

electrical energy metering on door



146 00 + 146 16



146 61



146 65



047 79



495 55

Ammeters, voltmeters, central measuring unit and cam switches can be mounted on XL<sup>3</sup> 800 and XL<sup>3</sup> 4000 curved doors

Pack	Cat.Nos	Analogue metering devices
		<b>Ammeters</b>
		Measure the intensity in amperes (A) of the current Connected via a 0 - 5 A output current transformer (CT) To be fitted with a measuring dial appropriate for the current to be measured
1	146 00	Round barrel Ø56 mm
1	146 01	Square barrel 68 x 68 mm
		<b>Measuring dial for ammeters</b>
		Supplied by set of 2 (1 for round barrel, 1 for square barrel)
1	146 10	0 - 50 A
1	146 13	0 - 100 A
1	146 15	0 - 200 A
1	146 16	0 - 250 A
1	146 17	0 - 300 A
1	146 18	0 - 400 A
1	146 20	0 - 600 A
1	146 21	0 - 800 A
1	146 22	0 - 1000 A
1	146 66	0 - 1250 A
1	146 24	0 - 1500 A
1	146 25	0 - 2000 A
1	146 26	0 - 2500 A
1	146 28	0 - 4000 A
		<b>Voltmeters</b>
		Measure the voltage in volts (V) AC ou DC Scale: 0 - 500 V
1	146 60	Round barrel Ø56 mm
1	146 61	Square barrel 68 x 68 mm

Pack	Cat.Nos	Digital central measuring units
		<b>Digital central measuring units</b>
		Enables via a 0 - 5 A output current transformer (CT), measuring electrical values for low voltage applications
		<b>Multi-function centrals</b>
		For measuring: current and voltage per phase, frequency, power factor, active and reactive energy... Adapts to 3-phase balanced or unbalanced supplies with or without neutral Max. measurement: 8000 A 220 V
1	146 65	Standard
1	146 67	Communicating Modbus/JBUS Data speed transmission: 1200 to 9600 Bauds

Cam switches (p. 334)

Pack	Cat.Nos	Current transformers (CT)
		<b>Current transformers (CT)</b>
		Used with ammeters, electricity meters and central measuring units Supply a current of 0 to 5 A to the secondary which is proportional to the primary current Can be fixed on plate, on rail EN 60715, on bars Secondary joining with terminals for lugs, cage terminals Precision class: 1 %
		<b>Single phase CT for bar 16 x 12.5 mm and cable Ø21 mm</b>
		Transformation ratio   Power (VA)
1	046 31	50/5   1.25
1	046 34	100/5   2.5
1	046 36	200/5   5.5
		<b>Single phase CT for bar 20.5 x 12.5 and 30 x 10.5 mm and cable Ø23 mm</b>
1	047 75	300/5   11
		<b>Single phase CT for bar 40.5 x 10.5 mm and cable Ø35 mm</b>
1	046 38	400/5   12
		<b>Single phase CT for bar 65 x 32 mm</b>
1	047 76	600/5   12
1	047 77	800/5   15
1	047 78	1000/5   20
		<b>Single phase CT for bar 84 x 34 mm</b>
1	047 79	1250/5   15
		<b>Single phase CT for bar 127 x 38 mm</b>
1	046 45	1500/5   15
1	046 46	2000/5   20
		<b>Single phase CT for bar 127 x 54 mm</b>
1	047 80	2500/5   50
1	046 48	4000/5   50
		<b>3-phase CT for 3 bars 20.5 x 5.5 mm or 3 cables Ø8 mm</b>
1	046 98	250/5   3
		<b>3-phase CT for 3 bars 35 x 5.5 mm</b>
1	046 99	400/5   4

Pack	Cat.Nos	Totalising hour counters (48 x 48)
		<b>Totalising hour counters (48 x 48)</b>
		One-piece device - IP 40 Front mounting on enclosure or cabinet doors Synchronous motor operation (operation indicator) For counting the operating hours of an electrical machine or device, with no reset Supplied with cover frame (55 x 55 mm) (for round cut-out) and fixing accessories Connection: 2 x 1.5 mm <sup>2</sup>
1	495 52	24 V~ - 50 Hz
1	495 53	110 to 120 V~ - 50 Hz
1	495 54	110 to 120 V~ - 60 Hz
1	495 55	200 to 240 V~ - 50 Hz
1	495 58	48 V~ - 50 Hz
1	495 59	400 V~ - 50 Hz
1	495 60	12 to 36 V=
100	495 97	Frame 55 x 55 mm



