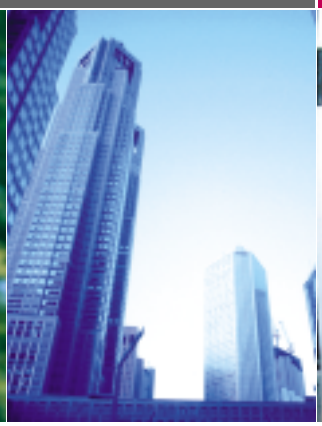
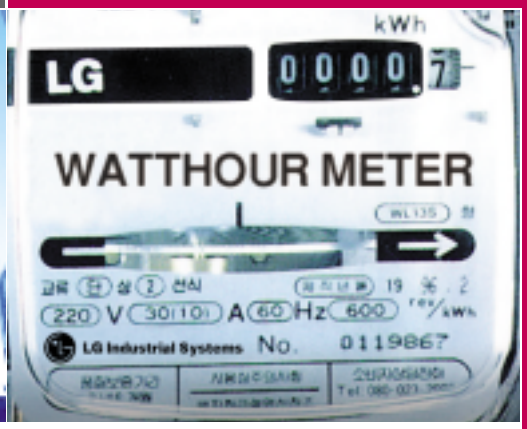
T-solution Leader in Electrics & Automation

Single & Poly-Phase
Electricity Meters

Electric Equipment





LG Industrial Systems
www.lgis.com

Single & Poly-Phase

Electricity Meters

Design features

- Compact and modern design
- Simple to adjustment
- Low friction and low temperature rise
- High accuracy and long-term reliability
- Low operation noise level
- Contact proof terminals
- High mechanical stability
- Maintenance-free components
- Diverse options such as remote meter reading system




Since the first production of electricity meters in Korea in 1963.

We have incessantly made researches and developments and came to succeed in developing the long-life electricity meters capable of registering up to 600% in 1989.
LG Electricity meters of WL and WB series are designed to meet the highest demands with respect to accuracy and reliability. They have a wide measuring range and long service life. WL and WB series comply with the specifications of

- IEC 521 : WL Type
- BS 5685 : WB Type

And they can be supplied conforming to other standards and your special requirements. In future, we will make much more efforts to supply products completely satisfying customer needs and to become the world best maker of electricity meters through researches and developments.

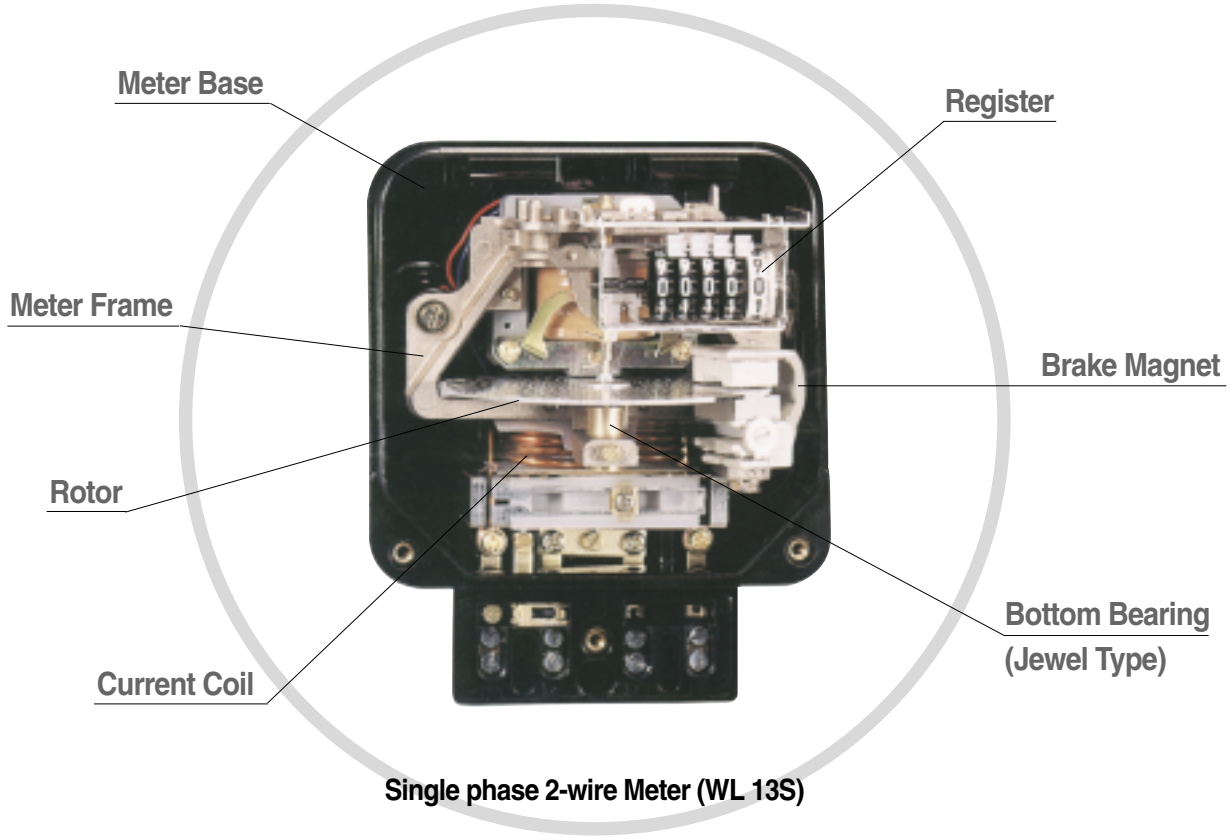
Construction

Case

The case with its integral terminal block is moulded in a high quality black phenolic material.
This is of generous section with internal ribbing resulting in a robust and mechanically strong unit.
The transparent meter cover is made of moulded polycarbonate providing a clear front view.
The carrying handle fitted to the top of base may be provided on request. The cover hooked into the top of the base and fastened by two sealable screws at the bottom.
The terminal cover of moulded plastic is fixed to the terminal block with a sealable screw.
The extended terminal cover is also available.

Measuring system support

The measuring system support consists of an aluminum alloy die-casting. It is fixed to the base by screw.
On this frame are mounted the current and voltage elements together with the brake magnet assembly, bearing system and register.
When required pawl can be fitted to the meter frame to act against the rotor cam and form an effective reverse running stop.
The voltage and current elements are fixed with screws on the frame ensuring a precise and stable main gap with minimum stress applied the lamination stacks. A pair of anisotropic brake magnets, one situated above to a die-casting which is screwed to the frame.

