

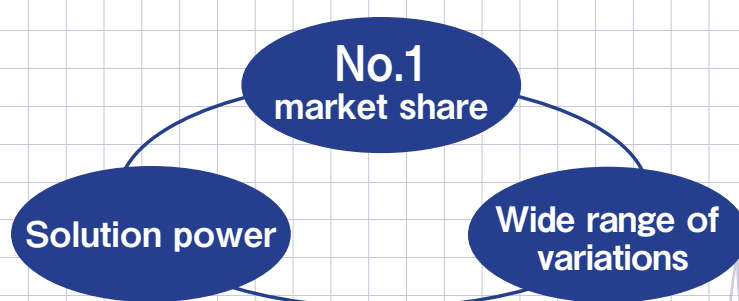
# TSUBAKI Miter Gear Box



# TSUBAKI's Miter Gear Box plays important roles around the world

TSUBAKI's Miter Gear Box has been used for a wide range of applications and in various specifications since it was launched in 1966.

The type ED and type ARA Gear Box are available in various special specifications besides the standard model.



## Top market share supported by reliability, results, and track record

TSUBAKI's Miter Gear Box has received recognition for its reliability, results, and track record, from customers in various fields, and has achieved top market share in the Gear Box field.

## Wide variations

The type ED & type ARA are available in a wide range of standard models and semi-standard models. (Refer to the Model list in p.9.)

### Type ED

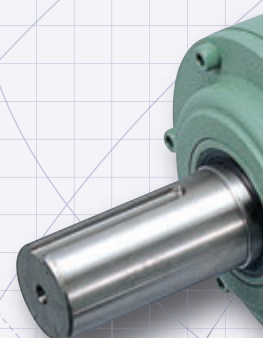
Speed ratio : 1:1, 1.5:1, 2:1, 2.5:1, 3:1  
Size : 10 sizes  
Shaft arrangement : 42 types  
Casing material : FC (Gray cast iron)  
FCD (Ductile cast iron)  
\* ED2 uses ADC (Aluminum die-casting)

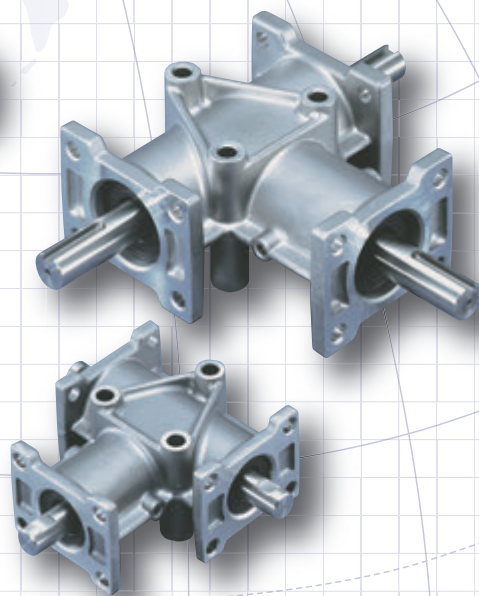
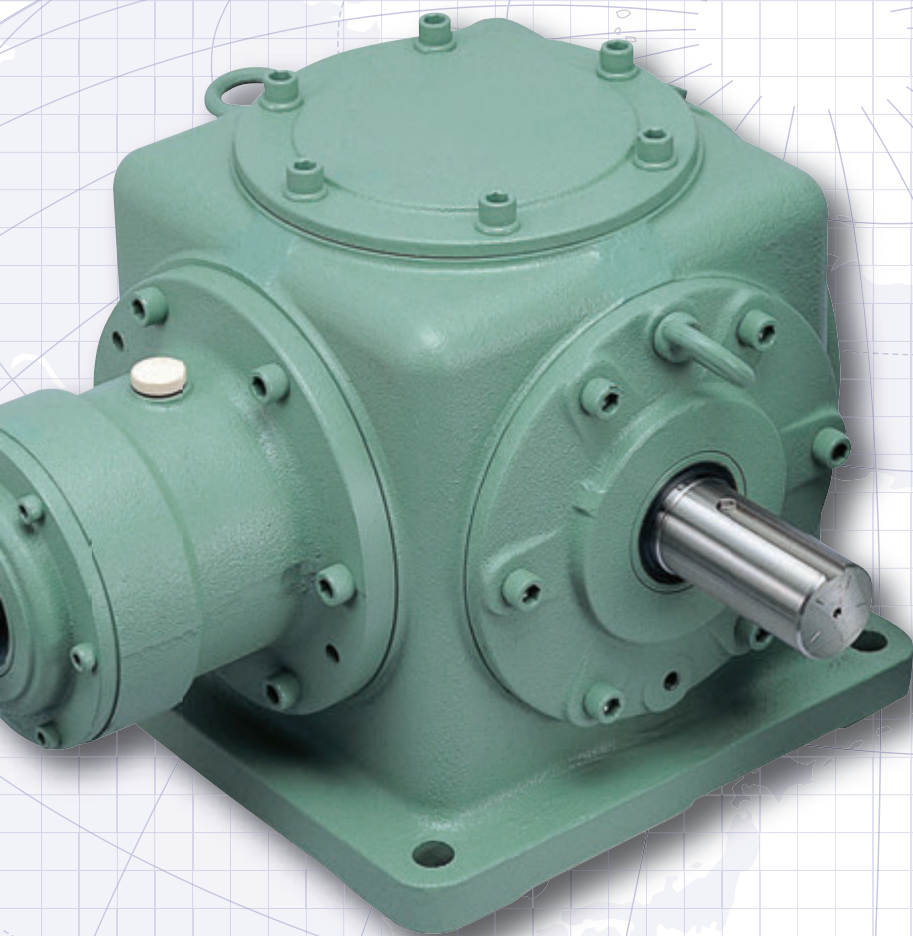
### Type ARA

Speed ratio : 1:1, 2:1  
Size : 3 sizes  
Shaft arrangement : 3 types  
Casing material : ADC (Aluminum die-casting)

## Solution power

We can propose the optimum specification for every application including various special specifications.





## CONTENTS

### ■ Type ED

Features, structure, functions .....	pp.7 to 8
Model list, Standard specification .....	pp.9 to 10
Indication of model number.....	pp.11 to 14
(Shaft arrangement, rotational relationship, type of mounting)	
Selection, Example of model selection.....	pp.15 to 16
Transmission capacity table .....	pp.17 to 20
Dimensional drawing.....	pp.21 to 54

### ■ Type ARA

Features, Model list, Standard specification .....	p.57
Indication of model number, Selection .....	p.58
Transmission capacity table, Dimensional drawing .....	pp.59 to 60

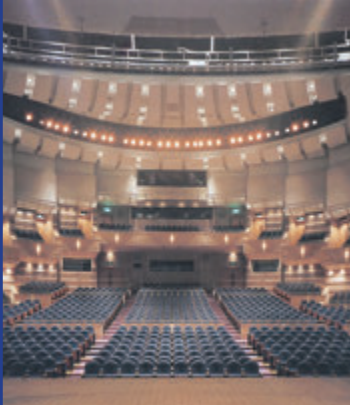



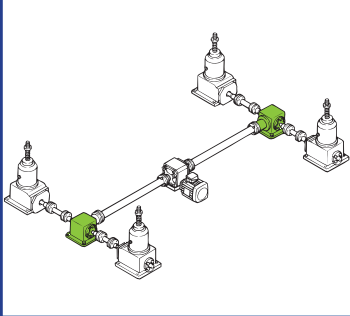
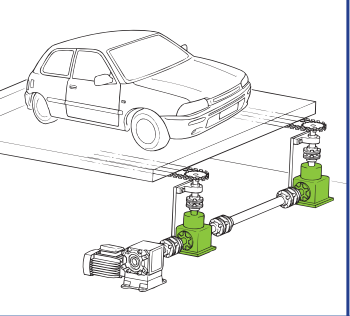
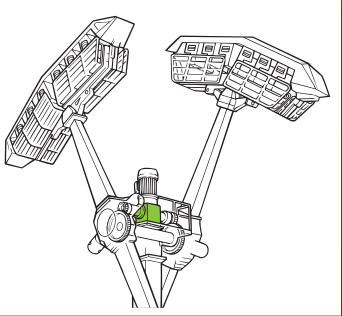
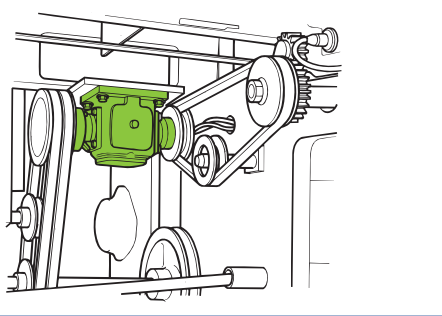
### ■ Technical document

