

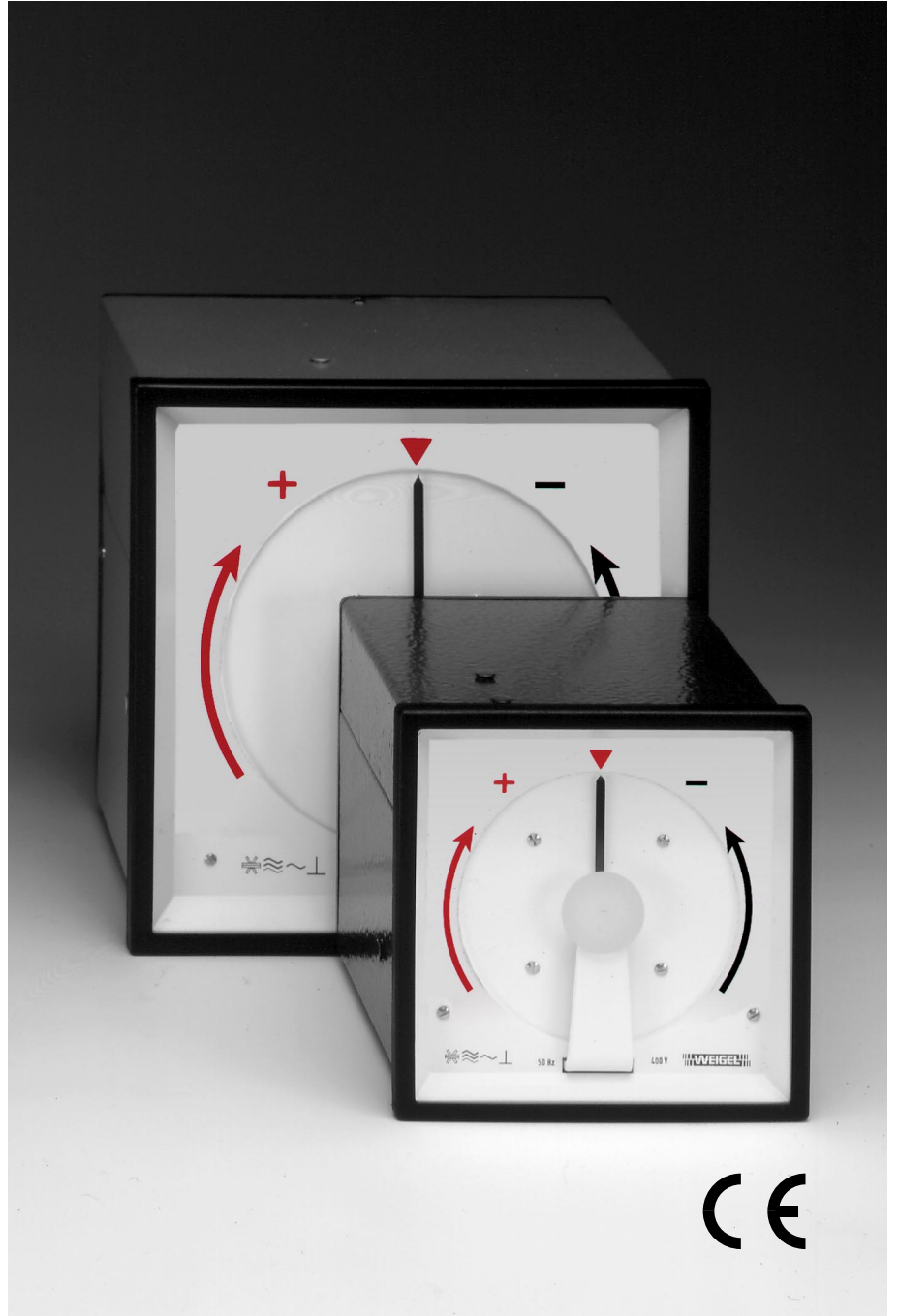


Data Sheet

M - Series
080.D.101.03

Analog Meters for Phase Comparison Synchronoscopes

SY 96 S
SY 144 S



WEIGEL

Application

The synchronoscopes **SY 96/144 S** (M-series) are used to measure phase difference of two AC voltages, e.g. those of a generator and the mains.

The dial carries a zero marker, a red arrow marked with “+” and a black arrow marked with “-”

When the frequencies of the two voltages differ less than approx. 2 Hz, they can be compared approximately:

The pointer rotates according to frequency ratio (and to meter connection) clockwise or anticlockwise. The pointer stands still when the frequencies get equal. The pointer rests at the zero marker when the phases coincide also; the AC voltages can be connected to each other.

