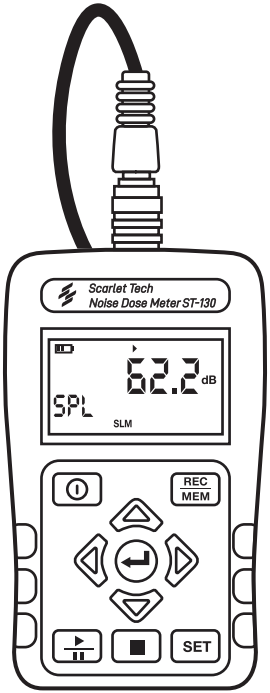
SCARLET | TECH



ST-130

Noise Dosimeter

User Guide

Contents

1. Instrument at a Glance

1.1 Overview

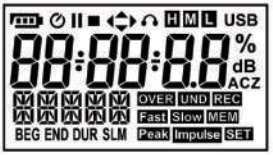
The **ST-130/ST-130S** is designed to test noise exposure in accordance with US Occupation Safety and Health Administration (OSHA), American Conference of Governmental Industrial Hygienists (ACGIH), Safety and Health Administration (MSHA), DOS, and ISO standards.

Scarlet ST-130/ST-130S also provide fast and easy on-site surveys to help determine noise reduction requirements.

The meter can also be used in SLM (sound level meter) mode. The SLM mode has a data logging feature that can recode up to 1000K readings which can be downloaded and transmitted to PC for further analysis through built-in USB interface.

Applications: Evaluation of environmental noise, Measurements of noise at workplaces, Assessment of product noise.

1.2 Display



Icon	Meaning
	Battery icon
	Auto power off enabled
▶ / ❚❚ / ■	Start / Pause / Stop
	115 dB indicator
Peak	140 dB indicator (peak)
USB	USB interface
H	SPL Hi dB range: 140…70 dB
M	SPL Mid dB range: 110…50 dB
L	SPL Lo dB range: 90…30 dB
SLM	Sound Level Meter mode
%	Noise dose %
dB	Unit of sound noise
USB	USB cable connected
SD	SD card inserted
	Low battery
A/C/Z	A / C / Z weighting
BEG/END/DUR	Start test / Stop test / Test duration
MEM	Visiting recorded data
Impulse	Time constant is impulse response
Fast	Time constant is fast response
Slow	Time constant is slow response
OVER	Measurement over Hi level
UND	Measurement under Lo level
REC	Auto record is on. When this icon flashing means recording
SET	In setting mode

2. Getting Started

2.1 Before using

The instrument has been checked mechanically and electrically prior to shipment.
Please make sure that the instrument is without any visible damages before using.

However, it is advised to carry out a rapid check in order to detect any possible damage that may cause during transport. If the device is already damaged, please make a claim to our dealer immediately. Check the packaging content according to packing list reported in 7.3.1 chapter .In case of discrepancies, contact the dealer immediately.

2.2 Key concept

2 Modes The meter can be in either Noise Dosimeter Mode (NDM) or Sound Level Meter Mode (SLM). The meter works in one mode at a time.

STOP Whenever a measure session has been started, user needs to press **STOP** button before doing further operation.

2.3 Power supply

The instrument is powered by 9 V battery. When battery voltage is low, the low battery symbol will show up on the display.

Caution

If you don't use the instrument for a long period, please take the batteries out to prevent eventual acid leakage.

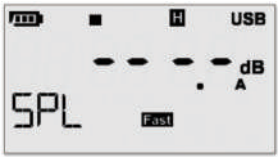
2.4 Calibration

The instrument complies with the technical specifications contained in this manual and such compliance is guaranteed for 1 year. The re-calibration is suggested to be taken after one year.

2.5 Storage

If the device was kept in extreme environmental conditions such as high temperature. Please make sure the instrument return to normal measuring conditions before using it.

2.6 Measure Noise Doses (NDM mode)



Measure data
> Turn on the meter by pressing **POWER** button. Make sure the meter is in NDM mode which means the icon "SLM" is not showed.