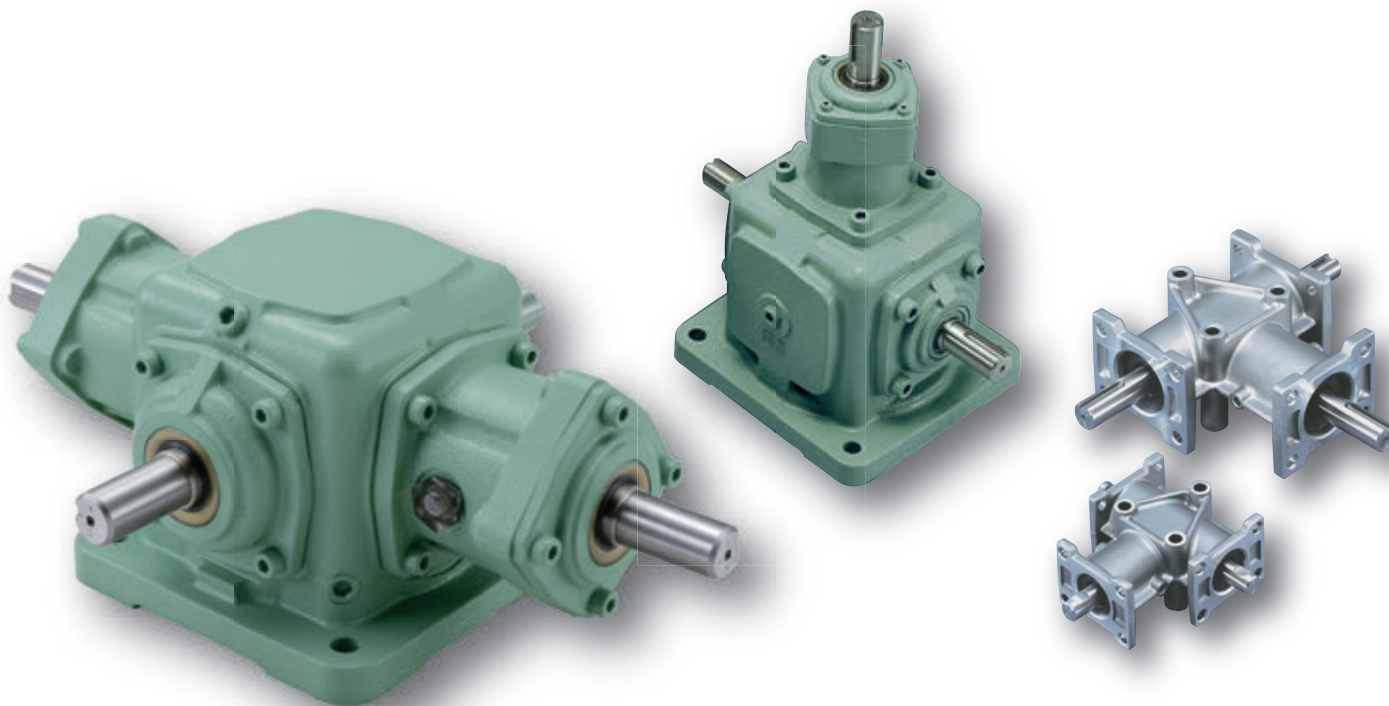
Technical data .....	pp.63 to 65
Option .....	pp.66 to 68
(FCD for casing material, shaft end tapping, spigot joint processing at bottom face, etc.)	
Special specification .....	pp.69 to 72
(Responds to high rotational speeds, special atmospheres, special layouts, high precision, and other requirements)	
Handling .....	pp.73 to 77
Check sheet for selected specification.....	p.78

# We can propose the optimum specification for every application.

The type ED and type ARA are available in standard models with a wide range of variations in terms of size, shaft arrangement, speed ratio, and material. Furthermore, with various special specifications, they play important roles in a wide range of applications such as entertainment facilities, chemical plants, food machinery.

## Type ED

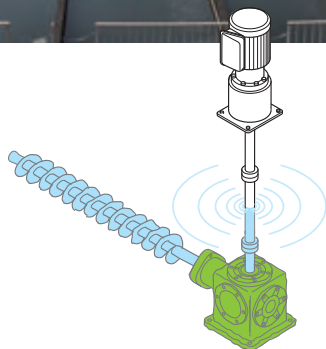
		Type ED	
Hoisting equipment	Multistory parking structure for transporting pallets	Entertainment facility	Paper folding machine
			
			
Motive power is distributed to the right and left sides, and is input to the jack.	Motive power is input from the cross shaft (orthogonal shaft), and the lateral shaft is set as the output shaft. Two units are coupled and synchronized.	Motive power is input from the cross shaft using the lateral dual shaft, and the opposing lateral shaft is rotated in the reverse direction.	Motive power is input to the cross shaft using a ceiling-mounted construction, then motive power is distributed to the pulleys of another cross shaft and lateral shaft, and they are driven at the same time.
<b>Merit</b>	<b>Merit</b>	<b>Merit</b>	<b>Merit</b>
Driven with one motor unit, synchronization is easy and hoisting is possible while keeping a horizontal state.	Driven with one motor unit, plural units can be synchronized.	Using the lateral dual shaft, rotation is possible in different directions with one motor unit.	Layout can be freely designed. (Please indicate type of mounting.)



## Type ARA

### Type ARA

#### Scraper in water

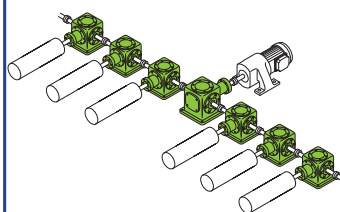


The screw in the water is driven by motive power from the unit on the ground.

#### Merit

It is possible to use the gear box in water. Harmonization with the environment can be promoted with water lubrication.

#### Iron- and steel-making machine

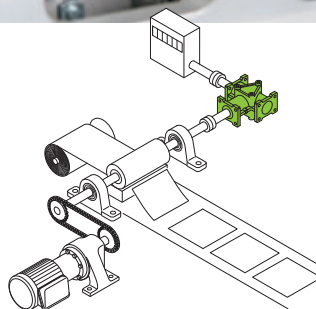


Motive power is distributed to the right and left sides, as well as to plural shafts, and the line shaft is driven.

#### Merit

Synchronized operation can be achieved easily by driving with one motor unit. A compact equipment design can be achieved.

#### Food packaging machine

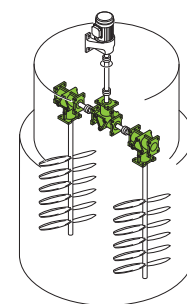


Packaging quantity is counted by linking the rotary cutter with the counter drive for the number of film sheets.

#### Merit

Space savings are possible by linking with the compact ARA Gear Box. Besides, when using the ARA Gear Box, which has excellent corrosion resistance, it is possible to prevent the generation of rust.

#### Agitator



The agitator is driven by distributing motive power to the right and left sides.

#### Merit

One motor unit can drive two shafts. Using the ARA Gear Box, which has excellent corrosion resistance, it is possible to prevent the generation of rust.

# MEMO

A large grid of graph paper, consisting of many small squares, intended for writing a memo. The grid covers most of the page below the 'MEMO' header.

# Type ED

## C O N T E N T S

Features, structure, functions .....	p.7
Model list .....	p.9
Standard specification .....	p.10
Indication of model number .....	p.11
Shaft arrangement, rotational relationship, type of mounting	
Selection .....	p.15
Transmission capacity table .....	p.17
Dimensional drawing .....	p.21

## Type ED

# Features, structure, functions

## Features

### Wide range of variations

The optimum model can be selected from a wide range.

We can also respond to various special specifications for all market needs.

### High quality

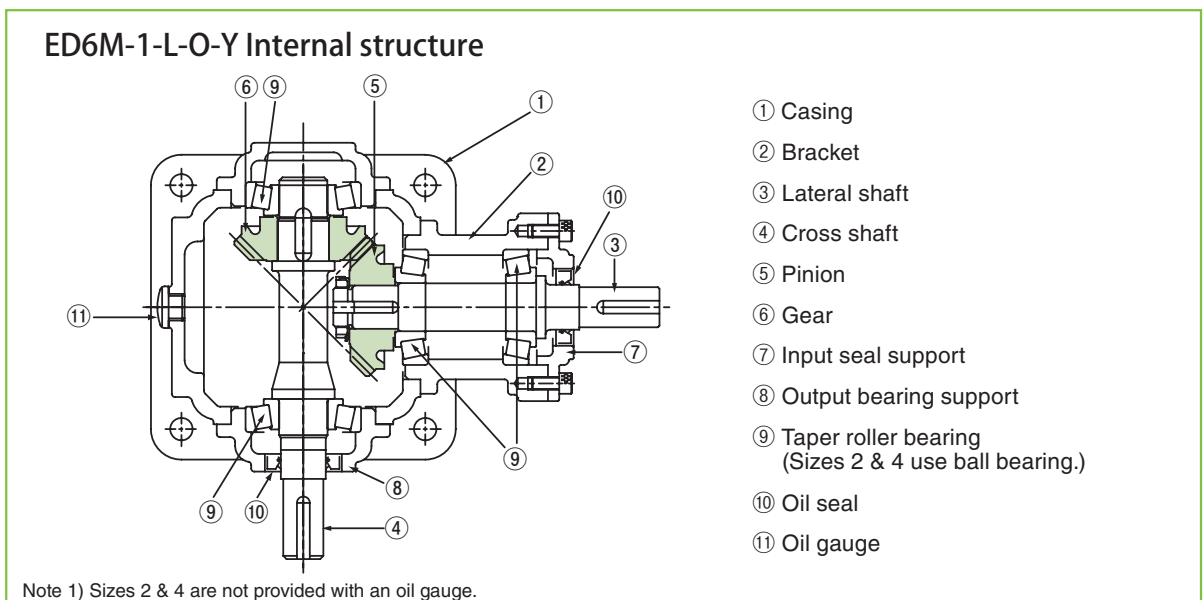
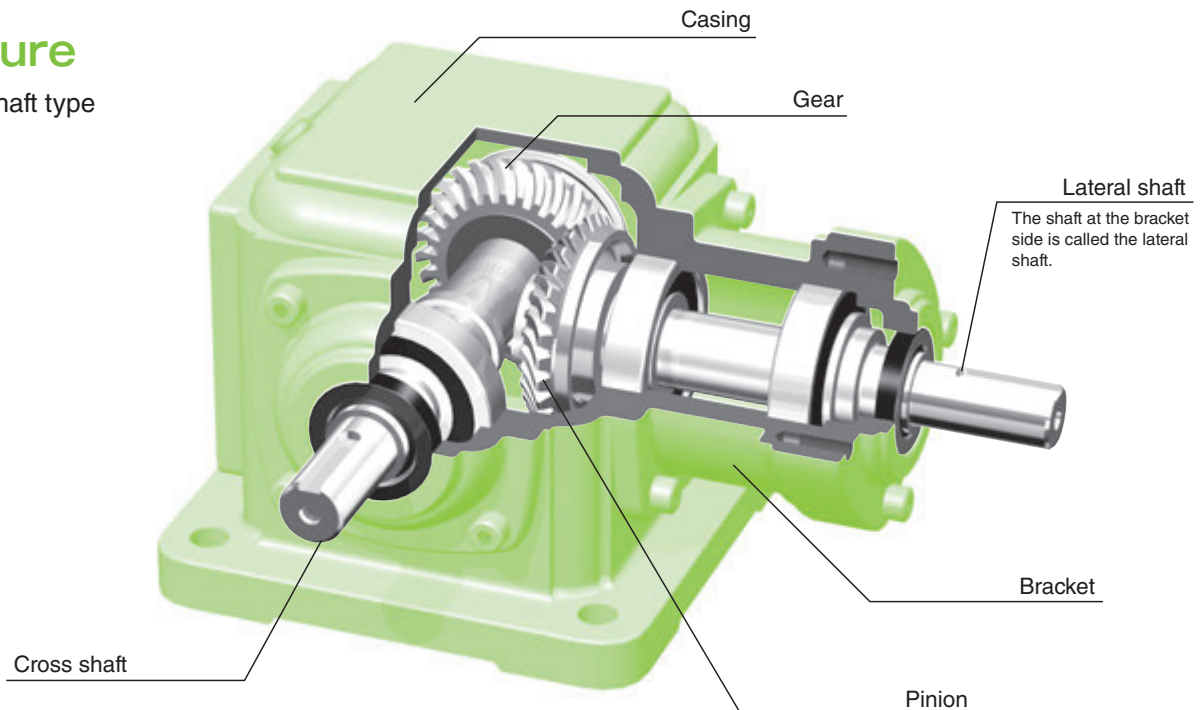
Because it adopts high-precision spiral bevel gears that comply with AGMA standards, many high-level functions such as high efficiency and high transmission capacity can be obtained.

