

# Ziegler

Redefine Innovative Metering

# Technical Datasheet

POWER FACTOR METER CQ/CL

---

ANALOG PANEL METERS

# POWER FACTOR METER CQ/CL

## CQ/CL

Analog Power Factor Meters are designed to monitor changing power factor conditions on Ir-reversible balanced and unbalanced load system. The Power Factor is indirectly determined by measuring the phase angle  $\emptyset$  between current and voltage(both sinusoidal). However the movements are calibrated in values of  $\cos \emptyset$  of the angle  $\emptyset$ . Scale is highly non-linear.

## Product Features

- Knife edge pointer
- Glass filled polycarbonate housing
- Easily replaceable glass and bezel
- Accuracy Class 1.5
- Easy installation with swivel screws
- Higher Proof Voltage 2kV AC for 1 minute



## Specifications:

Scale & Pointer	
Pointer	Knife - edge Pointer
Pointer Deflection(CQ)	0...90°
Pointer Deflection(CL)	0...240°
Scale characteristics	Non Linear (CQ)(CL)
Scale division	Coarse - Fine
Scale length(CQ)	CQ72 : 61mm, CQ96 : 97mm, CQ144 : 146mm
Scale length(CL)	CL96 : 142mm, CL144 : 230mm
Scale Interchangeability	Interchangeable
Mechanical Data	
Case details	Moulded square case suitable for mounting in Control / Switchgear panels, Machinery consoles.
Case material	Glass filled Polycarbonate – Flame retardant and drip proof as per UL94 V-0.
Front facia	Glass
Colour of bezel	Black
Position of use	Vertical
Panel fixing	Swivel screws
Mounting	Stack-able in a single cutout
Panel thickness	≤25mm
Terminals	Hexagon studs, M4 screws & wire clamps E3 (DIN 46282)
Electrical Data	
Measured quantity	Power Factor
Power consumption (Approx) (CQ) :- Current path Voltage path	≤ 1.0 VA ≤ 3.0 VA Balance /3.5 VA for Unbalance
Power consumption (Approx) (CL) :- Current path Voltage path	≤ 1.0 VA ≤ 3.5 VA

# POWER FACTOR METER CQ/CL

Overload capacity (acc to IEC 60051 / DIN EN 60051)	Continuously 1.2 times rated voltage or current
	Short duration for voltage : 2 times rated voltage, 5 sec max overload
	Short duration for current : 10 times rated current ,5 sec max overload
Enclosure code (IEC 60529)(CQ)	IP 52 case IP 00 for terminals without back cover IP 20 for terminals with back cover
Enclosure code (IEC 60529)(CL)	IP 52 case IP 00 for terminals
Insulation class	Group A according to VDE 0110
Rated Insulation Voltage	660V
Proof voltage testing	2kV
Installation category(IEC 61010)	300V CAT III
Insulation resistance	>50 MΩ at 500V DC
<b>Reference Conditions</b>	
Accuracy Class	1.5 according to IEC 60051/DIN EN 60051
Ambient temperature(CQ)	23°C ± 2°C
Ambient temperature(CL)	23°C ± 2°C
Position of use	Nominal position ± 1°
Waveform	Sine wave
Frequency	50Hz +/- 0.1%
Other conditions	IEC 60051/DIN EN 60051
Distortion Factor	<= 1 %
Warm up	>= 5 min at minimum 80 % of rated current and 100 % of rated voltage
Current(CQ)	95....100 % rated current for balance 40....100 % rated current for unbalance
Current(CL)	96....100 % rated current
Voltage	Rated voltage ± 2 %
<b>Nominal range of use</b>	
Ambient temperature	0...50°C
Position of use	Nominal Position ± 5°
Frequency	49...51 Hz
External magnetic field	0.5mT
Voltage	Rated voltage ± 15 %
Current	20....120 % of rated current
<b>Environmental conditions</b>	
Climatic suitability	Climate category II as per IEC 60051 (climatic class 3 acc to VDE/VDI 3540)
Operating temperature	-10 ... +55°C
Storage temperature	-25 ... +65°C
Relative Humidity	≤75% annual average, non-condensing
Shock resistance	15g, 11ms
Vibration resistance	10-55-10 Hz/0.15mm, 1.5 g at about 50 Hz

# POWER FACTOR METER CQ/CL

## Standard Measuring Ranges for CQ(Measuring ranges for 1 phase and 3phase balance and unbal load)/for CL (1 phase and 3 phase balance load)

COS $\phi$	cap 0.5...1...0.5 ind
COS $\phi$	cap 0.8...1...0.3 ind
COS $\phi$	cap 0.8...1...0.8 ind

