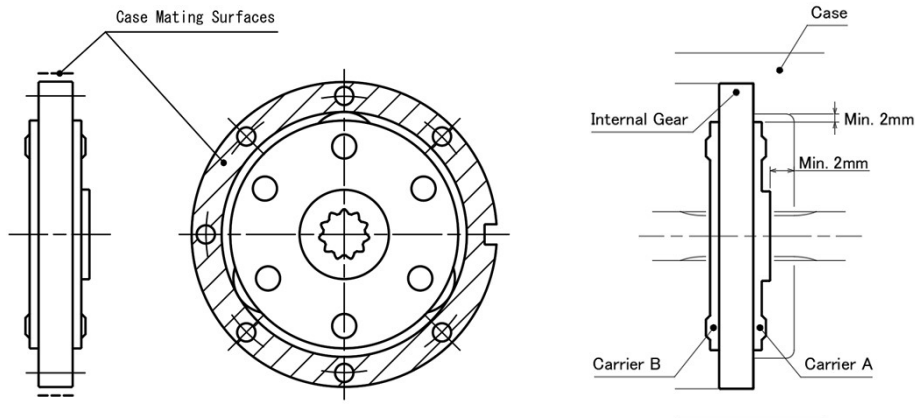


# DESIGN GUIDE

## ■ 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.)

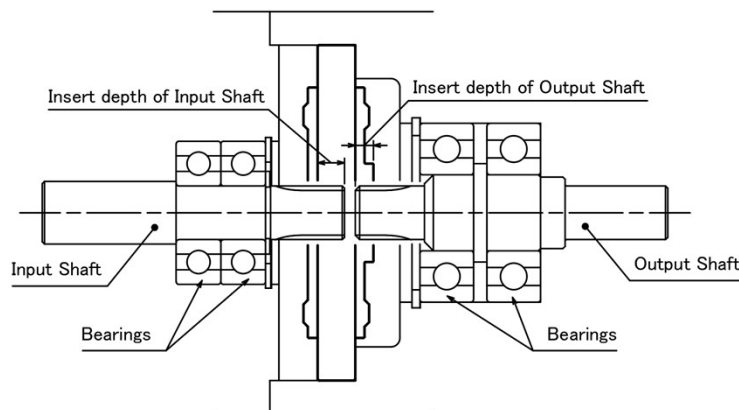
### 【Fixing the internal gear】

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.

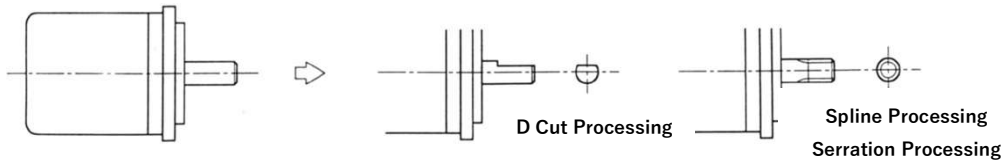
## ■ PRECAUTIONS

- 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.

