



Three-phase Digital Energy meters - CT connected (.J1A or .J5A)

Product and Applications description

This Energy-meter provides the essential measurement capabilities required to monitor a three phase electrical installation.

three-phases digital energy meter with connection by CT .../1 A up to 2000/1 A or by CT .../5 A up to 10.000/5 A 0.01-1(6) A
 2 tariffs
 inbuilt KNX communication
 1 S0 pulse output proportional to Active Imported KWh

Device is intended to be installed on DIN rail.

Main Menu

Main Page:
The value of the currently growing Active 3-phase Energy is represented (or the last one that has grown). The Energy is always Active, and may be Active Imported (right arrow), Active Exported (left arrow), with Tariff T1 or T2, depending on the current Energy flowing.

Second Active Energy Page

Third Active Energy Page

Fourth Energy Page:
In the second, third and fourth pages the other 3 energy registers are Represented

Firmware Release Page:
You can read the index of firmware release.

Firmware CheckSum Page:
The checksum is periodically calculated to verify that the firmware is reliable.

Display Test Page:
All the display segments are visible.
Whichever the page on the display, if no key is pushed for at least 20 sec., the main page appears again.

Partial Counter

Partial Active Energy Counters:
By pushing the "Partial key" partial active energy counters are readable in the main, second, third and fourth pages (i.e. for monthly energy consumption).

These counters are resettable, see the energy reset section. By pushing the "Partial key" in any of the four pages, you go back to the Main menu

Diagnostic Messages

One or more missing phase:
In case one or more phase is not detected, the corresponding icon disappears from the bottom row of the display. E.G. L2 is not detected.

Phase sequence error:
When the three phases are not in the correct zero-crossing sequence this message appears and the icons L1 and L2 blink. To make this message to disappears, you can keep pushed the "Menu key" for at least 4 seconds.

Error condition:
When the display shows the message "Error 2 or Error 3", the meter has got a malfunction and must be replaced.

Pulse rate limit

Pulse output setting

The maximum number of pulses per kWh (Pulse constant) that the meter can generate through S0 outputs is limited by the CT ratio and by the ON time of the pulse.

The relationship is:

$$\text{Max S0 Pulse Constant} = \frac{724368}{\text{CT ratio} \cdot (\text{ON time [msec]} + 30 \text{ msec})}$$

For example, if in your installation you need a CT ratio of 1000/5 = 200 and a ON pulse time of 70 ms, the maximum Pulse constant that you can select is:

$$\text{Max S0 Pulse Constant (CT ratio = 200, ON time = 70 msec)} = \frac{724368}{200 \cdot (70 + 30)} = 36$$

You can always modify the CT ratio and the pulse ON time as you prefer; in case the Pulse Constant is too high for your selections, it is automatically adjusted to the maximum allowed value.

Diagnostic messages



One or more missing phase:

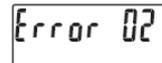
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Error condition:

When the display shows the message "Error 2 or Error 3", the meter has got a malfunction and must be replaced.



Modifiable Parameters

As above mentioned, the following parameters are modifiable:
 CT Primary Winding and CT Secondary Winding, On-Time and Pulse constant.

For example, in the CT Primary Winding page:

Start (✓) key kept pushed for 4 seconds
The value starts to blink.

Push Start, Down key to decrease, Up key to increase. Push the "Menu key" to confirm, otherwise after 8 seconds the modification will be lost.

KNX Application and Address programming



Once the metering equipment is installed, in order to have KNX correctly working, the KNX application (.WD4) and the address writing are required to be downloaded.



On the top right corner of the metering equipment front, there are a LED and a push button key dedicated to the KNX address downloading.



When you turn on the metering equipment, the LED should remain OFF. Also, if you push the KNX key without connecting the KNX bus to the metering equipment or if the KNX external interface is not powered, the LED remains OFF.



To prepare the KNX communication, proceed in the following way:

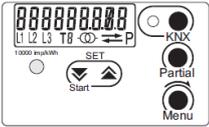
- 1) With the power supply totally disconnected, connect both mains and KNX plug-in connector
- 2) Turn on the metering equipment
- 3) Launch the KNX programming tools in a personal computer and connect the computer to the meter by means of a KNX interface.
- 4) Select the operation (application downloading/address writing/application downloading & address writing)
- 5) If the selected operation involves the address writing, push the KNX when required by the tool.
- 6) The KNX LED will turn ON



- 7) Once the operation is completed, the LED will switch OFF

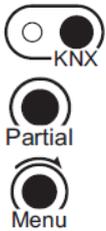


Display



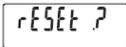
- Energy Value
- Running tariff
- Energy line (L1-2-3)
- Energy value „Partial“
- Energy **Import**
- Energy **Export**
- Metrological LED
- CT Indicator

