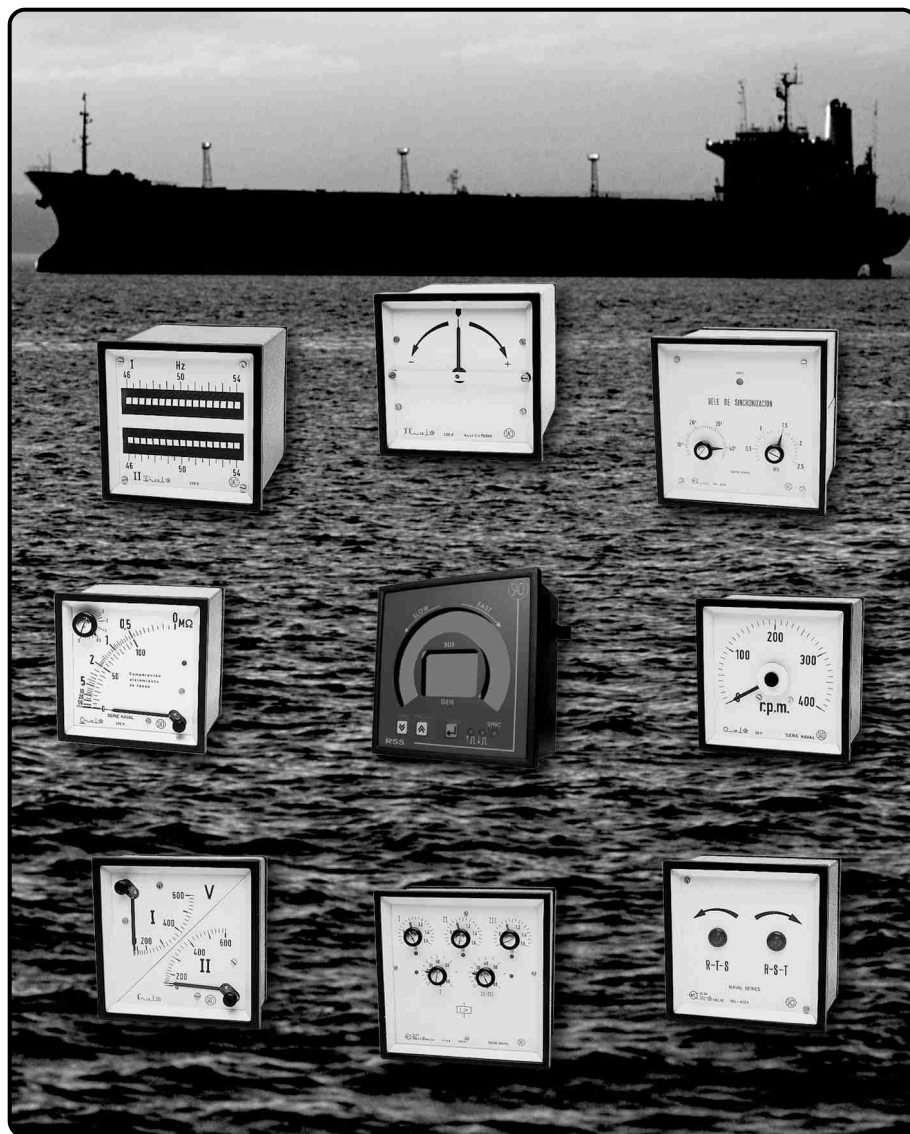


SYNCHRONIZATION RELAYS INSTRUMENTS FOR VESSELS



Aradique

ANALOGUE INSTRUMENTS

MEASURING INSTRUMENTS FOR VESSELS

Recommendations.

VOLTMETER

Depending on the system voltage, its full scale value will be 1.2 of that voltage as a minimum. This will be marked with a red line.

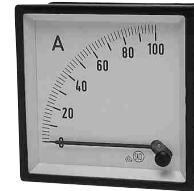
In the event of being connected to voltage transformers, the full scale will be 1.2 of the value of the transformer primary as a minimum. This will be marked with a red line.



AMMETER

Its full scale value will be 1.3 of the alternator rated current as a minimum. This will be marked with a red line.

The transformer current ratio must be as near as possible to the alternator's rated current.



WATTMETER

Its scale will have a full value between 0.6 and 1.2 of $U_n \times I_n \times \sqrt{3}$. Where (U_n) is the rated voltage or the primary of the voltage transformer, and (I_n) the primary current of the current transformer.

The alternator KW value is marked with a red line and in all cases its full scale value must exceed 20% of that value, which means that the final value will be approximately the same as its KVA.

When alternators are synchronised with others, the watt meter scale will be reversed to the left of zero. Its value must be 15% of full scale. In each case the watt meter will be 3-wire unbalanced three-phase.



REVERSE POWER RELAY

The adjustment value will be the alternator KW value (it will match the red line on the watt meter) and its value cannot be lower than $0.6 \times U_n \times I_n \times \sqrt{3}$. Setting is from 2 to 15% of that power. The transformer primary and secondary current and voltage values must be known. It will have a 5 s. delay.



ANALOGUE INSTRUMENTS

Analogue Instruments

MEASURING INSTRUMENTS FOR VESSELS

Recommendations.

MAXIMUM CURRENT RELAY

It may be connected to any $x/5$ A current transformer, but the available auxiliary voltage must be known.



SYNCHRONIZING RELAY

As a synchronizing auxiliary element, the selection and polarity of the voltage power supply must be correct. The width of the chosen phase and time parameters will depend on the level of response sensitivity to the alternators' speed and voltage settings and the value allowed by the group.



