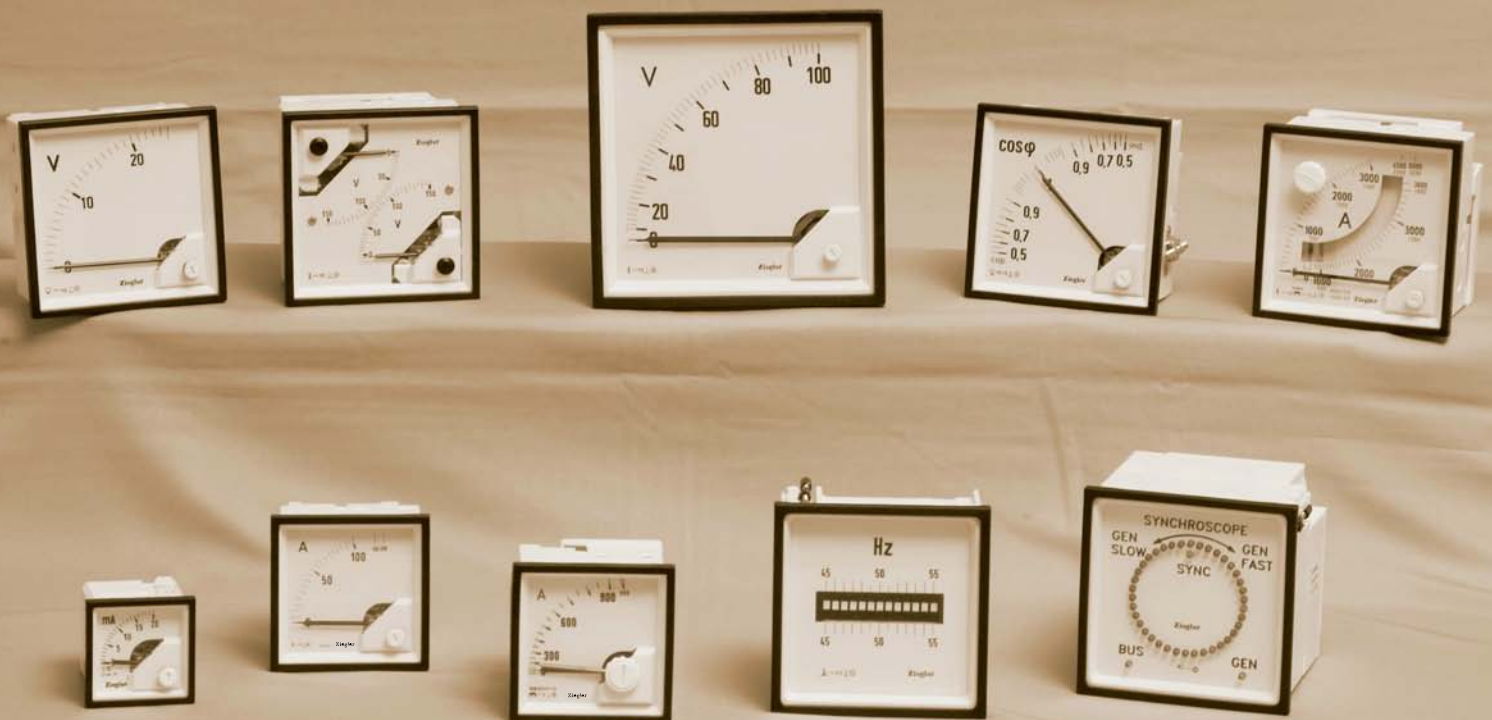
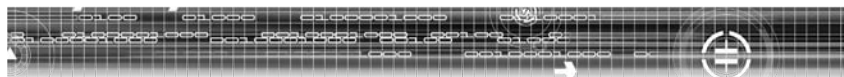


Analogue Panel Meters





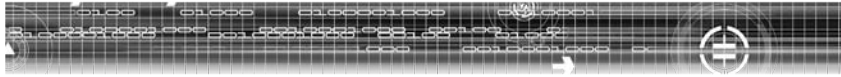
Ziegler

Redefine Innovative Metering

ANALOG PANEL METERS & ACCESSORIES

SECTION INDEX

1. Moving Iron Type 90 Degree Scale – DE for AC Current & Voltage.
2. Moving Coil Type 90 Degree Scale – DS for DC Current & Voltage.
3. Moving Coil with Rectifier Type 90 Degree Scale – DG for AC Current & Voltage.
4. Moving Coil with builtin transducer Type 90 Degree Scale – LF for Power Factor.
5. Moving Coil with builtin transducer Type 90 Degree Scale – LM for Active & Reactive Power.
6. Moving Coil with builtin transducer Type 90 Degree Scale – FM for Frequency.
7. Bimetallic Movement Type 90 Degree Scale – BM/EB for Maximum Demand Current.
8. 2 in 1 Pointer Type 90 Degree Scale meters.
9. Moving Iron Type 90 Degree Scale with builtin Selector Switch – for 3 phase AC Current & Voltage.
10. Moving Coil Type 240 Degree Scale – DSL for DC Current & Voltage.
11. Moving Coil with Rectifier Type 240 Degree Scale – DGL for AC Current & Voltage.
12. Moving Coil with builtin transducer Type 240 Degree Scale – LFL for Power Factor.
13. Moving Coil with builtin transducer Type 240 Degree Scale – LML for Active & Reactive Power.
14. Moving Coil with builtin transducer Type 240 Degree Scale – FML for Frequency.
15. LED Type Electronoc Synchroscope.
16. Vibrating REED Type Frequency meter.
17. DC Shunts for High Current Measurement.
18. Accessories



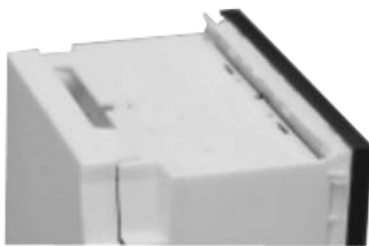
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Redefine Innovative Metering

ZIEGLER ANALOGUE PANEL METERS

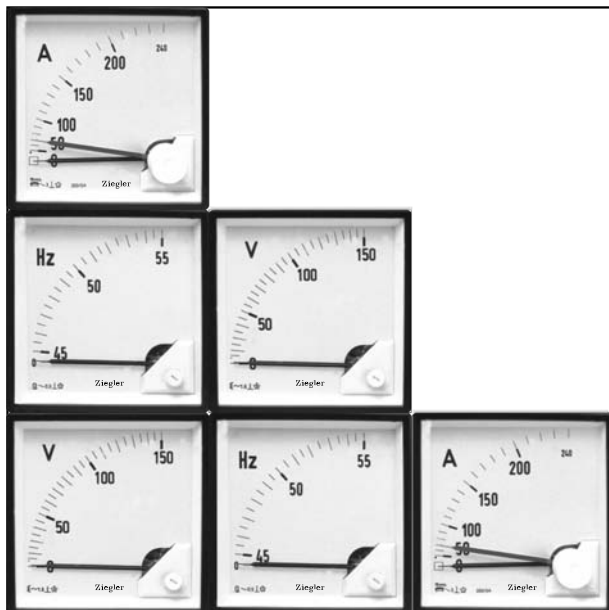
ROBUST CASE WITH CLASSIC FINISH

Ziegler Meters are housed in a Robust case made of glass filled Polycarbonate. This case is self extinguishing and non-drip which conforms to international regulations UL 94 V-0, resulting in no danger to the equipment below meters, since no burnt plastic material falls on some other equipment. This light weight material falls on some other equipment. This light weight material has very high mechanical strength and flame retardant properties



CONVENIENT HOUSING FOR EASY MOUNTING

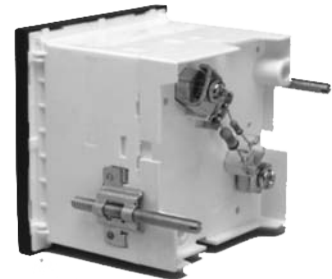
Housing design is so convenient that the installation is possible in various grid systems. The instrument is suitable for mounting in Control Panel, Switch Boards and machine consoles even up to a wall thickness of 25mm. Design facilitates for mounting meters in vertical and horizontal rows in a single cut-out. Optically an easy mounting leaf spring is also available for thickness of 1mm panel.



MOUNTING

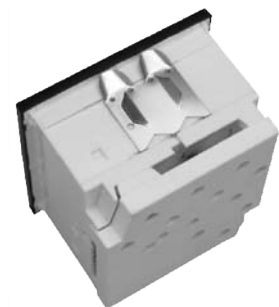
Mounting is possible through S type screw clamps which can be mounted on any two opposite sides of the meter either left and right or top and bottom. All fasteners are resistant to excessive vibration and shock. The "S" type screw clamp supplied as standard equipment is suitable for control panel of thickness

25mm



LEAF SPRING

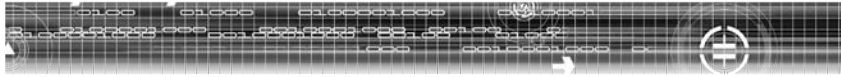
As optional, Ziegler can supply an easy mounting leaf spring. This is saving time in installation as they snap into the panel very easily & speedily. It can be as front mounting into various grid systems. The instruments are suitable for mounting in control panels, switchboards and machine consoles even up to wall thickness of 25mm. Design facilitate for mounting meters in vertical and horizontal rows in a single cut-out.



SELF LIFTING TERMINAL CLAMPS

The terminal screws are connected to the terminal clamps. Whenever we unscrew, the terminal clamp gets lifted along with the terminal screw. This simplifies clamping of connector/wires.



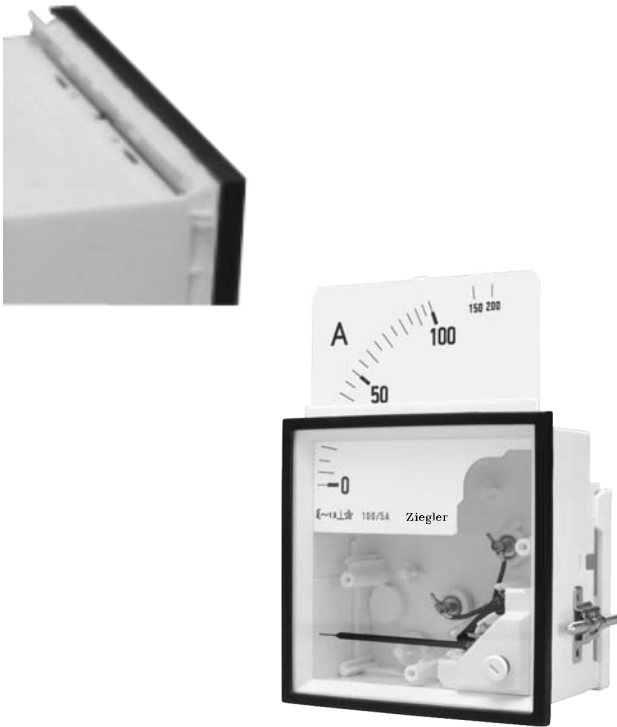


Ziegler

Redefine Innovative Metering

INTERCHANGEABLE SCALES

Scale replacement is quick and simple with no loss of accuracy and without tools. Interchangeable scale facility minimizes the carrying cost of inventory substantially. It also helps in reducing the lead times. A permanently fixed click fit window need only be opened for changing the scale.

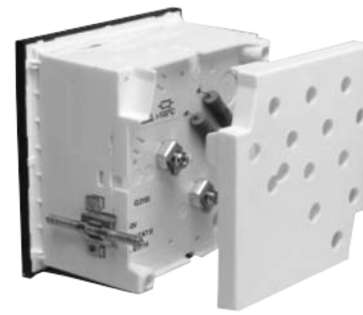


CONVENIENCE FEATURES

Bezels and front glass can be replaced easily. Material used for face plate is float glass. Optionally Anti-glare glass faceplate and transparent polycarbonate face plate are also available. Specially designed back cover eliminates risk of contact with live parts. Terminal protection cover conform to IP 20 as per IEC 529 (DIN 40050). The holes on the back cover facilitate to check the voltage without removing it.

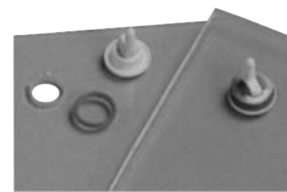
STANDARD IP20 (BACK COVER)

All Ziegler meters are supplied with click fit backcover. Specially designed back cover eliminates risk of contact with live parts. Terminal protection with back cover to IP 20 as per IEC 529. The holes on the backcover facilitate to check the voltage without removing it.



IP 52 PROTECTION

Ziegler meters conform to IP 52 protection as per IEC 529. The O-Ring incorporation in Zero Knob ensures protection from fine dust particles and water.



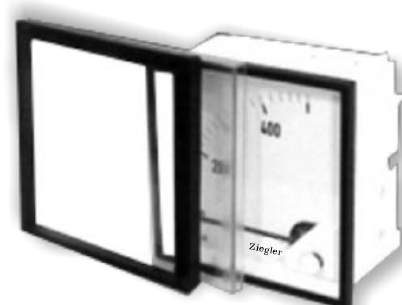
SURFACE MOUNTING TECHNOLOGY (SMT)

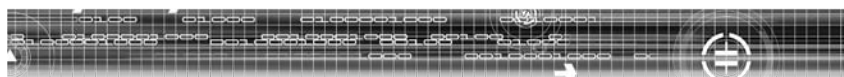
The built in Transducer forming a single unit meter. This is used for power, frequency and power factor measurements. Built in transducer PCB's with SMT manufacturing ensures quality and reliability of the products.



OPTIONAL IP54 & IP65

The Ip54 & Ip65 protection for the meter to meter will be provided on request. The Ip65 kit can be ordered separately and be added on site on the meters.





