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Chapter I Technical parameters of M8 Total Station

§1.1 Introduction

Welcome to use M8 Total Station products of GINTEC team (Guangzhou <u>G</u>eosurv <u>In</u>formation <u>Tec</u>hnology Co.,Ltd). Our team has been committed to popularize the advanced surveying and mapping technology and products to the hands of measurement users. If you want to know more about us, please visit the official website: http://www.gintec.cn/.

This manual shows the operations of Surpad when connect with M8 total station, including how to connect with Bluetooth, the basic setting, how to setup an orientation by angle, coordinate or resection, how to survey and stakeout, etc. Even if you have used other products of our company, it is recommended that you read this instruction carefully before using the instrument for better use.

§1.2 Technical parameters

Мо	odel	M8								
	Angle Measurement									
Measuren	nent Method	Absolute Encoding								
Circle	Diameter	79mm								
Minimu	m Readout	0.1"/1"/5"/10"								
Acc	curacy ^{*1}	2"								
		Telescope								
Magr	nification	30X								
In	nage	Erect								
Tube	e Length	154mm								
Effectiv	e Aperture	45mm (EDM:50MM)								
Field	of View	1°30′								
Minimum F	ocus Distance	1.4m								
Resolv	ing Power	3'010100								
		Dual-axis Compensator								
Worki	ng Range	±3'								
Ace	curacy	1"								
	Distance	Measurement (Good Conditions) [*]								
	Single Prism	5000m								
Measurement	Reflective Sheet	800m								
Range	Reflectorless*3	800m								
Accuracy	Single Prism	2mm+2ppm								
	Reflective Sheet	2mm+2ppm								

Measuring Time	Reflectorless* ³ Single Prism Reflective Sheet Reflectorless* ³	Fine(< 200m): 3mm+2ppm Fine(> 200m): 5mm+2ppm Tracking: 10mm+2ppm < 0.3s < 0.3s Typ. 0.3-3s max.10s		
		Communication		
-	Data Memory	Approx. 120000Points/SD Card(max.8G)		
Seria	I I/F port	USB Port/Bluetooth/SD Card		
		Plummet		
Laser p	olummet ^{*4}	±1.5mm at 1.5m		
Optical Plum	nmet (Optional)	Erect Image		
Magr	nification	ЗХ		
Focusi	ng Range	0.5m~∞		
Field	of View	5°		
		Power		
Batte	ery Type	Rechargeable Lithium battery		
Voltage	e/Capacity	7.4V(DC)/ 3100mAh		
Opera	ting Time	 8 Hours⁵ i fully charged i / i : able to continue to measure i : needed to finish the operations and replace the battery or charge it 		
		Others		
Waterpro	of/Dustproof	IP65(IEC60529 Standard)		
Di	isplay	Dual side, LCD 6 Lines		
Кеу	/board	Dual sides Alphanumeric Keyboard		
Operating	Temperature	-20°C~+50°C		
Weight (includi	ng battery)	5.2kg		
Dimensio	ons (W*D*H)	160*150*330mm		

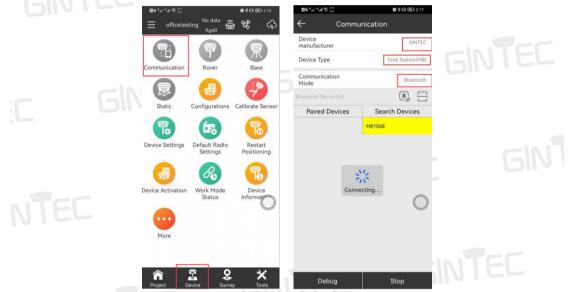
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Chapter 2 Connection and Basic Settings

This chapter introduces the connection and the basic setting before surveying and stakingout.

§2.1 Connection by BT

Step 1: Please center and level the M8 correctly firstly, then turn on the BT of M8, the BT name of M8 is the same as its SN (like M01068). Turn to the "Device-Communication" page of Surpad. All the icons will be grey before connection.



Step 2: Choose "Gintec" as "Device Manufacturer" and "Total Station (M8)" as "Device Type", search M8's BT and connect to it. The pairing password is 1234. If it has been connected before, directly choose it from the "Paired Devices" list and connect to it.

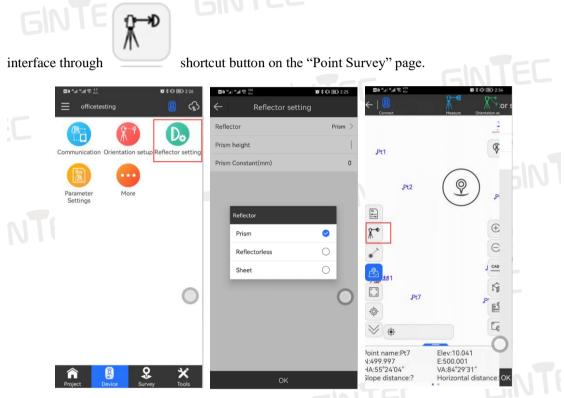
	en "al "al ≋ %) ← Commu	₩\$0⊞2-17 nication	■e *#i *#i *#i **************************	¥8≉101⊞0219	
	Device manufacturer	GINTEC			
TEL	Device Type	Total Station(M8)		tation setup Reflector setting	
	Communication Mode	Bluetooth	-		
		*		•	
	Paired Devices	Search Devices	Parameter Settings	More	
GINTEC	蓝牙配对请求				
	1234 PIN 码由字母或符号			0	
	您可能还需要在另一台码。				
	配对之后,向所配对 的访问权限	设备授予通讯录和通话记录			
	取消	确定	Project Device	Survey Tools	

Step 3: After a successful connection, the icon on the device interface will change to colorful. Note: Every time when there is a command sending by Surpad to M8, the M8 should be at the surveying pages (Angle/Distance/Coordinate), or the M8 will not receive and executive the command.

§2.2 Basic Settings

2.2.1 Reflector Settings

This page is to set the reflector types, target height and prism constant. You can also enter this



The target height is 0 by fault, and prism constant is not allowed to input when choose reflectorless or sheet.

Note: Please be careful to always check that the reflector type is set correctly. An incorrect type setting may cause the distance measurement to be unable to be performed.

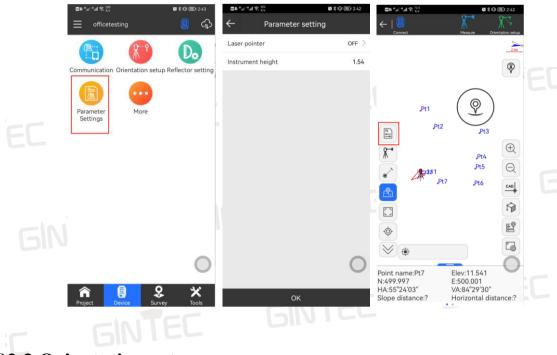
2.2.2 Parameter Settings

This page is to set the instrument height and to switch the laser pointer. You can also enter



this interface through

shortcut button on the "Point Survey" page.



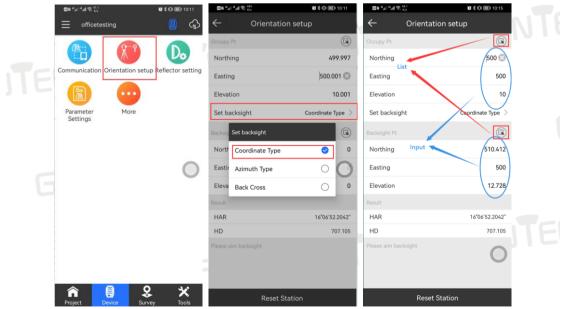
§2.3 Orientation setup

There are usually three ways to set up survey station and orientation: Angle/ Coordinate/ Resection.

2.3.1 Coordinate Type

Step 1: Aim the M8 at the back sight point firstly, then operate choose "Coordinate Type" on the "Orientation Setup" function.

Step 2: Input or call the coordinates of station point and back sight point from known points list.



Step 3: Clip "Observe", then it will show the result. Check if the distant and elevation errors

are acceptable and decide whether to aim and observe it again or accept the result. Remember to set the direction before clip "Accept".

	اله ".al ⊋. ⁴³	⊠ ≵ IQI @ ∎ 10:38	← Orie		00 %a	".al 😤 ^{2.9} K/s	🕲 孝 🕕 🕮 10:41
~	Orientation	setup		entation Result	\leftarrow	Orientatio	on Result
Occu	upy Pt		Backsight Observation		НА		359°57′04″
No	orthing	500	HA	359°57′04″			
Ea	sting	500 😒	VA	83°27′19″	VA		83°27′19″
	evation	10	SD	10.485	SD		10.485
		Coordinate Type >	HD	10.485	HD		10.485
Set	t backsight		н	1,54	н		1.54
Back	ksight Pt	G	нт	0	нт	Setting Type	0
No	orthing	510.412	Backsight Errors	0	Backsig	Set Zero	0
Eas	sting	500			Calc I	Set Direction	✓ 0.412
Ele	evation	12.728	Calc Horz Dist	10.412	Dist E	Not modified	0.005
Resu	ult		Dist Error	-0.005	Calc E	lev	12.735
HA	AR	0	Calc Elev Check if	f the errors acceptable 12.735	Elev E	rror	0.007
HD		10.412	Elev Error	0.007	Plate Se		
Plea	se aim backsight		Plate Settings	0	Settin		Set Direction
		\bigcirc	Setting Type	Set Direction >	Settin	утуре	Set Direction 7
_					Azimu	th	0°00′00″
	Cancel	Observe	Accept	Observe Again		Accept	Observe Again

2.3.2 Azimuth Type

Step 1: Aim the M8 at the back sight point firstly, then operate choose "Azimuth Type" on the "Orientation Setup" function.

Step 2: Input or call the coordinates of station point from known points list, then input the Angle between the station and the known direction.

■0 ⁴⁴ .sl ⁴⁴ .sl ^{41,1} _{K/6}	10 * 10	BD 10:11	20 °.a °.a	d ≑, ³⁸⁹ K/s	10° × 101 200	0 10:49	©0 ¹⁸ .d ¹⁰ .d ≑ ^{30.1} K/1	86 ≵ (C) (280) 10:50
	ing 🦉	୍ କୁ	÷	Orientation s	etup		← Orientat	ion setup
B			Occupy Pt				Occupy Pt	List 🕓
			Northing	1	5	00 🛞	Northing	500
Communication O	Prientation setup Reflect	or setting	Easting			500	Easting	500
	•		Elevation	n		10	Elevation	10
Parameter Settings	More	_	Set back	sight	Azimuth	Type >	Set backsight	Azimuth Type 🗦
Per		- 1	Azimı Se	t backsight		sssss	Azimuth	90
		F	Result	Coordinate Type	0		Result	
				zimuth Type	0	00'00"	HAR	0°00′00″
				Back Cross	0	10.412	HD	10.412
			Please				Please aim backsight	
		-						
-11						\mathbf{O}		0
								Ŭ
	Survey	X		Reset Statio	n		Reset	Station
					1.01	TC		

Step 3: Clip "Observe", then it will show the result. Remember to set the direction before clip "Accept".

≣0 st .a st .al ≑: ^{1,0} / ₅	🕼 🕏 🗐 🍘 10:53	■0 ^H al ^H al ? , ^{36,4}	級 常门I 团11102	200 s.al s.al 🕿 202 8/3	政 常中日() 11:03	
← Orienta	tion setup	← Orie	entation Result	← Orientat	ion Result	
Occupy Pt		HA	359°59′59″	НА	359°59′59″	
Northing	500	VA	83°27′19″	VA	83°27′19″	
Easting	500	SD	10.485	SD	10.485	
Elevation	10	HD	10.485	HD	10.485	
Set backsight	Azimuth Type $>$	н	1.54	н	1.54	
Azimuth	90	нт	C	HT Setting Type		
Result		Backsight Errors	0	Backsig Set Zero	0	
HAR	90	Calc Horz Dist	0	Calc I Set Direction	0	
HD Please aim backsight	10.412	Dist Error	-10.417	Dist E Not modified	0.417	
		Calc Elev	12.735	Calc Elev	12.735	
		Elev Error	0.007	Elev Error	0.007	
	0	Plate Settings		Plate Settings		
		Setting Type	Set Direction \geq	Setting Type	Set Direction $>$	
		Azimuth	90°00′00″	Azimuth	90°00′00″	
Cancel	Observe	Accept	Observe Again	Accept	Observe Again	
-10	TEL	ŀ				

2.3.3 Resection (Free Station)

This function always used when you have more than 2 known points but don't know the coordinate of your station.

Step 1: Aim the M8 at the first know point A, then operate choose "Back Cross" on the "Orientation Setup" function.

Step 2: Input or call the coordinates of point A from known points list, then clip "Survey" button.

Step 3: Now repeat steps 1 and 2 for the second known point B.

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©0 ".4 ".4 ≅ %;	◎考३ 圖 9:12	80 "게 "게 승 ???	◎参¥ 圖) 9:13	1989 ⁴ 4 ⁴ 개 축 ¹⁹²	簡孝単 1860 9:16
officetesting	<u>용</u> 🚯	Orientation s	etup	← Orientatio	in setup
	Do	Set backsight	Back Cross >	Instrument height	1.54 Confir m
Communication Orientation set		Point A	✓ ⓐ	Set backsight	Back Cross 🗦
	ap reflector setting	Northing	Northing	Point A	v 🚯
		Easting	Easting	Northing	510.412 😒
Parameter More Settings		Elevation	Elevation	Easting	500
		L1 Set backsight	8	Elevation	12.728
		Point B Coordinate Type		L1 Clip *Survey	y" to get the L 👔
	\bigcirc	North Azimuth Type	0		y" to get the ⊥ d angle to point A ✓ ③
		East Back Cross	sting 🖉	Northing	Northing
		Elevation	Elevation	Easting	Easting
		L2	L	Elevation	Elevation
		Occupy Pt Coordinate		L2	L 🕅
		HAR	15°50'43.6407"		0
		Northing		HAR	
		Easting		HAR	15°50'43.6407"
Project Device Sur		Accept	Calculate	Accept ⊲ ○	Calculate

Step 4: After you have survey two known points, you can get a result of station point P by clip "Calculate". Check the error and see if you can accept it. If you can, clip "Accept" then the P will be saved, and station will be set. If not, you can add more known points and repeat step 3

until it gets	s an accep	ptable result.					
-	SurPad 4.2 💿	≡ – d ^a ×	SurPad 4.2 🗐	≡ - d ^a ×	SurPad 4.2 🕖	≡ - a ×	
	©9 °.1 °.1 ≅ ∏	関参戦 📾 9:19	80 ta ta ộ ½	◎孝峯 圖0 9:22	©0 ""	■ 参 単 圖) 9:29	
	← Orie	entation setup	← Orient	ation setup	← Orientat	ion setup	
	Point A	♥ (3)		10.410			
	Northing	510.412 🛞	Northing Error	-0	Northing	498.158	
	Easting	500	Easting Error	-0	Easting	508.829	
	Elevation	12.728	Point B	✓ ③	Elevation	12.837	
	L1	10.416	Northing	498.158	L2	9.018	
	Point B	✓ ③	Easting	508.829	Northing Error	-1.728	
	Northing	498.158	Elevation	12.837	Ea	ompt 64	
	Easting	508.829	L2	9.018 🕅	point are incorr	es of the curre ht ect. Do you want current point?	
	Elevation	12.837	Northing Error	-0	No	12	
	L2	9.018	Easting Error	-0	Eat	Yes 00	
	Occupy Pt Coordinate	2	Occupy Pt Coordinate	0	Elevation	12	
	HAR	15°50'43.6407"	HAR	101.4536415	Incoreect result, p	lease check previous 7.126	
	Northing		Northing	499.996	Northing Error	-1.728	
	Easting		Easting	500			
	Elevation		Elevation	10	Easting Error	-0.764	
	Elev Error		Elev Error	-0.002	Occupy Pt Coordinate		
	Accept	Calculate	Recalculate	Accept Add Point	Recalculate Ac	cept Add Point	
	<		4	0 🗆	4	0 0	

Note: When you see the "Prompt" like the last picture, that means the error is too big, you may aim at a wrong point or some of the known coordinates are not correct. Please check and try it again after checking.

Chapter 3 Survey and Stakeout

This chapter is to show how to use M8 survey and stakeout with Surpad.

§3.1 Point Survey

3.1.1 Page Common functions 0 AR 2 oint Surv (1) Detail Survey AR Survey A 0. 05 CAD Point Stakeou 0 15 ++ Pt2 GIS data Stake road Stake road by **O**t8 Ð * Q Pt4 Pt5 å 0:0 2 CAD Pt7 Cross section measurement Stake road by cross section Stake road by bridge section rQ, 5 T. D 0 59 \$ nical Slo Electric Lines Electric Tower Stakeout 0 🗔 \leq Elev:12.672 E:509.735 VA:84°31'55" Point name:Pt8 N:506.716 HA:55°23'50″ Slope distance:? Horizontal distance:?

As the picture shows, there are many functions in the point survey page, here we introduce some functions used more often:

(1)Tracking measurement mode: M8 will collect data every two seconds, and real-time coordinate changes will be displayed below, but not saved.

(2) Measurement point type Settings:



Topo Point: This is the surveying method by fault, you can always us this page to do the

survey job. When you clip the survey button, it will turn to the survey result page, and the point will be saved after you clip "OK".

Quick Point: This is a surveying method that measure and save points, no need to jump to the measurement results interface.

(3) Tool Bar.

(4) Software Setup Bar.

(5) Information Bar and Last Point Information.

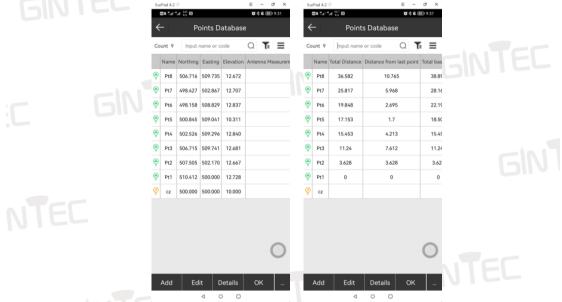
(6) Parameter Setting: Quick button of it, see Section 2.2.2 for details.

(7) Reflector Setting: Quick button of it, see Section 2.2.1 for details.

(8) Laser Point: To switch the laser point.

(9) Survey Button: To perform the measurement and save the results.

(10) Point Database: To check the saved points details, including coordinates, station information, angle, and distance, etc.



(11) Display Information setting: see Section 3.1.2 & 3.1.3 for details.



3.1.2 Information bar setting

The Information bar can be set through: "Display Information-Information bar", as the following pictures shows:

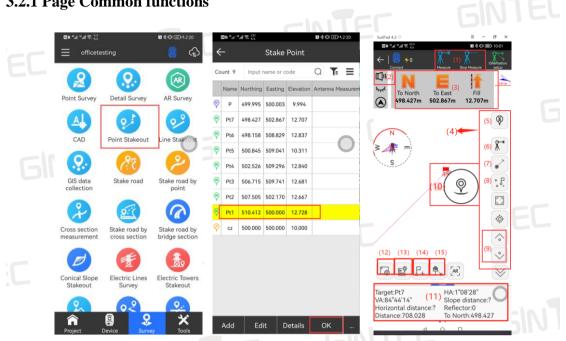
	SurPad 4.2	≡ - ♂ ×	SurPad 4.2 🗐	= - 0 ×	SurPad 4.2 💿		= - 0 ×	
	$ \begin{array}{c} \textcircled{\begin{tabular}{lllllllllllllllllllllllllllllllllll$	To \$ \$ 10 19:39	Be tar to the test of te	■考礼图 9:37 mation	20 5al 4al 189 80	y Informati	≌\$¥.≣)9:36 ion	
		0.8im	TOPO POINT INFORMATIC BAR	TOOLBARS		FORMATION BAR	TOOLBARS	
		(()	AGE Limit	5 >	Display Item	Op	tions	
	Pt8	v	Allow same point name		Point name	Cod	de	
			Keep last input focus		Elev	Hei	ght Error	
			Default Point Name	Pt1 >	Ν		lector	
			Point Name Increment	1 >	E	>> Ref	erence angle	
	.₽t4	\oplus	Default Code	same as last point >	НА	Sta	tion coordinate	
		Q	Average GPS	1 >	VA	Sta	tion coordinate	
	Pt5	CAD	Count	1.2	Slope distance	Sta	tion coordinate	
		1			Horizontal distance	K Kno	own azimuth	
	\$	E				н		
	Pt6					нт		
	₩	10		0			0	
	Point name:Pt8 Elev:1 N:502.662 E:495.	983						
	HA:304°01'09" VA:72' Slope distance:? Horizo	45'23" intal distance:?	DEFAULT	ок	DEFAULT		ок	
	4 0 0		٩ ٥	0	٥	0 0		
2 1 2 Cl								

3.1.3 Shortcut button setting

The shortcut button can be set through: "Display Information-Toolbars", as the following pictures show:

		Display Inform	¥0:≋0(團)2:52	← Display Int	formation	
Connect	Measure Orientation setup	RESECTION INFORMATIC		RESECTION INFORM B/	AR TOOLBARS	
		DAR		Display Item	Options	
Pt8	(AGE Limit	5 >	-\$- Jump map center	CAD Background color	
Fto		Allow same point name	$\bigcirc \circ$	Full Map	🖉 ReDraw	
		Keep last input focus		Switch map	Display Content	
	2)	Default Point Name	Pt1 >	s [→] Laser pointer	Coordinates	
8-	Ð	Point Name Increment	1 >	D _® Reflector setting	Perimeter and Area	
Pt4	Q	Default Code	same as last point $>$	Parameter Settings	Angle Converter	
Pt5	CAD				Ø Compass	
	₽				Cross Hair Light	
\$	E				Laser Plummet Light	
P16					Guidance Light	
	ev:10.607		0		Lcd Backlight	
HA:304°01'13" VA	495.983 A:72°45'23"		0		Ranging Mode	
Slope distance:? He	orizontal distance:?	DEFAULT	ок	DEFAULT	ок	
			GINI	EC	БIN	

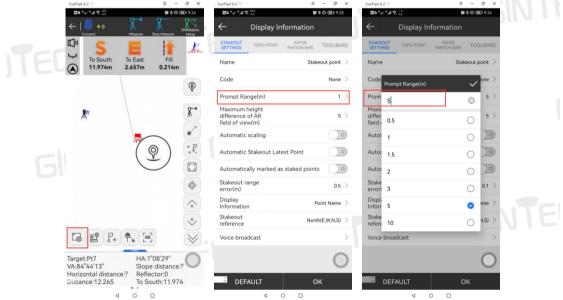
§3.2 Stakeout



Once you have access to the "Point Stakeout" function, select the first point to be staked out and then click "OK" to enter the stakeout page. You can see many icons in this page, now let's introduce the main parts:

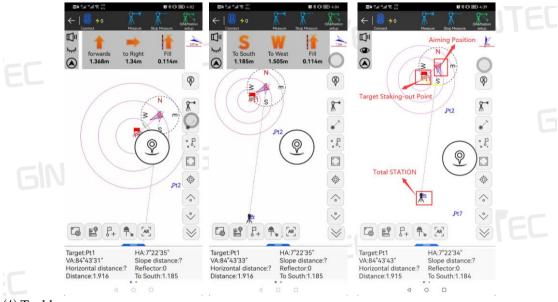
(1) "Measure" and "Stop Measure": Unlike RTK's staking out, deviation tips for total station staking-out can only be updated after each ranging. Click "Measure" key to carry out uninterrupted ranging to get real-time staking-out guidance, click "Stop Measure" key to stop measurement.

(2) Prompt Tone Switch: It's used to turn on and off staking-out prompt tone. When the prism is close to the coordinates of the lofting point, the beeping tone will prompt. The prompt range can be set by user.



3.2.1 Page Common functions

(3) Azimuth and Distance Indication: The default mode is Forwards/Backwards and Left/Right. **The direction of the prism facing the total station is defined as the front.** This direction display can be changed to NSEW.



(4) Tool bar.

(5) Measurement Point Type Settings: See Section 3.1.1 for details.

(6) Reflector Setting: See Section 3.1.1 for details.

(7) Laser Point: To switch the laser point.

(8) Latest Point: Jump to the first to-be-staked-out point.

(9) The Last/Next Point to be Staked Out.

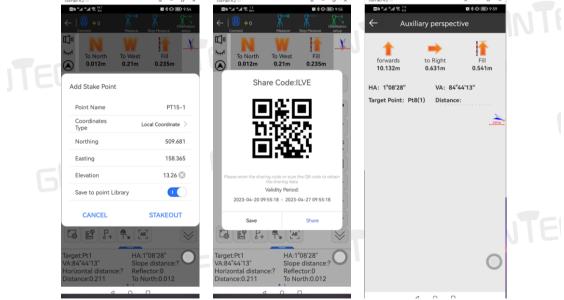
 $({\rm l}0)$ Survey Button: To perform the measurement and save the results.

(11) Information Bar and Last Point Information.

(12) Display Information Setting.

(13) Point Database: To check the saved points details, including coordinates, station information, angle, and distance, etc.

(14) Add Stake Point: To input a new staked out point.



(15)**Stake Out Sharing Function**: To generate a shared code for the prism officer to view the current lofting interface after scanning or inputing the code.

	M8 Total Station					TEC
	1 Mainbody					
	Name	Type	Description	Picture Size (L*W*H) Weight	QTY	
	Total station	M8	2", 2+2ppm 800m Reflectorless EDM	160*150*330mm 5.2KG	1	
	2 Accessories					
	Name	Type	Description	Heture	QTY	
	Carrying Case	1	/		1	
	Battery	LB-01	7.4V 3100mAh		2	EC
	Charger and Cable	LC-10	Charger Adapter 8.4V- 1.2A&Charging cable		1	
	Tool Pack	/	Tool Pack, Wipe Cloth, Wrench*2, Hex Wrenches *2, Screwdriver, Blush		1	5111
	Desiccant	/	Silica-Gel Drier		1	
	USB Drive	/	16GB		1	
	Reflective sheet	RP60, RP40, RP30, RP20	/		1	NTE
	Pumb Bob	/	/		1	1011
	Lens Cap	/	/		1	1
	DustCover	/	/		1	
						1

Appendix : Packing List

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NOTE:

These designs, figures and specifications are subject to change without notice. We shall not be held liable for damages resulting from errors in this instruction manual.

