



SYED BHAIS



POLYPHASE WATTHOUR METER

Type D-58P



Reduce Operating and Maintenance costs with long life D-58P polyphase meters

Syed Bhai's D-58P polyphase watt-hour meters give you the precise reading accuracy you require to keep utility revenues up and costs down. They are designed to give stable, long-life performance on all polyphase metering applications

Features:

- Magnetic Bearing
- Precise calibration and high accuracy
- Corrosion Resistance
- Construction
- Fully Sealed and weather-Proof design
- Extended Load range
- Longer term calibration stability
- Tamper resistant meter cover



Figure 1. D-58P Meter

Three Phase Meters – Type D-58P

For accurate, reliable and economical bottom-connected applications

DESCRIPTION

Polyphase induction Watt-hour meter for bottom connected applications, Model D-58P, 2 stators 3 wire or 3 stators (3 or 4 wires) line-load, 60, 120 or 240 Volts, 50 or 60 Hz, Cyclometer type register, primary or secondary reading, magnetic suspension or repulsion bearing system, accuracy class 2.

D-58P Polyphase meter with magnetic bearings are offered in 2 basic models:

D-58P: Self-contained type, rated current 15 or 30 Amp with 800% or 400% overload respectively.

D-58PC: Transformer rated, 2.5 or 5 A with 400% overload capacity respectively.

Other Models:

- **DM-58P Meter**

D-58P standard meter equipped with maximum demand register type M-02.

- **DR-58P Meter**

Reactive energy (VARh) meter based on D-58P active energy meters. They are calibrated as a normal watt-hour meter and internally connected.

The key to D-58P meter's superior reliability and economy is its magnetic bearing system which most other meter manufacturer's either do not offer or offer only at premium price. Magnetic bearings ensure a long trouble free service life without any sacrifice in accuracy or the need of bearing replacement. It saves a lot of money since its friction free operation keeps the disc turning freely and accurately for years and years.

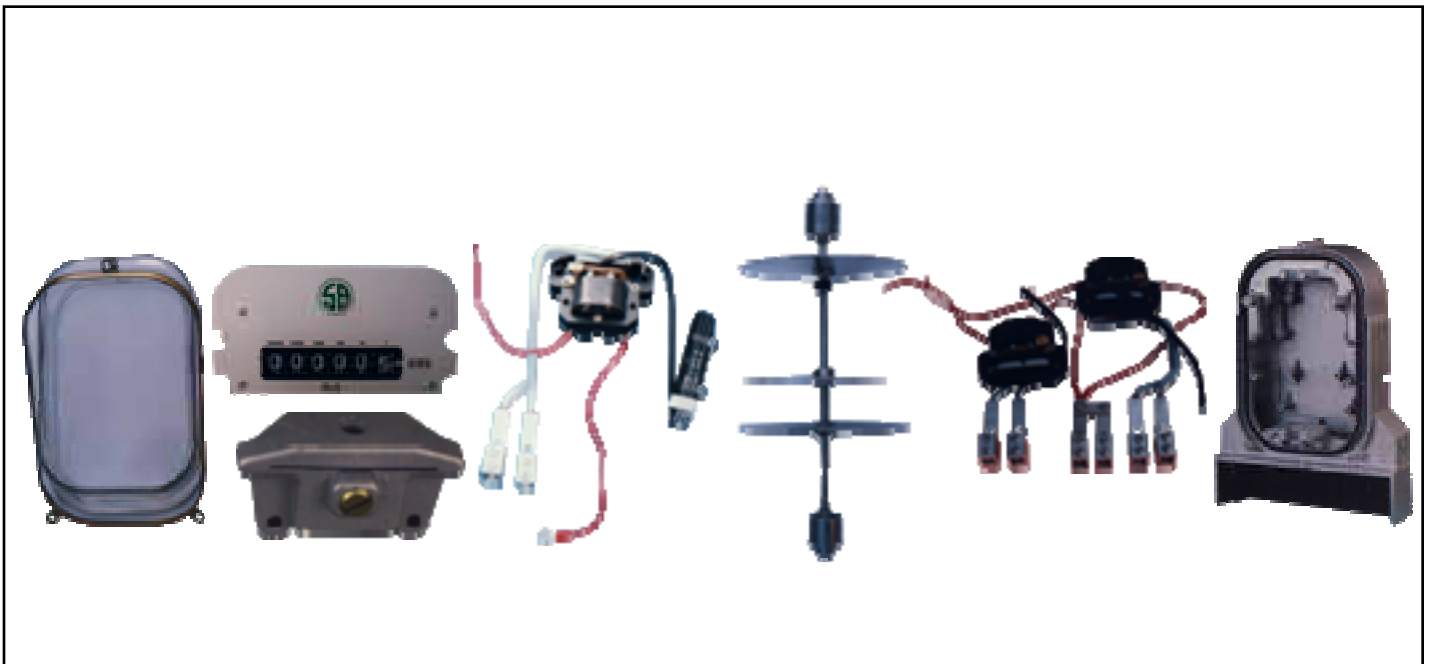
D-58P meters are made using specially selected metals and insulating materials with anti corrosive characteristics. This type of corrosion-resistant construction makes the meter suitable for any environment, indoors or outdoors. The meter cover is made of high grade transparent polycarbonate LEXAN* which offers total visibility of meter working parts from outside and greatly reduce the possibility of vandalism.

