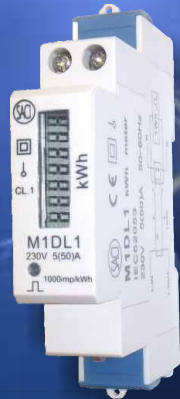




# ENERGY METERS



# ENERGY METERS

S.A. DE CONSTRUCCIONES INDUSTRIALES



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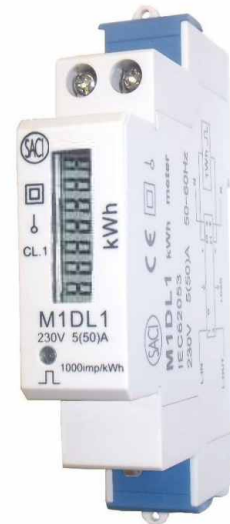
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## SINGLE-PHASE - DIRECT INPUT - M1DL1

- Single-phase
- Accuracy Cl.1 (EN 62053)
- Direct measurement up to 50 A
- Internal Shunt
- Energy consumption LED
- 7 digits electronic counter
- Pulse output SO (DIN 43864)
- 1 DIN module



### TECHNICAL SPECIFICATIONS

VOLTAGE INPUT	
Rated Voltage (Un)	230 V A.C.
Burden	< 8 VA, 2 W
Operating range	± 30% Un
Frequency	50 - 60 Hz

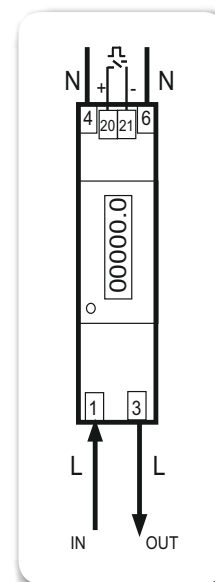
CURRENT INPUT	
Current IB (IMAX)	5 (50) A
Burden	< 1 VA
Operating range	0-100 % IMAX
Starting current (In)	< 0,4 % IB

PULSE OUTPUT (OPTOCOUPLER)	
Number of outputs	1
Pulse weight	1000 pulses / kWh
Type SO (DIN 43864)	Optocoupler
Insulation	3 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V D.C.
Pulse length	>70ms

### GENERAL FEATURES

GENERAL FEATURES	
Counter type	LED Display
Digits	5 + 2 decimals
N° of counters	1 (Total)
Class	1 ( EN 62053)
Operating temperature	-20 to +60 °C
Energy indicator	Flashing LED
Pulse weight	1000 pulses / kWh
Case material	ABS, UL94 V0
Dimensions	1 module (17,5 mm)
Terminals	Sealable
Connection	With screw
Max. wire section	12 mm <sup>2</sup>
Mounting	35 mm DIN rail

### CONNECTION DIAGRAM



## SINGLE-PHASE - DIRECT INPUT - M1DM1

- Single-phase
- Accuracy Cl. 1 (EN 62053)
- Direct measurement up to 50 A
- Internal Shunt
- Energy consumption LED
- 6 digits electromechanical counter
- Pulse output SO (DIN 43864)
- 1 DIN module



### TECHNICAL SPECIFICATIONS

VOLTAGE INPUT	
Rated Voltage (Un)	230 V A.C.
Burden	< 8 VA, 2 W
Operating range	± 30% Un
Frequency	50 - 60 Hz

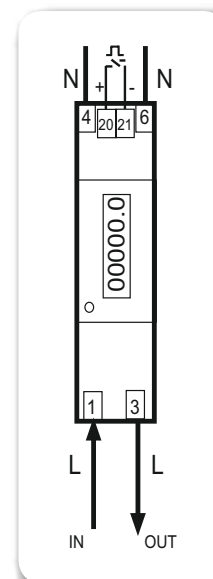
CURRENT INPUT	
Current IB (IMAX)	5 (50) A
Burden	< 1 VA
Operating range	0-100 % IMAX
Starting current (In)	< 0,4 % IB

PULSE OUTPUT (OPTOCOUPLER)	
Number of outputs	1
Pulse weight	1000 pulses / kWh
Type SO (DIN 43864)	Optocoupler
Insulation	3 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V D.C.
Pulse length	> 70 ms

### GENERAL FEATURES

GENERAL FEATURES	
Counter type	Electromechanical
Digits	5 + 1 decimal
N° of counters	1 (Total)
Class	1 ( EN 62053)
Operating temperature	-20 to +60 °C
Energy indicator	Flashing LED
Pulse weight	1000 pulses / kWh
Case material	ABS, UL94 V0
Dimensions	1 module (17,5 mm)
Terminals	Sealable
Connection	With screw
Max. wire section	12 mm <sup>2</sup>
Mounting	35 mm DIN rail

### CONNECTION DIAGRAM



## SINGLE-PHASE - DIRECT INPUT - M2DL1

- Single-phase
- Accuracy Cl. 1 (EN 62053)
- Direct measurement up to 80 A
- Internal Shunt
- Energy consumption LED
- 6 digits electronic counter
- 2 Counters (Partial and Total)
- Pulse output SO (DIN 43864)
- 2 DIN module



### TECHNICAL SPECIFICATIONS

VOLTAGE INPUT	
Rated Voltage (Un)	230 V A.C.
Burden	< 8 VA, 2 W
Operating range	± 30% Un
Frequency	50 - 60 Hz

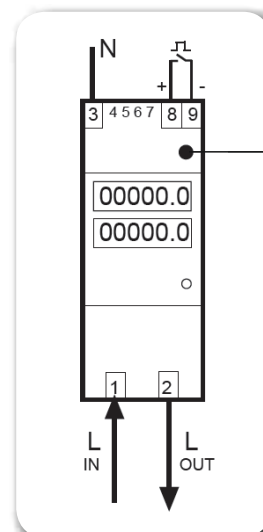
CURRENT INPUT	
Current IB (IMAX)	5 (80) A
Burden	< 1 VA
Operating range	0-100 % IMAX
Starting current (In)	< 0,4 % IB

PULSE OUTPUT (OPTOCOUPLER)	
Number of outputs	1
Pulse weight	1000 pulses / kWh
Type SO (DIN 43864)	Optocoupler
Insulation	3 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V D.C.
Pulse length	> 70 ms

### GENERAL FEATURES

GENERAL FEATURES	
Counter type	LED Display
Digits	5 + 1 decimal
N° of counters	2 (Total and partial)
Class	1 ( EN 62053)
Operating temperature	-20 to +60 °C
Energy indicator	Flashing LED
Pulse weight	1000 pulses / kWh
Case material	ABS, UL94 V0
Dimensions	2 modules (35 mm)
Terminals	Sealable
Connection	With screw
Max. wire section:	
Phase input terminals	24 mm <sup>2</sup>
Pulse and neutral terminals	12 mm <sup>2</sup>
Mounting	35 mm DIN rail

