

Watt and VAR Transducers

Auxiliary Powered.
Isolated Output.

Types E1-1W0 to E1-2VAR4

Function

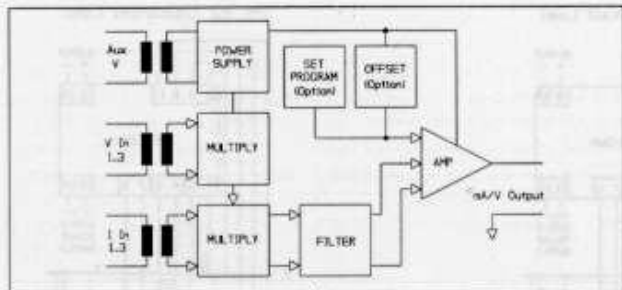
To convert Active Power ($V \cos \phi$) or Reactive Power ($V \sin \phi$) into a proportional easily measured d.c. signal

Description

The Series E1 Watt and VAR transducers are ideally used in Computer & Data Acquisition applications. The polarity of the output signal changes from + to - when the direction of the power flow reverses. This is ideal for all requirements where either unipolar or bipolar measurements are required. Transducers are precalibrated so do not have any user adjustments. Adjustment potentiometers are available as an optional extra.

Operating Principle

The measured a.c. current and voltage inputs are multiplied together using a pulse height/width system, resulting in a differential d.c. voltage proportional to Watts. A symmetrical d.c. amplifier converts this to a true constant current output.



Systems

	Active Pwr	Reactive Pwr
Single Phase (-)	E1-1W0	E1-1VAR0
3ph 3w Bal. (3-1E)	E1-1W3	E1-1VAR3
3ph 4w Bal. (3N-1E)	E1-1W4	E1-1VAR4
3ph 3w Unbal. (3-2E)	E1-2W3	E1-2VAR3
3ph 4w Unbal. (3N-2E)	E1-2W4	E1-2VAR4
3ph 4w Unbal. (3N-3E)	E1-3W4	-

Standards

BS EN 60688:1992 - Designed to comply with Electrical measuring transducers for converting a.c. electrical quantities to analogue or digital signals.

IEC414:1979 Safety, High Voltage Insulation

IEC521:1988 Impulse Voltage 5kV waveform 1,2/50uS



Conforms to Low Voltage Directive 73/23/EEC

EN50081-1 Emissions:- Radiated 30-1000MHz

EN55022:1987 Emissions:- Domestic, Class B.

Emissions:- Mains Terminal, Class B.

EN50082-2 Immunity:- Industrial, Class B.

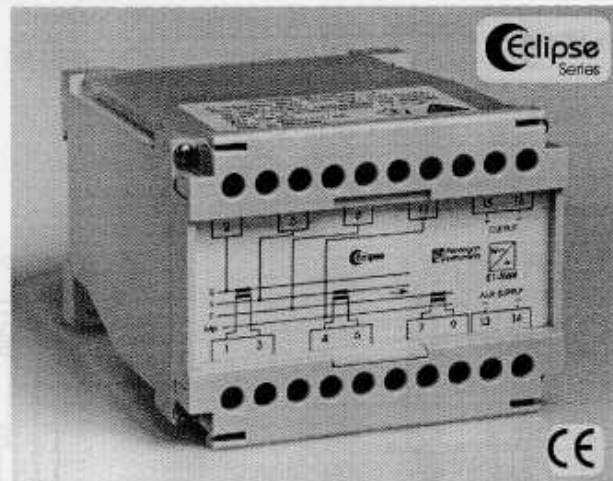
IEC801-2 Immunity:- Electrostatic discharge 8kV

IEC801-4 Immunity:- Transients 2kV 5/ 50nS, Class B.

ISO 9002 Registered with ISOQAR No.1744/98

General Specifications

Response 0 ... 99%	800mS
Temperature Range	-10 ... 60°C
Temp. Coefficient	0.02%/°C
Storage Temperature	-40 ... 70°C
Humidity	up to 90% non condensing
Stability	+/- 0.05% per annum N.A.
Ripple	<1% peak to peak



Specifications Input

Voltage (Vn)

57.7V	208V	380V
63.5V	220V	400V
110V	230V	415V
120V	240V	440V
139V	277V	480V

Current (In)

1A
5A
CT or Direct

Power Supply

110V +/-20%
230V +/-20%
400V +/-20%
(3W4 +20% -15%)

Voltage Range
Optimum Range
Voltage Overload
Current Consumption
Current Overload

0 ... 120% Vn	0.2VA
90 ... 110%	
120% cont	150% 10 sec
Approx 1.0VA	
x 2 cont.	x 10 for 5 secs
x20 for 1sec	
45 ... 65Hz	(1VAR0 Specify)

Frequency Range

Output

Outputs	Compliance
0 ... 1mA	0 ... 10K
0 ... 10mA	0 ... 1K0
0 ... 20mA	0 ... 500R
4 ... 20mA	0 ... 500R
1 ... 5V	2K0 min
0 ... 10V	2K0 min

Overall Accuracy

Class 0.3

Current Error

0.3% max

Voltage Error

0.05% (+/-1% Vn)

Multiplication Error

Better than 0.2%

EMC (one off peak)

-10% Vertical @ 375MHz

Power Factor

0 ... 1

Optional Extras

Range Programme or Bipolar Range
Any Other Current (In) 10A max
4kV Isolation
400Hz Calibration
Accuracy Class 0.2
Non Standard AC Power Supply or 24V DC Power Supply
Tropicalisation

E1-W/V Jan 2000



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We reserve the right to alter specifications without prior notification

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Measuring Range Limits

To check that the chosen measuring range is within manufacturing limits, given the nominal voltage and current, we offer this guide

V_n =Nom. Volts (VT Pri.) I_n =Nom. Current (CT Pri.)

