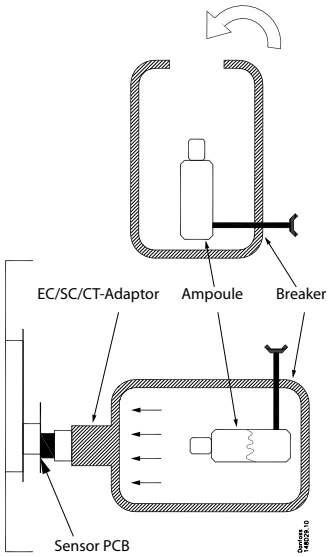
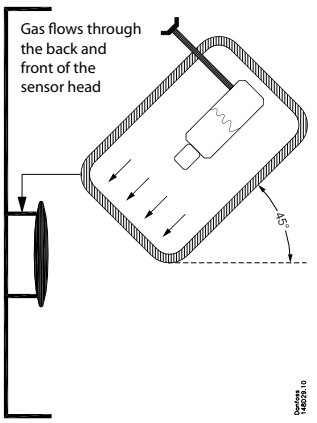
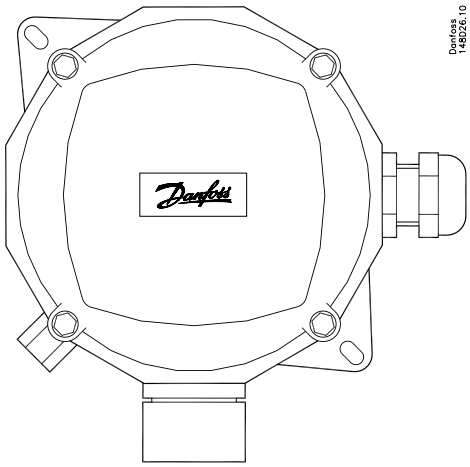


Fig. 2



Bump test on a wall mounted CO_2 detector

Fig. 3



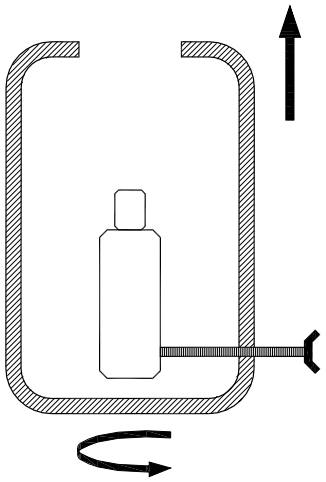


Fig. 4

BUMP TEST equipment

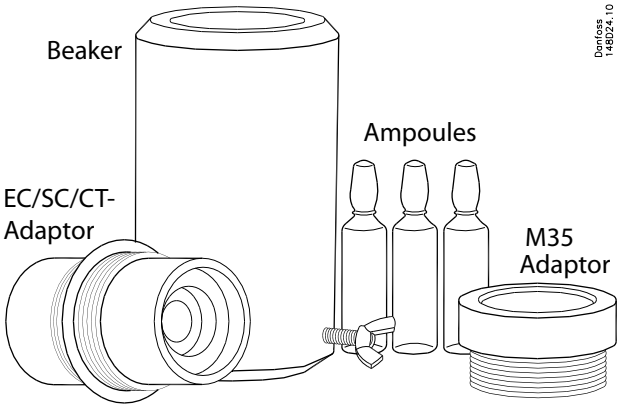


Fig. 5

Table 1 - Bump Test

	Sensor \ Models	Pass test criteria: Requirement for sensor response to pass Bump Test. Measure Voltage Output on Con3,(mother PCB) pin 1 and 3	Standard Basic	Standard Basic with LCD display	IP 65 for High RH and Fast response
1	GDA EC 100	>= 5 .0 V	Beaker + EC/SC/CT-Adaptor		Beaker
	GDA EC 300	>= 1.67 V			
	Bump test method		100 ppm Ammonia Ampoule		
2	GDA EC 1000	>= 5 V	Beaker + EC/SC/CT-Adaptor		Beaker
	Bump test method		1000 ppm Ammonia Ampoule		
3	GDA SC 1000	>= 5 .0 V	Beaker + EC/SC/CT-Adaptor		Beaker
	Bump test method		1000 ppm Ammonia Ampoule		
4	GDA SC 10000	>= 0.5 V	Beaker + EC/SC/CT-Adaptor		Beaker
	Bump test method		1000 ppm Ammonia Ampoule		
5	GDA CT 30000	>= 5 .0 V	Beaker + EC/SC/CT-Adaptor		Beaker + M35 Adaptor
	Bump test method		App. 5-8 % Ammonia water in a cloth [1])		
6	GDC IR 10000	>= 1.0 V	Beaker	Beaker	not available
	Bump test method		2000 ppm CO_2 Ampoule		

[1]) Drop a cloth to the bottom of the beaker, hold it at the bottom with the screw. Moisten the cloth (5-10 drops) with 5-8 % ammonia water.

Restricted bump test

	Sensor \ Models	Requirement for sensor response to pass Bump Test. Measure Voltage Output on Con3,(mother PCB) pin 1 and 3	Standard Basic	Standard Basic with LCD display	IP 65 for High RH and Fast response
7	GDC IR 20000	>= 2 .0 V	Sensor is self calibrating. Breathe on sensor to see response		
	GDC IR 40000	>= 2 .0 V			
	Bump test method				
8	GDHC SC 1000	>= 5 V	Long life sensor. Use a cigarette lighter to see response		
	GDHF SC 1000	>= 5 V			
	GDHF-R3 SC 1000	>= 5 V			
	Bump test method				
9	GDH SC 5000	>= 5 .0 V	Long life sensor. Use a cigarette lighter to see response		
	Bump test method				

Introduction

The frequency of testing or calibration is generally determined by local regulation or standards.
There are two concepts that need to be differentiated: bump test and calibration

Bump Test: This consists of exposing the sensor to a gas. The objective is to establish if the sensor is reacting to the gas and all the sensor outputs are working correctly. A qualified bump test is a test carried out using ampoules or cylinders of known concentration.

Calibration: This consists of exposing the sensor to a calibration gas setting the "zero" or "Standby voltage", the span or range, and checking/adjusting all the outputs, so that they are activated at a specified gas concentration.

Danfoss recommends annual checks by qualified bump test and replacement of the sensor PCB with a Danfoss pre-calibrated certified sensor PCB every two years. The mother PCB is at the same time tested with the GD tester.

The alternative to this is a full on site calibration. Sensor replacement should be more cost effective, eliminates end of life concerns, and constantly renews the detection system.

Procedures for bump test and calibration vary depending on the sensor technology used and the gas in question.

The GD is available in four sensor versions: Semiconductor (SC), Electrochemical (EC), Catalytic (CT), and Infrared (IR) for CO_2.

Before you carry out the test or calibration:

1. Advise occupants, plant operators, and supervisors.
2. Check if the relays (Con6 and Con7) are connected to external systems such as sprinkler systems, plant shut down, external sirens and beacons, ventilation, etc. and disconnect as appropriate.
3. Deactivate alarm delays with JP1 and JP2. See fig. 1. For this the GD must be powered off.
4. For Bump Test the GD should be powered up overnight.

NOTE:
If unit has been installed and running for about 24 hrs, and you need to power it off to set the delay at 0 min, then the warm-up is 2 min and you can begin the testing or calibration.

Table 1 - Bump Test (continued)

	IP 56 enclosure Low Temperature	EExd model	EExd model Low Temperature	IP 66 enclosure 5 m remote IP 65 sensor	IP 66 enclosure 5 m remote IP 65 EExd sensor
1	Beaker + EC/SC/CT-Adaptor	Beaker			
	100 ppm Ammonia Ampoule				
2	Beaker + EC/SC/CT-Adaptor	Beaker			
	1000 ppm Ammonia Ampoule				
3	Beaker + EC/SC/CT-Adaptor	Beaker + M35 Adaptor		Beaker	Beaker + M35 Adaptor
	1000 ppm Ammonia Ampoule				
4	Beaker + EC/SC/CT-Adaptor	Beaker + M35 Adaptor		Beaker	Beaker + M35 Adaptor
	1000 ppm Ammonia Ampoule				
5	Beaker + EC/SC/CT-Adaptor	Beaker + M35 Adaptor			
	App. 5-8 % Ammonia water in a cloth [1])				
6	Beaker	Beaker	Beaker	not available	not available
	2000 ppm CO_2 Ampoule				

[1]) Drop a cloth to the bottom of the beaker, hold it at the bottom with the screw. Moisten the cloth (5-10 drops) with 5-8 % ammonia water.

Restricted bump test

	IP 56 enclosure Low Temperature	EExd model	EExd model Low Temperature	IP 66 enclosure 5 m remote IP 65 sensor	IP 66 enclosure 5 m remote IP 65 EExd sensor
7	Sensor is self calibrating. Breathe on sensor to see response				
8	Long life sensor. Use a cigarette lighter to see response				
9	Long life sensor. Use a cigarette lighter to see response				

BUMP TEST (every year)

Ideally bump tests are conducted on site in a clean air atmosphere.

The bump test can be carried out on following types of GD (see table 1)
GDA (qualified bump test)
GDC (qualified bump test/ restricted bump test)
GDHC (restricted bump test)
GDHF (restricted bump test)
GDHF-R3 (restricted bump test)

See table 1, to find the GD type and the corresponding Bump test method.

Checking the zero (0 Voltage output).
See Appendix 1. (not required for IR sensor)

1. Remove the cover of enclosure of the GD

2. Make sure that both the ampoules and the calibration beaker are clean and dry (see fig. 5).

3. Unscrew the beaker hold screw and place the ampoule so that is sits in the base of the beaker (see fig. 2).

4. Tighten on the screw ampoule without breaking it.

5. For the models:
   Standard Basic
   Standard Basic with LCD display
   IP 56 enclosure
   IP 56 enclosure Low Temperature
   Screw in:
   EC/SC/CT-Adaptor or M35-Adaptor into the Beaker according to table 1.

   Place the beaker with the EC/SC/CT-Adaptor over the sensor. It should be as tight fitting as possible to allow maximum exposure to the gas (see fig. 5).

For the GDC (CO_2)models:
Standard Basic
Standard Basic with LCD display
IP 56 enclosure
IP 56 enclosure Low Temperature

Place the beaker over the sensor in a 45° degree (see fig. 3). This allows gas to flow through the back of the sensor and through the calibration ports.

For the models:
IP 65 for High RH and Fast response
EExd model
EExd model Low Temperature
IP 66 enclosure 5 m remote IP 65 sensor
IP 66 enclosure 5 m remote IP 65 EExd sensor

Screw/fit the beaker (possibly with M35 Adaptor) on the remote sensorhead (see fig. 4). It should be as tight fitting as possible to allow maximum exposure to the gas.

7. Connect volt meter to monitor sensor response. (Con3 pin 1 and 3 - see fig. 1).

8. Tighten on the ampoule until it shatters allowing the content to diffuse in the beaker. It should be left in place for approximately 5 min.

9. Voltage output will increase. This confirms that the sensor is responding. See Pass test criteria in table 1.

10. Carefully remove any ampoule remains from the gas detector, and reassemble the sensor enclosure.

Fill out the GD Bump Test Certificate (literature no.: PZ.S00.A).

Checking the zero. (0.0 V output)

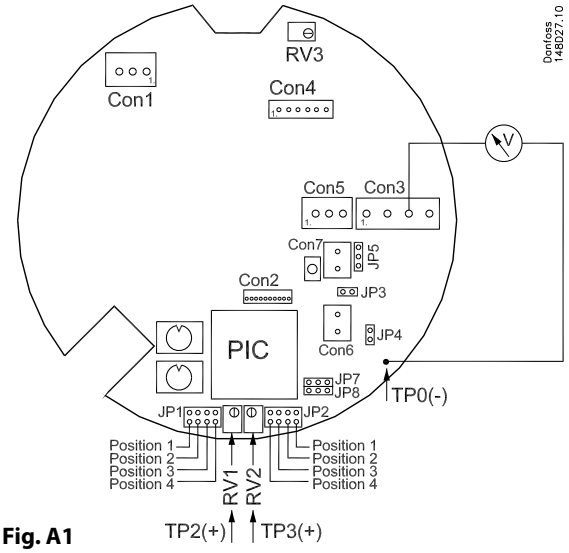
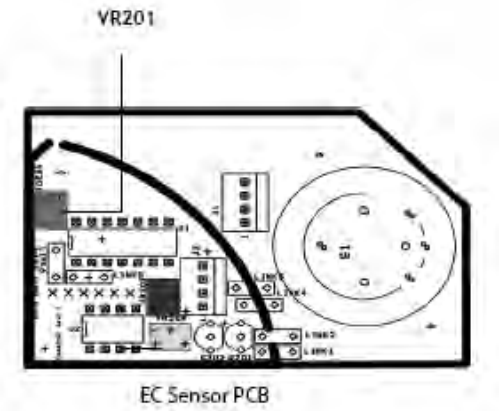


Fig. A1

EC sensor
To adjust the zero, Pot VR201 must be operated. It is located on the Sensor PCB

Connect a voltmeter to TP0 on the mother PCB and Con3, pin 3 on the mother PCB

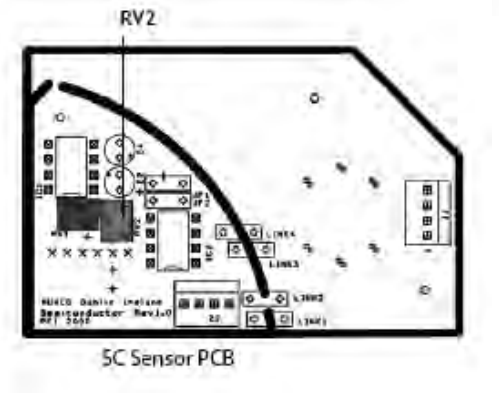
Pot VR201 (on the Sensor PCB) is used to adjust the zero of the range (span). Measure the Voltage output between TP0 (negative) and Con3 pin 3 (positive) at the 0V signal and adjust the Pot to 0.0 V or slightly positive (0.01 V is acceptable).



SC sensor
To adjust the zero, Pot RV2 must be operated. It is located on the Sensor PCB.

Connect a voltmeter to TP0 on the mother PCB and Con3, pin 3 on the mother PCB (see fig. A1)

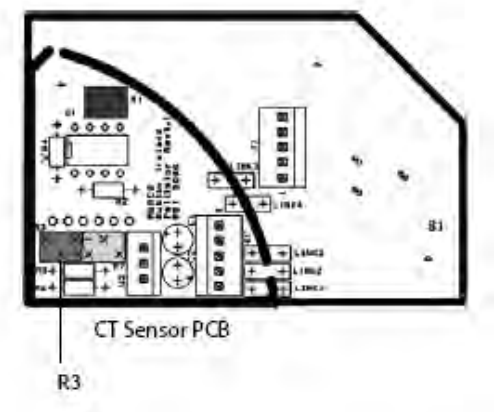
Pot RV2 (on the Sensor PCB) is used to adjust the zero of the range (span). Measure the Voltage output between TP0 (negative) and Con3 pin 3 (positive) at the 0V signal and adjust the Pot to 0.0 V or slightly positive (0.01 V is acceptable).



CT sensor
To adjust the zero, Pot R3 must be operated. It is located on the Sensor PCB.

Connect a voltmeter to TP0 on the mother PCB and Con3, pin 3 on the mother PCB (see fig. A1).

Pot R3 (on the Sensor PCB) is used to adjust the zero of the range (span). Measure the Voltage output between TP0 (negative) and Con3 pin 3 (positive) at the 0V signal and adjust the Pot to 0.0 V or slightly positive (0.01 V is acceptable).



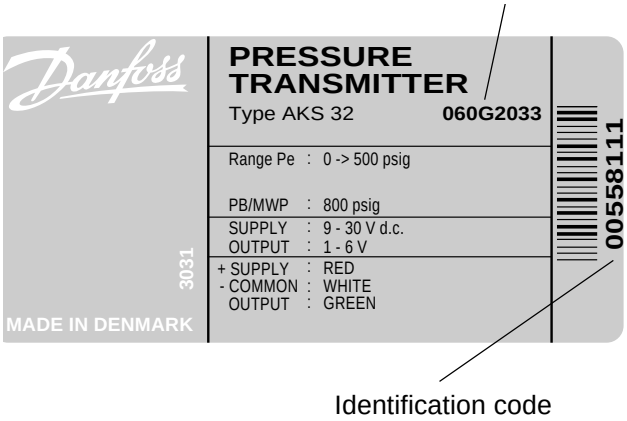
INSTRUCTIONS

AKS 32

060G2029 and 060G2033

060R9510

Identification

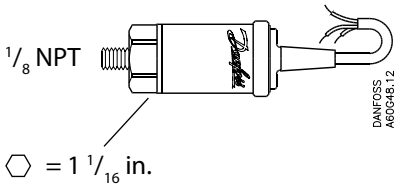


Main data

Max. media / ambient temperature: 175 °F (80 °C)
Min. media / ambient temperature: –40 °F (–40 °C)
Refrigerants:
NH_3, HFC, HCFC, CFC

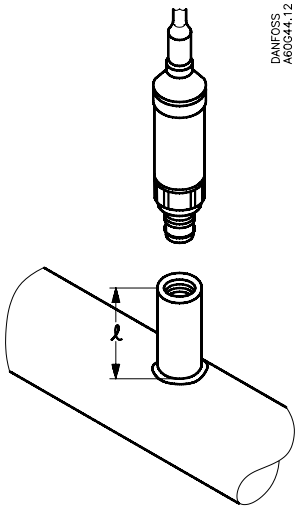
The sensor is non-adjustable!

Pressure connection



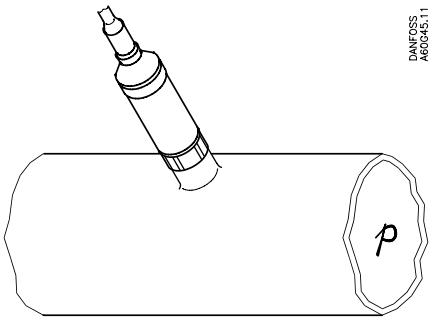
Mounting

Hot gas pipe



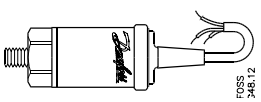
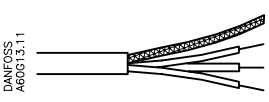
When used on a hot gas pipe use a distance sleeve to reduce temperature influence.
A hot gas temperature higher than 210 °F (100 °C), a 2 in. (5 cm) sleeve is to be used.

Max. pressure



Range	SWP / MWP	Test pressure
0 - 200 psig	400 psig	800 psig
0 - 500 psig	800 psig	800 psig

Electrical connection

Type	Symbol	Connection	Power sypply	Output signal
AKS 32		 Screen: Isolated from housing Red: + supply White: – supply / common Green: + output signal	Max. 30 V d.c.	1 - 6 V d.c. R > 10 kΩ

Instruction

GDA, GDC, GDHC, GDHF, GDH

148R9527

148R9527

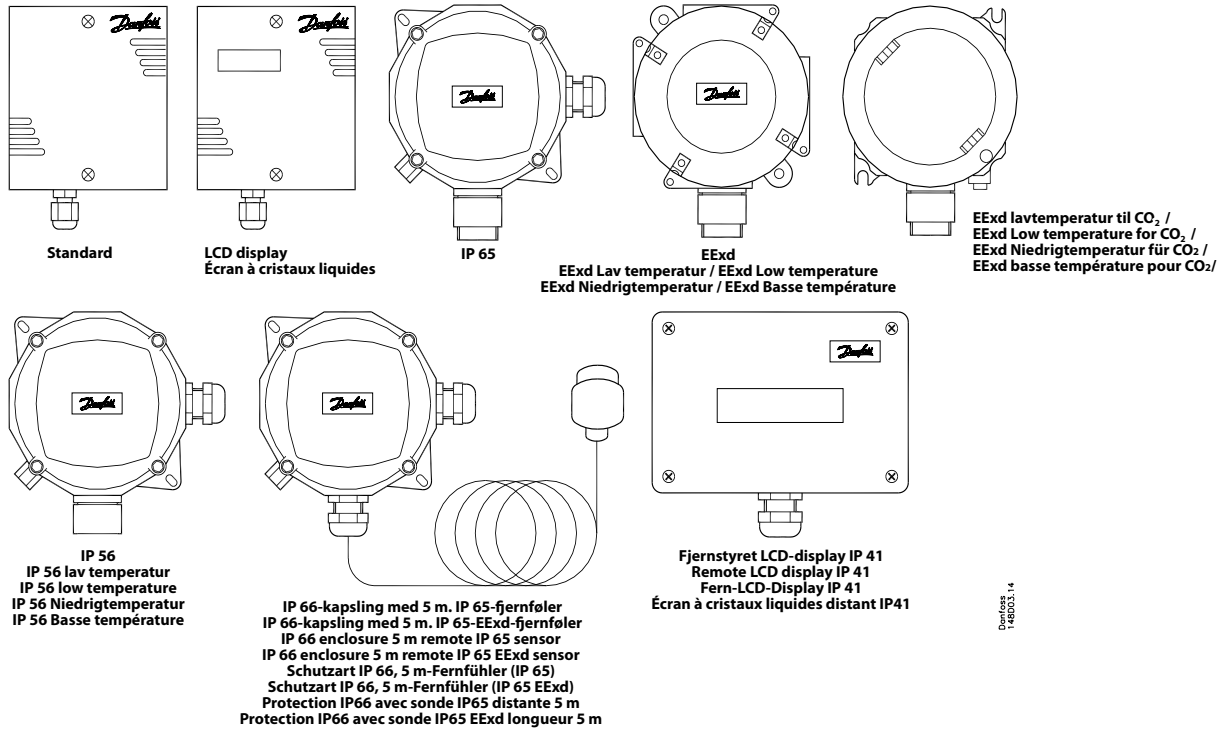
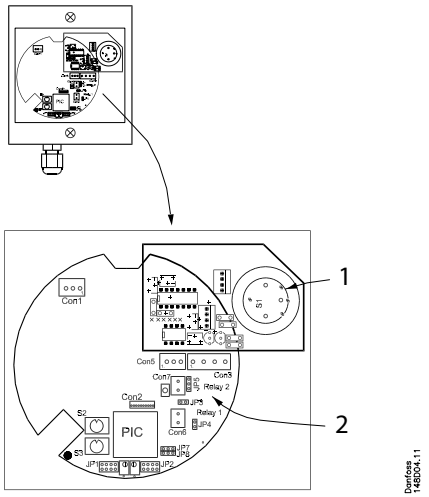


fig. 1

- **Standard**
- **LCD display**
  Écran à cristaux liquides

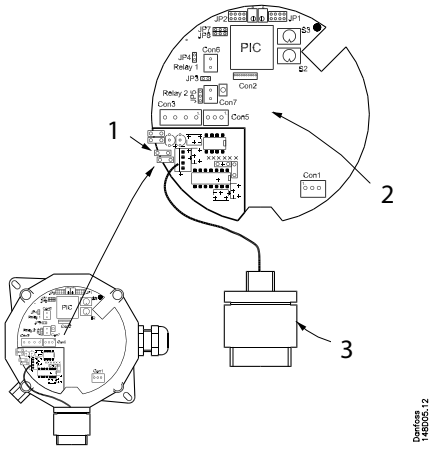


1 Sensor printkort / Sensor PCB / Sensorkarte / Carte de détection

2 Hovedprintkort / Mother PCB / Hauptplatine / Carte mère

fig. 2

- **IP 65**
- **EExd**
- **EExd lav temperatur**
  EExd low temperature
  EExd niedrigtemperatur
  EExd basse température



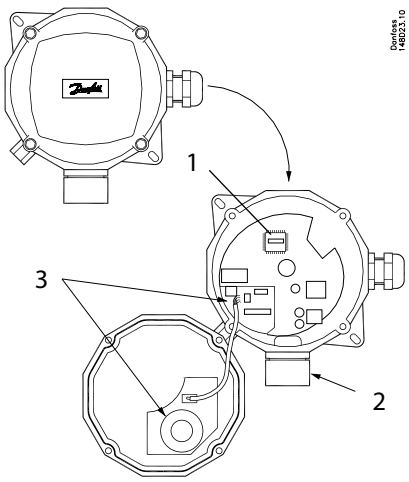
1 Sensor printkort med eksternt sensorhoved / Sensor PCB with external sensor / Sensorkarte mit externem Sensor / Carte de détection aved détecteur externe

2 Hovedprintkort / Mother PCB / Haupfplatime / Carte mère

3 Sensorhoved / Sensor head / Sensorkopf / Tête de détection

fig. 3

- **IP 56**
- **IP 56 lav temperatur**
  IP 56 low temperature
  IP 56 niedrigtemperatur
  IP 56 basse température



1 Hovedprintkort / Mother PCB / Haupfplatime / Carte mère

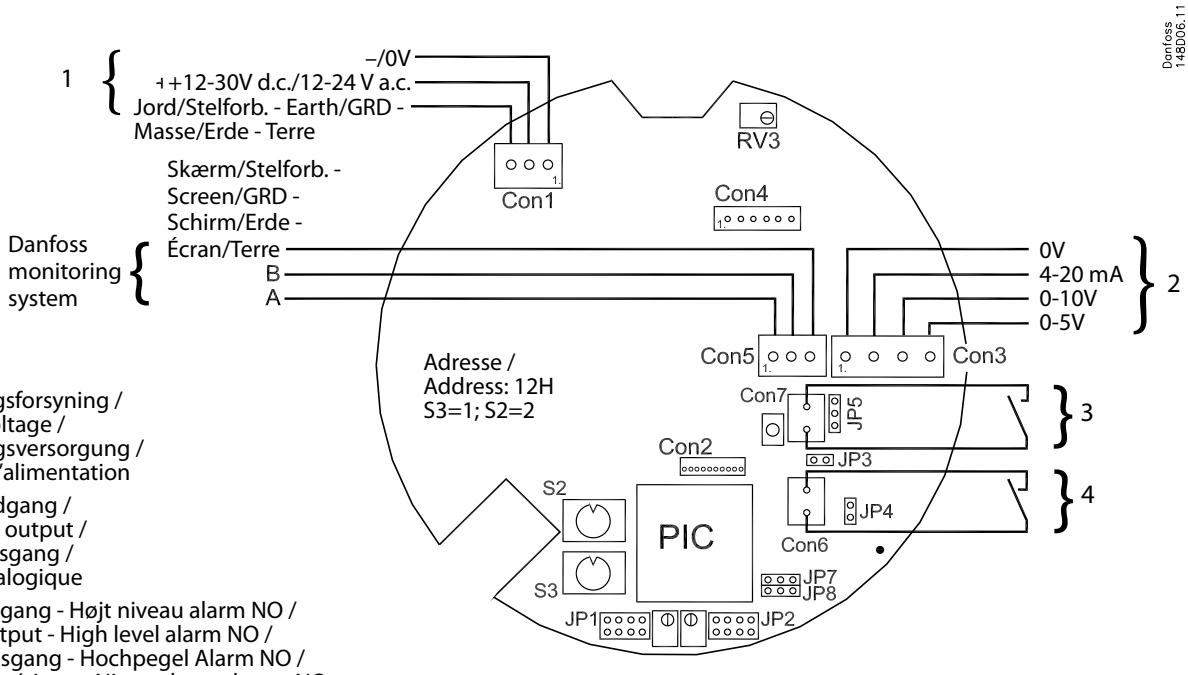
2 Udluftningsventildræn / Breather drain / Ventilationsöffnung / Tuyau du reniflard

3 Sensor printkort / Sensor PCB / Sensorkarte / Carte de détection

fig. 4

~~RI7HA452~~ → DKRCI.PI.S00.A1.52 / 520H2528

Elektrisk tilslutning af alle modeller / Electrical connection for all models / Elektrischer Anschluss für alle Modelle / Raccordements électriques pout tous modèles



1 Spændingsforsyning / Supply voltage / Spannungsversorgung / Tension d'alimentation

2 Analog udgang / Analogue output / Analogausgang / Sortie Analogique

3 Digital udgang - Højt niveau alarm NO / Digital output - High level alarm NO / Digital Ausgang - Hochpegel Alarm NO / Sortie numérique - Niveau haut alarme NO

4 Digital udgang - Lavt niveau alarm NO / Digital output - Low level alarm NO / Digital Ausgang - Niedrigpegel Alarm NO / Sortie numérique - Niveau bas alarme NO

fig. 5

Tilslutning af jumper på alle modeller / Jumper connection for all models / Steckbrückenanschlüsse für alle Modelle / Raccord cavalier pout tous modèles

1 Ved udskiftning af jumpere skal strømmen afbrydes (CON1) for at aktivere den nye jumperindstilling. / When changing any jumper position, the power must be disconnected (CON1) to enable the new jumper setting. / Werden Steckbrücken geändert, ist die Spannungsversorgung abzuschlaten (CON1) um die neue Steckbrückeneinstellung wirksom zu machen. / En cas de changement d'un cavalier, il est nécessaire de couper l'alimentation (CON1) afin d'activer le réglage du nouveau cavalier.

2 Gul LED3: Alarm for lavt niveau / Yellow LED3: Low alarm / Gelbe LED3: Niedrigalarm / DEL3 jaune : Alarme basse

3 Rød LED2: Alarm for højt niveau / Red LED2: High alarm / Rote LED2: Hochalarm / Del2 Rouge : Alarme haute

4 Grøn LED1: Anvendt spænding / Green LED1: Voltage applied / Grüne LED1: Spannung liegt an / DEL1 verte : Sous tension

5 JP1: Forsinket responstid, alarm for lavt niveau / JP1: Delay response time for Low Level alarm / JP1: Ansprechverzögerung für Niedrigpegelalarm / JP1: Temporisation pour l'alarme de niveau bas

6 JP2: Forsinket responstid, alarm for højt niveau / JP2: Delay response time for High Level alarm / JP2: Ansprechverzögerung für Hochpegelalarm / JP2: Temporisation pour alarme de niveau haut

7 JP5: Indstilling af digital udgang, alarm for højt niveau JP5: Setting for digital output, High Level alarm / JP5: Einstellung für Digitalausgang, Hochpegelalarm / JP5: Réglage de la sortie numérique, Alarme de niveau haut

8 JP3/JP4: Indstilling af digital udgang, alarm for lavt niveau/ JP3/JP4: Setting for digital output, Low Level alarm / JP3/JP4: Einstellung für Digitalausgang,Niedrigpegelalarm / JP3/JP4: Réglage de la sortie numérique, Alarme de niveau bas

9 JP7: Alarm for højt niveau / JP7: High Level alarm / JP7: Hochpegelalarm / JP7: Alarme de niveau haut

10 JP8: Alarm for lavt niveau / JP8: Low Level alarm / JP8: Niedrigpegelalarm / JP8: Alarme de niveau bas

11 Manuel nulstilling af alarm for lavt/højt niveau / Manual reset of Low/High Level alarm / Manuelle Rückstellung von Niedrig-/Hochpegelalarm / Réinitialisation manuelle de l'alarme de niveau bas-haut

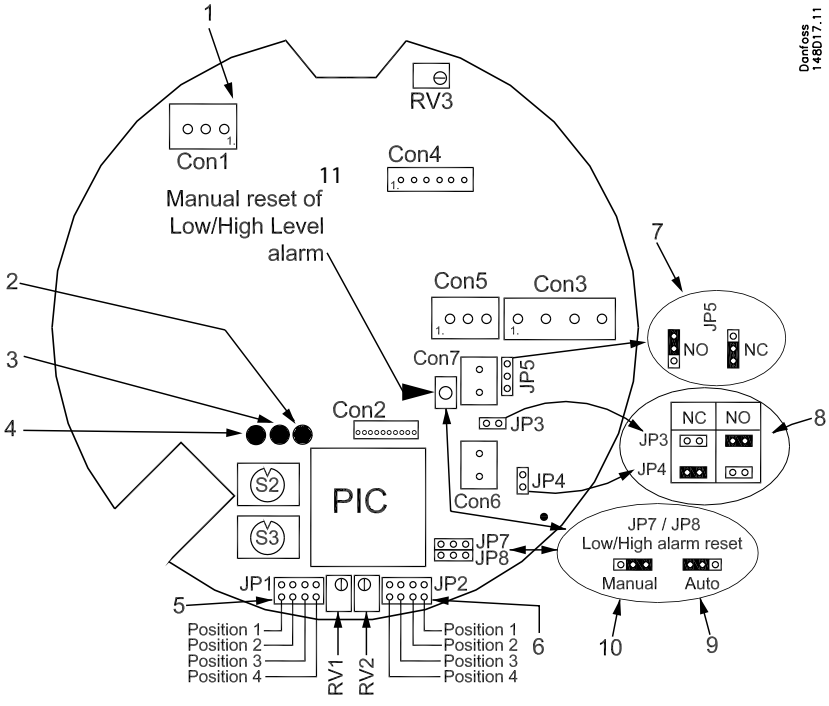


fig. 6

Justering af lave/høje alarmværdier / Adjusting low/high alarm values / Einstellen der Niedrig-/Hochwerte / Réglage des valeurs d'alarme basse-haute

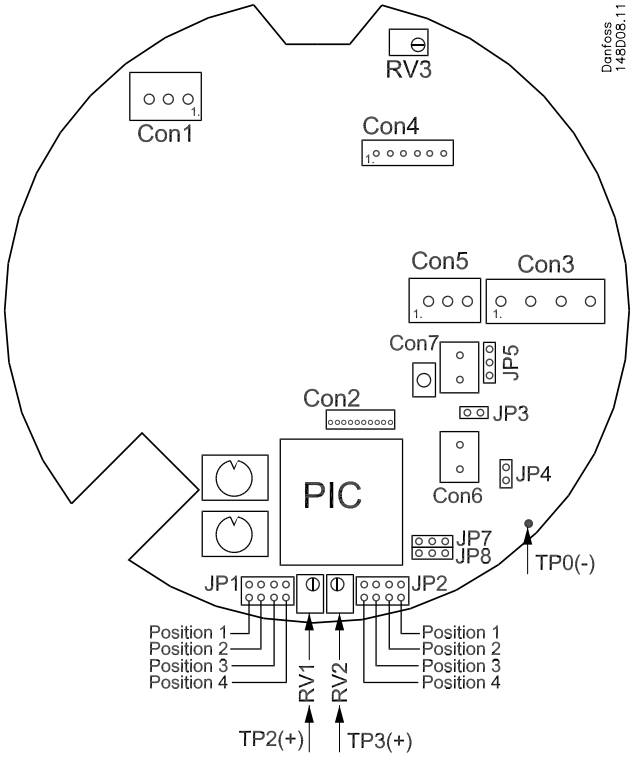


fig. 7

Indstilling af adresse ved kommunikation med Danfoss Monitoring System / Setting of address when communicating with Danfoss Monitoring System / Einstellen der Adresse zur Kommunikation mit Danfoss Monitoring System/ Réglage d'adresse pour communication avec Danfoss Monitoring System

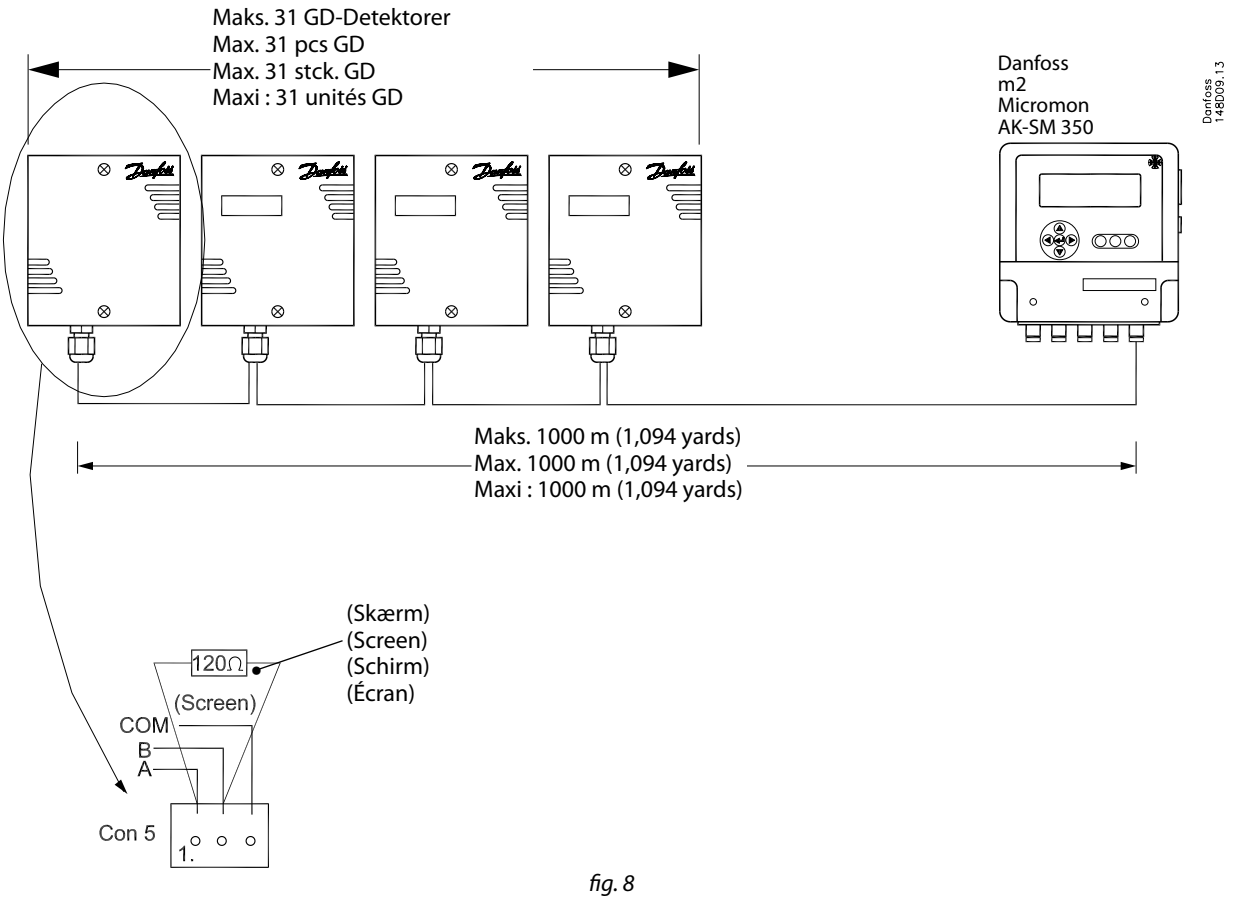


fig. 8

Indstilling af adresse ved kommunikation med Danfoss m2 *(fortsat)* **/**
Setting of address when communicating with Danfoss m2 *(continued)* **/**
Einstellen der Adresse zur Kommunikation mit Danfoss m2 *(fortgesetzt)* **/**
Réglage d'adresse pour communication avec Danfoss m2 *(suite)*

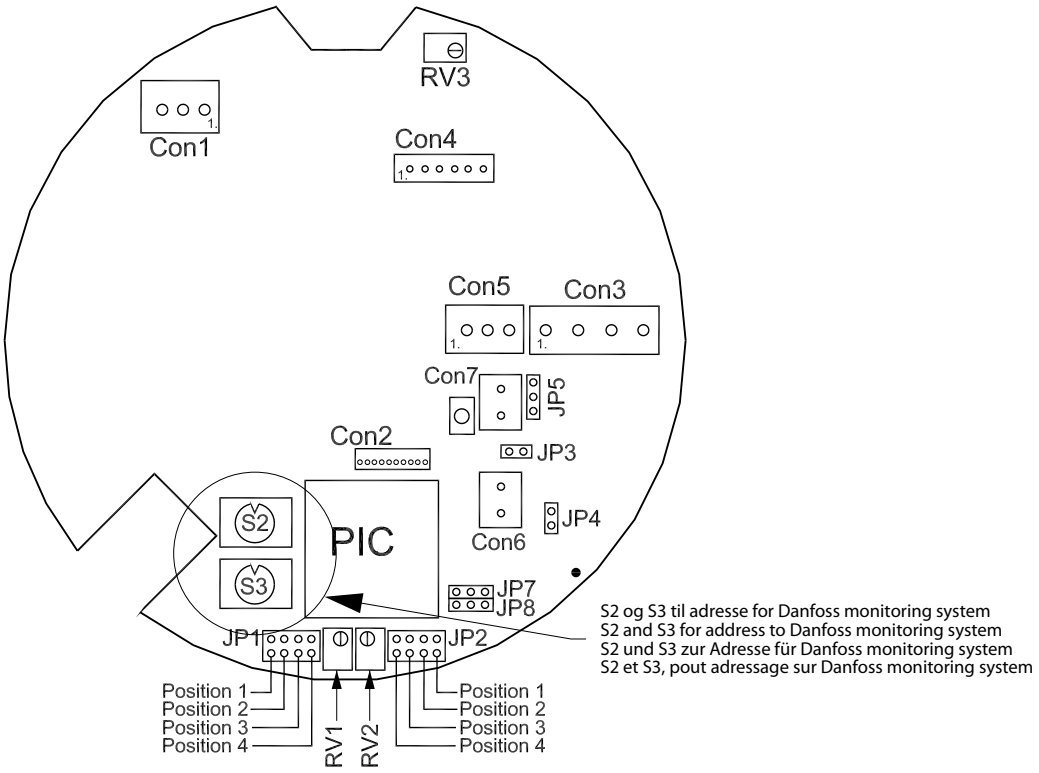


fig. 9

Kanal på Danfoss monitoring system Channel on Danfoss monitoring system Kanal von Danfoss monitoring system Canal zur Danfoss monitoring system	S3	S2	Kanal på Danfoss monitoring system Channel on Danfoss monitoring system Kanal von Danfoss monitoring system Canal zur Danfoss monitoring system	S3	S2	Kanal på Danfoss monitoring system Channel on Danfoss monitoring system Kanal von Danfoss monitoring system Canal zur Danfoss monitoring system	S3	S2
1	0	1	34	2	2	67	4	3
2	0	2	35	2	3	68	4	4
3	0	3	36	2	4	69	4	5
4	0	4	37	2	5	70	4	6
5	0	5	38	2	6	71	4	7
6	0	6	39	2	7	72	4	8
7	0	7	40	2	8	73	4	9
8	0	8	41	2	9	74	4	A
9	0	9	42	2	A	75	4	B
10	0	A	43	2	B	76	4	C
11	0	B	44	2	C	77	4	D
12	0	C	45	2	D	78	4	E
13	0	D	46	2	E	79	4	F
14	0	E	47	2	F	80	5	0
15	0	F	48	3	0	81	5	1
16	1	0	49	3	1	82	5	2
17	1	1	50	3	2	83	5	3
18	1	2	51	3	3	84	5	4
19	1	3	52	3	4	85	5	5
20	1	4	53	3	5	86	5	6
21	1	5	54	3	6	87	5	7
22	1	6	55	3	7	88	5	8
23	1	7	56	3	8	89	5	9
24	1	8	57	3	9	90	5	A
25	1	9	58	3	A	91	5	B
26	1	A	59	3	B	92	5	C
27	1	B	60	3	C	93	5	D
28	1	C	61	3	D	94	5	E
29	1	D	62	3	E	95	5	F
30	1	E	63	3	F	96	6	0
31	1	F	64	4	0	97	6	1
32	2	0	65	4	1	98	6	2
33	2	1	66	4	2	99	6	3

Installation

General procedure for all GD types (fig. 2, 3, 4)

All GD products are for wall mounting.

Removal of GD top cover:-
- For Standard and LCD display types:
  - Unscrew two front screws
- For IP 65, IP 56 and EExd types (fig. 3, 4):
  - Unscrew four front screws

Electrical installation (fig. 5 and 6)
The Earth/Ground connection must be made when using the standard, LCD display, or EExd enclosuretypes. The safety of the equipment is dependent on the integrity of the power supply and the earthing of the enclosure.

Apply voltage at CON 1 and the green LED will light up (fig. 6).

Stabilisation Period
Once the GD is initally powered up it takes some time to stabilise and will give a higher analog output (4-20 mA/0-10 V/0-5 V [1])) at the start before reverting to the actual concentration reading (in clean air and no leaks, on the analog output reverts back to:
(~ 0 V/4 mA / (~ 0 ppm)) [2]).

The stabilisation times specified below are only intended as a guide and may vary due to temperature, humidity, cleanliness of the air, storage time [3]) e.t.c

Model
GDA with EC sensor.....20-30 Sec
GDA with SC sensor..... 15 min.
GDA with CT sensor..... 15 min.
GDA with CT sensor, EExd model .....7 min.
GDHC/GDHF/GDHF-R3
with SC sensor .....1 min.
GDC with IR sensor .....10 sec.
GDC with IR sensor,
EExd model.....20 sec.
GDH with SC senso .....3 min.

When changing any jumper position, the power must be disconnected (CON1) to enable the new jumper setting.

Setting of normally open (NO) / normally closed (NC) for the digital output Low/ High Level alarm.
Both have an option to set at NO or NC. Factory setting is NO.

Digital output Low Level alarm
NO : JP3 ON, JP4 OFF (removed)
NC : JP4 ON, JP3 OFF (removed)
(fig. 6)

Digital output High Level alarm
NO : JP5 ON in upper position
NC : JP5 ON in lower position
(fig. 6)

Manual reset / auto reset of Low/High Level alarm (fig. 6)
This option available through JP8 (Low Level alarm) and JP7 (High Level alarm). The pre-set factory setting is Auto Reset. If manual reset is selected for either Low/ High Level alarm condition then manual reset push button is located next to CON 7.

Digital output Low Level alarm
Auto Reset : JP8 in left hand position
Manual: JP8 in right hand position

Digital output High Level alarm
Auto Reset : JP7 in left hand position
Manual: JP7 in right hand position

Adjusting delayed response time (fig. 6)
The digital output for Low/High Level alarms can be delayed.
The pre-set factory setting is 0 Minutes
Digital output Low Level alarm
JP1 in position
1 : 0 minutes
2 : 1 minutes
3 : 5 minutes
4 : 10 minutes
Digital output High Level alarm
JP2 in position
1 : 0 minutes
2 : 1 minutes
3 : 5 minutes
4 : 10 minutes

Adjusting Low/High alarm values (fig. 7)
All GD have been preset by the factory to realistic values related to the actual ppm range of the GD product. The actual Low and High alarm ppm limits are detailed on the external GD label. The factory preset value can be adjusted, with a voltmeter measuring the 0-5 V d.c output.
0 V corresponds to the min. ppm range (e.g. 0 ppm)
5 V corresponds to the max. ppm range (e.g. 1000)
E.g. if a setting of 350 ppm is required then the voltage shall be set to 1.75 V (35 % of 5 V)

Adjusting the Low alarm limit value
Between TP0(-) and TP2(+) a voltage between 0-5 V can be measured and with that the ppm Low alarm limit setting. The voltage/ppm setting can be adjusted at RV1.

Adjusting the High alarm limit value
Between TP0(-) and TP3(+) a voltage between 0-5 V can be measured and with that the ppm High alarm limit setting. The voltage/ppm setting can be adjusted at RV2.

Connecting GD to a Danfoss monitoring system (fig. 8 and 9)
Wiring (fig. 8)
All GD must be connected A-A, B-B, COM – COM (screen)
When connecting to the Danfoss monitoring system panel the same terminals are connected to each other i.e. A-A, B-B, Com – Com.

On the last GD and Danfoss monitoring system, fit a 120 ohm resistor across terminal A and B to terminate the communications system.

A maximum of 31 GDs can be connected. If more than 31 units are needed, please contact Danfoss for further information.

GD address (fig. 9)
The sensor address is set by S2 and S3, adjusting these dials between 0 and F will give the sensor its own address as shown in fig. 9. A conversion chart between Danfoss monitoring system channel numbers and the hexadecimal address of the GD is attached. Power must be removed when setting addresses on the GD.

---

[1])
Always use the voltage 0-10 V to check the output for stabilisation check.

[2])
GDC IR goes back to about 400 ppm as this is the normal level in air. (~4.6 mA/~0.4 V/ 0.2 V)

[3])
If the GD have been in long-term storage or have been swiched off for a long period, stabilisation will be much slower. However within 1-2 hours all the GD types should have dropped below the low alarm level and be operational.
The progress can be monitored exactly on the 0-10V output. When the output settles around zero (400 ppm in the case of IR CO_2 sensors) the GD is stabilised. In exceptional circumstances particularly with CT sensors the process can take up to 30 hours.

DECLARATION OF CONFORMITY

Name and Address of Manufacturer's Representative within the European Community
Danfoss A/S
Automatic Controls-Industrial Refrigeration
Albuen 29
DK-6000 Kolding
Denmark

Declaration
We hereby declare that below-mentioned equipment is in conformity with below mention directives, standars or other normative documents, provided it is used according to our instructions.

Description of Equipment
Gas Detection Sensor Transmitter
Type **GD**

References of other Technical Standards and Specifications used
EN 55011, 1998
EN 61326, 1996

Cenelec EN 61010-2, 2001

Following the provisions of 73/23/EEC, Low Voltage Directive (LVD)

Authorised Person for the Manufacturer's Representative within the European Community

Name: Kurt M. Sand Title: Product Manager

Signature: Kurt M. Sand Date: 14/01/2005

Instruction

GD tester for mother PCB

148R9539

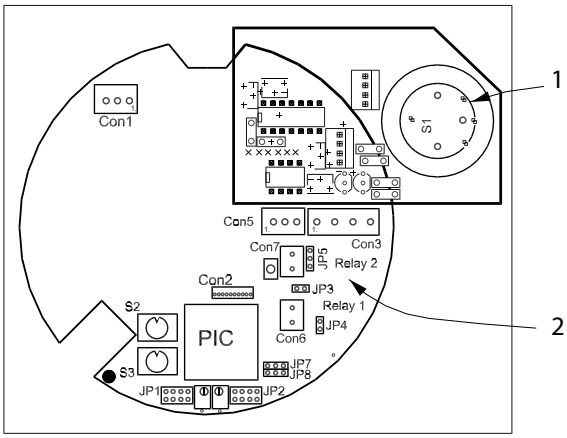


fig. 1

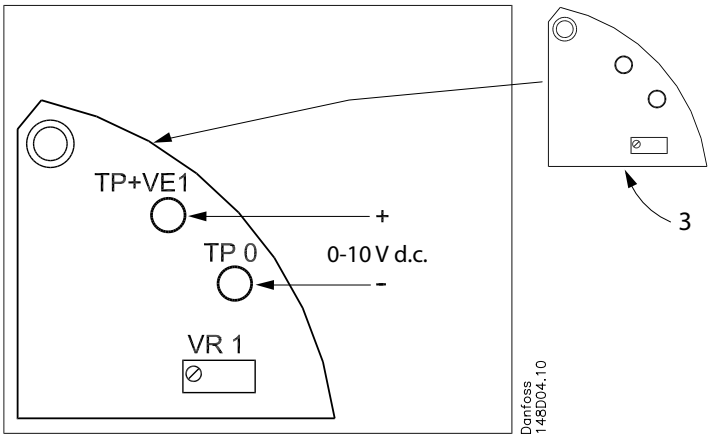


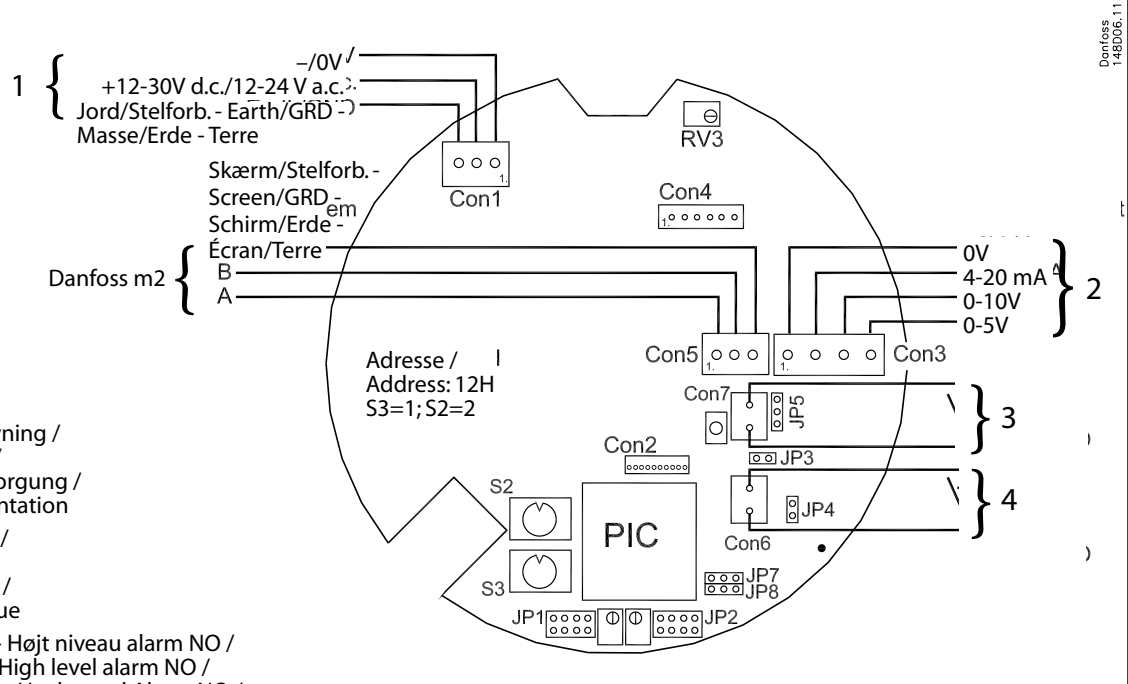
fig. 2

1 Detektorprintkort / Sensor PCB /
Sensorkarte / Carte de détection

2 Hovedprintkort / Mother PCB /
Hauptplatine / Carte mère

3 GD tester, Bestillingsnummer 148H5230
GD tester, code number 148H5230
GD-Tester, Bestellnr. 148H5230
Testeur du GD, numero de code, 148H5230

Elektrisk tilslutning af alle modeller / Electrical connection for all models / Elektrischer Anschluss für alle Modelle / Raccordements électriques pout tous modèles



1 Spændingsforsyning /
Voltage supply /
Spannungsversorgung /
Tension d'alimentation

2 Analog udgang /
Analog output /
Analogausgang /
Sortie Analogique

3 Digital udgang - Højt niveau alarm NO /
Digital output - High level alarm NO /
Digital Ausgang - Hochpegel Alarm NO /
Sortie numérique - Niveau haut alarme NO

4 Digital udgang - Lavt niveau alarm NO /
Digital output - Low level alarm NO /
Digital Ausgang - Niedrigpegel Alarm NO /
Sortie numérique - Niveau bas alarme NO

fig. 3

DANSK

Anvendelse
GD-testeren kan installeres i alle til rådighed stående gasdetektortyper. GD-testeren er derfor uafhængig af det anvendte kølemiddel, det valgte ppm-område samt gasdetektormodel.

Med GD-testeren er det muligt at simulere gasdetektorens drift i hele ppm-området, uden at det er nødvendigt at anvende kølemiddel-kalibreringsgas på stedet.

Det er derfor muligt at teste alle funktionerne på gasdetektorens hovedprintkort. F.eks.:
- Digital alarm for lavt niveau / gul LED
- Digital alarm for højt niveau / rød LED
- Forsinket responstid ved alarmer
- Analog udgang 4-20 mA
- Analog udgang 0-5 V
- Analog udgang 0-10 V
- Display (hvis installeret)
- Buskommunikation til Danfoss m2 (hvis installeret)

Ved det årlige (eller hyppigere) eftersyn af gasdetektoren anvendes GD-testeren i forbindelse med udskiftning af følerprintkortet til at udføre en endelig funktionstest af gasdetektoren og efterfølgende udstede GD-kalibrerings-certifikatet.

Installation
Frakobl strømmen til gasdetektoren.
Fjern CON1 (fig. 3).

Afmonter følerprintkortet.
Løsn de tre skruer, som holder følerprintkortet på plads (fig.1, pos. 1).
Fjern følerprintkortet ved forsigtigt at trække printkortet lodret op og ud af hovedprintkortet.
Monter GD-testeren.
Installer GD-testeren i CON4 (fig. 3).
Kontroller, at alle GD-testerens seks ben sidder korrekt i CON4.
Genetabler strømmen til gasdetektoren.
Geninstaller CON1 (fig. 3).

Drift af GD-testeren
Ved hjælp af potentiometeret VR1 (fig. 2) er det nu muligt at simulere hele gasdetektorens faktiske ppm-område med den installerede GD-tester.

VR1's faktiske indstilling kan overvåges. Der kan tilsluttes et voltmeter (0-10 V d.c.) mellem TP (+VE 1) og TP0 med henblik på at simulere alle værdier inden for ppm-området.

Hvis VR1 drejes med uret,
simuleres et faldende ppm-signal.

Hvis VR1 drejes mod uret,
simuleres et stigende ppm-signal.

F.eks.
Det originale følerprintkort har et ppm-område på 0-1000 ppm.

0 V målt mellem TP (+VE 1) og TP0 svarer til 0 ppm.

5,75 V målt mellem TP (+VE 1) og TP0 svarer til 575 ppm.

10,00 V målt mellem TP (+VE 1) and TP0 svarer til 1000 ppm.

