Lab Companion

OPERATION MAUNAL
Overhead Stirrer

Models : MSH-0512, MSH-0520
Manual No. :3714125L002 Version : 0.0

JEIO TECH

Lab Companion

⚠WARNING

Before using this product, read this entire Operator's Manual carefully. Users should follow all of the Operational Guidelines contained in this Manual and take all necessary safety precautions while using this product. Failure to follow these guidelines could result in potentially irreparable bodily harm and/or property damage.

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Lab Companion

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1.0 Safety

1.1 How to use the Manual

This operation manual describes the important subjects to maintain the product's functions and to use it safely. Especially, be sure to read <Safety Precaution> carefully before you use this equipment.
Please keep this manual close to the equipment to use it after reading through it once. Please place it where the new user can find it easily for the safety use when you hand over or lend the equipment to others.

1.2 Symbols used in this Manual

(1) The alert marks are for safety operation and protect user and instrument from Damage.

(2) Signal word panels are a method for calling attention to a safety messages or property damage messages and designate a degree or level of hazard seriousness.

(3) Pay attention enough to the contents of alert marks.

Signal word panels	Uses
⚠ DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury
⚠WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a property damage message.

1.3 Exemption for responsibility

(1) The claim which is out of the quality guaranteed by the manufacturer is out of manufacturer's responsibility.
(2) The damage which is from unexpected fault or damage of user by Acts of God is out of Manufacturer's responsibility

1.4 Warning statement

⚠WARNING
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

Observe all warning labels.

DO NOT remove warning labels.

DO NOT move machine during the operating.

DO NOT use or keep flammable gases near the product.

DO NOT install the Product near environments where flammable gas may leak.

DO NOT use the machine near environments where explosion can occur due to organic evaporating gases.

Do not inject any liquid and inflammable things inside of product.

Check the power voltage, phase (Phase), capacity and connect it correctly.

Be sure to use the power it has been ground.

DO NOT expose the Product to direct sunlight.

DO NOT expose the Product to direct heat sources.

DO NOT install the machine in the high humidity or water leakage place.

DO NOT use the machine near environments in industrial toxic gases, smoke, metal dust.

DO NOT operate the Product when there is strange sound, smell and smoke coming from the unit.

DO NOT disassemble, fix or change the Product other than for those items described in this operating manual.

1.5 Caution statement

⚠ CAUTION
Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury..

After use, be sure to turn off the main power switch and unplug the power cord after.

Do not put heavy things on the power line. Do not put the machine on the line.

Do not touch it with wet hands and put the main plug correctly.

Do not inject any Conductive thing and inflammable things inside of product.

Do not pure water or put liquid on the top of the product when cleaning.

Do not install the product near machinery generating high frequency noise

Do not sprinkle insecticide or flammable spray on the product. Use smooth cloths.

Please power off while product cleaning.

Electrical shock

Do not take the device apart deliberately.

No water.

No corrosive fluid or cleaners

Wear goggles.

Wear a face mask.

2.0 Functional Description

2.1 Introductions

This **MSH series** usually allows to use mixture and homogenization in cosmetics manufacturing, pharmaceutical, manufacturing of paints field; property of liquid matters, fine powder and liquid with the viscosity of the material.

2.2 Features

2.2.1 Excellent performance

(1) Product operating information and state can be shown conveniently by color touch screen and dial knob.

(2) The product can be shown torque which is measured operating

(3) It has the function of measuring and displaying the torque which is generated during rotating, and adjustment of torque.1

(4) During the operating, the products designed by minimize heat generation for efficient radiant heat.

(5) Aluminum die-casting body is sturdy and efficiently emits the heat generated.

(6) During sample viscosity change, the product provide the uniform RPM by feedback control.

2.2.2 Safety

(1) Motor temperature condition is indicated on display by three different colors to protect motor. When the motor is overheated, it stops stirring operation step by step.

(2) Best effort function intelligently manages its stirring speed to keep stirring even workload is out of its capacity.

(3) Smooth start function prevents spills from sample.

2.2.3 Convenience

(1) Compact and slim head design offers convenience in the experimental setup.

(2) Timer and Run time indicated

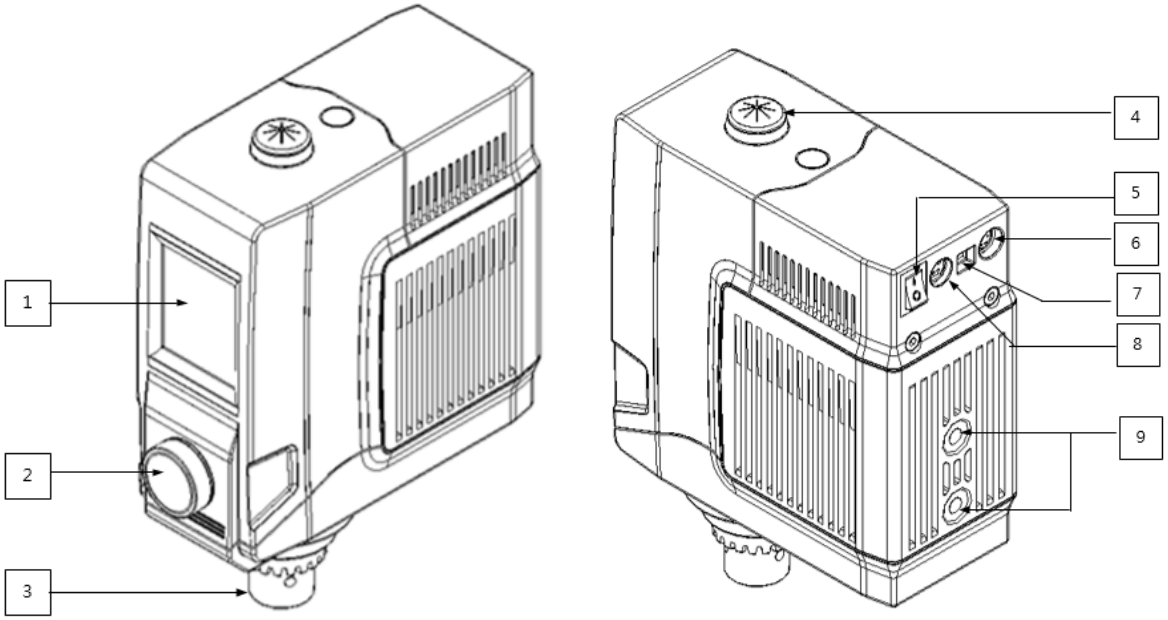
(3) Communication serial port and USB port are provided for external control and data collection.

(4) Screen lock function prevents accidental changes during operation.

(5) Stirring directions (CW↔CCW) are selectable depending on each impeller's shape and the set direction is visible on display.

(6) Various accessories are available such as basic stand, dial stand, impellers, and external controller. (optional)

2.3 Construction



[MSH-0512/0520]

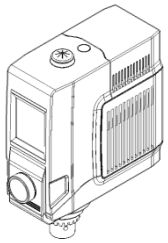
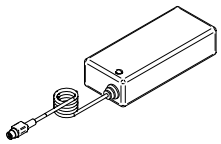
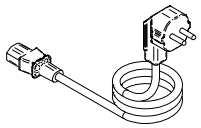
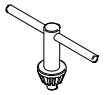
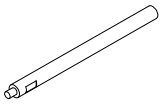
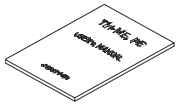
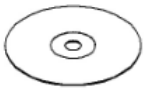
(1) **Touch Display(TFT-LCD):** Display for operating status and condition and set for screen lock or timer.
(2) **Dial Knob:** Set of rotating speed and operating.
(3) **Chuck:** Assembling the Impeller' Shaft.
(4) **Hollow shaft**: Hole that impeller shaft passes through.
(5) **Main power**
(6) **Serial port**
(7) **USB port**
(8) **Power socket**
(9) **Attaching rod connection (Hole for attaching rod)**

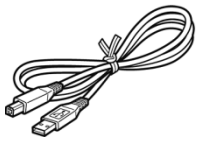
3.0 Installation

3.1 Components

After unpacking, please check the contents to ensure you have received all of the following unit components. Also, check the identification plate on the side of the unit to make sure you received the model number your ordered.

If you didn't receive one or more of the components or if the model is incorrect, contact your local Jeio Tech office, or the distributor from which the unit was purchased. Refer to 10.3 Warranty for Jeio Tech office information.

Item	Figure	Quantity	Description
Main body		1	-
Adapter		1	
Power cord		1	
Chuck handle		1	-
Attaching rod		1	-
Spanner		1	10mm/13mm
Operation Manual		1	
Software CD		1	-

Cable for Communication (USB)		1	-

3.2 Preparing before installation

3.2.1 Environmental setting

The unit can be operated properly under the following environmental conditions for a long time running without any problem.

No direct sunlight.

Please keep Ambient temperature 5℃~40℃

(The Optimum temperature is 25 ℃)

Relative humidity not to exceed 80%

Altitude not to exceed 2000m (6,562 feet)

3.2.2 Space requirements

(1) Please install on the sturdy surface laboratory which is set safety facility and make sure horizontal align correctly.

(2) When you install it, minimum space (over than 30 Cm in usual) required from other objects.

(3) Do not use the Product near environments where flammable gas may leak.

(4) Do not use the Product near machinery generating high frequency noise.

(5) Do not use the Product in short-circuit, leakage, and flooding place.

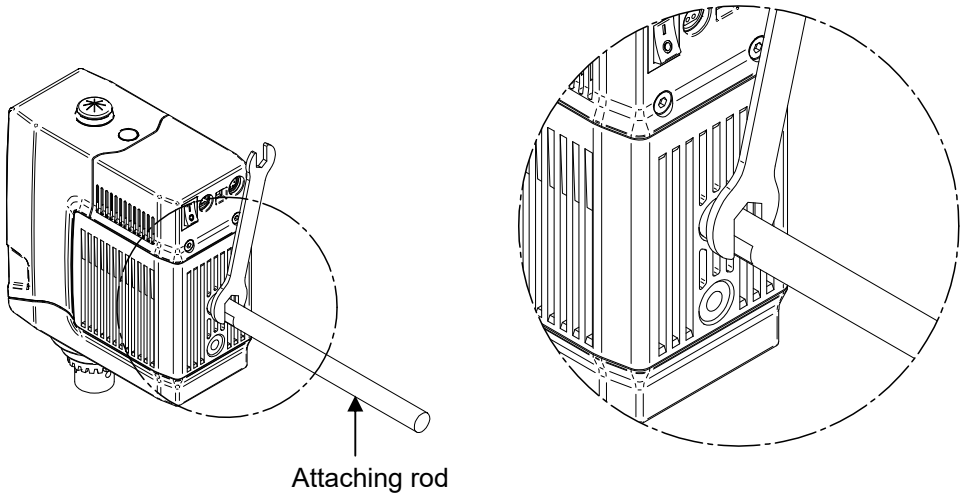
(6) Do not use Product in environments that contain industrial oil smoke and metallic dust.

