

AK-PC 551 Refrigeration Controller

Technical brochure

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Introduction

This technical brochure will give you a short introduction to the AK-PC 551 pack controller. With an application example, it is shown how easy the controller is configured and operated through the graphical display.



The AK-PC 551 is a pack controller for 1 or 2 suction groups of compressors and a common condenser.

AK-PC 551 supports a variety of compressor combinations including variable speed, Digital scroll and Stream 4 cylinder compressors. Additionally it offers a large number of energy saving functions and optimization features.

AK-PC 551 can be fully configured through a LCD display. The LCD display can be built in and/or be a remote connected display.

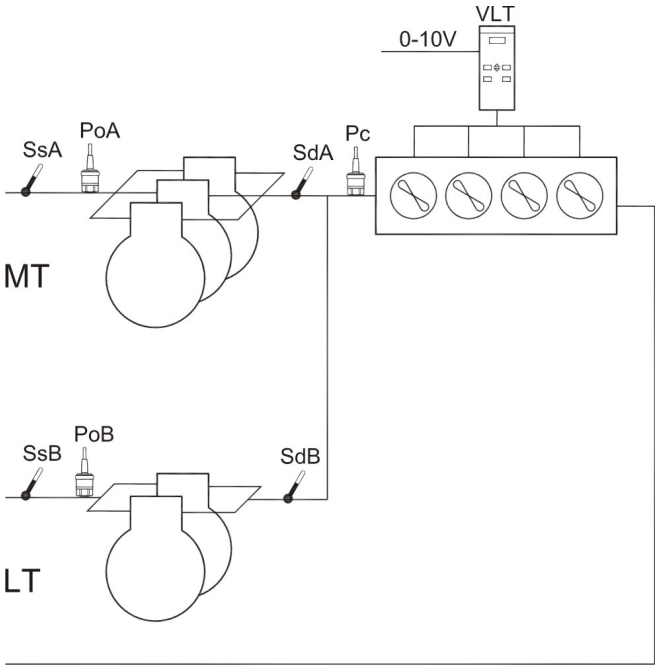
AK-PC 551 has a compact size of 8 DIN modules. All inputs and outputs can be configured for a variety of functions making the controller highly adaptable to any pack application.

AK-PC 551 can be connected into a MODBUS communication network and is available with 24 Vac or 110-230 Vac power supply.

Applications

AK-PC 551 is used for capacity control of compressors and condenser fans on small to medium sized refrigeration systems. It covers the following main applications:

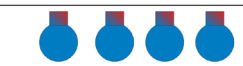
- One compressor group (max. 8 relays) and one condenser group
- Two compressor groups (max. 4 relays per group) and a common condenser



Introduction

Compressor combinations

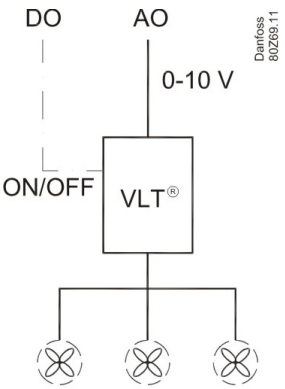
The compressor capacity can be controlled according to the suction pressure Po or a media temperature sensor S4.
AK-PC 551 covers a variety of compressor combinations.

Application	Description
	**Single step** Single step compressors of same size
	**Speed on lead** Speed compressor of one size single step compressors of another size
	**Digital scroll on lead** Digital scroll of one size single step compressors of another size
	**stream 4 cyl. on lead** 4 cylinger stream compressor of one size and single step compressors of same size
	**Multistep on lead** Multistep compressor and single step compressors of same size
	**Multistep compressors** Multistep compressors with same no. of unloader valves and of same size

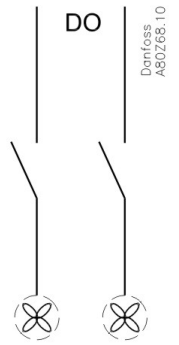
Condenser combinations

The condenser capacity can be controlled according to the condensing pressure Pc or a media temperature sensor S7
The condenser can be controlled in two ways:

- Speed control of all fans
- Step control of single fans



Speed control of all fans

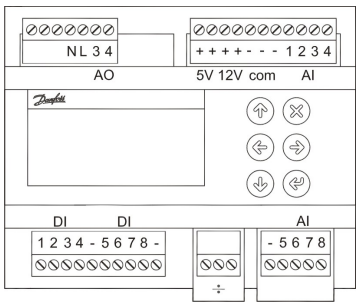


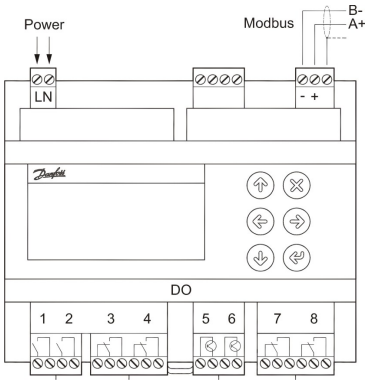
Step control of all fans

Inputs and outputs

All in- and outputs of an AK-PC 551 controller can be configured for various functions and signal types:

- 8 analogue inputs for pressure transmitters and temperature sensors.
- 6 digital relay outputs for compressors, fans, alarm.
- 2 digital solid state outputs for PWM control of Digital scroll or Stream compressor. If not used for this purpose they can be used as normal relay outputs.
- 2 analogue outputs for speed control of compressors and condenser fans.





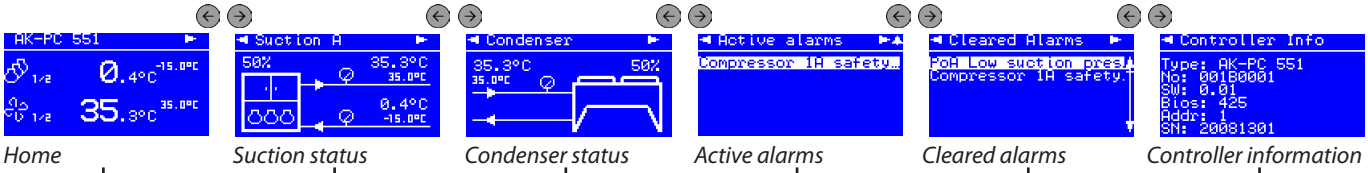
Basic Operation

Configuration and daily operation of AK-PC 551 is done via the built-in display or via a remote connected display. The display supports multiple languages and engineering units.

For a full description of the controller parameters please see the manual RS8GY

Status

Get an overview of how the system is running in the status screens. Use the LEFT / RIGHT buttons to view the status screens.



Home *Suction status* *Condenser status* *Active alarms* *Cleared alarms* *Controller information*

From any status screen press ENTER for 2 sec. to access main menu

Press ESCAPE to go one level back

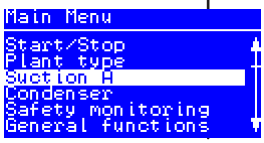
Password

Parameters and menus are protected by a password that gives access on 3 different user levels.

