Product Catalogue

ELTIME CONTROLS

Global Suppliers of Measurement and Protection Equipment for Industry

www.eltime.co.uk

Welcome to Eltime Controls

Since being founded in 1979, Eltime Controls has grown to become a leading global manufacturer and supplier of measuring instrumentation, control and protection products for industry. Based in the UK, we supply products throughout the world, specialising in the electrical control panel and switchboard industry.

With our modern, fully equipped manufacturing plant and staff expertise, we work closely with our customers to develop innovative quality products at competitive prices, to meet the expanding needs of the measurement industry.

All Eltime products are designed, developed and manufactured to ISO9001:2000 quality control and carry a full two year guarantee. Extensive stocks of most products are held which when coupled with our manufacturing base enables a high level of customer service and fast delivery on all orders.

Join our growing list of world-wide customers...

- Barbados
- Belgium
- Brazil
- Canada
- Cyprus
- Denmark
- Egypt
- France
- Germany
- Greece
- Hong Kong
- Indonesia
- Iran
- Ireland
- Israel
- Italy
- Japan
- Korea
- Kuwait
- Libya
- Malaysia
- Malta
- Mauritius
- Mexico
- Netherlands
- New Zealand
- Nigeria
- Pakistan
- Peru
- Phillipines
- Portugal
- Saudi Arabia
- Singapore
- South Africa
- Spain
- Sri Lanka
- Sweden
- Syria
- Turkey
- Uganda
- U.A.E.
- United Kingdom
- United States
- Vietnam
- West Indies

Key Information

Company Information

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Fax:	+44 (0)1621 855335
Email:	sales@eltime.co.uk
Web:	www.eltime.co.uk
Established:	1979
Co. Reg. No:	1446958
VAT No:	341 6057 77

Service

- A wide range of competitively priced products
- Extensive stocks held enabling next day delivery on most orders
- No minimum order value
- All products have a full two year guarantee
- Volume pricing - contact our sales team for volume pricing
- Technical support is available on all products

Quality

Eltime Controls are committed to supplying products that fully meet the requirements and expectations of our customers. Our ISO9001:2000 quality management system covers "The manufacture and supply of measuring and control equipment for the Electronic Industry" ensuring the highest levels of customer service and satisfaction.

A copy of our certificate of registration is available upon request.

Ordering

For orders, quotations, samples for evaluation or advice about any of our products contact:-

Telephone:	**+44 (0)1621 859500** (Mondays to Fridays 8:00am to 5:00pm)
Fax:	**+44 (0)1621 855335** (24 hours a day seven days a week)
Email:	**sales@eltime.co.uk** (24 hours a day seven days a week)
Mail:	**Eltime Controls, Hall Road, Maldon, Essex CM9 4NF**

We accept all major credit cards or call us to discuss opening a credit account.

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For analogue measurement of a variety of electrical parameters

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For digital measurement of a variety of electrical parameters

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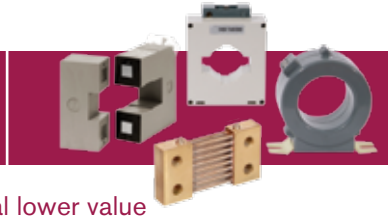
For measuring energy (kWh) consumption

Page 43 Multifunction Monitoring

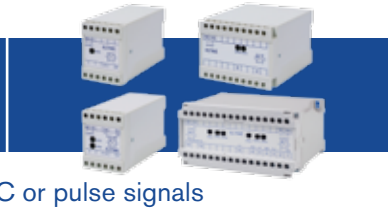
For measuring over 30 electrical parameters of a 3 phase electrical system

Page 49 Current Transformers & DC Shunts



For converting high AC or DC current to a proportional lower value

Page 61 Electrical Measurement Transducers



For converting electrical parameters to proportional DC or pulse signals

Page 81 Analogue Signal Conditioners

For converting and isolating DC process signals

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For protection against over, under, failure or reverse electrical conditions

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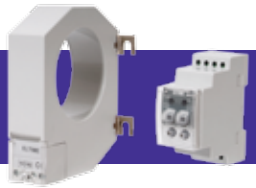

For protection against leakage of current to earth in 3 phase systems

Page 101 Electronic Timers

For timing control of machinery, systems and operational processes

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For timing control of daily or weekly events and processes

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For switching between phases to measure 3 phase voltage or current

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For plant control, automation and mechanical engineering applications

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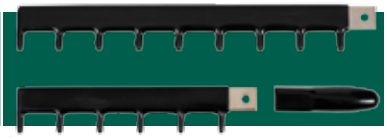
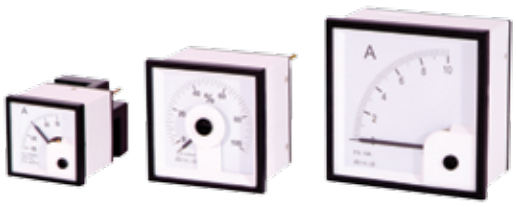


For safely splitting a 150A main supply into up to 9 circuits of up to 32A each


GENERATOR
NO. 3
kWh
V
200
100
0

Product Catalogue

DIN Square Measuring Instruments



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ELTIME CONTROLS

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General Specification

Reference Standards

Performance / Accuracy:	BS EN 60051-1, BS 89 and DIN 43780
Enclosure:	DIN 43700
Vibration Resistance:	DIN 43780
Measuring Ranges:	DIN 43701
Safety:	IEC 414
Dial Symbols:	IEC 51

Environmental

Calibration Temperature:	23°C
Operating Temperature:	-25°C to 50°C
Temperature Coefficient:	±0.03%/ °C
Relative Humidity:	0 - 90% non-condensing

Input

Input Burden:	See individual specifications
Overload:	See individual specifications
Response Time:	< 2seconds

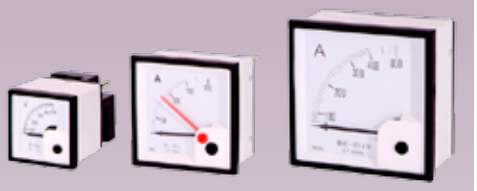
Scales

Dials:	White with black legends
Reference Standard:	DIN 43802
Scale Length:	DIN48 - 37mm
	DIN72 - 65mm
	DIN96 - 90mm

Enclosure

Enclosure:	Flame retardant white ABS plastic case with black bezel
	Plain glass window is standard* but a polycarbonate window is available.
	(*Polycarbonate window is standard on EL meters)
Enclosure Code:	Case IP52 (IP65 with gasket optional) to IEC529 and BS5490
Insulation Test:	2kV rms 50Hz 1min (to IEC 414)
Markings:	CE marked

Specification subject to change without notice.



Eltime Controls Tel: +44 (0) 1621 859500 Fax: +44 (0) 1621 855355

Moving Iron Meters

Moving iron meters are suitable for the measurement of true rms AC current or voltage. All moving iron meters have interchangeable scaleplates. Scales are non-linear and are calibrated down to 20% of full scale. Ammeters are available with a 2x overload as standard or a 6x overload for monitoring motor start up currents.

Voltmeters are also available with scales for high voltage measurement via voltage transformers. All moving iron meters are calibrated for operation at 50/60Hz but calibration at 400Hz is available upon request. Moving iron meters may be used to measure DC at reduced accuracy.

Models Available

FE48MIA DIN48 Moving Iron Ammeter
FE72MIA DIN72 Moving Iron Ammeter
FE96MIA DIN96 Moving Iron Ammeter

FE48MIV DIN48 Moving Iron Voltmeter
FE72MIV DIN72 Moving Iron Voltmeter
FE96MIV DIN96 Moving Iron Voltmeter

Product Features

- AC current or AC voltage
- Standard DIN square sizes
- Interchangeable scaleplates
- Many options available (see page 22)

For dimensions see pages 23-24

Moving Iron – for measurement of true rms AC current or voltage

Specification

Accuracy:
- Class 1.5 (±1.5% max. error)

Input Current, *In*:
- 0-0.5A to 0-100A direct connected
- FE48 40A maximum direct
- 0-1A or 0-5A CT operated

Input Voltage, *Un*:
- 0-100V to 0-800V direct connected
- FE48 500V maximum

Scales:
- 0-0.5, 1, 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10, 15, 20, 25, 30, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800, 1000, 1200, 1500, 1600, 2000, 2500, 3000A
- 100, 150, 250, 300, 400, 500, 600, 800V

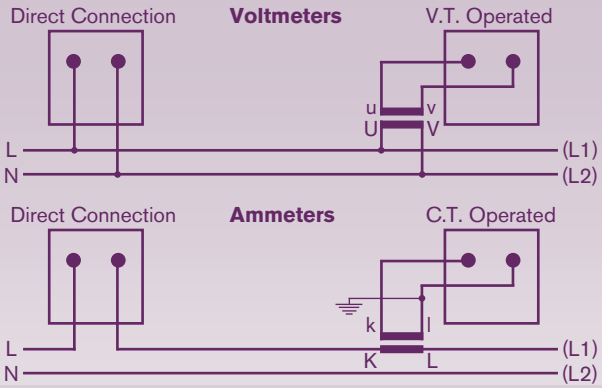
Overload:
- 1.2 x *In* or *Un* for 2 hours
- 10 x *In* or *Un* for 5 seconds

Frequency:
- 50/60Hz (400Hz upon request)

Burden:
- Ammeter < 1VA, Voltmeter < 3VA

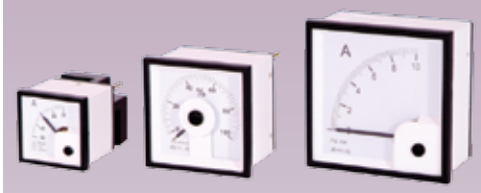
Weight:
- FE48 140g, FE72 190g, FE96 290g

Connections



Ordering information

Code	DIN Square Size & Movement Type	Meter Type	Input & Scaling
FE48MI	48 x 48mm Shortscale (90°)	–	–
FE72MI	72 x 72mm Shortscale (90°)	–	–
FE96MI	96 x 96mm Shortscale (90°)	–	–
A	–	Moving Iron Ammeter	–
V	–	Moving Iron Voltmeter	–
Specify	–	–	0.5 to 100A direct
	–	–	(FE48 – 40A max.)
Specify	–	–	1A or 5A from a CT
Specify	–	–	scaled 5A to 3000A
Specify	–	–	100, 150, 250, 300,
Specify	–	–	400, 500, 600, 800V
	–	–	(FE48 – 500V max.)
Example	**FE48MI**	**A**	**100/5A**



Moving Coil Meters

Moving coil meters are suitable for measurement of DC current or voltage. All meters have a jewel and pivot movement which ensures reliability and accuracy. The moving coil meters are available in shortscale (90°) versions or longscale (240°) versions.

All meters have interchangeable scaleplates. Scales are linear and are calibrated from zero to full scale. Scaleplates are available in any process unit including A, V, °C, bar, rpm, kW and %, so meters can be driven from a transducer output.

Models Available

FE48MCA DIN48 Moving Coil Ammeter
FE72MCA DIN72 Moving Coil Ammeter
FE96MCA DIN96 Moving Coil Ammeter
FE72LSA DIN72 240° Mov. Coil Ammeter
FE96LSA DIN96 240° Mov. Coil Ammeter

FE48MCV DIN48 Moving Coil Voltmeter
FE72MCV DIN72 Moving Coil Voltmeter
FE96MCV DIN96 Moving Coil Voltmeter
FE72LSV DIN72 240° Mov. Coil Voltmeter
FE96LSV DIN96 240° Mov. Coil Voltmeter

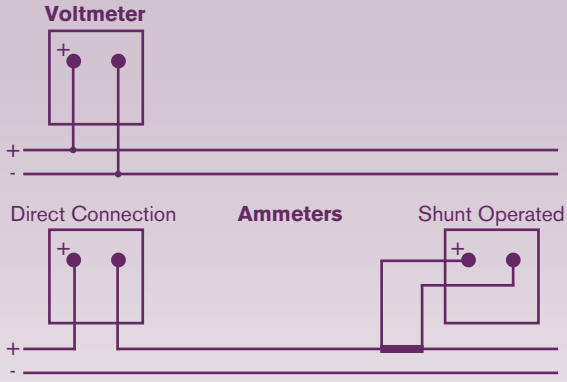
Product Features

- DC current or DC voltage
- Standard DIN square sizes
- Interchangeable scaleplates

For dimensions see pages 23-24

Moving Coil – for measurement of DC current or voltage

Connections



Ordering information

Code	DIN Square Size & Movement Type	Meter Type	Input & Scaling
FE48MC	48 x 48mm Shortscale (90°)	–	–
FE72MC	72 x 72mm Shortscale (90°)	–	–
FE96MC	96 x 96mm Shortscale (90°)	–	–
FE72LS	72 x 72mm Longscale (240°)	–	–
FE96LS	96 x 96mm Longscale (240°)	–	–
A	–	Moving Coil Ammeter	–
V	–	Moving Coil Voltmeter	–
Specify	–	50mA to 40A direct (FE48 - 25A max.)	
Specify	– > 40A use shunt & 50, 60, 75mV Voltmeter (c/w scale)		
Specify	–	–	4-20mA (c/w scale)
Specify	–	50mV to 800V (FE48 - 500V max.)	
Example	**FE72MC**	**V**	**100Vdc**

Specification

Accuracy:
- Class 1.5 (±1.5% max. error)

Input Current, *In*:
- 0-50mA to 0-40A direct connected
- FE48 25A maximum direct
- > 0-40A use shunt and mV voltmeter
- 4-20mA

Input Voltage, *Un*:
- 0-50mV to 0-800V direct connected
- FE48 500V maximum

Scales:
- 0-1, 1.5, 2, 2.5, 3, 4, 5, 6, 8, 10, 15, 20 25, 30, 40, 50, 60, 75, 80, 100, 120 150, 200, 250, 300, 400, 500, 600 800, 1000, 1200, 1500, 1600, 2000 2500, 3000 mA, mA, A, mV, V

Overload:
- 1.2 x *In* or *Un* for 2 hours
- 10 x *In* or *Un* for 5 seconds

Voltage Drop:
- Ammeter < 100mV

Current Consumption:
- Voltmeter < 200V 1mA, > 200V 200mA

Weight:
- FE48 140g, FE72 190g, FE96 280g
- FE72LS 310g, FE96LS 360g

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Rectified Moving Coil Meters

Rectified moving coil meters are suitable for measurement of average rms AC current or voltage. All meters have a jewel and pivot movement which ensures reliability and accuracy. The moving coil meters are available in shortscale (90°) versions or longscale (240°) versions.

All meters have interchangeable scaleplates. Scales are linear and are calibrated from zero to full scale. All meters are calibrated at 50Hz but can be calibrated at an alternative frequency upon request.

Models Available

FE72MCRA DIN72 Rect. M.C. Ammeter
FE96MCRA DIN96 Rect. M.C. Ammeter
FE72LSRA DIN72 240° Rect. M.C. Ammeter
FE96LSRA DIN96 240° Rect. M.C. Ammeter

FE48MCRV DIN48 Rect. M.C. Voltmeter
FE72MCRV DIN72 Rect. M.C. Voltmeter
FE96MCRV DIN96 Rect. M.C. Voltmeter
FE72LSRV DIN72 240° Rect. M.C. Voltmeter
FE96LSRV DIN96 240° Rect. M.C. Voltmeter

Product Features

- Linear AC current or AC voltage
- Standard DIN square sizes
- Interchangeable scaleplates
- Many options available (see page 22)

For dimensions see pages 23-24

Rectified Moving Coil – for measurement of average rms AC current or voltage

Specification

Accuracy:
- Class 1.5 (±1.5% max. error)

Input Current, *In*:
- 0-0.1 to 0-5A direct connected
- 0-1A or 0-5A CT operated
- FE48 not available

Input Voltage, *Un*:
- 0-10V to 0-800V direct connected
- FE48 500V maximum

Scales:
- 0-0.1, 0.2, 0.5, 1, 1.5, 2, 2.5, 3, 4, 5A
- 5A to 3000A CT operated (1A or 5A)
- 0-10, 15, 20, 25, 30, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800V

Overload:
- 1.2 x *In* or *Un* for 2 hours
- 10 x *In* or *Un* for 5 seconds

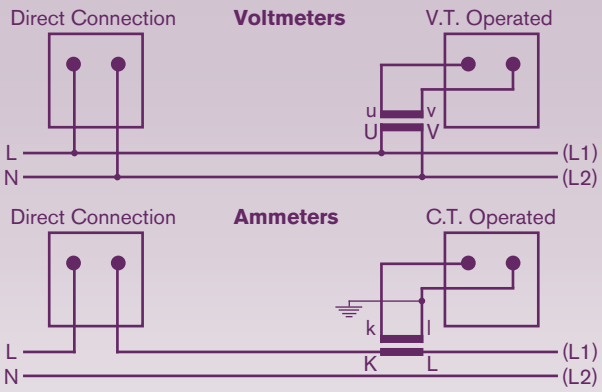
Frequency:
- 50Hz (up to 400Hz upon request)

Voltage Drop:
- Ammeter < 100mV

Current Consumption:
- Voltmeter < 200V 1mA, > 200V 200mA

Weight:
- FE48 170g, FE72 210g, FE96 310g
- FE72LS 350g, FE96LS 400g

Connections



Ordering information

Code	DIN Square Size & Movement Type	Meter Type	Input & Scaling
FE48MC	48 x 48mm Shortscale (90°) (R/A n/a)	–	–
FE72MC	72 x 72mm Shortscale (90°)	–	–
FE96MC	96 x 96mm Shortscale (90°)	–	–
FE72LS	72 x 72mm Longscale (240°)	–	–
FE96LS	96 x 96mm Longscale (240°)	–	–
RA	–	Rectified Moving Coil Ammeter	–
RV	–	Rectified Moving Coil Voltmeter	–
Specify	–	–	0.1 to 5A direct
Specify	–	1A or 5A from a CT scaled 5A to 3000A	
Specify	–	–	10 to 800V
	–	–	(FE48 – 500V max.)
Example	**FE48MC**	**RV**	**100V**

Frequency Meters

Frequency meters are suitable for the measurement of the frequency of an AC supply. All meters have a jewel and pivot movement which ensures reliability and accuracy. The frequency meters are available in shortscale (90°) versions or longscale (240°) versions.

All frequency meters have interchangeable scaleplates. Scales are linear and are calibrated from 45 to 65Hz with a suppressed zero. Frequency meters with dual scales (Hz & rpm) are available to display generator speed. High frequency (360-440Hz) meters and dual voltage input (110V & 230V) frequency meters are also available.

Models Available

FE48F DIN48 Frequency Meter
FE72F DIN72 Frequency Meter
FE96F DIN96 Frequency Meter
FE72LSF DIN72 Longscale Frequency Meter
FE96LSF DIN96 Longscale Frequency Meter

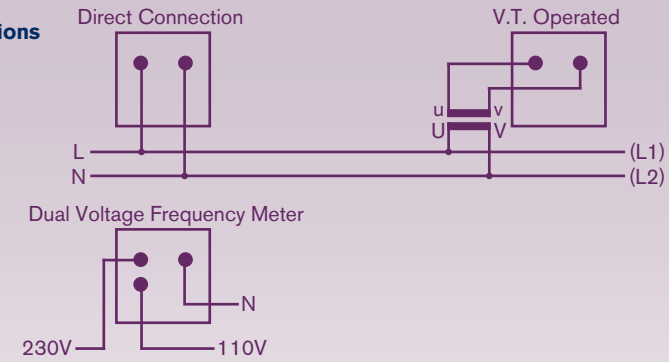
Product Features

- Frequency measurement
- Standard DIN square sizes
- Interchangeable scaleplates
- Many options available (see page 22)

For dimensions see pages 23-24

Frequency Meters – for measurement of AC frequency

Connections



Ordering information

Code	DIN Square Size & Movement Type	Scaling	Input
FE48	48 x 48mm Shortscale (90°)	–	–
FE72	72 x 72mm Shortscale (90°)	–	–
FE96	96 x 96mm Shortscale (90°)	–	–
FE72LS	72 x 72mm Longscale (240°)	–	–
FE96LS	96 x 96mm Longscale (240°)	–	–
F	–	45-65Hz	–
FR	–	45-65Hz & 1350-1950rpm	–
FD	–	45-65Hz @ 110 & 230V	–
FH	–	360-440Hz	–
Specify	–	–	110, 230, 415V
Example	**FE48**	**F**	**230V**

Specification

Accuracy:
- Class 0.5 (±0.5% max. error)

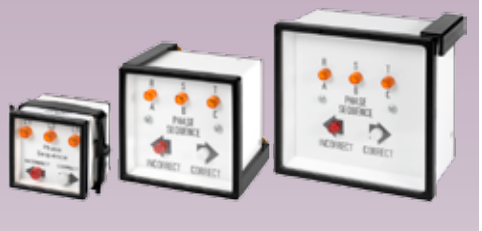
Input Voltage, *Un*:
- 110, 230 or 415V

Scales:
- 45-65Hz
- 45-65Hz & 1350-1950rpm
- 360-440Hz

Overload:
- 1.2 x *Un* for 2 hours
- 10 x *Un* for 5 seconds

Burden:
- 2VA at 230V

Weight:
- FE48 150g
- FE72 190g
- FE96 290g



Eltime Controls Tel: +44 (0) 1621 859500 Fax: +44 (0) 1621 855335

Phase Sequence Indicators

Phase sequence indicators are suitable for monitoring the correct connection of a three phase AC supply. Incorrect phase connection or the loss of one phase will often cause serious damage to motors in compressors, generators, pumps and heating & ventilation equipment.

The presence or absence of the three phases is indicated by three amber neons. Only when all three phases are present and in the correct sequence will the white neon illuminate. Any loss of phase or incorrect sequence is indicated by a red neon.

Models Available

FE48PSI DIN48 Phase Sequence Indicator
EL72PSI DIN72 Phase Sequence Indicator
EL96PSI DIN96 Phase Sequence Indicator

Product Features

- Phase sequence indication
- Standard DIN square sizes
- Highly visible neon display
- Many options available (see page 22)

For dimensions see pages 23-24

Phase Sequence Indicators – for correct connection of a three phase supply

Specification

Input Voltage, *Un*:
- 150 to 500Vac

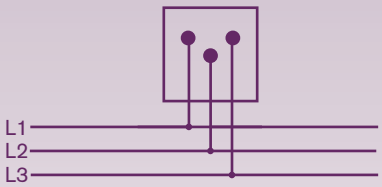
Overload:
- 1.2 x *Un* for 2 hours
- 10 x *Un* for 5 seconds

Frequency:
- 50/60Hz

Burden:
- 3VA

Weight:
- FE48 100g
- EL72 150g
- EL96 200g

Connections



Ordering information

Code	DIN Square Size & Meter Type
FE48PSI	48 x 48mm Phase Sequence Indicator
EL72PSI	72 x 72mm Phase Sequence Indicator
EL96PSI	96 x 96mm Phase Sequence Indicator
Example	**EL96PSI**

Wattmeters & Varmeters

Wattmeters and Varmeters are suitable for the measurement of active power (Watts) or reactive power (Vars). DIN96 meters are self contained whilst all smaller units are connected to a separate converter unit and calibrated as a complete unit to individual requirements.

The converter unit has finger-proof terminal covers and can be remotely DIN rail mounted. All meters have a jewel and pivot movement which ensures reliability and accuracy. The Wattmeters and Varmeters are available in shortscale (90°) only. Scales are linear and are calibrated from zero to full scale.

Notes:
1. Ensure that current transformers are mounted such that K faces the supply and L faces the load.
2. Secondary windings of the current transformers should be earthed.
3. No isolation is provided between input AC voltage and DC output on converter unit.

Models Available

FE48W DIN48 Wattmeter with Converter
FE72W DIN72 Wattmeter with Converter
EL96W DIN96 Wattmeter - Self Contained

FE48V DIN48 Varmeter with Converter
FE72V DIN72 Varmeter with Converter
EL96V DIN96 Varmeter - Self Contained

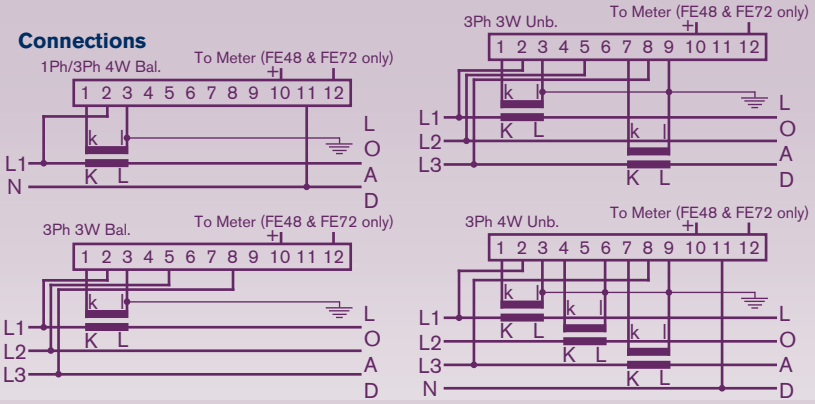
Product Features

- Active power (Watts) or Reactive power (Vars)
- Standard DIN square sizes
- Many options available (see page 22)

For dimensions see pages 23-24

Wattmeters & Varmeters – for measurement of active or reactive power

Connections



Ordering information

Code	DIN Square Size & Movement Type	Meter Type	Input & Scaling
FE48W	48 x 48mm Shortscale (90°) Wattmeter	–	–
FE72W	72 x 72mm Shortscale (90°) Wattmeter	–	–
EL96W	96 x 96mm Shortscale (90°) Wattmeter	–	–
/1	–	Single Phase	–
/2	–	3 Phase 3 Wire Balanced	–
/3	–	3 Phase 3 Wire Unbalanced	–
/4	–	3 Phase 4 Wire Balanced	–
/5	–	3 Phase 4 Wire Unbalanced	–
Specify	–	Voltage (L-N or L-L), Current (CT Ratio)	
Specify	–	and/or full scale Watts/Vars	
Example	**EL72W**	**/5**	**230VL-N, 100/5A**

Specification

Accuracy:
- Class 1.5 (±1.5% max. error)

Input Current, *In*:
- 0-0.2A to 0-10A direct connected
- 1A or 5A CT operated

Input Voltage, *Un*:
- 110, 230 or 415V (-15% to +10%)
- (50 to 600V upon request)

Frequency:
- 50/60Hz

Scales:
- 0-1 to 0-1000 W/Var, kW/kVar or MW/MVar

Overload:
- 1.2 x *In* or *Un* for 2 hours
- 6 x *In* for 5 seconds

Burden:
- Voltage circuit < 2VA per phase
- Current circuit < 1VA per phase

Response Time:
- < 1 second

Weight:
- FE48 140g, FE72 180g, EL96 320g
- Converter unit 200g

Converter Unit Enclosure:
- 55mm wide grey ABS
- Case IP40, terminals IP20
- Fixes to 35mm DIN rail (DIN-EN 50022)

Eltime Controls Tel: +44 (0) 1621 859500 Fax: +44 (0) 1621 855335

Power Factor (cosØ) Meters

Power factor meters are suitable for the measurement of power factor (cosØ). DIN96 meters are self contained whilst all smaller units are connected to a separate converter unit and calibrated as a complete unit to individual requirements. The converter unit has finger-proof terminal covers and can be remotely DIN rail mounted.

All meters have a jewel and pivot movement which ensures reliability and accuracy. The power factor meters are available in shortscale (90°) only. Scales are non-linear, bi-directional and are calibrated from 0.5 lead to 0.5 lag.

Notes:
1. Ensure that current transformers are mounted such that K faces the supply and L faces the load.
2. Secondary windings of the current transformers should be earthed.
3. No isolation is provided between input AC voltage and DC output on converter unit.

Models Available

FE48PF1 DIN48 1ph/3ph4w cosØ Meter
FE72PF1 DIN72 1ph/3ph4w cosØ Meter
FE48PF3 DIN48 3ph3w cosØ Meter
FE72PF3 DIN72 3ph3w cosØ Meter
(all above are complete with a converter unit)

FE96PF1 DIN96 1ph/3ph4w cosØ Meter
FE96PF3 DIN96 3ph3w cosØ Meter
(both above are self contained)

Product Features

- Power factor (cosØ) measurement
- Standard DIN square sizes
- Many options available (see page 22)

For dimensions see pages 23-24

Power Factor Meters – for measurement of power factor (cosØ)

Specification

Accuracy:
- Class 1.5 (±1.5% max. error)

Input Current, *In*:
- 0-0.2A to 0-10A direct connected
- 1A or 5A CT operated

Input Voltage, *Un*:
- 110, 230 or 415V (-30% to +10%)
- (50 to 600V upon request)

Frequency:
- 50/60Hz

Scale:
- 0.5 lead to 0.5 lag

Overload:
- 1.2 x *In* or *Un* for 2 hours
- 6 x *In* for 5 seconds

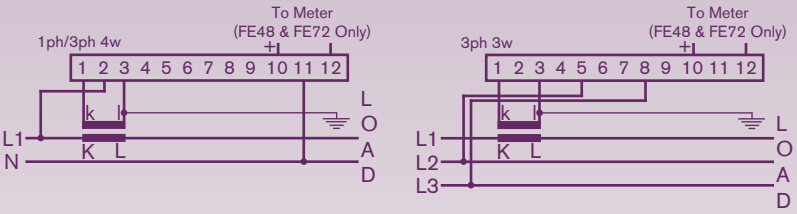
Burden:
- Voltage circuit < 2VA per phase
- Current circuit < 1VA per phase

Response Time:
- < 1 second

Weight:
- FE48 140g, FE72 180g, FE96 350g
- Converter unit 150g

Converter Unit Enclosure:
- 55mm wide grey ABS
- Case IP40, terminals IP20
- Fixes to 35mm DIN rail (DIN-EN 50022

Connections



Ordering information

Code	DIN Square Size & Movement Type	Meter Type	Input
FE48PF	48 x 48mm Shortscale (90°) CosØ meter	–	–
FE72PF	72 x 72mm Shortscale (90°) CosØ meter	–	–
FE96PF	96 x 96mm Shortscale (90°) CosØ meter	–	–
1	–	Single Phase / 3 Phase 4 Wire Balanced	
3	–	3 Phase 3 Wire Balanced	–
Specify	–	–	Voltage (L-N or L-L)
Specify	–	–	and Current
Example	**FE96PF**	**1**	**230VL-N, 5A**

Maximum Demand Meters

Maximum demand meters are suitable for measuring the maximum average load current over a 15 minute time period. Due to their inherent time lag the bimetallic movement remains unaffected by any momentary or short duration overloads. The mean maximum demand is therefore indicated by a red 'drag' pointer which can be set or reset to zero using the front control knob.

The FE96MDIA version also includes an instantaneous reading ammeter for constant monitoring of current demand. The meters are available to operate from 5A secondary rated current transformers. Scales are non-linear and are calibrated from 20% to 120% of full scale current.

Models Available

FE96MDI DIN96 Maximum Demand Meter
FE96MDIA DIN96 Maximum Demand Meter with Ammeter

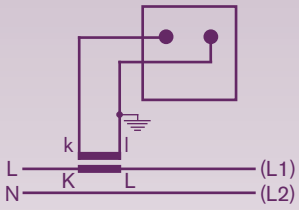
Product Features

- Maximum current demand measurement
- Standard DIN square size
- Interchangeable scaleplates
- Many options available (see page 22)

For dimensions see pages 23-24

Maximum Demand – for measuring the maximum average load current

Connections



Ordering information

Code	DIN Square Size & Meter Type	Input & Scaling
FE96MDI	96 x 96mm Maximum Demand Meter	–
FE96MDIA	96 x 96mm Maximum Demand with Ammeter	–
Specify	–	5/5A to 3000/5A (specify)
Example	**FE96MDIA**	**100/5A**

Specification

Accuracy:
- Class 1.5 (±1.5% max. error)

Input Current, *In*:
- 5A CT operated

Scales:
- 0-5, 10, 15, 20, 25, 30, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800, 1000, 1200, 1500, 1600, 2000, 2500, 3000A

Response Time:
- 15 minutes

Overload:
- 1.2 x *In* for 2 hours
- 10 x *In* for 5 seconds

Frequency:
- 50/60Hz (400Hz upon request)

Burden:
- < 2.5VA

Weight:
- FE96MDI 260g
- FE96MDIA 300g

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Hours Run Meters (Electromechanical)

Models Available

BZW48/2-E DIN48 Black AC Panel Mounted
BZW48/2-A DIN48 Black AC - DIN Rail Mount
BZG48/2-E DIN48 Black DC Panel Mounted
BZG48/2-A DIN48 Black DC - DIN Rail Mount

HE72ETM/A DIN72 White AC Panel Mounted
HE72ETM/D DIN72 White DC Panel Mounted
HE96ETM/A DIN96 White AC Panel Mounted
HE96ETM/D DIN96 White DC Panel Mounted

Product Features

- Hours run monitoring
- Standard DIN square sizes
- Non-resettable
- Many options available (see page 22)

For dimensions see pages 23-24

Hours run meters are suitable for monitoring equipment and scheduling of events. The meters are ideal for recording running time, maintenance intervals or machine utilisation. The electromechanical movement ensures the count is retained in the event of power loss. They are available in several sizes of DIN enclosure and are available to operate on a comprehensive variety of supply voltages and frequencies, including DC.

The DIN48 black hourmeters are available to panel mount or surface/ DIN rail mount. Optional 55mm and 72mm bezels enable circular hole mounting and optional gaskets are also available for all models. The DIN48 hourmeters have finger-proof terminals whilst the DIN72 and DIN96 hourmeters are supplied with a terminal cover.

Hours Run Meters – for monitoring hours of operation on machines

Specification

Counting Range:
- 99,999.99 hours with power indication

Numerals:
- DIN48: 3.5mm high (with magnifier)
- DIN72/DIN96: 4mm high

Enclosure:
- Flame retardant ABS to DIN 43700

Enclosure Code:
- DIN48: IP65 front
- DIN72/DIN96: IP54 front (IP65 optional)

Mounting:
- DIN rail: BZW48/2-A & BZG48/2-A
- Panel mounting: all others

Operating Voltages:
- 24, 48, 110, 230, 415Vac (±10%)
- 10-80, 80-220Vdc (±10%)

Test Voltage:
- 2.5kV rms for 1 minute

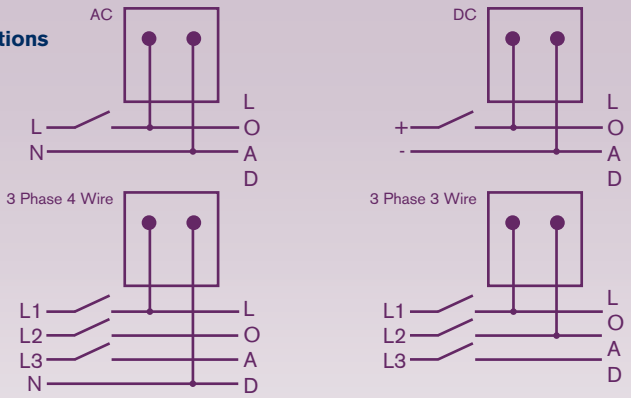
Frequency:
- 50 or 60Hz

Power Consumption:
- Approximately 10mA at rated voltage

Terminals:
- Polarity marked screw clamp

Weight:
- DIN48 60g, DIN72 150g, DIN96 190g

Connections



Ordering information

Code	DIN Square Size & Mounting Type	Voltage	Frequency
BZW48/2-E	48 x 48mm AC Panel Mounting	–	–
BZW48/2-A	48 x 48mm AC DIN Rail/Surface Mounting	–	–
BZG48/2-E	48 x 48mm DC Panel Mounting	–	–
BZG48/2-A	48 x 48mm DC DIN Rail/Surface Mounting	–	–
HE72ETM/A	72 x 72mm AC Panel Mounting	–	–
HE72ETM/D	72 x 72mm DC Panel Mounting	–	–
HE96ETM/A	96 x 96mm AC Panel Mounting	–	–
HE96ETM/D	96 x 96mm DC Panel Mounting	–	–
Specify	–	24, 48, 110, 230, 415Vac	–
Specify	–	10-80, 80-220Vdc	–
Specify	–	–	DC, 50 or 60Hz
Example	**BZW48/2-E**	**230V**	**50Hz**

Hours Run Meters (LCD)

LCD hours run meters are suitable for monitoring equipment and scheduling of events. These solid state electronic meters are black and feature an LCD display with large 7mm digits and optional electrical reset. The LCD hours run meters are available in two different DIN sizes and have exceptional reliability even in severe environments.

Memory is retained in excess of 25 years in the power off condition, by the use of non-volatile memory, so no internal battery is required. These instruments can record upto 99,999.9 hours before resetting with a 0.1 hour resolution, and have separate power and input terminals. Power consumption is minimal over the wide AC/DC supply voltage bands.

Models Available

DH24 DIN24x48 LCD Hours Run Meter
DH48 DIN48 LCD Hours Run Meter

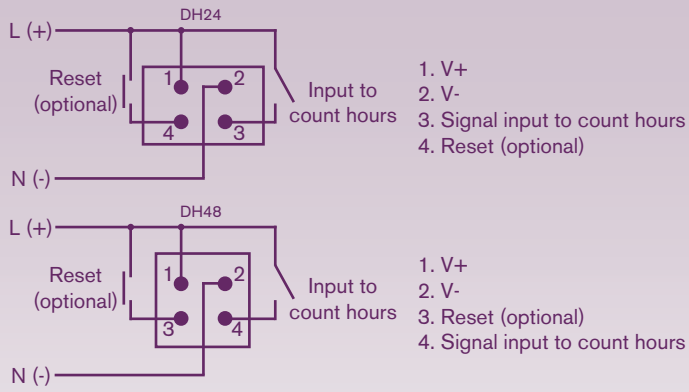
Product Features

- Hours run monitoring
- Standard DIN sizes
- Non-resettable or resettable
- Many options available (see page 22)

For dimensions see pages 23-24

Hours Run Meters – for monitoring hours of operation on machines

Connections



Ordering information

Code	DIN Size	Reset Type	Voltage
DH24	24 x 48mm LCD Hours Run Meter	–	–
DH48	48 x 48mm LCD Hours Run Meter	–	–
N	–	Non-Resettable	–
R	–	Electrical Reset	–
L	–	–	9-60Vdc & 15-75Vac
H	–		36-185Vdc and 75-270Vac
Example	**DH24**	**R**	**L**

Specification

Display:
- 6 digit LCD

Counting Range:
- 99,999.9 hours with operation indication

Numerals:
- DH24: 5mm high
- DH48: 7mm high

Accuracy:
- ±0.04% maximum error

Enclosure:
- Flame retardant ABS to DIN 43700

Enclosure Code:
- IP52 front

Mounting:
- Panel mounting

Operating Voltages:
- L: 9-60Vdc and 15-75Vac
- H: 36-185Vdc and 75-270Vac

AC Frequency Range:
- 48 to 440Hz

Power Consumption:
- < 2mA

Terminals:
- DH24: 4.8mm spade terminals
- DH48: 6.4mm spade terminals

Weight:
- DH24 40g, DH48 70g

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Energy Meters (kWh Meters)

Models Available
EL96GT DIN96 kWh Meter
EL96GTW DIN96 kWh Meter with Wattmeter

Product Features
- Active energy (kWh) measurement
- Standard DIN square size
- Accuracy class 1 (1%)
- Non-resettable
- Pulsed output option
- Many options available (see page 22)

For dimensions see pages 23-24

Kilowatt hour meters are suitable for the monitoring of active energy (kWh) in all types of sub-metering applications. Models are available for single phase and three phase, balanced and unbalanced loads, as well as DC systems. The panel mounting kWh meters are accurate to class 1 to IEC1036 and AC models have a user selectable CT ratio through a rotary switch accessible from a removable cover on the meter.

The meters are housed in a compact DIN96 enclosure measuring only 61mm in depth and are available combined with an analogue instantaneous reading wattmeter (EL96GTW) if required. All meters have an electromechanical counter eliminating the need for any auxiliary power supply on the AC models. All meters are available with an optional voltage free pulsed output for input to data loggers, PLC's, building management systems or computers.

kWh Meters – for measuring energy (kWh) consumption

General Specification

Design complies with:
- IEC1036, IEC521

Accuracy:
- kWh counter class 1 to IEC1036
- Wattmeter class 1.5 to IEC51

Counter:
- 6 digit (4mm high) electromechanical

Scales (EL96GTW):
- 0-1 to 0-1000W, kW or MW

Front Panel LED's:
- Energy LED indicates correct connection of voltage and current
- Pulse LED indicates rate of energy measurement and pulse output

Enclosure Code:
- Case IP52 (IP65 option)

Weight:
- EL96GT 370g, EL96GTW 420g

Pulsed Output:
- Voltage free isolated relay
- 5A contacts at 250Vac, 200msec

Pulsed Output Ratio:
- Once every counter increment

Specification (AC Measurement)

Input Current, *In*:
- 0-0.2A to 0-5A direct connected
- 1A or 5A CT operated

Input Voltage, *Un*:
- 110, 230, 415V or VT ratio
- (50 to 440V upon request)

Voltage Variation:
- ±20% of *Un*

Frequency:
- 50/60Hz

Overload:
- 1.2 x *In* or *Un* for 2 hours
- 6 x *In* for 5 seconds

Test Voltage:
- 2kV rms for 1 minute

Burden:
- Voltage circuit < 3VA per phase
- Current circuit < 0.1VA per phase

Counter & Pulse Resolution:
- 1 kWh (L CT ratio model)
- 10 kWh (H CT ratio model)
- Other resolutions available on request

Specification (DC Measurement)

Input Current, *In*:
- 0-0.1A to 0-10A direct connected
- 0-10A to 0-5000A from 50, 60 or 75mV shunt

Input Voltage, *Un*:
- 12, 24 or 48Vdc
- (upto 600V upon request)

Voltage Variation:
- 0-120% of *Un*

Overload:
- 1.2 x *Un* continuous, 2 x *Un* for 3 sec
- 1.2 x *In* continuous, 10 x *In* for 3 sec

Test Voltage:
- 1kV rms for 1 minute

Counter & Pulse Resolution:
- 1 Wh, 10Wh, 0.1kWh or 1kWh
- Other resolutions available on request

Auxiliary Power Supply:
- 12, 24, 48Vdc, 110, 230 or 415Vac

Auxiliary Power Supply Variation:
- -10% to +20% of nominal

Ordering information

Model	Code	Description
	EL96GT	96 x 96mm kWh Meter
	EL96GTW	96 x 96mm kWh Meter with Wattmeter

Current or CT Ratio	Code	Description
	1L	25/1 to 800/1A (selectable) - see table below *
	1H	200/1 to 6000/1A (selectable) - see table below **
	5L	25/5 to 800/5A (selectable) - see table below *
	5H	200/5 to 6000/5A (selectable) - see table below **
	Specify	Other CT ratio (specify)
	Specify	0.5 to 5 Amps direct (specify)
DC	Specify	0.1 to 10 Amps DC direct (specify) or 10 to 5000 Amps DC from 50, 60, 75mV shunt (specify)***

Wiring System	Code	Description
	/1	Single Phase
	/2	3 Phase 3 Wire Balanced
	/3	3 Phase 3 Wire Unbalanced
	/4	3 Phase 4 Wire Balanced
	/5	3 Phase 4 Wire Unbalanced
DC	/DC	DC System

Input Voltage	Code	Description
	Specify	110, 230 or 415Vac (specify L-N or L-L)
	Specify	50 to 440Vac upon request (specify)
DC	Specify	12, 24, 48Vdc or up to 600Vdc upon request

Auxiliary Power (DC)	Code	Description
DC	Specify	110, 230 or 415Vac (specify)
DC	Specify	12, 24 or 48Vdc (specify)

Options	Code	Description
	/P	Voltage Free Pulsed Output
	GTTC	Terminal Cover

Example	EL96GT - 5L - /5 - 415VL-L - /P

Current Transformer Primary Currents (Selectable)

* L 25, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800A

** H 200, 250, 300, 400, 500, 600, 800, 1000, 1200, 1500, 1600, 2000, 2500, 3000, 4000, 6000A

*** Standard Shunt Values

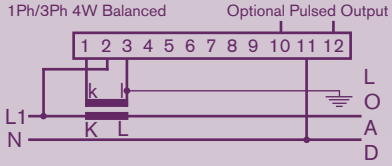
10, 15, 20, 25, 30, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800, 1000, 1200, 1500, 2000, 2500, 3000, 4000, 5000A

Notes:

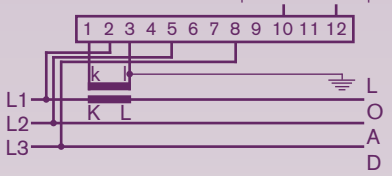
1. Models with (L)ow CT ratios will have a pulse rate of 1pulse/kWh and models with (H)igh CT ratios will have a pulse rate of 1pulse/10kWh (unless a VT ratio is applicable). Other pulse rates are available to suit direct connected units or VT ratios etc.
2. The Wattmeter on all EL96GTW meters will be scaled as calculated by Eltime unless specified otherwise.
3. Ensure that current transformers are mounted such that K faces the supply and L faces the load.
4. Secondary windings of the current transformers should be earthed.

