## **MULTIFUNCTION METERS**



**DIMENSIONS in mm** 



 The 105 mm dimensions correspond to 6 DIN modules (17.5 mm each)

	1RANM6	1RANM6R	1RANM6C	1RANM6CS	1RANM6C485	1RANM6CS485	1RANM6C232
ELECTRICAL PARAMETERS							
<ul> <li>Voltage phase-phase</li> </ul>	•	•	•	•	•	•	•
<ul> <li>Voltage phase-neutral</li> </ul>	٠	•	•	•	•	•	•
- Current	•	•	•	•	•	•	•
- Total Active Power			•	•	•	•	•
- Total Reactive Power			•	•	•	•	•
- Total Apparent Power			•	•	•	•	•
- Total Active Energy			•	•	•	•	•
- Partial Active Energy			•	•	•	•	•
<ul> <li>Total Reactive Energy</li> </ul>			•	•	•	•	•
- Power Factor			•	•	•	•	•
- Frequency			•	•	•	•	•
- Phase sequence			•	•	•	•	•
- Partial and Total working hours			•	•	•	•	•
Possibility to use the output contacts by	software						
(for example: turn-on or turn-off an engi	ne)					•	
The software is available, free of charge	, on our internet	address www.reval	co.it		•	•	•
STANDARD POWER SUPPLY					230 VAC 50/60H	2	
NOMINAL INPUT VALUES	Voltage				500V		
	Primary curre	ent		from 5A to 6000A	selectable by butto	n located at the fro	ont
	Secondary c	urrent			5A (1A on reques	t)	
	Frequency				from 40 to 60 Hz		
SELECTABLE CAPACITIES			from 5A	to 1000A with step	s of 5A – from 100	OA to 6000A with st	eps of 50A
PRECISION CLASS			2%	± 2 digit (Power ar	nd Energy) 0,5% ±	2 digit (all other va	lues)
CONSUMPTION				0	4VA	0	,
FRONT PROTECTION DEGREE					IP20		
INSULATION CLASS					Ш		
WORKING TEMPERATURE					-5°C +50°C		
	-20°C +70°C						
				2	kV at 50Hz for 1 mi		
				2	FEPROM	lute	
		NO (0.5A-1000\/)		NO (0.5A-1000\/)		NO(0.5A-1000)/)	
with high power (max 20VA)		110 (0,04-10007)		100 (0,04 1000 0)		100 (0,04 1000 V)	
switching voltage (1000VDC) or peak A	c.						
	•				RS	485	RS232
					MODBUS	SLAVE RTU	MODBUS SLAVE RTU
. HOTOODEL					1000000		ASCI on request
INSULATION VOLTAGE						3kV	
WEIGHT Kg					0.50	U.V.	

**TECHNICAL CHARACTERISTICS** 

## **1RANM6**

### **OPERATION**

**CONFIGURATION SELECTION MENU** 

Powering the instrument you can see the following page

Main fault

By pressing the front button, the introduction page of this analyser appears, on which the actual version is also identified.

In this position, the configuration selection menu page will appear (see at the bottom of this page) To enter into the configuration menu maintain pressure on the front button for a few seconds

- Maintaining pressure on the front button you will see the parameters displayed on this page Releasing the button the measurements will be shown
- Maintaining pressure on the front button you will see the parameters displayed on this page Releasing the button the measurements will be shown
- By pressing the front button for a few seconds a flashing page appears, indicating that you are entering into the configuration selection menu, and you will see for example:

Maintain pressure on the front button untill the following page is displayed. Releasing the button the further pages will be **automatically** shown

After a few seconds the CT selection page appears, by pressing the front button you can select the required CT value. From 5A up to 999A with steps of 5A

From 1000A up to 6000A with steps of 50A for their display it is necessary to refer in kA values where this unit measurement is indicated by the illumination of the light located on the extreme right of the display . To fast forward maintain pressure on the front button

- After a few seconds the page of the mathematical medium n° of samples appears; practically it is the stability filter of the measurement. The numbering goes from 1 to 60; the higher is the selected number the slower is the change of displays.
- Automatically the following page appears: here it is possible to select and memorise the main page that you want to see after the initial energising of the instrument. By pressing in succession the front button, the various titles of the pages available appear and when you see the one required release the button to memorise it. After 5 seconds the next page appears.

