EXA D6 MID

INSTALLATION GUIDE

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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-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 61010-1 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 damaged.
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.

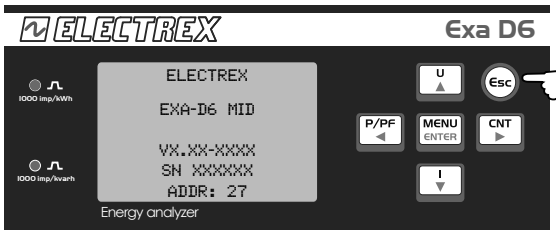
- The outputs and the options operate at low voltage level; they cannot be powered by any unspecified external voltage.
- The application of currents not compatible with the current inputs levels will damage to the instrument.

Further documentation may be downloaded from our web site www.electrex.it.

EXA MID D6 MODELS	
VERSIONS	**DESCRIPTION**
PFAE6M1-0A	EXA MID D6 RS485 85-440V ENERGY ANALYZER
PFAE6M1-QA	EXA MID D6 RS485 85-440V 2DI 2DO ENERGY ANALYZER
PFAE6M1-1A	EXA MID D6 RS485 85-440V 1DI 2DO ENERGY ANALYZER

NORMATIVE	
EN 50470-1	Equipment for the measurement of electric power (AC). General requirements, tests and test conditions.
EN 50470-3	Equipment for the measurement of electric power (AC). Special requirements.
Active Energy on terminals side (MID)	Class B EN50470
Reactive Energy	Class 2 EN62053-23
Active Energy - CT primary side	EN62053-21
ENVIRONMENTAL CONDITIONS	
Working temperature range	-25°C / +55°C
Storage temperature range	-25°C / +70°C
Relative Humidity max.	95% non-condensing
Mechanical environment	M1
Electromagnetic environment	E2

READINGS



Keep pressed for 2 seconds to display:
- Type of instrument
- Firmware version
- Serial number
- RS485 address

MEASURE LIST TABLE
(The parameters available vary according to instrument configuration)

P/PF — Short keypress

Long keypress						
P	P Avg Imp/Exp	P MD Imp/Exp				
Q	Q L Avg Imp/Exp	Q C Avg Exp/Exp	Q L MD Imp/Exp	Q C MD Exp/Exp		
S	S Avg Imp/Exp	S MD Imp/Exp				
PF						

U — Short keypress

Long keypress						
U L-N / f	U L-N THD	U L-N Min	U L-N Max			
U L-L / f	U L-L THD	U L-L Min	U L-L Max			

I — Short keypress

In	I	I THD	I Max	I AVG	I MD

CNT — Short keypress

Long keypress							
Ea MID Imp/Exp	Ea MAIN Imp/Exp	Ea P1 Imp/Exp	Ea P2 Imp/Exp	Ea P3 Imp/Exp	Ea Imp ∑ Fase	Ea Exp ∑ Fase
	Er L MAIN Imp/Exp	Er L P1 Imp/Exp	Er L P2 Imp/Exp	Er L P3 Imp/Exp	Er L Imp ∑ Fase	Er L Exp ∑ Fase
	Er C MAIN Imp/Exp	Er C P1 Imp/Exp	Er C P2 Imp/Exp	Er C P3 Imp/Exp	Er C Imp ∑ Fase	Er C Exp ∑ Fase
	Es MAIN Imp/Exp	Es P1 Imp/Exp	Es P2 Imp/Exp	Es P3 Imp/Exp	Es Imp ∑ Fase	Es Exp ∑ Fase
	C1 MAIN	C1 P1	C1 P2	C1 P3		
	C2 MAIN	C2 P1	C2 P2	C2 P3		
t LIFE	t MAIN	t P1	t P2	t P3		

LEGEND OF PARAMETERS AND SYMBOLS

L-N	Phase Neutral	**U**	Voltage
L-L	Phase Phase	**I**	Current
THD	Total Harmonic Distortion	**In**	Neutral current
Avg	Average (rolling) value	**P**	Active Power
MD	Maximum Demand	**Q**	Reactive Power
Imp	Import value	**S**	Apparent Power
Exp	Export value	**PF**	Power Factor
L	Inductive	**Ea**	Active Energy
C	Capacitive	**Er**	Reactive Energy
Min	Minimum values (10 cycles time base)	**Es**	Apparent Energy
Max	Maximum values (10 cycles time base)	f	Frequency
Main	Total	**Cn.**	Counter
Pn.	Partial	**t**	Timer

