STYLITIS-POWER

USER'S MANUAL

SYMMETRON
ELECTRONIC APPLICATIONS

0210

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CONVENTIONS USED IN THIS MANUAL

Symbol	Meaning
	To avoid injury of personnel and/or damage to the instrument, the operator must refer to the user's manual.
CAUTION	Calls attention to a procedure or condition which, if not correctly performed could result in damage to the instrument.

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1. INTRODUCTION

The Stylitis-Power data logger is an instrument designed specifically for measurement of electrical quantities in power substations, factories and other nodes where incoming and outgoing feeders are active. It provides:

- A local user interface with 240 x 128 graphic LCD display and touch screen.
- Direct connection to R, S, T and N voltage points.
- Current transformer connection with up to 10 R, S, T and N incoming or outgoing feeders.
- User selectable time interval for average calculations.
- Internal flash memory 4Mb for data storage
- Programming, control and data downloading via built-in RS232, GSM modem and Ethernet interfaces.

Sampling and storage continues unaffected while communicating with the user.

WORKING WITH STYLITIS-POWER

The data logger operates in different ways according to your application. (see Fig.2):

1. **As an autonomous unit with off-line data downloading.** The data logger samples the input signals and keeps the average values for each interval in the internal 4MB flash memory. The stored files are downloadable via any of the built-in interfaces. The connection between data logger and the PC may be via a direct RS-232 link, via a modem (PSTN or GSM) or via the Ethernet network (LAN). The PC must be equipped with an RS232 COM port, a modem or a network card respectively. The data logger is accompanied by Opton, the software required for programming, inspecting, data

downloading, and decompression. Data files are arranged in ASCII text files.

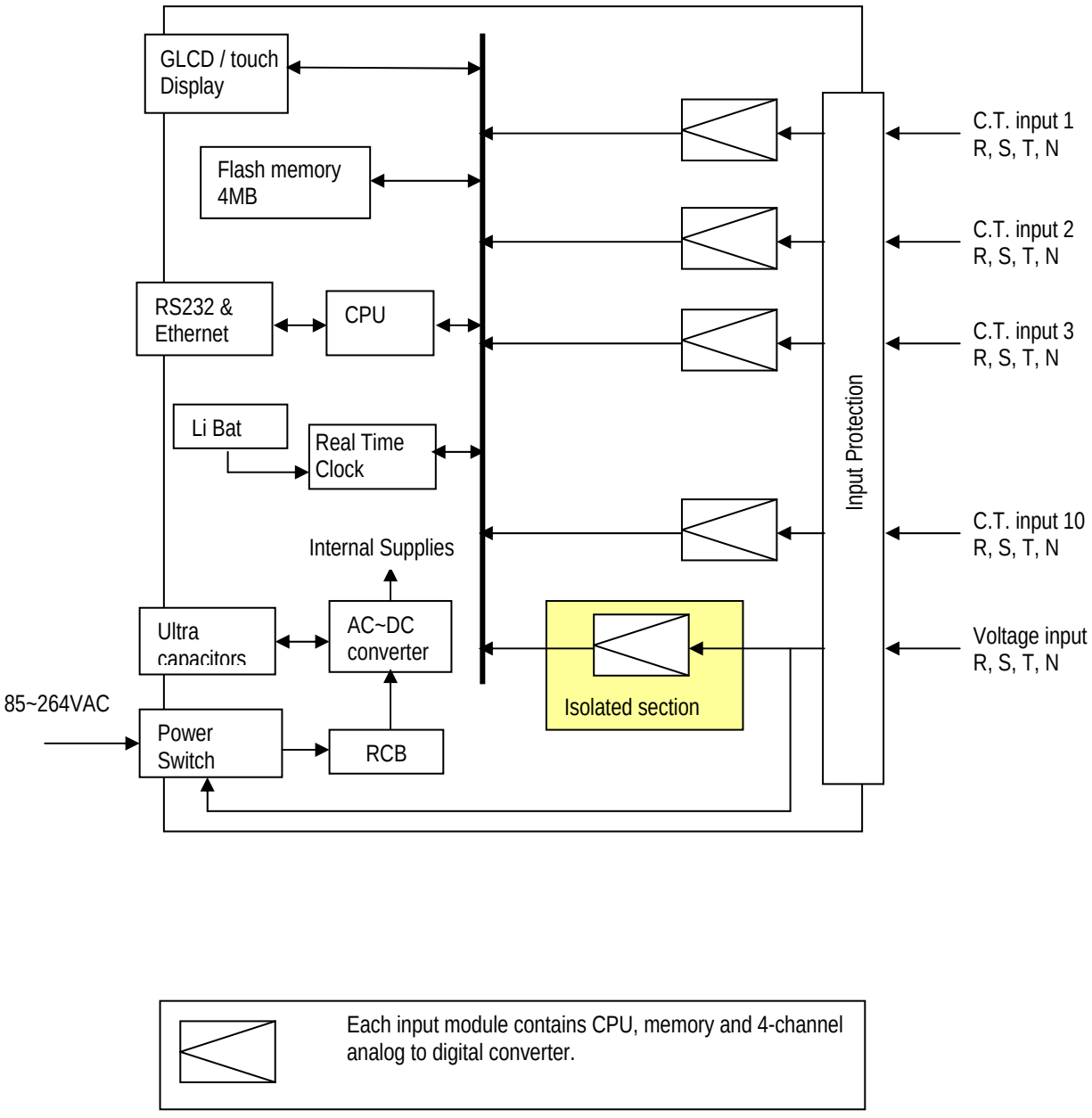
2. **Real Time Measurements.** On line data reading with appropriate user software, for storing and manipulation in a PC. The connection between data logger and the PC is as described above.

