

TIS700

SAFETY PAT ELITE



INSTRUCTION MANUAL VERSION 1.00

NOTE

**THE INSTRUMENT MUST ONLY BE USED BY SUITABLY
TRAINED AND COMPETENT PERSON(S).**

CONTENTS:

- 1.0 Introduction
- 2.0 Accessories
- 3.0 Safety Instructions
 - 3.1 Safety Symbols
 - 3.2 Warranty
- 4.0 Instrument Layout, display information & symbols
- 5.0 Operation of Instrument
 - 5.1 Power On / Off
 - 5.2 Lead(s) Calibration
 - 5.3 Insulation Resistance Test Voltage / Appliance Voltage Settings.
 - 5.4 Class I Testing
 - 5.5 Class II Testing
 - 5.6 Cord / Extension Lead Testing
 - 5.7 Socket Test
 - 5.8 Memory Function
 - 5.9 Memory Settings
 - 5.10 Importing Preset Lists / Custom Data
 - 5.11 Exporting Results To SD Card
 - 5.12 Delete Test Data
 - 5.13 Enable / Change Password
 - 5.14 Edit Date / Time
 - 5.15 Edit Display Font Size
 - 5.16 Enable / Disable Key Tone
- 6.0 Technical Specifications
- 7.0 Maintenance & Service
 - 7.1 Replacing Batteries
 - 7.2 Cleaning

1.0- INTRODUCTION

Thank you for purchasing the TIS700 Safety Pat Elite.

The TIS700 Safety Pat Elite is a handheld portable appliance tester featuring the following:

- Class I Safety Test:
>200mA Earth Bond / Continuity Measurement.
250V / 500V Insulation Resistance Measurement.
110V/230V Sub-Leakage Measurement.
- Class II Safety Test:
250V / 500V Insulation Resistance Measurement.
110V / 230V Sub-Leakage Measurement.
- Extension / Cord Test:
>200mA Earth Bond / Continuity Measurement.
250V / 500V Insulation Resistance Measurement.
L / N / PE Polarity Test
- Mains Socket Test: - L / N / PE Polarity Test
- Battery & Mains Powered (Using supplied 12V Mains Adaptor)
- 3.5" Display and Full QWERTY Keyboard.
- 3000 Result Internal Storage Capacity

2.0 - ACCESSORIES

- AC / DC Mains Adaptor1pcs
- IEC Test Lead1pcs
- Earth Continuity / Bond Lead1pcs
- Probe & Crocodile Clip1pcs
- AA (LR6) 1.5V Battery8pcs
- Instruction Manual1pcs
- 8GB SD Card1pcs
- Soft Carry Case1pcs
- Neck Strap1pcs

3.0 - SAFETY INSTRUCTIONS

Warnings – Please read and follow the following:

Before using the instrument, test leads and / or the adaptors please ensure there are no signs of damage as this could result in electrical shock and / or inaccurate results.

- Once the battery indicator appears, please either use the mains adapter or replace the batteries. As low battery level can produce inaccurate results.
- Do not use / store the instrument in high temperature, humid, flammable, or electromagnetic environments as this could result in injury, damage to the instrument and / or inaccurate results.
- If the instrument / equipment is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired.
- Do not connect test leads to live systems or hazardous voltages unless stated within the manual.
- Do not touch any exposed test terminals during testing, as hazardous voltages may be present due to a faulty appliance / lead.

Declaration of Conformity

This product has been manufactured to the specifications detailed in the instruction manual.

The product conforms to the following standards:

BS EN61326

BS EN61010-1

3.1 SAFETY SYMBOLS

	Note-Important safety information, refer to the instruction manual.
	Caution, possibility of electric shock
	Equipment protected throughout by double insulation or reinforced insulation.
	Complies with European (EU) safety standards
	Earth (ground) TERMINAL
	Direct current
	Alternating current

3.2 WARRANTY

NEW INSTRUMENTS HAVE A WARRANTY PERIOD OF: 1 YEAR FROM THE DATE OF PURCHASE BY THE USER, however the warranty period can be extended by a further year by having the instrument calibrated by: Test Instrument Solutions / Calibrations.

(A copy of the original purchase invoice may be requested to validate the purchase date).

This warranty period includes parts and labour only.

Any unauthorized repair / adjustment will void the warranty.

