

Ziegler

Redefine Innovative Metering

Technical Datasheet

2 IN 1 EQ | PQ | ZQ

ANALOG PANEL METERS

2 IN 1 EQ | PQ | ZQ

ANALOG PANEL METERS

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Ziegler 2 in 1 meter offers 2 different electrical parameter measurements in a single meter as per industrial standard. These meter comes in 2 sizes 96sqmm and 144sqmm with 3 different types i.e EQ,PQ and ZQ with input combination of Voltmeter-Voltmeter, Ammeter-Ammeter,Voltmeter-Ammeter and Frequency-Frequency. These meters are mainly used in motor starter panels. 2 in 1 meter comes with a highest accuracy of 1.5%.

Product Features

- Two different meters in one case.
- Near Linear scale.
- Glass filled polycarbonate housing(UL 94-V-0).
- Knife edge pointer.
- Easily replaceable glass and bezel.



Specifications: EQ

Scale & Pointer(EQ)	
Pointer	Knife - edge Pointer
Pointer Deflection	0...90°
Scale characteristics	Near Linear above 10% of nominal value
Scale division	Coarse - Fine
Scale length	EQ48 : 41mm, EQ72 : 63mm, EQ96 : 97mm, EQ144 : 146mm
Ammeters	2 times nominal current
Voltmeters	1.2 times nominal voltage
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 for Voltmeters & Ammeters ≤ 30A	Hexagon studs, M4 screws & wire clamps E3 (DIN 46282)
Terminals for Ammeters > 30A	Threaded studs M6 with nuts
Terminals for Ammeters > 60A	Threaded studs M8 with nuts
Electrical Data	
Measured quantity	AC Voltage or Current
Power consumption for Voltmeters	< 4.5VA
Power consumption for Ammeters ≤ 15A	< 0.5VA

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Power consumption for Ammeters > 15A	< 0.8 VA
Overload capacity (acc to IEC 60051)	Continuously 1.2 times rated voltage or current
	Short duration for voltmeters : 2 times rated voltage (max 1000V, max up to 5 seconds)
	Short duration for Ammeters : 10 times rated current for 5 sec max and 40 times (max 250A, max up to 1 second)
Enclosure code (IEC 60529)	IP52 for case IP 00 for terminals without back cover IP 20 for terminals with back cover
Insulation class	Group A according to VDE 0110
Rated Insulation Voltage	EQ48 : 660V, EQ72/96/144 : 1000V
Proof voltage	EQ48 : 2KV, EQ72/96/144 : 3KV
Installation category	EQ48 : 300V CAT III, EQ72/96/144 : 600V CAT III
Insulation resistance	>50 MΩ at 500V DC
Reference Conditions	
Accuracy Class	1.5 according to IEC 60051
Ambient temperature	23°C ± 2°C
Position of use	Nominal position ± 1°
Input Waveform	Rated value of measured quantity sine wave, distortion factor ≤ 5%
Frequency	45...65 Hz
Other conditions	IEC 60051
Nominal range of use	
Ambient temperature	0...50°C
Position of use	Vertical ± 5°
Frequency	15...100Hz (Voltage), 15...400Hz (Current)
External magnetic field	At 0.4 kA/m
Environmental conditions	
Climatic suitability	Climate category II as per IEC 60051 (climatic class 3 acc to VDE/VDI 3540)
Operating temperature	0 +50°C
Storage temperature	-25 ... +65°C
Relative Humidity	< 75% annual average, non-condensing
Shock resistance	15gn, 11ms
Vibration resistance	10-55-10 Hz/0.15mm, 1.5 gn at about 50 Hz
Terminals for Ammeters > 60A	Threaded studs M8 with nuts

Standard Measuring Ranges for EQ

AC Voltage	AC Current
6V	100mA
10V	150mA
15V	250mA
25V	400mA
40V	600mA
60V	1A
100V	1.5A
120V	2.5A
132V	3A
150V	4A

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200V	5A
250V	6A
300V	10A
400V	15A
500V	20A
600V	25A
750V (except EQ48)	30A
1000V (except EQ48)	40A
For use on voltage transformer	50A
.../100V secondary	60A
Or	100A (except for EQ48)
.../110V secondary	For use on current transformer .../1A secondary
	Or .../5A secondary



