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ERL MAINTENANCE SUPPORT SDN BHD

(Company No. 498574-T)

E-MAS

Effective Railway Operations; Reliable System Maintenance

ROLLING STOCK DEPARTMENT

IN-HOUSE TECHNICAL INSTRUCTION

TRAIN TEMPERATURE MINI DATA LOGGER TESTO 174T GUIDELINE

Doc.No.R00.OMR.M91111.BT.1001A

Release

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Amendments or additions to this procedure must be indicated with a vertical black line in the adjacent left margin.

Change Record and Configuration Control

A	05.01.12	New	Azerul
Revision	**Date**	**Modification**	**Name**

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1 Purpose

The purpose of this document is to provide guideline to carry out temperature condition monitoring in ERL and CRS passenger saloons, in the event of identifying abnormality of passenger air conditioning units operation, which cannot be identified by Air conditioning unit self-monitoring system. It is also will be an indicators for monitoring warm temperature in train passenger saloon in order comfortless on the ERL and CRS passenger shall be avoided.

2 Scope of Distributions

This document explains the basic safety instruction, handling and operational, and also the guideline for data taken from data logger of train temperature data logger Testo174T in proper way.

This document is applicable to all Rolling Stock personnel and shall be followed accordingly whenever applied. This document is accessible to all RST staff via EDMS or RST Portal [http://express50/E-MAS_Portal/RST.html].

3 Basic safety instruction

Please read through the following safety instructions carefully:

Avoiding electricity:

Never use the logger to measure on or near live parts! Particularly the read out contacts on the back of the data logger should be kept away from live parts!

Meeting warranty conditions:

The logger should only be operated within the parameters specified in the Technical data.

Please handle the logger with care.

The instrument should only be opened if expressly described in the instruction manual for maintenance purposes. **Force should never be applied**!

Disposal:

Please dispose of spent batteries responsibly.

You can return your logger directly to us at the end of its service life. We will dispose of it responsibly.

4 Temperature Data logger (Testo 174T) standard

This product meets guidelines corresponding to EN 12830:

Suitability: S (Storage), T (Transport)

Location: C (Food storage and distribution systems)

Accuracy class: 1

Measuring range: -30 to +70°C

In accordance with EN 12830, please ensure that a regular check and calibration in accordance with

EN 13486 (recommendation: once a year) is carried out on this instrument.

The conformity certificate confirms that this product meets the guidelines in accordance with 89/336/EEC.

4.1 Temperature Data Logger location ERL & CRS

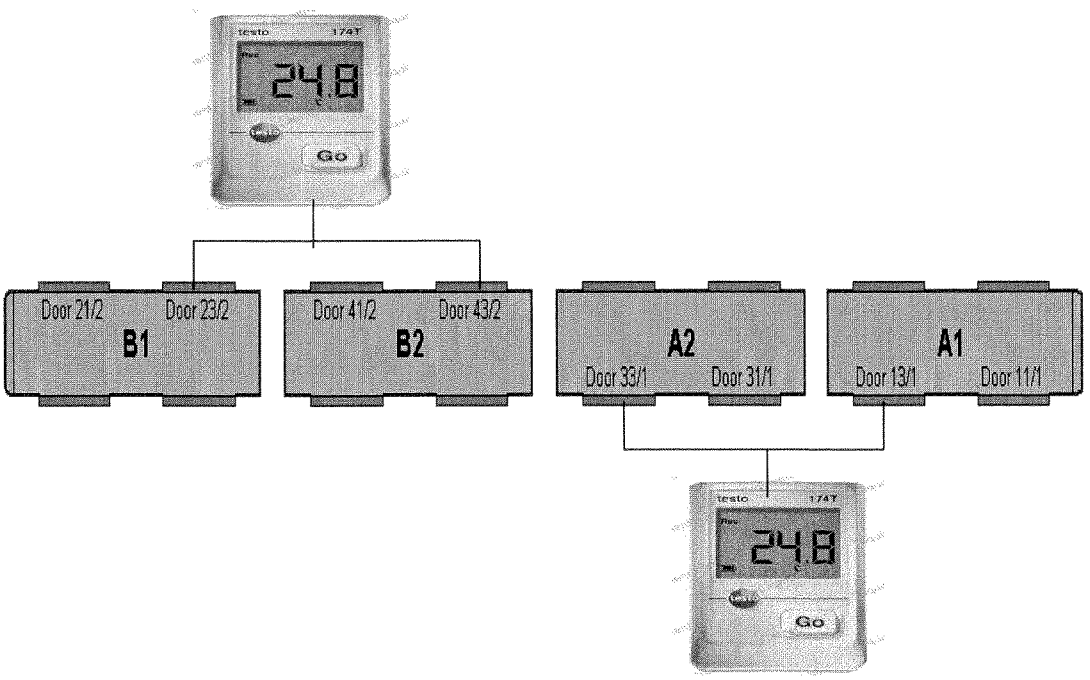


Fig 3.1: Data logger location on trains ERL and CRS

Data logger location (ERL & CRS)

1. Door 13/1
2. Door 33/1
3. Door 43/2
4. Door 23/2

5 Basic operation

5.1 Inserting the battery

You first have to place the battery supplied (CR2032) in the testo 174 before you can use the logger.

1 Place the data logger on its front.

2 Open the battery cover on the back of the logger using a coin. Turn coin left (anti clockwise) to open.

3 Place the battery in the logger so that the + pole is visible

4 Place the cover on the battery compartment and close it by.turning the battery cover to the right. It is best to use a coin. (refer fig 5.1)

- appears in the display:

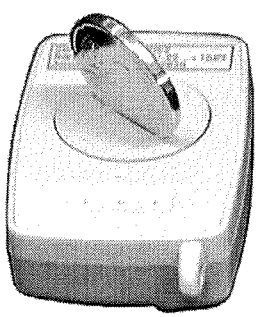


Fig 5.1: Data logger battery insert.

