

Speed Sensing/Monitor Relays PH3 -12/24 DIN-rail mounted

Introduction

This unit monitors the speed of rotating equipment using a magnetic pick-up and provides three relay outputs according to measured speeds. The pick-up could, for instance, detect teeth on a rotating gear or flywheel. The unit also provides a tachometer output for speed indication. The relay outputs can be used for alarm or control purposes. LEDs indicate power on and relay status.

Controls on the front panel set the trip points at which the relays and LEDs operate:

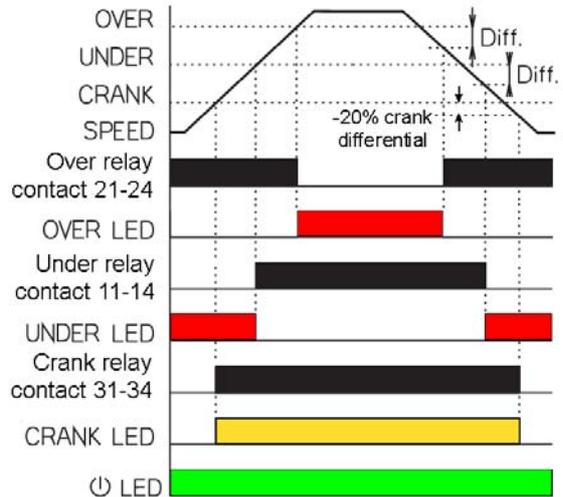
- Crank speed - set just above the speed of the crank motor.
- Under speed - set below the normal running speed (<100%).
- Over speed - set to the maximum permitted speed (>100%).

The unit can be calibrated such that a standard 100% on the unit represents the required nominal engine speed.

These instructions contain important safety information. Please read them thoroughly before commissioning, operating or maintenance of the unit.

Specification

Parameter	PH3
Supply voltage	12-24V d.c.
Supply voltage tolerance	+20/-10%
Burden on supply	1.4W max.
Input pulse amplitude	5-75V p-p
Frequency range	0-1 kHz min, 0-10 kHz max
Trip settings:	w.r.t calibrated speed:
Cranking	10-50%
Under-speed	50-100%
Over-speed	100-130%
Differential	Fixed at 2%
Analogue (meter) output	0-1 mA
at 100% rated speed	0.75 mA
at 133% rated speed	1 mA
Relay contacts: for general switching operations	3 x changeover, volt-free
Load capacity - a.c.	250V @ 8A, 2 kVA
Load capacity - d.c.	30V 8A
Insulation	4 kV/1 min
Mechanical endurance	30x10 ⁶ operations
Other Data:	
Dimensions	90 x 52 x 64 mm
Weight	133g approx.
Maximum conductor size	2 x 1.5 mm ² or 1 x 2.5 mm ²
Operating temperature	-20 to +55 °C
Storage temperature	-30 to +70 °C
Over-voltage category	III
Pollution degree	2
Environmental protection	IP40 for front panel IP20 for terminals.
Standards	EN 60255-6, EN 60255-27, EN 61000-6-2, EN 61000-6-4
	Insulation Class: Ensure any external circuits connected to the relay are provided with double or reinforced insulation.



The differential trip levels help to prevent relay chatter as the monitored speed varies.

As the relays have changeover contacts, the relay outputs can be inverted by wiring to the alternative terminals 11-12, 21-22 or 31-32.

Operation

The green  LED lights shows when the power supply is on.

With the motor running at its normal speed, between Under and Over speed settings, only the green and amber LEDs will be on and all three relays will be energised.

Crank

The Crank LED lights and the crank relay energises when the engine speed exceeds the Crank setting. This is normally set just above the cranking speed of the crank motor so that the unit indicates that the engine has started.

The LED goes off and the relay de-energises when the engine speed falls 20% below the crank speed setting.

Under-speed

The Under LED goes off and the relay energises when the engine speed exceeds Under-speed control setting.

The LED lights and the relay de-energises when the engine speed falls below the Under-speed control setting minus a 2% differential.

Over-speed

Normally, the Over relay is energised and the LED is off. If the engine speed exceeds the Over-speed limit setting, the Over relay de-energises and the LED lights. The relay remains de-energised with the LED on until the speed drops below the limit setting minus the 2% differential.

Sensor disconnection

If the sensor becomes disconnected, the Over LED flashes, the Over relay de-energises, the Crank and Under relays energise and the Crank and Under LEDs light.

Calibration

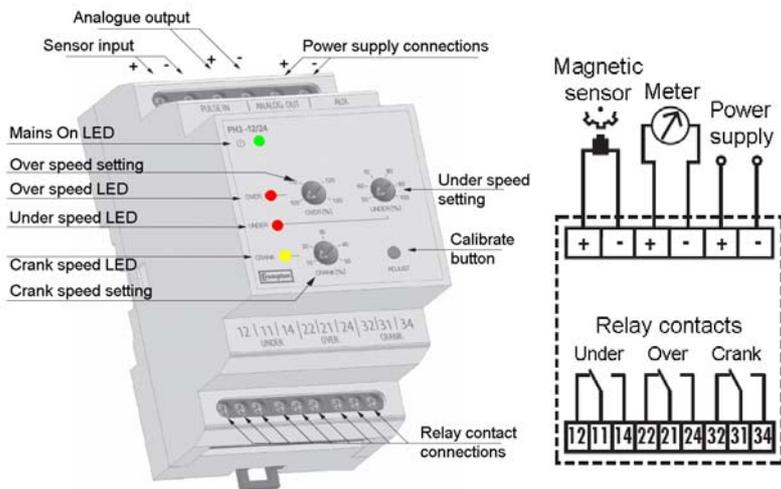
The unit can be calibrated by supplying an appropriate input to the sensor input terminals and pressing the Adjust button for more than 3s. This input then becomes the 100% reference used by the meter.

