High Precision Wireless Bore Gauge

B-1000

User's Guide

The contents of this manual could be different according to the software version and it can be changed without notice.
Please use this good after reading the manual thoroughly.

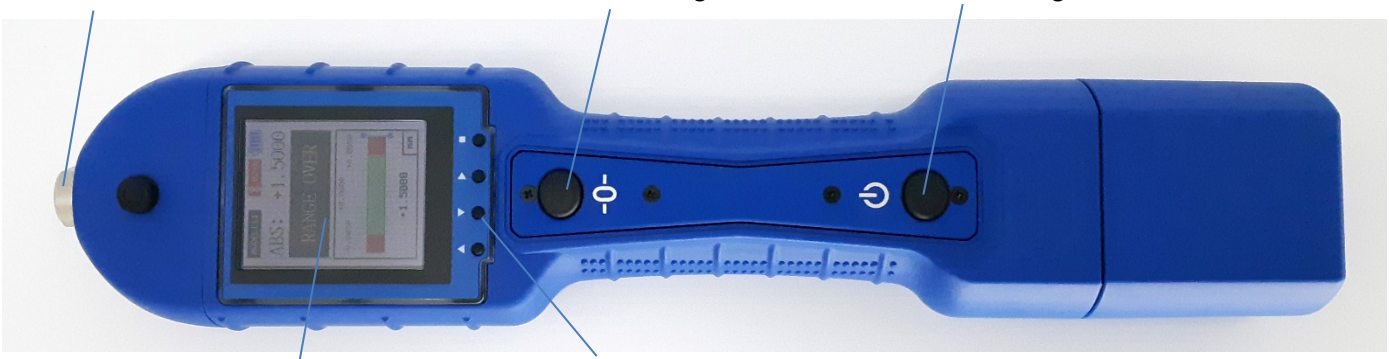
Table of Contents

Introduction

Thanks for buying our product.
B-1000 is a high precision wireless bore gauge with Bluetooth communication and a color TFT LCD. So, it is possible to send the measured data without any wire connection to the PC and also possible to check the data immediately by its own color TFT LCD.

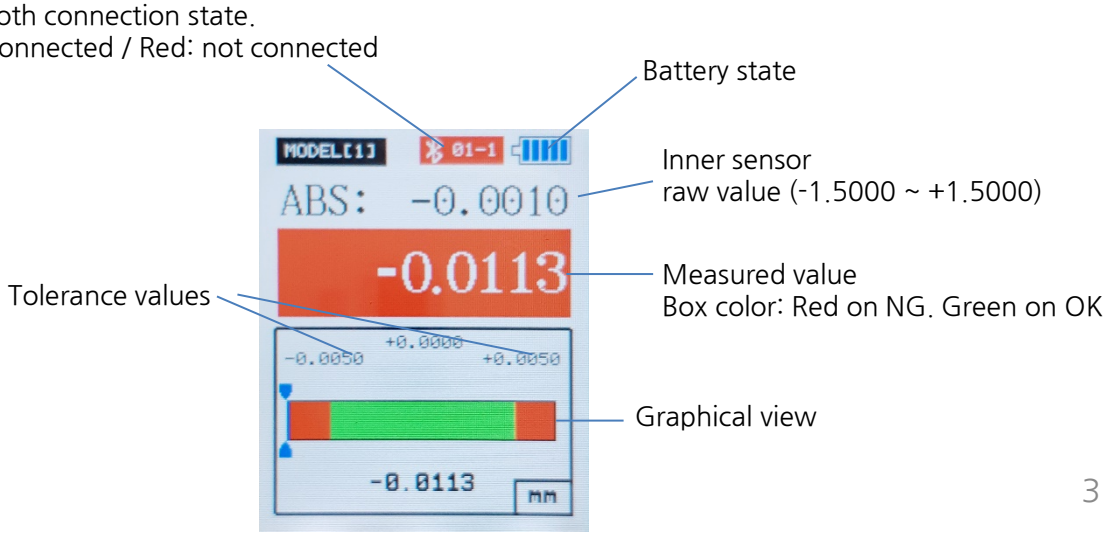
Specialty of B-1000
1. Wireless(Bluetooth 5.0) portable bore gauge.
2. Real time value checking by 2” color TFT LCD.
3. 0.1μm resolution.
4. Built-in Li-ion rechargeable battery.
5. Robustness.
6. IP65 sealing.

1. B-1000 feature



2. Recharging battery

3. Measuring screen



1. Power on / off

- If the measuring button B is pushed for over 3 sec, the power is on or off.
- The power is off automatically after 'Time Off' time. The 'Time Off' is set at the 'Setup' -> 'Power manage' menu.

