

Electronic data logger, 10 channel, as per European standard EN 12830



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1-INTRODUCTION

The instructions herewith are applicable to data logger models:

AKO-15720 data logger with printer

AKO-15722 data logger without printer

Both models have an optional PC connection facility through an RS-232/RS-485 converter and data management with the program ref. **AKO-5003**, or other compatible program. See publication 1572H151.



AKO-15720
Model with printer



AKO-15722
Model without printer

2-INSTALLATION

The installation of the equipment must be carried out by qualified personnel following the instructions herewith.

2.1- Accessories

On opening the packing case, you will find along with recorder:

- Technical instruction sheet
- 3 screws for wall-mounted installation with their corresponding plugs
- A paper roll **AKO-15703** (only with AKO-15720 equipment)
- 5 NTC probes reference **AKO-14901** with 1,5m of cable

2.2- Installing data logger

The equipment has to be installed in locations where the ambient temperatures are between +5°C and +40°C, relative humidity 80% maximum, and pollution grade: 2.

The operating position of the recorder is upright in the wall-mounted installation. Drill suitable holes for the inputs of the connecting cables. Secure the equipment using the three screws provided.

2.3- Electrical installation

The entire installation (power, sensors, alarms and communications) must be implemented using protective tubing. In order that the equipment maintain protection grade IP 65, the inputs must be formed with connectors having the same grade of protection.

2.3.1- Equipment power supply

This must comply with the electrical standards and regulations in force in the country where the unit is to be used. The power supply must be 230V, 50/60Hz, In:50mA, and employ cable of the type H05VV-F 2x0,5mm², or H05V-K 1x0,5mm². It should include a switch and current limiter. This unit must be marked with OFF for the recorder, be located close to the equipment and be sufficiently accessible for the staff responsible.

The recorder is classified as INSTALLATION CATEGORY II, according to the standard IEC 664.

2.3.2- Temperature Sensors AKO-14901, NTC type

These temperature sensors are those to be used in cold stores in order to comply with the standard EN12830. For their connection to the recorder, the extension cable **AKO-15586** can be used. The temperature drift due to the extension shall have a maximum diminution of 0,35°C for every 100 m of extension.

The 10 channels of the recorder accept up to 10 NTC sensors **AKO-14901** (5 are provided with the equipment).

The sensors and their cables must NEVER be installed in conduits together with power, control or feed cables.

For the readings to be correct, the sensors must be protected from thermal effects unrelated with the temperatures it is wished to record.

2.3.3- Digital inputs:

See publication 1572H151

2.3.4- Inputs type 4/20mA

See publication 1572H151

2.3.5- Remote alarms

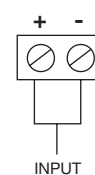
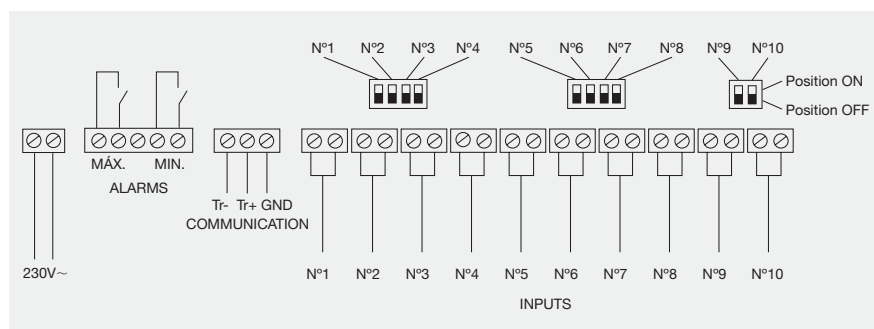
The equipment has two NO (normally open) relay contacts, for 5A, 250V, $\cos\phi = 1$, in order to be able to drive one external alarm element for maximum level, and another for minimum level. Cable of the type H05V-K 1x1mm² shall be used.