BAR INSULATION INDICATORS

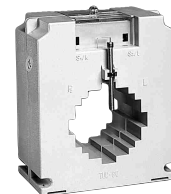
The instrument must be supplied directly by the three phases via a leakage analysis switch and never to the voltage transformer secondaries. The system power supply voltage and the available auxiliary power supply of the alarm circuit will be indicated.

This instrument must never be connected to three-phase systems with neutral connected to earth.



CURRENT TRANSFORMERS

Their power depends on the consumption of the instruments to be connected. At least 10VA in class 0.5 is recommended to avoid accuracy and angle errors. Polarity must be correct.



VOLTAGE TRANSFORMERS

The TE-15R model is specially designed for this application due to its power and accuracy (25VA, class 1). This allows all instruments that the control equipment usually has to be connected to the secondary without the introduction of ratio or phase errors.

No special recommendations are required for other instruments used in vessel control equipment.



ANALOGUE INSTRUMENTS FOR SYNCHRONIZING INSTRUMENTS

Analogue Instruments

DOUBLE VOLTMETERS

Two moving iron systems. True effective value.

- Scale: 90°
- Accuracy: 1,5 %
- Measuring range: 100, 110, 230, 400, 440 V
- Frequency: 45..65 Hz
- Burden: 1,5..3 VA

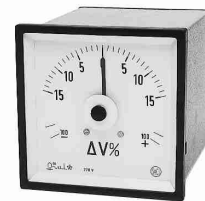


Model		EC3VII			EC2VII	
Dimensions	mm	96x96			144x144	
Approx. weight	Kg.	0,31			0,46	
DOUBLE VOLTMETERS						
Measuring range	Vn	2x100 V	2x110 V	2x230 V	2x400 V	2x440 V
Scales		2x160 V	2x175 V	2x365 V	2x635 V	2x700 V

DIFFERENTIAL VOLTMETERS

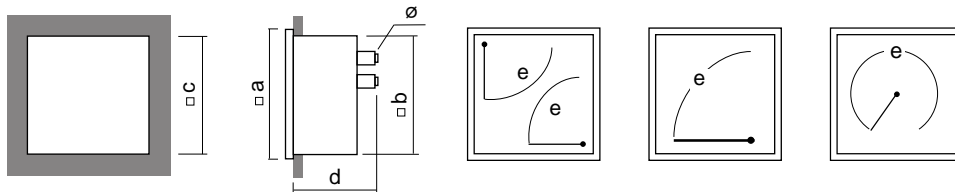
Difference (%) between two synchronizing voltages.

- Accuracy: 1,5 %
- Burden: 10 mA
- Frequency: 50 or 60 Hz
- Measuring range: 100, 110, 230, 400, 440 V



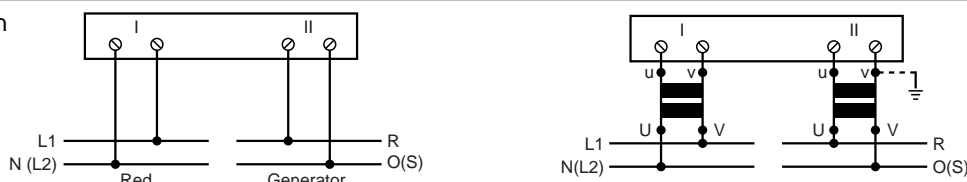
Model		CC3VGD		CC2VGD		CC3CGD		CC2CGD	
Dimensions	mm	96x96		144x144		96x96		144x144	
Approx. weight	Kg.	0,40		0,65		0,74		0,80	
DIFFERENTIAL VOLTMETERS									
Scales		100..15 - 0 - 15..100 % ΔV							

Dimensions



Models	Range	a	b	c	d	e	ø
EC3VII	100÷440	96	89	92 ^{+0,8}	59	2x55	M.4
EC2VII	100÷440	144	135	138 ⁺¹	59	2x68	M.4
CC3VGD	100÷440	96	89	92 ^{+0,8}	78	100	M.4
CC2VGD	100÷440	144	135	138 ⁺¹	92	140	M.4
CC3CGD	100÷440	96	89	92 ^{+0,8}	128	140	M.4
CC2CGD	100÷440	144	135	138 ⁺¹	92	220	M.4

Connection diagrams



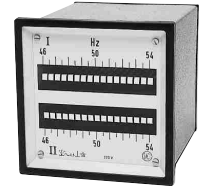
ANALOGUE INSTRUMENTS

Analogue Instruments

DOUBLE FREQUENCY METERS (REEDS OR POINTERS)

Double measurement (two systems) of two system frequencies.

- Accuracy: 0,5 %
- Voltage range: $\pm 15\%$ Vn
- Voltage (Vn): 100, 110, 230
400, 440 V
- Burden: 1,2..2,2 mA



Model		FC3VII	FC2VII
Dimensions	mm	96x96	144x144
Approx. weight	Kg.	0,87	1,25
DOUBLE FREQUENCY METERS			
Reeds		17	21
Scales	Hz	46..54 or 56..64	45..55 or 55..65

DIFFERENTIAL FREQUENCY METERS

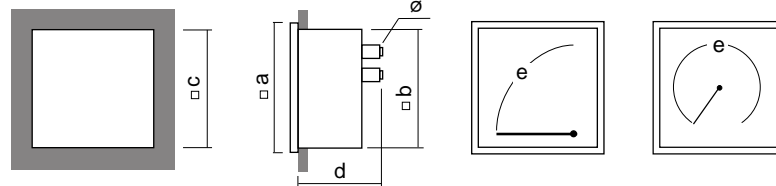
Frequency difference (%) between two systems.