The D-58P meter meets or exceeds the requirements of IEC 521 and ANSI C12.1 standards.

- **Accessories**

All meters above mentioned may be supplied with:

- Phase Indicating LED's
- Detent
- Polycarbonate security box



*LEXAN is a registered trademark of GE Plastics

CONSTRUCTION FEATURES

- **Meter Cover**

D-58P meter can be supplied with either a tampered high resistant glass or a polycarbonate *(Lexan®) cover. Both provides full visibility and superior protection against tampering or damage.

- **Meter Base**

Rigid base made of aluminum silicon die - cast alloy ensure stability of calibration for a long time. Designed for optimal deformation and corrosion resistance.

- **Terminal Block**

The Terminal Block is made of high quality Bakelite material. Designed to accommodate copper or aluminum with section upto 70 mm² and capable of carrying 120A of maximum current. For transformer rated meters the terminals are designed to accommodate cables with section up to 8mm².

The dielectric strength test is carried out on 100% of production and terminal blocks which withstand 2.5KV for one minute, are used in the assembly line.

- **Terminal Cover**

Metallic terminal cover; can be either short or extended in accordance with client's specifications. Extended terminal covers made of polycarbonate are also available on request. The meter wiring diagram is attached inside. The terminal cover is sealed by means of a rubber gasket for better protection against dust.

Driving Element or Stator

The number of stators in the meter is according to the type of electric circuits to be measured, can be either 2 or 3.

Specially treated potential and current stator assemblies offer dependable service and high corrosion resistance.

