CUBEscan™

BioCon-700

Service Manual

Man, Machine & Medicine

Mcube Technology Co., Ltd.

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Bladder Volume Measurement System
Service Manual

Any service work performed by persons who are not authorized by Mcube Technology Co.,Ltd. may void your warranty.

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Non-Mcube Technology product names are the property of their respective owners.

SAFETY SIGNS

Safety sign	Reference	Title	Description
	ISO 7010-M002	Refer to instruction manual/booklet	-
	ISO 7010-M001	General mandatory action sign	Filled circles with an exclamation mark indicate an action that must be performed
	ISO 7010-P001 and ISO 3864-1, Figure 1	General prohibition sign	Circular icons with a diagonal bar tell you that the action indicated is prohibited
	ISO 7010-W001	General warning sign	This icon indicates that personal injury or material damage can result if the information is ignored

Power Source and Adapter

- Do not use the device if the power cord is damaged. Do not heat or unduly twist or pull the cord and do not place heavy objects on the cord. These actions could damage the cord and cause a fire or electric shock. If the cord is damaged, contact your local distributor or Mcube Technology.
- Do not move the device while the AC power adapter is still connected. Do not pull on the connection cord to disconnect the AC power adapter. This can damage the power cord or cables and cause a fire or electric shock.
- Do not use with other devices.
- Do not disassemble.
- Do not expose to high heat and humidity.
- Do not subject to strong physical shocks.

- In order for the device to be disconnected safely in the event of an emergency, the plug should be located suitable place where the socket outlet is readily accessible, by removal of the plug from the socket outlet. (When an separable plug is used as isolation means)

- This device should be operated only from the type of power source indicated on this Operator Manual. If you are not sure, consult your local distributor or Mcube Technology.
- Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the device.
- The AC adapter is for indoor use only.
- Be sure the DC plug is securely connected to the device.
- Turn the device off before disconnecting the adapter. Disconnect the adapter by the plug, not the cable.
- If the AC adapter causes radio interference, reorient or relocate the receiving antenna.
- Pay attention to the direction of the DC power jack. Check the direction of the DC power jack. The “This Side Up” indication of the DC power jack has to be shown upright.
- Only use the AC/DC Adapters recommended by Mcube Technology.

Water and Moisture

- Do not use this device near water or in a wet environment.
- Do not use the device in the bathroom or shower. This can cause a fire or electric shock.
- Do not use if the transducer that has been immersed beyond the specified cleaning or disinfection level.

Enclosures

- Do not attempt to disassemble the device. Do not open the device's enclosures except the battery cover. All servicing, except battery and printer paper replacement, must be made by a qualified technician. Do not use the device when it has been dropped or the enclosure is damaged. This can cause a fire or electric shock. Contact your local distributor or Mcube Technology.
- Never push objects of any kind into this device through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the device.

Components and Accessories

- **Risk of explosion:** To avoid the risk of injury, do not operate the device in the presence of flammable gasses or anesthetics. The hazard of potential explosion exists.
- Do not use the device with any defibrillator at the same time.
- Do not use the device with any HF surgical equipment at the same time.

- **Power Cord:** Make sure the power cord is the correct type for your area. The equipment has a universal power adapter that allows operation at

either 100-120V AC or at 200-240V AC without the need for user adjustment.
(※ Only use the Power cord supplied by Mcube Technology.)

- **Adapter:** The device complies to the above standards only when used with the power adapter included. Only use adapters supplied by Mcube Technology.
- **Accessories**: Do not use accessories not recommended by the manufacturer because they may cause hazards. Do not place this device on an unstable cart, stand, or table. The device may fall, causing serious injury to a user or a patient, and serious damage to the device. Use only with a cart, stand, or table recommended by Mcube Technology. Any mounting of the device should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer. A device and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the device and cart combination to overturn.
- **Computer connection:** When connecting the **BioCon-700** to a computer, the computer must be certified to EN/IEC/CSA/UL 60950 or 60101-1 standard to maintain the device's compliance to EN/IEC/CSA/UL 60601-1-1 standard.

LCD

- In the event that LCD is damaged, care should be taken to avoid contact with liquid crystal. Take the urgent action indicated should any of the following situations arise:
- If liquid crystal comes in contact with your skin, clean the area with a cloth and then wash thoroughly with soap and running water.
- If liquid crystal enters your eyes, flush the affected eye with clean water for at least 15 minutes and then seek medical assistance.
- If liquid crystal is swallowed, rinse your mouth thoroughly with water. Drink large quantities of water and induce vomiting, then seek medical assistance.

Maintenance

- Do not immerse the console or the probe, when the cleaning and disinfecting
- Do not use harsh, corrosive chemicals when cleaning the outer case and probe.
- Do not use Cidex Plus or MetricidePlus 30 to disinfect the device. Cidex Plus or MetricidePlus 30 will attack and damage the plastic enclosure, when the disinfecting. This will be considered as abuse and will void the warranty.

- **Cleaning**: Unplug the adapter from the wall outlet and turn off the device before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp

cloth for cleaning.

- In the event that LCD is damaged, care should be taken to avoid contact with liquid crystal. Take the urgent action indicated should any of the following situations arise:
- If liquid crystal comes in contact with your skin, clean the area with a cloth and then wash thoroughly with soap and running water.
- If liquid crystal enters your eyes, flush the affected eye with clean water for at least 15 minutes and then seek medical assistance.
- If liquid crystal is swallowed, rinse your mouth thoroughly with water. Drink large quantities of water and induce vomiting, then seek medical assistance.
- To avoid electric shock disconnect the system from the AC mains and the battery, when cleaning the outer case and probe, when the cleaning and disinfecting

Service

- **Service**: Do not attempt to service this device yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Request all servicing to qualified service personnel only.

- **Parts**: When replacement parts are required, be sure to use replacement parts specified by the manufacturer. Unauthorized substitutions may result in fire, electric shock or other hazards.

Storage

- Do not leave this device in places subject to extremely high temperatures. Do not leave the device in locations such as a sealed vehicle or in direct sunlight. This can cause a fire.
- Do not place heavy objects on the device. This can cause the heavy object to turn over or fall and cause injury.

- For added protection for this device during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet.

Battery

- Do not use the battery pack not specified by Mcube Technology.
- Do not short-circuit the battery. Short circuiting the battery may cause rapid heating resulting is possible explosion. To avoid short-circuiting, do not let the battery come in contact with metal objects at any time, especially when transporting.
- Do not connect the battery in reverse polarity. Do not charge the battery in reverse polarity as it may cause the battery to rapidly heat, swell or even explode.
- Do not use a pack when something appears abnormal. Such as unusual

smell, deformation, discoloration, etc.

- Do not expose the battery to water, moisture, or any type of liquid.
- Do not use or store the battery in temperatures above 60℃ or next to any heat source. Doing so can cause the battery pack to swell, and explode.
- Do not abuse the battery pack. Doing so can cause damage to the battery resulting in a potentially unsafe situation.
- Do not heat, change or take apart the battery. Do not drop or subject the battery to impacts. Do not store the battery with metallic products. Any of these actions can cause the battery to burst or leak and cause fire or injury as a result.
- Do not transport or store with metal objects such as necklaces or hairpins.
- Do not expose to flame or heat. Do not disassemble or modify.
- Dispose of used batteries promptly.
- Do not drop or subject to strong physical shocks.
- The battery module has built in safety mechanisms. Do not disassemble or tamper with the battery pack.
- Only use the adapter that is supplied with the Unit. Contact a local distributer or Mcube Technology for replacements. Do not charge the battery outside of the recommended conditions, as it may damage the battery resulting in possible leakage of the electrolyte or explosion. Charge the batteries only when the ambient temperature is between +10℃ and +40℃ (+50 - +104˚F) (in door use).
- If electrolyte leakage occurs, do not touch the liquid. If it should come into contact with the skin or eyes, immediately seek help from a doctor.

- Battery capacity decreases at low temperatures; a depleted battery may not function at when cold. Do not place the battery in direct contact with hand warmers or other heating devices.
- Never use excessive force to install the battery.

- If the battery does vent, avoid any contact with the smoke.
- If the battery leaks and fluid gets in contact with your eyes, skin or clothing, flush the affected area with clean water and seek medical attention or call an emergency number right away.
- When carrying the battery, install it in a device or keep it in the hard case. When storing the battery, keep it in the hard case. When discarding, cover the battery terminals with insulation tape. Contact with other metallic objects or batteries could cause the battery to ignite or burst.
- After full charging, unplug the adapter from the power socket. Leaving the adapter plugged into the power socket can cause a fire.
- The battery is not charged at shipment. Charge the battery before use. Keep the battery in hard case when not in use.
- The battery gradually loses its charge when not in use. Charge the battery one or two days before use. Battery life can be extended by turning the device off when not in use.
- At normal temperatures, the battery can be recharged about 300 times. A noticeable decrease in the length of operation time indicates that it has reached the end of its service life and should be replaced.
- Keep the terminals clean.

- When connecting the battery module to a console, be careful about polarity. Be sure to securely fasten the battery cover.
- **Long term storage**: If the system is not likely to be used for more than a week, remove the battery module from the device and store it according to the recommended storage conditions.
- The battery pack life is over if the device can't run normal scanning continuously at least for 10 min after full charging battery. Please replace it with a new a battery pack.
- Fully charged battery is able to take up approximately 2,400 times of normal scan
- It takes approximately 6 hours of full charging for a completely discharged battery
- To avoid the risk of explosion, only use the battery recommended by Mcube Technology.
- When removing the battery cover, be careful not to bend the cover.

- If the time in the device shows 00:00 or it stops, the coin battery in the device was depleted. Please contact Mcube Technology or distributor for replacing new battery.

Memory Card

- Keep memory cards out of the reach of small children. Because memory cards are small, they can be swallowed by children. Be sure to store memory cards out of the reach of children. If a child swallows a memory card, seek medical attention or call an emergency number.
- Only use the SD card supplied by Mcube Technology.
- Use after formatting the SD card as FAT32 in the PC.

Rolling Cart

When the lock-handle is released, the spring-loaded or shock absorber column may expand rapidly and could cause injury. Carefully hold the upper column during the unscrewing of lock-handle.
Keep your head away from the assembly
Rolling cart edges may cause injury. Keep your head and other body parts away from the rolling cart edges.
Watch your step while moving the rolling cart in order to avoid any collision.
The lock handle has to be in the same direction of the back of console plate.

Do not load the wire basket over 5kg.

DEFINITIONS

These definitions are used in this Service Manual.

SCAN , **PWR** **UP** , **DN**	Tactile switch. These are not the icons on the LCD screen. The functions are activated when the tactile switches are physically pressed.
Pre-scan	General 2D real-time ultrasound scanning. 2D ultrasound images are displayed continuously in real time basis. This helps a operator locate bladder position and predicting the range of residual urine.
Normal scan	Get 12-plane ultrasound images and calculate the residual urine in the bladder (3D scanning).

Table of Contents

1 Introduction

1.1 Product Description

BioCon-700 is a portable ultrasound system intended to measure the volume of urine in a patient's bladder.**BioCon-700** transmits ultrasound signals into the abdomen of a patient and receives the echoed signals. Using the echoed signals, the system determines the bladder's outline and calculates the volume of the bladder based on the outline.

BioCon-700 has a Pre-Scan function, which shows a live ultrasound image of a horizontal planar cross-section of the bladder found by using the echoed signals. The Pre-Scan function helps in locating the bladder and improving accuracy.

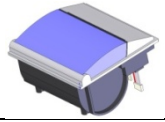
A user can print the results using a built-in thermal printer immediately after measurements are taken.

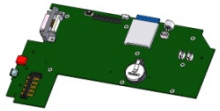
Figure1 BioCon-700 System Front View

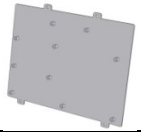
1.2 Service Parts List

1.2.1 Console

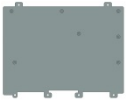
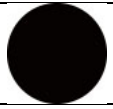
No	Picture	Part number	Parts	Description
1		41721 00001	Upper Case	-
2		41722 00001	Middle Case	-
3		41723 00001	Bottom Case	-
4		41728 00001	Battery Cover	-
5		41736 00001	Main Button	-

No	Picture	Part number	Parts	Description
6		41738 00001	Scan Button	-
7		31701 00002	Printer Module	-
8		52235 00001	Speaker	-
9		4B707 21231	LED Sheet	PC Sheet
10		4B707 21241	Bolt Sheet	PC Sheet
11		41705 00011	Back Label	PC Sheet(UL Label)

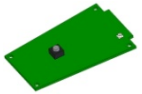
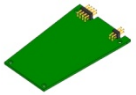
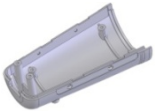
No	Picture	Part number	Parts	Description
12		41705 00021	Back Label	PC Sheet(CE Label)
13		4B707 21212	Back Label(CE)	PC Sheet
		4B707 21211	Back Label(UL)	
		4B707 21215	Back Label(KR)	
14		31734 00002	Handle Module	-
15		31780 00001	Control B/D	Control Board(PCB)
16		54117 00002 (=31702 00001)	LCD Module	-

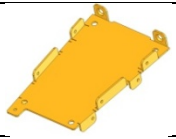
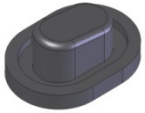
No	Picture	Part number	Parts	Description
17		41724 00001	LCD Holder	Sheet metal 0.8t zinc plating
18		41013 00005	Battery Pack	LI18S(X)
19		62303 25044	M2.5X4mm Round Head Self-Tapping Screw	For assembling LCD Holder Nickel Plating
20		62103 02044	M2X4mm Flat Head Self-Tapping Screw	Nickel Plating
21		62204 02044	M2X4mm Bind Head Screw	For assembling Control Board For assembling Battery cover

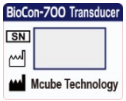
No	Picture	Part number	Parts	Description
22		62303 25104	M2.5X10mm Round Head Self-Tapping Screw	For assembling Upper case and Middle case For assembling Middle case and Bottom case
23		62104 02044	M2X4mm Flat Head Screw	For assembling Middle case and LCD Holder
24		62303 02044	M2X4mm Round Head Self-Tapping Screw	For assembling Buttons
25		3B701 10003	Upper case module	-
26		54117 0003	LCD(LMS700KF23)	New LCD
27		4B721 01002	Upper case	For a new LCD(LMS700KF23)

No	Picture	Part number	Parts	Description
28		4B721 15001	Gasket	For a new LCD(LMS700KF23)
29		4B721 05002	LCD holder	For a new LCD(LMS700KF23)
30		4B721 07003	Main Button	For a new LCD(LMS700KF23)
31		4B721 08003	Scan Button	For a new LCD(LMS700KF23)
32		4B707 21242	Handle Bolt Sheet	-

1.2.2 Probe (3B702 01012)

No	Picture	Part number	Parts	Description
1		31741 00001	Probe Head module	Probe Head Assembly Parts
2		31790 00001	ASP B/D	ASP Board(PCB)
3		31787 00001	Mot_Pul B/D	Motor and Pulser Board(PCB)
4		41744 00002	Probe Cover-B	-

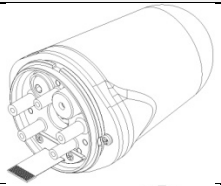
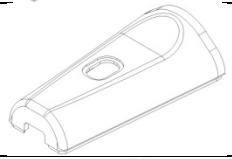
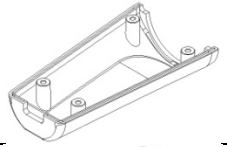
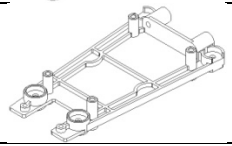
No	Picture	Part number	Parts	Description
5		41744 00001	Probe Cover-U	-
6		41754 00001	Probe Metal Plate	Sheet metal 0.8t zinc plating
7		41751 00001	Probe Scan Button	Silicone
8		41757 00001	Scan Button Bracket	Sheet metal 0.8t zinc plating
9		41705 00012	Probe Serial Sheet	PC Sheet (IEC 60601-1, 2nd edition)
		41705 00022	Probe Serial Sheet	PC Sheet (IEC 60601-1, 3rd edition)

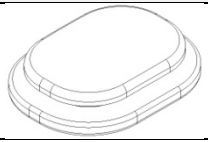
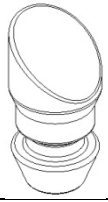
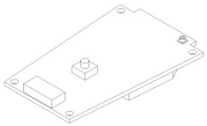
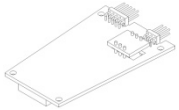
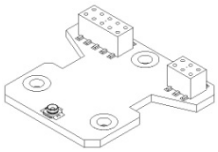
No	Picture	Part number	Parts	Description
10		4B707 22212	Probe Serial Sheet	PC Sheet
11		41705 00003	Probe Side Sheet	PC Sheet
12		4B707 22022	Probe Side Sheet	PC Sheet
13		31703 00001	Probe Cable	-
14		57108 00001	Coaxial Cable Assembly	-
15		62103 02044	M2X4mm Flat Head Self-Tapping Screw	For assembling Button

No	Picture	Part number	Parts	Description
16		61403 25064	M2.5X6mm Self-Tapping Screw Support	For assembling Mot_Pul Board
17		61404 25064	M2.5X6mm Support	For assembling Metal plate
18		62103 25044	M2.5 X 4mm Flat Head Bolt	For assembling Probe Metal Plate and Probe Head
19		62304 25054	M2.5X5mm Round Head screw	For assembling ASP Board

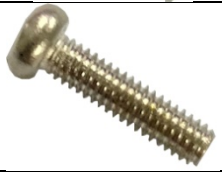
No	Picture	Part number	Parts	Description
20		62104 02044	M2 X 4mm Flat Head Screw	For assembling Probe cover-B, Probe cover-U and Probe metal plate
21		62303 25104	M2.5X10mm Round Head Self-Tapping Screw	For assembling Probe cover-B and Probe cover-U
21		62204 02044	M2X4mm Bind Head Screw	For assembling Metal plate and the lug of the Cable.

1.2.3 Probe (37S02 01012)

No	Picture	Part number	Parts	Description
1		37S02 04001	PROBE HEAD module	Probe Head Assembly Parts
2		47S22 10001	PROBE U COVER	Polycarbonate
3		47S22 11001	PROBE B COVER	Polycarbonate
4		47S22 12001	PROBE METAL PLATE	Aluminium Chromate Treatment

No	Picture	Part number	Parts	Description
5		47S22 13001	PROBE SCAN BUTTON	Silicone
6			BOLT CAP	Silicone
7		3B702 50001	PR-ASP B/D	ASP Board(PCB)
8		3B702 51001	PR-Mot_Pul B/D	Motor and Pulser Board(PCB)
9		37S02 56001	PR-ADT B/D	ADT Board(PCB)

No	Picture	Part number	Parts	Description
10		4B707 22312	PROBE S/N LABEL	PC Sheet
11		31703 00001	Probe Cable	-
12		57108 00001	Coaxial Cable Assembly	-
13		61127 02550	M2.5x5mm Pan-Head Machine screw	For assembling PR-ASP B/D(4ea) PR-Mot_Pul B/D(4ea) PR-ADT B/D(3ea)

No	Picture	Part number	Parts	Description
14		61127 02580	M2.5x8mm Pan-Head Machine screw	For assembling Probe Cable(2ea) PROBE METAL PLATE(2ea)
15		61121 02680	M2.5x10mm Pan-Head Machine screw	For assembling PROBE B COVER(4ea)

1.2.4 Accessory

No	Picture	Part number	Parts	Description
1		41710 00002	Mean Well Adapter (Class I)	-
2		41710 00001	Bridge Power Adapter (Class II)	-
3		41012 00002	Used with Class I AC Cord Set for Mean Well Adapter(International)	(Detachable) Rated 7 A, 250 V. Plug type CEE 7/VII, Connector type IEC 60320/C13, and Cord type H05VV-F3G, min. 0.75 mm2, 3-conductor terminating in moulded-on grounding type attachment plug. <HAR> marked on the cord. Maximum 4.0 m long.

No	Picture	Part number	Parts	Description
4		41712 00002	Used with Class II AC Cord Set for Bridge Power Adapter(International)	(Detachable) Rated 2.5 A, 250 V. Plug type CEE 7/, Connector type IEC 60320/C7, and Cord type H03VVH2-F, min. 0.75 mm2
		41712 00006	AC Cord Set for Japan	Plug: JIS C 8303 TYPE A Connector: IEC 60320 C7 Flexible Cord: VCTFK 0.75mm^2
5		41012 00001	Used with Class I AC Cord Set for Mean Well Adapter	Hospital Grade, 18 AWG, min. 10 A, 125 V, type SJT. Moulded on fitting. Indication that grounding reliability can only be achieved when connected to a receptacle marked "Hospital Grade". Marking is provided on a tag attached to the power supply cord.
6		41712 00001	Used with Class II AC Cord Set for Bridge Power Adapter	(Detachable) 18 AWG, min. 10 A, 125 V, 1-15P, type NISPT.

