

ATTO D4 70A

INSTALLATION INSTRUCTIONS

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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

This instrument was manufactured and tested in compliance with CEI EN 61010-1 CAT III -300V, class 2, standards for operating voltages up to 300 VAC rms phase to neutral. 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.
- Before mounting, ensure that the instrument operating voltages and the mains voltage are compatible then proceed with the installation.
- The instrument power supply needs no earth connection.
- The instrument is not equipped with a power supply fuse; a suitable external protection fuse must be foreseen by the contractor.
- 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.

- During normal operation dangerous voltages can occur on instrument terminals and on voltage and current transformers. Energized voltage and current transformers may generate lethal voltages. Follow carefully the standard safety precautions while carrying out any installation or service operation.
- The terminals of the instrument must not be accessible by the user after the installation. The user should only be allowed to access the instrument front panel where the display is located.
- Do not use the digital outputs for protection functions nor for power limitation functions. The instrument is suitable only for secondary protection functions.
- The instrument must be protected by a breaking device capable of interrupting both the power supply and the measurement terminals. It must be easily reachable by the operator and well identified as instrument cut-off device.
- The instrument and its connections must be carefully protected against short-circuit.

Precautions: Failure to respect the following instructions may irreversibly damage to the instrument.

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

Further documentation may be downloaded from our web site 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 26-02-2009.

The instrument is programmed with the following default values:

PAGE	MENU DISPLAYED	AVAILABLE PARAMETERS	DEFAULT
PASSWORD		0000 ... 9999	0000
RS485			
	RS485 Address	1 ... 247	27
	Rate	2400, 4800, 9600, 19200, 38400	38400
	Data Bit	7 or 8	8
	Parity	N = no parity, E =even parity, O = odd parity	N
	Stop Bit	1 or 2	2
NETWORK			
	Type (note n.1)	3PH-3W-2CT, 3PH-4W, 2PH-2W, 1PH-2W	1PH-2W
	Export	NO, YES	NO
	I FS	14 or 70A	70
AVG-MD TIME (note n.2)			
	POWERS	1...60 (minutes)	15
	CURRENTS	1...60 (minutes)	8
ALARM 1 / A (note n.11)			
	MODE (note n.3)	Normal, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (note n.4)	MAX, MIN	MIN
	MEAS (note n.5)	Controlled measure. See table n.1 for register selection	200
	THRE (note n.5)	Threshold value	0
ALARM 1 / B			
	HYST	1...100 (%)	1
	DELAY	1...99 (seconds)	1
	AVG (note n.6)	1...99 (seconds)	1
	OUT (note n.7)	Normal, Hold, Pulse-L, Pulse-S	NORMAL
ALARM 2 / A (note n.11)			
	MODE (note n.3)	Normal, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (note n.4)	MAX, MIN	MIN
	MEAS (note n.5)	Controlled measure. See table n.1 for register selection	200
	THRE (note n.5)	Threshold value	0
ALARM 2 / B			
	HYST	1...100 (%)	1
	DELAY	1...99 (seconds)	1
	AVG (note n.6)	1...99 (seconds)	1
	OUT (note n.7)	Normal, Hold, Pulse-L, Pulse-S	NORMAL
ALARM 3 / A (note n.11)			
	MODE (note n.3)	Normal, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (note n.4)	MAX, MIN	MIN
	MEAS (note n.5)	Controlled measure. See table n.1 for register selection	200
	THRE (note n.5)	Threshold value	0
ALARM 3 / B			
	HYST	1...100 (%)	1
	DELAY	1...99 (seconds)	1
	AVG (note n.6)	1...99 (seconds)	1
	OUT (note n.7)	Normal, Hold, Pulse-L, Pulse-S	NORMAL
ALARM 4 / A (note n.11)			
	MODE (note n.3)	Normal, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (note n.4)	MAX, MIN	MIN
	MEAS (note n.5)	Controlled measure. See table n.1 for register selection	200
	THRE (note n.5)	Threshold value	0
ALARM 4 / B			
	HYST	1...100 (%)	1
	DELAY	1...99 (seconds)	1
	AVG (note n.6)	1...99 (seconds)	1
	OUT (note n.7)	Normal, Hold, Pulse-L, Pulse-S	NORMAL
DIGITAL OUT 1 (note n.8)			
	MODE	PULSE, ALARM, REMOTE	PULSE
	POLARITY	NO, NC	NO
PULSE OUT 1			
	MEAS (note n.9)	P-IMP, QL-IMP, QC-IMP, S-IMP, P-EXP, QL-EXP, QC-EXP, S-EXP	P-IMP
	PRIMARY (note n.10)	YES, NO	YES
	WEIGHT	1...100000000 (Wh/100)	100000
	WIDTH	50ms...1S	500
DIGITAL OUT 2 (note n.8)			
	MODE	PULSE, ALARM, REMOTE	PULSE
	POLARITY	NO, NC	NO
PULSE OUT 2			
	MEAS (note n.9)	P-IMP, QL-IMP, QC-IMP, S-IMP, P-EXP, QL-EXP, QC-EXP, S-EXP	QL-IMP
	PRIMARY (note n.10)	YES, NO	YES
	WEIGHT	1...100000000 (Wh/100)	100000
	WIDTH	50ms...1S	500