- Accuracy: 0,2 %
- Voltage (Vn): 100, 110, 230
400, 440 V
- Burden: 10 mA
- Voltage range: $\pm 15\%$ Vn
- Frequency: 50 or 60 Hz



Model		FC3AD	FC2AD	FC3CD	FC2CD
Dimensions	mm	96x96	144x144	96x96	144x144
Approx. weight	Kg.	0,32	0,50	0,55	0,75
DIFFERENTIAL FREQUENCY METERS					
Scales	%	10 - 0 - 10 % Δ Hz			

Dimensions



Models	Range	a	b	c	d	e	ø
FC3AD	100÷440	96	89	92 ^{+0,8}	78	100	M.4
FC2AD	100÷440	144	135	138 ⁺¹	92	140	M.4
FC3CD	100÷440	96	89	92 ^{+0,8}	128	140	M.4
FC2CD	100÷440	144	135	138 ⁺¹	92	220	M.4
FC3VII	100÷440	96	89	92 ^{+0,8}	124	-	M.4
FC2VII	100÷440	144	135	138 ⁺¹	88	-	M.4

Connection diagrams



ANALOGUE INSTRUMENTS

Analogue Instruments

SYNCHRONOSCOPES

Phase synchronisation measurement (frequency and phase equality) between two single-phase or three-phase alternating current systems, or between system and generator.

- Accuracy: 1,5 % de 90° eléctricos
- Voltage range: $\pm 15\%$ Vn
- Voltage (Vn): 100, 110, 230
400, 440 V
- Burden: 20..30 mA
- Frequency: 50 or 60 Hz



		SYNCHRONOSCOPES	
Dimensions	mm	96x96	144x144
Approx. weight	Kg.	1,37	1,83
AC. SINGLE-PHASE			
AC. Single-phase *		SC3V-360°	SC2V-360°
BALANCED THREE-PHASE			
Balanced three-phase**		SC3VI-360°	SC2VI-360°

* With additional resistor box (external):
 100, 110, 230 V: Model 4.5.1
 400, 440 V: Model 4.5.1 and 2.4.1

** With additional resistor box (external):
 230 V: Model 1.6.1
 400, 440 V: Model 2.6.1 and 2.4.1

Dimensions							
Models	Range	a	b	c	d	e	Ø
SC3V-360°	100÷440	96	89	92 ^{+0,8}	135	100	M.4
SC3VI-360°	100÷440	96	89	92 ^{+0,8}	135	100	M.4
SC2V-360°	100÷440	144	135	138 ⁺¹	135	140	M.4
SC2VI-360°	100÷440	144	135	138 ⁺¹	135	140	M.4

Resistor boxes on page A36.

ANALOGUE INSTRUMENTS

Analogue Instruments

<p>Connection diagrams</p>		<p>Single-phase (100, 110, 230 V)</p>
<p>Connection: Transf. Voltage Direct input Transf. Voltage</p>		
<p>Connection diagrams</p>		<p>Single-phase (400, 440 V)</p>
<p>Connection: Transf. Voltage Direct input Transf. Voltage</p>		
<p>Connection diagrams</p>		<p>Three-phase (100, 110 V)</p>
<p>Connection: Transf. Voltage Direct input Transf. Voltage</p>		
<p>Connection diagrams</p>		<p>Three-phase (230 V)</p>
<p>Connection: Transf. Voltage Direct input Transf. Voltage</p>		
<p>Connection diagrams</p>		<p>Three-phase (400, 440 V)</p>
<p>Connection: Transf. Voltage Direct input Transf. Voltage</p>		

ANALOGUE INSTRUMENTS

Analogue Instruments

LAMP SYNCHRONOSCOPE

Genset synchronization for manual operation.

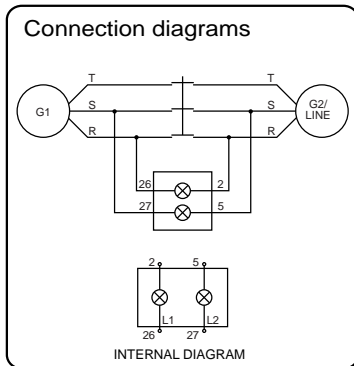


ALTERNATING CURRENT - NAVAL SERIES

- Frequency: 50 or 60 Hz - Voltage: 110, 230, 400 or 440 V $\pm 20\%$

Model		SC3VL	SC2VL
Dimensions	mm	96x96	144x144
Approx. weight	Kg.	0,20	0,26

Its operation is based on detecting voltage between similar phases in the two systems to be synchronized, so that when there is zero voltage the operator may give the connection order.



Dimensions

Models	Range	a	b	c	d	ø
SC3VL	110÷440	96	89	92 ^{+0,5}	78	M.4
SC2VL	110÷440	144	135	138 ⁺¹	78	M.4

SEQUENCE METER / SEQUENCE RELAY WITH ALARM

Displays the correct phase sequence in a three-phase system and provides a contact to allow the connection of the receiving device.