### Prompt delivery

A wide range of standard and semi-standard models is available. (Refer to the Model list in p.9.)

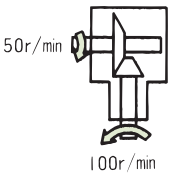
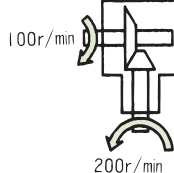
## Structure

Horizontal shaft type



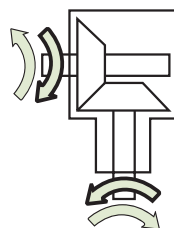


1. Input is possible from both of lateral and cross shafts. However, with the exception of the model with a speed ratio of 1:1, transmission from the lateral shaft to the cross shaft reduces speed, and transmission from the cross shaft to the lateral shaft increases speed.

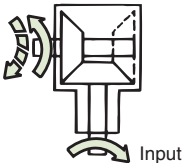
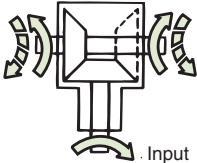
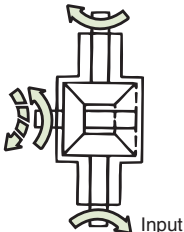
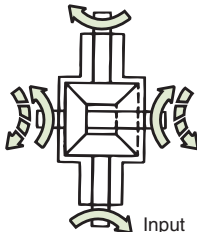
Input from lateral shaft, output from cross shaft	Input from cross shaft, output from lateral shaft
 <p>50r/min</p> <p>100r/min</p> <p>[Speed reduction]</p> <p>Input from lateral shaft at 100 rpm, output from cross shaft at 50 rpm</p>	 <p>100r/min</p> <p>200r/min</p> <p>[Speed increase]</p> <p>Input from cross shaft at 100 rpm, output from lateral shaft at 200 rpm</p>

\* This schema explains the rotational speed of the output shaft when an input is made at 100 rpm for a unit with a speed ratio of 2:1.  
 \* Transmission capacity tables (pp.17 to 20) describe values for inputs from the lateral shaft and outputs from the cross shaft.

2. Rotational directions of input shaft for right-handed rotation and left-handed rotation are both possible.



3. Regarding lateral single-shaft type, lateral dual-shaft type

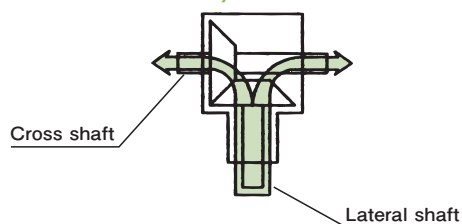
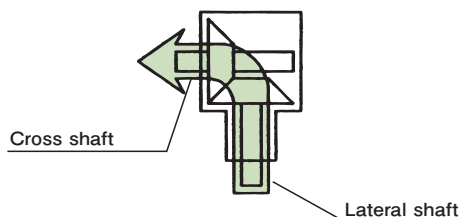
Lateral single-shaft type		Lateral dual-shaft type	
Dual shaft	Triple shaft	Triple shaft	Quad shaft
			

\* When the mounted position of the gear is reversed (dotted line in Fig.), the direction of rotation is changed.

## Function

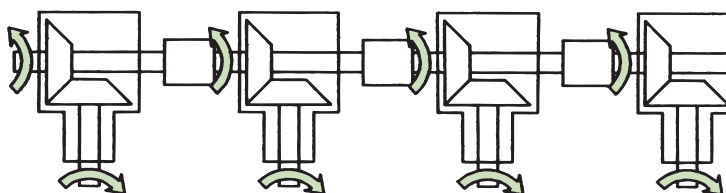
As a basic function...

- The direction for transmitting force is changed 90°.
- The direction for transmitting force is changed by 90°, and force is distributed to the right and left sides (upper and lower sides).

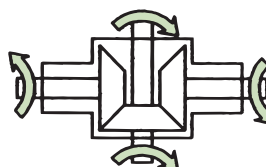


Example of application...

3. Miter Gear Boxes are arranged in one line to couple their cross shafts for inputs, and lateral shafts are rotated.



4. Motive power is input from the cross shaft using the lateral dual shaft, and the opposing lateral shaft is rotated in the reverse direction.



# Type ED

## Model list

### Model list

#### 1. Lateral single-shaft type

○ : Standard item    △ : Semi-standard item

Speed ratio Size	M (1 : 1)		B15 (1.5 : 1)		B20 (2 : 1)		B25 (2.5 : 1)		B30 (3 : 1)	
	Material FC	FCD	FC	FCD	FC	FCD	FC	FCD	FC	FCD
2	○ (ADC)	—	—	—	—	—	—	—	—	—
4	○	△	—	—	○	△	—	—	—	—
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
10	○	○	○	○	○	○	○	○	○	○
12	○	○	○	○	○	○	○	○	○	○
16	○	△	—	—	○	△	—	—	—	—
20	○	—	—	—	○	—	—	—	—	—
25	○	—	—	—	○	—	—	—	—	—

#### 2. Lateral dual-shaft type

Speed ratio Size	Material				
	M (1:1)	B15 (1.5:1)	B20 (2:1)	B25 (2.5:1)	B30 (3:1)
	FC				
2	※△ (ADC)	—	—	—	—
4	○	—	○	—	—
6	○	○	○	○	○
7	○	○	○	○	○
8	○	○	○	○	○
10	○	○	○	○	○
12	○	○	○	○	○
16	△	—	△	—	—
20	△	—	△	—	—
25	△	—	△	—	—

Note 1) ADC (Aluminum die-casting), FC (Gray cast iron), FCD (Ductile cast iron)

Note 2) For the lateral dual-shaft type of size 2, shaft arrangements of 1-1-UD (-O), 1-1-U (-O), 1-1-D (-O), U-D-LR (-O), U-D-R (-O), and U-D-L (-O) can be manufactured.

Note 3) For FCD, shaft arrangements of 1-LR (-O), 1-R (-O), and 1-L (-O) of the size in the table above can be manufactured.

# Type ED

## Standard specification

### Standard specification

Gear box	Speed reduction method	Spiral bevel gear
	Lubrication method	Sizes 2 & 4: Grease lubrication Sizes 6 to 25: Oil lubrication
	Specification of key	New JIS regular class JIS B1301-1976 The key is attached at delivery.
	Casing material	Size 2: ADC Sizes 4 to 25: FC (FCD is optional.)
	Sealing structure	Single oil seal
	Painting specification	Paint color: Munsell 2.5G6/3
		Undercoat: Lacquer-type undercoat paint Finish coating: Acrylic lacquer-type paint
Corrosion-resistant specification	Corrosion-resistant period: six months under indoor storage conditions (after shipment from the factory)	
	Outside corrosion-resistant treatment: Application of corrosion-preventive oil Inside corrosion-resistant treatment: Sealing after enclosing lubrication oil	
Ambient conditions	Installation site	Indoor
	Ambient temperature	-10°C to 50°C
	Humidity	95% or less
	Altitude	1,000 m or lower
	Atmosphere	There shall be no corrosive or explosive gas, vapor, and dew condensation, and there shall be minimal dust.
Type of mounting		Floor (Y), Ceiling (T), Wall (K1, K2, K3, K4)

Note 1) ADC (Aluminum die-casting), FC (Gray cast iron), FCD (Ductile cast iron)

Type ED

# Indication of model number

Shaft arrangement • Rotational relationship

Lateral single-shaft type **ED** **6** **M** - **1-LR** - **Y**

Lateral dual-shaft type **ED** **10** **B20** - **1-1-UD** - **T**

Size	Speed ratio	Shaft arrangement • Rotational relationship					
2	M (1 : 1)	1-LR		1-UD		U-LR	
		1-LR-O		1-UD-O		U-LR-O	
4	B15 (1.5:1)	1-R		1-U		U-R	
		1-R-O		1-U-O		U-R-O	
6	B20 (2 : 1)	1-L		1-D		U-L	
		1-L-O		1-D-O		U-L-O	
7	B25 (2.5 : 1)	1-LR		1-UD		U-LR	
		1-LR-O		1-UD-O		U-LR-O	
8	B30 (3 : 1)	1-R		1-U		U-R	
		1-R-O		1-U-O		U-R-O	
10	B20 (2 : 1)	1-L		1-D		U-L	
		1-L-O		1-D-O		U-L-O	
12	B25 (2.5 : 1)	1-R		1-U		U-R	
		1-R-O		1-U-O		U-R-O	
16	B30 (3 : 1)	1-L		1-D		U-L	
		1-L-O		1-D-O		U-L-O	
20	B15 (1.5:1)	1-LR		1-UD		U-LR	
		1-LR-O		1-UD-O		U-LR-O	
25	M (1 : 1)	1-R		1-U		U-R	
		1-R-O		1-U-O		U-R-O	