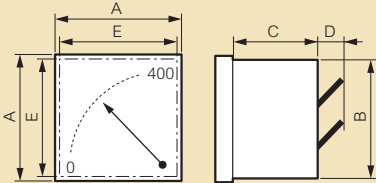
These products are part of protection and distribution systems > See p. 44-45

# electrical energy metering on door

## ■ Analogue metering devices

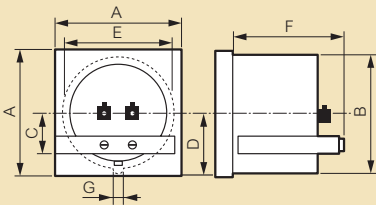
Frequency: 50/60 Hz  
 Precision class: 1.5 %  
 Operating temperature: - 10 °C to + 40 °C  
 Storage temperature: - 20 °C to + 80 °C  
 Consumption:  
 ammeter: 1.1 VA  
 voltmeter: 3 VA  
 Connection capacity: 2 x 2.5 mm<sup>2</sup> with screws or  
 Conform to IEC 60051, VDE 0410, BS 89,  
 EN 60051-1, cenelec HD 223

### Cat.No. 146 01/61



Dimensions (mm)				
A	B	C	D	E
72	66.5	44	12	68±0,7

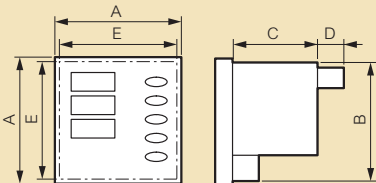
### Cat.No. 146 00/60



Dimensions (mm)						
A	B	C	D	E	F	G
72	∅55	21.4	28.5	56	46	3.2

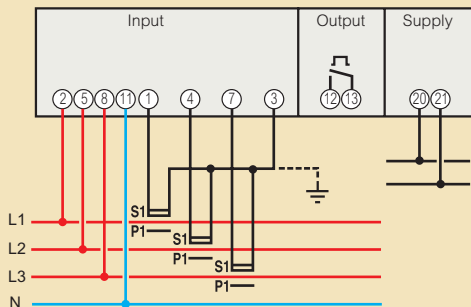
## ■ Digital central measuring units

- Precision class:  
voltage: ± 0.5 %  
current: ± 0.5 %  
power: ± 1.5 %  
power factor: ± 2 %  
frequency: ± 0.15 Hz  
Active energy: class 2  
Reactive energy: class 3
- Consumption:  
voltage: 0.5 VA / phase  
current: 0.75 VA / phase
- Auxiliary power supply:  
single-phase voltage 230 V (196 to 253 V)  
frequency 50 Hz (47 to 63 Hz)  
self consumption 6 VA - 3.5 W



Dimensions (mm)				
A	B	C	D	E
96x96	90x90	64.5	20	92x92

Output:  
 Energy pulse duration = 100 ms via volt free contact:  
 - for 5 A, 1 pulse/Wh  
 - from 20 to 150 A, 1 pulse/10 Wh  
 - from 200 to 1600 A, 1 pulse/100 Wh  
 - from 2000 to 8000 A, 1 pulse/kWh  
 Breaking capacity 110 V ~ / - 50 mA  
 4-wire connection - 3 CT:

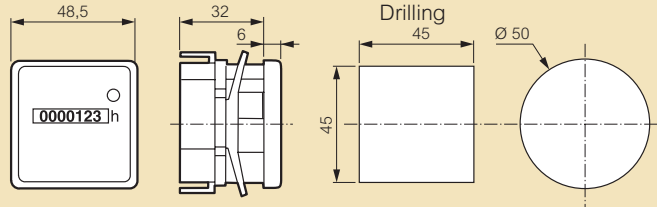


## ■ Cam switches (p. 334)

## ■ Totalising hour counters (48 x 48)

### Technical characteristics

Counter capacity: AC: 0...99 999.99 h/DC: 0...999 999.9 h  
 Reading accuracy: AC: 1/100th h / DC 1/10th h  
 Consumption: alternating - 2 VA / continuous - 0.65 W  
 Operating temperature: - 25 °C to + 80 °C