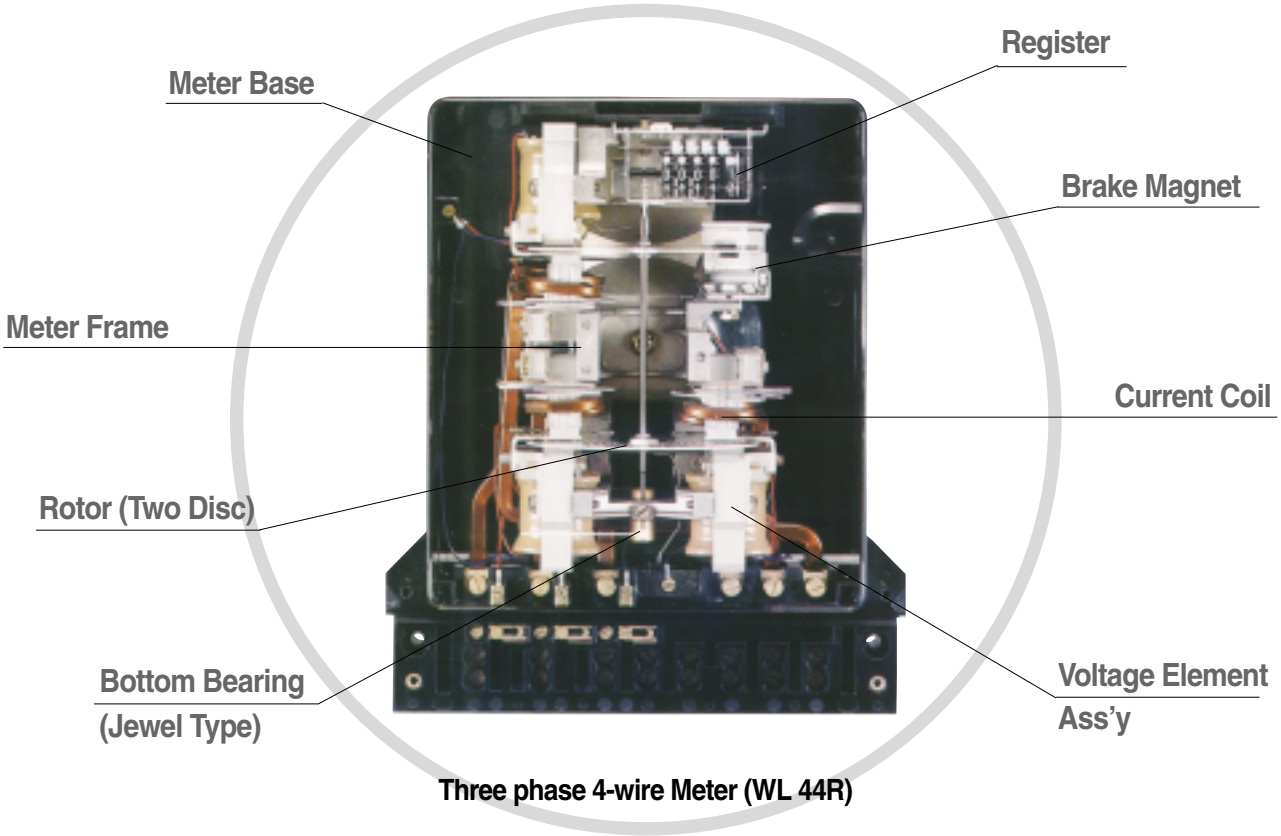


Single phase 2-wire Meter (WL 13S)

The driving elements

The voltage and current electromagnet cores are produced from precision cold steel formed into laminations of high accuracy.
The mounting of these cores on the frame is also designed to minimize strains and thus ensure long term stability. The limb of the current electromagnet has a number of iron turns which can be cut open for the purpose of coarsely adjusting the inductive load. The york of the current electromagnet carries a copper winding whose circuit is completed through a loop of copper sheet.
The copper sheet reduces the temperature-dependence of the meter. The voltage coil is wound wire of high conductivity enameled copper covered with a coating of polyurethane insulation of very high quality. The coil is wound on a moulded polypropylene former and is protected by a heat- shrunk sealing sleeve.
The use of these modern insulation materials provides exceptional protection against short circuited turns and ensures a high quality consistent product with the ability to withstand impulse voltages. A slide contact in the current coil former varies the effective length of this phase compensating loop, thus providing fine adjustment of the inductive load.

The current coil, which consists of a specially shaped copper conductor, is insulated by coating with epoxy resin(or enamel) and mounted on a temperature resistant plastic former giving the meter double insulation.
The laminated core is provided with overload compensation. A fine adjustment lever for low loads is fixed to the meter element support and has no mechanical reaction on the voltage system. It is accessible from the front and has a wide adjustment range.



Three phase 4-wire Meter (WL 44R)

Construction

Top bearing

The top bearing of the rotor consist of a 0.4mm diameter stainless steel guide needle running in a graphite ring. The top bearing requires no oiling and has stable characteristics over a long period.

Bottom bearing

There are two types of bottom bearing.

The double jewel bottom bearing is so designed that constant friction is ensured for a long period. A mirror-finished steel ball rotates between two sapphire cups which are secured in plastic shrouds. The whole plastic assembly is spring-supported and can be easily replaced by removing the cap.

The magnet floating type bearing consist of a pair of concentric disc magnets, made of phenolic bonded Alico grain, in repulsion. The pole faces of the discs are protected against accidental localised demagnetization by a thin integrally bonded barium ferrite covering.

The magnets are identically magnetized with two annular poles and when rotor assembly to "float" with 1mm nominal air gap between the magnetic discs.

Register

The register is normally of the five digit type. Six digits may be provided on special request. The quick changeover type register, operated positively by on out of balance member, may be provided on request. The 0.6mm diameter shafts rotate in plastic bearing while the stationary 1.3mm shafts are resiliently supported by the frame. The register is oil-free and maintains constant friction even after a long period of operation. The ratio wheels can be easily removed from the shafts should the register have to be adapted to other voltage and current ratings.

Brake magnet

The brake magnet comprises two high energy, high coercive magnetic chips secured to an aluminum die-cast holder. Errors due to temperature variations are compensated by a shunt of highly sensitive thermal alloy.

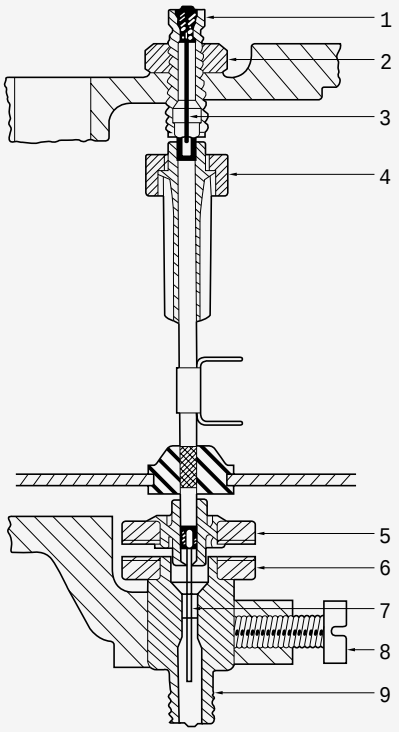
Coarse adjustment is achieved by rotation the whole magnet asseembly about the fixing screw centre. Fine adjustment is affected by rotating a barium ferrite disc magnet which has finely stepped notches and is arranged laterally at the lower magnet.

Rotor & Bearing system

The rotor is constrained against lateral movement by means of carbon bearings located at each end of the spindle running on polished stainless steel pins. The upper moulded journal housing incorporates the rotor worm and carries a damping weight which reduces a vibration. (provided on request) Both housings are pushed onto the rotor spindle and may be replaced if necessary without recourse to tools. The spindle also carries an adjustable anti-creep vane to inhabit continuous rotation of the rotor disc on voltage only.

