



Features of MHP High Ratio Hypoid Gears

A pair of MHP high-ratio hypoid gears are able to produce an amazing reduction of speed of 200:1 in one stage.

1. Total-cost reduction

The MHP provides a compact gearing body replacing several stages of reduction gears. This reduces the cost sharply.

2. High efficiency

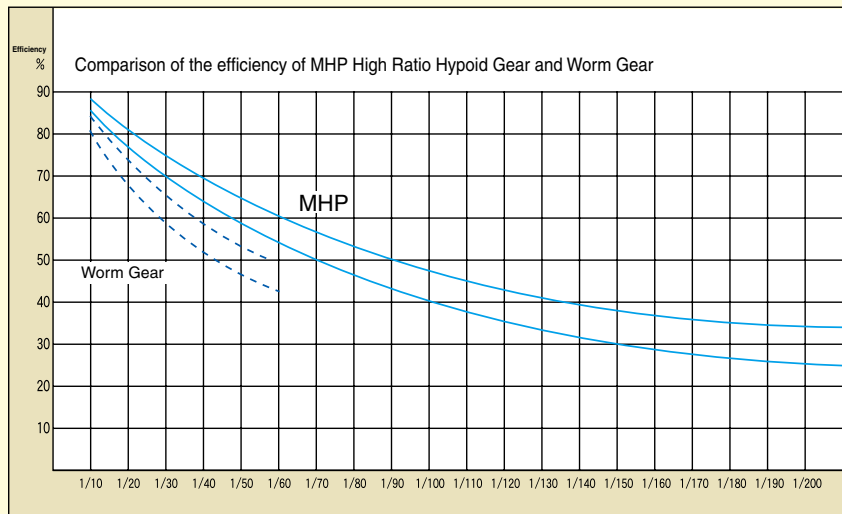
Compared to worm gear drives, the MHP has less sliding contact. The resulting higher efficiency allows the use of smaller motors (See the graph on the right).

3. High rigidity

The carburized hypoid gears lead to smaller size than comparable worms gears.

4. Compact gear assembly

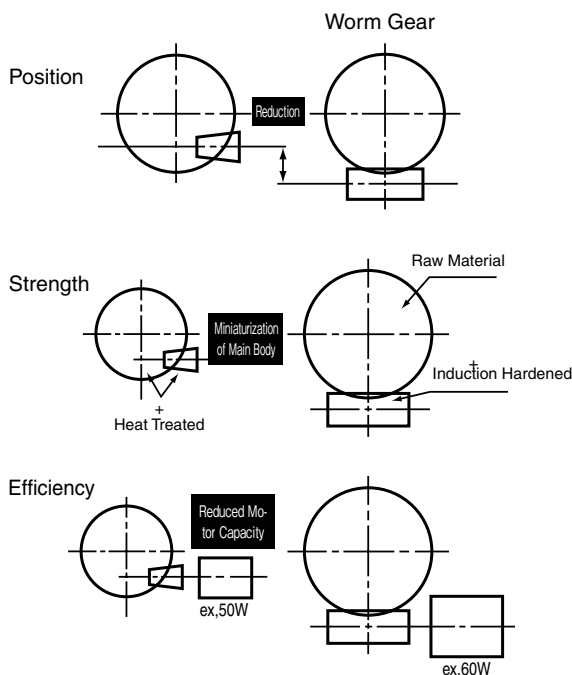
The size of the gear housing is nearly the same as outer diameter of the large gear. (See the diagrams below)



How to determine the radial and thrust loads

Before using the MHP high-ratio hypoid gears, be sure to confirm the direction of radial and thrust loads. Following equations are used to compute these loads. The radial and thrust load coefficients are given on the product pages.

Comparison of MHP and Worm Gear



Radial load calculation

W_{RP} : Radial load on the pinion or L(N)

$$W_{RP} = W_{KP} \times T_G \times \frac{n}{z}$$

W_{KP} : Radial load coefficient of pinion or L (given on the product pages)

T_G : Torque of gear or R(N·m)

n : Number of teeth of pinion or L

z : Number of teeth of gear or R

W_{RG} : Radial load on the gear or R(N)

$$W_{RG} = W_{KG} \times T_G$$

W_{KG} : Radial load coefficient of gear or R (given on the product pages)

T_G : Torque of gear or R(N·m)

Thrust load calculation

W_{XP} : Thrust load on the pinion or L(N)

$$W_{XP} = W_{NP} \times T_G \times \frac{n}{z}$$

W_{NP} : Thrust load coefficient of pinion or L (given on the product page)

T_G : Torque of gear or R(N·m)

n : Number of teeth of pinion or L

z : Number of teeth of gear or R

W_{XG} : Thrust load of gear or R(N)