> Press **START/PAUSE** button to measure noise dose. Press **START/PAUSE** button again to pause.

> Press **STOP** button to stop testing.

Review data
> Press **RIGHT** button to view parameters in order: SPL > Dose% > LPMAX > LPMIN > PKMAX > LEQ > SEL > LEP8 > TWA8 > LVAG > LN%

> Press **LEFT** button to review time stamp of the measurement:
BEG Time stamp when the measurement starts.
DUR Total duration of measurement.
PAUSE Total duration of pausing.
END Time stamp when the measurement ends.

> NOTE: time stamp format is hh:mm:ss. Press **ENTER** to toggle between date & time stamp. Date format is YY-DD-MM.

2.7 Measure Sound Level (SLM mode)

• Icon SLM displayed

Enter SLM mode
> Press **POWER** button to turn the meter on.

> Press **SET** button to enter setup mode. There are 7 function settings.

> Press **UP** or **DOWN** button to select "SLM" mode on LCD, then press **ENTER**.

Measure data
> Press **RIGHT** button to select test functions: SPL > Leq > SEL > PeakMAX.
Note: To switch between different modes, please press **STOP** button first.

> Press **START/PAUSE** button to noise doses measurement. To pause, press **START/PAUSE** button again.

> Icon "**OVER**" or "**UND**"displayed when sound level exceeds the bounds.

> Leq integral time and same sampling time can be set in setup mode. Refer to "Settings" section.

> When the sampling time is set to zero, the integration time will not be stopped until the user exits the measure.

> Press **STOP** button to stop testing.

Caution

Wind blowing across the microphone results in additional extraneous noise. Please mount the windscreen to prevent the undesirable signals in high wind condition (> 10 m/s). Keep the microphone dry and avoid severe vibration.

3. Record Data

3.1 Auto recording

> In Setup mode > Sampling Rate & Auto Record Setup > Make sure auto record function is on. Please refer to "Settings" section.

> In SLM mode, press **START** button to turn on recorder. Icon "REC" flashes.

> Bottom left of LCD shows "WRITE" indicates the data is written to memory.

> Bottom left of LCD shows "FULL" to indicate memory is already full.

> When running Auto Record mode, the manual one-shot recording function will not work.

3.2 Single record

> Press **REC/MEM** button to save on-screen readings. Icon "**REC**" flashes.

3.3 Read data

> Long press **REC/MEM** button to enter the data reading mode when icon MEM showed on the screen.

> Press **UPPER** or **DOWN** button to scroll through the readings. The data will first come with a number which means the order of recording. Then the detail information is shown on the screen.

> When data were recorded under NDM mode, user can press **RIGHT** button to select noise dose meter information.

> Press **LEFT** button to view date & time of data. Press **ENTER** button to switch between date & time. (Note: Time format hh:mm:ss, date format YY-MM-DD)

> Long press **REC/MEM** key again to exit data reading mode.

4. Setup Mode

> Press **SET** button to enter setup mode.

> Press **SET** button to switch between 7 different settings: Test Mode > Auto Power Off > Sampling Rate & Auto Record > Real Time Clock > 94dB OffsetAdjust > Noise standard > SLM Function

> Press **SET** button again to save the current settings and jump to next function setting mode.

> In any settings, press **ENTER** to save & quit Setup mode

4.1 Test Mode

> In the test mode setup page, press **UP** or **DOWN** button to change test mode (2 modes: NDM and SLM)

> NDM: Noise Dose Meter

> SLM: Sound Level Meter

4.2 Auto Power-Off

> In the auto power-off setup page, press **UP** or **DOWN** button to enable or disable Power Off Function.

4.3 Sampling Rate & Auto Record Setup

> In the sampling rate & auto-record setup page, press **RIGHT** or **LEFT** button to select auto record setup or sampling rate page.

> Press **UP** or **DOWN** button to enable auto record or adjust sampling rate.

> Sampling rate from 1 sec ... 23 hr 59 min 59 sec.

4.4 Real-Time Clock

> In the real-time clock setup page, press **RIGHT** or **LEFT** button to adjust timer setting.