MECHANICAL CHARACTERISTICS	
Suitable for internal environments	
Case	Self-extinguishing plastic material class V0
Protection degree	IP40 on front panel, IP20 terminals side (The IP51 protection degree is assured only if the device is installed in an enclosure with protection degree IP51 or higher).
Size	105 x 90 x 58 mm (6 DIN modules)
VOLTAGE INPUT	
Self consumption:	< 2,5VA
3-PH referring Voltage Un	400V +- 15%
CURRENT INPUT	
Iref	5A
Imax	>= 1.2 * Iref = 6A
Itr	= Iref / 20 = 250mA
Imin	<= 0.2 * Itr = 50mA
Ist	<= 0.04 * Itr = 10mA
FREQUENCY	
NOMINAL FREQUENCY	50 Hz
FUNCTIONING FREQUENCY	47-63 Hz

DEVICE SETUP

DESCRIPTION OF KEYS

	Short keypress	Long keypress
MENU ENTER	Confirm parameter	Enter/Exit from the device's configuration menu
U ▲	Modify parameter	
I ▼	Modify parameter	
P/PF ◄	Go to previous value	Go to previous page
CNT ►	Go to next value	Go to next page
Esc	Exit without saving the configuration	

SETUP SEQUENCE

PAGE	MENU VOICE	AVAILABLE PARAMETERS	DEFAULT
PASSWORD REQUEST		0000 ... 9999	0000
RS485			
	RS485 Address	1 ... 247	27
	Rate	2400, 4800, 9600, 19200, 38400	38400
	Data Bit	7 o 8	8
	Parity	N = no parity, E = even, O = odd	N
	Stop Bit	1 o 2	2
	Silent Time (S.T.)	0...1000 (ms)	100

```
    RS-485
ADDR 027
COM  38400-8-N-2
S.T.   100
```

NETWORK *(note n.1)*			
	CT	1...10000 / 5	5/5
	VT	1...400000 / 1...300	1/1
	Type	3P-4W, 3P-3W	3P-4W

```
    NETWORK
CT     00005/5
VT     000001/001
TYPE   3P-4W
```

AVG-MD TIME *(note n.2)*			
	POWERS	1...60 (minutes)	15
	CURRENTS	1...60 (minutes)	8

```
  AVG-MD TIME
POWERS   15
CURRENTS 08
```

ALARM 1 / A (*note n.11*)			
	MODE (*note n.3*)	Normal, 1-OF-3, 3-OF-3, DERIV, UNBAL, UNBAL%	NORMAL
	TYPE (*note n.4*)	MAX, MIN	MIN
	MEAS (*note n.5*)	Controlled measure. See table n.1 for register selection	276
	THRE (*note n.5*)	Threshold value	+000.00

```
  ALARM 1/A
MODE   NORMAL
TYPE   MIN
MEAS   200
THRE    000.00
```

ALARM 1 / B			
	HYST	1...100 (%)	01
	DELAY	1...99 (seconds) ON/OFF	01 S/01 S
	AVG (*note n.6*)	1...99 (seconds)	01
	OUT (*note n.7*)	Normal, Hold, Pulse-L, Pulse-S	NORMAL

```
  ALARM 1/B
HYST   01
DELAY  01 S/01 S
AVG    01
OUT    NORMAL
```

ALARM 2 / A (*note n.11*)			
	MODE (*note n.3*)	Normal, 1-OF-3, 3-OF-3, DERIV, UNBAL, UNBAL%	NORMAL
	TYPE (*note n.4*)	MAX, MIN	MIN
	MEAS (*note n.5*)	Controlled measure. See table n.1 for register selection	276
	THRE (*note n.5*)	Threshold value	+000.00
ALARM 2 / B			
	HYST	1...100 (%)	01
	DELAY	1...99 (seconds) ON/OFF	01 S/01 S
	AVG (*note n.6*)	1...99 (seconds)	01
	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, UNBAL%	NORMAL
	TYPE (*note n.4*)	MAX, MIN	MIN
	MEAS (*note n.5*)	Controlled measure. See table n.1 for register selection	276
	THRE (*note n.5*)	Threshold value	+000.00
ALARM 3 / B			
	HYST	1...100 (%)	01
	DELAY	1...99 (seconds) ON/OFF	01 S/01 S
	AVG (*note n.6*)	1...99 (seconds)	01
	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, UNBAL%	NORMAL
	TYPE (*note n.4*)	MAX, MIN	MIN
	MEAS (*note n.5*)	Controlled measure. See table n.1 for register selection	276
	THRE (*note n.5*)	Threshold value	+000.00
ALARM 4 / B			
	HYST	1...100 (%)	01
	DELAY	1...99 (seconds) ON/OFF	01 S/01 S
	AVG (*note n.6*)	1...99 (seconds)	01
	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

```
  DIGITAL OUT 1
MODE     PULSE
POLATITY  NO
```

