INSTRUCTION, LUBRICATION AND OPERATION INSTRUCTION

SB19～SB38 type.
Spiral bevel gear box

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INSTRUCTION MANUAL
FOR
SB TYPE BEVEL GEAR BOX

1. Inspection at Delivery

At the time of delivery. Please check the followig.

①Check the name plate and confirm that the produc is the same as you ordered.

②Check the unit for damages during transportation or presence of any other drawbacks.

③Make test run and check for abnormality.

2. Gear Box Construction

2－1 Main Body Housing

The main body housing are made of cast iron box type.

2－2 Gears

The gears are spiral bevel gears made of alloy steel. Heat treatment done is carburizing and annealing. With lapping finish on the tooth.

2－3 Shaft

Carbon steel for mechanical structure is used as material of each shaft. The A shaft, which has reduction ratio of 1／2, is a geared shaft (integrated type) whose material is therefore the same as used for gears.

2－4 Bearing

Bearings used are all tapered roller bearings.

2－5 Oil Seal

The oil seal conforming to JIS S or D is used in rotary section of the shaft.

2－6 Lubrication Method

Oil bath lubrication method is used for gears.
The bearings lubricated with grease. depending on the fitting construction. In this case. the gearse nipple is provided.

3. Precautions for Installation

(a)Install the gear box firmly on the rigid foundation. so that no dimensional deviations are caused even after the long-term operation. Take care to reserve the sufficient flat area for installation. If there is a swelled piase even in one location
out of the four fixing points and the unit is installed unknowingly, the stress concentration will occur on that point and cause the damages or gear box vibrations. Due care Should be taken to avoid this.

(b)The externally exposed surface like the shaft is coated with the rust preventive. wipe off the rust preventive with thinner or gasoline. Then tap the shaft coupling lightly with plastic hammer in axial direction and mount the unit on the shaft.
when the fitting is tight, warm the unit before installation. Do not hit the unit forcibly to mount it on to the shaft.

(c)Make the centering with mating machine as accurately as possible. When making the centering of the non-flexible coupling, be careful to keep the circular run-out and surface run-out on the datum centering surface. The deviations of the related machines can cause the unexpected external force on the ger box.

4. Test Run and proper operation

(a)Make the test run after completion of ger box inst-allation, conection, lubrication.

(b)Make inching operation of the main unit and check the conditions of rotary parts. Upon confirmation of normal condition, make the runin operation.

Wen any abnormal condition occurs during the run-in operation in terms of gear box noise, bearing temperature and vibration, stop the operation and find out the cause of abnormal occurrence. Resume the test run after taking a complate countermeasure.

When the test run is finished, start the proper operation.

(c)Make the constant checking of noise, vibration, bearing temperature, etc. during the operation. Investigate whenever abnormality occurs.

(d)The first replacement of the lubricant should be made approx. 100 hours after start of the operation. and thereafter at regular interval of 2, 500 hours or every 6 months.

the first replacement interval in the following cases.

·When the unit is. operated for long hours without stop (more than continuous 12 hours per day)

·When the ambient temperature is high, or when the atmosphere has high humidity or includes active gas.

(e)Approximate quantity of the lubricant is as follows.

Model No	19	25	30	38
Approx.Quantity of Lubricant (L)	0.6	1.2	1.8	2.6

(f) When the unit will be left unoperated for a long period of time, take care to protect the gear box from dusts.

When the unit is used after long time of storage, clean the inside with wash oil and freshen the lubricant prior to operation.

5. precautions for assembly and Disassembly

When the gear box needs to be disassembled, the following points must be strictly observed.

①Have clear idea about the purpose of disassembly, and take care to minimize the parts to be disassembled.

② After the disassembly is done, avoid placing the main body and the disassembled parts directly onto the dirty floor.

③ Keep the small parts separately to prevent them from missing.

④ Handle carefully to prevent scratches or any damage on gear teeth and on sealing section of the shaft. When scratches are found, repair carefully with oilstone or equivalent before assembly.

