ENERGY METERS

ENERGY METERS

CONTENTS

(*) Other technical specifications, please enquire.

ENERGY METERS

MODULAR - DIN RAIL - SUMMARY

	DIRECT INPUT ENERGY METERS									CT. OPERATED ENERGY METERS							
Type de Red	Single-phase						3-Ph Bal.	3-Phase 4 Wire		3-Phase, 4 W. Balanced		3-Phase				3-Phase 4 Wire	
System Type	Led	Elec.	Led	Electromechanical			Led	Elec.	Led	Electromechanical							
Model	M1DL	M1DM	M2DL	M2DM	TCID	TCIDI	TCIDL	TCID3	TCIL	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 In (A)	5 (50)	5 (50)	5 (80)	5 (80)	15 (30) or 30 (90)		5 (80)	20 (60)	x/5A	x/5 or x/1A							
										Rated current input / programmable / selectable							
Accuracy	C.l 1							2	1	Cl. 2 (C.l. 1 on request)							
Nº. of digits	5,2	5,1			6,1			6,2	7	8	6						
LED (Imp/Kwh)	1000				160			10	16 or 160	12000	16						
Burden (VA)	<8				<2,8			<8	<8	<8	<4						
Casings (DIN Modules)	1		2		6			4	6	4							
	PULSE OUTPUT																
Number of outputs (*)	1				1 or 2		1	1 or 2	1	1	2	1	2	1	2	1	2
Pulses/kWh	1				100		10	100 or 1000	1,10 or 100	MODEL 1: 1 Pulse / 1kWh MODEL 2: 1 Pulse / 10kWh							
Tipe	Optocoupler				Opto. Relay		Opto.	Opto. Relay	Opto.	Optocoupler (optional relay)							
Pulse length (**)	>70						>50	>100	>50	>100							

(*) 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

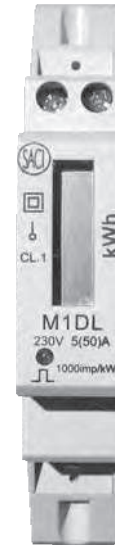|	
Operating temperature	-5 to +55 ºC
Storage temperature:	-30 to +70 ºC
Relative humidity	< 90 % without condensation
Insulation	2.5 kV, 1 min.
Reference Standards	IEC 1004-3, IEC 1004-4, IEC 1004-2
	EN 50081,EN 50082, IEC255-4

ENERGY METERS

SINGLE-PHASE - DIRECT INPUT - M1DL

- **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, 2W
Operating range	± 30 % Un
Frequency	50 or 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) with external power supply by optocoupler
Insulation	3 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V D.C.
Pulse length	> 70 ms

GENERAL FEATURES

Counter type	LED display
Digits	5 + 2 decimals
Number of counters	1
Accuracy	Class 1 (EN 62053)
Operating temperature from	-20 to +60 ºC
Energy indicator	flashing LED
	1000 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(1 module) 17,5 mm
Terminals	Sealable
Connection	Terminals with screw
Max. wire diameter	12 mm²
Mounting	35 mm DIN rail

CONNECTION DIAGRAM

Energy

ENERGY METERS
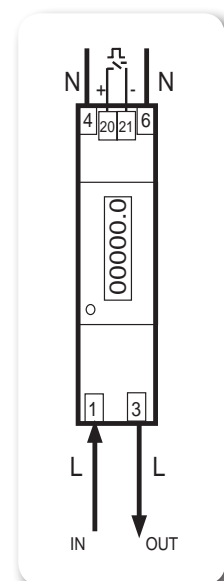
SINGLE-PHASE - DIRECT INPUT - M1DM

- **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, 2W
Operating range	± 30 % Un
Frequency	50 or 60 Hz

CURRENT INPUT

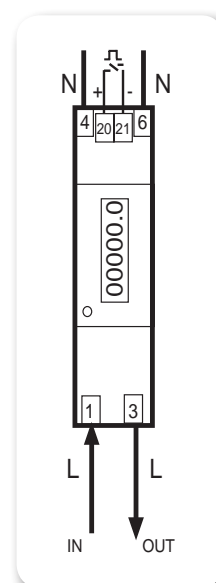|	
Current IB (IMAX)	5 (50) A
Burden	< 1 VA
Operating range	0-100 % IMAX
Starting current (In)	< 0,4 % IB

PULSE OUTPUT (OPTOCOUPLER)

Number of outputs	1
Pulse weight	1000 pulses / kWh
Type	SO (DIN 43864) with external power supply by optocoupler
Insulation	3 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V D.C.
Pulse length	> 70 ms

GENERAL FEATURES

Counter type	Electromechanical
Digits	5 + 1 decimals
Number of counters	1
Accuracy	Class 1 (EN 62053)
Operating temperature from	-20 to +60 ºC
Energy indicator	flashing LED
	1000 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(1 module) 17,5 mm
Terminals	Sealable
Connection	Terminals with screw
Max. wire diameter	12 mm^2
Mounting	35 mm DIN rail

CONNECTION DIAGRAM

ENERGY METERS

SINGLE PHASE - DIRECT INPUT - M2DL

- **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, 2W
Operating range	± 30 % Un
Frequency	50 or 60 Hz

