narda Safety Test Solutions
an L3 Communications Company
http://www.narda-sts.it

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AMB-8059

MULTI-BAND EMF AREA MONITOR

User's Manual

AMB-8059/00
AMB-8059/01
AMB-8059/02
AMB-8059/03

SERIAL NUMBER OF THE INSTRUMENT
You can find the Serial Number near the probe connector.
Serial Number is in the form: 000XY0000.
The first three digits and the letters are the Serial Number prefix, the last four digits are the Serial Number suffix. The prefix is the same for identical instruments, it changes only when a configuration change is made to the instrument.
The suffix is different for each instrument.

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NOTE:

® Names and Logo are registered trademarks of Narda Safety Test Solutions GmbH and L3 Communications Holdings, Inc. – Trade names are trademarks of the owners.

If the instrument is used in any other way than as described in this Users Manual, it may become unsafe

Before using this product, the related documentation must be read with great care and fully understood to familiarize with all the safety prescriptions.

To ensure the correct use and the maximum safety level, the User shall know all the instructions and recommendations contained in this document.

This product is a **Safety Class III** and instrument according to IEC classification and has been designed to meet the requirements of EN61010-1 (Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use).

In accordance with the IEC classification, the power supply of this product meets requirements **Safety Class II** and **Installation Category II** (having double insulation and able to carry out mono-phase power supply operations).

This product has a **Pollution Degree II** normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.

The information contained in this document is subject to change without notice.

KEY TO THE ELECTRIC AND SAFETY SYMBOLS:

You now own a high-quality instrument that will give you many years of reliable service. Nevertheless, even this product will eventually become obsolete. When that time comes, please remember that electronic equipment must be disposed of in accordance with local regulations. This product conforms to the WEEE Directive of the European Union (2002/96/EC) and belongs to Category 9 (Monitoring and Control Instruments). You can return the instrument to us free of charge for proper environment friendly disposal. You can obtain further information from your local Narda Sales Partner or by visiting our website at www.narda-sts.it .

Warning, danger of electric shock

Read carefully the Operating Manual and its instructions, pay attention to the safety symbols.

Earth Protection

Earth

Unit Earth Connection

Equipotential

KEY TO THE SYMBOLS USED IN THIS DOCUMENT:

DANGER **The DANGER sign draws attention to a potential risk to a person's safety. All the precautions must be fully understood and applied before proceeding.**

WARNING **The WARNING sign draws attention to a potential risk of damage to the apparatus or loss of data. All the precautions must be fully understood and applied before proceeding.**

CAUTION **The CAUTION sign draws attention against unsafe practices for the apparatus functionality.**

NOTE: **The NOTE draws attention to important information.**

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SAFETY RECOMMENDATIONS AND INSTRUCTIONS

This product has been designed, produced and tested in Italy, and it left the factory in conditions fully complying with the current safety standards. To maintain it in safe conditions and ensure correct use, these general instructions must be fully understood and applied before the product is used.

- When the device must be connected permanently, first provide effective grounding;
- If the device must be connected to other equipment or accessories, make sure they are all safely grounded;
- In case of devices permanently connected to the power supply, and lacking any fuses or other devices of mains protection, the power line must be equipped with adequate protection commensurate to the consumption of all the devices connected to it;
- In case of connection of the device to the power mains, make sure before connection that the voltage selected on the voltage switch and the fuses are adequate for the voltage of the actual mains;
- Devices in Safety Class I, equipped with connection to the power mains by means of cord and plug, can only be plugged into a socket equipped with a ground wire;
- Any interruption or loosening of the ground wire or of a connecting power cable, inside or outside the device, will cause a potential risk for the safety of the personnel;
- Ground connections must not be interrupted intentionally;
- To prevent the possible danger of electrocution, do not remove any covers, panels or guards installed on the device, and refer only to NARDA Service Centers if maintenance should be necessary;
- To maintain adequate protection from fire hazards, replace fuses only with others of the same type and rating;
- Follow the safety regulations and any additional instructions in this manual to prevent accidents and damages.

EC Conformity Certificate

(in accordance with directive EMC 89/336/EEC and low voltage directive 73/23/EEC)

This is to certify that the product: AMB-8059 Multi-band EMF Area Monitor

Produced by: NARDA S.r.l.
Safety Test Solution
Via Benessea 29/B
17035 Cisano sul Neva (SV) - ITALY

complies with the following European Standards:
Safety: CEI EN 61010-1 (2001)
EMC: EN 61326-1 (2007)

This product complies with the requirements of Low Voltage Directive 2006/95/CE and with Directive EMC 2004/108/CE.

NARDA S.r.l.

X	**EC Conformity**

1 – General Information

1.1 Documentation

This Users Manual contains the following annexes:

- A form to be returned to NARDA with the device when requesting service.
- A checklist of the accessories included in the shipment.

1.2 Introduction

The AMB-8059 family products are revolutionary, accurate and reliable solutions for remote and continuous monitoring of electromagnetic fields.

AMB-8059/01 and AMB-8059/03 are powered by high capacity internal batteries and solar panels that ensure practically unlimited autonomy under conditions of normal sunlight.
For indoor applications, the autonomy of the unit is at least 80 days after full battery charge.

AMB-8059/00 and AMB-8059/02 don't have any solar cells, as they are powered by replaceable high capacity primary battery for several months autonomy.

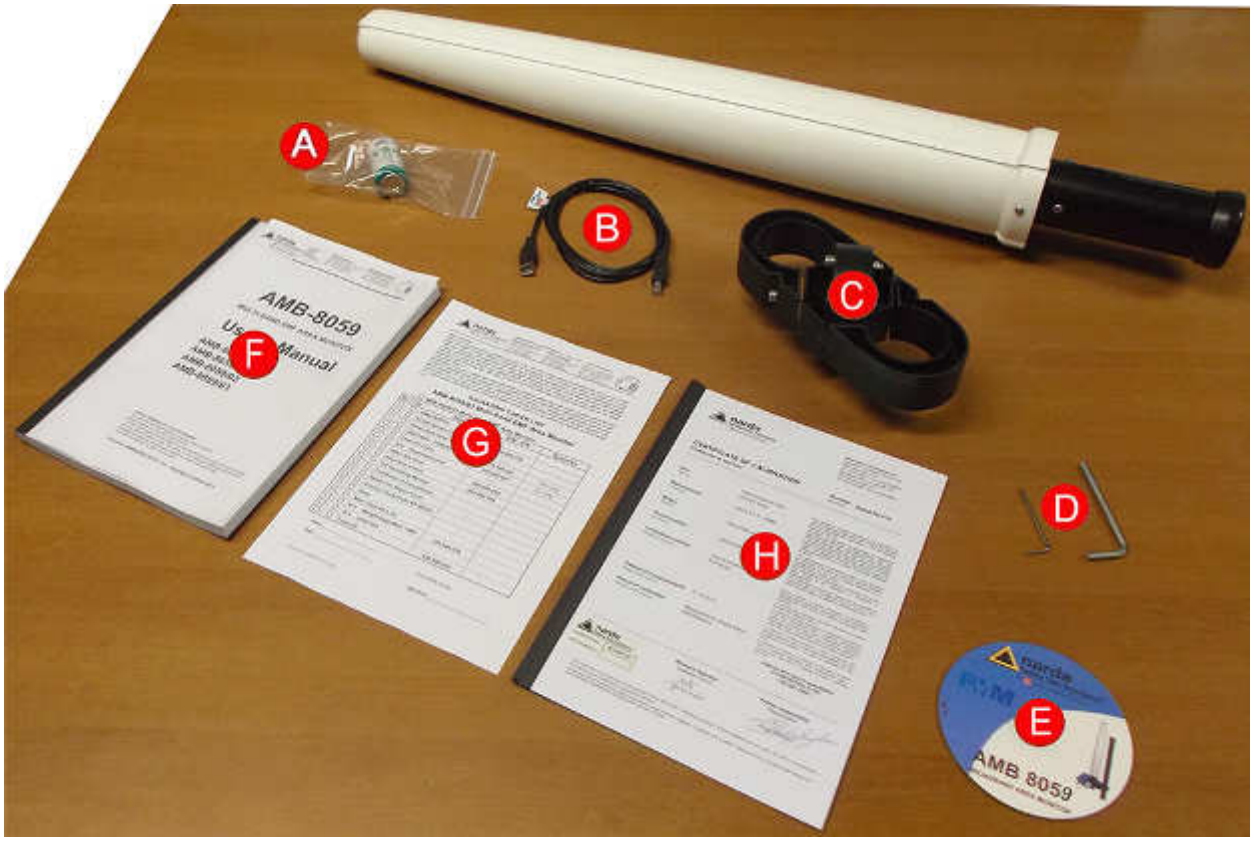
The system of acquisition makes it possible to program each parameter and transfer to a PC the data saved into the unit. The recorded data can be viewed either as a graph or as a table.

In the event of any alarm, such as a threshold setting being exceeded, or any attempt to tamper with the remote unit, or a breakdown of the unit, AMB-8059/02 and AMB-8059/03, which are equipped with GSM/GPRS modem, can be programmed to send an SMS, describing the alarm, to the user mobile phone, and/or generate a CSD data call to the controller PC. Station set for GPRS/FTP communication mode can be programmed to access the user's FTP server and download measurement results as soon as any alarm condition occurs.

1.3 Standard accessories AMB-8059/00 and AMB-8059/02

Standard accessories included with AMB-8059/00 and AMB-8059/02 units are:

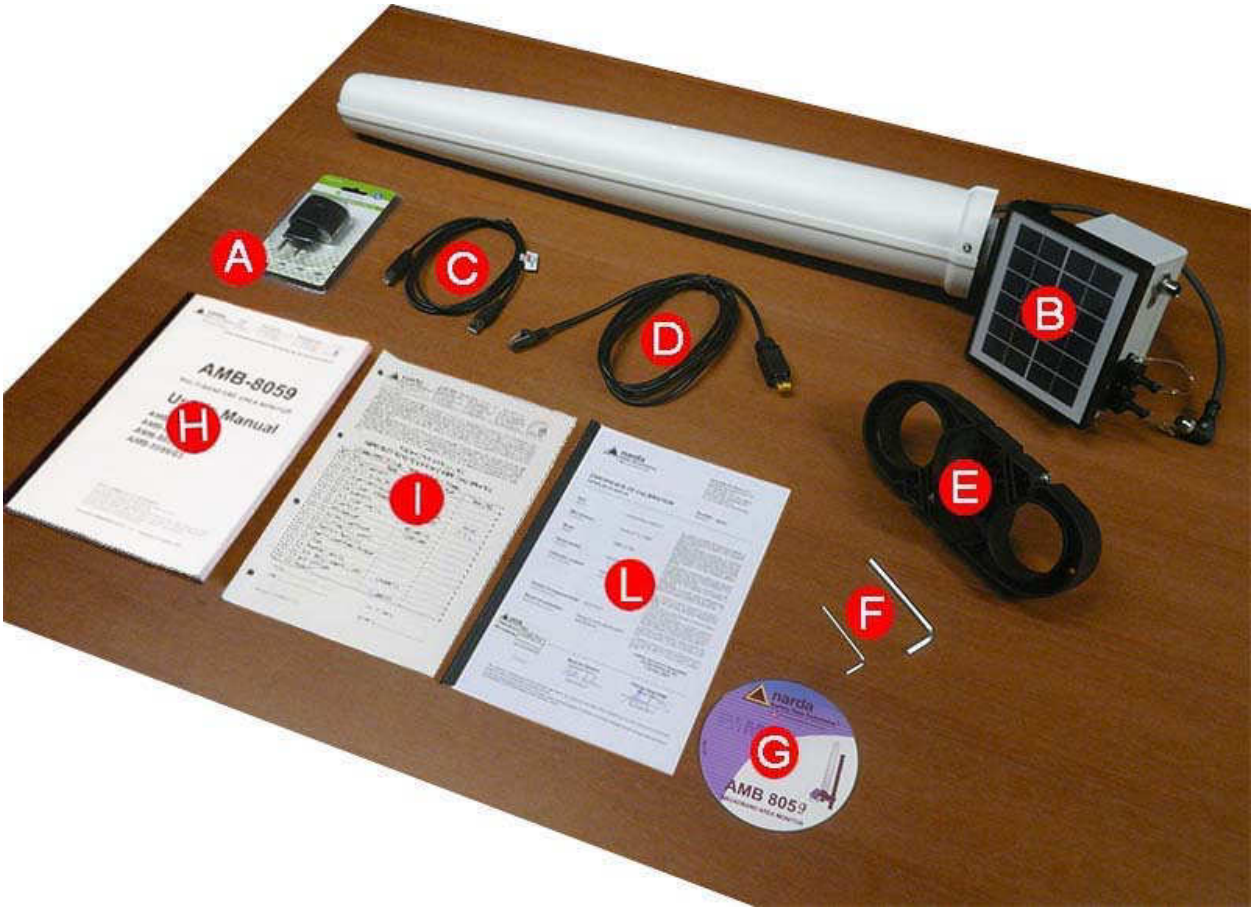
A – Primary Li-ion battery;
B – USB Cable 1.8m - USB(A)/USB(B);
C – Swivel joint for installation on the supporting pole;
D – 2.5 mm and 5 mm Allen keys for socket –head screws;
E – Software 8059SW-02 (CD-ROM).
F – User's Manual with Return Form for repair;
G – Checklist of the accessories;
H – Calibration Certificate;



1.4 Standard accessories AMB-8059/01 and AMB-8059/03

Standard accessories included with AMB-8059/01 and AMB-8059/03 units are:

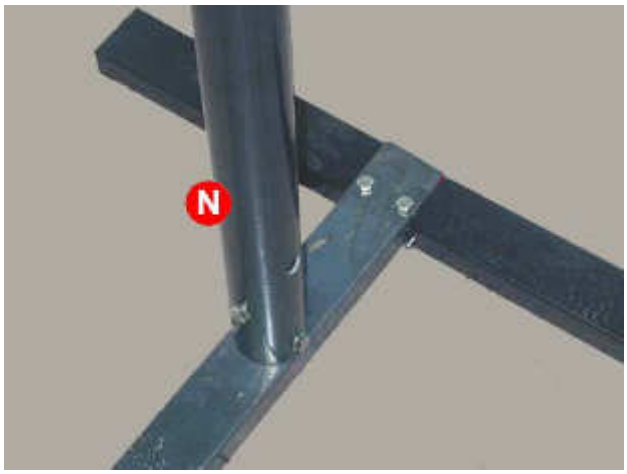
A – Battery charger;
B – Assembled Solar Panel;
C – USB Cable 1.8m - USB(A)/USB(B);
D – Ethernet Cable;
E – Swivel joint for installation on the supporting pole;
F – 2.5 mm and 5 mm Allen keys for socket – head screws;
G – Software 8059SW-02 (CD-ROM);
H – User's Manual with Return Form for repair;
I – Checklist of the accessories;
L – Calibration Certificate.

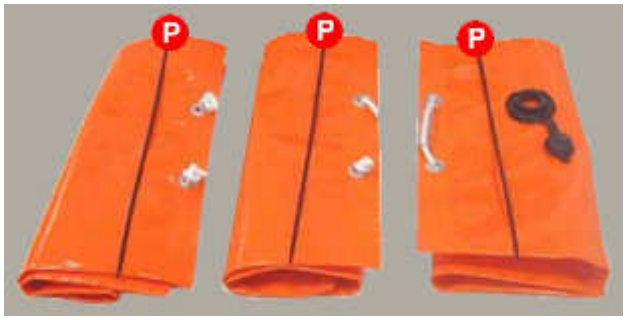


1.5 Optional accessories

Accessories supplied separately (on charge) for all models:

- 8059-MAST including;
  M - Metal supporting T-shaped base measuring 60 x 60 cm
  N - Fiberglass pole 2 m long;
  O - Tool Kit of screws and clamps.
  P - n°3 bags for ballast;
- Field probe EP-1B-01;
- Field probe EP-3B-01;
- Field probe HP-1B-01;
- Field probe EP-4B-01;
- Field probe EP-1B-03.
- Field probe EP-4B-02;
- Field probe EP-1B-04.





1.6 Main Specifications Tables 1-1 – 1-2 list the specifications of all models.

TABLE 1-1 Technical Specifications	
Frequency range	Depending on the probe
Dynamic range	Depending on the probe
Resolution	Depending on the probe
Sensitivity	Depending on the probe
Accuracy	Depending on the probe
Measurement Units	V/m, kV/m, nT, μT, mT. The unit shown depends on the probe connected
Field measured	Total field, average and Peak (MAX)
Sampling	1 measurement every 1 second

TABLE 1-2 Measurement/acquisition functions	
Memorization interval	from 30 sec to 15 min
Internal Memory	over 128 Mb
Max Data Storage Capacity (before old data are replaced by new ones)	over 364 days with 1 acquisition every minute. (See table)
Data download	Manual Automatic managed by the unit at predefined timings (1), (3) Automatic by PC (2), (3) Automatic creation of a TXT and .BMP file after download
Functions	AVG, RMS, maximum peak; daily report via SMS (3) Display and marking of data acquired (3)
Field strength alarm	two programmable field strength thresholds (warning and alarm) with automatic notice both of exceeding the limits and returning within the limits (3)
Clock	real time internal clock
Messages	SMS which can be sent to up to 10 mobile phones simultaneously (see table) (3)
Sensor	display of model and calibration date
Battery management	Every record includes Battery Voltage and Charge Current value
Temperature management	Every record includes Internal Temperature value
Humidity management	Every record includes Internal Humidity value
GPS coordinates	Programmable record

TABLE 1-3 General Specifications	
GSM module	Quad-band (850, 900, 1800, 1900 MHz) GPRS (3)
Field Probes	Interchangeable, several models available, single and dual probe operation
Interfaces	RS232, USB, Ethernet, Micro SD Card; GSM/GPRS modem (3).
Protection	microswitch to notify case opening
Other Alarms	protective case opening, internal overheat, internal humidity, battery too low, battery overload (model AMB-8059/01 and AMB-8059/03 only), probe malfunction, field over limit.
Internal battery	
AMB-8059/00 and AMB-8059/02	Non rechargeable primary battery, lithium SAFT LSH20, 3,6V, 13A/h lead;
AMB-8059/01 and AMB-8059/03	4 V, 2,5 A/h, rechargeable
Consumption	1 mA with GSM module off 20 mA with GSM module in stand-by state (3) 300 mA max with GSM module transmitting (3)
External power	DC, 5 V , 1 A max (AMB-8059/01 and AMB-8059/03 only)
Operating time	
AMB-8059/02	about 8 months @ 1min GSM module transmission per day and single probe operating mode (autonomy depends on probe and setting) (4) (5)
AMB-8059/03	> 80 days in total darkness @ a 1 min GSM module transmission per day and single probe operating mode (autonomy depends on the setting) (4) (5)..
Recharge time	24 hours with external power unit (AMB-8059/01 and AMB-8059/03 only)
Autotest	automatic (see Protection and Other Alarms)
Compliance	with directives 89/336 73/23 CEI 211-6 CEI 211-7 ITU-T K83
Environment temperature	-20 / +55°C
Dimensions	(WxDxH) 112 x 112 x 730 mm
Weight	
AMB-8059/00	1,2 kg only the unit; 6,5 kg total weight inclusive of supports and base
AMB-8059/01	2,4 kg only the unit; 7,7 kg total weight inclusive of supports and base
AMB-8059/02	1,2 kg only the unit; 6,5 kg total weight inclusive of supports and base
AMB-8059/03	2,4 kg only the unit; 7,7 kg total weight inclusive of supports and base
Environmental protection	IP55

Note (1): to the controller PC or to the user's FTP server depending on the preferred communication mode.
Note (2): directly from the station or from the user FTP server depending on the preferred communication mode.
Note (3): AMB-8059/02 and AMB-8059/03 only which are equipped with GSM/GPRS modem.
Note (4): Being not equipped with GSM/GPRS modem module, AMB-8059/00 and AMB-8059/01 power autonomy is longer.
Note (5): Specification depending on battery age, environmental temperature and GSM field coverage.

TABLE 1-4 Max acquisition time

All models can measure and store data for an extremely long period of time: one of the 128 Mb Flash memories is used exclusively for recording measurements and can contain up to 524.288 records of 32 bytes each. The following formula and table indicate the internal memory capacity depending on the Rate Setting.

Nrecords * [Rate (min)] / [minutes/day] = Memory capacity (days)

*For example, with a Storing Rate of 6 min, considering that a day consists of 1440 minutes, the memory capacity formula is: 524288 * 6 / 1.440 = 2184.5 days*

Storing Rate	Memory capacity
30 sec	>182 days
1 min	>364 days
6 min	> 2184 days (~6 years)

The internal memory can be read at every new data transfer to the central unit, at set times or by remote control. Moreover, when the memory is full, the new data are overwritten on the oldest so as to ensure availability of the data for the most recent measurement period.

All models also use an additional memory bank of 128Mb which serves various functions. 32kB of this memory serve for the registration of events, each of them occupies a space of 128 bytes.
In the memory there is therefore space to record at least the latest 224 events.

TABLE 1-5 Settings/Queries

AMB-8059/02 and AMB-8059/03 can be set and queried remotely via mobile phone or a central unit consisting of a PC, with 8059SW-02 software installed, connected via GSM or Line Modem (station set for CSD communication) or, through the Internet, by FTP (station set for GPRS communication). All models can be set and queried locally by means of the RS232, USB, Ethernet connection to the controller PC. The following table describes the different possibilities:

Possible functions	SMS	via Modem (CSD)	via FTP (non real time)	PC via RS232	PC via USB	PC via ETHERNET
Setting	YES	YES	YES	YES	YES	YES
Reading status and alarms	YES	YES	YES	YES	YES	YES
Reading max value	YES	NO	NO	NO	NO	NO
Reading average value	YES	YES	YES	YES	YES	YES
Download data	NO	YES	YES	YES	YES	YES
Reading of battery	YES	YES	YES	YES	YES	YES
Reading of internal temperature	YES	YES	YES	YES	YES	YES
Reading of internal humidity	YES	YES	YES	YES	YES	YES
Spontaneous call	NO	YES	YES	NO	NO	YES
Reporting alarms	YES	YES	YES	NO	NO	NO
Reporting via SMS of daily maximum	YES	NO	NO	NO	NO	NO

TABLE 1-6 Field Probe

All AMB-8059 models can be equipped with electric and magnetic field probes as follows:

Field Probe	Range of frequency	Reading
ELECTRIC FIELD PROBE EP-1B-01	100 kHz – 3 GHz	0,2 – 200 V/m
TRI-BAND ELECTRIC FIELD PROBE EP-3B-01	100 kHz – 3 GHz	0,2 – 200 V/m
MAGNETIC FIELD PROBE HP-1B-01	10 Hz – 5 kHz	50 nT – 200 μT
QUAD-BAND ELECTRIC FIELD PROBE EP-4B-01	100 kHz – 3 GHz	0,03 – 200 V/m
ELECTRIC FIELD PROBE EP-1B-03	100 kHz – 7 GHz	0,2 – 200 V/m
QUAD-BAND ELECTRIC FIELD PROBE EP-4B-02	100 kHz – 7 GHz	(0,03) 0.2 – 200 V/m
ELECTRIC FIELD PROBE EP-1B-04	10 Hz – 5 KHz	5 V/m – 20 kV/m

TABLE 1-7 Dual-probe configuration

All AMB-8059 models can be equipped with electric and magnetic field probes, in Dual-probe configuration, as follows:

Probe combinations
HP-1B-01 + EP-1B-04
HP-1B-01 + EP-1B-01
HP-1B-01 + EP-1B-03
HP-1B-01 + EP-3B-01

NOTE **Tri-band probes used in Dual-probe configuration provide the Wide band result only.**

TABLE 1-8 Technical Specifications of Field Probe

ELECTRIC FIELD PROBE EP-1B-01

Frequency range	0,1 – 3000 MHz
Reading range	0,2 – 200 V/m
Overload	600 V/m
Dynamic range	> 60 dB
Resolution	0,01 V/m
Sensitivity	0,2 V/m
Typical accuracy @ 6V/m	± 0,8 @ 50 MHz
Flatness @ 20V/m	1 – 200 MHz ±0,8 dB 150 kHz - 3 GHz ±1,5 dB
Anisotropy @ 6V/m	± 0,8 dB @ 50 MHz (typical 0,6 dB)
Rejection of magnetic field	> 20 dB
Temperature error	0,1 dB/°C
A/D conversion	On board
Calibration factors	On board E^2prom
Temperature sensor	On board
Dimensions	Length 450mm, diameter 55mm
Weight	180g

Fig. 1-1 EP-1B-01 probe

TRI-BAND ELECTRIC FIELD PROBE EP-3B-01

	Wide band	Low pass	High pass
Frequency range	0,1 – 3000 MHz	0,1 – 862 MHz	933 – 3000 MHz
Reading range	0,2 – 200 V/m		
Overload	600 V/m		
Dynamic range	> 60 dB		
Resolution	0,01 V/m		
Sensitivity	0,2 V/m		
Typical accuracy @ 6V/m	± 0,8 @ 50 MHz		± 0,8 @ 1 GHz
Flatness @ 20V/m	1 – 200 MHz ±0,8 dB 150 kHz - 3 GHz ±1,5 dB	1 – 200 MHz ±0,8 dB 150 kHz - 862 MHz ±1,5 dB	933 – 3000 MHz ±1,5 dB
Anisotropy @ 6V/m	± 0,8 dB @ 50 MHz (typical 0,6 dB)		+/- 0,8 dB @ 1 GHz (typical 0,6 dB)
Attenuation out of band	Not applicable	933 MHz – 3 GHz > 23 dB (respect to 50 MHz)	0,1 – 862 MHz > 23 dB (respect to 1 GHz)
Rejection of magnetic field	> 20 dB		
Temperature error	0,1 dB/°C		
A/D conversion	On board		
Calibration factors	On board E^2prom		
Temperature sensor	On board		
Dimensions	Length 450mm, diameter 55mm		
Weight	180g		

Fig. 1-2 EP-3B-01 Probe

MAGNETIC FIELD PROBE HP-1B-01

Frequency range	10 Hz – 5 kHz
Reading range	50 nT – 200 µT
Overload	> 1 mT
Dynamic range	> 72 dB
Resolution	1 nT
Sensitivity	50 nT
Flatness @ 40 Hz - 1 kHz	1 dB (typical 0,6)
Anisotropy @ 50 Hz 3µT	0,3 dB
Rejection of electric field	> 20 dB
A/D Conversion	On board
Calibration factors	On board E^2prom
Temperature sensor	On board
Dimensions	Length 83 mm, diameter 53 mm
Weight	110g

Fig. 1-3 HP-1B-01 Probe

QUAD-BAND ELECTRIC FIELD PROBE EP-4B-01

	Wide band	EGSM 900 Band pass	EGSM 1800 Band pass	UMTS Band pass
Frequency range	0.1 – 3000 MHz	925 – 960 MHz	1805 – 1880 MHz	2110 – 2170 MHz
Level range	0.2 – 200 V/m	0.03 – 30 V/m		
Dynamic range	> 60 dB	> 60 dB		
Resolution	0.01 V/m			
Sensitivity	0.2 V/m	0.03 V/m		
Flatness @ 6 V/m	1 – 200 MHz +/-0.8 dB 0.15 MHz - 3 GHz +/-1.5 dB	925 – 960 MHz +0.5 / -2.5 dB	1805 MHz – 1880 MHz +0.5 / -2.5 dB	2110 – 2170 MHz +0.5 / -2.5 dB
Anisotropicity @ 3 V/m	± 0.8 dB @ 50 MHz (typical 0.6 dB)	± 0.8 dB (typical 0.6 dB) @ 942.5 MHz	± 0.8 dB (typical 0.6 dB) @ 1842.5 MHz	± 0.8 dB (typical 0.6 dB) @ 2140 MHz
Out band attenuation	not applicable	Rejection to 1842 GSM = 25 dB to 2140 UMTS = 25 dB	Rejection to 942 GSM = 15 dB to 2140 UMTS = 13 dB	Rejection to 942 GSM = 17 dB to 1842 GSM = 10 dB
H filed rejection	> 20 dB			
Temperature error	0°C÷50°C = ± 0.3 dB		-20°C÷0°C = - 0.1 dB / °C	
Center frequency drift	not applicable	40°C÷60°C = ± 100 kHz	-20°C÷40°C = -100 kHz / °C	
A/D conversion	On board			
Calibration factors	On board E^2prom			
Temperature sensor	On board			
Size	Length 450 mm, diameter 55 mm			
Weight	210g			

Fig. 1-4 EP-4B-01 probe

ELECTRIC FIELD PROBE EP-1B-03

Frequency range	0,1 – 7000 MHz
Reading range	0,2 – 200 V/m
Overload	600 V/m
Dynamic range	> 60 dB
Resolution	0,01 V/m
Sensitivity	0,2 V/m
Typical accuracy @ 6V/m	± 0,8 @ 50 MHz
Flatness @ 20V/m	3 MHz - 200 MHz +/-0.8 dB 0.15 MHz - 3 GHz +/-1.5 dB 0.1 MHz - 6 GHz +/-2 dB
Anisotropy @ 6V/m	± 0,8 dB @ 50 MHz (typical 0,6 dB)
Rejection of magnetic field	> 20 dB
Temperature error	0,1 dB/°C
A/D conversion	On board
Calibration factors	On board E^2prom
Temperature sensor	On board
Dimensions	Length 450mm, diameter 55mm
Weight	180g

Fig. 1-5 EP-1B-03 probe

QUAD-BAND ELECTRIC FIELD PROBE EP-4B-02

	Wide band	EGSM 900 Band pass	EGSM 1800 Band pass	UMTS Band pass
Frequency range	0.1 – 7000 MHz	925 – 960 MHz	1805 – 1880 MHz	2110 – 2170 MHz
Level range	0.2 – 200 V/m	0.03 – 30 V/m		
Dynamic range	> 60 dB	> 60 dB		
Resolution	0.01 V/m			
Sensitivity	0.2 V/m	0.03 V/m		
Flatness @ 6 V/m	3 – 200 MHz +/-1.5 dB 0.15 MHz - 3 GHz +/-2 dB 0.1 MHz – 7 GHz +/- 3 dB	925 – 960 MHz +0.5 / -2.5 dB	1805 MHz – 1880 MHz +0.5 / -2.5 dB	2110 – 2170 MHz +0.5 / -2.5 dB
Anisotropicity @ 3 V/m	± 0.8 dB @ 50 MHz (typical 0.6 dB)	± 0.8 dB @ 942.5 MHz (typical 0.6 dB)	± 0.8 dB @ 1842.5 MHz (typical 0.6 dB)	± 0.8 dB @ 2140 MHz (typical 0.6 dB)
Out of band attenuation	not applicable	Rejection to 1842 GSM = 25 dB to 2140 UMTS = 25 dB	Rejection to 942 GSM = 15 dB to 2140 UMTS = 13 dB	Rejection to 942 GSM = 17 dB to 1842 GSM = 10 dB
H filed rejection	> 20 dB			
Temperature error	0°C÷50°C = ± 0.3 dB		-20°C÷0°C = - 0.1 dB / °C	
Center frequency drift	not applicable	40°C÷60°C = ± 100 kHz	-20°C÷40°C = -100 kHz / °C	
A/D conversion	On board			
Calibration factors	On board E^2prom			
Temperature sensor	On board			
Size	Length 450 mm, diameter 55 mm			
Weight	210g			

Fig. 1-6 EP-4B-02 probe

ELECTRIC FIELD PROBE EP-1B-04

Frequency range	10 Hz – 5 kHz
Level range	5 V/m – 20 kV/m
Overload	> 30 kV/m
Dynamic range	> 72 dB
Resolution	0.1 V/m
Sensitivity	5 V/m
Flatness @ 100 V/m (40 Hz - 1 kHz)	1 dB (typical 0,5)
Anisotropycity @ 100 V/m	0,5 dB @ 50 Hz
Rejection of magnetic field	> 20 dB
A/D Conversion	On board
Calibration factors	On board E^2prom
Temperature sensor	On board
Dimensions	Length 77 mm, diameter 53 mm
Weight	110g

Fig. 1-7 EP-1B-04 probe

1.7 AMB-8059/00 and AMB-8059/02

1.7.1 Top panel
(inside protective cover)

Fig. 1-8 Top panel

Legend:

1. **GPS**: antenna GPS (AMB-8059/02 only)
2. **SIM slot:** point of insertion of the SIM card for GSM/GPRS communication
3. **Micro SD slot:** point of insertion of the Micro SD card and its led status
4. **S/N**: serial number of the unit
5. **Probe Connector**: connector for measurement probe

1.7.2 Bottom panel
(inside protective cover)

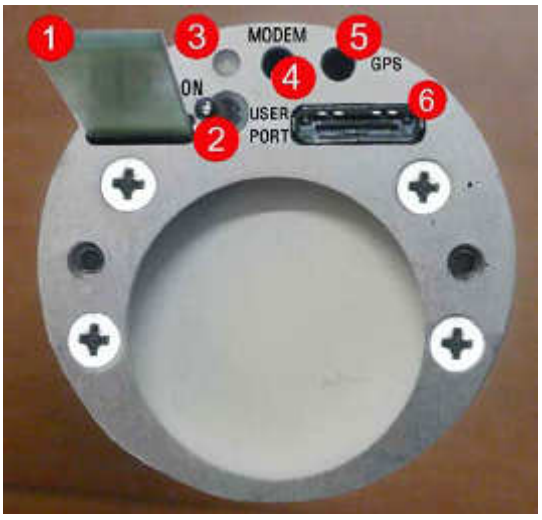


Fig. 1-9 Bottom panel

Legend:

1. **Antenna GSM**: multi-band antenna for internal GSM/GPRS modem (AMB-8059/02 only)
2. **Power switch**: switches AMB-8059 on/off
3. **Led ON**: lit when power is on
4. **External Modem**: future implementation (AMB-8059/02 only)
5. **External GPS**: future implementation (AMB-8059/02 only)
6. **User Port**: connector for data and power

1.7.3 Battery compartment cover (inside protective cover)

Fig. 1-10 Battery compartment c

Legend:

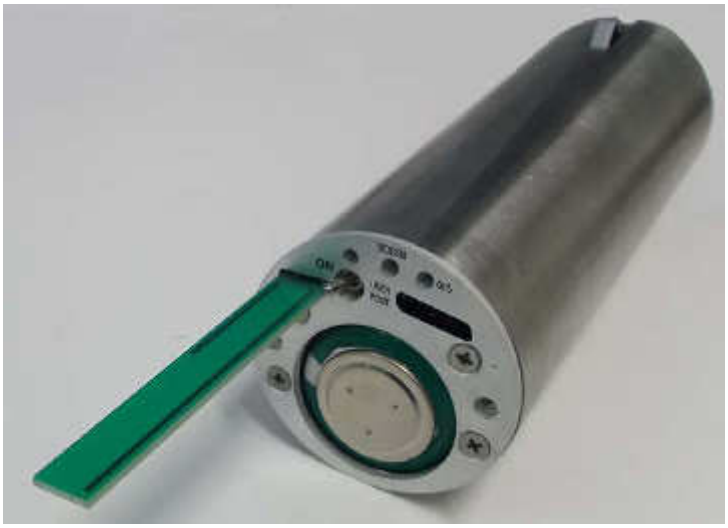
1. **Main Unit support**: to support the metering unit.
2. **Thumb screw**: to open and close the battery compartment.

1.7.4 Battery for AMB-8059/00 and AMB-8059/02

The monitoring station AMB-8059/00 and AMB-8059/02 are powered by an internal replaceable primary (non-rechargeable) battery.

Remove the monitoring unit by unscrewing the thumbscrews of the battery compartment from the bottom panel.

Respect polarity when replacing the battery!



Close the cover screwing the thumbscrews of the battery compartment to the bottom panel.

1.7.5 Tamperproof Interlock (inside protective cover)

A micro switch on the side of the unit is tripped when the unit is opened.
It is possible to activate an alarm, sent by AMB-8059/02 to any GSM mobile phone, warning of any attempts to tamper with the device.

Fig. 1-11 Tamperproof interlock

1.7.6 Base plate

A rubber cover on the lower side of the base plate protects unused USB port from dirt and dust; when open it allows the user to access the USB connection.
To open the USB cover by holding the cover self and pulling out.

WARNING

Do not open/close the cover by holding the lanyard.

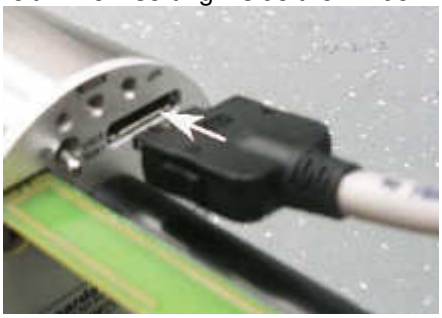
Fig. 1-12 AMB-8059/00 and AMB-8059/02 base plate

Legend:

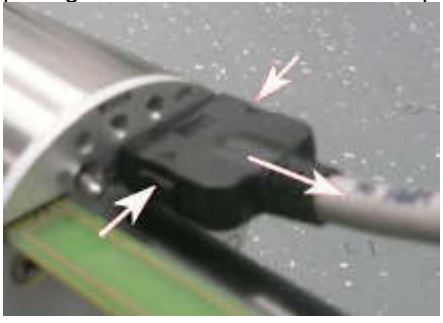
1. Plug (User Port)
2. Base plate
3. USB protective cover
4. USB-B connector

1.7.7 Plug (User Port)

The connector can be easily plugged into the User Port directly, just taking care about proper orientation, as for the following picture, until a “click” is felt while inserting inside the window.



Disconnected the User Port pushing the two buttons on the both sides and pulling in the direction shown in the picture.



1.8 AMB-8059/01 and AMB-8059/03

1.8.1 Top panel
(inside protective cover)

Fig. 1-13 Top panel

Legend:

1. **GPS**: antenna GPS (AMB-8059/03 only)
2. **SIM slot:** point of insertion of the SIM card for GSM/GPRS communication
3. **Micro SD slot:** point of insertion of the Micro SD card and its led status
4. **S/N**: serial number of the unit
5. **Probe Connector**: connector for measurement probe

1.8.2 Bottom panel
(inside protective cover)

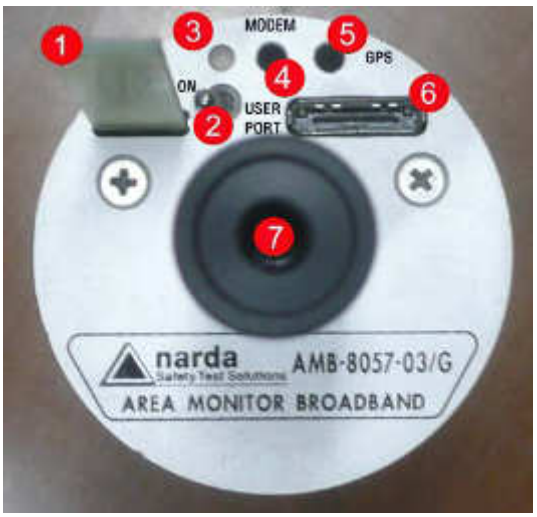


Fig. 1-14 Bottom panel

Legend:

1. **Antenna GSM**: multi-band antenna for internal GSM/GPRS modem (AMB-8059/03 only)
2. **Power switch**: switches AMB-8059 on/off
3. **Led ON**: lit when power is on
4. **External Modem**: future implementation (AMB-8059/03 only)
5. **External GPS**: future implementation (AMB-8059/03 only)
6. **User Port**: connector for data and power
7. **Main Unit support**: mechanical support

1.8.3 Tamperproof Interlock (inside protective cover)

A micro switch on the side of the unit is tripped when the unit is opened.
It is possible to activate an alarm, sent by AMB-8059/03 to any GSM mobile phone, warning of any attempts to tamper with the device.

Fig. 1-15 Tamperproof interlock

1.8.4 Base plate

Fig. 1-16 AMB-8059/01 and AMB-8059/03 base plate

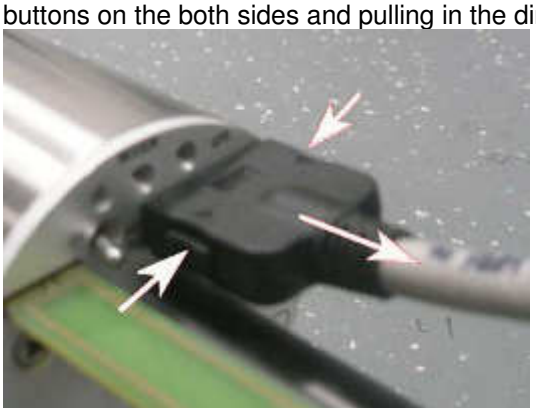
Legend:

1. Plug (User Port)
2. Base plate
3. Data-Supply connector

1.8.5 Plug (User Port)

The connector can be easily plugged into the User Port directly, just taking care about proper orientation, as for the following picture, until a “click” is felt while inserting inside the window.

The connector can be disconnected from the User Port pushing the two buttons on the both sides and pulling in the direction shown in the picture.



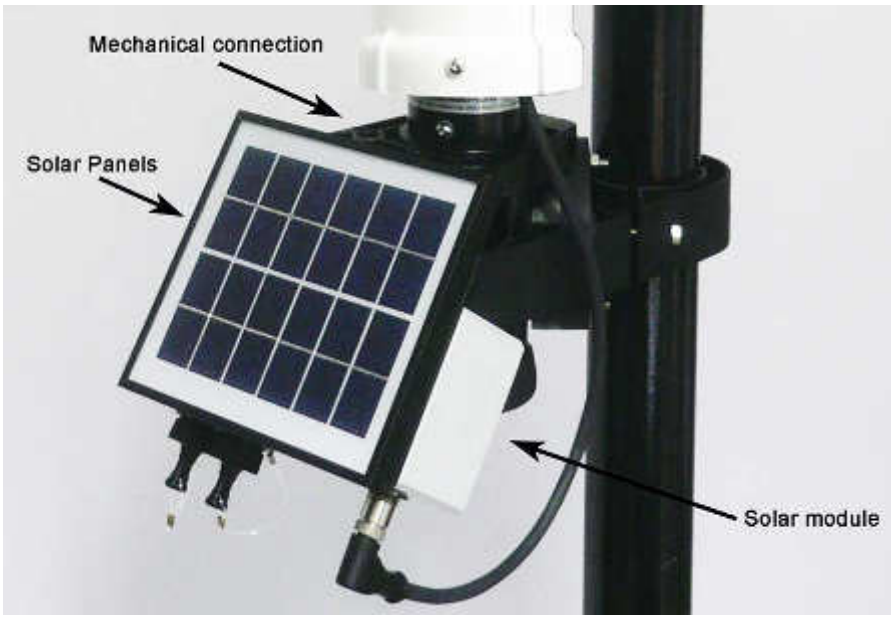
1.8.6 Data-Supply Connector

Connect the Data-Supply connector to the Solar module taking care about proper orientation and screw in the direction show in the picture

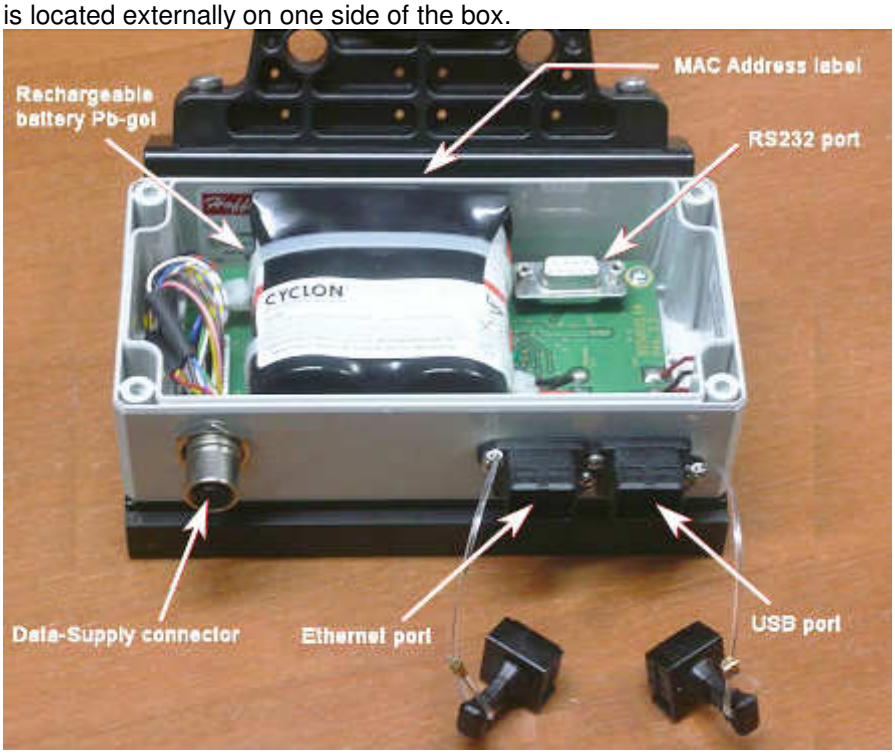
Disconnect the connector from the Solar module unscrewing in the direction show in the picture

1.8.7 Solar module

AMB-8059/01 and AMB-8059/03 are equipped with an independent power supply system and powered jointly by a rechargeable battery Pb-gel 4V, 2,5A, placed in a sealed compartment (so called “Solar Module”), and by solar panels.
This Solar Module has a suitable mechanical connection to the AMB-8059/01 and AMB-8059/03 main unit.



The Solar Module has an external Data-Supply connector to the monitoring station and Ethernet and USB port; it also has an internal RS232 connection.
The Solar module has a MAC address assigned by the manufacturer and it is located externally on one side of the box.



Detail of Solar Panel module:

- **Data-Supply connector** for connection to the monitoring station.
- **USB connector and its dust cap** for direct connection to Personal Computer and for battery charger.
- **Ethernet connector and its dust cap** for direct connection to Personal Computer.
- **RS232 connector** for direct connection to Personal Computer.

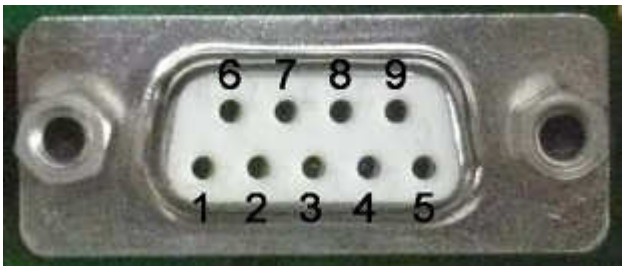


Fig. 1-17 DB9 Female front side view

DB9 Female Connector pin configuration:
Pin 2 RX [Received Data]
Pin 3 TX [Transmit Data]
Pin 5 GND [Signal Ground]
Pin 9 +3VD [Current limited]

- **MAC Address label** reports the physical address assigned to the module for Ethernet/LAN connection.

2 – Installation and use

2.1 Introduction

This section provides the information necessary to install and use the AMB-8059 Multi-band EMF Area Monitor.
It also includes information regarding initial inspection, power requirements, interconnections, working environment, assembly, cleaning, storage and shipment.

2.2 Initial inspection

Inspect the package for any possible damage.

If the packaging or protective material are damaged, check that the contents is complete and that the instrument has not been damaged in any of its electrical or mechanical parts.
Check the accessories, referring to the checklist enclosed with the manual.
Report any noticed damages to the forwarder and to NARDA.

2.3 Working environment

The working conditions for the instrument are as follows:

- Temperature — From -20°C to +55°C
- Relative humidity (without condensation) — ≤ 93%

The instrument should be stored in a clean, dry place free of acids, dust and moisture.
The storage environment must have the following specifications:

- Temperature — From -25°C to + 70°C
- Relative humidity (without condensation) — < 99%
- Altitude — Up to 4000 m (a.s.l.)

2.4 Return for repairs

Any part of the instrument – with the sole exception of the battery of AMB-8059/00 and AMB-8059/02 - can only be replaced by NARDA, therefore, in case of damage to parts and/or malfunctions, contact the NARDA service center.
When the instrument has to be returned to NARDA for repairs, please complete the form enclosed with this Users Manual, filling in all the information necessary for the service requested.
To reduce the time necessary for the repair, be as specific as possible in describing the malfunction. If the problem only occurs under specific conditions, detail in the best possible way how to reproduce these conditions.
Whenever possible, it is preferable to use the original packing for return, making sure to wrap the device in heavy paper or plastic. In alternative, pack the equipment in a sturdy card box with plenty of impact absorbing material all around the equipment, to ensure a tight fit and prevent it from moving inside the box. Take special precautions to protect the solar cells. Seal the package securely and write FRAGILE on the outside to encourage careful handling.

2.5 Cleaning

Use a clean, soft, dry cloth to clean the instrument and the solar cells.

To clean the instrument do not use solvents, acids, cleaning fluid, turpentine, acetone or similar products which could damage it

2.6 Installation and use

The AMB-8059 Multi-band EMF Area Monitor consist of a protective case made of material that is transparent to electromagnetic fields and designed to house the field probe, the electronic measuring instruments and the data transmission devices.

NOTE

Models AMB-8059/01 and AMB-8059/03 have power unit, consisting of solar panels and a battery; the low consumption of the system ensure a practically unlimited autonomy under normal sunlight conditions.

Fig. 2-1 AMB-8059/01

Fig. 2-2 AMB-8059/03

NOTE **Models AMB-8059/00 and AMB-8059/02 don't have the solar panel module.**

Fig. 2-3 AMB-8059/00

Fig. 2-4 AMB-8059/02

2.6.1 Installation

The NARDA Multi-band EMF Area Monitor is designed to operate outdoors, in the vicinity of the electromagnetic fields sources that shall be controlled, and under the most severe environmental conditions.

2.6.1.1 Installation of AMB-8059/00 and AMB-8059/02

1. Remove the three screws and take off along its axis the protective case from the monitoring unit.
2. Unplug the User Port connector (see § 1.7.7).
3. Remove the monitoring unit by unscrewing the thumbscrews of the battery compartment from the bottom panel (see § 1.7.4).
4. Be sure that the tray for the SIM card is locked inside its slot **even if the GSM is not being used (AMB-8059/02 only) or….**
5. Insert the SIM card enabled for data communication in its tray in the GSM modem of the unit (see fig. 2-5) (AMB-8059/02 only).

NOTE

Remove the PIN CODE on the SIM card and be sure that on the monitoring site the signal of the selected GSM provider is strong enough to allow operations (AMB-8059/02 only).

6. Be sure that the probe connector is well locking.
7. Insert the Li-ion battery respecting the polarity (positive toward the inner side) (see § 1.7.4).
8. Install the monitoring unit by screwing the thumbscrews of the battery compartment to the bottom panel.
9. Plug the user port connector that was removed at step 2.
10. Open carefully the cover of the USB connector available on the lower side of the base plate and connect the PC (USB port) to the connector using the USB cable (see § 1.7.6).
11. Switch the unit ON.
12. Be sure the AMB-8059 Area Monitor has been installed successfully on the virtual COM port (see § 3.5).
13. Run the program 8059SW-02 and set the parameters as desired.
14. Switch the unit OFF.
15. Disconnected the USB connector.
16. Close carefully the cover of the USB connector (be sure it is fully inserted) (see § 1.7.6).
17. Install again the protective cover that was removed at step 1 and tight the screws. Install the monitoring unit on the site to be monitored.

Follow instructions below to install the monitoring unit on the site:

18. Install the fibreglass pole (see chapter 4) on the site.
19. Slide on the fibreglass pole the mechanical joint:
    a) Unscrew the socket-head screw under the bottom cap of the protective case housing the unit without losing it completely.
    b) Press on the screw (the movement should be about 1cm) to unlock the blocking wedge inside the cap.
    c) Remove the bottom cap.
    d) Slide on the fibreglass pole the mechanical joint (see fig. 2-4).
    e) Insert and close carefully the bottom cap (be sure it is fully inserted), then screw the socket-head screw.
20. Slide the group monitoring station - connection joint onto the fibreglass pole and tight the screws at the desired position.

WARNING

To use the mechanical joint see chapter 4.

21. Put on top of the fibreglass pole the supplied cap, and install the strays and the ballast bags (see chapter 4);
22. Remove the protective case, switch the unit ON and slide the protective case
23. Local data download through USB will be regularly required if using AMB-8059/02 in case no GSM signal is present in the installation place.

2.6.1.2 Installation of AMB-8059/01 and AMB-8059/03

1. Remove the three screws and take off along its axis the protective case from the monitoring unit.
2. Be sure that the tray for the SIM card is locked inside its slot **even if the GSM is not being used (AMB-8059/03 only) or….**
3. Insert the SIM card enabled for data communication in its tray in the GSM modem of the unit (see fig. 2-5) (AMB-8059/03 only).

NOTE

Remove the PIN CODE on the SIM card and be sure that on the monitoring site the signal of the selected GSM provider is strong enough to allow operations (AMB-8059/03 only).

4. Be sure that the probe connector is well locking.
5. Be sure that the "user port" cable is well connected (see § 1.8.5).
6. Switch the unit ON.
7. Install again the protective cover that was removed at step 1 and tight the screws.
8. Slide on the fibreglass pole the mechanical joint:
9. Unscrew the socket-head screw under the bottom cap of the protective case housing the unit without losing it completely.
10. Press on the screw (the movement should be about 1cm) to unlock the blocking wedge inside the cap.
11. Remove the bottom cap.
12. Slide on the fibreglass pole the mechanical joint (see fig. 2-2).
13. Insert and close carefully the bottom cap (be sure it is fully inserted), then screw the socket-head screw.
14. Take off the cover of the Solar Module by unscrewing the 4 screws.
15. Charge the batteries for at least 24 hours (see § 4.6.1).
16. Connect the PC to the Solar Module (see § 1.8.7).
17. Connect the Data-Supply cable to the external connector on the Solar Module (see § 1.8.6).
18. Be sure the AMB-8059 Area Monitor has been installed successfully on the PC port (see § 3.4 - 3.5)
19. Run the 8059SW-02 software and set the parameters as desired.
20. Disconnect the Solar module from the PC.
21. Disconnect the Data-Supply cable (the unit is OFF).
22. Close the Solar Module. Install the monitoring unit on the site to be monitored.

Follow instructions below to install the monitoring unit on the site:

23. Install the fibreglass pole (see chapter 4) on the site to be monitored;
24. Slide the group monitoring station - connection joint – Solar Module onto the fibreglass pole and tight the screws at the desired position, paying attention to orienting toward south the solar cells of the Solar Module;

WARNING

To use the mechanical joint see chapter 4.

25. Put on top of the fibreglass pole the supplied cap, and install the strays and the ballast bags (see chapter 4);
26. Connect the Data-Supply cable to the external connector on the Solar Module.
27. Local data download through RS232, USB, Ethernet will be regularly required if using AMB-8059/03 in case no GSM signal is present in the installation place. The Solar Module cover must be temporary removed to access the internal RS232 connector.

NOTE

When the Ethernet cable is connected to the Solar module and is switched on, the RS232 port is not available.

NOTE

Every time the Ethernet cable is plugged to the Solar module, the connection will last 15 minutes regardless the scheduled time which continues to work in separate way.

WARNING

In the northern (boreal) hemisphere, the AMB-8059/01 and AMB-8059/03 should be installed with the solar cells facing south, in order to take the best advantage of the solar radiation for continuous recharging of the internal batteries. An angle of 35° with respect to vertical is the ideal position for the solar cells to optimize solar radiation in the European latitudes, specially in winter when the light levels are generally lower than in summer.

WARNING

To ensure maximum efficiency in recharging the battery and to take advantage of the maximum operating autonomy, make sure the position in which the unit is installed receives sunlight all the day long and is not shaded by buildings or other screening objects.

WARNING

To ensure maximum efficiency of recharging and optimum autonomy of the internal batteries, it is a good rule to keep the solar cells of the AMB-8059 clean, inspecting them periodically.
If necessary, clean them with a soft cloth and a normal glass cleanser.

WARNING

Correct readings may be conditioned by the nature of the places in which the field monitoring system is installed.
The field sensor is affected by huge metallic masses or other objects that may reflect the signal, if located in the vicinity of the unit.
Whenever possible, it is a good rule to install the unit at some distance from walls, high voltage pylons, buildings and other obstacles that could affect the signals reaching the sensor.

WARNING

Prior to installing stations equipped with the GSM/GPRS module, make sure that the point at which the field monitor will be installed is adequately covered by the mobile phone service allowing remote data communication.
This can be done using any GSM mobile phone capable of indicating the intensity of the signal coming from the local base radio station of the company chosen for the SIM card.

WARNING

The SIM card adopted shall be enabled to data transmission.
Dial up calls require that both the station SIM card as well as the PC modem one (if GSM) are enabled for CSD data communication.
GPRS/FTP communication mode require that the station SIM card is enabled for GPRS data communication allowing the station to access the user FTP server to download measurement results, automatically, according to the user setting. No modem but Internet access is required for the controller PC to access the user FTP server

NOTE

The internal clock has an autonomy of 1 week after the battery has been disconnected.

2.7 GSM Modem[1]

AMB-8059/02 and AMB-8059/03 are equipped with a GSM modem that allows remote communication for programming and for the remote collection of the data recorded.
The GSM modem requires a regular SIM Card enabled for data communication (CSD, GPRS or both, depending on the preferred communication mode).

2.7.1 SIM CARD

The SIM Card to be used must be enabled for the preferred data communication mode.
The user can choose the most suitable SIM Card to install, depending on the services and costs offered by the different mobile phone Service Providers; it should also be chosen so as to guarantee optimum coverage for the specific zone of installation of the field monitor.

Fig. 2-5 SIM Card

The modem for data transfer is housed inside the main unit and the SIM Card has to be inserted in the special slot, as shown in the figure. To extract it press the button just beside the SIM tray.

WARNING **To download the measurement data from the monitoring station through the RS232. USB, Ethernet port, the tray holding the SIM Card must be correctly fitted inside its slot even if no SIM Card is installed.**

WARNING **Before removing or inserting the SIM Card, switch off the monitoring station.**

WARNING **If you use a rechargeable SIM Card, make sure it is charged.**
Before using the SIM Card with the monitoring station, disable the PIN code using the proper function available on any mobile phone.

[1] AMB-8059/02 and AMB-8059/03 only

2.7.2 How to switch the GSM modem on

AMB-8059 is a very low power consumption device allowing thus very long autonomy of models powered with a primary lithium battery and unlimited autonomy of models equipped with the Solar module despite the small dimensions of its solar panel.
AMB-8059/02 and AMB-8059/03 are equipped with a GSM/GPRS modem which power consumption, specially while transmitting, is very high if compared with the station overall consumption.
Additionally, modem transmissions, including communications between GSM terminal (modem) and GSM network that are not under the user control, generate E.M. fields that affect the measurement results.
For the above reasons the modem activity of an E.M field monitoring device should be reduced to the minimum by switching the modem OFF whenever convenient.
The GSM modem of AMB-8059 is therefore switched ON/OFF depending on the user settings and other conditions.
When the modem is OFF it neither consumes power nor generates any E.M. field. On the other hand it is not able to receive calls or messages.
It is suggested to program the modem to be OFF for the major part of the day except times, usually one hour per day or less, to download results and be able to receive calls and messages. Abnormal situations, like alarm conditions, will be able, anyway, to switch the modem ON to allow automatic activities like alarm notifications.
A modem ON, but not communicating, is defined here as to be in “Stand-by” mode. It consumes some power but it is able to receive calls and messages.
Short transmissions due to communications between the modem and the GSM network occur usually every few hours when the modem is in Stan-by mode.
During transmission the modem power consumption is high and depends on the quality of the GSM signal
On the monitoring station the GSM modem can be switched on in three different ways:

1. **Programmed** (the User decides when the modem has to be switched on and for how long).
2. **Spontaneous** (the monitoring station switches the GSM modem on whenever there is an alarm)
3. **Automatic** (the monitoring station switches the GSM modem on and off automatically when certain conditions arise)

2.7.2.1 Programmed mode

The internal modem of the AMB-8059/02 and AMB/8059/03 will remain on and in Stand-by for 60 minutes after the monitor station was switched on.
Afterwards, the GSM modem will be switched on and off depending on the "Schedule for MODEM" settings.