Connections

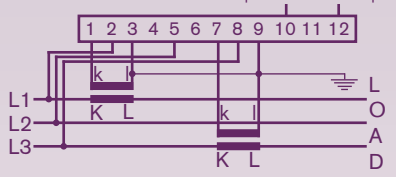
1Ph/3Ph 4W Balanced — Optional Pulsed Output



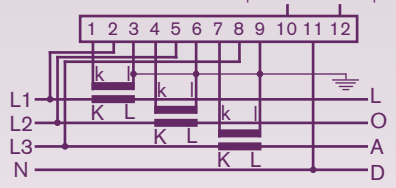
3Ph 3W Balanced — Optional Pulsed Output



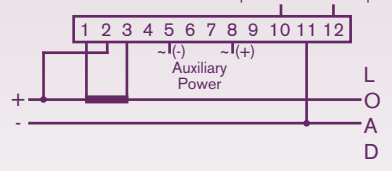
3Ph 3W Unbalanced — Optional Pulsed Output



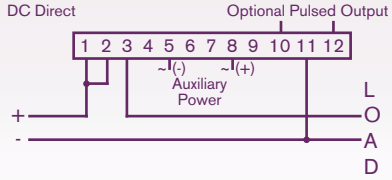
3Ph 4W Unbalanced — Optional Pulsed Output



DC from Shunt — Optional Pulsed Output



DC Direct — Optional Pulsed Output



Meter Options

Meter Terminal Covers
Available for FE72 and FE96* meters is a plastic terminal cover to finger-proof the terminals.
(Order Code: **FE72TC, FE96TC**) *All FE48 meters are supplied with terminal covers

Meter Terminal Covers
Available for all sizes of FE72, FE96 and EL meter are a pair of plastic terminal covers to finger-proof the terminals.
(Order Code: **MTC**)

DIN Square Blanking Plates
Available on all sizes of meter is a black plastic blanking plate to cover a DIN square hole.
(Order code: **FE48BP, FE72BP, FE96BP**)

Adjustable Red Pointer
Available on all sizes of shortscale meter is an adjustable red pointer which can be adjusted by a screwdriver from the front fascia. Not available on longscale meters.
(Order code: **ARP**)

Calibration Certificate
Calibration certificates traceable to national standards can be supplied on all meters.
(Order code: **CALCERT**)

6x Overload
Available on all ac ammeters is an overload reading of 6x the full scale current (2x is standard).
(Order Code: **6X O/L**)

Red Line On Scale
Available on any scale is a red line marked at any point on the scale, as specified by the customer.
(Order Code: **RL@ - specify**)

Coloured Sector On Scale
One or more specified coloured (red, green, yellow) sectors on the scale are available on all meters.
(Order Code: **Coloured Sector - specify**)

Heavily Damped Movements
1A or 5A DIN96 moving iron ammeters are available with a damped viscous movement and all moving coil meters are available with an electronically damped movement.
(Order Code: **HD movement**)

IP65 Sealing
All meters are available with a front sealed to IP65 and a neoprene gasket to retain sealing against the panel.
(Order Code: **IP65**)

Gaskets
Gaskets are available for all meters.
(Order Code: **G48F, G72F, G96F**)

Centre Zero Movement
Moving coil meters are available with a bi-directional reading, centre zero movement and scale. Moving coil meters are also available with an offset centre zero movement and scale.
(Order Code: **C/Z movement or O/Z movement**)

Suppressed Zero Movement
Moving Coil meters are available with a suppressed zero movement and scale (e.g. 15Vdc with suppressed scale from 0 to 10Vdc).
(Order Code: **S/Z movement**)

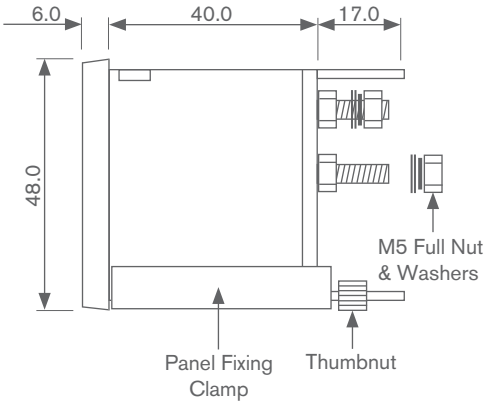
External Adjustable Trim Potentiometer
All moving coil meters are available with an external trim multi-turn potentiometer which is accessible from the back of the meter and adjusts the full scale reading by a minimum of ±20%.
(Order Code: **EXT. TRIM. POT.**)

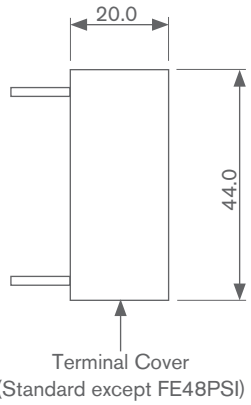
Polycarbonate Window
All sizes of FE meters have a glass window but a polycarbonate window is available. All sizes of EL meters have polycarbonate windows as standard.
(Order Code: **POLY window**)

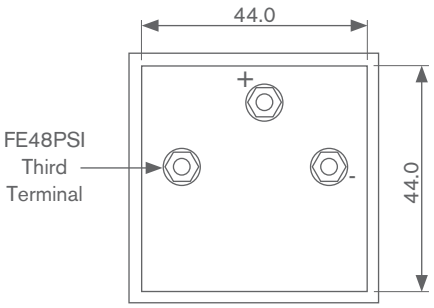
Anti-Glare Window
Anti-glare windows are available for all meters.
(Order Code: **AG window**)

Dimensions

FE48 Enclosure

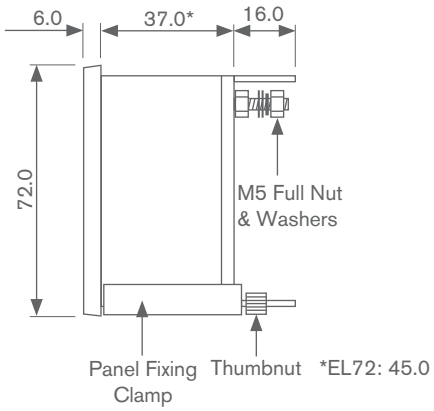


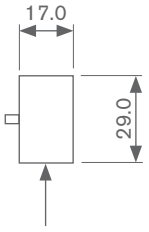


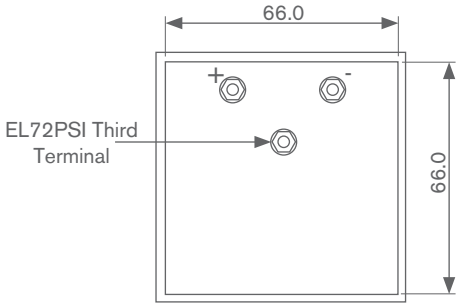


Max. Panel Thickness 12mm
Panel Cutout 45mm square

FE72/EL72 Enclosure

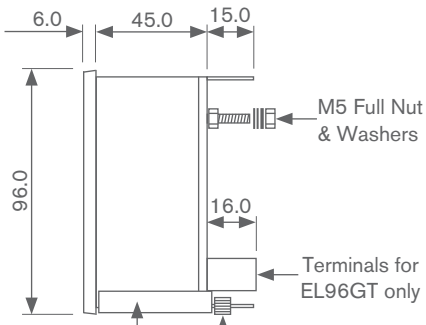


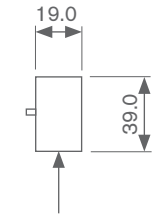


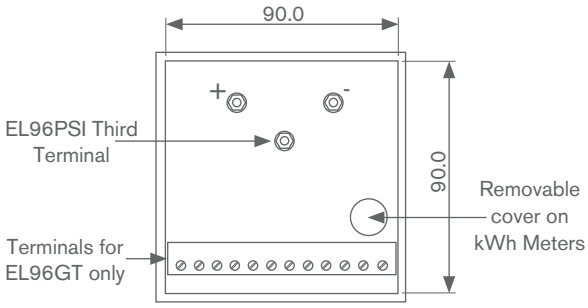


Max. Panel Thickness 10mm
Panel Cutout 68mm square

FE96/EL96 Enclosure

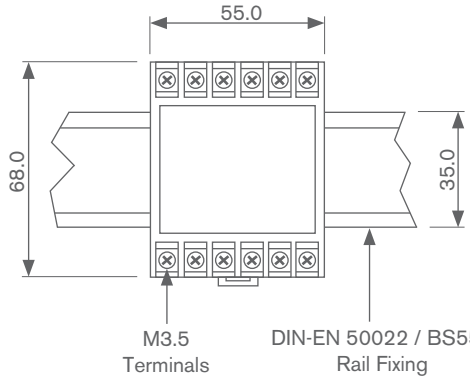


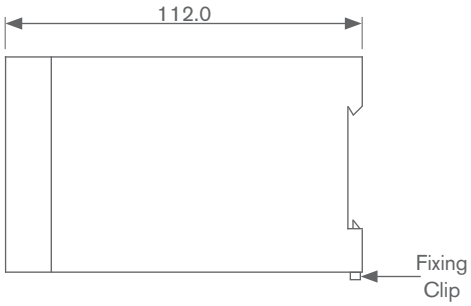




Max. Panel Thickness 9mm
Panel Cutout 92mm square

Watt/Var/cosØ Converter Unit Enclosure

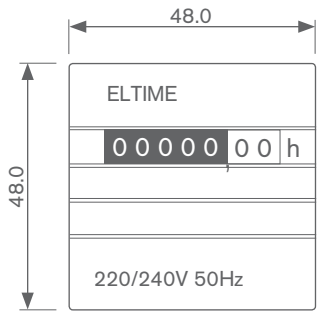


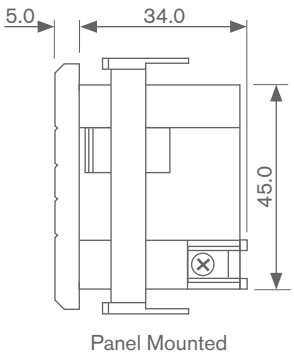


All dimensions in mm

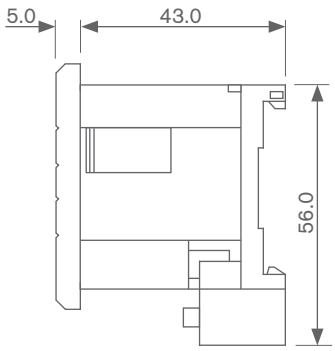
Dimensions

BZW48/BZG48 Enclosure

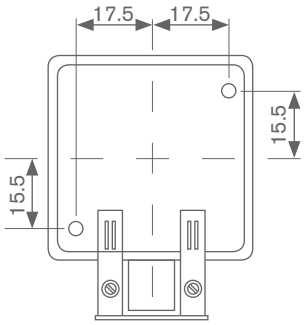




Panel Mounted

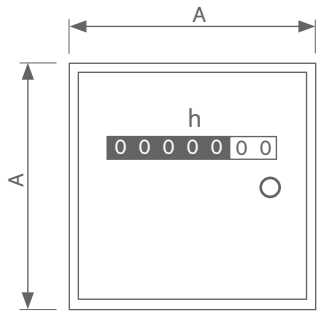


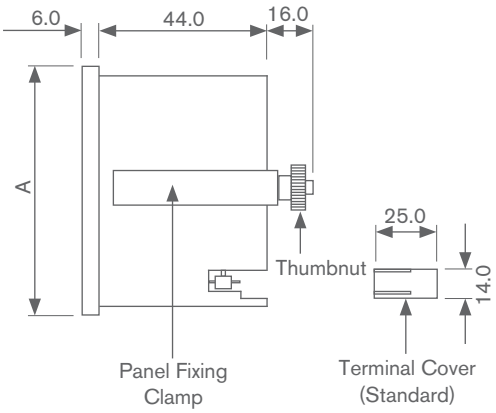
DIN Rail / Surface Mounted



Max. Panel Thickness 14mm
Panel Cutout 45.2(+0.3)mm square
or 50.2mm circular hole

HE72/HE96 Enclosure





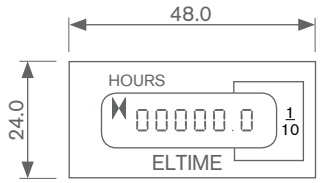
Panel Fixing Clamp

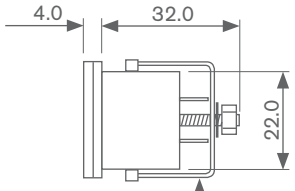
Terminal Cover (Standard)

DIN Size	A	Panel Cutout
HE72	72.0	68.0sq
HE96	96.0	92.0sq

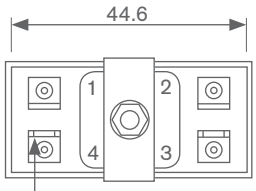
Max. Panel Thickness 10mm

DH24 Enclosure





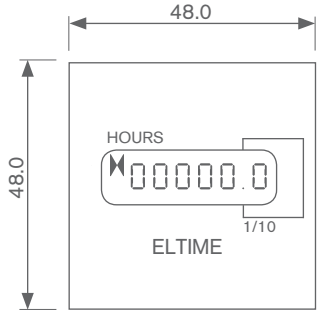
Panel Fixing Clamp

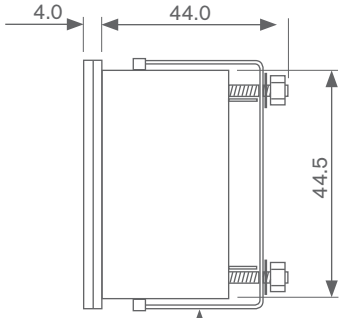


0.8 x 4.8 Spade Terminals

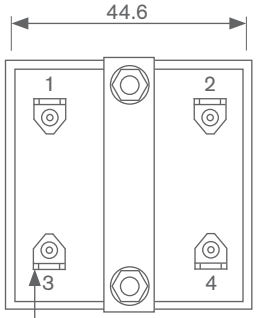
Max. Panel Thickness 10mm
Panel Cutout 45.3mm x 22.3mm (± 0.1)

DH48 Enclosure





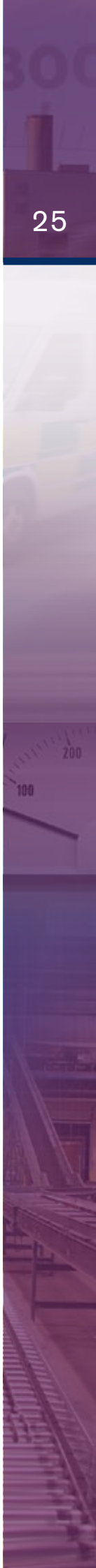
Panel Fixing Clamp



0.8 x 6.3 Spade Terminals

Max. Panel Thickness 10mm
Panel Cutout 45mm square

All dimensions in mm



For more information, please contact our sales team on +44(0)1621 859500

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ELTIME CONTROLS

Product Catalogue

Digital Metering

Global Suppliers of Measurement and Protection Equipment for Industry

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DC Ammeters & Voltmeters

DC digital ammeters and voltmeters are available in two DIN sizes, 48x24mm and 96x48mm, both featuring a 3½ digit red LED display. The meters are panel mounting and offer a wide choice of input and display options making them suitable for a large range of industrial applications.

All DC digital panel meters can be powered by a large selection of self contained AC or DC auxiliary power supplies, which all offer isolation between the measured input signal and auxiliary supply voltage.

All DC digital panel meters are delivered fully calibrated, however adjustments to zero and span points can be made (see calibration data sheets). Optional terminal protection covers are also available.

Models Available

FPM482DCA DIN48x24 DC Ammeter
FPM964DCA DIN96x48 DC Ammeter

FPM482DCV DIN48x24 DC Voltmeter
FPM964DCV DIN96x48 DC Voltmeter

Product Features

- 3½ digit red LED display
- Available in two standard DIN sizes
- User adjustable scale and decimal point
- 4-20mA process monitor available
- Easy to wire screw type terminals

For dimensions see page 33

For digital measurement of DC current, DC voltage and process signals

Specification

Accuracy:
- 0.1% ± 1digit

Input Current, *In*:
- 0-100mA to 0-10A direct connected
- DIN48x24 0-5A maximum direct
- > 10A use shunt and mV voltmeter
- 4-20mA process signal

Input Voltage, *Un*:
- 0-20mV to 0-800V direct connected
- DIN48x24 0-600V maximum
- 0-5V, 0-10V, 1-5V, 2-10V process signal

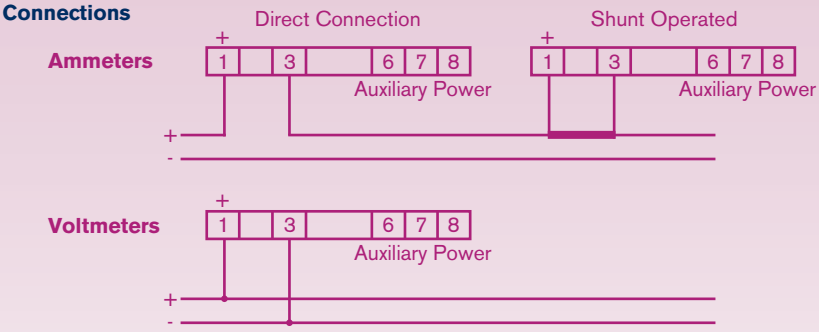
Overload:
- 2 x *In* or 1.2 x *Un* continuous
- 10 x *In* or 2 x *Un* for 5 seconds

Ammeter Voltage Drop:
- 20mV (direct connected)

Impedance:
- Voltmeter 10kohm/Volt
- DIN48x24 4-20mA: 50ohms
- DIN96x48 4-20mA: 1ohm

Weight:
- DIN48x24 90g, DIN96x48 380g

Connections



For auxiliary power connections see page 33

Ordering information

Code	DIN Size & Meter Type	Input & Scaling	Auxiliary
FPM482DCA	48 x 24mm DC Ammeter	–	–
FPM964DCA	96 x 48mm DC Ammeter	–	–
FPM482DCV	48 x 24mm DC Voltmeter	–	–
FPM964DCV	96 x 48mm DC Voltmeter	–	–
Specify	–	0-100mA to 0-10A direct (DIN48x24 - 5A max.)	
Specify	–	> 10A use shunt & 50, 60, 75mV Voltmeter	
Specify	–	4-20mA (scaled as required)	–
Specify	–	0-20mV to 0-800V (DIN48x24 - 600V max.)	
110/230Vac	–	110/230Vac Dual Auxiliary (DIN96x48 only)	
Specify	–	12, 24, 48, 110, 230Vac	
415Vac	–	415Vac (96x48mm only)	
10-60Vdc	–	10-60Vdc (96x48mm only)	
Specify	–	12, 24 or 48Vdc (48x24mm only)	
Example	**FPM482DCV**	**0-10Vdc / 0-100.0%**	**24Vdc**

AC Ammeters, Voltmeters & Frequency Meters

AC digital ammeters and voltmeters are available in two DIN sizes, 48x24mm and 96x48mm, and a digital frequency meter is available in the larger size, all featuring a 3½ digit red LED display. The meters are panel mounting and offer a wide choice of input and display options making them suitable for a large range of industrial applications.

All AC digital panel meters can be powered by a large selection of self contained AC or DC auxiliary power supplies, which all offer isolation between the measured input signal and auxiliary supply voltage.

All AC digital panel meters are delivered fully calibrated, however adjustments to zero and span points can be made (see calibration data sheets). Optional terminal protection covers are also available.

Models Available

FPM482ACA DIN48x24 AC Ammeter
FPM964ACA DIN96x48 AC Ammeter

FPM482ACV DIN48x24 AC Voltmeter
FPM964ACV DIN96x48 AC Voltmeter

FPM964F DIN96x48 Frequency meter

Product Features

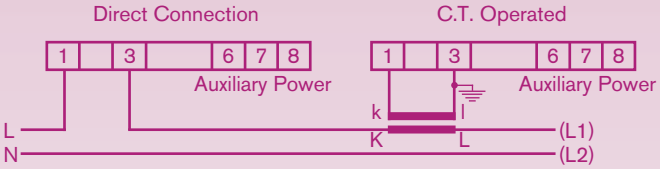
- 3½ digit red LED display
- Available in two standard DIN sizes
- User adjustable scale and decimal point
- Easy to wire screw type terminals

For dimensions see page 33

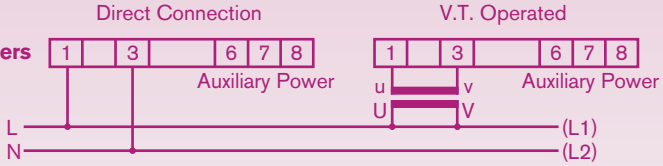
For digital measurement of AC current, AC voltage and frequency signals

Connections

Ammeters



Voltmeters & Frequency Meters



For auxiliary power connections see page 33

Ordering information

Code	DIN Size & Meter Type	Input & Scaling	Auxiliary
FPM482ACA	48 x 24mm AC Ammeter	–	–
FPM964ACA	96 x 48mm AC Ammeter	–	–
FPM482ACV	48 x 24mm AC Voltmeter	–	–
FPM964ACV	96 x 48mm AC Voltmeter	–	–
FPM964F	96 x 48mm Frequency meter	–	–
Specify		– 0-100mA~ to 0-10A~ direct (48x24mm - 5A~ max.)	
Specify		– 1A or 5A from a CT (scaled as required)	
Specify		– 0-20mV~ to 0-800V~ (48x24mm - 600V~ max.)	
Specify		– 0-199.9Hz or 0-1999Hz @ 30-600Vac (FPM964F)	
110/230Vac		– 110/230Vac Dual Auxiliary (96x48mm only)	
Specify		– 12, 24, 48, 110, 230Vac	
415Vac		– 415Vac (96x48mm only)	
10-60Vdc		– 10-60Vdc (96x48mm only)	
Specify		– 12, 24 or 48Vdc (48x24mm only)	
Example	**FPM964ACA**	**800/5A**	**110/230Vac**

Specification

Accuracy:
- DIN48x24 0.1% ± 1digit
- DIN96x48 0.25% ± 1digit

Input Current, *In*:
- 0-100mA~ to 0-10A~ direct connected
- DIN48x24 0-5A~ maximum direct
- 1A or 5A CT operated

Input Voltage, *Un*:
- 0-20mV~ to 0-800V~ direct connected
- DIN48x24 0-600V~ maximum

Overload:
- 2 x *In* or 1.2 x *Un* continuous
- 10 x *In* or 2 x *Un* for 5 seconds

Ammeter Burden:
- DIN48x24 1A: 0.2VA, 5A: 1VA
- DIN96x48 1A: 1VA, 5A: 0.5VA

Voltmeter Impedance:
- 10kohm/Volt (DIN48x24)
- 1kohm/Volt (DIN96x48)

Weight:
- DIN48x24 90g, DIN96x48 400g

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Wattmeters & Varmeters

Models Available

FPM482W DIN48x24 Digital Wattmeter
FPM964W DIN96x48 Digital Wattmeter

FPM482V DIN48x24 Digital Varmeter
FPM964V DIN96x48 Digital Varmeter

Product Features

- Active Power (Watts) or Reactive Power (Vars)
- 3½ digit red LED display
- Available in two standard DIN sizes
- Easy to wire screw type terminals

For dimensions see page 33

Digital Wattmeters and Varmeters are available in two DIN sizes, 48x24mm and 96x48mm, for the measurement of active power (Watts) or reactive power (Vars). The meters are panel mounting and are connected to a separate DIN rail mounted converter unit and calibrated as a complete unit to individual requirements.

All digital Wattmeters and Varmeters can be powered by a large selection of self contained AC or DC auxiliary power supplies, which all offer isolation between the measured input signal and auxiliary supply voltage. The converter unit has finger-proof terminal covers.

Notes:

1. Ensure that current transformers are mounted such that K faces the supply and L faces the load.
2. Secondary windings of the current transformers should be earthed.
3. No isolation is provided between input AC voltage and DC output on converter unit.

Digital Wattmeters & Varmeters - for measurement of active or reactive power

Specification

Accuracy:
- Class 1.0 (±1.0% max. error)

Input Current, *In*:
- 0-0.2A to 0-10A direct connected
- 1A or 5A CT operated

Input Voltage, *Un*:
- 110, 230 or 415V (-15% to +10%)
- (50 to 600V upon request)

Frequency:
- 50/60Hz

Scales:
- 0-1.000 to 0-1999 W/Var, kW/kVar or MW/MVar

Overload:
- 1.2 x *In* or *Un* for 2 hours
- 6 x *In* for 5 seconds

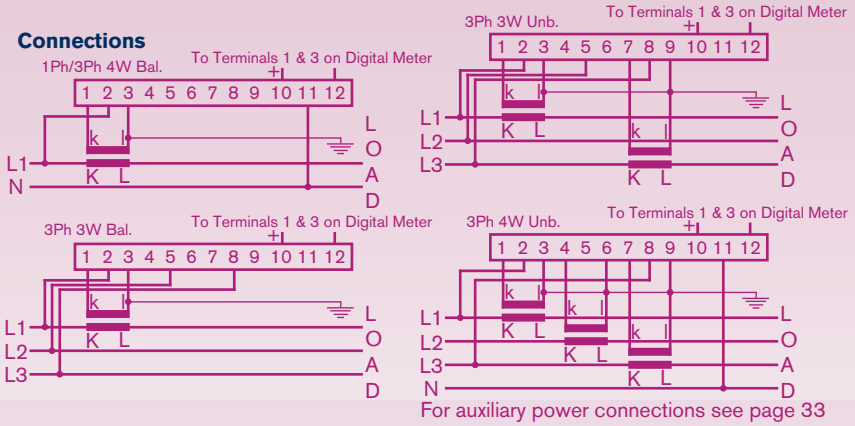
Burden:
- Voltage circuit < 2VA per phase
- Current circuit < 1VA per phase

Response Time:
- < 1 second

Weight:
- DIN48x24 90g, DIN96x48 380g
- Converter Unit 200g

Converter Unit Enclosure:
- 55mm wide grey ABS
- Case IP40, terminals IP20
- Fixes to 35mm DIN rail (DIN-EN 50022)

Connections



For auxiliary power connections see page 33

Ordering information

Code	DIN Size & Meter Type	Input & Scaling	Auxiliary
FPM482W	48 x 24mm Digital Wattmeter	–	–
FPM964W	96 x 48mm Digital Wattmeter	–	–
FPM482V	48 x 24mm Digital Varmeter	–	–
FPM964V	96 x 48mm Digital Varmeter	–	–
/1	Single Phase	–	–
/2	3 Phase 3 Wire Balanced	–	–
/3	3 Phase 3 Wire Unbalanced	–	–
/4	3 Phase 4 Wire Balanced	–	–
/5	3 Phase 4 Wire Unbalanced	–	–
Specify	–	Voltage (L-N or L-L), Current (CT Ratio)	
	–	and/or Full Scale Watts/Vars	–
110/230Vac	–	110/230Vac Dual Auxiliary (96x48mm only)	
Specify	–	12, 24, 48, 110, 230Vac	
415Vac	–	415Vac (96x48mm only)	
10-60Vdc	–	10-60Vdc (96x48mm only)	
Specify	–	12, 24 or 48Vdc (48x24mm only)	
Example	**FPM964W/5**	**230VL-N, 100/5A**	**10-60Vdc**

Power Factor (cosØ) Meters

Digital power factor meters are available in the DIN 96x48mm size, for the measurement of power factor (cosØ). These self contained meters are panel mounting and are calibrated bi-directionally from 0.30 lag to 0.30 lead.

All digital power factor meters can be powered by a large selection of self contained AC or DC auxiliary power supplies, which all offer isolation between the measured input signal and auxiliary supply voltage. Optional terminal protection covers are also available.

Notes:
1. Ensure that current transformers are mounted such that K faces the supply and L faces the load.
2. Secondary windings of the current transformers should be earthed.

Models Available

FPM964PF1 DIN96x48 1ph/3ph4w cosØ
FPM964PF3 DIN96x48 3ph3w cosØ

Product Features

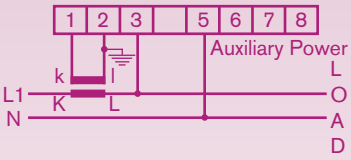
- Power Factor (cosØ) measurement
- 3 digit red LED display
- DIN 96x48mm size
- Easy to wire screw type terminals

For dimensions see page 33

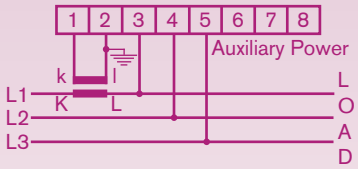
Digital Power Factor Meters - for measurement of power factor (cosØ)

Connections

FPM964PF1



FPM964PF3



For auxiliary power connections see page 33

Ordering information

Code	DIN Size & Meter Type	Input	Auxiliary
FPM964PF	96 x 48mm Digital CosØ meter	–	–
1	Single Phase / 3 Phase 4 Wire Balanced	–	–
3	3 Phase 3 Wire Balanced	–	–
Specify	–	Voltage (L-N or L-L) and Current	–
110/230Vac	–	–	110/230Vac Dual Auxiliary
Specify	–	–	12, 24, 48, 415Vac
10-60Vdc	–	–	10-60Vdc
Example	**FPM964PF1**	**230VL-N, 5A**	**110/230Vac**

Specification

Accuracy:
- Class 1.0 (±1.0% max. error)

Input Current, *In*:
- 0-0.2A to 0-10A direct connected
- 1A or 5A CT operated

Input Voltage, *Un*:
- 110, 230 or 415V (-30% to +10%)
- (50 to 600V upon request)

Frequency:
- 50/60Hz

Scale:
- 0.3 lag to 0.3 lead
- Lag denoted by minus sign (-)

Overload:
- 1.2 x *In* or *Un* for 2 hours
- 6 x *In* for 5 seconds

Burden:
- Voltage circuit < 2VA per phase
- Current circuit < 1VA per phase

Response Time:
- < 1 second

Weight:
- 420g

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Digital Trip Unit

Models Available

FPM964DTU DIN96x48 Digital Trip Unit

Product Features

- User Adjustable HI and LO setpoints
- 3½ digit red LED display
- DIN 96x48mm size
- User adjustable scale and decimal point
- Wide range of AC and DC inputs
- Easy to wire screw type terminals

For dimensions see page 33

The digital trip unit is an electronic monitoring and protection unit consisting of a digital meter and a remote DIN rail mounting relay unit. It offers increased reliability and accuracy over the traditional analogue meter relay and is available to measure all the same electrical parameters as the standard digital meters - AC Voltage, AC Current, DC Voltage, DC Current, Frequency and Power (Watts or Vars).

The digital trip unit has 'HI' and 'LO' trip points which can easily be set by the user with the aid of a small screwdriver and can be verified by pressing one of two push-buttons on the front of the meter. The FPM964 digital meter constantly displays the measured parameter so if a system is approaching its trip point it can be observed and action taken. Optional terminal protection covers are also available.

For digital measurement with user adjustable high and low setpoints

Specification

For Digital Meter Specification see relevant page (pages 28 to 30)

Differential:

- < 10 digits

Repeatability:

- < 3 digits

Relay Unit

Enclosure:

- 55mm wide grey ABS
- Case IP40, terminals IP20
- Fixes to 35mm DIN rail (DIN-EN 50022)

Auxiliary Power Supply:

- 110 or 230V 50/60Hz (standard)
- 12, 24, 48V 50/60Hz or 10-60Vdc

Auxiliary Power Supply Variation:

- ±15%

Auxiliary Burden:

- < 3VA

Output Contacts:

- 2 single pole changeover contacts
- 8A at 250Vac/30Vdc

Operating Temperature:

- 0°C to 60°C

Contact Life:

- 1,000,000 operations at 5A
- 10,000,000 operations at 1A

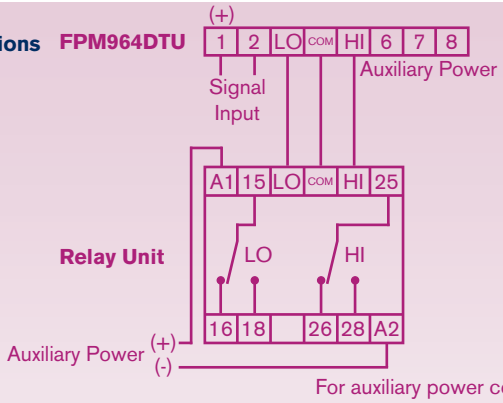
Reset Time:

- 100msec

Weight:

- 290g

Connections FPM964DTU



For auxiliary power connections see page 33

Ordering information

Code	Meter Type	Input & Scaling	Auxiliary
FPM964DTUDCA	DC Ammeter Trip Unit	–	–
FPM964DTUDCV	DC Voltmeter Trip Unit	–	–
FPM964DTUACA	AC Ammeter Trip Unit	–	–
FPM964DTUACV	AC Voltmeter Trip Unit	–	–
FPM964DTUF	Frequency Meter Trip Unit	–	–
FPM964DTUW*	Wattmeter Trip Unit	–	–
FPM964DTUV*	Varmeter Trip Unit	–	–
Specify	–	See Individual Specifications	
Specify	–		12, 24, 48, 110, 230, 415Vac
10-60Vdc	–		10-60Vdc
Example	**FPM964DTUDCV**	**0-10Vdc / 0-100.0%**	**230Vac**

* Wiring system information required e.g. 3 phase 4 wire unbalanced

General Specification

Environmental

Operating Temperature:	0°C to 60°C (Calibration temperature 23°C)
Storage Temperature:	-10°C to 70°C
Temperature Coefficient:	< 100ppm/ °C
Relative Humidity:	0 - 85% non-condensing
Warm Up Time:	1 minute

Display

Digit & Display:	3½ digit (1999) red LED (cosØ meter 3 digit)
Digit Height:	10.2mm high (FPM482), 14.2mm high (FPM964)
Decimal Point:	Internally selectable
Sampling Time:	Approx 0.4 sec (FPM482), 1 sec (FPM964)
Over Input Indication:	'1'
Polarity:	Automatic with (-) indicating negative inputs
Measuring Mode:	Dual slope
Input Mode:	Floating
Noise Elimination Ratio:	CMRR over 86dB 50/60Hz

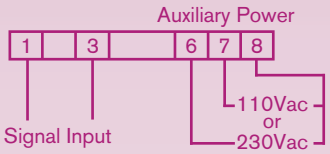
Enclosure

Enclosure:	Flame retardant black ABS plastic case
Enclosure Code:	Case IP54 (IP65 with gasket optional) to IEC529
Insulation Test:	2kV rms 50Hz 1min input/auxiliary (to IEC 414)
	2kV rms 50Hz 1min terminals/case (FPM482)
	4kV rms 50Hz 1min terminals/case (FPM964)
Markings:	CE marked

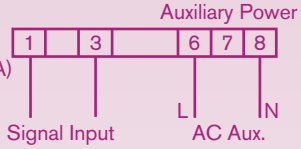
Specification subject to change without notice.

Auxiliary Power Connections

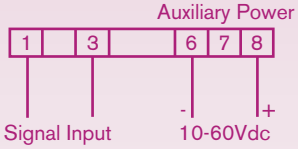
FPM964 Standard Dual AC Auxiliary Supply
110/230Vac ±20% (Burden < 3VA)



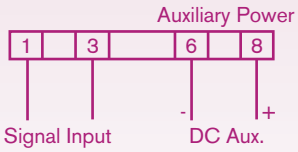
FPM964 Non Standard AC Auxiliary Supply
12Vac, 24Vac, 48Vac, 415Vac ±20% (Burden < 3VA)
FPM482 Standard AC Auxiliary Supply
12Vac (±10%)
24Vac, 48Vac, 110Vac, 230Vac ±20%
(Burden < 3VA)



FPM964 DC Auxiliary Supply
10-60Vdc (Burden < 2W)

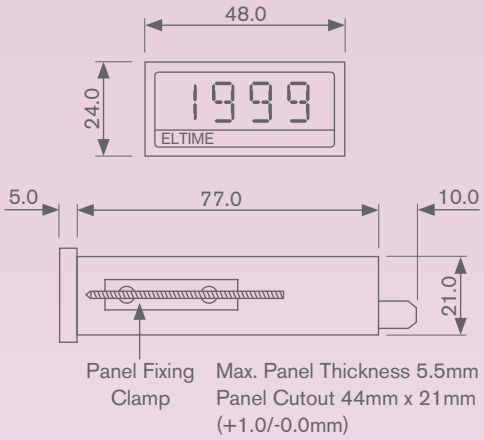


FPM482 DC Auxiliary Supply
12Vdc (±10%), 24Vdc, 48Vdc ±20%
(Burden < 2W)

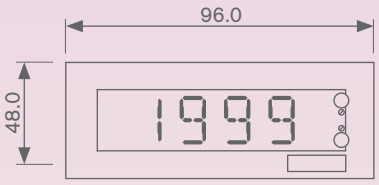


Dimensions

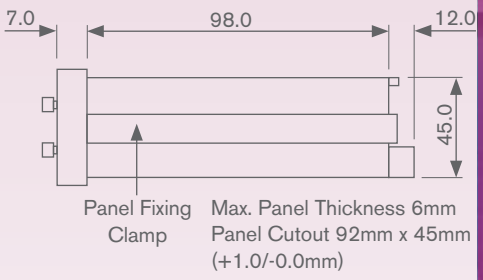
FPM482 Enclosure



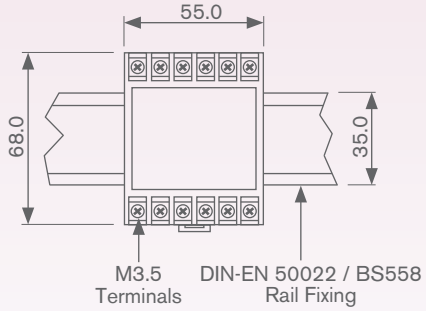
FPM964 Enclosure

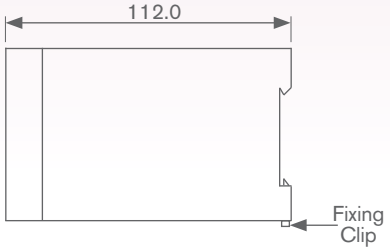


Front push buttons are for FPM964DTU only



Watt/Var/CosØ Converter Unit and DTU Relay Unit Enclosure





All dimensions in mm

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Product Catalogue

Energy Monitoring

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DIN Square kWh Meters

Models Available

EL96GT DIN96 kWh Meter

EL96GTW DIN96 kWh Meter with Wattmeter

Product Features

- Active energy (kWh) measurement
- Standard DIN square size
- Single phase, 3 phase and DC versions
- Accuracy class 1 (1%)
- Non-resettable
- Pulsed output option

Kilowatt hour meters are suitable for the monitoring of active energy (kWh) in all types of sub-metering applications. Models are available for single phase and three phase, balanced and unbalanced loads, as well as DC systems. The panel mounting kWh meters are accurate to class 1 to IEC1036 and AC models have a user selectable CT ratio through a rotary switch accessible from a removable cover on the meter.

The meters are housed in a compact DIN96 enclosure measuring only 61mm in depth and are available combined with an analogue instantaneous reading wattmeter (EL96GTW) if required. All meters have an electromechanical counter eliminating the need for any auxiliary power supply on the AC models. All meters are available with an optional voltage free pulsed output for input to data loggers, PLC's, building management systems or computers.

kWh Meters – for measuring energy (kWh) consumption

General Specification

Design complies with:
- IEC1036, IEC521

Accuracy:
- kWh counter class 1 to IEC1036
- Wattmeter class 1.5 to IEC51

Counter:
- 6 digit (4mm high) electromechanical

Scales (EL96GTW):
- 0-1 to 0-1000W, kW or MW

Front Panel LED's:
- Energy LED indicates correct connection of voltage and current
- Pulse LED indicates rate of energy measurement and pulse output

Enclosure Code:
- Case IP52 (IP65 option)

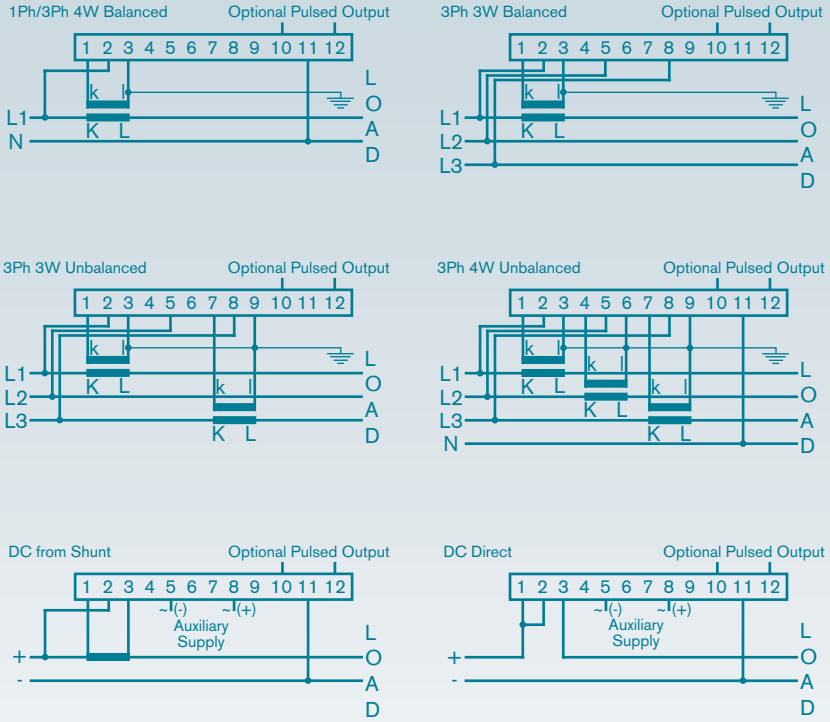
Weight:
- EL96GT 370g, EL96GTW 420g

Markings:
- CE marked

Pulsed Output:
- Voltage free isolated relay
- 5A contacts at 250Vac, 200msec

Pulsed Output Ratio:
- Once every counter increment

Connections



Notes:

1. Ensure that current transformers are mounted such that K faces the supply and L faces the load.
2. Secondary windings of the current transformers should be earthed.
3. The Wattmeter on all EL96GTW meters will be scaled as calculated by Eltime unless specified otherwise.

Ordering information

Model	Code	Description
	EL96GT	96 x 96mm kWh Meter
	EL96GTW	96 x 96mm kWh Meter with Wattmeter

Current or CT Ratio	Code	Description
	1L	25/1 to 800/1A (selectable) - see table below *
	1H	200/1 to 6000/1A (selectable) - see table below **
	5L	25/5 to 800/5A (selectable) - see table below *
	5H	200/5 to 6000/5A (selectable) - see table below **
	Specify	Other CT ratio (specify)
	Specify	0.5 to 5 Amps direct (specify)
DC	Specify	0.1 to 10 Amps DC direct (specify) or 10 to 5000 Amps DC from 50, 60, 75mV shunt (specify)***

Wiring System	Code	Description
	/1	Single Phase
	/2	3 Phase 3 Wire Balanced
	/3	3 Phase 3 Wire Unbalanced
	/4	3 Phase 4 Wire Balanced
	/5	3 Phase 4 Wire Unbalanced
DC	/DC	DC System

Input Voltage	Code	Description
	Specify	110, 230 or 415Vac (specify L-N or L-L)
	Specify	50 to 440Vac upon request (specify)
DC	Specify	12, 24, 48Vdc or up to 600Vdc upon request

Auxiliary Power (DC)	Code	Description
DC	Specify	110, 230 or 415Vac (specify)
DC	Specify	12, 24 or 48Vdc (specify)

Options	Code	Description
	/P	Voltage Free Pulsed Output
	GTTC	Terminal Cover

Example	EL96GT - 5H - /5 - 415VL-L - /P

Current Transformer Primary Currents (Selectable)

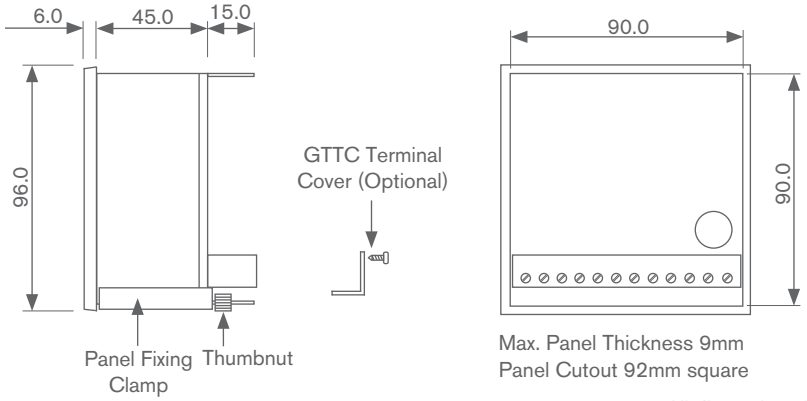
* L 25, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800A

** H 200, 250, 300, 400, 500, 600, 800, 1000, 1200, 1500, 1600, 2000, 2500, 3000, 4000, 6000A

*** Standard Shunt Values

10, 15, 20, 25, 30, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800, 1000, 1200, 1500, 2000, 2500, 3000, 4000, 5000A

Dimensions



Max. Panel Thickness 9mm
Panel Cutout 92mm square

All dimensions in mm

Specification (AC Measurement)

Input Current, *In*:
- 0-0.2A to 0-5A direct connected
- 1A or 5A CT operated

Input Voltage, *Un*:
- 110, 230, 415V or VT ratio
- (50 to 440V upon request)

Voltage Variation:
- ±20% of *Un*

Frequency:
- 50/60Hz

Overload:
- 1.2 x *In* or *Un* for 2 hours
- 6 x *In* for 5 seconds

Test Voltage:
- 2kV rms for 1 minute

Burden:
- Voltage circuit < 3VA per phase
- Current circuit < 0.1VA per phase

Counter & Pulse Resolution:
- 1 kWh (L CT ratio model)
- 10 kWh (H CT ratio model)
- Other resolutions available on request to suit direct connected units or VT ratios

Specification (DC Measurement)

Input Current, *In*:
- 0-0.1A to 0-10A direct connected
- 0-10A to 0-5000A from 50, 60 or 75mV shunt

Input Voltage, *Un*:
- 12, 24 or 48Vdc
- (upto 600V upon request)

Voltage Variation:
- 0-120% of *Un*

Overload:
- 1.2 x *Un* continuous, 2 x *Un* for 3 sec
- 1.2 x *In* continuous, 10 x *In* for 3 sec

Test Voltage:
- 1kV rms for 1 minute

Counter & Pulse Resolution:
- 1 Wh, 10Wh, 0.1kWh or 1kWh
- Other resolutions available on request

Auxiliary Power Supply:
- 12, 24, 48Vdc, 110, 230 or 415Vac

Auxiliary Power Supply Variation:
- -10% to +20% of nominal

Specification subject to change without notice.

