X30A

DATA ACQUISITION AND TRANSMISSION MODULE ON RS485 NETWORK

OPERATING INSTRUCTIONS

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PREFACE

This manual contains the information necessary for the product to be installed correctly and also instructions for its maintenance and use; we therefore recommend that the utmost attention is paid to the following instructions and to save it.

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Ascon Tecnologic S.r.l. and its legal representatives do not assume any responsibility for any damage to people, things or animals deriving from violation, wrong or improper use or in any case not in compliance with the instrument features.

Whenever a failure or a malfunction of the device may cause dangerous situations for persons, thing or animals, please remember that the plant has to be equipped with additional electromechanical devices which will guarantee safety.

1. INSTRUMENT DESCRIPTION

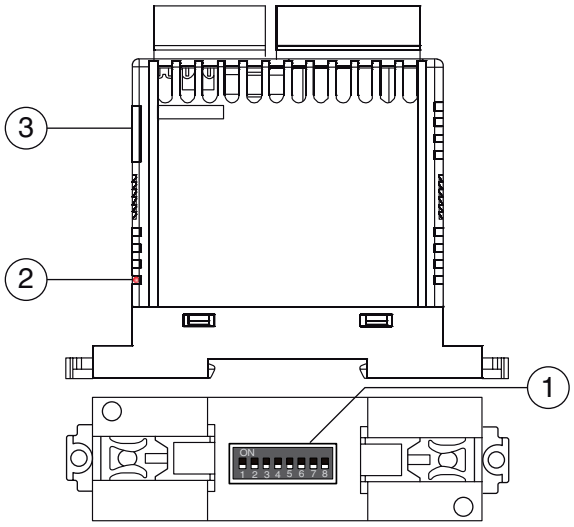
1.1 General description

The **X30A** is a data acquisition module and, at the same time, an output slave module.

The instrument has a **RS485** serial communications interface with **MODBUS-RTU** communications protocol, provides up to **4 output relays** and up to **4 configurable inputs** for **PTC**, **NTC** and **Pt1000** temperature probes.

The X30A has **2 digital inputs** and temperature probe inputs **Pr3** and **Pr4**, **can be configured**, as an **alternative**, as **2 further digital inputs**.

1.2 Instrument description

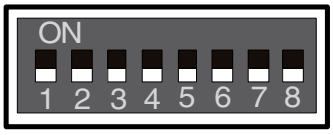


1. **DIP Switches:** Used for setting the RS485 communications parameters.
2. **LED ON (red):** Blinks to indicate the correct control unit operation. When the instrument is powered ON, it blinks faster for a few seconds to indicate that the control unit is starting and then the flashing frequency slows down.
3. **TTL communications port:** This port can be used to connect an A01 device and transfer the operation parameters to/from the instrument or for MODBUS communications through an USB interface.

2. PROGRAMMING

Configuration is made by means of DIP switches located at the bottom of the instrument and via the RS485 serial communications interface or the TTL port.

Through these DIP switches is possible to set the device address oand the communications speed.



DIP-SW	Description	Values
1	AT Lin Network Addr. selection	Do not use
2	AT Lin Network Addr. selection	
3	Bit 0 RS485 address	+1 RS485 Address
4	Bit 1 RS485 address	+2 RS485 Address
5	Bit 2 RS485 address	+4 RS485 Address
6	Bit 3 RS485 address	+8 RS485 Address
7	Bit 4 RS485 address	+16 RS485 Address
8	Baud Rate RS485	OFF = 9600 baud ON = 19200 baud

3. USAGE WARNINGS

3.1 Admitted use

The instrument has been projected and manufactured as a measuring and control device to be used according to EN61010-1 at altitudes operation below 2000 m.

Using the instrument for applications not expressly permitted by the above mentioned rule must adopt all the necessary protective measures.

The instrument **must not be used** in dangerous environments (flammable or explosive) without adequate protections.

The instrument used with NTC 103AT11 probe (identifiable by the printed code “103AT-11” visible on the sensor part) is compliant with standard EN 13485 (“Thermometers for measuring the air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream”) with the following classification: [EN13485 air, S, A, 2,- 50°C +90°C].

Remember that the end user must periodically check and verify the thermometers in compliance with standard EN 13486.

The installer must ensure that the EMC rules are respected, also after the instrument installation, if necessary using proper filters.

