



MSU / MSCP Installation and Instruction Manual



The Ogura model MSU is an inline shaft unit in which the MSC type clutch and MSB type brake are accurately centered and set in a light alloy housing, and is ideal for repeated start and stop. The MSCP type has only the clutch set in the same way as the MSU type. All of them are stationary type and have input / output shafts, so they can be easily connected directly by coupling or driven by belt pulleys. In addition, it has a large heat dissipation capacity, can withstand high frequency use, and the gap is kept constant by the auto gap device only by applying the exciting voltage, so no adjustment is required after installation.

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Please refer to the product catalog and technical data for detailed product dimensions and characteristics.

■ When using the unit, please read the "Safety Precautions" in Section 1 of this instruction manual first, and then read the functions and below in Section 2.

■ If you maintain the product based on this instruction manual and perform regular inspections, you can use it with peace of mind for longer performance.

■ Please follow this instruction manual in the handling, maintenance and inspection of the unit in your machine / equipment.

■ Please keep this instruction manual in a safe place so that you can take it out and read it when necessary, and be sure to deliver it to the final customer.

1. Safety Precautions << Be sure to read before use >>

When using the product, please read this instruction manual, product specifications, and other technical documents carefully, and pay sufficient attention to safety when handling the product correctly.

DANGER and CAUTION:

It is assumed that the user may be killed or seriously injured if mishandled.

There is a risk of injury to the user due to when mishandling, and property damage is expected to occur.

Although every effort has been made to ensure quality control, in the unlikely event that the clutch does not disengage and the machine rotates continuously, the brakes do not work and the machine coasts, or if the vibration becomes large, it may be damaged. It is expected. Please pay sufficient attention to safety measures on the machine side in case of these failures.

1-1. Precautions for Installation

Do not use in an atmosphere where there is a risk of ignition or explosion.

Never use it in a flammable gas atmosphere where there is a risk of ignition or explosion. Also, if there is a flammable material such as cloth nearby, seal the main body. Please note that the allowable work load will decrease if it is sealed.

When shutting off DC, use a protective element in parallel with the clutch / brake coil.

A counter electromotive voltage (back electromotive force) is generated when the switch is turned off, so if it is used as it is, it may cause deterioration of switch contacts, deterioration of coil insulation and burning, and cause adverse effects on peripheral devices. It is necessary to connect appropriate protection elements to form a discharge circuit.

Be sure to install the safety cover

Since there is a rotating body, touching the product with your hands or fingers may cause injury. To prevent danger, be sure to use a well-ventilated safety cover to prevent your body from touching it. Also, install a safety mechanism so that the rotating body suddenly stops when the cover is opened.

This product is a product in which the clutch and brake are engaged when the coil is energized.

Make sure that it is suitable for the intended use and purpose of use, and then install it in the machine.

Do not use in places exposed to dust, high temperature, condensation, wind and rain.

Also, do not install it directly in a place subject to vibration or shock.

If used in the above-mentioned surrounding environment, it may cause damage to the product, malfunction, or deterioration of performance.

1-2. Handling Precautions

Do not allow water or oils to adhere (do not apply).

Since the clutch and brake are for dry type, the torque will drop significantly if oils adhere to the friction surface. Therefore, the machine may coast or run away, causing an accident or injury.

Do not hang the product with lead wires.

Do not pull or bend the lead wire protruding from the terminal block at an acute angle. In particular, if you hang the product by holding the lead wire, the unit may fall on your leg and cause an accident or injury. Be sure to carry the product itself when handling it.

Please be careful about the weight when installing / removing / transporting.

If you have a heavy product, you may get injured due to back pain or falling. Please be careful when installing, removing, and transporting. Especially for products with eyebolts, use a hoist etc. for work.

1-3. Precautions for Installation

Use a wire size that matches the power capacity.

If an electric wire with a small current capacity is used, the insulation film will melt and insulation will be poor, which may cause electric shock and leakage, as well as cause a fire.

Be sure to control the tightening torque of the bolts and prevent them from loosening.

Depending on how tight the bolts are, they may be in a very dangerous state such as shearing and breakage. Be sure to use the specified tightening torque and bolt material, tighten it securely so that it will not loosen due to machine vibration, etc., and use adhesive, spring washers, etc. to prevent it from loosening.

