

STYLITIS-10

USER'S MANUAL



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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.
	Calls attention to a procedure or condition which, if not correctly performed could result in damage to the instrument.



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MANUFACTURERS DECLARATION OF CONFORMITY

We, the undersigned, hereby declare that the equipment specified conforms to the below Directives and Standards.

Standards to which Conformity is Declared

EMC Emissions: EN55022, EN61000-4-3

EMC Immunity: EN61000-4-2, EN61000-4-4, EN61000-4-5, EN61000-4-6

Safety: EN61010-1

Description of Equipment:

Data recording and logging instruments.

Model

Stylitis-10

Batch of product covered

Serial numbers:

0106001 to xx06xxx

Date and Place

Pallini, Greece, 20 Iavouapiou 2007

Authorized signatory on behalf of the manufacturer

Nick Hadzidakis

Theoni Katsabakou

Title: Owners and Directors

CONTENTS

1. INTRODUCTION.....	5
2. OPERATION AND SAFETY	9
3. USER INTERFACE AND OPERATIONS REVIEW	10
4. POWER SUPPLY	13
5. MEASUREMENTS.....	14
6. SENSOR SUPPLY OUTPUT	14
7. CHANNELS.....	15
8. PROGRAMMABLE DIGITAL OUTPUTS	18
9. DATA PROCESSING AND STORAGE.....	19
10. DATA RECORDING.....	20
11. DATA RETRIEVAL	21
12. DATA SAFETY	21
13. PASSWORD.....	21
14. COMMUNICATION SERIAL PORTS.....	22
15. INTERNAL ETHERNET	22
16. INTERNAL GSM/GPRS MODEM.....	23
17. SMS MESSAGES.....	23
18. SOFTWARE	24
19. TECHNICAL CHARACTERISTICS.....	25
APPENDIX A CONNECTION EXAMPLES.....	27
APPENDIX B DATA LOGGER SETTINGS	29
APPENDIX C COMMANDS	30

1. INTRODUCTION

The model Stylitis-10 data logger is a versatile, low cost and user friendly device for technical measurements, control and data storage. It provides:

- A local user interface with 2 line - LCD display and 4 key-buttons.
- Standard connection for most widely used transducers, like thermometers, anemometers, wind direction vanes, pyranometers, switches, etc.
- User selectable time interval for average calculations.
- Internal flash memory 4 Mbyte for data storage
- Digital outputs that may be programmed to switch ON or OFF external relays, LEDs, etc. The outputs may be set to respond to combinations of input channels' values.
- Programming, control and data downloading through RS232, modem, GSM modem, Ethernet.

Sampling and storage continues unaffected while communicating with the user.

WORKING WITH STYLITIS

Stylitis family data loggers operate 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 2MB flash memory. The stored files are downloadable via the serial port. The connection between data logger and the PC may be via a direct link, via a modem (PSTN or GSM) or via the Ethernet network (LAN). *The unit accepts an optional internal GSM modem or Ethernet server (in this case the 'COMMUNICATION'*

serial port is disabled). The PC must be equipped with an RS232 COM port, a modem or a network card respectively. The data logger is accompanied by Set-10, 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

