MICROENER

OPERATING MANUAL
High Precision Multifunctional Transducer
EMT-4s Series

MO n° : 12JMC0331443 rév A

MODIFICATIONS				
Rev.	**Description**	**Date**	**Checked by**	**Approuved by**
Z	Creation	2012/02/02	JMC	LA
A	First issue	2012/02/14	JMC	LA

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INTRODUCTION

EMT-4s is an high-precision multi-function meter, which provides measurement of all parameters of the electricity network such as current, voltage, power, energy, harmonic distortion (THD).
EMT-4s can be used on networks with single-phase or poli-phase, with or without neutral.
There is no display for measure results, the data are transfered via RS485 interface (Modbus Protocol).
The serial interface RS485, allows to create communication networks for multiple instruments to collect measurements (concentrator / PC) on complex installations.
Via serial interface, you can also configure the tools remotely and perform updates. These operations can be executed on a single node or multiple nodes (broadcast) simultaneously.
4 lines of I / O can be used to receive and / or generate pulses, alarms.
The ***EMT-4s*** series is designed for mounting on standard 35mm DIN rail.

AVAILABLE MODELS

EMT-4s is available with two different methods of detection of electric currents:
EMT-4sIT: detection of current value through internal current transformers. The conductor to be monitored is brought to an input terminal and departs from its output terminal. This version is designed to be interfaced directly to low current loads or to be connected to external current transformers for high currents.
EMT-4sTT: detection of the current value through current transformers located on the front panel. It is not necessary to interrupt by cutting the conductors to be monitored but is sufficient to provide a passage through the cavity of the CT. This version is designed for higher currents and for those cases where it is inappropriate to interrupt the conductors.

Options

- Neutral current measurement ;
- Digital I/O configuration ;
- Backup of data and maintaining Date / Time through SuperCap or battery.

Ordering Codes

EMT-4sIT N C 40

EMT-4s *Series*

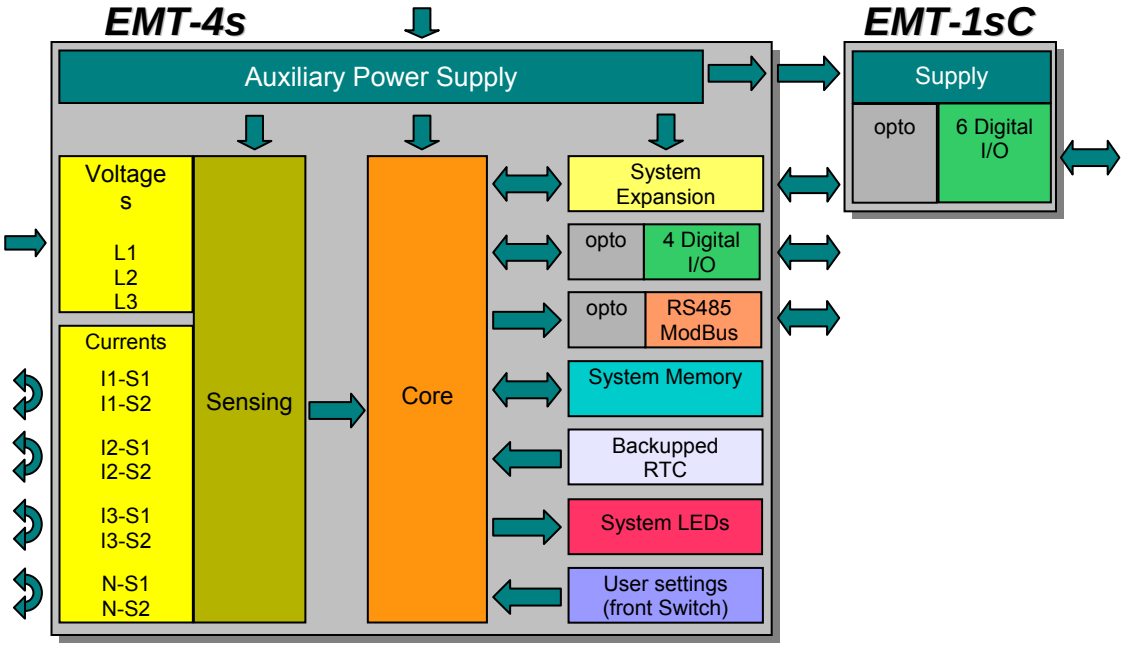
TA Position
IT = Internal TA
TT = TA on the top

Neutral Current
0 = neutral current not detected
N = neutral current detected

Backup system
0 = no Backup
C = SuperCap – 20 hours data retention
B = Battery – 25k hours data retention

I/O Configuration
40 = 4 digital inputs + 0 digital Outputs
31 = 4 digital inputs + 1 digital Outputs
22 = 2 digital inputs + 2 digital Outputs
13 = 1 digital inputs + 3 digital Outputs
04 = 0 digital inputs + 4 digital Outputs

BLOCK DIAGRAM



MEASUREMENT METHOD

Continuous sampling, without interruption (MID).
Each and every current voltage is sampled every 397µs (2520Hz).
@ 50Hz: 50 samples per cycle;
@ 60Hz: 42 samples per cycle;

ACCURACY

Voltage	<0.2%
Current	<0.2%
Power	<0.2%
Energy	<0.2%
Power Factor	<0.2%

MEASURED VARIABLES

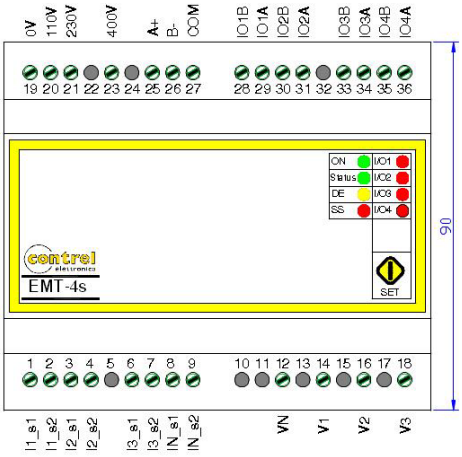
		Unità di misura	Sigle identificazione			
Instantaneous Measures	Phase Voltages	[mV]	V_{L1-N}	V_{L2-N}	V_{L3-N}	$\sum V_{L-N}$
	Line-to Line Voltages	[mV]	V_{L1-L2}	V_{L2-L3}	V_{L1-L3}	$\sum V_{L-L}$
	Phase currents	[mA]	I_{L1}	I_{L2}	I_{L3}	$\sum V_{L-L}$
	Neutral Current	[mA]				I_N
	Power Factor (Phase and system)	[n*10^5]	PF_{L1}	PF_{L2}	PF_{L3}	$\sum PF_L$
	Cosφ (Phase and system)	[n*10^5]	$COS_{\varphi 1}$	$COS_{\varphi 2}$	$COS_{\varphi 3}$	$\sum COS\varphi$
	Apparent Power (Phase and system)	[mVA]	VA_{L1}	VA_{L2}	VA_{L3}	$\sum VA$
	Active Power (signed - Phase and system)	[mW]	W_{L1}	W_{L2}	W_{L3}	$\sum W$
	Reactive Power (signed - Phase and system)	[mVAR]	VAR_{L1}	VAR_{L2}	VAR_{L3}	$\sum VAR$
	Frequency **(1)**	[mHz]				Hz_{L1}
	Temperature	[°C]				T
	Date/Time					
	Work hours	[Hr*10]				Hrl
	Last detected SAG (date/time)					
THD	Total Harmonic Distortion (THD) of Voltages	[% * 100]	THD_{VL1}	THD_{VL2}	THD_{VL3}	
	Total Harmonic Distortion (THD) of currents	[% * 100]	THD_{IL1}	THD_{IL2}	THD_{IL3}	
Energy (2)	Input Active Energy (Phase and system)	[Wh * 100]	Wh_{L1}	Wh_{L2}	Wh_{L3}	$\sum Wh$
	Output Active Energy (Phase and system)	[Wh * 100]	Wh_{L1}	Wh_{L2}	Wh_{L3}	$\sum Wh$
	Input Reactive Energy (Phase and system)	[VARh * 100]	$VARh_{L1}$	$VARh_{L2}$	$VARh_{L3}$	$\sum VARh$
	Output Reactive Energy (Phase and system)	[VARh * 100]	$VARh_{L1}$	$VARh_{L2}$	$VARh_{L3}$	$\sum VARh$
	Apparent Energy (Phase and system)	[VAh * 100]	VAh_{L1}	VAh_{L2}	VAh_{L3}	$\sum VAh$
Min & Max (3)	Minimum Value					
	Maximum Value					
	data/time of Minimum Value detection					
	data/time of Maximum Value detection					
Average Max & Last (4)	Average Current Last/Max (value)					
	Average Current Last/Max (date/time)					
	Average Active Power Last/Max (value)					
	Average Active Power Last/Max (date/time)					
	Average Reactive Power Last/Max (value)					
	Average Reactive Power Last/Max (date/time)					
	Average Apparent Power Last/Max (value)					
	Average Apparent Power Last/Max (date/time)					
Alarms (5)	Threshold					
	date/time of threshold overcoming					
	date/time of threshold re-entry					
Counters (6)	Inputs 1÷4 Counter					
	Outputs 1÷4 Counter					

