**Quick guide**

**Quick start**
1. Connect the controller according to the diagram in the “wiring” section.
2. Configure the $F$, $E$, and $S$ parameters according to the indications in the “Start up configuration”.

**Wiring**

![Wiring Diagram](image)

**Initial configuration**
Prior to start-up, it is vital to configure the following parameters:

- $F$: Select the type of refrigerant gas used in the installation from among the following compatible gases:
  - 0: R-22
  - 1: R-134A
  - 2: R-404A
  - 3: R-407C
  - 4: R-410A
  - 5: R-717
  - 6: R-23
  - 7: R-507C
  - 8: R-HFO1234ze
  - 9: R-744
  - 10: R-407A
  - 11: R-407F
  - 12: R-507A
  - 13: R-245F

- $E$: Select the expansion valve model installed from among the following compatible models:
  - 1: Danfoss ETS 12.5 / 25B
  - 2: Danfoss ETS 50B
  - 3: Danfoss ETS 300B
  - 4: Danfoss ETS 250
  - 5: Danfoss ETS 400
  - 6: Alco Ex4
  - 7: Alco Ex5
  - 8: Alco Ex6
  - 9: Alco Ex7
  - 10: Alco EX8 (330 step/sec)
  - 11: Alco EX8 (500 step/sec)
  - 12: Sporlan SEI 0.5~20
  - 13: Sporlan SEI 1~50
  - 14: Sporlan SEI 50~100
  - 15: Sporlan SEI 100~200
  - 16: Sporlan SEI 175
  - 17: Carel EZV

- $S$: Configure the overheating set point

**Description**

![Description](image)

**Operation**

- **Keypad**
  - **PRG**: Pressing it for 5 seconds accesses the parameters programming menu.
  - **SET**: Allows the displayed value to be changed (overheating, suction pressure, expansion valve opening or temperature) (only if the $d$ parameter = 0).

- **Connection/disconnection** should be made via a contact or potential free relay.

**Warnings**
Using the unit not observing the manufacturer’s instructions may alter the appliance’s safety requirements. Only probes supplied by AKO should be used for the appliance to operate correctly.

The unit should be installed in a place protected from vibrations, water and corrosive gases, where the ambient temperature does not exceed the values indicated in the technical data.

For the reading to be correct, the probe should be used in a place without heat influences apart from the temperature you want to measure or control.

The probe and its cable should NEVER be installed in a conduit together with power supply, control or feeder cables.

The power supply circuit should be equipped with a switch for its disconnection of at least 2A, 230V, situated near the appliance.

The cables are inserted into the rear part and should be HO5VV-F or HO5V-K type. The section to be used will depend on local regulations, but should not under any circumstances be less than 1 mm².

The power supply circuit should be equipped with a switch for its disconnection of at least 2A, 230V, situated near the appliance.

Temperature probes 1 and 2 should be installed as close as possible to the evaporator output. There should not be any device between them (valves, deep holes etc.) that could alter the reading.

The controllers are equipped with a port for connection of RS485 (MODBUS) data, which allows for remote management of these using an AKO-5012 server.

**IMPORTANT**: AKO-14560 controllers can only share a MODBUS network with other AKO-14560 devices. The rest of AKO devices must be connected to an independent network. For further information, refer to the user manual available on www.ako.com

**Operation**

- **Keypad**
  - **PRG**: Pressing it for 5 seconds accesses the parameters programming menu.

- **SET**: Allows the displayed value to be changed (overheating, suction pressure, expansion valve opening or temperature) (only if the $d$ parameter = 0).

The programming menu allows you to move around the different levels and accept changes. Pressing it for 5 seconds exits the programming menu.

**Description**

- **UP key**: Increases the displayed parameter value.
- **DOWN key**: Decreases the displayed parameter value.
- **SET key**: Accesses the corresponding parameter setting level.
- **PRG key**: Accesses the programming menu.

1: The display shows the overheating value.
2: The display shows the suction pressure value (Probe 2).
3: The display shows the valve opening percentage.
4: The display shows the temperature value.
5: An alert is active
6: The display shows the temperature value in °C.
7: The display shows the suction pressure value in bar
8: The opening degree of the valve has been configured manually (Cor)
Adjustment of parameters

Using the programming menu, you will be able to configure the various parameters in order to adapt the controller’s operation to the needs of its installation.

In order to access the programming menu, press the PRG key for 5 seconds, or until the message "Password required" is displayed. Using the ▲ and ▼ keys enter the password (programmed into the PSS parameter) and press SET. Once entered correctly, the password will not be requested again for 30 minutes.

**Password required**

![Password prompt](image)

Press the SET button for 5 seconds to exit programming. If no key is pressed for 3 minutes, the controller will exit programming.

*The default value of the password is 5. This may be changed using the PSS parameter.*

**Table of parameters**

The equipment’s operation functions are divided into 3 different groups. The Def. column indicates the default parameters set in the factory. Temperature values are expressed in °C (Equivalent temperature in °F) and the pressure values in bar (equivalent pressure in psi).