This manual includes detailed operation description. Technical support is available by phone: +30- 210-6034002, or e-mail:

support@symmetron.gr

And at: www.symmetron.gr

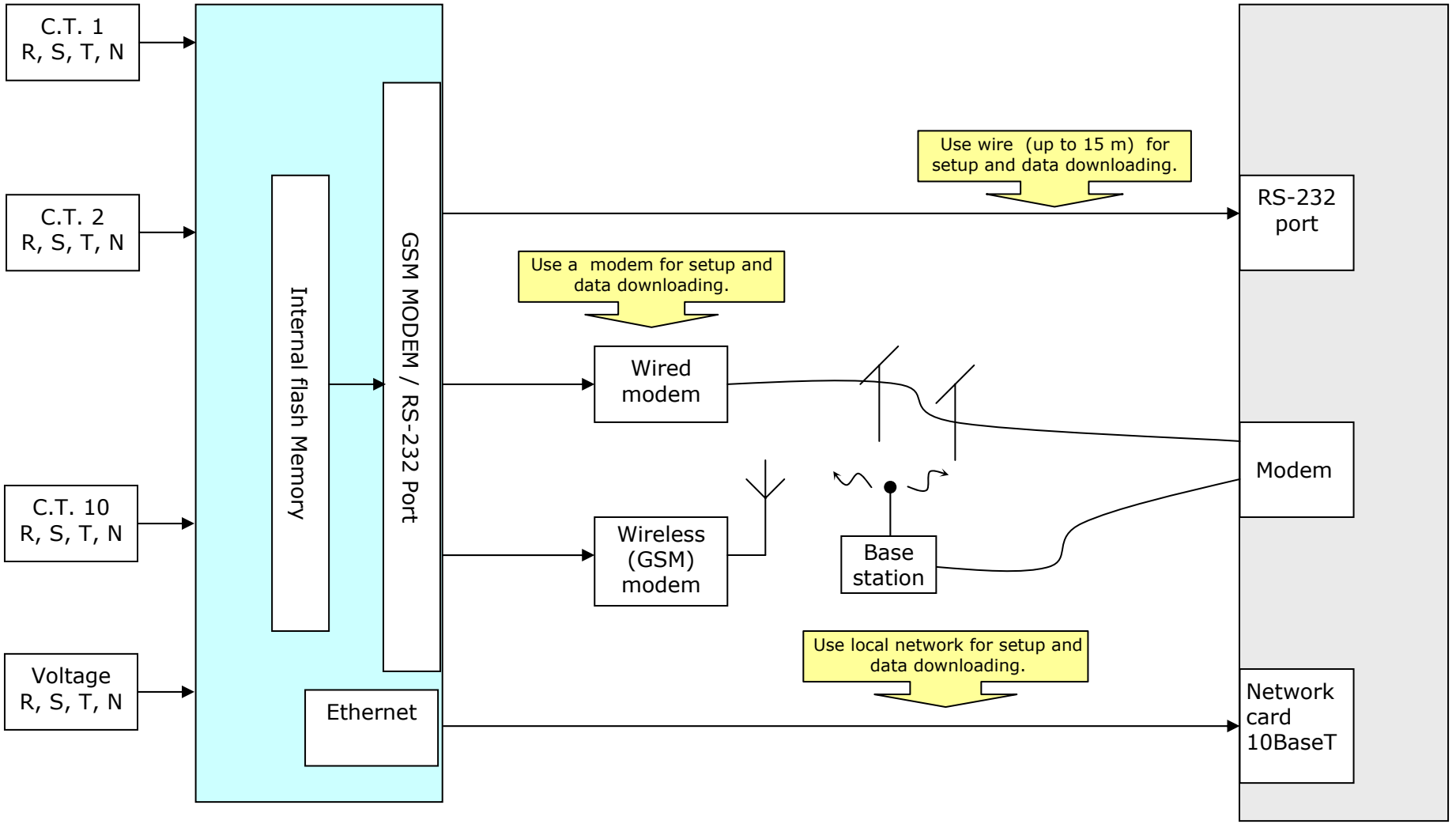
Fig 1: General Diagram



Stylitis-Power

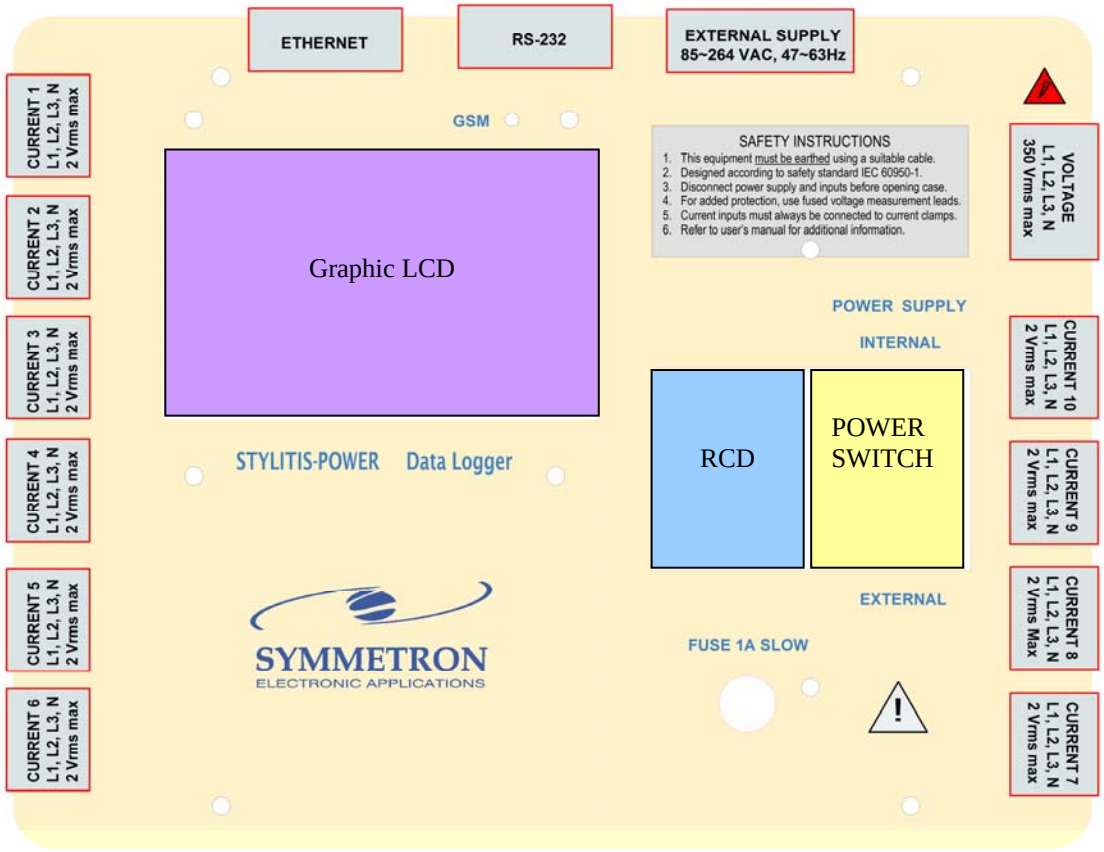
Fig. 2: Operation

PC



2. OPERATION AND SAFETY

EXTERNAL DESCRIPTION.



FUSE REPLACEMENT.

The instrument uses a 1 A power supply fuse, which must be replaced if blown (supply voltage out of limits). It is located in the front panel.
Make sure you have removed all external power supplies before attempting replacement.

CAUTION

The fuse used must of the specified rating. Never shortcircuit the fuse holder.

CONNECTORS

On the two sides and on the rear part of the datalogger, you can see the special polypolar (circular) connectors (which need the appropriate cables-adaptors), which correspond to the descriptions on the upper part, as you can see them, in the image above (RS-232, VOLTAGE, EXTERNAL SUPPLY, CURRENT 1, etc).

- On the right and left part of the instrument, there are the input connectors (of the voltage and the 10 current groups)
- On the rear side, there are: the Ethernet connector, for connection of the instrument to the local network, the RS-232 connector, for connection of the instrument to a computer RS-232 serial COM port, and the external power supply connector.

UPPER PART

