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# **INSTALLATION, LUBRICATION AND OPERATION INSTRUCTIONS**

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WORM GEAR SPEED REDUCER

Model:MA

These instructions must be read thoroughly before installing or operating speed reducers so that unit would be used for long time, File instructions for future reference and for ordering of replacement parts.

**Makishinko Co., Ltd.**

3-4-206 Tanimachi 7 Chome, Chuo-ku, Osaka 542-0012, Japan

Thank you for buying our worm gear speed reducer.  
This instruction explain its installation, operation, maintenance, service and so on so  
that unit would be used for long time.

For motorized unit, please see enclosed instruction made by motor maker.

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## General information

- This instruction is for set makers.

On the installation and usage of this product, please enclose this instruction and explain completely warning and attentions on operation to your end user.

- If your end user installs this product, e.g. for exchange of his product, he must observe all items in this instruction.

A set maker, a customer who installs our product  
An end user, a customer who uses the installed product

### Attention

- Transportation, installation, operation, maintenance, and service must be performed by personnel who is familiar this product.
- Any modifications by customers, which are out of our responsibility, are prohibited and lead to cancellation of liability.
- Don't use this product as a speed-increasing gear. Please observe its type and specifications shown on name plate. The product will be damaged.
- Don't put your hands or goods into the product openings. Personal injury or product damage might occur.
- On disposal of the product or lubricating oil, deal with it as general industrial waste.

## Definitions and symbols

In this instruction, the following symbols are used for the "danger", "warning", and "attention".

Danger: caution must be observed, otherwise death or serious injury might occur.

warning: caution must be observed, otherwise death or serious injury might occur.

Attention: caution must be observed, otherwise slight injury or product damage might occur.

## Product types in this instruction

MAB	.....	single reduction	
MAW	.....	single reduction	
MAK	.....	single reduction	
MAOB	.....	single reduction	hollow output shaft
MAOW	.....	single reduction	hollow output shaft
MAOK	.....	single reduction	hollow output shaft
MABP	.....	single reduction	with base plate
MAWP	.....	single reduction	with base plate
MAKP	.....	single reduction	with base plate
MAOBP	.....	single reduction	hollow output shaft with base plate
MAOWP	.....	single reduction	hollow output shaft with base plate
MAOKP	.....	single reduction	hollow output shaft with base plate
MAB-E	.....	single reduction	with motor
MAW-E	.....	single reduction	with motor
MAK-E	.....	single reduction	with motor
MAOB-E	.....	single reduction	hollow shaft with motor
MAOW-E	.....	single reduction	hollow output shaft with motor
MAOK-E	.....	single reduction	hollow output shaft with motor
MABP-E	.....	single reduction	with motor and base plate
MAWP-E	.....	single reduction	with motor and base plate
MAKP-E	.....	single reduction	with motor and base plate
MAOBP-E	.....	single reduction	hollow output shaft with motor and plate
MAOWP-E	.....	single reduction	hollow output shaft with motor and plate
MAOKP-E	.....	single reduction	hollow output shaft with motor and plate

※brake motor is included in case of with motor.

## Permissible environment

Temperature: 0°C~50°C

Humidity: 80% or less (condensed water must be removed)

Operation is not allowed in corrosive gas and in dusty air.

## Safety instructions

Please read and understand the following items before usage, and observe them.

### Danger:

- Don't use this product in explosive atmosphere and near flammable things.  
Explosion, ignition, fire, electric shock, injury, and product damage will be caused.
- On lifting the product for transport, never stand under it.  
Injury or accidents might be caused by falling down.

### Warning:

- Don't touch the product with bare hands in an hour around after stopping operation or during operation the product.  
Personnel might burn their hands because the product has high temperature.  
※ This warning is stuck to the product as a warning label.
- Check of worn gear must be performed while the product stops.  
Be sure to stop rotating the prime mover and the driven machine.  
Injury might occur by being caught in wheel mesh.
- Don't touch rotating parts (e.g. input and output shaft) of the running machine.  
It might cause being caught in the machine or getting injured.

