ENERGY METERS

Energy meters

ENERGY METERS

CONTENTS

(*) Other technical specifications, please enquire.

ENERGY METERS

MODULAR - DIN RAIL - SUMMARY

System Type	Single-phase						3-Ph Bal.	3-Ph 4-W	3-Phase 4 Wire		3-Phase, 4 W. Balanced		3-Phase		3-Phase 4 Wire	
Input	Shunt			Internal transformer (1)					Shunt		Internal transformer					
Model	M1DB	M2DB	M2D	M3D	M3DT	TCID	TCIDI	TCID3	TCI6-3	TCIV6-3	TCI6i-I	TCIV6i-I	TCI6i-II	TCIV6i-II	TCI6i-3	TCIV6i-3
Active energy	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Reactive energy										•		•		•		•
AC. Voltage	230 V					110-230 or 400 V										
Current	5 (20)	10 (20)	10 (40)	10 (30)	20 (100)	15 (30) ó 30 (90)		20 (60)	1 or 5 A Rated primary current selectable by switch							
Accuracy	Cl. 1							Cl.2 (Cl.1 on request)								
No. of digits	5,1			6		6,1		7	6							
LED (Wh)	0,50	1,56		7,81		6,25		62,5	-		62,5					
Burden	<3 VA			<1,5 VA		<2,8 VA		<4 VA								
Casings (DIN Modules)	1	2		3		6			6							
Number of outputs (*)	1	-	1	1		1 or 2			1	2	1	2	1	2	1	2
Pulses/kWh	20000	10	10	1		10		1	MODEL 1: 1 Pulse / 1kWh MODEL 2: 1 Pulse / 10kWh							
type	Optocoupler					Optocoupler and/or relay			Optocoupler		Optocoupler (optional relay)					
Pulse length (**)	>70 ms					>100 ms										

(1) M3DT model, external transformer

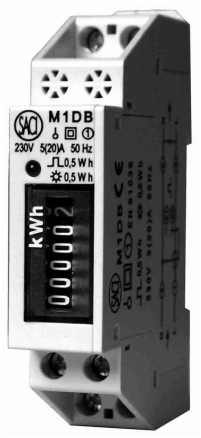
(*) Pulse outputs "1" is Ea+, and "2" is Ea+ and ErL
(**) On request, 300 ms pulse length on TCI6i-3
On request: Bidirectional active energy output on TCI6-3 and TCI6i-3
Other 127 / 220 V or 63.5 / 110 V voltage rated values, please enquire

TECHNICAL SPECIFICATIONS

Operating temperature	-5 to +55 ºC
Storage temperature:	-30 to +70 ºC
Relative humidity	< 90 % without condensation
Insulation	2.5 kV, 1 min.
Reference Standards	IEC 1004-3, IEC 1004-4, IEC 1004-2 EN 50081,EN 50082, IEC255-4

ENERGY METERS

SINGLE-PHASE - DIRECT INPUT - M1DB



- Single-phase
- Cl. 1 Accuracy (EN 61036)
- Direct measurement up to 20 A
- Built-in 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 C.A.
Burden	< 3 VA, 2W
Operating range	80-120 % Un
Frequency	50 or 60 Hz

CURRENT INPUT

Current IB (IMAX)	5 (20) A
Burden	< 1 VA
Operating range	0-100 % I_{MAX}
Starting current (In)	< 0,4 % I_B

PULSE OUTPUT (OPTOCOUPLER)

Number of outputs	1
Pulse weight	2000 pulses / kWh
Type	SO (DIN 43864) with external power supply
Insulation	by optocoupler 2,5 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V C.C.
Pulse length	> 70 ms

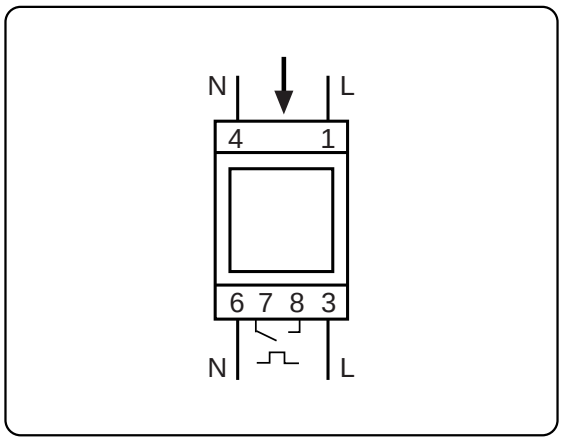
GENERAL FEATURES

Accuracy	Class 1
Operating temperature from	-5 to +55 ºC
Energy indicator	Flashing LED parpadeante 2000 pulses per kWh
Case material	
Dimensions	(1 module) 17.5 mm
Connection	Terminals with screw
Max. wire diameter	12 mm^2 (Inputs) 2.5 mm2 (Pulse output)
Mounting	35 mm DIN rail

LED:

continuously ON	Inverse start or no load start

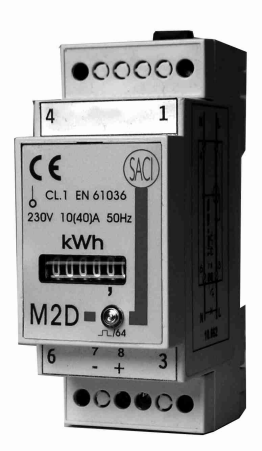
CONNECTION DIAGRAM



ENERGY METERS

SINGLE-PHASE - DIRECT INPUT - M2D

- Single-phase
- Cl. 1 Accuracy (EN 61036)
- Direct measurement up to 40 A
- Built-in shunt
- Energy consumption LED
- 6 digits electromechanical counter
- Pulse output: SO (DIN 43864)
- 2 DIN modules



TECHNICAL SPECIFICATIONS

VOLTAGE INPUT

Rated voltage (Un)	230 V C.A.
Burden	< 3 VA, 2W
Operating range	80-120 % Un
Frequency	50 or 60 Hz

CURRENT INPUT

Current IB (IMAX)	10 (40) A
Burden	< 1,5 VA
Operating range	0-100 % I_{MAX}
Starting current (In)	< 0,4 % I_B

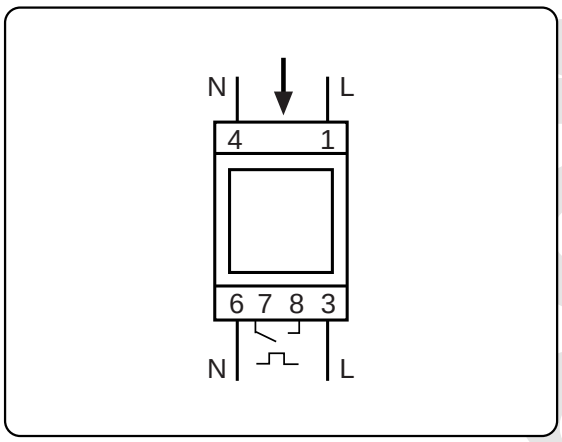
PULSE OUTPUT (OPTOCOUPLER)

Number of outputs	
Pulse weight	10 pulses / kWh
Type	with external power supply
Insulation	by optocoupler
Maximum current	50 mA
Voltage	5 - 48 V C.C.
Pulse length	> 70 ms