### **CONNECTION DIAGRAM**





three voltages phase/phase three currents

three voltages phase/neutral

three currents



1112 1123 1131

The example shows the displays of a 1200A CT

nuc	43	20	
	 10.1	100	14
			30

.dEF	Rut	E -
. Piles	AF.	and the second
PR9	E	

## **1RANM6R**

### **OPERATION**



When pressing the front button it is possible to choose between: OFF - On (excitation relay delay) or Or - OFF (disexcitation relay delay)

- On the further page it is possible to select the delay time up to max 30 seconds

On the further page it is possible to select the delay time of the 1st threshold



## On the further page it is possible to select the parameter to which applies the 1st alarm threshold between:

- 3U alarm applied simultaneously to the three phase-neutral voltages, where is enough that one of the three voltages exceeds the selected value to activate the alarm
- 3UF alarm applied simultaneously to the three phase-phase voltages, where is enough that one of the three voltages exceeds the selected value to activate the alarm
- alarm applied simultaneously to the three currents, where is enough that one of the three currents exceeds the selected value to activate the alarm 3i i2 alarm applied to the L2 current phase i3 alarm applied to the L3 current phase
- i1 alarm applied to the L1 current phase
- U1
- U12 alarm applied to the L1-L2 voltage phase
- alarm applied to the L1 phase-neutral voltage phase U2 alarm applied to the L2 phase-neutral voltage phase U3 alarm applied to the L3 phase-neutral voltage phase U23 alarm applied to the L2-L3 voltage phase
- The further page shows also the percentage value of the alarm. It is possible to modify the percentage value of the alarm; by pressing the front button the percentage is varied with steps of 1%( to fast forward maintain pressure on the front button) and displayed on the page is the equality between the numerical value and the percentage. Example: having choosen the parameter 3UF, the percentage 51% correspond to 255V

Ehr

Now the 2nd alarm threshold configuration page appears Where it is necessary to act exactly as explained above

## **CONNECTION DIAGRAM**

2 SEL





U31 alarm applied to the L3-L1 voltage phase



# **1RANM6C / 1RANM6C485 / 1RANM6C232**



Releasing the button you can see for example at  $\cos\varphi 1$  the following display:

HIII HUI **Reactive Power** 

If the value of the cosphi goes down, the phase displacement angle is immediately displayed, and the Active Power's bar goes down while the Reactive Power's bar will increase as for example in the figure:

Maintaining pressure on the front button you see the parameter displayed on this page

Active Power

Reactive Power

Maintaining pressure on the front button you see the parameter displayed on this page Releasing the button the graphics will be shown

Releasing the button the graphics will be shown



Visual simulation of the rotation of the electromechanical active kWh-meter indicating how much energy you are using at that time

**BEL BRE** Analogue display bar of the Active Power (settable)

If for example the selected CT is 50/5A but it is well known that the installation is already at 100% with 40A, You'll set the instrument in the way that with 40A the bar shows 100%









L1

L3

N

# **1RANM6CS / 1RANM6CS485**

## **OPERATION**

Powering the instrument you can see the following page Main fault By pressing the front button, the introduction page of this analyser appears, or on which the actual version is also identified. In this position, the configuration selection menu page will appear (see at the bottom of this page) To enter into the configuration menu maintain pressure on the front button for a few seconds three voltages phase/phase Maintaining pressure on the front button you will see the parameters displayed on this page Releasing the button the measurements will be shown three currents Maintaining pressure on the front button you will see the parameters displayed on this page three voltages phase/neutral Releasing the button the measurements will be shown three currents Maintaining pressure on the front button you will see the parameter displayed on this page Total Active Power. Releasing the button the measurement will be shown expessed in Watt Maintaining pressure on the front button you will see the parameter displayed on this page Total Reactive Power Releasing the button the measurement will be shown expessed in Var Maintaining pressure on the front button you will see the parameter displayed on this page Total Apparent Power, Releasing the button the measurement will be shown expessed in VA Maintaining pressure on the front button you will see the parameter displayed on this page Total Active Energy Releasing the button the measurement will be shown expessed in kWh Maintaining pressure on the front button you will see the parameter displayed on this page **Relative Active Energy** showing the quantity of energy used in 15 min expessed in kWh Releasing the button the measurement will be shown memorised every 15 min. The flashing symbol means that the instrument is counting the used energy during 15 minutes; when the symbol becomes static it means that the 15 minutes are passed and the final value is shown. To zero this value, maintain pressure on the front button. Maintaining pressure on the front button you will see the parameter displayed on this page Total Reactive Energy Releasing the button the measurement will be shown expessed in kVar. Maintaining pressure on the front button you will see the parameters displayed on this page Capacitive ( ERP ) or Inductive Power Factor ( Ind ) in number ( EDS ), or in electrical degrees ( ERS ) Frequency from 30Hz to 70Hz ( Releasing the button the measurement will be shown Maintaining pressure on the front button you will see the Phase sequence parameter displayed on this page Releasing the button this indication appears : (not correct sequence) (correct sequence) or Maintaining pressure on the front button you will see the parameter displayed on this page Hourmeter indicating the working hours of the instrument, the memorising of the time occurs every 15 min Releasing the button the measurement will be shown Maintaining pressure on the front button you will see the parameter displayed on this page Partial hourmeter indicating the working Releasing the button the measurement will be shown hours of the instrument (zeroing in the next page) Maintaining pressure on the front button you will see the

