

Compressor Pack Controller

AKC 25H5

Software version 1.3x

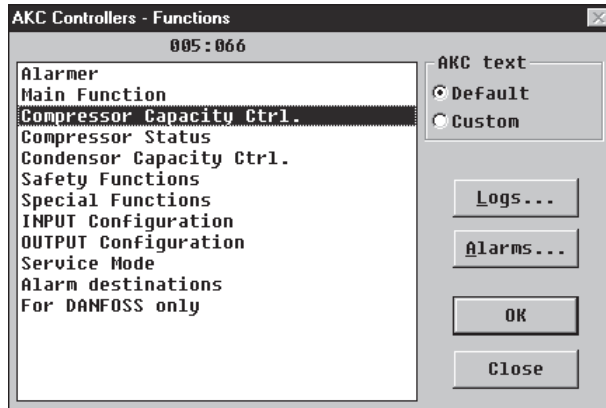
Menu list

This menu function can be used together with system software type AKM. The description is divided up into function groups that can be displayed on the PC screen. Within each group it is now possible to show the measured values, or settings. Regarding the use of AKM, reference is made to the AKM Manual.

Application

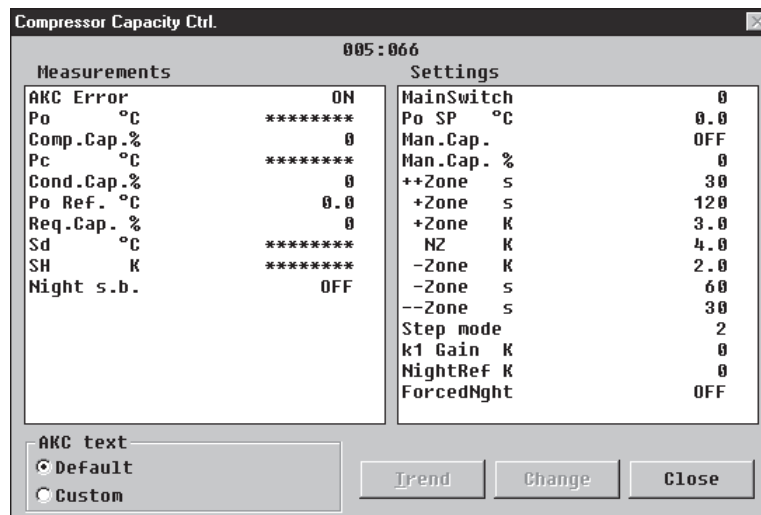
This menu operation (dated May 2000), applies to controller type AKC 25H5, code number 084B2020 and 084B2021 with programme version 1.3x.

Function groups



The operation is divided up into several function groups. When a selection has been made, push "OK", and you may continue to the next display. By way of example, "Compressor capacity Ctrl." has been selected here.

From the measure line the different values can be read. The values are constantly updated. In the list of settings the set values can be seen. If a setting has to be changed, select the parameter and proceed via "OK".

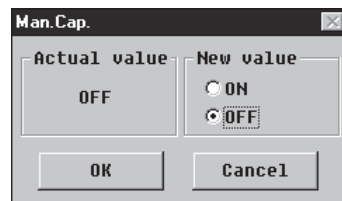


Measurements

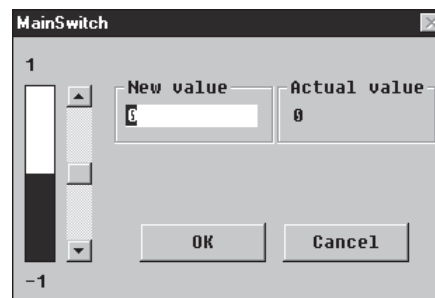
The various measurements can be read directly. If a graphic display of the measurements is required, up to eight of them can be shown. Select the required measurements and push "Trend".

Settings

There are four kinds of settings, ON/OFF settings, settings with a variable value, time settings and "reset alarms".