The Programmed mode consists of setting a time for switching the modem on and off and the repetition interval.
The parameter "Hours and Minutes" specifies at what time of the day the modem will be switched on and put on Stand-By; the "Stand-By" parameter establishes for how long (indicated in units of 15 minutes each) the GSM modem remains on and the parameter "Every" establishes the time interval of repetition or after how many hours from the last activation the modem has to be switched on again.
To keep the transmissions at the same time every day, the parameter "Every" is a sub-multiple of 24, for example: 1, 2, 3, 4, 6, 8, 12, 24.

The above picture shows the "schedule for MODEM" setting to place the modem in stand-by mode at 12:05 for 1 hour (4 quarters) every 24 hours.
It means that every day the monitor station is able to receive, or to originate, calls from 12:05 to 13:05.
If the monitor station is switched on at 11:30 the modem will be switched in stand-by mode until 12:30.
At 12:30 it will be switched off until 12:05 of the next day. No communications will be possible in this window time.

Instead, in case the monitor station is switched on at 10:50 the modem will be switched in stand-by mode until 11:50. Then OFF for 15 minutes until, at 12:05 of the same day, switched again in stand-by mode for 4 quarters by the "schedule for MODEM" settings.

NOTE

If you desire to use this function, in the window "schedule for MODEM" it is suggest to set the hour of programmed switching on at least 1 hour and 30 minutes after the monitor station was switched on.

2.7.2.2 Spontaneous mode

In Spontaneous mode, whenever an alarm condition occurs or when the normal conditions are restored (e.g. exceeding the threshold value set for the field intensity or returning below the threshold) the GSM modem is switched on directly by the monitoring station either to make a call or to send an SMS (depending on the settings) to the modem number(s) memorized.
Afterwards, the GSM remains on stand-by for 10 minutes.

2.7.2.3 Automatic mode

Certain particular conditions - apart alarms - can cause the modem to be switched on and off regardless of the programming time:

1. **AMB-8059/02 model only.**
   When the AMB-8059/02 is switched on, if the battery voltage is above **3,0** V, the GSM modem is switched on and remains on stand-by for 1 hour.

2. **AMB-8059/03 model only.**
   When the AMB-8059/03 is switched on, if the battery voltage is below **3,9** V, to allow the battery to be charged, the GSM is not switched on. In this case, for a faster recharge the battery charger should be used as indicated in §8.6.1. If the battery voltage is above the threshold, or upon reaching it, the GSM is switched on and remains on stand-by for 1 hour.

3. **Both models**
   If both Stand-By parameters ("Schedule for Modem" and "Schedule for SMS") are set to zero, the GSM would never be switched on and therefore the monitoring station would be unreachable. To avoid this condition, at 11 a.m. of the internal clock every day the GSM modem is placed on Stand-By for 45 minutes.

2.7.3 Status of the LED in relation to the status of the monitoring station

When the monitoring station is switched on, the LED on the bottom panel is first lit with a steady light for about 5 seconds, then starts to blink at the rate of one blink per second, indicating that the monitoring station is active in normal Stand-By conditions and **not** in the low consumption mode.

The condition in which the LED blinks at a rate of one (brief) flash per second indicating that the monitoring station is in Stand-By mode and not in low consumption mode, are the following:

- All the time the Modem is on Stand-By
  Even if no modem is provided with AMB-8059/00 and AMB-8059/01 the LED behaves in the same way. Even if the user will disable most of the modem functions through the software, the minimum periods at which the internal modem, if present, would be ON (first hour after switch ON without Low Battery alarm and from 11:00 to 11:45 when the "Schedule for modem" and "Schedule for SMS" are set to zero) the LED will be blinking every second
- The time between acknowledgment of a command (via RS232, USB, Ethernet) to about 60 seconds from the last command received.
- All the time between the attempts by the monitoring station to establish a communication with the probe to about 60 seconds after correct acknowledgement of the connection.

NOTE

After exiting this mode, the LED changes the manner of blinking to a (brief) flash every three seconds, thus indicating the low consumption status. The monitoring station remains in this status until an event rouses it and causes the return to Stand-by status again.
Possible events are:

- Modem switched on in Programmed or Spontaneous mode
- Sending of a programmed or spontaneous SMS
- Activity on the RS232, USB, Ethernet.
- Absence or malfunction of the probe

As indicated above, about 60 seconds after the termination of the event, the LED resumes blinking at the frequency of 0,3 Hz.

The LED also has five additional statuses:

- It blinks at a higher frequency than once per second during a communication (from the beginning to the end) to indicate the modem is in use.
- It remains on with fixed light during data downloads.
- It blinks red when the modem is on
- It blinks green when the modem is off
- It blinks orange when the Ethernet is connected

2.8 Micro SD

AMB-8059 is a self-contained instrument which does not require any external device such as mass-storage memory. Indeed, its built-in memory is large enough to store almost a full year data, with a rate of 1 minute.
However, the AMB-8059 supports Micro SD Card. It is solely intended for backing up data when no other way is accessible among the many present (RS232, USB, FTP, Ethernet and MODEM-CSD).
Therefore, for no reason should a Micro SD Card be left in the slot permanently, or for a long time, as its power consumption is 5 to 10 times higher than the whole monitoring station and the autonomy would be drastically reduced with no advantage at all.

In order to be used, a Micro SD Card should be first formatted, either FAT or FAT32, and then have a file named "SDCOPY.SD9"in the root.
The size of this file, "SDCOPY.SD9", determines the number of record will be backed-up on the Micro SD Card.
According to the §7.8 ""Download Description Multi-band EMF Area Monitor AMB-8059 for Single and three bands probes" and §7.9 "Download Description Multi-band EMF Area Monitor AMB-8059 for 4-Bands Probes", each record takes 32 bytes. Thus to store N records the required size is 32x N Bytes. For example, to back up 1000 records it is necessary to make the file "SDCOPY.SD9" whose size is 32000 bytes.
The AMB-8059, as soon as it detects the presence of an Micro SD Card, tries to open the file "SDCOPY.SD9" and, if successful, tries writing the last <size_of_file> divided by 32 records having thus the most recent ones. In the above example it would write the most recent 1000 records.
It is important to keep in mind that records will be aligned to last record-most recent record.

The Led let the user know about the state of process as shown in the following table.

TABLE 2-1 Led Micro SD status

LEDs	Status	Action
Blinking RED	DATA is being storing	***** DO NOT REMOVE the SD Card *****
Steady RED	SD Card ERROR	This can be caused by: • SD-card not formatted FAT or FAT32 • Damaged SD-Card •
Steady ORANGE	SD Card ERROR	This can be caused by: • File "SDCOPY.SD9" not present. • Non-Writable SD-Card

The speed of storing is roughly 128kB (4096 records which are nearly 3 days with 1 min storing rate) in 5 seconds
Keep in mind that when storing all tasks are suspended thus it is better to limit the size to the minimum required to avoid missing data.
Once more, do not leave the SD-Card in the slot as it would not store anything more, the storing process is triggered only by SD-Card insertion, but would draw energy reducing thus the autonomy.

2.9 Field probe

The technical features of the field probes are listed in Chapter 1 of this manual.

Should it be necessary to change the probe, this must be inserted and removed holding it by the metal part of the connector.
Inserting or removing the probe holding it by its support or head could heavily damage it.

When opening the protective case of the monitoring station, to avoid damages, remove along its axis the protective case from probe.

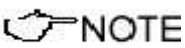
Before removing the probe, switch off the monitoring station. To avoid damages to the probe connector, the insertion key must be placed with care in correspondence of the connector.

2.10 RF signals of dangerous intensity

The probes used in the NARDA Multi-band EMF Area Monitor contain highly sensitive elements.
Never place the probe in an electrical field higher than the maximum allowed for that probe**.**

If radiated by strong electromagnetic fields, the probe can be damaged even if disconnected from the monitoring station, or connected to a monitoring station that is switched off.

2.11 Signals with AM modulation



When measuring fields coming from antennas transmitting at frequencies lower that few tens of MHz (e.g. medium wave AM stations), it is advisable to place the probe with the supporting handle perpendicular to the polarization of the antenna, so as to prevent it from affecting the measurement. In this case, if the monitoring station is installed indoor it should be placed in horizontal position. For outdoor installation the maximum allowed rotation (see §8.8.2) should not be exceeded.

The type of field sensor installed is automatically detected by the control system integrated in the NARDA Multi-band EMF Area Monitor, so it is not necessary to perform any operation after installing or replacing it.

2.12 Controlling the internal batteries

The voltage level (AMB-8059/00 and AMB-8059/02) or the level of the charge (AMB-8059/01 and AMB-8059/03) can be checked locally or by remote using the 8059SW-02 program: there is a specific window which displays battery voltage and where a battery charge alarm can be set, if necessary.
The battery status of stations equipped with GSM modem can be read from any mobile phone by sending an SMS with the code **#BM?BAT***.

WARNING

The lead batteries used in the AMB-8059/01 and AMB-8059/03 can be damaged if the charge drops to less than 3,2V.
Below this value chemical processes that could damage them begin. Therefore, if the unit is not used it should be switched off. For indoor applications or in the shade, do not use the station for longer than 80 days.
If it should be necessary to store the unit for a period of few months, it is advisable to disconnect the wire between the main unit and the Solar Module (AMB-8059/01 and AMB-8059/03 only).

WARNING

Any part of the instrument, with the sole exception of the battery of AMB-8059/00 and AMB-8059/02, can only be replaced by NARDA, therefore in case of any damages to parts and/or malfunctions, please contact the NARDA Service Center.

WARNING

Risk of explosion if the battery of AMB-8059/00 or AMB-8059/02 is replaced by an incorrect type. To replace the battery follow the instructions.

2.13 Power consumption and operating mode

The monitoring station is a device with very low current absorption. To achieve that, a number of different solutions have been applied, but the main one is to reduce the activity of the microcontroller to the very minimum.
Depending on the operating status of the monitoring station, it will absorb different current values for each status.

NOTE

The minimum consumption is obtained with the GSM modem completely off. In this mode, even the microcontroller shuts down about 20 seconds after having received the last command, with regular interruptions 20 times a minute to perform the check and function routines. This is the status in which the monitoring station operates most of the time.

Any command sent via RS232, USB, Ethernet immediately rouses the microcontroller. However, because of the peculiarity of the stop status, in this case the command is lost and must be sent again in order to be carried out. This is done automatically by the management software and should be taken into consideration by the User in developing any custom software.

WARNING

Obviously, this does not occur in case of commands issued via SMS or in case of connection via modem, as the microcontroller is always on when the GSM modem is on stand-by.
It should be noted, also, that the current absorption may be higher than normal, even with the modem off, when:

- **Data is required (the microcontroller is working);**
- **Any commands are sent (the microcontroller is working);**
- **There is no probe (the microcontroller is constantly in search mode);**
- **The RS232, USB, Ethernet cable is connected to a port (even if not in use).**

3 – 8059SW-02 - User's Guide for local RS232 and remote CSD communication

3.1 Introduction

This Chapter provides a guide for the installation and use of the data acquisition and control software 8059SW-02.
It also explains the functions available and the configuration details.

3.1.1 Connection

All AMB-8059 models can be connect to the PC via USB; in the AMB-8059/01 and AMB-8059/03 is also available a RS232 and Ethernet port.

AMB-8059/02 and AMB-8059/03, that are equipped with a GSM/GPRS modem, provide additional remote communication modes like SMS (see chapter 7), GPRS/FTP (see chapter 4) and CSD.
CSD is a dial-up, point to point, remote data communication and require that the SIM card installed in the area monitor modem, as well as the one installed in the PC modem (if GSM), are specifically enabled for CSD communication mode.
8059SW-02 shows two main sections: CSD and FTP. This chapter describes the CSD section only that provides functionalities for the local RS232, USB and Ethernet communication too.

AMB-8059/00 and AMB-8059/01, which do not provide remote communication capability, will be therefore managed through the CSD section of 8059SW-02 control software. To operate stations not equipped with modem all settings related to the CSD remote communication will be disabled, whenever possible, or set as specifically indicated in the following instructions

3.1.2 First Connection

The first connection may take place either via GSM modem (if available, depending on station model) or via direct RS232 or USB connection. The direct connection is much faster, therefore it is advisable to make the first connection in this way even if the subsequent operations will be done via GSM modem. For more details see chapter 2.

Remote communication in CSD mode is protected by a "Device Password" that is stored in every AMB-8059 Area Monitor.
The same password must be set, by the user, in the CSD station list provided by the control software.

WARNING

Remote communication in CSD mode is not allowed in case the two passwords do not match.
Device passwords are not checked during local RS232 or USB or Ethernet communication.
All the monitoring stations are initialized in the factory with the password "PASSPMM" that is advisable to replace during the first connection.

NOTE

Using a GSM Modem make sure the PIN code of the SIM card in use has been removed.

NOTE

For GPRS communication mode, first connection must be done via RS232 or USB cable to allow proper setting of GPRS parameters.

The 8059SW-02 software is a control program fully integrated into the AMB-8059 Multi-band EMF Area Monitor. It allows to access all the remote Field Monitor stations to download data and modify station settings.
Downloaded data are filed within the controller PC and a calendar style search tool allows data displaying, printing and saving in graph and tabled form.
The data transfer can be controlled by:
- USB cable connection (every AMB-8059 model)
- RS232 and Ethernet cable connection (AMB-8059/01 and AMB-8059/03 model only)
- Line or GSM PC modem (AMB-8059/02 and AMB-8059/03 set for CSD data communication)
- Internet by means of the user's FTP server (AMB-8059/02 and AMB-8059/03 set for GPRS/FTP data communication)

The software is based on the Windows™ operating system.

The 8059SW-02 software features the following basic functions:

- Querying and monitoring all the AMB-8059 Multi-band EMF Area Monitor installed;
- Programming different monitoring stations individually with different acquisition modes;
- Querying the Field Monitors at user programmable times (only stations equipped with modem);
- Communicating via line modem, GSM modem, Internet FTP, RS232, USB or Ethernet;
- Protecting accesses with different keys at different querying levels;
- Controlling and verifying the reliability of the data recorded;
- Protecting the data recorded;
- Acquisition and display of fields detected on different frequency bands (depending on the probe in use), providing for each the average and peak values;
- Saving and manipulating all the downloaded readings;
- Saving graphs and tables representing all the measured data;
- Downloading data with automatic generation of Bitmap (.BMP) and text file (.TXT) to be used for easy data exchange with any "Office" applications;
- Keeping traces of all the commands launched (LOGFILE).

3.2 Hardware requirements

To ensure the proper operations of the 8059SW-02 software, the minimum hardware requirements of the Personal Computer are:

- Pentium processor;
- at least 16 Mb RAM;
- at least 100 Mb of free space on your hard disk;
- minimum display resolution 1024x768 (the Windows™ default screen appearance setting is recommended. Depending on the operating system in use, some customized screen appearance could cause abnormal displaying of the control software);
- GSM or line modem (for CSD data communication);
- Full Internet access allowed for FTP (for GPRS communication);
- Free USB or RS232 or Ethernet port;
- Operating System: Windows™ XP, Vista, Win7.

PC modem can be either internal or external, line modem or GSM. It must support the data transmission protocol.

NOTE

If a GSM or PCMCIA GSM model with SIM Card is used, it must allow to receive and transmit data, not only on fixed phone numbers but also to and from cellular phones; check with the Telephone Service Provider to make sure this additional service is available.

For proper installation of the modem refer to the instructions of modem manufacturer.

NOTE

The User might have the need of administrator privileges to install the software in Windows 7; for further information see the next paragraph.

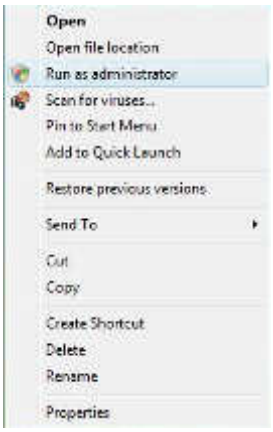
3.3 Software installation

To install the 8059SW-02 on PC from the supplied CD-ROM proceed as follows:

Insert the 8059SW-02 CD into the PC CD-ROM driver.
In Computer Resources double click on the corresponding CD-ROM driver.
To start the installation double click on the **8059NSTS Setup** icon.

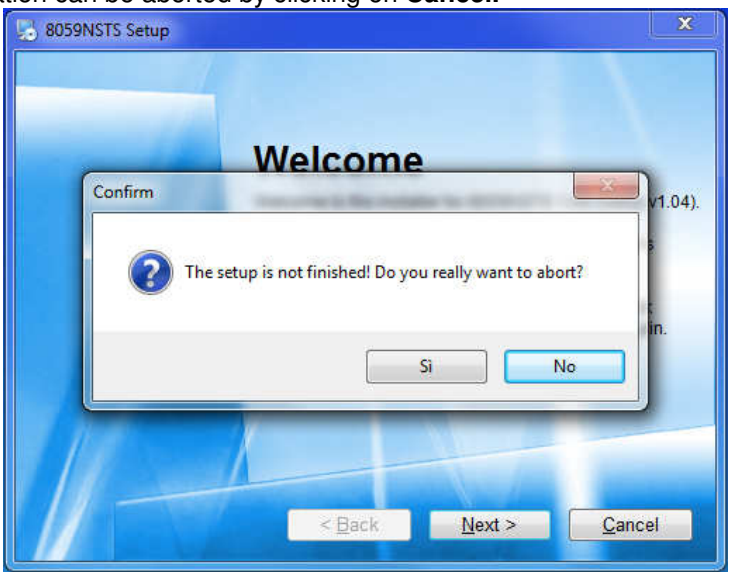
NOTE

The User must have administrator privileges to install the 8059SW-02 software in Windows 7; right click on the program .exe file and click on "Run as administrator" to temporarily run the program or application as an administrator until close it (Windows 7 also allows to mark an application so that it always runs with administrator rights).

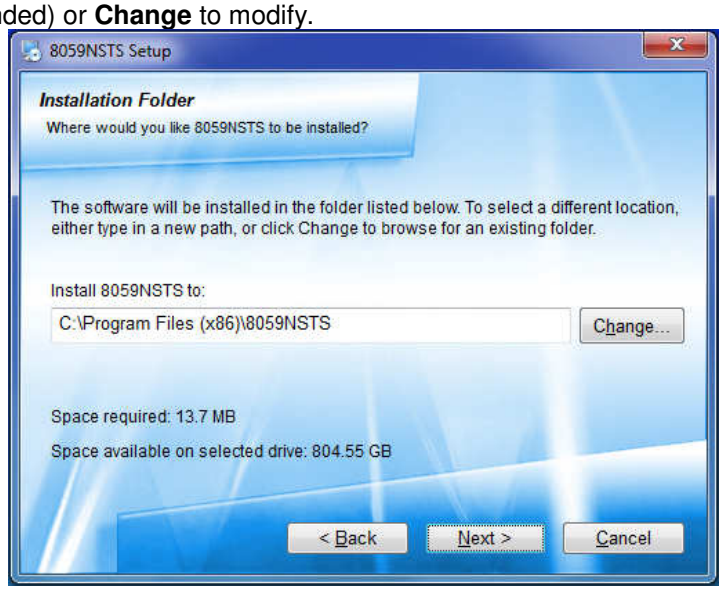


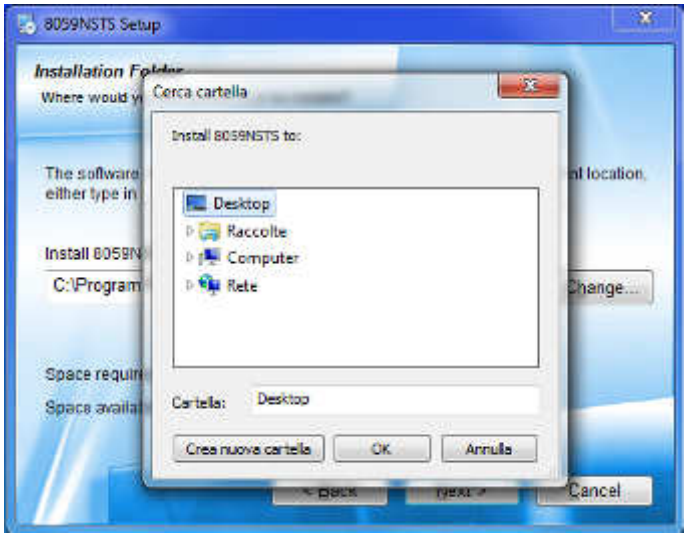
Follow set-up program instructions

The installation can be aborted by clicking on **Cancel.**

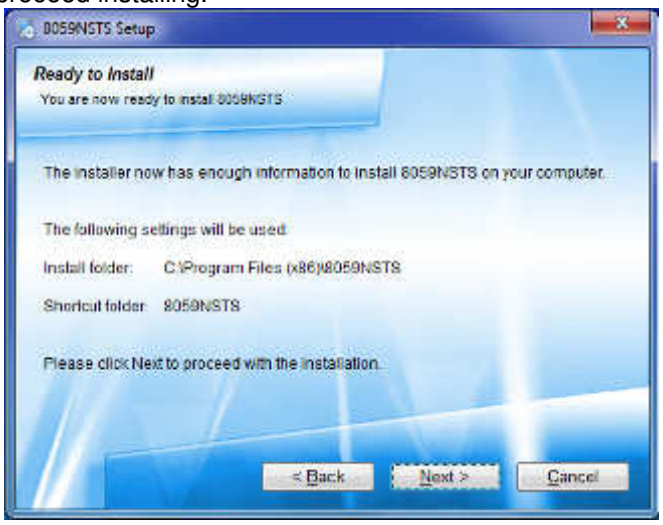


The installation folder must be specified. Click **Next** to confirm the default folder (recommended) or **Change** to modify.

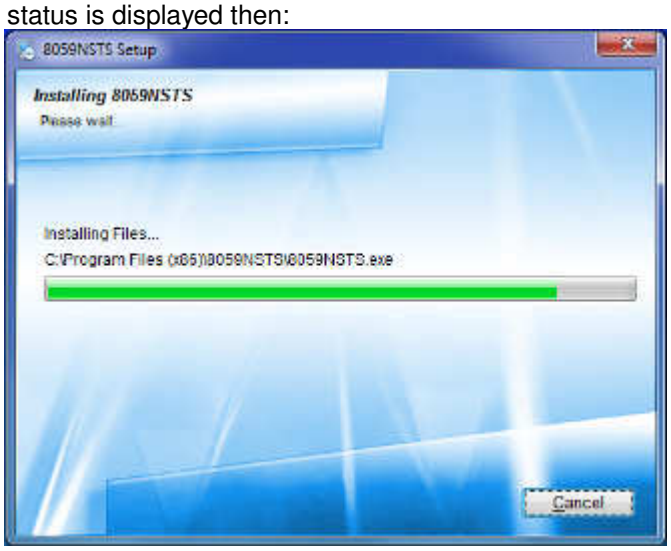




Click **Next** to proceed installing.

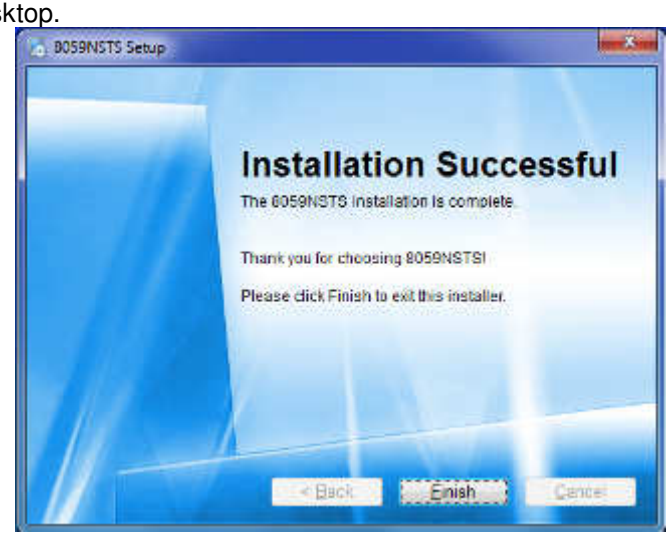


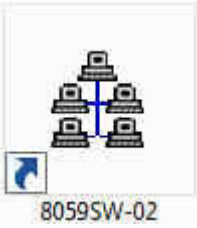
The installing status is displayed then:



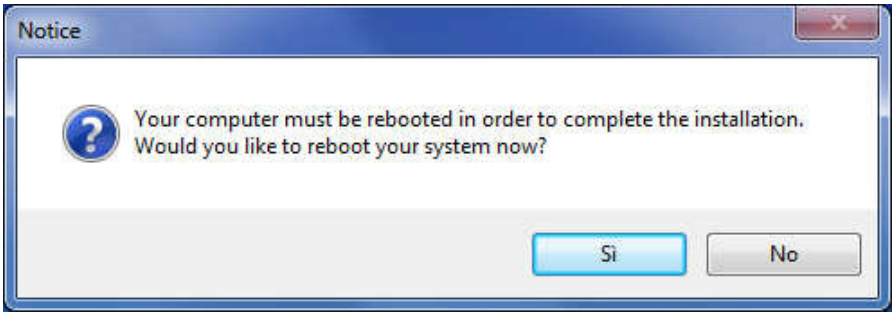
Click **Finish** to complete and exit the installer.

The folder **8059NSTS** is created under **Programs** with the icon **8059SW-02** on desktop.





When asked for, reboot your system to complete installation



8059SW-02 software is now installed in your PC, you can remove it, if needed, simply running the **Uninstall 8059NSTS** application (see §3.22).

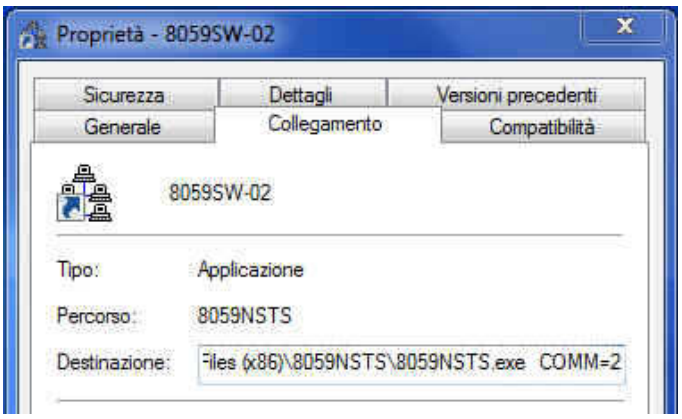
3.4 Assigning the Serial port

After startup, the program select the first available COM port that will be used for direct RS232 or USB connection or remote CSD communication by means of a PC modem.
A specific COM port must be usually selected to drive the control software to the AMB-8059 Area Monitor or some specific device like PC modem or RS232-to-USB converter that is needed if no RS232 port is available in the controller PC.
To assign a specific COM port proceed as follows:

- Select the icon **8059SW-02** with the right mouse button;
- Select **Properties**;
- Add the command COMM=N preceded by a space (in capital letters) at the end of the Destination field where N indicates the serial port to be used; for example, if the AMB-8059 Area Monitor or the PC Modem is connected to port 2, add the command COMM=2.

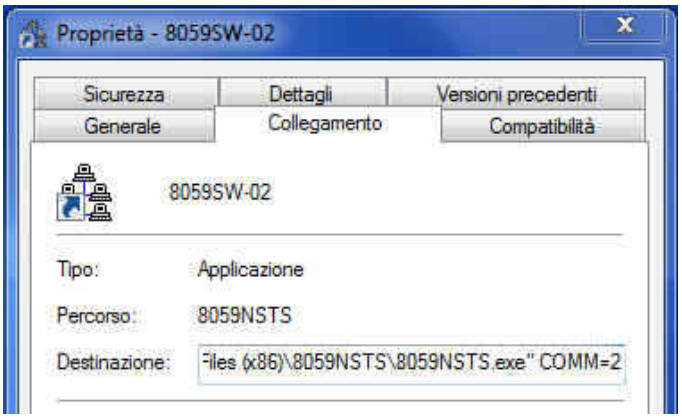
The assigned COM port nr. must be between 1 and 9.

NOTE



- **In some operating system the Destination field is enclosed in double quotation marks (“); in this case, the command COMM=N, preceded by a space must be outside as in the example below;**

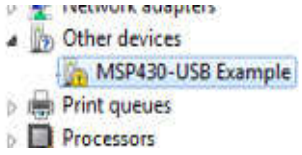
NOTE



- Then confirm by selecting Apply

3.5 Virtual COM port installation

All AMB-8059 models can be connect to the PC via USB.
When connect the AMB-8059 to the PC USB port for the first time, a message informing that new hardware has been found.
Enter in **Peripheral management** (**Start** > **Control Panel** > **Device Manager).** In **Other Devices** will be shown the device **MSP430 – USB Example** with a yellow exclamation point next to it.

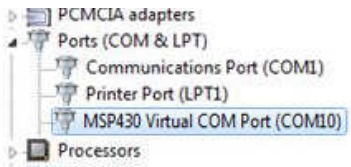


MSP430 Virtual COM Port requires a driver program to be installed in the system. The 8059SW-02 installation folder includes the file requested for the driver installation.

To install the MSP430 Virtual COM Port select the device **MSP430 – USB Example** with the right mouse button, click **Upgrade driver software** and **Browse my computer for driver software**.
Select **Browse,** locate the folder where is stored the file **MSP430_CDC.inf**, select **Next** and allow Windows to install the driver program.

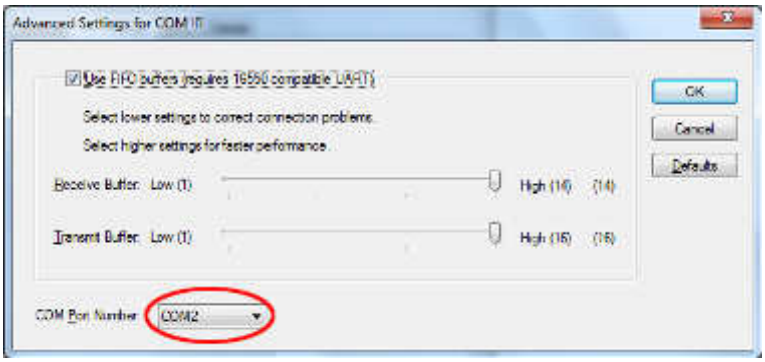
NOTE

After having installed the MSP430 Virtual COM Port successfully, make sure the assigned COM port nr. is comprised between 1 and 9.
In **Peripheral management,** the assigned COM can be found in **Ports (COM & LPT) – MSP430 Virtual COM Port (COMx)**.
COMx shows the COM port assigned to the device.



NOTE

If the device is set for a COM port nr. Not comprised between 1 and 9, double click the line **MSP430 Virtual COM Port (COMx),** enter in **Port settings** and **Advanced.**
In **Advanced Settings** select the COM port and click **OK** to confirm.



NOTE

The serial port selected must correspond to the value of COMM=N on the Destination line of the icon properties of the software 8059SW-02.
In the example shown above, for the MSP430 Virtual COM Port write COMM=2 (in capital letters).

3.6 Checking the modem

If you use the CSD remote communication but the software 8059SW-02 does not detect any modem or you are not sure about the connection with the PC or its working conditions, proceed as follows:

- To use the CSD remote communication, the baud rate of the Modem must be set to 115200.

- Preferably, a GSM PC modem should be used for calling remote stations in CSD mode. A line modem can be used but it should be connected to a direct phone line (the same connection used for a fax machine). Sometimes, if there is a switchboard system, it may only be possible to place outgoing calls but not to receive incoming calls (where an extension may be needed, etc.).

- Remove the PIN CODE on the SIM card and be sure that on the monitoring site the signal of the selected GSM provider is strong enough to allow operations.

- Be sure that the tray for the SIM card is locked inside its slot

- Make sure all cables are well connected to the Modem.

- Make sure the serial port corresponds to the value of COMM=N on the Destination line of the icon properties of the software 8059SW-02.

- Send some command by means of any Terminal program or similar applications to make sure the modem is working properly.

3.7 Starting the program

NOTE

The User must have administrator privileges to run the 8059SW-02 software in Windows 7; right click on the program .exe file and click on "Run as administrator" to temporarily run the program or application as an administrator until close it (Windows 7 also allows to mark an application so that it always runs with administrator rights).

Click twice on the 8059SW-02 icon to start the software. First a window appears displaying the software release, the port COM assigned and, if the previous time 8059SW-02 was closed from the CSD section, the presence and the status of the modem will be checked .

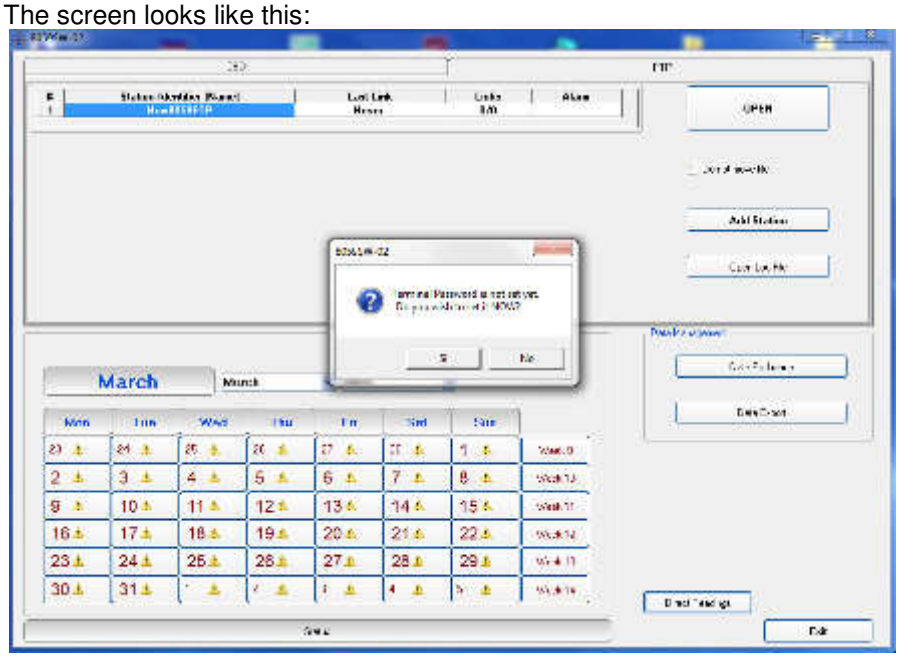
In case the software does not detect any modem the message **MODEM NOT FELT** will be displayed.

In case a modem is detected, the message **MODEM OK** will appear.

3.8 Password management

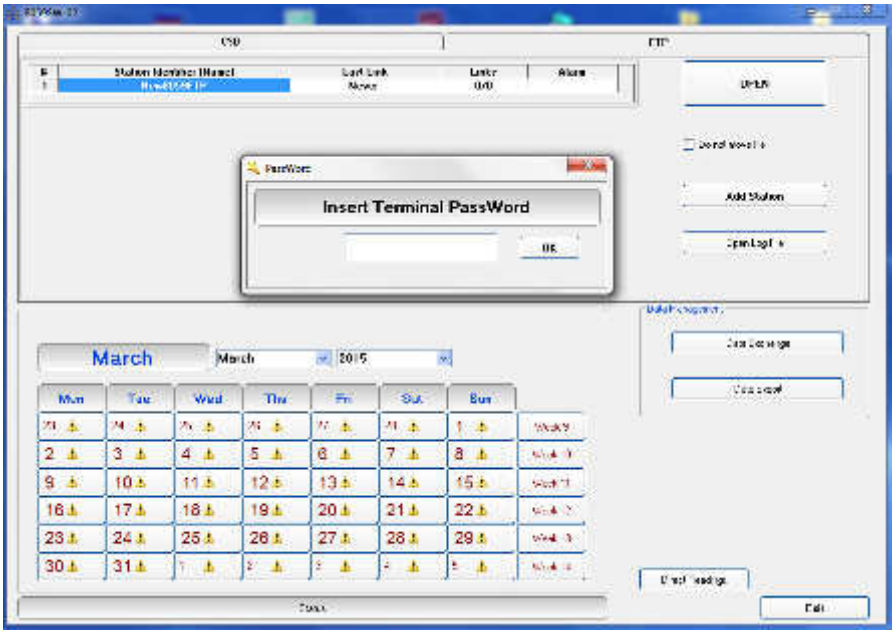
3.8.1 Entering the Terminal PASSWORD

8059SW-02 allows the user to create a list of all stations that are going to be used. The list include parameters, like telephone number, station name, ecc. needed by the software to access every single station. To avoid any improper modification of parameters included in the station list by non admitted personnel a **Terminal password** is needed. Running the software for the first time after installation the user is allowed to define the password.
The screen looks like this:



NOTE

If the answer is YES, a window will be opened where it is possible to enter the Terminal PASSWORD for the management of the Station list parameters. If the answer is NO, the program will allow to enter the password later. If the answer is YES, the screen looks like this:

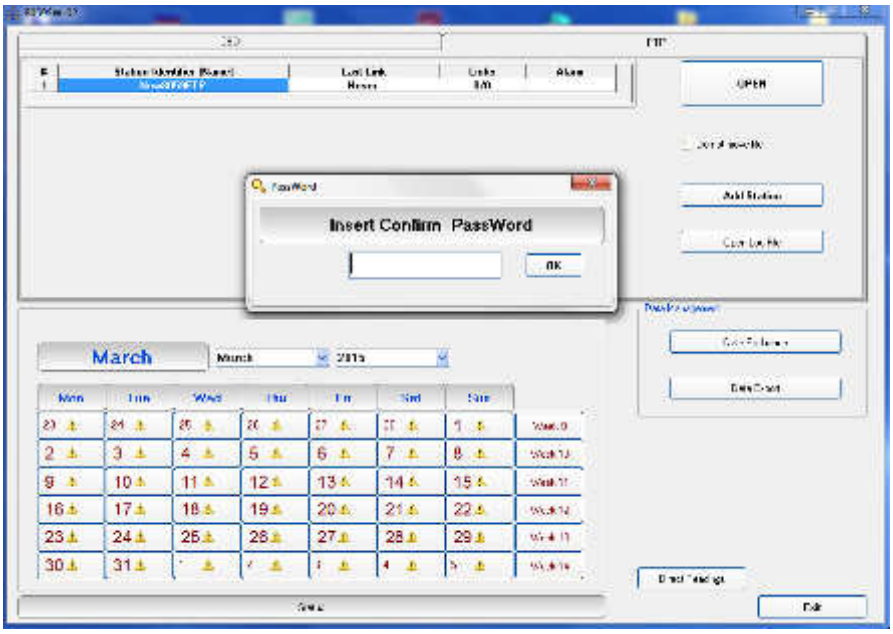


NOTE

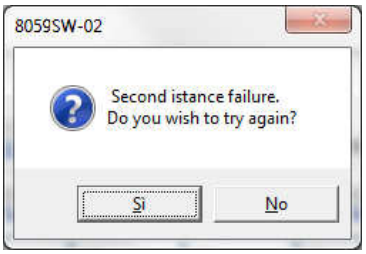
The User can enter any sequence of alphanumerical characters; any special characters are not allowed.
We recommend to take note of the Terminal PASSWORD entered.

After entering the **Password** with **OK**, the software will request confirmation of the password before registering it into the system.

The next screen will therefore look like this:



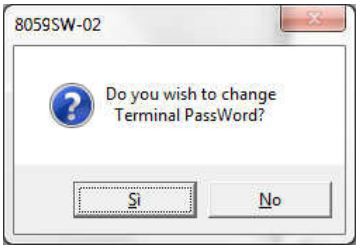
At this point, type the same **Password** again. In case of any mistake, the software will display the following message:



After the answer **YES** it is possible to re-enter the correct password; answering **NO** the procedure for the assignment of a new password starts over again.

3.8.2 Changing a Password

If it is necessary to change the Terminal Password, just press function key F10 while the software is displaying the main window that includes the station list. The software displays the message:



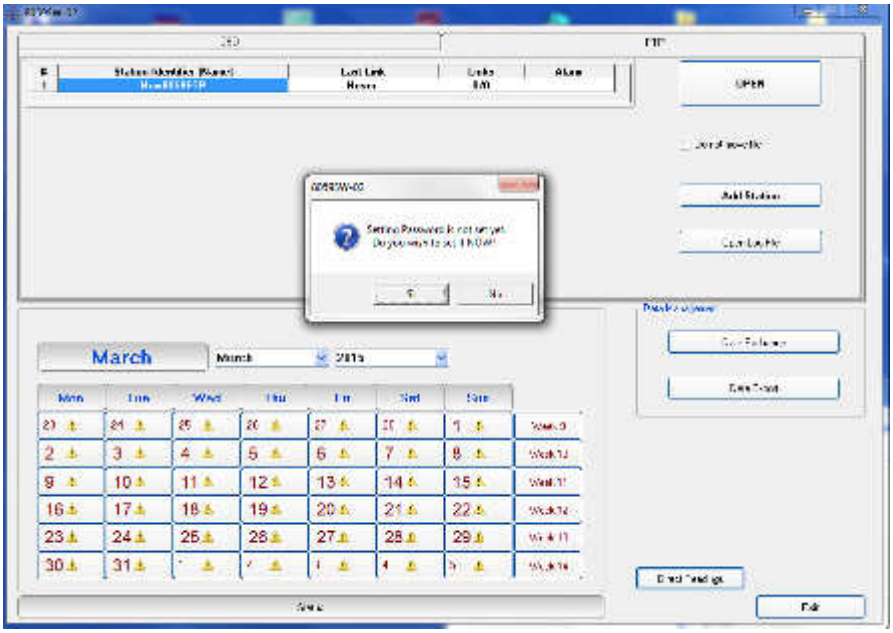
If the answer is **YES**, first enter the old **Terminal Password,** then enter the new one.

If a wrong **Terminal Password** is entered, the following message pops up:**:**

Press **OK** and try again.

3.8.3 Entering the Setting PASSWORD

After entering the **Terminal Password** needed to ensure the secure management of the Field Monitors, the software asks to define a **Setting PASSWORD** which is needed to edit the station settings like storing Rate, station clock, thresholds for alarm, ecc.. The **Setting Password** screen looks like this:



If the answer is **YES**, the User will be asked to enter and confirm a new **Password** (which may be different from the Terminal Password).
If the answer is **NO,** it is also possible to enter this Setting Password later on, at the time of the first call to the Field Monitor.

NOTE

The User can enter any sequence of alphanumerical characters; any special characters are not allowed.
Always take note of the Setting Password entered.

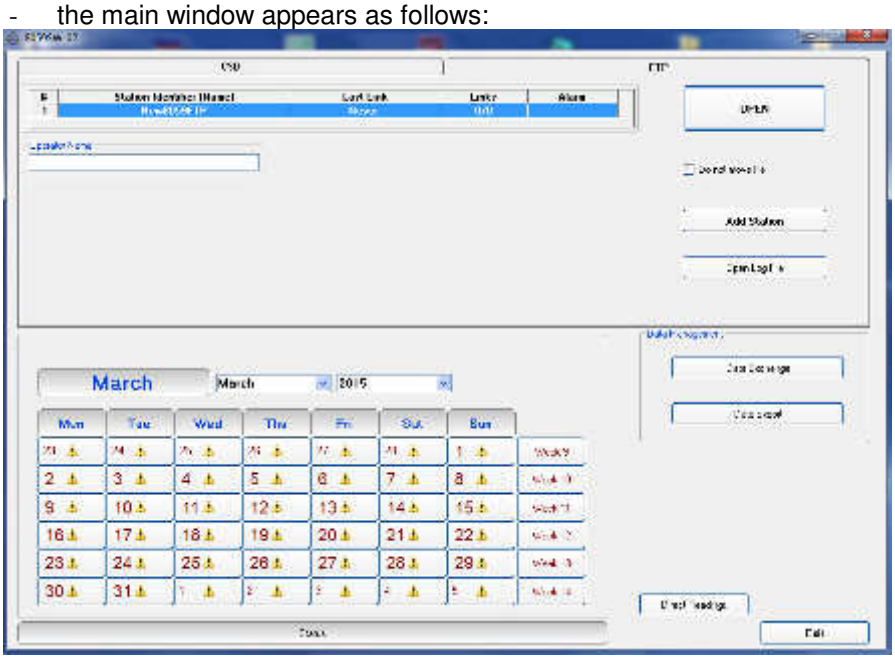
3.8.4 Setting stations to CSD communication mode

Stations equipped with GSM/GPRS modem are initially set, at the factory, for GPRS/FTP communication mode.
Stations set for FTP communication are intended to be configured by means of the user's FTP server through the Internet connection but can be accessed, locally, by connecting the RS232 or USB cable and, even if not recommended, by means of CSD calls too.

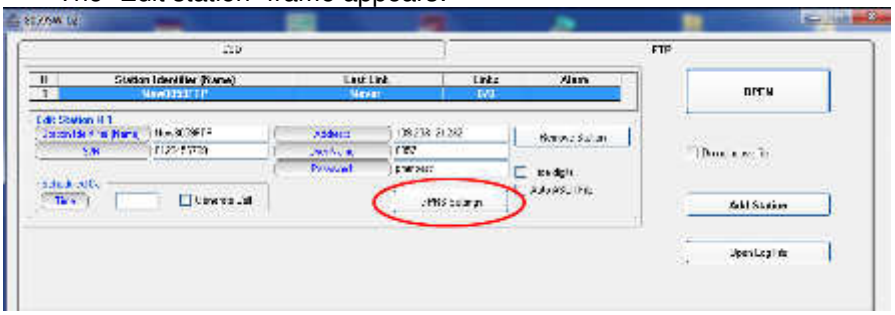
Some commands, specially related to the modem activity, are not enabled for the real time setting that can be done in RS232/USB and CSD if the station is set for FTP communication.

AMB-8059/02 and AMB-8059/03, if intended to be normally accessed for programming and data downloading in CSD or RS232 or USB communication mode must be set accordingly the following steps:

- connect the station to the controller PC by means of the cable for RS232 or USB communication and assign the correct COM port.
- run 8059SW-02 and, if not already active, select the FTP section by clicking the FTP area on the right, upper side of the main window.
- the main window appears as follows:

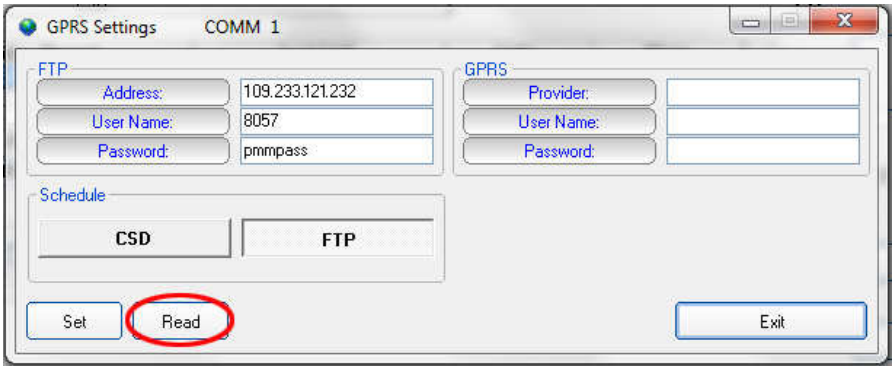


- double click the first station listed in the FTP station list (new software installations show the "New8059FTP" station, on the list, as an example).
- The "Edit station" frame appears:

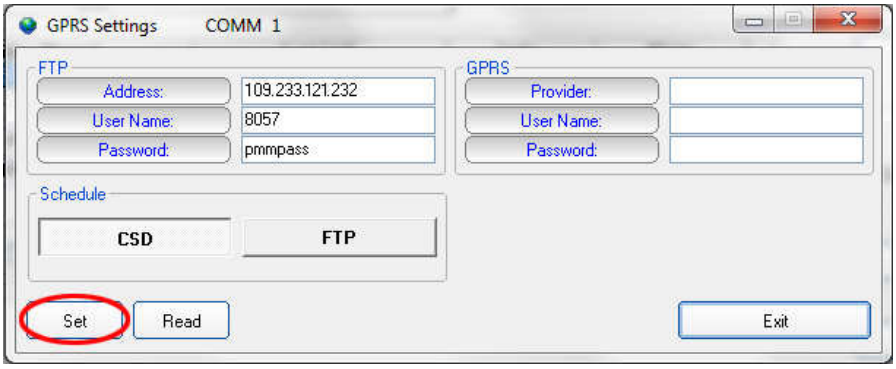


- click the button "GPRS Settings"

- The GPRS Setting window allows to set stations for FTP or CSD



- click the “Read” button and type the Terminal password when requested.
  The “Read” buttons queries the station connected by RS232 or USB and displays, in the “Schedule” frame, which communication mode is enabled.
  The above picture shows a station set for FTP communication mode.
- To set the station to the CSD mode select “CSD” in the “Schedule” frame, click the “Set” button and type the Terminal password when requested.



- the “Read” button can be used to check that the CSD mode has been correctly enabled in the station connected to the controller PC.
- Click the “Exit” button to go back to the main window and select the CSD section.

3.9 Main window

After entering the Passwords, the program displays the main window:

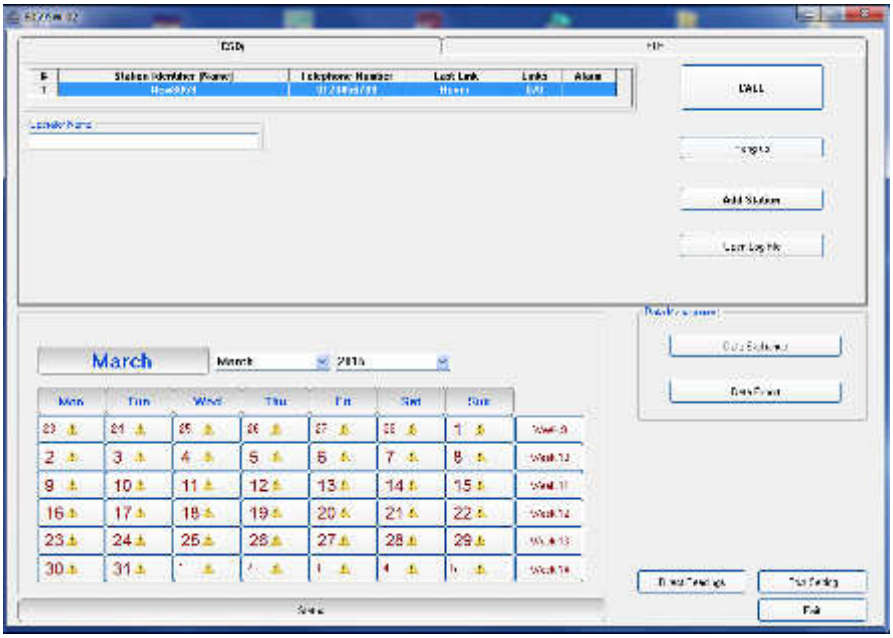
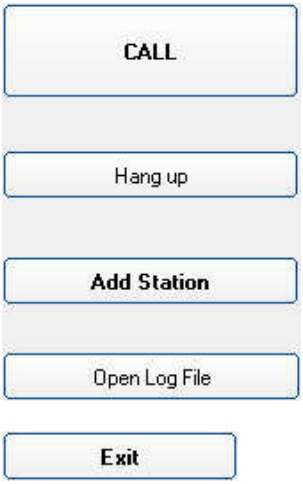


Fig. 3-1 CSD Main window

The first part of the main window is used to select from the list the Field Monitor to be queried. The 8059SW-02 software automatically installs, as an example, a dormant station called “New8059”.

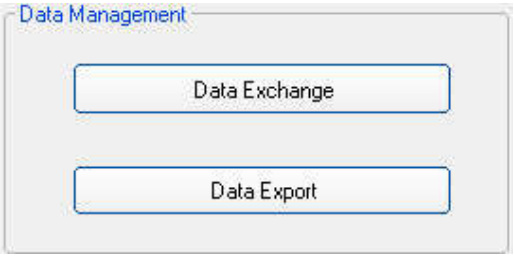


The following commands are also available:

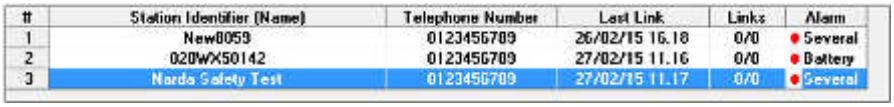
- **CALL** to make a CSD call or start RS232 or USB local connection to the station selected;
- **Hang up** to end the call/connection in progress;
- **Add Station** to add a new AMB-8059 Area Monitor to the list;
- **Open Log File** displays all settings and main activities automatically and manually downloaded from the station
- **Exit** to exit the program**.**

A “Data Management” window contains the following commands:

- **Data Exchange** to exchange data with other control centers (i.e. other PC’s);
- **Data Export** to generate .txt and .bmp files of measurement results related to user selectable time periods.



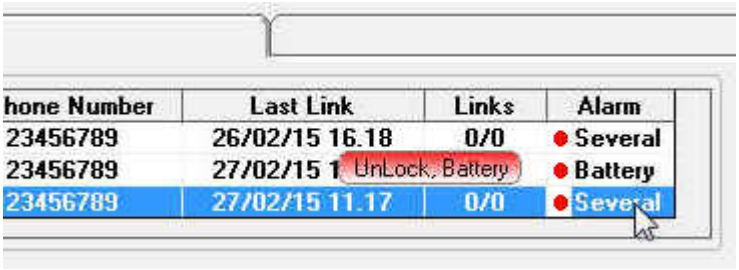
The list of remote stations contains the following information:

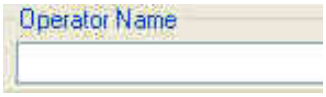


tt	Station Identifier (Name)	Telephone Number	Last Link	Links	Alarm
1	New8059	0123456789	26/02/15 16.18	0/0	Several
2	020WX50142	0123456789	27/02/15 11.16	0/0	Battery
3	Narda Safety Test	0123456789	27/02/15 11.17	0/0	Several

- **Station Identifier (Name):** the name of the monitoring station;
- **Telephone Number:** the phone number (CSD) of the station SIM card;
- **Last Link**: date of the latest connection made;
- **Links**: number of completed connections/number of trials;
- **Alarm**: alarm status relative to latest link.

The status of alarms relative to latest link, in the last column, is normally empty if there are no alarms. A red dot is displayed, followed by a description of the type of event causing the alarm in case of just one alarm. If more alarms occurred, to avoid overcrowding the column the word "**Several**" is displayed: simply move the mouse cursor above the description to display the list of all the alarms.





The name of the operator can be entered in the “Operator Name” field, so as to maintain a log of the operations performed and who requested them.

3.10 Station management

3.10.1 Entering a new station

To make a call or download data from an existing Field Monitor, it is necessary to use the **Add Station** command and add the station to the list. The screen looks like this:

The procedure to add a station is as follows:

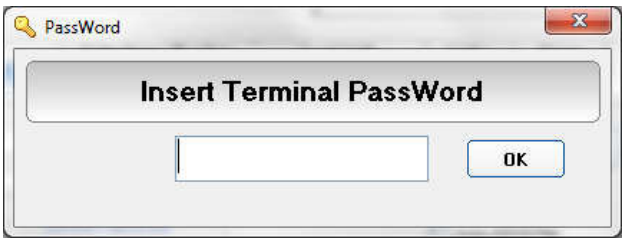
- Enter the station name (alphanumeric ASCII characters only) on the **Station Identifier (Name)** line. This name will be recorded in the station memory the first time it is queried. It will also appear on the display of your mobile phone every time the station is queried via SMS or when that station sends its daily Reports;
- Enter the **Telephone number** of the SIM card installed in the station (SIM cards allowed for CSD data communication are generally provided with three different numbers: Voice call, Fax, Data. Be sure to type the number assigned for CSD data communication); **the field Telephone Number must be filled even if the CSD communication mode is not desired or provided. Type a number string like "0123456789" to add the new station to the station list.**

NOTE

- Enter the **Device Password** identifying the station to allow CSD remote communication;
- If necessary, select one of the **Automatic Download** functions to start downloading data automatically every time a remote station calls the controller PC (**PC answering**) and /or every time the controller PC calls a remote station **(PC calling**).
- Select **Auto ASCII File** function if you want a data txt file to be automatically generated after any data download has been completed;
- In the **Scheduled Call** field, enter a **Time** when the PC, if enabled with the **Generate Call** function, automatically calls the station in CSD mode.

NOTE

The Terminal password will be requested for every operation.



If a wrong **Device Password** is entered, the following message appears when trying to access the remote station in CSD mode:

NOTE

Entering the Device Password prevents the station from being queried by any unauthorized person who might in some way to know its telephone number.
This Device Password is unnecessary only when connection is make via cable (RS232 or USB).

Device Password is request for every access through Modem or SMS, while it is not necessary when a direct connection via RS232 or USB is implemented. However, in particular conditions listed below, the Monitoring Station becomes inaccessible with direct RS232 or USB connection, even if the Password is entered, while it remains normally accessible, of course with Password authentication, via Modem.

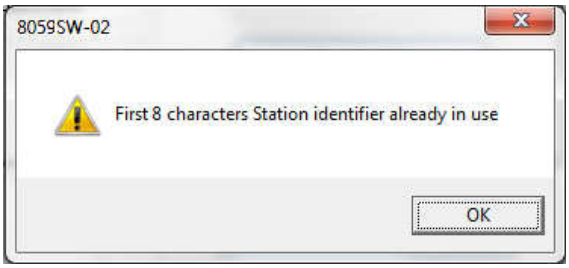
These conditions are:

- Spontaneous call from the monitoring station (upon appointment or alarm) not successfully completed. In this case the station is not accessible via RS232 or USB for all the period in which the station try to make a connection. This period may last at most 30 minutes.

- Spontaneous transmission of SMS from the station (upon appointment or alarm). In this case the station is not accessible via RS232 or USB for additional 2 or 3 minutes after a successful sending of the SMS.

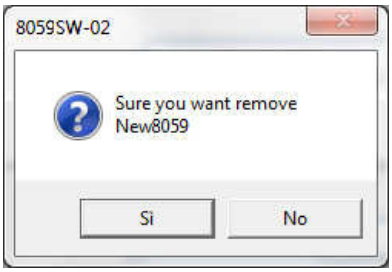
NOTE

The first 8 characters of the Station Identifier (Name) must differ from those of any other stations already entered. If they do not, the following error message will be displayed:



3.10.2 Removing a station

To remove a station from the list, click **Remove Station**. The message is:



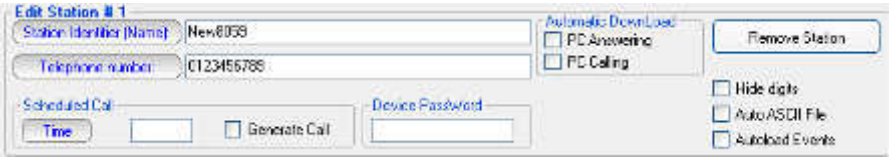
If the answer is **YES**, the software will require to enter the Terminal Password, and the station will be deleted; if the answer is **NO**, the operation will be aborted.