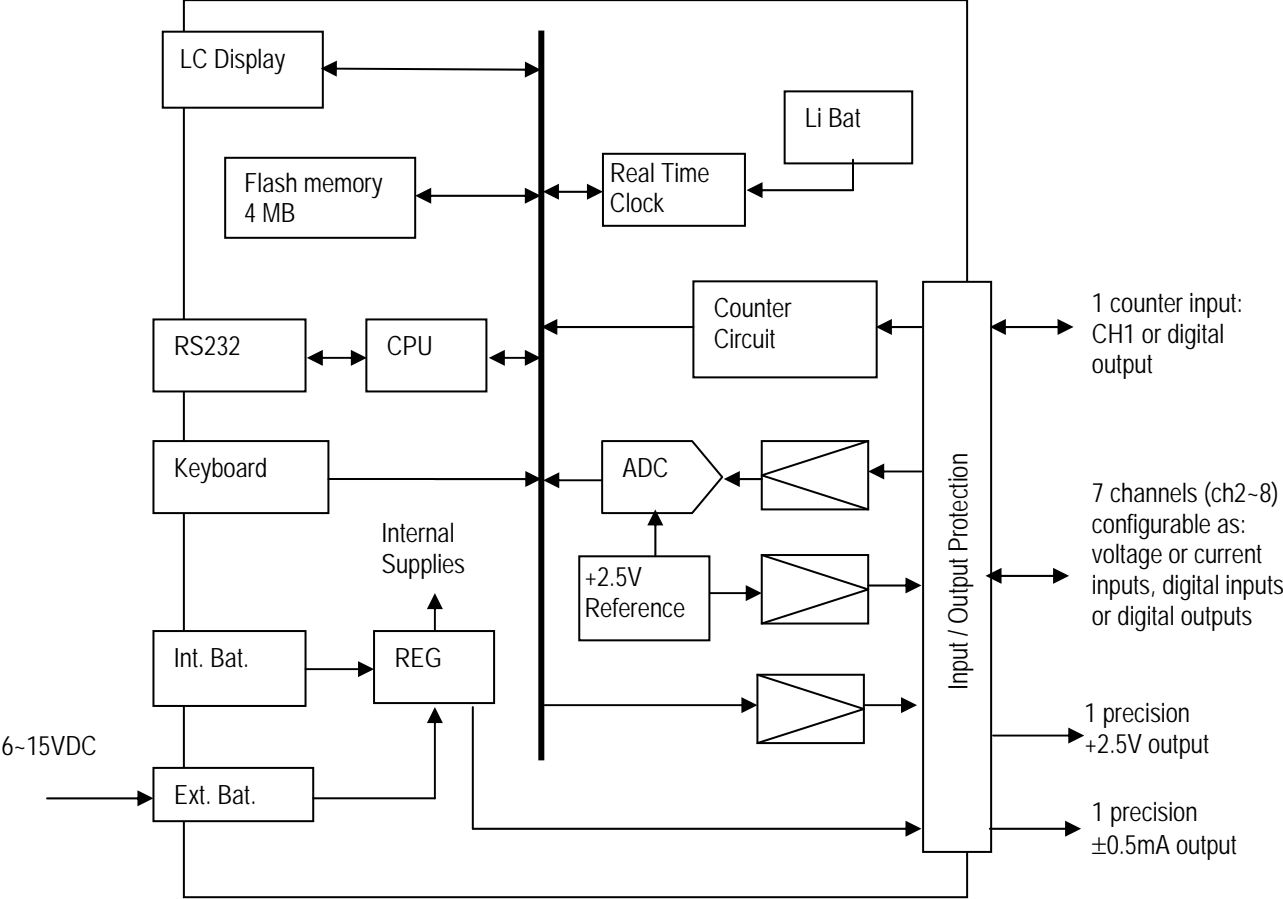
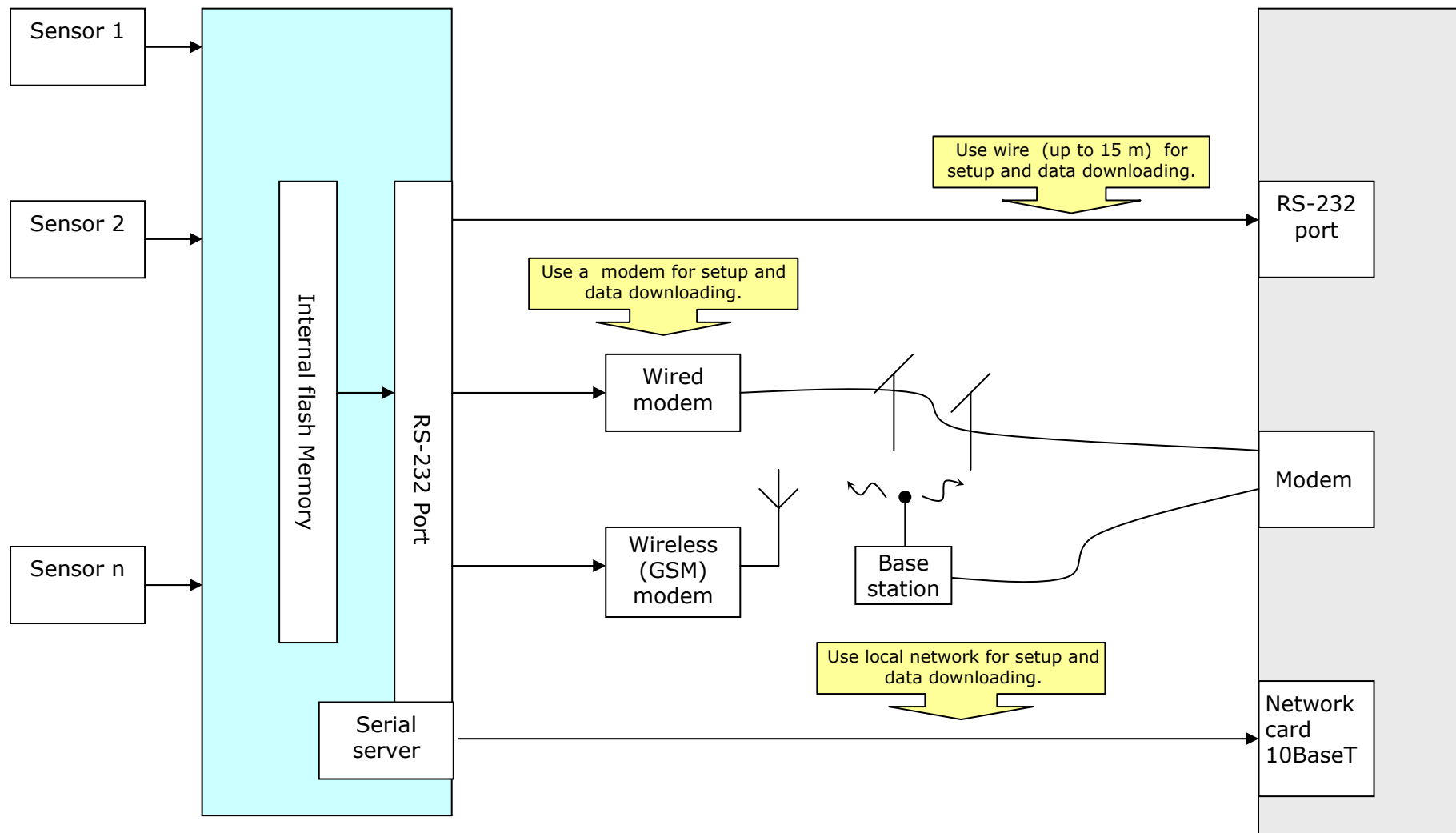



Fig. 2: Operation



2. OPERATION AND SAFETY

EXTERNAL DESCRIPTION.

Front View

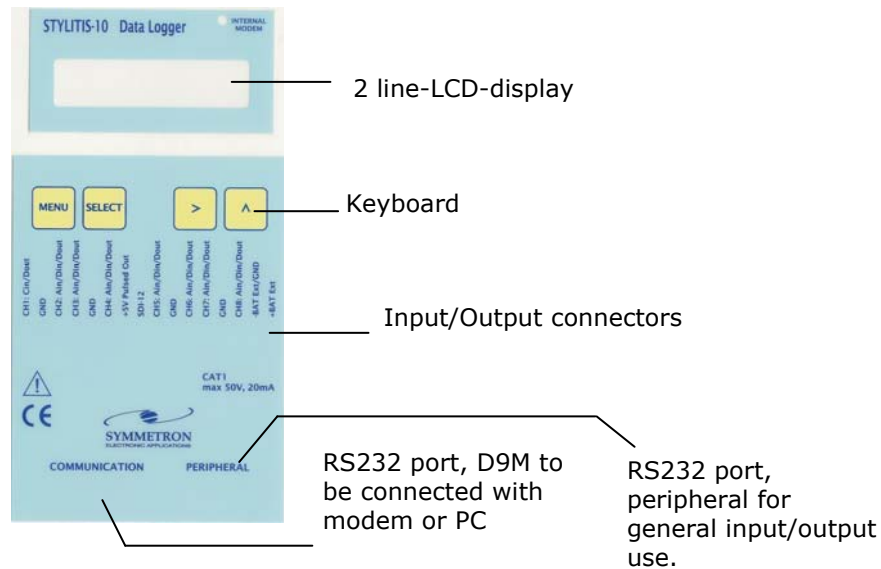


CAUTION

Do not:


- destroy
- overheat
- short-circuit
- charge dry cells.

If the instrument will not be used for a long time, remove the dry cells.



Back panel:

1 battery case PP3 (9V). Use of alkaline batteries is advised.



CAUTION

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

FUSE REPLACEMENT.