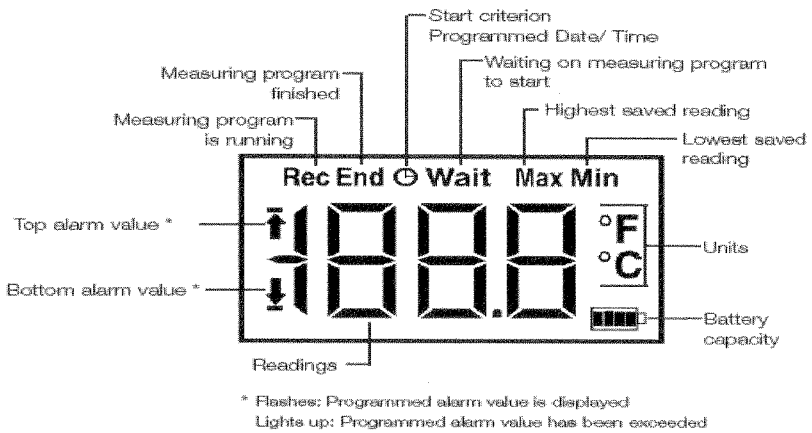
Battery capacity

Symbol	Capacity
	75-100%
	50-75%
	25-50%
	10-25%
	<10%
LO	Battery empty (Measuring program was stopped) ▸ Data is read out and battery is changed

Fig 5.2: Testo 147T Battery status

5.2 Display and control element

Due to technical reasons, the display speed of the liquid crystals slows down at temperatures below 0 °C (approx. 2 s at -10 °C, approx. 6 seconds at -20 °C). However, this does not have any influence on the accuracy of the measurement



5.3 Display sequence

Different information can be displayed, depending on the operating mode. A detailed diagram of the information, which can be called up, is shown in the overview included with every data logger.

5.4 Button functions

Programmed Wait Mode and Key start Start criterion:

Keep GO button pressed for approx. 3 sec. to start the measuring program. The measuring program starts and Rec appears in the display.

Operating mode Wait:

Press the GO button to change between the Top alarm value, Bottom alarm value, Battery life and Last reading displays. The displays appears in the named sequence in the display.

Operating mode Rec or End:

Press the button GO in order to change between the Highest saved reading, Lowest saved reading, Top alarm value, Bottom alarm value, Battery life and Last reading displays.The displays appear in the named sequence in the display.

5.5 Initial operation

Connecting the data logger to your PC. You will require a USB port in order to be able to connect the data logger interface to your PC.

1. Connect the serial connection cable of the interface to your PC.

2. Insert the logger into the interface holder.

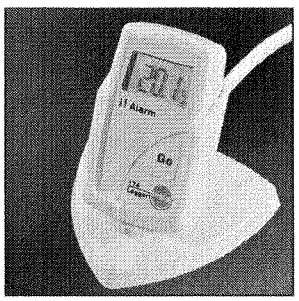


Fig 5.3: Mini data logger reader 174 D

5.5.1 TESTO 174T USB Connection.

Step 1: Connect TESTO Mini Data Logger to your PC/Laptop USB connection

Step 2: Open TESTO Comfort Software basic 5.0 using shortcut on your destop (refer fig. 5.4).

Once you click "enter" you can see Testo comfort software 5.0 as figure 5.5

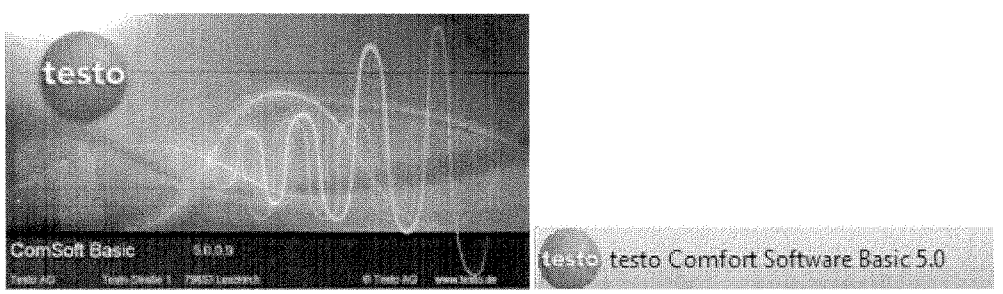


Fig 5.4: Testo Comfort Software basic 5.0 shortcut

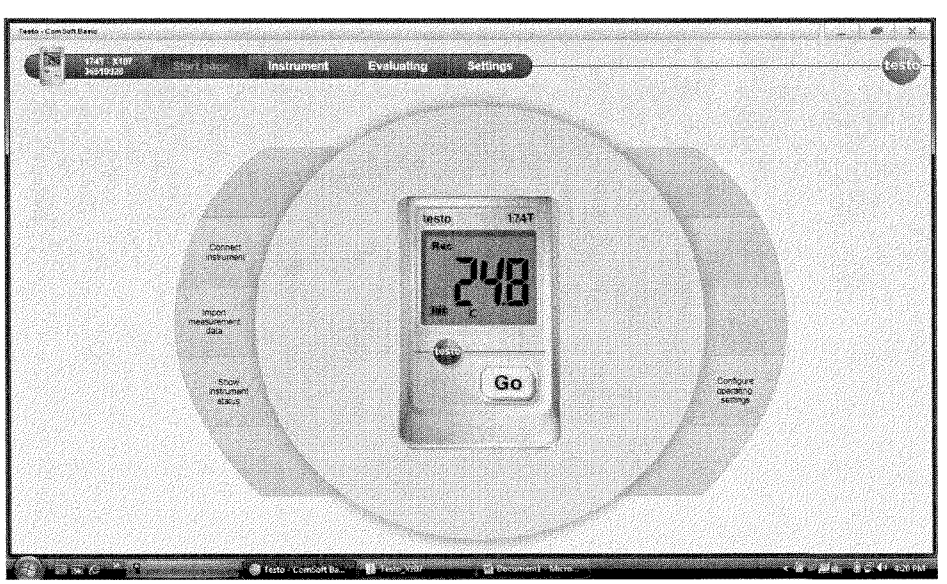


Fig 5.5: TESTO Comfort software 5.0 window

Step 3: Select connect instrument (box 1) and then select connect (box 2). Refer fig 5.6.