For service / calibration / repair requirements, please contact:

TEST INSTRUMENT SOLUTIONS LIMITED

UNIT 12/14, LUDDITE WAY BUSINESS PARK

RAWFOLDS WAY

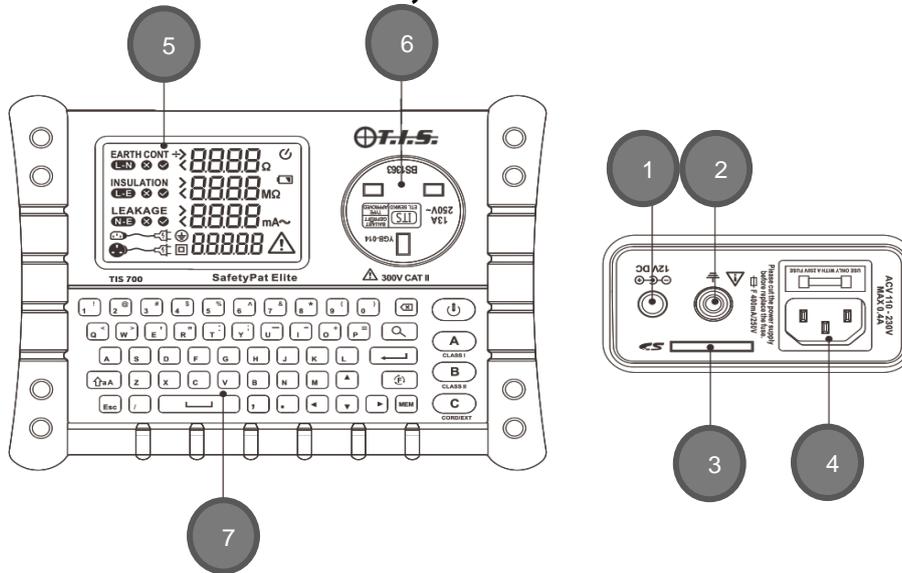
CLECKHEATON

BD19 5DQ

Tel: 01274 752407

Email: Sales@testinstrumentsolutions.co.uk

4.0 INSTRUMENT LAYOUT, DISPLAY INFORMATION & SYMBOLS



1	12VDC Power Connector: Power connector when using external 12VDC power supply
2	Grounding resistance connector (Class I appliances)
3	SD Card Holder: For inserting SD card
4	Input Socket: Input test voltage for CORD and socket test
5	3.5 inch LCD screen
6	Output Socket: Test voltage output for CLASS I, CLASS II, CORD test
7	Keyboard: For character input and test operations

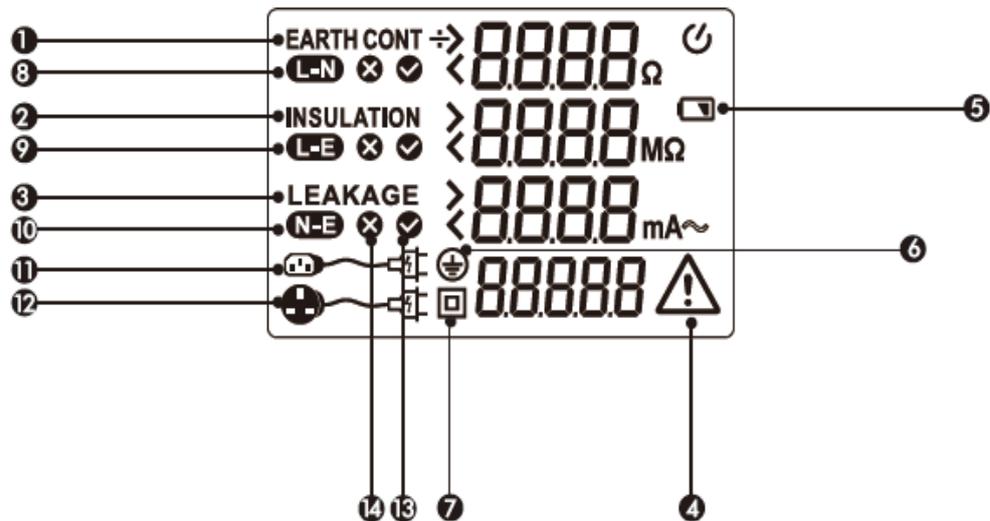
Button Description

	POWER ON/OFF
	TEST_A Key
	TEST_B Key
	TEST_C Key
	Function Key
	Search Key
	Delete Key
	Enter Key
	ESC Key