Level 0: See parameters (000)
Level 1: Change weekly schedule (100)
Level 2: Change control setpoints (200)
Level 3: Change configuration setpoints (300)



Press ESCAPE to go back to status
Press UP to decrease digit
Press DOWN to increase digit
Press LEFT / RIGHT to go to next / previous digit
Press ENTER to login



The password cannot be reset, so please remember the (level 3) password.

Logout

Go to the "Home" screen and hold down the X key for 5 seconds to logout.

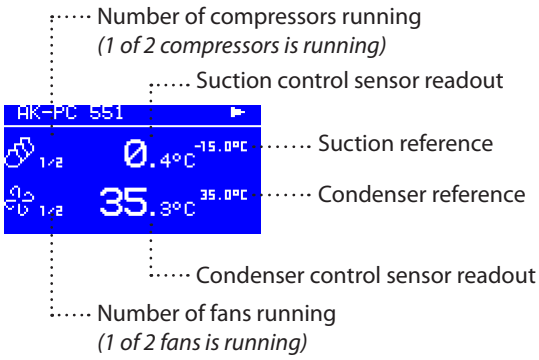
Setup & service

In the main menu you will find all control parameters divided into sub menus.

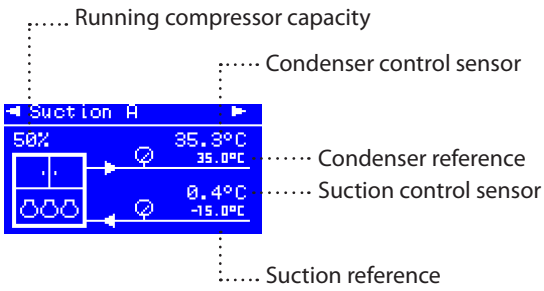
Basic Operation

The number of status screens and the presented data depends upon the configured application.

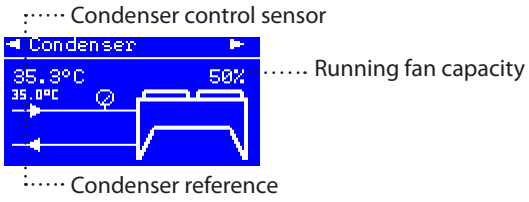
Home



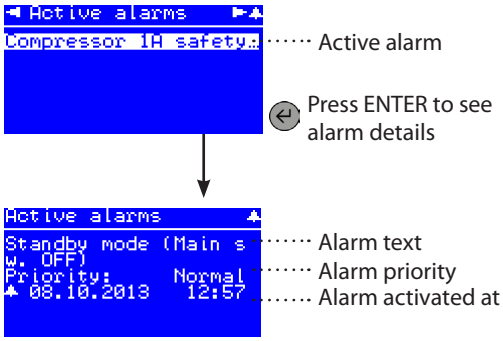
Suction status



Condenser status

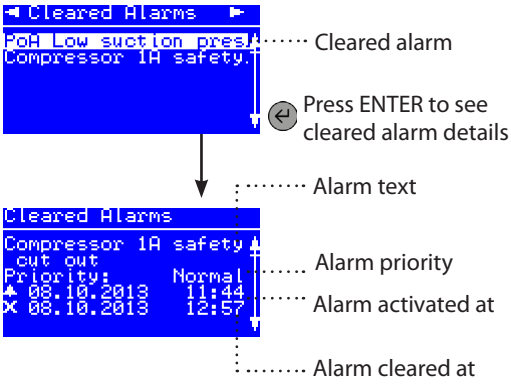


Active alarms

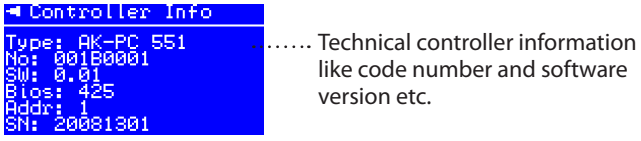


To clear an alarm press ESC (X) for 2 sec.

Cleared alarms



Controller information

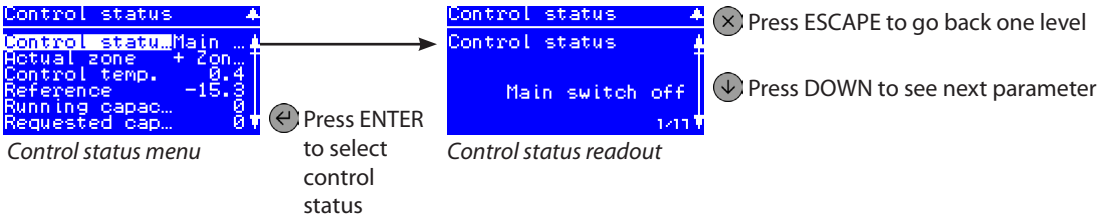


Basic Operation

View parameters

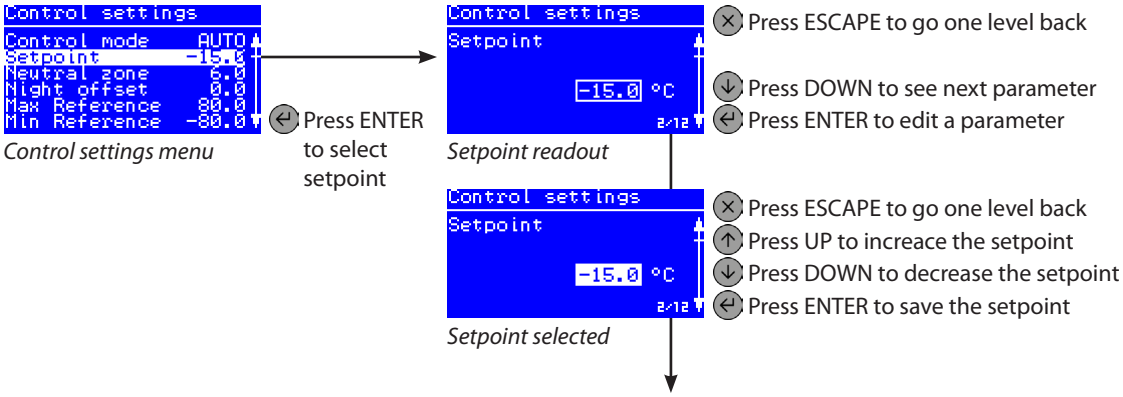
The display will only present parameters that are valid for the configured application e.g. if 4 compressors are selected only 4 are showed.

A *partly highlighted* row indicates that a parameter can be viewed and not changed.