Push - Buttons



- KNX address writing
- Command button for "Partial" reading selection
- Menu key for reading selection

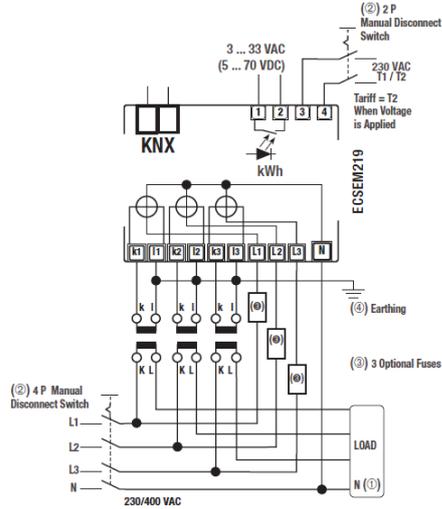
Energy Reset



In all pages representing an Energy value, a pressure of 20 sec. of the "Menu key" allows to enter in the zeroing menu, consequently on the display "see image aside" appears. The key must be released.
In order to confirm the operation and get back to default visualization, push it again for 4 seconds, otherwise after 4 sec., the reset will have no effect.

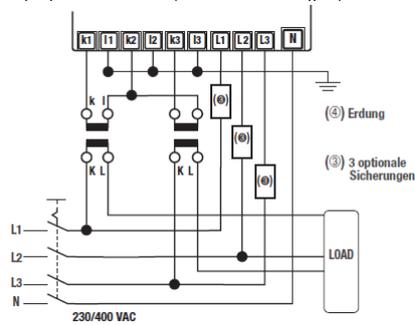
Wiring Diagram

The Energy Meter has OVERVOLTAGE CATEGORY III (according to IEC 62052-31 that refers to IEC-60664-1 Ed. 2.0:2007), hence its direct connection to the Public Electricity Grid is not allowed. The Energy Meter is intended for INDOOR installation only (according to EN 50470-1 and IEC 62052-31).
The Energy Meter must be installed on a DIN-rail and inside a cabinet with a protection degree (IP rating) equal to (or better than) IP51.
Direct connection of currents inputs to the Energy Meter is **NOT ALLOWED**: external CTs insertion with proper insulation level are mandatory.



Alternative wiring diagram, with only 2 external CTs.

- To be used only under the following conditions:
- The load is 3 wires (no neutral) and there is no current leakage (I1 - I2 - I3 = 0)
- Only 3-phase measures (Σ Power and Energies) are meaningful.



- (1) The connection of the Neutral Wire to the "N" terminal of the Energy Meter is mandatory. Its connection to the Load is optional, but, in the case, only 3-phase measures (Powers and Energies) are meaningful, while measures referred to L1, L2, and L3 are meaningless.
- (2) These manual disconnect switches are mandatory for safe installing operation. Their purpose and location must be easily evident to installation personnel
- (3) These fuses are not mandatory, they are recommended to protect the line, not the device itself.
Use >= 6 A fast (F) or >= 1 A delayed (T).
- (4) Earthing of secondary windings of CTs is governed by the laws in force in the Countries where the device is installed.
Current transformers must not be operated with open terminals since dangerous high voltages might occur which may result in personal injuries and property damage; furthermore, in this case the transformers are exposed to thermal overload.

Installation Instruction

WARNING

Device must be installed keeping a minimum distance of 4mm between electrical power line (mains - 230V) and red / black bus connector or bus cable.

- Device may be used for indoor installations in dry locations.
- Device must be mounted by an authorised installer.
- Device must be installed in a location that is accessible only to qualified installers
- The applicable safety and accident prevention regulations must be observed.
- Device must not be opened. Any faulty device should be returned to manufacturer.
- For planning and construction of electric installations, the relevant guidelines, regulations and standards of the respective country are to be considered.
- KNX bus allows you to remotely send commands to the system actuators. Always make sure that the execution of remote commands do not lead to hazardous situations, and that the user always has a warning about which commands can be activated remotely.



