HEIDON

THREE-ONE MOTOR

General Catalogue

HEIDON Three-one Motor promises to be

No. 1 in three areas:

1 Protecting safety

Those of us who have experienced the ferocity of laboratory fires caused by a motor spark know that unsafe products have no value, so we have placed priority on the spending for safety. The spark-free brushless motor developed for the Three-one Motor with the objective of demanding agitation applications has been adopted in all models. In addition, the agitator main unit has a safety-oriented sealed construction that does not easily allow the intake of external air. Inside the motor, a thermal protector prevents burnouts and a current limiter circuit in the electrical components, providing dual protection against overheating and over current accidents without stopping the agitation. Also, the countermeasures against noise have been improved, and the Three-one Motor is designed not to emit noise that may adversely impact other equipment as well as have resistance against malfunctions caused by noise from other equipment.

2 Delivering satisfaction

The Three-one Motor does not simply turn the agitator blades safely. It is full of HEIDON's workplace friendly ideas, such as a keyless chuck that can be gently tightened without the use of a chuck key and a free joint (patented) that allows the position of the agitator blades to be changed easily. In addition, we can configure an agitator to meet your needs from a range of purpose-specific blades and accessories and a wide variety of models that comprise everything from general purpose to laboratory agitators. At Shinto, we not only research agitation efficiency; we also welcome questions and discussion concerning agitation from everyone.

3 Providing service

Although we strive to provide safety and reliability, in the event of a failure, all you need to do is hand the unit over to the store from which you purchased it without disassembling anything. As to failures predefined by our company, we will repair the product free of charge within the warranty period. A prompt repair service will be provided even after the warranty period to ensure safe use of our product.

The name of the Three-one Motor was derived from the promise to be No. 1 in three areas.

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12 Ideas in the HEIDON Three-one Motor

1 Drive shaft

The geared drive shaft transmits the rotation of the powerful brushless motor to the agitator blade both quietly and with minimal vibration. Our research and experience have been applied to the materials, ratios and fixing method of the gears. In addition, the drive shaft is hollow, which makes it easy to set the vertical position of the agitator blade. To prioritize safety, the drive shaft no longer has an upper exposed part.

2 Brushless motor

The Three-one Motor is equipped with a spark-free brushless motor. Inside the motor, there are no contact points, such as brushes and commuters, and the maintenance that used to be required for brush wear is now no longer necessary. This powerful brushless motor is found only in the Three-one Motor, which was developed through long-term research and with the aim of demanding agitation.

3 Body

The body utilizes light, highly airtight aluminum. The flat housing, which no longer contains fins, makes it easy to wipe off dirt and liquid that splashes from the agitation container. The basic design, which aims for ease of use, has not changed since the initial model was released in 1966. It can even be used on crowded laboratory benches without taking up much space.

4 Keyless chuck

The agitator shaft can be gently secured without the use of a chuck key. Moreover, because the chuck makes use of a collet, it has high holding strength, limited center runout and can be used in both forward and reverse rotation. Also, optional collets for ϕ2 mm, ϕ4 mm and ϕ6 mm shafts and a stainless steel drill chuck (with chuck key) are available.

9 Safety measures

We place a priority on spending for safety.

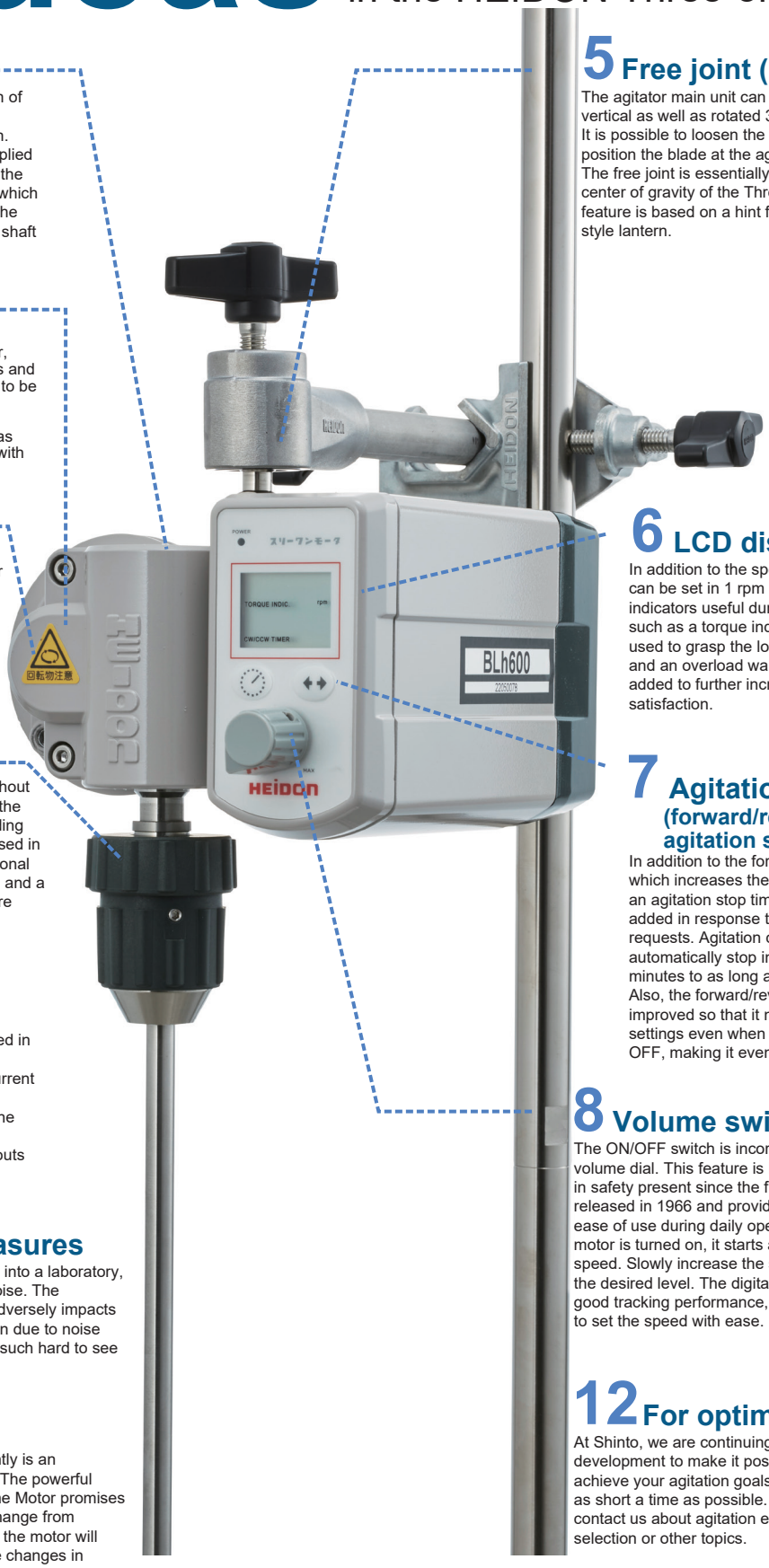
1. Safety cover: Prevents accidents during agitation, such as hair becoming entangled in the rotating parts.
2. Current limiter circuit: Limits excessive current to the motor during an overload. Without stopping the motor due to the overload, the speed slows and agitation continues.
3. Thermal protector: Protects against burnouts inside the motor.

