SYMMETRON
ELECTRONIC APPLICATIONS

Meteorological Measurement Equipment

CATALOG

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Meteorological Measurement Equipment

Company

Symmetron is a major supplier of wind potential assessment equipment for 20 years.

Founded in 1989, has been involved in various renewable energy projects, including custom instrumentation for wind turbine operation analysis and a computer-controlled, hardware simulator for studying the effects of wind turbine penetration in weak grids.

The company's strengths are high reliability products along with superior technical support.

With thousands of systems deployed throughout the world and a continuous growth record, Symmetron is expanding its development and production facilities to provide customers with innovative, problem-solving products and even better services.

Equipment

The equipment is suitable for measuring wind, solar and hydro energy in harsh environments. Systems may be assembled to suit most needs. The equipment is proven by many years operation in the field.

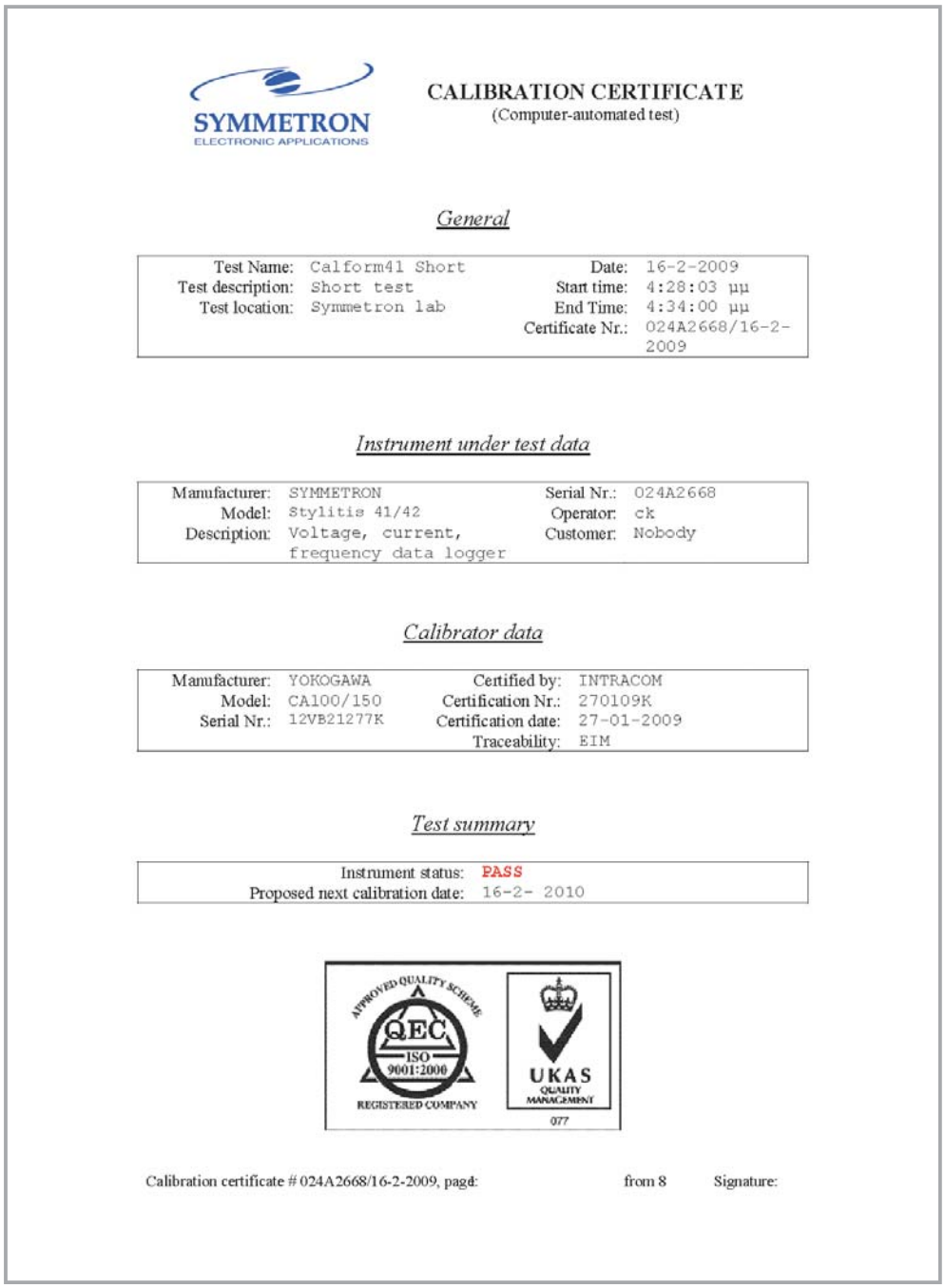
Please refer to following sections for more details.

Technical Support

Technical support via telephone, email or fax is free to customers for the entire life of the product.

Quality Control

Symmetron is certified according to ISO9001:2000. All data loggers are tested on automated stations, followed by a 'burn-in' for at least 48 hours. Problems that may arise are consolidated and analyzed, leading to a continuous product improvement cycle.
Test certificates are issued for each test and are available to customers on request. All certificates are archived forever.



SYMMETRON
ELECTRONIC APPLICATIONS

CALIBRATION CERTIFICATE
(Computer-automated test)

General

Test Name:	Calform41 Short	Date:	16-2-2009
Test description:	Short test	Start time:	4:28:03 µµ
Test location:	Symmetron lab	End Time:	4:34:00 µµ
		Certificate Nr.:	024A2668/16-2-2009

Instrument under test data

Manufacturer:	SYMMETRON	Serial Nr.:	024A2668
Model:	Stylitis 41/42	Operator:	ck
Description:	Voltage, current, frequency data logger	Customer:	Nobody

Calibrator data

Manufacturer:	YOKOGAWA	Certified by:	INTRACOM
Model:	CA100/150	Certification Nr.:	270109K
Serial Nr.:	12VB21277K	Certification date:	27-01-2009
		Traceability:	EIM

Test summary

Instrument status:	PASS
Proposed next calibration date:	16-2- 2010

APPROVED QUALITY SCHEME QEC ISO 9001:2000 REGISTERED COMPANY
UKAS QUALITY MANAGEMENT 077

Calibration certificate # 024A2668/16-2-2009, pagd: from 8 Signature:

Wind energy measurements

Wind energy measurements are performed for several years, leading progressively to improvements and refinements on every aspect of the measurement process.
Following the development of taller and more efficient wind turbines, it is not uncommon to use 80-meter or even higher masts. Many of them are installed on altitudes of 1500 meters or more.
In these highly demanding environments, components and systems must cooperate flawlessly.

