

**Products Covered**

Model	Description
244-14A)	Single Phase or 3 phase 3/4 Wire LED
077-14A)	- synchroscope
244-14L)	Single Phase or 3 phase 3/4 wire LED
077-14L)	- Synchroscope and Synchro check relay
244-14G)	244-14L with voltage difference input range
244-14H)	244-14D with voltage difference input range
244-14D)	Single phase or 3-phase 3/4 wire LED
077-14D)	- Synchroscope and Synchro check relay with deadbus

**Introduction**

244 models may be mounted in a panel of any thickness up to a maximum of 12mm. Mounting is by two clamps and thumbscrews.

077 Models may be mounted in a panel thickness up to a maximum of 8mm (5/16"). Mounting is by 4 x 1/4 - 28 UNF studs and nuts.

For all models 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 0-60 degrees Celsius.

The unit should not be mounted where it is subjected to excessive direct sunlight; vibration should be kept to a minimum. Connection wires should be sized to comply to local regulations and should be terminated in tags suitable for the crew connections provided, 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.

**Electromagnetic Compatibility (EMC) Installation Requirements**

This product range has been designed to meet the certification requirements of the EU Directives when installed to a good code of practice for EMC in industrial environments. e.g.

1. Screen output and low signal input leads. In the event of RF fields causing problems where screened leads can not be used, provision for fitting RF suppression components, such as ferrite absorbers, line filters etc., must be made.

**Analogue Instruments  
DIN Instruments 240 Series & ANSI  
Switchboard Meters 070 Series  
LED Synchroscope & Synchrocheck  
Relay with Dead Bus**

N.B. 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.

2. Avoid routing leads alongside cables and products that are, or could be, a source of interference.
  3. To protect the product against permanent damage, surge transients must be limited to 2kV pk.
  4. Electro Static Discharge (ESD) precautions must be taken at all times when handling this product.
- For assistance on protection requirements please contact your local sales office.

**Setting Up and Maintenance**

Units are adjusted before despatch and therefore no adjustments are required. Unless a fault develops, the unit requires little attention. 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 connections for tightness and corrosion. In the event of a repair being necessary, it is recommended that the unit be returned to the factory or to the nearest Crompton Instruments Service Centre, (details on page 2). Should repair be attempted then replacement components must be of the same type, rating and tolerance as those used in the original circuit. It is important that should calibration be deemed necessary, say after repair, then this should only be attempted if the required high accuracy equipment is available. With any enquiry please quote the full model number found on the side of the label. The unit must be recalibrated after repair.

**The operation as a Synchroscope**

The 244-14A and 077-14A synchrocopes 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 visa versa if the LED display turns anticlockwise.

**The operation as synchrocheck relay**

The 244-14L/G and 077-14L synchrocopes are 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.

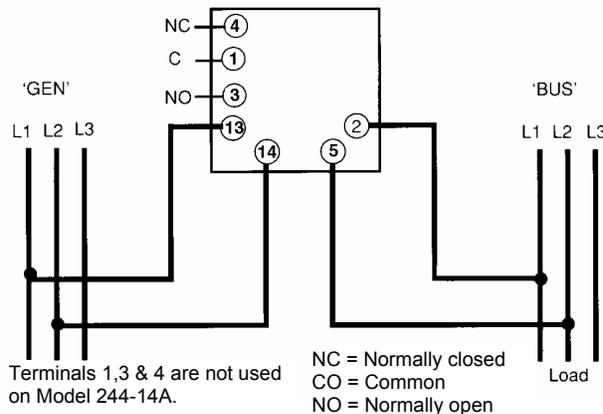
The voltage levels of the two input signals are continuously measured and compared with the user adjustable voltage difference setting. If the measured difference is outside the allowable range, the ring of LED's will be extinguished and the red GEN LED will be lit. If the voltage difference is within range the green GEN LED will be lit and the ring of LED's will indicate the phase relationship.

Once the BUS and GEN signals become coincident, the unit will wait for an adjustable time delay before lighting the green triangular SYNCHRONISED LED's and operating the 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 244-14D/H and 077-14D operate in the same way as the 244-14L and 077-14L Synchro check 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.

**Connection Diagrams**

**Model 244-14A 360° LED Synchroscope & Models 244-14L/D/G/H 360 LED Synchroscope and Synchro Check relay**



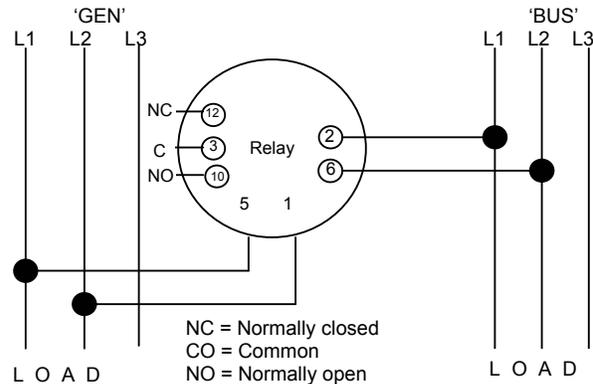
**INSTALLATION INSTRUCTIONS**

**Analogue Instruments  
DIN Instruments 240 Series & ANSI  
Switchboard Meters 070 Series  
LED Synchroscope & Synchrocheck  
Relay with Dead Bus**

**Relay Ratings**

Single pole changeover 250V, 5A a.c. resistive.

**Model 077-14A 360° LED Synchroscope & 360 LED Synchroscope and Synchro Check Relay Models 077-14L/D/G/H**



Terminals 3, 10 and 12 are not used on Model 077-14A.

**LOW VOLTAGE DIRECTIVE:-** This product complies with BSEN61010-1

**WARNING**

Voltages dangerous to human life may be present at some of the terminals of this unit. Ensure all supplies are de-energised before attempting any connection/disconnection. If it is necessary to make adjustments with the power connected then exercise extreme caution.

This product is manufactured by Crompton Instruments, Freebournes Road, Witham, Essex. England. CM8 3AH. Telephone +44 (0)1376 509509, Fax: +44 (0) 1376 509511.

The Information contained in these installation instructions is for use only by installers trained to make electrical power installations and is intended to describe the correct method of installation for this product. However, Tyco Electronics has no control over the field conditions, which influence product installation. It is the user's responsibility to determine the suitability of the installation method in the user's field conditions. Tyco Electronics' only obligations are those in Tyco Electronics' standard Conditions of Sale for this product and in no case will Tyco Electronics be liable for any other incidental, indirect or consequential damages arising from the use or misuse of the products. Crompton is a trademark.



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