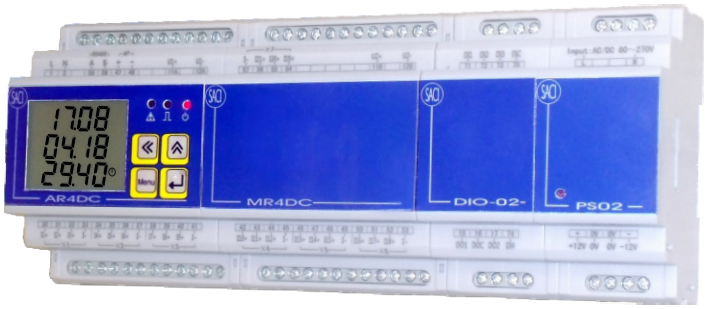
HALL EFFECT DC NETWORK ANALYZER AR4DCT

The AR4DCT Hall effect network analyzer is designed for voltage, current, power and energy measuring in DC systems using hall effect sensors. Its RS485 port allows monitoring easily. It includes temperature sensor and nominal voltage of 1500 V C.C.

GENERAL FEATURES

- **DIN RAIL MOUNTED.**
- **DC.**
- **HALL EFFECT SENSORS: 9 CURRENTS (UP TO 21*).**
- **RS485 PORT**
- **BIDIRECTIONAL ENERGY.**
- **OPTIONAL: 4 DIGITAL INPUTS AND 2 OUTPUTS**



ELECTRICAL PARAMETER	UNIT	SYMBOL	MAX/MIN	DEMAND	AR4DC	AR4DCT
Voltage	V	•	•		•	•
Current (9 extendable to 21)*	A	•	•	•	•	•
Power	kW	•	•	•	•	•
Import active energy	kWh	•			•	•
Export active energy	kWh					
Outdoor temperature measurement	ºC	•				•

*Module MR4DC and MR4DCT available to extend from 9 to 21 current inputs using 1 module MR4DC or up to 33 current inputs using 2 modules MR4DC

APPLICATIONS

- **FOR HALL EFFECT SENSORS.**
- **PHOTOVOLTAIC SYSTEM.**

NOMENCLATURES

- **AR4DCT** - DC Network analyzer with Temperature sensor.
- **MR4DC** - Current input extendable module (optional).
- **DIO-02** - Digital inputs and relay output extendable module (optional).
- **PS02** - 12 V Power supply.

INPUT	
Rated Voltage (Un)	1500 V DC.
Continuous overload	1,2 Un
Burden	< 1 VA
Impedance	> 4 MΩ
Rated Current (In)	4 V C.C.
Continuous overload	1,2 In
Burden	< 1 VA

AUXILIARY VOLTAGE	
Aux. V. AC/DC	80 - 270 V
Burden	< 5 VA

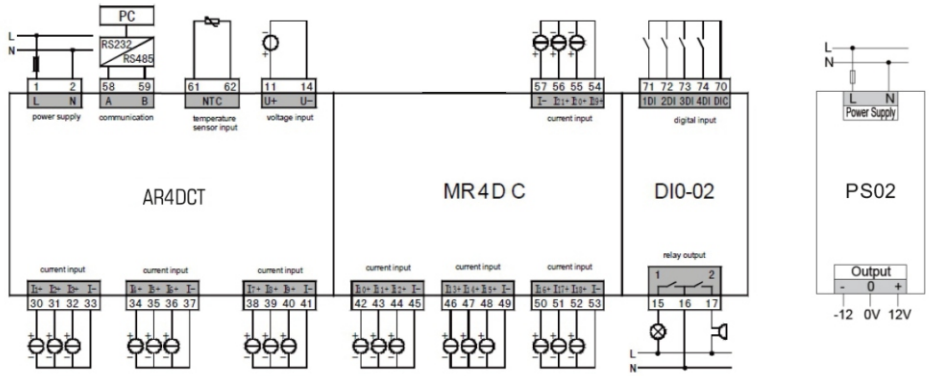
OUTPUT	
Relays	250 V/5A AC , 30V/5 A DC
Pulse weight	80 ± 20% ms
Serial port	RS485
Protocol	MODBUS RTU
Baud rate	Programmable 1,2-19,2 kbps
Connection	2 wires

GENERAL FEATURES	
Case material	ABS, UL94 V0
Dimensions	4 modules DIN (70 mm)
Terminals	With screws
Máx. wire section	2,5 mm²
Weight	0,15 Kg
Protection	IP 20
Operating temperature	-25 - 70 °C
Storage temperature	-30 - 80 °C
Relative humidity	< 93 %
Insulation	> 2 kV AC.

DIGITAL INPUT (DIO-02)	
Number of inputs	4
Type	Open-Contact or Open NPN Photo transistor

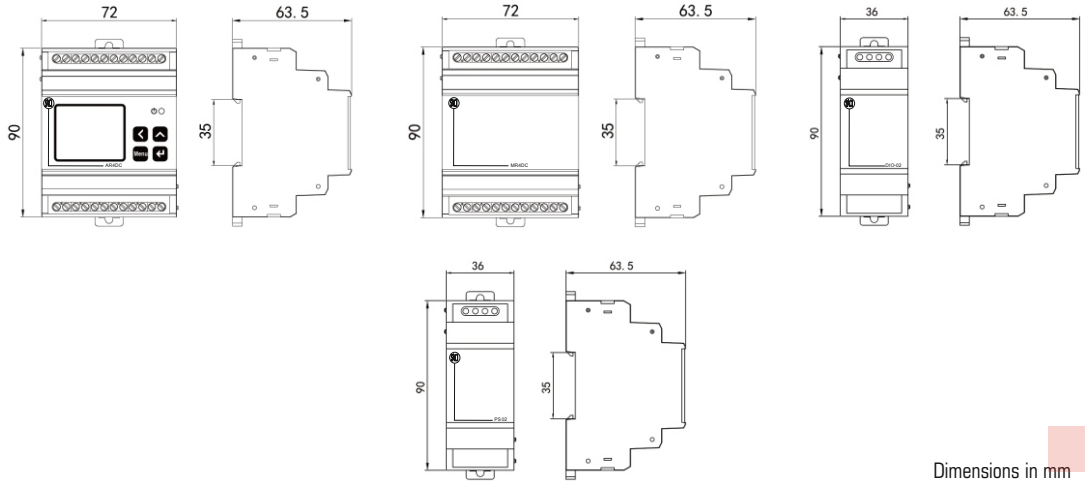
CONTACT OUTPUT (DIO-02)	
Number of outputs	2
Type	Relay N.O., 250 V, 3 A

