ATTO D4

INSTALLATION INSTRUCTIONS

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WARRANTY

This product is covered by a warranty against material and manufacturing defects for a period of 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-SHIPPING 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 detective 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 IEC 61010 class 2 standards for operating voltages up to 250 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 againstits 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 instrument is equipped with PTC current limiting device but a suitable external protection fuse should be foreseen by the contractor.
- 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.

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 EN 61326 – IEC 61326 CEI EN 61010 – IEC 1010.
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			
	RS 485 ADDRESS	1 ... 247	27
	Comm. Speed	2400, 4800, 9600, 19200, 38400	38400
	Data Bit	7 o 8	8
	Parity	N = no parity, E = parità pari, O = parità dispari	N
	Bit of stop	1 o 2	2
NETWORK			
	Type *(nota n.1)*	3PH-3W-2CT, 3PH-4W, 2PH-2W, 1PH-2W	3PH-4W
	Export	NO, YES	NO
	CT	10000/1 o 5	5/5
	VT	400000/300	1/1
AVG-MD TIME *(nota n.2)*			
	POWERS	1...60 (minuti)	15
	CURRENTS	1...60 (minuti)	8
ALARM 1 / A *(nota n.11)*			
	MODE (*nota n.3)*	Normale, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (*nota n.4)*	MAX, MIN	MIN
	MEAS (*nota n.5)*	Misura controllata. Vedi tabella n.1 per la selezione del registro	200
	THRE (*nota n.5)*	Valore soglia	0
ALARM 1 / B			
	HYST	1...100 (%)	1
	DELAY	1...99 (secondi)	1
	AVG (*nota n.6)*	1...99 (secondi)	1
	OUT (*nota n.7)*	Normal, Hold, Pulse-L, Pulse-S	NORMAL
ALARM 2 / A *(nota n.11)*			
	MODE (*nota n.3)*	Normale, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (*nota n.4)*	MAX, MIN	MIN
	MEAS (*nota n.5)*	Misura controllata. Vedi tabella n.1 per la selezione del registro	200
	THRE (*nota n.5)*	Valore soglia	0
ALARM 2 / B			
	HYST	1...100 (%)	1
	DELAY	1...99 (secondi)	1
	AVG (*nota n.6)*	1...99 (secondi)	1
	OUT (*nota n.7)*	Normal, Hold, Pulse-L, Pulse-S	NORMAL
ALARM 3 / A (*nota n.11)*			
	MODE (*nota n.3)*	Normale, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (*nota n.4)*	MAX, MIN	MIN
	MEAS (*nota n.5)*	Misura controllata. Vedi tabella n.1 per la selezione del registro	200
	THRE (*nota n.5)*	Valore soglia	0
ALARM 3 / B			
	HYST	1...100 (%)	1
	DELAY	1...99 (secondi)	1
	AVG (*nota n.6)*	1...99 (secondi)	1
	OUT (*nota n.7)*	Normal, Hold, Pulse-L, Pulse-S	NORMAL
ALARM 4 / A (*nota n.11)*			
	MODE (*nota n.3)*	Normale, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (*nota n.4)*	MAX, MIN	MIN
	MEAS (*nota n.5)*	Misura controllata. Vedi tabella n.1 per la selezione del registro	200
	THRE (*nota n.5)*	Valore soglia	0
ALARM 4 / B			
	HYST	1...100 (%)	1
	DELAY	1...99 (secondi)	1
	AVG (*nota n.6)*	1...99 (secondi)	1
	OUT (*nota n.7)*	Normal, Hold, Pulse-L, Pulse-S	NORMAL
DIGITAL OUT 1 (*nota n.8)*			
	MODE	PULSE, ALARM, REMOTE	PULSE
	POLARITY	NO, NC	NO
PULSE OUT 1			
	MEAS (*nota n.9)*	P-IMP, QL-IMP, QC-IMP, S-IMP, P-EXP, QL-EXP, QC-EXP, S-EXP	P-IMP
	PRIMARY (*nota n.10)*	YES, NO	YES
	WEIGHT	1...100000000 (Wh/100)	100000
	WIDTH	50ms...1S	500
DIGITAL OUT 2 (*nota n.8)*			
	MODE	PULSE, ALARM, REMOTE	PULSE
	POLARITY	NO, NC	NO
PULSE OUT 2			
	MEAS (*nota n.9)*	P-IMP, QL-IMP, QC-IMP, S-IMP, P-EXP, QL-EXP, QC-EXP, S-EXP	QL-IMP
	PRIMARY (*nota 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
With external PT(VT)	Primary: programmable (max. 400 kV) Secondary: programmable (max. 300 V)
	Overload: 900 Vrms phase to phase for 1 sec
Power supply	230/240Vac +/- 10% 50/60Hz
Self consumption	< 3VA
MODELS	
PFA7411-02	ATTO D4 RS485 230-240V ENERGY ANALYSER
PFA7411-12	ATTO D4 RS485 230-240V 1DI 2DO ENERGY ANALYSER