### CONNECTION DIAGRAM



Resettable partial counter (underneath terminal cover)

## SINGLE-PHASE - DIRECT INPUT - M2DM1

- Single-phase
- Accuracy Cl. 1 (EN 62053)
- Direct measurement up to 80 A
- Internal Shunt
- Energy consumption LED
- 6 digits electromechanical counter
- Pulse output SO (DIN 43864)
- 2 DIN module



### TECHNICAL SPECIFICATIONS

VOLTAGE INPUT	
Rated Voltage (Un)	230 V A.C.
Burden	< 8 VA, 2 W
Operating range	± 30% Un
Frequency	50 - 60 Hz

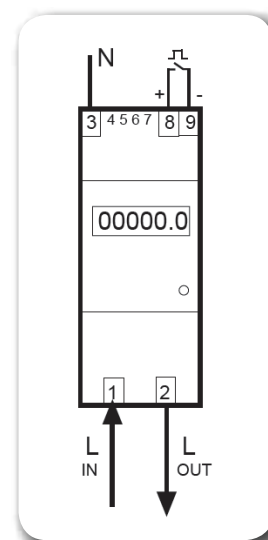
CURRENT INPUT	
Current IB (IMAX)	5 (80) A
Burden	< 1 VA
Operating range	0-100 % IMAX
Starting current (In)	< 0,4 % IB

PULSE OUTPUT (OPTOCOUPLER)	
Number of outputs	1
Pulse weight	1000 pulses / kWh
Type SO (DIN 43864)	Optocoupler
Insulation	3 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V D.C.
Pulse length	> 70 ms

### GENERAL FEATURES

GENERAL FEATURES	
Counter type	Electromechanical
Digits	5 + 1 decimal
N° of counters	1 (Total)
Class	1 ( EN 62053)
Operating temperature	-20 to +60 °C
Energy indicator	Flashing LED
Pulse weight	1000 pulses / kWh
Case material	ABS, UL94 V0
Dimensions	2 modules (35 mm)
Terminals	Sealable
Connection	With screw
Max. wire section:	
Phase input terminals	24 mm <sup>2</sup>
Pulse and neutral terminals	12 mm <sup>2</sup>
Mounting	35 mm DIN rail

### CONNECTION DIAGRAM



## THREE-PHASE - DIRECT INPUT - TCIDL1

- 3 or 4-wire Unbalanced 3-phase
- Accuracy Cl. 1 (EN 62053)
- Direct input up to 80 A
- Energy consumption LED
- Current checking LED
- 8 digits electronic counter
- Pulse output SO (DIN 43864)
- 4 DIN module



### TECHNICAL SPECIFICATIONS

VOLTAGE INPUT	
Rated Voltage (Un)	3x230 (400) V A.C.
Burden	< 8 VA, 2 W
Operating range	± 20% Un
Frequency	50 - 60 Hz

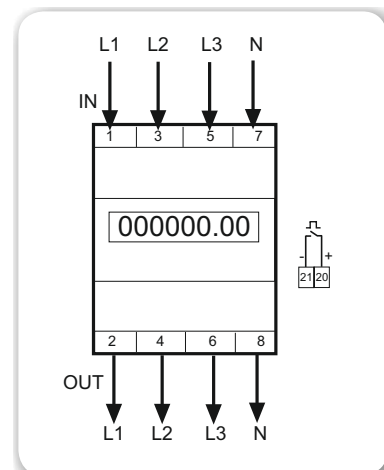
CURRENT INPUT	
Current IB (IMAX)	10 (80) A
Burden	< 3 VA
Operating range	0-100 % IMAX
Starting current (In)	< 0,4 % IB

PULSE OUTPUT (OPTOCOUPLER)	
Number of outputs	1
Pulse weight	100 pulses / kWh
Type SO (DIN 43864)	Optocoupler
Insulation	3 kV, 1 min.
Maximum current	< 20 mA
Voltage	< 24 V D.C.
Pulse length	> 50 ms

### GENERAL FEATURES

GENERAL FEATURES	
Counter type	LED Display
Digits	6 + 2 decimals
N° of counters	1 (Total)
Class	1 ( EN 62053)
Operating temperature	-20 to +55 °C
Energy indicator	Flashing LED
Pulse weight	1000 pulses / kWh
Case material	ABS, UL94 V0
Dimensions	4 modules (70 mm)
Terminals	Sealable
Connection	With screw
Max. wire section:	
Phase input terminals	25 mm <sup>2</sup>
Pulse and neutral terminals	2,5 mm <sup>2</sup>
Mounting	35 mm DIN rail

### CONNECTION DIAGRAM





## THREE-PHASE - INDIRECT INPUT - TCIL1

- 3 or 4-wire Unbalanced 3-phase
- Accuracy Cl. 1 (EN 62053)
- Programmable indirect input (x/5 A)
- Energy consumption LED
- Current checking LED
- 8 digits electronic counter
- Pulse output SO (DIN 43864)
- 4 DIN module



### TECHNICAL SPECIFICATIONS

VOLTAGE INPUT	
Rated Voltage (Un)	3x230 (400) V A.C.
Burden	< 8 VA, 2 W
Operating range	± 20% Un
Frequency	50 - 60 Hz

CURRENT INPUT	
Current IB (IMAX)	1,5 (6) A
Burden	< 3 VA
Operating range	0-100 % IMAX
Starting current (In)	< 0,4 % IB

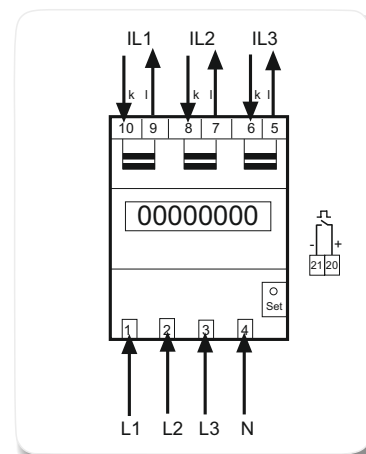
SELECTABLE PRIMARY CURRENT	
5, 10, 15, 25, 30, 40, 50, 60, 75, 80, 100, 120	
150, 200, 250, 300, 400, 500, 600, 750, 1000, 1200, 1500	
1600, 2000, 2500, 3000, 4000, 5000 or 6000 /5	