CONNECTION



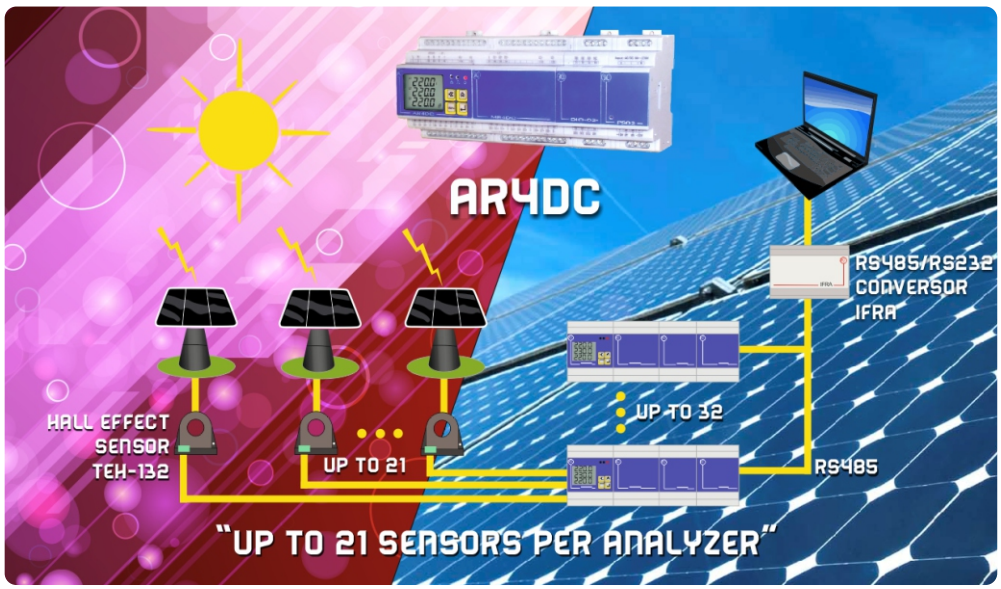
AR4DCT - DC Network analyzer with Temperature sensor.
MR4DC - Current input extendable module (optional).
DI0-02 - Digital inputs and relay output extendable module (optional).
PS02 - 12 V Power supply.

DIMENSIONS



Dimensions in mm

EXAMPLE OF APPLICATION



DC NETWORK ANALYZER - AR3DC

Instrument with microprocessor,programmable , LCD display, designed for measuring variables in a network of low voltage DC.

GENERAL FEATURES

- **DIN MODULAR INSTRUMENT**
- **DIRECT CURRENT**
- **RS 485 SERIAL PORT**
- **VALUE ALTERNATIVE MEASURE EVERY 2 S.**
- **1 OPTOCOUPLER OUTPUT**

ELECTRICAL PARAMETER	SYMBOL	TOTAL
Voltage	V	•
Current	A	•
Active power (P)	kW	•
Consumed active energy (EP+)	kWh	•
Generated active energy (EP-)	kWh	•
Ampere Hour (+)	Ah+	•
Ampere Hour (-)	Ah-	•
Shunt rated current	Ip	•

SETTING

- Instrument identify code.
- Primary current.
- Contacts operating mode.
- Energy pulse value.

The equipment is set through the serial port.

LCD DISPLAY

- LCD display (4 digits + Sign).
- Height of digits: 8 mm.
- Up to 8 measuring parameters.

SERIAL PORT

- Type: RS 485.
- Protocol: MODBUS RTU.
- Connection: 2 wire.
- Baud rate: Standar 9600 Bauds.
- Max Nº of instruments per line: 32.

TECHNICAL SPECIFICATIONS

INPUT	
Rated Voltage (Un)	12, 24, or 48 V DC.
Burden	<1 W
Operating range	80-120 % Un
Rated current (In)	
Direct connection	10, 20, or 40 A D.C
Connection to external shunt	50-1000 A/60mV DC
Operating range	1- 120 % In

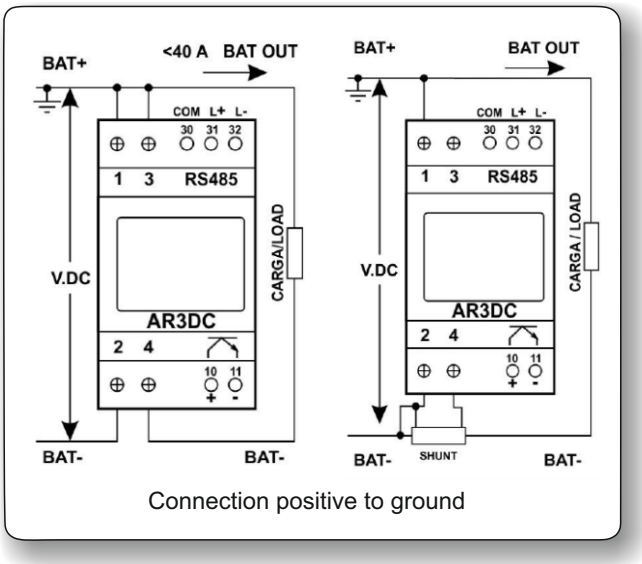
* Optional 125 V D.C.

CONTACTS OUTPUT *	
Number of outputs	1
Optocoupler	< 48 V DC.(24 V DC. 1 kΩ)

* Contact output can be set as max. or min. alarm contacts associated to any measured parameter, or as energy. They can also be set as contacts managed from the central unit.

