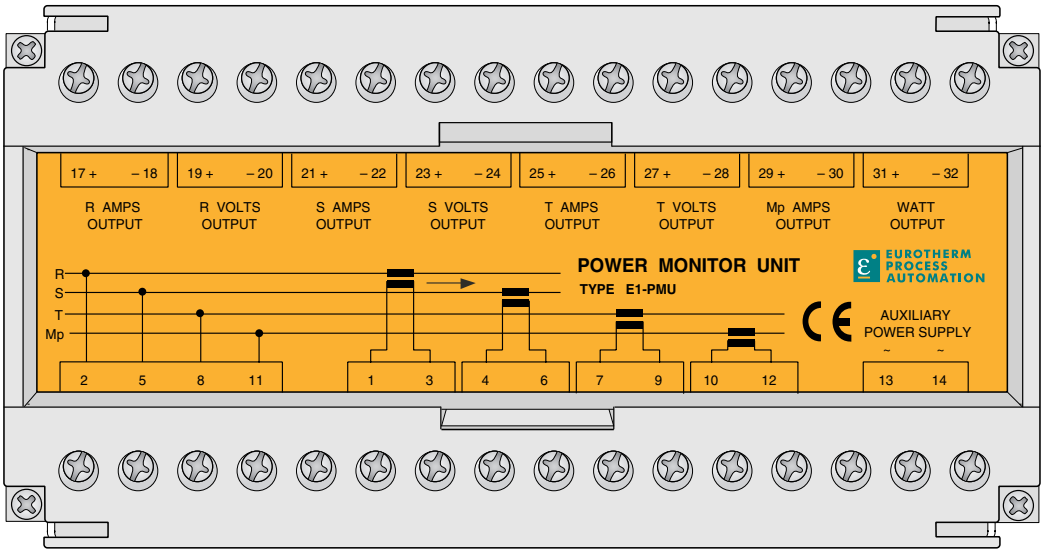
ECLIPSE

SERIES



Power monitoring unit

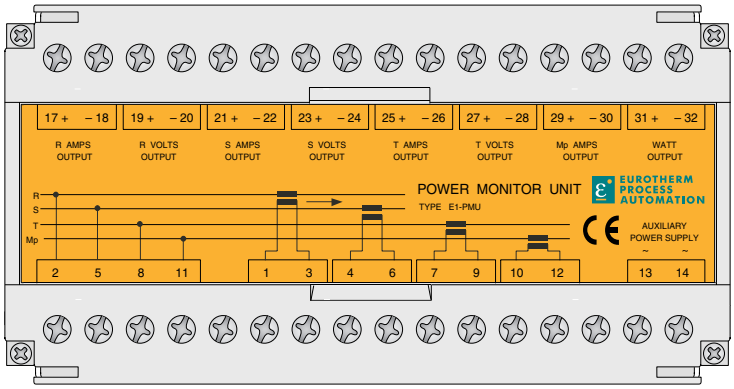
Product data

EUROTHERM PROCESS AUTOMATION

Invensys
An Invensys company

ECLIPSE SERIES POWER MONITORING UNIT

- **Fully isolated and CE compliant**
- **High stability**
- **True RMS current transducers**
- **Very low temperature coefficients**



FUNCTION

Instantaneously measures:–

			Active power (Watts)
R	L1	(Red)	Line/Neutral RMS Volts
S	L2	(Yellow)	Line/Neutral RMS Volts
T	L3	(Blue)	Line/Neutral RMS Volts
R	L1	(Red)	Line RMS Current
Y	L2	(Yellow)	Line RMS Current
B	L3	(Blue)	Line RMS Current
Mp	N	(Neutral)	RMS Current

DESCRIPTION

The E1-PMU measures the most used electrical variables in a three phase load and converts them into proportional dc voltages. Each transducer output is fully isolated from its input current and voltage and is suitable for use with any PLC or energy management system.

Active Power transducer This transducer is true three-element and uses the Time Division Multiplication principle (TDM) to convert Watts into a proportional dc voltage. The standard output is 0 to 10V corresponding to input range, and polarity automatically reverses in a reverse power situation.

Voltage transducers Each transducer is true RMS responding and is calibrated to an output of 0-10V for an input of 0-300V for a line-to-neutral input voltage 0 to 519.6V line-to-line.