NOTE

Removing stations from the station list does not erase measurement results that will be still available if the same Station Identifier (Name) is added again to the station list.

3.10.3 Editing a station

To change the name or telephone number of a station, click twice on the line relative to the station to open the following window:

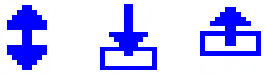


It is now possible to edit the necessary data, enable or disable automatic download functions or automatic creation of .TXT files, or change the status of the function relative to data display (name and telephone number). For each of the above operations the program will require to enter the security *Terminal Password*.

3.10.4 Automatic data downloads

The window for editing or adding the stations also provides an **Automatic Download** function which makes monitoring fully automatic, with transfer of the data from the station, generation of the .TXT file, etc..
Therefore some stations can be programmed for manual connection and others, after being called, will automatically transfer the data, while others again will automatically call (or be called by) the control PC at a certain time of day and download their data by themselves.

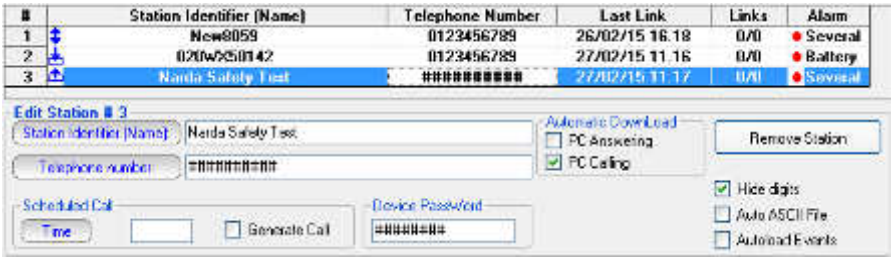
It is possible to enable every station for automatic download by selecting the flag **PC Answering** or **PC Calling** or both.
In this case three symbols appear at the left of the station name:
Arrow up = PC Answering
Arrow down = PC Calling
Both = both flags selected



If no command is enabled, data can only be downloaded manually.

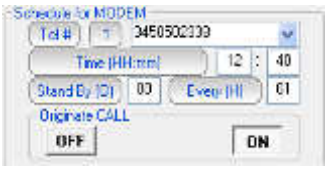
NOTE

If the function "Hide Digits" is selected, the telephone numbers and Device Passwords of the stations to call, edit or add will be encrypted and no longer displayed on the window screen.



The telephone number will be masked even in the status window.

3.10.5 Answering



By enabling the command PC Answering, at the scheduled time the station equipped with the GSM modem and enabled for CSD communication, calls the modem connected to the PC and automatically downloads all its data.
To program the station to do that, proceed as follows:

- access the station by pressing Call;
- wait for the connection to be established;
- when the software displays the configuration of the station, use the command Enable Setting and enter the Setting Password;
- In the window Schedule for MODEM write the telephone number the station has to call (PC modem). 2 different telephone numbers can be entered, that will be called in sequence. The first of these number that will answer and secure a communication will receive the data. This means that the data will be downloaded only on a PC that is switched on with the modem enabled;
- In the Time window enter the time when the call has to be made (of course the PC and modem must be on at that time);
- In the Stand BY (H) window write for how long the GSM modem must stay on. To save battery power, select the shortest possible time. Writing 00, the station switches the modem on, sends the data and switches it off immediately;
- In the window Every (H) enter a submultiple of 24 hours defining the daily rate at which the operation has to be repeated;
- The function Originate CALL should be ON. If OFF is selected, the modem will be switched on but no call will be made.

On receiving a call via modem from a station, the 8059SW-02 software requests that the calling station identifies itself and on the basis of the response string, it proceeds as follows:

1. If the ID (Name assigned to the station) of the calling station is on the list of known stations, the 8059SW-02 prepares to receive the data in the corresponding directories;
2. If the ID is not in the list of known stations, the 8059SW-02 adds the new station to the list (leaving the telephone number field empty) and creates the directories to receive the corresponding data;
3. If the ID is not provided or does not respect the protocol (e.g. a call by a telephone), the 8059SW-02 put itself in stand-by.

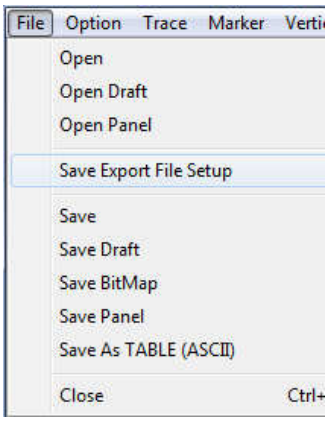
After having identified the calling station, all the parameters are requested in order to trace the call in the proper log, and after that all the field data since the latest successful link are requested, so as to ensure continuity of the downloaded data.
After the download of the data, the software sends the hang-up command to the station to minimize link time and make itself available for another call.

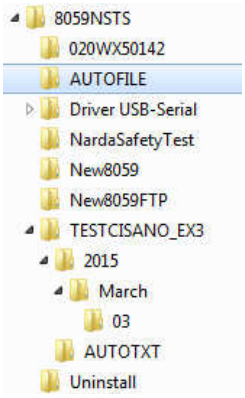
3.10.6 Calling

When the PC Calling function is enabled, every time the station is called using the CALL or "Scheduled CALL" commands, the data present on the station - and recorded since the latest download - will be automatically downloaded to the PC. This can be very useful because it makes unnecessary to remember the time of the latest download. After having completed the automatic download, the station does not hang up immediately but remains linked until either the call is ended manually or for 2 minutes after the last operation.

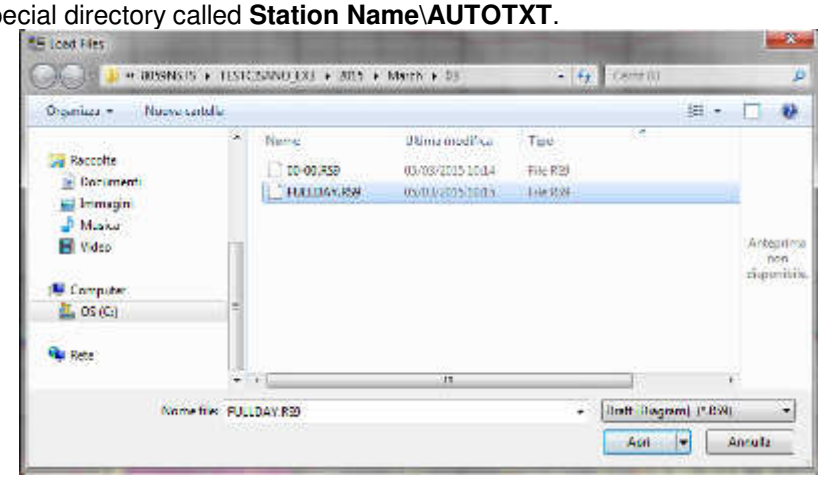
3.10.7 Auto ASCII File

Select **Auto ASCII File** to automatically generate an ASCII file and, if enabled, a .bmp file too, containing all the information relative to the data downloaded; the format will be the same adopted with the "**Save Export File Setup**" function, when displaying monitoring results starting from the calendar.
When displaying results, the function "**Save Export File Setup**" is available on the main menu, under the File menu command.





When a call, either incoming or outgoing, is reported by the station and the data are downloaded manually or automatically, all the files normally placed in the directory **Station Name\Year\Months\Day** are also copied in the special directory called **Station Name\AUTOTXT**.



When all the data have been downloaded, the files in the directory **Station Name\AUTOTXT** are grouped in a single file **.RS9** which displays a graph having as its starting and ending date and time the date and time of the download. This will be used to create the file **.TXT** that, identified with a specific name containing the time and date of the download and the serial number of the station generating it, will be saved in a special directory called **AUTOFILE**, common for all the stations and placed at the same level as their specific directories.
The file name appears in the following format:

POSTAZIONEserialnumber_FROM_YYYY-MM-DD_HH-mm_TO_YYYY_MM_DD_HH-mm.TXT

Every time the data are downloaded with the **AUTO ASCII FILE** function enabled, a new **.TXT** file will be created with a specific name, saved in the **AUTOFILE** directory and containing the data acquired by the station from the **Start** to the **Stop** time of the download.

If you enter the command /AUTOBMP in the destination field of the properties with the **AUTO ASCII FILE** function enabled, the software provide a **.txt** and **.bmp** file at the same time. The bitmap is created with the settings used to create the same file for the manual mode.
It will be saved in the **AUTOFILE** directory and placed at the same level of the txt file.

3.10.8 Autoload Events

The NARDA Area Monitor Broadband can save a certain number of events in the permanent memory of the station, so as to ensure traceability (independent from the operations of the control center) with regard to the settings and main activities of the station. These events can be downloaded from the station, displayed in text format and copied into the mass memory of the control center to keep updated the station history.

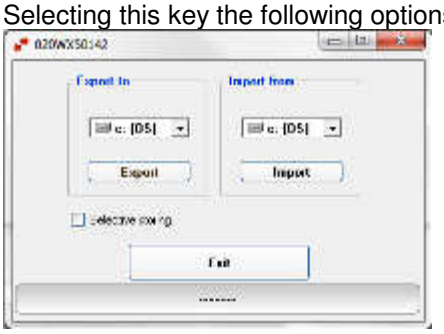
The option **Autoload Events** facilitates this task as, every time the station is contacted, it is automatically asked for all events not already downloaded. It is important to know that to increase the reliability in case of sudden interruption of the call, at each connection the events request is made at two separate times. The first request is made at the end of reception of the setting parameters and the second is made immediately before receiving the hang-up command. This ensure that all events are downloaded even in case of problems during the connection (which may be interrupted before all operations have been completed) and at the same time ensures that all events recorded after the connection in progress will also be received.

3.11 Data management

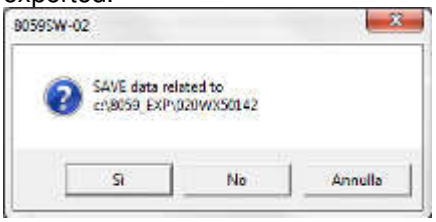
3.11.1 Filing data

The **Data Exchange** key is used to file the data saved, for example on a diskette, to import them later on to other control centers.

Selecting this key the following options are displayed:



When exporting data, after the selection of the type of support, the data are automatically saved in a directory called 8059_EXP.
Select **Selective storing** to enable the program to select which data to export, as shown in the figure below, otherwise all the data found will be exported.



Exported data can be easily imported by the 8059SW-02 control software installed in a different PC by selecting device containing exported data and clicking the “Import” button.

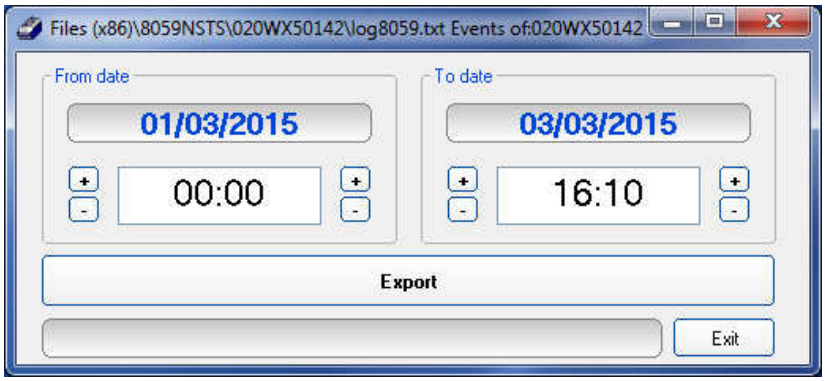
NOTE

Importing data creates a directory which name correspond to the Station Identifier (Name) selected from the station list before exporting data.
If not already present, a new station, with the same Station Identifier (Name) should be added to the station list in order to be able, through the calendar, to display measurement results.

3.11.2 Exporting data

Data Export

The **Data Export** function creates text files and, if enabled, .bmp files related to the time range specified by the user:



After selecting the desired time range (From date – To date) click the **Export** button to create, in the **AUTOFILE** directory, the following text files:

- A text file reporting the events relative to the control center in the selected period. This file is saved as AUTOFILE**PC_LOG.TXT**;
- A text file reporting the events relative to the station in the selected period. This file is saved as AUTOFILE**8059_LOG.TXT**;
- A text file and, if enabled, a .bmp file, reporting the data records (field strength, battery voltage, temperature, alarms, etc.) formatted as in the menu for the selected range. Indeed, the file is the same one produced automatically with the option Auto ASCII file except that, instead of referring to the period downloaded, the period can be specified manually. The file name appears in the following format:

POSTAZIONEserialnumber_FROM_YYYY-MM-DD_HH-mm_TO_YYYY_MM_DD_HH-mm.TXT

On opening the Data Export window, the initial date and time shown by default are the date and time of the latest export of the station: it is therefore possible to export in a very easy way all the data collected in the correct chronological sequence without having to remember the latest operation.

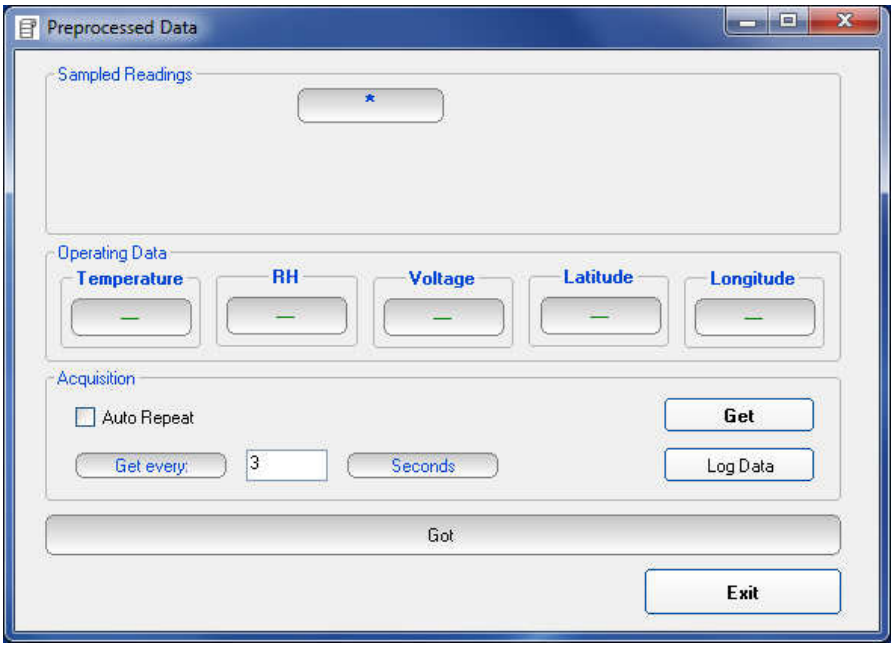
NOTE

The maximum time interval that can be processed by the Data Export function is one month.

3.12 Direct readings

Direct Readings

When the station is connected to the controller PC through the RS232 or USB cable, the **Direct Readings** button is used to open a window where it is possible to immediately read the basic station data.
With this function the User can read the field values acquired by the station without post-processing them; that is, without any RMS or arithmetic average, or maximum. The data, which can be requested at any time, are updated by the station 20 times per minute (every 3 seconds) so a higher reading frequency will produce only redundant data.



Get

The "**Get**" button is used to request the field value of different frequency bands (depending on the probe), battery voltage and temperature.
The **Auto Repeat** option, with a value **nn** indicated in **Get every,** is used to request the values automatically every **nn** seconds.

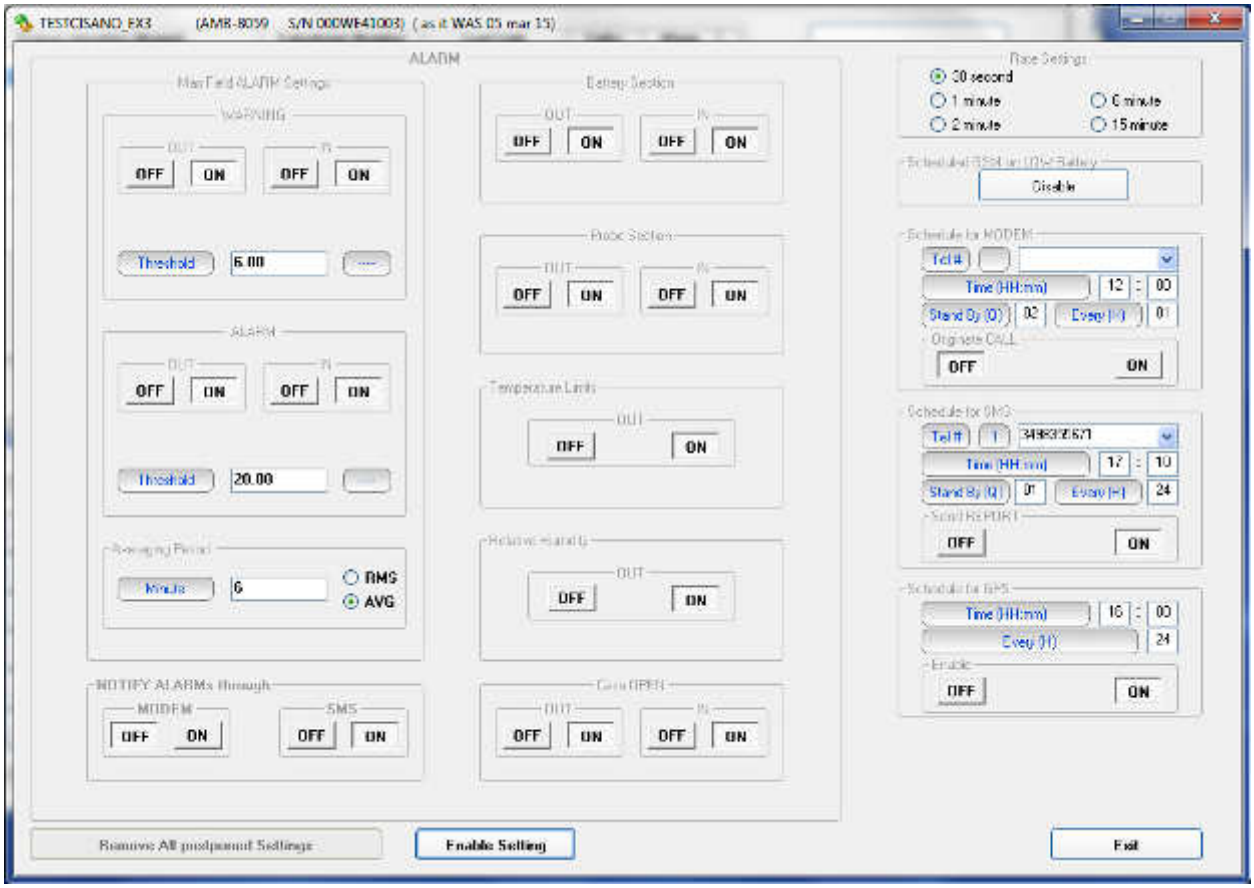
Log Data

The "**Log Data**" command allows to record the set of values read in a text file, in order to save the data to process them, if necessary, at a later time.
To start the save, press the Log Data button.
Press again to stop saving.
The actual status is shown in the window at the bottom (Getting Data)

3.13 Send settings

Post Setting

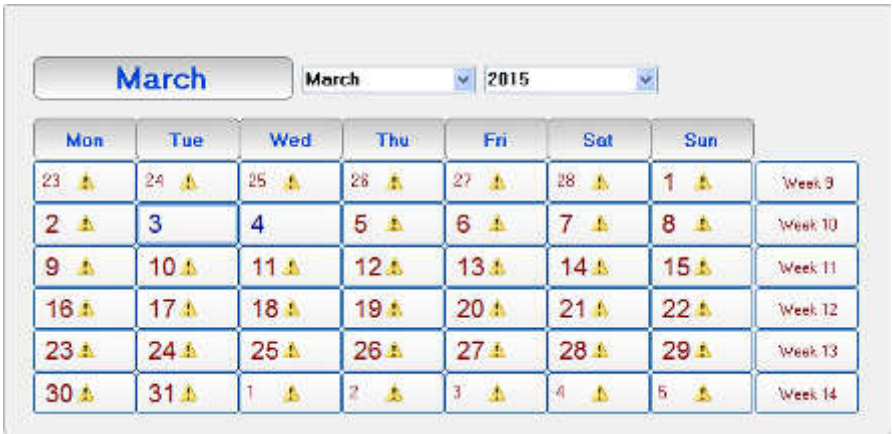
The **Post Settings** key is used to open a window where settings can be defined for the selected station.
This presetting operation allows to change the settings even if the station cannot be contacted at the specific moment, for any reason. All the settings are saved temporarily and sent to the station during the first link.



The pre-setting window shows the status of the station as it was during the last link or just after the latest modification of the parameters. Every change is saved in the order made, regardless of whether it may be redundant or contrary to the previous one. The command "**Remove All Postponed Settings**" cancels every setting saved and ready to be sent at the first available link. To prevent the data already stored in the memory of the station become meaningless because a change of settings, the presetting commands are sent to the station only immediately before the hang-up command.

3.14 Calendar of measurements

The calendar, created automatically by the 8059SW-02 software, always shows the current month and year and is used to select and display in graphical form the data downloaded from the Field Monitoring station, simply by clicking the button of the desired day or week.



NOTE **Only the buttons with blue characters contain data, which has been previously downloaded from the station.**

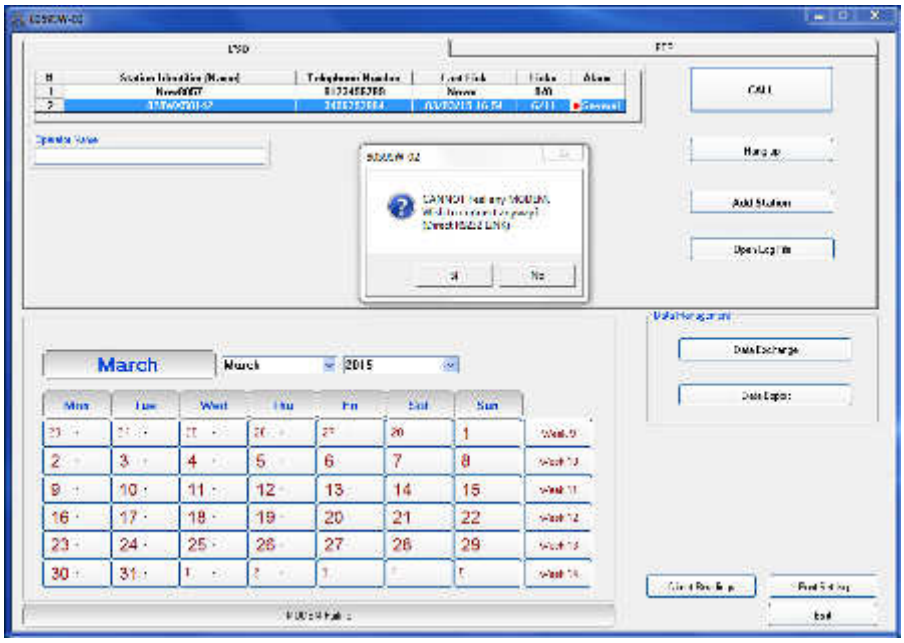
NOTE **Days or weeks with red characters are empty; in this case the symbol ⚠ will be displayed close to the days.**

The last part of the main screen contains a status bar showing additional information relative to the operations in progress, and the program **Exit** button.

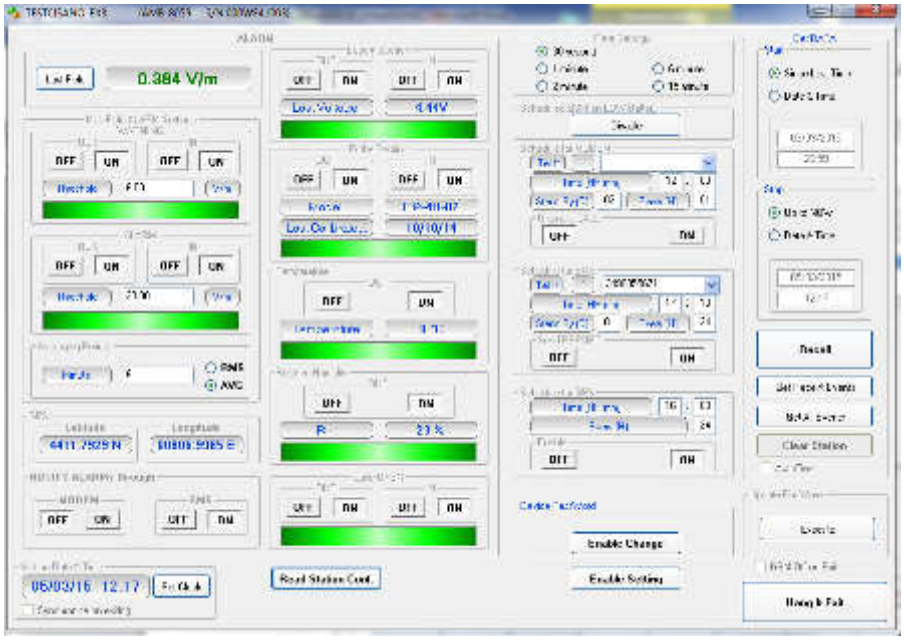
3.15 Calling a station via RS232 or USB

After the correct installation and configuration of the program 8059SW-02 as described in the paragraph "Software Installation" in this chapter, select the station to call and press the **CALL** button.
The status bar will show:
- The message “Checking MODEM”
- The message “MODEM Failure”

Moreover, a window will pop-up asking to continue via direct RS232 LINK.



Answering **YES** the setting panels opens:

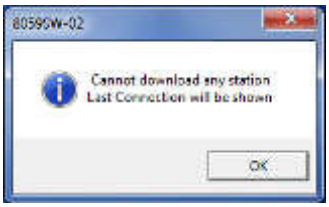


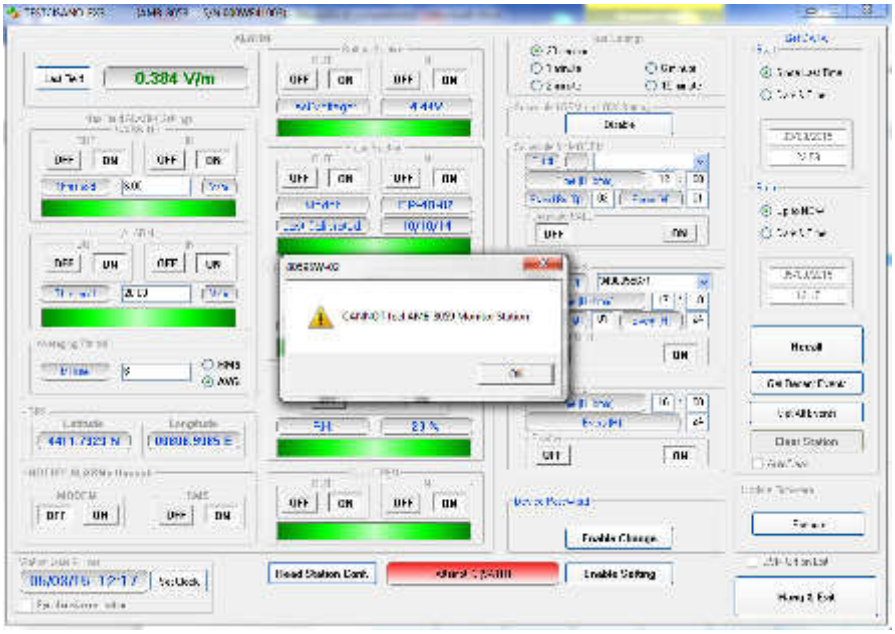
3.16 Calling a station via GSM modem (CSD mode)

After installing and switching ON the PC GSM or line modem, configure the program 8059SW-02 as described in the paragraph "Software Installation" in this chapter, select the station to call and press the **CALL** button.
The status bar will show the sequence of call/response commands of the ongoing link.

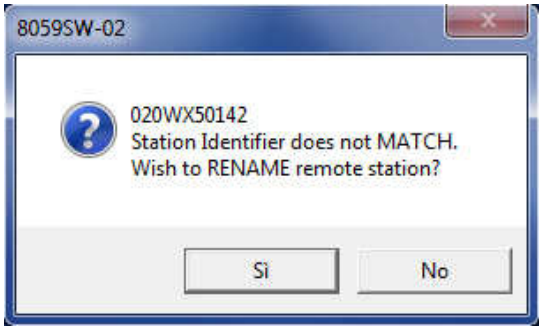
First, the match between the **Device Password** memorized in the PC and the one memorized in the station is checked. If they do not match, the status bar will display the string **#BM DENIED*** and the following message will appear on the screen:

If the answer is YES, the connection will not take place but it will be possible in any case to access the station set-up screen to check its status at the time of the latest successful link.



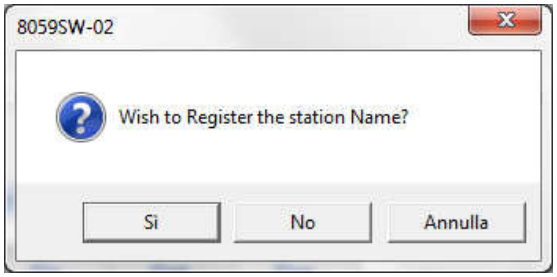


Sometime it may happen to call a station for which the password matches but not the name (Station Identifier), because the one in the station is different from the one recorded in the PC.
If, for example, the name **Test Station** has been entered in the list of the PC and the name in the memory of the station is **020WX50142**, the program detects the incongruence of the names and displays the following message:



If the answer is **Yes**, the software renames the station with the new name **Test Station** already recorded in the PC. Then it downloads the data and saves them in the directory **Test Station**.

Answering **No**, another window opens:



If the answer is **Yes**, the software allows access to the station and then the data download takes place, with these data saved in the relative directory named **020WX50142.** In this case the name saved in the station takes priority and the one in the list of the PC is updated.

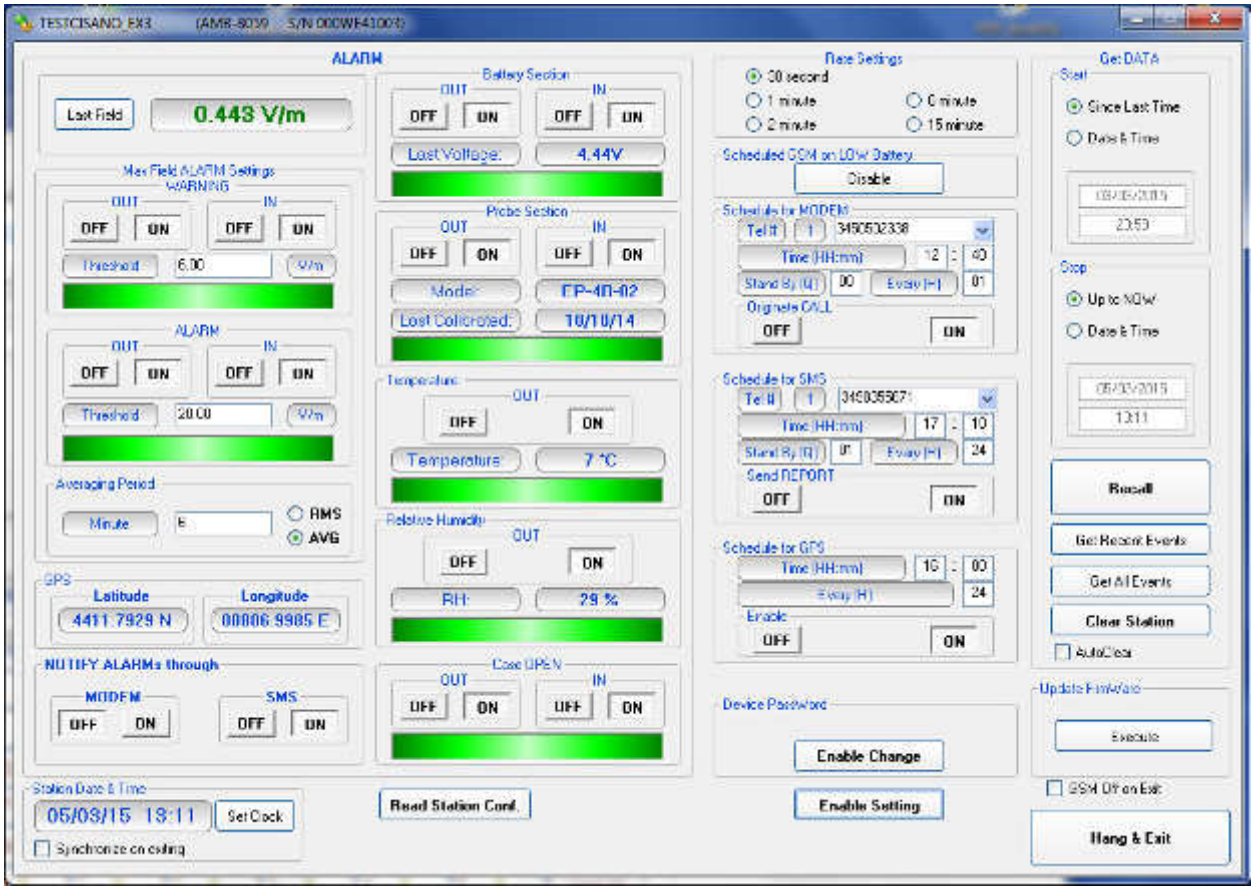
If the answer is **No** the data will be downloaded temporarily in the directory Test Station. Selecting Cancel no operation will be performed.

3.17 Control window

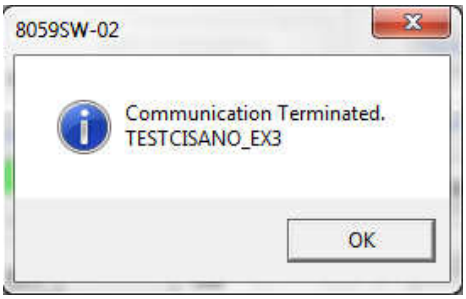
Once a link has been successfully established, in CSD mode or during local RS232 or USB connection, the control window is opened for the selected station and it is possible:

- Check the settings and parameters of the station;
- Edit the settings (function protected by the Setting Password);
- Download measurement results to the PC;
- Change the Device Password (needed for calls in CSD mode only).

The control window looks like this:



After two minutes of inactivity, the GSM link will be ended automatically. This will prevent keeping the line open due to a closing error or simple omission.



3.18 Description of controls

The control window is divided in different zones grouping the available commands by type and function. The main zones are:

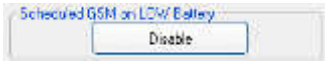
ALARMS divided in:

- Last Field
- WARNING
- ALARM
- Averaging Period
- Battery Section
- Probe Section
- Temperature Limit
- Relative Humidity Limit
- Case OPEN
- NOTIFY ALARMs through

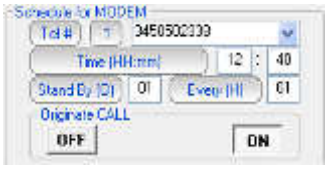
Rate Settings consisting of the options:

- 30 seconds
- 1 minute
- 2 minutes
- 6 minutes
- 15 minutes

The Rate Setting affects use of the memory and battery duration.



In the frame "**Scheduled GSM on Low Battery**" there is a "**Disable**" command. This command serves to disable the entire function of programmed switching on of the modem. If this command is selected, in order to prolong the battery duration all the programmed switches of the modem are disabled in case the battery voltage is lower than the minimum (< 3,9V for AMB-8059/03 and < 3,0 V for AMB-8059/02), without interfering with the relative settings either as regards timing or modem status,. However, this command does not disable sending SMS, if enabled, in case of unmasked alarms.
When the battery alarm status ceases, the command is automatically cancelled.



Schedule for MODEM divided in:

- Telephone number
- Time (HH:mm)
- Stand by (Q) indicated in number of quarters of an hour; this value affects battery duration
- Every (H)
- Originate CALL

Up to 2 fixed phone numbers can be programmed. The first phone number which is free and allows the data download will interrupt the search for the other number.

NOTE

If you desire to use this function, it is suggest to set the hour of programmed switching on in the window "schedule for MODEM" at least 1 hour and 30 minutes after the monitor station was switched on.

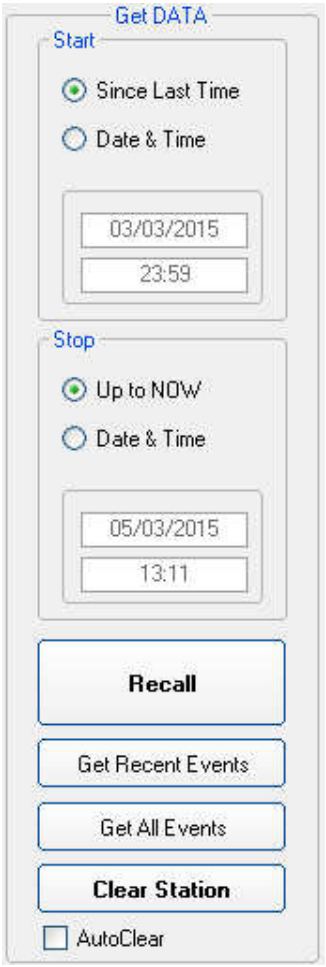
Schedule for SMS divided into:

- Telephone number
- Time (HH:mm)
- Stand by (Q) indicated in number of quarters of an hour; this value affects battery duration
- Every (H)
- Send REPORT

Up to 2 mobile phones can be programmed.
Both phones will receive the daily report.

Schedule for GPS divided into:

- Time (HH:mm)
- Every (H)
- Enable



Get DATA divided in:

- **Start** with the subcommands
  - Since Last Time
  - Date & Time

  The starting date must be coherent with the Rate selected and not later than the Stop date.
  If measurement results related to a period longer than the capacity of the memory, or data no longer contained in the memory (because overwritten) are requested, the software will show a warning message.

- **Stop** with the subcommands:
  - Up to NOW
  - Date & Time

  The **Stop** date must be later than the Start date otherwise an error message will appear.

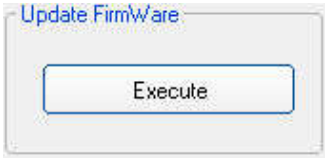
- **Recall**
  It is used to start downloading results acquired in the period from Start to Stop settings.

- **Get Recent Events**
  This command manually recalls all the events that have not yet been downloaded, and appends them at the end of the relative file.
  This command shall be considered the manual alternative to the option **Autoload Events**.

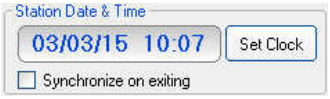
- **Get All Events**
  The command manually recalls all the events available on the station and appends them at the end of the relative file. Though this does not create any problems, no control of redundancy is made, so repeatedly selection of the command may lead to repetitive information.

- **Clear Station**
  Cancels the internal memory of the station linked.
  If there are data which have not been transferred to a PC yet, the function is automatically disabled.

- **Auto Clear**
  Enables total cancellation of the data in the station memory after complete downloads. When this option is enabled, after every complete download up to the time and date indicated in **Get Data→ Stop**, the software sends a request of complete cancellation (SCAM) of the data in the memory and, if there are no errors, the request is accepted by the station, which clears its memory. Obviously, once the data have been cancelled they cannot be recalled anymore.



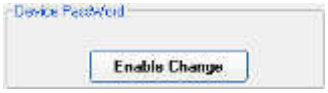
- **Update Firmware** to update the internal firmware of the station.



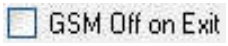
- **Station Date & Time** with subcommand
  - **Set Clock**, to transfer the current date of the PC to the station
  - **Synchronize on exiting**, to make the above function (updating time and date at the end of every link) automatic.

- **Read Station Configuration** to read the electromagnetic field, status of alarms and configuration;

- **Enable Setting** to edit the setup;



- **Device Password** to edit the identification password saved on the station.
  The device password shall be composed by a number alphanumeric characters from 1 to 32.
  Uppercase and lowercase are considered different characters.



- The option **GSM OFF on Exit** sends to the field monitor the request to switch off the station modem in advance, in addition to the request to end the connection. When this option is enabled, at the end of the link (not made after a line break and not after the maximum time without dialogue) the station switches the GSM modem off after a time ranging from 1 to 2 minutes, regardless of the residual time set.

- **Hang & Exit** to end the link**.**

NOTE

To edit the settings on the station, use the Enable Setting button.

You will be asked to enter the security “Setting Password”.

3.18.1 ALARM

Stations equipped with GSM modem are able to notify alarm condition by sending SMS and/or starting a CSD call to the controller PC. Stations not equipped with GSM modem are not able to notify alarm conditions that are anyway recorded along with measurement results.
Measurement results downloaded from any station include therefore information of any alarm occurred during the monitoring activity.

Depending on the local laws, the place of installation, the climatic conditions, the availability of sunlight and the duration of measurement, certain alarms should be enabled for the control and proper operation of the field monitor. In addition, if the station is installed in what is defined as a “sensitive” locations as regards electromagnetic fields, the alarm for exceeding the threshold defined by law should be enabled to ensure control almost in real time.

Any alarm notification can be set on a dual threshold, with reference to the occurrence of an event (**OUT**): i.e. exceeding a threshold; and upon regaining normal conditions (**IN**).

OUT: enabled (**ON** pressed) or disabled (**OFF** pressed) notifies you of an alarm in the following cases:

1. On exceeding a threshold setting for attention (Warning)
2. On exceeding an alarm threshold (Alarm);
3. When battery voltage is too low (e.g. <3,9 V for AMB-8059/02) or too high (e.g. >5,0 V for AMB-8059/03);
4. When one or more field probe parameters is faulty;
5. On exceeding the temperature limit inside the field monitor;
6. When the data memory is almost full
7. When the external container is opened.

NOTE

Whenever an alarm occurs, the GSM modem will remain on for 30 minutes to enable the operator to send an SMS message and query the station and download the data.

IN: enabled (**ON** pressed) or disabled (**OFF** pressed) notifies you that normal conditions have been restored.

NOTE

Both “OUT” and “IN” must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01)

NOTE

When the monitoring station is off, the alarms are shown as off when the station is switched on again.

3.18.1.1 NOTIFY ALARMs through

Stations equipped with the GSM modem are able to notify alarm via SMS and/or CSD calls.
Notification of alarms via SMS will be sent to both mobile phones indicated.
Notification via modem will be sent to the first number that answers the call.
When both Modem and SMS notifications are enabled, priority is given to the Modem.

NOTE

Both "MODEM" and "SMS" must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01)

For each one of the 7 alarms there is a bar in the in control window that shows by its color the current status of the respective alarm, regardless of whether notice via modem or SMS is enabled or disabled:
RED: alarm condition activated;
GREEN: alarm not active.

3.18.1.2 Last Field

Displays the field averaged in the latest minutes as set in the **Averaging Period** field

NOTE

AMB-8059/02 and AMB-8059/03 can be remotely queried for this value at any time from a mobile phone by sending the following SMS message to the station: #BM?LFA*

3.18.1.3 GPS

Displays the GPS coordinates (Latitude and Longitude) of the station.

3.18.1.4 Averaging Period

This command defines the time period on which the average of the field levels will be calculated. The average can be arithmetic (AVG) or quadratic (RMS).

3.18.1.5 Max Field ALARM Settings

Field alarm.

The field monitor features two warnings: field strength thresholds that can be set to define “WARNING” and “ALARM” conditions.

On exceeding one of these thresholds, a message is sent to the user mobile phone or to the controller PC from stations equipped with the GSM modem. This occurs only if the **ON** function is enabled in the **NOTIFY ALARMs through** window.

Select **ON** to enable the station to notify alarms and select **OFF** when no action shall be taken.

The **OUT** function is used to control the exceeding of the alarm threshold setting; select **IN** to control the return of the electrical field values below the set value.

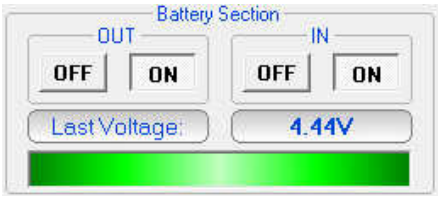
In this example an alarm will occur when the field exceeds 3 or 6 V/m averaged on the time period defined with the option Averaging Period.
Thus, brief but intense field variations will not necessarily cause any alarms if the averaged value (in this example on 6 minutes) does not exceed 3 or 6 V/m.

3.18.1.6 Battery Section

Battery Alarm.
The internal control system of the Field Monitor features a voltmeter for continuous measurement of the battery voltage. This function ensures constant control of the power situation for correct operation of the system.
Settings are made as for all the other alarms.

NOTE **For the model AMB-8059/00 and AMB-8059/02, the default values of the battery alarm are 3.00V (Thresold minimum) e 3.9V (Thresold maximum).**

NOTE **For the model AMB-8059/01 and AMB-8059/03, the default values of the battery alarm are 3.9V (Threshold minimum) e 5.02V (Threshold maximum).**



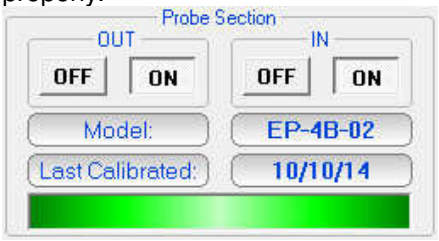
The bar turns red when the value is below the minimum or above the maximum and if the alarm notification is enabled an appropriate message will be sent via SMS.

NOTE **Stations equipped with the GSM modem can be remotely queried for this value using a mobile phone and sending to the station the SMS message: #BM?BAT***

NOTE **Both "OUT" and "IN" must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01).**

3.18.1.7 Probe section

Alarm for probe in use.
The following section displays the field probe in use and its calibration data. It is also possible to generate an alarm if any parameter does not function properly.



The characteristics of sensor used by a specific station equipped with GSM modem can be read by any mobile phone by sending the SMS message: **#BM?PRB***.

NOTE **Both "OUT" and "IN" must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01).**

3.18.1.8 Temperature limit

Temperature alarm.
The monitoring station features a thermometer for the measurement of the internal temperature, in order to have constant control upon the environmental conditions affecting the correct operation of the system.
The setting is made as for the other alarms.

NOTE

The internal temperature of stations equipped with the GSM modem can be remotely queried using a mobile phone and sending to the station the SMS message: #BM?TMP*
It returns the response in the following format: #BM TMP=tt,rh*
The first value read on the phone is the temperature expressed in degrees Centigrade.

NOTE

"OUT" must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01).

3.18.1.9 Relative Humidity limit

Relative Humidity limit.
The monitoring station also features a hygrometer for the measurement of the internal Relative Humidity, in order to have constant control upon the environmental conditions affecting the correct operation of the system.
The setting is made as for the other alarms.

NOTE

The internal Relative Humidity of stations equipped with the GSM modem can be remotely queried using a mobile phone and sending to the station the SMS message: #BM?TMP*
It returns the response in the following format: #BM TMP=tt,rh*
The second value read on the phone is the relative humidity expressed in Percentage.

NOTE

"OUT" must be set to OFF in case of station not equipped with GSM modem (AMB-8059/00 and AMB-8059/01).

3.18.1.10 Case OPEN

Case open alarm.
Whenever the external protective case of the field monitor is opened, an alarm condition occurs. Like it happens in case of other alarm conditions, the status bar shown below the "Case OPEN" frame, when connected to the station, will be displayed in red colour. Similarly to any other alarm frames the "OUT" and "IN" buttons must be set to OFF in case of stations not equipped with the GSM modem.

3.18.2 Schedule for MODEM

Programming the station for modem links.

To query the monitoring station by a remote PC linked to a telephone or to a GSM modem, the Station modem must be on.

In addition, when an alarm occurs, the station can automatically call in CSD mode the telephone number of the modem used by the controller PC.

Programming consists of setting a scheduled time for switching on the internal GSM modem, defining how much time the modem will stay ON (stand-by), repetition interval and whether or not a CSD call to the controller PC must be generated.

The parameter **Time (HH:mm)** specifies what time of day the Station modem has to be switched on and placed in Stand-By condition, while the parameter **Stand BY (H)** determines how long the GSM stays on. The parameter **Every (H)** indicates the frequency of repetition or after how many hours from the latest start the Station modem has to be switched on again.
To prevent the schedule from changing every day, this parameter has to be programmed in submultiples of 24, so that only the following values are accepted: 1, 2, 3, 4, 6, 8, 12, 24.

If the command **Originate CALL** is **ON**, the station will automatically call the remote PC at the first phone number listed in the field “Tel #” at the time indicated in the **Time (HH:mm)** field, if this number does not answer or the line is busy, the station will try to communicate with the second phone number on the list.
The minimum Stand By time is 0; that means that the station makes the call at the time indicated and automatically switches the internal modem off.

NOTE **See chapter 2, paragraph 2.7.2, for the different ways of switching on the modem.**

Setting for stations not equipped with GSM modem (AMB-8059/00 and AMB-8059/01) should be as follows:

- Tel # : VOID
- Time (HH:mm) : 00:00
- Stand By (Q): 00
- Every (H) : 24
- Originate CALL : OFF

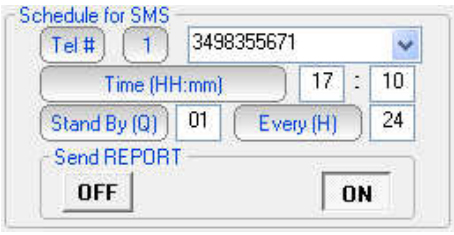
NOTE **The “Schedule for MODEM” frame is disabled, and therefore cannot be set, if the station is set for FTP communication mode (factory default configuration). See 3.8.4. for instructions to set the station to CSD/RS232 mode.**

3.18.3 Schedule for SMS

Querying the station with SMS messages.

Similarly to the “Schedule for MODEM” frame, the “Schedule for SMS” offers the opportunity to define an additional time period during which the station modem will be ON (stand-by mode) and therefore able to receive CSD calls and SMS query and setting commands. In addition, the “Schedule for SMS” frame allows defining two user’s mobile phone numbers that will receive alarm messages and/or daily reports.

Even in this case, the GSM modem switch ON/OFF time can be programmed as described in the previous paragraph.



With the **Send REPORT** command **ON**, at the time indicated in the window **Time (HH:mm)** the monitoring station automatically sends its daily report to all the mobile phones listed.

The minimum Stand By time (expressed in quarters of an hour) is 0; in this condition the station sends the Report via SMS at the time indicated and automatically switches off the internal GSM.

Recommended setting for stations not equipped with GSM modem (AMB-8059/00 and AMB-8059/01) is the following:

- Tel # : VOID
- Time (HH:mm) : 00:00
- Stand By (Q): 00
- Every (H) : 24
- Send REPORT: OFF

NOTE

It is possible to receive and read the daily report on any mobile phone (max field value, time and date, minimum battery voltage) by sending the SMS message: #BM?RPT*.

The Report shown on the phone display will indicate the highest field value and the time at which it was read, and the lowest battery voltage and the relative time since the last time the report was sent or requested.

NOTE

Therefore if at 9.00 a report is sent and at 10.00 the station is queried with the request of a new report, the display will show the highest field value and lowest battery voltage between 9.00 and 10.00.

NOTE

Chapter 7 of this Manual describes in detail all the commands and the messages available via SMS.

3.18.4 Rate Settings

Configuration of data memorization.

Data are saved in the station at a frequency (**Rate**) ranging from 30 seconds to 15 minutes.

NOTE

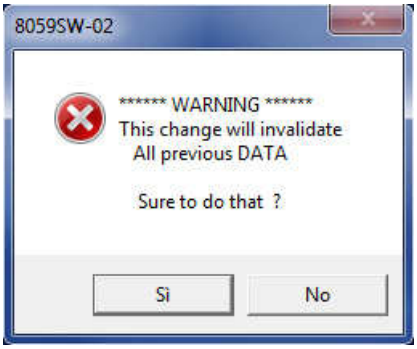
The station always performs 1 reading every 1 seconds and saves the average value and maximum (Peak) at the selected Rate.

Example: if the rate of 1 minute and an averaging period of 1min are selected, the station will take 60 readings and save the average value calculated minute by minute.

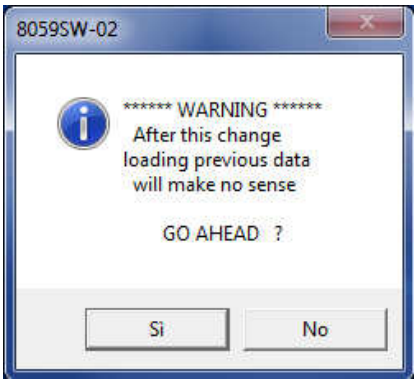
If an Averaging Period of 6min and a rate of 1min are selected the indication will represent, minute by minute, the field average calculated on the previous 6 minutes.

The selection of a different Averaging Period as well as a different Rate will invalidate all the data stored with the previous settings that will be no more available for downloading, therefore the software will indicate this risk.

The following message appears:



If the answer is **YES**, the software will show another message asking whether to continue with the new setting, as follows:



Answering **YES** again, the software will allow you to change the setting but all the data previously acquired will no longer be available for new downloads. It is therefore suggested to download any measurement result before changing settings.

NOTE

In general, great care shall be adopted in changing the timing or type of average or the saving rate.
Indeed, data recorded with the same station, relative to the same day but acquired with different settings will not be compatible. Only results acquired before changing setting will be displayed in the graph or table of the same day. Results acquired with the new setting will be displayed starting from the next day.
If it is really necessary to change the settings, NARDA recommends one of the following procedure:

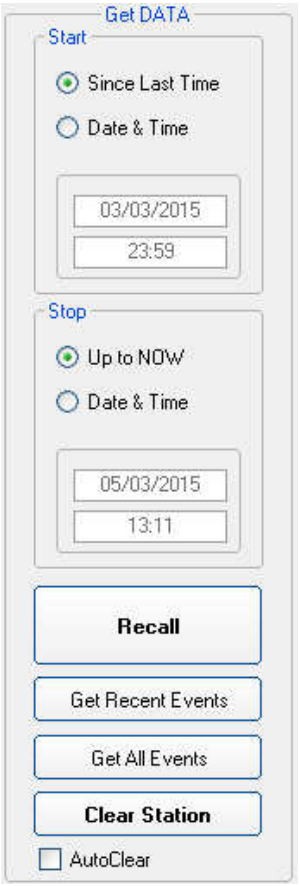
- **Change the station name before making the settings change.**
  In this case the station with the new name is considered a new station with all data and results stored in a new station directory. The old station name will be still available in the station list allowing selection and display of all data acquired previously.

- **Change the name of the directory in which the previous data were saved before the settings change (or in any case before downloading the new data).**
  In this case the station maintains the same name but, even if not lost, no old data will be displayed.
  To display data acquired with the old setting it will be necessary to add a station in the list which Station ID (name) correspond to the changed name of the old directory.

- **Do not download the data acquired in the period of time between the settings change and the midnight of the same day if neither of the above suggestions is adopted and results of the same day are not needed.**

3.18.5 Get DATA

Downloading data from the monitoring station to the PC.



The data in the internal memory of the station can be downloaded after defining a Start and Stop event as follows:

The Start and Stop of the data download is done between the following commands, in any combination.

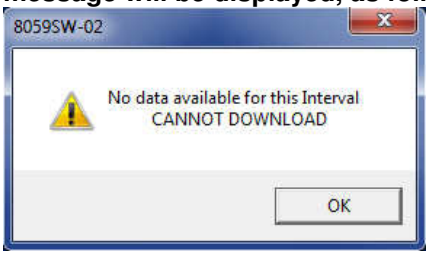
- **Since Last Time**: Automatically enters the time and date of the latest download;
- **Date & Time**: any date and time indicated;
- **Up to NOW**: actual date and time with reference to the station;

The "**Recall**" command starts downloading results to the controller PC.

The data downloaded will be assigned automatically to the relevant days of the calendar and those days will be marked with blue characters.

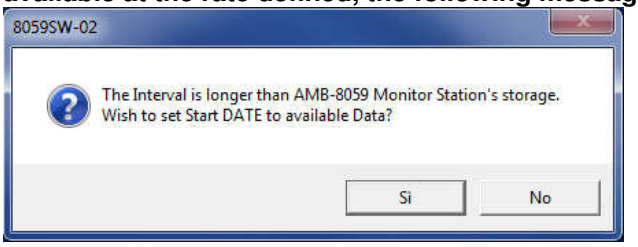
NOTE

The Start event must be earlier than the Stop event otherwise an error message will be displayed, as follows:



NOTE

If the download period is longer than that allowed by the memory available at the rate defined, the following message will appear:

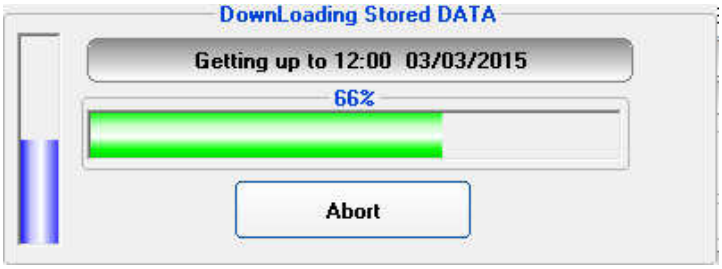


NOTE

After downloading the data, click Hang & Exit to view the data downloaded

NOTE

During the download of the data from the station a window is displayed with two bars indicating the progress of the download.



The vertical bar gives the percentage of the total amount of data to be downloaded while the horizontal shows the progress of the download for each subsequence six hours interval.

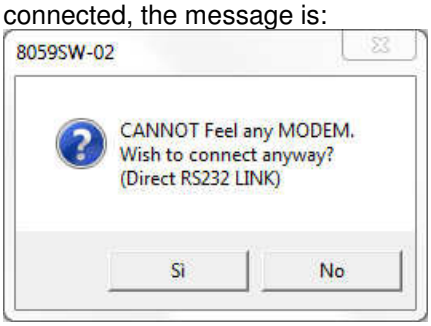
During data download in CSD mode, mainly due to poor reception or to poor quality of the GSM signal, some error messages may be received.
In these cases, repeat the **RECALL** command.

3.18.5.1 Examples of error and information messages

Many phenomena can affect good communications between the GSM modem of the monitoring station and the modem of the PC.
The selection of the port on which the modem is connected can generate a series of error messages.

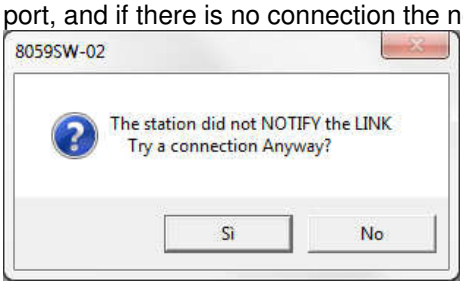
The message in the status window is:

If the PC modem is off or the software is searching for the modem on a different serial port than the one to which the modem is physically connected, the message is:

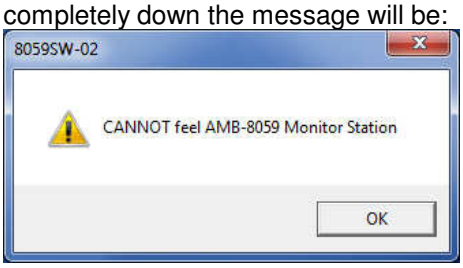


The same message also appears when the User wish to make a local connection to the monitoring station (this is the only communication mode provided by AMB-8059/00 and AMB-8059/01).