Set the required value and push "OK"



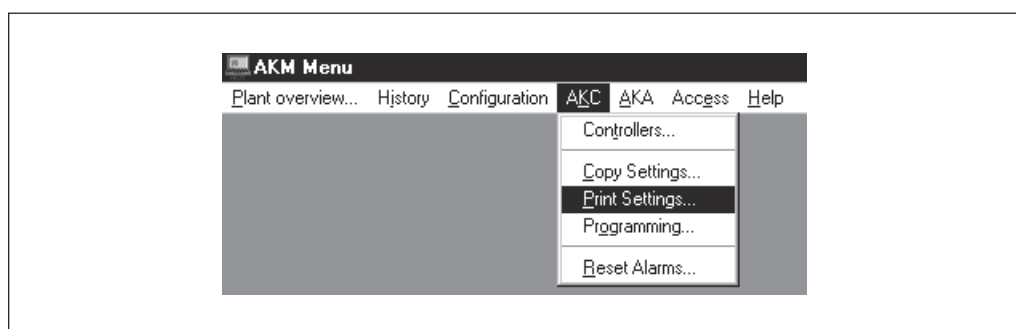
Enter the new value or move the sliding scale up or down. The new value will apply, when "OK" is pushed.

Go through the individual functions one by one and make the required settings. When settings have been made for one controller, the set values may be used as basis in the other controllers *of the same type and with the same software version*. Copy the settings by using the copy settings function in the AKM programme, and adjust subsequently any settings where there are deviations.

NB! If a list is required for noting down the individual settings, a printout can be made of it with a function in the AKM programme. Read the next section, "Documentation".

Documentation

Documentation of the settings of the individual controllers can be made with the print function in the AKM programme. Select the controller for which documentation of the settings is required and select the "Print Settings" function (cf. also the AKM Manual).



Functions

Shown below are function groups with corresponding measurements and settings. A printout of the given settings can be made using the AKM function "Print Settings" (see above).

Alarms

See page 11.

Main Function

Measurements	AKC Error	When "ON", there is an alarm message. See page 11.				
	P0 °C	Suction pressure in °C (measured with the pressure transmitter on the P0 input)				
	Comp.Cap.%	Cut-in compressor capacity in % (of total capacity)				
	Pc °C	Discharge pressure in °C (measured with the pressure transmitter on the Pc input)				
Cond.Cap.%	Cut-in condenser capacity in %					
	Rfg.Type R	Reading of set refrigerant type				
Settings	Main Switch	Function switch:	1:	Regulation		
			0:	Controller stopped		
		-1:	Service function			
	Rfg. Type	Refrigerant selection:	0:	No refrigerant selection	12:	R142b
1:			R12	13:	User defined	
2:			R22	14:	R32	
3:			R134a	15:	R227	
4:			R502	16:	R401A	
5:			R717 (ammonia)	17:	R507	
6:			R13	18:	R402A	
7:			R13b1	19:	R404A	
8:			R23	20:	R407C	
9:			R500	21:	R407A	
10:			R503	22:	R407B	
11:	R114	23:	R410A			

Language	Selection of language. Three languages have been entered in the controller. Either: 0: English 1: German 2: Franch Or: 0: English 3: Danish 4: Spanish
	NB! If this setting is changed, another "Upload" must be made of the controller's data for the AKM programme. You do it this way: - Select one of the available languages. - Close the menu - Proceed to menu "Configuration" - "Advanced Configuration" - "Delete description file" - Push file type "Default" - Select controller's code number and software version - Push "OK" - Proceed to menu "Configuration" - "Upload" - Complete the fields "Network", "Net configuration" and "AKC description" - Push "OK"
Mains freq.	Texts will now be obtained from the controller in the required language. Set the network frequency to 50 or 60 Hz

Compressor Capacity Ctrl.

