Installation & Operating Instructions

DIN Synchroscopes

244 Series LED Synchroscope
Synchrocheck Relay with Dead Bus

Product: **Single Phase or Three Phase- 3/4 Wire** **360 Degree LED Synchroscope with Check Relay**		
Part No.		
244-14HG-J-01	59 - 77V	Synchro check relay, Voltage Difference and Dead Bus
244-14HG- L-01	100 - 120V	
244-14HG-M-01	220 - 240V	
244-14HG-H-01	380 - 480V	
244-14GG-J-01	59 - 77V	Synchro check relay, Voltage Difference
244-14GG-L-01	100 - 120V	
244-14GG-M-01	220 - 240V	
244-14GG-H-01	380 - 480V	

Caution: Risk of Electric Shock and Danger

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.**

EMC Installation Requirements
This unit has been designed to provide protection against EM (electro-magnetic) interference in line with requirements of EU and other regulations. Precautions necessary to provide proper operation of this and adjacent equipment will be installation dependent, and further recommendations or requirements are provided in this document. The following should be considered as good practice, even if not specifically required:

- 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 supply for a period of greater than 5 seconds to restore correct operation.
- In applications that have inherently high levels of electrical interference, to ensure reliable operation it may be necessary to provide additional EM suppression to the generator input of this unit. Typically, clip over ferrite absorbers are both an effective and convenient mitigation. Where very high levels of electrical noise are prevalent, multiple turns of the supply lines through the suppressor may be required.

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.

Installation

244 models may be mounted in a panel of any thickness up to a maximum of 6mm with built-in mounting or up to 12mm by with two optional panel clamps. Consideration should be given to the space required behind the units to allow for bends in the connecting cables. Additional protection to the panel may be obtained by the use of an optional gasket. The terminals at the rear of the case should be protected from liquids. Units should be mounted in a reasonably stable ambient temperature and in any event where the temperature is within the range -20 to +45ºC

The unit should not be mounted where it is subjected to excessive direct sunlight; vibration should be kept to a minimum. Labels are fixed to the units and carry full connection information and data including type number, input voltage, current, frequency and supply as appropriate.

The products do not have internal fuses therefore external fuses **must** be used for safety protection under fault conditions.

Fusing & Connections

This unit must be fitted with 1A quick blow external fuses, or a circuit breaker in the voltage supply lines. Fuse type and breaking capacity should be appropriate to the supply and in accordance with local regulations. A switch or disconnecting device should be provided and positioned close to the unit allowing for isolation of the supplies. Cabling should be rated for 1A minimum and at least the highest voltage of the supply lines.
Connection is made through screw clamp terminals that will accept 0.5 to 2.5mm (30/12 AWG) stranded conductors. Recommended tightening torque is 0.5Nm

Setting Up and Maintenance

Adjustment potentiometers are provided on the rear of the unit for setting the desired tolerance of voltage and phase angle difference. In addition, a variable time delay for the synchro check relay function is also provided. All values chosen should be selected to suit the end use application. The unit contains no user serviceable parts and requires minimal maintenance. During routine servicing and inspection of the associated equipment, the unit should be inspected to normal standards for this class of equipment. For example, remove accumulations of dust and check all electrical connections for tightness and corrosion.

Product Description

The 244-14HG synchroscope is based on a microcontroller, which interprets the input signals and displays the phase and voltage information on a series of light emitting diodes (LED's)
Twenty-four red LED's are arranged in a ring simulating the traditional 360° analogue movement. Only one LED is lit at any one time indicating the phase difference between the busbar (BUS) and generator (GEN) signals. The unit will operate correctly at any frequency within its range. The voltage levels of the two input signals are continuously measured and compared with the user adjustable voltage difference setting. If the measured difference is outside the allowable range, the ring of LED's will be extinguished, and the red GEN LED will be lit. If the voltage difference is within range the green GEN LED will be lit and the ring of LED's will indicate the phase relationship.

The Operation as a Synchroscope

The 244-14H synchroscope provide illuminated indication of the actual phase difference between the generator GEN voltages and the busbar voltage. If the LED display rotates clockwise the generator frequency is too high and must be reduced and vice versa if the LED display turns anticlockwise.
The operation as synchrocheck relay
Once the BUS and GEN signals become coincident, the unit will wait for an adjustable time delay before lighting the green triangular SYNCHRONISED LEDS and operating the output relay. The ring of LED is also extinguished which means the user will only see green LED's when the generator GEN is synchronised with the BUS.
The rear pot adjustments should be set to suit operational requirements.

The Operation as Synchro Check Relay with Dead Bus

The 244-14HG operate in the same way as the 244-14GG Synchrocheck relays with the addition of a dead bus option. This optional feature enables the relay to energise with a GEN supply only thus allowing the generator to power the BUS during a supply failure.