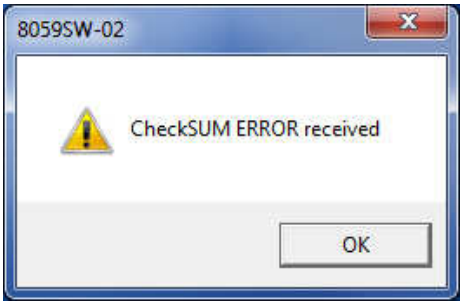
Answering **YES**, the software tries to connect the station via serial or USB port, and if there is no connection the next message is:



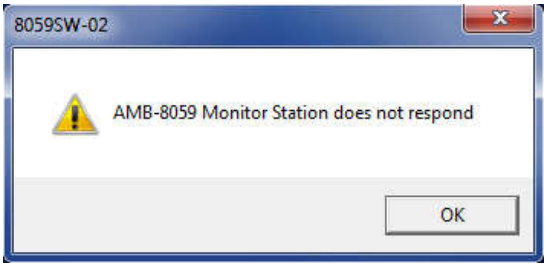
If the station does not answer because it is off or the batteries are completely down the message will be:



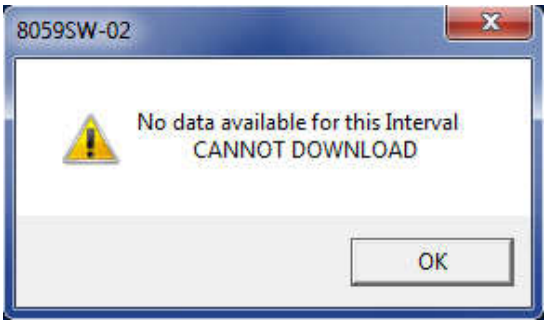
In case of error in data transmission this message will appear:



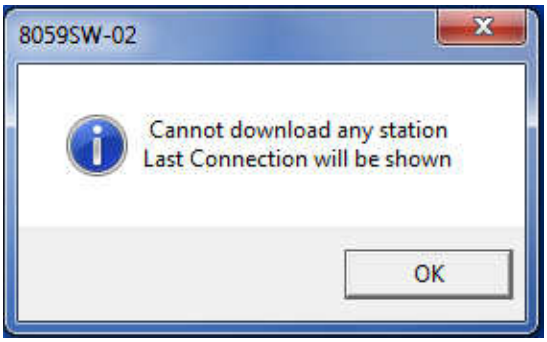
The control of the checksum guarantees the quality of the data received. When this error occurs, sometimes the 8059SW-02 software closes the application and exits.



No answer from the monitoring station



Message informing that data cannot be downloaded.



Click on **Read Station Conf.** to try and connect to the station and show its configuration. If the station does not answer, the configuration relative to the latest successful link is shown.

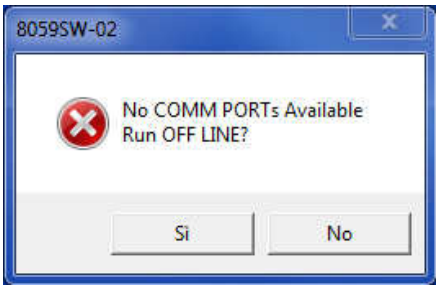
Last Call did not manage to negotiate

If there are communications problems in CSD mode between the servers of different GSM Service Providers, the message **LAST CALL DID NOT NEGOTIATE** appears in the Status frame of the main window. The same message can appear when there is heavy traffic or when the server is unable to perform roaming.

NO CARRIER

If the monitoring station is switched off or if the signal is insufficient for a CSD call, the message **NO CARRIER** appears in the Status frame of the main window.

If the 8059SW-02 software does not see any available port on the PC where it is installed, the following message appears:



See paragraph 3.4

If a COM port is configured in a way that makes it not available on the computer or if there are no free ports, you can run the software in DEMO MODE to read the data already downloaded.

3.18.6 Firmware update

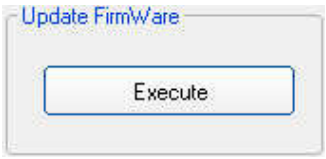
Update of internal Firmware

It is important to update the station firmware in order to use all the new functions added and eliminate any bugs in the software.

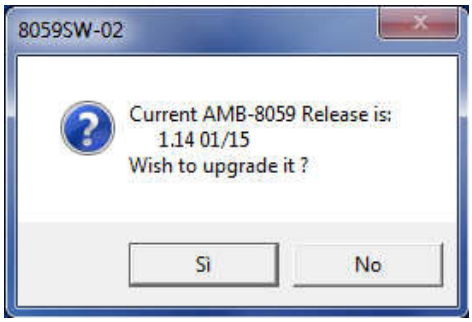
To update the firmware, use the **Execute** command.

The monitoring station will place the old firmware in its memory and will try to load a new one. A window with a coloured progress bar appears on the screen to indicate the firmware loading in progress.

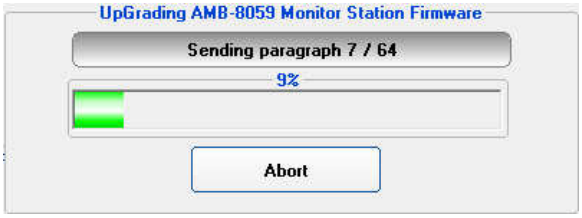
The following steps will be carried out:



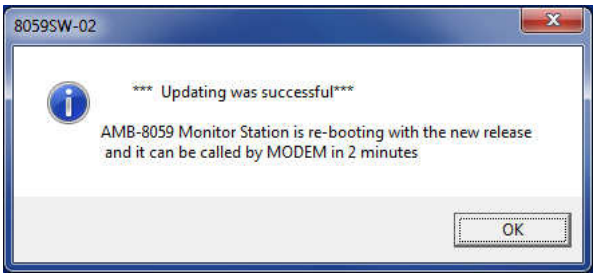
1. Request to confirm transfer;



2. Firmware transfer in progress indicated by the progress bar;
3. Back-up writing (Internal copy of FW);



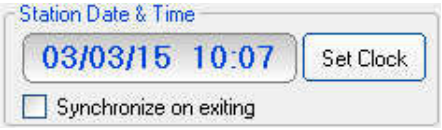
4. Reset and automatic startup of the monitoring station with new version of Firmware.



If any CRC errors occur or if, in CSD mode, there is a poor telephone connection, or if for any reasons the new firmware is not completely and successfully transferred to the monitoring station, the station will automatically restore the old firmware in order to prevent malfunctions or stops.
It is also possible to update the firmware by connecting the PC to the station.

3.18.7 Station Date & Time

Used to update or change the internal clock in the monitoring station and synchronize it with the time set on the PC. The operation will be carried out automatically after every connection if the **Synchronize on exiting** option is enabled.



NOTE

The internal clock of the station is extremely accurate and in many cases much more accurate than the clock on the PC. The internal clock is not automatically updated to summer time and/or to standard winter time.
When the internal clock of the station is changed, some readings may no longer appear contiguous and gaps may be found.
For this reason NARDA recommend to use of this function sparingly

3.19 General Commands Three general commands are located at the bottom of the main window:

Read Station Conf
Enable Setting
Hang & Exit

3.19.1 Read Station Conf. To read the status of the monitoring station, select **Read Station Conf**. Click on the button to start a new query of the station.

NOTE **This command is similar to RECALL but does not download any data**

3.19.2 Enable Setting To enable settings on the monitoring station, click on the **Enable Setting** button**.**

The software will ask to enter the Setting password::

3.19.3 Hang & Exit The **Hang & Exit** button ends the ongoing communication with the monitoring station and returns to the main window.

3.20 Download data via serial port RS232

As already explained, AMB-8059/00 and AMB-8059/01 having no GSM modem inside, make use of the direct communication for settings and downloading of measurement results.
In the AMB-8059/00 the USB connector is immediately available on the lower side of the station base plate avoiding thus the need to remove any cover to connect the serial cable.
The AMB-8059/01 has a Solar module with USB and Ethernet port and an internal RS232 connection.

Direct communication mode is provided by AMB-8059/02 and AMB-8059/03 too allowing thus local communication for initial settings or anytime the remote communication is not desired or the GSM service not available; in some situations where, for example, the GSM signal is very weak or there is no coverage of the network by the GSM Service Providers, it is possible to make an acquisition of long term (over 364 days with 1 acquisition every minute) data without downloading them daily via GSM. At the end of the desired acquisition period, the data can be downloaded on a PC using the USB connector available on the lower side of the base plate (AMB-8059/02) or the RS232 or USB or Ethernet port of the Solar module (AMB-8059/03).

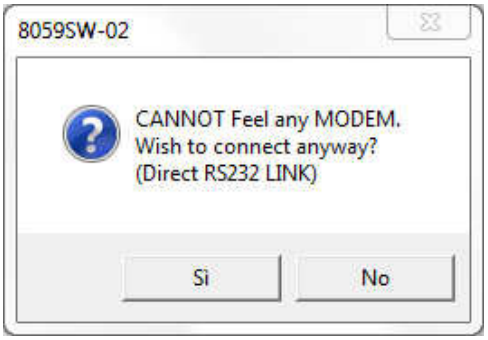
Main steps for a direct connection:

- Connect the PC to the AMB-8059 port with the provided cable.
- If necessary, change the destination line of the 8059SW-02 icon entering the command COMM=N (N is the number of the PC port where the cable is connected).
- Run the 8059SW-02 software;
- Call the station by pressing the **CALL** button.

NOTE

Refer to chapter 1 and 2 for details regarding battery charging, station positioning and further information about installation.

With no modem in use, the software will promptly display the message:



Answer **YES** to enter the station menu and download the data or change the configuration of the monitoring station.

3.20.1 Examples of errors

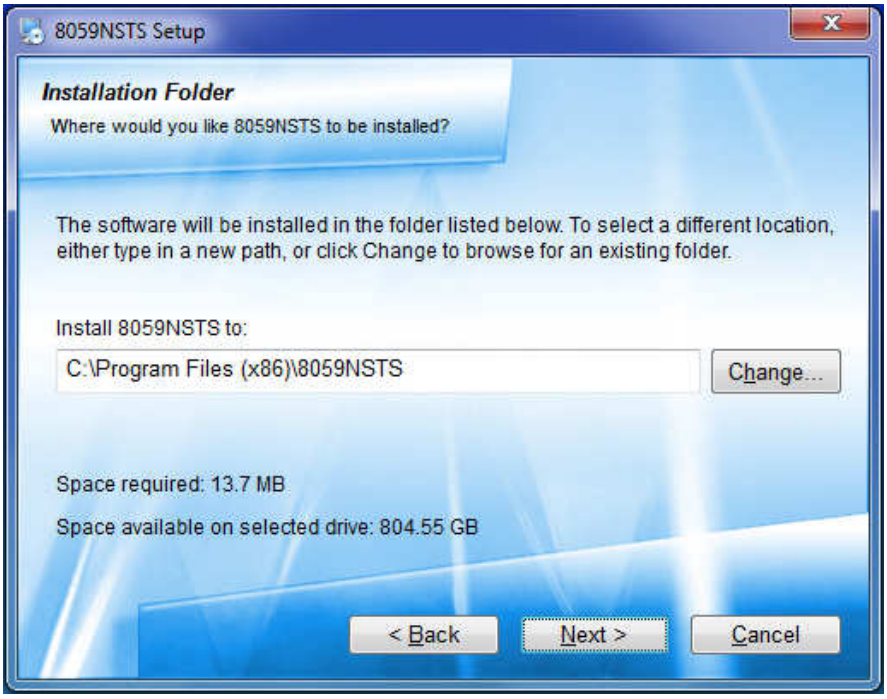
If the station is switched off, the serial communication cannot take place and the error message is:

Answer **NO** and try to solve the problem checking the conditions of the cable and if it has been connected to the port used by the 8059SW-02 software.

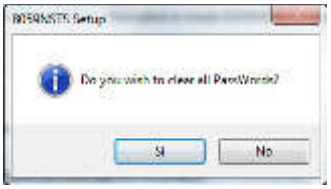
If the answer is **YES**, the software will show the existing communication at the time of the latest data download.

3.21 Software update

To update the software double click on the **8059NSTS Setup.**
After a few seconds the software will ask where to install the program. The default directory is **C:\Programmi(x86)\8059NSTS.**



Press **Next** to complete the installation.



During the installation process the software will ask the User if he wants to cancel all the existing Passwords.
If the answer is **YES,** all the stations and measurements already saved will be hidden, but still accessible by adding all the stations used and maintaining the original name (respecting upper and lower case letters) and phone number.
With this procedure, all hidden stations are made accessible to the User.

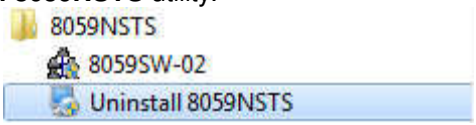
Answering **NO**, all the stations, telephone numbers and the respective Device Passwords will be immediately visible to the User.

The **8059NSTS** folder and the **8059SW-02** icon will be updated.

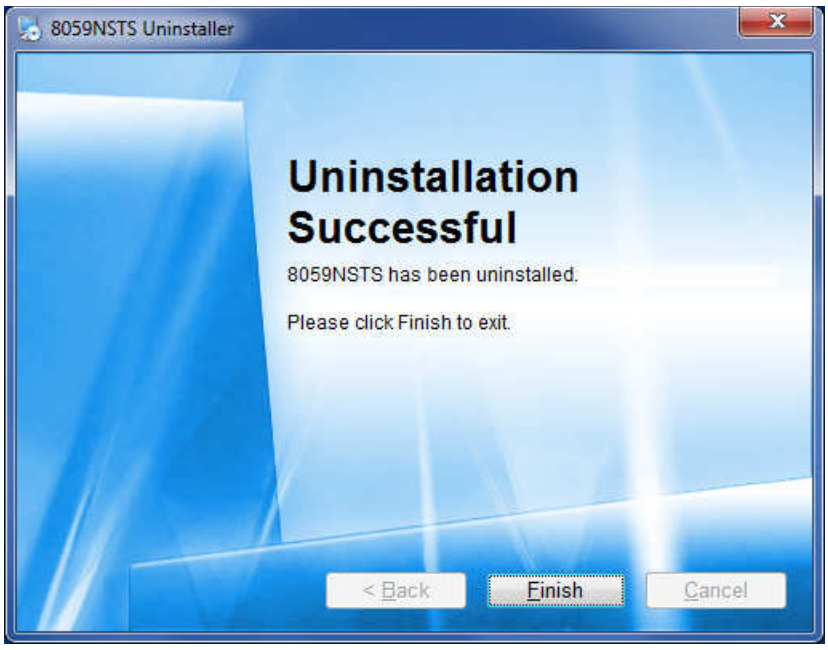
3.22 Uninstalling Software

It is possible to remove the 8059SW-02 software from the PC according to the following procedure:

Run the **Uninstall 8059NSTS** utility.



Follow the uninstaller instructions.



The software is now removed from the system; click **Finish** to close uninstaller utility

4 – 8059SW-02 - GPRS communication

4.1 General Information

4.1.1 Introduction

This section refers to AMB-8059 area monitor, equipped with GSM/GPRS modem, used in conjunction with 8059SW-02 control software.

AMB-8059 area monitors can be set to operate using two different remote communication modes, both using the GSM network: CSD (Circuit Switched Data) and GPRS (General Packet Radio Service).
The user should decide in advance the communication mode for each station as CSD communication mode is not allowed while a station is set for GPRS and viceversa.

This section provides operating instructions and suggestions to correctly use AMB-8059 area monitor set for GPRS communication mode.

NOTE

Please refer to chapter 3 of this manual for remote CSD and local RS232 or USB or Ethernet communication.

4.1.2 Brief description of GPRS communication

When a GPRS modem switches on it links up with the GPRS network.
Assuming that parameters such as Access Point Name, User Name and Password are correctly set by the user, the modem accesses the Internet to establish packet data communication towards other devices identified by their IP address.

Unlike CSD data communication there is no need to establish a direct connection between two devices by means of a call to a telephone number. Each data packet put in the network includes the receiver IP address so that any packet can be delivered efficiently.

In GPRS mode the telephone channel is not engaged continuously but only when some data have to be transmitted. In this way a single telephone channel can be shared between users or more channels can be used at the same time to improve the communication speed.

Usually there is no need to ask the provider for specific data service as SIM cards are often already enabled for GPRS.
An evident advantage using internet for data exchange is that it allows access to data from anywhere, at low cost, regardless distance.

4.1.3 Monitoring networks

The monitoring network is a system composed by one to several AMB-8059 remote monitoring stations and a controller PC running the 8059SW-02 control software.

Remote stations continuously perform field measurements and store results in their internal memory.
At programmed time each station downloads the stored results to the controller PC in a different way depending on the communication method that have been decided in advance.
In this section GPRS communication method only is taken into consideration.

4.1.4 System operation in GPRS mode

After initial installation there is no direct communication between remote stations set for GPRS mode and controller PC.
A user's FTP server with a static IP address is always available, presuming availability of the GSM signal at the remote station installation site, for AMB-8059 to download data to the server itself.
When connecting to the server the remote station will check for the existence of any request to modify its setting or to download results related to some specific time interval.
In case, the station will proceed accordingly by changing its setting or by downloading the requested data. If no special requests is found the station downloads all measurement results which have been acquired since the previous access to the server.

To avoid generating undesired electromagnetic fields that would be measured by the station itself, the station GSM/GPRS modem, which allows communication with the FTP server, should be set to be off for the major part of the day.
At the programmed time, set by the user, the modem switches on and the station access the ftp server to download its results.
Depending on the setting decided by the user, various abnormal conditions regarding field strength and station operation, generate alarm events able to immediately switch on the modem to access the server and/or send SMS to the user's mobile phone.
Being the modem a power consuming component, it is advisable to avoid programming the station to access the server more than once a day to avoid, specially during bad weather periods, affecting the energy balance between solar panel and battery backup.

The main interface to the system, from the operator side, is the controller PC.
When desired, through the control software 8059SW-02, the user can select a remote station from the station list and access the station folder opening an ftp connection to the server.
All data not already downloaded from the server to the controller PC are then downloaded and a new setting file, if requested by the user, is transferred to the server to be read by the station when it will access the server.
The controller PC needs a full internet connection allowed for File Transfer Protocol.

☞NOTE

Due to the GSM network signal quality it may happens, sometimes, that the station is not able to access the ftp server at the scheduled time. No data will be anyway loss being downloaded at the next time connection.

4.1.5 Some advantages

Any remote unit (AMB-8059 area monitor) downloads its data to the FTP server, at scheduled time, according to the user setting.
The controller PC is able to retrieve them whenever desired without any need to establish a direct connection to the remote station.
Integrity check of transmitted data is automatically performed by the remote station.
In case of bad GSM signal quality, remote stations automatically try several times to access the network and download measurement results.
The small dimensions of data files normally transferred by our systems make it convenient to chose telephone charges based on data volume usually available for GPRS service.

4.2 General Requirements

Remote station:

4.2.1 Remote station

- A SIM card enabled for GPRS communication must be provided by the user and inserted in the SIM card slot according to instruction provided by this manual.
- The SIM card PIN code must be disabled using a mobile phone

Information required for GPRS communication:

- **APN** (Access Point Name)
- **UN** (User Name)
- **PW** (Password)

The above parameters are specific of the SIM card provider, it often happens that User Name and Password are not required.

Some examples:

Italy: APN for a Vodafone SIM card is: web.omnitel.it
User name and password are not required.

Greece: APN for a Cosmote SIM card is: internet
User name and password are not required.

China: APN for a China Mobile (Shanghai) SIM card is: cmnet
User name and password are not required.

Configuration of the above, as well as ftp server parameters must be done in advance, before on site installation, using the controller PC running the provided 8059SW-02 control software or, as an alternative, by means of specific messages (SMS) to be sent to the station telephone number.

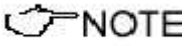
A Narda STS ftp server is available to our customer for preliminary tests:
IP address: 109.233.121.232
User Name: 8057
Password: pmmpass

Be aware that data in this server are periodically removed.

4.2.2 Minimum requirements of the controller pc

Minimum requirements of the controller pc:

- Operating system: Windows XP, Vista, Win7
- Pentium processor;
- at least 16 Mb RAM;
- at least 100 Mb of space free on your hard disk;
- Full Internet connection (**the PC and network firewall should not close the ports 20 and 21 normally used for FTP connection**)
- 8059SW-02 provided control software should be installed



8059SW-02 control software has been developed to operate properly with different Date /Time formats that can be selected through the Regional Settings of the Windows Control Panel.
Non all the possible combinations has been tested.
A functional test by setting European format (dd/MM/yyyy , HH:mm:ss) is suggested in case a malfunction is noticed.

4.2.3 FTP server requirements

FTP server requirements:

A STATIC IP address is required for the FTP server.

The following information regarding the ftp server must be available to set-up correctly remote units and controller PC:

IP address (it is the static IP address assigned to the ftp server)
User name and Password (to be allowed to exchange data with the ftp server)

NOTE

Username and Password must only contain alphanumeric characters; any special characters are not allowed.

4.2.4 Brief operating description and file structure

Basically, at scheduled times, the AMB-8059 regularly establishes, via GPRS, a connection to the server through FTP:

- First it loads, if any, all the (new) settings which have been written by the (client) application.
- Then it writes all data that have been requested by the application.
- Finally it erases all previous required settings in order to avoid reloading them at the next connection. Note that data related to field measurements are never deleted by the station.

After that the connection is terminated.

4.2.5 Structure

To avoid having multiple stations that store data in the same directory every data exchange is done on a directory named as the serial number of the monitoring station itself. Here, an example of directory structure:

FTP_Root
000WE41003
8059.CFG
8059.set
8059FLD.TXT
17_08_01_07_09_.D59

NOTE

Directories are created by the control software, at the first connection to the server, after the station parameter set-up has been completed. Remote station will not create any directory. **The user must ensure that the directory have been created before operating the remote station.**

4.2.5.1 CFG File (configuration)

Whenever the AMB-8059 connects to GPRS and accesses to FTP server, it looks for a file named 8059.CFG in its directory (its serial number). If the file is present, the AMB-8059 retrieves it and calculates the checksum in order to use it and thus get the new configuration. If the checksum is wrong, the file is discarded otherwise the new configuration is taken.
Is important to note that the new setting will not take effect immediately but only after the connection is closed.

4.2.5.2 FLD File (Read)

After having dealt with the configuration file 8059.CFG, the AMB-8059 check for the presence of a file named 8059FLD.TXT.
This, is an ASCII file which contains the date of the first requested record and the number of them. The syntax is: **FLD HH:mm;GG/MM/YY; n** where:

- HH is hour of the day.
- mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year
- n is the number of records required (if n="---" then all records starting from the date/hour up the last recorded record will be uploaded).

For example the string FLD **18:13;23/07/09;100**
Asks for 100 records from the 23th of July 2009 at 18:13 .

If, instead, the string would have been FLD **18:13;23/07/09;---**
It would ask for all records from the 23th of July 2009 at 18:13 up to now.

NOTE

Note that, in case of "---" (up to now option), in order to avoid huge files and long transfer time, the number of records will be limited to about 5000.

Once the AMB-8059 has read the file 8059FLD.TXT, it deletes it. It will be replaced later with the newer self created 8059FLD.TXT which reflects the last uploaded record.
This solves the continuity of records even without any external intervention. Indeed, for every connection the AMB-8059 uploads the records and writes a new FLD file which reports the date/hour of last record so that next connection will continue from this having thus an uninterrupted series of records.

4.2.5.3 Record File (Write)

After having read the FLD file, which informs the AMB-8059 about which records have to be uploaded, it writes a file named HH_mm_GG_MM_YY.D59 where:

- HH is hour of the day.
- mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

This file, in binary format, contains the downloaded measurement results.

4.2.5.4 FLD File (Write)

After having written the record file HH_mm_GG_MM_YY.D59, the AMB-8059 writes the file named 8059FLD.TXT which replaces the old one.
This, is an ASCII file which contains the date of the last uploaded record and terminates with the string "---".
The content will be therefore: FLD HH:mm;GG/MM/YY;--- where:

- HH is hour of the day.
- mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

For example the string FLD 20:30;23/07/09;---
Says that the last updated record is related to the date of 23th of July 2009 at 20:30 .

If the user does not need a specific period but, as usual, a simple continuous data logger , there is no need to write any FLD File as the system is self-sufficient.

4.2.5.5 Event File (Write)

After having written the FLD file, the AMB-8059 writes a file named HH_mm_GG_MM_YY.TXT where:

- HH is hour of the day.
- mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

Which represents the events file.
This, is an ASCII file which contains all the new events since last connection.
Alternatively, soliciting a connection, by the SMS command, different event history can be retrieved as follows:

- SCGNA : all the stored events are written in EVENT.TXT file
- SCGNL : The last 20 events are written in EVENT.TXT file

The content of EVENT file is the chronological history of all events up to the time of connection (RTC setting assumed to be correct).

4.3 First installation and Parameter setting

First configuration of each station and its functional test should be performed before installing the station on site.
User must ensure that the GSM signal is available in the installation site.
Refer to chapter 1 and 2 for details regarding battery charging, station positioning and other information about installation.

Main steps:

1 - Set-up the remote unit and recharge batteries as explained in the chapter 1 and 2;

2 - Install 8059SW-02 control software in the controller PC by running 8059NSTS setup and follow on screen instructions (see chapter 3);

3 - Check the COM port number assigned to the RS232 or USB port (or USB/RS232 adapter)
It may happen, using USB port or USB/RS232 adapter, that the assigned COM port number exceed 09.
In this case change the setting of your port in the Windows control panel (advanced setting) to assign a COM port number between 01 and 09 (see chapter 3);.

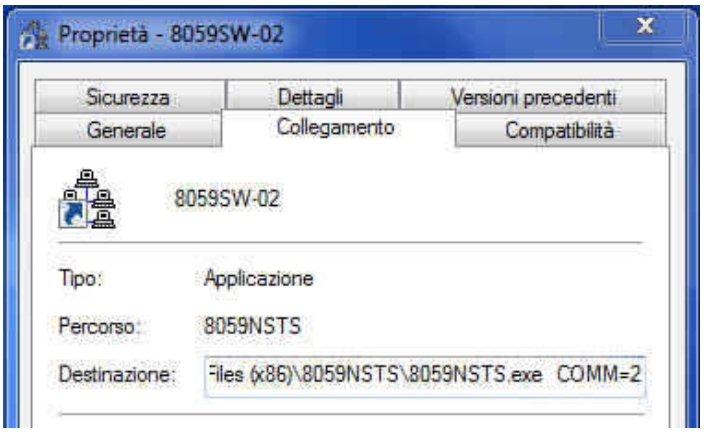
4 - Select the icon **8059SW-02** with the right mouse button;

5 - Select **Properties**

6 - Add the command COMM=N preceded by a space (in capital letters) at the end of the Destination field where N indicates the serial port to be used; for example, if the AMB-8059 Area Monitor is connected to port 2, add the command COMM=2.

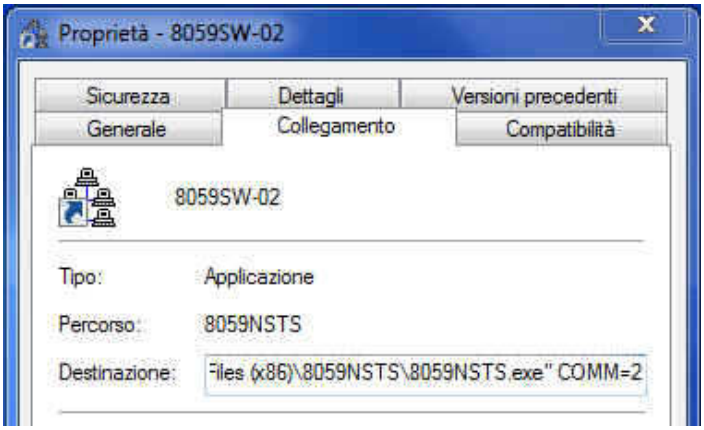
NOTE

The assigned COM port nr. must be between 1 and 9.



NOTE

In some operating system the Destination field is enclosed in double quotation marks (“); in this case, the command COMM=N, preceded by a space must be outside as in the example below;



7 - Then confirm by selecting **Apply**

8 - Connect the Area monitor to the PC with the provided cable, switch the station ON and run 8059SW-02 control software.

9 - Set Terminal and Setting passwords as requested by the software (If desired, Terminal and Setting passwords can be the same word). Take note of your passwords as they are needed to operate the application software.

10 - Select **FTP** section in the top side of the main window

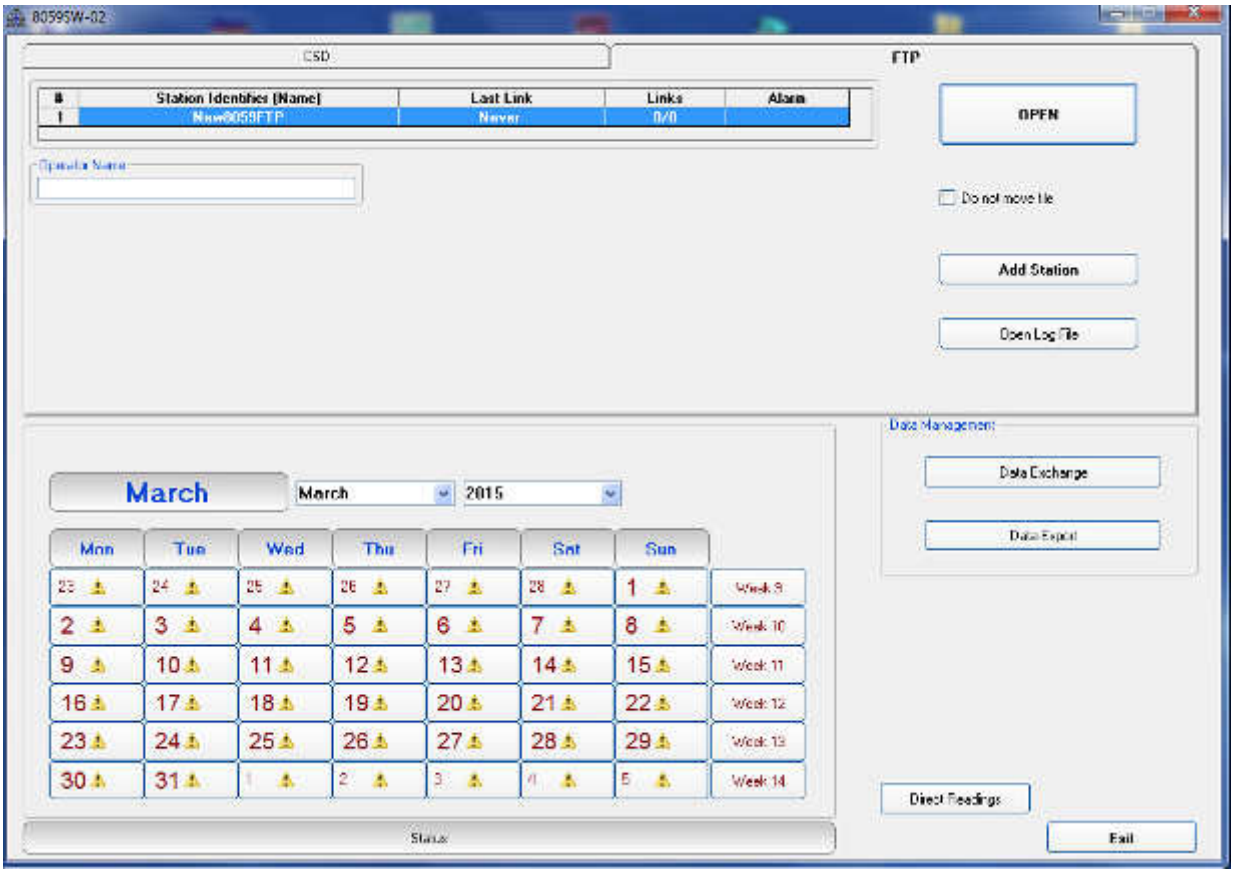
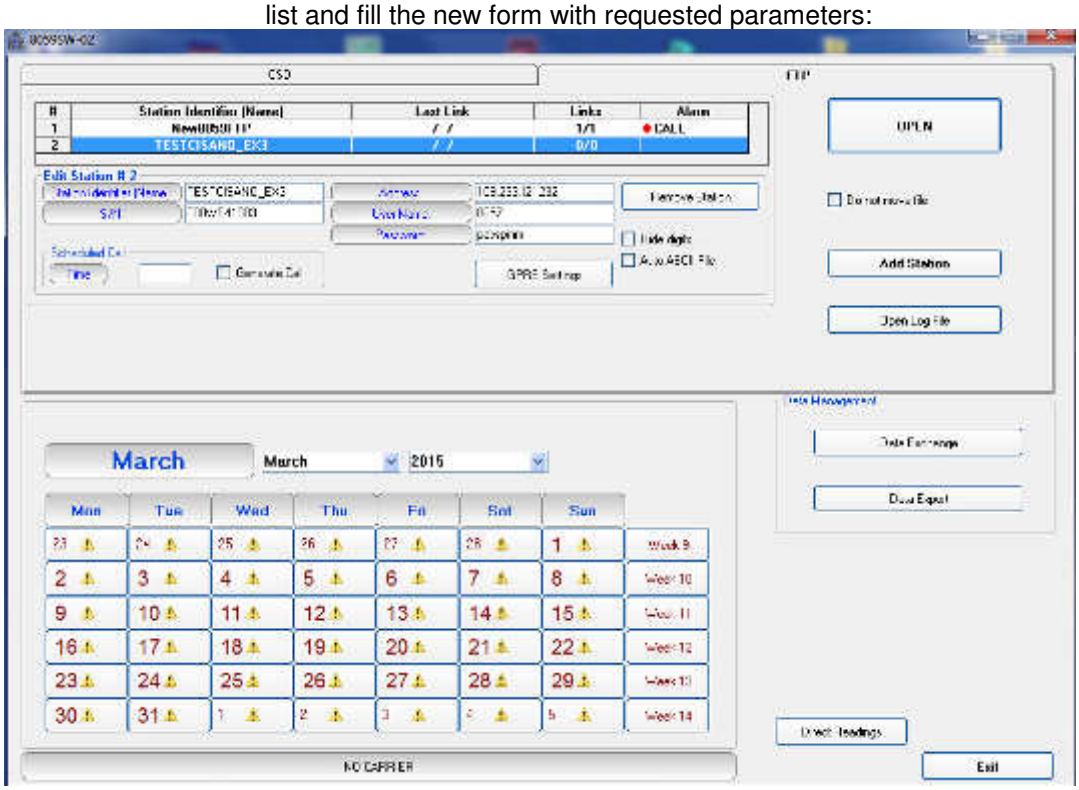


Fig. 4-1 FTP Main window

11 - The station list contains only one station as an example.

12 - Click **Add Station** button on the right side to add a new station to your list and fill the new form with requested parameters:



Station Identifier (Name):
"TESTCISANO_EX3" in this example, you can decide for any alphanumeric name.
The station list cannot contain two or more stations with the same name.
The folder containing all information and data of a specific station is created automatically by the control software. The folder name is the same assigned to the station in the station list.

S/N:
"**000WE41003**" in this example, is the serial number, different for any station.
By means of the control software a new directory with the same name will be created in the FTP server. It will be used for any data exchange between PC-server FTP and station-server FTP related to this specific station.

Address:
"109.233.121.232" in this example Narda STS ftp server IP address that can be used by user for preliminary tests. **Be aware that data in this server are periodically removed.**
User must set here the **static IP address** of his FTP server.

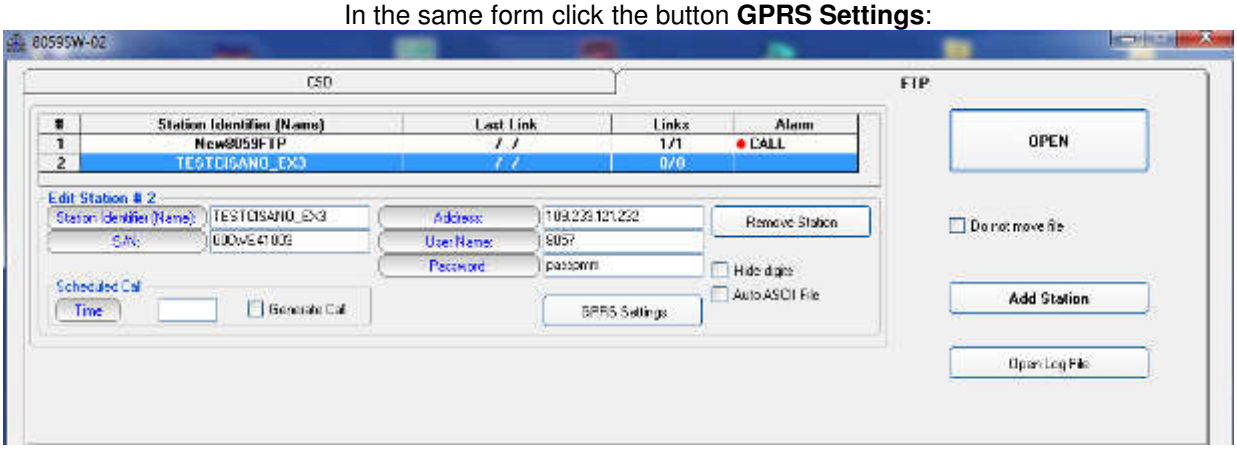
User Name and **Password:**
Respectively "8057" and "pmmpass" in this example to access the Narda STS ftp server for test.
User must set access parameters for his own ftp server.

NOTE **The above information S/N, Address, User name and password are necessary for the controller PC to access the ftp server for downloading station measurement results and change setting to the remote station.**

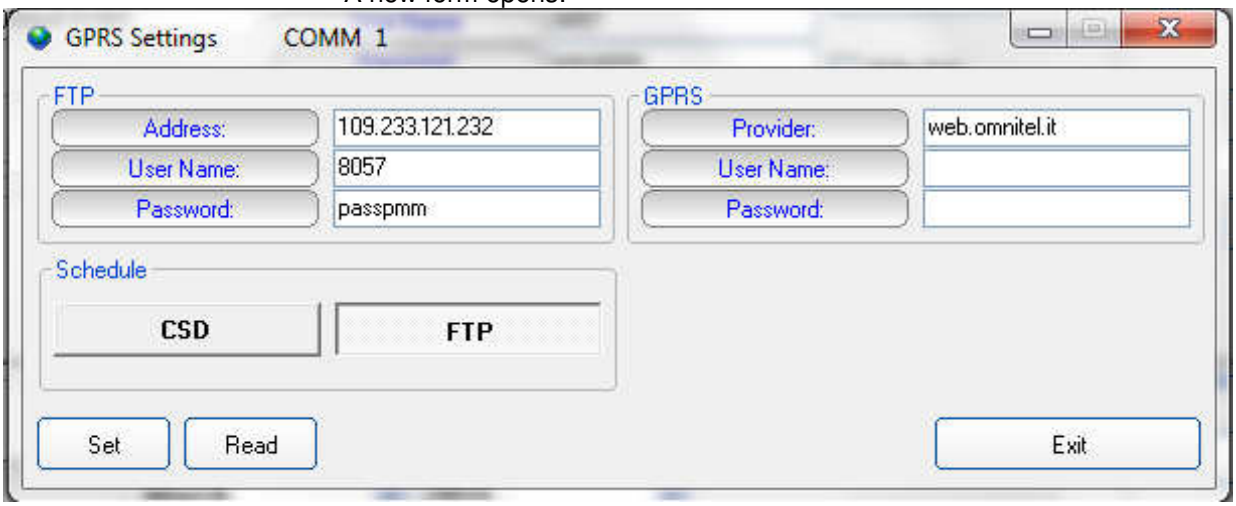
NOTE **After typing, press "Return" key to set each single parameter. Every time a single parameter is set in this form the user will be asked to type the terminal password.**

13 - GPRS parameters setting

In the same form click the button **GPRS Settings**:



A new form opens:



Select the button **FTP** in the frame **Schedule** if not already selected.
Fill the same parameters, Address, User Name and Password for the FTP server. This parameters will be transferred to the station and will be used by the station itself to access the ftp server for downloading measurement results and upload any new configuration file.
In this example parameters for the Narda STS ftp server are set for preliminary test.
User should then set access parameters for his own ftp server.

Fill the **GPRS** section with parameters needed by the station to link the GPRS network.
In this example are set parameters for an Italian Vodafone SIM card (see the above paragraph **Remote station requirement** for details).

Click the button **Set** to store the above parameters in the station memory.

NOTE **Use the Read button to display GPRS parameter of a station connected by the RS232 or USB cable.**

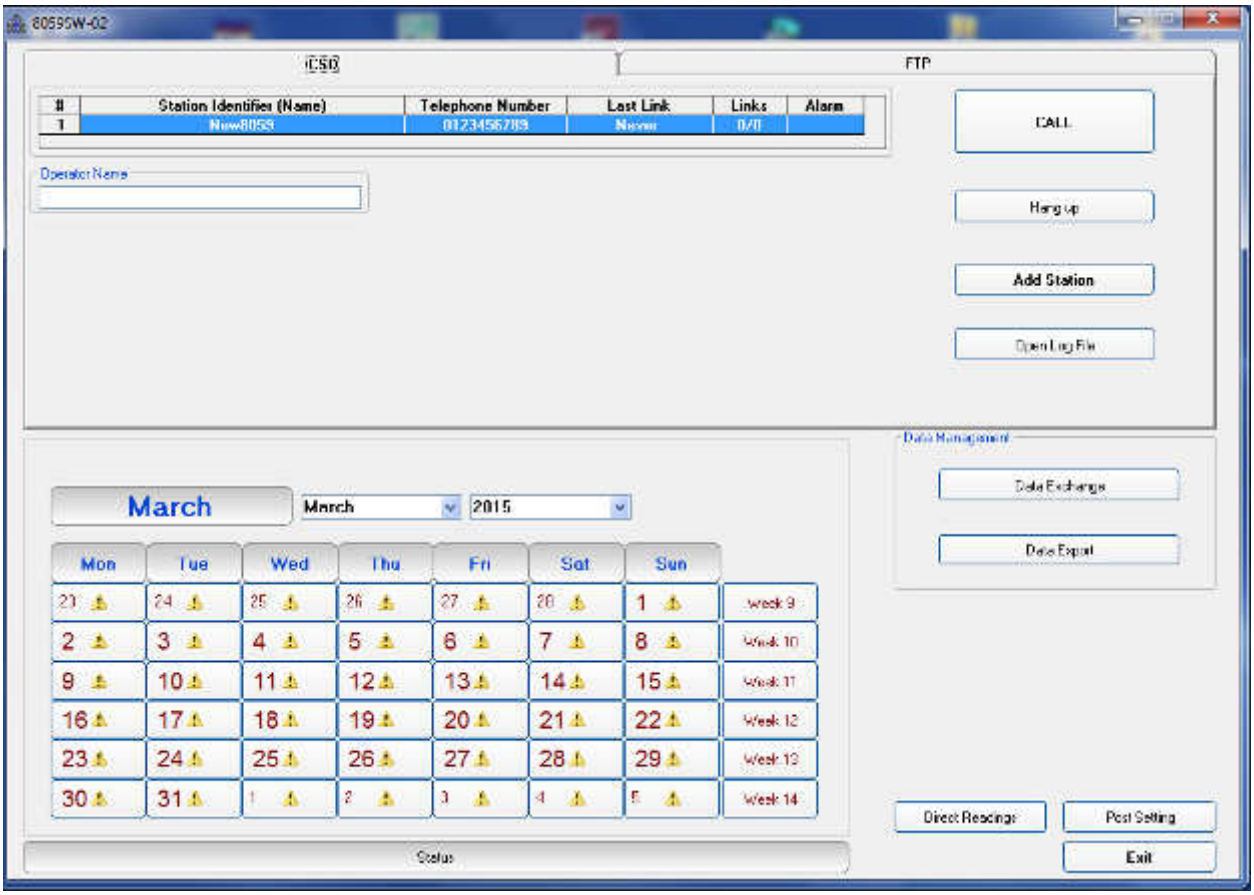
Click **Exit** to close this form.

14 – Setting station RTC (Real Time Clock)

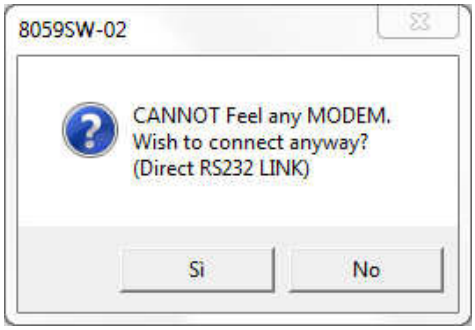
The station clock is very important as every field data stored by the station is related to time taking, as a reference, the station RTC.

Being connected through the cable the station clock will be set.
After on site installation, having no direct connection between controller PC and remote station, RTC will be set, if required, by means of a cell phone, sending an SMS to the station.

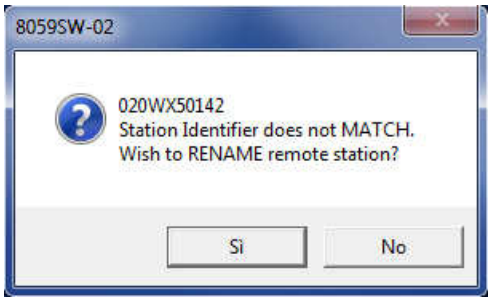
Select the **CSD** section of the 8059SW-02 control software and select one station from the stations list (the first installation will show only one station set by the software as an example):



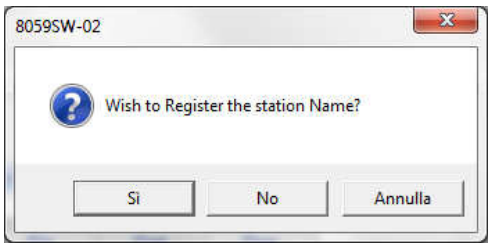
Select the station **New8059** and hit the button **Call**, on the right, to access the station connected by cable.
As the CSD mode normally operates through a modem, a message will inform that no modem has been detected on your COM port. It will ask whether you wish to access a station connected by cable. Being this the case, you will answer **Yes** to access your station through the Serial or USB cable:



The station name is always stored within the station and it is expected that it matches the name, in your station list, that have been selected before calling.
The user station have not been added to the CSD station list as the GPRS communication mode has been decided, in advance, for this station.
Answer **No** to the next messages as you neither wish to change the station name, nor add in the CSD station list the station you are using:



Answer **No** as you do not wish to change the name stored within your station.



Answer **No** as you do not need to add this station to the CSD station list, you are going to use it in GPRS mode. This station is in your GPRS station list.

The station Setting window will be shown:

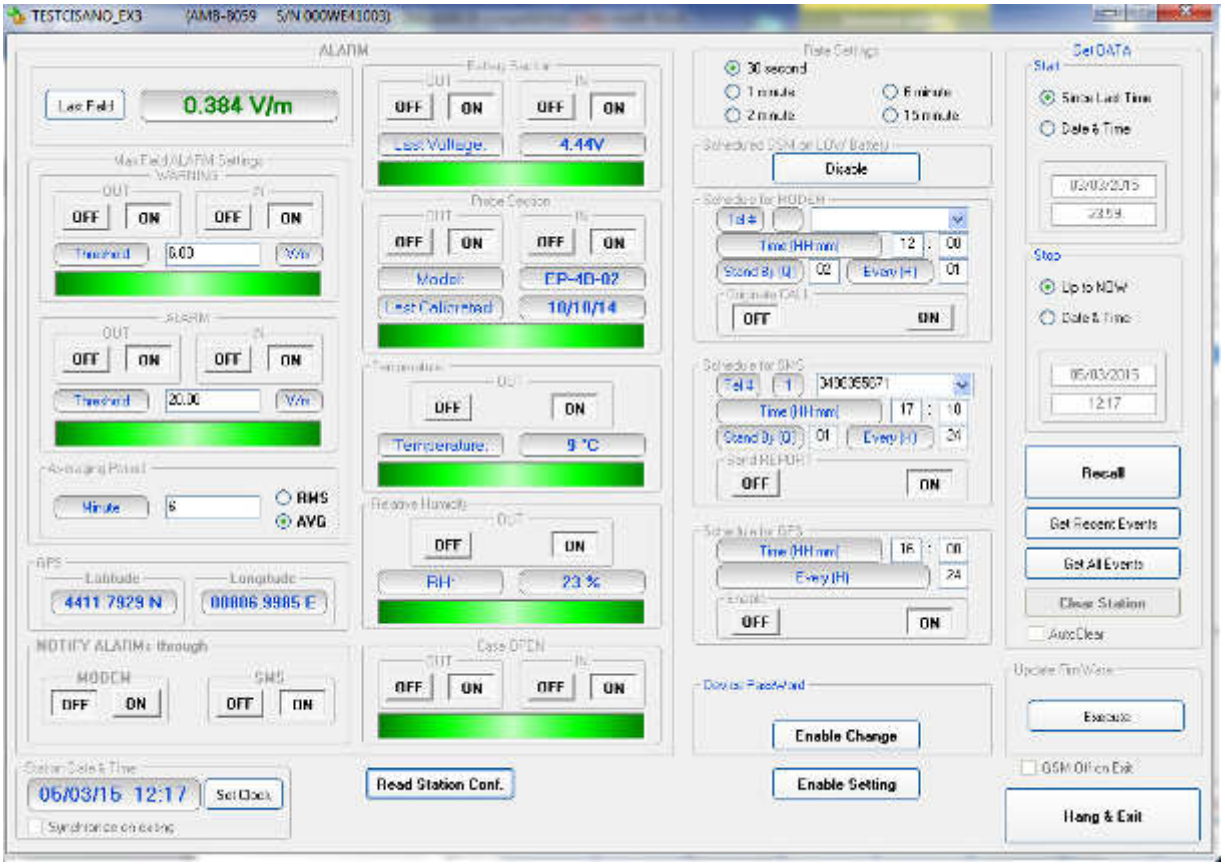


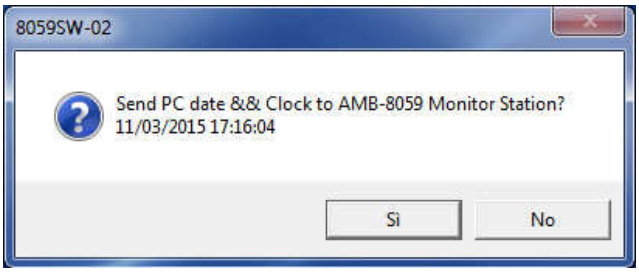
Fig. 4-2 Setting window

The above picture shows the “TESTCISANO_EX3” station. Please note that the station clock (RTC) has not been set as it shows the date, in the “Station Date & Time” frame on the left bottom side, 5th Mar 2015.

Hit the button **Enable Setting**, on the bottom right side, to modify the settings of your station.
You should remember the setting password that have been set the first time this software has been run. You will be asked to type it to be allowed to modify the station settings.

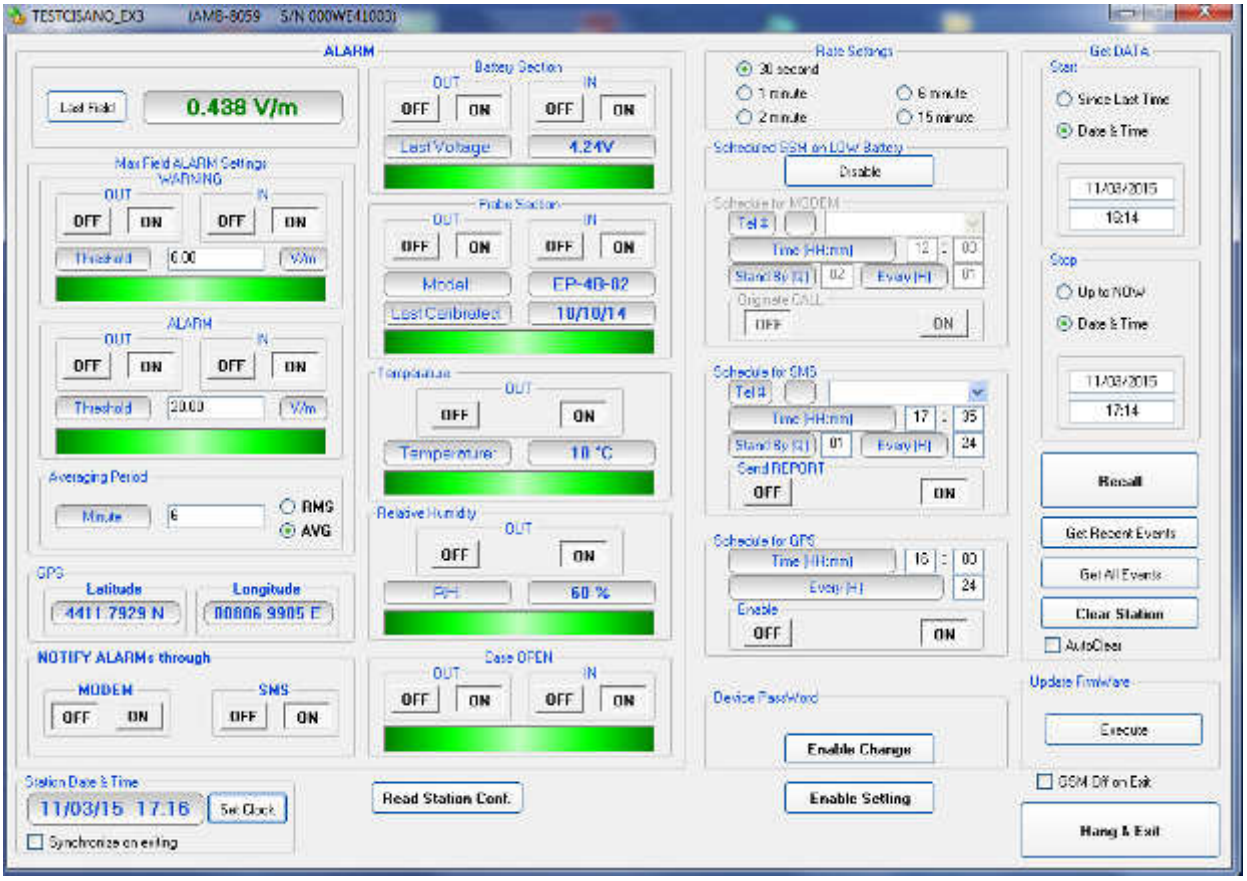
Type the setting password to be allowed to change RTC.

Hit the **Set Clock** button (left bottom side), the following message will be displayed:



Click **Yes** to synchronize the station clock with your PC.

The station clock is now set.

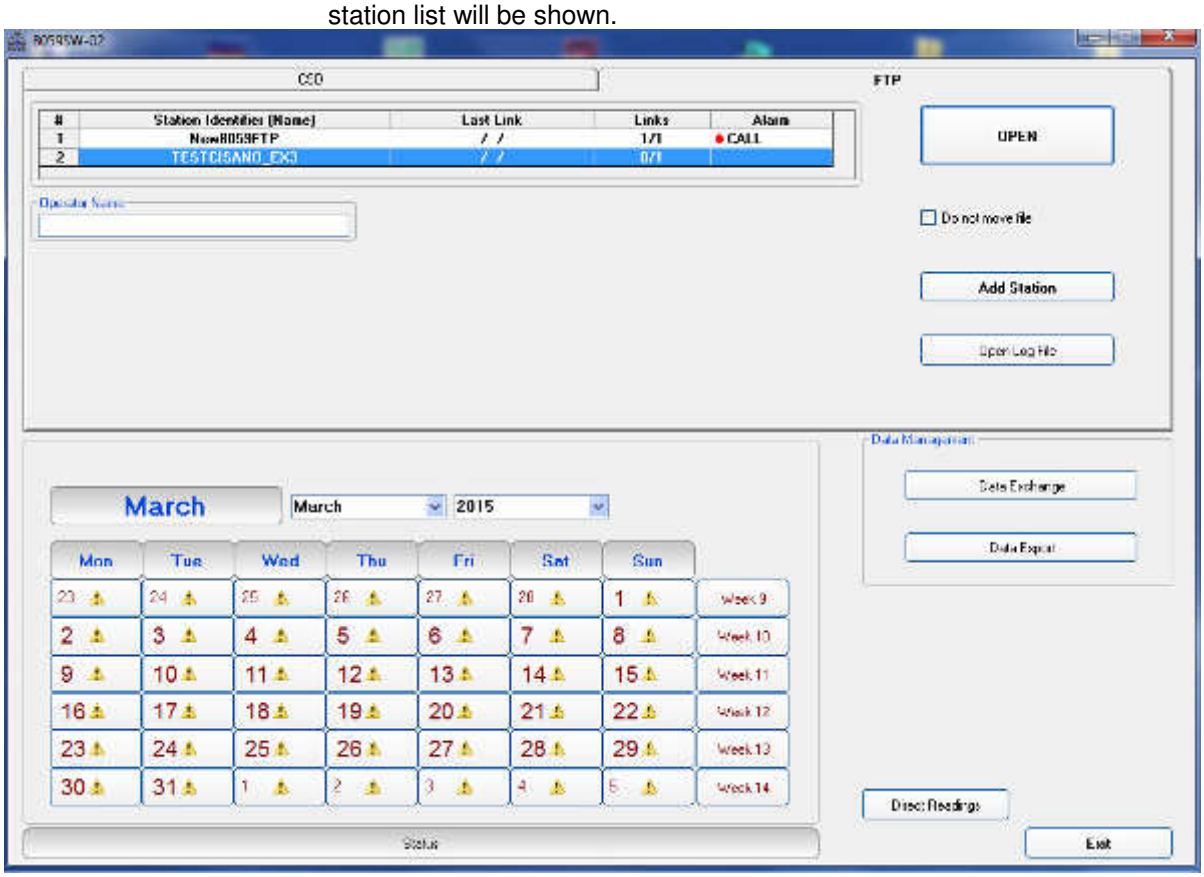


Hit the **Hang & Exit** button on the right bottom side of the setting window.

15 – Accessing the FTP server

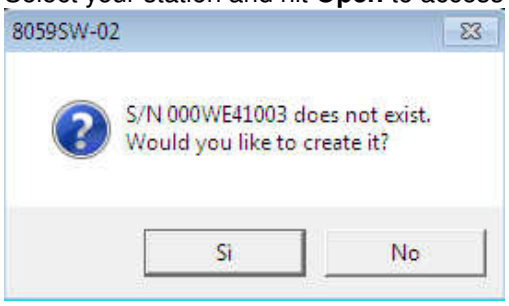
Be sure a full internet connection is available for the controller PC. The firewall, if active, should not close ports 20 and 21 usually used for ftp communication.

From the 8059SW-02 main window, select the **FTP** label, your GPRS station list will be shown.



If the function “Do not move file” is enabled the data stored in the ftp server by the station will be still available for a future download even from a different station.

Select your station and hit **Open** to access the ftp server.