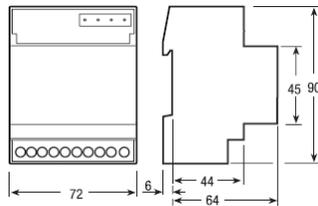
Technical Data

Data in compliance with CLC/TR 50579 , EN 62059-32-1, EN 50470-1, EN 50470-3

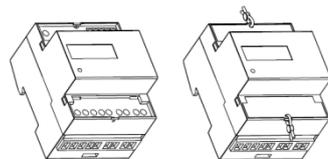
		DATA	
General characteristics			
• Housing	DIN 43880	DIN	4 modules
• Mounting	EN 60715	35 mm	18U rail
• Depth		mm	70
• Weight		g	250
Operating features			
• Connection	to three-phase network	n° wires	4
• Storage of energy values and config.	Internal flash memory	-	yes
• Tariff	for active energy	n° 2	T1 and T2
Supply Voltage and Power Consumption			
• Operating Supply Voltage range		VAC	92 ... 276 / 160 ... 480
• Maximum Power Dissipation (Voltage circuit)		VA (W)	<=2 (0.6)
• Maximum VA burden (Current circuit) @ Imax		VA	<=0.7
• Voltage Input Waveform		-	AC
Measuring input			
• Type of connection		-	CT /5A or /1A
• Reference Voltage Un	Line to Neutral	VAC	230
• Reference Voltage Un	Line to Line	VAC	400
• Reference Current (In)		A	1
• Minimum Current (Imin)		A	0.01
• Maximum Current (Imax)		A	6
• Starting Current (Ist)		A	0.001
• External CT	max CT ratio	A	10.000/5 A or 2.000/1 A
	ratio adjusting step	A	5 or 1
• Reference Frequency (fn)		Hz	50
• Number of phases (number of wires)		-	3 (4)
• Accuracy	Active Energies (accor. to EN 50470-3) and Active Powers	class	B
Overload capability			
• Voltage	continuous phase/phase	VAC	480
	1 second phase/phase	VAC	800
	continuous phase/N	VAC	276
	1 second phase/N	VAC	300
• Current	continuous	A	6
	Temporary (0.5 ms)	A	120
Measuring Features			
• Voltage range	phase/phase	VAC	160 ... 480
	phase/N	VAC	92 ... 276
• Current range (secondary winding)		A	0.001 ... 6
• Frequency range		Hz	45 ... 65
• Measured Displayed Quantities (main and Partial)		kWh	-> kWh T1, -> kWh T1 -> kWh T2, -> kWh T2
Display features			
• Display type	LCD	-	9 (2 Decimal)
• Energy digits dimension		mm	6 x 3
• Active Energy	7 digits + 2 decimal digits	min ... max kWh	0.01 ... 999999.99
• Running tariff	1 digit	-	T1 or T2
• Display refresh period		s	1
Optical metrological LED			
• Front mounted red LED (meter constant)	proportional to active imp/exp Energy	p/kWh	10000
Safety			
• Protective class		class	II
• AC voltage test (EN 50470-3, 7.2)		kV	4
• Degree of pollution		-	2 (4)
• Operational voltage		VAC	300
• Impulse voltage test		1.2/50 µs-kV	6
• Housing material flame resistance	UL 94	class	V0
Pulse Output (S0 signal)			
• Pulse Output	acc. to IEC 62053-31	-	kWh (-) (Active Imported Energy)
• Pulse Rate	proportional to adjustable	p/kWh	1 ... 10 ⁴ (*) N - depends on CT-ratio and Pulse on Time
• Pulse ON-time	adjustable	ms	30 ... 100
• Operating Voltage	Min - Max	VAC (VDC)	5 ... 26 VAC (5 ... 70 VDC)
• Pulse ON maximum current		mA	90
• Pulse OFF leakage current		µA	1
• Isolation class		-	SELV circuit
Embedded communication KIX			
• Physical interface		-	KIX terminal
• Isolation class		-	SELV circuit
Connection terminals			
• Screwdriver for mains terminals	head with Z +/-	POZIDRIV	P22
• Screwdriver for tariff and communication terminals	slotted head	mm	0.8 x 3.5
• Terminal capacity main current paths	solid wire min. (max)	mm²	1 (4)
	stranded wire with sleeve min. (max)	mm²	1 (4)
• Terminal capacity for tariff and communication	solid wire min. (max)	mm²	1 (4)
	stranded wire with sleeve min. (max)	mm²	1 (4)
Environmental conditions (storage)			
• Temperature range		°C	-25 ... +70
Environmental conditions (operating)			
• Temperature range		°C	-25 ... +55
• Mechanical environment		-	M1
• Electromagnetic environment		-	E2
• Installation	Indoor	-	yes
• Altitude (max.)		meters	<=2000
• Humidity	yearly average, not condensing	-	<=75%
	on 30 days per year (not condensing)	-	<=95%
• IP rating		-	IP51/IP40

For the installation in a cabinet at least with IP51 protection.

Dimension



Sealable terminal covers



DISPOSAL

The crossed-out bin symbol on the equipment or packaging means the product must not be included with other general waste at the end of its working life. The user must take the worn product to a sorted waste centre, or return it to the retailer when purchasing a new one. An efficient sorted waste collection for the environmentally friendly disposal of the used device, or its subsequent recycling, helps avoid the potential negative effects on the environment and people's health, and encourages the re-use and/or recycling of the construction materials.



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