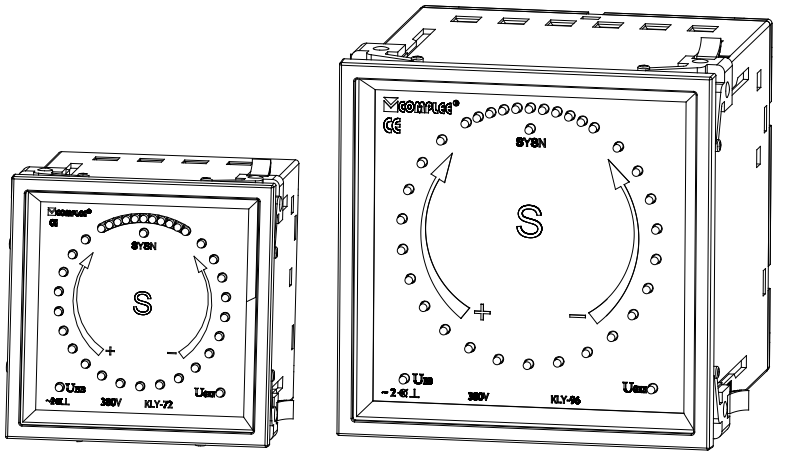
KLYB0.464.196 V0.6

COMPLEE®

KLY-S72/96/144-D KLY-S72/96-DR-A/B

Digital Synchroscope



COMPLEE®

I. Introduction

1. This instrument applies as the synchronizing indicator in between power network and generator. When the voltage, frequency in between generator and power network is nearly consistency within defined time, the LED light roulette will slow down until the light stop at SYNC led (i.e. Synchronizing), and then generator can connect to the power network. Synchroscope can indicate the difference on frequency and phase angle in between generator and power network.

2. The meter is designed competitively by single chip with advanced arithmetic and accurate control.

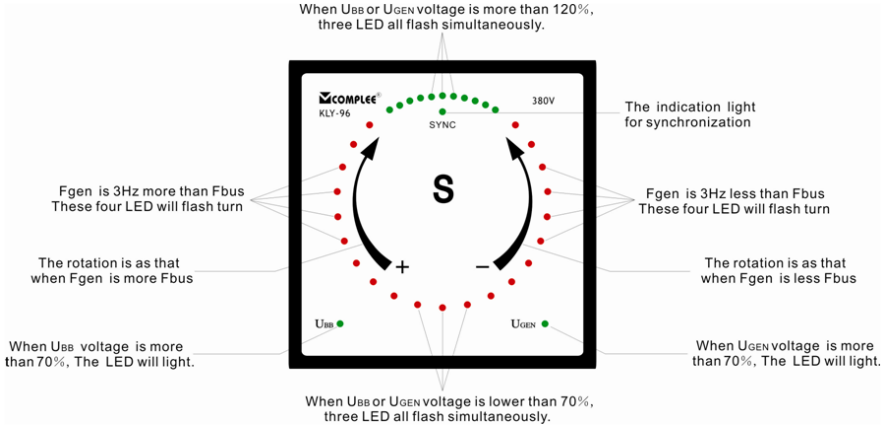
II. Technical Specification

1.Operating Voltage UN: a. AC 57V, 63V b. AC 100V, 110V
c. AC 220V, 230V, 240V d. AC 277V e. AC 380V, 400V, 415V
f. AC 440V, 450V

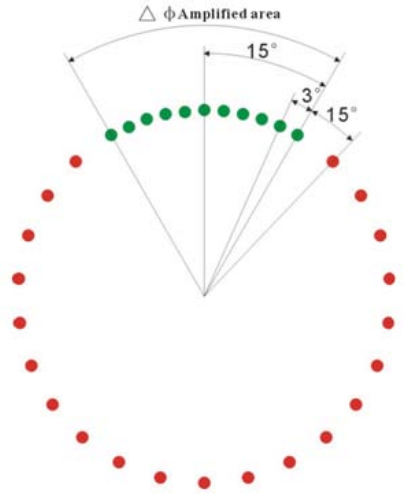
2. Voltage range:75%UN~115%UN
3. Frequency range:40~70Hz
4. Power consumption:≤4VA
5. Overload:Continuous 1.2×UN short time 2×UN, 3s
6. Electrical angle 15°~345° LED resolution ratio 15°
   Electrical angle 345°~0°~15° LED resolution ratio 3°
7. Measuring accuracy of phase angle ±1.5º
8. Voltage measuring error: ±1.0%UN
9. Time error: ±10ms
10. Blocking voltage(No indication on phase angle difference):
    Low voltage blocking voltage: 70%UN
    High voltage blocking voltage: 120%UN
11. LED display:Electrical angle ±15°(physical angle±30°)green LED display,remaining sight angle in red LEDs
12. Node capacity of relay output:AC 250V/5A, DC 30V/5A
13. Pulse width of relay output: 1000ms
14. working environment:Temperature: -10℃ ~+55℃
    RH:5%~95%,No condensation
15. storage environment:Temperature:-25℃ ~+70℃
    RH:5%~95%,No condensation