Ziegler

Redefine Innovative Metering

Moving Iron Panel Mount Analog Meters With Interchangeable Scales



DE 48	
DE 72	For Voltage-AC Voltmeter
DE 96	For Current-AC Ammeter
DE 144	with TRUE EFFECTIVE VALUE



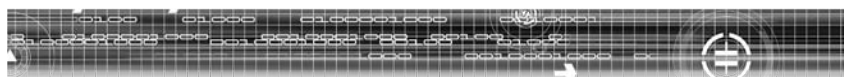
Available in both AC, Current & Voltage type, they come in standard size of 48x48, 72x72, 96x96 & 144x144mm

GENERAL FEATURES:

APPLICABLE STANDARDS	
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
OVER RANGE	
Ammeters	2 times nominal current
Voltmeters for use on voltage transformers	1.2 times nominal voltage
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:

Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles	
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0	
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)	
Color of Bezel	Black Red/Yellow/Blue/White (on request)	
Position of use	Vertical	
Panel Fixing (mountable in a single cutout)	Metal side clamps leaf springs	
Panel thickness	40mm	
Terminals	Voltmeter& Ammeter 30A	HEX STUD M4 screws and wire clamp
	Voltmeter& Ammeter >30A	Threaded studs M6 with nuts
	Voltmeter& Ammeter >60A	Threaded studs M8 with nuts
Pointer	Knife-edge pointer	
Pointer deflection	0-90°	
Scale characteristics	Nearly linear above 10% of nominal full scale value	
Scale divisions	Coarse & fine	
POWER CONSUMPTION :		
Voltmeter	< 4.5 VA	
Ammeter	<15A - < 0.5 VA >15A - <0.8 VA	
Accuracy class	1.5 according to IEC 60051	



Ziegler

Redefine Innovative Metering

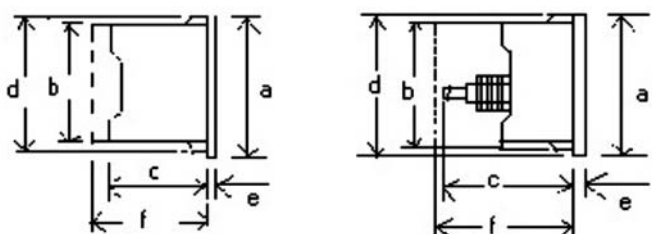
TECHNICAL SPECIFICATIONS:



Model	Unit	DE 48	DE 72	DE 96	DE 144
Front Facia	mm	48x48	72x72	96x96	144x144
Approximate weight	kg	0.10	0.16	0.20	0.40
AC Ammeter CT operated	A	1A, 5A			
AC Ammeter Direct measurement	A	100mA-60A	100mA-100A		
AC Voltmeter	V	6V-600V	6V-750V		
Rated insulation voltage	V	660V	1000V		
Proof voltage	V	2kV	3kV		

OVERLOAD CAPACITY :

Continuous		1.2 x rated voltage/current			
Short duration Voltmeter		2 x rated voltage, 5sec. max. 10 x rated current, 5sec. max.			
Ammeter	5sec	10 times (200A max.)	10 times		
	1sec	-----	40 times (250 A max.)		
Scale length	mm	41	63	97	146

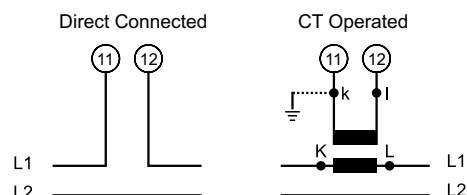


Dimensions (in mm)		DE 48	DE 72	DE 96	DE 144
Bezel	a	48	72	96	144
Case	b	43.5	66	90	136
Depth	c (<30A)	53	53	53	53
	c (>30A)	62	62	62	62
	c (>60A)	67	67	67	67
	d	44.5	67.5	91.5	137.5
	e	5.5	5.5	5.5	5.5
Cutout Size		45 ^{+0.6}	68 ^{+0.7}	92 ^{+0.8}	138 ⁺¹
Depth with back cover	f ^{xx}	64	64	64	64
		(30-60A)	70	70	70

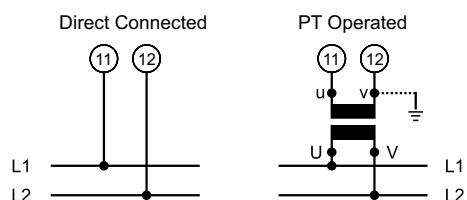
^{xx} f=75mm, for DE 48 I > 30 A

CONNECTION DIAGRAMS:

AC Ammeter



AC Voltmeter



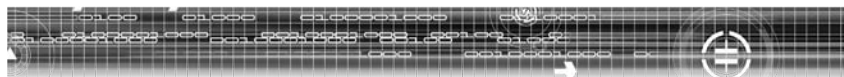
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	Measuring Range/Input	Over Range	Scale	Options
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ORDER EXAMPLE

DE	72	Ammeter	100/5A	x 2	100A	with back cover
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Ziegler

Redefine Innovative Metering

Moving Coil Panel Mount Analog Meters With Interchangeable Scales



DS 48	For Voltage-DC Voltmeter For Current-DC Ammeter
DS 72	
DS 96	
DS 144	



Available in both DC, Current & Voltage type, they come in standard size of 48x48, 72x72, 96x96 & 144x144mm

GENERAL FEATURES:

APPLICABLE STANDARDS

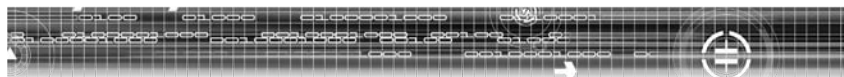
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking

OVER RANGE:

Ammeters	2 times nominal current
Voltmeters for use on voltage transformers	1.2 times nominal voltage
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:

Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles	
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0	
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)	
Color of Bezel	Black Red/Yellow/Blue/White (on request)	
Position of use	Vertical	
Panel Fixing (mountable in a single cutout)	Metal side clamps leaf springs	
Panel thickness	40mm	
Terminals	Voltmeter& Ammeter 6A	HEX STUD M4 screws and wire clamp
	Ammeter 6A	Threaded studs M6 with nuts
	Ammeter >60A	Threaded studs M8 with nuts
Pointer	Knife-edge pointer	
Pointer deflection	0-90°	
Scale characteristics	Nearly linear above 10% of nominal full scale value	
Scale divisions	Coarse & fine	
POWER CONSUMPTION :		
Voltmeter	< 4.5 VA	
Ammeter	<15A - < 0.5 VA >15A - <0.8 VA	
Accuracy class	1.5 according to IEC 60051	



Ziegler

Redefine Innovative Metering

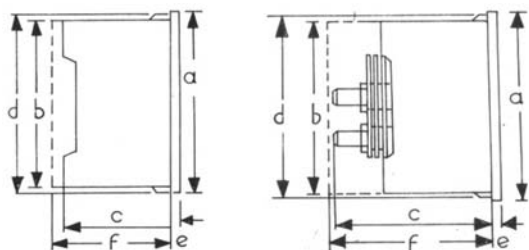
TECHNICAL SPECIFICATIONS:



Model	Unit	DS 48	DS 72	DS 96	DS 144
Front Facia	mm	48x48	72x72	96x96	144x144
Approximate weight	kg	0.13	0.18	0.22	0.43
DC Ammeter Direct measurement	A	15μA-60A	15μA-100A		40μA-100A
DC Voltmeter	V	15mV-600V			
Rated insulation voltage	V	660V	1000V		
Proof voltage	V	2kV	3kV		

OVERLOAD CAPACITY :

Continuous		1.2 x rated voltage/current			
Short duration Voltmeter		2 x rated voltage, 5sec. max. 10 x rated current, 5sec. max.			
Ammeter	5sec	10 times (200A max.)	10 times		
	1sec	-----	40 times (250 A max.)		
Scale length	mm	41	63	97	146



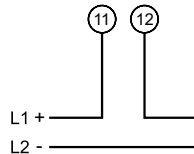
Dimensions (in mm)		DS 48	DS 72	DS 96	DS 144
Bezel	a	48	72	96	144
Case	b	43.5	66	90	136
Depth	c (<6)	53	53	53	53
	(6-60A)	68	68	68	68
	(>60A)	78	78	78	78
	d	44.5	67.5	91.5	137.5
	e	5.5	5.5	5.5	5.5
Cutout Size		45 ^{+0.6}	68 ^{+0.7}	92 ^{+0.8}	138 ⁺¹
Depth without back cover f ^{xx}		64	64	64	64
Depth with back cover (6-60A)		70	70	70	70

^{xx} f=75mm, for DS 48 I > 6 A

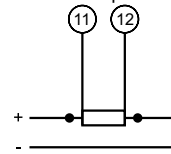
CONNECTION DIAGRAMS:

DC Ammeter

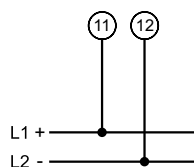
Direct Connected



Shunt Operated



DC Voltmeter



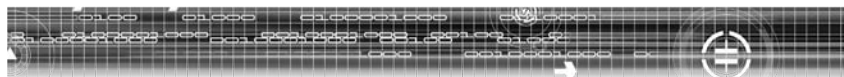
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	Measuring Range/Input	Scale	Options
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ORDER EXAMPLE

DS	96	Ammeter	100/75mV	100A _{DC}	with red mark at 80A _{DC}
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Ziegler

Redefine Innovative Metering

The Moving Coil, Rectifier Analogue Meter DG 48,72,96,144mm, for the measurement of AC, Current & Voltage



DG 48	
DG 72	
DG 96	
DG 144	

For Voltage-AC Voltmeter
For Current-AC Ammeter
with built-in rectifier



Available in both AC, Current & Voltage type, they come in standard size of 48x48, 72x72, 96x96 & 144x144mm

GENERAL FEATURES:

APPLICABLE STANDARDS

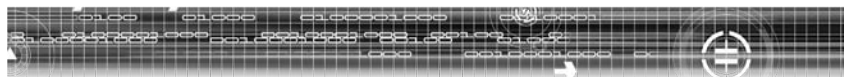
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking

OVER RANGE:

Ammeters	2 times nominal current
Voltmeters for use on voltage transformers	1.2 times nominal voltage
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:

Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles	
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0	
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)	
Color of Bezel	Black Red/Yellow/Blue/White (on request)	
Position of use	Vertical	
Panel Fixing (mountable in a single cutout)	Metal side clamps leaf springs	
Panel thickness	40mm	
Terminals	Voltmeter& Ammeter <6A	HEX STUD M4 screws and wire clamp
	Ammeter 6A	Threaded studs M6 with nuts
Pointer	Knife-edge pointer	
Pointer deflection	0-90°	
Scale characteristics	Nearly linear above 10% of nominal full scale value	
Scale divisions	Coarse & fine	
POWER CONSUMPTION :		
Voltmeter	< 4.5 VA	
Ammeter	<15A - < 0.5 VA >15A - <0.8 VA	
Accuracy class	1.5 according to IEC 60051	



Ziegler

Redefine Innovative Metering

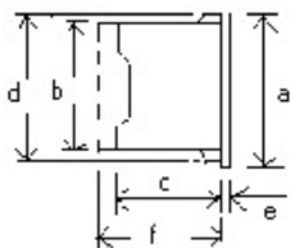
TECHNICAL SPECIFICATIONS:



Model	Unit	DG 48	DG 72	DG 96	DG 144
Front Facia	mm	48x48	72x72	96x96	144x144
Approximate weight	kg	0.13	0.18	0.22	0.43
AC Ammeter CT operated	A	1A, 5A	1A, 5A	1A, 5A	1A, 5A
AC Ammeter Direct measurement	A	10 μ A-10A			
AC Voltmeter	V	6V-600V			
Rated insulation voltage	V	660V	1000V		
Proof voltage	V	2kV	3kV		

OVERLOAD CAPACITY :

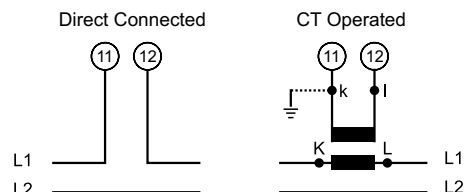
Continuous		1.2 x rated voltage/current			
Short duration Voltmeter		2 x rated voltage, 5sec. max. 10 x rated current, 5sec. max.			
Ammeter	5sec	10 times (200A max.)		10 times	
	1sec	-----		40 times (250 A max.)	
Scale length	mm	38	61	97	146



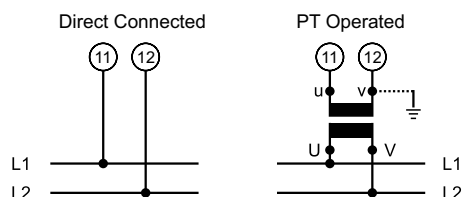
Dimensions (in mm)		DG 48	DG 72	DG 96	DG 144
Bezel	a	48	72	96	144
Case	b	43.5	66	90	136
Depth	c (<6)	53	53	53	53
	d	44.5	67.5	91.5	137.5
	e	5.5	5.5	5.5	5.5
Cutout Size		45 ^{+0.6}	68 ^{+0.7}	92 ^{+0.8}	138 ⁺¹
Depth with back cover	f	64	64	64	64

CONNECTION DIAGRAMS:

AC Ammeter



AC Voltmeter



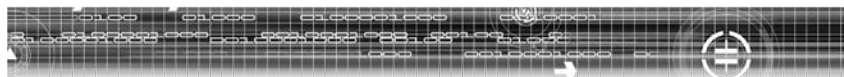
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	Measuring Range/Input	Scale	Options
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ORDER EXAMPLE

DG	72	Voltmeter	500V	500V	with back cover
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Ziegler

Redefine Innovative Metering

Analogue Pointer type Frequency meter



FM 48	For measuring frequency
FM 72	
FM 96	
FM 144	

Pointer type frequency meter measure frequencies in the range of 45Hz-450Hz. For maximizing the accuracy, the essential measuring range is obtained by suppressing the unwanted frequency span. They come in standard size of 48x48, 72x72, 96x96 & 144x144mm

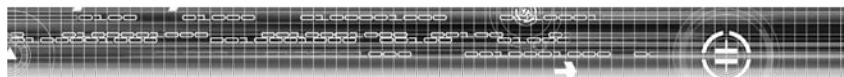


GENERAL FEATURES:

APPLICABLE STANDARDS	
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:

Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)
Color of Bezel	Black Red/Yellow/Blue/White (on request)
Position of use	Vertical
Panel Fixing (mountable in a single cutout)	Metal side clamps, Leaf springs
Panel thickness	40mm
Terminals	HEX STUD M4 screws and wire clamp
Pointer	Knife-edge pointer
Pointer deflection	0-90°
Scale characteristics	Linear
Scale divisions	Coarse & fine
POWER CONSUMPTION :	
Frequency meter	7 VA
Accuracy class	0.5 according to IEC 60051



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Redefine Innovative Metering

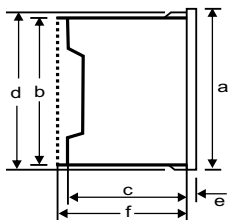
TECHNICAL SPECIFICATIONS:



Model	Unit	FM 48	FM 72	FM 96	FM 144
Front Facia	mm	48x48	72x72	96x96	144x144
Approximate weight	kg	0.15	0.21	0.28	0.49
Measuring range	Hz	45...50...55 Hz 48...50...52 Hz 45...55...65 Hz 55...60...65 Hz 58...60...62 Hz 180...200...220 Hz 360...400...440 Hz			
Rated insulation voltage	V	660V			
Proof voltage	V	2kV			

OVERLOAD CAPACITY :

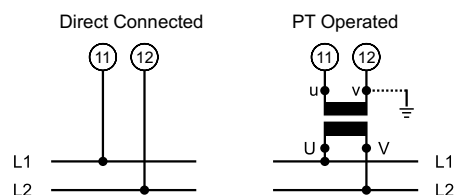
Continuous		1.2 x rated voltage			
Short duration Voltmeter		2 x rated voltage max. 5sec.			
Scale length	mm	41	63	97	146



Dimensions (in mm)		FM 48	FM 72	FM 96	FM 144
Bezel	a	48	72	96	144
Case	b	43.5	66	90	136
Depth	c	53	53	53	53
	d	44.5	67.5	91.5	137.5
	e	5.5	5.5	5.5	5.5
Cutout Size		45 ^{+0.6}	68 ^{+0.7}	92 ^{+0.8}	138 ⁺¹
Depth with back cover	f	64	64	64	64

CONNECTION DIAGRAMS:

FREQUENCY METER



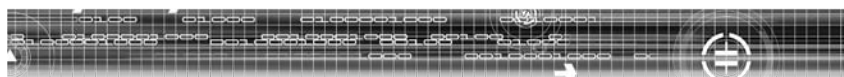
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	Input Voltage	Scale	Options
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ORDER EXAMPLE

FM	96	Frequency meter	230V	55Hz...60Hz...65Hz	with back cover
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Ziegler

Redefine Innovative Metering

Moving Coil Panel Mount Analogue Power Factor Meters with Built -in Transducer



LF 72	Analogue power factor meter with
LF 96	Angle adjuster for monitoring
LF 144	changing power factor.