Det er således muligt at kontrollere nedenstående funktioner på gasdetektoren:
- Digital alarm for lavt niveau / gul LED
- Digital alarm for højt niveau / rød LED
- Forsinket responstid ved alarmer
- Analog udgang 4-20 mA
- Analog udgang 0-5 V
- Analog udgang 0-10 V
- Display (hvis installeret)
- Buskommunikation til Danfoss m2 (hvis installeret)

Genmontering
Når alle funktionerne på gasdetektorens hovedprintkort er testet, skal GD-testeren fjernes.

Frakobl strømmen til gasdetektoren.
Fjern CON1 (fig. 3).

Fjern GD-testeren.
Installer nyt (eller eksisterende) følerprintkort.
Kontroller, at alle seks ben på følerprintkortet sidder korrekt i CON4.

Tilslut strømmen til detektoren.
Geninstaller CON1 (fig. 3).

ENGLISH

Application
GD tester can be installed in all types of available GD.
The GD tester is thus independent of type of refrigerant used, selected ppm range and GD model.

With the GD tester it is possible to simulate GD Operation within the full ppm range, without any need for refrigerant calibration gas locally.

That means that all functions on the GD Mother PCB can be tested. E.g.
- Digital Low Level Alarm / Yellow LED
- Digital High Level Alarm / Red LED
- Delayed response time on Alarms
- Analog output 4-20 mA
- Analog output 0-5 V
- Analog output 0-10 V
- Display (if installed)
- Bus communication to Danfoss m2 (if installed)

At annual check (or more frequently) of GD, the GD tester is needed when replacing the sensor PCB in order to carry out a final function test of GD Gas Detector and sign the GD Calibration Certificate subsequently.

Installation
Disconnect power to GD.
Remove CON1 (fig.3).
Dismount sensor PCB.
Unscrew the 3 screws that holds the sensor PCB (fig.1, pos 1).
Remove sensor PCB by carefully pulling the PCB vertically upwards from the Mother PCB.
Mount GD tester.
Install the GD tester at CON4 (fig 3).
Ensure that all 6 pins on GD tester fit correctly into CON4.
Reconnect power to GD.
Reinstall CON1 (fig.3).

Operation of GD tester
With potentiometer VR1 (fig.2) it is now possible to simulate the whole actual ppm range of the GD with the GD tester installed.

The actual setting of VR1 can be monitored. Between TP (+VE 1) and TP0 a volt meter (0-10 V d.c) can be connected in order to simulate any value within the ppm range.

Turn VR1 clockwise
Correspond to simulate decreasing ppm signal.

Turn VR1 counter clockwise
Correspond to simulate increasing ppm signal.

E.g.
The original sensor PCB had a ppm range of 0-1000 ppm.

0 V measured between TP (+VE 1) and TP0 correspond to 0 ppm.

5.75 V measured between TP (+VE 1) and TP0 correspond to 575 ppm.

10.00 V measured between TP (+VE 1) and TP0 correspond to 1000 ppm.

It is thus possible to check below mention functions of the actual GD:
- Digital Low Level Alarm / Yellow LED
- Digital High Level Alarm / Red LED
- Delayed response time on Alarms
- Analog output 4-20 mA
- Analog output 0-5 V
- Analog output 0-10 V
- Display (if installed)
- Bus communication to Danfoss m2 (if installed)

Reassembly
After all functions on the GD Mother PCB have been tested, the GD tester must be removed

Disconnect power to the GD.
Remove CON1 (fig.3).

Dismount the GD tester.
Install new sensor PCB (or exsisting sensor PCB).
Ensure that all 6 pins on the sensor PCB fit correctly into CON4.

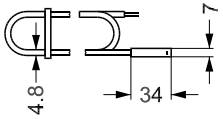
Reconnect power to the GD.
Reinstall CON1 (fig.3).

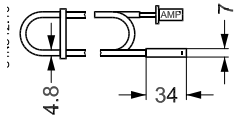
REFRIGERATION AND AIR CONDITIONING

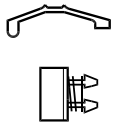
INSTRUCTIONS

AKS 10
Pt 1000 ohm

084R8003







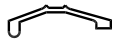
Accessories

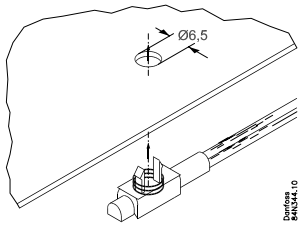
ohm	°C	°F
843	-40	-40
847	-39	-38
851	-38	-36
855	-37	-35
859	-36	-33
862	-35	-31
866	-34	-29
870	-33	-27
874	-32	-26
878	-31	-24
882	-30	-22
886	-29	-20
890	-28	-18
894	-27	-17
898	-26	-15
902	-25	-13
906	-24	-11
910	-23	- 9
914	-22	- 8
918	-21	-6
922	-20	-4
926	-19	-2
929	-18	0
933	-17	1
937	-16	3
941	-15	5

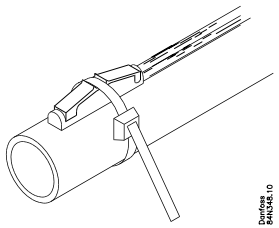
ohm	°C	°F
945	-14	7
949	-13	9
953	-12	10
957	-11	12
961	-10	14
965	-9	16
969	-8	18
973	-7	19
977	-6	21
980	-5	23
984	-4	25
988	-3	27
992	-2	28
996	-1	30
1000	0	32
1004	1	34
1008	2	36
1012	3	37
1016	4	39
1020	5	41
1023	6	43
1027	7	45
1031	8	46
1035	9	48
1039	10	50
1043	11	52

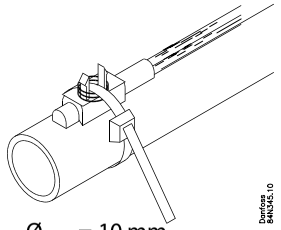
ohm	°C	°F
1047	12	54
1051	13	55
1055	14	57
1058	15	59
1062	16	61
1066	17	63
1070	18	64
1074	19	66
1078	20	68
1082	21	70
1086	22	72
1090	23	73
1093	24	75
1097	25	77
1101	26	79
1105	27	81
1109	28	82
1113	29	84
1117	30	86
1121	31	88
1124	32	90
1128	33	91
1132	34	93
1136	35	95

Approx. 4 ohm/°C
Approx. 2.25 ohm/°F

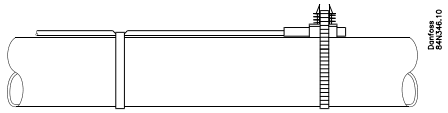


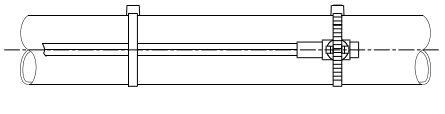


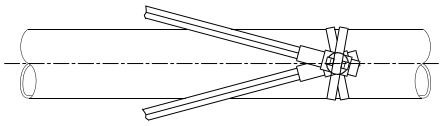




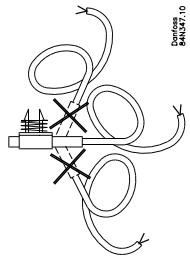
Ø $_{max}$ = 10 mm







NB!



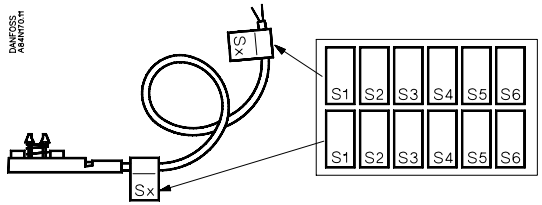
DE-BD

Electronic Refrigeration

INSTRUCTIONS

AKS 11
Pt 1000 ohm

084R9690

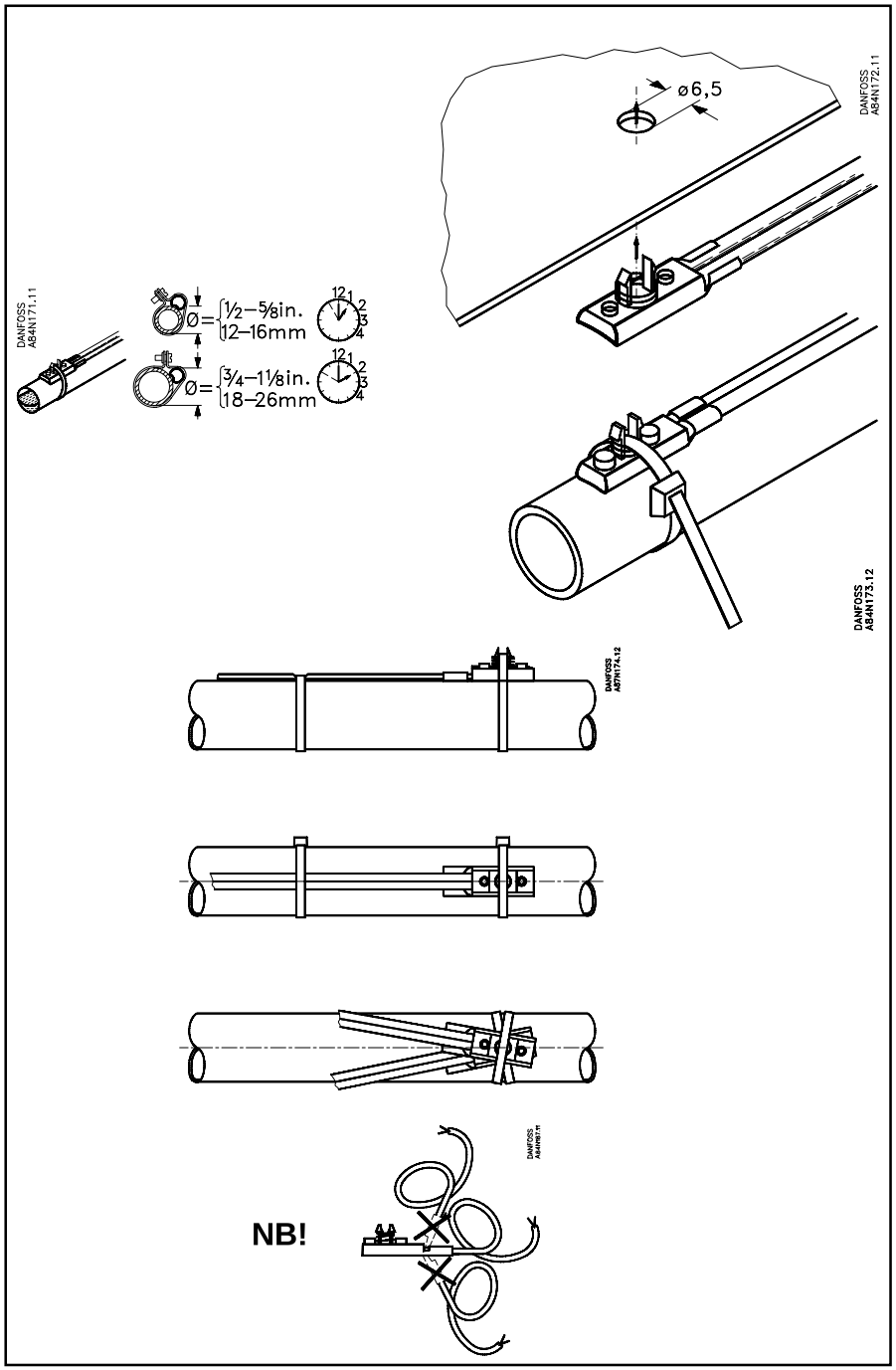


ohm	C	F
803	-50	-58
807	-49	-56
811	-48	-54
815	-47	-53
819	-46	-51
823	-45	-49
827	-44	-47
831	-43	-45
835	-42	-44
839	-41	-42
843	-40	-40
847	-39	-38
851	-38	-36
855	-37	-35
859	-36	-33
862	-35	-31
866	-34	-29
870	-33	-27
874	-32	-26
878	-31	-24
882	-30	-22
886	-29	-20
890	-28	-18
894	-27	-17
898	-26	-15
902	-25	-13
906	-24	-11
910	-23	- 9
914	-22	- 8

ohm	C	F
918	-21	-6
922	-20	-4
926	-19	-2
929	-18	0
933	-17	1
937	-16	3
941	-15	5
945	-14	7
949	-13	9
953	-12	10
957	-11	12
961	-10	14
965	-9	16
969	-8	18
973	-7	19
977	-6	21
980	-5	23
984	-4	25
988	-3	27
992	-2	28
996	-1	30
1000	0	32
1004	1	34
1008	2	36
1012	3	37
1016	4	39
1020	5	41
1023	6	43
1027	7	45

ohm	C	F
1031	8	46
1035	9	48
1039	10	50
1043	11	52
1047	12	54
1051	13	55
1055	14	57
1058	15	59
1062	16	61
1066	17	63
1070	18	64
1074	19	66
1078	20	68
1082	21	70
1086	22	72
1090	23	73
1093	24	75
1097	25	77
1101	26	79
1105	27	81
1109	28	82
1113	29	84
1117	30	86
1121	31	88
1124	32	90
1128	33	91
1132	34	93
1136	35	95

Approx. 4 ohm/°C Approx. 2.25 ohm/°F

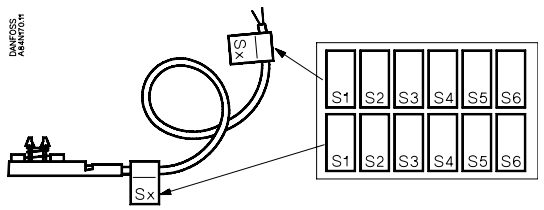


REFRIGERATION AND AIR CONDITIONING

INSTRUCTIONS

AKS 15
Pt 500 ohm

084R9728

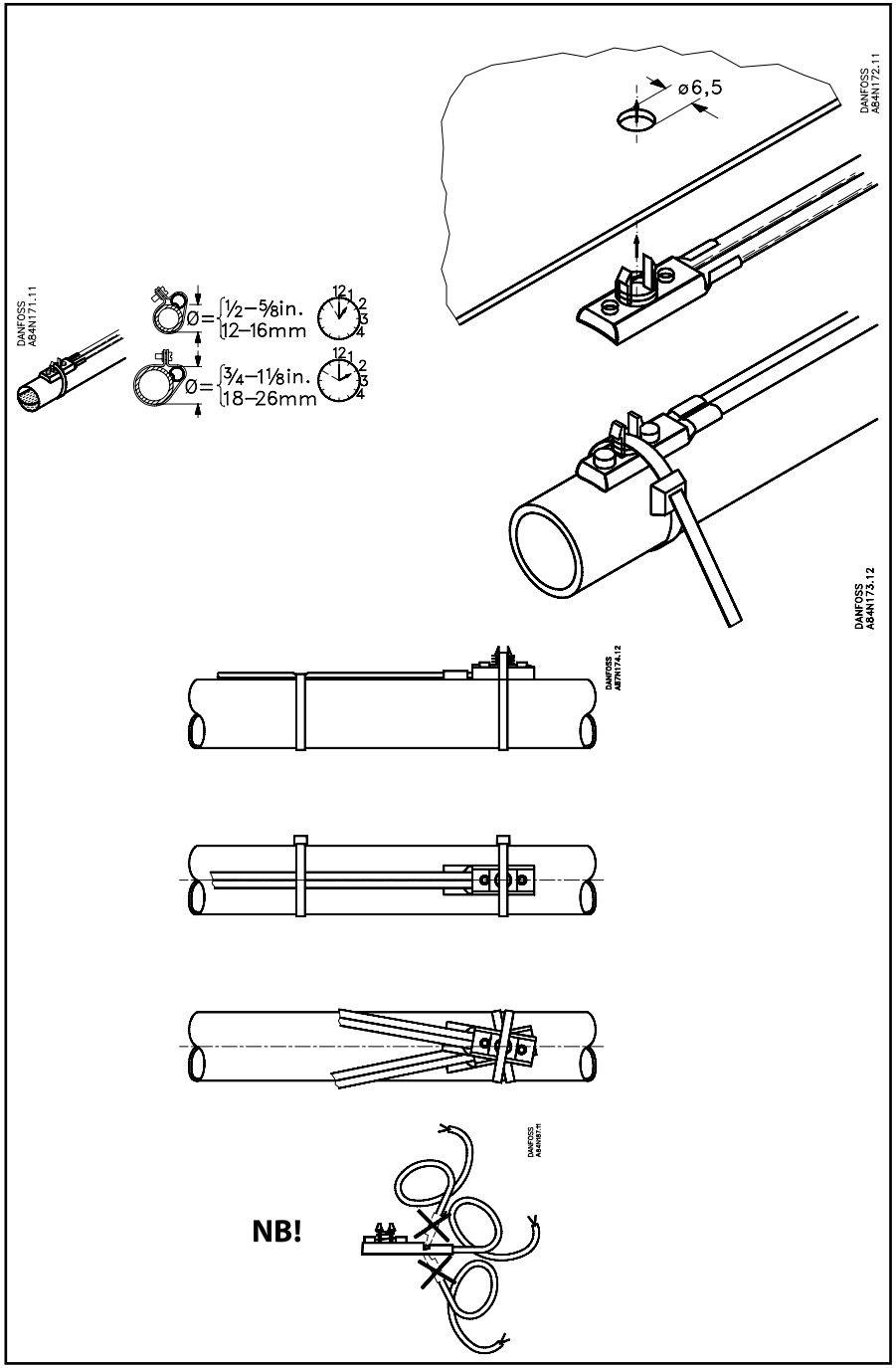


ohm	°C	°F
402	-50	-58
404	-49	-56
406	-48	-54
407	-47	-53
409	-46	-51
411	-45	-49
413	-44	-47
415	-43	-45
417	-42	-44
419	-41	-42
421	-40	-40
423	-39	-38
425	-38	-36
427	-37	-35
429	-36	-33
431	-35	-31
433	-34	-29
435	-33	-27
437	-32	-26
439	-31	-24
441	-30	-22
443	-29	-20
445	-28	-18
447	-27	-17
449	-26	-15
451	-25	-13
453	-24	-11
455	-23	- 9
457	-22	- 8

ohm	°C	°F
459	-21	-6
461	-20	-4
463	-19	-2
465	-18	0
467	-17	1
469	-16	3
471	-15	5
473	-14	7
475	-13	9
477	-12	10
479	-11	12
480	-10	14
482	-9	16
484	-8	18
486	-7	19
488	-6	21
490	-5	23
492	-4	25
494	-3	27
496	-2	28
498	-1	30
500	0	32
502	1	34
504	2	36
506	3	37
508	4	39
510	5	41
512	6	43
514	7	45

ohm	°C	°F
516	8	46
518	9	48
520	10	50
522	11	52
523	12	54
525	13	55
527	14	57
529	15	59
531	16	61
533	17	63
535	18	64
537	19	66
539	20	68
541	21	70
543	22	72
545	23	73
547	24	75
549	25	77
551	26	79
553	27	81
555	28	82
556	29	84
558	30	86
560	31	88
562	32	90
564	33	91
566	34	93
568	35	95

Approx. 2 ohm/°C Approx. 1.1 ohm/°F



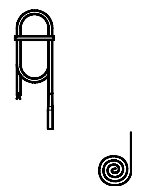
ELECTRONIC
REFRIGERATION

Instructions

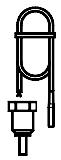
AKS 21

PT 1000 ohm

084R9670

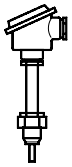


AKS 21A

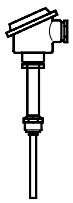


AKS 21W

AKS 21W



AKS 21W



AKS 21W

AKS 21D

AKS 21W

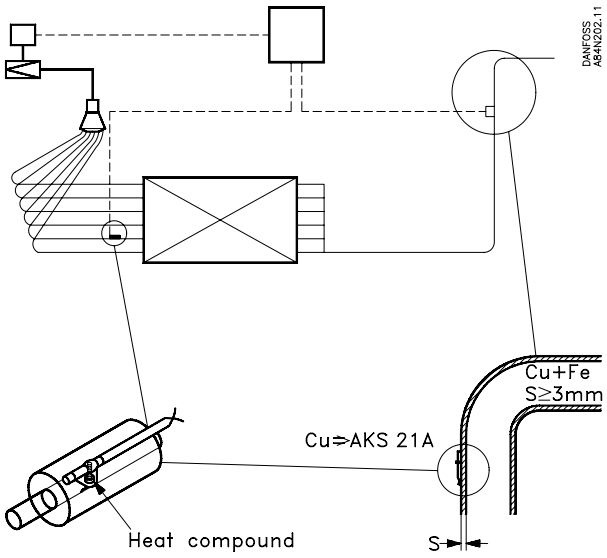
ohm A	°C	°F
723	-70	-94
727	-69	-92
731	-68	-90
735	-67	-89
739	-66	-87
743	-65	-85
747	-65	-83
751	-64	-81
755	-63	-80
759	-62	-78
763	-61	-76
767	-60	-74
771	-58	-72
775	-57	-71
779	-56	-69
783	-55	-67
787	-54	-65
791	-53	-63
795	-52	-62
799	-51	-60
803	-50	-58
807	-49	-56
811	-48	-54
815	-47	-53
819	-46	-51
823	-45	-49
827	-44	-47
831	-43	-45
835	-42	-44
839	-41	-42
843	-40	-40
847	-39	-38
851	-38	-36
855	-37	-35
859	-36	-33
862	-35	-31
866	-34	-29
870	-33	-27
874	-32	-26
878	-31	-24
882	-30	-22
886	-29	-20
890	-28	-18
894	-27	-17
898	-26	-15
902	-25	-13
906	-24	-11
910	-23	- 9
914	-22	- 8
918	-21	-6
922	-20	-4
926	-19	-2
929	-18	0

ohm	°C	°F
933	-17	1
937	-16	3
941	-15	5
945	-14	7
949	-13	9
953	-12	10
957	-11	12
961	-10	14
965	-9	16
969	-8	18
973	-7	19
977	-6	21
980	-5	23
984	-4	25
988	-3	27
992	-2	28
996	-1	30
1000	0	32
1004	1	34
1008	2	36
1012	3	37
1016	4	39
1020	5	41
1023	6	43
1027	7	45
1031	8	46
1035	9	48
1039	10	50
1043	11	52
1047	12	54
1051	13	55
1055	14	57
1058	15	59
1062	16	61
1066	17	63
1070	18	64
1074	19	66
1078	20	68
1082	21	70
1086	22	72
1090	23	73
1093	24	75
1097	25	77
1101	26	79
1105	27	81
1109	28	82
1113	29	84
1117	30	86
1121	31	88
1124	32	90
1128	33	91
1132	34	93
1136	35	95

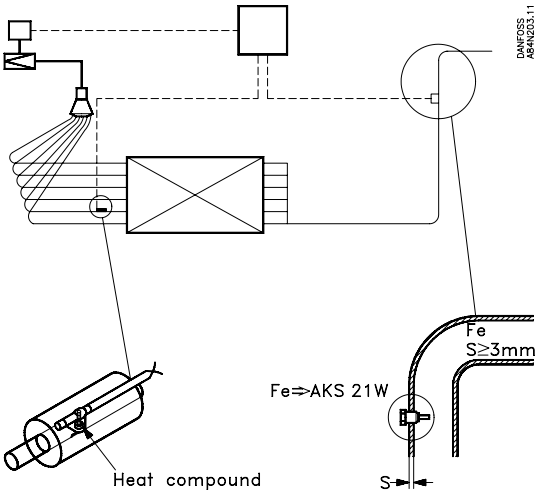
Approx. 4 ohm/°C Approx. 2.2 ohm /°F

084R9670

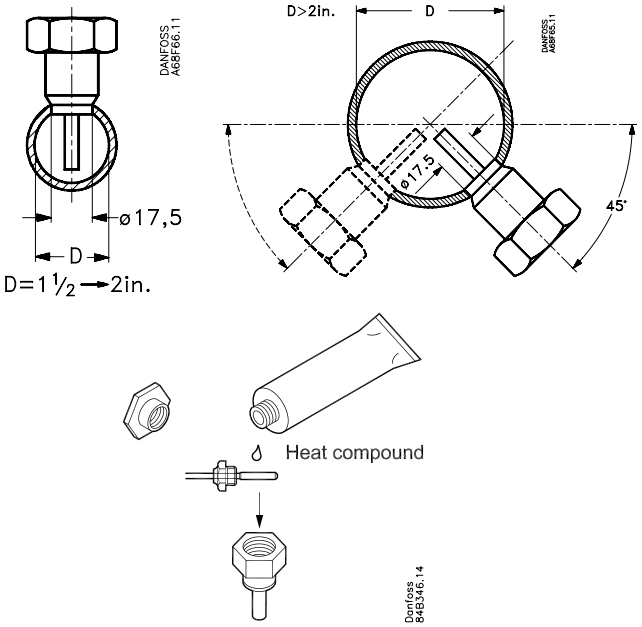
AKS 21W



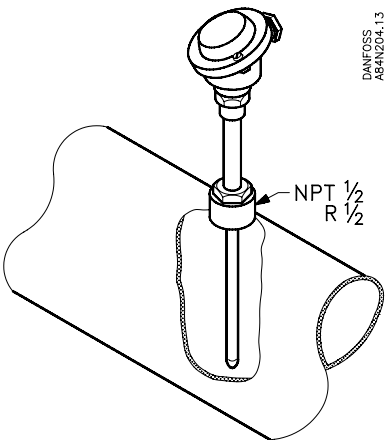
AKS 21W



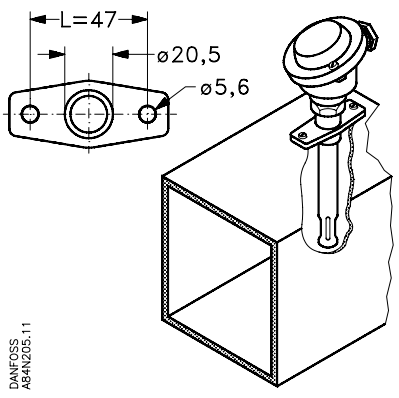
AKS 21W



AKS 21W



AKS 21D



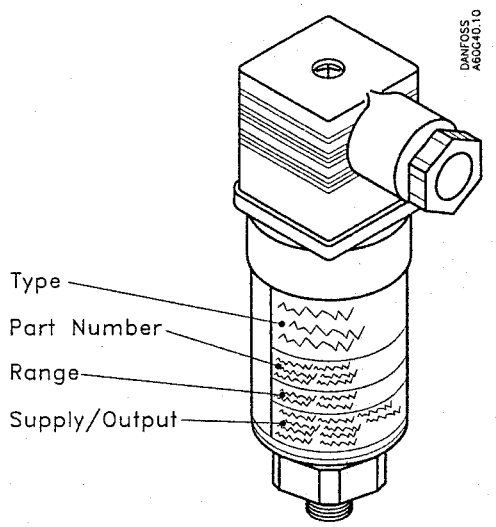
AC-RDT

Refrigeration Controls

INSTRUCTIONS

AKS 31 R, AKS 32 and AKS 33

Identification

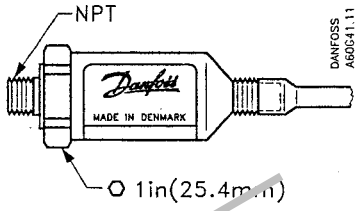


Main data

Max media / ambient temperature: 175°F (80°C)
Min. media / ambient temperature: -40°F (-40°C)
Approved for: R22, R134a, R502, R12 and R717 (NH_3)

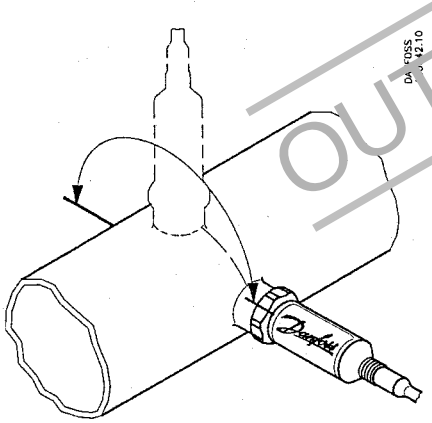
The sensor is non-adjustable!

Pressure connection



Mounting

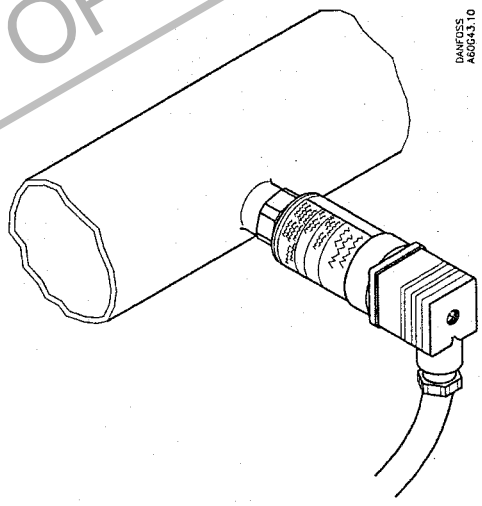
Cable version



Can be mounted in any position from horizontal to vertical with pressure connection facing downwards.

Do not mount with electrical connection facing downwards.

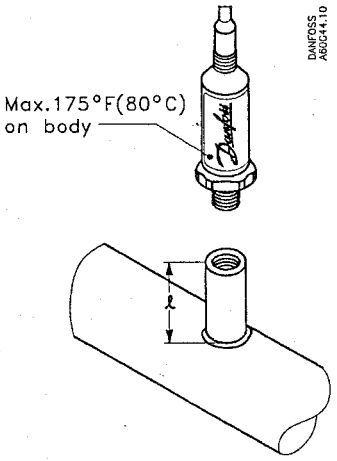
Plug version



The sensor should preferable be mounted horizontal to avoid water collection in plug screw.

Plug cable facing downwards prevent water collection in cable entry.

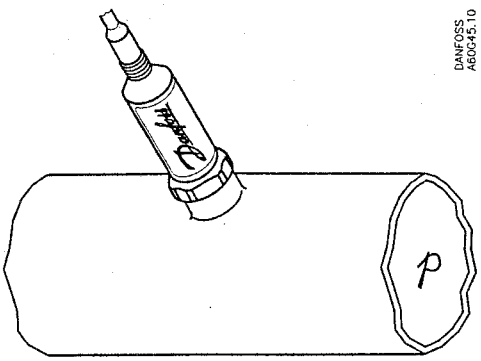
Hot gas pipe



When used on a hot gas pipe use a distance sleeve to reduce temperature influence.
At hot gas temperature higher than 210°F (100°,C) a 2 in (5 cm) sleeve is to be used.

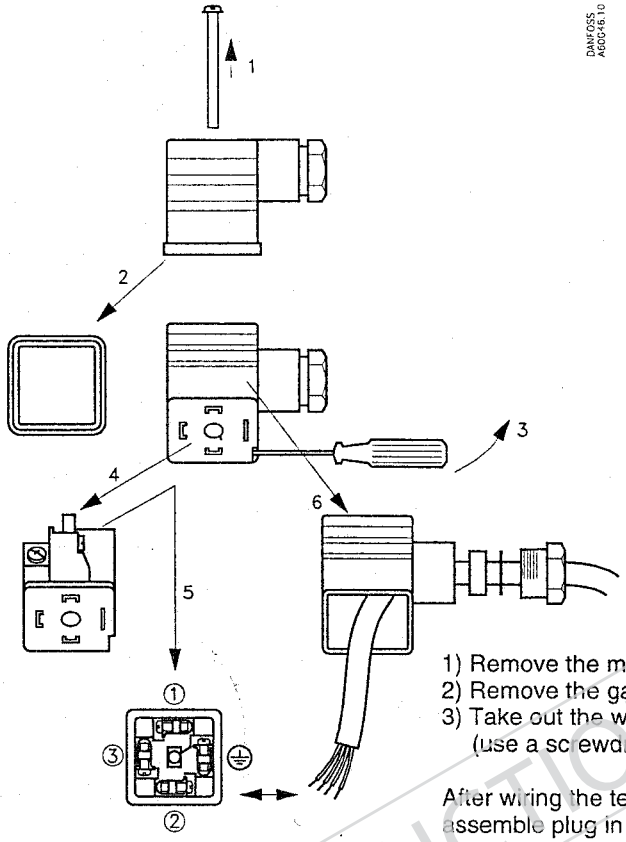
RI.5G.A2.22

Max. Pressure



Range	SWP / MWP	Test pressure
0 - 100 psig	400 psig	800 psig
0 - 200 psig	400 psig	800 psig
0 - 500 psig	800 psig	800 psig

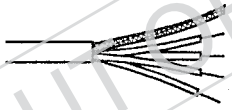
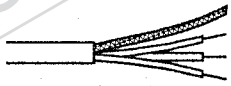
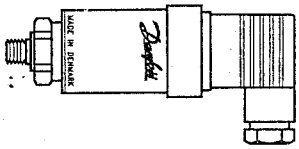
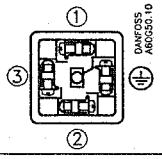
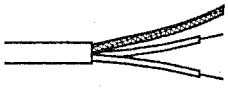
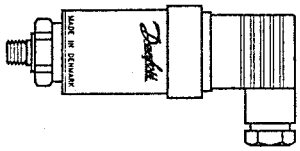
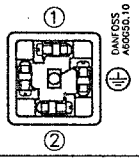
Disassemble plug



1) Remove the mounting screw.
2) Remove the gasket.
3) Take out the wiring center (use a screwdriver).

After wiring the terminals, assemble plug in opposite order.

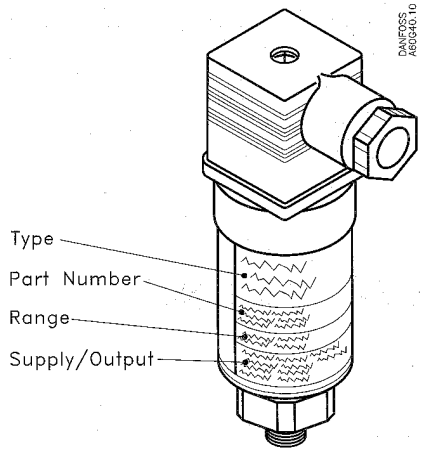
Electrical connection

Type	Symbol	Connection	Power supply	Output signal
AKS 31 R		 Screen: Isolated from housing Red: + supply Black: – supply White: – output signal Green: + output signal	Max. 11 V d.c.	10 mV / V supply, radiometric
AKS 32		 Screen: Isolated from housing Red: + supply Black: – supply / common White: + output signal	Max. 30 V d.c.	1 - 5 V d.c. R > 10 kΩ
		 1: + supply 2: – supply / common 3: + output signal ⏚: Ground	Max. 30 V d.c.	1- 5 V d.c. R > 10 kΩ
AKS 33		 Screen: Isolated from housing Red: + supply Black: – supply	Max. 30 V d.c.	4 - 20 mA
		 1: + supply 2: – supply ⏚: Ground	Max. 30 V d.c.	4 - 20 mA

Refrigeration Controls

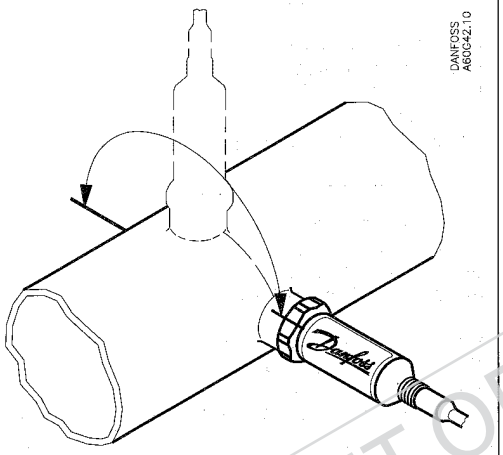
INSTRUCTIONS

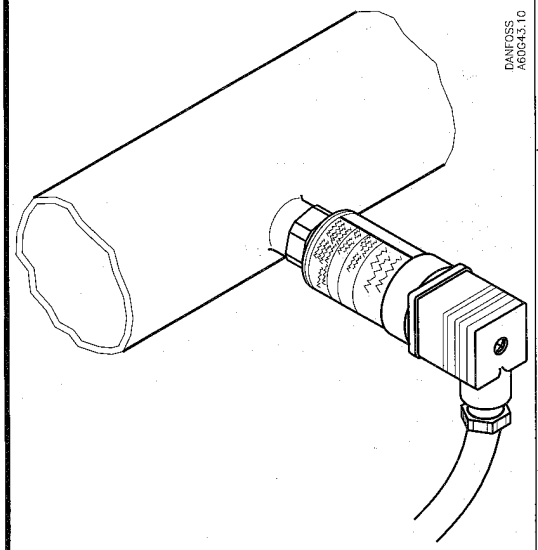
AKS 31R, AKS 32, AKS 33

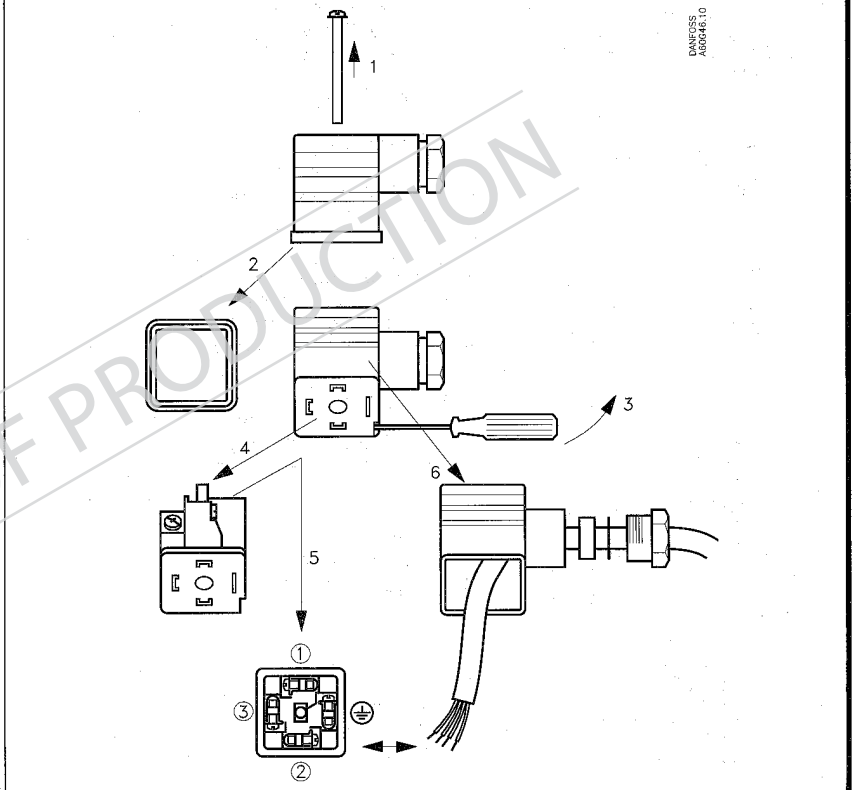


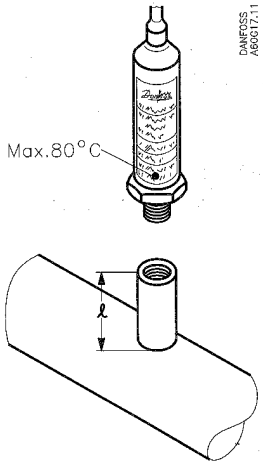
R12, R22, R134a, R502, R717 (NH_3)
−40 → 80 °C (−40 → 175 °F)

Område Range Bereich Plage bar	Tilladeligt driftstryk Max. working pressure Zul. Betriebsüberdruck Pression de service PB/MWP bar	Max prøvetryk Max. test pressure Max. Prüfdruck Pression d'essai max p' bar
≤ 12	22	30
> 12	40	55









Ved anvendelse på varmgasrør vil en afstandsstuds kunne nedsætte temperaturpåvirkningen.
Ved varmgastemperaturer over 100 °C anvendes en 5 cm lang studs.

When used on a hot gas pipe use a distance sleeve to reduce temperature influence.
At hotgas temperatures higher than 100 °C a 5 cm tube connector is to be used.

Durch die Verwendung einer Distanzbuchse an der Durchleitung kann die Temperatureinwirkung reduziert werden.
Bei Heißgastemperaturen über 100 °C wird ein 5 cm langer Stutzen empfohlen.

En cas de montage sur la conduite de gaz chauds, une turbulure d'cortement permet d'amortir l'influence thermique.
Pour les températures dépassant 100 °C, utiliser une tubulure de 5 cm.

~~RI.5G.B1.52~~ → **RI.5G.C1.52**

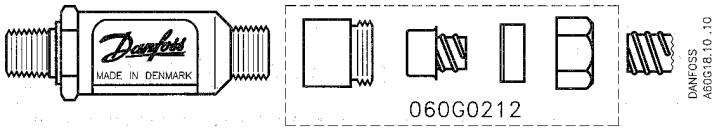
Tilbehør:
Adapter til panserslange

Accessories:
Adapter for armoured hose

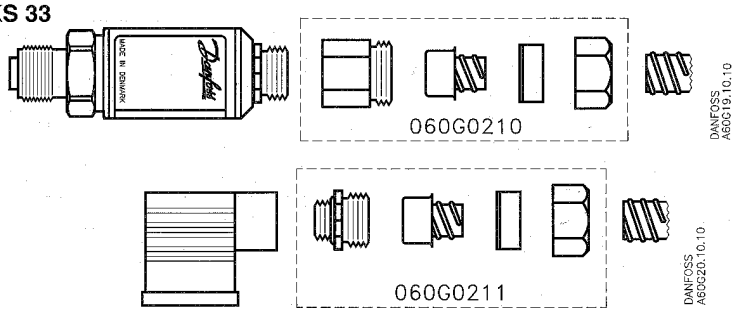
Zubehör:
Adapter für Panzerschlauch

Accessoires:
Adaptateur pour tuyau armé

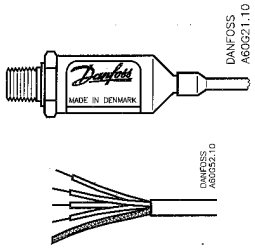
AKS 31R



AKS 32, AKS 33



AKS 31R



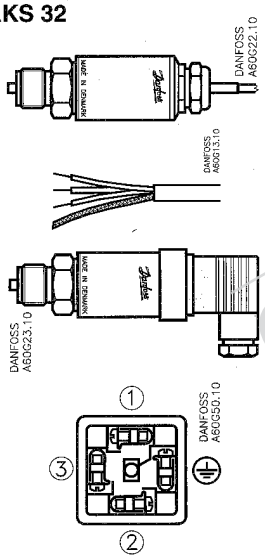
Orange: + Forsyning
Brun: – Forsyning
Rød: + Udgangssignal
Sort: – Udgangssignal
Skærm: Isoleret fra kapsling

Orange: + Supply
Brown: – Supply
Red: + Output signal
Black: – Output signal
Screen: Isolated from housing

Orange: + Versorgung
Braun: – Versorgung
Rot: + Ausgangssignal
Schwartz: – Ausgangssignal
Schirm: Vom Gehäuse isoliert

Orange: + Alimentation
Brun: – Alimentation
Rouge: + Signal de sortie
Noir: – Signal de sortie
Blindage de câble: Isolé de l'enveloppe

AKS 32



Rød: + Forsyning
Sort: – Forsyning (fælles)
Brun: + Udgangssignal (S)
Skærm: Isoleret fra kapsling

Red: + Supply
Black: – Supply (common)
Brown: + Output signal (S)
Screen: Isolated from housing

Rot: + Versorgung
Schwartz: – Versorgung (gemeinsam)
Braun: + Ausgangssignal
Schirm: Vom Gehäuse isoliert

Rouge: + Alimentation
Noir: – Alimentation (neutre)
Brun: + Signal de sortie
Blindage de câble: Isolé de l'enveloppe

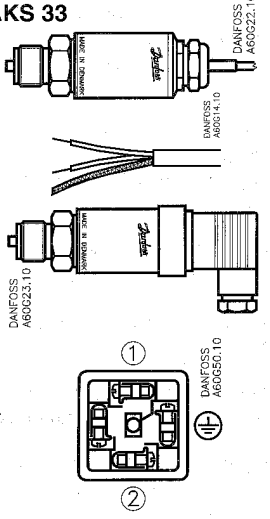
1: + Forsyning
2: – Forsyning (fælles)
3: + Udgangssignal (S)
⏚: Stel

1: + Supply
2: – Supply (common)
3: + Output signal (S)
⏚: Frame

1: + Versorgung
2: – Versorgung (gemeinsam)
3: + Ausgangssignal
⏚: Masse

1: + Alimentation
2: – Alimentation (neutre)
3: + Signal de sortie
⏚: Masse

AKS 33



Brun: + Forsyning
Sort: – Forsyning
Skærm: Isoleret fra kapsling

Brown: + Supply
Black: – Supply
Screen: Isolated from housing

Braun: + Versorgung
Schwartz: – Versorgung
Schirm: Vom Gehäuse isoliert

Brun: + Alimentation
Noir: – Alimentation
Blindage de câble: Isolé de l'enveloppe

1: + Forsyning
2: – Forsyning
⏚: Stel

1: + Supply
2: – Supply
⏚: Frame

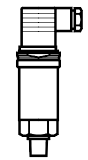
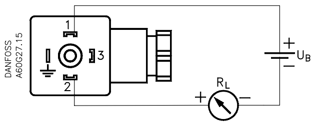
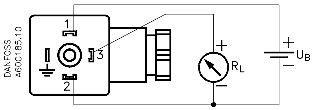
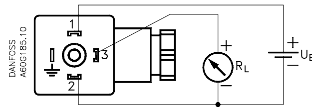
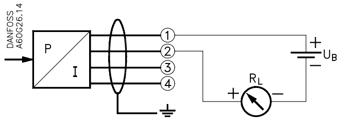
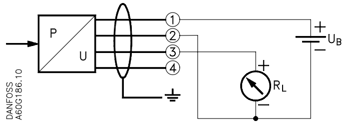
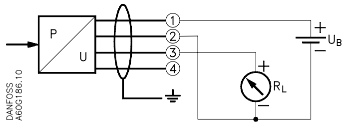
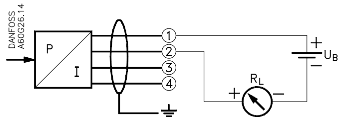
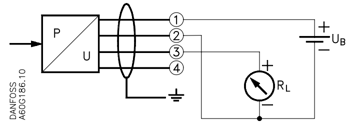
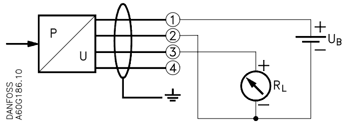
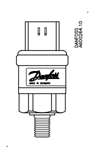
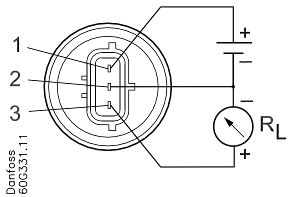
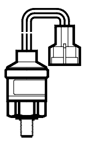
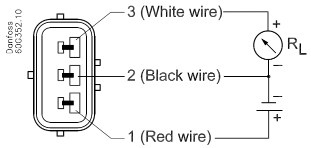
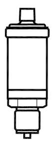
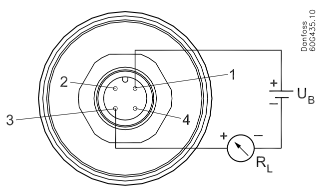
1: + Versorgung
2: – Versorgung
⏚: Masse

1: + Alimentation
2: – Alimentation
⏚: Masse

Instructions

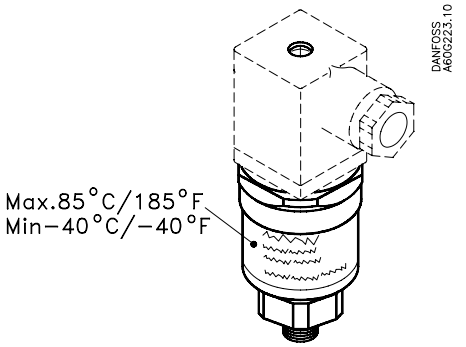
Pressure Transmitters

AKS 32, AKS, 32R, AKS 33,
AKS 2050, AKS 3000, AKS 3050, AKS 4050

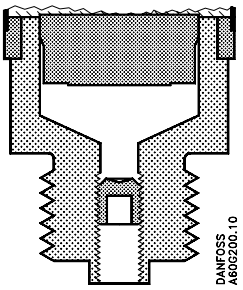
	4-20 mA AKS 33, AKS 3000, AKS 3050	1-5V, 1-6V, 0-10V AKS 32, AKS 3000, AKS 3050, AKS 4050	10 - 90% AKS 32R, AKS 2050	
				Forbundet til kapsling Connected to enclosure Mit Gehäuse verbunden laison au boîtier
SI-Units (bar) 	 ① Brun Brown Braun Brun ② Sort Black Schwarz Noir ③ Rød Red Rot Rouge ④ Orange Orange Orange Orange	 ① Rød Red Rot Rouge ② Sort Black Schwarz Noir ③ Brun Brown Braun Brun ④ Orange Orange Orange Orange	 ① Rød Red Rot Rouge ② Sort Black Schwarz Noir ③ Brun Brown Braun Brun ④ Orange Orange Orange Orange	Skærm: Ikke forbundet til kapsling Screen: Not connected to enclosure Schirm: Nicht mit Gehäuse verbunden Blindage: Isolé du boîtier
US-Units (psig) 	 ① Rød Red Rot Rouge ② Sort Black Schwarz Noir ③ Hvid White Weiss Blanc ④ Grøn Green Grün Vert	 ① Rød Red Rot Rouge ② Sort Black Schwarz Noir ③ Hvid White Weiss Blanc ④ Grøn Green Grün Vert	 ① Rød Red Rot Rouge ② Sort Black Schwarz Noir ③ Hvid White Weiss Blanc ④ Grøn Green Grün Vert	Skærm: Ikke forbundet til kapsling Screen: Not connected to enclosure Schirm: Nicht mit Gehäuse verbunden Blindage: Isolé du boîtier
				
			 ① Rød Red Rot ② Sort Black Schwarz ③ Hvid White Weiss	
				

060R9512

Kølemidler / Refrigerants / Kältemittel / Réfrigérants:
NH_3, R 22, R134a, R 404A, R 407C, R410A, R507 et.al

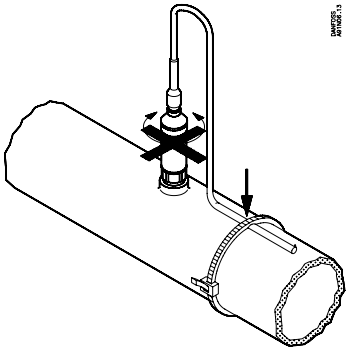


Bemærk / Note / Achtung / Attention



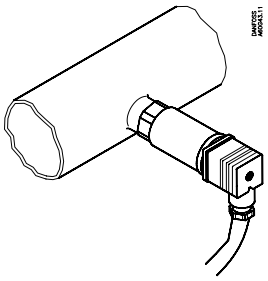
AKS 2050, 3050 & 4050 er udstyret med en dæmpedyse
AKS 2050, 3050 & 4050 are equipped with a damping orifice
AKS 2050, 3050 & 4050 ist mit einer Dämpfdüse ausgestattet
AKS 2050, 3050 & 4050: ce modèle est doté d'un orifice amortisseur.

Kabel version / Cable version / Kabel Version / Version de câble



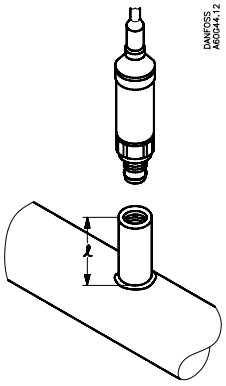
Tryktransmitteren skal monteres før kabel fastgøres.
The pressure transmitter must be mounted before cable is fastened.
Der Druckmessumformer muß montiert werden, bevor das Kabel befestigt wird.
Monter le transmetteur de pression avant de fixer le câble.

Orientering / Orientation / Orientierung / Orientation



Kan placeres horisontalt eller vertikalt, så tryktilslutningen vender nedad.
Lad kablet vende nedad for at forhindre vandsamling.
Can be mounted horizontal or vertical with pressure connection facing downwards.
Plug cable facing downwards prevents water collection in cable entry.
Kann horizontal oder vertikal mit Druckanschluss nach unten gerichtet montiert werden.
Wasseransammlung kann verhindert werden, wenn das Kabel nach unten gerichtet wird.
Orienter le raccord de pression horizontalement ou verticalement avec le câble vers le bas (pour éviter l'accumulation d'eau).

Varmgasledning / Hot gas pipe / Heißgasleitung / Conduite de gaz chaud



Benyt afstandsbøsning for at reducere temperaturpåvirkningen.
Use a distance sleeve to reduce temperature influence.
Abstandsbuchse benutzen um Temperatureinfluss zu mindern.
Installer une tubulure de distance pour réduire la contrainte thermique.

Udgangssignal / Output signal/ Ausgangssignal / Signal de sortie	Forsyningsspænding / Supply voltage / Versorgungsspannung / Tension d'alimentation [U_B]		
	AKS 32, 3000, 3050, 4050	AKS 32R, 2050	AKS 33, 3000, 3050
4 - 20 mA			10 - 30 V d.c.
10 - 90%		nom. 5 V d.c.	
1 - 5 V	9 - 30 V d.c.		
1 - 6 V	9 - 30 V d.c.		
0 - 10 V	15 - 30 V d.c.		

Must be provides by class 2 power supply when used as Refrigeration controller in hazardous locations.
Operating temperature code T4.
MWP 75 bar / 1088 psi

European approvals:
According to EMC Directive 89/366/EEC

American approvals:
1. Temperature indicating and regulating equipment acc. to UL 873, file no E31024
2. Class I, Div. 2, Group A,B,C and D acc. to UL 1604, file no E227388

Australian approvals:
According to N1297

Canadian approvals:
1. Process control equipment acc. to CSA std. C22.2 no. 142-M1987
2. Non-incendive electrial equipment for use in class I, Division 2, Group A, B, C and D acc. to CSA std. no. C22.2 no. 213-M1987

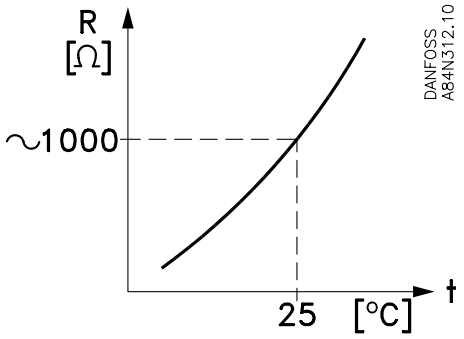
DE-BD

INSTRUCTIONS

Temperature sensor
EKS 111

ELECTRONIC
REFRIGERATION

PTC 1000 / 25°C



Føleren må **ikke** anvendes til måling af værdier, som anvendes til:
- Myndighedslog
- Regulering af overhedning

The sensor must **not** employed for measuring values used for:
- food safety logs
- regulation of superheat

Der Fühler darf in folgenden Fällen **nicht** zur Messung von Werten eingesetzt werden:
- Warensicherheitslogs
- Überhitzungsregelung

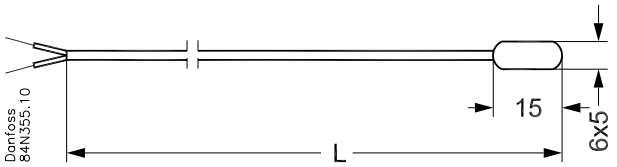
Ne jamais utiliser ce capteur pour le contrôle de valeurs utilisées pour:
- sécurité aliments enregistrement
- une régulation de surchauffe

R (Typ.) Ohm	Temp. °C	Error K	Temp. °F
1679	100	+/-3.5	212
1575	90		194
1475	80		176
1378	70		158
1286	60		140
1196	50		122
1111	40		104
1029	30		86
990	25	+/-1.3	77
951	20		68
877	10		50
807	0		32
740	-10		14
677	-20		-4
617	-30		-22
562	-40		-40
510	-50		-58
485	-55	+/-3.0	-67

Instructions
Temperature sensor
NTC 10 Kohm, type EKS 221

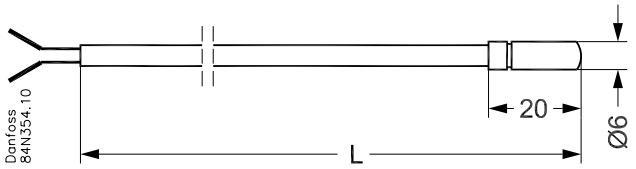
084R8020

Thermoplastic rubber
-50 to 120°C
IP 67



L = 1,5 m / 3,5 m / 5,5 m / 8,5 m

Steel
-50 to 110°C
IP 68



L = 1,5 m / 3,5 m / 5,5 m / 8,5 m

NTC 10000 ohm / 25°C

R_nom Ohm	Temp. °C	Temp. °F
595	120	248
757	110	230
972	100	212
1265	90	194
1667	80	176
2228	70	158
3020	60	140
4160	50	122
5827	40	104
8313	30	86
10000	25	77
12091	20	68
17958	10	50
27278	0	32
42450	-10	14
67801	-20	-4
111364	-30	-22
188500	-40	-40

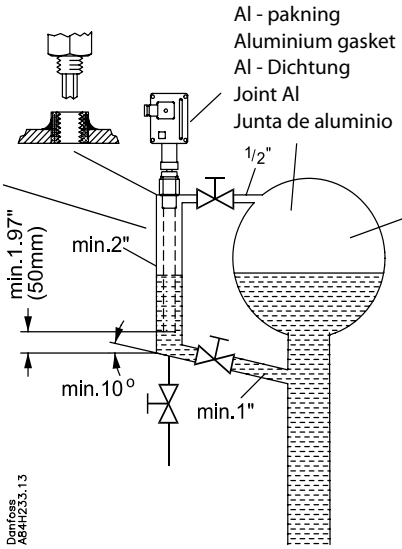
DE-BD

Instruction

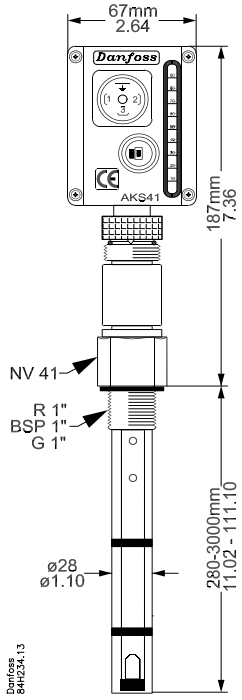
Type AKS 41 ver. 4.0

084R9633

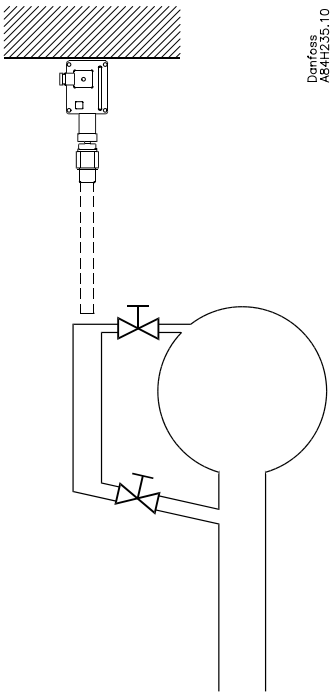
Montage
Asembly
Einbau
Montage
Montaje



Max. arbejdstryk: 100 bar g (1450 psig)
Max. working pressure: 100 bar g (1450 psig)
Max. Betriebsdruck: 100 bar g (1450 psig)
Pression de service max.: 100 bar g (1450 psig)
Presión de trabajo max: 100 bar g (1450 psig)



AKS 41-3 280 mm (11.02 ")



Husk frihøjde til en evt. udskiftning af niveautransmitteren

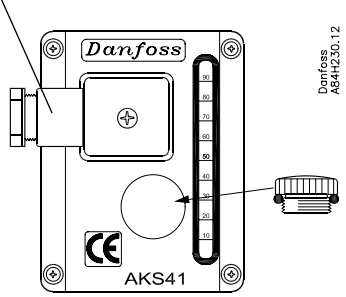
Remember clearance required for replacement of level transmitter, if applicable

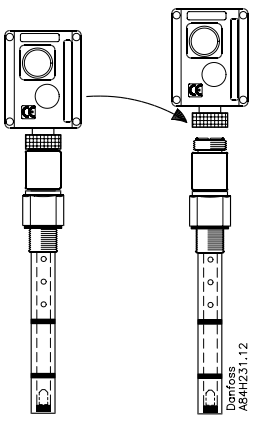
Bitte Höhenabstand zum evtl. Austausch der Sonde berücksichtigen.