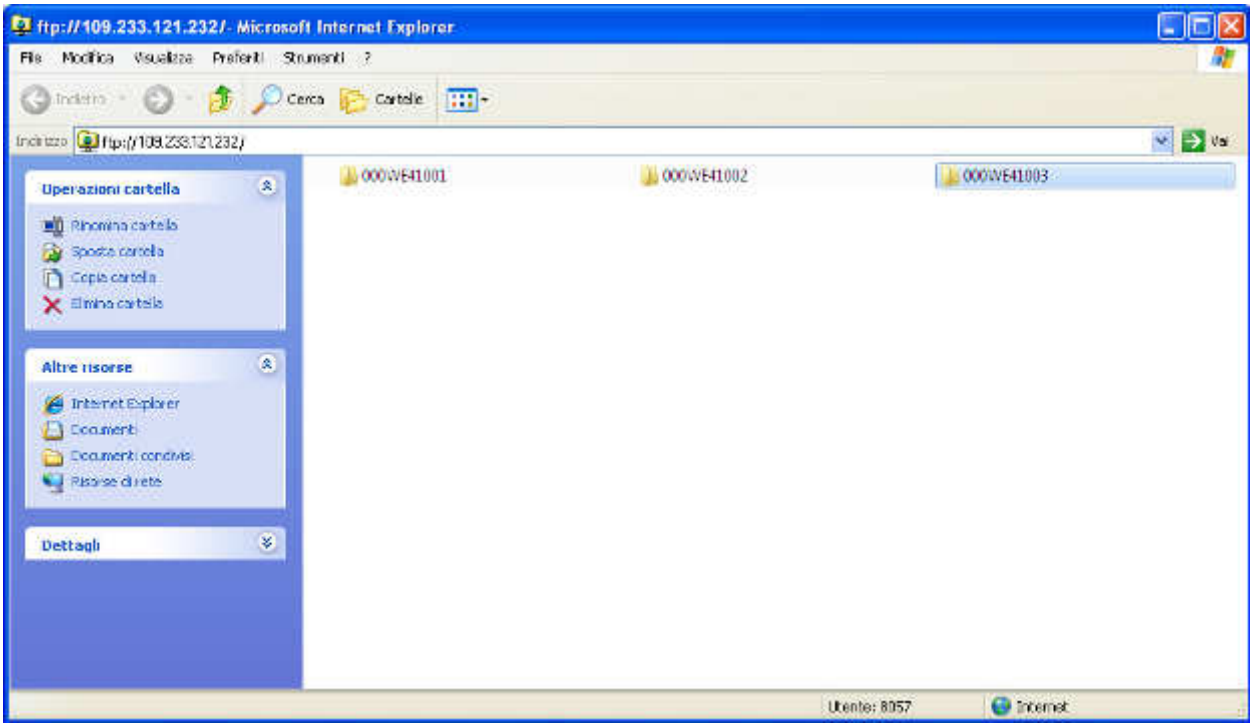


The station folder, into the ftp server, has not been created yet, answer **Yes** to create it.

The name of this folder will be the same as the station serial number that you already set, it will be used for any data exchange between Controller PC – FTP server and Remote Station – FTP server.

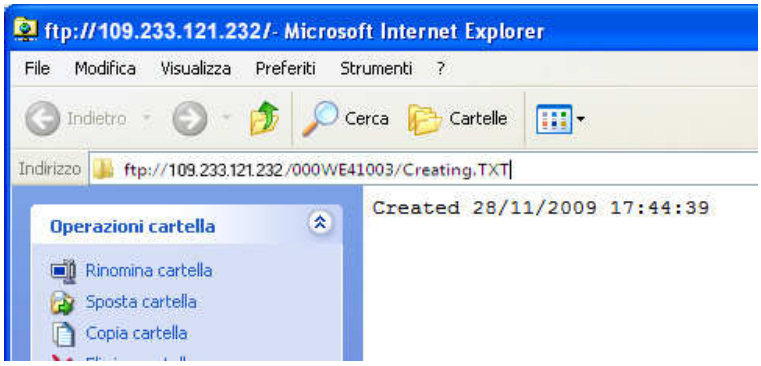
Hit **Yes**, the folder will be created.

NOTE **You can check it just accessing your ftp server using Windows Explorer.**

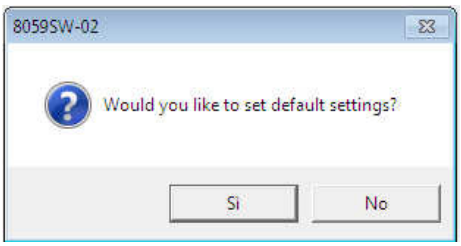


IP address, User Name and Password are to be set to access the ftp server through the Windows Explorer.

The only file you should find within the new folder is the “Creating.TXT” which contains information about creation date and time:

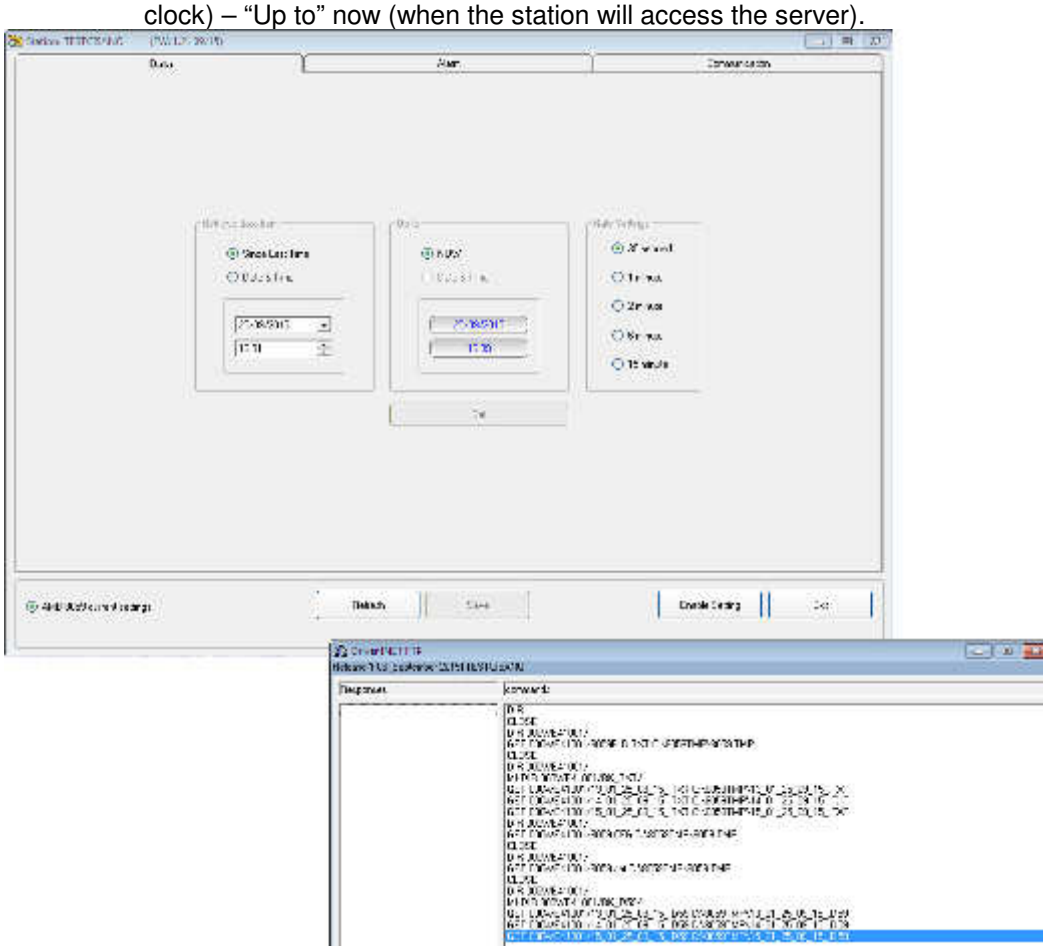


Next message shown by the software just ask you whether you wish to display a default setting which should be saved or modified by the user to save the first setting file ".cfg" which will be read and used by the station at its first connection to the server:



Answer **Yes** to display default setting.

The first section **Data** will show which data will be downloaded by the station at the next connection. The default setting is "Since" date-time (your PC clock) – "Up to" now (when the station will access the server).



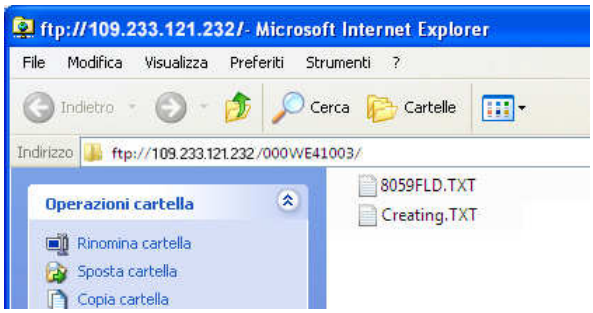
Meanwhile it will be shown the **DRIVER INET FTP** window; this driver manages the download and upload data in the ftp server.

Hit **Enable setting** and type the Setting Password to be allowed to hit the **Set** button to create the first .FLD file that will be read by the station, at its first connection to the server, to know which data have to be downloaded.

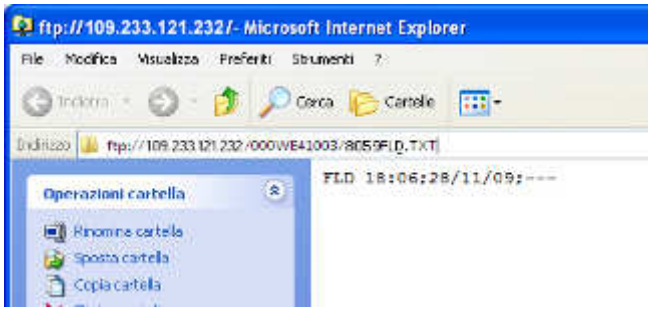
The Rate Setting frame, on the right, allows you to set the rate setting. It is the **storing rate** of the station. In the above example the station will store the field measurement, in its internal memory, every 6 minute.

NOTE

You can check that the 8059FLD file has been created by accessing the ftp server using Windows Explorer. Open the station folder (the name is its serial number).



8059FLD.txt file contains information related to the next data the station should download when accessing the ftp server:



The above picture shows the content of 8059FLD file. After reading this file the station will download data starting from November 28th at 18:06.
Last information, "---"in this case, shows how many records have to be downloaded.
"---" means "up to now" so: all data that have been acquired since November 28th at 18:06.

A different information, let's say "80" instead of "---" means 80 records.
In which case the time period depends on the **storing rate** that have been set for this station.
If the storing rate was 6min, 80 records means 6 x 80 minutes = 480 minutes that means 8 hours:
Downloaded data will be: "Since" November 28th at 18:06 "Up to" November 29th at 02:06.

NOTE

It is usual to set any monitoring station to download data "Since last time" – "Up to now" so that everytime the station access the server it downloads all data that have been acquired since the last access to the ftp server.

NOTE

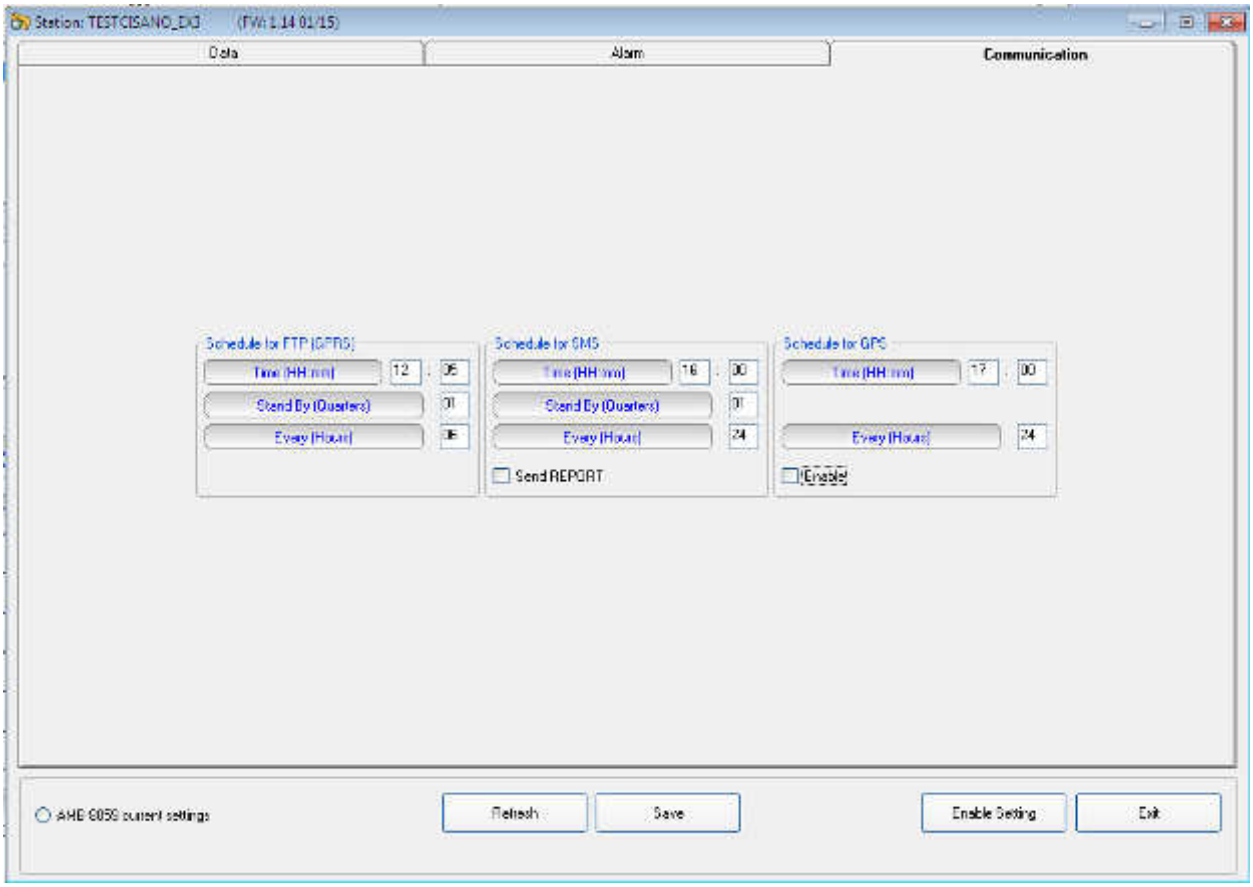
In case, due to some special need, a specific time period should be downloaded by setting the parameters "Retrieve Data From – Date&Time / Up to – Date&Time", continuity of data to be downloaded later cannot be resolved automatically and a gap will be shown since last data already downloaded up to the time of next connection.
After downloading the requested specific time period the parameter "Up to" will be automatically set to "Now".
The parameter "Retrieve Data From – Date&Time" should be then set manually to recover data not downloaded automatically.

The second section, named **Alarm,** allows the user to set which alarm should be notified, if through FTP connection or SMS to the user mobile phone.

The same windows allows the user to set which average type should be performed on the acquired data, **AVG** or **RMS**, and the averaging period over which the average calculation is performed.
In the above example average type is AVG over 6 minutes time period.

Both **Warning** and **Alarm** thresholds are set to be notified by an **SMS** to the user's mobile phone (telephone number should be set through an SMS sent to the station or, during RS232 or USB connection, through the **CSD** section).

Third section named **Communication** shows the station modem schedule. As explained above, the station modem should be off for the major part of the day. In this window you can decide, in two frames, when the station modem has to switch ON, how much time should stay in stand by mode and every how many hours this operation should repeat.



The above example shows that the station modem will switch ON for an FTP connection to the server at 12:05, it will stay ON for 15 minutes (1 quarter). Every 6 hours the loop will be repeated so that the modem will switch ON, and the station will download its data at 12:05, 18:05, 00:05, 06:05 every day.
So frequent connections are set for test purpose only, if the parameter **Every (Hours)** was set to 01 the station downloaded its data every hour.

NOTE

To avoid affecting the energy balance between solar panel, back up battery and station consumption we recommend to set the modem to switch on only once a day, better during day time, for 1 quarter (15 minutes). This configuration assures station power autonomy even during long bad weather periods when the solar radiation could be not enough to supply the station modem for longer time.

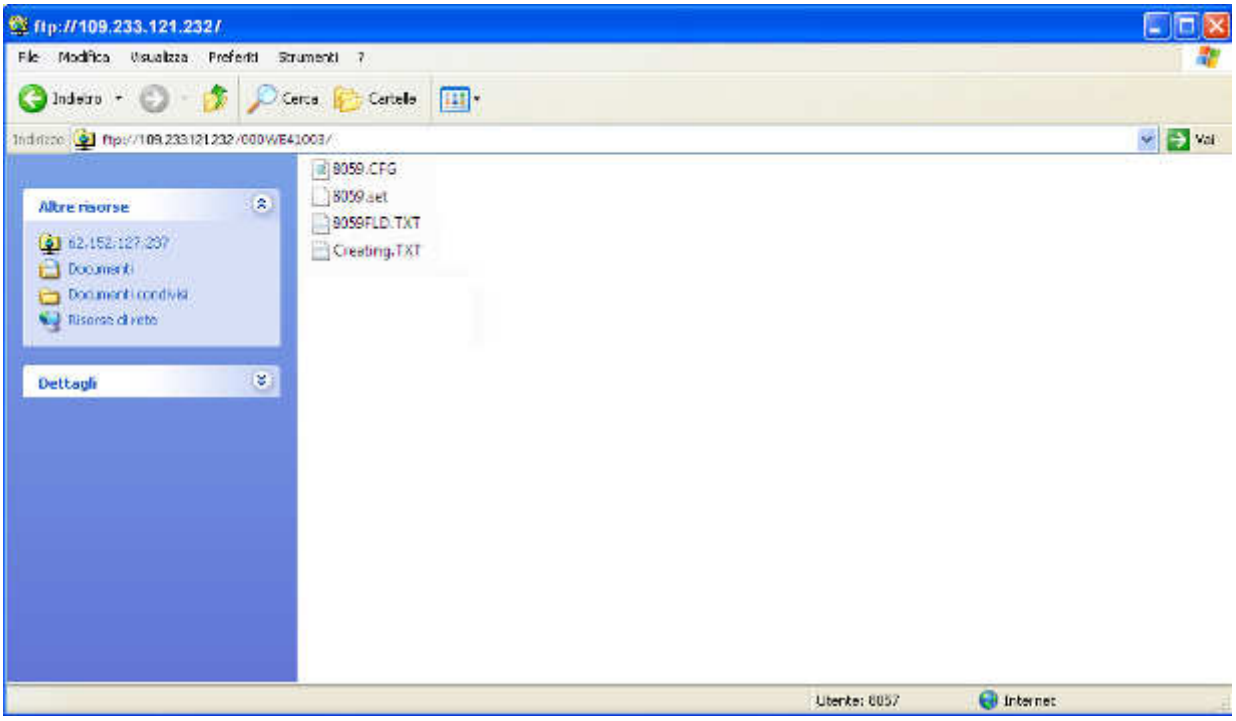
The second frame, **Schedule for SMS,** allows the user to set in the same way a second time period for the modem to be ON. If the command **Send Report** is checked, an SMS informing about maximum field strength measured and lowest battery voltage of the day is sent to the user mobile phone (telephone number to be set by SMS to the station or direct local connection during preliminary installation and test).

After all three sections, Data, Alarm and Communication are set as desired, hit the **Save** button, on the bottom side to store your settings. A **.CFG** file will be created in the station folder within the ftp server. It will be read by the station, when accessing the server, to set itself as requested.

Hit **Exit** to come back to the 8059SW-02 main window.

NOTE

The existence of 8059.CFG file can be checked by accessing the station folder, in the ftp server, through the Windows Explorer:



Other files and folders may be present in case the station already accessed the server.

16 – Switch OFF the AMB-8059 and insert the SIM card as follows:

Fig. 4-3 SIM card installation

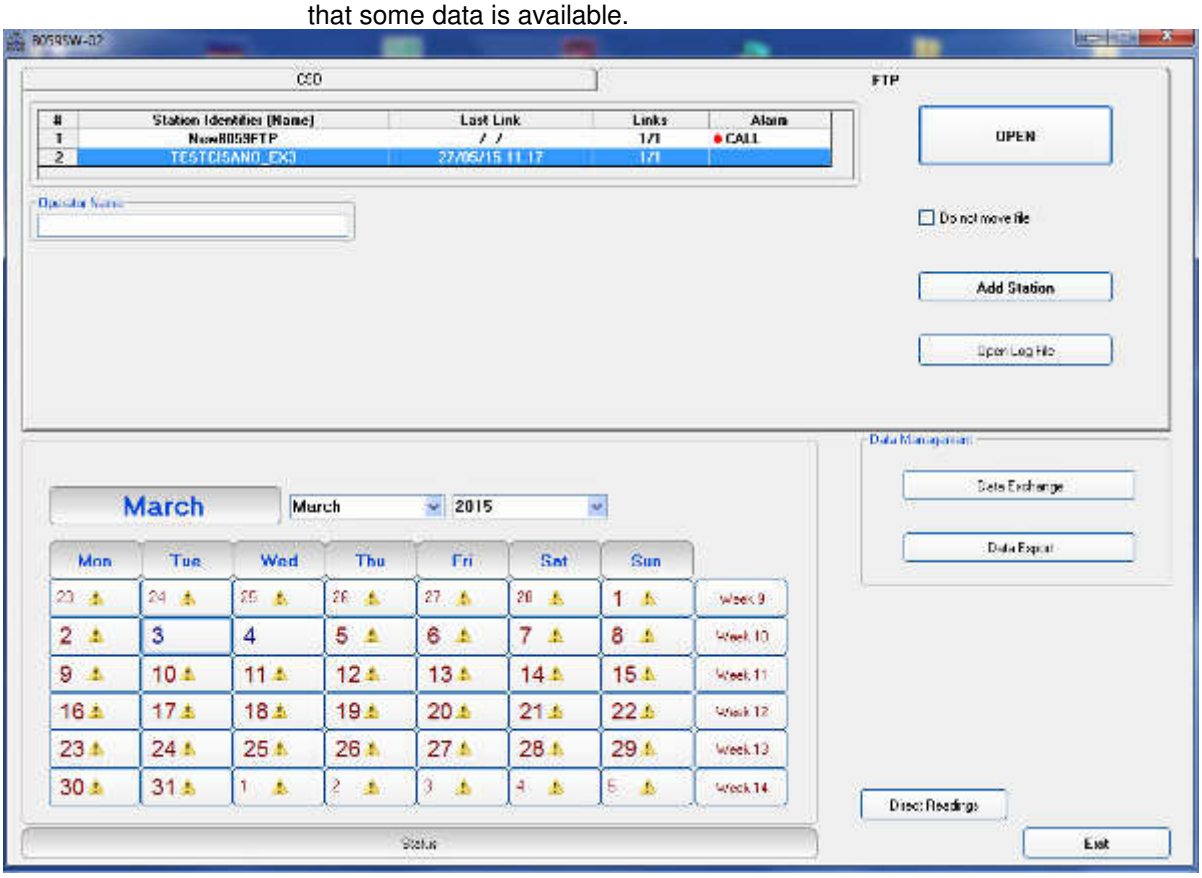
17 - Switch the station ON

18 - Displaying measurement results

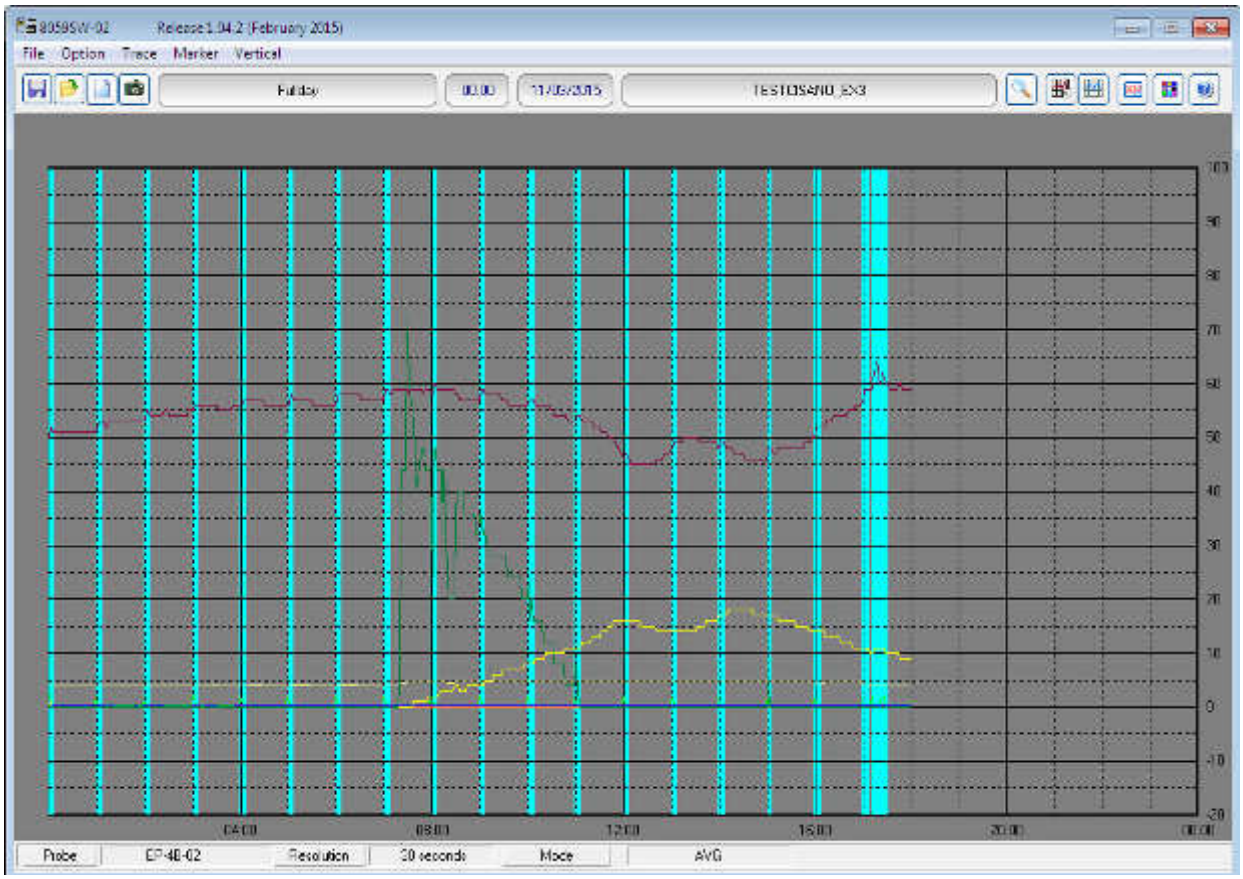
As soon as the station access the ftp server it downloads measurement results.

When desired, from the 8059SW-02 main window, FTP side, select your station and hit **Open** to access the station folder in the FTP server.

New data, if present will be downloaded to the controller PC. After all automatic tasks have been completed and the bottom bar shows no operation hit **Exit** to come back to the main window. If some data have been downloaded, the calendar will show the related day number in blue showing that some data is available.



Hit the blue day in the calendar to open a graph showing downloaded data.

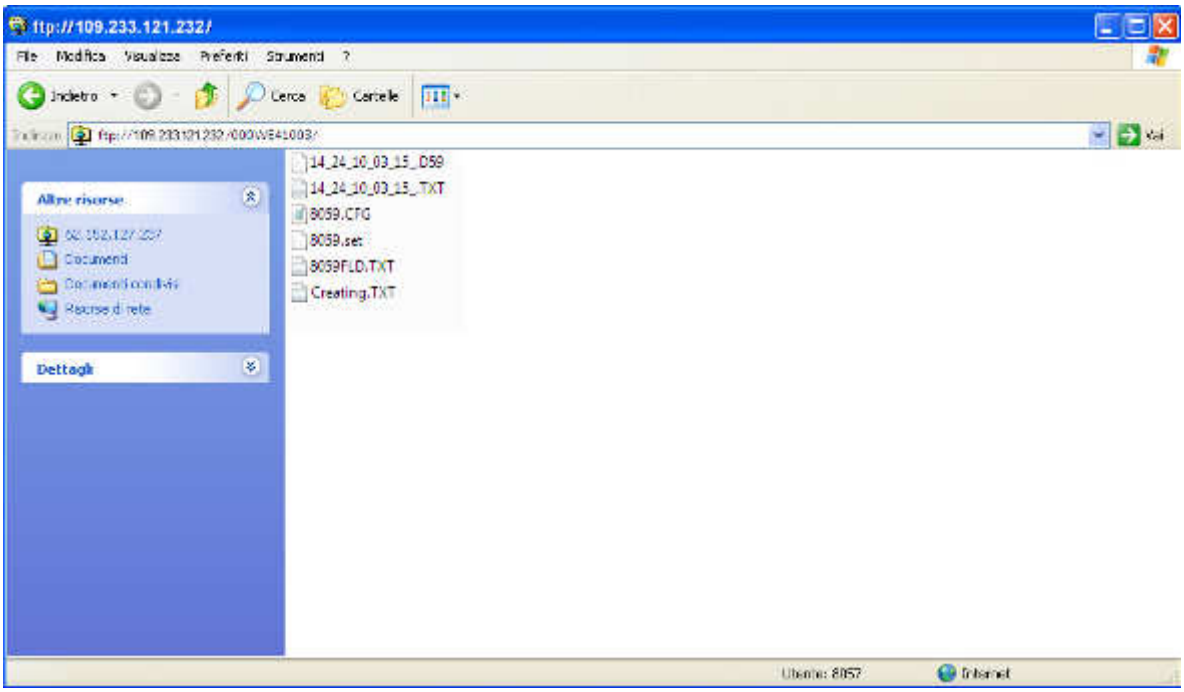


NOTE

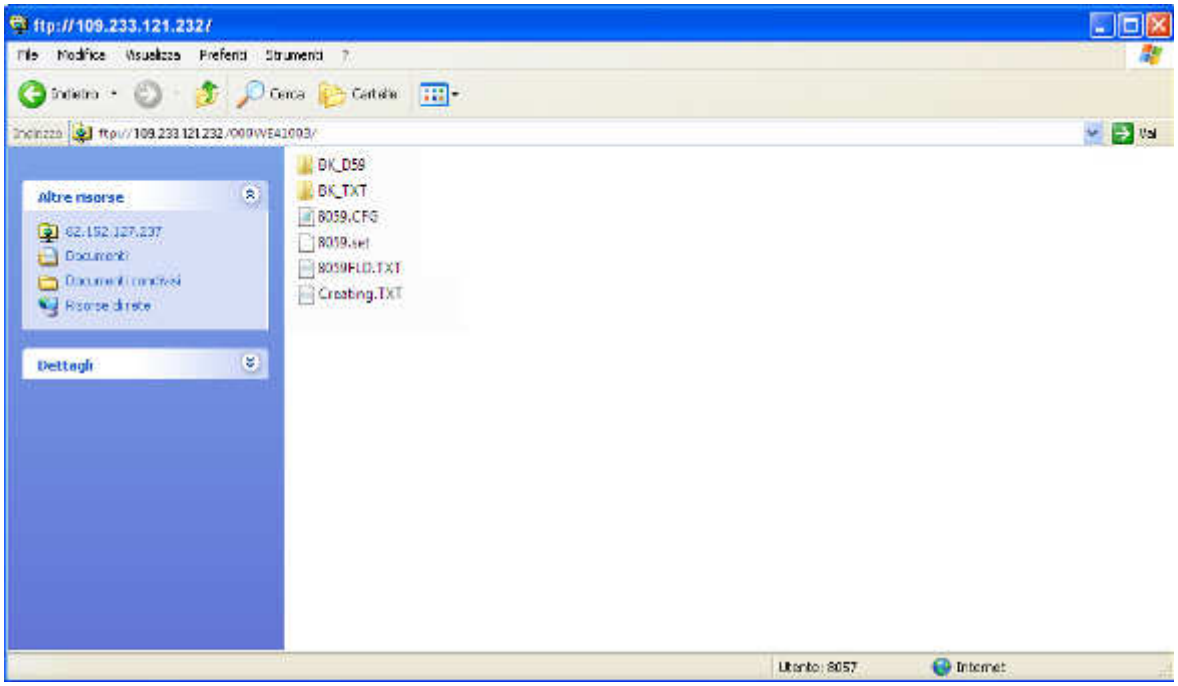
Please refer to the chapter 5 of this manual for details regarding data presentation, saving and related commands.

NOTE

It is possible to check whether some new data is present in the station folder by accessing it using Windows Explorer.
Two different kind of data file are downloaded at each connection: files with .txt extensions contains all Events related to the station, file with extension .D59 contains measurement result in binary format.



If the function "Do not move file" is disabled, all data already downloaded to the controller PC are transferred to back-up folders (one for the .txt files, one for the .D59 ones) and will not be available for a future download even from different station.



19 - Setting RTC of a remote station

As explained above there is never a direct connection between remote station and controller PC except when a local connection, using the provided cable, is established, generally during preliminary operation before installing the remote monitor on site.

The clock setting of a remote station, if needed, can be performed by means of SMS sent by the user.

As the SMS delivery time is not known, the SMS command sent by the user generate a message, sent by the station, to itself. If, as usual, the station receives its message within 30 seconds it takes the time information coming within the message as the time reference to be used to set its clock.
A confirmation message is then sent to the user mobile phone.

4.4 FPT-GPRS COMMANDs

These commands are used by the user to establish a connection with an Access Point or FTP server, to enable the GRPS or point-to-point CSD connection and to set time/date using the SMS provider's information. Each field cannot be more than 31 characters.
These commands cannot be executed via FTP/GPRS (because they would need to be already correctly set).
The GPRS commands are characterized by the presence of the character **GPR** in the string.

NOTE **Username and Password must only contain alphanumeric characters; any special characters are not allowed.**

4-1 GPRS Connection Data

Field	Description	Setting command Command to be issued by either SMS or RS232,USB,Ethernet
GPR**0** **APN** Access Point Name	The provider name of the GPRS bearer.	#BMSGPR**0** <apn>* where <apn> is Access Point Name Example: #BMSGPR**0** web.omnitel.it*
GPR**1** **GUN** User Name for Gprs access	The User Name required for logging-in. Sometimes this field might not be required and thus can be left empty.	#BMSGPR**1** <gun>* where <gun> is the User Name of GPRS access. Example: #BMSGPR**1** MyGPRS*
GPR**2** **GPSW** Password for Gprs access	The Password required for logging-in. Sometimes this field might not be required and thus can be left empty.	#BMSGPR**2** <gpsw>* where <gpsw> is the Password of GPRS access. Example: #BMSGPR**2** 1234*

4-2 FTP Connection Data

Field	Description	Setting command Command to be issued by either SMS or RS232,USB,Ethernet
GPR**3** **FUN** User Name for FTP access	The User Name required for accessing to the FTP server. This word is usually issued from the FTP administrator and is nothing to do with the bearer.	#BMSGPR**3** <fun>* where <fun> is the User Name for FTP. Example: #BMSGPR**3** MyFTP*
GPR**4** **FPSW** Password for FTP access	The Password required for accessing to the FTP server. This word is usually issued from the FTP administrator and is nothing to do with the bearer.	#BMSGPR**4** <fpsw>* where < fpsw > is the Password for FTP. Example: #BMSGPR**4** abcd*
GPR**5** **FIP** FTP IP Address	This parameter is the server address for FTP (IP Address of FTP). Normally this is the static IP Address that routes the file transferring process to the wanted server	#BMSGPR**5** <fip>* where < fip > is the IP Address for FTP. Example: #BMSGPR**5** 194.183.2.17*

NOTE **The commands GPR0, GPR1, GPR2, GPR3, GPR4 and GPR5 can also be query commands as reported in chapter 7, page 7-4.**

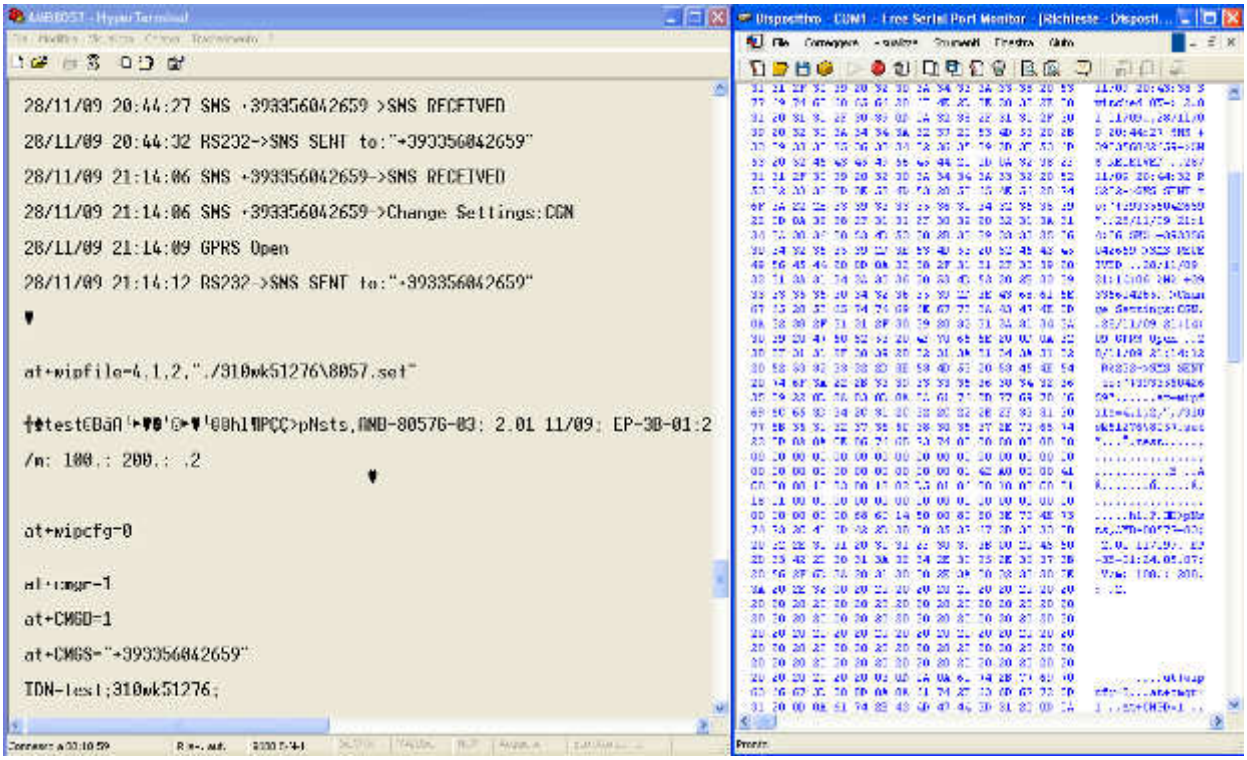
4-3 MISC		
Field	**Description**	**Setting command** Command to be issued by either SMS or RS232,USB, Ethernet
CGN Connect GPRS Now	This command starts a GPRS connection immediately. All the procedures are then the same as it would for a scheduled connection.	#BMSCGN*
CGNL Connect GPRS Now (Last Events)	This command starts a GPRS connection immediately as for CGN but it forces to have a EVENT.TXT file containing the last 20 events instead of the most recent, and not yet loaded, ones.	#BMSCGNL*
CGNA Connect GPRS Now (All Events)	This command starts a GPRS connection immediately as for CGN but it forces to have a EVENT.TXT file containing all the events available instead of the most, and not yet loaded, ones.	#BMSCGNA*
CGNFW Connect GPRS Now and update Firmware	This command starts a GPRS connection immediately as for CGN. Additionally, if the 2 firmware files are found, it updates the firmware and reboots.	#BMSCGNFW*
CGNFWI Connect GPRS Now and Immediately update Firmware	This command starts a GPRS connection immediately as for CGN. Additionally, if the 2 firmware files are found, it updates the firmware and reboots without uploading any records. The difference from CGNFW is that it does not upload the data before updating the FW thus all unloaded records are lost.	#BMSCGNFWI*
NETE Enable GPRS protocol	This command enables the AMB-8059 to connect via GPRS instead of point-to-point GSM-MODEM connection. The reply is the same as for command ?TSM	#BMSNETE*
NETD Disable GPRS protocol	This command disables the AMB-8059 GPRS and enables point-to-point GSM-MODEM connection. The reply is the same as for command ?TSM	#BMSNETD*
STS id Set Timedate SMS	This command sets the internal real clock time by using the SMS provider's information. To use it **id** (the AMB-8059 telephone number) must be sent. This command works assumes that the SMS provider gives the correct Clock/Date and its feedback is within 30 seconds. The reply is sent only if the real time clock has been updated and is the same as for the command "?CLK"	#BMSSTS nnnnnnnn* where nnnnnnnn is the telephone number of AMB-8059

4.5 Additional tests and hints

Windows HyperTerminal and a serial port monitor could be useful tools to check the station operation when connected to the controller PC through the RS232 or USB cable.
You can check attempts of the station to connect to the GPRS network and its operation.

Hyper Terminal and Serial Port Monitor show activity of the station being it connected to the PC RS232 or USB port.

The example below shows that the station received an SMS from the user's mobile phone and, executes the received CGN command by connecting immediately to the ftp server.



NOTE

Please be aware that GPRS service, as well as, generally, all mobile services, may be sometimes not available depending on the station installation site and on the GSM service condition.
Everytime a station is not able, for any reason, to access the ftp server, no measurement result will be lost, as soon as the station will be able to establish a connection to the server it will download all data that have not been downloaded till then.

4.6 AMB-8059 Firmware updates

Whenever a new software / firmware version is released it is available in our Web site for free downloading.
The new software includes the remote station firmware and commands to update it.

The remote station firmware can be updated by connecting the station to the controller PC by the RS232 or USB cable.
Updating procedure is described in the AMB-8059 user's manual.

Unlike in CSD mode, firmware of station set for GPRS communication cannot be updated remotely.

4.7 Data download volume calculation and space occupied in the FTP server

The quantity of the data downloaded per day from the station depends mainly on the model of the probe used (the dimension of the Quad-band probe records is approximately double than Mono and Tri-band probes), on the storing rate and, marginally, on the number of the downloads. Even the number of the events (alarms, etc.) slightly effects the size of the data downloaded.

Supposing just a daily download and using a Quad-band probe EP-4B-01 model the quantity of the data downloaded is the following:

Rate 30 s ➔ 100kB
Rate 1 min ➔ 50kB
Rate 2 min ➔ 25kB
Rate 6 min ➔ 12kB
Rate 15 min ➔ 6kB

In this case the space occupied on the hard disk does not differ a lot from the amount of the data downloaded.

Differently, if the station was set for accessing to the server each hour (24 downloads per day), because of the minimum memory occupied by every single file (hard disk clusters dimension used), the space daily occupied on the server FTP disk, with cluster of 4kB, would be about 200kB independently of the Rate.

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5 – Data display

5.1 Introduction

This section provides information for correct display and interpretation of the data downloaded from the AMB-8059 Area Monitor Broadband using the 8059SW-02 software.

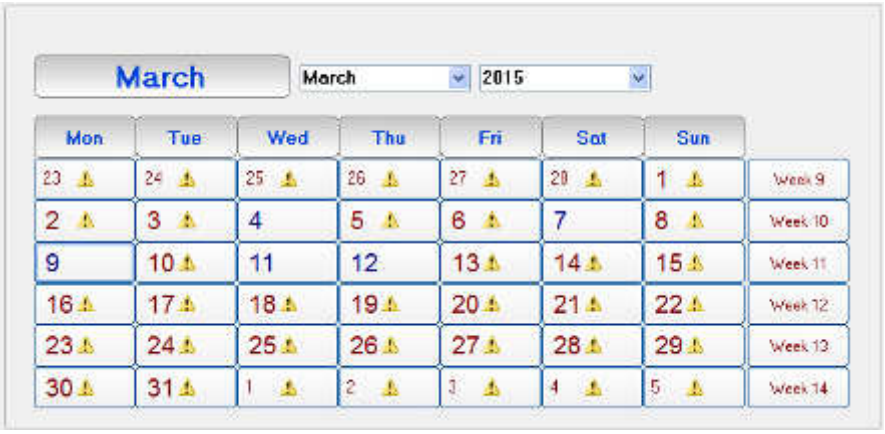
When a new monitoring station is installed, a new folder is created in the main program directory, among those listed in the main window of the program 8059SW-02, which will receive the data downloaded from that specific station.

The new folder is automatically named assigning the first 8 characters of the full name entered for the station (excluding spaces and special characters which should not be used).

Example: for a station called TESTCISANO_EX3 the corresponding folder will be named TESTCISANO_EX3.

5.2 Calendar

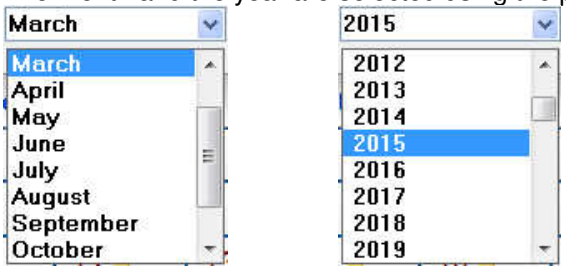
The new folder is created to collect the data every time the AMB-8059 station is queried, dividing them by day, month and year. The data are then automatically called up by the program on the basis of the day or week chosen in the Calendar tool in the main window of the 8059SW-02:



WARNING

To ensure the program runs correctly it is important not to rename or move the saved files.

Using the Calendar it is possible to select the day or the week to be presented in graph form, simply by pressing the corresponding key.
The month and the year are selected using the pulldown menu.



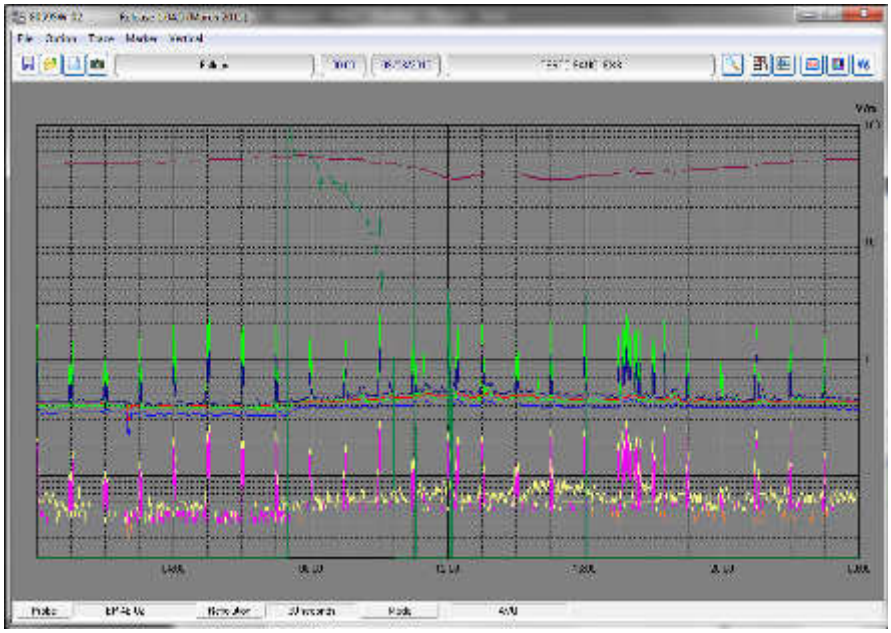
NOTE

Days and weeks containing data have the characters displayed in blue color, while those for which data have not been downloaded are shown in red color (the symbol ⚠ is displayed close to the days).

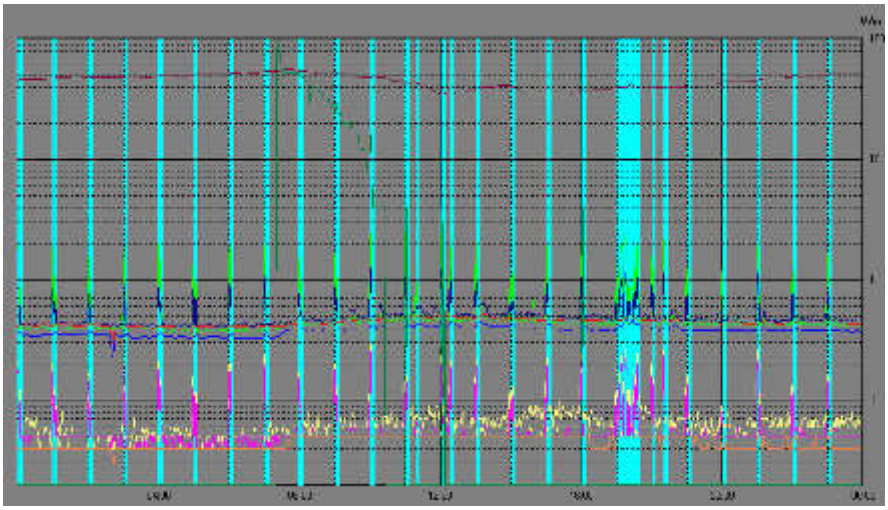
5.3 Data window

By selecting a day or a week shown in blue, the User can access the main menu for graphic representation. Using this menu it is also possible:

- Display any graphs belonging to any stations (using **Open Files**);
- Select the colors and the order of display for the different traces (using **Option**);
- Save the graphs (using **Save Files**);
- Save the graphs displayed as a BITMAP image on the clipboard for insertion in other applications such as a Word Processor or Image Editor (using **Clipboard**);
- Add or amend a comment (using **Comment**);
- Modify the appearance of the status window and the icons (using **Appearance**)
- Select the limits and the colors (using **Setup**);
- Highlight or remove the highlight for the time the GSM and/or others disturbance band is on, or when any of the alarms is active, or select traces to be displayed (using **Trace**);
- Position the marker (using **Marker**);
- Expand graphs horizontally (using **ZOOM**);
- Expand graphs vertically (using **Vertical**);
- Display a table containing the data shown in the graphs (using **Show Table File**);
- Display the software release (using **?**);

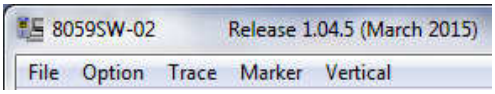


The data window presents the data for the selected day or week in a graphical form.
In the example below, it is possible to notice the narrow cyan vertical bands (the color can be set by the User), indicating that the internal GSM modem was transmitting either on the provider request (periodical querying of the phone number), or by the User request, calling the station to make any queries. This indication is used to discriminate fields generated by the internal GSM modem from any environmental field.



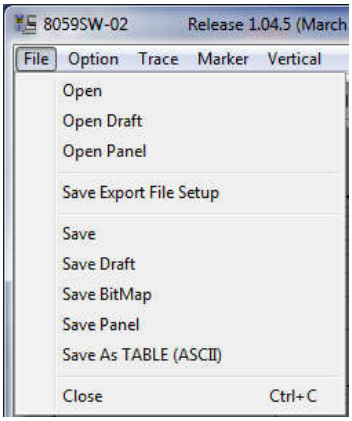
5.4 Main commands

The main commands of the 8059SW-02 are:



5.4.1 File

This command is used to open any files of any stations or to save the files downloaded.

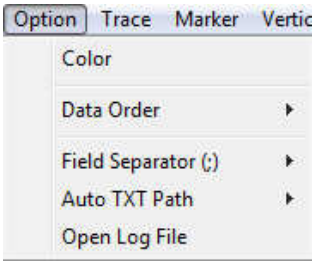


For a detailed description of its use see the paragraphs relative to the specific icons **Save** and **Open** here below.

5.4.2 Option

This command is used to define the colors of the traces (**Color**, as well as **Setup** described below); the order of priority for display of traces (**Data Order**); the character used as data separator when required by the form of table (**Field Separator (;)**); ~~the~~ path and the name that are used for the **AUTO ASCII FILE** (**Auto TXT Path**); to display all settings and main activities automatically and manually downloaded from the station (**Open Log File).**

The screen will show:



5.4.3 Trace

The **Trace** command allows to select which traces will be displayed in the graph.
The possible choices are:

- **Temperature**; indicates the temperature of the environment for each data reading;
- **Battery**; provides the voltage of the batteries whenever the field data are stored;
- **Peak 2140 MHz**; shows the peak value measured in the UMTS Band pass.
- **AVG 2140 MHz**; shows the average calculated in the UMTS Band pass;
- **Peak 1842 MHz**; shows the peak value measured in the EGSM 1800 Band pass.
- **AVG 1842 MHz**; shows the average calculated in the EGSM 1800 Band pass;
- **Peak Wide**; shows the peak value measured in the wide band;
- **AVG Wide**; shows the average calculated, in this example of the AVG type, in the Averaging Period (set in this example as 6 minutes) of the signal read by the wide band sensor
- **Peak 942 MHz**; shows the peak value measured in the EGSM 900 Band pass.
- **AVG 942 MHz**; shows the average calculated in the EGSM 900 Band pass;
- **Current**; provides the consumption current of the station whenever the field data are stored;
- **RH**; indicates the Relative Humidity of the environment for each data reading;

NOTE

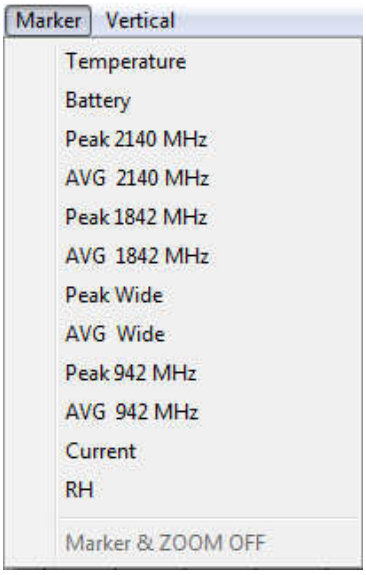
The above Labels refer to EP-4B-02 probe, different probes will show different Labels according to the probe frequency bands.

- **Disturbance Band**; used to hide or display any disturbance activity using vertical bars (which can be selected individually);;
- **Alarm Band**; used to hide or display any activity of alarms with vertical bars (which can be selected individually);
- **Display Temp&Volt when ON**; shows traces of the temperature and voltage on the graph when enabled;
- **All Traces ON**; shows all traces;
- **All Trace OFF**; hides all traces.

5.4.4 Marker

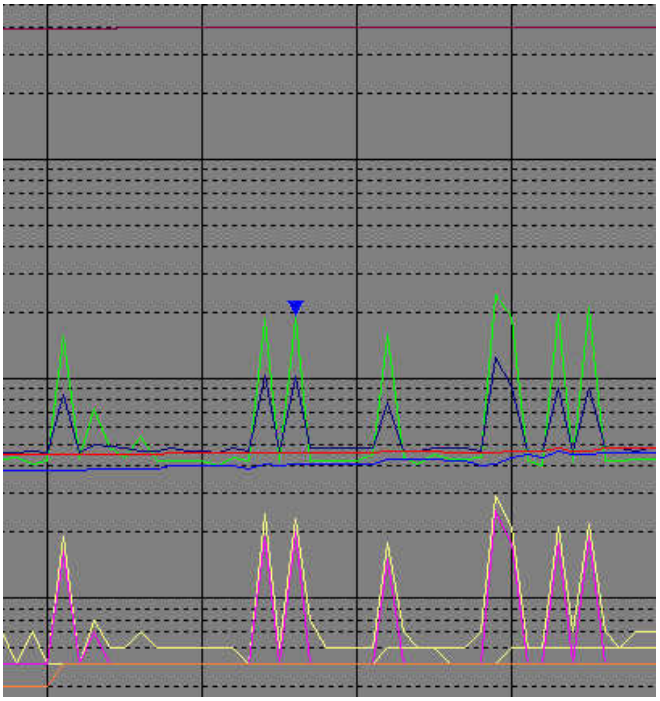
When the field monitor has been set up to display all data, the graph contains many traces. To ensure accurate measurement of each trace it is possible to enable a marker that will show the value of the electrical field, or temperature, or batteries, etc depending on the trace for which it is selected.

The screen will look like this:



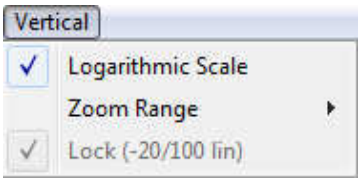
NOTE **The marker is made visible also by activating the ZOOM function.**

Using the mouse it is possible to scroll the entire time axis and stop on the trace and in the point for which the exact value is desired.

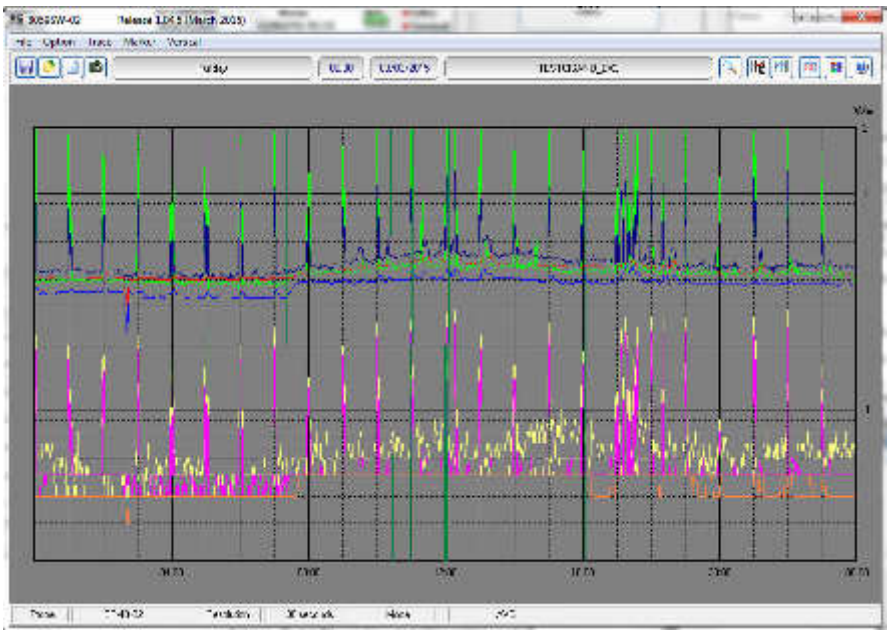


5.4.5 Vertical

This function is used to select the vertical scale with a linear or logarithmic view and also serves to define the scale range. The screen looks like this:



Selecting **x 100 Range** the maximum sensitivity is displayed (scale range equal to 2 V/m).



The function **Lock (-20/100 lin)** is activated when the User want to display on the graph both the temperature and the field trace. It forces the scale between -20 and 100 and shows everything in linear mode.