PULSE OUTPUT (OPTOCOUPLER)	
Number of outputs	1
Pulse weight	100 pulses / kWh
Type SO (DIN 43864)	Optocoupler
Insulation	3 kV, 1 min.
Maximum current	< 20 mA
Voltage	< 24 V D.C.
Pulse length	> 50 ms

### GENERAL FEATURES

GENERAL FEATURES	
Counter type	LED Display
Digits	6 + 2 decimals
N° of counters	1 (Total)
Class	1 ( EN 62053)
Operating temperature	-20 to +55 °C
Energy indicator	Flashing LED
Pulse weight	1000 pulses / kWh
Case material	ABS, UL94 V0
Dimensions	4 modules (70 mm)
Terminals	Sealable
Connection	With screw
Max. wire section:	
Phase input terminals	10 mm <sup>2</sup>
Pulse terminals	1,5 mm <sup>2</sup>
Voltage terminals	5 mm <sup>2</sup>
Mounting	35 mm DIN rail

### CONNECTION DIAGRAM



## THREE-PHASE - INDIRECT INPUT TCI6i - TCIV6i - TCI6iDT

- Balanced or unbalanced three-phase
- Active energy or Active energy + Reactive energy
- Cl. 2 Accuracy (EN 62053)
- Insulated current (internal transformers)
- On request, Cl. 1 (optional)
- Selectable primary current
- Energy consumption LED
- 6 digits electromechanical counter
- Pulse output (Optocoupler): SO (DIN 43864)
- 6 DIN modules



ACTIVE ENERGY	MODEL
Three-phase, balanced, 3 or 4 wire	TCI6i-I
Three-phase, unbalanced, 3 wire	TCI6i-II
Three-phase, unbalanced, 4 wire	TCI6i-3
ACTIVE ENERGY + REACTIVE ENERGY	MODEL
Three-phase, balanced, 3 or 4 wire	TCIV6i-I
Three-phase, unbalanced, 3 wire	TCIV6i-II
Three-phase, unbalanced, 4 wire	TCIV6i-3
ACTIVE ENERGY, DOUBLE TARIFF	MODEL
Three-phase, unbalanced, 4 wire	TCI6iDT-3

### TECHNICAL SPECIFICATIONS

VOLTAGE INPUT	
Rated Voltage (Un)	110, 230 or 400 V A.C.
Burden	< 2,8 VA, (L1-L3) < 1mA x Un (on measuring)
Operating range	80-120% Un
Frequency	50 - 60 Hz

CURRENT INPUT	
Current IB (IMAX)	X/1 or X/5 A
Burden	< 0,2 VA
Operating range	0-120 % IMAX
Starting current (In)	< 1 % IB

PULSE OUTPUT (OPTOCOUPLER)	
Number of outputs TCI...	1
Number of outputs TCIV...	2
Pulse weight version 1	1 pulse / kWh
Pulse weight version 2	1 pulse / 10 kWh
Type SO (DIN 43864)	Optocoupler
Insulation	4 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V C.C.
Pulse length	> 100 ms
(optional)	> 300 ms

### VERSIONS

TYPE 1
PRIMARY CURRENT
5, 10, 25, 50, 75, 100, 125, 150, 200, 250... 300, 400, 500, 600, 800 or 1000 A
TYPE 2
PRIMARY CURRENT
300, 400, 500, 600, 750, 800, 1000, 1200, 1250... 1500, 1600, 2000, 2500, 3000, 4000 or 5000 A

RELAY PULSE OUTPUT (OPTIONAL)	
Number of outputs TCI...	1
Number of outputs TCIV...	2
Pulse weight version 1	1 pulse / kWh
Pulse weight version 2	1 pulse / 10 kWh
Relay contacts	250 V, 3 A, 100 VA
Insulation	2 kV, 1 min.
Pulse length	> 100 ms
(optional)	> 300 ms

## GENERAL FEATURES

GENERAL FEATURES	
Accuracy (Optional)	Class 2 Class 1
Operating temperature	-5 to +55 °C
Energy indicator	Flashing LED
Pulse weight	16 pulses / kWh
Case material	ABS, UL94 V0
Dimensions	6 modules (105 mm)
Connection	Pluggable terminals
Max. wire section	2,5 mm <sup>2</sup>
Mounting	35 mm DIN rail

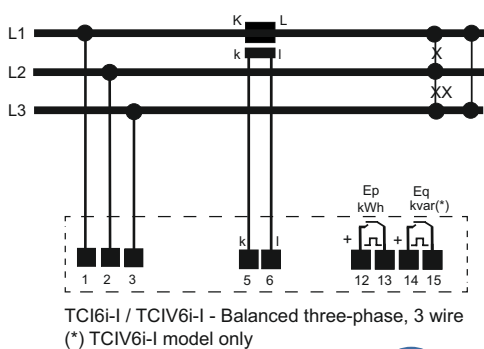
## AUXILIARY VOLTAGE

AUXILIARY VOLTAGE	
Aux. V.	Self supplied

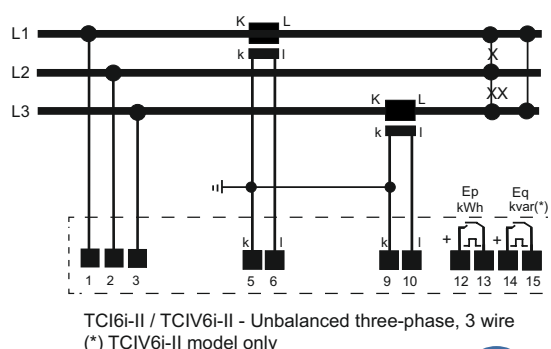
## DOUBLE TARIFF (TCI6i-DT)(\*)

The equipment has two local meters to add energy from the information received from a contact. Closed contact, adds kWh in meter I. Open contact, adds kWh in meter II. (\*) Option: select by input voltage