### RATED VOLTAGES

#### E- Single Phase D,V- three phase

E1C, D1C	V3C,D2C*1
57.5	100
63.5	110
100	220
110	380
120	415
127	440
220*	500
230	
240	
289	
380*	*1 possible in 96& 144
415*	* only for CQ meters
440*	
500*	

Rated Current 1A, 5A

**Note :-** Please clearly specify the application (3 Ph. 2 wire, 3 wire or 4 wire).

### Applicable standards(CQ/CL)

Nominal case & cutout dimensions for indicating electrical instruments	DIN 43700
Scale & Pointer for electrical measuring instruments	IEC 60051, DIN 43802
Connections and terminal markings for panel meters	IEC 60051, DIN 43807
Terminal bolts / leads	DIN 46200/46282
Safety requirements and protective measures for Electrical indicating instruments and their accessories	DIN 40050/8-70, VDE 0110/ 11-72 VDE 0410/ 10-76 IEC 60529, IEC 61010
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC 60051 / DIN EN 60051, DIN 43701
Front frames for indicating measuring instruments principle dimensions	DIN 43718
UL Combustibility class	UL94 V-0
Compliance with European directives	89/336/EEC (EMC Directive), 73/23/EEC (low voltage directive) & amendment 93/68/EEC for CE marking
Clamp straps for connections	DIN 46282

# POWER FACTOR METER CQ/CL

Technical conditions of delivery for electrical instruments	DIN 43701
Mechanical Strength (Free fall test, vibration test)	VDE 0411,part I, Sec.43/44.IEC 61010
Electromagnetic Compatibility (EMC) Compliance as per following standards	EN 50081-2,EN 50082-2,EN 55011/CISPR 11, EN 60555-2,IEC 555-2, EN 61 000-4-4/IEC 1000-4-4, EN 61 000-4-2/IEC 1000-4-2, EN 61 000-4-5/IEC 1000-4-5, ENV 50140

## Options

Front facia	Anti-glare glass
Colour of bezel	Red, Yellow, Blue, White
Red Index pointer	Front adjustable on site
Position of use	On request 0°...180°
Blank dial	With initial and end values marked
Special markings	Numbering / Lettering
Division dials	Basic divisions without numbering
Colour marking / band	Red or green

## Accessories

### Safety Terminal Protection

Full sized polycarbonate back cover to provide protection against accidental contact (hand and fingers) acc to VDE 0410

### Safety Precautions

- 1) Instruments with damaged bezels or window glasses must be disconnected from the mains.
- 2) Adequate safety clearance must be maintained to control panel fasteners and to sheet metal housing. If non-insulated connector wires are used.
- 3) The back cover must be snapped into place after connection wires have been clamped for protection against accidental contact.
- 4) Scales may only be replaced under voltage-free conditions.
- 5) Bezels and window glasses may only be replaced under voltage-free conditions.