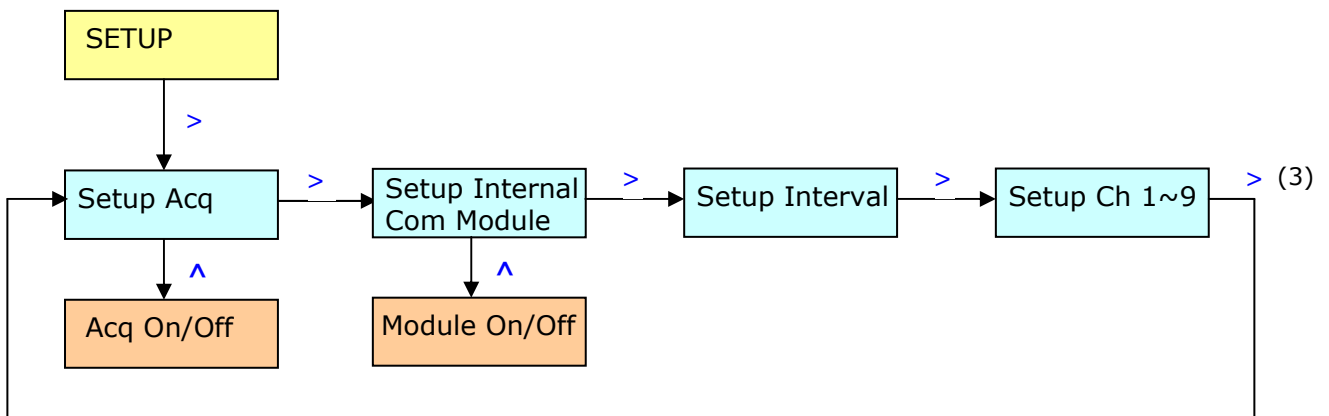
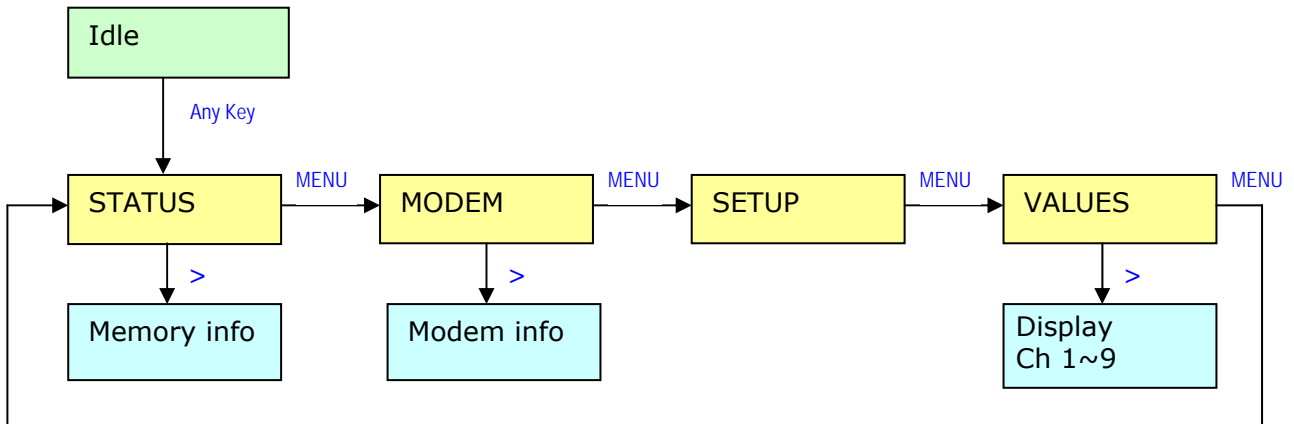
The instrument uses a 1 A power supply fuse, which must be replaced if blown (supply voltage out of limits). It can be found on the printed circuit board, after removing the 4 screws that hold the back panel in place. Make sure you have removed the external supply and cells before attempting the replacement.

3. USER INTERFACE AND OPERATIONS REVIEW

The display and keyboard may be used to:

- ❑ To see the current status and time.
- ❑ To check the battery.
- ❑ To check the amount of free memory.
- ❑ To check the current input data values.
- ❑ To check the modem signal.
- ❑ To check the input setup.
- ❑ To start or stop data storing (ACQquisition OFF/ON).

MENU STRUCTURE



NOTES:

1. The parameter setting is done through serial port and is permitted only if ACQUISITION is OFF.
2. From local interface only system inspection is possible and the change of ACQUISITION status (ON/OFF).
3. Channel types are explained in the table in next page.

KEYS

- | | |
|---------------|-----------------------------------|
| MENU | Go to next menu |
| SELECT | Accept change and go to next menu |
| > | Go to next sub-menu |
| ^ | Change setting |

Channel type	Channel	Input signal	Operation
C	1	SIN	Measures the number of sinusoidal periods per second and applies the formula: $[\text{Slope2} * x^2 + \text{Slope} * x + \text{Offset}]$. Stores the average for each interval.
C	1	TTL	Measures the number of TTL pulses per second and applies the formula: $[\text{Slope2} * x^2 + \text{Slope} * x + \text{Offset}]$. Stores the average for each interval.
E	1	SIN	Measures and stores the number of sinusoidal periods inside interval and applies the formula: $[\text{Slope2} * x^2 + \text{Slope} * x + \text{Offset}]$ (Event counting)
E	1	TTL	Measures and stores the number of TTL pulses inside interval and applies the formula: $[\text{Slope2} * x^2 + \text{Slope} * x + \text{Offset}]$ (Event counting)
A	2,3,4,5,6,7,8	VOLTAGE	Measures analog voltage per second. Applies the formula: $[\text{Slope2} * x^2 + \text{Slope} * x + \text{Offset}]$. Stores the average for each interval.
A	2,3,4,5,6,7,8	CURRENT	Measures analog current per second. Applies the formula: $[\text{Slope2} * x^2 + \text{Slope} * x + \text{Offset}]$. Stores the average for each interval.
V	5,6,7		Measures wind direction (vane). Measures the ratio: (Input voltage)/(Pulsed Out Voltage) per second, adds offset and converts to degrees. Calculates and stores vector direction average for each interval.
T	2,3,4,5,6,7,8		Temperature sensor PT100 or PT1000. Measures analog voltage per second and applies conversion formula for PT100 or PT1000. Stores averages for each interval.
I	2,3,4,5,6,7,8		Measures the digital input state (TTL 0/1) every second. Stores sum of input states for each interval.
O	1,2,3,4,5,6,7,8		Digital output (open-drain) according to user defined conditions.

4. POWER SUPPLY

There are 3 modes of operation:

➤ **ENERGY SAVING MODE**

This is the default mode. The system is in an idle condition, which is interrupted by the system clock every second, in order to take the input sampling, perform any calculation and store the data in memory. During this low consumption mode the display is off.

➤ **COMMUNICATION MODE**

By pressing any button or upon receiving a character from the COMMUNICATION serial port, the display is switched on and the serial communication is activated. The unit is active and the power consumption increases. The system returns automatically to energy save mode, 60 seconds after the last pressing of a button or 60 seconds after the last character received from the serial port.

➤ **CONTINUOUS OPERATION MODE**

By issuing the appropriate serial command (CONTINUOUS OPERATION) the data logger remains in COMMUNICATION MODE until another serial command switches it back to ENERGY SAVE mode.

