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## Controller for controlling industrial evaporators

# AKC 24P

Software version 1.5x

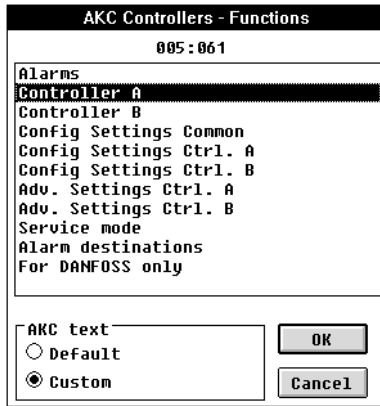
**Menu list**

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.

**Validity**

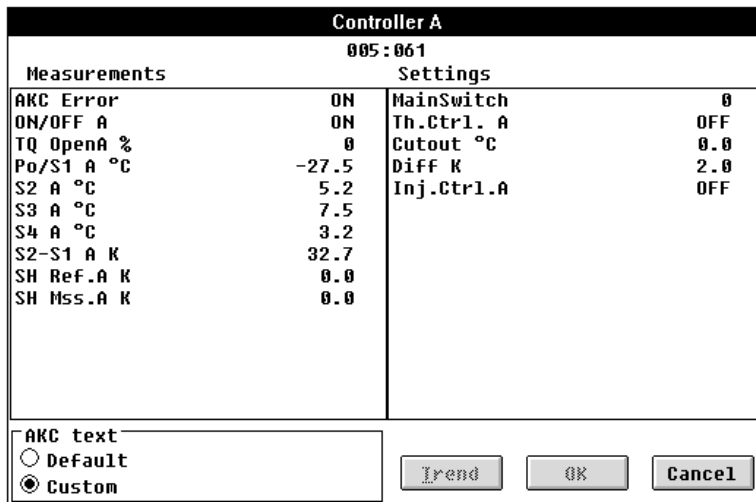
This menu operation was worked out in October 1994 and applies to AKC 24P with the code number 084B2011 and fitted with software version 1.5x.

**Function groups**



The operation is divided up into several function groups. When a selection has been made, push "OK", and you may continue from the next display. By way of example, the Controller A 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".

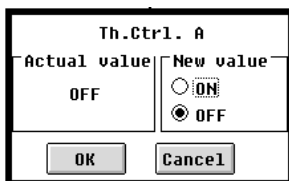


**Measurements**

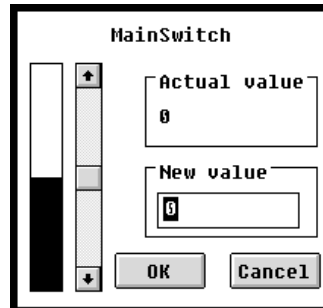
The various measurements can be read directly. If a graphic display of the measurements is required, up to eight of them can be shown. Select the required measurements and push "Trend".

**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"



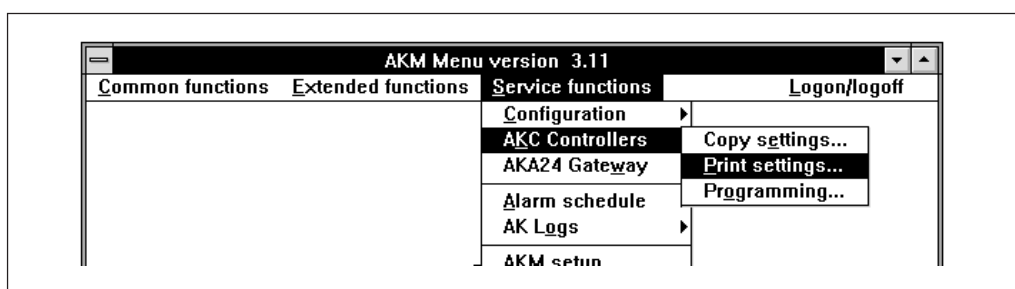
Enter the new value or move the sliding scale up or down. The new value will apply, when "OK" is pushed.