Actual situation of the thresholds

Releasing the button, the activation (ON) or the deactivation (OFF) of the two thresholds (th1 and th2) appears showing

parameter displayed on this page

Maintaining pressure on the front button you see the parameters displayed in this page Releasing the button the measurement will be shown This page serves to give an immediate visual situation of the installation Active Power Releasing the button you can see for example at  $\cos\varphi 1$  the following display

Actual analogue bar of the Active Power respect to the Total Apparent Power

Actual analogue bar of the Reactive Power respect to the Total Apparent Power

**Reactive Power** 

If the value of the cosphi goes down, the phase displacement angle is immediately displayed, and the Active Power's bar goes down while the Reactive Power's bar will increase as for example in the figure:

Maintaining pressure on the front button you see the parameter displayed on this page Visual simulation of the rotation of the electromechanical active kWh-meter indicating how much energy you are using at that time Releasing the button the graphics will be shown

tot	Ret	dSc
	-	
_		-

Active Power

Reactive Power

Maintaining pressure on the front button you see the parameter displayed on this page Releasing the button the graphics will be shown



Analogue display bar of the Active Power (settable)

If for example the selected CT is 50/5A but it is well known that the installation is already at 100% with 40A, You'll set the instrument in the way that with 40A the bar shows 100%

	CONFIGURATION SELECTION MENU
	By pressing the front button for a few seconds a flashing page appears, indicating that you are entering into the configuration selection menu, and you will see for example:
	Maintain pressure on the front button untill the following page is displayed. Releasing the button the further pages will be <b>automatically</b> shown
-	After a few seconds the CT selection page appears, by pressing the front button you can select the required CT value. From 5A up to 999A with steps of 5A
	From 1000A up to 6000A with steps of 50A and for their display it is necessary to refer in kA values where this unit measurent is indicated by the illumination of the light located on the extreme right of the display. To fast forward maintain pressure on the front button The example shows the display of a 1200A CT
	After a few seconds the page of the mathematically medium n° of samples appears; practically it is the stability filter of the measurement. The numbering goes from 1 to 60; the higher is the selected number the slower is the change of displays.
	After a few seconds the following page appears, on which it is possible to select the end scale value of the analogue bar of the Active Power (Act Ratio). The indicated example shows a value of 92% that can be modified (with steps of 1%) by pressing the front button (To fast forward maintain pressure on the front button).
	Releasing the button the page will show also the numerical equality in Watt of the percentage choosen In function of the nominal calibration data. If for example the CT 50/5A is selected and the percentage is 92% you'll see: where 6900W correspond to the end scale (92%) Calculated as follow: $92\% = Vnom \times CT$ value $\times 3$ $230V ph/n \qquad 50/5A$ (400V ph/ph) $230 \times 50 = 11500$ $11.500: 5 = 2300$ $2300 \times 3 = 6900$
	Automatically the following page appears: here it is possible to select and memorise the main page that you want to see after the initial energising of the instrument. By pressing in succession the front button, the various titles of the pages available appear and when you see the one required release the button to memorise it.
	After 5 seconds the next page appears. (version 1RANM6CS485 only) on which , by pressing the front button, it is possible to change the address to assign serial address serial address
	1st alarm threshold configuration page         Where pressing the front button it is possible to choose between:       OFF         Hi (max alarm),         Lo (min alarn)
	On the further page it is possible to select the delay time of the 1st threshold Where pressing the front button it is possible to choose between: OFF - On (excitation relay delay) or On - OFF (disexcitation relay delay)
	On the further name it is possible to select, the delay time up to max 30 seconds

3U alarm applied simultaneously to the three phase-neutral voltages, where is enough that one of the three voltages exceeds the selected value to activate the alarm

3UF alarm applied simultaneously to the three phase-phase voltages, where is enough that one of the three voltages exceeds the selected value to activate the alarm alarm applied simultaneously to the three currents, where is enough that one of the three currents exceeds the selected value to activate the alarm

i2 alarm applied to the L2 current phase

rEA alarm applied to the Reactive Power

U23 alarm applied to the L2-L3 voltage phase

- 3i
- i1 alarm applied to the L1 current phase
- U1 alarm applied to the L1 phase-neutral voltage phase U2 alarm applied to the L2 phase-neutral voltage phase
- Act alarm applied to the Active Power
- U12 alarm applied to the L1-L2 voltage phase

FrE alarm applied to the frequency

deg alarm applied to the electrical degrees of the Power factor

CoS alarm applied to the COSphi of the Power Factor

The further page shows also the percentage value of the alarm. It is possible to modify the percentage value of the alarm; by pressing the front button the percentage is varied with steps of 1%( to fast forward maintain pressure on the front button) and displayed on the page is the equality between the numerical value and the percentage. Example: having choosen the parameter 3UF, the percentage 51% correspond to 255V

#### Now the 2nd alarm threshold configuration page appears

Where it is necessary to act exactly as explained before

If in the configuration phase you decide NOT to use one or both threshold, these will remain available to be controlled via MODBUS SLAVE RTU, by the controll software.