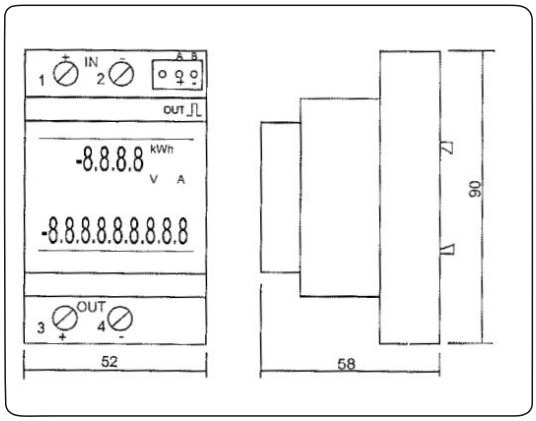
AUXILIARY VOLTAGE	
Aux. V. D.C.	Self supplied

CONNECTIONS



Connection positive to ground

DIMENSIONS



GENERAL

GENERAL FEATURES	
Mounting	DIN rail
Case material	ABS,UL94 V0
Dimensions	3 modules 52 x 90 mm
Terminals	With screws
Max. wire section	16 mm²
Weight	0,15 Kg
Temperature range	0 - 40 ºC
Protection	IP 20 terminals
Optional protection	IP 54 frontal
Electrical safety	(EN 61010) Class 2 Category III

ACCESSORIES

- Shunt x/60 mV.
- RS232/RS485 converters.
- RS 485 amplifiers.

OPTIONAL

- Reading software (without additional cost).
- Management software SACIgest.
- Connection negative to ground.

OVERLOAD

- 2 Vn x 10 s.
- 1,2 Vn permanent.
- 20 In x 1 s.
- 2 In permanent.

ACCURACY

Parameter	Operating range	Accuracy
Voltage	80-120%	0,5%(read.+full sca.)
Current	1-120%	0,5%(read.+full sca.)
Active power	1-120%	0,5%(read.+full sca.)
Active energy	1-120%	1%(read.+full sca.)
Reactive energy	1-120%	1%(read.+full sca.)
Ampere hour (+)	1-120%	1%(read.+full sca.)
Ampere hour (-)	1-120%	1%(read.+full sca.)

DC NETWORK ANALYZER - TMCC

Instrument with microprocessor, programmable, with three LED display indicating measurements and built-in keypad.

GENERAL FEATURES

- **DIN 144 x 144 INSTRUMENT**
- **DIRECT CURRENT**
- **RS 485 SERIAL PORT**
- **2 CONTACTS OUTPUT**
- **1 ANALOGUE OUTPUT 4-20 mA**

ELECTRICAL PARAMETER	SYMBOL	TOTAL
Voltage	V	•
Current	A	•
Active power (P)	kW	•
Consumed active energy (EP+)	kWh	•
Generated active energy (EP-)	kWh	•
Ampere Hour (+)	Ah+	•
Ampere Hour (-)	Ah-	•
Shunt rated current	Ip	•

SETTING

- Instrument identify code.
- Primary voltage.
- Primary current.
- Contacts operating mode.
- Energy pulse value.

Setting the device can be by keypad or through serial port.

SERIAL PORT (OPTIONAL)

- Type: RS 485.
- Protocol: MODBUS RTU.
- Connection: 2 wire.
- Baud rate: Optional. Standard 9600 Bauds.
- Max. Nº of instruments per line: 32.

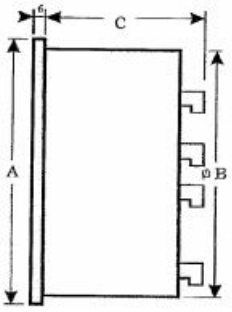
ANALOGUE OUTPUT

- Number of outputs: 1.
- Type: 4-20 mA.
- Accepted measurement: parameters.

LED DISPLAY

- 3 LED Display (4 digits + Sign)
- Height of digits: 14,5 mm
- Built in keypad (5 Keys)
- Up to 8 measuring parameters

DIMENSIONS



mm	TMCc
A	144x144
B	135 +0,6
C	88
D	6

TECHNICAL SPECIFICATIONS

INPUT	
Rated voltage (Un)	24,48,110,230 or 400 V DC.*
Burden	1mA per phase
Operating range	20-120 % Un
Rated current (In)	In / 60mV DC
Operating range	1- 120 % In

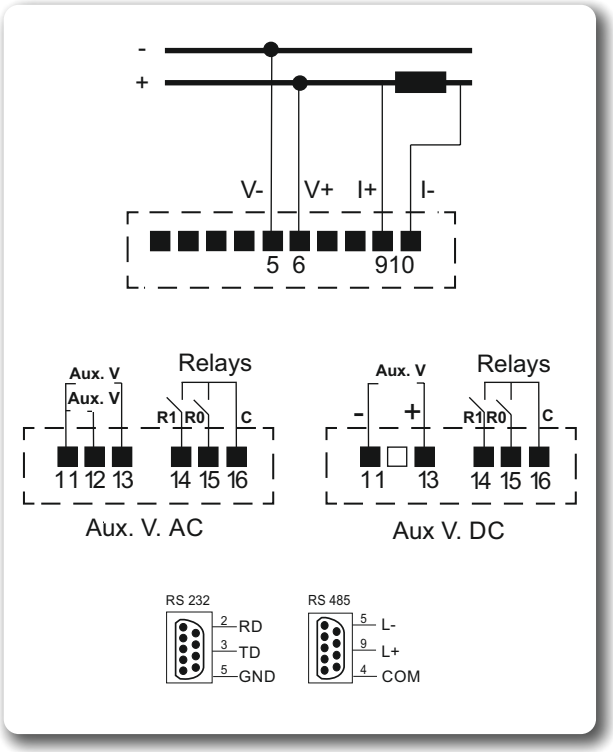
* Optional 1000 V D.C.