The disc is made of pure aluminum, die-cast onto an alloy spindle and is printed with 200 divisions. The periphery has 400 serrations for stroboscopic methods of testing and both face and edge carry a wide mark.

Magnet floating type



1. Top brass housing
2. Locking nut
3. Stainless steel pin
4. Damping weight
5. Top suspension magnet
6. Bottomsuspension magnet
7. Stainless steel pin
8. Locking screw
9. Bottom brass housing

Technical data

Type		Single phase 2-wire							
Load capacity	**(%IN)**	300		400				500	600
Basic current	**(A)**	10	40	5	10	20	30	10	10
Max. current	**(A)**	30	120	20	40	80	120	50	60
Power consumption in current circuit	**(W)**	0.45	0.7	0.27	0.27	0.35	0.28	0.21	0.14
	(VA)	0.72	1.2	0.42	0.42	0.6	0.43	0.32	0.24
Type of standard		WL,WB	WL	WL,WB	WL,WB	WB	WL	WB	WB
Power consumption in voltage circuit	**(W)**	0.8		1.1				1.2	1.4
	(VA)	2.5		3.7				4.0	4.5
Weight of meter	**(kg)**	1.1	1.5	1.53	1.53	1.54	1.54	1.54	1.54

Type		Three phase 4-wire				
Load capacity	**(%IN)**	300		400		Transformer-operated meters
Basic current	**(A)**	10	40	10	30	2.5
Max. current	**(A)**	30	120	40	120	5
Power consumption in current circuit	**(W)**	0.13	0.34	0.16	0.26	0.64
	(VA)	0.18	0.42	0.24	0.3	0.9
Type of standard		WL	WL	WL	WL	WL
Power consumption in voltage circuit	**(W)**	0.85		1.0		1.0
	(VA)	3.1		3.6		3.6
Weight of meter	**(kg)**	3.0	4.0	3.2	4.0	2.9

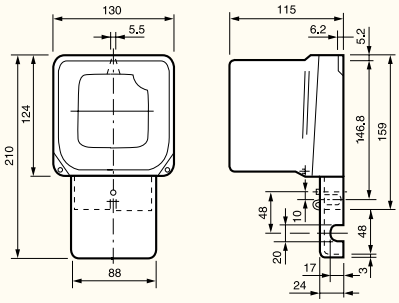
Rated voltage	**(V)**	**220/240**
Rated frequency	**(Hz)**	50/60
Class		2.0
Starting current		≤0.5% I_b at unity p. f
Creeping		No creeping between of 80% and 110% rated voltage
Influence due to temperature		In the range 0℃ to 40℃ and with loads between of the rated current and maximum rated current, for each10℃ of temperature increase (decrease)
at unity power factor		+0.3%(-0.3%)
at 0.5 power factor lagging		+0.5%(-0.5%)

Main model

Single phase 2-wire meter

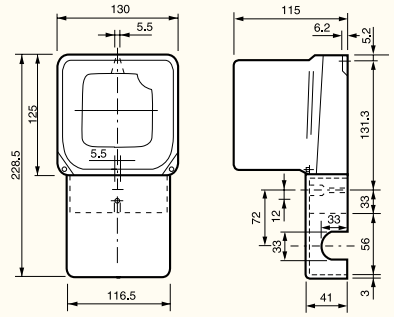
● WL 13S

Circuit System		Single phase 2-wire
Rated Current	(A)	10(30)
Rated Voltage	(V)	220
Load Capacity	(%IN)	300



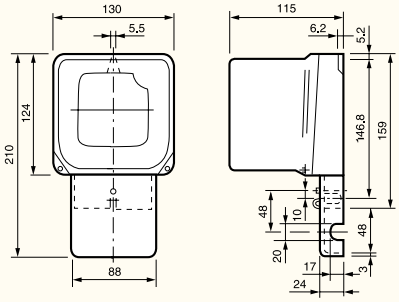
● WL 13S

Circuit System		Single phase 2-wire
Rated Current	(A)	40(120)
Rated Voltage	(V)	220
Load Capacity	(%IN)	300



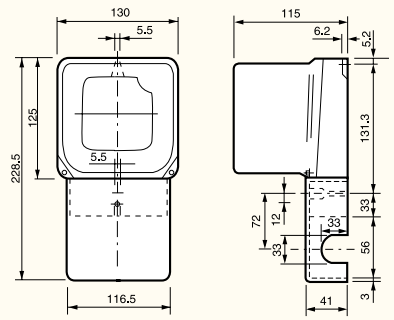
● WL 14S

Circuit System		Single phase 2-wire
Rated Current	(A)	10(40)
Rated Voltage	(V)	220
Load Capacity	(%IN)	400



● WB 14S

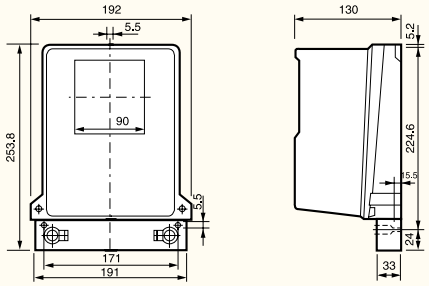
Circuit System		Single phase 2-wire
Rated Current	(A)	30(120)
Rated Voltage	(V)	220
Load Capacity	(%IN)	400



Three phase 4-wire meter

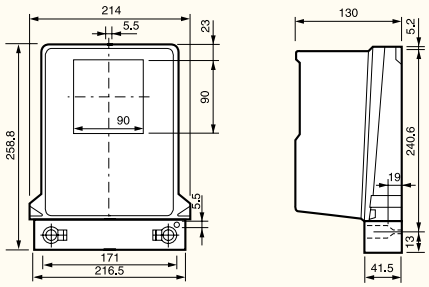
● WL 43R

Circuit System		Three phase 4-wire
Rated Current	(A)	10(30)
Rated Voltage	(V)	220/380
Load Capacity	(%IN)	300



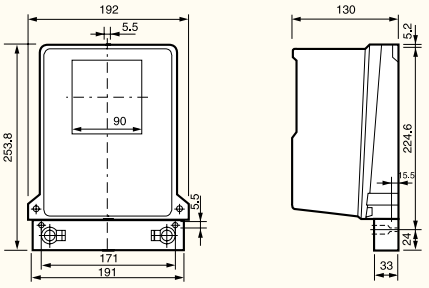
● WL 43R

Circuit System		Three phase 4-wire
Rated Current	(A)	40(120)
Rated Voltage	(V)	220/380
Load Capacity	(%IN)	300



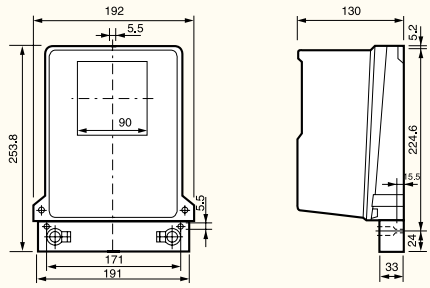
● WL 44R

Circuit System		Three phase 4-wire
Rated Current	(A)	10(40)
Rated Voltage	(V)	220/380
Load Capacity	(%IN)	400

