

Watt and VAR Transducers E1-W & E1-VAR Series

Systems to be measured

Single Phase

3 phase 3 wire balanced load

3 phase 4 wire balanced load

3 phase 3 wire unbalanced load

3 phase 4 wire unbalanced load

Active
Power

E1-1W0

E1-1W3

E1-1W4

E1-2W3

E1-3W4

Reactive
Power

–

E1-1VAR3

E1-1VAR4

E1-2VAR3

–

Function: The E1-W series converts Active Power ($V\cos\theta$) and the E1-VAR series converts Reactive Power ($V\sin\theta$) into a proportional linear dc current output.

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

The E1-W and E1-VAR series transducers are ideally used in Computer and 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. Front panel zero and span adjustment potentiometers are available as an optional extra.

SPECIFICATIONS

INPUTS:

AC Voltage Range (Vn) (Standard)

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

Voltage Input

0 to 120% of range

Optimum Input:

90 to 110% of range

Voltage Burden

0.2VA

Voltage Overload

120% continuous
150% for 10 seconds

AC Current (In)

1 Amp or 5 Amp
Via a CT or direct connection

Option: 10 Amp

Current Overload

x 2 continuous
x 10 for 5 seconds
x 20 for 1 second

Input Power Consumption

1.0VA approx

Frequency Range

45 to 65 Hz
Option: 400Hz calibration

OUTPUTS:

Output Configuration

Unipolar as standard

Optional Extra: Bipolar output

DC Current

0 to 1mA into 10K ohms max
0 to 10mA into 1K ohms max
0 to 20mA into 500 ohms max
4 to 20mA into 500 ohms max

DC Voltage

1 to 5 Volt into 2K ohms min
0 to 10 Volts into 2K ohms min

Optional Extra

Range Programming

The programmable transducer is used in applications where the system line voltage and CT secondary values are the same and only the range and CT primary value varies. With range programming a single transducer may be held in stock and ranged to individual requirements.

Isolation

2KV for 1 minute

Option: 4KV

SUPPLY:

Power Supply Voltage

110 Volt AC $\pm 20\%$
230 Volt AC $\pm 20\%$
400 Volt AC $\pm 20\%$

For 3W4 instrument tolerances are
 $+20\%/ -15\%$

Optional extras include non
standard AC power supply and
24 Volt DC power supply

Power Factor

0 1

Power Factor Error

0.08% / 0.1 PF maximum

Mounting

Standard 35mm DIN rail or
Bulkhead

Weight / Housing Width

E1-1W0	430 gms	55mm
E1-1W4	430 gms	55mm
E1-1VAR3	430 gms	55mm
E1-1VAR4	430 gms	55mm
E1-1W3	700 gms	100mm
E1-2W3	730 gms	100mm
E1-2VAR3	730 gms	100mm
E1-3W4	820 gms	100mm

GENERAL:

Overall Accuracy

Class 0.5

Optional Extra: Class 0.2

Voltage Error

0.05% (+10% Vn)

Current Error

0.03% (0 to 150% In)

Multiplication Error

Better than 0.2%

EMC Error (One off peak)

-10% vertical @ 375MHz and
10 volts per metre

Stability

+0.05% per annum N.A.

Ripple

< 1% peak to peak

Response Time

800mS (0 to 99% of span)

Temperature Coefficient

$\pm 0.2\%$ of span / $\square 10^\circ\text{C}$

Operating Temperature Range

-10 to +60°C

Storage Temperature Range

-40 to +70°C

Operating/Storage Humidity Range

0 to 90% RH non-condensing

MEASURING RANGE LIMITS

To check that the chosen measuring range is within manufacturing limits, we offer the following guide:

Given that you know the nominal voltage (V_n) from the primary of the Voltage Transformer (VT) and the nominal current (I_n) from the primary of the Current Transformer (CT) use the following equations:

Single Phase – Selected Range (W /kW /MW)