2. Rotating display

- B-1000 has the function that rotating display on the measuring screen.

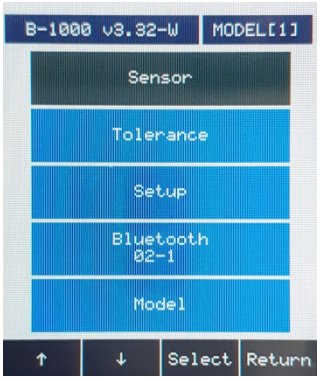
It is helpful to set a comfort user's view depended on the measuring direction.

Whenever the ▲ or ▼ buttons are hit on the measuring screen, the display is rotated by 90°.

- ▲ for counterclockwise / ▼ for clockwise.

3. Main menu

- Main menu is entered by hitting ■ button(4th button from left) on the measuring screen.



-The main menu is composed as like the picture at the left.
-Each functions can be chosen by ▶ button after cursor is moved by ▲▼buttons.

1. Sensor : To calibrate the inner sensor by Hi/Lo setting rings or Zero ring.
2. Tolerance : To input the tolerance of the measuring part.
3. Setup : To setup the brightness, power off time, and serial format etc.
4. Bluetooth: To link Bluetooth with BAP-1000, Bluetooth access point for B-1000.
5. Model : 16 memory spaces are given to save the users' specification setting. And user could recall them later.

4. Sensor

-To calibrate the inner sensor by setting rings. There are two calibrations. Because a linear calibration is done inside, usually Zero master calibration is used.

1) To use Hi/Lo setting rings(optional, do only when it's necessary as like BMD has a special gain.):
   a. Hi/Lo Master Size input → b. Hi/Lo Master Calibration → c. Measuring.
2) **To use one Zero setting ring(Linear calibration is done at the factory):**
   a**. Zero Master Calibration** → b**. Measuring**

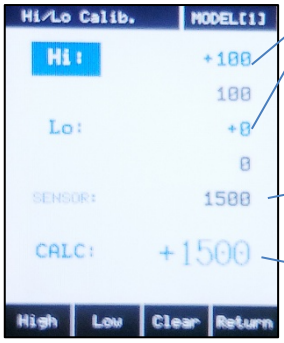
4-1. Hi/Lo Master Size

-The Hi/Low master's ring sizes are input in this menu.
ex) Low master ring: 5.000mm / Hi master ring: 5.100mm
→ Setting values Lo : 0.0 μm / Hi : 100.0 μm

4-2. Hi/Lo Master Calib.

-The sensor is calibrated by the Hi/Low master rings along the steps below.
-The default linear calibration is done in the factory, so please use it only when it's really necessary.
-Initialize Zero master value with Hi/Lo Master Calibration automatically.

a. High button(▲) is hit after B-1000 is set at the Hi master ring.
b. Low button(▼) is hit after B-1000 is set at the Low master ring.
→ Sensor calibration is done.
c. Clear button(▶) is used to clear the current setting.
d. Return to save the calibration.



Saved absolute sensor value for Hi/Low master.

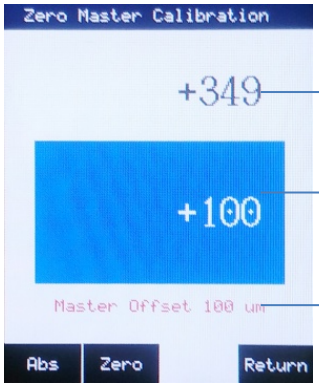
Raw sensor value

Sensor value
after Hi/Lo calibration.

4-3. Zero Master Calib.

-The zero master is set in this menu. It is useful if user need to change the zero point.
-Initialize Hi/Lo Master values with Zero master calibration automatically.

a. Abs(▲) is hit.
b. Zero(▼) is hit after B-1000 is set at the Zero master ring or master piece.
→ Zero Master Calibration is done. (Same as Button A is pressed over 2sec. at the measuring screen)
c. Return to save the calibration.



Raw sensor value

Value after zero master setting.

If zero master offset is not 0, the offset value is shown at the bottom.

4-4. Zero Master offset.

-If the zero master is not right size, the master value can be fixed by zero master offset.
And the measuring value is added with this master offset.

4-5. Average

-To change the number of input row data to average them.
B-1000 always gives the averaged data to the screen or Bluetooth output.