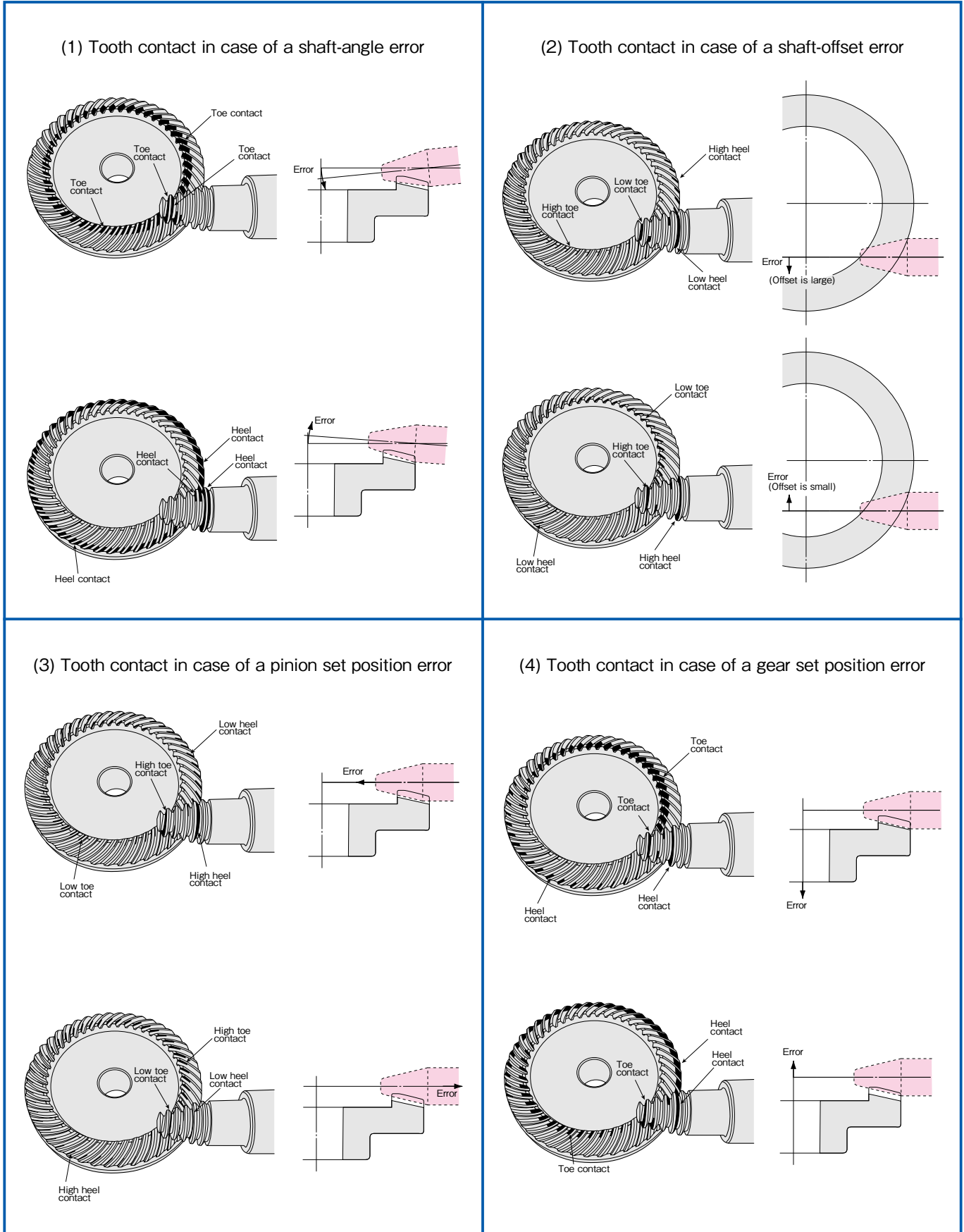
$$W_{XG} = W_{NG} \times T_G$$

W_{NG} : Thrust load coefficient of gear or R (given on the product pages)

T_G : Torque of gear or R(N·m)

Variations in tooth contact due to poor alignment of gears

If the gear engagement position is out of the normal position, variations in tooth contact, as illustrated below, may appear.



