96 RS485 - RJ45 - (NET)

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:
- There is clearly visible damaged.
- The instrument no longer functions.
- After lengthy storage in unfavorable conditions.
- 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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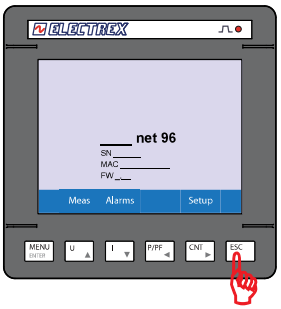
DECLARATION OF CONFORMITY

Akse hereby declares that its range of products complies with the following directives EMC 2014/30/EU, 2014/35/EU and complies with the following product's standard CEI EN 61326 - Ed. 2.0 (2012) – IEC 61326 - Ed. 2.0 (2012) CEI EN 61010 Ed. 3 (2010) – IEC 61010 Ed. 3 (2010). The product has been tested in the typical wiring configuration and with peripherals conforming to the EMC directive and the LV directive.

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)

U ▲	I ▼	P/PF ◄		CNT ►				
ULN	I	P	PF	Ea + Fase	Er + L Fase	Es + Fase	C1 MAIN	t MAIN
ULL	I ∑	P ∑	PF ∑	Ea - Fase	Er - L Fase	Es - Fase	C2 MAIN	t P1
ULN THD	I THD	P AVG +		Ea + MAIN	Er + C Fase	Es + MAIN	C3 MAIN	t P2
ULL THD	I MAX	P AVG -		Ea - MAIN	Er - C Fase	Es - MAIN	C4 MAIN	t P3
ULN MIN	I AVG	P MD +		Ea + P1	Er + L MAIN	Es + P1	C1 P1	t LIFE
ULL MIN	I MD	PMD -		Ea - P1	Er - L MAIN	Es - P1	C2 P1	
ULN MAX		Q		Ea + P2	Er + C MAIN	Es + P2	C3 P1	
ULL MAX		Q ∑		Ea - P2	Er - C MAIN	Es - P2	C4 P1	
		Q AVG +		Ea + P3	Er + L P1	Es + P3	C1 P2	
		Q AVG -		Ea - P3	Er - L P1	Es - P3	C2 P2	
		Q MD +			Er + C P1		C3 P2	
		Q MD -			Er - C P1		C4 P2	
		S			Er + L P2		C1 P3	
		S ∑			Er - L P2		C2 P3	
		S AVG +			Er + C P2		C3 P3	
		S AVG -			Er - C P2		C4 P3	
		S MD +			Er + L P3			
		S MD -			Er - L P3			
					Er + C P3			
					Er - C P3			

MEASURE SELECTION

ESC	Push the ESC key
< U I P/PF Cnt Esc	Select the measure group
< Top+ Top- Bot- Bot+ Esc	Selectthe display positioninig Top: upper / main part of the display Bot: bottom of display

MAIN / UPPER PART OF THE DISPLAY (TOP- AND TOP+ KEYS)

See list of measures in the table above

BOTTOM PART OF THE DISPLAY (BOT- AND BOT+ KEYS)

ULN	ULL	F	I ∑	In	P ∑	Q ∑	S ∑	PF ∑
Ea + MAIN	Ea - MAIN	Es + MAIN	Es - MAIN	Er + L MAIN	Er - L MAIN	Er + C MAIN	Er - C MAIN	

LEGEND OF PARAMETERS AND SYMBOLS

U	Voltage	**THD**	Total Harmonic Distortion
LN	Phase Neutral	**AVG**	Average (rolling) value
LL	Phase Phase	**MD**	Maximum Demand
I	Current	**MIN**	Minimum values (10 cycles time base)
In	Neutral current	**MAX**	Maximum values (10 cycles time base)
P	Active Power	**+**	Imported value
Q	Reactive Power	**-**	Exported value
S	Apparent Power	**Er L**	Inductive
PF	Power Factor	**Er C**	Capacitive
F	Frequency	**t**	Time counter
Ea	Active Energy	**C**	Pulse count
Er	Reactive Energy	**MAIN**	Total
Es	Apparent Energy	**P1,P2,P3**	Partial 1,2,3
		LIFE	Device lifetime

MECHANICAL CHARACTERISTICS	
Case	Self-extinguishing plastic material class V0
Protection degree	IP40 on front panel, IP20 terminals side
Size	96 x 96 x 72 mm
VOLTAGE INPUT	
Direct insertion	Up to 300 Vrms phase-neutral or 520 Vrms phase to phase
With external VT:	Primary: programmable (max. 400 kV) Secondary: programmable (max. 300 V)
	Overload: 900 Vrms phase to phase for 1 sec
Aux. power supply	85/265Vac +/- 10% 50/60Hz
Self consumption:	< 2,5VA

