

# Yocto I-O

## INSTALLATION INSTRUCTIONS

### COPYRIGHT

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### WARRANTY

This product is covered by a warranty against material and manufacturing defects for a 24 months period from the manufacturing date.

The warranty does not cover the defects that are due to:

- Negligent and improper use
- Failures caused by atmospheric hazards
- Acts of vandalism
- Wear out of materials
- Firmware upgrades

Akse reserves the right, at its discretion, to repair or substitute the faulty products

The warranty is not applicable to the products that will result defective in consequence of a negligent and improper use or an operating procedure not contemplated in this manual.

### RETURN AND REPAIR FORMALITIES

Akse accepts the return of instruments for repair only when authorized in advance. The transport costs are at customer charge.

### RE-SHIPING OF REPAIRED PRODUCT

The terms for re-shipment of repaired products are ex-works, i.e. the transport costs are at customer charge.

Products returned as defective but found to be perfectly working by our laboratories, will be charged a flat fee to account for checking and testing time irrespective of the warranty terms.

### SAFETY

In order to maintain this condition and to ensure safe operation, the user must comply with the indications and markings contained in the following instructions:

- When the instrument is received, before starting its installation, check that it is intact and no damage occurred during transport.
- Maintenance and/or repair must be carried out only by qualified, authorized personnel
- If there is ever the suspicion that safe operation is no longer possible, the instrument must be taken out of service and precautions taken against its accidental use.

Operation is no longer safe when:

- 1) There is clearly visible damage.
- 2) The instrument no longer functions.
- 3) After lengthy storage in unfavorable conditions.
- 4) After serious damage occurred during transport

The instruments must be installed in respect of all the local regulations.

### OPERATOR SAFETY

**Warning:** Failure to observe the following instructions may lead to a serious danger of death.

- The outputs and the options operate at low voltage level; they cannot be powered by any unspecified external voltage.
- The application on the current inputs of not compatible current levels, may damage the instrument.

Further documentation may be downloaded from our web site [www.electrex.it](http://www.electrex.it).

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### DECLARATION OF CONFORMITY

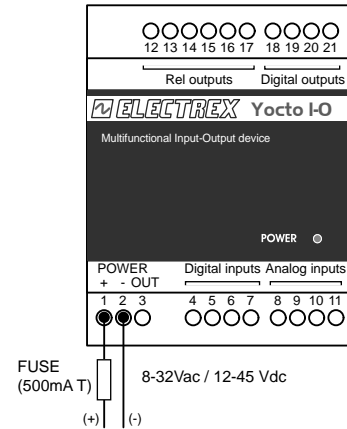
Akse hereby declares that its range of products complies with the following directives EMC 89/336/EEC 73/23CE 93/68 CE and complies with the following product's standard CEI CEI EN 61326 – IEC 61326 CEI EN 61010 – IEC 61010

The product has been tested in the typical wiring configuration and with peripherals conforming to the EMC directive and the LV directive.

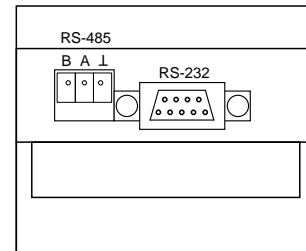
Subject to modification without notice. Edition 21-09-2009.

## POWER SUPPLY

The instrument is equipped with a separate power supply. The terminals for power are numbered (1 and 2). The max cross section of cables is 2,5 mm<sup>2</sup> if stremded, 4 mm<sup>2</sup> if rigid.