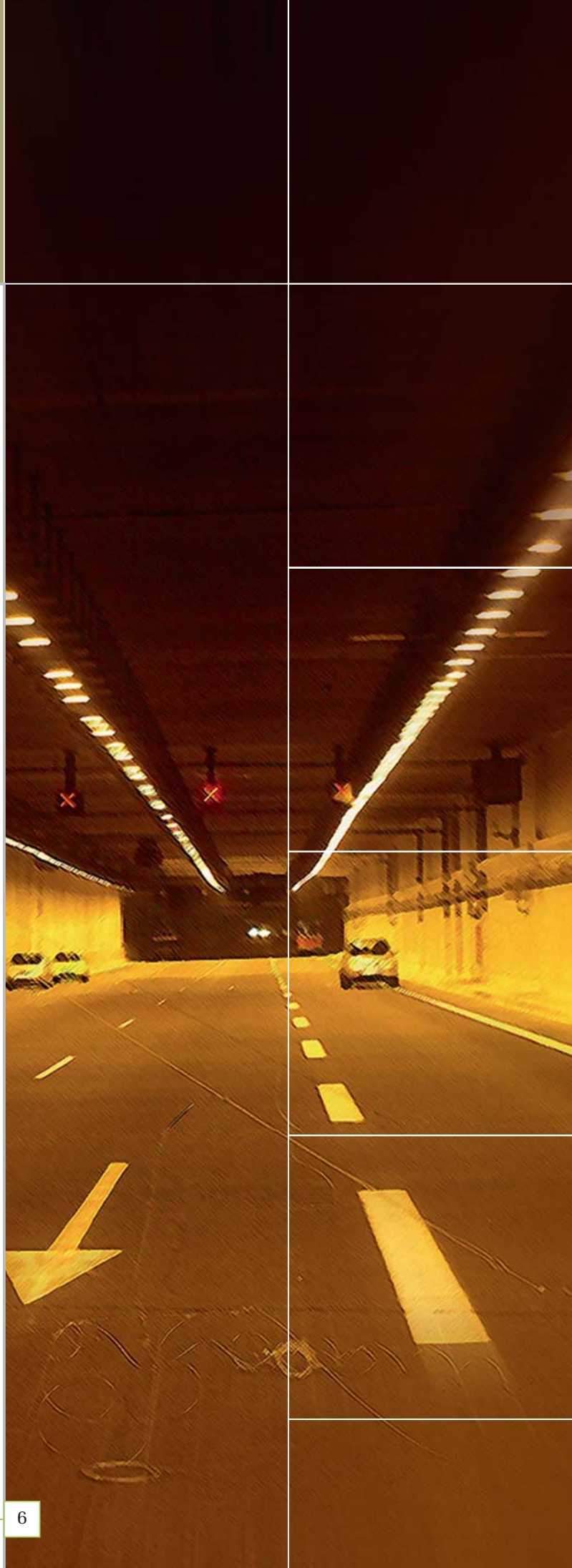
Hydriada

A finalist of 2008 European RegioStars, Hydriada is the world's first floating autonomous desalination unit. It derives its operating power from renewable energy sources and required the development of several innovative technologies, including all-weather mounting of the wind turbine and a chemical-free desalination process. A solar power system is also included. Currently it serves the needs of 300 people for high quality drinkable water in the Greek island of Heraclia. As an added bonus, it quickly became a tourist attraction pole! Partly funded by European Union, it is a joint venture of several research agencies. Among them, CRES (Center for Renewable Energy Sources), used Symmetron's Stylitis-101 data logger to measure and verify system performance.

A wind tunnel test case

The recently built Attiki Odos (Athens peripheral road) was a significant relief for Athens citizens. This task however required the drilling of several tunnels in Hymettus Mountain. The tunnels were built according to latest requirements for driver safety and comfort.

When International Wind Engineering was called to measure wind speed, turbulence and other parameters in the tunnels they opted for a Stylitis-101 data logger.



Data Loggers

Data logger comparison table

	Stylitis-10	Stylitis-41	Stylitis-101
Applications	**General**	**Wind, Solar, Hydro**	**Wind, Solar, Hydro, High performance**
Inputs			
Total number of Analog inputs	7	4	18
Number of single-ended 12-bit Analog voltage/vane/PT100 inputs. Gain= 1	7 (voltage), 3(vane,PT100)	2	-
Number of single-ended 12-bit Analog voltage/current/vane/PT100 inputs. Resistor-set gain=1~1000	-	2	-
Number of single-ended 12-bit Analog voltage/current. Program. gain=1,1.25,2,2.5,4,5,10,(only for voltage)20	7	-	-
Number of single-ended 12-bit Analog voltage/current/vane/PT100 inputs. Program. gain=1,10,100,1000	-	-	0~6
Number of differential 12-bit Analog voltage/current/vane/PT100 inputs. Program. gain=1,10,100,1000	-	-	0~12
Number of 12-bit Analog 6-wire bridge inputs. Auto-zeroing. Programmable gain=1,10,100,1000	-	-	0~6
Number of Digital TTL inputs	0~7	-	3
Outputs			
Number of pulsed/fixed precision outputs for sensor excitation.	1	2/3	-
Number of optional pulsed/fixed 12/18V outputs for current-loop (4~20mA transmitter) excitation	-	1	-
Number of pulsed/fixed precision programmable 0~5V/0~5mA outputs for sensor excitation. Step 0.1.	-	-	0~6
Number of programmable TTL outputs	0~8	-	0~3
Number of fixed auxiliary 5V outputs	-	2	2
Processing/Storage			
Individual slope/offset for each input	✓	✓	✓
1 Hz sampling and 1, 5, 10, 15 or 60 minute statistical interval (min, max, average, standard dev.)	-	✓	✓
1 second to 60 minute statistical interval (average)	✓	-	-
Variable 1~32Hz sampling and recording. Sampling rate individual for each channel.	-	-	✓
Internal SRAM buffer.	-	512KB	512KB
Removable PCMCIA Flash Card Storage.	No removable storage	2MB	2~192MB
Internal Flash Memory	4MB	-	-
Connectivity			
RS232 port for programming/data transfer	✓	✓	✓
GSM (cellular) modem support	✓	✓	✓
LAN support	✓	✓	✓
Power requirements			
2x9V Alkaline cell operation (typical)	-	2 months	3 weeks
1x9V Alkaline cell operation (typical)	2 weeks	-	-
6~15V External power supply operation	✓	✓	✓
General			
Integral LCD, keyboard and –30 ~ +70°C operation	✓	✓	✓
Transient over-voltage protection for all inputs	✓	✓	✓
Removable screw-terminals	✓	✓	✓
Environmental protection	IP20	IP65	IP65

Stylitis-10

PORTABLE, LOW-COST, DATA ACQUISITION & CONTROL SYSTEM

Portable, low cost, versatile data logger with:

- 8 multi-function channels, which can be used as measurement inputs or control outputs.
- 4-button keyboard and 2-line LCD display.
- 2 serial communication ports.
- SMS messages with data and alarms.

Free Set-10 operating software and optional Emmetron database for further Analysis are available.

MEASUREMENTS

It is capable of directly measuring voltage, current, frequency and events.
With suitable sensors it is also capable of measuring:

- Temperature, humidity, pressure.
- Wind speed and direction. It is capable of interfacing to virtually any type of anemometer and wind vane.
- Solar radiation, rain height, water speed, etc.

CONTROL

Supports user-programmable control outputs according to input values. Outputs are capable of driving small relays or lighting LEDs.

COMMUNICATION OPTIONS

- 2 built-in RS232 serial ports for communication to a PC, external modem, external display, etc.
- Optional internal GSM modem.
- Optional internal Ethernet port.
- Optional internal wireless Ethernet module.

APPLICATIONS

- Distributed temperature measurement.
- Low-cost weather stations.
- Environmental studies.
- Scientific experiments.
- Tank monitoring and control.
- Vehicle surveillance.
- Education.

TECHNICAL SPECIFICATIONS

ANALOG INPUTS/OUTPUTS

- 7, individually selectable input channels, 13bit. Accuracy: ±0.4%.
- Programmable input voltage range: min 0~125mV/ max: 0~+2,5V (Resolution: min 15mV/ max 305µV). Input impedance: 1MΩ.
- Programmable input current range: min 0~+5mA/ max 0~+50mA (Resolution: min 0,61µA/ max 6,1µA). Input impedance: 25Ω.
- PT100/1000 resolution: 0.06 degrees.
- Wind vane resolution: 2.8 degrees.
- Each input individually selectable as TTL-level digital input.
- Each channel individually selectable as Active-Low output (Open drain). Output impedance: 30Ω. Max sink current: 60mA.

COUNTER INPUT/OUTPUT

- 1, selectable input channel, 16 bit. Accuracy and resolution: ±1 count. Input range: 0~5kHz. Input impedance: 100kΩ.
- Selectable signal threshold. Bipolar AC signals: sensitivity 200mV. Unipolar TTL signals: sensitivity 1V.
- Channel individually selectable as Active-Low output. Output impedance: 25Ω. Max sink current: 60mA.

OUTPUT (SENSOR SUPPLY)

- 1, pulsed 2,5V. Total current 20mA. Accuracy ±0.3%.

PROTECTION

- Over voltage & fuse protection on all inputs/outputs.

DATA STORAGE

- *INTERNAL NON-VOLATILE MEMORY:* 2MBytes. Typical capacity (All channels, 10min averaging): 16 months.
- *REAL TIME CLOCK:* With automatic lap year correction. Accuracy: ±60 seconds/ month.

DATA PROCESSING

- Individually programmable slope, slope^2 and offset for each input. Sampling: 1 Hz. Calculation of ax^2+bx+c and storage of average value at selectable intervals from 1 second to 60 minutes.
- Dedicated wind vane algorithm for vector averaging.