2.3.6- Communication with PC

See publication 1572H151

2.4- Connecting the equipment

The equipment connections shall be made following the wiring schematic below. It is recommended that the connectors of the inputs be identified in order to simplify their configuration later. Polarity must be respected when wiring the 4/20 mA inputs.



Once the equipment has been wired, the microswitches are positioned as shown in the schematic, such that:

The microswitch of a **4/20 mA type input**, has to be set to the **ON** position.

The microswitch of a **digital or NTC sensor input**, has to be set to the **OFF** position.

3-CONFIGURATION

3.1- Initial default configuration

General programming

Language: Spanish

Date and time: Spanish

Reading frequency: 15 minutes; Period: 7 days

Inputs

Description of each input:

- Input 1: NUM. 1
- Input 2: NUM. 2
- Input 3: NUM. 3
- Input 4: NUM. 4

- Input 5: NUM. 5

- Input 6: NUM. 6

- Input 7: NUM. 7

- Input 8: NUM. 8

- Input 9: NUM. 9

- Input 10: NUM.10

Type of input: NTC temperature probe

Alarms: Disconnected

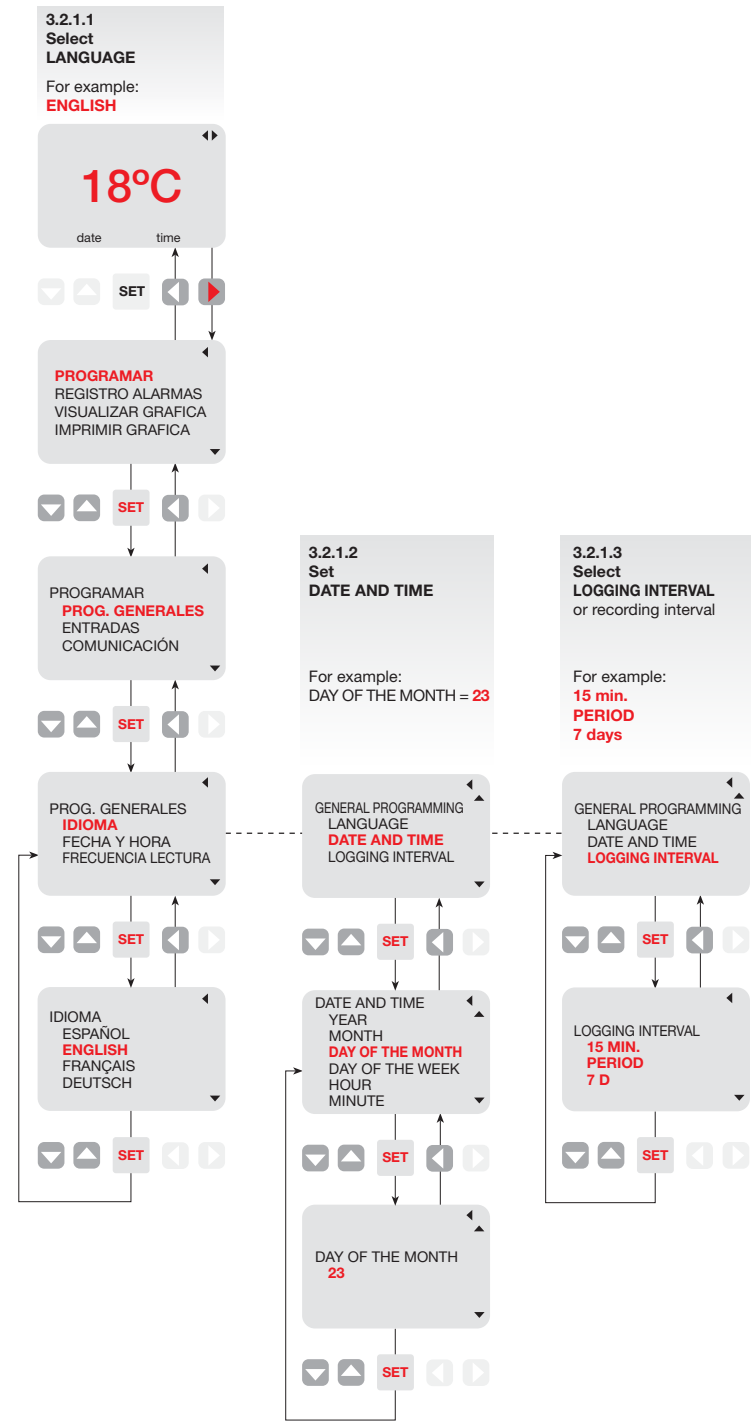
Communication

For a single recorder

3.2 - Modifying the configuration.

