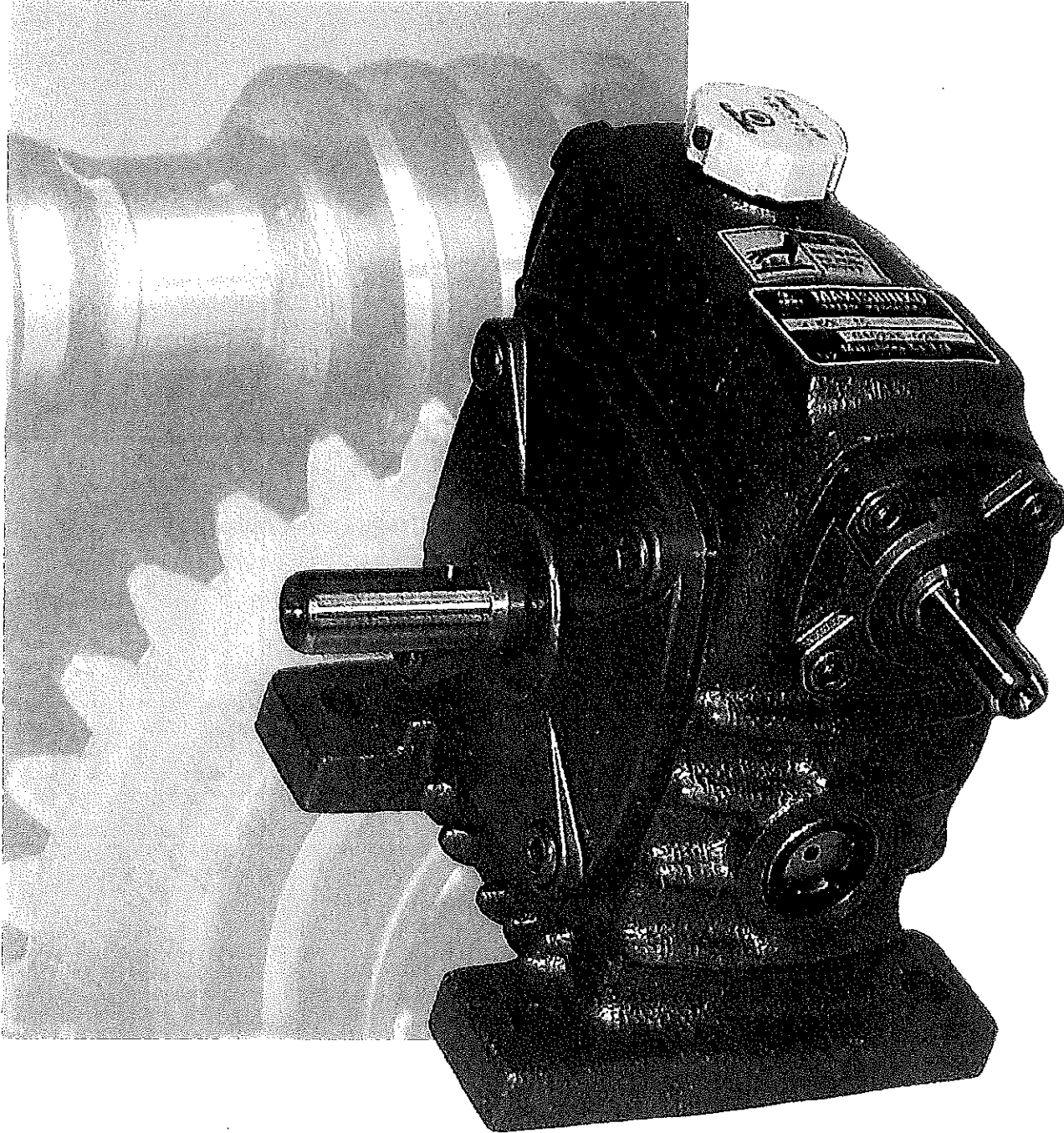




**MAKISHINKO**

**WORM GEAR SPEED REDUCERS**

Instructions for Insutallation and Operation



## Verifying your unit.

Before installation, check to be certain that the information on this unit's name plate is correct for the application.