CONTACTS OUTPUT *	
Number of outputs	2
Type	Relay N.O 250 V, 3 A

* Contact output can be set as max. or min. alarm contacts associated to any measured parameter, or as energy. They can also be set as contacts managed from the central unit.

AUXILIARY VOLTAGE	
Aux. V. DC	24 or 48 V (*)
Aux. V. AC	110, 230 or 400 V
Universal Aux. V.	85-264 V A.C 90-300 V DC
Burden	2,8 VA
Operating range	85-110 % Un
Frequency	50 or 60 Hz

CONNECTIONS



GENERAL

GENERAL FEATURES	
Case material	ABS,UL94 V0
Dimensions	DIN 144 x 144 mm
Depth	88 mm
Terminals	Pluggable
Max. wire section	16 mm^2
Weight	0,72 Kg
Temperature range	0 - 40 ºC
Protection	IP 20 terminals
Optional protection	IP 54 frontal
Electrical safety	(EN 61010) Class 2 Category III

ACCESSORIES

- Shunts x/60mV.
- RS232/RS485 converters.
- RS 485 amplifiers.

OPTIONAL

- Reading software (without additional cost).
- Management software SACIgest.

OVERLOAD

- 2 Vn x 10 s.
- 1,2 Vn permanent.
- 20 In x 1 s.
- 2 In permanent.

ACCURACY

Parameter	Operating range	Accuracy
Voltage	20-120%	0,5%(read.+full sca.)
Current	1-120%	0,5%(read.+full sca.)
Active power	1-120%	0,5%(read.+full sca.)
Active energy	1-120%	1%(read.+full sca.)
Reactive energy	1-120%	1%(read.+full sca.)
Ampere hour (+)	1-120%	1%(read.+full sca.)
Amperio hour (-)	1-120%	1%(read.+full sca.)

RS232/RS485 CONVERTER - IFR

IFR equipment converts the RS 232 standard levels to the corresponding levels in the RS485 standard.

IFR converters allow a PC with RS 232 to be connected to an RS485 bus.

RS232 drivers activations can be with RTS or automatically if this option has been selected with internal bridges.

For the automatic option, data from the RS 232 line activates the drivers.

When data transfer finishes, the IFR converters return to receive mode.

GENERAL FEATURES

- **DIN RAIL MOUNTING**
- **CONNECTIONS: 2 or 4 WIRE**
- **OPTICAL INSULATION BETWEEN RS 232 and RS 485 SERIAL PORTS**
- **UP TO RS 485 SERIAL PORTS**

MODEL IFR

- **IFR1** — 2 WIRE. 1 serial port RS232. 1 Serial port RS485.
- **IFRA3**
- **IFRA** — 2 or 4 wire. Optically insulated. 1 serial port RS232. 1 Serial port RS485.
- **IFR4** — 2 or 4 wire. Optically insulated. 1 serial port RS232. 4 serial port RS485.

TECHNICAL SPECIFICATIONS

INPUT	
Number of outputs	1
Type	RS 232 (RD, TD, RTS, CTS)

OUTPUT	
Number of outputs	
IFR1, IFRA, IFRA3	1
IFR4	4
Type	RS 485
Baud rate	300-76800 Bauds

AUXILIARY VOLTAGE	
Aux. V. AC.	110 or 220 V.
Aux. V. DC.	12, 24 or 48 V
Burden	
IFR1	3 VA
IFRA, IFR4	6 VA
IFRA	3 W

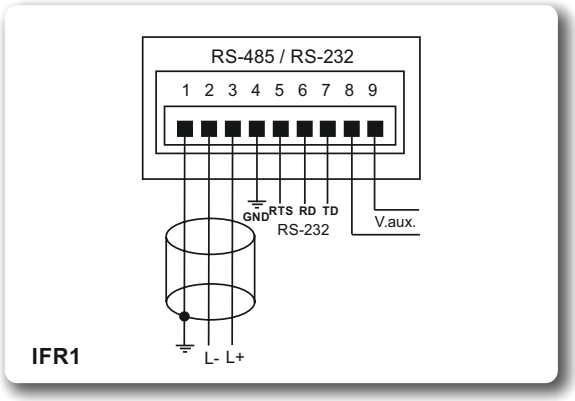
GENERAL

GENERAL FEATURES	
Case material	ABS,UL94 V0
Dimensions	
IFR1	(3 Modules), 52 x 90 mm.
IFRA3	(3 Modules), 52 x 90 mm.
IFRA	(6 Modules), 105 x 90 mm.
IFR4	(9 Modules), 155 x 90 mm.
Terminals	Pluggable
Max wire section	2,5 mm^2
Weight	
IFR1-IFRA3	0,30 kg
IFRA	0,45 kg
IFR4	0,65 kg
Mounting	DIN rail

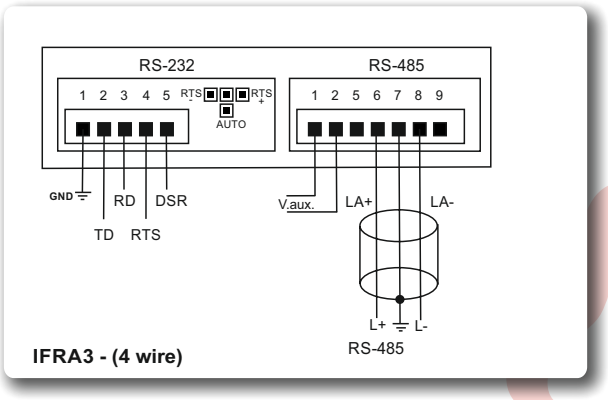
OVERLOAD

- 2 Vn x 10 s.
- 1,2 Vn permanent.
- 20 In x 1 s.
- 2 In permanent.