No	Picture	Part number	Parts	Description
7		41011 00002	USB Cable	Ferrite filter cable
8		41004 00001	Roll Paper	Width: 57mm, Roll Size : Φ35mm
9		41708 00011	SD card	SanDisk
10		51104 00001	SD Card Reader	USB 2.0
11		11400 00001	CUBEscan Phantom	-

No	Picture	Part number	Parts	Description
13		11300 00001	CUBEscan Calkit Set	-
14		1B711 00002	Rolling Cart	BioCon-700 mounted as shown on the left

1.3 Product Configuration

1.3.1 Console

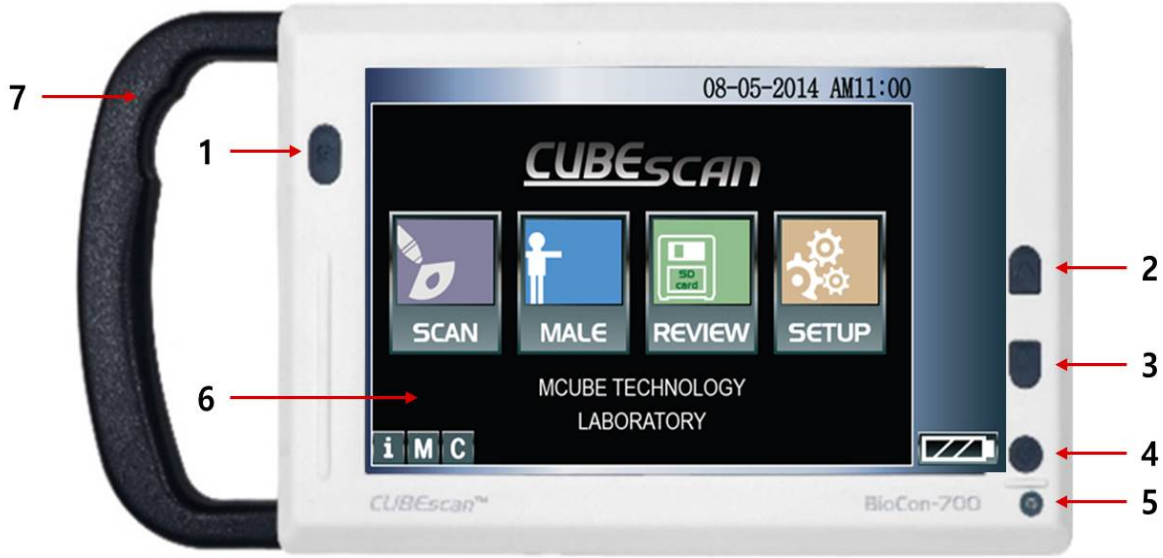


Figure2 Front of the console

No.	Item	Function	Remark
1	SCAN button	Enable scan function in a Top Screen or Scan Result Screen.	-
2	UP button	Move left or up	-
3	DN button	Move right or down	-
4	PWR button	Enter button (pressed for 1sec) Power on/off (pressed for 3 sec)	-
5	Indicator LED	Powered by DC adapter (Green LED) Charging the battery (Orange yellow LED)	-
6	LCD	Displays the information related to the current device operation	-
7	Handle	Grip for the console	-

Figure3 Right-side view of the console

No.	Item	Function	Remark
1	Probe connector	Connects a probe to a console	-
2	USB connector	Connector for USB connection with a computer	-
3	Adapter connector	Connector for adapter connection to a console	-

Figure4 Left-side view of the console

No.	Item	Function	Remark
1	Handle	Handle for the console	-

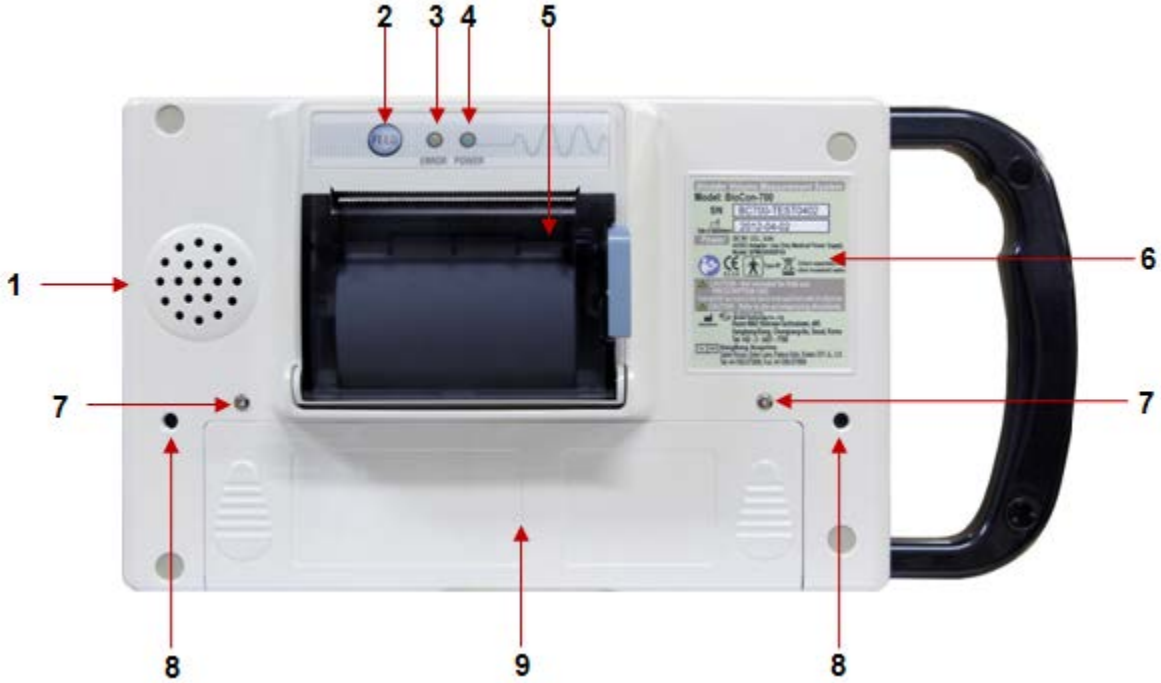


Figure5 Rear view of the console

No.	Item	Function	Remark
1	Speaker	Speaker for voice playback and event	-
2	FEED button	Button for paper feeding	-
3	Printer error indicator	Error indication in the printer	-
4	Pinter power indicator	Power indication when power is applied to the printer	-
5	Printer	Thermal printer	-
6	Label plate	Plate for device label attachment	-
7	Battery cover fixing hole	Holes for fixing the battery cover	-
8	Cradle socket	Sockets for mounting to the cradle	-
9	Battery cover	Cover for the battery compartment	-

Figure6 Upper view of the console

No.	Item	Function	Remark
1	Micro-phone	For voice recording	-
2	SD card slot	For SD card	-
3	RESET button	System reset	-

1.3.2 Ultrasonic Probe (3B702 01012)

Fig 7 Ultrasonic probe and cable

No.	Item	Function	Remark
1	SCAN button	Button for initiating pre-scan or scan	
2	Cable	Connects the probe to console.	
3	Probe cap	Transmits and receives ultrasound signals	
4	Connector	Connects the ultrasonic cable to the console	

1.3.3 Ultrasonic Probe(3B702 01020)

Figure8 Ultrasonic probe and cable

No.	Item	Function	Remark
1	Probe cap	Transmits and receives ultrasound signals	-
2	Probe Cable	Connects the probe to console.	-
3	Probe Connector	Connects the ultrasonic cable to the console	-
4	Probe SCAN button	Button for initiating Pre-scan or scan	-
5	Label	Label, please note that the label is subject to change without further notice.	-

1.4 System Structure

BioCon-700 is a 3-dimensional ultrasonic equipment to measure the bladder volume and quantity of remaining urine safely and comfortably through non-invasive method. Its overall structure is as below;

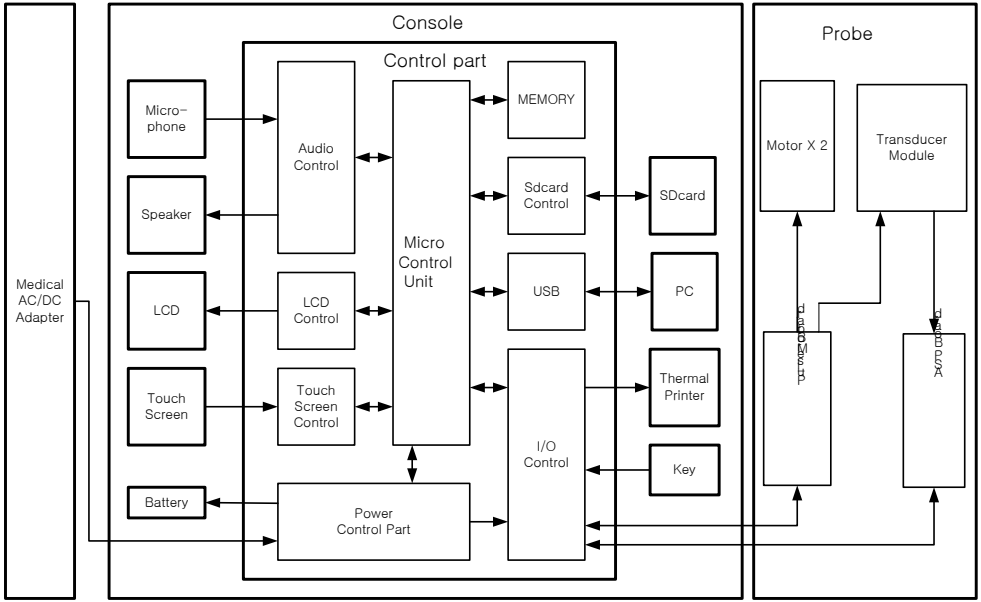


Figure9 System Diagram

As shown in Figure 8, BioCon-700 is composed of Console, Probe and AC/DC Adapter. Each function of unit is described from following table.

component		Function
Medical AC/DC Adapter		● AC/DC Adapter is medical power supply which puts out DC 9V from AC power input The Adapter output is connected to Power Control Part and charges the battery by charging IC. When the battery is low, it is used as main power system.
Console		● Controls the overall system with following major functions. ■ Processes user's input. ■ Drives the stepping motor of the thermal printer and transmits data ■ Controls the charging of a battery module ■ Interfaces PC through USB and serial port ■ Displays data on LCD ■ Processes data received from the analog board ■ Prints the information about the bladder and bladder images in the thermal printer.
Probe	**Transducer**	● Transmutes Pulser signal into ultrasonic signal and transmit. Transmutes the reflected ultrasonic signal into electrical energy.

component		Function
	Motor	Two Step Motors are equipped within the probe. ● Angle Motor: rotate the transducer on the transducer axis by certain angles. ● Plane Motor: rotate the transducer on the probe axis by certain angles.
	ASP B/D	● Processes the analog signals from transducer and convert them into digital signals to transmit to console.
	Mot_Pul Board	● Controls motor ● Generates pulser voltage for ultrasound output ● Process location information of transducer

1.5 Signal Interface Diagram

Signal interface of BioCon-700 is as below; (B2B B/D: 3B702 01012, ADT B/D: 37S02 01012)

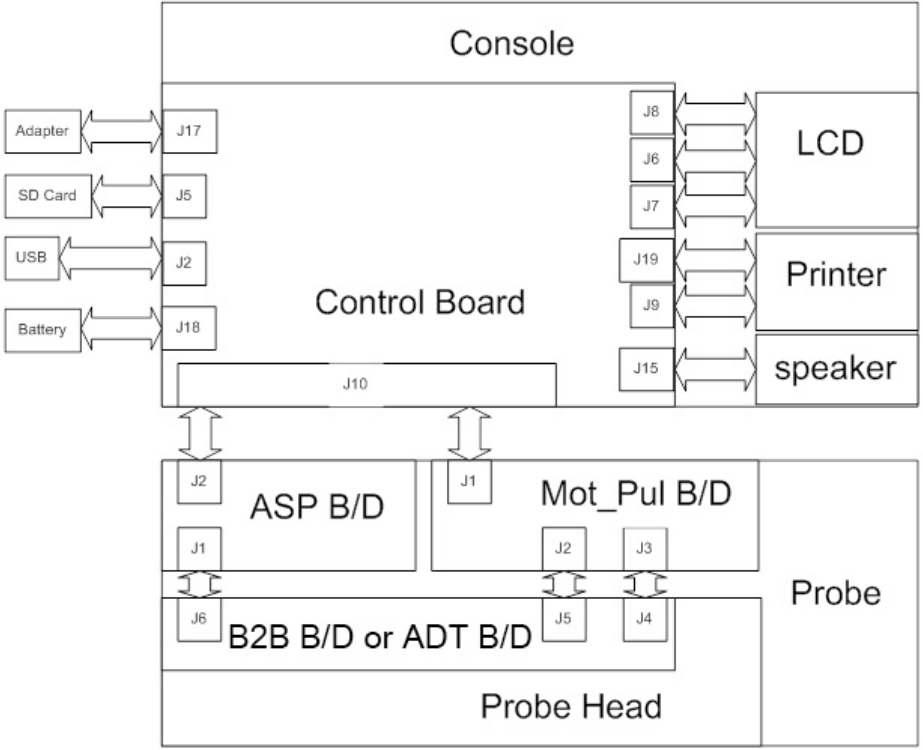


Figure10 Signal Interface Diagram of the BioCon-700

1.5.1 Signal Interface of the Control Board

Connector name	Function
J2	Data transmission to PC by USB data communication
J6	Transmit display information to LCD and supply power to LCD driver
J7	Interface to Touch Screen module
J8	Drive backlight LED of LCD
J9	Control the motor and strobe of the thermal printer
J10	Connected to Ultrasound Probe connector, control probe motor and data communication
J15	Speaker output cable
J17	Connected to DC adapter, charge the battery and supply power to the system
J18	Connected to rechargeable battery pack, monitors battery charging status. Supplies power or charge battery.
J19	Turn on or off printer LED. Input Feed Switch signal

1.5.2 Signal Interface of the ASP Board

Connector name	Function
J1	Connected to ultrasound transducer in ultrasound probe head
J2	Connected to digital board in Console. Supply power to ASP board and conduct data communication with Console

1.5.3 Signal Interface of the Mot_Pul B/D

Connector name	Function
J1	Connected to the digital board in Console Controls the transducer location
J2	Connects pulser signals to transducer
J3	Connected to motors in the ultrasound probe head

1.5.4 Signal Interface of the B2B B/D or ADT B/D

B2B B/D: 3B702 01012, ADT B/D: 37S02 01012

Connector name	Function
J4	Connects Mot_Pul Board, Angle motor and Plane motor
J5	Connects ultrasound transducer and Mot_Pul B/D
J6	Connects ultrasound transducer and ASP Board

2 Assembly of the BioCon-700

2.1 Assembly of the console

2.1.1 Structure and Components of the Bottom Case

The basic structure of the Bottom Case is as below;

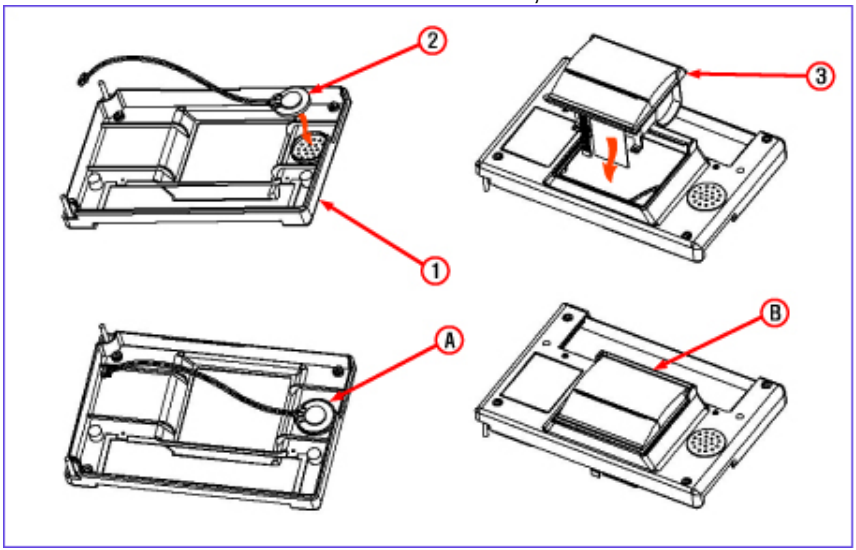


Figure11 Structure of the Bottom

No.	Name	Material	Q'TY
①	Bottom Case	-	1EA
②	Speaker	-	1EA
③	Printer Module	-	1EA

2.1.2 Assembling of the Bottom Case

A. Interpose ②speaker into the speaker position of bottom case and fix with glue (Figure 10).
B. Fix ③Printer to ①bottom case. As shown in the pictures below, turn the fastener to the direction of the arrow. After it is mounted on the ①bottom case, turn and lock the fastener as it is caught to the ①bottom case (Figure 10 & Figure 11).

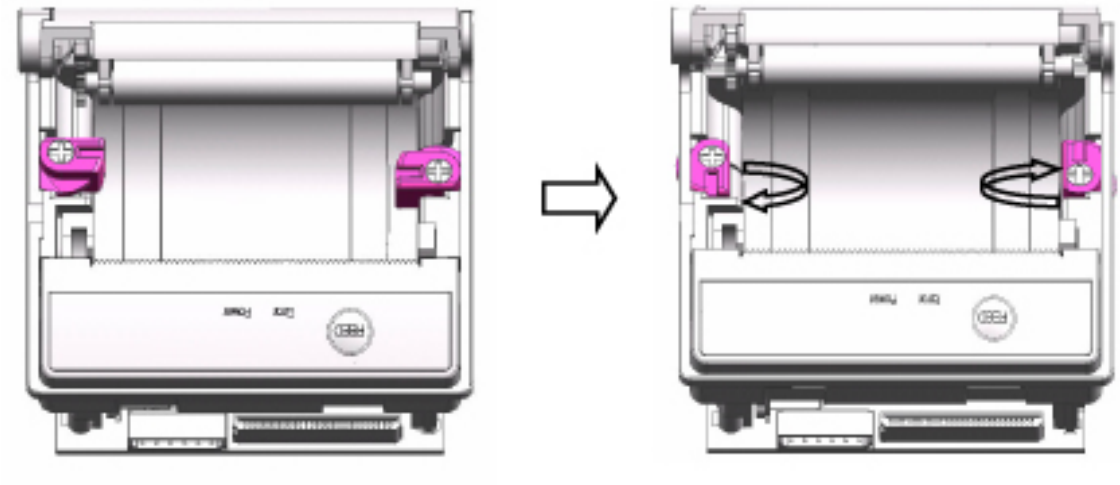
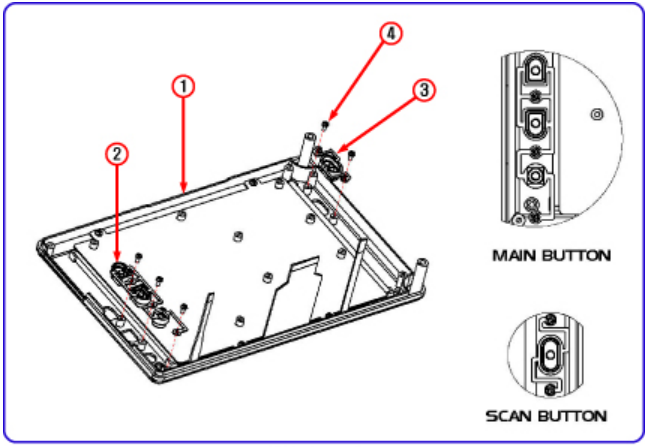
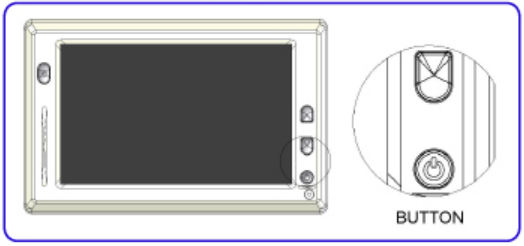


Figure12 Fixing the Printer

2.1.3 Assembling the Buttons at the Upper Case



Picture A



Picture B

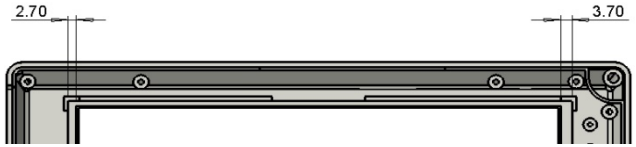
Figure13 Assembling the buttons at the upper case

