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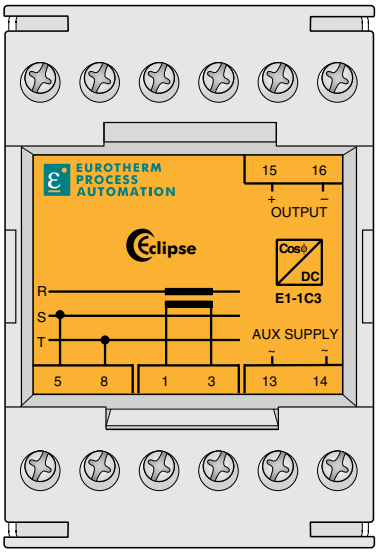
SYSTEM

EUROTHERM
PROCESS
AUTOMATION

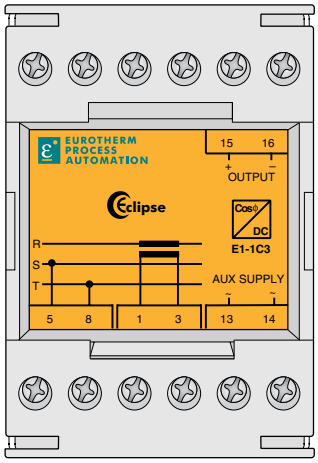


Eclipse series Phase angle transducers

Product Specification

ECLIPSE SERIES PHASE ANGLE TRANSDUCERS

- **Fully isolated**
- **Unipolar or bipolar output options**
- **Current outputs with true and 'live' zero**
- **Single or polyphase systems**
- **DIN rail mounting**



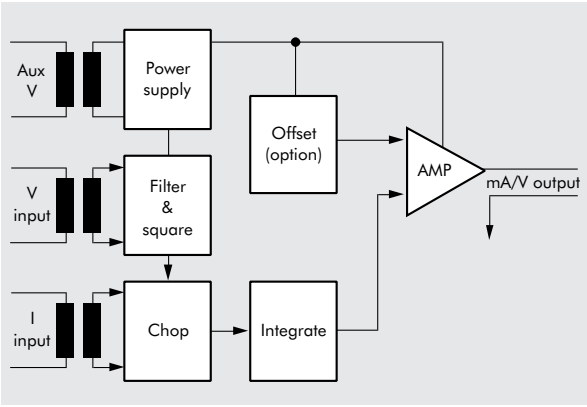
INTRODUCTION

The Eclipse series phase angle transducer provides an accurate dc output signal proportional to the phase angle between the ac current and voltage being measured.

The transducers are separately powered and use the latest electronic circuits to detect the electrical phase difference between a voltage and current and convert it into a signal which is amplified into a proportional dc voltage or current. The input range and output current have been selected from the most commonly used specifications. The output is bipolar unless unipolar is requested.

FUNCTIONAL DESCRIPTION

The measured ac current and voltage inputs are squared up and chopped using a precision quadrature switching circuit, resulting in a dual polarity pulsed current output. This is actively integrated and a symmetrical dc amplifier converts this to a true constant current output, linearly proportional to electrical degrees (non-linear to cos-phi scale).



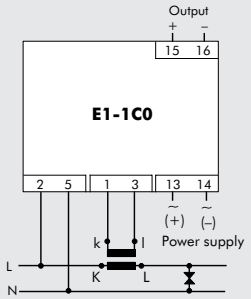
Phase angle/power factor

STANDARDS

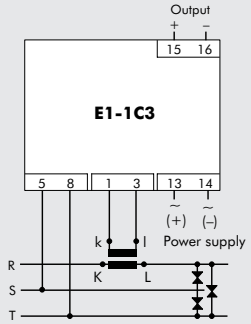
Conforms to EMC Directive 89/336/EEC amended by 93/68/EEC and Low Voltage Directive 72/23/EEC

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



Single phase load



Three phase three wire balanced load

WARNING: 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 should be fused. Current inputs may be direct or CT connected and for safety reasons one side of the CT secondary should be earthed. Current transformers MUST NOT be open circuited on load. To avoid possible damage to the electronic circuitry it is recommended that the output cable is screened and earthed at one end only. Avoid running it near high current carrying cables.