MODELLS
PFNE9-1HAD9-110, PFNK9-1Q5D9-121, PFNK9-1Q7D9-0MM, PFNE9-1H7D9-0M0, PFNE9-1H5D9-110, PFNK9-1Q5D9-A21, PFNE9-1H5D9-110B

DEVICE SETUP

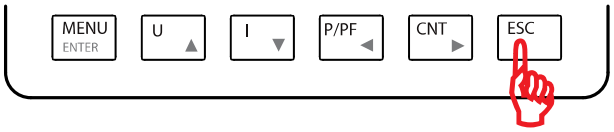
DESCRIPTION OF KEYS ON THE DISPLAY

Esc	Return to the previous level
Down	Scroll down
Up	Scroll upwards
Sel	Confirm the choice made

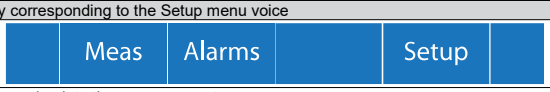
Esc	Return to the previous level
-	Decrease the digit or change selection
+	Increase the digit or change the selection
Left	Move selection to the left
Right	Move selection to the right
Sel	Confirm the choice made

ENTER THE SETUP MENU

Press ESC key twice

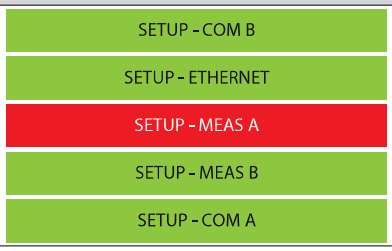


Press the key corresponding to the Setup menu voice



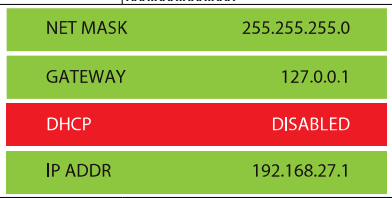
Meas	to go back to the measurement page
Setup	to enter the instrument setup

SETUP main page



SETUP SEQUENCE

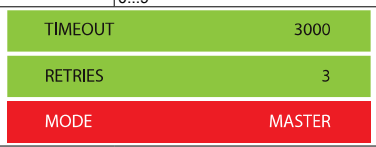
PAGE	PARAMETERS	VALUES AVAILABLE	DEFAULT
SETUP - ETHERNET			
	DHCP	ENABLE, DISABLED	DISABLED
	IP ADDR	xxx.xxx.xxx.xxx	192.168.27.1
	NET MASK	xxx.xxx.xxx.xxx	255.255.255.0
	GATEWAY	xxx.xxx.xxx.xxx	127.0.0.1



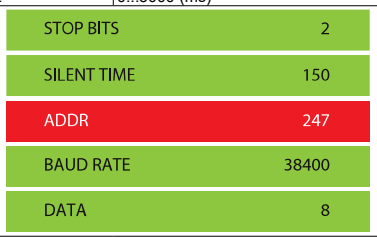
SETUP - MEAS A			
	NET	3PH-4W, 2PH-2W, 1PH-2W, 3PH-3W, 3I	3P-4W
	EXP	ENABLE, DISABLED	ENABLE

SETUP - MEAS B			
	VTP	1...400000	1
	VTS	1...300	1
	CTP	1...10000	5
	CTS	1...5	5

SETUP - COM A			
	MODE	SLAVE, MASTER	MASTER
	TIMEOUT	100...10000 (ms)	3000
	RETRIES	0...9	3



SETUP - COM B			
	ADDR	1 ... 247	247
	BAUD RATE	2400, 4800, 9600, 19200, 38400	38400
	DATA	5...8	8
	PARITY	N = no parity, E = even parity, O = odd parity	N
	STOP BITS	1 or 2	2
	SILENT TIME	0...5000 (ms)	150