Ne pas oublier le dégagement en hauteur nécessaire pour un remplacement éventuel du transmetteur de niveau.

No olvidar dejar el espacio suficiente por si es necesario cambiar el transductor de nivel.

Stik - kan monteres i 4 retninger.
Plug - can be mounted in 4 different positions
Stecker - in 4 Richtungen montierbar.
Prise - peut être montée dans 4 directions
Clavija - puede montarse en 4 direcciones





Kan adskilles uden at standrøret skal demonteres.

Can be separated without dismantling the standpipe.

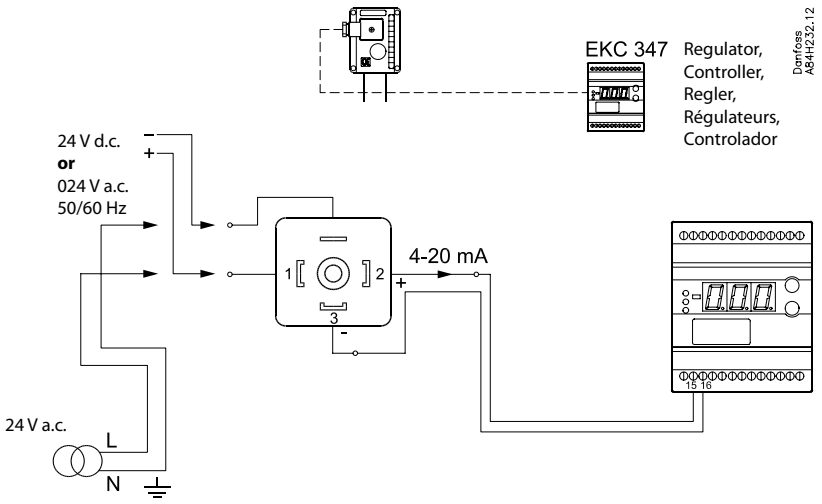
Die Umformereinheit kann ohne Ausbau der Sonde gewechselt werden.

Peut être retiré sans avoir à démonter le support.

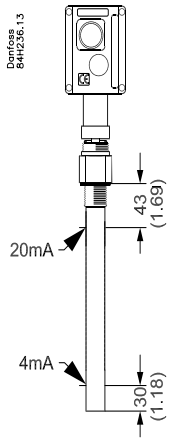
Puede separarse sin desmontar el tubo vertical.

 DKRCI.PI.SC0.A2.53 / 520H2632

Elektrisk tilslutning
Electrical connection
Elektrischer Anschluß
Connexion électrique
Conexion eléctrica



Måleområde
Measuring range
Meßbereich
Plage de mesure
Rango de medida



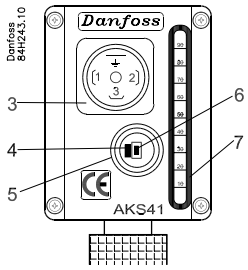
Fabriksindstilling:
Staven er fra fabrikken kalibreret til R 410A , så 4-20 mA dækker hele stavens måleområde. Svingninger i niveaumålingen dæmpes internt.

Factory setting:
The rod comes factory calibrated for R 410A, so that it will cover 4 to 20 mA throughout the rod's whole measuring range. Any disturbances in connection with the level measurement will be damped internally.

Werkseinstellung:
Die Sonde ist ab Werk für R 410A vorkalibriert, so dass 4 bis 20 mA den gesamten Messbereich der Sonde abdecken. Schwingungen in Verbindung mit der Niveaumessung werden intern gedämpft.

Réglages en usine :
La tige est calibrée en usine pour le fluide frigorigène R 410A, de façon à transmettre un signal d'intensité comprise entre 4 et 20 mA sur la plage de mesure complète de la tige. Toute perturbation dans le cadre de la mesure de niveau sera amortie intérieurement.

Ajuste de fábrica:
La varilla está calibrada de fábrica para R 410A, con una señal de salida de 4-20 mA, que se distribuye a lo largo de la longitud de la varilla. Cualquier perturbación del control de nivel será amortiguada interiormente.



3 DIN connection
4 Green LED
5 Calibration cover
6 Calibration pushbutton
7 OPTION: LED Bargraph for indication of liquid level.

English

Signal damping
Signal damping is factory-set at 15 seconds. This setting can be altered by activating the calibration switch. The setting range is 1 to 120 seconds. Settings can also be made whilst the system is operating.

Procedure:
1. Connect the supply voltage.

2. Push the calibration switch once for each second by which you want to increase the damping.
   Example:

1. push	to 1 sec.
2. pushes	to 2 sec.
etc.	
120. pushes	to 120 sec.
121. pushes	to 120 sec.

10 seconds after the last push, the value will be saved in the memory and the green LED will start flashing again. After 10 seconds, a further push will start 1-second signal damping again.
(If the damping setting is set too high, restart the procedure from step 1).

Adjusting the min. /max. calibration points:
Min. calibration:
1. Bring the refrigerant liquid level to desired minimum level.
2. Press the calibration pushbutton and keep it activated in approx. 5 seconds, until green LED stopps flashing.
3. Activate, within the next 10 seconds, the calibration pushbutton once (If calibration pushbutton is not activated within 10 seconds, it will automatically leave calibration mode and return to normal operation)

Green LED is ON in a few seconds, and then flashing.
Output is now 4 mA and AKS 41 is in normal operation

Max. calibration:
1. Bring the refrigerant liquid level to desired maximum level.
2. Press the calibration pushbutton and keep it activated in approx. 5 seconds, until green LED stopps flashing.
3. Activate, within the next 10 seconds, the calibration pushbutton twice (If calibration pushbutton is not activated within 10 seconds, it will automatically leave calibration mode and return to normal operation)

Green LED is ON in a few seconds, and then flashing.
Output is now 20 mA and AKS 41 is in normal operation

Min. calibration when minimum refrigerant level must be different from 4 mA:
1. Bring the refrigerant liquid level to desired minimum level.
2. Press the calibration pushbutton and keep it activated in approx. 5 seconds, until green LED stopps flashing.
3. Activate, within the next 10 seconds, the calibration pushbutton once and keep it activated. (If calibration pushbutton is not activated within 10 seconds, it will automatically leave calibration mode and return to normal operation)
4. Observe the output mA signal increasing fast starting at 4 mA.
5. Release the calibration pushbutton when the output signal is approx. 0.5 mA from the desired point.
6. All the next activations will increase the output signal by approx. 0.05 mA
7. Approx. 10 seconds after the latest activation the LED starts flashing
8. Output now corresponds to the value measured at the latest activation.

Max. calibration when maximum refrigerant level must be different from 20 mA:
1. Bring the refrigerant liquid level to desired maximum level.
2. Press the calibration pushbutton and keep it activated in approx. 5 seconds, until green LED stopps flashing.
3. Activate, within the next 10 seconds, the calibration pushbutton twice and keep it activated. (If calibration pushbutton is not activated within 10 seconds, it will automatically leave calibration mode and return to normal operation)
4. Observe the output mA signal decreasing fast starting at 20 mA.
5. Release the calibration pushbutton when the output signal is approx. 0.5 mA from the desired point.
6. All the next activations will decrease the output signal by approx. 0.05 mA
7. Approx. 10 seconds after the latest activation the LED starts flashing
8. Output now corresponds to the value measured at the latest activation.

Reset to factory setting
AKS 41 can always be reset to factory setting regardless of any revised calibration values.
1. Press the calibtation pushbutton and keep it activated in min. 20 sec, until green LED starts flashing
2. Release calibtation pushbutton
3. When LED starts flashing, reset to factory setting is completed.

AKS 41 is now operating according to the factory settings.

DECLARATION OF CONFORMITY

Name and Address of Manufacturer's Representative within the European Community
Danfoss Industrial Refrigeration A/S
Stormosevej 10
DK-8361 Hasselager

Declaration
We hereby declare that below-mentioned equipment is in conformity with below mention directives, standars or other normative documents, provided it is used according to our instructions.

Description of Equipment
Electronic Level Transmitter
Type **AKS 41**

References of other Technical Standards and Specifications used
EMC Directive 89/336/EEC
EMC Directive 92/31/EEC

EN 50081-2, January 1992
EN 50082-2, January 1992

Authorised Person for the Manufacturer's Representative within the European Community

Name: Kurt M. Sand Title: Product Manager

Signature: Kurt M. Sand Date: 14/01/2005

Instruction
Type AKS 45

084R9721

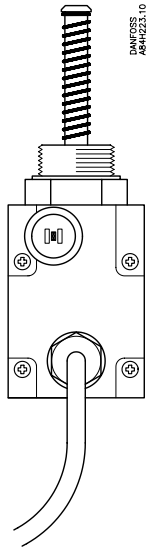


Fig. 1
AKS 45 - 26

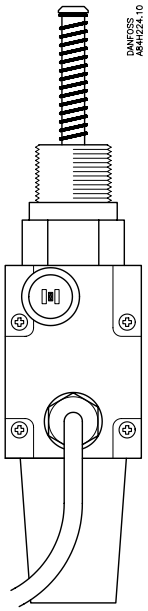


Fig. 2
AKS 45 - 67

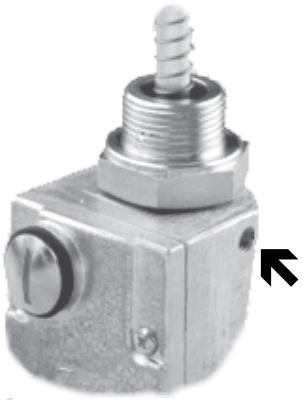
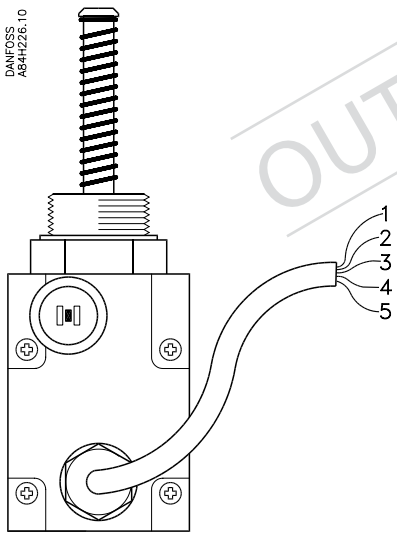


Fig. 3



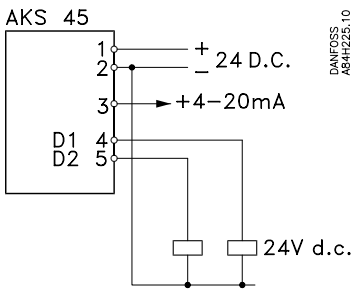
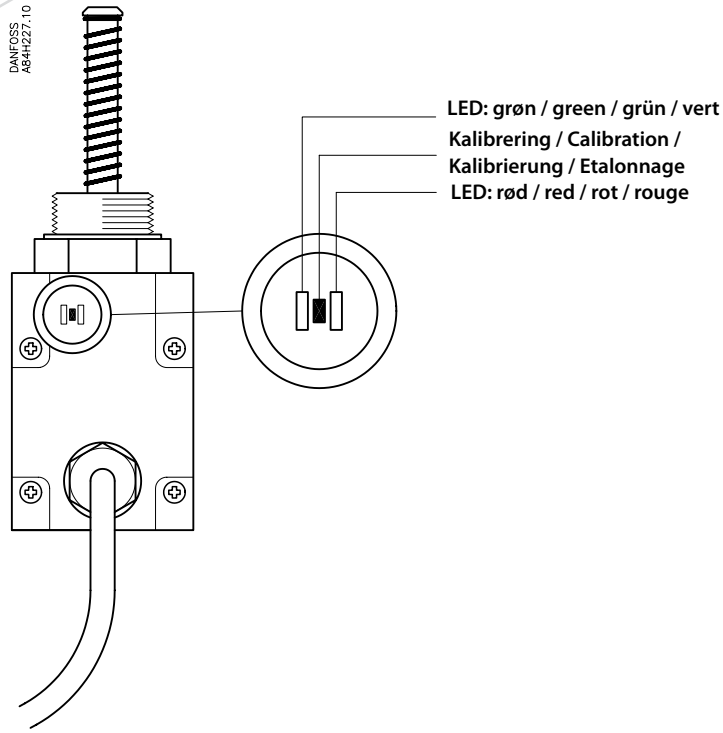


Fig. 4



084R9721

AKS 45 transmitter for PM and MEV/MRV valves:

Transmitter type	AKS 45 - 26 (fig. 1)	AKS 45 - 67 (fig. 2)
Code no.	**084H4045**	**084H4046**
For valve size	PM 5 - 65 PML 5 - 65 PMLX 5 - 65 PMC PMFH PMFL MRV MEV	PM 80 - 125 PML 80 - 125 PMLX 80 - 125
Nipple	M 24 (A/F 32)	M 35 (A/F 41)

Installation

Before AKS 45 is fitted on the valve, the system must be emptied, shut off, etc. to prevent damage or injury.

AKS 45 is supplied with a nipple to suit the valve itself (see table above).

1. **Screw out the valve bottom plug.**
2. **Loosen the grub screw (fig. 3) on AKS 45 so that the nipple turns freely.**
3. **Screw AKS 45 with nipple into the valve and turn it to the required position. Lock by retightening the grub screws.**

Wiring (fig. 4)

Colour	Description	
Grey (3)	AO signal: 4-20 mA, max. 500 W	
Yellow (4)	D1 signal	24 V d.c.[1)]
Green (5)	D2 signal:	24 V d.c.[1)]

Supply: 24 V d.c. -10/+10% (1 VA)

Brown (1)	+
White (2)	-

Supply: 24 V a.c. -15/+25% (1 VA)

Brown (1)	L
White (2)	N

[1)] **With alternating voltage (a.c.) AKS 45 cannot be used for contactors/relays via the Digital Outputs (D1 and D2).**

Calibration

When calibrating, AKS 45 will always apply an output signal of 4 mA at the first calibration point and an output signal of 20 mA to the second calibration point. AKS 45 is therefore able to indicate both a direct valve function, (PM, MEV/MRV valves) and a reverse valve function (PMFL valves).

AKS are calibrated as follows:

1. **Apply voltage to the transmitter for at least 5 minutes before starting calibration is begun and:**
2. **Remove the slotted screw that protects the two light emitting diodes and the calibration button.**
3. **Move the valve to the position (open or closed) in which an output signal of 4 mA is required and press the calibration button once. The red LED will light up constantly for 10 s.**
4. **When the red LED flashes, move the valve to the opposite position (open or closed) in which an output signal of 20 mA is required and press the calibration button for the second time. The red LED will light up constantly for 10 s.**
5. **When the red LED goes out, calibration is complete and AKS 45 is set for normal operation (see LED indication on page 4).**
6. **Replace slotted screw protecting LED's and calibrating button.**

Note:

If AKS 45 has been calibrated by moving the valve pressure pin manually between open and closed valve positions, it is not possible to open/close PM/PML/PMLX 65 - 125 and PMFH 500 completely with the manual spindle (accessory).
PMFL must be calibrated during operation or before the valve is installed because AKS 45 and the manual spindle cannot be mounted together.

After calibration, AKS 45 will register the pressure pin travel by producing the following output signals:

- **A variable output signal via terminals 2-3 of between 4 and 20 mA.**
- **A 24 V d.c. signal (with d.c. supply only) via terminals 2-4 (D1) when AKS 45 is in its 4 mA position, and via terminals 2-5 (D2) when AKS 45 is in its 20 mA position.**

LED Indication

See table on page 4.

ENGLISH

LED indication	Red LED	Green LED	D1	D2
AKS 45 calibration				
First calibration point	ON for 10s, then flashes	OFF	-	-
Second calibration point	ON for 10s, then OFF	OFF for 10s, then normal operation	-	-
AKS 45 normal operation				
Valve > 5% but < 95 %	OFF	Flashes	OFF	OFF
Valve < 5%	OFF	Flashes rapidly	ON	OFF
Valve > 95%	OFF	ON	OFF	ON

REFRIGERATION AND AIR CONDITIONING

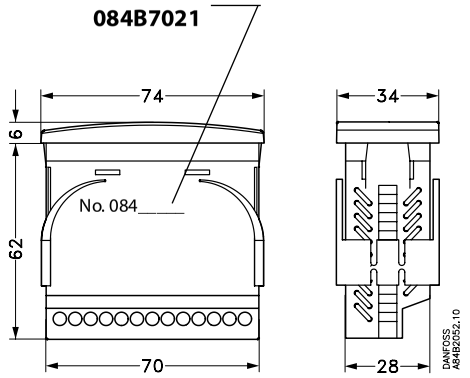
INSTRUCTIONS

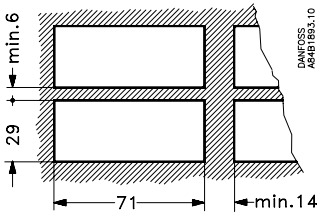
EKC 101

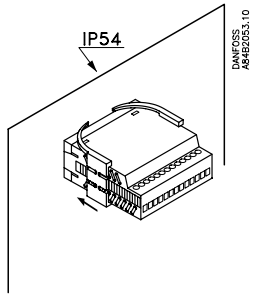
EKC 101

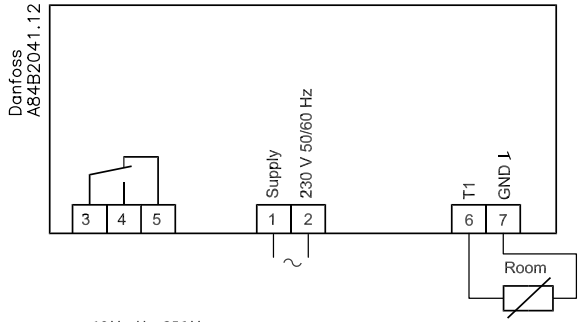
Code no. **084B7020**
084B7021

$t_{amb.}$ = -5 → +55°C
230 V a.c. 2.5 VA









10 V < U < 256 V
I_{max} (AC-1) = 10 A
I_{max} (AC-8) = 6 A

(Derated 16 A relay)

l = max. 10 m

EKS 111
(PTC 1000 R_{25} = 1000 ohm)

CE

EKS 111

PTC 1000 / 25°C

Føleren må **ikke** anvendes til måling af værdier, som anvendes til:
- Myndighedslog
- Regulering af overhedning

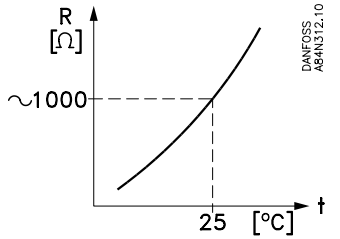
The sensor must **not** employed for measuring values used for:
- food safety logs
- regulation of superheat

Der Fühler darf in folgenden Fällen **nicht** zur Messung von Werten eingesetzt werden:
- Warensicherheitslogs
- Überhitzungsregelung

Ne jamais utiliser ce capteur pour le contrôle de valeurs utilisées pour:
- sécurité aliments enregistrement
- une régulation de surchauffe

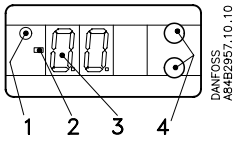
El sensor no se debe utilizar en la medida de valores para:
- registrar datos con fines sanitarios
- regulación del recalentamiento

Il sensore **non** deve essere utilizzato per:
- Registrazione dati sicurezza alimentare
- Regolazione del surriscaldamento



R (Typ.) Ohm	Temp. °C	Error K	Temp. °F
1679	100	+/-3.5	212
1575	90		194
1475	80		176
1378	70		158
1286	60		140
1196	50		122
1111	40		104
1029	30		86
990	25	+/-1.3	77
951	20		68
877	10		50
807	0		32
740	-10		14
677	-20		-4
617	-30		-22
562	-40		-40
510	-50		-58
485	-55	+/-3.0	-67

~~RI8AS667~~ → RI8AS767 01-2005



DANSK

Elektroniske regulator
EKC 101: Til indbygning i tavle.

Montering Se side 1

El-tilslutning
Se side 1 samt el-diagram på apparatet.

Betjening
1. Lysdiode
   = relæ trukket
2. Minustegn.
3. Display.
   (Blinker når indstillingsværdien for rumtemperaturen vises).
4. Taster til programmering og indstilling (se programmeringsvejledning).

Programmering og indstilling
Se programmeringsvejledningen og indstillinger.

Tryk på øverste tast i 2 s.

Tryk på nederste tast i 2 s.

Tryk på begge taster samtidigt.

ENGLISH

Electronic controller
EKC 101: For panel mounting

Installation See page 1

Electrical connection
See page 1 and electrical diagram on unit.

Operation
1. Light emitting diode
   = pull in relay
2. Minus sign
3. Display
   (Flashes when setting value for room temp. is displayed).
4. Keys for programming and setting (see programming instructions).

Programming and setting
see programming instructions and settings.

Press upper key for 2 s.

Press lower key for 2 s.

Press both keys at the same time.

DEUTSCH

Elektronische Regler
EKC 101: Für den Schalttafeleinbau.

Montage Siehe Seite 1.

Elektrischer Anschluß
Siehe Seite 1 sowie Schaltplan am Regler.

Bedienung
1. Leuchtdiode
   = Relais anziehen
2. Minuszeichen
3. Display
   (Blinkt, wenn der Einstellwert der Raumtemperatur angezeigt wird).
4. Tasten zur Programmierung und Einstellung
   (Siehe Programmierungsanleitung).

Programmierung und Einstellung
Siehe Programmierungsanleitung und Einstellungen.

Obere Taste für 2 s betätigen.

Untere Taste für 2 s betätigen.

Beide Tasten gleichzeitig betätigen.

FRANCAIS

Régulateur électronique
EKC 101 : pour montage sur tableau

Montage Voir page 1

Connexion électrique
Voir page 1 ainsi que le diagramme électrique sur l'appareil.

Utilisation
1. Diode lumineuse
   = relais fermé
2. Signe moins (-).
3. Affichage.
   (Clignote quand la température de réglage est atteinte).
4. Touches pour programmation et réglage (voir instructions de programmation).

Programmation et réglage
Consulter les instructions de programmation et les réglages.

Presser sur la touche supérieure pendant 2 sec.

Presser sur la touche inférieure pendant 2 sec.

Presser sur les deux touches en même temps.

ESPAÑOL

Controlador electrónico
EKC 101: Para montaje en panel

Instalación Ver pagina 1

Conexionado eléctrico
Ver página 1 y diagrama electrico de la unidad

Operación
1. LED Diodo luminoso
   = relé cerrado
2. Signo menos
3. Pantalla
   (Parpadea cuando se realiza el ajuste de la temperatura)
4. Botones de programacióny ajustes (ver instrucciones de programación)

Programación y ajustes
Ver instrucciones de programación y ajustes

Pulsar el boton superior durante dos segundos

Pulsar el boton inferior durante dos segundos

Pulsar los dos botones a la vez

ITALIANO

Controllore elettronico
EKC 101:Per montaggio su pannello

Installazione Vedi pag.1

Connessioni elettriche
Vedi pag.1 e lo schema elettrico

Funzionamento
1. LED luminoso
   = refrigerazione
2. Segno meno
3. Display
   (lampeggia durante l'impostazione temp. ambiente)
4. Tasti per programmare e tarare (vedi le istruzioni per programmazione)

Programmazione e taratura
Vedi istruzioni per programmazione e taratura

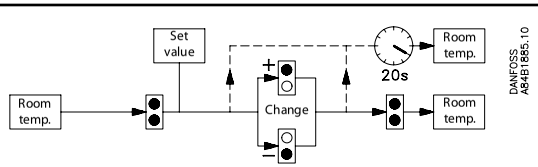
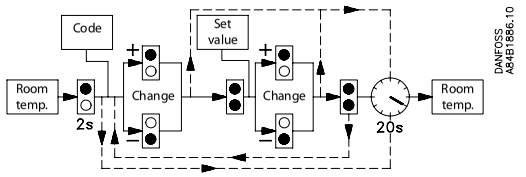
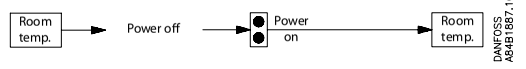
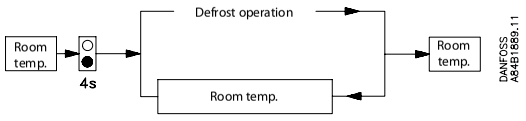
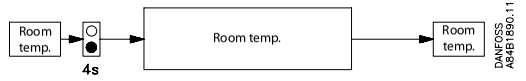
Premi il tasto superiore per 2 secondi

Premi il tasto inferiore per 2 secondi

Premi entrambi i tasti allo stesso tempo

English

Quick Guide

What to do	Initial controller setup	Operating the two pushbuttons Display readout What the controller does automatically	Resulting controller setup
Read or change room temp. setting	Normal operation Room temp. 1		Normal operation Room temp. 2
Read or change parameter codes and settings	Normal operation (or alarm) Unknown codes and settings		Normal operation (or alarm) Known codes and settings
Re-establish all factory settings	Unknown settings		All parameter settings = factory settings
Manually start of a defrost operation	Normal operation		Normal operation
Manually stop of a defrost operation	Defrost operation		Normal operation

Controller application setting parameters

Code No.: 084B7020, SW = 3.0x, 084B7021, SW = 3.0x

Setting and read-off parameters		Parameter codes	Min. value	Max. value	Factory setting [3]	Actual setting
Temperatur controller, temperature			-60(0)°C	50(99)°C	0°C	
Thermostat						
Differential [1]		r1	1 K	20 K	2 K	
Max. limitation of set temperature		r2	-59(1)°C	50(99)°C	50°C	
Min. limitation of set temperature		r3	-60(0)°C	49(99)°C	-60°C	
Adjustment of temperature indication		r4	-20 K	20 K	0.0 K	
Temperature unit (°C/°F). 084B7021 only		r5	-	-	°C	
Compressor						
Min. ON-time		c1	0 min	15 min	0 min	
Min. OFF-time		c2	0 min	15 min	0 min	
Cut-in frequency on sensor fault [2]		c3	0 %	99 %	0 %	
Defrost						
Defrost stop temperature		d2	0°C	25°C/OFF	OFF	
Interval between defrost starts		d3	OFF	48 hour	8 hour	
Max. defrost duration		d4	0 min	99 min	45 min	
Delay of display view after defrost stop		d5	0 min	15 min	0 min	
Defrost after strart-up	084B7020	d6	ON	99 min	OFF	
	084B7021		ON	240 min	OFF	
Miscellaneous						
Delay of outputsignal after start-up		o1	0 min	15 min	0 min	
Access code		o5	OFF	99	OFF	
Used sensor type Pt/Ptc. 084B7021 only		o6	-	-	Ptc	
Refrigeration or heat (rE=refrigeration, HE = heat)		o7	rE	HE	rE	

Fault code display	
Fault in controller	Er
Disconnected room sensor	Er
Short-circuited room sensor	Er

( ) Values stated in parenthesis, are only possible if the setting o7 = HE.

[1] Refrigeration (o7 = rE):
The relay closes when the room temperature exceeds the setting value and differential.
Heat (o7 = HE):
The relay closes when the room temperature drops to the setting value less the differential

[2] After start-up and throughout three days and nights this value is used by the controller. Afterwards the controller is capable by itself to calculate the average value of previous cut-in times.

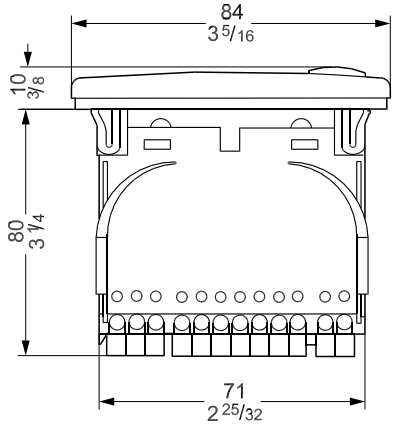
[3] The factory setting has been indicated for standard units 084B7020 and 084B7021. See also page 1. If the code number is a different one, the factory setting will be changed as per agreement.

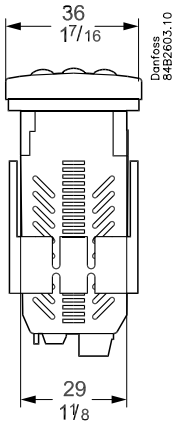
INSTRUCTIONS

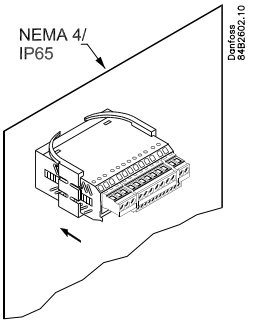
EKC 102D

REFRIGERATION AND AIR CONDITIONING

084R9984







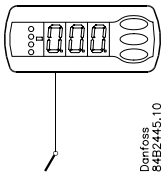
t_{amb} = 0 - +55°C

084B8506 = 230 V a.c.
084B8507 = 115 V a.c.

2.0 VA

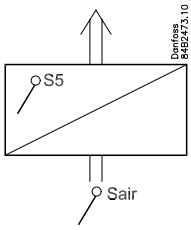
50/60 Hz

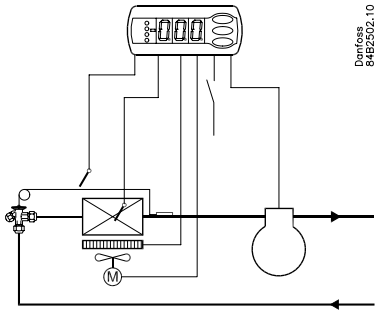
CE



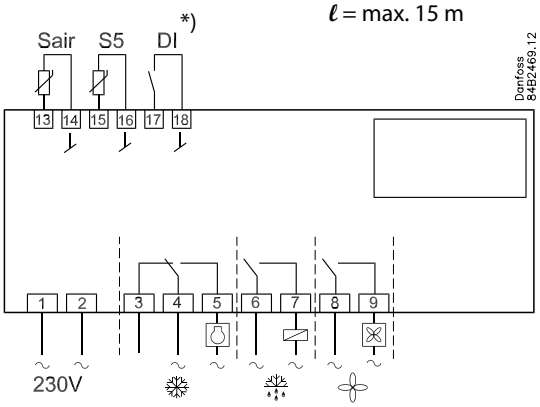
Type: Pt 1000 (1000 Ω /0°C) /
Ptc 1000 (1000 Ω /25°C) /
NTC-M2020 (5000 Ω / 25°C)

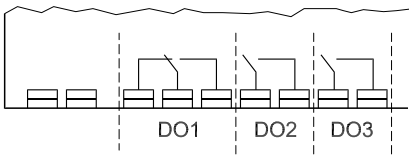
(o06)





*) AU:
Guld, Gold or Oro
ℓ = max. 15 m





	CE (250 V a.c.)	UL ** (240 V a.c.)
DO1. Refrigeration *	10 (6) A	10 A Resistive 5FLA, 30LRA
DO2. Defrost *	10 (6) A	10 A Resistive 5FLA, 30LRA
DO3. Fan *	6 (3) A	6 A Resistive 3FLA, 18LRA 131 VA Pilot duty
* DO1 and DO2 are 16 A relays. DO3 are 8 A relay. Max. load must be keept. ** UL-approval based on 30000 couplings		

English

The buttons

Set menu
1. Push the upper button until a parameter is shown
2. Push the upper or the lower button and find that parameter you want to change
3. Push the middle button until the parameter value is shown
4. Push the upper or the lower button and select the new value
5. Push the middle button again to enter the value.

Set temperature
1. Push the middle button until the temperature value is shown
2. Push the upper or the lower button and select the new value
3. Push the middle button to select the setting.

Reading the temperature at sensor S5
• Push briefly the lower button

Manuel start or stop of a defrost
• Push the lower button for four seconds.

Light emmiting diode
= refrigeration
= defrost
= fan running
Flashes fast at alarm

See alarm code
• Push briefly the upper button

Start-up:

Regulation starts when the voltage is on.

Go through the survey of factory settings. Make any necessary changes in the respective parameters.

SW = 1.3x

Parameters		Min.-value	Max.-value	Factory set-ting	Actual set-ting
Function	**Codes**				
Normal operation					
Temperature (set point)	---	-50°C	50°C	2°C	
Thermostat					
Differential	r01	0,1 K	20 K	2 K	
Max. limitation of setpoint setting	r02	-49°C	50°C	50°C	
Min. limitation of setpoint setting	r03	-50°C	49°C	-50°C	
Adjustment of temperature indication	r04	-20 K	20 K	0.0 K	
Temperature unit (°C/°F)	r05	°C	°F	°C	
Correction of the signal from Sair	r09	-10 K	10 K	0 K	
Manual service(-1), stop regulation(0), start regulation (1)	r12	-1	1	1	
Displacement of reference during night operation	r13	-10 K	10 K	0 K	
Activation of reference displacement r40	r39	OFF	on	OFF	
Value of reference displacement (can be activated by r39 or DI)	r40	-50 K	50 K	0 K	
Alarm					
Delay for temperature alarm	A03	0 min	240 min	30 min	
Delay for door alarm	A04	0 min	240 min	60 min	
Delay for temperature alarm after defrost	A12	0 min	240 min	90 min	
High alarm limit	A13	-50°C	50°C	8°C	
Low alarm limit	A14	-50°C	50°C	-30°C	
Alarm delay DI1	A27	0 min	240 min	30 min	
High alarm limit for condenser temperature (o70)	A37	0°C	99°C	50°C	
Compressor					
Min. ON-time	c01	0 min	30 min	0 min	
Min. OFF-time	c02	0 min	30 min	0 min	
Compressor relay must cutin and out inversely (NC-function)	c30	0 / OFF	1 / on	0 / OFF	
Defrost					
Defrost method (none/EL/gas)	d01	no	gas	EL	
Defrost stop temperature	d02	0°C	25°C	6°C	
Interval between defrost starts	d03	0 hours	48 hours	8 hours	
Max. defrost duration	d04	0 min	180 min	45 min	
Displacement of time on cutin of defrost at start-up	d05	0 min	240 min	0 min	
Drip off time	d06	0 min	60 min	0 min	
Delay for fan start after defrost	d07	0 min	60 min	0 min	
Fan start temperature	d08	-15°C	0°C	-5°C	
Fan cutin during defrost. 0=stopped, 1=running, 2=running during pump down and defrost	d09	0	2	1	
Defrost sensor (0=time, 1=S5, 2=Sair)	d10	0	2	0	
Defrost at start-up	d13	no	yes	no	
Max. aggregate refrigeration time between two defrosts	d18	0 hours	48 hours	0 hours	
Defrost on demand - S5 temperature's permitted variation during frost build-up. On central plant choose 20 K (=off)	d19	0 K	20 K	20 K	
Fans					
Fan stop at cutout compressor	F01	no	yes	no	
Delay of fan stop	F02	0 min	30 min	0 min	
Fan stop temperature (S5)	F04	-50°C	50°C	50°C	
Miscellaneous					
Delay of output signals after start-up	o01	0 s	600 s	5 s	
Input signal on DI1. Function: 0=not used. 1=status on DI1. 2=door function with alarm when open. 3=door alarm when open. 4=defrost start (pulse-pressure). 5=ext.main switch. 6=night operation 7=change reference (activate r40). 8=alarm function when closed. 9=alarm function when open. 10=case cleaning (pulse pressure). 11=Inject off when open.	o02	0	11	0	
Access code 1 (all settings)	o05	0	100	0	
Used sensor type (Pt /PTC/NTC)	o06	Pt	ntc	Pt	
Display step = 0.5 (normal 0.1 at Pt sensor)	o15	no	yes	no	
Case cleaning. 0=no case cleaning. 1=Fans only. 2=All output Off.	o46	0	2	0	
Access code 2 (partly access)	o64	0	100	0	

Save the controllers present settings to the programming key. Select your own number.	o65	0	25	0	
Load a set of settings from the programming key (previously saved via o65 function)	o66	0	25	0	
Replace the controllers factory settings with the present settings	o67	OFF	On	OFF	
Select application for S5 sensor (0=defrost sensor, 1= product sensor, 2=condenser sensor with alarm)	o70	0	2	0	
Service					
Temperature measured with S5 sensor	u09				
Status on DI1 input. on/1=closed	u10				
Status on night operation (on or off) 1=closed	u13				
Read the present regulation reference	u28				
Status on relay for cooling (Can be controlled manually, but only when r12=-1)	u58				
Status on relay for fans (Can be controlled manually, but only when r12=-1)	u59				
Status on relay for defrost. (Can be controlled manually, but only when r12=-1)	u60				
Temperature measured with Sair sensor	u69				

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 upper and lower button depressed at the same time as you reconnect the supply voltage

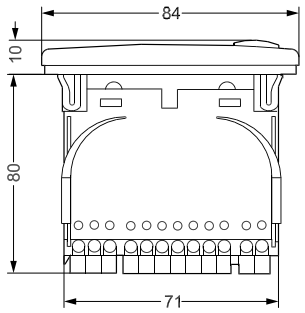
Fault code display		**Alarm code display**		**Status code display**	
E1	Fault in controller	A 1	High temperature alarm	S0	Regulating
E 27	S5 sensor error	A 2	Low temperature alarm	S2	ON-time Compressor
E 29	Sair sensor error	A 4	Door alarm	S3	OFF-time Compressor
		A 15	DI 1 alarm	S4	Drip-off time
		A 45	Standby mode	S10	Refrigeration stopped by main switch
		A 59	Case cleasning	S11	Refrigeration stopped by thermostat
		A 61	Condenser alarm	S14	Defrost sequence. Defrosting
				S15	Defrost sequence. Fan delay
				S16	Refrigeration stopped because of open DI input
				S17	Door open (open DI input)
				S20	Emergency cooling
				S25	Manual control of outputs
				S29	Case cleaning
				S32	Delay of output at start-up
				non	The defrost temperature cannot be displayed. There is stop based on time
				-d-	Defrost in progress / First cooling after defrost
				PS	Password required. Set password

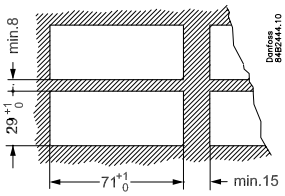
INSTRUCTIONS

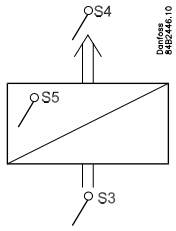
EKC 202D

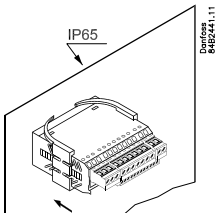
REFRIGERATION AND AIR CONDITIONING

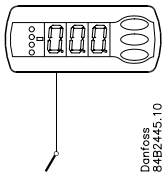
084R9986









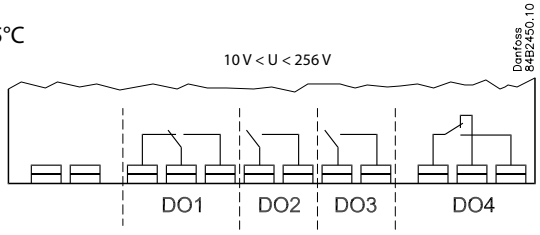


Type:
Pt 1000 (1000 Ω /0°C) /
Ptc 1000 (1000 Ω /25°C) /
NTC-M2020 (5000 Ω / 25°C)
(o06)

t_{amb} = 0 - +55°C

230 V a.c.

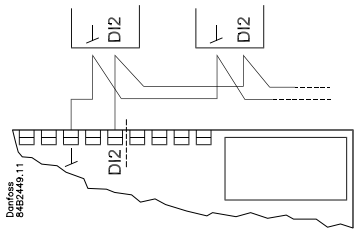
2.5 VA



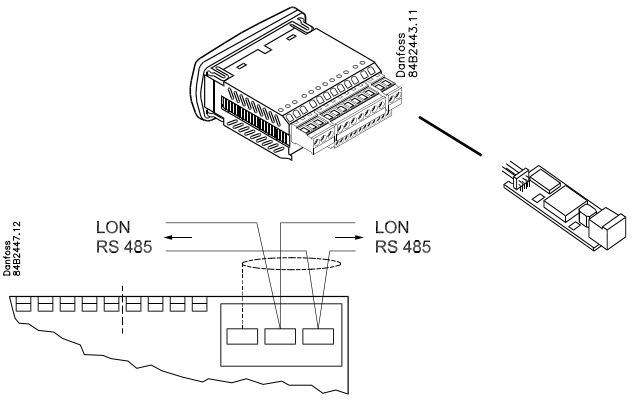
	CE (250 V a.c.)	UL *** (240 V a.c.)
DO1. Refrigeration *	10 (6) A	10 A Resistive 5FLA, 30LRA
DO2. Defrost *	10 (6) A	10 A Resistive 5FLA, 30LRA
DO3. Fan *	6 (3) A	6 A Resistive 3FLA, 18LRA 131 VA Pilot duty
DO4. Alarm, light or rail heat *	4 (1) A Min. 100 mA**	4 A Resistive 131 VA Pilot duty

* DO1 and DO2 are 16 A relays. DO3 and DO4 are 8 A relays. Max. load must be keept.
** Gold plating ensures make function wiht small contact loads
*** UL-approval based on 30000 couplings

Koordineret afrimning
Coordinated defrost



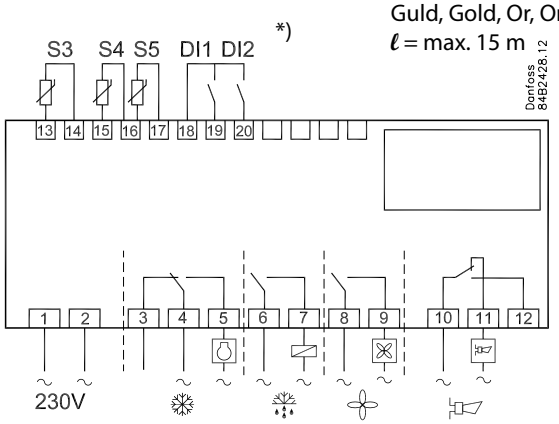
Data communication LON RS485:



o61 =

*) DI1, DI2:
AU:
Guld, Gold, Or, Oro
ℓ = max. 15 m

1



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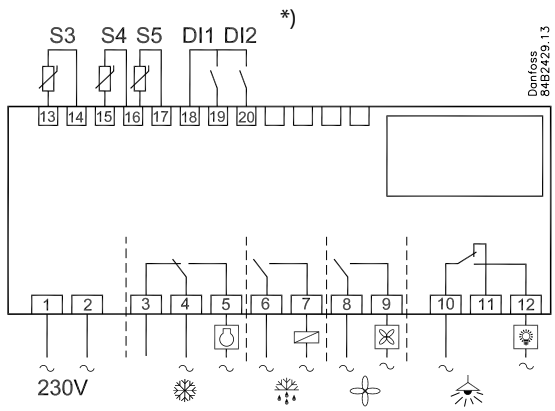

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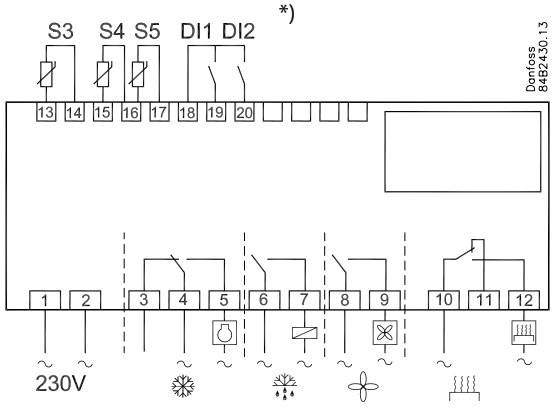


RI8KX253 12-2007

Parameters			EL-diagram number (page 1)			Min.-value	Max.-value	Factory setting	Actual setting
Function		**Codes**	**1**	**2**	**3**				
Normal operation									
Temperature (set point)		---				-50.0°C	50.0°C	2.0°C	
Thermostat									
Differential	***	r01				0.0 K	20.0K	2.0 K	
Max. limitation of setpoint setting	***	r02				-49.0°C	50°C	50.0°C	
Min. limitation of setpoint setting	***	r03				-50.0°C	49.0°C	-50.0°C	
Adjustment of temperature indication		r04				-20.0 K	20.0 K	0.0 K	
Temperature unit (°C/°F)		r05				°C	°F	°C	
Correction of the signal from S4		r09				-10.0 K	+10.0 K	0.0 K	
Correction of the signal from S3		r10				-10.0 K	+10.0 K	0.0 K	
Manual service, stop regulation, start regulation (-1, 0, 1)		r12				-1	1	0	
Displacement of reference during night operation		r13				-10.0 K	10.0 K	0.0 K	
Definition and weighting, if applicable, of thermostat sensors - S4% (100%=S4, 0%=S3)		r15				0%	100%	100%	
Activation of reference displacement r40		r39				OFF	ON	OFF	
Value of reference displacement (activate via r39 or DI)		r40				-50.0 K	50.0 K	0.0 K	
Alarm									
Delay for temperature alarm		A03				0 min	240 min	30 min	
Delay for door alarm	***	A04				0 min	240 min	60 min	
Delay for temperature alarm after defrost		A12				0 min	240 min	90 min	
High alarm limit	***	A13				-50.0°C	50.0°C	8.0°C	
Low alarm limit	***	A14				-50.0°C	50.0°C	-30.0°C	
Alarm delay DI1		A27				0 min	240 min	30 min	
Alarm delay DI2		A28				0 min	240 min	30 min	
Signal for alarm thermostat. S4% (100%=S4, 0%=S3)		A36				0%	100%	100%	
Compressor									
Min. ON-time		c01				0 min	30 min	0 min	
Min. OFF-time		c02				0 min	30 min	0 min	
Compressor relay 1 must cutin and out inversely (NC-function)		c30				0 OFF	1 ON	0 OFF	
Defrost									
Defrost method (none/EL/GAS/BRINE)		d01				no	bri	EL	
Defrost stop temperature		d02				0.0°C	25.0°C	6.0°C	
Interval between defrost starts		d03				0 hours	48 hours	8 hours	
Max. defrost duration		d04				0 min	180 min	45 min	
Displacement of time on cutin of defrost at start-up		d05				0 min	240 min	0 min	
Drip off time		d06				0 min	60 min	0 min	
Delay for fan start after defrost		d07				0 min	60 min	0 min	
Fan start temperature		d08				-15.0°C	0.0°C	-5.0°C	
Fan cutin during defrost		d09				no	yes	yes	
Defrost sensor (0=time, 1=S5, 2=S4)		d10				0	2	0	
Pump down delay		d16				0 min	60 min	0 min	
Max. aggregate refrigeration time between two defrosts		d18				0 hours	48 hours	0 hours	
Defrost on demand - S5 temperature's permitted variation during frost build-up. On central plant choose 20 K (=off)		d19				0.0 K	20.0 k	20.0 K	
Fan									
Fan stop at cutout compressor		F01				no	yes	no	
Delay of fan stop		F02				0 min	30 min	0 min	
Fan stop temperature (S5)		F04				-50.0°C	50.0°C	50.0°C	
Real time clock									
Six start times for defrost. Setting of hours. 0=OFF		t01-t06				0 hours	23 hours	0 hours	
Six start times for defrost. Setting of minutes. 0=OFF		t11-t16				0 min	59 min	0 min	
Clock - Setting of hours	***	t07				0 hours	23 hours	0 hours	
Clock - Setting of minute	***	t08				0 min	59 min	0 min	
Clock - Setting of date	***	t45				1	31	1	
Clock - Setting of month	***	t46				1	12	1	
Clock - Setting of year	***	t47				0	99	0	
Miscellaneous									
Delay of output signals after start-up		o01				0 s	600 s	5 s	
Input signal on DI1. Function: 0=not used. 1=status on DI1. 2=door function with alarm when open. 3=door alarm when open. 4=defrost start (pulse-pressure). 5=ext.main switch. 6=night operation 7=change reference (activate r40). 8=alarm function when closed. 9=alarm function when open. 10=case cleaning (pulse pressure). 11=forced cooling at hot gas defrost.		o02				1	11	0	
Network address		o03				0	240	0	
On/Off switch (Service Pin message) IMPORTANT! o61 **must** be set prior to o04		o04				OFF	ON	OFF	
Access code 1 (all settings)		o05				0	100	0	
Used sensor type (Pt /PTC/NTC)		o06				Pt	ntc	Pt	
Display step = 0.5 (normal 0.1 at Pt sensor)		o15				no	yes	no	
Max hold time after coordinated defrost		o16				0 min	60 min	20	

SW = 2.0x

Setting:

1 Open parameter r12 and stop the regulation

2 Select electric connection based on the drawings on page 1

3 Open parameter o61 and set the electric connection number in it

4 Open parameter r12 and start the regulation

5 Go through the survey of factory settings. Make any necessary changes in the respective parameters.

6 For network. Set the address in o03 and then transmit it to the gateway/ system unit with setting o04.

Select signal for display view. S4% (100%=S4, 0%=S3)		o17				0%	100%	100%	
Input signal on DI2. Function: (0=not used. 1=status on DI2. 2=door function with alarm when open. 3=door alarm when open. 4=defrost start (pulse-pressure). 5=ext. main switch 6=night operation 7=change reference (activate r40). 8=alarm function when closed. 9=alarm function when open. 10=case cleaning (pulse pressure). 11=forced cooling at hot gas defrost.). 12=coordinaded defrost)		o37				0	12	0	
Configuration of light function (relay 4) 1=ON during night operation. 2=ON / OFF via data communication. 3=ON follows the DI-function, when DI is selected to door function or to door alarm		o38				1	3	1	
Activation of light relay (only if o38=2)		o39				OFF	ON	OFF	
Rail heat On time during day operations		o41				0%	100%	0	
Rail heat On time during night operations		o42				0%	100%	0	
Rail heat period time (On time + Off time)		o43				6 min	60 min	10 min	
Case cleaning. 0=no case cleaning. 1=Fans only. 2=All output Off.	***	o46				0	2	0	
Selection of EL diagram. See overview page 1	*	o61*	**1**	**2**	**3**	1	3	1	
Access code 2 (partly access)	***	o64				0	100	0	
Save the controllers present settings to the programming key. Select your own number.		o65				0	25	0	
Load a set of settings from the programming key (previously saved via o65 function)		o66*				0	25	0	
Replace the controllers factory settings with the present settings		o67				OFF	On	OFF	
Service									
Status codes		S0-S33							
Temperature measured with S5 sensor	***	u09							
Status on DI1 input. on/1=closed		u10							
Temperature measured with S3 sensor	***	u12							
Status on night operation (on or off) 1=closed	***	u13							
Temperature measured with S4 sensor	***	u16							
Thermostat temperature		u17							
Read the present regulation reference		u28							
Status on DI2 output. on/1=closed		u37							
Temperature shown on display		u56							
Measured temperature for alarm thermostat		u57							
Status on relay for cooling	**	u58							
Status on relay for fan	**	u59							
Status on relay for defrost	**	u60							
Status on relay for railheat	**	u61							
Status on relay for alarm	**	u62							
Status on relay for light	**	u63							

*) Can only be set when regulation is stopped (r12=0)
**) Can be controlled manually, but only when r12=-1
***) With access code 2 the access to these menues will be limited

Fault code display	
E 1	Fault in controller
E 6	Change battery + check clock
E 25	S3 sensor error
E 26	S4 sensor error
E 27	S5 sensor error
Alarm code display	
A 1	High temperature alarm
A 2	Low temperature alarm
A 4	Door alarm
A 5	Max. Hold time
A 15	DI 1 alarm
A 16	DI 2 alarm
A 45	Standby mode
A 59	Case cleasning
Status code display	
S0	Regulating
S 1	Waiting for end of the coordinated defrost
S 2	ON-time Compressor
S 3	OFF-time Compressor
S 4	Drip-off time
S 10	Refrigeration stopped by main switch
S 11	Refrigeration stopped by thermostat
S 14	Defrost sequence. Defrosting
S 15	Defrost sequence. Fan delay
S 17	Door open (open DI input)
S 20	Emergency cooling
S 25	Manual control of outputs
S 29	Case cleaning
S 30	Forced cooling
S 32	Delay of output at start-up
non	The defrost temperature cannot be displayed. There is stop based on time
-d-	Defrost in progress
PS	Password required

The buttons

Set menu
1. Push the upper button until a parameter r01 is shown
2. Push the upper or the lower button and find that parameter you want to change
3. Push the middle button until the parameter value is shown
4. Push the upper or the lower button and select the new value
5. Push the middle button again to enter the value.

Cutout alarm relay / receipt alarm/see alarm code
• Push short the upper button

Set temperature
1. Push the middle button until the temperature value is shown
2. Push the upper or the lower button and select the new value
3. Push the middle button to select the setting.

Reading the temperature at defrost sensor
• Push briefly the lower button

Manuel start or stop of a defrost
• Push the lower button for four seconds.

LED

Light emmiting diode
= refrigeration
= defrost
= fan running

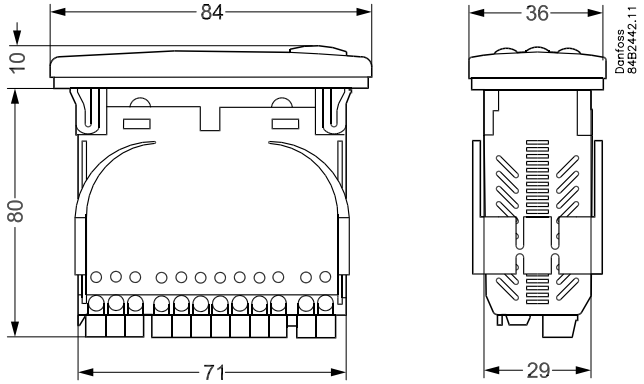
Flashes fast at alarm

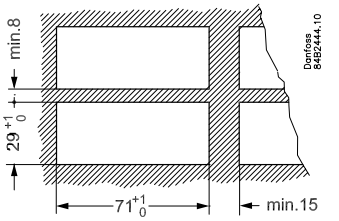
INSTRUCTIONS

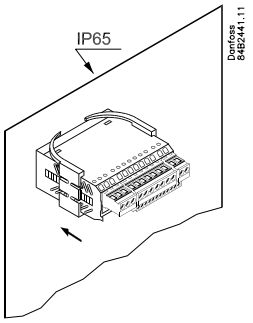
REFRIGERATION AND AIR CONDITIONING

AK-CC 210

084R8006





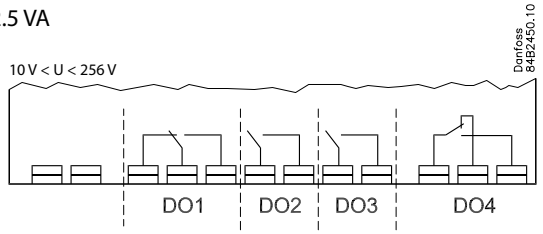


CE

t_{amb} = 0 - +55°C

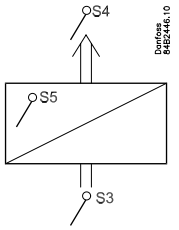
230 V a.c.