INPUT REGISTERS					
Address	n° Register	Type *	Description	Symbol	Unit
200	2	F	Phase to Neutral Voltage, THD	THD U1N	[%]
202	2	F	Phase to Neutral Voltage, THD	THD U2N	[%]
204	2	F	Phase to Neutral Voltage, THD	THD U3N	[%]
206	2	F	Phase to Phase Voltage, THD	THD U12	[%]
208	2	F	Phase to Phase Voltage, THD	THD U23	[%]
210	2	F	Phase to Phase Voltage, THD	THD U31	[%]
212	2	F	Phase Current, THD	THD I1	[%]
214	2	F	Phase Current, THD	THD I2	[%]
216	2	F	Phase Current, THD	THD I3	[%]
218	2	F	Frequency of U1N	f	[Hz]
220	2	F	Phase to Neutral Voltage, RMS Amplitude	U1N	[V]
222	2	F	Phase to Neutral Voltage, RMS Amplitude	U2N	[V]
224	2	F	Phase to Neutral Voltage, RMS Amplitude	U3N	[V]
226	2	F	Phase to Phase Voltage, RMS Amplitude	U12	[V]
228	2	F	Phase to Phase Voltage, RMS Amplitude	U23	[V]
230	2	F	Phase to Phase Voltage, RMS Amplitude	U31	[V]
232	2	F	Phase Current, RMS Amplitude	I1	[A]
234	2	F	Phase Current, RMS Amplitude	I2	[A]
236	2	F	Phase Current, RMS Amplitude	I3	[A]
238	2	F	Neutral Current, RMS Amplitude	IN	[A]
240	2	F	Phase Active Power (+/-)	P1	[W]
242	2	F	Phase Active Power (+/-)	P2	[W]
244	2	F	Phase Active Power (+/-)	P3	[W]
246	2	F	Phase Reactive Power (+/-)	Q1	[var]
248	2	F	Phase Reactive Power (+/-)	Q2	[var]
250	2	F	Phase Reactive Power (+/-)	Q3	[var]
252	2	F	Phase Apparent Power	S1	[VA]
254	2	F	Phase Apparent Power	S2	[VA]
256	2	F	Phase Apparent Power	S3	[VA]
258	2	F	Phase Power Factor (+/-)	PF1	[-]
260	2	F	Phase Power Factor (+/-)	PF2	[-]
262	2	F	Phase Power Factor (+/-)	PF3	[-]
264	2	F	Phase to Neutral Voltage, Mean THD	THD Ul	[%]
266	2	F	Phase to Phase Voltage, Mean THD	THD UD	[%]
268	2	F	Phase Current, Mean THD	THD I	[%]
270	2	F	Phase to Neutral Voltage, Mean RMS Amplitude	Ul	[V]
272	2	F	Phase to Phase Voltage, Mean RMS Amplitude	UD	[V]
274	2	F	Three phase current, RMS Amplitude	I	[A]
276	2	F	Total active power (+/-)	PS	[W]
278	2	F	Total reactive power (+/-)	QS	[var]
280	2	F	Total apparent power	SS	[VA]
282	2	F	Total power factor (+/-)	PFS	[-]
284	2	F	Internal Temperature, °C	T	[°C]
286	2	F	Internal Temperature, °F	T	[°F]
288	2	F	Phase to Neutral Voltage, RMS Amplitude, MIN	U1N MIN	[A]
290	2	F	Phase to Neutral Voltage, RMS Amplitude, MIN	U2N MIN	[A]
292	2	F	Phase to Neutral Voltage, RMS Amplitude, MIN	U3N MIN	[A]
294	2	F	Phase to Neutral Voltage, RMS Amplitude, MAX	U1N MAX	[A]
296	2	F	Phase to Neutral Voltage, RMS Amplitude, MAX	U2N MAX	[A]
298	2	F	Phase to Neutral Voltage, RMS Amplitude, MAX	U3N MAX	[A]
300	2	F	Phase to Phase Voltage, RMS Amplitude, MIN	U12 MIN	[A]
302	2	F	Phase to Phase Voltage, RMS Amplitude, MIN	U23 MIN	[A]
304	2	F	Phase to Phase Voltage, RMS Amplitude, MIN	U31 MIN	[A]
306	2	F	Phase to Phase Voltage, RMS Amplitude, MAX	U12 MAX	[A]
308	2	F	Phase to Phase Voltage, RMS Amplitude, MAX	U23 MAX	[A]
310	2	F	Phase to Phase Voltage, RMS Amplitude, MAX	U31 MAX	[A]
312	2	F	Phase Current, RMS Amplitude, MAX	I1 MAX	[A]
314	2	F	Phase Current, RMS Amplitude, MAX	I2 MAX	[A]
316	2	F	Phase Current, RMS Amplitude, MAX	I3 MAX	[A]
318	2	F	Neutral Current, RMS Amplitude, MAX	IN MAX	[A]
320	2	F	Phase Active Power, Import, MAX	P1+ MAX	[A]
322	2	F	Phase Active Power, Import, MAX	P2+ MAX	[A]
324	2	F	Phase Active Power, Import, MAX	P3+ MAX	[A]