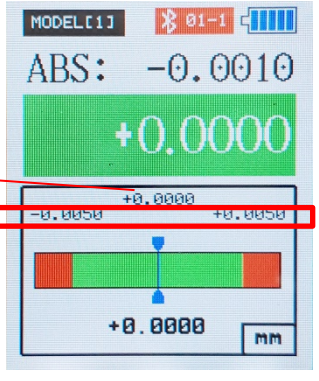
4-6. Direction

-To change the measuring direction. Default is IN-DIA. But if a BMD for out-diameter is used, please change this to OUT-DIA.

5. Tolerance

-Preset, +/- tolerances values are set in this menu.
** Preset(Nominal) value only affects to the display on the measuring screen, not affects to the OK/NG result.
ex) 5.000(+0.02/-0.01)
Preset : 5.0000um / Tol.▲: +20.0um / Tol.▼:-10.0um

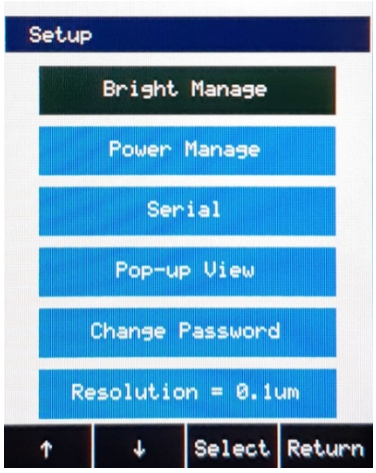
〈Setting screen〉



〈Measuring screen〉

6. Setup

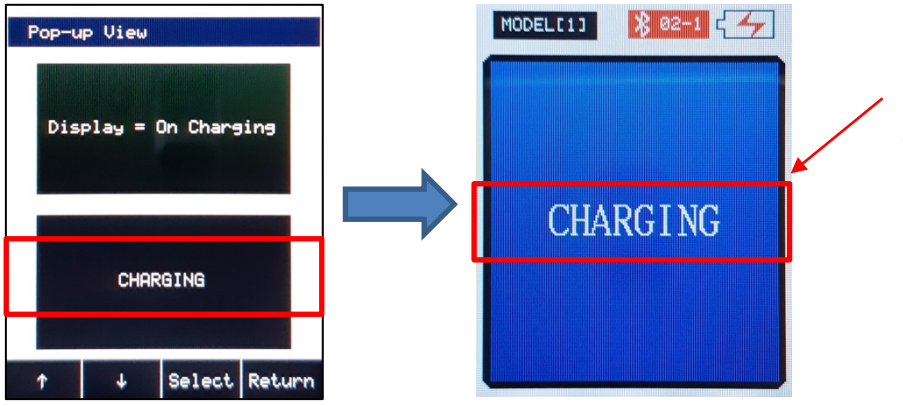
-The Setup menu is composed as like below.



-Each functions can be chosen by ▶ button after cursor is moved by ▲▼buttons.

1. Bright Manage : The LCD brightness control.
   1) Bright Sleep : The brightness on sleep mode. OFF, 10% ~ 100%.
   2) Bright Wake-up : The brightness on wake-up mode. 20% ~ 100%.
2. Power manage : The power manage by 'Time to sleep' and 'Time to off'.
   1) Time to Sleep : The brightness of LCD change to 'Bright Sleep' setting after the time. User can save the power with this control.
   2) Time to Off (BAT) : B-1000 power is off after this time on battery power.
   3) Time to Off (CHG) : B-1000 power is off after this time on External power.
3. Serial:
   1) Mode =
   - Always : sending data continuously.
   - Click : sending data only when 'Measuring button A or B' is pressed.
   - On discharge : sending data only when B-1000 is off from charging.
   - On wake-up : sending data only when B-1000 is on wake-up state.
   2) Format: '+00000' without decimal point. '+0.0000' with decimal point.
   3) Data/Sec. =
   - The number of serial out data in 1 sec., from 1 to 10.

4. Pop-up View: A message can display on charging or sleep mode on screen.
   1) Display =
   - On Charging : A message display on charging mode. Default latter is 'CHARGING'. User can change the message by serial command 'SET CHGMSG'. Please check the serial commands for details.
   - On Sleep : A message display on 'Sleep' mode. Default latter is 'SLEEP'. User can change the message by serial command 'SET CHGMSG'.
   - OFF : No pop-up view.
   2) Message view : it shows the letters along the pop-up view display mode.
   - CHARGING and SLEEP are default letters, but they can change by serial commands.
   - Where to use: to show the unit number or measuring size, etc.