Do not allow water or oils to adhere (do not apply).

Since the clutch and brake are for dry type, the torque will drop significantly if oils adhere to the friction surface. Therefore, the machine may coast or run away, causing an accident or injury. Please attach a protective cover when using in a place where oil or water easily enters.

1-4. Precautions Before Operating

Do not use in an atmosphere where there is a risk of ignition or explosion.

Never use it in a flammable gas atmosphere where there is a risk of ignition or explosion. Also, if there is a flammable material such as cloth nearby, seal the main body. Please note that the allowable work load will decrease if it is sealed.

Please operate within the allowable work load.

If you operate more than the allowable amount of work, heat generation may increase and the operating surface may become very hot and cause a fire. In addition, the specified performance will not be obtained, so please use within the allowable work load.

The surface may become hot just by energizing. Do not touch the product while the power is on.

The surface temperature of the main body rises due to the heat generated by the coil even when the power is turned on. Please note that touching it may cause burns. The temperature does not drop immediately after use. Make sure that the temperature has dropped sufficiently before working, not only during operation, but also when touching the product for maintenance or inspection.

1-5. Precautions While Operating

Do not increase the rotation beyond the permissible rotation speed.

If it is used above the permissible rotation speed, vibration will increase, and in some cases it may be damaged or scattered, resulting in a very dangerous condition. Be sure to use it at the allowable rotation speed or less and install a protective cover.

Do not touch the product while operating.

The rotating part is exposed to the outside, and touching the product with your hands or fingers may cause injury. Never touch the product while operating.

The surface temperature of the product may rise to about 90 to 100 ° C due to slip heat and heat generated by the built-in coil. Never touch the product while operating, as you will get burned if you touch it. The temperature does not drop immediately after the operation is stopped. Make sure that the temperature has dropped sufficiently before working, not only during operation, but also when touching the product for maintenance or inspection.

Keep voltage fluctuations within $\pm 10\%$.

If a voltage outside the specified range is applied, problems such as performance degradation and burning may occur.

If abnormal noise or vibration is generated during operation, there is a possibility that the product may not be installed properly, and if left unattended, the device itself may be damaged.

Immediately stop operation and inspect.

1-6. Precautions for Maintenance and Inspection

Never disassemble the product.

Please note that we are not responsible for any damages caused by repairs, disassembly and modifications made by any party.

Do not allow water or oils to adhere (do not apply).

Since the clutch and brake are for dry type, the torque will drop significantly if oils adhere to the friction surface. Therefore, the machine may coast or run away, causing an accident or injury. If you use it in a place where oil or water can easily enter, attach a protective cover.

Do not touch the power supply.

Since the power supply unit is exposed to the outside, there is a risk of electric shock if you touch it with your hands or fingers. Do not touch it directly during operation as well

as during maintenance and inspection, and be sure to turn off the power before starting work.

2. Function - Performance

2-1. Specifications

Table 1 Performance

Model Name	[N · m]	[V]	[W]	[Ω] at20°C	[kg]
MSU 1.2 MSCP 1.2	12	24	17	35	4.5 3.5
MSU 2.5 MSCP 2.5	25	24	25	23	7.8 5.8
MSU 5 MSCP 5	50	24	30	19	14.0 10.5
MSU 10 MSCP 10	100	24	35	16.4	25.5 19.0
MSU 20 MSCP 20	200	24	50	11.5	44.0 32.5
MSU 40 MSCP 40	400	24	65	8.9	71.5 55.0
MSU 70 MSCP 70	700	24	90	6.4	145 115
MSU 100 MSCP 100	1000	24	100	5.8	190 150

Note: MSU type indicates clutch / brake, and MSCP type indicates clutch only.

2-2. Structure and Operation

The MSU type has the structure shown in Fig. 1, and the MSCP type has the structure shown in Fig. 2.

③ ⑧ Clutch / brake field with built-in coil (*clutch field ② for MSCP type*) is fixed to the inner surface of the casing, respectively, ④ input shaft (*⑥ for MSCP type*) and ⑨ output shaft (*⑪ for MSCP type*). Is supported by ② ⑤ ball bearings (*MSCP type ③ ⑦ ⑩*).