MECHANICAL CHARACTERISTICS	
Enclosure	Self-extinguishing plastic material class V0
Protection degree	IP40 on front panel
Dimensions	70 x 90 x 58 mm (4 DIN modules)
VOLTAGE INPUT	
Direct	Up to 300 Vrms phase-neutral or 519 Vrms phase to phase
	Overload: 900 Vrms phase to phase for 1 sec
Power supply	230/240Vac +/- 10% 50/60Hz
Self consumption	< 3VA
MODELS	
PFA7431-02	ATTO D4 70A RS485 230-240V ENERGY ANALYSER
PFA7431-12	ATTO D4 70A RS485 230-240V 1DI 2DO ENERGY ANALYSER
PFTE000-00	CT external 70A 1 CT already included with the instrument *Order additional 2 CT's for the three-phase

Note n.7	
NORMAL	Physical output of the alarm excited during the duration of the alarm. It restores automatically
HOLD	Output remains excited until manual reset made via Modbus
PULSE-L	Output generate a 500ms impulse when the alarm goes on.
PULSE-S	Output generate a 100ms impulse when the alarm goes on.
Note n.8	
PULSE	Enables exit function as impulsive
ALARM	Enables exit function as alarm
REMOTE	Enables function output via protocol Modbus
NO	Normally open
NC	Normally closed
Note n.9	
P-IMP	Imported Active Power (Energy)
QL-IMP	Imported Reactive Inductive Power (Energy)
QC-IMP	Imported Reactive Capacitive Power (Energy)
S-IMP	Imported Apparent Power (Energy)
P-EXP	Exported Active Power (Energy)
QL-EXP	Exported Reactive Inductive Power (Energy)
QC-EXP	Exported Reactive Capacitive Power (Energy)
S-EXP	Exported Apparent Power (Energy)
Note n.10	
YES	Referred to CT primary
NO	Referred to CT secondary
Note n.11	
ALLARME 1	Alarm related to the physical output: DIGITAL OUT 1 (DO1, terminal 8)
ALLARME 2	Alarm related to the physical output: DIGITAL OUT 2 (DO2, terminal 9)
ALLARME 3	Only MODBUS alarm
ALLARME 4	Only MODBUS alarm

ALARM SET UP EXAMPLE

To ensure that the exit "DIGITAL OUT 1" remain excited for the alarm duration (latching) when average active power (MEAS 344) exceeds the value of 100 kW, hysteresis, 5% and latency of 5 seconds set the parameters such as table:

ALARM 1 / A	MODE (note n.2)	Normal, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (note n.3)	MAX, MIN	MAX
	MEAS (note n.4)	Controlled measure. See table n.1 for register selection	344
	THRE (note n.4)	Threshold value	100000
ALARM 1 / B	HYST	1...100 (%)	5
	DELAY	1...99 (seconds)	5
	AVG (note n.5)	1...99 (seconds)	1
	OUT (note n.6)	Normal, Hold, Pulse-L, Pulse-S	NORMAL
DIGITAL OUT 1	MODE	PULSE, ALARM, REMOTE	ALARM
	POLARITY	NO, NC	NO

To ensure that the exit "DIGITAL OUT 2" remain excited for the alarm duration (latching) when average active power (MEAS 344) goes down the value of 90 kW, hysteresis, 5% and latency of 5 seconds set the parameters such as table:

ALARM 2 / A	MODE (note n.2)	Normal, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (note n.3)	MAX, MIN	MIN
	MEAS (note n.4)	Controlled measure. See table n.1 for register selection	344
	THRE (note n.4)	Threshold value	90000
ALARM 2 / B	HYST	1...100 (%)	5
	DELAY	1...99 (seconds)	5
	AVG (note n.5)	1...99 (seconds)	1
	OUT (note n.6)	Normal, Hold, Pulse-L, Pulse-S	NORMAL
DIGITAL OUT 2	MODE	PULSE, ALARM, REMOTE	ALARM
	POLARITY	NO, NC	NO

VOLTAGE AND CURRENT CONNECTION

Voltage connection

Use cables with max cross-section of 2,5 mm² if flexible 4 mm² if rigid and connect them to the terminals marked voltage input on the instrument according to the applicable diagrams that follow.

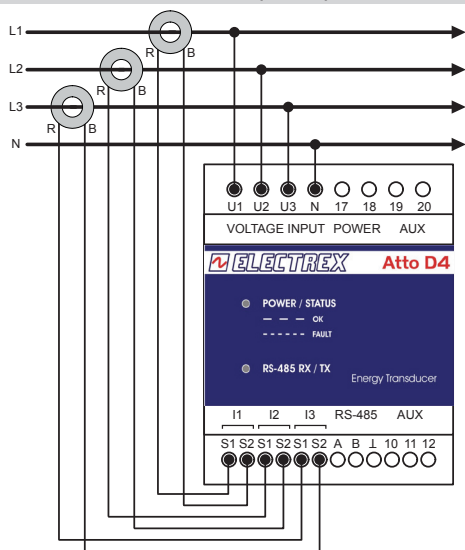
Current connection

It is necessary to use external CTs with a primary rating adequate to the load to be metered and with a 5A or 1A secondary rating. The number of CTs to be used (1, 2 or 3) depends upon the type of network. Connect the CT output(s) to the terminals marked I1, I2, I3 (current input) of the instrument according to the applicable diagrams that follow. Use cables with cross-section adequate to the VA rating of the CT and to the distance to be covered. The max cross-section for the terminals is 4 mm².

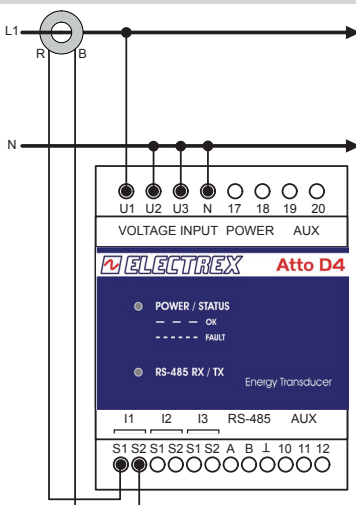
N.B. The CT secondary must always be in short circuit when not connected to the instrument in order to avoid damages and risks for the operator.

Warning: The phase relationship among voltage and current signals, the P1-P2 orientation and the S1-S2 connection of the CT(s) must be carefully respected. All disregard of this rule or of the wiring diagram leads to severe measurement errors.

