

Ziegler

Redefine Innovative Metering

Technical Datasheet

ROTATING LED SYNCHROSCOPE SQ

ANALOG PANEL METERS

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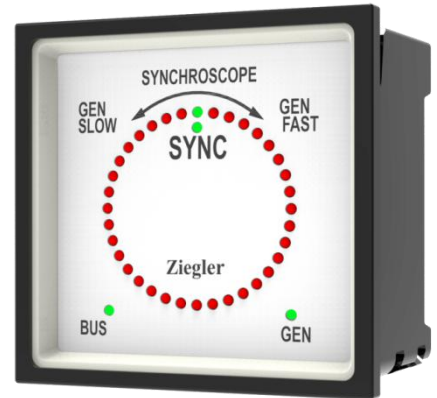
ANALOG PANEL METERS

SQ

The Rotating LED Synchroscope is designed to provide an illuminated indication to actual phase difference between the BUS voltage (reference voltage) and the GENERATOR voltage (incoming voltage). The two AC systems are synchronized when the green LED is lit in the 12 o' clock position along with two GEN/BUS LED's. The instrument is rated for continuous operation and connection. It denotes the actual frequency difference corresponding to the inverse of time taken for one rotation of illuminated vector spot.

Product Features

- Glass filled polycarbonate housing(UL 94-V-0)
- Easy replaceable Glass and Bezel
- Easy Installation with swivel screws



Description

The rotation of the vector spot is with reference to the bus voltage. If the vector spot 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 $1/T = \Delta f$

Example: Let the bus frequency be 50 Hz. The vector spot takes 10 Sec. for one rotation, clockwise.

$$1/10 = 0.1 \text{ Hz.}$$

The frequency difference = 0.1 Hz. Hence we can infer that GENERATOR frequency is 50.1 Hz.

If the Frequency & Phase of BUS signal matches with those of GENERATOR 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 " Switching in" the Generator

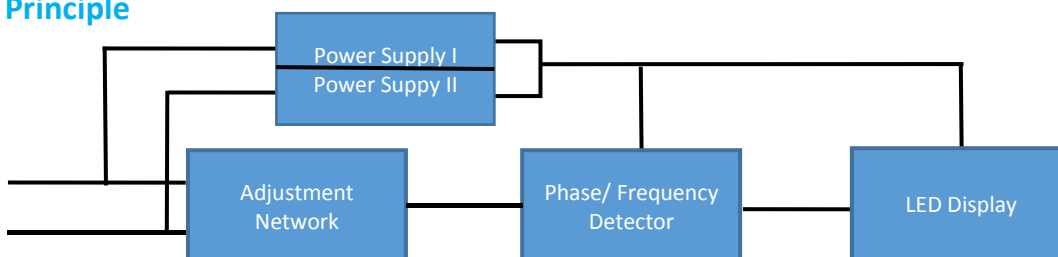
1. Ensure that the frequency difference between two inputs is within the requirements of user as follows:

Measure time taken for 1 complete rotation of the vector spot in SECOND(T).

The frequency difference will be $\Delta f = 1/T$ (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.

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Specifications:

Mechanical Data	
Case details	Molded square case suitable for mounting in Control / Switchgear panels, Machinery consoles
Case material	Glass filled Polycarbonate – Flame retardant and drip proof as per UL94 V-0.
Front facia	Glass
Colour of bezel	Black
Position of use	Vertical
Panel fixing	Swivel screws
Mounting	Stackable in a single cutout
Panel thickness	≤40mm
Terminals	Hexagon studs, M4 screws & wire clamps E3 (DIN 46282)
Electrical Data	
Measured quantity	Frequency and phase difference
Power consumption	6 VA Max
Enclosure code (IEC 60529)	IP52 for case IP 00 for terminals
Insulation class	Group A according to VDE 0110
Insulation Voltage	660V
Proof voltage	2KV
Installation category (IEC 61010)	300V CAT III
Insulation resistance	>50 Mohm at 500V DC
Reference Conditions	
Ambient temperature	23°C ± 3°C
Input Voltage	Rated voltage ±2°C
Rated Frequency	50 Hz ± 0.1 %
Environmental conditions	
Climatic suitability	Climate category II as per IEC 60051 (climatic class 3 acc to VDE/VDI 3540)
Operating temperature	-10 ... + 55°C
Storage temperature	-20 ... +65°C
Relative Humidity	≤ 75% annual average, non-condensing
Shock resistance	15g, 11ms
Vibration resistance	10-150-10 Hz/0.15mm, 5 cycles / 10 octave per min
Applicable standards	
Nominal case & cutout dimensions for indicating electrical instruments	DIN 43700
Scale & Pointer for electrical measuring instruments	IEC 60051, DIN 43802
Connections and terminal markings for panel meters	IEC 60051, DIN 43807