Power factor meter consist moving coil indicator with built-in SMD transducer to indicate power factor values in Single phase and Three phase systems. They come in standard size of 72x72, 96x96 & 144x144mm



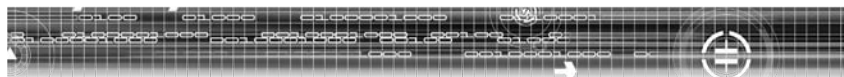
GENERAL FEATURES:

APPLICABLE STANDARDS

Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
Electro Magnetic Compatibility (EMC)	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
Insulation class	Group A according to VDE 0110
Installation category	CAT III 300 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:

Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)
Color of Bezel	Black Red/Yellow/Blue/White (on request)
Position of use	Vertical
Panel Fixing (mountable in a single cutout)	Metal side clamps leaf springs
Panel thickness	40mm
Terminals	HEX STUD M4 screws and wire clamp
Pointer	Knife-edge pointer
Pointer deflection	0-90°
Scale characteristics	Non linear
Scale divisions	Coarse & fine
POWER CONSUMPTION :	
Voltage path	3.0 VA
Current path	1.0 VA
Accuracy class	1.5 according to IEC 60051



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Redefine Innovative Metering

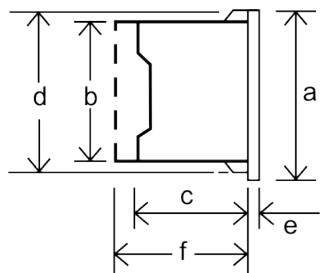
TECHNICAL SPECIFICATIONS:



Model	Unit	LF 72	LF 96	LF 144
Front Facia	mm	72x72	96x96	144x144
Approximate weight	kg	0.55	0.60	0.80
Rated current	A	1A, 5A		
AC Voltage range	V	57.5V-500V (Please specify the voltage range and system type while ordering)		
Measuring ranges	Cosφ	Cap 0.5 - 1 - 0.5 ind Cap 0.8 - 1 - 0.3 ind Cap 0.8 - 1 - 0.8 ind		
Rated insulation voltage	V	660V		
Proof voltage	V	2kV		

OVERLOAD CAPACITY :

Continuous		1.2 x rated voltage/current		
Short duration		2 x rated voltage, 5sec. max. 10 x rated current, 5sec. max.		
Scale length	mm	63	97	146



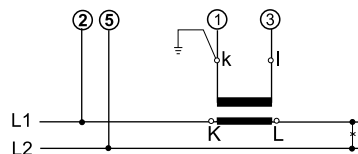
Dimensions (in mm)		LF 72	LF 96	LF 144
Bezel	a	72	96	144
Case	b	66	90	136
Depth	c	53	53	53
	d	67.5	91.5	137.5
	e	5.5	5.5	5.5
Cutout Size		68 ^{+0.7}	92 ^{+0.8}	138 ⁺¹
Depth with back cover	f	64	64	64

SYSTEM TYPES:

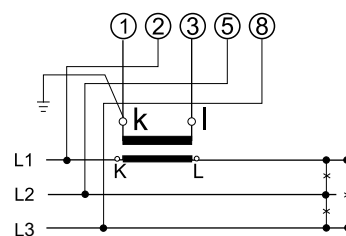
Type	Active Power
Single phase system	D1C
3 phase 3 wire system (balanced load)	E1C
3 phase 4 wire system (balanced load)	V1C
3 phase 3 wire system (unbalanced load)	D2C
3 phase 4 wire system (unbalanced load)	V3C

CONNECTION DIAGRAMS:

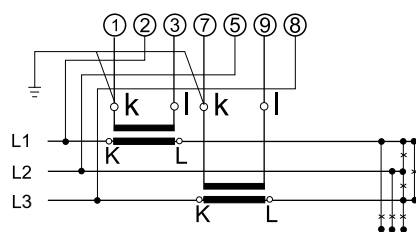
SINGLE PHASE SYSTEM



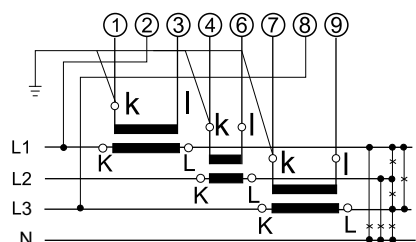
3 PHASE 3 WIRE SYSTEM (BALANCED LOAD)



3 PHASE 3 WIRE SYSTEM (UNBALANCED LOAD)

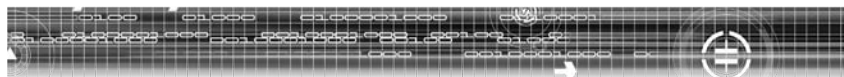


3 PHASE 4 WIRE SYSTEM (UNBALANCED LOAD)



Type	Size	Measured Qty	System type	Measuring Range/Input	Scale	Options
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LF	96	Power Factor	Single Phase	500V/5A	cap 0.5... 1...0.5 ind	with back cover
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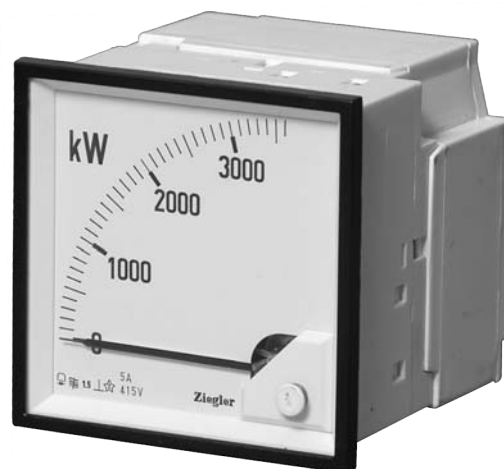
Redefine Innovative Metering

Moving coil panel mount analogue Watt meters with built-in transducer



LM 96	Analogue watt meters for,
LM 144	Single phase
	Three phase balance load 3 or 4 wire
	Three phase unbalanced load 3 or 4 wire

Analogue watt meters, available in 96x96 & 144x144mm, are suitable to indicate export and import, active and reactive power on sinusoidal and non-sinusoidal current. These instruments use built-in transducers manufactured with SMD technology, offering reliable and accurate performance.

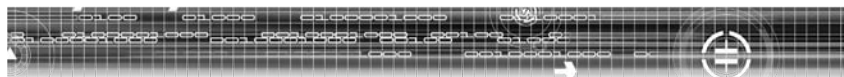


GENERAL FEATURES:

APPLICABLE STANDARDS	
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
Electro Magnetic Compatibility (EMC)	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
Insulation class	Group A according to VDE 0110
Installation category	CAT III 300 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:

Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0
Front Facia	Glass Antiglare Glass (on request) Polycarbonate / transparent (on request)
Color of Bezel	Black Red/Yellow/Blue/White (on request)
Position of use	Nominal position $\pm 1^\circ$
Panel Fixing (mountable in a single cutout)	Metal side clamps
Panel thickness	40mm
Terminals	HEX STUD M4 screws and wire clamp E3
Pointer	Knife-edge pointer
Pointer deflection	0-90°
Scale characteristics	Linear
Scale divisions	Coarse & fine
POWER CONSUMPTION :	
Current	0.2VA
Voltage path	E1W, D1W, D1B, V1W, V1B : 3.0VA E1B : 3.5VA D2W, D2B : 3.4VA V3W : 3.9VA V3B : 4.3VA
Accuracy class	1.5 according to IEC 60051
Input	Full power value P_w / P_b
Feasibility factor	$\Lambda = P_w / P_s$ or P_b / P_s



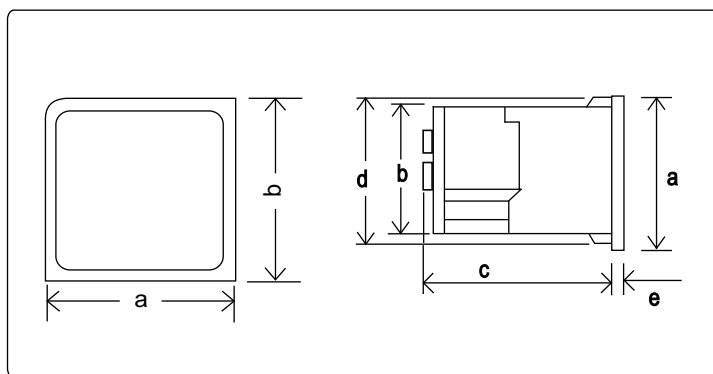
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Redefine Innovative Metering

TECHNICAL SPECIFICATIONS:



Model	Unit	LM 96	LM 144
Front Facia	mm	96x96	144x144
Approximate weight	kg	0.65-0.9	0.9-1.1
AC Wattmeter CT operated	A	1A, 5A	1A, 5A
AC wattmeter rated voltage	V	for single phase (E1W, E1B) : 57.7,63.5,100,110,127,220,289,380 for three phase (D1W, D1B, D2W, D2B, V1W, V1B, V3W, V3B) : 100, 110, 220, 240, 380, 415, 500	
Rated insulation voltage	V	660V	
Proof voltage	V	2kV	
OVERLOAD CAPACITY :			
Continuous		1.2 x rated voltage/current	
Short duration Voltage path		2 x rated voltage, 5sec. max. 10 x rated current, 5 sec. max.	
Response time	sec	4sec. max.	
Scale length	mm	97	146



Dimensions (in mm)		LM 96	LM 144
Bezel	a	96	144
Case	b	90	136
Depth	c	106	106
	d	91.5	137.5
	e	5.5	5.5
Cutout Size		92 ^{+0.8}	138 ⁺¹
Depth with back cover	f	64	64

SYSTEM TYPES:

Type	Active Power	Reactive Power
Single phase system	E1W	E1B
3 phase 3 wire system (balanced load)	D1W	D1B
3 phase 4 wire system (balanced load)	V1W	V1B
3 phase 3 wire system (unbalanced load)	D2W	D2B
3 phase 4 wire system (unbalanced load)	V3W	V3B

SELECTION OF MEASURING RANGE :

Apparant power P_s is calculated from primary ratings of current transformer and voltage transformer.

In single phase network, $P_s = V \cdot I$

where V = voltage between phase and neutral & I = line current.

In three phase network, $P_s = \sqrt{3} V \cdot I$

where V = voltage between two phase & I = line current.

Full scale value i.e range of the instrument (P_w = active power, P_b = reactive power) must be selected in such a way that the same remain between 0.5 times and 1.2 times the value of apparant power P_s .

Thus feasibility factor "Lambda" should be between 0.5 and 1.2

where "Lambda" = P_w/P_s or P_b/P_s

Full scale values shall preferably be selected from standard series according to DIN 43701, 1-1.2-1.5-2-2.5-3-4-5-6-7.5-8 and their decadic / decimal multiples.