326	2	F	Phase Active Power, Export, MAX	P1- MAX	[A]
328	2	F	Phase Active Power, Export, MAX	P2- MAX	[A]
330	2	F	Phase Active Power, Export, MAX	P3- MAX	[A]
332	2	F	Phase Current, RMS Amplitude, AVG	I1 AVG	[A]
334	2	F	Phase Current, RMS Amplitude, AVG	I2 AVG	[A]
336	2	F	Phase Current, RMS Amplitude, AVG	I3 AVG	[A]
338	2	F	Phase Current, RMS Amplitude, MD	I1 MD	[A]
340	2	F	Phase Current, RMS Amplitude, MD	I2 MD	[A]
342	2	F	Phase Current, RMS Amplitude, MD	I3 MD	[A]
344	2	F	Total imported active power, AVG	P+ AVG	[W]
346	2	F	Total imported inductive power, AVG	Qind+ AVG	[var]
348	2	F	Total imported capacitive power, AVG	Qcap+ AVG	[var]
350	2	F	Total imported apparent power, AVG	S+ AVG	[VA]
352	2	F	Total exported active power, AVG	P- AVG	[W]
354	2	F	Total exported inductive power, AVG	Qind- AVG	[var]
356	2	F	Total exported capacitive power, AVG	Qcap- AVG	[var]
358	2	F	Total exported apparent power, AVG	S- AVG	[VA]
360	2	F	Total imported active power, MD	P+ MD	[W]
362	2	F	Total imported inductive power, MD	Qind+ MD	[var]
364	2	F	Total imported capacitive power, MD	Qcap+ MD	[var]
366	2	F	Total imported apparent power, MD	S+ MD	[VA]
368	2	F	Total exported active power, MD	P- MD	[W]
370	2	F	Total exported inductive power, MD	Qind- MD	[var]
372	2	F	Total exported capacitive power, MD	Qcap- MD	[var]
374	2	F	Total exported apparent power, MD	S- MD	[VA]
376	2	F	External Pulse Counter, With Weight, Total counter or Tariff T1	CNT1 S	
384	2	F	External Pulse Counter, With Weight, Partial Counter or Tariff T2	CNT1 P	
392	2	I	External Pulse Counter, Total counter or Tariff T1	CNT1 S	[-]
400	2	I	Lifetimer, Total counter	TIME S	[s]
402	2	I	External Pulse Counter, Partial Counter or Tariff T2	CNT1 P	[-]
410	2	I	Lifetimer, Partial Counter or Conditional Counter	TIME P	[s]
412	2	I	Total imported active energy, Total counter or Tariff T1	Ea S +	[kWh/10]
414	2	I	Total imported inductive energy, Total counter or Tariff T1	Er Ind S +	[kvarh/10]
416	2	I	Total imported capacitive energy, Total counter or Tariff T1	Er Cap S +	[kvarh/10]
418	2	I	Total imported apparent energy, Total counter or Tariff T1	Es S +	[kVAh/10]
420	2	I	Total exported active energy, Total counter or Tariff T1	Ea S -	[kWh/10]
422	2	I	Total exported inductive energy, Total counter or Tariff T1	Er Ind S -	[kvarh/10]
424	2	I	Total exported capacitive energy, Total counter or Tariff T1	Er Cap S -	[kvarh/10]
426	2	I	Total exported apparent energy, Total counter or Tariff T1	Es S -	[kVAh/10]
428	2	I	Total imported active energy, Partial Counter or Tariff T2	Ea P +	[kWh/10]
430	2	I	Total imported inductive energy, Partial Counter or Tariff T2	Er Ind P +	[kvarh/10]
432	2	I	Total imported capacitive energy, Partial Counter or Tariff T2	Er Cap P +	[kvarh/10]
434	2	I	Total imported apparent energy, Partial Counter or Tariff T2	Es P +	[kVAh/10]
436	2	I	Total exported active energy, Partial Counter or Tariff T2	Ea P -	[kWh/10]
438	2	I	Total exported inductive energy, Partial Counter or Tariff T2	Er Ind P -	[kvarh/10]
440	2	I	Total exported capacitive energy, Partial Counter or Tariff T2	Er Cap P -	[kvarh/10]
442	2	I	Total exported apparent energy, Partial Counter or Tariff T2	Es P -	[kVAh/10]
444	2	I	Phase imported active energy	Ea+ L1	[kWh/10]