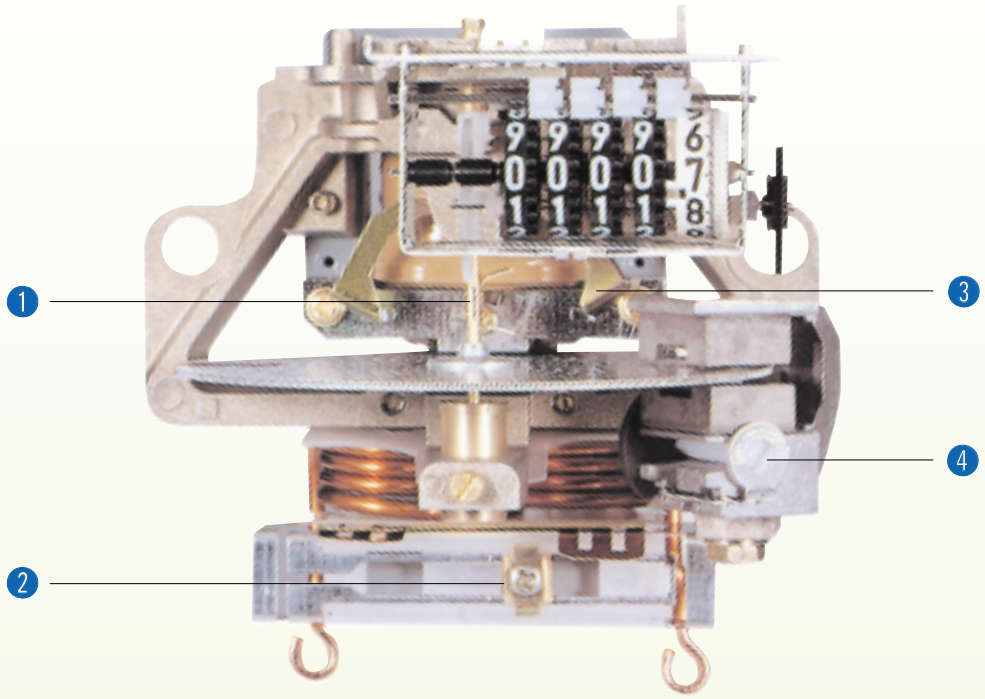


● WL 42R

Circuit System		Three phase 4-wire
Rated Current	(A)	2.5(5)
Rated Voltage	(V)	220/380
Load Capacity	(%IN)	200



Adjusting facilities



❶ Staring torque adjustment

A pliable U-shaped metal vane sets up a braking effect with the aid of the stary field from the moving elements. The required staring torque is set by changing the distance between the two protruding limbs on this vane. The braking effect does not depend on the vertical play of the rotor, provided that the tongue attached to the moving elements is between the protruding ends of the brake vane.

❷ Inductive load adjustment

Coares adjustment is effected by cutting open the phase compensating turns. Fine adjustment is effected by relocating the sliding contact screw, thus varying the resistance of the load winding on the current electromagnet.

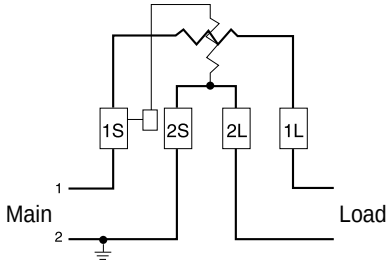
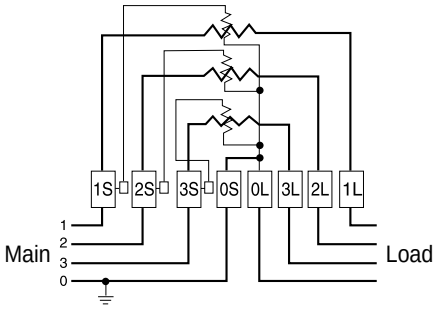
❸ Low load fine adjustment

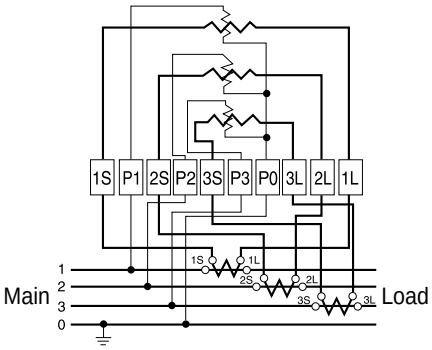
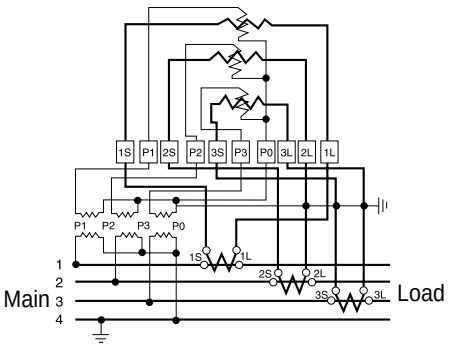
The lever mounted on the meter element support frame displaces the voltage flux, thus regulating the moving and restraining forces.
Creeping is thus eliminated and the low-load point firmly set.

❹ Rated speed

Coarse adjustment is obtained by the magnet being turned parallel to the rotor disc, thereby changing the rated speed. Fine adjustment is obtained by rotating the disc-shaped magnetic shunt.

Circuit diagrams

Phase & wire / Wiring connection	Single phase 2-wire	Three phase 4-wire
Direct connection meter		

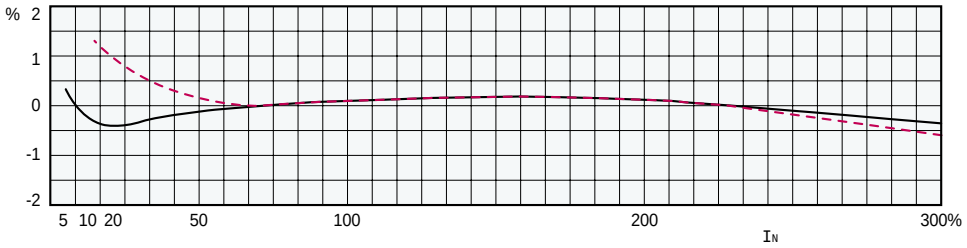
Phase & wire / Wiring connection	Three phase 4-wire	
	CT connection	**CT and PT connection**
CT or PT operated meter		