> Press **UP** or **DOWN** button to adjust digit of numbers.

4.5 94 dB Offset Adjust Mode

> In the 94dB offset adjust setup page, press **ENTER** button to auto-run 94dB adjustment.

> Press **RIGHT** or **LEFT** button to change the weighted filter.

> Press **UP** or **DOWN** button to adjust offset.

4.6 Noise Standards Setup

> In the noise standards setup page, press **UP** or **DOWN** button to select different NDM standards.

> *Note: The standards include: OSHA > MSHS > DOD > ACGIH > ISO85 > ISO90 > USER*

4.7 SLM function Setup

In SLM function setup page, press **RIGHT** and **LEFT** to switch test function. Press **UP** and **DOWN** to switch among settings: Sound level range > Time weighted > Frequency weighted > Peak frequency

Sound level range

> "**H**" SPL Hi dB Range (140-70 dB)
> "**M**" SPL Mid dB Range (110-50 dB)
> "**L**" SPL Lo dB Range (90-30 dB)

Time weighted

> **Fast, Slow** and **Impulse**

Frequency weighted

> **A, C** and **Z**

Peak frequency

> **Peak C** and **Peak Z.**

5. Acoustic Glossary

5.1 Sound level parameters

Test Function	Screen parameter	Description
SPL	LAFp	Sound pressure level (SPL)
SPL	LASp	Sound pressure level (SPL)
SPL	LCFp	Sound pressure level (SPL)
SPL	LCSp	Sound pressure level (SPL)
SPL	LZFp	Sound pressure level (SPL)
SPL	LZSp	Sound pressure level (SPL)
Leq	LAFq	Equivalent continuous level for the duration of the measurement for A weighting
Leq	LCFq	Equivalent continuous level for the duration of the measurement for C weighting
Leq	LZFq	Equivalent continuous level for the duration of the measurement for Z weighting
SEL	LAE	Frequency weighted sound exposure level for the duration of the measuremen for A weighting
SEL	LCE	Frequency weighted sound exposure level for the duration of the measuremen for C weighting
SEL	LZE	Frequency weighted sound exposure level for the duration of the measuremen for A weighting
Peak	Lcpeak	Instantaneous C peak level

5.2 A/C/Z weighting

A: The A weighting curve is based on 40 Phon Fletcher-Munson Equal Loudness Contour. Suggest to use the A weighting for noise assessment on human beings.

C: The C weighting in essentially is approximate smooth. Suggest using the C weighting with labor safety concern.

Z: The Z weighting for the electric instrument interior not the linear signal which processes after the filter, suits in wants to output AC or the DC signal does other research to use. The Z weighting is a linear signal which is not processed through the filter. It's suitable to output AC or DC signal for research.

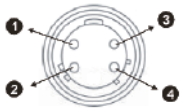
5.3 Classification

- Class 0: use in the laboratory reference standard.
- Class 1: laboratory or field use.
- Class 2: laboratory or field use.
- Class 3: general field use.

6. Hardware

6.1 Input Interface

The front is PLT 4, the signal input receptacle



Pin	ST-130S	ST-130
1	Power (+)	Power
2	GND	GND
3	Power (-)	NC
4	GND	NC

6.2 ST-130S Microphone

- Diameter : 1/2 inch
- Polarization voltage : 0 V
- Dynamic range : 25 dB...140 dB
- Sensitivity : -32 ± 3 dB (250 Hz 0 dB = 1V/Pa)
- Free field frequency response : ±2dB(25Hz...12.5kHz)