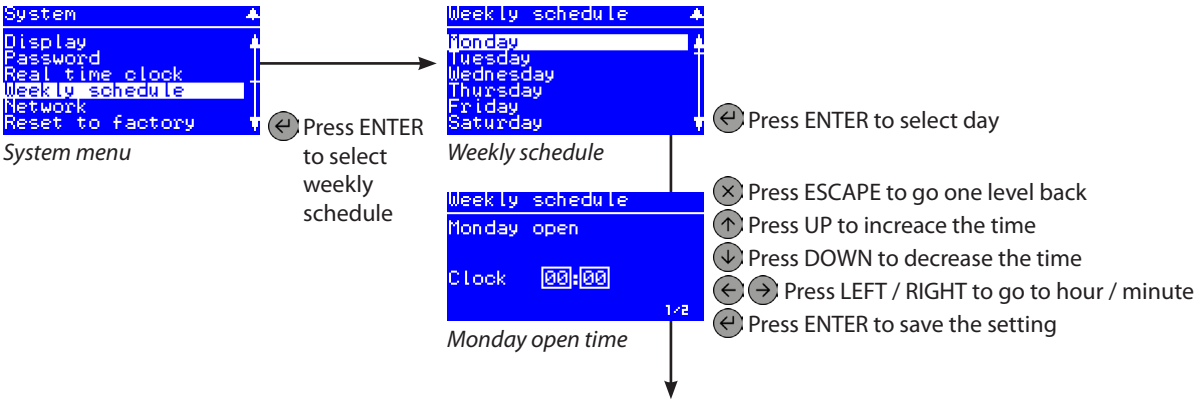


Change parameters

A *full highlighted* row indicates that a parameter can be changed.
A changable parameter has a frame around the setting.



Day / night schedule



First time start up

Configuration

After installation the controller must be configured for an application. Once power is applied to the controller, the "Power on" screen will appear.

Use one of the three options to configure the controller:

- Setup wizard
- Quick configuration
- Parametric setup



Power on screen

Press ENTER for 2 sec. and enter password (300) to access quick start



Quick start

Setup wizard
Setup wizard is a step by step up and running guideline, setting up inputs and outputs automatically.

Quick configuration
Quick configuration is a series of preconfigured applications, setting up inputs and outputs automatically.

Parametric setup
Parametric setup is for the expert user, who wants to set each parameter individually, adjust or finetune settings.

Example: Application

Application: Digital scroll

The configuration and daily operation of the AK-PC 551 will be explained via an application example:

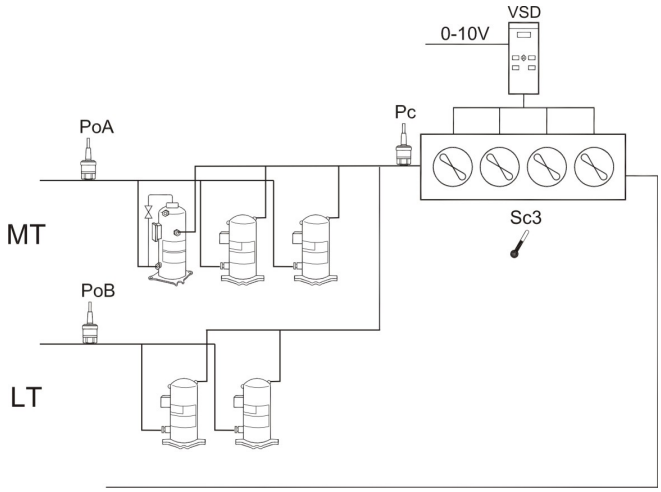
AK-PC 551 controls a refrigeration system with two suction groups of compressors and a common air cooled condenser.

Refrigerant: R404A

Suction group MT:
1 digital scroll compressor
2 single step scroll compressors
Control according to suction pressure Po
Set point -15 °C
Monitoring of discharge temperature of digital scroll

Suction group LT:
2 single step scroll compressors
Control according to suction pressure Po
Set point -30°C

Condenser:
Speed control of 4 fans
Common safety monitoring of fans
Relay output for start/stop of VSD
Control according to condensing pressure Pc
Floating reference according to Sc3 outdoor temp.



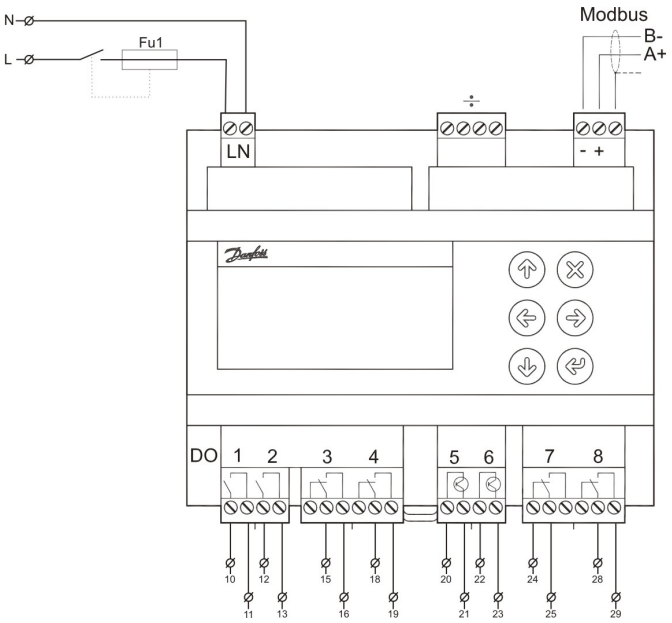
Example: Wiring Diagram

Electrical wiring

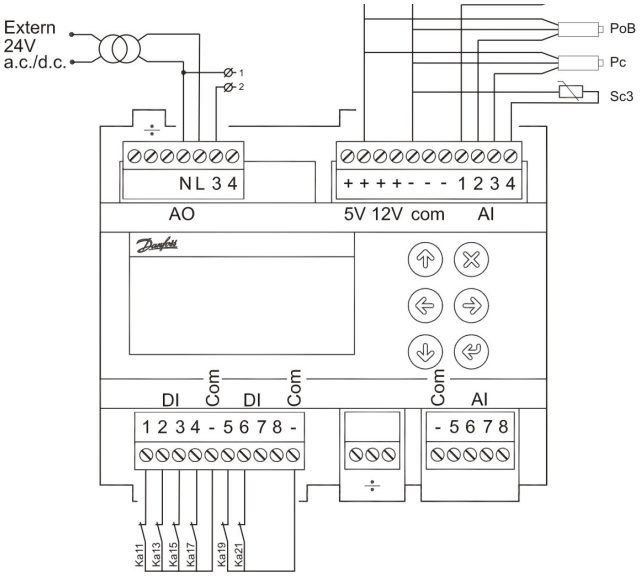
The electrical wiring is laid out according to the wizard rules for assigning functions to the inputs and outputs

