TX8000

Operating Instructions

Version 1.1

BI Communications
Innovation through Technology

Contents

Section 1 - Notices

1.1 Receiving the TX8000

Upon delivery of the TX8000, ensure the contents are consistent with the packing list, notify your supplier of any missing items.

If the equipment appears damaged, notify your carrier and supplier immediately, giving a detailed description of any damage, save the damaged packaging to substantiate your claim.

The TX8000 Includes, 0.5 mtr test lead, shoulder/neck strap, screw driver, 4 x AA batteries, protective case and Quick start instruction manual.

1.2 Safety Notices

WARNING

- This instrument meets the safety requirements of IEC61010-1: 1995
- TheTX8000 is designed for use on de-energized circuits only.
- Connection to line voltages will damage the instrument and could be hazardous to the operator
- This instrument is protected against connection to telecom network voltages according to EN61326-1.
- Safety is the responsibility of the operator

International Electrical Symbols

This symbol signifies that the instrument is protected by double or reinforced insulation. Use only specified replacement parts when servicing the instrument.

This symbol on the instrument indicates a WARNING, and that the operator must refer to the user manual for instructions before operating the instrument. In this manual, the symbol preceding instructions indicates that if the instructions are not followed, bodily injury, installation/sample and product damage may result.

Risk of electric shock. The voltage of the parts marked with this symbol may be dangerous.

1.3 Standards

The TX8000 has been manufactured in accordance with BI Communications ISO 9001-2015 quality system and meets with the following international standards:

Safety	IEC 61010-1
	EN 60950
EMC	BS/EN 61326-1
Water/ Dustproof to IP67	

Section 2- Introducing the TX8000

The TX8000 is a 6 Km range Time Domain Reflectometer housed in a rugged over moulded case being water proof to IP67 and drop resistant, designed for outdoor use, but sufficiently small and light weight for general use and may be operated using one hand. Using a 3.5-inch QVGA colour display information is clearly displayed; an illuminated keypad makes the TX8000 ideal for use in poorly lit areas.

Using 11 range scales with a first range of 7 meters near end faults are clearly visible. Using the scan hold function faults may be retained on screen for closer examination or when in scan mode intermittent faults may be easily identified. By using the trace hold and compare feature the current trace may be displayed and compared with a new trace. The user variable gain function allows small events on the wave form to be magnified for clearer identification. With dual cursors each cursor giving its length measurement and a differential distance between cursors the length of the fault may be identified. To assist in the identification of faults a number of fault types may be super imposed over the displayed fault for easier identification.

2.1 TX8000 features

2.2 Specifications.

Ranges	meters	7, 15, 30, 60, 120, 250, 500, 1km, 2km, 3km, 6km
	Feet	23, 49, 98, 197, 394, 820, 1640, 3280, 6560, 9850, 19000
Range Selection		Manual range control
Cursors		Dual cursors with a distance measurement between cursors
Accuracy		1% of selected range*
Resolution		Approx. 1% of range
Sensitivity		Min 3 pixel return at 4km on 0,6mm Æ , PE , TP
Velocity Factor		Adjustable from 10% to 99% or equivalent in Ft/ meters per micro second
Output Pulse		5 volts peak to peak. Into open circuit
Output Impedance		25, 50, 75, 100 & 120 ohms
Output pulse		3 ns to 3 us, Automatic with range
Scan Rate		2 scans / second or scan held
Tone Generator		810 – 1100Hz
Battery Life		7 hours typical use
Power Supply		6 volts, 4 x 1.5 AA Alkaline cells or NMH rechargeable cells
Power Down		1, 2, 3, 5, 10 and 15 minutes or disabled
Display		328mm x256mm QVGA
Voltage protection		250 volts AC
Operating Temp		-10° / 50°C
Storage Temp		-20° / 70°C
Dimensions		220 x 98 x 58 mm / 8.7x3.8x2.3 inches
Weight		0.5 Kg / 1pouind 2 ounces
Safety		IEC 61010-1 EN 60950
EMC		BS/EN 61326-1
Protection Class		IP67

* Measurement accuracy of +/-1% assumes the instrument setting for VoP of the cable under test to be accurately set, homogeneity of the VoP along the cable length, and accurate cursor positioning.

2.3 Accuracy

The TX8000 is able to measure distances to faults on cable lengths to an accuracy of +/- 1%, this accuracy is based upon the correct value VoP being selected and homogeneity of the VoP along the cable length. If the VoP varies additional errors will be incurred which may affect the measurement accuracy.

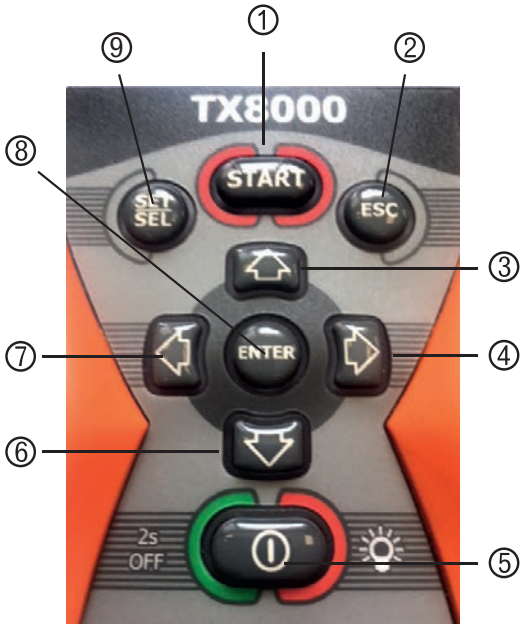
NOTE: - The VoP is less well defined with unshielded multicore cables including power cables and is lower when a cable is tightly wound on a drum than when installed.

Section 3 Initial preparation of TX8000

3.1 Fitting batteries

The TX8000 is supplied with 4 X AA 1.5-volt batteries. These will need to be installed, please refer to section 6.1 for installation procedure. The TX8000 is designed to accept AA size Alkaline cells or rechargeable NMH cells. Because Alkaline and NMH cells discharge at different rates the battery condition indicator is customised to accommodate each type, therefore the type of battery fitted will need to be selected. The type of batteries fitted are displayed at (9) and the battery status at (10) on the measurement screen, see section 5.1.

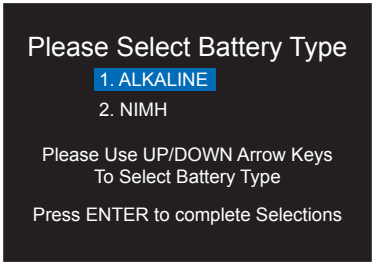
Section 3.2 Keypad functions.



1. To commence trace / hold trace
2. Escape to exit TDR mode
3. Increase setting
4. Cursor right/Option
5. On/Off and keyboard light
6. Decrease setting
7. Cursor left/Option
8. Enter to save selected setting and select active cursor
9. Set/Sel to select screen options

3.3 On/Off functions

Upon completion of item 3.1 press and release key (5), the start up display will be shown momentarily and will be followed by the battery selection display below.



This display will only be shown when the batteries are removed or replaced. Follow the on-screen instructions to select battery type.

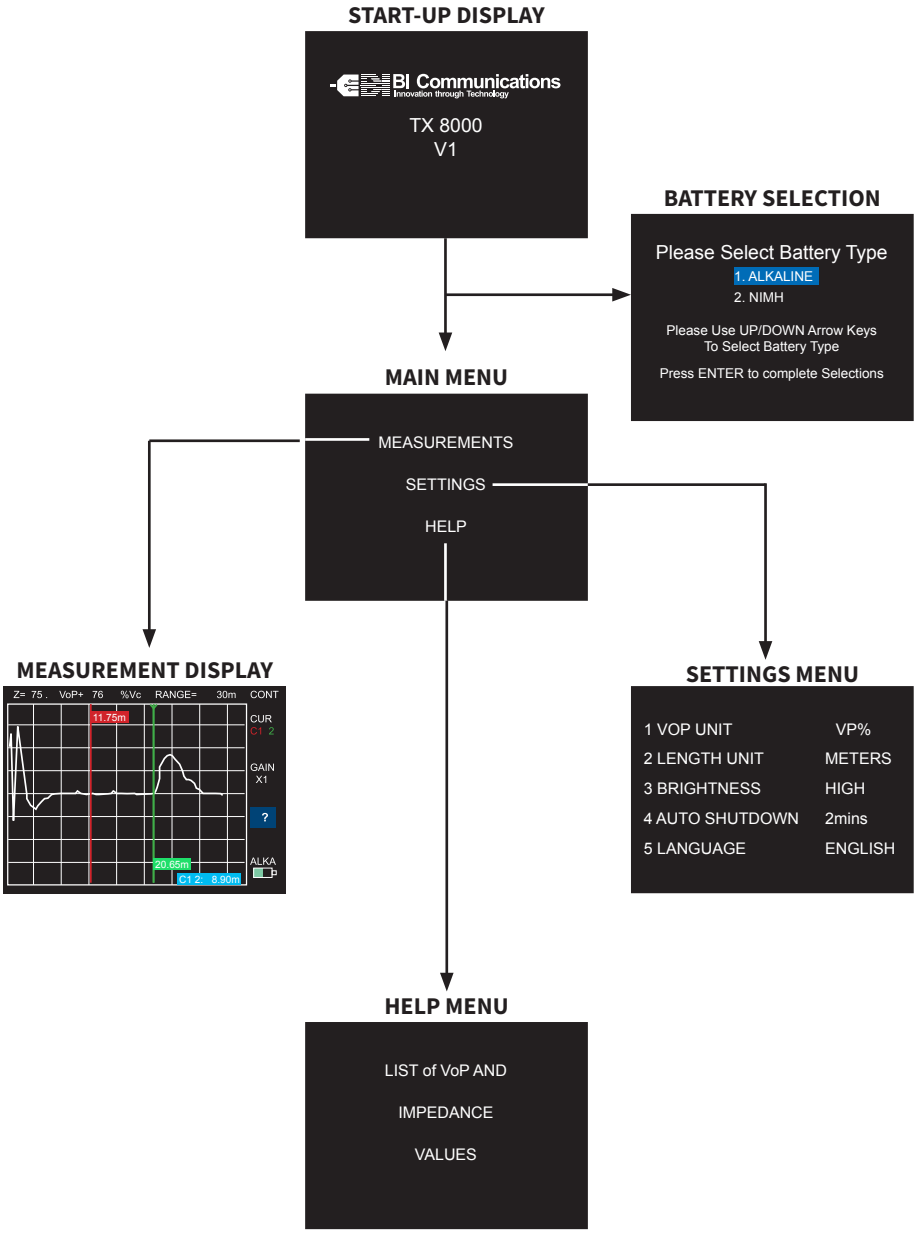
To turn off press and hold Key (5) until the display closes.

3.4 Key Pad Backlite

Upon switching on the TX8000 the key pad backlite will be turned on for 20 seconds, by pressing any key this will restart the illumination for 20 seconds. The illumination may be turned On or Off by momentarily pressing key (5). If manually turned off it will not start automatically with a key press. The function will return to automatic when the TX8000 is switched off and restarted.

Section 4 preparing the TX8000 for use

4.1 Screen displays and menus



Using the keypad as shown in section 3.2 set the following parameters, use key (9) to highlight the parameter and keys (3) and (6) to change values

4.2 Set Velocity of Propagation (VoP) unit
VoP may be set as a % of the speed of light or a speed in feet or meters per micro seconds, the unit of distance will be that selected in 4.3 below.

4.3 Set length unit of measure
The length unit of measure may be set in either feet or meters. When the length unit has been selected this will automatically be transferred to the setting in 4.2 above.

4.4 Set display brightness
This is selectable between High, medium and low. The lowest possible setting should be used suitable for the ambient light conditions to preserve battery life.

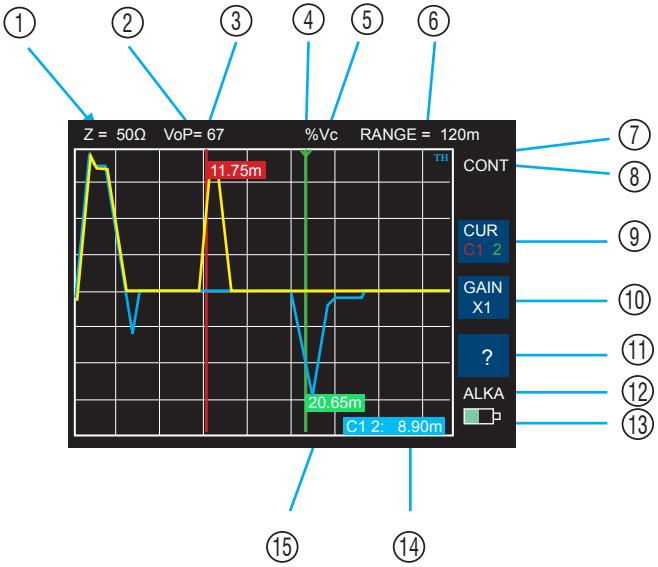
4.5 Auto shutdown
To preserve battery life the TX8000 is fitted with an auto shutdown feature, shutdown time may be selected for 1,3,5,10 and 15 minutes or disabled. When the TX8000 is set in tone mode (see section 5.4) the unit will default to disabled to allow time for cable tracing.

4.6 Language support
The TX8000 may be set to the following languages English, German, Spanish, Japanese and Polish.

Section 5 Using the TX8000

Upon completion of the set-up procedures in section 4 press key (2) to return to main menu and press (8) to select measurements the following display will be shown

5.1 Measurement display



1 - Impedance value selected
2 - Cursor distance Red
3 - VoP value
4 - Active cursor
5 - VoP unit
6 - Range selected
7 - Trace hold
8 - Scan Mode or Tone
9 - Cursor option selected
10 - Gain value selected
11 - Fault display overlay
12 - Battery type selected
13 - Battery condition indicator
14 - Distance between cursors
15-Cursor distance green

In sections 5.2 to 5.6, to change settings press key (9) to highlight parameter, press keys (3) or (6) to select required value

Section 5.2 Setting cable parameters
Impedance setting is selectable for 25,50, 75, 100 or 120 ohms. VoP values are selectable between 10 and 99% or an equivalent value in feet or meters per micro second. The values selected are shown on the display at (1), (2) and (3) Values for both impedance and VoP are shown in the help menu. If the cable required is not shown the cable manufacturer may be contacted for details or the VoP may be established from a sample length of the cable to be tested (see section 5.8)

Section 5.3 Range selection
The TX8000 has 11 range scales between 7 meters and 6 kilometres or the equivalent values in Feet. The range selected is shown on the display (4)

Section 5.4 Scan modes, Compare and Tone generator
The TX8000 has three scanning modes, single and continuous scan. single scan allows the user to hold the trace for closer examination and disconnect from the cable being tested whilst leaving the trace displayed, to commence a trace press key 1. Continuous scan fires continuous pulses into the cable under test thus enabling intermittent faults to be identified. When in continuous scan mode the trace displayed may be held by pressing START (key 1), TH will be displayed in the top right of the display, the trace will be held and may be compared with a new trace, to delete held trace press START (key1). The held trace will automatically be deleted if the TX8000 is switched off.

Tone Generator, this function is used to trace individual pairs within the cable. The TX8000 is connected to the cable pair being traced and using an industry standard tone probe in the frequency range of 810 to 1100Hz the probe will identify the pair, the volume will increase the nearer the probe is to the pair being traced. Auto shutdown is disabled whilst this function is being used.
The function selected is shown on the display (5)

Section 5.5 Cursors
The TX8000 has dual cursors, cursor 1 Red and cursor 2 Green, to alternate between cursors press key (8), the cursor selected is identified by the arrow on the top of the cursor, as shown (14) on the display. To move the cursor use keys 7 and 4. The length measurement is displayed on the flag attached to the cursor as shown on the display (12) and (13). The distance between cursors is shown on the display (11)

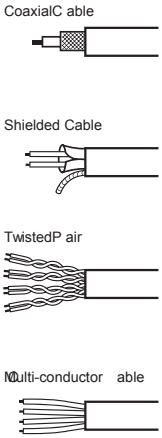
Section 5.6 Gain

The TX8000 has a pre-set gain for each of its 11 range scales, there is in addition 8 user selectable values to assist in the identification of small impedance miss matches. The gain value selected is shown on the display (7)

5.7 connecting the TX8000 to a cable to be tested

Attach the test lead set to the TX4000 via the 2 safety sockets located at the top of the unit,

1. Ensure that no power supply or equipment is attached to the cable to be tested
2. Ensure that the far end of the cable under test is open or Shorted (not fitted with a resistive termination)
3. Attach the TX8000 to one end of the cable to be tested



Coaxial Cable: Connect the red clip to the centre wire and the black clip to the shield/screen.

Shielded Cable: Connect the red clip to a wire adjacent to the shield and the black clip to the shield.

Twisted Pair: Separate out one pair and connect the red and black clips to the two wires of the pair.

Multicore Cable: Connect the clips to any two wires.

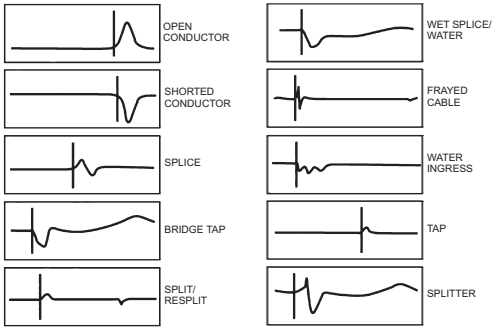
5.8 How to determine VoP value from a sample cable

Using a measured length of cable approximately 100 meters of the type to be tested, connect the TX8000 as shown 5.8 above, select a range scale that will cover the length of the sample cable, align the cursor to the rising edge of the output pulse, (the correct positioning of the cursor is shown In typical fault traces label on the rear of the TX8000 or may be displayed on screen by

selecting), select VoP, change the VoP setting until the length shown on the cursor flag equals the length of the sample. The VoP shown will be the VoP for the sample cable.

5.9 Typical fault displays

The following diagrams show typical fault traces, these faults may be superimposed on the measurement screen by selecting on the screen.



Typical Cable V.P and Impedance Values

Type	Vp	Z	Type	Vp	Z
Cat5 STP	72	100	T/Pair Jelly PE	64	100
Cat5 UTP	70	100	T/Pair PE	67	100
Coax Air	98	50/75	T/Pair PTFE	71	100
Coax Air Space	94	50/75	T/Pair PVC	58	100
Coax Foam PE	82	50/75	T/Pair Paper 72nF	88	100
Coax Solid PE	67	50/75	T/Pair Paper 83nF	72	100

Section 6 Maintenance

6.1 Fitting and changing batteries.

Disconnect the TX8000 from any cable or network link Turn the TX8000 off

- Loosen the 4 black screws and remove the battery compartment cover.
- Replace the batteries with 4 x 1.5 Alkaline or NMH AA size batteries observing the polarities
- Refit the battery compartment cover and refit the 4 screws.
- Refer to section 3.3 for switching on procedures.

6.2 Cleaning

Disconnect the instrument from any source of electricity

- Turn the instrument off
- Use a soft cloth lightly dampened with soapy water, wipe over the instrument, rinse the cloth in clean water squeezing out any excess water, wipe over the instrument removing any soap residue, dry instrument with a dry cloth
- Do not splash water directly on the instrument
- Do not use alcohol, solvents or hydrocarbons

6.3 Storage

If the instrument is not to be used for a period of more than 60 days, it is recommended that the batteries are removed and stored separately (see 6.1)

Section 7 Repair and Warranty

The instrument contains static sensitive devices and is not user serviceable. If an instrument fails, or its protection has been impaired, it should not be used but sent back for repair by suitably trained and qualified personnel.

New instruments are guaranteed against breakdown due to manufacturing or component defects for 36 months after the purchase date by the user.

NOTE: Any unauthorized prior repair or adjustment to the instrument will automatically invalidate the warranty.

The quality management system of BI Communications fulfils the stringent requirements of the international quality system ISO 9001-2015.

7.1 Contacting Us

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