Controller designed to display and control the process, with tight adjustment PID control, in appliances where accuracy is required, like water or oil cooling systems, furnaces, gas burners, plastic injection machinery, etc.

Input for type 4-20 mA, Pt100 sensors, Thermocouple J or Thermocouple K. Relay outputs may be used for control and/or alarm. It also has a logic output/input for control/alarm.

1- Versions and references

<table>
<thead>
<tr>
<th>Model</th>
<th>CT Module</th>
<th>2-20mA/0-10V Module</th>
<th>RS485 Module</th>
<th>Relay 3 Module</th>
<th>Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKU-15400</td>
<td>No</td>
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<td>No</td>
<td>No</td>
<td>20 to 48 V AC/DC</td>
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<td>AKU-15401</td>
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<tr>
<td>AKU-15402</td>
<td>No</td>
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<tr>
<td>AKU-15403</td>
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<td>AKU-15404</td>
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<td>AKU-15405</td>
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<td>AKU-15410</td>
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<tr>
<td>AKU-15406</td>
<td>No</td>
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<td>100 to 240 V, 50/60Hz</td>
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<tr>
<td>AKU-15407</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>100 to 240 V, 50/60Hz</td>
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<tr>
<td>AKU-15408</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>100 to 240 V, 50/60Hz</td>
</tr>
</tbody>
</table>

2- Installation

The controller should be installed in a place protected from vibrations, water and corrosive gases, and where ambient temperature does not surpass the value specified in the technical data. In order for the controllers to have IP55 protection, the gasket should be properly installed between the apparatus and the perimeter of the panel cut-out where it is to be fitted. In order to give a correct reading, the probe should be installed in a place without heat influences other than the temperature that is to be measured or controlled.

2.1-Fastening

To fix the unit, place the fasteners in the top and the lower parts and press them to enter in the controller lower parts and press them to enter in the controller panel until the controller is fixed.

2.2-Connection

The probe and its base should NEVER be installed in dusting along with power, control or power supply wiring. The power supply circuit should be connected with a minimum 2 A 250 V, switch located close to the unit. Power supply cables should be H05VV-F 2x0,5 mm² or H05V-K 2x0,5 mm². Section of connecting wires for relays contacts should range from 1 mm² to 2.5 mm². For the 4-20 mA control input, it is necessary to connect the 2-490 Ohm resistance supplied between terminals 10 and 11.

3- Adjustment and configuration

It should only be programmed or modified by personnel who are fully conversant with the equipment operation and possibilities.

3.1 Set Point temperature

The factory SET POINT default value is 0.0°C.
- Press PRG key for at least 3 seconds to CHANGE SET POINT SP1 or SP2. It displays SP1.
- Press  or  keys to SELECT SET POINT 1 or 2.
- Press  key to CHANGE SELECTED SET POINT. It displays the CURRENT SET POINT value.
- Press  or  keys to CHANGE SET POINT into the required value.
- Press SET key to ACCEPT THE NEW SET POINT. The display returns to the CURRENT TEMPERATURE display status.

3.2 Parameters configuration

Level 1 Menus

- Press PRG key for at least 10 seconds. We are in the programming LEVEL 1 MENUS and the first menu “SPCF” is displayed.
- Press  key to access the next menu and  key to return to the previous one.
- Press PRG key, the controller returns to the CURRENT TEMPERATURE display status.
- When PAS is displayed, PASSWORD programmed in PAS1 parameter of PAR menu should be entered to access programming LEVEL 1 MENUS.
- Press  or  keys to CHANGE NUMBER and DISPLAY PASSWORD programmed.
- Press SET key to ACCEPT PASSWORD. The first menu “SPCF” will be displayed.

Level 2 Parameters

- In the desired menu of LEVEL 1 MENUS, press key SET. LEVEL 2 PARAMETERS programming is accessed. The first parameter of the selected menu is displayed on the screen.
- Press  key to access the next parameter and  key to return to the previous one.
- Pressing PRG key, returns to the LEVEL 1 MENUS.

Level 3 Values

- Press the SET key to enter and modify the desired parameter.
- Press  or  keys to CHANGE VALUE.

- Pressing SET key, ACCEPT THE NEW VALUE and it returns to LEVEL 2 PARAMETERS.
- Pressing PRG key, it returns at LEVEL 2 PARAMETERS without modify value.

REMARK: If no key is pressed for 25 seconds in either of the previous steps, the controller will automatically return to the CURRENT TEMPERATURE display status without modifying any of the parameters values.

4- Operation

PRG key: Accepts the alarms and disconnects alarm outputs. When pressed for at least 3 seconds, the SP SET POINT temperature value is displayed. When pressed for 10 seconds displays the first level of menu SPC1 of parameters. Exit programming level.

Key : Accepts the alarms and disconnects alarm outputs. In programming, it makes the displayed value reduce.

Key : Accepts the alarms and disconnects alarm outputs. In programming, it makes the displayed value increase.