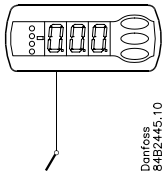
2.5 VA



	CE (250 V a.c.)	UL *** (240 V a.c.)
DO1. Refrigeration *	10 (6) A	10 A Resistive 5FLA, 30LRA
DO2. Defrost *	10 (6) A	10 A Resistive 5FLA, 30LRA
DO3. Fan or refrigeration 2 *	6 (3) A	6 A Resistive 3FLA, 18LRA 131 VA Pilot duty
DO4. Alarm, light, rail heat or hotgas defrost *	4 (1) A Min. 100 mA**	4 A Resistive 131 VA Pilot duty

* DO1 and DO2 are 16 A relays. DO3 and DO4 are 8 A relays. Max. load must be keept.
** Gold plating ensures make function with small contact loads
*** UL-approval based on 30000 couplings

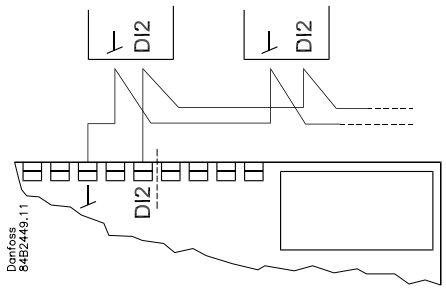




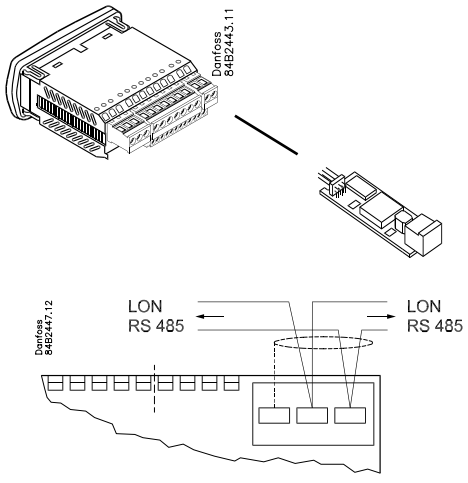
Type: Pt 1000 (1000 Ω /0°C) /
Ptc 1000 (1000 Ω /25°C) /
NTC-M2020 (5000 Ω / 25°C)

(o06)

Koordineret afrimning
Coordinated defrost



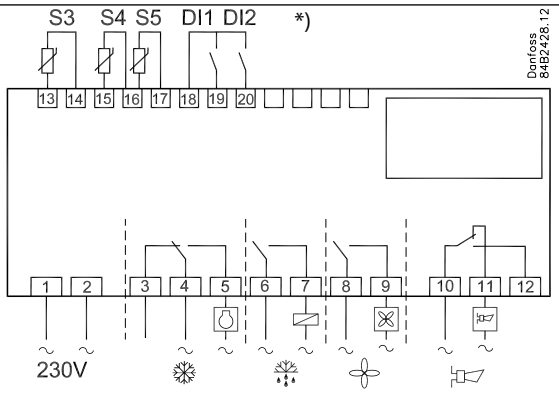
Data communication LON RS485:



RI8MB253 12-2007

o61 — Elforbindelser - Electrical connections - Elektrische Verbindungen

1



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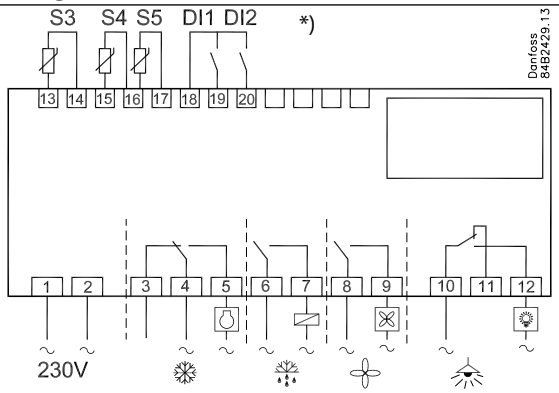

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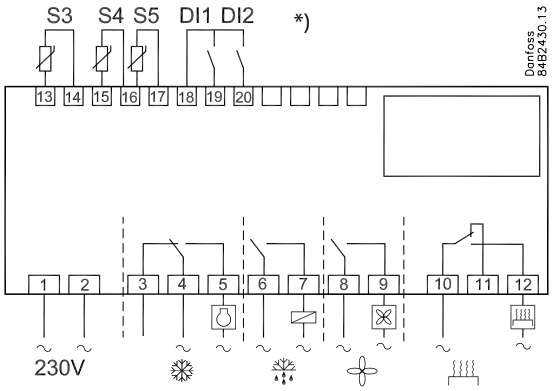

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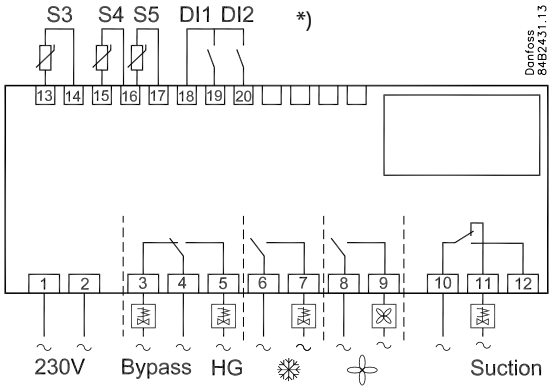
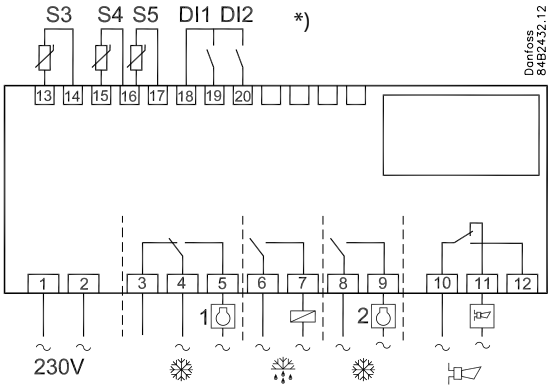


5



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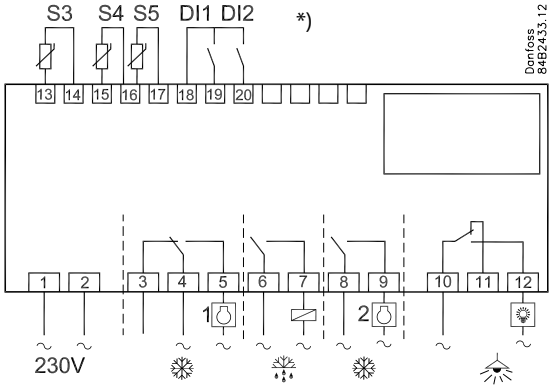

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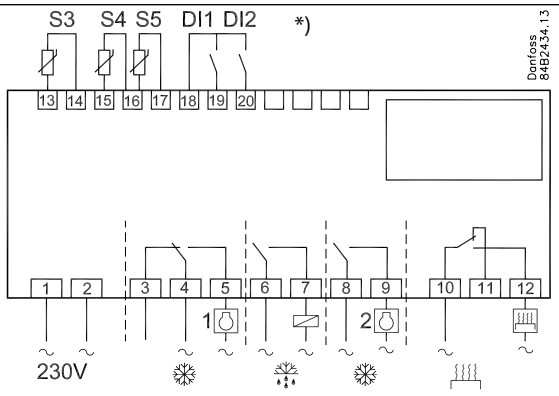

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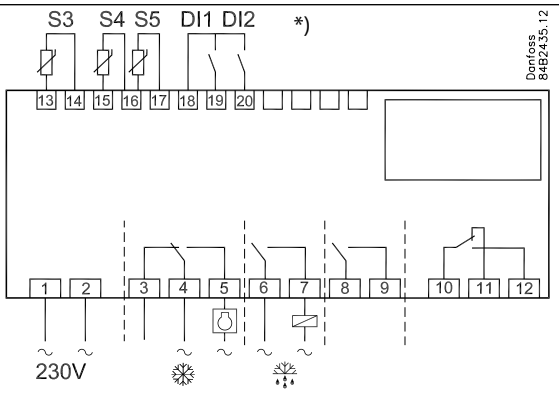

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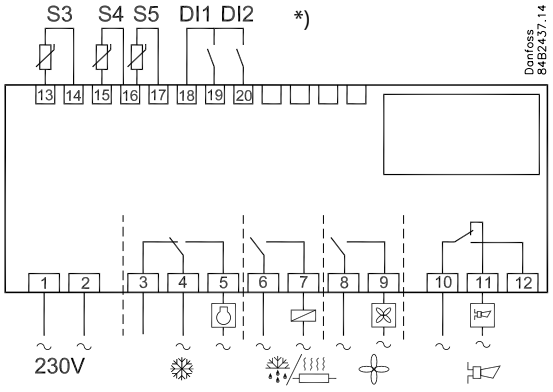

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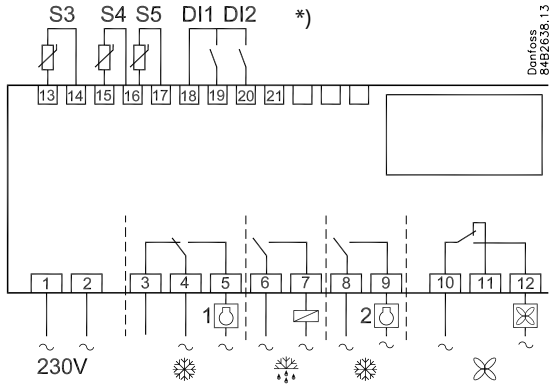


! ! ! ⟶ ***) DI1, DI2: AU: Guld, Gold, Or, Oro** ℓ **= max. 15 m**

Setting:

1 Open parameter r12 and stop the regulation

2 Select electric connection based on the drawings on page 2

3 Open parameter o61 and set the electric connection number in it

4 Now select one of the preset settings from the table on the right-hand side

5 Open parameter o62 and set the number for the array of presettings

6 Open parameter r12 and start the regulation

7 Go through the survey of factory settings. Make any necessary changes in the respective parameters.

8 For network. Set the address in o03 and then transmit it to the gateway/system unit with setting o04.

Auxiliary table for settings (quick-setup)	**Case**			**Room**		
	Defrost stop on time	Defrost stop on S5		Defrost stop on time	Defrost stop on S5	
Preset settings (o62)	**1**	**2**	**3**	**4**	**5**	**6**
Temperature (SP)	4°C	2°C	-24°C	6°C	3°C	-22°C
Max. temp. setting (r02)	6°C	4°C	-22°C	8°C	5°C	-20°C
Min. temp. setting (r03)	2°C	0°C	-26°C	4°C	1°C	-24°C
Sensor signal for thermostat. S4% (r15)	100%			0%		
Alarm limit high (A13)	10°C	8°C	-15°C	10°C	8°C	-15°C
Alarm limit low (A14)	-5°C	-5°C	-30°C	0°C	0°C	-30°C
Sensor signal for alarm funct.S4% (A36)	100%			0%		
Interval between defrost (d03)	6 h	6h	12h	8h	8h	12h
Defrost sensor: 0=time, 1=S5, 2=S4 (d10)	0	1	1	0	1	1
DI1 config. (o02)	Case cleaning =10			Door function =3		
Sensor signal for display view S4% (017)	100%			0%		

Array 1-6: The settings in the grey fields will be changed

Parameters			**EL-diagram number (page 2)**										**Min.-**	**Max.-**	**Factory**	**Actual**
Function		**Codes**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**value**	**value**	**setting**	**setting**
Normal operation																
Temperature (set point)		---											-50.0°C	50.0°C	2.0°C	
Thermostat																
Differential	***	r01											0.0 K	20.0K	2.0 K	
Max. limitation of setpoint setting	***	r02											-49.0°C	50°C	50.0°C	
Min. limitation of setpoint setting	***	r03											-50.0°C	49.0°C	-50.0°C	
Adjustment of temperature indication		r04											-20.0 K	20.0 K	0.0 K	
Temperature unit (°C/°F)		r05											°C	°F	°C	
Correction of the signal from S4		r09											-10.0 K	+10.0 K	0.0 K	
Correction of the signal from S3		r10											-10.0 K	+10.0 K	0.0 K	
Manual service, stop regulation, start regulation (-1, 0, 1)		r12											-1	1	0	
Displacement of reference during night operation		r13											-10.0 K	10.0 K	0.0 K	
Definition and weighting, if applicable, of thermostat sensors - S4% (100%=S4, 0%=S3)		r15											0%	100%	100%	
The heating function is started a number of degrees below the thermostats cutout temperature		r36											-15.0 K	-3.0 K	-15.0 K	
Activation of reference displacement r40		r39											OFF	ON	OFF	
Value of reference displacement (activate via r39 or DI)		r40											-50.0 K	50.0 K	0.0 K	
Alarm																
Delay for temperature alarm		A03											0 min	240 min	30 min	
Delay for door alarm	***	A04											0 min	240 min	60 min	
Delay for temperature alarm after defrost		A12											0 min	240 min	90 min	
High alarm limit	***	A13											-50.0°C	50.0°C	8.0°C	
Low alarm limit	***	A14											-50.0°C	50.0°C	-30.0°C	
Alarm delay DI1		A27											0 min	240 min	30 min	
Alarm delay DI2		A28											0 min	240 min	30 min	
Signal for alarm thermostat. S4% (100%=S4, 0%=S3)		A36											0%	100%	100%	
Compressor																
Min. ON-time		c01											0 min	30 min	0 min	
Min. OFF-time		c02											0 min	30 min	0 min	
Time delay for cutin of comp.2		c05											0 sec	999 sec	0 sec	
Compressor relay 1 must cutin and out inversely (NC-function)		c30											0 OFF	1 ON	0 OFF	
Defrost																
Defrost method (none/EL/GAS/BRINE)		d01											no	bri	EL	
Defrost stop temperature		d02											0.0°C	25.0°C	6.0°C	
Interval between defrost starts		d03											0 hours	48 hours	8 hours	
Max. defrost duration		d04											0 min	180 min	45 min	
Displacement of time on cutin of defrost at start-up		d05											0 min	240 min	0 min	
Drip off time		d06											0 min	60 min	0 min	
Delay for fan start after defrost		d07											0 min	60 min	0 min	
Fan start temperature		d08											-15.0°C	0.0°C	-5.0°C	
Fan cutin during defrost		d09											no	yes	yes	
Defrost sensor (0=time, 1=S5, 2=S4)		d10											0	2	0	
Pump down delay		d16											0 min	60 min	0 min	
Drain delay		d17											0 min	60 min	0 min	
Max. aggregate refrigeration time between two defrosts		d18											0 hours	48 hours	0 hours	
Defrost on demand - S5 temperature's permitted variation during frost build-up. On central plant choose 20 K (=off)		d19											0.0 K	20.0 k	20.0 K	
Fan																
Fan stop at cutout compressor		F01											no	yes	no	
Delay of fan stop		F02											0 min	30 min	0 min	
Fan stop temperature (S5)		F04											-50.0°C	50.0°C	50.0°C	

			1	2	3	4	5	6	7	8	9	10				
HACCP																
Actual temperature measurement for the HACCP function		h01														
Last registered peak temperature		h10														
Selection of function and sensor for the HACCP function. 0 = no HACCP function. 1 = S4 used (maybe also S3). 2 = S5 used		h11											0	2	0	
Alarm limit for the HACCP function		h12											-50.0°C	50.0°C	8.0°C	
Time delay for the HACCP alarm		h13											0 min.	240 min.	30 min.	
Select signal for the HACCP function. S4% (100% = S4, 0% = S3)		h14											0%	100%	100%	
Real time clock																
Six start times for defrost. Setting of hours. 0=OFF		t01-t06											0 hours	23 hours	0 hours	
Six start times for defrost. Setting of minutes. 0=OFF		t11-t16											0 min	59 min	0 min	
Clock - Setting of hours	***	t07											0 hours	23 hours	0 hours	
Clock - Setting of minute	***	t08											0 min	59 min	0 min	
Clock - Setting of date	***	t45											1	31	1	
Clock - Setting of month	***	t46											1	12	1	
Clock - Setting of year	***	t47											0	99	0	
Miscellaneous																
Delay of output signals after start-up		o01											0 s	600 s	5 s	
Input signal on DI1. Function: 0=not used. 1=status on DI1. 2=door function with alarm when open. 3=door alarm when open. 4=defrost start (pulse-pressure). 5=ext.main switch. 6=night operation 7=change reference (activate r40). 8=alarm function when closed. 9=alarm function when open. 10=case cleaning (pulse pressure). 11=forced cooling at hot gas defrost.		o02											1	11	0	
Network address		o03											0	240	0	
On/Off switch (Service Pin message) IMPORTANT! o61 **must** be set prior to o04		o04											OFF	ON	OFF	
Access code 1 (all settings)		o05											0	100	0	
Used sensor type (Pt /PTC/NTC)		o06											Pt	ntc	Pt	
Display step = 0.5 (normal 0.1 at Pt sensor)		o15											no	yes	no	
Max hold time after coordinated defrost		o16											0 min	60 min	20	
Select signal for display view. S4% (100%=S4, 0%=S3)		o17											0%	100%	100%	
Input signal on DI2. Function: (0=not used. 1=status on DI2. 2=door function with alarm when open. 3=door alarm when open. 4=defrost start (pulse-pressure). 5=ext. main switch 6=night operation 7=change reference (activate r40). 8=alarm function when closed. 9=alarm function when open. 10=case cleaning (pulse pressure). 11=forced cooling at hot gas defrost.). 12=coordinaded defrost)		o37											0	12	0	
Configuration of light function (relay 4) 1=ON during day operation. 2=ON / OFF via data communication. 3=ON follows the DI-function, when DI is selected to door function or to door alarm		o38											1	3	1	
Activation of light relay (only if o38=2)		o39											OFF	ON	OFF	
Rail heat On time during day operations		o41											0%	100%	0	
Rail heat On time during night operations		o42											0%	100%	0	
Rail heat period time (On time + Off time)		o43											6 min	60 min	10 min	
Case cleaning. 0=no case cleaning. 1=Fans only. 2=All output Off.	***	o46											0	2	0	
Selection of EL diagram. See overview page 2	*	o61*											1	10	1	
Download a set of predetermined settings. See overview previous page.	*	o62*											0	6	0	
Access code 2 (partly access)	***	o64											0	100	0	
Save the controllers present settings to the programming key. Select your own number.		o65											0	25	0	
Load a set of settings from the programming key (previously saved via o65 function)		o66*											0	25	0	
Replace the controllers factory settings with the present settings		o67											OFF	On	OFF	
Service																
Status codes are shown on page 8		S0-S33														
Temperature measured with S5 sensor	***	u09														
Status on DI1 input. on/1=closed		u10														
Temperature measured with S3 sensor	***	u12														
Status on night operation (on or off) 1=closed	***	u13														
Temperature measured with S4 sensor	***	u16														
Thermostat temperature		u17														
Read the present regulation reference		u28														
Status on DI2 output. on/1=closed		u37														
Temperature shown on display		u56														
Measured temperature for alarm thermostat		u57														
Status on relay for cooling	**	u58														
Status on relay for fan	**	u59														
Status on relay for defrost	**	u60														
Status on relay for railheat	**	u61														
Status on relay for alarm	**	u62														
Status on relay for light	**	u63														
Status on relay for valve in suction line	**	u64														
Status on relay for compressor 2	**	u67														

*) Can only be set when regulation is stopped (r12=0)
**) Can be controlled manually, but only when r12=-1
***) With access code 2 the access to these menues will be limited

SW = 2.0x

Factory settings are indicated for standard units. Other code numbers have customized settings.

The buttons

Set menu
1. Push the upper button until a parameter r01 is shown
2. Push the upper or the lower button and find that parameter you want to change
3. Push the middle button until the parameter value is shown
4. Push the upper or the lower button and select the new value
5. Push the middle button again to enter the value.

Cutout alarm relay / receipt alarm/see alarm code
• Push short the upper button

Set temperature
1. Push the middle button until the temperature value is shown
2. Push the upper or the lower button and select the new value
3. Push the middle button to select the setting.

Reading the temperature at defrost sensor
• Push briefly the lower button

Manuel start or stop of a defrost
• Push the lower button for four seconds.

See HACCP registration
1. Give the middle button a long push until h01 appears
2. Select required h01-h10
3. See value by giving the middle button a short push

LED

Light emmiting diode
= refrigeration
= defrost
= fan running

Flashes fast at alarm

HACCP
HACCP function is activ

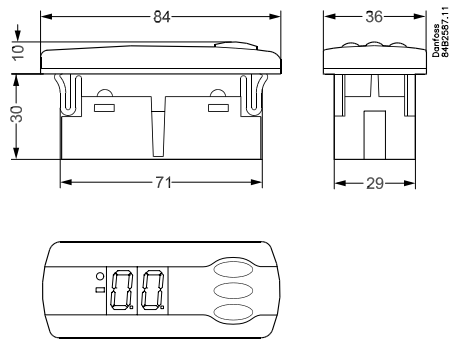
Fault code display		Alarm code display		Status code display	
E 1	Fault in controller	A 1	High temperature alarm	S0	Regulating
E 6	Change battery + check clock	A 2	Low temperature alarm	S 1	Waiting for end of the coordinated defrost
E 25	S3 sensor error	A 4	Door alarm	S 2	ON-time Compressor
E 26	S4 sensor error	A 5	Max. Hold time	S 3	OFF-time Compressor
E 27	S5 sensor error	A 15	DI 1 alarm	S 4	Drip-off time
		A 16	DI 2 alarm	S 10	Refrigeration stopped by main switch
		A 45	Standby mode	S 11	Refrigeration stopped by thermostat
		A 59	Case cleasning	S 14	Defrost sequence. Defrosting
		A 60	HACCP alarm	S 15	Defrost sequence. Fan delay
				S 17	Door open (open DI input)
				S 20	Emergency cooling
				S 25	Manual control of outputs
				S 29	Case cleaning
				S 30	Forced cooling
				S 32	Delay of output at start-up
				S33	Heat function r36 is active
				non	The defrost temperature cannot be displayed. There is stop based on time
				-d-	Defrost in progress
				PS	Password required

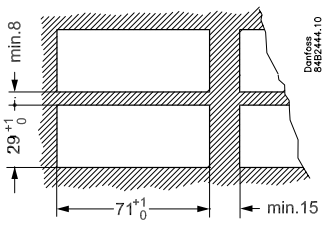
REFRIGERATION AND
AIR CONDITIONING

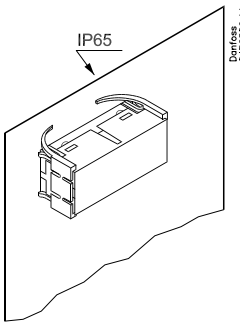
INSTRUCTIONS

EKC 100
084B8512

084R9991



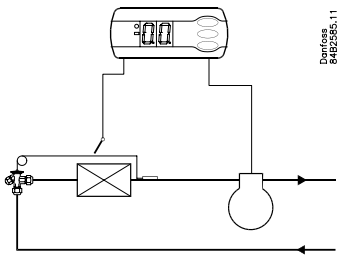


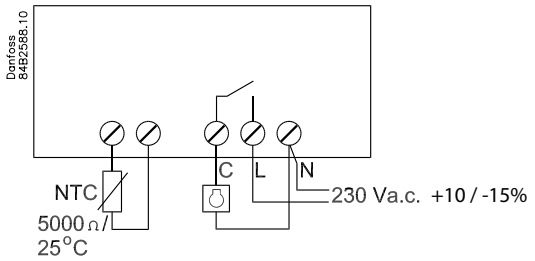


230 V a.c.
0.5 VA

t_{amb} = 0 - +55°C

CE





Type = EKS 211
(5000 Ω / 25°C)

Relay	CE
Rated voltage	250 V
I	10 (6) A

(Derated 16 A relay)

English

Set temperature
1. Push the middle button until the temperature value is shown
2. Push the upper or the lower button and select the new value
3. Push the middle button to select the setting.

Manual start or stop of a defrost
• Push the lower button for 5 seconds.

Light emitting diode (LED)
• Relais is cut-in

Set menu
1. Push the upper button until a parameter is shown
2. Push the upper or the lower button and find that parameter you want to change
3. Push the middle button until the parameter value is shown
4. Push the upper or the lower button and select the new value
5. Push the middle button againt to enter the value. Time out 20 sec.

Start-up:
Regulation starts when the voltage is on.

Go through the survey of factory settings. Make any necessary changes in the respective parameters.

SW = 1.0x

Parameter		Min.	Max.	Factory	Actual
Function	**Codes**	**value**	**value**	**setting**	**setting**
Normal operation					
Temperature (set point)	---	-60°C	50°C	2°C	
Thermostat					
Differential	r1	1 K	20 K	6 K	
Max. limitation of setpoint setting	r2	-59°C	50°C	50°C	
Min. limitation of setpoint setting	r3	-60°C	49°C	-60°C	
Display adjust	r4	-20 K	20 K	0 K	
Sensor adjustment	r9	-20 K	20 K	0 K	
Compressor					
Min. ON-time	c1	0 min	15 min	2 min	
Min. OFF-time	c2	0 min	15 min	2 min	
Defrost					
Defrost stop temperature	d2	0°C	25°C / off	25°C / off	
Interval between defrost stats	d3	0 hours	48 hours	5 hours	
Max. defrost duration	d4	0 min	99 min	15 min	
Displacement of time on cutin of defrost at start-up	d5	0 min	15 min	0 min	
Miscellaneous					
Delay of output signal after start-up	o1	0 min	15 min	0 min	
Access code (0= no function)	o5	0	99	0	
Fault code					
Sensor error	Er				

co : Enter Access code

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 the upper and lower button depressed at the same time as you reconnect the supply voltage

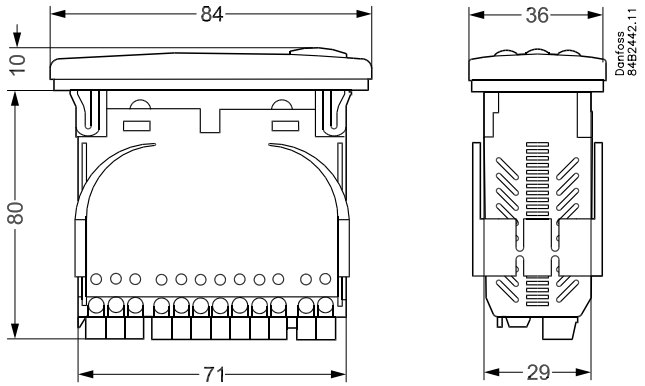
RI8LD202 06-2007

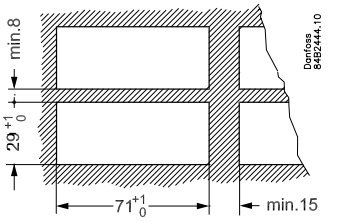
INSTRUCTIONS

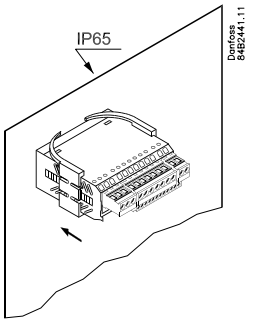
REFRIGERATION AND AIR CONDITIONING

EKC 102A

084R9965





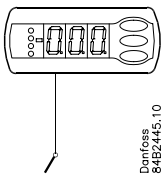


t_{amb} = 0 - +55°C

230 V a.c. 50/60 Hz

1.0 VA

CE



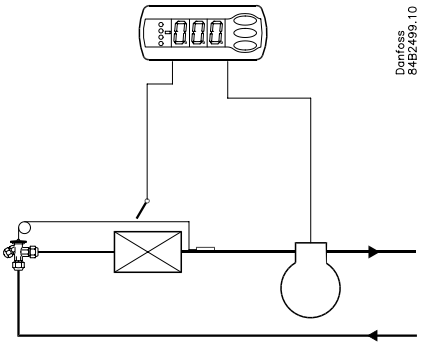
Type: Pt 1000 (1000 Ω /0°C) /
Ptc 1000 (1000 Ω /25°C) /
NTC-M2020 (5000 Ω / 25°C)

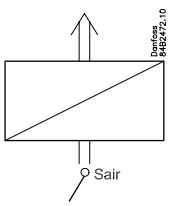
(o06)

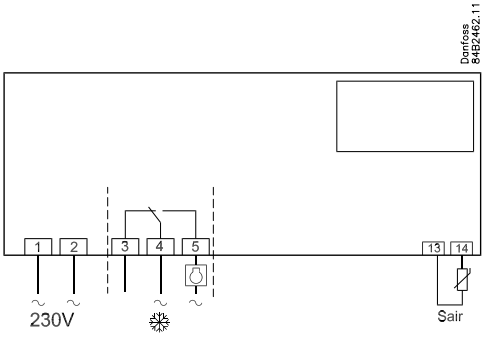
10 V < U < 256 V

CE (250 V a.c.)	UL (240 V a.c.)
10 (6) A 16 A relays	10 A Resistive 5FLA, 30LRA UL-approval based on 30000 couplings

Max. load must be keept.







RI8JT667 11-2008

The buttons

Set menu
1. Push the upper button until a parameter is shown
2. Push the upper or the lower button and find that parameter you want to change
3. Push the middle button until the parameter value is shown
4. Push the upper or the lower button and select the new value
5. Push the middle button again to enter the value.

Set temperature
1. Push the middle button until the temperature value is shown
2. Push the upper or the lower button and select the new value
3. Push the middle button to select the setting.

Manuel start or stop of a defrost
• Push the lower button for four seconds.

Light emmiting diode
= refrigeration / pull in relay
= defrost
Flashes fast at alarm

Cutout alarm / see alarm code
• Push briefly the upper button

SW = 1.2X

Parameters		Min.-value	Max.-value	Factory setting	Actual setting
Function	**Codes**				
Normal operation					
Temperature (set point)	---	-50°C	99°C	2°C	
Thermostat					
Differential	r01	0,1 K	20 K	2 K	
Max. limitation of setpoint setting	r02	-49°C	99°C	99°C	
Min. limitation of setpoint setting	r03	-50°C	99°C	-50°C	
Adjustment of temperature indication	r04	-20 K	20 K	0 K	
Temperature unit (°C/°F)	r05	°C	°F	°C	
Correction of the signal from Sair	r09	-10 K	10 K	0 K	
Manual service (-1), stop regulation (0), start regulation (1)	r12	-1	1	1	
Compressor					
Min. ON-time	c01	0 min	30 min	0 min	
Min. OFF-time	c02	0 min	30 min	0 min	
Compressor relay must cutin and out inversely (NC-function)	c30	OFF	On	OFF	
Defrost					
Defrost method (0=none / 1=natural)	d01	0	1	1	
Defrost stop temperature	d02	0°C	25°C	6°C	
Interval between defrost starts	d03	0 hours	48 hours	8 hours	
Max. defrost duration	d04	0 min	180 min	45 min	
Displacement of time on cutin of defrost at start-up	d05	0 min	240 min	0 min	
Defrost sensor (0=time, 1=Sair)	d10	0	1	0	
Defrost at start-up	d13	no	yes	no	
Miscellaneous					
Delay of output signals after start-up	o01	0 s	600 s	5 s	
Access code	o05	0	100	0	
Used sensor type (Pt /PTC/NTC)	o06	Pt	ntc	Pt	
Refrigeration or heat (rE=refrigeration, HE=heat)	o07	rE	HE	rE	
Display step = 0.5 (normal 0.1 at Pt sensor)	o15	no	yes	no	
Save the controllers present settings to the programming key. Select your own number.	o65	0	25	0	
Load a set of settings from the programming key (previously saved via o65 function)	o66	0	25	0	
Replace the controllers factory settings with the present settings	o67	OFF	On	OFF	
Service					
Status on relay Can be controlled manually, but only when r12=-1	u58				

Start-up:

Regulation starts when the voltage is on.

Go through the survey of factory settings. Make any necessary changes in the respective parameters.

Fault code display	
A45	Standby mode
Alarm code display	
E1	Fault in controller
E29	Sair sensor error
Status code display	
S0	Regulating
S2	ON-time Compressor
S3	OFF-time Compressor
S10	Refrigeration stopped by main switch
S11	Refrigeration stopped by thermostat
S14	Defrost sequence. Defrosting
S20	Emergency cooling
S25	Manual control of outputs
S32	Delay of output at start-up
non	The defrost temperature cannot be displayed. There is no sensor
-d-	Defrost in progress / First cooling after defrost
PS	Password required. Set password

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 upper and lower button depressed at the same time as you reconnect the supply voltage

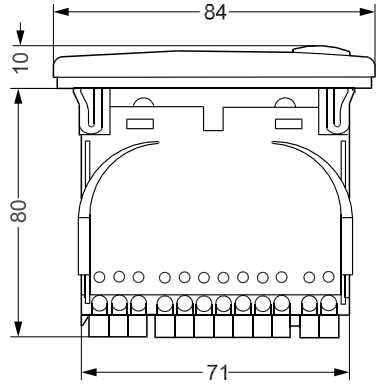
Warning ! Direct start of compressors *
To prevent compressor breakdown parameter c01 and c02 should be set according to suppliers requirements or in general :
Hermetic Compressors c02 min. 5 minutes
Semihermetic Compressors c02 min. 8 minutes and c01 min. 2 to 5 minutes (Motor from 5 to 15 KW)
*) Direct activating of solenoid valves does not require settings different from factory (0)

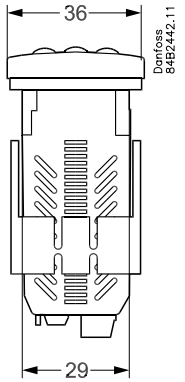
REFRIGERATION AND AIR CONDITIONING

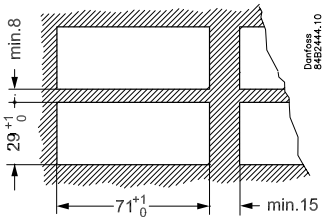
INSTRUCTIONS

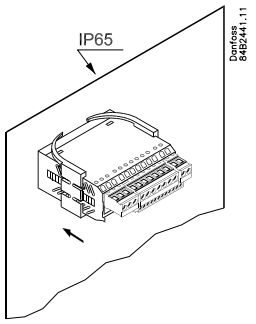
EKC 102B,
EKC 102C

084R9966







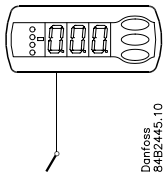


t_{amb} = 0 - +55°C

230 V a.c. 50/60 Hz

1.5 VA

CE



Type: Pt 1000 (1000 Ω /0°C) /
Ptc 1000 (1000 Ω /25°C) /
NTC-M2020 (5000 Ω / 25°C)

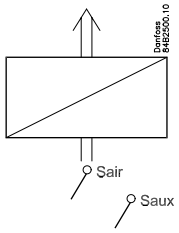
(o06)

10 V < U < 256 V

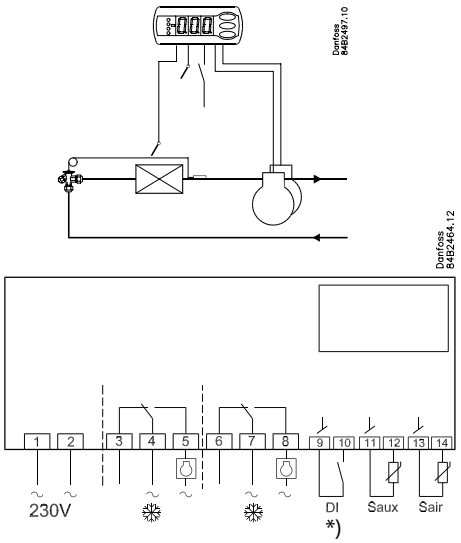
CE (250 V a.c.)	UL (240 V a.c.)
10 (6) A 16 A relays	10 A Resistive 5FLA, 30LRA UL-approval based on 30000 couplings

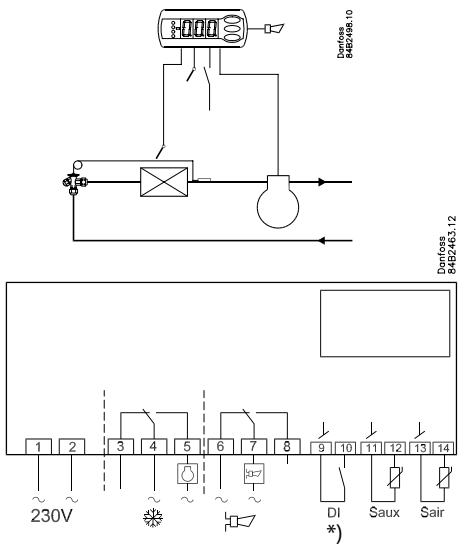
Max. load must be keept.

EKC 102B

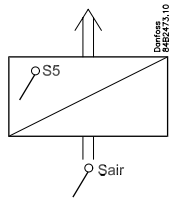


*) AU:
Guld, Gold or Oro
ℓ = max. 15 m

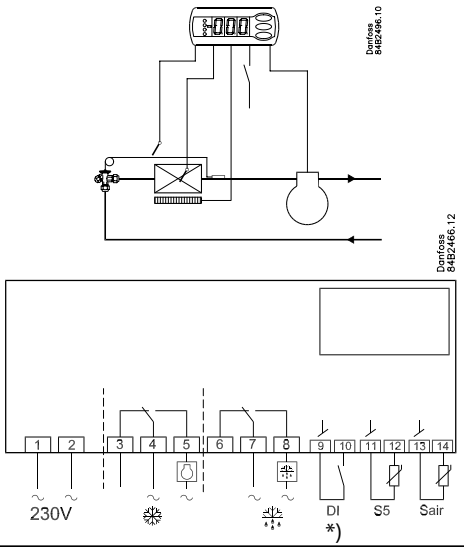


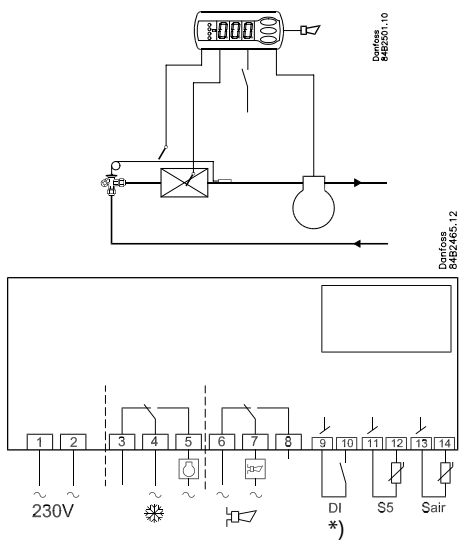


EKC 102C



*) AU:
Guld, Gold or Oro
ℓ = max. 15 m





RI8JU767 11-2008

The buttons

Set menu
1. Push the upper button until a parameter is shown
2. Push the upper or the lower button and find that parameter you want to change
3. Push the middle button until the parameter value is shown
4. Push the upper or the lower button and select the new value
5. Push the middle button again to enter the value.

Set temperature
1. Push the middle button until the temperature value is shown
2. Push the upper or the lower button and select the new value
3. Push the middle button to select the setting.

See temperature at the other temperature sensor
• Push briefly the lower button

Manuel start or stop of a defrost
• Push the lower button for four seconds.

Light emmiting diode
= refrigeration
= defrost
Flashes fast at alarm

See alarm code
• Push briefly the upper button

Parameters		EKC	EKC	Min.-	Max.-	Factory	Actual
Function	**Codes**	**102B**	**102C**	**value**	**value**	**setting**	**setting**
Normal operation							
Temperature (set point)	---			-50°C	50°C	2°C	
Thermostat							
Differential	r01			0,1 K	20 K	2 K	
Max. limitation of setpoint setting	r02			-49°C	50°C	50°C	
Min. limitation of setpoint setting	r03			-50°C	49°C	-50°C	
Adjustment of temperature indication	r04			-20 K	20 K	0 K	
Temperature unit (°C/°F)	r05			°C	°F	°C	
Correction of the signal from Sair	r09			-10 K	10 K	0 K	
Manual service, stop regulation, start regulation (-1, 0, 1)	r12			-1	1	1	
Displacement of reference during night operation	r13			-10 K	10 K	0 K	
Alarm							
Delay for temperature alarm	A03			0 min	240 min	30 min	
Delay for door alarm	A04			0 min	240 min	60 min	
Delay for temperature alarm after defrost	A12			0 min	240 min	90 min	
High alarm limit	A13			-50°C	50°C	8°C	
Low alarm limit	A14			-50°C	50°C	-30°C	
High alarm limit for condenser temperature (o69)	A37			0°C	99°C	50°C	
Compressor							
Min. ON-time	c01			0 min	30 min	0 min	
Min. OFF-time	c02			0 min	30 min	0 min	
Time delay for cutin of comp.2	c05			0 sec	999 sec	5 sec	
Compressor relay must cutin and out inversely (NC-function)	c30			OFF	On	OFF	
Defrost							
Defrost method (0=none / 1=natural, 2=gas)	d01	0/1	0/1*/2	0	2	1	
Defrost stop temperature	d02			0°C	25°C	6°C	
Interval between defrost starts	d03			0 hours	48 hours	8 hours	
Max. defrost duration	d04			0 min	180 min	45 min	
Displacement of time on cutin of defrost at start-up	d05			0 min	240 min	0 min	
Defrost sensor 0=time, (B:1=Sair.) (C: 1=S5, 2=Sair)	d10	1=Sair	1=S5	0	1 (2)	0	
Defrost at start-up	d13			no	yes	no	
Max. aggregate refrigeration time between two defrosts	d18			0 hours	48 hours	8 hours	
Defrost on demand - S5 temperature's permitted variation during frost build-up. On central plant choose 20 K (=off)	d19			0 K	20 k	2 K	
Miscellaneous							
Delay of output signals after start-up	o01			0 s	600 s	5 s	
Input signal on DI1. Function: (0=not used. , 1= door alarm when open. 2=defrost start (pulse-pressure). 3=ext.main switch. 4=night operation	o02			0	4	0	
Access code 1 (all settings)	o05			0	100	0	
Used sensor type (Pt /PTC/NTC)	o06			Pt	ntc	Pt	
Display step = 0.5 (normal 0.1 at Pt sensor)	o15			no	yes	no	
Access code 2 (partly access)	o64			0	100	0	
Save the controllers present settings to the programming key. Select your own number.	o65			0	25	0	
Load a set of settings from the programming key (previously saved via o65 function)	o66			0	25	0	
Replace the controllers factory settings with the present settings	o67			OFF	On	OFF	
Select application for Saux sensor (0=not used, 1=product sensor, 2=condenser sensor)	o69			0	2	0	
Select application for S5 sensor (0=defrost sensor, 1= product sensor)	o70			0	1	0	
Select application for relay 2: 1=compressor-2 / defrost, 2= alarm relay	o71	Comp. / Alarm	Defrost/ Alarm	1	2	1	
Service							
Temperature measured with Saux sensor	u03						
Temperature measured with S5 sensor	u09						
Status on DI1 input. on/1=closed	u10						
Status on relay for cooling Can be controlled manually, but only when r12=-1	u58						
Status on relay 2 Can be controlled manually, but only when r12=-1	u70						

Factory setting SW = 1.2X

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 upper and lower button depressed at the same time as you reconnect the supply voltage

Start-up:

Regulation starts when the voltage is on.

Go through the survey of factory settings. Make any necessary changes in the respective parameters.

Alarm code display	
A1	High temperature alarm
A2	Low temperature alarm
A4	Door alarm
A45	Standby mode
A61	Condenser alarm
Fault code display	
E1	Fault in controller
E27	S5 sensor error
E29	Sair sensor error
E30	Saux sensor error
Status code display	
S0	Regulating
S2	ON-time Compressor
S3	OFF-time Compressor
S10	Refrigeration stopped by main switch
S11	Refrigeration stopped by thermostat
S14	Defrost sequence. Defrosting
S17	Door open (open DI input)
S20	Emergency cooling
S25	Manual control of outputs
S32	Delay of output at start-up
non	The defrost temperature cannot be displayed. There is no sensor
-d-	Defrost in progress / First cooling after defrost
PS	Password required. Set password

Warning ! Direct start of compressors *

To prevent compressor breakdown parameter c01 and c02 should be set according to suppliers requirements or in general :
Hermetic Compressors c02 min. 5 minutes
Semihermetic Compressors c02 min. 8 minutes and c01 min. 2 to 5 minutes (Motor from 5 to 15 KW)
*) Direct activating of solenoid valves does not require settings different from factory (0)

* 1=> EL if o71 =1

REFRIGERATION AND AIR CONDITIONING

INSTRUCTIONS

EKC 201, EKC 301

084R9697

EKC 201

$t_{amb.}$ = 0 → +55°C
12 V a.c./d.c./230 V a.c.
2.5 VA

Standard:
084B7505
....
084B7512

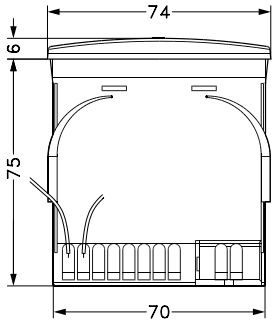
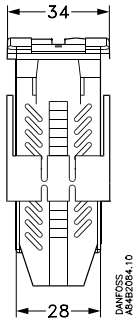


Fig. 1



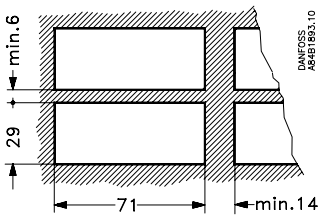


Fig. 2

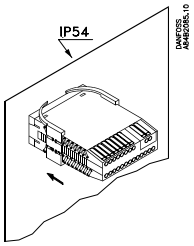
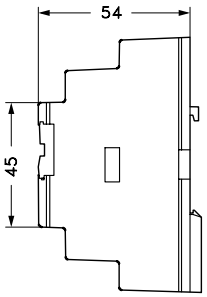


Fig. 3

EKC 301

$t_{amb.}$ = 0 → +55°C
IP 20
230 V a.c.
5 VA

Standard:
084B7513
....
084B7518



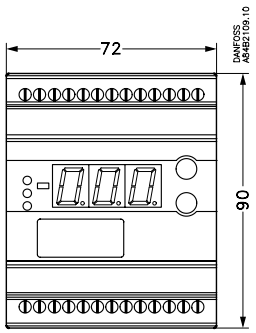
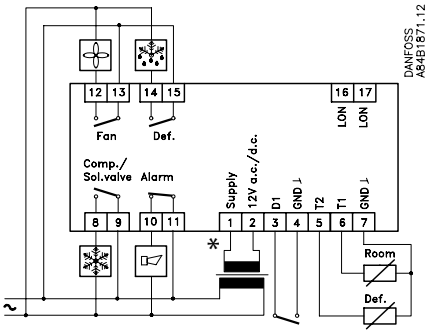


Fig.4

EKC 201, 12 V



* l = max. 1 m if 60 Hz

Fig. 5

EKC 201, 230 V

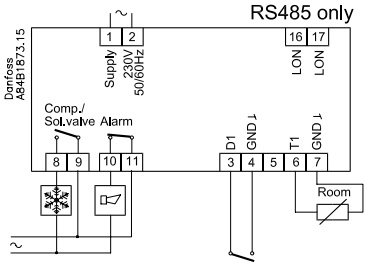


Fig. 6

EKC 301

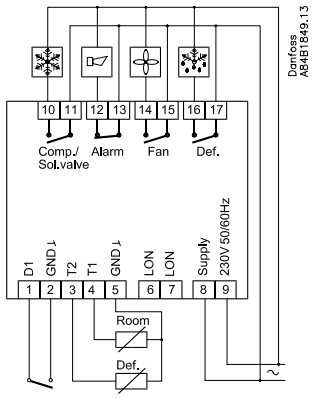
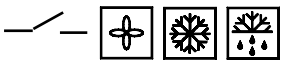


Fig. 7



10 V < U < 256 V
I_{max} (AC-1) = 6 A
I_{max} (AC-15) = 3 A

10 V < U < 256 V
I_{max} (AC-1) = 4 A
I_{max} (AC-15) = 1 A

T1 / (T2)

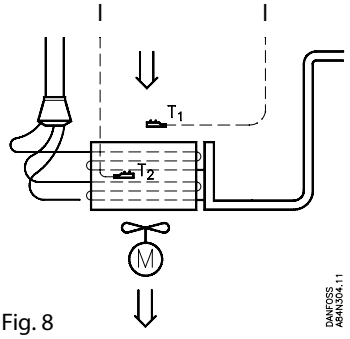
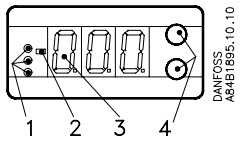


Fig. 8

If 60 Hz : l = max. 100 m

~~RI.8A.E3.67~~ → RI.8A.E4.67 01-2002

Fig. 9



DANSK

Elektroniske regulatorer
EKC 201: Til indbygning i tavle.
EKC 301: Til montering på DIN-skinne.

Montering Se fig. 1-4 og fig. 8.

El-tilslutning
Se fig. 5-7 samt el-diagram på apparatet.
12 V regulatorerne skal tilsluttes separat transformer på min. 3 VA.

Betjening
(Se fig. 9).
1. Lysdiode
   = køling
   = afrimning
   = ventilator i gang
   Blinker langsomt ved indstilling
   Blinker hurtigt ved alarm
2. Minustegn.
3. Display.
   (Blinker når indstillingsværdien for rumtemperaturen vises).
4. Taster til programmering og indstilling
   (se programmeringsvejledning).

Programmering og indstilling
Se programmeringsvejledningen og indstillinger.

Tryk på øverste tast i 2 s.

Tryk på nederste tast i 2 s.

Tryk på begge taster samtidigt.

ENGLISH

Electronic controllers
EKC 201: For panel mounting
EKC 301: For DIN-rail mounting

Installation See figs. 1-4 and fig. 8.

Electrical connection
See figs 5-7 and electrical diagram on unit.
The 12 V controllers must be connected separately: transformer of min. 3 VA.

Operation
(See fig. 9).
1. Light emitting diode
   = refrigeration
   = defrost
   = fan running
   Flashes slowly at setting
   Flashes fast at alarm
2. Minus sign
3. Display
   (Flashes when setting value for room temp. is displayed).
4. Keys for programming and setting (see programming instructions).

Programming and setting
see programming instructions and settings.

Press upper key for 2 s.

Press lower key for 2 s.

Press both keys at the same time.

DEUTSCH

Elektronische Regler
EKC 201: Für den Schalttafeleinbau.
EKC 301: Für die Montage auf DIN-Schiene.

Montage Siehe Abb. 1 - 4 und Abb. 8.

Elektrischer Anschluß
Siehe Abb. 5-7 sowie Schaltplan am Regler.
12 V-Regler müssen an separaten Trafo von min. 3 VA angeschlossen werden.

Bedienung
(Siehe Abb. 9).
1. Leuchtdiode
   = Kühlung
   = Abtauung
   = Lüfter läuft
   Blinkt langsam bei Einstellung
   Blinkt schnell bei Alarm
2. Minuszeichen
3. Display
   (Blinkt, wenn der Einstellwert der Raumtemperatur angezeigt wird).
4. Tasten zur Programmierung und Einstellung. (Siehe Programmierungsanleitung).

Programmierung und Einstellung
Siehe Programmierungsanleitung und Einstellungen.

Obere Taste für 2 s betätigen.

Untere Taste für 2 s betätigen.

Beide Tasten gleichzeitig betätigen.

FRANCAIS

Régulateurs électroniques
EKC 201 : pour montage sur tableau
EKC 301 : pour montage sur rail DIN

Montage
Voir fig. de 1 à 4 et fig. 8.

Connexion électrique
Voir fig. 5-7 ainsi que le diagramme électrique sur l'appareil.
Les régulateurs de 12 V doivent se brancher sur un transformateur séparé d'au moins 3 VA.

Utilisation
(Voir fig. 9).
1. Diode lumineuse
   = refroidissement
   = dégivrage
   = ventilateur en fonction
   Clignotement lent pendant le réglage
   Clignotement rapide en cas d'alarme
2. Signe moins (-).
3. Affichage.
   (Clignote quand la température de réglage est atteinte).
4. Touches pour programmation et réglage (voir instructions de programmation).

Programmation et réglage
Consulter les instructions de programmation et les réglages.

Presser sur la touche supérieure pendant 2 sec.

Presser sur la touche inférieure pendant 2 sec.

Presser sur les deux touches en même temps.

ESPAÑOL

Controlador electrónico
EKC 201: Para montaje en panel
EKC 301: Para montaje en rail DIN

Instalación Ver fig. 1-4 y fig. 8.

Conexionado eléctrico
Ver fig. 5-7 y diagrama electrico de la unidad.
Los controladores de 12 V se deben conectar por separado: transformador minimo de 3VA.

Operación
(Ver fig. 9).
1. LED Diodo luminoso
   = refrigeración
   = desescarche
   = marcha de ventiladores
   Parpadea ligeramente al ajustarse
   Parpadea rapidamente en estado de alarma
2. Signo menos
3. Pantalla
   (Parpadea cuando se realiza el ajuste de la temperatura).
4. Botones de programación y ajustes
   (ver instrucciones de programación).

Programación y ajustes
Ver instrucciones de programación y ajustes.

Pulsar el boton superior durante dos segundos

Pulsar el boton inferior durante dos segundos

Pulsar los dos botones a la vez

ITALIANO

Controllore elettronico
EKC 201: per montaggio su pannello
EKC 301: per montaggio su barra DIN
Installazione Vd. Fig. 1-4 e fig. 8.

Connessioni elettriche
Vedi fig. 5-7 e gli schemi elettrici
I regolatori 12 V devono essere collegati ad un trasformatore singolo da 3VA.

Funzionamento
(vd Fig. 9).
1. Led luminoso
   = refrigerazione
   = sbrinamento
   = ventilatore
   Il led lampeggia lentamente durante l'impostazione parametri
   Il led lampeggia velocemente durante un allarme
2. Segno meno
3. Display
   (lampeggia durante l'impostazione temp. ambiente).
4. Tasti per programmare e tarare (vedi le istruzioni di programmazione)

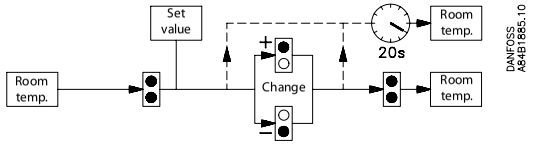
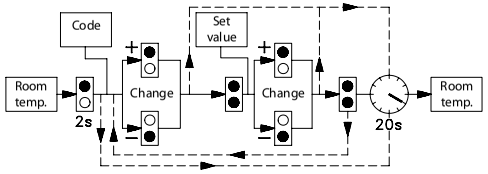
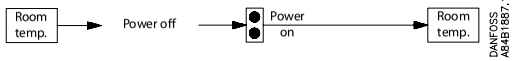
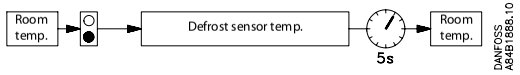
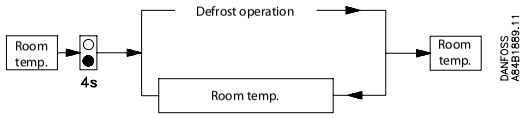
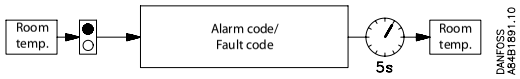
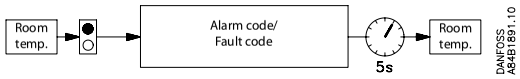
Programmare e tarare
Vedi le istruzioni di programmazione

Premi il tasto superiore per 2 secondi

Premi il tasto inferiore per 2 secondi

Premi entrambi i tasti allo stesso tempo

Quick Guide

What to do	Initial controller setup	Operating the two pushbuttons Display readout What the controller does automatically	Resulting controller setup
Read or change room temp. setting	Normal operation Room temp. 1		Normal operation Room temp. 2
Read or change parameter codes and settings	Normal operation (or alarm) Unknown codes and settings		Normal operation (or alarm) Known codes and settings
Re-establish all factory settings	Unknown settings		All parameter settings = factory settings
Read defrost sensor temp.	Normal operation or alarm		Normal operation
Manually start of a defrost operation	Normal operation		Normal operation
Manually stop of a defrost operation	Defrost operation		Normal operation
Reset alarm relay	Alarm relay activated		Alarm relay not activated
Read codes cause of alarm mode	Alarm relay not activated		Alarm

[1]) The compressor relay closes when the room temperature exceeds the setting value and differential.