⚠WARNING

Avoid use in places where the heat source or direct sunlight. It can cause abnormal equipment operation or performance degradation.

3.3 Installation of main body

3.1.1 Attaching rod connection



As above, one basic shaft must be turned on the right and fixed it tight by using spanner 13mm.
In case of dial stand use, it must be connected to the specialized attaching rod.

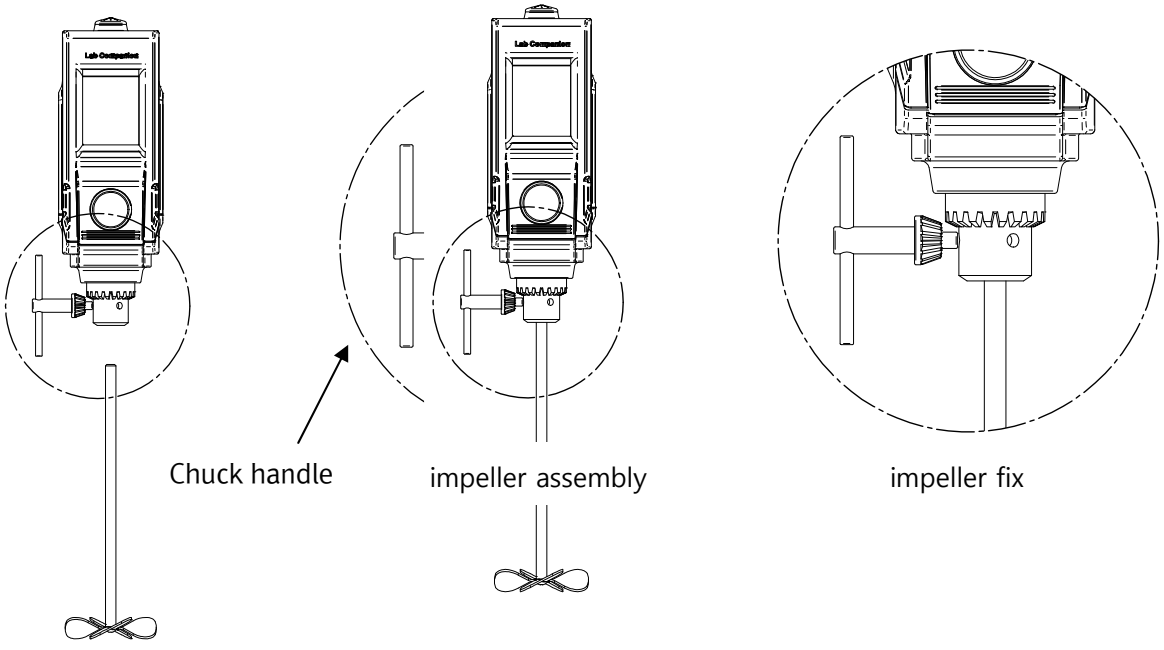
3.1.2 Fixing it to stand

Fix the the joint port of attaching rod and the main body by clamp at the proper position.
(Refer to 8.0 Accessories)

3.1.3 Assembling the impeller

(1) As the figure, loosen the jaw of the chuck counterclockwise by using chuck handle.

(2) As the figure, insert the impeller into the chuck, and turn it up clockwise until it's fixed tight by using chuck handle.



NOTICE

There are 3 holes in the chuck. As above, turn it up in 3 holes turns in the chuck until locking when assembling.

⚠ CAUTION

Imbalance of the impeller and the chuck and in particular the stirring tools can lead to uncontrolled resonant vibration behavior of the unit and the whole assembly. Take care to ensure that the center of the impeller is positioned properly to the chuck

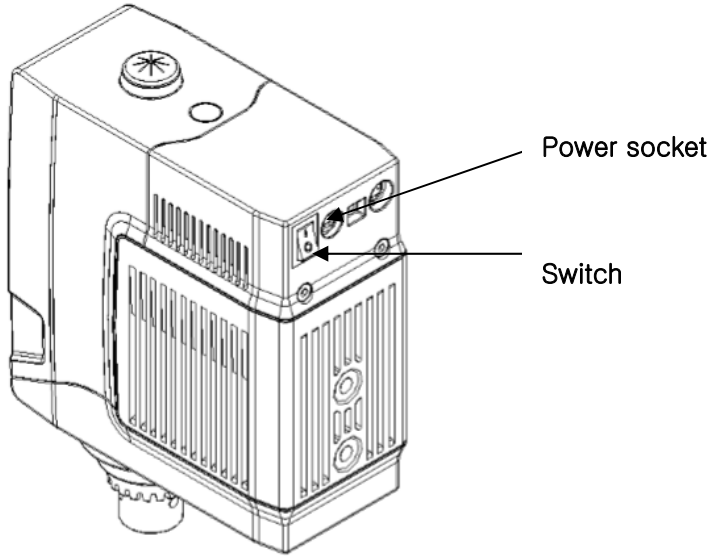
3.4 Power connection

Connect the electric power to the unit according to the following process.

(1) Turn off the switch before power supply.

(2) Connect DC plug of the power cord on the socket located on the back side of the unit.

(3) Connect the power cord to the consent.



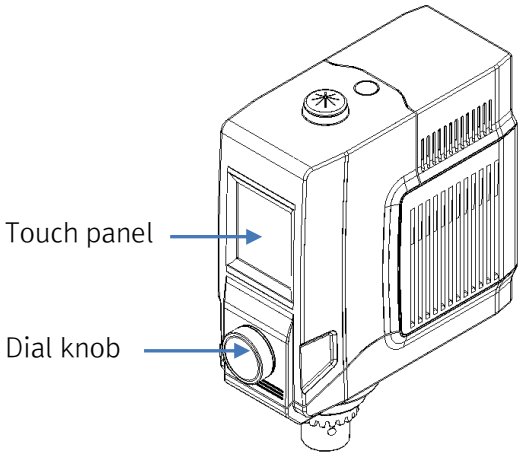
⚠WARNING

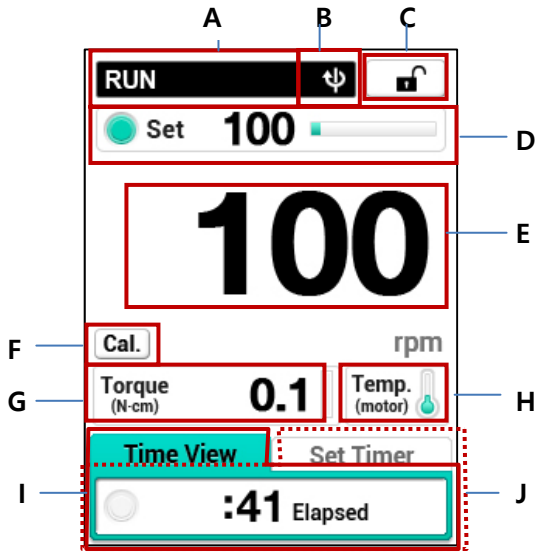
- Electrical Shock Hazard.
- Check to make sure that the correct line voltage, phase and capacity correspond to them specified on the identification plate.
- Do not use the branch socket, extension tap. It cause of cable damager, fire by overcurrent.
- Incorrect power line will cause the product damage or personal injury.
- Do not touch the unit or plug with wet hands.
- Make sure the power should be connect second grade ground

4.0 Operation

4.1 Touch panel & Dial knob

MSH series, colorful touch screen applied is easy to set the value or operate with touch penal and dial knob and also easy to check the various operating status on the screen.





(1) Touch panel

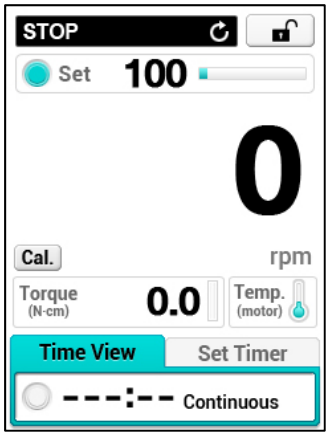
A	Operating Status	RUN, STOP, BEST EFFORT, Time End
B	Direction of the motor circling	CW: ψ CCW : ψ
C	LOCK	Display lock function
D	Set value of RPM	Display the set value of the RPM. In the case of the circle in front of the Set is blue, change and put the value is available.
E	Present value of RPM	Display present value of RPM
F	Cal.	Calibrating the torque value as 0.0
G	Torque	Display the torque of the motor during the operating
H	Temp. of the motor	Display the temp. of the motor with blue(normal)~ yellow~orange(overtemp)
I	Time View	Display the time after starting the stirring
J	Set Timer	Set the timer

(2) Dial knob: set the value with turning it left and right and save the value with pushing it.

4.2 How to operate

4.2.1 Supply the power

Switch on then the Jeiotech logo is appeared and then beep generated with initial display.



4.2.2 Start and Stop

(1) Push the dial knob then the stirring is started.
The display changed from STOP→RUN.
(2) Set the rpm with turning the dial knob left and right. Check whether the rpm reaches to the set point.
(3) Push the dial knob during the operating, the rpm is slowly decreased and the stirring is stopped.

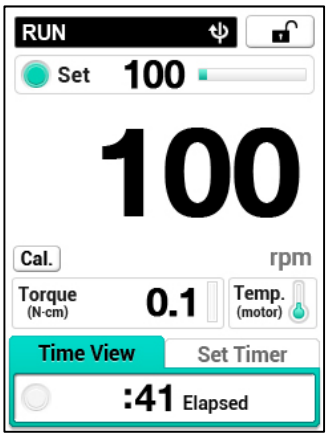
4.2.3 Display and calibrate the torque

MSH measure the torque generated from the shaft of the impellor and display the value. It is available to calibrate the torque display as '0' for the accuracy of the torque value. Calibration function is useful when the common set rpm is changed. In the case of the calibration is needed, follow below steps.