(1) To read the frequency must be connected at least the voltage input V_{L1}.
(2) Measures processed for total energies and for each timeband.
(3) Shows the maximum, minimum and date / time relating to measures for the following parameters: voltage, phase current, neutral current, apparent power, active power, reactive power, power factor, frequency.
(4) For each parameter the average value is reported for the last defined range and the maximum average value and marked the date / time of the event.
(5) Alarms can be set for the following parameters: voltage, phase current, neutral current, power factor, Cos φ, apparent power, active power, reactive power, frequency.
(6) The association of counters depends on I / O configuration of the instrument. The counters of the input pulses can be divided into 16 time band. The counters for the generation of output pulses are parametrized for "weight", duration, level. They are also involved in the pre-pay mode for the amount of energy consumed set by the user.

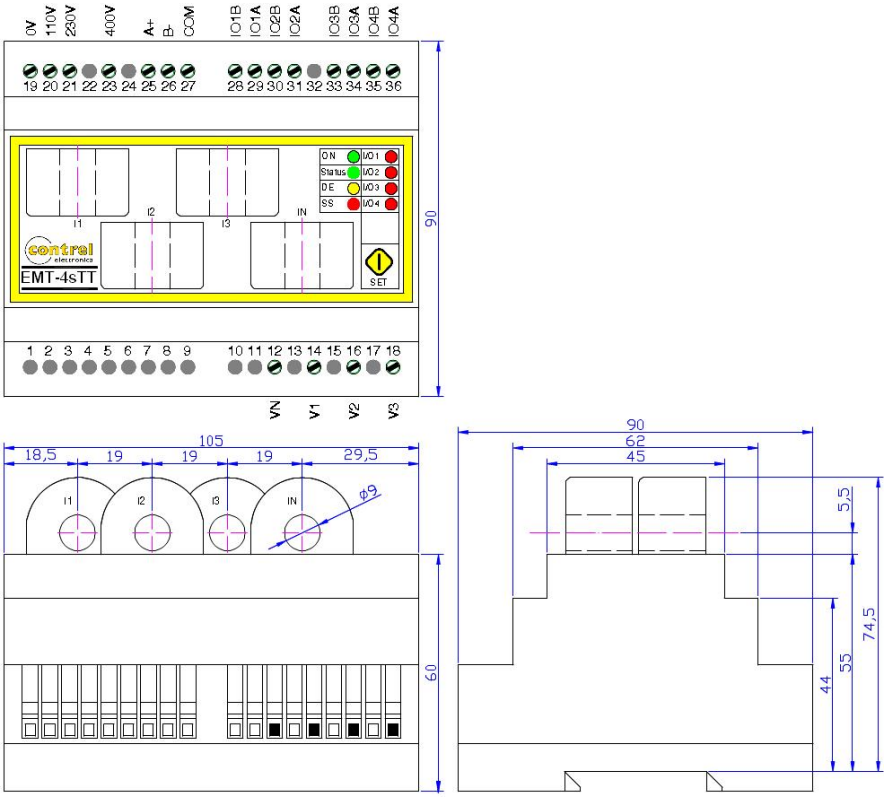
DIMENSIONAL SPECIFICATIONS, ENVIRONMENTAL AND ERGONOMIC

- standard 35mm DIN rail mounting;
- dimensions : 6 DIN modules - 105mm (see mechanical drawing);
- weight : 420gr÷450gr max;
- protection degree (IP) : ***EMT-4sIT*** : IP52 front – IP20 enclosure;
- ***EMT-4sTT*** : IP40 front – IP20 enclosure;
- working temperature : -5 ÷ +50°C ; storage temperature : -15 ÷ +60°C ;
- operating humidity : 90% not condensing;

EMT-4sIT – internal current transformers



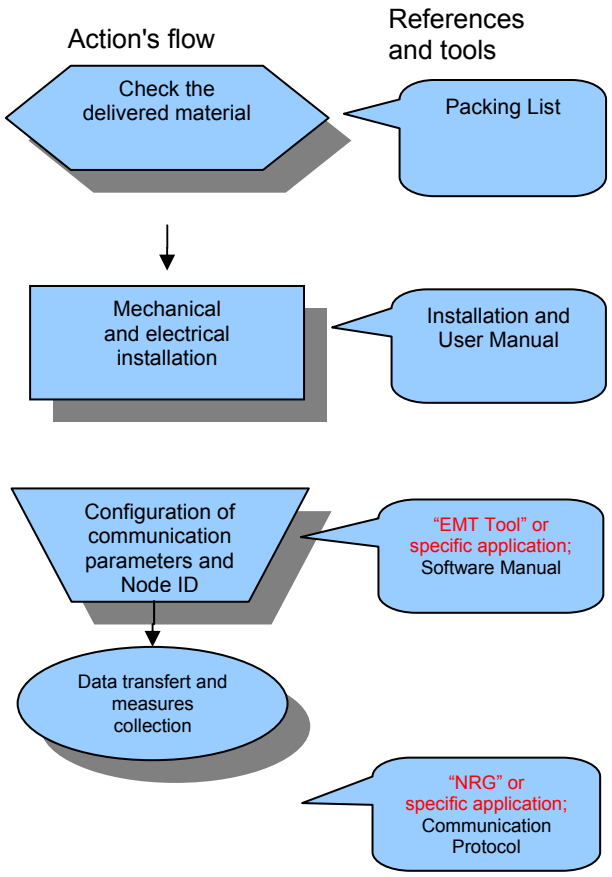
EMT-4sTT - through current transformers on the front panel



INSTALLATION

Operator safety

Carefully read the instructions in this manual before installing and using the instrument.
The instrument described in this manual is intended for use and installation by properly trained personnel.



Verify that the package contains exactly what is required and necessary to the installation. We do not recommend the implementation of partial installations and / or provisional.

Mechanically install the instruments and perform the wiring as indicated in this manual.

At delivery, all communication parameters are set at factory defaults (NodeID, baud rate etc.). If necessary, configure the instruments for communication. This can happen in two distinct modes:
- by connecting the instrument to the PC and sending the appropriate commands ModBus;
- placing the tools in a multidrop network and automatically configures all the nodes using the software EMT TOOL.

Once communication is established, you can query the instruments connected to collect the measured electrical parameters.

For details about configuring communications parameters and collection of measures, refer to the *COMMUNICATION PROTOCOL MANUAL*.

Safety

This instrument has been manufactured and tested in compliance with IEC 61010 Class 1. To ensure these conditions, follow the instructions and guidelines contained in this manual. Upon receipt of the instrument, prior to installation, verify its integrity and the absence of transport damage. Check the supply voltage match the values specified for the instrument. Do not connect the power supply to the ground. It is prohibited any maintenance or repairs performed by unauthorized personnel. If it is received, during operation, to consider a loss of security tool, disable it and make sure it is not used inadvertently.
If in any doubt about the instrument's safety take it out of service and implement the necessary procedures to prevent its inadvertent use.

Instrument operation is no longer safe:

- **When the instrument shows clear signs of damage.**
- **When the instrument does not work.**
- **The instrument appears clearly damaged.**
- **After serious damage during shipment.**
- **After long storage in extreme conditions.**

Connections

Carefully follow the wiring diagram contained in this manual. Provide external protection with fuses for voltage inputs and cables suitable for current and voltages, with a diameter of 0.5 to 2.5 mm^2.