CURRENT INPUT

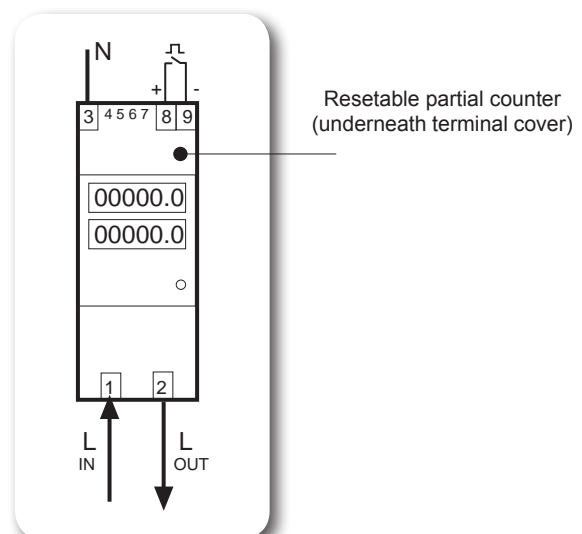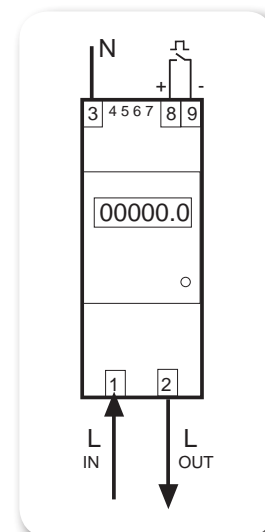|	
Current IB (IMAX)	5 (80) A
Burden	< 1 VA
Operating range	0-100 % IMAX
Starting current (In)	< 0,4 % IB

PULSE OUTPUT (OPTOCOUPLER)

Number of outputs	1
Pulse weight	1000 pulses / kWh
Type	SO (DIN 43864) with external power supply by optocoupler
Insulation	3 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V D.C.
Pulse length	> 70 ms

GENERAL FEATURES

Counter type	LED display
Digits	5 + 1 decimals
Number of counters	1 (total)
	1 (partial) with reset to zero
Accuracy	Class 1 (EN 62053)
Operating temperature from	-20 to +60 ºC
Energy indicator	flashing LED
	1000 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(2 module) 35 mm
Terminals	Sealable
Connection	Terminals with screw
Max. wire diameter	
phase input terminals	24 mm^2
pulses and neutral terminals	12 mm^2
Mounting	35 mm DIN rail

CONNECTION DIAGRAM

Resetable partial counter
(underneath terminal cover)

Energy

ENERGY METERS

SINGLE PHASE - DIRECT INPUT - M2DM

- **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, 2W
Operating range	± 30 % Un
Frequency	50 or 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) with external power supply by optocoupler
Insulation	3 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V D.C.
Pulse length	> 70 ms

GENERAL FEATURES

Counter type	Electromechanical
Digits	5 + 1 decimals
Number of counters	1 (total)
Accuracy	Class 1 (EN 62053)
Operating temperature from	-20 to +60 ºC
Energy indicator	flashing LED
	1000 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(2 module) 35 mm
Terminals	Sealable
Connection	Terminals with screw
Max. wire diameter	
phase input terminals	24 mm^2
pulses and neutral terminals	12 mm^2
Mounting	35 mm DIN rail

CONNECTION DIAGRAM

THREE-PHASE - DIRECT INPUT - TCIDL

- **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, 2W
Operating range	± 20 % Un
Frequency	50 or 60 Hz

CURRENT INPUT

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

GENERAL FEATURES

Counter type	LED display
Digits	6 + 2 decimals
Number of counters	1 (total)
Accuracy	Class 1 (EN 62053)
Operating temperature from	-20 to +60 ºC
Energy indicator	flashing LED
	1000 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(4 module) 70 mm
Terminals	Sealable
Connection	Terminals with screw
Max. wire diameter	
phase input terminals	25 mm^2
pulses terminals	2,5 mm^2
Mounting	35 mm DIN rail

PULSE OUTPUT (OPTOCOUPLER)

Number of outputs	1
Pulse weight	100 pulses / kWh
Type	SO (DIN 43864) with external power supply by optocoupler
Insulation	3 kV, 1 min.
Maximum current	< 20 mA
Voltage	< 24 V D.C.
Pulse length	> 50 ms

CONNECTION DIAGRAM

Energy

ENERGY METERS
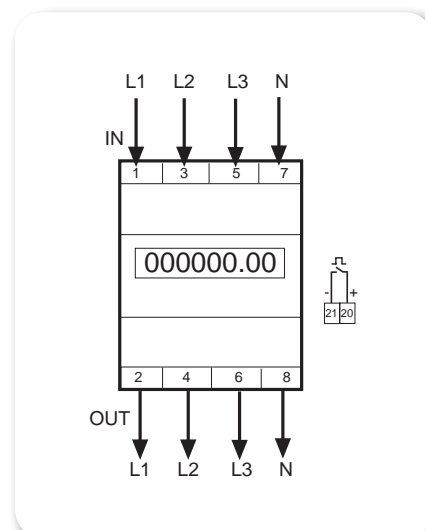
THREE-PHASE - CT OPERATED - TCIL

