

T361...

Three-Phase
Meter



APPLICATION

The electricity meter type T361.. is suitable for measuring active energy for direct connection in three-phase three- or four-wire networks at balanced or nonbalanced load.

RATINGS

The measuring and technical characteristics comply with IEC 62053-11, IEC 62052-11, IEC 60521, BS 5685 specifications.

The accuracy class is 2.

DESIGN

The following versions of meters are manufactured:

Type T361C for 400 % current loading

Type T361E for 500 % current loading

Type T361F for 600 % current loading

Additional marking designates as follows:

D: double tariff type meter (T361ED ..)

2: meter with magnetic bearing (T361E2 ..)

S: technological changes on the meters that are tied with year 2002

CONSTRUCTION

Meter Base with Terminals

Meter base is made of bakelite, highly resistant to creep current. A suspension hook is fastened to it. It allows different affixing dimensions of the meter with a screw outside the case or under it. The T361..meter base makes an integral part with the terminal block, made in accordance with BS 5685 Standard. The flashover and creep distances in the bakelite framework, between metal parts of individual circuits on one hand, and terminals and outside contact parts on the other, are large enough to assure high breakdown strength.

Fixing of outer wire is provided by means of two M6 screws. Diameter of terminal hole is max. 12.5 mm.

One auxiliary terminal is available only for double tariff version.

Meter Cover

Meter cover is made of bakelite or transparent thermoplastic material.

Bakelite cover has a glass window at the front side. The window is sealed with silicon sealant from the internal side and is fastened with selflocking elastic washers. The cover is fastened to the base with two sealing screws so that better sealing between the cover and the base is attained. During the calibration the covers can be hanged on the meter base without screwing.

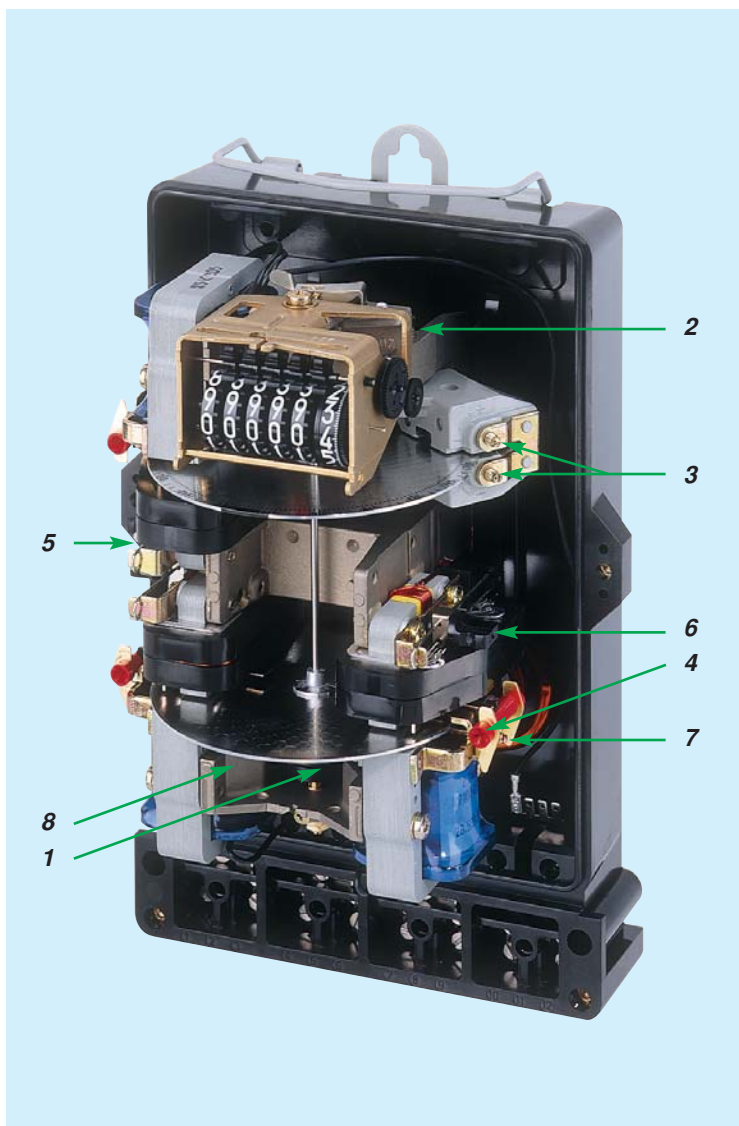
Transparent cover is made of thermoplastic material (Polymethyle-Methacrilate or Polycarbonate), resistant to shocks, and strengthened with ribs on the inner side. The cover is fastened to the base with two sealing screws, so that sealing is possible irrespective of the position of the terminal block cover.