Typical performance characteristic curves

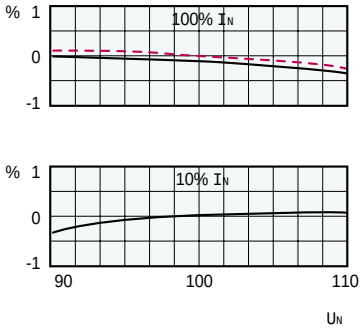
Single phase 2-wire

cos = 0.5
cos = 1.0

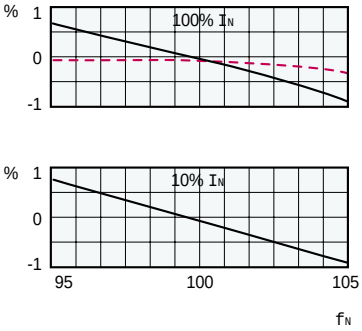
Load curve



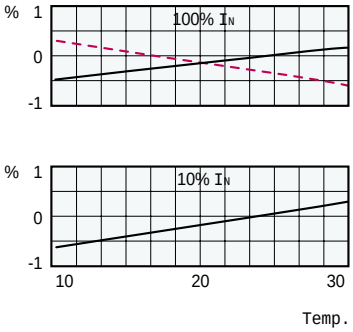
Effect on load curve by varying the voltage



Effect on load curve by varying the frequency

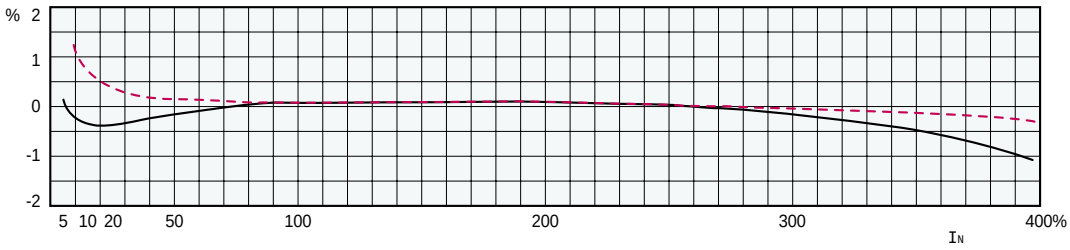


Effect on load curve by varying the temperature

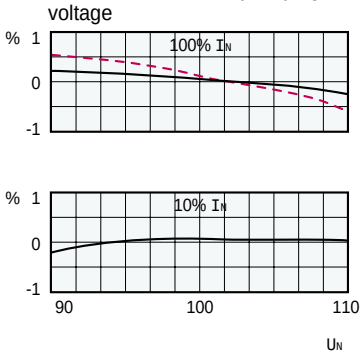


cos = 0.5
cos = 1.0

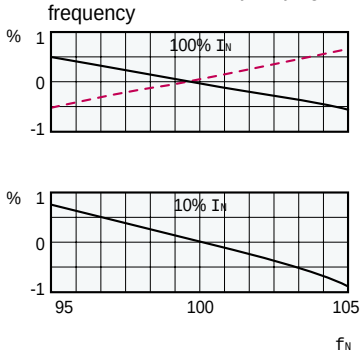
Load curve



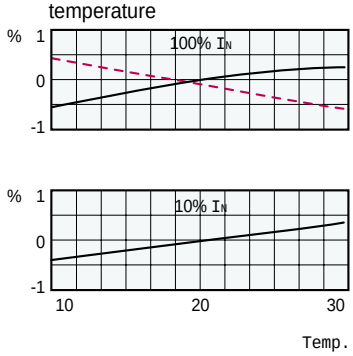
Effect on load curve by varying the voltage



Effect on load curve by varying the frequency

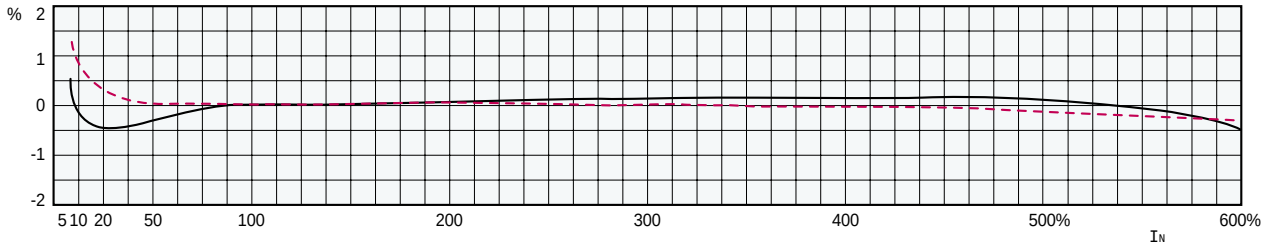


Effect on load curve by varying the temperature

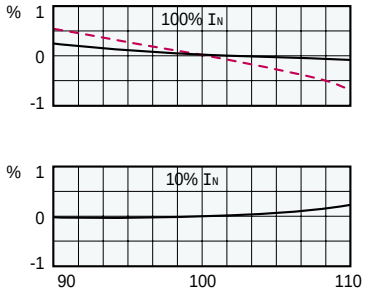


cos = 0.5
cos = 1.0

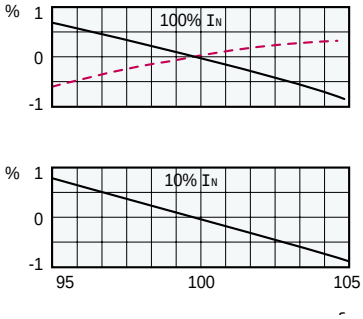
Load curve



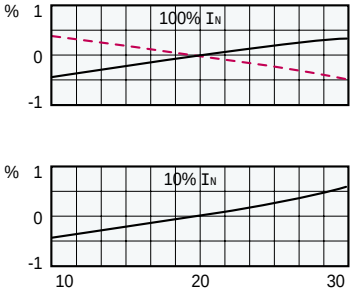
Effect on load curve by varying the voltage