(1) Operate the unit with max. rpm for the warming up of the motor.
(2) Set the rpm.
(3) Push the dial knob and stop the stirring.
(4) Separate the stirrer and impellor from the sample or separate the impellor from the chuck so that no load is on the motor.
(5) Push the dial knob and operate the stirrer with (2) set rpm.
(6) Touch the Cal. button and check whether 0.0Ncm is on the display or no.
(7) Stop the stirrer pushing the dial knob after check the 0.0Ncm on the display.
(8) Install the impellor and soak the impellor in the sample.
(9) Stirring the sample and check the torque on the display.

4.2.4 TIMER

MSH shows the elapsed time from shaking start time on bottom part of display.



. (:41means 41sec elapsed, 0:41means 41min elapsed)

In case of machine stop after a certain amount of shaking time, user can use the timer function as below.

(1) Press “Set Timer” on the lower right-hand corner of display.
Konb icon on left side of timer area is activated ( )and Knob icon on shaking set –up area is not deactivated.
(2) Turn dial knob from side to side for time setting
(3) Timer setting is completed when press the dial knob.
Setting time and Timer ON is displayed on “Time View” tab.
(If user set up timer during shaking operation, remaining time and Remain is displayed after Timer setting)
After timer setting is completed, Konb icon in Timer area is deactivated ( ), Konb icon in shaking setting area is activated.
(4) Once the setting time is completed, “TIMER End” is displayed.
To return standby display, turn or press the dial knob or touch the screen.

NOTICE

MSH series has the function that save the latest operation status (Timer ON/ Continuous)
User can set up Timer save function from Setup User of System Setup (Refer to 4.3 SETUP USER, Prev. Mode Save)

- In case of save function operation, the machine maintains Timer ON status if the machine is stopped during Timer operation
- In case of No save function operation, the machine status will be Continuous if the machine is stopped during Timer operation

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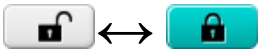
4.2.5 Input setting restriction

To restrict input by touch screen tab and shaking speed change by dial knob, please refer to the below.

(1) Operate the machine with shaking.

(2) Press “LOCK” button on right upper side.

If “LOCK” button color is changed as blue, touch screen and dial knob is become to deactivated.



During “LOCK” status, “LOCK” function is cancelled if press “LOCK” button

NOTICE

In case of Lock function is activated, setting value change by dial knob and touch button function is deactivated.
But the machine can be stopped once press dial knob even lock function is activated.

4.3 SETUP USER

MSH series provide the user setting function as below.
To enter user setting mode, turn power switch on during press the dial knob.
Once the clause selection on display appears, please take away fingers from knob.
Please select setup user by dial knob

1	Knob Resolution	In case of shaking speed setting, increased or decreased by setting unit • Unit: 1, 5, 10, 20
2	BE Inc. SV	In case of Best Effort, shaking speed increase step • Unit: 1~10
3	Ramp UP Level	Shaking increase speed control (1~10 steps)
4	Ramp DOWN Level	Shaking decrease speed control (1~10 steps)
5	Prev. Mode Save	Save function of the latest operation (Timer ON/ Continuous)
6	Motor Direction	Select of Motor sense of rotation CW(Clockwise rotation), CCW(Counter clock wise) In case of change, please be careful to impeller’s directional nature.
7	Sound Notice ON	Select of system sound mute
8	Sound Err. ON	Select of sound mute in case of system error
9	Touch Calibration	Calibration of touch screen coordinate
10	Set Touch Default	Setting touch screen as default value
11	Set Default	Return to user’s setting value to default value
12	Save Option	Save setting change value
13	System Reset	System rebooting

5.0 Safety functions

MSH Series are designed for user safety with the safety functions as mentioned below to prevent damage on products due to overload, overheating caused by stirring high viscosity material for a long time.

5.1 Best Effort mode

MSH Series has 'Best Effort Mode' to protect the sample (application) without stopping,

Generally, overhead stirrer would stop in over-operation regarding set value of stirring, viscosity then it would influence on sample (application).

RUN(Best Effort) shows up on display when over-current or over-load happened to slow down stirring speed to continue stirring.

Even though RUN(Best Effort) shows up, there is no change in RPM because it is internally controlled.

The RPM is gradually getting up to setting value as the user condition gets better like stirring done.

5.2 Overload device

'Overload stop' shows up as below and operation stops when over load due to stirring a mess of high viscosity material which would cause over load.

5.3 Overheating protection

'Over-temp Stop' shows up as below and operation stops when overheating.

MSH Series has the small fan to prevent overheating of motor.

'Fan check Stop' shows up as below when problem happened with the fan and then operation stops

NOTICE

- In case of over-heating or over-loading, turn off the power and cool down sufficiently -to re-start operation or else overheating protection starts without operation.
- When safety devices ring, turn off & unplug and then, re-start after cooling completely.

6.0 Maintenance

6.1 Inspection cycle

Classification	Inspection cycle	
	Daily	Weekly
General		
Power cord		
- - Inspect power cord connection at unit and receptacle.	●	
- Inspect power cord for wear, cracks or cuts.	●	
Stand and accessories cleaning		●
Surface cleaning on the unit		●
Main body		
Controller function		●
Motor on/off checking	●	
Motor speed checking	●	
Attachment assembly checking	●	

6.2 Cleaning

The unit maintains the best condition and operates with full efficiency and extend the life expectancy, only satisfied with periodical cleaning. We suggest that checking cleanliness every day, cleaning the chamber once a week, cleaning the surface of the unit once a month. And immediate cleaning is required when the unit is contaminated.

6.2.1 Cleaning the Unit

Unplug the power cord and clean it with soft and dry towel. Rub the unremoved part, using alcohol solvent (methanol, ethanol) with towel.

⚠ CAUTION

- Do not immerse the unit in water to clean up
- Please take notice not to get damage with parts inside or system
- Please take notice that main body is not being contact from Strong acids or strong alkalis or acetone, benzene, phenol, toluene, chloroform, cresol, affiliate acetic acid, affiliate chlorine.
- Do not use detergent which includes chlorine, abrasive, ammonia
- Please unplug when it is not used.
- Please move it after unplug.

6.2.2 Accessories

Keep the unit clean always by cleaning the unit with a dry soft cloth before and after using.

6.3 Storage

In case of not using long time

(1) Unplug the unit from the main power.

(2) Clean the unit with a soft cloth neatly.

(3) Store in a dry place after packing

7.0 Trouble shooting

Check the below statement and take action according to the instruction.
If the unindicated problems arise or you cannot solve the problem with the instruction

7.1 Power

Trouble	Causes	Solution
The unit does not turn on	• Incorrect electric power	• Compare power source and voltage on the ID plate and make sure they are the same. ID plate is found on the back of unit.
	• Power failure or circuit breaker shuts down	• Find out the causes of power failure and recovery. also find the cause of power failure and recovery when break circuit is down
	• Main plug not seated properly.	• Check the electrical cord connection at the unit to ensure it is fully seated.
	• Socket / plug / main power line might be cut	• If the socket / plug / main power line are cut, request service.
	• PCB has damaged by reagent	• Request service.
Room circuit breaker trips often when the unit is turned on or running	• Too many plugs connect at the same time	• Check the circuit breaker size along with the voltage and current supplied to it. • Check that several similar units are inserted together, if so you should not use overly.
	• Internal circuit fault	• Asking after sales service
It does not work even though Power is supplied	• Working Overheat protection system	• Restart after cooling.
	• Internal circuit fault	• Asking after sales service

7.2 Malfunction on operation

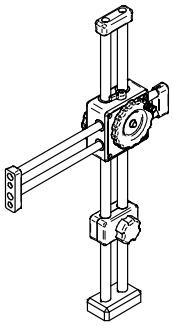
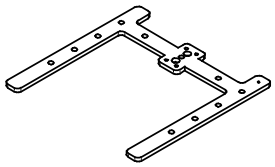
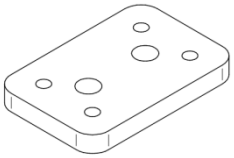
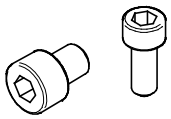
Trouble	Causes	Solution
Solution cannot be mixed up very well	• Too many soultion	• Reduce the volume, or speed up rpm
	• High density of solution(solvent) in flask..	• High density of solution(solvent) may not be mixed up very well
Stopping operation	• Overheat protection system.	• Restart after cooling
Making sound like touching each other	• Rotation support part is fault	• Asking aftersales service
Dial knobe does not work properly	• Knob fault	• Asking aftersales service
Touch screen errors	• In case of Button Locked	• Checking “Lock” function.
	• Coordinate of touch screen	• User setting(refer to 4.3 SETUP USER) – calibrate it at Touch calibration menu
	• Parts get demage from chemcial or overheat	• Asking aftersales service.