#### Warning

Don't touch the surface!  
You might burn your hands.

### Attention:

- Be sure to use hanging bolts or lifting apparatus on transporting the product.  
working persons might get injured if the product falls down.
- Don't touch the shaft key way with bare hands.  
It might hurt your hands.
- Don't transport the product with holding the shaft or lifting apparatus on the shaft.  
The shaft might be bent or damaged, which might cause troubles of the product.
- Please remove a red pin (or a white one) of the oil filler before running the product.  
For size 80,100,125,140 and 160, which are without oil filler, please change to the attached oil filler with air vent hole, otherwise the lubricating oil will leak.
- Check if regulated quantity of lubricating oil is observed before starting operation.  
If lubricating oil is not enough, the product might be damaged.
- The maximum temperature of the outer wall of the product is 95°C.  
If it is over 95°C, the product might be damaged.

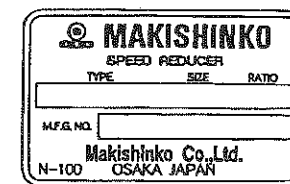
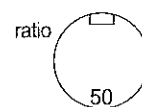
## Check of the product

please check the following items about the product you bought.

### Attention:

- Please unpack the product after verifying the package isn't upside down.  
Falling the product might cause injury.
- Please check if the product is the same one as you ordered by means of the product itself and its name plate (its specifications; type, size, ratio, etc.).
- Please check if the product is not damaged by an accident during transport.
- If you don't use the product immediately and need to store it for a short term, please keep it at a dry and well ventilated place.
- The name plate is mounted on the product.  
Don't remove the name plate.
- The ratio is carved in the edge of the output shaft.  
please check if the ratio is the same as that in the name plate.

Display on the edge



## Transportation

Please pay attention to the following items on transportation.

When lifting up the product with wire, please use hanging bolts or lifting apparatus to avoid personal injury and physical damage by falling down the product.  
Don't hang wire directly on the input/output shaft hold them with bare hands.

### Danger:

- On lifting the product for transport, never stand under it.  
Injury or accidents might be caused by falling down.

### Attention:

- When transporting the product, please be sure to use hanging bolts or lifting apparatus.  
Injury might be caused by falling down.
- Don't transport the product with holding the shaft or hanging lifting apparatus on the shaft.  
The shaft might be bent or damaged, which might cause the failure of the product.
- Don't drop or fall down the product during transportation.  
Injury or product damage might be caused.
- Don't touch the axle key way with bare hands.  
It might hurt your hands.

## Installation

On installation, please pay attention to the following items.

- Mounting direction  
In case of the standard type, install the product so that the mounting surface faces to the bottom.  
In wrong direction, lubrication of worm gear and bearings is impossible, therefore, the product will be damaged.
- Mounting surface  
mounting surface must be rigid enough and secured a flat surface processed mechanically. Otherwise, vibration and noise will cause the product damage.
- Installation of the product with hollow output shaft  
Align the product with the corresponding machine based on the hollow hole of the output shaft and install the base plate.

## Connection to the driven machine

On connection to driven machine, please pay attention to the following items.

### Attention:

- When the product is directly connected to the driven machine, direct-connected accuracy must be less than its permissive value.  
Damage on the product/machine might occur.
- Please check the rotating direction of the shaft before connecting the driven machine.  
Injury or product damage might occur.
- Put a protecting cover not to touch rotating parts.  
Otherwise, injury might occur.
- Input/output shaft
  - Rust prevention oil is applied to some input/output shafts.  
In this case, remove with solution like thinner. Please be careful so that the solution doesn't stick to oil seal of the shaft. It might cause damage on the oil seal.
  - Shafting dimension tolerance of input/output shaft of h6 (JIS B 0401) is observed, the key, B 1301-1976 (new JIS/parallel key in normal class).  
Prior to fit coupling on the shaft, please apply antiseize lubricant to the shaft. If a coupling is forced to insert into the input/output shaft, the inside of the product will be damaged.
- Connecting appliance to the driven machine
  - Connecting by means of couplings  
On connecting the shaft of the product to that of the driven machine with couplings, the shaft must be aligned precisely according to the direct-connected accuracy the coupling manufacturer recommends.
  - Connecting by means of pulleys or sprockets  
Pulleys or sprockets must be mounted at the tension their manufacturers recommend. Excessive or insufficient tension will cause troubles.  
On mounting pulleys or sprockets on the product, the load point working on the shaft must be mounted as close as possible to the product (further point