Lateral single-shaft type

• The shaft arrangements described to the right have the same rotational relationships. However, note that the positions of plug, oil gauge, and name plate differ.  
 U-LR=U-LR-O, U-R=U-L-O, U-L=U-R-O, D-LR=D-LR-O, D-R=D-L-O, D-L=D-R-O, 1-1-LR=1-1-LR-O, 1-1-R=1-1-L-O, 1-1-L=1-1-R-O, U-D-LR=U-D-LR-O,  
 U-D-R=U-D-L-O, U-D-L=U-D-R-O

**Type of mounting** For mounting by each shaft arrangement, refer to pp.13, 14.

Lateral dual-shaft type

Shaft arrangement  
 1-1-UD(-O)  
 1-1-U(-O)  
 1-1-D(-O)

	Floor mount	Ceiling mount	Wall mount			
	Y	T	K1	K2	K3	K4

Lateral dual-shaft type	D-LR	1-1-LR	1-1-UD	U-D-LR
	D-LR-O	1-1-LR-O	1-1-UD-O	U-D-LR-O
	D-R	1-1-R	1-1-U	U-D-R
	D-R-O	1-1-R-O	1-1-U-O	U-D-R-O
	D-L	1-1-L	1-1-D	U-D-L
	D-L-O	1-1-L-O	1-1-D-O	U-D-L-O

# Type ED

## Indication of model number

### Type of mounting

### Lateral single-shaft type

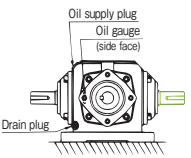
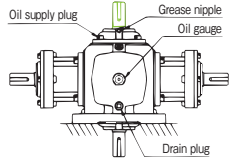
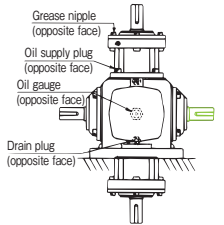
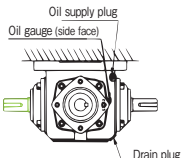
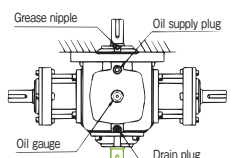
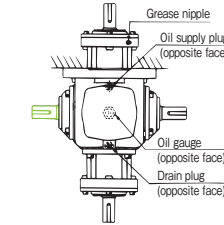
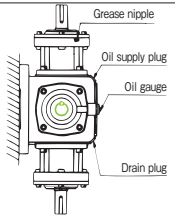
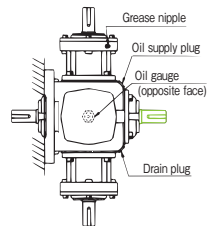
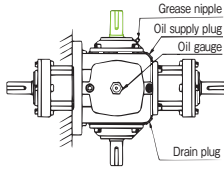
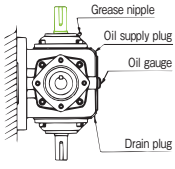
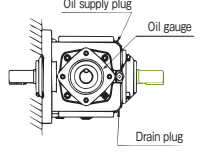
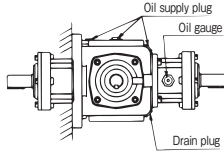
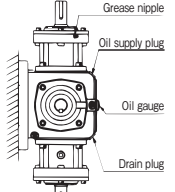
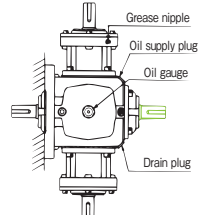
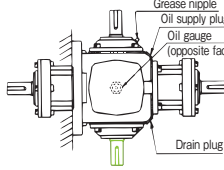
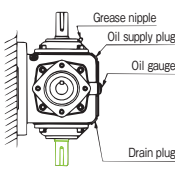
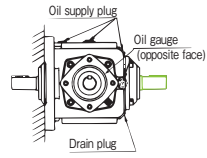
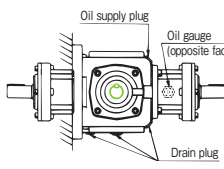
### Type of mounting • Position of each plug

Shaft arrangement		<b>1-LR(-O)</b> <b>1-R(-O)</b> <b>1-L(-O)</b>	<b>1-UD(-O)</b> <b>1-U(-O)</b> <b>1-D(-O)</b>	<b>U-LR(-O)</b> <b>U-R(-O)</b> <b>U-L(-O)</b>	<b>D-LR(-O)</b> <b>D-R(-O)</b> <b>D-L(-O)</b>
Type of mounting					
Floor mount	<b>Y</b>				
	<b>T</b>				
Wall mount	<b>K1</b>	 For 1-L (-O), the parts are at the opposite side of the cross shaft.			
	<b>K2</b>			 For U-R (-O), the parts are at the opposite side of the cross shaft.	 For D-R (-O), the parts are at the opposite side of the cross shaft.
	<b>K3</b>	 For 1-R (-O), the parts are at the opposite side of the cross shaft.			
	<b>K4</b>			 For U-L (-O), the parts are at the opposite side of the cross shaft.	 For D-L (-O), the parts are at the opposite side of the cross shaft.

Note 1) Sizes 2 & 4 are not provided with oil gauge and grease nipple. They can be mounted in any direction.

Note 2) For sizes 6 to 25, floor mount (Y) is the standard. In the cases of ceiling mount (T) and wall mount (K1, K2, K3, K4), the positions of the oil gauge, plug, and grease nipple differ.

## Lateral dual-shaft type Type of mounting • Position of each plug

Shaft arrangement		<b>1-1-LR(-O)</b> <b>1-1-R(-O)</b> <b>1-1-L(-O)</b>	<b>1-1-UD(-O)</b> <b>1-1-U(-O)</b> <b>1-1-D(-O)</b>	<b>U-D-LR(-O)</b> <b>U-D-R(-O)</b> <b>U-D-L(-O)</b>
Type of mounting				
Floor mount	<b>Y</b>			
	<b>T</b>			
Wall mount	<b>K1</b>	 For 1-1-L (-O), the parts are at the opposite side of the cross shaft.		
	<b>K2</b>			 For U-D-R (-O), the parts are at the opposite side of the cross shaft.
	<b>K3</b>	 For 1-1-R (-O), the parts are at the opposite side of the cross shaft.		
	<b>K4</b>			 For U-D-L (-O), the parts are at the opposite side of the cross shaft.

Note 3) These are for sizes 6 to 16. The positions of the oil gauge and plug differ for sizes 20 & 25.  
Furthermore, a pressure vent is mounted for size 12 or larger. For the mounting position, refer to the dimensional drawings (pp.45 to 54).

# Type ED Selection

## Selection conditions

1. Machine and equipment used, layout
2. Operating conditions
3. Ambient atmosphere
4. Others (option, special specification, etc.)

1. Machine and equipment used, layout
2. Operating conditions
  - Description of prime mover
  - Load torque N·m [kgf·m] or transmission kW
  - Operating time: ( ) hrs/day Continuous • Intermittent
  - Starting and stopping frequency: ( ) times/hr
  - Input rotational speed: Regular ( ) rpm  
Max. ( ) rpm
  - Direction of input shaft: Lateral shaft • Cross shaft

- Speed ratio: 1 : 1, 1.5 : 1, 2 : 1, 2.5 : 1, 3 : 1
- Characteristics of load :  
Uniform load • Load with some shock • Load with large shock

### 3. Ambient atmosphere

- Usage environment : Indoors • Outdoors • Near a furnace • Inside a refrigerator • Others ( )
- Ambient temperature : Regular ( ) ° C  
High temperature ( ) ° C • Low temperature ( ) ° C
- Ambient atmosphere: Salt damage • Dust • Acid • Others ( )

### 4. Others

- Option (pp.66 to 68), Special specification (pp.69 to 72), etc.

\* Also use the Check sheet for selecting the specification (p.78).

## Selection procedure

Make the selection according to the following procedure, considering conditions.

### 1. Decision on service factor

All transmission capacity tables in the catalog show values with the service factor set at 1.0. Depending on service conditions, decide the service factor using the Service factor table in Table 1.

### 2. Decision on corrected torque or corrected kW

Decide corrected torque or corrected kW considering the service factor.  
Corrected torque or Corrected kW =  
(Load torque or transmission kW applied to the Miter Gear Box) × Service factor (Table 1)

### 3. Decision on size

For the rotational speed used, select the size that satisfies corrected torque or corrected kW from the transmission capacity tables. Furthermore, check whether the peak torque at starting and stopping is kept to within 200% of the transmission capacity of the selected size.

### 4. Confirmation of radial load

When driving is performed at a state with sprocket, gear, or pulley, etc. mounted on the lateral shaft and/or cross shaft, confirm the radial load using the following formula.

■ Formula for confirming radial load

$$\text{Allowable radial load} \geq \frac{T \times f \times L_f}{R}$$

(Allowable radial load: p.64)

T = Corrected torque N·m [kgf·m]  
f = O.H.L. factor (Table 2)  
L<sub>f</sub> = Operating position factor (Table 3)  
R = Pitch circle radius of sprocket, pulley, etc. m

Table 2 O.H.L. factor (f)

Chain	1.00
Gear	1.25
Toothed belt	1.25
V-belt • Strong toothed belt	1.50

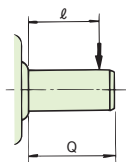


Table 1 Service factor

Characteristics of load	Operating time		
	2 hrs	10 hrs	24 hrs
Uniform load	1.00 (1.00)	1.00 (1.25)	1.25 (1.50)
Load with some shock	1.00 (1.25)	1.25 (1.50)	1.50 (1.75)
Load with large shock	1.25 (1.50)	1.50 (1.75)	1.75 (2.00)

Note 1) When frequency of starting and stopping is not less than 10 times an hour, or the prime mover is a multi-cylinder engine, use the values in ( ).  
Note 2) The service factors above are general guidelines. Make a decision considering service conditions.