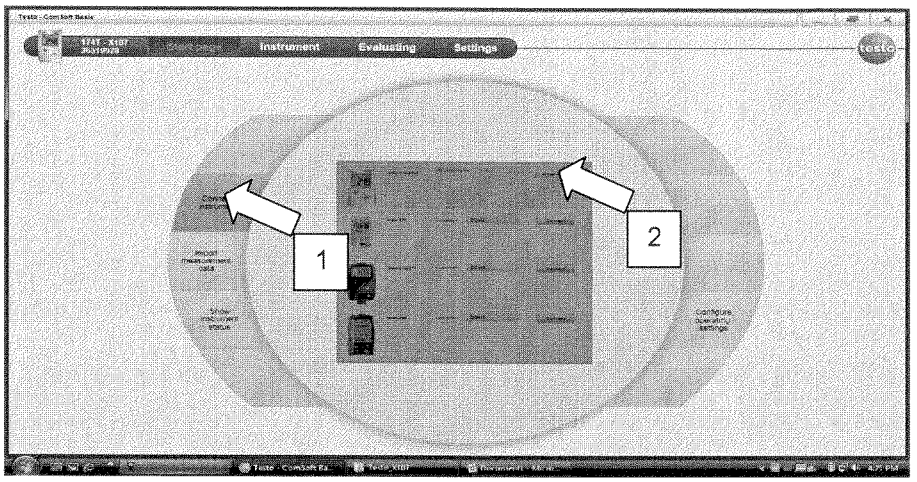


Fig 5.6: TESTO start page

Step 4: You can read line identification when the Testo 174T is connected. Refer fig 5.7

Fig 5.7: Testo confirmation ID

5.5.2 TESTO 174 T data download

Step 5: In start page menu select import measurement data as you can refer box 3 (*Fig 5.8*)

Step 6: Rename file and set data save location. Then start import. Refer Fig 5.9

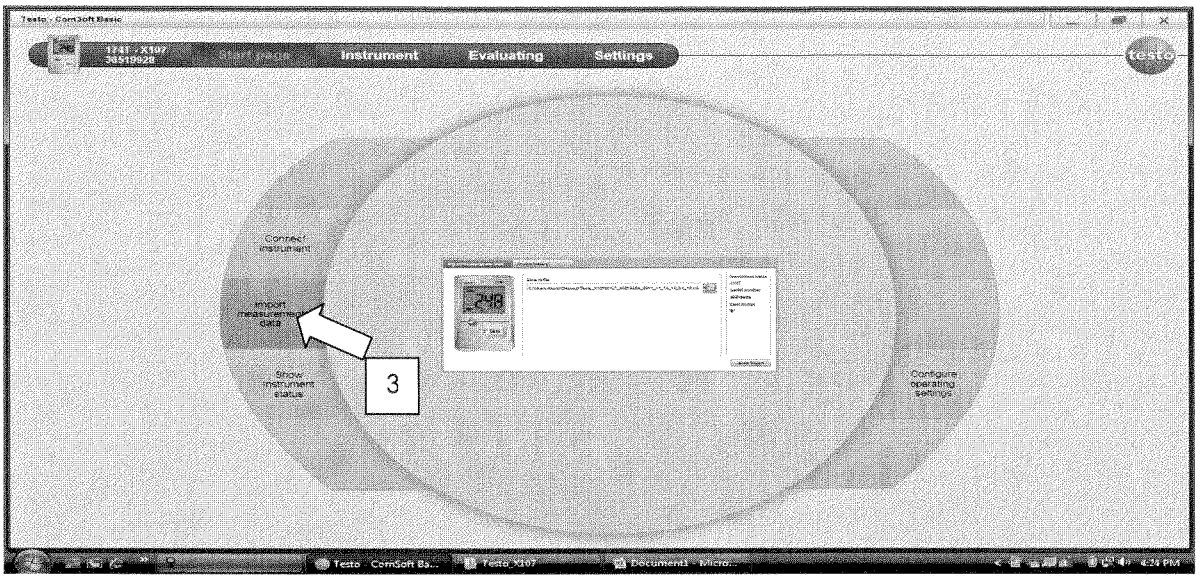


Fig 5.8: Import measuring data (box 3)