**1RANM6CS485** 

- alarm applied to the L3 current phase i3
- APP alarm applied to the Apparent Power

U3 alarm applied to the L3 phase-neutral voltage phase U31 alarm applied to the L3-L1 voltage phase



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Scheme n. 1: Connection between instruments and PC for distances up to 800m

SERIAL COMMUNICATION



## **COMPUTER INTERFACE 1RINT**



#### **TECHNICAL CHARACTERISTICS**

1RINT is an interface for use with personal computers compatible with IBM AT via a serial cable RS232 CANNON DB9 with the following characteristics:

- PC Entry, female connectors, nine pin
- Interface Entry, male connectors, nine pin
- In cases of Line Disturbance, connect the "S" wire (contained in the cable) to ground, on one side.

RINT SIDE



This converter can work with either 422 or 485 which are selectable by means of a switch located in the upper part of the device (under the slide)



2 kV a 50Hz for 1 minute 230V +/- 10% 50/60Hz



CONSUMPTION

L1

Ν

DIMENSIONS

**BIDIRETIONAL SERIAL COMMUNICATION** 

green led lights (Power ON), while during the comunication, the yellow led lights (Rx) for the input signal and the red led lights (Tx) for the output signal. The speed of the serial comunication is

When the interface is powered, the working

selfconfigured, between 1200 baud and 19200 baud.

It adapts to the speed of the instrument to which the converter is connected.

> 3VA selectable between RS 232 / RS 422 and RS 232 / 485 3 rail DIN modules

-5°C...+ 50°C - 20°C...+ 80°C IP 20

### **DIMENSIONS** in mm



The 52,5 mm dimensions correspond to 3 DIN modules (17,5 mm each)

Weight: 0,23 Kg 

TEST VOLTAGE

POWER SUPPLY

WORKING TEMPERATURE

STORAGE TEMPERATURE

**PROTECTION DEGREE** 



### SERIAL COMMUNICATION

Example of application: connection for distances more than 15 meters



## **MEMORY INTERFACE 1REPROM**



#### **GENERAL DESCRIPTION**

**1REPROM** is an interface with memory to connect between the multifunction meters and a PC through a serial cable RS232 CANNON DB9 female for the analysis of the memorised parameters. 1REPROM will memorise all the parameters measured by the 1RANM6 series up to 2000 memory blocks by a programmable scanning times of from 1 second to 24 hours. By use of a switch positioned under the slide on the top of the case, it is possible to stop the memorisation up to 2000 blocks or allow overwriting new blocks of data.

Included is the possibility of remote command START / STOP MEMORY.

Through a PC programm on 1REPROM the memorisation time and other required options can, after first removing the 1REPROM from the multimeters and connect to the PC, enable all of the required information to be read from a monitor.

### **TECHNICAL CHARACTERISTCS**

NC |

L1

Ν

230V ~ 50 Hz

10 11 12

AUXILIARY POWER SUPPLY	230VAC +/- 10% (galvanically insulated)
SIGNALLING LEDS	POWER ON = green led light-on
	STOP = red led light-on (memory full)
	MEMO = fixed red led light-on (programming by PC)
	<ul> <li>flashing red led (memo phase)</li> </ul>
REMOTE START/STOP COMMAND	by NC contact: NC = START; NO = STOP
SERIAL COMMUNICATION	19200 - 9600 - 4800 - 2400, 8, n, 1 baud (not insulated) on terminals 10-11-12
	115200 baud on serial cable RS232 DB9 female
INTERNAL CLOCK	with back-up
MEMORY	EEPROM 1Mbit I2C Bus (expandable to 4 MBit - from 2048 to 8192 recorders 64 bytes)
BURDEN	1,5 – 2 W
TEMPERATURES	working temperature: from -10°C to + 55°C (UR < 90%)
	storage temperature : from – 40°C to + 70°C (UR < 90%)
INSULATION CLASS	ll
PROTECTION CLASS	IP 20
DIMENSIONS	3 modules DIN
DIMENSIONS in mm	CONNECTION DIAGRAM
58	START / STOP
	REMOTE DU TY CND



The 52,5 mm dimensions correspond to 3 DIN modules (17,5 mm each)

Weight: 0,23 Kg