PQ

Scale & Pointer(PQ)	
Pointer	Knife - edge Pointer
Pointer Deflection	0...90°
Scale characteristics	Linear
Scale division	Coarse - Fine
Scale length	PQ48 : 41mm, PQ72 : 61mm, PQ96 : 97mm, PQ144 : 146mm
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 for Voltmeters & Ammeters <5A	Hexagon studs, M4 screws & wire clamps E3 (DIN 46282)
Terminals for Ammeters >5A	Threaded studs M6 with nuts
Terminals for Ammeters > 60A	Threaded studs M8 with nuts

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Electrical Data	
Measured quantity	DC Voltage or Current
Overload capacity (acc to IEC 60051)	Continuously 1.2 times rated voltage or current
	Short duration for voltmeters : 2 times for 5 sec : 1 overload 2 times for 0.5 sec : 9 overloads
	Short duration for Ammeters : 10 times for 5 sec : 1 overload 10 times for 0.5 sec : 9 overloads
Enclosure code (IEC 60529)	IP 52 case IP 00 for terminals without back cover IP 20 for terminals with back cover
Insulation class	Group A according to VDE 0110
Rated Insulation Voltage	PQ48 : 660V, PQ72/96/144 : 1000V
Proof voltage	PQ48 : 2KV, PQ72/96/144 : 3KV
Installation category	PQ48 : 300V CAT III, PQ72/96/144 : 600V CAT III
Insulation resistance	>50 MΩ at 500V DC
Reference Conditions	
Ambient temperature	23°C ± 2°C
Position of use	Nominal position ± 1°
Input	Rated value of measured quantity
Other conditions	IEC 60051/DIN EN 60051
Nominal range of use	
Ambient temperature	0...50°C
Position of use	Vertical ± 5°
External magnetic field	At 0.4 kA/m
Environmental conditions	
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

DC Current	
Rated Value	Approx Voltage Drop
15 uA ^{*3 *5}	140 mV
25 uA ^{* *5}	240 mV
40 uA ^{*3}	374 mV
50 uA ^{*4}	424 mV
60 uA ^{*4}	600 mV
100 uA	400 mV
150 uA	600 mV
250 uA	140 mV
400 uA	540 mV
500 uA	540 mV
600 uA	540 mV
1 mA	37 mV
1.5 mA	196 mV
2.5 mA	196 mV

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4 mA	196 mV
5 mA	196 mV
6 mA	196 mV
10 mA	196 mV
15 mA	11 mV
20 mA	60 mV
25 mA	60 mV
40 mA	60 mV
60 mA	60 mV
100 mA	60 mV
150 mA	60 mV
250 mA	60 mV
400 mA	60 mV
600 mA	60 mV
1 A	60 mV
1.5 A	60 mV
2.5 A	60 mV
4 A	60 mV
5 A	60 mV
6 A	72 mV
10 A	60 mV
15 A	60 mV
20 A	60 mV
25 A	60 mV
30 A	60 mV
40 A	60 mV
60 A	72 mV
100 A *	60 mV
For use on transducer 4-20 mA	60 mV

DC Voltage	
Rated Value	Sensitivity (±10%)
15 mV *4 *5	0.16 kohm/V
25 mV *4 *5	0.16 kohm/V
40 mV *4 *5	0.16 kohm/V
50 mV	0.16 kohm/V
60 mV	0.16 kohm/V
75 mV	0.16 kohm/V
100 mV	0.16 kohm/V
150 mV	0.16 kohm/V
250 mV	01.6 kohm/V
400 mV	0.16 kohm/V
600 mV	0.16 kohm/V
1 V	1 kohm/V
1.5 V	1 kohm/V
2.5 V	1 kohm/V
4 V	1 kohm/V
6 V	1 kohm/V
10 V	1 kohm/V
15 V	1 kohm/V