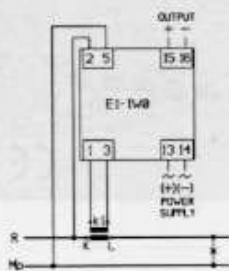
Single Phase - $\frac{\text{Selected range (W/ kW/ MW)}}{V_n (\text{Ph/ } \phi) \times I_n}$

Three Phase - $\frac{\text{Selected Range (W/ kW/ MW)}}{1.732 \times V_n (L / L) \times I_n}$

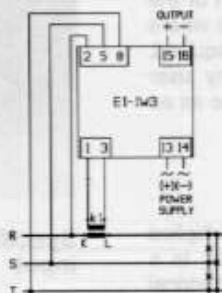
The figure obtained should be between 0.5 to 1.5.

Connection Diagrams

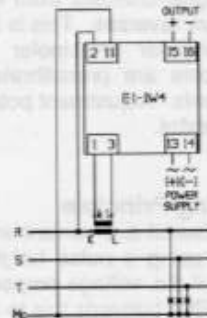
Single Phase Load



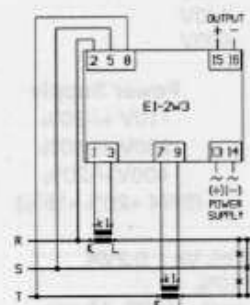
3Ph 3W Balanced Load



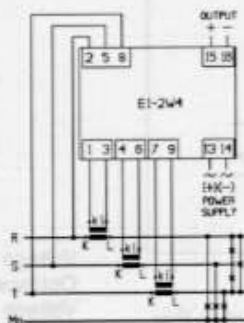
3Ph 4W Balanced Load



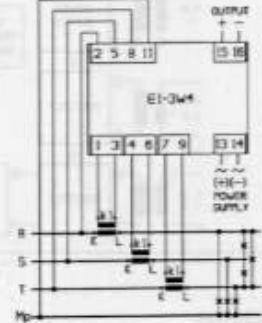
3Ph 3W Unbalanced Load



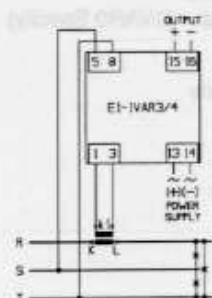
3Ph 4W Unbalanced Load



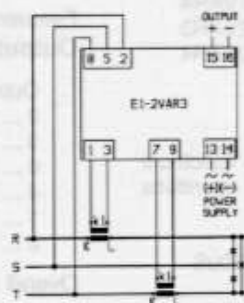
3Ph 4W Unbalanced Load



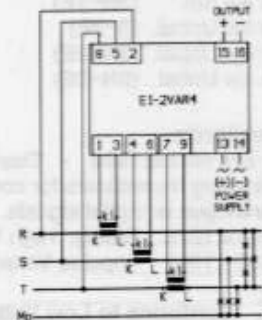
3Ph 3W Balanced Load



3Ph 3W Unbalanced Load



3Ph 4W Unbalanced Load



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

Housings

The housing has a moulded grey ABS plastic case with a moulded polycarbonate terminal assembly. The case is snap mounted on top hat rail DIN 46277-3 (CENELEC EN 50-022) or may be wall mounted using fixing screws provisions.

Range Program (optional extra)

The programmable transducer is used in applications where the system line voltage and CT secondary values are the same and only range and CT primary value varies.

A single transducer may be held in stock and ranged to individual requirements.

■ Most Diesel Generators use 3Ø 4 wire unbalanced loads with 380/415V line voltage and -/5A CT. The E1-2W4 with 1mA would mean the availability of ex-stock wattmeters.

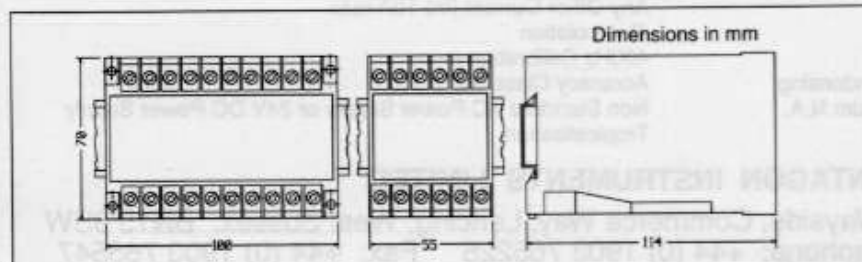
■ HV application in Power Line Transmission where VTs of 11kV/110V and -/5A CTs are used.

For full details please request Data sheet No. 101

Ordering Information

Transducers should be ordered as follows using the information from the boxes overleaf:

Type : System : Range in kW : Input Voltage (Vn) : CT ratio (In) : Output : Power Supply : Options (if required.)



Gross Weights & Housings

E1-1W0	430 gms	55mm
E1-1W4	430 gms	55mm
E1-1VAR3/ 4	430 gms	55mm
E1-1W3	600 gms	55mm
E1-2W3	730 gms	100mm
E1-2W4	735 gms	100mm
E1-2VAR3	730 gms	100mm
E1-2VAR4	735 gms	100mm
E1-3W4	820 gms	100mm