Lubrication

Necessity of lubrication

In a roller chain transmission, even if the chain and sprockets are designed to suit the service conditions, poor lubrication inhibits maintaining performance and life to design specifications. In the case of a roller chain, the wear loss caused under proper lubrication is dramatically different from that caused without it. Troubles caused due to insufficient lubrication include the wear of pins and bushings, rough engagement with the sprockets, increased noise, and breakage as a result of prolonged undesirable conditions. Proper lubrication is very important. Requirements of lubrication and the effects of proper lubrication are listed below.

Requirements of lubrication	Effects of proper lubrication
• Selection of lubricant • Lubricating points • Lubrication type (lubricating method, lubrication intervals, amount of lubrication)	• The wear of frictional portions is decreased. • Power loss is decreased. • Seizure is prevented. • Frictional heat is decreased. • Generated heat is eliminated. • Ensure smooth operation and extends machine life.

Selection of lubricant

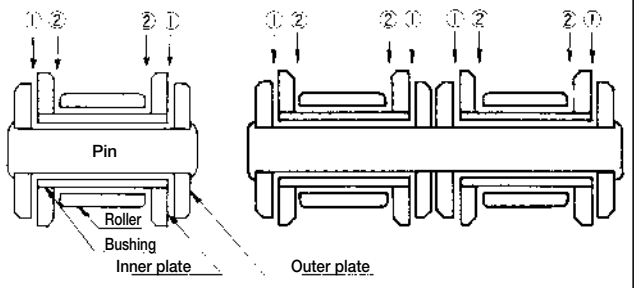
Select the lubricant of a roller chain in reference to the lubrication type (P.133), ambient temperature and chain No., according to the following table.
Lubricant should be a mineral oil of good quality. It is important that the lubricant contains no dust or foreign substance. Never use waste oil. If the ambient temperature is extremely low (-10°C or lower) or high (+60°C or higher), a specific oil is necessary. In this case, please consult our engineering department.

Lubricating points

If the chain is immersed in an oil bath, oil penetrates every part of the chain. In the case of manual lubrication, brush lubrication or drip lubrication, ensure that the oil sufficiently penetrates the portions of ① and ② in the following illustration.

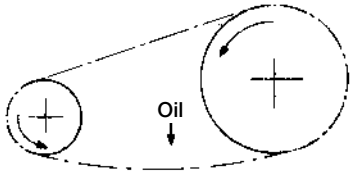
Lubricating points

①Between outer links and inner links (for prevention of elongation)
②Between bushings and inner plates (for noise reduction and protection against wear and impact damage on bushings and rollers.)



Simplex roller chain　　Duplex roller chain

Lubricate on the sag side of the chain, i.e., at the position indicated in the following illustration. Since the lubricant is also useful for rust prevention, coating the entire surface of the chain with the oil is recommended.

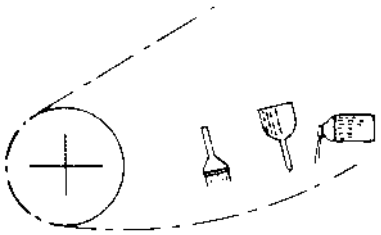
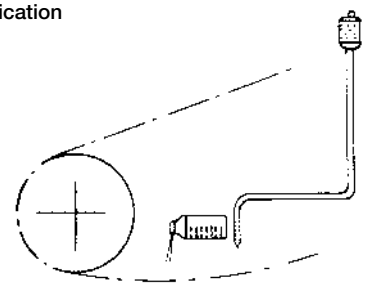
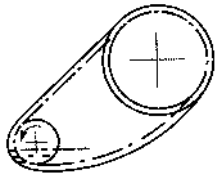
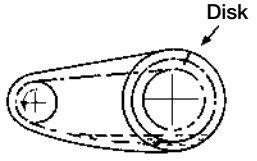
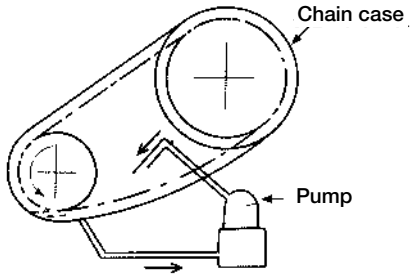


Type of lubrication	A, B				C			
Chain No. \ Atmospheric temperature	−10℃～0℃	0℃～40℃	40℃～50℃	50℃～60℃	−10℃～0℃	0℃～40℃	40℃～50℃	50℃～60℃
DID 25～DID 50	SAE10W	SAE20	SAE30	SAE40	SAE10W	SAE20	SAE30	SAE40
DID 60～DID 80	SAE20	SAE30	SAE40	SAE50				
DID 100					SAE20	SAE30	SAE40	SAE50
DID 120～DID 240	SAE30	SAE40	SAE50					

Special kind of lubricant must be applied when ambient temperature is -10°C or lower or 60°C or higher. Please consult us for appropriate selection of lubricant.

