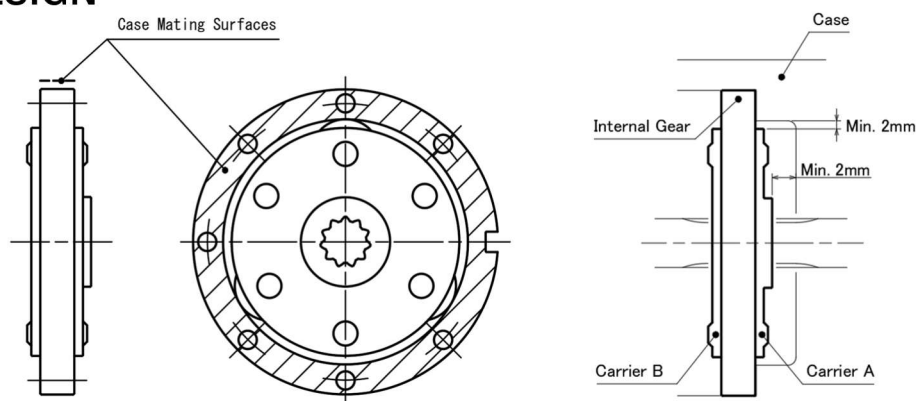


DESIGN GUIDE

CASE DESIGN



【Case Size】

The inner surface of the case which is fitted to the outer surface of the internal gear should be designed with fitting tolerance class H7~H8(JIS).

【Reference Surface】

The Inner surfaces of the case which are fitted to the outer surface of the internal gear of both circumferential and side surfaces should be flat and uniform. (See the above left fig.)

【Clearance】

To avoid mechanical interference, the clearance between the case and Carrier A and B should be 2mm or more. (See the above right fig.)

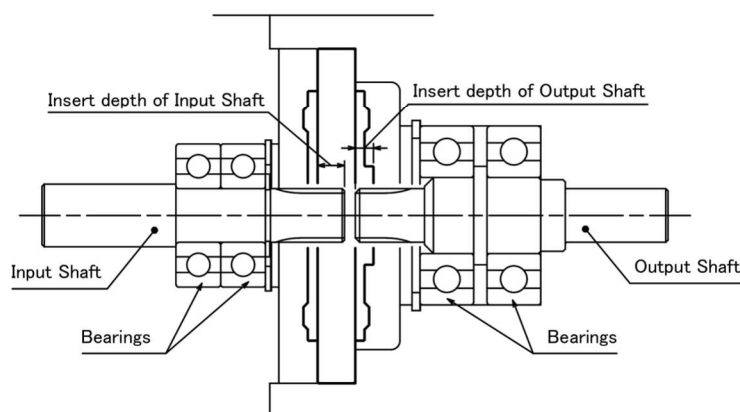
【Fixing the internal gear】

LGU26, LGU35, LGU54, LGU85 Series : Fix the internal gear using the key groove/key.

Fitting plate (Option Part) would be used if necessary.

Other Series : Fix the internal gear by fastening bolts with same torque for all holes.

INPUT/OUTPUT SHAFT DESIGN



【Input/Output Shaft Support】

To avoid the direct radial and thrust load to the gear, input/output shafts require to be supported by bearings of the case shown as the above figure.

【Radial Alignment】

Radial alignment errors should be 0.15mm or less after the input and output shafts have been fixed.

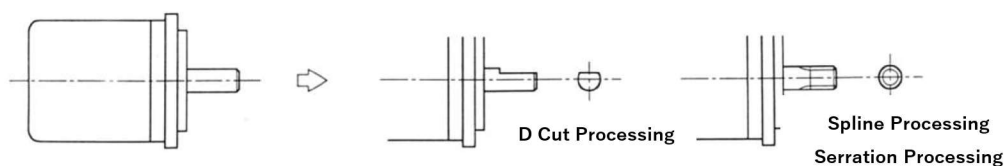
PRECAUTIONS

- Avoid rapid temperature change not to generate unwanted moisture or dew.
- Keep gears under circumstances of 40°C or less temperature and dark indoors not to contaminate foreign substances, dust, and moisture.
- Improper setting may cause excessive noise and/or vibration.