- Spur Gears
- Helical Gears
- Internal Gears
- Racks
- CP Racks & Pinions
- Miter Gears
- Bevel Gears
- Screw Gears
- Worm Gear Pair
- Bevel Gearboxes
- Other Products



Spur Gears

Helical Gears

Internal Gears

Racks

CP Racks & Pinions

Miter Gears

Bevel Gears

Screw Gears

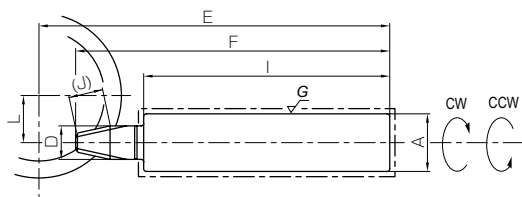
Worm Gear Pair

Bevel Gearboxes

Other Products



Specifications	
Precision grade	JIS B 1704 grade 3
Gear teeth	Gleason
Pressure angle	20°
Material	SCM415
Heat treatment	Carburizing
Tooth hardness	60 ~ 63HRC



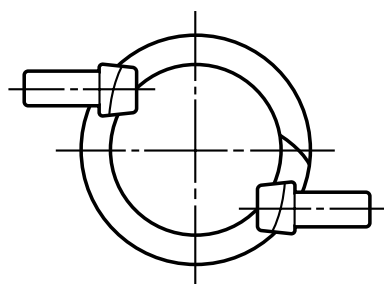
B8

Catalog No.	Reduction ratio	Nominal module	Actual module	No. of teeth	Direction of spiral	Shape	Bore • Shaft Dia.		Pitch dia.	Outside dia.	Mounting distance	Total length	Hub width	Length of bore and shaft
							A (Bore: H7 - Shaft: h7)	B						
MHP1-0453R MHP1-3045L	15	m1	1.067	45 3	R L	B9 B8	12 22.1	30	48 10.3	48 10.3	19 127	16.3 113	7	14 94
MHP1.5-0453R MHP1.5-3045L	15	m1.5	1.733	45 3	R L	B9 B8	14 31.1	40	78 17.6	78 17.6	28 170	23.7 148	10	20 116
MHP1-0603R MHP1-3060L	20	m1	1.05	60 3	R L	B9 B8	12 26.1	34	63 11.7	63 11.7	21 142	18.1 125	8	16 102
MHP1.5-0603R MHP1.5-3060L	20	m1.5	1.633	60 3	R L	B9 B8	20 36.1	50	98 15.7	98 15.7	33 199	28.7 168	13	25 135
MHP1-0602R MHP1-2060L	30	m1	1.05	60 2	R L	B9 B8	12 22.1	34	63 12.8	63 12.8	21 134	17.8 120	8	16 94
MHP1.5-0602R MHP1.5-2060L	30	m1.5	1.633	60 2	R L	B9 B8	20 31.1	50	98 17.7	98 17.7	33 175	28.2 149	13	25 116
MHP1-0451R MHP1-1045L	45	m1	1.067	45 1	R L	B9 B8	12 20.1	30	48 10.1	48 10.1	19 115	16.5 104	7	14 85
MHP1.5-0451R MHP1.5-1045L	45	m1.5	1.733	45 1	R L	B9 B8	14 26.1	40	78 18.3	78 18.3	28 152	23.9 138	10	20 102
MHP1-0601R MHP1-1060L	60	m1	1.05	60 1	R L	B9 B8	12 22.1	34	63 12.9	63 12.9	21 134	17.9 122	8	16 94
MHP1.5-0601R MHP1.5-1060L	60	m1.5	1.633	60 1	R L	B9 B8	20 31.1	50	98 17.7	98 17.7	33 175	28.2 151	13	25 116
MHP1-0901R MHP1-1090L	90	m1	1.089	90 1	R L	B9 B8	20 31.1	50	98 15.7	98 15.7	33 170	28.8 149	13	25 116
MHP1-1201R MHP1-1120L	120	m1	0.817	120 1	R L	B9 B8	20 31.1	50	98 13.4	98 13.4	33 170	29.3 149	13	25 116
MHP1-1801R MHP1-1180L	180	m1	1	180 1	R L	B9 B8	25 42.1	70	180 22.4	180 22.4	47 242	40.1 200	18	35 154
MHP1-2001R MHP1-1200L	200	m1	1	200 1	R L	B9 B8	25 42.1	70	200 21.5	200 21.5	47 252	40.6 205	18	35 154

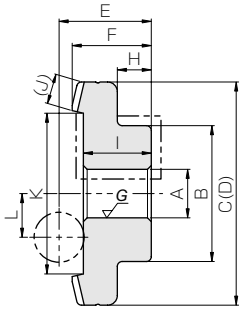
- [Caution on Product Characteristics]
- The allowable torques are obtained from the results of experimentation with the pinion at 600 rpm, lubricated with Kingstar SG-O (NIHON GREASE).
 - Radial and thrust load coefficients are the factors used for calculation of those loads. As shown in the figure B8 Shape, CW and CCW stand for clockwise and counterclockwise rotation. A plus sign means that the two gears in a set move away each other when load is applied. A minus sign means that two gears in a set approach each other when load is applied. For more details, see the section "How to determine the radial and thrust loads" on page 454.