Effect on load curve by varying the frequency



Effect on load curve by varying the temperature

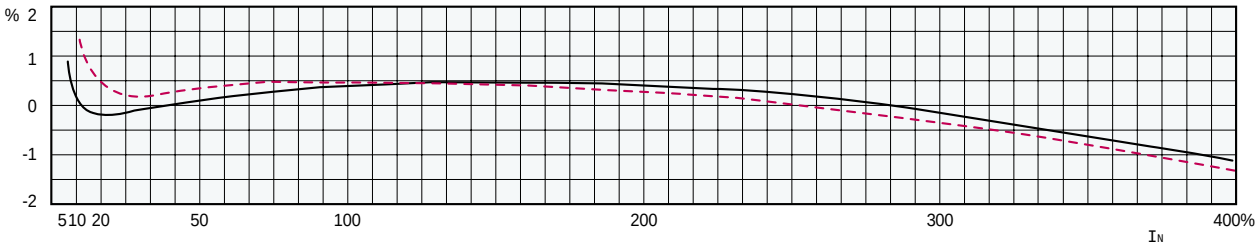


Typical performance characteristic curves

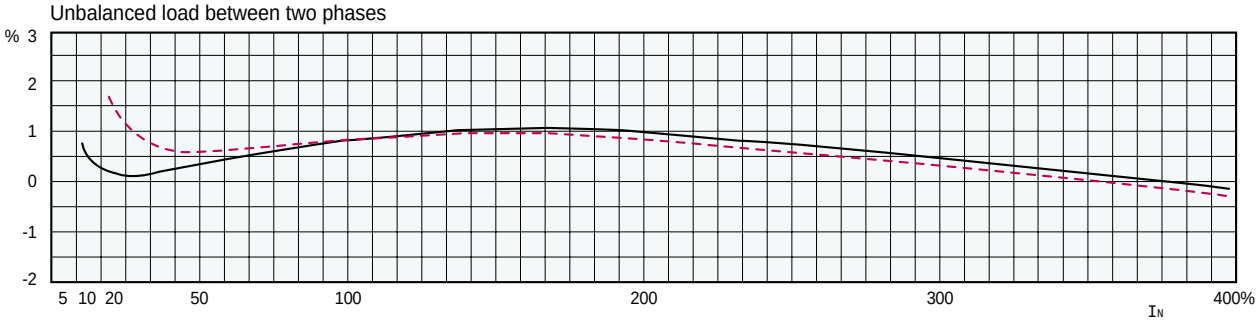
Three phase 4-wire

cos = 0.5
cos = 1.0

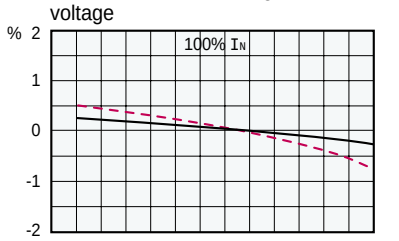
Balanced load



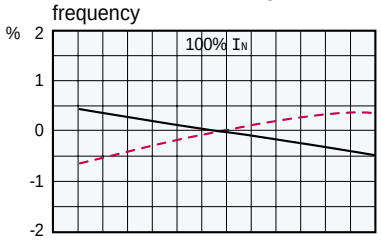
Unbalanced load between two phases



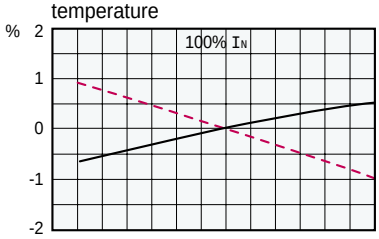
Additional error for change in voltage

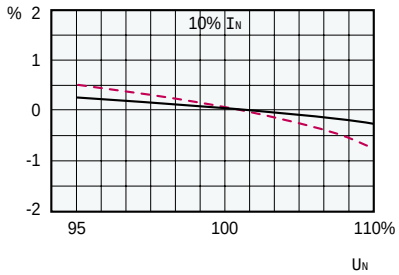


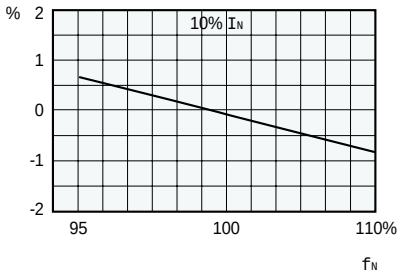
Additional error for change in frequency