## SERIAL COMMUNICATION



**NB** The serial port RS-232 (DB9) is used only for firmware upgrades.

## DEFAULT SETUP

The configuration of the instrument is done through the software Energy Brain. The instrument is distributed with the following defaults:

485 Address	27
Communication	38400, 8, N, 2

POWER SUPPLY	
Power supply	8-32Vac / 12-45 Vdc
Self consumption	max 3 W
WORKING CONDITIONS	
Working temperature	-20/+70 °C
Relative Humidity	95% without condensing
MECHANICAL CHARATERISTICS	
Case	Self-extinguishing plastic material
Protection degree	IP40 on front panel, IP20 terminal side
Size	70 x 90 x 58 mm (DIN rail mount 4 modules)
MODELS	
PFA9401-G6	YOCTO I-O 2AI 2DI 2DO 2RO D4 8÷32V
PFA9401-H6	YOCTO I-O 2AI 4DI 2RO D4 8÷32V
PFA9401-M6	YOCTO I-O 2AI 6DI D4 8÷32V

Holding Registers				
Registers	n°Registers	Data type	Description	Value
<b>ANALOG PORT 1</b>				
650	2		Reserved	
652	2		Reserved	
654	2	F	Alarm threshold	
656	1	I	Latency time alarm	
657	1	I	XXXXXXXX xxxxxxxx: Hysteresis alarm rate in % xxxxxxxx Xxxxxxxx: direction of the threshold	if 1: threshold upward if 0: threshold down
658	3	C	Reserved	
661	1	I	Reserved	
662	1	I	Reserved	
<b>ANALOG PORT 2</b>				
663	2		Reserved	
665	2		Reserved	
667	2	F	Alarm threshold	
669	1	I	Latency time alarm	
670	1	I	XXXXXXXX xxxxxxxx: Hysteresis alarm rate in % xxxxxxxx Xxxxxxxx: direction of the threshold	if 1: threshold upward if 0: threshold down
671	3	C	Reserved	
674	1	I	Reserved	
675	1	I	Reserved	
<b>DIGITAL PORT 1</b>				
676	1		Reserved	
677	1		Reserved	
678	2		Reserved	
680	2	F	Alarm threshold	
682	1	I	Latency time alarm	
683	1	I	XXXXXXXX xxxxxxxx: Hysteresis alarm rate in % xxxxxxxx Xxxxxxxx: direction of the threshold	if 1: threshold upward if 0: threshold down
684	3	C	Reserved	
687	1	I	Reserved	
688	1	I	Reserved	
<b>DIGITAL PORT 2</b>				
689	1		Reserved	
690	1		Reserved	
691	2		Reserved	
693	2	F	Alarm threshold digital port 2	
695	1	I	Latency time alarm digital port 2	
696	1	I	XXXXXXXX xxxxxxxx: Hysteresis alarm rate in % xxxxxxxx Xxxxxxxx: direction of the threshold	if 1: threshold upward if 0: threshold down
697	3	C	Reserved	
700	1	I	Reserved	
701	1	I	Reserved	
7003	1	C	xxxxxxxx xxXXXXxx alarms activation from 51 to 54 * note n°2	if 1: active, if 0: not active
<b>ANALOG PORT 1</b>				
8650	2	F	Maximum value of the unit associated with the analog port 1	
8652	2	F	Minimum value of the unit associated with the analog port 1	
8654	1	I	Input type	if 0: 0-10V(default) if 1: -10/10V if 2: 0/5V if 3: -5/5V if 4: NTC
<b>ANALOG PORT 2</b>				
8655	2	F	Maximum value of the unit associated with the analog port 2	
8657	2	F	Minimum value of the unit associated with the analog port 2	
8659	1	I	Type of analog input 2	if 0: 0-10V(default) if 1: -10/10V if 2: 0/5V if 3: -5/5V if 4: NTC
<b>DIGITAL PORT 1 * note n°1</b>				
8676	1	I	Operation mode	if 0 it's a digital port if 1 it's a moving average counter if 2 it's a simple counter
8677	1	I	Integration time of the moving average counter	from 1 to 60 minutes
8678	2	F	Multiplication factor of the counter	
8680	1	I	Antibounce	from 1 to 100 ms
<b>DIGITAL PORT 2 * note n°1</b>				
8681	1	I	Operation mode	if 0 it's a digital port if 1 it's a moving average counter if 2 it's a simple counter
8682	1	I	Integration time of the moving average counter	from 1 to 60 minutes
8683	2	F	Multiplication factor of the counter	
8685	1	I	Antibounce	from 1 to 100 ms
<b>DIGITAL PORT 3 * note n°1</b>				
8686	1	I	Operation mode	if 0 it's a digital port if 1 it's a moving average counter if 2 it's a simple counter
8687	1	I	Integration time of the moving average counter	from 1 to 60 minutes
8688	2	F	Multiplication factor of the counter	
8690	1	I	Antibounce	from 1 to 100 ms
<b>DIGITAL PORT 4 * note n°1</b>				
8691	1	I	Operation mode	if 0 it's a digital port if 1 it's a moving average counter if 2 it's a simple counter
8692	1	I	Integration time of the moving average counter	from 1 to 60 minutes
8693	2	F	Multiplication factor of the counter	
8695	1	I	Antibounce	from 1 to 100 ms