Check:

1. The Model number.
2. Correct orientation of the worm to right or left.
3. Speed reduction ratio and/or output speed.

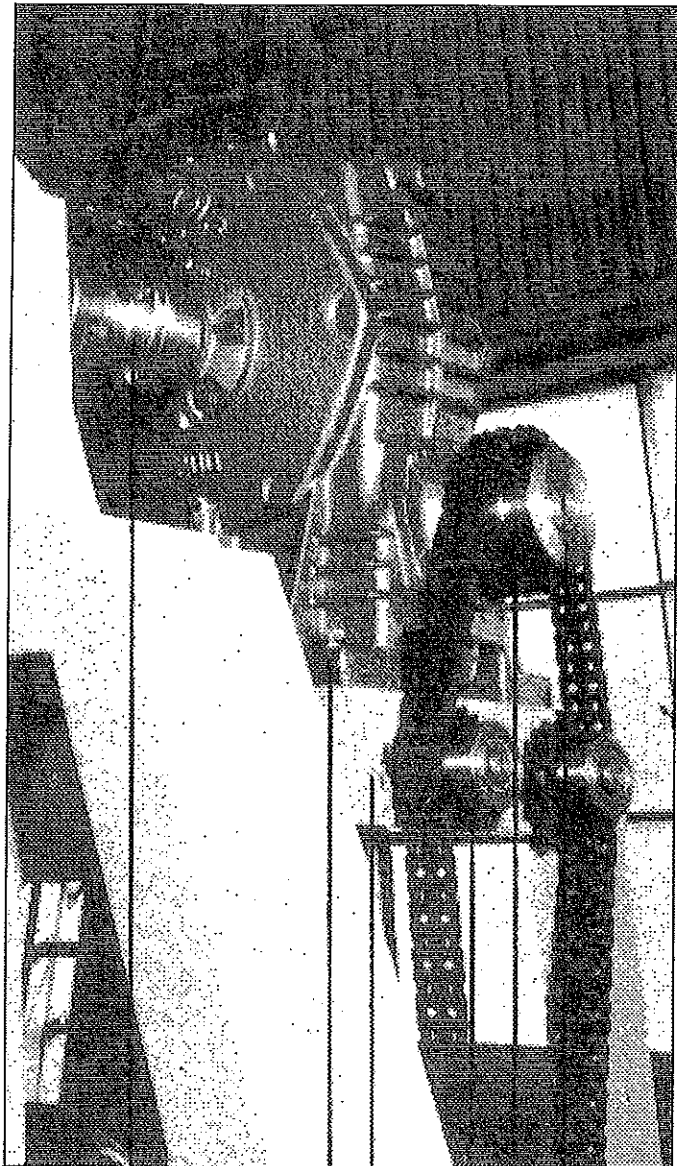
## Caution

Fill and check the unit with the proper lubricant before operating

## Installation.

Correct installation is important to proper performance of your Makishinko reducer. Poor mounting can lower efficiency and eventually cause damage to any gear reducer. These guidelines will give you best results.

1. Mount the unit on a flat, sturdy surface.
2. Use the maximum size hole-down bolts that will comfortably fit the mounting holes.
3. When direct couplings are used, align both input and output shafts accurately.
4. All pulleys, sprockets and gears, on both input and output shafts, should be placed as far inboard as possible to minimize overhung (bending) loads.
5. The proper vertical and horizontal alignments of all pulleys, sprockets and couplings is critical for proper performance and long life.
6. Shock by hammering under tight fitting with pulleys, sprockets, couplings, and etc.



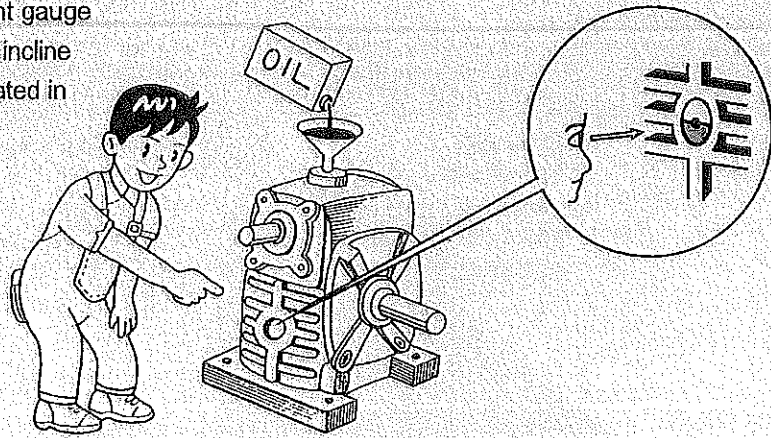
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### Before operation

Fill unit to center of the oil sight gauge with correct lubricant. If unit is incline mounted, fill with quantity indicated in the Makishinko's catalog.