DATA TRANSFER AND PROGRAMMING

- *COMMUNICATION PORT:* RS232C port. 9600 baud, 8 bits, no parity, 1 stop bit. Socket is DB9M (DTE).
- *PERIPHERAL PORT:* RS232C port. 9600 baud, 8 bits, no parity, 1 stop bit. Socket is DB9F (DCE).
- *OPTIONAL INTERNAL COMMUNICATION MODULES:* Dual-band GSM Modem or Ethernet server or secure 802.11b wireless Ethernet server.

POWER SUPPLY

- *INTERNAL BATTERY:* 9V alkaline-typical life 2 weeks.
- *EXTERNAL:* 6~15VDC. Typical consumption (without optional communication modules): 0.8mA (LCD off), 5mA (LCD on).

VARIOUS

- *ENCLOSURE:* Plastic ABS. Desktop stand and wall mounting attachments included.
- *DIMENSIONS:* 18 x 10 x 4cm.
- *WEIGHT:* 200g.
- *CONNECTORS:* Removable screw terminals strips on front panel.
- *OPERATING TEMPERATURE:* -30°~ +70°C.
- *WARRANTY:* 1 Year.
- *APPROVALS:* CE.

Stylitis-41

ENVIRONMENTAL DATA ACQUISITION SYSTEM

Wind energy projects are evaluated by collecting site data regarding wind characteristics.

Designed with friendliness and reliability in mind, Stylitis-41 makes collection of **wind, meteorological and technical data** easy and cost effective.

Programming is simple, via the built-in LCD display and numeric keyboard.

It has 3 counting and 4 analog inputs. It operates for more than 2 months on 2 small 9V batteries. And, data are stored on reliable PCMCIA memory cards.

MEASUREMENTS

It is capable of directly measuring voltage, current, frequency and events. With suitable sensors it is also capable of measuring:

- Wind speed, direction and wind-turbine power curves. It is capable of interfacing to virtually every type of anemometer and wind vane.
- Temperature, humidity, pressure.
- Solar radiation, rain height, water speed, etc.

DATA STORAGE & RETRIEVAL

To save space, data are stored compressed in the large internal buffer. Inserting a memory card in the slot retrieves data. This capability lowers operating costs, since a memory card is not permanently required.

If you wish, however, you can leave a memory card in the PCMCIA slot to increase logging memory to more than 2Mbytes.
Of course, cards are replaced without interrupting the acquisition process.
The RS-232 serial port comes as standard with Stylitis-41. Thus, it is possible to program it and retrieve stored data locally with a notebook PC or remotely. And, the optional GSM modem package allows data collection right from your office.

Data records are decompressed to columns using the free Stylitis Explorer software. Further data processing is possible using standard available software like Excel. Optional Emmetron database for further analysis is available.

TECHNICAL SPECIFICATIONS

INPUTS
- Each individually selectable:
- *ANALOG:* 4, 12bit each. Input range: 0~+5V. Input impedance 10MΩ. Resolution 1.22mV. Accuracy: ±0.1%. Vane resolution ±1.4 degrees.
- 2 of the inputs have a selectable resistor-set gain of up to x1000 and/or input impedance of 20 Ohms for 4~20mA sensors. Accuracy: ±0.2%.
- *COUNTING:* 3, 16 bit each. Accuracy ±1 count. Input range: 0-5kHz. Input impedance: 100kΩ. Sensitivity: 200mV.

OUTPUTS (SENSOR SUPPLY)
- Pulsed 5V (3). Total current 25mA. Accuracy ±0.2%.
- Fixed 5V (2). Total current 10mA. Accuracy ±5%.

PROTECTION
- Transient over voltage protection on all inputs/outputs.

SENSOR EXAMPLES
- Anemometers, vanes, pyranometers, thermometers, RTDs, rain level, water level, water speed, barometric pressure, pulse counting, etc.

DATA STORAGE
- *INTERNAL BUFFER:* 512KBytes. Typical capacity (1 analog/1 counting input, 10 min averaging): 212 days.
- *MEMORY CARDS (Optional):* Removable PCMCIA SRAM/FLASH 256Kbytes~2Mbytes
- *REAL TIME CLOCK:* With automatic lap year correction. Accuracy: ±1 minute/month.

DATA PROCESSING
- Individually programmable slope and offset for each input. Sampling @ 1 Hz. Calculation and storage of Minimum, Maximum, Average and Standard Deviation selectable @ 1, 2, 5, 10, 15, or 60 minute intervals.

SERIAL PORT
- *PROGRAMMING AND DATA TRANSFER:* RS232C port. 9600 baud, 8 bits, no parity, 1 stop bit. Socket is DB9M.

POWER SUPPLY
- *INTERNAL BATTERY:* 2x9V alkaline-typical life 2 months (2 sensors, 10 min intervals). 1,5 month with +12V output energized.
- *EXTERNAL:* 6~15V, DC/AC typical consumption 500μA (LCD off) or 25mA (LCD on).

VARIOUS
- ***ENCLOSURE:*** polyester, IP65 sealed.
- *DIM:* 31 x 21 x 17cm.
- *WEIGHT: 4kg.*
- *CONNECTORS*: Removable terminal strips on bottom.
- *OPERATING TEMPERATURE:* -30°~+70°C
- *APPROVAL: CE.*
- *WARRANTY:* 1 Year.

OPTIONAL
- *GSM PACKAGE:* Modem, antenna and On/Off modem timer.
- *ETHERNET ADAPTER:* Allows operation in LANs.
- *POWER SUPPLY: Receptacles* for 2 additional 9V cells.
- *POWER SUPPLY:* Solar panel, charger and lead battery.
- *OUTPUT*: +12/18V (±10%) pulsed, for current-loop sensors.
- *SHELTER BOX:* 50 x 40 x 20 cm polyester, IP65 sealed.

Stylitis-101

ADVANCED PORTABLE DATA ACQUISITION SYSTEM

STYLITIS-101 was designed to cover a wide range of measurement and recording needs in the industry, research, renewable energy, laboratory and education areas.

FEATURES

The instrument stands alone compared to other data collection methods:

- Competitive products offer small memory capacities for storing averages. In contrast, Stylitis-101 offers large internal and removable storage space, allowing recording of time-series samples. Detailed examination of phenomena is now easier than ever.
- Due to very low power consumption, it does not require an external mains supply to operate. Battery or a small optional PV panel is all that's needed.
- Upgradeable: Internal slots are provided to accept optional input signal conditioning modules. These include amplification, bridge excitation, current and resistance measurement, temperature measurement, etc.
- Simple user interface via an LCD display and 16-key numeric keyboard.
- PCMCIA socket for large capacity memory cards (up to 192Mbytes).
- Serial port for interfacing and data transfer to PC.
- Batteries for stand alone operation.
- It directly measures Voltage, Current, Frequency, Events, State, PT100 and 6-wire bridges.

PROCESSING

Records are stored with a "Time-Stamp" for enhanced data security. Data are processed according to one of the following operating modes:

1. TIME-SERIES MODE: Sampling frequency is programmable from 1 to 32 Hz. All data are stored without statistical processing.
2. MATH MODE: Sampling frequency is fixed at 1Hz, while averaging intervals are programmable from 1 to 60 minutes. Each record contains calculations for one interval:
   - Minimum, Maximum, Average and Standard Deviation for each selected input.

DATA STORAGE/RETRIEVAL

To save space data are stored compressed in the internal buffer and in the removable memory cards. Full cards are replaced without interrupting the acquisition process.

- The RS-232 serial port is standard and the optional GSM modem package allows data collection right from your office.
- Data records are decompressed to columns using the free Stylitis Explorer S/W. Further processing is possible using standard software like Excel.
- Optional Emmetron database for further Analysis is available.

TECHNICAL SPECIFICATIONS

INPUTS
- *ANALOG (Plug-in modules):* 18, 12bit each. See Card11~17 input modules. Each module carries 3 channels. Basic accuracy: ±0.15% - refer to User's Manual. Vane resolution: ±1.4 degrees.
- *COUNTING (built-in):* 3, 16 bit each (C1~C3). 0.5Hz resolution using a frequency doubling circuit when sampling at 1Hz. Accuracy: ±0.5 count. Input range: 0~5kHz. Input imp: 1MΩ. Sensitivity: 200mV. Input type Low-level AC, TTL.
- *COUNTING (Plug-in modules):* 3, 16 bit each (C4~C6). See Card21~27 input modules.
- *DIGITAL:* 3, 1 bit each (TTL).