DO	Function	DI	Function	AO	Function	AI	Function
DO1	Com. 1A	DI1	Comp. 1A safety	AO3	Fan VSD	AI1	PoA suction pressure
DO2	Comp. 2A	DI2	Comp. 2A safety	AO4		AI2	PoB suction pressure
DO3	Comp. 3A	DI3	Comp. 3A safety			AI3	Pc condensing pressure
DO4	Comp. 1B	DI4	Comp. 1B safety			AI4	Sc3 outdoor temp.
DO5	Comp. 1A PWM	DI5	Comp. 2B safety			AI5	Sd Comp. 1A
DO6	Comp. 2B	DI6	Fan safety			AI6	
DO7	Fan VSD	DI7				AI7	
DO8		DI8				AI8	
DO8		DI8				AI8	

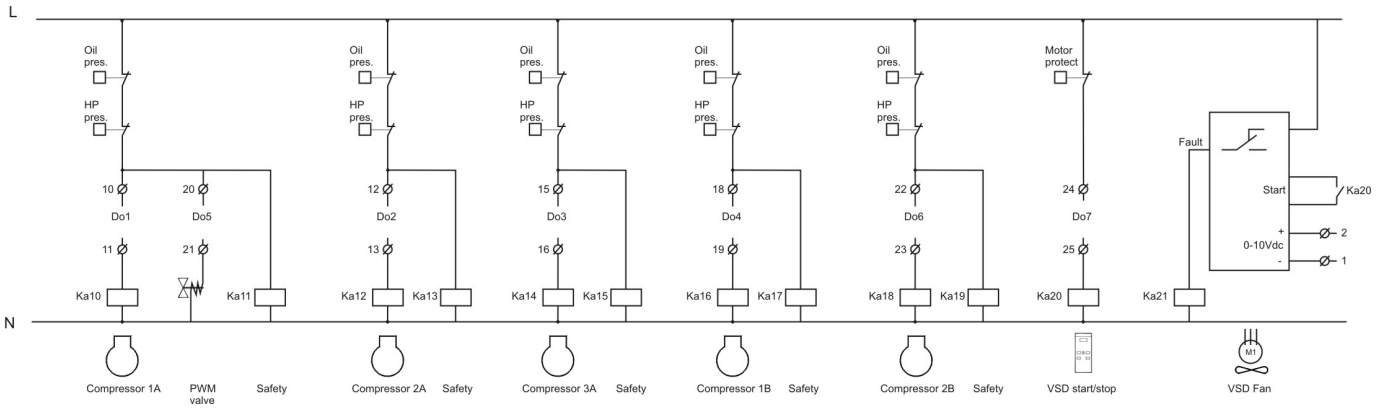
Connection, lower level



Connection, upper level



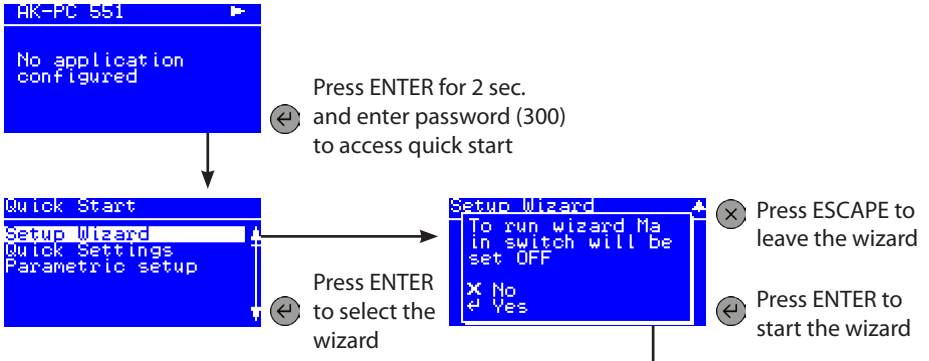
Electrical diagram



Example: Wizard

Wizard setup

In this example we will use the wizard to configure the controller.



General

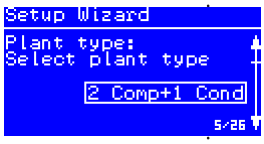
In the first general screens you must select how data are presented in the display. Please note that the "Control setup unit" decides whether the control set points are presented in pressure units or temperature units (saturated temperature).



Wizard screens:	Settings:
Language:	*English*
Control setup unit:	*Sat. temp*
Temperature units:	*°C*
Pressure units:	*Bar*

Plant type

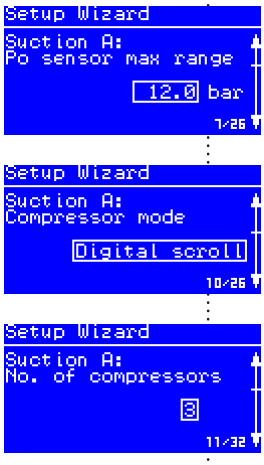
Select the overall application of the controller and the refrigerant type.



Select plant type:	*2 comp + 1 cond*
Refrigerant type:	*R404A*

Suction A and B

Set the compressor combination as well as the compressor sizes, control sensor and set point. The pressure range of the pressure transmitter can be set.

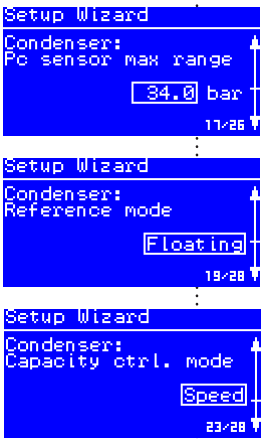


Suction A	
Po sensor max. range:	*12.0 bar*
Po sensor min. range:	*-1.0 bar*
Setpoint:	*-15 °C*
Compressor mode:	*Digital scroll*
No. of compressors:	*3*
Lead compressor size:	*5 kW*
Comp. size:	*5 kW*

Suction B	
Po sensor max. range:	*12 bar*
Po sensor min. range:	*-1.0 bar*
Setpoint:	*-30 °C*
Compressor mode:	*Single step*
No. of compressors:	*2*
Comp. size:	*3 kW*

Example: Wizard

Condenser
Set the condenser control as well as control sensor and reference settings. The pressure range of the pressure transmitter can be set.



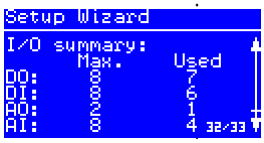
Pc sensor max. range:	*34.0 bar*
Pc sensor min. range:	*-1.0 bar*
Reference mode:	*Floating*
Setpoint:	*30 °C*
Min. reference:	*15 °C*
Max. reference:	*45 °C*
Capacity ctrl. mode:	*Speed*
No. of fans:	*1*
VSD Start via DO:	*Yes*
Monitor fan safety:	*Common*

Extra
Select whether to use an alarm relay and Modbus network address.

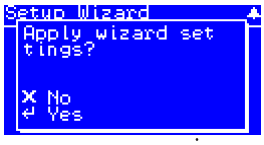


Alarm output:	*No relay*
Modbus address:	*100*

Summary
Get an overview of the inputs and outputs generated by the wizard.

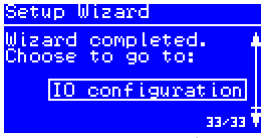


Apply wizard settings
Press ENTER to apply the wizard settings to the controller including automatic assignment requested inputs and outputs.