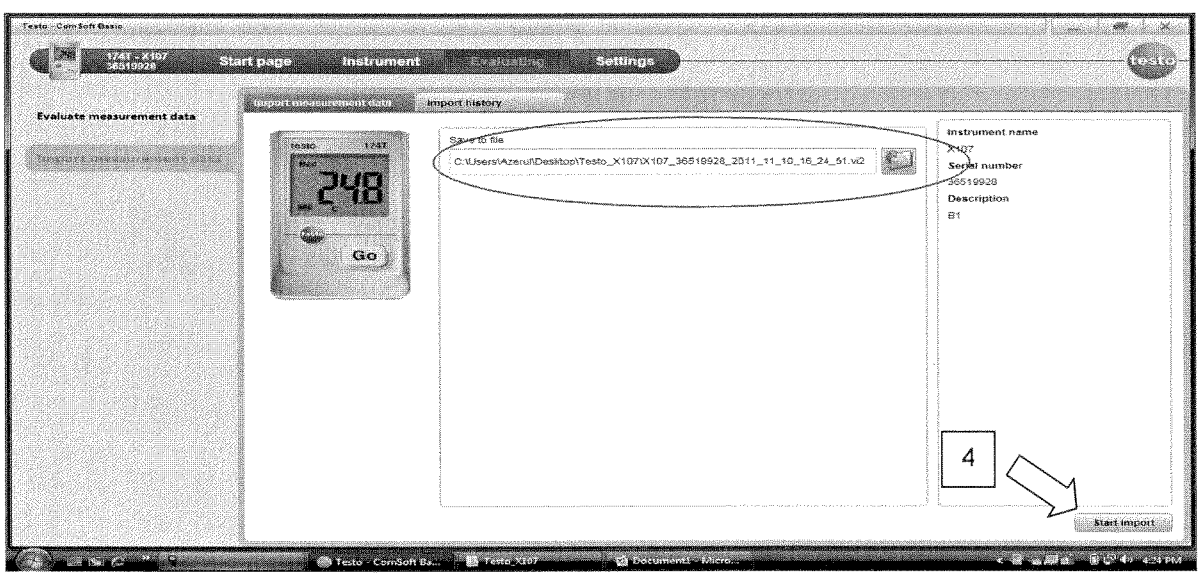


Fig 5.9: Rename save files location (red circle) and Start import (box 4).

Step 7: Data will appear in graph and table after you click start import.(fig 5.10).

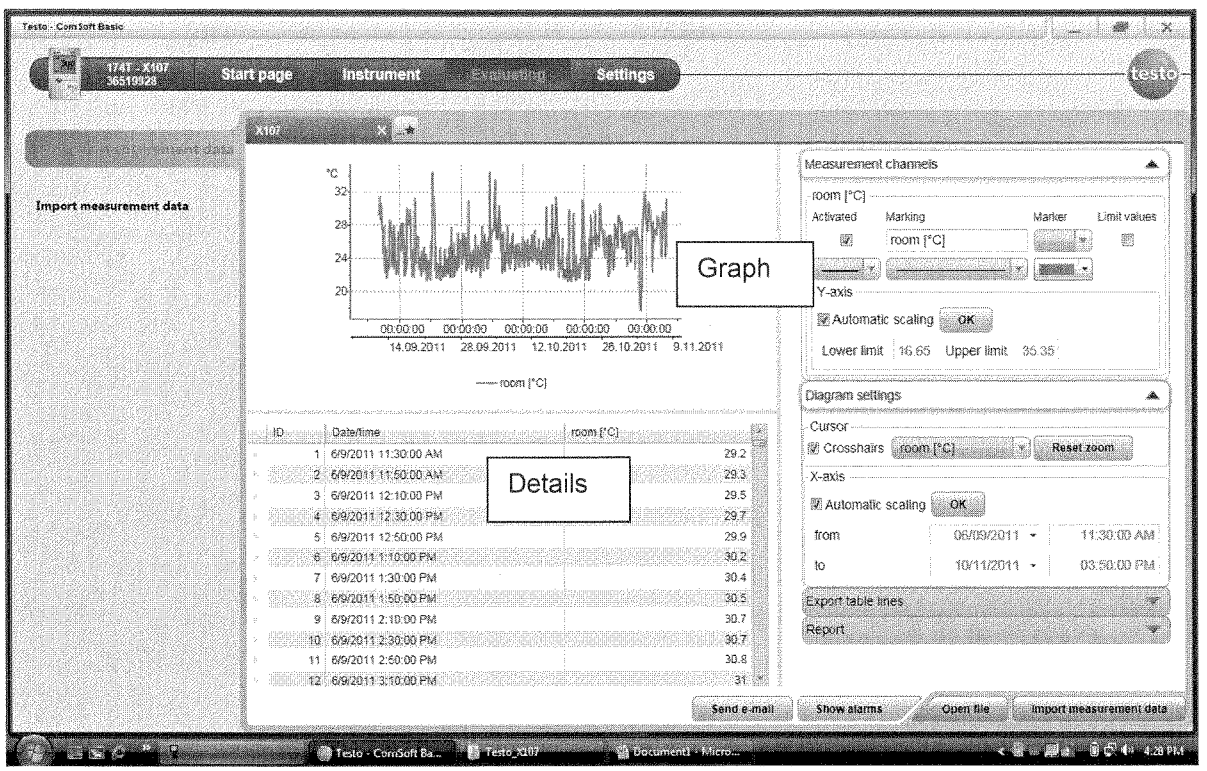


Fig 5.10: Data overview for graph and table

5.5.3 TESTO 174T Export report

Report data can be selecting either Diagram (graph) or Table (details) and can be save using xls or PDF format. Refer fig 5.11 and 5.12. and 5.13