Measurements	AKC Error	When "ON", there is an alarm message. See page 11.
	P0 °C	Suction pressure in °C (measured with the pressure transmitter on the P0 input)
	Comp.Cap.%	Cut-in compressor capacity in % (of total capacity)
	Pc °C	Discharge pressure in °C (measured with the pressure transmitter on the Pc input)
	Cond.Cap.%	Cut-in condenser capacity in %
	P0 Ref. °C	Suction pressure reference (incl. external reference signal, if any)
	Req.Cap.%	Reference for compressor capacity (deviations may be due to time delays)
	Sd °C	Discharge gas temperature measured with the temperature sensor on the Sd input
	SH K	Measured superheat (Ss - P0). Ss = Temperature signal. P0 = Pressure signal.
	Night s.b.	Status of night setback function ON: An increase of the evaporating pressure is permitted OFF: Normal situation
Settings	Main Switch	Function switch: 1: Regulation 0: Controller stopped -1: Service function
	P0 SP °C	Setting of required suction pressure in °C
	Man.Cap.	Forced control function OFF: No forced control ON: There may be forced control of the compressor capacity
	Man.Cap.%	Forced control function Manual setting of compressor capacity The value is in % of total capacity controlled by the controller
	++Zone s	Time delay between step cut-ins in the regulation band over the "+Zone band" Set in seconds
	+Zone s	Time delay between step cut-ins in the regulation band over the neutral zone Set in seconds
	+Zone K	Regulation band over the neutral zone
	NZ K	Neutral zone for suction pressure
	-Zone K	Regulation band under the neutral zone
	-Zone s	Time delay between step cut-outs in the regulation band under the neutral zone Set in seconds
	--Zone s	Time delay between step cut-outs in the regulation band under the "-Zone band" Set in seconds
	Step mode	Cut-in and cut-out sequence for compressors 1: Sequential (first in, last out) 2: Cyclic (equalisation of run time)
	k1 Gain K	Displacement to be produced by max. reference signal (10 V) (value is only set, if "Ext.Ref" inputs is used)
	NightRef K	Displacement value for suction pressure in connection with an active night setback signal (set in Kelvin)
ForcedNght	Forced control for night operation Evaporator reference changed by setting in "NightRef K"	

Compressor Status

Measurements	AKC Error	When "ON", there is an alarm message. See page 11.
	P0 °C	Suction pressure in °C (measured with the pressure transmitter on the P0 input)
	Comp.Cap.%	Cut-in compressor capacity in % (of total capacity)
	Pc °C	Discharge pressure in °C (measured with the pressure transmitter on the Pc input)
	Cond.Cap.%	Cut-in condenser capacity in %
	1 Cap. %	Actual cut-in capacity on this compressor
	1 Run Time	Compressor's aggregate run time in hours (Zero-setting of the value can be performed under "Output Configuration")
	1 Cut/24 h	Number of compressor starts during the past 24 hours
	2 ...	As above for compressor no. 2 to 9
	Settings	Main Switch

Condenser Capacity Ctrl.

Measurements	AKC Error	When "ON", there is an alarm message. See page 11.
	P0 °C	Suction pressure in °C (measured with the pressure transmitter on the P0 input)
	Comp.Cap.%	Cut-in compressor capacity in % (of total capacity)
	Pc °C	Discharge pressure in °C (measured with the pressure transmitter on the Pc input)
	Cond.Cap.%	Cut-in condenser capacity in %
	Req. Cap.%	Reference for condenser capacity
	Pc Ref. °C	Discharge pressure reference in °C
	S7 °C	Temperature measured by S7 sensor
	S8 °C	Temperature measured by S8 sensor
	Settings	Main Switch
Pc SP °C		Setting of required discharge pressure in °C
Man.Cap.		Forced control function OFF: No forced control ON: There may be forced control of the condenser capacity
Man.Cap.%		Forced control function Manual setting of condenser capacity The value is in % of total capacity
++Zone s		Time delay between step cut-ins in the regulation band over the "+Zone band"
+Zone s		Time delay between step cut-ins in the regulation band over the neutral zone
+Zone K		Regulation band over the neutral zone
NZ K		Neutral zone for discharge pressure in K
-Zone K		Regulation band under the neutral zone
-Zone s		Time delay between step cut-outs in the regulation band under the neutral zone
--Zone s		Time delay between step cut-outs in the regulation band under the "-Zone band"