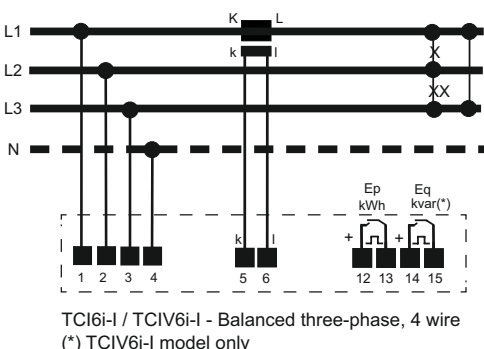
## CONNECTION DIAGRAM



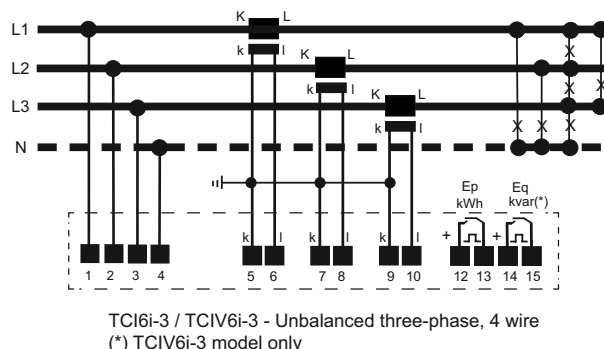
16 position switch



16 position switch



16 position switch



16 position switch

## THREE-PHASE - INDIRECT INPUT - TCI6-3 - TCIV6-3

- Unbalanced three-phase
- Active energy or Active energy + Reactive energy
- Cl. 2 Accuracy (EN 62053)
- Selectable primary current
- 6 digits electromechanical counter
- Pulse output (Optocoupler): SO (DIN 43864)
- 6 DIN modules



ACTIVE ENERGY	MODEL
Three-phase, unbalanced, 4 wire	TCI6-3
ACTIVE ENERGY + REACTIVE ENERGY	MODEL
Three-phase, unbalanced, 4 wire	TCIV6-3

### TECHNICAL SPECIFICATIONS

VOLTAGE INPUT	
Rated Voltage (Un)	110, 230 or 400 V C.A
Burden	< 2,8 VA, (L1-L3) < 1mA x Un (on measuring)
Operating range	80-120 % Un
Frequency	50 - 60 Hz

CURRENT INPUT	
Current IB (IMAX)	X/1 or X/5 A
Burden	< 0,2 VA
Operating range	0-120 % IMAX
Starting current (In)	< 1 % IB

### VERSIONS

TYPE 1
PRIMARY CURRENT
5, 10, 25, 50, 75, 100, 125, 150, 200, 250... 300, 400, 500, 600, 800 or 1000 A
TYPE 2
PRIMARY CURRENT
300, 400, 500, 600, 750, 800, 1000, 1200, 1250... 1500, 1600, 2000, 2500, 3000, 4000 or 5000 A

PULSE OUTPUT (OPTOCOUPLER)	
Number of outputs TCI...	1
Number of outputs TCIV...	2
Pulse weight version 1	1 pulse / kWh
Pulse weight version 2	1 pulse / 10 kWh
Type SO (DIN 43864)	Optocoupler
Insulation	4 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V D.C.
Pulse length	> 100 ms
(optional)	> 300 ms

RELAY PULSE OUTPUT (OPTIONAL)	
Number of outputs TCI...	1
Number of outputs TCIV...	2
Pulse weight Version 1	1 impulso / kWh
Pulse weight Version 2	1 impulso / 10 kWh
Relay contacts	250 V, 3 A, 100 VA
Insulation	2 kV, 1 min.
Pulse length	> 100 ms
(optional)	> 300 ms

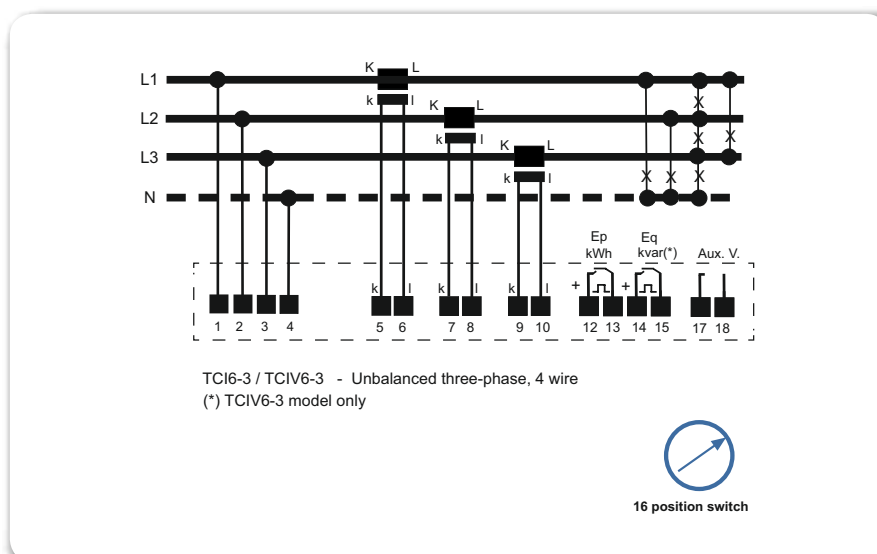
## GENERAL FEATURES

GENERAL FEATURES	
Accuracy (Optional)	Class 2 Class 1
Operating temperature	-5 to +55 °C
Energy indicator	Flashing LED
Pulse weight	16 pulses / kWh
Case material	ABS, UL94 V0
Dimensions	6 modules (105 mm)
Terminals	Pluggable
Max. wire section	2,5 mm <sup>2</sup>
Mounting	35 mm DIN rail

## AUXILIARY VOLTAGE

AUXILIARY VOLTAGE	
V. aux.	110 or 230 V C.A
Burden	2,8 VA
Operating range	80-120% Un

## CONNECTION DIAGRAM



## THREE-PHASE - INDIRECT INPUT - TI96 - TIV96

- Unbalanced three-phase
- Active energy or Active energy + Reactive energy
- Cl. 2 Accuracy (EN 62053)
- Selectable primary current
- Insulated current (internal transformers)
- Energy consumption LED
- 7 digits electromechanical counter
- Pulse output (Relay): SO (DIN 43864)
- 96 x 96 DIN dimensions



ACTIVE ENERGY	MODEL
Three-phase, unbalanced, 3 wire	TI96-II
Three-phase, unbalanced, 4 wire	TI96-3
ACTIVE ENERGY + REACTIVE ENERGY	MODEL
Three-phase, unbalanced, 3 wire	TIV96-II
Three-phase, unbalanced, 4 wire	TIV96-3

### TECHNICAL SPECIFICATIONS

VOLTAGE INPUT	
Tensión nominal (Un)	110, 230, or 400 V C.A.
Burden	< 1 mA x U phase N
Operating range	20-120 % Un
Frequency	50 - 60 Hz

### ENTRADA DE CORRIENTE

CURRENT INPUT	
Current IB (IMAX)	X/1 or X/5 A
Burden	< 0,2 VA
Operating range	0-100 % IMAX
Starting current (In)	1 % IB

