

Three-phase Digital Energy meters - CT connected (.../1 A or .../5 A)



Operating instructions		
with partial active energy counter resettable and inbuilt communication KNX - 2 tariffs		
Code	Model	Description
K.SUS.01H.20N.EU	Susano KNX	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

RISK OF ELECTROCUTION, BURNS OR EXPLOSION
This device must be installed and maintained **ONLY** by qualified and duly authorized personnel.
During its installation, be sure there is no voltage applied.

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

CT Primary Winding
In this page the primary winding of the CT appears. If the secondary winding is 5 A you can modify the value between 5 to 10000, otherwise if the secondary winding is 1 A you can modify the value between 1 to 2000.

CT Secondary Winding
In this page the CT secondary winding appears. You can choose between a secondary winding of 5 A or 1 A.

On-Time Page
In this page the On-time of the S0 pulse appears. The On-time can be adjusted between 30 ms and 100 ms.

Pulse Constant Page
In this page the number of pulses per kWh can be adjusted between 1 and maximum that depends on CT-ratio and on ON-time (see “**Pulse rete limit**” paragreh below)

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.

Device Switch ON

Partial counter

Partial

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

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 “**rESEt**” 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.

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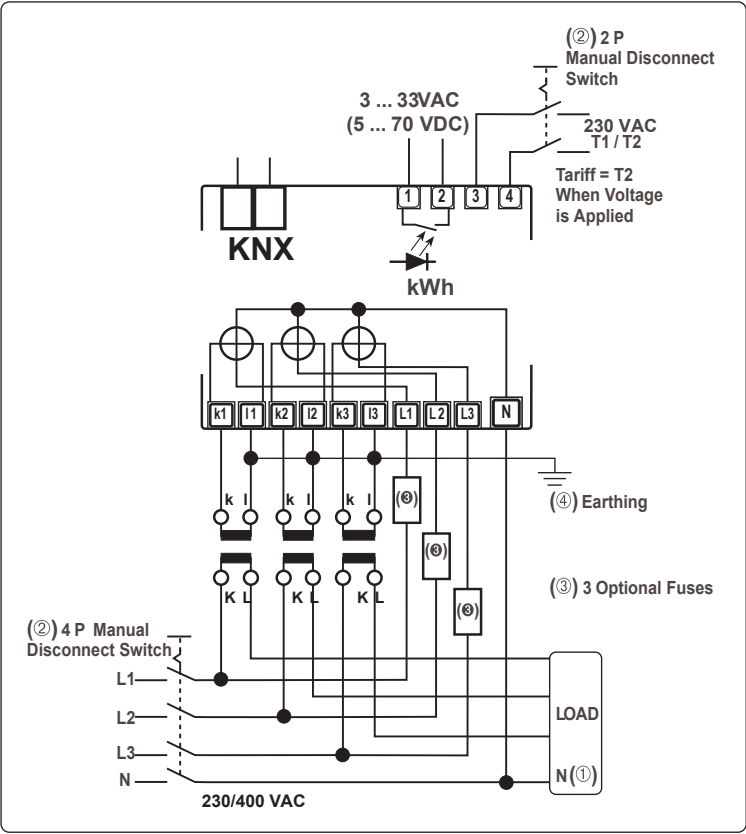
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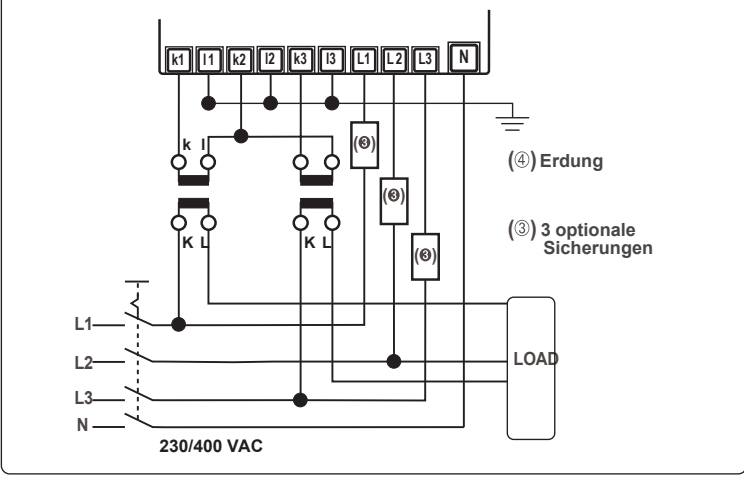
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Wiring diagram

• 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.