8.0 Accessories

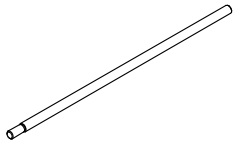
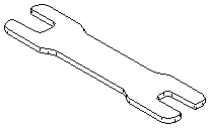
8.1 Advanced dial Stand

(1) It is made of Cast Iron and can be adjusted the height slightly along with 2 axes installed on the solid frame using dial knob.
(2) It can be adjusted the position slightly by dial knob and fixed with small stopper tightly while it is using.
(3) The stand bar for constructing can be fixed firmly on the Main Frame processed several supports with M14-tap. (Optional)

8.1.1 Accessories for advanced dial stand

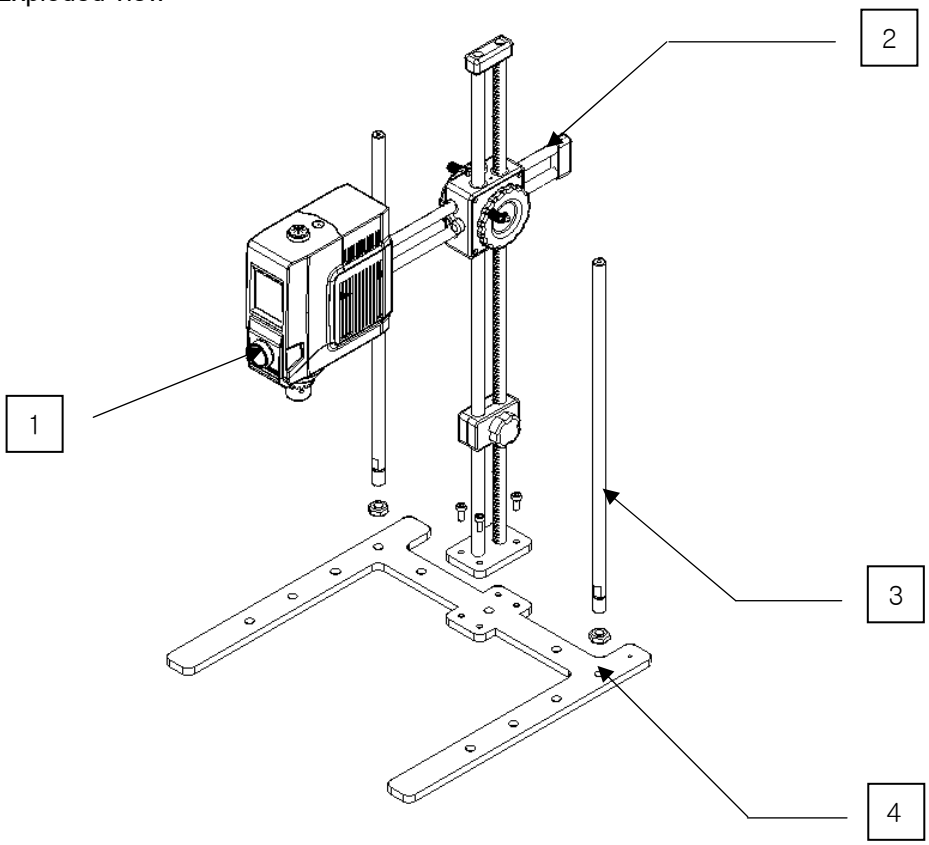
[Dial Stand]	[Base Plate]	[Base Block]
		
[Wrench Bolts]	**[Wrench]**	
 **M8 x 10 2ea** **M6 x 15 4ea**	 **5mm** **6mm**	

8.1.2 Optional Accessories for advanced dial stand

[supporter-500mm]	[Bolt]	[Wrench]
 **Ø15, Ø18, Ø20 (option)**	 M6	 13mm / 10mm

8.1.3 Assembling the advanced Dial stand to the main unit

8.1.3.1 Exploded view



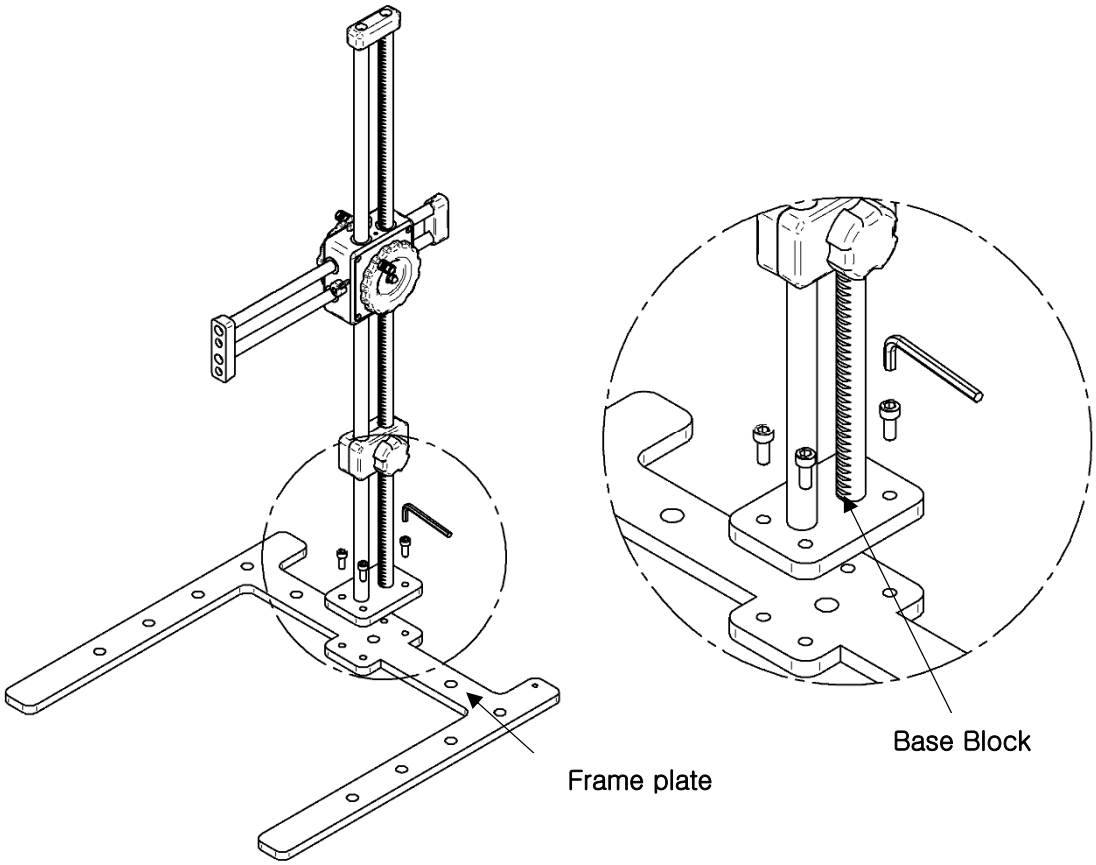
[Figure 8-1]

(1) Head
(2) Dial Stand
(3) Support (500mm-Optional)
(4) Frame Plate

⚠ CAUTION

Please install this unit on a flat, dry and fireproof floor.

8.1.3.2 Assembling Dial Stand



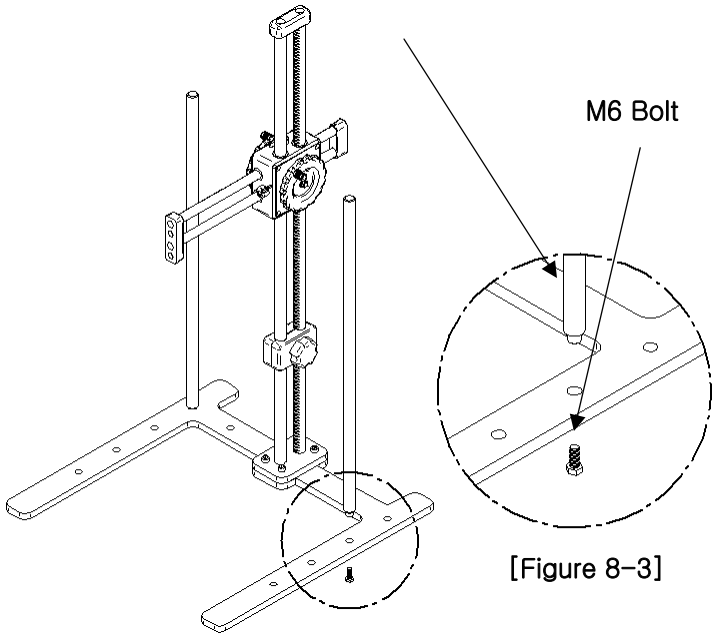
[Figure 8-2]

(1) Position the Base block and base plate of dial stand as shown [figure 8-2]
(2) Turn 4 ea wrench bolt (M6X15) clock wise with 5mm wrench to assemble them.

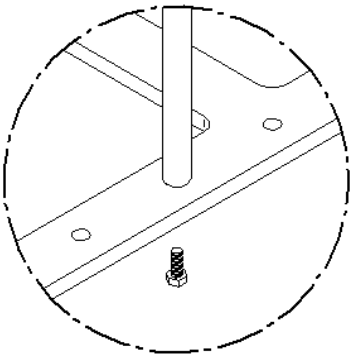
⚠ CAUTION

When you tighten the wrench bolt (M6X15) up, please make sure that 4 bolts are tightened equally. Vibration may occur if the assembling is unbalanced.

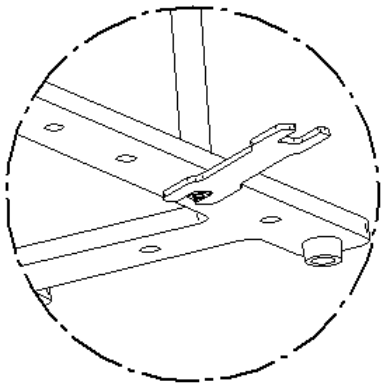
8.1.3.3 Assembling supports (500mm-optional)



[Figure 8-3]



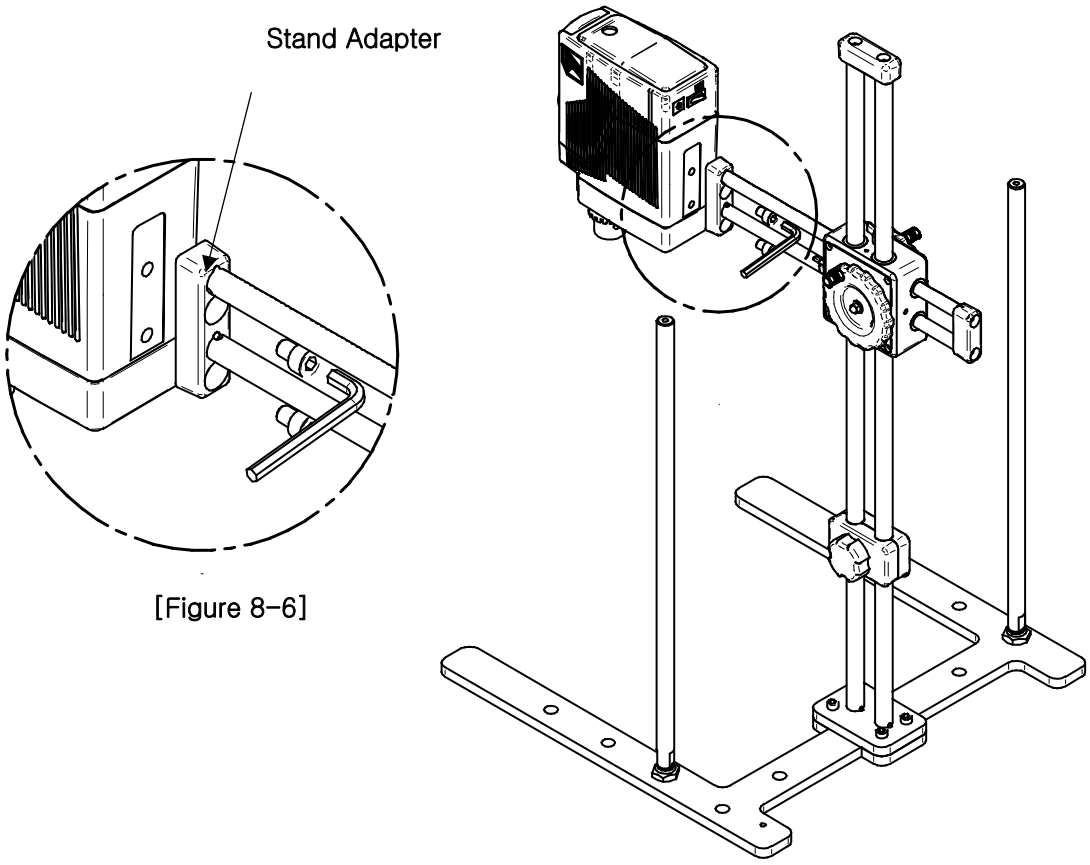
[Figure 8-4]