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Terminal bolts / leads	DIN 46200/46282
Clamp straps for connections	DIN 46282
Safety requirements and protective measures for Electrical indicating instruments and their accessories	DIN 40050/8-70, VDE 0110/ 11-72 VDE 0410/ 10-76 IEC 60529, IEC 61010
Performance specifications for direct acting indicating analogue electrical measuring instruments and their accessories Environmental conditions	IEC 60051 / DIN EN 60051, DIN 43701, IEC 60051, VDE / VDI 3540
Front frames for indicating measuring instruments principle dimensions	DIN 43718
UL Combustibility class	UL94 V-0
Technical conditions of delivery for electrical instruments	DIN 43701
Mechanical strength (Free fall test , vibration test)	IEC 60051, VDE 0411, part 1, Sec. 43/44, IEC 61010

Options

Front fascia	Anti-glare glass
Colour of bezel	Red, Yellow, Blue, White
Color of LED's	Orange, Yellow
Special markings	Numbering / Lettering

Safety Precautions

- 1) Instruments with damaged bezels or window glasses must be disconnected from the mains.
- 2) Adequate safety clearance must be maintained to control panel fasteners and to sheet metal housing. If non-insulated connector wires are used.
- 3) Bezels and window glasses should be replaced under voltage-free conditions.

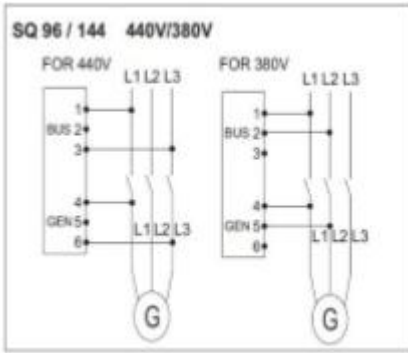
Input Voltage		
SQ96	440V	380V
SQ144	240V	220V
	480V	415V
	110V	100V
	127V	120V

Table: Input Voltage

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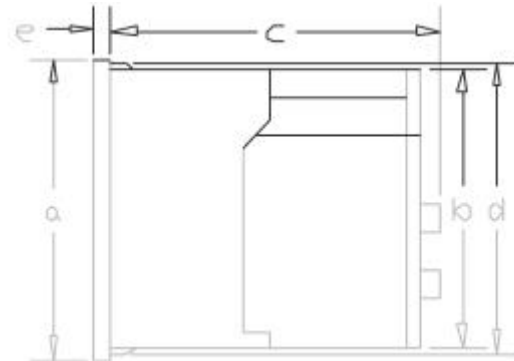
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Connection Diagram :



Type	Terminals	
BUS	1-3	1-2
GEN	4-6	4-5
SQ96	440V	380V
SQ144	240V	220V
	480V	415V
	110V	100V
	127V	120V

Dimensions:



Dimensions (in mm)		SQ 96	SQ 144
Bezel	a	p96	p144
Case	b	p90	p136
Depth	c	106	106
	d	p 91.5	p137.8
	e	5.5	8.5
Cutout Size		p 92 ^{ns}	p 138 ^{*1}
Weight (approx.)		0.60Kg	0.70Kg

Ordering information

SQ	
Front dimension	96X96mm, 144X144mm
Rated Voltage	Refer to table inside
Front facia	Normal glass *1, PC glass *3, Anti-glare glass *3
Colour of bezel	Black *1 Red, Blue, Yellow, White *3
Position of use	Vertical *1(0°.....360°) *3
Dial	Additional lettering on request*3 Additional numbering on request*3
Logo	Ziegler*1, Others*3

*1 Standard

*3 Please clearly add the desired specifications while ordering

Ordering Example – SQ96, Rated voltage AC 230 V

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