In the cover rabbet there is a solid rubber gasket meeting all dust-proof requirements, and enabling the cover to be smoothly placed on the base.

During the calibration the cover can be hanged on the meter base.

Terminal Block Cover

Terminal block cover is made of solid, self-extinguishable, thermoplastic or duroplastic material. It can be supplied in short, extended or middle version. The terminal block cover prevents undesired access to the suspension hook and terminals.



SETTING ELEMENTS

- 1 – sensitivity adjustment
- 2 – coarse adjustment of number of revolutions
- 3 – fine adjustment of number of revolutions
- 4 – adjustment of small loads
- 5 – coarse phase adjustment
- 6 – fine phase adjustment
- 7 – balance of torques of driving elements
- 8 – reverse phase sequence adjustment

Electromagnets

The type T361.. meter employs three similar electromagnet elements which are mounted on a robust die-cast frame. Two elements drive the lower disc and one the upper disc on which the brake magnet operates.

The voltage electromagnet of each element has a double magnetic circuit and the current electromagnet is of U form. Electromagnetic sheet of a corresponding initial permeability in current cores assures specified error curves with respect to the load, either at small loads or overloads.

Frame

For the drive systems and the brake system a pressure-injected SiAl casting of high physical strength and endurance is applied. The framework is fastened with two screws to the

base through an adapter which unloads the bakelite base, and makes the measuring system elastic.

Brake Magnet

It effects on the upper disc of the rotor. A massive, two-directional brake magnet is made of AlNiCo alloy, and sealed in a SiAl casting. The number of revolutions can be precisely set by adjusting screws placed outside the magnet. However, by turning the complete brake system, revolutions can be set approximately. Between the poles of both magnets there is a temperature compensative material compensating registration changes in respect of temperature variations in a wide temperature range.

Rotor

The two-disc rotor are made from aluminium sheet selected for its conductivity and purity.

It is free from particles of ferrous metal. The upper disc has a mark which helps count the revolutions on the disc for testing purposes. On special request it can also be marked by a 100-, 200-, 400-division pattern for stroboscopic testing.

The Lower Bearing

It is of two-cup or magnetic type.

The two-cup bearing

Between two sapphire cups lies a polished steel ball, protected against corrosion by a thin layer of good quality oil. Initial friction is insignificant, and the bearing has a long life. The bearing assembly is fastened with spring to prevent damage during transportation, and to enable a simple exchange of the rotor by pushing the bearing assembly only, without any readjustment.

TECHNICAL DATA

Type	T361F	T361L	T361C	T361B	T361E	T361E	T361F	T361C
Ref. voltage U_r (V)	3 x 230/400							
Ref. frequency (Hz)	50							
Basic current I_b (A)	10	10	20	30	20	40	20	40
Max. current I_{max} (A)	40	60	80	90	100	100	120	160
Thermal current (A)	48	72	96	108	120	120	144	192
Losses in voltage coils (W)	3 x 1 to 1.1							
at the rated voltage (VA)	3 x 4.6 to 4.9							
Losses in current coils (W)	3 x 0.10	3 x 0.10	3 x 0.28	3 x 0.50	3 x 0.23	3 x 0.65	3 x 0.23	3 x 0.53
at the basic current (VA)	3 x 0.12	3 x 0.12	3 x 0.32	3 x 0.55	3 x 0.25	3 x 0.8	3 x 0.25	3 x 0.6
Torque at basic load ($\times 10^{-4}$ Nm)	6.5	6.7	10.1	14.2	9.8	20	7.6	12
Meter constant (revs/kWh)	120	75	48	48	37.5	37.5	37.5	24
Rated number of revolutions at basic load (r.p.m.)	13.8	8.625	11.04	16.56	8.625	17.25	8.625	11.04
No-load running	Rotor does not run when the current circuit is open, and if the voltage varies from 80% to 110% U_{ref} .							
Starting current at U.P.f	< 0.5 % I_b							
Dielectric strength	Between the parts at load and inner meter's metal parts: 2000Vef. Between the parts at load and outer touching metal parts: 4000Vef.							
Surge voltage strength (1.2/50 μ s)	7 kV (up to 12 kV on special request)							
Weight of the rotor (g)	approx. 52 with two-cup bearing, and 55 with magnetic bearing							
Weight of the meter (kg)	approx. 3.2 to 3.5							