When the formula at the left side is not satisfied as a result of confirming the radial load, it is necessary to increase "R," namely the pitch circle radius of the sprocket, pulley, etc.

Table 3 Operating position factor (L<sub>f</sub>)

When load is applied to the center of the shaft or inside	$l \leq \frac{Q}{2}$	L <sub>f</sub> = 1
When load is applied to the outside rather than the center of the shaft	$l > \frac{Q}{2}$	L <sub>f</sub> = $\frac{2l}{Q}$

Q = Length of output shaft end l = Operating position of radial load

Note) If radial load and axial load are to be applied at the same time, please consult our company.

### 5. Decision on shaft arrangement • rotational relationship, type of mounting – Decision on model number

- Shaft arrangement • Rotational relationship  
Select from Shaft arrangement • Rotational relationship (pp.11 to 12). (Pay attention to rotational direction of the shaft.)
- Type of mounting  
Select from Type of mounting (pp.13 to 14). (Sizes 2 & 4 are lubricated with grease, and there is no limit to the mounting direction.)  
Decide model number on the basis of the conditions above.

### 6. Investigation/study of options, special specifications, etc.

Because we also manufacture options (pp.66 to 68) as well as standard items and items with special specifications (pp.69 to 72), please consult our company.



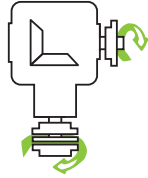
## Type ED

## Example of selection

## Example 1 of selection

## ■ General selection

## Usage layout



## Operating conditions

- Motive power is input from the lateral shaft by directly coupling a general-purpose motor (15 kW × 4P × 60 Hz).
- For the cross shaft side, a sprocket with a Pitch Circle Diameter (P.C.D.) of 100 mm is mounted.
- It is operated at a load transmission in kW of 10 kW.
- Operating time is 10 hrs/day under a load with some shock.
- Start-stop: Intermittent operation 12 times/hr
- Speed ratio is 1:1.

## Ambient atmosphere

- Indoor, 30° C constant, ordinary atmosphere (no dust, etc.)

## Option

- None (The standard item can be used.)

## ① Decision on service factor

From Table 1, the service factor becomes 1.50 under the operating condition above (load with some shock, 10 hrs/day, and starting and stopping 12 times/hr).

## ② Decision on corrected kW

Corrected kW = 10 kW (load transmission kW) × 1.5.  
(service factor) = 15 kW  
So, the corrected kW becomes 15 kW.

## ③ Decision on size

For the size that satisfies the corrected kW = 15 kW, inputted rotational speed of 1,750 rpm, ED6M is selected from the transmission capacity tables.

## ④ Confirmation of radial load

(It is assumed that the radial load is applied at the center of the cross shaft.)

With a chain transmission, the O.H.L. factor  $f = 1.0$  from Table 2, and the operating position factor  $L_f = 1$  because the radial load is applied to the shaft center.

From the formula for confirming radial load and service conditions,

$$\text{Radial load} = \frac{\frac{9550 \times 15}{1750} \times 1.0 \times 1.0}{\frac{100}{2 \times 1000}} = 1637\text{N}$$

From the Allowable radial load of the ED6M's cross shaft = 2,303 N > 1,637N, it can be used within the allowable value.

## ⑤ Decision on model number

Decide model number from shaft arrangement, rotational relationship, and type of mounting for usage layout.

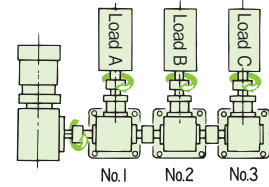
ED6M-1-R-Y can be selected.

\* Check direction of rotation.

## Example 2 of selection

## ■ Line shaft drive

## Usage layout



## Operating conditions

- All loads A, B, and C are used at a uniform load of 245 N·m (25 kgf·m), and operating time is 8 hrs/day.
- Input rotational speed is 300 rpm, and speed ratio is 1:1 for all loads.

## Ambient atmosphere

- Indoor, 30° C constant, ordinary atmosphere (no dust, etc.)

## Option

- None (The standard item can be used.)

## \* Precautions for selecting line shaft drive

In the case of line shaft drive, the load applied to the gear and the load applied to the line shaft (cross shaft) differ. Therefore, it is necessary to select each individually.

For the allowable torsional transmission capacity of the cross shaft alone (allowable torque of the cross shaft), refer to p.63.

## ① Decision on service factor

From Table 1, the service factor is 1.0 under the operating conditions above (uniform load, 8 hrs/day).

## ② Selection of each Miter Gear Box

## (1) Miter Gear Box No. 1

- The gear drives only load A.  
→ Transmission capacity of  $245 \text{ N}\cdot\text{m} \times 1.0 = 245 \text{ N}\cdot\text{m}$  or more is required.
- The cross shaft drives loads A, B, and C.  
→ Cross shaft torque of  $(245 \text{ N}\cdot\text{m} + 245 \text{ N}\cdot\text{m} + 245 \text{ N}\cdot\text{m}) \times 1.0 = 735 \text{ N}\cdot\text{m}$  or more is required. So, ED10M is selected from the transmission capacity tables and allowable torque of cross shaft.

$$\left( \begin{array}{l} \text{ED10M Transmission capacity: } 513 \text{ N}\cdot\text{m} > 245 \text{ N}\cdot\text{m}, \\ \text{Allowable torque of cross shaft: } 891 \text{ N}\cdot\text{m} > 735 \text{ N}\cdot\text{m} \end{array} \right)$$

## (2) Miter Gear Box No. 2

- The gear drives only load B.  
→ Transmission capacity of  $245 \text{ N}\cdot\text{m} \times 1.0 = 245 \text{ N}\cdot\text{m}$  or more is required.
- The cross shaft drives loads B and C.  
→ Cross shaft torque of  $(245 \text{ N}\cdot\text{m} + 245 \text{ N}\cdot\text{m}) \times 1.0 = 490 \text{ N}\cdot\text{m}$  or more is required. So, ED8M is selected from the transmission capacity tables (pp.17 to 18) and allowable torque of the cross shaft (p.63).

$$\left( \begin{array}{l} \text{ED8M Transmission capacity: } 331 \text{ N}\cdot\text{m} > 245 \text{ N}\cdot\text{m}, \\ \text{Allowable torque of cross shaft: } 627 \text{ N}\cdot\text{m} > 490 \text{ N}\cdot\text{m} \end{array} \right)$$

## (3) Miter Gear Box No. 3

- Both gear and cross shaft drive only load C.  
→ Transmission capacity as well as cross shaft torque of  $245 \text{ N}\cdot\text{m} \times 1.0 = 245 \text{ N}\cdot\text{m}$  or more is required.  
So, ED8M is selected from the transmission capacity tables (pp.17 to 18) and allowable torque of cross shaft (p.63).

$$\left( \begin{array}{l} \text{ED8M Transmission capacity: } 331 \text{ N}\cdot\text{m} > 245 \text{ N}\cdot\text{m}, \\ \text{Allowable torque of cross shaft: } 627 \text{ N}\cdot\text{m} > 245 \text{ N}\cdot\text{m} \end{array} \right)$$

## ③ Decision on model number

Decide model number from shaft arrangement, rotational relationship, and type of mounting for usage layout (pp.11 to 14).

No.1 ED10M-1-LR-O-Y

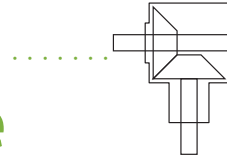
No.2 ED8M-1-LR-O-Y

No.3 ED8M-1-R-O-Y can be selected.

\* Check direction of rotation.

