- **Front Dimension 96x96mm**
- **DIN43700, DIN43802, DIN43718, IEC1010, IEC473, IEC51, BS89**
- **Polycarbonate, self extinguishing and drip-proof per UL94V-0**
- **Rugged housing-non combustible, plastic-heat resistance.**
- **Accuracy ± 3 °**
- **360 Degree.**
- **1Phase or 3Phase system.**

Application

Electronic Synchroscope is designed to provide an illuminate and indication of phase difference between BUS Voltage (reference voltage) & GENERATOR Voltage (incoming voltage) It denotes the actual frequency difference corresponding to the inverse of time taken for one rotation of the illuminated vector spot.
When two alternators are paralleled, it is necessary that,
1)Frequency must be equal.
2)Phase must be same.
Sychroscope is, hence used to indicate the Phase & Frequency difference between two AC alternators,which are to be paralleled. Square panel meters for alternating current system. All panel meters are direct indication of measuring input. They are suitable to use on the distribution panel, control panel, switchboard panel, power plant, mimic board, machines and others.

The instruments has designed for industrial applications which required precise, reliable and robust instruments for the display range and indicating. Used for comparing phase from two source or more, in single phase and three phase network to parallel system. Each measuring instrument is suited for one of the following measuring tasks:

- AC voltage direct connection 0-150V, 0-300V,0-500V, 0-600V or request.
- AC voltage PT connection 100, 110, 115, 120 v ac or request.
- Working frequency 50 or 60 Hz.
- 1Phase and 3Phase system.
- more detail see ordering information.

Description

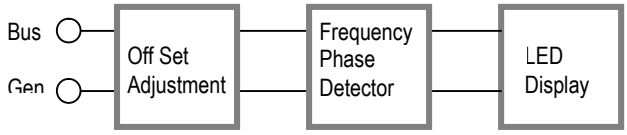
Rotation of the vector spot is with reference to the bus voltage. If LED turns clockwise, it indicates the GENERATOR frequency is greater than the BUS frequency. It means the speed of the generator must be reduced by the operator. If the spot LED turns anticlockwise, the GENERATOR frequency is less than BUS frequency.In this case speed of the generator must be increased. If 'T' is the time taken for one rotation, the frequency difference can be calculated as 1/ T = A f

Example:
Let the bus frequency be 50 Hz. The vector spot takes 10 Sec. for one rotation, clockwise. Then 1/10 = 0.1 Hz.
The frequency difference = 0.1Hz. Hence we can infer that GENERATOR frequency is 50.1 Hz.
If Frequency & Phase of BUS matches with those of Generator's signal, the two green led's at 12 o'clock position glow.
If the Frequency matches & Phase does not, then one red led corresponding to the phase difference will glow.

Favorable Condition for for " Switching in" the Generator:

1.Ensure that frequency difference between two inputs is within the requirements of user as follows:
Measure time taken for 1 complete rotation of the vector spot in SECOND(T).
The frequency difference will be Af = 1/T(Hz)
2.Provided the frequency difference is within acceptable limits, wait till the SYNC mark LED s(two green LED s at 12 o'clock position)glow. At this instant , it is safe to CONNECT the GENERATOR to BUS.

Principle



The Bus & Gen inputs are fed to the Frequency & Phase detection network.
The output duty cycle of the network corresponds to the frequency difference between Bus & Generator Voltage. The detector network also determines the actual phase difference.

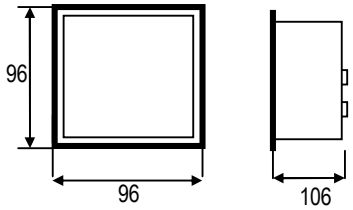
Characteristic

Display	
Measured	Frequency & Phase difference
Scale Graduation	LED
Mechanical Design	
Housing Material	Polycarbonate, self-extinguishing and drip-proof per UL94V-0
Mounting Fasteners	Standard type screw clamp
Scale	Interchangeable scales Scales may only be replaced under voltage-free conditions !
Replaceable	Bezels and glass face plates, May only be replaced under voltage-free conditions!
Terminals	M4 (Din 46282) screw terminals with self-lifting terminal clips. Screws can be turned with standard screw drivers tool.
Contact Protection	Finger-safe full cover included
Accuracy	1.5
Consumption	
Voltage Path	6 VA for 500V.
Voltage Path	4 VA for PT Rated.
Ambient Conditions	
Operating Temperature	- 20 ... + 55 °C
Storage Temperature	- 40 ... + 70 °C
Relative Humidity	max. 95%
Frequency	35...70 Hz.

Application Standards

Protection	IP 52 front panel, Teminal IP20
Protection	Class 1
Insulation class group A	VDE 0110
Insulation voltage	660 V
Test voltage	3.25kV
Pull in / drop out Freq.	+ / - 9 Hz
Installation category	300 V CAT III (IEC1010)
Insulation resistance	> 50 Mohm at 500 V d.c.
Shock resistance	15g, 11ms
Vibration resistance	10-150-10 Hz / 0.15 mm 5 Cycles /10 octave per minute.
Nominal case and cutout dimensions:	IS 2419
Indicating measuring instruments:	IN 43700
Connections and Terminal markings:	IS 1248
Panel meters:	DIN 43807
Terminal bolts / leads.:	DIN 46200/46282
Clamp straps for connections:	DIN 46282
Safety requirements and protective- measures for Electrical indicating- : instruments and their accessories.	IS 9249 - 1979 DIN 40050 / 8-70, VDE 0110/ 11-72 VDE 0410/ 10-76 IEC 529 , IEC 1010
Performance specification for direct acting: indicating analogue electrical measuring instrument and their accessories	IS 1248-1983 IEC 51 DIN EN 60051
Environmental conditions:	IS 1248 - 1983 IS: 9000 VDE / VDI 3540
Front frames for indicating measuring: instruments principal dimensions	DIN 43718
UL Combustibility Class:	94 V-0
Technical conditions of delivery: electrical instruments	DIN 43701
Mechanical Strength: (Free fall test, Vibration test)	IS 1248/IEC 51 IEC 1010, IS 9000-1979 VDE 0411,part 1

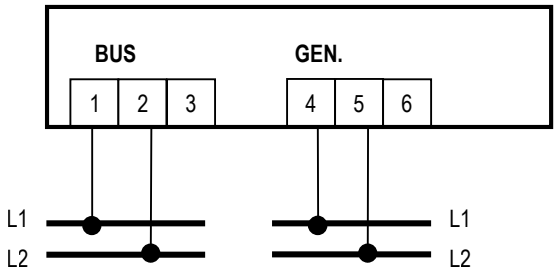
Dimension



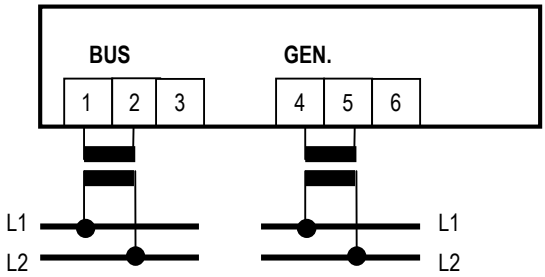
Wiring Diagram.

Synchroscope Meter.

Direct Connection



PT Connection



Ordering Information.

1) Model
ESYN96 Dimension 96x96mm.

2) Input Type
AC Voltage
100V, 230V, 380V & customize
PT Rated ? / 100, ? / 110, ? / 115, ? / 120V & customize

3) Operating Frequency
50Hz. Or 60Hz.
Please specify when ordering.

Example
1) ESYN96 Synchroscope Meter Input PT115kV/115V, 50Hz.