III. Application Instruction

1.Display of front panel



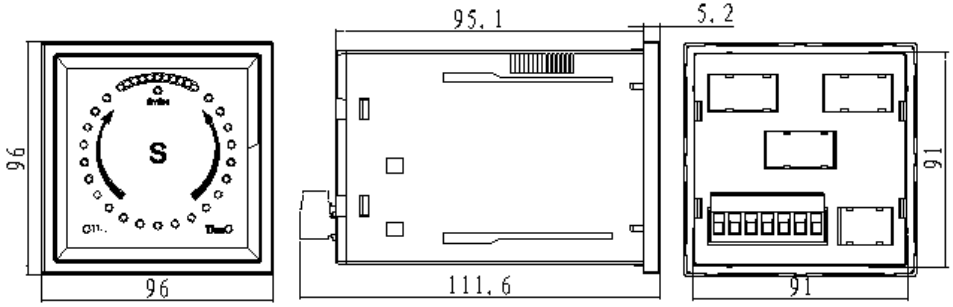
2.LED indicates the instant phase error Δϕ,the resolution ratio of red LED is 15º. The resolution ratio of green LED is 3º within the range of synchronized point ±15º. During normal operation period, only one LED lights among the circular bar graph will light, the position of LED is stimulated the actual phase angle difference. Details see below diagram:



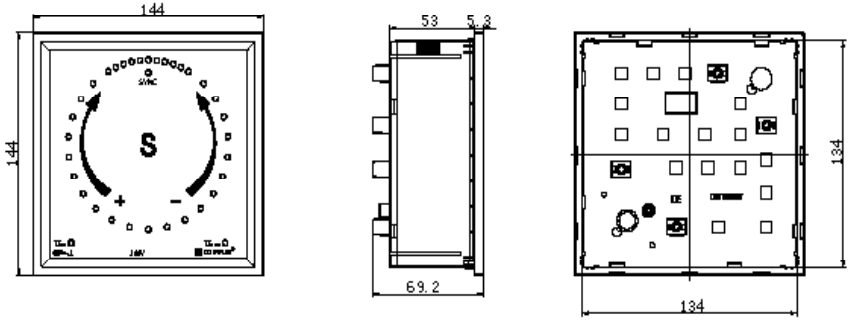
X. Caution

1. Please DO the connection properly according to the wiring diagram
2. Please cut off the power before any connection
3. DO NOT apply voltage over than the range of the suggested voltage; otherwise the instrument will malfunction.
4. DO NOT use the instrument under the condensation environment.
5. DO NOT touches any part of the applied voltage when you use the instrument near the area of the exposed live parts, wearing the insulated hand gloves is recommended.

2.KLY-S96-D,KLY-S96-DR-A/B

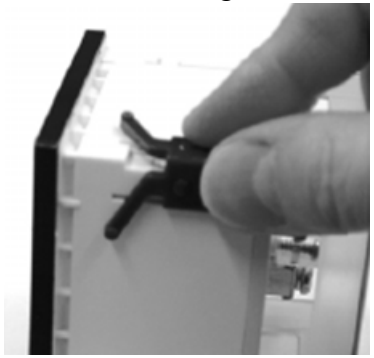


3.KLY-S144-D

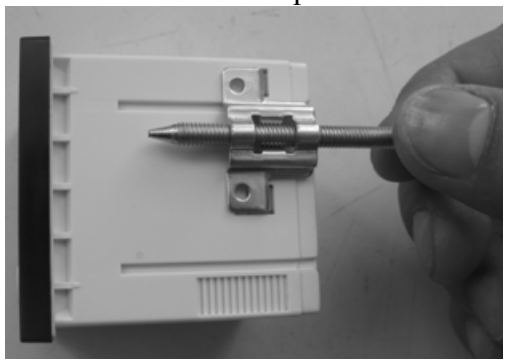


IX. Installation Metho

1.Push tight



2. Iron clip



IV. Condition of synchronization for Type D synchroscope

Voltage difference of UBB and UGEN < 10%UN;
Frequency difference of Fbus and Fgen < 0.5Hz;
Phase angle 345°~15°
All above conditions are satisfied.