5. MEASUREMENTS

*Connection
Examples:
See Appendix A.*

Stylitis-10 is capable of directly measuring voltage, current, frequency, pulses and RTD temperature.

With the proper sensors it can measure:

- ✓ Solar radiation, humidity, pressure.
- ✓ Wind speed, wind direction. It connects with many types of anemometers and vane sensors.
- ✓ Rain height, water speed, water depth, etc

The sensors must output Voltage (from 0~125mV to 0~2.5V full-scale), current (from 0~5mA to 0~50mA full-scale), or a frequency signal (0~5 kHz).

6. SENSOR SUPPLY OUTPUT

CAUTION

Do not apply Voltage to device's output.

For *voltage* sensor supply, the + PULSED OUT may be used. It can supply 2.5V at up to 25 milliamps, with $\pm 0.2\%$ accuracy.

For *current* sensor supply, the + AUX output may be used. It can supply 0.5mA, with $\pm 0.3\%$ accuracy.

In Energy Save mode *both these outputs are pulsed* in order to save battery power. They are always ON in Continuous Operation mode.

7. CHANNELS

➤ DIGITAL INPUTS: CH2~CH8

The channel is connected to a digital signal. Stylitis samples the value (0 or 1) of the digital signal every second. The samples are summed up during selected interval and stored in memory.

➤ DIGITAL OUTPUTS: CH1~CH8

Any channel may be used as a digital programmable output, which is driven low (0) for user-programmable combinations of input channels' values.

➤ ANALOG INPUTS: CH2~CH8

Stylitis-10 has an 7-channel Analog to Digital Converter (for CH2~CH8), with 13 bit-resolution plus sign and 0~+2.5V input range.

In addition there is a programmable input amplifier for the following full scale input ranges:

Voltage: $0\sim 2.5V$, $0\sim 1.25V$, $0\sim 625mV$, $0\sim 500mV$,
 $0\sim 312,5mV$, $0\sim 250mV$, $0\sim 156.25mV$, $0\sim 125mV$.

Current: $0\sim 50mA$, $0\sim 25mA$, $0\sim 20mA$, $0\sim 12.5mA$, $0\sim 10mA$,
 $0\sim 6.25mA$, $0\sim 5mA$.

There are 6 basic options for each analog input channel:

1. **NOT USED.** The channel is not stored.
2. **VOLTAGE INPUT.** A formula is applied to the measured value in order to convert it to appropriate physical units. Three user-programmable parameters, Slope2, Slope and

CAUTION

Do not apply
Voltage exceeding
the limit of ($\pm 20V$)
to system's Inputs

Offset are applied to measured value x :

$$\text{Physical value} = [\text{Slope2} * x^2 + \text{Slope} * x + \text{Offset}].$$

3. **DIFFERENTIAL VOLTAGE INPUT.** A formula is applied to the measured value in order to convert it to appropriate physical units. Three user-programmable parameters, Slope2, Slope and Offset are applied to measured value x :

$$\text{Physical value} = [\text{Slope2} * x^2 + \text{Slope} * x + \text{Offset}].$$

4. **CURRENT INPUT.** A formula is applied to the measured value in order to convert it to appropriate physical units. Three user-programmable parameters, Slope2, Slope and Offset are applied to measured value x :

$$\text{Physical value} = [\text{Slope2} * x^2 + \text{Slope} * x + \text{Offset}].$$

5. **VANE.** Measures wind direction from potentiometric sensors. The Voltage input 0V~2.5V is transformed to 0~360 degrees, with resolution 2.8 degrees. The vector averaging is needed for continuation from 360 deg. to 0 deg. The offset (0~359 deg.) from north is user selectable. E.g. if the vane alignment is 30° East the offset must be set 30, if the vane alignment is 30° West the offset must be set 330 (=360-30).

6. **RTD.** Measures temperature with PT100 or PT1000 type sensors and an external precision resistor. (see Appendix A). A conversion formula is applied internally.

➤ **BATTERY INPUT: CH9**

There are 2 options for the Battery channel:

1. **NOT USED.** The channel is not stored.

CAUTION

Do not apply Voltage exceeding the limit of ($\pm 20V$ to system's Inputs

2. **SLOPE/OFFSET.** A linear formula is applied to display battery voltage with an accuracy of $\pm 5\%$. The Slope & Offset parameters have fixed values.

➤ COUNTER INPUT: CH1

There is 1 counter input channel of 16-bit (0-65535 counts), with 3 basic options:

1. **NOT USED.**
2. **FREQUENCY COUNTER.** A linear formula is applied. The input signal type is selectable; it can be a low voltage AC sinusoidal signal (SIN) or a pulsed positive signal (TTL). User programmable Slope2, Slope and Offset parameters are applied to the measured input frequency x :
$$\text{Physical value} = [\text{Slope2} * x^2 + \text{Slope} * x + \text{Offset}].$$

3. **EVENT COUNTER.** Counts-up the pulses during interval time period. The input signal type is selectable; it can be a low voltage AC sinusoidal signal (SIN) or a pulsed positive signal (TTL). User programmable Slope2, Slope and Offset parameters are applied to the measured number of pulses x :
$$\text{Physical value} = [\text{Slope2} * x^2 + \text{Slope} * x + \text{Offset}].$$

8. PROGRAMMABLE DIGITAL OUTPUTS

All channels (CH1-CH8) may be programmed as digital outputs.

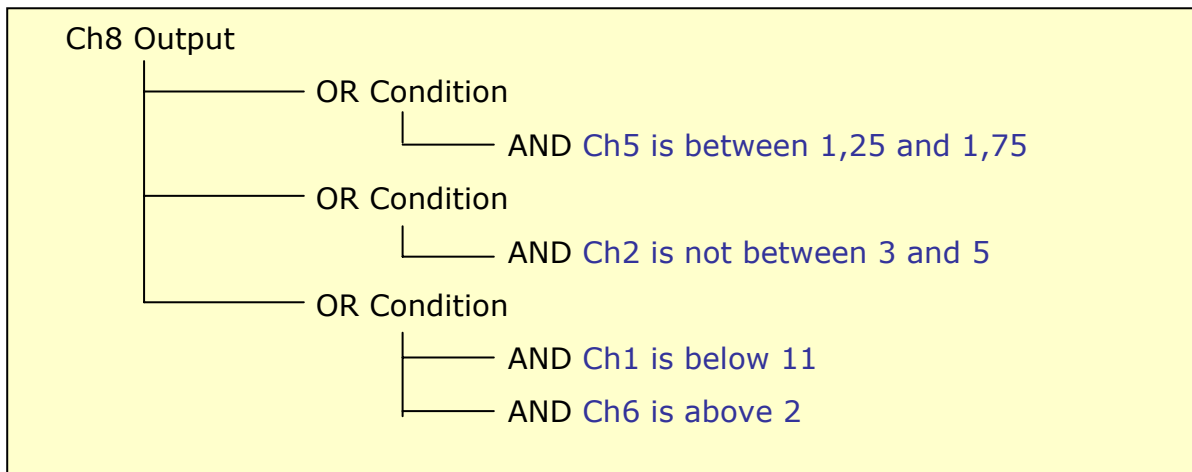
The output state depends on measured values of input channels:

- For each individual output, up to 5 **conditions** may be defined. The conditions are **ORed**, which means that it is enough to satisfy one or more conditions in order to drive the specified output Low (0).
- Each condition contains one or more **requirements**. The requirements are **ANDed**, which means that all requirements in a condition must be satisfied to satisfy this condition. A requirement utilizes the measurement result of any specified input channel and compares it to user-programmed values using 4 operators: *Above*, *Below*, *Between* and *Not Between*.