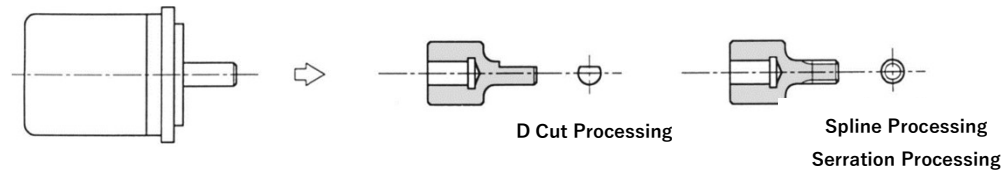
# DESIGN GUIDE

## CONNECTION to MOTOR

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

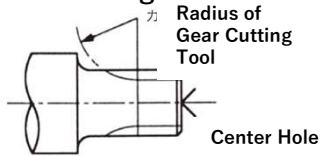


### 2. Indirect connection to the gear unit via a coupling or a joint shaft

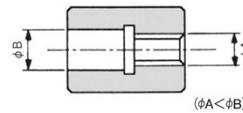


## GEAR CUTTING(Serration · Spline)

### 1. Shaft Processing



### 2. Hole Processing



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

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						SHAFT					
Nominal Diameter	No. of Teeth	Module	Pressure Angle	Basic Pitch Circle Diameter	Shift Factor	Root Diameter	Tip Diameter		Over Pin Diameter		Measuring Pin Diameter	Root Diameter		Tip Diameter	Over Pin Diameter		Measuring Pin Diameter
							Basic Dimension	Deviation	Basic Dimension	Deviation		Basic Dimension	Deviation		Basic Dimension	Deviation	
9	11	0.75	45°	8.25	+0.1	9.3	7.8	+0.058	5.831	+0.091	φ 1.5	9	0	7.5	10.693	-0.018	φ 1.5
							0	+0.045		-0.075			-0.054				
12	11	1	45°	11	+0.1	12.4	10.4	+0.07	7.775	+0.091	φ 2.0	12	0	10	14.257	-0.018	φ 2.0
							0	+0.045		-0.1			-0.054				
19.5	25	0.75	45°	18.75	+0.1	19.8	18.3	+0.084	16.403	+0.088	φ 1.5	19.5	0	18	21.276	-0.023	φ 1.5
							0	+0.046		-0.075			-0.061				

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

BASIC PROFILES						HOLE						SHAFT										
Nominal Diameter	No. of Teeth	Module	Pressure Angle	Basic Pitch Circle Diameter	Shift Factor	Root Diameter		Tip Diameter		Over Pin Diameter			Root Diameter	Tip Diameter	Over Pin Diameter							
						Centralizing by tooth flank		Basic Dims.	Deviation	Basic Dims.	Deviation	Basic Dims.			Deviation	Measuring Pin Diameter	Basic Dims.	Basic Dims.	Basic Dimension	Deviation		Measuring Pin Diam.
						Basic Dims.	Deviation													Class a	Class b	
8	9	0.75	20°	6.75	+0.633	8	-0.013	6.5	+0.015	4.916	+0.108	V=1.50	7.85	6.2	9.202	-0.097	-0.011	φ 1.4				
							-0.028		0		V1=1.20					-0.162	-0.076					
17	15	1	20°	15	+0.8	17	-0.016	15	+0.018	12.984	+0.07	V=2.00	16.8	14.6	18.598	-0.108	-0.013	φ 1.8				
							-0.034		0		V1=1.68					-0.18	-0.085					
21	10	1.75	20°	17.5	+0.8	21	-0.02	17.5	+0.018	14.12	+0.083	V=3.50	20.65	16.8	24.913	-0.111	-0.016	φ 3.6				
							-0.041		0		V1=2.94					-0.187	-0.092					
25	13	1.667	20°	21.667	+0.8	25	-0.02	21.7	+0.021	18.286	+0.084	V=3.333	24.667	21	27.563	-0.122	-0.017	φ 3.0				
							-0.041		0		V1=2.80					-0.206	-0.101					
30	16	1.667	20°	26.667	+0.8	30	-0.02	26.7	+0.021	23.445	+0.085	V=3.333	29.667	26	32.851	-0.129	-0.018	φ 3.0				
							-0.041		0		V1=2.80					-0.217	-0.107					
38	17	2	20°	34	+0.8	38	-0.025	34	+0.025	29.989	+0.085	V=4.00	37.6	33.2	41.297	-0.13	-0.019	φ 3.6				
							-0.05		0		V1=3.36					-0.219	-0.108					
38.333	21	1.667	20°	35	+0.8	38.333	-0.025	35	+0.025	31.681	+0.085	V=3.333	38	34.333	41.214	-0.136	-0.019	φ 3.0				
							-0.05		0		V1=2.80					-0.229	-0.113					
48.333	27	1.667	20°	45	+0.8	48.333	-0.025	45	+0.025	41.703	+0.086	V=3.333	48	44.333	51.36	-0.143	-0.02	φ 3.0				
							-0.05		0		V1=2.80					-0.241	-0.119					

※ Module 1.75 is our original spec. 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.