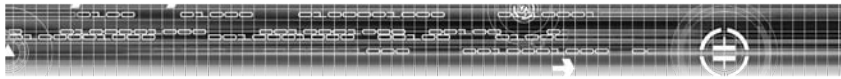
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	System type	Measuring Range/Input	Scale	Options
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ORDER EXAMPLE

LM	144	Active Power	3 phase 3 wire balanced load	380V/5A	1900W	with back cover
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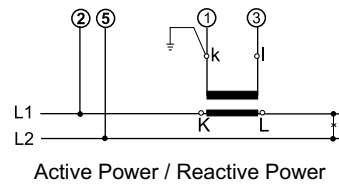


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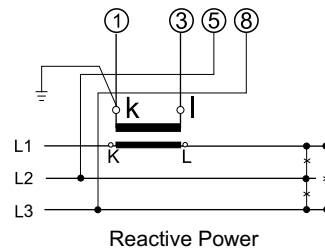
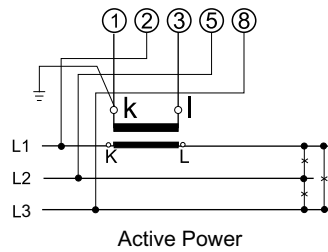
Redefine Innovative Metering

CONNECTION DIAGRAMS:

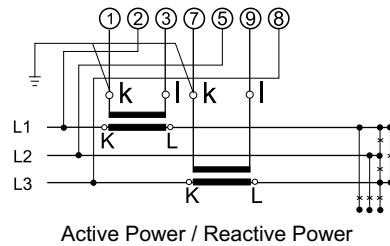
● SINGLE PHASE SYSTEM :



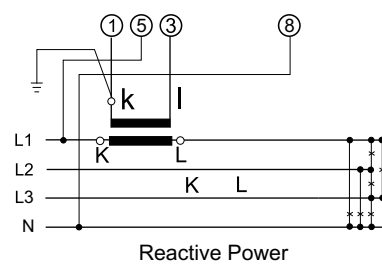
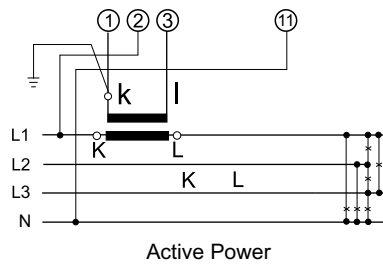
● 3 PHASE 3 WIRE SYSTEM (BALANCED LOAD) :



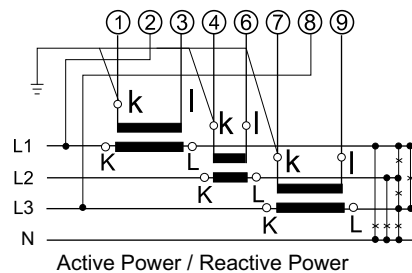
● 3 PHASE 3 WIRE SYSTEM (UNBALANCED LOAD) :

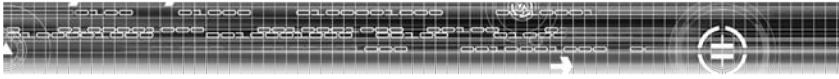


● 3 PHASE 4 WIRE SYSTEM (BALANCED LOAD) :



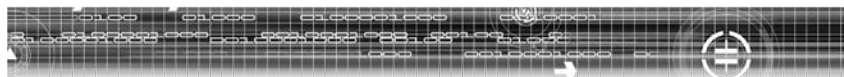
● 3 PHASE 4 WIRE SYSTEM (UNBALANCED LOAD) :





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Redefine Innovative Metering



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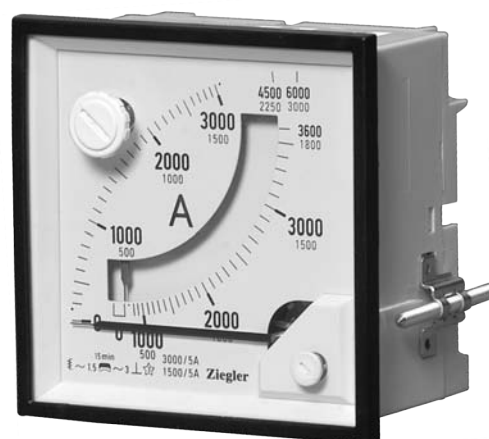
Redefine Innovative Metering

Analogue Maximum Demand Ammeter with Bimetallic Movement



BM/EB 48	BM-Bimetallic Movement MDI meter
BM/EB 72	EB-Bimetallic Movement MDI meter
BM/EB 96	combined with Moving Iron Ammeter

The MDI meter indicates maximum demand of the system with thermal movement, deflecting proportional to the current time integral. The indicating system drives the red slave pointer which indicates the maximum value until it is reset manually by the resetting knob. If it is required to measure instantaneous current then EB type instrument serves the purpose. They come in standard size of 72x72, 96x96

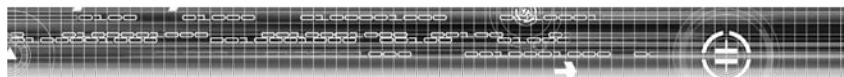


GENERAL FEATURES:

APPLICABLE STANDARDS	
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 40 (standard)
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
OVER RANGE:	
Ammeters	2 times rated current
Bimetallic Ammeters	1.2 times rated current
Insulation class	Group A according to VDE 0110
Installation category	CAT III 300 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:



Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles	
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0	
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)	
Color of Bezel	Black Red/Yellow/Blue/White (on request)	
Position of use	Vertical	
Panel Fixing (mountable in a single cutout)	Metal side clamps, Leaf springs	
Panel thickness	40mm	
Terminals	HEX STUD M4 screws and wire clamp E3	
Pointer	Knife-edge pointer	
Pointer deflection	0-90°	
Scale characteristics	Bimetallic-Quadratic Moving iron-nearly linear	
Scale divisions	Coarse & fine	
POWER CONSUMPTION :	BM 72/96	EB 72/96
1A rated current	< 1.6 VA	< 2.5 VA
5A rated current	< 2.5 VA	< 3.4 VA
Accuracy class	3(Bimetallic movement-referred to slave pointer) 1.5 (moving iron movement) according to IEC 60051	
Response time	Approx. 1sec. (moving iron)	
Thermal time delay	15 minutes 8 min/20min/30min. on request	

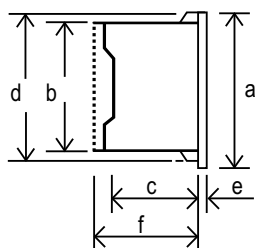


Ziegler

Redefine Innovative Metering

TECHNICAL SPECIFICATIONS:

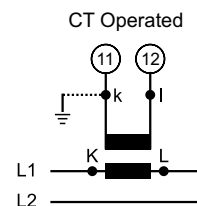
<div></div>							
Model	Unit	BM 48	BM 72	BM 96	EB 48	EB 72	EB 96
Front Facia	mm	48x48	72x72	96x96	48x48	72x72	96x96
Approximate weight	kg	0.20	0.22	0.26	0.20	0.26	0.30
Measuring range	A	1A, 5A					
Rated insulation voltage	V	1000V					
Proof voltage	V	3kV					
OVERLOAD CAPACITY :							
Continuous	1.2 x rated current						
Short duration	10 x rated current , 1sec. max.						
Scale length							
Bimetallic	mm	41	61	52	35	97	71
Moving Iron	mm	—	—	61	41	—	97



Dimensions (in mm)		BM 48	BM 72	BM 96	EB 48	EB 72	EB 96
Bezel	a	48	72	96	48	72	96
Case	b	43.5	66	90	43.5	66	90
Depth	c	53	53	53	53	53	53
	d	67.5	67.5	91.5	67.5	67.5	91.5
	e	5.5	5.5	5.5	5.5	5.5	5.5
Cutout Size		45 ^{+0.6}	68 ^{+0.7}	92 ^{+0.8}	45 ^{+0.6}	68 ^{+0.7}	92 ^{+0.8}
Depth with back cover	f	64	64	64	64	64	64

CONNECTION DIAGRAMS:

MDI AMMETER



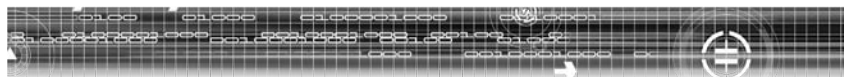
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	Measuring Range/Input	RS Time	Scale	Options
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ORDER EXAMPLE

BM	96	MDI Ammeter	300/5A	15min.	300A (x 1.2)	with back cover
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Redefine Innovative Metering

2 IN 1 Pointer Type Analogue Panel Meters



DE/2 96	For measuring AC voltage & current
DS/2 96	For measuring DC voltage & current
FM/2 96	For measuring frequency

2 in 1 pointer type analogue panel meter come in 96mm x 96mm size. These measure frequency, AC and DC voltage and current depending upon the application. These combine 2 measuring systems independent of each other.



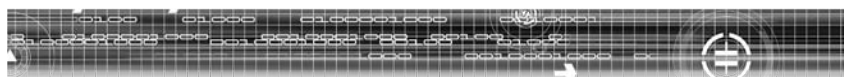
GENERAL FEATURES:

APPLICABLE STANDARDS

Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
Electro Magnetic Compatibility (EMC)	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
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:

Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles	
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0	
Front Facia	Glass Antique Glass (on request) Polycarbonate/transparent(on request)	
Color of Bezel	Black Red/Yellow/Blue/White (on request)	
Position of use	Vertical	
Panel Fixing (mountable in a single cutout)	Metal side clamps leaf springs	
Panel thickness	40mm	
Terminals	AC Voltmeter, Frequency meter & AC Ammeter 30A & DC Ammeter <6A	HEX STUD M4 screws and wire clamp
	AC Ammeter >30A DC Ammeter 6A	Threaded studs M6 with nuts
	Ammeter >60A	Threaded studs M8 with nuts
Pointer	Knife-edge pointer	
Pointer deflection	0-90°	
Scale characteristics	AC moving iron-Nearly linear DC moving coil & frequency-linear	
Scale divisions	Coarse & fine	
POWER CONSUMPTION :		
AC Voltmeter	< 4.5 VA	
AC Ammeter	<15A - < 0.5 VA >15A - <0.8 VA	
Frequency meter	7 VA	
DC Voltmeter	< 4.5 VA	
DC Ammeter	<15A - < 0.5 VA >15A - <0.8 VA	
Accuracy class	1.5 (for ammeter & voltmeter) 0.5 for frequency meter according to IEC 60051	



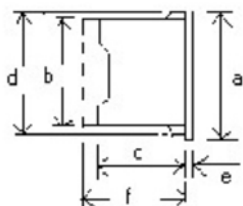
Ziegler

Redefine Innovative Metering

TECHNICAL SPECIFICATIONS:



Model	Unit	DE/2 96	DS/2 96	FM/2 96
Front Facia	mm	96x96	96x96	96x96
Approximate weight	kg	0.20	0.26	0.28
Measuring range		100mA-100A 6V-750V	15μA-100A 15mV-600V	45...50...55 Hz 48...50...52 Hz 45...55...65 Hz 55...60...65 Hz 58...60...62 Hz 180...200...220 Hz 360...400...440 Hz Rated input voltage 57.7V-440V
Rated insulation voltage	V	1000V		660V
Proof voltage	V	3kV		2kV
OVERLOAD CAPACITY :				
Continuous		1.2 x rated voltage		
Short duration Voltmeter		2 x rated voltage max. 5sec.		
Scale length	mm	54	54	54



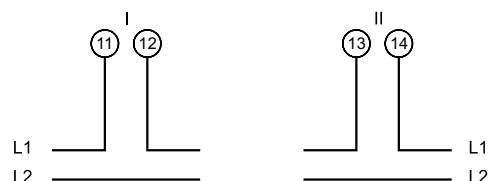
For AC Voltmeters, Ammeters & Frequency meters upto 30A
For DC Voltmeters & Ammeters <6A

Dimensions (in mm)	DE/2 96	DS/2 96	FM/2 96
Bezel a	96	96	96
Case b	90	90	90
Depth c	53	53	53
d	91.5	91.5	91.5
e	5.5	5.5	5.5
Cutout Size	92 ^{+0.8}	92 ^{+0.8}	92 ^{+0.8}
Depth with back cover f	64	64	64

CONNECTION DIAGRAMS:

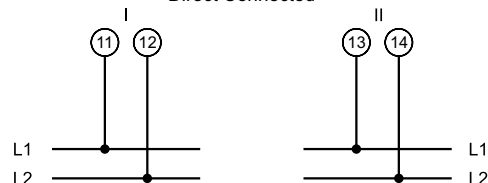
AC / DC AMMETER

Direct Connected



AC / DC VOLTMETER / FREQUENCY METER

Direct Connected



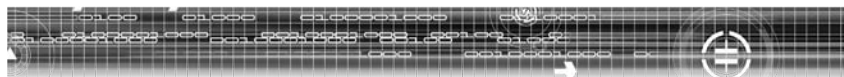
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	Measuring Range/Input	Over Range	Scale	Options
------	------	--------------	-----------------------	------------	-------	---------

ORDER EXAMPLE

DE/2	96	2 in 1 Voltmeter	415V	----	415V	with back cover
------	----	------------------	------	------	------	-----------------



Ziegler

Redefine Innovative Metering

Moving Coil Panel Mount Analog Meters With Interchangeable Scales



DSL 48	For Voltage-DC Voltmeter For Current-DC Ammeter
DSL 72	
DSL 96	
DSL 144	

Available in both DC Current & Voltage type, they come in standard size of 48x48, 72x72, 96x96 & 144x144mm

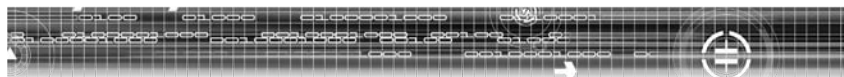


GENERAL FEATURES:

APPLICABLE STANDARDS	
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
OVER RANGE:	
Ammeters	2 times nominal current
Voltmeters for use on voltage transformers	1.2 times nominal voltage
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:

Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles	
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0	
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)	
Color of Bezel	Black Red/Yellow/Blue/White (on request)	
Position of use	Vertical	
Panel Fixing (mountable in a single cutout)	Metal side clamps leaf springs	
Panel thickness	40mm	
Terminals	Voltmeter& Ammeter 6A	HEX STUD M4 screws and wire clamp
	Ammeter 6A	Threaded studs M6 with nuts
	Ammeter >60A	Threaded studs M8 with nuts
Pointer	Knife-edge pointer	
Pointer deflection	0-240°	
Scale characteristics	Nearly linear above 10% of nominal full scale value	
Scale divisions	Coarse & fine	
POWER CONSUMPTION :		
Voltmeter	< 4.5 VA	
Ammeter	<15A - < 0.5 VA >15A - <0.8 VA	
Accuracy class	1.5 according to IEC 60051	



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Redefine Innovative Metering

TECHNICAL SPECIFICATIONS:

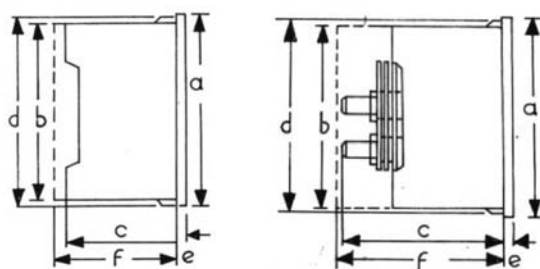


Model	Unit	DSL 48	DSL 72	DSL 96	DSL 144
Front Facia	mm	48x48	72x72	96x96	144x144
Approximate weight	kg	0.13	0.25	0.30	0.43

DC Ammeter Direct measurement	A	100μA- 100A	50μA- 30A	50μA-100A
DC Voltmeter	V	60mV-600V		
Rated insulation voltage	V	660V		
Proof voltage	V	3kV		

OVERLOAD CAPACITY :

Continuous		1.2 x rated voltage/current			
Short duration Voltmeter		2 x rated voltage, 5sec. max. 10 x rated current, 5sec. max.			
Ammeter	5sec	10 times (200A max.)	10 times		
	1sec	-----	40 times (250 A max.)		
Scale length	mm	70	106	142	230

