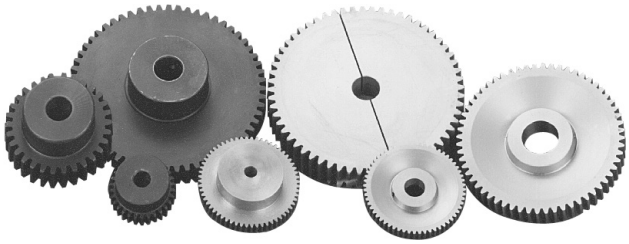
Bulletin No. GRS-J
Drawing No. LP0167
Released 06/13

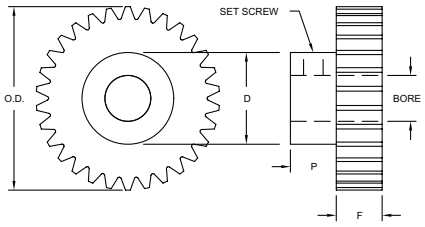
MACHINED STEEL SENSING GEARS FOR EXCITING SENSORS



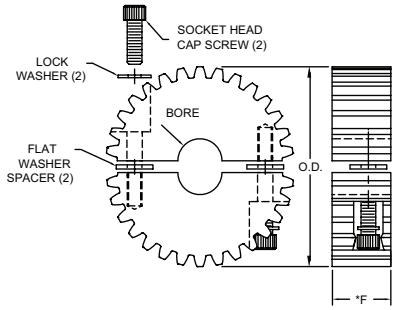
Sensing Gears are available in a variety of sizes to cover most applications where a sensor is to be used, but a suitable existing machine gear is not available. Split-type gears are convenient for use on machine drive shafts where a shaft-end is not available to mount a standard gear. Hubless gears are ideal for mounting in tight locations or when only a short shaft stub is available. Hub-type, Split, and Hubless gears can be supplied with special bores (See notes below Ordering Information & Dimensions table).

*Caution: RLC's machined steel sensing gears are **NOT** to be used as driving or driven gears in a power transmission system.*

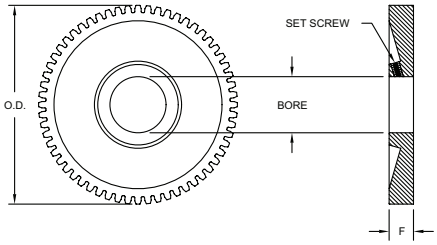
HUB TYPE GEARS



SPLIT GEARS



HUBLESS GEARS



ORDERING INFORMATION & DIMENSIONS

TYPE	NO. OF TEETH & DIAMETRAL PITCH	STOCK BORE +0.003" -0.000"	MAX. SPL. BORE +0.003" -0.000"	O.D. ±0.003"	HUB		FACE "F" ±0.010"	RECOMMENDED TORQUE FOR SET & CAP SCREWS	RECOMMENDED MAXIMUM GEAR SPEEDS	PART NUMBER
					DIA "D" ±0.010"	PROJ "P" ±0.020"				
HUB TYPE	30 T. 16 D.P.	0.500"	1.375"	2.000"	1.625"	0.500"	0.500"	25 in. lbs.	5000 RPM	0950500
	60 T. 20 D.P.	0.375"	1.750"	3.100"	2.000"	0.500"	0.375"	25 in. lbs.	5000 RPM	0970375
	60 T. 10 D.P.	0.875"	2.250"	6.200"	2.500"	0.875"	1.000"	55 in. lbs.	5000 RPM	0910875
SPLIT GEAR	30 T. 10 D.P.	0.750"	1.875"	3.200"			*1.000"	182 in. lbs.	3000 RPM	0920750
	60 T. 10 D.P.	0.875"	4.250"	6.200"			*1.000"	182 in. lbs.	1500 RPM	0930875
HUBLESS	60 T. 20 D.P.	0.625"	0.870"	3.100"			0.375"	25 in. lbs.	5000 RPM	0960625
	60 T. 20 D.P.	0.875"	0.875"	3.100"			0.375"	25 in. lbs.	5000 RPM	0960875
	60 T. 12 D.P.	1.125"	1.370"	5.160"			0.656"	40 in. lbs.	5000 RPM	0941125
	60 T. 12 D.P.	1.375"	1.620"	5.160"			0.656"	40 in. lbs.	5000 RPM	0941375
	60 T. 12 D.P.	1.625"	1.625"	5.160"			0.656"	40 in. lbs.	5000 RPM	0941625

* A portion of the teeth near the cap screws are milled away. However, at least ¼" of the teeth face width is available, allowing sensing of all teeth.