### VERSIONS

TYPE 1	
PRIMARY CURRENT	
5, 10, 25, 50, 75, 100, 125, 150, 200, 250... 300, 400, 500, 600, 800 or 1000 A	
TYPE 2	
PRIMARY CURRENT	
300, 400, 500, 600, 750, 800, 1000, 1200, 1250... 1500, 1600, 2000, 2500, 3000, 4000 or 5000 A	

### PULSE OUTPUT (RELAY)

PULSE OUTPUT RELAY	
Number of outputs TI...	1
Number of outputs TIV...	2
Pulse weight version 1	1 pulse / kWh
Pulse weight version 2	1 pulse / 10 kWh
Relay contacts 250 V, 3 A	(24 V D.C., 3 A D.C.)
Insulation	2 kV, 1 min.
Pulse length	> 100 ms
(optional)	> 300 ms

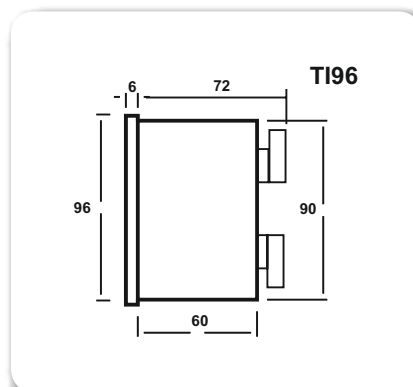
### GENERAL FEATURES

GENERAL FEATURES	
Accuracy	Class 2
(Optional)	Class 1
Operating temperature	-5 to +55 °C
Energy indicator	Flashing LED
Pulse weight	16 pulses / kWh
Case material	Metálica+ABS, UL94 V0
Dimensions	DIN 96x96 mm
Connection	Current inputs, M4
Terminals	Pluggable
Max. wire section	2,5 mm <sup>2</sup>

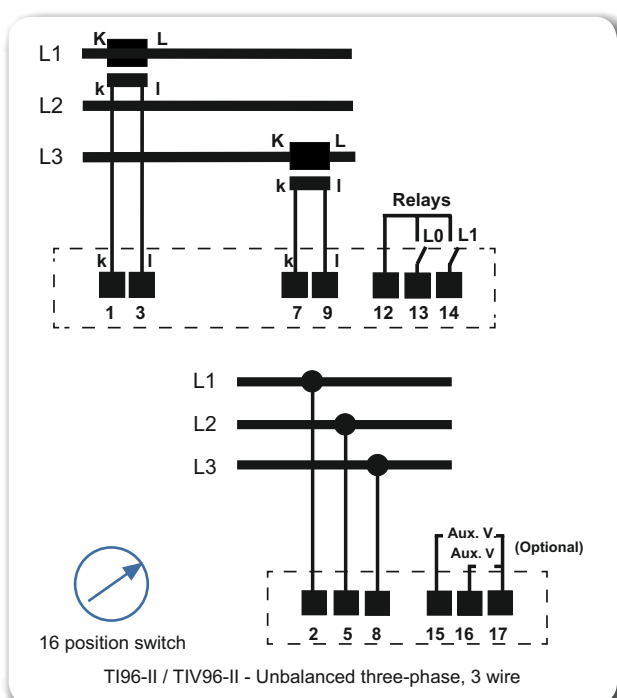
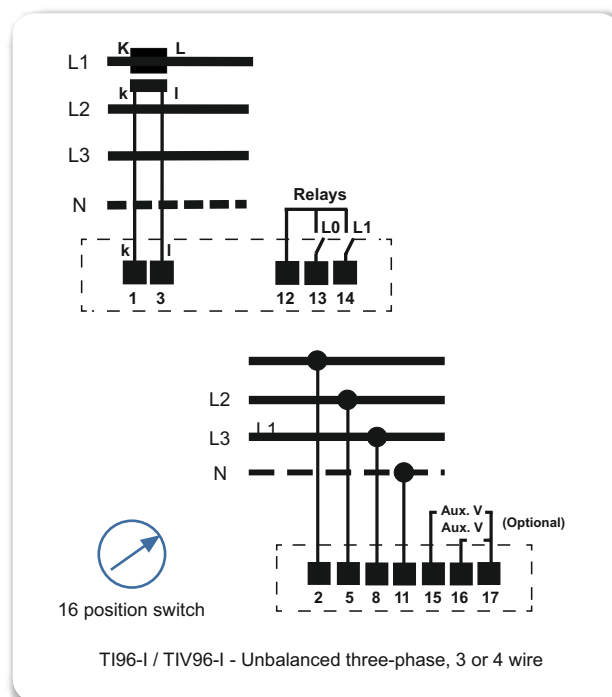
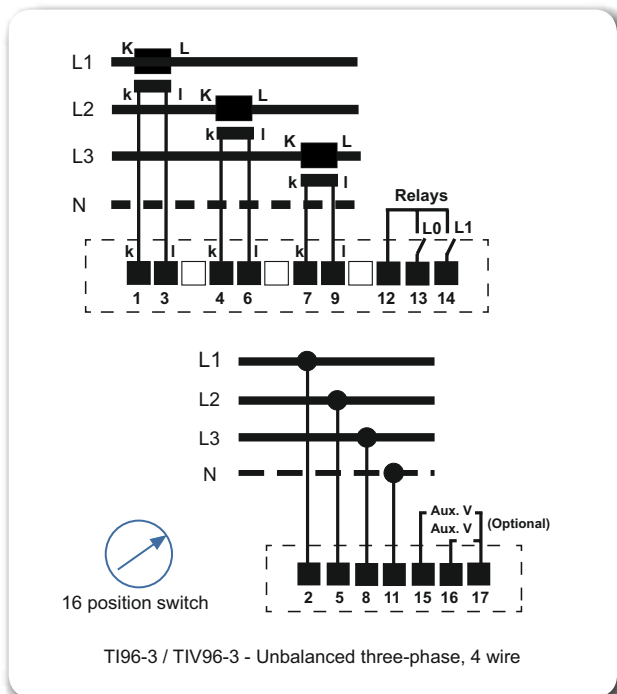
## AUXILIARY VOLTAGE

AUXILIARY VOLTAGE	
Aux. V	110, 230, or 400 V A.C.
Burden	2,8 VA
Operating range	80-120% Un

## DIMENSIONS (mm)



## CONNECTION DIAGRAM



## TOTALIZER TERMINALS TTI - TTIM

**TTI:** Totalyzer module with microprocessor and serial output.

**TTIM:** Totalyzer module with microprocessor and serial output.  
128 kB memory, LCD display and built-in keypad.



- 8 independent pulse counters.
- Independent counter reset.
- Programmable counter value.
- **TTIM: 90 days of load curve per counter.**
- RS485 serial output.
- Programmable (capable to measure closed contact time in seconds, time or pulses)