10 Noise countermeasures

With so many pieces of equipment crowded into a laboratory, attention must be given to the problem of noise. The Three-one Motor does not emit noise that adversely impacts other equipment, nor will it easily malfunction due to noise from other equipment. HEIDON focuses on such hard to see problems.

11 Feedback

Agitation in which the load changes constantly is an extremely demanding operation for motors. The powerful brushless motor developed for the Three-one Motor promises near perfect feedback even for loads that change from moment to moment. Within the rated range, the motor will maintain the set speed even when there are changes in viscosity.



5 Free joint (patented)

The agitator main unit can be tilted +/- 30° from vertical as well as rotated 360° around its axis. It is possible to loosen the lock screw and position the blade at the agitation point. The free joint is essentially located at the center of gravity of the Three-one Motor. This feature is based on a hint from the Odawara style lantern.

6 LCD display panel

In addition to the speed indicator that can be set in 1 rpm increments, other indicators useful during experiments such as a torque indicator, which can be used to grasp the load during agitation, and an overload warning have been added to further increase customer satisfaction.

7 Agitation timer (forward/reverse rotation, agitation stop)

In addition to the forward/reverse timer, which increases the agitation efficiency, an agitation stop timer has been newly added in response to numerous requests. Agitation can be set to automatically stop in as short as 30 minutes to as long as 24 hours. Also, the forward/reverse timer has been improved so that it now retains its settings even when the power is turned OFF, making it even easier to use.

8 Volume switch

The ON/OFF switch is incorporated into the volume dial. This feature is based on the belief in safety present since the first model was released in 1966 and provides an unnoticed ease of use during daily operations. When the motor is turned on, it starts at the slowest speed. Slowly increase the speed until reaching the desired level. The digital display also has good tracking performance, making it possible to set the speed with ease.

12 For optimum agitation

At Shinto, we are continuing our research and development to make it possible for you to achieve your agitation goals both safely and in as short a time as possible. Please feel free to contact us about agitation efficiency, equipment selection or other topics.

HEIDON Origin of HEiDON

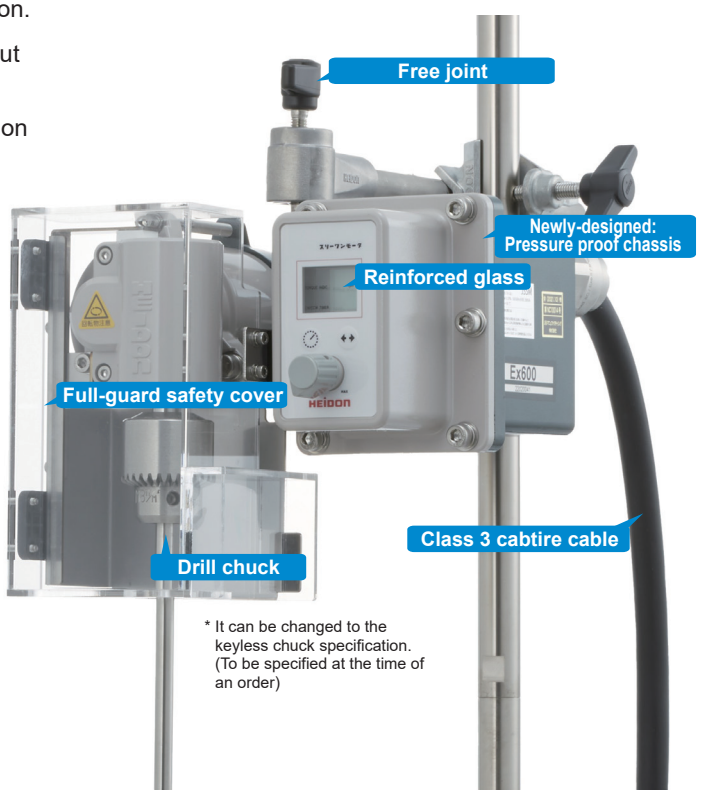
The product name “HEIDON” originated from a nickname given to the founder of Shinto Scientific Masahei Nomura during his time as an apprentice. “Don” was added to the “Hei” in “Masahei” to form “Heidon.” Our HEIDON products continue to embody the principles of the company founder.

Pressure and explosion proof agitator

Three-one Motor Ex

A Three-one Motor which can also be used in an explosion-proof atmosphere is now available.
It employs a motor to enable precise adjustments by monitoring the rotation display.
With the unique feedback function, agitation operations can be carried out while maintaining the rotation speed regardless of torque variation.
Due to a new safe design employed in the pressure and explosion proof chassis, it can even endure explosions within the chassis and thus there is no danger of fire spreading to the outer part.

- Employs a newly-designed pressure and explosion proof chassis to prevent fire spreading to the outer part in case of an explosion.
- Unlike the air motor type, agitation operations can be carried out while monitoring the rotation speed.
- Equipped with a feedback function to maintain the preset rotation speed.
- Employs a compact-sized chassis which is perfect for use inside laboratories.
- Similar functions and usability of the BL series are realized.
- Available in 5 types of models depending on various agitation needs.
- Equipped with a stainless steel drill chuck which is resistant to organic solvents, etc.
- Equipped with an interlock-type full-guard safety cover as standard.



* It can be changed to the keyless chuck specification. (To be specified at the time of an order)

Safety precautions:

Agitation of paints and organic solvents shall be deemed as a hazard operation.
The air purge does not have an explosion proof structure.

The **Three-one Motor Ex** is capable of executing agitation within the hazard area including ZONE 1 and ZONE 2.

The explosion-proof certification of the Ex is valid only in Japan.

Pressure and explosion proof agitator **Ex series**

Ex300 For high viscosity
- Rotation speed: 5-300 rpm
- Maximum torque: 2.0 N·m

Ex600 For medium to high viscosity
- Rotation speed: 10-600 rpm
- Maximum torque: 1.0 N·m

Ex1200 For medium to low viscosity
- Rotation speed: 20-1200 rpm
- Maximum torque: 0.5 N·m

Ex2000 For low viscosity
- Rotation speed: 35-2000 rpm
- Maximum torque: 0.2 N·m

Ex3000 For low viscosity
- Rotation speed: 50-3000 rpm
- Maximum torque: 0.15 N·m

Common specifications for the Ex series Three-one Motor

Motor	DC brushless motor, Class B insulation 130°C
Safety device	Current limiter circuit, thermal protector, safety cover
Panel display	Rotation speed: 4-digit digital/overload indicator, Torque indicator: 20% increments
Rotation control	Feedback control, forward/reverse switching function, forward/reverse switching timer, agitation stop timer
Dimensions/Weight	W 189 × D 192 × H 200 mm (not including the arm rod)/5.1 kg
Power supply	100 V 50/60 Hz (common), 200 VA
Power cord	Class 3 cabtire cable (3 m) (3PNCT × 3-core) with ϕ16 mm, Terminal: Round terminal R2-4
Accessories	Clamp holder, safety cover, operation manual with a warranty certificate
Options	Collapsible stand Type: CS2, agitation shaft, agitator blade

* A grounding rubber plug to be used for operation checks will be included. Make sure not to use this plug in hazard areas.