than the edge of the shaft). If the load point is on the edge of the shaft, the product might be damaged because excessive force is added to the shaft.

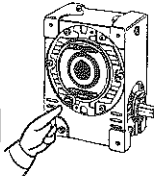
## Operation

Please confirm the following items before starting operation.

### Attention:

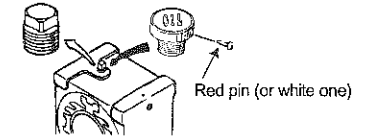
- At the initial operation, please secure an air vent hole by pulling off the resinous red pin (or the white one) on the oil filler.  
In case of size 80, 125, 140 and 200, which are without oil filler, please change to the attached oilfiller with air vent hole, otherwise leakage of the lubricating oil might cause personal injury or the product damage.

- Check of the lubricating oil  
Please check if the regulated quantity of the lubricating oil is supplied.  
Oil level gauge: oil level must be in the center of the oil level gauge.



If the lubricating oil is not enough, please add the same recommended lubricating oil as actually used. Too much oil might spout. Please be sure to tighten the removed oil drain plug with seal tape and so on to avoid leakage of oil.

- Check of vent hole  
Our product is delivered with a red pin (or a white one) inserted into the air vent hole of the oil filler in order to avoid leakage of oil from it during transportation. Therefore, please pull off the red pin (or the white one) at the oil filler before starting operation.  
In case of products without air vent holes, please change for the attached Filler with air vent hole, otherwise leakage of the lubricating oil will occur.



- Running-in  
Running-in is not particularly needed, but we recommend to start from the rated torque load of 80% around and then to bring it closer to the rated gradually.
- Temperature increase  
Due to sliding conduction, temperature of the product increases and that of the outer wall sometimes reaches 90°C around in a few hour after starting running the product in the rated operation. But it is no problem.  
The allowed temperatre of the outer wall of our speed reducer is 95°C.

### Attention:

- Operation must be stopped as soon as trouble occurs.  
Injury, a fire, or damage on the device might happen.

- Don't touch the product with bare hands in an hour around after stopping operation or during running.  
Personnel might burn their hands because the product has high temperature.
- Don't use the product with higher load than permitted.  
Injury, a fire, or damage on the device might happen.
- Don't use the product at more high revolutions than permitted.  
Injury, a fire, or damage on the device might happen.

Warning!
Don't touch the surface! You might burn your hands.

## Maintenance

On maintenance, please check the following items:

- Exchanging lubricating oil  
The first exchange must be performed in 50-200 hours after the initial operation. After this, once a half year. Especially, the first exchange must be performed to remove the initial abrasion dust caused by the running-in.  
High-performance lubricant Glygoyle is enclosed a MA series.  
The copper elements which occurred by wear an early stage of a worm wheel combine with a Glygoyle ingredient and sometimes become blacker than of it lubricating oil early compared with other lubricants.  
However, if a worm wheel has running in, the degree of muddy become lowers.  
In addition, lubrication performance cannot decrease in this, but perform lubricating oil exchange, and please note that you can postpone the life of the speed reducer by removing abrasion powder.  
Don't exchange oil in a few hours after stopping operation. The product has high temperature right after stopping operation.  
Please apply lubricating oil in the separated list on recommended lubricating oil.
- Attention at the time of the lubricating oil exchange  
Glygoyle is not congenial to some paint including the lacquer.  
The speed reducer case inside uses the paint which is insoluble in Glygoyle.  
The outside uses paint of the phthalate series, but, please wipe off the outside painting promptly when the lubricating oil which it shed by lubricating oil exchange is left for a long term when you attach because you might erode.  
In addition, please attention that because it may be eroded depending on a kind of the paint immediately when it attach to the device of the rotation that speed reducer is incorporated in.
- Grease lubrication  
In case of vertical output shaft (type K), the upper bearing of the output shaft is lubricated by grease.  
For size 80, 125, 140 and 160, grease nipples are mouted on the output shaft cover. Please supply some grease every 1000 hours or once a half year. In case of types less than type 63, grease is included, therefore, there is no need to supply.  
Grease nipple of JIS B 1575 is available.