Safety Functions

Measurements	AKC Error	When "ON", there is an alarm message. See page 11.
	P0 °C	Suction pressure in °C (measured with the pressure transmitter on the P0 input)
	Comp.Cap.%	Cut-in compressor capacity in % (of total capacity)
	Pc °C	Discharge pressure in °C (measured with the pressure transmitter on the Pc input)
Cond.Cap.%	Cut-in condenser capacity in %	
Settings	Main Switch	Function switches: 1: Regulation 0: Controller stopped -1: Service function
	Sd Max °C	Max. value of discharge gas temperature (If the value is exceeded, the entire compressor capacity will be cut out)
	Pc Max °C	Max. value of discharge pressure in °C (If the value is exceeded, the entire compressor capacity will be cut out) (At 3 K under Pc Max. the entire condenser capacity is cut in)
	P0 Min °C	Min value of suction pressure in °C (If the value becomes less, the entire compressor capacity will be cut out)
	Restart m	Time delay before restart (Applies to the three earlier functions: "Sd Max", "Pc Max" and "P0 Min")
	SH Max K	Alarm limit for max. superheat
	SH Min K	Alarm limit for min. superheat
	SH Delay m	Time delay before alarm for "SH max" and "SH min"

Special Functions

Measurements	AKC Error	When "ON", there is an alarm message. See page 11.
	P0 °C	Suction pressure in °C (measured with the pressure transmitter on the P0 input)
	Comp.Cap.%	Cut-in compressor capacity in % (of total capacity)
	Pc °C	Discharge pressure in °C (measured with the pressure transmitter on the Pc input)
Cond.Cap.%	Cut-in condenser capacity in %	
Settings	Main Switch	Function switches: 1: Regulation 0: Controller stopped -1: Service function
	Mo day h	Time table for displacement of evaporating pressure on Mondays. End of night setback (normal suction pressure) At setting = 0 there is no displacement this day
	Mo night h	Time table continued: Start (of night setback) when the suction pressure is changed with setting "Night Ref K". At setting =0 there is no displacement this day. If day and night settings are identical, or if night comes before day, there will be a different function. See functional description.
	Tu day h	As above, Tuesdays
	Tu night h	As above, Tuesdays
	We day h	As above, Wednesdays
	We night h	As above, Wednesdays
	Th day h	As above, Thursdays
	Th night h	As above, Thursdays
	Fr day h	As above, Fridays
	Fr night h	As above, Fridays
	Sa day h	As above, Saturdays
	Sa night h	As above, Saturdays
	Su day h	As above, Sundays
	Su night h	As above, Sundays
	P0 Ref. md.	Displacement of suction pressure as a function of external signals 1: Reference = set reference + voltage signal on EXT.REF (0-10 V), if any 2: Reference = set reference + RH% signal on EXT.REF (0-10 V), if any + signal on S6, if any.

k2 Gain	Amplification factor for temperature displacement (set only, if "P0 Ref.md" is with setting = 2)
RH Ref. %	Reference for relative humidity. Is used, when a signal on the relative humidity at input "EXT.REF" is added. (Set only if "P0 Ref.md" is with setting = 2)
ta Ref °C	Reference for temperature in connection with temperature displacement. (Set only if "P0 Ref.md" is with setting = 2)
P0RefMax K	Max. permissible increase of suction pressure reference with external signal
P0RefMin K	Max. permissible reduction of suction pressure reference with external signal
LoadShed %	Max. permissible compressor capacity when input "LOAD SHED" is short-circuited
Inj.Diff K	Temperature setting for "Liquid injection in suction line" function. Set the value where the liquid injection starts (SH max - Inj. Diff)
Sens. P0	Amplification factor for the compressor regulation's PI controller. The setting should not be changed
Pc Ref.md.	Displacement of the condensing pressure as a function of external signals 1: Reference = set reference "Pc SP" 2: Reference is changed as a function of the S7 signal and possibly the Tc signal
min tm K	Mean temperature differential across the condenser at the lowest actual compressor capacity (tm differential at min. load) (It is the temperature differential between air- and condensing temperature)
dim tm K	Mean temperature differential across the condenser at max. load (tm differential at max. load) (It is the temperature differential between air- and condensing temperature)
PcRefMax K	Max. permissible increase of condensing pressure reference with external signal
PcRefMin K	Max. permissible reduction of condensing pressure reference with external signal
Heat SP °C	Thermostat value at heat recovery (S8 measurement and AKV output) (Cut-in value)
HeatDiff K	Temperature differential for the heat recovery thermostat (cut-out value = cut-in value + differential)
Sens. Pc	Amplification factor for the condenser regulation's PI controller. The setting should not be changed.