Pressure and explosion proof

ExdIIBT4Gb

Ex: Symbol indicating an explosion-proof structure
d: Pressure and explosion proof structure
IIB: An area with an explosive gas atmosphere, where the maximum safety gap is 0.5-0.9 mm
T4: The maximum surface temperature is 135°C
Gb: Equipment with a high protection level that does not act as an ignition source during either a normal operation or a predictable malfunction when the equipment is used in an explosive gas atmosphere.

Agitator with enhanced safety

Three-one Motor Saf series

The Saf series adopts a large-sized acrylic cover clearly covering the part that cannot be covered by the conventional safety cover.
To further improve safety, the interlock function is installed and automatically stops the motor rotation when the safety cover is opened.

- Flat design in which the upper motor shaft does not stick out
- Can open the cover to raise or lower the agitation bar
- Acrylic case that clearly shows the rotation status

BLh-Saf series

The BLW series now has a much-expected safety cover

BLW-Saf series

High power general purpose agitator with enhanced safety — BLh-Saf series

BLh300Saf For high viscosity
- Rotation speed: 5-300 rpm
- Maximum torque: 2.6 N·m

BLh600Saf For medium to high viscosity
- Rotation speed: 10-600 rpm
- Maximum torque: 1.3 N·m

BLh1200Saf For medium to low viscosity
- Rotation speed: 20-1200 rpm
- Maximum torque: 0.6 N·m

BLh3000Saf For low viscosity
- Rotation speed: 50-3000 rpm
- Maximum torque: 0.2 N·m

Main unit: W 144 × D 175 × H 242 mm / 2.6 kg (not including the free joint and power cord)

General purpose agitator with enhanced safety — BL-Saf series

BL300Saf For high viscosity
- Rotation speed: 5-300 rpm
- Maximum torque: 1.3 N·m

BL600Saf For medium to high viscosity
- Rotation speed: 10-600 rpm
- Maximum torque: 0.7 N·m

BL1200Saf For medium to low viscosity
- Rotation speed: 20-1200 rpm
- Maximum torque: 0.3 N·m

BL3000Saf For low viscosity
- Rotation speed: 50-3000 rpm
- Maximum torque: 0.1 N·m

Main unit: W 144 × D 175 × H 242 mm / 2.4 kg (not including the free joint and power cord)

Mini plant class agitator with enhanced safety — BLW-Saf series

BLW300Saf For high viscosity
- Rotation speed: 5-300 rpm
- Maximum torque: 4.5 N·m

BLW600Saf For medium to high viscosity
- Rotation speed: 10-600 rpm
- Maximum torque: 2.2 N·m

BLW1200Saf For medium to low viscosity
- Rotation speed: 20-1200 rpm
- Maximum torque: 1.2 N·m

Main unit: W 157 × D 210 × H 242 mm / 6.5 kg (not including the arm rod and power cord)

The functions and specifications except the safety cover are same as those of the BL, BLh, and BLW series.

A full-guard safety cover can be installed on the Three-one Motor you are currently using. Pease refer to the page 13.

BL series

The BL series is equipped with a maintenance-free brushless motor developed with the aim of demanding agitation applications. The forward/reverse function completely eliminates the ring-shaped unmixed region that results from single direction rotation by changing the direction of rotation. When using a tilted blade (cross, propeller, etc.), the axial flow also reverses, further increasing the agitation effect.

BLh series

Pick this series if you are unsure which type you need!

The BLh series uses a high output 80 W brushless motor designed with the aim of demanding agitation applications. This powerful laboratory agitator generates twice the torque of the BL series. The forward/reverse function with timer completely eliminates the ring-shaped unmixed region that results from single direction rotation by changing the direction of rotation.

BLW series

The BLW series is equipped with a 120 W motor for the purpose of agitating high viscosity liquids and has even more torque than the other series. It is capable of agitating liquids that are too viscous for the BL (40 W) and BLh (80 W) series, thereby significantly increasing the range of possible experiments. In addition, to make it suitable for existing production work and experiments, this series continues the Three-one Motor tradition of speed control (forward/reverse switch, forward/reverse timer) and ease of use.

- The excellent quietness will not disrupt the laboratory environment.
- The set speed is maintained even when there are changes in viscosity during agitation.
- It is equipped with a powerful brushless motor that does not spark.
- During agitation, the direction of rotation can be changed with a single switch.
- It does not emit noise that adversely impacts other equipment, nor will it malfunction due to noise from other equipment.
- To protect the motor against overloads, it is equipped with a current limiter circuit and thermal protector.
- It includes a new agitation stop timer that enables agitation to be automatically stopped at the time set with the 0.5-24 hour timer.

General purpose agitator

BL series

BL300 For high viscosity
- Rotation speed: 5-300 rpm
- Rated torque: 1.3 N·m

BL1200 For medium to low viscosity
- Rotation speed: 20-1200 rpm
- Rated torque: 0.3 N·m

BL600 For medium to high viscosity
- Rotation speed: 10-600 rpm
- Rated torque: 0.7 N·m

BL3000 For low viscosity
- Rotation speed: 50-3000 rpm
- Rated torque: 0.1 N·m

- Motor / DC brushless motor, Class B insulation (130°C), 40 W
- Chuck / ϕ8 mm collet-type keyless chuck
- Safety devices / Current limiter circuit, Thermal protector: Motor coil temperature 90°C, Safety cover
- Power supply and consumption / Single phase 100 V +/-10%, 50/60 Hz, 120 VA
- Dimensions: Main unit: W 135 × D 170 (not including the arm rod) × H 211 (230 with a safety cover) mm
- Weight / 2.0 kg

Can be configured for use with overseas power supplies
* Optional

High power general purpose agitator

BLh series

Powerful

BLh300 For high viscosity
- Rotation speed: 5-300 rpm
- Rated torque: 2.6 N·m

BLh1200 For medium to low viscosity
- Rotation speed: 20-1200 rpm
- Rated torque: 0.7 N·m

BLh600 For medium to high viscosity
- Rotation speed: 10-600 rpm
- Rated torque: 1.3 N·m

BLh3000 For low viscosity
- Rotation speed: 50-3000 rpm
- Rated torque: 0.2 N·m

- Motor / DC brushless motor, Class B insulation (130°C), 80 W
- Chuck / ϕ8 mm collet-type keyless chuck
- Safety devices / Current limiter circuit, Thermal protector: Motor coil temperature 90°C, Safety cover
- Power supply and consumption / Single phase 100 V +/-10%, 50/60 Hz, 200 VA
- Dimensions: Main unit: W 135 × D 170 (not including the arm rod) × H 211 (230 with a safety cover) mm
- Weight / 2.2 kg

Can be configured for use with overseas power supplies
* Optional

Mini plant class agitator

BLW series

BLW300 For high viscosity
- Rotation speed: 10-300 rpm
- Rated torque: 4.5 N·m

BLW1200 For medium to low viscosity
- Rotation speed: 30-1200 rpm
- Rated torque: 1.2 N·m

BLW600 For medium to high viscosity
- Rotation speed: 15-600 rpm
- Rated torque: 2.2 N·m

BLW3000 For low viscosity
- Rotation speed: 75-3000 rpm
- Rated torque: 0.4 N·m

- Motor / DC brushless motor, Class B insulation (130°C), 120 W
- Chuck / ϕ13 mm drill chuck * Shafts up to 12 mm can be passed through the hollow drive shaft. BLW3000 does not have a hollow drive shaft.
- Safety devices / Current limiter circuit, Motor axis restricting protection circuit, Thermal protector: Motor coil temperature 90°C
- Power supply and consumption / Single phase 100 V +/-10%, 50/60 Hz, 300 VA
- Dimensions: Main unit: W 158 × D 205 × H 218 mm, BLW3000: W 158 × D 185 × H 240 mm (not including the arm rod)
- Weight / 5.0 kg, BLW3000: 4.6 kg

* The BLW series normally employs a fixed arm rod. Please contact us if you wish to order a special model with a movable arm rod.
* A step-down transformer will be necessary when using the product in countries other than Japan. Please inquire us for details.