ALTERNATING CURRENT - NAVAL SERIES

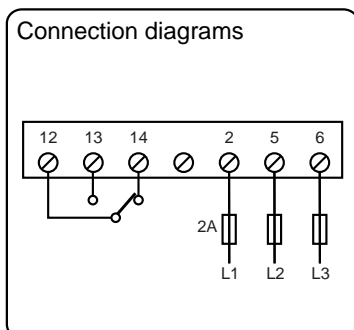
- Frequency: 50 or 60 Hz - Burden: 1,2 VA - Voltage: 110, 230, 400 or 440 V $\pm 20\%$

Model		RSQ	
Dimensions	mm	96x96	
Approx. weight	Kg.	0,35	

Has three LEDs showing:

- Inverse sequence (red), marked L3-L3-L2.
- Direct sequence (green), marked L3-L2-L3.
- Operates enable relay (green), marked OK.

Close enable output: 250 V, 8A relay



Dimensions

Models	Range	a	b	c	d	ø
RSQ	110-440	96	89	92 ^{+0,8}	78	M.4

ANALOGUE INSTRUMENTS

Analogue Instruments

SYNCHRONOSCOPE / DIGITAL SYNCHRONIZING RELAY

Allows both the phase and parameters of the two voltages from two systems to be displayed and their synchronization.



ALTERNATING CURRENT - NAVAL SERIES

- Input: 110, 230, 400 or 440 V $\pm 20\%$
- Frequency range: 45 a 65 Hz
- Phase-difference range: $\pm 180^\circ$
- Voltage-difference range: $\pm 100\%$
- Accuracy: 0,5 %
- Accuracy: 0,1 %
- Accuracy: 1 %
- Accuracy: 1 %

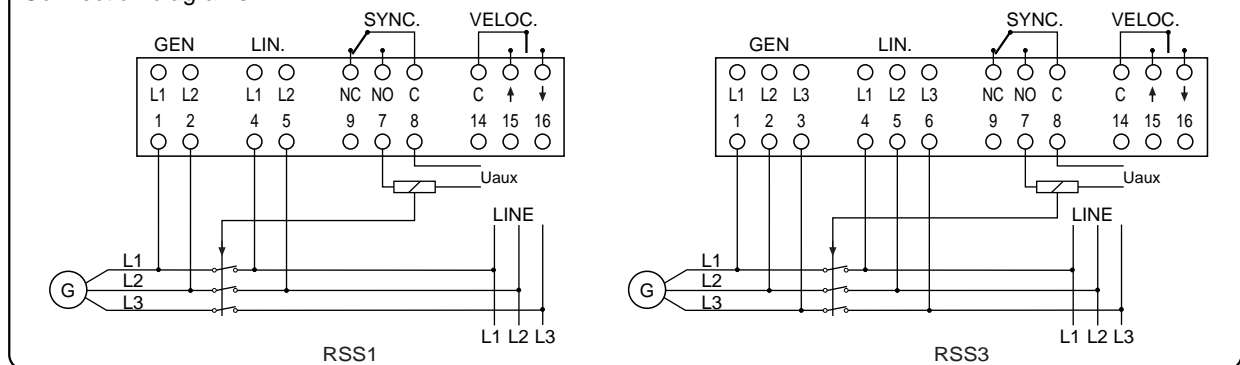
Model		RSS1 (2 wire)	RSS3 (3 wire)
Dimensions	mm	96x96	96x96
Approx. weight	Kg.	0,85	0,85
SYNCHRONOSCOPE / DIGITAL SYNCHRONIZING RELAY			
	V	110 or 230 V	110, 230, 400, or 440 V

Has a rotating display showing the phase between two voltages and two number indicators which display their module. Allows the current module difference, phase difference and trip time to be set. Once the enable conditions have been met, the output relay closes, either for a fixed time (300 ms) or continuously while the condition lasts. Receives power from the bus/bars signal. When operating as an automatic synchronizer it supplies acceleration/delay pulses for the alternator speed. LEDs on the front display the operation of the 8 output relays.

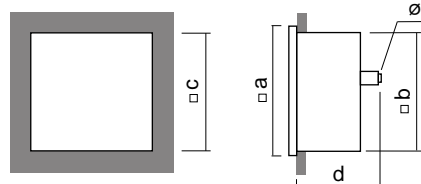
The front keypad programs:

- Voltage difference: $\pm 10\%$
- Phase difference: $\pm 20^\circ$
- Permanent time: 0,1 - 5 s.
- Operate enable relay: Pulse, 300 msg. - Continuous (SYNC)
- Operate control relays(SPEED)

Connection diagrams



Dimensions



Models	Range	a	b	c	d	ø
RSS-	110÷440 V	96	89	92 \pm 0,8	78	Term.

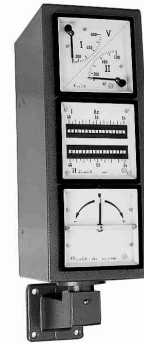
ANALOGUE INSTRUMENTS

Analogue Instruments

SYNCHRONIZING EQUIPMENT

Equipment with three instruments, double or differential voltmeter, double or differential frequency meters and synchronoscope, for connecting two generators in parallel, or connecting a generator with system.

