

## Installation & Maintenance

### Screw Dismantling

It's better not to dismantle the nut and screw. If they must be dismantled, please use a dismantling sleeve.

$$d_3 = d_2 \begin{matrix} 0 \\ -0,05 \end{matrix}$$

(d2 is the diameter of the screw)

**Note** PL series Planetary Roller Screws are mostly multiple head threads. If the frictional torque before and after the dismantling of the screw and nut is different, please do installation again immediately until the value is the same as the original.

### Screw Installation

Please mind the following points when installing Planetary Roller Screws:

1. Make the screw parallel to the guide rail
2. Fix the mounting nuts
3. Spin the nut within the whole journey, and check if the nut can work smoothly

### Matters to Note

Please read through the instruction below. In order to ensure the optimal work and extraordinary service lifetime performance, the following points shall be strictly complied with. If you have any question, please contact KOFON.

#### Lubrication

Unless otherwise specified, grease lubrication shall be applied to Planetary Roller Screws before they leave the workshop. Please do not remove the lubrication grease at will. The re-lubrication shall be done with the grease of the same brand only.

#### Transportation

The Planetary Roller Screws shall be transported carefully: they shall not fall down for fear of damage.

#### Installation

Do not dismantle the screw and nut (unless dismantling sleeve is used). The installation shall be careful enough to ensure the parallelism of the Planetary Roller Screw with the guide rail, otherwise the Screw will be damaged.

#### Storage

The original vacuum package can be opened only right before the installation.

#### Bending

The nut shall be free from lateral force.

## Lubrication

The lubrication method of Planetary Roller Screw is almost the same as that of gears and bearings, and oil lubrication or grease lubrication can be adopted according to actual work condition. Unless otherwise specified, the standard products shall be grease lubricated before leaving the workshop. We can also recommend more suitable lubrication method according to the actual work condition of customers.

According to Part 2 of DIN51517, when the circular oil lubrication contains EP additive (with respect to CL), the anti-aging and anti-corrosion capacity of the lubrication oil will be improved. This especially applies to the lubrication of Planetary Roller Screw. The crucial factor in deciding the adhesiveness of the lubrication oil is: speed, ambient temperature, and operating temperature.

The amount of lubrication oil depends on the diameter of the screw, the number of rollers and the heat dissipation capacity. The reference value of oil amount for small screw is 1 cm<sup>3</sup>/h, while that of big screw is 30 cm<sup>3</sup>/h.

The shortest lubrication interval depends on the load and speed. The suggested interval is 5 minutes each time when the load is great, and -1 hour each time when the load is small. Automatic lubrication system is suggested in condition of great load and high speed. For dip-feed lubrication, it shall be ensured that the lowest roller is totally immersed in the oil. The oil amount and interval of oil changing depend on the load bearing and installation. Application of lubrication oil with proper will make the surface of the Planetary Roller Screw form thin oil films to achieve optimal effect.

Figure A suggests the relation of the lubrication oil work adhesive value  $V_k$  with the rotary speed and diameter of Planetary Roller Screw. When the system is not contaminated by impurities from outside, the moderate adhesive value  $V_k$  ensures good lubrication condition of the Planetary Roller Screw and the estimated service lifetime is fulfilled. Nominal adhesive value can be calculated based on the value  $V_k$  with reference to the adhesiveness and temperature graph and actual operating temperature. The nominal adhesiveness is the adhesiveness of lubrication oil at the temperature of 40°C. Adhesiveness levels ISO VG (DIN51519) are indicated in graph V-t.

Figure A suggests the nominal diameters of PL series Planetary Roller Screws. The diameters of PLR series Planetary Roller Screws are slightly

different. Necessary work adhesiveness values are available in the figure. For inquiry of adhesiveness of moderate value, we will consider selecting the closest value to it. The nominal adhesiveness of the lubrication oil can't be calculated unless we get the work temperature or estimated temperature. The actual work temperature can be obtained by measuring the nut after the system becomes stable. Proper lubrication oil can be selected based on the supplier's list of adhesiveness at 40°C. Normally, the work temperature of 30°C can also be the basic temperature for selection of lubrication oil.

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Planetary Roller Screws	PL3910
Average Work Speed	nm= 1400r/min
Work Temperature (Estimated)	t = 25°C

In Figure A, for rotary speed nm= 1400r/min and nominal diameter of 39mm, we can get the nominal adhesiveness  $v_k=33\text{mm}^2/\text{s}$ . In graph V-t (Figure B), the line corresponding to 25°C and 34mm<sup>2</sup>/s is between ISO VG15 and ISO VG22, and we finally select VG22 lubrication oil of high adhesiveness value.

Proper CLP (DIN51517) or HLP (DIN51525) lubrication oil can also be selected.

If it's hard to define the work condition, we recommend the lubrication of 150cst at 40°C.

Usually grease lubrication is recommended for Planetary Roller Screws. It's better to use lubrication grease containing lithium, barium or calcium thickeners. The selected lubrication grease shall at least possess adhesiveness of 100-150 cst at 40°C grade 2, and contain specific additives.

The interval of lubrication depends on the installation of screws, sizes and work condition. KOFON can provide suggestions for any type of application.