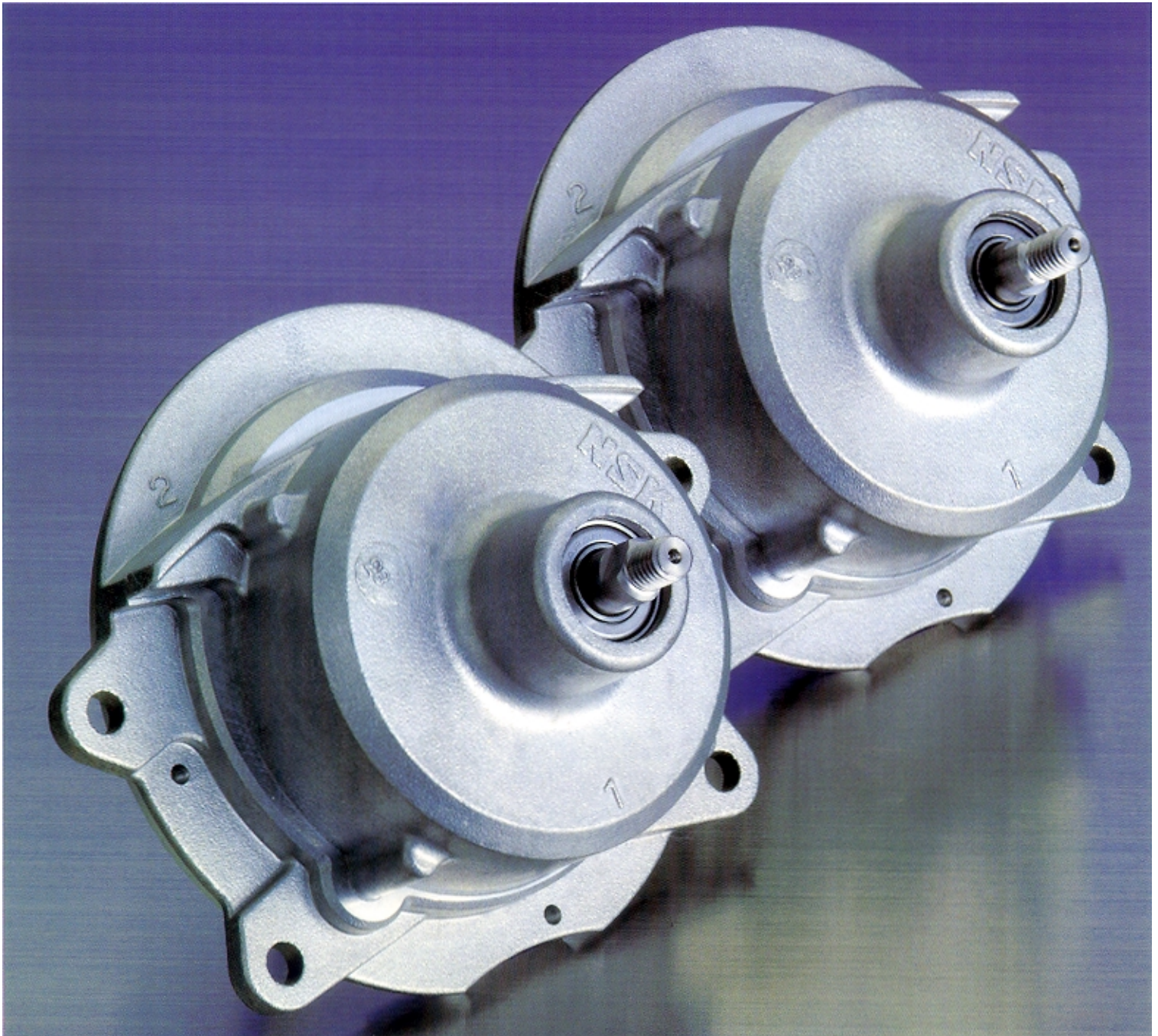
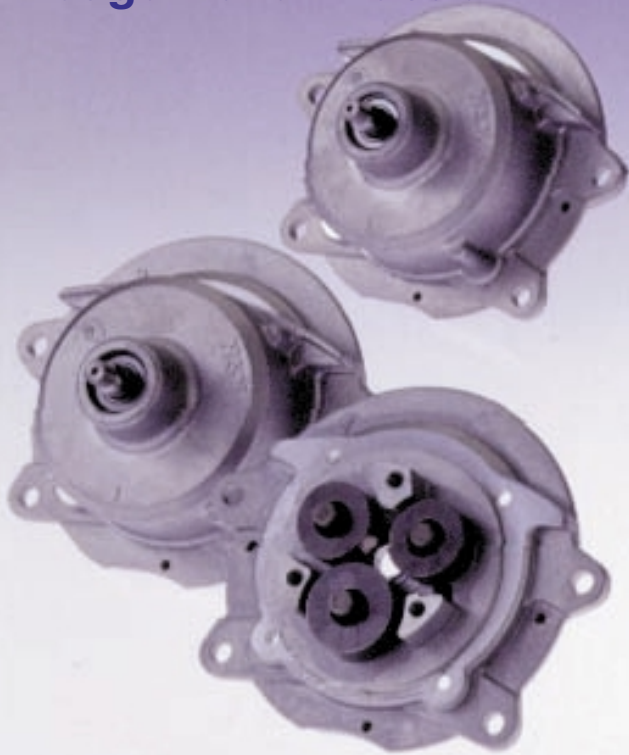