4. INSTALLATION WARNINGS

4.1 Mechanical mounting

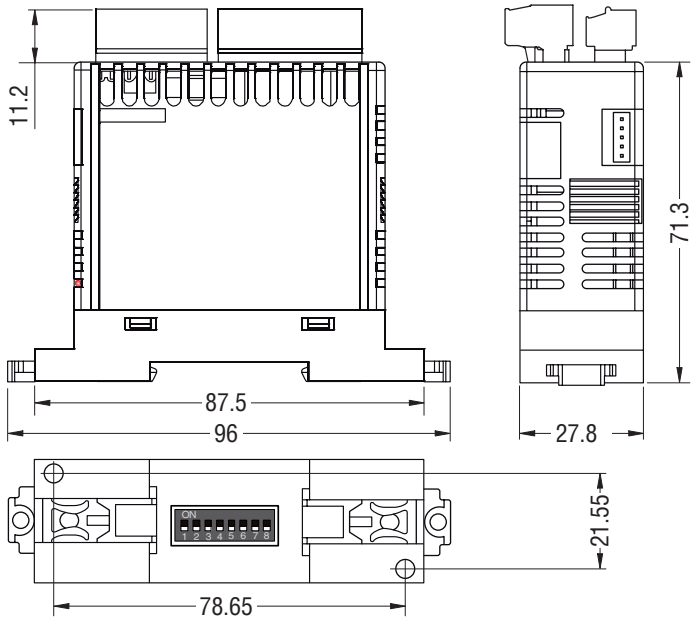
This instrument is intended for permanent installation, for indoor use only, inside an electrical panel, specific for DIN rail mounting.

Avoid placing the instrument in environments with very high humidity levels or dirt that may create condensation or introduction of conductive substances into the instrument.

Ensure adequate ventilation to the instrument and avoid installation in containers that house devices which may overheat or which may cause the instrument to function at a higher temperature than the one permitted and declared.

Connect the instrument as far away as possible from sources of electromagnetic disturbances such as motors, power relays, relays, solenoid valves, etc..

4.1.1 Dimensions [mm]



4.2 Electrical connections

Carry out the electrical wiring by connecting only one wire to each terminal, according to the following diagram, checking that the power supply is the same as that indicated on the instrument and that the load current absorption is no higher than the maximum electricity current permitted.

As the instrument is built-in equipment with permanent connection inside housing, it is not equipped with either switches or internal devices to protect against current overloads: the

installation will include an overload protection and a two-phase circuit-breaker, placed as near as possible to the instrument and located in a position that can easily be reached by the user and marked as instrument disconnecting device which interrupts the power supply to the equipment.

It is also recommended that the supply of all the electrical circuits connected to the instrument must be protect properly, using devices (ex. fuses) proportionate to the circulating currents.

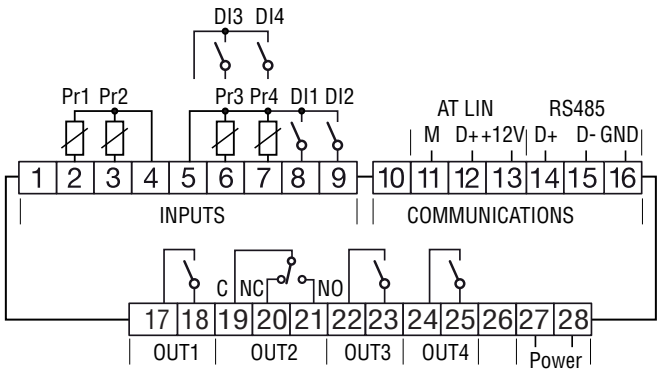
It is strongly recommended that cables with proper insulation, according to the working voltages and temperatures, be used.

Furthermore, the probes input cable must be kept separated from line voltage wiring and, if shielded cables are used, the shield must be connected to ground at only one side.

For the electrical supply of the G type instruments it is recommended to use an external TCTR transformer, or with equivalent features and to use a transformer for each instrument because there is no insulation between input and power supply.

⚠ We recommend that a **check** should be made that the **parameters are those desired** and that the **application functions correctly before connecting the outputs** to the actuators so as to **avoid malfunctioning** that may cause **irregularities in the plant** that could **cause damage** to people, things or animals.

4.2.1 Electrical wiring diagram



	61810 EN	60730 EN	UL
Out1:	16 (9) A	10 (4) A	12 A Res., 30LRA/5FLA
Out2:	8 (3) A	4 (4) A	10 A Res.
Out3, 4:	5 (1) A	2 (1) A	2 A Gen. Use

5. FUNCTIONS

5.1 Configuration

With the `SE` parameter it is possible to select the type of probe installed: Thermistors PTC KTY81-121 (Pt), NTC 103AT-2 (nt) or Pt1000 (P1).