Connections type

- 4 Phoenix terminals for cables max 2.5mm^2.

Pin-Out

- Refer to figures in the chapter "Dimensional specifications, environmental and ergonomics".

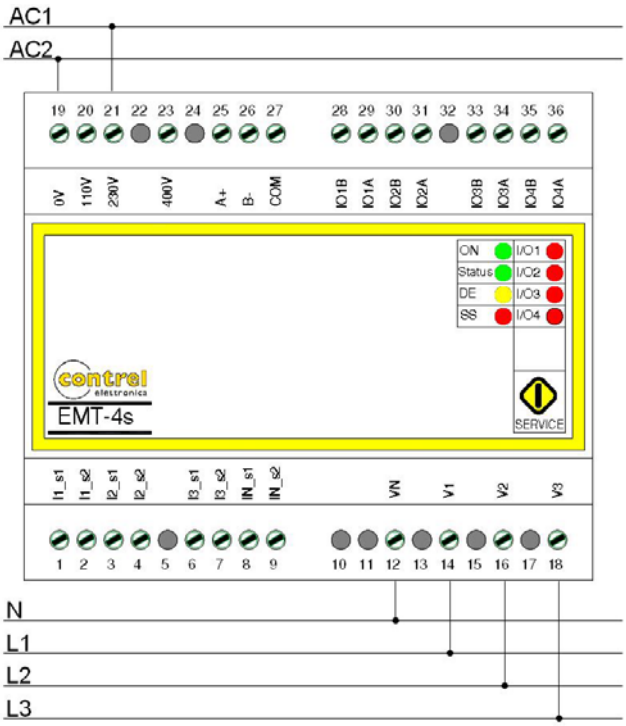
Auxiliary Supply

There are 4 terminals for the auxiliary power of the instrument so that you can use the following voltages:

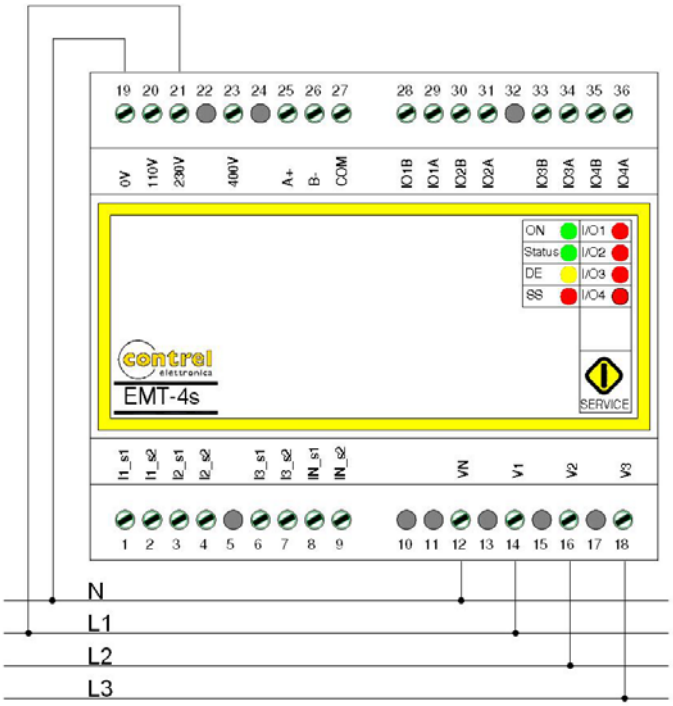
Vac version	
Terminals	**Supply**
19-20	0-110Vac = 100÷125Vac 50/60Hz
19-21	0-230Vac = 220÷240Vac 50/60Hz
19-23	0-400Vac = 380÷415Vac 50/60Hz

You can take the power from the network under test, using the phase and neutral for a 4-wire, phase to phase in a 3-wire system without neutral or from a TV in a MT application.

Auxiliary supply
from dedicated line



Auxiliary supply
derived from poly-phase network



Voltage Inputs

- 4 terminals available for direct connection to 3 phase and neutral network measurement.
- 3 inputs, range 10 to 600Vac phase to phase (6 ÷ 350Vac phase to neutral);
- 50/60Hz frequency range;
- Allowed over-voltage: 750VAC phase-phase permanent (430Vac phase to neutral). Over, this voltage is mandatory to use of voltage transformers.
- Over-voltage category: II (permanent installations);
- Pollution Degree: 2 (normally non-conductive, conductive condensation temporarily);
- Input resistance:> 1.5MΩ;
- Load (Burden) for each voltage input: 0.08VA.

***Note (1):* VN terminal needs to be ever wired;**
Note (2): must be connected at least the terminal V1 to detect the frequency.

For more details, refer to chapter "***Electrical Insertions***".

Current Inputs

Depending on the model of the instrument, current measurements can be performed by connecting the terminals of Amperometric inputs (EMT-4sIT) or by inserting the conductor to be monitored in the cavity of the CT on the front panel (EMT-4sTT).
All current inputs are isolated by current transformers with different ranges depending on the model of the instrument.
They can be interfaced directly to the line to be monitored or to be connected to the output of the CT higher range.
The connections to the lines to be monitored are described in chapter "***Electrical Insertions***".

With neutral current input option installed, the Instrument allows the direct measurement of neutral current in the same way as described for the Line inputs.

NOTE: it is essential to observe the correct phase sequence, not invert the connections between the phases of the current inputs and voltage (ie the CT placed on L1 phase must absolutely match at I1 Current and V1 voltage). Do not invert the terminals S1 and S2 of the CT because the measurement of power factors, and the powers would no longer be trusted.

- ***EMT-4sIT***: three-phase current inputs isolated by 3 internal current transformers – current range 50mA÷5A; Load (Burden) for each current input : 0.0016VA;

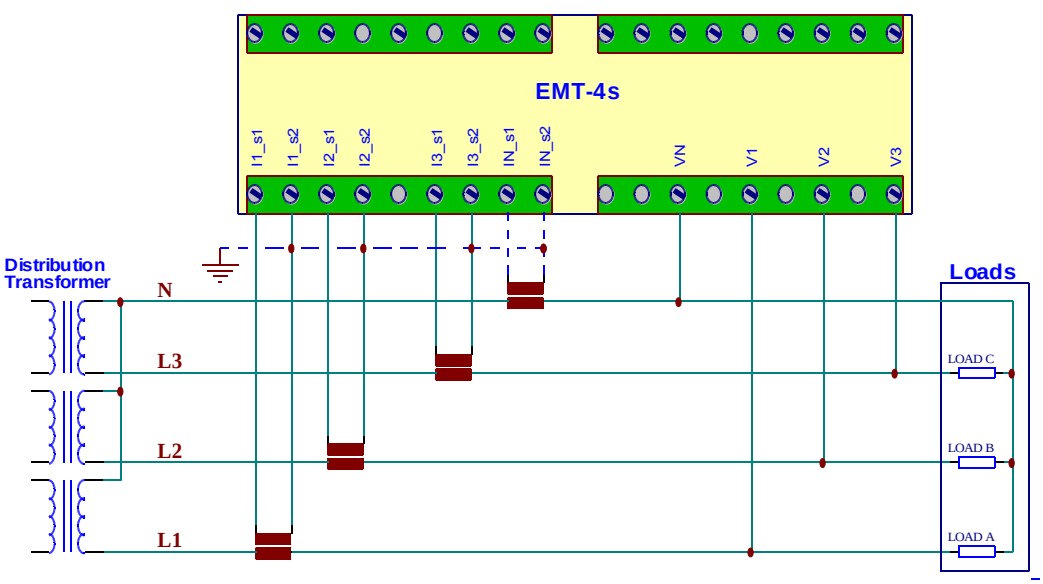
- ***EMT-4sTT***: three-phase current inputs isolated by 3 current transformers on front panel (cable entry with a maximum diameter of 8.5mm Ø without interruptions) – current range 250mA÷32A; Load (Burden) for each current input : 0.018VA;

- ***EMT-4sIT Option N*** : same as ***EMT-4sIT*** + Neutral current input;

- ***EMT-4sTT Option N*** : same as ***EMT-4sTT*** + Neutral current input;