Next step
Select which main menu to go to. Press DOWN to go to the selected menu.

It is recommended to check the IO (input / output) configuration before starting the controller.



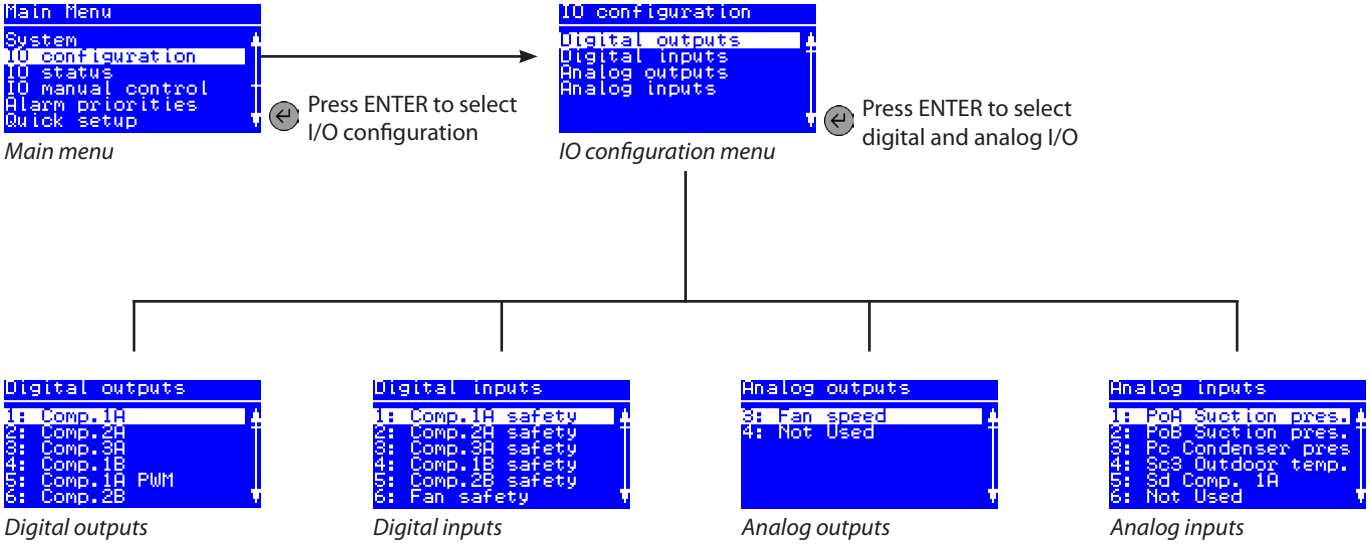
↓ Press DOWN to go to the selected menu and finish the wizard

Example: Check IO configuration

Wizard assignment of inputs and outputs (I/0)

Once the wizard is applied, the IO functions are automatically assigned to hardware inputs and outputs.

The screens below shows how the IO functions are assigned according to the example.



Main menu *IO configuration menu* *Digital outputs* *Digital inputs* *Analog outputs* *Analog inputs*

Assignment of inputs and outputs

The table indicates rules for assignment of inputs and outputs via the wizard.

Digital outputs (DO1-DO8)	Digital inputs (DI1-DI8)	Analog outputs (AO3 – AO4)	Analog inputs(AI1-AI8)
PWM outputs for capacity control of Digital scroll or Stream 4 compressor are placed on the solid state relays DO5 and DO6	Compressor safety inputs for respectively suction group A and B	Speed control of compressor for respectively suction group A and B	PoA og PoB suctionpressure are placed on AI1 and AI2
Starting from DO1:	Fan safety inputs	Speed control of condenser	Pc condensing pressure is placed on AI3
Compressor start relays followed by unloading valves for respectively suction group A and B	External Main switch (ON/ OFF) *		Sc3 outdoor temperature is placed on AI4
Condenser fan	HP safety switch*		S4A and S4B suction media temperature sensors *
Injection ON for A/B *	LP safety switch *		S7 condenser media temperature sensor *
Alarm relay	Night setback *		Sd komp. 1 discharge temp. sensor for digital scroll/Stream compressor for suction A and B
	Heat recovery *		Ss suction gas temperature for suction group A and B *
	Load shedding *		Sd discharge temperature for suction A and B *
	General alarm inputs 1-3 *		Saux for general thermostat *

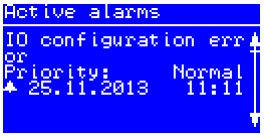
** Special features to be enabled through configuration screens. Not part of the wizard setup.*

Example: Check IO configuration

IO configuration error

If you get an "IO configuration error" alarm after setting main switch in ON position, the reasons can be:

- Not all enabled IO functions have been assigned to a hardware input or output
- The number of enabled IO functions exceeds the number of available inputs or outputs of the controller

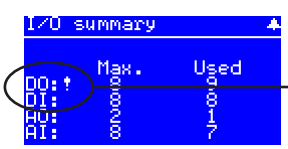


Alarm:
IO configuration error

IO summary
Go to Main menu -> IO Status -> IO summary

If the number of enabled IO functions exceeds the maximum number supported by the hardware, an exclamation mark "!" will be shown at the IO type in question. This means that you will have to disable some of the IO functions via the configuration menus of the suction groups and condenser in order not to exceed the maximum available inputs or outputs.

If no exclamation mark is shown it means that at least one IO function has not been assigned to a hardware input or output. This means that you will have to go into the IO configuration menu of each IO type, select a free input/output and select the missing function (if a function is selectable this is the reason for the IO configuration error alarm).



I/O summary

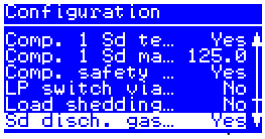
An exclamation mark is shown when max. number of IO is exceeded !

Example: Add extra I/O

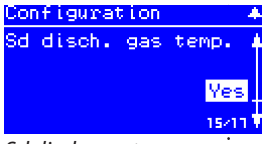
Add extra I/O
The wizard covers all basic functions of the AK-PC 551 pack controller. Additional features can be set through the configuration screens of the suction group or the condenser.

In this example we will add a Sd discharge temperature monitoring of both suction groups.

1. Enable Sd temperature monitoring in suction group A and B
Go to Main menu -> Suction A ->Configuration

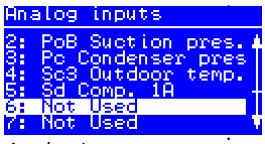


Configuration menu



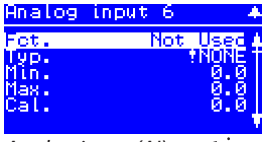
Sd discharge temp.