[2]) Alarm is released and sensor failure is indicated, if the room temperature reaches 5°C or more outside the setting range –60° to +50°C.

[3]) After start-up and throughout three days and nights this value is used by the controller. Afterwards the controller is capable by itself to calculate the average value of previous cut-in times.

[4]) Function possibilities with SPST contact, connected to the terminals 3 and 4 are the following:
Door alarm: If SPST is cut out, alarm signalling starts and the fan is stopped, cf. A04 or F03.
Defrost: If SPST is cut in, defrost starts.
(However, if d03 is not OFF, defrost will during contact break down start with the programmed time intervalles).
Bus: With installed communication card, the position of the SPST contacts will be registered in the BUS system.
Main Switch: Start/stop control

[5]) Factory settings are indicated for standard units (see code numbers, page 1). Other code numbers have customized settings.

Controller application setting parameters

Setting and read-off parameters	Parameter codes	Controller application no. 1	2	3	4	Min.-value	Max.-value	Factory setting [5])	Actual settings
Normal operation									
Temperature controller, temperature						-60°C	50°C	3°C	
Thermostat									
Differential [1])	r01					0.1 K	20 K	2 K	
Max. limitation of set temperature	r02					-59°C	50°C	50°C	
Min. limitiation of set temperature	r03					-60°C	49°C	-60°C	
Adjustment of temperature indication	r04					-20 K	20 K	0.0 K	
Temperature unit (°C/°F)	r05							°C	
Alarm									
Upper deviation (above temp.setting + differential) [2])	A01					0 K	50 K	10 K	
Lowe devaition (below temp. setting) [2])	A02					-50 K	0 K	-10 K	
Temperature alarm delsy	A03					0 min	90 min	30 min	
Door alarm delay	A04					0 min	90 min	60 min	
Compressor									
Min. ON-time	c01					0 min	15 min	0 min	
Min. OFF-time	c02					0 min	15 min	0 min	
Cut-in frequency on sensor fault [3])	c03					0%	100%	0%	
Compressor stop at open door (yes/no)	c04							no	
Defrost									
Defrost method (EL/GAS)	d01							EL	
Defrost stop temperature	d02					0°C	25°C	6°C	
Interval mbetween defrost starts	d03					OFF	48 hour	8 hour	
Max. defrost duration	d04					0 min	180 min	45 min	
Defrost time delay (after power up)	d05					0 min	60 min	0 min	
Drip-off time	d06					0 min	20 min	0 min	
Fan start delay after defrost	d07					0 min	20 min	1 min	
Fan start temperature	d08					-15°C	0°C	-5°C	
Fan cut-in during defrost (yes/no)	d09							no	
Defrost sensor (yes/no)	d10							yes	
Temperature alarm delay after defrost	d11					0 min	199 min	90 min	
Delay of display view after defrost stop	d12					0 min	15 min	1 min	
Defrost at start-up	d13					no	yes	no	
Fan									
Fan stop on compressor cut-out (yes/no)	F01							no	
Fan stop delay	F02					0 min	30 min	0 min	
Fan stop at open door (yes/no)	F03							yes	
Miscellaneous									
Delay of output signal after start-up	o01					0 s	600 s	5 s	
Digital input signals [4]) (0=not used. 1=door alarm. 2=defrost. 3=bus. 4=Main switch.)	o02							0	
Access code	o05					OFF	100	OFF	
Used sensor type (Pt /PTC)	o06							Pt/PTC	
Real time clock (if fitted)									
Six start times for defrost All can be cut out by setting on OFF	t01-t06					0	23	OFF	
Hour setting	t07					0 hour	23 hour	0 hour	
Minute setting	t08					0 min	59 min	0 min	

Fault code display		Alarm code display		Status code display	
E 1	Fault in controller	A 1	High temperature alarm	S 2	ON-time
E 2	Disconnected room sensor	A 2	Low temperature alarm	S 3	OFF-time
E 3	Short-circuited room sensor	A 4	Door alarm	S 4	Drip-off time
E 4	Disconnected defrost sensor			S 10	Cooling stopped
E 5	Short-cirucuited defrost sensor				
E 6	Change battery + check clock				

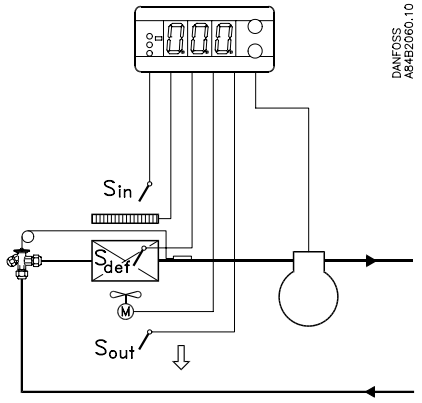
REFRIGERATION AND AIR CONDITIONING

INSTRUCTIONS

EKC 201C
with double thermostat

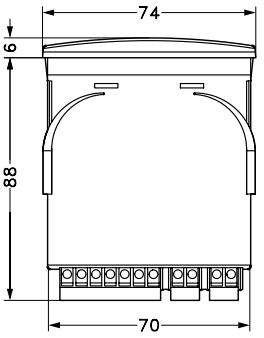
084R9788

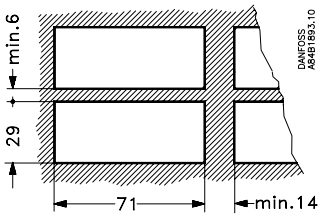
Principle
Prinzip
Principe

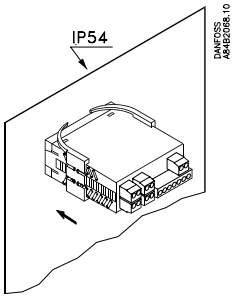


S:
Pt 1000 /
PTC 1000/25°C

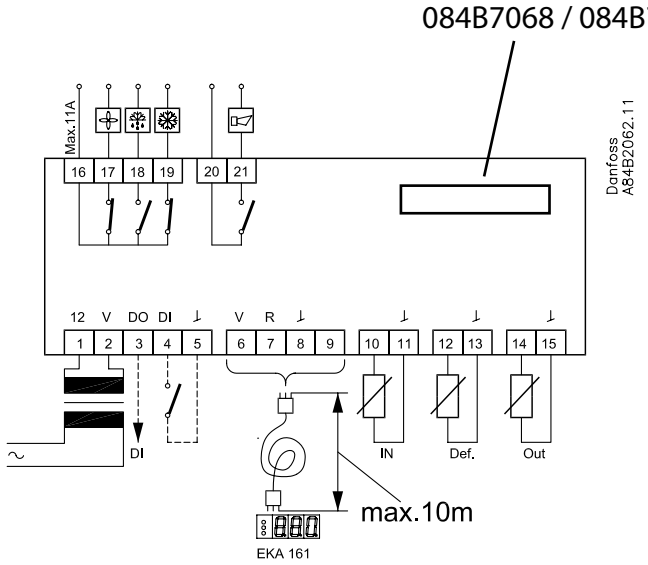
CE



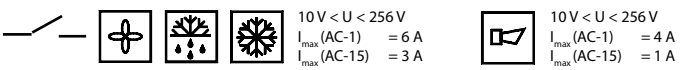




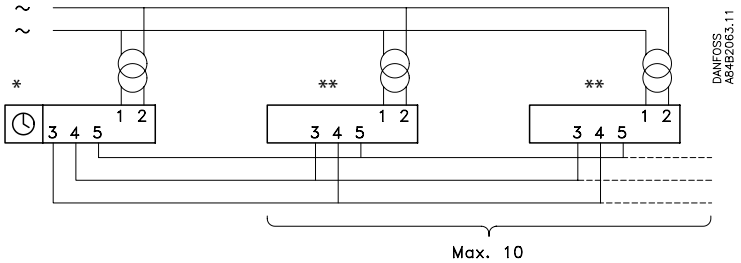
084B7068 / 084B7064



$t_{amb.}$ = 0 → +55°C
12 V +/- 15%, 50/60 Hz / d.c.
2.5 VA



Application example
Anwendungsbeispiel
Application exemple



Common defrost start / Common start after defrost
Gemeinsamer Abtau anlauf / Gemeinsamer Anlauf nach Abtauung
Enclenchement dégivrage commun / remise en route après dégivrage

* Main controller
Hauptgerät
Commande
(o13 =1)

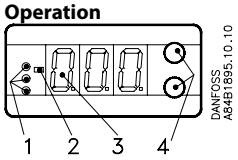
** secondary controller
Folgegerät
Récepteur
(o13 =2)

RI.8J.A1.83 04-2004

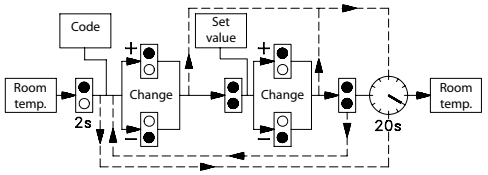
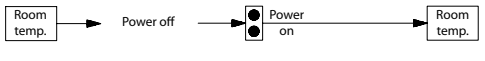
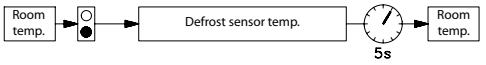
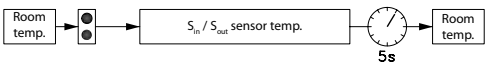
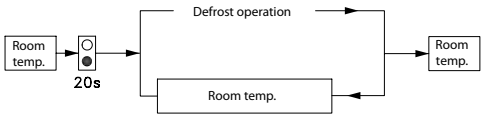
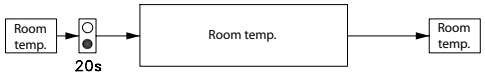
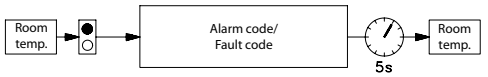
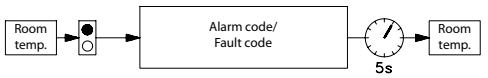
Installation
For panel mounting

Electrical connection
The controllers must be connected separately:
transformer of min. 3 VA.

Operation



1. Light emitting diode
   = refrigeration
   = defrost
   = fan running
   Flashes slowly at setting
   Flashes fast at alarm
2. Minus sign
3. Display
4. Keys for programming and setting
   Press upper key for 2 s.
   Press lower key for 2 s.
   Press both keys at the same time.

What to do	Initial controller setup	Operating the two pushbuttons Display readout	Resulting controller setup
Read or change parameter codes and settings	Normal operation (or alarm) Unknown codes and settings		Normal operation (or alarm) Known codes and settings
Re-establish all factory settings	Unknown settings		All parameter settings = factory settings
Read defrost sensor temp.	Normal operation or alarm		Normal operation
Read the other sensor temp.	Normal operation or alarm		Normal operation
Manually start of a defrost operation	Normal operation		Normal operation
Manually stop of a defrost operation	Defrost operation		Normal operation
Reset alarm relay	Alarm relay activated		Alarm relay not activated
Read codes cause of alarm mode	Alarm relay not activated		Alarm

- Room temp. = S_{out} or S_{in}
- The compressor relay closes when the room temperature exceeds the setting value and differential.

Fault code display		Alarm code display		Status code display	
E1	Fault in controller	A4	Door alarm	S1	Waiting for end of the coordinated defrost
E4	S_{def} Disconnected	A5	Information. Parameter o16 has expired	S2	On-time min.
E5	S_{def} Short-circuited	A6	High temperature alarm (S_{out})	S3	Restart time
E6	Fault in Real time clock	A7	Low temperature alarm (S_{out})	S4	Drip-off time
E7	S_{out} Disconnected	A8	High temperature alarm (S_{in})	S6	Day operation (S_{out} control)
E8	S_{out} Short-circuited	A9	Low temperature alarm (S_{in})	S7	Night operation (S_{in} control)
E9	S_{in} Disconnected			S10	Refrigeration stopped
E10	S_{in} Short-circuited				

Further information: Manual RS.8B.L

Parameter Name	Display	Min. value	Max. value	Unit	Factory settting	Actual settig
Thermostat						
Cutout value S_{out}	Out	-50	50	°C (°F)	3.0°C	
Temperature unit	r05	°C	°F		°C	
Differential S_{out}	r07	0.1	20	K	2.0	
Differential S_{in}	r08	0.1	20	K	2.0	
Correction of signal from S_{out}	r09	-20	20	K	0.0	
Correction of signal from S_{in}	r10	-20	20	K	0.0	
Delta S_{in}, S_{out} (S_{in} reference)	r20	0	10	K	6.0	
Alarm						
Temperature alarm delay	A03	0	90	Min.	10	
Delay on door alarm	A04	0	90	Min.	60	
Upper deviation for S_{out} (above cutout value)	A05	0	50	K	10	
Lower deviation for S_{out} (below cutout value)	A06	-50	0	K	-10	
Upper deviation for S_{in} (above cutout value)	A07	0	50	K	10	
Lower deviation for S_{in} (below cutout value)	A08	-50	0	K	-10	
S_{in} Alarm offset during night	A09	-50	50	K	10.0	
Compressor						
Min. ON-time	c01	0	15	Min.	0	
Min. OFF-time	c02	0	15	Min.	0	
Cutin frequency on sensor fault *1)	c03	0	100	%	50	
Compressor stop at open door (yes/no)	c04	No	Yes		No	
Defrost						
Compressor ON during defrost	d01	No	Yes		No	
Defrost stop temperature	d02	0	25	°C (°F)	10	
Interval between defrost starts	d03	OFF	48	Hour	8	
Max. defrost duration	d04	0	180	Min.	45	
Defrost time delay (after power up)	d05	0	60	Min.	0	
Drip-off time	d06	0	20	Min.	0	
Fan start delay after defrost	d07	0	20	Min.	0	
Fan start temperature (>25°C=OFF)	d08	-25	26	°C (°F)	25	
Fan cutin during defrost	d09	No	Yes		No	
Defrost sensor *2)	d10	Out	Def		Out	
Temperature alarm delay after defrost	d11	0	200	Min.	90	
Delay of display view after defrost	d12	0	30	Min.	1	
Defrost at power up	d13	No	Yes		No	
Realtime Clock						
1. Defrost start. Hour	t01	OFF	23	Hour	OFF	
1. Defrost start. Minute	t11	0	59	Min.	0	
2. Defrost start. Hour	t02	OFF	23	Hour	OFF	
2. Defrost start. Minute	t12	0	59	Min.	0	
3. Defrost start. Hour	t03	OFF	23	Hour	OFF	
3. Defrost start. Minute	t13	0	59	Min.	0	
4. Defrost start. Hour	t04	OFF	23	Hour	OFF	
4. Defrost start. Minute	t14	0	59	Min.	0	
5. Defrost start. Hour	t05	OFF	23	Hour	OFF	
5. Defrost start. Minute	t15	0	59	Min.	0	
6. Defrost start. Hour	t06	OFF	23	Hour	OFF	
6. Defrost start. Minute	t16	0	59	Min.	0	
Setting af hours	t07	0	23	Hour		
Setting of minutes	t08	0	59	Min.		
Fan						
Fan stop on compressor cut out	F01	No	Yes		No	
Fan stop delay	F02	0	15	Min.	0	
Fan stop on open door (yes/no)	F03	No	Yes		Yes	
Miscellaneous						
Delay of output signal after start-up	o01	0	600	Sec.	5	
Digital input control *3)	o02	OFF	6		OFF	
Network address (range = 0-60)	o03	0	990		0	
LON service pin	o04	OFF	ON		OFF	
Access code	o05	OFF	100		OFF	
Used sensor type	o06	Pt	Ptc		Pt	
Digital output control *4)	o13	OFF	2		OFF	
Active sensor	o14	Aut	Out		Out	
Display step = 0.5 (normal = 0.1/ Pt sensor)	o15	No	Yes		No	
Max. hold after coordinated defrost	o16	1	30	Min.	20	
Display sensor *5)	o17	Aut	In		In	
Manual control of outputs *6)	o18	OFF	5		OFF	
Relay use (alarm / light)	o36	1	2		1	

Comments

*1) After start-up and throughout three days and nights this value is used by the controller.
Afterwards the controller is capacble by itself to calculate the average value of previous cut-in times.

*2) Out=S_{out} sensor used. Def=S_{def} sensor used

*3) OFF=Not used, 1=Bus, 2=Defrost, 3=Night Cover, 4=Main switch, 5=Secondary controller Defrost In, 6 = Door

*4) OFF=Not used, 1=Main controller Defrost Out, 2=Secondary controller Defrost Out

*5) 'Aut'=Automatic Day/Night switch, 'Out'=S_{out} is displayed, 'In'=S_{in} is displayed

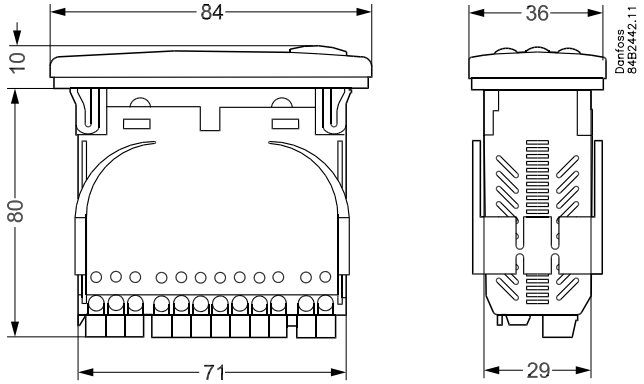
*6) OFF=output not forced, 1=Comp On, 2=Def On, 3=Fan On, 4=Alarm On, 5=Dig On
When manual control is finished, the settting must be changed to OFF.

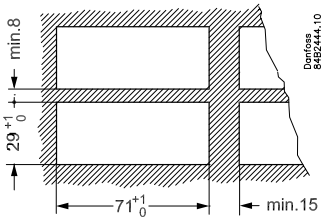
REFRIGERATION AND
AIR CONDITIONING

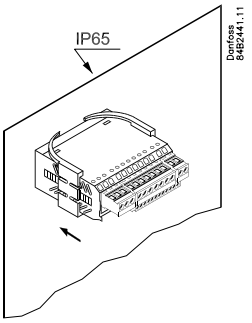
INSTRUCTIONS

EKC 202A
EKC 202B
EKC 202C

084R9967





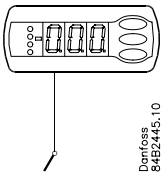


t_{amb} = 0 - +55°C

230 V a.c.

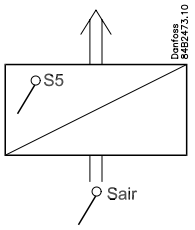
2.0 VA

CE



Type: Pt 1000 (1000 Ω /0°C) /
Ptc 1000 (1000 Ω /25°C) /
NTC-M2020 (5000 Ω / 25°C)

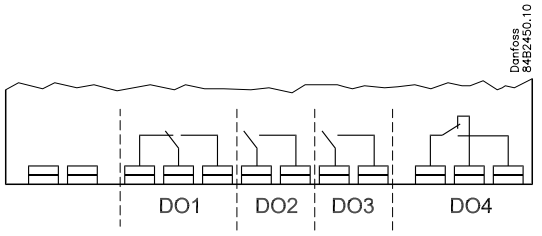
(o06)



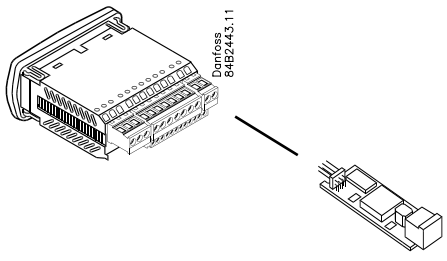
10 V < U < 256 V

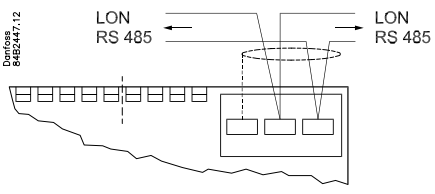
	CE (250 V a.c.)	UL *** (240 V a.c.)
DO1. Refrigeration *	10 (6) A	10 A Resistive 5FLA, 30LRA
DO2. Defrost *	10 (6) A	10 A Resistive 5FLA, 30LRA
DO3. Fan *	6 (3) A	6 A Resistive 3FLA, 18LRA 131 VA Pilot duty
DO4. Alarm, light or rail heat *	4 (1) A Min. 100 mA**	4 A Resistive 131 VA Pilot duty

* DO1 and DO2 are 16 A relays. DO3 and DO4 are 8 A relays. Max. load must be keept.
** Gold plating ensures make function with small contact loads
*** UL-approval based on 30000 couplings



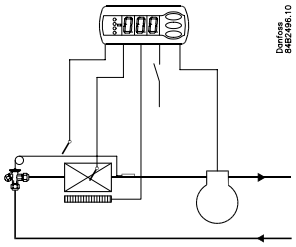
Data communication LON RS 485:

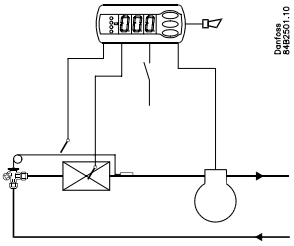




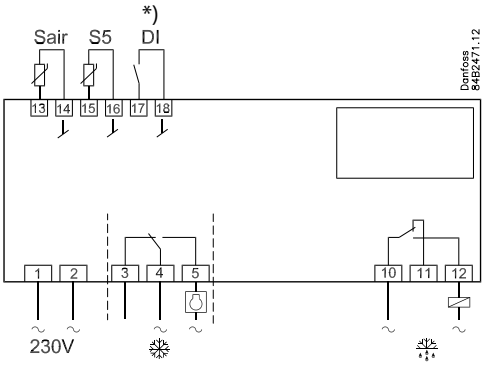
RI8JV653 12-2007

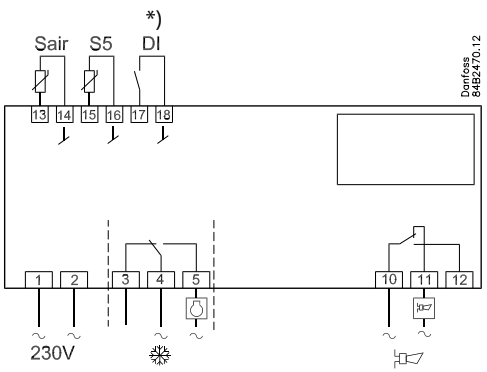
EKC 202A



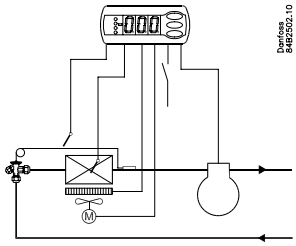


*) AU:
Guld, Gold or Oro
ℓ = max. 15 m

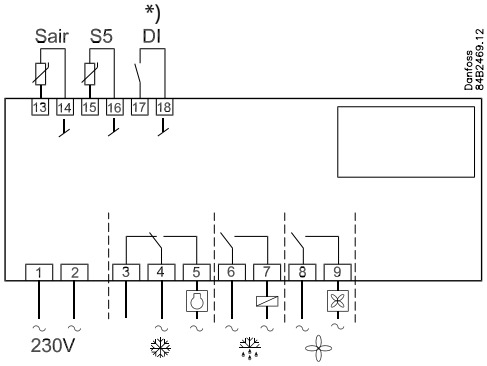




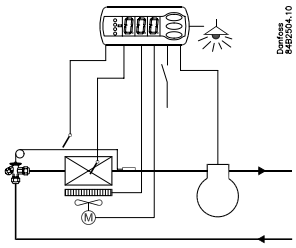
EKC 202B

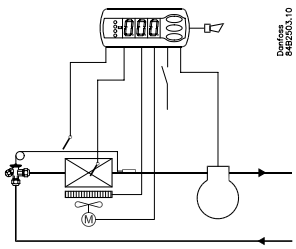


*) AU:
Guld, Gold or Oro
ℓ = max. 15 m

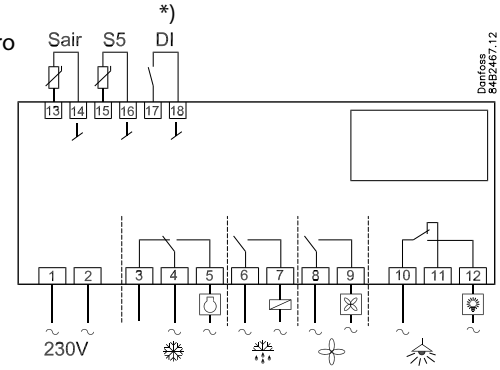


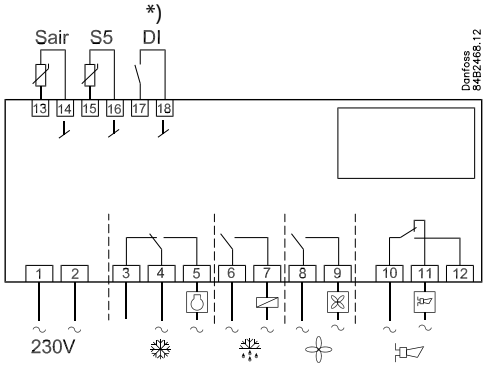
EKC 202C





*) AU:
Guld, Gold or Oro
ℓ = max. 15 m





The buttons

Set menu
1. Push the upper button until a parameter is shown
2. Push the upper or the lower button and find that parameter you want to change
3. Push the middle button until the parameter value is shown
4. Push the upper or the lower button and select the new value
5. Push the middle button again to enter the value.

Set temperature
1. Push the middle button until the temperature value is shown
2. Push the upper or the lower button and select the new value
3. Push the middle button to select the setting.

Reading the temperature at sensor S5
• Push briefly the lower button

Manuel start or stop of a defrost
• Push the lower button for four seconds.

Light emmiting diode
= refrigeration
= defrost
= fan running
Flashes fast at alarm

Cutout alarm relay / see alarm code
• Push briefly the upper button

Start-up:

Regulation starts when the voltage is on.

1 Go through the survey of factory settings. Make any necessary changes in the respective parameters.
2 For network. Set the address in o03 and then transmit it to the gateway/system unit with setting o04.

SW = 1.2x

Parameters		Controller			Min.-value	Max.-value	Factory setting	Actual setting
Function	**Codes**	**EKC 202A**	**EKC 202B**	**EKC 202C**				
Normal operation								
Temperature (set point)	---				-50°C	50°C	2°C	
Thermostat								
Differential	r01				0,1 K	20 K	2 K	
Max. limitation of setpoint setting	r02				-49°C	50°C	50°C	
Min. limitation of setpoint setting	r03				-50°C	49°C	-50°C	
Adjustment of temperature indication	r04				-20 K	20 K	0.0 K	
Temperature unit (°C/°F)	r05				°C	°F	°C	
Correction of the signal from Sair	r09				-10 K	10 K	0 K	
Manual service(-1), stop regulation(0), start regulation (1)	r12				-1	1	1	
Displacement of reference during night operation	r13				-10 K	10 K	0 K	
Activation of reference displacement r40	r39				OFF	on	OFF	
Value of reference displacement (can be activated by r39 or DI)	r40				-50 K	50 K	0 K	
Alarm								
Delay for temperature alarm	A03				0 min	240 min	30 min	
Delay for door alarm	A04				0 min	240 min	60 min	
Delay for temperature alarm after defrost	A12				0 min	240 min	90 min	
High alarm limit	A13				-50°C	50°C	8°C	
Low alarm limit	A14				-50°C	50°C	-30°C	
Alarm delay DI1	A27				0 min	240 min	30 min	
High alarm limit for condenser temperature (o70)	A37				0°C	99°C	50°C	
Compressor								
Min. ON-time	c01				0 min	30 min	0 min	
Min. OFF-time	c02				0 min	30 min	0 min	
Compressor relay must cutin and out inversely (NC-function)	c30				0 / OFF	1 / on	0 / OFF	
Defrost								
Defrost method (none/EL/gas)	d01				no	gas	EL	
Defrost stop temperature	d02				0°C	25°C	6°C	
Interval between defrost starts	d03				0 hours	48 hours	8 hours	
Max. defrost duration	d04				0 min	180 min	45 min	
Displacement of time on cutin of defrost at start-up	d05				0 min	240 min	0 min	
Drip off time	d06				0 min	60 min	0 min	
Delay for fan start after defrost	d07				0 min	60 min	0 min	
Fan start temperature	d08				-15°C	0°C	-5°C	
Fan cutin during defrost	d09				no	yes	yes	
Defrost sensor (0=time, 1=S5, 2=Sair)	d10				0	2	0	
Max. aggregate refrigeration time between two defrosts	d18				0 hours	48 hours	0 hours	
Defrost on demand - S5 temperature's permitted variation during frost build-up. On central plant choose 20 K (=off)	d19				0 K	20 K	20 K	
Fans								
Fan stop at cutout compressor	F01				no	yes	no	
Delay of fan stop	F02				0 min	30 min	0 min	
Fan stop temperature (S5)	F04				-50°C	50°C	50°C	
Real time clock								
Six start times for defrost. Setting of hours. 0=OFF	t01-t06				0 hours	23 hours	0 hours	
Six start times for defrost. Setting of minutes. 0=OFF	t11-t16				0 min	59 min	0 min	
Clock - Setting of hours	t07				0 hours	23 hours	0 hours	
Clock - Setting of minute	t08				0 min	59 min	0 min	
Clock - Setting of date	t45				1	31	1	
Clock - Setting of month	t46				1	12	1	
Clock - Setting of year	t47				0	99	0	

Miscellaneous								
Delay of output signals after start-up	o01				0 s	600 s	5 s	
Input signal on DI1. Function: 0=not used. 1=status on DI1. 2=door function with alarm when open. 3=door alarm when open. 4=defrost start (pulse-pressure). 5=ext.main switch. 6=night operation 7=change reference (activate r40). 8=alarm function when closed. 9=alarm function when open. 10=case cleaning (pulse pressure). 11=Inject off when open.	o02				0	11	0	
Network address	o03				0	119	0	
On/Off switch (Service Pin message)	o04				OFF	ON	OFF	
Access code 1 (all settings)	o05				0	100	0	
Used sensor type (Pt /PTC/NTC)	o06				Pt	ntc	Pt	
Display step = 0.5 (normal 0.1 at Pt sensor)	o15				no	yes	no	
Max hold time after coordinated defrost	o16				0 min	60 min	20	
Configuration of light function (relay 4) 1=ON during night operation. 2=ON / OFF via data communication. 3=ON follows the DI-function, when DI is selected to door function or to door alarm	o38				1	3	1	
Activation of light relay (only if o38=2)	o39				OFF	ON	OFF	
Case cleaning. 0=no case cleaning. 1=Fans only. 2=All output Off.	o46				0	2	0	
Access code 2 (partly access)	o64				0	100	0	
Save the controllers present settings to the programming key. Select your own number.	o65				0	25	0	
Load a set of settings from the programming key (previously saved via o65 function)	o66				0	25	0	
Replace the controllers factory settings with the present settings	o67				OFF	On	OFF	
Select application for S5 sensor (0=defrost sensor, 1= product sensor, 2=condenser sensor with alarm)	o70				0	2	0	
Select application for relay 4: 1=defrost/light, 2= alarm	o72	defrost / Alarm		Light / Alarm	1	2	2	
Service								
Temperature measured with S5 sensor	u09							
Status on DI1 input. on/1=closed	u10							
Status on night operation (on or off) 1=closed	u13							
Read the present regulation reference	u28							
Status on relay for cooling (Can be controlled manually, but only when r12=-1)	u58							
Status on relay for fans (Can be controlled manually, but only when r12=-1)	u59							
Status on relay for defrost. (Can be controlled manually, but only when r12=-1)	u60							
Temperature measured with Sair sensor	u69							
Status on relay 4 (alarm, defrost, light).(Can be controlled manually, but only when r12=-1)	u71							

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 upper and lower button depressed at the same time as you reconnect the supply voltage

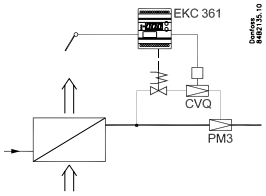
Fault code display		Alarm code display		Status code display	
E1	Fault in controller	A 1	High temperature alarm	S0	Regulating
E6	Change battery + check clock	A 2	Low temperature alarm	S1	Waiting for end of the coordinated defrost
E 27	S5 sensor error	A 4	Door alarm	S2	ON-time Compressor
E 29	Sair sensor error	A 5	Max. Hold time	S3	OFF-time Compressor
		A 15	DI 1 alarm	S4	Drip-off time
		A 45	Standby mode	S10	Refrigeration stopped by main switch
		A 59	Case cleasning	S11	Refrigeration stopped by thermostat
		A 61	Condenser alarm	S14	Defrost sequence. Defrosting
				S15	Defrost sequence. Fan delay
				S16	Refrigeration stopped because of open DI input
				S17	Door open (open DI input)
				S20	Emergency cooling
				S25	Manual control of outputs
				S29	Case cleaning
				S32	Delay of output at start-up
				non	The defrost temperature cannot be displayed. There is stop based on time
				-d-	Defrost in progress / First cooling after defrost
				PS	Password required. Set password

REFRIGERATION AND
AIR CONDITIONING

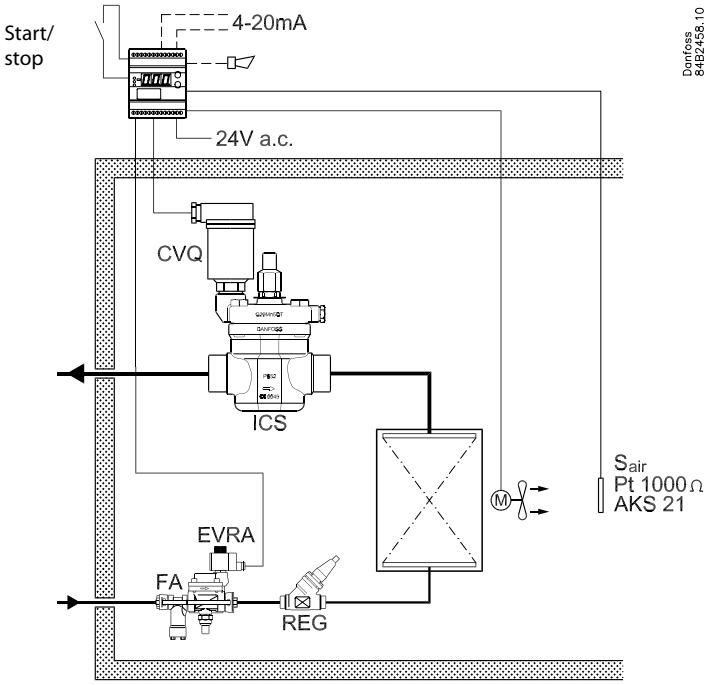
Instructions

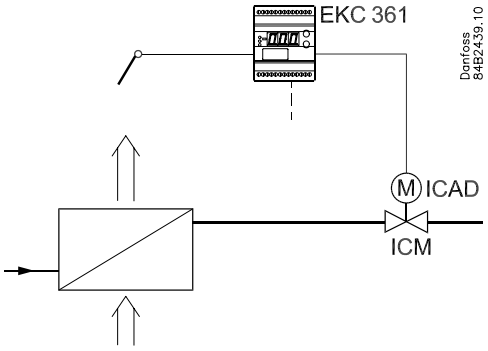
EKC 361

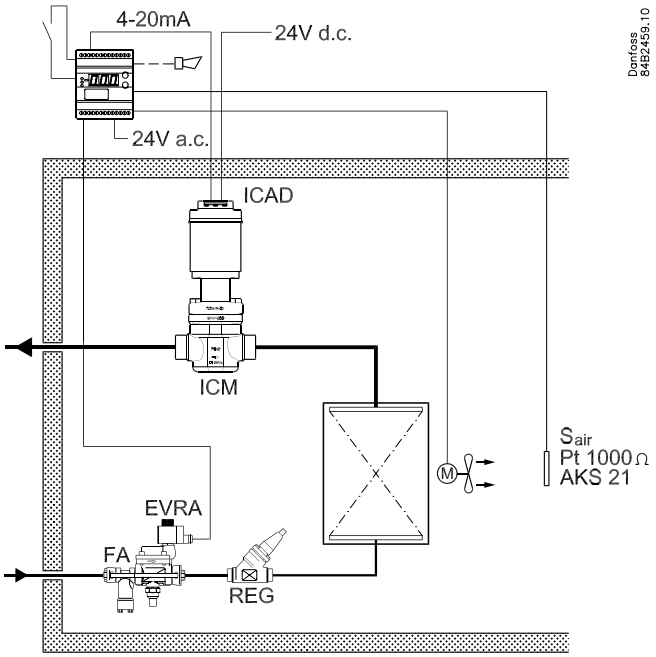
Princip
Principle
Montageprinzip
Principe



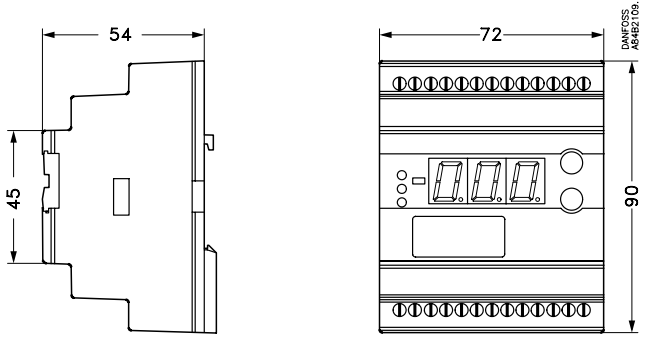
ICS or PM







Mål
Dimensions
Maße
Dimensions



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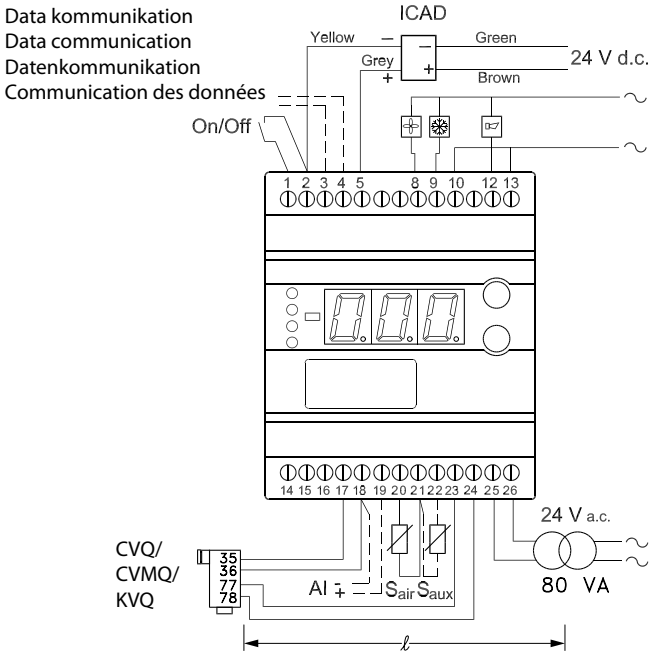
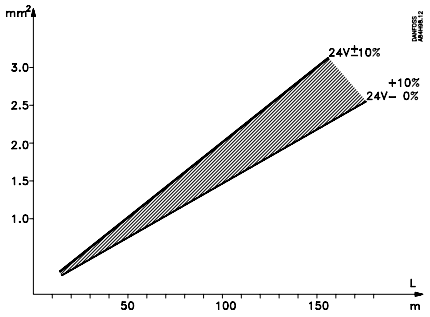


!! U_{77-78}: 24 V +/-10% !!

Kabel fx, Cable ex., Kabel z.B., câble fx

L < 25 m	:	0.75 mm²
25 m < L < 75 m	:	1.5 mm²
75 m < L	:	2.5 mm²



ENGLISH

Connections

Necessary connections

Terminals:

25-26 Supply voltage 24 V a.c.
17-18 Signal from actuator (from NTC)
23-24 Supply to actuator (to PTC)
20-21 Pt 1000 sensor at evaporator outlet
1-2 Switch function for start/stop of regulation. If a switch is not connected, terminals 1 and 2 must be shortcircuited.

Application dependent connections

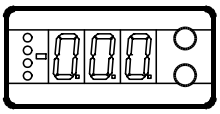
Terminal:

12-13 Alarm relay
There is connection between 12 and 13 in alarm situations and when the controller is dead
8-10 Relay switch for start/stop of fan
9-10 Relay switch for start/stop of solenoid valves
18-19 Current signal from other regulation (Ext.Ref.)
21-22 Pt 1000 sensor for monitoring
2-5 Current output for Sair/Saux temperature or ICAD actuator for ICM valve
3-4 Data communication
Mount only, if a data communication module has been mounted.
It is <u>important</u> that the installation of the data communication cable be done correctly.
Cf. separate literature No. RC8AC...

Operation

Display

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



Light-emitting diodes (LED) on front panel

There are LED's on the front panel which will light up when the corresponding relay is activated.
The three lowest LED's will flash, if 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**	Errors in the controller
E7		Cut-out S_{air}
E8		Shortcircuited S_{air}
E11		Valve's actuator temperature outside its range
E12		Analog input signal is outside the range
A1	**Alarm message**	High-temperature alarm
A2		Low-temperature alarm

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 (eller udkoble en alarm)

Gives access to changes

Saves a change

Examples of operations

Set set-point
1. Push the two buttons simultaneously
2. Push one of the buttons and select the new value
3. Push both buttons again to conclude the setting

Set one of the other menus
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

Literature survey:
Manual EKC 361 RS8AE---
Installation guide, Data communication link RC8AC---

Menu survey

SW =1.5x

Function	Para-meter	Min.	Max.	Fac. setting
Normal display				
Shows the temperature at the selected sensor At ICM valve OD also can be selected	-		°C	
Reference				
Set the required room temperature	-	-70°C	160°C	10°C
Temperature unit	r05	°C	°F	°C
Input signal's temperature influence	r06	-50°C	50°C	0.0
Correction of the signal from S_{air}	r09	-10,0°C	10,0°C	0.0
Correction of the signal from S_{aux}	r10	-10,0°C	10,0°C	0.0
Start/stop of refrigeration	r12	OFF/0	On/1	On/1
Alarm				
Upper deviation (above the temperature setting)	A01	0	50 K	5.0
Lower deviation (below the temperature setting)	A02	0	50 K	5.0
Alarm's time delay	A03	0	180 min	30
Regulating parameters				
Actuator max. temperature	n01	41°C	140°C	140
Actuator min. temperature	n02	40°C	139°C	40
Actuator type (1=CVQ-1 to 5 bar, 2=CVQ 0 to 6 bar, 3=CVQ 1.7 to 8 bar, 4= CVMQ, 5=KVQ, 6= ICM)	n03	1	6	2
P: Amplification factor Kp	n04	0,5	50	3
I: Integration time Tn (600 = off)	n05	60 s	600 s	240
D: Differentiation time Td (0 = off)	n06	0 s	60 s	10
Transient phenomenon 0: Ordinary control 1: Underswing minimised 2: No underswing	n07	0	2	2
OD - Opening degree - max. limit - ICM only	n32	0%	100%	100
OD - Opening degree min. limit - ICM only	n33	0%	100%	0
Miscellaneous				
Controller's address (0-120)	o03*	0	990	0
ON/OFF switch (service-pin message)	o04*	-	-	
Define output signal of analog output: 0: no signal, 1: 4 - 20 mA, 2: 0 - 20 mA	o09	0	2	0
Define input signal of analog input 0: no signal, 1: 4 - 20 mA, 2: 0 - 20 mA	o10	0	2	0
Language (0=english, 1=German, 2=French, 3=Danish, 4=Spanish and 6=Swedish.)When you change the setting to an other language you must activate o04 before "the new language" can be visible from the AKM program.	011*	0	6	0
Set supply voltage frequency	o12	50 Hz/0	60 Hz/1	0
Select of running display value	o17	Au/0	Air/1	Air/1
(Setting for the function o09) Set the temperature value where the output signal must be minimum (0 or 4 mA)	o27	-70°C	160°C	-35
(Setting for the function o09) Set the temperature value where the output signal must be maximum (20 mA)	o28	-70°C	160°C	15
Service				
Read temperature at the S_{air} sensor	u01		°C	
Read regulation reference	u02		°C	
Read temperature at the S_{aux} sensor	u03		°C	
Read valve's actuator temperature	u04		°C	
Read reference of the valve's actuator temperature	u05		°C	
Read value of external current signal	u06		mA	
Read value of transmitted current signal	u08		mA	
Read status of input DI	u10		on/off	
ICM opening degree. (only at ICM)	u24		%	

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

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

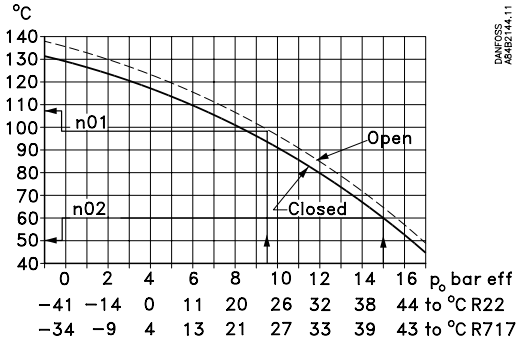
n01 and n02

Connection between the evaporating temperature and the actuator's temperature (the values are approximate).

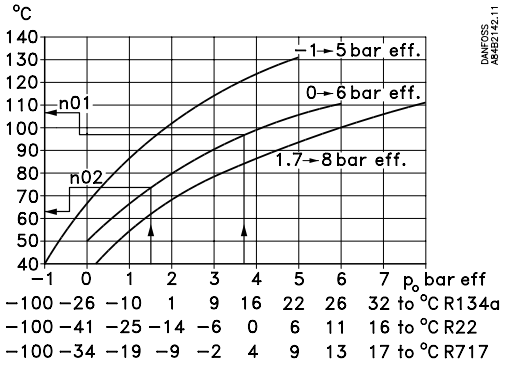
n01: The highest regulated room temperature will have a belonging t_o value which in turn indicates the value of the n01 setting. Due to tolerances in the actuator, the setting value must be 10 K **higher** than shown in the curve.

n02: The lowest occurring suction pressure will have a belonging t_o value which in turn indicates the value of the n02 setting. Due to tolerances in the actuator, the setting value must be 10 K **lower** than shown in the curve.

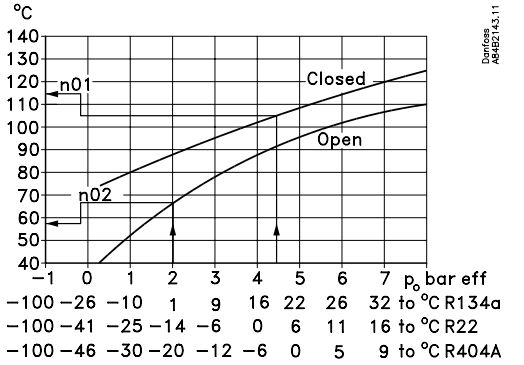
CVMQ



CVQ



KVQ



Start of controller

When the electric wires have been connected to the controller, the following points have to be attended to before the regulation starts:

1. Switch off the external ON/OFF switch that starts and stops the regulation.
2. Follow the menu survey, and set the various parameters to the required values.
3. Switch on the external ON/OFF switch, and regulation will start.
4. If the system has been fitted with a thermostatic expansion valve, it must be set to minimum stable superheating. (If a specific T0 is required for the adjustment of the expansion valve, the two setting values for the actuator temperature (n01 and n02) can be set to the belonging value while the adjustment of the expansion valve is carried out. Remember to reset the values).
5. Follow the actual room temperature on the display. (On terminals 2 and 5 a current signal can be transmitted which represents the room temperature. Connect a data collection unit, if applicable, so that the temperature performance can be followed).

If the temperature fluctuates

When the refrigerating system has been made to work steadily, the controller's factory-set control parameters should in most cases provide a stable and relatively fast regulating system.
If the system on the other hand oscillates, you must register the periods of oscillation and compare them with the set integration time T_n, and then make a couple of adjustments in the indicated parameters.

If the time of oscillation is longer than the integration time:
($T_p > T_n$, (T_n is, say, 4 minutes))
1. Increase T_n to 1.2 times T_p
2. Wait until the system is in balance again
3. If there is still oscillation, reduce K_p by, say, 20%
4. Wait until the system is in balance
5. If it continues to oscillate, repeat 3 and 4

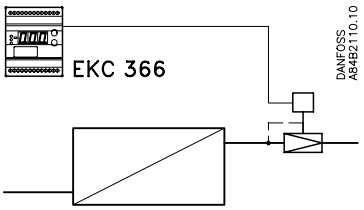
If the time of oscillation is shorter than the integration time:
($T_p < T_n$, (T_n is, say, 4 minutes))
1. Reduce K_p by, say, 20% of the scale reading
2. Wait until the system is in balance
3. If it continues to oscillate, repeat 1 and 2

REFRIGERATION AND
AIR CONDITIONING

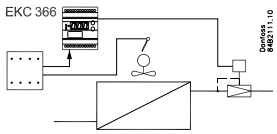
Instructions

EKC 366

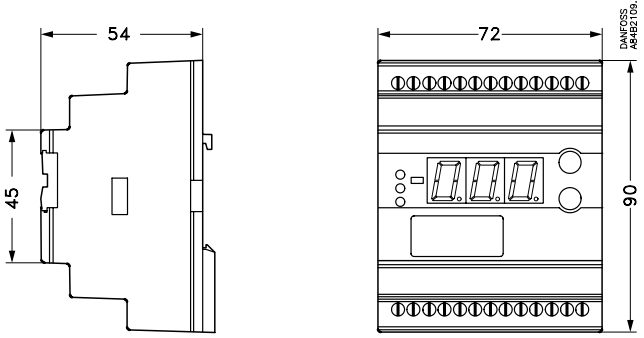
Princip
Principle
Montageprinzip
Principe



CVQ + PM
KVQ
TQ
PHTQ
TEAQ
CVMQ

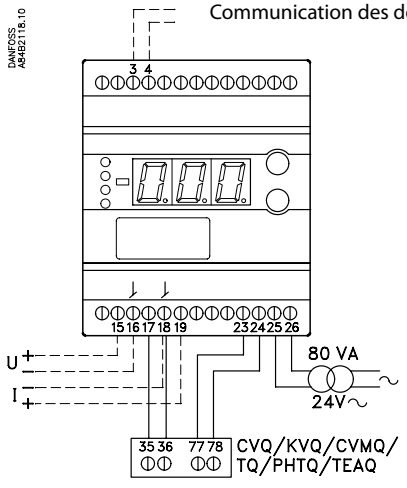


Mål
Dimensions
Maße
Dimensions



Tilslutning
Connection
Anschluß
Raccordement

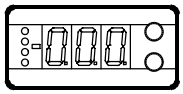
Data kommunikation
Data communication
Datenkommunikation
Communication des données



0 - 10 V d.c. (15, 16)
eller/or/oder/ou
2 - 10 V d.c. (15, 16)
eller/or/oder/ou
4 - 20 mA (18, 19)
eller/or/oder/ou
0 - 20 mA (18, 19)

Betjening

Display
Værdierne bliver vist med tre cifre, og med en indstilling kan du bestemme, om de skal vises i °C eller i °F.



Lysdioder på fronten
Der er én lysdiode på fronten, som vil lyse, når der sendes effekt til pilotventilen:
Yderligere er der tre lysdioder, som vil blinke, hvis der er en fejl i reguleringen. I denne situation kan du kalde fejlkoden frem på displayet og udkoble alarmen ved at trykke kortvarigt på den øverste knap.

Regulatoren kan give følgende meddelelser:	
E1	Fejl i regulatoren
E11	Ventilens aktuatortemperatur er udenfor området
E12	Indgangssignalet er uden for området

Knapperne
Når du vil ændre en indstilling, vil de to knapper give en højere eller en lavere værdi alt efter hvilken knap, du trykker på. Men før du kan ændre værdien, skal du have adgang ind i menuen. Det får du ved at trykke på den øverste knap i et par sekunder – så kommer du ind i rækken med parameterkoder. Find den parameterkode du vil ændre, og tryk så på begge knapper samtidig. Når du har ændret værdien, gemmer du den nye værdi ved igen at trykke på begge knapper samtidig.
Eller kort:

Giver adgang til menuen

Giver adgang til at ændre

Gemmer en ændring.

Eksempler på betjening

Indstille ventilens basis temperaturreference
1. Tryk på begge knapper samtidig
2. Tryk på en af knapperne og vælg den nye værdi
3. Tryk igen på begge knapper for at afslutte indstillingen.

Aflæse ventilens reguleringsreference
1. Tryk på den nederste knap.
   (Efter ca. 20 sekunder vender regulatoren automatisk tilbage og viser igen ventilens aktuelle temperatur)

Indstille en af de øvrige menuer
1. Tryk på den øverste knap til der vises en parameter
2. Tryk på en af knapperne og find hen til den parameter, du vil indstille
3. Tryk på begge knapper samtidig indtil værdien for parameteren vises
4. Tryk på en af knapperne og vælg den nye værdi
5. Tryk igen på begge knapper for at afslutte indstillingen.

Menuoversigt

Funktion	**Para-meter**	**Min.**	**Max.**
Aflæse ventilens aktuelle temperatur (normalbillede)	-		°C
Indstil ventilens basis temperaturreference	-	40,0°C	140°C
Aflæse ventilens reguleringsreference	-		°C
Vælge temperaturenheden (°C/°F)	r05	°C	°F
Indgangssignalets temperaturindflydelse	r06	-99,9 K	99,9 K
Regulatorens adresse	o03*	1	60
On/off omskifter (service-pin meddelelse)	o04*	-	-
Definér indgangssignalet: 0: Ikke noget signal 1: 4 - 20 mA 2: 0 - 20 mA 3: 0 - 10 V 4: 2 - 10 V	o10	0	4
Sprog (0=engelsk, 1=tysk, 2=fransk, 3=dansk, 4=spansk og 6 = svensk). Hvis du ændrer denne indstilling skal du også aktivere O04.	011*	0	6
Indstil forsyningsspændingens frekvens	o12	50 Hz	60 Hz
Serviceinformationer			
Aflæse værdien af det eksterne strømsignal	u06		mA
Aflæse værdien af det eksterne spændingssignal	u07		V

*) Denne indstilling vil kun være mulig, hvis der er monteret et datakommunikationsmodul i regulatoren.

Fabriksindstilling
Hvis du får behov for at vende tilbage til de fabriksindstillede værdier, kan det ske således:
- Afbryd forsyningsspændingen til regulatoren
- Hold begge knapper inde samtidig med at du igen tilslutter forsyningsspændingen.

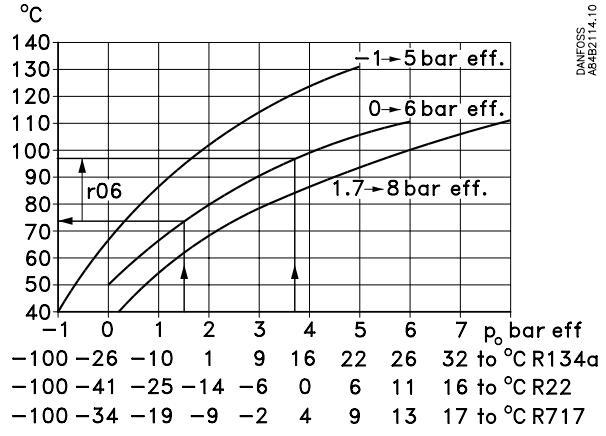
Litteraturoversigt:
Manual EKC 366 RS.8A.D-.--
Installationsvejledning;
Datakommunikationsforbindelse til ADAP-KOOL® RC.8A.C-.--

Ventilens arbejdstemperatur

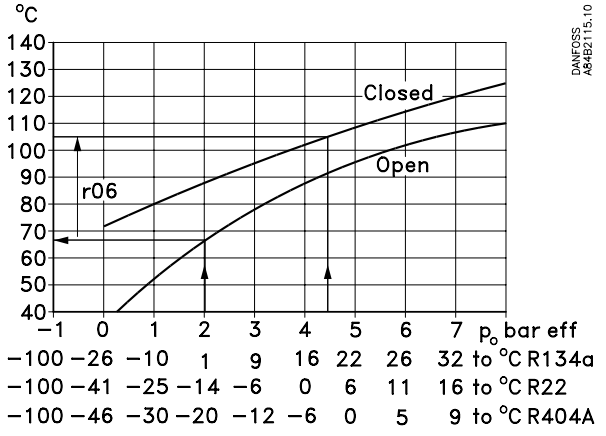
Uden eksternt signal
Arbejdstemperaturen skal indstilles ud fra en af de følgende kurver. Find den aktuatortemperatur som svarer til den ønskede fordampningstemperatur (tryk).
Indstil værdien i regulatoren som nævnt under "Indstille ventilens basis temperaturreference".

Med eksternt signal
Hvis ventilen skal styres med et eksternt signal, er der to indstillinger, der skal foretages. Den ene er som nævnt til venstre, og den anden er, hvor meget signalet skal kunne hæve temperaturen i ventilen. Denne værdi aflæses også på en af de følgende kurver.
Indstil værdien i menuen r06.
Hvis den indstillede værdi er for lav, vil ventilen ikke kunne lukke / åbne helt.