DIGITAL OUT 2 (*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	+0.1...+100.00K (wh)	+1000.0
	WIDTH	10...1000 (ms)	100

```
  PULSE OUT 1
MEAS     P-IMP
PRIMARY  YES
WEIGHT   100.00k
WIDTH    0500
```

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	+0.1...+100.00K (wh)	+1000.0
	WIDTH	10...1000 (ms)	100
DISPLAY			
	CONTRAST	20 - 45	27
ENTER NEW PASSWORD		0000 ... 9999	0000
RESTORE FACTORY SETTINGS		NO, YES	NO
CLEAR REGS/A			
	PHASE NRGY	NO, YES	NO
	MD POWER	NO, YES	NO
	MD CURRENT	NO, YES	NO
	PEAKS	NO, YES	NO
CLEAR REGS/B			
	CNT MAIN	NONE, DI, TIMER, ENERGY, ALL	NONE
	CNT P1	NONE, DI, TIMER, ENERGY, ALL	NONE
	CNT P2	NONE, DI, TIMER, ENERGY, ALL	NONE
	CNT P3	NONE, DI, TIMER, ENERGY, ALL	NONE

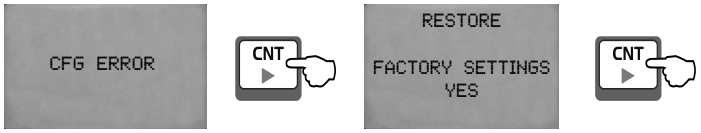
TABLE n.1 (ModBus Registers for alarm configuration)

REGISTER	DESCRIPTION	SYMBOL	UNITS
200	Phase to Neutral Voltage, THD	THD U1N	[%]
202	Phase to Neutral Voltage, THD	THD U2N	[%]
204	Phase to Neutral Voltage, THD	THD U3N	[%]
206	Phase to Phase Voltage, THD	THD U12	[%]
208	Phase to Phase Voltage, THD	THD U23	[%]
210	Phase to Phase Voltage, THD	THD U31	[%]
212	Phase Current, THD	THD I1	[%]
214	Phase Current, THD	THD I2	[%]
216	Phase Current, THD	THD I3	[%]
218	Frequency of U1N	f	[Hz]
220	Phase to Neutral Voltage, RMS Amplitude	U1N	[V]
222	Phase to Neutral Voltage, RMS Amplitude	U2N	[V]
224	Phase to Neutral Voltage, RMS Amplitude	U3N	[V]
226	Phase to Phase Voltage, RMS Amplitude	U12	[V]
228	Phase to Phase Voltage, RMS Amplitude	U23	[V]
230	Phase to Phase Voltage, RMS Amplitude	U31	[V]
232	Phase Current, RMS Amplitude	I1	[A]
234	Phase Current, RMS Amplitude	I2	[A]
236	Phase Current, RMS Amplitude	I3	[A]
238	Neutral Current, RMS Amplitude	IN	[A]
240	Phase Active Power (Imp/ Exp)	P1	[W]
242	Phase Active Power (Imp/ Exp)	P2	[W]
244	Phase Active Power (Imp/ Exp)	P3	[W]
246	Phase Reactive Power (Imp/ Exp)	Q1	[var]
248	Phase Reactive Power (Imp/ Exp)	Q2	[var]
250	Phase Reactive Power (Imp/ Exp)	Q3	[var]
252	Phase Apparent Power	S1	[VA]
254	Phase Apparent Power	S2	[VA]
256	Phase Apparent Power	S3	[VA]
258	Phase Power Factor (Imp/ Exp)	PF1	[-]
260	Phase Power Factor (Imp/ Exp)	PF2	[-]
262	Phase Power Factor (Imp/ Exp)	PF3	[-]
264	Phase to Neutral Voltage, Mean THD	THD UI	[%]
266	Phase to Phase Voltage, Mean THD	THD UD	[%]
268	Phase Current, Mean THD	THD I	[%]
270	Phase to Neutral Voltage, Mean RMS Amplitude	UI	[V]
272	Phase to Phase Voltage, Mean RMS Amplitude	UD	[V]
274	Three phase current, RMS Amplitude	I	[A]
276	Total active power (Imp/ Exp)	PS	[W]
278	Total reactive power (Imp/ Exp)	QS	[var]
280	Total apparent power	SS	[VA]
282	Total power factor (Imp/ Exp)	PFS	[-]
332	Phase Current, RMS Amplitude, AVG	I1 AVG	[A]
334	Phase Current, RMS Amplitude, AVG	I2 AVG	[A]
336	Phase Current, RMS Amplitude, AVG	I3 AVG	[A]
344	Total imported active power, AVG	P Imp AVG	[W]
346	Total imported inductive power, AVG	Qind Imp AVG	[var]
348	Total imported capacitive power, AVG	Qcap Imp AVG	[var]
350	Total imported apparent power, AVG	S Imp AVG	[VA]
352	Total exported active power, AVG	P Exp AVG	[W]
354	Total exported inductive power, AVG	Qind Exp AVG	[var]
356	Total exported capacitive power, AVG	Qcap Exp AVG	[var]
358	Total exported apparent power, AVG	S Exp AVG	[VA]