Common specifications for the BL / BLh / BLW series

Rotation control	Feedback control, Forward/reverse switch (timer mode, manual)
Timer function	Forward/reverse timer function: Can select 5, 10, 20, 30, 45, 60 seconds, Agitation stop timer function: 0.5-24 hours
Panel display	4-digit speed indicator, Load indicator
	Torque indicator (1 unit equals 20%)
Power cord	2 m power cord with 2-pole grounded plug
Accessories	1 clamp holder (type: 21 × 16)

Functional agitators

TE series

The TE series has a torque measurement function, with a strain gauge type torque meter mounted on the Three-one Motor. In this way, torque measurement with less variation, which had been difficult with the existing R series or Ft series, can be achieved.
With a special torque meter employed, its usability meets the standard of the Three-one Motor.

- Equipped with a torque meter to enable precise torque measurements.
- Output of rotation speed can also be realized by leveraging the Ft option.
- Digital display of the torque value is enabled.

R series Can be connected to a PC with a USB

The R series is a remote-controlled agitator that is convenient for use inside draft chambers. The state of agitation can be grasped from the external output of the speed and converted torque, and the speed and direction of rotation can be input externally based on the state of agitation, making it possible to use this agitator as part of an agitation system.

- Agitation speed and load current data can be easily imported to a PC by USB connection.
- The speed and direction of rotation can be input and controlled externally. * Analog input
- The speed and converted torque are output as analog voltages, making it possible to grasp changes in viscosity.
- The controller and motor are separated from the main unit.

Ft series

In the Ft series, the speed and converted torque are output as analog voltages from the output connector, making it possible to measure changes in viscosity during agitation using a data logger, etc.

- The speed and converted torque are output as analog voltages, making it possible to grasp changes in viscosity.
- The set speed is maintained even when there are changes in viscosity during agitation.

A torque meter is only mounted on the TE series.

A strain gauge type torque transformer is only mounted on the TE series to enable an accurate measurement of torque.
With the R series and Ft series, the load current of the motor is calculated to output the converted torque.
The TE series is recommended for an application that requires precise torque measurements.

Differences between the R series and Ft series, and how to select the proper agitator

To begin, the physical housings are different. The controls for the R series are separate and operated by remote control.
Also, the Ft series provides only output, while the R series also has an input function, so it is possible to control the speed and direction of rotation with an external signal.
Select the R series if it will be used in a draft chamber or if you want the controls in the palm of your hand.
Also, select the R series if you want external control with a built-in sequencer, etc.
Both the Ft series and R series are suited for applications in which you want to monitor the torque and speed.

Data logger

GL240

●A dedicated connection cable is included. Preset to be used with a Three-one Motor.

●Analog input channels: 10 channels
●External input/output: Trigger input, 4 channels alarm output
●Measurement range: Voltage, thermocouple (optional)
●Dimensions / Main unit: W 188 × H 117 × D 42 mm
●Weight / 500 g

Recommended when purchasing an R, FT or TE model

Use the convenient and simple data logger to measure the output data.
It is equipped with a dedicated cable and comes preset, so it can be used right away.
It is possible to display the torque changes and speed on the large LCD panel in real-time during agitation. In addition, it is easy to transmit the data to a PC, making it possible to analyze the data.

Common specifications for the TE / R / Ft series

Rotation control	Feedback control, Forward/reverse switch (timer mode, manual)
Timer function	Forward/reverse timer function: Can select 5, 10, 20, 30, 45, 60 seconds, Agitation stop timer function: 0.5-24 hours
Chuck	ϕ8 mm collet-type keyless chuck
Safety device	Current limiter circuit, Thermal protector: Motor coil temperature 90°C, Safety cover
Power cord	2 m power cord with 2-pole grounded plug
Accessories	1 clamp holder (type: 21 × 16), Safety cover

Agitators with a torque converter

TE series

* The picture is partly different from the product.
The amplifier table is only for taking the picture.

TE300 For high viscosity
- Rotation speed: 5-300 rpm
- Rated torque: 2.0 N·m

TE600 For medium to high viscosity
- Rotation speed: 10-600 rpm
- Rated torque: 1.0 N·m

TE1200 For medium to low viscosity
- Rotation speed: 20-1200 rpm
- Rated torque: 0.5 N·m

Optional

- Ft External output function for rotation speed

Safety cover included as standard

- Motor / DC brushless motor, Class B insulation, 80 W
- Panel display / 4-digit digital speed indicator, overload indicator, Torque indicator (1 unit equals 20%)
- Power supply and consumption / Single phase 100 V +/-10%, 50/60 Hz, 200 VA
- Dimensions: Main unit: W 135 × D 175 (not including the arm rod) × H 340 (360 with a safety cover) mm, Amplifier: W 120 × D 190 × H 75
- Weight / Main unit: 3.0 kg, Amplifier: 930 g
- External output: Torque output, analog 0-5 V
- Amplifier display: 3 digits after the decimal points, 2.0 N·m at maximum
- Torque meter: 0-1.0 N·m, 0-2.0 N·m

* Can be selected at the time of an order

Remote controlled agitator with external input/output

R series

* The picture is partly different from the product.
The controller table is only for taking the picture.

BLh300R For high viscosity Powerful
- Rotation speed: 10-300 rpm
- Rated torque: 2.0 N·m

BLh600R For medium to high viscosity Powerful
- Rotation speed: 15-600 rpm
- Rated torque: 1.0 N·m

BLh1200R For medium to low viscosity Powerful
- Rotation speed: 30-1200 rpm
- Rated torque: 0.5 N·m

BL300R For high viscosity
- Rotation speed: 10-300 rpm
- Rated torque: 1.0 N·m

BL600R For medium to high viscosity
- Rotation speed: 15-600 rpm
- Rated torque: 0.5 N·m

BL1200R For medium to low viscosity
- Rotation speed: 30-1200 rpm
- Rated torque: 0.3 N·m

Please contact us about the delivery date of the made-to-order.

- Motor / DC brushless motor, Class B insulation, BLh: 70 W, BL: 35 W
- Display / 4-digit digital speed indicator (rpm), Load indicator: Converted torque (N·m), Load current (mV), Load ratio (%)
- Rotation speed input / Analog voltage: DC 0-5 V
- Power supply and consumption / Single phase 100 V +/-10%, 50/60 Hz, BL: 100 VA, BLh: 160 VA
- Dimensions: Main unit: W 135 × D 175 (not including the arm rod) × H 211 (230 with a safety cover) mm, Control box: W 118 × D 245 × H 102 mm
- Weight / Main unit – BL: 2.5 kg, BLh: 2.7 kg, Control box – BL: 1.8 kg, BLh: 2.2 kg
- External output: Rotation output, Converted torque output, Analog 0-5 V

Agitators with external output

Ft series

* The picture is partly different from the product.