### MODEL

TTI	
Basic model	
TTIM	
Basic model	
128 kB Circular memory, LCD Display	
90 days of load curve	

### AUXILIARY VOLTAGE

AUXILIARY VOLTAGE	
Aux. V.	100, 110, 230 or 400 V C.A
Burden	4 VA
Operating range	80-120% Un

### TECHNICAL SPECIFICATIONS

INPUT	
Number of outputs	8
Pulse length	> 100 ms
Time between pulses	> 100 ms
Max. Voltage	12 V
Max. Current	10 mA
Insulation by optocoupler	2,5 kV, 1 min

### GENERAL FEATURES

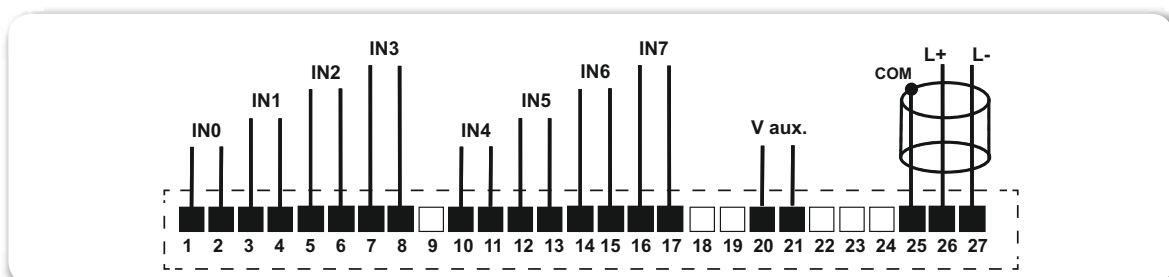
GENERAL FEATURES	
Case material	ABS, UL94 V0
Dimensions	(9 modules) 155 x90
Terminals	Pluggable
Max. wire section	2,5 mm <sup>2</sup>
Weight	0,40 kg
Operating temperature	-5 to +55 °C
Electrical safety (EN 61010)	Class 2, Category 3

CONTACTS OUTPUT	
Number of outputs	1
Type	RS485
Connection	2 or 4 wires
Baud rate (standard)	9600 Bauds
Communication protocol	MODBUS
Max. N° of instruments per line	32
Max. length of system per line	1250 m

### ACCESSORIES

ACCESSORIES
RS232/RS485 Converters
RS485 Amplifiers

### CONNECTION DIAGRAM





## SOFTWARE - TTIgest

SACI has developed the TTIgest, to optimize and check water, gas, electricity, consumption etc., in applications such as hotels, harbours, rented offices, etc. The system is compatible with our 'TTI - TTIM' totalizers and 'MAR' power analyzers.



It is designed to manage power consumption by these meters and to issue the corresponding bills. It is not an accounting or billing system. It is a program which checks meters and issues bills.

First all required data is defined to issue these bills. Then the physical elements comprising the instrument network are configured, such as the meters and totalizers.

Its operation is very simple. An 'Input customer' button associates the required meters to customer use. They take the meter's values and store them. Another button, 'Customer Output' reads the associated meters again, calculates power consumption and issues a bill with the relevant charges. The self billing option may be chosen for each time period.

The totalizers with memory (TTIM) can create load curves, examining the data numerically or as a graph as well as printing and exporting it.

The new version includes all unchecked consumption histories for all meters (using header meters) plus the assigned and non assigned checked consumption.

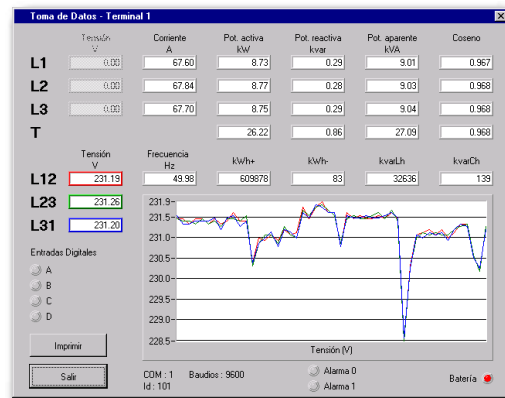
Innovations include the prepaid checking, allowing each meter's balance to be checked or allowing collective or individual contributions to be made. It also checks the free consumption limit and the minimum amount to be invoiced.

The TTIgest program must be installed on a PC with the following minimum requirements:

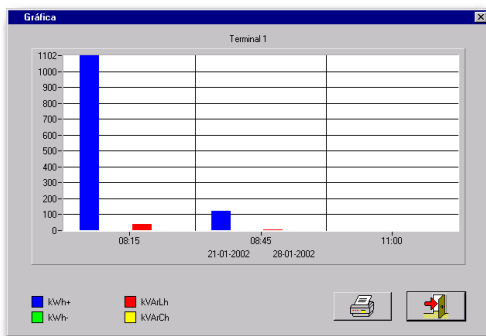
- CPU: Pentium 200 MMX
- RAM: 64 Mb
- Screen: VGA with 1Mb
- Monitor: Colour, 14"
- Software: Windows 98, Me, NT4, 2000 or Xp
- DOES NOT OPERATE WITH WIN95**

It must also have a serial port for the RS-232 - RS485 (IFRxx) converter connection and a serial port for the mouse. It must also have a parallel port for connecting the anti-copying device and a printer.

Microsoft Internet Explorer 4.x or above must be installed.



Fecha	Hora	kWh+	kWh-	kVAhLh	kVACh
07-02-2002	09:30	571	0	18	0
07-02-2002	09:45	6	0	0	0
07-02-2002	10:00	7	0	0	0
07-02-2002	10:15	6	0	1	0
07-02-2002	10:30	7	0	0	0
07-02-2002	10:45	6	0	0	0
07-02-2002	11:00	6	0	0	0
07-02-2002	11:30	13	0	1	0
07-02-2002	11:45	6	0	0	0
07-02-2002	12:00	7	0	0	0
07-02-2002	14:15	57	0	2	0



## STARTING-UP

Start-up consists in identifying all the physical elements comprising the instrument system and the necessary data for issuing bills.