Display Information & Symbols

	Indicator	Description
1	EARTHCONT	Ground Resistance Test / Reading result
2	INSULATION	Insulation Resistance Test / Reading result
3	LEAKAGE	Leakage Current Test / Reading result
4		The warning of DC voltage output
5		Low Battery Symbol
6		Earth-leakage protection/class I Test

7		Double Insulated / Class II Test
8		Live - Neutral
9		Live - Earth
10		Neutral - Earth
11		CORD test
12		Power socket test
13		Pass Symbol
14		Fail Symbol



5.0 OPERATION OF INSTRUMENT

5.1 POWER ON / OFF

Press the power button  to switch the instrument on, the instrument will then load internal configuration data “Start” will be displayed on the bottom right corner.

The process will take 30-60 seconds, a notification tone will indicate when the configuration is completed.

5.2 CALIBRATION

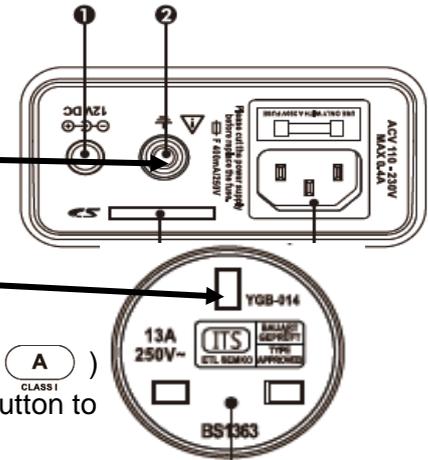
The test leads / cables will require calibrating, either when using the test leads / cables for the 1st time or when replacing the test leads / cables. (The calibration process will compensate for the test lead / cable resistance when conducting Earth Bond / Continuity measurements).

Calibrating the Earth Bond (Class I) Test Lead

Insert the Earth Bond lead into the input terminal (2)

Using the probe supplied, insert the probe into the earth pin of the output socket.

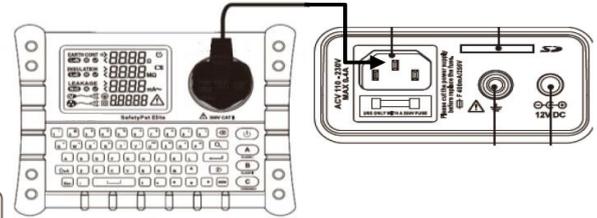
Whilst the instrument is switched on Press and hold the  and  keys together until the calibration interface is displayed, then press the A () key this will then perform the lead calibration adjustment, press the ESC button to exit the calibration interface.



Calibrating the IEC / Cord Earth Lead Resistance

Insert the plug of the IEC lead supplied into the output socket and the IEC socket into the input socket as shown.

Whilst the instrument is switched on Press and hold the **(F)** and **(A)** keys together until the calibration interface is displayed, then press the **(C)** key to calibrate the IEC lead's resistance, press the ESC button once the process has been completed.



5.3 INSULATION RESISTANCE TEST VOLTAGE / APPLIANCE VOLTAGE SETTINGS.

The insulation resistance test voltage and working test voltage 110V / 230V (Sub leakage calculation) can be changed, to suit the appliance to be tested.

Changing the Insulation resistance test voltage

Whilst the instrument is switched on press the **(F)** and **(B)** together until the voltage interface is displayed. Using the enter button (**(↵)**) select Insulation the output voltage can then be changed using the up and down arrow keys, using the enter key (**(↵)**) to confirm the required output voltage.

Changing the Leakage Voltage

Whilst the instrument is switched on press the **(F)** and **(B)** together until the voltage interface is displayed. Press the down arrow key and select leakage using the enter key.

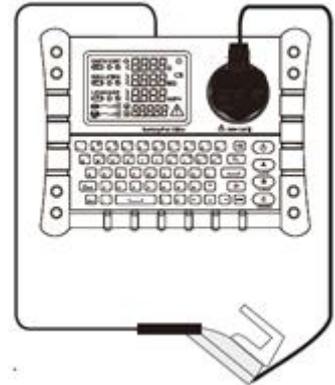
The leakage voltage can then be changed between 110V & 230V modes using the up and down arrow keys, use the enter key (**(↵)**) to confirm the voltage setting required.