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DIN Rail Mounting kWh Meters

Models Available

EL100GT DIN Rail Mounting kWh Meter

Product Features

- Active energy (kWh) measurement
- DIN rail mounting enclosure
- Single phase, 3 phase and DC versions
- Accuracy class 1 (1%)
- Non-resettable
- Pulsed output option
- Fingerproof terminal cover included

Kilowatt hour meters are suitable for the monitoring of active energy (kWh) in all types of sub-metering applications. Models are available for single phase and three phase, balanced and unbalanced loads, as well as DC systems. The kWh meters are accurate to class 1 to IEC1036 and AC models have a user selectable CT ratio through a rotary switch accessible from a removable cover on the meter.

The meters are housed in a compact DIN rail mounting enclosure measuring only 100mm in width. All meters have an electromechanical counter eliminating the need for any auxiliary power supply on the AC models. All meters are available with an optional voltage free pulsed output for input to data loggers, PLC's, building management systems or computers.

kWh Meters – for measuring energy (kWh) consumption

General Specification

Design complies with:
- IEC1036, IEC521

Accuracy:
- Class 1 to IEC1036

Counter:
- 7 digit (4mm high) electromechanical

Front Panel LED's:
- Energy LED indicates correct connection of voltage and current
- Pulse LED indicates rate of energy measurement and pulse output

Enclosure Code:
- Case IP50, terminals IP10

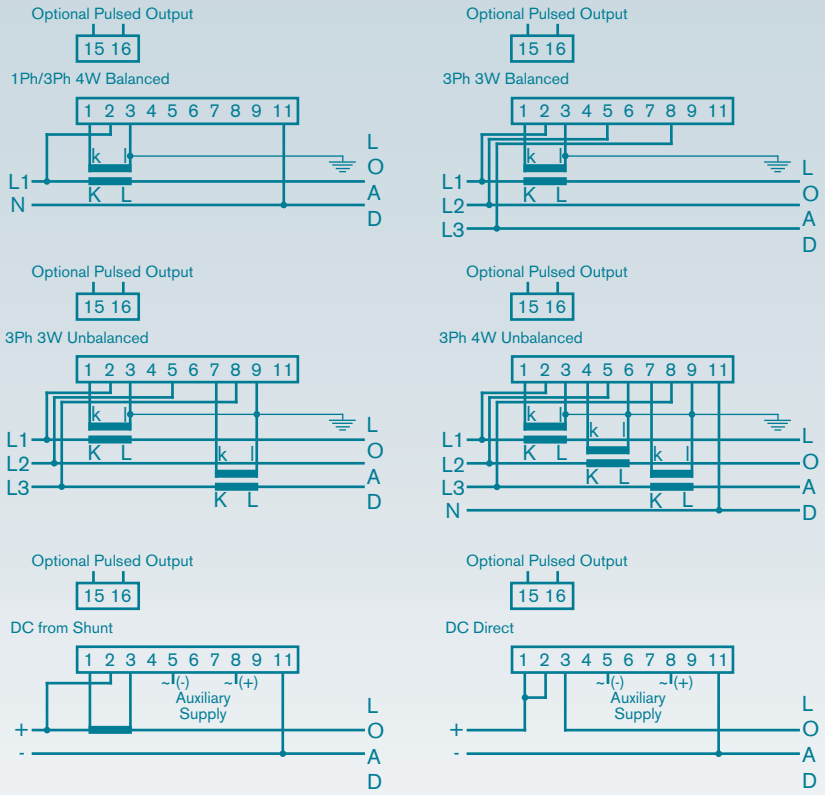
Weight:
- 350g

Markings:
- CE marked

Pulsed Output:
- Voltage free isolated relay
- 5A contacts at 250Vac, 200msec

Pulsed Output Ratio:
- Once every counter increment

Connections



Notes:

1. Ensure that current transformers are mounted such that K faces the supply and L faces the load.
2. Secondary windings of the current transformers should be earthed.

Ordering information

Model	Code	Description
	EL100GT	DIN Rail Mounting kWh Meter

Current or CT Ratio	Code	Description
	1L	25/1 to 800/1A (selectable) - see table below *
	1H	200/1 to 6000/1A (selectable) - see table below **
	5L	25/5 to 800/5A (selectable) - see table below *
	5H	200/5 to 6000/5A (selectable) - see table below **
	Specify	Other CT ratio (specify)
	Specify	0.5 to 5 Amps direct (specify)
DC	Specify	0.1 to 10 Amps DC direct (specify) or 10 to 5000 Amps DC from 50, 60, 75mV shunt (specify)***

Wiring System	Code	Description
	/1	Single Phase
	/2	3 Phase 3 Wire Balanced
	/3	3 Phase 3 Wire Unbalanced
	/4	3 Phase 4 Wire Balanced
	/5	3 Phase 4 Wire Unbalanced
DC	/DC	DC System

Input Voltage	Code	Description
	Specify	110, 230 or 415Vac (specify L-N or L-L)
	Specify	50 to 440Vac upon request (specify)
DC	Specify	12, 24, 48Vdc or up to 600Vdc upon request

Auxiliary Power (DC)	Code	Description
DC	Specify	110, 230 or 415Vac (specify)
DC	Specify	12, 24 or 48Vdc (specify)

Options	Code	Description
	/P	Voltage Free Pulsed Output

Example	EL100GT - 5L - /1 - 230VL-N - /P

Current Transformer Primary Currents (Selectable)

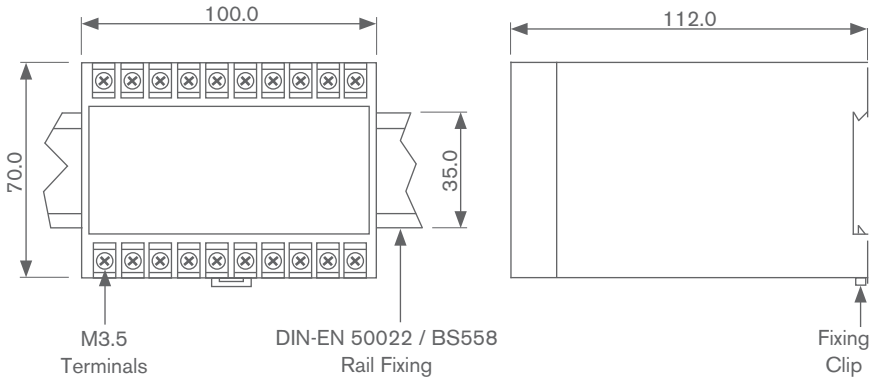
* L 25, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800A

** H 200, 250, 300, 400, 500, 600, 800, 1000, 1200, 1500, 1600, 2000, 2500, 3000, 4000, 6000A

*** Standard Shunt Values

10, 15, 20, 25, 30, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800, 1000, 1200, 1500, 2000, 2500, 3000, 4000, 5000A

Dimensions



All dimensions in mm

Specification (AC Measurement)

Input Current, *In*:
- 0-0.2A to 0-5A direct connected
- 1A or 5A CT operated

Input Voltage, *Un*:
- 110, 230, 415V or VT ratio
- (50 to 440V upon request)

Voltage Variation:
- ±20% of *Un*

Frequency:
- 50/60Hz

Overload:
- 1.2 x *In* or *Un* for 2 hours
- 6 x *In* for 5 seconds

Test Voltage:
- 2kV rms for 1 minute

Burden:
- Voltage circuit < 3VA per phase
- Current circuit < 0.1VA per phase

Counter & Pulse Resolution:
- 1 kWh (L CT ratio model)
- 10 kWh (H CT ratio model)
- Other resolutions available on request to suit direct connected units or VT ratios

Specification (DC Measurement)

Input Current, *In*:
- 0-0.1A to 0-10A direct connected
- 0-10A to 0-5000A from 50, 60 or 75mV shunt

Input Voltage, *Un*:
- 12, 24 or 48Vdc
- (upto 600V upon request)

Voltage Variation:
- 0-120% of *Un*

Overload:
- 1.2 x *Un* continuous, 2 x *Un* for 3 sec
- 1.2 x *In* continuous, 10 x *In* for 3 sec

Test Voltage:
- 1kV rms for 1 minute

Counter & Pulse Resolution:
- 1 Wh, 10Wh, 0.1kWh or 1kWh
- Other resolutions available on request

Auxiliary Power Supply:
- 12, 24, 48Vdc, 110, 230 or 415Vac

Auxiliary Power Supply Variation:
- -10% to +20% of nominal

Specification subject to change without notice.

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100A Direct Connected kWh Meters

Models Available

A100C Single Phase 100A Direct kWh Meter
A1100 Three Phase 100A Direct kWh Meter

Product Features

- Active energy (kWh) measurement
- 100A direct connection
- Single phase and 3 phase versions
- Surface mounting enclosure
- OFGEM approved
- Non-resettable
- Pulsed output option

Direct connected kilowatt hour meters are suitable for the monitoring of active energy (kWh) in all types of metering applications of supplies up to 100A. Models are available for single phase and three phase, balanced or unbalanced loads and all the meters are OFGEM approved.

The meters are housed in a surface mounting enclosure and have a liquid crystal display. The meters have a non-volatile memory providing count retention in the power off condition and eliminating the need for any auxiliary power supply.

All meters are available with an optional voltage free pulsed output for input to data loggers, PLC's, building management systems or computers.

kWh Meters – for measuring energy (kWh) consumption up to 100A directly

Specification

Approval:
- OFGEM

Accuracy:
- A100C class 2 to IEC 62053-21
- A1100 class 1 to IEC 61036

Counter:
- 7 digit high contrast wide angle LCD
- 9.8mm x 3.5mm digits

Counter & Pulse Resolution:
- 0.01 kWh

Input Current, *In*:
- 20-100A direct connected

Input Voltage, *Un*:
- A100C: 230V
- A1100: 3x230/400V

Voltage Variation:
- A100C: 210-250V
- A1100: 220-240VL-N

Frequency:
- 50Hz (60Hz available upon request)

Test Voltage:
- 4kV rms 50Hz for 1 min (to IEC 414)

Impulse Withstand:
- A100C: 12kV 1.2/50µs 40ohm source
- A1100: 12kV 1.2/50µs 500ohm source

Burden:
- A100C: 0.66W (8.5VA) capacitive
- A1100: 0.9W (9VA) capacitive

Current Circuit Burden:
- A1100: 2VA at 100A/phase (maximum)

Specification Continued

Pulsed Output:
- 20mA at 27Vdc maximum
- 100ms pulse length

Pulsed Output Ratio:
- 100 pulses/kWh (=10Wh/pulse)

Optical Test Output:
- A100C: LED flashes 1000 imp/kWh
- A1100: LED flashes 500 imp/kWh

Enclosure Code:
- Case IP53 to IEC 60529

Operating Temperature:
- -20°C to 55°C

Storage Temperature:
- -25°C to 85°C

Humidity:
- Annual mean 75%
- 95% for 30 days spread over one year

Certified Product Life:
- A100C: 20 years
- A1100: 10 years

Connections:
- Screw type terminals

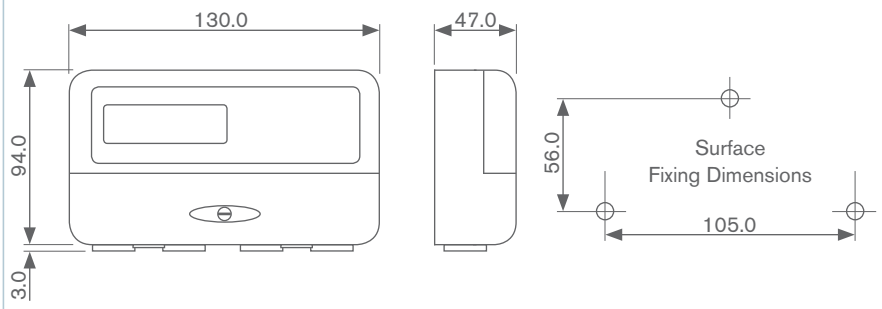
Weight:
- A100C 350g, A1100 900g

Markings:
- CE marked

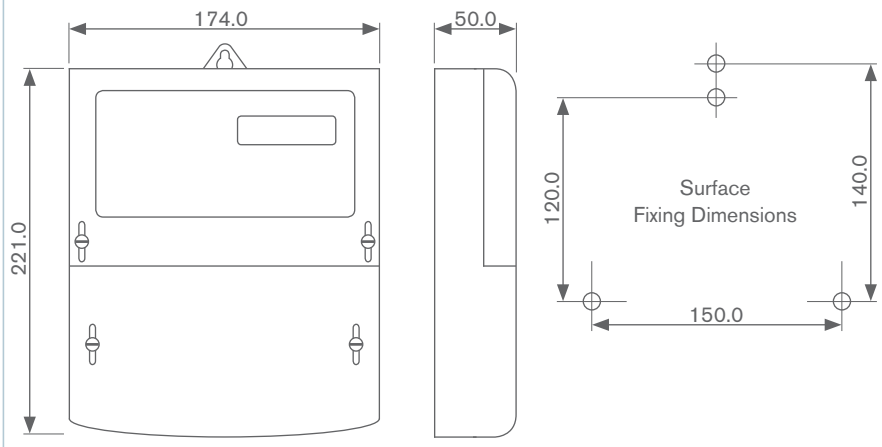
Specification subject to change without notice.

Dimensions

A100C



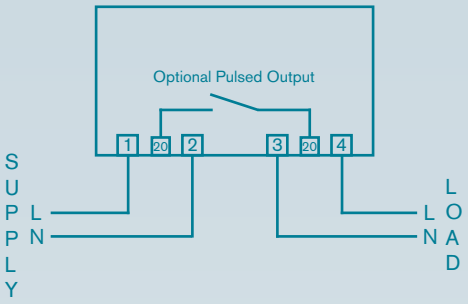
A1100



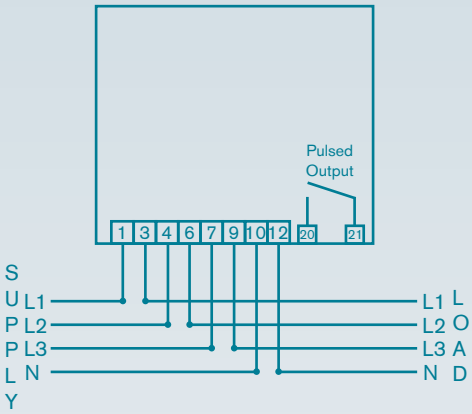
All dimensions in mm

Connections

A100C

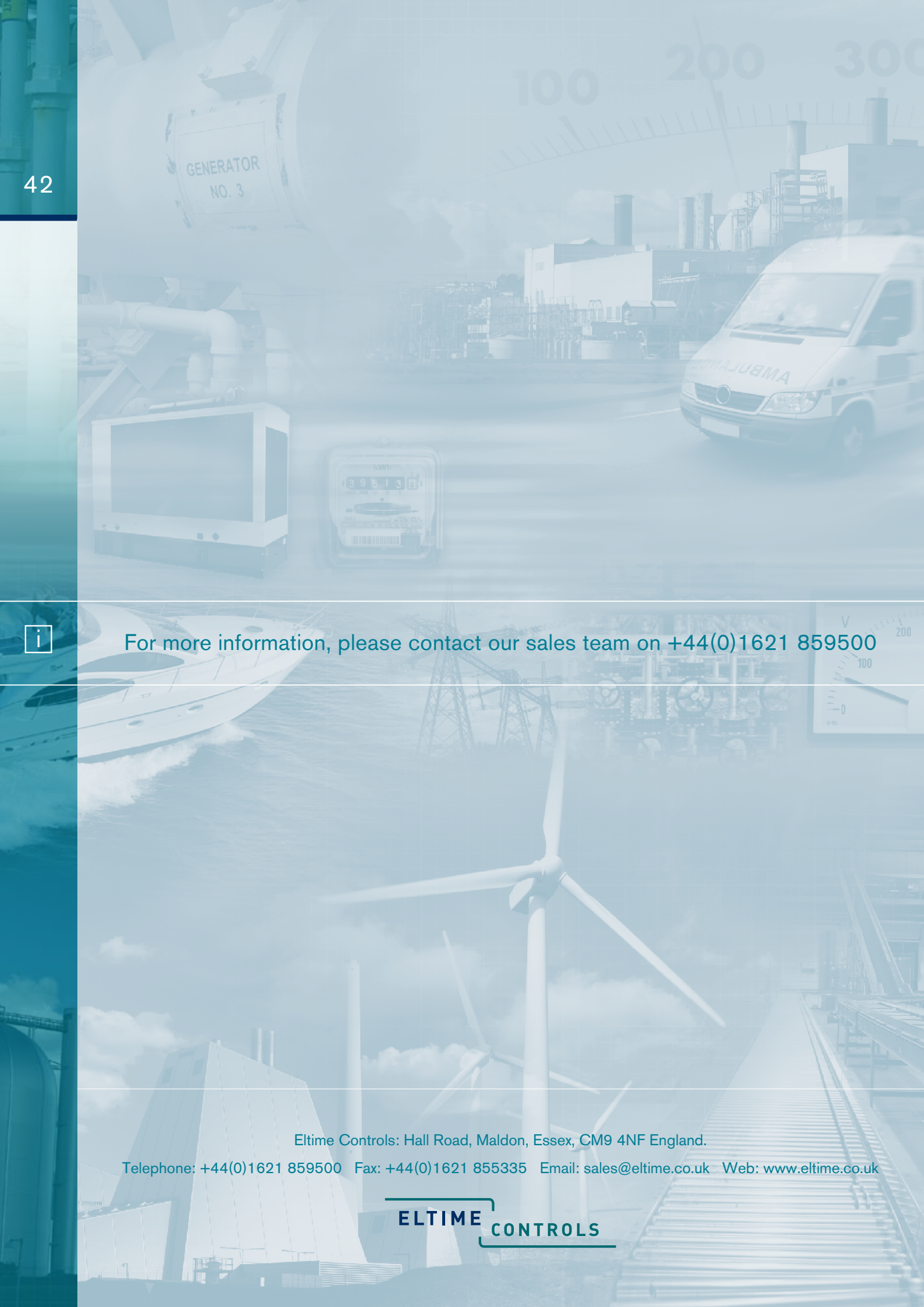


A1100



Ordering information

Code	Meter Type	Options
A100C	Single Phase 100A kWh Meter	–
A1100	Three Phase 100A kWh Meter	–
P	–	Pulsed Output (Opto-isolated)
Example	**A100C**	**P**



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Product Catalogue

Multifunction Monitoring

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LDA-C

Models Available

LDA-C 3 Phase Multifunction Monitor

Product Features

- Measures over 30 electrical parameters
- 3 phase 4 wire or 3 wire unbalanced
- 4 quadrant measurement
- Volts, Amps, Watts, Vars
- Neutral current, Hz, cosØ, kWh
- Max demand A, kW, kVA, KVar
- Maximum and minimum values
- Measures total harmonic distortion
- True RMS readings
- DIN96 metal enclosure
- 3 line LCD screen
- User programmable CT and VT ratios
- 2 pulsed outputs / alarm outputs
- RS485 serial port
- Software available

The LDA-C multifunction monitor is suitable for the measurement of over 30 parameters of a three phase electrical system in one auxiliary powered instrument. The large LCD screen and compact DIN96 enclosure ensures suitability for a wide range of industrial applications.

The LDA-C can be programmed through the front built-in keypad buttons or remotely via the serial port. The RS485 serial port uses the MODBUS RTU communication protocol and up to 32 units can be connected in one network.

Two voltage free output relays can be configured as either pulsed outputs for energy or alarm contacts for any parameter. Optional meter reading software and full data analysis software are available.

For measuring over 30 electrical parameters of a 3 phase electrical system

Specification

Safety Standard:
- EN 61010 Class 2 (Category III)

Input Current, *In*:
- 1A or 5A CT operated
- Measuring range 1-120% *In*

Input Voltage, *Un*:
- 100, 110, 230, 400V or VT ratio
- Measuring range 20-120% *Un*

Frequency:
- 50/60Hz

Overload:
- 1.2 x *In* or *Un* for 2 hours
- 6 x *In* for 5 seconds

Test Voltage:
- 2kV rms for 1 minute

Burden:
- Voltage circuit: 1mA per phase
- Current circuit: 0.2VA per phase

Auxiliary Power Supply:
- 63.5/110Vac or 230/400Vac (±20%)
- Burden 3VA

Accuracy:
- See table

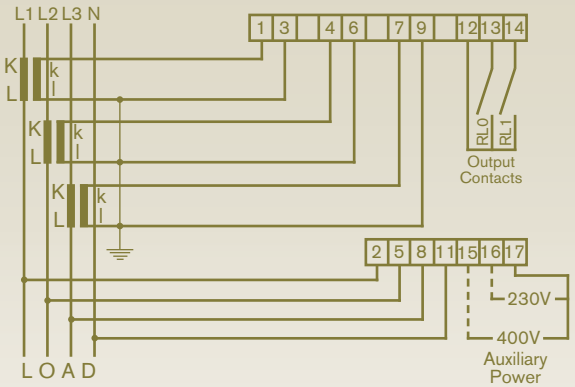
Output Contacts:
- 2 voltage free relay contacts (N/O)

Contact Rating:
- 3A at 250Vac

Impulse Duration:
- > 100ms

Operating Temperature:
- -5°C to 55°C

Connections



Electrical Parameter	Operating Range	Accuracy
Voltage	20 to 120%	0.3% of (reading + full scale)
Current	1 to 120%	0.3% of (reading + full scale)
Active Power (P)	1 to 120%	0.3% of (reading + full scale)
Reactive Power (Q)	1 to 120%	0.3% of (reading + full scale)
Apparent Power (S)	1 to 120%	0.5% of(reading + full scale)
Power Factor (cosØ)	-0.5 to +0.5	0.6% of reading
Frequency	45 to 65Hz	0.2% of rated frequency
Active Energy	5 to 120%	1% of reading
Reactive Energy	5 to 120%	2% of reading

Ordering information

Code	Description	Auxiliary
LDA-C	96 x 96mm 3 Phase Multifunction Monitor	–
63.5/110Vac	–	63.5Vac and 110Vac
230/400Vac	–	230Vac and 400Vac
Example	**LDA-C**	**230/400V**

Programming
The LDA-C can be programmed through the keypad or remotely via the serial port.
The following details can be programmed:
· Instrument identity code
· Primary voltage / VT ratio
· Primary current / CT ratio
· Relay operation (pulse output or alarm contact)
Multiple programming can be achieved when units are linked in a communication network. The LDA-C can be factory programmed if required.

Serial Port Communication
The LDA-C has a serial port with a programmable baud rate between 300 and 19200 bps, communicating using the RS485 standard. The standard baud rate is 9600 bps with 8 data bits, no parity and 1 stop bit. It allows the transmission of the measured values to a computer or PLC. The connection is done on 2 wires half duplex. The RS485 uses the MODBUS RTU communication protocol. The standard configuration permits connection of up to 32 units in one network. Optional software is available to allow meter reading or full data analysis.

Pulse / Alarm Outputs
The output relay contacts can be programmed to operate as follows:
· Active energy (kWh) or reactive energy (kVarh) indicated by voltage free pulse contacts.
· Any specified parameter can have one or two alarm contacts.
Both contact outputs can be programmed and activated through the serial port.

Maximum Demand
Maximum demand values for I1, I2, I3, IN, P, Q and S can all be displayed. The integration period can be selected as 15 or 30 minutes.

Display / Keypad
A custom LCD display has been developed to show more than 30 electrical parameters by sequential pages, selected by the up and down keys. The meter has 5 keys to select the parameters displayed and for programming.

Minimum / Maximum Values
The LDA-C is capable of displaying the minimum and maximum values of the following parameters: V1, V2, V3, V12, V23, V31, I1, I2, I3, P1, P2, P3, P, Q, S, cosØ and Hz.

Parameters Measured

Electrical Parameter	Symbol	System	Line 1	Line 2	Line 3	Reset
Voltage (Line-Neutral)	V		X	X	X	
Voltage (Line-Line)	V		X	X	X	
Current	A		X	X	X	
Neutral Current	A	X				
Active Power (P)	kW	X	X	X	X	
Reactive Power (Q)	kVAr	X	X	X	X	
Apparent Power (S)	KVA	X	X	X	X	
Power Factor (cosØ)	PF	X	X	X	X	
Maximum Demand Current	A		X	X	X	
Maximum Demand P	kW	X				
Maximum Demand Q	kVAr	X				
Maximum Demand S	KVA	X				
Frequency	Hz	X				
THD Current	A		X	X	X	
THD Voltage	V		X	X	X	
Consumed Active Energy (EP+)	kW-h	X				X
Generated Active Energy (EP-)	-kW-h	X				X
Consumed Inductive Reactive Energy (EP+)	kvarL-h	X				X
Consumed Capacitive Reactive Energy (EP-)	kvarC-h	X				X

Specification Continued
Communication Standard:
- RS485 (2 wire half duplex)
- baud rate 300 to 19200 bps
- (9600 bps standard)

Maximum Length Of Net Per Line:
- 1250m without repeater

Maximum Number Of Units Per Line:
- 32

Enclosure:
- DIN96 metal and ABS (UL94 V0)
- Panel mounting with LCD screen
- 14mm high digits

Enclosure Code:
- Case front IP54, terminals IP20

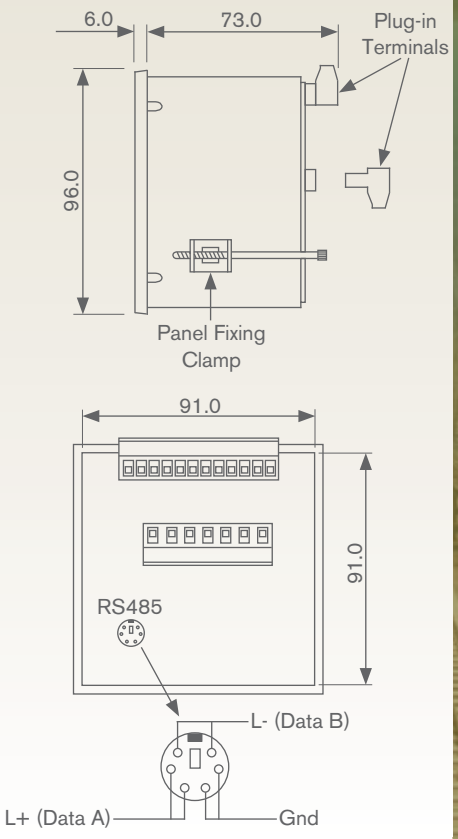
Input/Output Connectors:
- Plug-in type
- 2.5mm² maximum cable entry

Weight:
- 600 grams

Markings:
- CE marked

Specification subject to change without notice.

Dimensions



Max. Panel Thickness 9mm
Panel Cutout 92mm square (±1.0)

All dimensions in mm

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LCC

Models Available

LCC 3 Phase Multifunction Monitor

Product Features

- Measures over 30 electrical parameters
- 3 phase unbalanced or balanced
- 4 quadrant measurement
- Volts, Amps, Watts, Vars
- Neutral current, Hz, cosØ, kWh
- Max demand A, kW, kVA, KVar
- Maximum and minimum values
- True RMS readings
- DIN96 ABS enclosure
- Backlit 3 line LCD screen
- User programmable CT and VT ratios
- 2 pulsed outputs / alarm outputs
- Port for RS485 communications
- Software available

The LCC multifunction monitor is suitable for the measurement of over 30 parameters of a three phase electrical system in one self powered instrument. The large backlit LCD screen and compact DIN96 enclosure ensures suitability for a wide range of industrial applications.

The LCC can be programmed through the front built-in keypad buttons or remotely via the serial port. The RS485 serial port uses the MODBUS RTU communication protocol and up to 16 units can be connected in one network.

Two voltage free output relays can be configured as either pulsed outputs for energy or alarm contacts for any parameter. Optional meter reading software and full data analysis software are available.

For measuring over 30 electrical parameters of a 3 phase electrical system

Specification

Safety Standard:
- EN 61010 Class 2 (Category III)

Input Current, *In*:
- 1A or 5A CT operated
- Measuring range 1-120% *In*

Input Voltage, *Un*:
- 400VL-L
- Measuring range 80-120% *Un*

Frequency:
- 50/60Hz

Overload:
- 1.2 x *In* or *Un* for 2 hours
- 6 x *In* for 5 seconds

Test Voltage:
- 2kV rms for 1 minute

Burden:
- Voltage circuit: 20mA per phase
- Current circuit: 0.2VA per phase

Accuracy:
- See table

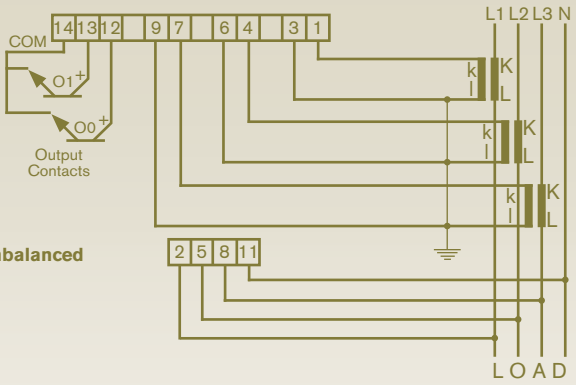
Output Contacts:
- 2 optocoupler contacts (N/O)
- < 48Vc.c. (24Vc.c. 1kW)

Impulse Duration:
- 100ms

Pulse Resolution (Energy):
- 1pulse/kWh or 1pulse/10kWh

Operating Temperature:
- -5°C to 55°C

Connections



3 Phase 4 Wire Unbalanced

Electrical Parameter	Operating Range	Accuracy
Voltage	80 to 120%	0.3% of (reading + full scale)
Current	1 to 120%	0.3% of (reading + full scale)
Active Power (P)	1 to 120%	0.3% of (reading + full scale)
Reactive Power (Q)	1 to 120%	0.3% of (reading + full scale)
Apparent Power (S)	1 to 120%	0.5% of(reading + full scale)
Power Factor (cosØ)	-0.5 to +0.5	0.6% of reading
Frequency	45 to 65Hz	0.2% of rated frequency
Active Energy	5 to 120%	1% of reading
Reactive Energy	5 to 120%	2% of reading

Ordering information

Code	Description	Options
LCC	96 x 96mm 3 Phase Multifunction Monitor	–
MC-LCC	–	RS485 Communication Module
Example	**LCC**	**with MC-LCC**

Programming
The LCC can be programmed through the keypad or remotely via the serial port.
The following details can be programmed:
· Instrument identity code
· Primary voltage / VT ratio
· Primary current / CT ratio
· Relay operation (pulse output or alarm contact)
· Balanced or unbalanced system
Multiple programming can be achieved when units are linked in a communication network. The LCC can be factory programmed if required.

Serial Port Communication
The LCC has a serial port which when used with a MC-LCC communication module, enables the LCC to communicate using the RS485 standard with a baud rate of 9600 bps. It allows the transmission of the measured values to a computer or PLC. The connection is done on 2 wires half duplex. The RS485 uses the MODBUS RTU communication protocol. The standard configuration permits connection of up to 16 units in one network. Optional software is available to allow meter reading or full data analysis.

Pulse / Alarm Outputs
The output optocoupler contacts can be programmed to operate as follows:
· Active energy (kWh) or reactive energy (kVarh) indicated by voltage free pulse contacts.
· Any specified parameter can have one or two alarm contacts.
Both contact outputs can be programmed and activated through the serial port.

Maximum Demand
Maximum demand values for I1, I2, I3, P, Q and S can all be displayed. The integration period can be selected as 5, 10, 30, 60, 300, 480, 600 or 900 seconds.

Display / Keypad
A custom backlit LCD display has been developed to show more than 30 electrical parameters by sequential pages, selected by the up and down keys. The meter has 3 keys to select the parameters displayed and for programming.

Minimum / Maximum Values
The LCC is capable of displaying the maximum values of the following parameters: V1, V2, V3, V12, V23, V31, I1, I2, I3, IN, P, Q and S and the minimum values of V1, V2, V3, V12, V23 and V31.

Parameters Measured

Electrical Parameter	Symbol	System	Line 1	Line 2	Line 3	Reset
Voltage (Line-Neutral)	V		X	X	X	
Voltage (Line-Line)	V		X	X	X	
Current	A		X	X	X	
Neutral Current	A	X				
Active Power (P)	kW	X	X	X	X	
Reactive Power (Q)	kVAr	X	X	X	X	
Apparent Power (S)	KVA	X	X	X	X	
Power Factor (cosØ)	PF	X	X	X	X	
Maximum Demand Current	A		X	X	X	
Maximum Demand P	kW	X				
Maximum Demand Q	kVAr	X				
Maximum Demand S	KVA	X				
Frequency	Hz	X				
Consumed Active Energy (EP+)	kW-h	X				X
Generated Active Energy (EP-)	-kW-h	X				X
Consumed Inductive Reactive Energy (EP+)	kvarL-h	X				X
Consumed Capacitive Reactive Energy (EP-)	kvarC-h	X				X

Specification Continued
Communication Standard:
- RS485 (2 wire half duplex)
- baud rate 9600 bps

Maximum Length Of Net Per Line:
- 1250m without repeater

Maximum Number Of Units Per Line:
- 16

Enclosure:
- DIN96 ABS (UL94 V0)
- Panel mounting with backlit LCD screen
- 14mm high digits

Enclosure Code:
- Case front IP40, terminals IP20

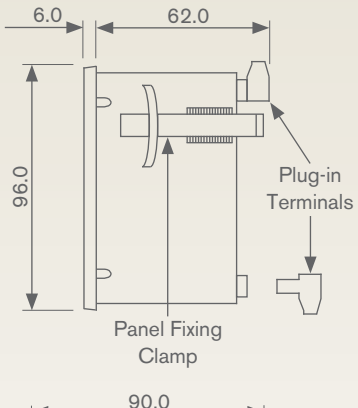
Input/Output Connectors:
- Plug-in type with
- 2.5mm² maximum cable entry

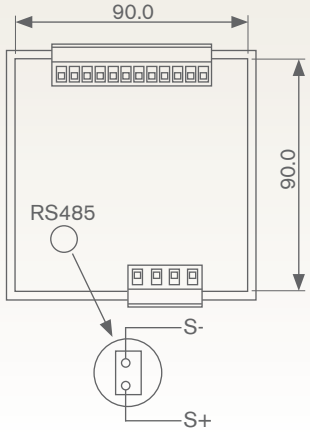
Weight:
- 325 grams

Markings:
- CE marked

Specification subject to change without notice.

Dimensions





Max. Panel Thickness 9mm
Panel Cutout 92mm square (±1.0)

All dimensions in mm

For more information, please contact our sales team on +44(0)1621 859500

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ELTIME CONTROLS

Product Catalogue

Current Transformers and DC Shunts

Global Suppliers of Measurement and Protection Equipment for Industry

www.eltime.co.uk

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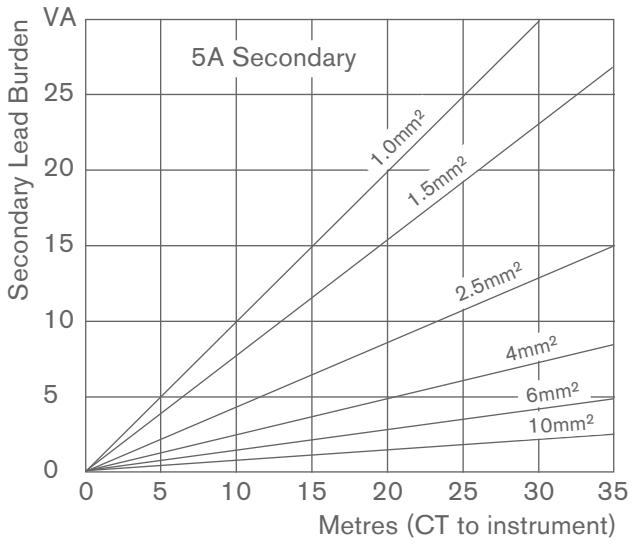
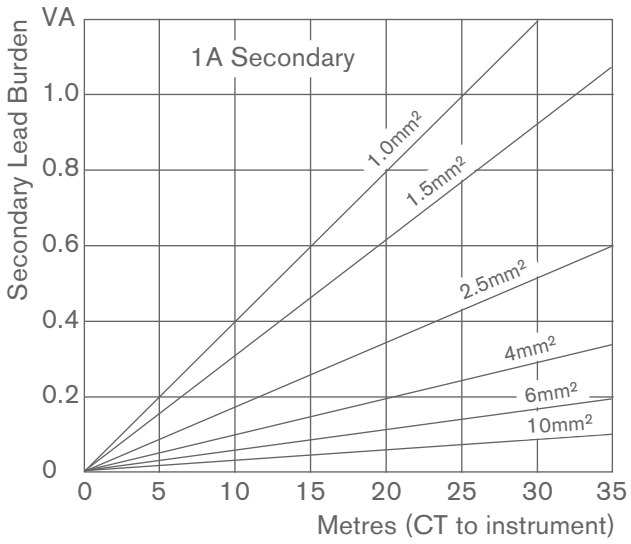
Current Transformer General Specification

Secondary Lead Burdens

When selecting a current transformer, it is important to consider the power absorbed by the cables connecting the CT secondary terminals and the measuring instrument. The overall burden of the cable and measuring equipment should not exceed the available VA of the CT. Where the current transformer is to be mounted remotely a 1A secondary is recommended. Where there is a very large distance between the instrument and current transformer the use of a current transducer to convert the AC current into a DC signal is recommended.





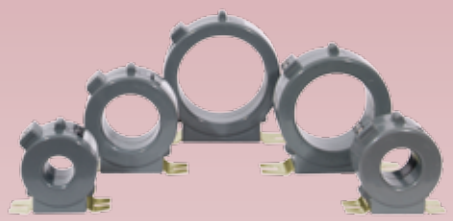
Installation & Application Notes

1. It is essential with certain instrumentation that the CT is physically orientated correctly on the conductor. K or P1 must face the supply and L or P2 must face the load. It is also important to ensure that the secondary connections are made in accordance with the instrument connection diagram.

2. The secondary terminals of the CT must NOT make open circuit on load as dangerously high voltages may occur under these conditions. During installation the secondary terminals must be shorted and during operation it is recommended that one side of the secondary winding is earthed.

3. On all current transformers it is possible to reduce the CT ratio by passing multiple turns of the primary conductor cable through the aperture. The resultant CT ratio will be CT primary rating divided by the number of through turns e.g. a 100/5A CT with the primary conductor passed through the aperture twice will produce a CT with a ratio of 50/5A.

Specification subject to change without notice.



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FCT Series Current Transformers

Models Available

FCT29 Ring Type Current Transformer
FCT39 Ring Type Current Transformer
FCT61 Ring Type Current Transformer
FCT85 Ring Type Current Transformer
FCT105 Ring Type Current Transformer

Product Features

- Circular aperture ideal for cables
- Moulded ABS plastic housing
- 1 Amp or 5 Amp secondary
- Accuracy class 1
- Mounting feet
- Screw type terminals
- Optional terminal cover available
- Optional busbar clamp kit available

FCT series current transformers are available for primary currents between 5 Amps and 2500 Amps, offering reliability and class 1 accuracy making them suitable for a large range of industrial applications.

The FCT series current transformers are available in five different physical sizes all with a circular aperture, ideally suited for circular cables. They are enclosed in a protective ABS housing ensuring excellent mechanical strength and electrical insulation.

The FCT series current transformers have fixing feet as standard and can be used with the optional busbar mount clamp kit if required. An optional terminal cover is also available.

For transforming high AC current to a proportional 1 Amp or 5 Amp output

Specification

Reference Standard:
- BS7626-1993, BS3938

Accuracy:
- Class 1 (±1% max. error)

Primary Input Current:
- 0-5A to 0-2500A (see range data table)

Secondary Current:
- 0-1A or 0-5A

Overload:
- To BS3938 - IEC 185

Operating Voltage:
- 600Vac maximum

Test Voltage:
- 2kV rms 50Hz for 1 minute

Frequency:
- 50/60/400Hz

Burden:
- See range data table

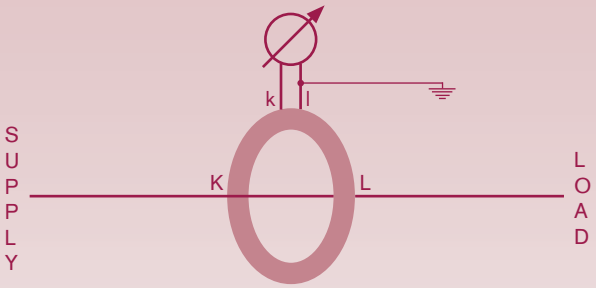
Enclosure:
- Flame retardant ABS
- Surface mounting or busbar mounting
- M4 screw terminals
- IP40 enclosure code
- Insulation class E

Operating Temperature:
- -20°C to 70°C

Weight:
- See range data table

Markings:
- CE marked

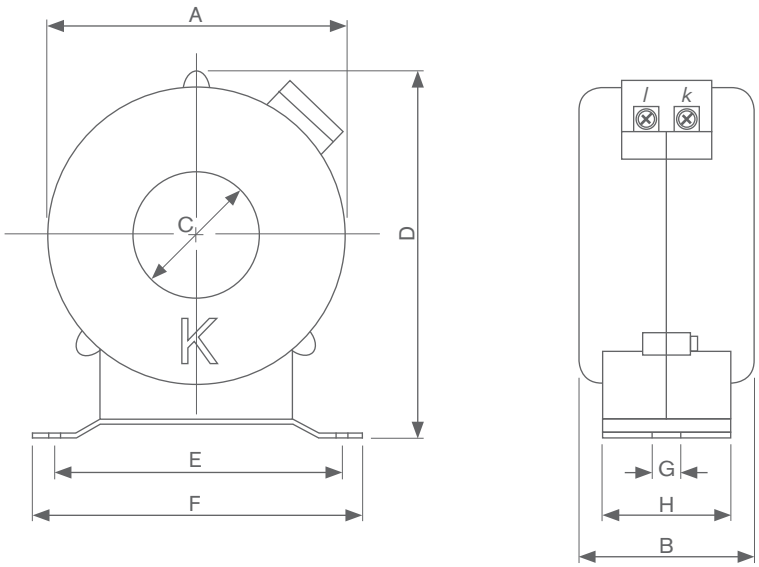
Connections



Ordering information

Code	Model & Size	Ratio
FCT29	Ring Type CT - 29mm Hole	5/1, 10/1, 15/1, 20/1, 25/1, 30/1, 40/1, 50/1, 60/1, 80/1, 100/1, 150/1
FCT61	Ring Type CT - 61mm Hole	200/1, 250/1, 300/1, 400/1
FCT29	Ring Type CT - 29mm Hole	5/5, 10/5, 15/5, 20/5, 25/5, 30/5, 40/5 50/5, 60/5, 75/5, 80/5, 100/5, 120/5 150/5, 200/5, 250/5, 300/5
FCT39	Ring Type CT - 39mm Hole	400/5, 500/5
FCT61	Ring Type CT - 61mm Hole	600/5, 800/5
FCT85	Ring Type CT - 85mm Hole	1000/5
FCT105	Ring Type CT - 105mm Hole	1200/5, 1500/5, 2000/5, 2500/5
Example	**FCT29**	**100/5**

Dimensions



	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)
FCT29	74	55	29	93	84	98	6	42
FCT39	81	55	39	105	84	98	6	42
FCT61	103	55	61	129	105	120	6	42
FCT85	122	55	85	144	125	141	6	42
FCT105	141	55	105	160	133	156	10	50

Options

A busbar mount clip (Order Code: **BBCK**) is available which enables the standard ring type FCT current transformers to be safely clamped to a busbar.

Also available for the FCT series of current transformers is a terminal cover (Order Code: **FCTC**) to insulate the secondary terminals.