5.5 Secondary commands

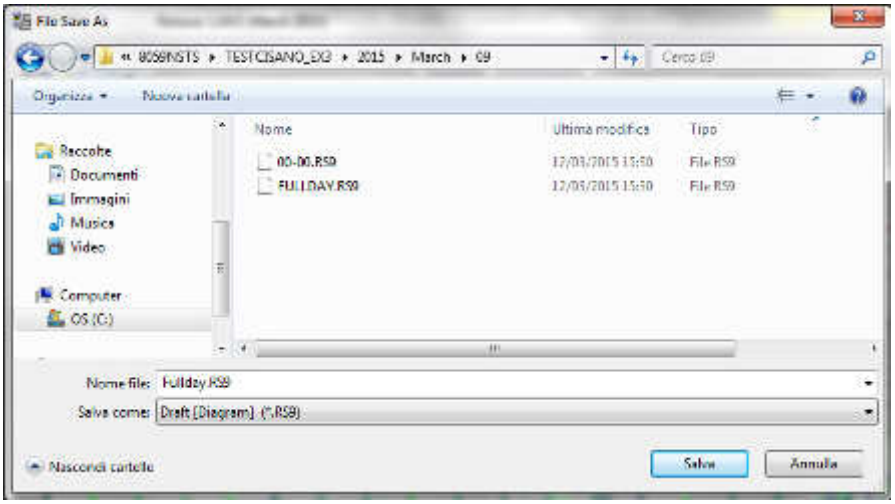
Description of command bar:

5.5.1 Save Files

Used to save files of measurements in the following formats:

1. **Draft (Diagram) (*.RS2)** (Default) Archive for future processing of readings;
2. **Panel (*.P87)** A file with the extension ***.P87** is saved, containing the current settings selected with the **Setup** key, so that the operator can readily restore the preferred settings at a later date. (Normally the program starts with the setting in the file **default.P87**)
3. **BitMap (*.BMP)** A graphic bitmap file is saved which is identical to the diagram displayed on the screen at the time of the request.
4. **ASCII (*.TXT)** A text file is saved containing the data of the configuration, saved with the function **Save Export File Setup**.

The screen looks like this:



Measurements can be saved in any directories. During this procedure the software shows a list of the previously saved files.

5.5.1.1 Saving File in ASCII format

Files in ASCII format with the .TXT extension contain an * (asterisk) marking any data, and averaged value, affected by the internal modem and others disturbance activity.
The structure of data tables saved in the default .TXT format is as follows:

- All traces enabled;
- All alarms or disturbance enabled;
- All marker enabled;
- Separation character: ";" (semicolon);
- Data sorted according to "**Wide, Low Pass, High**" mode, first average and then peak.

NOTE

This structure can be changed with the Save Export File Setup function. This also applies to alarms and disturbances marking.

The actual settings can be viewed by pressing **Show Table File**. This function automatically creates the table of data relative to the graph on view, and reflects the default settings listed above or those saved with the **Save Export File Setup** function.
Lastly, columns are shown indicating all the active alarms.

8059SW-02
Firmware: 1.14 01/15

Station: TESTCISANO_EX3 (Nsts,AMB-8059 S/N 000WE41003)

Date: 09/03/2015 Time: 00:00 (AVG 6 minute)

Probe EP-4B-02 (Last Calibrated:10.10.14)

Limit = 0,7 V/m AVG

Date;Time;TxOn;AVG W.;AVG 2140;AVG 1842;AVG 942;Peak W.;Peak 2140;Peak 1842;Peak 942;Battery;Temp;Current;RH;Alarms;
;;;V/m;V/m;V/m;V/m;V/m;V/m;V/m;V/m;V;C°;mA;%;AWPLCTV;

09/03/2015;00:00:00;;0.35;0.05;0.04;0.41;0.38;0.06;0.05;0.41;4.22;0;0;45;.....T.;
09/03/2015;00:00:30;*;0.36;0.05;0.04;0.41;1.88;0.20;0.17;0.84;4.18;0;0;45;.....T.;
09/03/2015;00:01:00;*;0.36;0.05;0.04;0.41;0.42;0.05;0.05;0.44;4.18;0;0;44;.....T.;
09/03/2015;00:01:30;*;0.36;0.05;0.04;0.41;0.39;0.05;0.04;0.42;4.14;1;0;44;.....T.;
09/03/2015;00:02:00;*;0.36;0.05;0.04;0.41;0.39;0.06;0.04;0.43;4.14;1;0;45;.....T.;
09/03/2015;00:02:30;*;0.36;0.05;0.04;0.41;0.40;0.07;0.05;0.44;4.14;1;0;45;.....T.;
09/03/2015;00:03:00;*;0.36;0.05;0.04;0.41;2.00;0.22;0.19;0.91;4.14;0;0;45;.....T.;
09/03/2015;00:03:30;*;0.37;0.05;0.04;0.42;0.39;0.07;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:04:00;*;0.37;0.05;0.04;0.42;0.39;0.07;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:04:30;*;0.37;0.05;0.04;0.42;0.38;0.05;0.04;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:05:00;*;0.37;0.05;0.04;0.42;0.38;0.06;0.05;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:05:30;*;0.37;0.05;0.04;0.42;0.38;0.05;0.04;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:06:00;*;0.37;0.05;0.04;0.42;0.36;0.05;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:06:30;*;0.36;0.05;0.04;0.42;0.37;0.06;0.05;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:07:00;*;0.36;0.05;0.04;0.42;0.38;0.05;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:07:30;*;0.35;0.05;0.04;0.42;0.40;0.05;0.05;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:08:00;*;0.35;0.05;0.04;0.42;0.38;0.06;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:08:30;*;0.35;0.05;0.04;0.42;0.37;0.05;0.05;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:09:00;*;0.35;0.05;0.04;0.42;0.39;0.05;0.05;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:09:30;;0.34;0.05;0.04;0.42;0.39;0.06;0.04;0.44;4.14;0;0;46;.....T.;
09/03/2015;00:10:00;;0.34;0.05;0.04;0.42;0.37;0.06;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:10:30;;0.34;0.05;0.04;0.42;0.38;0.06;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:11:00;;0.34;0.05;0.04;0.42;0.38;0.05;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:11:30;;0.34;0.05;0.04;0.41;0.40;0.06;0.05;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:12:00;;0.34;0.05;0.04;0.41;0.39;0.06;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:12:30;;0.34;0.05;0.04;0.41;0.38;0.06;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:13:00;;0.34;0.05;0.04;0.41;0.40;0.05;0.04;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:13:30;;0.34;0.05;0.04;0.41;0.38;0.06;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:14:00;;0.34;0.05;0.04;0.41;0.40;0.05;0.05;0.44;4.14;0;0;46;.....T.;
09/03/2015;00:14:30;;0.34;0.05;0.04;0.42;0.39;0.05;0.05;0.44;4.14;0;0;46;.....T.;
09/03/2015;00:15:00;;0.34;0.05;0.04;0.42;0.39;0.07;0.05;0.44;4.14;0;0;46;.....T.;
09/03/2015;00:15:30;;0.34;0.05;0.04;0.41;0.40;0.06;0.05;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:16:00;;0.35;0.05;0.04;0.42;0.38;0.07;0.05;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:16:30;;0.34;0.05;0.04;0.42;0.39;0.05;0.05;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:17:00;;0.35;0.05;0.04;0.42;0.38;0.07;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:17:30;;0.35;0.05;0.04;0.42;0.38;0.07;0.04;0.44;4.14;0;0;46;.....T.;
09/03/2015;00:18:00;;0.35;0.05;0.04;0.42;0.40;0.05;0.04;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:18:30;;0.35;0.05;0.04;0.42;0.39;0.06;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:19:00;;0.35;0.05;0.04;0.42;0.38;0.07;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:19:30;;0.35;0.05;0.04;0.42;0.39;0.07;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:20:00;;0.34;0.05;0.04;0.42;0.39;0.06;0.05;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:20:30;;0.34;0.05;0.04;0.42;0.38;0.05;0.05;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:21:00;;0.34;0.05;0.04;0.42;0.39;0.07;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:21:30;;0.34;0.05;0.04;0.42;0.38;0.06;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:22:00;;0.34;0.05;0.04;0.42;0.40;0.05;0.04;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:22:30;;0.34;0.05;0.04;0.41;0.37;0.06;0.05;0.42;4.14;0;0;46;.....T.;
09/03/2015;00:23:00;;0.34;0.05;0.04;0.42;0.39;0.06;0.05;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:23:30;;0.34;0.05;0.04;0.42;0.38;0.07;0.05;0.43;4.14;0;0;46;.....T.;
09/03/2015;00:24:00;;0.34;0.05;0.04;0.41;0.37;0.05;0.04;0.42;4.14;0;0;46;.....T.;

NOTE

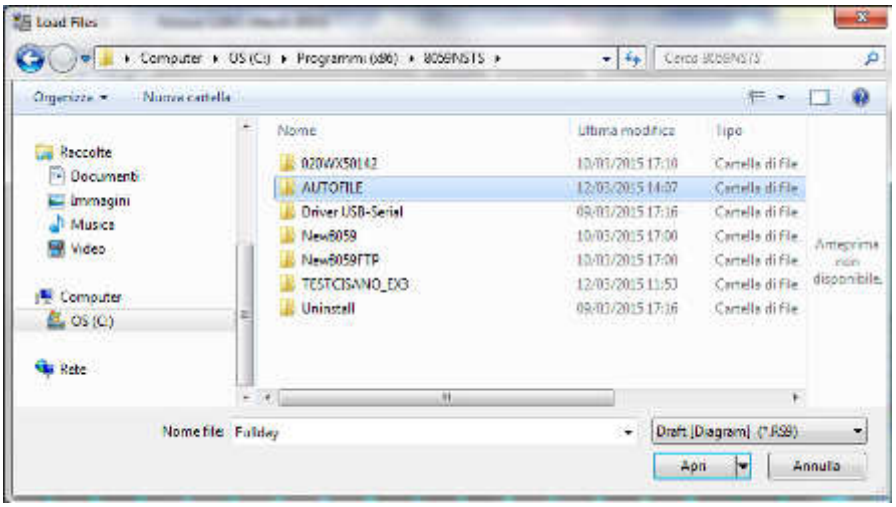
Like every other item listed in the table, the asterisks (*) of the GSM, Charging, USB, Ethernet Band on will not be shown if the Trace Menu has this item disabled at the time of activating the Save Export File Setup function.

5.5.2 Open Files

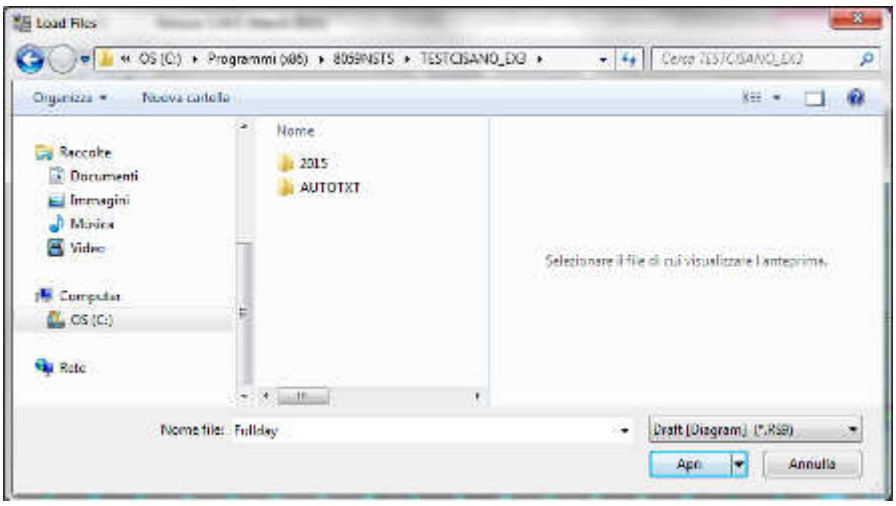

:

Used to download and view measurement files previously saved (*.RS9). Also serves to load files of settings (*.P87).

If the software is already in graph mode, clicking on **Open Files** will display all the stations available and also the directory **AUTOFILE,** containing only the **.TXT** files created automatically with the **AUTO ASCII FILE** function.

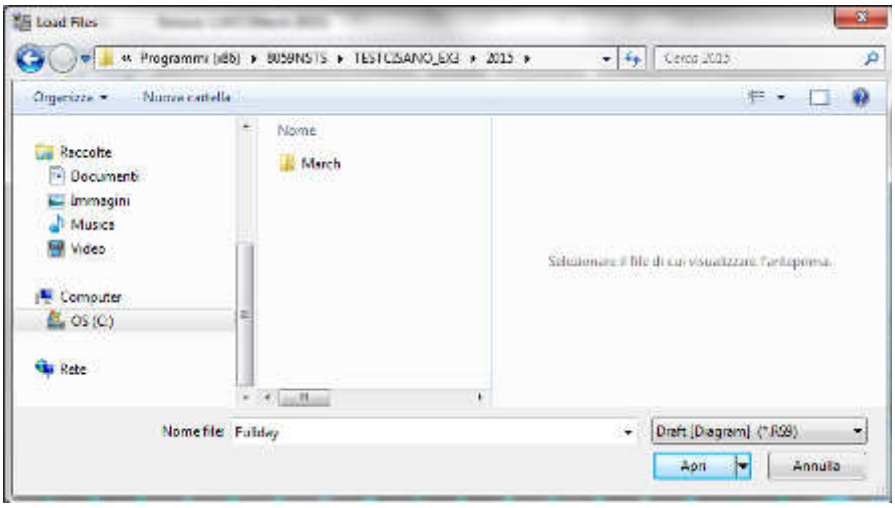


Selecting, for example, station **TESTCISANO_EX3**, it will display all the years relative to downloads and the directory "**AUTOTXT**":



Associated with the name of each station, the software creates the directory of years (in this example 2015) and the directory "**AUTOTXT**" which contains all the data relative to the **Auto ASCII File** function.

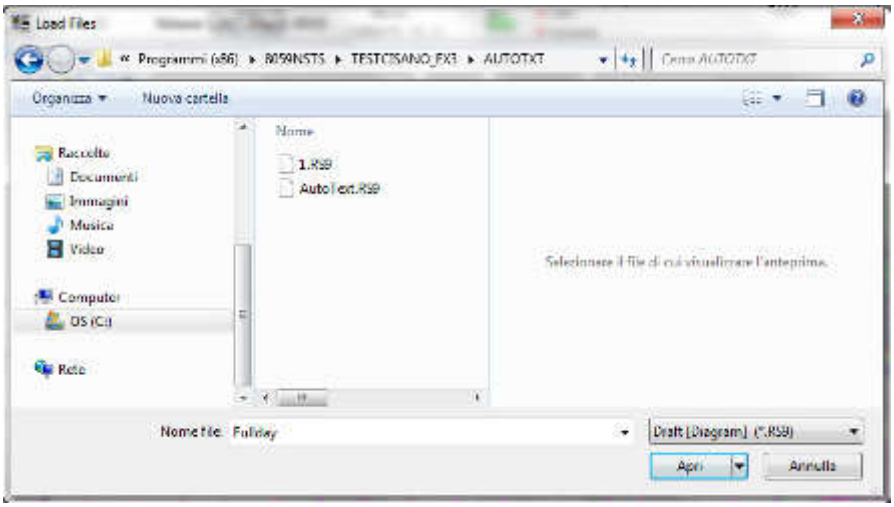
Selecting the desired year, the menu will display all the months and weeks available:



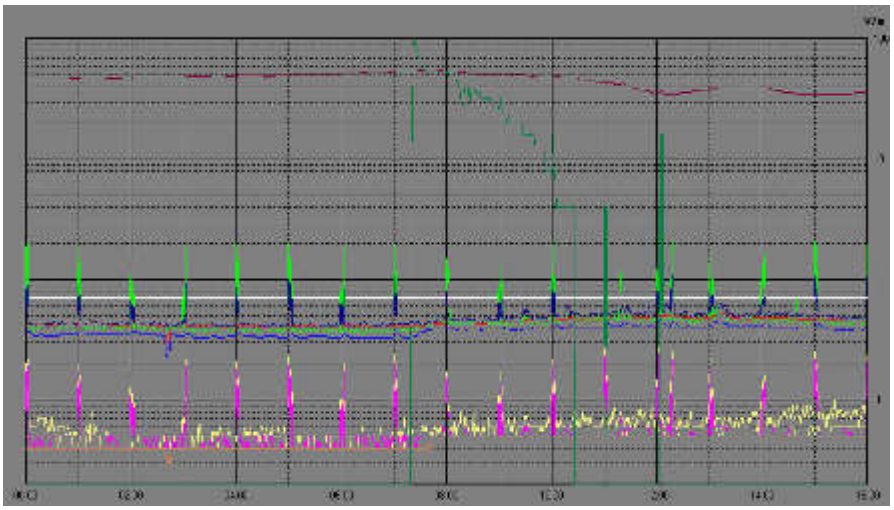
Selecting the month, the software will display the list of all the days containing data.
Selecting the desired day and clicking **OK** the data will be displayed; pressing **Cancel** to interrupt the operation.

5.5.2.1 Open Autotext file

The files in the **AUTOFILE** directory are saved in .TXT format, while the files in the **AUTOTXT** directory are saved in **.RS9** format. The former are created so as to be readily exported into Windows Office programs, and cannot be opened using 8059SW-02 software. The latter can be viewed because they are saved in the proprietary graph form of AMB-8059 (.RS9).

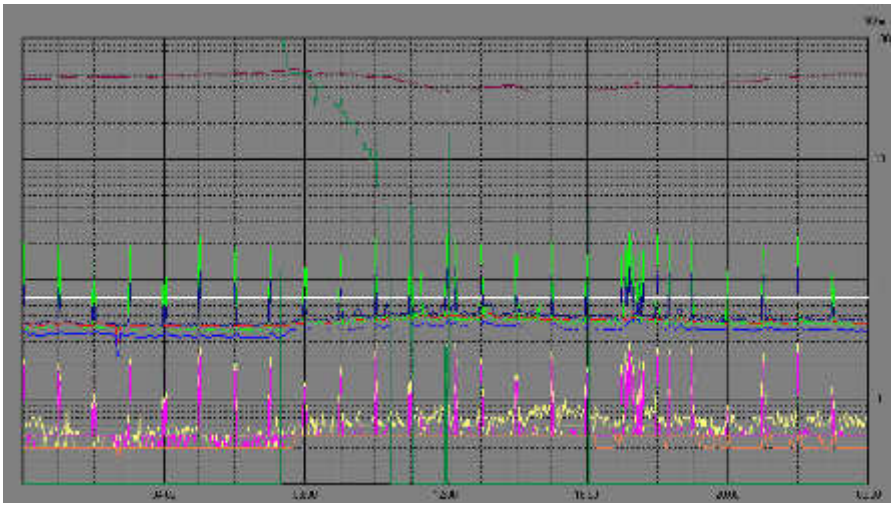


The time window between Start and Stop is defined by the conditions used during download.



In this example, the software shows the graph from 00.00 to 16:00 of autotxt file .RS9.

If, however, you open the file Fullday.RS9 (created automatically in the Month/Day directory), the same graph displays the data for the 24 hour period, from 00.00 to 24.00.



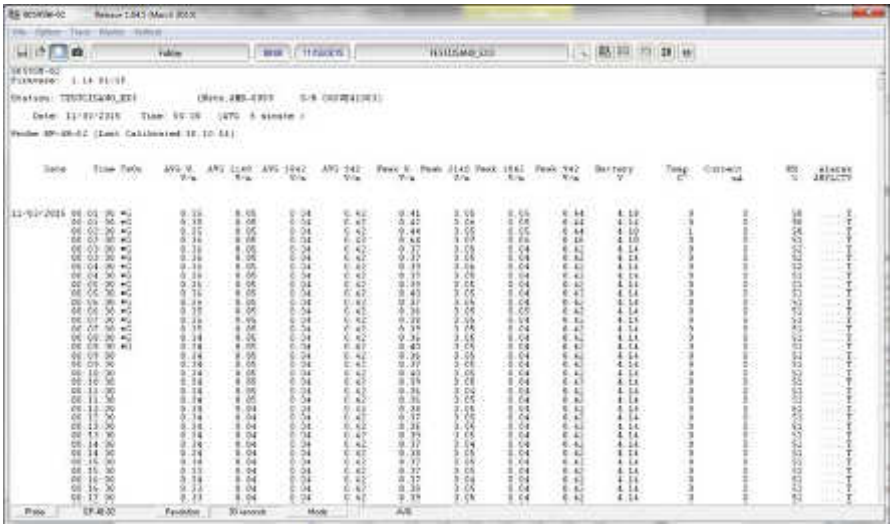
NOTE

Therefore, with the function Auto ASCII File it is possible to create any graphs with a start and end period of measurement defined in any desired way. For example, from Friday to Monday, or between two months, etc.
Of course, this time period must be selected in the download data procedure.

5.5.3 Show Table File

This is used to automatically display a table report containing the data relative to the set of traces saved with the **Save Export File Setup** function.

When the **Show Table File** function is enabled, every other function is disabled. The screen looks like this.



5.5.4 Clipboard

Used to make the bitmap corresponding to the actual measurement displayed on the Windows Clipboard. That makes it possible to perform operations of cutting and pasting images directly on other programs without constructing exchange files. This operation can be useful to integrate test reports or other documents written with a Word Processor, such as Word for Windows™, inserting the graphic image of the taken readings.
Each single trace is converted into bitmap format and copied with the colors taken from the palette selected in **Setup**.

The **File Name** field contains the name of the file displayed.
This is normally updated automatically with the **LOAD** command.

Fields **Status 1** and **Status 2** show the time and date of start of the display.

The next field contains the name of the Field Monitor unit.

5.5.5 Zoom Mode

This is used for horizontal expansion of the actual measurement displayed (ZOOM) to observe the measurement with better definition. When the ZOOM function is on, the **Marker** function is enabled as well. A small blue triangle appears on the display and can be moved with the mouse to any point on the graph. The window at the bottom will show the amplitude marked and the time of occurrence.

To enable the **Zoom** function proceed as follows:

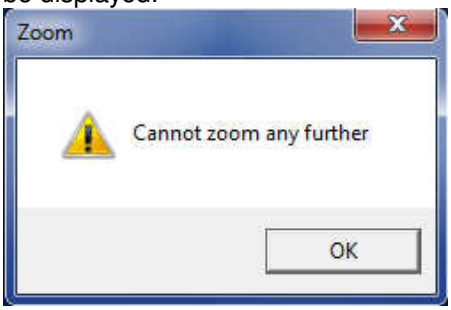
- select the **Zoom Mode** key;
- position the mouse on the **Marker** triangle at the starting point;
- holding the left mouse key down, drag the **Marker** to the point at the end of the trace you wish to expand. Release the mouse key and the selected trace will be expanded immediately.

During this operation an orange cross and two vertical bars are displayed to aid in selection of the area to expand. To return to normal display unselect **Zoom Mode**.

WARNING

The smallest selectable trace is 120 seconds (2 minutes). A greater enlargement would only put more space between the two measurement points without adding any significant information.

If you try to zoom on a trace of less than 2 minutes an error message will be displayed.



As already mentioned, the **Zoom Mode** key is used to enable the **Marker**, represented by a colored arrow which, using the mouse, can be positioned anywhere along the displayed trace. In this case, the time values will be reported on the status bar at the bottom of the screen (time from start of measurement) and the amplitude will be displayed with respect to the actual position of the **Marker**. This function is used for a detailed analysis of the graph and of the relative values saved.

NOTE

When the Zoom Mode key is enabled, the other commands are automatically disabled except Save, ClipBoard and Help.

5.5.6 Comment

When this icon is selected, it is possible to enter or display the field containing the comment, which can be written or edited up to a **maximum of 1024 characters**. The screen looks like this:

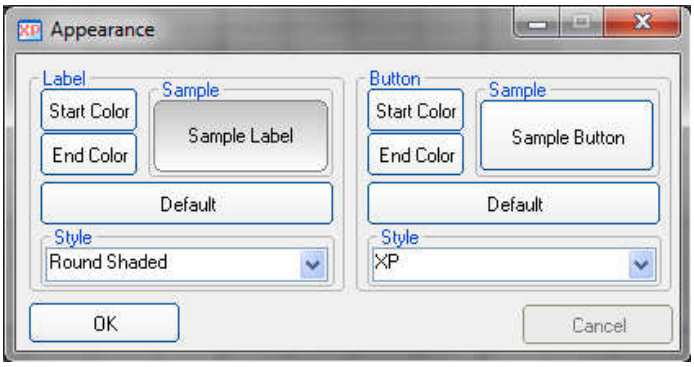
NOTE

In the bitmap, the comment is shown only when the Comment key is enabled.

5.5.7 Redraw

Used to refresh the screen and redraw the diagram.
This operation is necessary in particular when the PC does not have much memory and/or many applications are running at the same time.

5.5.8 Appearance



Button and label style can be selected from a **Style** list

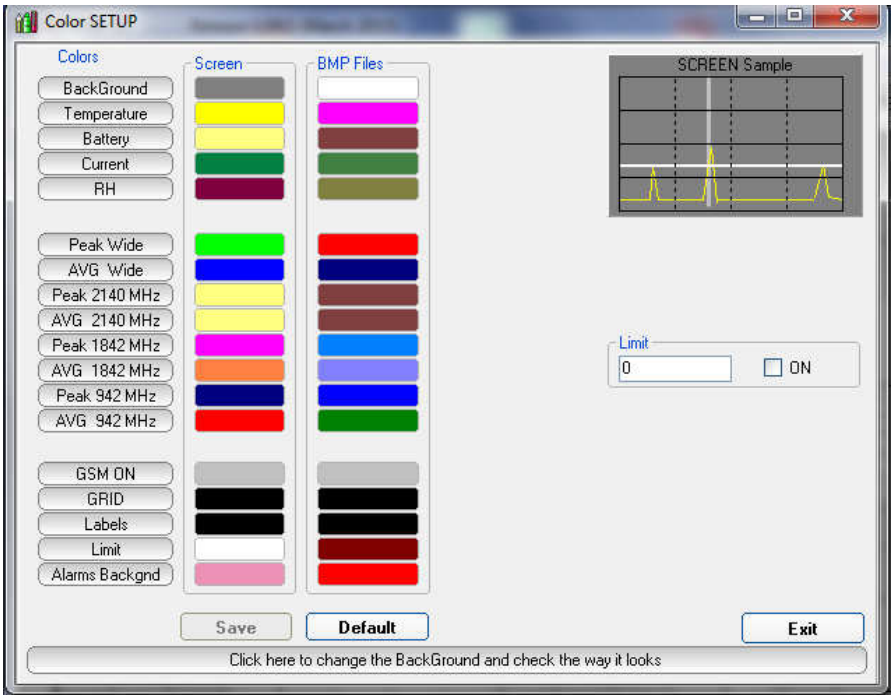
Start and **End Color** button allow selection from a color palette

Sample Button and **Sample Label** show the appearance preview

Default button to set appearance to the default parameters

5.5.9 Setup

The use of the **Setup** key allows to access the window for setting the colors of the graph.
It is possible to change the current settings at any time, and the new settings can be saved in a file and restored later.
The **Setup** window looks like this:



For each trace of the graph listed under **Colors**, the desired color can be selected, and these colors can be different for the **Screen** and for the **BMP Files** to better adapt to the viewing and printing needs of the User.

5.5.9.1 Color Palette

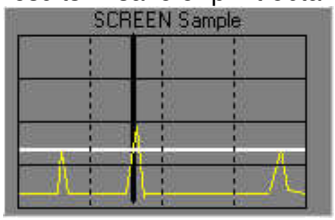
The choice is made by moving the mouse to the color to be changed and then using the Color Palette window.

5.5.10 Limit

The **Limit** field is used to set and enable a reference trace on the current screen.

5.5.10.1 SCREEN Sample

The small graph on the upper right of the display gives a preview of the results in save or print obtained with the colors selected.

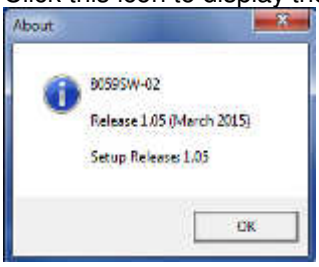


NOTE

Click Exit to close the Setup window without saving the new setting, to maintain the current settings for the graphs displayed after opening the program again. The new configuration can be saved in a relevant file by clicking Save.

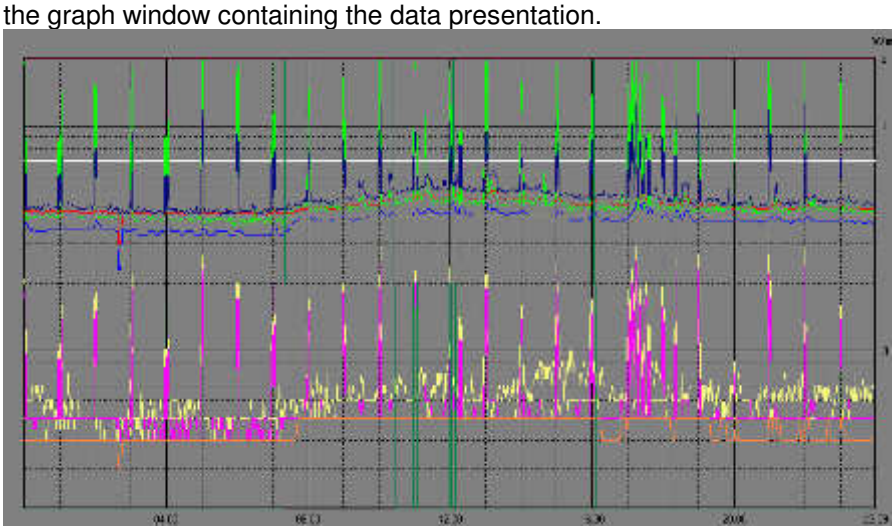
5.5.11 Software release

Click this icon to display the software release currently installed on the PC.



5.6 Graph window

The central part of the data window for the 8059SW-02 program displays the graph window containing the data presentation.



The graph window displays the traces saved on the basis of the settings made in the main window of the **Storing Settings** section.

When **Zoom Mode** is enabled, a triangle with its apex pointing downward highlights the position of the **Marker**.

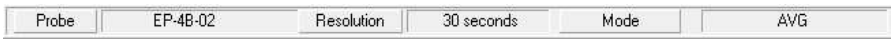
A horizontal line, of the color chosen with **Setup**, highlights the limit set, permitting easy comparison with the values shown on the graph.

5.7 Status window

The bottom section of the data window in the 8059SW-02 program displays the status window.

This window provides useful information about the program functions and also gives extended and immediate help with the meaning of the commands and options on which the mouse is positioned.

A few examples are shown below:



Actual operating mode

Values relative to **Marker** position

Display of description of the **Clip Board** key

5.8 Importing data to Word or Excel

All the graphs saved in .TXT format can be displayed by other programs. If Word or Excel are used, the saved file can be searched with the Open file command and selected using **File type: All files (*.*).** Search for the file in the 8059SW-02 directory and follow the path (Station Name, year, month and day) to select the desired file to open.

6 – Dual-probe operation

6.1 Description

This section provides additional information regarding the Dual-probe operating mode only. Please refer to the other sections of this manual for installation and use of the AMB-8059 Multi-band EMF Area Monitor.

AMB-8059 Multi-band EMF Area Monitor can operate in Dual-probe configuration that enhances its field monitoring capacity.
Dual-probe operation is based on the HP-1B-01 probe, for low frequency magnetic field measurement, that is equipped with a “pass-through” connector to allow the installation of a secondary probe.

Any single or tri-band probe can be installed as the secondary one of Dual-probe configuration allowing thus to acquire, besides the ELF magnetic field, the ELF or RF electric one, depending on the secondary probe model.

NOTE

When a tri-band probe is used in Dual-probe configuration the additional result, provided besides the low frequency magnetic field, will be limited to the electric field measurement of the Wide section only, without providing any information related to the Low and High frequency bands.

6.2 Installation

Follow the installation instructions provided in chapter 1 and chapter 2 and install the primary probe HP-1B-01 to the main section of the unit.
The HP-1B-01 top panel provides an additional connector for the secondary probe.

Fig. 6-1 HP-1B-01 top panel

Connect the secondary probe to the primary one as shown in the following pictures:

Fig. 6-2 Dual-probe configuration (internal view): EP-1B-01 mounted as secondary probe

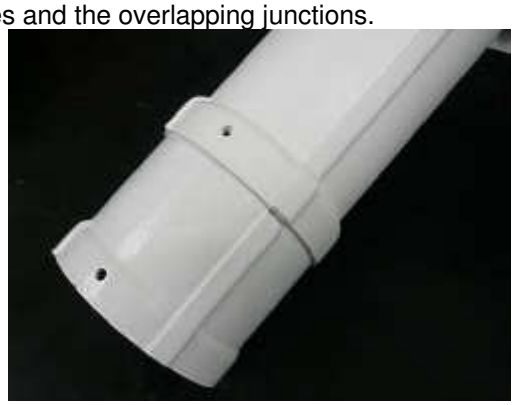
Fig. 6-3 Dual-probe configuration (internal view): EP-1B-04 mounted as secondary probe

WARNING

Dual-probe configuration requires the use of the 8059-extension for protective case when either EP-1B-01 or EP-1B-03 or EP-3B-01 is mounted as secondary probe.

The following picture shows the 8059-extension for protective case (check for any missing accessory with reference to the enclosed packing list). The Tool kit provided includes:
- n°3 Hexagon socket button head screws;
- n°3 Plastic washers;
- n°3 Hexagonal Nut.

Insert carefully the 8059-extension into the protective case; rotate the same to align the holes and the overlapping junctions.



Fasten the protective case extension by means of the provided screws keeping the nuts inside the case and the plastic washers on the outer surface. Tighten the screws using the provided 2.5mm Allen key

Fasten the 8059-extension to the base plate and install the monitoring unit on the site following the installation instructions provided in chapter 1 and chapter 2.

Fig. 6-4 AMB-8059 in Dual-probe configuration

The Dual-probe configuration is automatically detected by the station Firmware which provides the requested functions.
Thresholds for field Warning and Alarm are based on the **reference** probe which is, as default settings, the primary one (HP-1B-01). As explained in the following sections any of the two probes can be set as the **reference** one by means of a specific command.

6.3 Probe combinations

Besides safety applications informing about critical situations by means of alarm messages and providing historical results, long term EM field monitoring is the best solution to show, specially in case of population concern and protests against antennas and power lines, that the field intensity is usually low and well below the regulation limits.
Even if in some applications, like measurement in proximity of power lines, low frequency electric field can be easily determined trough mathematical calculations and usually does not change with time, its monitoring, along with magnetic field, can be beneficial to show population measurement result of both quantities instead of explaining theory.

Regulations provide limits for Electric and Magnetic fields. Continuous monitoring of both quantities provides complete results to be easily compared to the limits without the need of any calculation.
Additionally, some industrial application may take advantage of the Dual-probe monitoring.

Different probe combinations are possible by selecting the secondary one depending on specific monitoring needs as shown in the following table. Please note that the primary probe, directly connected to the area monitor main unit, must always be the HP-1B-01 model.

TABLE 6-1 Probe combinations		
ELF		
HP-1B-01 + EP-1B-04	complete solution for low frequency monitoring providing both E and H field in the 10Hz – 5kHz frequency range	best answer to the concern of population exposed to power plants or lines.

ELF + RF		
HP-1B-01 + EP-1B-01	H field: 10Hz – 5kHz + E field: 100kHz - 3GHz	whenever population can be exposed to both low and high frequency fields
HP-1B-01 + EP-1B-03	H field: 10Hz – 5kHz + E field: 100kHz - 7GHz	
HP-1B-01 + EP-3B-01	H field: 10Hz – 5kHz + E field: 100kHz - 3GHz	

NOTE **Quad-band probes do not operate in Dual-probe configuration.**

6.4 Selecting the reference probe

As described in § 6.2, the default Dual-probe configuration sets the primary HP-1B-01 as the **reference** probe.
This means that the Last Field value, shown by the control software on the left side of the station control panel, will be calculated on the magnetic field measurement.
The Last Field value is continuously compared with the Warning and Alarm thresholds, set by the user, to determine whether any field alarm condition is occurring.

Fig. 6-5

Fig. 6-5 Last Field, as shown by the control software, and field alarm thresholds settings. Reference on primary probe as default.

If desired, it is possible to set the secondary probe (E field) as the reference one. In this case, Last Field and field alarm thresholds will be based on the electric field measurement provided by the secondary probe.

A command through RS232 or USB or Ethernet or SMS containing the string "**#BMSSAAS***" can be sent to the station to set the secondary probe as the reference one.
Please, see chapter 7 for command syntax and related information.

Fig. 6-6

Fig. 6-6 Last Field, as shown by the control software, and field alarm thresholds settings. Reference on secondary probe.

6.5 Control panel in Dual-probe configuration

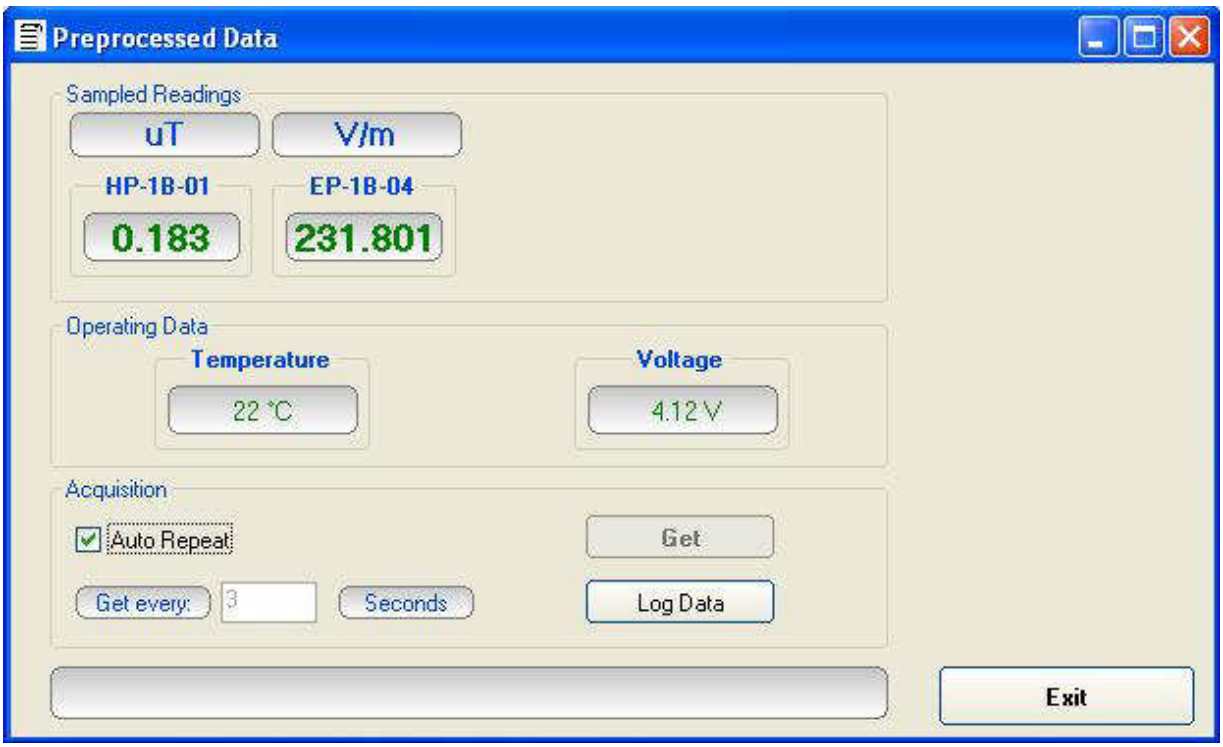
The only difference shown in the station control panel, displayed by the software, is the “Probe Section” which shows model and calibration date of both probes.

NOTE

The Probe alarm is always referred to the primary probe only.

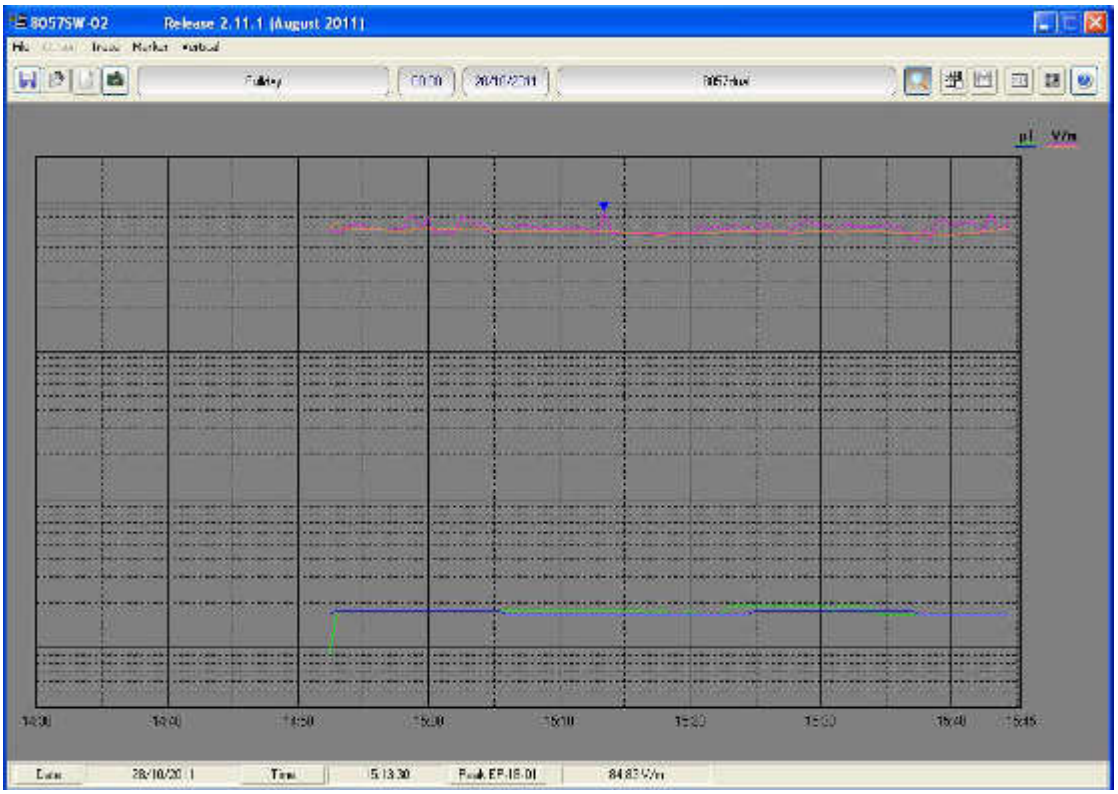
6.6 Direct readings

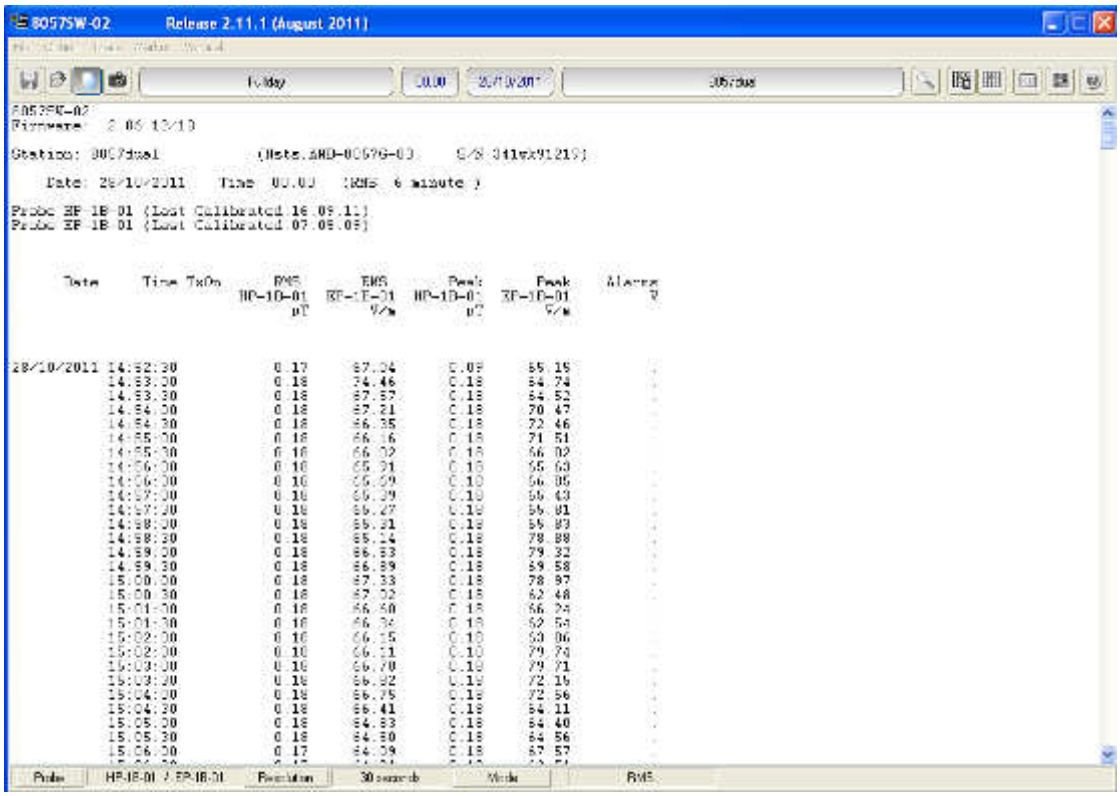
The Direct Readings function operates only when the station is connected to the controller PC by means of the RS232, USB, Ethernet cable. In case of Dual-probe configuration both results, H and E field, will be displayed.



6.7 Measurement results

Measurement results downloaded from AMB-8059 can be displayed by the control software in graphical or table format. Results from both probes can be included in the same graph or table.





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7 – Command protocol

7.1 Introduction

This chapter provides information about the communications protocol of the AMB-8059 Multi-band EMF Area Monitor via mobile phone using SMS (Short Message System) or through RS232, USB, Ethernet by means of Windows Hyper Terminal or similar applications.
Every monitoring station equipped with GSM modem can be reached by any GSM mobile phone and the commands sent via SMS will enable the User to change the settings or query various functions of the station.
The commands have the following general format:

#BMQcommand(parameters)* where:

# = opens the command string;
BM = string always included;
Q = **?** for query commands;
S for setting commands ;
Command = command string;
(parameters) = value of setting parameters (if any);
* = closes the command string.

The commands available via SMS message are divided into three main categories:

- **Query COMMANDs**;
- **Setting COMMANDs**.
- **GPRS COMMANDs**.

NOTE

Expect of "EVN", "EVNL" and "EVNR" (not present on SMS) all the commands are available on SMS, Modem, RS232, USB, Ethernet.

NOTE

Every SMS sent to the AMB-8059 must contain as a first command the invitation to authenticate the device password. This is to protect the station for undesired access.

Therefore every SMS, to be processed correctly, must start with the string:
#BM?IDN psw*

Where psw is the device password set for the station (the default password is PASSPMM).

Example: to request the last reading (average value) the SMS message to be sent to the AMB-8059 with the password set by the factory is as follows:
#BM?IDN PASSPMM*#BM?LFA*

NOTE

Any command sent via RS232, USB, Ethernet immediately rouses the microcontroller. However, because of the peculiarity of the stop status, in this case the command is lost and must be sent again in order to be carried out. This is done automatically by the 8059SW-02 software and should be taken into consideration by the User in developing any custom software.
Obviously, this does not occur in case of commands issued via SMS or in case of connection via modem, as the microcontroller is always on when the GSM is on stand-by.

7.2 List of commands

Query COMMANDs

Syntax	Function
#BM?IDNF psw*	Request extended ID.
#BM?IDN psw*	Request ID.
#BM?CLK*	Request complete internal clock.
#BM?STA*	Request alarm status.
#BM?MSK*	Request alarm screen.
#BM?BAT*	Request battery voltage status.
#BM?RPT*	Request report.
#BM?RPT0*	Request report with reset.
#BM?TMP*	Request temperature.
#BM?PRB*	Request field probe data.
#BM?TDM*	Request complete modem phone list.
#BM?TDMn*	Request single modem phone number.
#BM?TDS*	Request complete SMS phone list.
#BM?TDSn*	Request single SMS phone number.
#BM?ALR*	Request alarm threshold.
#BM?WRN	Request warning threshold.
#BM?TSM*	Request schedule programmed settings for modem.
#BM?TSS*	Request schedule programmed settings for SMS.
#BM?TSG*	Request schedule programmed settings for GPS.
#BM?TSE*	Request schedule programmed settings for Ethernet
#BM?AQ_*	Request actual acquisition mode setting.
#BM?LFA*	Request latest average value.
#BM?MES*	Request instantaneous (not averaged) field value.
#BM?MESR*	Request instantaneous field value (continued).
#BM?EVN*	Request record of all events.
#BM?EVNL*	Request record of latest 20 events.
#BM?EVNR*	Request record of events since last reading.
#BM?GPS*	Request latest NMEA RMC sentence revealed.

Setting COMMANDs

Syntax	Function
#BMSPSW (parameters)*	Save new Password.
#BMSCLT (parameters)*	Set clock time.
#BMSCLD (parameters)*	Set clock date.
#BMSIDN (parameters)*	Set station ID.
#BMSMSK (parameters)*	Set alarm screen.
#BMSALR (parameters)*	Set alarm threshold.
#BMSWRN (parameters)*	Set attention threshold.
#BMSAVG (parameters)*	Set averaging time.
#BMSAA (parameters)*	Set the reference probe in Dual-probe config.
#BMSTDMn parameters)*	Set modem phone number.
#BMSTDSn (parameters)*	Set SMS phone number.
#BMSDMO*	Set MODEM disable function.
#BMSTSM (parameters)*	Set programmed schedule for modem.
#BMSTSS (parameters)*	Set programmed schedule for SMS.
#BMSTSG*	Set programmed schedule for GPS.
#BMSTSE*	Set programmed schedule for Ethernet
#BMSENC*	Enable to calls.
#BMSDIC*	Disable to calls.
#BMSENR*	Enable to send reports.
#BMSENG*	Enable the GPS.
#BMSENE*	Enable the Ethernet
#BMSDIE*	Disable the Ethernet
#BMSDIR*	Disable to send reports.
#BMSDIG*	Disable the GPS.
#BMSGOI*	Switch the GPS on.
#BMSGOIF*	Switch the GPS on + SMS.
#BMSATH*	End communication in progress.
#BMSATH0*	End communication in progress + modem.
#BMSETH*	End and switch the Ethernet off.
#BMSCNL (parameters)*	Enable deferred call.
#BMSAQ_ (parameters)*	Set acquisition mode.
#BMSRST*	Restore Default configuration.
#BMSRSTR*	Restore default configuration and storing rate.

FTP-GPRS Setting COMMANDs

NOTE **Username and Password must only contain alphanumeric characters; any special characters are not allowed.**

Syntax	Function
#BMSGPR0 (parameter)*	Set Access Point Name for GPRS.
#BMSGPR1 (parameter)*	Set User Name for GPRS access network.
#BMSGPR2 (parameter)*	Set Password for GPRS access.
#BMSGPR3 (parameter)*	Set User Name for FTP access server.
#BMSGPR4 (parameter) *	Set Password for FTP access.
#BMSGPR5 (parameter)*	Set IP Address of the FTP server.
#BMSCGN*	Start a GPRS connection and access the FTP server.
#BMSCGNL*	Start a GPRS connection, access the FTP server and upload txt file including last 20 events.
#BMSCGNA*	Start a GPRS connection, access the FTP server and upload txt file including all events available.
#BMSCGNFW*	Start a GPRS connection with update firmware and reboot.
#BMSCGNFWI*	Start a GPRS connection with update firmware and reboot without uploading any records.
#BMSNETE*	Set the station to the GPRS communication mode.
#BMSNETD*	Set the station to the CSD communication mode.
#BMSSTS (parameter)*	Set the internal Real Time Clock by using the SMS provider's information.

FTP-GPRS Query COMMANDs

NOTE **Username and Password must only contain alphanumeric characters; any special characters are not allowed.**

Syntax	Function
#BM?GPR0*	Request Access Point Name for GPRS
#BM?GPR1*	Request User Name for GPRS access network
#BM?GPR2*	Request Password for GPRS access
#BM?GPR3*	Request User Name for FTP access server.
#BM?GPR4*	Request Password for FTP access
#BM?GPR5*	Request IP Address of the FTP server

7.3 Query COMMANDs

Using these commands the monitoring station can be queried with a series of requests to which the unit will respond with an SMS message containing the required information.
Query commands are characterized by the character **?** in the string.

Command	Meaning
?IDNF psw (Identity)	Request of ID with authentication of the password to enable commands. The subject "psw" must be the Device Password saved in the monitoring station using the command **SPSW** to enable the communication when the unit is not directly connected via RS232, USB, Ethernet. Any spaces entered between the IDN string and the password string are ignored. At least one space must be entered. The response of the unit contains the ID followed by: • brand (Nsts), model and release of firmware • Serial number of the unit • Date of latest calibration • Origin call **ON** or **OFF** • Time and frequency of MODEM start 1 (for non-SMS calls) • Transmission of the report via SMS **ON** or **OFF** • Time and frequency of MODEM start 2 (for non-SMS calls) • Alarms currently on (not masked) The format is: #BM IDN= ***NAME*** **;NARDA,Model;** ***R.rr MM/YY*****;Serial No.;dataprobe;ON|OFF HH:mm** (X**q**) **each** Y**h; ON|OFF HH:mm** (X**q**) **each** Y**h;ALARM;*** Where: **Name** is the ID string saved with the command **#BMSIDN** **Model** is the Station model **R.rr** is the release version and ***MM/YY*** the date of the firmware. **Serial No.** is an alphanumerical string that distinguishes the unit (serial number) **Dataprobe** is the date of the latest calibration in the format dd.MM.YY (day.month.year) • First interval **ON|OFF** only one of the two strings is present to indicate whether the incoming call is enabled or not **HH:mm** (X**q**) **each** Y**h** displays the MODEM start schedule, exactly as in the command **#BM?TSM*** • Second interval **ON|OFF** only one of the two strings is present to indicate whether the transmission of the report via SMS is enabled or not **HH:mm** (X**q**) **each** Y**h** displays the MODEM start schedule, exactly as in the command **#BM?TSS*** **ALARM** displays the status of the alarms in progress (not masked) in symbolic mode as in the command **#BM?ALR*** When receiving a command like the following **#BM?IDNF PASSPMM*** first the unit verifies that the Password PASSPMM in the command is the same previously memorized in the unit, then it returns the expected string if: • It is connected directly via RS232, USB, Ethernet regardless of the correctness of the password • It is connected via modem and the password has been successfully verified • It is receiving a command via SMS and the password has been successfully verified (in this case all succeeding commands in the same SMS will be accepted as well). The expected response string of the example is ***#BM IDN= TESTCISANO_EX3;Nsts,AMB-8059/03; 1.00 11/14; 000WE41003; 10.10.14;ON 02:00 (1q) each 24h;----------;**** It identifies the field monitor Nsts model AMB-8059/03; serial number 000WE41003; Firmware released in November 2014, Version 1.00; Date of latest calibration October 10, 2014; Programmed time to switch on the modem set at 02:00 for fifteen minutes only once a day; Call by unit enabled. No alarms active. If the Password is incorrect (although required) the response string is: **#BM DENIED***

?IDN psw (Identity)	Request of ID with authentication of the password to enable commands. The subject "psw" must be the Device Password saved in the monitoring station using the command **SPSW** to enable the communication when the unit is not directly connected via RS232, USB, Ethernet. Any spaces entered between the IDN string and the password string are ignored: at least one space must be entered. The response of the unit contains the ID followed by the serial number as follows: #BM IDN=**NAME;Serial No*** Where **Name** is the ID string saved with the command **#BMSIDN** and **Serial No**. is an alphanumerical string that distinguishes the field monitor (serial number). When receiving a command like the following **#BM?IDN PASSPMM*** first the unit verifies that the Password PASSPMM in the command is the same previously memorized in the unit (see the command **SPSW**), then it returns the expected string if: • It is connected directly via RS232, USB, Ethernet regardless of the correctness of the password • It is connected via modem and the password has been successfully verified • It is receiving a command via SMS and the password has been successfully verified (in this case all succeeding commands in the same SMS will be accepted as well). The expected response string of the example is **#BM IDN= Via_Marconi; 0987654321*** And it provides the serial number "09876564321" and the ID "Via_Marconi". If the Password is incorrect (although required) the response string is: **#BM DENIED*** Since the SMS commands are recognize after the control of the Password, this command should be used instead of **?IDNF** because using less characters. Indeed, the **IDNF** answer will use almost all the 160 characters allowed for a single SMS and would therefore be impossible to read and recognize the following commands.
?CLK (clock)	Request complete clock. The response returns the time in the format: **#BM CLK:**HH.mm.ss;GG.MM.YY* H = hour m = minutes s = seconds G = days M = Month Y = Year **#BM CLK:20.02.09;19.10.00***
?STA (status)	Request Alarm Status. The response returns a string with the relative alarms in the format: **#BM STA=AWLVPTCawlvp*** A = threshold of ALARM exceeded W = threshold of Attention exceeded L = ALARM for tampering V = ALARM for low battery P = ALARM for PROBE malfunction (for HP-1B-01 only in dual probe configuration) T = ALARM for temperature C = ALARM for relative humidity a = threshold of ALARM regained w = threshold of Attention regained l = Tampering ALARM ended v = Battery ALARM ended p = PROBE ALARM ended the hyphen (-) means the specific alarm is not active **#BM STA=A--V--------***

?MSK (mask)	Request Status of Alarm SCREEN. The response returns a string with the relative alarms active in the format: **#BM MSK=WwAaPpVvLIT MODEM SMS*** The same symbols are used as for ?STA The inclusion of the string MODEM means the alarm is active on the MODEM function. The inclusion of the string SMS means the alarm is in progress on the SMS function **#BM?MSK*** Response **#BM MSK=--A-----L--*** **#BM?MSK*** Response **#BM MSK=--A-----L—MODEM*** **#BM?MSK*** Response **#BM MSK=--A-----L—SMS*** **#BM?MSK*** Response **#BM MSK=--A-----L—MODEM SMS ***	
?BAT (battery)	Request Battery Voltage Status. The response indicates the voltage in VOLT and hundredths of VOLT in the format: **#BM BAT=V.vv***	**#BM BAT=4.10***
?RPT (Report)	Request of data relative to max field recorded by latest reading and battery voltage at the time. The time and date of the event are supplied. For example, the command **#BM ?RPT*** returns the response **#BM REPORT=MAX:0.70 V/m 18:08 28/10/00** **Battery=4.10V 18:05 28/10/00***	
?RPT0 (Report & reset)	Request of data relative to max field recorded by latest reading and battery voltage at the time. The time and date of the event are supplied, but in addition, the stored value of the field is reset so as to start over for a new period. For example, the command **#BM ?RPT0*** returns the response **#BM RPT=MAX:0.70 V/m 18:08 28/10/00** **Battery=4.10V 18:05 28/10/00***	
?TMP (temp. and relative. humid.)	Request Temperature and Relative Humidity. The response returns the temperature in degrees Centigrade and the relative humidity in percentage. The format is: **#BM TMP=tt,rh***	**#BM TMP=22.75,20.5***
?PRB (probe)	Request PROBE data. The response returns the probe model, latest calibration date, unit of measurement and divider in the format: **Triband Probe:** • **#BM PRB=NAME:dd.MM.YY;unit: divider:range:minlevel*** **Quadriband Probe:** **#BM PRB=NAME:dd.MM.YY; unit: divider:range:minlevelWide:4: minlevelSubBand *** **SingolBand Probe:** • **#BM PRB=NAME:dd.MM.YY;unit: divider:range:minlevel:S *** **Dual-probe configuration:** **answers related to the two probes connected are provided, in the same format as above, separated by the semicolon ';' character.** • **#BM PRB=NAME:dd.MM.YY;unit: divider:range:minlevel:S; PRB=NAME:dd.MM.YY;unit: divider:range:minlevel:S ***	**#BM PRB=EP-4B-02:10.10.14; V/m:100.00:200.00:0.25:4:0.02*** **In case of Dual-probe configuration:** **#BM PRB=HP-1B-01:24.12.10; uT : 100.: 180.: .04:S;PRB=EP 3TB:24.12.10; V/m: 100.: 300.: .45:S***

?TDMn **T**elephone **D**irectory **M**odem	Request **MODEM** phone **no.** (n may vary from 0 to 9). The response returns the number requested, if any, or VOID in the following format: **#BM TDMn=xxxxxxxxxxx*** For example, the command **#BM?TDM1*** returns the response **#BM TDM1=VOID***	
?TDM **T**elephone **D**irectory **M**odem	Request **MODEM** phone list. The response returns the numbers, if any, or VOID in the following format (every number is separated by<LF>: **#BM TDM=** **xxxxxxxxxxx** **VOID** *	**#BM TDM=** **1234568565** **VOID** **…** **VOID**
?TDS **T**elephone **D**irectory **S**MS	Request **SMS** phone list. The response returns the numbers, if any, or VOID in the following format (every number is separated by <LF>: **#BM TDS=** **xxxxxxxxxxx** **void** *	**#BM TDS=** **1234568565** **VOID** **….** **VOID***
?TDSn **T**elephone **D**irectory **S**ms	Request **SMS** phone **no.** (n may vary from 0 to 9). The response returns the number requested, if any, or VOID in the following format: **#BM TDSn=xxxxxxxxxxx*** For example, the command **#BM ?TDS1*** returns the response **#BM TDS1=1234568565***	
?ALR Alarm	Request ALARM threshold. The response returns the threshold in the current unit followed by the average time (in minutes) on which it is calculated: In case of Dual-probe configuration, the answer is related to the field of the probe set as the reference one (see command **SAA**).	**#BM ALR= 6.0; 6***
?WRN Alarm	Request WARNING threshold. The response returns the threshold in the current unit followed by the average time (in minutes) on which it is calculated:	**#BM WRN= 6.0; 6***
?TS**M** **Ti**me **S**chedule **M**odem	Request Time Schedule Settings for **MODEM**. The format is: **#BM TSM=ON|OFF HH:mm (Xq) each Yh (DIS)*** where: **ON|OFF** indicates if the call from the station to the controlling PC is enabled or not**;** **HH.mm** expresses the starting time of the modem (on and Stand-By). **Xq** expresses the time **in Quarters of an HOUR** that the MODEM is on (maximum 24 quarters of an hour). **Yh** expresses how often the operation must be repeated. (**DIS**) informs whether the disable command (see **SDMO**) is on. The lack of the string (DIS) indicates that the function is disabled and that the modem will therefore function correctly at the required time. For example, the command **#BM ?TSM*** returns the response: **#BM TSM=OFF 14:53 (1q) each 24h*** which confirms that the modem is started at 14:53 and will remain on for 15 minutes and this will repeated every day.	