### Lubrication

Makishinko's units are normally exported without oil. Consult the Makishinko catalog for a list of lubricants, or ask your lubricant supplier. Lubricant type and viscosity will vary with temperature, service factor and the application.

### Regular inspection

Check your Makishinko Reducer's mounting bolts and couplings for tightness regularly. Check the unit's oil level in the sight gauge. Remove the oil fill cap, check that the breather hole is not plugged by dust or refuse, and visually check gears for signs of wear.

### After 50 hours of operation

Drain unit and flush with light oil. Refill.

For a Makishinko Catalog or additional information, particularly of the installation, lubrication, operation and maintenance, write to MAKISHINKO Co., Ltd. 3-4-206 Tanimachi 7-chome, chuo-ku, Osaka 542 Japan

### Every 6 months of operation

Drain, flush and refill.

### Manufacturer's Recommended Lubricants for Worm Gear Speed Reducers

Brand	Ambient Temperature
	0°C~50°C
ISO Viscosity	ISO VG 320
Mobil	Mobilgear600 xp 320
Shell	Omala Oil S2G 320

## TROUBLE – SHOOTING

Trouble-free long-life power train (10,000 to 15,000 hours is usual, depending on loading hours of continuous driving lubrication, etc.) is designed and incorporated into Makishinko Speed Reducers. Should malfunction occur, the source of the trouble can be traced easily and its solution requires no special skill. The table below will prove to be helpful for the users.

PROBLEMS	CAUSES	TROUBLE-SHOOTINGS
Reducer is overheating	<ol style="list-style-type: none"> <li>1. Overload</li> <li>2. Insufficient or excessive lubricant</li> <li>3. Incorrect lubricant</li> <li>4. Oil seal damaged</li> </ol>	<p>Check the actual loading and adjust with proper load.</p> <p>Check the oil level and adjust the quantity of oil to proper level.</p> <p>Flush with the correct oil and fill with correct oil.</p> <p>Check and replace the oil seal if necessary.</p>
Reducer buzzes	<ol style="list-style-type: none"> <li>1. Gears damaged</li> <li>2. Bearings damaged</li> <li>3. Inadequate lubricant</li> <li>4. Foreign matter in the reducer</li> </ol>	<p>Replace the damaged gears.</p> <p>Replace the damaged bearings.</p> <p>Supply more oil.</p> <p>Remove it and change oil.</p>
Unusual vibration	<ol style="list-style-type: none"> <li>1. Worm gear distorted</li> <li>2. Worm worn out</li> <li>3. Foreign matter entered</li> <li>4. Bearing damaged worn out</li> <li>5. Loose bolts</li> </ol>	<p>Replace with new one.</p> <p>Replace with new one.</p> <p>Remove it and change the oil.</p> <p>Replace with new one.</p> <p>Fasten tightly.</p>
Leaking of oil	<ol style="list-style-type: none"> <li>1. Oil seal damaged</li> <li>2. Packing damaged</li> <li>3. Drain plug loosed</li> <li>4. Oil gauge damaged</li> </ol>	<p>Replace with new one.</p> <p>Replace with new one.</p> <p>Tighten.</p> <p>Replace with new one.</p>
Input/output shafts do not rotate	<ol style="list-style-type: none"> <li>1. Worm and worm gears are overheating</li> <li>2. Bearings damaged</li> <li>3. Solid foreign materials in gearbox</li> </ol>	<p>Repair or replace if necessary with new one.</p> <p>Replace with new one.</p> <p>Remove it first, clean the inside, and fill with new lubricant.</p>
Rapid or excessive wear	<ol style="list-style-type: none"> <li>1. Overloading</li> <li>2. Inadequate lubrication</li> <li>3. Bearings damaged</li> <li>4. High ambient temperature</li> </ol>	<p>Adjust the load,</p> <p>Lubricate properly.</p> <p>Replace them along gears.</p> <p>Re-size to larger units.</p>

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