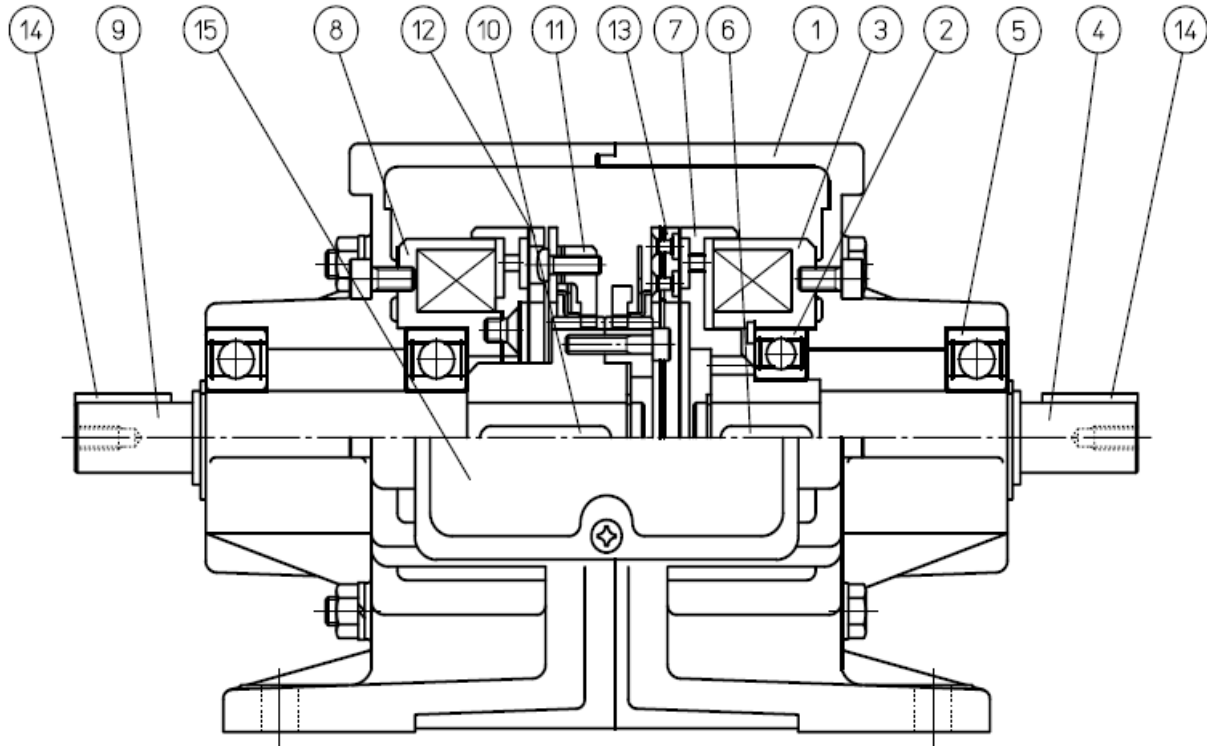
For the MSU type, the brake disc assembly is screwed to the brake field. The ⑦ rotor assembly is fixed to the input shaft by the ⑥ parallel key, and the ⑪ armature hub (*⑫ for the MSCP type*) is fixed to the output shaft by the ⑩ parallel key (*⑨ for the MSCP type*).

⑬ Clutch armature (*MSCP type is ⑧*) and ⑫ Brake armature are attached to the spline part of the armature hub via a guide.

When the clutch side coil is energized, magnetic flux flows between the clutch field, rotor, and clutch armature, the armature is attracted to the rotor, the clutch is engaged, and the rotation of the input shaft is transmitted to the output shaft.

The auto-gap device keeps the air gap constant even if the friction surface wears.