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

Frequency ranges:	50, 60 or 400Hz
Voltage:	110V, 240V, 380V, 415V
Voltage range:	Vn ± 20%
Power supply burden:	1.8VA approx
Current:	1A or 5A
Current range:	40% to 150% of nominal In
Burden:	0.8VA approx

Outputs

Accuracy:	Class 1.0 ±2°
Isolation test:	2kV for 1 minute
Load error:	Zero

Drive capability

Outputs:	10V

General specifications

Temperature range:	–10 to +60°C
Temperature drift:	0.02%/°C
Ripple:	<1% peak-to-peak
Stability:	±0.05% per annum non-accumulative
Response:	0-90% in 300mS
Storage temperature:	–40 to 70°C
Humidity:	Up to 90% non-condensing

Mechanical

Weight:	400gm approx
Dimensions:	55W × 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 50-022)

Phase angle transducer output and range options

Range 0.5 lead to 1 to 0.5 lag

Bipolar output

	0.5 lead (60°C Cap)	1 (0°)	0.5 lag (60° Ind)	Load
1mA Centre zero	–0.5mA	0	+0.5mA	0-10kΩ
10mA Centre zero	–5mA	0	+5mA	0-1kΩ
20mA Centre zero	–10mA	0	+10mA	0-500Ω

Unipolar output

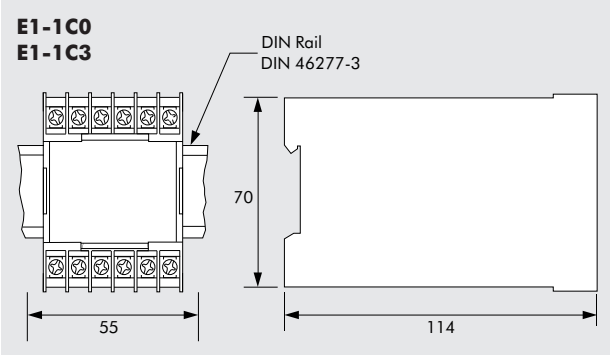
	0.5 Lead (60°C Cap)	1 (0°)	0.5 Lag (60° Ind)	Load
0-1mA	0mA	0.5mA	1mA	0-10kΩ
0-10mA	0mA	5mA	10mA	0-1kΩ
0-20mA	0mA	10mA	20mA	0-500Ω
4-20mA	4mA	12mA	20mA	0-500Ω

Range 0.8 lead to 1to 0.2 lag

Unipolar output

	0.8 lead (26.9°C Cap)	1 (0°)	0.2 lag (78.5° Ind)	Load
0-1mA	0mA	0.32mA	1mA	0-10kΩ
0-10mA	0mA	3.2mA	10mA	0-1kΩ
0-20mA	0mA	6.4mA	20mA	0-500Ω
4-20mA	4mA	9.11mA	20mA	0-500Ω

HOUSING DETAILS



ORDERING INFORMATION

Phase angle transducer

Base unit	Voltage input	Frequency input	Current input	O/P range & units	Auxiliary supply	Options
E1-1C3	380V	50Hz	5A	±10mA	400V	–

Base unit	Voltage input	Frequency input	Current input	O/P range & units	Auxiliary supply	Options
E1-1C3	415V	50Hz	5A	0-20mA	24V	Unipolar 0.8 to 1 to 0.2

Examples

Example 1 above shows a 3 phase, 3 wire balanced load with 0.5 lead to 1 to 0.5 lag range, working on a 380V line to line system with a 5A current input, an output of –10mA to +10mA and a 400V power supply.

Example 2 above shows a 3 phase, 3 wire balanced load with 0.8 lead to 1 to 0.2 lag range, working on a 415V line to line system with a 5A current input, an output of 0-20mA and a 24V dc power supply.

Base unit	**Code**
Single phase	E1-1C0
Three phase	E1-1C3
Voltage input (Vn)	
110V	110V
220V	220V
230V	230V
240V	240V
380V	380V
400V	400V
415V	415V
Frequency input	
50Hz	50Hz
400Hz	400Hz
Current input (In)	
1A	1A
5A	5A
10A	10A
CT ratio	Specify

Output range and units	**Code**
Not available unless unipolar specified as a option	
0-1mA	0-1mA
0-10mA	0-10mA
0-20mA	0-20mA
4-20mA	4-20mA
Ranges only available for power factor 0.5 lead to 1 to 0.5 lag	
–0.5mA to +0.5mA	±0.5mA
–5mA to +5mA	±5mA
–10mA to +10mA	±10mA
Auxiliary supply	
110V ac ±20%	110V
230V ac ±20%	230V
400V ac ±20%	400V
24V dc	24V
Options	
4kV isolation tested	
Unipolar output*	

* Please specify 0.5 lead to 1 to 0.5 lag or 0.8 lead to 1 to 0.2 lag

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