Installation and Operating Instructions

ANSI Switchboard Synchroscopes

Products covered:

007-14A-PRAE-C7

Warnings

Caution: Risk of Electric Shock and Danger

- **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 user replaceable 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.**

EMC Installation Requirements

This unit has been designed to provide protection against EM (electro-magnetic) interference in line with requirements of FCC and other regulations. Precautions necessary to provide proper operations 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.
- The supply to the unit should not be subjective to excessive interference. In some cases, a supply line filter may be required.
- 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.
- 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.

Marking and ratings

Barrel side labels show function and electrical rating. The terminals are connected directly across the input to be measured. Note that the electrical rating may differ from the dial scale marking, and the unit side label is definitive. These meters are intended for a rated temperature range of -10 to +45 deg C and up to 80% relative humidity. The acceptable range of the voltages is +/-15% of the rated voltage. The maximum total supply burden is less than 5VA

Installations

The meter should be installed in line with the requirements of the National Electrical Code (NEC) for USA or Canadian Electrical Code (CEC) for Canada. It should be installed in a dry position, not in direct sunlight and where the ambient temperature is reasonably stable and will not be outside the range noted above. These units are only for built in use, at an altitude not exceeding 2000 meters. Terminals must be inaccessible to users after installation. It is essential to make proper ANSI cut-out in the panel to make mounting possible, please refer diagram of ANSI panel cut-out as shown over the page.

Do not tighten the mounting nuts beyond the torque necessary to secure the meter to the panel.

Please refer to the connection diagram for wiring guidelines.

Note: proper grounding of the panel should be ensured before installation.

Wiring

Choice of associated components

A table giving guidance of choice of fuses, connection cable and ring lugs, where applicable, is shown over the page.

Choose fuses for a voltage rating equal to or exceeding the rated voltage of the circuit into which the meter is connected and of a type and with breaking capacity appropriate to the supply to which the fuse is connected. Connection wires and ring lugs should be approved for at least 1amp. Ensure cables and lugs have a voltage installation rating equal to or greater than the rated voltage of the circuit to which they are connected. Use Copper Conductors Only.

Fusing & Connections

Terminals are suitable for use with insulated ring lugs. Ensure a minimum spacing of 0.21 inches (5.5mm) between uninsulated parts of adjacent ring lugs: Fit the supplied lock nut to each terminal after the first nut to ensure that connections cannot come loose in service.

Tighten terminal nuts to 2Nm (1.5 ft/b) only. Wiring must comply with NEC class 1 requirements. These products do not have internal fuses therefore external fuses must be used for safety protection under fault conditions. Voltage input lines must be fused with a quick blow fuse 1A maximum and rated no less than the highest voltage connected to the meter.

The equipment into which this meter is installed must have an adjacent means of isolating the supply voltage to permit safe access for subsequent maintenance.

Voltage transformers (PTs) may be used where appropriate to extend the range, provided that the ratings marked on the side label are not exceeded at point of connection to meter. These products are designed for permanently connected use, normal condition, overvoltage category III, pollution degree 2 (e.g.non ventilated panels or ventilated panels with fillers, without condensation occurring), basic insulation, for rated voltage.

Maintenance

As required wipe the front face with a damp cloth, ensuring that no moisture enters the unit or penetrates behind the mounting panel. No maintenance is required beyond periodically checking the mechanical zero of the meter as described below in “commissioning”, if necessary, remove any accumulations of dust or other forgoing matter from the terminal area and ensure that the connections remain tight.

This equipment is not intended to be field serviceable and contains no user replaceable parts.

Commissioning

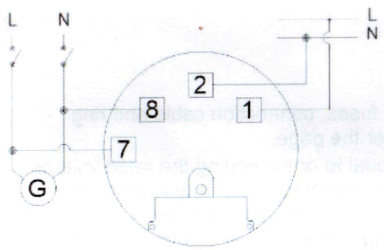
The units are calibrated at the factory for full accuracy. It is recommended that after installation, test signals are applied to confirm correct indication.

Special Synchroscope Operational Information

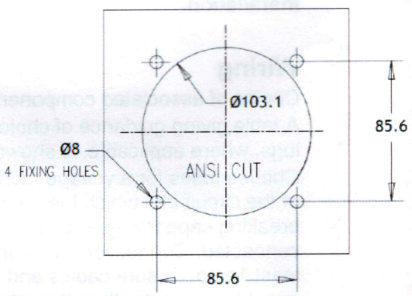
- The electricity net circuit and generator circuits of the synchroscope should be electrically isolated
- When the frequency difference of generator and electricity net is within 1.0Hz, the pointer of synchroscope can indicate the direction correctly. Turning in the clockwise direction means the frequency of generator is higher than frequency of electricity net: Conversely, the frequency of generator is lower than the frequency of electricity net when the pointer rotation is counter-clockwise.
- With the frequency difference of generator and electricity net within 1.0Hz, the RPM of the pointer of the synchroscope will be stable.
- Under the reference condition, when the circuit of either generator of electricity net is switched off, or both circuits are switched off, the pointer of the synchroscope should not be located in the range of 30 degree on either side of synchronised mark.
- The synchroscope is rated for continuous operation, provided that inputs are maintained within specifications.
- When the synchroscope is connected according to the diagram and both supplies are switched on, the generator RPM can be adjusted until supply synchronisation is indicated, at which point the net and generator circuits can be connected.
- Note: The synchroscope indicates frequency or phase difference only. It must be ensured that the voltage difference between the measured circuits is within acceptable limits prior to circuit closure.

Choose UL approved fuses, connection wires and ring lugs if the installation is to meet UL requirements or CSA approved items if the installation is to meet CSA requirements.

Wiring Diagram



Panel Cut Out



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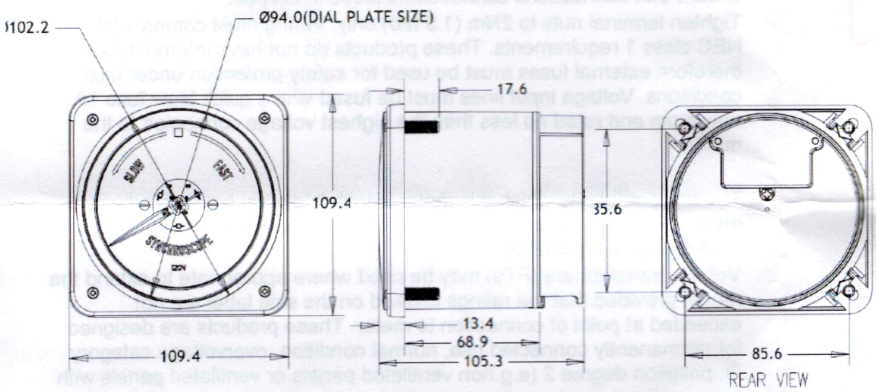
Product dimensions



Explanation of Symbols:

Refer to manual

Danger of electric shock

Do not discard

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