5. Change password: To set a password to enter the setting menu from measuring screen. Password is disabled by no number entered.

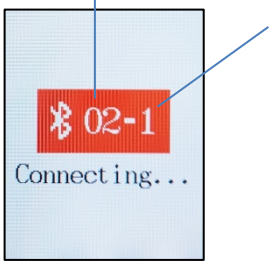
6. Resolution : 1um ←→ 0.1um, Master zero should be done again after changing res.!

7. Bluetooth

- SID : Station ID for BAP-1000. B-1000 can be connected by 8 units on each BAP-1000.
  BAP-1000 ID is set by dial switches on its panel.
  User should put in the Station ID on B-1000. And it will search by itself.
  Each of BAP-1000 should have different SID by user's setting.

- DID : Device ID for B-1000. 1 to 8.
  If DID of a B-1000 is set the same with another B-1000, only first connected unit's link is survived and others will have a warning.
  User should set the available DID. Vacant DID can be realized by the LED on BAP-1000.

<SID>: Should be same with the dial setting on BAP-1000

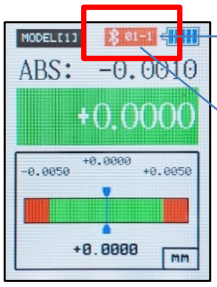


<DID> : 1 - 8

BAP-1000

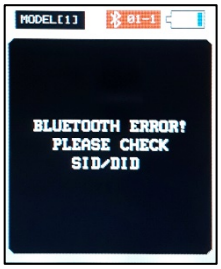
<Link LED>
Off: No link, Vacant
Green: Linked
Green blink: communicating
Red blink: Collision

<SID>: 01-99



<SID> - <DID>

BOX COLOR :
1)BLUE : LINKED
2)RED : NO LINKED
3)YELLOW : LINKED BUT WEAK
4)BLACK flickering : Unavailable ID. Other B-1000 is already using it.

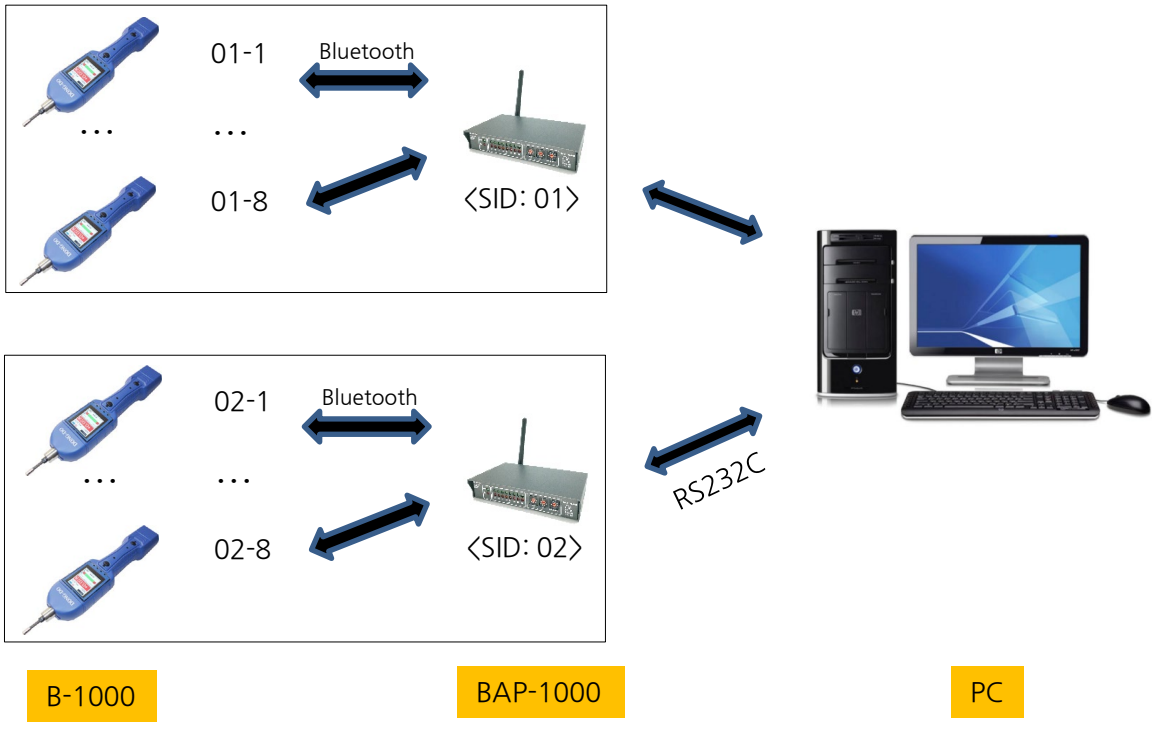


A collision message box pops up once on measuring screen if there is colliding between B-1000s.
Then user should check the <SID>, <DID> to remove the pop-up box.