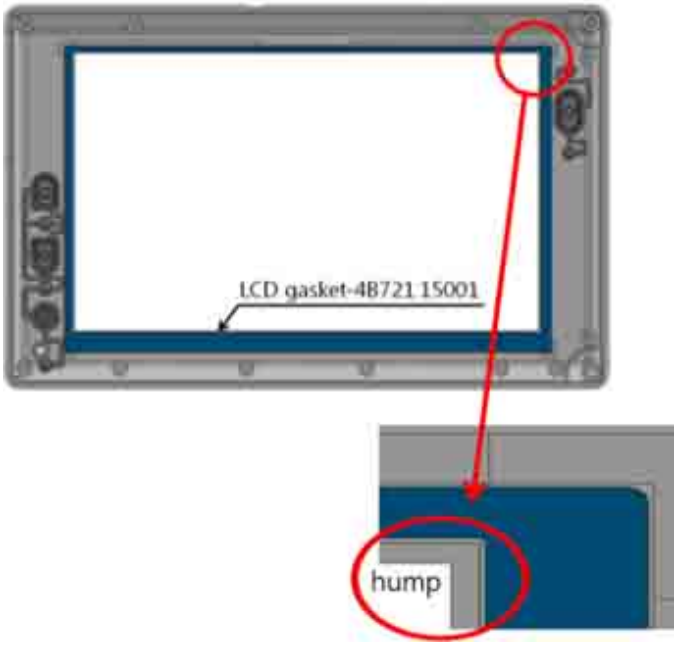
No.	Name	Material	Q'TY
①	Upper case	-	1EA
②	Main Button	-	1EA
③	Scan Button	-	1EA
④	M2X4mm Round Head Self-Tapping Screw	Nickel Plating	4EA

A. Put ②main button into the ①Upper case and fix it with ④M2X4mm Round Head Self-Tapping Screw.

B. Put ③Scan button into the ①Upper case and fix it with ④M2X4mm Round Head Self-Tapping Screw.

2.1.4 Assembling the Upper Case Module and Middle case

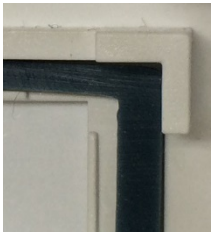
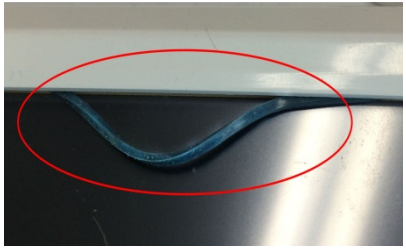
1. How to mount the LCD gasket on the Upper case	
	Upper case(4B721 01002) Length of left side : 2.7mm Length of right side : 3.7mm
	LCD gasket(4B721 15001) Length of left side : 2.5mm Length of right side : 3.5mm

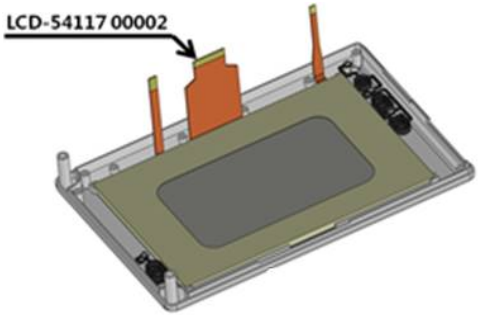
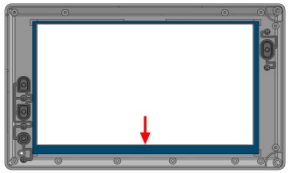


1) Check if the Scan button and Main button are pre-assembled on the Upper case.

2) Note : Right side(3.5mm) of gasket faces toward the Scan button.

Note : Make sure that the gasket does not pass over the hump of Upper case, otherwise the LCD touch screen does not work.

***Good and Bad examples of Gasket mounting. ***				
				
Good	Bad	Good	Bad	
Left side of Upper case		Right side of Upper case		Bad : LCD gasket passed over the hump of Upper case

2. Assembly of LCD-54117 00002	
	1) Remove the LCD protective film.
	2) Put the LCD on the frame as the FPC faces downward. 

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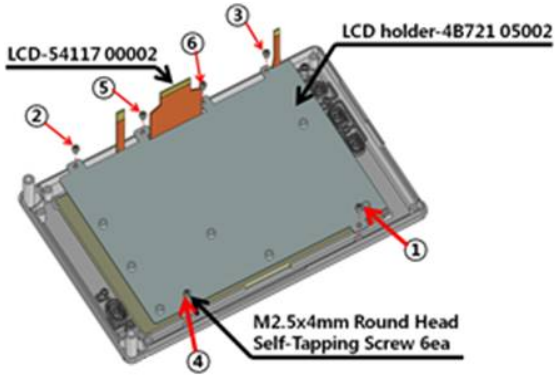
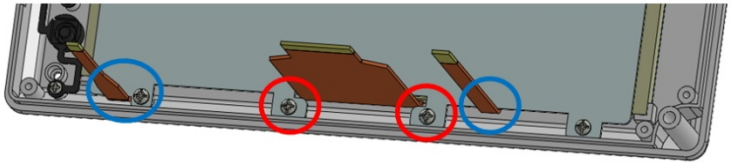
<td rowspan="2"> 
</td>
<td>3) Insert the widest FPC into the two guides of LCD holder and mount the LCD holder on the LCD.
Tighten the Screws (M2.5x4mm,6ea) in order(①→⑥).
Note : Take care of the FPCs not to be crumpled.
  </td>
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<tr>
<td>  M2.5x4mm Round Head Self-Taping screw, 6ea</td>
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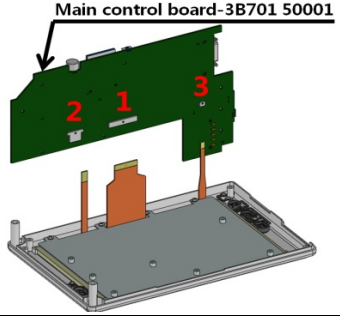
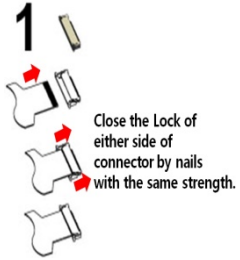
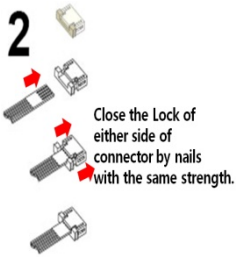
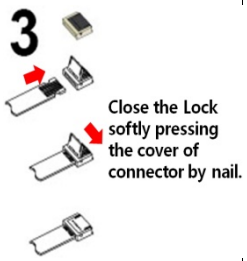
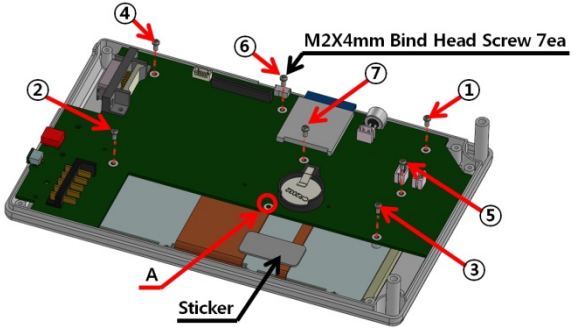
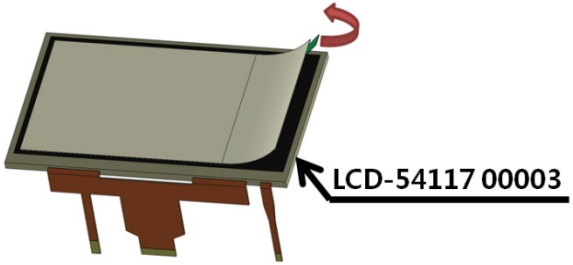
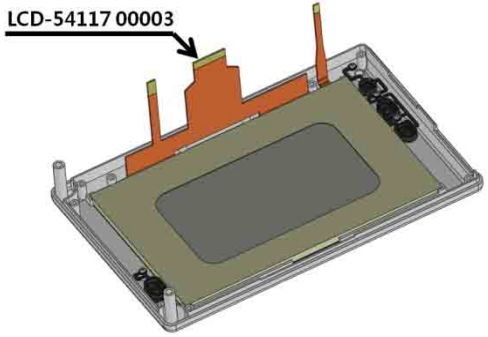
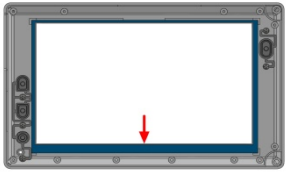
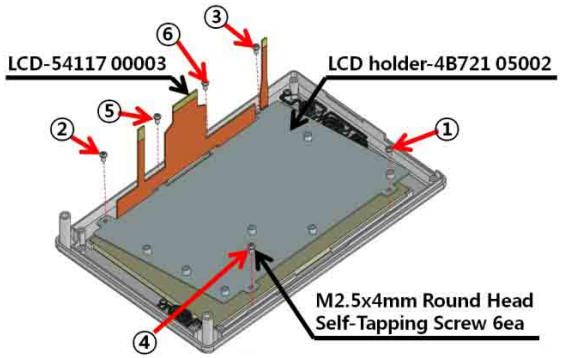
<td> 
</td>
<td>4) Connect the FPC terminals to the connectors of Control board in order (1->2->3).
Note : Take care of the FPCs not to be crumpled.</td>
</tr>
</table>

<table>
<tr><td rowspan="2"></td><td> 
</td><td> 
</td><td> 
</td></tr>
<tr><td>Data connector</td><td>Backlight connector</td><td>Touch connector</td></tr>
<tr><td> 
</td><td colspan="3">5) Mount the Control board on the LCD holder.
6) Tighten the screws(M2x4mm,7ea).
Note: Do not tighten a screw in A hole in the middle of Control board.
7) Attach the FPCs on the LCD holder with the sticker.
Note: Take care of the FPC terminals not to be taken off from the connectors.
  M2x4mm Bind Head Screw, 7ea</td></tr>
</table>

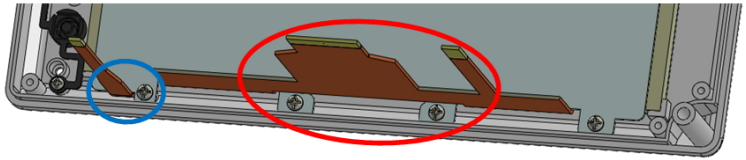
3. Assembly of LCD-54117 00003	
	1) Remove the LCD protective film.
	2) Mount the LCD on the frame as the FPC faces downward. 



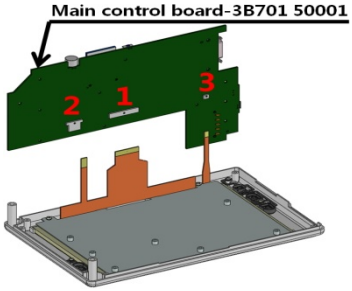
3) Insert the guide into the hole of the FPC and mount the holder on the LCD.

Tighten the Screws(M2.5x4mm,6ea) in order(①→⑥).

Note : Take care of the FPCs not to be crumpled.



M2.5x4mm Round Head Self-Taping screw, 6ea



4) Connect the FPC terminals to the connectors of Control board in order (1->2->3).

Note : Take care of the FPCs not to be crumpled.

<table>
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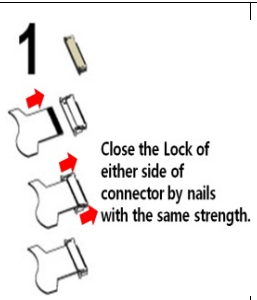
<td rowspan="2"></td>
<td> 
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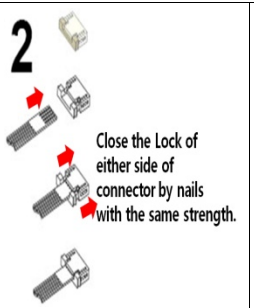
<td> 
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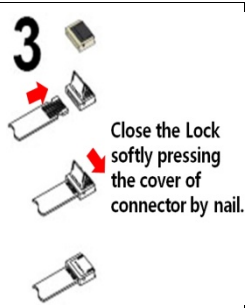
<td> 
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<tr>
<td>DATA connector</td>
<td>Backlight connector</td>
<td>Touch connector</td>
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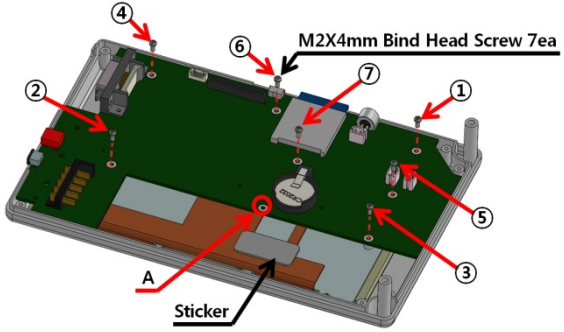
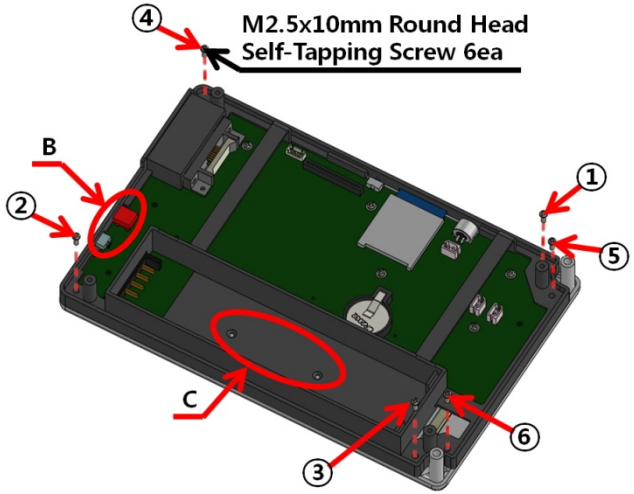
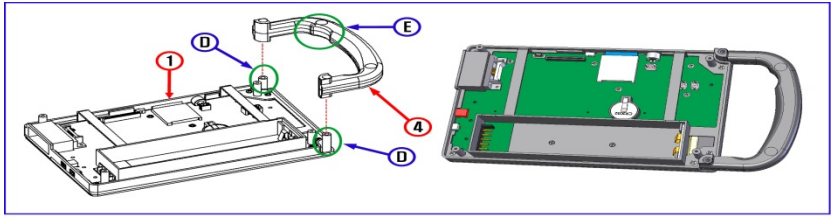
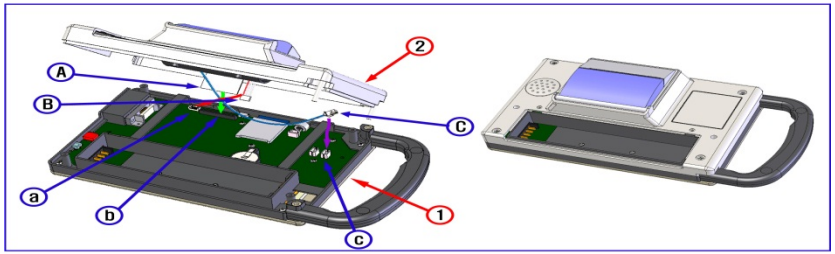
<td> 
</td>
<td colspan="3">5) Mount the Control board on the LCD holder.
6) Tighten the screws(M2x4mm, 7ea).
Note: Do not tighten a screw in A hole in the middle of Control board.
7) Attach the FPCs on the LCD holder with the sticker.
Note: Take care of the FPC terminals not to be taken off from the connectors.
  M2x4mm Bind Head Screw, 7ea</td>
</tr>
</table>

4. Assembly of Middle case	
	1) First, insert (B) of Middle case to the Control board and then mount the Middle case on the Control board. (B : USB connector and DC Jack) * Make sure that the inlets of USB and DC 9V are not blocked by the Middle case. Note : Do not screw the two screws in (C) of Middle Case.( :M2x4mm Flat Head Screw,2ea)
	 M2.5x10mm Round Head Self-Tapping Screw, 6ea

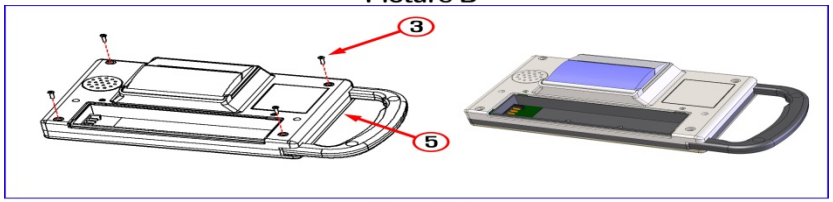
2.1.5 Assembling the Bottom Case Module



Picture A



Picture B



Picture C

Figure14 Assembling the Bottom Case Module

No.	Name	Material	Q'TY
①	Upper case	-	1EA
②	Bottom case	-	1EA
③	M2.5X10mm Round Head Self-Tapping Screw	Nickel Plating	4EA
④	Handle	-	1EA
⑤	Console	-	1EA

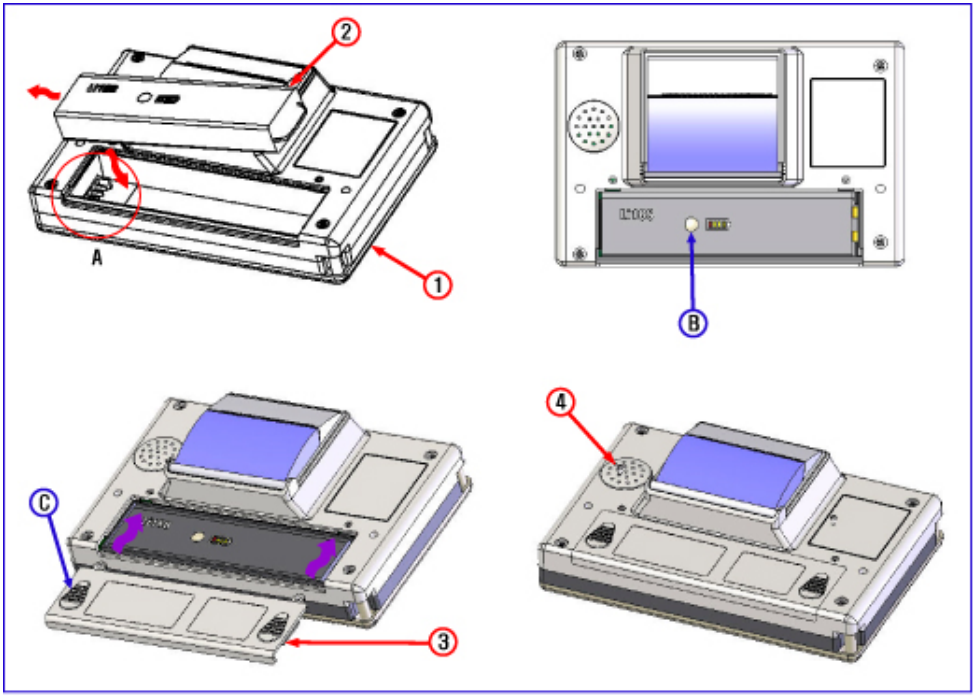
A. Connect ④Handle to ①Upper case as shown in the picture A(Holes of handle ->D).
Please be careful of the direction of handle as E shows.