DIGITAL PORT 5 * note n°1				
8696	1	I	Operation mode of digital port 5	if 0 it's a digital port if 1 it's a moving average counter if 2 it's a simple counter
8697	1	I	Integration time of the moving average counter of digital port 5	from 1 to 60 minutes
8698	2	F	Multiplication factor of the counter of digital port 5	
8700	1	I	Antibounce of digital port 5	from 1 to 100 ms
<b>DIGITAL PORT 6 * note n°1</b>				
8701	1	I	Operation mode of digital port 6	if 0 it's a digital port if 1 it's a moving average counter if 2 it's a simple counter
8702	1	I	Integration time of the moving average counter of digital port 6	from 1 to 60 minutes
8703	2	F	Multiplication factor of the counter of digital port 6	
8705	1	I	Antibounce of digital port 6	from 1 to 100 ms
<b>INPUT REGISTERS</b>				
9140	16	Byte Array ASCII String	Active Timezone Name	
9161	2	I (4 bytes)	UTC	
9173	2	I (4 bytes)	Serial Speed	if 0 it's 9600 if 1 it's 19200 if 2 it's 38400 if 3 it's 4800
<b>RESET YOCTO IO</b>				
16698	2		Firmware 3.14 or higher 1. The register displays the value 1 2. Write to the register the value 111111 3. The register displays the value 0 4. Switch off and switch on the instrument in order to effect the reset.	

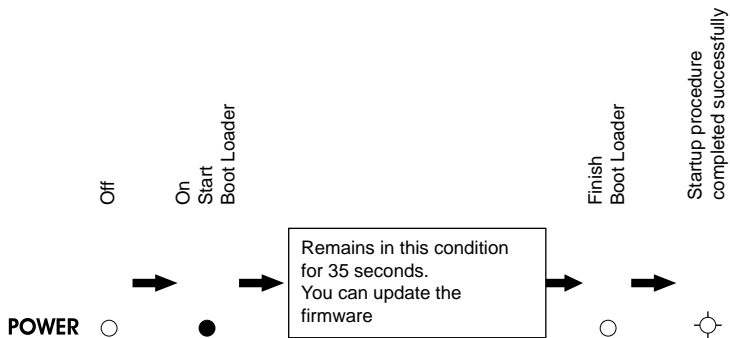
INPUT REGISTERS				
Address	n°Registers	Type *	Description	
0	2	F	analog input 1 value (mediated)	
2	2	F	analog input 2 value (mediated)	
4	2	F	counter 1 value unweighted	
6	2	F	counter 2 value unweighted	
8	2	F	counter 3 value unweighted	
10	2	F	counter 4 value unweighted	
12	2	F	counter 5 value unweighted	
14	2	F	counter 6 value unweighted	
16	2	F	analog input 1 value (instantaneous)	
18	2	F	analog input 2 value (instantaneous)	
20	2	F	counter 1 value weighted	
22	2	F	counter 2 value weighted	
24	2	F	counter 3 value weighted	
26	2	F	counter 4 value weighted	
28	2	F	counter 5 value weighted	
30	2	F	counter 6 value weighted	