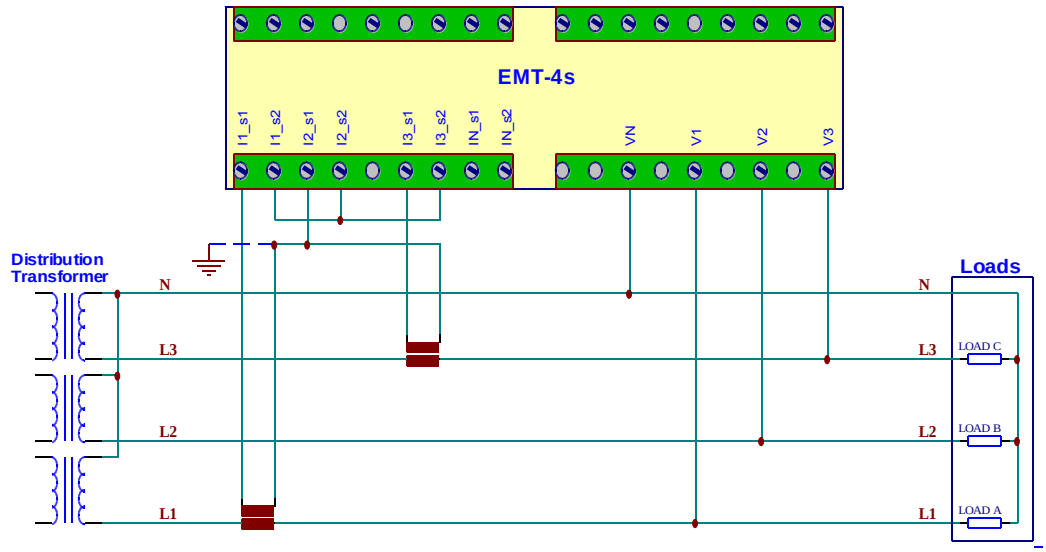
Note (1) : **VN terminal needs to be wired;**
Note (2) : must be connected at least the terminal V1 to detect the frequency.

Three-Phase, 4-Wires Y Configuration.



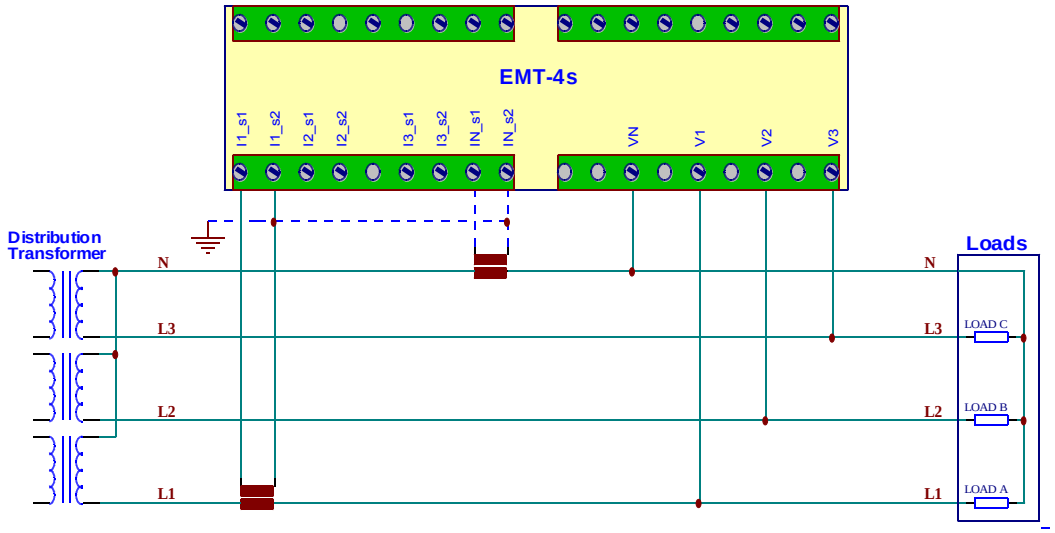
Three-phases classic 4-wires insertion.
All electrical parameters are measured.

Three-Phase, 4-Wire Y Configuration. ARON Insertion (n.2 CT).



Note:
allows to accurately measure the three-phase currents using only 2 CT.

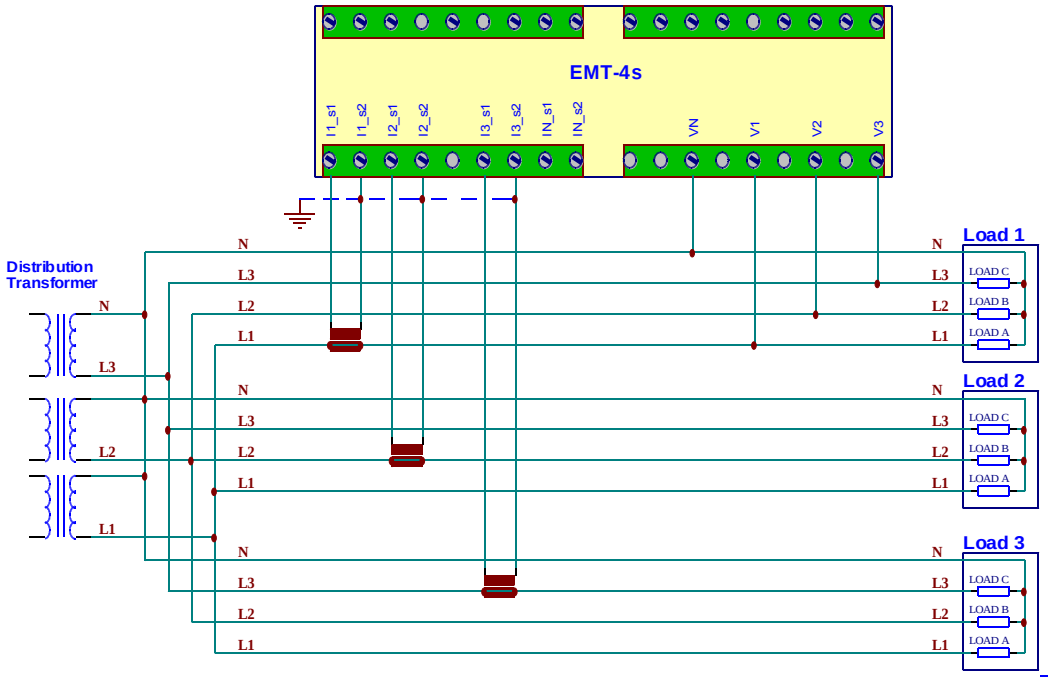
Three-Phase Balanced Loads, 4-Wires Configuration.



Note :
can be used to three-phase lines with distributed and equal load to the 3 phases. It is possible to measure the current on one phase (using only one CT). The electrical measurements on unmonitored phases are calculated mathematically.

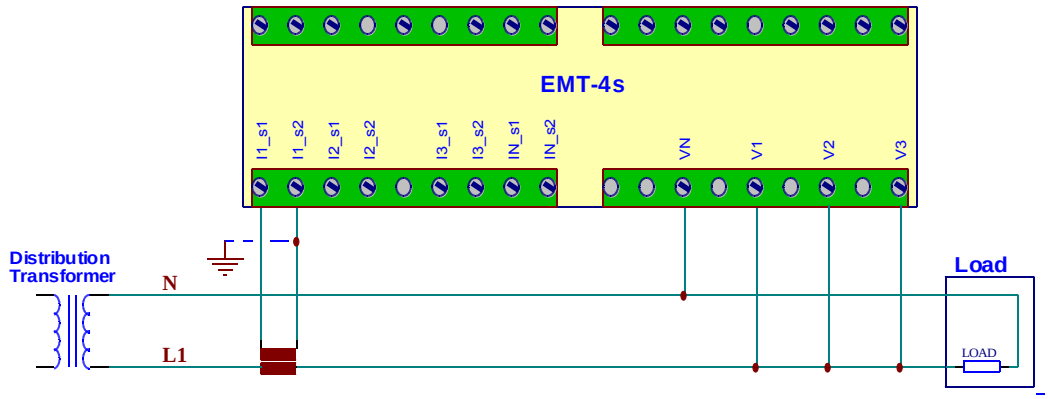
The measurement of neutral current is optional.

Three-Phase, Multiple Balanced Loads. 4-Wires Configuration.



Note:
like the above insertion, in the presence of multiple, balanced three-phase loads, you can control the system by monitoring a single phase current for each load and calculating the corresponding electrical parameters.