- **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, 2W
Operating range	± 20 % Un
Frequency	50 or 60 Hz

CURRENT INPUT

Current IB (IMAX)	1,5 (6) A
Burden	< 3 VA

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 A

Operating range	0-100 % IMAX
Starting current (In)	< 0,2 % IB

PULSE OUTPUT (OPTOCOUPLER)

Number of outputs	1
Pulse weight	1, 10 or 100 pulses / kWh

(depending on the relationship of the chosen transformer)

Type	SO (DIN 43864) with external power supply by optocoupler
Insulation	3 kV, 1 min.
Maximum current	< 20 mA
Voltage	< 24 V D.C.
Pulse length	> 50 ms

GENERAL FEATURES

Counter type	LED display
Digits	8
Decimals	2,1 or 0

(depending on the relationship of the chosen transformer)

Number of counters	1 (total)
Accuracy	Class 1 (EN 62053)
Operating temperature from	-20 to +60 ºC
Energy indicator	flashing LED
	12000 pulses per kWh
Case material	ABS, UL94 V0
Dimensions	(4 module) 70 mm
Terminals	Sealable
Connection	Terminals with screw
Max. wire diameter	
phase input terminals	10 mm²
pulses terminals	2,5 mm²
Mounting	35 mm DIN rail

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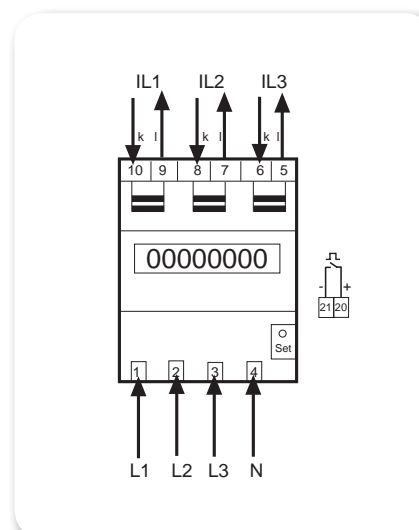
SINGLE-PHASE or THREE-PHASE - DIRECT INPUT - TCID

- **Single-phase or Balanced three-phase**
- **Cl. 1 Accuracy (EN 62053)**
- **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 A.C.
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 % IMAX
Starting current (In)	< 0,4 % IB

AUXILIARY VOLTAGE (SINGLE-PHASE)

Aux. v.	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 pulse / kWh
Type	SO (DIN 43864) with external power supply
	by optocoupler
Insulation	2,5 kV, 1 min.
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 pulse / 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 pulse per kWh
Case material		ABS, UL94 V0
Dimensions		(6 modules)105 mm
Conductor primario máx.	15 (30) A	Ø8 mm
	30 (90) A	Ø12 mm
Connection		Terminals with screw
Max. wire diameter		2,5 mm²
Mounting		35 mm DIN rail

CONNECTION DIAGRAM

TCID - Single-phase

TCIDI - Balanced three-phase e-phase
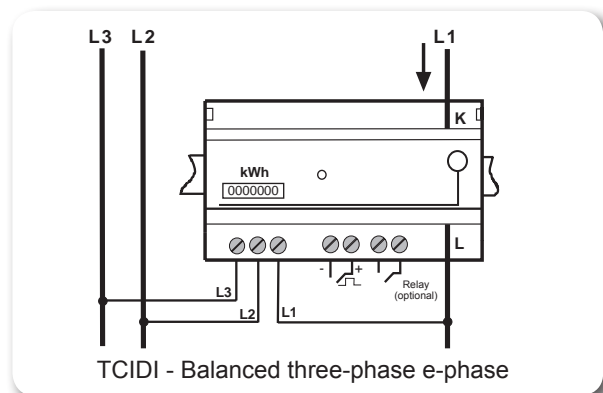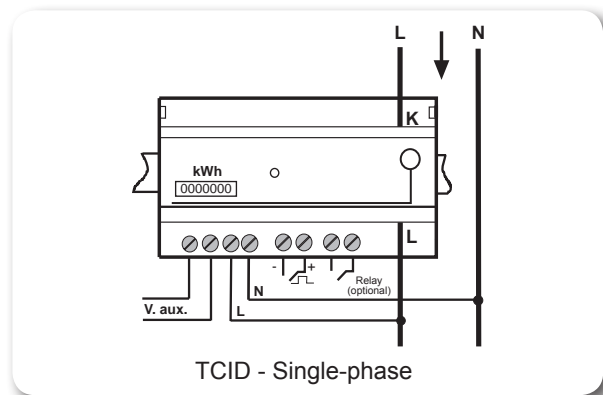
Energy

THREE-PHASE - DIRECT INPUT - TCID3

- Unbalanced three-phase
- Cl. 2 Accuracy (EN 62053)
- 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
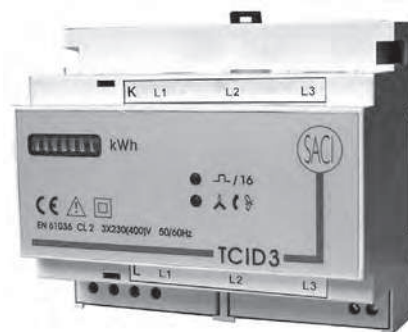
MODEL