If press measuring button A or B, the message will be disappeared.

Functions

-Linkage map



-BAP-1000, Bluetooth Access Point for B-1000, supports a quick, comfort, and safe Bluetooth link for you.
-Maximum 8 units of B-1000 can link to a BAP-1000.
-Maximum 99 units of BAP-1000 can link to PC.

8. Model

-Model : 16 memory spaces are given to save the users' specification setting.
And user could recall them later.

1. Bluetooth serial format:

<DID> [STX] [SID-DID], [MODEL], [PRESSED], [DATA REL], [DATA ABS] **[ETX] [CR] [LF]**
Ex) <1>[STX]01-1,M01,P, +12345, +12345[ETX][CR][LF]

<DID> : Device ID (3 bytes)
[STX] : 0x02 (1bytes)
[SID-DID] : Station ID - Device ID (4 bytes)
[PRESSED] : Space or 'P' (1bytes)
[DATA REL] : Measuring data from the master zero (10bytes)
[DATA ABS] : Inner sensor raw data (10bytes)
[ETX] : 0x03 (1bytes)
, : comma (1byte)
'[' and ']' : No serial data but just for manual.

2. Serial Commands

1) Brightness setting
<DID>SET DISPLAY X[CR] :
X = Forced to sleep brightness : 0 / Forced to wake-up brightness : 1
Ex) <1>SET DISPLAY 0[CR] then Brightness is down to a sleep brightness.
  Return: <1>OK[CR][LF]

2) Measuring command
<DID>PRESS DATA X[CR] :
X = '0' up to '9' mirrored at reply position [PRESSED] and
unlike physically pressing the data button *not influencing screen brightness*
Ex) <1>PRESS DATA 0[CR] then output: <1>[STX]01-1,M01,**0**, +12345, +12345[ETX][CR][LF]

3) Pop-up message change
<DID>SET CHGMSG XXXXXXXXXX[CR] :
X = Max. 10 characters
Ex) <1>SET CHGMSG DIA_02[CR]
  then Message of Pop-up view on B-1000 menu will be changed to 'DIA_02'.
  Return: <1>OK[CR][LF]

4) Setting the preset(nominal) value
<DID>SET PRESET XXX.XXXX[CR] :
Set a nominal value.
A nominal value is added on the current measuring value then displayed on the measuring screen and RS232C data. No affection for the OK/NG result.
X = xxx.xxxx / +xxx.xxxx / -xxx.xxxx / xxx.xxx / +xxx.xxx / -xxx.xxx all fine.
Ex) <1>SET PRESET +100.0000 then 000.0000 → 100.0000
  Return: <1>OK[CR][LF]

5) Tolerance setting
<DID>SET LIMIT UL XXX.XXXX[CR] : Set the upper limit.
<DID>SET LIMIT LL XXX.XXXX[CR] : Set the lower limit.
X = xxx.xxxx / +xxx.xxxx / -xxx.xxxx / xxx.xxx / +xxx.xxx / -xxx.xxx all fine.
Ex) <1>SET LIMIT UL +000.0010 then Upper limit is set 000.0000 → +000.0010
Return: <1>OK[CR][LF]

6) Hi/Low master setting (If necessary. ZERO and ZERO2 will be initialized with this calibration.)
<DID>SET LO M XXX.XXXX[CR] :
Set the current value to the Low master. XXX.XXXX is the low master ring size.
**It should be done with the condition that B-1000 is set in the low master ring.
<DID>SET HI M XXX.XXXX[CR] :
Set the current value to the High master. XXX.XXXX is the high master ring size.
**It should be done with the condition that B-1000 is set in the high master ring.