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25 V	1 kohm/V
30 V	1 kohm/V
40 V	1 kohm/V
50 V	1 kohm/V
60 V	1 kohm/V
100 V	1 kohm/V
150 V	1 kohm/V
200 V	1 kohm/V
250 V	1 kohm/V
300 V	1 kohm/V
400 V	1 kohm/V
500 V	1 kohm/V
600 V	1 kohm/V
1000 V	1 kohm/V
1-5 V	1 kohm/V
For use on external shunt	
60 mV *6	1 kohm/V
75 mV *6	1 kohm/V
150 mV *6	1 kohm/V



ZQ

Scale & Pointer(ZQ)	
Pointer	Knife - edge Pointer
Pointer Deflection(ZQ)	0...90°
Scale characteristics	Linear *
Scale division	Coarse – Fine
Scale length(ZQ)	ZQ48 : 41mm, ZQ72 : 63mm, ZQ96 : 97mm, ZQ144 : 146mm
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

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Panel fixing	Swivel screws
Mounting	Stack-able in a single cutout
Panel thickness	≤25mm
Terminals	Hexagon studs, M4 screws & wire clamps E3
Electrical Data	
Measured quantity	Frequency
Input Quantity	Alternating voltage is sine waveform
Overload capacity (acc to IEC 60051)	Continuously 1.2 times rated voltage
	Short duration : 2 times rated voltage , 5 sec
Enclosure code (IEC 60529)	IP52 for case IP 00 for terminals without back cover IP 20 for terminals with back cover
Insulation class	Group A according to VDE 0110
Rated Insulation Voltage	660V
Proof voltage	2KV
Installation category	300V CAT III
Insulation resistance	>50 MΩ at 500V DC
Power consumption	≤7 VA
Reference Conditions	
Accuracy Class	0.5 according to IEC 60051 / DIN EN 60051)
Ambient temperature	23°C ± 2°C
Position of use	Nominal position ± 1°
Input	Rated value of measured quantity
Voltage	Rated voltage ± 2%
Other Conditions	IEC 60051 / DIN EN 60051
Preheating time	≥ 3 min
Nominal Range of Use	
Ambient Temperature	0...50°C
Position of use	Nominal ± 5°
External Magnetic Field	0.5 mT
Voltage	Rated Voltage ± 15 %
Environmental conditions	
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
Pollution degree(ZQ)	2

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Standard Measuring Ranges (ZQ)

Frequency ranges

45...50...55 Hz
45...55...65 Hz
55...60...65 Hz
360...400...440 Hz
380...400...420 Hz

Standard Measuring Ranges(ZQ)

Rated Input Voltage

55.7 V
63.5 V
100 V
110 V
115 V
120 V
127 V
208 V
220 V
230 V
240 V
289 V
380 V
400 V
415 V
440 V
440 V
500 V

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Applicable standards	
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
Clamp straps for connections	DIN 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 Environmental conditions	IEC 60051 IEC 60051 / DIN EN 60051, DIN 43701, IEC 60051, VDE / VDI 3540
Front frames for indicating measuring instruments principle dimensions	DIN 43718
UL Combustibility class	UL 94 V-0
Technical conditions of delivery for electrical instruments	DIN 43701
Mechanical strength (Free fall test , vibration test)	IEC 60051, VDE 0411,part 1, 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 61000-4-4 / IEC 1000-4-4, EN 61000-4-2 / IEC 1000-4-2, EN 61000-4-5 / IEC 1000-4-5, ENV 50140
Comply with following European directives	89/336/EEC (EMC directive), 73/23/EEC (low voltage directive), & amendment 93/68/EEC for CE marking

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°
Accuracy class	1
Blank dial	With initial and end values marked
Special markings	Numbering / Lettering
Division dials	Basic divisions without numbering
Colour marking / band	Red or green

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Accessories

Safety Terminal Protection

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

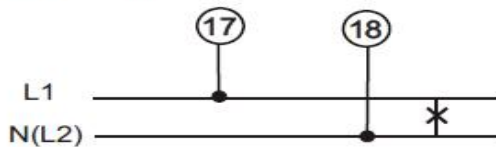
Safety Precautions

- 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 should be replaced under voltage-free conditions.
- 5) Bezels and window glasses may only be replaced under voltage-free conditions.

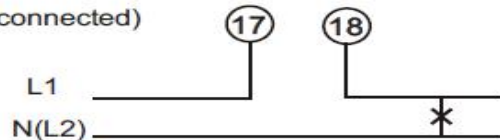
Connection Diagram

For EQ

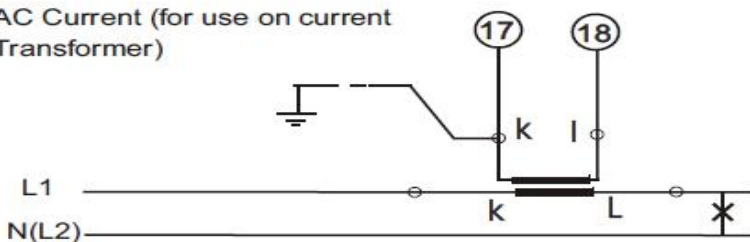
AC Voltage (Direct connected)



AC Current (Direct connected)



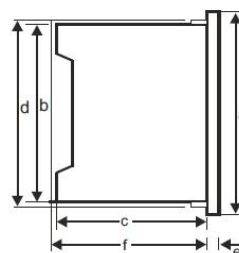
AC Current (for use on current Transformer)



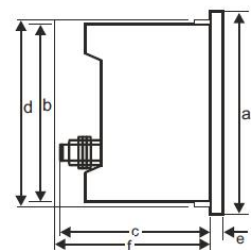
Dimensions (in mm)		EQ 96	EQ 144
Bezel	a	96	144
Case	b	90	136
Depth	c ^x	53	53
	d	91.5	137.5
	e	5.5	5.5
		92 ^{+0.8}	138 ⁺¹
Cotout Size			
Depth with Back cover	f ^{xx}	64	64

Dimensions:

For Voltmeters and Ammeters below 30A



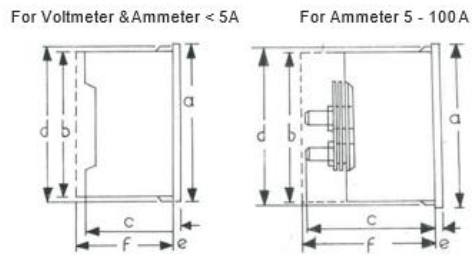
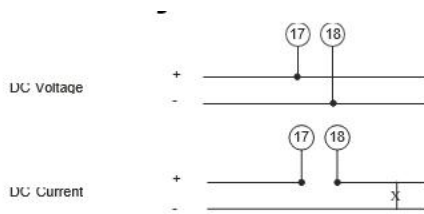
For Ammeters 30A and above



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FOR PQ

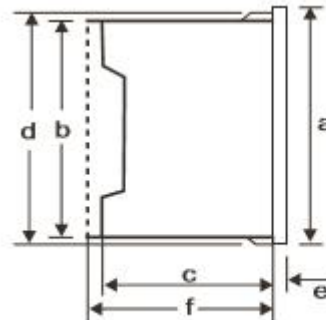
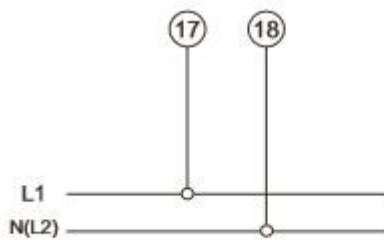


Dimensions (in mm)	PQ 96	PQ 144
Bezel a	□ 96	□ 144
Case b	□ 90	□ 136
Depth c*	53	53
d	□ 91.5	□ 137.5
e	5.5	5.5
Cutout size	□ 92 ^{+0.8}	□ 138 ^{**}
Weight(Approx)	0.2kg	0.4kg
Depth with back cover f**	64	64

* c = 68mm, for I= 6 to 30 A

**f = 70mm, for I= 6 to 30 A

FOR ZQ



	ZQ 96	ZQ 144
Cutout Size	92 ^{+0.8}	138 ^{**}
Weight (approx.)	0.2 kg.	0.4 kg.