446	2	I	Phase imported active energy	Ea+ L2	[kWh/10]
448	2	I	Phase imported active energy	Ea+ L3	[kWh/10]
450	2	I	Phase imported inductive energy	Er Ind + L1	[kvarh/10]
452	2	I	Phase imported inductive energy	Er Ind + L2	[kvarh/10]
454	2	I	Phase imported inductive energy	Er Ind + L3	[kvarh/10]
456	2	I	Phase imported capacitive energy	Er Cap + L1	[kvarh/10]
458	2	I	Phase imported capacitive energy	Er Cap + L2	[kvarh/10]
460	2	I	Phase imported capacitive energy	Er Cap + L3	[kvarh/10]
462	2	I	Phase imported apparent energy	Es + L1	[kvarh/10]
464	2	I	Phase imported apparent energy	Es + L2	[kvarh/10]
466	2	I	Phase imported apparent energy	Es + L3	[kvarh/10]
468	2	I	Phase exported active energy	Ea- L1	[kWh/10]
470	2	I	Phase exported active energy	Ea- L2	[kWh/10]
472	2	I	Phase exported active energy	Ea- L3	[kWh/10]
474	2	I	Phase exported inductive energy	Er Ind - L1	[kvarh/10]
476	2	I	Phase exported inductive energy	Er Ind - L2	[kvarh/10]
478	2	I	Phase exported inductive energy	Er Ind - L3	[kvarh/10]
480	2	I	Phase exported capacitive energy	Er Cap - L1	[kvarh/10]
482	2	I	Phase exported capacitive energy	Er Cap - L2	[kvarh/10]
484	2	I	Phase exported capacitive energy	Er Cap - L3	[kvarh/10]
486	2	I	Phase exported apparent energy	Es - L1	[kvarh/10]
488	2	I	Phase exported apparent energy	Es - L2	[kvarh/10]
490	2	I	Phase exported apparent energy	Es - L3	[kvarh/10]
492	1	B	Digital Inputs Status	DI	[-]
494	1	B	Alarms Status (simple)	ALS	[-]
495	1	B	Alarms Status (combined)	ALC	[-]
496	4	I	Total imported active energy, Total counter or Tariff T1	Ea S +	[Wh/10]
500	4	I	Total imported inductive energy, Total counter or Tariff T1	Er Ind S +	[varh/10]
504	4	I	Total imported capacitive energy, Total counter or Tariff T1	Er Cap S +	[varh/10]
508	4	I	Total imported apparent energy, Total counter or Tariff T1	Es S +	[VAh/10]
512	4	I	Total exported active energy, Total counter or Tariff T1	Ea S -	[Wh/10]
516	4	I	Total exported inductive energy, Total counter or Tariff T1	Er Ind S -	[varh/10]
520	4	I	Total exported capacitive energy, Total counter or Tariff T1	Er Cap S -	[varh/10]
524	4	I	Total exported apparent energy, Total counter or Tariff T1	Es S -	[VAh/10]
528	4	I	Total imported active energy, Partial Counter or Tariff T2	Ea P +	[Wh/10]
532	4	I	Total imported inductive energy, Partial Counter or Tariff T2	Er Ind P +	[varh/10]
536	4	I	Total imported capacitive energy, Partial Counter or Tariff T2	Er Cap P +	[varh/10]
540	4	I	Total imported apparent energy, Partial Counter or Tariff T2	Es P +	[VAh/10]
544	4	I	Total exported active energy, Partial Counter or Tariff T2	Ea P -	[Wh/10]
548	4	I	Total exported inductive energy, Partial Counter or Tariff T2	Er Ind P -	[varh/10]
552	4	I	Total exported capacitive energy, Partial Counter or Tariff T2	Er Cap P -	[varh/10]
556	4	I	Total exported apparent energy, Partial Counter or Tariff T2	Es P -	[VAh/10]
560	4	I	Phase imported active energy	Ea+ L1	[Wh/10]
564	4	I	Phase imported active energy	Ea+ L2	[Wh/10]
568	4	I	Phase imported active energy	Ea+ L3	[Wh/10]
572	4	I	Phase imported inductive energy	Er Ind + L1	[varh/10]
576	4	I	Phase imported inductive energy	Er Ind + L2	[varh/10]
580	4	I	Phase imported inductive energy	Er Ind + L3	[varh/10]