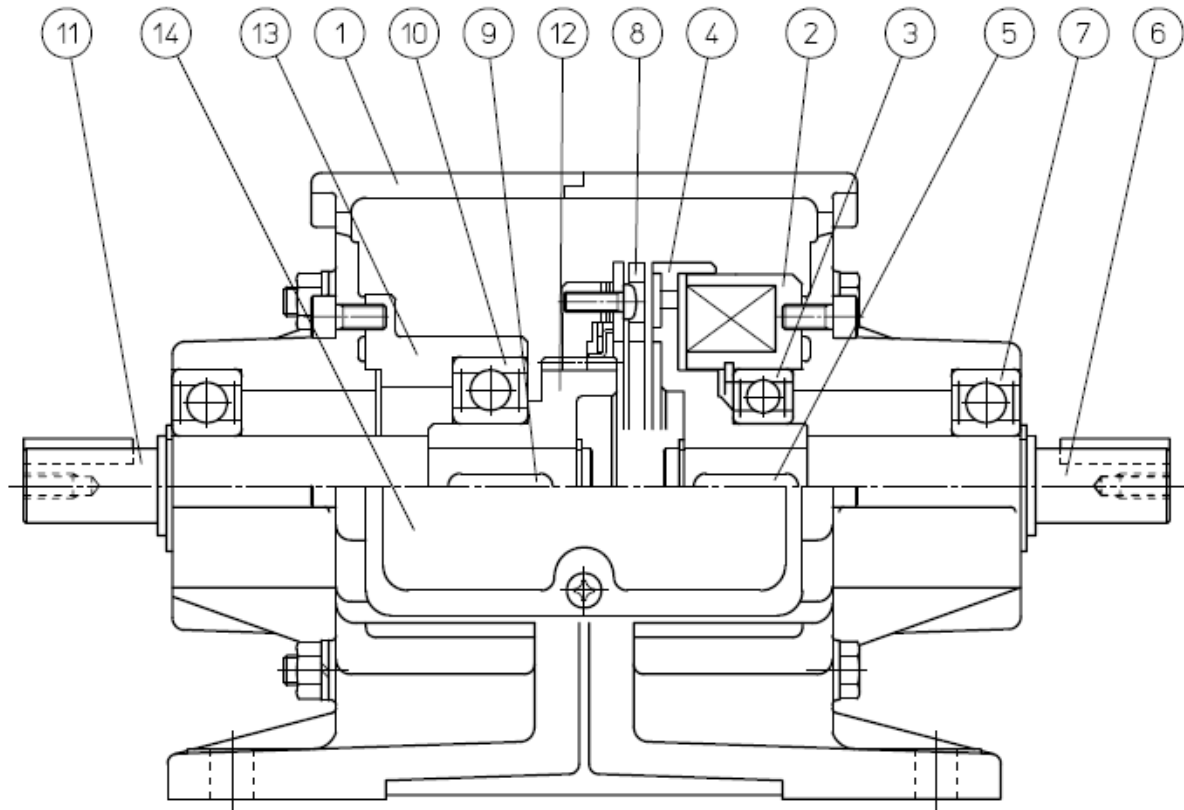
Fig 1. MSU type



MSU type clutch / brake component names

- | | | |
|-------------------|----------------|------------------|
| ① Casing | ② Ball bearing | ③ Clutch field |
| ④ Input axis | ⑤ Ball bearing | ⑥ Parallel key |
| ⑦ Rotor assembly | ⑧ Brake field | ⑨ Output shaft |
| ⑩ Parallel key | ⑪ Armature hub | ⑫ Brake armature |
| ⑬ Clutch armature | ⑭ Parallel key | ⑮ Terminal block |

Fig 2. MSCP type



MSCP type clutch component names

- | | | |
|------------------|-------------------|----------------|
| ① Casing | ② Clutch field | ③ Ball bearing |
| ④ Rotor assembly | ⑤ Parallel key | ⑥ Input axis |
| ⑦ Ball bearing | ⑧ Clutch armature | ⑨ Parallel key |
| ⑩ Ball bearing | ⑪ Output shaft | ⑫ Armature hub |
| ⑬ Flange | ⑭ Terminal block | |

3. Precautions – Practical Use

3-1. Handling Precautions

Do not hit, drop, or apply excessive force to the product.

Electromagnetic clutches and brakes use a lot of soft materials. Please note that if you hit or drop it or apply excessive force, it may cause dents or deformation, which may cause malfunction or insufficient torque.

Do not allow water or oils to adhere (do not apply).

Since the clutch and brake are for dry type, if oils adhere to the friction surface, the torque will be significantly reduced and the function of the product will be impaired, so please avoid water and oils. Also, be aware that if oil gets on the auto-gap device or the armature hub, the auto-gap function cannot be maintained. If you use it in a place where oil or water can easily get in, attach a protective cover.

Do not hang the product with lead wires.