Technical data

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

General characteristics		K.SUS.01H.20N.EU CT connection built-in communication KNX	
•Housing	DIN 43880	DIN	4 modules
•Mounting	EN 60715	35 mm	DIN 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) @ I_{max}		VA	≤0.7
•Voltage Input Waveform		-	AC
Measuring input			
•Type of connection		-	CT .../5 A or .../1 A
•Reference Voltage Un	Line to Neutral	VAC	230
•Reference Voltage Un	Line to Line	VAC	400
•Reference Current (I_{ref})		A	1
•Minimum Current (I_{min})		A	0.01
•Maximum Current (I_{max})		A	6
•Starting Current (I_{st})		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
	continuous	A	6
	Temporary (0,5 ms)	A	120
Measuring Features			
•Voltage range	phase/phase	VAC	160 ... 480
	phase/N	VAC	92 ... 276
		A	0.001 ... 6
•Current range (secondary winding)		Hz	45 ... 65
•Frequency range		kWh	→ kWh T1, ← kWh T1 → kWh T2, ← kWh T2
•Measured Displayed Quantities (main and Partial)			
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 ... 9999999.99
•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
•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 proportional to adjustable	-	kWh (→) (Active Imported Energy) 1 ... N (*) ((*) N - depends on CT-ratio and Pulse on Time)
•Pulse Rate		p/kWh	
•Pulse ON-time	adjustable	ms	30 ... 100
•Operating Voltage	Min - Max	VAC (VDC)	5 ... 33 VAC (5 ... 70 VDC)
•Pulse ON maximum current		mA	90
•Pulse OFF leakage current		µA	1
•Isolation class		-	SELV circuit
Embedded communication KNX			
•Physical interface		-	KNX terminal
•Isolation class		-	SELV circuit
Connection terminals			
•Screwdriver for mains terminals	head with Z +/-	POZIDRIV	PZ2
•Screwdriver for tariff and communication terminals	slotted head	mm	0.8 x 3.5
•Terminal capacity main current paths	solid wire min. (max)	mmf	1 (4)
	stranded wire with sleeve min. (max)	mmf	1 (4)
	solid wire min. (max)	mmf	1 (4)
	stranded wire with sleeve min. (max)	mmf	1 (4)
•Terminal capacity for tariff and communication			
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.

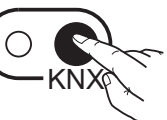
KNX Application and Address programming

Once the metering equipment is installed, in order to have KNX correctly working, the KNX application (.v04) 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

10000 imp/kWh

SET

Start

KNX

Partial

Menu

T8

• Tariff Running tariff, called tariff

L1 L2 L3

• Energy line (L1-2-3)

• CT indicator

P

• Energy value "Partial"

10000 imp/kWh

• Energy export (absorbed ←)

• Energy import (supplied →)

• Metrological LED

Led & Push Buttons

KNX

• KNX reset Button

• Link activity LED

SET

Start

Parameters set

Menu

• Menu key for reading selection

Partial

• Command button for "Partial" reading selection

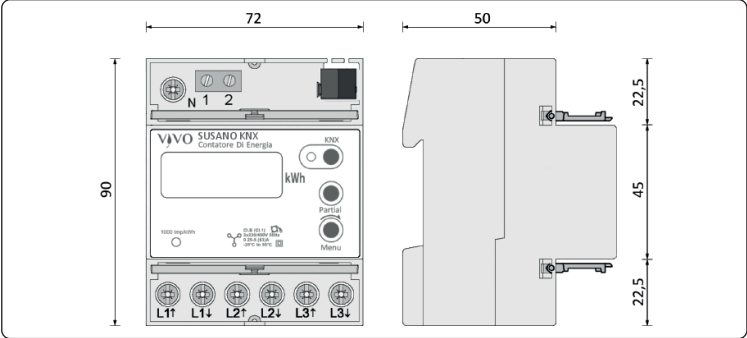
Symbols

• Measuring elements

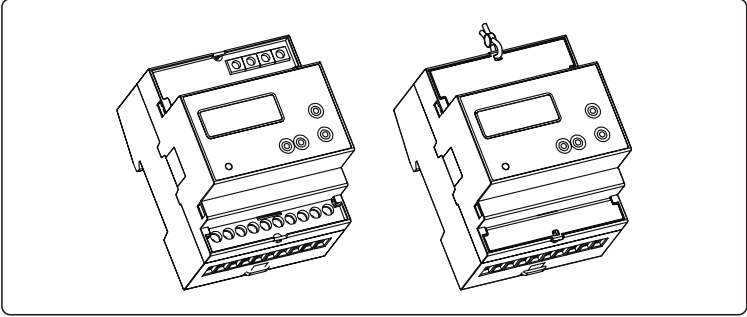
• Reversal preventing device

• Protected by double insulation

Dimension



Sealable terminal covers



Cable stripping length and max terminal screw torque

1 A / 5 A CT connection main terminals

Screw driver PZ1

1 Nm

Tariff and communication terminals

Screw driver blade 0.8x3.5 mm

0.8 Nm

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

Pr 200

Start (↖) key kept pushed for 4 seconds

The value starts to blink.

Pr 200

→

Push **Start** (↖) key to decrease, (↗) to increase. Push the “**Menu key**” to confirm, otherwise after 8 seconds the modification will be lost.