The functions of each key are to be respected as indicated in point 4.1

3.2.1 - General programming



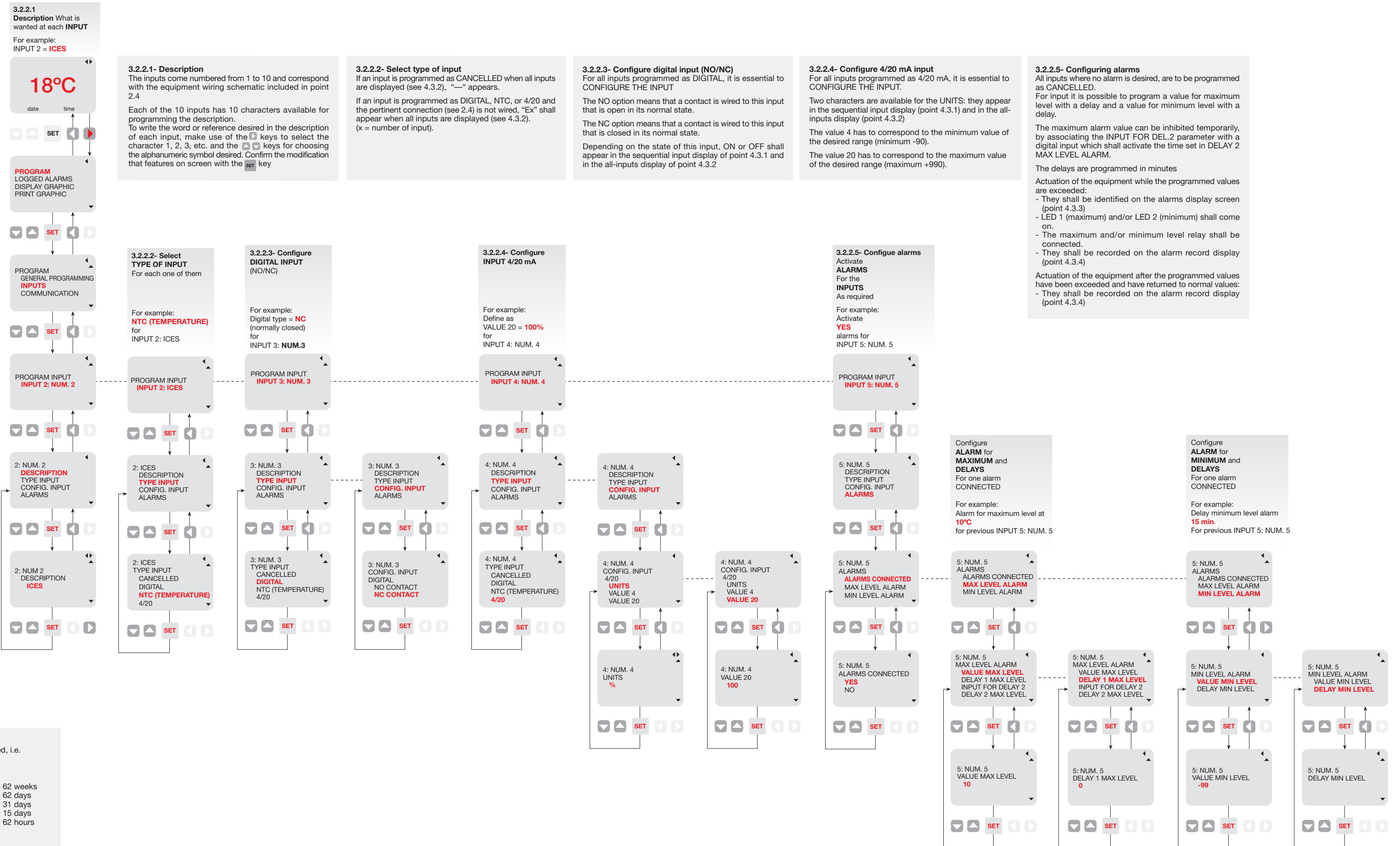
3.2.1.2- Set date and time
Programming the day of the week:

Monday	= 1
Tuesday	= 2
Wednesday	= 3
Thursday	= 4
Friday	= 5
Saturday	= 6
Sunday	= 7

3.2.1.3- Select reading frequency or recording interval.
On choosing the reading frequency, the period is also predetermined, i.e. the amplitude the graphics will have and the memory capacity.
It is possible to select one of the following values:

Frequency = 15 MIN	Period = 7 D	Memory = 62 weeks
Frequency = 5 MIN	Period = 24 H	Memory = 62 days
Frequency = 1 MIN	Period = 12 H	Memory = 31 days
Frequency = 30 S	Period = 6 H	Memory = 15 days
Frequency = 5 S	Period = 60 MIN	Memory = 62 hours

3.2.2 - Inputs



3.2.2.1- Description
The inputs come numbered from 1 to 10 and correspond with the equipment wiring schematic included in point 2.4
Each of the 10 inputs has 10 characters available for programming the description.
To write the word or reference desired in the description of each input, make use of the **←** keys to select the character 1, 2, 3, etc. and the **→** keys for choosing the alphanumeric symbol desired. Confirm the modification that features on screen with the **SET** key

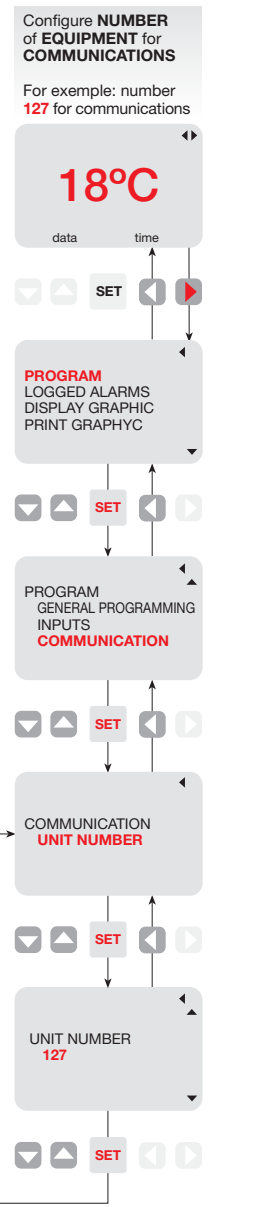
3.2.2.2- Select type of input
If an input is programmed as CANCELLED when all inputs are displayed (see 4.3.2), "—" appears.
If an input is programmed as DIGITAL, NTC, or 4/20 and the pertinent connection (see 2.4) is not wired, "Ex" shall appear when all inputs are displayed (see 4.3.2). (x = number of input).

3.2.2.3- Configure digital input (NO/NC)
For all inputs programmed as DIGITAL, it is essential to CONFIGURE THE INPUT
The NO option means that a contact is wired to this input that is open in its normal state.
The NC option means that a contact is wired to this input that is closed in its normal state.
Depending on the state of this input, ON or OFF shall appear in the sequential input display of point 4.3.1 and in the all-inputs display of point 4.3.2

3.2.2.4- Configure 4/20 mA input
For all inputs programmed as 4/20 mA, it is essential to CONFIGURE THE INPUT.
Two characters are available for the UNITS: they appear in the sequential input display (point 4.3.1) and in the all-inputs display (point 4.3.2)
The value 4 has to correspond to the minimum value of the desired range (minimum -90).
The value 20 has to correspond to the maximum value of the desired range (maximum +990).