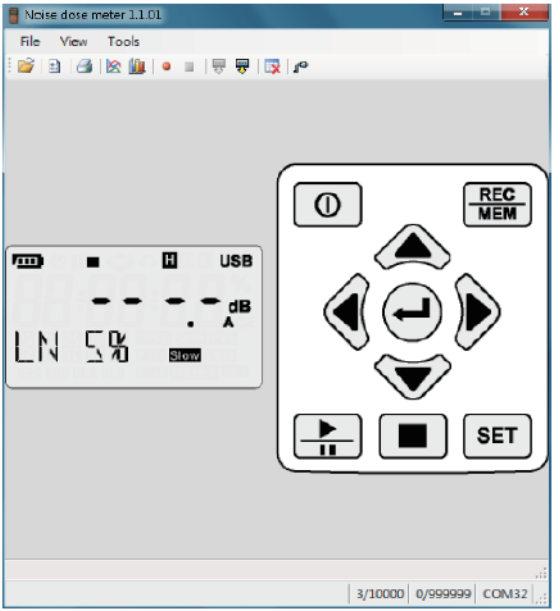
Frequency (KHz)	Deviation of pressure
0.25	0.0
1	-0.1
2	-0.5
3	-0.6
4	-0.9
5	-1.2
6	-1.7
7	-2.2
8	-2.8
9	-3.3
10	-4.1
12.5	-6.0

7. Software

7.1 Main screen

ST-103 App running on Windows provides user an intuitive interface to control dosimeter in real-time, to capture dose report & sound level log, to draw plots and download data out of the meter.

User is able to trigger sound level logging by one button clicking and read the log and corresponding graphical plots by opening csv file in the App.



Icons

Icon	Function
	Open file
	Options
	Print noise dose report (*.ndr)
	Sound level chart
	Noise dose chart (LN%)
	Start log sound level (*.csv)
	Stop log sound level
	Download sound level log & noise dose report
	Erase meter data
	Port detection

Getting started

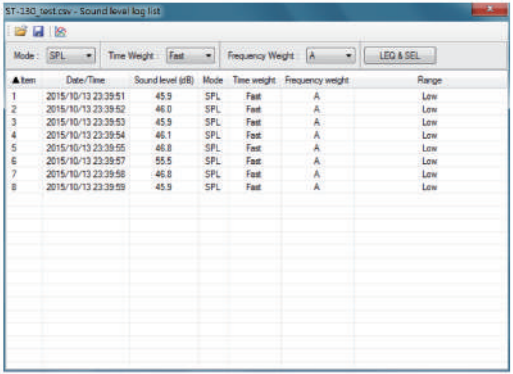
> To install necessary softwares, run AutoRun.exe and the UI will guide you to go through the steps.
> Connect the meter and PC with the USB cable shipped with the instrument.
> Press Port detection icon and the App will connect to the meter automatically.
> Control the meter with virtual panel.

System requirements

Operating System: Windows® XP/ Windows Vista/ Windows 7/Windows 8/ Windows 10
• Storage:200 MB of available hard disk space.
• Processor: Intel Pentium® 4
• Memory: 1GB RAM (XP), 1.5 GB (Windows Vista/Windows 7/Windows 8)
• Other: PL2303 Windows Drive; Microsoft .NET Framework 3.5 Service Pack 1
• Required software & driver are shipped with meter. User can also download it from Scarlet web site.

7.2 Sound level log

Open sound level log (*.csv) generated by the App and the following window will pop up.



Item	Date/Time	Sound level (dB)	Mode	Time weight	Frequency weight	Range
1	2015/10/13 23:39:51	45.9	SPL	Fast	A	Low
2	2015/10/13 23:39:52	46.0	SPL	Fast	A	Low
3	2015/10/13 23:39:53	45.9	SPL	Fast	A	Low
4	2015/10/13 23:39:54	46.1	SPL	Fast	A	Low
5	2015/10/13 23:39:55	46.8	SPL	Fast	A	Low
6	2015/10/13 23:39:57	55.5	SPL	Fast	A	Low
7	2015/10/13 23:39:58	46.8	SPL	Fast	A	Low
8	2015/10/13 23:39:59	45.9	SPL	Fast	A	Low