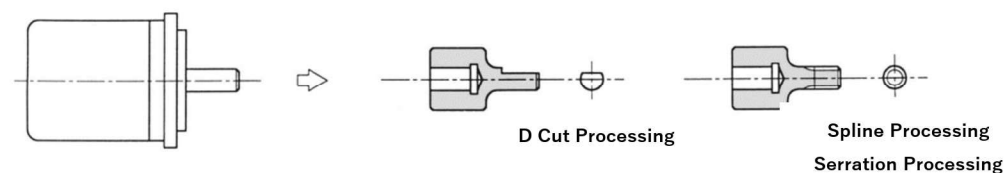
DESIGN GUIDE

■ CONNECTION to MOTOR

1. Direct connection, Inserting the motor shaft directly to the gear unit

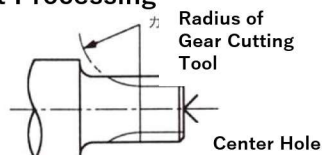


2. Indirect connection to the gear unit via a coupling or a joint shaft



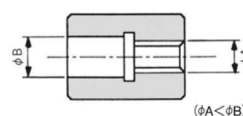
■ GEAR CUTTING(Serration · Spline)

1. Shaft Processing



Note that a step near gear may interfere with the gear cutting tool on its cutting.

2. Hole Processing



Make the work space for cutting tool like the above figure for the hole processing.

■ TABLE of SERRATION · SPLINE

● Important Parameters Table of Involute Serration JIS B 1602(mm)

BASIC PROFILES						HOLE (FEMALE SERRATION)						SHAFT (MALE SERRATION)					
Nominal Diameter	Number of Teeth	Module	Pressure Angle	Basic Pitch Circle Diameter	Shift Factor	Major Diameter	Minor Diameter		Over Pin Diameter		Measuring Pin Diameter	Major Diameter	Minor Diameter		Over Pin Diameter		Measuring Pin Diameter
							Basic Dimension	Deviation	Basic Dimension	Deviation		Basic Dimension	Deviation	Minor Diameter	Basic Dimension	Deviation	
9	11	0.75	45°	8.25	+0.1	9.3	7.8	+0.058 0	5.831	+0.091 +0.045	φ 1.5	9	0 -0.075	7.5	10.693	-0.018 -0.054	φ 1.5
12	11	1		11		12.4	10.4	+0.07 0	7.775	+0.091 +0.045	φ 2.0	12	0 -0.1	10	14.257	-0.018 -0.054	φ 2.0
19.5	25	0.75		18.75		19.8	18.3	+0.084 0	16.403	+0.088 +0.046	φ 1.5	19.5	0 -0.075	18	21.276	-0.023 -0.061	φ 1.5

● Important Parameters Table of Involute Spline JIS D 2001(mm)