OUTPUTS (Sensor supply)
- 0~6 programmable (1 per Card1x module). Accuracy: ±0.2%. Total current: 100mA.
- 3 fixed +5V. Accuracy: ±5%. Total current: 10mA

PROTECTION
- All inputs/outputs are over-voltage protected.

DATA STORAGE
- *INTERNAL BUFFER:* 512KBytes. Typical capacity (1 analog and 1 counting input, 10 min averaging): 7 months.
- *REMOVABLE PCMCIA MEMORY FLASH CARDS*: 2Mbytes ~ 192Mbytes.
- *REAL TIME CLOCK:* With automatic lap year correction. Accuracy: ±1 minute/month.

DATA PROCESSING
- Individually programmable slope and offset for each input. Operating Modes:
- TIME-SERIES MODE: Individually programmable and synchronized sampling rate for each input: 1, 2, 4, 8, 16, 32 Hz.
- MATH MODE: Sampling @ 1 Hz. Calculation and storage of Minimum, Maximum, Average and Standard Deviation selectable @ 1, 2, 5, 10, 15, or 60 minute intervals.

SERIAL PORT
- *PROGRAMMING AND DATA TRANSFER:* RS232C port. 9600 baud, 8 bits, no parity, 1 stop bit. Socket is DB9M. Connects optionally to Ethernet adapter.

POWER SUPPLY
- *INTERNAL BATTERY:* 2x9V alkaline-life 2 weeks (Math mode, 10 min intervals).
- *EXTERNAL:* 6~15V, DC/AC. Typical consumption 1.5mA (Energy save) or 50mA (Continuous mode).

VARIOUS
- *ENCLOSURE:* IP65 sealed.
- *DIMENSIONS:* 31x21,5x17,5cm.
- *WEIGHT*: 4kg.
- *CONNECTORS:* Removable terminal strips on right side.
- *OPERATING TEMPERATURE:* 30°~ +70°C
- *APPROVAL:* CE
- *WARRANTY:* 1 Year.

INPUT MODULES

CARD-11 (for analog slots)
- 2 differential voltage inputs ±5mV~±5V.Diff. Input imp: >10MΩ.
- 1 single-ended current input ±200µA~±20mA. Input imp. 35Ω.
- 1 voltage output 0~5V step 0.1

CARD-12 (for analog slots)
- 2 differential voltage inputs ±5mV~±5V. Diff. input imp: >10MΩ.
- 1 single ended voltage input ±5mV~±5V. Input imp: >10MΩ.
- 1 voltage output 0~5V step 0.1

CARD-13 (for analog slots)
- 2 differential current inputs ±200µA~±20mA. Input imp: 35Ω.
- 1 single-ended current input ±200µA~±20mA. Input imp: 35Ω.
- 1 voltage output 0~5V step 0.1

CARD-14 (for analog slots)
- 2 differential voltage inputs ±5mV~±5V. Diff. input imp: >10MΩ.
- 1 single ended voltage input ±5mV~±5V. Input imp: >10MΩ.
- 1 current output 0~5mA step 0.1

CARD-16 (for analog slots)
- 2 differential voltage inputs ±0.5V~±50V. Diff. input imp: >10KΩ. Common mode input imp: 110KΩ.
- 1 single-ended voltage input ±0.5V~±50V. Input imp: 110KΩ.
- 1 voltage output 0~5V step 0.1

CARD-21 (for counting slots)
- 1 input. Resolution: 1Hz. Accuracy: ±1 count. Range: 0~5kHz (TTL), 0~50Hz (REED). Input imp: 100kΩ. Sensitivity: 2V.

CARD-22 (for counting slots)
- 1 input. Resolution: 1Hz. Accuracy: ±1 count. Range: 0~5kHz (Sin), 0~5kHz (TTL). Input imp: 100kΩ. Sensitivity: 200mV.

OUTPUT MODULES

CARD-25 (for counting slots)
- 1 open drain' output. Output impedance <0.5Ω.

Stylitis-power

ADVANCED POWER SYSTEM DATA LOGGER

STYLITIS-POWER is specifically designed for substation power system analysis.

FEATURES

A combination of unique features in a lightweight portable instrument:

- 4 voltage and 10 current differential inputs.
- All inputs are 3-Phase plus Neutral.
- All inputs sampled simultaneously.
- For enhanced data security, each record is stored together with a full "Time-Stamp". Thus, even fragmented downloaded files are usable.
- Inputs not used do not consume memory space.
- Capable of downloading data and displaying values while recording.
- Watertight, rugged case and connectors.
- Choice of power source: internal via voltage measurement channel L1 or external via wall socket. Universal voltage compatibility requires no switches.
- 240 x 128 graphic LCD display with touch screen.
- 2 built-in ports: Ethernet and PC (RS232). Built-in Quad-band GSM/GPRS modem.
- Earth Leakage Circuit Breaker for added operator safety.
- A bank of Ultra capacitors with capacity enough to keep the instrument operating in power outages of more than 10 seconds.

MEASUREMENTS

Using the Power Explorer software, power measurement true RMS data are available for each current phase and neutral conductor:

- Voltage, current, power factor, apparent, active and reactive power.
- Minimum, Maximum and Average for each selected input over selectable time periods.
- Load factor and frequency are also available.
- Each input channel may be scaled to account for different sensor sensitivity, etc.
- True RMS values are calculated in 0.5-second intervals.

DATA STORAGE/ RETRIEVAL

To save space, data are stored compressed in the internal memory.

- Data may be retrieved through Ethernet, the RS-232 serial port or the GSM modem.
- Data may be downloaded manually or automatically.
- The free Set-10 software supports all data retrieval options as well as data decompression.
- Optional Emmetron database for further analysis is available.

TECHNICAL SPECIFICATIONS

INPUT

- *VOLTAGE (phase to neutral):*
  a. 4 differential voltage inputs. The 4 inputs are grouped into one 8-contact connector. Differential input impedance: 700kOhm
  b. Input range: 0 to 280VAC. Connector used is male, IP68, UL approved, rated at 380V RMS/5A RMS.
  c. Voltage values measured are true RMS.
  d. Accuracy: +/-0.25% of reading + 0.1% of full scale
  e. Resolution 0.1V
  f. Continuous over voltage: 350VAC
- *CURRENT:*
  a. 40 differential current inputs. The inputs are grouped into one 8-contact connector per 4 inputs. Differential input impedance: 20kOhm
  b. Input range is software configurable to cater for various CTs: 0,29 to 1,45 full scale VRMS for 0 to 1000A. Connector used is male, IP68, rated at 600V/7.5A
  c. Voltage values measured are true RMS.
  d. Accuracy: +/-0.25% of reading + 0.1% of full scale
  e. Resolution 0.01A
- *POWER FACTOR:* For each phase. Accuracy: +/-0.5% of reading + 0.2% of full scale
- *FREQUENCY:* 47 to 63 Hz. Accuracy +/-0.25% of reading + 0.1% of full scale

SAFETY

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

PROTECTION

- All inputs/outputs are 4kV transient protected.

DATA 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 lap year correction. Accuracy: ±7.5ppm (4 minutes/year). Backed-up by internal, long-life Lithium battery.

DATA PROCESSING

- Individually programmable slope for each input.
- All inputs sampled simultaneously at 2 kHz sample rate.
- True RMS value calculation based on full cycles within a 0.5 second interval.
- Averaging Interval selectable from 0.5 second to 1 hour in steps of 0.5 seconds.

CALCULATED VALUES

- *POWER:* Active, Reactive and Apparent for each phase. Accuracy: +/-0.5% of reading + 0.2% of full scale
- *ENERGY:* Active, Reactive and Apparent for each phase. Accuracy: +/-0.5% of reading + 0.2% of full scale
- *LOAD FACTOR:* Accuracy: +/-0.5% of reading + 0.2% of full scale

PORTS

- *BUILT-IN GSM/GPRS MODEM:* Quad band 850/900/1800/1900, enhanced sensitivity modem. External antenna.
- *ETHERNET PORT:* Auto 10/100, IP67 exrernal connector.

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 10 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 (Volume 11275 cm^3).
- *WEIGHT:* 3kg.
- *CONNECTORS:* Removable circular connectors on left and right side.
- *OPERATING TEMPERATURE:* 0°~ +65°C
- *OPERATING HUMIDITY:* 5~ 95%
- *WARRANTY:* 1 Year.