Type ED

# Lateral single-shaft type Transmission capacity table



Speed ratio	Rotational speed of lateral shaft r/min	ED2			ED4			ED6			ED7			ED8		
		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque	
			N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}
1 : 1	3000	3.41	10.6	{1.08}	7.71	24.0	{2.45}	22.8	71.1	{ 7.25}	—	—	—	—	—	—
	2000	2.43	11.3	{1.16}	5.96	27.9	{2.84}	18.6	87.0	{ 8.87}	27.1	105	{12.9}	57.3	268	{27.3}
	1750	2.15	11.5	{1.17}	5.61	30.0	{3.06}	17.1	91.1	{ 9.30}	24.8	132	{13.5}	52.3	279	{28.5}
	1450	1.79	11.6	{1.18}	4.94	31.9	{3.25}	14.9	96.0	{ 9.80}	22.0	142	{14.5}	45.6	294	{30.0}
	1150	1.43	11.7	{1.19}	4.19	34.1	{3.48}	12.7	103	{10.5 }	18.4	150	{15.3}	37.5	305	{31.1}
	870	1.12	12.1	{1.23}	3.46	37.2	{3.80}	10.5	113	{11.5 }	15.2	164	{16.7}	29.0	312	{31.8}
	580	0.74	12.1	{1.23}	2.45	39.5	{4.03}	7.35	119	{12.1 }	11.4	184	{18.8}	19.8	319	{32.6}
	300	0.39	12.3	{1.26}	1.30	40.5	{4.13}	3.93	123	{12.5 }	6.35	198	{20.2}	10.6	331	{33.8}
	100	0.13	12.7	{1.30}	0.44	41.9	{4.28}	1.36	127	{13.0 }	2.20	206	{21.0}	3.70	346	{35.3}
	10	0.01	13.0	{1.33}	0.04	43.0	{4.39}	0.14	132	{13.5 }	0.22	214	{21.8}	0.38	361	{36.8}
1.5 : 1	3000	—	—	—	—	—	—	19.7	92.1	{ 9.39}	—	—	—	—	—	—
	2000	—	—	—	—	—	—	14.9	105	{10.7 }	19.2	135	{13.7}	25.8	181	{18.5}
	1750	—	—	—	—	—	—	13.7	110	{11.2 }	17.4	139	{14.2}	22.7	182	{18.6}
	1450	—	—	—	—	—	—	12.1	117	{11.9 }	15.0	145	{14.8}	19.1	185	{18.9}
	1150	—	—	—	—	—	—	9.96	122	{12.4 }	12.0	147	{15.0}	15.4	188	{19.2}
	870	—	—	—	—	—	—	7.66	123	{12.6 }	9.30	150	{15.3}	11.8	191	{19.5}
	580	—	—	—	—	—	—	5.23	126	{12.9 }	6.32	153	{15.6}	8.14	197	{20.1}
	300	—	—	—	—	—	—	2.77	129	{13.2 }	3.35	157	{16.0}	4.34	203	{20.7}
	100	—	—	—	—	—	—	0.95	134	{13.7 }	1.16	163	{16.6}	1.49	210	{21.4}
	10	—	—	—	—	—	—	0.09	139	{14.2 }	0.12	169	{17.2}	0.15	218	{22.2}
2 : 1	3000	—	—	—	5.56	34.6	{3.53}	15.6	97.3	{ 9.92}	—	—	—	—	—	—
	2000	—	—	—	4.30	40.2	{4.10}	10.7	100	{10.2 }	14.2	133	{13.5}	18.9	176	{18.0}
	1750	—	—	—	3.97	42.4	{4.33}	9.44	101	{10.3 }	12.7	135	{13.8}	16.9	180	{18.4}
	1450	—	—	—	3.32	42.8	{4.37}	7.90	102	{10.4 }	10.6	137	{14.0}	14.0	180	{18.4}
	1150	—	—	—	2.67	43.4	{4.43}	6.39	104	{10.6 }	8.55	139	{14.2}	11.3	183	{18.7}
	870	—	—	—	2.04	43.8	{4.47}	4.88	105	{10.7 }	6.56	141	{14.4}	8.70	187	{19.1}
	580	—	—	—	1.38	44.4	{4.53}	3.34	108	{11.0 }	4.47	144	{14.7}	5.92	191	{19.5}
	300	—	—	—	0.72	45.5	{4.64}	1.76	110	{11.2 }	2.37	148	{15.1}	3.14	196	{20.0}
	100	—	—	—	0.24	46.6	{4.76}	0.60	114	{11.6 }	0.81	152	{15.5}	1.08	202	{20.6}
	10	—	—	—	0.02	48.5	{4.95}	0.06	116	{11.8 }	0.08	157	{16.0}	0.11	209	{21.3}
2.5 : 1	3000	—	—	—	—	—	—	11.7	91.1	{ 9.29}	—	—	—	—	—	—
	2000	—	—	—	—	—	—	8.00	93.5	{ 9.53}	9.40	110	{11.2}	15.2	177	{18.1}
	1750	—	—	—	—	—	—	7.13	95.3	{ 9.72}	8.36	112	{11.4}	13.5	180	{18.4}
	1450	—	—	—	—	—	—	5.97	96.2	{ 9.82}	6.99	113	{11.5}	11.4	184	{18.8}
	1150	—	—	—	—	—	—	4.78	97.2	{ 9.92}	5.64	115	{11.7}	9.11	185	{18.9}
	870	—	—	—	—	—	—	3.68	99.0	{10.1 }	4.30	116	{11.8}	7.00	188	{19.2}
	580	—	—	—	—	—	—	2.48	100	{10.2 }	2.92	118	{12.0}	4.76	192	{19.6}
	300	—	—	—	—	—	—	1.32	102	{10.5 }	1.55	121	{12.3}	2.53	197	{20.1}
	100	—	—	—	—	—	—	0.44	104	{10.7 }	0.52	123	{12.6}	0.86	203	{20.7}
	10	—	—	—	—	—	—	0.04	107	{11.0 }	0.05	126	{12.9}	0.08	208	{21.2}
3 : 1	3000	—	—	—	—	—	—	9.59	89.7	{ 9.14}	—	—	—	—	—	—
	2000	—	—	—	—	—	—	6.56	92.0	{ 9.38}	7.30	102	{10.4}	10.9	152	{15.6}
	1750	—	—	—	—	—	—	5.78	92.7	{ 9.46}	6.48	104	{10.6}	9.78	157	{16.0}
	1450	—	—	—	—	—	—	4.84	93.6	{ 9.55}	5.42	105	{10.7}	8.20	159	{16.2}
	1150	—	—	—	—	—	—	3.88	94.8	{ 9.67}	4.34	106	{10.8}	6.55	160	{16.3}
	870	—	—	—	—	—	—	2.97	95.9	{ 9.79}	3.34	108	{11.0}	5.04	163	{16.6}
	580	—	—	—	—	—	—	2.02	97.6	{ 9.96}	2.25	109	{11.1}	3.42	166	{16.9}
	300	—	—	—	—	—	—	1.07	100	{10.2 }	1.18	111	{11.3}	1.80	169	{17.2}
	100	—	—	—	—	—	—	0.36	102	{10.4 }	0.40	115	{11.7}	0.61	173	{17.7}
	10	—	—	—	—	—	—	0.03	104	{10.6 }	0.04	118	{12.0}	0.06	179	{18.3}

Note 1) When it is used between the respective rotational speeds, calculate the values by interpolation.

Note 2) When rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 3) When it is used at a rotational speed of [grey box], it corresponds to the specification of oil lubrication. Refer to the item on special specification.

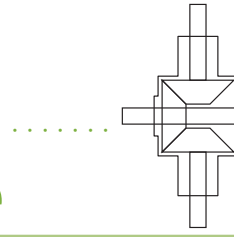
Note 4) When it is used at a rotational speed of [green box], it may correspond to the specification of forced lubrication. In such a case, please consult our company.

In the case of a rotational speed between a rotational speed of [green box] and a lower rotational speed, also please consult our company.

Speed ratio	Rotational speed of lateral shaft r/min	ED10			ED12			ED16			ED20			ED25		
		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque	
			N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}
1 : 1	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	79.0	358	{36.5}	—	—	—	—	—	—	—	—	—	—	—	—
	1750	74.6	399	{40.7}	109.6	586	{59.8}	—	—	—	—	—	—	—	—	—
	1450	65.3	421	{43.0}	96.0	619	{63.2}	163	1019	{104 }	—	—	—	—	—	—
	1150	55.7	453	{46.2}	81.8	665	{67.9}	139	1098	{112 }	234	1842	{188}	—	—	—
	870	44.6	479	{48.9}	67.5	726	{74.1}	114	1186	{121 }	193	2009	{205}	335	3489	{356}
	580	30.6	493	{50.3}	49.7	802	{81.8}	85.9	1343	{137 }	145	2274	{232}	252	3940	{402}
	300	16.4	513	{52.3}	26.8	835	{85.2}	54.1	1637	{167 }	90.8	2744	{280}	159	4792	{489}
	100	5.72	535	{54.6}	9.36	875	{89.3}	20.3	1842	{188 }	35.3	3205	{327}	60.0	5439	{555}
	10	0.59	561	{57.2}	0.98	919	{93.8}	2.14	1940	{198 }	3.53	3205	{327}	6.30	5713	{583}
1.5 : 1	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	49.5	336	{34.3}	—	—	—	—	—	—	—	—	—	—	—	—
	1750	46.0	368	{37.6}	65.9	528	{53.9}	—	—	—	—	—	—	—	—	—
	1450	38.7	374	{38.2}	58.3	564	{57.6}	—	—	—	—	—	—	—	—	—
	1150	31.2	380	{38.8}	49.2	601	{61.3}	—	—	—	—	—	—	—	—	—
	870	24.1	389	{39.7}	40.7	656	{66.9}	—	—	—	—	—	—	—	—	—
	580	16.4	396	{40.4}	28.9	699	{71.3}	—	—	—	—	—	—	—	—	—
	300	8.78	411	{41.9}	15.5	724	{73.9}	—	—	—	—	—	—	—	—	—
	100	3.04	426	{43.5}	5.37	754	{76.9}	—	—	—	—	—	—	—	—	—
	10	0.31	443	{45.2}	0.56	785	{80.1}	—	—	—	—	—	—	—	—	—
2 : 1	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	32.0	290	{29.6}	—	—	—	—	—	—	—	—	—	—	—	—
	1750	28.2	302	{30.8}	48.3	516	{52.7}	87.7	908	{ 92.7}	—	—	—	—	—	—
	1450	23.6	305	{31.1}	40.0	516	{52.7}	73.7	921	{ 94.0}	126	1578	{161}	—	—	—
	1150	19.0	309	{31.5}	31.7	516	{52.7}	59.5	938	{ 95.7}	102	1607	{164}	199	3146	{321}
	870	14.6	315	{32.1}	24.0	516	{52.7}	46.0	958	{ 97.8}	79.0	1646	{168}	155	3224	{329}
	580	10.0	322	{32.9}	16.3	524	{53.5}	31.3	980	{100 }	54.2	1695	{173}	107	3332	{340}
	300	5.33	332	{33.9}	8.71	543	{55.4}	16.7	1009	{103 }	29.0	1754	{179}	57.5	3479	{355}
	100	1.84	344	{35.1}	3.01	563	{57.4}	5.84	1058	{108 }	10.1	1833	{187}	20.1	3646	{372}
	10	0.19	357	{36.4}	0.31	586	{59.8}	0.60	1098	{112 }	1.06	1921	{196}	2.11	3822	{390}
2.5 : 1	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	24.3	275	{28.1}	—	—	—	—	—	—	—	—	—	—	—	—
	1750	21.7	290	{29.6}	37.4	500	{51.0}	—	—	—	—	—	—	—	—	—
	1450	18.2	293	{29.9}	31.4	507	{51.7}	—	—	—	—	—	—	—	—	—
	1150	14.7	298	{30.4}	25.3	514	{52.4}	—	—	—	—	—	—	—	—	—
	870	11.2	302	{30.8}	19.5	523	{53.4}	—	—	—	—	—	—	—	—	—
	580	7.68	310	{31.6}	13.3	535	{54.6}	—	—	—	—	—	—	—	—	—
	300	4.06	317	{32.3}	7.08	552	{56.3}	—	—	—	—	—	—	—	—	—
	100	1.40	326	{33.3}	2.43	568	{58.0}	—	—	—	—	—	—	—	—	—
	10	0.14	336	{34.3}	0.25	588	{60.1}	—	—	—	—	—	—	—	—	—
3 : 1	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	18.6	252	{25.8}	—	—	—	—	—	—	—	—	—	—	—	—
	1750	16.8	270	{27.5}	28.2	452	{46.1}	—	—	—	—	—	—	—	—	—
	1450	14.0	270	{27.6}	23.6	458	{46.7}	—	—	—	—	—	—	—	—	—
	1150	11.3	275	{28.1}	19.0	464	{47.3}	—	—	—	—	—	—	—	—	—
	870	8.66	279	{28.5}	14.6	469	{47.9}	—	—	—	—	—	—	—	—	—
	580	5.89	285	{29.1}	9.92	480	{49.0}	—	—	—	—	—	—	—	—	—
	300	3.11	291	{29.7}	5.29	495	{50.5}	—	—	—	—	—	—	—	—	—
	100	1.07	300	{30.6}	1.82	510	{52.0}	—	—	—	—	—	—	—	—	—
10	0.11	308	{31.4}	0.18	527	{53.8}	—	—	—	—	—	—	—	—	—	