Holding Registers				
Indirizzo	n° Registri	Tipo dato	Nome Descrizione	Valore
100	2	I	Primario TV	from 1 to 400000 V
102	1	I	Secondario TV	from 1 to 999 V
103	1	I	Primario TA (Non usato se versione 70A)	from 1 to 10000 A
104	1	I	Secondario TA (Fondo scala corrente se versione 70A)	1 o 5 A (14 o 70 se versione 70A con TA esterni. In tale versione, i registri 103 e 104 puntano allo stesso parametro)
105	1	B	Modalità inserzione	Bit 7 = Abilita Export Bit 0-3 = modalità di inserzione: 0x00 // 0 = 1P, 0x01 // 1 = 2P 0x02 // 2 = 3P_4W, 0x03 // 3 = 3P_3W_2CT
106	1	I	Integration Time for Power	from 1 to 60 min
107	1	I	Integration Time for Current	from 1 to 60 min
109	1	B	Life Timer 2 (partial)	Bit 0-1 = selezione ingresso comando (0-4, 0=disabilita comando esterno) Bit 4 = Comando da canale allarme (0=comando da ingresso digitale, 1=comando da allarme) Bit 7 = inverte polarità comando (0=conta se comando attivo, 1=conta se comando non attivo)
110	1	B	Energy Counters set 1 (totals)	Bit 0-1 = selezione ingresso comando Bit 4 = Comando da canale allarme Bit 7 = inverte polarità comando
111	1	B	Energy Counters set 2 (partials)	Bit 0-1 = selezione ingresso comando Bit 4 = Comando da canale allarme Bit 7 = inverte polarità comando
112	2	F	Multiplier CNT1	Se 0, disabilita contatore impulsi CNT1
120	2	I	Measure unit CNT1	4 caratteri ASCII da 0x30 a 0x39 e da 0x41 a 0x5A
128	1	I	Total counters set symbol	2 caratteri ASCII da 0x30 a 0x39 e da 0x41 a 0x5A
129	1	I	Partial counters set symbol	2 caratteri ASCII da 0x30 a 0x39 e da 0x41 a 0x5A
135	1	I	Pulse output 1 measure selection	Bit 0-2 = Indice potenza (0=Pimp, 1=QindImp, 2=QcapImp, 3=Simp, 4=Pexp, 5=QindExp, 6=QcapExp, 7=Sexp Bit 7 = Valore a secondario TA/TV es: 0x00, 0x01, 0x02...=primario; 0x80, 0x81, 0x82… =secondario
136	1	I	Pulse length output 1	from 50 to 1000 ms
137	2	I	Pulse weight output 1	in Wh/100, da 1 a 100000000
139	1	I	Pulse output 2 measure selection	Bit 0-2 = Indice potenza Bit 7 = Secondario
140	1	I	Pulse length output 2	from 50 to 1000 ms
141	2	I	Pulse weight output 2	in Wh/100, from 1 to 100000000
151	1	B	Configuration DI 1	Bit 0 = Durata minima chiusura (0=5ms, 1=50ms) Bit 4 = Durata minima apertura (0=5ms, 1=50ms) Bit 11 = Inverte stato (non ha effetto sulla funzione contaimpulsi; il contatore si incrementa SEMPRE alla chiusura del contatto) es: 0x0000 -> max frequenza impulsi = 100Hz (dritto) 0x0011 -> max frequenza impulsi = 10Hz (dritto) 0x0811 -> max frequenza impulsi = 10Hz (invertito)
155	1	B	Configuration DO 1	Bit 0-1 = Modo (0=comando modbus, 1=allarme, 2=impulsi) Bit 7 = Normalmente chiuso