[Figure 8-5]

(1) Turn 14mm nut into the support clockwise as[Figure 8-3] shown.
(2) Turn the support into the hole of the frame plate clockwise as [Figure 8-4]shown.
(3) Turn M14 nut clockwise with 22mm spanner to assemble a base plate and support as [Figure 8-5] shown.

8.1.3.4 Assembling main body



[Figure 8-6]

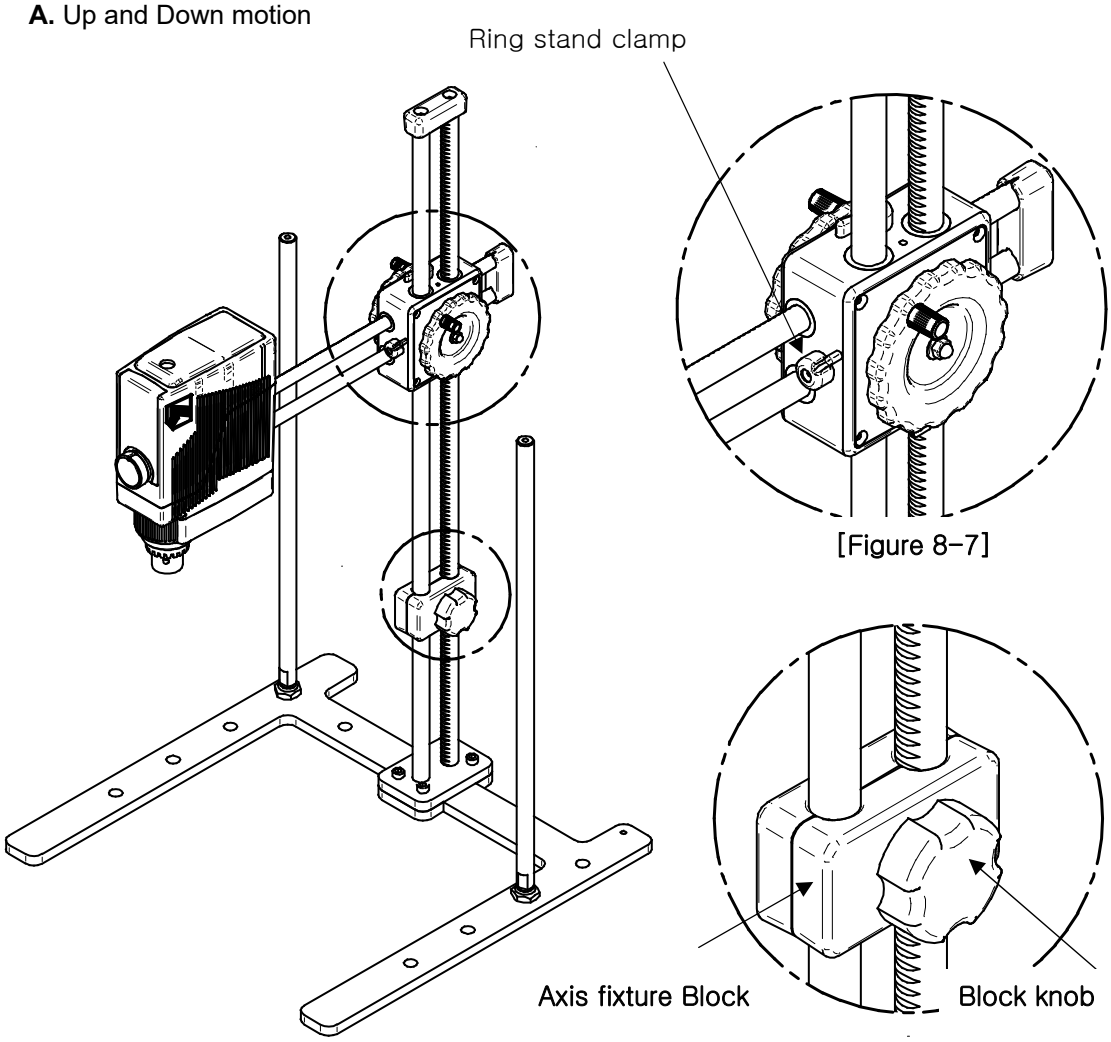
(1) Using a 6 mm wrench handle, insert bolts (M8X10) in the stand adapter and match the stand adapter holes with the (2) holes located at the backside of the head as shown in [Figure 8-6] located above.

⚠ CAUTION

Jeiotech guarantees safety operation of the unit with accessories which are only supplied by Jeiotech.
Unplug Power before you set accessories.

8.1.3.5 How to use advanced type of dial stand

A. Up and Down motion

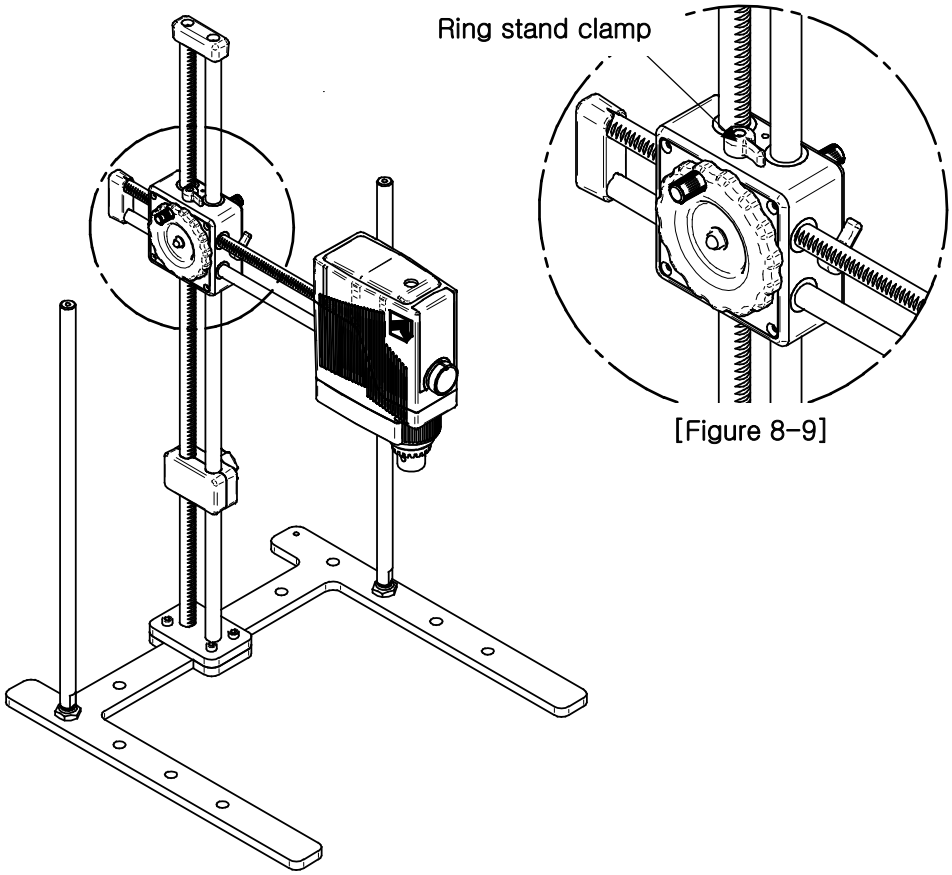


[Figure 8-7]

[Figure 8-8]

(1) Turn the Knob clockwise as [Figure 8-7] above.
(2) Head can be moved to upward or downward by the knob as [Figure 8-7] above. The head moves to upward by turning the knob clockwise, and moves to downward by turning it counterclockwise.
(3) After set the head in a proper position, fix it tightly by turning the knob Counterclockwise.
(4) Turn the block knob of Axis fixture block counterclockwise as [Figure 8-8] above, and position it in the middle between the knob and frame plate.

B. Forward/Backward Movement



[Figure 8-9]

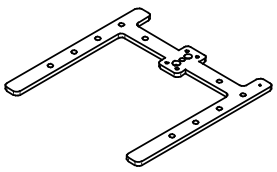
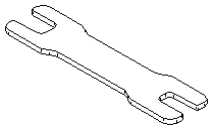
(1) Turn the knob fixture clip counterclockwise as [Figure 8-9] above.
(2) Head can move to upward and downward by dial knob as [Figure 8-9]
It moves to upward if the knob is turned clockwise and downwards if the knob is turned counterclockwise.
(3) After set the head in a proper position, fix it tightly by turning the knob counterclockwise as [Figure 8-9] above.

⚠ CAUTION

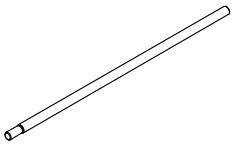
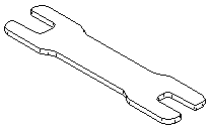
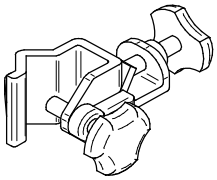
Jeiotech guarantees safety operation of the unit with accessories which are only supplied by Jeiotech.
Unplug Power before you set accessories.