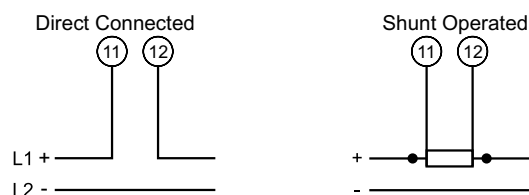


Dimensions (in mm)		DSL 48	DSL 72	DSL 96	DSL 144
Bezel	a	48	72	96	144
Case	b	43.5	66	90	136
Depth	c (<6)	53	53	53	53
	(6-60A)	68	68	68	68
	(>60A)	78	78	78	78
	d	44.5	67.5	91.5	137.5
	e	5.5	5.5	5.5	5.5
Cutout Size		45 ^{+0.6}	68 ^{+0.7}	92 ^{+0.8}	138 ⁺¹
Depth without back cover f ^{xx}		64	64	64	64
Depth with back cover (6-60A)		70	70	70	70

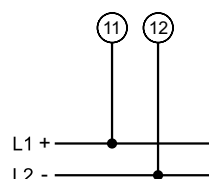
^{xx} f=75mm, for DSL 48 I > 6 A

CONNECTION DIAGRAMS:

DC AMMETER



DC VOLTMETER



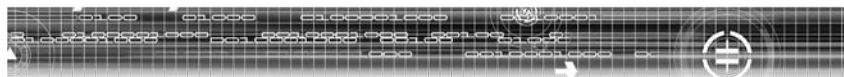
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	Measuring Range/Input	Scale	Options
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ORDER EXAMPLE

DSL	72	Voltmeter	300V	300V _{DC}	with back cover
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Redefine Innovative Metering

The moving coil, rectifier analogue meter DGL 48, 72, 96, 144mm, for the measurement of AC, Current & Voltage



DGL 48	For Voltage-AC Voltmeter For Current-AC Ammeter with built-in rectifier
DGL 72	
DGL 96	
DGL 144	

Available in both AC, Current & Voltage type, they come in standard size of 48x48, 72x72, 96x96 & 144x144mm

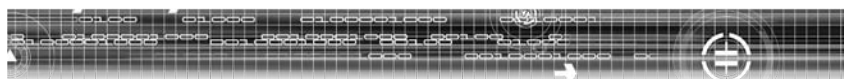


GENERAL FEATURES:

APPLICABLE STANDARDS	
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
OVER RANGE:	
Ammeters	2 times nominal current
Voltmeters for use on voltage transformers	1.2 times nominal voltage
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:


Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles	
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0	
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)	
Color of Bezel	Black Red/Yellow/Blue/White (on request)	
Position of use	Vertical	
Panel Fixing (mountable in a single cutout)	Metal side clamps leaf springs	
Panel thickness	40mm	
Terminals	Voltmeter& Ammeter <6A	HEX STUD M4 screws and wire clamp
	Ammeter 6A	Threaded studs M6 with nuts
Pointer	Knife-edge pointer	
Pointer deflection	0-240°	
Scale characteristics	Nearly linear above 10% of nominal full scale value	
Scale divisions	Coarse & fine	
POWER CONSUMPTION :		
Voltmeter	< 4.5 VA	
Ammeter	<15A - < 0.5 VA >15A - <0.8 VA	
Accuracy class	1.5 according to IEC 60051	

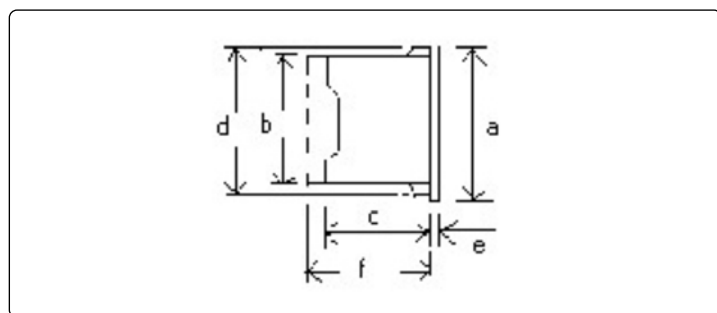


Ziegler

Redefine Innovative Metering

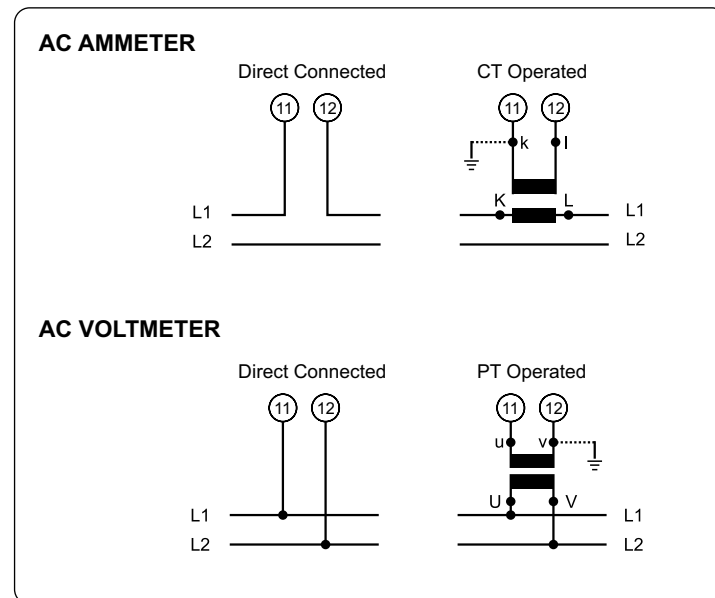
TECHNICAL SPECIFICATIONS:

					
Model	Unit	DGL 48	DGL 72	DGL 96	DGL 144
Front Facia	mm	48x48	72x72	96x96	144x144
Approximate weight	kg	0.13	0.25	0.30	0.43
AC Ammeter CT operated	A	1A, 5A			
AC Ammeter Direct measurement	A	100mA-10A			
AC Voltmeter	V	6V-600V			
Rated insulation voltage	V	660V			
Proof voltage	V	3kV			
OVERLOAD CAPACITY :					
Continuous		1.2 x rated voltage/current			
Short duration Voltmeter		2 x rated voltage, 5sec. max. 10 x rated current, 5sec. max.			
Ammeter	5sec	10 times (200A max.)	10 times		
	1sec	-----	40 times (250 A max.)		
Scale length	mm	70	106	142	230



Dimensions (in mm)		DGL 48	DGL 72	DGL 96	DGL 144
Bezel	a	48	72	96	144
Case	b	43.5	66	90	136
Depth	c (<6)	53	53	53	53
	d	44.5	67.5	91.5	137.5
	e	5.5	5.5	5.5	5.5
Cutout Size		45 ^{+0.6}	68 ^{+0.7}	92 ^{+0.8}	138 ⁺¹
Depth with back cover	f ^{xx}	64	64	64	64

CONNECTION DIAGRAMS:



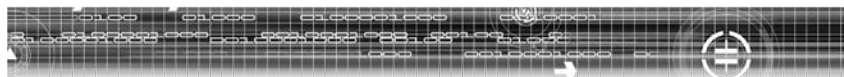
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	Measuring Range/Input		Scale	Options
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ORDER EXAMPLE

DGL	48	Voltmeter	500V		500V	with back cover
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Redefine Innovative Metering

Analogue Pointer type Frequency meter



FML 96

FML 144

For measuring frequency

Pointer type frequency meter measure frequencies in the range of 45Hz-450Hz. For maximizing the accuracy, the essential measuring range is obtained by suppressing the unwanted frequency span. They come in standard size of 96x96 & 144x144mm

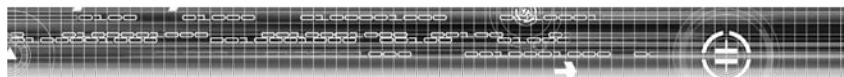


GENERAL FEATURES:

APPLICABLE STANDARDS	
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:

Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)
Color of Bezel	Black Red/Yellow/Blue/White (on request)
Position of use	Vertical
Panel Fixing (mountable in a single cutout)	Metal side clamps, Leaf springs
Panel thickness	40mm
Terminals	HEX STUD M4 screws and wire clamp
Pointer	Knife-edge pointer
Pointer deflection	0-240°
Scale characteristics	Linear
Scale divisions	Coarse & fine
POWER CONSUMPTION :	
Frequency meter	7 VA
Accuracy class	0.5 according to IEC 60051



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Redefine Innovative Metering

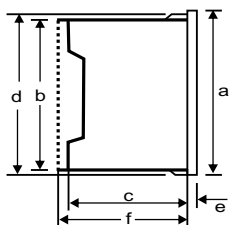
TECHNICAL SPECIFICATIONS:



Model	Unit	FML 96	FML 144
Front Facia	mm	96x96	144x144
Approximate weight	kg	0.45	0.60
Measuring range	Hz	45...50...55 Hz 48...50...52 Hz 45...55...65 Hz 55...60...65 Hz 58...60...62 Hz 180...200...220 Hz 360...400...440 Hz	
Rated insulation voltage	V	660V	
Proof voltage	V	2kV	

OVERLOAD CAPACITY :

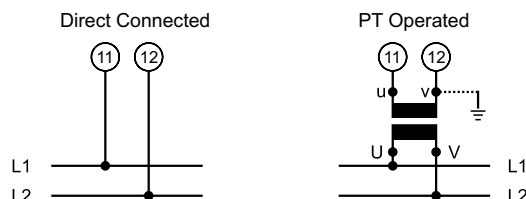
Continuous		1.2 x rated voltage	
Short duration Voltmeter		2 x rated voltage, 5sec. max. 10 x rated current, 5sec. max.	
Scale length	mm	142	230



Dimensions (in mm)		FML 96	FML 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 ⁺¹
Depth with back cover	f	64	64

CONNECTION DIAGRAMS:

FREQUENCY METER



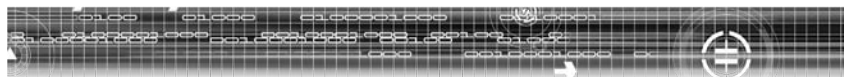
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	Input Voltage	Scale	Options
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ORDER EXAMPLE

FML	96	Frequency meter	230V	55Hz...60Hz...65Hz	with back cover
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Ziegler

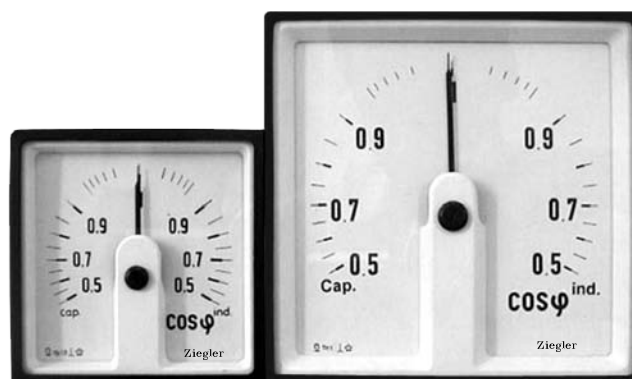
Redefine Innovative Metering

Moving coil panel mount analogue power factor meters with built -in transducer phase.



LFL 96 | Analogue power factor meter with
LFL 144 | Angle adjuster for monitoring
changing power factor.

Power factor meter consist moving coil indicator with built-in SMD transducer to indicate power factor values in Single phase and Three phase systems. They come in standard size of 96x96 & 144x144mm

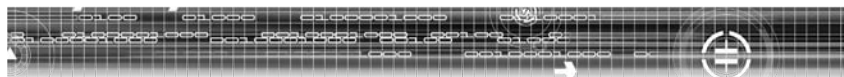


GENERAL FEATURES:

Applicable Standards	
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
Electro Magnetic Compatibility (EMC)	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
Insulation class	Group A according to VDE 0110
Installation category	CAT III 300 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:

Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)
Color of Bezel	Black Red/Yellow/Blue/White (on request)
Position of use	Vertical
Panel Fixing (mountable in a single cutout)	Metal side clamps leaf springs
Panel thickness	40mm
Terminals	HEX STUD M4 screws and wire clamp
Pointer	Knife-edge pointer
Pointer deflection	0-240°
Scale characteristics	Non linear
Scale divisions	Coarse & fine
Power Consumption :	
Voltage path	3.5 VA
Current path	1.0 VA
Accuracy class	1.5 according to IEC 60051



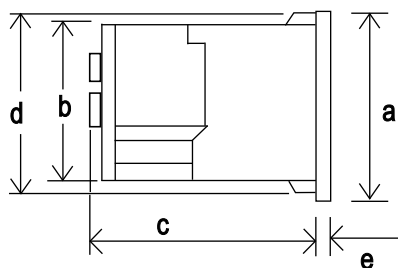
Ziegler

Redefine Innovative Metering

TECHNICAL SPECIFICATIONS:



Model	Unit			LFL 96	LFL 144
Front Facia	mm			96x96	144x144
Approximate weight	kg			0.68	0.80
Rated current	A		1A, 5A		
AC Voltage range	V	57.5V-500V (Please specify the voltage range and system type while ordering)			
Measuring ranges	Cosφ	Cap 0.5 - 1 - 0.5 ind Cap 0.8 - 1 - 0.3 ind Cap 0.8 - 1 - 0.8 ind			
Rated insulation voltage	V		660V		
Proof voltage	V		2kV		
OVERLOAD CAPACITY :					
Continuous		1.2 x rated voltage/current			
Short duration		2 x rated voltage, 5sec. max. 10 x rated current, 5sec. max.			
Scale length	mm			142	230



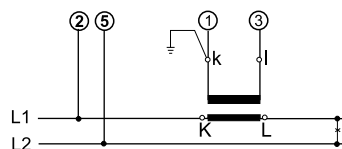
Dimensions (in mm)		LFL 96	LFL 144
Bezel	a	96	144
Case	b	90	136
Depth	c	106	106
	d	91.5 ^{+0.8}	137.5
	e	5.5	5.5
Cutout Size		92	138 ^{+0.1}
Depth with back cover	f	64	64

System types:

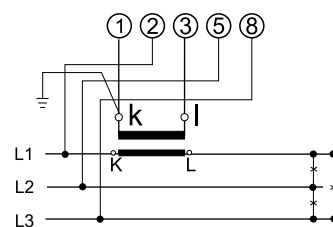
Type	Active Power
Single phase system	E
3 phase 3 wire system (balanced load)	D

CONNECTION DIAGRAMS:

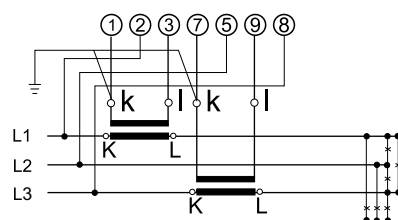
SINGLE PHASE SYSTEM



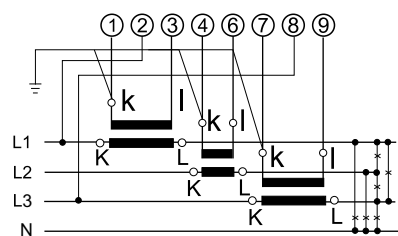
3 PHASE 3 WIRE SYSTEM (BALANCED LOAD)



3 PHASE 3 WIRE SYSTEM (UNBALANCED LOAD)



3 PHASE 4 WIRE SYSTEM (UNBALANCED LOAD)



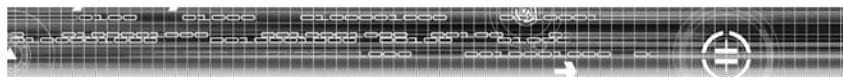
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	System type	Measuring Range/Input	Scale	Options
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ORDER EXAMPLE

LFL	96	Power Factor	Single Phase	500V/5A	cap 0.5... 1...0.5 ind	with back cover
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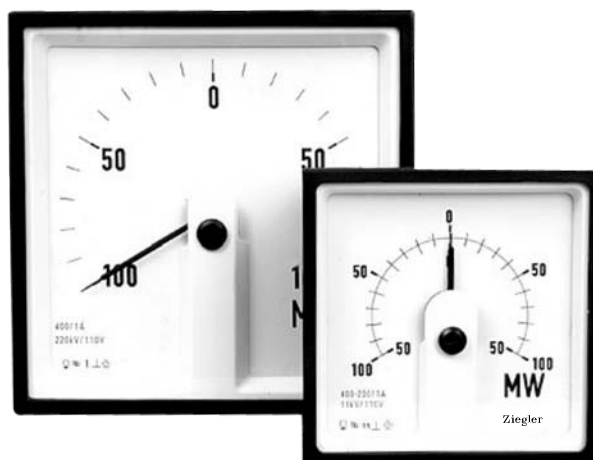
Redefine Innovative Metering

Moving coil panel mount analogue Watt meters with built-in transducer



LML 96	Analogue watt meters for, Single phase
LML 144	Three phase balance load 3 or 4 wire Three phase unbalanced load 3 or 4 wire

Analogue watt meters, available in 96x96 & 144x144mm, are suitable to indicate export and import, active and reactive power on sinusoidal and non-sinusoidal current. These instruments use built-in transducers manufactured with SMD technology, offering reliable and accurate performance.



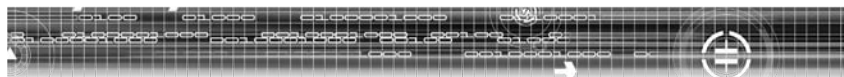
GENERAL FEATURES:

APPLICABLE STANDARDS

Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
Electro Magnetic Compatibility (EMC)	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
Insulation class	Group A according to VDE 0110
Installation category	CAT III 300 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:


Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0
Front Facia	Glass Antiglare Glass (on request) Polycarbonate / transparent (on request)
Color of Bezel	Black Red/Yellow/Blue/White (on request)
Position of use	Nominal position $\pm 1^\circ$
Panel Fixing (mountable in a single cutout)	Metal side clamps
Panel thickness	40mm
Terminals	HEX STUD M4 screws and wire clamp E3
Pointer	Knife-edge pointer
Pointer deflection	0-240°
Scale characteristics	Linear
Scale divisions	Coarse & fine
POWER CONSUMPTION :	
Current	0.2VA
Voltage path	E1W, D1W, D1B, V1W, V1B : 3.0VA E1B : 3.5VA D2W, D2B : 3.4VA V3W : 3.9VA V3B : 4.3VA
Accuracy class	1.5 according to IEC 60051
Input	Full power value P_w / P_b
Feasibility factor	$\Lambda = P_w / P_s$ or P_b / P_s

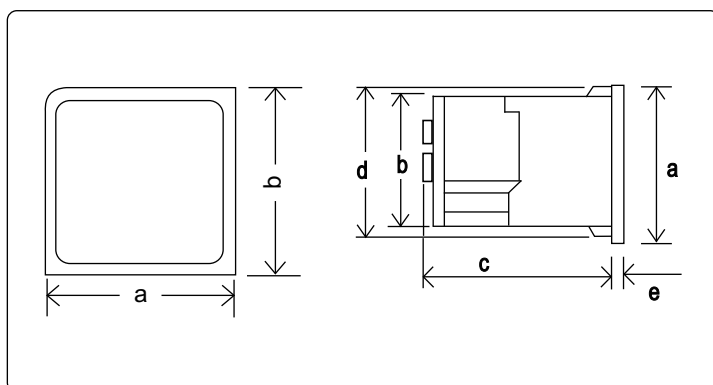


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Redefine Innovative Metering

TECHNICAL SPECIFICATIONS:

			
Model	Unit	LML 96	LML 144
Front Facia	mm	96x96	144x144
Approximate weight	kg	0.73-0.98	0.9-1.2
AC Wattmeter CT operated	A	1A, 5A	1A, 5A
AC wattmeter rated voltage	V	for single phase (E1W, E1B) : 57.7, 63.5, 100, 110, 127, 220, 289, 380 for three phase (D1W, D1B, D2W, D2B, V1W, V1B, V3W, V3B) : 100, 110, 220, 240, 380, 415, 500	
Rated insulation voltage	V	660V	
Proof voltage	V	2kV	
OVERLOAD CAPACITY :			
Continuous		1.2 x rated voltage/current	
Short duration Voltage path		2 x rated voltage, 5sec. max. 10 x rated current, 5 sec. max.	
Response time	sec	4sec. max.	
Scale length	mm	142	230



Dimensions (in mm)		LML 96	LML 144
Bezel	a	96	144
Case	b	90	136
Depth	c	106	106
	d	91.5	137.5
	e	5.5	5.5
Cutout Size		92 ^{+0.8}	138 ⁺¹
Depth with back cover	f	64	64

SYSTEM TYPES:

Type	Active Power	Reactive Power
Single phase system	E1W	E1B
3 phase 3 wire system (balanced load)	D1W	D1B
3 phase 4 wire system (balanced load)	V1W	V1B
3 phase 3 wire system (unbalanced load)	D2W	D2B
3 phase 4 wire system (unbalanced load)	V3W	V3B

SELECTION OF MEASURING RANGE :

Apparant power P_s is calculated from primary ratings of current transformer and voltage transformer.

In single phase network, $P_s = V \cdot I$

where V = voltage between phase and neutral & I = line current.

In three phase network, $P_s = \sqrt{3} V \cdot I$

where V = voltage between two phase & I = line current.

Full scale value i.e range of the instrument (P_w = active power, P_b = reactive power) must be selected in such a way that the same remain between 0.5 times and 1.2 times the value of apparant power P_s .

Thus feasibility factor "Lambda" should be between 0.5 and 1.2 where "Lambda" = P_w/P_s or P_b/P_s

Full scale values shall preferably be selected from standard series according to DIN 43701, 1-1.2-1.5-2-2.5-3-4-5-6-7.5-8 and their decadic / decimal multiples.

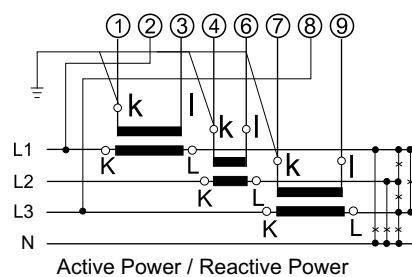
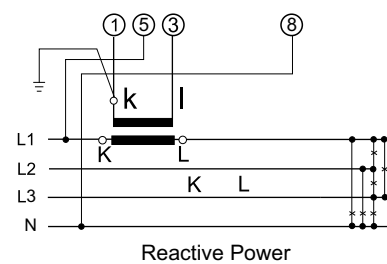
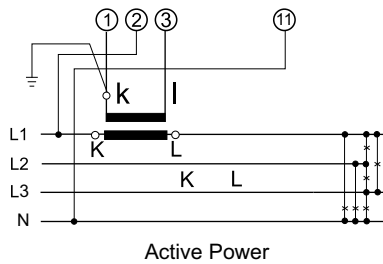
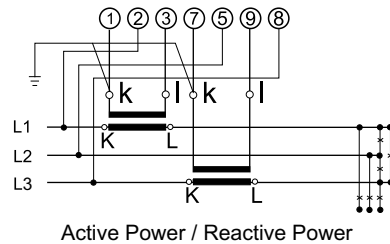
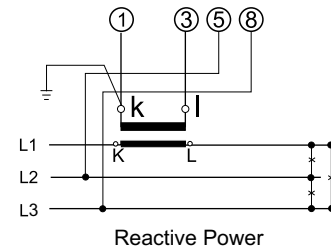
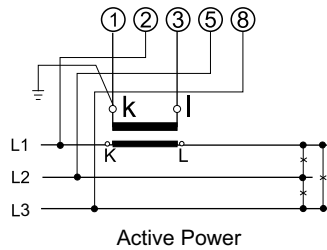
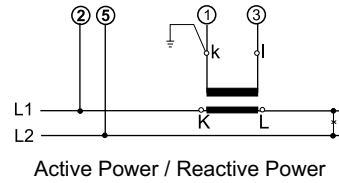
ORDERING INFORMATION

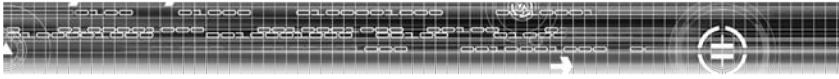
Please specify ordering information as given below,

Type	Size	Measured Qty	System type	Measuring Range/Input	Scale	Options
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ORDER EXAMPLE

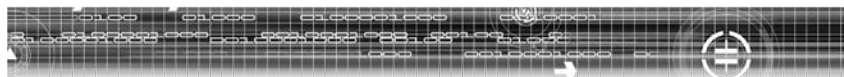
LML	96	Active Power	3 phase 3 wire balanced load	380V/5A	1900W	with back cover
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Redefine Innovative Metering



Ziegler

Redefine Innovative Metering

LED Type Electronic Synchroscope

SQ 96

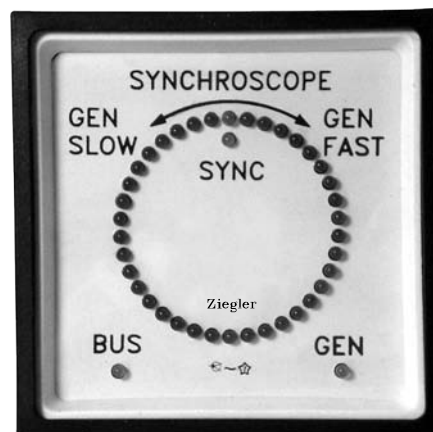
Electronic LED type
Synchroscope for synchronizing
application

The Electronic Synchroscope is designed to provide an illuminated indication of actual phase difference between the BUS voltage (reference voltage) & the GENERATOR Voltage (incoming voltage)

It denotes the actual frequency difference corresponding to the inverse of time taken for 1 rotation of the illuminated vector spot. When 2 alternators are paralleled, it is necessary that,

- 1) Frequency must be equal.
- 2) Phase must be same.

Synchroscope is, hence used to indicate the phase and frequency difference between 2 AC alternators.



Applicable Standards

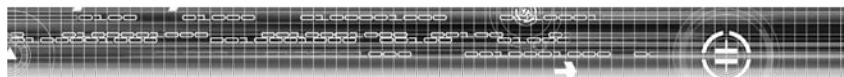
GENERAL FEATURES:

APPLICABLE STANDARDS

Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
OVER RANGE:	
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation resistance	>50MΩ at 500 V DC

FACT SHEET:


Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles	
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0	
Front Facia	Glass glare Antiglare Glass (on request) Polycarbonate/transparent(on request)	
Color of Bezel	Black/Red/Yellow/Blue/White (on request)	
Color of LED's	Red/Orange/Yellow	
Position of use	Vertical	
Panel Fixing (mountable in a single cutout)	Swivel screws	
Panel thickness	40mm	
Terminals	Voltmeter& Ammeter <6A	HEX STUD M4 screws and wire clamp
	Ammeter 6A	Threaded studs M6 with nuts
POWER CONSUMPTION :		
Sychroscope	< 6 VA max.	



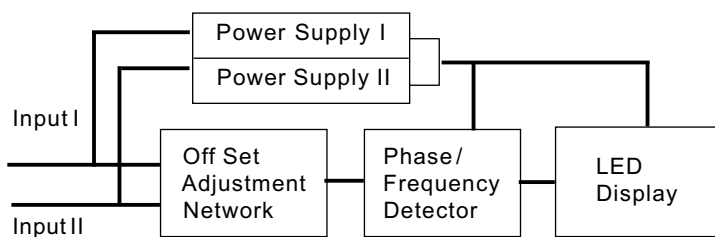
Ziegler

Redefine Innovative Metering

TECHNICAL SPECIFICATIONS:

		
Model	Unit	SQ
Front Facia	mm	96X96
Approximate weight	kg	0.60
Measuring quantity		Frequency & Phase difference
Measuring range	Hz	35-70Hz
Pull in/drop out frequency	Hz	±9Hz
Rated insulation voltage	V	660V
Proof voltage	V	2kV
Dimensions (in mm)		SQ 96
Bezel a		96
Case b		90
Depth c (<6)		104
d		91.5
e		5.5
Cutout Size		92 ^{+0.8}
Depth with back cover f		64

FUNCTIONAL PRINCIPLE:



The Bus & Gen inputs are fed to the Frequency & Phase detection network. The output duty cycle of the network corresponds to the frequency difference between Bus & Generator Voltage. The detector network also determines the actual phase difference.

DESCRIPTION

The rotation of the vector spot is with reference to the bus voltage. If the vector spot LED turns clockwise, it indicates the GENERATOR frequency is greater than the BUS frequency. It means the speed of the generator must be reduced by the operator.

If the spot LED turns anticlockwise, the GENERATOR frequency is less than BUS frequency. In this case, speed of the generator must be increased.

If 'T' is the time taken for one rotation, the frequency difference can be calculated as $1/T = \Delta f$

Example: Let the bus frequency be 50 Hz. The vector spot takes 10 Sec. for one rotation, clockwise.

$1/10 = 0.1 \text{ Hz}$

The frequency difference = 0.1 Hz. Hence we can infer that GENERATOR frequency is 50.1 Hz.

If the Frequency & Phase of BUS signal matches with those of GENERATOR signal, the two green led's at 12 o'clock position glow.