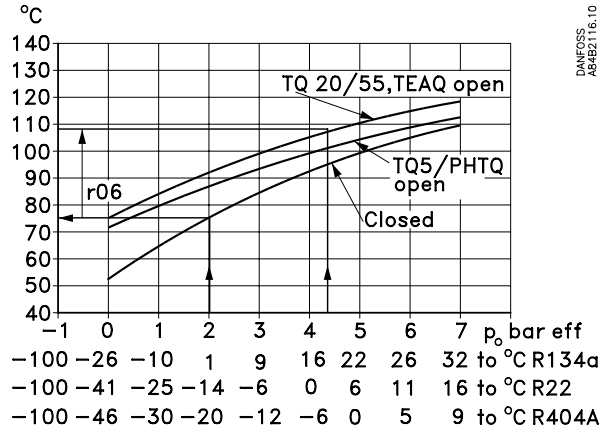
CVQ



KVQ

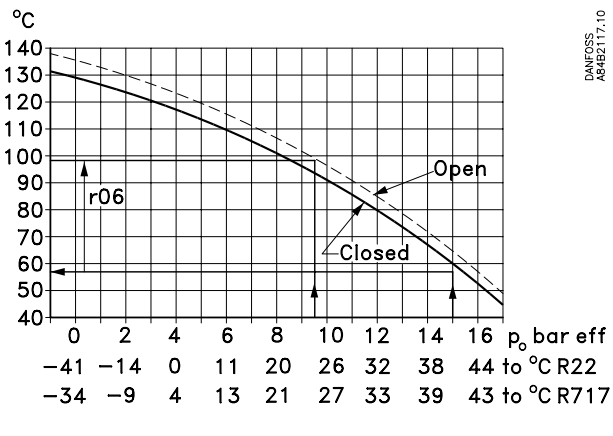


TQ



Alle de viste kurver er tilnærmelsesvise.

CVMQ



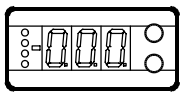
De to kurver er vist med ventilens fjederindstilling på fabriksindstillingen. Ændres der på fjederindstillingen mod et højere tryk, forskydes kurven tilsvarende med en højere temperatur.

Eksempel
CVQ-type = 0-6 bar
Kølemedie = R_{717}
Der ønskes en konstant fordampningstemperatur eller tilgangstryk til ventilen på -9°C (2 bar).
Ifølge kurven over CVQ-en vil dette kræve en temperatur i aktuatoren på 80°C.
Indstil ventilens basis temperaturreference til 80°C.

Når ventilen er kommet op i arbejdstemperatur, kan det være nødvendigt at finjustere indstillingen ud fra anlæggets manometer.

Operation

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



LED's on the front panel
There is one LED on the front panel which will light up when power is sent to the pilot valve.
There are furthermore three LED's which will flash if there is an error in the regulation. In this situation you can show the error code on the display and cut out the alarm by giving the upper button a brief push.

The controller can give the following messages:	
E1	Errors in the controller
E11	Valve's actuator temperature outside its range
E12	Input signal outside its range

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

Gives access to changes

Saves a change

Examples of operations

Set the valve's basic temperature reference
1. Push the two buttons simultaneously
2. Push one of the buttons and select the new value
3. Push both buttons again to conclude the setting

Read the valve's regulating reference
1. Push the lower button
   (After approx. 20 seconds the controller automatically returns to its setting, and it again shows the valve's actual temperature)

Set one of the other menus
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

Menu survey

Function	**Para-meter**	**Min.**	**Max.**
Read valve's actual temperature (standard display)	-		°C
Set valve's basic temperature reference	-	40.0°C	140°C
Read valve's regulation reference	-		°C
Select temperature unit (°C/°F)	r05	°C	°F
Input signal's temperature influence	r06	-99.9 K	99.9 K
Controller's address	o03*	1	60
ON/OFF switch (service-pin message)	o04*	-	-
Define input signal 0: no signal 1: 4 - 20 mA 2: 0 - 20 mA 3: 0 - 10 V 4: 2 - 10 V	o10	0	4
Language (0=English, 1=German, 2=french, 3=Danish, 4=Spanish, 6=Swedish). When you change this setting you must also activate o04.	011*	0	6
Set supply voltage frequency	o12	50 Hz	60 Hz
Service information			
Read value of external current signal	u06		mA
Read value of external voltage signal	u07		V

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

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

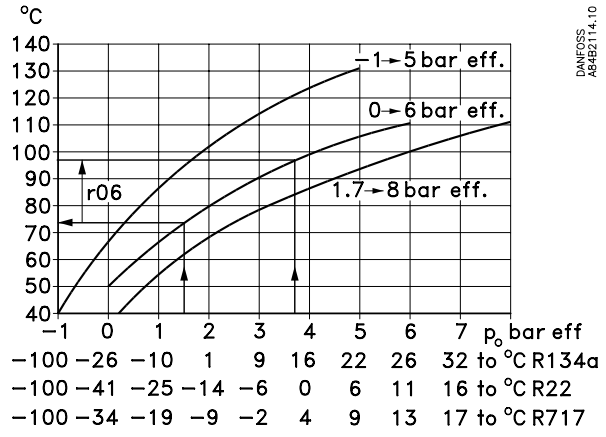
Literature survey:
Manual EKC 366 RS.8A.D-.--
Installation guide, Data communication link RC.8A.C-.--

Valve's working temperature

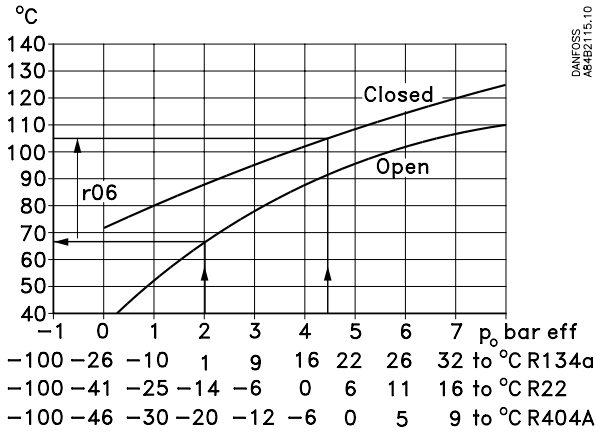
Without external signal
The working temperature must be set on the basis of one of the following curves. Find the actuator temperature corresponding to the required evaporating temperature (push). Set the value in the controller as mentioned under "Set the valve's basic temperature reference".

With external signal
If the valve is to be operated with an external signal, two settings have to be made. One is as mentioned to the left, and the other determines how much the signal must be able to raise the temperature in the valve. This value is also read on one of the following curves.
Set the value in the r06 menu.
If the set value is too low, the valve will not be able to close/open fully.

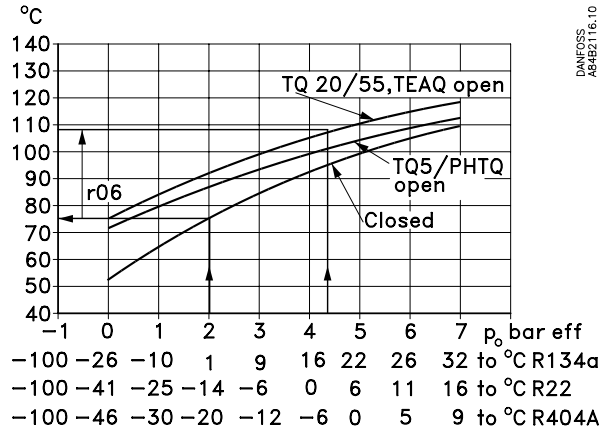
CVQ



KVQ

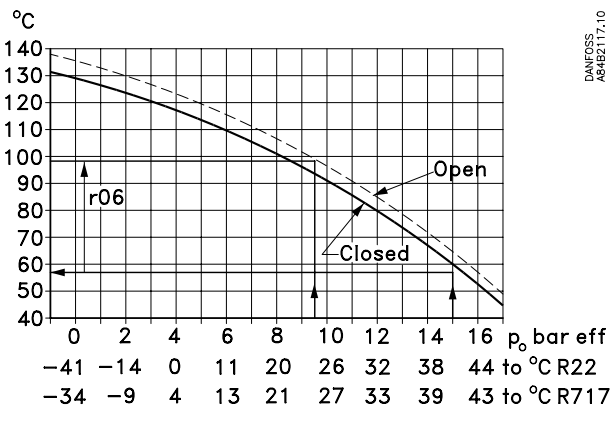


TQ



All the curves shown are approximate.

CVMQ



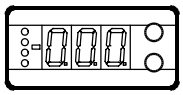
The two curves are shown with the valve's spring setting equal-ling the factory setting. If the spring setting is changed to a higher pressure, the curve will be displaced correspondingly to a higher temperature.

Example
CVQ type = 0-6 bar
Refrigerant = R_{717}
A constant evaporating temperature or input pressure to the valve of -9°C (2 bar) is required.
According to the CVQ curve this will require a temperature in the actuator of 80°C.
Set the valve's basic temperature reference at 80°C.

When the valve has reached its working temperature, it may be necessary to fine-adjust the setting from the system's manometer.

Bedienung

Display
Die Wertdarstellung erfolgt dreistellig. Es besteht die Wahl zwischen Anzeige in °C oder in °F.



Frontplatzierte Leuchtdioden
Auf der Front befindet sich eine Leuchtdiode, die beim Abgeben eines Leistungssignals an das Pilotventil aufleuchtet:

Darüber hinaus sind drei Leuchtdioden vorhanden, die bei einer Störung der Regelung blinken. Der Fehlercode lässt sich in dieser Situation am Display abrufen, und der Alarm durch kurzzeitiges Betätigen der obersten Taste abschalten.

Der Regler kann folgende Meldungen anzeigen:	
E1	Fehler im Regler
E11	Stellantriebstemperatur des Ventils außerhalb des Bereichs
E12	Eingangssignal außerhalb des Bereichs

Tasten
Mit den beiden Tasten lassen sich die Einstellungen ändern. Je nachdem, welche Taste Sie betätigen, ergibt sich ein höherer oder niedrigerer Wert. Bevor Werte geändert werden können, muss Zugang zum Menü hergestellt werden. Durch einige Sekunden langes Betätigen der obersten Taste erhält man Zugang zu einer Reihe von Parametercodes. Wählen Sie den zu ändernden Parametercode aus, und betätigen Sie anschließend beide Tasten gleichzeitig. Nach Änderung des Werts lässt sich der neue Wert speichern, indem erneut beide Tasten gleichzeitig betätigt werden.
Kurz zusammengefasst:

Zugang zum Menü

Zugang zu Änderungen

Speichert eine Änderung

Beispiele zur Bedienung

Einstellen der Referenztemperatur des Ventils
1. Beide Tasten gleichzeitig betätigen.
2. Eine der Tasten betätigen, und den neuen Wert auswählen.
3. Erneut beide Tasten gleichzeitig betätigen, um die Einstellung abzuschließen.

Anzeige der Regelungsreferenz des Ventils
1. Die unterste Taste betätigen.
   (Nach ca. 20 Sekunden kehrt der Regler automatisch zur An zeige der aktuellen Ventiltemperatur zurück.)

Einstellung eines der übrigen Menüs
1. Die oberste Taste betätigen, bis ein Parameter zur Anzeige gelangt.
2. Eine der Tasten betätigen, um zum gewünschten Parameter zu gelangen.
3. Beide Tasten gleichzeitig betätigen, bis der Wert des Parameters zur Anzeige kommt.
4. Eine der Tasten betätigen, und einen neuen Wert festlegen.
5. Erneut beide Tasten betätigen, um den Einstellvorgang abzuschließen.

Menüübersicht

Funktion	**Para-meter**	**Min.**	**Max.**
Anzeige der aktuellen Ventiltemperatur (Normalbild)	-		°C
Einstellung der Referenztemperatur des Ventils	-	40,0°C	140°C
Anzeige der Regelungsreferenz des Ventils	-		°C
Wahl der Temperatureinheit (°C/°F)	r05	°C	°F
Temperatureinfluss des Eingangssignals	r06	-99,9 K	99,9 K
Regleradresse	o03*	1	60
AUS/EIN-Wechselschalter (Service-PIN-Mitteilung)	o04*	-	-
Definition des Eingangssignals: 0: Kein Signal 1: 4 - 20 mA 2: 0 - 20 mA 3: 0 - 10 V 4: 2 - 10 V	o10	0	4
Sprache (0=Englisch, 1=Deutsch, 2=Französisch, 3=Dänisch, 4=Spanisch, 6=Schwedisch). Wenn Sie eine andere Sprache einstellen, müssen Sie auch o04 aktivieren.	011*	0	6
Einstellung der Spannungsversorgungsfrequenz	o12	50 Hz	60 Hz
Serviceinformationen			
Anzeige des externen Stromsignalwerts	u06		mA
Anzeige des externen Spannungssignalwerts	u07		V

*) Diese Einstellung ist nur möglich, wenn ein Datenkommunikationsmodul im Regler montiert ist.

Werkseinstellung
Die Rückkehr zu den ab Fabrik eingestellten Werten lässt sich wie folgt vornehmen:
- Die Spannungszufuhr zum Regler unterbrechen.
- Beide Tasten betätigt halten und gleichzeitig die Spannungszufuhr wieder einschalten.

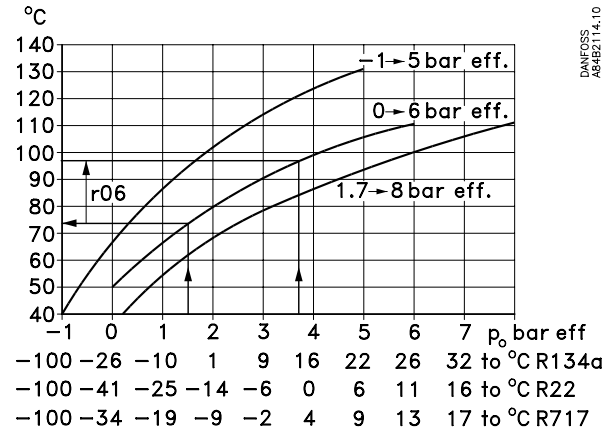
Literaturübersicht:
Manual EKC 366 RS.8A.D-.--
Installationsanleitung;
Datenkommunikationsanschluss RC.8A.C-.--

Arbeitstemperatur des Ventils

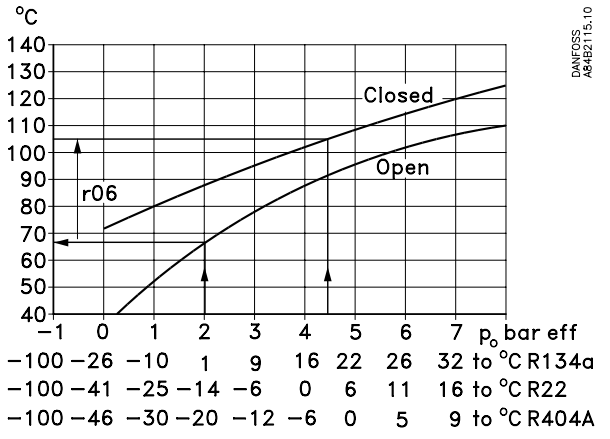
Ohne externes Signal
Die Arbeitstemperatur ist auf Grundlage einer der folgenden Kennlinien vorzunehmen. Die der gewünschten Verdampfungstemperatur (Druck) entsprechende Stellantriebtemperatur ermitteln. Den Wert im Regler, wie im Abschnitt „Einstellung der Referenztemperatur des Ventils“ beschrieben, einstellen.

Mit externem Signal
Wird das Ventil mit einem externem Signal geregelt sind zwei Einstellungen vorzunehmen. Zum einen ist wie im Abschnitt links beschrieben vorzugehen, zum anderen ist festzulegen, wie viel das Signal die Ventiltemperatur anheben soll. Dieser Wert ist ebenfalls einer der folgenden Kennlinien zu entnehmen.
Den Wert im Menü r06 einstellen.
Bei zu niedrig eingestelltem Wert lässt sich das Ventil nicht völlig schließen / öffnen.

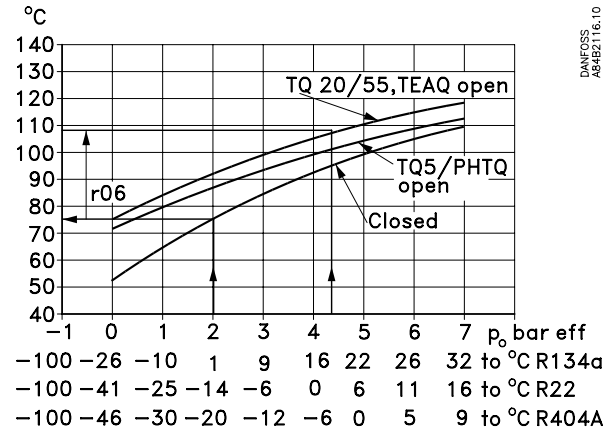
CVQ



KVQ

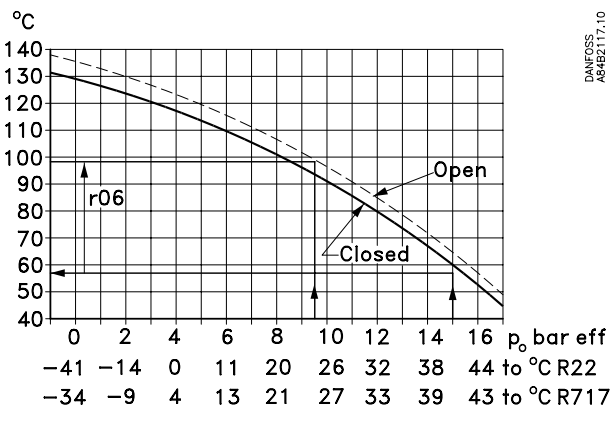


TQ



Alle dargestellten Kennlinien sind Näherungswerte.

CVMQ



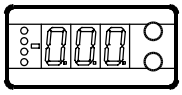
Die beiden Kennlinien gelten für die der Werkseinstellung entsprechende Federeinstellung des Ventils. Wird die Federeinstellung auf einen höheren Druck verändert, verschiebt sich die Kennlinie mit einer entsprechend höheren Temperatur.

Beispiel
CVQ-Typ = 0-6 bar
Kältemittel = R_{717}
Verdampfungstemperatur oder Eingangsdruck des Ventils sollen mit -9°C (2 bar) konstant gehalten werden.
Gemäß der CVQ-Kennlinie erfordert dies eine Stellantriebtemperatur von 80°C.
Den Wert der Referenztemperatur des Ventils auf 80°C einstellen.

Nachdem das Ventil die Arbeitstemperatur erreicht hat, kann eine notwendige Feinjustierung der Einstellung mit Hilfe des Manometers in der Anlage vorgenommen werden.

Utilisation

Afficheur
Les valeurs sont affichées avec trois chiffres, un réglage permettant de choisir entre °C et °F.



Diodes luminescentes en façade
Une diode s'allume sur le devant lorsque la vanne pilote est alimentée: ⊠
Trois autres diodes clignotent en cas d'erreur de la régulation. Dans ce cas, on peut appeler le code d'erreur à l'afficheur et déclencher l'alarme en appuyant brièvement sur le bouton supérieur.

Le régulateur peut émettre les messages suivants :	
E1	Erreur dans le régulateur
E11	Température de l'actuateur de la vanne hors limites
E12	Signal d'entrée hors limites

Les boutons
Les deux boutons permettent de modifier un réglage, l'augmentant ou la réduisant selon le cas. Mais il faut d'abord avoir accès au menu: appuyer quelques secondes sur le bouton supérieur. Apparaissent alors la série de codes de paramétrage. Chercher le code à modifier et appuyer sur les deux boutons en même temps. Après la modification, mémoriser la nouvelle valeur en appuyant à nouveau sur les deux boutons en même temps. Ou bref :

Accès au menu

Accès à la modification

Mémorisation de la modification

Exemples d'utilisation

Réglage de la référence de base pour la température de la vanne
1. Appuyer sur les deux boutons en même temps.
2. Appuyer sur l'un des boutons pour choisir la nouvelle valeur.
3. Appuyer à nouveau sur les deux boutons en même temps pour terminer le réglage.

Relevé de la référence de régulation de la vanne
1. Appuyer sur le bouton inférieur
   (après 20 secondes environ, le régulateur retourne automatiquement à l'affichage de la température actuelle de la vanne).

Réglage des autres menus
1. Appuyer sur le bouton supérieur jusqu'à apparition d'un paramètre.
2. Appuyer sur l'un des boutons pour trouver le paramètre à régler.
3. Appuyer sur les deux boutons en même temps jusqu'à apparition de la valeur du paramètre.
4. Appuyer sur l'un des boutons pour choisir la nouvelle valeur.
5. Appuyer à nouveau sur les deux boutons en même temps pour terminer le réglage.

Sommaire des menus

Fonction	**Para-mètre**	**Min.**	**Max.**
Relever la température actuelle de la vanne (affichage normal)	-		°C
Régler la référence de base pour la température de la vanne	-	40,0°C	140°C
Relevé de la référence de régulation de la vanne	-		°C
Choisir l'unité de température (°C ou °F)	r05	°C	°F
Influence sur la température du signal d'entréee	r06	-99,9 K	99,9 K
Adresse du régulateur	o03*	1	60
Commutateur ON/OFF (message broche service)	o04*	-	-
Définir le signal d'entrée 0: aucun signal 1: 4 - 20 mA 2: 0 - 20 mA 3: 0 - 10 V 4: 2 - 10 V	o10	0	4
Langue (0 = anglais, 1 = allemand, 2=francais, 3 = danois, 4 = espagnol et 6 = suédois). En cas de changement de langue, il faut également actionner o04.	011*	0	6
Choisir la fréquence d'alimentation	o12	50 Hz	60 Hz
Informations service			
Relever la valeur du signal de courant externe	u06		mA
Relever la valeur du signal de tension externe	u07		V

*) Ce réglage n'est possible que si un module de transmission de données est installé dans le régulateur.

Réglage départ usine
Pour retrouver éventuellement les valeurs réglées en usine, procéder ainsi :
- Couper la tension d'alimentation du régulateur.
- Maintenir les deux boutons enfoncés en remettant le régulateur sous tension.

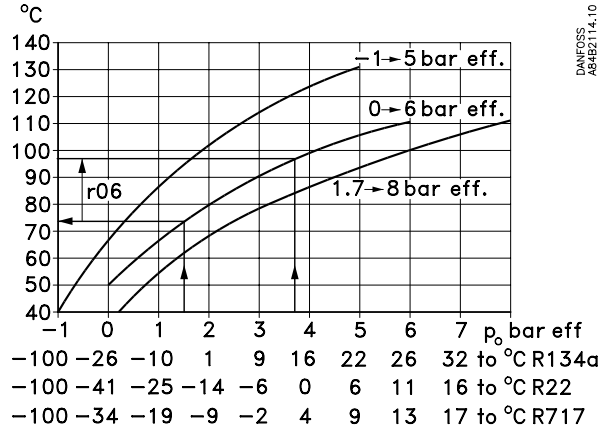
Documentation techniques
Manuel EKC 366 RS.8A.D-.--
Guide d'installation;
Ligne de transmission de données RC.8A.C-.--

Température de travail de la vanne

Sans signal externe
Régler la température de travail en fonction de l'une des courbes ci-dessous. Chercher la température d'actuateur qui correspond à la température (pression) d'évaporation voulue. Régler alors la valeur dans le régulateur comme expliqué en „Réglage de la référence de base pour la température".

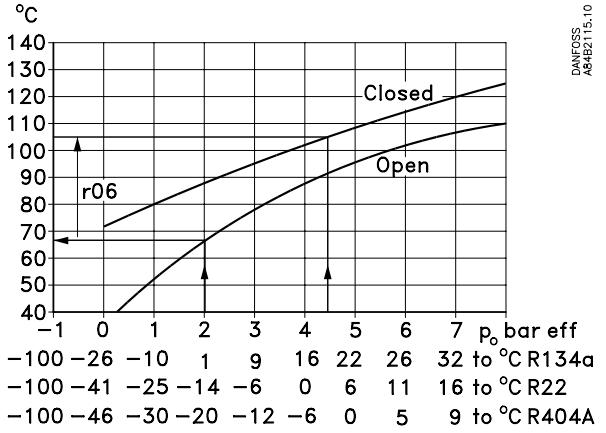
Avec signal externe
Si la vanne est régulée en fonction d'un signal externe, deux réglages sont à effectuer. L'un comme expliqué ci-contre, l'autre portant sur combien le signal doit pouvoir augmenter la température de la vanne. Relever également cette valeur de l'une des courbes ci-dessous.
Régler la valeur dans le menu r06.
Si cette valeur est réglée trop bas, la vanne ne peut ni se fermer ni s'ouvrir totalement.

CVQ



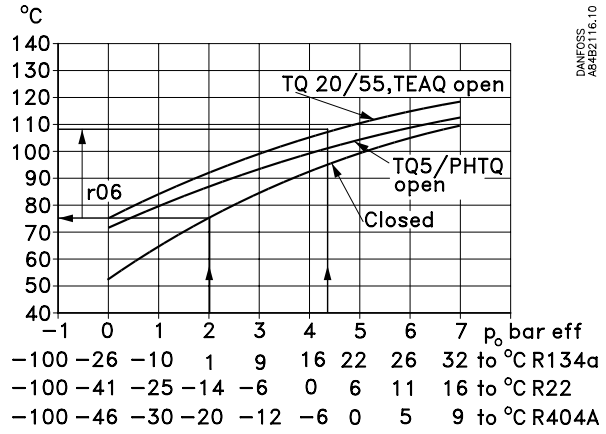
	−1	0	1	2	3	4	5	6	7	p_o bar eff
−100	−26	−10	1	9	16	22	26	32		to °C R134a
−100	−41	−25	−14	−6	0	6	11	16		to °C R22
−100	−34	−19	−9	−2	4	9	13	17		to °C R717

KVQ



	−1	0	1	2	3	4	5	6	7	p_o bar eff
−100	−26	−10	1	9	16	22	26	32		to °C R134a
−100	−41	−25	−14	−6	0	6	11	16		to °C R22
−100	−46	−30	−20	−12	−6	0	5	9		to °C R404A

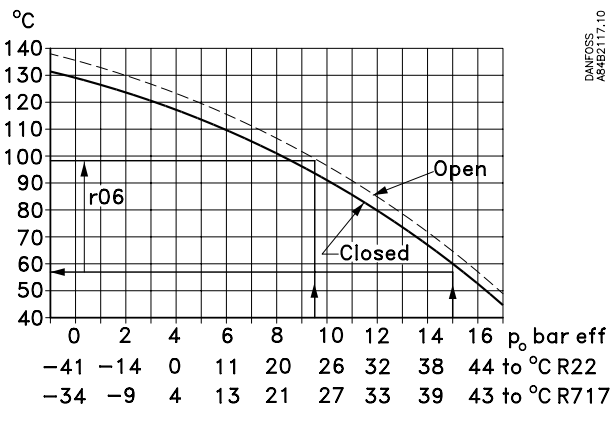
TQ



	−1	0	1	2	3	4	5	6	7	p_o bar eff
−100	−26	−10	1	9	16	22	26	32		to °C R134a
−100	−41	−25	−14	−6	0	6	11	16		to °C R22
−100	−46	−30	−20	−12	−6	0	5	9		to °C R404A

Toutes les courbes montrées ne sont qu'approximatives.

CVMQ



	0	2	4	6	8	10	12	14	16	p_o bar eff
−41	−14	0	11	20	26	32	38	44		to °C R22
−34	−9	4	13	21	27	33	39	43		to °C R717

Ces deux courbes sont montrées avec le ressort en réglage départ usine. Si le réglage du ressort est augmenté (pression plus élevée), la courbe est décalée en conséquence vers une température plus élevée.

Exemple
Type CVQ = 0-6 bar
Réfrigérant = R_{717}
On cherche une température d'évaporation ou une pression constante à l'entrée de la vanne de -9°C (2 bar)
En fonction de la courbe CVQ, ceci demande une température dans l'actuateur de 80°C. Régler donc la référence de base pour la température à 80°C.

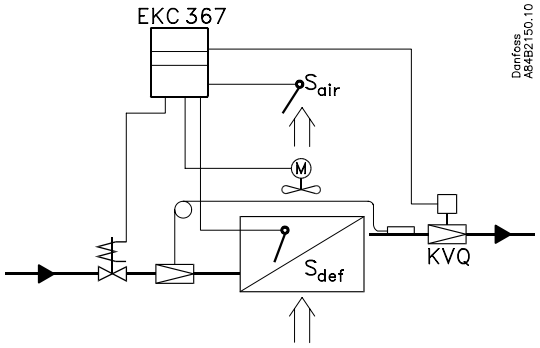
Lorsque la vanne a atteint la température de travail, il faut éventuellement ajuster le réglage depuis le manomètre de l'installation.

REFRIGERATION AND AIR CONDITIONING

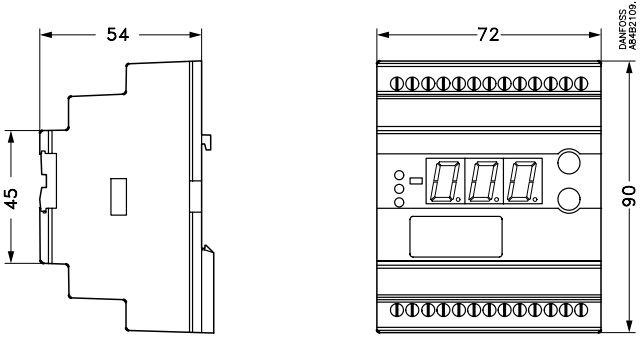
Instructions

EKC 367

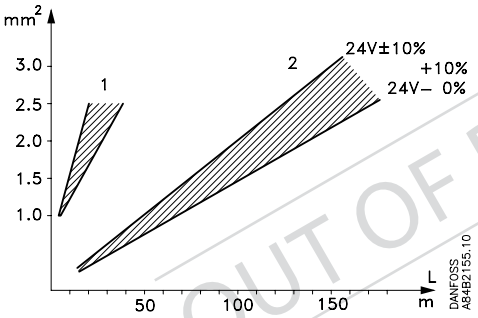
Princip
Principle
Montageprinzip
Principe

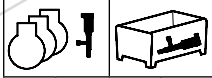
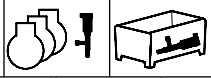
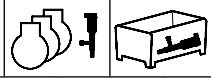
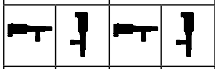
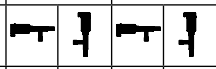
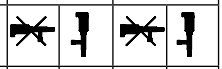


Mål
Dimensions
Maße
Dimensions



Kabellængde/ ledningstværsnit
Cable length/ wire cross section
Kabellänge/Leitungsquerschnitt
Longeur du câble/section du câble



Afrimning/Defrost/Abtauung/Dégivrage											
El/Electricity				Varmgas/Hotgas/Warmgas/Gaz chaud							
--				$t_{KVQ} > 0$				$t_{KVQ} > 0$			
											
											
1	2	2	2	1	2	1	2	-	1	-	1

Dansk

Kabellængden til aktuatoren. Aktuatoren skal have tilført 24 V a.c. ±10%.
For at undgå et for stort spændingstab i ledningen til aktuatoren, skal der anvendes et kraftigere kabel ved større afstande.
Hvis KVQ-ventilen monteres liggende, tillades ikke så lange ledningslængder, som hvis den monteres oprejst.
Den må ikke monteres liggende ved varmgas-afrimning, hvis temperaturen omkring KVQ-ventilen er under 0°C.

English

Cable length for the actuator. The actuator must be supplied with 24 V a.c. ±10%.
To avoid excessive voltage loss in the cable to the actuator, use a thicker cable for large distances.
If the KVQ valve is mounted lying down, shorter cable lengths are allowed than if it is mounted standing up.
It must not be mounted lying down in connection with hot-gas defrost if the temperature around the KVQ-valve is below 0°C.

Deutsch

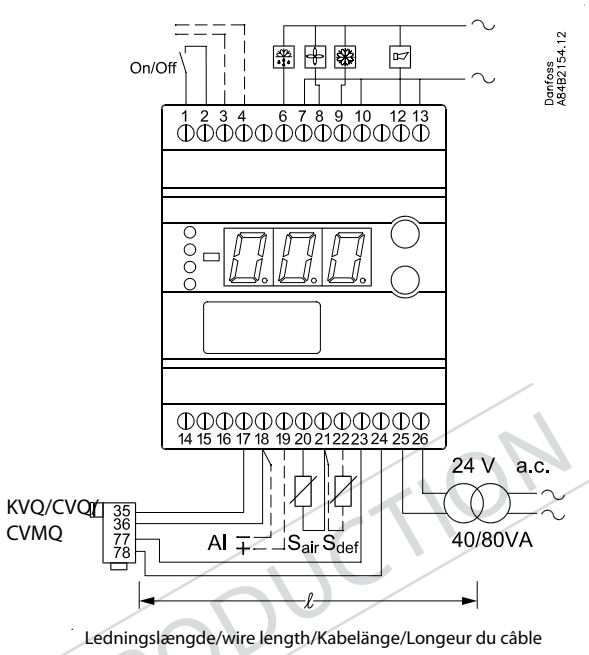
Kabellänge zum Stellantrieb. Der Stellantrieb ist mit 24 V a.c. ±10% zu versorgen.
Um einen zu großen Spannungsverlust in der Leitung zum Stellantrieb zu vermeiden, ist bei größeren Abständen ein Kabel mit größerem Querschnitt auszuwählen.
Wird das KVQ-Ventil in liegender Stellung montiert, sind nur kürzere Leitungslängen als bei stehender Montage zugelassen.
Bei einer Temperatur unter 0°C um das KVQ-Ventil herum, darf bei Heißgasabtauung keine liegende Montage vorgenommen werden.

Francais

Longueur du câble de l'actuateur.
L'actuateur doit être alimenté en 24 V c.a. ±10%. Pour éviter les pertes de tension d'alimentation, il faut installer un câble plus puissant pour les distances plus grandes.
Si la vanne KVQ est installée couchée, les longueurs de câbles admises sont inférieures à celles admises pour une vanne debout. En cas de dégivrage au gaz chaud, la vanne KVQ ne doit pas être couchée si la température autour d'elle est inférieure à 0°C.

Tilslutning
Connection
Anschluß
Raccordement

Data kommunikation
Data communication
Datenkommunikation
Communication des données



ENGLISH

Connections

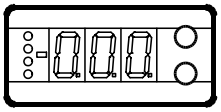
Necessary connections
Terminals:
25-26 Supply voltage 24 V a.c.
17-18 Signal from actuator (from NTC)
23-24 Supply to actuator (to PTC)
20-21 Pt 1000 sensor at evaporator outlet
1-2 Switch function for start/stop of regulation. If a switch is not connected, terminals 1 and 2 must be shortcircuited.

Application dependent connections
Terminal:
12-13 Alarm relay
There is connection between 12 and 13 in alarm situations and when the controller is dead
6-7 Relay switch for start/stop of defrost
8-10 Relay switch for start/stop of fan
9-10 Relay switch for start/stop of cooling
18-19 Voltage signal from other regulation (Ext.Ref.)
21-22 Pt 1000 sensor for defrost function.
Short-circuit of the terminals for two seconds (pulse signal) will start a defrost
3-4 Data communication
Mount only, if a data communication module has been mounted.
It is <u>important</u> that the installation of the data communication cable be done correctly. Cf. separate literature No. RC.8A.C...

Operation

Display

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



Light-emitting diodes (LED) on front panel

There are LED's on the front panel which will light up when the belonging relay is activated.
The three lowermost LED's will flash, if 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**	Errors in the controller
E7		Cut-out Sair
E8		Shortcircuited Sair
E11		Valve's actuator temperature outside its range
E12		Analog input signal is outside the range
A1	**Alarm message**	High-temperature alarm
A2		Low-temperature alarm

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 reference temperature

1. Push the two buttons simultaneously
2. Push one of the buttons and select the new value
3. Push both buttons again to conclude the setting

Set one of the other menus

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

Menu survey

Function	Para-meter	Min.	Max.
Normal display			
Shows the temperature at the room sensor	-		°C
Give the lower button a brief push to see the temperature at the defrost sensor	-		°C
Reference			
Set the required room temperature	-	-70°C	160°C
Temperature unit	r05	°C	°F
External contribution to the reference	r06	-50 K	50 K
Correction of the signal from Sair	r09	-10,0 K	10,0 K
Correction of the signal from Sdef	r11	-10,0 K	10,0 K
Start/stop of refrigeration	r12	OFF	On
Alarm			
Upper deviation (above the temperature setting)	A01	0	50 K
Lower deviation (below the temperature setting)	A02	0	50 K
Alarm's time delay	A03	0	180 min
Defrost			
Defrost method (ELECTRICITY/GAS)	d01	off	GAS
Defrost stop temperature	d02	0	25°C
Max. defrost duration	d04	0	180 min
Drip-off time	d06	0	20 min
Delay for fan start or defrost	d07	0	20 min
Fan start temperature	d08	-15	0°C
Fan cut in during defrost (yes/no)	d09	no	yes
Delay for temperature alarm after defrost	d11	0	199 min
Regulating parameters			
Actuator max. temperature	n01	41°C	140°C
Actuator min. temperature	n02	40°C	139°C
Actuator type (1=CVQ-1 to 5 bar, 2=CVQ 0 to 6 bar, 3=CVQ 1.7 to 8 bar, 4= CVMQ, 5=KVQ)	n03	1	5
P: Amplification factor Kp	n04	0,5	20
I: Integration time Tn (600 = off)	n05	60 s	600 s
D: Differentiation time Td (0 = off)	n06	0 s	60 s
Transient phenomenon 0: Fast cooling 1: Cooling with less underswing 2: Cooling where underswing is unwanted	n07	0	2
Start-up time after hotgas defrost	n08	5 min	20 min
Miscellaneous			
Controller's address	o03*	1	60
ON/OFF switch (service-pin message)	o04*	-	-
Define input signal of analog input 0: no signal 1: 0 - 10 V 2: 2 - 10 V	o10	0	2
Language (0=english, 1=German, 2=French, 3=Danish, 4=Spanish, 5=Italian, 6=Swedish) When you change the setting to an other language you must activate o04 before "the new language" can be visible from the AKM program.	011*	0	6
Set supply voltage frequency	o12	50 Hz	60 Hz
Service			
Read temperature at the Sair sensor	u01		°C
Read regulation reference	u02		°C
Read valve's actuator temperature	u04		°C
Read reference of the valve's actuator temperature	u05		°C
Read value of external voltagt signal	u07		V
Read temperature at the Sdef sensor	u09		°C
Read status of input DI	u10		on/off
Read duration of defrost	u11		m

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

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

Start of controller

When the electric wires have been connected to the controller, the following points have to be attended to before the regulation starts:

1. Switch off the external ON/OFF switch that starts and stops the regulation.
2. Follow the menu survey and set the various parameters to the required values.
3. Switch on the external ON/OFF switch, and regulation will start.
4. If the system has been fitted with a thermostatic expansion valve, it must be set to minimum stable superheating. (If a specific T0 is required for the adjustment of the expansion valve, the two setting values for the actuator temperature (n01 and n02) can be set to the belonging value while the adjustment of the expansion valve is carried out. Remember to reset the values).
5. Follow the actual room temperature on the display. (Use a data collection system, if you like, so that you can follow the temperature performance).

If the temperature fluctuates

When the refrigerating system has been made to work steadily, the controller's factory-set control parameters should in most cases provide a stable and relatively fast regulating system.
If the system on the other hand oscillates, you must register the periods of oscillation and compare them with the set integration time T_n, and then make a couple of adjustments in the indicated parameters.

If the time of oscillation is longer than the integration time:
($T_p > T_n$, (T_n is, say, 4 minutes))

1. Increase T_n to 1.2 times T_p
2. Wait until the system is in balance again
3. If there is still oscillation, reduce K_p by, say, 20%
4. Wait until the system is in balance
5. If it continues to oscillate, repeat 3 and 4

If the time of oscillation is shorter than the integration time:
($T_p < T_n$, (T_n is, say, 4 minutes))

1. Reduce K_p by, say, 20% of the scale reading
2. Wait until the system is in balance
3. If it continues to oscillate, repeat 1 and 2

Literature survey:

Manual EKC 367	RS.8A.F-.--
Installation guide, Data communication link	RC.8A.C-.--

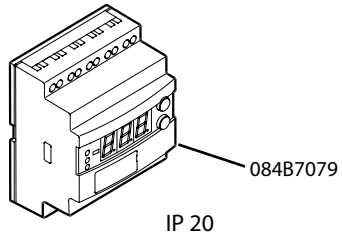
REFRIGERATION AND
AIR CONDITIONING

INSTRUCTIONS

EKC 368

084R9792

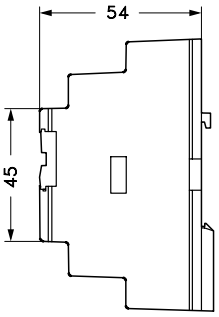
Identification

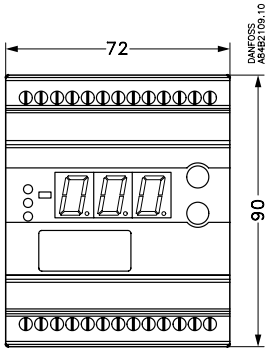


IP 20

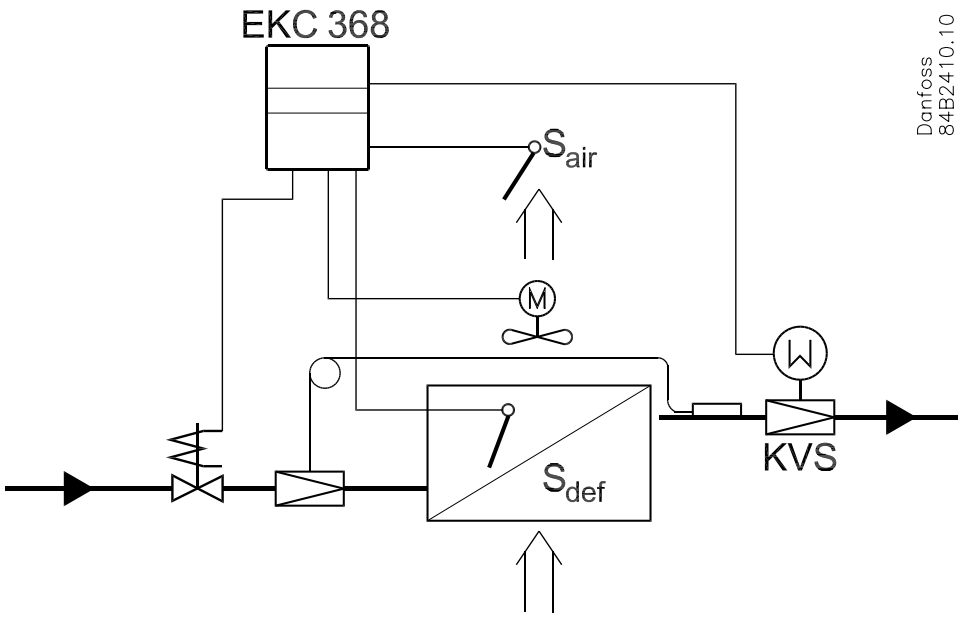
CE

Dimensions





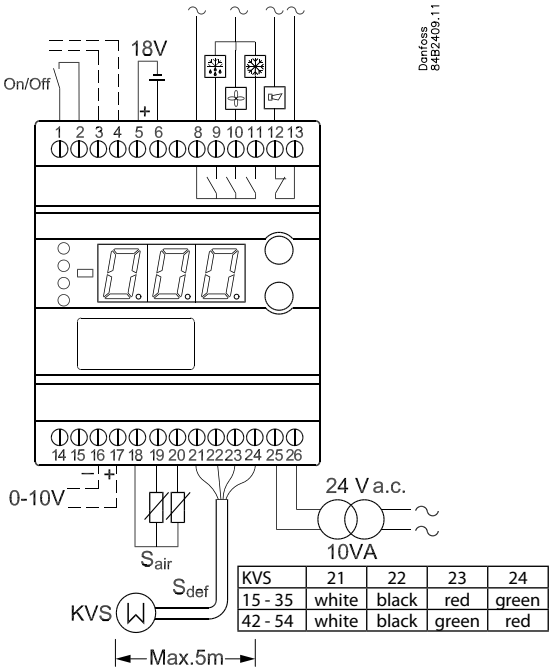
Principle



Sair, Sdef:
Pt 1000 ohm /0°C
(AKS 11)

RI8JC253 03-2006

Principle



KVS	21	22	23	24
15 - 35	white	black	red	green
42 - 54	white	black	green	red

English

Connections

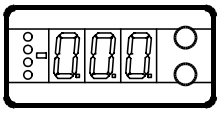
Necessary connections
Terminals:
25-26 Supply voltage 24 V a.c.
18-19 Pt 1000 sensor at evaporator outlet
21-24 Supply to step motor
1-2 Switch function for start/stop of regulation. If a switch is not connected, terminals 1 and 2 must be shortcircuited.
5-6 Battery (the voltage will open the KVS valve if the controller loses its supply voltage)

Application dependent connections
Terminal:
12-13 Alarm relay
There is connection between 12 and 13 in alarm situations and when the controller is dead
8-9 Relay switch for start/stop of defrost
8-10 Relay switch for start/stop of fan
8-11 Relay switch for start/stop of cooling
16-17 Voltage signal from other regulation (Ext.Ref.)
If the voltage signal is received from a PLC or the like, a data communication module, if any, must be with galvanic separation.
18-20 Pt 1000 sensor for defrost function.
Short-circuit of the terminals for two seconds (pulse signal) will start a defrost
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.

Operation

Display

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



Light-emitting diodes (LED) on front panel

There are LED's on the front panel which will light up when the belonging relay is activated.
The three lowermost LED's will flash, if 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**	Errors in the controller
E6		Change battery in timer. Set the timer.
E7		Cut-out Sair
E8		Shortcircuited Sair
E12		Analog input signal is outside the range
A1	**Alarm message**	High-temperature alarm
A2		Low-temperature alarm
A43		Check supply voltage for the step engine
A44		Battery alarm (no voltage or too low voltage)

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 reference temperature
1. Push the two buttons simultaneously
2. Push one of the buttons and select the new value
3. Push both buttons again to conclude the setting

Set one of the other menus
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

Menu survey

SW =1.6x

Function	Parameter	Min.	Max.	Fac. setting
Normal display				
Shows the temperature at the room sensor	-		°C	
Give the lower button a brief push to see the temperature at the defrost sensor	-		°C	
Reference				
Set the required room temperature	-	-70°C	160°C	10
Temperature unit	r05	°C	°F	°C
External contribution to the reference	r06	-50 K	50 K	0
Correction of the signal from Sair	r09	-10,0 K	10,0 K	0
Correction of the signal from Sdef	r11	-10,0 K	10,0 K	0
Start/stop of refrigeration	r12	OFF	On	On
Alarm				
Upper deviation (above the temperature setting)	A01	0	50 K	5
Lower deviation (below the temperature setting)	A02	0	50 K	5
Alarm's time delay	A03	0	180 min	30
Monitoring of battery	A34	Off	On	Off
Defrost				
Defrost method (ELECTRICITY/GAS)	d01	Off	GAS	Off
Defrost stop temperature	d02	0	25°C	6
Max. defrost duration	d04	0	180 min	45
Drip-off time	d06	0	20 min	0
Delay for fan start or defrost	d07	0	20 min	0
Fan start temperature	d08	-15°C	0°C	-5
Fan cut in during defrost (yes/no)	d09	no	yes	no
Delay for temperature alarm after defrost	d11	0	199 min	90
Regulating parameters				
Actuator type: 1=KVS15-22, 2=KVS28-35, 3=KVS42-54 4=User defined via AKM / For Danfoss only Setting of menu only when r12 = off.	n03	1	4	1
P: Amplification factor Kp	n04	1	50	4
I: Integration time Tn (600 = off)	n05	60 s	600 s	120
D: Differentiation time Td (0 = off)	n06	0 s	60 s	0
Transient phenomenon 0: Fast cooling 1: Cooling with less underswing 2: Cooling where underswing is unwanted	n07	0	2	1
Start-up time after hotgas defrost	n08	0 min	20 min	1
Miscellaneous				
Controller's address	o03*	1	60	0
ON/OFF switch (service-pin message)	o04*	-	-	Off
Define input signal of analog input 0: no signal 1: 0 - 10 V 2: 2 - 10 V	o10	0	2	0
Set supply voltage frequency	o12	50 Hz	60 Hz	50
Service				
Read temperature at the Sair sensor	u01		°C	
Read regulation reference	u02		°C	
Read value of external voltagt signal	u07		V	
Read temperature at the Sdef sensor	u09		°C	
Read status of input DI	u10		on/off	
Read duration of defrost	u11		m	
Opening degree of the valve	u23		%	

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

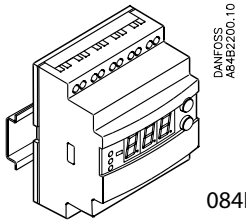
Factory setting
If you need to return to the factory-set values, it can be done in this way:
- Cut out the supply voltage to the controller
- Keep both buttons depressed at the same time as you reconnect the supply voltage

REFRIGERATION AND AIR CONDITIONING

Instructions

EKC 316A

Identifikation
Identification



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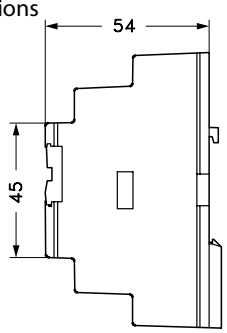

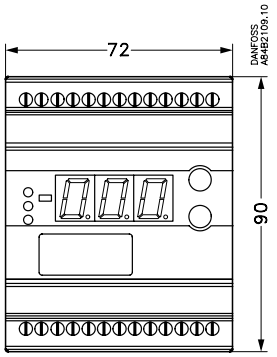

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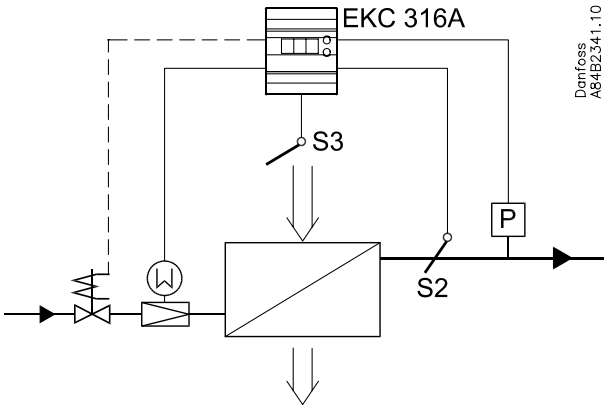
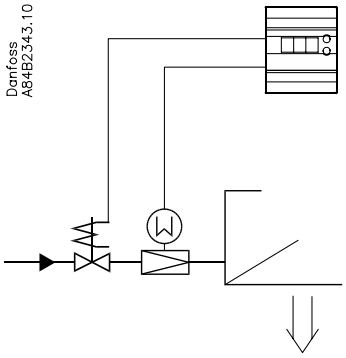
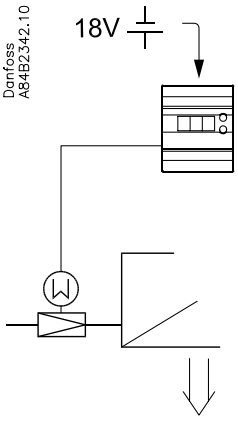
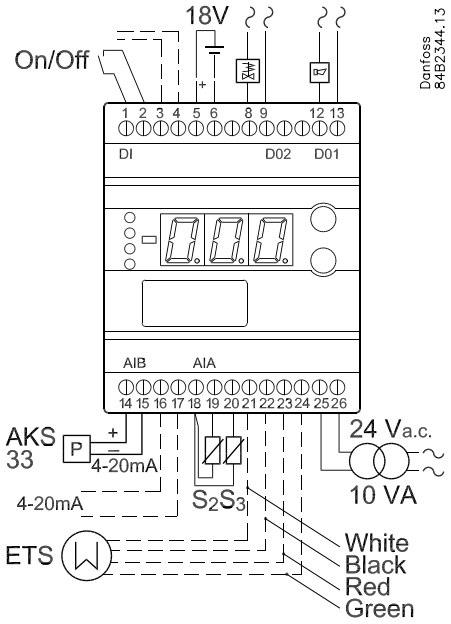






Data kommunikation
Data communication
Datenkommunikation
Communication des données



L > 5 m => AKA 211. Se manual
L > 5 m => AKA 211. See manual
L > 5 m => AKA 211. Siehe Manual
L > 5 m => AKA 211. Voir manual

<------ max. 5 m ---------->

ENGLISH

Connections

Necessary connections
Terminals:

25-26 Supply voltage 24 V a.c.
21-24 Supply to step motor
18-19 Pt 1000 sensor at evaporator outlet (S2)
14-15 Pressure transmitter type AKS 33
1-2 Switch function for start/stop of regulation. If a switch is not connected, terminals 1 and 2 must be short circuited.
5-6 Battery (the voltage will close the ETS valve if the controller loses its supply voltage. The battery connection may however be replaced by installation of a solenoid valve in the liquid line. This will then be connected to terminals 8-9.

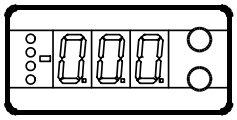
IMPORTANT
The 24 Volts a.c. supply to the EKC 316A at terminals 25 and 26 should be completely isolated from the battery supply at terminals 5 and 6, and under no circumstances should these two supplies have common earth.

Application dependent connections
Terminal:

18-20 Pt 1000 sensor for measuring air temperature (S3)
8-9 Thermostat relay
12-13 Alarm relay
There is connection between 12 and 13 in alarm situations and when the controller is dead
16-17 Current signal from other regulation (Ext.Ref.)
3-4 Data communication
Mount only, if a data communication module has been mounted.
It is <u>important</u> that the installation of the data communication cable be done correctly. Cf. separate literature No. RC8AC...

Operation

Display
The values will be shown with three digits, and with a setting you can determine whether the temperature are to be shown in °C or in °F. (Pressure in bar or psig.)



Light-emitting diodes (LED) on front panel
There are LED's on the front panel which will light up when the belonging relay is activated.
The uppermost LED will indicate when the valve is moving towards a greater opening degree.
The next LED will indicate when the valve is moving towards a smaller opening degree.
The third one will indicate when the thermostat demands refrigeration.
All 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 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 set-point for the thermostat
1. Push the two buttons simultaneously
2. Push one of the buttons and select the new value
3. Push both buttons again to conclude the setting

Set one of the other menus
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

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

*) Used only when thermostat function (r14 = 1) is selected.
**) The display on the controller can display 3 digits only, but the setting value has 4 digits. Only the 3 most important will be shown. It means f.ex. . 250 will give a setting of 2500.

Menu survey

SW = 1.2x

Function	Parameter	Min.	Max.	Fac. sett.
Normal display				
Shows the actual superheat/ valve's opening degree/ temperature Define view in o17	-		K	
If you wish to see the expansion valve's actual opening degree, give the lower button a brief push (1s). Define view in o17	-		%	
Reference				
Set the required set point for the thermostat	- *	-60°C	50°C	3.0
Differential	r01 *	0.1 K	20.0 K	2.0
Units (0=°C+bar /1=°F+psig)	r05	0	1	0
External contribution to the reference	r06	-50 K	50 K	0..0
Correction of signal from S2	r09	-10.0 K	10.0 K	0.0
Correction of signal from S3	r10	-10.0 K	10.0 K	0.0
Start / stop of refrigeration	r12	OFF	On	On
Define thermostat function (0= no thermostat function, 1=On/off thermostat)	r14	0	1	0
Alarm				
Upper deviation (above the temperature setting)	A01 *	3 K	20 K	5
Lower deviation (below the temperature setting)	A02 *	1 K	10 K	3
Alarm's time delay	A03 *	0 min.	90 min.	30
Battery monitoring	A34	Ooff	On	Off
Regulating parameters				
P: Amplification factor Kp	n04	0.5	20	3.0
I: Integration time T	n05	30 s	600 s	120
D: Differentiation time Td (0 = off)	n06	0 s	90 s	0
Max. value of superheat reference	n09	2 K	30 K	10
Min. value of superheat reference	n10	1 K	12 K	4
MOP (max = off)	n11	0.0 bar	60 bar	20
Signal reliability during start-up. Safety time period. Should only be changed by trained staff	n15	0 s	90 s	0
Signal reliability during start-up – Opening degree's start value. Should only be changed by trained staff.	n17	0%	100%	0
Stability factor for superheat control. Changes should only be made by trained staff	n18	0	10	5
Damping of amplification around reference value Changes should only be made by trained staff	n19	0.2	1.0	0.3
Amplification factor for superheat Changes should only be made by trained staff	n20	0.0	10.0	0.4
Definition of superheat control 1=MSS, 2=LOADAP	n21	1	2	1
Value of min. superheat reference for loads under 10%	n22	1 K	15 K	2
Max. opening degree Changes should only be made by trained staff	n32	0 %	100 %	100
"n37" to "n42" are adapted to valve type ETS 50 and should only be changed through the use of another valve.				
Number of steps from 0-100% opening degree (x10) (ETS 50 = 263. ETS 100 = 353)	n37	000 stp**	5000 stp **	263
Number of steps per second	n38	10 stp/s	300 stp/s	250
Compensation of spindle play at the valve's closing point	n39	0 stp	100 stp	50
Compensation of spindle play in the control range	n40	0 stp	100 stp	100
Valve status when power supply interrupted: 1 = NC, 2 = NO (special application)	n41	1	2	1
Compensation of spindle play at the closing point must take place: 1=when the valve opens, 2=when the valve closes	n42	1	2 stp	1
Attenuation factor for inner loop	n43	0,1	1	0.4
Integration time for inner loop (TnT0)	n44	10 s	120 s	30
Safety value for lower temperature difference for inner loop	n45	1 K	20 K	3.0

Miscellaneous				
Controller's address	o03***	0	119	0
ON/OFF switch (service-pin message)	o04***	-	-	-
Define input signal on the analoge input AIA: 0: no signal, 1: Temperature setpoint. 0-20 mA 2: Temperature setpoint. 4-20 mA 3: Displacement of superheat reference. 0-20 mA 4: Displacement of superheat reference. 4-20 mA 5: Forced control of valve's max. opening degree. 0-20 mA 6: Forced control of valve´s max. opening degree 4-20 mA	o10	0	6	0
Set supply voltage frequency	o12	50 Hz	60 Hz	50
Select display for "normal picture" 1: Superheat 2: Valve's opening degree 3: Air temperature	o17	1	3	1
Manual control of outputs: OFF: no manual control 1: Relay for solenoid valve: select ON 2: Relay for solenoid valve: select OFF 3: Alarm relay activated (cut out) 4: Forced control of valve's opening degree. 0-20 mA 5: Forced control of valve´s opening degree 4-20 mA At settings 1-3, "o45" will be active	o18	off	5	0
Working range for pressure transmitter – min. value	o20	-1 bar	60 bar	-1.0
Working range for pressure transmitter – max. value	o21	-1 bar	60 bar	12.0
Refrigerant setting 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.	o30	0	29	0
Manual control of the valve's opening degree. The function can only be operated if "o18" has been set.	o45	0 %	100 %	0
Selection of control mode: 1=Normal 2 = With inner loop (T0) 3 = With inner loop (S media temperature less T0)	o56	1	3	1

Service		
Analog input AIA (16-17)	u06	mA
Read status of input DI	u10	on/off
Thermostat cut-in time	u18	min.
Temperature at S2 sensor	u20	°C
Superheat	u21	K
Superheat reference	u22	K
Read AKV valve's opening degree	u24	%
Read evaporating pressure	u25	bar
Read evaporating temperature	u26	°C
Temperature at S3 sensor	u27	°C
Temperature reference	u28	°C
Read signal at pressure transmitter input	u29	mA

***) This setting will only be possible if a data communication module has been installed in the controller.
Configuration settings available only when regulation is stopped.