## Type ED

# Lateral dual-shaft type Transmission capacity table



Speed ratio	Rotational speed of lateral shaft r/min	ED2			ED4			ED6			ED7			ED8		
		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque	
			N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}
1 : 1	3000	2.38	7.42	{0.75}	5.39	16.8	{1.71}	15.9	49.7	{5.07}	—	—	—	—	—	—
	2000	1.70	7.91	{0.81}	4.17	19.5	{1.99}	13.0	60.9	{6.21}	18.9	73.5	{ 7.50}	40.1	187	{19.1}
	1750	1.50	8.05	{0.81}	3.92	21.0	{2.14}	11.9	63.7	{6.50}	17.3	92.4	{ 9.42}	36.6	195	{19.9}
	1450	1.25	8.12	{0.82}	3.45	22.3	{2.27}	10.4	67.2	{6.85}	15.4	99.4	{10.1 }	31.9	205	{21.0}
	1150	1.00	8.19	{0.83}	2.93	23.8	{2.43}	8.89	72.1	{7.35}	12.8	105	{10.7 }	26.2	213	{21.7}
	870	0.78	8.47	{0.86}	2.42	26.0	{2.65}	7.35	79.1	{8.07}	10.6	114	{11.7 }	20.3	218	{22.2}
	580	0.51	8.47	{0.86}	1.71	27.6	{2.82}	5.14	83.3	{8.50}	7.98	128	{13.1 }	13.8	223	{22.7}
	300	0.27	8.61	{0.88}	0.91	28.3	{2.89}	2.75	86.1	{8.78}	4.44	138	{14.1 }	7.42	231	{23.6}
	100	0.09	8.89	{0.91}	0.30	29.3	{2.99}	0.95	88.9	{9.07}	1.54	144	{14.7 }	2.59	242	{24.7}
	10	0.01	9.10	{0.93}	0.02	30.1	{3.07}	0.09	92.4	{9.42}	0.15	149	{15.2 }	0.26	252	{25.7}
1.5 : 1	3000	—	—	—	—	—	—	13.7	64.4	{6.57}	—	—	—	—	—	—
	2000	—	—	—	—	—	—	10.4	73.5	{7.50}	13.4	94.5	{ 9.64}	18.0	126	{12.9}
	1750	—	—	—	—	—	—	9.59	77.0	{7.85}	12.1	97.3	{ 9.92}	15.8	127	{13.0}
	1450	—	—	—	—	—	—	8.47	81.9	{8.35}	10.5	101	{10.3 }	13.3	129	{13.2}
	1150	—	—	—	—	—	—	6.97	85.4	{8.71}	8.4	102	{10.5 }	10.7	131	{13.4}
	870	—	—	—	—	—	—	5.36	86.1	{8.78}	6.51	105	{10.7 }	8.26	133	{13.6}
	580	—	—	—	—	—	—	3.66	88.2	{9.00}	4.42	107	{10.9 }	5.69	137	{14.0}
	300	—	—	—	—	—	—	1.93	90.3	{9.21}	2.34	109	{11.2 }	3.03	142	{14.5}
	100	—	—	—	—	—	—	0.66	93.8	{9.57}	0.81	114	{11.6 }	1.04	147	{15.0}
	10	—	—	—	—	—	—	0.06	97.3	{9.92}	0.08	118	{12.0 }	0.10	152	{15.5}
2 : 1	3000	—	—	—	3.89	24.2	{2.47}	10.9	68.1	{6.95}	—	—	—	—	—	—
	2000	—	—	—	3.01	28.1	{2.87}	7.49	70.0	{7.14}	9.94	93.1	{ 9.5 }	13.2	123	{12.5}
	1750	—	—	—	2.77	29.6	{3.02}	6.60	70.7	{7.21}	8.89	94.5	{ 9.64}	11.8	126	{12.8}
	1450	—	—	—	2.32	29.9	{3.05}	5.53	71.4	{7.28}	7.42	95.9	{ 9.78}	9.80	126	{12.8}
	1150	—	—	—	1.86	30.3	{3.10}	4.47	72.8	{7.42}	5.98	97.3	{ 9.92}	7.91	128	{13.0}
	870	—	—	—	1.42	30.6	{3.12}	3.41	73.5	{7.5}	4.59	98.7	{10.0 }	6.09	130	{13.3}
	580	—	—	—	0.96	31.0	{3.17}	2.33	75.6	{7.71}	3.12	100	{10.2 }	4.14	133	{13.6}
	300	—	—	—	0.50	31.8	{3.25}	1.23	77.0	{7.85}	1.65	103	{10.5 }	2.19	137	{14.0}
	100	—	—	—	0.16	32.6	{3.32}	0.42	79.8	{8.14}	0.56	106	{10.8 }	0.75	141	{14.4}
	10	—	—	—	0.01	33.9	{3.46}	0.04	81.2	{8.28}	0.05	109	{11.2 }	0.07	146	{14.9}
2.5 : 1	3000	—	—	—	—	—	—	8.19	63.7	{6.5}	—	—	—	—	—	—
	2000	—	—	—	—	—	—	5.60	65.4	{6.67}	6.58	77.0	{7.85}	10.6	123	{12.6}
	1750	—	—	—	—	—	—	4.99	66.7	{6.8}	5.85	78.4	{8.00}	9.45	126	{12.8}
	1450	—	—	—	—	—	—	4.17	67.3	{6.87}	4.89	79.1	{8.07}	7.98	128	{13.1}
	1150	—	—	—	—	—	—	3.34	68.0	{6.94}	3.94	80.5	{8.21}	6.37	129	{13.2}
	870	—	—	—	—	—	—	2.57	69.3	{7.07}	3.01	81.2	{8.28}	4.9	131	{13.4}
	580	—	—	—	—	—	—	1.73	70.0	{7.14}	2.04	82.6	{8.42}	3.33	134	{13.7}
	300	—	—	—	—	—	—	0.92	71.4	{7.28}	1.08	84.7	{8.64}	1.77	137	{14.0}
	100	—	—	—	—	—	—	0.30	72.8	{7.42}	0.36	86.1	{8.78}	0.60	142	{14.5}
	10	—	—	—	—	—	—	0.02	74.9	{7.64}	0.03	88.2	{9.00}	0.05	145	{14.8}
3 : 1	3000	—	—	—	—	—	—	6.71	62.7	{6.4}	—	—	—	—	—	—
	2000	—	—	—	—	—	—	4.59	64.4	{6.57}	5.11	71.4	{7.28}	7.63	106	{10.8}
	1750	—	—	—	—	—	—	4.04	64.8	{6.62}	4.53	72.8	{7.42}	6.84	109	{11.2}
	1450	—	—	—	—	—	—	3.38	65.5	{6.68}	3.79	73.5	{7.50}	5.74	111	{11.3}
	1150	—	—	—	—	—	—	2.71	66.3	{6.77}	3.03	74.2	{7.57}	4.58	112	{11.4}
	870	—	—	—	—	—	—	2.07	67.1	{6.85}	2.33	75.6	{7.71}	3.52	114	{11.6}
	580	—	—	—	—	—	—	1.41	68.3	{6.97}	1.57	76.3	{7.78}	2.39	116	{11.8}
	300	—	—	—	—	—	—	0.74	70.0	{7.14}	0.82	77.7	{7.92}	1.26	118	{12.0}
	100	—	—	—	—	—	—	0.25	71.4	{7.28}	0.28	80.5	{8.21}	0.42	121	{12.3}
	10	—	—	—	—	—	—	0.02	72.8	{7.42}	0.02	82.6	{8.42}	0.04	125	{12.7}

Note 1) When it is used between respective rotational speeds, calculate the values by interpolation.

Note 2) When rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 3) When it is used at a rotational speed of  , it corresponds to the specification of oil lubrication. Refer to the item on special specification.

Note 4) When it is used at a rotational speed of  , it may correspond to the specification of forced lubrication. In such a case, please consult our company.

In the case of a rotational speed between a rotational speed of   and a lower rotational speed, also please consult our company.