In the example below, 3 conditions are set:

1. Ch8 will be driven low whenever Ch5's value falls between 1.25 and 1.75.
2. Ch8 will be driven low whenever Ch2 falls outside the 3~5 zone.
3. Ch8 will also be driven low, if Ch1 is below 11 and, at the same time, Ch6 is above 2.

Each of the 3 conditions can drive Ch8 low independently of the others. However, the requirements in the last condition must be satisfied simultaneously.



9. DATA PROCESSING AND STORAGE

The statistical interval is user selectable from 1 second to 60 minutes. Inputs are measured per second and their values are placed in temporary storage.

Math processing is selectable: Average values only or Average, Minimum and Maximum values.

At the end of the time interval, the 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.

10. DATA RECORDING

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

- Upon selection of acquisition ON the following happen:
 1. A new file is opened in memory.
 2. Recording starts according to user set parameters.

Only when acquisition is off parameter change is permitted.

- Upon selection of acquisition OFF the following happen:
 1. Recording stops.
 2. The file is closed in memory.
- When downloading 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.

11. DATA RETRIEVAL

File downloading and memory erasure are done via serial commands (direct link, modem, etc.), using the accompanying Set-10 software in the host PC.

Files downloaded to a PC are compressed to save memory space and speed up data transfer. The data are retrieved using the Set-10 software. Data are decompressed to ASCII text files, suitable for further manipulation using available programs like Excel, etc.

12. 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.

13. PASSWORD

The user can activate a password to prevent logger usage by unauthorized personnel. A password may contain up to 8 alphanumeric characters and is set by the **NEW PASSWORD** command. Password protection is activated when the logger switches to Energy Save mode. Stylitis-10 becomes active after a button is pressed or a serial character is received. At this point the password is asked for. No further action can take place without first providing the correct password. Up to 4 attempts are allowed. After 4 contiguous wrong attempts the system locks up and further access is denied. Only SYMMETRON can unlock it using any serial communication method.

To deactivate the password supply an empty **NEW PASSWORD**.

14. COMMUNICATION SERIAL PORTS

The Set-10 software is used for communicating with the host PC. Stylitis-10 comes with 2 RS232 ports. Both can be used for communication.

COMMUNICATION

port DB9M:

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

PERIPHERAL port

DB9F:

- PIN 2 Transmit
- PIN 3 Receive
- PIN 5 Ground

Communication

settings: 9600 baud,

8 data bits, 1 stop

bit, no parity bit.

- The 'COMMUNICATION' port is a DTE type, i.e. Stylitis-10 appears as a PC. 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 'COMMUNICATION' port is enabled only when an internal modem or Ethernet server are not used.
- The 'PERIPHERAL' port is a DCE type, i.e. Stylitis-10 appears as a modem. A 'null modem' cable (DB9M male to DB9M male) is required for connection to an external modem. A 'straight' cable (DB9M male to DB9F female) is required for connection to a PC.

15. INTERNAL ETHERNET

You can enable/ disable the internal server module using the LCD and keys, from the 'Setup Internal Com Module' menu (see chapter 3). To setup, follow these steps:

1. Power-up the logger and connect the RJ-11 connector to the LAN. A yellow light on the connector indicates a correct connection. Wait 30 seconds to allow LAN setup.
2. Use the command '*Find Logger in LAN*' in the Set-10 software 'Communication' menu to find the 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.
3. Enter this IP address in the Set-10 '*Logger Communication Settings*' menu. Close the *Digi Device Discovery* window. To

connect to the logger from the Set-10 software, use the *'Connect'* command.

16. INTERNAL GSM/GPRS MODEM

You can enable/ disable the internal modem using the LCD and keys, from the 'Setup Internal Com Module' menu (see chapter 3). To setup, follow these steps:

1. Disconnect all power supplies and remove the 4 screws on the back side of the logger. Open the back cover 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 you put it in the logger.
2. Power-up the logger. The INTERNAL MODEM 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). Use the 'Check modem' command in the logger to display the GSM network operator name and received signal strength (see chapter 3).
4. Enter the SIM data call number in the 'Logger Communication Settings' menu of the Set-10 software. To connect to the logger, use the 'Connect' command.

17. SMS MESSAGES

With an optional GSM modem, the data logger has 2 options to send SMS messages:

1. When a control output changes.
2. The statistical values at the end of each interval.

These options are exclusive i.e. you can have only one activated.

18. SOFTWARE

Install Set-10 from the accompanying CD or download it from the Symmetron site. Software upgrades are free to download.

Following the first installation select *Site Folders / 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 *Site Folders / FOLDER NAME*.

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 14.

Now you can try some of the commands in the left pane of the Set-10 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 *Communication / Communication Settings* 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.

19. TECHNICAL CHARACTERISTICS

All accuracies stated are the **mean of 5 measurements**.

COUNTER INPUT (CH1) 16 bit.

- Resolution: ± 0.2 count (Hz). Accuracy: ± 0.2 count.
- Input Frequency range: 0~5 kHz.
- Input resistance: 100 k Ω . Sensitivity bipolar AC: 200 mV_{p-p}. Unipolar TTL 1 V_{p-p}.
- Channel may be programmed as active-low (open-drain) output, i.e. as a switch with one end grounded. Output resistance 30 Ohms, maximum sink current 60 mA.
- **Maximum external DC Voltage at connector: $\pm 20V$.**

COUNTER INPUT (CH8) 16 bit.

- Resolution: ± 0.2 count (Hz). Accuracy: ± 0.2 count.
- Input Frequency range: 0~5 kHz.
- Input resistance: 1 M Ω . Sensitivity: 3 Unipolar TTL V_{p-p}.

ANALOG INPUTS (CH2~CH8) individually selectable.