INPUT Configuration

Measurements	AKC Error	When "ON", there is an alarm message. See page 11.
	P0 °C	Suction pressure in °C (measured with the pressure transmitter on the P0 input)
	Comp.Cap.%	Cut-in compressor capacity in % (of total capacity)
	Pc °C	Discharge pressure in °C (measured with the pressure transmitter on the Pc input)
	Cond.Cap.%	Cut-in condenser capacity in %

Settings

Settings can only be made when the MAIN SWITCH input is cut out.

Main Switch	Function switches:	1: Regulation
		0: Controller stopped
		-1: Service function

There are three settings for each input. Define first what the input is to register. Next, the information that is to belong to the input. And finally, a time delay.

D11 Type	Alarm input DI 1 0: Input not used 1: Input registers the compressors' safety circuit Compressors no. is selected in the next menu 2: Input registers the condensers' safety circuit Condensers no. i selected in the next menu 3: Other alarm monitoring. (Alarm text is selected in next menu)
D11 Dev.No	Type = 1: (see above): Select the compressor no. Type = 2: (see above): Select the condenser no. Type = 3: (see above): Select the alarm text 0: Factory setting. Correct setting to one of the following values: 1: Low liquid level 2: Refrigerant leak 3: Current fault 4: Phase fault 5: Liquid flow switch 6: Air flow switch 7: Speed controller fault 8: Condensate pump fault 9: High condensate level
D11 Del.m	Time delay from the alarm is registered until executed
DI ...	As above for DI 2 to DI 9

OUTPUT Configuration

Measurements	AKC Error	When "ON", there is an alarm message. See page 11.
	P0 °C	Suction pressure in °C (measured with the pressure transmitter on the P0 input)
	Comp.Cap.%	Cut-in compressor capacity in % (of total capacity)
	Pc °C	Discharge pressure in °C (measured with the pressure transmitter on the Pc input)
	Cond.Cap.%	Cut-in condenser capacity in %

Settings

Settings can only be made when the MAIN SWITCH input is cut out.

Main Switch	Function switches:	1: Regulation 0: Controller stopped -1: Service function
DO1 Type	Relay outputs are used for:	0: Not used 1: Compressor / compressor steps 2: Condenser / condenser steps
DO1 Dev.No	Type = 1: (see above): Select the compressor no. Type = 2: (see above): Select the condenser no.	
DO1 Cap. %	Output capacity in relation to the whole system's capacity	
DO1 Recy m	Minimum period of time between two successive starts (If the output controls an unloader or a condenser step, the setting will have no effect).	
DO1 ON m	Minimum duration of ON period (If the output controls an unloader or a condenser step, the setting will have no effect).	
DO1 Time h	Reading and adjustment, if applicable, of hourmeter	
DO...	As above for DO 2 to DO 9	

Recommendation

Use DO1 and up. If you skip DO1 or another DO, a subsequent DI-alarm will not be displayed satisfactorily. Speed regulation, if required, must however be installed on DO9.

This text is only relevant if Speed Ctrl is set in pos. ON.

If the output is used for controlling the speed regulation of a compressor, the setting must represent the max. capacity the compressor is able to produce. I.e., the nominal capacity times the max. speed which is then converted into a percentage value of the whole system's capacity.