If the Frequency matches & Phase does not, then one red led corresponding to the phase difference will glow.

FAVORABLE CONDITION FOR "SWITCHING IN" THE GENERATOR:

1. Ensure that the frequency difference between two inputs is within the requirements of user as follows:

Measure time taken for 1 complete rotation of the vector spot in SECOND(T).

The frequency difference will be $\Delta f = 1/T(\text{Hz})$

2. Provided the frequency difference is within acceptable limits, wait till the SYNC mark LED s (two green LED s at 12 o'clock position) glow.

At this instant, it is safe to CONNECT the GENERATOR to BUS.

CONNECTIONS DIAGRAM :

SQ 96 440V/380V

FOR 440V L1 L2 L3

BUS 1 2 3

GEN 4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

FOR 380V L1 L2 L3

BUS 1 2 3

GEN 4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

4 5 6

L1 L2 L3

1 2 3

TYPE	TERMINAL	
BUS	1-3	1-2
GEN	4-6	4-5
SQ - 96	440 V	380 V
	240 V	220 V
	480 V	415 V
	110 V	100 V
	127 V	120 V

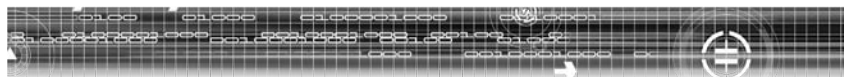
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	Measuring Range/Input	Options
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ORDER EXAMPLE

SQ	96	Frequency & Phase difference	415V/50Hz	with back cover
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Redefine Innovative Metering

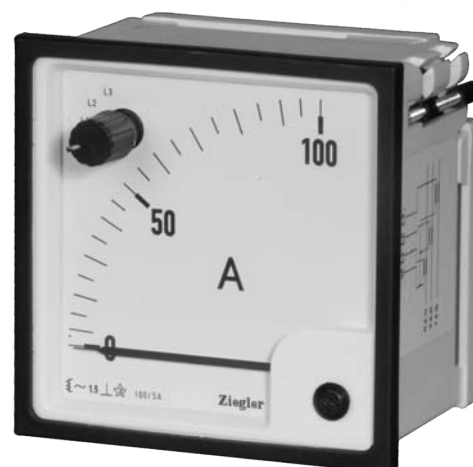
Moving Iron Panel Mount Analog Meters With Interchangeable Scales & built-in selector switch



EQ 72 SWT	For Voltage-AC Voltmeter with selector switch
EQ 96 SWT	For Current-AC Ammeter with selector switch with TRUE EFFECTIVE VALUE in 3 phase systems

Available in both AC Current & Voltage type, they
come in standard size of 72x72, 96x96mm

Selector Switch Position	System & Instrument Type
L1, L2, L3, OFF	3 Phase Ammeter
L1L2, L2L3, L3L1, OFF	3 Phase 3 Wire Voltmeter
L1L2, L2L3, L3L1 L1N, L2N, L3N	3 Phase 4 Wire Voltmeter
L1L2, L2L3, L3L1 L1N, L2N, L3N OFF	

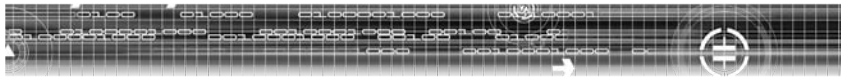


GENERAL FEATURES:

APPLICABLE STANDARDS	
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
OVER RANGE:	
Ammeters	2 times nominal current
Voltmeters for use on voltage transformers	1.2 times nominal voltage
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:


Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)
Color of Bezel	Black Red/Yellow/Blue/White (on request)
Position of use	Vertical
Panel Fixing (mountable in a single cutout)	Swivel screws
Panel thickness	40mm
Terminals	HEX STUD M4 screws and wire clamp E3
Pointer	Knife-edge pointer
Pointer deflection	0-90°
Scale characteristics	Nearly linear above 10% of nominal full scale value
Scale divisions	Coarse & fine
POWER CONSUMPTION :	
Voltmeter	< 3.5 VA
Ammeter	1 VA
Accuracy class	1.5 according to IEC 60051

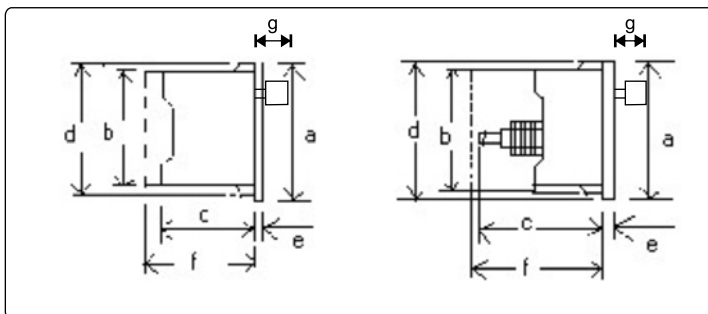


Ziegler

Redefine Innovative Metering

TECHNICAL SPECIFICATIONS:

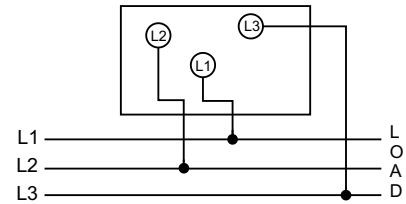
			
Model	Unit	EQ 72	EQ 96
Front Facia	mm	72x72	96x96
Approximate weight	kg	0.19	0.23
AC Ammeter	A	1A, 5A	
AC Voltmeter	V	110V, 120V, 132V, 150V, 200V, 250V, 300V, 400V, 500V, 600V	
Rated insulation voltage	V	1000V	
Proof voltage	V	3kV	
OVERLOAD CAPACITY :			
Continuous		1.2 x rated voltage/current	
Short duration Voltmeter		2 x rated voltage max. 1000V upto max. 5sec.	
Ammeter	5sec	10 times	
	1sec	40 times (250 A max.)	
Scale length	mm	61	97



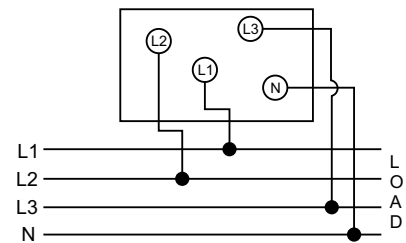
Dimensions (in mm)		EQ 72 SWT	EQ 96 SWT
Bezel	a	72	96
Case	b	66	90
Depth	c	53	53
	d	67.5	91.5
	e	5.5	5.5
Cutout Size		68 ^{+0.7}	92 ^{+0.8}
Depth with back cover	f	64	64
	g	13	13

CONNECTION DIAGRAMS:

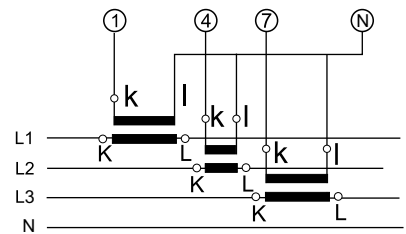
AC VOLTMETERS 3 PHASE 3 WIRE



AC VOLTMETERS 3 PHASE 4 WIRE



AC AMMETERS 3 PHASE 4 WIRE



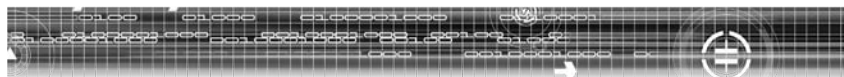
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	System Type	Measuring Range/Input	Scale	Options
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ORDER EXAMPLE

EQ	72	Voltmeter	3 Phase 3 Wire	250V	250V	with back cover
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Ziegler

Redefine Innovative Metering

Vibrating REED Type Frequency Meter



FQ 72	For measuring frequency
FQ 96	of Generators and Power Suppliers

The vibrating REED Type Frequency Meters are used measuring frequency of gensets, generator sets in the span of rated frequencies 50Hz or 60Hz. They come in 72x72mm & 96x96mm DIN Quadratic sizes.

Movement :

Vibrating REED Movement with 13nos. If REEDs mounted in HORIZONTAL ARRANGEMENT. Each REED is tuned to a different value in the frequency span.

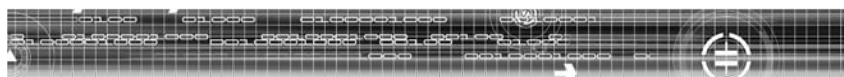


GENERAL FEATURES:

APPLICABLE STANDARDS	
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Scale and pointer for electrical measuring instruments	DIN 43802
Nominal case and cutout dimensions for indicating Electrical instruments	DIN 43700 DIN 16257
Connections and Terminal markings for panel meters	DIN 43807
Terminal bolts / leads.	DIN 46200/46282
Principle Dimensions & Front frames for indicating measuring instruments	DIN 43718
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 529 , IEC 1010
Enclosure code	IP 52 (standard) IP 65(on req.) IP 54 (on request) casings
UL combustibility class	UL 94 V-0
Compliance with European Directives	89/336/EEC (EMC directive) 73/23/EEC (low voltage directive) & amendment 93/68/EEC, for CE Marking
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation Resistance	>50MΩ at 500 V DC

FACT SHEET:

Casing Details	Moulded square case suitable for mounting in control / switchgear panels, Machinery consoles
Case Material	Glass filled polycarbonate, Flame retardant & drip proof as per UL 94 V0
Front Facia	Glass Antiglare Glass (on request) Polycarbonate/transparent(on request)
Color of Bezel	Black Red/Yellow/Blue/White (on request)
Position of use	Vertical
Panel Fixing (mountable in a single cutout)	Metal side clamps, Leaf springs
Panel thickness	40mm
Terminals	HEX STUD M4 screws and wire clamp E3
No. of REEDs	13
REED Arrangement	Horizontal
Scale divisions	Coarse & fine
Accuracy class	0.5 according to IEC 60051



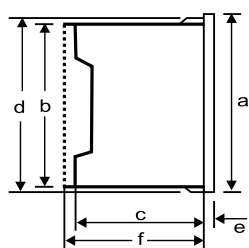
Ziegler

Redefine Innovative Metering

TECHNICAL SPECIFICATIONS:



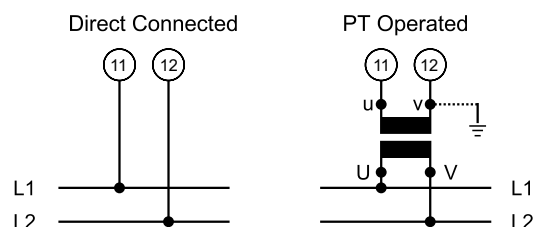
Model	Unit	FQ 72	FQ 96
Front Facia	mm	72x72	96x96
Approximate weight	kg	0.30	0.40
Measuring range	Hz	45...50...55 Hz 47...50...53 Hz 44...50...56 Hz 57...60...63 Hz 54...60...66 Hz	Resolution: ½ Hz ½ Hz 1 Hz ½ Hz 1 Hz
Rated voltage		100V 110V 230V 400V 500V 600V	Approx. power consumption 0.4VA 0.5VA 1VA 1.5VA <3VA <3VA
Rated insulation voltage	V	660V	
Proof voltage	V	2kV	
OVERLOAD CAPACITY :			
Continuous		1.2 x rated voltage	
Short duration		2 x rated voltage max. 5sec.	



Dimensions (in mm)		FQ 72	FQ 96
Bezel	a	72	96
Case	b	66	90
Depth	c	53	53
	d	67.5	91.5
	e	5.5	5.5
Cutout Size		68 ^{+0.7}	92 ^{+0.8}
Depth with back cover	f	64	64

CONNECTION DIAGRAMS:

Frequency meter



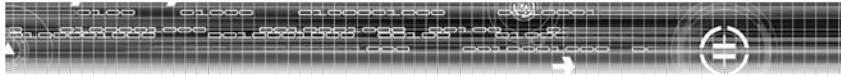
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Measured Qty	Input Voltage	Scale	Options
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ORDER EXAMPLE

FQ	72	Frequency	230V	45...50...55 Hz	with back cover
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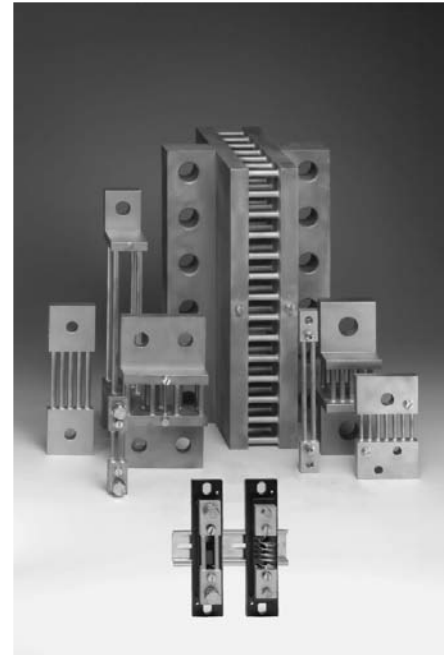
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DC Shunts for High current on DC circuits

50mV
60mV
75mV
150mV

For measuring High Value current connection on DC circuits on 0.5 and 1 class.