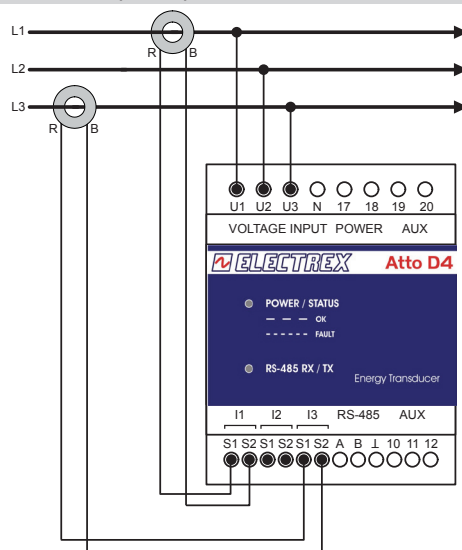
4W Star (4 wire) 3PH-4W



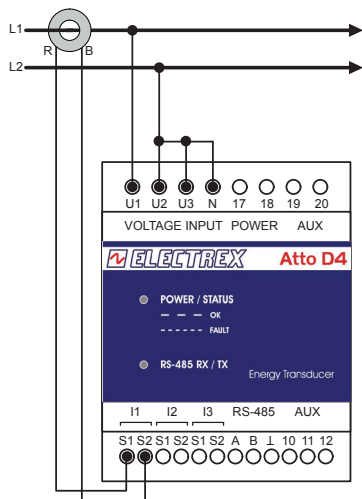
SINGLE PHASE 1PH-2W



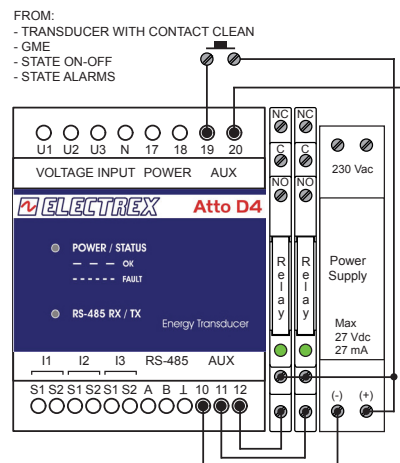
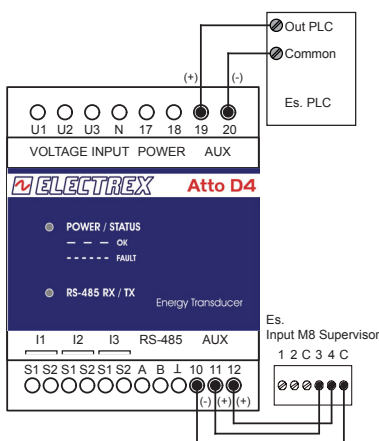
3W Delta (3 wire) 3PH-3W-2CT



BI-PHASE 2PH-2W

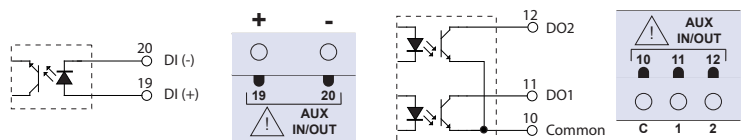


INPUT AND OUTPUT CONNECTION EXAMPLES



DIGITAL INPUTS AND OUTPUTS CONNECTION

(Applicable only to type PFA7431-12)



Digital Inputs	
Supply voltage (external):	from 10 to 30 Vdc
Current consumption:	from 2 to 10mA
Max. count frequency	10 or 100Hz
N.B. For gas meters a galvanic separation is needed per ATEX standards	

Digital outputs (optocoupled NPN transistor type per DIN 43864)	
Maximum applicable voltage:	27 Vdc
Maximum switchable current:	27 mA

POWER SUPPLY AND SERIAL LINE CONNECTION

The instrument is fitted with a separate power supply. The power supply terminals are numbered (17) and (18). Use cables with max cross-section of 2,5 mm² if flexible, 4 mm² if rigid.