Stylitis Explorer

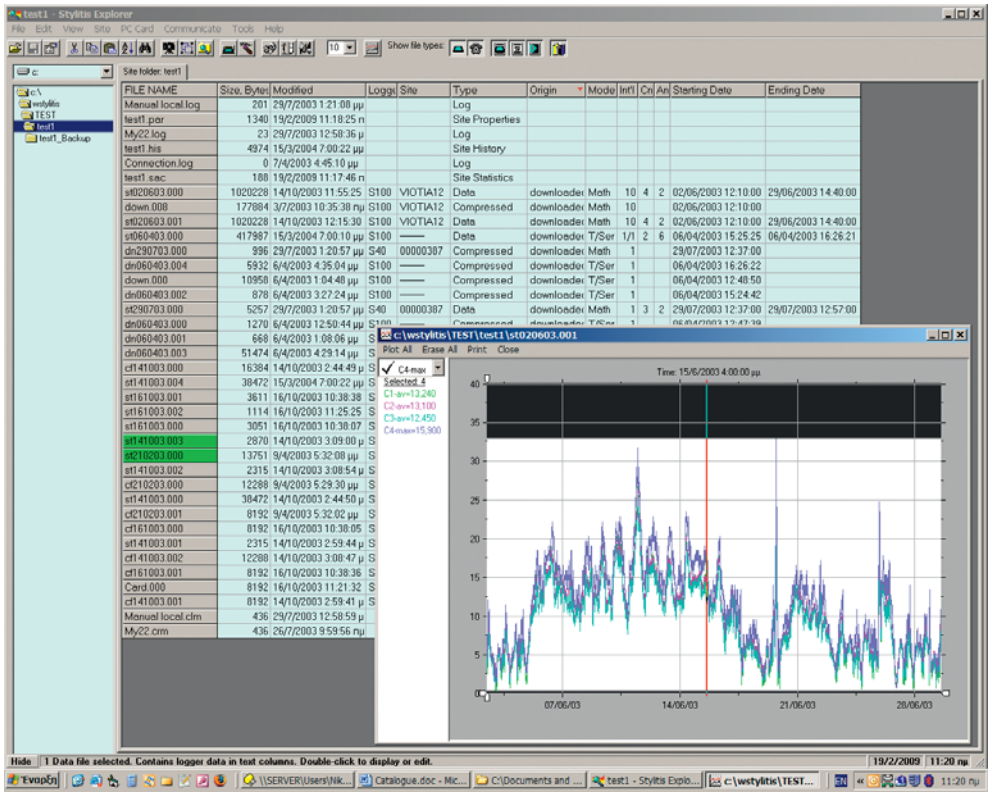
Stylitis Explorer is a 32-bit Windows application software designed for use with the Stylitis-40/100 family of data loggers. It may be used alone or in conjunction with WindRose, CRES's wind data analysis software.

Stylitis Explorer has been designed to streamline operations and allow users work with site data as easily as possible. It features:

- A configurable Windows Explorer-like interface with each folder representing a single site.
- Network operation in workgroups.
- Built-in viewer and text editor, capable of opening multiple data files in a site
- Automated procedures for checking and exporting data files to WindRose or other programs.
- Data retrieval via memory cards, RS232 connections and GSM or PSTN modems
- Automatic connection and downloading from remote or local sites.
- Site statistics.

To work with Stylitis Explorer, a user would typically carry on some of the following typical activities:

- Read and decompress data from a memory card.
- Download and decompress data from a remote station.
- Open and inspect the decompressed Data files. Edit them if needed.
- Export data files to WindRose (CRES's wind data analysis software) for further processing.



Cres Windrose

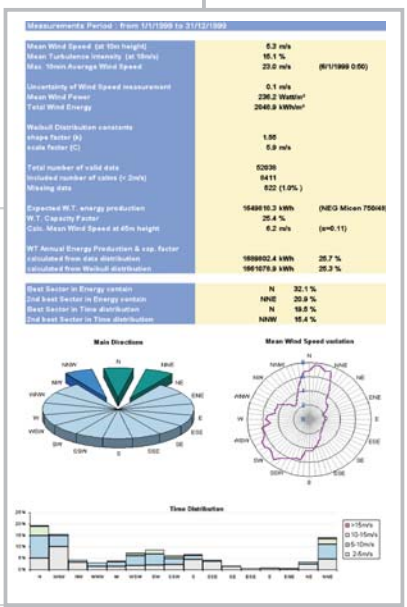
Wind data analysis software

WindRose is a software tool dedicated to the analysis of wind characteristics (speed, direction, turbulence, temperature). It is not a standalone program, but an **Add-In** to the Microsoft Excel® 2000/XP, for the Windows 9x/ME/NT4/2000/XP operating systems. The results of the analysis are stored graphically and numerically into spreadsheets, which can be further used as ordinary Excel files.

The results of the analysis are stored graphically and numerically into spreadsheets, which can be further used as ordinary Excel files.

The program is designed to provide all the results of the data analysis, in a customizable form to meet any particular needs. Thus, the user can rearrange all the graphs, resize them, change their colours, copy or link them to other sheets or programs (i.e.: embedded links to Microsoft Word® document), create new tables using the numerical results, etc.

Data analysis complies with the requirements imposed by the IEC and MEASNET standards.



Main features

- It performs complete statistical analysis of the wind data, including Weibull distribution constants (per direction sector and global), turbulence intensity evaluation and polar plots (wind roses) of the time and energy distribution of the wind.
- It correlates data from two sites calculating correlation coefficients globally and per ranges of wind speed and direction. As a result, it provides the predicted time-series for the missing data of a site, based on the other site's complete set of data (MCP method).
- It has a user configurable time step (10 minutes, 1 hour, etc) and it is able to analyse huge data sets (limited only by the available computer memory).
- A dozen of power-curves from a variety of wind turbines are included, providing an estimation of the expected energy production.
- In case of measurements with systematic errors, a linear correction can be applied for all the measured quantities and separately for each file.
- It includes 3 methods for the air-density correction (due to the site elevation height and to the temperature), which is critical for the correct calculation of the wind energy.
- It produces monthly charts and tables with the per hour variation of wind speed, wind direction, expected wind turbine's power, temperature and solar radiation.
- Developed and support by CRES (Center for Renewable Energy Sources).

How it works

WindRose reads ASCII files containing columns of data, an output format supported by the majority of data-loggers. Five columns of data are necessary for the program to run: wind speed, wind direction, standard deviation of the wind speed, time and date. Several formats are supported when dealing with date and time. Whenever temperature and/or solar radiation are recorded, then the appropriate analysis is performed.

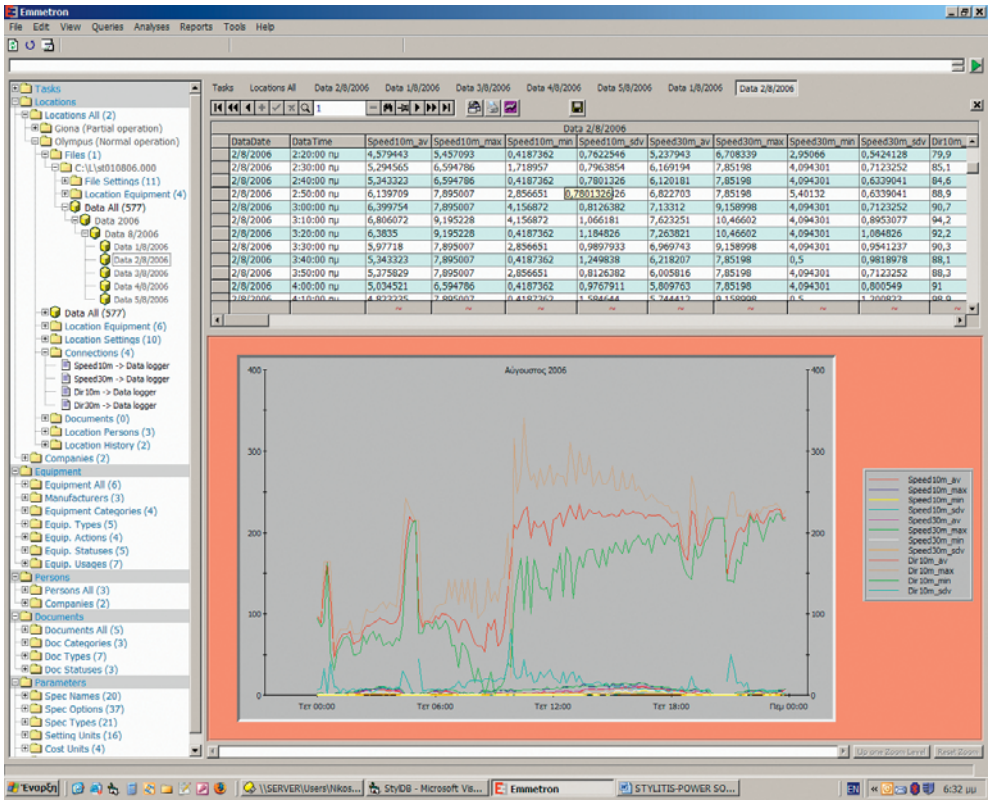
Emmetron

DATA, SITE AND RESOURCE MANAGEMENT SOFTWARE

Windows application software designed for use with Stylitis data loggers.