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 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 (df. also the AKM Manual).



## Functions

Indicated 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 8.

## Controller A

Measurements	AKC Error	When “ON”, there is an alarm message. See page 8.
	ON/OFF A	Status at the “ON/OFF” inlet
	TQ OpenA %	Opening degree of expansion valve in % of K max
	P0/S1 A °C	Evaporating pressure or media temperature at evaporator inlet
	S2 A °C	Refrigerant temperature at evaporator outlet
	S3 A °C	Media temperature before the evaporator
	S4 A °C	Media temperature after evaporator
	S2-S1 A K	Superheat of evaporator measured with the sensors P0/S1 and S2
	SH Ref.A K	Actual superheat reference of the control (adaptively changed)
SH Mss.A K	Registered optimum superheat	
Settings	MainSwitch	Main switch: <ul style="list-style-type: none"> <li>1: Regulation</li> <li>0: Controller stop</li> <li>-1: Service</li> </ul>
	Th.Ctrl. A	Choose thermostat function ON/OFF. S3 is used as thermostat sensor
	Cutout °C	Cut-out temperature
	Diff K	Differential
	Inj.Ctrl.A	Choose expansion valve function ON/OFF

## Controller B

Measurements	AKC Error	When "ON", there is an alarm message. See page 8.	
	ON/OFF B	Status at the "ON/OFF" inlet	
	TQ OpenB %	Opening degree of expansion valve in % of K max	
	P0/S1 B °C	Evaporating pressure or media temperature at evaporator inlet	
	S2 B °C	Refrigerant temperature at evaporator outlet	
	S3 B °C	Media temperature before the evaporator	
	S4 B °C	Media temperature after evaporator	
	S2-S1 B K	Superheat of evaporator measured with the sensors P0/S1 and S2	
	SH Ref.B K	Actual superheat reference of the control (adaptively changed)	
SH Mss.B K	Registered optimum superheat		
Settings	MainSwitch	Main switch:	1: Regulation 0: Controller stop -1: Service
	Th.Ctrl. B	Choose thermostat function ON/OFF. S3 is used as thermostat sensor	
	Cutout °C	Cut-out temperature	
	Diff K	Differential	
	Inj.Ctrl.B	Choose expansion valve function ON/OFF	

## Config Settings Common

Measurements	AKC Error	When "ON", there is an alarm message. See page 8.	
	Rfg. Type R	Reading of set refrigerant type	
Settings	MainSwitch	Main switch:	1: Regulation 0: Controller stop -1: Service
	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: AZ50 6: R13                                      18: R402A 7: R13b1                                  19: R404A 8: R23                                      20: KLEA 66 9: R500                                    21: R407A 10: R503                                  22: KLEA 61 11: R114
	Rfg. K1	Refrigerant selection No. 13. Special function, please contact Danfoss.	
	Rfg. K2	Refrigerant selection No. 13. Special function, please contact Danfoss.	
	Rfg. K3	Refrigerant selection No. 13. Special function, please contact Danfoss.	

## Config Settings Ctrl. A

Measurements	AKC Error	When "ON", there is an alarm message. See page 8.	
Settings	MainSwitch	Main switch:	1: Regulation 0: Controller stop -1: Service
	Adap.Ctrl.	Choose adaptive superheat control ON/OFF	
	MOP Ctrl.	Choose MOP function ON/OFF	
	MOP °C	Value of MOP point	
	SH Min. K	Min. value of superheat reference	
	SH Max. K	Max. value of superheat reference	
	Use AKS 32	ON for use of AKS 32 for registration of P0 OFF for use of S1 sensors	
	S3A Offset	Off-set adjustment of measured media temperature	
	Alarm	Alarm thermostat function ON/OFF	
	UpperLim°C	The thermostats upper alarm limit. Absolute value	
	LowerLim°C	The thermostats lower alarm limit. Absolute value	
	Delay Min	Time delay for temperature alarm	
	Ext max K	Change of max. input signal (10 V)	
	Vin ExtRef	Definition of external reference signal (connect to terminal "REF") 1: 0 - 10 V signal 2: 2 - 10 V signal	
	Ext Ref	Function selector switch for external reference inlet 0: No external reference 1-2: Changes the cut-out value 3-4: Changes the superheat reference	
	SH Close K	Min. value of superheat reference at loads below 10%. (The value must be lower than SH min.)	

## Config Settings Ctrl. B

Measurements	AKC Error	When "ON", there is an alarm message. See page 8.	
Settings	MainSwitch	Main switch:	1: Regulation 0: Controller stop -1: Service
	Adap.Ctrl.	Choose adaptive superheat control ON/OFF	
	MOP Ctrl.	Choose MOP function ON/OFF	
	MOP °C	Value of MOP point	
	SH Min. K	Min. value of superheat reference	
	SH Max. K	Max. value of superheat reference	
	Use AKS 32	ON for use of AKS 32 for registration of P0 OFF for use of S1 sensors	
	S3B Offset	Off-set adjustment of measured media temperature	
	Alarm	Alarm thermostat function ON/OFF	
	UpperLim°C	The thermostats upper alarm limit. Absolute value	
	LowerLim°C	The thermostats lower alarm limit. Absolute value	
	Delay Min	Time delay for temperature alarm	
	Ext max K	Change of max. input signal (10 V)	
	Vin ExtRef	Definition of external reference signal (connect to terminal "REF") 1: 0 - 10 V signal 2: 2 - 10 V signal	

Ext Ref	Function selector switch for external reference inlet 0: No external reference 1-2: Changes the cut-out value 3-4: Changes the superheat reference
SH Close K	Min. value of superheat reference at loads below 10%. (The value must be lower than SH min.)

## Adv. Settings Ctrl. A

Measurements	AKC Error	When "ON", there is an alarm message. See page 8.
	TfTq °C	Special TQ temperatures. Used by Danfoss only
	Tfs °C	Special TQ temperatures. Used by Danfoss only
	Tfs1 °C	Special TQ temperatures. Used by Danfoss only
Settings	MainSwitch	Main switch:                    1: Regulation 0: Controller stop -1: Service
	Kp	Amplification factor
	Tper. sec.	Period time. (Minimum time between two automatic reductions of the superheat reference = 1.5 x Tper. Integration time = 1.2 x Tper).
	Kmax Curve	Change at the TQ valve's K max. curve
	Standby K	Change of the TQ valves standby temperature

## Adv. Settings Ctrl. B

Measurements	AKC Error	When "ON", there is an alarm message. See page 8.
	TfTq °C	Special TQ temperatures. Used by Danfoss only
	Tfs °C	Special TQ temperatures. Used by Danfoss only
	Tfs1 °C	Special TQ temperatures. Used by Danfoss only
Settings	MainSwitch	Main switch:                    1: Regulation 0: Controller stop -1: Service
	Kp	Amplification factor
	Tper. sec.	Period time. (Minimum time between two automatic reductions of the superheat reference = 1.5 x Tper. Integration time = 1.2 x Tper).
	Kmax Curve	Change at the TQ valve's K max. curve
	Standby K	Change of the TQ valves standby temperature

## Service mode

Measurements	AKC Error	When "ON", there is an alarm message. See page 8.
	P0 A Bar	Pressure measured with pressure transmitter connected to P0A
	S1 A °C	Refrigerant temperature at evaporator inlet, control A
	S2 A °C	Refrigerant temperature at evaporator outlet, control A
	S3 A °C	Media temperature before the evaporator, control A
	S4 A °C	Media temperature after the evaporator, control A
	P0 B Bar	Pressure measured with pressure transmitter connected to P0B
	S1 B °C	Refrigerant temperature at evaporator inlet, control B
	S2 B °C	Refrigerant temperature at evaporator outlet, control B
	S3 B °C	Media temperature before the evaporator, control B
	S4 B °C	Media temperature after the evaporator, control B
	NTC A °C	TQ-temperature, control A
	ON/OFF A	Status of forced closed inlet "ON/OFF" control A OFF = Solenoid valve closed, TQ in standby position