Icons

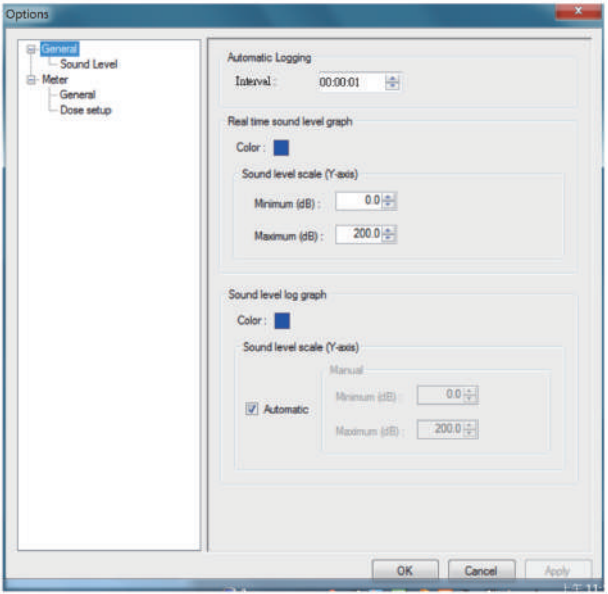
Icon	Function
	Open file
	Save file as...
	Show graph

Drop down menu

Icon	Function
Mode : SPL	SPL > LEQ > SEL > PeakMax
Time Weight : Slow	Fast > Slow > Impulse
Frequency Weight : A	A > C > Z
LEQ & SEL	Calculate LEQ & SEL

7.3 Settings

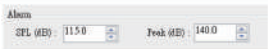
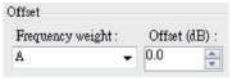
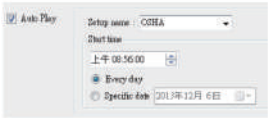
Main screen > Tools > Options. User can setup General (PC settings) and Meter (ST-130 settings) via the interface.



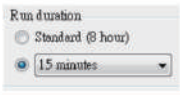
General settings

Icon	Function
Automatic Logging Interval : 00:00:01	PC data logger sample rate
Color :	Color of the curve
Sound level scale (Y-axis) Minimum (dB) : 0.0 Maximum (dB) : 200.0	Y-axis sound level range

Meter Settings

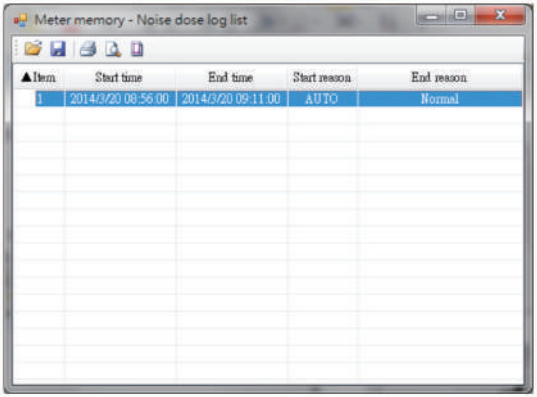
Icon	Function
	Serial number. 0…9; A…Z; 16 words
	Alarm settings
	Offset settings
	Real time clock
	Enable/disable auto record. Sample rate.
	Enable/disable auto play noise dose measurement. Meter must be in NDM mode.

Dose Meter Setting

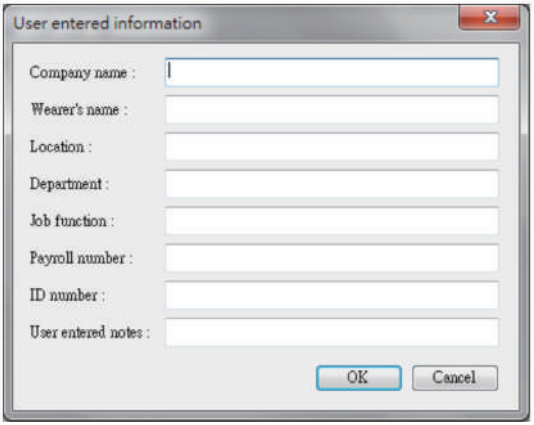
Icon	Function
	Select noise dose standard
	Select play noise dose measuring duration.
	Import/export *.ncg file

7.4 Print Noise Dose Report (*ndr)

> Select noise dose logger report (*.ndr)