EMMETRON consolidates resources, events and data from measurement campaigns into one integrated environment. Streamlines operations and allow users work with site data as easily as possible. It does not have restrictions in the number of Access or MySQL databases it can handle. It features:

- A central database for all data.
- A tree-structured user interface.
- Network operation.
- Automatic/manual data retrieval from Stylitis data logger sites.
- Built-in document storage and management.
- Built-in query generator.
- Built-in report generator.
- Built-in task manager with reminders.
- User-parameterised.
- Printing and exporting data to other programs.



Equipment Management

- Manufacturer (name, address, contacts, representative, etc.)
- Model (Name, photo, cost, notes, related documents)
- Type (data logger, sensor, mast, etc.)
- Category (measuring, supporting, mechanical)
- Specifications (fixed, options, adjustments, etc.)
- Status (under repair, not meeting specs, etc)
- Settings (Calibration factors, switches, etc.)
- Ownership (i.e. Companies, Zones, etc.)
- Usage history (i.e. locations, dates, etc.)
- Event history (i.e. Repair, calibration, withdrawal, etc.). Event costs.
- History related documents.
- Inventory number/ Serial number.

Queries Management

- Built-in, easy to use query generator for non-experienced users.
- Open database structure allows experienced users build and edit own SQL queries.
- Queries are organized in user specified categories.
- User generated queries are integrated in the query menu.
- Import and export of user queries.

Location Management

- Locations (Measurement sites, offices, storehouses, etc.) are organized in Regions (i.e. Companies, Zones, etc.)
- Map representation of locations in a region with status.
- Equipment symbolic name (i.e. 'Ext. Temp. 10m', etc.)
- Symbolic equipment connections (i.e. Sensor1 to logger input A1, etc.)
- Equipment addition date, removal date.
- Equipment in sites is presented graphically.
- Equipment location settings may override equipment settings.
- Location data files with file importing parameters.
- Status (i.e. partial operation, under construction, etc.)
- Task history (i.e. visit, maintenance, equipment transport, etc.)
- History related documents.
- Persons employed (dates, work hours, costs, related documents)
- Task and Location costs.
- Location related documents.

Data Management

- Data from Stylitis logger sites can be imported automatically or manually.
- Data are imported according to location-specific settings.
- Users can set preferred factors (slope, offset, time intervals) for each site.
- Automatic conversion of logger data files to user set preferred factors (i.e. logger slope can be replaced by site slope, etc.).
- Data presented grouped per day, month and year or any other period.
- Parallel comparison of data from many sites.
- User-generated custom analyses (i.e. display data with values between two set points, display all locations where the average of data for a time period is greater than X, etc.)
- Tracing back of data captured to equipment used.
- Tabular and graphical representation.
- Printing and exporting to various formats: comma delimited, Excel, text, Stylitis text.

Persons Management

- Information (i.e. name, call numbers, email, company, photo, etc.)
- Site employment history (i.e. sites, dates, documents, costs, etc.)

Documents Management

- Title
- Inventory code
- Type (i.e. manual, photo, contract, report, etc.)
- Category (i.e. internal, classified, etc.)
- Status (i.e. current, obsolete, etc.)
- Physical location
- Issue and Revision dates
- Revision authority
- External filename or URL
- Internal storage in database
- Notes

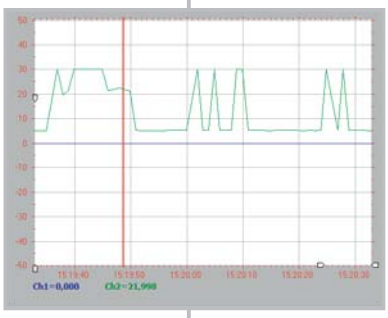
Set 10

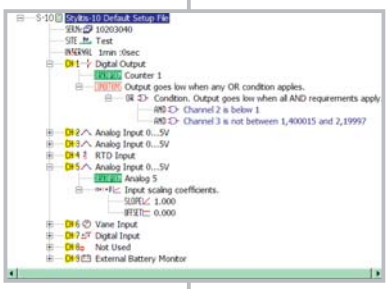
Set-10 is a 32-bit Windows application software designed for use with the Stylitis-10/Power family of data loggers.

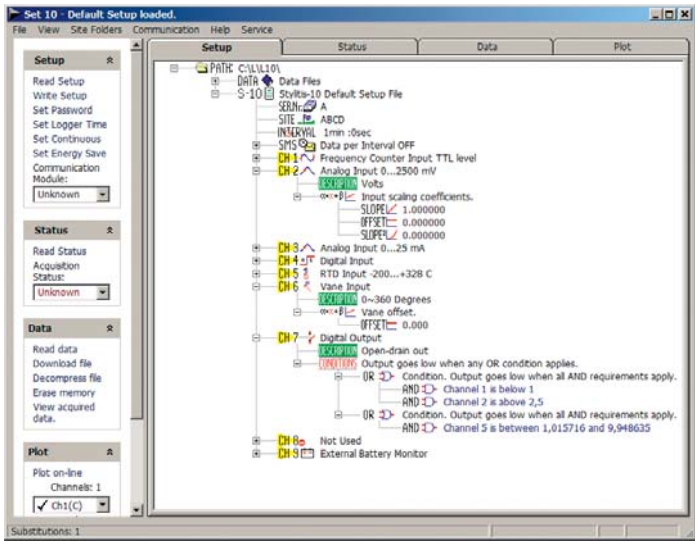
Set-10 has been designed to streamline operations and allow users work with data as simply as possible.

It features:

- Single-click selection of most operations.
- Graphical setup of data logger.
- Data organized in Windows folders with each folder representing a site.
- Built-in data viewer and graph.
- On-line plot.
- Data retrieval and decompression via RS232/Ethernet connections and GSM or PSTN modems.
- Built in web server allows network computers access on-line data from Set-10.
- Compatible with Windows 2000/XP/2003

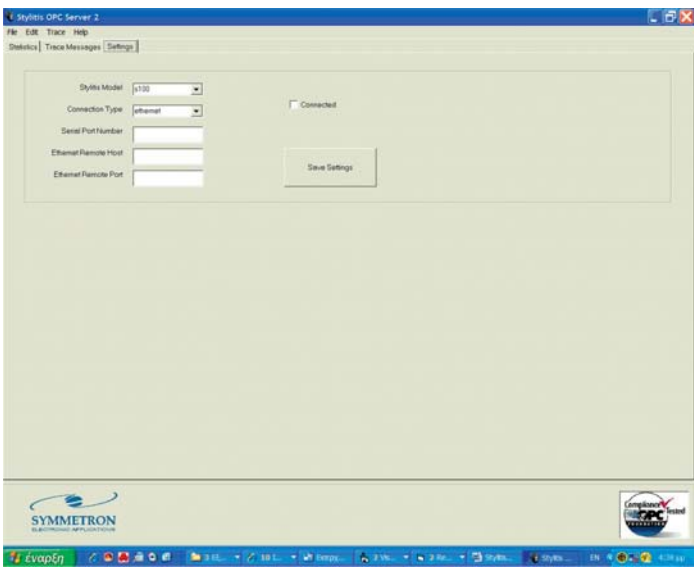






Stylitis OPC server

- Display real-time data from a Stylitis-41 or Stylitis-101 data logger to any SCADA, HMI or custom software package which adheres to the principles of an OPC client.
- Suitable for wind-monitoring systems in wind farms.
- Windows 2000/XP/2003
- User license for a single computer, with connection to an unlimited number of loggers.