B. Connect the connectors A, B and C to each corresponding socket as shown in the picture B.
(A->a: J9, B->b : J19, C->c : J15)

C. Connect ②Bottom case to ①Upper case as shown in the picture B.

D. Fix the unit with ③M2.5X5mm Bolts.

2.1.6 Assembling of the Battery Cover



Picture A

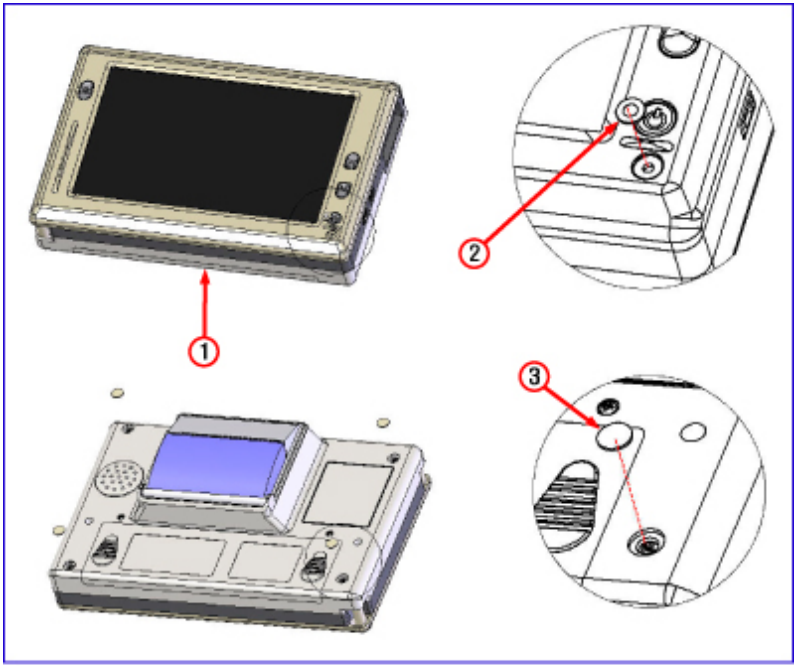
Figure15 Assembling the Battery Cover

No.	Name	Material	Q'TY
①	Console	-	1EA
②	Battery	-	1EA
③	Battery Cover	-	1EA
④	M2X4mm Bind Head Screw	Nickel Plating	2EA

A. Put ②Battery into ①Console and then slide up ③Battery Cover horizontally as shown in the Picture A.

B. Fix ③Battery Cover with ④M2X 4mm Bind Head Screw.

2.1.7 Cover bolt and LED hole



Picture A

Figure16 Cover bolt and LED hole

No.	Name	Material	Q'TY
①	Console	-	1EA
②	PC Sheet for LED	PC Sheet	1EA
③	PC Sheet for Bolt Hole	PC Sheet	4EA

A. Cover the LED hole with ②PC Sheet sticker and cover Bolt holes with ③PC Sheet stickers.

2.2 Assembly of the Probe (3B702 01012)

2.2.1 Assembling the Probe Button

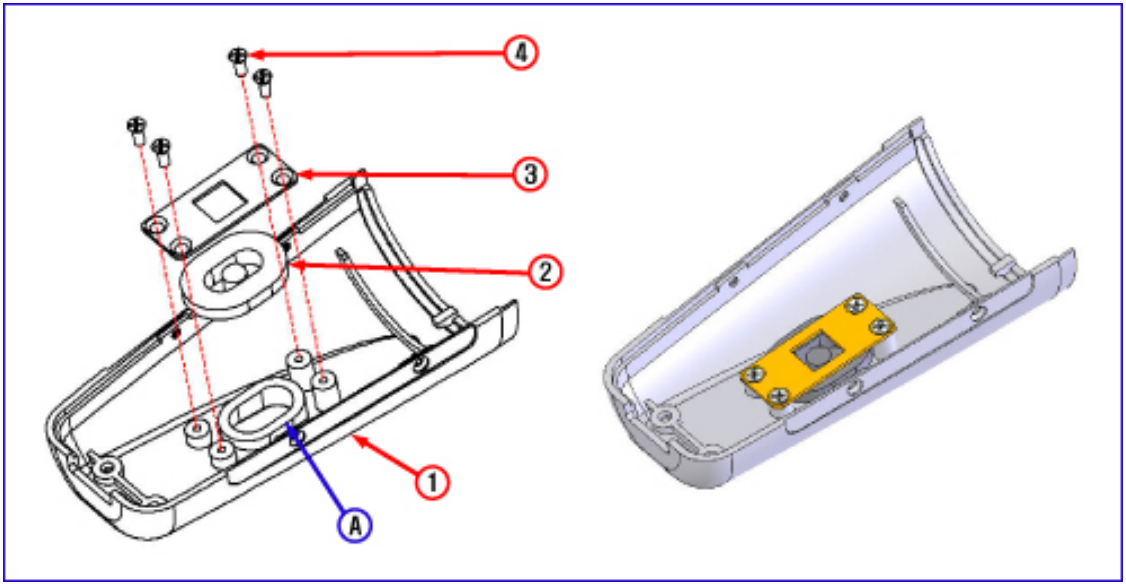


Figure17 Assembling the Probe button

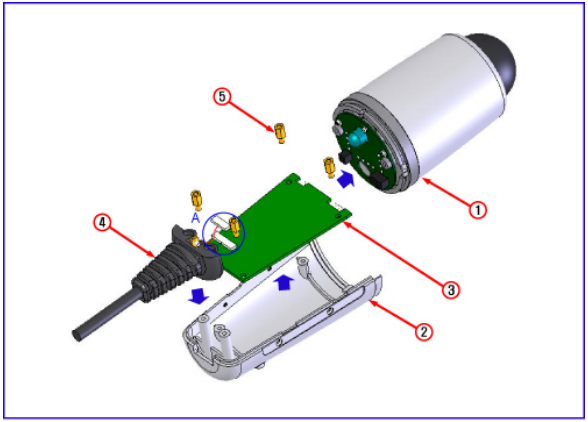
No.	Name	Material	Q'TY
①	Probe cover-U	-	1EA
②	Probe Scan Button	Silicone	1EA
③	Scan Button Bracket	Sheet Metal	1EA
④	M2X4mm Flat Head Self-Tapping Screw	Nickel Plating	4EA

A. Insert ②Probe Button into the hole of ①Probe Upper Cover in right direction.

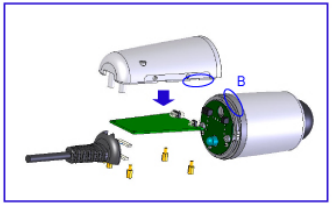
B. Fix ②Probe Button with ③Button Bracket firmly.

C. Fix with ④M2X 4mm Flat Head Self-Tapping Screw.

2.2.2 Assembling of the Mot-Pul B/D



Picture A



Picture B

Figure18 Assembling the Mot_Pul B/D

No.	Name	Material	Q'TY
①	B2B Board on the Probe Head	-	1EA
②	Probe cover-B	-	1EA
③	Mot-Pul B/D	-	1EA
④	Cable	-	1EA
⑤	M2.5X6mm Self-Tapping Screw Support	Nickel Plating	4EA

A. Connect 12pin connector of ④Cable to ③Mot-Pul B/D.

B. Assemble ④Cable to ②Probe cove-B.
Make sure that two holes of cable and two supports of the probe cover-B are well assembled as the round-shape edge of cable faces downwards as the circle A shows.

C. Connect the receptacles on ①B2B B/D on the Probe Head to Pin connectors of ③Mot-Pul B/D (6pin : J2->J5, 8pin : J3->J4)

D. As shown in the picture B, align ①Probe Head and ②Probe cover-B, as the receptacle on ③Mot-Pul B/D faces upwards as the circle B shows.

E. Fix ③Mot-Pul B/D to ②Probe cover-B with ⑤M2.5 X 6mm Self-Tapping Screw Supports.

2.2.3 Assembling the Metal Plate

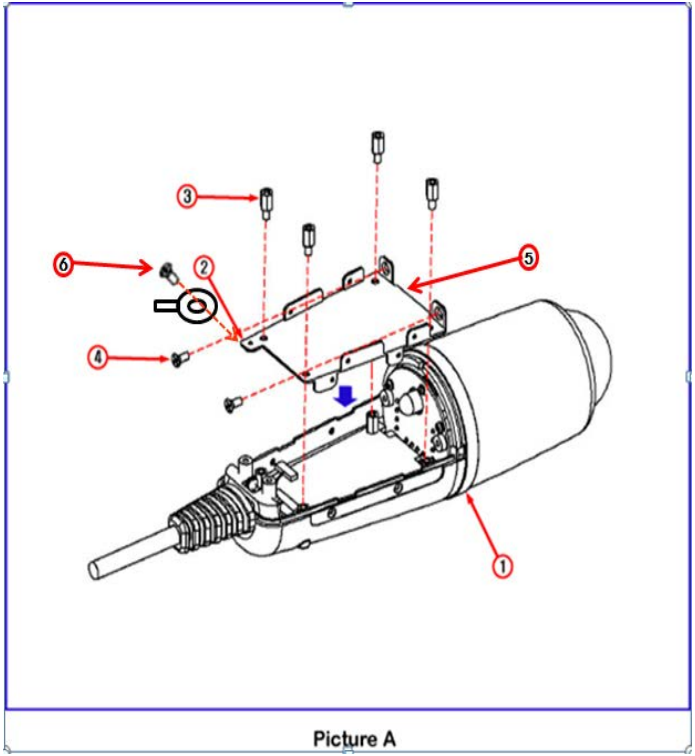


Figure19 Assembling the Metal plate

No.	Name	Material	Q'TY
①	Partly Manufactured Probe(A)	-	1EA
②	hole for cable lug on the Metal Plate	-	
③	M2.5 X 6mm Support	Nickel Plating	4EA
④	M2.5 X 4mm Flat Head Screw	Nickel Plating	2EA
⑤	Probe Metal Plate	Steel	1EA
⑥	M2X4mm Bind Head Screw(with cable lug)	Nickel Plating	1EA

A. Place ②Probe Metal Plate onto ①Partly Manufactured Probe(A).

B. Fix ②Probe Metal Plate with ④M2.5 X 4mm Flat Head Screws.

C. Fix ③M2.5 X 6mm Supports as shown in the Picture A.

D. Connect the cable lug to ②hole for lug with ⑥M2.5 X 3mm Round Head Screw.

2.2.4 Assembling the ASP B/D

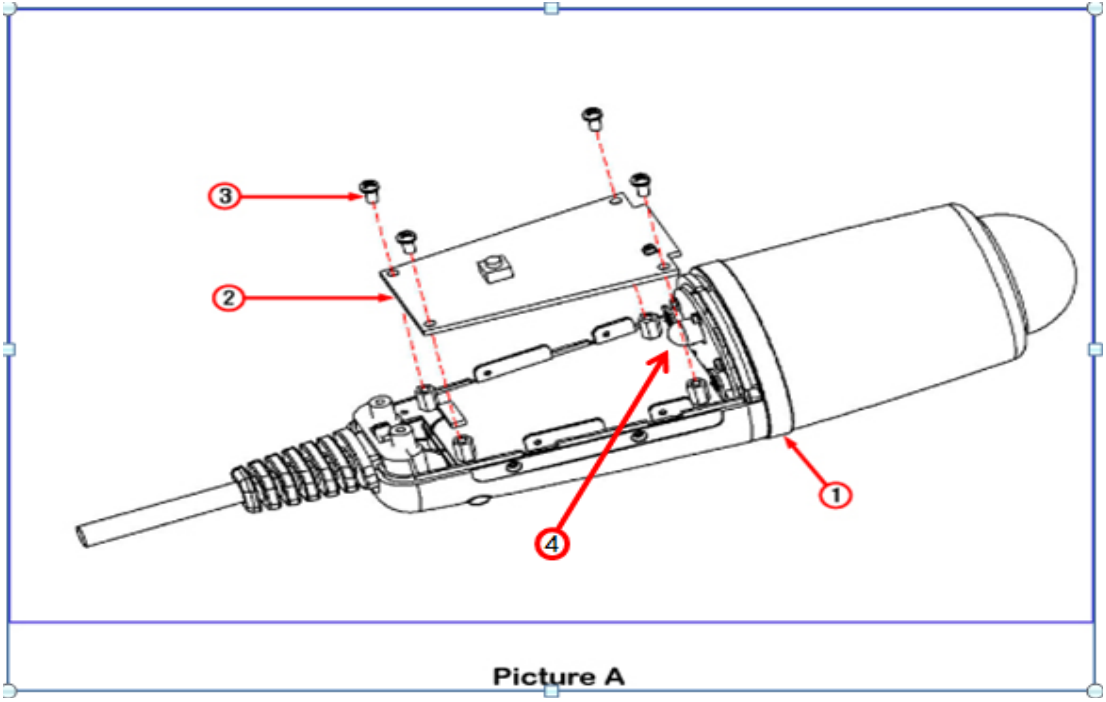


Figure20 Assembling the ASP B/D

No.	Name	Material	Q'TY
①	Partly Manufactured Probe(B)	-	1EA
②	ASP B/D	-	1EA
③	M2.5X5mm Round Head Screw	Nickel Plating	4EA
④	B2B B/D(Bottom of Probe Head)	-	1EA

A. Connect the 10pin of the cable to the 10pin receptacle on ②ASP B/D.

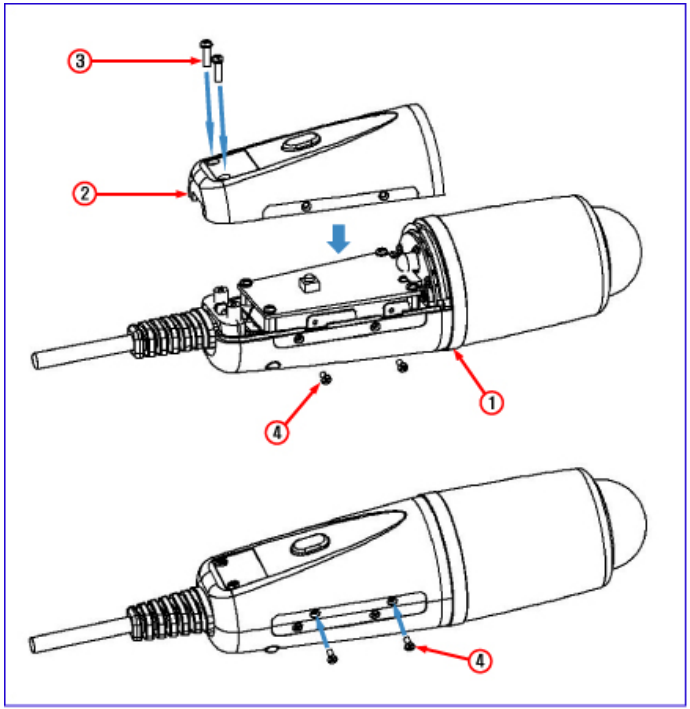
B. Fix ②ASP B/D to ①Partly Manufactured Probe(B) with ③M2.5 X 5mm Round Head Screws.

   Make sure that the ASP B/D does not press or tear the balloon on the B2B B/D, when assembling.

   Make sure that the receptacle on the ASP B/D faces upwards.

C. Coaxial Cable(J6) on ④B2B B/D connect the J1 on ②ASP B/D.

2.2.5 Assembling the Upper case module



Picture A

Figure21 Assembling the Upper case module

No.	Name	Material	Q'TY
①	Partly Manufactured Probe(C)	-	1EA
②	Upper case module	Steel	1EA
③	M2.5X10mm Round Head Self-Tapping Screw	Nickel Plating	2EA
④	M2 X 4mm Flat Head Bolt	Nickel Plating	8EA

A. Assemble ①Partly Manufactured Probe(C) and ②Upper case module.

B. Fix ①Partly Manufactured Probe(C) and ②Upper case module with ③M2 X 4mm Round Head Self-Tapping Screw and ④M2 X 4mm Flat Head Screw.

2.2.6 Attaching the Probe Side sheets, Probe serial sheet& Back label

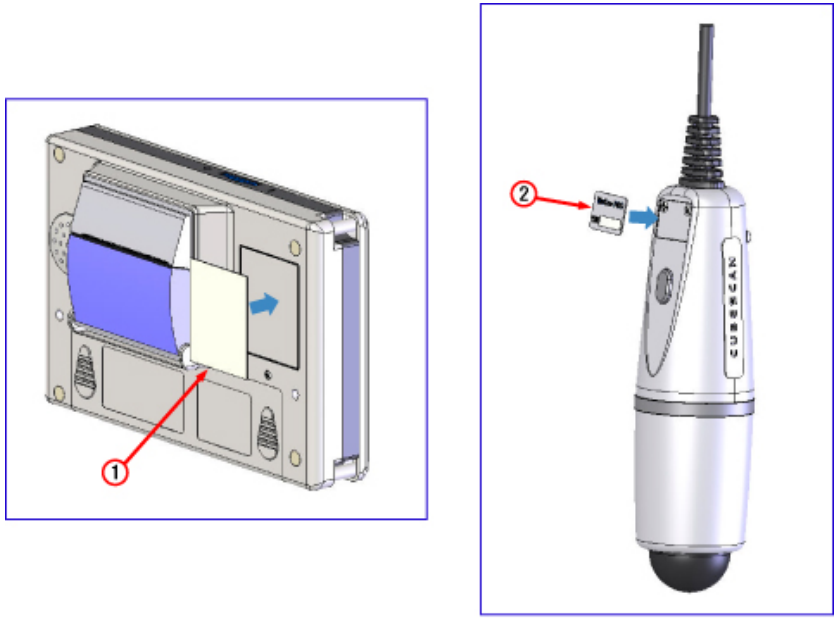
Picture A

Figure22 Attaching the Side sheets

A. Attach the ②Probe side sheets to ①finished Probe as shown in the Picture A.

B. Attach the ②Probe serial sheet as shown below.

C. Attach the ①Back label as shown below.



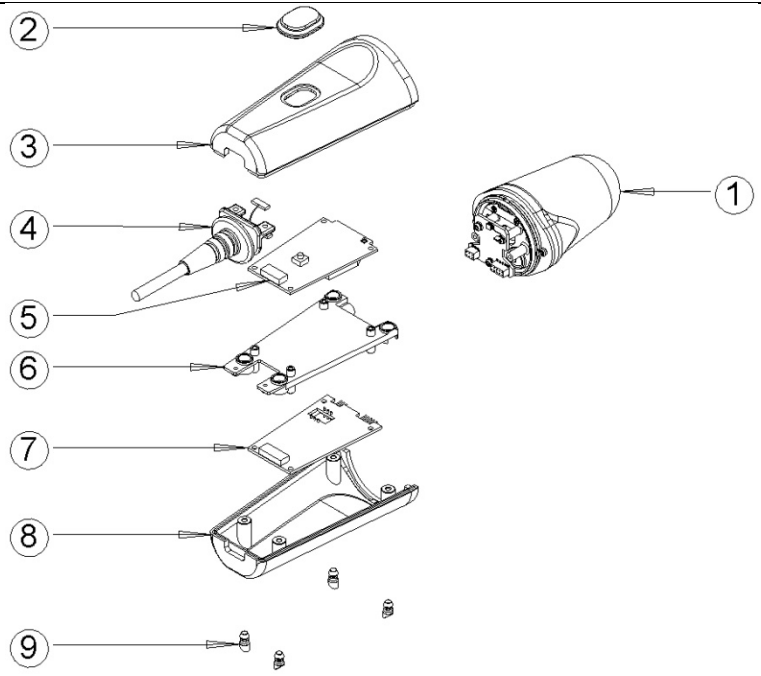
Picture A

Figure23 Attaching the Probe serial sheet

2.3 Assembly of the Probe (37S02 01022)

2.3.1 Structure and Components of the Probe

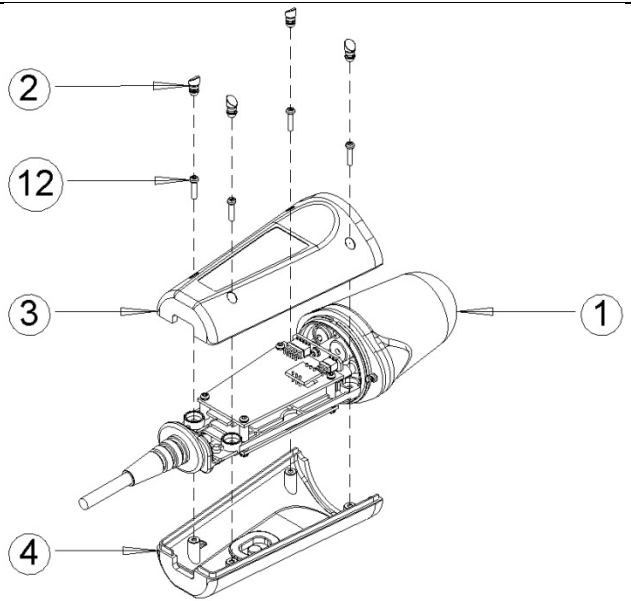
The basic structure of the Probe is as below;

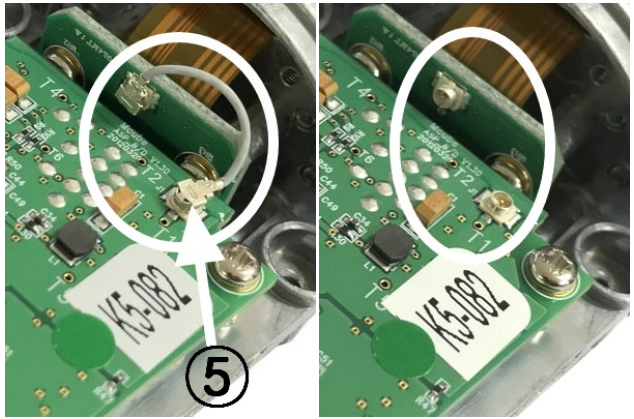


No.	Name	Q'TY
①	PROBE HEAD module	1EA
②	PROBE SCAN BUTTON	1EA
③	PROBE U COVER	1EA
④	PROBE CABLE	1EA
⑤	PR-ASP	1EA
⑥	PROBE METAL PLATE	1EA
⑦	PR-Mot_Pul	1EA
⑧	PROBE B COVER	1EA
⑨	BOLT CAP	4EA