Example: Three compressors of 5, 5 and 10 kW, respectively, where the 10 kW unit is speed-regulated at between 0.8 and 1.3 times the nominal speed. The capacity here will be 1.3 times 10 = 13 kW. This will give a setting of 56% ($13/(5+5+13) = 0.56$).
(Remember to set the two values 0.8 and 1.3 in the speed regulation).

Speed Ctrl	Switch for speed regulation ON: AO output is active. DO9 starts and stops the speed regulation OFF: DO9 functions as normal ON/OFF output
MinCap DO9	Setting of the step's min. capacity in relation to the step's max. capacity: Value = min. speed/max. speed (e.g. $0.8/1.3 = 0.62$).
AKV appl.	The output is used for: 1: Liquid injection with an AKV valve in the suction line 2: Liquid injection with a thermostatic expansion valve and a solenoid valve in the suction line 3: Solenoid valve for heat recovery (S8 measurement) 4: Conventional thermostat function (S8 measurement)

Alarm destinations

Measurements	AKC Error	When "ON", there is an alarm message. See page 11.
	P0 °C	Suction pressure in °C (measured with the pressure transmitter on the P0 input)
	Comp.Cap.%	Cut-in compressor capacity in % (of total capacity)
	Pc °C	Discharge pressure in °C (measured with the pressure transmitter on the Pc input)
Cond.Cap.%	Cut-in condenser capacity in %	

Settings	Main Switch	Function switches:	1: Regulation 0: Controller stopped -1: Service function
	Network	ON:	When alarms are registered via PC or Gateway printer
		OFF:	When alarm are registered via AKA 21, only

Set the priority for the following alarm texts (choose between 1, 2, 3 or 0. They have the following meaning:)

- 1: Alarm at relay output + DANBUSS message
 - 2: DANBUSS message only
 - 3: Alarm at relay output + DANBUSS message, but the DO2 output on a master gateway will not be activated
 - 0: No alarm and no DANBUSS message
- The individual alarms are explained in more detail on page 11

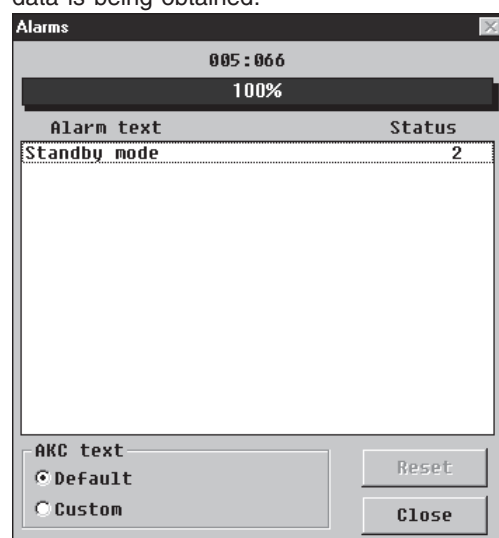
StandbyMod	(Regulation has stopped)
RfgType	(Changed refrigerant)
Man. Ctrl.	(Peak load limitation)
Load Shed	(Regulation is overridden)
No. DI Def.	(DI-input not defined)
P0 Min °C	(Min. value of suction pressure in °C)
Pc Max °C	(Max. value of discharge pressure in °C)
Sd Max °C	(Max. value of discharge gas temperature)
SH max/min	(Alarm limit for max/min. superheat)
DI1 AIdest	(Cut-out in safety circuit DI 1)
DI2 AIdest	(Cut-out in safety circuit DI 2)
DI3 AIdest	(Cut-out in safety circuit DI 3)
DI4 AIdest	(Cut-out in safety circuit DI 4)
DI5 AIdest	(Cut-out in safety circuit DI 5)
DI6 AIdest	(Cut-out in safety circuit DI 6)
DI7 AIdest	(Cut-out in safety circuit DI 7)
DI8 AIdest	(Cut-out in safety circuit DI 8)
DI9 AIdest	(Cut-out in safety circuit DI 9)
P0 error	(Faulty P0 pressure transmitter)
Pc error	(Faulty Pc pressure transmitter)
Ss error	(Faulty Ss sensor)
Sd error	(Faulty Sd sensor)
S6 error	(Faulty S6 sensor)
S7 error	(Faulty S7 sensor)
S8 error	(Faulty S8 sensor)

AKM menu "For DANFOSS only"

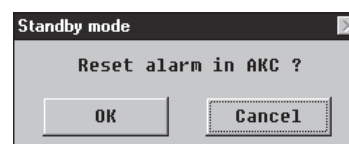
This menu contains data and setting values for special internal controller functions.
Do not change the stated values.