BLh300Ft For high viscosity Powerful
- Rotation speed: 5-300 rpm
- Rated torque: 2.6 N·m

BLh600Ft For medium to high viscosity Powerful
- Rotation speed: 10-600 rpm
- Rated torque: 1.3 N·m

BLh1200Ft For medium to low viscosity Powerful
- Rotation speed: 20-1200 rpm
- Rated torque: 0.6 N·m

BL300Ft For high viscosity
- Rotation speed: 5-300 rpm
- Rated torque: 1.3 N·m

BL600Ft For medium to high viscosity
- Rotation speed: 10-600 rpm
- Rated torque: 0.7 N·m

BL1200Ft For medium to low viscosity
- Rotation speed: 20-1200 rpm
- Rated torque: 0.3 N·m

Can be configured for use with overseas power supplies

* Optional

- Motor / DC brushless motor, Class B insulation, BLh: 80 W, BL: 40 W
- Panel display / 4-digit digital speed indicator, overload indicator, Torque indicator (1 unit equals 20%)
- Power supply and consumption / Single phase 100 V +/-10%, 50/60 Hz, BL: 120 VA, BLh: 200 VA
- Dimensions: Main unit: W 135 × D 175 (not including the arm rod) × H 211 (230 with a safety cover) mm
- Weight / BLh-Ft: 2.3 kg, BL-Ft: 2.1 kg
- External output: Rotation output, Converted torque output, Analog 0-5 V

We can also provide a 3000FT model and BLW series.

Explosion-proof air motor agitator* EP series

This explosion-proof agitator is equipped with an air motor. The rotation speed and torque are controlled by adjusting the air pressure with a needle valve attached to the air motor so that it can be used safely even in laboratories where sources of fire are prohibited.
The Three-one Motors EP series share the same components as the well-established BL series and its usability is inherited as well. Moreover, it is of course MADE IN JAPAN.

- It can be operated without oil.
- It is equipped with a stainless steel drill chuck that is resistant against organic solvents, etc.

Common specifications for the EP series

Maximum output	0.3 HP
Maximum air consumption	190 L/min (When 0.5 MPaG without load)
Accessories	Air hose, Safety cover, Clamp holder, Chuck key, Separator unit (air filter, lubricator, regulator, turbine oil)
Options	Agitator blade, Agitation shaft, Collapsible stand CS2 Can be changed to the self-standing type separator unit.

EP1800 For low viscosity
● Rotation speed: 1800 rpm ● Maximum torque: 0.2 N·m ● Recommended maximum speed: 1300 rpm

EP700 For medium to low viscosity
● Rotation speed: 700 rpm ● Maximum torque: 0.7 N·m ● Recommended maximum speed: 500 rpm

EP400 For medium to high viscosity
● Rotation speed: 400 rpm ● Maximum torque: 1.3 N·m ● Recommended maximum speed: 280 rpm

EP200 For high viscosity
● Rotation speed: 190 rpm ● Maximum torque: 2.6 N·m ● Recommended maximum speed: 140 rpm

Air source will be necessary when using the EP series.
It should be able to supply 0.5 MPaG.
Air volume of 190 L/min is required at maximum, without load.

Separator unit

Mini plant class explosion-proof air motor agitator* EPW series

This explosion-proof air motor agitator is equipped with a large gear box that has been used and proven in the BLW series and a drill chuck supporting a ϕ13 shaft as standard, and enables high-torque agitation.
A large-type arm rod with no movable part has been adopted, which can safely be used for agitation of large volumes.
An optional large-sized safety cover can also be installed.

- It can be operated without oil.
- Adopts a drill chuck supporting 12 shafts.

Common specifications for the EPW series

Maximum output	0.3 HP
Maximum air consumption	190 L/min (When 0.5 MPaG without load)
Accessories	Air hose, Clamp holder, Chuck key, Separator unit (air filter, lubricator, regulator, turbine oil)
Options	Safety cover, Agitator blade, Agitation shaft, Collapsible stand CS2 Can be changed to the self-standing type separator unit.

* Equipped with an optional accessory.

EPW700 For medium to low viscosity
● Rotation speed: 700 rpm ● Maximum torque: 1.2 N·m ● Recommended maximum speed: 500 rpm

EPW400 For medium to high viscosity
● Rotation speed: 400 rpm ● Maximum torque: 2.2 N·m ● Recommended maximum speed: 280 rpm

EPW200 For high viscosity
● Rotation speed: 190 rpm ● Maximum torque: 4.5 N·m ● Recommended maximum speed: 140 rpm

The gears of the EP and EPW series agitators may get damaged when operated with a torque exceeding the maximum torque.

* These agitators, which use no electricity, are products to which the explosion-proof standard of electric equipment does not apply.

Agitators that can be attached to tanks

MSM series

The MSM series, which enables the Three-one Motor to be easily and securely attached to the agitation tank, consists of 5 models depending on the agitation volume.
It is equipped with a ferrule (2s) type that allows attachment to both open and sealed tanks, so it can be attached to all kinds of tanks.

Lineups

MSM-BL ● For small volume **MSM-BLh** ● For medium volume **MSM-BLW** ● For large volume

MSM-Ex ● For explosion-proof **MSM-EP** ● Air agitator

BL600Z⁺ For medium to high viscosity

Vertical motion rotating agitator

Z⁺ series

The agitator blades move up and down while rotating. The vertical movement prevents decreases in agitation efficiency caused by circular flows that tend to form in rotational agitation. In addition, vertical flow can be more easily created, and uniform agitation within the tank is realized in a short period of time.

●The agitator blade moves up and down in conjunction with the rotation.

Major specifications * The basic specification is the same as that of BL600.

Vertical stroke length	30 mm (unchangeable)
Vertical stroke speed	8 rotations/1 full stroke
Dimensions and weight	W 135 × D 175 (not including the arm rod) × H 203 (214 with a safety cover) mm, 3.2 kg

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YT

Mechanical torque meter unit

YT

This torque meter unit can be easily attached to your Three-one Motor chuck and makes it possible to read the changes in viscosity as rotational torque. Utilizing the twist in the spring, it is extremely robust with high repeatability. Please select and order the suitable model from the 5 types of YT torque meters available depending on your objectives.

Lineups

(BL3000)
5 N·cm (0.05 N·m)
(BL600)
50 N·cm (0.5 N·m)
10 N·cm (0.1 N·m)
(BL300)
100 N·cm (1.0 N·m)
(BL1200)
20 N·cm (0.2 N·m)

* A clamp holder is included in the package.

* It is recommended to support the models within the brackets.

MIGHTY MAG SHIEL

Magnetic vacuum coupling seal for stirrer

MG-6

The magnetic vacuum coupling seal for stirrer, “MIGHTY MAG SHIEL” not only has a drive transmission function but also employs a magnetic coupling to keep airtightness inside flasks. High-vacuum agitation can be realized just by attaching it to the Three-one Motor.

Lineups

MG-6-01 ● For TS24/40
MG-6-02 ● For TS29/42
MG-6-03 ● For TS34/45

* Make sure to use the optional helical coupling when connecting with the Three-one Motor’s agitation shaft.