BASIC PROFILES						HOLE (FEMALE SPLINE)						SHAFT (MALE SPLINE)						
Nominal Diameter	Number of Teeth	Module	Pressure Angle	Basic Pitch Circle Diameter	Shift Factor	Major Diameter		Minor Diameter		Over Pin Diameter			Major Diameter	Minor Diameter	Over Pin Diameter			Measuring Pin Diameter
						Centralizing by tooth flank									Deviation		Class a	
						Basic Dimension	Deviation	Basic Dimension	Deviation	Basic Dimension	Deviation	Measuring Pin Diameter	Basic Dimension	Basic Dimension	Basic Dimension	Class a	Class b	
8	9	0.75	20°	6.75	+0.633	8	-0.013 -0.028	6.5	+0.015 0	4.916	+0.108 0	7.85	6.2	9.202	-0.097 -0.162	-0.011 -0.076	φ 1.4	
17	15	1		15	+0.8	17	-0.016 -0.034	15	+0.018 0	12.984	+0.07 0	16.8	14.6	18.598	-0.108 -0.18	-0.013 -0.085	φ 1.8	
21	10	1.75		17.5		21	-0.02 -0.041	17.5	+0.018 0	14.12	+0.083 0	20.65	16.8	24.913	-0.111 -0.187	-0.016 -0.092	φ 3.6	
25	13	1.667		21.667	25	-0.02 -0.041	21.7	+0.021 0	18.286	+0.084 0	24.667	21	27.563	-0.122 -0.206	-0.017 -0.101	φ 3.0		
30	16	1.667		26.667	30	-0.02 -0.041	26.7	+0.021 0	23.445	+0.085 0	29.667	26	32.851	-0.129 -0.217	-0.018 -0.107	φ 3.0		
38	17	2		34	38	-0.025 -0.05	34	+0.025 0	29.989	+0.085 0	37.6	33.2	41.297	-0.13 -0.219	-0.019 -0.108	φ 3.6		
38.333	21	1.667		35	38.333	-0.025 -0.05	35	+0.025 0	31.681	+0.085 0	38	34.333	41.214	-0.136 -0.229	-0.019 -0.113	φ 3.0		
48.333	27	1.667		45	48.333	-0.025 -0.05	45	+0.025 0	41.703	+0.086 0	48	44.333	51.36	-0.143 -0.241	-0.02 -0.119	φ 3.0		

* Module 1.75 is our original specification based on the JIS standard.

DESIGN GUIDE

LUBRICATION

[with or without Lubrication]

- Both with and without pre-lubricated gear units are existing. Please see the below table G-1.
- For non-pre-lubricated gears, Please use the gear by putting lubrication and sealing before embedding the gear into your product.
- Depending on the gear series, Greaseless can be provided. Please consult us.

Table G-1 with or without Lubrication and its type

Series	LGU26-S	LGU35-S	LGU35-M	LGU35-P	LGU54-P	LGU54-C	LGU75-P	LGU75-S	LGU75-M	LGU85-M	LGU120-M	LGU146-M	LGU200-M
Type	DYNAMAX EP No.1			DYNAMAX No.1					Without Lubrication				

[Volume of Lubrication]

- Please see the Table G-2 for the volume of lubrication for the LGU75-M Series.
- In case the gear case has enough space or clearance, inject the grease into the case as 50-80% of the case volume
- For oil lubrication, 30-50% of the volume of the case should be filled by the oil.

Table G-2 Volume of Grease

Series	LGU75-M	LGU75-M8	LGU75-M12
Grease(g)	8	13	15

[How to Inject Grease]

Inject grease to the gear from the gap between the internal gear and the carrier or the hole of the center of the carrier, and make grease reach equally to the whole planetary gear unit.

[Recommended Lubricants]

LGU75-M : Grease or Oil is recommended.

LGU85, 120, 146, 200 : Oil is recommended.

Grease Lubrication : 『JIS K 2220 NLGI. No.1(Cone Penetration) equivalent』

Oil Lubrication : 『JIS K 2219 for Industry』 Class 1 or Class 2

Some of the recommended products are shown in the below table G-3.

Table G-3 Table of Lubrication (Partially Selected)

Lubrication		Surrounding Temperature	IDEMITSU	COSMO OIL LUBRICANTS	SHELL LUBRICANTS	ENEOS	EMG LUBRICANTS (MOBIL)
Oil	Class 1	0~40°C	Daphne Mechanic Oil 150	ALLPUS150	Morlina S2B 150	FBK Oil RO 150	Unipower SHT150
	Class 2		Daphne Super Gear Oil 150	COSMO GEAR SE 150	Omala S2G 150	BONNOC M 150	Mobil Gear 600XP 150
Grease	Multi Purpose	0~40°C	Daphne Eponex Grease SR No.1	DYNAMAX No.1	Alvania S No.1	MULTINOC GREASE No.1	-
	Extreme Pressure		Daphne Grease MPNo.1	DYNAMAX EP No.1	Alvania EP No.1	EPNOC GREASE No.1	Mobilux EP No.1

※ In case the lubricant with extreme pressure additive is used for plastic parts, damage to the parts may occur. Consultation to the lubrication maker would be needed.