X = xxx.xxxx / +xxx.xxxx / -xxx.xxxx / xxx.xxx / +xxx.xxx / -xxx.xxx all fine.
Ex) <1>SET LO M 000.0000 then current sensor value is set to 000.0000.
'SET HI M' should be done once, too. And ZERO and ZERO2 value will be cleared.
The gain will be calculated inside by the entered low master/high master values.
Return: <1>OK[CR][LF]

7) Zero master setting (HI/LO master will be initialized with this calibration.)
<DID>SET ZERO[CR] :
Set the current value to the Zero.
<DID>SET ZERO2 XXX.XXXX[CR] :
Set the current value to the Zero master with adding a offset value.
Ex) <1>SET ZERO2 000.010 then Current value → 000.010
** To remove the zero master offset value, 'SAVE ZERO2 000.0000' should be used.
Return: <1>OK[CR][LF]

8) Clearing master settings
<DID>CLEAR MASTER[CR] :
Initialize all master settings, HI/LO/ZERO.
Ex) <1>CLEAR MASTER[CR] then all of the setting is initialized to default value.
Return: <1>OK[CR][LF]

9) Direction setting (Hi/Low mastering and Zero mastering should be done again.)
<DID>SET DIRECTION X[CR] :
X = In-diameter : 0 / Out-diameter : 1
Ex) <1>SET DIRECTION 0[CR] then In-diameter measuring.
Return: <1>OK[CR][LF]

10) Battery status
<DID>GET BATTERY[CR] :
Get battery charged amount status by %
Ex) <1>SET BATTERY[CR]
Return: <1>BATTERY 087[CR][LF]

11) Firmware Version check
<DID>GET VERSION[CR] :
Get the firmware version on B-1000
Ex) <1>GET VERSION[CR]
Return: <1>VERSION V3.10-W,B-1000[CR][LF]

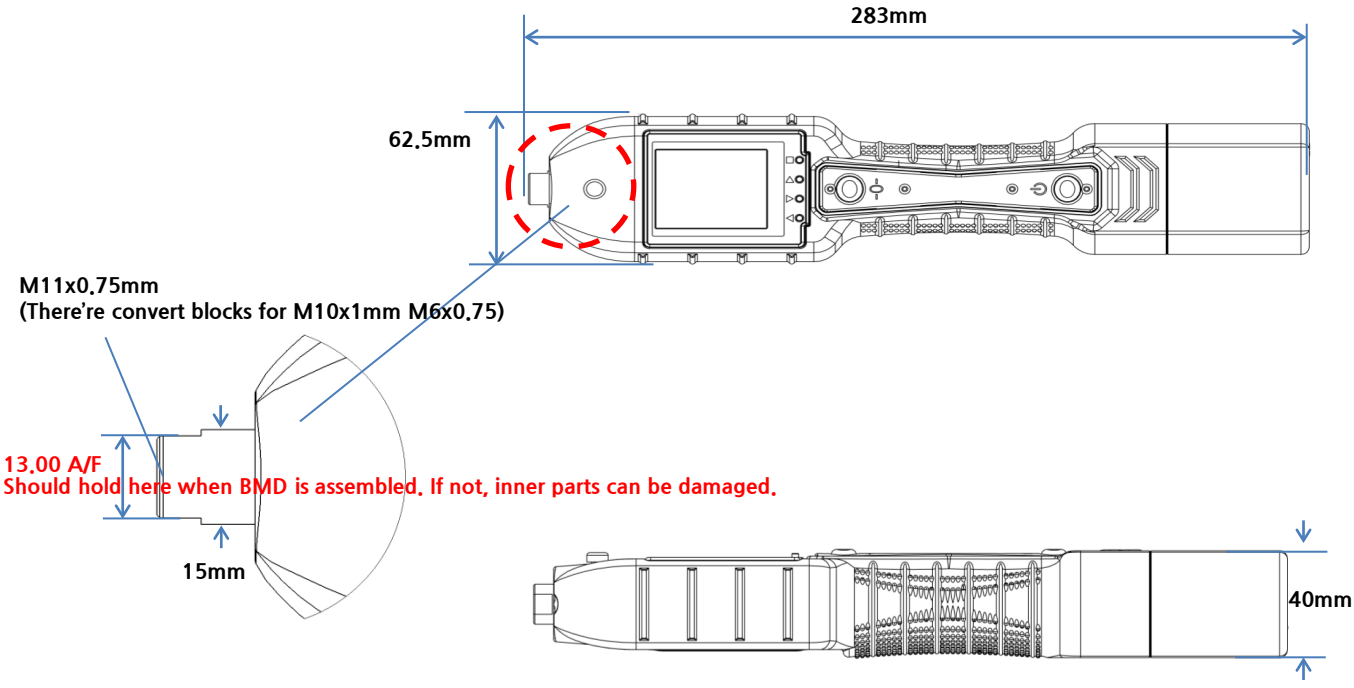
Specifications

System	
Bore measuring range	Variable diameter heads can be used that has M10x1mm or M6x0.75mm thread. M11x0.75mm is a default set.
Internal gauge measuring range	±1.5mm
Internal gauge resolution	0.1μm
Internal gauge repeatability	≤ 0.15μm
Internal gauge non-linearity	0.1% of reading
Bluetooth version	Bluetooth 5.0
Bluetooth range	Typically, 100M on open space (working distance can vary depending on install environment)
Display	2" color TFT LCD(176 x 220 pixel)
Operating temperature	0 ~ 40°C
Sealing	IP65