- On the instrument's upper part (see the image above), besides the fuse, there is also the graphic LCD touch screen, the description and operation of which will be mentioned in detail, in the next chapter.
- Moreover, there is an earth leakage relay (RCD), which must be switched to ON for the instrument to operate. It will automatically switch to OFF in case there is a considerable difference between a live wire (phase) and the return wire (neutral), therefore there is a considerable leakage current to the earth, which is dangerous for the user. If you press the **Test** button, this process will be simulated, therefore the relay must switch to OFF, for the circuit to operate correctly.
- Finally, there is a switch (POWER SWITCH in the image above) with which you can select the datalogger's power supply. It may be external (switch to EXTERNAL), therefore you must apply a supply of 85-264 VAC in the corresponding connector on the rear part, as it was mentioned before. If you switch to INTERNAL, the datalogger will be supplied by the voltage input, if one has been connected in the corresponding connector. It must be noted that in this case, the input voltage must not be higher than 264 VAC (upper limit of the power supply voltage). Generally (if the power supply is external), the measured input can be up to 280 VAC.

3. USER INTERFACE AND OPERATIONS REVIEW

The touch screen GLCD display may be used to:

- To see the datalogger's current status and time, ie if the Acquisition is ON, the recording interval and the memory status (No option- Starting menu).
- To display the voltage, current, power and power factor input data values for all channels in tabular or bar graph form. (**Display** option). Select **R, S, T** or **N** to select the phase to be displayed and **Val** or **Bar** for display of the values in tabular or bar graph form respectively.
- To enable or disable the internal GSM modem. (Select: **Modem** and then select: **Int/Ext**)
- To check the modem signal and operator (Select: **Modem** and then select: **Check**)
- To display instruction pages, concerning general information about user safety and the connectors' pinout.
- To display genereal information of the instrument, such as manufacturer and version (**About** option)

4. POWER SUPPLY

There are 3 modes of operation:

- **NORMAL OPERATION MODE**

The instrument samples inputs at 0,5 second intervals and records averages of data from 0,5 second to 1 hour. All functions are active.

- **DROPOUT MODE**

When voltage is lost the data logger records the date/time of the event along with voltage and frequency values. When voltage is restored the logger records the date/time of the event end along with voltage values, in a text file (**dropouts**), while a new data file opens. When you download the data file, the dropouts file is also downloaded. The logger is capable to record dropouts even when its power supply is lost for up to 15 seconds (display and communications are disabled for as long as there is no power supply).