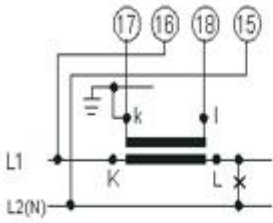
# POWER FACTOR METER CQ/CL

## Connection Diagram :

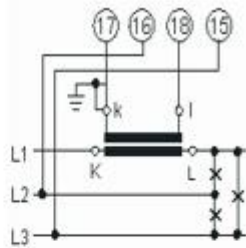
FOR CQ

FOR CL

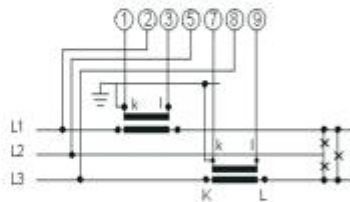
CQ 96/144 Single phase



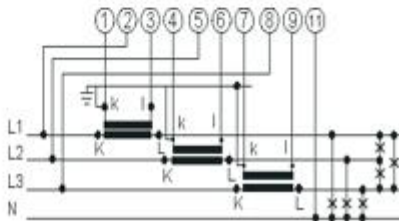
CQ 72/96/144 three ph. bal. Load



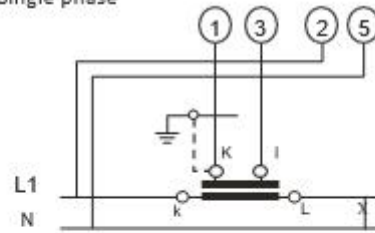
CQ 96/144 3ph. 3W Unbal. Load



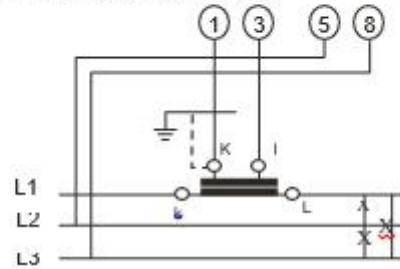
CQ 96/144 3ph. 4W Unbal. Load



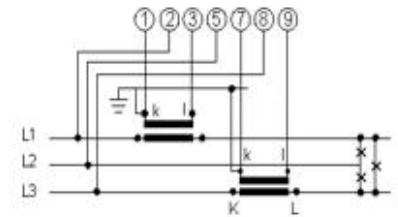
CL 96/144 Single phase



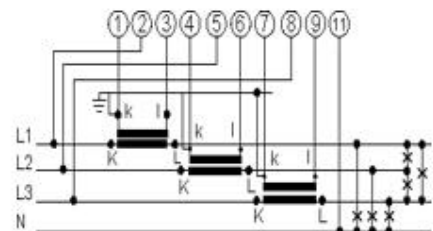
CL 96/144 Three phase balanced load



CL 96/144 3ph. 3W Unbal. Load



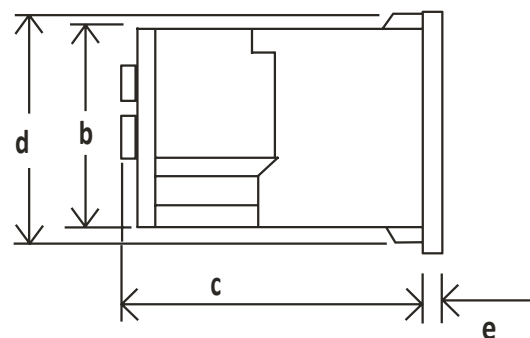
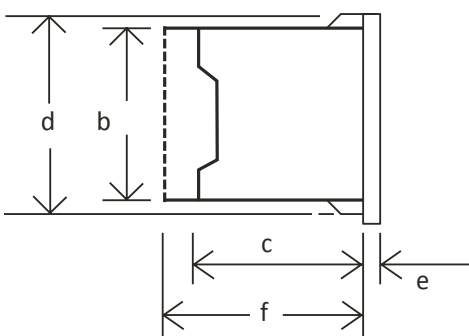
CL 96/144 3ph. 4W Unbal. Load



## Dimensions:

For CQ

FOR CL



**FOR CQ**

Dimensions (mm)	CQ 72	CQ 96	CQ 144
Bezel (a)	72	96	144
Case (b)	66	90	136
Depth (c) Balance	72	53	53
Unbalance	-	122	136
(d)	68	92	138
(e)	5.5	5.5	6.5
Cutout size	68	92	138
Depth with cover (f)	—	64	64
Weight (approx.)	0.55 kg.	0.6 kg.	0.8 kg.

**FOR CL**

Dimensions (in mm)		CL 96	CL 144
Bezel	a	96	144
Case	b	90	136
Depth	c	102	136
	u	91.5 <sup>±0.2</sup>	137.5
	e	5.5	5.5
Cutout Size		92	138 <sup>±0.1</sup>
Weight (approx.)		0.68 kg	0.8 kg

**Ordering information**

CQ/CL	
Front dimension(CQ)	72X72mm, 96X96mm, 144X144mm
Front dimension(CL)	96X96mm, 144X144mm
Type E	Single phase system
D	3 phase 2 wire system balance/unbalance load.
V	3 phase 4 wire system balance/unbalance load.
Measuring ranges COS Ø	cap 0.5....1....0.5 ind, cap 0.8....1....0.3 ind, cap 0.8....1....0.8 ind
Terminal Protection	Full sized polycarbonate back cover
Rated Voltages	Refer to table inside
Rated Currents	1 A, 5 A
Front facia	Normal glass *1, PC glass *3, Anti-glare glass*3
Colour of bezel	Black *1 Red, Blue, Yellow, White *3
Position of use	Vertical *1 On request 0.....180°*3
Dial	Standard scale same as measuring range*1 Blank dial with division*3 Additional lettering on request*3 Additional numbering on request*3 Coloured marking red or green*3 Coloured sector red or green*3
Logo	Ziegler*1, Others*3

\*1 Standard

\*3 Please clearly add the desired specifications while ordering

**Ordering Example – CQ96/CL96**, 3 phase 3 wire system balanced load, measuring range(cos φ) cap 0.5...1...0.5 ind, rated voltage AC 230V, rated current 1A.

# Ziegler

Redefine Innovative Metering

**Ziegler Instrumentation UK Ltd.**

Central Buildings, Woodland close old woods Trading Estate, Torquay Devon, TQ2 7BB, United Kingdom  
+441803 616 800 | [info@ziegler-instrument.com](mailto:info@ziegler-instrument.com) | [ziegler-instrument.com](http://ziegler-instrument.com)