- 7, 13 bits+sign each. For input ranges see Table below.
- Channel may be programmed as digital input (0/1) with a threshold of 1.5 V.
- Channel may be programmed as active-low (open-drain) output, i.e. as a switch with one end grounded. Output resistance 30 Ohms, maximum sink current 60 mA.
- Channels pairs 2/3, 4/5, 6/7 can be configured as differential inputs. Differential common mode input range: 0~2.5V (from v2.59)
- **Maximum external DC Voltage at connector: $\pm 20 V$.**
- **Maximum external DC Current at connector: $\pm 60 mA$.**

Input	Accuracy referred to input	Resolution	Remarks
0~2.5V	($\pm 0.3\%$)+ ($\pm 1.5mV$)	305 μV	Input resistance 1 MOhm
0~1.25V	($\pm 0.3\%$)+ ($\pm 0.5mV$)	153 μV	Input resistance 1 MOhm
0~625mV	($\pm 0.3\%$)+ ($\pm 0.5mV$)	76 μV	Input resistance 1 MOhm
0~500mV	($\pm 0.3\%$)+ ($\pm 0.5mV$)	61 μV	Input resistance 1 MOhm
0~312,5mV	($\pm 0.3\%$)+ ($\pm 0.5mV$)	38 μV	Input resistance 1 MOhm
0~250mV	($\pm 0.3\%$)+ ($\pm 0.5mV$)	30 μV	Input resistance 1 MOhm
0~156.25mV	($\pm 0.3\%$)+ ($\pm 0.5mV$)	19 μV	Input resistance 1 MOhm
0~125mV	($\pm 0.3\%$)+ ($\pm 0.5mV$)	15 μV	Input resistance 1 MOhm
0~50mA	($\pm 0.3\%$)+ ($\pm 30 \mu A$)	6.1 μA	Input resistance 30 Ohms
0~25mA	($\pm 0.3\%$)+ ($\pm 10 \mu A$)	3 μA	Input resistance 30 Ohms
0~20mA	($\pm 0.3\%$)+ ($\pm 10 \mu A$)	2.4 μA	Input resistance 30 Ohms
0~12.5mA	($\pm 0.3\%$)+ ($\pm 10 \mu A$)	1.5 μA	Input resistance 30 Ohms
0~10mA	($\pm 0.3\%$)+ ($\pm 10 \mu A$)	1.2 μA	Input resistance 30 Ohms
0~6.25mA	($\pm 0.3\%$)+ ($\pm 10 \mu A$)	0.76 μA	Input resistance 30 Ohms
0~5mA	($\pm 0.3\%$)+ ($\pm 10 \mu A$)	0.61 μA	Input resistance 30 Ohms
VANE	± 2.8 degrees	2.8 degrees	CH5, 6, 7. Pot value: 1~100K
PT100/1000	± 0.4 degrees	0.06 degrees	External Resistor: 2K, 0.1%

BATTERY VOLTAGE (CH9)

The power supply voltage is measured. Resolution: 0.1 V. Accuracy: $\pm 5\%$.

SDI-12/AUX OUTPUT (from serial number 020xxxxx or newer)

- 1, 0.5 mA. Pulsed (Energy Save mode, Duration On: 5 mSec) or Continuous (Continuous mode). Accuracy: $\pm 0.3 \%$.
- **Maximum short-circuit duration to Ground: infinite.**

PULSED OUT OUTPUT (for sensors supply)

- 1, +2.5 V. Pulsed (Energy Save mode, Duration On: 5 mSec) or Continuous (Continuous mode). Maximum supply current 25 mA. Accuracy: $\pm 0.2\%$.
- **Maximum short-circuit duration to Ground: infinite.**

PROTECTION

- All inputs and outputs are protected from over voltage by quick acting diodes.

SENSOR EXAMPLES

- RTD, switch, anemometer, potentiometric vane, pyranometer, thermometer, rain gauge, water speed, barometer, pulse meter, etc.

DATA STORAGE

- *INTERNAL FLASH MEMORY: size 4MB.* Typical duration for storing averages for all channels, every 10 min, is about 32 months.

DATA PROCESSING

- For each channel, Slope2, Slope and Offset are independently programmable. Sampling: 1 Hz. Calculation and storage of ax^2+bx+c . Selectable storage of *Average* only or *Average, Min, Max* values at selectable intervals: 1-59 seconds, 1, 2, 5, 10, 15 or 60 minutes. In case of 1 sec interval, all samples are recorded (time series).
- Dedicated wind vane algorithm for vector averaging.
- Real time clock with automatic correction of leap years. Accuracy: ± 1 minute per month.

SERIAL PORTS

- *PROGRAMMING AND DOWNLOADING:* 2 RS232C ports, 9600 baud, 8 bits, no parity, 1 stop bit. Connectors DB9M (DTE) , DB9F (DCE). Support for direct connection, modems (PSTN or GSM) and Ethernet servers.