SET Key: Accepts the alarms and disconnects alarm outputs. When pressed during 3 seconds, it activates the Autotune function if Aut=1. Deactivates the Autotune function. In programming, accept the programmed new value.

LED OUT1: CONTROL 1 indicator activated.

LED AL1: Alarm 1 indicator enabled. Flashing: Alarm 1 detected, relay deactivated but signalling maintained.

LED OUT2/AL2: CONTROL 2 or Alarm 2 indicator enabled. Flashing with Alarm 2: Alarm 2 detected, relay deactivated but signalling maintained.

LED AT: Autotune indicator enabled.

4.1 Control 1, control 2 and alarms operation

AUTOTUNE: Press SET key for 3 seconds to activate a SELF-ADJUSTMENT (AUTOTUNE). The controller will configure automatically the parameters at process characteristics setting.

Gain (Gain): The output is configured proportionally to the error signal width.

Overall time (t): The final error is eliminated by the output regulation proportionally to the error signal width and duration.

Derivative time (t): It determines the controller reaction on process temperature changing. Over and lower pulses prevention. It is also used to quick actuation on the variable process value in the event of a sudden change in the set point.

Level 1 Parameters

- o2C=0 Two independent stages and ON/OFF control type

Direct operation

- o2C=1 Two related stages

Direct operation

- o2C=2 Neutral Zone
### 5- Accessories

PARAMETERS TRANSFER
AKO-14918 portable server with no power supply, in which parameters programmed in a powered controller can be copied by transfer. Parameters can be transferred again from the server to other identical powered controllers.

### 6- Maintenance and Warnings

Clean the controller surface with a soft cloth and soap and water. Do not use abrasive detergents, petrol, alcohol or solvents.

The use of the unit without observing the manufacturer’s instructions may alter its safety qualification. To ensure correct operation of the apparatus, only probes supplied by AKO should be used.

### 7- Parameters and messages

**Values in the Def column are factory-set.**

#### Level 1 Parameters

<table>
<thead>
<tr>
<th>Description</th>
<th>Values</th>
<th>Min.</th>
<th>Def.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1=Digital Input SSR CONTROL 1, R1=ALARM 2 (only with MODULE 4/20 mA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2=Digital Input SSR CONTROL 2, R2=ALARM 1 (only with MODULE 4/20 mA)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3=Digital Input SSR CONTROL 2, R2=ALARM 1 (only with MODULE 4/20 mA)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4=Digital Input SSR CONTROL 1, R1=ALARM 2 (only with MODULE 4/20 mA)</td>
<td></td>
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</tr>
<tr>
<td>5=Digital Input SSR CONTROL 1, R1=ALARM 2 (only with MODULE 4/20 mA)</td>
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<tr>
<td>6=Digital Input SSR CONTROL 1, R1=ALARM 2 (only with MODULE 4/20 mA)</td>
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</table>

#### Level 2 Parameters

<table>
<thead>
<tr>
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<th>Values</th>
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<th>Max.</th>
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<tbody>
<tr>
<td>1=Digital Input SSR CONTROL 1, R1=ALARM 2 (only with MODULE 4/20 mA)</td>
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</table>

#### Level 3 Parameters

<table>
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<tr>
<th>Description</th>
<th>Values</th>
<th>Min.</th>
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<th>Max.</th>
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<tbody>
<tr>
<td>1=Digital Input SSR CONTROL 1, R1=ALARM 2 (only with MODULE 4/20 mA)</td>
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#### Level 4 Parameters

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<th>Description</th>
<th>Values</th>
<th>Min.</th>
<th>Def.</th>
<th>Max.</th>
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</thead>
<tbody>
<tr>
<td>1=Digital Input SSR CONTROL 1, R1=ALARM 2 (only with MODULE 4/20 mA)</td>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### 8- Technical Data

Range according to type of sensor configured:

- Pt100: -99.9 °C to 850.0 °C (148 °F to 1562 °F)
- Thermocouple: J, K, T: -99.9 °C to 800.0 °C (148 °F to 1427 °F)
- K: -99.9 °C to 1370.0 °C (148 °F to 2486 °F)

### 9- Technical Information

#### 3V DC supply voltage

- 24 V DC supply voltage

#### 4-20 mA / 0-10 V supply

- 24 V DC supply voltage

#### Transfer

- 24 V DC supply voltage

#### Power supply

- 24 V DC supply voltage

#### Programing

- 24 V DC supply voltage

#### I/O key blocking

- 24 V DC supply voltage

#### Digital input enabling delay

- 24 V DC supply voltage

#### Digital input / Output and R1, R2, R3 relays

- 24 V DC supply voltage

#### Overall time (see item 4.1)

- 24 V DC supply voltage

#### Incorrect resolution - see Res parameter

- 24 V DC supply voltage

#### Double insulation between the power supply, the secondary circuit and the relay output.