2. Assign the two Sd discharge temperature sensors to free analog inputs
Go to Main menu -> IO configuration of analog inputs (AI)

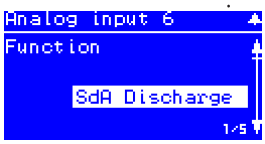


Analog inputs menu

3. Select the Sd A and Sd B discharge sensors for respectively AI6 and AI7



Analog input (AI) no. 6



AI no. 6 function

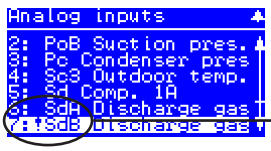
Please notice that it is only functions that are enabled in the suction/condenser configuration menus that are selectable in the IO configuration.

PWM outputs for Digital scroll or Stream compressors can only be selected on the solid state relays DO5 and DO6.

Pressure transmitters with current signals of 0-20mA or 4-20mA are only supported on AI1-AI4.

If a function has been assigned to an input or output and the same function has been deselected in the suction/condenser configuration afterwards, the IO configuration will show an exclamation mark at the function. This is done in order to show that an IO point is occupied by a function which is not used by the controller.

In this situation you should either enable the function again in the suction/condenser configuration menus or deselect the function in the IO configuration.



Analog inputs

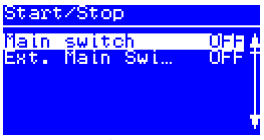
An exclamation mark is shown when an IO point is occupied by a function which is not used by the controller.

Example: Check I/O wiring

Initialize the controllers IO configuration

1. Set main switch in ON position
Go to Main menu -> Start/Stop

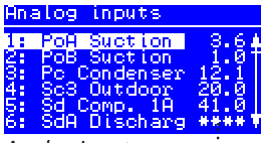
Set main switch ON



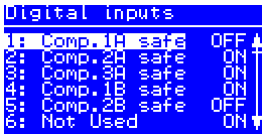
Main switch menu

2. Check correct reading of inputs and outputs in the IO status menus
Go to Main menu -> IO Configuration -> Analog/Digital inputs

Check correct status of all inputs.



Analog inputs

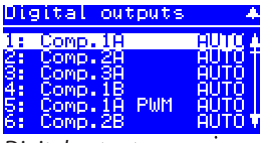


Digital inputs

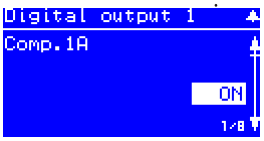
*The stars "****" indicates that sensor error is detected or not intialized (main switch ON).*

3. Check correct wiring of the outputs via the IO manual control menus
Go to Main menu -> IO Configuration -> Analog/Digital outputs

Check correct electrical wiring by manually overriding the outputs.



Digital outputs



Digital output 1 ON

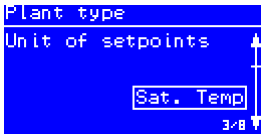
Network setup

AK-PC 551 can be integrated into a Modbus communication network. It is important that the installation of the communication cable is done correctly. Also remember correct termination at both ends of the cable.
Please refer to separate literature no. RC8AC

When AK-PC 551 is integrated into an ADAP-KOOL® network with a system manager of the types AK-SC 355 or AK-SM 850 it is important that some settings are set correctly.

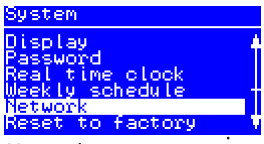
1. Set unit of setpoints
Go to Main menu -> Plant type

The "Unit of setpoints" has to be set up before the controller is scanned on the network. This is required in order for the front end (AK-SC 355 or AK-SM 850) to present settings/readings in the correct units (saturated temperature or pressure).



Unit of setpoints

2. Set network address
Go to Main menu -> System -> Network

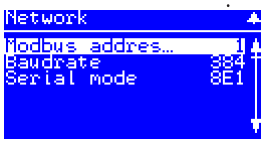


Network

3. Set the Modbus address in the range 1-199
- assuring that the selected address is not occupied by another controller on the network.

4. Make sure that the Baud rate of the controller is set to "384"
(38400 bits per second)

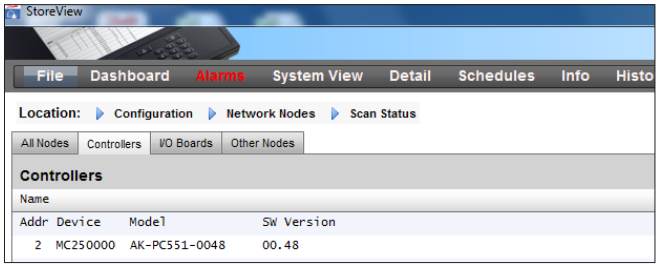
5. Make sure that the serial mode is set "8E1"



Modbus address and Baudrate

When a network scan is carried out the controller will be identified as:

- "AK-PC 551 - xxxx (MC250000)" - if the control setup unit is saturated temperature.
- "AK-PC 551 - xxxx (MC250001)" - if the control setup unit is pressure.



Scanned controllers shown in the front end

You can check the scanned controller in the front end in the menu entry:
Configuration -> Network Nodes -> Scan Status

The AK-SM 850/AK-SC 355 must have software version G03.090 or higher in order to support AK-PC 551. The software version can be found in menu entry:
Info -> Information -> SW version

Example: Quick configuration

Quick configuration

As an alternative to the wizard, the controller can be set up by selecting one of the preconfigurations defined in the controller. Please refer to the application table (on page 18) for a full description of all selectable preconfigurations and the associated input and output wiring.

A quick configuration is done in five steps:

1. Select a quick setting
2. Set language
3. Set unit of setpoints
4. Set refrigerant type
5. Set main switch on

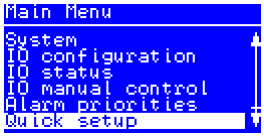
1. Select quick setting
Go to Main menu -> Quick setup or select Quick settings at start up.

In this example is used the preconfiguration number 17:
3CDA + 2CB+FS

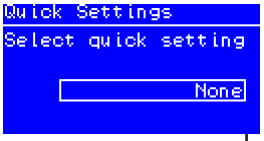


Quick Start menu

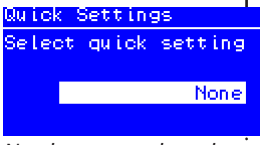
Press ENTER to select the quick settings



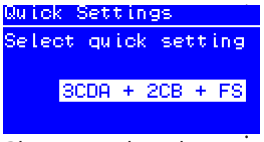
The Quick setup can (after first time setup) be accessed from the main menu.



Quick setting



No plant type selected



Plant type selected

After pressing ENTER the selection goes back to "None" and the selected preconfiguration is loaded into the controller.

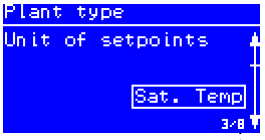
2. Set language
Go to Main menu -> System -> Display



Language

Default is "English"

3. Set unit of setpoints
Go to Main menu -> Plant type

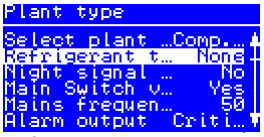


Unit of setpoints

Default is "Sat. Temp."