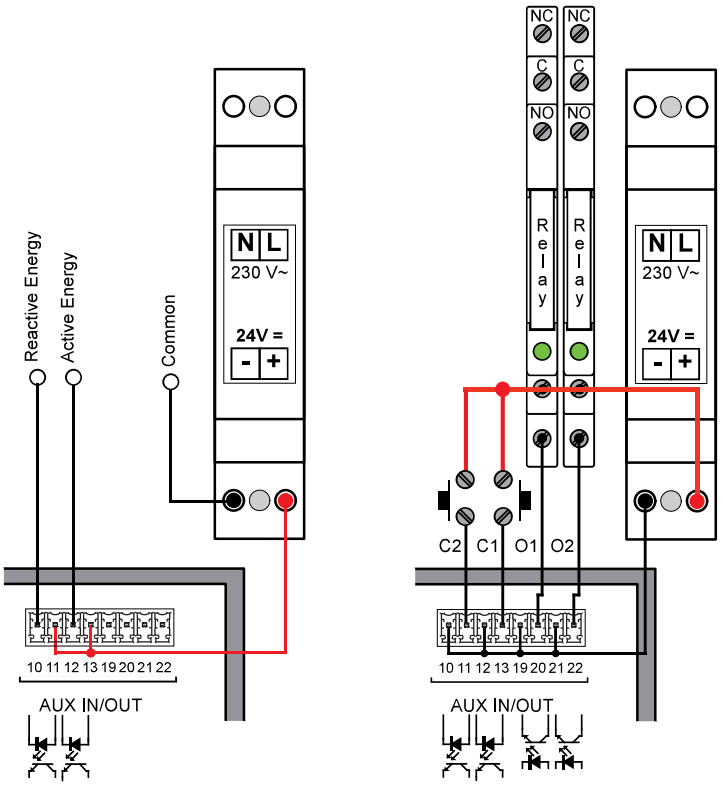


NOTE n. 1		
DHCP	Enable / Disable the search for a DHCP server in the network	
IP ADDR	IP address of the network interface	
NET MASK	Subnet mask: defines the belonging range of a host within an IP subnetwork	
GATEWAY	IP address of the gateway	
NOTE n. 2		
NET	3PH-3W	2 phases 3 wires, Triangle
	3PH-4W	3 phases 4 wires, Star
	2PH-2W	2 phases 2 wires, Bi-phase
	1PH-2W	1 phase, 2 wires, Single phase
	3I	
EXP	ENABLE, DISABLED	If enabled, it considers the current direction
NOTE n. 3		
VTP	Primary of the voltage transformer (VT)	
VTS	Secondary of the voltage transformer (VT)	
CTP	Primary of the current transformer (CT)	
CTS	Secondary of the current transformer (CT)	
NOTE n. 4		
MODE	SLAVE - RS485 port set as Slave of the network. MASTER - RS485 port set as Master of the network.	
TIMEOUT	Predetermined time in which a given operation must be completed	
RETRIES	Number of communication attempts on the RS485 port	

INPUTS - OUTPUTS

INPUTS			OUTPUTS		
10	C2	Common 2 (negative)	19	C1	Common 1 (negative)
11	I2	Input 2 (positive)	20	O1	Output 1 (positive)
12	C1	Common 1 (negative)	21	C2	Common 2 (negative)
13	I1	Input 1 (positive)	22	O2	Output 2 (positive)

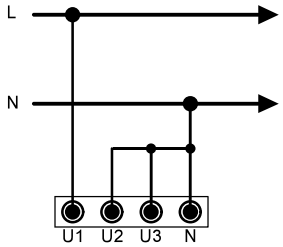
INPUTS		OUTPUTS	
Supply voltage (external):	from 10 to 30 Vdc	Maximum applicable voltage:	27 Vdc
Current consumption:	from 2 to 10mA	Maximum switchable current:	27mA
Max. count frequency	10 or 100Hz		
N.B. For gas meters a galvanic separation is needed per ATEX standards		N.B. Transistor optocoupler digital outputs (NPN) according to DIN 43864.	



VOLTAGE CONNECTION

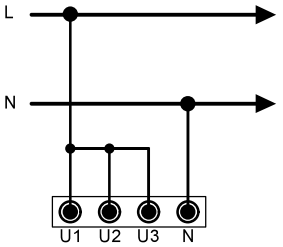
Use cables with max cross-section of 2,5 mm² if stranded, 4 mm² if rigid and connect them to the clamps marked VOLTAGE INPUT on the instrument according to the applicable diagrams that follow.

1P2W



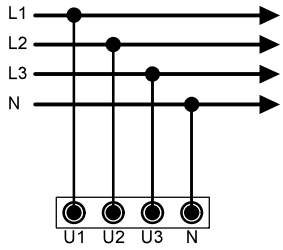
VOLTAGE INPUT

3I



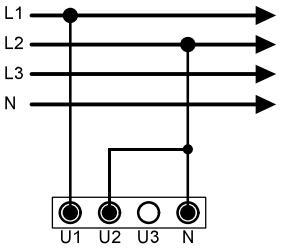
VOLTAGE INPUT

3P4W / 3I



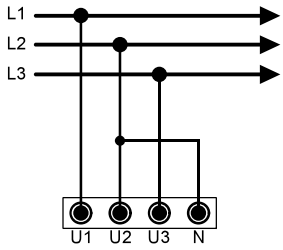
VOLTAGE INPUT

2P2W



VOLTAGE INPUT

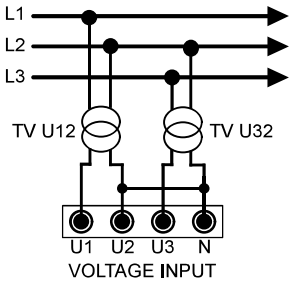
3P3W



VOLTAGE INPUT

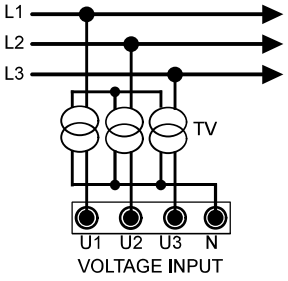
MEDIUM OR HIGH VOLTAGE 3P3W

2 VT



VOLTAGE INPUT

3 VT



VOLTAGE INPUT

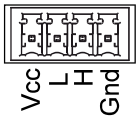
NOTE: The diagram is valid for the use of VTs with delta primary and secondary and with a transformation ratio of 15000/100 or 20000/100; any other VTs must be evaluated during installation.