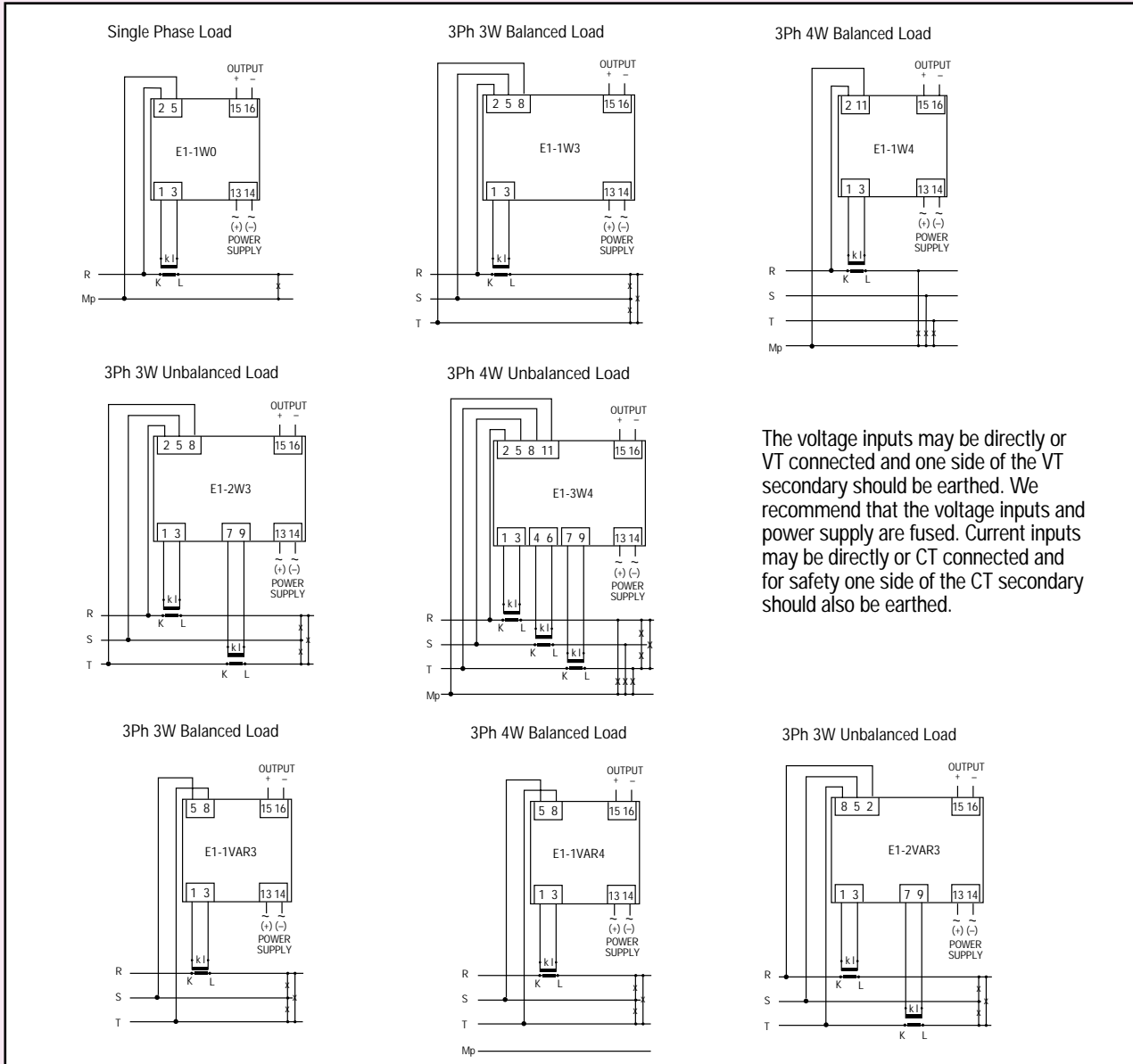
$$\frac{V_n (\text{Ph} / 0) \times I_n}{1.732}$$

Three Phase – Selected Range (W /kW /MW)

$$1.732 \times V_n (L / L) \times I_n$$

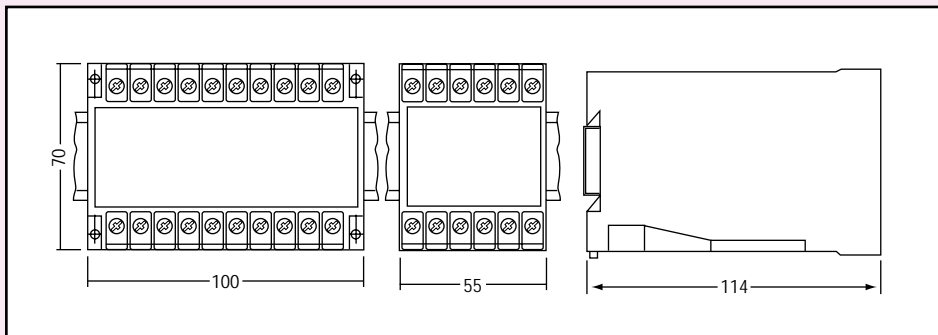
The figure obtained should be between 0.5 and 1.5

TERMINATION DETAILS



The voltage inputs may be directly 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 directly or CT connected and for safety one side of the CT secondary should also be earthed.

MECHANICAL DETAILS



ORDERING DETAILS

- Specify instrument code, i.e. E1-2W3
- Specify power supply, i.e. 230 Volt AC
- Specify input frequency, i.e. 60 Hz
- Specify input voltage, i.e. 380 Volt AC
- Specify CT ratio, i.e. 100/5 Amp AC
- Specify measured range, i.e. 5kW
- Specify output required, i.e. 0 to 20mA
- Specify any of the optional extras required