Position: Vertical (as column with 180° turn)
Horizontal (with two supports)



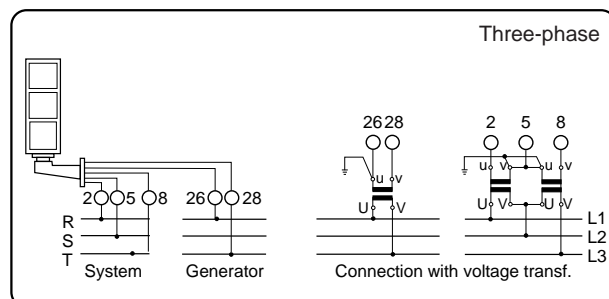
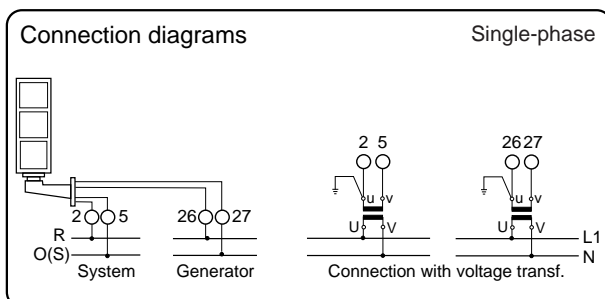
Technical specifications: see instrument data.

Model	VOLTMETERS	FREQUENCY METERS	SYNCHROSCOPES
ES3V	EC3VII or CC3VGD	FC3VII or FC3AD	SC3V-360°
ES3VI	EC3VII or CC3VGD	FC3VII or FC3AD	SC3VI-360°
ES2V	EC2VII or CC2VGD	FC2VII or FC2AD or FC2AD	SC2V-360°
ES2VI	EC2VII or CC2VGD	FC3VII or FC3AD or FC2AD	SC2VI-360°
ES3C	CC3CGD	FC3CD	SC3V-360°
ES3CI	CC3CGD	FC3CD	SC3VI-360°
ES2C	CC2CGD	FC2CD	SC2V-360°
ES2CI	CC2CGD	FC2CD	SC2VI-360°

		90° SCALE		240° SCALE	
Dimensions EQUIPMENT	mm	410x223x120	576x258x170	410x223x120	576x258x170
Dimensions INSTRUMENTS	mm	96x96	144x144	96x96	144x144
Approx. weight	Kg.	5,70	9,00	5,80	8,70
SINGLE-PHASE					
Single-phase		ES3V	ES2V	ES3C	ES2C
BALANCED THREE-PHASE					
Balanced three-phase		ES3VI	ES2VI	ES3CI	ES2CI

Dimensions

Models	a	b	c	d	e	f	g
ES3V-ES3VI	410	223	176	80	60	500	120
ES2V-ES2VI	576	258	176	115	85	692	170
ES3C-ES3CI	410	223	176	80	60	500	120
ES2C-ES2CI	576	258	176	115	85	692	170



ANALOGUE INSTRUMENTS

Analogue Instruments

REVERSE POWER RELAY

Power relay to limit the inverse power (antimotoring) between two alternating current generators connected in parallel.



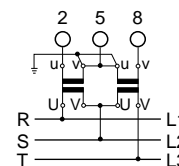
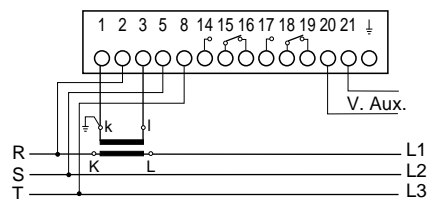
ALTERNATING CURRENT NAVAL SERIES

- Accuracy: $\pm 1,5\%$ (of Pn) - Frequency: 50 or 60 Hz

Model	RIC2VI	
Dimensions	mm	144x144
Approx. weight	Kg.	1,25
REVERSE POWER RELAY		
Un	V	100, 110, 230, 400 or 440
In	A	..5
Vaux	V	100, 230 or 400

- Un range: $-40 \div +20\%$
 - In range: $20 \div 120\%$
 - Hysteresis: $< 1\%$ (of Pn)
 - Delay for output signal: 5 ± 0.3 secs. (optional, without delay)
 - Output contacts power: Max. 200 VA, 400 V, 5 A
 - Vaux range: $\pm 20\%$
 - Scale: $Un \times In \times \sqrt{3} \times \cos \varphi$ (KW)
 - Adjustment limit: 2-15 % (of the alternator Pn in KW)
- Two light indicators determine the period of time between overload and the closing of the output relay.

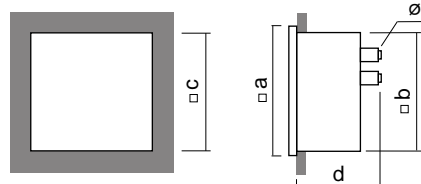
Connection diagrams



- Output contacts: Timing switch relay: 15 common
- Without auxiliary voltage: 14 open, 16 closed
- With auxiliary voltage: 15 and 14 closed

- With overload: 15 and 16 closed after time-out
- Instant relay: 18 common, 17 open, 19 closed
- With overload: 18 and 17 closed

Dimensions



Models	Range	a	b	c	d	ø
RIC2VI	100÷440 V	144	135	138 ⁺¹	89	M.4

ANALOGUE INSTRUMENTS

Analogue Instruments

SYNCHRONISING RELAY

Electronic relay for synchronization of two alternating current generators comparing their voltage, phase and frequency.



ALTERNATING CURRENT NAVAL SERIES

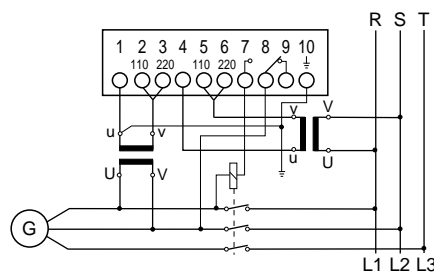
- Frequency: 50 or 60 Hz - Un range: $\pm 15\%$

Model	RSC2	
Dimensions	mm	144x144
Approx. weight	Kg.	2,00
SYNCHRONISING RELAY		
Un	V	2x110, 230, 400 or 440

A check adjusts the phase difference from 5 to 40 electrical degrees, and another adjusts the minimum time from 0.2 to 5 secs, during which this difference must be maintained.