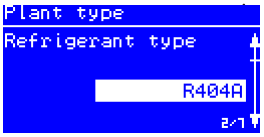
Example: Quick configuration

4. Set refrigerant type
Go to Main menu -> Plant type



Default is "None"

Refrigerant menu

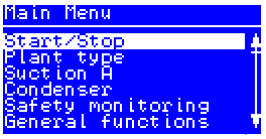


Refrigerant type R404A

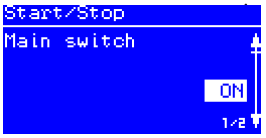
By default the Quick configuration will assign AKS32R type pressure transmitters for the suction and condensing pressure with -1 to 12 bar and -1 to 34 bar pressure ranges.

It is recommended to check the IO (input / output) configuration before starting the controller.

5. Set main switch ON
Go to Main menu -> Start/Stop -> Main switch



Start/Stop menu



Main switch on

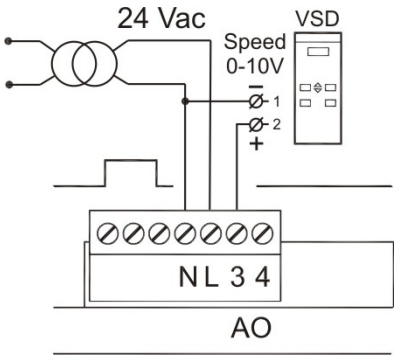
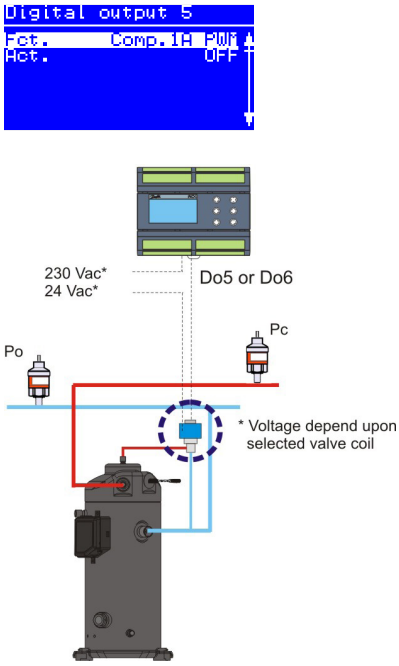
Application table

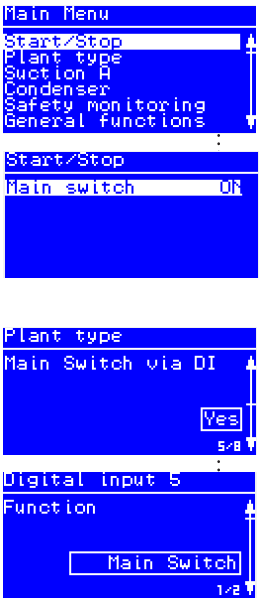
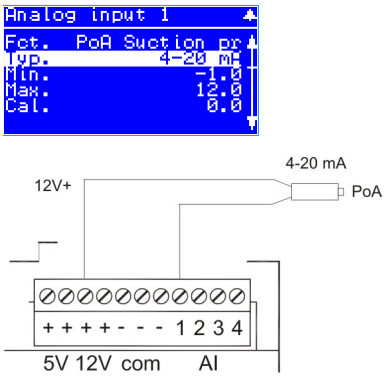
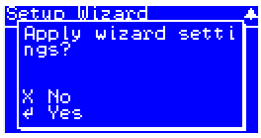
The application table shows the selectable preconfigurations number, type of compressors and condensor fans. For more details see the quick configuration table.

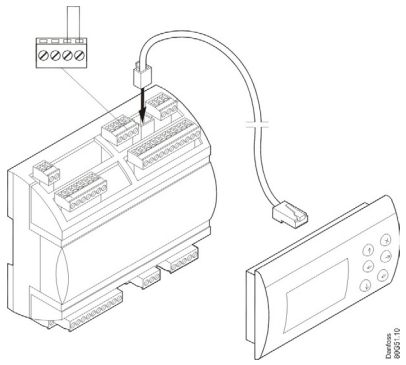
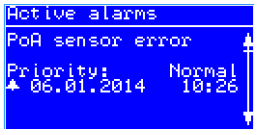
App. no.	Display views	Suction group A			Suction group B	Condenser	
		Speed	Digital (Scroll / steam)	1-step	1-step	Step	Speed
17	3CDA + 2CB + FS		1	2	2		x
16	2CDA + 2CB + 3F		1	1	2	3	
15	3CSA + 2CB + FS	1		2	2		x
14	2CSA + 2CB + 3F	1		1	2	3	
13	4CA + 3CB + FS			4	3		x
12	3CA + 2CB + FS			3	2		x
11	2CA + 2CB + 3F			2	2	3	
10	4CDA + FS		1	3			x
9	3CDA + FS		1	2			x
8	3CDA + 3F		1	2		3	
7	2CDA + 2F		1	1		2	
6	4CSA + FS	1		3			x
5	4CA + FS			4			x
4	4CA + 4F			4		4	
3	3CSA + FS	1		2			x
2	3CA + FS			3			x
1	3CA + 3 F			3		3	
0	None	After selection the setting returns to "None"					