The required sensor input can be obtained either by running the engine at the required speed or by providing a pulse input at the appropriate frequency from a pulse generator.

Installation

The unit is intended for mounting on a standard DIN rail. Hook the unit onto the top of the rail and press the bottom of the unit until it locks in place. To remove the unit from the rail, lever down the black tab at the bottom of the unit to release it from the rail.

The unit is intended for use in a reasonably stable ambient temperature within the range -20 to +55°C. Do not mount the unit where there is excessive vibration or in excessive direct sunlight.



Warnings:

- During normal operation, voltages hazardous to life may be present at some of the terminals of this unit. Installation and servicing should be performed only by qualified, properly trained personnel abiding by local regulations. Ensure all supplies are de-energised before attempting connection or other procedures.
- It is recommended adjustments be made with the supplies de-energised, but if this is not possible, then extreme caution should be exercised.
- Terminals should not be user accessible after installation and external installation provisions must be sufficient to prevent hazards under fault conditions.
- This unit is not intended to function as part of a system providing the sole means of fault protection - good engineering practice dictates that any critical function be protected by at least two independent and diverse means.
- The unit does not have internal fuses therefore external fuses must be used for protection and safety under fault conditions.
- If this equipment is used in a manner not specified by the manufacturer, protection provided by the equipment may be impaired.

Safety

The unit was designed in accordance with BS EN 600255-6 and -27 – Permanently connected use, Normal condition. Insulation category III, pollution degree 2, basic insulation for rated voltage. Measurement Category III.

All of the above information, including drawings, illustrations and graphic designs, reflects our present understanding and is to the best of our knowledge and belief correct and reliable. Users, however, should independently evaluate the suitability of each product for the desired application. Under no circumstances does this constitute an assurance of any particular quality or performance. Such an assurance is only provided in the context of our product specifications or explicit contractual arrangements. Our liability for these products is set forth in our standard terms and conditions of sale.

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EMC Installation Requirements

This unit has been designed to provide protection against EM (electromagnetic) interference in line, in accordance with BS EN 61000-6-2 and -6-4. Precautions necessary to provide proper operation of this and adjacent equipment will be installation dependent and so the following can only be general guidance:

- Avoid routing wiring to this unit alongside cables and products that are, or could be, a source of interference.
- To protect the product against incorrect operation or permanent damage, surge transients must be controlled. It is good EMC practice to suppress differential surges to 2kV or less at the source. The unit has been designed to automatically recover from typical transients, however in extreme circumstances it may be necessary to temporarily disconnect the auxiliary supply for a period of greater than 5 seconds to restore correct operation.
- Screened communication leads are recommended and may be required. These and other connecting leads may require the fitting of RF suppression components, such as ferrite absorbers, line filters etc., if RF fields cause problems.
- It is good practice to install sensitive electronic instruments that are performing critical functions in EMC enclosures that protect against electrical interference causing a disturbance in function.

Wiring

All connections are made to screw clamp terminals. Terminals are suitable for copper wires only and will accept one stranded 0.05 - 2.5mm² (30 - 12 AWG) stranded or solid core cables. Terminal screws should be tightened to 0.5 Nm. Choice of cable should meet local regulations.

Instrument transformers used for connection to the meter must be of approved type, compliant with ANSI/IEEE C57.13 / IEC 60044-1 to provide isolation from measuring inputs.

For UL approved installation, use National Electrical Code (NEC) Class 1 wiring, rated at 300V / 60°C min rating.

Auxiliary Supply

The unit should ideally be powered from a dedicated supply 12-48V DC 1.4W, polarity reversal will not cause damage but the instrument will not function.

Fusing

A suitable switch or circuit breaker conforming to the relevant parts of IEC 60947-1 and IEC 60947-3 should be included in the building installation. It should be positioned so as to be easy to operate, in close proximity to the equipment, and clearly identified as the disconnecting device.

This unit must be fitted with an external fuse in voltage supply line. Line must be fused with a quick blow fuse 1A maximum. Choose fuse of a type and with a breaking capacity appropriate to the supply and in accordance with local regulations.

For UL approved installations:

UL listed branch circuit fuses, suitable for the installation voltage, shall be provided and installed in accordance with national installation code – 1A fast acting AC rated at the input.

Maintenance

In normal use, little or no maintenance is needed. Where used, ensure any CT secondary circuits are short circuited prior to carrying out installation or maintenance of the unit. As appropriate for service conditions, isolate electrical power, inspect the unit and remove any dust or other foreign material present. Periodically check all connections for freedom from corrosion and screw tightness, particularly if vibration is present.