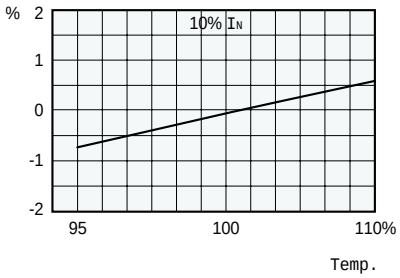


Additional error for change in temperature

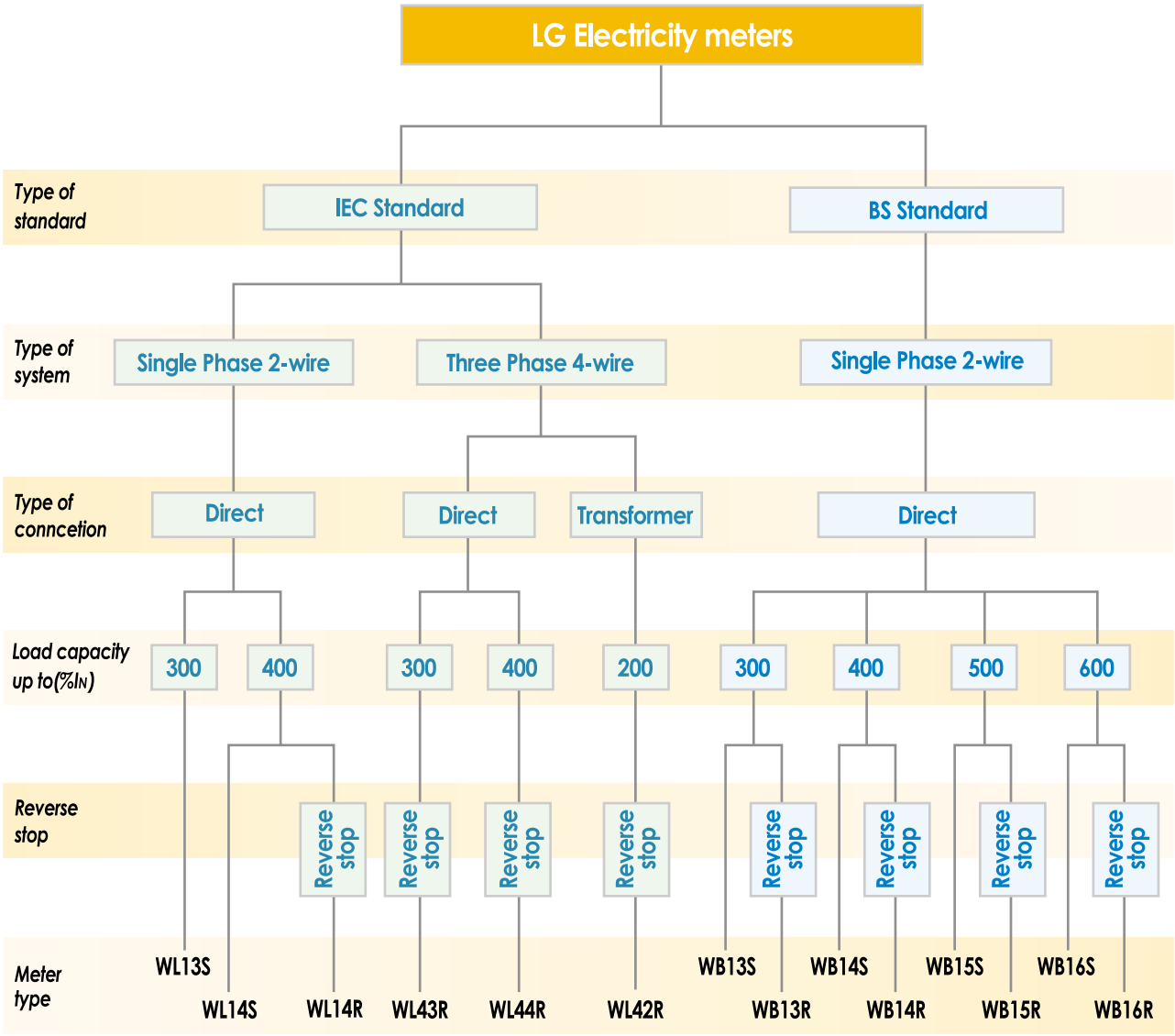








Ordering details



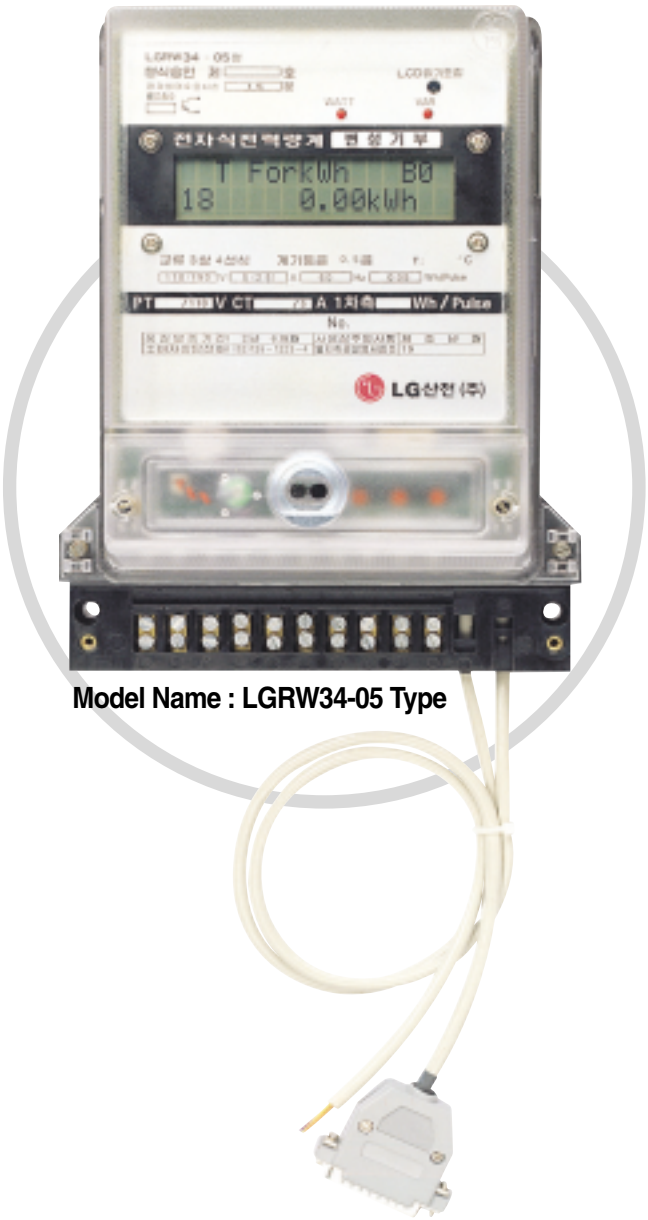
When ordering or requesting please inform us the followings.

Order specification	Example
1. Meter type	WL14S
2. Basic current(Max. current)	10(40)A
3. Rated voltage and frequency	220V, 50Hz
4. Connection	Direct connection(or Current Transformer-operated)
5. Lower bearing type	Magnetic bearing(or Jewel bearing)
6. Type of impulsing device	Single channel read S/W output
7. Type of terminal cover	Extended terminal cover

LG electronic polyphase electricity meter

General

This meter is LG electronic polyphase electricity meter with real, reactive, power factor measurement capability. The meter consists of the base, main cover, lower cover, terminal cover, upper frame, basic circuit board, power & communication circuit board, register circuit board. It has been tested and verified that it complies with IEC1036 & IEC 687.



Model Name : LGRW34-05 Type

Meter Types

- Polyphase 3 wire and 4 wire system
- Basic Model : 110V / 190V,5(2.5)A.60Hz
- Class 0.5 and class 1.0

System Integration

- Programming and Reading by Optical Communication port based on IEC 1107 & ANSI C12,13
- Data translation support in software package (KERNEL : Korean Ianguage version software)
- Dial Up Modem Interface for communication

Meter Compatibility

- Front connection mounting
- Flush mounting

Output funcition

- Standard outputs
  - pulse initiator signal (Forward kwh, Lagging kvarh, Leading kvarh)
  - End of interval signal

Programmable dates

- Calender
  - programmable TOU schedule;
  - each time, weekday, weekend, season, sunday,
  - irregular holidays(up to 30 days per year)
- Time Switch
  - TOU for 5 Tariffs with up to selectable tariff set points per day
- Demand reset days
  - Programmable regular and irregular demand reset days

Measured quantities

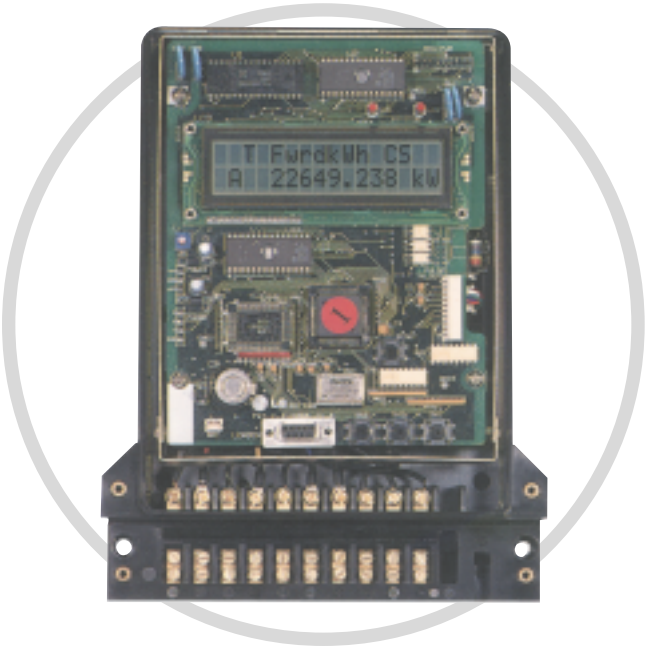
- kwh, kvarh
  - Bidirectional kwh(Forward, Reverse)
  - Lagging and Leading kvarh
  - Total consumption
  - Five independent programmable TOU periods
  - Displayable 7 digits
  - Selectable decimal position
- kwh, kvar demand
  - Measured concurrently with programmable kwh, kvarh
  - Display selection; current, cumulative. continuously cumulative
  - Programmable display format : decimal position
  - Block interval or rolling demand cumulation with selectable intervals
    block interval : 5,10,15,30, and 60 minutes
    sub interval : 1,2,3,4,5 minutes
  - Demand intervals start simultaneously with TOU period
- Power Factor
  - Average power factor (Total, TOU period)
  - power factor at previous interval
  - power factor at kw, kvar during TOU period

Battery

- Maintain register memory for 120 days
- Lithium thiony1 chloride (LiSOCL2) type