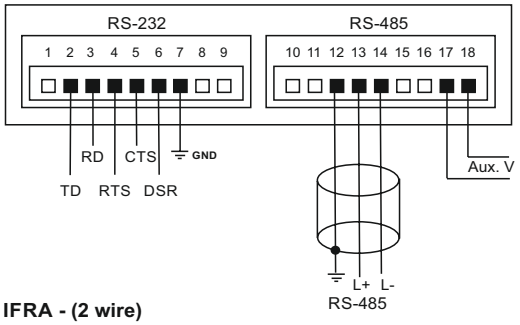
CONNECTIONS



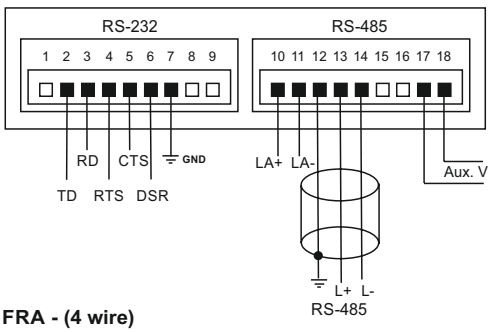
IFR1



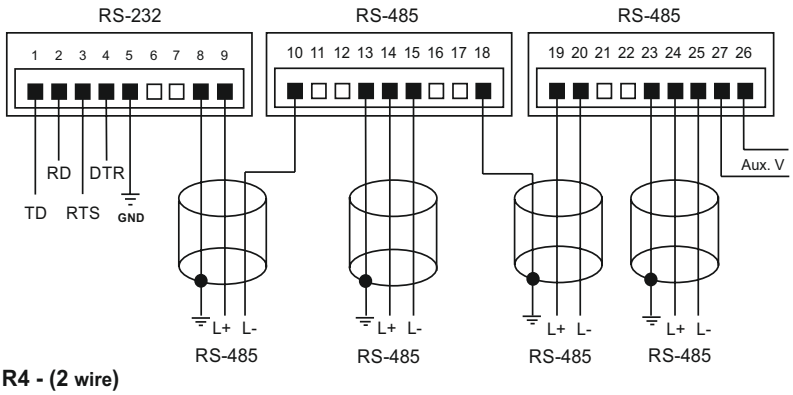
IFRA3 - (4 wire)



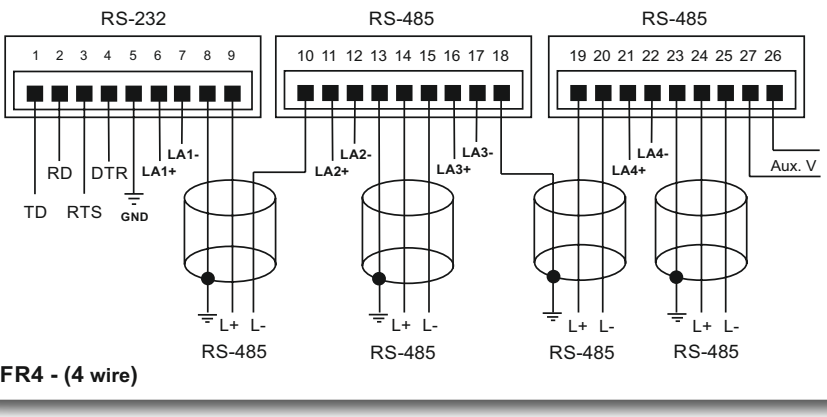
IFRA - (2 wire)



IFRA - (4 wire)



IFR4 - (2 wire)

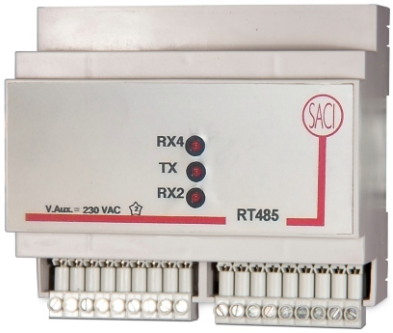


IFR4 - (4 wire)

REPEATER RS485/RS485 - RT485

The RT485 repeater is a communication equipment that allows the extension of a RS485 bus in order to increase communication distance, or the maximum recommended number of terminals.

It receives a communication from the bus and sends it to the other bidirectionally. It allows two or four wires connection and due to an auxiliary power supply it separates the two communications buses electrically. LEDs on the front display operation signals.



GENERAL FEATURES

- **DIN RAIL MOUNTING**
- **CONNECTIONS: 2 or 4 WIRE**
- **OPTICAL INSULATION BETWEEN RS232 and RS485 SERIAL PORT**
- **2 or 4 WIRE**