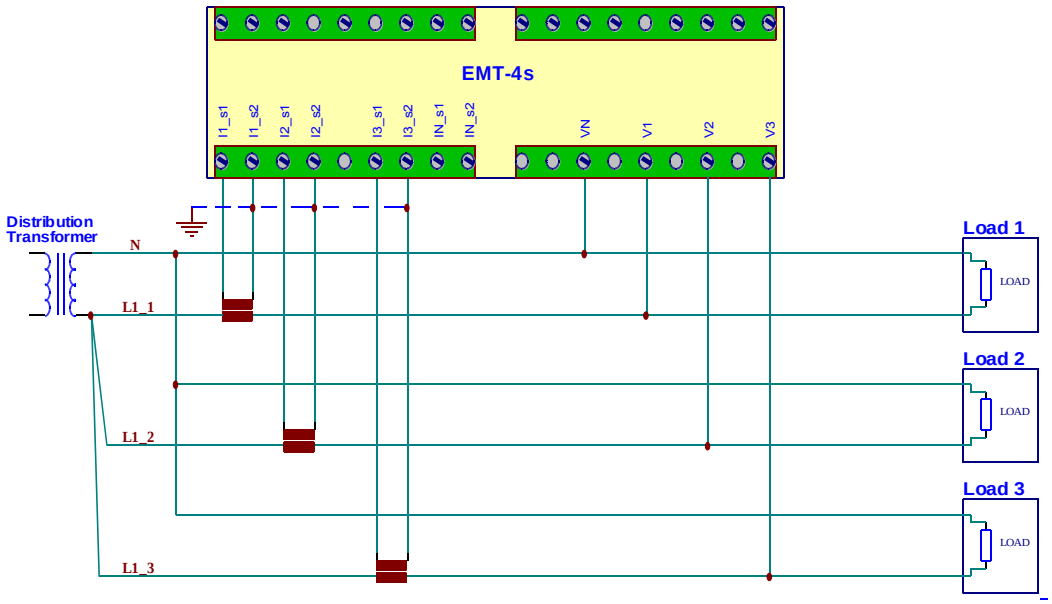
Single-Phase 2-Wires Configuration.



Classic insertion for single-phase line.

Note : it is mandatory to connect the current input IL1 and voltage input V1.

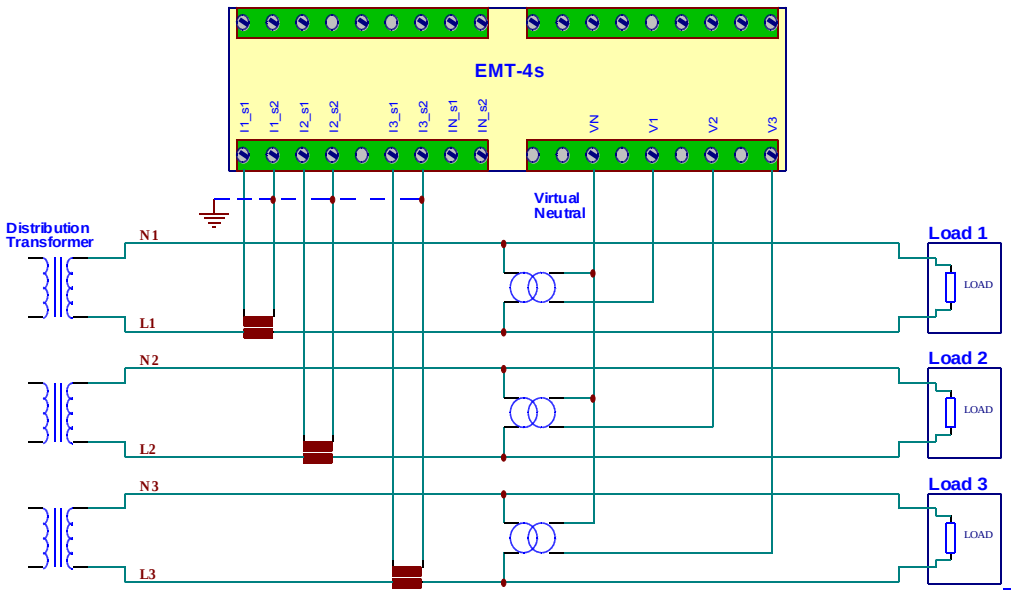
Single-Phase, Multiple Loads, 2-Wires Configuration.



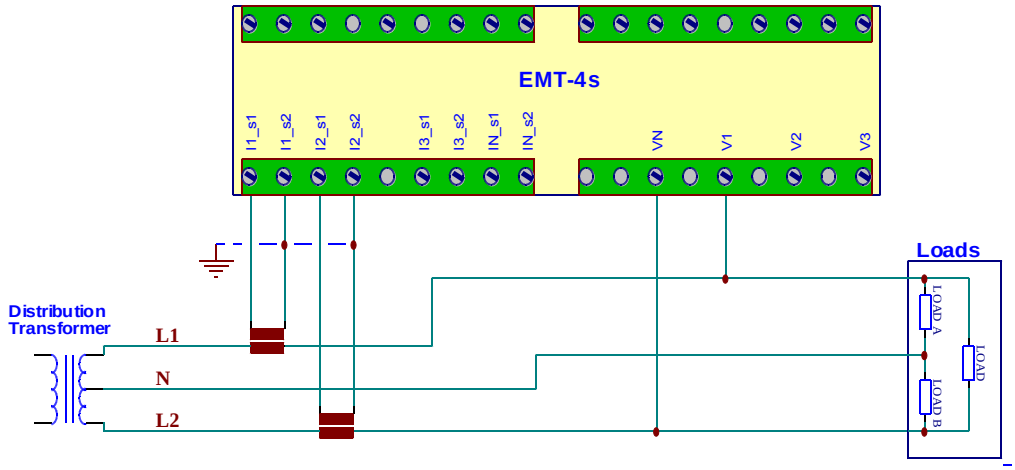
The instrument is placed on a single-phase line with multiple loads. Electrical parameters are measured for individual loads.

Note : for correct calculation of power and energy, is mandatory to connect the voltage inputs related to the used current inputs.

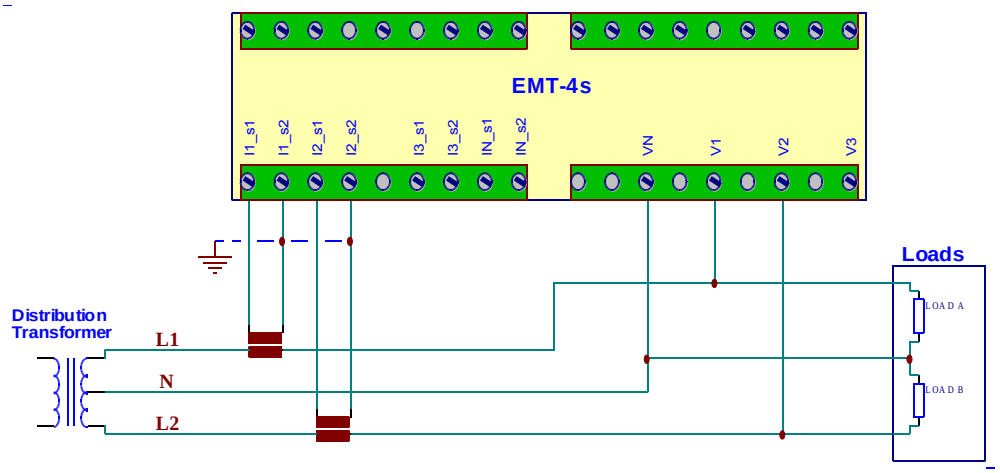
Multiple Single-Phase, Multiple Loads. 6-Wires Configuration.



Single-Phase. 3-Wires Configuration.



Two-Phase. 3-Wires Configuration.



TIME + CALENDAR (RTC)

Hours, minutes, seconds, day, date, month, year are up-to-date and backuped;
RTC adjustment can be made via ModBus command and synchronization from digital input.
Automatic temperature compensation.
Keeping date / time can be secured through two different backup systems:

- Option ***C***: SuperCap => 20h backup guaranteed @ 25 ° C;
- Option ***B***: a rechargeable lithium battery => 25000h backup guaranteed about @ 25 ° C;
  Both backup systems do not require replacement or maintenance. If discharged, it is sufficient to ensure an adequate period of charging (30sec for SuperCap and 10h for battery).