Range Data

Model	Primary Current (Amps)	Secondary Current (Amps)	Burden (VA)	Through Turns	Hole Diameter (mm)	Weight (grams)
FCT29-5/1	5	1	3	10	29	600
FCT29-10/1	10	1	3	5	29	600
FCT29-15/1	15	1	3	4	29	600
FCT29-20/1	20	1	3	5	29	600
FCT29-25/1	25	1	3	2	29	600
FCT29-30/1	30	1	3	2	29	600
FCT29-40/1	40	1	3	2	29	600
FCT29-50/1	50	1	3	1	29	600
FCT29-60/1	60	1	3	1	29	600
FCT29-80/1	80	1	3	1	29	600
FCT29-100/1	100	1	3	1	29	600
FCT29-150/1	150	1	3	1	29	600
FCT61-200/1	200	1	5	1	61	600
FCT61-250/1	250	1	5	1	61	600
FCT61-300/1	300	1	5	1	61	600
FCT61-400/1	400	1	5	1	61	600
FCT29-5/5	5	5	3	10	29	600
FCT29-10/5	10	5	3	10	29	600
FCT29-15/5	15	5	3	4	29	600
FCT29-20/5	20	5	3	5	29	600
FCT29-25/5	25	5	3	2	29	600
FCT29-30/5	30	5	3	2	29	600
FCT29-40/5	40	5	3	2	29	600
FCT29-50/5	50	5	3	1	29	600
FCT29-60/5	60	5	3	1	29	600
FCT29-75/5	75	5	3	1	29	600
FCT29-80/5	80	5	3	1	29	600
FCT29-100/5	100	5	3	1	29	600
FCT29-120/5	120	5	3	1	29	600
FCT29-150/5	150	5	3	1	29	600
FCT29-200/5	200	5	3	1	29	600
FCT29-250/5	250	5	3	1	29	600
FCT29-300/5	300	5	3	1	29	600
FCT39-400/5	400	5	5	1	39	600
FCT39-500/5	500	5	5	1	39	600
FCT61-600/5	600	5	10	1	61	600
FCT61-800/5	800	5	10	1	61	600
FCT85-1000/5	1000	5	10	1	85	750
FCT105-1200/5	1200	5	10	1	105	1000
FCT105-1500/5	1500	5	10	1	105	1000
FCT105-2000/5	2000	5	10	1	105	1000
FCT105-2500/5	2500	5	10	1	105	1000

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MFO Series Current Transformers

Models Available

MFO30 Busbar Type Current Transformer
MFO40 Busbar Type Current Transformer
MFO60 Busbar Type Current Transformer
MFO100 Busbar Type Current Transformer

Product Features

- Staggered aperture ideal for busbars
- Moulded ABS plastic housing
- 5 Amp secondary
- Accuracy class 1
- Mounting feet
- Screw type terminals
- Terminal cover included
- Busbar clamp kit included
- Optional DIN rail mounting clip

MFO series current transformers are available for primary currents between 5 Amps and 2500 Amps, offering reliability and class 1 accuracy making them suitable for a large range of industrial applications.

The MFO series current transformers are available in four different physical sizes all with a staggered rectangular aperture, ideally suited for busbars. They are enclosed in a protective ABS housing ensuring excellent mechanical strength and electrical insulation.

The MFO series current transformers have fixing feet, a busbar clamp kit and terminal cover as standard. Optional DIN rail mounting clips are available for mounting the current transformers to 35mm DIN rail.

For transforming high AC current to a proportional 5 Amp output

Specification

Reference Standard:
- BS7626-1993, BS3938

Accuracy:
- Class 1 (±1% max. error)

Primary Input Current:
- 0-5A to 0-2500A (see range data table)

Secondary Current:
- 0-5A

Overload:
- To BS3938 - IEC 185

Operating Voltage:
- 600Vac maximum

Test Voltage:
- 2kV rms 50Hz for 1 minute

Frequency:
- 50/60/400Hz

Burden:
- See range data table

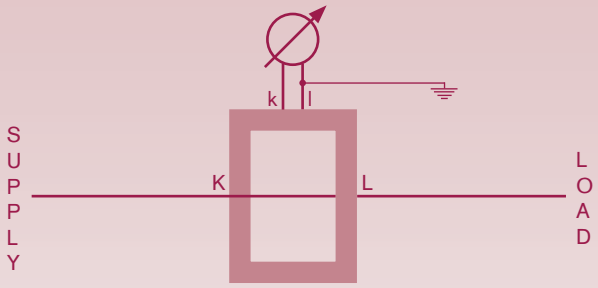
Enclosure:
- Flame retardant ABS
- Surface mounting or busbar mounting
- Optional DIN rail mounting clip available
- M4 screw terminals
- IP40 enclosure code
- Insulation class E

Operating Temperature:
- -20°C to 70°C

Weight:
- See range data table

Markings:
- CE marked

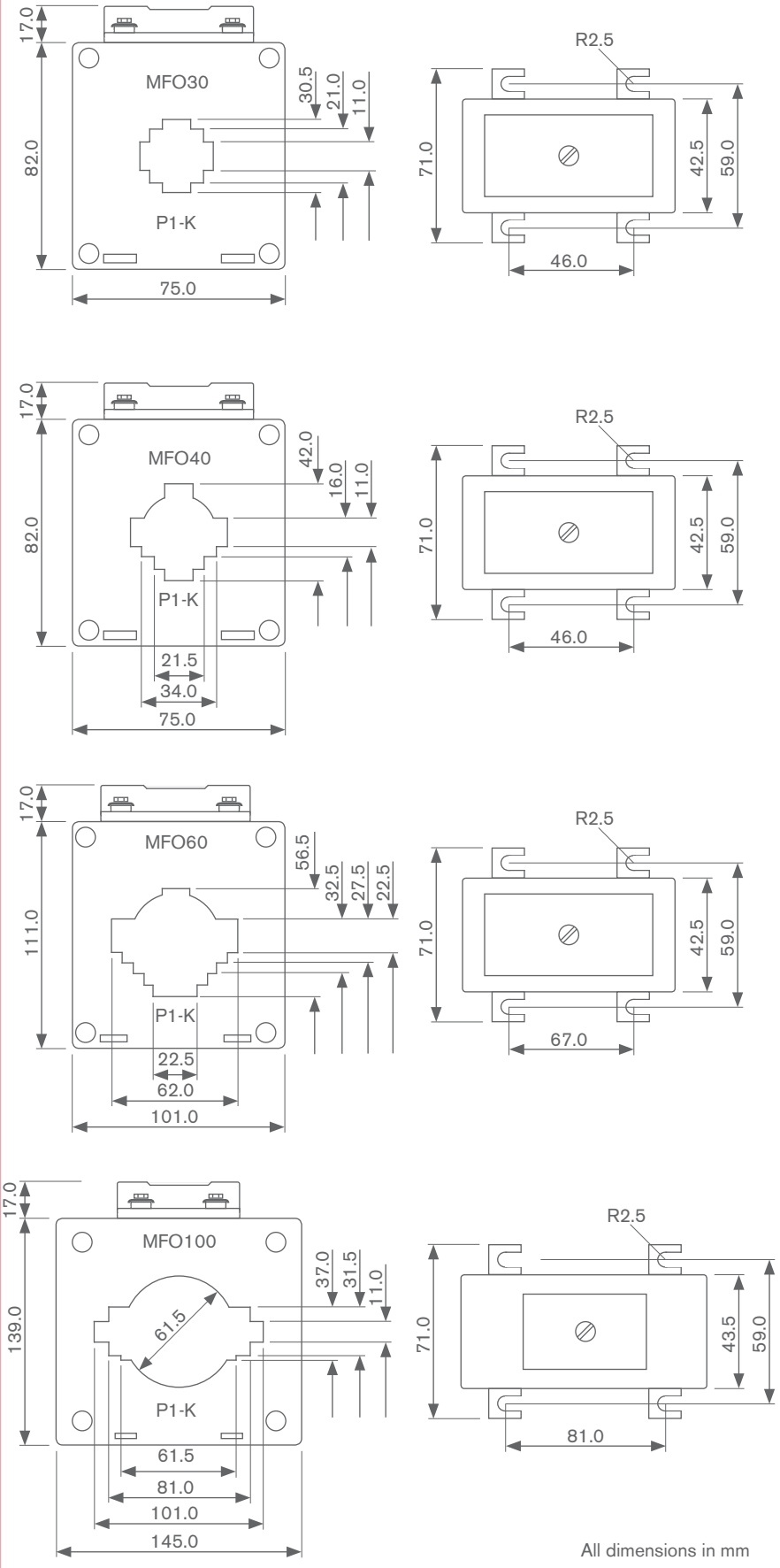
Connections



Ordering information

Code	Model & Size	Ratio	Options
MFO30	Busbar Type CT	5/5, 10/5, 15/5, 20/5, 25/5, 30/5, 40/5 50/5, 60/5, 80/5, 100/5, 120/5, 150/5	
MFO40	Busbar Type CT	200/5, 250/5, 300/5, 400/5	
MFO60	Busbar Type CT	500/5, 600/5, 800/5	
MFO100	Busbar Type CT	1000/5, 1200/5, 1500/5, 1600/5, 2000/5, 2400/5, 2500/5	
DRMC1	–	DIN rail mounting clip for MFO30/MFO40	
DRMC2	–	DIN rail mounting clip for MFO60	
DRMC3	–	DIN rail mounting clip for MFO100	
Example	**MFO40**	**300/5**	

Dimensions



All dimensions in mm

Range Data

Model	Primary Current (Amps)	Secondary Current (Amps)	Burden (VA)	Through Turns	Hole Diameter (mm)	Weight (grams)
MFO30-5/5	5	5	3	10	21	600
MFO30-10/5	10	5	3	10	21	600
MFO30-15/5	15	5	3	4	21	600
MFO30-20/5	20	5	3	5	21	600
MFO30-25/5	25	5	3	2	21	600
MFO30-30/5	30	5	3	2	21	600
MFO30-40/5	40	5	3	2	21	600
MFO30-50/5	50	5	3	1	21	600
MFO30-60/5	60	5	3	1	21	600
MFO30-80/5	80	5	3	1	21	600
MFO30-100/5	100	5	3	1	21	600
MFO30-120/5	120	5	3	1	21	600
MFO30-150/5	150	5	3	1	21	600
MFO40-200/5	200	5	3	1	31	600
MFO40-250/5	250	5	3	1	31	600
MFO40-300/5	300	5	3	1	31	600
MFO40-400/5	400	5	3	1	31	600
MFO60-500/5	500	5	5	1	45	600
MFO60-600/5	600	5	5	1	45	600
MFO60-800/5	800	5	5	1	45	600
MFO100-1000/5	1000	5	10	1	60	800
MFO100-1200/5	1200	5	10	1	60	1000
MFO100-1500/5	1500	5	10	1	60	1000
MFO100-1600/5	1600	5	10	1	60	1000
MFO100-2000/5	2000	5	10	1	60	1000
MFO100-2400/5	2400	5	10	1	60	1000
MFO100-2500/5	2500	5	10	1	60	1100

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TA Series Current Transformers

TA current transformers are available for primary currents between 100 Amps and 2500 Amps, offering reliability and class 1 accuracy making them suitable for a large range of industrial applications.

The TA series current transformers are available in five different physical sizes all with a rectangular aperture and due to their split core design are ideal for retro-fitting. They are protected in a resin encapsulated enclosure ensuring excellent mechanical strength and electrical insulation.

The TA series current transformers have a busbar clamp kit and terminal cover as standard.

Models Available

TA30R Split Core Current Transformer
TA60R Split Core Current Transformer
TA80R Split Core Current Transformer
TA100R Split Core Current Transformer
TA125R Split Core Current Transformer

Product Features

- Split core ideal for retro-fitting
- Resin encapsulated housing
- 5 Amp secondary
- Accuracy class 1
- Screw type terminals
- Terminal cover included
- Busbar clamp kit included

For transforming high AC current to a proportional 5 Amp output

Specification

Reference Standard:
- IEC185, UNE EN 60044-1, VDE0414

Accuracy:
- See range data table

Primary Input Current:
- 0-100A to 0-2500A (see data table)

Secondary Current:
- 0-5A

Overload:
- To BS3938 - IEC 185

Operating Voltage:
- 720Vac maximum

Test Voltage:
- 3kV rms 50Hz for 1 minute

Frequency:
- 50/60/400Hz

Burden:
- See range data table

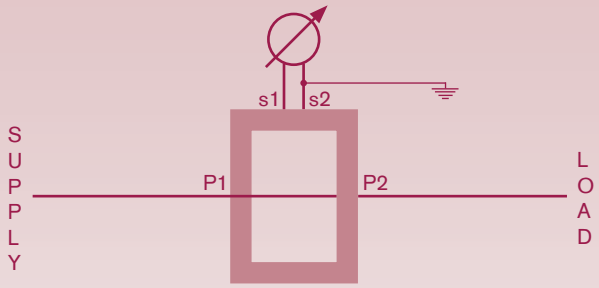
Enclosure:
- Self extinguishing to UL94V0
- Busbar mounting with clamp
- M5 screw terminals
- IP40 enclosure code
- Insulation class E

Operating Temperature:
- -10°C to 50°C

Weight:
- See range data table

Markings:
- CE marked

Connections

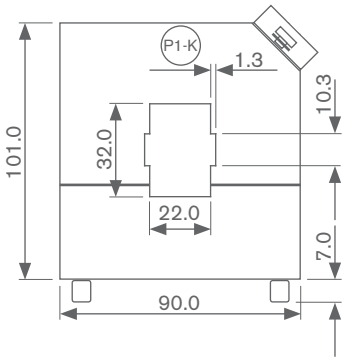


Ordering information

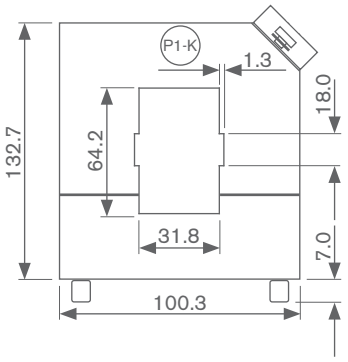
Code	Model & Size	Ratio
TA30R	Split Core CT	100/5, 150/5, 200/5, 250/5
TA60R	Split Core CT	300/5, 400/5, 500/5, 600/5
TA80R	Split Core CT	800/5, 1000/5
TA100R	Split Core CT	1200/5, 1500/5, 1600/5, 2000/5
TA125R	Split Core CT	2500/5
Example	**TA125R**	**2500/5**

Dimensions

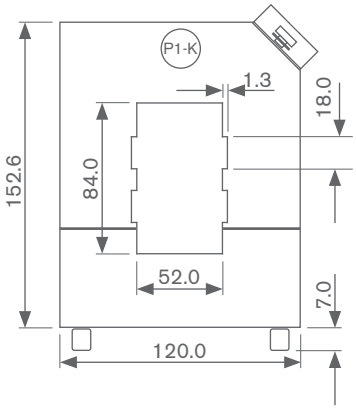
TA30R



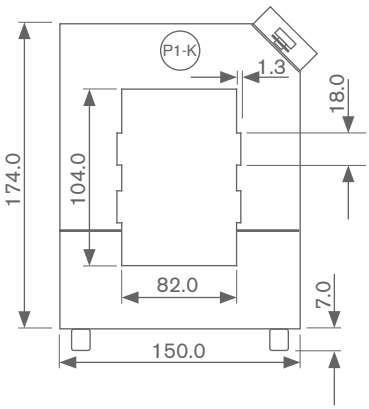
TA60R



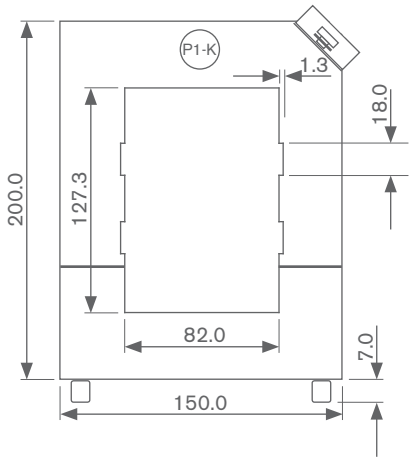
TA80R



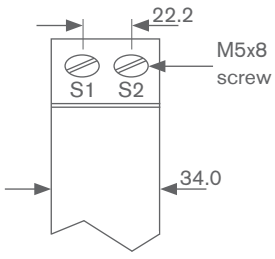
TA100R



TA125R



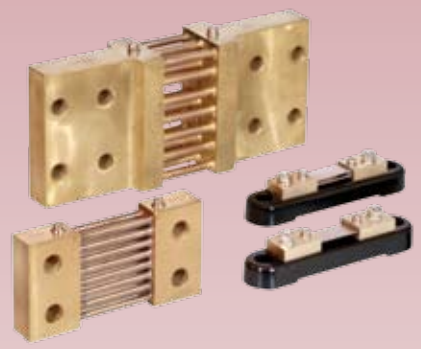
Terminal Arrangement
(All Sizes)



All dimensions in mm

Range Data

Model	Primary Current (Amps)	Burden (VA) Accuracy Class 0.5	Burden (VA) Accuracy Class 1	Burden (VA) Accuracy Class 3	Weight (grams)
TA30R-100/5	100	-	-	3	850
TA30R-150/5	150	-	-	3.75	850
TA30R-200/5	200	-	2.5	4	850
TA30R-250/5	250	-	3.75	5	850
TA60R-300/5	300	2.5	3.75	5	1150
TA60R-400/5	400	2.5	3.75	7.5	1150
TA60R-500/5	500	3.75	5	15	1150
TA60R-600/5	600	5	7.5	20	1150
TA80R-800/5	800	7.5	10	20	1400
TA80R-1000/5	1000	10	15	20	1400
TA100R-1200/5	1200	15	20	30	1850
TA100R-1500/5	1500	15	20	30	1850
TA100R-1600/5	1600	15	20	30	1850
TA100R-2000/5	2000	20	30	45	1850
TA125R-2500/5	2500	25	30	45	2000



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DC Shunts

DC shunts are available for currents between 10 Amps and 5000 Amps, offering reliability and class 0.5 accuracy making them suitable for a large range of industrial applications.

Two ranges are available that develop either 50mV or 60mV at full load current. The millivolt signal can then be safely taken to a suitably scaled moving coil indicating instrument or other monitoring device.

The shunts are brass ended manganin and all shunts up to the 200 Amp rating are mounted on an insulated base ensuring electrical insulation. All non-insulated shunts may need protection against accidental contact. The shunts should be mounted vertically with the blade faces vertical to achieve maximum heat dissipation.

Models Available

FST 50mV Shunt Range
NST 60mV Shunt Range

Product Features

- Brass ended manganin shunts
- 10 Amp to 5000 Amp
- 50mV or 60mV output
- Accuracy class 0.5
- Insulated base on shunts up to 200A

For measuring DC current by producing a proportional 50mV or 60mV output

Specification

Reference Standard:
- BS89, IEC51

Accuracy:
- Class 0.5 (±0.5% max. error)

Current Rating, *In*:
- 0-10A to 0-5000A

(see range data table)

Output:
- 0-50mV (FST series)
- 0-60mV (NST series)

Overload:
- 1.2 x *In* continuous
- 10 x *In* for 5 seconds (10A to 500A)
- 5 x *In* for 5 seconds (600A to 2000A)
- 2 x *In* for 5 seconds (2500A to 5000A)

Enclosure:
- Insulated base (all shunts up to 200A)
- M3 screw terminals
- See dimensions for mounting

Operating Temperature:
- -20°C to 60°C

Calibration Temperature:
- 23°C

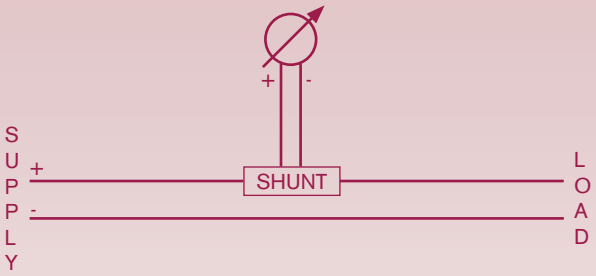
Temperature Coefficient:
- 0.004%/°C

Weight:
- See range data table

Markings:
- CE marked

Specification subject to change without notice.

Connections

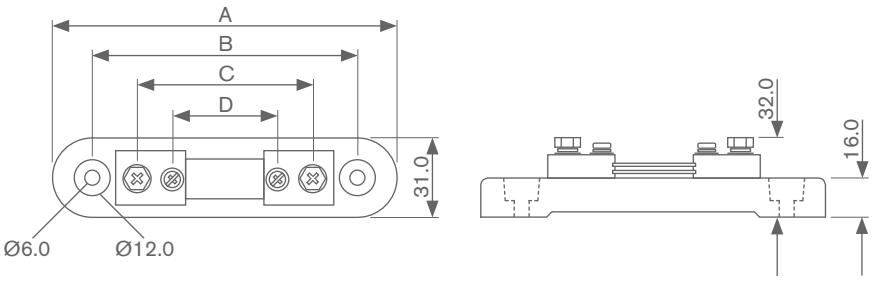


Ordering information

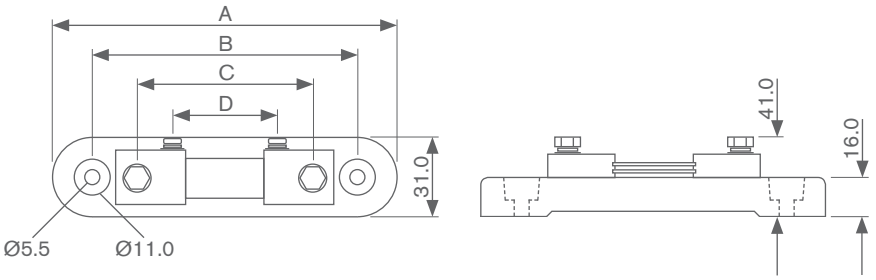
Code	Shunt Output	Current Rating
FST10	50mV	10, 15, 20, 25, 30, 40, 50, 60, 80, 100, 150A
FST20	50mV	200A
FST30	50mV	250, 300, 400, 500, 600A
FST40	50mV	800, 1000A
NST10	60mV	10, 15, 20, 25, 30, 40, 50, 60, 80, 100, 150A
NST20	60mV	200A
NST30	60mV	250, 300, 400, 500, 600A
NST40	60mV	800, 1000, 1200, 1500A
NST50	60mV	2000, 2500, 3000, 4000, 5000A
Example	**FST10**	**100A**

Dimensions

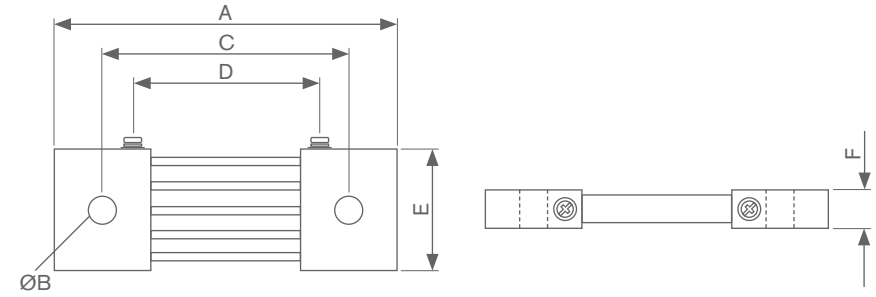
FST10 & NST10



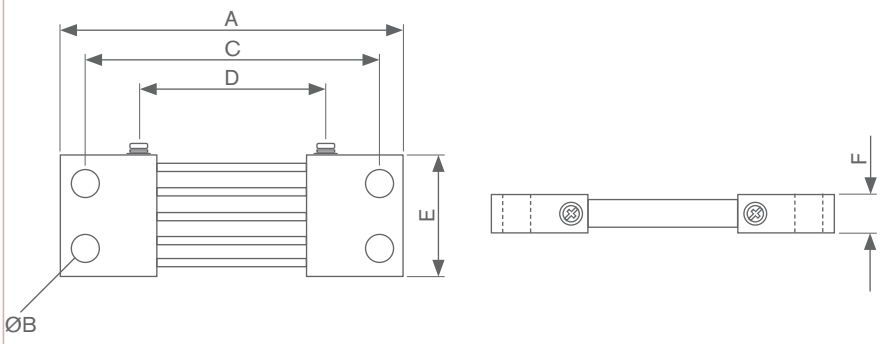
FST20 & NST20



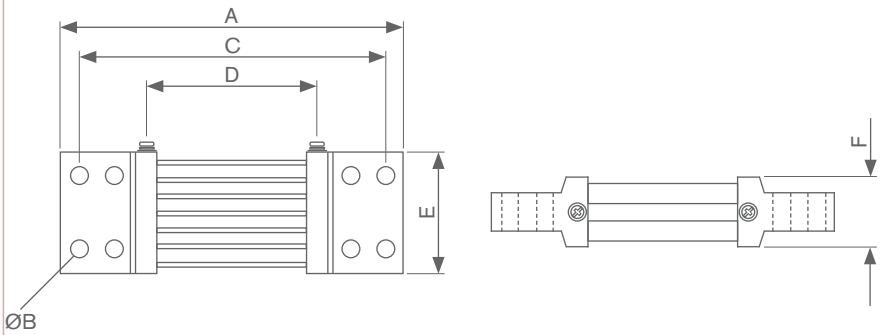
FST30 & NST30



FST40 & NST40



FST50 & NST50



All dimensions in mm

Range Data

Model	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	Weight (kg)
FST10-10	136	110	74	43	-	-	0.16
FST10-15	136	110	74	43	-	-	0.16
FST10-20	136	110	74	43	-	-	0.16
FST10-25	136	110	74	43	-	-	0.16
FST10-30	136	110	74	43	-	-	0.16
FST10-40	136	110	74	43	-	-	0.16
FST10-50	136	110	74	43	-	-	0.16
FST10-60	136	110	74	43	-	-	0.16
FST10-80	136	110	74	43	-	-	0.16
FST10-100	136	110	74	43	-	-	0.16
FST10-150	136	110	74	43	-	-	0.16
FST20-200	136	110	74	51	-	-	0.26
FST30-250	115	10.0	88	64	41	12	0.32
FST30-300	116	12.5	88	64	35	20	0.44
FST30-400	116	12.5	86	64	44	20	0.54
FST30-500	116	12.5	88	64	55	20	0.68
FST30-600	125	12.5	90	64	60	20	0.85
FST40-800	125	12.5	90	64	70	20	0.95
FST40-1000	160	12.5	120	64	70	20	1.45
NST10-10	136	110	74	43	-	-	0.16
NST10-15	136	110	74	43	-	-	0.16
NST10-20	136	110	74	43	-	-	0.16
NST10-25	136	110	74	43	-	-	0.16
NST10-30	136	110	74	43	-	-	0.16
NST10-40	136	110	74	43	-	-	0.16
NST10-50	136	110	74	43	-	-	0.16
NST10-60	136	110	74	43	-	-	0.16
NST10-80	136	110	74	43	-	-	0.16
NST10-100	136	110	74	43	-	-	0.16
NST10-150	136	110	74	43	-	-	0.16
NST20-200	136	110	74	51	-	-	0.26
NST30-250	115	10.0	88	64	41	12	0.32
NST30-300	116	12.5	88	64	35	20	0.44
NST30-400	116	12.5	86	64	44	20	0.54
NST30-500	116	12.5	88	64	55	20	0.68
NST30-600	125	12.5	90	64	60	20	0.85
NST40-800	125	12.5	90	64	70	20	0.95
NST40-1000	160	12.5	120	64	70	20	1.45
NST40-1200	160	12.5	120	64	85	20	1.90
NST40-1500	160	12.5	120	64	100	20	2.10
NST50-2000	230	12.5	205	65	103	50	4.80
NST50-2500	191	13.5	167	56	103	38	5.00
NST50-3000	280	15.0	238	65	103	64	6.90
NST50-4000	292	17.0	253	65	110	82	9.50
NST50-5000	315	17.0	271	65	128	106	15.6

For more information, please contact our sales team on +44(0)1621 859500

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ELTIME CONTROLS

Product Catalogue

Electrical Measurement Transducers

Global Suppliers of Measurement and Protection Equipment for Industry

www.eltime.co.uk

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General Specification

Output

Response Time:	< 400ms for 0-90% of input value
Warm Up Time:	< 15 minutes
Residual Output Ripple:	< 1% peak full scale
Long Term Drift:	±0.25% per year non-cumulative
Maximum Load:	1mA < 10kohm 2.5mA < 6kohm 5mA < 3kohm 10mA < 1.5kohm 20mA < 750ohm
	Self powered voltage and current transducers have an adjustable span while all other units have an adjustable zero and span accessible from the front panel.

Auxiliary

AC:	110 / 230 / 415V (±20%) (others upon request)
DC:	24 / 48 / 110V (±20%)

Environmental

Operating Temperature:	-20°C to 65°C
Storage Temperature:	-40°C to 75°C
Variation With Temperature:	±0.5% maximum
Relative Humidity:	0 - 95% non-condensing

Burden

Input Circuits:	See individual specifications
Auxiliary Power Supply:	7VA combined Watt/Var transducers (4VA all other transducers)

EMC Compliance

Directive 89/336/EEC:	Electrostatic discharge IEC801.2 (8kV) Electromagnetic fields IEC801.3 level 3 Fast transient bursts IEC801.4 level 4 Surge withstand IEC255-5

Enclosure

Enclosure:	Grey ABS plastic with finger proof terminal covers
Enclosure Code:	Case IP50, terminals IP10 to IEC529 and BS5490
Isolation:	4kV rms 50Hz 1min (to IEC 414) between input / output / case / AC auxiliary (2kV rms 50Hz 1 min for EK energy transducers) 1kVdc / 600Vac between Watt & Var outputs (EPQ units)
Mounting:	35mm DIN rail (DIN-EN 50022)
Markings:	CE marked

Specification subject to change without notice.

Options

Non Standard Calibration

All transducers are supplied calibrated to standard input values as detailed in the individual specifications, however non-standard calibration input values can be specified (subject to technical viability).

Wide Output Adjust Switch on Power Transducers

All power transducers are available with a ten position switch accessible from the front panel which provides coarse adjustment of the output signal between 50% and 200% of the nominal.

Calibration Certificate

Calibration certificates traceable to national standards can be supplied on all transducers.

Conformal Coating

A conformal coating can be applied to the transducer circuitry during manufacture for transducers that will be operating in harsh environmental conditions.

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AC Current Transducers

Models Available

ECCC Self Powered Zero Based Output
ECCP Auxiliary Powered Live Zero Output
ECCR Auxiliary Powered True RMS
ECCB Auxiliary Powered Bi-Polar Output

Product Features

- Isolated DC mA or DC voltage output
- Accuracy class 0.25
- Adjustable 'span' and 'zero'
- DIN rail mounting enclosure
- 4kV rms 50Hz 1 minute isolation between input / output / case / auxiliary
- Screw type terminals
- Fingerproof terminal cover included

AC current transducers measure AC current either directly or through a current transformer. The transducer converts the AC current signal to either a DC mA or DC voltage output which is directly proportional to the input signal value. The ECCC and ECCP are average sensing rms calibrated while the ECCR is a true rms sensing, rms calibrated transducer typically used for measuring distorted waveforms. The ECCB measures the magnitude and direction of the input current for use when monitoring import/export of branch currents in supply loops.

The ECCC transducers are self powered whilst all other AC current transducers are powered from a large choice of AC or DC auxiliary power options. The 4kV isolated output signals can then be fed to analogue meters, digital meters, PLC's or building management systems.

For converting AC current to a proportional DC mA or DC voltage output

Specification

Reference Standard:
- IEC 688, BS 6253, VDE/VDI 2191

Accuracy:
- Class 0.25 (±0.25% f.s. max. error)

Input Current, *In*:
- 0-0.7A to 0-7.5A direct connected
- 0-1A or 0-5A CT operated

Overload:
- 2 x *In* continuous
- 30 x *In* for 1 second

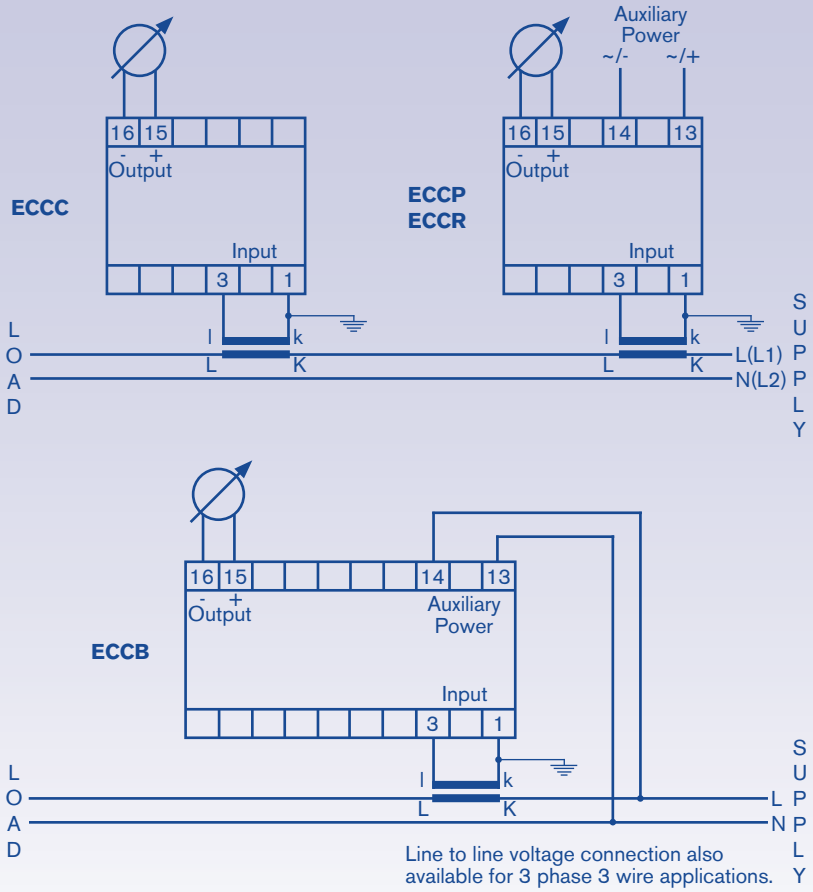
Working Range:
- 0 - 120%*In* (auxiliary powered)
- 10 - 120%*In* (self powered)

Frequency:
- 50 or 60Hz
- ECCR 40 to 500Hz

Burden:
- < 0.3VA (auxiliary powered)
- < 3VA (self powered)

Weight:
- ECCC 350g
- ECCP, ECCR, ECCB 600g

Connections



Line to line voltage connection also available for 3 phase 3 wire applications.

Ordering information

Model	Code	Description
	ECCC	Self Powered - Zero Based Output
	ECCP	Auxiliary Powered - Live Zero Output
	ECCR	Auxiliary Powered - True RMS
	ECCB	Auxiliary Powered - Bi-Polar Output

Input Current	Code	Description
	C1	1 Amp
	C5	5 Amp
	CX	0.7 to 7.5 Amps (specify)

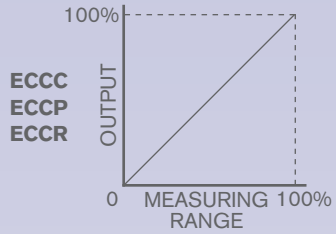
Auxiliary Power	Code	Description
	E0	Self Powered (ECCC only)
	E1	110Vac (±20%)
	E2	230Vac (±20%)
	E3	415Vac (±20%)
	E4	63.5Vac (±20%)
	E5	24Vdc (±20%)
	E6	48Vdc (±20%)
	E7	110Vdc (±20%)

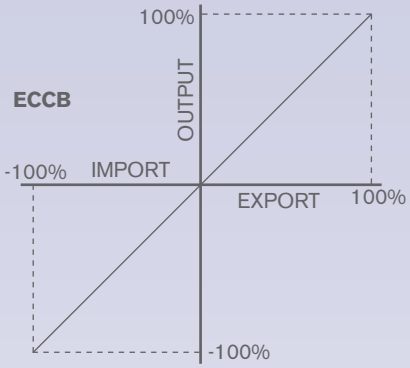
Output	Code	Description	
	X1	0-1mA	±1mA (ECCB)
	X2.5	0-2.5mA	±2.5mA (ECCB)
	X5	0-5mA	±5mA (ECCB)
	X10	0-10mA	±10mA (ECCB)
	X20	0-20mA	±20mA (ECCB)
	XA	4-20mA	N/A (ECCB)
	XV	Voltage (specify up to 15Vdc)	±Voltage (ECCB)

Input Frequency	Code	Description
	F50	50Hz
	F60	60Hz

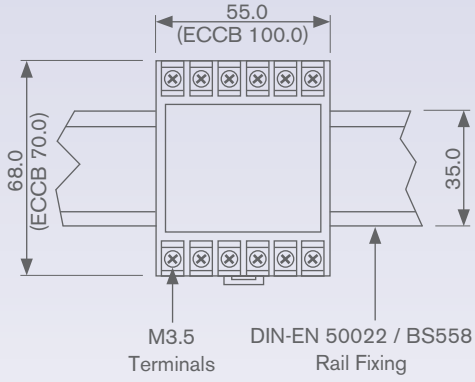
Example	**ECCP - C5 - E1 - XA - F50**

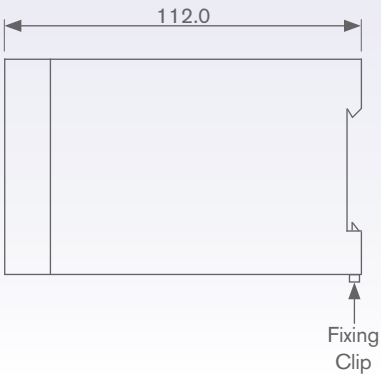
Function Graphs





Dimensions





All dimensions in mm

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AC Voltage Transducers

Models Available

EVCC Self Powered Zero Based Output
EVCP Auxiliary Powered Live Zero Output
EVCX Self Powered Expanded Scale
EVXP Auxiliary Powered Expanded Scale
EVCR Auxiliary Powered True RMS
EVXR Auxiliary Powered True RMS Expanded Scale

Product Features

- Isolated DC mA or DC voltage output
- Accuracy class 0.25
- Adjustable 'span' and 'zero'
- DIN rail mounting enclosure
- 4kV rms 50Hz 1 minute isolation between input / output / case / auxiliary
- Screw type terminals
- Fingerproof terminal cover included

AC voltage transducers measure AC voltage either directly or through a voltage transformer. The transducer converts the AC voltage signal to either a DC mA or DC voltage output which is directly proportional to the input signal value. The EVCC and EVCP are average sensing rms calibrated while the EVCR is a true rms sensing, rms calibrated transducer typically used for measuring distorted waveforms.

The EVCX, EVXP and EVXR are designed to monitor the deviation of a voltage over a narrow band around the specified nominal voltage. The EVCC and EVCX transducers are self powered whilst all other AC voltage transducers are powered from a large choice of AC or DC auxiliary power options. The 4kV isolated output signals can then be fed to analogue meters, digital meters, PLC's or building management systems.

For converting AC voltage to a proportional DC mA or DC voltage output

Specification

Reference Standard:
- IEC 688, BS 6253, VDE/VDI 2191

Accuracy:
- Class 0.25 (±0.25% f.s. max. error)

Input Voltage, *Un*:
- 50V to 550V direct connected (specify)
- or VT operated

Overload:
- 1.2 x *Un* continuous
- 1.5 x *Un* for 1 second

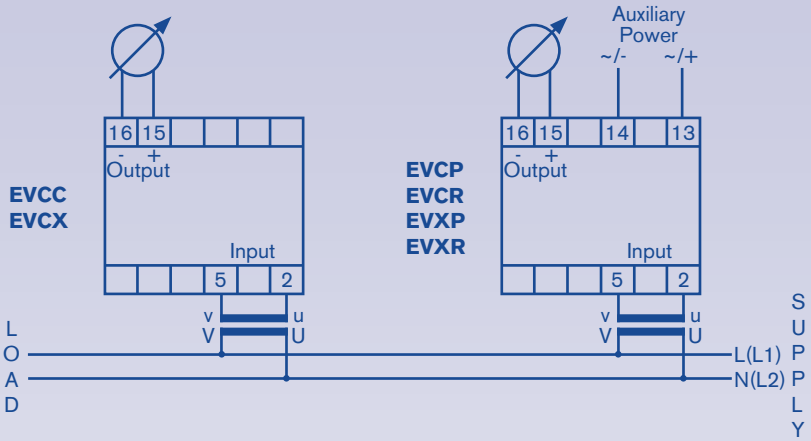
Working Range:
- 0 - 120%*Un* (auxiliary powered)
- 10 - 120%*Un* (self powered)

Frequency:
- 50 or 60Hz
- EVCR / EVXR 40 to 500Hz

Burden:
- < 0.2VA (auxiliary powered)
- < 3VA (self powered)

Weight:
- EVCC, EVCX 350g
- EVCP, EVCR, EVXP, EVXR 600g

Connections



Ordering information

Model	Code	Description
	EVCC	Self Powered - Zero Based Output
	EVCP	Auxiliary Powered - Live Zero Output
	EVCX	Self Powered - Expanded Scale
	EVXP	Auxiliary Powered - Expanded Scale
	EVCR	Auxiliary Powered - True RMS
	EVXR	Auxiliary Powered - True RMS Expanded Scale

Input Voltage	Code	Description
	P1	110, 115 or 120Vac (specify)
	P2	220, 230 or 240Vac (specify)
	P3	380, 400, 415 or 440Vac (specify)
	PX	50 to 550Vac (specify)

Input Deviation/Range	Code	Description
	-	N/A (EVCC, EVCP and EVCR)
	D15	±15% (EVCX)
	D20	±20% (EVCX) 20% (EVXP, EVXR)
	DX	20% to 100% (EVXP, EVXR - specify)

Auxiliary Power	Code	Description
	E0	Self Powered (ECCC only)
	E1	110Vac (±20%)
	E2	230Vac (±20%)
	E3	415Vac (±20%)
	E4	63.5Vac (±20%)
	E5	24Vdc (±20%)
	E6	48Vdc (±20%)
	E7	110Vdc (±20%)

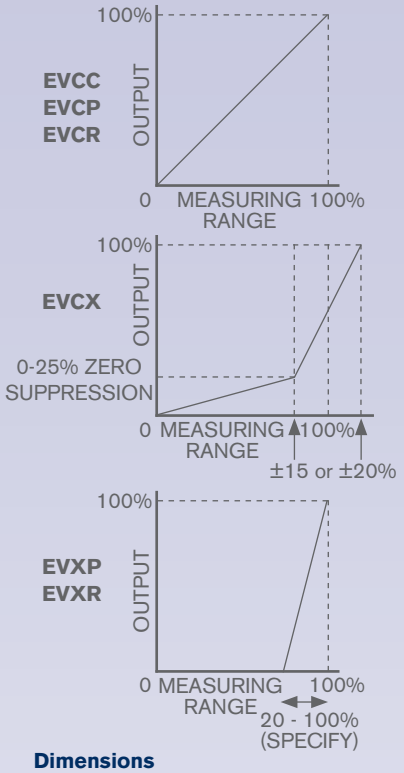
Output	Code	Description
	X1	0-1mA (not EVCX)
	X2.5	0-2.5mA
	X5	0-5mA
	X10	0-10mA
	X20	0-20mA
	XA	4-20mA
	XV	Voltage (specify up to 15Vdc)

EVCX Zero Suppression	Code	Description
	SZ	Upto 25% (specify)
	S0	True Zero

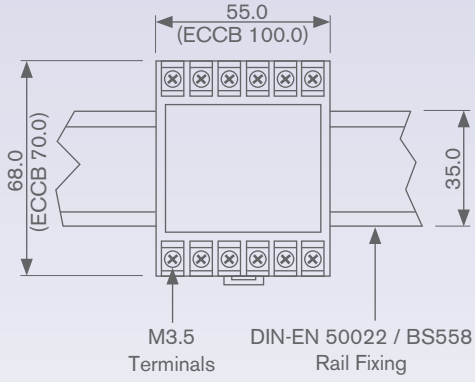
Input Frequency	Code	Description
	F50	50Hz
	F60	60Hz

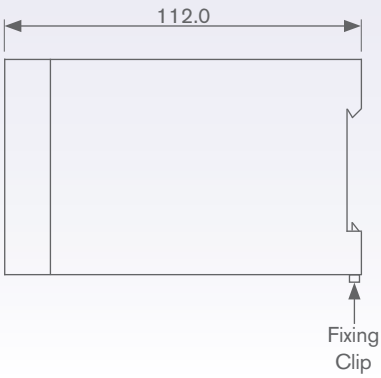
Example	EVXR - P1(110V) - D20 - E1 - XA - SZ - F50

Function Graphs



Dimensions





All dimensions in mm

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Power (Watts & Vars)

Models Available

EP12B Single Phase Watts
EP33B 3 Phase 3 Wire Bal. Watts
EP33U 3 Phase 3 Wire Unbal. Watts
EP34B 3 Phase 4 Wire Bal. Watts
EP34U 3 Phase 4 Wire Unbal. Watts

EQ12B Single Phase Vars
EQ33B 3 Phase 3 Wire Bal. Vars
EQ33U 3 Phase 3 Wire Unbal. Vars
EQ34B 3 Phase 4 Wire Bal. Vars
EQ34U 3 Phase 4 Wire Unbal. Vars

EPQ12B Single Phase Watts & Vars
EPQ33B 3 Phase 3 Wire Bal. Watts & Vars
EPQ33U 3 Phase 3 Wire Unbal. Watts & Vars
EPQ34B 3 Phase 4 Wire Bal. Watts & Vars

Power transducers measure AC power (active, reactive or both) either directly or through voltage and/or current transformers. The transducer converts the AC power signal to either a DC mA or DC voltage output which is directly proportional to the input signal value.