Other rated voltages up to 500 V and currents (5/20, 10/20, 5/30, 10/30, 5/40, 15/60, 20/60, 10/80, 50/100, 30/120, 80/160 A, ...) are also available on special request.

The magnetic bearing

The temperature compensated magnetic bearing has two magnetic parts with equally polarised adjacent surfaces. Due to the mutually repelling forces between the two magnetic surfaces and the rotor weight, the rotor magnet floats at a distance from the stator magnet.

The rotor is guided by a highly polished spindle which projects from the lower part of the bearing into the upper part, its upper pin acting as an armature. The stainless steel spindle runs in a graphite bearing sleeve, making lubrication unnecessary.

The Upper Bearing

It is pin-like acting as an armature. The polished stainless steel spindle runs in the upper bearing, which is together with the worm made of solid thermoplastic material. No lubrication is necessary.

The Register

Single- rate register consists of six or seven graduated drums. The periphery of the last drum is divided in 100 sections. Thin polished axles are rotating in plastic bearings causing minimum friction and high error stability at small loads. No lubrication of bearings is necessary. The register framework can be fastened to the meter framework with one screw without an adjustment plate, so that the worm and the worm wheel fit each other completely. Two versions of single-tariff register are produced: a register with standard digit drum with the size of numbers 4,7 x 2,3 mm and a register with larger digit drum with size of numbers 6,9 x 3,65 mm.

Two- rate register has six or seven digits for each tariff. The rear register circumference is divided in 100 sections. The tariff

switchover is enabled by a change-over relay functioning via differential gear. Thus the register display error at switchover from the first to the second tariff and vice-versa is eliminated. The change-over relay is a D.C. version supplied via the incorporated rectifier and protective resistor.

Adjustment Devices

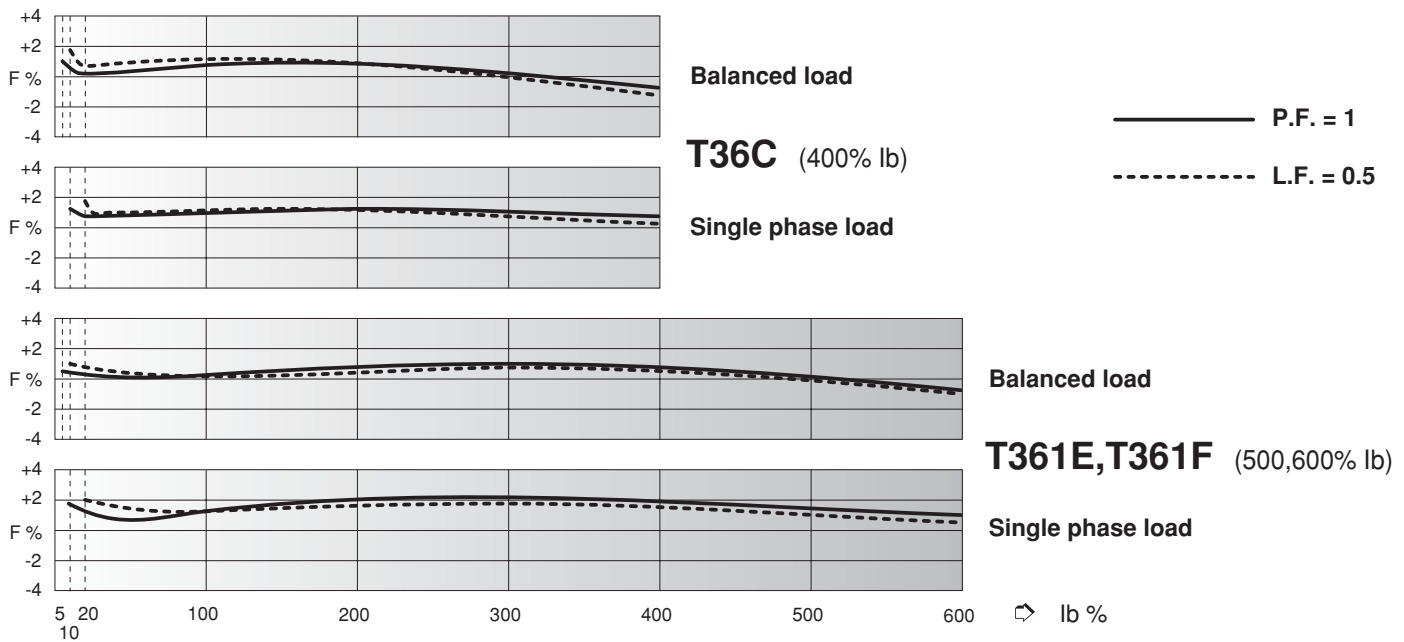
Adjustment devices are placed at the outside of individual driving systems. They are easily accessible, the setting range is wide enough, their interaction is minimal. Adjustment is partially manual, and partially done with a screw-driver.