At the time of disassembly, check the unit for the tooth contact condition and the presence of damaged parts. Take pictures for these.

Due attention should be paid for the gear backlash which will affect the service life, When it is either too small or excessive, by causing noise, vibrations、heat generation, etc.

The damaged parts should be repaired or replaced with new ones before assembly. Whenever inspection or disassembly is made, keep reco ds of the measurements or observations.

Recommended Lubricant

Rotational Speed of Pinion (rpm)	Maker	Ambient Temp.	Ambient Temp.
		0℃ - 35℃	35℃ - 60℃
Less than 500	Viscosity Grade ISO VG	VG 150	VG 220
	Nippon Oil Corporation	Bonnoc M150	Bonnoc M220
From 500 to 1800	Viscosity Grade ISO VG	VG 150	VG 220
	Nippon Oil Corporation	Bonnoc M150	Bonnoc M220

Recommended Grease

Idemitsu Kosan : Daphne Eponex SR No.2

Note 1) Unless otherwise specified, Bonnoc M150 is packed as lubricant.It should be replaced by more appropriate lubricant if necessary judging from the operation speed,ambient temperature,etc.
From the necessity of transportation,some units are delivered non-lubricated.(When the unit is not lubricated,the indication to that effect appears on the tag.)

2) For the bearings which require greasing, Daphne Eponex SR No.2 is packed.
Therefore the initial greasing is not needed.

Troubleshooting

Symptom	Cause	Solution
Overheating of Unit	·Overloaded operation	Check the load and adjust it to proper level
	·Scarce or Excessive lubricant	Adjust the oil level.
	·Deteriorated or improper lubricant	Replace the old or contaminated lubricant. Use proper lubricant.
	·Excessively tight interference of bearing	Change and adjust the mounting.
	·Oil starvation of oil seal	Lubricate with several drops of oil.
Excessive Noise	·Requlary produced noise	
	Improper tooth contact	Recondition the tooth contact. Contact Makishinko agent.
	Damaged bearing	Replace the bearing. Contact Makishinko agent.
	·High pitch metallic noise	
	Too small bearing fitting clearance	Adjust the clearance.
	Lubricant starvation	Replenish the lubricant.
	·Irrequlary noise	
	Inclusion of foreign substance	Remove the foreign matter. Replace the lubricant.
	Damaged bearing	Replace the bearing. Contact Makishinko agent.

Symptom	Cause	Solution
Excessive Vibrations	·Wears or damages of tooh	Replace the gear. Contact Makishinko agent.
	·Intrusion of foreign substance	Remove the foreign substance. Replace the lubricant.
	·Wears or damages of bearing	Replace the bearing. Contact Makishinko agent.
	·Loosened fixing bolt	Tighthe bolt.
	·Imperfect centering	Adjust the centering.
Leakage of Lubricant	·Damaged oil seal	Replace the oil seal
	·Insufficient tight-ening of bolt	Tighten the bolt.
	·Imperfect tight-ening of oil supply／drain plug	Tighten the plug perfectly.
Both input and output shafts are locked and cannot be moved.	·Seizure on tooth	Repair or replace the gear, depending on the degree of trouble.
	·Damaged bearing	Replace the bearing. Contact Makishinko agent.

Symptom	Cause	Solution
Input and out put shafts are idled and unable to transmit the power.	·Clogging of solid foreign matter	Remove the foreign matter. clean the inside. Replace the lubricant.
	·Worn out gear	Replace the gear. Contact Makishinko agent.
	·Damaged key	Replace the key. Contact Makishinko agent.
	·Broken shaft	Replace the shaft. Contact Makishinko agent.
Excessive Wears of Teeth	·Overloading	Adjust the load to proper level.
	·Deteriorated or improper lubricant	Replace the lubricant.
	·Lubricant starvation	Replenish the lubricant.
	·Worn out bearing	Replace the bearing. Contact Makishinko agent.
	·Operating temperature is too high.	improve the ventilation.

Described above are the most commonly observed troubles. please contact makishinko when any other abnormal conditions occur.