### GROUP 1

<table>
<thead>
<tr>
<th>Description</th>
<th>Values</th>
<th>Min.</th>
<th>Def.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LpH</td>
<td>Overheating set point</td>
<td>(K)</td>
<td>3.5</td>
<td>10</td>
</tr>
<tr>
<td>LoR</td>
<td>Initial opening for valve start-up</td>
<td>(%)</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>LsT</td>
<td>Duration of initial start-up opening</td>
<td>(Sec.)</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>PrC</td>
<td>Proportional gain</td>
<td></td>
<td>0.1</td>
<td>3</td>
</tr>
<tr>
<td>LmC</td>
<td>Integral time</td>
<td>(Sec.)</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>LdC</td>
<td>Derivative time</td>
<td>(Sec.)</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>LsP</td>
<td>Lower overheating alarm</td>
<td>0: Deactivated</td>
<td>1: Automatic reset</td>
<td>2: Manual reset</td>
</tr>
<tr>
<td>LsS</td>
<td>Lower overheating alarm activation value</td>
<td>(K)</td>
<td>0.5</td>
<td>3</td>
</tr>
<tr>
<td>LsE</td>
<td>Lower overheating alarm turn-on delay time</td>
<td>(Sec.)</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>LsC</td>
<td>Lower overheating alarm deactivation time</td>
<td>(K)</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>ApA</td>
<td>Maximum pressure alarm in probe 2</td>
<td>0: Deactivated</td>
<td>1: Automatic reset</td>
<td>2: Manual reset</td>
</tr>
<tr>
<td>ApS</td>
<td>Maximum pressure alarm activation value</td>
<td>(bar/psi)</td>
<td>-999</td>
<td>9</td>
</tr>
<tr>
<td>ApE</td>
<td>Maximum pressure alarm turn-on delay time</td>
<td>(Min.)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ApP</td>
<td>Maximum pressure alarm deactivation time</td>
<td>(K)</td>
<td>-999</td>
<td>9</td>
</tr>
<tr>
<td>StA</td>
<td>Maximum overheating alarm</td>
<td>0: Deactivated</td>
<td>1: Automatic reset</td>
<td>2: Manual reset</td>
</tr>
<tr>
<td>StS</td>
<td>Maximum overheating alarm activation value</td>
<td>(K)</td>
<td>10.0</td>
<td>30</td>
</tr>
<tr>
<td>StE</td>
<td>Maximum overheating alarm turn-on delay time</td>
<td>(Min.)</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>StC</td>
<td>Maximum overheating alarm deactivation time</td>
<td>(K)</td>
<td>7.0</td>
<td>27</td>
</tr>
<tr>
<td>PfP</td>
<td>Freeze alarm</td>
<td>0: Deactivated</td>
<td>1: Automatic reset</td>
<td>2: Manual reset</td>
</tr>
<tr>
<td>PfS</td>
<td>Maximum freeze alarm activation value</td>
<td>(ºC)</td>
<td>-100</td>
<td>0</td>
</tr>
<tr>
<td>PfE</td>
<td>Maximum freeze alarm turn-on delay time</td>
<td>(Sec.)</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>PfP</td>
<td>Maximum freeze alarm deactivation time</td>
<td>(ºC)</td>
<td>-100</td>
<td>0</td>
</tr>
<tr>
<td>LpJ</td>
<td>Lower pressure alarm in probe 2</td>
<td>0: Deactivated</td>
<td>1: Automatic reset</td>
<td>2: Manual reset</td>
</tr>
<tr>
<td>LpS</td>
<td>Lower pressure alarm activation value</td>
<td>(bar/psi)</td>
<td>-999</td>
<td>9</td>
</tr>
<tr>
<td>LpE</td>
<td>Lower pressure alarm turn-on delay time</td>
<td>(Sec.)</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>LpC</td>
<td>Lower pressure alarm deactivation time</td>
<td>(bar/psi)</td>
<td>0</td>
<td>0.3</td>
</tr>
</tbody>
</table>

**GROUP 2**

### Messages

**P5**

Problem in the pressure sensor

**LoP**

Lower Operation Pressure (LOP) alarm

**Problem in the pressure sensor**

**Max**

Maximum overheating alarm

**LrL**

Lower overheating alarm

**FtR**

Frost detection alarm

**S8P**

Regulation stopped by external thermostat (ON/OFF Input)

**CSE**

Communication set point

**CSP**

Communication speed

**S1**

Initial settings (enter password and press SET)

*The L5c and D5P parameters are adjusted automatically when the expansion valve model is selected. They should only be changed by qualified staff. AKO is not responsible for any damage that may be inflicted on the installation.*

**IMPORTANT:** In the event of an alarm or fault in any of the probes, the controller closes the liquid solenoid and expansion valve until the problem is solved.

**Technical specifications**

- **Power supply:** 24 V – ±10% / ±15%, 50/60 Hz
- **Working ambient temperature:** -10 to 50 °C, moisture <50%
- **Storage ambient temperature:** -20 to 60 °C, moisture <90%
- **Relay solenoid valve:** (EN60730-2: 2)(2) A 250 V – SPST
- **No. of relay operations:** EN60730-1: 100,000 operations
- **Maximum voltage in the SELV circuits:** 20 V
- **Protection degree:** IPX2

**Connections:** Terminal screw for cables with a section of up to 2.5 mm²

**Control device classification:** Built-in assembly, with Type 1.B automatic operation action feature, for use in clean situations, logical support (Software) class A and continuous operation. Degree of contamination 2 acc. to UNE-EN 60730-1.

**Double power input insulation, secondary circuit and relay output.**

**Rate pulse voltage:** 2500 V

**Pressure ball test temperature:** 75 °C

**Parts that position active elements:** 125 °C

**Voltage and current declared by the EMC tests:** 207 V / 17 mA

**Radio interference suppression test current:** 270 mA

**Voltage and current declared by the EMC tests:** 207 V, 17 mA

For further information, refer to the user manual available on our website: www.ako.com