COILS				
Address	n°Registers		Description	
0	1		Digital Output 1	
1	1		Digital Output 2	
2	1		Digital Output 3	
3	1		Digital Output 4	

NOTE n°1	
If the input is of type:	
Simple counter	should not be taken into account the Integration time parameter
Digital Port	should not be taken into account the parameters: Integration time, Threshold, Hysteresis, Measurement Unit and Antibounce.
NOTE n°2	
- It's the last block of registers to be written to configure the instrument.	
- This block of registers must be written or read in one go!	
- Analog port 1 alarm has index 51, Analog port 2 alarm has index 52, Digital port 1 alarm has index 53, Digital port 2 alarm has index 54.	

F	Float IEEE754
I	Integer
B	Bitmapped

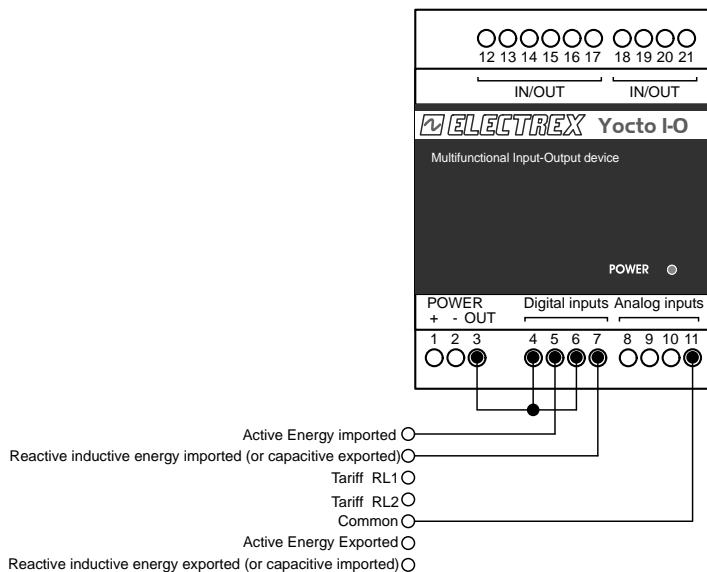
## BOOT SEQUENCE



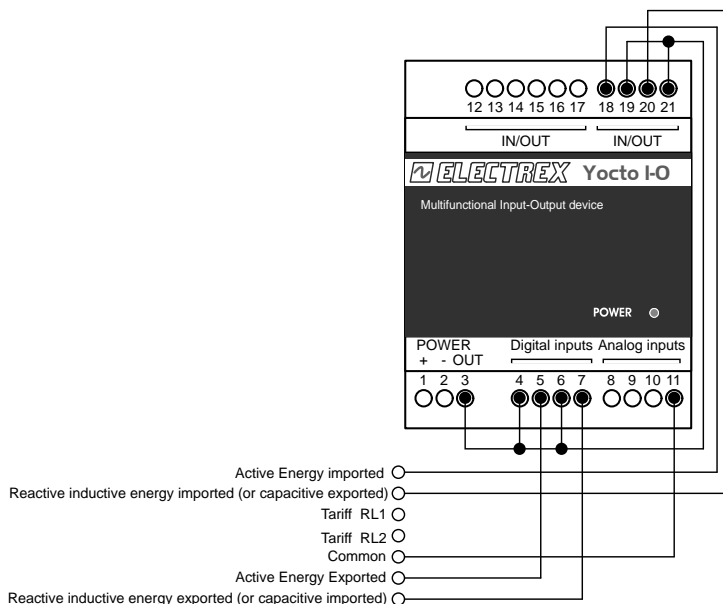
Legenda	
○	LED off
●	LED on
⦿	Slow blinking
⦿	Fast blinking