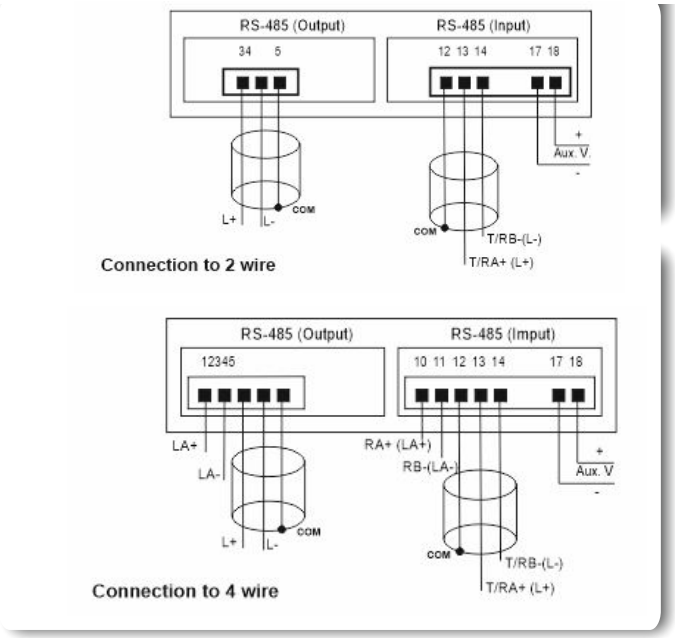
TECHNICAL SPECIFICATIONS

INPUT	
Number of outputs	1
Type	RS 485

OUTPUT	
Number of outputs	1
Type	RS 485
Baud rate	300-19200 Bauds

AUXILIARY VOLTAGE	
A.C.	110, 220 or 400 V
D.C.	24, 48, 110 or 220 V

CONNECTIONS



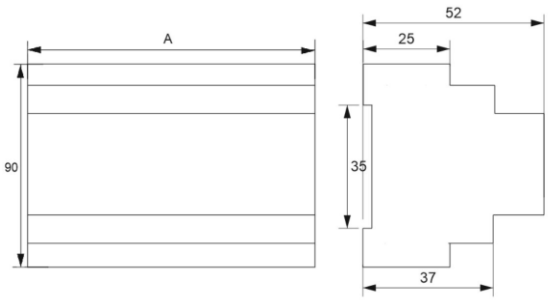
GENERAL

GENERAL FEATURES	
Case material	ABS,UL94 V0
IFRA	(6 Modules), 105 x 90 mm.
Terminals	Pluggable
Max. wire section	1,5 mm^2
Weight	0,45 kg
Mounting	DIN rail
LED indication	
Rx4	Received data (4wire)
Rx2	Received data (2wire)
TX	Sent data

OVERLOAD

- 2 Vn x 10 s.
- 1,2 Vn permanent.
- 20 In x 1 s.
- 2 In permanent.

DIMENSIONS



ETHERNET CONVERTER - etherGATE1

The etherGATE is a communications gateway used to convert the physical Ethernet environment to serial RS-485 .

GENERAL FEATURES

- **CONVERT ETHERNET TO RS485**
- **TRANSPARENT CONVESION UNDER TCP or UPD CONNECTIONS**
- **NETWORK PROTOCOLS MODBUS/TCP, TCP, UPD - HTTP**
- **CONFIGURATION THROUGH FIXED IP or DHCP NAME**
- **DIN RAIL 2 MODULES**

TECHNICAL SPECIFICATIONS

POWER CIRCUIT	
Single-phase (A1 – A2)	230 Vac
Frequency	47…63 Hz
Maximum consumption	4,6…7,5 V.A
Working temperature	-10 …..+ 60 ºC

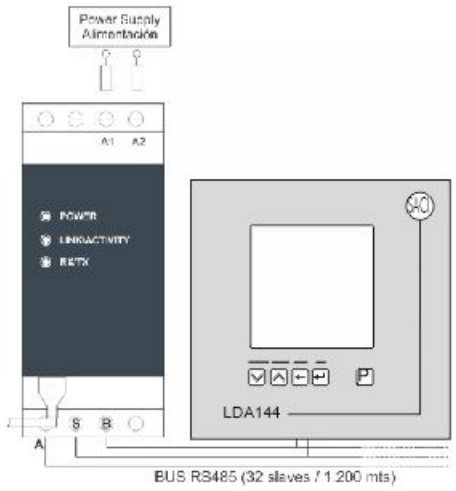
NETWORK INTERFACE	
Type	Ethernet 10 BaseT / 100Base TX
Connector	RJ 45
Network protocols	TCP / UDP / Modbus/TCP - HTTP

MECHANICAL FEATURES	
Case material	UL94 - V0 Plastic
Protection degree	IP 20.
Dimensions (mm)	35,4 x 73 x 84,7 (2 modules)
Weight (g)	120 g
Maximum operating height	2.000 m

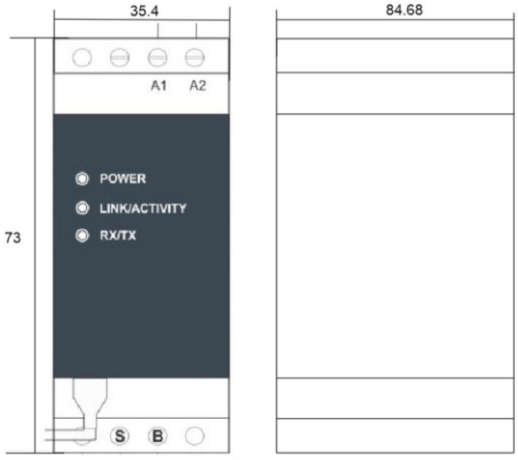
SERIAL INTERFACE	
Type	RS-485 three wires
Transmission speed	4.800 - 115.200 bps
Data bits	7, 8
Parity	No parity, odd, even
Stop bit	1 or 2

CONNECTIONS

Figure 1. Standard connection of serial equipment



DIMENSIONS



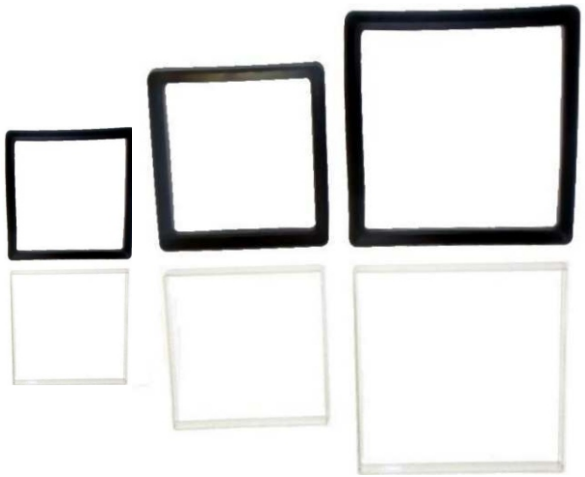
ACCESSORIES - IP65 PROTECTION COVER

Protective cover IP65 for panel mounting devices.

GENERAL FEATURES

- **EASY ASSEMBLY.**
- **PROTECCTION AGAINST BUMPS, SCRATCHES OR ANY OTHER EXERNAL EXPOSURE, RAIN, LIQUIDS...**
- **FULLY ADJUSTABLE.**
- **AVAILABLE IN 3 STANDARD SIZES.**

Model	Dimension	Ordering code
3V	96x96 mm	YVARSV193
4V	72x72 mm	YVARSV194
5V	48x48 mm	YVARSV266



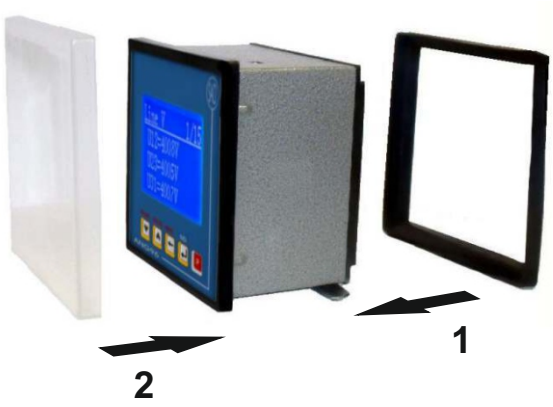
MOUNTING

1- Insert the rubber into the device through the back area. Then introduce the device into the panel hole intended, and help yourself to him to bring the rubber at the front area of the device.