Common specifications ● Maximum speed: 1000 rpm ● Vacuum tolerance: 10^{-3} Pa ● Shaft diameter: ϕ8 mm ● Weight: 600 g

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Stirrer 100 For low viscosity circulation

Circulating stirrer

Stirrer 100

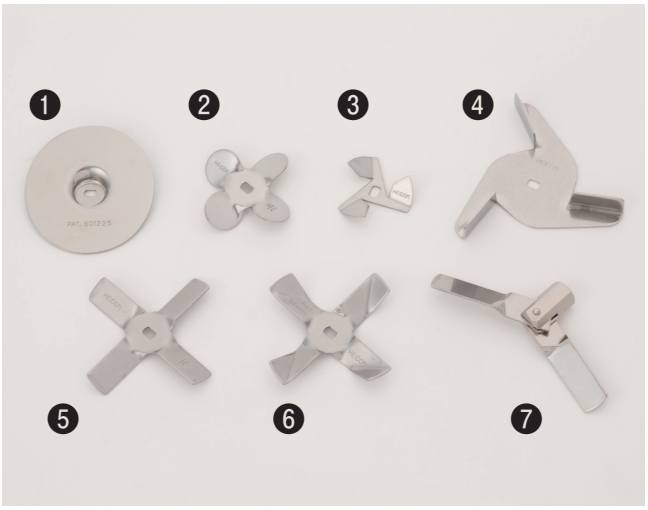
This extremely tough circulating agitator can be used with confidence even for long-term uniform temperature distribution in constant-temperature water baths.

Major specifications for the Stirrer 100

Motor	Output and current	3 W / 0.2 A
	Rated torque	50 Hz: 0.025 N·m, 60 Hz: 0.021 N·m
	Rated speed	50 Hz: 1200 rpm, 60 Hz: 1450 rpm
Circulation temperature		About 100 liters (50 × 50 × water depth 40 cm)
Power supply		Single phase 100 V +/-10%, 50/60 Hz

Agitator blades that broaden the agitation applications

General purpose agitator blades



These blades are inexpensive because they are mass produced using a press.
They can be used for a wide range of applications.

1 Butterfly 60 mm blade diameter
- SUS-316 tip
- SUS-316 tip with boss

* Available while stock lasts.

2 Propeller R* 50 mm blade diameter
- SUS-316 tip
- SUS-316 tip with boss
- Titanium tip

3 Fan 38 mm blade diameter
- SUS-316 tip

4 Turbine 86 mm blade diameter
- SUS-316 tip
- SUS-316 tip with boss
- Titanium tip

5 Square cross R* 70 mm blade diameter
- SUS-316 tip
- SUS-316 tip with boss
- Titanium tip

6 Soft cross 70 mm blade diameter
- SUS-316 tip
- SUS-316 tip with boss

7 Helicopter 100 mm blade diameter
- SUS-316 tip

*** Blades with a reverse twist is called "Propeller L" and "Square cross L".**

Tips can be secured to the end of the shaft using the nut included in the package. It is only available with the shaft manufactured by HEIDON. Bosses can be attached to any position on the shaft with the lock screw located on the boss. They can also be used for multi-level agitation by combining the bosses.

Agitator blade sets

Recommended! FS-7 is recommended for new Three-one Motor users.

Type: FS-7 General purpose set including 7 blades
<Items> Fan, Propeller R, Soft cross, Square cross R, Soft cross with boss, Turbine, Square cross R with boss, Agitation shaft (with a nut of ϕ8 mm, 500 mm in length)

Type: FS-4 General purpose set including 4 blades
<Items> Fan, Propeller R, Square cross R, Turbine, Agitation shaft (with a nut of ϕ8 mm, 500 mm in length)

Type: FS-3T 3 blade titanium set
<Items> Propeller R, Square cross R, Turbine, Agitation shaft (with a nut of ϕ8 mm, 500 mm in length)

Shafts (With ϕ8 mm nut)

500mm
- ϕ8 SUS-316
- ϕ8 Titanium

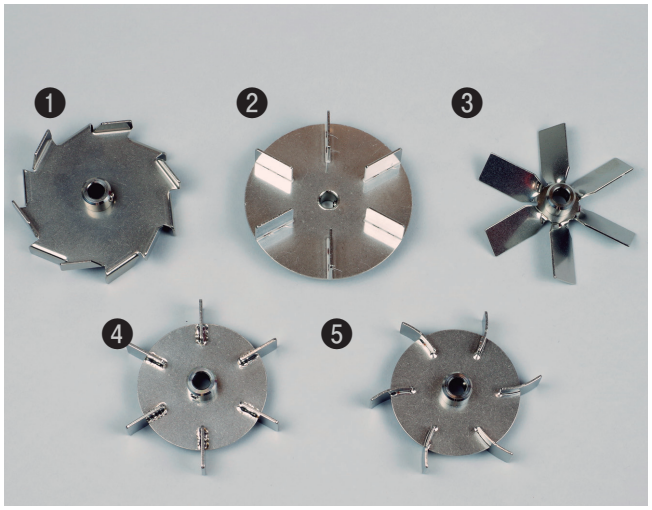
600mm
- ϕ8 SUS-316

700mm
- ϕ8 SUS-316

800mm
- ϕ8 SUS-316

1000mm
- ϕ8 SUS-316

Agitator blades



1 Disperser
- 40 mm blade diameter
- 60 mm blade diameter
- 80 mm blade diameter
- 100 mm blade diameter

2 Blade turbine
- 80 mm blade diameter

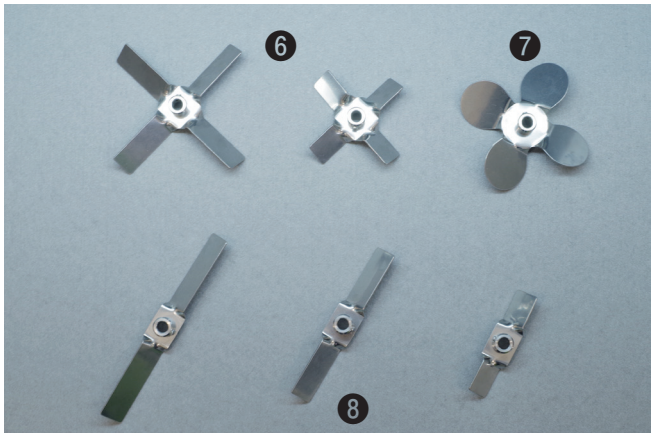
3 Tilted paddle
- 40 mm blade diameter
- 80 mm blade diameter
- 100 mm blade diameter
- 120 mm blade diameter

4 Disc turbine
- 40 mm blade diameter
- 80 mm blade diameter
- 100 mm blade diameter
- 120 mm blade diameter

5 Curved disc turbine
- 40 mm blade diameter

Bosses can be attached at any position on the shaft with the lock screw located on the boss. They can also be used for multi-level agitation.

* Blade turbines and curved disc turbines will be available while stock lasts.