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

TECHNICAL SPECIFICATIONS

VOLTAGE INPUT

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

CURRENT INPUT

Current IB (IMAX)	20 (60)A
Burden	< 0,02 VA
Operating range	0-100 % IMAX
Starting current (In)	< 0,4 % IB

PULSE OUTPUT (OPTOCOUPLER)

Number of outputs	1
Pulse weight	1 or 0,1 pulse / kWh
Type	SO (DIN 43864) with external power supply
Insulation	by optocoupler
	4 kV, 1 min.
Maximum current	50 mA
Voltage	5 - 48 V DC
Pulse length	> 100 ms

RELAY PULSE OUTPUT (OPTIONAL)

Number of outputs	1
Pulse weight	1 pulse / kWh
Type	relay contacts 250 V, 3 A
Insulation	4 kV, 1 min.
Pulse length	> 100 ms

GENERAL FEATURES

Accuracy	Class 2
Operating temperature from	0 to + 40 ºC
Energy indicator	Flashing LED
	16 or 160 pulse per kwh
Case material	ABS, UL94 V0
Dimensions	(6 modules) 105 mm
Conductor primario máx.	Ø10 mm
Connection	Terminals with screw
Max. wire diameter	2,5 mm^2
Mounting	35 mm DIN rail

CONNECTION DIAGRAM

ENERGY METERS
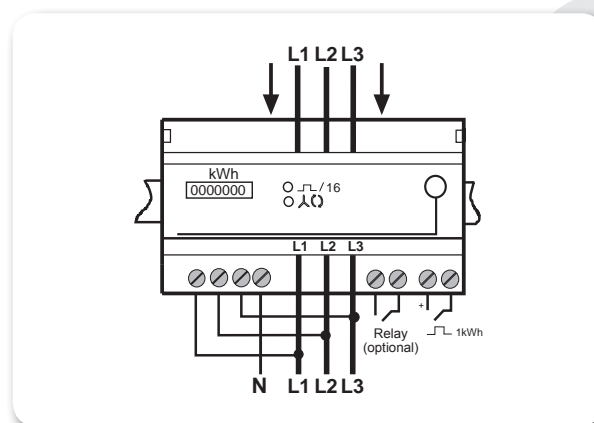
THREE-PHASE - CT OPERATED
TCI6i – TCIV6i – TCIV6iDT

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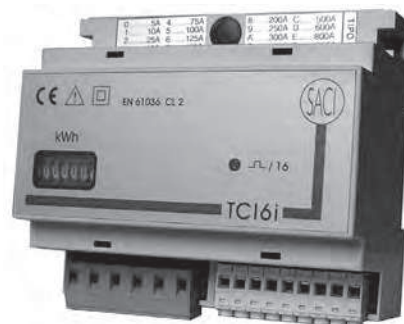
ACTIVE ENERGY	MODEL
Three-phase, balanced, 3 or 4 wire	TCI6i-I
Three-phase, unbalanced, 3 wire	TCI6i-II
Three-phase, unbalanced, 4 wire	TCI6i-3
ACTIVE ENERGY+REACTIVE ENERGY	**MODEL**
Three-phase, balanced, 3 or 4 wire	TCIV6i-I
Three-phase, unbalanced, 3 wire	TCIV6i-II
Three-phase, unbalanced, 4 wire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

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 and 60 Hz

CURRENT INPUT

Current IB (IMAX)	X/1 or X/5 A
Burden	< 0,2 VA
Operating range	0-120 % IB
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
	TCIV...	2
Pulse weight	Version 1	1 pulse / kWh
	Version 2	1 pulse / 10 kWh
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 / kWh
	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

ENERGY METERS

GENERAL FEATURES

Accuracy	Class 2
	Class 1 (optional) on request
Operating temperature from	-5 to + 55 ºC
Energy indicator	Flashing LED
	16 pulse 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.
(*) Option: select by input voltage

CONNECTION DIAGRAMS
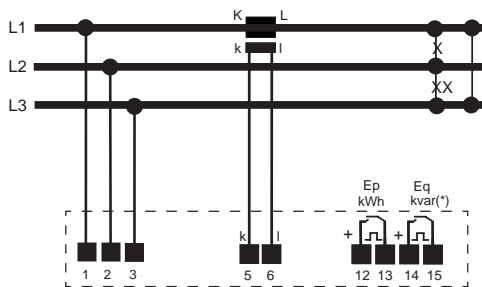
TCI6i-I / TCIV6i-I - Balanced three-phase, 3 wire
(*) TCIV6i-I model only
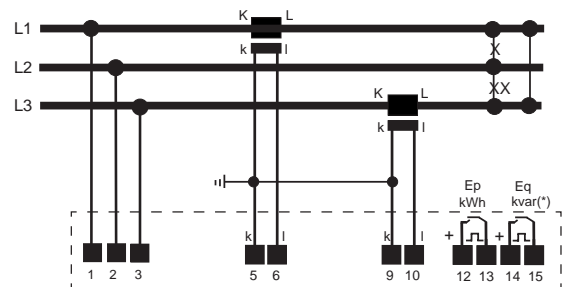
16 position switch