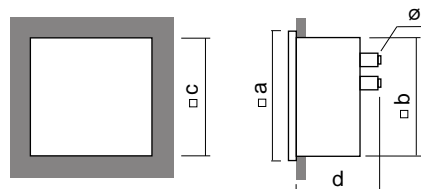
When both parameters go into the set limits, the output relay operates the synchronizing switch and an LED indicates that coupling may be carried out. To adjust operating limit, remove security cover or screw.

Connection diagrams



Output relay: 1 switching contact (max. 200 VA, 250 V, 5 A AC.)

Dimensions



Models	Range	a	b	c	d	ø
RSC2	100÷440 V	144	135	138 ⁺¹	134	M.4

ANALOGUE INSTRUMENTS

Analogue Instruments

MAXIMUM CURRENT RELAY

Electronic overcurrent relay which detects the current level in each phase in three-phase alternators.

ALTERNATING CURRENT NAVAL SERIES

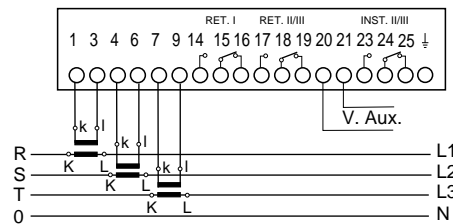


- Accuracy: Current: $\pm 2,5\%$ (Trip set value)
Time: $\pm 3\% \pm 1$ sg. of set value
- Frequency: 50 or 60 Hz

Model		RMC2	RMC2A
Dimensions	mm	144x144	144x144
Approx. weight	Kg.	1,33	1,33
MAXIMUM CURRENT RELAY			
In	A	..5	..5
Vaux	V	-	100, 110, 230, 400 or 440 $\pm 30\%$ A.C.

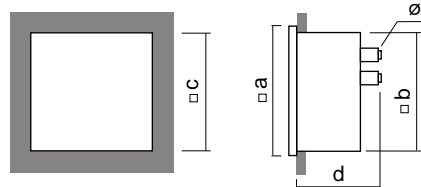
- Overload: 10 In for 1 s
- Vaux range: $\pm 30\%$
- Hysteresis: < 0.16 A
- Adjustment limit: 0.6÷1.6 (of In independent of each phase)
- Delay on output signal: (independent of overload): 1 from 2 to 60 secs in phases II and III
- Output contacts power: Max. 200 VA, 400 V, 5 A
- Indicators to check operation time.
- To adjust operating limit, remove security cover or screw.

Connection diagrams



- Output contacts: Phase I, Relay I
- 15-14 switch normally open and 15-16 closed
- In overload: 15-14 closed after time-out
- Phases II/III: Relay II/III, 18-17 switch normally open and 18-19 closed
- With auxiliary voltage, without overload, 18-17 closed
- In overload: 18-19 closed after time-out
- Instant relay.
- Switch, 24-23 open, 24-25 closed In overload, 24-23 closed
- On standby, 18-17 is open and 18-19 closed
- With auxiliary voltage, without overload, 18-19 remain closed
- In overload, 18-17 closed after time-out
- RMC2A:
The same features as RMC2 except that II/III relay operation is reversed

Dimensions



Models	Range	a	b	c	d	ø
RMC2	..5	144	135	138 ⁺¹	89	M.4
RMC2A	..5	144	135	138 ⁺¹	89	M.4

ANALOGUE INSTRUMENTS

Analogue Instruments

MIN-MAX VOLTAGE AND FREQUENCY RELAY

Instrument for voltage and frequency control in a three-phase or single-phase system.



ALTERNATING CURRENT NAVAL SERIES

- Accuracy: $\pm 2\%$ - Frequency: 50 or 60 Hz

Model	RUFC2	
Dimensions	mm	144x144
Approx. weight	Kg.	1,25
MINIMUM-MAXIMUM VOLTAGE AND FREQUENCY RELAY		
Un	V	100, 110, 230, 400 or 440
Vaux.	V	110, 230 or 400 $\pm 30\%$ A.C.

- Un range: $-40 \div +20\%$
- Vaux range: $\pm 30\%$

MINIMUM VOLTAGE SETTING

- Un range: 60-100 % (Accuracy 1%)
- Timer: 0-5 s. (Accuracy 2% ± 0.2 s)

MAXIMUM VOLTAGE SETTING

- Un range: 80-120 % (Accuracy 1%)
- Timer: 0-5 s. (Accuracy 2% ± 0.2 s)

MINIMUM FREQUENCY SETTING

- Range: 45-55 / 55-65 Hz (Accuracy 1%)
- Timer: 0-10 s. (Accuracy 2% ± 0.2 s)

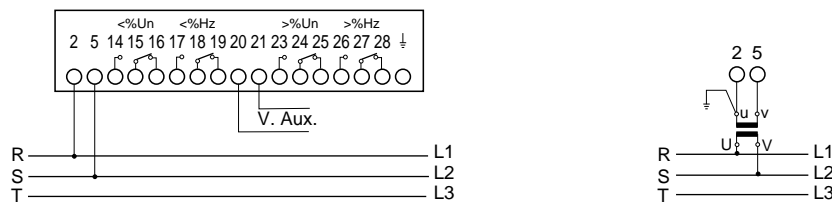
MAXIMUM FREQUENCY SETTING

- Range: 45-55 / 55-65 Hz (Accuracy 1%)
- Timer: 0-10 s. (Accuracy 2% ± 0.2 s)

Instant alarm and relay operation indicators.