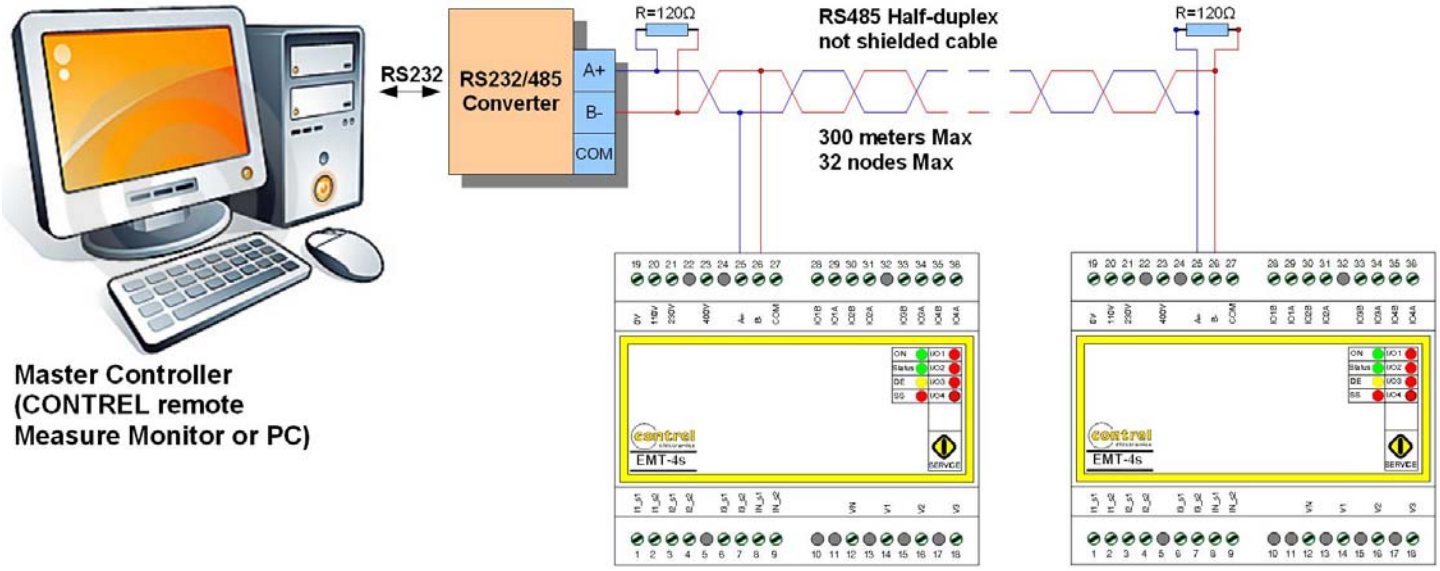
COMMUNICATION INTERFACES

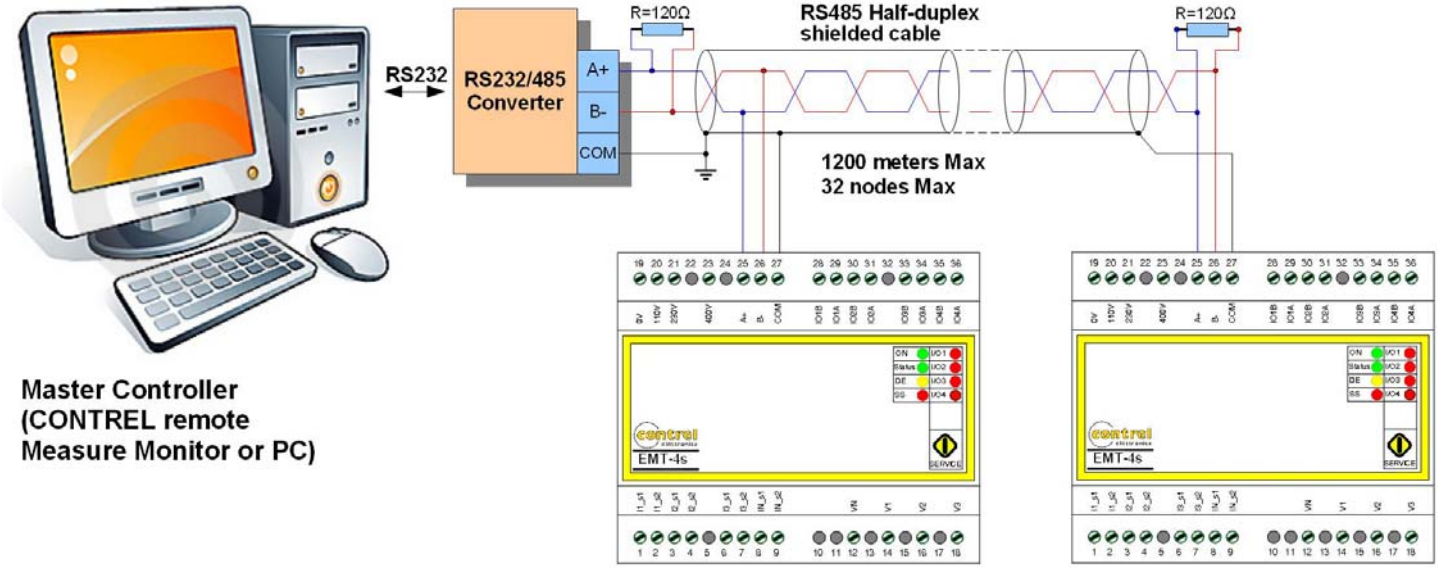
RS485 (ModBus Protocol)

The instrument communicates via a serial asynchronous isolated interface in the standard RS485 Half-duplex that allows a multi-drop up to 247 nodes. This allows to implement a communication network between different instruments and a master unit (data concentrator) for a detailed control of an electrical installation.
The maximum length of the line depends on variables such as the transmission rate and characteristics of the cables used. We recommend using a shielded twisted pair cable with low attenuation, with a minimum section of 0.36mm^2 (22AWG) and capacity of less than 60pF / m (eg EIA 485-BELDEN Ref.3105A).
The maximum length is about 1200m. For longer distances you need to use signal amplifiers (repeaters).
High networking length and/or where environments are electrically "noisy", it requires the inclusion of two termination resistors (at the beginning and end of the line) value of 100 to 120Ω. The use of repeaters is also necessary in the case of networks with more than 32 nodes.
At each repeater can be connected 32 units.
Please note that complex networks with large number of nodes, making slower the speed of response by the instruments.

- Connection type : half-duplex (2 wires + common);
- isolation : digital isolators (4000 Vpeak or 2500 Vrms);
- BaudRate : 4800; 9600; 19200; 38400;
- nodeID : 1 ÷ 247 ;
- parity : even; odd; none;
- stop bit : 1 or 2 ;
- **Note : emergency recovery *configuration: node # 1, 9600 baud, no parity, 1 stop bit. To force the emergency recovery configuration, hold the Power ON button on the front as described in "Communication Protocol Manual".***

The configuration of the EMT-4s series does not require Dip-Switches (DIPless). The configuration of instrument is made by a software tool that allows the association of a node ID from 1 to 247 chosen by the user and the setting of communication parameters such as baud rate, parity, stop bits. It's also possible to configure the instrument through simple commands ModBus. The configuration operations are described in detail in ***"Communication Protocol Manual".***





DIGITAL INPUTS AND OUTPUTS

The basic instrument is equipped with 4 digital I / O lines configured as input or output during assembly.