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

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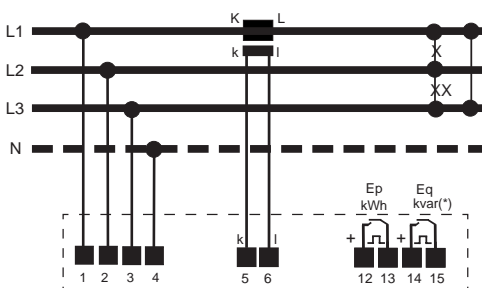
TCI6i-I / TCIV6i-I - Balanced three-phase, 4 wire
(*) TCIV6i-I model only
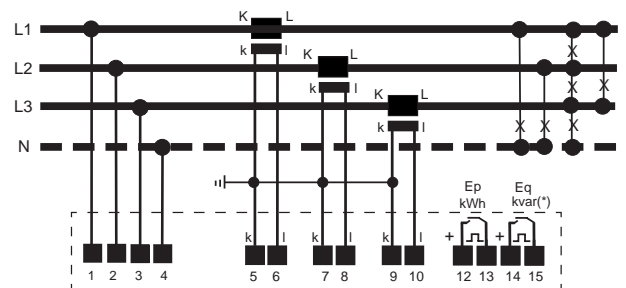
16 position switch

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

16 position switch

THREE-PHASE - CT OPERATED - 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
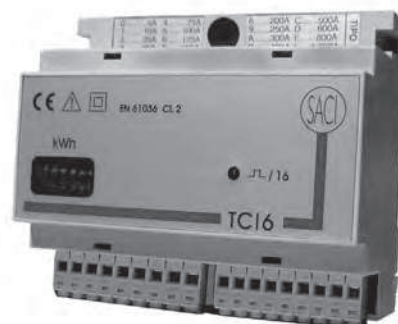
ACTIVE ENERGY	MODEL
Three-phase, unbalanced, 4 wire	TCI6-3
ACTIVE ENERGY+REACTIVE ENERGY	MODEL
Three-phase, unbalanced, 4 wire	TCIV6-3

TECHNICAL SPECIFICATIONS

VOLTAGE INPUT

Rated voltage (Un)	110, 230 or 400 V A.C.
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	< 0,2 VA
Operating range	0-120 % IB
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
	TCIV...	2
Pulse weight	Version 1	1 pulse / kWh
	Version 2	1 pulse / 10 kWh
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 / kWh
	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

GENERAL FEATURES

Accuracy	Class 2
	Class 1 (optional) on request
Operating temperature from	-5 to + 55 ºC
Energy indicator	Flashing LED
	16 pulse 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

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

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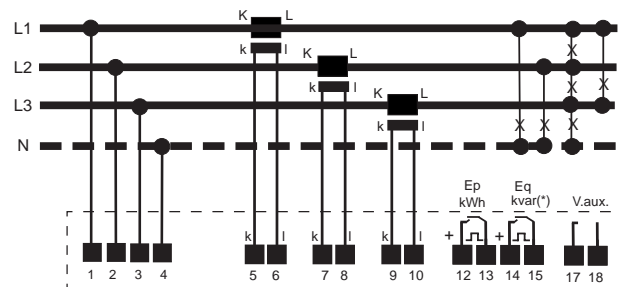
TCI6-3 / TCIV6-3 - Unbalanced three-phase, 4 wire
(*) TCIV6-3 model only

16 position switch

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

- **Single-phase or Unbalanced three-phase**
- **Active energy**
- **Cl. 2 Accuracy (EN 62053)**
- **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 A.C.
Burden	< 1 mA x Un (L1-L3)
Operating range	80-120 % Un
Frequency	50 or 60 Hz

CURRENT INPUT

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

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 D.C., 3 A D.C.)
Insulation	2 kV, 1 min.
Pulse length	> 100 ms

DIMENSIONS

TD96

GENERAL FEATURES
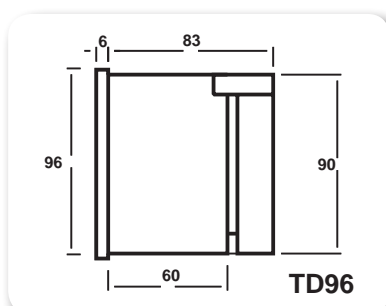
Accuracy	Class 1
	Class 1 (optional) on request
Temperatura de funcionamiento:	-5 to + 55 ºC
Energy indicator	Flashing LED
	16 pulse per kwh
Case material	Metal+ABS, UL94 V0
Dimensions	DIN 96 x 96 mm
Connection	Current inputs M4
Others	Pluggable terminals
	Max. wire diameter 2,5 mm^2

AUXILIARY VOLTAGE

Self supplied

CONNECTION DIAGRAMS

ENERGY METERS
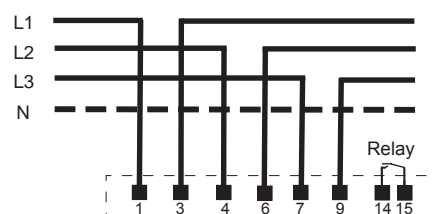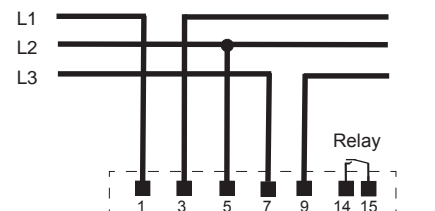
THREE-PHASE - CT OPERATED - TI96 - TIV96