8.2 Basic Stand

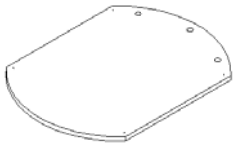
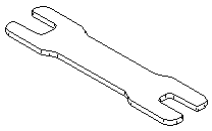
8.2.1 BS-01 Stand accessories

[700mm support]	[Base plate]	[Bolt]
		 M6
[Spanner]		
 13mm / 10mm		

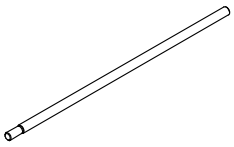
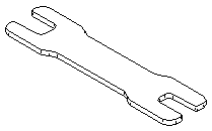
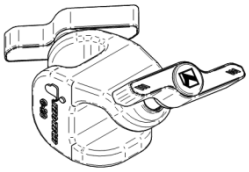
8.2.2 BS-01 Optional Accessories

[500mm support]	[Bolt]	[Spanner]
 **Ø15, Ø18, Ø20 (option)**	 M6	 13mm / 10mm
[Clamp]		
 **(option)**		

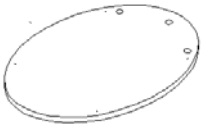
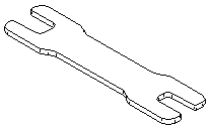
8.2.3 BS-02 Accessories for Stand

[700mm-support]	[Base Plate]	[Bolt]
		 M6
[Spanner]		
 13mm / 10mm		

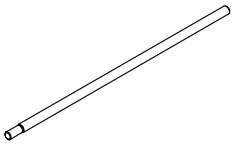
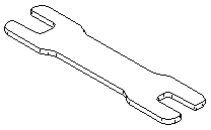
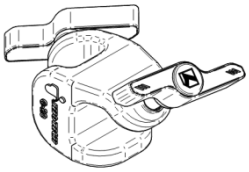
8.2.4 BS-02 Optional Accessories for Stand

[Support-500mm]	[Bolt]	[Spanner]
 **Ø15, Ø18, Ø20 (option)**	 M6	 13mm / 10mm
[Clamp]		
 **(option)**		

8.2.5 BS-03 Accessories for Stand

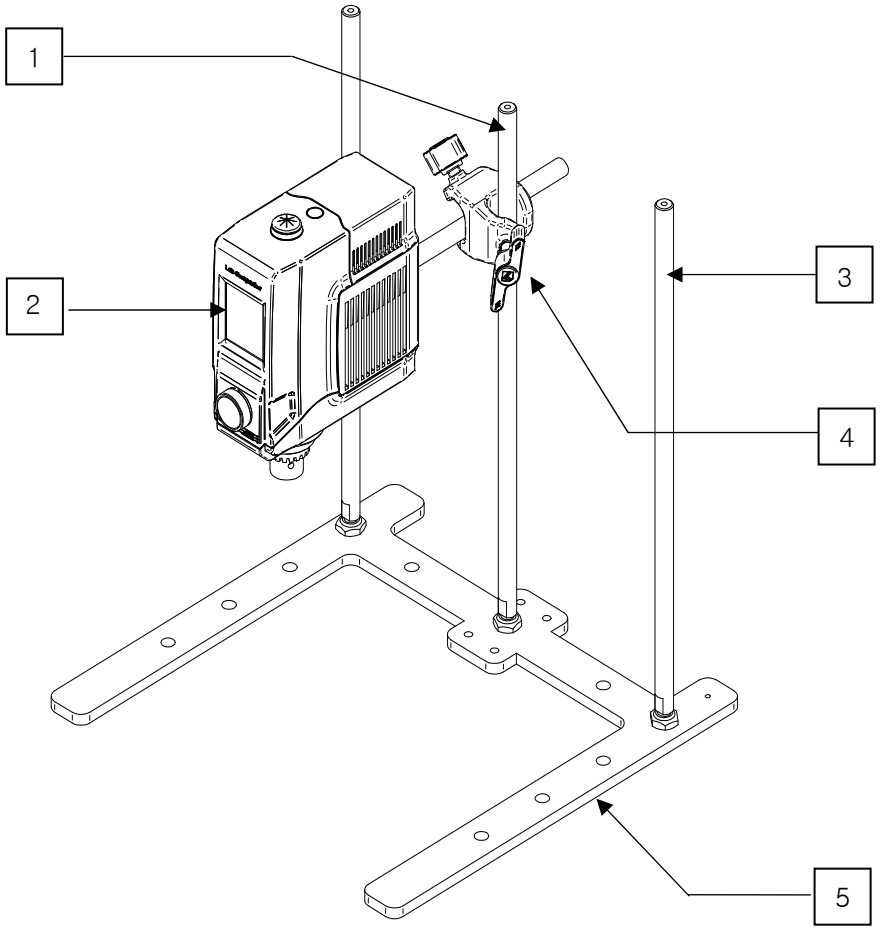
[700mm Support]	[Base Plate]	[Bolt]
		 M6
[Spanner]		
 13mm / 10mm		

8.2.6 BS-03 , BS-02 Optional Accessories for Stand

[Support-500mm]	[Bolt]	[Spanner]
 **Ø15, Ø18, Ø20 (option)**	 M6	 13mm / 10mm
[Clamp]		
 **(option)**		

8.2.7 Assembling Basic(BS-01) Stand

8.2.7.1 Exploded View



(1) Support(700mm)
(2) Head
(3) Support(500mm-Optional)
(4) Clamp(Optional)
(5) Base Plate

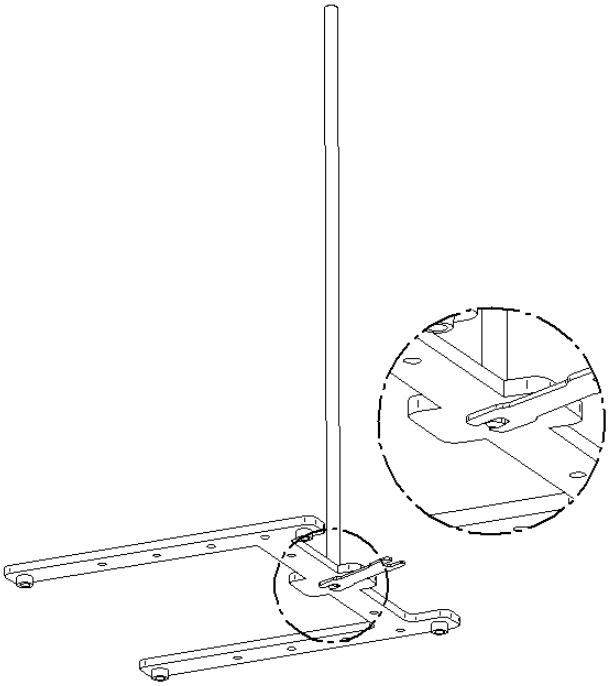
[Figure 8-10]

⚠ CAUTION

Please install this unit on a flat, dry and fireproof floor

8.2.7.2 Assembling Basic (BS-01) Stand

(1) Assemble the support (700mm) into the frame plate with 22, 13mm spanner using M14 nut as [Figure 8-11,12] below.

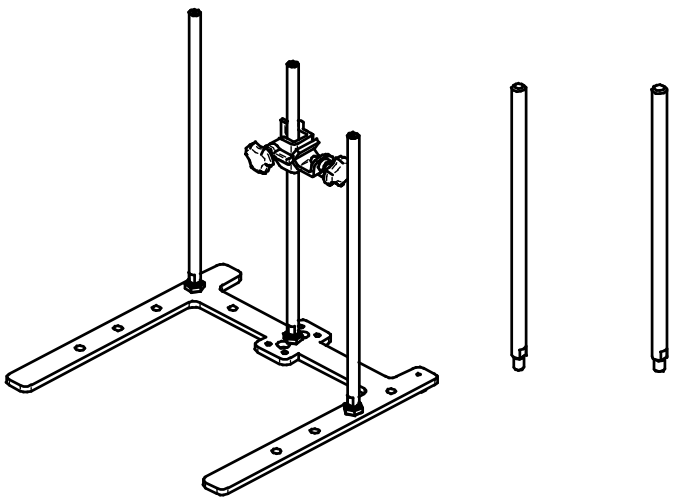


BS-01 Stand

[Figure 8-11]

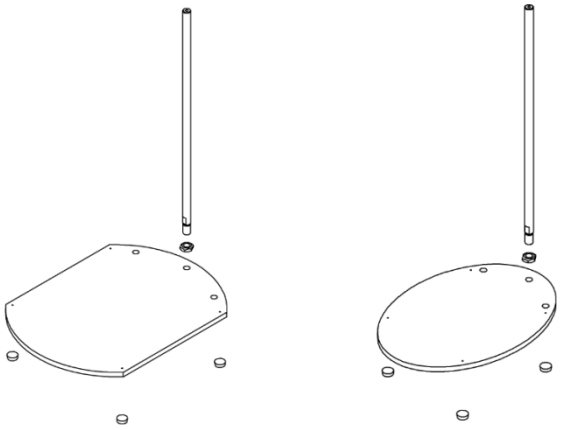
[Figure 8-12]

If you purchase Ø15, Ø18, Ø20 support(500mm) optional accessories and then assemble them with base plate and use it as [figure 8-13] above.



[Figure 8-13]

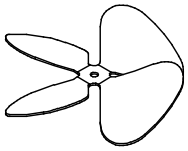
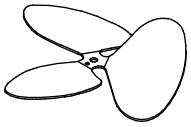
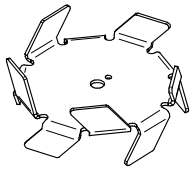
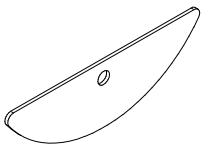
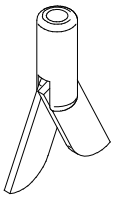
(2) In case of BS-02 stand and BS-03 stand, assemble as [Figure 8-14] below.

