Self-leveling Rotary laser TSD203

Service Manual

Catalogue

1.0 Instrument & Accessories

TSD203 Main Body

Remote Control

FC101Charger

TST100 Detector with clamp

Whole set of instrument includes TSD203、TST100 detector、Clamp、FC101Charger and remote control

4 section 2# rechargeable batteries are available for the instrument. Take the batteries out of instrument after . loosing the cover screw of battery case.

1.1 Basic Operation

1. Press the Key On/Off, The laser head will rotate freely to form a horizontal scanning-surface of laser beam as reference surface, It also will emit a plump line upwards and a down point when the instrument is set upright. When lay down the laser, it will supply a plump plane and emit a horizontal line .

2.According to the working requirement, The speed of spin can be adjusted、stop rotate, laser head can step-move right or left、scanning function、The slope of instrument can also be adjusted. etc.

3.When the instrument match the detector FRD100,the height of laser beam will be decided according to indicator of the detector.

1.2 Key functions

⑴Voltage indicator：When the light is shining, The The pressure of power is low. Should recharge instrument

Or renew the batteries(4 section 2# batteries)

⑵Power indicator：When it lights, the instrument is starting Up. Otherwise it is closing down.

⑶Mode indicator：When it lights,the instrument is leveling manually. When it winks, it stays in alam.(The slope of the instrument is out of range)

⑷ON/OFF: Controlling the state of power

⑸ Speed up: Circling knob, Speed of scanning includes 5 levels:0-60-120-300-600 r.p.m

⑺ Manual/Automatic: Control the mode of Manual or Auto leveling.

⑻Left spinning: Making laser prism step-move anti-clockwise, when laser prism is stop spinning or in scanning mode.

⑼Right spinning: Make laser prism step-move clockwise, when laser prism is stop spinning or in scanning mode.

⑽ X-axis: Adjusting the slope of X-axis, when the instrument is in manual mode.

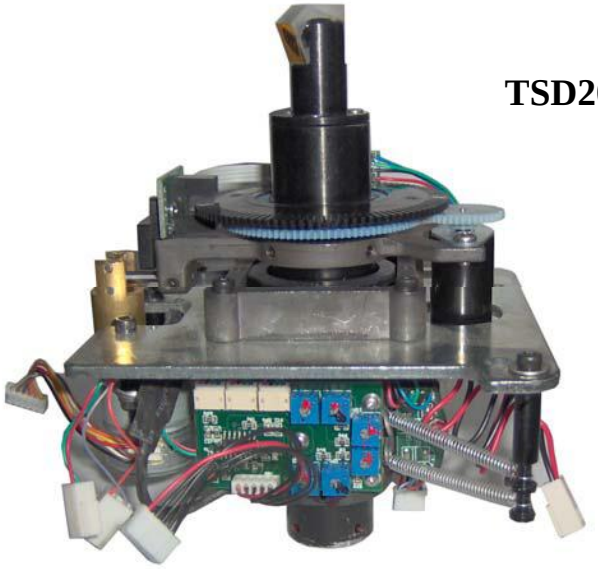
⑾ Y-axis: Adjusting the slope of Y-axis, when the instrument is in manual mode.

⑿Key of Automatic drift system model: Warns the user for a misaligned device.

2.0 Structure

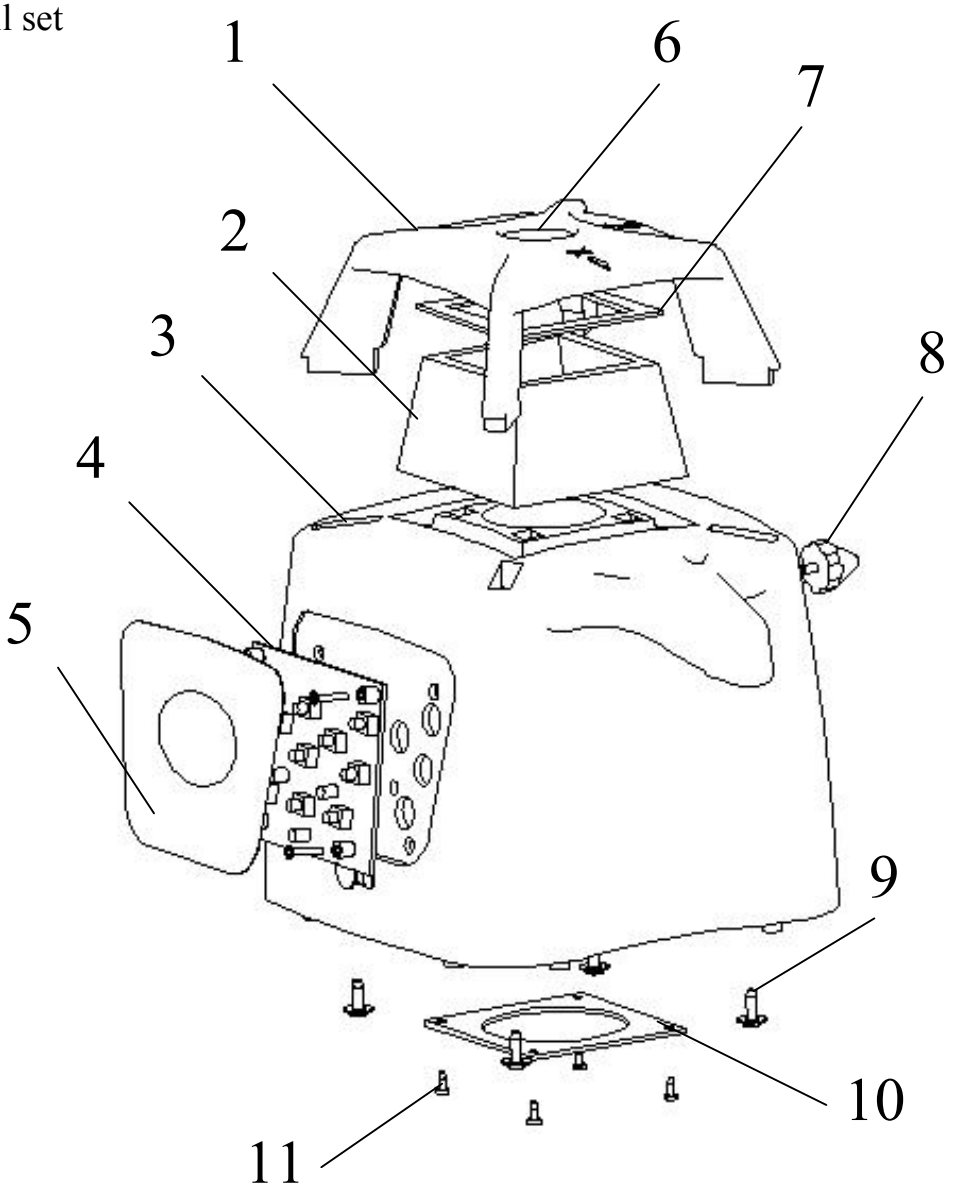
TSD203-2-1001Shell set

TSD203-2-200 Underpan sets



TSD203-100 Pendulum

2.1Shell set

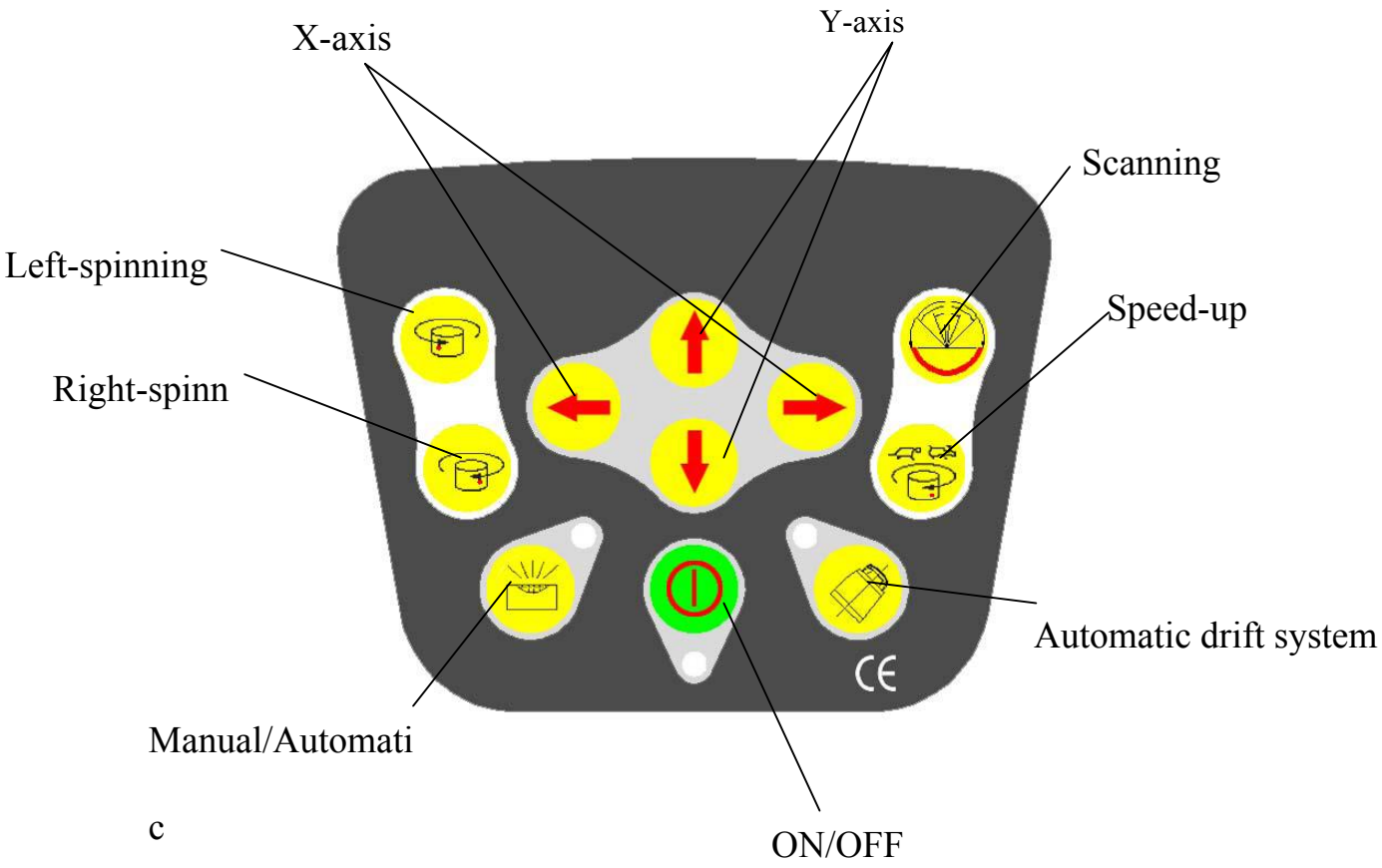


Bombing illustration of shell

Serial	Code	Name	Quantity
1	TSD203-203	Top-cover	1
2	TSD203-217	Shielding glass	1
3	TSD203-202	Shell	1
4	TSD203-305	Panel	1
5	TSD203-212	Label	1
6	TSD101-302	Glass	1
7	TSD203-214	Gasket	1
8	TSD203-109	Screw	1

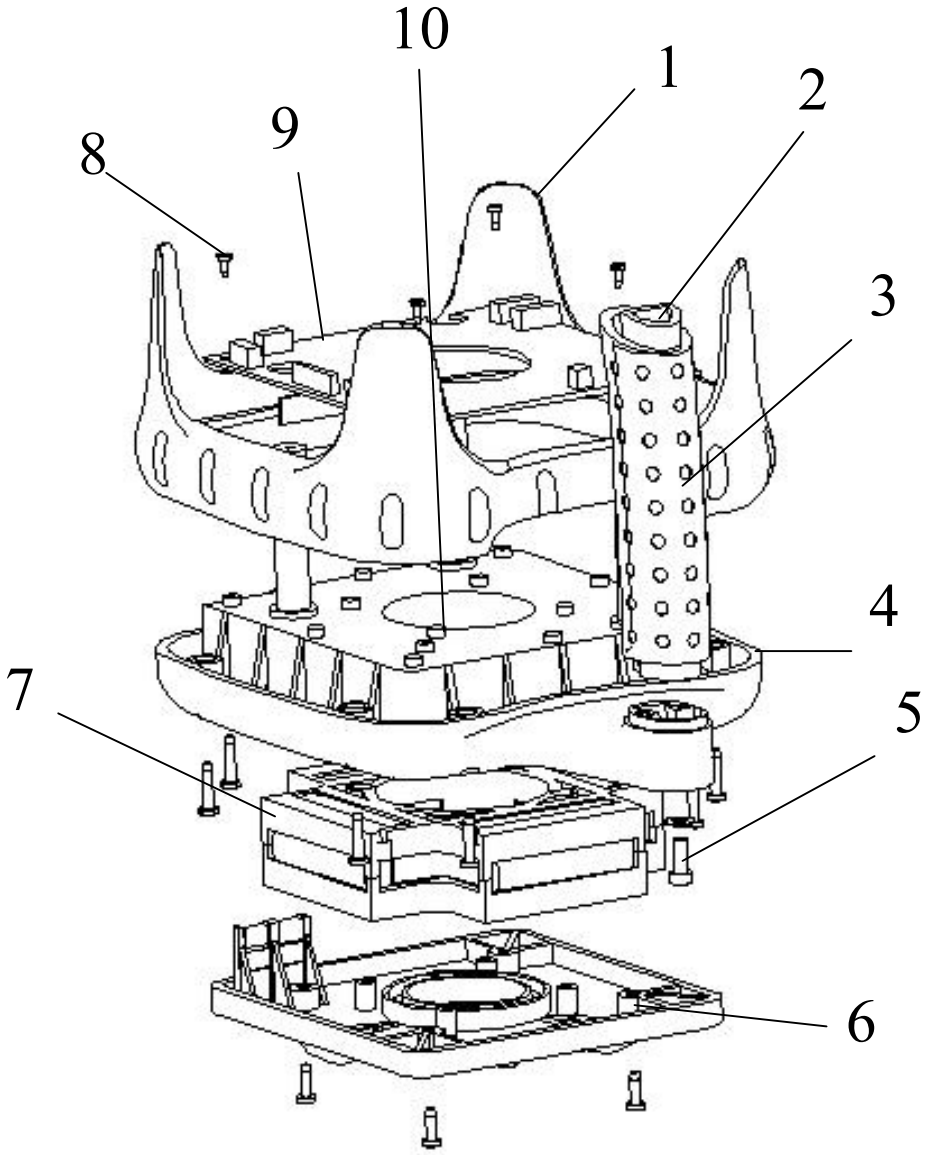
9	GB/T845-1985	Screw ST2.2 9.8	4
	GB/T 96-1985	φ2.5 Gasket	4
10		Infrared receive head	4
	TSD101-315YB	Receive board	1
11	GB/T845-1985	Screw ST2.2 4.5	4

2.2Shell set



Penal function

2.3 Underpan set

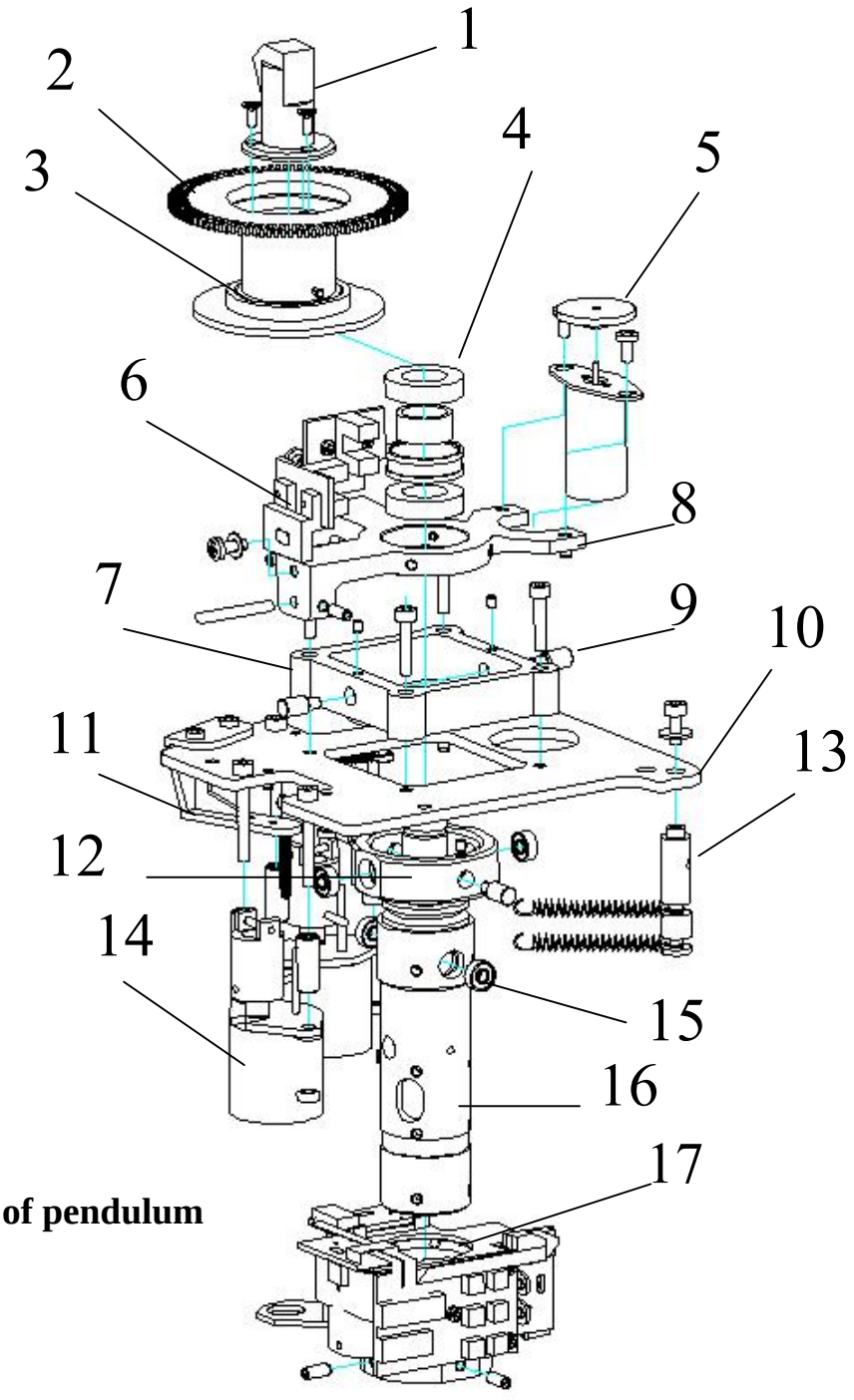


Bombing illustration of underpan set

Serial	Code	Name	Quantity
1	TSD203-206	Rubber-cover	1
2	TSD203-205	Handle	1
3	TSD203-207	Handle-cover	1
4	TSD203-201	Base	1
5	GB/T818-2000	Screw M4 12	1
	GB/T 96-1985	φ4Gasket	1
6	TSD203-215	Spring Strip I	2
	TSD203-204	Battery cover	1

	GB/T845-1985	Screw ST2.9 13.5	4
7	TSD203-208	Battery retainer	2
	GB/T845-1985	Screw ST2.9 17.5	4
		2#Rechargable batteries	4
8	GB/T845-1985	Screw ST2.2 5.5	4
9	TSD203-302	PCB	1
10			

2.4 Pendulem

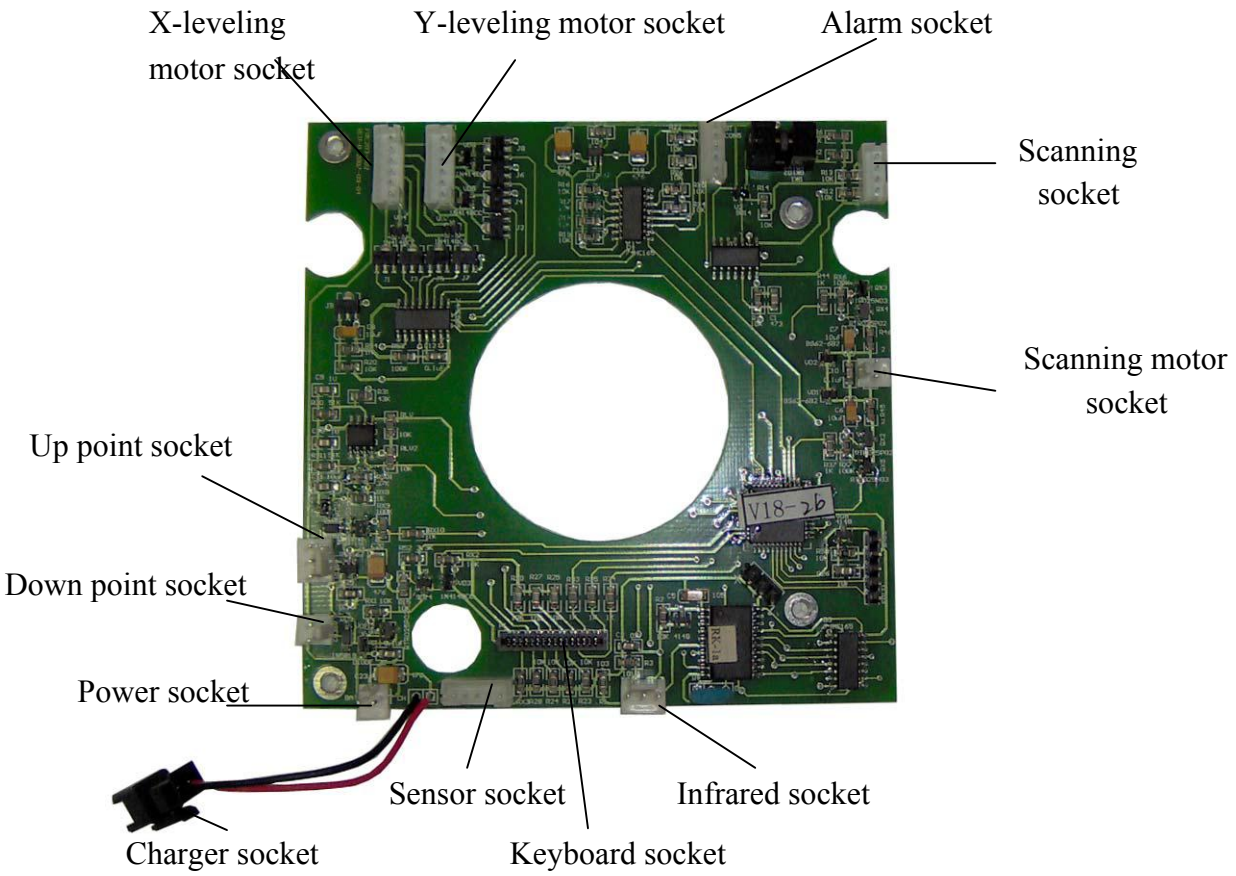


Bombing illustration of pendulum

Serial	Code	Name	Quantity
1	TSD101-307	Pentagon prism 10 10	1
	TSD101-104	Prism base	1
	GB/T819.2-1997	Screw 2.5 6	3
2	TSD101-112	Raster	1
3	TSD101-107	Scanning GearII	1
	TSD203-102	Scanning base	1
4		6801ZZ Bearing	2
	TSD101-110	Gasket I	1
	TSD101-108	Nut	1
	TSD101-124	Universal ring	1
5	TSD101-106	Scanning gearI	1
	TSD202-116a	Motor fixation board	
		Motor	1
	GB/T818-2000	Screw M1.6 4	2
	GB/T818-2000	Screw M3 6	2
6	TSD203－209	Scanning optical coupler base	2
	TSD203－304	Scanning optical coupler board	2
		Optical coupler （Scanning）	2
	GB/T818-2000	Screw M3 6	2
	GB/T845/1985	Screw ST2.2 5.8	2
	GB//T96-1985	φ3 Gasket	2
7	TSD203－105	Outer ring	1
	GB/T70.1-2000	Screw M3 15	4
	GB/T80-2000	Screw M2.5 3	2
8	TSD203-104	Leveling bracket	1
	GB309-85	φ3 23.8 Pin	
	GB/T80-2000	Screw M3 6	2

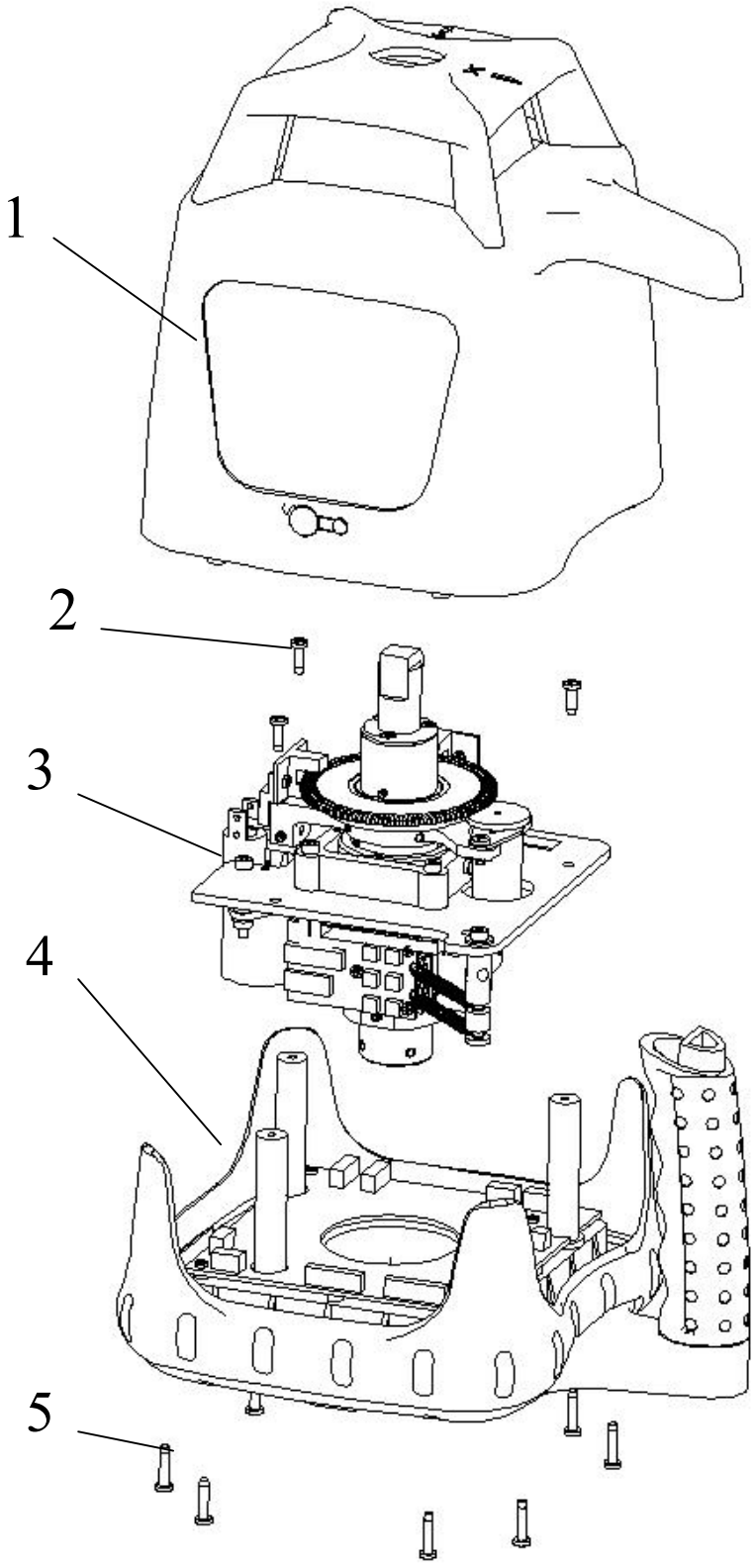
	GB/T80-2000	Screw M3 8	4
9	TXD441-124	Pin	2
10	TSD203-107	Stabilizing board	1
11	TSD203-211	Alarm base	1
11	P7-106	Alarm spring	1
	GB/T818-2000	Screw 2.5 6	2
12	TSD203-106	Inner ring	1
	TXD441-124	Pin	2
	GB/T80-2000	Screw M2.5 3	2
		623ZZ Bearing	2
13	TSD203－108	Spring holder	1
	P6-1-308	Spring（Long）	2
	GB/T70.1-2000	Screw M3 8	1
	GB//T96-1985	φ3 Gasket	1
14		Leveling motor set	2
	TXD441-106	Motor pillar	1
	GB/T70.1-2000	Screw M3 24	1
	GB/T6170-2000	M3 Nut	2
	TSD201-134	Sprin（Shorter）	2
15		623ZZBearing	2
16	TSD203－103	Pendulum	1
		6512Beam lamp-house（Top）	1
		1526Beam lamp-house （Down）	1
17		Bubble set	1
	GB/T80-2000	Screw M3 8	6

2.5 PCB



2.6 Instrument Assembling

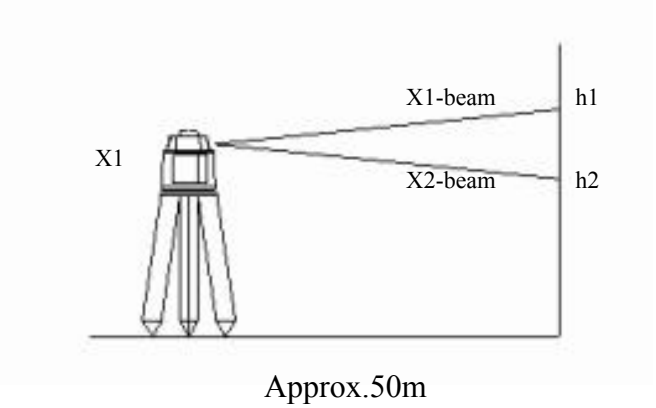
1	TSD203-2-100	Shell set	1
2	GB/T845/1985	Screw ST2.9 11.8	3
3	TSD203-100	Pendulum	1
4	FRE203-2-200	Underpan set	1
5	GB/T845/1985	Screw ST2.9 15.8	8



Bombing illustration of whole set

3.0 Instrument Inspect

(1)Place the instrument at the point of 50m in front of wall(or set a scaleplate at the point of 50m away from the instrument),Then adjust the level of the base approximately to aim the X1 to the wall(or scaleplate)as depicted right side:



(1) Switch on the power, then measure the h1 of X1-beam on the wall or scaleplate by using detector. (3)Loose the screw of the tripod, then turn around the instrument 180° to measure the h2 of X2-beam on the wall or scaleplate. D-value between h1 and h2 ought to be less then 10mm (4)Inspect the Y-beam with the same way.

3.1 Level calibration

If the D-value between h1 and h2 is more than 5mm,calibrat The laser as following steps:

(1)Press the key ON/OFF, when the power indicator lights, Laser will automatic leveling.

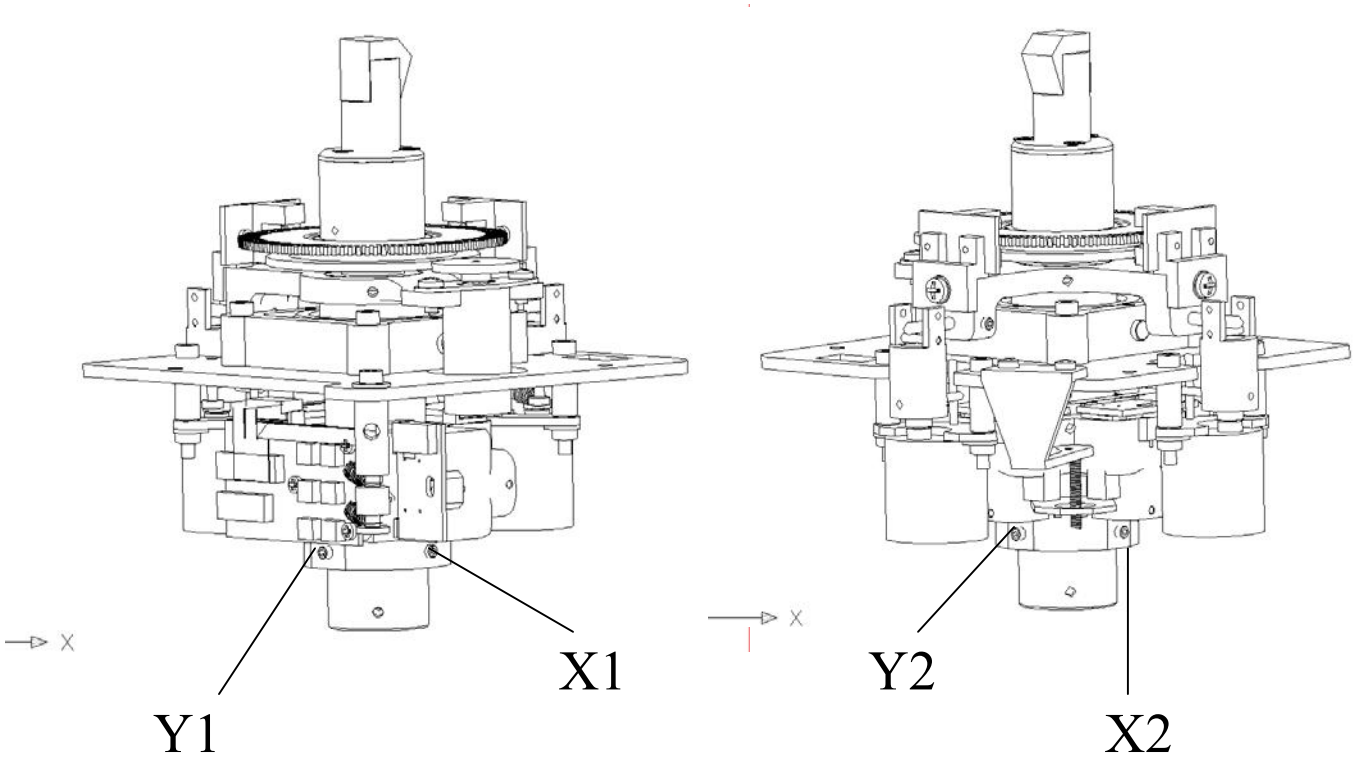
(2) Press the Key" ⇦ "and" ⇨ "simultaneously for 3 seconds when undervoltage mode indicator winks, the instrument enters the mode of Y-axis adjusting.

(3) Press the Key" ⇧"or" ⇩ ",the instrument will adjust one step when press once. Check the position of laser beam when undervoltage indicator is winking till the D-value between h1 and h2 is less than 5mm.Then press the key" 〈 " and " 〉 " simultaneously for 3 seconds until the undervoltage indicator off, The calibration is accepted.

(4) Press the Key" ⇧ "and" ⇩ "simultaneously for 3 seconds when undervoltage indicator winks, the instrument enters mode of adjusting.

（5）Press the Key" ⇦ "or" ⇨ ",the instrument will adjust one step when press once. Check the position of laser beam when undervoltage indicator is winking till the D-value between h1 and h2 is less than 5mm.Then press the key" ⇧" and "⇩ " simultaneously for 3 seconds until the undervoltage indicator off, The calibration is accepted.

3.2 If the D-value of h1 and h2 is beyond 10mm, You should use mechanical calibration, The method is as follows:



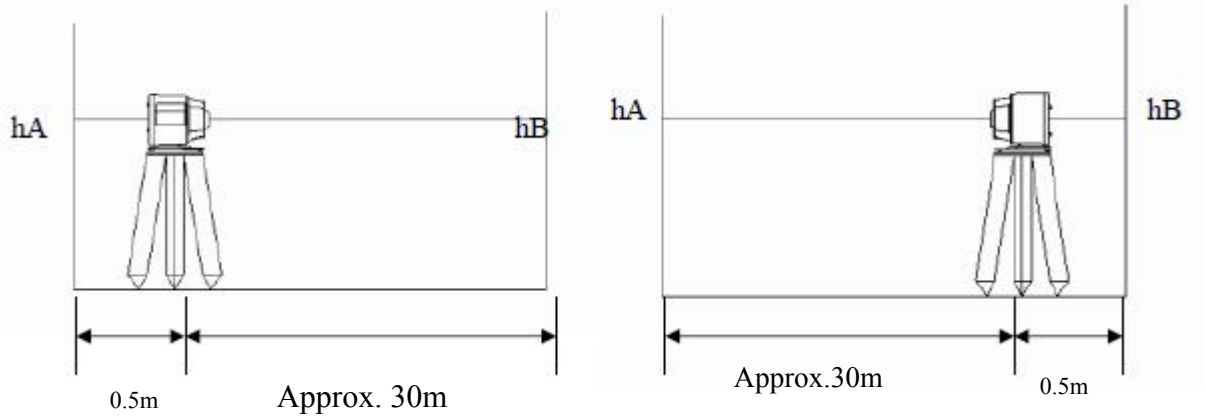
As illustration shows, When instrument is leveling, adjust X1 or X2(Y1 or Y2),until the D-value of h1 and h2 less then 5mm.

Attention: If the calibration is out of range, You should better contact distributor for repairing.

4.0 Horizontal-line Adjust

4.1 Inspection

(1) Place the instrument between two walls with the distance of 30m (or two scaleplates with the distance of 30m)



(2) Place the instrument according to horizontal setting manner and then adjust the instrument.

(3)Switch on the power, and then measure the middle point of the laser beam on two walls(or scaleplates),There are hA、hB and hA'、hB'

(4) 1=hA-hA′, 2=hB-hB′

D-value between 1 and 2 ought to be less than 4mm.

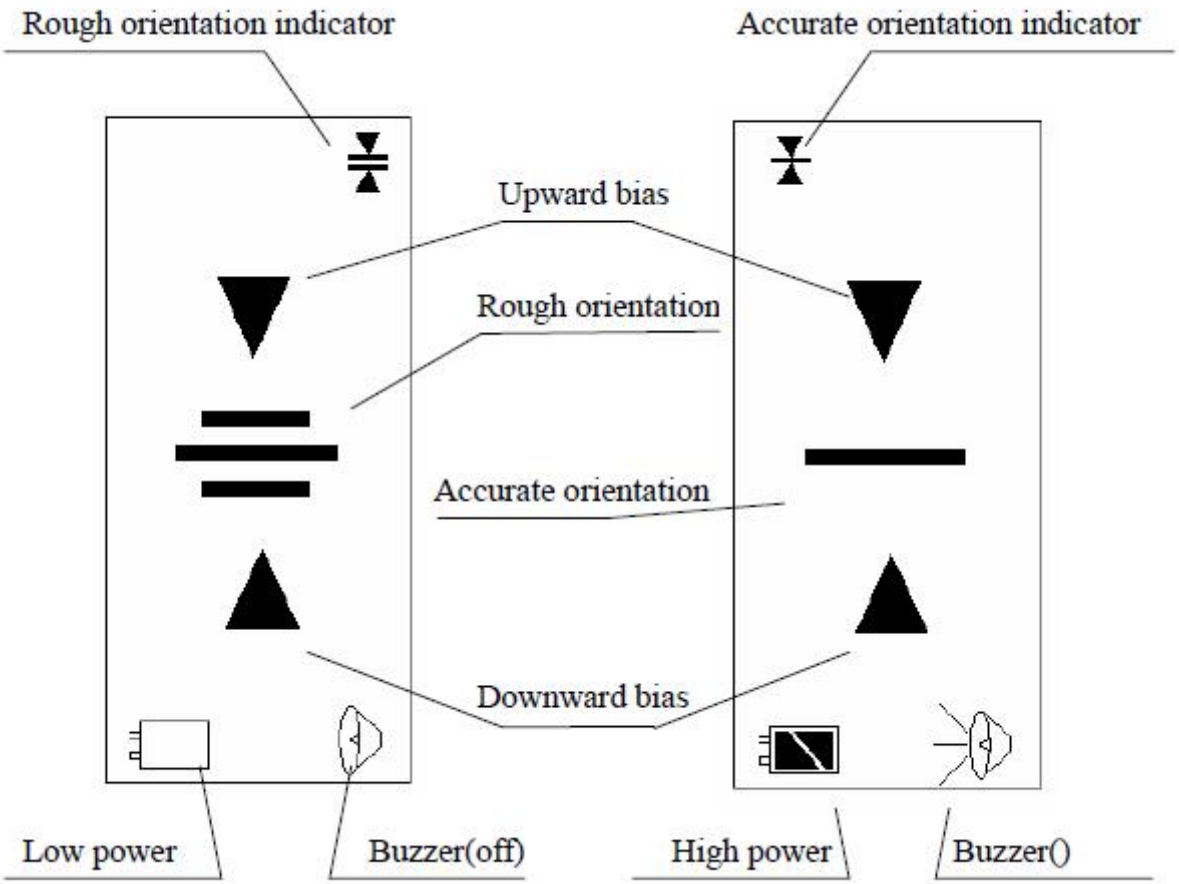
4.2 Adjusting(Vertical)

If D-value between Δ1and Δ2 is more than 4mm ， adjust the instrument in the same way of level adjusting. Please refer to the details of Y-axis calibration in 3.0 and 3.1.

5.0 Detector

5.1 TST100: Introduce of the detector's circuit.

1. The laser beam is received by silicon photocell. After amplifying and judging the signal received, the detector will send out command signal to control the display of LCD and the buzzer.



LCD illustration

States of buzzer：upward bias alarm、downward bias alarm、

accurate-orientated alarm（prolonged sound）

2.Normal fault and repair

（1）Buzzer doesn't work

① Symptons：Buzzer off when press key.

② Reason for causing this problem: a. Socket of buzzer dropt。b. Broken of circuit board。

③ Repair： a. Open the cover then insert the socket.

b. Broken of circuit，send back to manufacturer.

（2）No response when power on.

①Symptoms：Press ON/OFF, there is no sound, no display on LCD.

② Reason： a. Wrong set of batteries. Socket on PCB has dropt. c. Fault of circuit board.

③ Resolve method：

a. Open the batteries cover, then reset the batteries.

b. Open the shell, then insert the socket

c. Fault of circuit board，send back to manufacturer.

6.0 Malfunctions & Eliminations

6.1 Failures in starting up

(1) Symptoms：

After pressing the Key ON/OFF, power indicator can't light and also the instrument doesn't start up.

(2) Causes：

a. Poor contact of keys on the panel or panel plug.

b. Poor contact of batteries or power plug, and insufficient power，

c. Troubles of PCB.

(3) Eliminations：

a. Take off the shell，and renew the panel or connect the power plug with PCB well.

b. Take down the cover of battery case to check whether t here are some dirt or rust between the spring and spring strip，and clear off them if it is true；Recharge the batteries till power is sufficient and then detach the shell to connect the power plug with PCB well.

c. Detach the shell to change the PCB.

d. Please contact the supplier when the instrument still doesn't start up after all your effort above.

6.2 No spinning of laser head.

(1) Symptoms：

The laser beam is being emitted but the laser head doesn't rotate after instrument is power on.

(2) Causes：

a. Center to center distance of gear is not suitable， gearing is abnormal.

b. Troubles of scanning motor.

c. Laser head has touched the optical coupler.

d. Troubles of PCB.

(3) Eliminations：

a. Take off the shell to readjust the center-to-center distance of the gear.

b. Change the scanning motor after taking off the shell.

c. Detach the shell to readjust the space between laser head and optical coupler.

d. Change the PCB.