GENERAL FEATURES

Accuracy	Class 1
Operating temperature from	-5 to +55 ºC
Energy indicator	Flashing LED 640 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(2 modules) 35 mm
Connection	Terminals with screw
Max. wire diameter	12 mm^2 (Inputs) 2.5 mm2 (Pulse output)
Mounting	35 mm DIN rail

CONNECTION DIAGRAM



ENERGY METERS

SINGLE-PHASE - DIRECT INPUT - M2DB

- Single-phase
- Cl. 1 Accuracy (EN 61036)
- Direct measurement up to 20 A
- Built-in shunt
- Energy consumption LED
- 6 digits electromechanical counter
- Pulse output: SO (DIN 43864) (Optional)
- 2 DIN modules

TECHNICAL SPECIFICATIONS

VOLTAGE INPUT

Rated voltage (Un)	230 V C.A
Burden	< 3 VA, 2W
Operating range	80-120 % Un
Frequency	50 or 60 Hz

CURRENT INPUT

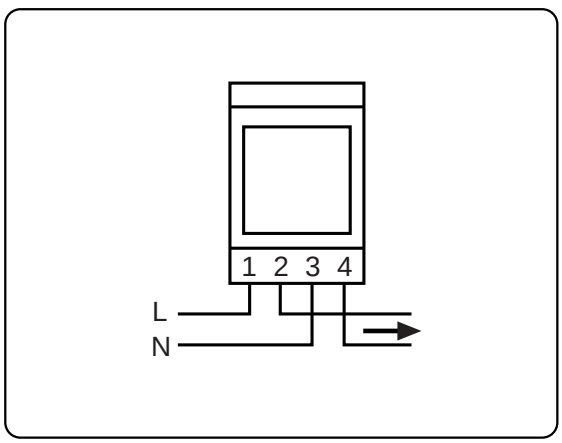
Current IB (IMAX)	10 (20) A
Burden	< 1 VA
Operating range	0-100 % I_{MAX}
Starting current (In)	< 0,4 % I_B

PULSE OUTPUT (OPTOCOUPLER)

Number of outputs	
Pulse weight	10 pulses / kWh
Type	with external power supply
Insulation	by optocoupler
	2,5 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V C.C.
Pulse length	> 70 ms

GENERAL FEATURES

Accuracy	Class 1
Operating temperature from	-5 to +55 ºC
Energy indicator	Flashing LED
	640 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(2 modules) 35 mm
Connection	Terminals with screw
Max. wire diameter	12 mm^2 (Inputs)
	2.5 mm2 (Pulse output)
Mounting	35 mm DIN rail



ENERGY METERS

SINGLE-PHASE – DIRECT INPUT - M3D

- Single-phase
- Cl. 1 Accuracy (EN 61036)
- Direct measurement up to 30 A
- Internal transformer
- Energy consumption LED
- 6 digits electromechanical counter
- Pulse output: SO (DIN 43864)
- 3 DIN modules

TECHNICAL SPECIFICATIONS

VOLTAGE INPUT

Rated voltage (Un)	230 V C.A
Burden	< 1,5 VA
Operating range	80-120 % Un
Frequency	50 and 60 Hz

CURRENT INPUT

Current IB (IMAX)	10 (30) A
Burden	< 0,5 VA
Operating range	0-100 % I_{MAX}
Starting current (In)	< 0,4 % I_B

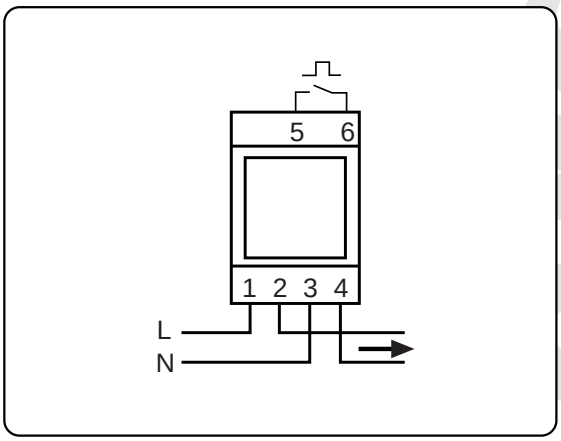
PULSE OUTPUT (OPTOCOUPLER)

Number of outputs	
Pulse weight	10 pulses / kWh
Type	with external power supply
Insulation	by optocoupler
Maximum current	
Voltage	
Pulse length	

GENERAL FEATURES

Accuracy	Class 1
Operating temperature from	-5 to +55 ºC
Energy indicator	Flashing LED 128 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(3 modules) 52.5 mm
Connection	Terminals with screw
Max. wire diameter	12 mm^2 (Inputs) 2.5 mm2 (Pulse output)
Mounting	35 mm DIN rail

CONNECTION DIAGRAM



ENERGY METERS

SINGLE-PHASE – DIRECT INPUT* - M3DT

- Single-phase
- Cl. 1 Accuracy (EN 61036)
- Direct measurement up to 100 A
- External transformer (included)(*)
- Energy consumption LED
- 6 digits electromechanical counter
- Pulse output: SO (DIN 43864)
- 3 DIN modules

TECHNICAL SPECIFICATIONS

VOLTAGE INPUT

Rated voltage (Un)	230 V C.A.
Burden	< 1,5 VA
Operating range	80-120 % Un
Frequency	50 and 60 Hz

CURRENT INPUT

Current IB (IMAX)	20 (100) A
Burden	< 0,5 VA
Operating range	0-100 % I_{MAX}
Starting current (In)	< 0,4 % I_B

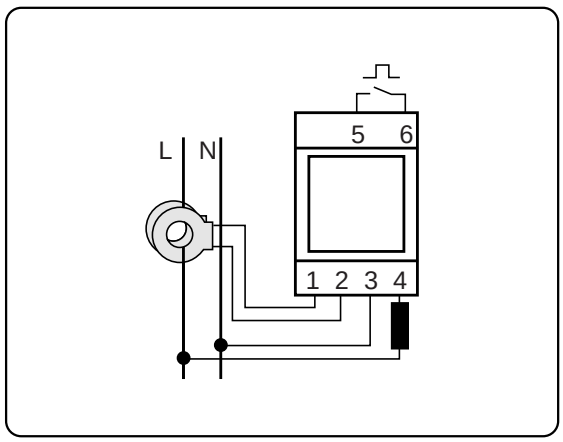
PULSE OUTPUT (OPTOCOUPLER)

Number of outputs	1
Pulse weight	1 pulses / kWh
Type	SO (DIN 43864) with external power supply
Insulation	by optocoupler 2,5 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V D.C.
Pulse length	200 - 300 ms

GENERAL FEATURES

Accuracy	Class 1
Operating temperature from	-5 to +55 ºC
Energy indicator	Flashing LED 128 pulses per kWh
Case material	
Dimensions	(3 modules) 52.5 mm
Connection	Terminals with screw
Max. wire diameter	12 mm^2 (Inputs) 2.5 mm2 (Pulse output)
Mounting	35 mm DIN rail

CONNECTION DIAGRAM



ENERGY METERS

SINGLE-PHASE or THREE-PHASE - DIRECT INPUT - TCID

- Single-phase or Balanced three-phase
- Cl. 1 Accuracy (EN 61036)
- Direct measurement up to 90 A
- Internal transformer
- Energy consumption LED
- 7 digits electromechanical counter
- Pulse output (Optocoupler): SO (DIN 43864)
- Relay pulse output (optional)
- Optional auxiliary voltage on single-phase model
- 6 DIN modules