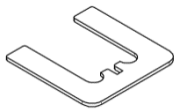
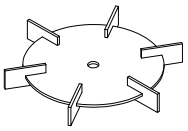
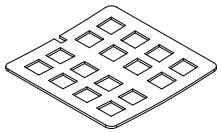


BS-02 Stand BS-03 Stand

[Figure 8-14]

8.3 Impeller

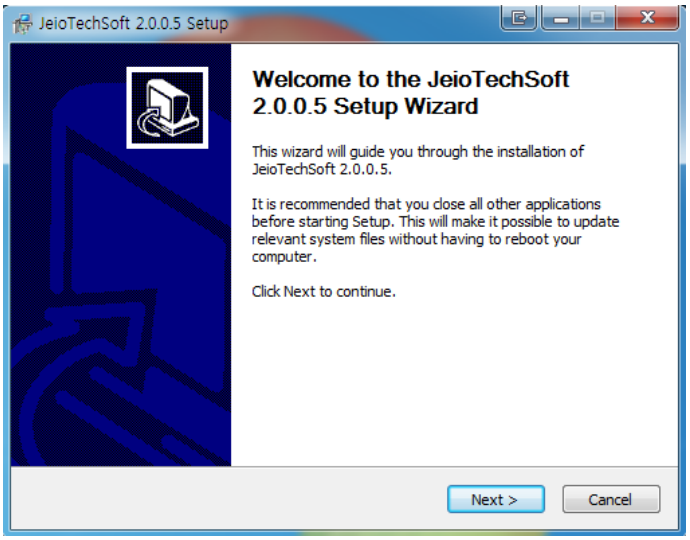
Designation	Materials	Description	Impeller Shaft
	SUS	4 bladed 50mm 4 bladed 70mm 4 bladed 100mm	8Ø, 400mm
	PTFE	4 bladed 50mm 4 bladed 70mm	8Ø, 500mm
	SUS	3 bladed 50mm 3 bladed 70mm 3 bladed 100mm	8Ø, 400mm
	SUS	Dissolve 35mm Dissolve 55mm	8Ø, 400mm
	SUS	Half Moon 65/20mm Half Moon 90/25mm	8Ø, 300mm 8Ø, 500mm
	PTFE	Half Moon 60/18mm	8Ø, 500mm
	SUS	Centrifugal 50mm Centrifugal 80mm (can be folded)	8Ø, 500mm
	PTFE	Centrifugal 76/17mm	8Ø, 500mm

Designation	Materials	Description	Impeller Shaft
	SUS	Anchor 45mm Anchor 60mm	8Ø, 300mm 8Ø, 500mm
	PTFE	Anchor 80/40mm Anchor 80/50mm	8Ø, 500mm
	SUS	Turbine 40mm Turbine 70mm	8Ø, 500mm
	PTFE	Turbine 70mm	8Ø, 500mm
	SUS	Paddle 70mm	8Ø, 500mm
	PTFE	Paddle 70mm Paddle 78/80mm	8Ø, 500mm

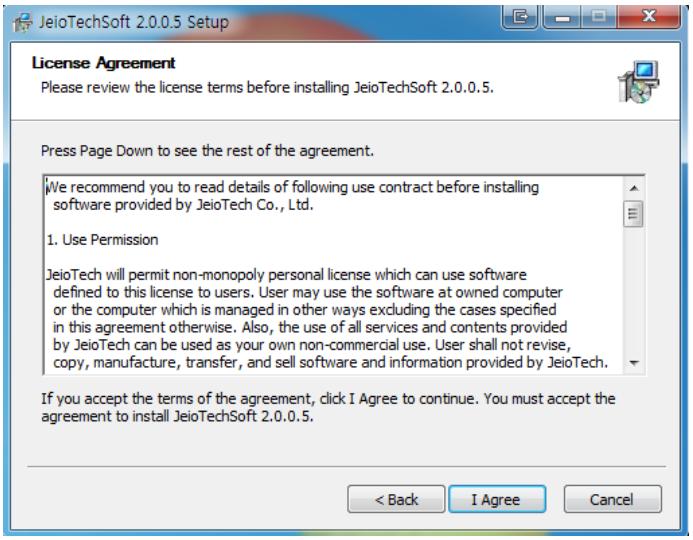
9.0 Exclusive S/W S/W

9.1 Monitoring Program installation

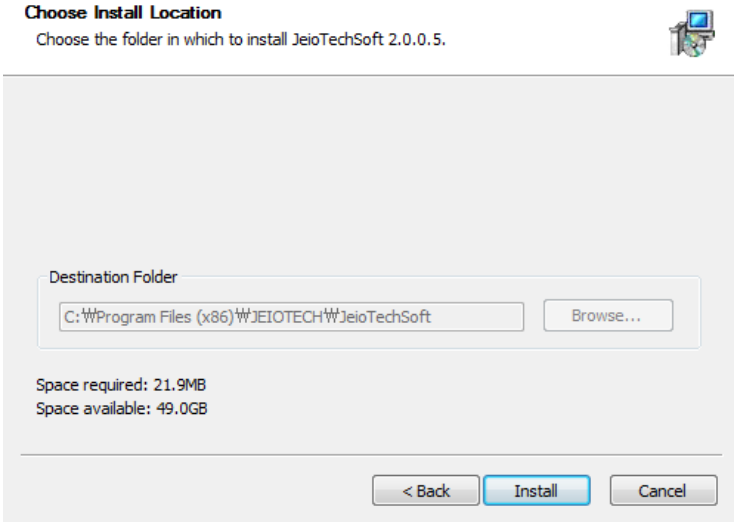
(1) Put the installation CD on the CD-ROM drive then the program is operated automatically. Click the “Next” button go to the License Agreement.



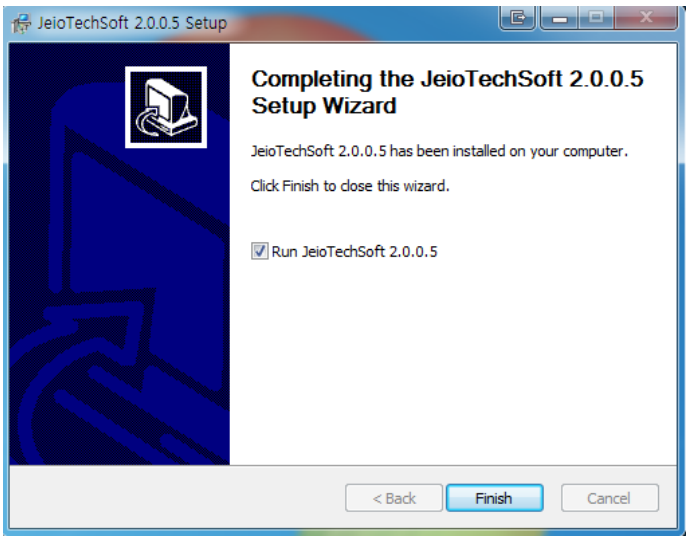
(2) Check the details and click the “I agree”



(3) Click the “Install” and install the program.

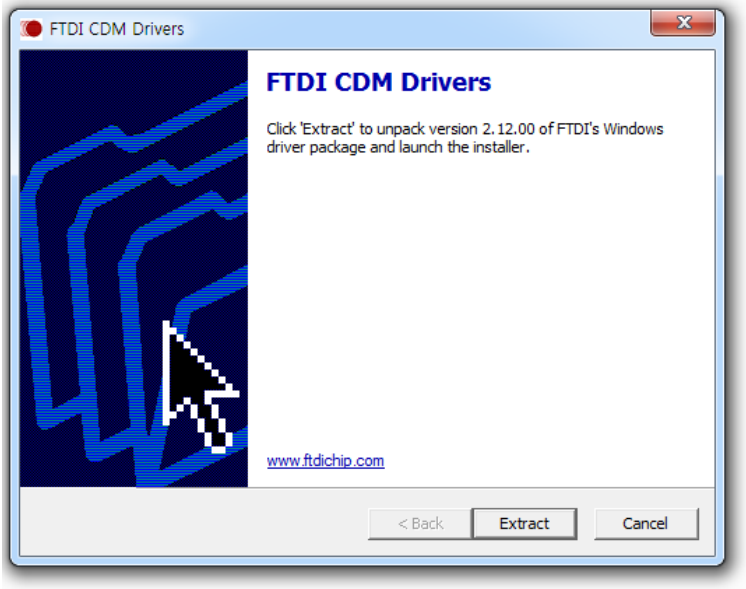


(4) Once the program is installed, below window is up and JeioTechSoft icon is generated on the background.
Check the Run JeioTechSoft 2.0.0.5 or double click the icon then the program starts.



(5) When you connect with equipment and PC by included USB cable, the USB driver is automatically install in PC. In case of USB driver is not install automatically or cannot find on network, please install USB driver file (CDM vx.xx.xx WHQL Certified.exe) which is located in S/W CD. The USB driver software is provided from FTDI company. (please remember that Jeiotech will not be have responsibility from using USB driver software installation and any direct(indirect) damage)

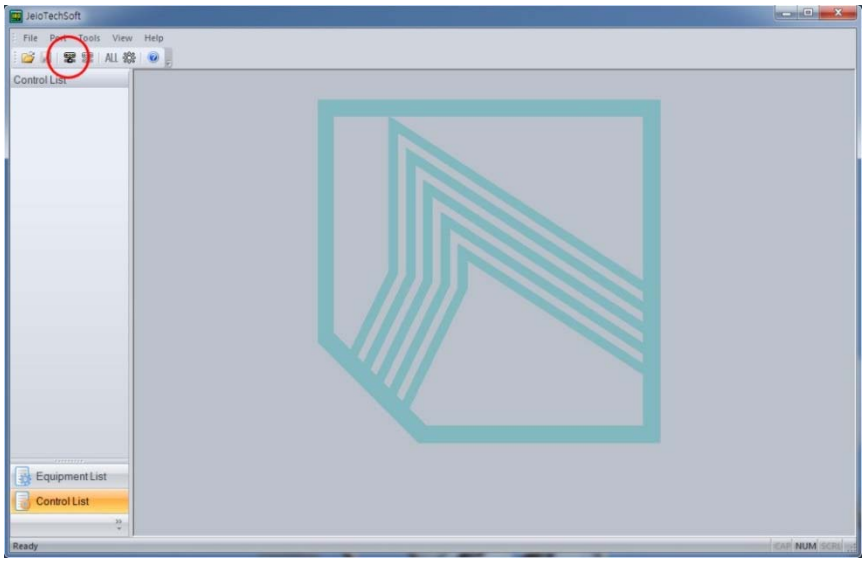
You can download the driver from following URL;
http://www.ftdichip.com/Drivers/D2XX.htm



