EXA TR D6 4-20mA

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.

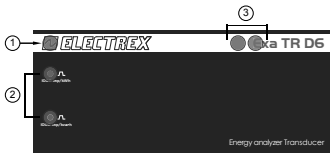
Further documentation may be downloaded from our web site www.electrex.it.

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 61010.
The product has been tested in the typical wiring configuration and with peripherals conforming to the EMC directive and the LV directive.

LED

Description of the LEDs

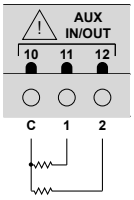


LED (1)	Under the sine wave symbol next to the Electrex logo a red LED indicates the operation status
LED (2)	Two red LEDs, for calibration checking, pulse with a frequency proportional to the active and reactive energy imported.
LED (3)	Two other LEDs, below the white band, indicate the communication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

ANALOGUE OUTPUTS CONNECTION

For loads with impedance less than or equal to 250 ohms follow the diagrams below.

ANALOGUE OUTPUT	
C	Common (negative)
1	Output 1 (positive)
2	Output 2 (positive)



Max 250 ohm

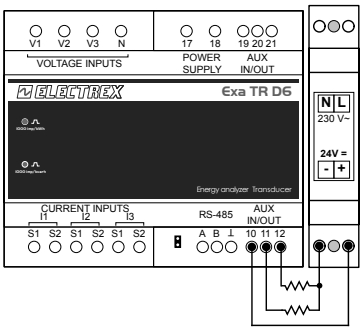
For loads with higher impedance of 250 ohms it is necessary to include in series an external power supply.

The voltage to be applied is given by the following formula: R max = (Vdc / 0.027) + 250

V = (R-250) x 0.027

(Eg. with an impedance of 1 ohm, the voltage to be applied is:
(1000-250) x 0.027= 20.25 Vdc

Vdc	R max
5	435
9	583
12	694
24	1138



MECHANICAL CHARACTERISTICS	
Case	Self-extinguishing plastic material class V0
Protection degree	IP40 on front panel. IP20 terminals side
Size	105 x 90 x 58 mm (6 moduli DIN)
CURRENT INPUT	
Direct	Up to 290 Vrms phase-neutral or 502 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	< 2,5VA
MODELLI	
PFAE6T1-62	EXA TR D6 RS485 230-240V 2AO4-20mA ENERGY ANALYZER

The instrument is shipped with the following default values:

PAGE	PARAMETERS	VALUES AVAILABLE	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 or 2	2
NETWORK			
	Type *(note n.1)*	3PH-4W, 2PH-2W, 1PH-2W, 3PH-4W-BAL, 3PH-3W-2CT	3PH-4W
	Export	NO, YES	NO
	CT	10000/1 o 5	5/5
	VT	400000/300	1/1
AVG-MD TIME *(note n.2)*			
	POWERS	1...60 (minutes)	15
	CURRENTS	1...60 (minutes)	8
ALARM 1 / A (*note n.8)*			
	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.8)*			
	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 (*nota n.8)*			
	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.8)*			
	MODE (*note n.3)*	Normale, 1-OF-3, 3-OF-3, DERIV, UNBAL	NORMAL
	TYPE (*note n.4)*	MAX, MIN	MIN
	MEAS (*note n.5)*	Misura controllata. Vedi tabella n.1 per la selezione del registro	200
	THRE (*note n.5)*	Valore soglia	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
ANALOG OUT 1			
	MEAS (*note n.5)*	Controlled measure. See table n.1 for register selection	200
	MODE	4-20, 0-20	4-20
	LOW (*note n.9)*		000.00
	HIGH (*note n.9)*		000.00
ANALOG OUT 2			
	MEAS (*note n.5)*	Controlled measure. See table n.1 for register selection	200
	MODE	4-20, 0-20	4-20
	LOW (*note n.9)*		000.00
	HIGH (*note n.9)*		000.00

COMMUNICATION PROTOCOL

It is possible to obtain the communication protocol of the instrument by sending a request to: info@electrex.it

NOTE n.1	
3PH-4W	3 phases 4 wires, Star
2PH-2W	2 phases 2 wires, biphase
1PH-2W	1 phase 2 wires, monophase
3PH-4W-BAL	3 phases 4 wires, Star Balanced
3PH-3W-2CT	2 phases 3 wires, triangle
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	
ALLARME 1	Only MODBUS alarm
ALLARME 2	Only MODBUS alarm
ALLARME 3	Only MODBUS alarm
ALLARME 4	Only MODBUS alarm
NOTE n.9	
LOW	Associated scale value starts at 0 and 4 mA
HIGH	Full scale value associated with 20 mA

VOLTAGE AND CURRENT CONNECTION

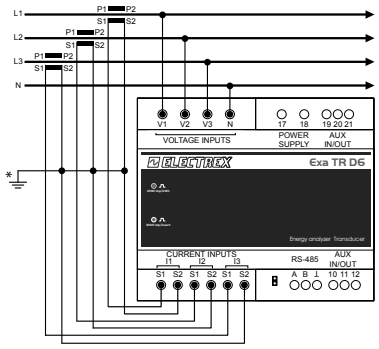
Voltage connection: Use cables with max cross-section of 2,5 mm² if stranded 4 mm² if rigid and connect them to the clamps marked VOLTAGE INPUT on the instrument according to the applicable diagrams that follow.

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.