2.3.2 PROBE Disassembly

No.	Part name	Q'ty
1	PROBE HEAD module	1EA
2	BOLT CAP	4EA
3	PROBE B COVER	1EA
4	PROBE U COVER	1EA
5	Coaxial Cable Assembly	1EA
6	PROBE CABLE	1EA
7	PR-ASP B/D	1EA
8	PR-Mot_Pul B/D	1EA
9	PROBE METAL PLATE	1EA
10	M2.5x5mm Pan-Head Machine screw	11EA
11	M2.5x8mm Pan-Head Machine screw	4EA
12	M2.5x10mm Pan-Head Machine screw	4EA
13	M2.5 Teflon washer	2EA



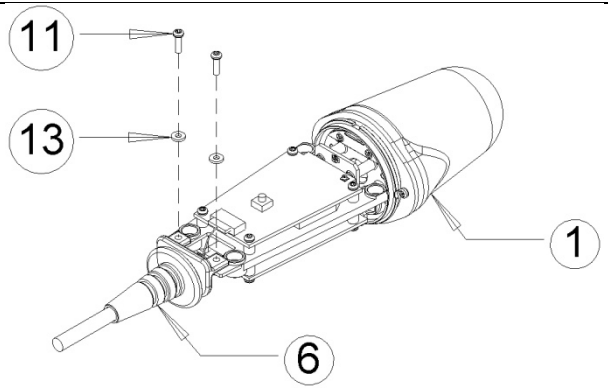
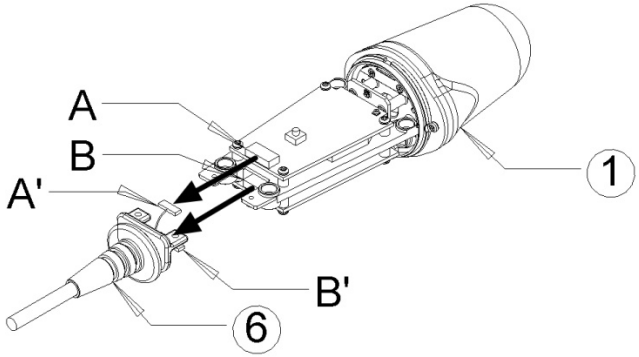


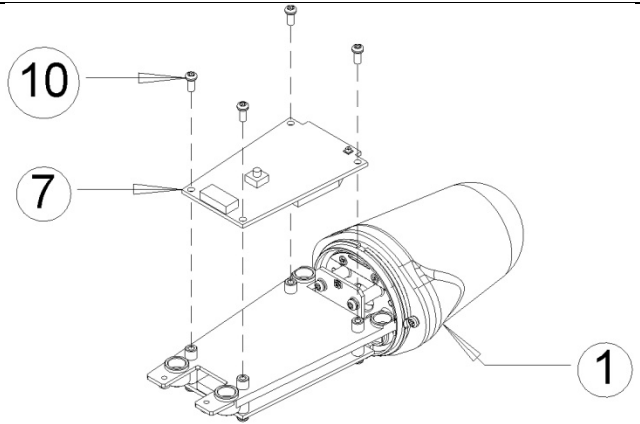
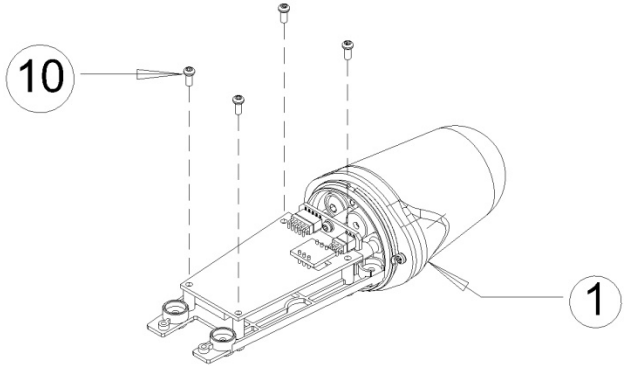
STEP 1

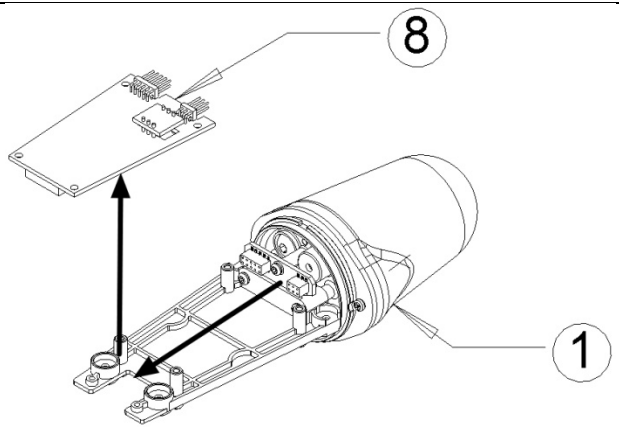
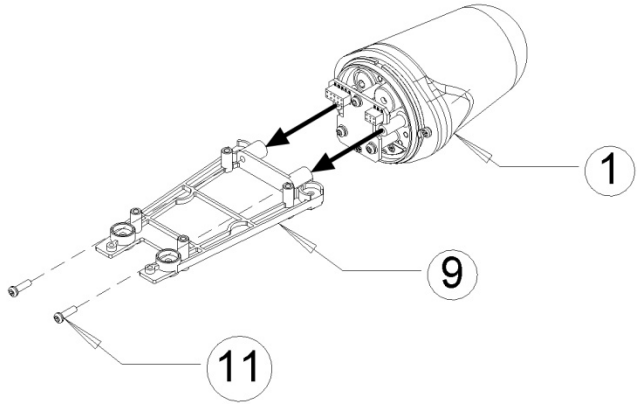
Remove ②Bolt Caps(4EA), loosen ⑫M2.5x10mm Pan-Head Machine screws(4EA), and separate ③PROBE B COVER and ④ PROBE U COVER from ① PROBE HEAD module.

STEP 2

Disconnect ⑤Coaxial Cable Assembly from each cable connector of ①PROBE HEAD module and ⑦PR-ASP B/D.

	
STEP 3 Loosen ⑪M2.5x8mm Pan-Head Machine screws (2EA), remove ⑬M2.5 Teflon washers(2EA), and separate ⑥ PROBE CABLE.	STEP 4 Disconnect the pin connectors **A'** and **B'** of ⑥PROBE CABLE from the connection terminals **A** and **B** respectively.

	
STEP 5 Loosen ⑩M2.5x5mm Pan-Head Machine screws(4EA) on ⑦PR-ASP B/D, and separate ⑦ from ① PROBE HEAD module.	STEP 6 Turning it over, loosen ⑩M2.5x5mm Pan-Head Machine screws(4EA) on the opposite side.

	
STEP 7 Pushing in the direction of the arrow, separate ⑧PR-Mot_Pul B/D from ①PROBE HEAD module. * Be careful not to damage the pin connector.	STEP 8 Loosen ⑪M2.5x8mm Pan-Head Machine screws (2EA), and separate ⑨PROBE METAL PLATE from ①PROBE HEAD module.

2.3.3 PROBE Assembly

No.	Part name	Q'ty
1	PROBE HEAD module	1EA
2	PROBE METAL PLATE	1EA
3	PR-Mot_Pul B/D (from 3B702 01012)	1EA
4	PR-ASP B/D (from 3B702 01012)	1EA
5	PROBE CABLE	1EA
6	Coaxial Cable Assembly (from 3B702 01012)	1EA
7	PROBE U COVER	1EA
8	PROBE B COVER	1EA
9	BOLT CAP	4EA
10	M2.5x5mm Pan-Head Machine screw	11EA
11	M2.5x8mm Pan-Head Machine screw	4EA
12	M2.5x10mm Pan-Head Machine screw	4EA
13	M2.5 Teflon washer	2EA

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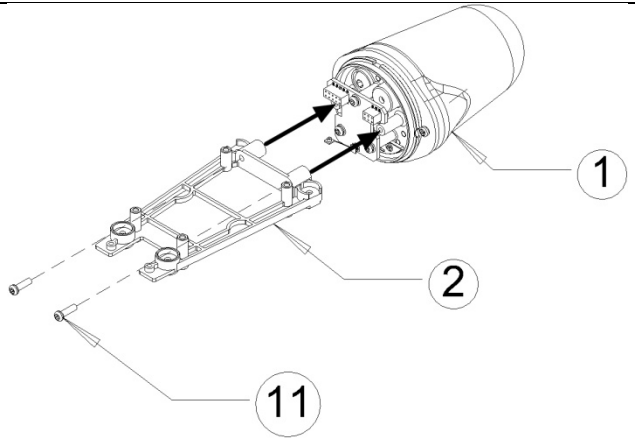
<td colspan="2"> 
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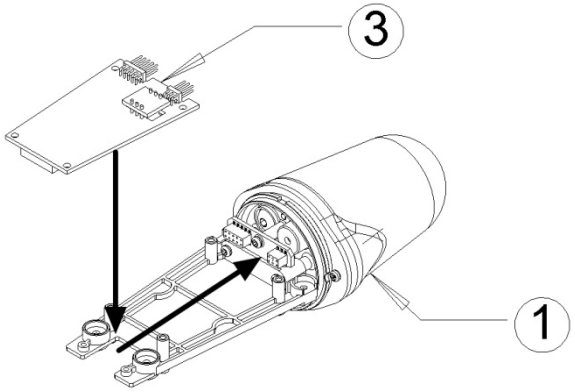
<td> 
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<tr>
<td>STEP 1
Fix ②PROBE METAL PLATE to ①PROBE HEAD module with ⑪M2.5x8mm Pan-Head Machine screws(2EA).</td>
<td>  </td>
<td>STEP 2
Putting the pin connectors in the receptacles, assemble ①PROBE HEAD module and ③PR-Mot_Pul B/D(from 3B702 01012).</td>
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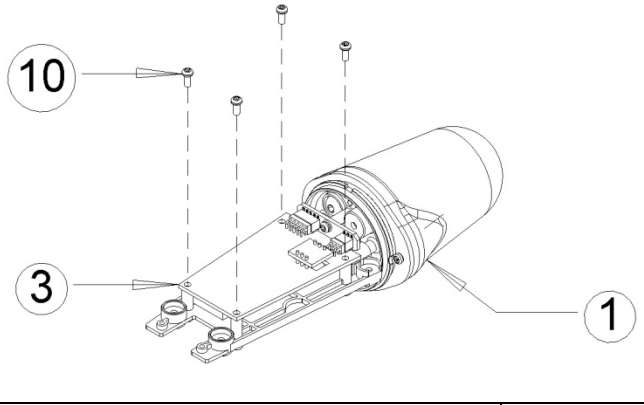
<td> 
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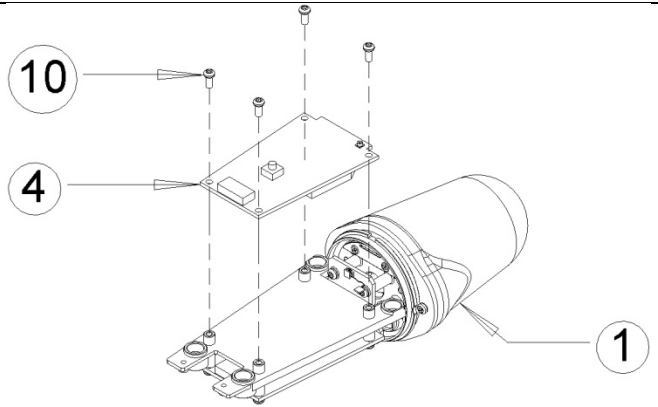
<td> 
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<td>STEP 3
Fix ③PR-Mot_Pul B/D (from 3B702 01012) with ⑩M2.5x5mm Pan-Head Machine screws(4EA).</td>
<td>  </td>
<td>STEP 4
Turning ① over, fix ④PR-ASP B/D (from 3B702 01012) with ⑩M2.5x5mm Pan-Head Machine screws(4EA).</td>
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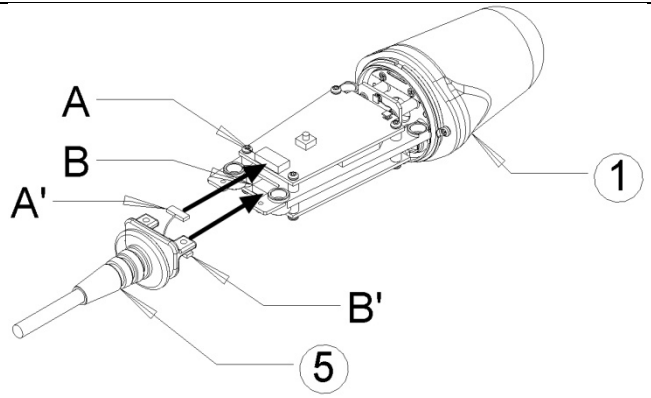	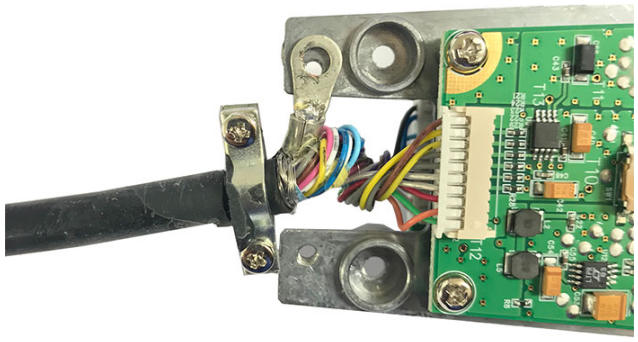
STEP 5 Connect the pin connectors **A', B'** of ⑤PROBE CABLE to the receptacles **A** and **B**, respectively. * Pay attention to the size of the connectors.	STEP 6 Align the cable and the ground connection as shown in the picture.

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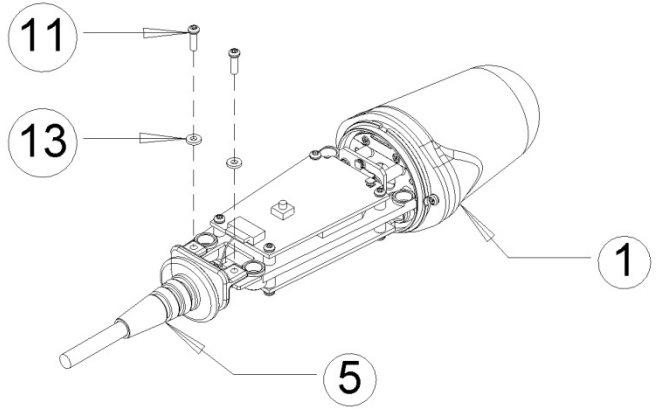
<td> 
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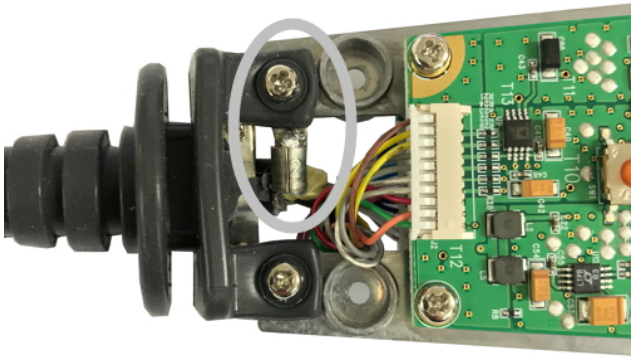
<td colspan="2">  </td>
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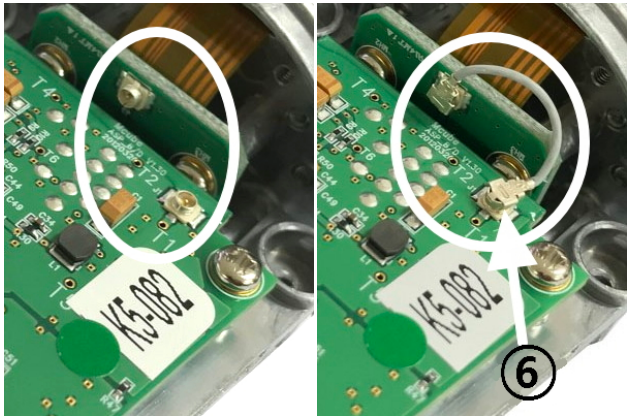
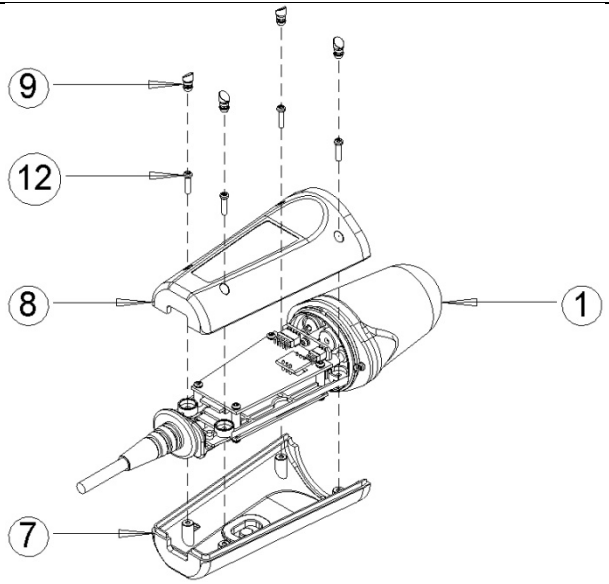
<tr>
<td>STEP 7

Fix ⑤PROBE CABLE to ①PROBE HEAD module with ⑬ M2.5 Teflon washers(2EA) and ⑪M2.5x8mm Pan-Head Machine screws(2EA).</td>
<td>  </td>
<td>* Make sure the ground connection and the Taflon washer are firmly screwed up together.</td>
</tr>
</table>



STEP 8

Connect each end of ⑥Coaxial Cable Assembly (from 3B702 01012) to the cable connectors on ①PROBE HEAD module and ④PR-ASP B/D (from 3B702 01012).

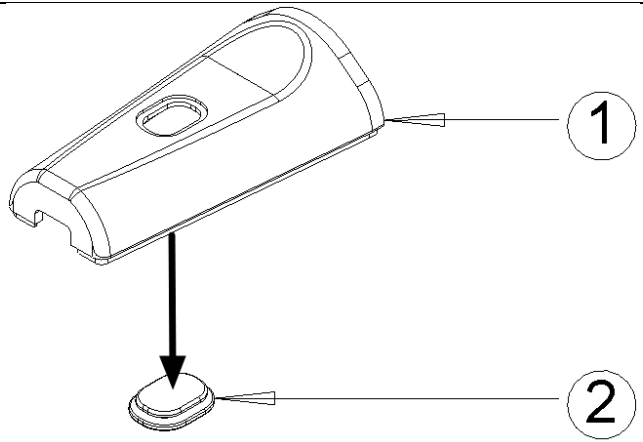


STEP 9

Positioning ⑦PROBE U COVER and ⑧ PROBE B COVER properly on ①PROBE HEAD module, fix them with ⑫M2.5x10mm Pan-Head Machine screw(4EA), and then cover them with ⑨BOLT CAPS(4EA).

2.3.4 PROBE SCAN BUTTON Disassembly

No.	Part name	Q'ty
1	PROBE U COVER	1EA
2	PROBE SCAN BUTTON	1EA

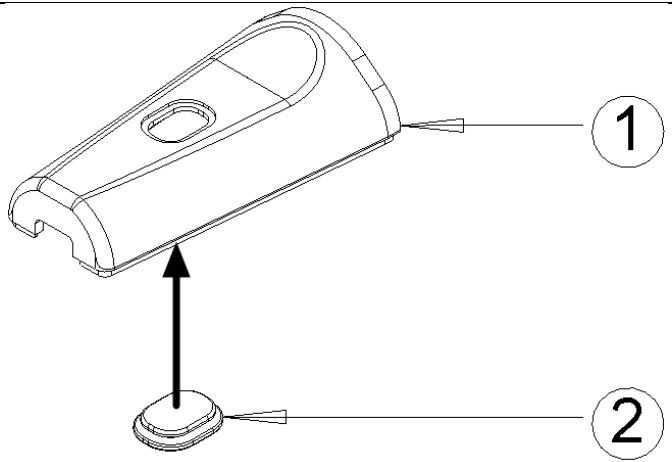


STEP 1

Separate ②PROBE SCAN BUTTON from ①PROBE U COVER by applying force as shown in the picture.