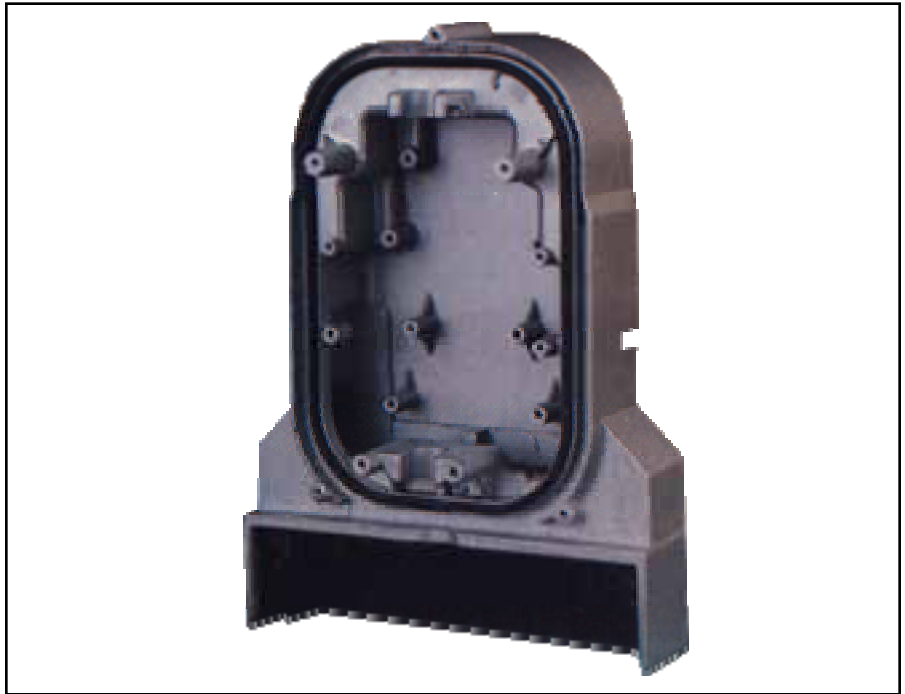


Figure 2: Meter Base & Terminal block

- **Potential and Current Cores:**

Mounted on templates and riveted in order to assure perfect alignment and rigidity of the assembly and coated with electrophoretic paint against oxidation.

- **Potential Coils**

D-8P meter Potential coils are nylon encapsulated which is non-hygroscopic and protects the meter against high voltage surges resulting from electrical storms and system transients. Voltage coils are machined wound from polyurethane coated wire.

- **Current Coils**

The current coil wound from large cross-section rectangular copper strip and heavily insulated by special epoxy resin ensures its high overload capacity.

According to the type of application, current coils can be supplied for max. currents of 10, 20, 90/120 amp.



Figure 3: Driving Element or Stator

Rotor Assembly

- **Rotor Assembly**

Composed of an aluminum shaft and discs in equal number as to stators, manufactured in adequate material to guarantee a lower weight to torque ratio and mechanical strength.

- **Disk**

Made of stamped and machined highly conductive aluminum having peripheral marks permitting its stroboscopic calibration, and Two diametrically opposed anti-creep holes to prevent its displacement running with no load, and also to be used for photoelectric calibration.

Magnetic Bearings

Magnetic bearing system yields low cost, maintenance free meter life under normal conditions.

Lower bearing consists of two concentric magnets with a material of high corective force, keeping the rotating assembly virtually friction free. Temperature compensation over a range of -20°C to $+100^{\circ}\text{C}$ maintains constant field strength and avoids variation in disc height.

The upper bearing is simply a guide pin to keep moving system in its correct place.

Because of no friction, there are no wear & tear effects in the moving parts and stability of calibration is ensured for longer period.

Name Plate

Made of aluminum. The nameplate displays meter data in an easy-to-read type and, if required, the client's current and potential transformer ratio.



Figure 4: Rotor assembly & Magnetic bearing

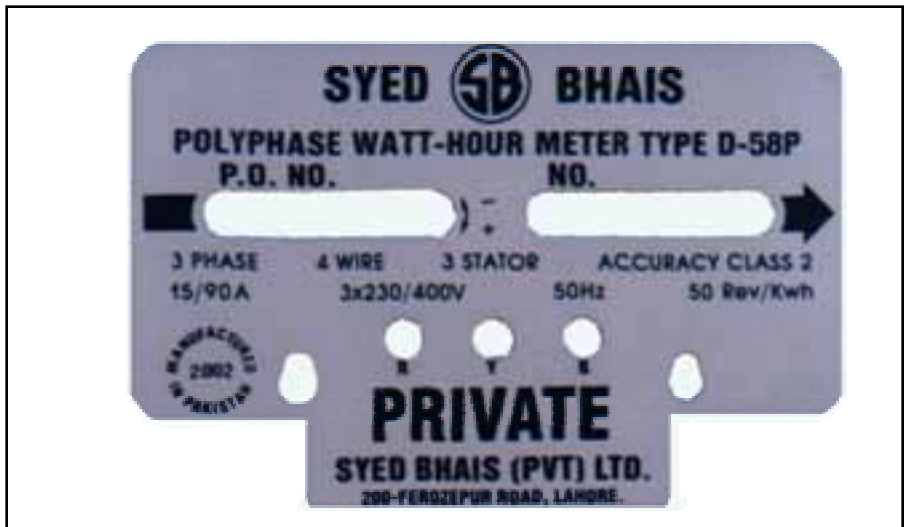


Figure 5: Name Plate

Register

Six digit cydrometer register is available with varying digit size as required.

The register consists of a small number of parts engineered in such a way to provide long life operation at very low friction levels and to

reduce the possibility of handling damage. The aluminum front plate enhances the general appearance and allows easy reading. The register gears and shafts are made of brass and stain-less steel respectively to ensure normal operation under direct solar radiation and to provide better protection against tampering or damage. The



Figure 6: Register Assembly



Figure 7: Brake Magnet

The pinions and drums are made of *NORYL.