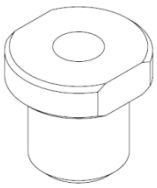
Power & Other features	
Power	Protected Li-ion Battery 3.7V 2600mAh, 18650 size (Rechargeable)
Operation time	Around 12 hours with fully charged battery. *
Charging	Wireless charger (QI reference WPC1.1) or 24V DC adapter
Size(W/L./H)	275 x 62.5 x 40mm
Weight	370g
Operation environment	Temp. : 0 ~ 40°C / Humidity : below 80%

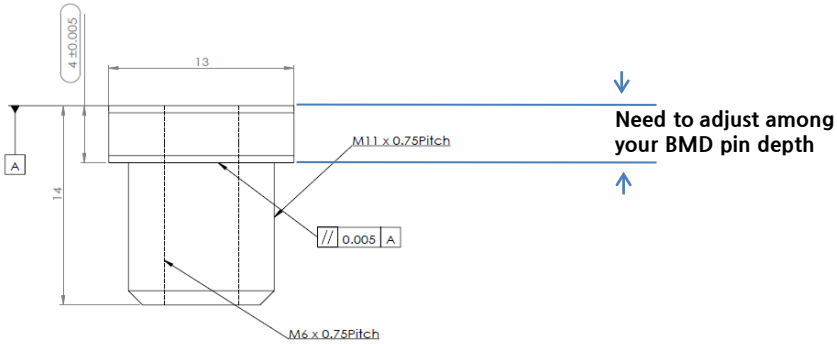
* Tip to save the battery power:
1. Reduce the brightness of the LCD.
2. Reduce the 'Sleep' time.
3. Reduce the 'Off' time.