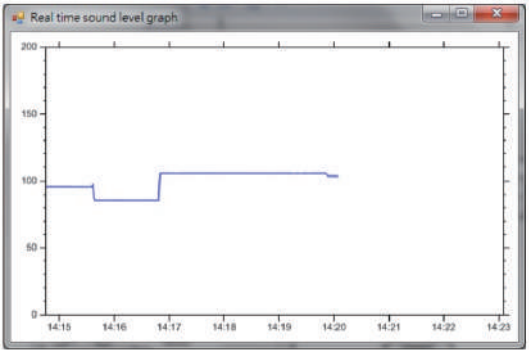


> Click "Search" button for report output

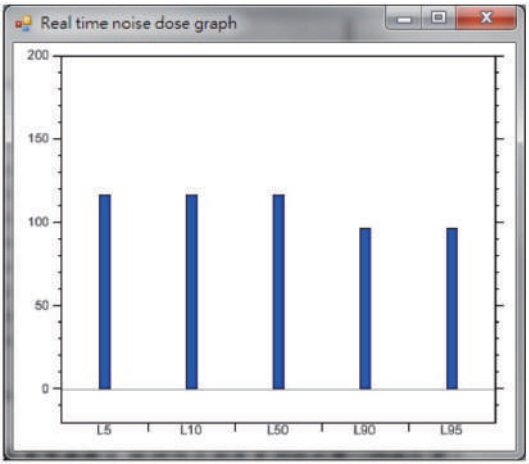


7.5 Sound level chart & Noise dose chart (LN %)

Sound level char. X-axis is the time coordinate.Y-axis is the sound coordinate.

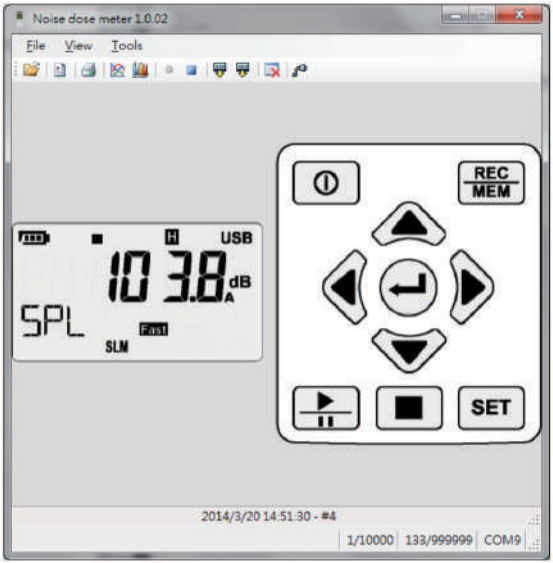


Noise does chart. X-axis is the LN%. Y-axis is the sound coordinate.



7.6 Enable PC data logger

Sound level char. X-axis is the time coordinate.Y-axis is the sound coordinate.



> Click Record button ● to enable data logger
> Create a new log file (*.csv)
> Click Stop button ■ to stop data recording

7.7 Download & erase recorded data

Download

> Click Download button  to download sound level logs or noise dose report from the meter memory

> It usually takes 15 minutes to download 100,000 recorded data

Erase

> Click Erase button  to delete all records in the meter 25

8. Technical Specifications

Display	Single LCD MAX reading 999999
Display Refresh Rate	1 Time/sec
Standards	IEC 61252-1993 IEC 61672-1-2003 ANSI S1,25-1992 ANSI S1,4-1983 ANSI S1,43-1997
Microphone(ST-130S)	1/2" pre-polarized condenser microphone build in preamplifier: 1V/Pa@250HZ, frequency range: 20 Hz~12.5 kHz, Thermal noise: <25 dB(A)
Microphone(ST-130)	1/2 inch Electret condenser microphone
Measurement Items(NDM)	Doses%, Lxyp, Lxmax, Lxmin, Lxeq, SEL(LAE), Peak, LAVG, TWA, LEP, LN%
Measurement Items(SLM)	Lxyp,Lxmax,Lxmin,Lxeq,SEL(LAE),Peak
Measurement Range	30dB to 130dB (A) 35dB to 130dB (C) 40dB to 130dB (Z)
Dynamic Range	60 dB
Accuracy	±1.5dB@94dB 1KHZ
Internal memory	MAX Datalogger data：10000(NDM); 1000000(SLM)
Maximum Peak C Weighting Sound Level Measurement	90~143 dB
Time Weighting	Fast, Slow, Impulse, Peak
Frequency Weighting	A/C/Z
Frequency Range	20Hz~8KHz
Starting Time	＜10 Second
Battery Life(ST-130)	24 hours (9V×1 battery Alkaline)
Battery Life(ST-130S)	20 hours (9V×1 battery Alkaline)
Dimensions	113(L) x 65(W) x 34(H) mm