5.4 CLASS I TEST

Connect the appliance to be tested to the TIS700, using the cord / lead supplied.

Insert the Earth Bond lead into the input terminal (2) then connect the lead to a conductive part of the Class I appliance.

Once ensuring a good connection press the  test button to start the measurement process:



Earth Bond Resistance Measurement

If the measured resistance is greater than 25Ω to instrument will stop the test sequence, the buzzer will sound and ground icon will be shown to indicate either an incorrect connection or insufficient earth. Once a sufficient earth has been found the measurement will continue and the resistance will be displayed.

Insulation Resistance Measurement

If the TIS700 detects an insufficient load capacity a “Lo Load” error indication may be displayed. Either switch the appliance on (press and hold the switch of the appliance) or press the  key to continue with the insulation resistance measurement.

Leakage Measurement

If the TIS700 detects an insufficient load capacity a “Lo Load” error indication may be displayed. Either switch the appliance on (press and hold the switch of the appliance) or press the  key to continue with the leakage measurement.

Once the test sequence has been completed the appliance details and results can be stored. Use the “MEM” to confirm and save the information or use the “ESC” button to discard the results.

5.5 CLASS II TEST

Connect the appliance to be tested using lead / cord supplied.

Press the  test button to start the measurement process.

Insulation Resistance Measurement

If the TIS700 detects an insufficient load capacity a “Lo Load” error indication may be displayed.

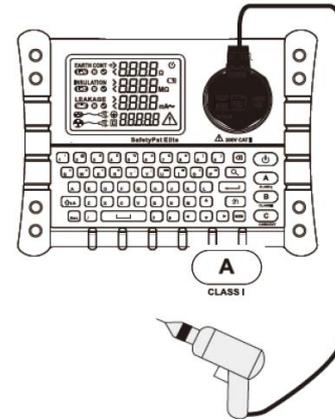
Either switch the appliance on (press and hold the switch of the appliance) or press the  key to continue with the insulation resistance measurement.

Leakage Measurement

If the TIS700 detects an insufficient load capacity a “Lo Load” error indication may be displayed.

Either switch the appliance on (press and hold the switch of the appliance) or press the  key to continue with the leakage measurement.

Once the test sequence has been completed the appliance details and results can be stored. Use the “MEM” to confirm and save the information or use the “ESC” button to discard the results.



5.6 CORD / EXTENSION LEAD TEST

Testing Cord / IEC leads – Connect the plug to the output socket and the other end into the IEC input socket. (Additional lead accessories / adaptors may be needed to connect to the IEC input socket).

Testing extension leads – Connect the plug of the extension lead into the output socket, then use a calibrated IEC lead to plug into the extension and IEC input socket.

Earth Bond / Continuity Measurement

If the connection is incorrect or the resistance is greater than 25Ω the buzzer will sound and a ground icon will be displayed.

Once a sufficient earth has been found the measurement will continue and the resistance will be displayed.

Insulation Resistance Measurement

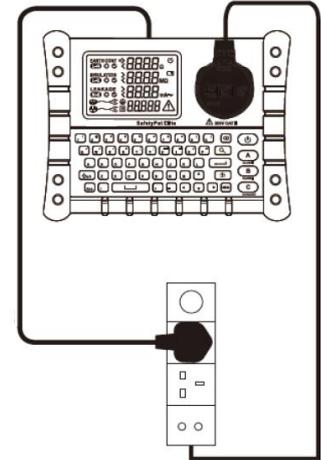
If the extension lead to be tested has anti-surge technology the insulation resistance test voltage will have to be reduced to 250V to ensure measurement accuracy. Refer to section 5.3 to change the test voltage.

Polarity Test

This measurement will indicate either correct polarity, Open Circuit, Short Circuit or Reversed polarity error messages.

Once the test sequence has been completed the appliance details and results can be stored.

Use the “MEM” to confirm and save the information or use the “ESC” button to discard the results.



5.7 SOCKET / POLARITY TEST

Connect the IEC lead supplied to the TIS700 by the IEC input socket, then connect the plug to the socket to be tested.

Switch the socket under test on, the TIS700 will then automatically perform the test.