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ANALOG PANEL METERS

Ordering information

Type EQ	Moving-iron panel meter	Moving-iron panel meter
Front dimension 96	96 mm x 96 mm	144 mm x 144 mm
Over range (Ammeters)	2 times, 3 times 6 times, 5 times	2 times, 3 times 6 times, 5 times
Measuring Ranges	Refer to table inside	Refer to table inside
Terminal protection	full sized polycarbonate back cover	full sized polycarbonate back cover
Panel Fixing	Mounting Clamps	Mounting Clamps
Red Index Pointer	None ^{*1} Required ^{*3}	None ^{*1} ^{*3} Required ^{*3}
Housings color	white, ^{*1} Black ^{*3}	Black ^{*1} , White ^{*3}
Front facia	Normal glass ^{*1} Anti-glare glass ^{*3} Polycarbonate glass ^{*3}	Normal glass ^{*1} Anti-glare glass ^{*3} Polycarbonate glass ^{*3}
Colour of bezel	Black ^{*1} Red, Blue, Yellow, White ^{*3}	Black ^{*1} Red, Blue, Yellow, White ^{*3}
Position of use	Vertical ^{*1} On request 0.....180 ^{*3}	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}	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}	ZIEGLER ^{*1}

Type PQ	Moving-coil panel meter	Moving-coil panel meter
Front dimension 96	96 mm x 96 mm	144 mm x 144 mm
Measuring ranges	Refer to table inside	Refer to table inside
Housing color	White ^{*1} , Black ^{*3}	Black ^{*1} ,White ^{*3}
Front facia	Normal glass ^{*1} Anti-glare glass ^{*3}	Normal glass ^{*1} Anti-glare glass ^{*3}
Colour of bezel	Black ^{*1} Red, Blue, Yellow, White ^{*3}	Black ^{*1} Red, Blue, Yellow, White ^{*3}
Position of use	Vertical ^{*1} on request 0.180 ^{*3}	Vertical ^{*1} on request 0.180 ^{*3}
Terminal protection	Full sized polycarbonate back cover	Full sized polycarbonate back cover
Zero position	Left, ^{*1} Off-set zero ^{*3} Centre ^{*1}	Left, ^{*1} Off-set zero ^{*3} Centre ^{*1}
Increased sensitivity	4 kohm/V for voltmeters 1...600 V ^{*3} 10 kohm /V for voltmeters 15 ...150 V ^{*3}	4 kohm/V for voltmeters 1...600 V ^{*3} 10 kohm /V for voltmeters 15 ...150 V ^{*3}
Adjustment Resistance (Sensitivity)	Within $\pm 1\%$ at 23 C ^{*3}	Within $\pm 1\%$ at 23 C ^{*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}	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}	ZIEGLER ^{*1} , Others ^{*3}

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Type ZQ	Pointer type frequency meter	Pointer type frequency meter
Front Dimension	96mm x 96mm	144mm x 144mm
Measuring Ranges	Refer to table inside	Refer to table inside
Housing color	White ^{*1} , Black ^{*3}	Black ^{*1} , White ^{*3}
Front fascia	Normal glass ^{*1} Anti-glare glass ^{*3}	Normal glass ^{*1} Anti-glare glass ^{*3}
Colour of Bezel	Black ^{*1} Red, Blue, Yellow, White ^{*3}	Black ^{*1} Red, Blue, Yellow, White ^{*3}
Position of use	Vertical ^{*1} on request 0. 180 ^{0*3}	Vertical ^{*1} on request 0. 180 ^{0*3}
Terminal Protection	Full sized polycarbonate back cover	Full sized polycarbonate back cover
Dial	Standard scale same as measuring range 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} .	Standard scale same as measuring range 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}	ZIEGLER ^{*1}

Ordering Example

EQ 30A - 500V 96*96, EQ 300V - 500V 144*144, EQ 30A - 5A96*96.

PQ 5A- 500V 96*96, PQ 75mV - 10V 96*96, PQ 1mA - PQ 1A 144*144,

ZQ 96/144, measuring 45...50...55 Hz / 55...60...65 Hz, rated voltage AC 230 V/ AC 380 V.

Ziegler

Redefine Innovative Metering

Ziegler Instrumentation UK Ltd.

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