



OPERATING AND INSTALLATION INSTRUCTIONS FOR THE PM1

IMPORTANT

This unit has been tested to the standards listed on its certificate of conformity. It is the responsibility of the installer / user to ensure the system and installation conforms to any relevant standards.

Loss of safety features could occur if used outside the specified parameters or incorrectly installed.

Installation and commissioning of this unit should be carried out by a suitably competent person. This document should be read in conjunction with other product literature for best performance.

All fault finding especially when a voltage loss or failure is suspected or indicated by the unit should be done with the supplies isolated and by a competent body.

The unit contains no user serviceable parts.

Brief Description

The PM1 monitors up to three ac inputs and converts them to proportional dc mA currents respectively. Volt free contacts are available to indicate loss of the input voltages.

Detailed Operation

A signal in the range of 0 to 300Vac is input to each channel, a proportional current output in the range of 4 to 20mA is produced. This current can be used for monitoring purposes and will drive into several hundred ohms. The circuit draws its power from the input signal being monitored thus no auxiliary power supply is needed. Obviously 4mA will never be a valid level and the lowest current level will be approximately 6mA. Light duty volt free changeover contacts are available to signal abnormally low, or loss of, voltage this level is factory set. A fixed hysteresis is incorporated to stop relay chatter during fluctuation of the low- level input signal.

Three separate channels are available on the unit these need not all be used if not required. The input signals may be from different sources or the user can link the neutral connections to monitor three lines of a three-phase supply.

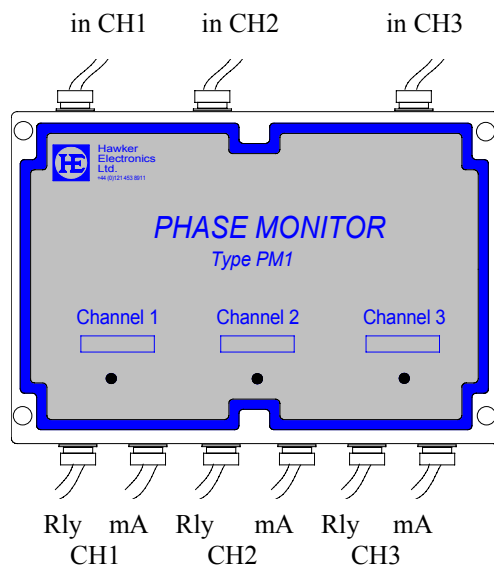
The output current loops are isolated from each other and earth, and the ac input via the input transformers. The output current is driven from an internally derived nominal 12Vdc supply.

Mounting and Installation

The unit is mounted as shown below in a permanent position usually inside a panel on Din rail, the unit is supplied with two 35mm Din mounting brackets.

The unit uses a plug and socket arrangement for connection of incoming and outgoing signals, this allows for easy connection / disconnection without the need to open the enclosure. These plugs are not designed for frequent connection and disconnection.

The ac-input voltage to each used channel should be supplied via a local isolating fuse. The fuse rating must not exceed 100mA, an anti-surge type is recommended. The output current and relay signals although low voltage should have an adequate means of protection and isolation determined by the user / installer.



The ac inputs are via 3-pin plugs which connect to 3-pin sockets mounted externally on the enclosure top. The volt free contacts and current loop exit from the bottom, for each channel respectively. The relay contacts and current connections are via 4-pin plug and sockets. The user terminates incoming wiring to the plugs only, the sockets are factory pre-wired.

If a three-phase supply is being monitored the common “N” neutral of the three phases may go into any “N” and be linked on the plugs. In this configuration care must be taken, as **415V** may be present inside the unit.

The volt free contacts and current are terminated as below. Careful positioning and segregation should be used to avoid noise problems. The Led for each channel can be seen below the channel identification boxes.

Plug connections


4-20mA Current output (4-Pin)

1	not connected
2	not connected
3	I +
4	I -

Relay Volt free contacts (4-Pin)

1	not connected
2	Common
3	Normally Closed
4	Normally Open

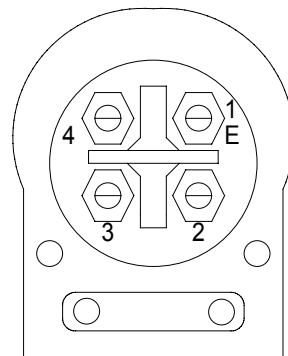
Voltage a/c Input (3-Pin)