LAN 10/100 ETHERNET PORT

The instrument is equipped with a Ethernet Lan 10/100 Auto-MDI/MDIX port.
For the connection can be used a data cable straight or crossover.

Note: the port is not a PoE (Power over Ethernet = device power supply via the Lan port) type. The connection of the device to a PoE port is anyway accepted. The power supply anyway must be always provided by an external power supplier.

EXPBUS PORT



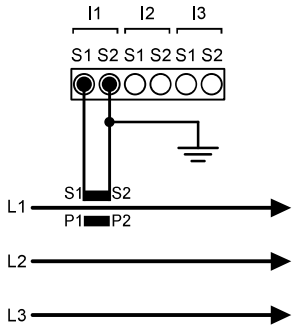
The ExpBus port, configurable via Ethernet port on web pages:
- uses a multicast communication rated at 250kb/sec with collision management
- max cable length : 10 meters
- manages up to 16 modules (but technically can manage up to 126)
- uses the UTP cable, 4 wires used:
  2 for the power supply at 9 Vdc
  2 for the bidirectional communication

The modules will also power supply the ExpBus port
The cable must be connected in in-out modality (multidrop) as per the RS485 Bus.

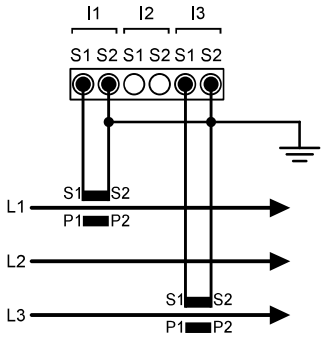
CURRENT CONNECTION

Connect the CT outputs to the terminals marked I1, I2, I3 (CURRENT INPUT) of the instrument according to the applicable diagrams that follow.

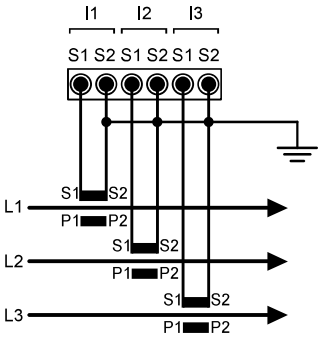
1P2W / 2P2W



3P3W

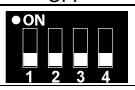
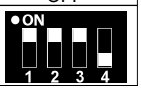


3P3W / 3P4W / 3I



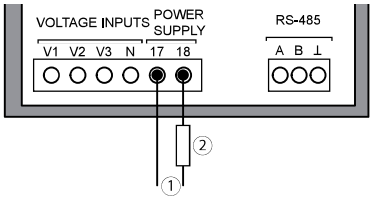
Note: Scrupulously respect the matching of phase between the voltage signals and current signals. Failure to comply with this correspondence and connection diagrams gives rise to measurement errors.

DIP-SWITCH CONFIGURATION

DIP	FUNCTION	SLAVE	MASTER *
1	Line termination resistance (120 Ohm)	OFF	ON
2	Fail safe resistance B (-)	OFF	ON
3	Fail safe resistance A (+)	OFF	ON
4	Not used	OFF	OFF
* with RS-485 Master PUK activated			

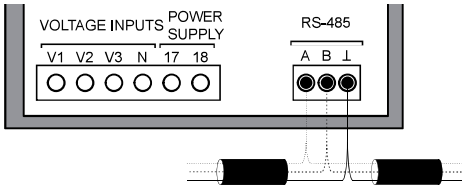
POWER SUPPLY

The instrument is equipped 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 stranded, 4 mm² if rigid.



POWER SUPPLY	
1	85/265Vac +/- 10% 50/60Hz
2	F: 500 mA T

SERIAL LINE CONNECTION



RS485	
Address	27
Baud rate	38400
Parity	None
Bit of Stop	2

Max cable length: 1000 meters.

akse srl Via Aldo Moro, 39 42124 Reggio Emilia Italy
Tel. +39 0522 924 244 Fax +39 0522 924 245 info@akse.it www.akse.it
P.I. 01544980350 R.E.A. 194296 Cap. Soc. Euro 85.800,00 i.v.

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www.electrex.it - info@electrex.it

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