2- Fit the plastic cover from the front. The pressure between the rubber, the device and the panel will make sure it is securely attached

3- Hold the device to the panel with the corresponding fixing system.

- The device will be fully adjusted and protected. The material composed it makes it completely waterproof against dust, liquids ... avoiding the risk that may occur against rain or another external exposures.



3

MANAGEMENT SOFTWARE - SACIGEST

The SACIgest program is a system allowing the SACI terminals installed on the net to be easily managed as graphs. The electrical installation is grouped by sections, each of which is displayed differently, in the way they are inserted in their corresponding terminals.

A variable for each terminal can be monitored on the screen and placed in an appropriate position on the graph.

The system includes the easy creation of virtual terminals based on actual terminals by simply applying a definition formula.

Given the possible inclusion of direct current analyzer terminals, alternating current sections and direct current sections can be created.

Terminal models handing the system are as follows.

SAM3000, AHM1, AHM3, ANG96, MAR
MDA
LCA_, LDA_, LAB
CP2000, CP3000, CP4000
TMCQ
M2DL2, M1DL1, M2DL1, M2DL1, M2DM1
TCIDL1, TCIL1(*)
meters of water, gas, etc,
with pulse output (*)
TMC-C TMCC-H
TTI
VIRTUALS
(*) Through TTI.

The SACIgest software can work in several languages, initially prepared in Spanish and English. The customer can choose or define his own language.

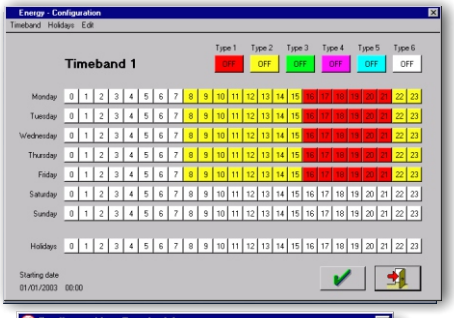
All definition and setting operations can be password protected.
The software is capable of handing up to 4 communication ports (COM1 - COM4), as well as using a modem to communicate with the different terminals installed on the network. The communication speed with the terminals can also be configured (where possible).

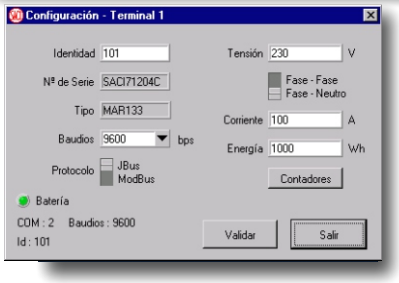
The Client- Server operating mode via an Ethernet network can be selected.

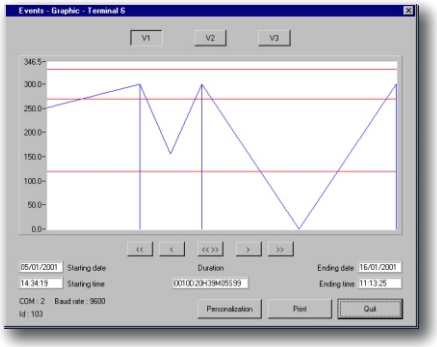
Minimum requirements:

CPU: Microprocessor:	Pentium III
RAM:	128 Mb
Video card:	SVGA
Monitor:	Colour , 15'' 800 x 600
Software:	XP, Win , Vista, Win 8, 32 bits,

It must also have a serial port for the RS-232 - Rs485 converter connection (IFRxx Model). It can be phisically or through a converter USB-RS232







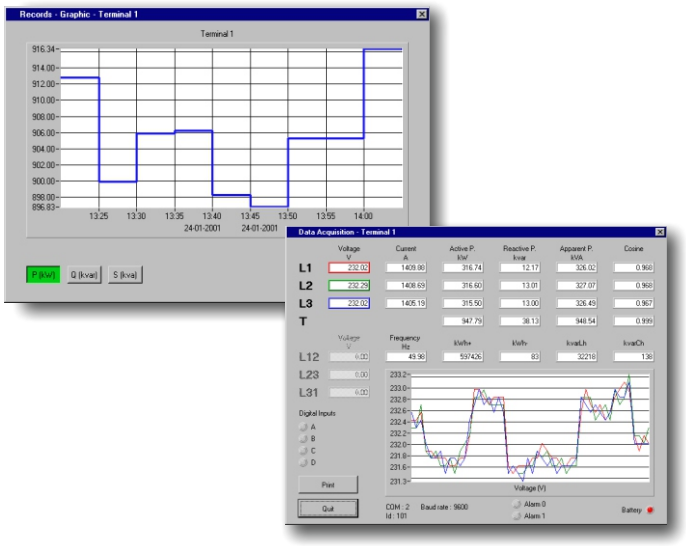
MANAGEMENT SOFTWARE - SACIGEST

Versions

The system has different versions according to its applications:

- SACIgest 01: Version for terminal monitoring and setting options. All terminal parameters can be set and the monitoring data can be accessed. It has a numerical indicator next to the terminal where the value of the selected variable appears.

- SACIgest 02: Version which adds the Energies option to 01. The energy consumption of the instalation can be displayed using the terminals or sections. The values can be shown as a graph. Energy closures can be generated and displayed. Setting of up to 6 types of different tariffs for 12 time periods with holi days defined. The sampling period is programmable by the user in intervals of 5, 10, 15, 20, 30 and 60 minutes based on the PC clock for terminals directly connected to a PC. Also, a different sampling interval can be defined for terminals connected via modem.