3.2.2.5- Configuring alarms
All inputs where no alarm is desired, are to be programmed as CANCELLED.
For input it is possible to program a value for maximum level with a delay and a value for minimum level with a delay.
The maximum alarm value can be inhibited temporarily, by associating the INPUT FOR DEL.2 parameter with a digital input which shall activate the time set in DELAY 2 MAX LEVEL ALARM.
The delays are programmed in minutes
Actuation of the equipment while the programmed values are exceeded:
- They shall be identified on the alarms display screen (point 4.3.3)
- LED 1 (maximum) and/or LED 2 (minimum) shall come on.
- The maximum and/or minimum level relay shall be connected.
- They shall be recorded on the alarm record display (point 4.3.4)
Actuation of the equipment after the programmed values have been exceeded and have returned to normal values:
- They shall be recorded on the alarm record display (point 4.3.4)

3.2.3 - Communication




3.2.3- Communication
When there are several recorders connected to be managed by PC, they must be identified by allocating a number to each according to its location in the wiring scheme.
Maximum number of recorders connectable: 32
Maximum number for identification purposes: 247

4-OPERATION

4.1- Function of each key

Key  **is used for:**


- Reduce the contrast of the main screen
- Stepping down through menus
- Decreasing values
- Move the cursor to the left

Key  **is used for:**


- Increase the contrast of the main screen
- Stepping up through menus
- Increasing values
- Move the cursor to the right

Key  **is used for:**

- Confirming values
- Access to main screen when electricity supply is down

Key  **is used for:**

- Access to inputs and alarms from main screen
- In programming, returning to the previous screen
- To go back in the graphics visualisation (4.3.5)

Key  **is used for:**

- Access to programming from main screen
- To advance in the graphics visualisation (4.3.5)

Key  **(only for AKO-15720 equipment):**

- With each depression, the paper advances a few lines without printing

4.2- Indicator LEDs

- Max:** - Permanently ON:
Maximum level alarm activated and relay connected
- Flashing:
Maximum level alarm activated and relay disconnected.
- Min:** - Permanently ON:
Minimum level alarm activated and relay connected
- Flashing:
Minimum level alarm activated and relay disconnected
- Rx:** - In communication mode.
Recorder receiving information
- Tx:** - In communication mode.
Recorder transmitting information
- 230 V:** - Power present

4.3- Screen information



4.3.1-Sequential display of each input

Main screen. This is the screen which appears when the equipment power is connected and 30 seconds have passed after any manipulation.

Screen content:

- **Numerical identification of the input**
Coincides with the numbering of the inputs on the wiring diagram of section 2.4
- **Description**
That programmed in 3.2.2.1
- **Value or status of the input**
In large format (at the digital inputs, ON or OFF appears, depending on the input state).
Non-connected inputs or programmed as INPUT TYPE = CANCELLED, (3.2.2.2) do not appear in the display sequence.
- **Units**
For inputs programmed as INPUT TYPE = NTC (3.2.2.2), the units are °C.
For inputs programmed as INPUT TYPE = 4/20, the units programmed in 3.2.2.2 appear.
- **Data and time**
Setting in 3.2.1.2

4.3.2-Display with all inputs

On selecting this information, this remains permanently on screen until a change is made to another voluntarily by means of keys  or 

Screen content:

- **Numerical identification of the input**
Coincides with the numbering of the inputs on the wiring diagram of section 2.4
- **Value or status of the input**
For inputs programmed as INPUT TYPE = DIGITAL (3.2.2.3) ON or OFF appears, depending on the input state)
For inputs programmed as INPUT TYPE = CANCELLED (3.2.2.2), “—“ is displayed.
For inputs not connected or out of range, “Ex” is displayed (x = number of input).
- **Units**
For inputs programmed as INPUT TYPE = NTC (3.2.2.2), the units are °C.
For inputs programmed as INPUT TYPE = 4/20, the units programmed in 3.2.2.4 appear.
- **Data and time**
Setting in 3.2.1.2