MODEL

- TCID	Single-phase
- TCIDI	Balanced three-phase

VOLTAGE INPUT

Rated voltage (Un)	110, 230 or 400 V AC.
Burden	< 1mA x Un
Operating range	80-120 % Un
	(with auxiliary voltage 0-120 % Un)
Frequency	50 or 60 Hz

CURRENT INPUT

Current IB (IMAX)	15 (30) or 30 (90)A
Burden	<0,02 VA
Operating range	0-100 % I_{MAX}
Starting current (In)	<0,4 % I_B

AUXILIARY VOLTAGE (SINGLE-PHASE)

Vaux.	110 V, 230 or 400 V AC.
Burden	2,8 VA
Operating range	80-120 % Un

PULSE OUTPUT (OPTOCOUPLER)

Number of outputs	1
Pulse weight	10 pulses / kWh
Type	SO (DIN 43864)
	with external power supply
Insulation	by optocoupler
Maximum current	50 mA
Voltage	5 - 48 V D.C.
Pulse length	> 30 ms

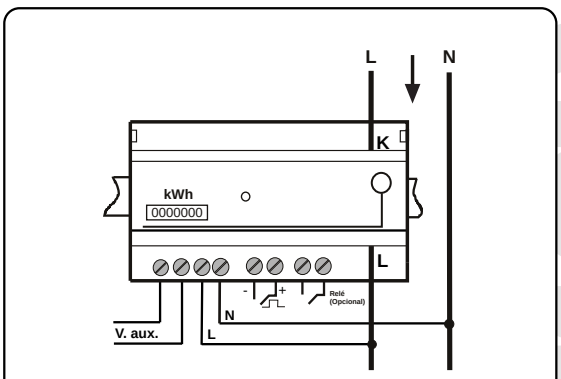
RELAY PULSE OUTPUT (OPTIONAL)

Number of outputs	1
Pulse weight	10 pulses / kWh
Type	relay contacts
	250 V, 3 A
Insulation	2 kV, 1 min.
Pulse length	> 30 ms

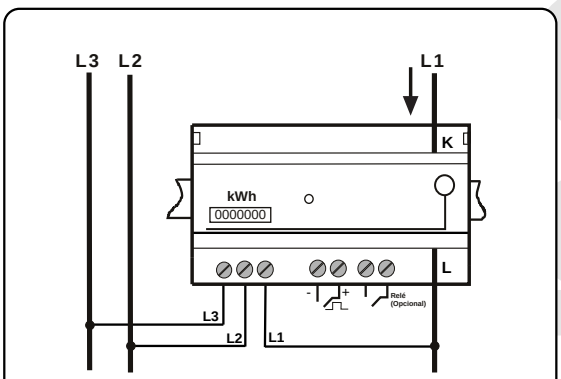
GENERAL FEATURES

Accuracy	Class 1
Operating temperature from	0 to + 40 ºC
Energy indicator	Flashing LED
	160 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(6 modules) 105 mm
Max. primary conductor	15 (30) A Ø8 mm
	30 (90) A Ø12 mm
Connection	Terminals with screw
Max. wire diameter	2,5 mm^2
Mounting	35 mm DIN rail

CONNECTION DIAGRAM



TCID - Single-phase

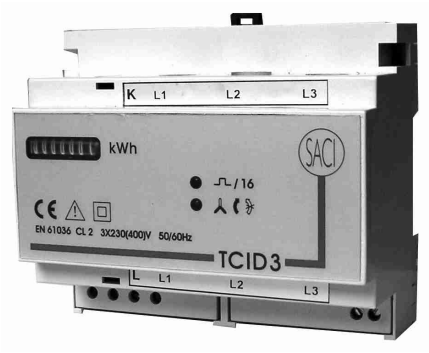


TCIDI - Balanced three-phase

ENERGY METERS

THREE-PHASE - DIRECT INPUT - TCID3

- Unbalanced three-phase
- Cl. 1 Accuracy (EN 61036)
- Direct measurement up to 60 A
- Internal transformer
- Energy consumption LED
- Phase sequence LED
- 7 digits electromechanical counter
- Pulse output (Optocoupler): SO (DIN 43864)
- Relay pulse output (optional)
- 6 DIN modules



MODEL

- TCID-3 Unbalanced three-phase, 3 or 4 wire

TECHNICAL SPECIFICATIONS

VOLTAGE INPUT

Rated voltage (Un)	110, 230 or 400 V AC.
Burden	< 4 VA (L1-L3)
Operating range	80-120 % Un
Frequency	50 and 60 Hz

CURRENT INPUT

Current I_B (I_{MAX})	20 (60)A
Burden	< 0,02 VA
Operating range	0-100 % I_{MAX}
Starting current (In)	< 0,4 % I_B

PULSE OUTPUT (OPTOCOUPLER)

Number of outputs

Pulse weight	1 pulse / 10kWh
Type	SO (DIN 43864) with external power supply
Insulation	by optocoupler
Maximum current	50 mA
Voltage	5 - 48 V DC
Pulse length	> 100 ms

RELAY PULSE OUTPUT (OPTIONAL)

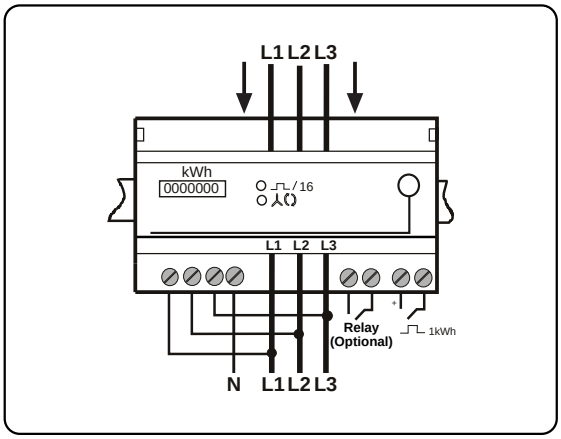
Number of outputs

Pulse weight	1 pulse / 10kWh
Type	relay contacts
Insulation	4 kV, 1 min.
Pulse length	> 100 ms

GENERAL FEATURES

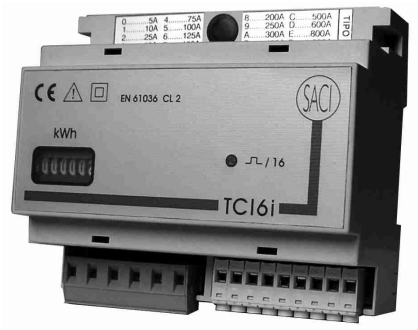
Accuracy	Class 1
Operating temperature from	0 to + 40 ºC
Energy indicator	Flashing LED 16 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(6 modules) 105 mm
Max. primary conductor	Ø10 mm
Connection	Terminals with screw
Max. wire diameter	2,5 mm^2
Mounting	35 mm DIN rail

CONNECTION DIAGRAM



THREE-PHASE - CT OPERATED
TCI6i – TCIV6i – TCIV6iDT

- Balanced or unbalanced three-phase
- Active energy or Active energy + Reactive energy
- Cl. 2 Accuracy (EN 61036)
- 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	TCIV6i-3DT