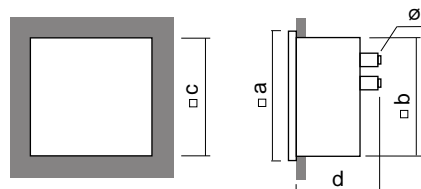
To adjust operating limit, remove security cover or screw.

Connection diagrams



- One switch output relay each setting (max. 200 VA, 400 V).
- Hysteresis $< 2\%$

Dimensions



Models	Range	a	b	c	d	ø
RUFC2	100÷440 V	144	135	138 ⁺¹	89	M.4

ANALOGUE INSTRUMENTS

Analogue Instruments

INSULATION INDICATORS

Instrument which detects and measures an earth insulation failure in a three-phase circuit with insulated neutral with direct and continuous connection to the system (position G on switch).

The IAC_VA models have a built-in alarm system with continuous adjustable setting device from 0 and 5 MΩ.



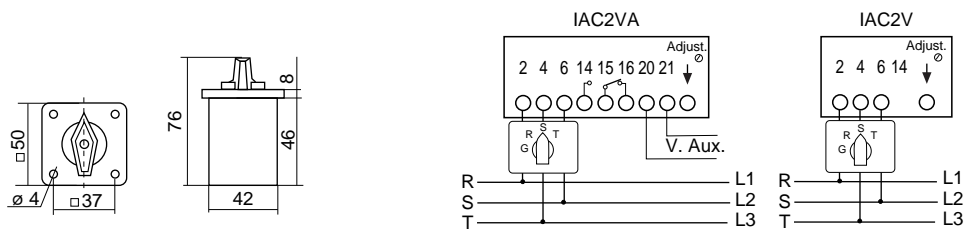
ALTERNATING CURRENT NAVAL SERIES

- Accuracy: $\pm 1,5\%$ (of U_n scale arch)
- Frequency: 50 or 60 Hz

Model	IAC3V	IAC2V	IAC3VA	IAC2VA
Dimensions mm	96x96	144x144	96x96	144x144
Approx. weight Kg.	0,92	1,20	0,92	1,20
INSULATION INDICATORS				
Vaux	230-400 or 440 V			110 or 230 A.C.

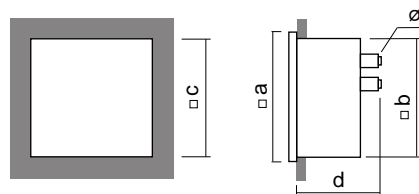
- Scale: 0..50..0 MΩ (1 MΩ to centre)
- Vaux range: $\pm 20\%$
- Guaranteed number of operations: 107
- Output contact: Switched at 2A, 230 V AC., 200 VA
- Scale: 0-100 (Insulation comparison)
- Setting accuracy: $\pm 3\%$ of scale value
- To adjust operating limit, remove security cover or screw.

Connection diagrams



If the insulation drops below the selected level, an internal spdt micro-relay closes the alarm circuit as the indicator, located beside the setting device, comes on. Moving the switch to position R, S or T, allows the faulty phase to be located. The phase with the lowest reading will have the insulation fault.

Dimensions



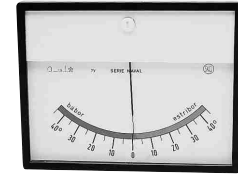
Models	Ranges	a	b	c	d	e	Ø
IAC3V IAC3VA	230÷440	96	89	92 ^{+0,8}	92	100	M.4
IAC2V IAC2VA	230÷440	144	135	138 ⁺¹	89	140	M.4

ANALOGUE INSTRUMENTS

Analogue Instruments

RUDDER DEGREE INDICATOR FOR VESSELS

Rudder position indicator through connection to potentiometer using resistance variations.



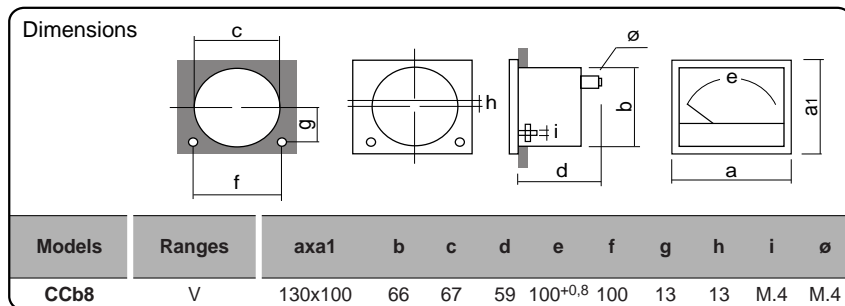
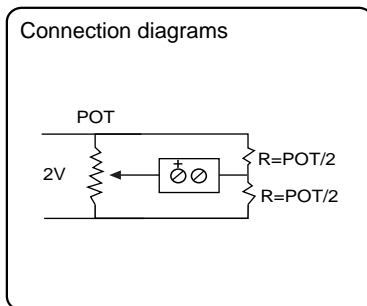
DIRECT CURRENT - NAVAL SERIES

- Scale: 90° - Accuracy: ±1,5 %

- Burden: 2000 Ω/V

Model	CCb8	
Dimensions	mm	130x100
Approx. weight	Kg.	0,25
RUDDER DEGREE INDICATOR		
Scales	°	40-0-40 or 45-0-45
Ranges	V	7-0-7 or 12-0-12

Standardised scales. PORT (red arc); STARBOARD (green arc). Lighting: Grade line at 12 V (two 2W lamps). The central value or 0° on the scale coincides with the potentiometer centre.