Current transducers Each transducer is true RMS responding and is calibrated to an output of 0-10V for an input of 0-5A.

Input currents

The E1-PMU may be supplied for use with current transformers having 1A or 5A secondaries or with our own range of split core current transformers. For use with electronic current transformers with a voltage output as supplied by HENE, please refer to our leaflet E1-PMU/V.

Type E1-PMU/5A – For use with 5A secondary CTs
In this application the Power Monitor Unit is designed for use with the 5A secondary of a current transformer.

Type E1-PMU/1A – For use with 1A secondary CTs
In this application the Power Monitor Unit is designed for use with the 1A secondary of a current transformer.

NOTE: The overall system accuracy is determined by the accuracy of current transformers. CTs with 5A secondaries are normally Class 1 from 100/5A upwards and CTs with 1A secondaries are Class 3 from 60/1A upwards. Current transformers are normally supplied by the customer but we could advise customers who are unsure of their requirements.

Type E1-PMU/SC – For use with Split core CTs
In this application the Power Monitor Unit is designed for use with our own range of split core current transformers. Flexibility of design allows only three CTs to cover the whole range, 100A/100mA, 500A/100mA and 1000A/100mA. The standard E1-PMU offers three ranges of 50kW, 250kW and 500kW respectively but for in between ranges the above CTs are used and the E1-PMU calibrated accordingly.

APPLICATIONS

Diesel generator supervision
Output suitable for most PLCs
Process control supervision
Low cost data acquisition
Local power distribution systems
Factory economy measurements
Marine generator supervision

OUTPUTS

Since the E1-PMU uses a single power supply to drive the output stage of each transducer, the way the outputs are connected to the external electronics dictates which output configuration is required. An output voltage of 0-10V has been selected for flexibility. All output voltages are true and are load independent down to 2K0 min.

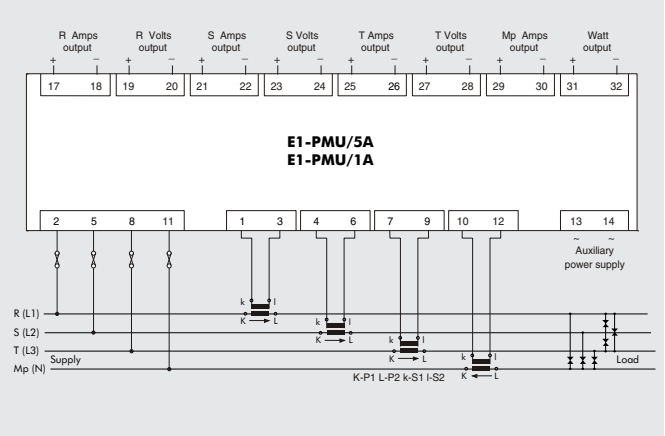
Output voltage Since the negative output voltage is referenced to zero it is possible to use the E1-PMU with a PLC which has either a single ended (common negative) or differential (internally isolated) input.

STANDARDS

Conforms to EMC Directive 89/336/EEC amended by 93/68/EEC and Low Voltage Directive 72/23/EEC

BS EN 60688:1992	Designed to comply with Electrical measuring transducers for converting ac electrical quantities to analogue or digital signals.
IEC414:1979	Safety, high voltage insulation
IEC521:1988	Impulse voltage 5kV waveform 1,2/50uS
IEC255-21-1/3	High frequency disturbance 2.5kV common, 1kV series mode
EN50081-2	Emissions:– Industrial
EN50082-2	Immunity:– Industrial

CONNECTION AND INSTALLATION



Current transformer input

WARNING: Voltage inputs may be direct or VT connected and for safety reasons one side of the VT secondary should be earthed. We recommend that the voltage inputs and power supply should be fused. Current inputs may be direct or CT connected and for safety one side of the CT secondary should be earthed.

It is recommended that the transducer is housed in an enclosure (e.g. Control Panel) that does NOT allow unauthorised access as high voltages can be present on the terminals. The power supply should be fused.