2.3.5 PROBE SCAN BUTTON Assembly

No.	Part name	Q'ty
1	PROBE U COVER	1EA
2	PROBE SCAN BUTTON	1EA

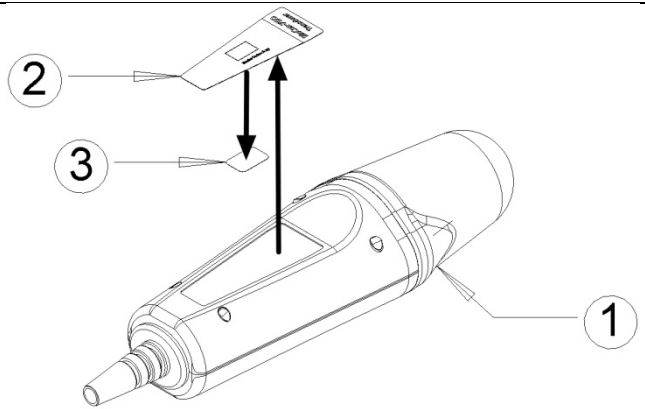


STEP 1

Assemble ②PROBE SCAN BUTTON into ①PROBE U COVER as shown in the picture.

2.3.6 PROBE S/N LABEL Disassembly

No.	Part name	Q'ty
1	PROBE B COVER	1EA
2	PROBE S/N LABEL	1EA
3	PROBE S/N	1EA

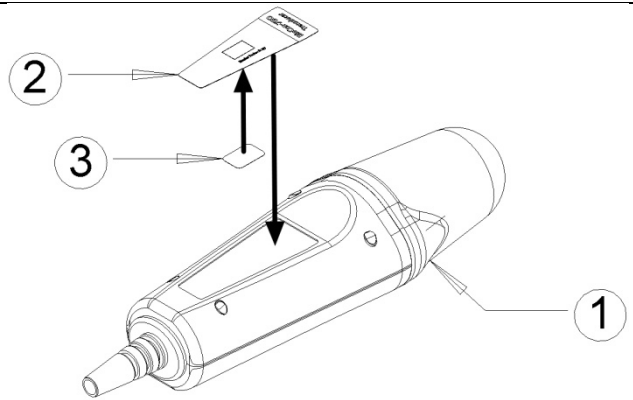


STEP 1

Detach ②PROBE S/N LABEL from ①PROBE B COVER, and separate ③PROBE S/N from ②PROBE S/N LABEL.

2.3.7 PROBE S/N LABEL Assembly

No.	Part name	Q'ty
1	PROBE U COVER	1EA
2	PROBE S/N LABEL	1EA
3	PROBE S/N	1EA



STEP 1

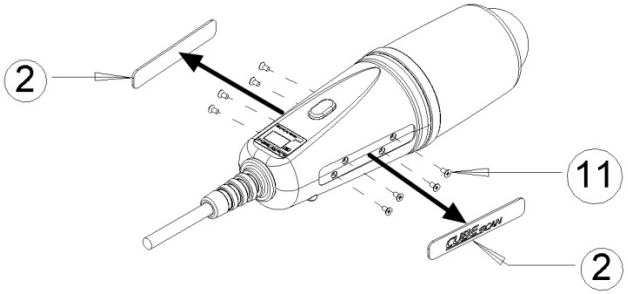
Put ③PROBE S/N on ②PROBE S/N LABEL, and attach ②PROBE S/N LABEL to ①PROBE U COVER.

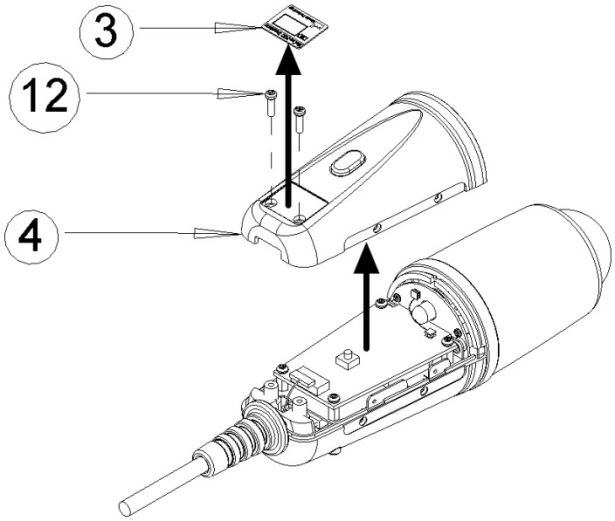
2.4 Replacing the probe head of 3B702 01012 with the probe head of 37S02 01022

2.4.1 Probe Disassembly (3B702 01012)

No.	Part name	Q'ty
1	PROBE HEAD module	1EA
2	Probe Side Sheet	2EA
3	Probe Serial Sheet	1EA
4	Probe Cover-U	1EA
5	PR-ASP B/D	1EA
6	Coaxial Cable Assembly	1EA
7	Probe Metal Plate	1EA
8	PR-Mot_Pul B/D	1EA
9	Probe Cover-B	1EA
10	Probe Cable	1EA
11	M2x4mm Flat-Head Machine screw	8EA
12	M2.5x10mm Round-Head Self-Tapping screw	2EA
13	M2.5x5mm Round-Head Machine screw	4EA
14	M2x4mm Bind-Head Machine screw	1EA

15	M2.5x6mm Support Machine screw	4EA
16	M2.5x4mm Flat-Head Self-Tapping screw	2EA
17	M2.5x6mm Support Self-Tapping screw	4EA



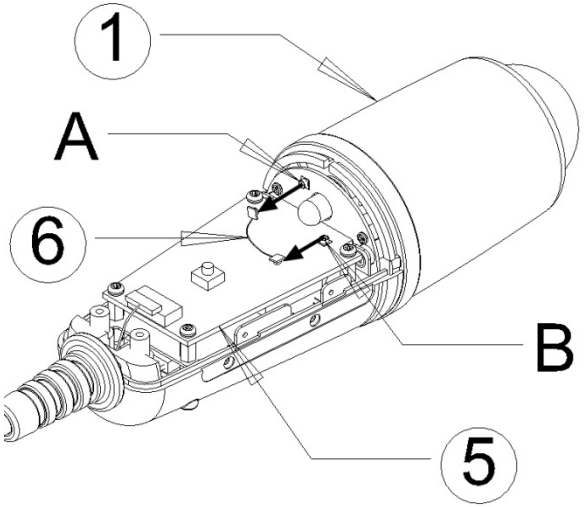
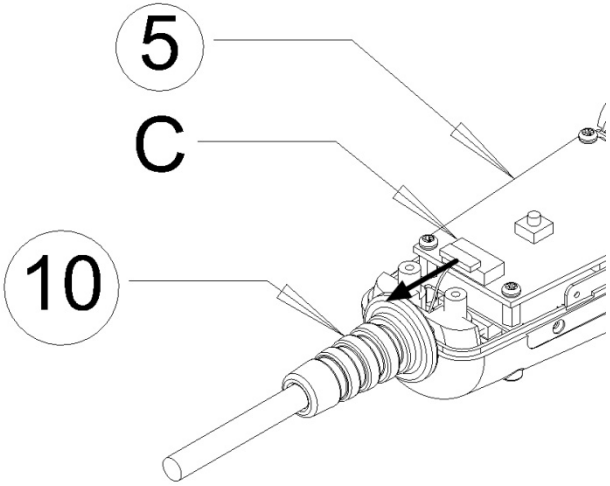


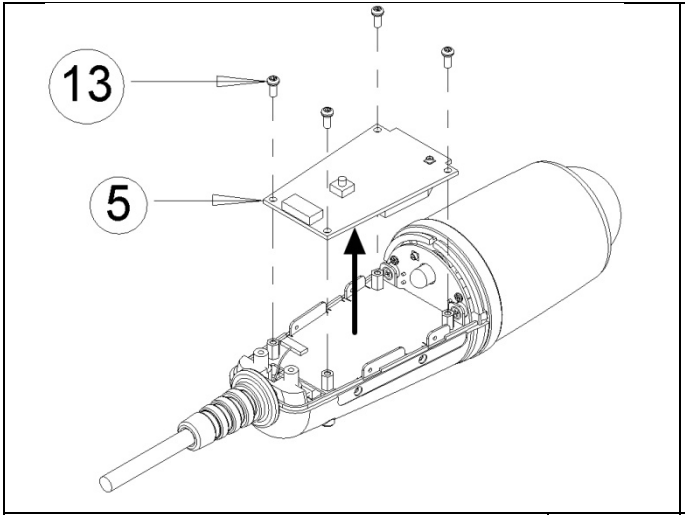
STEP 1

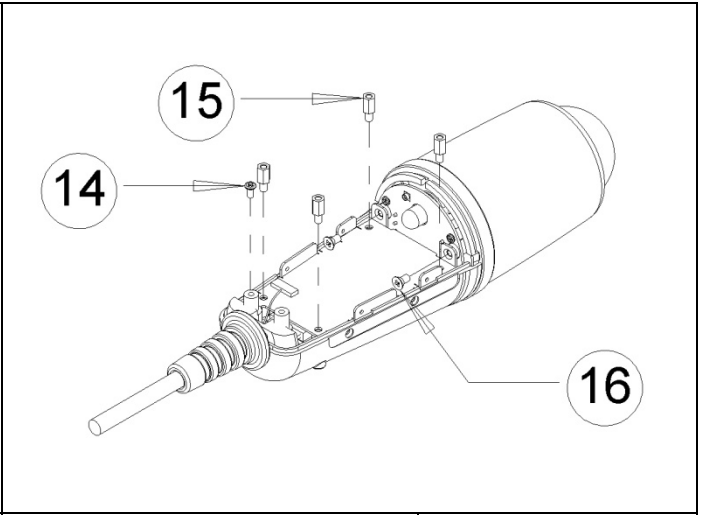
Detach ②Probe Side Sheets(2EA), and loosen ⑪M2x4mm Flat-Head Machine screws(8EA).

STEP 2

Detach ③Probe Serial Sheet, loosen ⑫M2.5x10mm Round-Head Self-Tapping screws(2EA), and take off ④Probe Cover-U.

	
STEP 3 Disconnect ⑥Coaxial Cable Assembly from the connectors **A** and **B** on ①PROBE HEAD module and ⑤PR-ASP B/D.	STEP 4 Disconnect ⑩Probe Cable from the receptacle **C** of ⑤PR-ASP B/D.



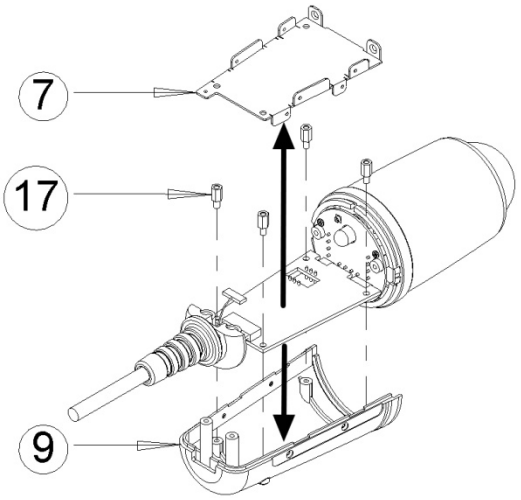


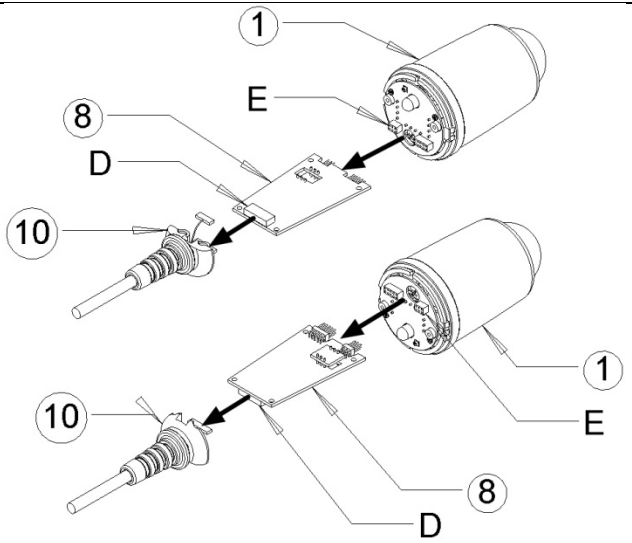
STEP 5

Loosen ⑬M2.5x5mm Round-Head Machine screws(4EA), and remove ⑤PR-ASP B/D.

STEP 6

Loosen ⑭M2x4mm Bind-Head Machine screw(1EA), ⑮M2.5x6mm Support Machine screws(4EA), and ⑯M2.5x4mm Flat-Head Self-Tapping screws(2EA) in order.





STEP 7

Separate ⑦Probe Metal Plate, loosen ⑰ M2.5x6mm Support Self-Tapping screws(4EA), and take off ⑨Probe Cover-B.

STEP 8

Disconnect the pin connectors of ⑩Probe Cable from the receptacle **D** of ⑧PR-Mot_Pul B/D, and separate ⑧PR-Mot_Pul B/D from **E** of ①PROBE HEAD module.

2.4.2 PROBE Assembly (37S02 01022)

1	PROBE HEAD module	1EA
2	PROBE METAL PLATE	1EA
3	PR-Mot_Pul B/D (from 3B702 01012)	1EA
4	PR-ASP B/D (from 3B702 01012)	1EA
5	PROBE CABLE	1EA
6	Coaxial Cable Assembly (from 3B702 01012)	1EA
7	PROBE U COVER	1EA
8	PROBE B COVER	1EA
9	BOLT CAP	4EA
10	M2.5x5mm Pan-Head Machine screw	11EA
11	M2.5x8mm Pan-Head Machine screw	4EA
12	M2.5x10mm Pan-Head Machine screw	4EA
13	M2.5 Teflon washer	2EA

<table>
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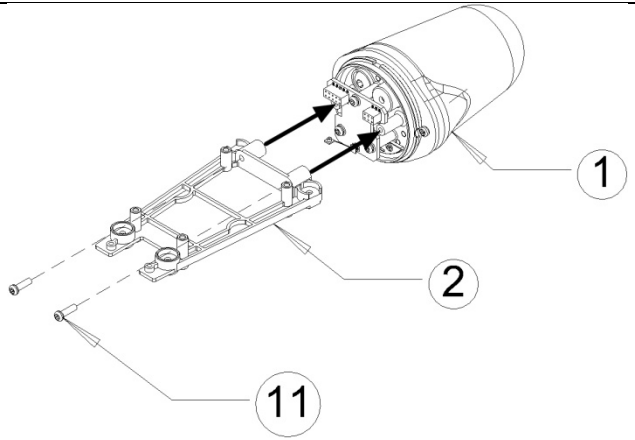
<td colspan="2"> 
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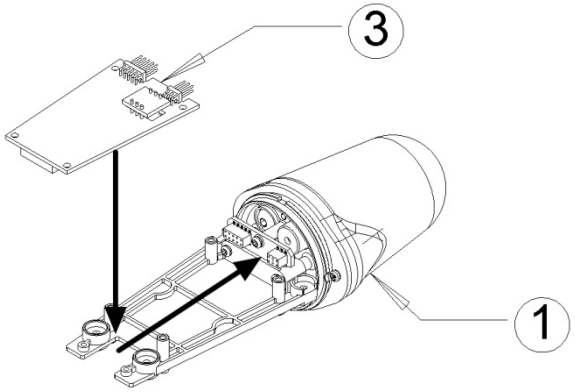
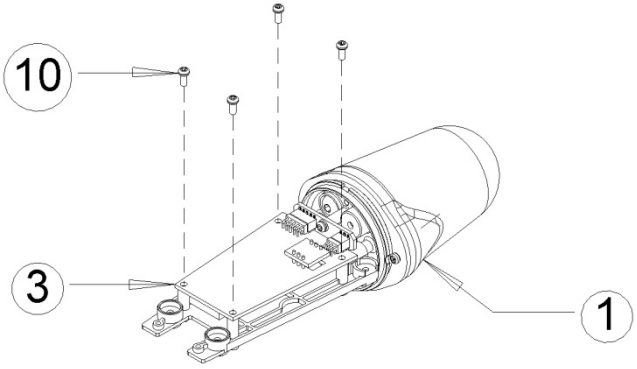
<td> 
</td>
</tr>
<tr>
<td>STEP 1
Fix ②PROBE METAL PLATE to ①PROBE HEAD module with ⑪M2.5x8mm Pan-Head Machine screws(2EA).</td>
<td>  </td>
<td>STEP 2
Putting the pin connectors in the receptacles, assemble ①PROBE HEAD module and ③PR-Mot_Pul B/D(from 3B702 01012).</td>
</tr>
</table>

<table>
<tr>
<td colspan="2"> 
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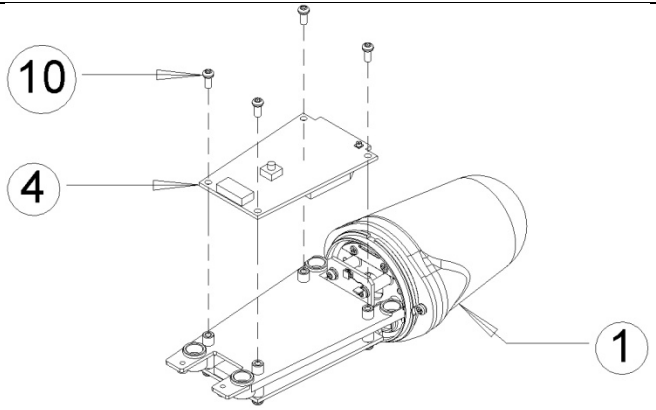
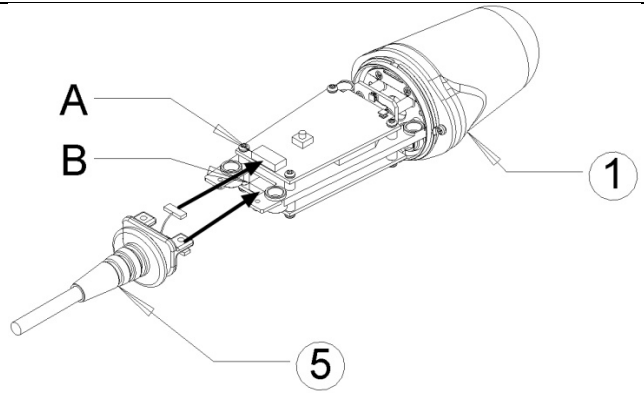
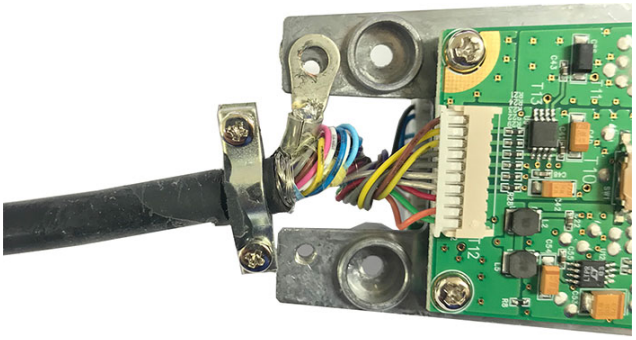
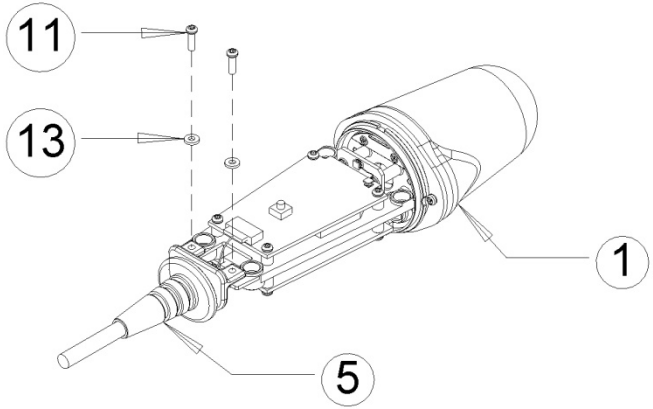
<td colspan="2"> 
</td>
</tr>
<tr>
<td>STEP 3
Fix ③PR-Mot_Pul B/D (from 3B702 01012) with ⑩M2.5x5mm Pan-Head Machine screws(4EA).</td>
<td>  </td>
<td>STEP 4
Turning ① over, fix ④PR-ASP B/D (from 3B702 01012) with ⑩M2.5x5mm Pan-Head Machine screws(4EA).</td>
<td>  </td>
</tr>
</table>

	
STEP 5 Connect the pin connectors A′, B′ of ⑤PROBE CABLE to the receptacles A and B, respectively. * Pay attention to the size of the connectors.	STEP 6 Align the cable and the ground connection as shown in the picture.