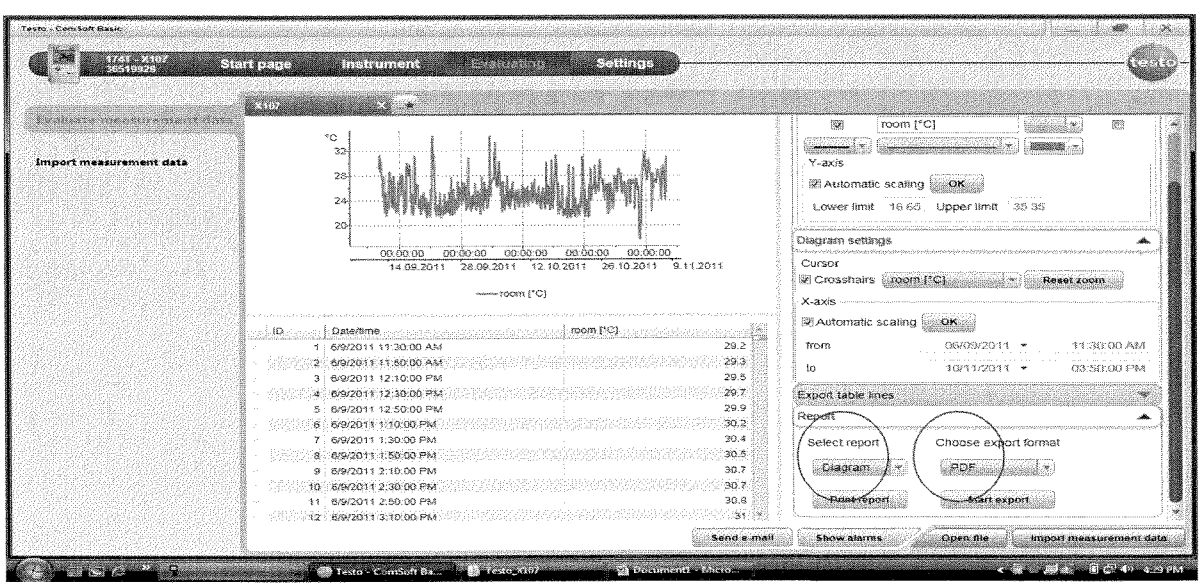


Fig 5.11 : Report selection and export format

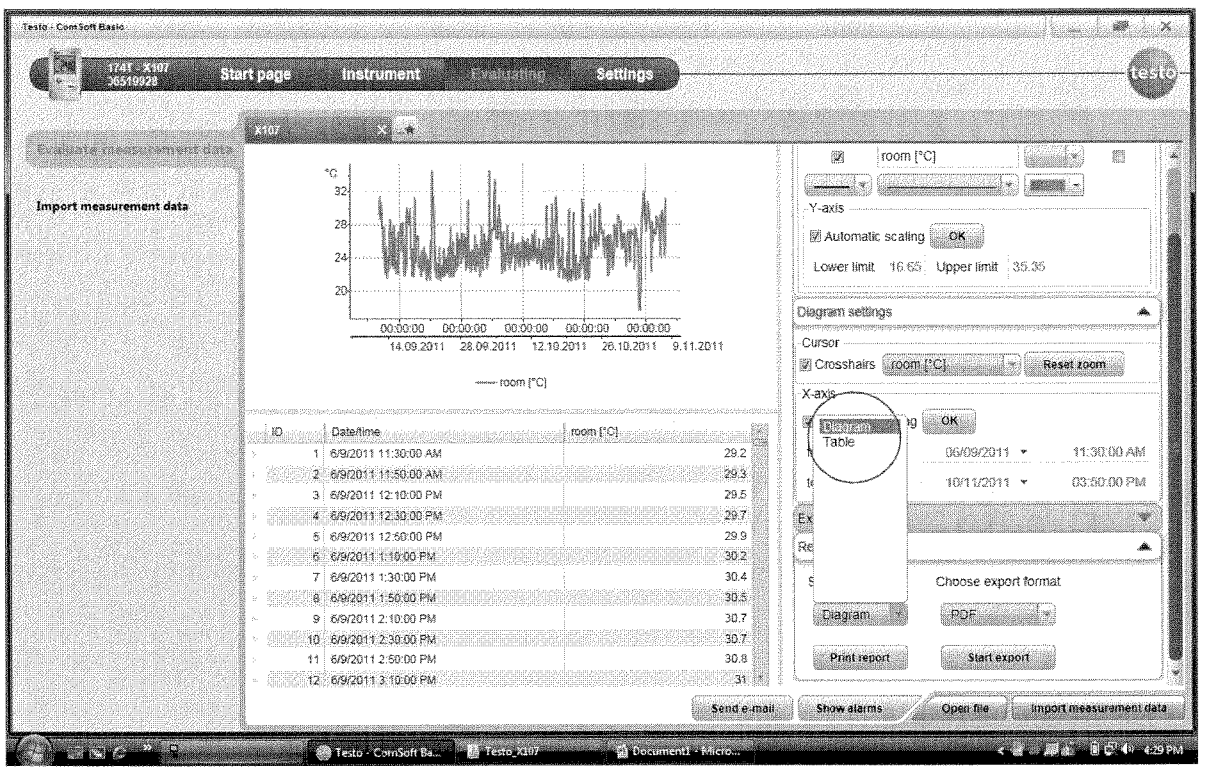


Fig 5.12 : Diagram select

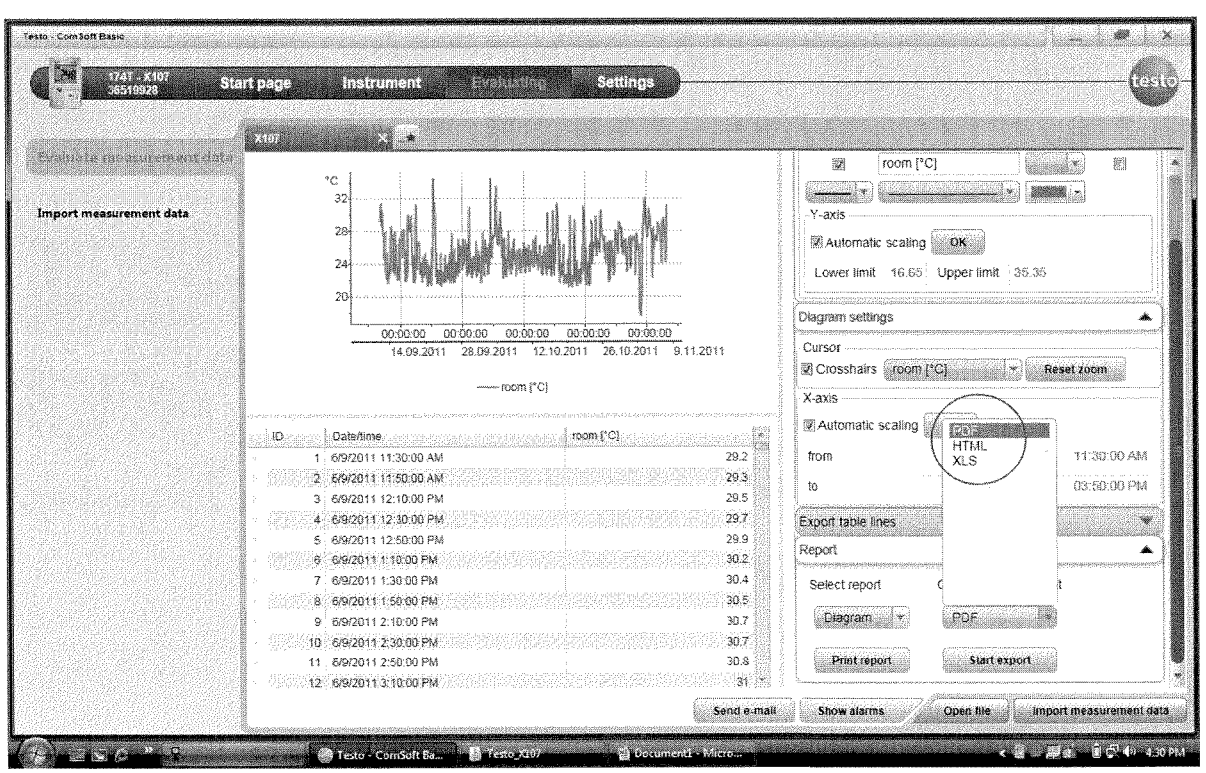


Fig: 5.13 Export select format

For our monitoring purpose we will select Table for type of report and select xls (excel format) as our format of record. Refer fig 5.14 and 5.15