NOTE n.1		
TYPE	3PH-4W	3 phases 4 wires, Star
	3PH-3W-2CT	2 phases 3 wires, triangle
CT	Primary / Secondary of the current transformer (CT)	
VT	Primary / Secondary of the voltage transformer (VT)	
NOTE n.2		
POWERS	Integration time of the average value (AVG) and peak value (MD) for power (from 1 to 60 minutes)	
CURRENTS	Integration time of the average value (AVG) and peak value (MD) for current (from 1 to 60 minutes)	
NOTE n.3		
NORMALE	Classic Alarm with reference to a fixed threshold or to maximum and minimum delay and applicable hysteresis. “AVG” parameter is not used.	
1-OF-3	Consider also the 2 following registers of the selected one in “MEAS”. Works on a fixed max or min threshold with delay and applicable hysteresis. If one of the three register exceed the threshold the alarm goes on. “AVG” parameter is not used.	
3-OF-3	Consider also the 2 following registers of the selected one in “MEAS”. Works on a fixed max or min threshold with delay and applicable hysteresis. When all the three register exceed the threshold the alarm goes on. “AVG” parameter is not used.	
DERIV	“THRE” parameter becomes a % value, “AVG” parameter is used. The instant value applied to the alarm on “MEAS” is compared with its value mediated obtained on the basis of the time set on “AVG”. When the instantaneous value combined alarm differs in more (setting “Max”) or less (setting “MIN”) from the average value (“ AVG “) of the percentage set on “THRE” the alarm goes on. With delay and applicable hysteresis.	
UNBAL	Consider also the 2 following registers of the selected one in “MEAS”. “THRE” parameter becomes a % value. Alarm goes on when one of the three register is different from the percentage set on “THRE” comply with the higher value of the three read register if “MAX” is set on “TYPE”, or comply with the lower value of the three register if “MIN” is set on “TYPE” With delay and applicable hysteresis.	
NOTE n.4		
MAX	Alarm setting in excess compared with the established conditions. With the exception of “UNBAL”.	
MIN	Alarm setting in decrease compared with the established conditions. With the exception of “UNBAL”	
NOTE n.5		
MEAS	Indicates which register (and thus measure) the alarm is related. See table n.1 input register.	
THRE	Alarm threshold in absolute value, with the exception made for “DERIV” and “UNBAL” in which the value inserted becomes a percentage.	
NOTE n.6		
AVG	Parameter to be used only in “DERIV” mode. Is the duration of the reference (in seconds) used to create a reference value for the istantaneous readings.	
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	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 11)	
ALLARME 2	Alarm related to the physical output: DIGITAL OUT 2 (DO2, terminal 12)	
ALLARME 3	Only MODBUS alarm	
ALLARME 4	Only MODBUS alarm	