TECHNICAL SPECIFICATIONS

VOLTAGE INPUT

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

CURRENT INPUT

Current IB (IMAX)	X/1 or X/5 A
Burden	< 0,02 VA
Operating range	0-120 % I_B
Starting current (In)	1 % I_B

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
	TCIV...	2
Pulse weight	Version 1	1 pulse / 10kWh
	Version 2	1 pulse / 10kWh
Type		SO (DIN 43864)
		with external power supply
		by 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
	TCIV-	2
Pulse weight	Version 1	1 pulse / 10kWh
	Version 2	1 pulse / 10kWh
TYPE		Relay contacts
		250 V, 3 A,100 VA
Insulation		2 kV, 1 min.
Pulse length		> 100 ms
		Optional: > 300 ms

ENERGY METERS

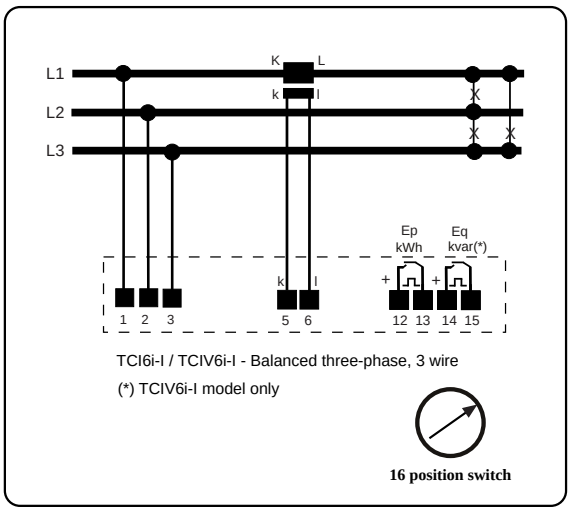
GENERAL FEATURES

Accuracy	Class 2
	Class 1 (optional) on request
Operating temperature from	-5 to +55 ºC
Energy indicator	Flashing LED
	16 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(6 modules) 105 mm
Connection	Pluggable terminals
Max. wire diameter	2,5 mm^2
Mounting	35 mm DIN rail
AUXILIARY VOLTAGE	Self supplied

DOUBLE TARIFF (TCI6i-DT)

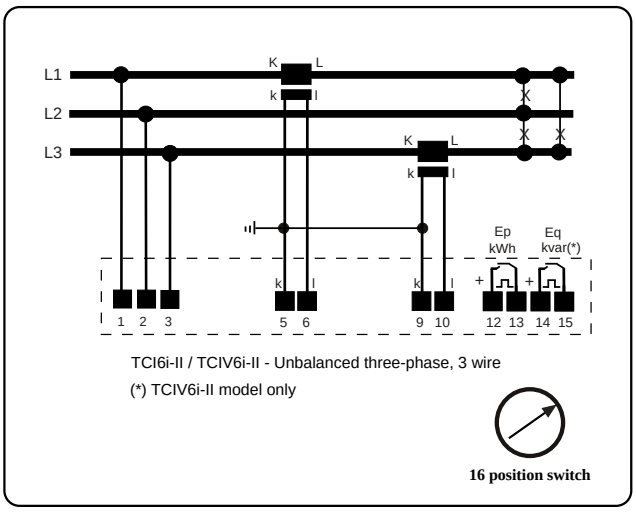
The equipment has two local meters to add energy from the information received from a contact.
Closed contact, adds kWh in meter I.
Open contact, adds kWh in meter II.

CONNECTION DIAGRAMS



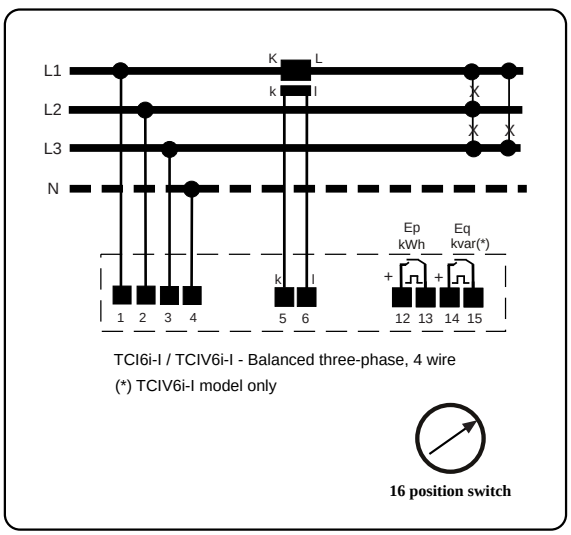
TCI6i-I / TCIV6i-I - Balanced three-phase, 3 wire
(*) TCIV6i-I model only

16 position switch



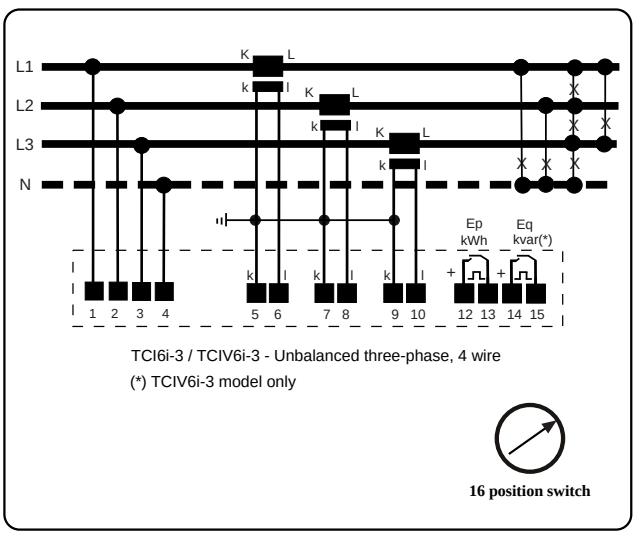
TCI6i-II / TCIV6i-II - Unbalanced three-phase, 3 wire
(*) TCIV6i-II model only

16 position switch



TCI6i-I / TCIV6i-I - Balanced three-phase, 4 wire
(*) TCIV6i-I model only

16 position switch



TCI6i-3 / TCIV6i-3 - Unbalanced three-phase, 4 wire
(*) TCIV6i-3 model only

16 position switch

ENERGY METERS

THREE-PHASE - CT OPERATED - TCI6-3 - TCIV6-3

- Unbalanced three-phase
- Active energy or Active energy + Reactive energy
- Cl. 2 Accuracy (EN 61036)
- 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 AC.
Burden	< 2,8 VA
	< 1mA x Un (on measuring)
Operating range	80-120 % Un
Frequency	50 and 60 Hz

CURRENT INPUT

Current IB (IMAX)	X/1 or X/5 A
Burden	< 0,02 VA
Operating range	0-120 % I_B
Starting current (In)	1 % I_B

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
	TCIV...	2
Pulse weight	Version 1	1 pulse / 10kWh
	Version 2	1 pulse / 10kWh
Type		SO (DIN 43864)
		with external power supply
		by 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
	TCIV-	2
Pulse weight	Version 1	1 pulse / 10kWh
	Version 2	1 pulse / 10kWh
TYPE		Relay contacts
		250 V, 3 A,100 VA
Insulation		2 kV, 1 min.
Pulse length		> 100 ms
		Optional: > 300 ms