Wedge Roller Traction Drive Unit

Quiet, smooth movement
Next-generation power transmission system



1. Wedge Roller Traction Drive Unit



The quiet, smooth traction drive was developed for a variety of uses. Recently, it has been applied to electrical power-assisted bicycles as the next-generation power transmission system. A traction drive transmits power with EHL oil film between two rolling elements. The equation is $F_t = \mu \cdot F_c$, a simple formula of friction (F_t : traction force). Many methods are designed to generate F_c , known as the contact force. By utilizing a wedge action, a simple system is used by the NSK Wedge Roller Traction Drive Unit to get contact force in proportion to input torque.

1-1 System

Fig.1 shows the Wedge Roller Traction Drive Unit system, illustrating the eccentric input shaft and output ring. When the input shaft rotates in one direction, the wedge roller moves in the direction of the wedge between the input shaft and the output ring to get contact force, F_c . This F_c generates traction power to transmit torque. When the input shaft rotates in the opposite direction, the wedge roller moves away from the wedge, resulting in contact force, $F_c=0$; the input shaft remains idle and does not transmit torque.

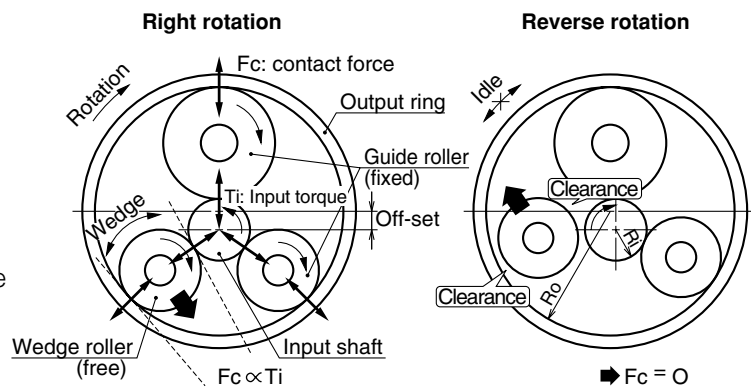


Fig. 1 Input torque in right rotation / reverse rotation

2. Features

(1) One-way clutch with built-in reduction gear

The clutch function is required since the wedge roller clutches in the right rotation and is not correctly positioned in the reverse rotation. Therefore, a conventional clutch is not required to save space.

(2) High efficiency

Contact force is obtained in proportion to input torque because it is generated by the wedge action. Ideal contact force is obtained across the entire load area. Also, high efficiency is obtained especially in the low load area. Measured results of input torque and efficiency are shown in Fig. 2.

(3) Easy to install

Since the wedge roller is movable, it can be installed, for example, into the motor shaft in one touch.