4.3.3- Alarm display

Screen content:

- Information appears on the current status of the inputs which have been previously programmed as:
ALARMS CONNECTED = YES (3.2.2.5)
- **Numerical identification of the input**
Coincides with the numbering of the inputs on the wiring diagram of section 2.4 (equipment wiring).
 - **Significance of the information contained in each input**
No information. The value of this input does not exceed the values programmed in 3.2.2.5.
 - ▲ The present value of this input is higher than that programmed in VALUE MAX LEVEL ALARM (3.2.2.5)
 - ▼ The present value of this input is lower than that programmed in VALUE MIN LEVEL ALARM (3.2.2.5)
 - T1** Value of maximum or minimum level exceeded and programmed delay time 1 not exceeded.
 - T2** Value of maximum level exceeded, the input for delay 2 is activated and delay time 2 is not exceeded.
 - A** Value of maximum or minimum level exceeded and programmed delay times exceeded.

4.3.4- Alarm record display

A situation of alarm is considered from the point where programmed values and times are exceeded.

Screen content:

- The last 6 alarms are displayed.
- **Numerical identification of the input**
Coincides with the numbering of the inputs on the wiring diagram of section 2.4
 - **Data and time of alarm commencement**
 - **Arrow upwards** ▲
Alarm for maximum level
 - **Arrow downwards** ▼
Alarm for minimum level

4.3.5- Graphic display on screen

To be able to display graphics, the following must be defined beforehand:

The start of the period it is wished to display. (The periods shall depend on the frequency value programmed in 3.2.1.3)
The input number.

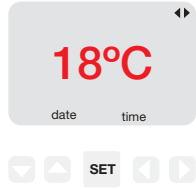
Content of the information screen prior to the graphics

- **Numerical identification of the input:**
Coincides with the numbering of the inputs on the wiring diagram of section 2.4
- **Description**
That programmed in 3.2.2.1
- **Starting date and time of the period**
- **Period or duration of the graphic**
- **Reading frequency**
- **Maximum and minimum values recorded**
- **Value of maximum alarm level programmed**
- **Value of minimum alarm level programmed**

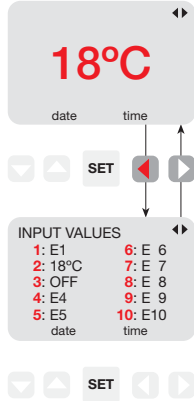
OPERATION

The arrows which appear on the right of the screen indicate which keys are operational at that moment.

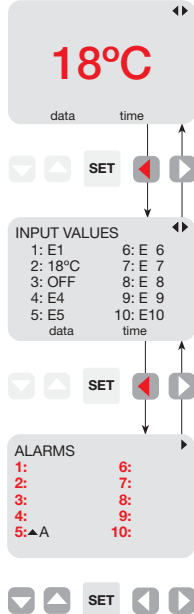
4.3.1- Sequential display of each input



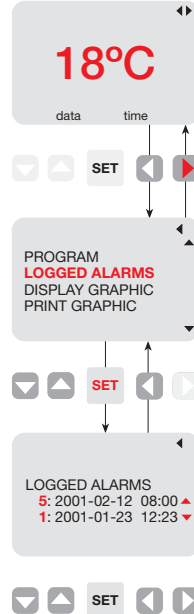
4.3.2- Display of all inputs



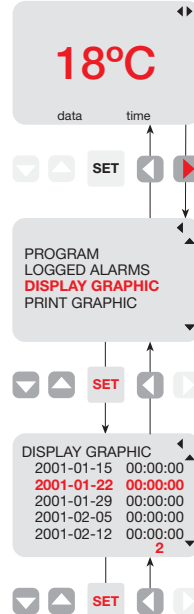
4.3.3- Alarms display



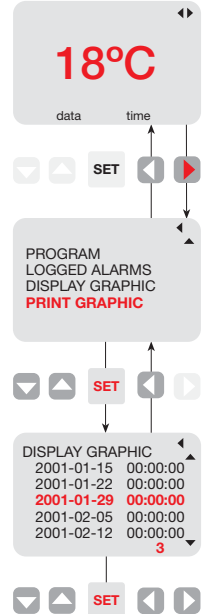
4.3.4- Display logged alarms



4.3.5- Display graphic on screen



4.3.6- Print graphic only in AKO-15720



4.3.6- Print graphic (only if AKO-15720 equipment)