### ■ Current transformer

Degree of protection: IP 20  
 Frequency: 50/60 Hz

### Dimensions

	Opening for cable ∅ max. (mm)	Opening for bar width x th. (mm)	Fixing center for fixing on plate (mm)
<b>Single phase CT</b>			
CT 50/5 100/5 200/5	∅21	16 x 12.5	on rail EN 50022
CT 300/5	∅23	20.5 x 12.5 25.5 x 11.5 30.5 x 10.5	50 x 45
CT 400/5	∅35	40.5 x 10.5	54 x 45
CT 600/5 800/5 1000/5	-	65 x 32	fix on bar
CT 1250/5	-	84 x 34	fix on bar
CT 1500/5 CT 2000/5	-	127 x 38	fix on bar
CT 2500/5 4000/5	-	127 x 54	fix on bar
<b>3-phase CT</b>			
CT 250/5	∅8	20.5 x 5.5	fix on bar
CT 400/5	-	30.5 x 5.5	fix on bar

**electrical energy metering on rail**



046 02



046 00



046 63



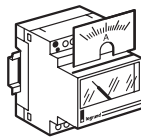
046 65



046 64

**Dimensions (p. 183)**

Pack	Cat.Nos	Analogue metering devices	
		<b>Ammeters</b>	
		Measure the intensity in Amperes (A) of the current circulating in an electrical circuit	Number of modules
1	046 02	Direct connection AC or DC Scale: 0 - 30 A - supplied with dial	4
1	046 00	Connected via a 0 - 5 A output current transformer (CT)	4
		<b>Measuring dials for ammeter Cat.No 046 00</b>	
2	046 10	0-50 A	
2	046 13	0-100 A	
2	046 15	0-200 A	
2	046 16	0-250 A	
2	046 17	0-300 A	
2	046 18	0-400 A	
2	046 20	0-600 A	
2	046 21	0-800 A	
2	046 22	0-1000 A	
2	046 66	0-1250 A	
2	046 24	0-1500 A	
2	046 25	0-2000 A	
		<b>Voltmeter</b>	
		Measure the AC or DC voltage in a circuit in volts (V)	Number of modules
1	046 60	Scale: 0-500 V	4
		<b>Digital ammeter / voltmeter</b>	
		Connection: - Ammeter mode: connected via a 0 - 5 A current transformer (CT) Reading range adjusted according to CT used - Voltmeter mode: measures the AC or DC voltage of an electrical circuit; scale 0 - 600 V	Number of modules
1	046 63	Voltage: 230 V~ - 50/60 Hz Reading: I - 0 to 8000 A U - 0 to 500 V	4



Pack	Cat.Nos	Selective measurement switches	
		For manual selection of the circuits to be measured	
		<b>Ammeter cam switch</b>	
		For measuring the current in a circuit with one ammeter, connected via a current transformer (CT)	Number of modules
1	046 50	3-phase, 4-position cam switch	3
		<b>Voltmeter cam switches</b>	
		For measuring the voltages in a circuit with one voltmeter	
1	046 52	3-phase, 4-position cam switch	3
1	046 53	3-phase with neutral, 7-position cam switch	3
		<b>Digital frequency meter</b>	
		For measuring the frequency of a 230 V~ electrical circuit in hertz (Hz) Supply voltage 230 V~ (connected to circuit to be measured)	Number of modules
1	046 64	Green LED 3 digit display - 40-80 Hz display	4
		<b>Totalising hour counters</b>	
		Count the operating hours of a machine or an electrical device to determine its exact operating time Counter with numerical display Capacity: 5 digits + 2 decimal places (1 unit = 1 hour) Precision: 1/100th hour Consumption: 0.2 VA	Number of modules
1	046 94	230 V~ - 50 Hz	2
1	046 91	24 V~ - 50 Hz	2



Pack	Cat.Nos	Central measuring units	
		<b>Multi-function centrals</b>	
		Measure via a 0 - 5 A output current transformer (CT), electrical values for low voltage applications: For measuring current per phase, phase-to-phase voltage, frequency, power factor, instantaneous power (active, reactive, apparent), active and reactive energy Adapt to 3-phase balanced or unbalanced supplies with or without neutral 220 V - max. measurement: 8000 A	
1	046 65	Standard	
1	046 67	Communicating Modbus/JBUS Data speed transmission: 1200 to 9600 Bauds	