While assembling the meter, the rotor to register gear meshing is done using high resolution TV cameras, so that accurate and dependable energy registration with minimum register loading on the meter is possible.

Braking Element

The D-58P meter's retarding magnets, made of stable Alnico V material comes with class I thermal compensation, which ensures stable magnetic properties for different ambient temperatures. Being embedded in the aluminum- silicon alloy casting, magnets get permanently protected against demagnetization due to lightning and switching surges. This assembly also provides the braking element with a high magnetic and mechanical stability.

Reactive Energy Meters

The reactive energy meter, Model DR-58P, was designed based on active energy meters, and as such has basically the same performance as active energy meter D-58P.

Due to the excellent independence of stators in D-58P meters, the reactive energy meter DR-58P introduce the great advantage of being calibrated and in laboratories or in the field; using the single phase active energy system. For this, there is a special system which permits with greater compliance to change the potential coil from the calibration or active checking position to the working position, that is, reactive energy registration.

All DR-58P meters are manufactured with a detent to prevent the inverse rotation of the rotor on leading PF. Type DR-58P VARh meters comply fully with BS 5685 part:4: 1986 (IEC 145).

Demand Meter

The total amount of electric energy required in a specific and determined period is called DEMAND. The maximum demand is the highest of the demand values registered during several time intervals (of 30 minutes each for instance). The units of measuring demand are Kilowatt, Kilovolt-ampere, and reactive Kilovolt-ampere (Kilovar). The most frequent unit used is Kilowatt.

Accessories

Syed Bhai's polyphase meters allow use of some accessories to meet specific requirements of clients. A short description of the main characteristics of these optional parts is given hereunder.

- **Phase Indicating System (LED's)**

The phase indicating assembly is a device that consists of a printed circuit board, resistors, red-light emitting diodes (LED's) and wires for internal connections.

The induced voltage of each potential coil energizes the system and, therefore one can be sure when a LED does not function that occurred a phase failure to the corresponding potential coil.

There are 3 holes on the meter name plate corresponding to the number of stators that allow one to see the corresponding LED numbers that identify the power supply phases of the meter.

Technical Advantages:

- Practically unlimited operation life
- Very low power consumption
- Full operational reliability
- Instant identification of phase failures.
- Easy identification of the energized LED.

As indicated by its name the Kilowatt-hour and demand meter simultaneously measures demand and active energy consumption (KWh). Syed Bhai's supplies its demand meters with the most advanced electronic registers type M-02 capable of recording maximum demands occurring during 15, 30 or 60 minute intervals or any other user defined value. See publication DM-58P for various demand meter models and electronic module details.



Figure 8: Demand meter type DM-58P



Figure 9: D-58P meter with phase indicating LED's, housed in security box

Polycarbonate security box

A mechanism developed by SYED BHAIS for the first time to provide superior meter protection against tampering or damage.

The security box is made from shatterproof clear transparent polycarbonate material and consists of two main parts – Upper & Lower. The meter cover is integrated with the upper part. Both the parts are ultrasonically welded from the points

of contact in such a way that the complete meter resides in the box. This assembly also provides better prevention against penetration of dust and water. Security box is optional and can be ordered on request.

- **Accuracy Class 1.0**

The polyphase meters manufactured by SYED BHAIS are usually accuracy class 2 (2% error limit). However, subject to consultation, class 1 accuracy meters can be supplied to meet special applications.

D-58P models provide superior electrical characteristics – Here's why:

Rigid die-cast base and precision machining of the frame ensures perfect mechanical balance in the meter. The retarding magnets being die-cast in aluminum and fixed on the frame, can not get displaced due to vibration. Hence the meter calibration remains stable for a long time. Because of the temperature compensation the retarding magnets behave uniformly, even if the ambient temperature changes radically.

- **Overload curves**

The overload characteristics show stable performance from no-load to 800% overloaded condition.

Voltage curves: System voltage fluctuations do not significantly affect meter accuracy.

Frequency curves: System frequency fluctuation of $\pm 5\%$ from nominal has little effect on meter accuracy.