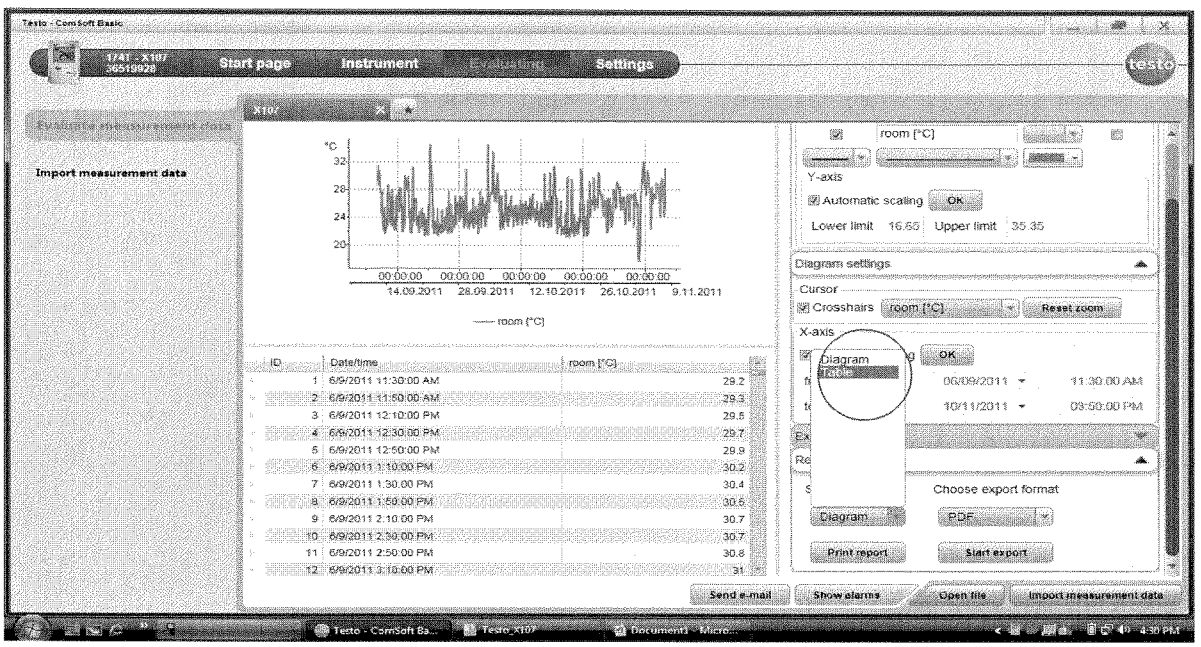


Figure 5.14 : Report select as Table

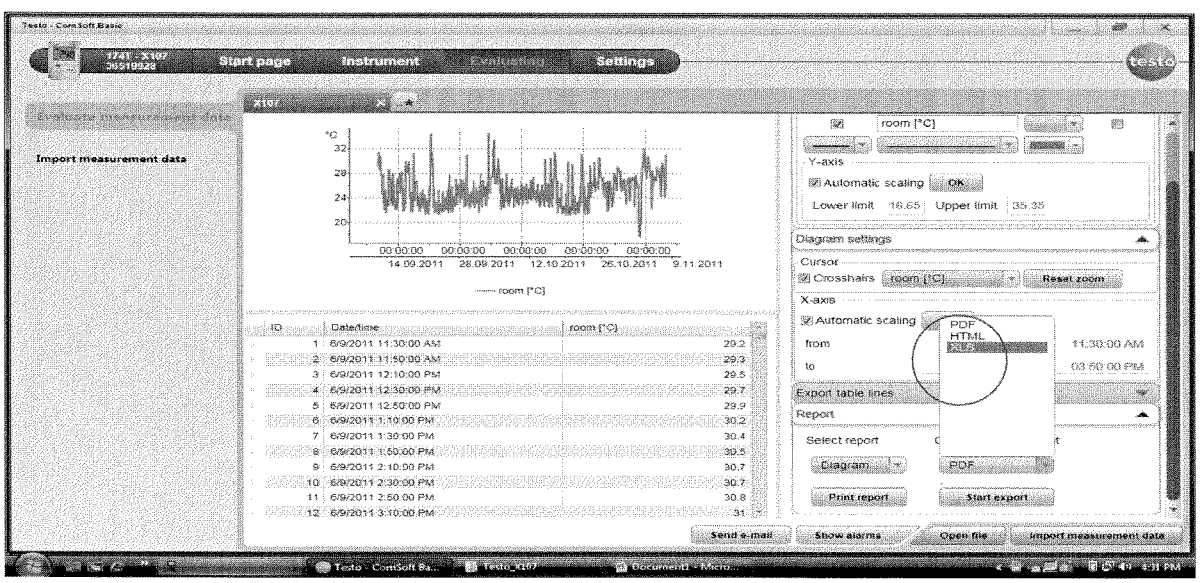


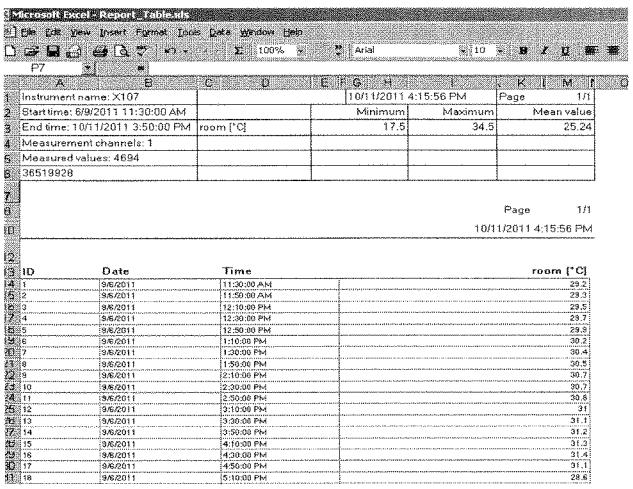
Fig 5.15: Export format in XLS

5.5.4 Save the data files and select location

Once you select import measurement data refer fig 4.15 the software will request location for filed saved.

Step 8: Please create a folder under testo readout/Testo_X107/ spesific train_specific loc_specific date

Eg: Testo X107/ X107A1_2011_12_24



Instrument name: X107			10/11/2011 4:15:56 PM	Page 1/1
Start time: 6/9/2011 11:30:00 AM		Minimum	Maximum	Mean value
End time: 10/11/2011 3:50:00 PM	room [°C]	17.5	34.5	25.24
Measurement channels: 1				
Measured values: 4694				
36519928				

Page 1/1
10/11/2011 4:15:56 PM

ID	Date	Time	room [°C]
1	9/6/2011	11:30:00 AM	29.2
2	9/6/2011	11:50:00 AM	29.3
3	9/6/2011	12:10:00 PM	29.5
4	9/6/2011	12:30:00 PM	29.7
5	9/6/2011	12:50:00 PM	29.9
6	9/6/2011	1:10:00 PM	30.2
7	9/6/2011	1:30:00 PM	30.4
8	9/6/2011	1:50:00 PM	30.5
9	9/6/2011	2:10:00 PM	30.7
10	9/6/2011	2:30:00 PM	30.7
11	9/6/2011	2:50:00 PM	30.8
12	9/6/2011	3:10:00 PM	31
13	9/6/2011	3:30:00 PM	31.1
14	9/6/2011	3:50:00 PM	31.2
15	9/6/2011	4:10:00 PM	31.3
16	9/6/2011	4:30:00 PM	31.4
17	9/6/2011	4:50:00 PM	31.1
18	9/6/2011	5:10:00 PM	28.6

Fig5.16: Sample table format

To open import previous files which you already saved on evaluate measurement data menu select open file. Then another window will appear on you screen.Select which file you required and choose open. Refer fig 5.17.