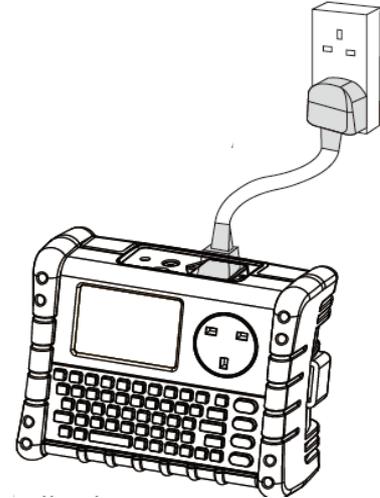
Test Indications:

Correct Polarity Indication - LN✓, LE✓, NE✓

Live Fault Indication - LN✗, LE✗, NE✓

Neutral Fault Indication - LN✗, LE✓, NE✗

Ground Fault Indication - LN✓, LE✗, NE✗



Please note all other functions / operations will be disabled during the live socket / polarity test function.

Normal operation of the instrument will continue once mains voltage is no longer detected.

5.8 MEMORY FUNCTION

Once testing has been completed, the results can be reviewed by pressing the “MEM” button.

The Memory function interfaces example are as follows:

TYPE : CLASS II	0019/3000
E/B Res : N/A	
Insulation : 19.99 MR	
Sub Leakage : 0.10 mA~	
Polarity : N/A	
Pass/Fail : Pass	Date:2017/12/04 11:40:30

<u>Appliance</u> : Drill	<u>Appliance ID</u> : N/A
<u>Fuse</u> : 13A	<u>Visual</u> : PASS
<u>Location</u> : Workshop	<u>Building</u> : 14#

<u>User</u> : Smith	<u>RN</u> : TEST0001
Customer Name : XXXXXXXXXXXXXXXX	
<u>Site Address</u> : xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	

The picture above shows the first type memory function interface. (FONT SIZE is set as SMALL, all information can be displayed in one page)

TYPE : CLASS II	0019/3000
E/B Res : N/A	
Insulation : 19.99 MR	
Sub Leakage : 0.10 mA~	
Polarity : N/A	
Pass/Fail : Pass	Date:2017/12/04 11:40:30

<u>User</u> : Smith	
<u>RN</u> : TEST0001	≡
Customer Name : XXXXXXXXXXXXXXXX	
<u>Site Address</u> : xxxxxxxxxxxxxxxxxxxxxxxxxxxx	

The picture above shows the second type memory function interface. (FONT SIZE is set as MEDIUM, information will be displayed in different pages, the page can be switched by pressing ▲ or ▼ button. FONT SIZE set as LARGE/EX.LARGE will be displayed similar)

Note: In different FONT SIZE, the interface will displayed in small differences, but the operation mode is basically the same. If there is no excessive differences in the following instructions, no special explanation will be given.

5.9 MEMORY SETTINGS

The following information / appliance details & lists can be stored on the TIS700:

Data	Maximum Characters	Maximum list capacity
Appliance	30	100
Appliance ID	14	N/A
Visual	14	2
Location	30	100
Building	30	100
User	30	20
Report Number	30	N/A
Customer Name	30	N/A
Site Address	98	N/A

The internal preset data lists can be edited by either the TIS700 Interface or via the SD card by:

- Open the SD card using a laptop or desktop computer
- Open the folder System files
- Select the .TXT list that you require editing i.e. Appliances.txt
- Input data, if maximum storage capacity has been reached delete previous data i.e. appliance description – Iron, or Kettle, (Please note that all data entries must be separated with a comma)
- Save the .TXT File
- Import the data to the TIS700.

5.10 IMPORTING PRESET LISTS / CUSTOM DATA:

- Whilst the TIS700 is switched on, press and hold the  key to enter the function / settings menu.
- Using the up and down arrow keys select Import custom data function
- Press the enter key () to import the data.

```
Keypad tone: ON
Edit Date/Time: GO
Password Config: ENABLE
Copy Data to SD: GO
Import Custom Data: GO
FONT SIZE: MEDIUM
Date:2018/02/09 11 : 33 : 42
```

5.11 EXPORTING RESULTS TO THE SD CARD

Exporting the test results can be processed one of two ways:

Export all results

- Whilst the TIS700 is switched on, press and hold the  key to enter the function / settings menu.
- Using the up and down arrow keys select: Copy data to SD function.
- Press the enter key () to export all the results to the SD card.

```
Keypad tone: ON
Edit Date/Time: GO
Password Config: ENABLE
Copy Data to SD: GO
Import Custom Data: GO
FONT SIZE: MEDIUM
Date:2018/02/09 11 : 33 : 42
```

Exporting custom results / reports

- Whilst the TIS700 is switched on, press the “MEM” key to access the internal memory.
- Press the search key () to access the search field.
- Using the left and right arrow keys select from one of the following search criteria's

Date:

User:

Appliance ID:

Search by: Date

Input the test date of the results required (DD/MM/YYYY) i.e. 02/01/2019 and press the enter key ()

The TIS700 will then search the internal memory for any results stored on the requested date.

Once the search has finished the user will then be asked if they would like to export the result(s) Y/N.

Press the Y Key to export the results or the N key to return to the search menu.

The report can then be found on the SD card file name: Search by date:_xxxxxxx.

Search by: User

Input the User details (this field is case sensitive, so please ensure that the user name is identical) and press the enter key (↵).

The TIS700 will then search the internal memory for all the results stored by the requested user.

Once the search has finished the user will then be asked if they would like to export the result(s) Y/N.

Press the Y Key to export the results or the N key to return to the search menu.

The report can then be found on the SD card file name: Search by user:_xxxxxxx

Search by: Appliance ID

Input appliance ID "From"

Press the down arrow key to select the "To" field and input the appliance ID you would like the search to (These fields are case sensitive, so please ensure that the appliance ID is identical).

For example:

Appliance ID:

From ID: ID01001

To: ID01008.

Press the enter key to start.

Once the search has finished the user will then be asked if they would like to export the result(s) Y/N.

Press the Y Key to export the results or the N key to return to the search menu.

The report can then be found on the SD card file name: Search by appliance ID:_xxxxxxx.

5.12 DELETE TEST DATA

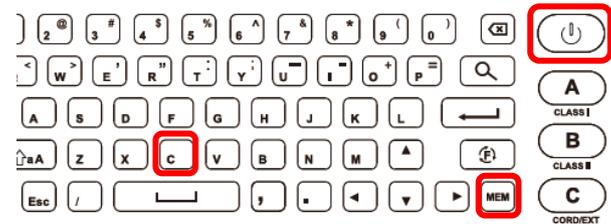
Delete individual test results / data:

- Press the "MEM" key to access the memory function
- Select the result to be deleted using the up and down arrow keys
- Press the backspace / delete key () (A password may be required, if the password functionality has been enabled). Default Password: 000000.

Delete all test results / data:

- Whilst the TIS700 is switch off press and hold the MEM & C keys
- Whilst holding the MEM & C key switch the TIS700 on
- Input the default or customer password
- Press the enter key () to confirm.

(Please note that once the results / data have been deleted it cannot be restored).



5.13 ENABLE / DISABLE, CHANGE PASSWORD

- Whilst the TIS700 is switched on, press and hold the  key to enter the function / settings menu.
- Using the up and down arrow keys select Password Config: and press enter key ().
- To enable / disable the password input the default password: 000000 and press enter key ().

```
Keypad tone: ON
Edit Date/Time: GO..
Password Config: ENABLE
Copy Data to SD: GO..
Import Custom Data: GO..
FONT SIZE: MEDIUM
Date:2018/02/09 11 : 33 : 42
```

```
Password:  Disable   Enable   Change
The current setting!
```

To change the password

- Use the right hand arrow key to select “Change” and press enter key ().
- Input old password, then press the enter key ().
- Input the new / custom password, then press the enter key () to confirm.
-

(Please note that the instrument would have to be returned to the manufacturer with proof of purchase, for the password resetting if the user was to misplace / forget the custom password).