The connection of the meter can be chosen so that the pointer rotates clockwise or counterclockwise when the frequency f_1 (e.g. generator) is higher.

When the meter is not in work, the pointer cannot be seen.

The instruments are suitable to be mounted in generating sets, power supply control panels, switchboards or mosaic panels.

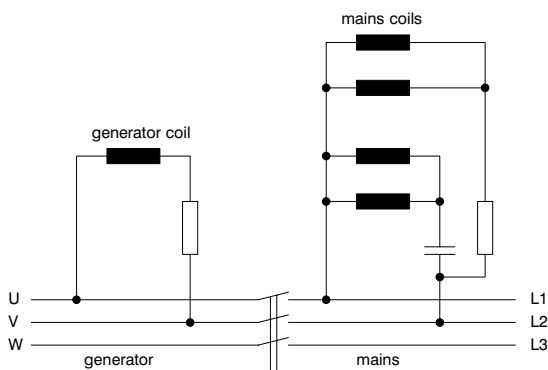
Movements

The synchronoscopes SY 96 S and SY 144 S are supplied with an iron-less electrodynamical quotient movement.

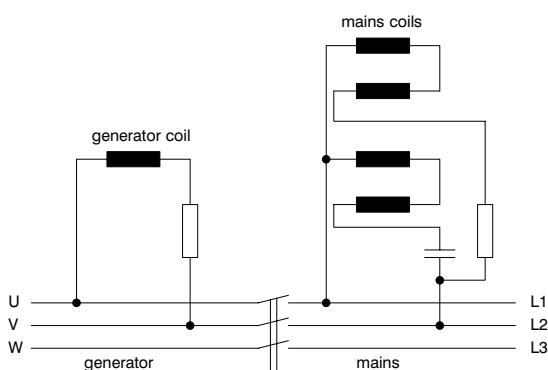
The pointer is able to rotate over 360° in both directions.

Principle Circuit Diagrams

for voltages 100/110 V



for voltages 230/400/500 V



Mechanical Data

case details	square case suitable to be mounted in switchboards or mosaic grid panels, stackable ▶	
material of case	pressed steel	
material of window	glass ▶	
colour of bezel	black (similar to RAL 9005) ▶	
terminals	hexagon studs, M3 screws and wire clamps C6 ▶	
terminal protection against accidental contact	full-sized terminal cover (SY 96 S) / protective sleeves SW6 (SY 144 S) included	
position of use	vertical $\pm 5^\circ$ ▶	
dimensions	SY 96 S	SY 144 S
bezel	□ 96 mm	□ 144 mm
case	□ 90 mm	□ 137 mm
depth	119 mm	117 mm
panel cutout	□ 92 ^{+0.8} mm	□ 138 ⁺¹ mm
panel thickness	1...15 mm	1...40 mm
panel fixing	4 pieces WEIGEL screw clamps	2 pieces type B screw clamps acc. to DIN 43 835
weight approx.	1.0 kg	1.1 kg

Electrical Data

measuring unit	phase angle of two sinusoidal AC voltages	
frequency	rated frequency 50 Hz ▶	frequency range 48.5 ... 51.5 Hz
voltage	rated voltage 110 V 230 V 400 V 500 V ▶	voltage range 100 ... 120 V 208 ... 230 V 380 ... 400 V
power consumption approx.	generator side	mains side
at rated voltage	110 V 230 V 400 V 500 V	0.7 VA 1.5 VA 3.2 VA 3.5 VA 6.7 VA
operating range	$U_N \pm 10\%$	
overload capacity	$U_N + 20\%$	
max. using time	≤ 15 min	
protection class	I	
excess voltage category	CAT II / CAT III	
pollution level	2	
operating voltage	300 V CAT III / 600 V CAT II	
enclosure code	IP 52 case ▶ IP 00 for terminals without protection against accidental contact IP 20 for terminals protected against accidental contact	

Scaling

pointer	bar pointer
pointer deflection	360°
zero	triangle on dial top

▶ also refer to "Options"



Analog Meters for Phase Comparison Synchronoscopes

Environmental

climatic suitability	climatic class 2 according to VDE/VDI 3540 ▶
operating temperature range	–10 ... +40 °C
storage temperature range	–25 ... +65 °C
relative humidity	≤ 75% annual average, non–condensing
shock resistance	15 g, 11 ms
vibration resistance	2.5 g, 5 ... 55 Hz
stray magnetic field	<0.5 mT according to DIN EN 60 051