E	Earth	
L	Live	
N	Neutral	

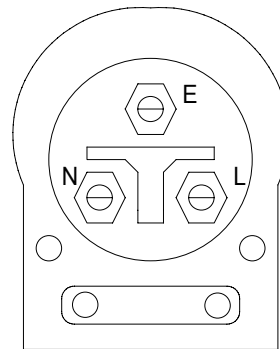
**IMPORTANT -
THIS EQUIPMENT MUST BE EARTHED**

**ENSURE THE CORD GRIP IS USED ON ALL
FITTED PLUGS.**

Inside view of 4-pin plug



Inside view of 3 pin plug



General

It is important never to exceed the channel maximum input volts, this is 300V between any channels Live and Neutral terminal. Even so using the neutral as the common reference it is possible to monitor a three-phase supply.

Rectangular boxes are outlined on the lid label showing the Red, Yellow and Blue channels when monitoring a three-phase supply. These can be ignored and may not be relevant when monitoring single phases of different supplies or when different installation colour coded conductors are used. The user must ensure correct phase connections and identification.

Indication of a low/loss of volts

If a loss of volts occurs or the input voltage level drops below the pre-set value the corresponding channel led will extinguish and the user relay will de-energise. When fault finding it must be remembered to take extreme care and to use approved tools or equipment to diagnose the problem. All voltages must be isolated for safety when work is carried out, in case the supply corrects itself. This equipment is for mains fluctuation monitoring purposes it is not intended to be used as a voltage meter.

Technical Specifications

Taken @ 25°C

Input	40 to 300Vac 50Hz per channel * 30mA max per channel
Min I/P. Volts	Approx. 40Vac
Output Current	350 Ohms max min. 6.1mA @ 40Vac I/P max 20mA @ 300Vac I/P
User Relay	For volts failure detection S.P.C.O. Normally energised Volt Free Contacts max switching 1A @ 30Vdc
Relay Drop out volts	Approx. 50Vac Input (Factory Set)
User Relay pull In volts	Greater than approx. 60Vac Input
Led	Green, illuminated when User relay energised.
Accuracy	better than 3%
Linearity	2%
Op temp	-10°C to +40°C
Enclosure	Polycarbonate, Low Halogen, LxWxH 240 x 160 x 90 IP50 with Plug and Sockets terminations.
Fixing	Standard 35mm Din Rail
Weight	1.6Kg

* The nominal input voltage is 240Vac however the unit will monitor up to an absolute maximum 300Vac. A maximum continuous time of 4 hours at 300V at +40°C should not be exceeded, the unit should then be returned to the nominal voltage or less for an equal time period.

Because of continuing development we reserve the right to change the specifications without notice.
For a full list of HAWKER products and application notes visit our web site at www.hawker-electronics.co.uk

HAWKER ELECTRONICS LTD .

57 The Avenue,
Rubery Industrial Estate,
Birmingham B45 9AL, ENGLAND
Telephone : + 44 (0)121-453-8911 Fax : + 44 (0)121-453-3777
e.m ail: info@ hawker-electronics.co.uk



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According to the
EMC Directive 89/336EE and Low-Voltage Directive, 73/23/EEC
Including amendments by the CE Marking Directive, 93/68/EEC

Type of equipment: **Vac to mA Signal Converter**
Brand name: **Phase Monitor**
Type model: **PM1**
Manufacturer: **Hawker Electronics Ltd.**
Manufacturers Address: **51 The Avenue, Rubery Industrial Estate, Rubery,
Birmingham, B45 9AL. U.K**

Tested to the following harmonised European EMC standards: -

Generic Standards EN50081/2 Using EN55011 Class A limits

EN55011 Class A Conducted Emissions, PASS
EN55011 Class A Radiated Emissions, PASS
EN61000-4-4 Fast Transient Bursts, PASS
EN61000-4-2 Static Discharge, PASS

Tested to the following harmonised European Electrical Safety Standards: -

***BS EN 61010-1 :2001 Safety requirements for electrical equipment for
measurement, control and laboratory use.***

Additional information

Indicate below compliance, with reference to the above Directives:

- The product complies with the harmonised European safety standards listed above.
- The product complies with good engineering practice in safety matters within the EEA, including parts of the safety standards / specifications listed above.
- We have an internal production control system that ensures compliance between the manufactured products and the technical documentation.

As manufacturer / ~~the manufacturer's authorised representative~~ established within the EEA, we declare under our sole responsibility that the equipment follows the provisions/Directives stated above.

Signed Date

M Armstrong
Technical Director