- SACIgest 03: The possibility of having historical values is added to version 02. The voltage, current and power variables are sampled and their historical values are generated. The sampling interval can be defined by the end user. In fact, all parameters are quickly sampled and when it is time to generate the history, the values sampled during the selected interval are averaged.

- SACIgest 04: Alarm option is added to 03. Different alarms on the system can be defined for each terminal allowing actions to be taken on the digital outputs of the terminal or on any other terminal. Pending alarm recordings and already registered alarms are shown. A button on the main screen will indicate if any alarm has been set off.

Sub-versions

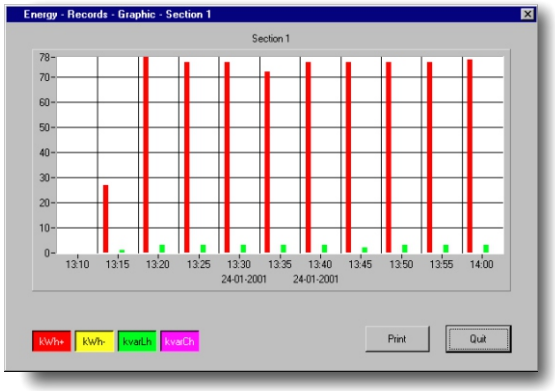
Within each SACIgest version there are different subversions which shall be defined below.

- Normal: This is the version for the majority of users. It consists of a single PC connected to the SACI instrument network.

- Server: The SACIgest software can operate in a Client.

- Server environment using an Ethernet interface with NetBios and TCP/IP protocol. This is the Server version which is physically installed in the terminals and provides the service to the clients.

- Client: Within the Client - Server operating mode, this is the client version which accesses the terminals and data allocated on the server. The client version is free, as many clients as required can be installed, but the Server version is required to operate.



There are also the following installation options for all of the above mentioned versions:

- Normal: This is the normal installation with no limit on terminals.

- Reduced: Same as above, but with a limit of 6 terminals in the installation. The price is also lower.

- Demo: There are completely operational trial versions, which exits after using it for 60 minutes.

All versions, except for the DEMO and Client versions require hardware protection to operate. Each version has its specific protection and it cannot operate without its protection.

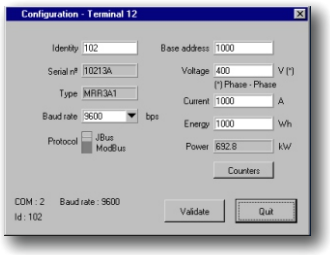
The depth of section graph has to be edited by the final user with any graphic design program or with digital photographs.

MANAGEMENT SOFTWARE - SACIGEST

SOFTWARE - LCDA

LCDA software is designed to manage the most common LCA, LCAM, LCC, LCCM, LDA96 and LDA144 versions.

This version can manage different equipment on the network with the option option to program the communication speed and to program it via modem. Equipment in the first four communication port on the PC can be managed.

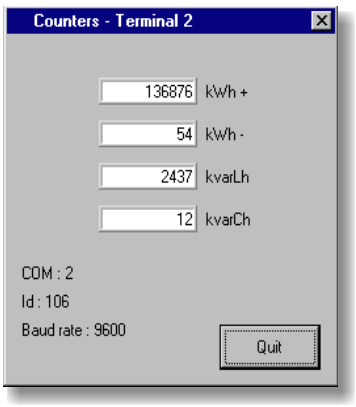


With this version, the two digital outputs of the instrument, maximums and minimums, harmonics and maximum required values (LDA) can be managed. It takes data for 30 electrical parameters and displays the variables as a graph.

This software version operates on a 32 bit platform, i.e. for Win 7, Win 8, XP, Vista

SOFTWARE - LCDAM

LCDAM software is designed to manage the more common versions of LCA, LCAM, LCC, LCCM, LDA96, LDA144 and LDA144 with memory. This version can manage different equipm ent on the system with the option to set the communication speed and program it via modem. It allows to manag e any equipme nt connected to the first four communication ports on the PC.



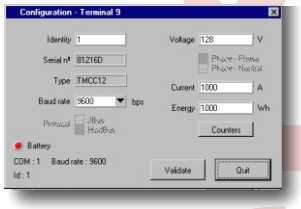
With this version, the two digital outputs of the instrument, maximums and minimums, harmonics, maximum required values (LDA and LCC) and the historical values of the LDA144 with memory can be managed. It takes data for 30 electrical parameters and displays the variables as a graph

SOFTWARE - REMREADER

This is a software for remote readings at a predetermined time of all connected and configured terminals showing their values as a text file. It saves and registers the configuration of the terminals.

RemReader software manages all SACI terminals except for the TMCQ and TTI, although it includes meters connected to the TTI.

The program allows showing the results and the use of a modem to establish communications.

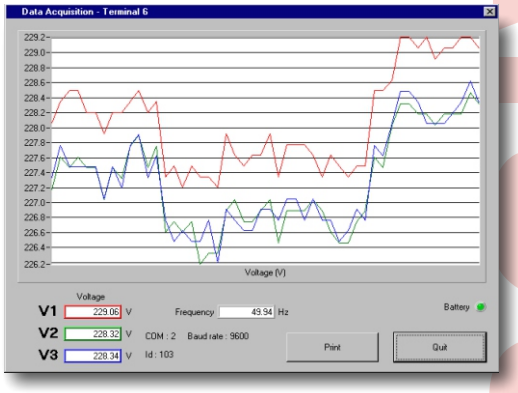


This software version operates on a 32 bit platform, i.e. for Win 7, Win 8, XP, Vista...

SOFTWARE - MODEMCFG

This software allows to choose the optimal way to properly operate with the network.

Given that two identical modems do not exist and that not all modems accept the same commands, this software has been created to extract the existing configuration in Windows and to reconfigure it. It is easy to assume that the modem has to be installed previou sly using Windows to allow this configuration software to receive its information.



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