App. no.	Display views	Outputs										Inputs															
		On/Off								Analog		Analog								Digital							
		DO1	DO2	DO3	DO4	DO5	DO6	DO7	DO8	AO3	AO4	AI1	AI2	AI3	AI4	AI5	AI6	AI7	AI8	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8
17	3CDA + 2CB + FS	C1A	C2A	C3A	C1B	C1A PWM	C2B	Fan VSD	Alarm		Fan Speed	PoA	PoB	Pc	Sc3	SdA Digi				C1A	C2A	C3A	C1B	C2B		Main Sw.	Fan safe.
16	2CDA + 2CB + 3F	C1A	C2A	C1B	C2B	C1A PWM	Fan1	Fan2	Fan3			PoA	PoB	Pc	Sc3	SdA Digi				C1A	C2A	C1B	C2B			Main Sw.	Fan safe.
15	3CSA + 2CB + FS	C1A	C2A	C3A	C1B	C2B		Fan VSD	Alarm	C1A Speed	Fan Speed	PoA	PoB	Pc	Sc3					C1A	C2A	C3A	C1B	C2B		Main Sw.	Fan safe.
14	2CSA + 2CB + 3F	C1A	C2A	C1B	C2B	Fan1	Fan2	Fan3	Alarm	C1A Speed		PoA	PoB	Pc	Sc3					C1A	C2A	C1B	C2B			Main Sw.	Fan safe.
13	4CA + 3CB + FS	C1A	C2A	C3A	C4A	C1B	C2B	C3B	Alarm		Fan Speed	PoA	PoB	Pc	Sc3					C1A	C2A	C3A	C4A	C1B	C2B	C3B	Fan safe.
12	3CA + 2CB + FS	C1A	C2A	C3A	C1B	C2B		Fan VSD	Alarm		Fan Speed	PoA	PoB	Pc	Sc3					C1A	C2A	C3A	C1B	C2B		Main Sw.	Fan safe.
11	2CA + 2CB + 3F	C1A	C2A	C1B	C2B	Fan1	Fan2	Fan3	Alarm			PoA	PoB	Pc	Sc3					C1A	C2A	C1B	CB2			Main Sw.	Fan safe.
10	4CDA + FS	C1	C2	C3	C4	C1 PWM		Fan VSD	Alarm		Fan Speed	PoA		Pc	Sc3	SdA Digi				C1	C2	C3	C4			Main Sw.	Fan safe.
9	3CDA + FS	C1	C2	C3		C1 PWM		Fan VSD	Alarm		Fan Speed	PoA		Pc	Sc3	SdA Digi				C1	C2	C3				Main Sw.	Fan safe.
8	3CDA + 3F	C1	C2	C3	Fan1	C1 PWM	Fan2	Fan3	Alarm			PoA		Pc	Sc3	SdA Digi				C1	C2	C3				Main Sw.	Fan safe.
7	2CDA + 2F	C1	C2	Fan1	Fan2	C1 PWM			Alarm			PoA		Pc	Sc3	SdA Digi				C1	C2					Main Sw.	Fan safe.
6	4CSA + FS	C1	C2	C3	C4			Fan VSD	Alarm	C1 Speed	Fan Speed	PoA		Pc	Sc3					C1	C2	C3	C4			Main Sw.	Fan safe.
5	4CA + FS	C1	C2	C3	C4			Fan VSD	Alarm		Fan Speed	PoA		Pc	Sc3					C1	C2	C3	C4			Main Sw.	Fan safe.
4	4CA + 4F	C1	C2	C3	C4	Fan1	Fan2	Fan3	Fan4			PoA		Pc	Sc3					C1	C2	C3	C4			Main Sw.	Fan safe.
3	3CSA + FS	C1	C2	C3				Fan VSD	Alarm	C1 Speed	Fan Speed	PoA		Pc	Sc3					C1	C2	C3				Main Sw.	Fan safe.
2	3CA + FS	C1	C2	C3				Fan VSD	Alarm		Fan Speed	PoA		Pc	Sc3					C1	C2	C3				Main Sw.	Fan safe.
1	3CA + 3 F	C1	C2	C3	Fan1	Fan2	Fan3		Alarm			PoA		Pc	Sc3					C1	C2	C3				Main Sw.	Fan safe.
0	None																										

Frequently asked questions (FAQ)

Question	Solution	
How to connect variable speed drive (VSD)?	The analogue outputs AO3 and AO4 of the AK-PC 551 pack controller is galvanic separated from the other inputs and outputs of the controller. So if the AK-PC 551 controller is ordered for 24Vac supply voltage, you can use the same 24Vac transformer for power supply of the controller and for supply of the analogue outputs. It is recommended to use a double isolated transformer (Class II) as this type does not need to be connected to protective earth on the secondary side. This will prevent any ground loops between the AK-PC 551 pack controller and the variable speed drive connected to AO3 or AO4.	 *Example: Variable speed drive connected to AO3*
How to connect the PWM valve of a digital scroll compressor?	The Pulse Width Modulated valve (PWM) of a digital scroll compressor must be connected to one of the solid state relays (SSR) of AK-PC 551 - which are the outputs DO5 or DO6. The PWM valve function cannot be selected for any of the other digital outputs. The PWM valve of the digital scroll compressor works in such a way that when voltage is supplied to the valve, the digital scroll compressor is unloaded and when no voltage is supplied to the valve, the digital scroll compressor is loaded. When the PWM valve signal is selected for DO5 or DO6, the polarity of the output signal is by default inverted and thereby the PWM valve of the digital scroll compressor can be connected directly to the AK-PC 551 without any intermediate relays.	 *Example: Wiring of PWM valve of digital scroll compressor to DO5/DO6 of AK-PC 551*

Question	Solution	
How to start and stop an AK-PC 551 pack controller?	The AK-PC 551 controller has two options for start/stop of control. Parameter set via the display: The parameter "Main switch" is used to start/stop control (see screen dumps) Optional start/stop via digital input signal: The AK-PC 551 controller can also be controlled via a digital input signal. This function is enabled in the Plant type menu and then set up in the IO configuration of digital inputs. If any of the two "Main switch" signals is in OFF position, the AK-PC 551 will stop all control, set all outputs in standby position and clear all active alarms. At the same time the controller will generate a special alarm "Standby mode alarm" in order to indicate that the controller has been stopped.	
How to setup and connect a pressure transmitter with 0-20 mA or 4-20 mA current signals?	Pressure transmitters with current output signals of 0-20 mA or 4-20 mA MUST be connected to one of the analogue input terminals AI1, AI2, AI3 or AI4. The signal type and signal range of the pressure transmitter is setup in the "IO configuration" menu for analogue inputs. In the example the suction pressure signal for suction group A, has been selected for analogue input 1 and the signal type is selected as "4-20mA". Please be aware that the minimum and maximum pressure ranges are set in relative pressure. The power supply for pressure transmitters with current signal must be connected to the 12 Vdc terminal of AK-PC 551. The signal wire must be connected to the analogue input pin in question.	
How does the wizard assign functions to inputs and outputs?	If the AK-PC 551 controller is configured via the wizard, the required functions are automatically assigned to inputs and outputs. At the end of the Setup wizard, the user is asked whether the controller should apply the settings made in the wizard. Please be aware that the wizard will overwrite all previous configurations, if the user selects to apply the wizard settings. Once the user selects to apply the wizard settings, the required functions are assigned to inputs and outputs based on simple priority rules. The rules can be seen in detail in the paragraph "Example: Check IO configuration"	

Question	Solution	
How to connect a remote display?	The remote MMIGRS2 display is connected to the controller via a cable that can be ordered with different lengths. When connecting the remote display, please remember to make a short circuit of the two rightmost terminals on the terminal block to the left of the cable connection – please refer to drawing.	
When are alarms cleared?	Normally alarms are automatically cleared as soon as the alarm condition is cleared. However, some safety alarms require that a safety restart delay has to expire before the alarm condition is cleared and normal control is resumed. This goes for the following safety alarms: • High condensing pressure • Low suction pressure • High discharge temperature Furthermore sensor alarms have a clearance delay of 10 minutes (default), which means that the sensor has to be OK for 10 minutes before the alarm is cleared. However normal control procedure will be resumed as soon as the sensor signal is OK. The reason for the delay is to avoid numerous alarms if a sensor has a bad electrical connection. Alarms can also be cleared manually by entering the alarm detail picture and pressing the "X" button for 3 seconds. If the alarm condition of a manually cleared alarm is still active the alarm will be raised again.	 *Press the X (escape) button for 3 seconds to clear alarms manually*

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