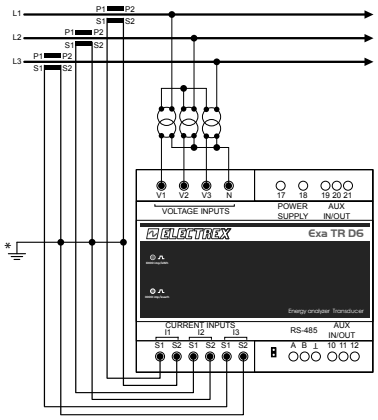
N.B. The CT secondary must always be in short circuit when not connected to the instrument in order to avoid damages and risks for the operator.

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.

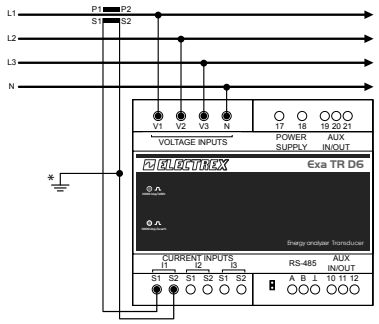
STAR 4W (4 WIRES) 3PH-4W LV



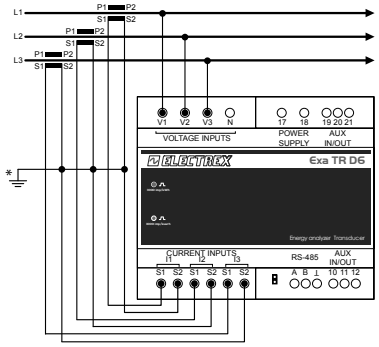
STAR 4W (4 WIRES) 3PH-4W MV



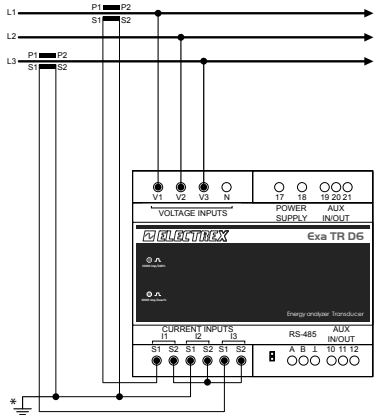
STAR 4W (4 WIRES) 3PH-4W-BAL



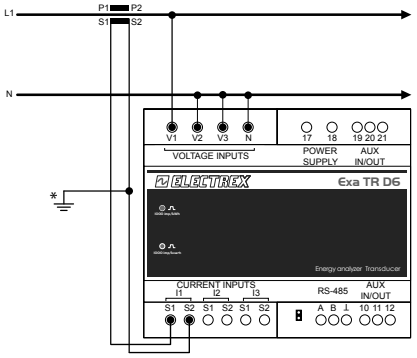
TRIANGLE 3W (3 WIRES) 3PH-3W



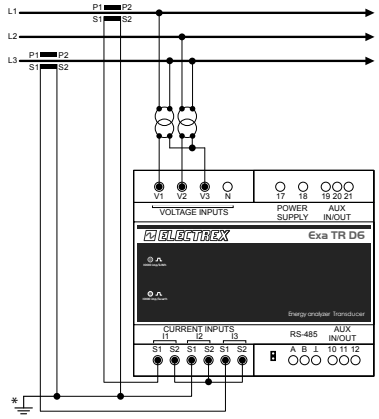
TRIANGLE 2CT (3 WIRES) 3PH-3W



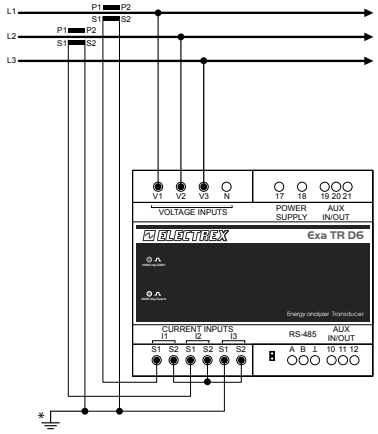
MONOFASE (2 WIRES) 1PH-2W



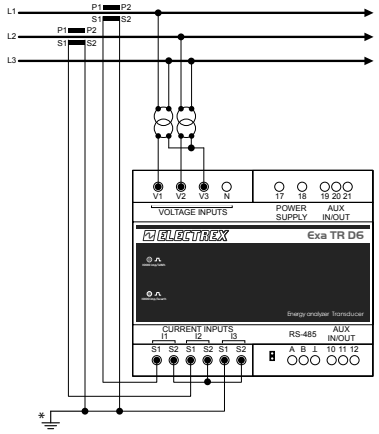
TRIANGLE 2CT(3 WIRES) 3PH-3W



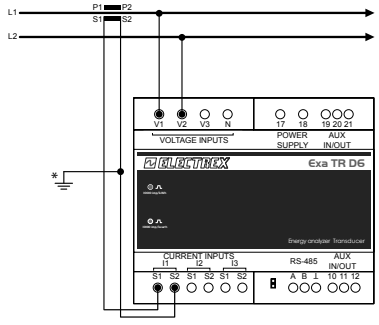
TRIANGLE 2CT (3 WIRES) 3PH-3W



TRIANGLE 2CT (3 WIRES) 3PH-3W

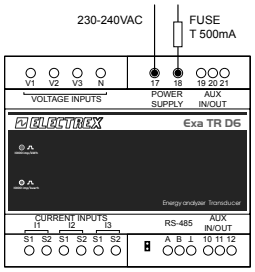


BI-PHASE (2 WIRES) 2PH-2W



POWER SUPPLY AND SERIAL LINE CONNECTION

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



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