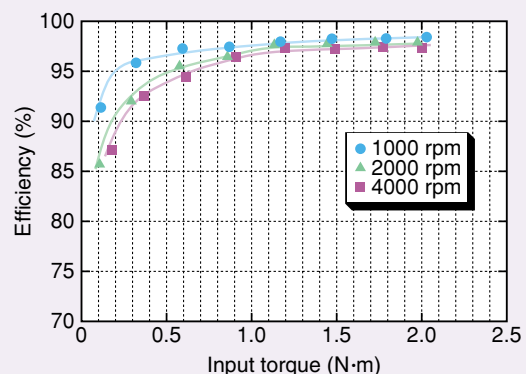


Fig. 2 Measured results of input torque and efficiency

Wedge Roller Traction Drive Unit

3. Wedge Roller Traction Drive Unit Structure

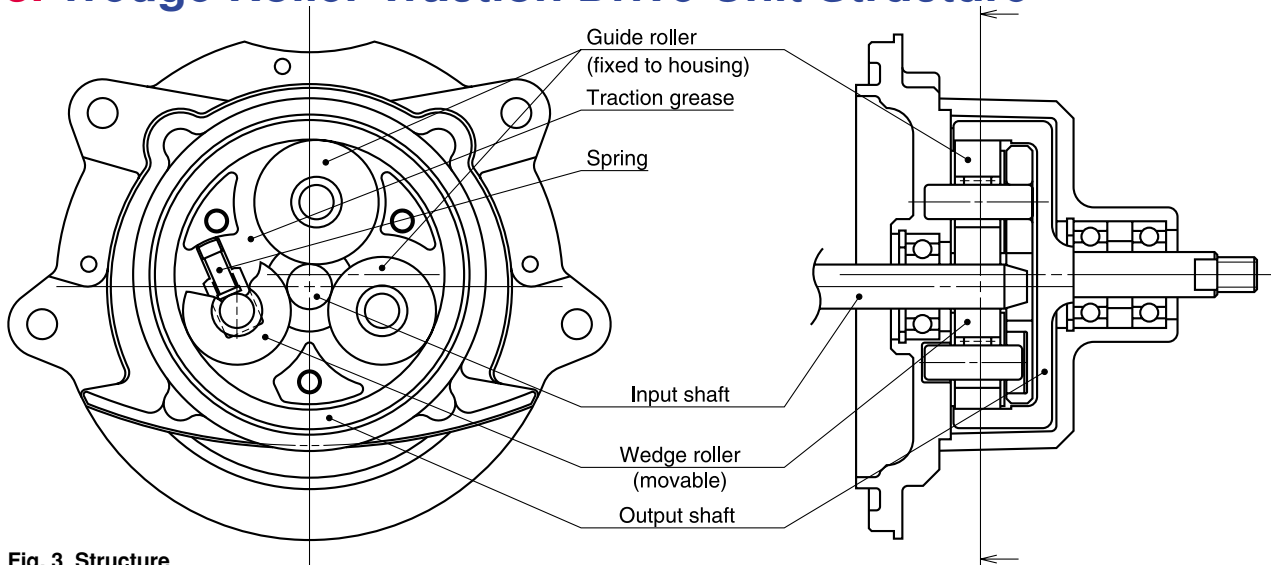


Fig. 3 Structure

3-1 Speed ratio

Speed ratio is the ratio of output roller diameter to input roller diameter. Therefore $\lambda = R0 / R1$.

3-3 Housing

Housing shape can be adapted to suit the specific parts used and installation conditions.

3-2 Output ring shape

The shape of the output ring can be applied to gears, pulleys, etc., according to the method of power output from the Wedge Roller Traction Drive Unit.

3-4 Grease

Wedge Roller Traction Drive Unit is lubricated with special traction grease. Other greases cannot be used.

4. Dimensions

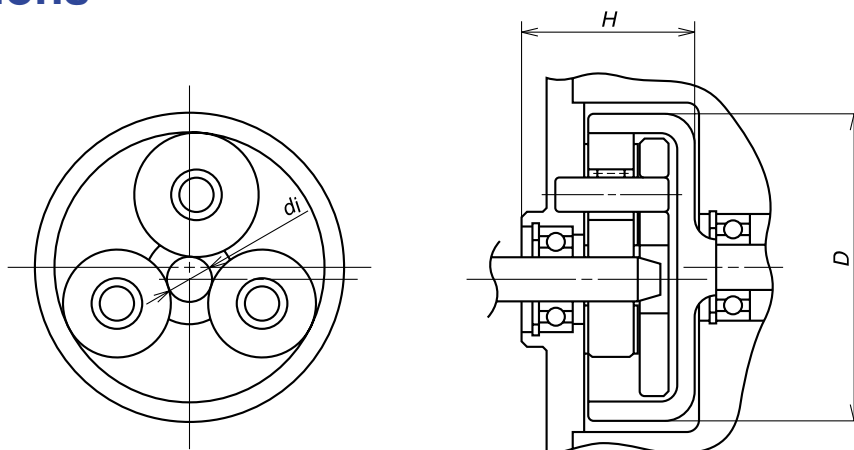


Fig. 4 Dimension drawings

Table

Input shaft diameter (mm) ϕd_i	Speed ratio	Outside diameter of output ring (mm) ϕD	Width (mm) H	Input torque (N·m)
$\phi 8$	6~8	$\phi 55 \sim \phi 72$	35	2
$\phi 10$	4~9	$\phi 47 \sim \phi 110$	40	3.5
$\phi 12$	4~9	$\phi 55 \sim \phi 128$	45	6.5

Contact NSK for designs for specific application conditions.