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
E19		The input signal on terminals 16-17 is outside the range.
E20		The input signal on terminals 14-15 is outside the range (P0 signal)
A1	**Alarm message**	High-temperature alarm
A2		Low-temperature alarm
A11		No refrigerant has been selected
A43		Check the supply voltage to the step motor
A44		Battery alarm (no voltage or too low voltage)

Start of controller

When the electric wires have been connected to the controller, the following points have to be attended to before the regulation starts:
1. Switch off the external ON/OFF switch that starts and stops the regulation.
2. Follow the menu survey and set the various parameters to the required values.
3. Switch on the external switch, and regulation will start.
4. Follow the actual room temperature or superheat on the display.

If the superheating fluctuates

When the refrigerating system has been made to work steadily, the controller's factory-set control parameters should in most cases provide a stable and relatively fast regulating system.
If the system however fluctuates this may be due to the fact that too low superheat parameters have been selected:

If adaptive superheat has been selected:
Adjust: n09, n10 and n18.

If load-defined superheat has been selected:
Adjust: n09, n10 and n22.

Alternatively it may be due to the fact that the set regulation parameters are not optimal.

If the time of oscillation is longer than the integration time:
($T_p > T_n$, (T_n is, say, 240 seconds))
1. Increase T_n to 1.2 times T_p
2. Wait until the system is in balance again
3. If there is still oscillation, reduce K_p by, say, 20%
4. Wait until the system is in balance
5. If it continues to oscillate, repeat 3 and 4

If the time of oscillation is shorter than the integration time:
($T_p < T_n$, (T_n is, say, 240 seconds))
1. Reduce K_p by, say, 20% of the scale reading
2. Wait until the system is in balance
3. If it continues to oscillate, repeat 1 and 2.

Check that the ETS valve closes when the supply voltage to the controller is interrupted

This control is performed if the controller is connected to battery backup.
The battery will make the step motor move to the end stop and thus close the valve.

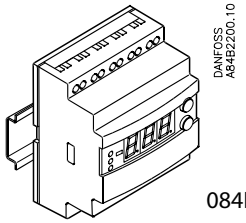
The control may be omitted if a solenoid valve is mounted and connected via terminals 9-10.

REFRIGERATION AND
AIR CONDITIONING

Instructions

EKC 315A

Identifikation
Identification



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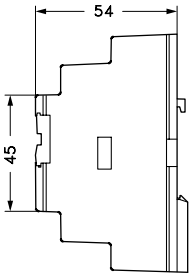

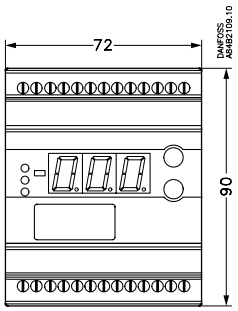

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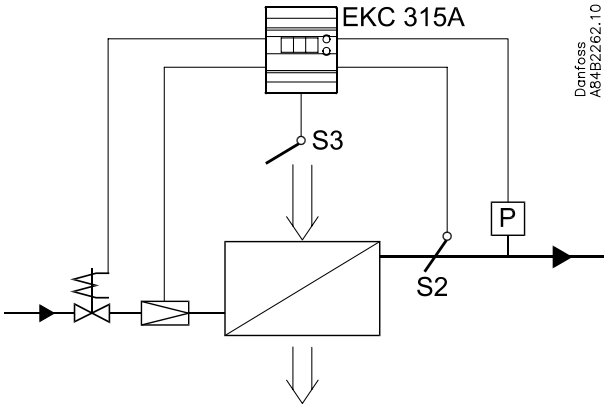

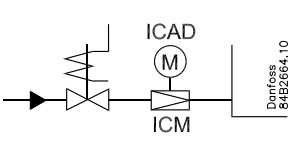

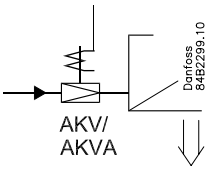

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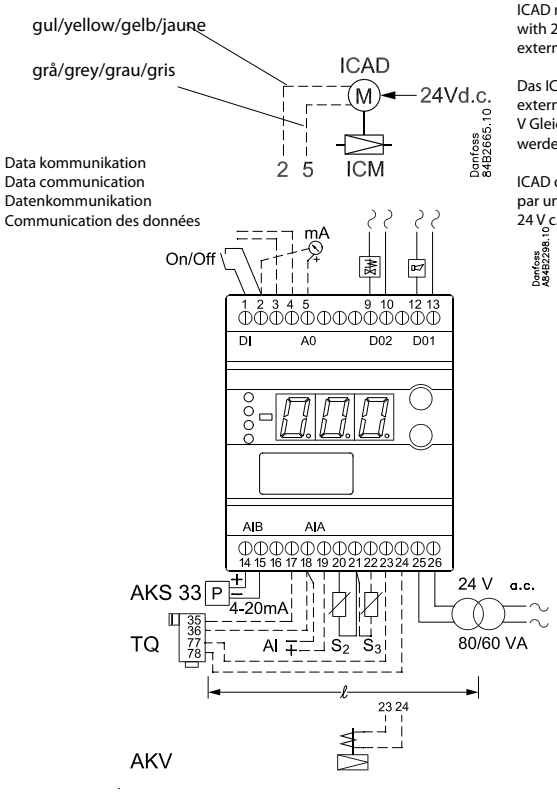


ICAD skal forsynes fra ekstern kilde med 24 V d.c.

ICAD must be supplied with 24 V DC from an external source.

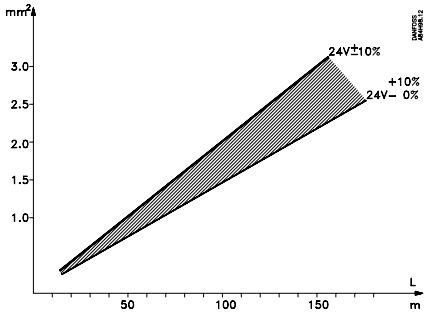
Das ICAD muss von einer externen Quelle mit 24 V Gleichstrom versorgt werden.

ICAD doit être alimenté par une source externe de 24 V c.c.

!! U_{77-78}: 24 V +/-10% !!

Kabel fx, Cable ex., Kabel z.B., câble fx

L < 25 m	:	0.75 mm²
25 m < L < 75 m	:	1.5 mm²
75 m < L	:	2.5 mm²



ENGLISH **ENGLISH**

Connections

Necessary connections

Terminals:

25-26 Supply voltage 24 V a.c.

17-18 Only at TQ actuator: Signal from actuator

20-21 Pt 1000 sensor at evaporator outlet (S2)

14-15 Pressure transmitter type AKS 33

9-10 Relay switch for start/stop of solenoid valve

1-2 Switch function for start/stop of regulation. If a switch is not connected, terminals 1 and 2 must be shortcircuited.

Application dependent connections

Terminal:

21-22 Pt 1000 sensor for measuring air temperature (S3)

12-13 Alarm relay
There is connection between 12 and 13 in alarm situations and when the controller is dead

18-19 Current signal from other regulation (Ext.Ref.)

23-24 Supply to actuator AKV/TQ

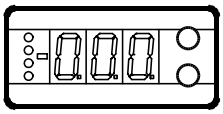
2-5 Current output for showing superheat or air temperature. Or for signal to a slave module. Or control of ICM valve.

3-4 Data communication
Mount only, if a data communication module has been mounted.
It is <u>important</u> that the installation of the data communication cable be done correctly.
Cf. separate literature No. RC8AC...

Operation

Display

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



Light-emitting diodes (LED) on front panel

There are LED's on the front panel which will light up when the belonging relay is activated.
The upper LED will indicate the valve's opening degree. A short pulse indicates a small liquid flow and a long pulse a heavy liquid flow. The other LED will indicate when the controller calls for refrigeration.
The three lowermost LED's will flash, if 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 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 set-point
1. Push the two buttons simultaneously
2. Push one of the buttons and select the new value
3. Push both buttons again to conclude the setting

Set one of the other menus
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

Menu survey

SW = 1.3x

Function	Parameter	Min.	Max.	Factory setting
Normal display				
Shows the actual superheat/ valve's opening degree/ temperature Define view in o17	-		K	
Temperature, superheating, or the temp. reference is displayed if the bottom button is pressed briefly. Define view in o17	-		%	
Reference				
Set the requirede set point	-	-60°C	50°C	10
Differential	r01	0.1 K	20 K	2.0
Units (0=°C+bar /1=°F+psig)	r05	0	1	0
External contribution to the reference	r06	-50 K	50 K	0
Correction of signal from S2	r09	-10.0 K	10.0 K	0.0
Correction of signal from S3	r10	-10.0 K	10.0 K	0.0
Start / stop of refrigeration	r12	OFF	On	1
Define thermostat function (0= no thermostat function, 1=On/off thermostat)	r14	0	1	0
Alarm				
Upper deviation (above the temperature setting)	A01	3.0 K	20 K	5.0
Lower deviation (below the temperature setting)	A02	1 K	10 K	3.0
Alarm's time delay	A03	0 min.	90 min.	30
Regulating parameters				
P: Amplification factor Kp	n04	0.5	20	3.0
I: Integration time T	n05	30 s	600 s	120
D: Differentiation time Td (0 = off)	n06	0 s	90 s	0
Max. value of superheat reference	n09	2 K	50 K	6
Min. value of superheat reference	n10	1 K	12 K	4
MOP (max = off)	n11	0.0 bar	60 bar	60
Period time (only when AKV/A valve is used)	n13	3 s	10 s	6
Stability factor for superheat control. Changes should only be made by trained staff	n18	0	10	5
Damping of amplification around reference value Changes should only be made by trained staff	n19	0.2	1.0	0.3
Amplification factor for superheat Changes should only be made by trained staff	n20	0.0	10.0	0.4
Definition of superheat control 1=MSS, 2=LOADAP	n21	1	2	1
Value of min. superheat reference for loads under 10%	n22	1	15	2
Standby temperature when valve closed (TQ valve only) Changes should only be made by trained staff	n26	0 K	20 K	0
Standby temperature when valve open (TQ valve only) Changes should only be made by trained staff	n27	-15 K	70 K	20
Max. opening degree Changes should only be made by trained staff	n32	0	100	100
Min. opening degree Changes should only be made by trained staff	n33	0	100	0
Miscellaneous				
Controller's address	o03*	0	119	-
ON/OFF switch (service-pin message)	o04*	-	-	-
Define valve and output signal: 0: Off 1: TQ. AO: 0-20 mA 2: TQ. AO: 4-20 mA 3: AKV, AO: 0-20 m 4: AKV, AO: 4-20 mA 5: AKV, AO: EKC 347-SLAVE 6: ICM, AO: 0-20 mA / ICM OD% 7: ICM, AO: 4-20 mA / ICM OD%	o09	0	7	0

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

Define input signal on the analoge input AIA: 0: no signal, 1: Temperature setpoint. 0-20 mA 2: Temperature setpoint. 4-20 mA 3: Displacement of superheat reference. 0-20 mA 4: Displacement of superheat reference. 4-20 mA	o10	0	4	0
Set supply voltage frequency	o12	50 Hz	60 Hz	0
Select display for "normal picture" (Display the item indicated in parenthesis by briefly pressing the bottom button) 1: Superheat (Temperature) 2: Valve's opening degree (Superheat) 3: Air temperature (Temperature reference)	o17	1	3	1
Manual control of outputs: OFF: no manual control 1: Relay for solenoid valve: select ON 2: AKV/A output: select ON 3: Alarm relay activated (cut out)	o18	off	3	Off
Working range for pressure transmitter – min. value	o20	-1 bar	60 bar	-1.0
Working range for pressure transmitter – max. value	o21	-1 bar	60 bar	12
(Setting for the function o09, only AKV and TQ) Set the temperature value or opening degree where the output signal must be minimum (0 or 4 mA)	o27	-70°C	160°C	-35
(Setting for the function o09, only AKV and TQ) Set the temperature value or opening degree where the output signal must be maximum (20 mA)	o28	-70°C	160°C	15
Refrigerant setting 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.	o30	0	29	0

Service		
TQ valve's actuator temperature	u04	°C
Reference of the valve's actuator temperature	u05	°C
Analog input AIA (18-19)	u06	mA
Analog output AO (2-5)	u08	mA
Read status of input DI	u10	on/off
Thermostat cut-in time	u18	min.
Temperature at S2 sensor	u20	°C
Superheat	u21	K
Superheat reference	u22	K
Read AKV valve's opening degree	u24	%
Read evaporating pressure	u25	bar
Read evaporating temperature	u26	°C
Temperature at S3 sensor	u27	°C
Temperature reference	u28	°C
Read signal at pressure transmitter input	u29	mA

*) 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	**Error message**	Fault in controller
E11		Valve's actuator temperature outside its range
E15		Cut-out S2 sensor
E16		Shortcircuited S2 sensor
E17		Cut-out S3 sensor
E18		Shortcircuited S3 sensor
E19		The input signal on terminals 18-19 is outside the range.
E20		The input signal on terminals 14-15 is outside the range (P0 signal)
A1	**Alarm message**	High-temperature alarm
A2		Low-temperature alarm
A11		No refrigerant has been selected

Start of controller

When the electric wires have been connected to the controller, the following points have to be attended to before the regulation starts:

1. Switch off the external ON/OFF switch that starts and stops the regulation.
2. Follow the menu survey and set the various parameters to the required values.
3. Switch on the external switch, and regulation will start.
4. Follow the actual room temperature or superheat on the display.
   (On terminals 2 and 5 a current signal can be transmitted which represents the display view. Connect a data collection unit, if applicable, so that the temperature performance can be followed).

If the superheating fluctuates

When the refrigerating system has been made to work steadily, the controller's factory-set control parameters should in most cases provide a stable and relatively fast regulating system.
If the system however fluctuates this may be due to the fact that too low superheat parameters have been selected:

If adaptive superheat has been selected:
Adjust: n09, n10 and n18.

If load-defined superheat has been selected:
Adjust: n09, n10 and n22.

Alternatively it may be due to the fact that the set regulation parameters are not optimal.

If the time of oscillation is longer than the integration time:
($T_p > T_n$, (T_n is, say, 240 seconds))
1. Increase T_n to 1.2 times T_p
2. Wait until the system is in balance again
3. If there is still oscillation, reduce K_p by, say, 20%
4. Wait until the system is in balance
5. If it continues to oscillate, repeat 3 and 4

If the time of oscillation is shorter than the integration time:
($T_p < T_n$, (T_n is, say, 240 seconds))
1. Reduce K_p by, say, 20% of the scale reading
2. Wait until the system is in balance
3. If it continues to oscillate, repeat 1 and 2.

If the superheat has excessive underswing during start-up

If you regulate with valve type AKV:
Adjust n22 a little bit up and/or n04 a little bit down.

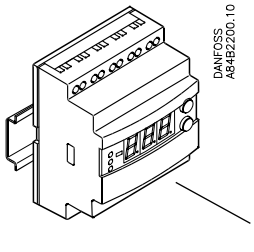
If you regulate with valve type TQ:
Adjust n26 a littlle bit down

REFRIGERATION AND
AIR CONDITIONING

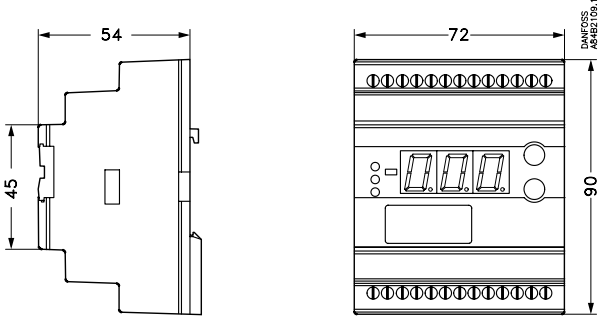
Instructions

EKC 347

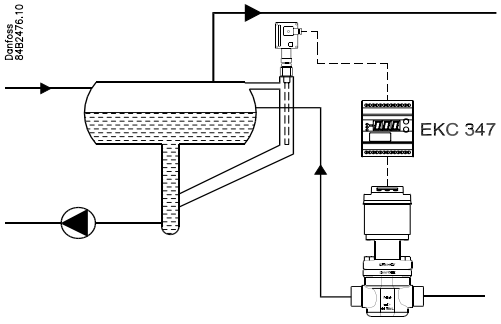
Identification
Identification

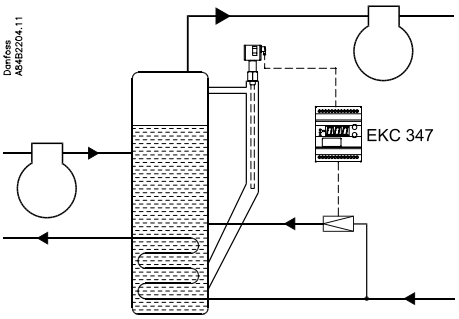


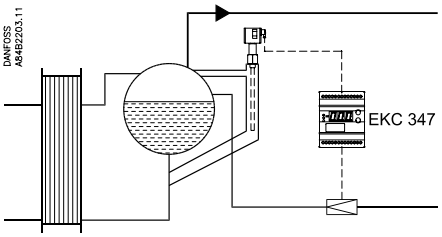
Mål
Dimensions
Maße
Dimensions

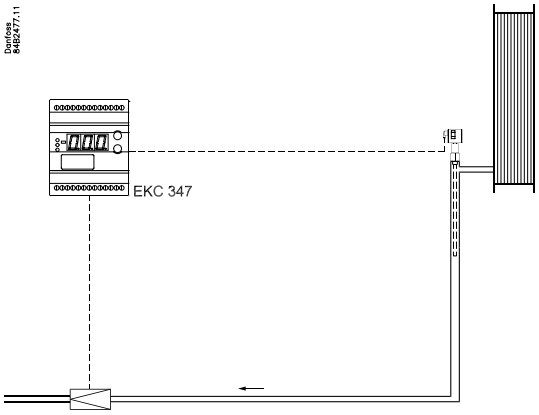


Princip
Principle
Montageprincip
Principe





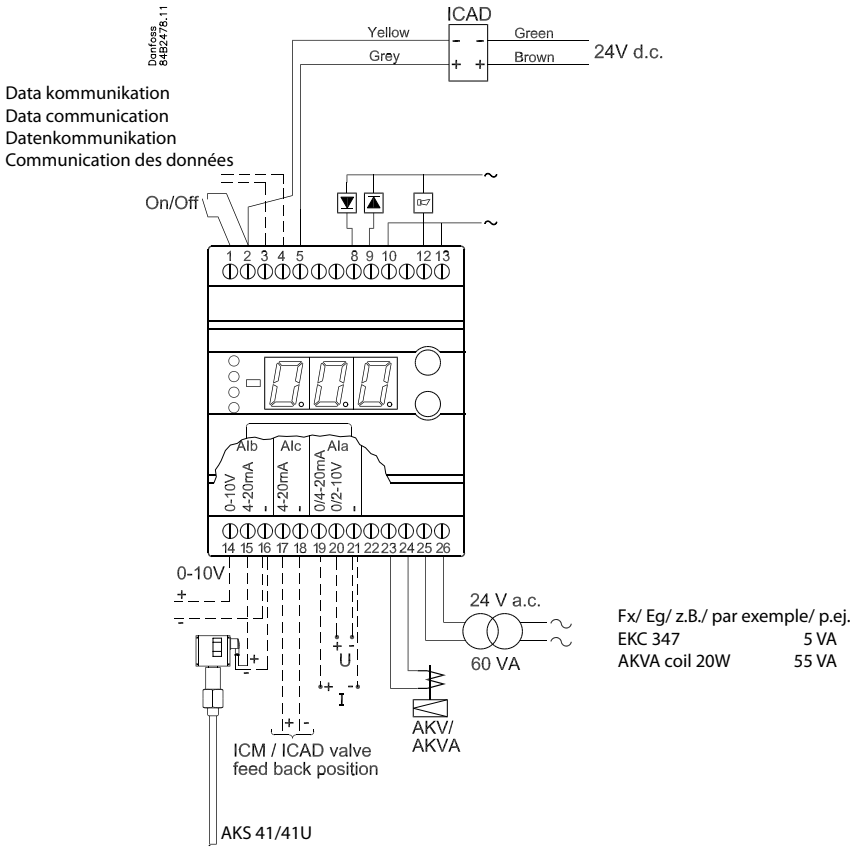




Type = AKV / AKVA

RI8BY452 11-2006

Tilslutning
Connection
Anschluß
Raccordement



ENGLISH

Necessary connections

Terminals:

25-26 Supply voltage 24 V a.c.

15-16 Signal from level transmitter type AKS 41 **or**

14-16 Signal from transmitter 0-10V

23-24 Expansion valve type AKV or AKVA **or**

2-5 Expansion valve type: ICM with ICAD

1-2 Switch function for start/stop of regulation. If a switch is not connected, terminals 1 and 2 must be shortcircuited.

Application dependent connections

Terminal:

12-13 Alarm relay
There is connection between 12 and 13 in alarm situations and when the controller is dead

8-10 Relay for lower level limit. There is connection between 8 and 10 when the set value is passed

9-10 Relay for upper level limit. There is connection between 9 and 10 when the set value is passed

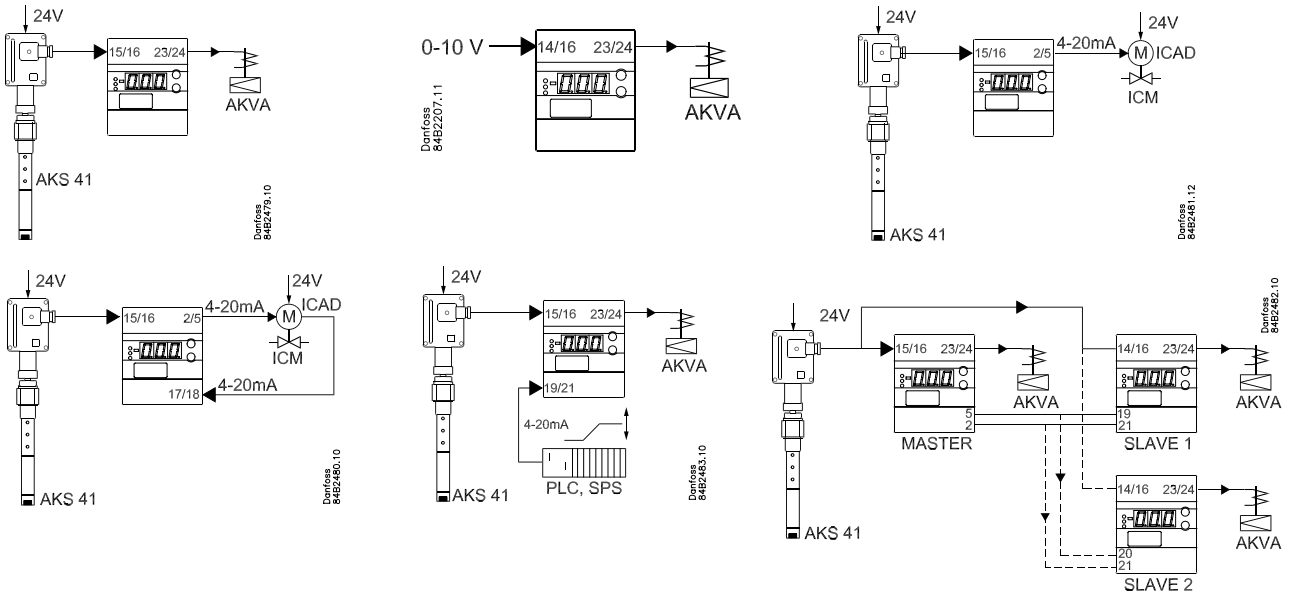
17-18 ICM valve feedback signal from ICAD 0/4-20 mA

19-21 Current signal **or**

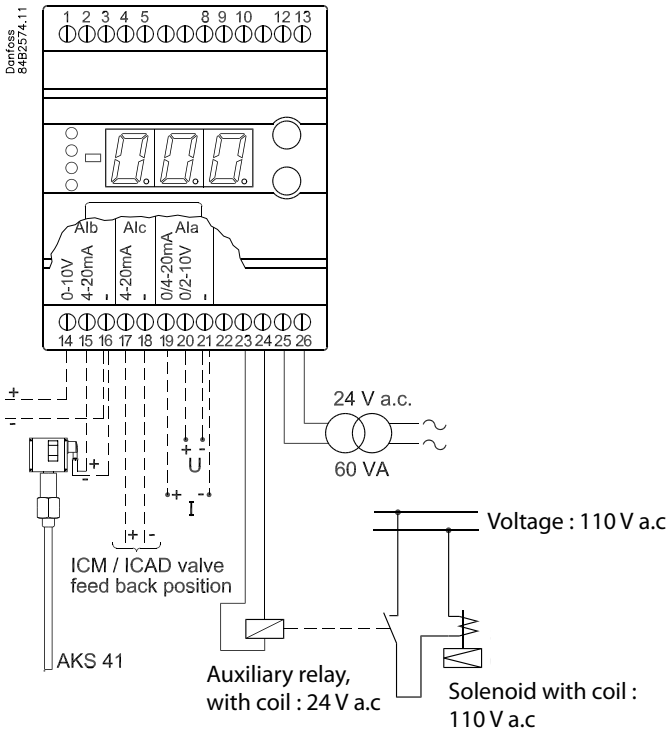
20-21 Voltage signal from other regulation (for external reference displacement)

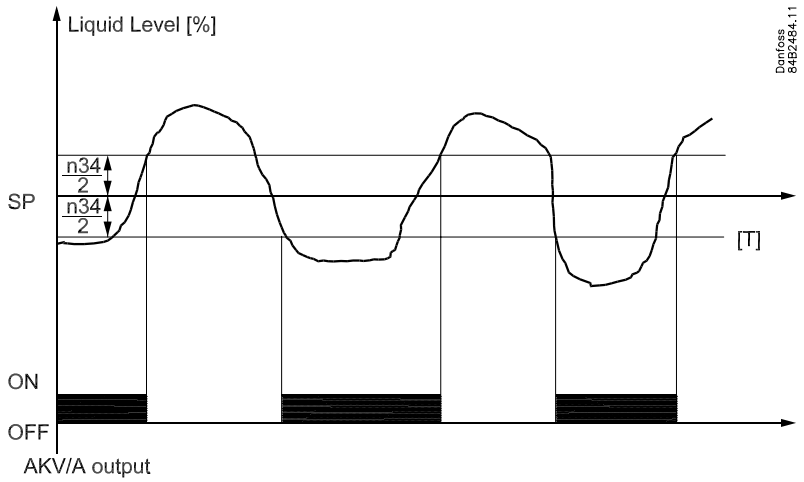
3-4 Data communication
Mount only, if a data communication module has been mounted.
It is important that the installation of the data communication cable be done correctly.
Cf. separate literature No. RC8AC...

Tilslutningseksempler
Connection examples
Anschlußbeispiele
Exemples de raccordement



EKC 347 – ON/OFF Application. Open/Close solenoid valve with coil 110 V





DANSK
ON/OFF anvendelse
Udover modulerende PI regulering understøtter EKC 347 også ON/OFF betjening med hysterese.

For at sikre denne betjening:
P.Band skal være (n04)=0%//OFF
Hysterese er givet ved (n34)
Setpoint som normal procedure. (Trykke på den øverste og nederste knap samtidig)
Lav eller højtryksside system. (n35)

DEUTACH
EIN/AUS-Anwendung
Außer modulierender PI-Regelung unterstützt EKC 347 auch EIN/AUS-Bedienung mit Hysterese.

Für diese Bedienungsart ist Folgendes zu gewährleisten:
Das P-Band muss (n04)=0%//AUS sein
Die Hysterese wird in (n34) angegeben
Der Sollwert als normale Vorgehensweise. (Die oberste und unterste Taste gleichzeitig betätigen.)
Nieder- oder Hochdruckseitensystem (n35).

ENGELSK
ON/OFF application
Beside of modulating PI control EKC 347 does also support ON/OFF operation with hysteresis.

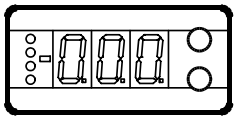
To ensure this operation:
P.Band must be (n04)=0%//OFF
Hysteresis is given by (n34)
Setpoint as normal procedure. (pushing the upper/lower buttons simultaneously)
Low or High side system. (n35)

FRANCAIS
Utilisation ON/OFF
Outre la régulation modulante PI, l'EKC 347 soutient également une commande ON/OFF avec hystérésis.

Pour assurer cette commande :
Bande P doit être (n04)=0%//OFF
Hystérésis définie par (n34)
Point de consigne comme pour le procédé normal. (Appuyez simultanément sur les boutons supérieur et inférieur)
Système basse ou haute pression. (n35)

Operation

Display
The values will be shown with three digits, and after an operation the controller will return to its standard mode and show the measured liquid level.



Light-emitting diodes (LED) on front panel
There are LED's on the front panel which will light up when the corresponding relay is activated.
The upper LED will indicate the valve's opening degree. A short pulse indicates a slow liquid flow and a long pulse a fast liquid flow.
The three lowest LED's will flash, if 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 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 cuts out an alarm)

Gives access to changes

Saves a change

Examples of operations

Set reference
1. Push the two buttons simultaneously
2. Push one of the buttons and select the new value
3. Push both buttons again to conclude the setting

Set one of the other menus
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

Literature survey:
Manual for EKC 347.....RS8AX---
Instruction for EKC 347.....RI8BY---
Installation guide, "Data communication link for ADAP-KOOL® ".....RC8AC---

Menu survey

SW = 1.1x

Function	Parameter	Min.	Max.	Fac. setting
Normal display				
Read the measured liquid level	-		%	50.0
If you wish to see the actual opening degree, give the lower button a brief push	-		%	0
If you wish to set the required setpoint you obtain access by pushing both buttons simultaneously	-	0%	100%	100
Level control				
External contribution to the reference. Cf. also o10. Value is set in %-points.	r06	-100	100	0.0
Start / stop of level control	r12	OFF/0	ON/1	1
Alarm				
Upper level limit	A01	0 %	100%	85
Lower level limit	A02	0%	100%	15
Time delay for upper level limit	A03	0 s	999 s	50
Time delay for lower level limit	A15	0 s	999 s	10
Level alarm limit	A16	0 s	999 S	20
Delay for level alarm	A17	0 s	999 s	0
The level alarm is linked to: 0: Rising level (higher level than A16) 1: Falling level (lower level than A16) 2: Same function as if A18=0. When A2 alarm is generated and Relay for lower level limit, gives OFF signal (cut out). 3: Same function as if A18=1 When A2 alarm is generated and Relay for lower level limit, gives OFF signal (cut out).	A18	0	3	0
Function for Alarm relay when A1, A2 or A3 alarms are detected. 0: Alarm relay to be activated when A1 or A2 or A3 are detected. 1: Alarm relay only to be activated when A3 is detected.	A19	0	1	0
Regulating parameters				
P - band	n04	0%/Off	200%	30
I: Integration time Tn	n05	60	600/ Off	400
Period time (only if AKV/A valve is used)	n13	3 s	10 s	6
Max. opening degree	n32	0%	100%	100
Min. opening degree	n33	0%	100%	0
Neutral zone (only for ICM valve)	n34	2%	25%	2
Definition of regulating principle Low: On the low-pressure side (valve closes when liquid level is rising) High: On the high-pressure side (valve opens when liquid level is rising)	n35	Low/0	Hig/1	0
Miscellaneous				
Controller's address	o03*	0	60	0
ON/OFF switch (service-pin message)	o04*	OFF	ON	
Define valve and output signal: 1: ICM. AO: 4-20 mA 2: ICM. AO: 0-20 mA 3: AKV/A, AO: 4-20 mA 4: AKV/A, AO: 0-20 mA Or if a master/slave function is used: 5: AKV/A, MASTER 6: AKV/A, SLAVE 1/1. AO:4-20 mA 7: AKV/A, SLAVE 1/1. AO:0-20 mA 8: AKV/A, SLAVE 1/2. AO:4-20 mA 9: AKV/A, SLAVE 1/2. AO:0-20 mA 10: AKV/A, SLAVE 2/2. AO:4-20 mA 11: AKV/A, SLAVE 2/2. AO:0-20 mA 12: AKV/A, SLAVE 1/1. AO:4-20 mA - AO always updated 13: AKV/A, SLAVE 1/1. AO:0-20 mA- AO always updated 14: AKV/A, SLAVE 1/2. AO:4-20 mA- AO always updated 15: AKV/A, SLAVE 1/2. AO:0-20 mA- AO always updated 16: AKV/A, SLAVE 2/2. AO:4-20 mA- AO always updated 17: AKV/A, SLAVE 2/2. AO:0-20 mA- AO always updated	o09	1	17	1

Continued from previous page

Define the input signal on terminals 10, 20, 21 (external reference displacement) 0: OFF 1: 4-20 mA 2: 0-20 mA 3: 2-10 V 4: 0-10 V	o10	0	4	0
Language 0=English, 1=German, 2=Frensh, 3=Danish, 4=Spanish, 5=Italian, 6=Swedish. When you change the setting you must also activate o04.	o11*	0	6	0
Set supply voltage frequency	o12	0/50 Hz	1/60 Hz	0
Selection of parameter for display and AO (except from when o09=1,2 or 5) If o34 = 0: 0: Liquid level is show 1: Valve's opening degree OD will be shown If o34 = 1: 0: Liquid level is show 1: The ICM valve position feed back signal [%] will be shown	o17	0	1	0
Manual control of outputs: OFF: No manual control 1: Upper level relay put in pos. ON 2: Lower level relay put in pos. ON 3: AKV/A output put in pos. ON 4: Alarm relay activated (cut out)	o18	OFF	4	0
Define input signal (level signal) on terminals 14, 15, 16 0: OFF 1: 4-20 mA 2: 0-10 V (also set the voltage values in the next two menus) Read functional description if the connection used is a master/slave function.	o31	0	2	1
Define input signal's lower value for terminal 14, if required	o32	0.0 V	4.9 V	4.0
Define input signal's upper value for terminal 14, if required	o33	5.0 V	10 V	6.0
Define input signal on terminals 17-18 0: Not used 1: ICM mA feedback signal from ICAD connected 2: Not used	o34	0	2	0
Service				
Read liquid level	u01			%
Read liquid level reference	u02			%
Read external contribution to the reference	u06			mA
Read external contribution to the reference	u07			V
Read current signal on the analog output	u08			mA
Read status of input DI	u10			
Read valve's opening degree	u24			%
Read level signal	u30			mA
Read level signal	u31			V
Read signal from ICM/ICAD	u32			mA
Read signal from ICM/ICAD converted into %	u33			%

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

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

Error messages

The controller can give the following messages:		
E1	**Error message**	Errors in the controller
E12		The external reference contribution is outside the range
E21		Level signal outside the range 1)
E22		Signal from ICM/ICAD outside the range
A1	**Alarm message**	Upper level limit reached
A2		Lower level limit reached
A3		Alarm level limit reached

1)
If E21 is detected. EKC 347 will force the valve to close or open the valve depending af n35

If Low presure has been selected. (n35=0)
The valve is forced to fully closed, however if Min. Opening Degree (n33) is higher than 0 the valve will open to the value of n33

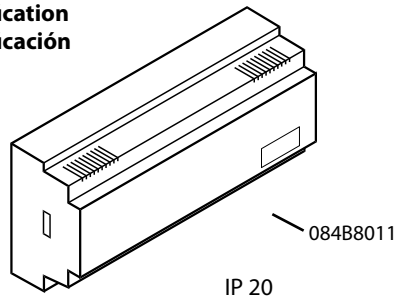
If High presure has been selected. (n35=1)
The valve is forced to fully open, however if Max. Opening Degree (n32) is lower than 100 the valve will open to the value of n32

REFRIGERATION AND
AIR CONDITIONING

INSTRUCTIONS

EKC 414A1

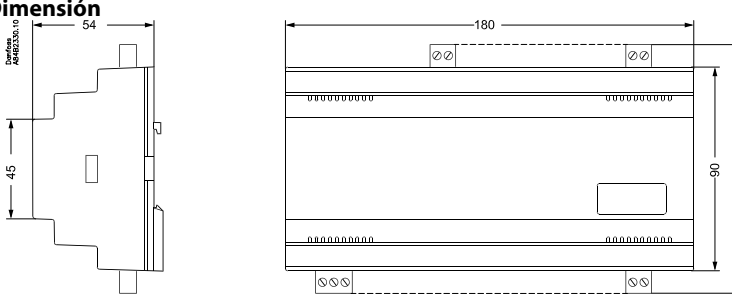
Identifikation
Identification
Identificación



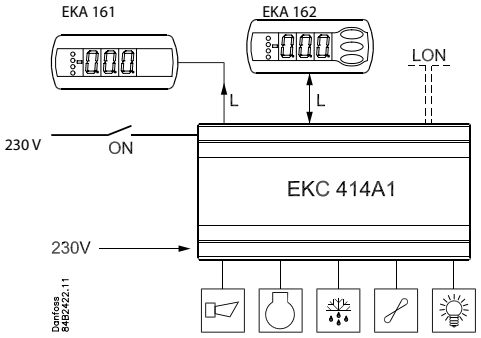
IP 20

CE

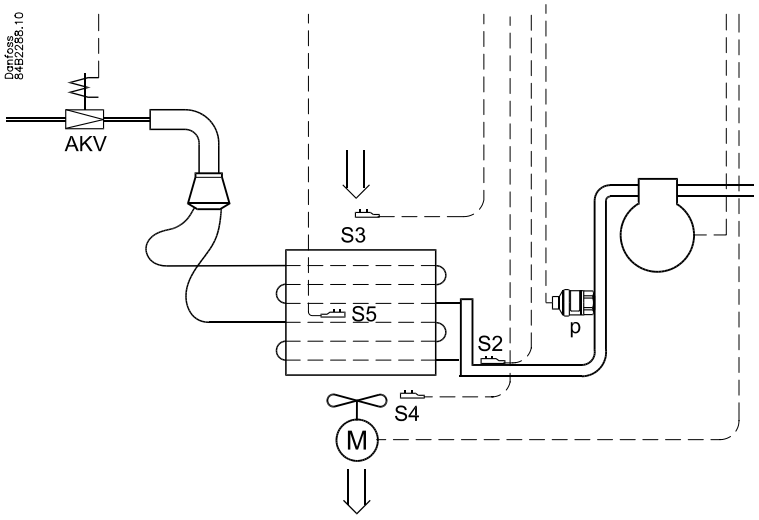
Mål
Dimensions
Maße
Dimensions
Dimensión



Princip
Principle
Prinzip
Principe
Principio



L = Max. 10 m



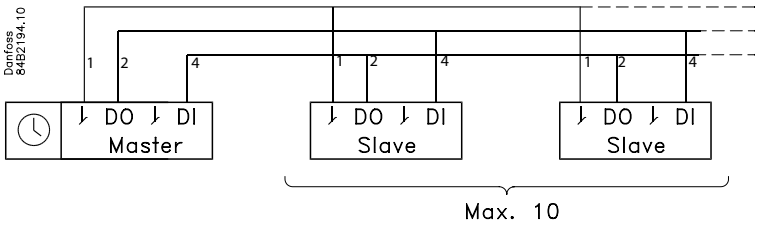
P
AKS 32R

S2:
Pt 1000 ohm /0°C
(AKS 11)

S3, S4, S5:
Pt 1000 ohm/0°C or Ptc
1000 ohm/25°C (AKS
12/EKS 111)

Application eksempel
Application example
Anwendungsbeispiel
Application exemple
Aplicación ejemplo

Fælles afrimningsstart / Fælles start efter afrimning
Common defrost start / Common start after defrost
Gemeinsamer Abtau anlauf / Gemeinsamer Anlauf nach Abtauung
Enclenchement dégivrage commun / remise en rout après dégivrage



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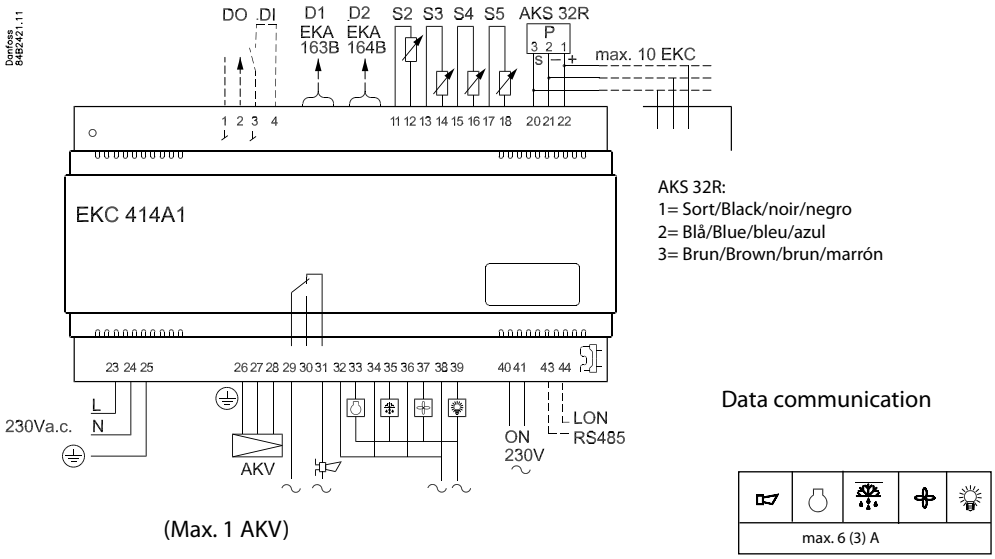


Connection

Necessary connections

11-12	Pt 1000 ohm sensor. Refrigeration outlet (S2)
13-14	Air temperature sensor before evaporator (S3)
15-16	Air temperature sensor after evaporator (S4) It is application determined whether S3 or S4 or both has to be mounted. *S3, S4 and S5 may either be Pt 1000 ohm or Ptc 1000 ohm, but they must all be of the same type.*
20 - 22	Signal from pressure transmitter type AKS 32R
23 - 24	Supply voltage 230 V 50/60 Hz
25, 26	Protective earth connection
27 - 28	Expansion valve type AKV (230 V d.c.) No switch must be mounted in the supply voltage to the AKV valve
40 - 41	230 V signal for start/stop of regulation (the connection can be left out with setting in o29).

Application dependent connections

1 - 2	Output signal on terminal 2, if there is coordinated defrost with cable connections
3 - 4	Input signal from a contact function or signal on terminal 4, if there is coordinated defrost with cable connections
D1	Possibility of connecting an external display type EKA 161
D2	Possibility of connecting an external display with operating knobs type EKA 162
17-18	Defrost sensor on the evaporator (S5). (The sensor can either be Pt 1000 ohm or Ptc 1000 ohm)
29 - 31	Alarm relay There is connection between 29 and 31 in alarm situations and when the controller is de-energised
32 - 33	Compressor relay
34 - 35	Defrost relay
36 - 37	Fan relay
38 - 39	Light relay There is connection between 38 and 39 when control performed during day operation
43 - 44	Data communication It is <u>important</u> that the installation of the data communication cable be done correctly. Cf. separate literature No. RC8AC... Gateway AKA 243B <u>must</u> be version 5.3x or newer version. The wire switch to the left of terminal 43 will terminate with 120 ohm in closed position.

Rail heat relay:
If a rail heat relay is required, either the alarm relay, compressor relay or light relay can be changed for this application. The change takes place via a setting in o68.

Operation

Operation of the controller can take place via data communication or from a separate display.

The buttons (EKA 162 only)
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.
Or briefly:


Gives access to the menu (or cutout an alarm)


Gives access to changes


Saves a change

Temperature setting
When it is the temperature setting you wish to change, do not enter the menu. Push both buttons simultaneously and you will be allowed to change the temperature reference when the display answers back by flashing.

Forced control
In addition to the normal way of operating the controller you are now able to perform a number of forced control functions which

you start, as follows:

- Cut out alarm relay / check alarm code
  • Push the upper button

- Read the defrost stop temperature
  • Push the lower button

- Manual start or stop of defrost
  • Push the lower button for four seconds

Examples put in another way:

Set the temperature
1. Push the two buttons simultaneously
2. Push one of the buttons and select the new value
3. Push both buttons again to conclude the setting

Set 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

Menu survey

SW = 1.0x

Function	Para meter	Min.	Max.	Factory settings
Normal display				
Shows the temperature at the selected sensor Define view in O17	-		°C	
If you wish to see selected defrost stop temperature, give the lower button a brief push (1 sec.) no= stop on temperature not selected	-		°C	
Thermostat				
Differential	r01	0.1 K	10.0 K	2.0
Max. limitation of thermostat's setting temperature	r02	-49°C	50°C	50.0
Min. limitation of thermostat's setting temperature	r03	-50°C	49°C	-50.0
Temperature unit (°C/°F)	r05	°C	°F	0/°C
Correction of signal from S4 (S_{out})	r09	-10.0 K	10.0 K	0.0
Correction of signal from S3 (S_{in})	r10	-10.0 K	10.0 K	0.0
Start/Stop of refrigeration	r12	OFF	ON	OFF
Reference displacement during night operation	r13	-20.0 K	20.0 K	0.0
Define thermostat function 1=ON/OFF, 2=Modulating	r14	1	2	1
Definition and weighting, if applicable, of thermostat sensors 100%=S4 (S_{out}), 0%=S3 (S_{in}). The thermostat temperature can be seen in U17	r15	0%	100%	100
Time between melt periods	r16	0 h	10 h	1
Duration of melt periods	r17	0 min	10 min.	5
Alarm				
Alarm time delay	A03	0 min.	120 min	30
Door alarm time delay	A04	0 min.	90 min.	60
Time delay during cooling	A12	0 min.	240 min	120
High alarm limit	A13	-50°C	50°C	5.0
Low alarm limit	A14	-50°C	50°C	-30.0
Setting of the weighting between S3/S4 to be used by the alarm function. The alarm temperature can be seen in u57	A36	0%	100%	100
Compressor				
Min. ON-time	c01	0 min	50 min	0
Min. OFF-time	c02	0 min	50 min	0
Defrost				
Defrost stop temperature	d02	0	25°C	6.0
Interval between defrost starts	d03	OFF	48 h	8
Max. defrost duration	d04	0	180 min	45
Time displacement of defrost cut-ins during start-up	d05	0	240 min	0
Drip-off time	d06	0	60 min	0
Fan start delay after defrost	d07	0	60 min	0
Fan start temperature	d08	-15	0°C	-5.0
Fan cut-in during defrost (yes/no)	d09	no	yes	no
Defrost sensor 0=S4 (S_{out}) , 1=S5 (S_{def}), 2=non. Stop on time	d10	0	2	2
Defrost at power up	d13	no	yes	no
RTC module (if installed) see RTC instructions	t01 to t16			
Injection control function				
Max. value of superheat reference	n09	3.0 K	15.0 K	12.0
Min. value of superheat reference	n10	3.0 K	10.0 K	3.0
MOP temperature	n11	-50.0°C	15°C/off	15°C
AKV valve's time period Should only be changed to OFF by trained staff	n13	3 sec.	6 sec.	6
Adaptive control Should only be changed to OFF by trained staff	n14	OFF	ON	on

Average opening degree. Should only be changed by trained staff	n16	10%	75%	30.0
Start-up time for signal reliability Should only be changed by trained staff.	n17	5%	70%	30.0
Stability factor for superheat control. Changes should only be made by trained staff	n18	0	10	4
Forced closing. AKV valve shut in pos. ON	n36	OFF	ON	OFF
Fan				
Fan stop on compressor cut out	F01	no	yes	no
Delayed fan stop when compressor is cut out	F02	0 min	30 min	0
Safety function. The fan stops if the S5 temperature reaches this value	F04	-50.0	50.0/ off	50.0
Miscellaneous				
Delay of output signal after start-up	o01	0 sec.	600 sec	5
Define digital input signal (DI: OFF=not used, 1=Door alarm, 2=defrost start, 3=Night operation, 4=External start/stop, 5 = Coordinated defrost with cable connections, 6 = door function	o02	OFF	6	0
Network address (range = 0-60)	o03	0	990	0
ON/OFF switch (service-pin message)	o04	OFF	ON	OFF
Access code	o05	OFF	100	OFF
Used sensor type for S3, S4 and S5 (Pt / PTC)	o06	Pt	Ptc	0/Pt
Set supply voltage frequency	o12	50 Hz	60 Hz	50
Define digitalt output signal (DO: 0=not used Coordinated defrost with cable connections: 1=Master, 2= Slave	o13	0	2	0
Max. standby time after coordinated defrost	o16	1 min	30 min	20
Display S4 % (S_{out}) 0%=S3 (S_{in}) 100%=S4 (S_{out}) The display temperature can be seen in u56	o17	0%	100%	100
Manual control of outputs: OFF=No override 1: Compressor reay is ON (railheat relay = ON) 2: Defrost relay is ON 3: Fan relay is ON 4: Alarm relay is OFF (Railheat relay = on) 5: DO output is ON 6: AKV output is ON 7: Light relay is ON (Railheat relay = on) When manual control is terminated, the setting must be changed to OFF	o18	OFF	7	OFF
Pressure transmitter working range – min. value	020	-1 bar	5 bar	-1
Pressure transmitter working range – max. value	021	6 bar	36 bar	12
Inject-ON definition When the ON input is cut out refrigeration is stopped. Here you define how the fan relay and the alarm function are to act: 1 = Fan relay = ON, alarm monitoring active 2 = Fan relay = OFF, alarm monitoring active 3 = Fan relay = OFF, no alarm monitoring 4 = Fan relay = ON, no alarm monitoring 5 to 8= as 1 to 4, but without connection to terminal 40-41.	o29	1	8	5
Refrigerant setting 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
Rail heat during day operation. Setting of ON period in percentage of the time in "o43"	o41	0%	100%	100
Rail heat during night operation. Setting of ON period in percentage of the time in "o43"	o42	0%	100%	100
Rail heat Time period for the aggregate ON/OFF time	o43	6 min	60 min	10
Rail heat definition 0 = no rail heat relay 1 = alarm relay changed into rail heat relay 2 = compressor relay changed into rail heat relay 3 = no function 4 = no function 5 = light relay changed into rail heat relay	o68	0	5	0

Service			
The following readouts can be performed via the belonging parameter			
Defrost sensor S5 S_{def}	u09	°C	
Status on DI-input	u10		
Defrost time	u11	min.	
Air temperature S3 (S_{in})	u12	°C	
Status on night operation (on or off)	u13		
Status on ON-input	u14		
Status on DO-output	u15		
Air temperature S4 (S_{out})	u16	°C	
Thermostat temperature	u17	°C	
Thermostat cut-in time	u18	min.	
Temperature at S2	u20	°C	
Superheat	u21	K	
Superheat reference	u22	K	
AKV valve's actual opening degree	u23	%	
Evaporating pressure	u25	bar	
Evaporating temperature	u26	°C	
Weighted S3/S4 temperature shown in the display	u56	°C	
Weighted S3/S4 temperature used by the alarm function	u57	°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

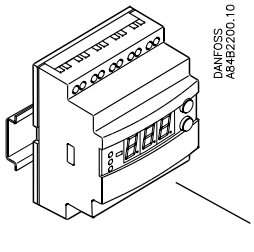
Error messages

The controller can give the following messages:		
E1	**Error message**	Fault in controller
E4		Defrost sensor disconnected
E5		Shortcircuited defrost sensor
E6		Change battery and check clock
E7		S4 (S_{out}) sensor disconnected
E8		Shortcircuited S4 (S_{out})
E9		S3 (S_{in}) sensor disconnected
E10		Shortcircuited S3 (S_{in}) sensor
E15		S2 sensor disconnected
E16		Shortcircuited S2 sensor
E20		AKS 32R fault
A1	**Alarm message**	High temperature alarm
A2		Low temperature alarm
A4		Door alarm
A5		Function "O16" activated during a coordinated defrost
A10		Control problem
A11		No refrigerant selected
A45		Cooling stopped (Main Switch)
S1	**Status message**	Waiting for end of the coordinated defrost
S2		Waiting for end of compressor ON time
S3		Waiting for end of compressor OFF time
S4		Defrost sequence. Evaporator drips off and waits for the time to expire
S10		Refrigeration stopped by the internal or external start/stop function
S11		Thermostat cut out
S14		Defrost sequence. Defrost in progress
S15		Defrost sequence. Fan waiting for time to elapse
S16		Refrigeration stopped due to open ON input
S17		Door is open. Input DI is open
S18		Melt function in progress (refrigeration interrupted)
S19		Modulating thermostat control
S20		Emergency refrigeration due to sensor error
S22		Start-up phase 2. Evaporator is charged
S23		Adaptive control
S24		Start-up phase 1. Signal reliability from the sensors is checked
S25		Manual control of outputs
S26		No refrigerant selected
S31		Door open and cooling stopped
non		Time delay on outputs during start-up
PS		Password required. Set password

REFRIGERATION AND
AIR CONDITIONING

Instructions
EKC 319A

Identification
Identification



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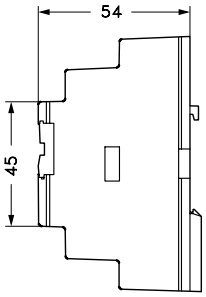
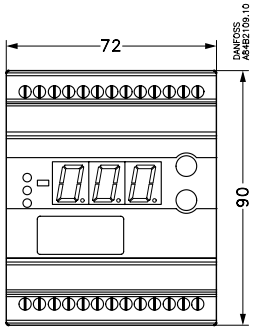
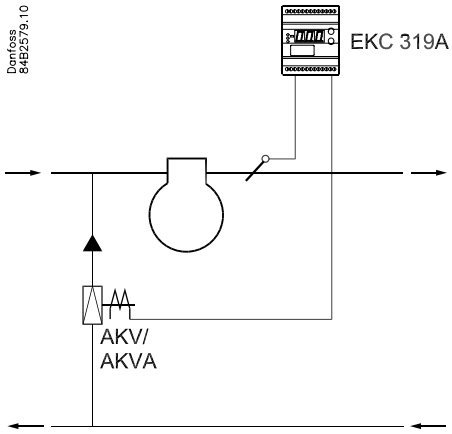
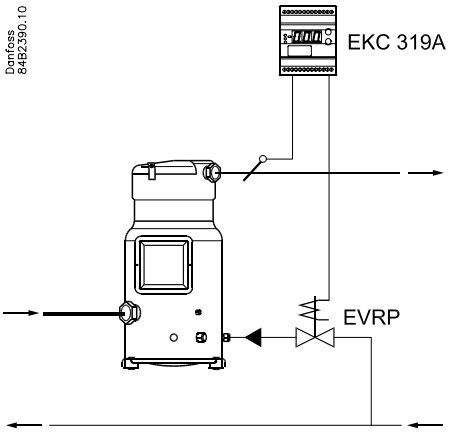




Princip
Principle
Montageprinzip
Principe





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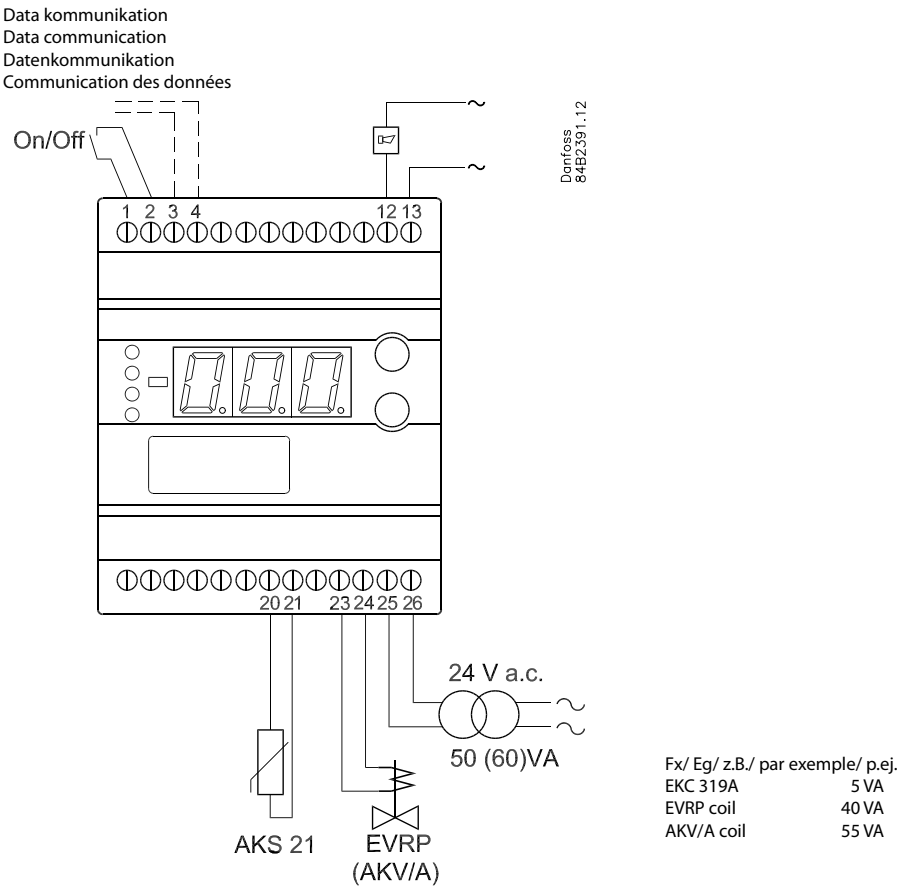
Tilslutning
Connection
Anschluß
Raccordement



Fx/ Eg/ z.B./ par exemple/ p.ej.