## CONNECTION DIAGRAM OF SIGNAL BOARD OF ENERGY SUPPLIER COUNTER

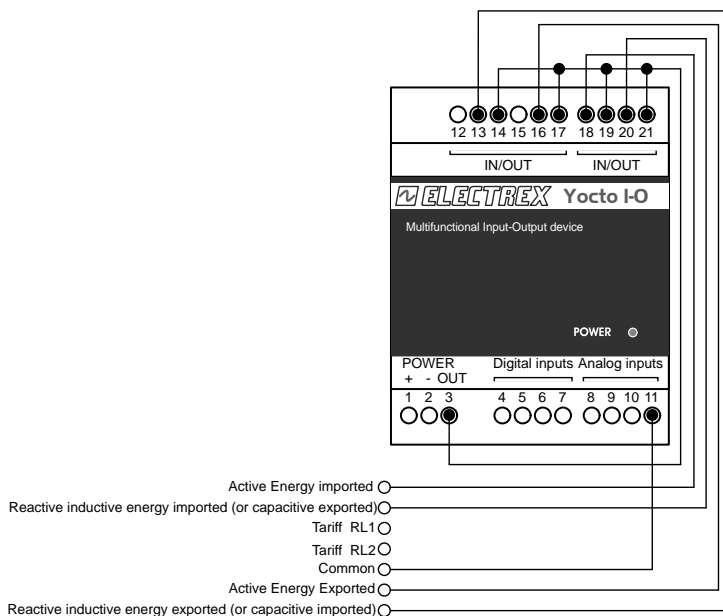
### YOCTO I-O 2AI 2DI 2DO 2RO D4 8÷32V



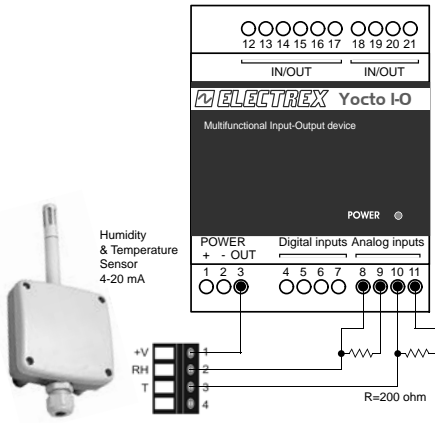
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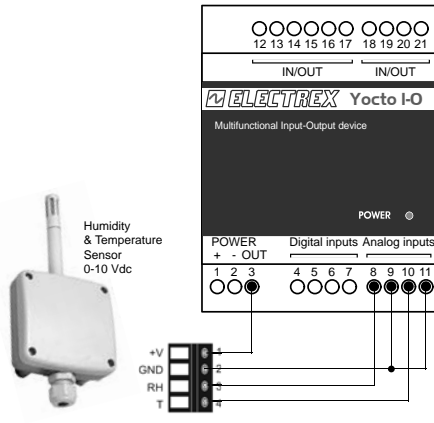
### YOCTO I-O 2AI 6DI D4 8÷32V