Lubrication types (Explanation of A, B and C in the tables of Drive performance (kW ratings)

The allowable kilowatt ratings of chains shown in table of the drive performance (kW ratings) is based on the condition that any of the following lubrication is adopted. If any of the following lubrication cannot be adopted or in circumstances where earth, sand or dust exists, see the DID Ultimate Life Chain Series (see P.64).

Lubrication type	Name and method	Lubrication intervals and amount	Caution
A Use DID chain lube (see P.114).	Lubricator Brush 	Carry out periodical using a lubricator or brush at least once a day.	While rotating the chain slowly, lubricate the entire length uniformly three to four times. Take care not to allow your hand or clothes to be caught by the chain during lubrication. Note that extra oil will be scattered when the operation is started.
	Drip lubrication 	Supply about 5 to 20 drops of oil per minute.	In this case, since extra oil is scattered, installing a simple casing is recommended.
B	Oil bath lubrication 	Keep the chain immersed in oil, about 10 mm below the oil surface. If immersion is too deep, the oil will become abnormally hot.	The container should be leak proof. Before using the container for the first time, thoroughly wash the inside to remove dust and other foreign substance.
	Disk lubrication 	A disk is used to apply oil to the chain. Keep the disk immersed in oil, at a depth of about 20 mm. Keep the peripheral speed higher than 200 m/ min.	
C	Forced feed lubrication 	The amount of lubrication must be set to avoid abnormal heating. In general, the oil amount should be set at a level not to allow the chain high temperature over 60°C.	The oil container should be leak proof. When using the container for the first time, thoroughly wash the inside to remove all dust and foreign substance.

General cautions for lubrication

Unless proper lubrication is carried out, chain fatigue will result earlier, causing various problems. Careful inspection is necessary.

In the case of insufficient lubrication

If the lubricant is exhausted, red rust is generated between the inner and outer plates, causing wear drastically. When a chain is disassembled after going under such condition, red rust is visible on the surfaces of pins, and the surfaces are roughened, as shown in this photo. (Normally, pins have a mirror surface.) The lubricant must be applied before this happens.

Do not use grease for lubrication !!

Do not use grease to lubricate your chains, since grease takes too long to reach the inside through pins and bushings at ambient temperature. Use the machine oil shown in the table on P.132 or DID Chain Lube/DID HI-PWR Lube (a spray lubricant).

Before lubrication, remove foreign substances and dirt from the chain as thoroughly as possible. If water is used for washing the chain, quickly dry it to prevent rusting, and then lubricate.

In the case of drip lubrication, oil bath lubrication or forced feed lubrication

Check the following:
1. The lubricant is not dirty.
2. The amount of lubricant is correct.
3. Lubricant is uniformly applied to the chain.

Cautions

Dust contamination must be avoided to maintain wear resistance. If temperature rises abnormally or the chain squeaks, the oil may be exhausted. Check to verify the condition.

Troubleshooting Guide

Trouble	Possible cause	Correction
A pin, bushing or roller is fractured. Note: See "Fracture patterns of respective chain components" on P.136.	High speed revolution exceeding the tolerance of chain and sprockets	Decelerate the speed, or select a chain with a smaller pitch. Otherwise, select a sprocket with a larger number of teeth. Refer to the details of "Selection by Drive Performance (kilowatt ratings)" (P.120).
	Sudden large shock load	Avoid shock load as much as possible. Install a damper, etc., to damp the shock load.
	Improper lubrication	Periodically supply the correct lubricant. Spray type chain oil "DID Chain Lube" is recommended.
	Corrosion of chain	Check the service circumstances and lubrication condition, and select a proper chain.
	Wear of sprocket	Replace it with a new one. Use a sprocket conforming to the correct standard dimensions.
	Seized foreign substances	Immediately remove the foreign substances, and strictly control the service circumstances.
Abnormal noise	Chain is excessively tensioned or sagged.	Pay constant attention to the chain sag. Correct by adjusting it according to the procedure stated in "Sag adjustment of roller chain" (P.131).
	Incorrect alignment of sprockets	Check the alignment between both the large and small sprockets.
	Large wear elongation of chain or wear of sprocket	Replace chains that are elongated beyond the tolerance and worn sprockets with new ones.
	Incorrect installation of chain case	If the chain contacts the chain case, immediately correct and adjust.
	Improper lubrication	Lubricate properly and periodically. (See "Lubrication types" (P.133).
	Improper combination of chain and sprockets	When replacing the chain, use the correct chain size and sprocket sizes. Select a chain suitable for sprocket sizes, and sprockets suitable for the chain size. (Especially be alert when replacing HK Series multiplex chain.)