

Polyphase (T8) Meters

The Elster Polyphase meter single disk technology, the total quality concept at every level of the manufacturing process and the right selection of materials, make that the characteristics of these meters remain unaltered in the most adverse operational environmental conditions. Variations in temperature, humidity, location, voltage or frequency as well as external magnetic fields, short-circuits and unbalanced load have little effect on these meters, that hold their accuracy over the whole operational range from 5% basic current to maximum current.



Features

- High Stability
- Accuracy Class: 2; 1 and 0.5
- High Overload (Up to 800% Ib)
- Magnetic Repulsion Bearing System
- Low Losses
- Long Service Life (30 Years or more)
- Cyclometer Type Register
- Stabilized Components
- Maintenance not required. Micrometrical Calibration for Basic Load; Low Load; Power Factor Adjustment and Phase Balance.

Intended Uses/Users

- Utilities & Electricity Distribution Companies
- Submetering Companies

Innovations

Base

In the IEC version, the base is die-cast from an aluminum-silicon alloy, while in the DIN and BSI versions it is made of phenolic resin.

Frame

The frame is die-cast from an aluminum-silicon alloy; it is very robust and light. All internal components are mounted on this rigid piece keeping their proper position and assuring the long-term meter accuracy.

Electromagnets and register are all self-positioning; making it possible for the components haphazardly dismantled, to be accurately repositioned.

Cover

The cover is made of transparent polycarbonate plastic. This material contains ultra-violet inhibitors to retard aging and discoloration, which can occur over a long period of time when meter enclosures are exposed to direct sunlight. Its design gives it a great mechanical resistance. Its high transparency allows an optimum reading of the register and the sight of the internal parts. The cover is sealed against the base with a synthetic rubber gasket that assures the exclusion of dust and insects.

The cover sealing was designed to prevent possible tampering with fine or small diameter extraneous objects. The cover is sealed with two captive security screws, suitable for use with wire and lead seals. As an option, tamper resistant "Snap Seal™" may be used. The Snap Seal™, is a patented seal, which encloses the cover screw. Once inserted, it only can be removed by breaking the molded plastic cylinder, providing a positive indication of tampering. Snap Seal™ can be used in addition to conventional lead-wire seal and plastic seals.

Terminal block

The terminal block is a solid and robust piece molded of a phenolic resin of high dielectric and mechanical characteristics. The low humidity absorption and the wide dimensions of the walls permit safe work even in overload and maximum admissible currents.

In the IEC version, the terminal block has two holes, which allow the meter to be fixed against the wall with two screws.

To complete the meter fixation to the wall, the base has a hole for a third screw on the upper part, which precludes meter inclination.

Register

- The standard cyclometer type register has six very low mass drums of plastic resin mounted on an especial support of stamped aluminum, which gives the piece extraordinary strength.
- The fixation system on the meter frame of both the register and the register adapted support is self-positioning, and it assures the proper mesh of the worm on the disk shaft and the coupling wheel, making the adjustments of the register mesh unnecessary.
- The small diameter movable shafts (0.6 mm) made of especial steel rotate over self-lubricating plastic bearings. Special features of both pieces assure low-friction at contacting points.
- The union gears between drums are self-positioning and made of self-lubricating plastic material just as the relating and coupling wheels.
- All these materials have excellent mechanical properties and resist elevated temperatures, assuring a great stability and low friction, with minimal incidence on the meter response.

Braking Magnet

Two magnets manufactured from ALNICO V, which is an especial alloy with a high coercive force, form the magnetic brake. After saturation, the magnets undergo demagnetization by a stabilizing field in order to achieve magnets very resistant to the demagnetization provoked by the higher short-circuit currents.

The braking magnet assembly is a sturdy die-cast aluminum housing into which the two magnets are cast. The temperature compensator, that makes the meter stable in spite of temperature variation, also is die-cast into the magnet housing.

Moving element

- The single disk for the three-element meter is fabricated of multiple thin layers of ultra pure aluminum. The multi-layered disk with alternating radial cuts on each layer assures accurate registration without interference between the phases.
- Two stator meters employ a solid aluminum disk and the lower levels of cross-element interference are compensated with a magnetic bridge.
- The moving element shaft is machined from a high mechanical resistant aluminum.
- The worm gear is meshed into this shaft, and at the shaft ends there are the self-lubricating bearings. The disk is attached to the shaft by die-cast cubes of an especial alloy.
- The disk design allows the contrast of the meter by using stroboscopic, comparison and photoelectric means.