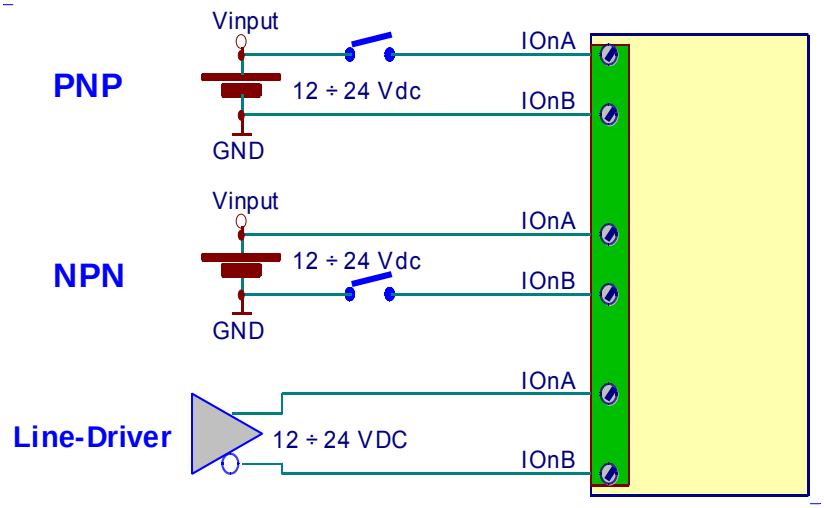
Configurazione IO	IO1 (pin 28-29)	IO2 (pin 30-31)	IO3 (pin 33-34)	IO4 (pin 35-36)
4I = 4 IN + 0 Out	IN1	IN2	IN3	IN4
3I = 3 IN + 1 Out	IN1	IN2	IN3	OUT0
2I = 2 IN + 2 Out	IN1	IN2	OUT1	OUT0
1I = 1 IN + 3 Out	IN1	OUT2	OUT1	OUT0
0I = 0 IN + 4 Out	OUT3	OUT2	OUT1	OUT0

4 timers for management of input or output pulses can be associated to digital I / O lines.

Wiring notes: the digital I / O are low voltage and low power resources. The cabling layout must avoid common paths to the power wires to prevent interference due to capacitive and / or inductive coupling.
The coupling noise is directly proportional to the length of the path along which the I / O and power cables are parallel. To limit interference, please avoid common pathways and, in the case of intersection between the lines, try to keep the intersection angle as close as possible to 90 °. Alternatively, consider using shielded cables.

Digital inputs

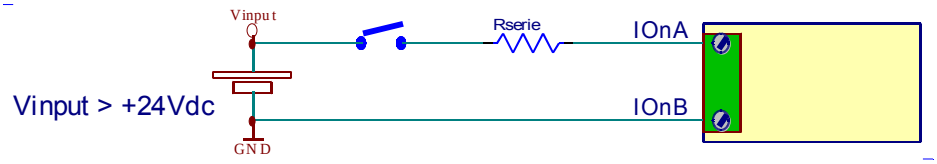
- Numbers of isolated digital inputs: depending on the hardware configuration – 4 digital inputs maximum on basic instrument.
- Isolation level : 3.5KVRMS for 60 sec.;
- Input configuration (NPN, PNP, line-driver) : 2 terminals available (A-K) fot each inputs (best flexibility of connection);
- Input range VINPUT 12 ÷ 24VDC ;
- IINPUT @ VINPUT : 10mA @ VIN=24V ; 4mA @ VIN=12V ;
- TON_min 20ms ;
- TOFF_min 20ms ;
- Basic operation mode of the inputs: pulse counter, status, change of timeband.



Connecting to the digital inputs:

Note: positive voltage must be connected to the input terminal with "A" suffix (eg IO1A) while the negative voltage must be connected to the input terminal with "B" suffix (eg IO1B).

If you need to connect to the inputs voltages greater than 24VDC, you must insert a series resistor to limit the input current.

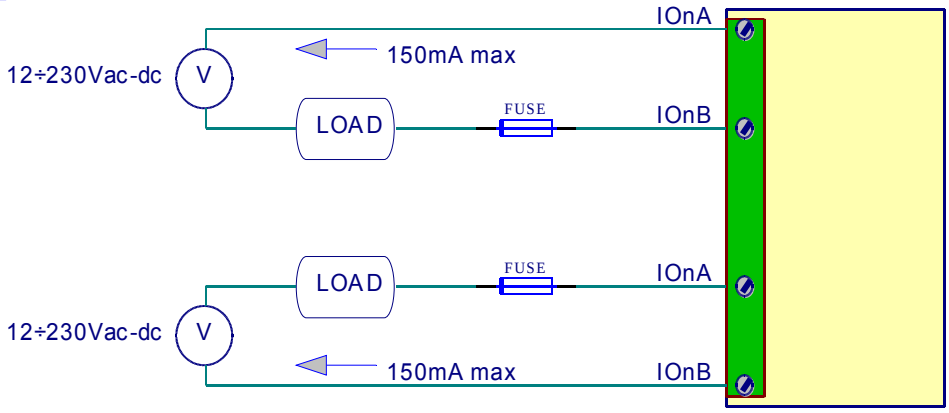


To calculate the resistance value and the power dissipated by the resistance, use the following formulas:
Rs = (Vinput-24)/0.01 = resistor value (Ω)
PDr = $(Vinput-24)^2$ / Rs = continuous power dissipation (W)

Example: *Vinput* = 48Vdc => *Rs* = (48-24) / 0.01 = 2400 Ω
PDr = $(48-24)^2$ / 2400 = 0.24W.

Digital Outputs

- Compliance with CEI EN62053-31 (Class A devices).
- Number of digital isolated outputs : depending on the hardware configuration – 4 digital outputs maximum on basic instrument.
- Isolation level : $4KV_{RMS}$ for 60 sec.;
- output type : Photo-MOS (solid state);
- output voltage/current : $10\div300V_{DC}$ $150mA_{max}$; $12\div250V_{AC}$ $150mA_{max}$;
- R_{ON} = 8Ωtyp. ($12\Omega_{MAX}$);
- ***"Pulse"*** output mode:
  - T_{ON_min} 20ms
  - T_{OFF_min} 20ms
  - pulse output period adjustable from 20ms to 2400ms :
  - pulse polarity programmable (active closed or active open);
  - programmable pulse "weight";
- "***Alarm"*** output mode:
  - the output state changes when is detected the causes of the alarm;
  - state polarity programmable (active closed or active open);
- output protections :
  - varistor for transients ;
  - ***current limiting to be provided externally.***



Connecting to the digital outputs:

The PhotoMOS have a behavior identical to a mechanical contact which closes. Therefore, there are problems with the polarity.

Note: the outputs are not equipped with devices for current limiting.
The protection must be provided externally (eg, fuse).

INTERNAL TEMPERATURE DETECTION

- The temperature inside the apparatus is detected by a sensor and can be read through a Modbus command.

VISUAL INDICATIONS

- POWER_ON : Green LED – signaling that the device is powered;
- STATUS : Green LED – system diagnostics – different coded flashes;
- DE : Yellow LED – Drive Enable – signaling that the instrument is using the RS485 Bus(response);
- SS : Red LED – Slave Select – signaling of visual recognition of instrument chosen to set up or receiving an Update command – broadcast;
- IO1 : Red LED – engaged input or output closed (depending on I/O configuration);
- IO2 : Red LED – engaged input or output closed (depending on I/O configuration);
- IO3 : Red LED – engaged input or output closed (depending on I/O configuration);
- IO4 : Red LED – engaged input or output closed (depending on I/O configuration).

TECHNICAL FEATURES

	EMT-4sIT	EMT-4sTT
Auxiliary Supply		
Auxiliary voltage range	0-110Vac = 100÷125Vac 50/60Hz (terminals 19-20); 0-230Vac = 220÷240Vac 50/60Hz (terminals 19-21); 0-400Vac = 380÷415Vac 50/60Hz (terminals 19-23);	
Power consumption	3VA max - 0.5VA min	
Isolation voltage	3700V_{AC} rms for 60 sec.	
Voltage inputs		
Inputs type	3 phase inputs + Neutral	
Inputs range	10÷600Vac phase-to-phase (6÷350Vac phase-to-neutral)	
Permitted Over Voltage	750Vac continuous phase-to-phase (430Vac phase-to-neutral). Over this voltage is mandatory to use voltage transformers. Over-Voltage category : III (permanent installations);	
Input resistance	>1.5MΩ	
Frequency range	50/60Hz - ***Note: V1 terminal must be connected.***	
Load (burden) for each input (phase-neutral)	0.08VA	
Current inputs		
Inputs type	3 inputs isolated by internal current transformers. N option : additional input for neutral current with characteristics similar to phase inputs.	3 inputs isolated by current transformers on front panel (cable entry with a maximum diameter of 8.5mm Ø without interruptions). N option: additional input for neutral current with characteristics similar to phase inputs.
Inputs range	50mA÷5A	250mA÷32A
Maximum continuous Overload	10A	50A
Load (Burden) for each input	0.0006VA	0.0023VA
Measures / precision		
Voltage	<0.2%	
Current	<0.2%	
Power	<0.2%	
Energy	<0.2%	
Power factor	<0.2%	
Serial Interface		
Standard	RS485 Half-duplex (ModBus protocol)	
Isolation	4KVpeak o 2.5KV_{RMS} – transceiver stage self powered	
BaudeRate	4800 – 9600 – 19200 - 38400	
Node-ID	1 ÷ 247	
Parity	Even – Odd - None	
Stop bit	1 or 2	
Emergency recovery *configuration (refer to "Communication Protocol Manual")*	Node #1 – BaudeRate 9600 – no-parity – 1 stop bit	