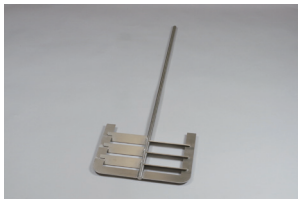


6 4-blade tilted paddle
- 80 mm blade diameter
- 120 mm blade diameter

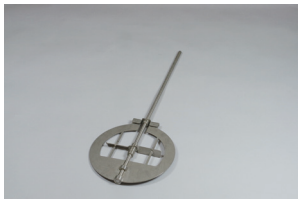
7 4-blade propeller
- 100 mm blade diameter

8 2-blade tilted paddle
- 80 mm blade diameter
- 120 mm blade diameter
- 150 mm blade diameter

Made-to-order blades such as anchor blades are available. Please feel free to contact us.

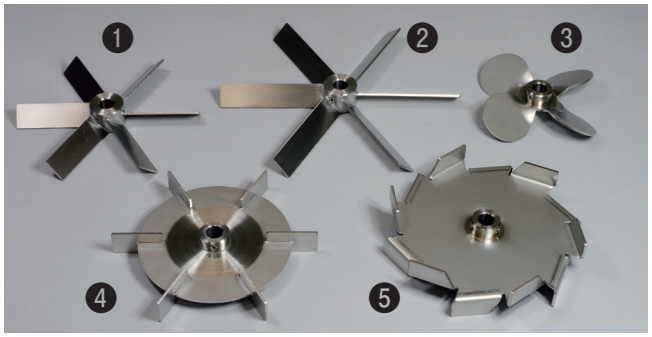


● e.g.) Customized anchor paddle blade



● e.g.) Customized foldable blade for separable flask

Large type agitator blade (12 series) * Made-to-order



❶12 tilted paddle ϕ150
- SUS-316 tip with boss

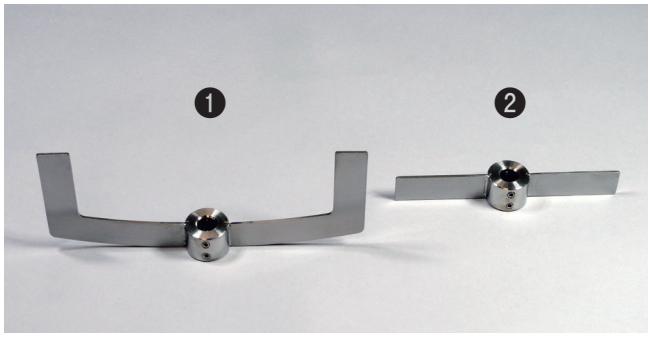
❷12 tilted paddle ϕ200
- SUS-316 tip with boss

❸12 propeller R ϕ120
- SUS-316 tip with boss

❹12 disk turbine ϕ150
- SUS-316 tip with boss

❺12 disperser ϕ150
- SUS-316 tip with boss

Paddle type agitator blade (12 series) * Made-to-order

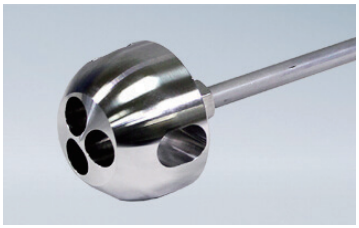


❶12 anchor blade ϕ200
- SUS-316 tip with boss

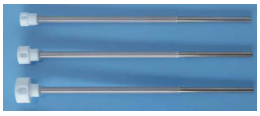
❷12 flat paddle blade ϕ150
- SUS-316 tip with boss

ϕ12 agitation shaft (12 series) * Made-to-order

ℓ800mm
- ϕ12 SUS-316



- SUS-316 type



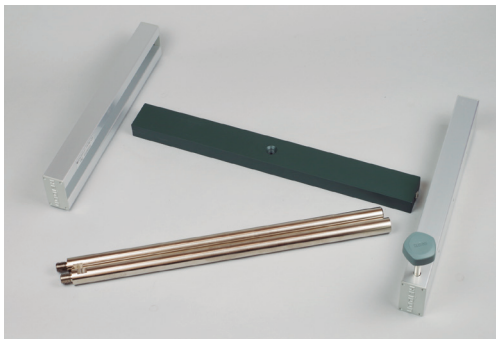
- Fluorine resin type

Centrifugal stirrer “C-Mix”

C-Mix

This is an all-new agitation technology, where the agitation body equipped with two communication holes with different distance (discharge hole and suction hole) is rotated around its axis (shaft) to generate a centrifugal force inside the agitation body.
The swirl flow formed by the rotation of the C-Mix and the suction flow from the bottom are generated simultaneously, creating a steric agitation flow that involves vertical stirring movements. In this way, the liquid inside the container is thoroughly mixed to ensure uniform agitation of diluted substances and components, which even promotes soaking to realize a stable agitation operation with shorter amount of time.

It does not take in air. (Eliminates air bubbles)
Properties of the materials are maintained. (Reduces breaking of stirred materials)
Contents at the bottom of the container is mixed well. (Prevents settling)

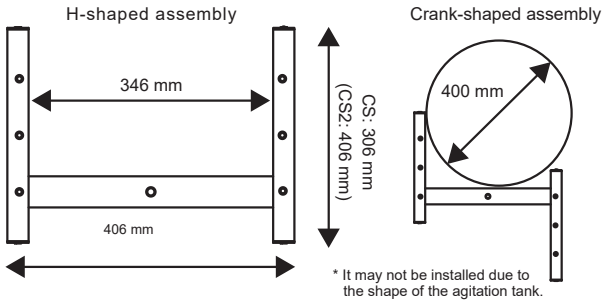


Collapsible stand — Type: CS CS2 PAT.1569032

CS / CS2

This H-shaped collapsible stand has the pole located at the most dynamically stable point for the 4 legs. In addition, one of the legs includes an adjustment screw to eliminate wobble on uneven surfaces. By tightening the 2 included screws with the L wrench, this slim collapsible stand can be assembled in an H-shape, as shown in the picture, or crank-shape.

- Type: CS MSRP: 28,000 yen
- Type: CS2 (For BLW, Ex, EP) MSRP: 35,000 yen



400 mm extension pole
- Type: CS
- Type: CS2

200 mm extension pole
- Type: CS
- Type: CS2

The standard pole length of 800 mm is achieved by connecting two 400 mm poles. However, optional extension poles of 400 mm and 200 mm are available. By combining the standard 800 mm pole with the 400 mm extension pole, a pole of 1200 mm will be available.
* Poles CS and CS2 differ in diameter.

Clamp holder — Type: 21 × 16

Painstakingly designed as the holder for the Three-one Motor, this dual opening holder can secure poles with a range of ϕ16 mm to ϕ21 mm at the correct angle.
The knobs on the end of the screws have a shape that makes tightening extraordinarily easy, and the rods can be tightly secured using little force.

Clamp holder
- Type: 21×16
- Type: 21×16×10

Drill chuck

Stainless steel drill chuck. When the agitation shaft must be secured using a chuck key, it is possible to replace the keyless chuck with the drill chuck. Please specify which style chuck you want when placing an order.

Drill chuck

- Application: ϕ8 mm (It can also be used for dimeters smaller than 8 mm.)

Air purge

Recently, there are increasingly more calls for improved safety during experiments. In order to increase the safety of the Three-one Motor, we have created an air purge optional accessory. Through pressure created by an air supply, the pressure inside the motor and control box is raised slightly above the external pressure, thereby preventing ambient air from entering these areas.