EKC 319A	5 VA
EVRP coil	40 VA
AKV/A coil	55 VA

ENGLISH

Necessary connections

Terminals:

25-26 Supply voltage 24 V a.c.

20-21 Signal from temperature sensor

23-24 Solenoid valve type EVRP / expansion valve type AKV or AKVA

1-2 Switch function for start/stop of regulation. If a switch is not connected, terminals 1 and 2 must be shortcircuited.

Application dependent connections

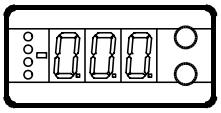
Terminal:

12-13 Alarm relay
There is connection between 12 and 13 in alarm situations and when the supply voltage to the controller is interrupted

3-4 Data communication
Mount only, if a data communication module has been mounted.
It is <u>important</u> that the installation of the data communication cable be done correctly.
Cf. separate literature No. RC.8A.C...

Operation

Display
The values will be shown with three digits, and after an operation the controller will return to its standard mode and show the measured discharge temperature.



Light-emitting diodes (LED) on front panel
There are LED's on the front panel which will light up when the belonging function is activated.
The upper LED will indicate the valve's opening degree. A short pulse indicates a slow liquid flow and a long pulse a fast liquid flow.
The three lowermost LED's will flash, if 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 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 cuts out an alarm)

 Gives access to changes

 Saves a change

Examples of operations

Set reference
1. Push the two buttons simultaneously
2. Push one of the buttons and select the new value
3. Push both buttons again to conclude the setting

Set one of the other menus
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

Menu survey

SW = 1.1x

Function	Parameter	Min.	Max.	Fac. setting
Normal display				
Read the measured discharge gas temperature	-		°C	
If you wish to see the actual opening degree, give the lower button a brief push	-		%	
If you wish to set the temperature reference you obtain access by pushing both buttons simultaneously	-	-70°C	160°C	125
Display / Control				
Select unit (0=°C, 1=°F)	r05	0	1	0
Start / stop of regulation	r12	OFF	ON/on	on
Alarm				
Alarm limit	A16	-50°C	150°C	135
Time delay for alarm	A17	0 s	999 s	0
Function of the alarm relay when the temperature exceed the alarm limit 0: Alarm relay active 1: Alarm relay not active	A19	0	1	1
Regulating parameters				
Proportionale factor Kp	n04	0,5	30	15
I: Integration time Tn	n05	60 s	600 s / Off	120
Periode time	n13	3 s	10 s	3
Miscellaneous				
Controller's address	o03*	0	119	-
ON/OFF switch (service-pin message)	o04*	OFF	ON	-
Set supply voltage frequency	o12	0/50 Hz	1/60 Hz	50
Select the showing of the "normal display": 0: Discharge gas temperature is shown 1: Valve's opening degree is shown	o17	0	1	0
Manual control of outputs: OFF: No manual control 1: Valve output put in pos. ON 2: Alarm relay activated (cut out)	o18	OFF	2	off
Service				
Read discharge gas temperature	u01		°C	
Read temperature reference	u02		°C	
Read status of input DI	u10			
Read valve's opening degree	u24		%	

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

Error messages

The controller can give the following messages:		
E1	**Error message**	Errors in the controller
E17		The temperature sensor is disconnected
E18		The temperature sensor is shortcircuited
A3	**Alarm message**	Alarm temperature limit is reached

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

Literature survey:
Manual for EKC 319A.....RS8EB---
Instructions for EKC 319A.....RI8HY---
Installation guide, "Data communication link for ADAP-KOOL® " RC8AC---

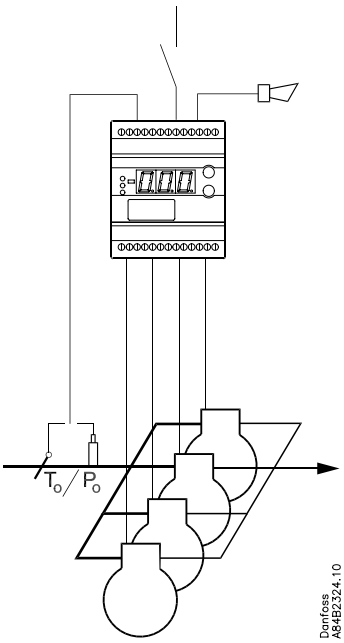
REFRIGERATION AND
AIR CONDITIONING

Instructions

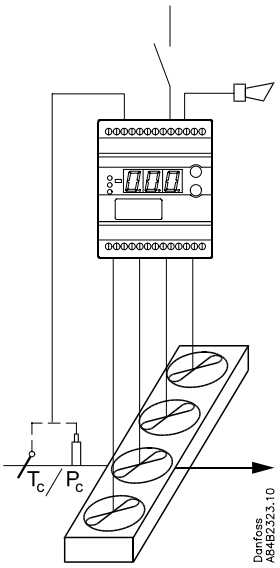
EKC 331T

Princip/Principle/Montageprinzip/Principe/Principio

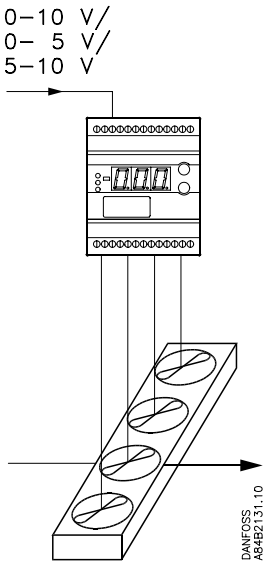
Kompressorregulering
Compressor control
Verdichterregelung
Régulation de compresseur
Regulación de compresor

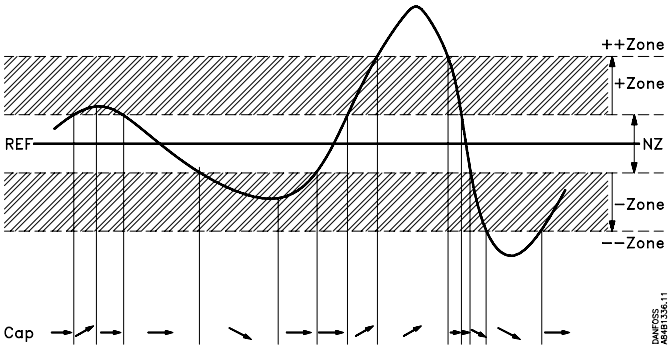


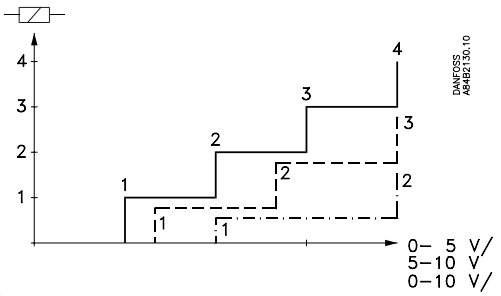
Kondensatoregulering
Condenser control
Verflüssiger regelung
Régulation de condensation
Regulación de condensador



Relæmodul
Relay module
Relaismodul
Module de relais
Módulo de réles







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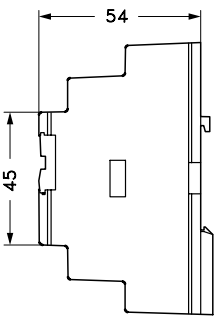

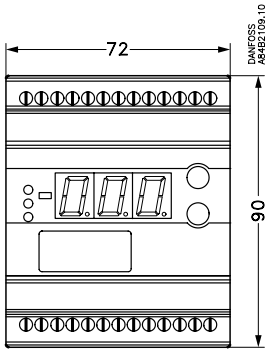

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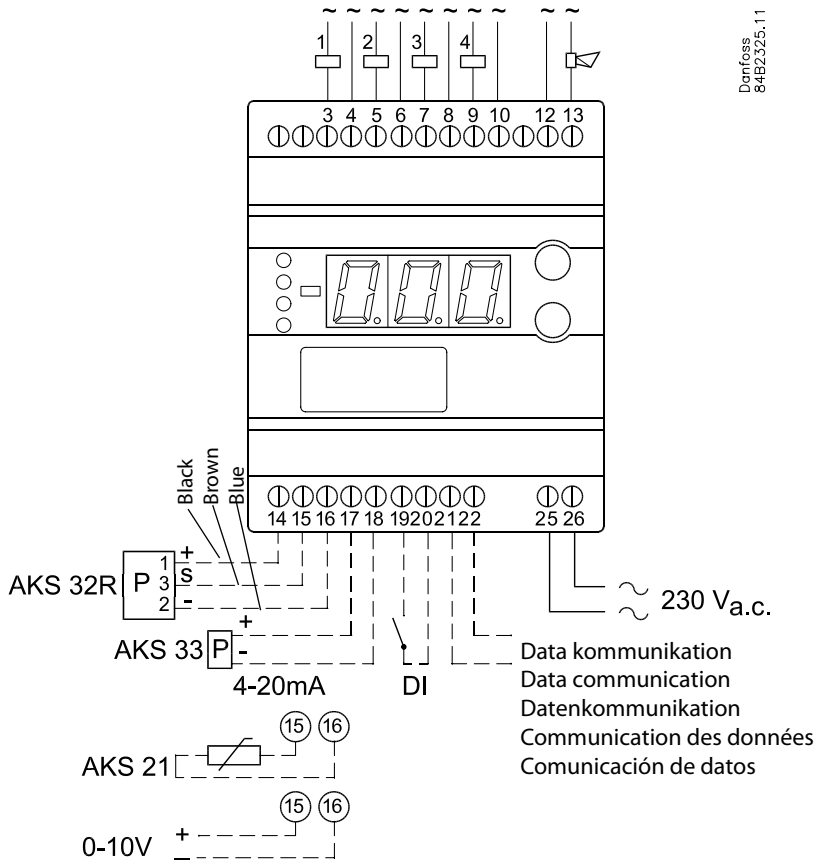
Tilslutning
Connection
Anschluß
Raccordement
Conexión



ENGLISH

Connections

Necessary connections
Terminals:
25-26 Supply voltage 230 V a.c.
3- 10 Relay connections no. 1, 2, 3 and 4
12-13 Alarm relay
There is connection between 12 and 13 in alarm situations and when the controller is dead
Control signal (see also o10)
Either terminals:
14-16 Voltage signal from AKS 32R
or
17-18 Current signal from AKS 3000 or AKS 33
or
15-16 Sensor signal from AKS 21, AKS 12 or EKS 111
or
15-16 Voltage signal from an other regulation.

External contact function, if applicable
19-20 Contact function for displacement of reference or start/ stop of the regulation or for monitoring of safety circuit.

Data communication, if applicable
21-22 Mount only, if a data communication module has been mounted.
It is <u>important</u> that the installation of the data communication cable be done correctly. Cf. separate literature No. RC8AC..

ENGLISH

Connections

Literature survey:

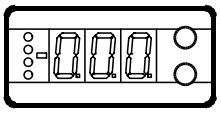
Manual EKC 331T	RS8CU--
Installation guide, Data communication link	RC8AC--

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

Operation

Display

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



Light-emitting diodes (LED) on front panel

There are four LED's on the front panel which will light up when the relays are operated.
All LED's will flash if there is an error in the regulation. In this situation you can upload the error code on the display and cancel the alarm by pushing the top button briefly.

The controller can give the following messages:		
E1	**Error message**	Errors in the controller
E2		Regulation out of range or control signal is defect.
A1	**Alarm message**	High pressure alarm
A2		Low pressure alarm
A11		No refrigerant selected
A12		Regulation stopped due to interrupted signal on the DI input

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 the regulation's set point

1. Push the two buttons simultaneously
2. Push one of the buttons and select the new value
3. Push both buttons again to conclude the setting

Set one of the other menus

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

Menu survey

SW: 1.1x

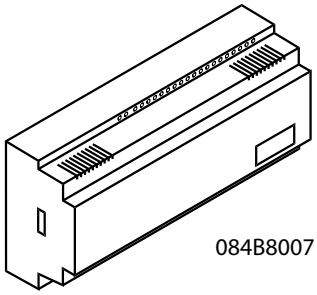
Function	**Para-meter**	**Min.**	**Max.**	**Factory setting**
Normal display				
Shows the signal from the temperature sensor / pressure transmitter	-		°C	
Reference				
Set the regulation's set point	-	-60 °C	170 °C	3
Neutral zone	r01	0.1 K	20 K	4.0
Max. limitation of set point setting	r02	-60 °C	170 °C	50
Min. limitation of set point setting	r03	-60 °C	50 °C	-60
Correction of signat from the sensor	r04	-20 K	20 K	0.0
Select unit (C-b=°C and F-P= °F)	r05	C-b	F-P	C-b
Reference displacement by signal at DI input	r13	-50 K	50 K	0
Capacity				
Min. ON time for relays	c01	0 min.	30 min	2
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: Compressor with unloader	c08	1	3	1
If the regulation mode 3 has been selected, the relays for the unloaders can be defined to: no: Cut in when more capacity is required nc: Cut out when more capacity is required	c09	no	nc	no
Regulation parameter for + Zone	c10	0.1 K	20 K	3
Regulation parameter for + Zone min.	c11	0.1 min.	60 min.	2
Regulation parameter for ++ Zone seconds	c12	1 s	180 s	30
Regulation parameter for - Zone	c13	0 K	20 K	3
Regulation parameter for - Zone min.	c14	0.1 min.	60 min.	1
Regulation parameter for - - Zone seconds	c15	1 s	180 s	30
Alarm				
Alarm time delay	A03	1 min.	90 min.	30
Upper alarm limit (absolute value)	A10	-60 °C	170 °C	50
Lower alarm limit (absolute value)	A11	-60 °C	50 °C	-60
Miscellaneous				
Controllers address	o03*	1	60	0
On/off switch (service-pin message)	o04*	-	-	-
Access code	o05	off(-1)	100	-
Define input signal and application: 0: no signal / regulation stopped 1: 4-20 mA pressure transmitter - compressor reg. 2: 4-20 mA pressure transmitter - condenser reg. 3: AKS 32R pressure transmitter - compressor reg. 4: AKS 32R pressure transmitter - condenser reg. 5: 0 - 10 V relay module 6: 0 - 5 V relay module 7: 5 - 10 V relay module 8: Pt 1000 ohm sensor - compressor reg. 9: Pt 1000 ohm sensor - condenser reg. 10: PTC 1000 ohm sensor - compressor reg. 11: PTC 1000 ohm sensor - condenser reg.	o10	0	11	0
Set supply voltage frequency	o12	50 Hz	60 Hz	50
Manual operation with "x" relays	o18	0	4	0
Define number of relay outputs	o19	1	4	4
Pressure transmitter's working range - min. value	o20	-1 bar	0 bar	-1
Pressure transmitter's working range - max. value	o21	1 bar	40 bar	12
Define DI input: 0: not used 1: Contact displaces reference 2: Contact starts and stops regulation 3: Interrupted contact will cut out the capacity, and alarm will be given.	o22	0	3	0
Operating hours of relay 1 (value times 10)	o23	0 h	999 h	0
Operating hours of relay 2 (value times 10)	o24	0 h	999 h	0
Operating hours of relay 3 (value times 10)	o25	0 h	999 h	0
Operating hours of relay 4 (value times 10)	o26	0 h	999 h	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

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

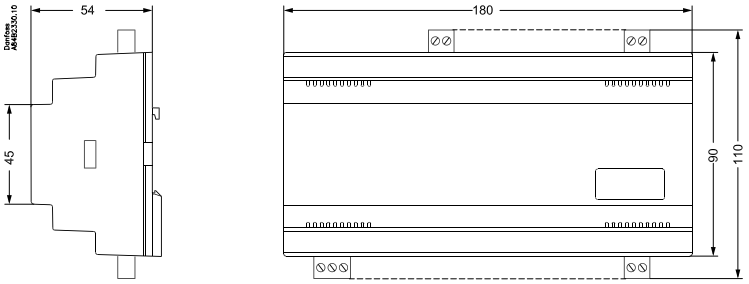
REFRIGERATION AND
AIR CONDITIONING

Instructions
EKC 531D1

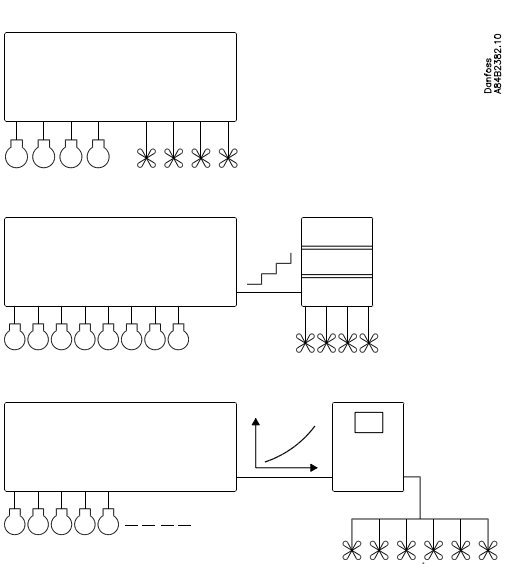
Identification

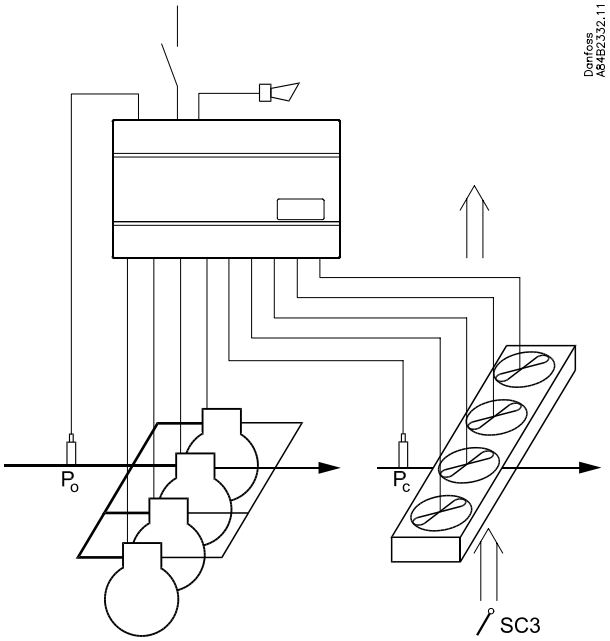


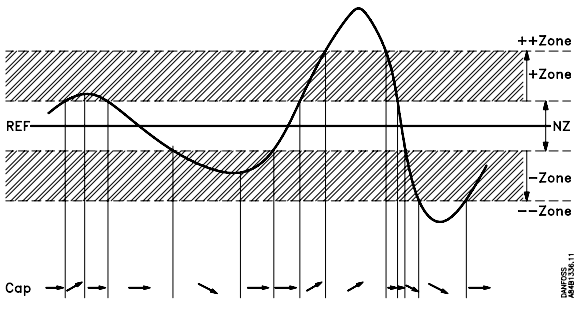
Dimensions



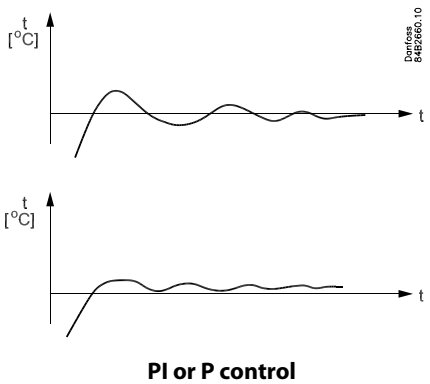
Principle







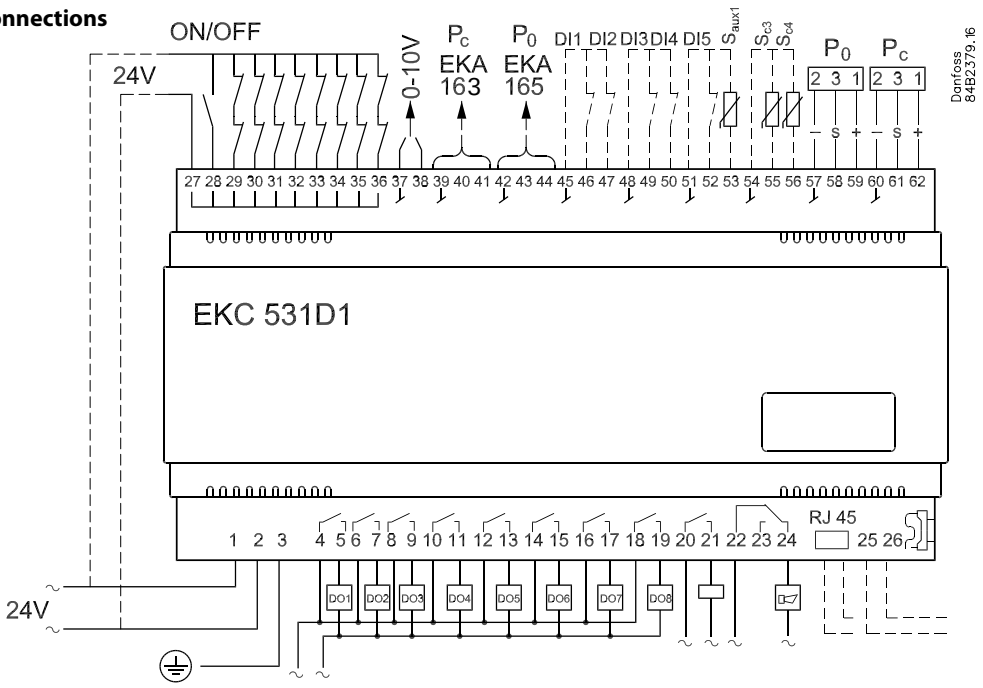
NZ control



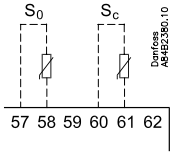
PI or P control

RI8HU452 10-2006

Connections



P0/Pc: AKS 32R:
1 = Black = +
2 = Blue = -
3 = Brown = s



Brine cooling

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

Data communication

Necessary connections

Terminals:

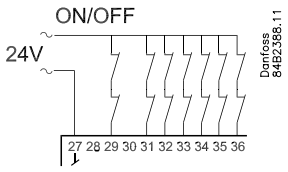
1-2 Supply voltage 24 V a.c.

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 DO 1
27-30 24 V signal from the safety circuit DO 2
27-31 24 V signal from the safety circuit DO 3
27-32 24 V signal from the safety circuit DO 4
27-33 24 V signal from the safety circuit DO 5
27-34 24 V signal from the safety circuit DO 6
27-35 24 V signal from the safety circuit DO 7
27-36 24 V signal from the safety circuit DO 8
57-59 Suction pressure. Voltage signal from AKS 32R **
60-62 Condenser pressure. Voltage signal from AKS 32R **

Unloader



If an output is used for an unloader it is not neccessary to wire the belonging safety circuit.

Application dependent connections

20-21 AKD start/stop *
The relay cutin when the frequency converter have to start.

37-38 Voltage signal to external condenser control

39-41 Possibility of connecting an external display type EKA 163 for display of Pc

42-44 Possibility of connecting an external display type EKA 163 for display of P0, or EKA 165 for operation and display of P0

45-46 DI1 - Contact function for alarm signal

45-47 DI2 - Contact function for alarm signal

48-49 DI3 - Contact function for alarm signal

48-50 DI4 - Contact function for displacement of the suction pressure reference or for alarm signal.

51-52 DI5 - 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

54-55 Out temperature (Sc3). Sensor signal from AKS 11, AKS 12 or EKS 111 (mounted if r33 =2 or 4)

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 <u>important</u> that the installation of the data communication cable be done correctly. Cf. separate literature No. RC8AC.
The termination bracket is placed to the right of terminal 26.

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

**)
- If the controller has to control only the comrpessor or the fans, respectively Pc and P0 sensor can be dispensed
- 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.

Compressor configuration when o61 =1 or 2 (This is where you can choose between the options shown.)
Setting "c16" will define the configuration.
Setting "c08" will define coupling mode.

Compressor connections										Coupling mode
Relay no.										Set "C16" to	Set "C08" to
1	2	3	4	5	6	7	8	9	10		
1										1	1
1	2									2	1 / 2
1	2	3								3	1 / 2
1	2	3	4				Binary			4	1 / 2 / 3
1	1a									5	1
1	1a	1b								6	1
1	1a	1b	1c							7	1
1	1a	2	2a							8	1 / 2
1	2	3	4	5						9	1 / 2
1	2	3	4	5	6					10	1 / 2
1	2	3	4	5	6	7				11	1 / 2
1	2	3	4	5	6	7	8			12	1 / 2
1	1a	1b	2	2a	2b					15	1 / 2
1	1a	1b	1c	2	2a	2b	2c			16	1 / 2
1	1a	2	2a	3	3a					17	1 / 2
1	1a	1b	2	2a	2b	3	3a	3b		18	1 / 2
1	1a	2	2a	3	3a	4	4a			19	1 / 2
1	1a	2					4 x 25 %			21	1
1	1a	2	3				6 x 16,6%			22	1 / 2
1	1a	2	3	4			8 x 12,5 %			23	1 / 2
1	1a	1b	2				6 x 16,6 %			24	1
1	1a	1b	2	3			9 x 11 %			25	1 / 2
1	1a	1b	2	3	4		12 x 8,3 %			26	1 / 2

Capacity step
All capacity steps are presumed to be identical. The only exception is the settings c16 = 4 and 21 to 26.

Coupling mode
Coupling mode 1 = *sequential* operation.
Coupling mode 2 = *cyclic* operation.
Coupling mode 3 = *cyclic* and binary operation where the compressor capacities are, as follows:
1: 9%
2: 18%
3: 36%
4: 36%
There is cyclic coupling at 3 and 4, and binary on 1, 2 and 3/4.
(for c16=4 only)

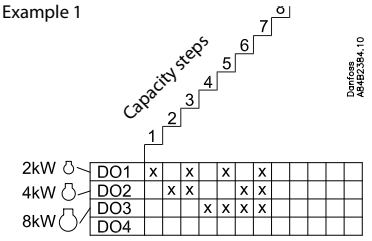
Couplings
When there is cyclic operation and connections with unloaders there will in some capacity cutins and cutouts be overlappings where the unloaders from either one compressor or another may be active.
In such cases the unloaders on the compressor with the lowest number of hours will be cut in, and the others cut out.
The changeover will take place at 6-second intervals.

Equalised operation
When c16 = 21 to 26, compressor 1 + belonging unloader must have the same capacity as each of the subsequent compressors. The unloading function will equalise the cut-in capacity when the subsequent compressors are cut in and out.
Compressor 1 will always be operating.

Compressor configuration when o61 = 3 or 4 (This is where you must define yourself how the relays are to be activated.)

Survey of relays in Mix and Match operation																	
Relay no.	Calculation value	Combination of relays that must be cut in															
1	1	1		1		1		1		1		1		1		1	
2	2		2	2			2	2			2	2			2	2	
3	4				4	4	4	4					4	4	4	4	
4	8								8	8	8	8	8	8	8	8	
The sum of 1-8 is the setting value for each step		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

Example 1

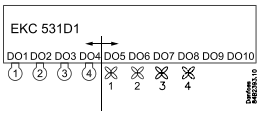


Settings:
c17 to 1
c18 to 2
c19 to 3
c20 to 4
c21 to 5
c22 to 6
c23 to 7

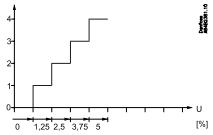
Example 2
If capacity step 1 has to cut in relay number 3 only, you must set c17 to 4.
If capacity step 2 has to cut in relay number 4 only, you must set c18 to 8.
If capacity step 3 has to cut in relay numbers 3 and 4, you must set c19 to 12.
Continue with a setting for c20 etc. until all capacity steps have been defined.

Condenser couplings

When the compressor relays have been established the turn comes to the fan relays.
The first vacant relay (DO1-DO8) will become the first fan relay. It will be followed by the subsequent relays. If more relays are required than the vacant DO relays, a relay module can be connected to the analog output.
The function is, as follows:

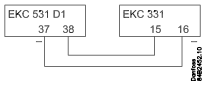


If there are up to four external fans on an EKC 331:

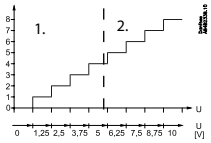


Output signal from EKC 531D1
In EKC 331 the voltage range must be set to 0-5 V ("o10" = 6).
In EKC 331 the number of steps must be set to 4 ("o19" = 4) (also when fewer fans are connected).

Connection

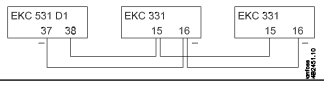


If there are more than four external fans on two EKC 331 units:

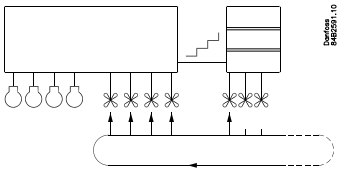


Output signal from EKC 531D1
In the first EKC 331, set 0-5 V ("o10" = 6).
In the second EKC 331, set 5-10 V ("o10" = 7).
In both EKC's the number of steps must be set to 4 ("o19" = 4) (also when fewer fans are connected to the second EKC).

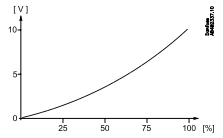
Connection



Alternating start-up of fans (only if c29 is 11 to 18)
The fans can be defined to start alternately when they have all been stopped.
The first time regulation is started, fan 1 will be started first – the regulation determines whether additional fans will be started.
After the next time all fans are stopped, fan 2 will be the first to be started, and so on.
Fan 1 will again be the first fan to be started when the rotation has been through the total number of fans.
If there is more than one fan on an EKC 331, it will not be possible to start the other fans first. Here, the fan with the lowest voltage step will always be the one which is started first.



If the entire condenser capacity is to be controlled by a frequency converter, EKC 531D1 must send an analog signal about the required capacity ("c29" = 9).
The signal varies from 0 to 10 V. Signal and capacity have the following context.

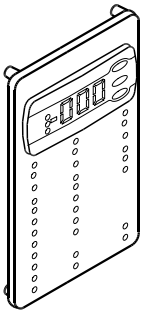


Operation

Data communication
If the controller is extended with data communication, the operation can be performed from a system unit.

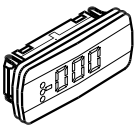
The importance of the alarms that are sent can be defined with the setting: 1 (High), 2 (Medium), 3 (Low) or 0 (No alarm).

Operation via external 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 in bar. Or whether the temperature is to be shown in °F or in psig. There are three options for the display.

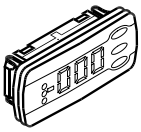


You can connect this display to the EKC 531D1 with software version 1.3 or later.

EKA 165



EKA 163



EKA 164

EKA 165
To operate the controller and view the evaporation pressure.
If the lowermost key is pressed, the condensation pressure will be shown briefly in the display. (If regulation is based only on the condensation pressure, the display will always show Pc).

During normal operation the light-emitting diodes in the display will indicate where regulation is taking place.

Highest + second highest	:	++Zone
Second highest	:	+Zone
"None"	:	Neutral zone
Second lowest	:	-Zone
Lowest+ second lowest	:	- - Zone

The other LEDs on the display will show the functions that are active:
- Relays for compressors
- Relays for fans
- Input signals for the digital inputs
- The optimisation LED will light up when the reference is 2 K or more over the set point.

EKA 163
If the condensation pressure is to be shown constantly, a display without operating keys can be connected.

EKA 164
To operate the controller and view the evaporation pressure.
If the lowermost key is pressed, the condensation pressure will be shown briefly in the display.
Like the EKA 165, the LEDs in the display will show where the regulation is located.

The buttons on the display
When you want to change a setting, the upper and the lower 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 mittle button. When you have changed the value, save the new value by once more pushing the mittle button.

Or short:
1. Push the upper button (long push) until a parameter is shown
2. Push one of the buttons and find the parameter you want to change
3. Push the mittle button until the setting value is shown
4. Push one of the buttons and select the new value
5. Push the mittle button again to conclude the setting

(A brief pushing wil show the active alarm codes.)

Menu survey

Sequence

1. o61 must be set as the first parameter. This parameter determines which of the four operating interfaces are activated. This must be set via the display keys. It cannot be set via data communication. (Active functions are shown below in shaded fields.)

2. Quick- start
To get the system up and running quickly so that cooling can be commenced, start it by setting the following parameters (these parameters can only be set when the regulation is stopped r12=0):
r23, r28 and then either (c08, c09 and c16) or (c17 to 28) – continue with c29, o06, o30, o75, o76, o81 and finally r12=1.

3. Once the regulation is under way, you can go through the other parameters and adjust them in situ.

SW: 1.3x

Function	Parameter	o61 =				Min.	Max.	Factory setting
		1	2	3	4			
Normal display								
Shows P0 in EKA 165 (display with buttons)	-	°C	P	°C	P	°C / bar		
Shows Pc in EKA 163	-	°C	P	°C	P	°C / bar		
P0 reference								
Neutral zone	r01					0.1°C / 0.1 bar	20°C /5.0 bar	4.0°C / 0.4 bar
Correction of signal from P0 sensor	r04					-50°C /-5.0 bar	50°C / 5.0 bar	0.0
Select unit (0=bar and °C, 1=Psig and °F)	r05					0	1	0
Start/Stop of regulation	r12					OFF	ON	OFF
Reference offset for P0 (see also r27)	r13					-50°C / -5.0 bar	50°C / 5.0 bar	0.0
Set regulation setpoint for P0	r23					-99°C / -1 bar	30°C / 60.0 bar	0.0°C / 3.5 bar
Shows total P0 reference (r23 + various displacements)	r24						°C / bar	
Limitation: P0 reference max. value (also applies to regulation with reference displacement)	r25					-99°C / -1.0 bar	30°C / 60.0 bar	30.0°C / 40.0 bar
Limitation: P0 referencen min. value (also applies to regulation with reference displacement)	r26					-99°C / -1.0 bar	30°C / 40.0 bar	-99.9°C / -1.0 bar
Displacement of P0 (ON=active "r13")	r27					OFF	ON	OFF
Pc reference								
Set regulation setpoint for Pc	r28					-25°C / 0.0 bar	75°C / 60.0 bar	35°C / 15.0 bar
Shows total Pc reference	r29						°C / bar	
Limitation: Pc referencen max. value	r30					-99.9°C / -0.0 bar	99.9°C / 60.0 bar	55.0°C / 60.0 bar
Limitation: Pc referencen min. value	r31					-99.9°C / 0.0 bar	99.9°C / 60.0 bar	-99.9°C / 0.0 bar
Correction of signal from Pc sensor	r32					-50°C / -5.0 bar	50°C / 5.0 bar	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)	r33					1	4	1
Reference offset for Pc	r34					-50°C / -5.0 bar	50°C / 5.0 bar	0.0
The mean temperature difference across the condenser at maximum load (dim tm K)	r35					3.0	50.0	10.0
The mean temperature difference across the condenser at the lowest relevant compressor capacity (min tm K)	r56					3.0	50.0	8.0
This is where you can see the actual pressure (P0) that is being measured by the pressure transmitter.	r57						°C / bar	
This is where you can see the actual pressure (T0) that is part of the regulation. From the sensor which is defined in "o81"	r58						°C	
Capacity								
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

To be continued

Regulation parameter for + Zone	c10					0.1 K / 0.1 bar	20 K / 2.0 bar	4.0 / 0.4 bar
Regulation parameter for + Zone	c11					0.1 min	60 min	4.0
Regulation parameter for ++ Zone	c12					0.1 min.	20 min	2.0
Regulation parameter for - Zone	c13					0.1 K / 0.1 bar	20 K / 2.0 bar	4.0 / 0.3 bar
Regulation parameter for - Zone	c14					0.1 min.	60 min	1.0
Regulation parameter for - - Zone	c15					0.02 min.	20 min	0.5
Definition of compressor connections. See options on page 3.	c16					1	26	0
Following "c17" to "c28" is another way to define compressorw than with "c16". 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)	c17					0	15	0
Step 2 (M&M operation)	c18					0	15	0
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: **1-8:** Total number of fan relays or voltage step on the voltage output **9:** Only via analog output and start of frequency converter **10:** Not used **11- 18:** Total number of fan relays which are to be connected with alternating start-up.	c29					0/OFF	18	0
Cut in compressor capacity with manual control. See also "c32"	c31					0%	100%	0
Manual control of compressor capacity (when ON, the value in "c31" will be used)	c32					OFF	ON	OFF
Pump down limit. Limit value where the last compressor is cut out.	c33					-99.9°C / -1.0 bar	100°C / 60 bar	100°C / 60 bar
Proportinal band Xp for (P= 100/Xp) condenser regulation	n04					0.2 K / 0.2 bar	40.0 K / 10.0 bar	10.0 K / 3.0 bar
I: Integration time Tn for condenser regulation	n05					30 s	600 s	150
Cutin condenser capacity with manual control. See also "n53"	n52					0%	100%	0
Manual control of condenser capacity (when ON, the value in "n52" will be used)	n53					OFF	ON	OFF
Start speed The voltage for the speed regulation is kept at 0V until the regulation requires a higher value than the value set here.	n54					0%	75%	20%
Min. speed. The voltage for the speed regulation switches to 0V when the regulation requires a lower value than the value set here.	n55					0%	50%	10%
Alarm								
Delay time for a A32 alarm	A03					0 min.	90 min.	0 min.
Low alarm and safety limit for P0	A11					-99°C / -1.0 bar	30°C / 40 bar	-40°C / 0.5 bar
Delay time for a DI1 alarm	A27					0 min. (-1=OFF)	999 min.	OFF
Delay time for a DI2 alarm	A28					0 min. (-1=OFF)	999 min.	OFF
Delay time for a DI3 alarm	A29					0 min. (-1=OFF)	999 min.	OFF
Upper alarm and safety limit for Pc	A30					-10 °C / 0.0 bar	99 °C / 60.0 bar	60.0°C / 60.0 bar
Upper alarm limit for sensor "Saux1"	A32					1°C (0=OFF)	150°C	OFF
Delay time for a P0 alarm	A44					0 min. (-1=OFF)	999 min.	0 min.
Delay time for a Pc alarm	A45					0 min. (-1=OFF)	999 min.	0 min.
Miscellaneous								
Controllers address	o03*					1	990	
On/off switch (service-pin message)	o04*					-	-	

* this setting is only possible if data communication module is mounted in the controller

Access code	o05					1 (0=OFF)	100	OFF
Used sensor type for Sc3, Sc4 and "Saux1" **0=**PT1000, **1=**PTC1000 2-7=variations with temperature sensor on P0 and Pc. See earlier in the manual.	o06					0	7 (1)	0
Set supply voltage frequency	o12					50 Hz	60 H	0
Manual control of outputs: **0:** No override **1-10:** 1 will cut in relay 1, 2 relay 2, etc. **11-18:** 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	60 bar	12.0
Use of DI4-input **0=**not used. **1=**P0 displacement. **2=**alarm function. Alarm="A31"	o22					0	2	0
Operating hours of relay 1 (value time 1000)	o23					0.0 h	99.9 h	0.0
Operating hours of relay 2 (value time 1000)	o24					0.0 h	99.9 h	0.0
Operating hours of relay 3 (value time 1000	o25					0.0 h	99.9 h	0.0
Operating hours of relay 4 (value time 1000)	o26					0.0 h	99.9 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. 31=R422A.	o30					0	31	0
Use of DI5-input **0=**not used. **1=**Pc displacment. **2=**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
Operating hours of relay 5 (value time 1000)	o50					0.0 h	99.9 h	0.0
Operating hours of relay 6 (value time 1000)	o51					0.0 h	99.9 h	0.0
Operating hours of relay 7 (value time 1000)	o52					0.0 h	99.9 h	0.0
Operating hours of relay 8 (value time 1000)	o53					0.0 h	99.9 h	0.0
Selection of application 1. Temperature signal and "c16" mode 2: Pressure signal and "c16" mode 3. Temperature signal and M&M mode 4. Pressure signal and M&M mode	o61	1	2	3	4	1	4	1
Function for relay output DO9: 0. Start / stop of speed regulation 1. Inject on signal for evaporator control 2. Boost ready (at least one compressor is on) 3. Start /stop of condenser fan	o75					0	3	0
Function for relay output DO10: 0. Alarm relay 1. Start / stop of condenser fan	o76					0	1	0
Definition of alarm message at DI1 signal: 0. Not used 1. Fan failure (A34) 2. DI1 alarm (A28)	o78					0	2	0
Definition of the signal to the P0 regulation when temperature signal. If frost protection is required, the setting must be 1 or 2. 0. Pressure transmitter AKA32R on P0 1. Temperature input Saux 2. Temperature input S4	o81					0	2	0
Display connection Off: EKA 164 On: EKA 165 (extended display with light-emitting diodes)	o82					Off	On	Off

Service						
Status on DI1 input	u10					
Status on DI2 input	u37					
Read temperature at sensor "Sc3"	u44					°C
Read temperature at sensor "Sc4"	u45					°C
Status on DI3 input	u87					
Status on DI4 input	u88					
Status on DI5 input	u89					

The controller can give the following messages		
E1	**Error message**	Fault in controller
E2		Regulation is outside the range, or the control signal is defective
A2	**Alarm message**	Low P0
A11		Refrigerant not selected
A17		High Pc
A19		DO 1 alarm. Terminal 29 is open
A20		DO 2 alarm. Terminal 30 is open
A21		DO 3 alarm. Terminal 31 is open
A22		DO 4 alarm. Terminal 32 is open
A23		DO 5 alarm. Terminal 33 is open
A24		DO 6 alarm. Terminal 34 is open
A25		DO 7 alarm. Terminal 35 is open
A26		DO 8 alarm. Terminal 36 is open
A27		Room temperature alarm (Saux1 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
A34		Fan alarm. There is a signal on DI1 input
A45		Regulation stopped
S2	**Status message**	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
S25		Manual control of outputs
S34		Safety cutout. Setting A30 is exceeded or all safety inputs (29-36) are open
PS	**Info**	Access code is required before you have access to the settings

Messages can be brought up on the display by briefly pressing the uppermost key. If there is more than one alarm, they can be scrolled through

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 the upper and the lower button depressed at the same time as you reconnect the supply voltage

REFRIGERATION AND
AIR CONDITIONING

INSTRUCTIONS

Display
EKA 165

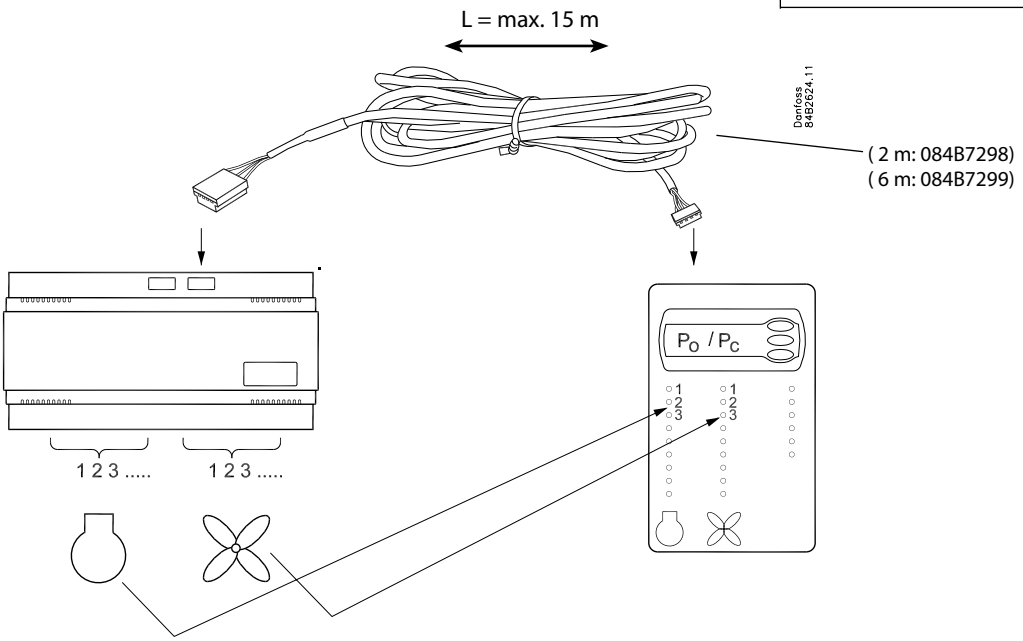
084R9983

Principle / Connection

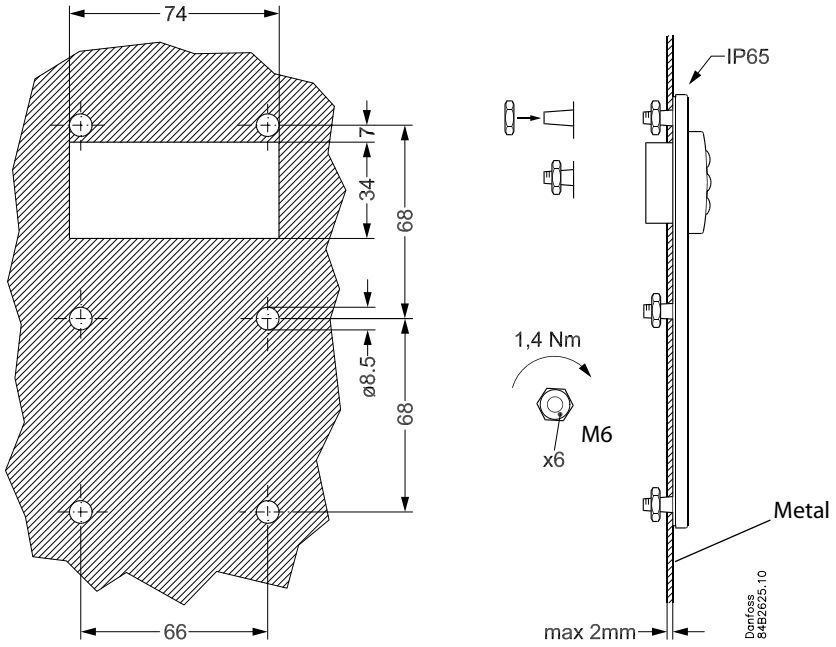
t_{amb} = 0 - +55°C
Non condensing

CE

084R9983



Mounting



Operation: See controller

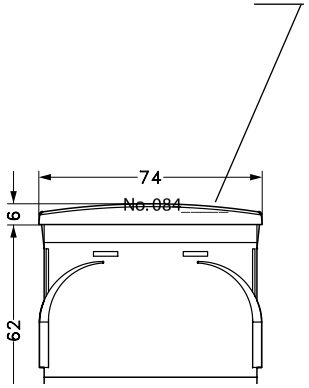
INSTRUCTIONS

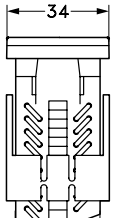
EKA 151

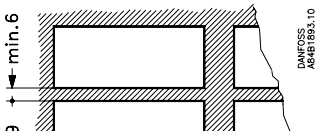
EKA 151

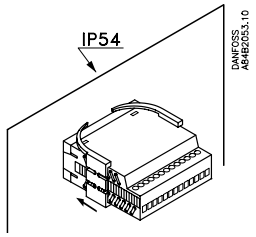
Code no. 084B7023

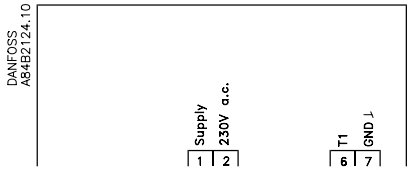
$t_{amb.}$ = -5 → +55°C
230 V a.c. 2.5 VA











EKS 111
(PTC 1000 R_{25} = 1000 ohm)
-60°C < t < +99°C

653

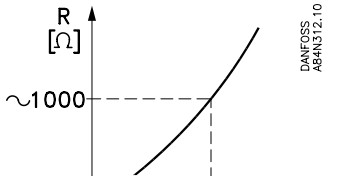
RI.8A.Z1.67 12-1999

EKS 111

PTC 1000 / 25°C

Føleren må ***ikke*** anvendes til måling af værdier, som anvendes til:
- Myndighedslog
- Regulering af overhedning

The sensor must ***not*** employed for measuring values used for:
- food safety logs
- regulation of superheat



Der Fühler darf in folgenden Fällen ***nicht*** zur Messung von Werten eingesetzt werden:
- Warensicherheitslogs
- Überhitzungsregelung

Ne jamais utiliser ce capteur pour le contrôle de valeurs utilisées pour:
- sécurité aliments enregistrement
- une régulation de surchauffe

El sensor no se debe utilizar en la medida de valores para:
- registrar datos con fines sanitarios
- regulación del recalentamiento

Il sensore ***non*** deve essere utilizzato per:
- Registrazione dati sicurezza alimentare
- Regolazione del surriscaldamento

R (Typ.) Ohm	*Temp. °C*	*Error K*	*Temp. °F*
1679	100	+/-3.5	212
1575	90		194
1475	80		176
1378	70		158
1286	60		140
1196	50		122
1111	40		104
1029	30		86
990	25	+/-1.3	77
951	20		68
877	10		50
807	0		32
740	-10		14
677	-20		-4
617	-30		-22
562	-40		-40
510	-50		-58
485	-55	+/-3.0	-67

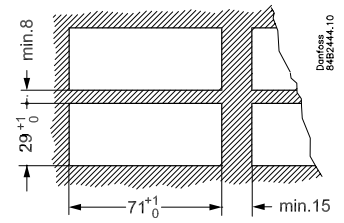
INSTRUCTIONS
EKA 163A / 164A

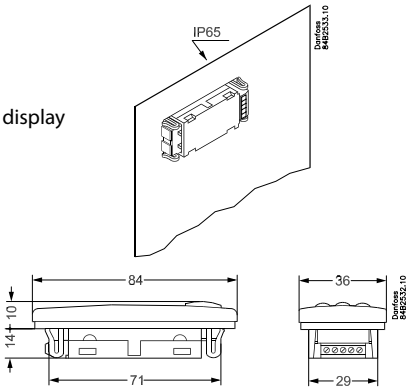
REFRIGERATION AND AIR CONDITIONING

084R9970

EKA 163A Universal display (084B8562)

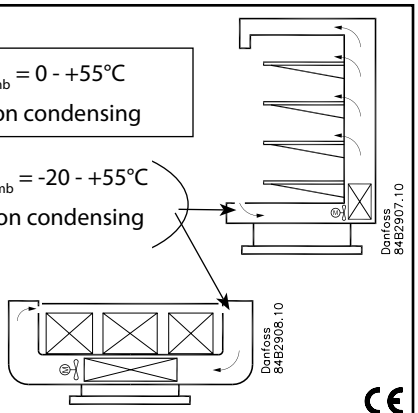
EKA 164A Universal setting display (084B8563)





t_{amb} = 0 - +55°C
Non condensing

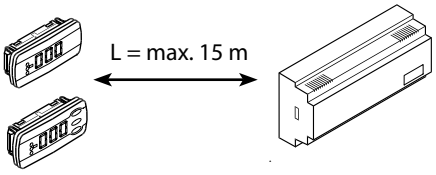
t_{amb} = -20 - +55°C
Non condensing

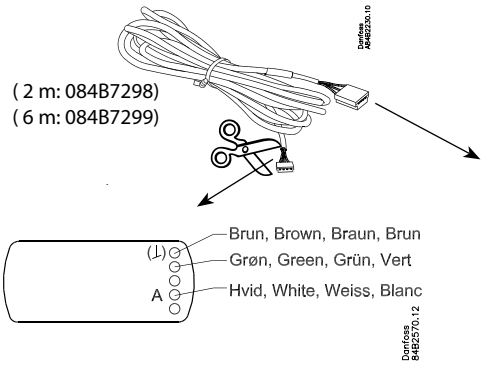


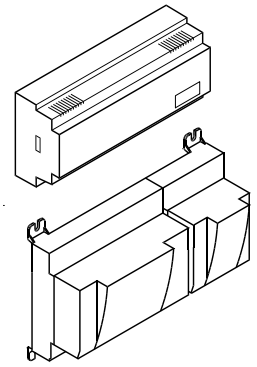
CE

EKA 163A /
EKA 164A → EKC 4xx / EKC 5xx / AK..

L = max. 15 m

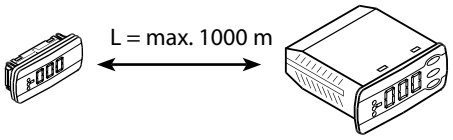




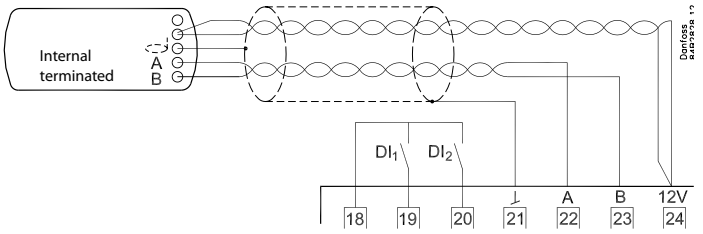


EKA 163A → EKC 202D / 204A1, AK-CC 210

L = max. 1000 m



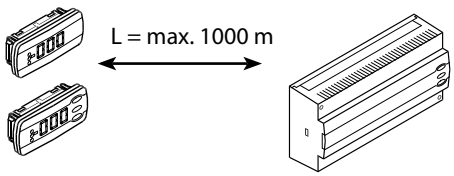
Data communication: See literature RC8AC



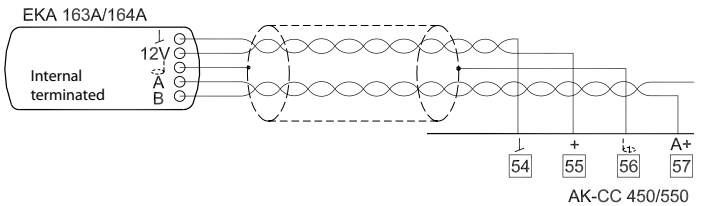
EKC 202D, EKC 204A1, AK-CC 210

EKA 163A / 164A → AK-CC 450 /550

L = max. 1000 m



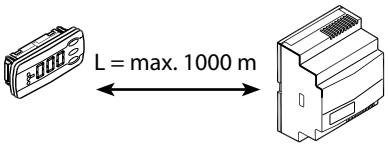
Data communication: See literature RC8AC



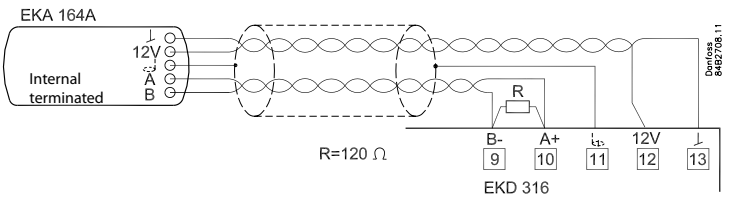
AK-CC 450/550

EKA 164A → EKD 316

L = max. 1000 m



Data communication: See literature RC8AC



EKD 316

DE-BD

RI8KB600 5-2009