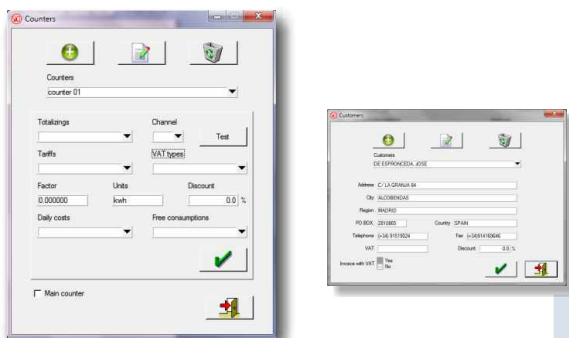
- **Definition:** Necessary elements are as follows:
- **Currency:** The currency appearing on the bills is defined.
- **VAT Types:** Different types of VAT may be defined.
- **Tariffs:** Also different tariffs may be set.
- **Daily costs:** Daily fixed contract costs may be associated to preset meters.
- **Free consumption:** Free consumption limits may be assigned to meters.
- **Bill:** All components on the bill are defined, including the automatic billing option.
- **Customer:** Option for accessing the customer data base.
- **Password:** To protect the operations to be carried out.
- **Setting:** Representing the physical elements comprising the system.
- **Modems:** Modem communication may be established.
- **Totalizers:** Identifies the totalizers (TTI or TTIM) on the system.
- **Meters:** All existing meters with their VAT identification, tariff, daily cost, free consumption, units, factor, etc. Header meters are also defined.
- **Groups:** Option for associating several meters in one group to manage them as one single element.
- **Reports:** To check the system's default settings, communications and bills.

### Customer input

That is to say, when a customer enters to use the installation, he only has to be started as a customer, if not one already, and then he is shown which meter system or group to which he is to be assigned. Once this is done, the system reads the meters and stores the values. An innovation allows the use of histories to be used for inputs and the option for not issuing bills.

### Customer Output

When a customer leaves the installation, the elements associated with that customer are selected and the meters are read. Consumption is calculated and the



bill issued. Histories may also be used on departure. Customer departure may be previously set so that it is automatically carried out.

### Bills

Allows the bills which are to be issued to be checked, deleted and printed. It is also possible to add independent items to a customer as required.

Stored bills may be displayed, cancelled, deleted and printed. Automatic manual billing is allowed.



### Errors

The system detects all communication errors and manages them, allowing it to act as a system administrator.

### Histories

This allows load data curves for meters connected to a totalizer with memory to be examined. Data may be printed and exported and a load curve graph displayed between the two selected dates.

This new version includes a load curve for all meters, uncontrolled consumption recordings and assigned and non assigned controlled consumption recordings.

### Prepayment

Main innovation in this version. Manages the prepayment checking for customers and informs them to the balance on each in real time. It allows collective or individual payment including setting prepayment tariffs.

### Header

SACI MAR - 3 instruments may located at the connection of the electrical installation to display all electrical parameters in the system and, using the software, save and show as a graph energy histories for 15 minute periods, by hours and by days. It also displays instant values.

### Tools

The language may be defined, the data base compressed, preset or manual copies made, old data deleted, ...

## MULTIFUNCTION RECORDING METERS FOR TYPE 2, 3 AND 4 CUSTOMERS

### CTMR II and CTMR IID – FUNCTIONAL DESCRIPTION

CTMR II and CTMR IID are static meters for 3-phase connection. They measure active and reactive energy with classes 1 and 2, respectively. Moreover, these meters include built-in recording functions for type 2, 3 and 4 customers.

They have a four line, twenty character display for data displaying, two buttons, one for bill closures and another for display management, LED diodes for checking active and reactive energy measurement, signal outputs using relays and pulse emission by solid state relays. They also have three communication interfaces, a UNE EN 62056-21 optical one, a RS232 electrical one and a RS232 or RS485 one. Communication protocol is UNE EN 61870-5-102, which can be adapted by the System Operator.

### AVAILABLE INFORMATION

Additionally, the counter has the following information:

- Phase voltage and line voltage
- Currents
- Active, reactive and apparent power, global and per phase  $\phi \cos$
- Frequency
- Information about software updates
- Information about special actions (reset to zero, transformation ratio, and burden curve periods.
- Backup of the main values.

### CONFIGURABLE PARAMETERS

#### Global:

- Date and time\*
- Automatic or scheduled season change
- Date of winter/summer change
- Minimum time between bill closures
- Transformation ratio\*
- Setting of communication ports and modem setting
- Description of measurement point (twenty character string)
- Programming identification (twenty five character string)
- Recording and measurement point address
- General access and only read password
- Outputs setting
- Turn on/off the closing button
- Private password for electronic sign



For each active or latent contract:

Latent contract is understood to mean one which will start operating on a preset date.

- Seasons: it defines the seasons into which the year is divided, the different types of days and time slots for those days\*.
- Activation date of the latent contact.\*
- Table of holidays.\*
- Table of special days.\*
- Contracted powers in each billing period.\*
- Day of automatic billing closure (if applicable).\*
- Preset bill closures (a date and time for a closure is set).

\* Limitations according to legal metrology.

### TECHNICAL CHARACTERISTICS

#### ELECTRICAL REFERENCE VALUES

Reference voltage  $U_n$ :

Indirect	3 x 63,5 / 110 V
Semi-Indirect	3 x 230 / 400 V
Direct	3 x 230 / 400 V

Reference current  $I_n$  ( $I_{max}$ ):

Indirect	0,05-5 (10) A
Semi-Indirect	0,05-5 (10) A
Direct	0,5-10 (80) A

Reference frequency:

50 Hz.

Over currents:

Indirect	20 $I_{max}$ .0,5s.
Semi-Indirect	0,05-5 (10) 20
Direct	30 $I_{max}$ half cycle

Over voltages:

2  $U_n$  10 s.

## ACCURACY

	UNE EN 50470	UNE EN 62053
CTMR II	B and C	0,5S & 1(Active); 1* & 2 (Reactive)
CTMRD II	B	1 (Active); 2 (Reactive)

\* Extrapolated from class 2.

Starting current on active:

Indirect	10 mA
Semi-Indirect	10 mA
Direct	40 mA

Clock accuracy: 0,5 s/day between 20 and 26 °C

Variation of clock accuracy with temperature: < 0,1s/°C/24h.

Check contact:

CTMR II Indirect	20.000 Imp/kWh
	20.000 Imp/kvarh
CTMR II Semi-Indirect	5.000 Imp/kWh
	5.000 Imp/kvarh
CTMRD II Direct	500 Imp/kWh
	500 Imp/kvarh

## CASING

Dimensions: According to DIN 43857  
Weight: Indirect, Semi-Indirect 1,9 Kg.  
Direct 2,4 Kg.

Mounting triangle: 230 mm between upper and lower points and 150 between lower points.