Triplex Modem

GSM/RS232 Communication Device: TRIPLEX MODEM

- A GSM/GPRS modem with 3, RS232 ports.
- Benefit by paying for one SIM card and remotely connect to multiple RS232 Devices.
- In GPRS networks, achieve continuous online connection between a PC and 3 remote RS232 ports.

Features:

- When used with GPRS SIM cards, it can send emails with daily data of Stylitis-41/101 data loggers.
- GSM modem is switched On/Off automatically.
- Remotely programmable.
- Internal real-time clock allows automatic, device-to-modem connection at programmed time.
- Individually programmable access time for each serial device.
- On-demand connection of any device to port/modem via remote commands.
- Remote inspection of GSM modem's Signal Strength.
- Sends SMS to specified phone if power supply is found low.
- Local device port control via 2 buttons and 4 LEDs.
- Built-in Lithium battery keeps settings and clock alive for years.

Specifications:

- Baud rate: 9600 baud fixed.
- RS232 ports flow control support: None, XON/XOFF, RTS/CTS.
- Power supply: 6~30 VDC. Consumption: 14 mA idle, including modem. Connected 400 mA.
- Temperature range: -30 to +70 °C. Dimensions (W x D x H): 140 x 110 x 35 mm.

Standard Gsm/gprs Modems And Antennas

Wavecom Fastrack Supreme

Quad-band GSM/GPRS modem: 850/900/1800/1900 MHz.
- Audio/Data/Fax/SMS. Built-in SIM card drawer.
- SMA male antenna connector.
- Serial connector D15F.
- Supply 5.5 ~ 32VDC.
- Idle consumption 12mA. Connected consumption 480 mA.
- Dimensions (73 x 54.5 x 25.5 mm. Weight 130 g.

Siemens MC-35T

Dual Band GSM/GPRS Modem 900/1800MHz.
- Audio/Data/Fax/SMS. Built-in SIM card drawer.
- FME male antenna connector.
- D9F data connector.
- Idle consumption 35mA.
- Supply 8~30VDC .
- Dimensions 65 x 74 x 33 mm, weight 130 g.

GSM MAG 900/1800

Vertical, magnetic base 900/1800MHz GSM antenna
- Internal/external use.
- Impedance 50Ω, 20W max.
- Antenna height 105mm, cable length 2500mm.
- Cable terminated to female FME connector.

GSM ON 900/1800

Screw-on 900/1800MHz GSM antenna
- Internal/external use.
- Impedance 50Ω, 20W max.
- Female FME connector.

GSM DIR 900/1800

Directional 900/1800MHz GSM antenna.
- Internal/external use.
- Impedance 50Ω, 20W max.
- Dimensions: width 230 mm, height 170 mm, depth 70 mm.
- 2500mm cable terminated to female FME connector.
- Other cable lengths and connectors available.

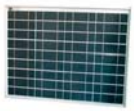
Accessories

PV12/10

Solar panel 12V/10W.
Mounting arms are available to secure panels on tubular masts at a 45 angle.

PV12/20

Solar panel 12V/20W.



RW-PCI-FS

Internal, dual-slot PCMCIA memory card drive.

USBR

External USB drive for PCMCIA memory cards.

FLASH 2MB

2Mbyte PCMCIA Flash memory card (for Stylitis-41/101)

FLASH 64MB

64 Mbyte PCMCIA Flash memory card (for Stylitis-101)

VOTOC3

Voltage-to-current converter/transmitter for voltage-output sensors and vanes.

WITOC100

Frequency to current converter/transmitter 0~100 Hz to 4~20 mA.

WITOC1024

Frequency to current converter/transmitter 0~1024 Hz to 4~20 mA.

WITOC 14/min

Events to current converter/transmitter 0~14/minute to 4~20 mA.

Tiltometer

The Tiltometer is the first product designed specifically for measuring the tilt (verticality) of masts.

It is designed to operate tied on a mast, sending out angle information as analog voltage outputs. The angle information will either be recorded on a data logger or will be monitored via the RS232 port, or both. It is compatible with most brands of data loggers.

Used with a GSM modem, it can deliver on-line data or transmit an SMS message when Elevation angle (tilt) exceeds a preset level.

Although it is designed for vertical masts, it is also well suited for other 2-axis monitoring applications.

The Tiltometer contains gravity sensors and a microprocessor that converts tilt information to full 3-D polar angle coordinates. It outputs mast verticality information in voltage or via an RS232 connection, which corresponds to polar coordinates, i.e. Elevation and Azimuth.

Applications

- Monitor the mast slope and deformation at real time.
- Examine the mast slope and deformation history over time.
- Relate wind speed to mast slope and deformation.
- Program visits to the site for guy wire tensioning.
- Prevent mast fall and subsequent expenses.
- Automatically transmit an SMS message on crossing a predetermined mast slope.
- Plot and analyze dynamic mast behavior.
- Compare mast strength and quality.
- Examine mechanical effect of ice covering the mast during winter.
- Assure higher reliability of wind-measured data.
- Warn for malicious actions on mast.
- Validate data logger measurements.

TECHNICAL SPECIFICATIONS

Elevation Output.

- Range: 0-2.5 volts or 0-5 volts, representing –90 to +90 degrees. Resolution: 0,7 degree.
- Accuracy: better than 2 degrees.

Azimuth Output.

- Range: 0-2.5 volts or 0-5 volts, representing 0 to +360 degrees. Resolution: 1,4 degrees.
- Accuracy: better than 4 degrees.
- RS232 connection: 9600 baud, 8 bits, no parity.
- Power Supply: 6 to 15 VDC supply @ 8 mA (typical).
- Box: Aluminium IP65. Dimensions: 115 x 65 x 30 mm.
- Mounting: directly on wind masts with diameters between 70 and 150mm, using clamp (see picture).
- I/O Connections: On internal 10-position screw terminal.
- Operating Temperature: -25 to +75 C.
- Protection: IP65.

Sensors

Anemometers	#40	A100LM	1st Class
Class	-	1	0.5
Measurement range	1 m/s to 96 m/s	0 to 75 m/s	0 to 50 m/s
Starting Speed	0.78 m/s	0.2m/s	< 0.3 m/s
Measuring accuracy	within 0.1 m/s for the range 5 m/s to 25 m/s		
Resolution	76.5 cm	10 cm	5 cm
Distance constant	3 m	2.3 m +/-10%	3 m
Output range	0 Hz to 125 Hz	10 Hz per m/s	0 to 1082 Hz
Power supply	-	4.75~28V DC (1mA typical)	Voltage: 3.3~42 V DC (0,5 mA @5 V typical)
Cups	Injection-molded polycarbonate	Plastic	Carbon-fibre-reinforced plastic.
Temperature Range	-55 °C to 60 °C	-30 to +70 °C	-50 to + 80 °C
Calibration	Recommended every 12 months	Recommended every 24 months	Recommended every 24 months
Mounting	onto a 13 mm diameter mast with cotter pin and set screw	0.25 inch BSW/UNC screw into base	Mounting on 1" mast, 1½" with separate adapter (option)
Connections	4-40 brass hex nut/post terminals	3m cable	8-pole plug.
Mechanical	Body: ABS plastic Weight: 140 g	Body: aluminum Weight: 490 g	Body: aluminum Weight: 500 g
Manufacturer	NRG	Vector	Thies

Precipitation sensors	Rain Gauge
Measurement Range	up to 25 mm of precipitation per hour
Output signal range	200 VDC max, 0.5 A max, 10 W max
Accuracy	+/- 1% up to 50 mm per hour +/- 3% up to 100 mm per hour
Resolution	0.254 mm
Dimensions	Overall Assembly Height: 360 mm Catchment Area: 203 mm diameter Cable Length: 7 m
Enclosure	Anodized Aluminum and Thermoplastic, stainless steel fasteners
Manufacturer	NRG