The paper for the graphics is thermal type, therefore, if it is wished to keep the graphics for a long time, photocopies should be made. The length of the graphic printed for an input is less than the length of a DIN A4 page.

To be able to print graphics, the following must be defined beforehand:

- The start of the period it is wished to display. (The periods shall depend on the frequency value programmed in 3.2.1.3)
- The input number, in order to print a specific one, or select ALL INPUTS to make a printout of all of the inputs.

For each input, the following information is printed:

- Numerical identification of the input:
Coincides with the numbering of the inputs on the wiring diagram of section 2.4
- Description
That programmed in 3.2.2.1
- Starting date and time of the period
- Period or duration of the graphic
- Reading frequency
- Maximum and minimum values recorded
- Value of maximum alarm level programmed
- Value of minimum alarm level programmed

Notes for the graphics

When the recorder has no reading or recording of a first value is pending for the period selected, the message "WITHOUT DATA" appears or is printed.

The height or "y" axis of the graphics represents the values recorded and the scale is adjusted automatically to these values.

The length or "x" axis of the graphics is time. On the screen graphics the right arrow allows you to go forward on that axis and the left arrow to go back.

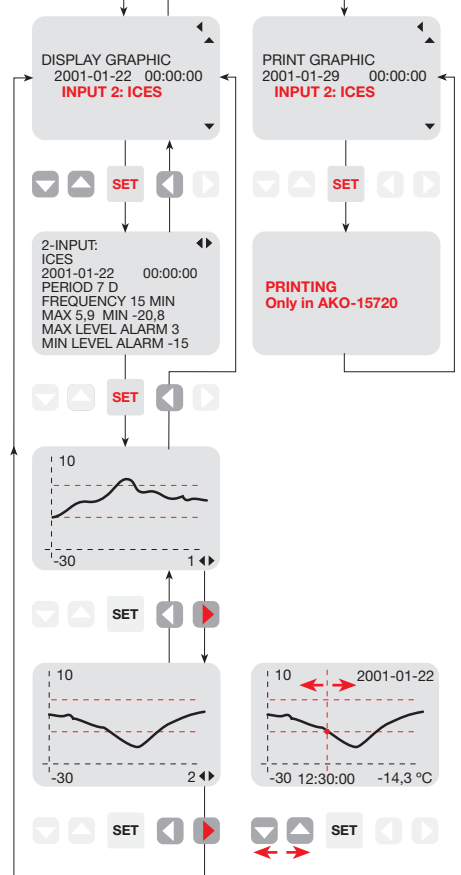
The duration and memory for the graphics shall depend on the frequency programmed in 3.2.1.3.

With a frequency or interval register of 15 minutes the registers maintain the information in memory for more than one year, which allows EN 12830 to be met and print or visualise the graphics whenever they are needed.

If frequencies of less than 15 minutes are configured, to be able to meet EN 12830, the graphics must be printed before the memory runs out and be stored for one year. In this case for the register AKO-15722, a PC must be used running the program AKO-5003

Frequency = 15 MIN	length or period = 7 D	Units of values on this axis = days
Frequency = 5 MIN	length or period = 24 H	Units of values on this axis = hours
Frequency = 1 MIN	length or period = 12 H	Units of values on this axis = hours
Frequency = 30 S	length or period = 6 H	Units of values on this axis = hours
Frequency = 5 S	length or period = 60 MIN	Units of values on this axis = minutes

If alarms have been programmed for this input in this time period, and they are located between the highest and lowest values of the graphic, dashed axes shall appear corresponding to said alarms, permitting comparison between these values and the recorded values.