Terminal box: Interchangeable  
Protection class: II  
Mechanical strength: 0,22 0,05Nm.  
Shock: 30gn, 18ms.  
Vibration: f<60Hz, 0,075mm. f>60Hz, 1g

Resistance to heat and fire: 960 ± 15 on terminal box, 650 ± 10 on terminal cover and casing for 301s.

Protection against water and dust penetration.: IP 51.  
Dry heat: 70±2°C, 72h.  
Cold: -25±3°C, 72h.  
Humid heat: According to IEC-2-30, variant 1.

## CLIMATE CONDITIONS

Temperature range:

Operation	-10 °C to 55 °C.
Operating limit	-20 °C to 60 °C.
Storage and transport	-25 °C to 70 °C.

## ELECTRICAL REQUIREMENTS

Burden:  
Voltage circuits: <2W and 3VA  
Current circuits: <3x1VA  
Un range:  
Operation 0,9 to 1,1 Un.  
Operation limit 0 to 1,15 Un.

Insulation:  
Alternating voltage: 4kV, 50 Hz. 1 minute.  
Pulse voltage: 6kV. 1,2/5s

## ELECTROMAGNETIC COMPATIBILITY

Electrostatic discharges:  
Severity level: 4, 10 discharges of 8kV.  
Immunity to HF electromagnetic fields: 10 V/m from 80 to 1000MHz. Severity level 3.

Insulation against rapid transient bursts: 2 kV and 4 kV.

Radio-interference measurement: between 0,15 and 300 MHz. 4, 10 discharges of 8 kV.

Immunity to HF electromagnetic fields: 10 V/m from 80 to 1000MHz. Severity level 3.

Insulation against rapid transient bursts: 2 kV and 4 kV.

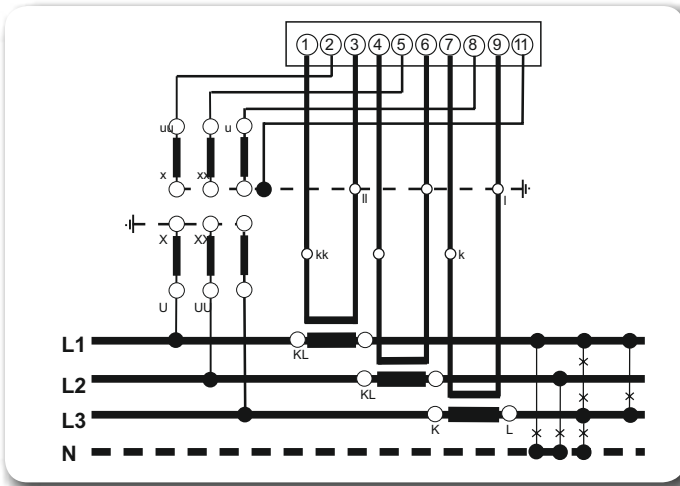
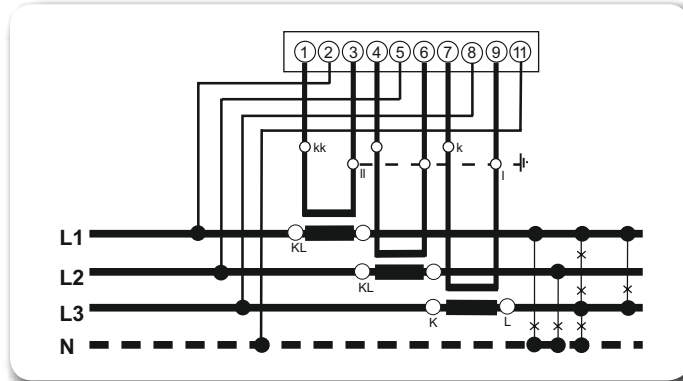
Radio-interferences measurement: between 0,15 and 300 MHz.

## GENERAL FEATURES

Display: 4x20 LCD alphanumeric characters  
Communication:  
Protocol: published by System Operator  
Optical: According to UNE EN 61107, programmable baud rate up to 9600 bauds, parity programmable.  
Local port: RS232 direct or via modem, programmable, speed up to 115200 bauds, parity programmable.  
Operating reserve: 10 years.  
Buttons: 1 sealable for manual reset to zero  
1 for display management.  
Battery: polarized housing for easy change over

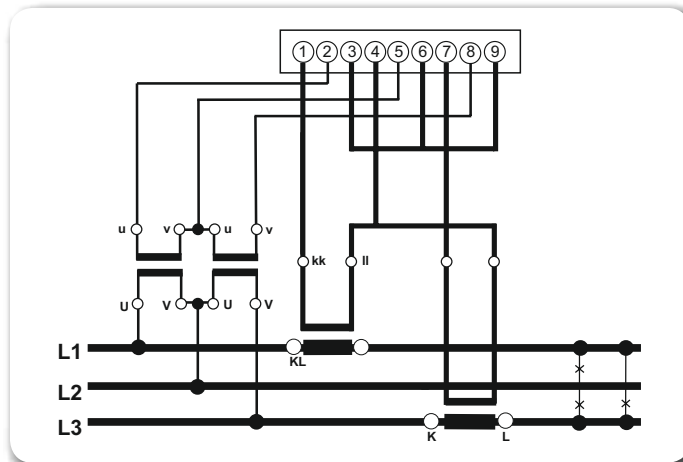
**CONNECTION DIAGRAM**

**CTMR II - SEMI-INDIRECT**  
Three-phase, 4 wire, low voltage



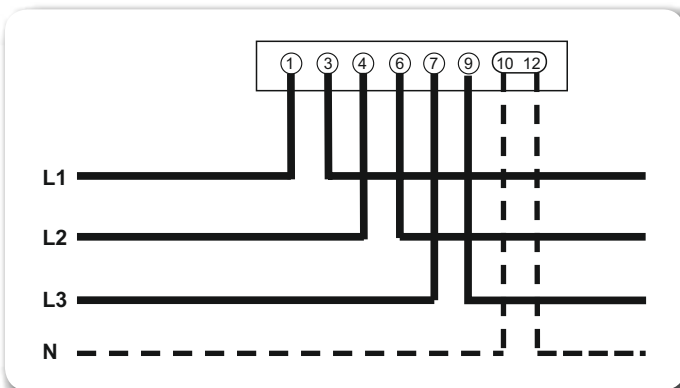
**CONNECTION DIAGRAM**

**CTMR II - INDIRECT**  
Three-phase, 4 wire, med voltage



**CONNECTION DIAGRAM**

**CTMR II - INDIRECT**  
Three-phase, 3 wire, med voltage



**CONNECTION DIAGRAM**

**CTMR DII - DIRECT**  
Three-phase, 4 wire, low voltage

## DIMENSIONS (mm)