SPECIAL BORES: Hub-Type, Split, and Hubless gears can be supplied with special bore sizes between the Stock Bore and Max. Special Bore sizes listed above. To order Special Bores, substitute 9999 for the last 4 digits of the part number and specify special bore size required.

ASSEMBLY NOTE FOR SPLIT GEARS: When tightening the split gear halves on a shaft, it is recommended that the flat washer spacers be used to help keep the gap between halves equal.

Run-out should be checked after installation is complete. Always use the supplied lock washers when tightening the socket head cap screws. Torque these screws to 182 in. lbs.

STANDARD SPUR GEAR DEFINITIONS, RELATIONSHIPS & FORMULA

Gear parameters are fundamentally related to their use as power transmission elements. Although these parameters are not the most convenient when using gears to excite magnetic pickups, they can be easily converted to more useful form, once the basic definitions are understood.

PITCH DIAMETER (P.D.) - The diameter of the circle described by the tooth-to-tooth contact point when running in mesh with the teeth of another gear. This point is roughly half way between the root (bottom) and the tip of the gear tooth. The Pitch Diameter is slightly smaller than the outside diameter of the gear.

DIAMETRAL PITCH (D.P.) - The number of teeth/inch of Pitch Diameter. Thus a 20 D.P. gear has 20 teeth for each inch of Pitch Diameter. A 60-tooth, 20 D.P. gear would have a pitch diameter of 3', a 60T, 10 D.P. gear has a Pitch Diameter of 6'.

PRESSURE ANGLE - Pressure angle relates to tooth shape and strength. It has no significant effect on the operation of the gear for exciting magnetic pickups, and pickups can be used with gears of any pressure angle.

OUTSIDE DIAMETER (O.D.) - The outside diameter is the overall diameter of the gear to the tops of the teeth, and is used for calculating surface speed when the gear is used to excite a magnetic sensor. The O.D. can be determined from the following formula:

$$\text{O.D.} = \frac{\text{RPM} \times \text{Nt}}{60}$$

Example: A 60T, 16 D.P. Gear has an O.D. of:

$$\text{O.D.} = \frac{10 \times 60}{3.1 \times \pi} = 3.875 \text{ inches}$$

SURFACE SPEED - The output of a magnetic pickup depends on the linear surface speed of the tops of the passing gear teeth. Surface speed is normally expressed in inches/sec. and can be calculated for a given gear as follows:

$$\text{Surface Speed in inches /sec.} = \frac{50 \times 3.1 \times \pi}{60}$$

$$\textbf{or;} \quad \text{RPM} = \frac{60 + 2}{20}$$

Example: What is the surface speed of the 60T, 20 D.P. Gear when running at 50 RPM? At what RPM will the 1-Volt Threshold Speed (10 inches/sec.) for the MP-62TA be realized?

$$\text{Gear O.D.} = \frac{\text{Surface Speed} \times 60}{\text{O.D.} \times \pi} = 3.1\text{" (From O.D. formula above)}$$

$$\text{Surface Speed} = \frac{\text{RPM} \times \text{O.D.} \times \pi}{60} = 8.115 \text{ inches /sec.}$$

$$\text{1-Volt Threshold RPM (@ 10 in/sec.)} = \frac{60 + 2}{16} = 61.61 \text{ RPM}$$

OUTPUT SIGNAL FREQUENCY - The frequency generated by passing gear teeth is related to gear RPM and the number of gear teeth (Nt) by the following:

$$\text{Output frequency (Hz or teeth/sec.)} = \frac{\text{Nt(No. of teeth)} + 2}{\text{D.P. (Diametral Pitch)}}$$