5.14 EDIT TIME & DATE

- Whilst the TIS700 is switched on, press and hold the  key to enter the function / settings menu.
- Using the up and down arrow keys select Edit Date / Time: and press enter key (.
- Enter the date (YYY/MM/DD) and time (hh:mm:ss)
- Press the enter key ( to confirm.

```
Keypad tone: ON
Edit Date/Time: GO..
Password Config: ENABLE
Copy Data to SD: GO..
Import Custom Data: GO..
FONT SIZE: MEDIUM
Date:2018/02/09 11 : 33 : 42
```

5.15 EDIT DISPLAY FONT SIZE

- Whilst the TIS700 is switched on, press and hold the  key to enter the function / settings menu.
- Using the up and down arrow keys select Font Size and press the enter key (.
- Using the up and down arrow keys select the desired font size and press the enter key (.

```
Keypad tone: ON
Edit Date/Time: GO..
Password Config: ENABLE
Copy Data to SD: GO..
Import Custom Data: GO..
FONT SIZE: MEDIUM
Date:2018/02/09 11 : 33 : 42
```

5.16 KEYPAD TONE ON / OFF

- Whilst the TIS700 is switched on, press and hold the  key to enter the function / settings menu.
- Using the up and down arrow keys select Keypad tone: and press the enter key (.
- Using the up and down arrow keys select the either OFF or ON
- Press enter ( to confirm.

```
Keypad tone: ON
Edit Date/Time: GO..
Password Config: ENABLE
Copy Data to SD: GO..
Import Custom Data: GO..
FONT SIZE: MEDIUM
Date:2018/02/09 11 : 33 : 42
```

6.0 TECHNICAL SPECIFICATIONS

Function	Range	Accuracy	Technical parameters
Grounding performance test	0Ω~19.99Ω	±5%+3	Test current>200mA (R < 2Ω)
			If 0.01~0.10Ω passed, display "√"
			If 0.10~0.50Ω passed, display "√" and flash
			If 0.51~19.99 failed, display "x"
			Test voltage 5VDC, test time 5S
Insulation resistance test	Test voltage 500VDC	—	Test current> 1mA (R = 500KΩ) Test time 5S
	0.2MΩ~19.99MΩ	±5%+3	
	Test voltage 250VDC	—	Test current> 1mA (R = 250KΩ), test time 5S
	0.2MΩ~19.99MΩ	±5%+3	
	CLASS I	—	If ≥1MΩ passed, display "√"
	CLASS II	—	If ≥2MΩ passed, display "√"
	CORD	—	If ≥1MΩ passed, display "√"
Leakage current test	0.10mA~10mA	±5%+3	Test voltage 50V rms, frequency 50Hz Test time 5S
	CLASS I	—	If 0.1~0.75mA passed, display "√" If 0.75~3.50mA passed, display "√" and flash If 3.51~10.50mA failed, display "x"
	CLASS II	—	If 0.1~0.25mA passed, display "√" If 0.25~10.50mA failed, display "x"

Polarity test	Correct	Display "LN ✓, LE ✓, NE ✓, GOOD"	
	L open	"LN x, LE x, NE ✓, OPEN"	
	N open	"LN x, LE ✓, NE x, OPEN"	
	G open	"LN ✓, LE x, NE x, OPEN"	
	L_N short	"LN x, LE ✓, NE ✓, SHOR"	
	L_G short	"LN ✓, LE x, NE ✓, SHOR"	
	N_G short	"LN ✓, LE ✓, NE x, SHOR"	
	L_N reverse	"LN x, LE ✓, NE ✓, CORS"	
	L_E reverse	"LN ✓, LE x, NE ✓, CORS"	
	N_E reverse	"LN ✓, LE ✓, NE x, CORS"	
	Multiple errors	"LN x, LE x, NE x, FAIL"	
Power socket test	Correct	Display "LN ✓, LE ✓, NE ✓"	230VAC±15% 110VAC±15%
	Open Neutral	Display "LN x, LE ✓, NE x"	
	Open ground	Display "LN ✓, LE x, NE x"	

Environmental Ratings:

Operating Temperature Range: 0°C – 40°C

Storage Temperature Range: -25°C – 65°C

Operating / Storage Altitude: <2000m

IP Rating: IP20

7.0 MAINTENANCE & SERVICE

The instrument must be calibrated periodically by an authorized service center (see section 3.2), to ensure the accuracy of the instrument.

7.1 REPLACING BATTERIES

When the battery warning symbol (🔋) appears either replace the batteries or plug the mains adaptor in.

- Disconnect all test leads & appliances before replacing the batteries.
- Ensure the polarity of the batteries is correct.
- Required Batteries: X8 AA (LR6)

7.2 CLEANING & USER CHECKS

Clean only with a dry cloth.

Do not use solvents.

Before use:

Ensure that the instrument is clean and dry.

Visual inspect the case, all leads and connectors, any damage / wear must be rectified to ensure user safety.