- Storage for a long period  
When stopping running the product for more than three months, please operate it for about 5 minutes once a month to avoid rusting inside.
- Check of worm gear  
Please verify that teeth worm wheels is not worn out or scratched.  
The teeth of worm wheels wear. Please exchange them for new once if the teeth wear 5 times as much as greater values on the backlash list in the catalogue.
- Attention to environment  
When this product is used for a machine which especially hates oil like a food machine, please install an oil catcher and so on as a solution of possible leakage of lubricating oil or grease.  
On disposal of the product or lubricating oil, deal with it as general industrial waste.

### Attention:

- Check of wheels must be performed while the machine stops.  
Be sure to stop rotating the driving gear and the driven gear.  
Injury might occur by being caught in wheel mesh.

## Regulated lubricating oil and recommended grease

- Regulated lubricating oil

Type MA 50-125

Manufacturer	Lubricating oil
Mobil	MOBIL GLYGOYLE220

Type MA 140-160

Manufacturer	Lubricating oil
Mobil	MOBIL GLYGOYLE320

- ※ Lubricating oil except mentioned above doesn't take effect.
- ※ If you need oil mentioned above, please contact this manufacturer or our nearest sales office.
- ※ If you have any questions about these kinds of oil, please consult to our nearest sales office or service center.
- ※ Please do not mix another oil.

- Recommended grease  
For upper bearing of output shaft for type MAK more than type 80

Manufacturer	Grease
Mobil	MOBIL GREASC XHP222

NOK Sutaburags NBU12	Mobil Mobilux EP2	Nisseki Epinock AP2	Others Equivalent types to those mentioned left
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## Quantity of lubricating oil

Quantity of lubricating oil

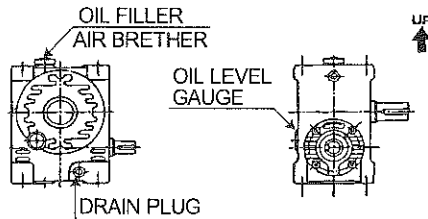
All quantity in liter

	50	63	80	100	125	140	160
MAB	0.3	0.4	1.0	1.5	3	5	9
MAW	0.5	0.7	1.3	2.5	5	8	12
MAK	0.4	0.6	1.0	1.9	4	7	10
MAOB	0.3	0.4	1.0	1.5	3	5	9
MAOW	0.5	0.7	1.3	2.5	5	8	12
MAOK	0.4	0.6	1.0	1.9	4	7	10

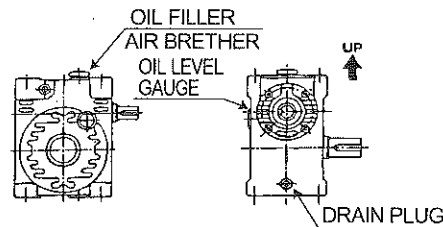
※ There are some differences depending on ratio etc. Please check the quantity of oil with oil level gauge.

## Positions of lubricating oil filler, oil level gauge, and drain

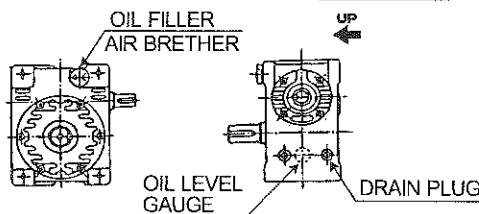
plug



Type MAB



Type MAW



Type MAK

## Product trouble; its cause and solution

In case of following troubles, please stop the operation immediately and remove the trouble.