Bearings

- The lower bearing - Magnethrust Self-cleaning System - works according to the magnetic repulsion effect. The disk-shaft floats on a friction-less magnetic field between the opposing faces of the lower support bearing magnet and the magnet which is die-cast on the disk-shaft assuring total operational stability during the whole useful life of the meter.
- The magnets of the set, produced with barium-ferrite (a nonmetallic material), are inalterable over the time, being 350% more resistant to the demagnetization than any ferromagnetic magnet.
- The generated magnetic flux keeps the gap permanently free of any ferrous particle.
- This self-cleaning effect turns unnecessary any maintenance, so common in other bearing systems that do not use the repulsion effect.
- The upper bearing consists of a steel pin that leads a well-finished polyamide bearing located at the end of the disk shaft.

Current Electromagnet

- The current electromagnet is constituted by a laminated silicon-steel core of high magnetic permeability on which the overload compensating set is mounted.
- The core is partially covered by an insulating bobbin on which the coil is tightly wound, which assures excellent mechanical strength against haphazard short-circuits on the net and also reduces the possibilities of generating vibrations or noises.
- Current terminals are welded at the coil ends by a high melting point material.
- External power and load conductors may be connected with the two screws, which are provided on each current terminal. This provides a greater surface of contact (between conductor and terminal), eliminating unwanted and dangerous overheating.

Voltage Electromagnet

- This electromagnet is formed by a low loss laminated silicon-steel core on which the voltage

coils, the low load micrometrical adjustment, the inductive load adjustment and balance adjustment are assembled.

- The perfect design of both the voltage coil and the magnetic circuit, permits obtain a high torque with low losses.
- The proper distance between the live parts and earth, along with insulating materials of low humidity absorption and high dielectric properties, provide for secure withstanding of overvoltages and surges.

Adjustment Devices

The meters have the following adjustment devices:

- Braking element calibration
- Torque balance (in phases R and T)
- Power factor calibration (in all the phases)
- Low load calibration

The main characteristics of these devices are:

- Negligible mutual influence
- Operation by micrometrical system which allows the adjustment to be predetermined.
- Easy access and operation, allowing the adjustments by using a simple screwdriver.

Thanks to these characteristics the meters are calibrated in an easy, fast and precise way.

Accessories and special versions

- Detent device

This meter can be supplied with a detent device to prevent reverse disk rotation.

- Unidirectional register

Always register in positive direction regardless of the disk rotation. Its application is ideal when inversion of the connections by mistake or tampering is a possibility.

- Pulse Initiator

Pulse initiators are available as accessories when required to send energy pulse signals which frequency depends on the disc speed. A photoelectric sensor provides a frictionless and accurate sensing of disk rotation.

- Internal / external disable link

The disable link can be internal or external. In the internal version, the disconnection link of the voltage coil, normally located in the terminal block, is under the meter main cover.

- Tropicalized version

In this version, the external screws and terminals have an additional anti-corrosive treatment that added to the especial design of the voltage and current coils, assure a proper performance in corrosive environmental conditions and increase its dielectric rigidity.

Special requirements

Meters can be ordered with several standard reference voltages, current ratings and frequency values; polycarbonate cover or aluminum cover with polycarbonate/glass window; die-cast aluminum-silicon alloy base or molded of phenolic resin; standard register, unidirectional or double rate register; sequential or line-load connection; extended or short, opaque or transparent terminal block cover; alternating current watt-hour meters or reactive energy meters; class 2, 1 or 0.5; and special markings.

Technical specifications of some versions

Characteristics	Units	T8S1/a	T4F5
Reference voltage (Ur)	V	380/220	220/380
Basic current (Ib)	A	5	25
Maximum current (Imax)	A	40	100
Frequency	Hz	50	50
Basic torque	Gcm	7.4	12
Basic speed	r.p.m.	8.25	13.7

Current power losses	VA	0.22	.75
Voltage power losses	W	1.2	1.2
	VA	7.5	7.5
Creep	%Ur	80 - 110	80 – 110
Starting current	%Ib	0.8	0.5
Dielectric properties Line Frequency Impulse	V	2000	2000
	KV	6	6
Rotor mass	G	31	31
Meter mass	Kg	3.3	3.3
Constant	Rev/kWh	150	50

Standards:

Elster's meters fulfill national and international standards: IRAM (Argentina), COPANT (Panamerican) IEC (International), DIN (Germany) in phenolic base version and BSI (British Standard) in phenolic base version.