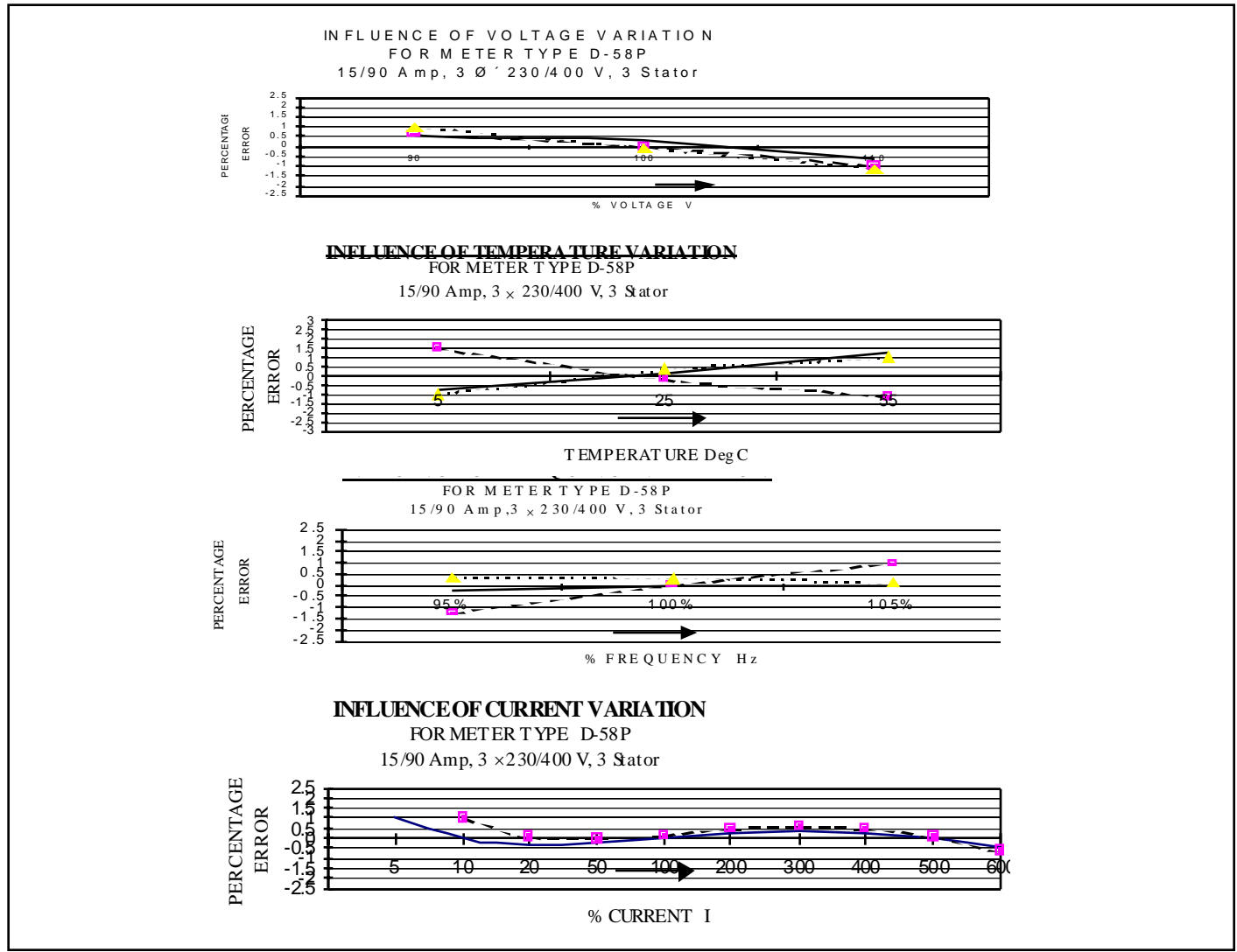


Figure 10: Typical accuracy curves

Packing

Designed to fulfill both inland and overseas transportation requirements, D-58P polyphase meters are duly packed in individual boxes which eliminates possibilities of damages during transportation.

Meter Model	Approx. unit weights	Approximate box dimensions (in mm)		
D-58P	5.8 Kg	343	262	210
D-58PC	5.5 Kg	343	262	210
DR-58PC	5.5 Kg	270	206	356
DM-58PC	5.9 Kg	270	245	356