Models are available for single phase and three phase, balanced and unbalanced loads and are available with a zero based or live zero output. Combined Watt & Var transducers are also available with two galvanically isolated outputs, one proportional to active power (Watts) and the other proportional to reactive power (Vars). All power transducers are available self powered or powered from a large choice of AC or DC auxiliary power options. The 4kV isolated output signals can then be fed to analogue meters, digital meters, PLC's or building management systems.

For converting AC power to a proportional DC mA or DC voltage output

Specification

Reference Standard:
- IEC 688, BS 6253, VDE/VDI 2191

Accuracy:
- Class 0.25 (±0.25% f.s. max. error)

Input Voltage, *Un*:
- 50V to 550V direct connected (specify)
- or VT operated

Input Current, *In*:
- 0-0.7A to 0-7.5A direct connected
- 0-1A or 0-5A CT operated

Overload:
- 1.2 x *Un*, 2 x *In* continuous
- 1.5 x *Un*, 30 x *In* for 1 second

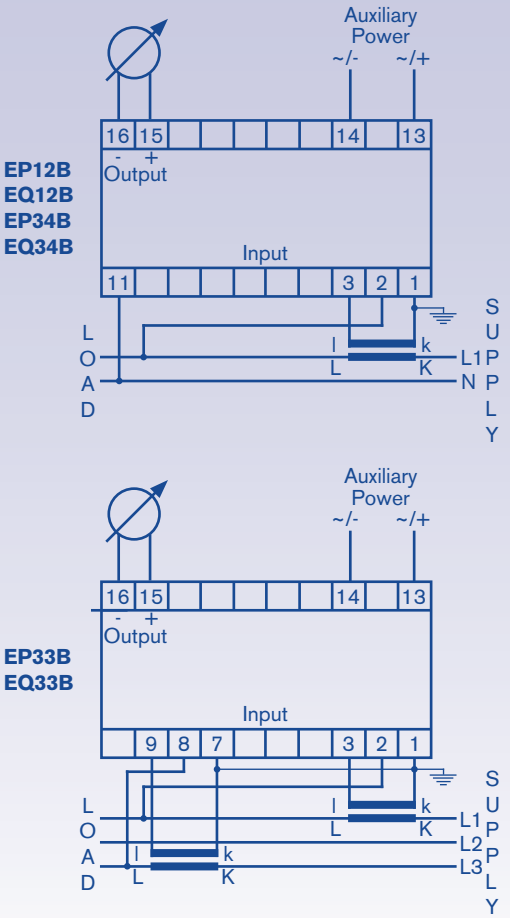
Working Range:
- 0 - 120%*Un* (auxiliary powered)
- 80 - 120%*Un* (self powered)
- 0 - 120%*In*

Frequency:
- 50 or 60Hz

Burden:
- Current circuit < 0.3VA (aux. powered)
- Current circuit < 3VA (self powered)
- Voltage circuit < 0.2VA (aux. powered)
- Voltage circuit < 3VA (self powered)

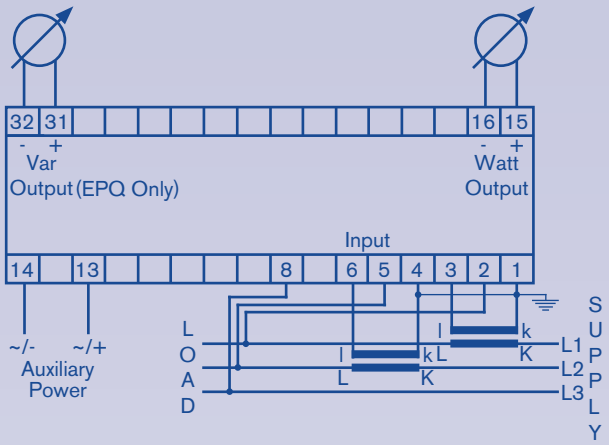
Weight:
- EP12B, EP33B, EP34B 700g
- EP33U, EQ33U 900g
- EP34U, EQ34U, All EPQ 1000g

Connections

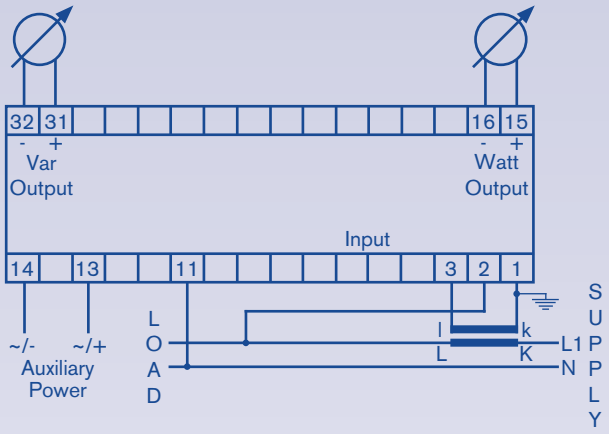


Connections

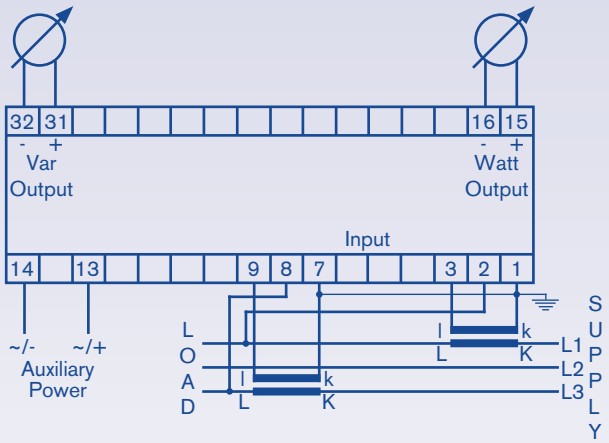
EP33U
EQ33U
EPQ33U



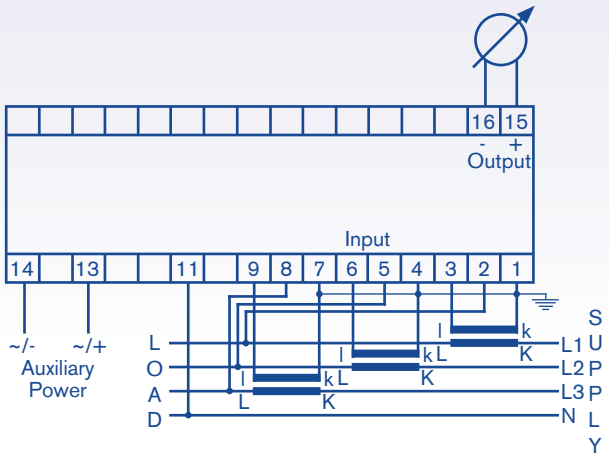
EPQ12B
EPQ34B



EPQ33B



EP34U
EQ34U

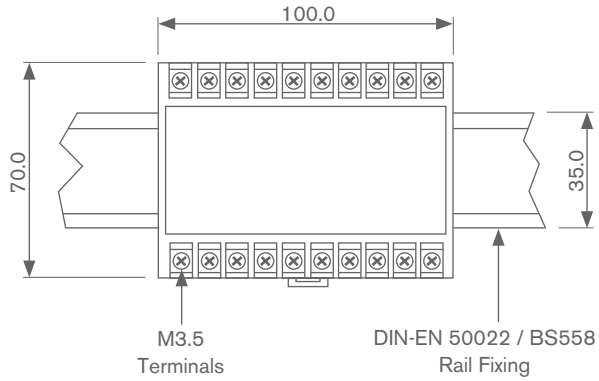


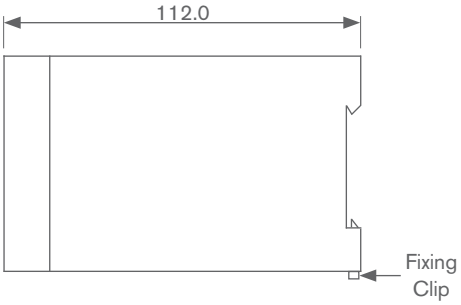
Product Features

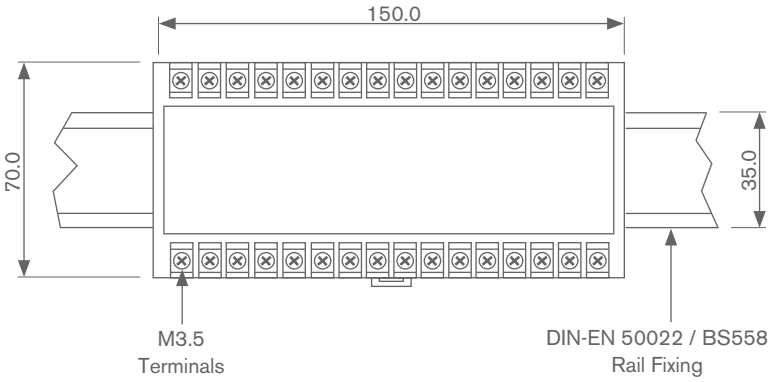
- Isolated DC mA or DC voltage output
- Accuracy class 0.25
- Adjustable 'span' and 'zero'
- DIN rail mounting enclosure
- 4kV rms 50Hz 1 minute isolation between input / output / case / auxiliary
- 1kVdc / 600Vac isolation between Watt & Var outputs on Watt/Var transducers
- Screw type terminals
- Fingerproof terminal cover included

Dimensions

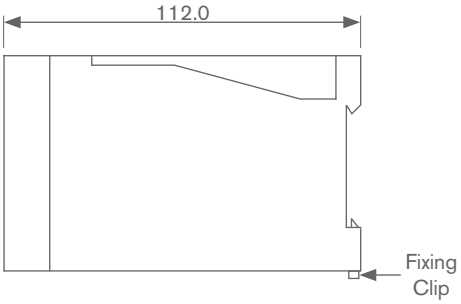
EP12B
EQ12B
EP33B
EQ33B
EP34B
EQ34B

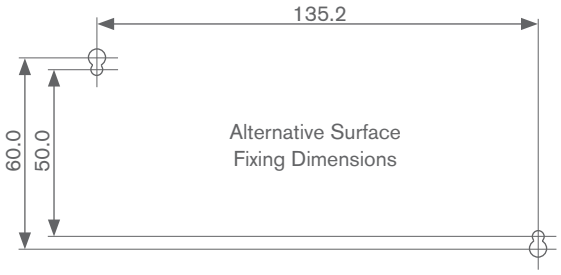






EP33U
EQ33U
EP34U
EQ34U
EPQ12B
EPQ33B
EPQ34B
EPQ33U





All dimensions in mm

Ordering information

Model	Code	Description
	EP	Active Power (Watts)
	EQ	Reactive Power (Vars)
	EPQ	Active & Reactive Power (Watts & Vars)

Wiring System	Code	Description
	12B	Single Phase
	33B	3 Phase 3 Wire Balanced
	33U	3 Phase 3 Wire Unbalanced
	34B	3 Phase 4 Wire Balanced
	34U	3 Phase 4 Wire Unbalanced (EPQ N/A)

Input Voltage	Code	Description
	P1	110Vac (±20% self power, 0-120% aux. power)
	P2	230Vac (±20% self power, 0-120% aux. power)
	P3	415Vac (±20% self power, 0-120% aux. power)
	PX	50 to 550Vac (specify)

Input Current	Code	Description
	C1	1 Amp
	C5	5 Amp
	CX	0.5 to 7.5 Amps (specify)

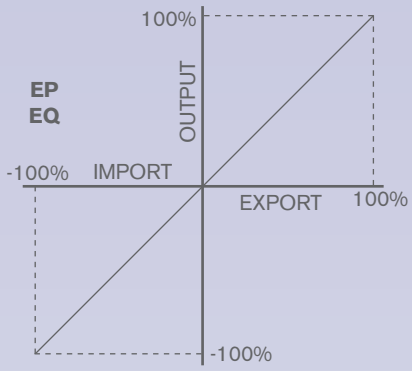
Auxiliary Power	Code	Description
	E0	Self Powered
	E1	110Vac (±20%)
	E2	230Vac (±20%)
	E3	415Vac (±20%)
	E4	63.5Vac (±20%)
	E5	24Vdc (±20%)
	E6	48Vdc (±20%)
	E7	110Vdc (±20%)

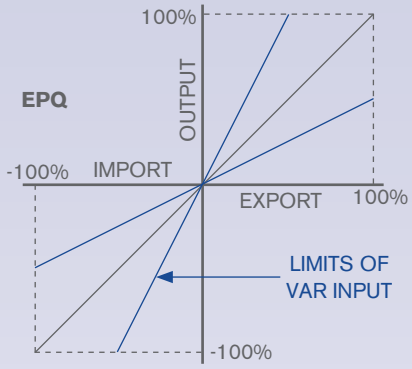
Output	Code	Description
	X1	±1mA
	X2.5	±2.5mA
	X5	±5mA
	X10	±10mA
	X20	±20mA
	XA	4-20mA
	XB	4-12-20mA
	XV	±Voltage (specify up to 15Vdc)

Input Frequency	Code	Description
	F50	50Hz
	F60	60Hz

Example	EPQ - 33B - P1 - C5 - E1 - XA - F50

Function Graphs





On EPQ combined Watt & Var transducers the full scale Var input can be specified between 50% and 200% of the full scale Watt input.

e.g. If full scale Watt input is 200Watts, the Var input can be specified anywhere between 100 and 400Vars.

Input Voltage & Current	Full Scale Watts and/or Vars	12B Single Phase	33B/33U 3 Phase 3 Wire	34B/34U 3 Phase 4 Wire
110V & 1A (P1-C1)	**Standard** On Request	**100** 50 to 200	**200** 100 to 400	**300** 150 to 600
110V & 5A (P1-C5)	**Standard** On Request	**500** 250 to 1000	**1000** 500 to 2000	**1500** 750 to 3000
230V & 1A (P2-C1)	**Standard** On Request	**200** 100 to 400	**400** 200 to 800	**600** 300 to 1200
230V & 5A (P2-C5)	**Standard** On Request	**1000** 500 to 2000	**2000** 1000 to 4000	**3000** 1500 to 6000
415V & 1A (P3-C1)	**Standard** On Request	**400** 200 to 800	**800** 400 to 1600	**1200** 600 to 2400
415V & 5A (P3-C5)	**Standard** On Request	**2000** 1000 to 4000	**4000** 2000 to 8000	**6000** 3000 to 12000

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Energy (kWh) Transducers

Models Available

EK12B Single Phase
EK33B 3 Phase 3 Wire Balanced
EK33U 3 Phase 3 Wire Unbalanced
EK34B 3 Phase 4 Wire Balanced
EK34U 3 Phase 4 Wire Unbalanced
EKDC DC System

Product Features

- Voltage free pulsed output
- Accuracy class 1
- DIN rail mounting enclosure
- 2kV rms 50Hz 1 minute isolation between input / output / case / (auxiliary)
- Screw type terminals
- Fingerproof terminal cover included

Energy transducers measure active energy (kWh) either directly or through a voltage and/or current transformers or DC shunt. The transducer converts the energy signal to a voltage free pulse output which is directly proportional to the input signal value.

Models are available for single phase and three phase, balanced and unbalanced systems as well as DC systems. AC models have a user selectable CT ratio through a rotary switch accessible from a removable cover on the transducer. All AC energy transducers are self powered whilst DC energy transducers are powered from a large choice of AC or DC auxiliary power options. The 2kV isolated output signal can then be fed to remote counters, data loggers, PLC's or building management systems.

For converting energy (KWh) to a proportional voltage free pulsed output

Specification

Reference Standard:
- IEC 688, BS 6253, VDE/VDI 2191

Accuracy:
- Class 1 (±1% of reading max. error)

Input Voltage, *Un*:
- 50V to 440V direct connected (specify)
- or VT operated

Input Current, *In*:
- 0-0.7A to 0-5A direct connected
- 0-1A or 0-5A CT operated

Overload:
- 1.2 x *Un*, 2 x *In* continuous
- 1.5 x *Un*, 30 x *In* for 1 second

Working Range:
- 80 - 120%*Un*
- 0 - 120%*In*

Frequency:
- 50, 60Hz or DC

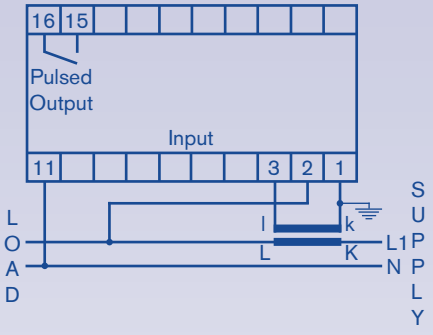
Burden:
- Current circuit < 0.1VA per phase
- Voltage circuit < 3VA per phase

Pulsed Output:
- Voltage free isolated relay
- 5A contacts at 250Vac, 200msec

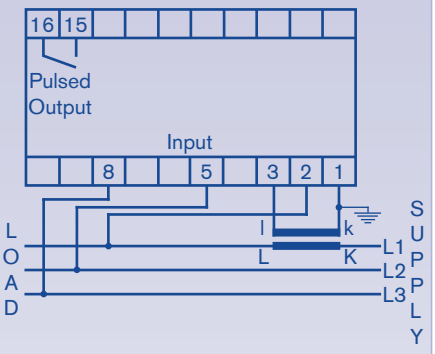
Weight:
- EK12B, EK33B, EK34B 600g
- EK33U 700g
- EK34U 800g

Connections

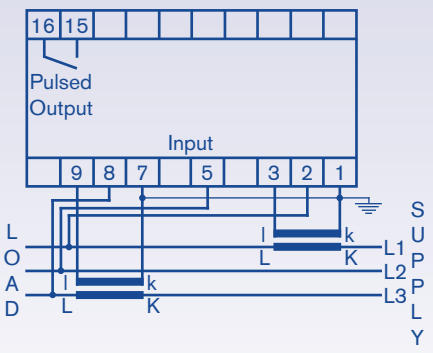
EK12B / EK34B



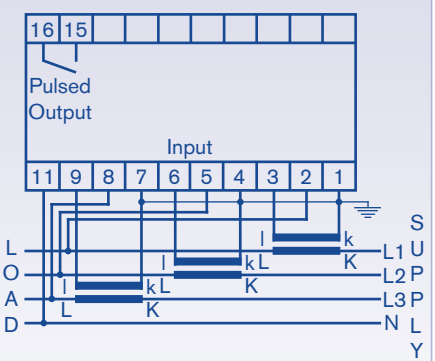
EK33B



EK33U



EK34U



Ordering information

Model	Code	Description
	EK12B	Single Phase
	EK33B	3 Phase 3 Wire Balanced
	EK33U	3 Phase 3 Wire Unbalanced
	EK34B	3 Phase 4 Wire Balanced
	EK34U	3 Phase 4 Wire Unbalanced
	EKDC	DC System

Input Voltage	Code	Description
	P1	110Vac
	P2	230Vac
	P3	415Vac
	PX	50 to 440Vac (specify)
EKDC		12, 24, 48Vdc or upto 600Vdc upon request

Input Current	Code	Description
	C1L	25/1 to 800/1A (selectable) - see table below*
	C1H	200/1 to 6000/1A (selectable) - see table below**
	C5L	25/5 to 800/5A (selectable) - see table below*
	C5H	200/1 to 6000/1A (selectable) - see table below**
	C5X	Other CT ratio (specify)
	CX	0.7 to 7.5 Amps direct (specify)
EKDC		10 to 5000 Amps DC from 50, 60, 75mV shunt (specify)***

Auxiliary Power	Code	Description
	-	N/A (EK12B, EK33B, EK33U, EK34B, EK34U)
EKDC	E1	110Vac (±20%)
EKDC	E2	230Vac (±20%)
EKDC	E3	415Vac (±20%)
EKDC	E5	24Vdc (-10% to +20%)
EKDC	E6	48Vdc (-10% to +20%)
EKDC	E8	12Vdc (-10% to +20%)

Input Frequency	Code	Description
	F50	50Hz
	F60	60Hz
EKDC	FDC	DC

Example	EK34U - P2 - C5L - F50

Current Transformer Primary Currents (Selectable)

* L 25, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800A

**H 200, 250, 300, 400, 500, 600, 800, 1000, 1200, 1500, 1600, 2000, 2500, 3000, 4000, 6000A

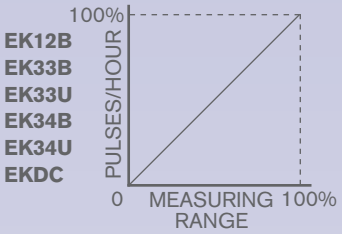
*** Standard Shunt Values

10, 15, 20, 25, 30, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 800, 1000, 1200, 1500, 2000, 2500, 3000, 4000, 5000A

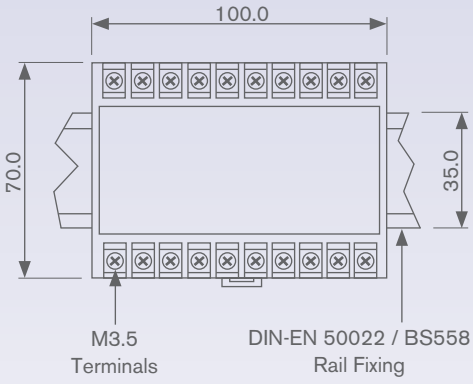
Notes:

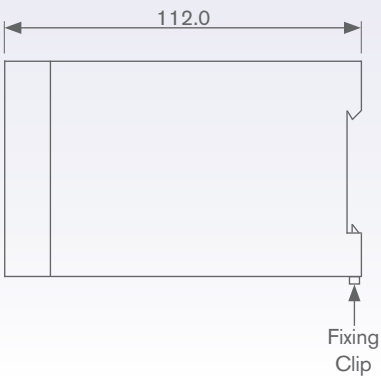
1. Models with (L)ow CT ratios will have a pulse rate of 1pulse/kWh and models with (H)igh CT ratios will have a pulse rate of 1pulse/10kWh (unless a VT ratio is applicable). Other pulse rates are available to suit direct connected units or VT ratios etc.
2. Ensure that current transformers are mounted such that K faces the supply and L faces the load.
3. Secondary windings of the current transformers should be earthed.

Function Graph



Dimensions





All dimensions in mm

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Phase Angle Transducers

Models Available
EA12B Single Phase
EA33B 3 Phase Balanced
EA12V Voltage Synchronisation

Product Features
- Isolated DC mA or DC voltage output
- Accuracy class 0.25
- Adjustable 'span' and 'zero'
- DIN rail mounting enclosure
- 4kV rms 50Hz 1 minute isolation between input / output / case / (auxiliary)
- Screw type terminals
- Fingerproof terminal cover included

Phase angle transducers measure the phase relationship between a current and a voltage or two voltages. The transducer converts the phase angle value to either a DC mA or DC voltage output which is directly proportional to the input signal.

These can be used for monitoring and optimising power factor correction systems. All phase angle transducers are available self powered or powered from a large choice of AC or DC auxiliary power options.

The 4kV isolated output signals can then be fed to analogue meters, digital meters, PLC's or building management systems.

For converting phase angle to a proportional DC mA or DC voltage output

Specification
Reference Standard:
- IEC 688, BS 6253, VDE/VDI 2191

Accuracy:
- Class 0.25 (±0.25% f.s. max. error down to 10% f.s.)

Input Voltage, *Un*:
- 0-50V to 0-550V direct connected
- or VT operated

Input Current, *In*:
- 0-0.7A to 0-7.5A direct connected
- 0-1A or 0-5A CT operated

Overload:
- 1.2 x *Un*, 2 x *In* continuous
- 1.5 x *Un*, 30 x *In* for 1 second

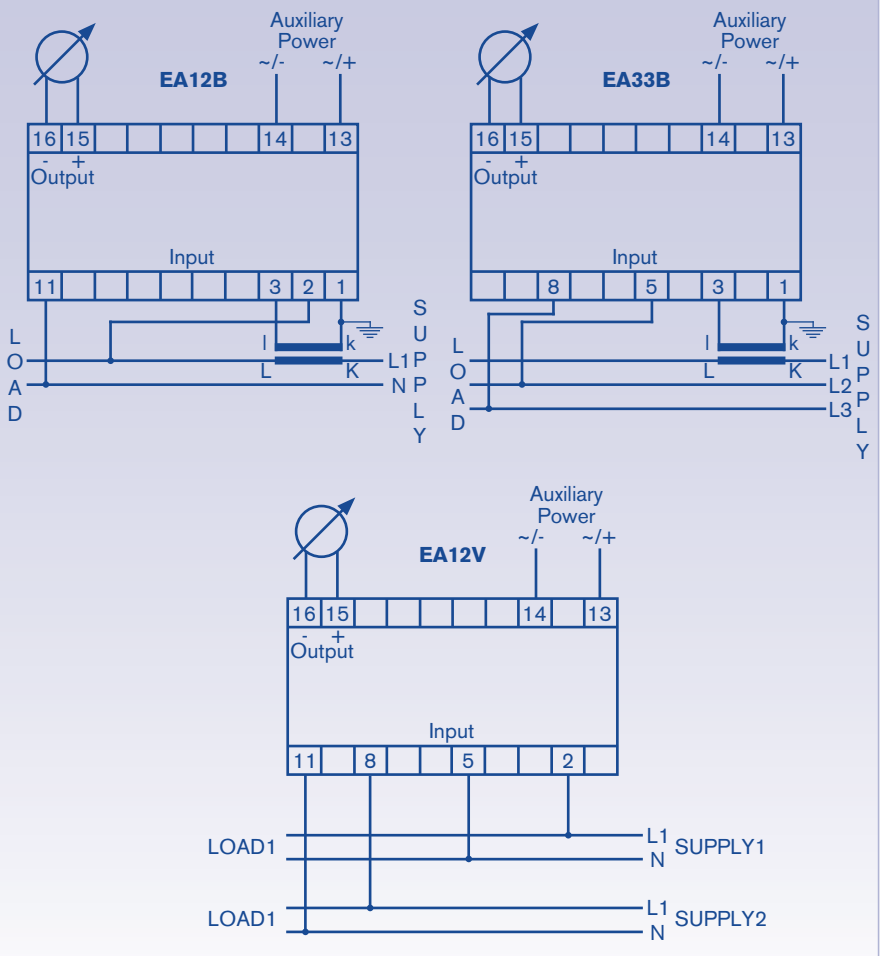
Working Range:
- 0 - 120%*Un* (auxiliary powered)
- 80 - 120%*Un* (self powered)
- 0 - 120%*In*

Frequency:
- 50 or 60Hz

Burden:
- Current circuit < 0.3VA (aux. powered)
- Current circuit < 3VA (self powered)
- Voltage circuit < 0.2VA (aux. powered)
- Voltage circuit < 3VA (self powered)

Weight:
- EA12B, EA33B, EA12V 700g

Connections



Ordering information

Model	Code	Description
	EA12B	Single Phase
	EA33B	3 Phase Balanced
	EA12V	Voltage Synchronisation

Input Phase Angle	Code	Description
	60	±60° (N/A for EA12V)
	90	±90° (N/A for EA12V)
	180	±180° (N/A for EA33B)

Input Voltage	Code	Description
	P1	110Vac
	P2	230Vac
	P3	415Vac
	PX	50 to 550Vac (specify)

Input Current	Code	Description
	C1	1 Amp
	C5	5 Amp
	CX	0.5 to 7.5 Amps direct (specify)

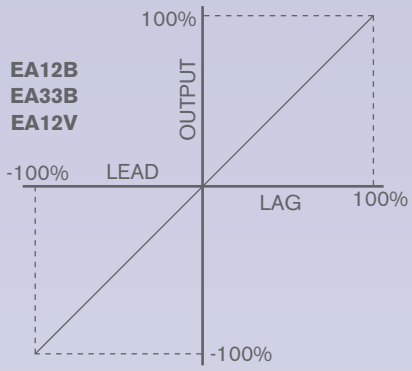
Auxiliary Power	Code	Description
	E0	Self Powered
	E1	110Vac (±20%)
	E2	230Vac (±20%)
	E3	415Vac (±20%)
	E4	63.5Vac (±20%)
	E5	24Vdc (±20%)
	E6	48Vdc (±20%)
	E7	110Vdc (±20%)

Output	Code	Description
	X1	±1mA
	X2.5	±2.5mA
	X5	±5mA
	X10	±10mA
	X20	±20mA
	XB	4-12-20mA
	XV	±Voltage (specify up to 15Vdc)

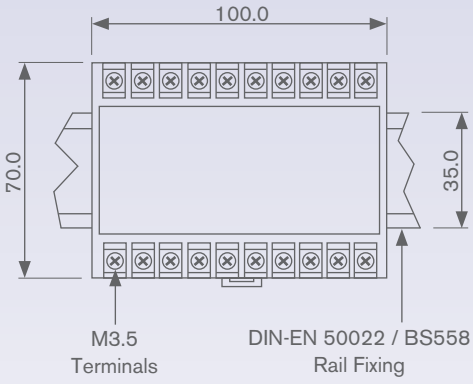
Input Frequency	Code	Description
	F50	50Hz
	F60	60Hz

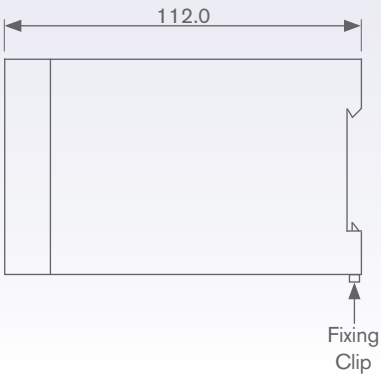
Example	EA33B - 60 - P1- C5 - E1 - XB - F50

Function Graph



Dimensions





All dimensions in mm

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Frequency Transducers

Frequency transducers measure frequency either directly or through a voltage transformer. The transducer converts the AC frequency signal to either a DC mA or DC voltage output which is directly proportional to the input signal value.

The output is directly proportional to the frequency deviation around a specified nominal frequency. All frequency transducers are self powered.

The 4kV isolated output signals can then be fed to remote counters, data loggers, PLC's or building management systems.

Models Available

EF12U Self Powered Uni-polar Output
EF12B Self Powered Bi-Polar Output

Product Features

- Isolated DC mA or DC voltage output
- Accurate to ±0.1% of centre frequency
- Adjustable 'span' and 'zero'
- DIN rail mounting enclosure
- 4kV rms 50Hz 1 minute isolation between input / output / case / (auxiliary)
- Screw type terminals
- Fingerproof terminal cover included

For converting frequency to a proportional DC mA or DC voltage output

Specification

Reference Standard:
- IEC 688, BS 6253, VDE/VDI 2191

Accuracy:
- ±0.1% of centre frequency

Input Voltage, *Un*:
- 50V to 550V direct connected
- or VT operated

Overload:
- 1.2 x *Un* continuous
- 1.5 x *Un* for 1 second

Working Range:
- 80 - 120%*Un*

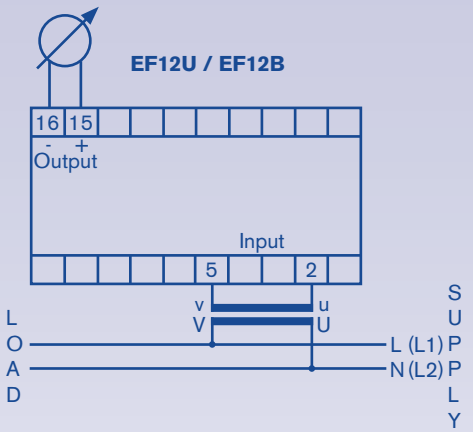
Centre Frequency, *Fn*:
- 44 to 65Hz
- 400Hz

Frequency Deviation:
- ±1, 2, 3, 5Hz (centre 44 to 65Hz)
- ±10, 20, 30, 40Hz (centre 400Hz)

Burden:
- Voltage circuit < 3VA

Weight:
- EF12U, EF12B 600g

Connections



Ordering information

Model	Code	Description
	EF12U	Self Powered - Uni-Polar Output
	EF12B	Self Powered - Bi-Polar Output

Input Voltage	Code	Description
	P1	110Vac
	P2	230Vac
	P3	415Vac
	PX	50 to 550Vac (specify)

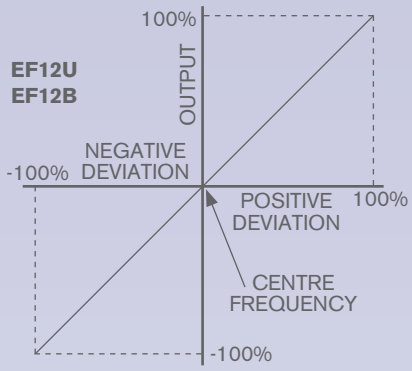
Output	Code	Description	
		EF12U	EF12B
	X1	0-1mA	±1mA
	X2.5	0-2.5mA	±2.5mA
	X5	0-5mA	±5mA
	X10	0-10mA	±10mA
	X20	0-20mA	±20mA
	XA	4-20mA	N/A
	XB	N/A	4-12-20mA
	XV	Voltage (specify up to 15Vdc)	±Voltage

Centre Frequency	Code	Description
	F50	50Hz
	F60	60Hz
	F400	400Hz
	FX	44 to 65Hz (specify)

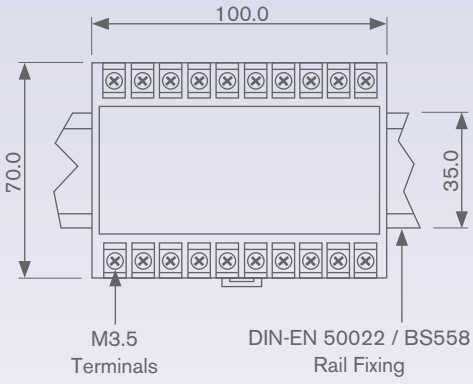
Frequency Deviation	Code	Description
	D1	±1Hz
	D2	±2Hz
	D3	±3Hz
	D5	±5Hz
	DX	±1 to ±8Hz (specify)
	DX	±10 to ±40Hz (F400 - specify)

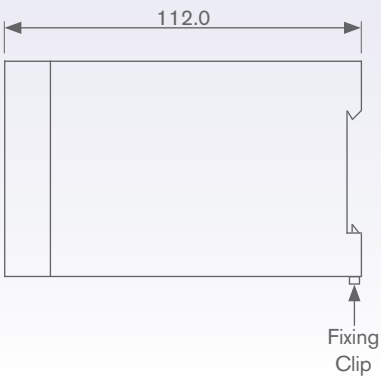
Example	EF12U - P1- XA - F50 - D5

Function Graph



Dimensions





All dimensions in mm

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DC Current & Voltage Transducers

Models Available

EDCC Auxiliary Powered DC Current
EDCV Auxiliary Powered DC Voltage

Product Features

- Isolated DC mA or DC voltage output
- Accuracy class 0.25
- Adjustable 'span' and 'zero'
- DIN rail mounting enclosure
- 4kV rms 50Hz 1 minute isolation between input / output / case / auxiliary
- Screw type terminals
- Fingerproof terminal cover included

DC voltage transducers measure DC voltage directly and the DC current transducers measure DC currents up to 10 Amps directly. Higher currents can be measured using a shunt and a DC voltage transducer.

The transducers convert the DC voltage or current signal (or DC millivolt value from the shunt) to either a DC mA or DC voltage output which is directly proportional to the input signal value. All DC transducers are powered from a large choice of AC or DC auxiliary power options.

The DC transducers offer isolation between the DC input signal and the DC output which can be used to prevent earth loops. The 4kV isolated output signals can then be fed to analogue meters, digital meters, PLC's or building management systems.

For converting DC signals to a proportional DC mA or DC voltage output

Specification

Reference Standard:
- IEC 688, BS 6253, VDE/VDI 2191

Accuracy:
- Class 0.25 (±0.25% f.s. max. error)

Input Current, *In*:
- 0-1mA to 0-10A direct connected
- 50, 60, 75mV shunt operated

Input Voltage, *Un*:
- 0-20mV to 0-600V direct connected

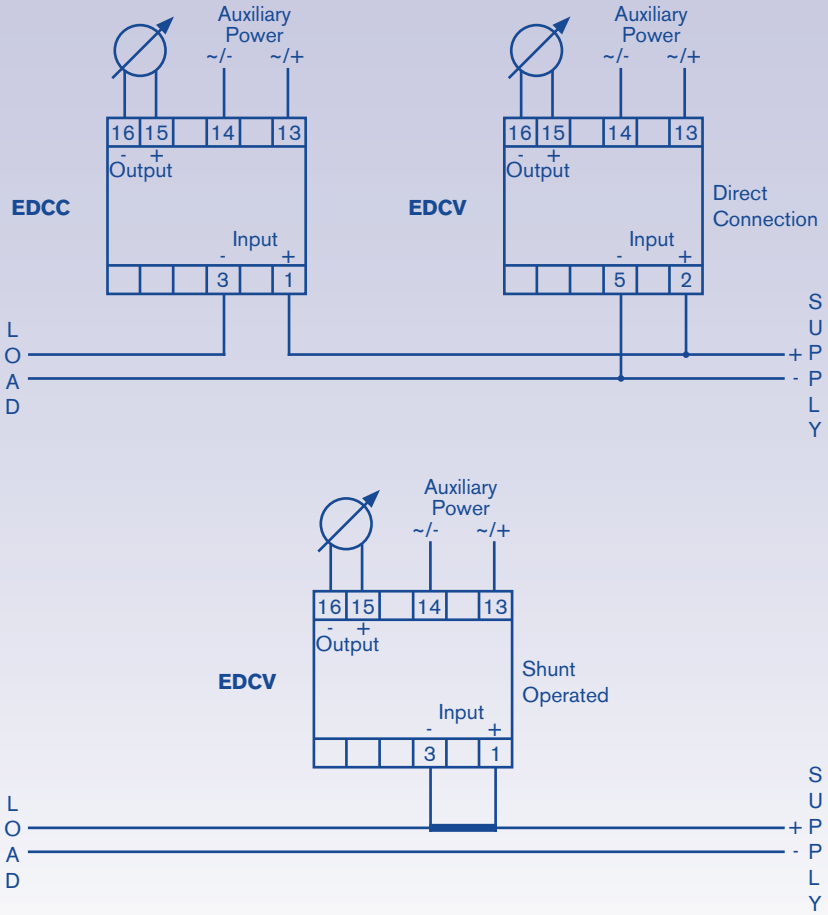
Overload:
- 1.2 x *Un*, 2 x *In* continuous
- 1.5 x *Un*, 30 x *In* for 1 second

Working Range:
- 0 - 120%*Un*

Burden:
- EDCC < 0.3VA
- EDCV < 0.2VA

Weight:
- EDCC, EDCV 600g

Connections



Ordering information

Model	Code	Description
	EDCC	Auxiliary Powered DC Current
	EDCV	Auxiliary Powered DC Voltage

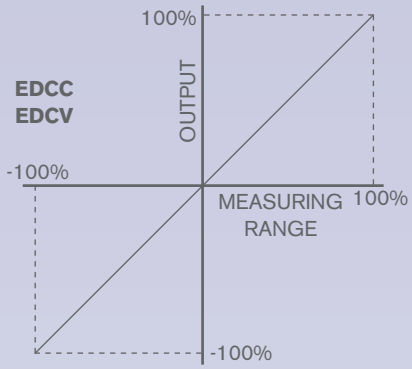
Input Voltage/Current	Code	Description
	CX	±1mA to ±10A (specify)
	CA	4-20mA
	VX	±20mV to ±600V (specify)

Auxiliary Power	Code	Description
	E1	110Vac (±20%)
	E2	230Vac (±20%)
	E3	415Vac (±20%)
	E4	63.5Vac (±20%)
	E5	24Vdc (±20%)
	E6	48Vdc (±20%)
	E7	110Vdc (±20%)

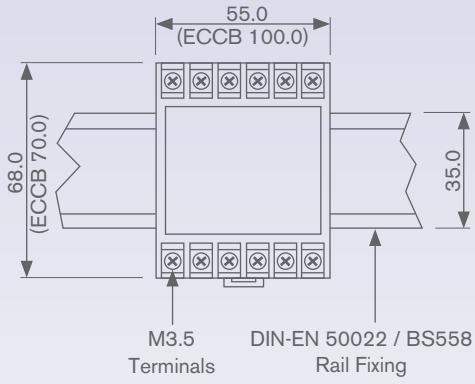
Output	Code	Description
	X1	±1mA
	X2.5	±2.5mA
	X5	±5mA
	X10	±10mA
	X20	±20mA
	XA	4-20mA
	XB	4-12-20mA
	XV	±Voltage (specify up to 15Vdc)

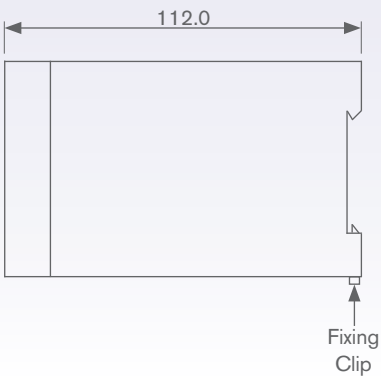
Example	EDCC - CX(5Adc) - E1 - XA

Function Graphs



Dimensions





All dimensions in mm

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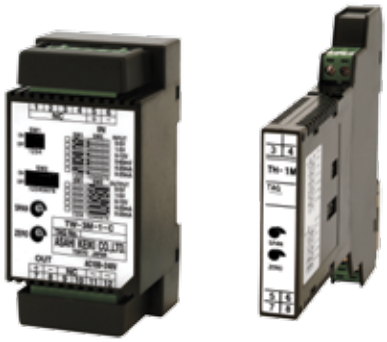
Product Catalogue

Analogue Signal Conditioners



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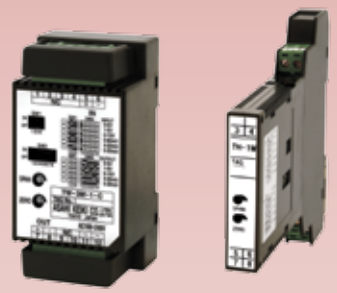

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Analogue Signal Conditioners

Models Available

TH-1M Slim Analogue Signal Conditioner
24Vdc Auxiliary Powered

TW-3M Analogue Signal Conditioner
100-240Vac Powered

Product Features

- Convert and isolate process signals
- User selectable input and output
- TH-1M linearity 0.25% full scale
- TW-3M linearity 0.1% full scale
- Adjustable 'span' and 'zero'
- DIN rail mounting enclosure
- 1.5kV rms 50Hz 1 minute isolation between input / output / auxiliary
- Screw type terminals
- Fingerproof terminal cover included

Analogue signal conditioners isolate and convert DC voltage or current signals. The signal conditioner converts the DC voltage or DC mA signal to either a DC mA or DC voltage output which is directly proportional to the input signal value.

The user can select the input range and output range through the DIP switches on the front of the isolator. These signal conditioners offer isolation between the DC input signal and the DC output which can be used to prevent earth loops.

The 1.5kV isolated output signals can then be fed to analogue meters, digital meters or PLC's.

