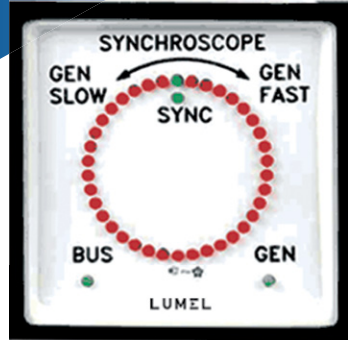
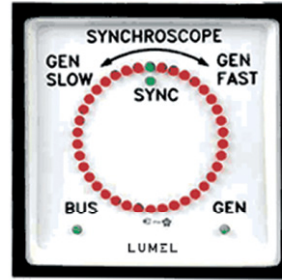


SA19, SA12

SYNCHROSCOPE



SA12



SA19



APPLICATION

The Electronic Synchroscope is designed to provide an illuminated indication of actual phase difference between the BUS Voltage (reference voltage) & the GENERATOR Voltage (incoming 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 LEDs 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.

TECHNICAL DATA

Frequency range	35 - 70 Hz
Proof voltage	2 kV
Power consumption	≤ 6 VA

Rated operation condition:

- ambient temperature	-10...23...55°C
- relative air humidity	≤ 75%

Reference conditions

Reference temperature	23°C
Input voltage	Un +/-2%
Rated frequency	50Hz +/-0,1%

Categories of meter climatic versions

If it is not written otherwise in the order, these meters in standard execution are intended to use in moderate climatic conditions, in non-airconditioned rooms.

Requirements concerning safety acc. EN 61010-1 standard:

- installation category	III
- pollution degree	2
- maximal phase-earth working voltage	660 V

Electromagnetic Compatibility:

- meters meet requirements CE mark	
- noise immunity	acc. to EN 61000-6-2
- noise emissions	acc. to EN 61000-6-4

Other fulfilled standards:

EN 60051-1...9
EN 60664-1:2011

Impact resistance:

- peak acceleration	15 g
- duration of impact	11 ms

Shock resistance:

- range of vibration frequency	10-55-10Hz
- vibration amplitude	0.15mm (corresponds to 1.5 g at 50 Hz)

Protection Grade acc. to EN 60529 ensured by:

- case:	standard	IP 52
- terminals		IP 00

Case material

thermoplastic material,
self-extinguishing plastic (UL 94V-O)