Through the `uP` parameter it is possible to select the temperature engineering unit and the desired measure resolution (**C0** = °C/1°; **C1** = °C/0.1°; **F0** = °F/1°; **F1** = °F/0.1°).

The instrument allows the measure calibration, which can be used to recalibrate the instrument according to application needs. The calibration is made by using parameters `C1` (input Pr1), `C2` (Pr2 input), `C3` (input Pr3) and `C4` (input Pr4).

The instrument is always equipped with 2 Digital Inputs and, when necessary, **Pr3** and **Pr4** probe inputs can be configured as free of voltage Digital Inputs.

In order to use **Pr3** and **Pr4** as Digital Inputs, it is necessary to program parameters `P3` and `P4` = **dg**. When `P3` and `P4` are set as **EP**, **Au**, **cd** and **2E**, they work as temperature probe inputs.

With parameter `Ft` it is possible to program time constant of the software filter for the input measured value, in order to reduce noise sensitivity (increasing the reading time).

5.2 Output Configuration

The instrument outputs can be configured through parameters `o01`, `o02`, `o03` and `o04`.

When the Outpus are disabled (parameter `o0`**x** = **oF**), they can be controlled by the serial intarface at the following addresses:

Hexadecimal address	Description	Action
28E	OUT1 Output Enable/Disable when `o.o1` = oF	0 = Disable output 1 = Enable output
28F	OUT2 Output Enable/Disable when `o02` = oF	0 = Disable output 1 = Enable output
290	OUT3 Output Enable/Disable when `o03` = oF	0 = Disable output 1 = Enable output
291	OUT4 Output Enable/Disable when `o04` = oF	0 = Disable output 1 = Enable output

Otherwise, it is possible to program an output to point out the local alarms:

`AE` To control an acknowlegdeable alarm device through a Normally Open contact (Closed during the alarm).

`AL` To control a not acknowlegdeable alarm device through a Normally Open contact (Closed during the alarm).

`An` To control a latched alarm device through a Normally Open contact (Closed during the alarm).

`-E` To control an acknowlegdeable alarm device through a Normally Closed contact (Open during the alarm).

`-L` To control a not acknowlegdeable alarm device through a Normally Closed contact (Open during the alarm).

`-n` To control a latched alarm device through a Normally Closed contact (Open during the alarm).

`on` To control a device that must be ON when the instrumento is powered ON. The Output is OFF when the in strument is OFF or Stand-By status.

5.3 Alarm functions

The alarm conditions of the instrument are:

– Probe errors `E1`, `-E1`, `E2`, `-E2`, `E3`, `-E3`, `E4` and `-E4`;

– Temperature alarms `H1`, `L1`, and `H2`, `L2`.

The alarm functions trigger the output selected with parameters `o01`, `o02`, `o03` and `o04` according to the parameters set.

The silent alarm can be silenced by sending a serial command to the **HEX 288** address.

5.3.1 Temperature alarms

The instrument has two temperature alarms, fully configurable with a maximum and minimum threshold.

The temperature alarms work according to the probe measurements set at parameters `AY1` and `AY2`, the alarm thresholds set with parameters `AH1` and `AH2`(maximum alarm) and `AL1` and `AL2` (minimum alarm) and the relative differential `Ad1` and `Ad2`.

Depending on the desired alarm operating mode, parameter `AY1` and `AY2` can be set as:

`1`, `2`, `6`, `7` Absolute alarms referred to probe **Pr1**;

`11`, `12` Absolute alarms referred to probe **Pr2**;

`3`, `4`, `8`, `9` Absolute alarms referred to probe **Au**;

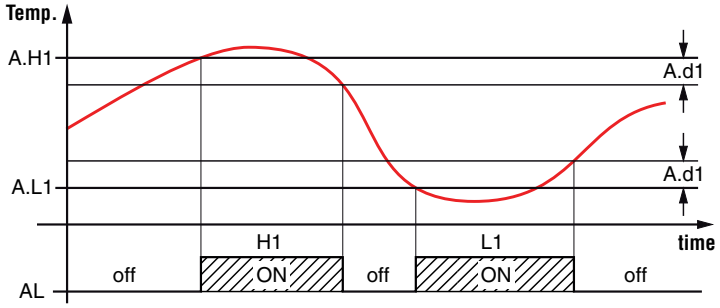
5, *10*, Absolute alarms referred to probe **CD**.