156	1	B	Configurazione DO 2	Bit 0-1 = Modo (0=comando modbus, 1=allarme, 2=impulsi) Bit 7 = Normalmente chiuso
159	1	I	Selezione grandezza allarme 1	Indirizzo del IR cui collegare l'allarme. Da 200 a 390 (o 490)
160	1	I	Modo allarme 1	Bit 0-3 = Modalità allarme 0 = Normale 1 = 1/3 (prende le misure ai due addr successivi a quello programmato) 2 = 3/3 (prende le misure ai due addr successivi a quello programmato) 3 = Sbilanciamento (prende le misure ai due addr successivi a quello programmato) 4 = Variazione (delta) rispetto a valore medio su finestra mobile Bit 4 = Direzione (polarità): 0 = Min (neg se derivata) 1 = Max (pos se derivata) Bit 8-11 = Modalità pilotaggio uscita 0 = Normale 1 = Impulso short (100mS) - Non ha effetto su IR/HR (come modo 0) 2 = Impulso long (500mS) - Non ha effetto su IR/HR (come modo 0) 3 = Hold Bit 12-14 = Selezione della logica d'uscita Bit 12 = Operatore porta uscita 0 out = A or B 1 out = A and B Bit 13 = Operatore porta A (0=OR, 1=AND) Bit 14 = Operatore porta B (0=OR, 1=AND)
161	1	I	Combinazione logica allarme 1	Bit 0-3 = Canali allarme ingresso porta A Bit 4-7 = Ingressi digitali ingresso porta A Bit 8-11 = Canali allarme ingresso porta B Bit 12-15 = Ingressi digitali ingresso porta B
162	1	I	Tempo integrazione allarme 1	Se Modo=Variazione: Ampiezza intervallo di integrazione per il calcolo della media (da 1 a 99 sec)
163	1	I	Isteresi allarme 1	0-99 %
164	1	I	Ritardo allarme 1	0-99 s (bit 0-7=ritardo attivazione, bit 8-15=ritardo disattivazione?)
165	2	F	Soglia allarme 1	In percentuale se Modo=Sbilanciamento o Modo=Variazione. Viene automaticamente arrotondato al numero di cifre editabili da tastiera.
167	1	I	Selezione grandezza allarme 2	
168	1	I	Modo allarme 2	
169	1	I	Combinazione logica allarme 2	
170	1	I	Tempo integrazione allarme 2	
171	1	I	Isteresi allarme 2	
172	1	I	Ritardo allarme 2	
173	2	F	Soglia allarme 2	
215	1	I	Ritardo di trasmissione seriale	da 10 a 1000 ms
216	1	B	Porta seriale: flags di swap	Byte alto sempre uguale a byte basso. 0x01 Swap bytes 0x02 Swap word 0x04 Swap dwords 0x08 Swap words in floats 0x10 Swap bytes in floats 0x80 BCD Mode (not yet!)
217	1	I	Porta seriale: velocità	0=2400, 1=4800, 2=9600, 3=19200, 4=38400
221	1	B	Comando uscite	Bit 0 = Uscita 1, Bit 1 = Uscita 2 Bit 2 = Uscita 3, Bit 3 = Uscita 4
223	1	B	Combined Alarm Status	Bit 0 = Canale 1, Bit 1 = Canale 2 Bit 2 = Canale 3, Bit 3 = Canale 4
226	1	I	Reset strumento	La scrittura della word "0xDEAD" provoca il riavvio
230	1	B	Reset contatori set 1 (totali)	Bit 0 = Ea, Bit 1 = Er ind, Bit 2 = Er cap, Bit 3 = Es (imp) Bit 4 = Ea, Bit 5 = Er ind, Bit 6 = Er cap, Bit 7 = Es (exp) Bit 8 = CNT1, Bit 9 = CNT2, Bit 10 = CNT3, Bit 11 = CNT4
231	1	B	Reset contatori set 2 (parziali)	Bit 0 = Ea, Bit 1 = Er ind, Bit 2 = Er cap, Bit 3 = Es (imp) Bit 4 = Ea, Bit 5 = Er ind, Bit 6 = Er cap, Bit 7 = Es (exp) Bit 8 = CNT1, Bit 9 = CNT2, Bit 10 = CNT3, Bit 11 = CNT4
232	1	B	Reset contatori fase 1	Bit 0 = Ea, Bit 1 = Er ind, Bit 2 = Er cap, Bit 3 = Es (imp) Bit 4 = Ea, Bit 5 = Er ind, Bit 6 = Er cap, Bit 7 = Es (exp)
233	1	B	Reset contatori fase 2	Bit 0 = Ea, Bit 1 = Er ind, Bit 2 = Er cap, Bit 3 = Es (imp) Bit 4 = Ea, Bit 5 = Er ind, Bit 6 = Er cap, Bit 7 = Es (exp)
234	1	B	Reset contatori fase 3	Bit 0 = Ea, Bit 1 = Er ind, Bit 2 = Er cap, Bit 3 = Es (imp) Bit 4 = Ea, Bit 5 = Er ind, Bit 6 = Er cap, Bit 7 = Es (exp)
235	1	B	Azzeramento AVG potenze	Bit 0 = P, Bit 1 = Q ind, Bit 2 = Q cap, Bit 3 = S (imp) Bit 4 = P, Bit 5 = Q ind, Bit 6 = Q cap, Bit 7 = S (exp)
236	1	B	Azzeramento MD Potenze	Bit 0 = P, Bit 1 = Q ind, Bit 2 = Q cap, Bit 3 = S (imp) Bit 4 = P, Bit 5 = Q ind, Bit 6 = Q cap, Bit 7 = S (exp)
237	1	B	Azzeramento AVG correnti	Bit 0 = I1, Bit 1 = I2, Bit 2 = I3
238	1	B	Azzeramento MD Correnti	Bit 0 = I1, Bit 1 = I2, Bit 2 = I3
239	1	B	Azzeramento min/max Us	Bit 0 = max U1, Bit 1 = max U2, Bit 2 = max U3, Bit 3 = x Bit 4 = min U1, Bit 5 = min U2, Bit 6 = min U3
240	1	B	Azzeramento min/max Ud	Bit 0 = max U1, Bit 1 = max U2, Bit 2 = max U3, Bit 3 = x Bit 4 = min U1, Bit 5 = min U2, Bit 6 = min U3
241	1	B	Azzeramento min/max I	Bit 0 = max I1, Bit 1 = max I2, Bit 2 = max I3, Bit 3 = max In
242	1	B	Azzeramento min/max Pimp	Bit 0 = max P1, Bit 1 = max P2, Bit 2 = max P3
243	1	B	Azzeramento min/max Pexp	Bit 0 = max P1, Bit 1 = max P2, Bit 2 = max P3