DC shunts convert high value current in DC circuits into proportional voltage drop (50mV/60mV/75mV/150mV) which can be connected of DC voltmeters to measure the high value current. They come in three forms as described below,

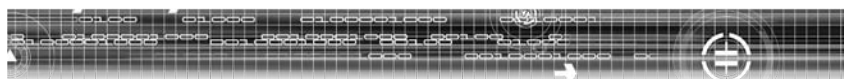


GENERAL FEATURES:

APPLICABLE STANDARDS	
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories	IEC51/DINEN60051 DIN 43701
Shunts	DIN 73703
Mounting rails	DIN EN 50022-35
Enclosure code	IP 00
OVER RANGE:	
Shunt	1.2 times nominal current
Insulation class	Group A according to VDE 0110
Installation category	CAT III 600 V (IEC 61010)
Insulation Resistance	>50M Ω at 500 V DC

FACT SHEET:




Form A	Insulating base mounted shunts clamping to DIN mounting rail or wall mounting (upto 30A) without insulating base (31...150A)
Form B	L-profile end blocks
Resistance bars	Manganin
End blocks Form A	High conductivity brass
Form B/C	High conductivity brass / copper
Base material	Polycarbonate, black
POWER CONSUMPTION :	
Voltmeter	< 4.5 VA
Ammeter	<15A - < 0.5 VA >15A - <0.8 VA
Accuracy class	Class 1, 0.5, 0.2



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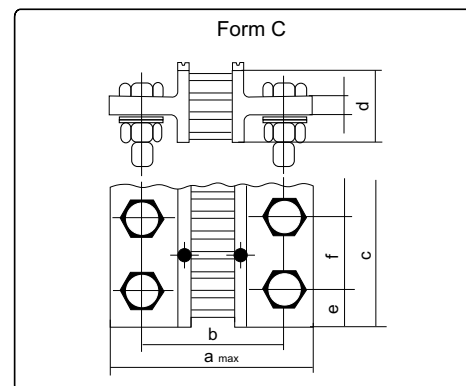
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TECHNICAL SPECIFICATIONS:

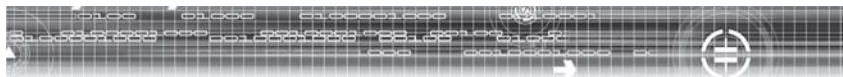
DIN 43703 standard				
				
Model		Form A	Form B	Form C
Voltage drop	mV	50mV, 60mV, 75mV, 150mV	50mV, 60mV, 75mV, 150mV	50mV, 60mV, 75mV, 150mV
MEASURING RANGE	In	1,2,4,5,6 10,15,20,25,30,40 50,60,80,100 or 150	200; 250; 300; 400; 500; 600; 750; 800; 1000; 1200; 1500; 2000 or 2500	1200; 1500; 2000 or 2500 3000 or 4000

Approximate weight (Kg)							
In	1...30A	31...150A	200...250A	400...600A	1000A	1500A	2500A
50/60mV	0.12	0.13	0.61	0.85	1.45	1.96	2.90
75mV	0.12	0.16	0.61	1	1.90	3	3.10
150mV	0.15	0.23	0.68	1.16	2.15	3.15	5.20

Voltage drop mV	Rated current A	Exec. according to figure	a	b	c	d	e	f	No. of screws	Hexagonal screw DIN 933-5-8
50/60 mV	1...30A	A	90	70	20	-	-	-	2 x 1	M5x12
	31...150A	A	110	80	20	-	-	-	2 x 1	M8x16
	200...250A	B	155	105	30	30	15	-	2 x 1	M12x40
	400...600A	B	155	105	30	30	20	-	2 x 1	M16x45
	1000A	B	175	115	60	30	30	-	2 x 1	M20x50
	1500A	B	175	115	90	30	21	48	2 x 2	M16x45
	2500A	C	175	115	120	30	30	60	2 x 2	M20x50
75mV	200...250A	B	165	125	30	30	15	-	2 x 1	M12x40
	400...600A	B	165	125	40	30	20	-	2 x 1	M16x45
	1000A	B	185	135	60	30	30	-	2 x 1	M20x50
	1500A	B	185	135	90	30	21	-	2 x 2	M16x45
	2500A	C	185	135	120	30	30	-	2 x 2	M20x50
150mV	200...250A	B	270	230	30	50	15	-	2 x 1	M12x40
	400...600A	B	270	230	40	50	20	-	2 x 1	M16x45
	1000A	B	290	240	70	60	35	-	2 x 1	M20x50
	1500A	C	290	240	90	60	21	-	2 x 2	M16x45
	2500A	C	290	240	120	60	30	-	2 x 2	M20x50



Shunt	75mV	500A	Class 1	NA
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Analog Meters with Moving-Iron Movement with contacts

EQC 96

Available in both AC, Current & Voltage type, they come in standard size of 96x96mm

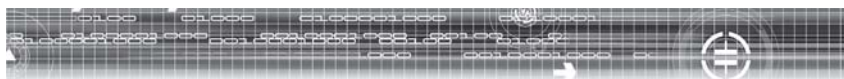


GENERAL FEATURES:

APPLICABLE STANDARDS	
Nominal case and cutout dimensions for indicating Electrical instruments	IEC 61554
Scale and pointer for electrical measuring instruments	DIN 43802
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 529, IEC 1010
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories.	IEC 51 / DIN EN 60051 DIN 43701
Environmental conditions	VDE / VDI 3540
Front frames for indicating measuring instruments principle dimensions	DIN 43718
Enclosure code	IP 52 case
UL Combustibility Class	UL 94 V-0
Insulation class	Group A according to VDE 0110
Rated insulation voltage	1000 V
Proof voltage	EQC 96 : 2KV
Installation category	300 V CAT III (IEC 1010)
Insulation resistance	> 50 Mohm at 500 V d.c
Voltmeters	2 times rated voltage
Ammeter	
5 s max.	10 times (200 A max.) : 10 overloads
1 s max.	-- 40 times (250 A max.)
Relay contact rating	10A @ 250VAC
Time delay	0 - 30 Sec. \pm 3 Sec.
Set accuracy	\pm 5 %
Trip Setting	0 - 100%
Set accuracy	\pm 5 %
Hysterisys	2% of the scale

FACT SHEET:

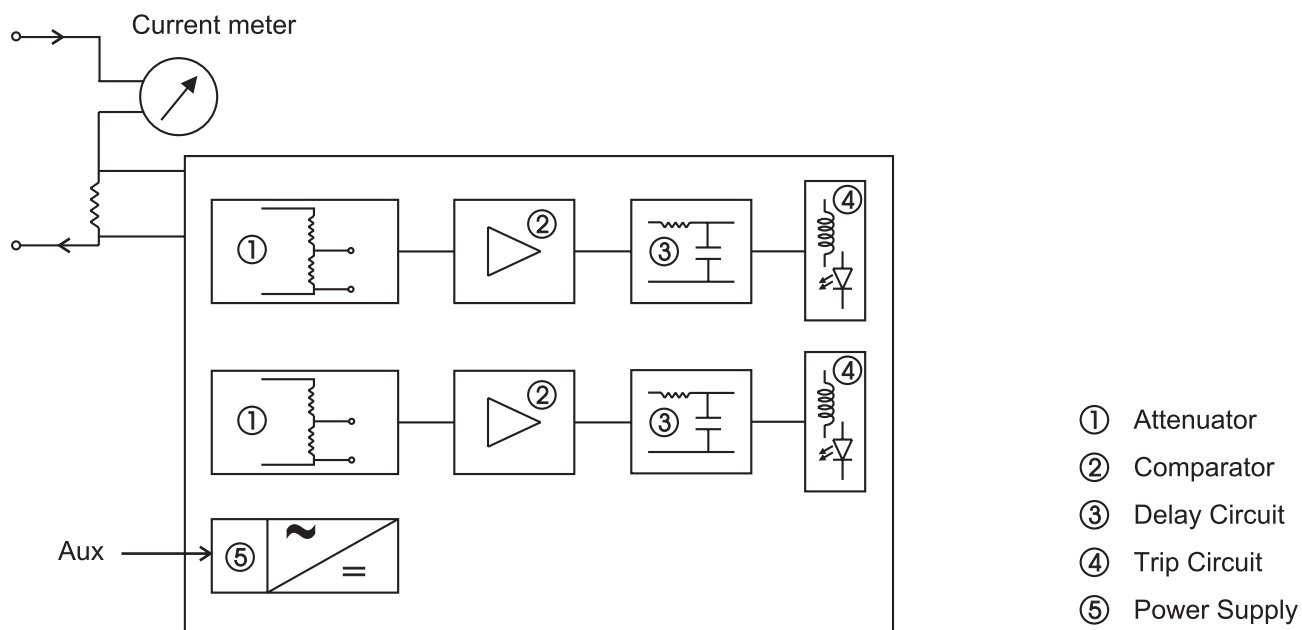
Case details	Moulded square case suitable for mounting in Control / Switchgear panels, Machinery consoles.
Case material	Glass filled polycarbonate, flame retardant and drip proof as per UL 94 V-0.
Front facia	Glass
Colour of bezel	Black
Position of use	Vertical
Panel fixing	Mounting Clamps
Mounting	Stackable in a single cutout
Panel thickness	\leq 25 mm
Terminals	Plug and play terminal blocks
Pointer	Knife - edge pointer
Pointer deflection	0...90°
Scale characteristics	Near Linear above 10% of nominal full Scale value
Scale division	Coarse - fine
Scale length	EQC 96 97mm
Over range	
Ammeters	2 times nominal current
Voltmeters for use on	1.2 times nominal voltage
Voltage transformer	
Scale Interchangeability	Interchangeable
Power consumption	
Ammeter < 15 A	< 1 VA
Ammeter > 15 A	< 1.5 VA
Voltmeter	< 4.5 VA
Accuracy class	1.5 according to IS : 1248 (IEC 51/ DIN EN 60051)



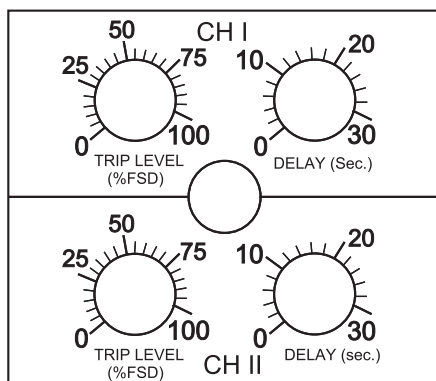
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Schematic Diagram



Trip level and delay settings



	CH-I	CH-II
Trip level setting	0 - 100%	0 - 100%
Delay setting	0 - 30 sec	0 - 30 sec

Relay and LED status

Cascade I mode :

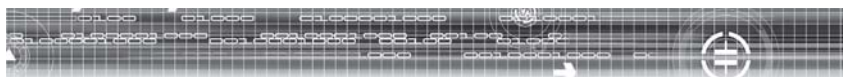
	Relay I	LED I	Relay II	LED II
Healthy condition	ON	OFF	ON	OFF
Trip condition	OFF	ON	OFF	ON

Note : Trip condition will occur after the set delay.

Cascade II mode :

	Relay I	LED I	Relay II	LED II
Healthy condition	OFF	OFF	OFF	OFF
Trip condition	ON	ON	ON	ON

Note : Trip condition will occur after the set delay.



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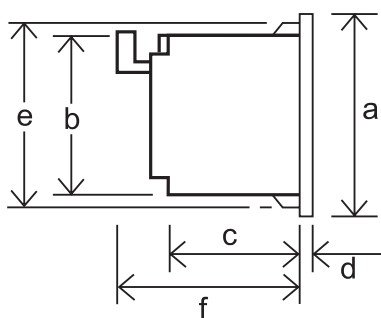
TECHNICAL SPECIFICATIONS:



Model	Unit	EQC 96
Front Facia	mm	96x96
Approximate weight	kg	0.450
AC Ammeter CT operated	A	1A, 5A
AC Ammeter direct measurement	A	100mA-10A
AC voltmeter	V	6-600V
Aux Supply	V	230VAC±15% 45-65 Hz
Rated insulation voltage	V	1000V
Proof voltage	V	2kV

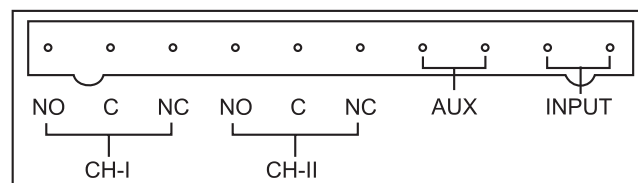
OVERLOAD CAPACITY :

Continuous		1.2 x rated voltage/current
Short duration Voltage path		2 x rated voltage, 5sec. max.
Ammeter	5sec 1sec	10 times (200A max.) 40 times (250A max.)
Scale length	mm	97mm



Dimensions (in mm)		EQC 96
Bezel	a	96
Case	b	87.5
Depth	c	60
	d	5
	f	72
Cutout Size	e	92 ^{+0.8}

CONNECTION DIAGRAMS:



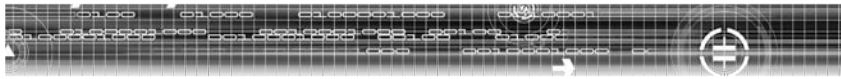
ORDERING INFORMATION

Please specify ordering information as given below,

Type	Size	Over Range	Measuring Range	Index Pointer	Front Facia	Color of Bezel	Aux	Modes
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ORDER EXAMPLE

EQC 96	96	0-5	Amps	Red	Normal glass	Black	230V AC	Cascade 1
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Redefine Innovative Metering

Accessories - Analogue Panel Meters

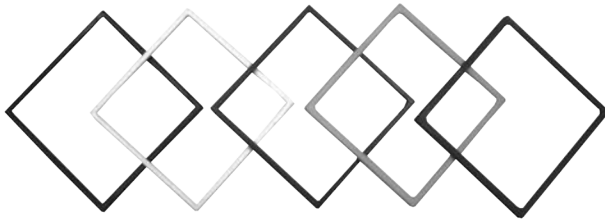
SCALES

Ziegler can supply blank and printed scales as accessories. The special color marking, scale mark with different color bands also supplied on request. All scales are printed as per the DIN standard. Also plastic scale can be supplied on request.



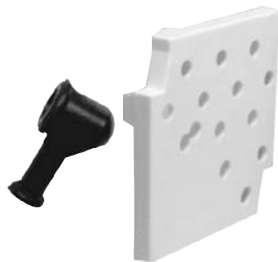
DIFFERENT SIZES AND COLOR BEZELS

In Ziegler meters we can change scale very easily and can use different color bezel for indication. Eg: Red, White, Yellow, Blue & Black. Available in 48x48, 72x72, 96x96, 144x144mm sizes.



TERMINAL COVER / BACK COVER

The click fit back cover can be supplied as an accessory with different DIN sizes 48, 72, 96 & 144. For protection we have other option as terminal cover.



ADAPTER PLATE

Available for following size:
96x144
72x96



MOUNTING CLAMPS

The swivel screw and leaf spring can be supplied as accessories.



RED POINTER KIT

Available for following size:
48X48
72X72
96X96
144X144
Available in 90° & 240°



PLOTTER AND ACCESSORIES

Plotter & Printing Software can be supplied on request for printing the scales locally in bulk quantities.

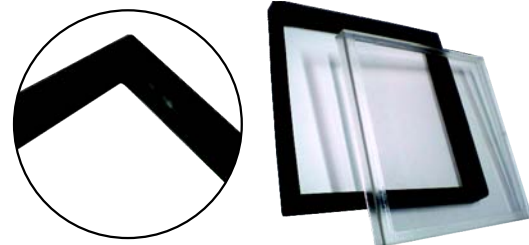


GLASS

The Glass can also be replaced and can be ordered as an accessory. The Antiglare, Polycarbonate glasses can be supplied on request

IP 65 KIT

48X48
72X72
96X96



PANEL WINDOWS

72X72
96X96