- 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-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 A.C.
Burden	< 1 mA x Ufase N
Operating range	20-120 % Un
Frequency	50 and 60 Hz

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)

Number of outputs	TI	1
	TIV	2
Pulse weight	TYPE 1	1 Imp. / kWh
	TIPo 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 pulse per kwh
Case material	Metal+ABS, UL94 V0
Dimensions	DIN 96 x 96 mm
Connection	Current inputs M4
Others	Pluggable terminals
	Max. wire diameter 2,5 mm^2

ENERGY METERS

AUXILIARY VOLTAGE

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

DIMENSIONS

TI96

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

Energy
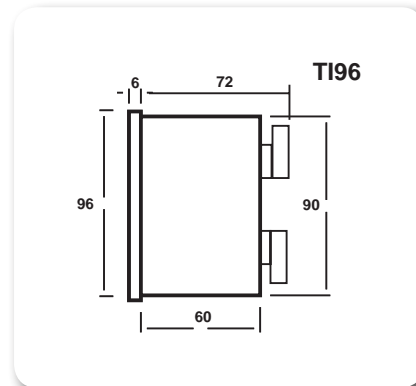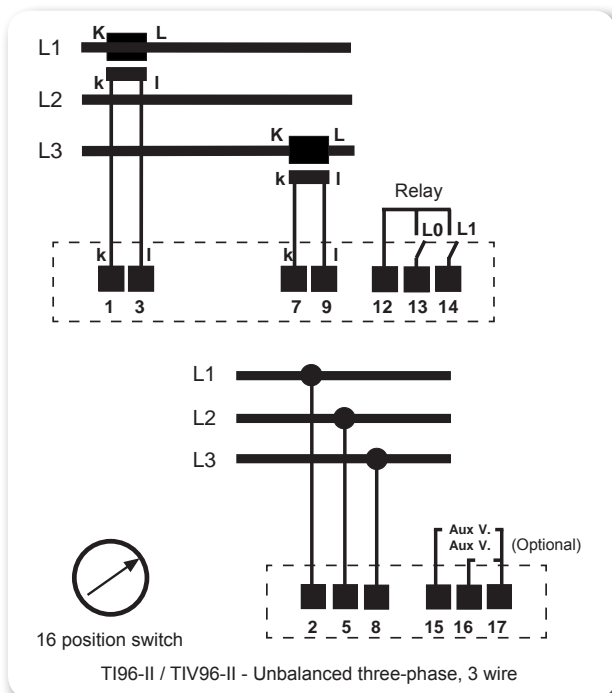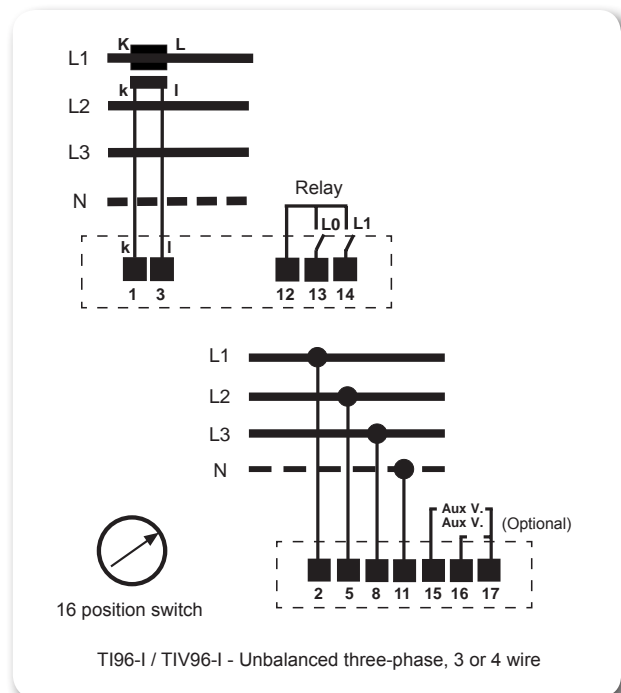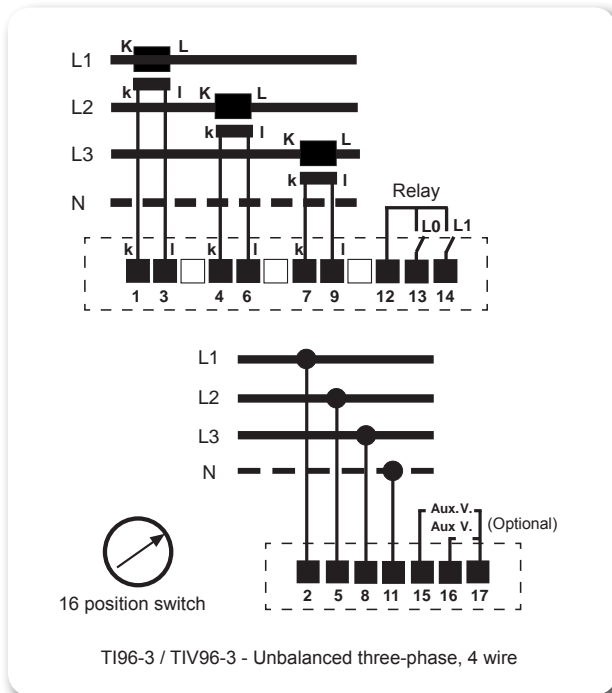
TOTALIZER MODULE TTI - TTIM