ENERGY METERS

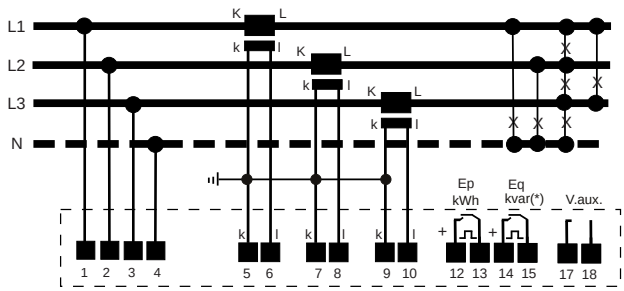
GENERAL FEATURES

Accuracy	Class 1
	Class 1 (optional) on request
Operating temperature from	-5 to +55 ºC
Case material	ABS, UL94 V0
Dimensions	(6 modules) 105 mm
Connection	Pluggable terminals
Mounting	35 mm DIN rail
Max. wire diameter	2,5 mm^2

AUXILIARY VOLTAGE

Vaux.	110 or 230 V AC.
Burden	2,8 VA
Operating range	80-120 % Un

CONNECTION DIAGRAMS



TCI6-3 / TCIV6-3 - Unbalanced three-phase, 4 wire
(*) TCIV6-3 model only

16 position switch

ENERGY METERS

SINGLE-PHASE or THREE-PHASE - DIRECT INPUT - TD96

- Single-phase or Unbalanced three-phase
- Active energy
- Cl. 2 Accuracy (EN 61036)
- 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
Single-phase	TD96
Three-phase, unbalanced, 3 wire	TD96-II
Three-phase, unbalanced, 4 wire	TD96-3

TECHNICAL SPECIFICATIONS

VOLTAGE INPUT

Rated voltage (Un)	110, 230 or 400 V AC.
Burden	< 1 mA x Un (L1-L3)
Operating range	80-120 % Un
Frequency	50 or 60 Hz

CURRENT INPUT

Current I_B (I_{MAX})	10 (30) A
Burden	< 0,5 VA
Operating range	0-100 % I_{MAX}
Starting current (In)	0,4 % I_B

PULSE OUTPUT (RELAY)

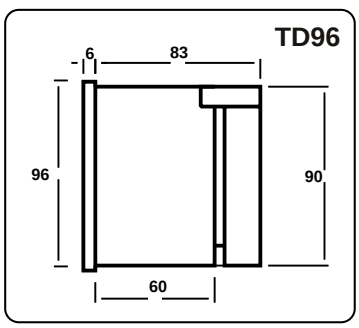
Number of outputs	1
Pulse weight	10 Imp. / kWh
Type	Relay contacts
	SO (DIN 43864)
	With external power supply
	250 V, 3 A (24 V C.C., 3 A D.C.)
Insulation	2 kV, 1 min.
Pulse length	> 100 ms

GENERAL FEATURES

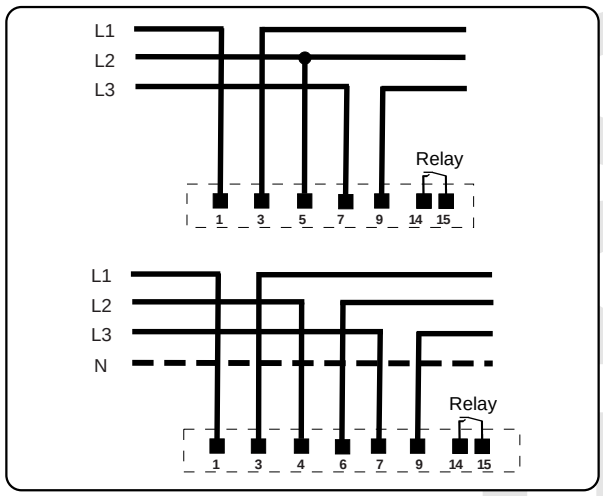
Accuracy	Class 2
	Class 1 (optional) on request
Operating temperature from	-5 to +55 ºC
Energy indicator	Flashing LED
	16 pulses per kWh
Case material	Metal+ABS, UL94 V0
Dimensions	DIN 96 x 96 mm
Connection	Current inputs M4
Other	Pluggable terminals
	Max. wire diameter 2.5 mm^2

AUXILIARY VOLTAGE Self supplied

DIMENSIONS



CONNECTION DIAGRAMS



ENERGY METERS

THREE-PHASE - CT OPERATED - TI96 - TIV96

- Unbalanced three-phase
- Active energy or Active energy + Reactive energy
- Cl. 2 Accuracy (EN 61036)
- 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-III
ACTIVE ENERGY+REACTIVE ENERGY	**MODEL**
Three-phase, unbalanced, 3 wire	TIV96-II
Three-phase, unbalanced, 4 wire	TIV96-III

TECHNICAL SPECIFICATIONS

VOLTAGE INPUT

Rated voltage (Un)	110, 230 or 400 V AC.
Burden	< 1 mA x Uphase N
Operating range	20-120 % Un
Frequency	50 and 60 Hz

CURRENT INPUT

Current IB (IMAX)	X/1 or X/5 A
Burden	< 0,02 VA
Operating range	0-100 % I_{MAX}
Starting current (In)	1 % I_B

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)

Number of outputs	TI	1
	TIV	2
Pulse weight	TYPE 1	1 Imp. / kWh
	TYPE 2	1 Imp. / 10kWh
Type		Relay contacts
		SO (DIN 43864)
		With external power supply
		250 V, 3 A (24 V DC, 3 A DC)
Insulation		2 kV, 1 min.
Pulse length		> 100 ms
		Optional: > 300 ms

GENERAL FEATURES

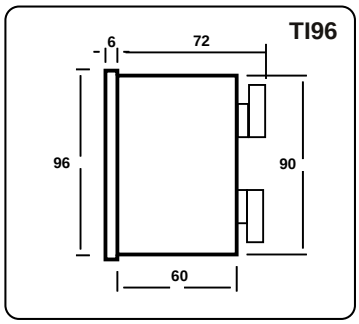
Accuracy		Class 2
		Class 1 (optional) on request
Operating temperature from		-5 to +55 ºC
Energy indicator		Flashing LED
		16 pulses per kWh
Case material		Metal+ABS, UL94 V0
Dimensions		DIN 96 x 96 mm
Connection	Current inputs	M4
Other		Pluggable terminals
	Max. wire diameter	2.5 mm^2