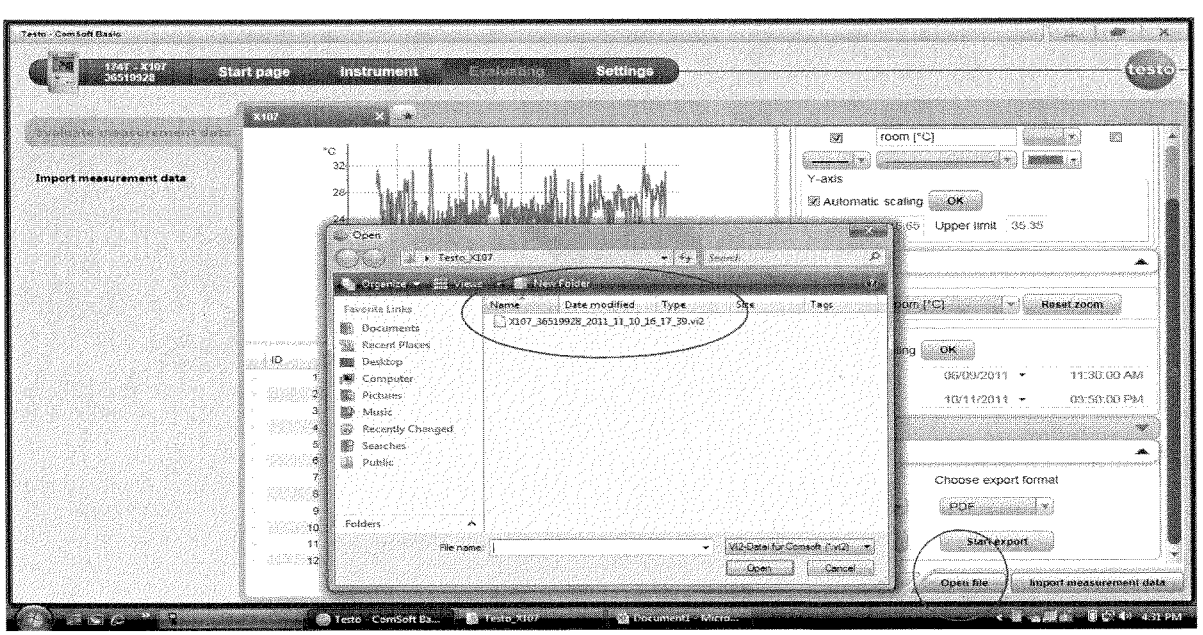


Fig 5.17 open previous import file

It is important to confirm that you a fix data logger back to its original location. To confirm the Data logger location you can select instrument menu. From select menu you can see exact train and the location. Refer fig 5.18.

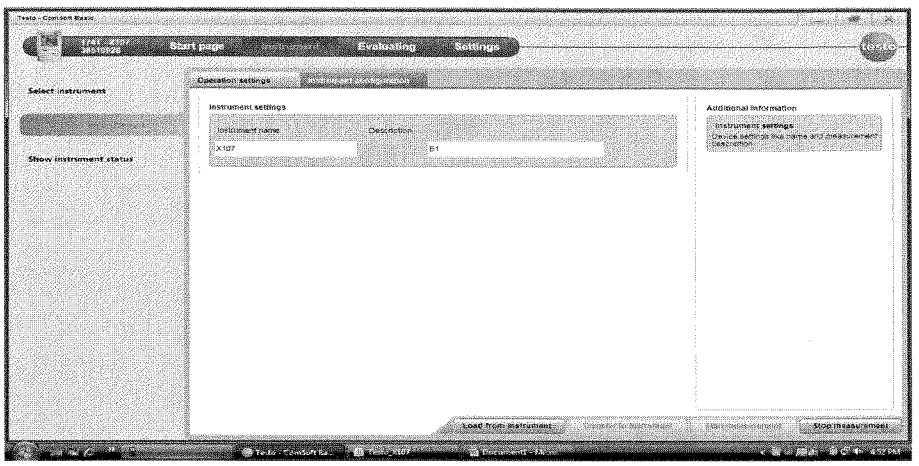


Fig 5.18: Instrument configuration

From instrument menu also you can check battery status and other devices information eg: measuring cycles, serial number, operating mode, which under show instrument status window refer fig 5.19.

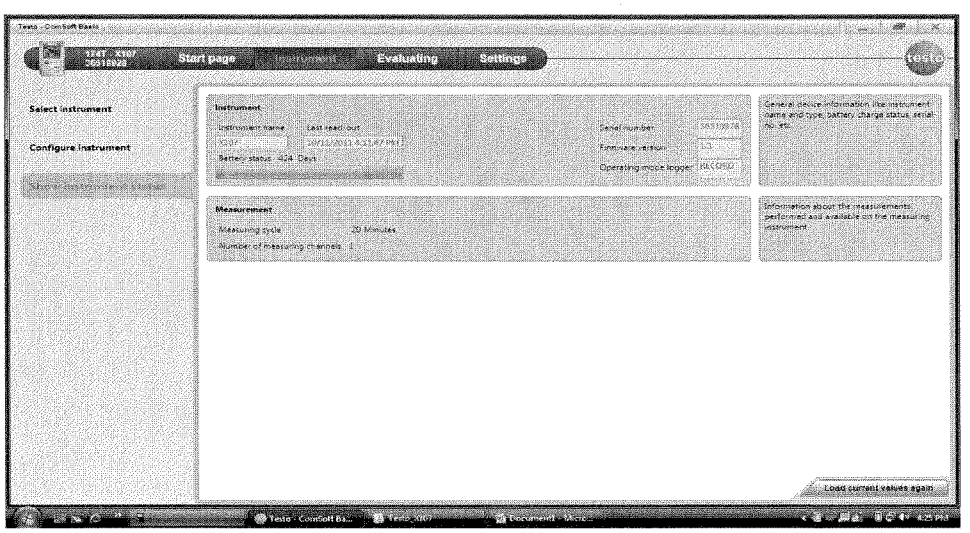


Fig 5.19 : Instrument status

6 Technical Data

Parameter .....Temperature °C / °F
Sensor.....NTC
Number of measuring channels .....1 channel (internal)
Measuring range .....-30 to +70 °C
Accuracy .....±0.8 °C (-30 to -20.1 °C)
.....±0.5 °C (-20 to +40 °C)
.....±0.8 °C (+40.1 to +70 °C)
Resolution .....0.1 °C
Measuring rate .....1 min to 4 h (freely selectable)
Storage temperature .....-40 to +70 °C
Operating temperature .....-30 to +70 °C
Operating temperature/Display.....-30 to +65 °C
Memory capacity.....3900 readings
Protection class.....IP 65
Housing .....ABS
Dimensions in mm (lxwxh) .....55 x 35 x 14
Weight 24g
Battery .....CR 2032 Lithium
Battery life .....Approx. 500 days (with original Testo battery)