For converting and isolating DC process signals

Specification

Linearity:
- TH-1M < 0.25% full scale
- TW-3M < 0.1% full scale

Accuracy:
- < 1% full scale after switches adjusted

Temperature Variation:
- 0.02% full scale / °C

Response Time:
- < 50ms for 0-90% of input value

Insulation Resistance:
- > 100Mohm between input / output / auxiliary

Isolation:
- 1.5kV rms 50Hz for 1 minute between input / output / auxiliary

Power Supply:
- TH-1M 24Vdc ±10%
- TW-3M 100-240Vac ±10%

Power Consumption:
- < 80mA at 24Vdc
- < 50mA at 100-240Vac

Operating Temperature:
- -5°C to 50°C

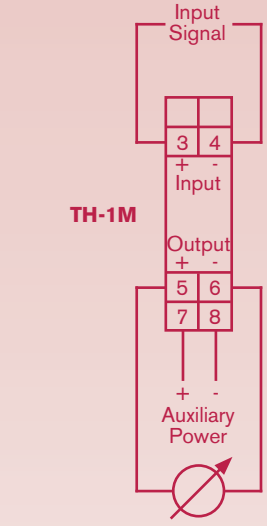
Operating Humidity:
- < 90% non-condensing

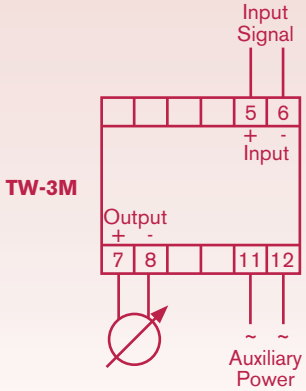
Mounting:
- 35mm DIN rail (DIN-EN 50022)

Weight:
- TH-1M 80g, TW-3M 130g

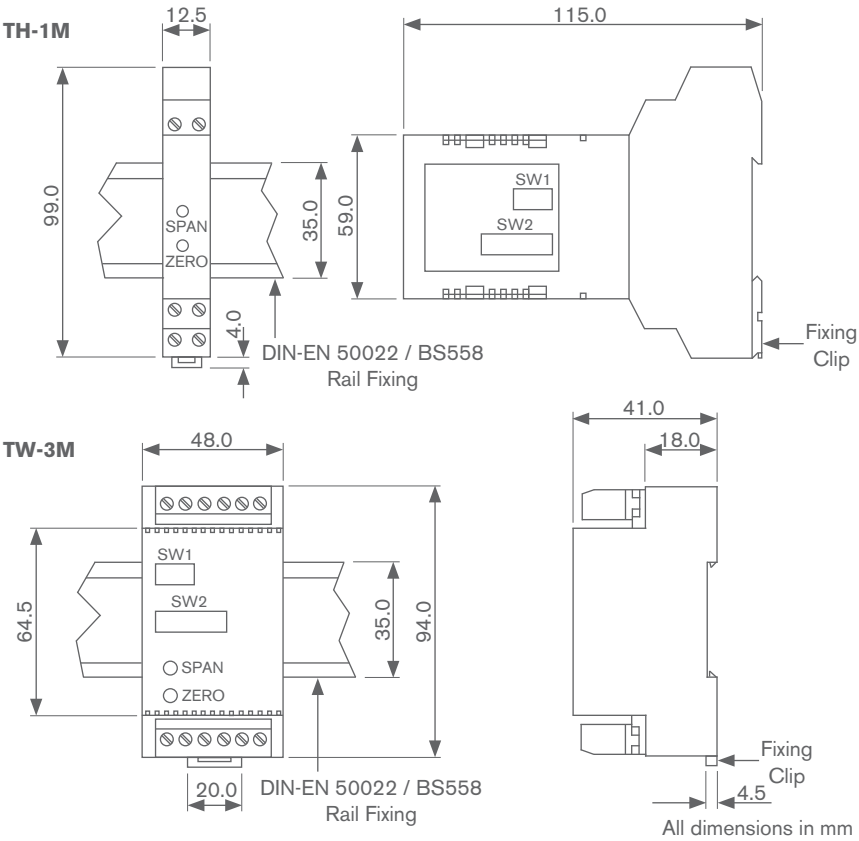
Markings:
- CE marked

Connections





Dimensions



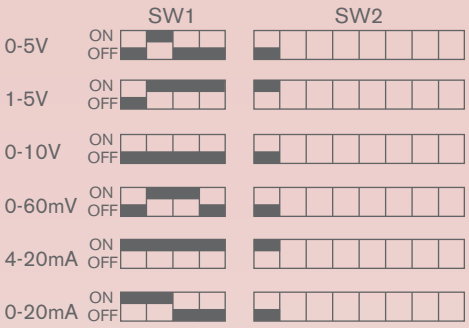
Ordering information

	Code	Description
	TH-1M	Slim Analogue Signal Conditioner - 24Vdc
	TW-3M	Analogue Signal Conditioner - 100-240Vac
Example	**TW-3M**	

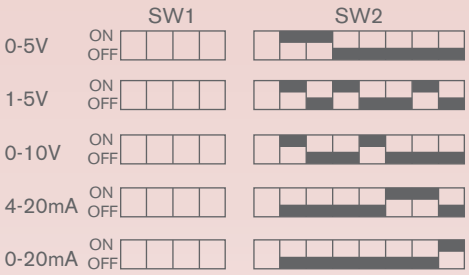
Note: Calibration can be factory set at a specific input and output if required (specify when ordering).

Range Settings

Input Range Setting



Output Range Setting



Resistance Values

Input	Input Resistance
0-5Vdc 1-5Vdc 0-10Vdc 0-60mV	More than 1Mohm
4-20mA 0-20mA	250 ohms

Output	Allowable Load Resistance
0-5Vdc 1-5Vdc	More than 2kohm
0-10Vdc	More than 4kohm
4-20mA 0-20mA	More than 550 ohms

Specification subject to change without notice.

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General Specification

Reference Standards

Performance: IEC 144 / BS 5420 / VDE/VDI 0435 / IEC 947 / EN60947

Environmental

Calibration Temperature: 23°C
Operating Temperature: 0°C to 60°C
Storage Temperature: -10°C to 70°C
Temperature Coefficient: ±0.03%/ °C
Relative Humidity: 0 - 95% non-condensing

Relay Output

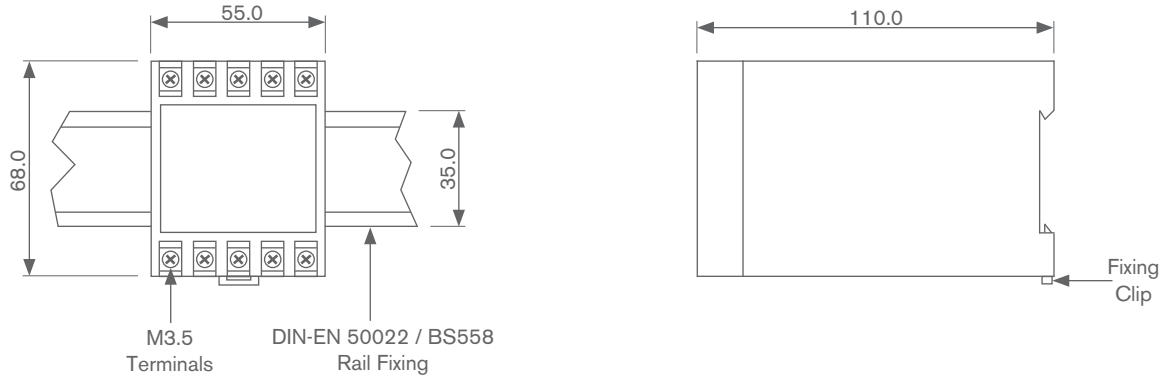
Relay Type: Single pole change-over
(Except CST-100 has single pole normally open or normally closed)
(Double pole change-over available on some models as as option)
Contact Rating: 5A @ 250Vac (non-resistive), 1A @ 125Vdc (resistive)
Contact Life: 1,000,000 at 5A, 10,000,000 at 1A
Mechanical Life: 2,000,000 operations
Dielectric Strength: 4kV coil/contact, 1kV contact/contact
Optional Time Delay: 0.3-10 sec, 1-30 sec, 2-60 sec, 3-100 sec or 10-300 sec (delay on fault or reset)
(Note if the voltage supply to the protection relay falls below 75% of the nominal the timer will fail to operate and the relay will trip instantaneously upon fault)

Enclosure

Enclosure: Flame retardant black ABS plastic with screw type terminals
Enclosure Code: Case IP50, terminals IP10 to IEC529 and BS5490
Insulation Test: 2kV rms 50Hz 1min (to IEC 414) between Input / Case / AC Auxiliary
Mounting: 35mm DIN rail (DIN-EN 50022)
Markings: CE marked

Specification subject to change without notice.

Dimensions



All dimensions in mm

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Phase Protection (Phase Failure)

Phase protection relays continuously monitor a three phase AC power supply, tripping upon fault condition. These relays protect against total loss of a phase (phase failure), incorrect phase sequence (rotation), symmetrical under voltage and asymmetrical under voltage. The A866PSI model also offers phase sequence and fault indication.

The internal relay remains energised and the LED illuminates only when the power supply is satisfactory for connection to the three phase equipment. The under voltage trip point on all three phases is fixed at 85% of the nominal voltage although an alternative trip point may be possible upon request. The relays are self powered, requiring no auxiliary power supply and are available with either a single or double pole changeover relay output and optional built-in time delay.

Models Available

B866/3W 3 Phase 3 Wire
B866/4W 3 Phase 4 Wire
A866PSI/3W 3 Phase 3 Wire with Phase Sequence Indication
A866PSI/4W 3 Phase 4 Wire with Phase Sequence Indication

Product Features

- Protects against:-
  Loss of phase
  Incorrect phase sequence (rotation)
  Phase reversal
  Symmetrical/asymmetrical under voltage
- LED indication
- Single or double pole output available
- Optional built-in time delay

For dimensions see page 87

For protection against phase failure, incorrect sequence and under voltage

Specification

Nominal Voltage, *Un*:
- 110, 230VL-N
- 380, 400, 415VL-L
- 60-500V upon request

Frequency:
- 50/60Hz (400Hz upon request)

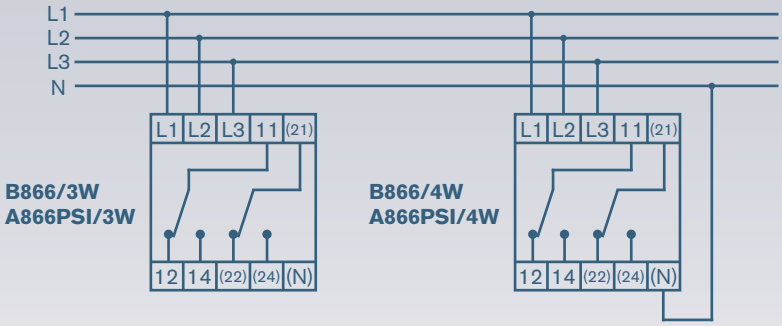
Overload:
- 1.5 x *Un* continuous
- 2 x *Un* for 5 seconds

Burden:
- B866/3W & B866/4W < 2VA
- A866PSI/3W & A866PSI/4W < 4VA

Operating Time:
- 100ms typically
- Built-in time delay (optional)

Weight:
- B866/3W & B866/4W 275g
- A866PSI/3W & A866PSI/4W 300g

Connections



Ordering information

Code	Relay Type	Nominal Voltage	Output
B866/3W	3 Phase 3 Wire	–	–
B866/4W	3 Phase 4 Wire	–	–
A866PSI/3W	3 Phase 3 Wire with Indication	–	–
A866PSI/4W	3 Phase 4 Wire with Indication	–	–
Specify	–	110, 230VL-N, 380, 400, 415VL-L	–
Specify	–	50 to 600V L-N/L-L	–
1C/O	–	1 Pole Changeover Relay Output	
2C/O	–	2 Pole Changeover Relay Output	
Time Delay (B866 only)	–	Time Delay on Reset - Specify Time Range	

(Note: order code begins TA866, not B866 when time delay is included)

Example	B866/3W	415VL-L	2C/O

Phase Balance Protection

Phase balance protection relays continuously monitor a three phase AC power supply, tripping upon fault condition. These relays protect against asymmetrical under or over voltage.

The internal relay remains energised and the LED illuminates only when the voltage balance between all three phases is within the user adjustable limit and hence satisfactory for connection to the three phase equipment.

The unbalance trip point is adjustable from 5% to 15% of the nominal voltage through the front control knob. The relay is self powered, requiring no auxiliary power supply and is available with either a single or double pole changeover relay output and built-in 5 second time delay.

Models Available

B921 3 Phase 3 Wire

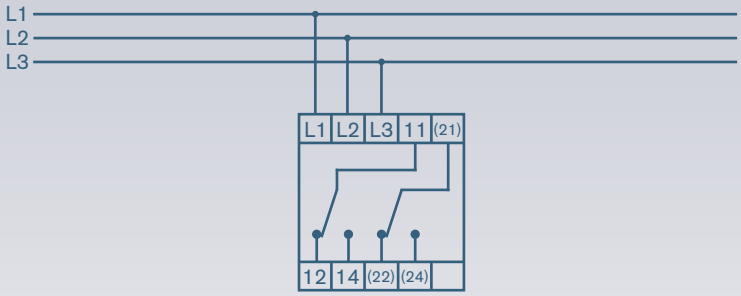
Product Features

- Protects against:-
  Asymmetrical under and over voltage
- LED indication
- Single or double pole output available
- 5 second fixed time delay

For dimensions see page 87

For protection against assymetrical under and over voltage

Connections



Ordering information

Code	Relay Type	Nominal Voltage	Output
B921	3 Phase 3 Wire	–	–
Specify	–	110, 380, 400, 415VL-L	–
Specify	–	50 to 600VL-L	–
1C/O	–		1 Pole Changeover Relay Output
2C/O	–		2 Pole Changeover Relay Output
Example	**B921**	**415VL-L**	**2C/O**

Specification

Nominal Voltage, *Un*:
- 380, 400, 415VL-L
- 60-500V upon request

Calibrated Scale:
- 5 to 15% (adjustable)

Frequency:
- 50/60Hz (400Hz upon request)

Overload:
- 1.5 x *Un* continuous
- 2 x *Un* for 5 seconds

Burden:
- < 2VA

Time Delay:
- 5 second fixed time delay

Weight:
- 275g

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AC Voltage Protection

Models Available

B853/1 Single Phase Over & Under
B853/2 Single Phase Over
B853/3 3 Phase 3 Wire Over & Under
B853/4 3 Phase 4 Wire Over & Under
B853/5 3 Phase 3 Wire Over
B853/6 3 Phase 4 Wire Over
B853/7 3 Phase 4 Wire Under
B853/8 3 Phase 3 Wire Under
B853/9 Single Phase Under
B853/10 3 Phase 4 Wire Under 320-400V
B853/11 3 Phase 3 WIre Under 320-400V

Product Features

- Protects for under and/or over voltage
- LED indication
- Single or double pole output available
- Optional built-in time delay

For dimensions see page 87

AC voltage protection relays continuously monitor single phase or three phase AC voltages, tripping upon fault condition.

The output relay trips when the monitored voltage is outside of the user adjustable limit and the LED illuminates indicating a fault condition. The trip point on all models (except the B853/10 and B853/11) is adjustable from 5% to 20% of the nominal voltage through the front control knob.

The output relay is set to de-energise in the under voltage condition ensuring the protection relays are failsafe. The relays are self powered, requiring no auxiliary power supply and are available with either a single or double pole changeover relay output and optional built-in time delay.

For AC voltage monitoring and protection against under and/or over voltage

Specification

Nominal Voltage, *Un*:
- 110, 230VL-N
- 380, 400, 415VL-L
- 60-500V upon request

Calibrated Scale:
- 5% to 20% (B853/1 to B853/9)
- 320 to 400V (B853/10 & B853/11)

Setting Accuracy:
- 1%

Repeatability:
- Better than 0.5% of nominal

Differential (Hysteresis):
- Fixed 2%

Frequency:
- 50/60Hz (400Hz upon request)

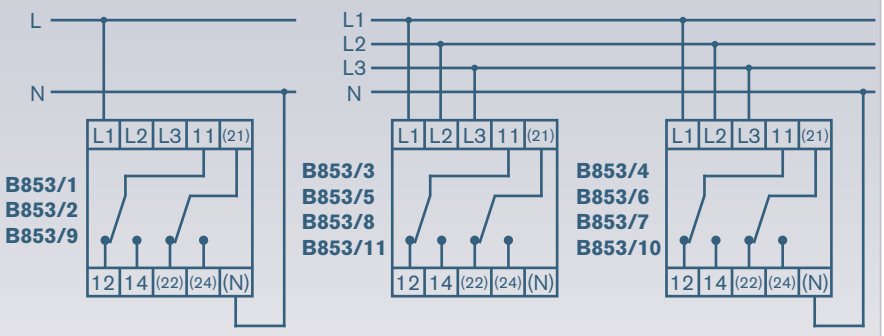
Overload:
- 1.5 x *Un* continuous
- 2 x *Un* for 5 seconds

Burden:
- < 2VA

Operating Time:
- 200ms typically
- Built-in time delay (optional)

Weight:
- 275g

Connections



Ordering information

Code	Relay Type	Nominal Voltage	Output
B853/1	Single Phase Over & Under	–	–
B853/2	Single Phase Over	–	–
B853/3	3 Phase 3 Wire Over & Under	–	–
B853/4	3 Phase 4 Wire Over & Under	–	–
B853/5	3 Phase 3 Wire Over	–	–
B853/6	3 Phase 4 Wire Over	–	–
B853/7	3 Phase 4 Wire Under	–	–
B853/8	3 Phase 3 Wire Under	–	–
B853/9	Single Phase Under	–	–
B853/10	3 Phase 4 Wire Under (320-400V)	–	–
B853/11	3 Phase 3 Wire Under (320-400V)	–	–
Specify		110, 230VL-N, 380, 400, 415VL-L or 50 to 600V L-N/L-L	
1C/O	–		1 Pole Changeover Relay Output
2C/O	–		2 Pole Changeover Relay Output
Time Delay	– Time Delay - Specify on Fault or Reset and Time Range		
(Note: order code begins TA853, not B853 when time delay is included)			
Example	**B853/8**	**380VL-L**	**2C/O**

AC Current Protection

AC current protection relays continuously monitor single phase or three phase AC currents either directly or through current transformers, tripping upon fault condition. The output relay trips when the monitored current is outside of the user adjustable limit and the LED illuminates indicating a fault condition.

The trip point on all models is adjustable from 20% to 120% of the nominal current through the front control knob. The output relay is set to de-energise in the under current condition ensuring the protection relays are failsafe.

The relays are auxiliary powered and are available with either a single or double pole changeover relay output and optional built-in time delay.

Models Available

B867-1A Single Phase Over Current
B867-1B Single Phase Under Current
B867-3A 3 Phase Over Current
B867-3B 3 Phase Under Current

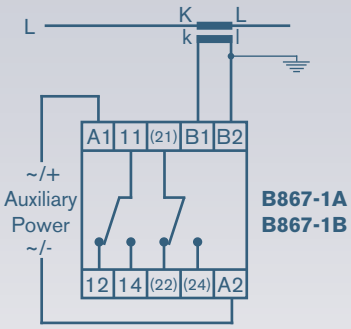
Product Features

- Protects for under or over current
- LED indication
- Single or double pole output available (Single phase model only)
- Optional built-in time delay

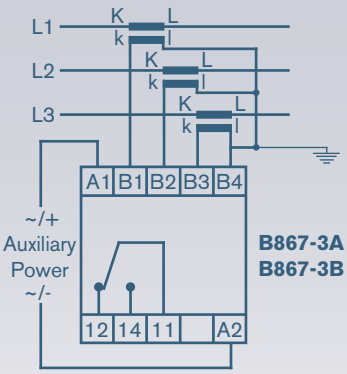
For dimensions see page 87

For AC current monitoring and protection against under or over current

Connections



B867-1A
B867-1B



B867-3A
B867-3B

Ordering information

Code	Relay Type	Nominal Current / Aux.	Output
B867-1A	Single Phase Over Current	–	–
B867-1B	Single Phase Under Current	–	–
B867-3A	Three Phase Over Current	–	–
B867-3B	Three Phase Under Current	–	–
Specify	–	1A or 5A from a CT	–
Specify	–	0.1A to 5A direct (B867-1 only)	–
Specify	–	110, 230, 380, 400 or 415Vac	–
Specify	–	24, 48Vac	–
Specify	–	10-60Vdc	–
1C/O	–	1 Pole Changeover Relay Output	
2C/O	–	2 Pole Changeover Relay Output	
Time Delay	– Time Delay - Specify on Fault or Reset and Time Range		
(Note: order code begins TA867, not B867 when time delay is included)			
Example	**B867-3A**	**5A, 230Vac**	**2C/O, 0.3-10 sec Delay on Fault**

Specification

Nominal Current, *In*:
- 1A or 5A from CT
- 0.1 to 5A direct (single phase model only)

Calibrated Scale:
- 20 to 120% (adjustable)

Frequency:
- 50/60Hz (400Hz upon request)

Overload:
- 2 x *In* continuous
- 10 x *In* for 3 seconds

Auxiliary Supply:
- 110, 230, 380, 400 or 415Vac (±15%)
- 24, 48Vac (±15%)
- 10-60Vdc (isolation 500V)

Burden:
- Current circuit < 0.5VA
- Auxiliary supply < 2VA

Operating Time:
- 100ms with a 200% over/under current
- 2.5 sec with a 2% over/under current
- Built-in time delay (optional)

Weight:
- 275g

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Frequency Protection

Frequency protection relays continuously monitor the frequency of AC supplies, tripping upon fault condition.

The output relay trips when the monitored frequency is outside of the user adjustable limit and the LED illuminates indicating a fault condition. The trip point on all models (except the B851C) is adjustable from 1Hz to 5Hz through the front control knob.

The output relay is set to de-energise in the under frequency condition ensuring the protection relays are failsafe. The relays are self powered, requiring no auxiliary power supply and are available with either a single or double pole changeover relay output and optional built-in time delay.

Models Available

B851 Over & Under Frequency
B851A Under Frequency
B851B Over Frequency
B851C Over Frequency 40-70Hz

Product Features

- Protects for under and/or over frequency
- LED indication
- Single or double pole output available
- Optional built-in time delay

For dimensions see page 87

For frequency monitoring and protection against under and/or over frequency

Specification

Nominal Frequency:
- 50, 60Hz (400Hz upon request)

Input Voltage, *Un*:
- 110, 230, 380, 400, 415VL-L (±15%)
- 60-500V upon request

Calibrated Scale:
- 1 to 5Hz (B851, B851A, B851B)
- 40 to 70Hz (B851C)

Setting Accuracy:
- 1%

Repeatability:
- Better than 0.5% of nominal

Differential (Hysteresis):
- Fixed 0.5Hz

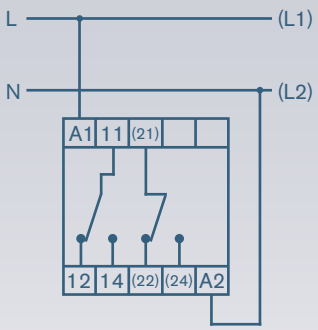
Overload:
- 1.5 x *Un* continuous
- 2 x *Un* for 5 seconds

Burden:
- < 2.5VA

Operating Time:
- 200ms typically
- Built-in time delay (optional)

Weight:
- 275g

Connections



Ordering information

Code	Relay Type	Nominal Freq. & Voltage	Output
B851	Over & Under Frequency	–	–
B851A	Under Frequency	–	–
B851B	Over Frequency	–	–
B851C	Over Frequency 40-70Hz	–	–
Specify	–	50, 60, 400Hz (N/A for B851C)	–
Specify	–	110, 230, 380, 400, 415Vac	–
Specify	–	50 to 600Vac	–
1C/O	–	1 Pole Changeover Relay Output	
2C/O	–	2 Pole Changeover Relay Output	
Time Delay	– Time Delay - Specify on Fault or Reset and Time Range		
(Note: order code begins TA851, not B851 when time delay is included)			
Example	**B851**	**50Hz, 230Vac**	**2C/O**

3 Phase Current Balance Protection

A three phase current balance protection relay continuously monitors a three phase AC current through current transformers, tripping upon an unbalanced load condition. The output relay trips when the monitored current is outside of the user adjustable limit and the LED ceases to illuminate indicating a fault condition.

The trip point is adjustable from 3% to 20% of the nominal current through the front control knob. The relay also has a built-in time delay, adjustable from 0.1 to 10 seconds, used to avoid nuisance tripping.

The output relay is set to de-energise in the unbalanced condition ensuring the protection relay is failsafe. The relay is auxiliary powered and is available with either a normally open or normally closed relay output.

Models Available

CST-100 Three Phase Current Balance

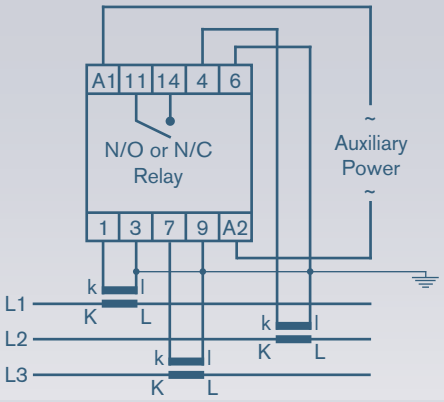
Product Features

- Protects against:-
  Unbalance in three phase loads
- LED indication
- Adjustable 0.1-10 second delay

For dimensions see page 87

For 3 phase current monitoring and protection against unbalanced loads

Connections



Ordering information

Code	Relay Type	Nominal Current / Aux.	Output
CST-100	Three Phase Current Balance	–	–
Specify	–	1A or 5A from a CT	–
Specify	–	110, 230, 380, 400 or 415Vac	–
Specify	–	24, 48Vac	–
N/O	–	Normally Open Relay Output	
N/C	–	Normally Closed Relay Output	
Example	**CST-100**	**5A, 230Vac**	**N/O**

Specification

Input Current, *In*:
- 1A or 5A from CT

Calibrated Scale:
- 3 to 20% (adjustable)

Time Delay:
- 0.1 to 10 seconds (adjustable)

Frequency:
- 50/60Hz (400Hz upon request)

Overload:
- 2 x *In* continuous
- 10 x *In* for 3 seconds

Auxiliary Supply:
- 110, 230, 380, 400 or 415Vac (±15%)
- 24, 48Vac (±15%)

Burden:
- Current circuit < 0.5VA
  Auxiliary supply < 2VA

Low Current Lockout:
- Non-operational below 0.2A

Weight:
- 300g

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DC Current or Voltage Protection

Models Available

B846-A DC Over Current
B846-B DC Under Current
F187/U DC Under Voltage
F187/O DC Over Voltage

Product Features

- Protects for:-
  Under or over DC Current or
  Under or over DC voltage
- LED indication
- Single or double pole output available (DC current relay only)
- Optional built-in time delay

For dimensions see page 87

DC current protection relays continuously monitor DC currents (either directly or through a current shunt) and DC voltage protection relays continuously monitor DC voltages, tripping upon fault conditions. The output relay trips when the monitored current or voltage is outside of the user adjustable limit and the LED illuminates indicating a fault condition.

The trip point on the current model is adjustable from 20% to 120% and the voltage model 70% to 130% of the nominal rating through the front control knob. The output relay is set to de-energise in the under condition ensuring the protection relays are failsafe. The voltage relay is self powered while the current relay requires an auxiliary power supply. The current protection relays are available with either a single or double pole changeover relay output and optional built-in time delay.

For monitoring and protection against under or over DC current or voltage

Specification

B846 Nominal Current, *In*:
- 50, 60 or 75mV from DC current shunt
- 0-20mA to 0-5A direct

F187 Nominal Voltage, *Un*:
- 12, 24, 48 or 110Vdc

Calibrated Scale:
- 20% to 120% (B846)
- 70% to 130% (F187)

Setting Accuracy:
- >5%

Repeatability:
- Better than 0.5% of nominal

Differential (Hysteresis):
- Fixed 5% (B846)
- Specify >0.1*Un* (F187)

Overload:
- 2 x *In,* 1.5 x *Un* continuous
- 10 x *In,* 2 x *Un* for 5 seconds

B846 Auxiliary Supply:
- 110, 230, 380, 400 or 415Vac (±15%)
- 24, 48Vac (±15%)
- 10-60Vdc (isolation 500V)

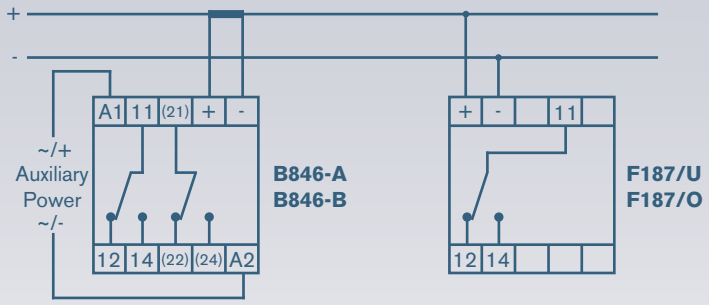
Burden:
- <0.5VA (B846), <0.6VA at *Un* (F187)

Impedance:
- 10kohm/volt (F187)

Operating Time:
- 200ms typically
- Built-in time delay (optional B846 only)

Weight:
- F187 175g, B846 275g

Connections



Ordering information

Code	Relay Type	Nominal Input / Aux.	Output
B846-A	DC Over Current	–	–
B846-B	DC Under Current	–	–
F187/U	DC Under Voltage	–	–
F187/O	DC Over Voltage	–	–
Specify (B846)	–	0-100mA to 0-5A direct	–
Specify (B846)	–	50, 60, 75mV from DC shunt	–
Specify (F187)	–	12, 24, 48Vdc (specify differential)	–
Specify (B846)	–	110, 230, 380, 400 or 415Vac	–
Specify (B846)	–	24, 48Vac	–
Specify (B846)	–	10-60Vdc	–
1C/O (B846)	–	1 Pole Changeover Relay Output	
2C/O (B846)	–	2 Pole Changeover Relay Output	
Time Delay (B846)	– Time Delay - Specify on Fault or Reset and Time Range		
(Note: order code begins TA846 not B846 when time delay is included)			
Examples	**B846-A**	**5Adc / 110Vac**	**2C/O**
	F187/U	**12Vdc**	**(1Vdc differential)**

Reverse Power Protection

Reverse power protection relays protect parallel operated generators against reverse current flows, tripping upon fault condition. The output relay trips when the monitored reverse current exceeds the user adjustable limit and the reverse power LED illuminates indicating a fault condition.

The trip point is adjustable from 2% to 20% of the nominal current through the front control knob. The relay also has a built-in time delay, adjustable from 0.2 to 20 seconds, used to avoid nuisance tripping.

The output relay is set to energise in reverse power conditions but can be supplied to de-energise if required. The relays are self powered, requiring no auxiliary power supply and LED's indicate forward and reverse power conditions.

Models Available

B871/1 Single Phase / 3 Phase 4 Wire
B871/3 3 Phase 3 Wire

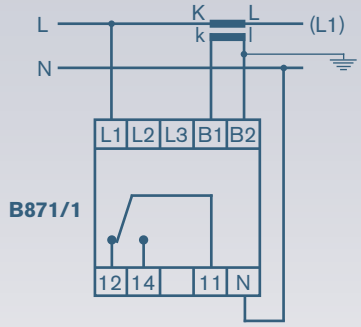
Product Features

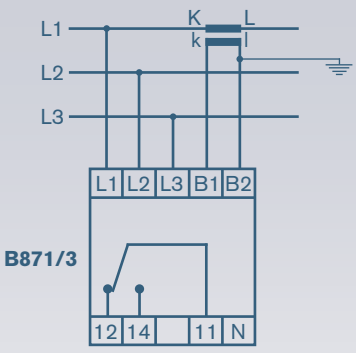
- Protects against reverse power (from generators)
- LED indication

For dimensions see page 87

For protection against reverse current flows from parallel operated generators

Connections





Ordering information

Code	Relay Type	Nominal Current	Voltage
B871/1	Single Phase / 3 Phase 4 Wire Reverse Power	–	–
B871/3	3 Phase 3 Wire Reverse Power	–	–
Specify	–	1A or 5A from a CT	–
Specify	–		110 or 230VL-N (B871/1)
Specify	–		110, 380, 400 or 415VL-L (B871/3)
Example	**B871/1**	**5A**	**110Vac**

Specification

Nominal Current, *In*:
- 1A or 5A from CT

Nominal Voltage, *Un*:
- 110, 230VL-N (B871/1)
- 110, 380, 400 or 415VL-L (B871/3)

Calibrated Scale:
- 2 to 20% reverse current (adjustable)

Time Delay:
- 0.2 to 20 seconds (adjustable)

Repeatability:
- Better than 0.5% of nominal

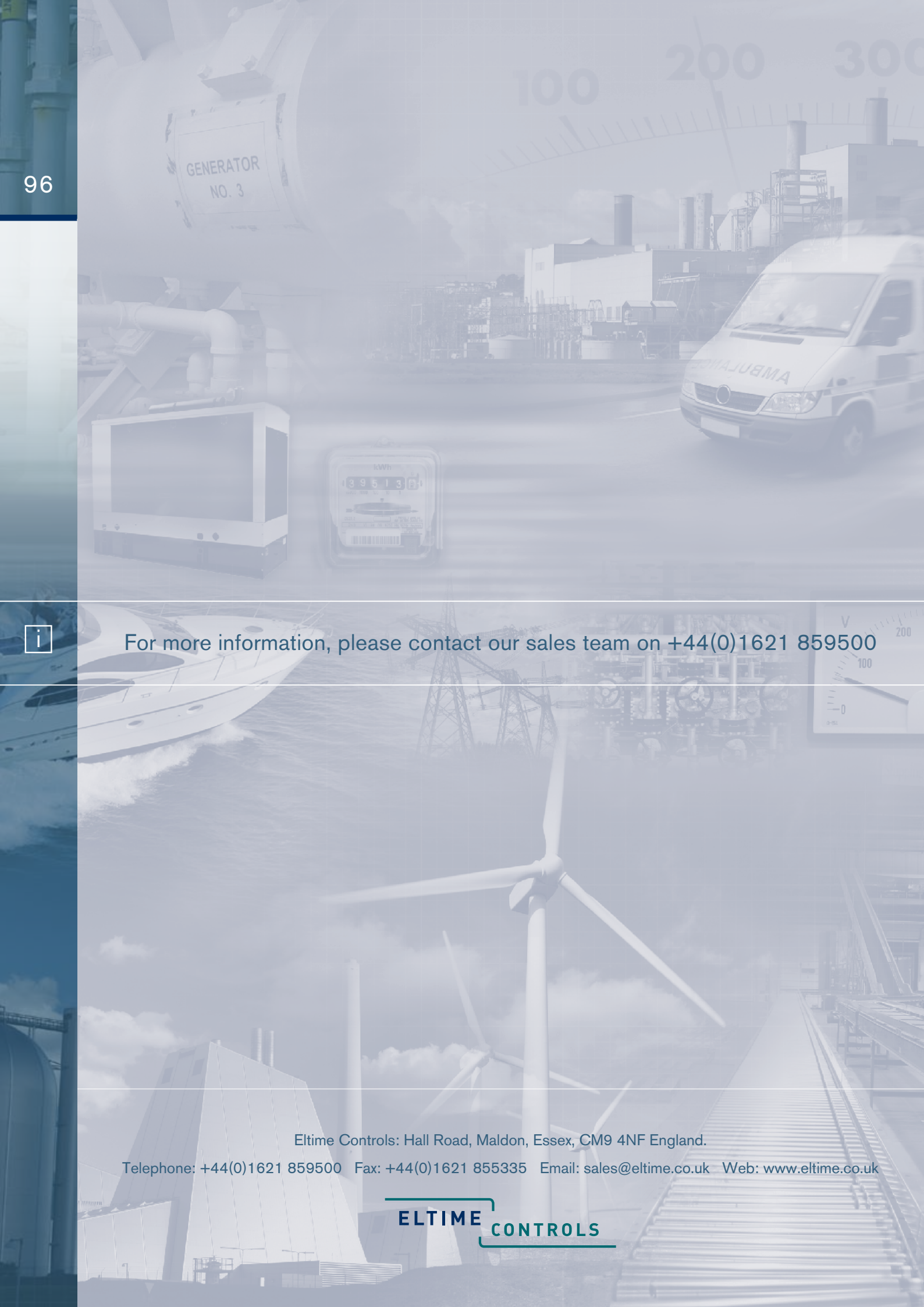
Differential (Hysteresis):
- Fixed 1%

Frequency:
- 50/60Hz (400Hz upon request)

Overload:
- 2 x *In* continuous
- 10 x *In* for 3 seconds

Burden:
- Current circuit < 0.5VA
- Voltage circuit < 2VA

Weight:
- 300g



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ELTIME CONTROLS

Product Catalogue

Earth Leakage Relays

Global Suppliers of Measurement and Protection Equipment for Industry

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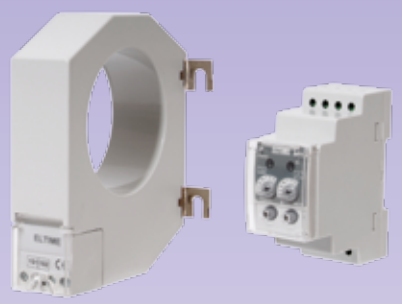

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Earth Leakage Relays

Models Available

RN-0.03 Fixed Instantaneous 30mA trip point
RN-0.3 Fixed Instantaneous 300mA trip point
RN-R Selectable 30mA to 5A trip point and 20ms to 5 second delay

Core Balance Transformers

WN35 35mm hole
WN70 70mm hole
WN105 105mm hole
WN140 140mm hole
WN210 210mm hole

Product Features

- 3 phase earth leakage protection
- 30mA to 5A trip current
- Instantaneous or up to 5 second delay
- Test and reset functions
- DIN rail mounting enclosure

Earth leakage relays monitor the leakage of current to earth on 3 phase electrical systems. The earth leakage relay is used in conjunction with a core balance transformer which are available in five different sizes to cover all sizes of three phase installations.

The relays are available with either a fixed 30mA or 300mA instantaneous trip point or with a user adjustable trip point and time delay both adjustable through rotary switches on the front of the relay. The relays are available auxiliary powered from either 110Vac or 230Vac.

All relays have reset and test functions and two LED's to indicate both power and trip status. The relays are DIN rail mounting and the RN-R has a clear front cover enabling a tamper-proof seal to be fitted if required.

For protection against the leakage of current to earth in 3 phase systems

Specification (Relay)

Trip Point, *In*:
- 30mA (RN-0.03), 300mA (RN-0.3)
- 30mA to 5A (RN-R) - see table
- Reset value < 50%*In*

Accuracy:
- < 2%

Time Delay:
- RN-0.03 & RN-0.3 Instant (<40ms)
- RN-R 0.02 to 5 seconds - see table

LED Indication:
- Green: 'On', Red: 'Trip'

Test Circuit:
- Manual push button

Relay Output:
- Single pole changeover contact
- 5A at 250Vac (cosØ=1) or 30Vdc
- 3A at 250Vac (cosØ=0.4)

Isolation:
- 2.5kV rms 50Hz for 1 minute between input / output / auxiliary

Power Supply:
- 110 or 230Vac ±10% (4VA)

Operating Temperature:
- -5°C to 50°C

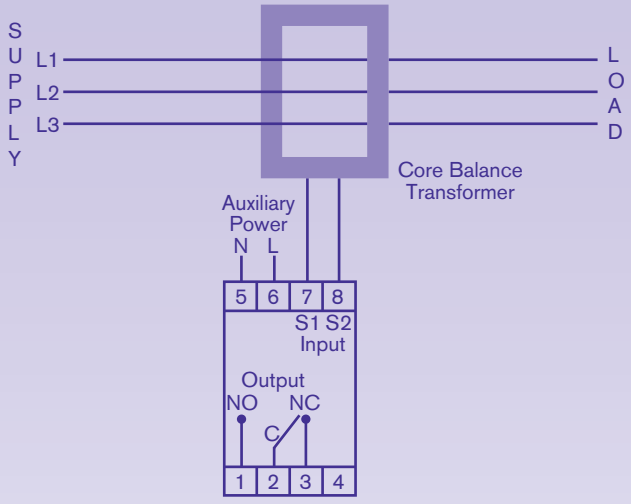
Enclosure:
- Mount: 35mm DIN rail (DIN-EN 50022)
- Screw type terminals (4mm² entry)

Weight:
- 200g

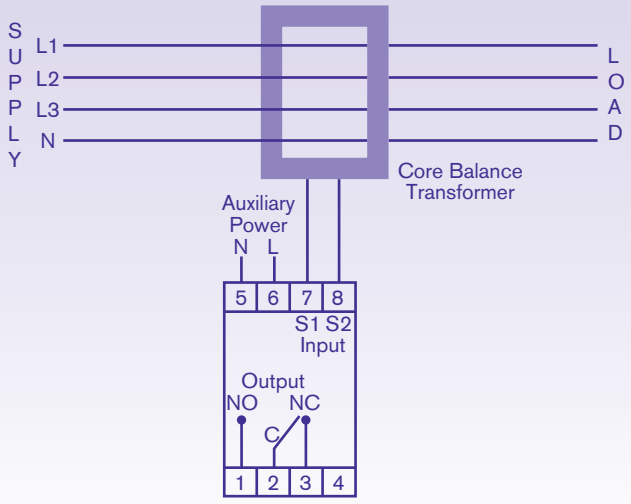
Markings:
- CE marked

Connections

3 Phase 3 Wire

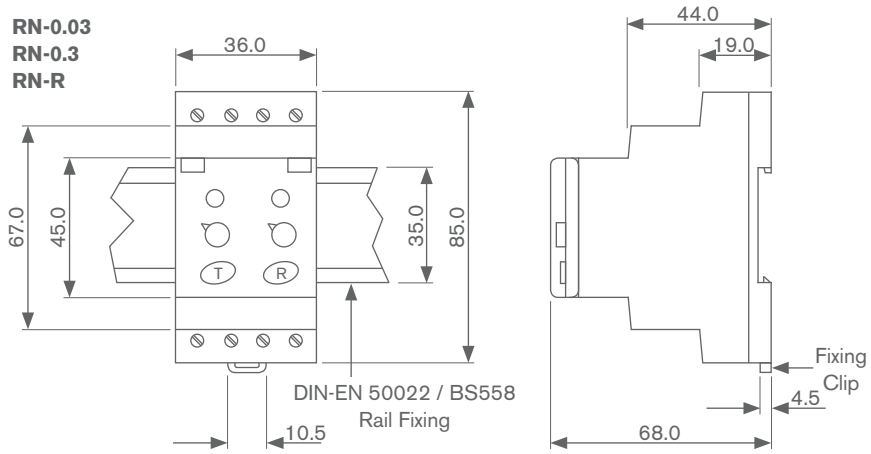


3 Phase 4 Wire

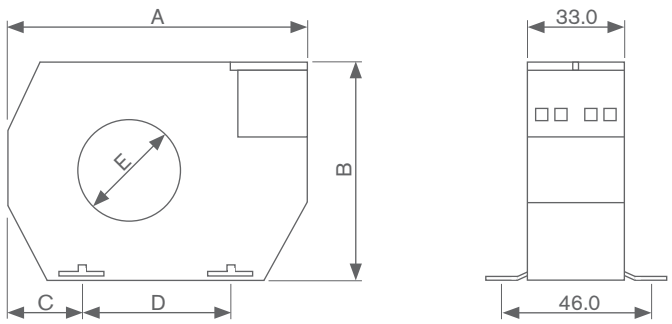


Dimensions

RN-0.03
RN-0.3
RN-R



WN35
WN70
WN105
WN140
WN210



	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	Weight (grams)
WN35	100	79	26	48.5	35	150
WN70	130	110	32	66	70	240
WN105	170	146	38	94	105	500
WN140	220	196	48.5	123	140	1200
WN210	299	284	69	161	210	2500

All dimensions in mm

Ordering information

Code	Relay	Auxiliary	Core Bal Trans.
RN-0.03	30mA Trip, Instantaneous	–	–
RN-0.3	300mA Trip, Instantaneous	–	–
RN-R	30mA to 5A Trip, 0.02 to 5 second Delay		–
110V	–	110Vac	–
230V	–	230Vac	–
WN35	–	–	35mm Internal Hole
WN70	–	–	70mm Internal Hole
WN105	–	–	105mm Internal Hole
WN140	–	–	140mm Internal Hole
WN210	–	–	210mm Internal Hole
Example	**RN-R**	**110Vac**	**WN105**

RN-R Switch Settings

Trip Point, In (Amps)	Time Delay (seconds)
0.03 (30mA)	0.02 (20ms)
0.1 (100mA)	0.1 (100ms)
0.3 (300mA)	0.3 (300ms)
0.5 (500mA)	0.5 (500ms)
1	1
3	3
5	5

LED Indication

Power LED	Trip LED	Indication
On	Off	System OK
Blinking	On	Transformer continuity failure
On	On	Relay tripped - earth fault
On	Blinking every 2 sec	Current 25-50% of trip level (RN-R only)
On	Blinking every 1 sec	Current 50-75% of trip level (RN-R only)
On	Blinking every 0.5 sec	Current 75-100% of trip level (RN-R only)

Specification (Core Balance Trans.)

Maximum Operating Voltage:
- 720Vac

Test Voltage:
- 3kV rms 50Hz for 1 minute

Calibration Temperature:
- 20°C ± 5°C

Operating Temperature:
- -5 to 50°C

Weight:
- See table

Markings:
- CE marked

Specification subject to change without notice.

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ELTIME CONTROLS

Product Catalogue

Electronic Timers

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TM977 Timers

Models Available

TM977E Delay on Energise Timer
TM977A Delay on De-energise Timer
TM977N Interval Timer
TM977C Cyclic Symmetrical Timer
TM977B Flasher Timer
TM977M Multifunction Timer

Product Features

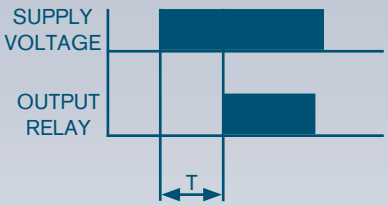
- Slimline - only 22.5mm wide
- Single function or multifunction
- Time ranges from 1 second to 10 hours
- Supply voltages from 12Vdc to 415Vac
- DIN rail mounting enclosure
- Fingerproof screw type terminals

Electronic timers are used to control operation of equipment, machinery, systems or processes in a wide range of industrial applications. The timers offer many different timing functions together with accurate, long term switching reliability and high current (8 Amp) switching contacts.

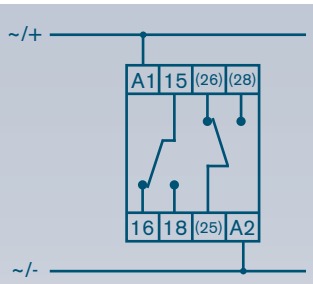
The TM977 timers are housed in a compact DIN rail mounting enclosure and are auxiliary powered from a large choice of AC or DC auxiliary power options. Time ranges from 1 second to 10 hours are available, adjustable through the calibrated front control knob.