?TS**S** **T**ime **S**chedule **S**MS	Request Time Schedule Settings for **SMS**. The format is as follows: **#BM TSS=ON|OFF HH:mm (Xq) each Yh (DIS)*** where: **ON|OFF** indicates if the call from the station to the controlling PC is enabled or not**;** **HH.mm** expresses the starting time of the modem/GSM (on and Stand-By). **Xq** expresses the time **in Quarters of an HOUR** that it is on (maximum 24 quarters of an hour). **Yh** expresses how often the operation must be repeated. (**DIS**) informs whether the disable command (see **SDMO**) is on. The lack of the string (DIS) indicates that the function is disabled and that the modem will therefore function correctly at the required time. For example, the command **#BM ?TSS*** returns the response: **#BM TSS=OFF 12:00 (4q) each 24h*** which confirms that the modem/gsm is started at 12:00 and will remain on for 1 hour and this will be repeated every day.
?TS**G** **T**ime **S**chedule **GPS**	Request Time Schedule Settings for **GPS**. The format is as follows: **#BM TSG= ON|OFF HH:mm each ee*** where: **ON|OFF** indicates if the **GPS** is enabled or not**;** **HH.mm** expresses the starting time of the GPS. **ee** is the number of hours between every turn on For example, the command **#BM ?TSG*** returns the response: **#BM TSG=ON 12:00 each 24h*** which confirms that the GPS is started at 12:00 and will be repeated every 24 hours
?TSE **T**ime **S**chedule **E**thernet	Ethernet set timing query. The format is the following: :**#BM TSG= ON|OFF HH:mm each ee*** where: **HH.mm** is the set time at which the Ethernet is switched on **ee** sets the number of hours on which the operation is repeated. Example **#BM ?TSE*** The answer is: **#BM TSE= ON 12:00 each 24h*** informing that Ethernet will be on at 12:00 and repeated every day.
?AQ_	Request current acquisition mode setting: the response is given in the following format **#AQ**_LTR* where: **L** is an index that goes from 0 to 4 and represents the rate of storing as follows" "0" = 30 seconds "1" = 1 minute "2" = 2 minutes "3" = 6 minutes "4" = 15 minutes **T** indicates an internal status and is not significant for any purpose **R** expresses the type of average used A= AVG; R=RMS Example **#BM ?AQ_*** returns the response: **#BM AQ_=43A*** which means that the station is storing data every 15 minutes and the average is AVG.
?LFA	Request latest average value. The response returns the value with the current unit followed by the time (in minutes) of the average on which it has been calculated (the same indicated in the command ALR). In case of Dual-probe configuration, the answer is related to the field of the probe set as the reference one (see command **SAA**). Example **#BM ?LFA*** returns the response: **#BM LFA=1.23 V/m;06*** which means that the average of the last 6 minutes is 1,23 V/m

?MES	Request instant value (not averaged) of field. This command requests the elementary value for each band in the format: **Triband Probe:** • **#BM MES=W.WW;L.LL;H.HH V/m*** where: • W.WW is the wide band field probe value • L.LL is the low pass band field probe value (<862 MHz) • H.HH is the high pass band field probe value (>933MHz) • V/m Label Unit of measurement **Quadriband Probe:** • **#BM MES=W.WW;A.AA;B.BB;C.CC V/m*** where: • W.WW is the wide band field probe value • A.AA is the band1 field probe value (950 MHz) • B.BB is the low pass band field probe value (1850 MHz) • C.CC is the low pass band field probe value (2150 MHz) • V/m Label Unit of measurement **SingolBand Probe:** • **#BM MES=W.WW; V/m*** where: • W.WW field probe value • V/m Label Unit of measurement **Dual-probe configuration:** • **#BM MES=W.WW;S.SS; Unit_P, Unit_S*** where: • W.WW field value of Primary probe • W.WW field value of Secondary probe • **Unit_P unit of Primary probe** • **Unit_S* unit of Secondary probe** It should be noted that, due to the delay for data transfer from probe->unit->RS232, USB, Ethernet, the reading refers to the acquisition value of the previous sampling (minimum ≥ 3 seconds, maximum <6 seconds).

?MESR	Request instant value (not averaged) of field **continuously**. This command requests the elementary value for every band as for the previous command "**?MES**" but enables continuous transfer of the elementary data as soon as they are available (1 second). This command can be useful, for example, to record separately all the elementary data processed by the station. In this case the prefix "**#BM**" and the suffix '*****' are omitted. **Triband Probe:** • **MES=W.WW;L.LL;H.HH V/m** where: • W.WW is the wide band field probe value • L.LL is the low pass band field probe value (<862 MHz) • H.HH is the high pass band field probe value (>933MHz) • V/m Label Unit of measurement **Quadriband Probe:** • **MES=W.WW;A.AA;B.BB;C.CC V/m** where: • W.WW is the wide band field probe value • A.AA is the band1 field probe value (950 MHz) • B.BB is the low pass band field probe value (1850 MHz) • C.CC is the low pass band field probe value (2150 MHz) • V/m Label Unit of measurement **SingolBand Probe:** • **MES=W.WW;; V/m** where: • W.WW field probe value • V/m Label Unit of measurement **Dual-probe configuration:** • **MES=W.WW;S.SS ; Unit_P, Unit_S** where: • W.WW field value of the Primary probe • W.WW field value of the Secondary probe • **Unit_P unit of Primary probe** • **Unit_S unit of Secondary probe** To disable continuous transmission just send the command "**?MES**" Note that when this command is enabled the absorption of the station, due to the full activity of the UART, is much greater than normal (~ 10 time greater)

?EVN	Request record of events. The response returns the complete list of all events recorded by the unit. The terminator is **#BM END_EVENTS*** This command does not return any data in **SMS** mode but only the terminator feedback **EVN N/A on SMS.**
?EVNL	Request record of latest 20 events. The response returns the list of the latest 20 events recorded by the unit. The terminator is **#BM END_EVENTS*** This command does not return any data in **SMS** mode but only the terminator feedback **EVN N/A on SMS.**
?EVNR	Request record of events not yet read. The response returns the complete list of all events recorded by the station since the last reading. The terminator is **#BM END_EVENTS*** This command does not return any data in **SMS** mode but only the terminator feedback **EVN N/A on SMS.**
?GPS	Request NMEA RMC (NMEA 0183 ver 3.01) phrase. This command requests the last RMC NMEA phrase taken by the internal GPS. NMEA phrase is fully reported between **#BM** and the terminator**'*'** In case any position has been taken, the answer is:"------VOID" Example of answer to the command "**?GPS**" **#BM** $GPRMC,**053740.000,A,2503.6319,N,12136.0099,E,2.69,79.65,100106,,,A***53*

7.4 Setting COMMANDs

These commands are used to make settings on the monitoring station so that the unit can respond with an SMS message containing the corresponding information or confirmation.
The setting commands are characterized by the presence of the character **S** in the string.

Command	Meaning	Example of Response
SPSW	Save new Password. The command responds with the string **#BM PSW0=psw*** if successful, otherwise with **#BM ERROR*** Syntax: **#BM SPSW** psw* **psw** is the Password that will be saved and must be alphanumerical. At least one space is required for separation between SPSW and the string. Every additional initial space is removed. This command is always accepted when connection is in direct mode (without MODEM or SMS) or via MODEM or SMS if the current Password has been verified (with the command **"?IDN psw"**)	**#BM PSW0=PASSPMM***
SCLT	Set clock time. The response returned is the same as the response to the command ?CLK **#BMSCLT** HH.mm.ss * H = hour m = minutes s = seconds	**#BM CLK:20.02.09;19.10.00***
SCLD	Set clock date. The response returned is the same as the response to the command ?CLK **#BMSCLD** DD.MM.YY * D = days M = Month Y = Year	**#BM CLK:20.02.09;19.10.00***
SIDN	Set station ID. The maximum length is 20 characters. The response returned is the same as the response to the command ?IDN **#BMSIDN** Istituto Marconi, 23*	**#BM IDN=Istituto Marconi 23; AMB-8059; A.00 10/00;***
SMSK	Set alarm window. The window must contain the mnemonic symbols representing the individual alarms as shown in the table. The order of the symbols is not important. A = threshold of ALARM exceeded W = threshold of Attention exceeded L = ALARM for tampering V = ALARM for low battery P = ALARM for PROBE malfunction T = ALARM for temperature C = ALARM for relative humidity a = threshold of ALARM regained w = threshold of Attention regained l = Tampering ALARM ended v = Battery ALARM ended p = PROBE ALARM ended S= Enabled set to **SMS** M= Enabled set to **MODEM** The response is the same as the response to the command "?MSK" For example: **#BMSMSK AL*** enables threshold alarms and protective case opening. **Note that to have a call on alarm the relevant device (either MODEM or SMS) must also be enabled**	

SALR x.x	Set Alarm Threshold. The setting xx.x establishes the threshold value: **#BMSALR 6.0*** In case of Dual-probe configuration, the answer is related to the field of the probe set as the reference one (see command **SAA**). The response is the same as response to command ?ALR	**#BM ALR= 6.0; 6***
SWRNx.x	Set Attention Threshold. The setting xx.x establishes the threshold value: **#BMSWRN 4.0*** In case of Dual-probe configuration, the answer is related to the field of the probe set as the reference one (see command **SAA**). The response is the same as response to command ?WRN	**#BM WRN= 4.0; 6***
SAVG x	Set average time for alarm and attention threshold. The setting x is expressed in minutes: **#BMSAVG 4.0*** In case of Dual-probe configuration, the answer is related to the field of the probe set as the reference one (see command **SAA**). The response is the same as response to command ?ALR	**#BM ALR= 6.0; 6***
SAAx	**This command is valid in Dual-probe configuration only** Set the reference probe on which measurement will be related the field strength Alarm and Warning thresholds as well as response to the commands MES and LFA. The command **#BMSSAAS*** sets the Secondary probe (mounted on the Primary one) as the reference, field thresholds and readings (MES, LFA) will be therefore related to this Secondary probe. The response to #BMSSAAx* is the same as received by the **?ALR** command. The command **#BMSSAAP*** sets the Primary probe (mounted directly on the main unit) as the reference, field thresholds and readings (MES, LFA) will be therefore related to this Primary probe. The response to #BMSSAAx* is the same as received by the **?ALR** command.	

STDMn **T**elephone **D**irectory **M**odem	Set MODEM telephone number in the directory. The format is as follows: **#BM STDMn xxxxxxxxxx*** where: **n** represent the position in the list and must be between 0 and 9 **xxxxxxxxxx** expresses the telephone number. To change a number just overwrite the previous number and to delete a number just enter a new number that starts with 00000. The response has the same format as the command **?TDMn**. For example the command **#BM STDM1 987654321*** returns the response: **#BM TDM1=987654321***
STDSn **T**elephone **D**irectory **S**ms	Set SMS telephone number in the directory. The format is as follows: **#BM STDSn xxxxxxxxxx*** where: **n** represent the position in the list and must be between 0 and 9 **xxxxxxxxxx** expresses the telephone number. To change a number just overwrite the previous number and to delete a number just enter a new number that starts with 00000. The response has the same format as the command **?TDSn**. For example the command **#BM STDS1 0000000*** returns the response: **#BM TDS1=VOID***
SDMO	Set the command to disable MODEM function. This command is accepted only if there is a battery alarm active. When the battery alarm ends, the status of disable function will be automatically cancelled. The response to this command is identical to ?TSM. For example, the command **#BM SDMO*** returns the response: **#BM TSM=14:53 (1q) each 24h*** which, in the absence of the string **(DIS),** informs that the disable command has been ignored.
STS**M** **T**ime **S**chedule **M**odem	Set **MODEM** time schedule. The format is as follows: **#BM STSM HH.mm.xx.ee*** where: **HH.mm** expresses the MODEM switch on time (on and Stand-By). **xx** expresses the time in **Quarters of an HOUR** of time the modem is on (maximum 24 quarters of an hour). **ee** expresses how often the operation has to be repeated. NOTE: The numbers must always consist of two digits and no spaces can be used in the time, duration and repetition, which must be sub-multiples of 24 hours. The response has the same format as the command ?TSM. For example, the command **#BM STSM 14.53.01.24*** returns the response: **#BM TSM=14:53 (1q) each 24h*** confirming that the modem will go on at 14:53 and stay on for 15 minutes and this will be repeated every day at the same time.
STSS **T**ime **S**chedule **S**MS	Set **SMS** time schedule. The format is as follows: **#BM STSS HH.mm.xx.ee*** where: **HH.mm** expresses the MODEM/GSM start time (on and Stand-By). **xx** expresses the time in Quarters of an Hour of time the modem is on (maximum 24 quarters of an hour). **ee** expresses how often the operation has to be repeated. NOTE: The numbers must always consist of two digits and no spaces can be used in the time, duration and repetition, which must be sub-multiples of 24 hours. The response has the same format as the command ?TSS. For example, the command **#BM STSS 12.00.04.24*** returns the response: **#BM TSS=12:00 (4q) each 24h*** confirming that the modem/gsm will go on at 12:00 and stay on for 1 hour and this will be repeated every day at the same time.

STSG **T**ime **S**chedule **G**PS	Set **GPS** time schedule. The format is as follows: **#BM STSG HH.mm.xx.ee*** where: **HH.mm** is the GPS turn on time. **xx** must be 01. **ee** expresses how often the operation has to be repeated. **ee** sets on every how many hours the operation must be repeated. The numbers must always be two digits without spaces, and must be a submultiple of the 24 hours Answer has the same format of the command ?TSG. For example, the command **#BM STSG 12.00.01.24*** gives the answer: **#BM TSG= ON 12:00 each 24h*** confirming that the GPS will be turn on at 12:00 and will be repeated every 24 hours.
STSE **T**ime **S**chedule **E**thernet	Ethernet setting time command. The format is the following: **#BM STSE HH.mm.xx.ee*** where: **HH.mm** is the set time at which the Ethernet is switched on **xx** must be 01. The on time of Ethernet is 10 minutes. To save Energy it is recommended to switch it off by SETH.as soon as the communication is completed. **ee** sets the number of hours on which the on is repeated. This can be 12 or 24 and every different number will be automatically converted in 24. Notes. Numbers must be two digits. Blank are not allowed in the timing definition. The answer has the same format of ?TSG command. Example **#BM STSE 12.10.01.24*** Answer is: **#BM TSE= ON 12:10 each 24h*** confirming that Ethernet will be available at 12:10 for ten minutes every day.
SENC **EN**able **C**all	This command enables calls from the AMB-8059 to the control center. When enabled, at the scheduled time (STSM) the MODEM switches on, registers with the server, and makes a call to the first number saved in the MODEM phone directory, following the call procedure. After the call, it remains in Stand-by condition for the rest of the time. Note that this command only enables the call and not MODEM startup at the scheduled time, which remains effective in any case. The response has the same format as the command ?TSM. For example, **#BM SENC*** returns the response: **#BM TSM=ON 14:53 (1q) each 24h*** confirming that the station is enabled for the call **(ON)** at given schedule and modes.
SENR **EN**able **R**eport	This command enables sending the report via SMS. When enabled, at the scheduled time (STSS) the GSM is switched on, registers with the server, and sends the SMS message containing the report to all the numbers saved in the SMS phone directory: after sending all the messages it remains in Stand-by condition for the rest of the time. Note that this command only enables message transmission and not GSM activation at the scheduled time, which remains enabled in any case. The response has the same format as the command ?TSS. For example, **#BM SENR*** returns the response: **#BM TSS=ON 12:00 (2q) each 24h*** confirming that the station is sending SMS messages **(ON)** at given schedule and modes.

SENG **EN**able **GPS**	This command enables the GPS activity. Once enabled, at the settled time (STSG) the GPS is turned on and starts the satellites research. When FIX is obtained, the NMEA **GLL** phrase is stored and then the GPS is turned off. Answer has the same format of the command ?TSS. Example **#BM SENG*** gives the answer: **#BM TSG=ON 12:00 each 24h*** confirming that GPS is active and will be turned on (**ON**) at the settled time.
SENE **EN**able **E**thernet	This command enables the activity of the scheduled Ethernet connection. Once enabled, on the scheduled time (STSE) Ethernet is available for 10 minutes. The answer has the same format of ?TSE command. Example **#BM SENE*** gives the answer: **#BM TSE=ON 12:00 each 24h*** confirming that Ethernet will be available (**ON**) at the scheduled time.
SDIE **DI**sable **E**thernet	Disable activity on Ethernet. When disable Ethernet will be permanently off independently from the scheduled (STSE). The answer has the same format of ?TSE command. Example **#BM SDIE*** gives the answer: **#BM TSE= OFF 12:00 each 24h*** confirming that Ethernet is disabled.
SDIC **DI**sable **C**all	This command disables the call by the unit to the control center. If disabled, at the scheduled time (STSM) the MODEM switches on, registers with the server and remains in reception mode ready to receive any calls or SMS messages. The response has the same format as the command ?TSM. For example, **#BM SDIC*** returns the response: **#BM TSM= 14:53 (1q) each 24h*** confirming that the station is disabled for the call, at given schedule and modes.
SDIR **DI**sable **R**eport	This command disables sending the report via SMS. When disabled, at the scheduled time (STSS) the GSM switches on, registers with the server, and remains in reception mode ready to receive calls or SMS messages. The response has the same format as the command ?TSM. For example, **#BM SDIR*** returns the response: **#BM TSS= 12:00 (2q) each 24h*** confirming that the station is disabled for the call, at given schedule and modes.
SDIG **DI**sable **GPS**	This command disables the GPS activity. If disabled the GPS unit is permanently off saving energy. The answer has the same format of the command ?TSG. Example **#BM SDIG*** Gives the answer: **#BM TSG= OFF** 12:00 each 24h* confirming that the GPS is disabled
SGOI **G**PS **O**N **I**mmediately	This command switches on the GPS immediately; it will remain on until the firs FIX or for a maximum time-out of 4 minutes. Answer is **#BM SGOI=OK***
SGOIF **G**PS **O**N **I**mmediately **F**eedback	This command switches on the GPS immediately; it will remain on until the firs FIX or for a maximum time-out of 4 minutes. Moreover, at the first FIX or timeout, a feedback by SMS will be sent, with the format NMEA RMC (NMEA 0183 ver 3.01), to every telephone number present in the list. Answer is **#BM SGOI Feedback=OK***
SATH **H**ANG	This command ends the communication in progress and is equivalent to having the station hanging up. It should always be used to end the communication as it confirms that the data exchange has ended. The response is always **#BM ATH=OK*** Example: **#BM SATH***

SATH0 **H**ANG	Like the previous command, this one disables the communication in progress and is equivalent to having the station hanging up, then it switches the MODEM off. To allow it to complete any functions in progress correctly, the Modem is switched off after a time ranging from 1 to a maximum of 2 minutes. During this time the GSM can be called again. The response is always **#BM ATH=OK*** Example: **#BM SATH0***
SETH	Interrupt and switch off Ethernet connection. To save energy it must be sent as soon as the communication is finished. Answer is **#BM ETH=OK*** Example: **#BM SETH***
SCNL **C**all **N**umber **L**ater	Format: **#BM SCNL d nnnnnnnn *** where **d** is in minutes and ranges from 1 to 9 and **nnnnnnnn** is the number to be called. This command enables a deferred call to the number **nnnnnnnn** indicated. The call will be made d minutes later than the scheduled time. For example, **#BM SCNL 5 018220346*** returns the response: **#BM SCNL=018220346*** confirming that the station will call back the number indicated.
SAQ_	Set acquisition mode: the response is identical to that of command **?AQ_** The format is as follows: **#SAQ_LTR*** where: L is the rate of storing and goes from • 0 (30 seconds) • 1 (1 minute) • 2 (2 minutes) • 3 (6 minutes) • 4 (15 minutes) T must be "3" R expresses the type of average used A= AVG; R=RMS example **#BM SAQ_13R*** returns the response: **#BM AQ_=13R*** confirming that the station is set to save data every minute using RMS average.
SRST	Restore Default configuration. The command restores the main parameters as follows: • Alarms all masked • Calls from station by appointment disabled • SMS from station by appointment disabled • Average period = 6 minutes • Average in progress reset • Type of average = RMS • **Interval 1** Modem switched on at 12:05 every 24 hours for 1 hour • **Interval 2** Modem switched on at 16:00 every 24 hours for 1/2 hour • **(AMB-8059/00 and AMB-8059/02)** Minimum battery charge alarm threshold = 3,00V • **(AMB-8059/00 and AMB-8059/02)** Maximum battery charge alarm threshold = 3,9V • **(AMB-8059/01 and AMB-8059/03)** Minimum battery charge alarm threshold = 3,9V • **(AMB-8059/01 and AMB-8059/03)** Maximum battery charge alarm threshold = 5,02V • Minimum temperature alarm threshold = 0 °C • Maximum temperature alarm threshold = 50 °C The response indicates everything is OK with the string: **#BM RST=OK***

SRST**R**	Restore Default configuration and rate of storing. The command, in addition to restoring the main parameters like SRST, also sets the rate of saves and executes the RESET (**ReBoot**) as follows: • **Save every 6 Minutes** • Alarms all masked • Calls from station by appointment disabled • SMS from station by appointment disabled • Average period = 6 minutes • Average in progress reset • Type of average = RMS • **Interval 1** Modem switched on at 12:05 every 24 hours for 1 hour • **Interval 2** Modem switched on at 16:00 every 24 hours for 1/2 hour • **(AMB-8059/00 and AMB-8059/02)** Minimum battery charge alarm threshold = 3,00V • **(AMB-8059/00 and AMB-8059/02)** Maximum battery charge alarm threshold = 3,9V • **(AMB-8059/01 and AMB-8059/03)** Minimum battery charge alarm threshold = 3,9V • **(AMB-8059/01 and AMB-8059/03)** Maximum battery charge alarm threshold = 5,02V • Minimum temperature alarm threshold = 0 °C • Maximum temperature alarm threshold = 50 °C The answer indicates the result of operation with the string **#BM RST RATE=OK*** To permit the accomplishment of the residual running functions (for example, to send the return SMS at the same command), the reboot complete comes postponed of 30 seconds from the identification of the command. Consequently, each activity or command will be interrupted to expiring of the 30th second for which, in modem connection eventual command “SATH” (neither necessary neither indispensable) it would have to be send within this time. **Extreme care should be taken in using this command as it invalidates all the data already saved considering them as not significant.**

7.5 FPT-GPRS COMMANDs

These commands are used by the user to establish a connection with an Access Point or FTP server, to enable the GRPS or point-to-point CSD connection and to set time/date using the SMS provider's information. Each field cannot be more than 31 characters.
These commands cannot be executed via FTP/GPRS (because they would need to be already correctly set).
The GPRS commands are characterized by the presence of the character **GPR** in the string.

NOTE **Username and Password must only contain alphanumeric characters; any special characters are not allowed.**

GPRS Connection Data		
Field	**Description**	**Setting command** Command to be issued by either SMS or RS232,USB,Ethernet
GPR**0** **APN** Access Point Name	The provider name of the GPRS bearer.	#BMSGPR**0** <apn>* where <apn> is Access Point Name Example: #BMSGPR**0** web.omnitel.it*
GPR**1** **GUN** User Name for Gprs access	The User Name required for logging-in. Sometimes this field might not be required and thus can be left empty.	#BMSGPR**1** <gun>* where <gun> is the User Name of GPRS access. Example: #BMSGPR**1** MyGPRS*
GPR**2** **GPSW** Password for Gprs access	The Password required for logging-in. Sometimes this field might not be required and thus can be left empty.	#BMSGPR**2** <gpsw>* where <gpsw> is the Password of GPRS access. Example: #BMSGPR**2** 1234*

FTP Connection Data		
Field	**Description**	**Setting command** Command to be issued by either SMS or RS232,USB,Ethernet
GPR**3** **FUN** User Name for FTP access	The User Name required for accessing to the FTP server. This word is usually issued from the FTP administrator and is nothing to do with the bearer.	#BMSGPR**3** <fun>* where <fun> is the User Name for FTP. Example: #BMSGPR**3** MyFTP*
GPR**4** **FPSW** Password for FTP access	The Password required for accessing to the FTP server. This word is usually issued from the FTP administrator and is nothing to do with the bearer.	#BMSGPR**4** <fpsw>* where < fpsw > is the Password for FTP. Example: #BMSGPR**4** abcd*
GPR**5** **FIP** FTP IP Address	This parameter is the server address for FTP (IP Address of FTP). Normally this is the static IP Address that routes the file transferring process to the wanted server	#BMSGPR**5** <fip>* where < fip > is the IP Address for FTP. Example: #BMSGPR**5** 194.183.2.17*

NOTE **The commands GPR0, GPR1, GPR2, GPR3, GPR4 and GPR5 can also be query commands as reported in page 7-4.**

MISC		
Field	**Description**	**Setting command** Command to be issued by either SMS or RS232,USB, Ethernet
CGN Connect GPRS Now	This command starts a GPRS connection immediately. All the procedures are then the same as it would for a scheduled connection.	#BMSCGN*
CGNL Connect GPRS Now (Last Events)	This command starts a GPRS connection immediately as for CGN but it forces to have a EVENT.TXT file containing the last 20 events instead of the most recent, and not yet loaded, ones.	#BMSCGNL*
CGNA Connect GPRS Now (All Events)	This command starts a GPRS connection immediately as for CGN but it forces to have a EVENT.TXT file containing all the events available instead of the most, and not yet loaded, ones.	#BMSCGNA*
CGNFW Connect GPRS Now and update Firmware	This command starts a GPRS connection immediately as for CGN. Additionally, if the 2 firmware files are found, it updates the firmware and reboots.	#BMSCGNFW*
CGNFWI Connect GPRS Now and Immediately update Firmware	This command starts a GPRS connection immediately as for CGN. Additionally, if the 2 firmware files are found, it updates the firmware and reboots without uploading any records. The difference from CGNFW is that it does not upload the data before updating the FW thus all unloaded records are lost.	#BMSCGNFWI*
NETE Enable GPRS protocol	This command enables the AMB-8059 to connect via GPRS instead of point-to-point GSM-MODEM connection. The reply is the same as for command ?TSM	#BMSNETE*
NETD Disable GPRS protocol	This command disables the AMB-8059 GPRS and enables point-to-point GSM-MODEM connection. The reply is the same as for command ?TSM	#BMSNETD*
STS id Set Timedate SMS	This command sets the internal real clock time by using the SMS provider's information. To use it **id** (the AMB-8059 telephone number) must be sent. This command works assumes that the SMS provider gives the correct Clock/Date and its feedback is within 30 seconds. The reply is sent only if the real time clock has been updated and is the same as for the command "?CLK"	#BMSSTS nnnnnnnn* where nnnnnnnn is the telephone number of AMB-8059

7.6 GPRS on Multi-band EMF Area Monitor AMB-8059

These commands are used to make settings on the monitoring station so that the unit can respond with an SMS message containing the corresponding information or confirmation.
The setting commands are characterized by the presence of the character **S** in the string.

7.6.1 Fundamentals

As opposed to point-to-point Modem connection, which needs that both uploader and downloader are connected at the same time, GPRS via FTP mode works instead on a server way. Indeed, the monitoring station regularly stores all data on a server while a client application can retrieve them later on. This means there is no necessity to be on-line at the same time.
Moreover, more clients can share the same data as all data are stored in a server and stays there until they are deleted (by a client).
The method used is FTP.

Similarly to MODEM GSM schedule, which dials a remote Modem number stored in AMB-8059 telephone directory, GPRS establishes a connection using Provider Name, Username etc stored in its memory.

Basically, at schedules, the AMB-8059 regularly establishes, via GPRS, a connection to the server and through FTP:

- First it loads, if any, all the (new) settings which have been written by the (client) application.
- Then it writes all data that have been requested by the application.
- Finally it erases all previous required settings in order to avoid reloading them at the next connection. Note that data related to field measurements are never deleted by the station.

After that the connection is terminated.

Although the AMB-8059 can operate in both modes, MODEM and GPRS, it cannot do it at the same time. This means that a setting command is used to configure the AMB-8059 to work either via MODEM way or via GPRS.

7.6.2 Structure

All data exchange is done on the directory named as the serial number of the monitoring station itself. That is in order to avoid having multiple stations that store on same directory and, at the same time, having a unique location. Here, an example of directory structure:

FTP_Root
- **000WE80201**
  - 8059.CFG
  - 8059.set
  - 8059FLD.TXT
  - 17_08_01_07_09_.D59
- **000WE80202**
  - 8059.CFG
  - 8059.set
  - 8059FLD.TXT
  - \ 20_00_01_07_09_.D59

Note that the user must ensure that the directory is already present on the FTP root as the AMB-8059 will not create it.

7.6.3 Configuration (Read)

Whenever the AMB-8059 connects to GPRS and accesses to FTP, it looks for a file named **8059.CFG** in its directory (its serial number). If the file is present, the AMB-8059 retrieves it and calculates the checksum in order to use it and thus get the new configuration. If the checksum is wrong, the file is discarded otherwise the new configuration is taken.
Is important to note that the new setting will not take effect immediately but only after the connection is closed.

NOTE

All figures are Little Endian notation unless differently specified.

The structure of the configuration file is as follows.

Pos	Name	Size Byte	Type	Description
0	ChkSum	2	Unsigned int	Check sum (see the related paragraph)
2	idStation	34	char	The name of Station. This is a null terminated string.
36	Mask alarm	2	Unsigned int Being Bits this is **BIG endian**	The mask of Alarm is a bit mask where '1' means Alarm Enabled while '0' is Alarm disabled. Here is a list of alarms. 0x0001 MAX threshold Field OUT. 0x0002 Warning threshold Field OUT. 0x0010 LOCK OUT. 0x0080 Low Battery Voltage OUT 0x0004 Probe OUT 0x0020 Temperature 0x0040 Relative Humidity 0x0008 MAX threshold Field IN. 0x0100 Warning threshold Field IN. 0x0400 LOCK IN. 0x0800 Low Battery Voltage IN 0x0200 Probe IN
38	Reserved	1	Unsigned char	None
39	AvgRms	1	Unsigned char	The way of averaging. If 'AvgRms' is 0 then is arithmetic average otherwise is Root Mean Square
40	MaxThr	4	Float	A little endian floating point figure that represents Max threshold used for Alarm.
44	WarnThr	4	Float	A little endian floating point figure that represents Warning threshold used for Alarm.
48	Logger	1	Unsigned char	This parameter sets the rate of the logger as follows "0" 30 seconds "1" 1 minute "2" 2 minutes "3" 6 minutes "4" 15 minutes
49	reserved	1	Unsigned char	None
50	Naver	2	Unsigned int	This parameter represents the averaging time for Warning and Alarm threshold. It is expressed as 4 times the averaging time. For example a 6 min time is reported as 24
52	GPRS Appoint	2	Unsigned int	This parameter represents the scheduled time for connecting to GPRS of the day. It is expressed in minutes elapsed since midnight. Figures equal or higher than 1440 are ignored. For example the schedule 12:30 would be (12*60)+30 =750

54	GPRS Ton	1	Unsigned char	This parameter represents the time the GSM remains ON after a GPRS connections. It is expressed in quarter of hour.
55	GPRS Interval	1	Unsigned char	This parameter represents the interval between GPRS connections (starting from the first connection which is done at Appoint). It is expressed in hours.
56	prxon	1	Unsigned char	This is the flag for connecting to GPRS upon alarms. If bit 0x01 is '1' and one or more unmasked alarm is set, a GPRS connection is done as it was for schedule. Note that bit 0x08, the GPRS Flag, Must always be ON.
57	reserved	1	Unsigned char	None
58	SMS Sched	2	Unsigned int	This parameter represents the scheduled time for SMS schedule of the day. It is expressed in minutes elapsed since midnight. Figures equal or higher than 1440 are ignored. For example the schedule 12:30 would be (12*60)+30 =750
60	SMS Ton	1	Unsigned char	This parameter represents the time the GSM remains ON after a SMS connections. It is expressed in quarter of hour.
61	SMS Interval	1	Unsigned char	This parameter represents the interval between SMS connections (starting from the first connection which is done at Appoint). It is expressed in hours.
62	SMS Xon	1	Unsigned char	This is a double flag for sending a report and alarm on SMS. If bit 0x01 is '1' and one or more unmasked alarm is set, an "ALR" like SMS is sent to the number stored in the SMS telephone directory. If bit 0x02 is '1' a "RPT" like SMS is sent to the number stored in the SMS telephone directory.
63	Reserved	1	Unsigned char	Reserved
64	GPS Sched	2	Unsigned int	This parameter represents the scheduled time for GPS schedule of the day. It is expressed in minutes elapsed since midnight. For example the schedule 12:30 would be (12*60)+30 =750
66	Reserved	1	Unsigned char	Reserved
67	GPS Interval	1	Unsigned char	This parameter represents the interval between GPS searches (starting from the first connection which is done at GSP Sched). It is expressed in hours.
68	GPS Active	1	Unsigned char	This parameter enables/disables GPS searches. When GPS Active = 0x02 the GPS activity is regulated by GPS sched. Instead, When GPS Active is 0 the GPS is OFF

69	Reserved	1	Unsigned char	Reserved
70	Ethernet Sched	2	Unsigned int	This parameter represents the scheduled time for Ethernet schedule of the day. It is expressed in minutes elapsed since midnight. For example the schedule 11:08 would be (11*60)+8 =668
72	Reserved	1	Unsigned char	Reserved
73	Ethernet Interval	1	Unsigned char	This parameter represents the interval between Ethernet connection (starting from the first connection which is done at “Ethernet Sched”). It is expressed in hours and it can be either 12 or 24. Any other interval will be automatically converted to 24.
74	Ethernet Sched Active	1	Unsigned char	This parameter enables/disables Ethernet Scheduling. When “Ethernet Schedule Active” = 0x02 the Ethernet activity is regulated by “Ethernet Sched”. Instead, when “Ethernet Schedule Active” is 0 the GPS is OFF.
75 277	Reserved	1	Unsigned char	Reserved

NOTE

The checksum must be calculated starting from **idStation** (position 2) up to (included) position 77 for a total of 76 bytes.

7.6.4 FLD File (Read)

After having dealt with the configuration file **8059.CFG**, the AMB-8059 check for the presence of a file named 8059FLD.TXT.
This is an ASCII file which contains the date of the first requested record and the number of them.
The syntax is: **FLD HH:mm;GG/MM/YY;n** where:

- HH is hour of the day.
- Mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year
- n is the number of records required (if n="---" then all records starting from the date/hour up the last recorded record will be uploaded).

For example the string FLD **18:13;23/04/14;100**
Asks for 100 records from the 23th of April 2014 at 18:13.

If, instead, the string would have been FLD **18:13;23/04/14;---**
It would ask for all records from the 23th of April 2014 at 18:13 up to now.

Note that, in case of "---" (up to now option), in order to avoid huge files and long transfer time, the number of records will be limited to 5000.

Once the AMB-8059 has read the file 8059FLD.TXT, it deletes it. It will be replaced later with the newer self-created 8059FLD.TXT which reflects the last record.
This solves the continuity of records even without any external intervention. Indeed, for every connection the AMB-8059 uploads the records and writes a new FLD file which reports the date/hour of last record so that next connection will continue from this having thus an uninterrupted series of records.

7.6.5 Record File (Write)

After having read the FLD file, which informs the AMB-8059 about which records have to be uploaded, it writes a file named **HH_mm_GG_MM_YY.D59** where:

- HH is hour of the day.
- Mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

The content of this file is binary and reflects what is described, according to the setting, in the § 7.8 "Download Description Area Monitor Broadband 8059 for 4-Bands Probes". Please refer to them for the correct interpretation of data.

7.6.6 FLD File
(Write)

After having written the record file **HH_mm_GG_MM_YY.D59**, the AMB-8059 writes the file named 8059FLD.TXT which replaces the old one.
This is an ASCII file which contains the date of the last uploaded record and terminates with the string "---".
The content will be therefore: **FLD HH:mm;GG/MM/YY;---** where:

- HH is hour of the day.
- Mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

For example the string FLD **20:30;23/04/14;---**
Says that the last updated record is related to the date of 23th of April 2014 at 20:30.

If a client does not necessitate a specific period, and needs a simple continuous data logger, there is no need to write any FLD File as the system is self-sufficient.

7.6.7 Event File
(Write)

After having written the FLD file, the AMB-8059 writes a file named **HH_mm_GG_MM_YY.TXT** where:

- HH is hour of the day.
- Mm is minute of the day.
- GG is the day.
- MM is the month.
- YY is the year

Which represents the events file.
This is an ASCII file which contains all the new events since last connection.
Alternatively, soliciting a connection, by the SMS command, different event history can be retrieved as follows:

- **SCGNA** : all the stored events are written in EVENT.TXT file
- **SCGNL** : The last 20 events are written in EVENT.TXT file

The content of EVENT file is the chronological history of all events up to the time of connection (RTC setting assumed to be correct).

7.6.8 Setting status
(Write)

After having written the EVENT.TXT file, the AMB-8059 writes a file named **8059.set** which reflects the configuration of the monitoring station.
Similarly to the Configuration 8059.CFG the file is binary.
This file is solely intended for reading as it is ignored by AMB-8059 and therefore any change of it will be discarded. Use 8059.CGF if you want to change any setting.

NOTE **All figures are in Little Endian notation.**

The structure of the configuration file is as follows.

Pos	Name	Size Byte	Type	Description
0	ChkSum	2	Unsigned int	Check sum (see the related paragraph)
2	idstation	34	Char	The name of Station. This is a null terminated string.
36	Mask alarm	2	Unsigned int Being Bits this is **BIG endian**	The mask of Alarm is a bit mask where '1' means Alarm Enabled while '0' is Alarm disabled. Here is a list alarms. 0x0001 MAX threshold Field OUT. 0x0002 Warning threshold Field OUT. 0x0010 LOCK OUT. 0x0080 Low Battery Voltage OUT 0x0004 Probe OUT 0x0020 Temperature 0x0040 Relative Humidity 0x0008 MAX threshold Field IN. 0x0100 Warning threshold Field IN. 0x0400 LOCK IN. 0x0800 Low Battery Voltage IN 0x0200 Probe IN
38	Reserved	1	Unsigned char	None
39	AvgRms	1	Unsigned char	The way of averaging. If 'AvgRms' is 0 then is arithmetic average otherwise is Root Mean Square
40	MaxThr	4	Float	A little endian floating point figure that represents Max threshold used for Alarm.
44	WarnThr	4	Float	A little endian floating point figure that represents Warning threshold used for Alarm.
48	Logger	1	Unsigned char	This parameter sets the rate of the logger as follows "0" 30 seconds "1" 1 minute "2" 2 minutes "3" 6 minutes "4" 15 minutes
49	reserved	1	Unsigned char	None
50	Naver	2	Unsigned int	This parameter represents the averaging time for Warning and Alarm threshold. It is expressed as 4 times the averaging time. For example a 6 min time is reported as 24
52	GPRS Appoint	2	Unsigned int	This parameter represents the scheduled time for connecting to GPRS of the day. It is expressed in minutes elapsed since midnight. For example the schedule 12:30 would be (12*60)+30 =750
54	GPRS Ton	1	Unsigned char	This parameter represents the time the time the GSM remains ON after a GPRS connections. It is expressed in quarter of hour.

55	GPRS Interval	1	Unsigned char	This parameter represents the interval between GPRS connections (starting from the first connection which is done at Appoint). It is expressed in hours.
56	Prxon	1	Unsigned char	This is the flag for connecting to GPRS upon alarms. If bit 0x01 is '1' and one or more unmasked alarm is set, a GPRS connection is done as it was for schedule. Note that bit 0x08, the GPRS Flag, Must always be ON.
57	Reserved	1	Unsigned char	None
58	SMS Sched	2	Unsigned int	This parameter represents the scheduled time for SMS schedule of the day. It is expressed in minutes elapsed since midnight. For example the schedule 12:30 would be (12*60)+30 =750
60	SMS Ton	1	Unsigned char	This parameter represents the time the time the GSM remains ON after a SMS connections . It is expressed in quarter of hour.
61	SMS Interval	1	Unsigned char	This parameter represents the interval between SMS connections (starting from the first connection which is done at Appoint). It is expressed in hours.
62	SMS Xon	1	Unsigned char	This is a double flag for sending a report and alarm on SMS. If bit 0x01 is '1' and one or more unmasked alarm is set, a "ALR" like SMS is sent to the number stored in the SMS telephone directory. If bit 0x02 is '1' a "RPT" like SMS is sent to the number stored in the SMS telephone directory.
63	Reserved	1	Unsigned char	Reserved
64	GPS Sched	2	Unsigned int	This parameter represents the scheduled time for GPS schedule of the day. It is expressed in minutes elapsed since midnight. For example the schedule 12:30 would be (12*60)+30=750
66	Reserved	1	Unsigned char	Reserved
67	GPS Interval	1	Unsigned char	This parameter represents the interval between GPS searches (starting from the first connection which is done at GPS Sched). It is expressed in hours.
68	GPS Active	1	Unsigned char	This parameter enables/disables GPS searches. When GPS Active = 0x02 the GPS activity is regulated by GPS sched. Instead, when GPS Active is 0 the GPS is OFF.
69	Reserved	1	Unsigned char	Reserved
70	Ethernet Sched	2	Unsigned int	This parameter represents the scheduled time for Ethernet schedule of the day. It is expressed in minutes elapsed since midnight. For example the schedule 11:08 would be (11*60)+8=668
72	Reserved	1	Unsigned char	Reserved
73	Ethernet Interval	1	Unsigned char	This parameter represents the interval between Ethernet connections (starting from the first connection which is done at Ethernet Sched). It is expressed in hours and it can be either 12 or 24.
74	Ethernet Sched Active	1	Unsigned char	This parameter enables/disables Ethernet Scheduling. When "Ethernet Schedule Active" = 0x02 the Ethernet activity is regulated by "Ethernet Sched". Instead, when "Ethernet Schedule Active" is 0 the GPS is OFF
75	Reserved	17	Unsigned char	Reserved

86	Status alarm	2	Unsigned int Being Bits this is **BIG endian**	The status of Alarm contains the alarm bit by bit where '1' means Alarm ON while '0' is Alarm OFF. Here is a list alarms. 0x0001 MAX threshold Field OUT. 0x0002 Warning threshold Field OUT. 0x0010 LOCK OUT. 0x0080 Low Battery Voltage OUT 0x0004 Probe OUT 0x0020 Temperature 0x0040 RH 0x0008 MAX threshold Field IN. 0x0100 Warning threshold Field IN. 0x0400 LOCK IN. 0x0800 Low Battery Voltage IN 0x0200 Probe IN
88	Temp	2	Int	This parameter shows the AMB-8059 Temperature. It is ten times the last measured temperature. Thus, in order to get actual temperature Temp should be dived by 10.
90	RH	2	Int	This parameter shows the AMB-8059 Relative Humidity. It is ten times the last measured Relative Humidity. Thus, in order to get actual Relative Humidity, RH should be divided by 10.
92	Battery	2	Int	This parameter shows the AMB-8059 current voltage. It is hundred times the last measured Battery Voltage. Thus, in order to get actual Battery Voltage, Battery should be divided by 100.
94	Reserved	98		None
192	NMEA GPS	64	Char	Last received NMEA RMC sentence (NMEA 0183 Rel. 3.01). This filed is the copy of NMEA RMC sentence without the "$GPRMC" preamble and without ending characters of checksum. For example the string: 053740.000,A,2503.6319,N,12136.0099,E,2.69,79.65,100106,,,A Should be considered as it was: $GPRMC,**053740.000,A,2503.6319,N,12136.0099,E,2.69,79.65,100106,,,A***53
256	Firmware	32	Char	The Fw name and version. This is a null terminated string
288	Probe	64	Char	A null terminated string which gives all probe relevant data. The Quad-band format is: Name:dd.MM.YY; unit: divider:range:minlevelWide:4:MinLevSubBand The string is the same it would get by the command **#F7?PRB*** See the **?PRB** for further information.
352	Reserved	160		None

7.6.9 Checksum algorithm

As previously mentioned, there a little endian 16 bit unsigned int which is called checksum. The checksum is intended for verifying the reliability of the array read mainly from the AMB-8059's side as a corrupt configuration could potentially make the AMB-8059 ineffectual.
Therefore the application must ensure that the checksum in the 8059.CFG file reflects the actual state of the configuration setting. Otherwise, if the checksum does not match the exact value, the new configuration will be ignored.

The Checksum is calculated as the sum of all the byte involved starting from a seed of 0xAAAA.
Then, from the result the modulo 0x10000 is then taken (which also means truncating the result to 4 bytes).

7.7 GPS on Multi-band EMF Area Monitor AMB-8059

The AMB-8059 has a built-in GPS which allows tracking its position. Data is reported in a NMEA RMC sentence according to NMEA 0183 ver 3.01.

Although the GPS circuitry is at the state-of-the-art to keep power consumption extremely low, in comparison to AMB-8059 average battery drawing, the required power is higher than the whole consumption, similar to the modem situation.
Therefore, the GPS should not be kept permanently on but instead it should be turned on only when necessary.

The AMB-8059 has an efficient way to use the GPS by turning it on when required and switching it off as soon as the position has been fixed (or when it has timed out).
In the following, there is a description on how the GPS works.

Whenever the station is switched on, the GPS is turned on as well allowing thus tracking the position at first installation. Once the fix is made, or the tracking has timed out, the GPS is turned off. After that, the information is available at any time via all ways (SMS, RS232, USB, FTP, Ethernet and MODEM-CSD).
Under normal conditions, this is sufficient to have the coordinates related to the station and covers the majority of installations.

In addition to that, there is a specific command, GOI, which forces the GPS ON. Again, the GPS will stay on until a fix is made or a time out occurs.
Optionally, by adding an 'F' to the command, becoming GOIF, when the GPS is off, it will also send an SMS to the numbers stored in the sms-directory having thus an immediate feedback.
This feature can be used for example when a station is prepared and closed in a lab and is only afterwards moved to its final location.

Moreover, there is the possibility to schedule GPS activity by means of specific settings.
These settings are independent of all other schedules, such as sms-schedule and GPRS/modem schedule, allowing consequently turning the GPS on at certain times every day regardless the modem activity.
Indeed, the ON hour can be specified in the whole 24 hour span and the interval between activities can be set in the range of 1 up to 24 hours.

As per the modem, it is suggested turning it on during daylight, i.e. around noon, when solar power is in excess.

All commands and settings are fully described in separated documents while GPS information is according to the standard RMC NMEA sentence NMEA 0183 rel. 3.01 compliant.

7.8 Download Description Area Monitor Broadband AMB-8059 for Single and three bands probes

This document describes the structure of a single or three bands probe record.

These records are created by either GPRS/ftp enabled (files D59) or "?FLD" command

7.8.1 Command mode

Sintax	Description
?FLD HH:mm,dd/MM;n	Request for **n** samples starting from Hour **HH** and minute **mm** of the day **dd** of the month **MM** of this year. In case MM is higher than current month, the referred year is the past one. For Example, the command **#BM ?FLD 13:00,01/08;60*** asks for 60 measures starting from 13:00 of the 1st of August This answer is a block of binary data

The block of bytes in replying to **?FLD HH:mm,GG/MM;n** command is as follows:
The block of bytes in replying to #BM **?FLD HH:mm,GG/MM;n** command is as follows:
A Header: made of #BM **FLD=***<CR><LF> (11 bytes)
A series of **32** bytes per sample as shown in the following table.
A final Checksum as described at the end of this document.

7.8.2 GPRS/ftp Mode

At GPRS schedule a file named HH_mm_dd_MM_yy_.D59 is created (see separate GPRS documentation).
This file contains 32 * **n** bytes (where n is the number of requested records).

Note
All figures in this document are BIG ENDIANNESS

7.8.3 Single and Three Bands Probes Structure description (Bands in red are present only for three band Probes)

Wide_avg		Wide_Peak		Reserved			
Hi Byte 1	Lo Byte 2	Hi Byte 3	Lo Byte 4	Byte 5	Byte 6	Byte 7	Byte 8

Battery	Temperature	Alarm	PERTS	MISC	DateTime		
Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16

L_B_Avg		L_B_Peak		H_B_Avg		H_B_Peak	
Hi Byte 17	Lo Byte 18	Hi Byte 19	Lo Byte 20	Hi Byte 21	Lo Byte 22	Hi Byte 23	Lo Byte 24

Reserved		Reserved		Reserved		Charge	RH
Byte 25	Byte 26	Byte 27	Byte 28	Byte 29	Byte 30	Byte 31	Byte 32

The 16 bit figure named **Wide_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Wide Avg Byte 1/2	**INFL** flag	15 bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval of field strength measured by the broadband channel. The figure should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). In the particular case in which the figure **Wide_Avg** is equal to **0xFFFF** then **Wide_Avg** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.

If, for example, 16 bit figure named **Wide Avg** is 0x0244 and the divider 100 then the **RMS** (or AVG) field strength value related to broadband channel will be 5.80 (0x0244 in decimal notation is 580).

Most significant bit (D15) INFL flag gives the information whether in the period the measurement was influenced (Bit High) or not (Bit Low) by external cable or MODEM activity. Therefore it is not part of field strength and has to be masked.
Indeed, this is just a flag which informs that the measure could have been influenced by the system itself.

Bit 15 is INFL flag which informs the user that the measurement could have been **influenced** by a sum of external issues such as GSM transmission, charging cable, USB cable & activity end Ethernet connection.
INFL flag is the OR of all single flags which refer to its own disturbing part (see **PERTs** byte).
Note that the presence of this flag informs the measurement can be heavily disturbed and thus could not be reliable at all.

The 16 bit figure named **Wide_ Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Wide Peak Byte 3/4	**RMS** flag	15 bit unsigned integer														

It is the **Peak** value , **Max value** detected in the stored interval, of field strength measured by the broadband channel. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) gives the information whether the average was quadratic RMS (Bit High) or arithmetic (Bit Low) and therefore it is not part of field strength and it should be masked.
In the particular case in which the figure **Wide_ Peak** is equal to **0xFFFF** then **Wide_ Peak** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.
If, for example, 16 bit figure named **Wide Peak** is 0x0244 and the divider 100 then the **PEAK** field strength value related to broadband channel will be 5.80 (0x0244 in decimal notation is 580).

Reserved Byte 5 / 6 / 7 / 8	Reserved

The figure named **Battery** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Battery Byte 9	8 bit unsigned integer (**Voltage**)							

It is the voltage of the 8059 battery. The number should be considered as an unsigned 8 bit integer. To get the correct value of the battery voltage the following formula is used: Volt = **Voltage * 0.0406**

If, for example, 8 bit figure named **Battery** is 0x6A (decimal 106) then the battery voltage will be 4.30V

The figure named **Temp** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Temp Byte 10	SPR FLAG	7 bit unsigned integer (**Temperature**)						

It is the Temperature recorded in the interval. The number should be considered as an unsigned 7 bit integer. In order to avoid negative figure an offset of 40 degrees centigrade is added thus, to get the correct value of the temperature, the following formula is used: T Centigrade = **Temp - 40.**
SPR Flag is a reserved one and should be masked (for example **Temp & 0x7F**).
If, for example, 8 bit figure named **Temp** is 0x3f (decimal 63) then the temperature will be 23°C

The figure named **ALARM** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
ALARM Byte 11	ABAT	ARH	ATMP	ALCK	Reserved	APRB	AWRN	AALR

It is the block of alarms recorded in the interval. Each bit should be considered individually as follows:

- ABAT When High it flags that the battery voltage was out of the safe limits.
- ARH When High it flags that the relative humidity is out of working range.
- ATMP When High it flags that the temperature was out of working range.
- ALCK When High it flags that the case was unlock.
- APRB When High it flags that a Probe failure was detected.
- AWRN When High it flags that the broadband field value overcame Warning threshold.
- AALR When High it flags that the broadband field value overcame Alarm threshold.

The figure named **PERTs** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
PERTs Byte 12	Reserved	Reserved	Reserved	TXON	Reserved	USB	CHG	ETH

It is the block of every single perturbing occurrence recorded in the interval. Each bit should be considered individually as follows:

- TXON When High it flags that RF Modem was ON during sampling.
- USB When High it flags that the USB connection was ON during sampling.
- CHG When High it flags that the external Charger was connected by cable during sampling.
- ETH When High it flags that the Ethernet connection was ON during sampling.

Note that the presence of one of the above flags indicates that the record has been perturbed by external influence and the result, in the best case, could be unreliable.

The 16 bit figure named **MISC** is shown as follows:

				BND1	BND0	AVP3	AVP2	AVP1	AVP0	M6	M5	M4	M3	M2	M1	M0
MISC Byte 13/14	**Reserved**			NOB		**AVGPeriod** 4 bit unsigned integer				**MONTHS** 7 bit unsigned integer						

This figure (**MISC)** should be considered as four different data as follows:

- Reserved. Three Most significant bits are reserved
- **NOB** is a 2 bit unsigned integer which informs how many bands are present in the record.
- **AVGPeriod** is a 4 bit unsigned integer which shows the interval (expressed in minute) related to the time span used to get the average (RMS or AVG).
- **MONTHS** is a 7 bit unsigned integer which indicates how many months have been elapsed since 1st January 2014. Being the range limited to 127 the overlapping period is more than 10 years.

If, for example, **MISC** is **0x0083** then the meaning will be:

- AVGPeriod=1 (1 minute). Indeed (**0x0083 >> 7) & 0xF = 0x01**
- MONTHS =3 (April 2014). Indeed **0x0083 & 0x7F = 0x03**

The 16 bit figure named **DateTime** is shown as follows:

	MI15	MI14	MI13	MI12	MI11	MI10	MI9	MI8	MI7	MI6	MI5	MI4	MI3	MI2	MI1	MI0
DateTime Byte 15/16	**DateTime**															

DateTime should be considered as a big-endian unsigned 16 bit integer and indicates how many minutes have been elapsed since the beginning of the current month (previous MONTHS data).
If, for example, **DateTime** is 0x95AE (decimal 38318) then the record will be related to the 27th of the month at 14:38.
Indeed :

Day = 1 +Int(**DateTime** / 1440) = 1 +Int (38318 / 1440) = 27
Hour = Int((**DateTime** Mod (1440)) / 60) = Int ((38318 Mod (1440)) / 60) = 14
Minute = (**DateTime** Mod (1440)) Mod 60)= (38318 Mod (1440)) Mod 60) = 38

Merging the data with MONTHS we can get the full date of acquisition which is 14:38 27/04/2014

The 16 bit figure named **L_B_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
L_B_Avg Byte 17 / 18	Reserved	15 Bit unsigned integer														

Significant only when NOB=3.
L_B_Avg is the value, **RMS** or **AVG** averaged in the stored interval, of field strength measured by Low Band. The number should be considered a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.
In the particular case in which the figure **L_B_Avg** is equal to **0xFFFF** then **L_B_Avg** value must be considered invalid.
If, for example, 16 bit figure named **L_B_Avg** is 0x0244 and the divider 100 then the **RMS** (or AVG) field strength value related to channel tuned at L_B MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **L_B_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
L_B_Peak Byte 19 / 20	Reserved	15 Bit unsigned integer														

Significant only when NOB=3.
L_B_Peak is the **Peak** value, **Max value** detected in the stored interval, of field strength measured by the channel tuned at L_B MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.
In the particular case in which the figure **L_B_Peak** is equal to **0xFFFF** then **L_B_Peak** value must be considered invalid.
If, for example, 16 bit figure named **L_B_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at L_B MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **B_H_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
B_H_Avg Byte 21 / 22	Reserved	15 Bit unsigned integer														

Significant only when NOB=3.
B_H_Avg is the value, **RMS** or **AVG** averaged in the stored interval, of field strength measured by the channel tuned at **B_H** MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.
In the particular case in which the figure **B_H_Avg** is equal to **0xFFFF** then **B_H_Avg** value must be considered invalid.
If, for example, 16 bit figure named **B_H_Avg** is 0x0244 and the divider 100 then the **RMS** (or AVG) field strength value related to channel tuned at B_H MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **B_H_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
B_H_Peak Byte 22 / 23	Reserved	15 Bit unsigned integer														

Significant only when NOB=3.
B_H_Peak is the **Peak** value , **Max value** detected in the stored interval, of field strength measured by the channel tuned at B_H MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.
In the particular case in which the figure **B_H_Peak** is equal to **0xFFFF** then **B_H_Peak** value must be considered invalid.
If, for example, 16 bit figure named **B_H_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at B_H MHz will be 5.80 (0x0244 in decimal notation is 580).