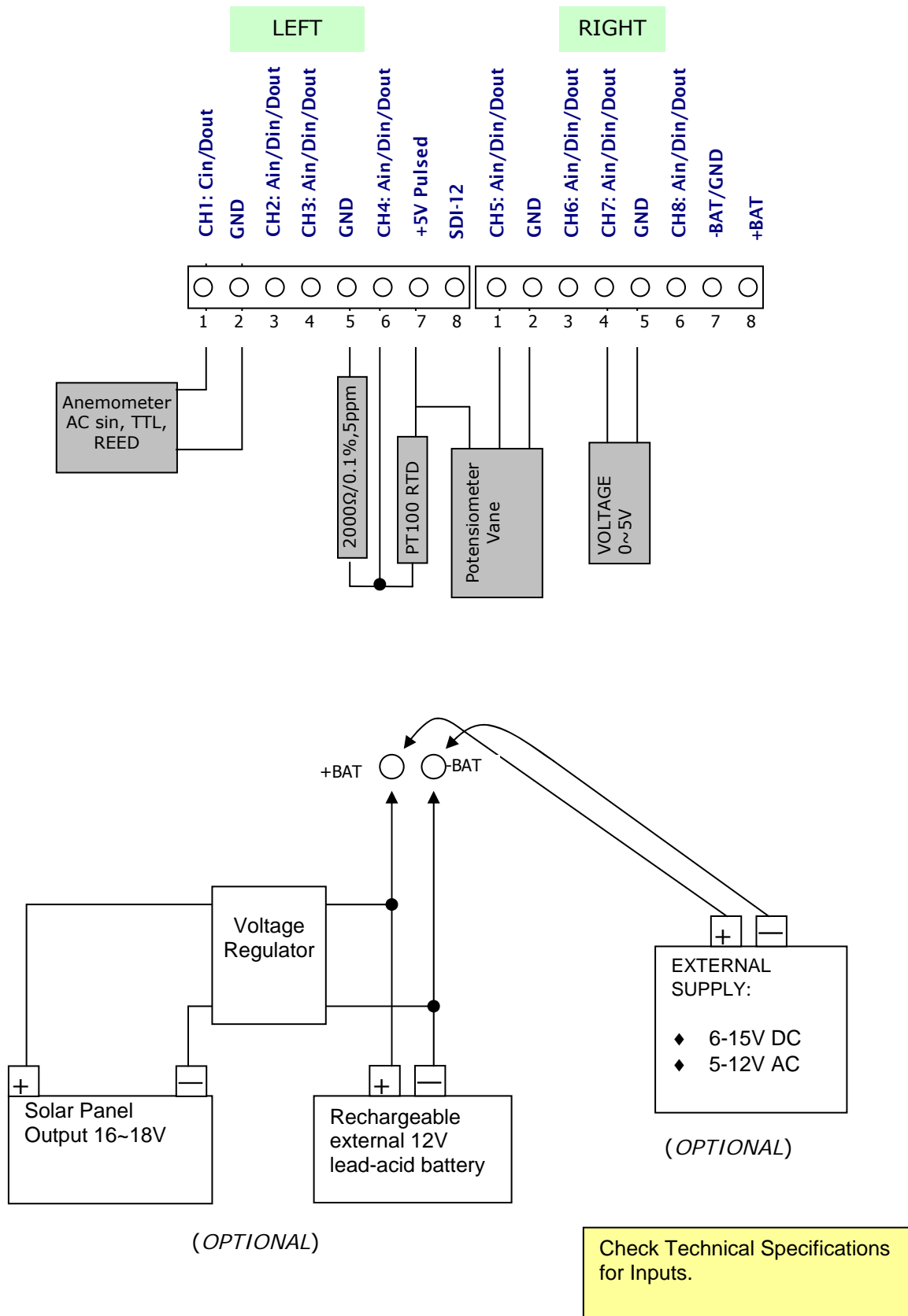
POWER SUPPLY

- *INTERNAL BATTERY:* 1x9V alkaline – typical duration 2 weeks.
- *EXTERNAL:* 6~15V, DC/AC
- **Maximum permitted External Supply Voltage: 18V**
- *POWER CONSUMPTION (Typical):*
 - Energy Save: 0.9 mA.
 - Energy Save + Internal modem idle: 10 mA.
 - Continuous: 4.5mA.
 - Continuous + RS232 I/O: 12mA
 - Continuous + Internal modem idle: 15mA
 - Internal modem connected: 400mA
 - Internal Ethernet server: 300mA
- Real-time clock operating time without any power source: 1 year
- *OPTIONAL:* Solar panel and rechargeable battery.

Miscellaneous

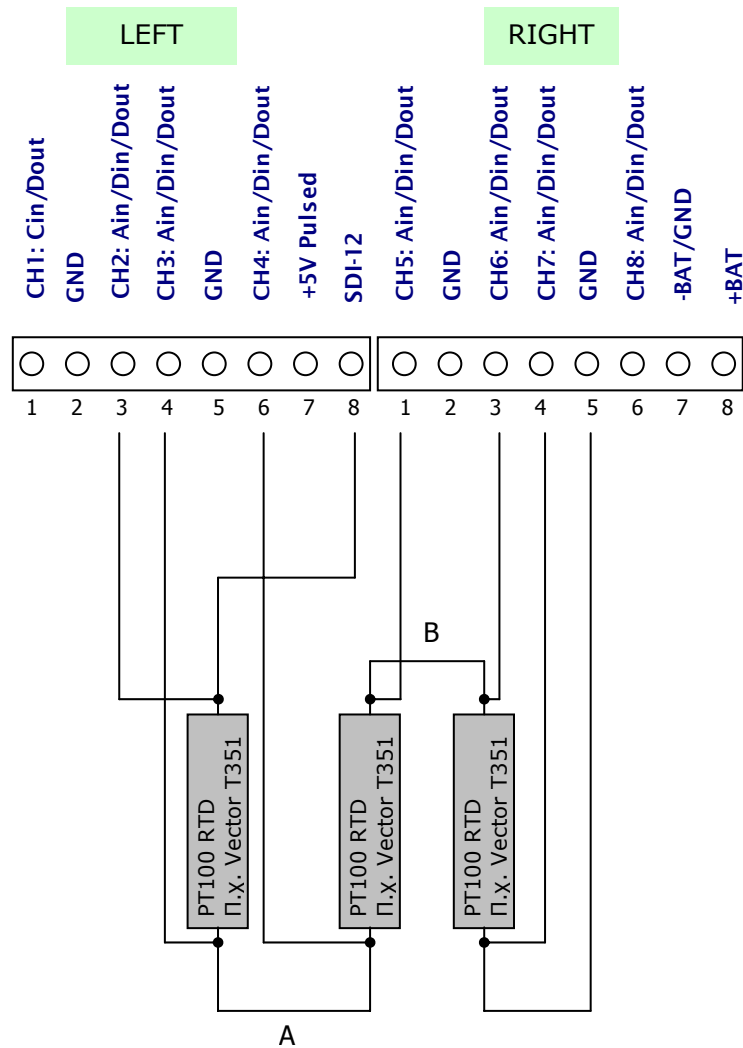
- *BOX:* small, portable
- *DIMENSIONS:* 180x100x40mm
- *WEIGHT:* 200g.
- *SCREW TERMINALS:* Detachable on the front panel.
- *OPERATIONAL/STORAGE TEMPERATURES:* -30°C~ +70°C
- *LCD OPERATIONAL TEMPERATURES:* 0-50°C
- *WARRANTY:* 1 year
- *OPTIONAL:* internal GSM modem or Ethernet server or secure wireless Ethernet (WiFi 802.11b) server.

DETACHABLE SCREW TERMINALS



Alternative connection method of up to 3 PT100s, in order to avoid errors due to long cable resistance (firmware v2.61 or newer).

DETACHABLE SCREW TERMINALS



NOTES

- For only one PT100 connect wire A to GND.
- For only two PT100s connect wire B to GND.
- The corresponding input channels (2/3, 4/5, 6/7) must be set as in Appendix B, case 7.
- Wires to differential channel inputs must be connected close to PT100s.