Do not pull or bend the lead wire coming out of the product at an acute angle. In particular, if you place an object on the lead wire or hang the product by holding the lead wire, the lead wire will be crushed, damaged or broken, and you will not be able to use it. Be sure to carry the product itself when handling it.

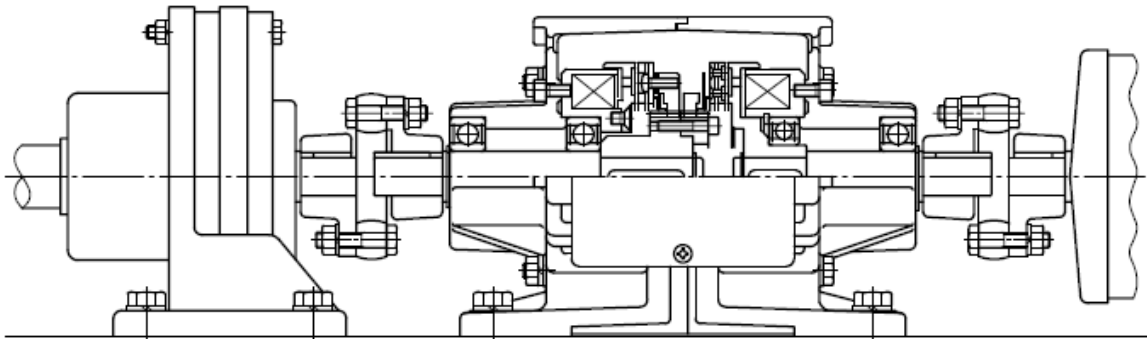
Be careful not to damage the clutch or brake when handling.

When installing, removing, and transporting, be careful when handling the clutch and brake so that there is no impact or collision.

3-2. Precautions for Installation

When installing, pay attention to the following points:

Fig 3. An example in which the MSU type is installed between the motor and the reducer to start and stop the load.



Do not allow water or oils to adhere (do not apply).

Since the clutch and brake are for dry type, if oils adhere to the friction surface, the torque will be significantly reduced and the function of the product will be impaired, so please avoid it. If you use it in a place where oil or water can easily get in, attach a protective cover.

Securely mount the installation on a solid flat surface.

For the casing installation surface, securely tighten the bolts to the specified torque on a solid machined flat surface, and take measures to prevent loosening with adhesive, spring washers, etc.

Install so that there is no misalignment.

When connecting by coupling etc., install so that there is no misalignment (axial displacement, deviation, declination).

Do not give an impact to the input shaft and output shaft.

If an impact is applied to the input shaft / output shaft, the auto gap device will not operate normally. Therefore, when inserting a coupling etc. into the shaft, use the center tap at the end of the input shaft / output shaft.

Set the inner diameter tolerance of the coupling etc. to H7.

The input shaft and output shaft are processed to h7. Set JIS H7 and h7 for the drive side and the driven side.

Connect the wiring to the clutch and brake as shown in the figure.

Connect the accessory back surge absorption protection element (varistor) to each of the clutch and brake in parallel. At that time, the lead wires and protective elements of the clutch and brake have no polarity.

Fig 4. Terminals

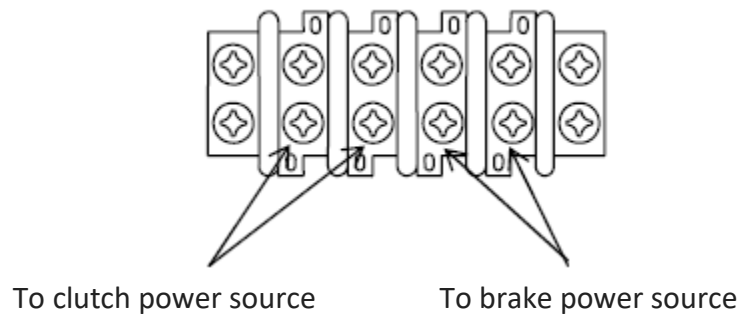
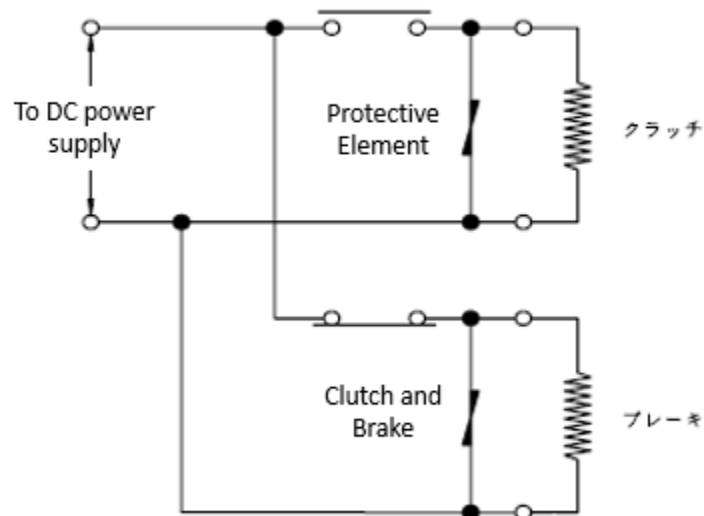