Trouble		Cause	Solution
Over heating of speed reducer		Running with too much load	Keep proper load
		Excessive or insufficient lubricating oil	Adjust quantity of oil correctly with the product stopped.
		Wrong or bad lubricating oil	Exchange it for new one.
		Wrong adjustment of bearing	Get in touch with us.
Too much noise	Constant noise	Wrong gear contact pattern	Get in touch with us.
		Damage on bearing	Exchange the bearing.
	High metallic noise	Wrong or bad lubricating oil	Get in touch with us.
		A shortage of lubricating oil	Adjust quantity of oil correctly with the product stopped.
	Irregular noise	Foreign matter is mixed.	Wash the inside, remove the foreign matter, and exchange lubricating oil
		Damage on bearing	Exchange the bearing.
Too much vibration		Wear of teeth	exchange input shaft (worm shaft) and worm wheel.
		Foreign matter is mixed.	Wash the inside, remove the foreign matter, and exchange lubricating oil.
		Damage on bearing	Exchange the bearing.
		Loose fitting bolt	Check if the alignment of input/output shaft is correct and tighten the bolt more.
Leakage of lubricating oil		Damage on bearing	Exchange the oil seal.
		Damage on bearing	Exchange the packing.
		Oil purging stopper is not tightened enough.	Tighten up the oil purging stopper with seal tape.
		damage on oil level gauge	Exchange the oil level gauge.
Input/output shaft doesn't move at all.		Air ventilation is not enough	Pull off the red pin (or the white one) on the oil filler or change it to the plug.
		Teeth seizure	Get in touch with us.
		Damage on bearing	Exchange the bearing.
Input shaft is idling and output shaft doesn't rotate.		Solid foreign matter is caught.	Get in touch with us.
		Wear of teeth	Exchange input shaft (worm shaft) and worm wheel.
		Damage on bearing	Exchange the key and related parts.
		Damage on input shaft (worm shaft)	Exchange input shaft (worm shaft) and worm wheel.
	Damage on output shaft	Exchange the output shaft and related parts.	

※ Common troubles are shown in this list. For other troubles, please contact our nearest sales office.





# **MAKISHINKO Co., Ltd.**

## **Head office:**

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## **Sales departments**

### **Tokyo office:**

6-3-7 shinagawa-ku suri-je south oi building sixth floor Tokyo 140-0013 Japan  
tel:03-3766-6536 fax:03-3766-0907

### **Nagoya office:**

5-13-3 Shimizu Kita-ku Nagoya-shi 462-0844 Japan  
tel:052-911-7116 fax:052-911-8877

### **Oaka office:**

3-4-128 Tanimachi 7 chome Chuo-ku Osaka 542-0012 Japan  
tel:06-6768-5171 fax:06-6768-5062

### **Chushikoku office:**

Royal city 101 453-1 Tsumesaki Tamashima Kurashiki-shi Okayama  
710-0252 Japan  
tel:086-525-2130 fax:086-525-2139

### **Fukuoka office:**

4-8-8 Nakahata Onojo-shi Fukuoka 816-0921 Japan  
tel:092-571-4845 fax:092-571-4866

Foreign affairs department:

3-4-206 Tanimachi 7 chome Chuo-ku Osaka 542-0012 Japan  
tel:06-6768-5671 fax:06-6763-2100

## **Manufacturing departments**

### **Nabari factory:**

2832 Natsumi Nabari-shi Mie 518-0441 Japan  
tel:0595-63-1031 fax:0595-64-5435

### **Shijonawate factory:**

1-12-7 Okayama Shijonawate-shi Osaka 575-0002 Japan  
tel:072-877-1781 fax:072-879-5117

For inquiry about products and technique

Service center:

3-4-128 Tanimachi 7 chome Chuo-ku Osaka 542-0012 Japan  
tel:0120-07-4050 fax:0595-63-5537