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.**
- **RS485 serial output.**
- **Programmable (capable to mesure 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

SALIDA SERIE

Number of outputs	1
Type	RS485
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)	1250 m

AUXILIARY VOLTAGE

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

GENERAL FEATURES

Case material	ABS, UL94 V0
Dimensions	(9 modules) 155 x 90 mm
Terminales	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

ACCESORIOS

RS232 / RS485 converters
RS485 amplifiers

CONNECTION DIAGRAM

ENERGY METERS
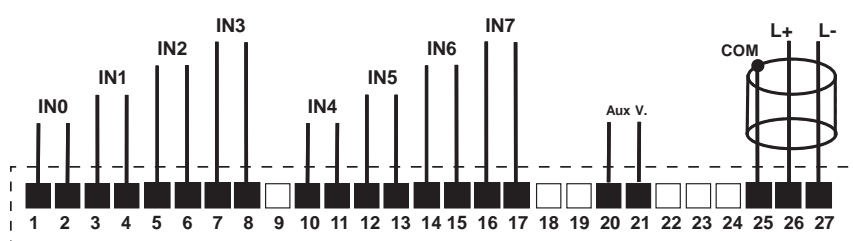
SOFTWARE - TTIgest

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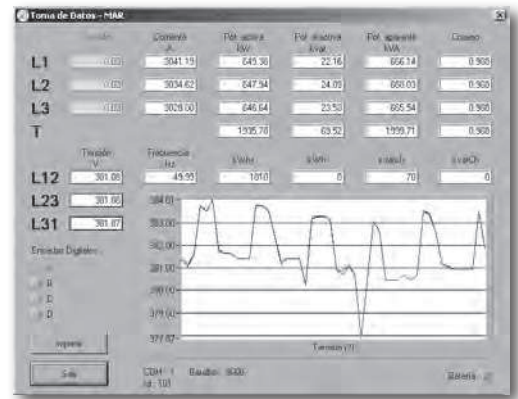
CPU: Pentium 200 MMX
RAM: 64 Mb
Screen: VGA with 1Mb
Monitor: Colour, 14''
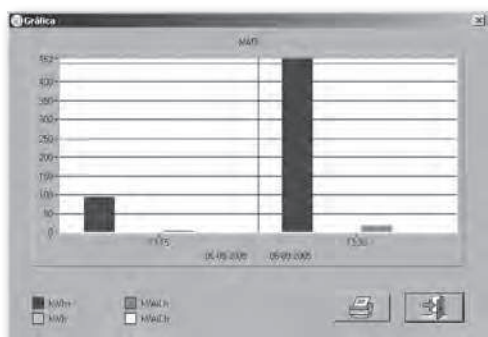Software: Windows 98, Me, NT4, 2000 or Xp
DOES NOT OPERATE WITH WIN95

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

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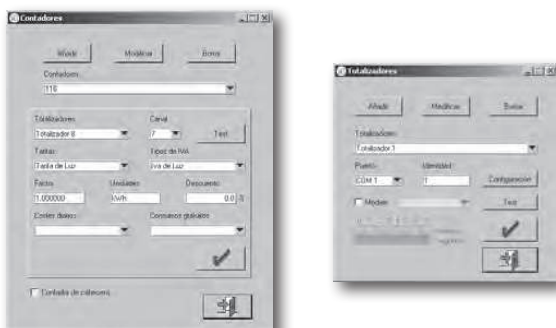
bill issued. Histories may also be used on departure. Customer departure may be previously set so that it is automatically carried out.

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

CTMRII – FUNCTIONAL DESCRIPTION

CTMRII 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 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)

TECHNICAL CHARACTERISTICS

ELECTRICAL REFERENCE VALUES

Reference voltage Un:

Depending on connection:	
Indirect	**3x63,5/110V**
Semi-Indirect	**3x230/400V**
Direct	**3x230/400V**

Reference current In (Imax):

Depending on connection:	
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:

Depending on connection:	
Indirect	20 Imax.0,5 s.
Semi-Indirect	20 Imax.0,5 s.
Direct	30 Imax half cycle

Over voltages 2 Un 10s.

Energy

ENERGY METERS

ACCURACY

Accuracy class: B for active energy and 2 for reactive energy

Starting current on active:
Depending on connection:

Indirect	10 mA
Semi- Indirect	10 mA
Direct	40 mA

Clock accuracy: 0,5 s/día entre 20 and 26 ºC
Variation of clock accuracy with temperature: <0,1s/ºC/24h.

Check constant:

CTMRII (Indirect)	20000 Imp/kWh, 20000 Imp/kvarh
CTMRII (Semi-Indirect)	5000 Imp/kWh, 5000 Imp/kvarh
CTMRII (Direct)	500 Imp/kWh, 500 Imp/kvarh

CASING

Dimensions: acording 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±2ºC, 72h.
Cold: -25±3ºC, 72h.
Humid heat: Según IEC 68-2-30, variante 1.