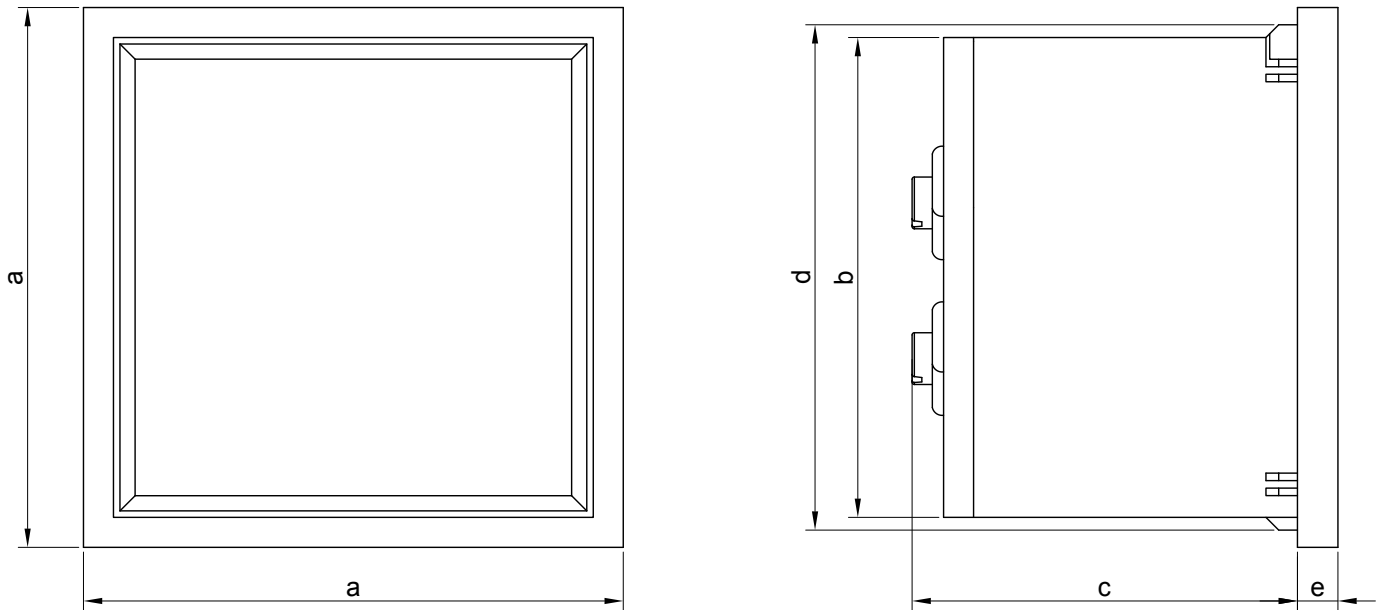
Meter glass material

glass (in standard)
anti-reflective glass on request

ACCESSORIES

Screw holders - 2 pcs. (for SA19) or 4 pcs. (for SA12).

EXTERNAL DIMENSIONS



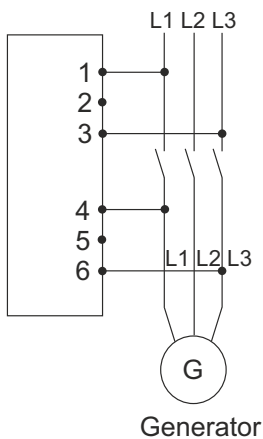
External dimensions of synchronoscopes SA12, SA19 [mm]

Table 1

Type	a	b	c	d	e	mounting hole	weight [kg]
SA12	144	136	106	137.5	5.5	138 x 138	0.8
SA19	96	90	106	91.5	5.5	92 x 92	0.68

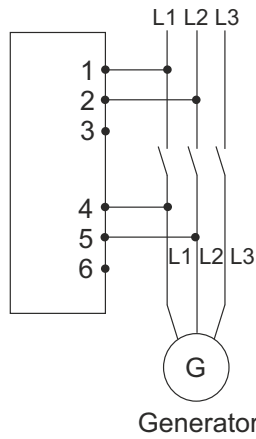
ELECTRICAL CONNECTION

a)



Generator

b)



Generator

Electrical connections for a) Un 380V b) 440 V

Table 2

Type	Terminal	
NETWORK	1-3	1-2
GENERATOR	4-6	4-5
	Ranges	
Input voltage ¹	100 V	120 V
	100 V	127 V
	110 V	100 V
	127 V	120 V
	240 V	220 V
	380 V	415 V
	380 V	440 V

¹ All available ranges can be found in the coding table. Depending on the execution code, the synchronoscope has 1 or 2 input voltage ranges. If there is only one voltage range, use terminals 1-2 (NETWORK) and 4-5 (GENERATOR).

ORDERING CODES

Synchronoscope SA12	V	XX	X	X	N	X	W	A	W	OLM
Input voltage:										
100 V - 120 V		01								
100 V - 127 V		02								
110 V - 100 V		03								
127 V - 120 V		04								
240 V - 220 V		05								
380 V - 415 V		06								
380 V - 440 V		07								
400 V		08								
415 V - 415 V		09								
440 V - 380 V		10								
440 V - 440 V		11								
480 V - 415 V		12								
57,8 V		13								
63,5 V		14								
120 V		15								
100 V		16								
110 V		17								
500 V		18								
380 V		19								
220 V		20								
Glass material:										
glass					N					
Terminal cover:										
white									W	
Scale material:										
aluminium								A		
Scale colour:										
white										W

Synchronoscope SA19	V	XX	X	X	N	X	W	A	W	OLM
Input voltage:										
100 V - 120 V		01								
100 V - 127 V		02								
110 V - 100 V		03								
127 V - 120 V		04								
240 V - 220 V		05								
380 V - 415 V		06								
380 V - 440 V		07								
400 V		08								
415 V - 415 V		09								
440 V - 380 V		10								
440 V - 440 V		11								
480 V - 415 V		12								
57,8 V		13								
63,5 V		14								
120 V		15								
100 V		16								
110 V		17								
500 V		18								
380 V		19								
220 V		20								
Glass material:										
glass					N					
Terminal cover:										
white									W	
Scale material:										
aluminium								A		
Scale colour:										
white										W

ORDERING EXAMPLE OF SYNCHRONOSCOPES

The order should specify: the name and type of the meter, the execution code and any additional requirements.

Sample order: **SA19 V08XXNXWAW0LM** stands for a synchronoscope with front face dimensions 96x96mm, with voltage input 400V, standard version.