Using some parameters it is also possible to delay the enabling and the intervention of these alarms.

These parameters are:

AP 1, *AP2* Temperature alarm intervention delay **at instrument power ON** if the instrument is in alarm status at power ON.
If the instrument is not in alarm status when it is switched ON *AP 1* and *AP2* will not be considered.

At 1, *At2* Temperature 1 and 2 alarm delay activation times. The temperature alarms are enabled at the end of *AP 1* and *AP2* and are enabled after the *At 1* and *At2* time when the temperature measured by the probes exceed or goes below the respective maximum and minimum alarm thresholds.



The maximum and minimum temperature alarms can be disabled by setting the related parameters *AH***x** and *AL* **x** = **oF**.

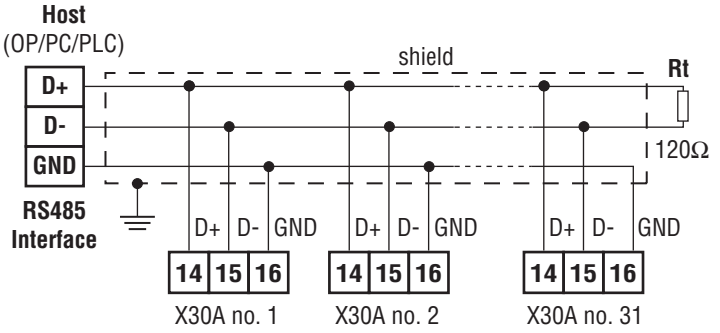
5.4 RS485 Serial Interface

The instrument can be equipped with an **RS485** serial communications interface, by means of which it is possible to connect the controller to a network to which other instruments (PLC controllers) are connected. All these devices typically depend on a Personal Computer that acts as a plant supervisor. Using a Personal Computer is possible to acquire all the function information and to program all the instrument configuration parameters.

The software protocol adopted for **X30A** is a **MODBUS RTU** type, widely used in several PLC and supervision programs available on the market.

The instrument has two terminals called **D+** and **D-** that must be connected to all network terminals with the same label.

For wiring the line, it is advisable to adopt a 3-pole wired and shielded cable connected as shown.



The interface circuit allows the connection of up to **32** instruments on the same line.

To maintain the line in rest conditions a 120Ω resistance (**Rt**) must be connected to the end of the line.

6. ACCESSORIES

The instrument has a lateral socket which allow to connect the accessiories.

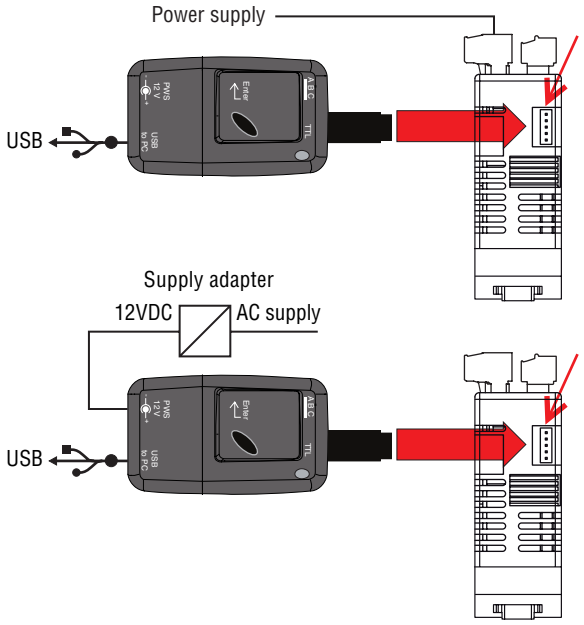
6.1 Parameters configuration by "A01"

The instrument is equipped with a 5 poles connector that allows the transfer from and toward the instrument of the functioning parameters through the device A01.

This device it is mainly usable for the serial programming of some instruments which need to have the same parameters configuration or to keep a copy of the parameters setting of an instrument and allow its rapid retransmission.

The same device allows to connect a PC via USB with which, through the appropriate configuration software for "*AT UniversalConf tools*", the operating parameters can be configured.

To use the **A01** device it is necessary that the device or instrument are being correctly supplied.



For additional info, please have a look at the A01 instruction manual.