*

F	Float IEEE754
I	Integer
B	Bitmapped

NOTA n.1	
3PH-3W-2CT	2 fasi 3 fili, triangolo
3PH-4W	3 fasi 4 fili, Stella
2PH-2W	2 fasi 2 fili, bifase
1PH-2W	1 fase, 2 fili, monofase
NOTA n.2	
POWERS	Tempo di integrazione del valore medio (AVG) e di punta (MD) per la potenza (da 1 a 60 minuti)
CURRENTS	Tempo di integrazione del valore medio (AVG) e di punta (MD) per la corrente (da 1 a 60 minuti)
NOTA n.3	
NORMALE	Allarme classico con riferimento ad una soglia fissa o di massimo o di minimo con ritardo e isteresi applicabili Il parametro " AVG" non viene utilizzato
1-OF-3	Prende anche i due registri successivi a quello selezionato su "MEAS" Funziona su una soglia fissa o di massimo o di minimo con ritardo e isteresi applicabili. Se uno dei tre registri supera la soglia scatta l'allarme Il parametro " AVG" non viene utilizzato
3-OF-3	Prende anche i due registri successivi a quello selezionato su "MEAS" Funziona su una soglia fissa o di massimo o di minimo con ritardo e isteresi applicabili. Quando tutti e tre i registri superano la soglia scatta l'allarme Il parametro "AVG" non viene utilizzato
DERIV	Il parametro "THRE" diventa un valore in percentuale Il valore istantaneo applicato all'allarme su "MEAS" viene confrontato con il suo valore mediato ottenuto sulla base del tempo impostata su "AVG" Quando il valore istantaneo abbinato all'allarme differisce in più (settando "MAX") o in meno(settando "MIN") rispetto al valore medio ("AVG") della percentuale impostata su "THRE" l'allarme scatta. Con ritardo e isteresi applicabili. Il parametro "AVG" viene utilizzato
UNBAL	Prende anche i due registri successivi a quello selezionato su "MEAS" Il parametro "THRE" diventa un valore in percentuale L'allarme scatta quando uno dei tre registri differisce della percentuale impostata in "THRE" rispetto al valore più alto dei tre registri letti se si setta "MAX "in "TYPE" oppure al più basso dei tre se si setta "MIN" in "TYPE". Con ritardo e isteresi applicabili
NOTA n.4	
MAX	Impostazione dell'allarme in supero rispetto alle condizioni stabilite. Ad eccezione della modalità "UNBAL"
MIN	Impostazione dell'allarme in decremento rispetto alle condizioni stabilite. Ad eccezione della modalità "UNBAL"
NOTA n.5	
MEAS	Indica su quale registro (e quindi misura) viene riferito l'allarme. Vedi tabella n.1 (Input Register)
THRE	Soglia dell'allarme in valore assoluto, ad eccezione delle modalità "DERIV" e "UN-BAL" in cui il valore inserito diventa una percentuale
NOTA n.6	
AVG	Parametro da utilizzare nella sola modalità "DERIV". Ampiezza finestra mobile(in secodi) utilizzata per creare un valore di riferimento con cui confrontare il dato istantaneo
NOTA n.7	
NORMAL	L'uscita rimane eccitata per tutta la durata dell'allarme, poi rientra.
HOLD	L'uscita resta eccitata fino al riarmo manuale effettuato via modbus
PULSE-L	L'uscita genera un impulso di 500ms allo scattare dell'allarme
PULSE-S	L'uscita genera un impulso di 100ms allo scattare dell'allarme
NOTA n.8	
PULSE	Abilita funzione uscita come impulsiva
ALARM	Abilita funzione uscita come allarme
REMOTE	Abilita funzione uscita tramite protocollo MODBUS
NO	Normalmente aperto
NC	Normalmente chiuso
NOTA n.9	
P-IMP	Potenza (Energia) Attiva Importata
QL-IMP	Potenza (Energia) Reattiva Induttiva Importata
QC-IMP	Potenza (Energia) Reattiva Capcitiva Importata
S-IMP	Potenza (Energia) Apparente Importata
P-EXP	Potenza (Energia) Attiva Esportata
QL-EXP	Potenza (Energia) Reattiva Induttiva Esportata
QC-EXP	Potenza (Energia) Reattiva Capacitiva Esportata
S-EXP	Potenza (Energia) Apparente Esportata
NOTA n.10	
YES	Riferito al primario del TA
NO	Riferito al secondario del TA
NOTA n.11	
ALLARME 1	Allarme associato alla uscita fisica DIGITAL OUT 1 (DO1, morsetto 8)
ALLARME 2	Allarme associato alla uscita fisica DIGITAL OUT 2 (DO2, morsetto 9)
ALLARME 3	Allarme solo MODBUS
ALLARME 4	Allarme solo MODBUS

ESEMPI SETTAGGIO ALLARMI

Per fare in modo che l'uscita "DIGITAL OUT 1" si ecciti e che rimanga eccitata per tutta la durata dell'allarme (latching) quando la potenza attiva media (MEAS 344) supera il valore di 100 kW, isteresi del 5% e latenza di 5 secondi settare i parametri come da tabella:

ALARM 1 / A	MODE (*nota n.2)*	Normale, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (*nota n.3)*	MAX, MIN	MAX
	MEAS (*nota n.4)*	Misura controllata. Vedi tabella n.1 per la selezione del registro	344
	THRE (*nota n.4)*	Valore soglia	100000
ALARM 1 / B	HYST	1...100 (%)	5
	DELAY	1...99 (secondi)	5
	AVG (*nota n.5)*	1...99 (secondi)	1
	OUT (*nota n.6)*	Normal, Hold, Pulse-L, Pulse-S	NORMAL
DIGITAL OUT 1	MODE	PULSE, ALARM, REMOTE	ALARM
	POLARITY	NO, NC	NO

Per fare in modo che l'uscita "DIGITAL OUT 2" si ecciti e che rimanga eccitata per tutta la durata dell'allarme (latching) quando la potenza attiva media (MEAS 344) scende sotto il valore di 90 kW, isteresi del 5% e latenza di 5 secondi settare i parametri come da tabella:

ALARM 2 / A	MODE (*nota n.2)*	Normale, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (*nota n.3)*	MAX, MIN	MIN
	MEAS (*nota n.4)*	Misura controllata. Vedi tabella n.1 per la selezione del registro	344
	THRE (*nota n.4)*	Valore soglia	90000
ALARM 2 / B	HYST	1...100 (%)	5
	DELAY	1...99 (secondi)	5
	AVG (*nota n.5)*	1...99 (secondi)	1
	OUT (*nota 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

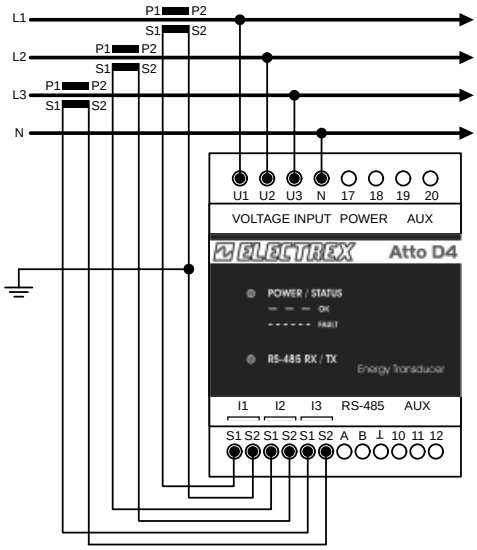
It is necessary to use external CTs with a primary rating adequate to the load to be metered and with a 5A or 1A secondary rating. The number of CTs to be used (1, 2 or 3) depends upon the type of network. Connect the CT output(s) to the terminals marked I1, I2, I3 (current input) of the instrument according 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.