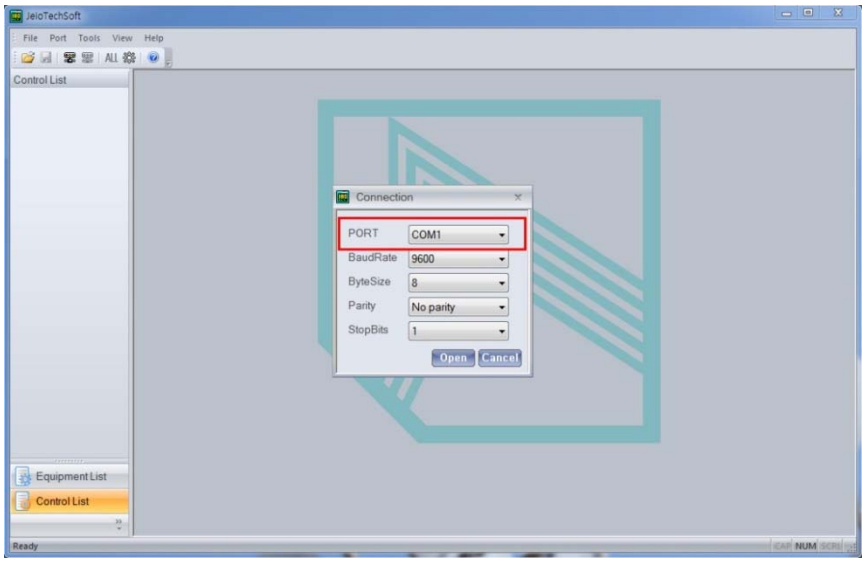
9.2 Program operating and equipment connect

(1) Double Click the operating file ( ) in installed Program folder.

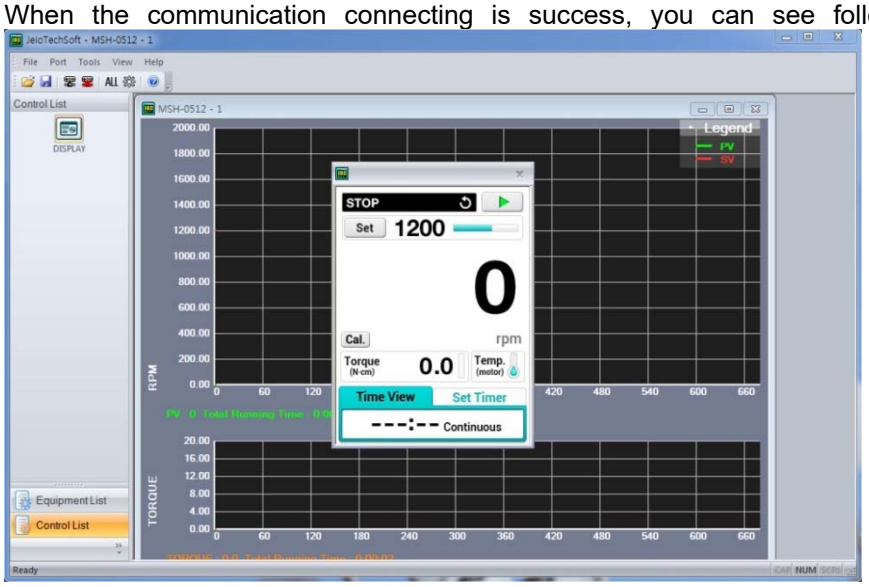
(2) Click the connect icon.



(3) Select the connected communication port.



(4) When the communication connecting is success, you can see follow image screen.



9.3 Communication protocol

It is possible to communication from this product to external device by USB port. Providing Jeiotech software can be supported the both way communication, check the operating status, data recording, and data saving. In addition, if you want to modify the software, please refer below communication protocol and communication reference.

Communication Reference :

http://www.modbus.org/docs/Modbus_Application_Protocol_V1_1b3.pdf

9.3.1 Physical Layer

- Communication port : USB

9.3.2 System number for each model

ITEM	System Number	System	Model Number
Overhead Stirrer series	A120H	Overhead Stirrer-TFT 24V, 3.5A, 41.6N	MSH-0512
			MSH-0520

9.3.3 Modbus Protocol Address Definition

	Register	ModBus Adress (DEC)	Send Real Adress (DEC)	Description	Data	Data Length (byte)
W	WS	1	0	Beep - Test, Sound off	1	2
				Beep - Key sound	2	2
R	RH	2	1	Model Name	Don't Care	2
W	WS	3	2	System Reset(Watch Dog)	Don't Care	2
W	WS	4	3	System Reset	Don't Care	2
W	WS	5	4	Torque offset	0: Clear, 1: Apply	2
W	WS	6	5	Escape Stop State	Don't Care	2

R	RH	7	6	Model Name	Don't Care	2
R	RH	8	7	F/W Version	(ex) 2.5 <=> 0x0205	2
R	RH	9	8	Min rpm	Min rpm	2
R	RH	10	9	Max rpm	Max rpm	2
R	RH	11	10	Max Torque	Max Torque / 10.0	2
R	RH	12	11	Reserved	Reserved	2

R/ W	WS, WM, RI	13	12	Timer Set	분	2
R/ W	WS, WM, RI	14	13	Timer On/Off	0: off, not 0: on	2
R/ W	WS, WM, RI	15	14	Motor run/stop	0: stop, not 0: run	2
R/ W	WS, WM, RI	16	15	SV	Min rpm ~ Max rpm	2
R/ W	WS, WM, RI	17	16	Calibration Value	/10	2

R	RH	18	17	PV		2
R	RH	19	18	Torque	Data / 10	2
R	RH	20	19	Motor Temperature	Integer(0~ 60)	2
R	RH	21	20	Time Tick (Hour)	Hour	2
R	RH	22	21	Time Tick (Min, Sec)	High Byte: Min, Low Byte: Sec	2
R	RH	23	22	Shot Time Tick (Hour)	Hour	2
R	RH	24	23	Shot Time Tick (Min, Sec)	High Byte: Min, Low Byte: Sec	2
R	RH	25	24	Status		2

10.0 Appendix

10.1 Technical Specification

Models			MSH-0512	MSH-0520
Technical data	Stirring capacity (L, H_2O)		100(~1,200rpm)	60 (~2,000rpm)
	Max. RPM at corresponding viscosity*	5,000(cP)	1,200	2,000
		10,000(cP)	1,200	1,600
		30,000(cP)	1,200	600
		50,000(cP)	700	300
	Speed control		Feedback control 50~1,200rpm	Feedback control 50~2,000rpm
	Speed accuracy (No Load)		300~1,200rpm±0.5%	300~2,000rpm±0.5%
	Speed display resolution		Setting: user selectable increment (1/10/50 rpm) Display : 1 rpm	
	Rated torque (N·cm)		41.6	20.8
	Motor type		BLDC	
General data	Motor output(W)		50	
	Control panel		2.8" TFT-Touch-LCD, Dial knob	
	Features		Motor temp/ torque display, Timer 1 min to 99 hrs 59min Selectable cw/ccw	
	Safety device		Thermal protection, current protection	
	Communication port		USB	
	Chuck range(mm/inch)		3~10/0.12~0.39	
	Material		Main body : Cast aluminum alloy, powder coated, Cover : PP	
	Electrical supply		AC 100~240V, 50/60Hz	
	Current consumption(24V, A)		5	
	Dimension(W x D x H, mm/inch)		80 x 181 x 235 / 3.1 x 7.3 x 9.3	
	Net weight(Kg/lbs)		3.1 / 6.8	

* Using 3-bladed propeller impeller, 50Ø

※ The standard value is recorded by 25℃, 60%R.H. conditions.

※ Above spec. can be changed without prior notice.

10.2 Disposing of products

Before you dispose product or the components
1. The equipment should be cleaned and decontaminated to protect workers servicing the equipment, the environment or the public purchasing surplus equipment because the incubated shaker can potentially be contaminated with biological material, chemicals or radioisotopes. Check with your institution or laboratory for individual policies and procedures for disposal of laboratory equipment.

2. Please contact your local governing body for regulations regarding disposal of electrical, electronic, metal (brass, aluminum, steel and stainless steel), refrigeration and rubber components. Jeio Tech recommends the user find a local scavenger or laboratory equipment recycler to properly dispose of the unit and its components.

10.3 Warranty

10.3.1 Terms of Warranty Service

(1) The warranty period of 24 months, covering for defects in workmanship and material when used under recommended as set forth in the operating manuals for such equipment.

(2) Please let me know as below for better and quick service when service needs.

- Purchasing date
- Serial number on Identification plate.
- Defect and trouble
- Application and using condition.

10.3.2 Warranty exception

Customer can't get free warranty service in case of as below.

- If the product is broken due to the user's fault.
- If the product is broken due to improper operation or storage.
- If the product is broken due to improper modify or repairing.
- If the product is broken due to overuse of voltage or earthshock.
- If the product is broken without taking care of the "Notice" alerted on the manual.

10.3.3 Service and technical advice

We, Jeiotech Co., Ltd. are doing best to give best support based on customer service system.
When we get the symptoms, fault states, contact number by customer, we offer after sales service.

- **International Sales Head Office (Korea)**

  #1005, Byucksan Digital Valley 6-cha, 219, Gasan digital 1-ro, Geumcheon-gu, Seoul, Korea
  153-704
  Tel: +82 2 2627 3816 **E-mail:** overseas@jeiotech.com
  FAX: +82 2 3143 1824

- **The Americas (U.S.A. Branch)**

  19 Alexander RD Unit #7, Billerica MA 01821, U.S.A.
  Tel: +1 781 376 0700 **E-mail:** info@jeiotech.com
  FAX: +1 781 376 0704

- **Europe (U.K. Branch)**

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  Tel: +44 1865 400321 **E-mail:** labcompanion@medlinescientific.com
  FAX: +44 1865 400736

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  B-705, Jingting Bldg. No.1000 Hongquan Rd, Minhang district,
  Shanghai, P.R.CHINA 201103
  Tel: +86-21-5108-9161, 5414-8389 **E-mail:** longjuncao@jeiotech.com
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- **South East Asia (Malaysia Branch)**

  No 57-59, Jalan Adenium 2G/6, Pusat Perniagaan Adenium, 48300 Bandar Bukit Beruntung, Selangor Darul Ehsan , Malaysia
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