Dimensions

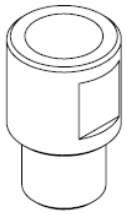


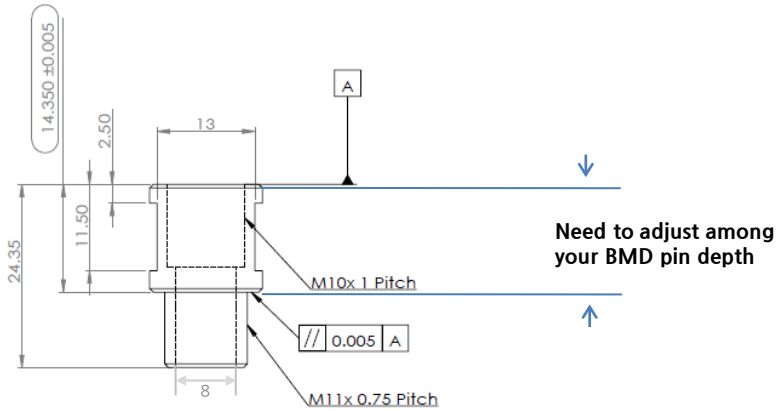
M11 to M6 convert block





M11 to M10 convert block

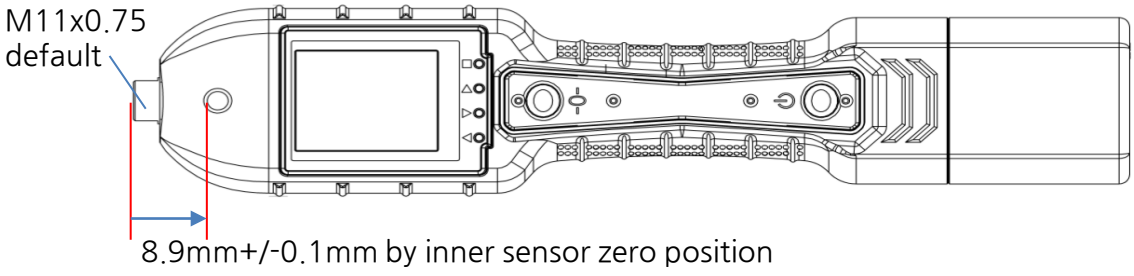


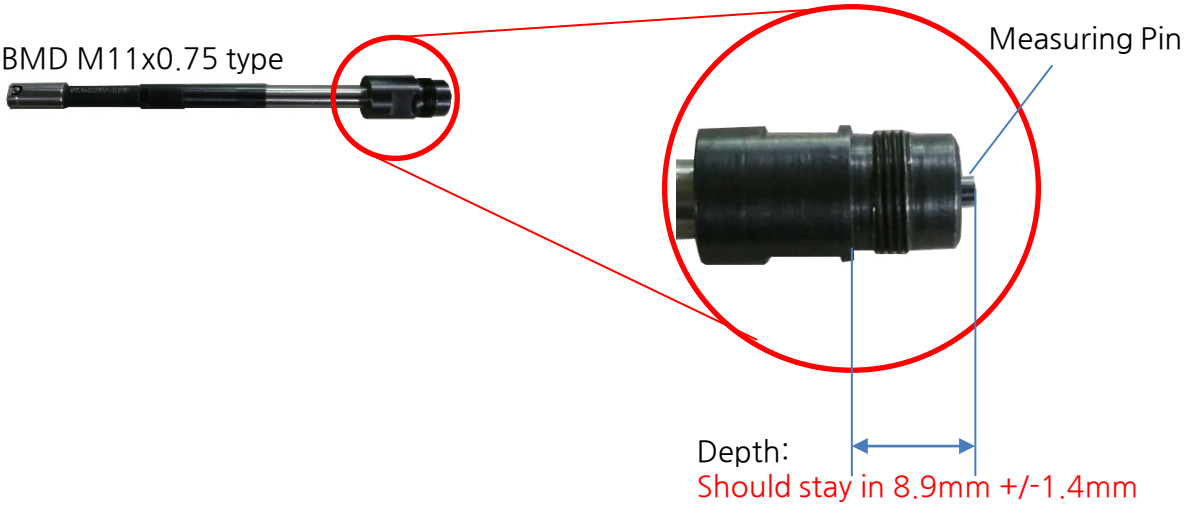


Cautions & Maintenance

1. Do not disassemble the unit or attempt any internal alterations. It's causing of damaging.

2. Please check the depth of the BMD. Our standard depth by the zero position of the internal sensor is 8.9mm from the top. So, the measuring pin of the BMD should stay 8.9mm +/-1.4mm. (+/-1.5mm is a measuring range of the internal sensor)





BMD M6x0.75 type

Usually 4mm longer than M11x0.75
→Add convert block, M11x0.75 to M6x0.75
**User should make this block depends on the depth.
Please check the front page.

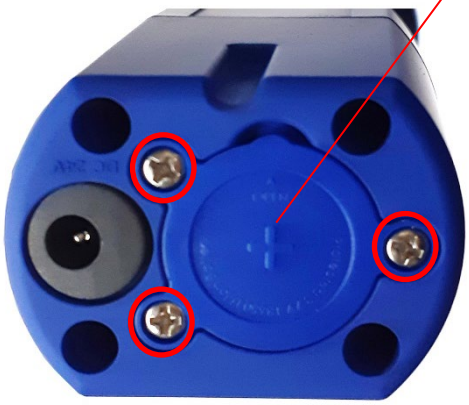
BMD M10x1.0 type

Usually 14mm longer than M11x0.75
→Add convert block, M11x0.75 to M10x1.0
**User should make this block depends on the depth.
Please check the front page.

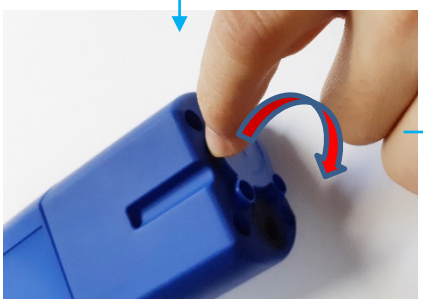
Cautions & Maintenance

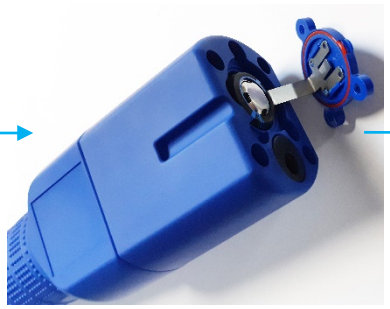
3. Battery exchange
-B-1000 uses a rechargeable protected 3.7V 2600mA 18650 size Li-ion battery.
User can purchase it easily on the web. Please do not use non-protected 18650 battery cell.

Check the direction of the battery



Unscrew the 3 bolts and open the cover softly.





Take out the old battery and exchange along the right battery direction.