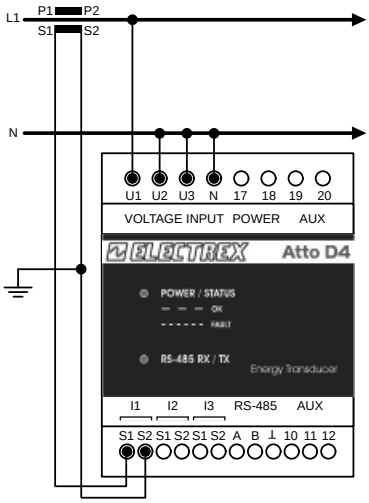
Warning: The phase relationship among voltage and current signals, the P1-P2 orientation and the S1-S2 connection of the CT(s) must be carefully respected.

All disregard of this rule or of the wiring diagram leads to severe measurement errors.

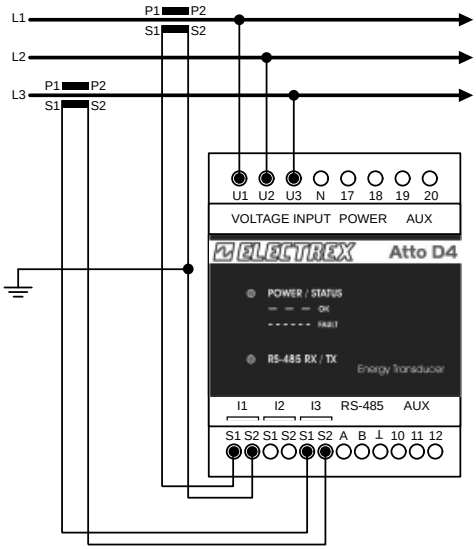
4W Star (4 wire) 3PH-4W



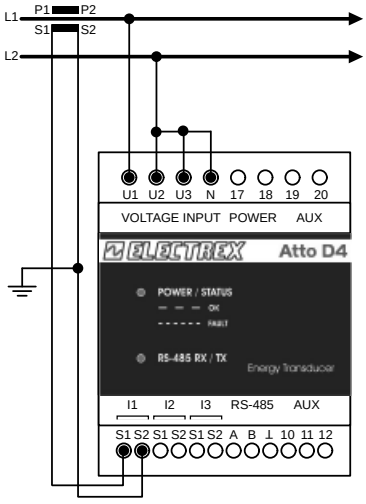
SINGLE PHASE 1PH-2W



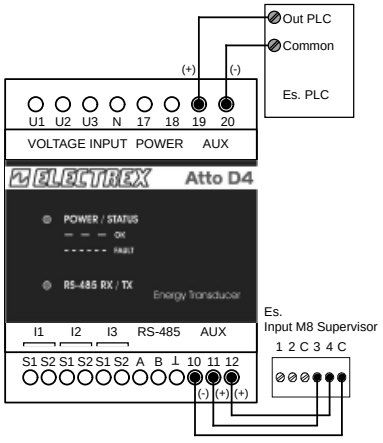
3W Delta (3 wire) 3PH-3W-2CT

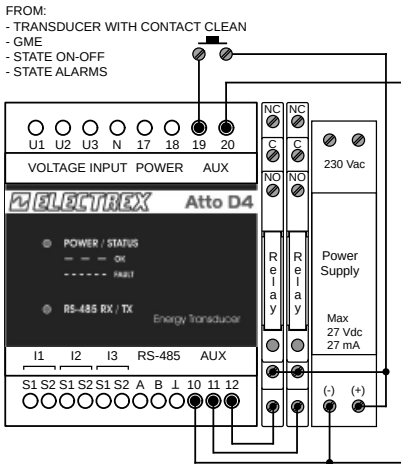


BI-PHASE 2PH-2W



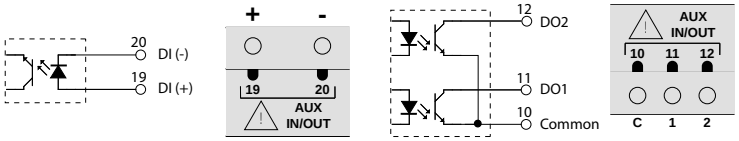
ESEMPI DI COLLEGAMENTO INGRESSI E USCITE





DIGITAL INPUTS AND OUTPUTS CONNECTION

(Applicable only to type PFA6411-12)

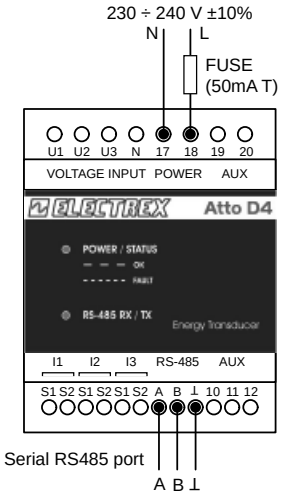


Digital Inputs	
Supply voltage (external):	from 10 to 30 Vdc
Current consumption:	from 2 to 10mA
Max. count frequency	10 or 100Hz
N.B. For gas meters a galvanic separation is needed per ATEX standards	

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.



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