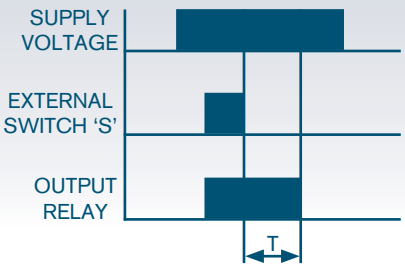
The single or double pole changeover relay output contacts are isolated from the supply voltage and all timers have two LED's to indicate both power and relay status.

For timing control of machinery, systems and operational processes

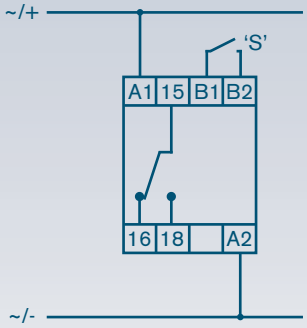


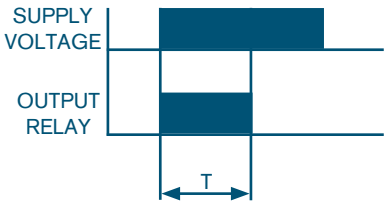
TM977E (Delay on Energise)
The time period starts when the supply voltage is applied. At the end of the time period, the changeover relay energises and remains energised until the supply voltage is removed.



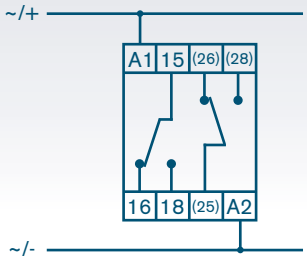


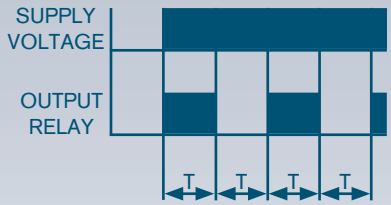
TM977A (Delay on De-energise)
With the supply voltage applied, closing the external switch 'S' energises the changeover relay. When the switch opens, the time period starts and the relay de-energises at the end of the time period. Closing switch 'S' at any point resets the timer.





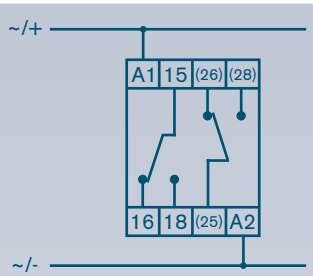
TM977N (Interval)
The changeover relay energises when the supply voltage is applied. At the end of the time period the relay de-energises.

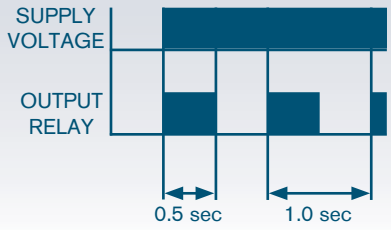




TM977C (Cyclic Symmetrical)

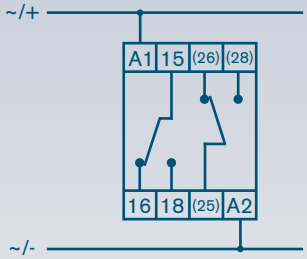
With the supply voltage applied the changeover relay energises for the time period then de-energises for the same time period, repeating indefinitely until the supply voltage is removed.

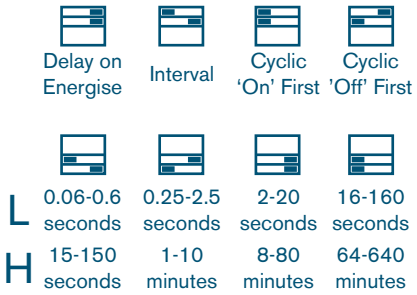




TM977B (Flasher)

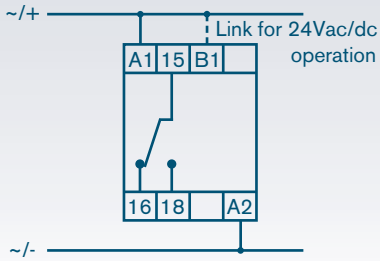
With the supply voltage applied the changeover relay will cycle indefinitely 60 times per minute. The flasher timer is ideal for alarm circuits and other control functions.





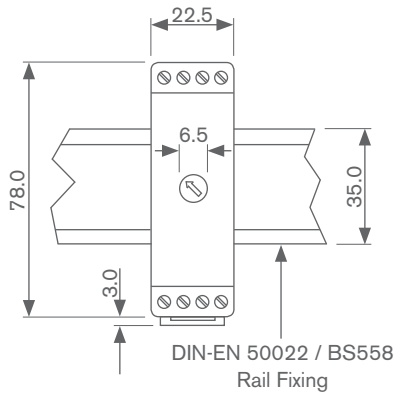
TM977M (Multifunction)

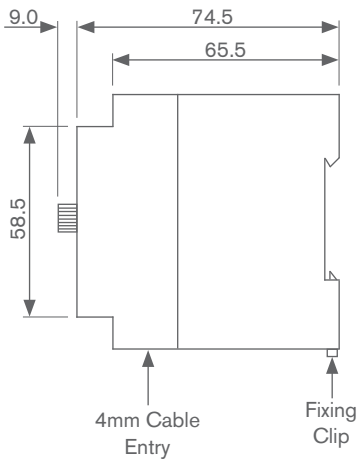
Selectable through four DIP switches on the front of the timer are the energise, interval, 'cyclic on' and 'cyclic off' functions and four **L**ow (TM977ML) or four **H**igh (TM977MH) time ranges. The timer can operate from 24Vac/dc or 110/230Vac.



For 110/230Vac operation use A1 and A2 **(Do not link A1-B1)**

Dimensions





All dimensions in mm

Specification

Repeat Accuracy:
- ±0.5% at constant ambient
- ±3% to temperature spec. VDE 0435
- Setting accuracy ±15%

Power Supply Voltages:
- 24Vac/dc, 110Vac, 230Vac (±15%)
- 12Vdc, 415Vac (±15%)

Burden:
- < 2VA

Frequency:
- 50/60Hz

Relay Output:
- 1 or 2 pole changeover contact(s)

Contact Rating:
- 8A at 250Vac/30Vdc

Contact Life:
- 1,000,000 operations at 5A
- 10,000,000 operations at 1A

Reset Time:
- 100ms approximately

Operating Temperature:
- -20°C to 60°C

Enclosure:
- 22.5mm wide grey ABS
- Mount: 35mm DIN rail (DIN-EN 50022)

Enclosure Code:
- Case IP50, terminals IP10

Vibration Resistance:
- To VDE 0160

Weight:
- 100g

Markings:
- CE marked

Specification subject to change without notice.

Ordering information

Model	Code	Description
	TM977E	Delay on Energise Timer
	TM977A	Delay on De-energise Timer
	TM977N	Interval Timer
	TM977C	Cyclic Symmetrical Timer
	TM977B	Flasher Timer
	TM977M	Multifunction Timer

TIme Range	Code	Description
	0.03-1 sec	0.03 to 1 second
	0.1-3 sec	0.1 to 3 seconds
	0.3-10 sec	0.3 to 10 seconds
	1-30 sec	1 to 30 seconds
	2-60 sec	2 to 60 seconds
	3-100 sec	3 to 100 seconds
	10-300 sec	10 to 300 seconds
	20-600 sec	20 to 600 seconds
	1-30 min	1 to 30 minutes
	2-60 min	2 to 60 minutes
	0.1-3 hours	0.1 to 3 hours
	0.3-10 hours	0.3 to 10 hours
	L	TM977ML only (see description)
	H	TM977MH only (see description)

Auxiliary Power	Code	Description
	12V	12Vdc
	24V	24Vac/dc
	110V	110Vac
	230V	230Vac
	415V	415Vac
	Other	Specify (subject to technical viability)

Output / Options	Code	Description
	1C/O	1 Pole Changeover Relay Output
	2C/O	2 Pole Changeover Relay Output
	Preset	Factory Preset Fixed Time Range (specify)

Example	TM977E - 1-30 sec - 110V - 2C/O

Options

Timer Relay Output

All timers are supplied with a single pole changeover relay output however a two pole changeover relay output is available as an option (not available on the TM977A, TM977ML or TM977MH). The TM977A timer is available with a two pole normally open relay output.

Fixed Time Range

Timers can be supplied with a factory preset time range fixed during manufacture and a blanking plug fitted replacing the front control knob.

TB822 Timers

Electronic timers are used to control operation of equipment, machinery, systems or processes in a wide range of industrial applications. The timers offer many different timing functions together with accurate, long term switching reliability and high current (10 Amp) switching contacts.

The TB822 timers are housed in a DIN rail mounting enclosure and are auxiliary powered from a large choice of AC or DC auxiliary power options. Time ranges from 1 second to 10 hours are available, adjustable through the calibrated front control knob.

The single or double pole changeover relay output contacts are isolated from the supply voltage and all timers have an LED to indicate relay status.

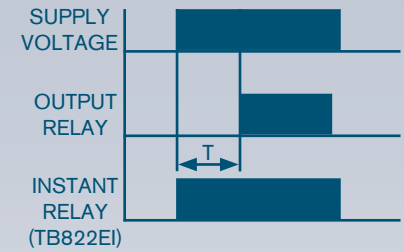
Models Available

TB822E Delay on Energise Timer
TB822EI Delay on Energise Timer with Instant Contact
TB822A Delay on De-energise Timer
TB822N Interval Timer
TB822C Cyclic Symmetrical Timer
TB822CA Cyclic Asymmetrical Timer
TB822B Flasher Timer
TB822AH Delay after Supply Off Timer
TB822S Star/Delta Timer
TB822MA Multi-attempt Start Timer

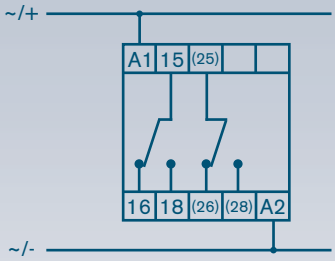
Product Features

- Time ranges from 1 second to 10 hours
- Supply voltages from 12Vdc to 415Vac
- DIN rail mounting enclosure
- Screw type terminals

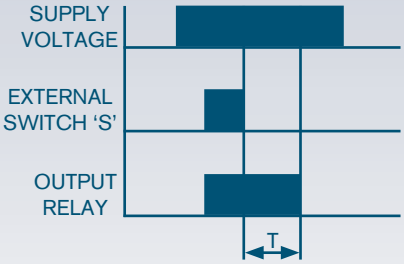
For timing control of machinery, systems and operational processes



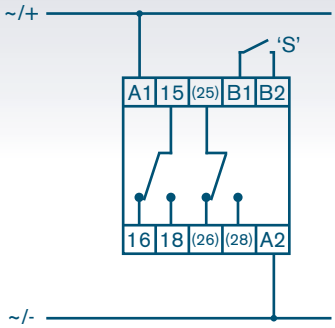
TB822E (Delay on Energise)
TB822EI (with Instant Contact)
The time period starts when the supply voltage is applied. At the end of the time period, the changeover relay energises and remains energised until the supply voltage is removed. The TB822EI has an additional relay which energises when the supply is applied.

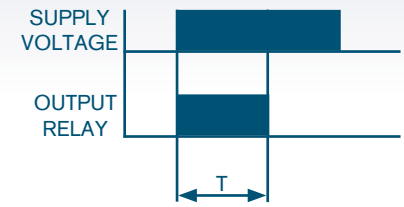


TB822EI 25, 26, 28: INSTANT CONTACT

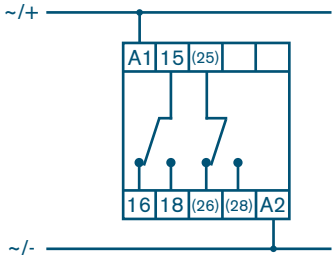


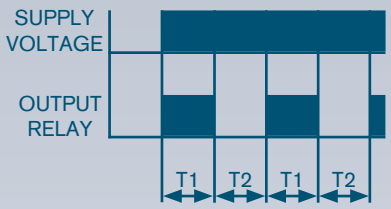
TB822A (Delay on De-energise)
With the supply voltage applied, closing the external switch 'S' energises the changeover relay. When the switch opens, the time period starts and the relay de-energises at the end of the time period. Closing switch 'S' at any point resets the timer.





TB822N (Interval)
The changeover relay energises when the supply voltage is applied. At the end of the time period the relay de-energises.

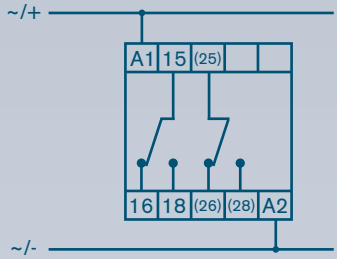


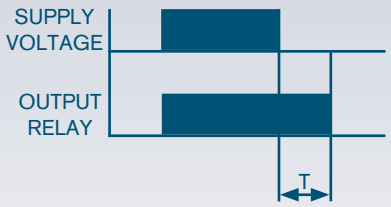


TB822C T1=T2
TB822CA T1=T2
TB822B T1=T2=0.5 sec

TB822C (Cyclic Symmetrical)
TB822CA (Cyclic Asymmetrical)
TB822B (Flasher)

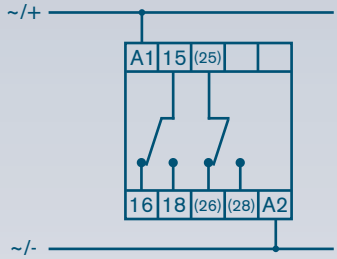
With the supply voltage applied the changeover relay energises for the on time period (T1) then de-energises for the off time period (T2), repeating indefinitely until the supply voltage is removed.

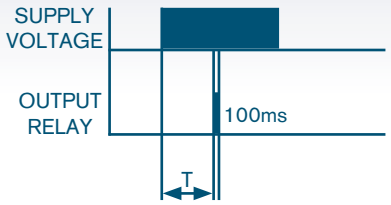




TM977AH (Delay After Supply Off)

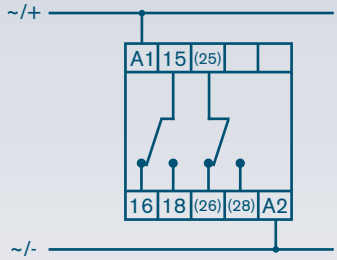
With the supply voltage applied, the changeover relay energises. When the supply voltage is removed the time period starts and the relay remains energised. The relay then de-energises at the end of the time period.

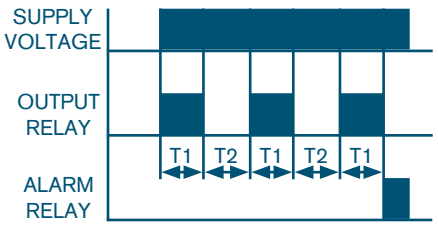




TB822S (Star/Delta)

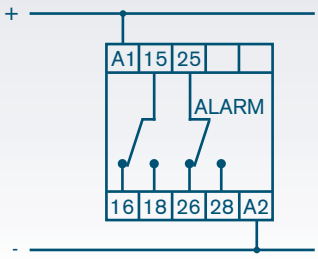
With the supply voltage applied, the adjustable 1-30 second time period starts. At the end of the time period the changeover relay energises for 100ms before de-energising.



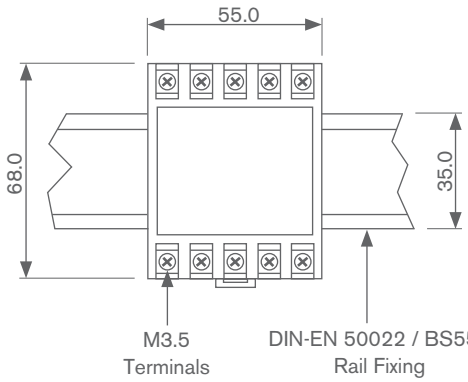


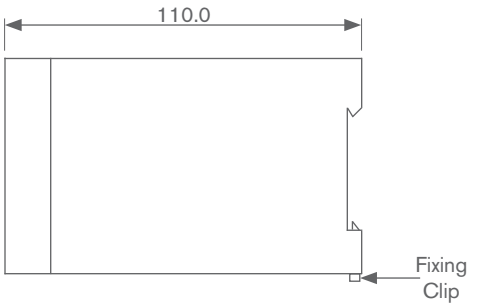
TB822MA (Multi-attempt Start)

With the supply voltage applied the changeover relay energises for the on time period T1 (2-60sec) then de-energises for the off time period T2 (2-60sec), repeating 3 times or until the equipment starts and hence the supply voltage is removed. Available in 12Vdc or 24Vdc only.



Dimensions





All dimensions in mm

Ordering information

Model	Code	Description
	TB822E	Delay on Energise Timer
	TB822EI	Delay on Energise Timer with Instant Contact
	TB822A	Delay on De-energise Timer
	TB822N	Interval Timer
	TB822C	Cyclic Symmetrical Timer
	TB822CA	Cyclic Asymmetrical Timer
	TB822B	Flasher Timer
	TB822AH	Delay after Supply Off Timer
	TB822S	Star/Delta Timer
	TB822MA	Multi-attempt Start Timer

TIme Range	Code	Description
	0.03-1 sec	0.03 to 1 second
	0.1-3 sec	0.1 to 3 seconds
	0.3-10 sec	0.3 to 10 seconds
	1-30 sec	1 to 30 seconds
	2-60 sec	2 to 60 seconds
	3-100 sec	3 to 100 seconds
	10-300 sec	10 to 300 seconds
	20-600 sec	20 to 600 seconds
	1-30 min	1 to 30 minutes
	2-60 min	2 to 60 minutes
	0.1-3 hours	0.1 to 3 hours
	0.3-10 hours	0.3 to 10 hours (N/A TB822AH)
	N/A	TB822S and TB822MA

Auxiliary Power	Code	Description
	12V	12Vdc
	24V	24Vac/dc
	110V	110Vac
	230V	230Vac
	415V	415Vac
	Other	Specify (subject to technical viability)

Output / Options	Code	Description
	1C/O	1 Pole Change-over Relay Output
	2C/O	2 Pole Change-over Relay Output
	Preset	Factory Preset Fixed Time Range (specify)

Example	TB822A - 1-30 min - 230V - 2C/O

Options

Timer Relay Output

All timers are supplied with a single pole changeover relay output however a two pole changeover relay output is available as an option (not available on the TB822EI and TB822MA).

Terminal Cover

Available for all TB822 timers is the PC55-10 plastic terminal cover to finger-proof the terminals.

Fixed Time Range

Timers can be supplied with a factory preset time range fixed during manufacture and a blanking plug fitted replacing the front control knob.

Specification

Repeat Accuracy:
- ±0.5% at constant ambient
- ±3% to temperature spec. VDE 0435
- Setting accuracy ±15%

Power Supply Voltage:
- 24Vac/dc, 110Vac, 230Vac (±15%)
- 12Vdc, 415Vac (±15%)

Burden:
- < 2VA

Frequency:
- 50/60Hz

Relay Output:
- 1 or 2 pole changeover contact(s)

Contact Rating:
- 1 Pole: 10A at 250Vac/30Vdc
- 2 Pole: 5A at 250Vac/30Vdc

Contact Life:
- 1,000,000 operations at 5A
- 10,000,000 operations at 1A

Reset Time:
- 100ms approximately

Operating Temperature:
- 0°C to 60°C

Enclosure:
- 55mm wide black ABS
- Mount: 35mm DIN rail (DIN-EN 50022)

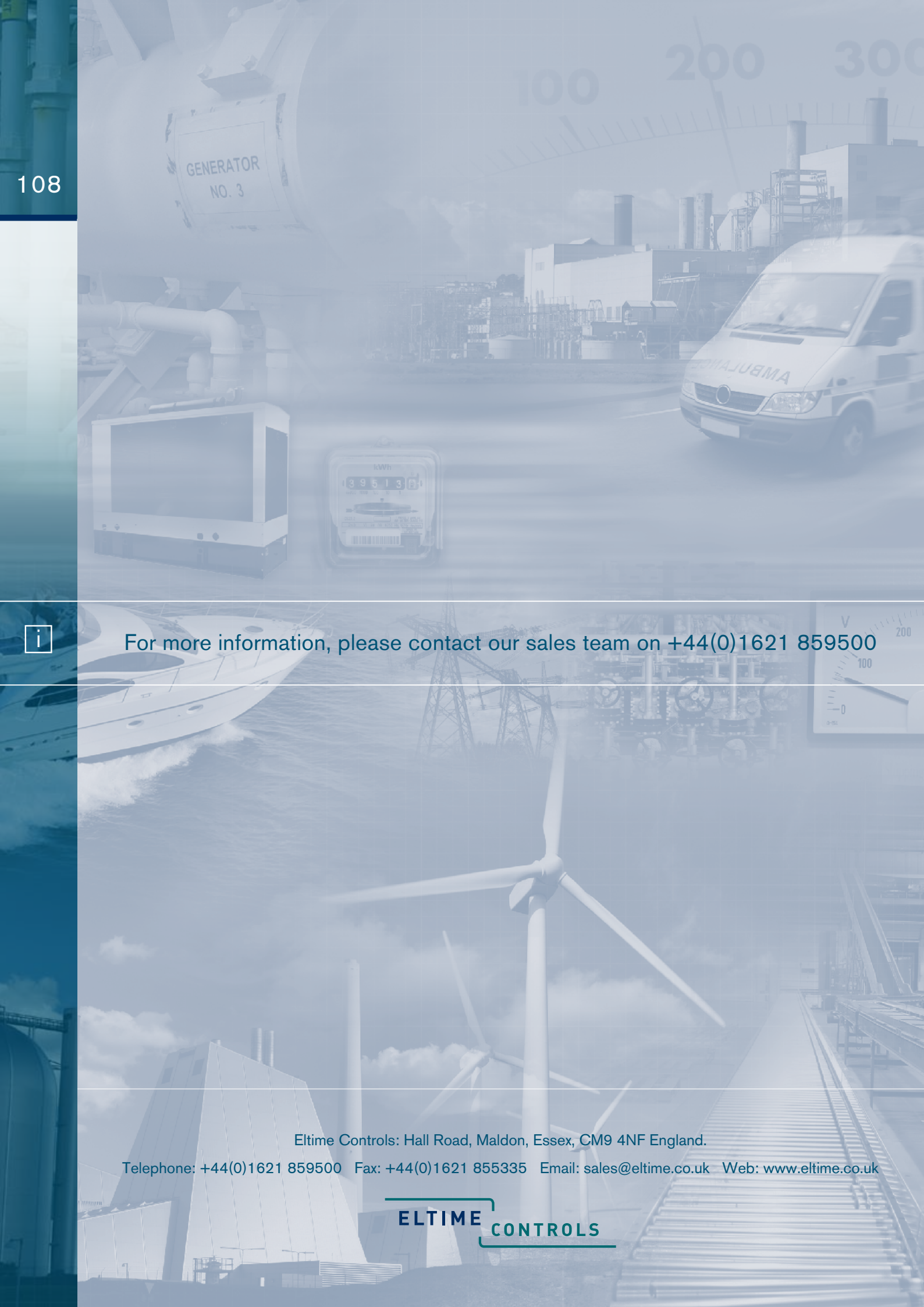
Enclosure Code:
- Case IP40, terminals IP10

Vibration Resistance:
- To VDE 0160

Weight:
- 175g

Markings:
- CE marked

Specification subject to change without notice.



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ELTIME CONTROLS

Product Catalogue

Timeswitches

Global Suppliers of Measurement and Protection Equipment for Industry

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Quartz Analogue Timeswitches

Quartz analogue timeswitches offer accuracy and flexibility making them suitable for a large range of industrial control applications. The timeswitches are powered from a large choice of AC or DC auxiliary power options and have a voltage free changeover relay contact. The universal mounting enclosure allows the SPHQ to be panel, DIN rail or surface mounted.

In the event of a mains shut down or power failure the SPHQ will continue to operate, accurate to the second, due to a 100 hour battery power reserve. The face of the timeswitch clearly indicates the time and a rotating disc at the centre indicates operation. There is a manual override facility on both SPHQ models. Extra pairs of tappets (pegs) are available for both 24 hour and 7 day models.

Models Available

SPHQ/24HOUR 24 Hour Timeswitch
SPHQ/7DAY 7 Day Timeswitch

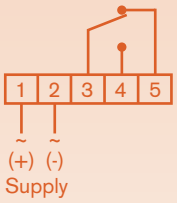
Product Features

- 24 hour or 7 day versions
- Quartz accuracy
- ON/OFF tappets:
  24 hour - 2 pairs (up to 24 on request)
  7 day - 6 pairs (up to 28 on request)
- Minimum switching interval
  24 hour - 30 minutes
  7 day - 3 hours
- Panel, DIN rail and surface mounting
- 100 hour NiMH battery reserve
- Standard DIN square size
- Screw type terminals

For dimensions see page 115

For timing control of daily or weekly events and processes

Connections



Ordering information

Code	Timeswitch Type	Auxiliary Voltage	Options
SPHQ/24HOUR	24 Hour Analogue Timeswitch	–	–
SPHQ/7DAY	7 Day Analogue Timeswitch	–	–
Specify	–	12 or 24Vac/dc	–
Specify	–	110, 230 or 415Vac	–
Specify	–	Other (specify)	–
TPS/24HOUR	–		Extra Pair Tappets - 24 Hour
TPS/7DAY	–		Extra Pair Tappets - 7 Day
Example	**SPHQ/24HOUR**	**110Vac**	**4xTPS/24HOUR**

Specification

Accuracy:
- ±1 sec in 24 hours (quartz timebase)

Adjustability:
- 15 minutes (24 hour), 1 hour (7 day)

Supply Voltage:
- 12Vac/dc, 24Vac/dc (-15% to +10%)
- 110, 230, 415Vac (-15% to +10%)

Burden:
- 1.5VA (AC) or 1.5W (DC)

Frequency:
- 45 to 65Hz or DC

Battery Reserve:
- 100 hours (after 48 hours charge)

Relay Output:
- 1 voltage free changeover relay contact

Contact Rating:
- 10A (resistive), 6A (inductive/capacitive)
- 250Vac maximum
- Contact life 10,000,000 operations

Operating Temperature:
- 0°C to 55°C

Enclosure:
- DIN72 flame retardant grey ABS
- Panel, DIN rail or surface mounting
- IP40 enclosure code

Weight:
- 200g

Markings:
- CE marked

Specification subject to change without notice.

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Digital Timeswitch - DIN Rail Mounting

Models Available

TM848 LCD Digital Timeswitch

Product Features

- Quartz accuracy
- Up to 8 on and 8 off operations
- 1 minute minimum switching interval
- Daily, 7 day week, 5 day week and weekend modes
- Liquid crystal display
- DIN rail or surface mounting
- Screw type terminals
- 500 hour lithium battery reserve
- Programming instructions supplied

For dimensions see page 115

The TM848 digital timeswitch offers quartz accuracy and flexibility making it suitable for a large range of industrial control applications. The timeswitch can be powered from a large choice of AC or DC auxiliary power options and has a voltage free changeover relay contact. The enclosure allows the TM848 to be DIN rail or surface mounted.

In the event of a mains shut down or power failure the TM848 will maintain programme memory and continue to operate, accurate to the second, due to a 500 hour battery power reserve. The TM848 is very simple to programme through a step-by-step push button sequence and flexible programming enables individual day or weekend programs. The timeswitch has a permanent override function and an LED to indicate relay status.

For digital timing control of daily or weekly events and processes

Specification

Accuracy:
- ±1 sec in 24 hours (quartz timebase)

Display:
- Liquid crystal - 5mm high characters

Supply Voltage:
- 12Vac/dc, 24Vac/dc (-15% to +10%)
- 110, 230, 415Vac (-15% to +10%)

Burden:
- 5VA (AC) or 1.2W (DC)

Frequency:
- 45 to 65Hz or DC

Battery Reserve:
- 500 hours (display/memory, not output)

Relay Output:
- 1 voltage free changeover relay contact

Contact Rating:
- 16A (resistive), 3A (inductive/capacitive)
- 250Vac maximum
- Contact life 10,000,000 operations

Operating Temperature:
- -10°C to 55°C

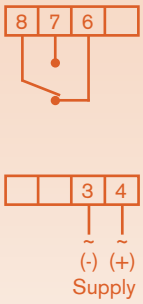
Enclosure:
- 36mm wide flame retardant grey ABS
- 35mm DIN rail (DIN-EN 50022) or surface mounting
- IP40 enclosure code

Weight:
- 100g

Markings:
- CE marked

Specification subject to change without notice.

Connections



Ordering information

Code	Timeswitch Type	Auxiliary Voltage
TM848	Digital Timeswitch - DIN Rail Mounting	–
Specify	–	12 or 24Vac/dc
Specify	–	110, 230 or 415Vac
Specify	–	Other (specify)
Example	**TM848**	**12Vac/dc**

Digital Timeswitch - 2 Channel

The TM812 digital timeswitch offers quartz accuracy and flexibility making it suitable for a large range of industrial control applications. The timeswitch can be powered from a large choice of AC or DC auxiliary power options, has two independently programmable voltage free changeover relay contacts and can be DIN rail or surface mounted.

In the event of a mains shut down or power failure the TM812 will maintain programme memory and continue to operate, accurate to the second, due to a 500 hour battery power reserve. The TM812 is very simple to programme each channel through a step-by-step push button sequence and flexible programming enables individual day or weekend programs. The timeswitch has a permanent override function and two LED's to indicate each channel relay status.

Models Available

TM812 LCD 2 Channel Digital Timeswitch

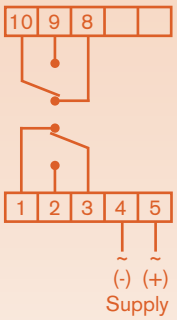
Product Features

- 2 independent channels
- Quartz accuracy
- Up to 8 on and 8 off operations
- 1 minute minimum switching interval
- Daily, 7 day week, 5 day week and weekend modes
- Liquid crystal display
- DIN rail or surface mounting
- Screw type terminals
- 500 hour lithium battery reserve
- Programming instructions supplied

For dimensions see page 115

For digital timing control of daily or weekly events and processes

Connections



Ordering information

Code	Timeswitch Type	Auxiliary Voltage
TM812	Digital Timeswitch - 2 Channel	–
Specify	–	12 or 24Vac/dc
Specify	–	110, 230 or 415Vac
Specify	–	Other (specify)
Example	**TM812**	**230Vac**

Specification

Accuracy:
- ±1 sec in 24 hours (quartz timebase)

Display:
- Liquid crystal - 6mm high characters

Supply Voltage:
- 12Vac/dc, 24Vac/dc (-15% to +10%)
- 110, 230, 415Vac (-15% to +10%)

Burden:
- 6VA (AC) or 1.5W (DC)

Frequency:
- 45 to 65Hz or DC

Battery Reserve:
- 500 hours (display/memory, not output)

Relay Output:
- 2 voltage free changeover relay contacts

Contact Rating:
- 16A (resistive), 3A (inductive/capacitive)
- 250Vac maximum
- Contact life 10,000,000 operations

Operating Temperature:
- -10°C to 45°C

Enclosure:
- 52.5mm wide flame retardant grey ABS
- 35mm DIN rail (DIN-EN 50022) or surface mounting
- IP40 enclosure code

Weight:
- 140g

Markings:
- CE marked

Specification subject to change without notice.

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Digital Timeswitch - Panel Mounting

The TM823 digital timeswitch offers quartz accuracy and flexibility making it suitable for a large range of industrial control applications. The timeswitch can be powered from a large choice of AC or DC auxiliary power options, has a voltage free changeover relay contact and is panel mounted. An optional 96mm x 83mm mounting bezel is also available.

In the event of a mains shut down or power failure the TM823 will maintain programme memory and continue to operate, accurate to the second, due to a 500 hour battery power reserve. The TM823 is very simple to programme through a step-by-step push button sequence and flexible programming enables individual day or weekend programs. The timeswitch has a permanent override function and an LED to indicate relay status.

Models Available

TM823 LCD Panel Mounting Digital Timeswitch

Product Features

- Quartz accuracy
- Up to 8 on and 8 off operations
- 1 minute minimum switching interval
- Daily, 7 day week, 5 day week and weekend modes
- Liquid crystal display
- Panel mounting
- Spade terminals - 6.3mm
- 500 hour lithium battery reserve
- Programming instructions supplied

For dimensions see page 115

For digital timing control of daily or weekly events and processes

Specification

Accuracy:
- ±1 sec in 24 hours (quartz timebase)

Display:
- Liquid crystal - 6mm high characters

Supply Voltage:
- 12Vac/dc, 24Vac/dc (-15% to +10%)
- 110, 230, 415Vac (-15% to +10%)

Burden:
- 5VA (AC) or 1.2W (DC)

Frequency:
- 45 to 65Hz or DC

Battery Reserve:
- 500 hours (display/memory, not output)

Relay Output:
- 1 voltage free changeover relay contact

Contact Rating:
- 16A (resistive), 3A (inductive/capacitive)
- 250Vac maximum
- Contact life 10,000,000 operations

Operating Temperature:
- -10°C to 55°C

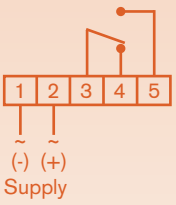
Enclosure:
- Flame retardant black ABS
- Panel mounting - 60x48mm cut out
- IP40 enclosure code

Weight:
- 100g

Markings:
- CE marked

Specification subject to change without notice.

Connections

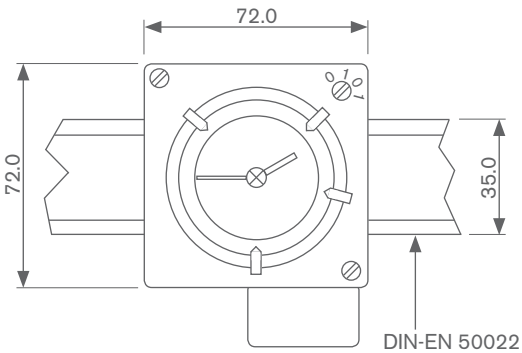


Ordering information

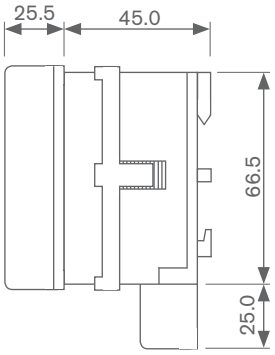
Code	Timeswitch Type	Auxiliary Voltage	Options
TM823	Digital Timeswitch - Panel Mounting	–	
Specify	–	12 or 24Vac/dc	
Specify	–	110, 230 or 415Vac	
Specify	–	Other (specify)	
TM823BK	–		96 x 83mm Mounting Bezel
Example	**TM823**	**230Vac**	**TM823BK**

Dimensions

SPHQ Enclosure

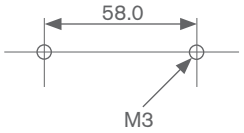


DIN-EN 50022 / BS558
Rail Fixing



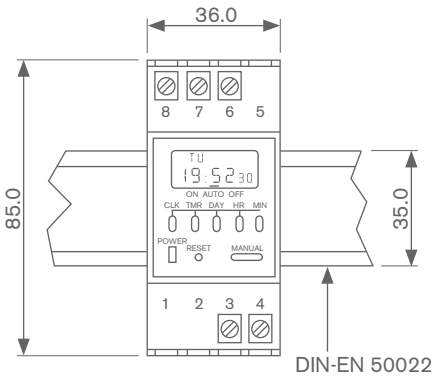
Cable entry 2mm²

Dimensions for Surface Mounting

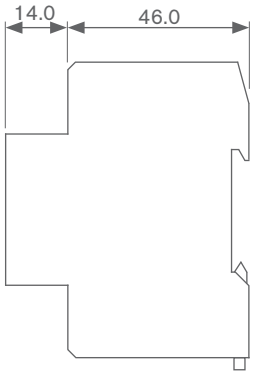


Max. Panel Thickness 10mm
Panel Cutout 66.0mm square (± 1.0mm)

TM848 Enclosure

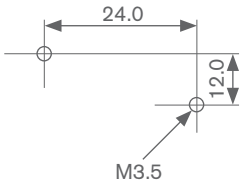


DIN-EN 50022 / BS558
Rail Fixing

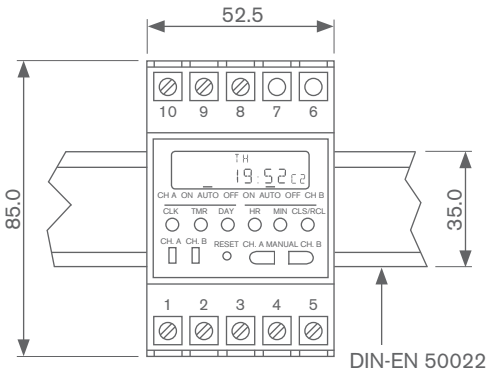


Cable entry 2mm²

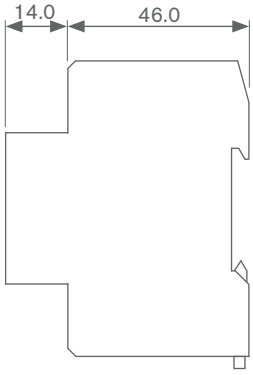
Dimensions for Surface Mounting
Adaptor Plate



TM812 Enclosure

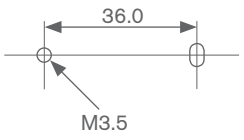


DIN-EN 50022 / BS558
Rail Fixing

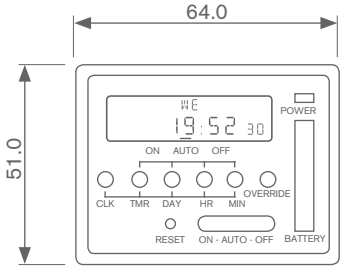


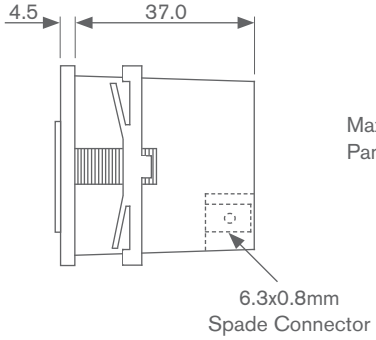
Cable entry 2mm²

Dimensions for Surface Mounting
Adaptor Plate



TM823 Enclosure





6.3x0.8mm
Spade Connector

Max. Panel Thickness 10mm
Panel Cutout 60mm x 47.0mm (± 1.0mm)

All dimensions in mm

For more information, please contact our sales team on +44(0)1621 859500

Eltime Controls: Hall Road, Maldon, Essex, CM9 4NF England.
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ELTIME CONTROLS

Product Catalogue

Selector Switches

Global Suppliers of Measurement and Protection Equipment for Industry

www.eltime.co.uk

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Voltmeter & Ammeter Switches

Models Available

C174 3 Phase 3 Wire Voltmeter Switch
C176 3 Phase 4 Wire Voltmeter Switch
C178 Ammeter Switch

Product Features

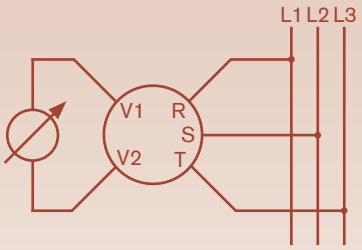
- 48mm x 60mm front facia
- Choice of interchangeable legend plates
- 600Vac and 16A rated
- Fingerproof screw clamp terminals

Voltmeter and ammeter selector switches are used to switch between phases for measurement on a three phase system.

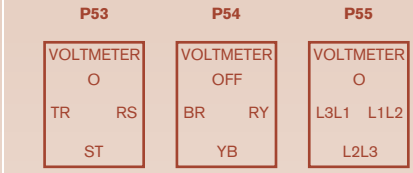
Voltmeter selector switches are available to switch between line-line voltage or line-line and line-neutral voltage while the ammeter selector switch switches between the three phase line currents. The output from the switch can then be fed to an analogue or digital measuring instrument.

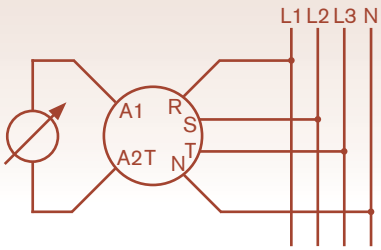
The switches offer long term switching reliability and high current switching contacts. The switch facia measures 48mm by 60mm and the switch terminals are fingerproof. A wide choice of interchangeable legend plates are available to suit each switch.

For switching between phases to measure 3 phase voltage or current

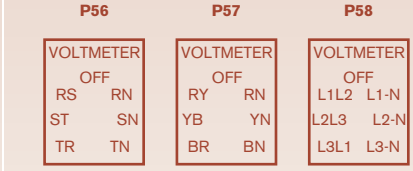


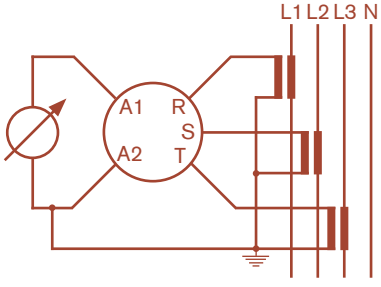
C174 Voltmeter Selector Switch
For connection to a 3 phase 3 wire system.



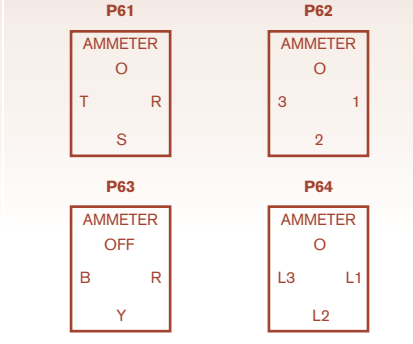


C176 Voltmeter Selector Switch
For connection to a 3 phase 4 wire system.

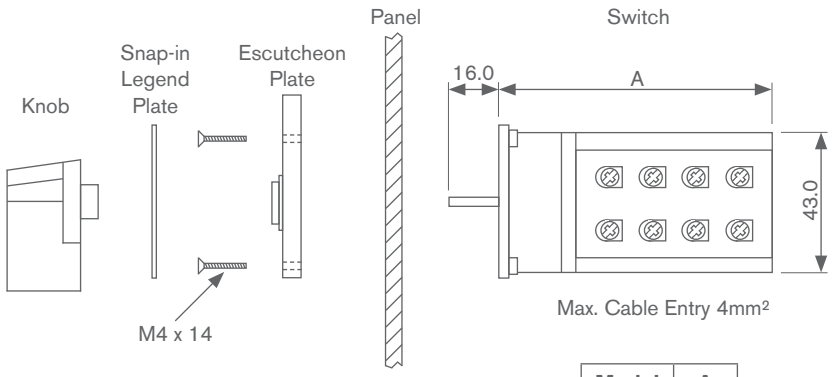




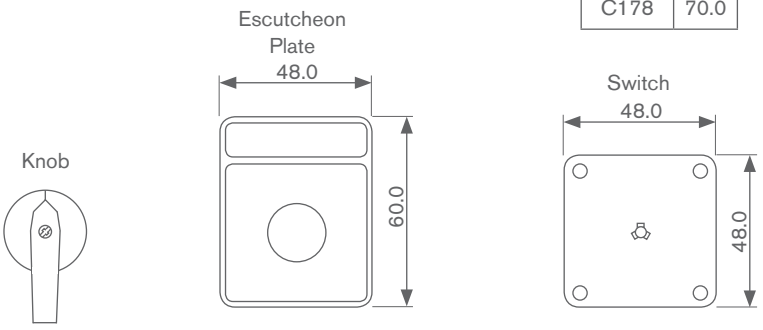
C178 Ammeter Selector Switch
For connection to a 3 phase 3 wire or 3 phase 4 wire system.

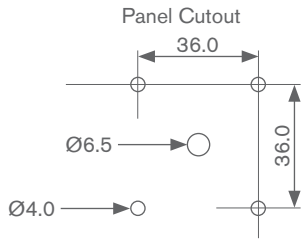


Dimensions



Model	A
C174	59.0
C176	70.0
C178	70.0





All dimensions in mm

Ordering information

Code	Switch Type	Legend Plate
C174	3 Phase 3 Wire Voltmeter Switch	–
C176	3 Phase 4 Wire Voltmeter Switch	–
C178	3 Phase Ammeter Switch	–
P53	–	O, RS, ST, TR (C174 only)
P54	–	OFF, RY, YB, BR (C174 only)
P55	–	OFF, L1L2, L2L3, L3L1 (C174 only)
P56	–	OFF, RN, SN, TN, TR, ST, RS (C176 only)
P57	–	OFF, RN, YN, BN, BR, YB, RY (C176 only)
P58	–	OFF, L1-N, L2-N, L3-N, L3L1, L2L3, L1L2 (C176 only)
P61	–	O, R, S, T (C178 only)
P62	–	O, 1, 2, 3 (C178 only)
P63	–	O, R, Y, B (C178 only)
P64	–	O, L1, L2, L3 (C178 only)
Example	**C178**	**P64**

Specification

Reference Standard:
- Compliant with VDE 0660

Operating Voltage:
- 600V maximum

Test Voltage:
- 2.5kV rms 50Hz for 1 minute

Frequency:
- 50/60Hz

Contact Material:
- Silver / Silver alloy with sliding contacts

Contact Rating:
- 16 Amps

Contact Life:
- 1,000,000 operations

Operating Temperature:
- -20°C to 60°C

Enclosure:
- Flame retardant black and blue ABS
- Panel mounting with 4 screws

Enclosure Code:
- Front facia IP20, terminals IP00

Legend Plate:
- Silver with black legend

Terminals:
- M4 screw clamp terminals

Cable Size:
- 4mm² maximum

Weight:
- 150g

Markings:
- CE marked

Specification subject to change without notice.