Alarms

The menu display for alarms shows the active alarms. Dots will appear at the top of the menu for as long as data is being obtained.



Alarms may be acknowledged one by one by selecting one, and then pushing "OK". An Alarm message will now appear, e.g.:



Push "OK" to acknowledge.
The following alarm messages may occur:

Alarm message	Meaning	Action/cause
P0 Error	Faulty P0 pressure transmitter	Check connection
Pc Error	Faulty Pc pressure transmitter	Check connection
Ss Error	Faulty Ss sensor	Check sensor connection / sensor resistance
Sd Error	Faulty Sd sensor	Check sensor connection / sensor resistance
S6 Error	Faulty S6 sensor	Check sensor connection / sensor resistance
S7 Error	Faulty S7 sensor	Check sensor connection / sensor resistance
S8 Error	Faulty S8 sensor	Check sensor connection / sensor resistance
RFG.Type change after power up	Changed refrigerant	Check the selected refrigerant. Regulation with changed refrigerant may not be done until the controller has been de-energised
Discharge temp. too high	Too high discharge gas temperature	Sd higher than max. Sd setting. Wait for temperature to drop
Condensing temp. too high	Too high condensing temperature	Pc higher than max. Pc setting. Wait for temperature to drop
Suction temp. too low	Too low suction pressure temperature	P0 lower than min. P0 setting
Suction gas SH too high	Too high superheat (Ss-P0)	SH higher than max. SH setting
Suction gas SH too low	Too low superheat SH (Ss-P0)	SH lower than min. SH setting
Compr. no () safety cut-out	Signal on terminal DI () interrupted	Check compressor safety circuit
Compr. no () not in auto	Wrong setting of switch on AKC 22H	Put switch in pos. "AUT."

Compr. no () disch temp. cut-out	Alarm from AKC 22H	Check compressor safety circuit
Compr. no () motor prot. cut-out	Alarm from AKC 22H	Check compressor safety circuit
Compr. no () current cut-out	Alarm from AKC 22H	Check compressor safety circuit
Compr. no () oil press. cut-out	Alarm from AKC 22H	Check compressor safety circuit
Compr. no () disch press cut-out	Alarm from AKC 22H	Check compressor safety circuit
Cond no () safety cut-out	Signal on terminal DI () interrupted	Check condensator safety circuit
Low liquid level	Low level of refrigerant	Check refrigerant quantity
Refrigerant leak	Refrigerant leaking	Check the unit that monitors refrigerant leaks
Current fault	Wrong supply voltage	Check earth leakage circuit breaker
Phase fault	Wrong supply voltage	Check supply voltage
Liquid flow switch	Error message from liquid flow switch	Check the flow switch
Air flow switch	Error message from air flow switch	Check the flow switch
Speed controller fault	Speed controller has stopped	Check speed controller/frequency converter
Condensate pump fault	Faulty drip tray pump	Check the pump
High condensate level	High drip tray level	Check the drip tray
RFG.type not selected	No selection of refrigerant	Select refrigerant
Stand by mode	Regulation has stopped	The function switch (Main Switch) is either set in the position "Controller stopped" or "Service function".
Man. Compr. Cap. ctrl set ON	Regulation is overridden	The forced control function for the compressor capacity or the condenser capacity is active.
Load shedding	Peak load limitation	There is a signal from other control system
No DI defined for compressor	A "DI-input" for a compressor is not defined	Define the input under "Configuration of inputs" or set alarm destination at "0".

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