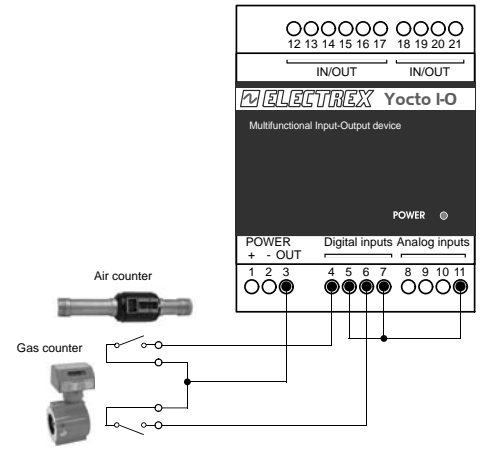
### INPUT CONNECTION 4-20mA



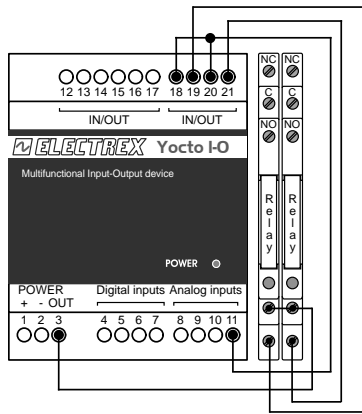
### INPUT CONNECTION 0-10 V



### DIGITAL INPUT CONNECTION



### DIGITAL OUTPUT CONNECTION



### INPUTS AND OUTPUTS

Relay Outputs							
	<table border="1"> <tr> <td>Maximum voltage applied</td> <td>250 Vac</td> </tr> <tr> <td>Maximum switching current (For resistive loads)</td> <td>5 A</td> </tr> </table>	Maximum voltage applied	250 Vac	Maximum switching current (For resistive loads)	5 A		
Maximum voltage applied	250 Vac						
Maximum switching current (For resistive loads)	5 A						
<ul style="list-style-type: none"> <li>- Piloting of a relay</li> <li>- Alarm signal</li> <li>- Direct handling of a load</li> </ul>							
Transistor optoisolated digital outputs (NPN)							
	<table border="1"> <tr> <td>Maximum voltage applied</td> <td>27 Vdc</td> </tr> <tr> <td>Maximum switching current</td> <td>27mA</td> </tr> </table>	Maximum voltage applied	27 Vdc	Maximum switching current	27mA		
Maximum voltage applied	27 Vdc						
Maximum switching current	27mA						
<ul style="list-style-type: none"> <li>- Piloting of a relay</li> <li>- Interface with PLC or central home automation</li> </ul>							
Digital inputs							
	<table border="1"> <tr> <td>2 Digital inputs, Voltage</td> <td>from 10 to 30 Vdc</td> </tr> <tr> <td>Input current</td> <td>from 2 to 10mA</td> </tr> <tr> <td>Max counting frequency</td> <td>100Hz</td> </tr> </table>	2 Digital inputs, Voltage	from 10 to 30 Vdc	Input current	from 2 to 10mA	Max counting frequency	100Hz
2 Digital inputs, Voltage	from 10 to 30 Vdc						
Input current	from 2 to 10mA						
Max counting frequency	100Hz						
<ul style="list-style-type: none"> <li>- State function (0, 1) (On, Off). State of a switch, technical alarms or other device status</li> <li>- Impulse counters from different transducers (e.g. Gas, Water, Electric Energy)</li> </ul>							
N.B. for gas counters it is needed a galvanic separator as according to ATEX normatives.							
Analog Inputs							
	<table border="1"> <tr> <td>2 analog inputs 0 - 10V</td> <td></td> </tr> <tr> <td>Compatible with 4-20 mA with a 200 ohms external resistor (not supplied).</td> <td></td> </tr> </table>	2 analog inputs 0 - 10V		Compatible with 4-20 mA with a 200 ohms external resistor (not supplied).			
2 analog inputs 0 - 10V							
Compatible with 4-20 mA with a 200 ohms external resistor (not supplied).							
<ul style="list-style-type: none"> <li>- Detection of temperature, humidity, levels, etc..</li> </ul>							

PFA9401-G6	PFA9401-H6	PFA9401-M6			
DIGITAL INPUTS	2	DIGITAL INPUTS	4	DIGITAL INPUTS	6
ANALOG INPUTS	2	ANALOG INPUTS	2	ANALOG INPUTS	2
DIGITAL OUTPUTS	2	DIGITAL OUTPUTS	0	DIGITAL OUTPUTS	0
RELAY OUTPUTS	2	RELAY OUTPUTS	2	RELAY OUTPUTS	0