R.P.M. INDICATOR FOR VESSELS

Supplied by a generator located at the propeller axis indicating its r.p.m. AHEAD or ASTERN.



DIRECT CURRENT - SERIE NAVAL

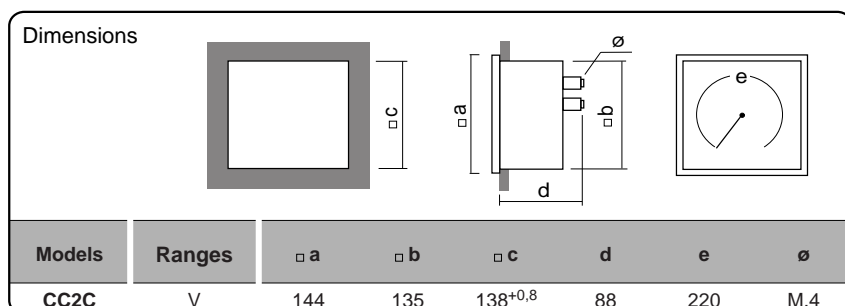
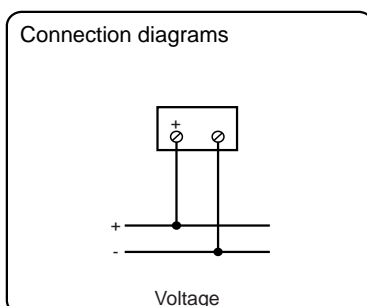
- Scale: 240°

- Accuracy: ±1,5 %

- Burden: 100 Ω/V

Modelo	CC2C	
Dimensions	mm	144x144
Approx. weight	Kg.	0,68
R.P.M. INDICATOR FOR VESSELS (MAIN MOTOR)		
Scales	r.p.m.*	150-0-150, 180-0-180, 200-0-200 or 300-0-300
Ranges	V**	10-0-10

*Standardised scales. ASTERN (red arc); AHEAD (green arc). ** Standardised ranges, according to voltage/speed curve (V.DC./r.p.m.) of the generator. Full scale adjustment: With built-in potentiometer ±10 % of total value. Lighting: Translucent at 12 or 24 V.



ANALOGUE INSTRUMENTS

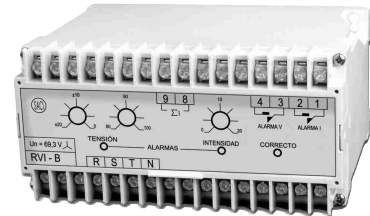
Analogue Instruments

VOLTAGE AND CURRENT SURVEILLANCE RELAY

Designed for supervising measurement board connections in installations or substations. Detection of Current Unbalance, Voltages, Overvoltage and Undervoltage.

ALTERNATING CURRENT

- Detection range:
 - Unbalance 0 to 20 % of V_n .
 - Undervoltage 80 to 100 % of V_n .
 - Unbalance 0 to 20 % of I_n .
 - Overvoltage 120 % of V_n .
- Class: 1
- Output features: 250 V, 3 A, 300 VA.
- Burden: 0.48 VA per phase



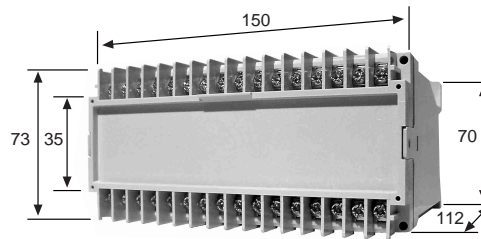
Model		RVIA (three-phase, 3 wire)	RVIB (three-phase, 4 wire)
Dimensions	mm	150x70x112	150x70x112
Approx. weight	Kg.	1,20	1,20
VOLTAGE AND CURRENT SURVEILLANCE RELAY			
	V	110, 230 or 400 V	
	A	..5 A or ..1/A	

Current faults activate an alarm relay and any form of voltage fault activates a second relay. Has an indicator to show "CORRECT" status and two indicators to show "CURRENT FAILURE" and "VOLTAGE FAILURES".

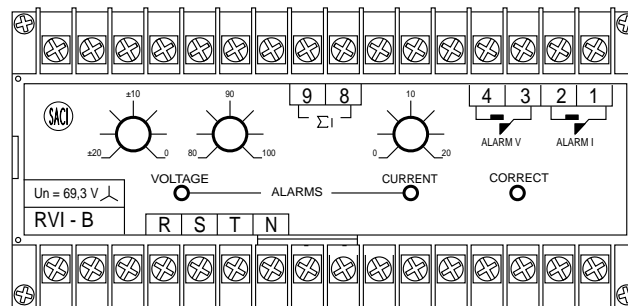
Controls on the front allow comparison levels to be selected to set off the alarm. Two controls are for voltage, for unbalance levels (from 0 to 20 %), and undervoltage levels (from 80 to 100 %) and a third for current (from 0 to 20 %).

To operate, the three phases to be supervised are connected to the voltage inputs and the three currents pass through the associated toroidal transformer.

Dimensions



Connection diagrams



Connections:

Voltages, connected to terminals marked R, S, T and N. For three wire equipment, obviously neutral is not connected.

Currents, the toroidal transformer output is connected to terminals marked Σ (8 and 9).

Output relays have potential-free contacts and are insulated for complete connection flexibility.