ENERGY METERS

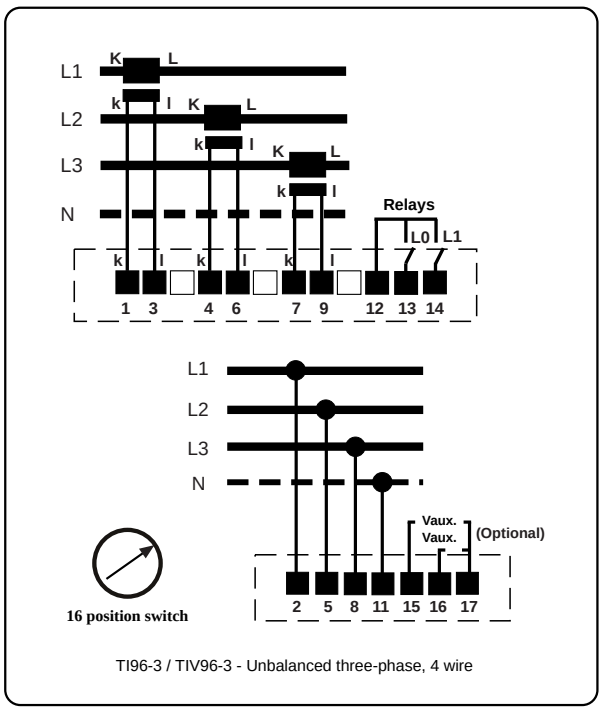
AUXILIARY VOLTAGE

Vaux.	110 or 230 V AC.
Burden	2,8 VA
Operating range	80-120 % Un

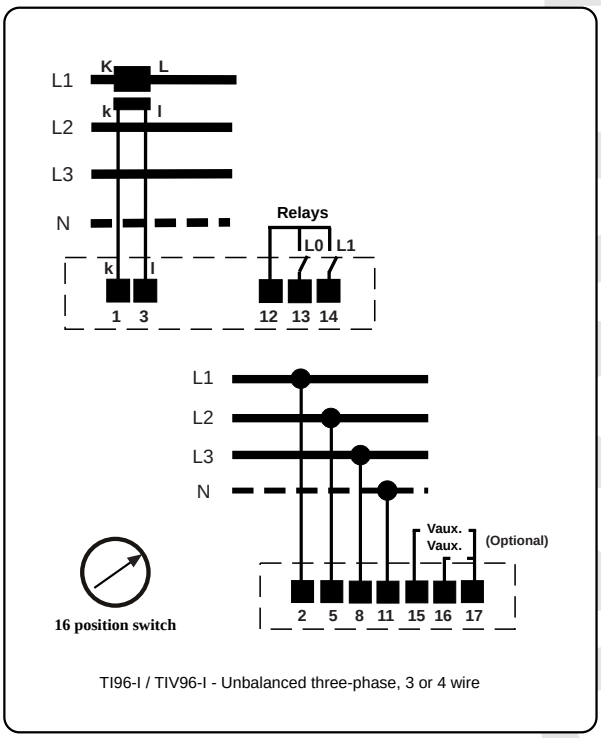
DIMENSIONS



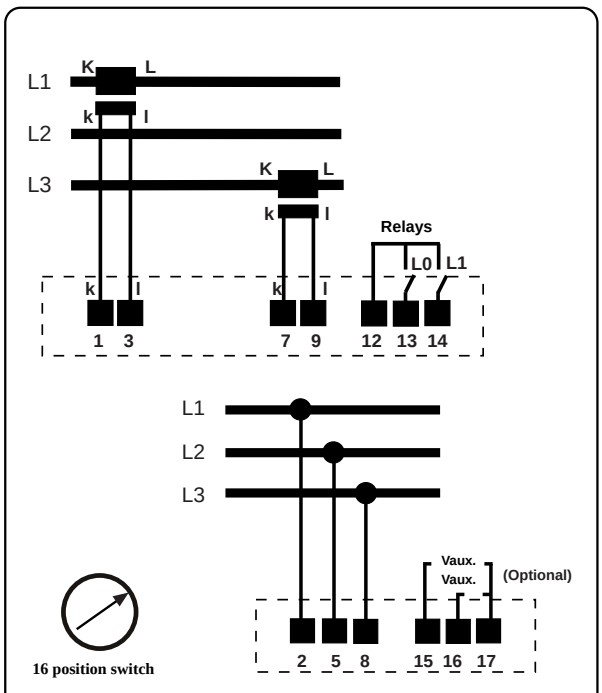
CONNECTION DIAGRAMS



TI96-3 / TIV96-3 - Unbalanced three-phase, 4 wire



TI96-I / TIV96-I - Unbalanced three-phase, 3 or 4 wire



TI96-II / TIV96-II - Unbalanced three-phase, 3 wire

TOTALIZER MODULE TTI - TTIM

TTI: Totalizer module with microprocessor and serial output.

TTIM: Totalizer 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.
- RS232 / RS485 serial output.
- Programmable (able to meter 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

TECHNICAL SPECIFICATIONS

INPUT

Number of inputs	8
Type	SO DIN 43864 Transistor output pulse voltage free contacts
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

SERIAL OUTPUT

Number of outputs	
Type	
Connection	2 wire or 4 wire
Baud rate (standard)	9600 bauds
Communication protocol	MODBUS
Max. number of devices per line	32
Max. length of system per line (without amplifier)	1250m

(On request, RS232 serial port)

AUXILIARY VOLTAGE

Vaux.	100, 110, 230 or 400 V AC.
Burden	4 VA
Operating range	80-120 % Un

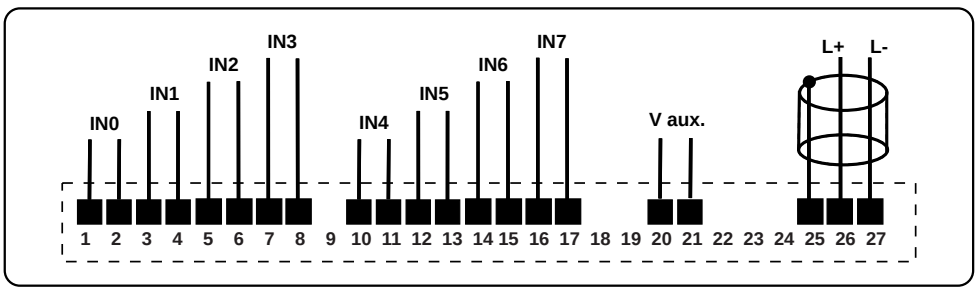
GENERAL FEATURES

Case material	ABS, UL94 V0
Dimensions	(9 Modules) 155 x 90 mm
Terminals	Pluggable
Max. wire diameter	2,5 mm^2
Weight	0,40 kg
Operating temperature from	-5 to +55 ºC
Electrical safety (EN 61010)	Class 2 Category III

ACCESSORIES

RS232 / RS485 converters
RS485 amplifiers

CONNECTION DIAGRAM



ENERGY METERS

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.

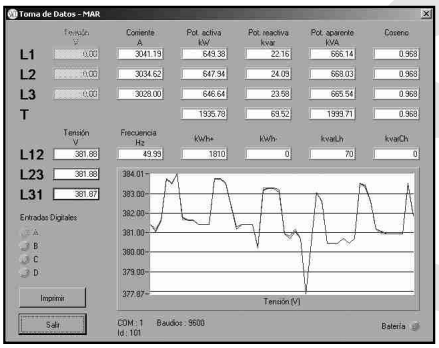
Innovations include the prepaid checking, allowing each meter's balance to be checked or allowing collective or individual contributions to be made. It also checks the free consumption limit and the minimum amount to be invoiced.