Digital Inputs / Outputs		
I/O Lines		The basic instrument is equipped with 4 digital I / O lines configured as input or output during assembly.
Inputs	Input voltage range	Input rated voltage V_{INPUT} 12 ÷ 24V_{DC}
	Input current	Rated input current I_{INPUT} @ V_{INPUT} : 10mA @ VIN=24V ; 4mA @ VIN=12V
	Inputs configuration	2 terminals (A-K) for each input : NPN, PNP, line-driver
	Isolation voltage	3.5KV for 60 sec.
	Timing	T_{ON_min} 20ms T_{OFF_min} 20ms
	Inputs functionality	pulses, states (alarms), change of timeband
outputs	Standards compliance	CEI EN62053-31 (class A equipments).
	Outputs type	Photo-MOS (solid state); R_{ON} = 8Ωtyp. (12$Ω_{MAX}$)
	Voltage/current range	10÷300V_{DC} 150mA_{max} ; 12÷250V_{AC} 150mA_{max};
	Output protections	◦ Output varistor for transients ◦ a current limitation device must be provided externally
	Voltage isolation	4KV for 60 sec.
	Outputs functionality	• ***"pulse"*** : ◦ selectable pulse period 20ms÷2400ms : ◦ programmable pulse polarity (active close or active open); ◦ programmable pulse "weight"; • "***Alarm"*** : ◦ output state changes when a programmed event appear; ◦ programmable alarm output polarity (active close or active open);
	Timing	In "pulse" mode : T_{ON_min} 20ms - T_{OFF_min} 20ms
Time + Calendar (RTC)		
Data		hours, minutes, seconds, day, date, month, year;
Update		through ModBus command and synchronization from digital input or ModBus;
Data backup		• Option ***C***: SuperCap => 20h backup guaranteed @ 25 ° C; • Option ***B***: a rechargeable lithium battery => 25000h backup guaranteed about @ 25 ° C; Both backup systems do not require replacement or maintenance. If discharged, it is sufficient to ensure an adequate period of charging (30sec for SuperCap and 10h for battery).
Compensation		Automatic temperature compensation;
Data storage		
Non Volatile Memory for :		- maximum and minimum of instantaneous measures (value, date/time); - energies (total and for 16 Timebands); - Counters (total and for 16 Timebands); - Alarms (date/time of overcoming and re-entry); - average (lasts and max);

Visualizations		
LED on front panel :	- Power ON Green - instrument status Green - RS485 Drive Enable Yellow - Slave Select Red - Digital I/O 1÷4 Reds	
Dimensional specifications, environmental and ergonomic		
mounting	standard 35mm DIN rail mounting;	
Dimensions	6 modules DIN	
Weight	430gr max	450gr max
IP protection degree	IP52 front – IP20 enclosure	IP40 front – IP20 enclosure
Working temperature	-5 ÷ +50°C	
Storage temperature	-15 ÷ +60°C	
Operating humidity	90% not condensing	
Standards compliance		
Safety	EN61010 – 1:2001	
EMC	EN61000-6-2 / EN61000-6-4 / CISPR22-EN55022	
Energy	EN62053-21 / EN62053-23	
MID	2004/22/CE MID (*Measuring Instrument Directive*)	
Marking	CE	

EMT-1SC : I/O DIGITAL I/O EXPANSION MODULE

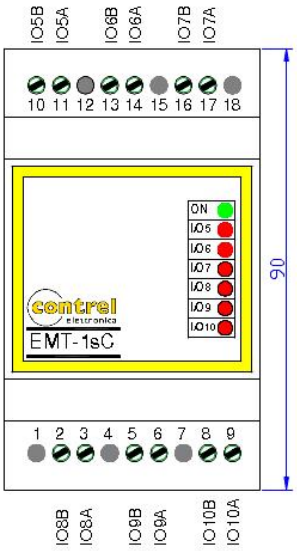
- To the basic system can be associated an expansion moduel that adds 6 lines of Digital I / O configured as input or output during assembly.

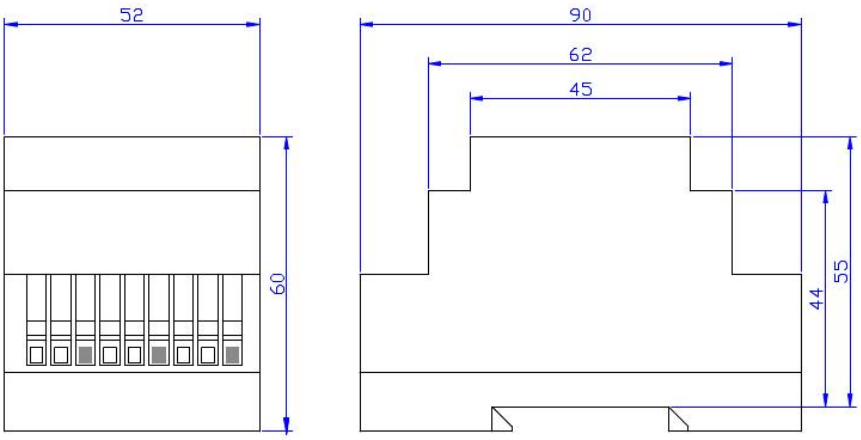
Standards compliance

- Safety : EN61010 – 1:2001;
- EMC : EN61000-6-2 / EN61000-6-4 / CISPR22-EN55022;
- Energy: EN62053-21 / EN62053-23.

DIMENSIONAL SPECIFICATIONS, ENVIRONMENTAL AND ERGONOMIC

- standard 35mm DIN rail mounting;
- dimensions : 3 modules DIN - 52mm (see mechanical drawing);
- weight : 150gr max ;
- IP protection degree : IP52 front – IP20 enclosure;
- working temperature : -5 ÷ +50°C ;
- storage temperature : -15 ÷ +60°C ;
- operating humidity : 90% not condensing.





Digital Inputs and outputs

The inputs and outputs of expansion module EMT-1sC have the same specifications as those of the base unit but they have *NOT* the ability to associate the timer / counter for pulses. Must be considered "status I / O" (recognition / warning alarms, etc.).

VISUALIZATIONS

- POWER_ON : Green LED – signaling that the device is powered;
- IO5 : Red LED – engaged input or output closed (depending on I/O configuration);
- IO6 : Red LED – engaged input or output closed (depending on I/O configuration);
- IO7 : Red LED – engaged input or output closed (depending on I/O configuration);
- IO8 : Red LED – engaged input or output closed (depending on I/O configuration);
- IO9 : Red LED – engaged input or output closed (depending on I/O configuration);
- IO10 : Red LED – engaged input or output closed (depending on I/O configuration).

ELECTRIC CONNECTIONS

Carefully follow the wiring diagram contained in this manual. Provide external protection with fuses for voltage inputs and cables suitable for current and voltages, with a diameter of 0.5 to 2.5 mm^2.

To connect digital I/O of expansion module, refer to wiring specifications of basic instruments.

Connections type

- 4 Phoenix terminals for cables max 2.5mm^2.

Pin-Out

Refer to figures in the chapter "Dimensional specifications, environmental and ergonomics".

ORDERING CODES

EMT-1sC 33

I/O Expansion ***EMT-1sC***

I/O Configuration
60 = 6 digital inputs + 0 digital Outputs
33 = 3 digital inputs + 3 digital Outputs
06 = 0 digital inputs + 6 digital Outputs

The performances and the characteristics reported in this manual are not binding and can modified at any moment without notice.

MICROENER
Quartier du pavet neuf - 49 rue de l'Université - F - 93160 Noisy Le Grand
Tél : +33 1 48 15 09 09 / Fax : +33 1 43 05 08 24 / Email : Info@microener.com
Site : http://www.microener.com