Reserved Byte 25 / 30	Reserved

The figure named **Charging** is shown as follows:

Charging	D07	D06	D05	D04	D03	D02	D01	D00
Byte 31	8 bit unsigned integer							

This value represents the charging. The number should be considered as an unsigned 8 bit integer.
To get the value in mA the following formula should be used:
Current (mA)= **Charging** * 4

If, for example, 8 bit figure named **RH** is 0x20 (decimal 32) then the charging current would be 128mA

The figure named **RH** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
RH Byte 32	8 bit unsigned integer (**RH**)							

This value is the relative Humidity and is expressed in percent . The number should be considered as an unsigned 8 bit integer. It

If, for example, 8 bit figure named **RH** is 0x32 (decimal 50) then the value of RH would be 50%

These 32 bytes above described constitute the block containing all record data related to the interval. Therefore the number of block sent are as many as the required sample (asked by **n** parameter) by the command:**?FLD HH:mm,dd/MM;n** or, when GPRS/ftp enabled, through the file 8059FLD.TXT (see separate GPRS documentation).

Then, according the mode used, either command or ftp, the behavior is as follows:

Command query (**?FLD HH:mm,dd/MM;n**).

As soon as all records have been sent an additional byte (8 bit) is appended. This additional character represents the checksum of the just sent packet. This checksum is calculated summing up all received bytes and making then modulo 256. This can be helpful for checking the transmission correctness.
Hence, expected size of reply can be easily calculated as follows:
Len = **11 + n*32 + 1** . Indeed, 11 bytes are for the header ("#BM FLD=*\r\n"), 32 bytes for each sample plus 1 byte of checksum.

As the monitor station, when sending data, suspends all other tasks (sending data gets highest priority) storing included, it is preferable asking not many data at once so that the 8059 is not engaged, for say, for more than 10 seconds. Therefore, when having a lot of data to retrieve, it is better to split up into consecutive smaller requests instead of asking the whole block so that the 8059 can service its own tasks in between them. On the other hand, the overall transmission time will not be significantly influenced as few millisecond are needed for sending a new command.

GPRS/ftp mode (8059FLD.TXT file).

At GPRS schedule a file named HH_mm_dd_MM_yy_.D59 is created (see separate GPRS documentation).
This file contains 32 * **n** bytes (where n is the parameter present in the file content (FLD HH:mm;dd/MM/yy;**n**)

7.9 Download Description Multi-band EMF Area Monitor AMB-8059 for 4-Bands Probes

This section describes the structure of a 4-bands probe record.
These records are created by either GPRS/ftp enabled (files D59) or "?FLD" command.

7.9.1 Command mode

Sintax	Description
?FLD HH:mm,dd/MM;n	Request for n samples starting from Hour HH and minute mm of the day dd of the month MM of this year. In case MM is higher than current month, the referred year is the past one. For Example, the command **#BM ?FLD 13:00,01/08;60*** asks for 60 measures starting from 13:00 of the 1st of August This answer is a block of binary data

The block of bytes in replying to **?FLD HH:mm,GG/MM;n** command is as follows:

The block of bytes in replying to #BM **?FLD HH:mm,GG/MM;n** command is as follows:

A Header: made of #BM **FLD=*<**CR><LF> (11 bytes)
A series of **32** bytes per sample as shown in the following table.
A final Checksum as described at the end of this document.

7.9.2 GPRS/ftp Mode

At GPRS schedule a file named HH_mm_dd_MM_yy_.D59 is created (see §3.6 GPRS on Multi-band EMF Area Monitor AMB-8059).
This file contains 32 * **n** bytes (where n is the number of requested records).

Note
All figures in this document are BIG ENDIANNESS

7.9.3 4-Bands Probes Structure description

Wide_avg		**Wide_Peak**		**Reserved**			
Hi Byte 1	Lo Byte 2	Hi Byte 3	Lo Byte 4	Byte 5	Byte 6	Byte 7	Byte 8

Battery	**Temperature**	**Alarm**	**PERTS**	**MISC**	**DateTime**		
Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16

2140_Avg		**2140_Peak**		**1842_Avg**		**1842_Peak**	
Hi Byte 17	Lo Byte 18	Hi Byte 19	Lo Byte 20	Hi Byte 21	Lo Byte 22	Hi Byte 23	Lo Byte 24

942_avg		**942_Peak**		**Reserved**		**Charge**	**RH**
Hi Byte 25	Lo Byte 26	Hi Byte 27	Lo Byte 28	Byte 29	Byte 30	Byte 31	Byte 32

The 16 bit figure named **Wide_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Wide Avg Byte 1/2	**INFL** flag	15 bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval of field strength measured by the broadband channel. The figure should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). In the particular case in which the figure **Wide_Avg** is equal to **0xFFFF** then **Wide_Avg** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.
If, for example, 16 bit figure named **Wide Avg** is 0x0244 and the divider 100 then the **RMS** (or AVG) field strength value related to broadband channel will be 5.80 (0x0244 in decimal notation is 580).

Most significant bit (D15) INFL flag gives the information whether in the period the measurement was influenced (Bit High) or not (Bit Low) by external cable or MODEM activity. Therefore it is not part of field strength and has to be masked.
Indeed, this is just a flag which informs that the measure could have been influenced by the system itself.

Bit 15 is **INFL** flag which informs the user that the measurement could have been **influenced** by a sum of external issues such as GSM transmission, charging cable, USB cable & activity end Ethernet connection.
INFL flag is the OR of all single flags which refer to its own disturbing part (see **PERTs** byte).
Note that the presence of this flag informs the measurement can be heavily disturbed and thus could not be reliable at all.

The 16 bit figure named **Wide_ Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
Wide Peak Byte 3/4	**RMS** flag	15 bit unsigned integer														

It is the **Peak** value , **Max value** detected in the stored interval, of field strength measured by the broadband channel. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) gives the information whether the average was quadratic RMS (Bit High) or arithmetic (Bit Low) and therefore it is not part of field strength and it should be masked.
In the particular case in which the figure **Wide_ Peak** is equal to **0xFFFF** then **Wide_ Peak** value must be considered invalid (8059 was not able to get a measure) and all the data (all 32 bytes) are meaningless.
If, for example, 16 bit figure named **Wide Peak** is 0x0244 and the divider 100 then the **PEAK** field strength value related to broadband channel will be 5.80 (0x0244 in decimal notation is 580).

Reserved Byte 5 / 6 / 7 / 8	Reserved

The figure named **Battery** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Battery Byte 9	8 bit unsigned integer (**Voltage**)							

It is the voltage of the 8059 battery. The number should be considered as an unsigned 8 bit integer. To get the correct value of the battery voltage the following formula is used: **Volt = Voltage * 0.0406**

If, for example, 8 bit figure named **Battery** is 0x6A (decimal 106) then the battery voltage will be 4.30V

The figure named **Temp** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
Temp Byte 10	SPR FLAG	7 bit unsigned integer (**Temperature**)						

It is the Temperature recorded in the interval. The number should be considered as an unsigned 7 bit integer. In order to avoid negative figure an offset of 40 degrees centigrade is added thus, to get the correct value of the temperature, the following formula is used: T Centigrade = **Temp - 40.**
SPR Flag is a reserved one and should be masked (for example **Temp & 0x7F**).
If, for example, 8 bit figure named **Temp** is 0x3f (decimal 63) then the temperature will be 23°C

The figure named **ALARM** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
ALARM Byte 11	ABAT	ARH	ATMP	ALCK	Reserved	APRB	AWRN	AALR

It is the block of alarms recorded in the interval. Each bit should be considered individually as follows:

- ABAT When High it flags that the battery voltage was out of the safe limits.
- ARH When High it flags that the relative humidity is out of working range.
- ATMP When High it flags that the temperature was out of working range.
- ALCK When High it flags that the case was unlock.
- APRB When High it flags that a Probe failure was detected.
- AWRN When High it flags that the broadband field value overcame Warning threshold.
- AALR When High it flags that the broadband field value overcame Alarm threshold.

The figure named **PERTs** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
PERTs Byte 12	Reserved	Reserved	Reserved	TXON	Reserved	USB	CHG	ETH

It is the block of every single perturbing occurrence recorded in the interval. Each bit should be considered individually as follows:

- TXON When High it flags that RF Modem was ON during sampling.
- USB When High it flags that the USB connection was ON during sampling.
- CHG When High it flags that the external Charger was connected by cable during sampling.
- ETH When High it flags that the Ethernet connection was ON during sampling.

Note that the presence of one of the above flags indicates that the record has been perturbed by external influence and the result, in the best case, could be unreliable.

The 16 bit figure named **MISC** is shown as follows:

						AVP3	AVP2	AVP	AVP0	M6	M5	M4	M3	M2	M1	M0
MISC Byte 13/14	**Reserved**					**AVGPeriod** 4 bit unsigned integer				**MONTHS** 7 bit unsigned integer						

This figure (**MISC)** should be considered as three different data as follows:

- **AVGPeriod** is a 4 bit unsigned integer which shows the interval (expressed in minute) related to the time span used to get the average (RMS or AVG).
- **MONTHS** is a 7 bit unsigned integer which indicates how many months have been elapsed since 1st January 2014. Being the range limited to 127 the overlapping period is more than 10 years.

If, for example, **MISC** is **0x0083** then the meaning will be:

- AVGPeriod=1 (1 minute). Indeed (**0x0083 >> 7) & 0xF = 0x01**
- MONTHS =3 (April 2014). Indeed **0x0083 & 0x7F = 0x03**

The 16 bit figure named **DateTime** is shown as follows:

	MI15	MI14	MI13	MI12	MI11	MI10	MI9	MI8	MI7	MI6	MI5	MI4	MI3	MI2	MI1	MI0
Date Time Byte 15/16	**DateTime**															

DateTime should be considered as a big-endian unsigned 16 bit integer and indicates how many minutes have been elapsed since the beginning of the current month (previous MONTHS data).
If, for example, **DateTime** is 0x95AE (decimal 38318) then the record will be related to the 27th of the month at 14:38.
Indeed :
Day = 1 +Int(**DateTime** / 1440) = 1 +Int (38318 / 1440) = 27
Hour = Int((**DateTime** Mod (1440)) / 60) = Int ((38318 Mod (1440)) / 60) = 14
Minute = (**DateTime** Mod (1440)) Mod 60)= (38318 Mod (1440)) Mod 60) = 38

Merging the data with MONTHS we can get the full date of acquisition which is 14:38 27/04/2014

The 16 bit figure named **2140_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
2140_Avg Byte 17 / 18	Reserved	15 Bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval, of field strength measured by the channel tuned at 2140 MHz. The number should be considered a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.
In the particular case in which the figure **2140_Avg** is equal to **0xFFFF** then **2140_Avg** value must be considered invalid.
If, for example, 16 bit figure named **2140_Avg** is 0x0244 and the divider 100 then the **RMS** (or AVG) field strength value related to channel tuned at 2140 MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **2140_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
2140_Peak Byte 19 / 20	Reserved	15 Bit unsigned integer														

It is the **Peak** value, **Max value** detected in the stored interval, of field strength measured by the channel tuned at 2140 MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.
In the particular case in which the figure **2140_Peak** is equal to **0xFFFF** then **2140_Peak** value must be considered invalid.
If, for example, 16 bit figure named **2140_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at 2140 MHz will be 5.80 (0x0244 in decimal notation is 580).

If, for example, 16 bit figure named **2140_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at 2140 MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **1842_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
1842_Avg Byte 21 / 22	Reserved	15 Bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval, of field strength measured by the channel tuned at **1842** MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.
In the particular case in which the figure **1842_Avg** is equal to **0xFFFF** then **1842_Avg** value must be considered invalid.
If, for example, 16 bit figure named **1842_Avg** is 0x0244 and the divider 100 then the **RMS** (or AVG) field strength value related to channel tuned at 1842 MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **1842_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
1842_Peak Byte 22 / 23	Reserved	15 Bit unsigned integer														

It is the **Peak** value , **Max value** detected in the stored interval, of field strength measured by the channel tuned at 1842 MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.
In the particular case in which the figure **1842_Peak** is equal to **0xFFFF** then **1842_Peak** value must be considered invalid.
If, for example, 16 bit figure named **1842_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at 1842 MHz will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **942_Avg** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
942_Avg Byte 24 / 25	Reserved	15 Bit unsigned integer														

It is the value, **RMS** or **AVG** averaged in the stored interval , of field strength measured by the channel tuned at 942 MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.
In the particular case in which the figure **942_Avg** is equal to **0xFFFF** then **942_Avg** value must be considered invalid.
If, for example, 16 bit figure named **942_Avg** is 0x0244 and the divider 100 then the **RMS** (or AVG) field strength value related to channel tuned at 2140 942 will be 5.80 (0x0244 in decimal notation is 580).

The 16 bit figure named **942_Peak** is shown as follows:

	D15	D14	D13	D12	D11	D10	D09	D08	D07	D06	D05	D04	D03	D02	D01	D00
942_Peak Byte 26 / 27	Reserved	15 Bit unsigned integer														

It is the **Peak** value , **Max value** detected in the stored interval, of field strength measured by the channel tuned at 942 MHz. The number should be considered as a big-endian unsigned 15 bit integer multiplied by the typical probe divider (see dedicated **?PRB** command). Most significant bit (D15) is not part of the data and should be masked.
In the particular case in which the figure **942_Peak** is equal to **0xFFFF** then **942_Peak** value must be considered invalid.
If, for example, 16 bit figure named **942_Peak** is 0x0244 and the divider 100 then the **Maximum** field strength value related to channel tuned at 942 MHz will be 5.80 (0x0244 in decimal notation is 580).

Reserved Byte 28 / 29	Reserved

The figure named **Charging** is shown as follows:

Charging	D07	D06	D05	D04	D03	D02	D01	D00
Byte 31	8 bit unsigned integer							

This value represents the charging. The number should be considered as an unsigned 8 bit integer.
To get the value in mA the following formula should be used:
Current (mA)= **Charging** * 4

If, for example, 8 bit figure named **RH** is 0x20 (decimal 32) then the charging current would be 128mA

The figure named **RH** is shown as follows:

	D07	D06	D05	D04	D03	D02	D01	D00
RH Byte 32	8 bit unsigned integer (**RH**)							

This value is the relative Humidity and is expressed in percent . The number should be considered as an unsigned 8 bit integer. It

If, for example, 8 bit figure named **RH** is 0x32 (decimal 50) then the value of RH would be 50%

These 32 bytes above described constitute the block containing all record data related to the interval. Therefore the number of block sent are as many as the required sample (asked by **n** parameter) by the command:**?FLD HH:mm,dd/MM;n** or, when GPRS/ftp enabled, through the file 8059FLD.TXT (see separate GPRS documentation).

Then, according the mode used, either command or ftp, the behavior is as follows:

Command query (**?FLD HH:mm,dd/MM;n**).

As soon as all records have been sent an additional byte (8 bit) is appended. This additional character represents the checksum of the just sent packet. This checksum is calculated summing up all received bytes and making then modulo 256. This can be helpful for checking the transmission correctness.
Hence, expected size of reply can be easily calculated as follows:
Len = **11 + n*32 + 1** . Indeed, 11 bytes are for the header ("#BM FLD=*\r\n"), 32 bytes for each sample plus 1 byte of checksum.

As the monitor station, when sending data, suspends all other tasks (sending data gets highest priority) storing included, it is preferable asking not many data at once so that the 8059 is not engaged, for say, for more than 10 seconds. Therefore, when having a lot of data to retrieve, it is better to split up into consecutive smaller requests instead of asking the whole block so that the 8059 can service its own tasks in between them. On the other hand, the overall transmission time will not be significantly influenced as few millisecond are needed for sending a new command.

GPRS/ftp mode (8059FLD.TXT file).

At GPRS schedule a file named HH_mm_dd_MM_yy_.D59 is created (see separate GPRS documentation).
This file contains 32 * **n** bytes (where n is the parameter present in the file content (FLD HH:mm;dd/MM/yy;**n**)

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8 - Accessories

8.1 Introduction

This chapter provides the necessary information for installation and use of the Accessories of the AMB-8059 Multi-band EMF Area Monitor.
It also includes information regarding the initial inspection, power requirements, connections, working environment, assembly, cleaning, storage and shipment.

8.2 Initial inspection

Check the package for any damages.

WARNING

If the packing materials or protective materials are damaged, check the equipment and make sure it is complete with all parts and intact, without any mechanical or electrical damage.
Check the accessories with reference to the packing list enclosed with the device.
Report any damages at once to the shipping company and to NARDA.

8.3 Working environment

The working environment for the accessories, unless specified otherwise, must be in the following ranges:

- Temperature from -10°C to +55°C
- Relative humidity (without condensation) ≤ 93%

The accessories should be stored in a clean, dry place free of acids, dusts and humidity.

The storage environment must be in the following ranges:

- Temperature from -25°C to + 70°C
- Relative humidity (without condensation) < 99% relative

8.4 Returning for repair

Any part of the instrument – with the sole exception of the battery of AMB-8059/00 and AMB-8059/02 – can only be replaced by NARDA, therefore, in case of damage to parts and/or malfunctions, contact the NARDA service center.
When the instrument has to be returned to NARDA for repair, the User is kindly requested to fill out the questionnaire enclosed with this User's Manual and write all the required service information and a full description of the malfunction, to enable NARDA to repair the device in the shortest possible time.
To reduce the time necessary for the repair, be as specific as possible in describing the malfunction. If the problem only occurs under specific conditions, detail in the best possible way how to reproduce these conditions.
Whenever possible, use the original packing when returning items, and make sure to wrap the device in heavy paper or plastic.
If the original package material is no longer available, use a sturdy card box and a sufficient quantity of impact absorbing material all around the equipment to provide a tight fit and prevent its moving inside the packing.
In particular, take every precaution to protect the solar panels.
Seal the packing securely and write FRAGILE on the container to encourage better care in handling.

8.5 Cleaning

Use a clean, dry, soft cloth to clean the instruments.

WARNING

Do not use solvents, acids, turpentine, acetone or similar products to clean the instruments to prevent damages.

8.6 *Battery charger (AMB-8059/01 and AMB-8059/03 only)*

8.6.1 Recharging the batteries of stations equipped with solar panel

AMB-8059/01 and AMB-8059/03 Multi-band EMF Area Monitor are equipped with an autonomous power unit and are powered jointly by a rechargeable internal battery and directly by solar panels. The unit can also be connected to an additional battery charger.

If, for example, the Field Monitor is used indoor for a prolonged period and there is no direct sunlight illumination, the internal battery could run down and undergo damage. In this case it is advisable to recharge the battery using the battery charger before switching on again the unit.

To charge the battery connect the USB Cable - USB(A)/USB(B) between the USB port of the Solar module and the USB port of the battery charger; plug the battery charger to the mains supply.

NOTE **Use of the battery charger is not recommended during measurement, as it may introduce noises that could noticeably affect the readings.**

The battery charger must be used with a mains frequency of 50/60 Hz and voltage of 100-240V.

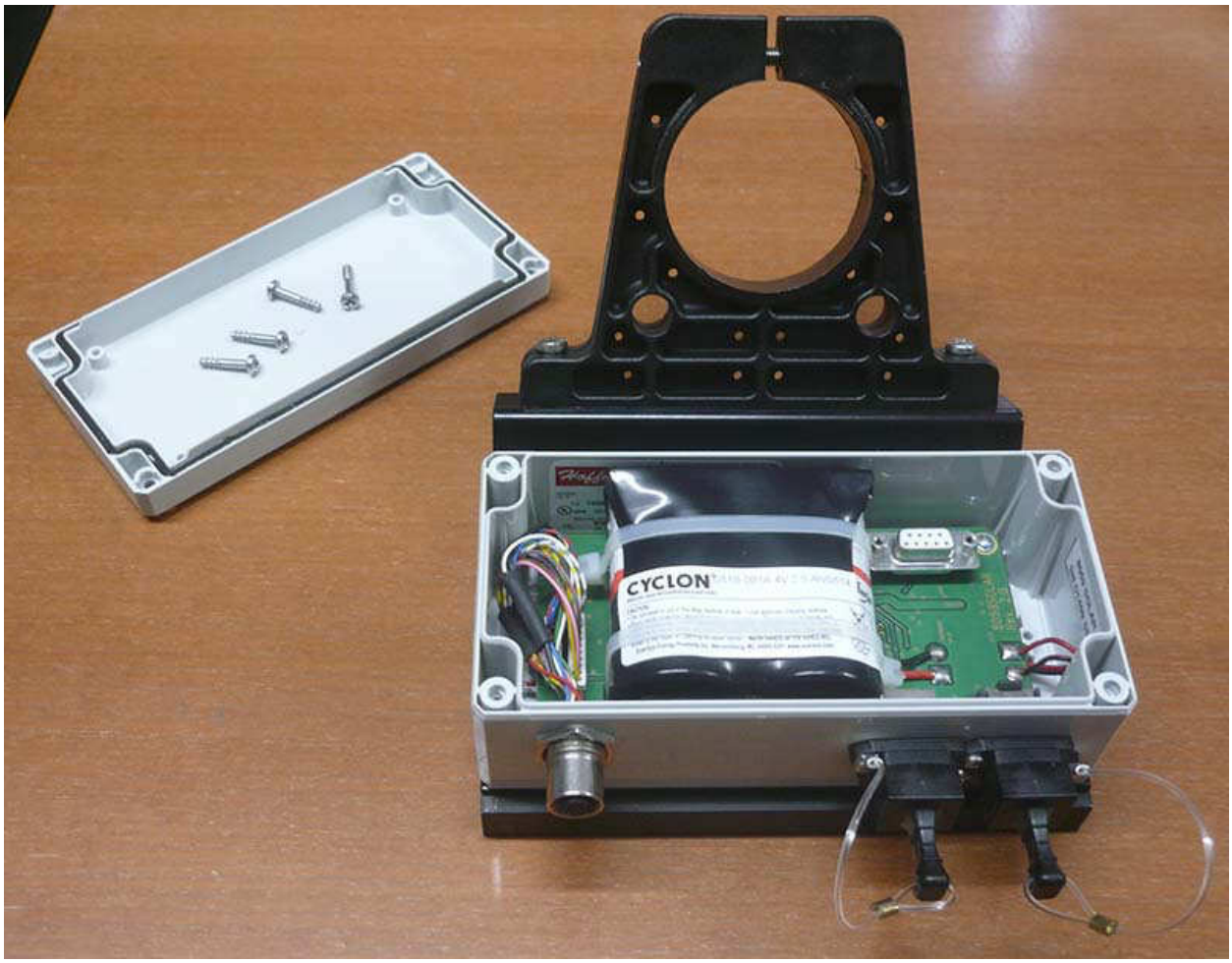
NOTE **Use only the battery charger supplied, which provides 5V DC, 1A max.**

It takes about 24 hours to perform a complete battery recharge.

NOTE **When recharging, the Data-Supply connector shall be connected.**

NOTE

Before installing the field monitor outdoors, make sure the cover on the Solar Module is securely closed, in order to prevent any moisture from penetrating the unit.



8.7 *8059-MAST Supporting pole*

8.7.1 Installation of the AMB-8059 on the mast

NARDA recommends to install all NARDA Field Monitoring Stations on the special mast that rests on a sturdy metal base.

Fig. 8-1
AMB-8059/00
AMB-8059/02
on its mast
without joint

Fig. 8-2
AMB-8059/00
AMB-8059/02
on its mast
with swivel joint

Fig. 8-3
AMB-8059/01
AMB-8059/03
on its mast
without joint

Fig. 8-4
AMB-8059/01
AMB-8059/03
on its mast
with swivel joint

TABLE 8-1 8059-MAST Supporting pole Technical Specifications

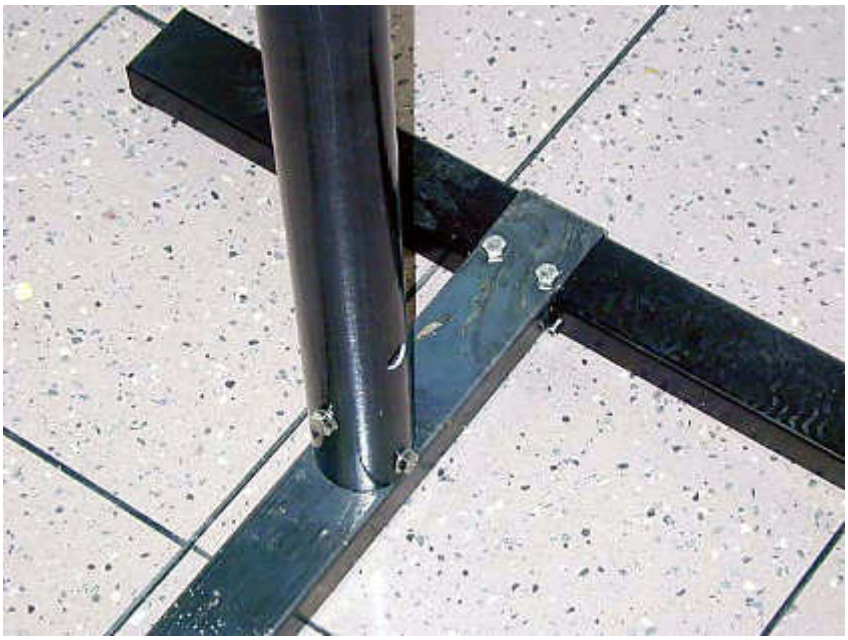
Base material	Varnished iron
Mast material	Fiberglass
Dimensions	(WxDxH) 600 x 600 x 2000 mm
Exterior mast diameter	60mm
Total weight	
AMB-8059/00 and AMB-8059/02	approx. 5,5 kg (with field monitoring station)
AMB-8059/00 and AMB-8059/02 with swivel joint	approx. 6,5 kg (with field monitoring station)
AMB-8059/01 and AMB-8059/03	approx. 6,6 kg (with field monitoring station)
AMB-8059/01 and AMB-8059/03 with swivel joint	approx. 7,7 kg (with field monitoring station)

8.7.1.1 Metal base

First, assemble the “T” base with the two screws supplied, then position the base where it will be installed, making sure it is leveled to ensure stability.

8.7.1.2 Mast

The mast fits inside the pipe stub at the center of the base. Match the holes on the pole with those on the stub and fasten with the four 8MAx20mm bolts as shown in the figure below.



The 8059-MAST kit is complete with the tools necessary for installation (13 mm hexagonal wrench and bolts).

8.7.1.3 Bags

The Field Monitor is usually installed outdoors where atmospheric agents, especially strong winds, can endanger its stability.

To ensure the necessary stability under the worst possible conditions, the unit is supplied with three ballast bags that can be filled with water or sand and fastened to the base of the mast as shown in the following examples.

Fasten the ballast bags to the mast using the plastic straps.

The hook at the top of the mast serves for fastening the nylon wind strays supplied with the kit.

8.8 Installation of the field monitor on the mast.

See the following instructions to install the field monitor on the mast **for indoor use only**.

8.8.1 Indoor use

- Loose the central screw;
- Unscrew and remove the two fastening screws from the swivel joint;

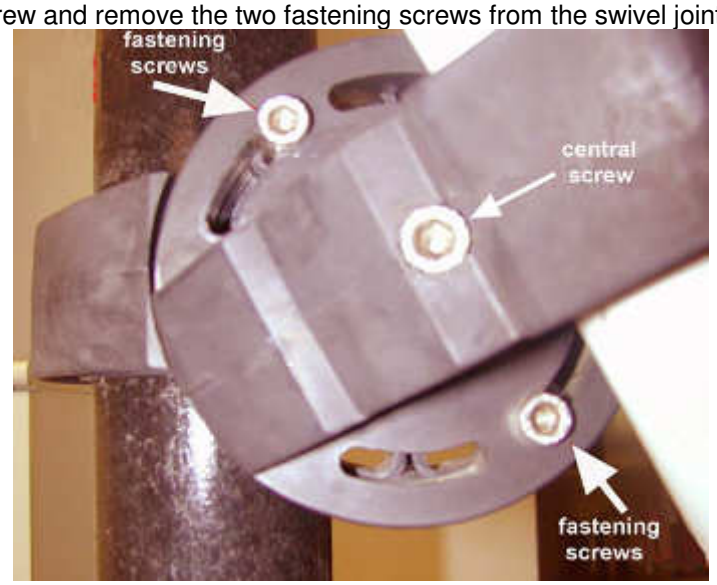


Fig. 8-5 Swivel joint

- Turn the field monitor to the desired position;

- Fasten the central screw;

- Replace and fasten the two screws in the joint slots;

Fig. 8-6 Horizontal position of AMB-8059/02

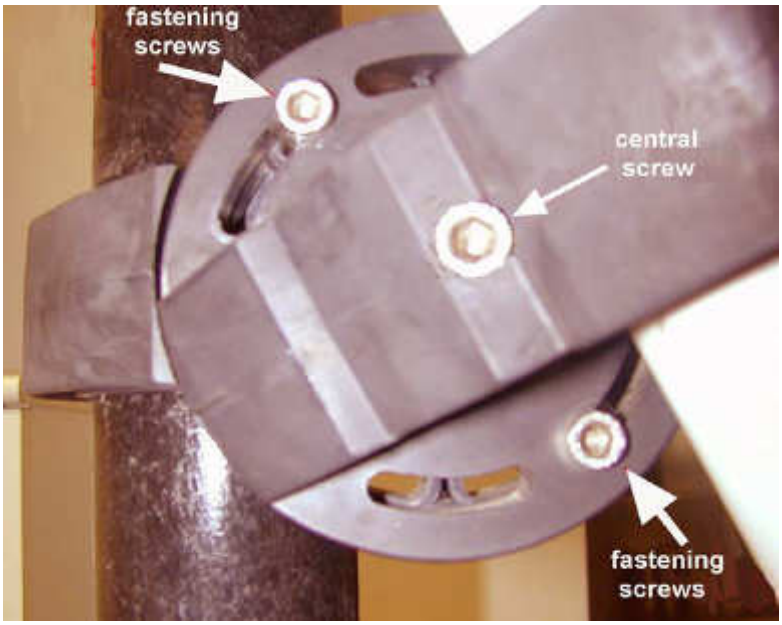
Fig. 8-7 Horizontal position of AMB-8059/03

NOTE

You can turn the field monitor in any angle when using it indoor.

8.8.2 Outdoor use

- Loosen the central screw.
- Loosen the two fastening screws without removing them from the plate slots.



NOTE

During the outdoor use, the two screws limit the range of rotation. (about 30 degree from the mast).

- Turn the field monitor to the desired position.

- Fasten the central screw.

- Fasten the two screws in the plate slots.

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9 – Action of the wind on the AMB-8059

9.1 Introduction

This section provides the information necessary to install and use the Multi-band EMF Area Monitor AMB-8059 in the presence of wind.
The Field Monitor is usually installed outdoors where the strong winds can endanger its stability that depends on the weight and eventual ballast bags or nylon wind strays.
Depending on the AMB-8059 models and wind speed, it is possible to calculate the weight of the ballast bags through the tables below to guarantee the stability of the apparatus.

WARNING

It is necessary to calculate the speed and pressure of the wind in the place of installation; through the table it is possible to determine if it is necessary to use the ballast bags with their full weight or to fasten the nylon wind strays

The models of the AMB-8059 are:
- AMB-8059/00 and AMB-8059/02 without swivel joint;
- AMB-8059/00 and AMB-8059/02 with swivel joint;
- AMB-8059/01 and AMB-8059/03 without swivel joint;
- AMB-8059/01 and AMB-8059/03 with swivel joint.

AMB-8059/00
AMB-8059/02
(without swivel joint)

AMB-8059/00
AMB-8059/02
(with swivel joint)

AMB-8059/01
AMB-8059/03
(without swivel joint)

AMB-8059/01
AMB-8059/03
(with swivel joint)

9.2 AMB-8059/00 AMB-8059/02 without joint

Table 9-1 Wind resistance of the AMB-8059/00 and AMB-8059/02 without swivel joint

Wind speed [km/h]	Wind speed [m/s]	Aerodynamic form	Air density [N/mc]	Wind pressure [N/m^2]	Overturning moment [Nm]	Stabilizing moment [Nm]	Weight ballast [N]	NOTE
3,60	1,00	1,20	1,25	0,75	0,13	0,19	-54,06	Ballast bags not necessary
7,20	2,00	1,20	1,25	3,00	0,50	0,75	-51,23	
10,80	3,00	1,20	1,25	6,75	1,13	1,70	-46,51	
14,40	4,00	1,20	1,25	12,00	2,01	3,02	-39,90	
18,00	5,00	1,20	1,25	18,75	3,15	4,72	-31,41	
21,60	6,00	1,20	1,25	27,00	4,53	6,79	-21,03	
25,20	7,00	1,20	1,25	36,75	6,16	9,25	-8,77	
28,80	8,00	1,20	1,25	48,00	8,05	12,08	5,39	Ballast bags filled with water
32,40	9,00	1,20	1,25	60,75	10,19	15,29	21,43	
36,00	10,00	1,20	1,25	75,00	12,58	18,87	39,35	
39,60	11,00	1,20	1,25	90,75	15,22	22,83	59,17	
43,20	12,00	1,20	1,25	108,00	18,12	27,17	80,87	
46,80	13,00	1,20	1,25	126,75	21,26	31,89	104,46	
50,40	14,00	1,20	1,25	147,00	24,66	36,99	129,94	
54,00	15,00	1,20	1,25	168,75	28,31	42,46	157,30	
57,60	16,00	1,20	1,25	192,00	32,21	48,31	186,55	
61,20	17,00	1,20	1,25	216,75	36,36	54,54	217,69	
64,80	18,00	1,20	1,25	243,00	40,76	61,14	250,71	
68,40	19,00	1,20	1,25	270,75	45,42	68,12	285,62	
72,00	20,00	1,20	1,25	300,00	50,32	75,48	322,42	
75,60	21,00	1,20	1,25	330,75	55,48	83,22	361,10	
79,20	22,00	1,20	1,25	363,00	60,89	91,34	401,68	
82,80	23,00	1,20	1,25	396,75	66,55	99,83	444,14	Ballast bags filled with sand
86,40	24,00	1,20	1,25	432,00	72,46	108,70	488,48	
90,00	25,00	1,20	1,25	468,75	78,63	117,94	534,72	
93,60	26,00	1,20	1,25	507,00	85,05	127,57	582,84	
97,20	27,00	1,20	1,25	546,75	91,71	137,57	632,85	
100,80	28,00	1,20	1,25	588,00	98,63	147,95	684,74	
104,40	29,00	1,20	1,25	630,75	105,80	158,70	738,52	Fastening the nylon wind strays
108,00	30,00	1,20	1,25	675,00	113,23	169,84	794,19	
111,60	31,00	1,20	1,25	720,75	120,90	181,35	851,75	
115,20	32,00	1,20	1,25	768,00	128,83	193,24	911,19	
118,80	33,00	1,20	1,25	816,75	137,00	205,50	972,52	
126,00	35,00	1,20	1,25	918,75	154,11	231,17	1100,85	
129,60	36,00	1,20	1,25	972,00	163,05	244,57	1167,84	
133,20	37,00	1,20	1,25	1026,75	172,23	258,34	1236,72	
136,80	38,00	1,20	1,25	1083,00	181,66	272,50	1307,48	
140,40	39,00	1,20	1,25	1140,75	191,35	287,03	1380,14	
144,00	40,00	1,20	1,25	1200,00	201,29	301,94	1454,68	

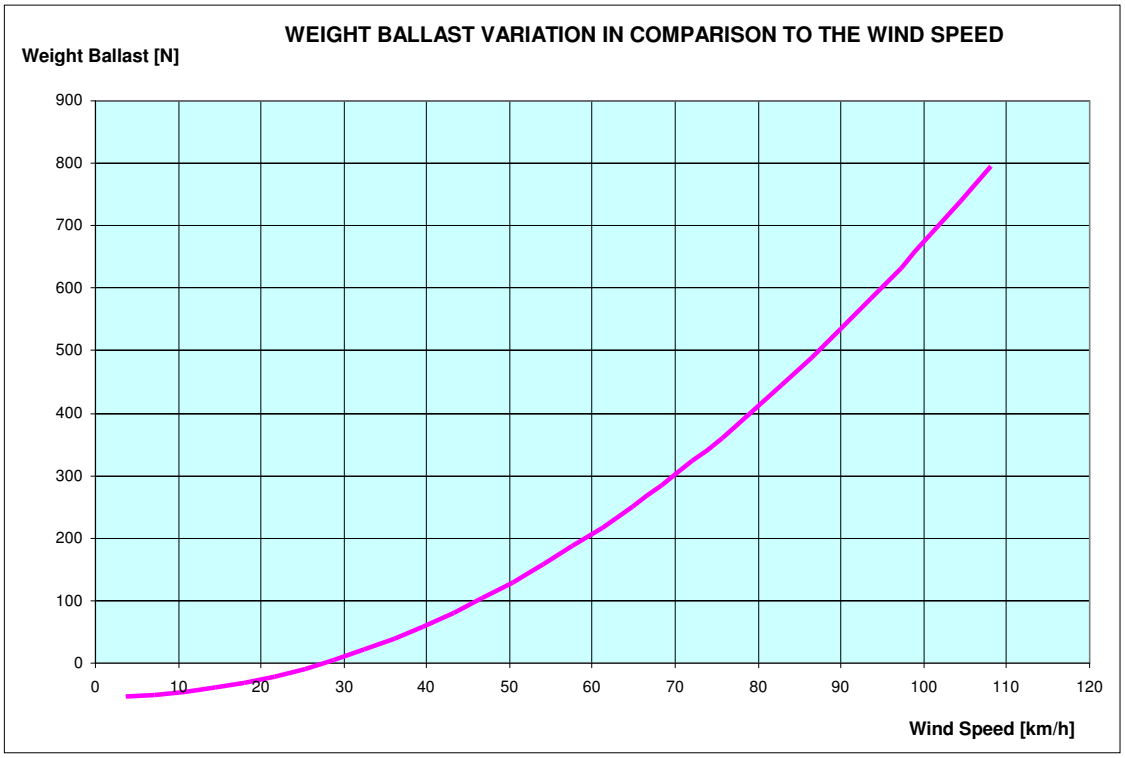

Fig. 9-1 Weight Ballast variation in comparison to the wind speed
for AMB-8059/00 and AMB-8059/02 without joint

9.3 AMB-8059/00 AMB-8059/02 with joint

Table 9-2 Wind resistance of the AMB-8059/00 and AMB-8059/02 with swivel joint

Wind speed [km/h]	Wind speed [m/s]	Aerodynamic form	Air density [N/mc]	Wind pressure [N/m^2]	Overturning moment [Nm]	Stabilizing moment [Nm]	Weight ballast [N]	NOTE
3,60	1,00	1,20	1,25	0,75	0,18	0,27	-63,65	Ballast bags not necessary
7,20	2,00	1,20	1,25	3,00	0,72	1,08	-59,61	
10,80	3,00	1,20	1,25	6,75	1,62	2,42	-52,88	
14,40	4,00	1,20	1,25	12,00	2,87	4,31	-43,46	
18,00	5,00	1,20	1,25	18,75	4,49	6,73	-31,34	
21,60	6,00	1,20	1,25	27,00	6,46	9,69	-16,53	
25,20	7,00	1,20	1,25	36,75	8,80	13,19	0,97	Ballast bags filled with water
28,80	8,00	1,20	1,25	48,00	11,49	17,23	21,17	
32,40	9,00	1,20	1,25	60,75	14,54	21,81	44,06	
36,00	10,00	1,20	1,25	75,00	17,95	26,93	69,64	
39,60	11,00	1,20	1,25	90,75	21,72	32,58	97,91	
43,20	12,00	1,20	1,25	108,00	25,85	38,78	128,88	
46,80	13,00	1,20	1,25	126,75	30,34	45,51	162,54	
50,40	14,00	1,20	1,25	147,00	35,19	52,78	198,89	
54,00	15,00	1,20	1,25	168,75	40,39	60,59	237,93	
57,60	16,00	1,20	1,25	192,00	45,96	68,93	279,67	
61,20	17,00	1,20	1,25	216,75	51,88	77,82	324,10	
64,80	18,00	1,20	1,25	243,00	58,16	87,24	371,22	
68,40	19,00	1,20	1,25	270,75	64,81	97,21	421,04	Ballast bags filled with sand
72,00	20,00	1,20	1,25	300,00	71,81	107,71	473,55	
75,60	21,00	1,20	1,25	330,75	79,17	118,75	528,75	
79,20	22,00	1,20	1,25	363,00	86,89	130,33	586,64	
82,80	23,00	1,20	1,25	396,75	94,96	142,45	647,23	
86,40	24,00	1,20	1,25	432,00	103,40	155,10	710,51	
90,00	25,00	1,20	1,25	468,75	112,20	168,30	776,48	Fastening the nylon wind strays
93,60	26,00	1,20	1,25	507,00	121,35	182,03	845,15	
97,20	27,00	1,20	1,25	546,75	130,87	196,30	916,51	
100,80	28,00	1,20	1,25	588,00	140,74	211,11	990,56	
104,40	29,00	1,20	1,25	630,75	150,97	226,46	1067,30	
108,00	30,00	1,20	1,25	675,00	161,56	242,35	1146,73	
111,60	31,00	1,20	1,25	720,75	172,52	258,77	1228,86	
115,20	32,00	1,20	1,25	768,00	183,82	275,74	1313,68	
118,80	33,00	1,20	1,25	816,75	195,49	293,24	1401,20	
122,40	34,00	1,20	1,25	867,00	207,52	311,28	1491,41	
126,00	35,00	1,20	1,25	918,75	219,91	329,86	1584,31	
129,60	36,00	1,20	1,25	972,00	232,65	348,98	1679,90	
133,20	37,00	1,20	1,25	1026,75	245,76	368,64	1778,18	
136,80	38,00	1,20	1,25	1083,00	259,22	388,83	1879,16	
140,40	39,00	1,20	1,25	1140,75	273,04	409,57	1982,83	
144,00	40,00	1,20	1,25	1200,00	287,23	430,84	2089,20	

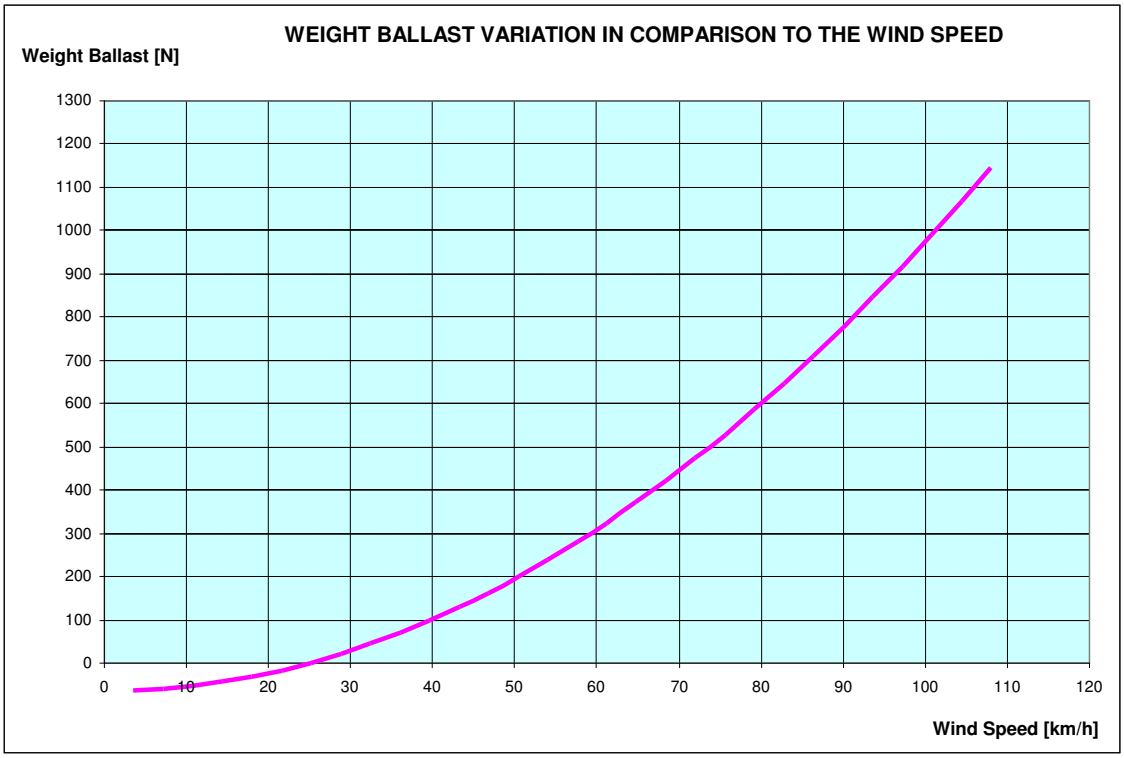

Fig. 9-2 Weight Ballast variations in comparison to the wind speed for AMB-8059/00 and AMB-8059/02 with joint

9.4 AMB-8059/01 AMB-8059/03 without joint

Table 9-3 Wind resistance of the AMB-8059/01 and AMB-8059/03 without swivel joint

Wind speed [km/h]	Wind speed [m/s]	Aerodynamic form	Air density [N/mc]	Wind pressure [N/m^2]	Overturning moment [Nm]	Stabilizing moment [Nm]	Weight ballast [N]	NOTE
3,60	1,00	1,20	1,25	0,75	0,14	0,21	-64,95	Ballast bags not necessary
7,20	2,00	1,20	1,25	3,00	0,56	0,84	-61,79	
10,80	3,00	1,20	1,25	6,75	1,26	1,90	-56,52	
14,40	4,00	1,20	1,25	12,00	2,25	3,37	-49,15	
18,00	5,00	1,20	1,25	18,75	3,51	5,27	-39,67	
21,60	6,00	1,20	1,25	27,00	5,06	7,58	-28,08	
25,20	7,00	1,20	1,25	36,75	6,88	10,32	-14,39	
28,80	8,00	1,20	1,25	48,00	8,99	13,48	1,41	Ballast bags filled with water
32,40	9,00	1,20	1,25	60,75	11,38	17,06	19,32	
36,00	10,00	1,20	1,25	75,00	14,04	21,07	39,33	
39,60	11,00	1,20	1,25	90,75	16,99	25,49	61,46	
43,20	12,00	1,20	1,25	108,00	20,22	30,34	85,68	
46,80	13,00	1,20	1,25	126,75	23,74	35,60	112,02	
50,40	14,00	1,20	1,25	147,00	27,53	41,29	140,46	
54,00	15,00	1,20	1,25	168,75	31,60	47,40	171,00	
57,60	16,00	1,20	1,25	192,00	35,95	53,93	203,66	
61,20	17,00	1,20	1,25	216,75	40,59	60,88	238,42	
64,80	18,00	1,20	1,25	243,00	45,50	68,26	275,28	
68,40	19,00	1,20	1,25	270,75	50,70	76,05	314,26	
72,00	20,00	1,20	1,25	300,00	56,18	84,27	355,34	
75,60	21,00	1,20	1,25	330,75	61,94	92,91	398,53	
79,20	22,00	1,20	1,25	363,00	67,98	101,96	443,82	Ballast bags filled with sand
82,80	23,00	1,20	1,25	396,75	74,30	111,44	491,22	
86,40	24,00	1,20	1,25	432,00	80,90	121,35	540,73	
90,00	25,00	1,20	1,25	468,75	87,78	131,67	592,34	
93,60	26,00	1,20	1,25	507,00	94,94	142,41	646,06	
97,20	27,00	1,20	1,25	546,75	102,39	153,58	701,89	
100,80	28,00	1,20	1,25	588,00	110,11	165,17	759,83	Fastening the nylon wind strays
104,40	29,00	1,20	1,25	630,75	118,12	177,17	819,87	
108,00	30,00	1,20	1,25	675,00	126,40	189,60	882,01	
111,60	31,00	1,20	1,25	720,75	134,97	202,45	946,27	
115,20	32,00	1,20	1,25	768,00	143,82	215,73	1012,63	
118,80	33,00	1,20	1,25	816,75	152,95	229,42	1081,10	
122,40	34,00	1,20	1,25	867,00	162,36	243,53	1151,67	
126,00	35,00	1,20	1,25	918,75	172,05	258,07	1224,35	
129,60	36,00	1,20	1,25	972,00	182,02	273,03	1299,14	
133,20	37,00	1,20	1,25	1026,75	192,27	288,41	1376,03	
136,80	38,00	1,20	1,25	1083,00	202,80	304,21	1455,04	
140,40	39,00	1,20	1,25	1140,75	213,62	320,43	1536,14	
144,00	40,00	1,20	1,25	1200,00	224,71	337,07	1619,36	

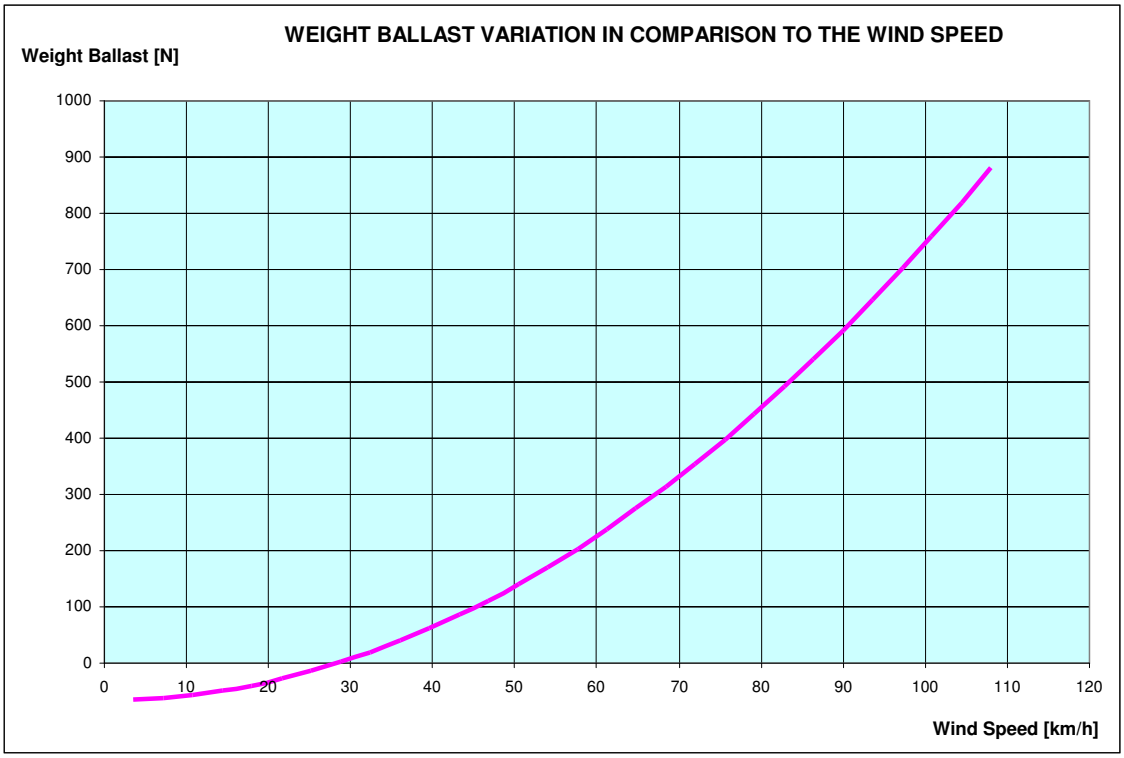

Fig. 9-3 Weight Ballast variations in comparison to the wind speed
for AMB-8059/01 and AMB-8059/03 without joint

9.5 AMB-8059/01 AMB-8059/03 with joint

Table 9-4 Wind resistance of the AMB-8059/01 and AMB-8059/03 with swivel joint

Wind speed [km/h]	Wind speed [m/s]	Aerodynamic form	Air density [N/mc]	Wind pressure [N/m^2]	Overturning moment [Nm]	Stabilizing moment [Nm]	Weight ballast [N]	NOTE
3,60	1,00	1,20	1,25	0,75	0,19	0,29	-75,54	Ballast bags not necessary
7,20	2,00	1,20	1,25	3,00	0,78	1,16	-71,18	
10,80	3,00	1,20	1,25	6,75	1,75	2,62	-63,89	
14,40	4,00	1,20	1,25	12,00	3,11	4,66	-53,70	
18,00	5,00	1,20	1,25	18,75	4,85	7,28	-40,60	
21,60	6,00	1,20	1,25	27,00	6,99	10,48	-24,58	
25,20	7,00	1,20	1,25	36,75	9,51	14,27	-5,65	
28,80	8,00	1,20	1,25	48,00	12,43	18,64	16,20	Ballast bags filled with water
32,40	9,00	1,20	1,25	60,75	15,73	23,59	40,95	
36,00	10,00	1,20	1,25	75,00	19,42	29,12	68,62	
39,60	11,00	1,20	1,25	90,75	23,49	35,24	99,20	
43,20	12,00	1,20	1,25	108,00	27,96	41,94	132,69	
46,80	13,00	1,20	1,25	126,75	32,81	49,22	169,09	
50,40	14,00	1,20	1,25	147,00	38,05	57,08	208,41	
54,00	15,00	1,20	1,25	168,75	43,69	65,53	250,64	
57,60	16,00	1,20	1,25	192,00	49,70	74,56	295,78	
61,20	17,00	1,20	1,25	216,75	56,11	84,17	343,83	
64,80	18,00	1,20	1,25	243,00	62,91	94,36	394,80	
68,40	19,00	1,20	1,25	270,75	70,09	105,14	448,68	Ballast bags filled with sand
72,00	20,00	1,20	1,25	300,00	77,66	116,49	505,47	
75,60	21,00	1,20	1,25	330,75	85,62	128,43	565,17	
79,20	22,00	1,20	1,25	363,00	93,97	140,96	627,79	
82,80	23,00	1,20	1,25	396,75	102,71	154,06	693,31	
86,40	24,00	1,20	1,25	432,00	111,83	167,75	761,76	Fastening the nylon wind strays
90,00	25,00	1,20	1,25	468,75	121,35	182,02	833,11	
93,60	26,00	1,20	1,25	507,00	131,25	196,87	907,37	
97,20	27,00	1,20	1,25	546,75	141,54	212,31	984,55	
100,80	28,00	1,20	1,25	588,00	152,22	228,33	1064,64	
104,40	29,00	1,20	1,25	630,75	163,29	244,93	1147,64	
108,00	30,00	1,20	1,25	675,00	174,74	262,11	1233,55	
111,60	31,00	1,20	1,25	720,75	186,58	279,88	1322,38	
115,20	32,00	1,20	1,25	768,00	198,82	298,22	1414,12	
118,80	33,00	1,20	1,25	816,75	211,44	317,15	1508,77	
122,40	34,00	1,20	1,25	867,00	224,44	336,67	1606,33	
126,00	35,00	1,20	1,25	918,75	237,84	356,76	1706,81	
129,60	36,00	1,20	1,25	972,00	251,63	377,44	1810,20	
133,20	37,00	1,20	1,25	1026,75	265,80	398,70	1916,50	
136,80	38,00	1,20	1,25	1083,00	280,36	420,54	2025,71	
140,40	39,00	1,20	1,25	1140,75	295,31	442,97	2137,84	
144,00	40,00	1,20	1,25	1200,00	310,65	465,98	2252,88	

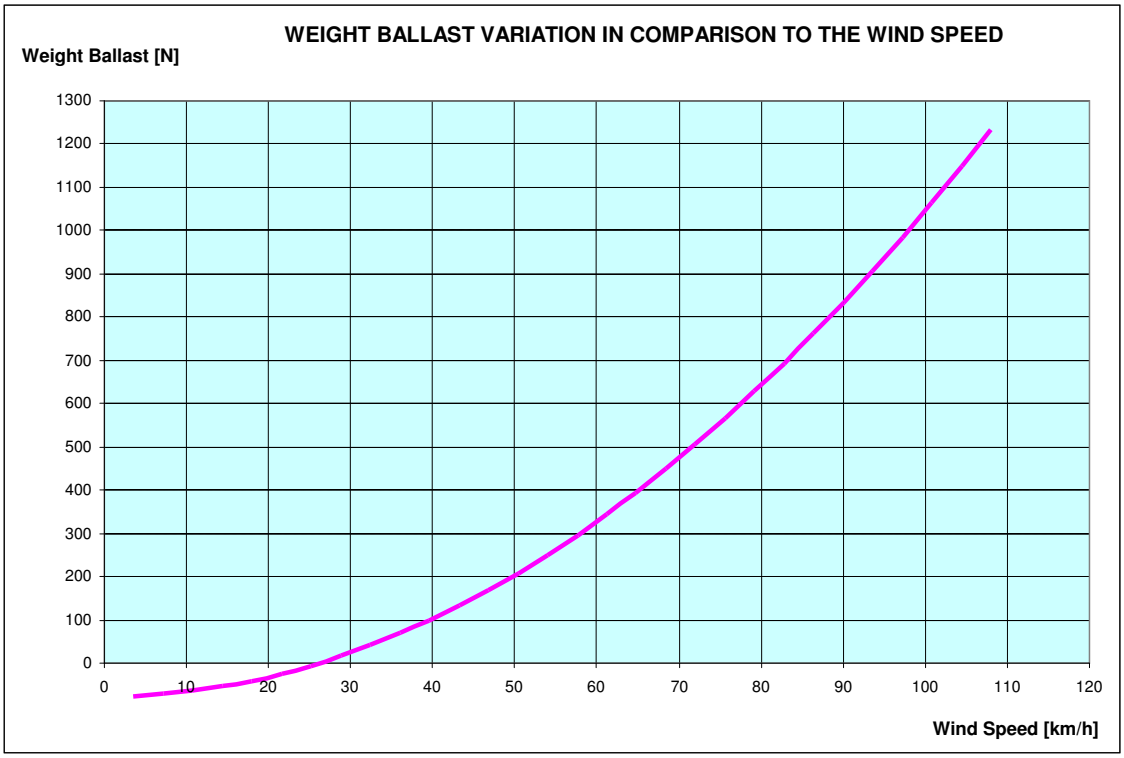

Fig. 9-4 Weight Ballast variations in comparison to the wind speed for AMB-8059/01 and AMB-8059/03 with joint

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Mod. 18-1

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☐ Calibration only ☐ Repair ☐ Repair & Calibration ☐ Certified Calibration ☐ Other:

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Persona da contattare: *Technical contact person:*
Telefono: *Phone n.*

Modello: *Equipment model:*
Numero di serie: *Serial n.*

☑ ***Accessori ritornati con l'apparecchiatura:*** ☐ **Nessuno** ☐ **Cavo(i)** ☐ **Cavo di alimentazione** **Altro:**
☑ *Accessories returned with unit:* ☐ None ☐ Cable(s) ☐ Power cable Other:

☑ ***Sintomi o problemi osservati:*** ☑ *Observed symptoms / problems*:

☑ ***Guasto*:** ☐ **Fisso** ☐ **Intermittente** ***Sensibile a*:** ☐ **Freddo** ☐ **Caldo** ☐ **Vibrazioni** ☐ **Altro**
☑ *Failure*: ☐ Continuous ☐ Intermittent *Sensitive to*: ☐ Cold ☐ Heat ☐ Vibration ☐ Other

Descrizione del guasto/condizioni di funzionamento:
Failure symptoms/special control settings description:

Se l'unità è parte di un sistema descriverne la configurazione:
If unit is part of system please list other interconnected equipment and system set up:

Suggerimenti / Commenti / Note:
Suggestions / Comments / Note: