

LRF-3000 MANUAL 201205-01-001

一、技术参数 SPECIFICATIONS

1. 测距参数 location parameter

- (1) 最大距离: 3000 m
Max range: 3000 m
- (2) 有效测程: 30 ~ 3000 m
Measuring range: 30 ~ 3000 m
- (3) 测距误差: $\pm 0.5\text{m}$
Ranging error: $\pm 0.5\text{m}$
- (4) 距离选通: 20 ~ 5120 m (步长为 10m)
Gate: 20 ~ 5120 m
- (5) 准测率 : 98%
Accuracy rate: 98%
- (6) 重复频率: 1/6 ~ 1/3 Hz (10 ~ 20 次/分)
Working frequency: 1/6 ~ 1/3 Hz

2. 测距功能 functions

- (1) 计算测量数据平均值
Get average data
- (2) 测量数据存储(1000 个数据)
Save data(max 1000)
- (3) 测量数据发送(输出接口: RS232、2400、8、N、2)
Transmit data(output: RS232、2400、8、N、2)
- (4) 液晶显示屏和分划板照明及亮度调整, 20s 无任何操作时自动关闭。
adjust the brightness of screen and reticle, close the light when no operation in continuous 20 seconds.
- (5) 仪器工作寿命统计
Count work times
- (6) 最近十次测距值查询
Index last ten data
- (7) 电池寿命查看
View battery life
- (8) 序列号查询
query serial number
- (9) 存储区数据查询
query storage data

3. 光学参数 optical parameters

- (1) 接收孔径: $\Phi 30\text{mm}$
Receiving diameter: $\Phi 30\text{mm}$
- (2) 瞄准镜视场: 6.5°
Field of view: 6.5°
- (3) 瞄准镜放大倍率: 7^\times
Magnification : 7^\times

4. 激光器参数 laser parameter

- (1) 光源: Nd:YAG
Laser type: Nd:YAG
- (2) 波长: $1.064 \mu\text{m}$
Wavelength: $1.064 \mu\text{m}$

- (3) 输出能量: ≥ 5 mj
Output energy: ≥ 5 mj
- (4) 工作寿命: ≥ 20000 次
Life: ≥ 20000 times
5. 工作温度 **working temperature**
-20°C ~ +50°C
6. 环境适应 **Environmental adaptation**
防尘, 防水, 抗震
Dustproof waterproof shockproof
7. 机械参数 **mechanical parameters**
- (1) 外型尺寸: 115mm*152mm*54mm
Size: 15mm*152mm*54mm
- (2) 重量: 1 Kg
Weight: 1Kg
8. 电源 **power supply**
聚合物锂电池组(11.1 伏、1200 毫安时), 在常温下, 每个充足的电池组可测距 3000 次以上。
Polymer lithium battery(11.1V, 1200mAh). At normal temperature working life over 3000times

二、工作原理 Working principle

1. 测距原理 range principle

脉冲式激光测距仪是通过测量激光脉冲在测距仪与被测目标之间往返一次所需时间 t 来确定目标的距离。

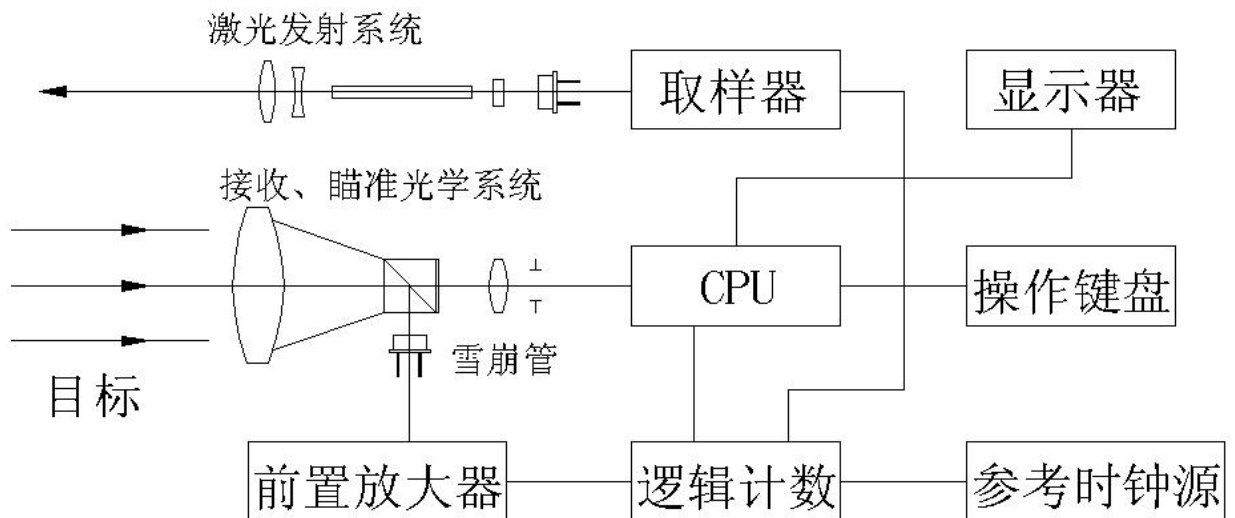
Pulsed laser rangefinder determine the distance of the target by measuring the time t which the pulse round trip between rangefinder and target .

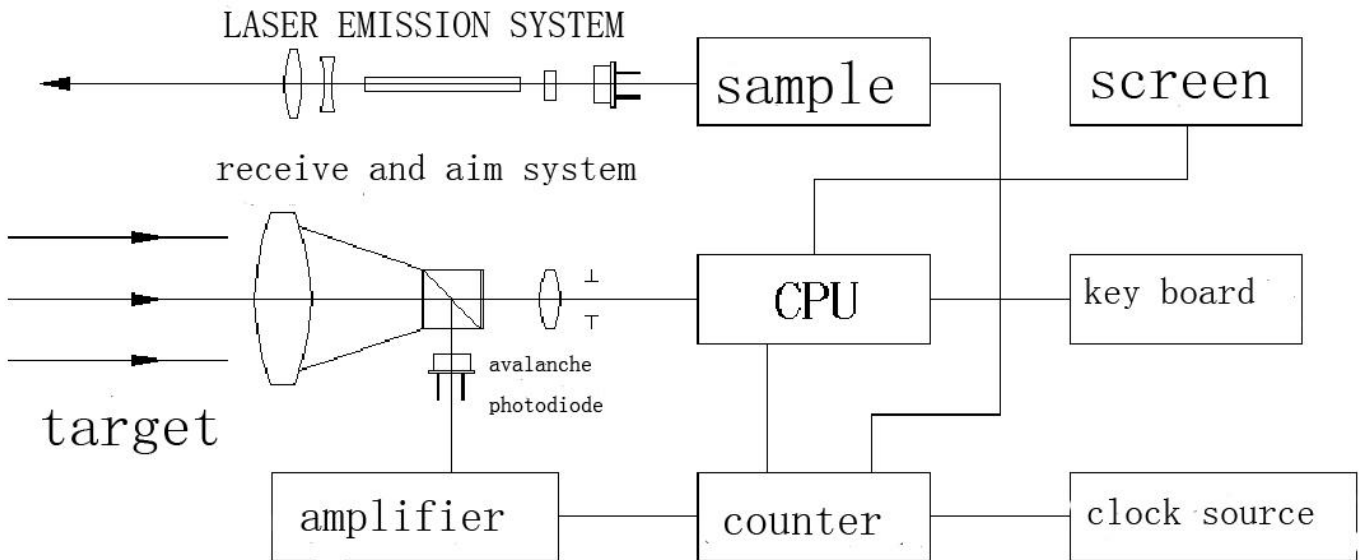
设被测目标与测距仪的距离为 L , 而光在空气中的传播速度为 C , 则有:

Set the distance t between rangefinder and target is L , and the speed of light in air is C , then

$$L = 1/2 * c * t (c = 3 * 10^8 \text{ m/s})$$

2. 激光测距仪工作原理 unit working principle





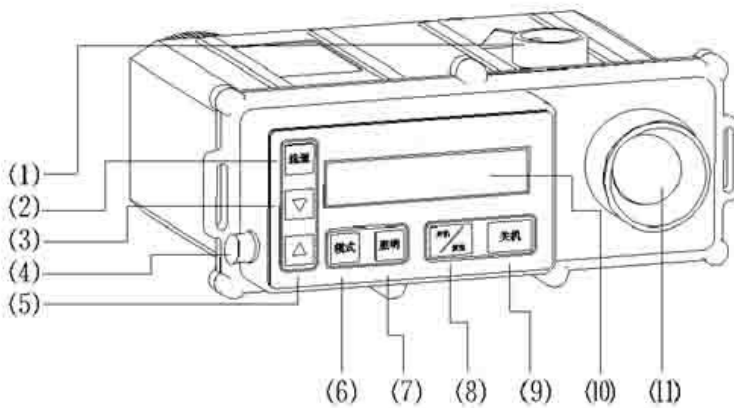
三、测距仪结构和操作功能 Structure and function

① 机械结构 Mechanical structure

测距仪的机械结构为单目两合一光路结构形式(即接收和瞄准合一光路，发射光路独立)。

The mechanical structure of the rangefinder is monocular two-in-one light path structure. (as receive and aim use one light path, emit light path independence.)

② 控制结构 operating controls



- | | |
|-----------|-------------|
| (1) 触发键 | (2) 选通键 |
| (3) 上键 | (4) 连接插头 |
| (5) 下键 | (6) 模式键 |
| (7) 照明键 | (8) 开机/复位键 |
| (9) 关机键 | (10) 液晶显示窗口 |
| (11) 瞄准目镜 | |

③ 功能简述 function

- (1) 触发键 : 发射激光脉冲,使仪器正常测距。
Trigger key emit Laser
- (2) 选通键 : 设定仪器的最小距离门。
Gate key: set minimal distance
- (3) 上键 : 数值修正或菜单选择。
Up key Numerical correction or menu selection
- (4) 连接插头 : 用于仪器和外围设备的信号输入/输出。
Connect plug: transmit data between range finder and Peripheral equipment
- (5) 下键 : 数值修正或菜单选择。
Down key: Numerical correction or menu selection
- (6) 模式键 : 菜单键, 大部分功能均由该键进入。
Model key: enter menu
- (7) 照明键 : 用于夜间或低照度环境条件下液晶显示器和分划板照明。
Light key turn on/off the light,
- (8) 开机/复位 : 开启仪器电源或复位, 退出当前状态。
On/reset key Power on or reset, quit the current state
- (9) 关机键 : 切断仪器电源。
Off key: Power off
- (10) 显示窗口 : 显示被测目标的距离值和操作功能字符。
LCD screen display data
- (11) 瞄准目镜 : 操作者由此目镜瞄准目标。
Ocular Aim at the target

四、一般使用 normal use

- ① 按仪器红色按钮“开机/复位”。液晶显示窗显示“GOLD TOP”, 这表明仪器初始化通过, 可以进行测距。

Press the red key 'on/reset', LCD screen show 'GOLD TOP', System has completed initialize

- ② 通过观察目镜瞄准目标, 并将观察目镜中的十字分划线中心对准目标, 调节视度调节圈, 使所瞄准的目标图象最清晰。

Find the target with the eyepiece, move unit, aim the center of cross at the target, adjust the diopter adjustment ring so that the image of the target be clearest.

- ③ 按一下触发键, 仪器开始测距, 并显示如下结果之一:

Press trigger key, the unit start work and the screen display one of below

I 显示所瞄准目标的距离数。如“S-1234.5m▽”。其中“▽”表示本次测距有双目标, 按下箭头按钮即可显示第二目标, 如“S-2345.0m△”; 再按上箭头按钮又可显示第一目标距离值。如无双目标, 则不显示符号“▽”。

Display the range of the target, e.g. "S-1234.5m ▽". the "▽" means there are double targets in this ranging. Press the down key, the screen display the range of the second target, e.g. "S-2345.0m△". press the up key, the range turn back to the first target .If there is only single target, it will not display the character "▽".

II “AAAA.Am”表示没有测到目标或目标在测程之外。

“AAAA.Am” no target or target out of the range

III “0000.0m”表示没有激光输出。

“0000.0m” no laser output

IV 如果在液晶显示窗中显示出符号 “□”, 则表示电压低, 需对电池组进行充电或更换电池组。

When the screen shows the character "□", the battery voltage is low, should be charged or replaced.

- ④ 在每次正常测距结束, 即得到有效的测距值后, 将自动以 ASCII 格式通过串行口发送当前测距值。

After ranging and get the valid data, the unit will output the value of the range through the serial port with the format of ASCII

五、特殊使用 special use

在本测距仪中，除了最常用的测距功能外，还有强大的辅助功能，作为特殊使用。包括：选通，平均，数据存储，数据发送，角度测量，数据检索，照明，数据删除，背光开关。

In addition to the normal ranging function, the unit has auxiliary functions as a special use, such as Gate, average, data save, data transmit, angle measurement, data index, data delete, brightness adjustment. etc.

在特殊使用中，无论进入了何种状态，按复位键可退出此状态。长按复位退到初始状态，显示“[PLR-I]”。

In special use, the unit could quit the current state by press the reset key. Long press the reset key, the unit turn back to the initial state and display “[PLR-I]”.

选通，模式，照明，复位四键为功能键，相互之间无任何优先级分布，可任意切换。上箭头和下箭头可进行菜单选择和数值修正。

The Gate key, model key, light key and reset key are function keys, they have not any priority distribution between each other, and could be arbitrary switching. Press up key or down key to select menu and correct numerical.

1. 选通功能：如果瞄准光路中有多重目标，可以通过选通功能进行有选择地测距(选通范围为 20~5120 m)。

Gate function: if there are multiple targets in aiming light path, the unit could do ranging selectively by use the Gate function. The range of the Gate is 20~5120m.

① 开机后按“选通”键，仪器显示“MGR: 0020m”，表示最小距离门为 20m。此时按上、下箭头按钮可进行选通值修正。

Press Gate key after power on, the unit display “MGR: 0020m ” what means the min limit of ranging is 20m. press up/down key could correct the Gate value.

② 修正完选通值后再按一下触发键，即可测得选通值之后目标的距离。

Press trigger key after correct the Gate value, the unit get the distance of the target behind the Gate value

③ 在进行选通值修正时，每按一次上/下按钮，则选通距离增/减 20m；按住上/下按钮不放，则选通距离每隔 0.3 秒增/减 100m。

During correcting the Gate value, press the up/down key once, the value plus/minus 20m, hold pressing the up/down key, the value plus/minus 100m every 0.3 seconds.

④ 如在一次正常测距后随即按“选通”键，则将当前测距值加 10m 后自动置为当前选通值。

Press the Gate key after a normal ranging immediately, the current Gate value will be changed as the ranging value plus 10m

⑤ 长按“选通”，则将选通值恢复为 20m。

Long press Gate key, the Gate value back to 20m.

2. 平均功能(AVG)：如需精确测量目标距离值，可进行平均测距，有效的平均次数为 1~100 次。

Average function: as it need accurate measurement, the unit could do average range. The effective average times are 1~100.

当测距次数设为 101~110 次，即为连续测量。

As the number of range times is 101~110, it will be continuous measurement.

① 开机后按“模式”键，仪器显示一模式菜单，其中闪烁的为当前选中的功能名称，按上下按键选择到“AVG”。

Press model key after power on, the screen display the model menu. The flash words is the function which be selected. Press up/down key to select “AVG”.

② 按“模式”键予以确认，则进入平均功能。此时显示“NUM=001”，表示仪器处于单次测距状态。

Press model key to confirm, the unit enter average function. The screen display “NUM=001”, the unit is in single range state.

③ 按上下键修正平均次数，单按每次加/减 1 次；长按则每次加/减 10 次。

Press up/down key to correct average times, short press to plus/minus 1 every time and long press to plus/minus 10 time per one time.

④ 调整好平均次数后，再按一次“模式”键，确认平均次数，此时显示“Average Ready!”,表示可以进行平均测距了。

Finished adjusting the average times, press model key to confirm, the screen should display “Average Ready!”

and the unit can enter average ranging.

⑤ 按一般操作规程瞄准目标，按一下触发键，仪器将按程序自动测距，并显示每次测距结果。测距结束后，将显示出平均数值，如“a(100):1234.5m”，表示平均测距 100 次，距离平均值为 1234.5m。

Aim the target as commonly use, then press trigger key, the unit will range auto and display the result every time. When finished range, it will display the average data, as “a(100):1234.5m”, it means average range 100 times, and average value is 1234.5m.

⑥ 在步骤①~⑤中，每按“复位”键一次均退向上一操作步骤。

During step ①~⑤, the unit turn back to the last step by each press reset key.

⑦ 在进行自动平均测距的过程中，如连续三次测到无效数据，则自动退出平均测距，并显示“Average Error!”；如在平均测距过程中按“复位”键，则退出平均测距状态，并显示有效测距次数及平均值。

During the auto average range, the unit quit average range when get invalid data three times, and display “Average Error!”. If press reset key during average range, the unit quit current state, and display effective times and average value.

⑧ 在进行正常平均测距的过程中，并不向外发送测距信息，而在平均测距完毕后，才向外界发送平均测距次数及平均值。

The unit will not transmit the data during average range, until the range finished.

注：正常平均测距频率为 1/3 Hz(20 次/分)。

The normal work frequency is 1/3 Hz (20rpm)

处于平均测距状态时，除复位键外，其他键都不能操作。

It is none key but “reset” could work during the average range.

3. 存储功能(SAV): 如果现场记录数据有困难或想用计算机对数据集中处理，可用存储功能。

Save function: the save function could be used when it is difficulty to recode data at work place or need to process data with computer.

① 开机后按“模式”键，仪器显示一模式菜单，其中闪烁的为当前选中的功能名称，按上下按键选择到“SAV”。

Press model key after power on, the screen display the model menu. The flash words is the function which be selected. Press up/down key to select “SAV”.

② 按“模式”键予以确认，则进入平均功能。此时显示“STOP [A] [B]”，其中 “[A]” 在闪烁，表示当前选中存储区 A，可用上下键对存储区进行选择。“STOP”表示停止存储功能。

Press model key to confirm, the unit enter save function. The screen display “STOP [A] [B]”, and the “[A]” is flashing. It means the storage area A is selected currently. The storage area could be selected with up/down key. “STOP” means stop use save function

③ 按“模式”键对所选存储区予以确认，此时显示“SD-A010”，表示当前处于存储区 A，其中已存有 10 个有效数据。

Press model key to confirm the storage area, the unit display as “SD-A010”, it means the current storage area is A, and it has 10 effective data.

④ 此时再按“模式”键，则又回复到步骤②，可重新选择存储区。

Press model key again, the unit turn back to step ②, and could select storage area

⑤ 按“复位”键可退出当前状态。

Press reset key to quit current state

注：I 开机缺省为进入存储区 A。

The default storage area is A

II 本仪器内共分 A、B、C、D 四个存储区，每个存储区右存储 250 个数据，共可存储器 1000 个数据。切断电源后数据仍可保留。

The unit has A、B、C、D four storage areas which could save 250 data each one. It could store total 1000 data, and the data will be saved when power off.

III 当存储区 A 存满数据后，将自动转入存储区 B，并依次类推。当四个存储区都存满数据时，将显示“Data Full!”。

The data will save in storage area B when storage area A is full, and so on. The unit will display ‘Data

Full!' when the four storage areas are all full.

4. 发送功能(TXD): 如需将内存数据发送到外围设备进行处理, 可用发送功能。

Transmit function: the transmit function could be used when it need to sent the data to a Peripheral equipment processing.

① 通过专用电缆将仪器与外围设置正常连接。仪器插座排脚如下表所示:

Connect the unit and Peripheral equipment with the cable. The function of the pins are shown in following table.

脚 号	功 能
1	信号地 GND
2	VDD
3	开关 Switch
4	TXD
5	RXD
6	充电口 CHARGE

② 开机后按”模式”键, 仪器显示一模式菜单, 其中闪烁的为当前选中的功能名称, 按上下按键选择到”TXD”, 使之处于闪烁状态。

Press model key after power on, the screen display the model menu. The flash words is the function which be selected. Press up/down key to select “TXD”.

③ 按”模式”键予以确认, 则进入发送功能。此时显示”[A] [B] [C]”, 其中[B]在闪烁, 表示当前发送区为 B 区。可用上下键对发送区域进行选择。

Press model key to confirm, the unit enter transmit function. The screen display ” [A] [B] [C]”, and as the “[B]” is flashing, It means the current selected transmission area is B. The transmission area could be selected with up/down key.

④ 在选择了正确的发送区后再按”模式”键, 此时显示” TXD-B Running”, 表示正在发送 B 区中的数据; 之后显示”TXD-B End!”, 表示数据发送完毕。如所选发送区中没有数据, 则显示”(B)-No Data!”, 不执行发送操作。

Press model key to confirm the transmission area, the unit display as “TXD-B Running”, it means the data in storage area B is sending. Then the unit display as “TXD-B End”, it means the transmission is completed. If there is no data in selected transmission area, the unit display as ‘(B)-No Data!’ and do not transmit.

⑤ 再次”模式”键确认, 则将所选发送区中的数据重新发送一次。

Press model key again, the data in selected transmission area will be transmitted again.

⑥ 按”复位”键可退出所处的当前状态。

Press reset key to quit current state

注: 在单次测距状态下, 每测距一次, 则发送一次距离值; 在平均测距状态下, 仅在平均测距结束后才发送一次平均值和测距次数。

At single range state, the unit transmit a value after every ranging. At average range state, it only transmit the average value and range times once after the whole average range finish.

5. 测角功能(ANG): 显示测距仪当前的俯仰角

angle measurement function: show the current angle of pitch

① 开机后按 “模式”键, 仪器显示模式菜单, 其中闪烁的为当前待选的功能名称, 按 “上键”或 “下键”选择到 “ANG”, 使之处于闪烁状态。

Press model key after power on, the screen display the model menu. The flash words is the function which be selected. Press up/down key to select “ANG”

② 按 “模式”键予以确认, 则进入测角功能。此时显示当前测距仪的俯仰角。有两种角度显示方式, 一种显示单位为角度, 另一种显示单位为密位。此时按 “模式”键可在角度和密位显示之间切换。

Press model key to confirm, the unit enter angle measurement function. The screen display the current angle of

pitch. It has two kinds of angle display mode, the one is angle, another is mil. Press model key can switch between angle and mil.

③ 在测角状态下，每次测距除发送距离值外，还发送当前角度值。（数据格式参见附录）

At the angle measurement state, beside range value, the unit also transmit the current angle.

④ 按“复位”键可退出所处的当前状态。

Press reset key to quit current state

⑤ 在仪器处于存储状态时，如果进入了测角功能，并进行单次测距操作，仪器将同时记录距离值和角度值。（注：在平均测距和连续测距状态时不能使用测角功能）

At the save state, if the unit enter the angle measurement function, and do single range, it will record both the range value and angle.(it can not use angle measurement function at average state or continuous measurement state)

6. 数据检索功能 (IND): 查看存储区中的数据和一些与仪器有关的数据。包括：最近十次数据检索 {LTD}，区域数据检索(SEI)，产品序列号显示(S/N)，电池寿命显示(BAT)及测距次数显示(LIF)。

Data index function: View store data and some data related the instruments.

6.1 最近十次数据检索: 显示开机后的最近十次测距值，可用上下键翻阅查看。

index ten nearest data: show the ten nearest data after power on, press up/down key to look up.

6.2 区域数据检索: 显示四个数据存储区的测距值。

Data index : display the range value in the four storage areas

6.3 产品序列号显示: 显示该仪器的序列号。

Product serial number : displays the equipment serial number

6.4 电池寿命显示: 直接显示当前电池电压值。

Battery life: show the voltage of the battery.

6.5 测距次数显示: 检查仪器累计测距次数。

Range times: check the cumulative number of the unit ranging

注：除平均功能外，无论在何种状态，长按模式键，均可进入序列号显示。

Long press model key, the unit display serial number when it at any state except average function.

7. 亮度调整功能: 在照明打开的状态下，此功能用于分别调整液晶及分划板的亮度。


brightness adjustment function: When the light is on, it can respectively adjust the brightness of screen and reticle.


① 开机后按“模式”键，仪器显示一模式菜单，按上下按键选择到“ADJ”。

Press model key after power on, the screen display the model menu. Press up/down key to select “ADJ”.

② 按“模式”键予以确认，则进入亮度调整功能。此时菜单显示“LED LCD”，此时“LCD”闪烁，表示当前选中液晶照明亮度调整。按上下键可选择对液晶还是分划板进行亮度调整。

Press model key to confirm, the unit enter brightness adjustment function. The screen display ‘LED LCD’, and as the “LCD” is flashing, It means the unit select to adjust the brightness of screen . press up/down key to select the screen or reticle.

③ 按“模式”键予以确认，此时显示当前存储的照明亮度等级。如“LCD:  ”，表示当前存储的液晶照明亮度等级为四级。

Press model key to confirm, the screen display the brightness level, such as ‘LCD :  ’, it means the brightness level is 4.

④ 按“复位”键可依次退出以上状态。

Press reset key to quit current state

注： I 亮度调整共有 4 级，1 级亮度最低，4 级最高。

The brightness could be adjusted total 4 levels, the 1 is lowest and the 4 is highest

II 长按“照明”键，可快速进入亮度调整功能。

Long press light key, the unit can quickly enter brightness adjustment state.

8. 数据删除: 如需将仪器存储区内的数据清除，可用清除功能。

Delete: The delete function can be used in need to clean the storage areas.

① 开机后按“模式”键，仪器显示一模式菜单，其中闪烁的为当前选中的功能名称，按上下按键选择到“DEL”。

Press model key after power on, the screen display the model menu. The flash words is the function which be selected. Press up/down key to select "DEL"

② 按"模式"键予以确认, 则进入数据清除功能。此时显示"[A] [B] [C]", 其中"[B]", 表示当前选中 B 区, 可用上下键对 A、B、C、D 4 区进行选择。

Press model key to confirm, the unit enter delete function. The screen display "[A] [B] [C]", and as the "[B]" is flashing, It means the current selected storage area is B. The storage area could be selected with up/down key

③ 按"模式"键予以确认, 则所选区内的数据被清除。如显示"B-Deleted!", 则表示 B 区内的数据被清除。

Press model key to confirm, the data in the storage area has been deleted. The screen display as "B-Deleted!", It means the data in storage area B has been deleted

④ 按"复位"键可依次退出以上状态。

Press reset key to quit current state

注: 数据一旦被删除, 就无法恢复。

The data can not be recovered as it has been deleted.

9. 照明: 在低照度和夜间环境条件下, 可使用"照明"功能:

Light: The light function can be used on night or lightless environment.

① 开机后按"照明"键, 仪器显示"Light On?". 如再次按"照明"键, 则打开液晶及分划板照明; 如按复位键, 则退出打开照明询问状态。

Press light key after power on, the unit display "Light On?". Then press light key again to open the LCD and the reticle illumination, or press reset key to quit the state ask for light.on.

② 在照明打开的状态下, 按"照明"键, 仪器显示"Light Off?". 如再次按"照明"键, 则关闭液晶及分划板照明; 如按复位键, 则退出关闭照明询问状态。

Press light key when the light is on, the unit display "Light Off?". Then press light key again to close the LCD and the reticle illumination, or press reset key to quit the state ask for light off

注: in automatic lighting off, any operation can activate the lighting.

在照明打开后, 如连续 20 秒无任何操作, 则自动关闭照明; 在自动关闭照明后, 任一操作均能激活照明。

When light is on, the unit will automatically close the light if there is not any operation at continuous 20 seconds. in automatic lighting off, any operation can activate the lighting.

六、架设使用 Erection

如果需稳定、可靠的测量远距离目标, 可以通过仪器底部连接板的 1/4 螺孔固定在照相机架上使用, 或通过连接板的燕尾槽经专用转接机构与各种经纬仪相连使用, 并通过外触发电缆进行遥控测距操作。

If it is need to measure distant target steadily and reliably, the unit could be mounted to tripod with the 1/4 screw on batten plant, or be mounted to theodolite with dovetail groove on batten plant and Special switching mechanism. The unit could be remote used by external trigger cable

七、电池 battery

① 本仪器使用的是 11.1V、1200mAh 专用聚合物锂电池组。

This range finder use 11.1V、1200mA lithium polymer battery

② 当仪器显示电池欠压时请及时充电或更换专用电池。

Please charge or change battery in time when it shows the battery is undervoltage

③ 为防止受伤或起火, 不要让金属物接触电池电极。

Do not let metal contact the battery's electrode in order to prevent injury or fire

④ 为防止损坏电池组, 请勿打开电池组包装, 请保持电池干燥。

In order to prevent damage to the battery, do not open the battery and keep battery dry.

⑤ 请勿把电池放入火中 (放入火中有爆炸的危险)。

Do not put the battery in fire.

⑥建议使用配套的专用充电器对电池组充电，使用劣质充电器可能对电池组造成伤害。

Please use the special charger which we supplied. The

⑦电池充电时请保持环境温度为 0°C 到 40°C 之间，相对湿度 ≤80%，不合适的使用环境可能会对电池性能造成伤害。

Please charge in an ambient temperature between 0°C and 40°C, relative humidity less than 80%.

(注意：长期不使用时，请将专用电池组存放于包装箱内，不要放在测距仪内。)

When it will not use the unit for long time, please put the battery into case, do not leave it in the instrument.

八、充电器使用 charger use

将充电适配器的输出插头插入仪器插座中，然后将充电适配器的插头插入交流 100~240V 电源。此时充电适配器红色指示灯点亮，表示正在进行充电。充满后红色指示灯熄灭，绿色指示灯点亮。充电结束后先将充电适配器的插头从交流电源拔下，然后将输出插头从仪器插座中拔出。

Connect charger to the rangefinder first, then insert the charger's pin into the 100~240V AC power source. The red light lights, the charger become charging. When finish charging, the red light goes out and the green light lights. Be sure unplug the charger from power source first, then disconnect the charger from the rangefinder.

九、维护保养 maintaining

1. 仪器维护 maintaining

① 经常检查仪器外观及时清除表面的灰尘脏污、油脂、霉斑等。

Check the unit regularly and clear away the dust, smudginess, oil, mildew and so on.

② 清洁目镜、物镜或激光发射窗时应使用柔软的干布。严禁用硬物刻划，以免损坏光学性能。

Use soft and dry flannelette to clean the ocular, objective and laser exit window. Do not scratch with hard objects to avoid damaging the optical properties

③ 本机为光、机、电一体化高精密度仪器，使用中应小心轻放，严禁挤压或从高处跌落，以免损坏仪器。

The unit is a precision instrument which is integrated optics, machinery and electron. It should be handled with great care, do not squeeze or fall from a height, so as not to damage the instrument.

2. 故障处理 fault handling

使用人员排除故障仅限于装卸和更换电池以及一些不需要打开仪器的校验。发现故障应及时与本公司联系。严禁私自打开仪器，以防机内高压伤人或进上步扩大故障。

User is limited to change battery and do some calibration without open the instrument. Contact us when the fault is happened. Do not open the instrument without permission to avoid hurt by high-pressure or make fault worse.

十、保修 Warranty

自仪器出本公司，保修壹年，凡因制造或元器件引起的质量问题，由本公司免费更换零件和维修。如属于用户使用不慎或贮存和运输不当造成的事故损坏，不属保修范畴。

We warrant the unit against deficiencies in materials or workmanship for one year from date of purchase. This warranty does not cover deficiencies caused by accidental damage, wear and tear.

本产品实行终身维修，超过保修期，本公司只收取部分检修费和维修成本费。

This product is lifetime maintenance, we just charge the test and material cost when it out of warranty

十一、装箱清单 packing list

序号	名称 name	数量 quantity	备注 note
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1	仪器箱 case	1 只	
2	测距仪 rangefinder	1 具	
3	充电器 charger	1 个	
4	专用电池组 Battery	1 组	
5	外触发电缆 external trigger cable	1 个	
6	绒布 flannelette	1 块	
7	合格证	1 张	

警告： 本产品 在 30 米之内或有遮挡物（比如玻璃）时，不得测距！

Warning: the unit mustn't do range function when there is an obstacle in 30m .

附录：Appendix

1. 操作功能检索表 Function Index

测距 range-----	测量距离 measure distance
选通 Gate-----	设置最小距离门 set minimal distance
照明 light-----	打开液晶及分划板照明 open the LCD and the reticle illumination
模式 model-----	功能模块 function module
—— 平均 Average(AVG) -----	平均测距功能 Average range function
—— 存储 Save(SAV) -----	区域数据存储功能 save data function
—— 发送 Transmit(TXD) -----	测量数据串行发送 data transmit
—— 测角 (ANG) -----	仰角测量 angle measurement function
—— 检索 Index(IND) -----	数据检索 index data
—— (LTD) -----	最近十次测量数据查询 index last ten data
—— (SEI) -----	区域数据查询 index storage data
—— (S/N) -----	序列号查询 serial number
—— (BAT) -----	电池寿命查询 Battery life
—— (LIF) -----	测距寿命查询 range life
—— 调整(ADJ) -----	照明亮度调整 brightness adjustment
—— (LED) -----	分划板亮度调整 reticle brightness adjustment
—— (LCD) -----	液晶亮度调整 screen brightness adjustment
—— 删除(DEL) -----	区域数据删除 Delete data

2. 按键长按功能 long press function

1. 选通 Gate-----选通值置为 20m set value of range 20m

- 2. 照明 -----快速进入亮度调整 quickly enter brightness adjustment
- 3. 模式 -----显示序列号 display serial number
- 4. 复位 -----退出所有功能 quit all functions

3. 数据发送格式 Data transmission format

数据以 ASCII 码发送，距离值以符号“L”开头，以回车符结束，角度值以符号“A”开头，以回车符结束。

The data is transmitted with the format of ASCII. The value of range starts with 'L' and ends with carriage return. The value of angle starts with 'A' and ends with carriage return.

1. 距离值数据格式: range format

L	*	*	*	*	.	*	m	↵
代表距离 range	距离值, 最大 10000 Value of range: max 10000						距离单位 Distance unit	结束标记 Ending mark

2. 角度值数据格式: angle format

A	*	*	*	.	*	°	↵	
代表距离 angle	角度值, 最大 359.9 ° Value of angle: max 359.9						角度单位 Angle unit	结束标记 Ending mark

3. 当距离值和角度值一起发送时，首先发送距离值，再发送角度值，最后以回车符结束。

When transmit value of range and angle at same time, send value of range first, than send value angle, end with carriage return at last.

L	*	*	*	*	.	*	m	↵	A	*	*	*	.	*	°	↵	↵
距离 range	距离值 最大 10000m Value of range: max 10000m						结束标记	角度	角度值 最大 359.9 ° Value of angle: max 359.9						结束标记	整组数据结束	

4. 发送平均测距数据时，首先发送距离值，再送发送测距次数，然后以回车符结束。

When transmit average data, send value of range first, then send range times, end with carriage return at

last.

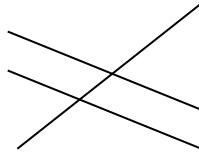
L	*	*	*	*	.	*	m	↵	N				↵	↵
距离	距离值 最大 10000m						结束标记	次数	次数值 最大 100			结束标记	整组数据结束	

L	*	*	*	*	.	*	m	↵	N				↵	↵
range	Value of range: max 10000m						Ending mark	number	Number of times Max 100			Ending mark	End of all	

4. 仪器与 Pc 机串口通讯的连接方法 serial communication connection method

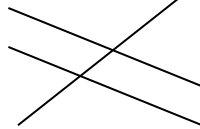
RS232C 信号线和 DB-9 引脚定义 仪器输出插座插脚定义
连接方式

符号	名称	引脚
DCD	空脚	1
RXD	接受数据线	2
TXD	数据发送线	3
DTR	空脚	4
GND	公共地	5
DSR	空脚	6
RTS	空脚	7
CTS	空脚	8
RI	空脚	9



脚号	功能
1	信号地
2	VDD
3	开关
4	TXD
5	RXD
6	充电口

Name	description	pin
DCD	Empty Pin	1
RXD	Receive Data	2
TXD	Transmit Data	3
DTR	Empty Pin	4
GND	System Ground	5
DSR	Empty Pin	6
RTS	Empty Pin	7
CTS	Empty Pin	8
RI	Empty Pin	9



PIN	FUNCTION
1	GND
2	VDD
3	Switch
4	TXD
5	RXD
6	CHARGE