V. Condition of synchronization and predefined table for Type DR-A synchroscope

1. User must precisely set up 3 parameters; voltage difference(△ U), frequency difference(△ F)and deferred time(Time), Each parameter is defined by 16 pos rotary DIP switch (from 0 to F), each pos has its corresponding value, see below table for details:

Switch position	0	1	2	3	4	5	6	7
△ U (%)	1	2	3	4	5	6	7	8
△ F (Hz)	0.05	0.07	0.09	0.11	0.13	0.15	0.17	0.19
Time(ms)	50	80	110	140	170	200	230	260
Switch position	8	9	A	B	C	D	E	F
△ U (%)	9	10	11	12	13	14	15	16
△ F(Hz)	0.21	0.23	0.25	0.27	0.29	0.31	0.33	0.35
Time(ms)	290	320	350	380	410	440	470	500

2. When turned on, users can find the code switch failure early through the panel indicating of code switch position. Voltage difference(△ U), frequency difference(△ F)and deferred time(Time) code switch position indicates in turn, each indicates about 3 seconds. The top LED light represents the switch position is 0, the LED lights in clockwise turn represents the switch position plus 1, until F. The top left three green LEDs light in turn respectively represents the current switch position is voltage difference(△ U), frequency difference(△ F)and deferred time(Time).

3.Condition on synchronized signal release:

Voltage difference of UBB and UGEN < △ U×UN;
Frequency difference of Fgen and Fbus < △ F;
The moment before phase angle difference is 0º,and ahead of time = Time.

All above conditions are satisfied, the synchronized signal will be

VI. Condition of synchronization and predefined table for Type DR-B synchroscope

1. User must precisely set up 3 parameters; voltage difference(△ U), phase angle difference(△ φ)and deferred time(Delay). In order to ensure safety of power system, after the synchroscope is connected with power, all its new setting will not be effect until next power connection. This instrument has a 16 pos. rotary DIP switch (from 0 to F), each pos has its corresponding value, see below table for details.

Switch position	0	1	2	3	4	5	6	7
△ U(%)	1	2	3	4	5	6	7	8
△ φ(°)	5	6	7	8	9	10	11	12
Delay(s)	0.1	0.2	0.4	0.6	0.8	1.0	1.2	1.4
Switch position	8	9	A	B	C	D	E	F
△ U(%)	9	10	11	12	13	14	15	16
△ φ(°)	13	14	15	16	17	18	19	20
Delay(s)	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0

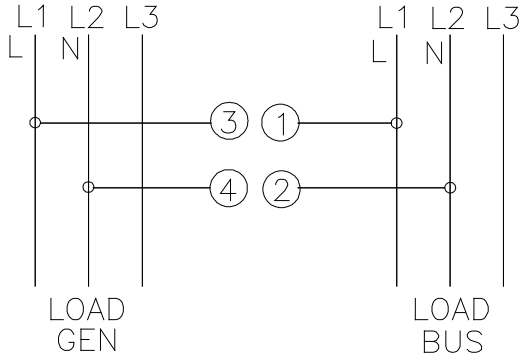
2.Condition on synchronized signal release:

Voltage difference of UBB and UGEN < △ U×UN;

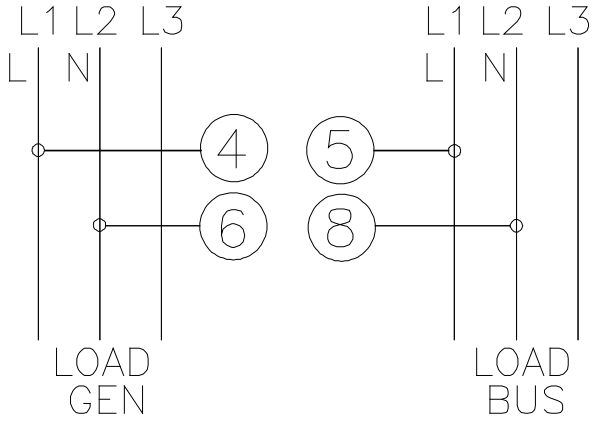
Phase angle difference of UBB and UGEN match with △ φ deferred time,Within pre-set time in (Delay),the phase angle difference comply with △ φ condition,synchronized signal release.

VII. Connection Diagram

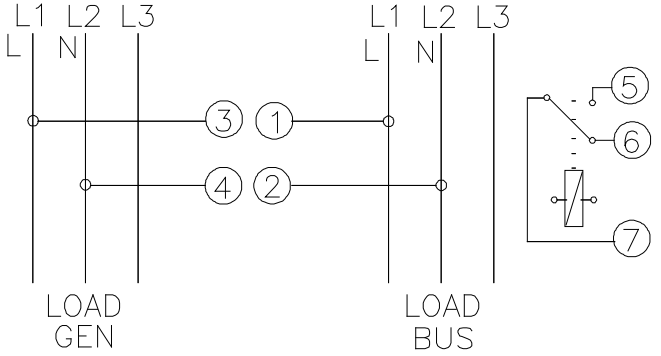
1. KLY-S72/96-D synchroscope



2. KLY-S144-D synchroscope



3. KLY-S72/96-DR-A/B synchroscope



VIII. Outline Drawing

1.KLY-S72-D,KLY-S72-DR-A/B