Helix Hands and Offset Position

MHP High Ratio Hypoid Gears are designed to be right hand helix for gears, left hand helix for pinions. The opposite helix hand gears are not available for these products. Also, the offset position is already set, so please refer to the illustration bellow when designing or assembling.



High-Ratio Hypoid Gears



B9

Face width (J)	Holding surface dia. (K)	Offset (L)	Radial load coefficient		Thrust load coefficient		Allowable torque (N·m)	Allowable torque (kgf·m)	Backlash (mm)	Weight (kg)	Catalog No.
			CW	CCW	CW	CCW					
(6)	35.1 —	10	48.48 147.3	-37.67 523.74	13 969.92	31.74 -831.16	10.3	1.05	0.05~0.15	0.15 0.29	MHP1-0453R MHP1-3045L
(10)	56.5 —	18	26.78 100.09	-18.67 338.45	8.98 566.72	21.19 -466.63	41.2	4.20	0.10~0.20	0.50 0.73	MHP1.5-0453R MHP1.5-3045L
(8)	46.4 —	15	33.88 159.43	-26.2 502.91	10.11 956.55	23.73 -829.74	23.3	2.38	0.05~0.15	0.29 0.45	MHP1-0603R MHP1-3060L
(10)	76.8 —	22	20.44 119.32	-16.54 194.45	7.15 577.56	13.95 -511.77	82.4	8.40	0.10~0.20	0.94 1.15	MHP1.5-0603R MHP1.5-3060L
(8)	46.4 —	18	33.59 186.59	-24.15 784.31	8.21 1461.23	24.77 -1248.6	24.1	2.46	0.05~0.15	0.29 0.28	MHP1-0602R MHP1-2060L
(10)	76.7 —	28	20.39 142.71	-15.29 466.2	5.96 899.1	14.75 -782.21	87.3	8.90	0.10~0.20	0.94 0.77	MHP1.5-0602R MHP1.5-2060L
(6)	34.9 —	14	48.04 400.81	-35.58 1579.79	11.13 3014.6	34.11 -2605.26	11.3	1.15	0.05~0.15	0.16 0.22	MHP1-0451R MHP1-1045L
(10)	56 —	25	26.36 233.59	-16.04 1034.08	6.88 1755.84	22.02 -1439.58	46.6	4.75	0.10~0.20	0.50 0.48	MHP1.5-0451R MHP1.5-1045L
(8)	46.3 —	20	33.34 357.61	-23.12 1564.81	7.41 2936.72	25.14 -2514.09	25.3	2.58	0.05~0.15	0.29 0.28	MHP1-0601R MHP1-1060L
(10)	76.8 —	30	22.63 303.06	-17.19 974.4	5.82 1912.11	15.81 -1675.65	94.0	9.58	0.10~0.20	0.94 0.77	MHP1.5-0601R MHP1.5-1060L
(10)	76.2 —	32	21.08 464.7	-15.72 1404.28	5.71 2777.98	15.17 -2443.73	71.4	7.28	0.05~0.15	0.94 0.76	MHP1-0901R MHP1-1090L
(10)	76.4 —	32	21.17 720.78	-16.46 1811.47	6.39 3718.13	14.76 -3326.46	51.8	5.28	0.03~0.10	0.94 0.75	MHP1-1201R MHP1-1120L
(15)	148.2 —	60	11.69 614.04	-9.25 1458.9	3.53 3026.67	7.96 -2721.83	260	26.5	0.05~0.15	3.99 1.88	MHP1-1801R MHP1-1180L
(18)	162.4 —	65	10.77 695.62	-8.9 1430.75	3.58 3074.35	7.05 -2808.83	333	34.0	0.05~0.15	4.76 1.88	MHP1-2001R MHP1-1200L

[Caution on Secondary Operations]

- ① Please read "Caution on Performing Secondary Operations" (Page 452) when performing modifications and/or secondary operations for safety concerns. Haguruma Kobo, the KHK's system for quick modification of KHK stock gears is also available.
- ② In the illustration, the area surrounded with ---- line is masked during the carburization process and can be modified. However, care should be exercised since the hardness is high (approx. HRC40, maximum).

Spur
GearsHelical
GearsInternal
Gears

Racks

CP Racks
& PinionsMiter
GearsBevel
GearsScrew
GearsWorm
Gear PairBevel
GearboxesOther
Products