Displayable quantities

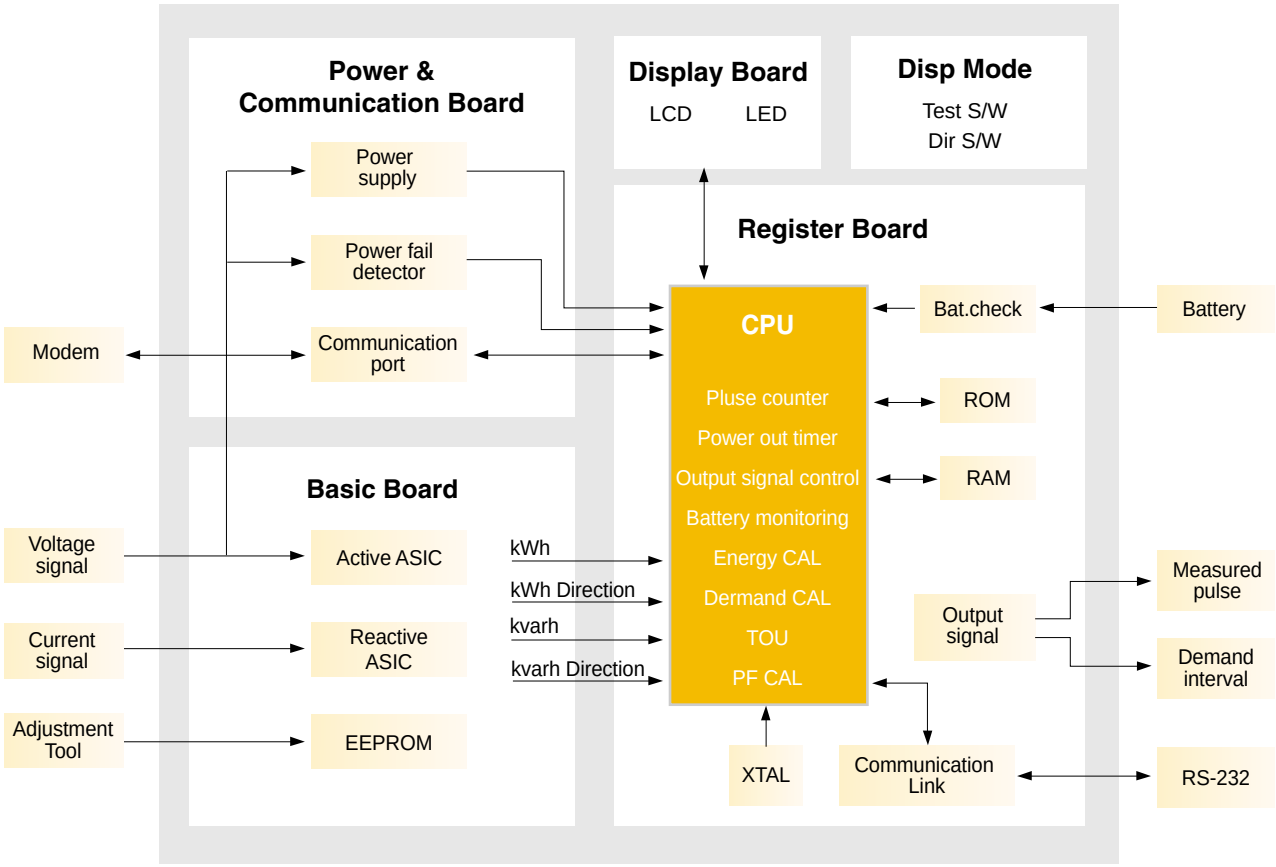
- Energy(kwh, kvarh)
  - total
  - TOU rate period quantities by quadrant concept
- Demand (kw, kvarh)
  - current
  - previous interval demand
  - cumulative, continuously cumulative
- Power factor
  - TOU average power gactor
  - total average power factor
  - previous interval power factor
- TOU rate
  - 5 TOU rate (A, B, C, D, E)
- Display Identifier
  - display by special letter
- Units of value
  - kwh, kvarh, kw, kvar, etc.



- Meter status display
  - pulse input blink indicator on display
  - Quadrant indicator on display
  - emand Reset display
  - Error number & error contents display
- Display operation
  - programmable sequence of display item
  - display item names for each item
  - programmable display time for each item
  - Alternate scroll easy to initiate and exit using display switch
- Test mode

System integration

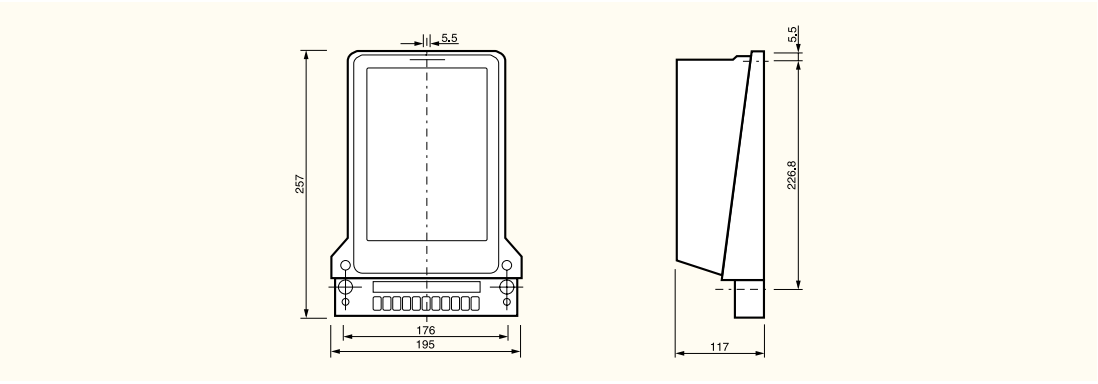
- Optional external dial up modem
  - read a recorded data form meter to central station
  - data rate : ASYNCHRONOUS 1200, 2400 bps.
  - line requirement : voice band two-wire PSTN line
- Local program loader
  - programmable TOU schedule
  - read a measuring data
  - IBM-PC based WINDOWS compatible software
- Remote reading software
  - IBM-PC based WINDOWS compatible software
  - protocol : IEC 1107 mode C
  - Management and Billing in central



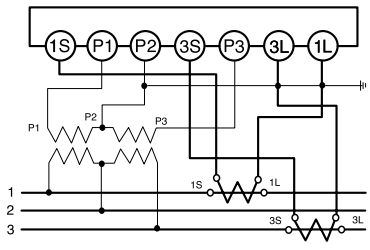
Block Diagram

TECHNICAL DATA

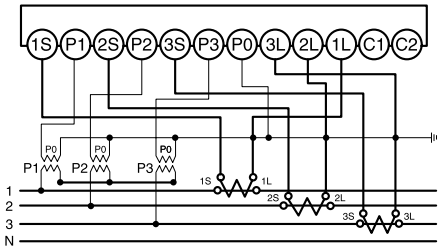
Items	Description
Voltage	110/190V
Current	5(2.5)A
Frequency	60Hz
Accuracy	Class 0.5 (IEC 687)
	Class 1.0 (IEC 1036)
Meter constant	3wire : 0.025 (Wh/pulse)
	4wire : 0.5 (Wh/pulse)
Recording channel	4CH
Temperature range	-25℃ ~ +55℃
Voltage loss (CL1.0)	< 2.0W per phase
Current loss (CL1.0)	< 0.1W per phase
Battery	850mAh, 3.6V, Lithium
Display	16 by 2 line DOT characters LCD
RAM	1M bit
EPROM	512K bit
CPU	68HC11E (Motorola)
Weight	2.3Kg
Dimensions	191(W) × 258.5(D) × 106.8(H)



External connection diagram



3phase 3wire
(Transformer Rated with voltage and Current Transformers)



3phase 4wire
(Transformer Rated with voltage and Current Transformers)

Leader in Electrics & Automation

Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance.
  Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.

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