- **SLEEP MODE**

If power supply is removed the logger keeps its real time clock running by supplying it by its internal Lithium battery. All other activities are disabled.

5. MEASUREMENTS

Connection Examples:
See Appendix A.

Stylitis-Power is capable of directly measuring voltage on up to 4 lines. Frequency is measured on the first voltage line(L1). With suitable current transformers, it is also capable of measuring current, apparent power, active power, reactive power and power factor in up to 10 groups (feeders) of 4 lines each.

Current transformers must output an AC voltage (up to 1,4 Volt RMS maximum) proportional to primary current (up to 1000 Amperes). Conversion to physical units (amperes) is accomplished via the slope factor.

There are 2 options for each current group:

1. NOT USED. The group is not recorded.

2. USED. A formula is applied to the measured value in order to convert it to appropriate physical units. A user-programmable parameter, Slope is applied to measured value *x*:
   *Physical value = [Slope * x].*
   The average of physical values is calculated and stored in memory for each statistical interval.

NOTE: The Opton software can automatically set the Slope by specifying the Current Transformer's full scale input current and output voltage.

6. DATA PROCESSING AND STORAGE

All inputs are sampled simultaneously at 2kHz rate and their values are placed in temporary storage. True RMS values are calculated in 0.5-second intervals. For precise results, the calculations are based on the number of full cycles completed within a 0.5 second interval. Cycles not completed within the averaging interval are accounted for in the next. The averaging interval is selectable from 0.5 seconds to 1 hour in steps of 0.5 seconds.

At the end of the time interval, the average values are calculated and stored in the internal FLASH Memory, along with a time mark corresponding to the end of statistical interval time.

Stored data in the FLASH memory is organized in files, which are kept even without supply power. For enhanced data safety each individual record is marked with its own time stamp.

7. DATA RECORDING

During recording (acquisition on): no change of parameters (Setup) is permitted.

- Upon selection of acquisition ON (**Acquisition Status: ON**), via Opton, the following happen:

  1. A new file is opened in memory.
  2. Recording starts according to user set parameters (Setup) via Opton.

- Upon selection of acquisition OFF (**Acquisition Status: OFF**), via Opton,the following happen:

Only when acquisition is off parameter (Setup) change is permitted.

  1. Recording stops.
  2. The file is closed in memory.

- When downloading (**Download file** via Opton)during recording:

  1. The recording is continued in a temporary memory.
  2. Upon completion of successful downloading, the file closes.
  3. The recording is continued in a new file.

- Default data download is from file currently open. Previous files can also be downloaded.
- File downloading does not disturb the recording process.

You will find more information about Opton software in chapter 13. SOFTWARE, and in the corresponding help file.

8. DATA RETRIEVAL

File downloading and memory erasure are done via remote commands (RS-232, modem, Ethernet), using the accompanying Opton software in your PC.

Files downloaded to a PC are compressed to save memory space and speed up data transfer. The data are retrieved using the Opton software. Data are decompressed to ASCII text files, suitable for further manipulation using available programs like Emmetron, Excel, etc.

9. DATA SAFETY

Stored data in the FLASH memory is organized in files, which are kept even without supply power. Data files are individually accessible. Each record has its own time stamp.

10. SERIAL PORT

COMMUNICATION port DB9M:

- PIN 2 Receive
- PIN 3 Transmit
- PIN 5 Ground
- PIN 7 RTS
- PIN 8 CTS

Communication settings: 9600 baud, 8 data bits, 1 stop bit, no parity bit.

The Opton software is used for communicating with the datalogger via your PC.

- The RS-232 port is a DTE type, i.e. Stylitis-Power appears as a PC. In order to use the DB9 serial cables, you must firstly connect the corresponding polypolic adaptor to the datalogger's RS-232 connector, in order to connect the cables to its serial end. A 'straight' cable (DB9M male to DB9F female) is required for connection to an external modem. A 'null modem' cable (DB9F female to DB9F female) is required for connection to a PC. The 'RS-232' port is enabled only when an internal modem is not used. You can find more information about enabling and disabling the internal modem in chapter:
  3. USER INTERFACE AND OPERATIONS REVIEW

11. INTERNAL ETHERNET

To setup, follow these steps:

1. Power-up the logger and connect the RJ-11 connector to the LAN. Wait 30 seconds to allow LAN setup.
2. Use the command '*Find Logger in LAN*' in the Opton software 'Communication' menu to find thedatalogger's IP address. In the right pane of the *Digi Device Discovery* window, you should read the IP address of the found device, marked as 'Digi Connect ME'. If you wish, you can enter a fixed IP address for the logger: to do so, select the 'Configure Network Settings' option in the left pane and select '*Manually configure network settings*' in the appearing window.
3. In the Opton '*Communication*|*Communication Settings*' menu, in the '*Connection*' tab, select '*Ethernet*' and enter this IP address in the '*Remote IP Address*' field, while in the '*Remote*

IP Port' field, type '2101'. Close the *Digi Device Discovery* window. To connect to the logger from the Opton software, select '*Communication|Connect to Logger'* from the menu.

12. INTERNAL GSM/GPRS MODEM

You can enable/ disable the internal modem using the using the 'Modem' menu from the touch-screen LCD. To setup, follow these steps:

1. Disconnect all power supplies and remove the 4 screws on the front panel of the logger. Raise the front panel and insert a Data SIM card in the modem (the direction is shown on modem). Remember to permanently unlock the SIM card using any available cell phone before putting it in the modem. Replace the 4 screws on the front panel of the logger.
2. Power-up the logger. The GSM indicator on the logger has the following states: Flashing quickly – Searching for Network; Flashing slowly – registered to the network (idle); continuously ON – connected.
3. Wait until the INTERNAL MODEM indicator starts flashing slowly (registered). Select 'Modem' and then 'Check' from the menu of the datalogger's LCD touch screen to display the GSM network operator name and received signal strength (see chapter 3).
4. Enter the SIM data call number in 'Call number' field of the 'Communication|Communication Settings' menu of the Opton software. To connect to the logger, select the 'Communication|Connect to Logger' menu option.

NOTE: You can enable a GPRS connection to the logger by placing a GPRS-enabled SIM card in the modem. In this case you will probably need to connect via the Diameson server. A GPRS connection in Opton is set up like a standard Ethernet connection, where the *Diameson user name* box is not blank. For more information please consult the Opton and Diameson documentation.

13. SOFTWARE

Install Opton from the accompanying CD or download it from the Symmetron site. Software upgrades are free to download.

Following the first installation select *File* | *Add New Site* and choose a Windows folder to use as data storage for this specific data logger. If you use several data loggers it is recommended to repeat this procedure choosing a separate folder for each one of them.

To work with the site folder select it from tree in the window's left pane.

In the next step, determine how the PC will get connected to the data logger. Select *Communication* | *Communication Settings* and enter the connection details (for example, to connect via RS-232 select *Connect Using: COM1* and *Com Port Rate: 9600*). If you select one of the installed modems, (field *Connect Using*) then fill in the *Call number*. The RS-232-to-PC connection is described in chapter 10.

Now you can try some of the commands in the left pane of the Opton window, i.e. *Read Status*, *Read Data* etc.

To change logger settings first select *Read Setup*. Then change settings in the right hand pane and click *Write Setup*. The settings can be changed only when data recording is stopped (Acquisition Off). Select Acquisition On to start recording.

To get stored data select *Download File*. To avoid missing data you can download files while *Acquisition On*. If you want to automate data downloading, check the *Enable Scheduled Automatic Connection* box in the appearing window of the *Communication* | *Communication Settings* menu and set the download time. In the *Automatic* tab select the action for each weekday.

The automatic downloading is possible only after downloading and installing the AutoConnect software.

14. TECHNICAL CHARACTERISTICS

All accuracies stated are the mean of 5 measurements.

VOLTAGE INPUTS.

- Input Voltage range (RMS): 0~280 VAC. Accuracy: +/-0.25% of reading + 0.1% of full scale. Resolution 0.1 V.
- Input Frequency range: 47~63 Hz. Accuracy +/-0.25% of reading + 0.1% of full scale. Resolution 0.01 Hz. Frequency measured from first voltage channel.
- Differential input resistance: 700 kohms.
- Maximum continuous over Voltage: 350VAC.

C.T. INPUTS (CH1~CH10) individually selectable in groups of 4.

- Input Voltage range (RMS) from current transformer: 0.29~1.45 VAC. Accuracy: +/-0.25% of reading + 0.1% of full scale. Resolution 0.01 A.
- Differential input resistance: 20 kohms.
- Power Factor (Measured for each phase). Accuracy: +/-0.5% of reading + 0.2% of full scale.
- Power: Active, Reactive and Apparent for each phase. Accuracy: +/-0.5% of reading + 0.2% of full scale.

INPUT PROTECTION

- All inputs/outputs are 4kV transient protected.

DATA PROCESSING AND STORAGE

- RECORDED DATA: TRMS Voltage, TRMS Current, Power Factor, Frequency
- INTERNAL MEMORY: 4 Mbytes FLASH. No battery backup required. Operation mode is First-In-First-Out. Capacity (all inputs at 15 minute averaging): more than 100 days.
- REAL TIME CLOCK: With automatic leap year correction. Accuracy: ±7.5ppm (4 minutes/year). Backed-up by internal, long-life Lithium battery.

COMMUNICATION

PROGRAMMING AND DOWNLOADING:

- Built-in RS232C port, 9600 baud, 8 bits, no parity, 1 stop bit. Connector DB9M (DTE). When used, internal modem is disabled.
- Built-in GSM/GPRS Quad-band modem. Connector SMA female. When used, RS-232C port is disabled.
- Built-in 10Mbit Ethernet server. Connector RJ-45. Always enabled.

SAFETY

- Double insulated. Complies with IEC60950
- Built-in Earth Leakage Circuit Breaker.

POWER SUPPLY

- Built-in universal power supply (85 to 264 VAC, 47 to 63 Hz). Input power source switch-selectable: internal or external.
- INTERNAL: via voltage measurement channel L1.
- EXTERNAL: via 3-prong wall socket
- POWER OUTAGES: operates for at least 15 seconds without power and records time/date of outage. Energy storage medium: Ultra capacitors.

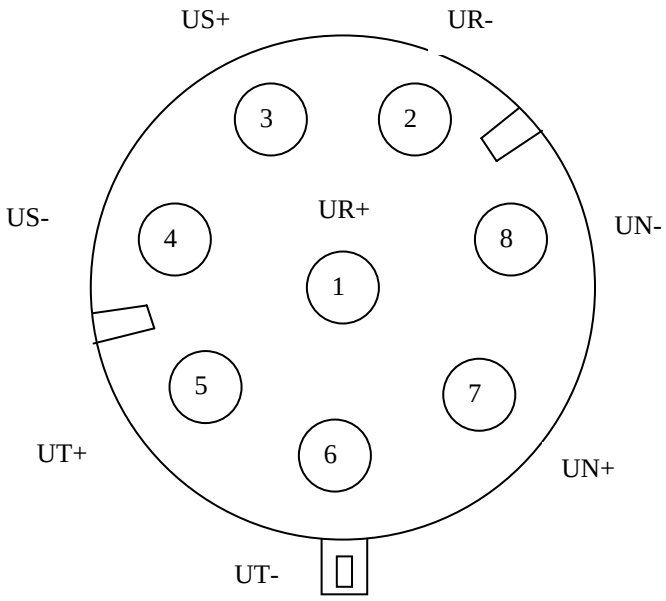
- POWER CONSUMPTION: 5VA MAX

VARIOUS

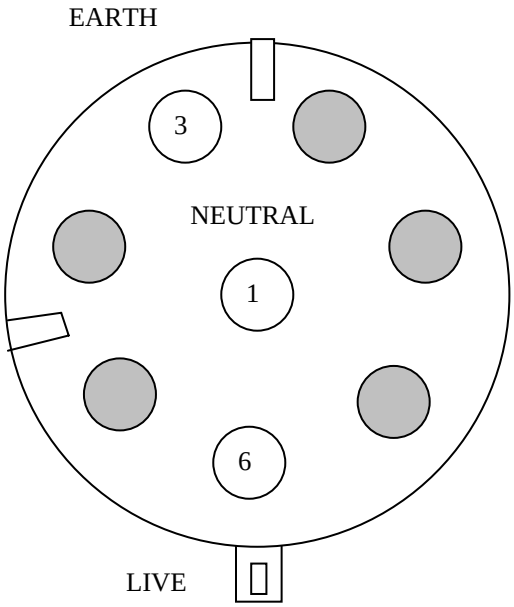
- ENCLOSURE: IP67 sealed with carrying handle.
- DIMENSIONS: 27 x 24.6 x 17,4 cm (11275 cm3).
- WEIGHT: 3kg.
- CONNECTORS: Removable circular connectors on left and right side.
- OPERATING TEMPERATURE: 0°~ +65°
- OPERATING HUMIDITY: 5°~ 95%
- WARRANTY: 1 Year.

CONNECTOR NUMBERING SHOWN CORRESPONDS TO:

- Chassis Connectors: Front View
- Cable Connectors: Back View



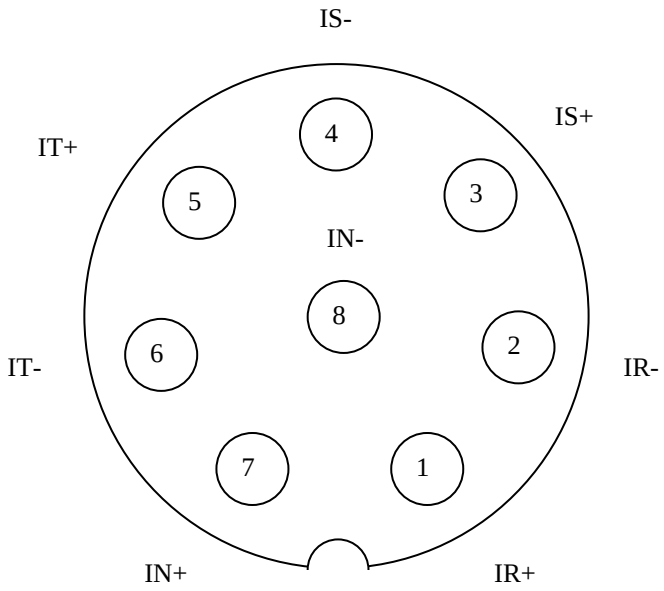
U input



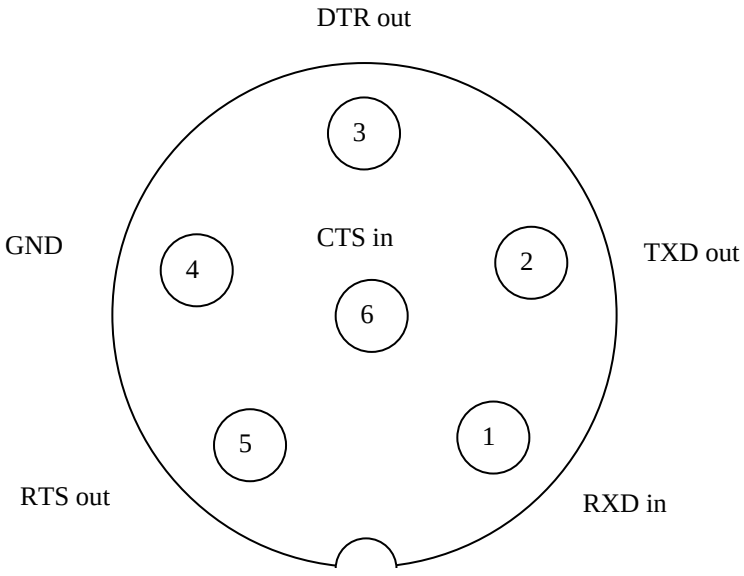
POWER SUPPLY input

CONNECTOR NUMBERING SHOWN CORRESPONDS TO:

- Chassis Connectors: Front View
- Cable Connectors: Back View



C.T. input



RS-232