<table>
<tr>
<td> 
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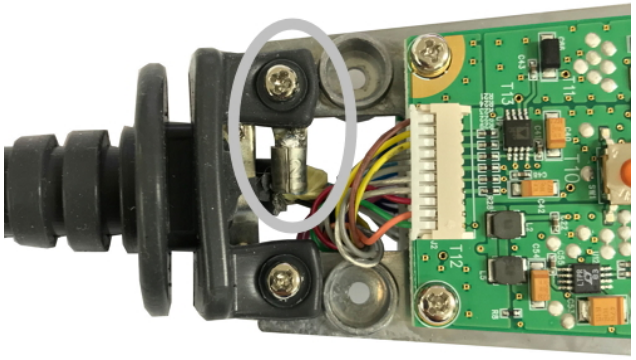
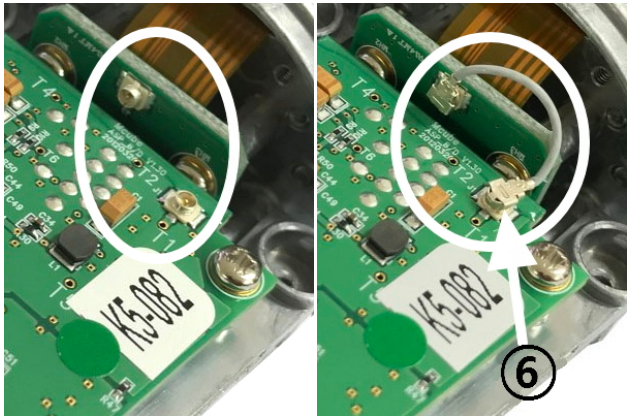
<td colspan="2">  </td>
</tr>
<tr>
<td>STEP 7

Fix ⑤PROBE CABLE to ①PROBE HEAD module with ⑬ M2.5 Teflon washers(2EA) and ⑪M2.5x8mm Pan-Head Machine screws(2EA).</td>
<td>  </td>
<td>* Make sure the ground connection and the Taflon washer are firmly screwed up together.</td>
</tr>
</table>

<table>
<tr>
<td> 
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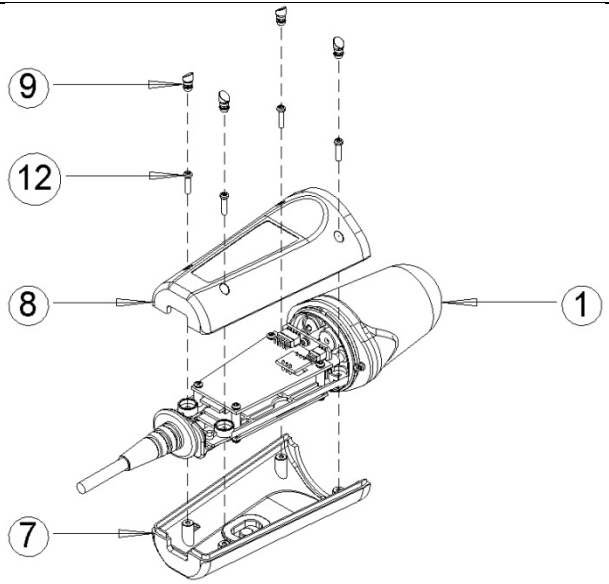
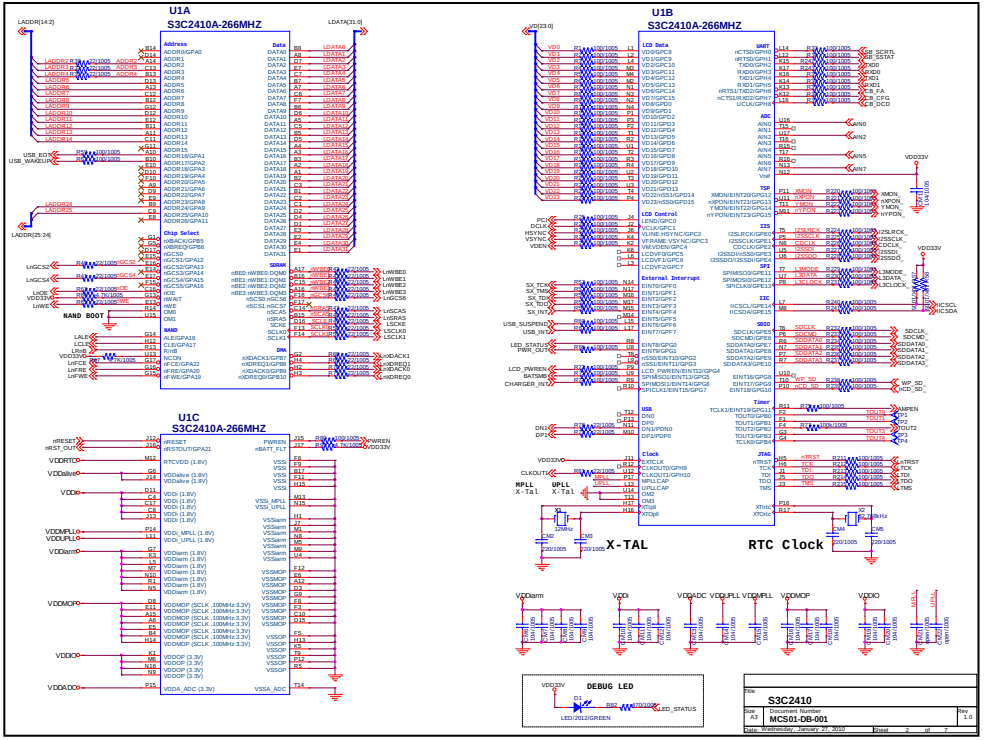
<td> 
</td>
</tr>
<tr>
<td>STEP 8

Connect each end of ⑥Coaxial Cable Assembly (from 3B702 01012) to the cable connectors on ①PROBE HEAD module and ④PR-ASP B/D (from 3B702 01012).</td>
<td>STEP 9

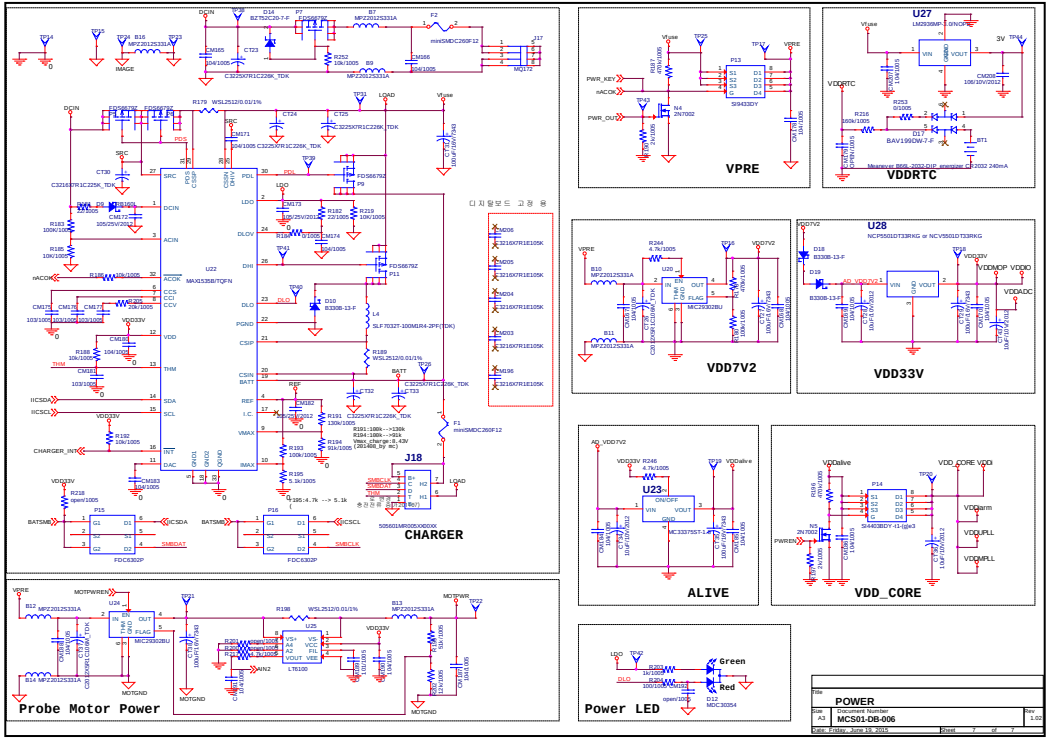
Positioning ⑦PROBE U COVER and ⑧PROBE B COVER properly on ①PROBE HEAD module, fix them with ⑫ M2.5x10mm Pan-Head Machine screw(4EA), and then cover them with ⑨BOLT CAPS(4EA).</td>
</tr>
</table>

3 Circuit Diagram

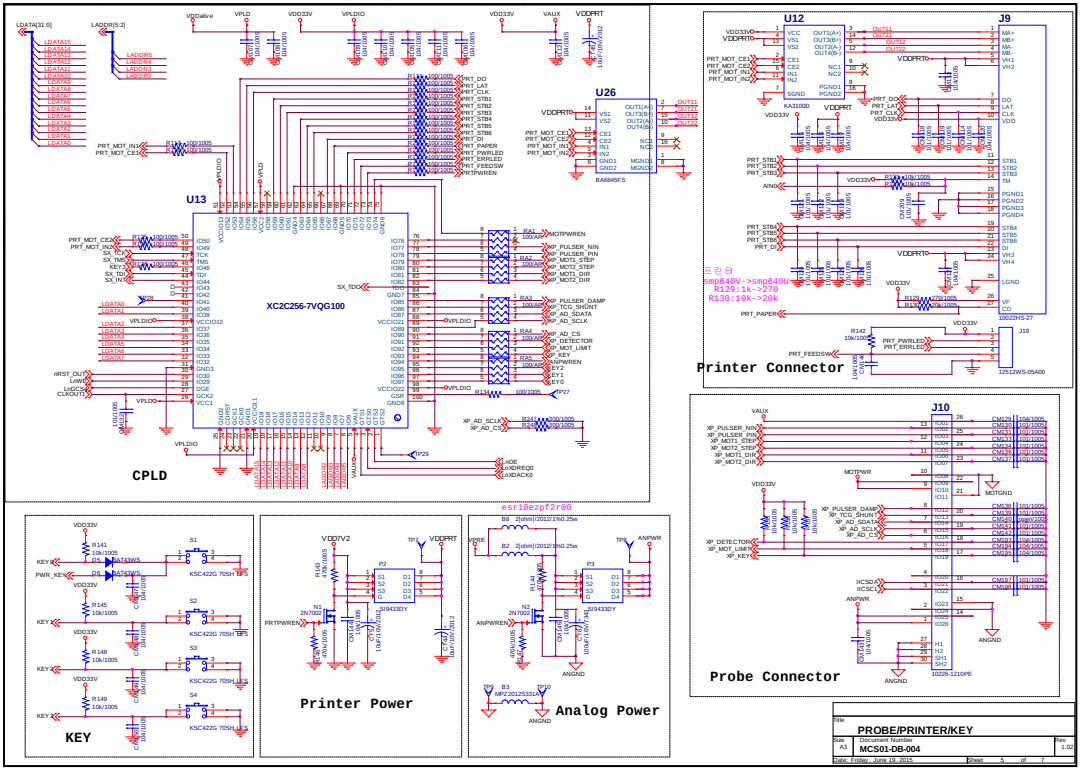
3.1 Control Board CPU



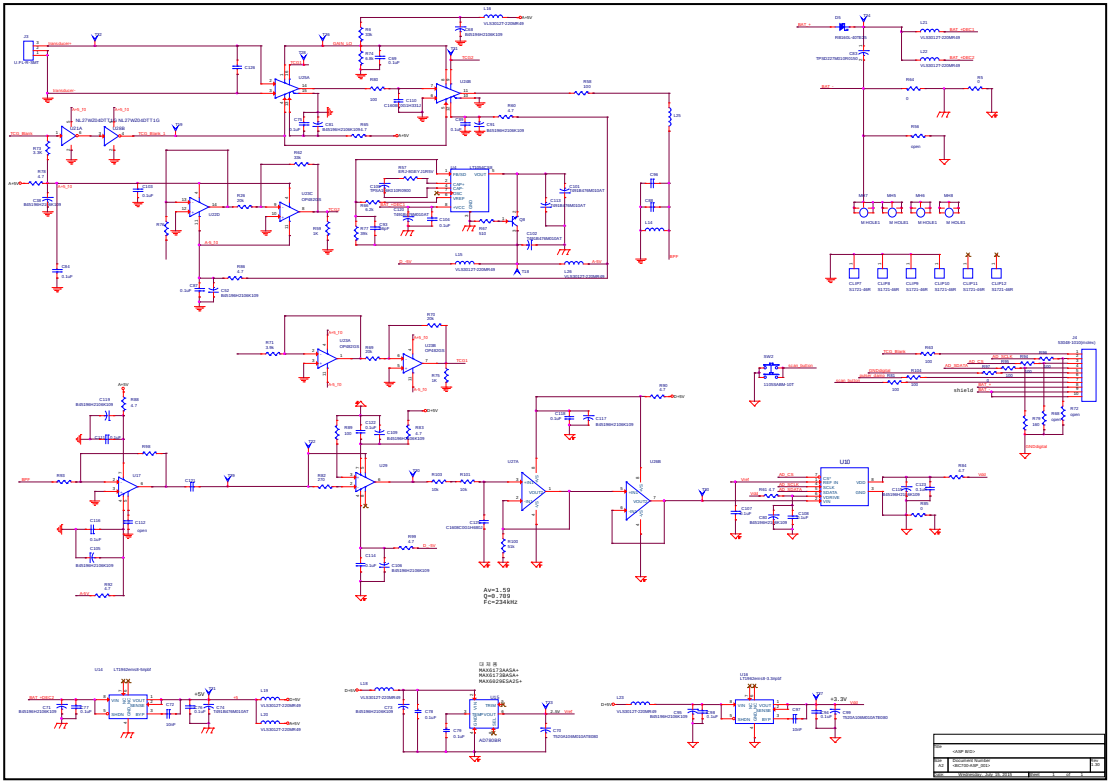
3.2 Control Board Power In/Charger



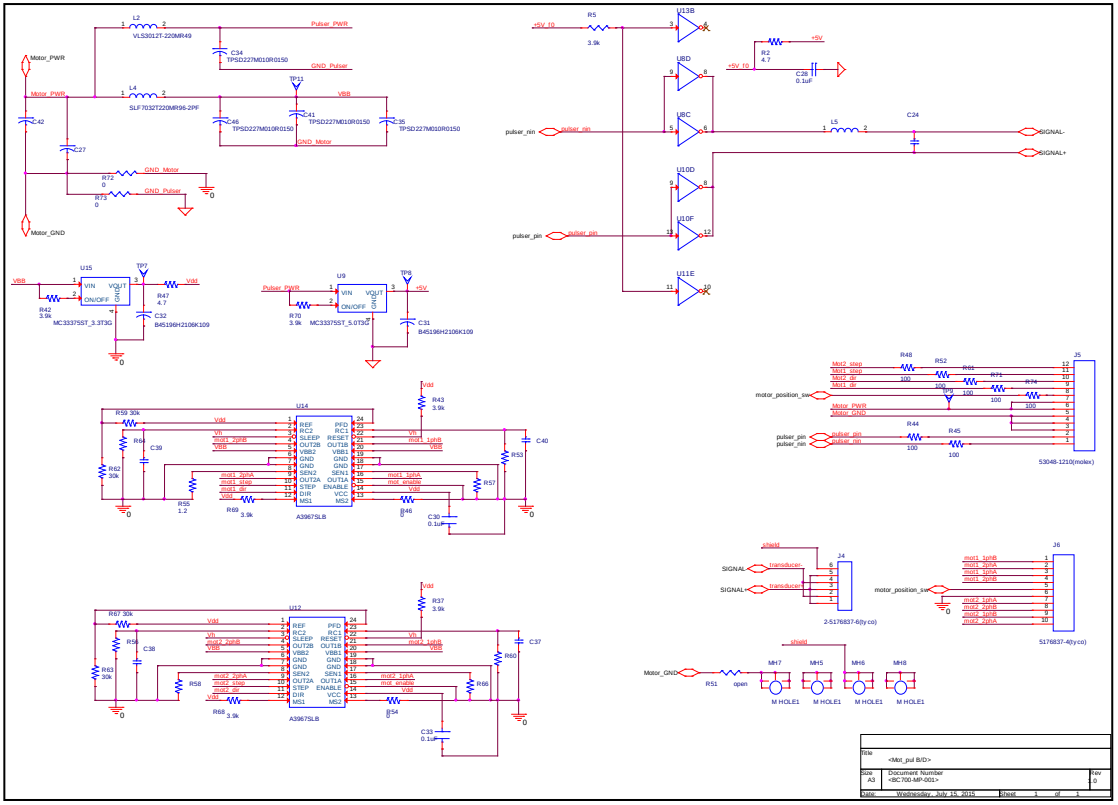
3.3 Control Board Probe IF / Printer / Key



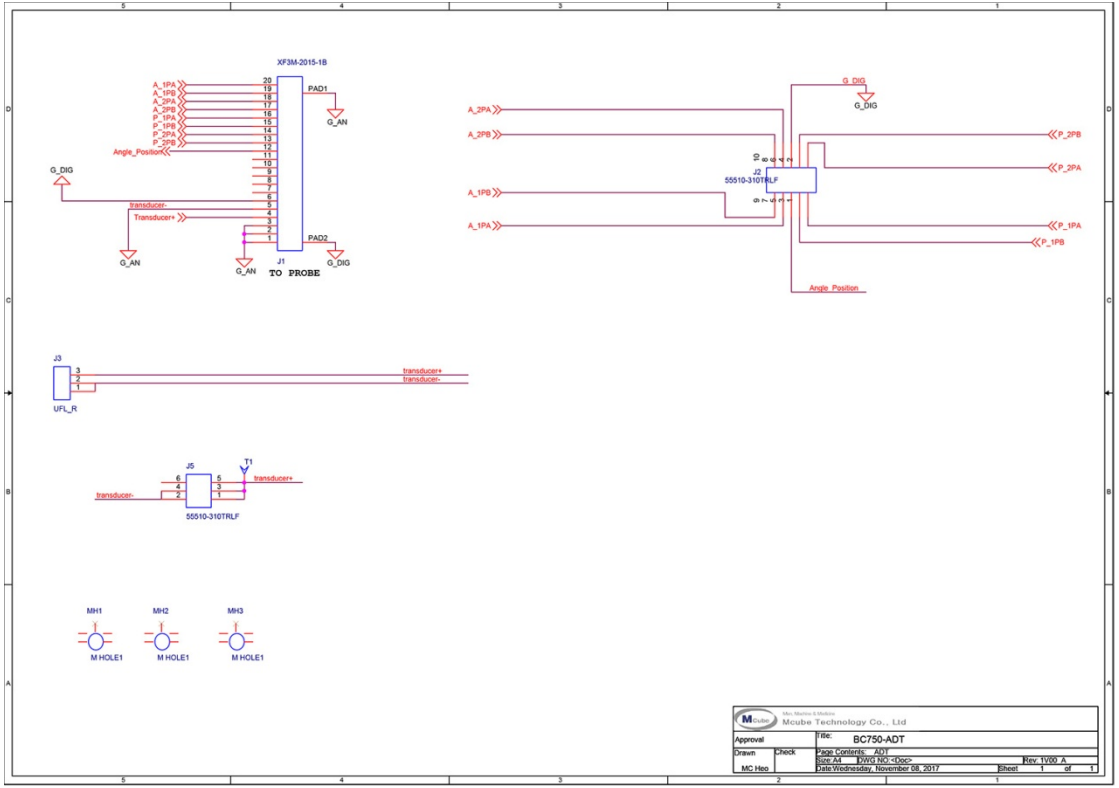
3.4 Probe ASP Board



3.5 Probe Mot_Pul Board

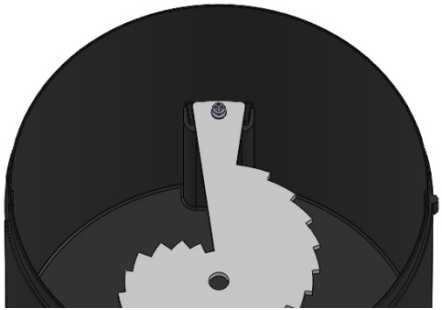


3.6 Probe ADT Board



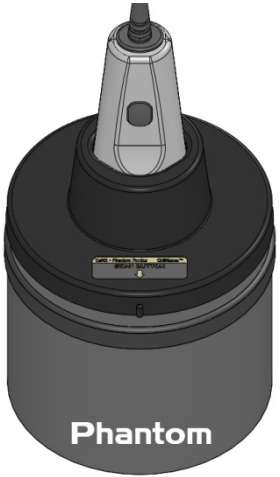
4 Calibration

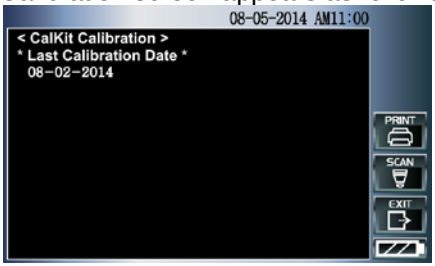
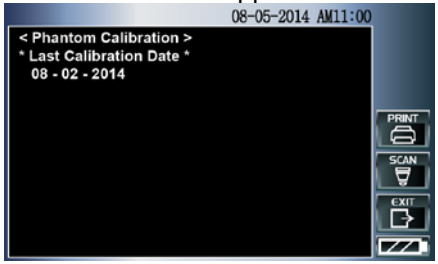
There are two methods for the calibration. Following table shows the calibration process.