Figure 5 Wiring diagram



Check the torque when installing the machine.

This unit is designed to generate the specified torque from the beginning, but if the friction surface is not sufficiently fitted depending on the mounting condition, the specified torque may not be generated from the beginning, so be sure to check the torque sufficiently when installing the machine.

On the actual machine, make sure that the load can be started within the specified time and stopped within the specified time and distance.

<<Burnishing of friction surfaces>>

If the specified torque is not output, pay attention to the following points when burnishing the friction surfaces.

Pay attention to the temperature rise of the casing under the condition of less than half of the allowable power of the catalog.

Perform break-in operation with a light load.

If the specified torque does not come out even after burnishing, please contact us.

3-3. Confirmation During Operation

1) Be sure to check the following points during trial run or before starting operation.

- (a) Is the casing securely tightened?
- (b) Is the exciting voltage the rated voltage at the terminal block of the clutch / brake?
- (c) Does the armature operate smoothly by turning the switch ON / OFF?

Especially when starting to use after long-term storage, make sure that the output shaft rotates smoothly when the clutch is turned on and stops when the brake is turned on before starting operation.

2) Check the following points during the test run.

- (a) Does the clutch work and the load is connected smoothly?
- (b) Does the brake work and the load stops smoothly?

(c) Is there any abnormal noise or overheating?

If you continue to operate and the casing temperature rises too high, check that the load is below the allowable power in the catalog.

3-4. Maintenance and Inspection

In order to keep the clutch and brake in a normal state at all times, perform the following maintenance and inspection regarding the clutch and brake.

1) Protection

Do not allow water or oils to adhere (do not apply).

Since this clutch / brake is for dry type, if oils adhere to the friction surface, the torque will be significantly reduced and the function of the product will be impaired. Therefore, never use water or oils. If you use it in a place where oil or water can easily get in, attach a protective cover.

Make sure to supply the specified voltage.

The engagement time and torque of clutches and brakes change depending on the exciting voltage. Also, if the exciting voltage is too low, the clutch and brake will not be able to engage, so be sure to supply the specified voltage. Even if the power supply voltage is as specified, if the circuit is long, the voltage will drop due to line resistance, so check the voltage at the clutch / brake terminal when the power is on.

Check the ambient temperature

The operating atmosphere temperature should be in the range of -10 to 40° C. If used at high temperatures, the frictional heat generated during clutching and braking cannot be dissipated, and the coil and friction parts may be damaged. Also, please note that when used at low temperatures, moisture will adhere due to condensation.

Be careful of rust.

Make sure that the clutch and brake are free of rust. Especially when used in areas with high salt content such as beach areas, the installation environment may promote the generation of rust. In this case, please consider implementing rust prevention measures.

2) Point Inspection

If you inspect this clutch / brake regularly, you will be able to demonstrate its performance for a longer period of time. The inspection period varies depending on the specific usage conditions of the customer, so please contact us.

Is there any foreign matter or water or oil on the friction surface or rotating parts?

The clutch and brake are for dry use, so make sure that oil, water or dust does not get into the friction surface. If foreign matter gets into the friction surface or rotating parts, the performance of the clutch / brake may deteriorate.

Is a large amount of dust or abrasion powder accumulated?

If a large amount of dust or abrasion powder collects in the gaps or sliding parts of the clutch / brake, it may cause malfunction.

Is there rust?