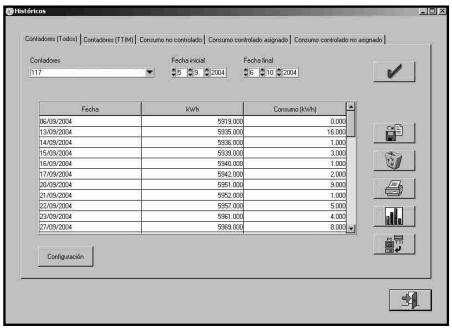
The TTIgest program must be installed on a PC with the following minimum requirements:

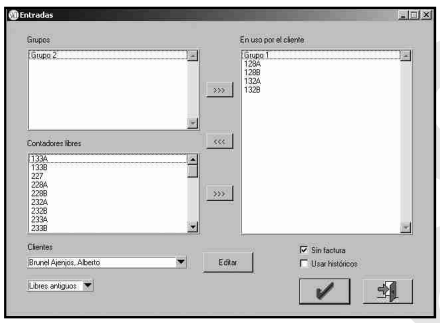
CPU :	Pentium 200 MMX
RAM:	64 Mb
Screen:	VGA with 1Mb
Monitor:	Colour, 14''
Software:	Windows 98, Me, NT4, 2000 or Xp
	DOES NOT OPERATE WITH WIN95

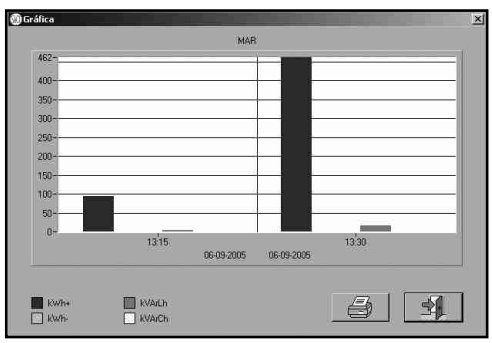
It must also have a serial port for the RS-232 - RS485 (IFRxx) converter connection and a series port for the mouse. It must also have a parallel port for connecting the anti-copying device and a printer.

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









ENERGY METERS

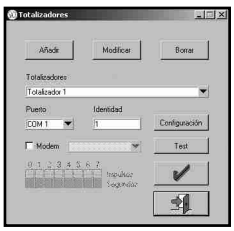
STARTING-UP

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

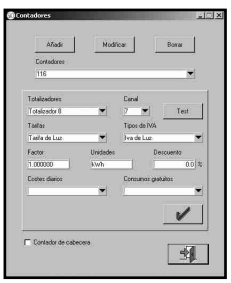
- **Definition:** Necessary elements are as follows:
- **Currency:** The currency appearing on the bills is defined.
- **VAT Types:** Different types of VAT may be defined.
- **Tariffs:** Also different tariffs may be set.
- **Daily costs:** Daily fixed contract costs may be associated to preset meters.
- **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 Entry

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 Departure

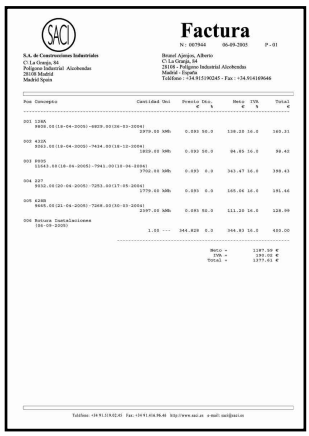


When a customer leaves the installation, the elements associated with that customer are selected and the meters are read. Consumption is calculated and the bill issued. Histories may also be used on departure. Customer departure may be previously set so that it is automatically carried out.

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 3 AND 4 CUSTOMERS

OPERATIONAL DESCRIPTION

CTMR and CTMRD static meters three-phase connection for active and reactive energy measurement with classes 1 and 2 respectively. Built in measurement recording functions for type 3 and 4 customers.

They have a four line, twenty character display for displaying data, two buttons, one for bill closures and another for display management. LED diode for checking active and reactive energy measurements, signal outputs using relays and pulse emission by optical optocouplers. It also has two communication interfaces, one UNE EN 61107 optical and another RS232 electrical. The communication protocol is UNE EN 61870- 5-102 adapted by the System Operator.

2.3.- Configurable parameters.

General:

- Date and time.
- Date of winter/summer changes.
- Synchronization threshold. (determines time checks or synchronised meter).
- Minimum time between bill closures.
- Transformation ratio.
- Setting communication ports modem start up.
- Description of measurement point (twenty character string).
- Recording and measurement point address.
- General access and read only password.
- Setting the signal outputs.
- Private password (type 3 only).

For each active or latent contract:
Latent contract is understood to mean one which will start operating on a preset date.

- Seasons: Defines the seasons into which the year is divided, different day types and time slots for those days.
- Date of activating the latent contract.
- Table of holidays.
- Contracted powers in each billing period.
- Day of automatic bill closure -if applicable -.
- Power demand meter mode -if used in a regulated market -.
- Preset bill closures (a date and time for a closure is set).

TECHNICAL FEATURES.

ELECTRICAL REFERENCE VALUES

Reference voltage Un:

CTMR	**3x63.5/110V.; 3x230/400V**
CTMRD	**3x230/400V**
Reference current In (Imax):	
CTMR	**5 (10) A**
CTMRD	**10(80)A**
Reference frequency:	50 Hz.
Overcurrents:	
CTMR	20 Imax 0.5 s.
CTMRD	30 Imax half cycle
Overvoltages	2 Un 10s.

ACCURACY

Accuracy class:	1 on active energy,
Starting current on active:	0.2%In. on active,

Accuracy of clock: ±0.5 s/1 day between 20 and 26 ºC.

Clock accuracy variation with temperature:	< 0,1s/ºC/24h.

ENERGY METERS

Check constant

CTMR - TYPE 3	16000 pulse/kWh, 16000 pulse/kvarh
CTMR - TYPE 4	1600 pulse/kWh, 1600 pulse/kvarh
CTMRD - TYPE 4	160 pulse/kWh, 160 pulse/kvarh

CASING

Dimensions:	According to DIN 43857
Weight:	CTMR, 1.9 Kg. CTMRD, 2.4 Kg

Mounting triangle: 230 mm between upper and lower points and 150 mm 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±15ºC on terminal box, 650±10ºC on terminal cover and casing for 301s. Protection against water and dust penetration: IP 51.

Dry heat:	70±2ºC, 72h.
Cold:	-25±3ºC, 72h.
Humid heat:	According to IEC 68-2-30, variant 1.

CLIMATE CONDITIONS

Temperature ranges	
Operation:	from -10 ºC to 55 ºC.
Operating limit:	from -20 ºC to 60 ºC.
Storage and transport:	from -25 ºC to 70 ºC.

ELECTRICAL REQUIREMENTS

Burden	
Voltage circuits:	<2W and 3VA
Current circuits:	<3x1VA
Un range	
Operation	from 0.9 to 1.1 Un
Operation limit from	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 x 8kV discharges.
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 x 8kV discharges.

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.