## electrical energy metering on rail ┌ (continued)



046 81

046 72

046 74

**Dimensions (p. 183)**

Measure the electrical energy consumed by a single phase or 3-phase circuit downstream of the metering of energy distributor  
Provide a clear display of the consumption in kWh  
Class I precision for energy active for Cat.Nos 046 73 and 046 74 in accordance with IEC 62053-21/23  
Class II precision for energy active for Cat.Nos 046 81 and 046 72 in accordance with IEC 62053-21/23 (with a sealable box)

Pack	Cat.Nos	Single phase meters	Number of modules
1	046 81	Direct connection Power supply: 230 V~ - 50/60 Hz <b>Without pulse transmitter</b> Up to 32 A Display: LCD screens 6 digits including 1 decimal place 1 unit = 0.1 kWh Partial counting with reset	2
1	046 72	<b>With pulse transmitter</b> Up to 63 A Display: LCD screen 6 digits including 1 decimal place 1 unit: 0.1 kWh Partial counting with reset With pulse transmitter to feed back remote electrical energy consumption pulse output: 1 imp/10 Wh	2

Pack	Cat.Nos	3-phase meters	Number of modules
1	046 73	Display: LCD screen 8 digits, 1 unit: 0.01 kWh With pulse transmitter to feed back remote electrical energy consumption measurements via volt-free contact Partial counting with reset <b>Direct connection</b> Up to 63 A per phase Power supply: - 230 V~ - 50/60 Hz (3 phase) - 400 V~ - 50/60 Hz (3 phase + N) Programmable pulse output: 1 x 200 ms pulse every 1 kWh (default value)	4
1	046 74	<b>Connection via a 0 - 5 A current transformer (CT)</b> Power supply: - 230 V~ - 50/60 Hz (3 phase + N) - 400 V~ - 50/60 Hz (3 phase + N) Programmable pulse output: 1 x 200 ms pulse every 1 kWh (default value) Current transformation ratio: 50/5 to 8000/5	4

**Current transformers (CT) (p. 104)**

## electrical energy metering on rail ┌

### ■ Ammeters

#### Technical characteristics

Type of measurement	Analogue	
	Ferromagnetic	
Frequency	50 to 60 Hz	
Precision	1.5 %	
Operating temperature	- 10 °C to + 40 °C	
Storage temperature	- 20 °C to + 80 °C	
Consumption:		
• voltage circuit	-	
• measurement circuit	1.1 VA	
Connection capacity	Direct	Par TI
	6 mm <sup>2</sup>	4 mm <sup>2</sup>
Conformity to standards	NF EN 61010-1	

### ■ Voltmeters

#### Technical characteristics

Type of measurement	Analogue	
	Ferromagnetic integration	
Frequency	50 to 60 Hz	
Precision	1.5 %	
Operating temperature	- 10 °C to + 40 °C	
Storage temperature	- 20 °C to + 80 °C	
Consumption	3 VA	
Connection capacity	2 x 2.5 mm <sup>2</sup>	
Conformity to standards	NF EN 61010-1	

### ■ Frequency

#### Technical characteristics

Type of measurement	Quartz electronic
Precision	± 0.2 % for ± 1 digit
Operating temperature	- 10 °C to + 40 °C
Storage temperature	- 20 °C to + 70 °C
Consumption	4.5 VA
Connection capacity	2 x 2.5 mm <sup>2</sup>
Conformity to standards	NF EN 61010-1

### ■ Multi-function central unit

#### Technical characteristics

- **Display:**  
3 green LED displays with manual selection:  
- Current per phase  
- Phase-to-phase voltage  
- Phase voltage  
- Instantaneous power: active, reactive and apparent  
- Frequency and power factor (inductive/capacitive indication)  
- Active energy  
Unit of measurement: display according to the CT ratios  
Automatic change of rating  
Energy metering: totalising 9 digits in kWh, resolution 10 Wh
  - **Input:**  
Voltage measurement consumption < 1 VA per phase  
Current measurement consumption < 0.5 VA per phase
  - **Auxiliary power supply:**  
Voltage 230 V single phase (+/- 10%)  
Frequency 50 Hz (47 to 63 Hz)  
Consumption < 6 VA - 3.5 W
  - **Output:**  
Energy pulse: duration > 100 ms  
Via volt free contact
- Connection**
- **3 or 4-wire connection - 3 CT**