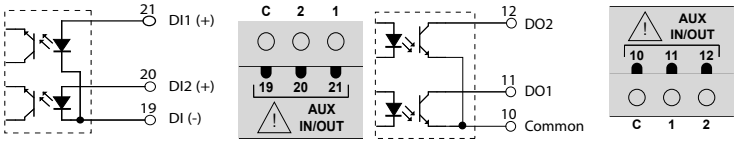
MESSAGE “CFG ERROR”

During the set up operation a “CFG ERROR” message could appear. This means that some wrong parameters are typed. To restore the factory default settings use the following procedure (RESTORE FACTORY SETTING):

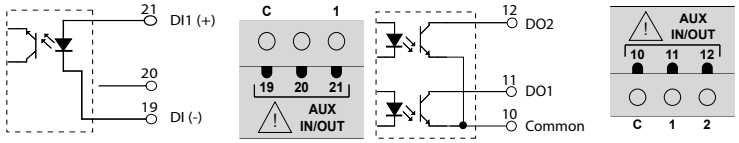


Once this procedure is done the meter is configured with its factory default settings. Stored data will remain after the restore operation.

INPUT & OUTPUT CONNECTION PFAE6M1-QA



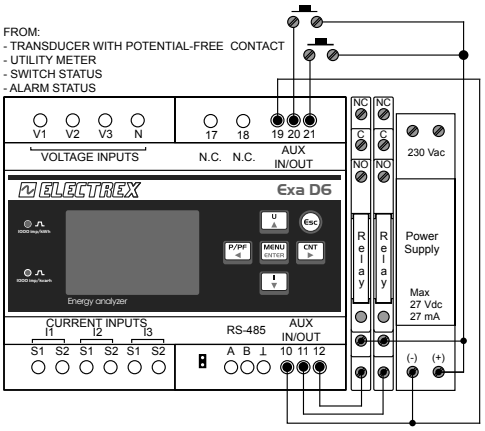
INPUT & OUTPUT CONNECTION PFAE6M1-1A



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 for DIN 43864)	
Maximum applicable voltage:	27 Vdc
Maximum switchable current:	27 mA

INPUT & OUTPUT CONNECTION EXAMPLE



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

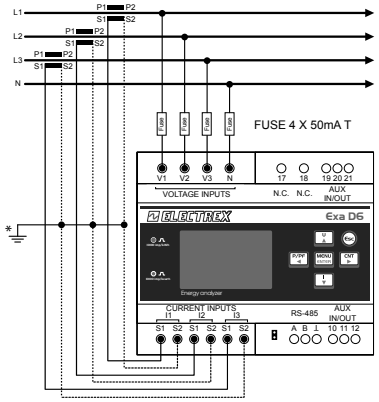
Voltage connection: Use cables with max cross-section of 2,5 mm² if stranded 4 mm² if rigid and connect them to the clamps marked VOLTAGE INPUT on the instrument according to the applicable diagrams that follow.

Current connection: It is necessary to use external CTs with a primary rating adequate to the load to be measured and with a 5A or 1A secondary rating. 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 2,5 mm² if stranded and 4 mm² if rigid.

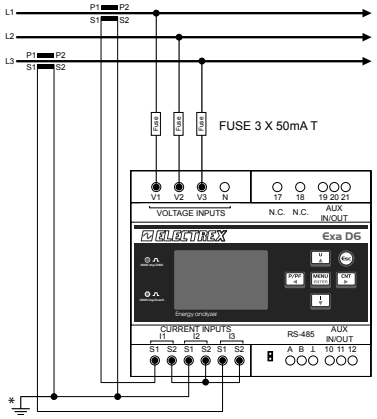
N.B. The CT secondary must always be in short circuit when not connected to the instrument in order to avoid damages and risks for the operator.

Scrupulously respect the matching of phase between the voltage signals and current signals (RTD) and the direction of insertion of CT (P1-P2 and S1-S2). Failure to comply with this correspondence and connection diagrams gives rise to measurement errors. (*) The grounding of S2 must be close to the CT and not near the instrument.