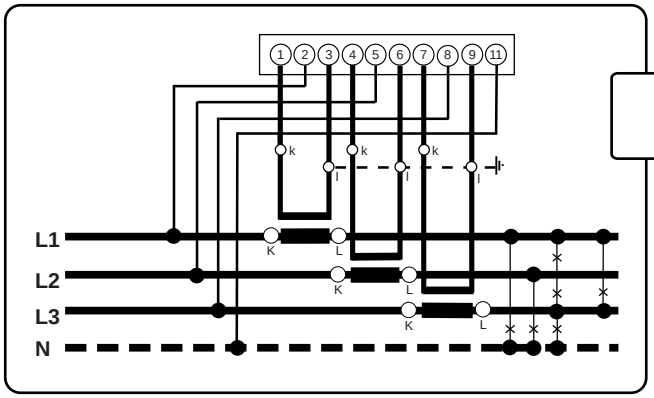
GENERAL FEATURES

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 RS232 direct o via modem, programmable speed up to 115200 bauds, parity programmable

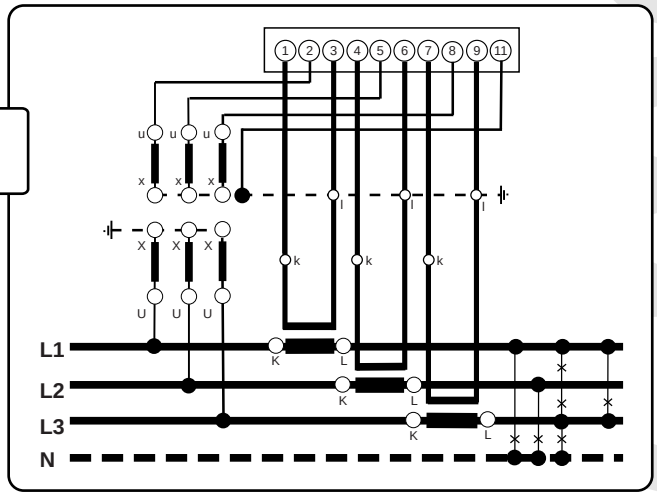
Operating reserve:	10 years.
Buttons:	1 sealable for manual return to zero, 1 for display management
Battery:	Polarised housing for easy change over.

ENERGY METERS



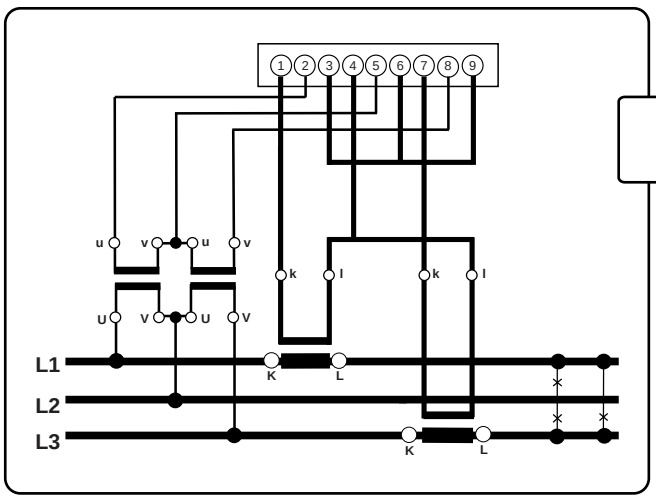
CONNECTION DIAGRAM

CTMRD - TYPE 4
Three-phase, 4 wire, low voltage



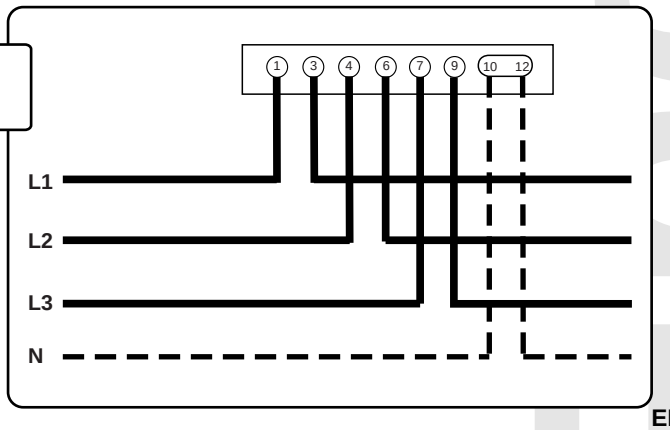
CONNECTION DIAGRAM

CTMR - TIPO 3
Three-phase, 4 wire, mid voltage



CONNECTION DIAGRAM

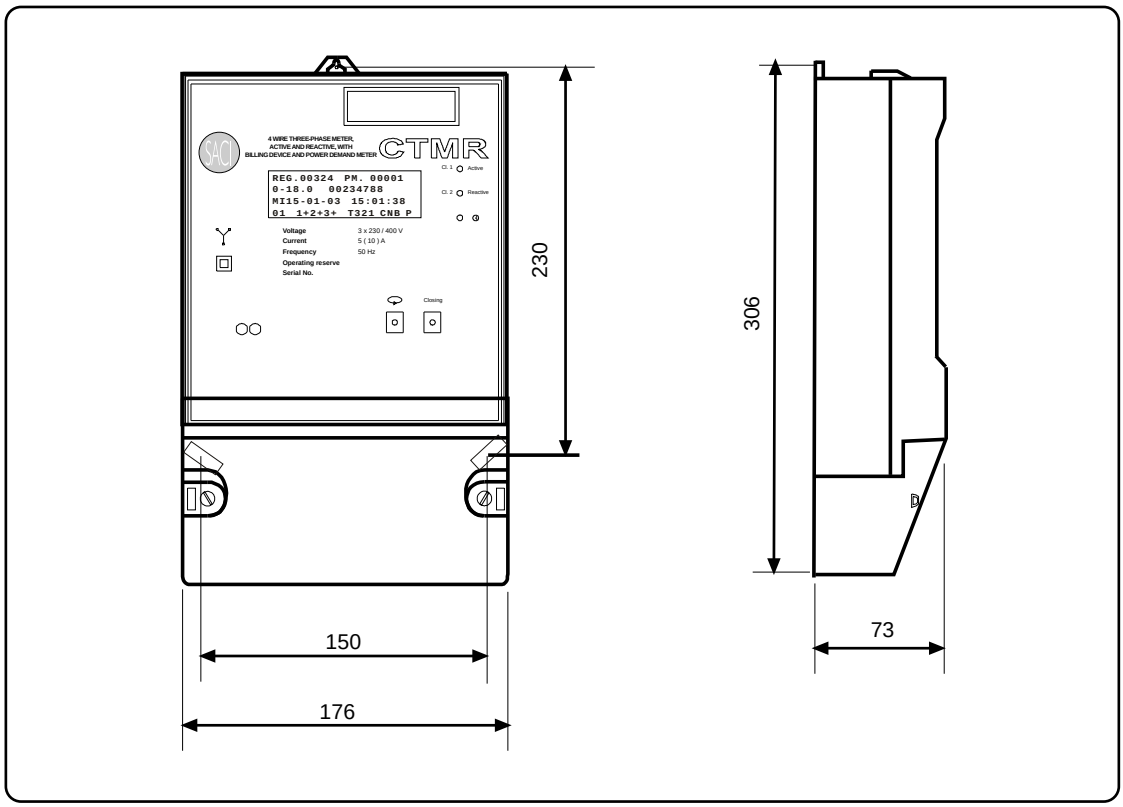
CTMR - TYPE 3
Three-phase, 3 wire, mid voltage



CONNECTION DIAGRAM

CTMRD - TYPE 4
Three-phase, 4 wire, low voltage

DIMENSIONS


4 WIRE THREE-PHASE METER,
ACTIVE AND REACTIVE, WITH
BILLING DEVICE AND POWER DEMAND METER
CTMR
Cl. 1 Active
Cl. 2 Reactive
REG.00324 PM. 00001
0-18.0 00234788
MI15-01-03 15:01:38
01 1+2+3+ T321 CNB P
Voltage 3 x 230 / 400 V
Current 5 (10) A
Frequency 50 Hz
Operating reserve
Serial No.
Closing
230
306
150
176
73