For more information, please contact our sales team on +44(0)1621 859500

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ELTIME CONTROLS

Product Catalogue

Schrack Plug-in Relays

Global Suppliers of Measurement and Protection Equipment for Industry

www.eltime.co.uk

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MT Series

Models Available

MT2 Schrack Octal 2 Pole Plug-in Relay
MT3 Schrack 11 Pin 3 Pole Plug-in Relay

Product Features

- 2 pole or 3 pole changeover contacts
- 10 Amp contact rating
- Cadmium-free contacts
- Choice of DC or AC coils
- Mechanical indicator
- Push to test and latch system
- White write-on panel
- DIN rail mounting base available
- Approvals

Schrack MT series plug-in relays are available in octal (2 pole) and 11 pin (3 pole) versions and are suitable for a large range of engineering and plant control applications.

The MT relays are available with a wide range of AC and DC coil voltages and have silver alloy contacts ensuring a high switching current capability and a reliable, long operational life.

Relay bases with self opening rising clamp terminals and captive screws are available for mounting to 35mm DIN rail. Additional optional extras for the Schrack relays are available including retaining clips, protection diodes and LED modules - please contact sales for further information.

For mechanical engineering and plant control applications

Specification - Relay

Contact Configuration:
- 2 pole or 3 pole changeover contacts

Contact Voltage Rating:
- 250Vac/30Vdc (Maximum 440Vac)

Rated Current:
- 10A ac/dc (make current 20A)

Rated Breaking Capacity:
- 2500VA

Contact Material:
- AgNi 90/10

Mechanical Life:
- > 20,000,000 operations

Electrical Life:
- 100,000 operations

Maximum Switching Rate:
- Mechanically 6000 operations/hour
- Full load 1000 operations/hour

Test Voltage:
- coil-contact 2.5kV rms 50Hz / 1 min
- pole-pole 2.5kV rms 50Hz / 1 min
- contact-contact 1.5kV rms 50Hz / 1 min

Enclosure Code:
- IP50

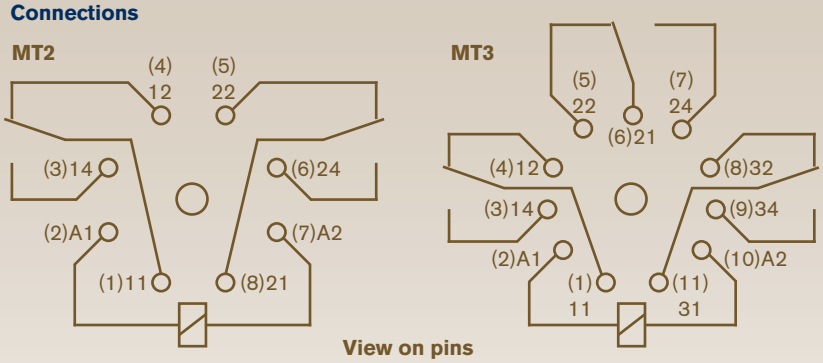
Operate/Release/Bounce Time:
- 12ms / 5ms / 4ms

Operating Temperature:
- DC: -45°C to 60°C, AC: -45°C to 50°C

Weight:
- 80 grams

Markings:
- CE marked

Connections

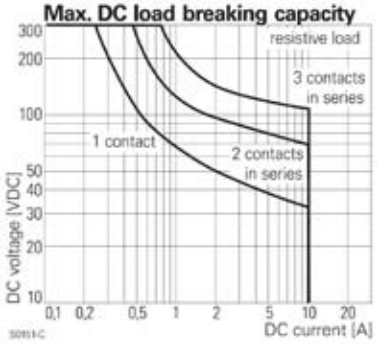


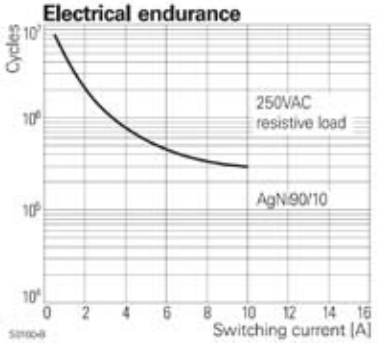
View on pins

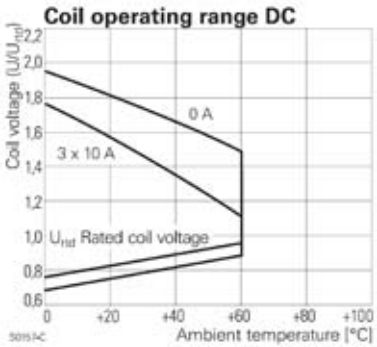
Coil Data

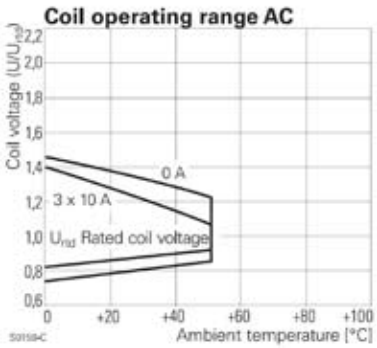
Coil Code	Nominal Voltage	Pull In Voltage	Release Voltage	Coil Resistance	Coil Current
1012	12Vdc	9.0Vdc	1.2Vdc	110W ± 10%	109.1mA
1024	24Vdc	18.0Vdc	2.4Vdc	475W ± 10%	50.5mA
1048	48Vdc	36.0Vdc	4.8Vdc	2000W ± 10%	24.0mA
1110	110Vdc	82.5Vdc	11.5Vdc	10000W ± 12%	11.0mA
6012	12Vac	9.6Vac	4.8Vac	24W ± 10%	182.5mA
6024	24Vac	19.2Vac	9.6Vac	86W ± 10%	94.2mA
6048	48Vac	38.4Vac	19.2Vac	345W ± 10%	47.5mA
6115	115Vac	92.0Vac	46.0Vac	2000W ± 10%	20.6mA
6230	230Vac	184.0Vac	92.0Vac	8300W ± 12%	10.1mA

Performance Graphs



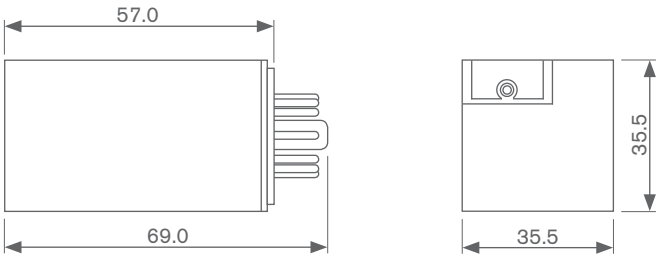






Relay Dimensions

MT2 & MT3 Relays



All dimensions in mm

Ordering information

Code	Relay/Base Type	Voltage
MT22	Octal 2 Pole Plug-in Relay	–
MT32	11 Pin 3 Pole Plug-in Relay	–
1012	–	12Vdc
1024	–	24Vdc
1048	–	48Vdc
1110	–	110Vdc
6012	–	12Vac
6024	–	24Vac
6048	–	48Vac
6115	–	115Vac
6230	–	230Vac
MT78755	Octal Relay DIN Rail Mounting Base	–
MT78750	11 Pin Relay DIN Rail Mounting Base	–
Example	**MT22 with MT78755**	**6230**

Specification - Relay Base

Rated Current:
- 10A

Rated Voltage:
- 400Vac

Test Voltage:
- coil-contact 3.0kV rms 50Hz / 1 min

Operating Temperature:
- -25°C to 80°C

Enclosure Code:
- IP20

Protection Against Accidental Contact:
- VBG 4

Mounting:
- To 35mm DIN rail (DIN-EN 50022)

Wire Cross Section:
- 2 x 2.5mm²

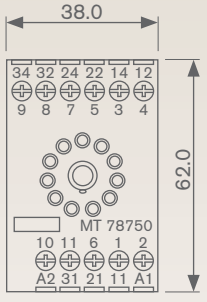
Weight:
- 60 grams

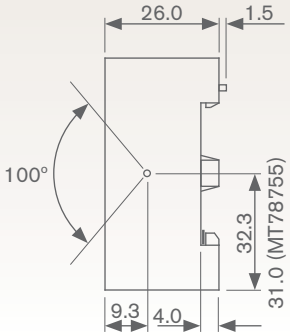
Markings:
- CE marked

Specification subject to change without notice.

Relay Base Dimensions

MT78755 & MT78750 Relay Bases





All dimensions in mm

Eltime Controls Tel: +44 (0) 1621 859500 Fax: +44 (0) 1621 855335

PT Series

Schrack PT series plug-in relays are 14 pin (4 pole) relays, suitable for a large range of control and automation applications.

The PT relays are available with a wide range of AC and DC coil voltages and have silver alloy contacts ensuring a high switching current capability and a reliable, long operational life.

Relay bases with self opening rising clamp terminals and captive screws are available for mounting to 35mm DIN rail.

Additional optional extras for the Schrack relays are available including retaining clips, protection diodes and LED modules - please contact sales for further information.

Models Available

PT Schrack 4 Pole Plug-in Relay

Product Features

- 4 pole changeover contacts
- 6 Amp contact rating
- Cadmium-free contacts
- Choice of DC or AC coils
- Mechanical indicator
- Push to test and latch system
- White write-on panel
- DIN rail mounting base available
- Lloyds register type approval
- Approvals

For use in control and automation applications

Specification - Relay

Contact Configuration:
- 4 pole changeover contacts

Contact Voltage Rating:
- 250Vac/30Vdc (Maximum 250Vac)

Rated Current:
- 6A ac/dc (make current 12A)

Rated Breaking Capacity:
- 1500VA

Contact Material:
- AgNi 90/10

Mechanical Life:
- > 20,000,000 operations

Electrical Life:
- 100,000 operations

Maximum Switching Rate:
- Mechanically 36000 operations/hour
- Full load 360 operations/hour

Test Voltage:
- coil-contact 2.5kV rms 50Hz / 1 min
- pole-pole 2.0kV rms 50Hz / 1 min
- contact-contact 1.5kV rms 50Hz / 1 min

Enclosure Code:
- IP50

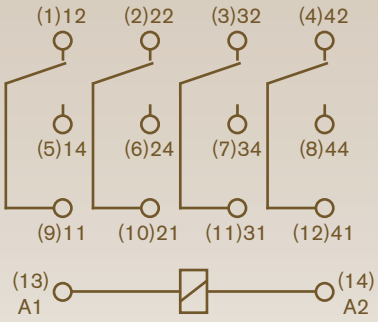
Operate/Release/Bounce Time:
- 15ms / 10ms / 5ms

Operating Temperature:
- DC: -45°C to 70°C, AC: -45°C to 70°C

Weight:
- 30 grams

Markings:
- CE marked

Connections

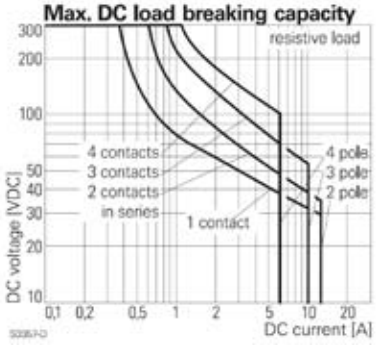


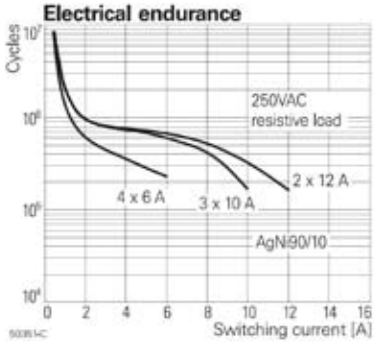
View on pins

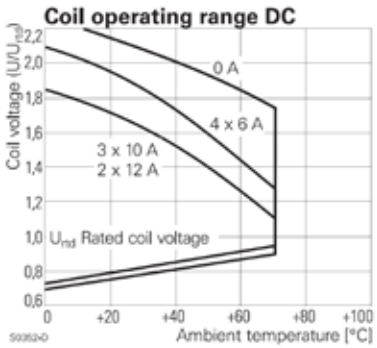
Coil Data

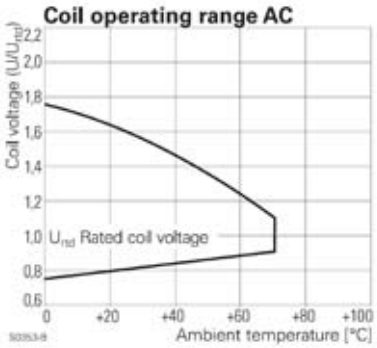
Coil Code	Nominal Voltage	Pull In Voltage	Release Voltage	Coil Resistance	Coil Current
012	12Vdc	9.0Vdc	1.2Vdc	192W ± 10%	62.5mA
024	24Vdc	18.0Vdc	2.4Vdc	777W ± 10%	31.3mA
048	48Vdc	36.0Vdc	4.8Vdc	3072W ± 12%	15.6mA
110	110Vdc	82.5Vdc	11.5Vdc	16133W ± 15%	6.8mA
512	12Vac	9.6Vac	3.6Vac	48W ± 10%	83.3mA
524	24Vac	19.2Vac	7.2Vac	192W ± 10%	41.6mA
548	48Vac	38.4Vac	14.4Vac	777W ± 10%	21.3mA
615	115Vac	92.0Vac	34.5Vac	4845W ± 12%	8.8mA
730	230Vac	184.0Vac	69.0Vac	19465W ± 15%	4.3mA

Performance Graphs

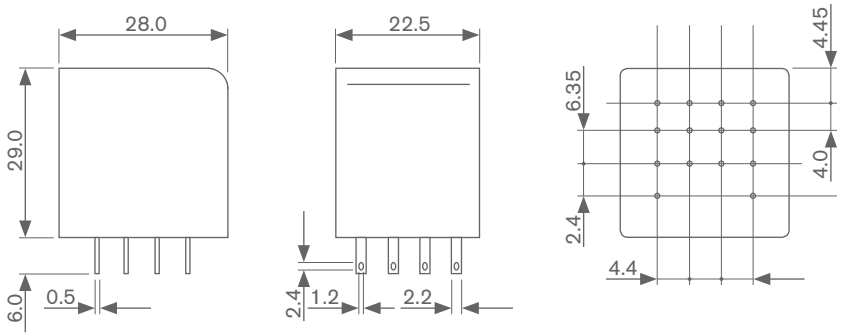








Relay Dimensions



All dimensions in mm

Ordering information

Code	Relay/Base Type	Voltage
PT570	14 Pin 4 Pole Plug-in Relay	–
012	–	12Vdc
024	–	24Vdc
048	–	48Vdc
110	–	110Vdc
512	–	12Vac
524	–	24Vac
548	–	48Vac
615	–	115Vac
730	–	230Vac
PT78740	14 Pin Relay DIN Rail Mounting Base	–
Example	**PT570 with PT78740**	**730**

Specification - Relay Base

Rated Current:
- 6A

Rated Voltage:
- 300Vac

Test Voltage:
- coil-contact 3.0kV rms 50Hz / 1 min

Operating Temperature:
- -45°C to 70°C

Enclosure Code:
- IP20

Protection Against Accidental Contact:
- VBG 4

Mounting:
- To 35mm DIN rail (DIN-EN 50022)

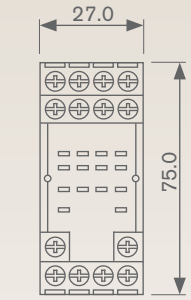
Wire Cross Section:
- 2 x 2.5mm²

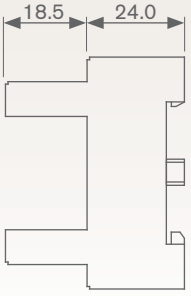
Weight:
- 60 grams

Markings:
- CE marked

Specification subject to change without notice.

Relay Base Dimensions





All dimensions in mm

Eltime Controls Tel: +44 (0) 1621 859500 Fax: +44 (0) 1621 855335

RT Series

Schrack RT series plug-in relays are available in 1 pole and 2 pole versions and are suitable for a large range of control panels and mechanical engineering applications.

The RT relays are available with a wide range of AC and DC coil voltages and have silver alloy contacts ensuring a high switching current capability and a reliable, long operational life.

Relay bases with self opening rising clamp terminals and captive screws are available for mounting to 35mm DIN rail.

Models Available

RTD14 Schrack 1 Pole Plug-in Relay
RTE24 Schrack 2 Pole Plug-in Relay

Product Features

- 1 pole or 2 pole changeover contacts
- 16 Amp contact rating (1 pole)
- 8 Amp contact rating (2 pole)
- Cadmium-free contacts
- Choice of DC or AC coils
- Sensitive 400mW coil
- Protection class II (VDE 0700)
- 5mm pinnning
- 5kV / 10mm coil-contact
- DIN rail mounting base available
- Approvals

For use in control panels and mechanical engineering applications

Specification - Relay

Contact Configuration:
- 1 pole or 2 pole changeover contacts

Contact Voltage Rating:
- 250Vac/30Vdc (Maximum 440Vac)

Rated Current (1 pole / 2pole):
- 16A / 8A (make current 30A / 15A)

Rated Breaking Capacity:
- 4000VA (1 pole), 2000VA (2 pole)

Contact Material:
- AgNi 90/10

Mechanical Life:
- > 5,000,000 operations

Electrical Life:
- 30,000 operations

Maximum Switching Rate:
- Mechanically 72000 operations/hour
- Full load 360 operations/hour

Test Voltage:
- coil-contact 5.0kV rms 50Hz / 1 min
- pole-pole 2.5kV rms 50Hz / 1 min
- contact-contact 1.0kV rms 50Hz / 1 min

Enclosure Code:
- IP50

Operate/Release/Bounce Time:
- 7ms / 3ms / 3ms

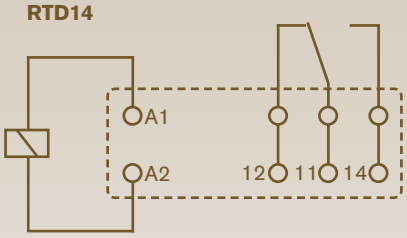
Operating Temperature:
- DC: -40°C to 85°C, AC: -40°C to 70°C

Weight:
- 14 grams

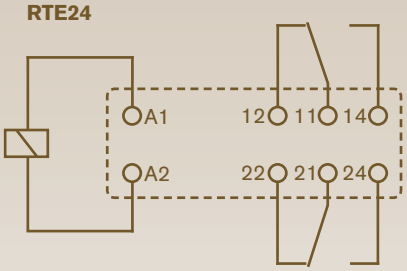
Markings:
- CE marked

Connections

RTD14



RTE24

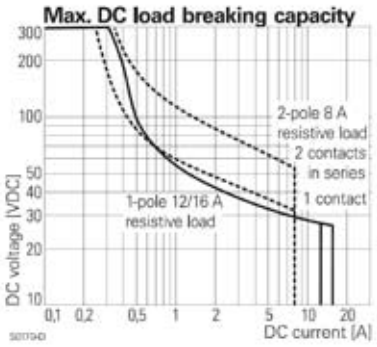


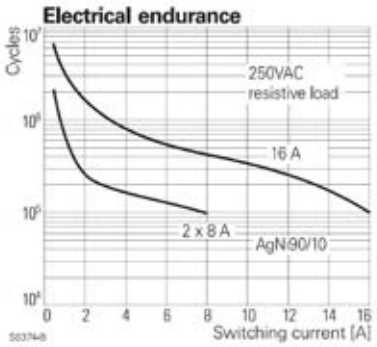
View on pins

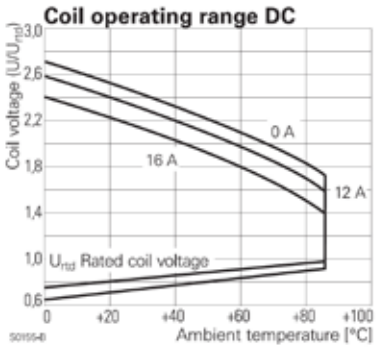
Coil Data

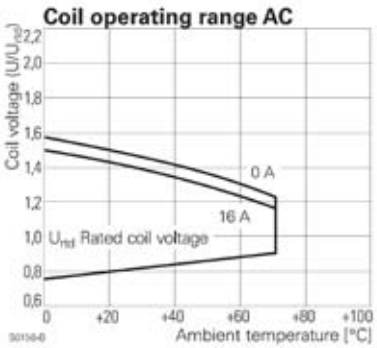
Coil Code	Nominal Voltage	Pull In Voltage	Release Voltage	Coil Resistance	Coil Current
012	12Vdc	8.4Vdc	1.2Vdc	360W ± 10%	33.3mA
024	24Vdc	16.8Vdc	2.4Vdc	1440W ± 10%	16.7mA
048	48Vdc	33.6Vdc	4.8Vdc	5520W ± 10%	8.7mA
110	110Vdc	77.0Vdc	11.0Vdc	26600W ± 12%	4.1mA
524	24Vac	18.0Vac	7.2Vac	350W ± 10%	31.6mA
615	115Vac	86.3Vac	34.5Vac	8100W ± 15%	6.6mA
730	230Vac	172.5Vac	69.0Vac	32500W ± 15%	3.2mA

Performance Graphs

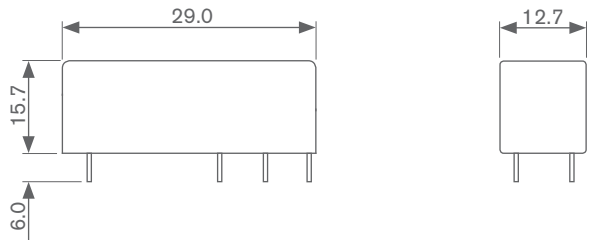








Relay Dimensions



All dimensions in mm

Ordering information

Code	Relay/Base Type	Voltage
RTD14	1 Pole 16 Amp Plug-in Relay	–
RTE24	2 Pole 8 Amp Plug-in Relay	–
012	–	12Vdc
024	–	24Vdc
048	–	48Vdc
110	–	110Vdc
524	–	24Vac
615	–	115Vac
730	–	230Vac
RT78625	RT Relay DIN Rail Mounting Base	–
Example	**RTE24 with RT78625**	**024**

Specification - Relay Base

Rated Current:
- 6A (1 pole), 2x12A (2pole)

Rated Voltage:
- 300Vac

Test Voltage:
- coil-contact 4.0kV rms 50Hz / 1 min

Operating Temperature:
- -25°C to 80°C

Enclosure Code:
- IP20

Protection Against Accidental Contact:
- VBG 4

Mounting:
- To 35mm DIN rail (DIN-EN 50022)

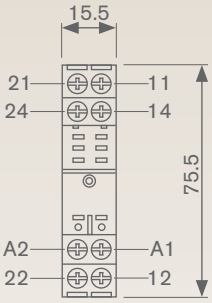
Wire Cross Section:
- 2 x 2.5mm²

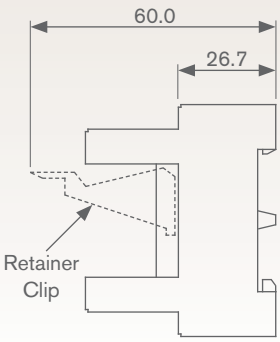
Weight:
- 40 grams

Markings:
- CE marked

Specification subject to change without notice.

Relay Base Dimensions





All dimensions in mm

Eltime Controls Tel: +44 (0) 1621 859500 Fax: +44 (0) 1621 855335

SNR Relays

Schrack SNR relays are single pole, measure only 6mm wide and are suitable for a large range of heating control, timer, plc and interface technology applications.

The SNR relays are available with a 35mm DIN rail mounting base as a complete module in 12, 24 or 48Vdc and 110 or 230Vac versions.

The SNR relays have silver alloy contacts ensuring a high switching current capability and a reliable, long operational life.

The relay bases have self opening rising clamp terminals and captive screws.

Models Available

SNR12 SNR 12Vdc Relay Module
SNR24 SNR 24Vdc Relay Module
SNR48 SNR 48Vdc Relay Module
SNR110 SNR 110Vac Relay Module
SNR230 SNR 230Vac Relay Module

Product Features

- 1 pole changeover contact
- 6 Amp contact rating
- Cadmium-free contacts
- Choice of DC coils
- Sensitive 170mW coil
- Protection class II (VDE 0700)
- 4kV coil-contact
- 6/8mm clearance/creepage
- DIN rail mounting base available
- Approvals

For use in heating control, timers, plc's and interface technology applications

Specification - Relay

Contact Configuration:
- 1 pole changeover contact

Contact Voltage Rating:
- 250Vac/30Vdc (Maximum 440Vac)

Rated Current:
- 6A

Rated Breaking Capacity:
- 1500VA

Contact Material:
- AgSnO2

Minimum Contact Load:
- > 100mA at 12Vdc, > 10mA at 5Vdc

Maximum Switching Rate:
- Mechanically 72000 operations/hour
- Full load 360 operations/hour

Test Voltage:
- coil-contact 4.0kV rms 50Hz / 1 min
- contact-contact 1.0kV rms 50Hz / 1 min

Enclosure Code:
- IP67

Operate/Release Time:
- 5ms / 2.5ms

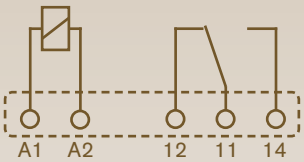
Bounce Time:
- 1.5ms / 5ms (N/O / N/C)

Operating Temperature:
- -40°C to 85°C

Weight:
- 6 grams

Markings:
- CE marked

Connections



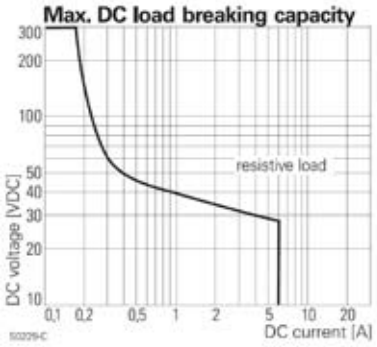
View on pins

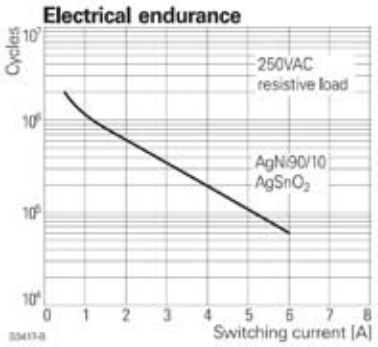
Coil Data

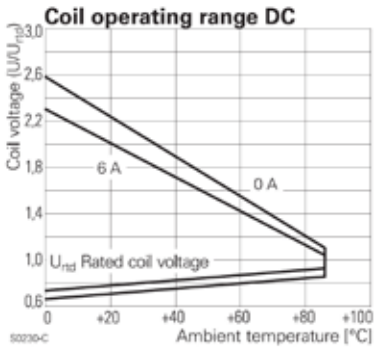
Coil Code	Nominal Voltage	Pull In Voltage	Release Voltage	Coil Resistance	Coil Current
012	12Vdc	8.4Vdc	0.6Vdc	848W ± 10%	14.2mA
024	24Vdc	16.8Vdc	1.2Vdc	3390W ± 10%	7.1mA
048	48Vdc	33.6Vdc	2.4Vdc	10600W ± 15%	4.5mA
060*	60Vdc	42.0Vdc	3.0Vdc	20500W ± 15%	2.9mA

* Note: The 110Vac and 230Vac modules use the 60Vdc relay

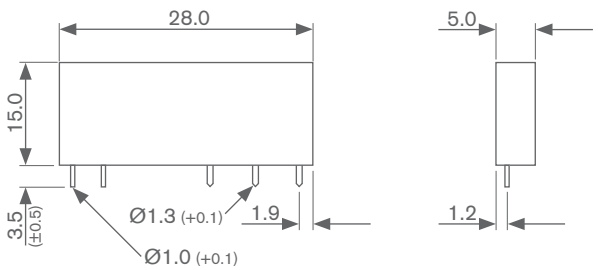
Performance Graphs







Relay Dimensions



All dimensions in mm

Ordering information

Code	Relay/Base Type
SNR12	1 Pole 6 Amp 12Vdc Relay Module
SNR24	1 Pole 6 Amp 24Vdc Relay Module
SNR48	1 Pole 6 Amp 48Vdc Relay Module
SNR110	1 Pole 6 Amp 110Vac Relay Module
SNR230	1 Pole 6 Amp 230Vac Relay Module
Example	**SNR24**

Specification - Relay Base

Rated Current:
- 6A

Rated Voltage:
- 250Vac

Test Voltage:
- coil-contact 4.0kV rms 50Hz / 1 min

Operating Temperature:
- -25°C to 55°C

Enclosure Code:
- IP20

Protection Against Accidental Contact:
- VBG 4

Mounting:
- To 35mm DIN rail (DIN-EN 50022)

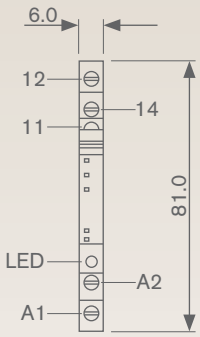
Wire Cross Section:
- 0.22 to 2.5mm²

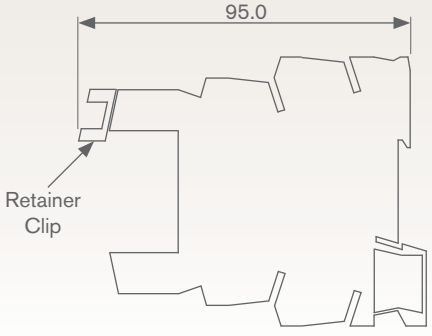
Weight:
- 30 grams

Markings:
- CE marked

Specification subject to change without notice.

Relay Base Dimensions





All dimensions in mm

For more information, please contact our sales team on +44(0)1621 859500

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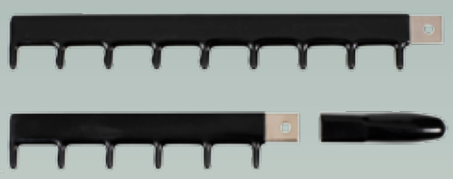
Telephone: +44(0)1621 859500 Fax: +44(0)1621 855335 Email: sales@eltime.co.uk Web: www.eltime.co.uk

ELTIME CONTROLS



Mini-Disbars

Mini-disbars are a unique 'miniature distribution bar' for use where a main supply is to be split and fed to multi-way fused circuits of up to 32 Amps each. Six way (MD6) and nine way (MD9) versions are available with a 33mm prong spacing, suitable for front of panel fuse carriers.

The mini-disbar eliminates the problem of multi-wire feeds and looping of distribution cables in a simple, inexpensive and compact way, saving assembly time and producing a more efficient and safer result.

The insulated prongs can be easily stripped and fed directly into individually fused circuits and unused prongs can be left with the insulating coating intact allowing provision for future extension. A black PVC insulating sleeve is also available to insulate the cable to mini-disbar join.

Models Available

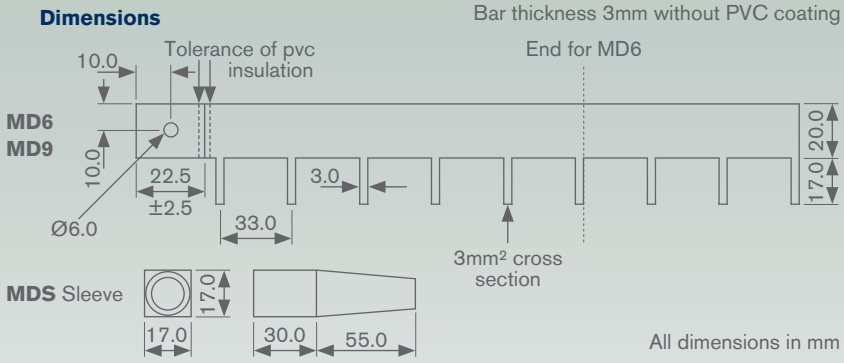
MD6 6 Way Mini-Disbar (33mm spacing)
MD9 9 Way Mini-Disbar (33mm spacing)

Product Features

- 150 Amp rating for overall bar
- 32 Amp rating for each prong
- Improves quality and safety standard
- Eliminates looping of cables
- Reduces assembly time

For safely splitting a 150A main supply into up to 9 circuits of up to 32A each

Dimensions



Ordering information

Code	Mini-Disbar Type	Options
MD6	6 Way - 33mm spacing	–
MD6	6 Way - 33mm spacing	–
MDS	–	PVC Insulating Sleeve
Example	**MD6**	**with MDS**

Specification

Material:
- Half hard 3mm thick copper sheet manufactured to BS2870-C106
- Nickel plated

Insulation:
- Durable and hardwearing black PVC to a minimum thickness of 1.5mm offering good insulation protection
- Flame retardant to UL94-HB

Current Rating:
- 150 Amps - main bar
- 32 Amps - each prong

Voltage Rating:
- 600Vac maximum

Operating Temperature:
- 0-20°C to 100°C continuously

Weight:
- MD6 140g, MD9 200g
- MDS Sleeve 15g

Markings:
- CE marked

Specification subject to change without notice.

Terms and Conditions of Sale

1. Applicability of Conditions
a) Notwithstanding any prior arrangement or discussion no contract for the sale of goods specified herein shall be concluded until Eltime Controls either issues a written confirmation of the Buyer's order, or despatches the goods, whichever occurs first.
b) These conditions shall govern the supply of goods to the Buyer by Eltime Controls to the exclusion of any other terms, even if contained in any of the Buyer's documents, which purport to provide that the Buyers' own terms shall prevail. No modification of these terms shall be valid unless agreed in writing by Eltime Controls.

2. Duration of Quotations
Every quotation shall be deemed to have been withdrawn if not followed by an order from the Buyer within 90 days of the date of the quotation.

3. Protective Devices/Supplementary material
a) Protective devices and other materials and accessories relating to the goods will only be supplied by Eltime Controls if requested by the Buyer, and agreed in writing.
b) Drawings, designs, illustrations and other accessory data supplied by Eltime Controls in connection with the goods shall remain the property of Eltime Controls. The Buyer shall take all reasonable care of the same and ensure they are not copied or handed or shown to third parties.

4. Prices and Delivery
a) Unless stated otherwise all prices are quoted ex warehouse and exclusive of the cost of packaging/carriage, which will be charged separately to the Buyer.
b) If Eltime Controls undertakes to provide or arrange carriage from its warehouse to a place specified by the Buyer such carriage shall be charged in addition to the price.
c) The price charged to the Buyer will be that ruling on the date of despatch and will be subject to Value Added Tax and any other government tax or duty which is applicable.
d) If and where prices are quoted or goods sold "FOB", "C & F", "CIF", "CIF duty paid" or "Free Delivered" for ultimate delivery outside the United Kingdom, any increase in insurance, packing or freight costs, import duty, internal taxes or any other charges incidental to the delivery of the goods and taking effect between the date the Buyer's order is accepted and the date or dates of delivery, together with all costs of any trans-shipment and/or deviation of voyage, shall be paid for by the Buyer.

5. Payment
a) Payment of the price and any delivery charges shall be made in sterling, without any deduction or deferment on account of any dispute or cross-claim whatsoever, not later than 30 days from the date of the invoice. The date of payment shall be of the essence to the contract.
b) Without prejudice to its other rights and remedies, Eltime Controls shall be entitled to charge interest at a rate of 1% per month on invoices not paid within 30 days from the date of invoice.

6. Title
a) The property of the goods shall not pass to the Buyer until the whole of the price has been paid, and until full payment the Buyer shall hold the goods as bailee for Eltime Controls (returning the same to Eltime Controls on request).
b) The whole of the price shall not be treated as paid until any cheque or other instrument of payment given by the Buyer has been met on presentation or otherwise honoured in accordance with its terms. Eltime Controls may sue for the whole of the price at any time after it has become payable.
c) Payment shall be applied to invoices in the order in which they were issued and to goods in the order in which they are listed in invoice.
d) In the event of any sale or other disposition of the goods by the Buyer prior to full payment, the Buyer shall hold on trust for Eltime Controls the whole of the proceeds of sale.
e) The Buyer shall not pledge the goods or documents of title thereto or allow any lien to arise thereon, or deal with the goods other than in the ordinary course of the Buyer's business.
f) If the Buyer defaults in punctual payment of any sum to Eltime Controls then Eltime Controls shall be entitled to the immediate return of all goods in which property has not passed to the Buyer, and hereby authorises Eltime Controls to recover the goods and to enter any premises of the Buyer for that purpose. Recovery of the goods by Eltime Controls shall not of itself discharge the Buyer's liability to pay the whole of the price for the goods.
g) Where the goods are manufactured to the Buyer's specification, Eltime Controls will sell the goods subject to any rights of third parties, whether in respect of a patent, trade mark, registered design, copyright or otherwise howsoever to prevent or restrict the sale or use of the goods in any part of the world, and the Buyer will in this respect accept such title as Eltime Controls may have to the goods.

7. Force Majeure
Should Eltime Controls be delayed in or prevented from making delivery of the goods owing to any cause whatsoever beyond Eltime Controls' control, Eltime Controls shall be at liberty to cancel or postpone delivery without incurring any liability for any loss or damage resulting therefrom.

8. Delivery, Dates and Risk
a) Any periods of times quoted for Delivery of the goods are estimates only, and Eltime Controls accepts no responsibility for loss or damage resulting from delay in delivery of the goods or completion of work. Delay through circumstances outside the control of Eltime Controls shall not entitle the Buyer to cancel any order or to refuse to accept delivery and extra costs or expenses arising from delays caused by the Buyers instructions (or failure to give any instructions required) shall be added to the contract price.
b) Delivery shall be deemed to take place when the goods are loaded onto the carriers vehicle at Eltime Controls' premises.
c) Eltime Controls does not accept any responsibility for goods damaged in transit to the place specified by the Buyer unless Eltime Controls has agreed in writing to insure the goods in transit and unless such damage is reported by notice in writing to the carriers and to Eltime Controls within three days of receipt of the goods by the Buyer.
d) The risk of goods for all purposes shall pass to the Buyer on Delivery.

9. Guarantee
a) Subject to the provision of paragraphs (b) and (h) below Eltime Controls hereby warrants the goods against defective performance caused by faulty materials and/or workmanship for a period (the "Warranty Period") of 24 months from the date of delivery. If replacement goods are delivered to the Buyer in substitution for original goods, the performance of those replacement goods will be warranted as aforesaid only for the residue of the period of 24 months from the date of delivery of the original goods.
b) Save as expressly stated in these terms and save in respect of Section 12 of the Sale of Goods Act 1979 (and without prejudice to the statutory rights under Sections 13 and 14 of the said Act of a person dealing as a consumer with Eltime Controls) Eltime Controls liability under any conditions or warranty, statutory or otherwise, express or implied, is excluded.
c) Save insofar as the liability is in respect of death or personal injury resulting from Eltime Controls negligence all liability in Eltime Controls for any loss or damage whatsoever (whether direct or indirect or consequential and howsoever arising) is limited in the manner provided by paragraph (d) below:-

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d) Save as provided in paragraph (c) the liability of Eltime Controls which arises out of any defect in the goods in the Warranty Period shall be limited to the purchase price of the goods affected. In no circumstance shall Eltime Controls be liable for any loss of profit, cost of overheads or loss resulting from shut-down of plant or other form of consequential or other loss or damage.
e) Notwithstanding paragraph (d) if the Buyer complies with the procedures set out in the paragraph (g) below Eltime Controls shall, upon satisfying itself that the defect arising in the Warranty Period arose solely from faulty materials or workmanship, make good such defect in a reasonable manner.
f) Eltime Controls liability hereunder:-
I) shall not apply to expendable parts (which include, but are not limited to, floppy discs and the information recorded thereon, lamps and fuses):
II) shall cease forthwith if goods are dismantled further than is required for normal day-to-day maintenance as described in any instruction manual:
III) shall not apply if goods are used on an incorrect voltage or contrary to the instructions in any instruction manual (including those as to set-up and maintenance) or accidentally damaged or are otherwise subject to misuse, neglect, inexpert repair, connection or unusual physical or electrical stress:
IV) shall not apply if alterations are made to goods or if attachments not authorised by Eltime Controls are made thereto. For this purpose "alterations" means changes from the original design and "attachments" means the connection (mechanically, electrically or electronically) to goods or other equipment or devices not supplied by Eltime Controls:
V) shall not require Eltime Controls to provide repair or replacement services outside normal business hours.
g) I) On receipt of the goods the Buyer shall inspect them for patent damage and shall notify Eltime Controls within 3 working days of any damage so discovered. The notice shall specify the damage in reasonable detail. In the absence of such notice being received by Eltime Controls, it shall be conclusively presumed the goods were delivered free from patent damage.
II) If at any time during the Warranty Period there is (or appears to be) a defect in the goods the Buyer shall within 14 days of the defect becoming apparent notify Eltime Controls of such defect and give reasonable details thereof. Failing such notice being received by Eltime Controls, no claim for breach of warranty will lie against Eltime Controls.
III) The defective goods will, where possible, be placed aside and made available for inspection by Eltime Controls' representative.
h) Without prejudice to the foregoing, Eltime Controls shall be under no liability whatsoever for any defect in the goods arising in any way whatsoever from the Buyer's specifications.

10. Changes in Design/Specification
Eltime Controls reserve the right to modify the design or specification of its goods provided such modifications do not materially and adversely affect performance of such goods.

11. Cancellations
Cancellation of any order or part order can only be made with the prior agreement of Eltime Controls. Unless otherwise agreed by Eltime Controls any expense incurred by Eltime Controls prior to the date of cancellation of any order shall be for the account of the Buyer.

12. Default by Buyer
Notwithstanding anything to the contrary expressed or implied elsewhere herein, Eltime Controls may at its sole discretion (and without prejudice to its other rights) either terminate any order from the Buyer or forthwith suspend delivery to the Buyer under any order until further notice on notifying the Buyer either orally (confirming such notification in writing) or by notice in writing in the event that:-
a) the Buyer fails to take deliveries of goods when required, or
b) the Buyer fails to make any payment due to Eltime Controls in respect of any order placed upon Eltime Controls punctually by the due date, or
c) the Buyer cancels or purports to cancel any order placed upon Eltime Controls or
d) the Buyer commits any other breach of its obligations under these terms and conditions or any other contract with Eltime Controls or
e) any distress or execution or other legal process shall be levied upon the property or assets of the Buyer or
f) a liquidator (other than for the purpose of amalgamation or reconstruction), trustee in bankruptcy, receiver or manager is appointed in respect of the assets and/or undertaking or if any such associated company enters into an arrangement or completion with its creditors, or any similar appointment, arrangement or composition is made under any applicable law, or if Eltime Controls has a reason to anticipate any such appointment, arrangement or composition.
Notwithstanding the termination of orders and/or suspension of deliveries by Eltime Controls under the foregoing provisions, Eltime Controls shall be entitled to payment on a quantum merit basis in respect of all work done by it prior to termination/cancellation or to recover any loss on resale of goods.

13. Third Party Claims
The Buyer shall indemnify Eltime Controls against all costs, damages and losses which Eltime Controls may sustain directly or indirectly in consequence of any claims against Eltime Controls or the Buyer by third parties which (a) arise from or in connection with the goods or any ancillary equipment, materials or appliances supplied hereunder or the use thereof and (b) are in respect of the infringement of any intellectual property rights of third parties in designs, drawings or data given to Eltime Controls by the Buyer.

14. Miscellaneous
a) Eltime Controls hereby gives notice to the Buyer that Eltime Controls has available information and product literature concerning the conditions necessary to ensure that the goods supplied hereunder will be safe and without risks to health when properly used. If the Buyer is not already in possession of such literature or requires any information or advice in connection with the safe use of the goods at work the Buyer should immediately contact Eltime Controls.
b) The Buyer shall obtain the necessary permits for importation of the goods into the country of destination. Failure to obtain the necessary permits or part thereof shall allow Eltime Controls, at its option, to terminate an order without further liability or obligation on the part of Eltime Controls, to the Buyer as a result of such termination.

15. Waiver/Indulgence
a) No waiver by either party of any provision of these terms and conditions shall be binding unless made expressly and expressly confirmed in writing. Further, any such waiver shall relate only to such matters, non-compliance of breaches as it expressly relates to and shall not apply to any subsequent or other matter, non-compliance, default or breach.
b) No indulgence or forbearance extended to the Buyer shall limit or prejudice any right or claim available to Eltime Controls.

16. Proper Law/Disputes
a) If at any time any dispute or difference shall arise between Eltime Controls and the Buyer relating to this contract or other matter arising therefrom such dispute or difference shall be referred to a single expert to be approved by Eltime Controls and the Buyer or failing agreement over such appointment by the President for the time being of the Institute of Electrical and Electronics Engineers. Any decision by such an expert shall be final and binding on the Buyer and Eltime Controls. Such an expert shall be deemed as acting as expert and not as arbitrator.
b) Incoterms 2000 shall govern the interpretation of trade terms in these term and conditions of sale, except as may be provided elsewhere.

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