STAR (4 WIRES) 3PH-4W



TRIANGLE (3 WIRES) 3PH-3W ARON

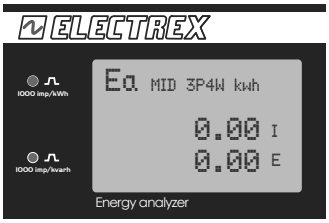


METROLOGY MEASURES

Display page where can be read the metrologically relevant measures.

This page is displayed by pressing the button CNT or automatically after 30 seconds of inactivity.

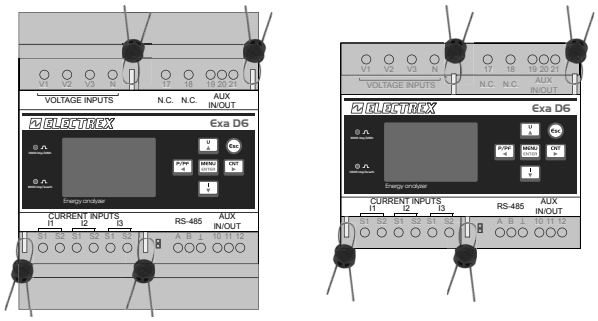
The energy counters, displayed on this page, do not take into account the ratio of current and voltage transformers (CT and VT).



SEALING

Sealed current and voltage inputs.

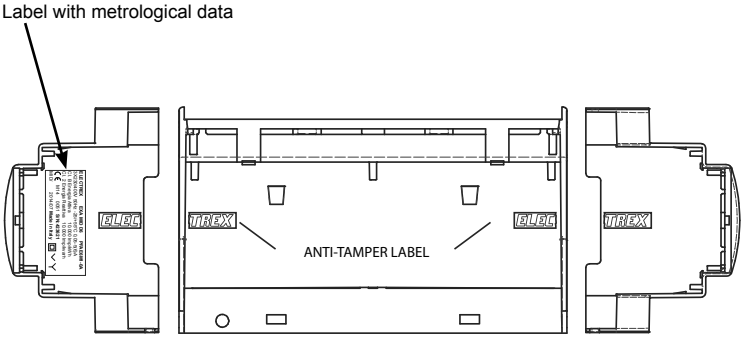
In the image below the seals positioning.



The sealing of the terminal cover must be performed by professionally qualified operators.

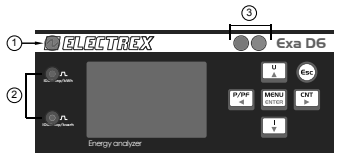
CASE SEALING LABEL

Label with metrological data



LED

Description of the LEDs



LED (1)	Under the sine wave symbol next to the Electrex logo a red LED indicates the operation status
LED (2)	Two red LEDs, for calibration checking, pulse with a frequency proportional to the active and reactive energy imported.
LED (3)	Two other LEDs, below the white band, indicate the communication activities of the RS485 port (red LED TX, green LED RX)

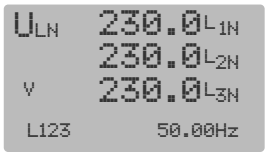
JUMPER

The use of the JUMPER will not permit the modification of the device settings via display or Modbus protocol.

	JUMPER	
A B ⊥ 10 11 12	PRESENT	- Modbus protocol reading/writing - Setup display enabled - Backlight active
A B ⊥ 10 11 12	NOT PRESENT	- Modbus protocol ONLY reading - Setup display not enabled - Backlight not active

ATTENTION:
INSERT OR REMOVE THE JUMPER WHEN THE DEVICE IS NOT POWERED.

PHASE SEQUENCE



Please note that:

- is performed only the detection of the voltages sequence
- the detection is performed assuming that the voltages are sinusoidal (or slightly distorted) and belonging to a symmetric (or “almost”) triple set:
- regardless of the 3W / 4W mode used, it is evaluated exclusively the sign of the 2nd and 3rd voltage in the surrounding of the zero crossing point of the 1st phase voltage; is not calculated, the effective phase of the fundamental of the voltages.
- the phase sequence is indicated by the symbols “L123”, “L132”, “L-” next to the frequency, in the display page of the voltages.
-

It is assumed:

L1 is the voltage with phase 0 °

L2 is the voltage with phase 240 ° (lagging behind L1)

L3 is the voltage with phase 120 ° (in advance of L1)

L123	Correct sequence
L132	Incorrect sequence
L---	Indicates that the device is not able to detect the sequence

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