APPENDIX B

DATA LOGGER SETTINGS

	SENSOR⁽¹⁾	TYPE	CHANNELS	INPUT TYPE SELECTION	SLOPE	OFFSET	UNITS
1	NRG MAX #40	Wind speed	1	Frequency Counter Sinus Level	0,765	0,35	m/sec
2	VECTOR A100LM	Wind speed	1	Frequency Counter TTL Level	0,1	0,0	m/sec
3	NRG RG	Rain Gauge	1	Event Counter TTL Level	0,254	0,0	mm/hour
4	NRG 200P	Wind vane	5, 6, 7	Vane Input	-	-	Degrees
5	VECTOR W200P	Wind vane	5, 6, 7	Vane Input	-	-	Degrees
6	VECTOR T351 ⁽²⁾	Temperature PT100	2..8	RTD Input	-	-	°C
7	VECTOR T351 ⁽³⁾	Temperature PT100	2/3, 4/5, 6/7	Differential Input 0...125 mV	5194.8	-259.74	°C
8	DELTAOHM 9009TR	Temperature	2...8	Analog Input 0...1250 mV	120,0	-40,0	°C
9	DELTAOHM 9009TR	Humidity	2...8	Analog Input 0...1250 mV	100,0	0,0	Relative %
10	DELTAOHM 9408T	Barometer	2...8	Analog Input 0...1250 mV	300,0	800,0	mBar
11	LiCor 200SA	Pyramometer	2...8	Analog Input 0...125 mV	83,33	0,0	W/m ²

NOTE (1): The SLOPE and OFFSET factors shown are nominal. Enter the corrected factors if the sensor comes calibrated.

NOTE (2): Voltage excitation with external resistor.

NOTE (3): Current excitation, no external resistor (serial numbers 020xxxxx or newer).

All commands or queries must be in CAPITAL and terminated with <CR>+<LF>. The characters are NOT echoed back. If you are using the Windows HyperTerminal utility you can set it to echo back characters.

By default Password is disabled. If enabled, this command must be the first to access Stylitis-10 remotely. If not Stylitis-10 will respond: "ENTER PASSWORD"+<CR>+<LF> to any question or command.

Host Question		<i>Action & response</i>	<i>Response end</i>
*ACQ?	√	ACQ ON, ACQ OFF	<CR>+<LF> + OK+<CR>+<LF> Or ERROR+<CR>+<LF>
*AUX?	√	AUX=0 (EXTERNAL Modem/Ethernet), AUX=1 (INTERNAL)	
*INi? (i=1...9)	√	Input I value, e.g. IN1=3.5 (9:bat)	
*INALL?	√	All input values in ascii form separated by <CR>,<LF>	
*INTERVAL?	√	Gives averaging interval in min, e.g. INTERVAL=10	
*SITE?	√	SITE=xxxxxxx (up to 8 chars)	
*BAT?	√	Battery voltage.	
*DIGOUTi?	√	Digital output value	
*DIGOUTiCOND?	√	Returns 5 masks(dw) & conditions(dw) in binary form (40Bytes total)	
*DIGOUTLEVS?	√	Returns Low comparison Level(w) & High comparison Level(w) for the 9 channels in binary form (36Bytes total)	
*TIME?	√	e.g. 18/11/04 10:50:00	
*FREEMEM?	√	----- Bytes free for ----- hours, etc.	
*INISLOPE?	√	e.g. IN1SLOPE=0.77	
*INISLOPE2?	√	e.g. IN1SLOPE2=0.77	
*INiOFFSET?	√	e.g. IN1OFFSET =-0.2	
*INiTYPE?	√	S/T(for ch1) V/C (for ch2-8)	
*INiMODE?	√	C/E /N(ch1) , A/V/T/N or I/O/N (ch2-8) , B/N(ch9)	
*INTYPES?	√	A series of input types, e.g SAAADDDD	
*INMODES?	√	A series of input modes, e.g CVTAIDNO	
*INiGAIN?	√	e.g. IN1GAIN=1/2/4/5/8/10/16/20	
*MINMAX?	√	MINMAX=ON/OFF. Enables Minimum & Maximum storage	
*NAMEi?	√	Returns channel's(i) name (up to 16 chars)	
*VERSION?	√	Returns f/w version	
*SERNO?	√	Returns SERIAL NUMBER (up to 8 chars)	
*SMSNUM?	√	Phone number to send data message per interval	
*SMSSEL?	√	SMS data=ON, SMS data=OFF	
*SMSALSEL?	√	SMS alarms=ON, SMS alarms=OFF	

Host Command		<i>Action & response with OK,<CR>,<LF> Or ERROR,<CR>,<LF></i>
*ACQ=ON, *ACQ=OFF	√	ON: Write new file header in flash memory. Set ACQ on flag. OFF: Clear ACQ on flag, do not store in flash anymore.
*AUX=0, *AUX=1	√	AUX=0 (EXTERNAL Modem/Ethernet), AUX=1 (INTERNAL)
*CONT	√	Set CONTINUOUS mode
*DIGOUTi=1 or 0	√	Set a value to a Digital output
*DIGOUTiCOND=...	√	Sends 5 masks (dw) & conditions (dw) in binary form (40Bytes total)
*DIGOUTLEVS=...	√	Sends Low comparison Level(w) & High comparison Level(w) for the 9 channels in binary form (36Bytes total)
*DOWNLOAD=n	√	Download File #n
*DOWNLOADF	√	Download current File
*ENERGYSAVE	√	Set Energy Save mode
*ERASEFLASH	√	Erase Flash Memory
*EXIT	√	Exit communication after entering with password
*INTERVAL=...	√	Set new averaging interval in min (1,2,5,10,15,30,60)
*INTERVALSEC=...	√	Set new averaging interval in sec (0-59)
*NEWPASSWORD=...	√	Give a new password (up to 8 characters or nothing to deselect)
*NAMEi=	√	Give a name to channel i (up to 16 chars)
*INiSLOPE=.....	√	Set appropriate input cal slope in EEPROM table. Default 1.0
*INiSLOPE2=.....	√	Set appropriate input slope in EEPROM table
*INiOFFSET=.....	√	Set appropriate input offset in EEPROM table
*MINMAX=...	√	ON: Enables Min & Max storage. OFF: Disables Min & Max storage (from v2.59).
*INiGAIN=....	√	Set appropriate input GAIN in EEPROM table
* INiTYPE=S/T(for ch1) V/C (for ch2-8)	√	Set appropriate input type in EEPROM table S: sinus T: TTL V: voltage input analog or digital C: current input Analog or digital
*INiMODE=A/D/V/T I/O C/E N	√	Set appropriate input mode in EEPROM table A for analog slope/offset, D for differential slope/offset (Channels 2, 4, 6 only) V for vane analog (Channels 5, 6, 7 only) T for pt100 temperature analog I for digital input O for digital output C for counter E for events N for not used B only for ch9 :battery
*PASSWORD=.....	√	Give password to start communication (up to 8 characters or nothing if not selected)
*SITE=.....	√	Set new Site name (up to 8 characters)
*SEROUT=....		Set a value to a Serial Port output
*TIME=dd/mm/yy, hh:mm:ss	√	Update real timer
*SMSNUM=.....	√	Set Phone number to send data message per interval (up to 20 characters)
*SMSSEL=ON, *SMSSEL=OFF	√	Enable, disable data message per interval.
*SMSALSEL=ON, *SMSALSEL=OFF	√	Enable, disable alarm messages (from v2.57).