NOTE: Environmental conditions: temperature 23° C ± 5° C, relative humidity < 80%*rh*.

8.1 Standard

IEC and other standard IEC 61252 (1993); IEC 61672-1 (2003); ANSI S1, 25-1992; ANSI S1, 4-1983; ANSI S1, 43-1997.

EMC This instrument was designed in accordance with EMC Standards in force and its compatibility has been tested in accordance with EN61326-2 (2006).

9. Handling, & Maintenance

9.1 Important handling information

Cleaning Clean instrument immediately if it comes in contact with anything that may cause stains—such as dirt, ink, makeup, or lotions. To clean:
- Disconnect all cables and turn instrument off.
- Use a soft, lint-free cloth.
- Avoid getting moisture in openings.
- Don't use cleaning products or compressed air.

Operating Environment
- For inside use, max height: 2000m
- Reference temperature: 23° ± 5° C
- Operation temperature: 5°...40° C
- Operation humidity: < 80% RH
- Storage temperature: -10°...60° C
- Storage humidity: < 70%
- Don't use cleaning products or compressed air.

The instrument can be damaged and battery life shortened if stored or operated outside of these temperature ranges. Avoid exposing the instrument to direct sunlight even the the air temperature is within the limits.

Operating humidity The instrument is designed to work in humidity < 80%rh and stored in dry place where humidity is less than 70%rh.

Store microphone carefully Microphone is the key component of the instrument and keep it dry and avoid severe shake or vibration.

Battery replacement Low battery icon displayed in LCD indicates the user needs to replace batteries. To replace:
- Turn off the instrument.
- Remove the battery cap.
- Insert new batteries and then put the cap back.
- Process the waste batteries accordingly.

9.1 Packing list

- ST-130 Meter x 1
- User guide x 1
- Power adapter x 1 (100...240 V AC to DC 6...9 V/500 mA)
- Carrying case x 1
- 9V batteries x 1 (NEDA 1604 、IEC 6F22 or JIS 006P)
- USB sticker for software installation
- USB cable w/ mini B type

10. Safety Precautions

10.1 Safety Precautions

When taking measurements:

- Avoid doing measurements in humid or wet places - make sure that humidity is within the limits indicated in section "environmental conditions".
- Avoid doing measurements in presence of explosive gas, combustible gas, steam or excessive dust.

The following symbols are used:

Caution: refer to the user's manual. An incorrect use may damage the components of devices or even users.

CE *The instrument conforms to the CE standard.*

10.2 Note During Operation

- Do not operate the instrument at temperature and humidity environment beyond to reference conditions of chapter 7.2.1.
- Keep the microphone dry and avoid severe vibration.
- Wind blowing across the microphone may bring additional extraneous noise.
- Once using the instrument in the presence of wind, the microphone must be mounted on the windscreen to prevent the undesirable signals.

10.3 Warranty

This product is guaranteed for one year after date of purchase. During limited warranty period any defective product will be repair or replace with comparable product without charges. The limited warranty does not cover battery and damages of any kind including physical caused accidentally or from misuse. Manufacturer's responsibility is limited to repair or replace the product. Any liability for direct or indirect damage caused by product failure is excluded. The claimed product will be repaired or replaced only when returned to the store where it was purchased together with original invoice.

Scarlet Tech Co., Ltd.

4F-3, No. 347 , HePing E Rd, 2nd Sec, DaAn District, Taipei City 106, Taiwan
info@scarlet.com.tw
www.scarlet-tech.com
version 241216