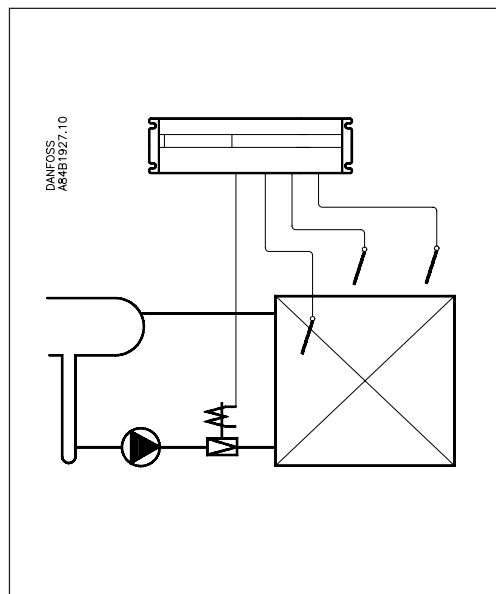


Evaporator controller type AKC 151R

Introduction

The AKC 151R is an electronic controller comprising all functions necessary to control a fan coil evaporator in a cold room on industrial plants where the evaporators are liquid overfed (pump recirculation principle). The controller works in conjunction with an electrically operated valve which will either be a solenoid valve or an expansion valve. Pt1000 ohm temperature sensors, having great signal accuracy are used for measuring temperatures. Depending on the application selected, anywhere from 1 to 3 sensors are used per regulated evaporator.

In addition to temperature control and monitoring (i.e. alarm functions and logging) the controller offers secondary functions such as: Defrosting, fan control, compressor start/stop, forced closing, alternative thermostat settings depended on power tariff, remote adjustment of circulation rate (if AKVA valve is applied)



Application

Automatic control and logging of air temperature in cold rooms in:

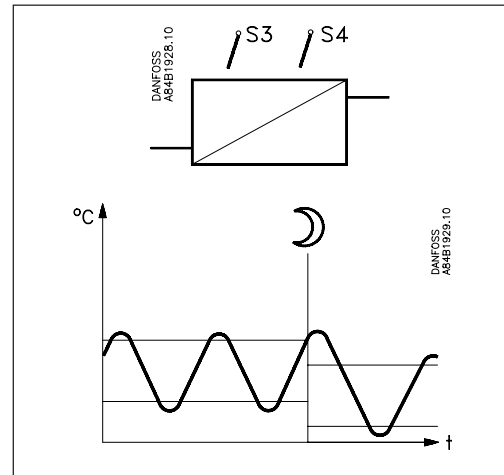
- cold stores
- breweries
- abattoirs
- dairies

Functions

Thermostat

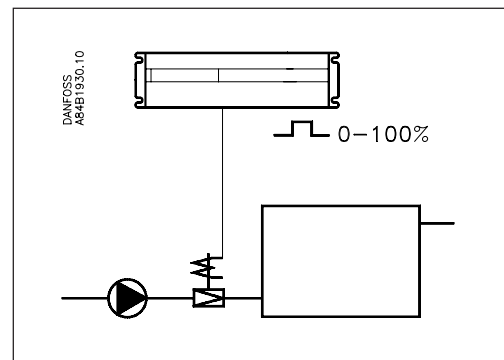
When the air temperature at the media temperature sensor(s) equals the set cut out value the controller will stop refrigeration and close the valve in the liquid line and the suction line valve. When two air sensors (S3 and S4) are used, regulation may be based on the mean temperature measured by these sensors.

At times of the day when electricity prices are low (differentiated tariffs) the air temperature may be lowered to accumulate cold. The setback value, by which the controlled temperature has to be decreased, is set on the controller. An external signal is used to change over to this lower temperature (night operation).



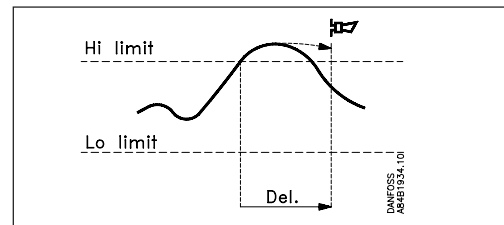
Refrigerant flow control

There are two ways of controlling the liquid supply to the evaporator. One is the traditional way of employing a solenoid valve (type EVRA) and a throttle valve (type REG). Alternatively the controller offers the possibility of replacing the solenoid valve plus the throttle valve with an expansion valve type AKVA. This system corresponds to a remotely adjustable throttle valve in that the opening degree of the valve is entered as a setting in the controller. Also possible is an increased opening degree in a start up period after a defrost cycle has been terminated.



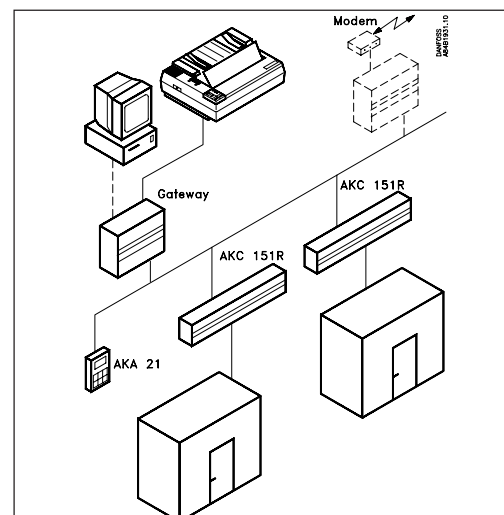
Alarm function

A built-in alarm function constantly keeps an eye on the sensors, the valve and the regulating functions. Actual alarms and the nature of the alarm are shown directly on the operating unit. For example the alarm is activated when the air temperature is too high or too low. Alarm limits and time delays can be set as required.



Data transmission

Operation of the controller takes place via a separate control unit, type AKA 21 or a PC with AKM software may be connected to the system. In this way it is possible to operate the system and collect all operational data via the PC. All controllers are interconnected by means of a two-core cable. When this connection has been established, all data communication between the control unit (or PC) and the controllers takes place via this cable. The control unit or the PC may be located centrally for instance in a service office.



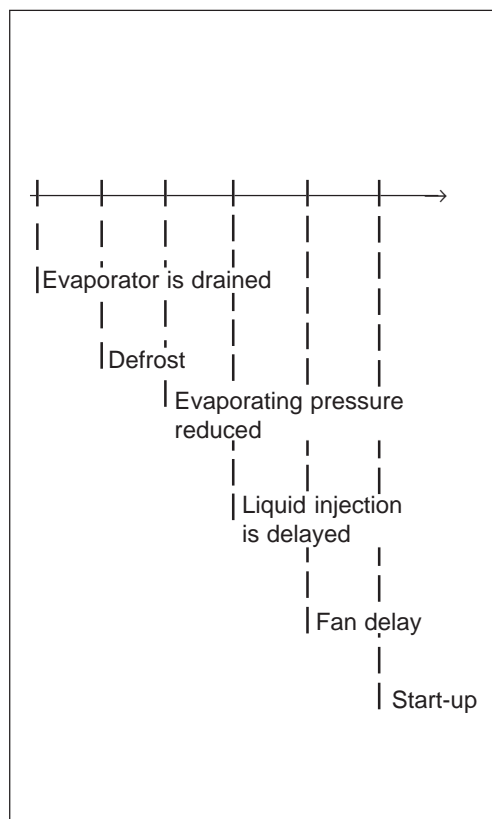
Defrost control

An extremely versatile defrost function adapts to a great number of methods for defrosting a fin coil evaporator.

- Choose between hot gas or electrical defrost function.
- Activate the defrost function with an external pulse signal or by using the internal clock.
- Stop defrosting based on temperature registration or when a set time has run out.
- Choose whether the fans should be on or off during defrost.
- Choose whether the compressor output should be on or off during defrost.

The defrost sequence consists of up to 6 events where it is possible, both to adjust the duration of each event, or even leave out individual events, if required.

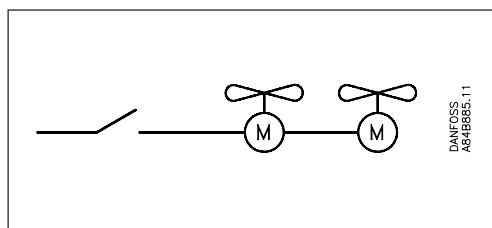
- See at the bottom of page 6 — 1. HP bypass - liquid is drained off the evaporator via a by-pass of the float valve.
- See at the top of page 4 — 2. Normal defrosting
- See at the bottom of page 5 — 3. Drain delay - a suction by pass is opened to smoothly pull down the pressure.
4. Injection delay - the suction valve is opened but the liquid line is still shut off.
5. Fan delay - cooling down with the fans off.
- See at the top of page 6 — 6. Start up period - the AKVA valve (if used) is operated with an increased opening degree.



Fan control

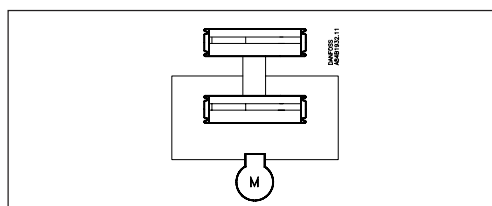
This function permits cycling operation to the fans when the thermostat is cut out. On/off periods for fan operation can be set on the control unit.

To avoid unnecessary supply of power to the room, should cooling be stopped unintentionally, the fans can be switched off when the S5 temperature exceeds a set limit.



Compressor control

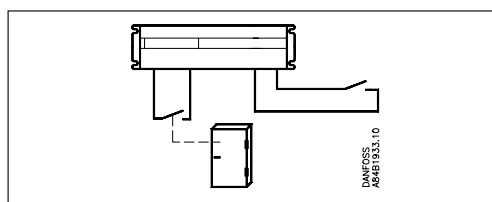
An output on the controller works in connection with the thermostat function. The outputs of several controllers can be wired in parallel to the compressors control circuit to switch off the lowest capacity step when there is no need for cooling.



Forced operation

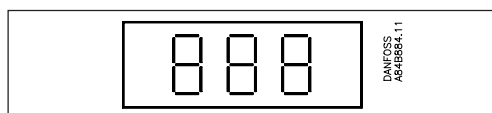
Cooling can be forced off by an external signal, for example a door switch. Choose whether the fans should be on or off.

Cooling can be forced on by an external signal for example if hot gas is needed to defrost other evaporators.



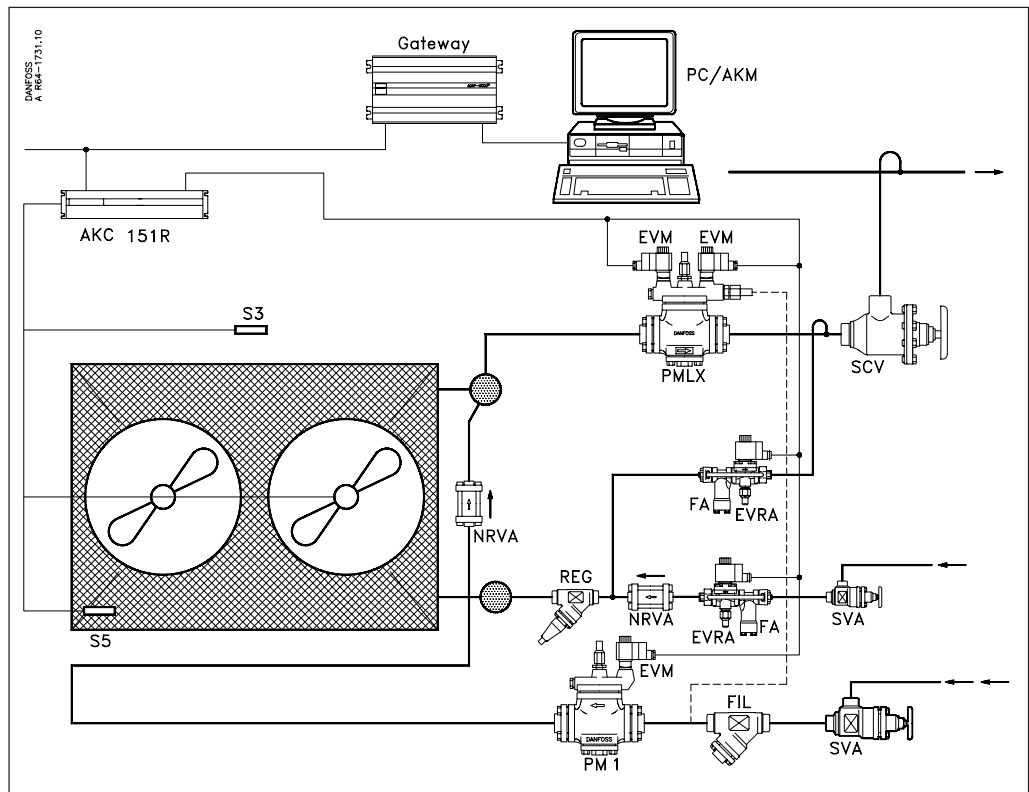
Display

A display can be connected which will show the air temperature.

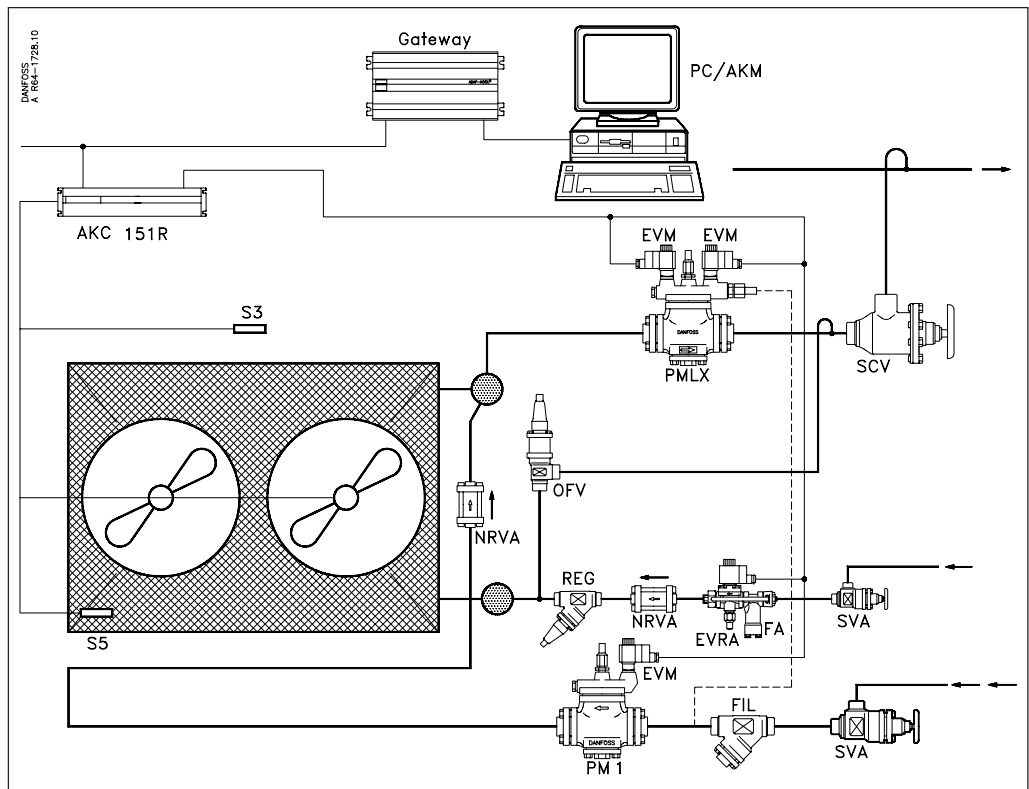


Application samples

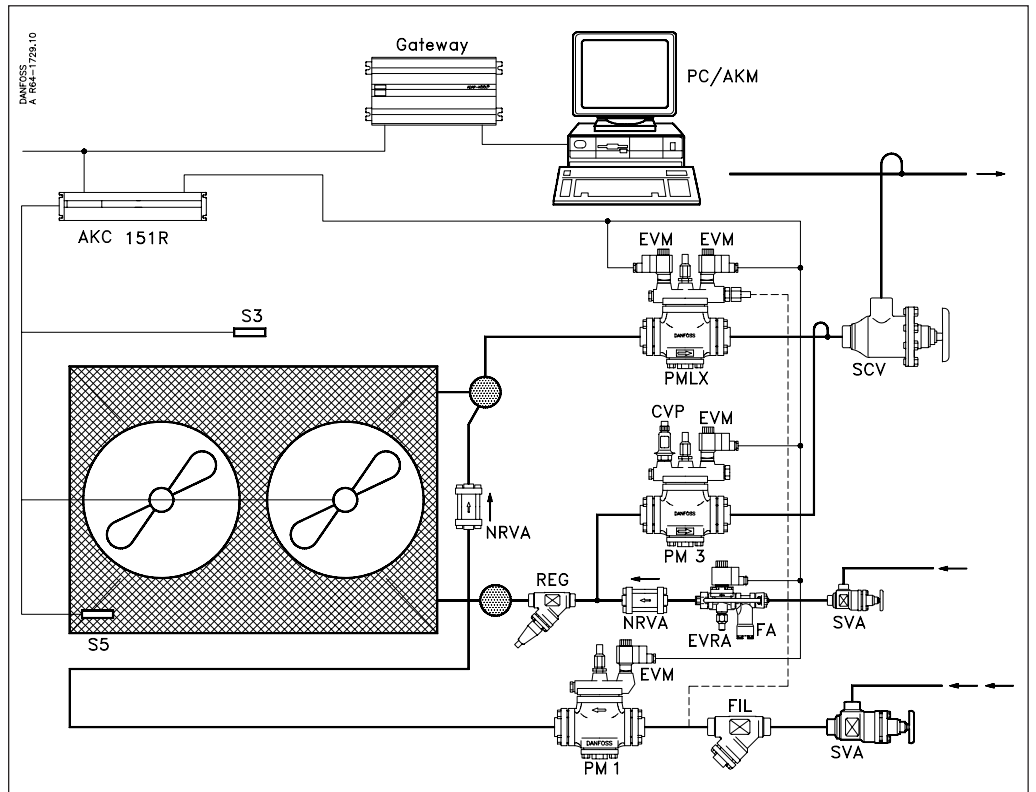
Flooded air cooler for pumped ammonia liquid supply.
Hot gas defrost with liquid drain through the throttle valve and two step opening of the main valve.



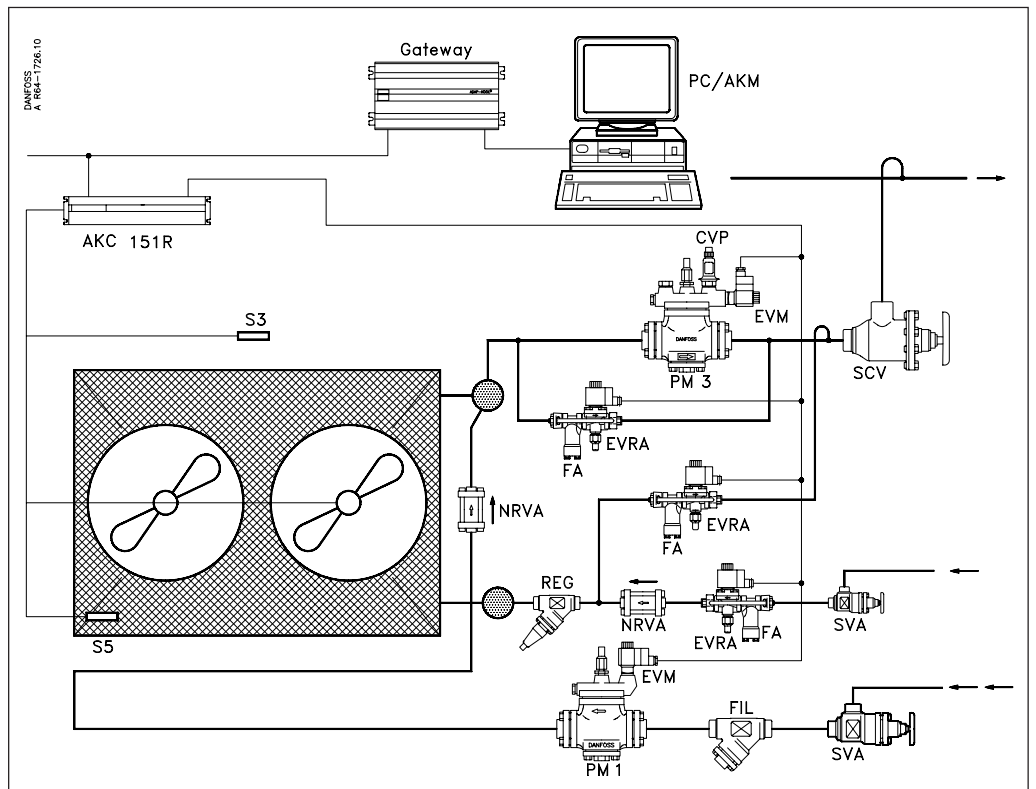
Flooded air cooler for pumped ammonia liquid supply.
Hot gas defrost with pressure controlled drain valve and two step opening of the main valve.



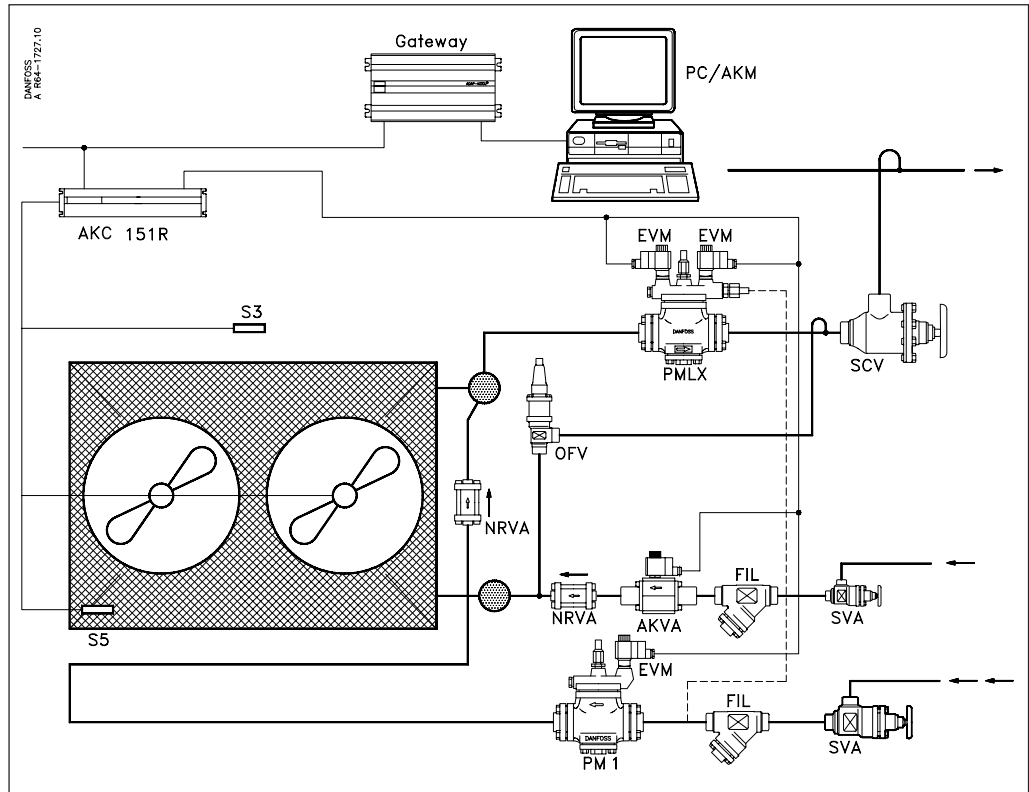
Flooded air cooler for pumped ammonia liquid supply.
 Hot gas defrost with solenoid and pressure controlled drain valve.
 Two step opening of the main valve.



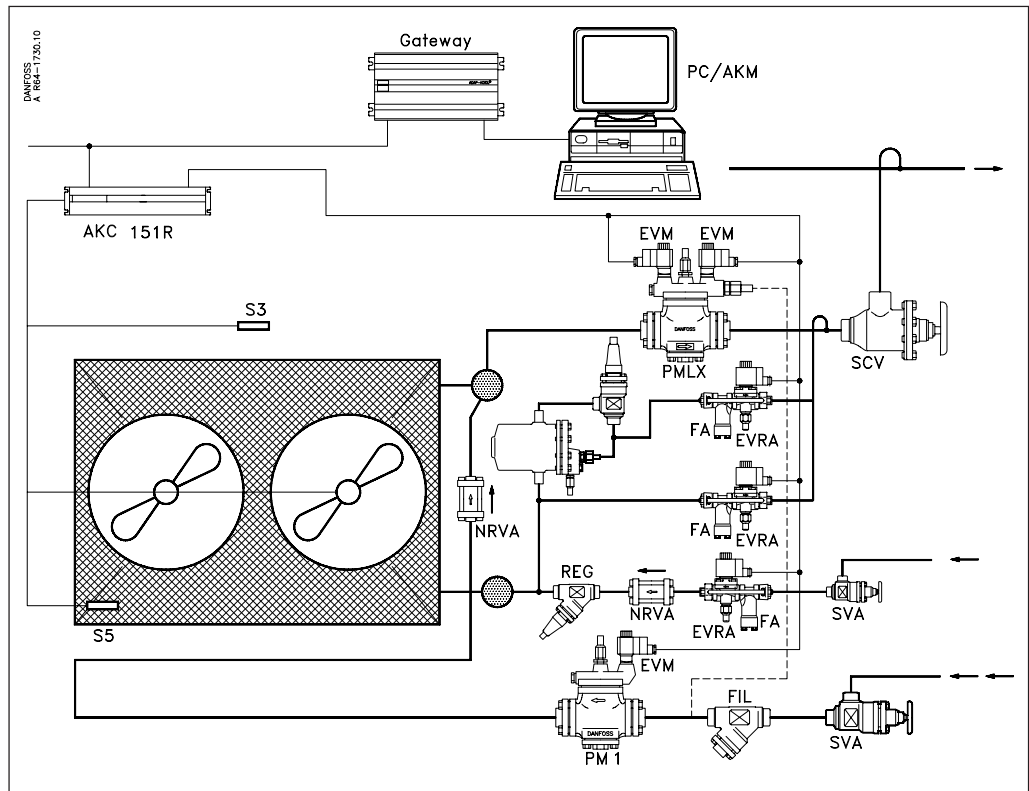
Evaporator pressure controlled flooded air cooler with pumped ammonia liquid supply and hot gas defrost.
 Pressure equalisation of main valve after defrost.



Flooded air cooler with Pulse Width Modulated liquid valve for pumped ammonia liquid supply. Hot gas defrost with pressure controlled drain valve and two step opening of the main valve.



Flooded air cooler for pumped ammonia liquid supply. Hot gas defrost with float controlled drain valve and two step opening of the main valve.



Technical data

Supply voltage	230 V +10/-15%, 50/60 Hz Power consumption: 10 VA		
Sensor inputs	Pt 1000	Saux1, Saux2:	General purpose sensors
		S3, S4	Thermostat sensors
		S5	Defrost termination sensor
On / Off inputs	Contact function *)	S6	Night setback (when closed)
		D1	Forced cooling (when closed)
	230 V a.c.	On	Start/stop of cooling (230 V a.c. ON)
		DEF.START	Defrost start (230 V a.c. ON)
ON/OFF outputs (230 V)	Semiconductor	AKV (Mosfet)	Liquid line valve (EVRA or AKVA) **)
		FAN (triac)	Evaporator fans
	Relay: AC-1 (ohmic): 6 A AC-15 (inductive): 3 A	HP BYPASS:	Liquid drain when defrosting
		SUCTION:	Suction line valve (PML/X)
		COMPRES:	Compressor ON/OFF
		ALARM:	Common alarm output
	HOTGAS	Hot gas line valve	
Ambient temperature	During operation	0 - +55°C	
	During transport	-50 - +70°C	
Enclosure	Material	Anodised aluminium (End covers of plastic)	
	Density	IP30(32)	
	Weight	1.5 kg	
	Mounting	On wall or DIN rail	
Operation	Control panel type AKA 21 or PC with software type AKM		

*) To achieve a reliable switching, we recommend to use relays or switches with fine silver or fine grain silver contacts (Ag/AgNi0.15). These contacts may eventually be gold plated (Ag + Au).

**) The AKV output requires a coil for 230 V direct current.

Ordering

Type	Function	Code no.
AKC 151R	Evaporator control	084B6195

Literature

AKC 151R	Menu operation via AKA 21	RC4JC
	Instructions	RI4JS
	Settings	RI4JT
Common	Installation guide for data communication cable	RC0XA
	Operation of ADAP-KOOL® Refrigeration controls	RC0XL
	Catalogue	RK00H

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