Make sure that the clutch and brake are free of rust. Especially when used in areas with high salt content such as beach areas, rusting may be promoted depending on the installation environment. In this case, please consider implementing rust prevention measures.

Is there any abnormality in the operation?

When the clutch is ON, check that the input shaft and output shaft rotate smoothly in the connected state, and when the brake is ON, check that the output shaft is in the stopped state and the input shaft rotates smoothly.

Is the exciting voltage normal?

For clutches and brakes, the engagement time and torque change when the exciting voltage fluctuates. Also, if the exciting voltage falls below the specified value, the clutch and brake will not be able to attract, so be sure to supply the specified voltage. Even if the power supply voltage is as specified, if the circuit is long, the voltage will drop due to line resistance, so check the voltage at the clutch / brake terminal when the power is on.

Is the airgap set to the specified value?

Since the clutch and brake are equipped with an auto gap device, they can be kept constant at the specified clearance for the entire life. Do not subject it to vibration or shock. Measure the airgaps uniformly at 3 or more circumferences.

Is there any abnormal noise?

Pay attention to the abnormal noise generated by the clutch and brake.

Is there an abnormal high temperature?

Make sure that the clutch and brake do not generate abnormal heat.

Are the mounting screws loose?

Check that the unit mounting screws and components are not loose.

3) Inspection of Wear Amount

Check the wear limit line on a regular basis.

The friction surface gradually wears over time, but the air gap is kept constant by the action of the auto gap device, so no adjustment is necessary.

Occasionally remove abrasion powder using air or the like.

In the case of normal wear, the amount of wear can be used up to the limit value shown in Table 4. If the wear limit line (see Fig. 6) is exceeded, the product will reach the end of its life, so replace the unit with a new one.

Figure 6

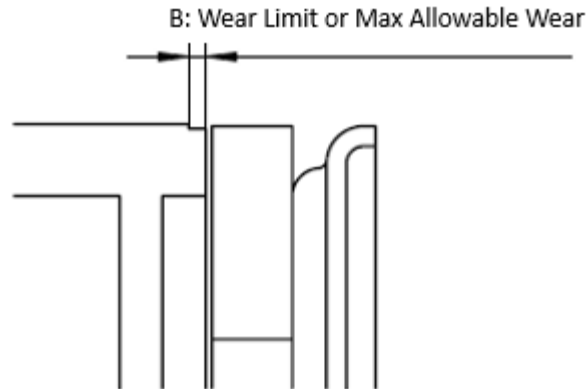


Table 4 Wear limit and total work (at room temperature)

Model Name MSU - MSCP	1.2	2.5	5	10	20	40	70	100
Max Wear B (mm)	1.0	1.0	1.3	1.5	2.0	2.0	2.0	2.0
Max Total Energy to Life (J)	18×10^7	27×10^7	56×10^7	83×10^7	160×10^7	230×10^7	370×10^7	520×10^7

4. Troubleshooting

* If you find any abnormality during use, check the following probable factors and take appropriate measures. If you have any questions, please contact us.

Problem : Clutch / brake slips

Reason: Oil adheres to the friction surface. Action: Replace the unit.

Reason: Foreign matter is in the friction surface. Action: Remove foreign matter.

Reason: The exciting voltage is low. Action: Apply rated voltage.

Reason: Overload. Action: Reduce load torque or increase the unit size.

Problem: Clutch / brake is not working properly

Reason: Abnormality of power supply, circuit, switch. Action: Replace with a normal one.

Reason: The exciting voltage is low. Action: Apply rated voltage.

Problem: Clutch / brake does not work

Reason: Abnormality in the electric circuit. Action: Replace with a normal one.

Reason: The rated voltage is not supplied to the clutch / brake terminals. Action: Apply rated voltage.

Reason: The clutch / brake coil or lead wire is broken. Action: Replace the unit.

Problem: Clutch / brake temperature is high

Reason: High excitation voltage. Action: Set to rated voltage.

Reason: Loose connection. Action: Tighten the connection.

Reason: Overload. Action: Lighten the load.

Reason: High ambient temperature. Action: Improve ventilation / airflow.

Problem: There is an abnormal noise

Reason: Foreign matter in the friction surface. Action: Remove foreign matter.

Reason: The mounting condition is not good. Action: Install correctly.

Please note that the specifications and contents described in this instruction manual are subject to change without notice.