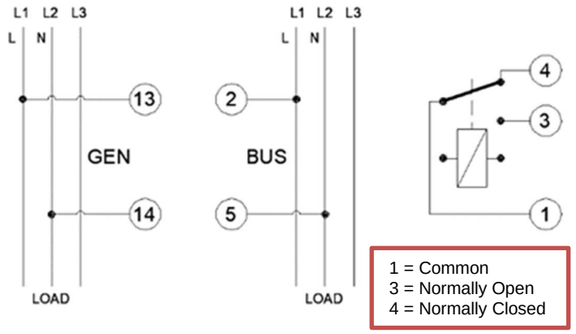
Scan the QR code to see the product on our website.

Ratings:

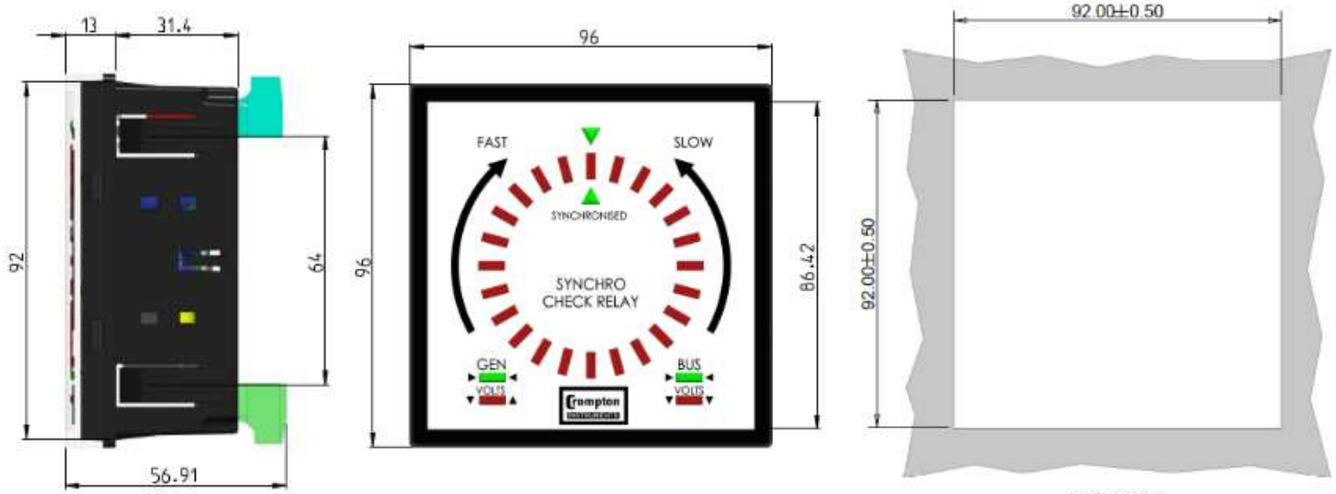
Voltage	+/-10% of range of use (see product descriptions for applicable ranges)
Frequency	45 to 65Hz
Burden	< 4VA (total)
Overload	1.2 x range maximum, continuous 2 x range maximum / 5s
Dielectric	4kV / 1min
Temperature	-20/+45℃ (operating) -30/+70℃ (storage)
Humidity	97% (RH non-condensing)
Altitude	2000m (maximum)
Relay	Single pole changeover 250V, 5A a.c. resistive.
Installation	**CAT III (300V)**

Model 244-14 360°LED Synchroscope and Synchro Check Relay, Models 244-14HG/GG

Wiring Diagram



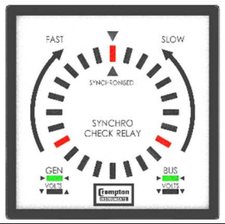
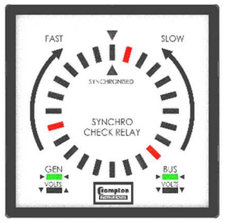
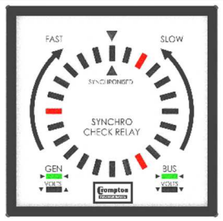
Product Dimensions & Panel Cut-Out



Product Images

Image for illustrative purposes only.

Error Table

Error illustration	Fault Description
	The synchroscope indicates a system error by flashing the following phase LEDs: 0°, 120° and 240°
	The synchroscope indicates an over voltage error by flashing the following phase LEDs: 15°, 135° and 255° at: • ≥ 80V for 59V - 77V variant • ≥ 140V for 100V - 120V variant • ≥ 285V for 220V - 240V variant • ≥ 525V for 380V - 480V variant
	The synchroscope indicates an over frequency error (>68Hz) by flashing the following phase LEDs: 30°, 150° and 270°

Explanation of Symbols

Refer to manual

Danger of electric shock

Do not discard

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Project 2391
Drawing No.CI-3M03501 Rev.5 09/09/24