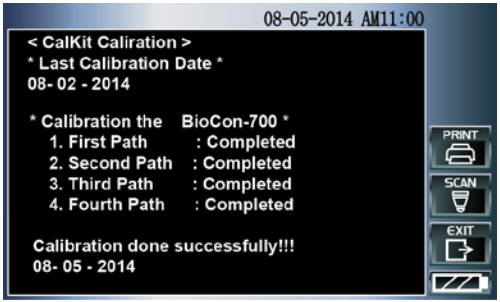
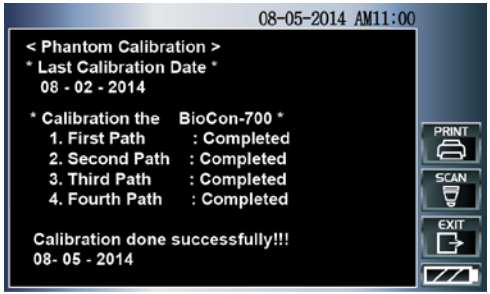
Step	CalKit Calibration	Phantom Calibration
1	Open the cap of the calibration kit and pour **saline solution**. ***Ideal calibration condition*** Confirm that the air bubble is absent. You can also the pure water on behalf of the saline solution. But in this case, do calibration after confirming that all the air bubbles went away. 	Place the CUBEscan phantom on a flat surface. And open the cover of the phantom. 

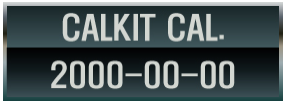
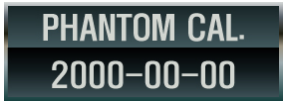
Step	CalKit Calibration	Phantom Calibration
	Fill the water into the CalKit until the water level meets the ***Water Level*** as the below picture. The Water Level can be found about 1 cm away from the top edge. 	Drop about 5ml water or more on the center surface of the phantom 

Step	CalKit Calibration	Phantom Calibration
2	Close the cap of the calibration kit. Make sure that the top lid arrow mark aligns with the nipple of bottom. 	Place the holder on the top of the CUBEScan phantom. Check if the holder is in a stable and flat position. 

<table>
<tr><th>Step</th><th colspan="2">CalKit Calibration</th><th>Phantom Calibration</th></tr>
<tr><td>3</td><td colspan="2">Align the probe scan button with the arrow mark of the calibration kit, and put the probe head into the probe holder firmly.
 
</td><td>Put the probe head into the probe holder firmly.
 
</td></tr>
<tr><td>4</td><td colspan="3">Connect the probe to the console.</td></tr>
<tr><td>5</td><td colspan="3">Turn the console power on.</td></tr>
<tr><td>6</td><td>Touch
 
</td><td colspan="2">Touch the Setup icon on the Top screen.
The Setup icon on the Top screen.</td></tr>
</table>

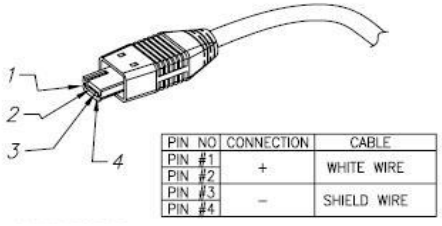
Step	CalKit Calibration	Phantom Calibration
7	 Touch the following icon on the Setup screen.	
8	Touch the following icon on the Scan Setup screen. 	Touch the following icon on the Scan Setup screen. 
9	Calibration screen appears as follows: 	Calibration screen appears as follows: 
10	 When you touch the left icon, you can print the last or current calibration information.	
11	Touch “SCAN” icon to start calibration and wait until the calibration is completed. If calibration succeeds, the calibration date will be changed and save the calibrated value.	Touch “SCAN” icon to start calibration and wait until the calibration is completed. If calibration succeeds, the calibration date will be changed and save the calibrated

Step	CalKit Calibration	Phantom Calibration
	If any calibration error occurs during calibration, try calibration once again after checking the *ideal condition** of calibration. If any error occurs again, contact a local distributor or Mcube Technology. 	value. If any calibration error occurs during calibration, try calibration once again after checking the *ideal condition** of calibration. If any error occurs again, contact a local distributor or Mcube Technology. 
12	Click the “Exit” Icon after CalKit or Phantom Calibration succeeds!!! (Refer to the above screen.) 	
13	Check the date (CALKIT CAL.) is newly changed to the calibration completed date. If the date is not changed after the calibration, calibrate the device again (go back to step 8). If the date is not changed after several times of calibration, please	Check the date (Phantom CAL.) is newly changed to the calibration completed date. If the date is not changed after the calibration, calibrate the device again (go back to step 8). If the date is not changed after several times

Step	CalKit Calibration	Phantom Calibration
	contact a local distributor or Mcube Technology. 	of calibration, please contact a local distributor or Mcube Technology. 
14	After checking the last calibration time and date are newly updated, touch “OK” icon. And then calibration completes successfully. 	

5 Troubleshooting

5.1. The system is not charged.

Case 1: The system is not charged.	
Step.	**Actions**
1	- When the Error Message is displayed, See 5.5 Error message.
2	- Measure the output voltage of DC adapter by Multimeter Pin1 – Pin4 : 9.0 Vdc– 9.8Vdc - If the output voltage is out of normal range, replace DC adapter. - If the output voltage is within the normal range, go to the next step.  PIN NO / CONNECTION / CABLE PIN #1, PIN #2 / + / WHITE WIRE PIN #3, PIN #4 / – / SHIELD WIRE
3	Remove the Battery Cover and take the battery out. Remove the Bottom case of Console.
4	Install a new battery.
5	Connect a DC adapter to console and put the plug to wall outlet.
6	Measure the voltage between TP23 and TP38 Normal voltage range: 9Vdc – 9.8Vdc -If the measured voltage is within the normal range, replace the digital board. - If the measured voltage is out of normal range, check the connection between DC

Case 1: The system is not charged.	
Step.	**Actions**
	adapter and console connector. If the connection is all right, replace the digital board.

5.2. The Console is abnormal.

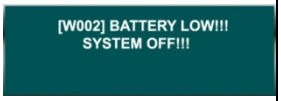
Case 2: The BLU(Back Light Unit) is dark or does not operate.	
No.	**Actions**
1	After removing the battery cover and battery, remove the Bottom Case of Console.
2	Install a battery
3	Turn on the system by PWR button of Console.
4	Measure the voltage of following Test points. a. TP34 - TP35 : 24Vdc ± 1Vdc b. TP34 - TP36 : 24Vdc ± 1Vdc c. TP34 - TP37 : 24Vdc ± 1Vdc
5	If the voltage of Test Point is normal, replace the LCD module
6	If the voltage of Test Point is abnormal, replace the Digital board

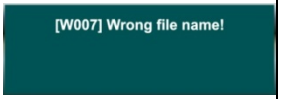
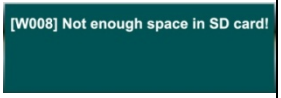
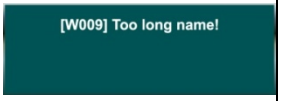
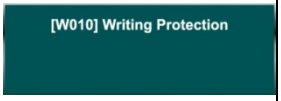
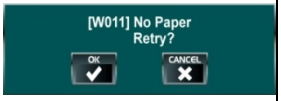
5.3. If the measured value is not accurate or the probe operating is abnormal

Case 3: The measured value is not accurate	
No.	**Actions**
1	Perform **Calkit** calibration or Phantom calibration.
2	When Error is displayed, see 5.6 Calibration error message.
3	Check after replacing ASP board.
4	Check after replacing Probe Head.

Case 4: The probe operating is abnormal.	
No.	**Actions**
1	Perform **Calkit** calibration or Phantom calibration.
2	When Error is displayed, see5.6 Calibration error message.
3	Check after replacing Probe Head.
4.	Check after replacing Mot_Pulboard.

5.4. Warning message

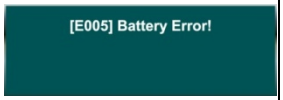
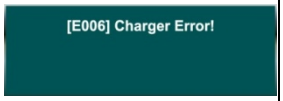
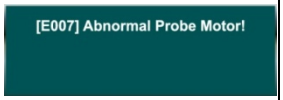
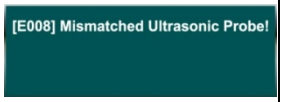
Warning message	Description	Actions
	Remaining Capacity: Less than 5%	Use again after charging the battery.
	For going to normal power off mode	Use again after charging the battery.
	No SD card installed in the SD card slot	Use after installing the SD memory card to the SD memory card slot.
	An unformatted card installed	Use after formatting(FAT32 file system)
	-	There is no such corresponding file name to the searching file name
	-	There is a file with same name.

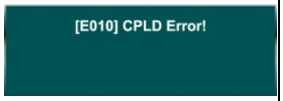
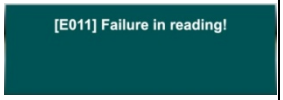
Warning message	Description	Actions
	Invalid character as a file name	Use valid characters for a file name. Do not use following characters for a file name. \ / : * ? “ <> |
	-	There is not enough space in SD card.
	-	Too long file name. (max 255 characters)
	The SD Card is write-protected.	Sliding it up or down will unlock or lock the card. You always keep the card unlocked for saving data.
	Printer error	1. Check if the printer cover is opened. If the cover is opened, close the cover and try printing again. 2. Check if the printer has enough thermal paper roll. If there is no paper, insert a new paper roll and try printing again. 3. After the above actions the same trouble happens, contact Mcube technology service center.

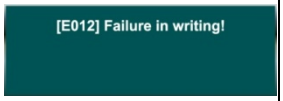
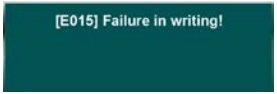
Warning message	Description	Actions
	The storage format of SCAN data is wrong	Try scan and save the scanned data. Review the saved data. If the trouble is continued even under the proper connection, contact Mcube technology service center.
	The file is not exist in SD card	Check if that file exists in the PC. If the trouble is continued even under the proper connection, contact Mcube technology service center.

5.5. Error message

Error message	Description	Actions
	Probe Connector disconnection error	1. Check if the connection between the probe-terminal of console with the probe connector is firm. 2. Replace the probe cable by a new one. 3. If the trouble is continued, contact Mcube technology service center.
	Communication Fail between the console and the probe	1. Check if the connection between the probe-terminal of console with the probe connector is firm. 2. Replace the probe cable by a new one. 3. If the trouble is continued even under the proper connection, contact Mcube technology service center.
	The data format from the probe is wrong	1. Try SCAN again after checking the connection to the probe. 2. Replace the probe cable by new one. 3. If the trouble is continued even under the proper connection, contact Mcube technology service center.

Error message	Description	Actions
	There is no installed CPLD file.	1. Check if the SD card has install file. 2. Save and store new Install file in a new SD card. And turn the system on again. 3. If the trouble is continued, contact Mcube technology service center.
	Communication Fail between the console and the battery	1. Check after replacing battery 2. Check after replacing Digital board 3. If the trouble is continued, contact Mcube technology service center.
	Communication Fail between the console and the charger	1. Check after replacing Digital board 2. If the trouble is continued, contact Mcube technology service center.
	Angle motor error	1. Check after replacing Probe Head 2. Check after replacing Mot_Pul board 3. Check after replacing Probe Cable 4. If the trouble is continued, contact Mcube technology service center.
	Wrong probe attachment	1. Maintenance setup >> Click the Maintenance Icon>> Click the Match probe Icon 2. If Success is displayed after the Action1

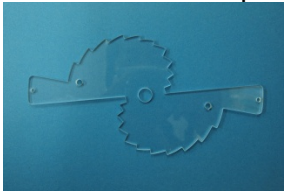
Error message	Description	Actions
		above, you may use the probe. 3. If Fail is displayed after the Action1 above, you have to replace the probe. 4. If the trouble is continued, contact Mcube technology service center.
	There is an error during data saving.	1. Check the format of the SD card. And try again. 2. If the trouble is continued even under the proper connection, contact Mcube technology service center.
	CPLD file error	1. Check if the SD card has install file. 2. Save and store new Install file in a new SD card. And turn the system on again. 3. Check after replacing Digital board 4. If the trouble is continued, contact Mcube technology service center.
	Read error in SD card	1. Try after reformatting the SD memory card or use another SD memory card. 2. Check after replacing Digital board 3. If the trouble is continued, contact Mcube technology service center.

Error message	Description	Actions
	Read error in SD card	1. Try after reformatting the SD memory card or use another SD memory card. 2. Check after replacing Digital board 3. If the trouble is continued, contact Mcube technology service center.
	Transducer circuit open	Contact a local distributor or an authorized technical center.
	Read error in internal memory	Contact a local distributor or an authorized technical center.
	Write error in internal memory	Contact a local distributor or an authorized technical center.

5.6. Calibration Error message

Following table explains error messages during **Calkit** calibration or Phantom calibration

Error Code	Description	Actions	
		CalKit	Phantom
1	Insufficiency of	1. Check the solution level	Pour enough saline or water

Error Code	Description	Actions	
		CalKit	Phantom
	saline solution	(***fill-mark***).	
2	No signal from transducer	1. Check after replacing Probe cable 2. Check the connection of Coaxial Cable Connector which assembles ASP board and B2B board(ADT board) 3. Check after replacing ASP board 4. Check after replacing Probe Head 5. If the trouble is continued, contact Mcube technology service center.	
3	Plane Motor Error(1) : the scanning location is moved	1.Check after replacing Probe Head 2. If the trouble is continued, contact Mcube technology service center.	Contact Mcube technology service center.
4	Plane Motor Error(2) : the opposite direction of motor spinning	1.Check the target orientation of the **Calkit**. The upside view has to be as the below picture.  2. If the trouble is continued, contact Mcube technology	Contact Mcube technology service center.

Error Code	Description	Actions	
		CalKit	Phantom
		service center.	
5	No Plane Motor spinning	1.Check after replacing Probe Head 2.Check after replacing Mot_Pul board 3.Check after replacing Probe cable 4. If the trouble is continued, contact Mcube technology service center.	Contact Mcube technology service center.
6	Reserved	Contact Mcube technology service center.	Contact Mcube technology service center.
7	Abnormal data	1.Check after replacing ASP board 2.Check after replacing Probe cable	Contact Mcube technology service center.
8	Weak signal	1.Check the target assembly; Check if the screws are correctly fastened 2.Check the water level of the **CalKit** is enough 3.Check after replacing Probe head	1. Check the center surface of the phantom has enough water 2. Check after replacing the Probe head 3.Check after replacing ASP board

Error Code	Description	Actions	
		CalKit	Phantom
		4.Check after replacing ASP board 5.Check after replacing Mot_Pul board 6. If the trouble is continued, contact Mcube technology service center.	4.Check after replacing Mot_Pul board 5. If the trouble is continued, contact Mcube technology service center.
9	Angle Motor Error(1)	1.Check after replacing Probe head 2.Check after replacing Mot_Pul board 3. If the trouble is continued, contact Mcube technology service center.	
10	Angle Motor Error(2)	1.Check after replacing Probe head 2.Check after replacing Mot_Pulboard 3. If the trouble is continued, contact Mcube technology service center.	
11	Distance error from transducer to target	1. Check the cap of the **CalKit**is correctly closed 2. Check Probe scan button is correctly aligned with the arrow mark of the calibration kit 3. Check the target is correctly assembled to the **CalKit** 4. If the trouble is continued,	Contact Mcube technology service center.

Error Code	Description	Actions	
		CalKit	Phantom
		contact Mcube technology service center.	
12	Too low echo signal	1. Confirm that the air bubble is absent. 2. Replace Mot_Pul board 3. Replace ASP B/D 4. Replace Probe Head 5. If the trouble is continued, contact Mcube technology service center.	1. Check the saline or water on the phantom 2. Replace Mot_Pul board 3. Replace ASP board 4. Replace Probe Head 5. If the trouble is continued, contact Mcube technology service center.
13	Too high echo signal	1. Check if **Calkit** was filled with proper solution 2. Check if **Calkit** target is sticked with foreign substance. 3. If the trouble is continued, contact Mcube technology service center.	Contact Mcube technology service center.
14	Reserved	Contact Mcube technology service center.	Contact Mcube technology service center.
15	Measured volume value is different reference value.	Contact Mcube technology service center.	1. Measure the volume of Calibration phantom by the other normal BioCon-700 to

Error Code	Description	Actions	
		CalKit	Phantom
			see if the scan result is normal 2. Check after replacing ASP board 3. Check after replacing Probe Head 4. If the trouble is continued, contact Mcube technology service center.
16	Probe data transmission error Or Angle motor error	1. Replace Probe Cable 2. Replace Probe Head 3. Replace Mot_PulB/D 4. If the trouble is continued, contact Mcube technology service center.	
17	Error in detection of bladder phantom sides.	Contact Mcube technology service center.	1. Replace Probe Cable 2. Replace Probe Head 3. Replace Mot_Pul 4. If the trouble is continued, contact Mcube technology service center.

Error Code	Description	Actions	
		CalKit	Phantom
18	No Limit switch signal or Motor Error	1. Replace Probe Cable 2. Replace Probe Head 3. Replace Mot_Pul board 4. If the trouble is continued, contact Mcube technology service center.	1. Replace Probe Head 2. ReplaceMot_Pul board 3. Replace Probe cable 4.Contact Mcube technology service center.

6 Maintenance

6.1 Battery Care

Do not overcharge the battery and avoid deep discharges. To lengthen the battery's lifetime, use the system while the battery is between 25%~75%.

The BioCon-700 does draw power from the battery even while powered off. To avoid deep discharge, disconnect the battery from the system if it will not be used for more than a week. When storing the battery, pre-charging to about 75% is recommended.

6.2 Cleaning & Disinfection

Please refer to the section 8.1 of BioCon-750's operator' manual.

6.3 Weekly Inspection

a) Try to scan with the probe disconnected, check if the "NO SCANHEAD" message is displayed on the main display.
b) Thoroughly inspect the probe if it has any cracks or leakage.
c) Inspect the probe cable for any damage.
d) When scanning, check out any abnormal noise emanating from the probe head.

6.4 Device Repair

Faults not described in section "6. Troubleshooting" are intended to be serviced by a certified technician. In the event a situation outside of those described in the section occurs, contact an authorized servicer or Mcube Technology for servicing.

6.5 Disposal

The device and accessories may contain environmentally hazardous materials (mineral oil, lead, battery pack, etc). When they have reached the end of its useful service life, return them to the Mcube Technology, or follow your local regulations for hazardous waste disposal.

7 Glossary

B-Mode	A kind of ultrasound imaging mode. Displays the brightness information corresponding to the amplitude of the signal.
Console	The main device with the LCD display.
Contextual menu	The menu displayed in the bottom of LCD based on the system state.
Session	The time a user starts to scan on Top Screen, to right before returning to the Top Screen again.
Transducer	Device that transforms one form of energy into another form of energy. Ultrasound transducer transforms electric energy into acoustic energy and vice versa. Transducer in this guide means ultrasound transducer.
Calkit	Test kit designed by Mcube Technology Co., Ltd. to investigate if CUBEscan products work fine.
fill-mark	The desired level of filling **Calkit** with saline or water.

CUBEscan™
BioCon-700

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