Applicable models: BLh, BL, Z+, Ft, R (Only the main unit)

* The air purge does not meet the criteria for completely explosion proof.
* An air source, such a compressor, is required.
* Please inquire us about the price.

Stopper for preventing shaft fall

As the Three-one Motor's agitation shaft is designed to penetrate through the drive axis, unexpected shaft fall can be eliminated by mounting this stopper.
The stopper should be attached especially when using glass containers such as beakers.

Stopper for preventing shaft fall

* With a L-wrench

Vacuum stirrer PAT.

The main feature is in the taper joint. Twelve thin fins in the seal between the flask and Teflon create a tight seal. The high degree of vacuum makes reduced pressure agitation of at least 10^{-3} possible. The shaft joint seal uses the gland packing method of a Teflon cup seal with O-ring.

Vacuum stirrer

- Type/K24 ● Application: For TS24
- Type/K29 ● Application: For TS29

Spare parts

- Gland seals (4 seals included)
- Internal components

Collets for the keyless chuck

Only ϕ8 mm shafts fit the keyless chuck provided with the Three-one Motor. To use ϕ2 mm, ϕ4 mm or ϕ6 mm shafts, it is necessary to change the collet.
ϕ5 mm shafts, which are common in the steel core of Teflon-coated blades, are also available.

Collets for the keyless chuck

- Type: CC-2 ● Application: ϕ2 mm
- Type: CC-4 ● Application: ϕ4 mm
- Type: CC-5 ● Application: ϕ5 mm
- Type: CC-6 ● Application: ϕ6 mm
- Type: CC-8 ● Application: ϕ8 mm

Safety cover (simple type)

Cover for the chuck that makes agitation operations with the Three-one Motor even safer. It is possible that long hair may become entangled in the rotating chuck when peering into the agitation tank. The safety cover encloses the rotating chuck, making the Three-one Motor extremely safe to operate.

Safety cover for the BL series

- 4 safety covers
- 1 safety cover

* The cover cannot be attached to the BLW or EPW series.
* For the EP series, use the safety cover for the EP series.

Full-guard safety cover (for retrofitting)

The large-sized safety cover, which can be retrofitted to an existing agitator, has improved safety and covers not only the chuck part but also the upper part of the drive shaft.
It adopts an acrylic cover that enables the operation status to be clearly observed and, because it is openable, the blades can easily be replaced.
Applicable to the BLW, BLh, BL, Ex and EP series. (except BLW3000)

Full-guard safety cover (for retrofitting)

- Type: BLW ● Application: For BLW
- Type: BL ● Application: For BL, BLh
- Type: Ex ● Application: For Ex
- Type: EP ● Application: For EP

* The picture is different from the actual specifications.

Foreign object catcher

It should be mounted to the agitation shaft to prevent foreign matters attached to the chuck from falling into the agitation container.
* The catcher will also rotate during the agitation operation because it is fixed to the shaft (ϕ8 mm) with a boss.

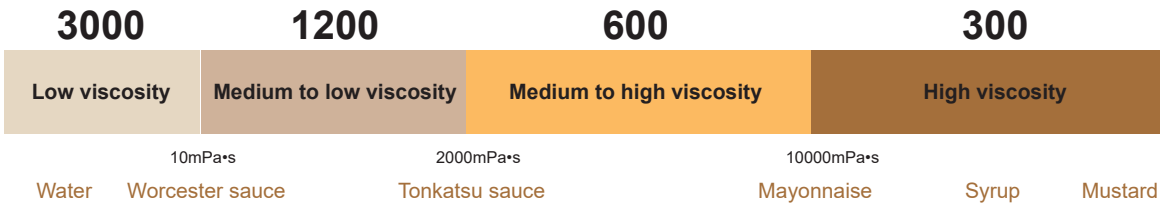
Foreign object catcher

How to select a Three-one Motor

There are three major series of Three-one Motors, and they differ based on the strength (power) of the motor. The BL series uses a 40 W motor, while the BLh series uses an 80 W motor and the BLW series uses a 120 W motor, and as the figure increases, the torque becomes stronger, enabling the Three-one Motor to handle the agitation of high viscosities and large volumes. In addition, each series contains four models, and the figure in the model number represents the maximum speed (rpm). Within the same series, the lower the number (low maximum speed), the stronger the torque (power), and the higher the number, the weaker the torque (power). Normally, a 300 or 600 model is used to agitate high viscosity substances, and a 1200 or 3000 model is used for low viscosity substances.

Image of the agitation volume by series

Image of the applicable viscosities by model



Case Study

Case 1 **Painting manufacturer** Three-one motor model **EX2000**	**Paint** In the trial production of paints, usual electric-type agitators had been used. After the laboratory was moved, however, use of the usual agitators was no longer allowed due to a fire prevention reason.	For agitation of paints and organic solvents, an air motor type agitator or pressure and explosion proof agitator, which is usable in a hazardous place, is needed. Moreover, for the trial production of paints, fine adjustments of rotation is required and stable rotation is also essential. Therefore, the EX2000 was introduced.	By using the EX2000, which is an approved product, no problem was indicated in the fire prevention. As EX2000 does not need compressor, the cost for introduction was lower as compared with an air motor type product. • Agitation in a hazardous place • Agitation requiring fine rotation adjustments and accurate rotation control
Case 2 **Foodstuff manufacturer** Three-one motor model **TE300**	**Paste (fish)** Traditionally, each individual worker made the paste by hand, but there was some variation in the quality of the final product based on the skill, experience, etc. of the worker. Therefore, it was not possible to supply a product with stable quality.	In order to make a paste with consistent quality, it is necessary to control the viscosity during the manufacturing process, so the BL600Te was introduced. The torque during agitation was measured in simulated production and used as the change in viscosity.	By controlling and recording the work process of an experienced worker, an operation process manual was successfully created. Following the completion of the manual, it became possible for all workers to create products with the same quality as an experienced worker and for the company to provide products with consistently stable quality. • Grasp the state of agitation of 2 liquids with different viscosities. • Grasp the state of reactions that result in changes in viscosity.
Case 3 **Adhesive manufacturer** Three-one motor model **BLW300**	**Sealant** Because the viscosity of the sealant was high and agitation after inputting the reagents did not go well, the final mixing around the edges of the container had to be done by hand. The effect of the added reagents sometimes did not occur when agitation was insufficient.	For liquids with a high viscosity, it is necessary to use an agitator blade with a large contact surface. Therefore, a Three-one Motor model BLW300, with its high torque, was introduced.	As a result of the agitator's high torque, it was possible to use a blade that measured 90% of the diameter of the container, and sufficient agitation was achieved. Through this, the expected effects of the reagents could be adequately realized. • Agitation of high viscosity substances such as corn starch, syrup, grease, etc. • Possible to agitate larger volumes by using a large blade.

HEIDON

HEIDON Shinto Scientific Co., Ltd.

Headquarters/Sales Department:
27 Kanda-Higashikonya-cho, Chiyoda-ku, Tokyo 101-0034
Phone: +81-3-3252-2791 FAX +81-3-3252-2792
Nihonbashi Laboratory:
11-11 Nihonbashi Kobuna-cho, Chuo-ku, Tokyo 103-0024
Ogose Factory:
178-1 Doyama, Ogose-machi, Iruma-gun, Saitama Prefecture 350-0406

http://www.heidon.co.jp/ tom@heidon.co.jp

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