CLIMATE CONDITIONS

Temperature range:

Operation:	de -10 ºC a 55 ºC.
Operating limit :	de -20 ºC a 60 ºC.
Storage and transport:	de -25 ºC a 70 ºC.

ELECTRICAL REQUIREMENTS

Burden
Voltage circuits: <2W and 3VA
Current circuits: <3x1VA
Un range:

Operation	de 0,9 a 1,1 Un.
Operation limit	0 a 1,15 Un.

Insulation:

Alternating voltage:	4kV, 50 Hz. 1 minuto.
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
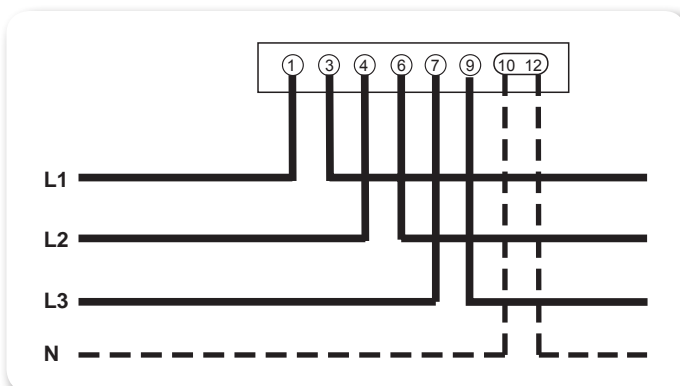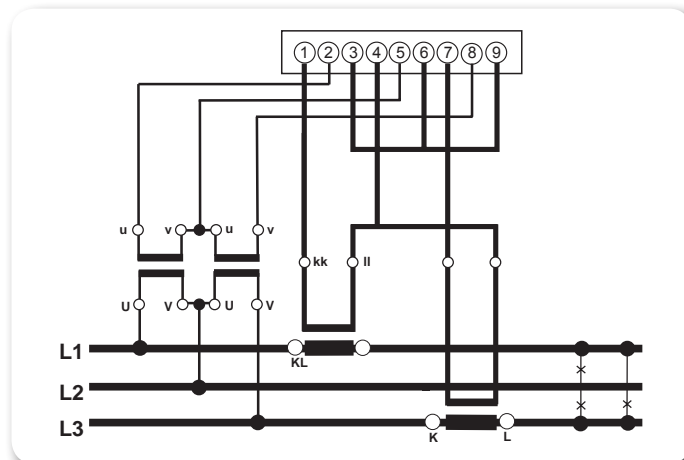
CTMRII - SEMI-INDIRECT
Three-phase, 4 wire, low voltage
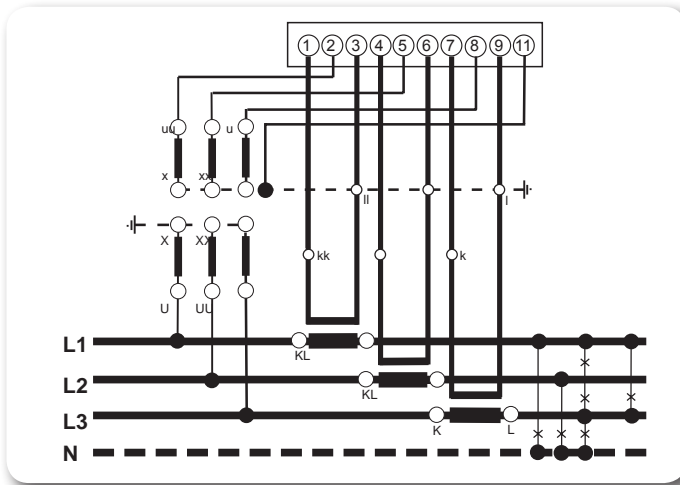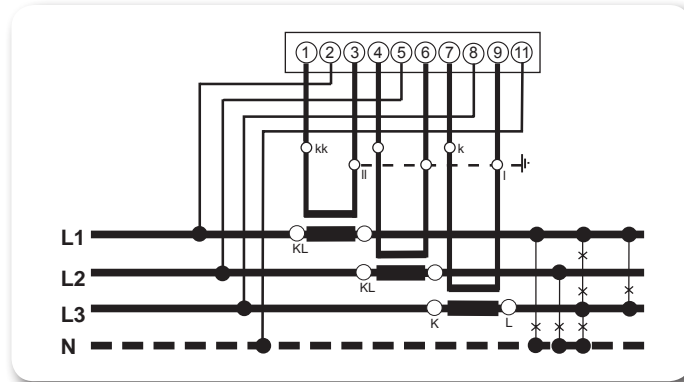
CONNECTION DIAGRAM

CTMRII - INDIRECT
Three-phase, 4 wire, mid voltage

CONNECTION DIAGRAM

CTMRII - INDIRECT
Three-phase, 3 wire, mid voltage

CONNECTION DIAGRAM

CTMRII - DIRECT
Three-phase, 4 wire, low voltage

Energy

ENERGY METERS

DIMENSIONS