NTC B °C TQ-temperature, control B  
 ON/OFF B Status of forced closed inlet "ON/OFF" control B  
 OFF = Solenoid valve closed, TQ in standby position  
 Ref. A V Signal at reference inlet A  
 Ref. B V Signal at reference inlet B

Settings MainSwitch Main switch: 1: Regulation  
 0: Controller stop  
 -1: Service  
 Man. Ctrl. ON: Diagnosis function is activated  
 Note: No control  
 When diagnosis function is finished, setting must be changed to OFF  
 TQ A % Forced servo operation of power supply to expansion valve control A  
 EVR A Forced servo operation of solenoid valve outlet (EVR), control A  
 ON => 24 V a.c. on X1/X2  
 TQ B % Forced servo operation of power supply to expansion valve, control B  
 EVR B Forced servo operation of solenoid valve outlet (EVR), control B  
 ON => 24 V a.c. on X3/X4  
 Alarm Out Forced servo operation of alarm outlet  
 ON => relay switch closed = no alarm (0 V on Y7/Y8)

## Alarm destinations

Measurements AKC Error When "ON", there is an alarm message. See page 8.

Settings MainSwitch Main switch: 1: Regulation  
 0: Controller stop  
 -1: Service  
 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 or 0. They have the following meaning:)*

1: Alarm at relay output + DANBUSS® message  
 2: DANBUSS® message only  
 0: No alarm and no DANBUSS® message  
 The individual alarms are explained in more detail on page 8

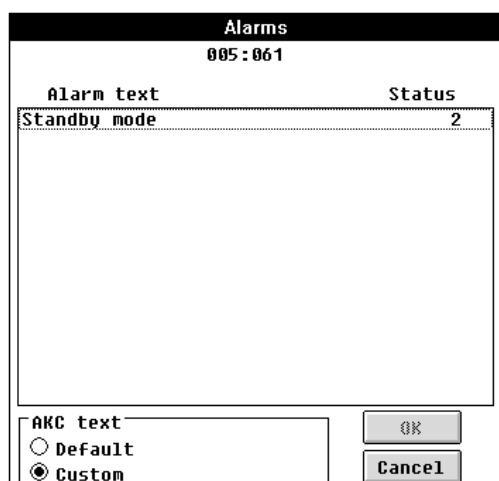
StandbyMod (Regulation has stopped)  
 Rfg. Type (Changed refrigerant)  
 Too High Temp (Too high temperature)  
 Too Low Temp (Too low temperature)  
 Adj. TQ (Setting error)

## AKM menu "For DANFOSS only"

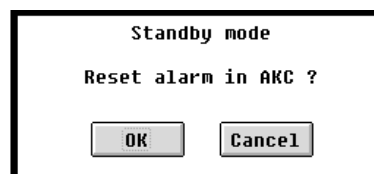
This menu contains data and setting values for special internal controller functions.  
**Do not chage the stated values.**

## 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 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
Rfg.Type changed after power up	Changed refrigerant	Check chosen refrigerant. Regulation with changed refrigerant not possible before the controller has been de-energized.
Rfg. Type Not selected	No selection of refrigerant	Select refrigerant
Sx error ( )	Sx sensor error	Check sensor connection / sensor resistance
NTC Error TQ ( )	NTC sensor error in the TQ actuator	Check sensor connection / sensor resistance
P0 Error ( )	Pressure transmitter error	Check connections
Adj. Error AKS 32 not ON	Setting error	Check whether P0 is measured with AKS 32
Too high Temp. ( )	Too high temperature	Load is possibly too high. Defrost just finished
Too low temp. ( )	Too low temperature	Check the thermostat settings and alarm settings
Standby mode	Regulation has stopped	The function switch (Main Switch) is either set in the position "Controller stop" or "Service".

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