Meter connection

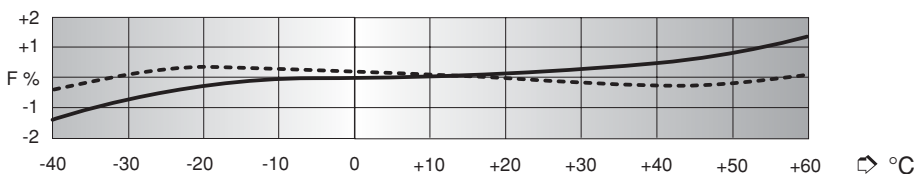
Normal or reverse phase sequence connection to the meter does not effect no-load running between 80% to 110 % reference voltage.

TYPICAL PERFORMANCE CHARACTERISTIC

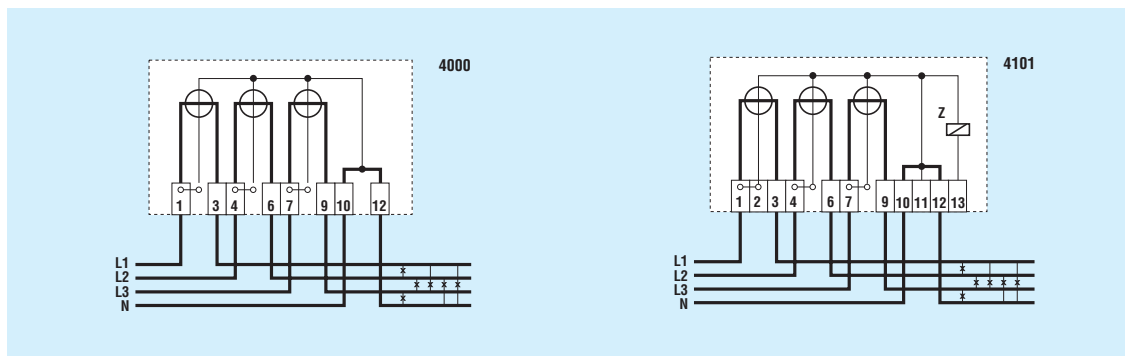
Load curves



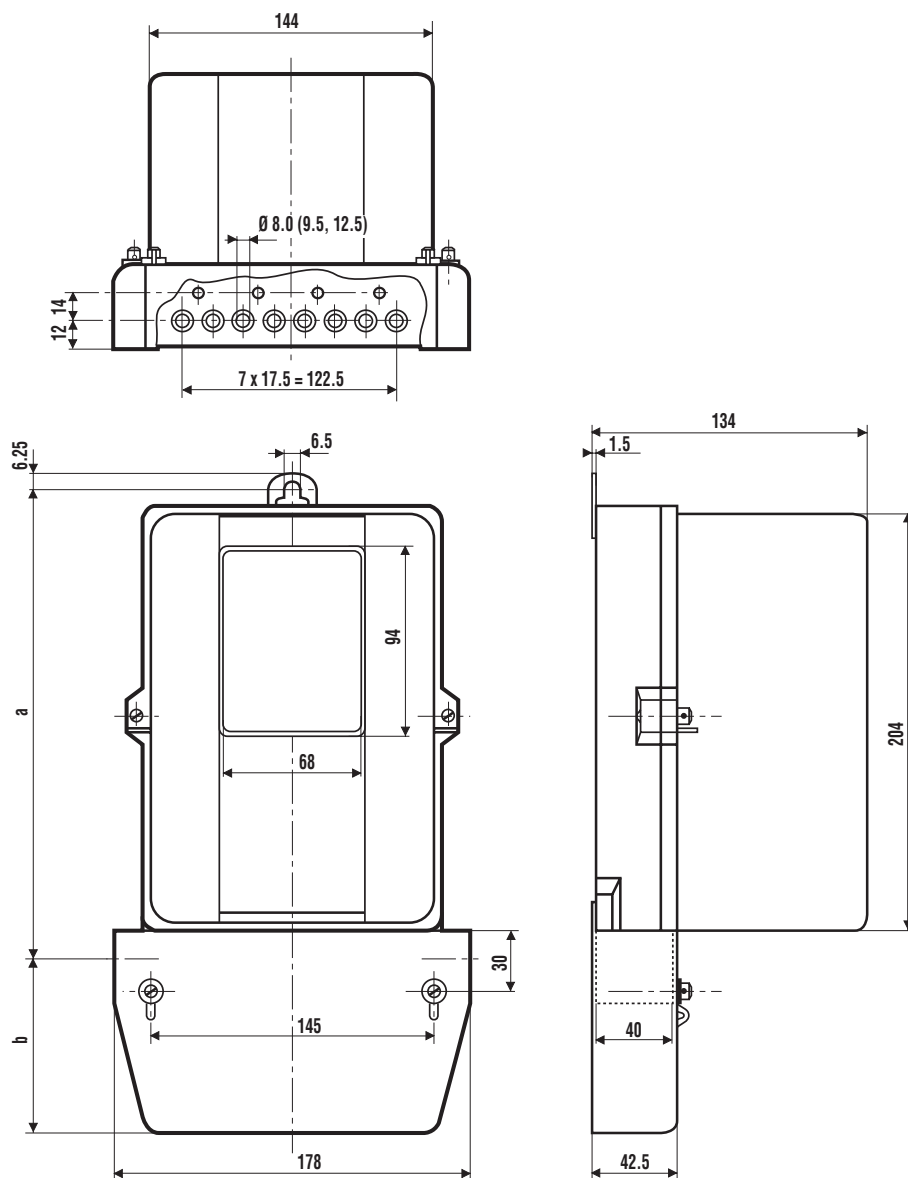
Error due to temperature variation



CONNECTION DIAGRAMS



ASSEMBLING DATA FOR METER



- a= 230 ±1 mm external hanging
180 ±1 mm internal hanging (suspension hook hidden behind the meter base)
- b= 28 ±1 mm short terminal cover
59 ±1 mm medium terminal cover
102 ±1 mm extended terminal cover

Order specifications**Example**

1. Meter type: T361C2 – 1000 pcs.
2. Rated voltage and frequency: 3 x 230/400 V, 50 Hz
3. Basic and maximum current: 40 – 160 A
4. Six- or seven- drum register (for single-tariff register specify the size of numbers) single-tariff, seven-digit register with larger digit drums
5. Connection: 4000
6. Lower bearing version magnetic bearing
7. Nameplate: owner's information The Property of...
8. Size of terminal block cover extended thermoplastic
9. Packaging container (boxes, truck)

Packaging

The meters are supplied individually or in groups in boxes.
Data on dimensions and gross weight depend on packaging:

Packaging	No. of packed meters	External dimensions of packages (mm)	Gross weight approx. kg
individual	1	282 x 182 x 142	3.5
truck	50	1200 x 800 x 790	200
	80	1200 x 800 x 1005	310
container	66	1075 x 625 x 1080	254
wooden box	80	1276 x 872 x 1028	330

Packaging depends on destination, type of transport and specific requirements of individual buyers.

Owing to periodical improvements of our products the supplied products can differ in some details from data stated in the prospectus material

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