Wind Vanes	200P	W200	1st Class
Survival Speed	-	75 m/s	85 m/s
Starting Threshold	1 m/s	0.6 m/s	0.5 m/s
Measurement range	0~360°	0~360°	0~360°
Dead-band	4° Typical	2.3° Typical	-
Damping Coefficient	-	0.2	0.25
Linearity	1%	0.25%	0.25%
Delay distance	-	2.3 m	1 m
Operating Temperature	-55 to +60 °C	-50 to +70 °C	-50 to +80 °C
Electrical supply for potentiometer	1 V to 15 V DC	1 to 5 V DC	4V DC to 42 V DC
Potentiometer resistance	10 KΩ	1 KΩ	2/10 KΩ
Electrical supply for heating	-	-	24 V AC/DC
Mounting	onto a 13 mm diameter mast with cotter pin and set screw	0.25 inch BSW/UNC nylon screw into base	Mounting on 1" mast, 1½" with separate adapter (option)
Connections	4-40 brass hex nut/post terminals	6 wire screened cable	8-pole plug
Mechanical	• 210 mm length x 120 mm height • Weight:0.14kg Body: black UV stabilized static-dissipating plastic	• 155mm length x 169 mm height • Weight:0.49 kg including 3m cable • Materials: Anodized aluminium alloys and stainless steels for exposed parts	• 420mm length x 250 mm height • Weight:0.7kg • Protection: IP 55 (DIN 40050)
Manufacturer	NRG	Vector	Thies

Sensors

Temperature-Humidity sensors	110S	RH-5	9009TR + 9007 A1	T351-TR
Type	Temperature	Humidity	Temperature-Humidity	Temperature
Measurement Range	-40 °C to 52.5 °C	0 to 95% RH	5~98%RH -40~+80 °C	-50 °C to +70 °C
Output signal range	0 V to 2.5 V DC	0 to 5V	0 to 1 V DC	
Accuracy	± 1.11 °C	±5% RH at 25 °C	±2%RH (5…90%RH) ±0.1 °C	±0.1 °C
Operating tempera-ture/Humidity	-40 °C to 52.5 °C 0 to 100% RH	-40 °C to 54 °C 0 to 95% RH	-40~+80 °C	-50 °C to +70 °C
Power Supply	Voltage: 4 V to 35 V DC Current: 300 µA max. (no load on output)	10 V to 36 V DC, 12 V at 1.2 mA typical	7…30Vdc (2mA)	-
Electrical time constant	250 µs	-	-	-
Thermal time constant	10 minutes	-	60 s with filter; 5 s without filter	50 s
Weight	0.47 kg	0.68 kg	0.64 kg	0.28 kg
Dimensions	sensor only: 30.5 mm height x 12.7 mm diameter	115 mm x 102 mm x 80 mm	Φ 26 x 225 mm	Φ 75 x 140 mm
Materials	Probe: aluminum, epoxy filled Shield: UV-stabilized thermoplastic solar radiation shield	Enclosure: Cast aluminum and stainless steel	Stainless steel Ubar mounting bracket for shafts from 25 to 44mm.	White plastic weather-resisting screen.
Connections	3 conductor 22 AWG	3 conductor 22 AWG	Screws	4-wire cable
Manufacturer	NRG	NRG	Delta Ohm	Vector

Air Pressure Sensors	BP-20	HD 9408T BARO
Measurement range	15 kPa to 115 kPa	800 to 1100 mbar
Output signal range	0 to 5 V	0 1 Vdc
Accuracy	-	± 0.4 mbar, @ 20 °C
Operating Temperature	-	-30 +60°C
Turn-on time	15 ms	1 sec
Power Supply	Voltage: 7 V to 35 V DC Current: 8 mA typical	Voltage: 8 35 Vdc Current: < 4 mA
Dimensions	• 57 mm diameter • 112 mm length	-
Enclosure	Weatherproof ABS	housed in a sturdy MACROLON case (degree of protection IP67)
Weight	0.1 kg	-
Connections	wire leads, 3 conductor shielded cable	wire leads, 4 conductor shielded cable
Manufacturer	NRG	Delta Ohm

Pyranometers	SA-200	SKS 1110
Measurement range	0~3000 W/m^2	0~5000 W/m^2
Output signal range	0 μA to 270 μA typical (90 μA per 1000 Watts/m^2)	Current: 5μA/100 W/m^2 Voltage: 1mV/100W/m^2
Operating Temperature/ Humidity	Temperature: -40 to 65 °C Humidity: 0 to 100% RH	Temperature: -30 to + 75 °C Humidity: 0 to 100% RH
Response time	10 μs	10ns
Connections	2 bare wire leads from coaxial cable	2 core screened DEF std 61-12/4.5
Enclosure	Weatherproof anodized aluminum case with acrylic diffuser and stainless steel hardware	Material Dupont 'Delrin' fully sealed to IP68
Dimensions	2.38 Dia. x 2.54 cm Height	34 mm Dia. x 38mm Height
Weight	28 g	130 g (with 3m cable)
Manufacturer	LiCor	Skye

Tubular Meteorological Towers

Many meteorological stations have been installed by Enallaktiki Energiaki during the past, at different sites in Greece, Turkey and Mongolia. The sites accessed by the company are of different topography, ground morphology, and weather conditions.

The company's field experience, including tests and studies regarding the proper choice of materials and dimensions, have led to the construction of wind towers of proven endurance and reliability under unfavourable climatic conditions.

This experience, combined with a strong scientific background has led the company to design and produce a range of meteorological masts. The range, depending on the desired height of measurement and the diameter of the tube is as follows: (Tube thickness is 1.5mm for 70mm tube diameter and 2.5 mm for 130mm or 152mm tube diameter).

Manufacturer: Enallaktiki Energiaki.

	Mast height: 10m Tube diameter: 70mm	Mast height: 10m Tube diameter: 130mm	Mast height: 20m Tube diameter: 130mm	Mast height: 20m Tube diameter: 152mm	Mast height: 30m Tube diameter: 130mm	Mast height: 30m Tube diameter: 152mm	Mast height: 40m Tube diameter: 130mm	Mast height: 40m Tube diameter: 152mm	Mast height: 45m Tube diameter: 130mm
Max speed with no radial ice (m/s)	40	60	50	55	45	50	40	45	40
Max speed with 15mm radial ice (m/s)	20	40	30	35	25	30	20	25	-
Mast weight (kg)	100	150	300	360	470	530	620	700	670
Guy wire levels	2	2	4	3	6	4	7	5	7
Anchors	5	5	12	12	20	20	24	16	24
Gin pole length (m)	3	3	6	6	9	9	9	9	12

Lattice Meteorological Towers

The lattice tower design was implemented using CAD CAE technology. Modeling, design and assembly as well as finite element analysis techniques were integrated within NX4 platform (formerly known as Unighraphics). The software also equips NX-Nastran 4 Solver which is widely used for the finite element analysis. These techniques improve the design and optimize the strength of the components for the specific system development.

The lattice tower is designed to withstand wind velocities of more than 50m/sec that rarely appear in the Greek territory. In high altitude areas (> 1000) the heavy snowfall during the winter might build ice over the guy wires which results in heavy loading of the anchors and the lattice structure. During the winter the lattice tower should preventively be visited following extreme events to ensure its stability and operability. Several other heights off aluminum lattice mast could also be manufactured.

Manufacturer: Enallaktiki Energiaki.

	Mast height: 44m Triangle side: 360mm	**Mast height: 50m Triangle side: 360mm**	**Mast height: 54m Triangle side: 360mm**
Max speed with no radial ice (m/s)	50	45	40
Max speed with 15mm radial ice (m/s)	30	25	20
Mast weight (kg)	570	650	700
Guy wire levels	4	4	5
Anchors	14	14	14
Gin pole length (m)	9	9	12

Systems

Systems, including data logger, modem, antenna, battery, charge controller and other sensors are assembled to customer requirements.

Stylitis-41 and Stylitis-101 data loggers are typically enclosed in glass-reinforced polyester (GRP) shelter boxes with dimensions of 500 x 400 x 230 mm.
These are high quality, heavy duty and maintenance-free IP65 cabinets, suitable for all environmental conditions.

Special stainless steel bars are available to secure the shelter box on tubular masts.

Calibration Services

Calibration Services for anemometers are provided via the following organizations:

CRES

- ISO 17025
- MEASNET

International Wind Engineering

- ISO 17025

+30 6937322636

Meteorological Measurement Equipment

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