SPECIFICATIONS

Inputs

Input voltage:	0-300V (LN)
Nominal L/N voltage:	230V (220/240V)
Nominal line voltage:	400V (380/415V)
Voltage range:	80 to 120% Vn
Voltage overload:	200% (EN60688.6.18.2a)
Voltage burden:	0.15VA per element
Frequency range (Fn):	45 to 65Hz
Input current:	CT or split core CT
Current range:	0 to 120%
CT burden:	0.8VA/element
Current overload:	×1.5 cont. × 5 for 10 secs
Split core CT:	100mA
Power supply:	195 to 265V 10VA 94 to 120V 10VA

Output

Output/transducer:	0-10V into 2kΩ min
Output overload:	120% max
Accuracy:	Class 0.5 (Watts, Volts and Current)
EMC watts (one off peak):	0.5% horizontal @ 370MHz
EMC current (one off peak):	1% vertical @ 370MHz
EMC voltage (one off peak):	2% vertical @ 370MHz
Output protection:	Protected against o/c and s/c
Output ripple:	<0.5% peak-to-peak per transducer
Test voltage:	2kV RMS for 1 minute
Isolation tests:	Input/output, common input circuits/case-Earth

General specifications

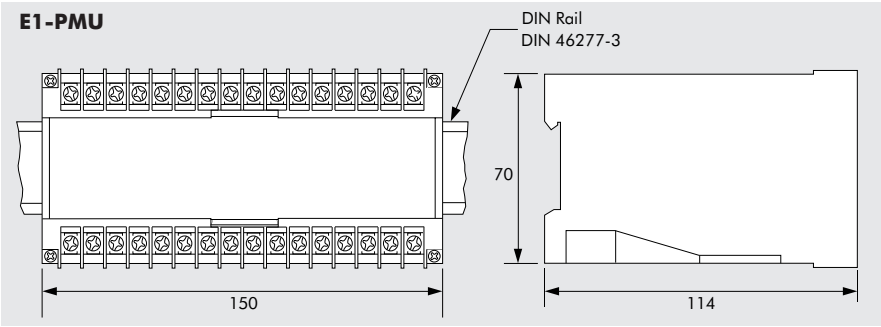
Temperature range:	–10 to +60°C
Temperature drift:	0.01%/°C
Ripple:	<1% peak-to-peak
Stability:	±0.02% per annum all transducers
Response:	0-90% in 200ms (watts) 0-90% in 300ms (current and volts)
Storage temperature:	–40 to 70°C
Humidity:	5% to 85% non-condensing

Mechanical

Weight:	1120gm
Dimensions:	150W × 70H × 114D mm
Housing:	Moulded grey ABS plastic case self extinguishing to VDE0304 Degree 1, with moulded polycarbonate terminal assembly. The case is snap mounting on top-hat rail DIN 4677-3 (CENELEC EN 50-022g) as well as screw mounting.

NOTE The overall system accuracy is determined by the accuracy of the current transformers. We advise Class 1 for the 1A and 5A CTs.

HOUSING DETAILS



ORDERING INFORMATION

Power monitoring unit

Base unit	Power range	System voltage (L/L)	Secondary CT input	O/P range & units	Auxiliary supply
E1-PMU	D1	400V	5A	0-10V	230V

Example

Base unit	Code
Power monitoring unit	E1-PMU

Power range*	
E1-PMU/5A calibrated power 2500W	D1
E1-PMU/1A calibrated power 500W	D2
E1-PMU/SC calibrated power 50W	D3
Specify	x kW

System voltage (line-to-line)	
110V	110V
230V	230V
400V	400V

Secondary CT input	Code
1 Amps	1A
5 Amps	5A
Split core CT	SC

Output range and units	
0-10V	0-10V

Power supply	
110V ±20%	110V
230V ±20%	230V

NOTES

* Range in kW and CT ratio for active power transducer
Unless otherwise specified the E1-PMU will be supplied with the active power transducer scaled with the calibration powers indicated by default options D1, D2 or D3.

With these calibration details the ratio of the CT required will be twice the range in kW for all applications.

eg

D1 a required range of 50kW will need a 100/5A CT

D2 a CT of 200/1A will give a range of 100kW

D3 a range of 250kW will be achieved if a split core CT of 500/100mA is used.

For any other range:–
Should a calibration requirement other than the above be required please specify range and selected CT ratio and check that these fall within our manufacturing limits as follows:–

Un=Nom. Volts (VT Pri.) In=Nom. Current (CT Pri.)

Three phase – $\dfrac{\text{Selected Range (W/kW/MW)}}{1.732 \times \text{Un (L/L)} \times \text{In}}$

The factor should be between 0.5 to 1.5

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