When a graphic is being visualised on screen, the keys and allow the cursor to be moved to the right or the left. The temperature of the intersection point of the cursor with the graphic appears on the lower left corner of the screen, at the top, the year, month and date and at the bottom the hour minute and second of the intersection point.

4.4- Memory and autonomy

The recorder memory shall depend on the frequency and period that have been configured, see 3.2.1.3

The recorder has an autonomy period greater than **36** hours. If there is a power outage and the recorder is left with no electricity supply, the screen shall go blank, but the equipment shall continue to record and store data. During this period, each time the **SET** key is pressed, the main screen shall appear for 2 minutes approximately.

If the equipment remains without power for a period greater than that stated, it shall cease to record data and it shall not be possible to display the main screen. It retains all previous records and all data entered at configuration. When the electricity supply is restored, data recording is resumed and the main screen reappears.

4.5- Activation and erasure of alarms

4.5.1- Activation of a first alarm

The relay corresponding to maximum or minimum level is actuated; see 2.4

The pertinent LED comes on permanently: LED 1 = maximum; LED 2 = minimum.

4.5.2- Erasure of alarm

Press the **SET** key

The relay is deactivated.

The LED starts to flash and remains in this state until the alarm at the input is cleared, or its value is altered in the configuration.

4.5.3- Activation of other alarms

If, while there is an alarm activated and relay disconnected (LED flashing), another alarm appears, the corresponding relay is reactivated and the LED comes on again permanently.


4.6- Printing stop

To halt the printer while it is printing, press the **SET** key


5- MAINTENANCE


5.1- Changing printer paper (only in AKO-15720 equipment)

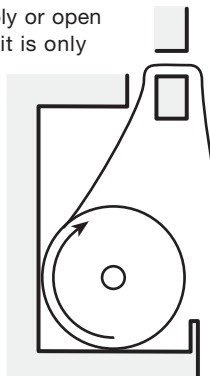
When a paper roll finishes, replace it with a new one of **Ref. AKO-15703**.

There is no need to switch off the electricity supply or open the recorder to carry out the paper roll change; it is only necessary to gain access to the front panel by opening the transparent cover. If necessary, finish removing the paper of the roll to be replaced by pressing the  key until it ends.

When installing the new roll, remember this is thermal paper and can only print on one of the two faces, it is therefore necessary to respect the position shown in the diagram.

Once the roll has been located in the correct position, insert the paper in the printer and press the paper feed key  supporting the paper until it is drawn by the printer itself.

If the paper feed has terminated and the paper has still not appeared at the front of the printer, press the  key again until the paper comes out at the top.



5.2- Batteries

The equipment comes fitted with Ni-Cd batteries, which can be replaced with a 341571103 set, when the former do not offer the foreseen autonomy. The equipment power supply must first be disconnected.

5.3- Fuses

The equipment is fitted with protective fuses, the replacement of which should be carried out with the equipment disconnected.

5.4- Cleaning the equipment

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

5.5- Periodic Verification

When the recorder is used in cold stores and the EN12830 standard has to be complied with, maintenance must include the periodic verifications stipulated in the prEN13486 standard.

6-LIST OF SPARE PARTS AND ACCESSORIES

- AKO- 15703** Roll of thermal paper for replacement (in boxes of 10 pieces)
- AKO- 14901** NTC temperature probe with 1,5 m cable.
- AKO- 5003** Program for PC
- AKO- 15586** Sensor extender cable (100 m reels)
- AKO- 80021** RS-232/RS-485 converter (see publication 1572H151)
- AKO- 80004** Pt 100 to 4/20 mA, converter (see publication 1572H151)
- AKO- 80013** Encased humidity sensor and 4/20 mA, adapter (see publication 1572H151)
- AKO-80014A**Power supply unit, (see publication 1572H151)

Warning:

Using the equipment without respecting the manufacturer's instructions, can lead to infringement of the safety requirements.

Technical Service: see the address to be found at the end of these instructions.

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