Rules and Standards

DIN 43 700	measuring and control instruments for panel mounting; nominal case and cutout dimensions
DIN 43 701	electrical switchboard instruments
DIN 43 718	bezels and front panels
DIN 16 257	nominal position of use and position symbols applicable for measuring instruments
DIN 40 050	enclosure codes; protection of electrical equipment against ingress of solid foreign bodies and of water
DIN EN 60 051	direct acting indicating electrical measuring instruments and their accessories
DIN EN 61 010	safety requirements for electrically operated measuring, control and laboratory equipment
VDE/VDI 3540 sheet 2	reliability of measuring and control equipment (classification of climates)

Options

electrical data

frequency	rated frequency	frequency range
	16 ² / ₃ Hz	16 ¹ / ₃ ... 17 Hz
	60 Hz	58.5 ... 61.5 Hz
voltage	rated voltage	voltage range
	60 V	100 ... 120 V : √3
	415 V	
	440 V	
	others (>57.8 V ... <500 V) on request	

case

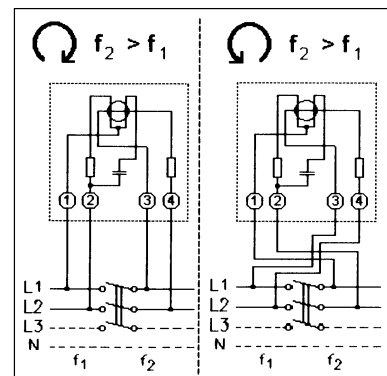
window	non–glaring glass
colour of bezel	gray (similar to RAL 7037)
position of use	on request 15° ... 165°
increased mechanical loads	shock 30 g, 11 ms vibration 5 g, 5 ... 55 Hz
climatic suitability	climatic class 3 according to VDE/VDI 3540
with operating temperature range (relative humidity)	–10 ... +55 °C ≤ 75% annual average, non–condensing
climatic suitability	“limited use in the tropics”
with operating temperature range (relative humidity)	–25 ... +55 °C ≤ 75% annual average, non–condensing
marine application	non–certified
enclosure code	IP 54 splash–water protected front
terminals	connector blades 6.3 x 0.8
terminal protection against accidental contact	rubber nozzles

dial

lettering	in German, English, French, Italian, Portuguese, Spanish or on request
additional lettering	on request e.g. “generator”
logo on the dial	none or on request

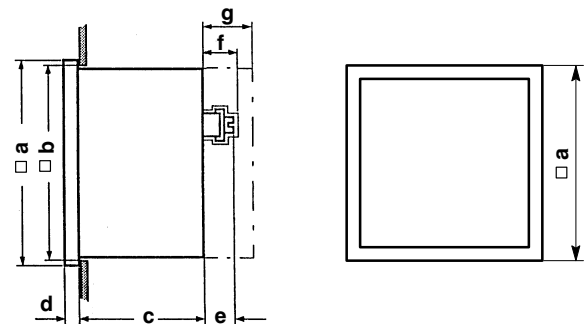
Connections

Note: The rotation direction depends on connection.



See also meter label

Dimensions



dimensions (in mm)	SY 96 S	SY 144 S
a	96	144
b	92	138
c	100	103
d	5	8
e	6.5	3
f	19*)	–
g	–	14

*) including cover for external series resistor

Ordering Information

type SY	synchronoscope
front dimensions 96 S 144 S	96 mm x 96 mm 144 mm x 144 mm
rated voltage	60 V 100 V 110 V 230 V *) 400 V 415 V 440 V 500 V others **) (>57.8 V ... <500 V)
rated frequency	16 ² / ₃ Hz 50 Hz *) 60 Hz
window	glass *) non-glaring glass
colour of bezel	black (similar to RAL 9005) *) gray (similar to RAL 7037)
position of use	vertical *) on request 15 ... 165° **)
mechanical loads	shock 15 g, vibration 2.5 g *) shock 30 g, vibration 5 g
climatic suitability	class 2, -10 ... +40° C *) class 3, -10 ... +55° C "limited use in the tropics", -25 ... +55° C
marine application	none *) non-certified
enclosure code	IP 52 *) IP 54 splash-water protected front
terminals	screws M3 x 6 and wire clamps *) connector blades 6.3 x 0.8
dial lettering	no text *) German *) English French Spanish Italian Portuguese on request **) additional lettering on request **)
logo	WEIGEL *) none OEM logo **)

*) standard

**) Please clearly add the desired specifications.

ordering example

SY 96 S, rated voltage AC 230 V, rated frequency 50 Hz,
window non-glaring glass, no logo

– specifications subject to change without notice; date of issue 12/01 –

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