Speed ratio	Rotational speed of lateral shaft r/min	ED10			ED12			ED16			ED20			ED25		
		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Input kW	Cross shaft torque	
			N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}		N·m	{kgf·m}
1 : 1	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	55.3	250	{25.5}	—	—	—	—	—	—	—	—	—	—	—	—
	1750	52.2	279	{28.5}	76.7	410	{41.8}	—	—	—	—	—	—	—	—	—
	1450	45.7	294	{30.0}	67.2	433	{44.2}	114	713	{72.8}	—	—	—	—	—	—
	1150	38.9	317	{32.3}	57.2	465	{47.5}	97.3	769	{78.4}	164	1289	{132}	—	—	—
	870	31.2	335	{34.2}	47.2	508	{51.8}	79.8	830	{84.7}	135	1406	{144}	235	2442	{249}
	580	21.4	345	{35.2}	34.7	561	{57.2}	60.1	940	{95.9}	102	1592	{162}	176	2758	{281}
	300	11.4	359	{36.6}	18.7	584	{59.6}	37.9	1146	{117}	63.6	1921	{196}	111	3354	{342}
	100	4.00	374	{38.2}	6.55	612	{62.5}	14.2	1289	{132}	24.7	2244	{229}	42.0	3807	{389}
	10	0.41	392	{40.0}	0.68	643	{65.6}	1.50	1358	{139}	2.47	2244	{229}	4.41	3999	{408}
1.5 : 1	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	34.6	235	{24.0}	—	—	—	—	—	—	—	—	—	—	—	—
	1750	32.2	257	{26.2}	46.1	369	{37.7}	—	—	—	—	—	—	—	—	—
	1450	27.0	261	{26.7}	40.8	394	{40.2}	—	—	—	—	—	—	—	—	—
	1150	21.8	266	{27.1}	34.4	420	{42.9}	—	—	—	—	—	—	—	—	—
	870	16.8	272	{27.7}	28.4	459	{46.8}	—	—	—	—	—	—	—	—	—
	580	11.4	277	{28.2}	20.2	489	{49.9}	—	—	—	—	—	—	—	—	—
	300	6.14	287	{29.3}	10.8	506	{51.7}	—	—	—	—	—	—	—	—	—
	100	2.12	298	{30.4}	3.75	527	{53.8}	—	—	—	—	—	—	—	—	—
	10	0.21	310	{31.6}	0.39	549	{56.0}	—	—	—	—	—	—	—	—	—
2 : 1	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	22.4	203	{20.7}	—	—	—	—	—	—	—	—	—	—	—	—
	1750	19.7	211	{21.5}	33.8	361	{36.8}	61.4	636	{64.9}	—	—	—	—	—	—
	1450	16.5	213	{21.7}	28.0	361	{36.8}	51.6	645	{65.8}	88.2	1105	{113}	—	—	—
	1150	13.3	216	{22.0}	22.1	361	{36.8}	41.7	657	{67.0}	71.4	1125	{115}	139	2202	{225}
	870	10.2	220	{22.5}	16.8	361	{36.8}	32.2	671	{68.5}	55.3	1152	{118}	109	2257	{230}
	580	7.00	225	{23.0}	11.4	366	{37.4}	21.9	686	{70.0}	37.9	1187	{121}	74.9	2332	{238}
	300	3.73	232	{23.7}	6.09	380	{38.7}	11.7	706	{72.1}	20.3	1228	{125}	40.3	2435	{249}
	100	1.28	240	{24.5}	2.10	394	{40.2}	4.09	741	{75.6}	7.07	1283	{131}	14.1	2552	{260}
	10	0.13	249	{25.5}	0.21	410	{41.8}	0.42	769	{78.4}	0.74	1345	{137}	1.48	2675	{273}
2.5 : 1	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	17.0	192	{19.6}	—	—	—	—	—	—	—	—	—	—	—	—
	1750	15.1	203	{20.7}	26.1	350	{35.7}	—	—	—	—	—	—	—	—	—
	1450	12.7	205	{20.9}	21.9	354	{36.2}	—	—	—	—	—	—	—	—	—
	1150	10.2	208	{21.2}	17.7	359	{36.7}	—	—	—	—	—	—	—	—	—
	870	7.84	211	{21.5}	13.6	366	{37.3}	—	—	—	—	—	—	—	—	—
	580	5.37	217	{22.1}	9.31	374	{38.2}	—	—	—	—	—	—	—	—	—
	300	2.84	221	{22.6}	4.95	386	{39.4}	—	—	—	—	—	—	—	—	—
	100	0.98	228	{23.2}	1.70	397	{40.5}	—	—	—	—	—	—	—	—	—
	10	0.09	235	{24 }	0.17	411	{42.0}	—	—	—	—	—	—	—	—	—
3 : 1	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	13.0	176	{18.0}	—	—	—	—	—	—	—	—	—	—	—	—
	1750	11.7	189	{19.2}	19.7	316	{32.2}	—	—	—	—	—	—	—	—	—
	1450	9.8	189	{19.2}	16.5	320	{32.7}	—	—	—	—	—	—	—	—	—
	1150	7.91	192	{19.6}	13.3	324	{33.1}	—	—	—	—	—	—	—	—	—
	870	6.06	195	{19.9}	10.2	328	{33.5}	—	—	—	—	—	—	—	—	—
	580	4.12	199	{20.3}	6.94	336	{34.2}	—	—	—	—	—	—	—	—	—
	300	2.17	203	{20.7}	3.70	346	{35.3}	—	—	—	—	—	—	—	—	—
	100	0.74	210	{21.4}	1.27	357	{36.4}	—	—	—	—	—	—	—	—	—
	10	0.07	215	{22.0}	0.12	368	{37.6}	—	—	—	—	—	—	—	—	—

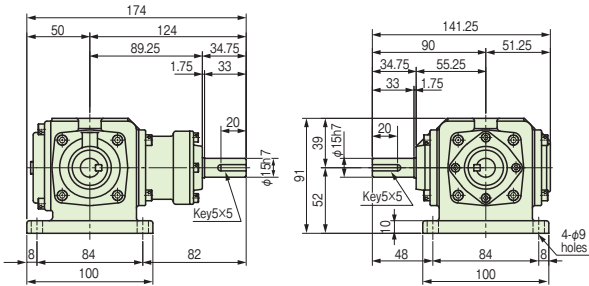
## ED2

## Lateral single-shaft type

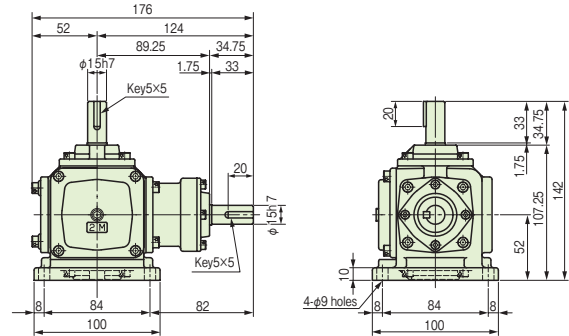
■ Speed ratio : M (1:1) ■ Type of mounting : Y (Free mounting direction)

## Dimensional drawing

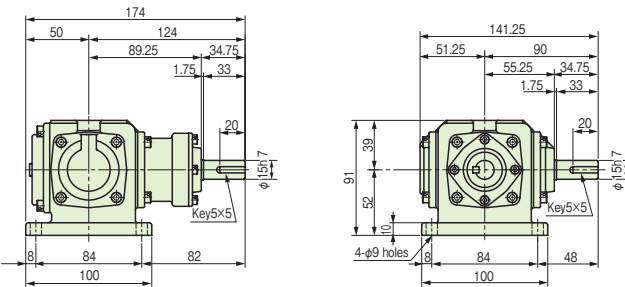
## 1-L, 1-L-0



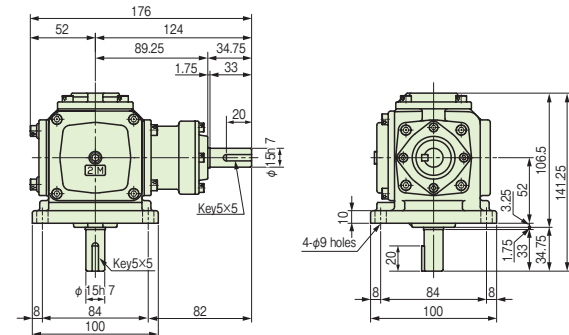
## 1-U, 1-U-0



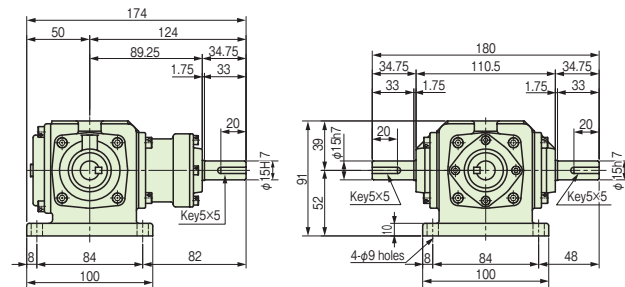
## 1-R, 1-R-0



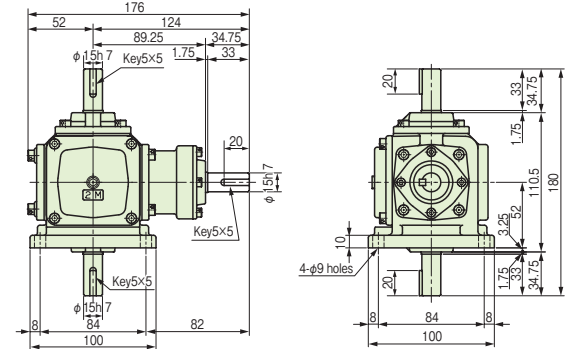
## 1-D, 1-D-0



## 1-LR, 1-LR-0



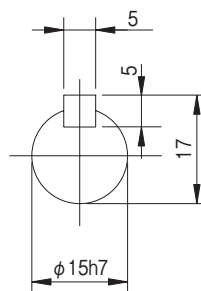
## 1-UD, 1-UD-0



## Transmission capacity table

Size	Rotational speed of lateral shaft rpm	M Speed ratio 1 : 1						
		Input kW	Cross shaft torque		Allowable radial load N {kgf}			
			N · m	{kgf·m}	Lateral shaft	Cross shaft		
ED2	3000	3.41	10.6	{1.08}	127	{13.0}	117	{12.0}
	2000	2.43	11.3	{1.16}	186	{19.0}	176	{18.0}
	1750	2.15	11.5	{1.17}	216	{22.0}	196	{20.0}
	1450	1.79	11.6	{1.18}	265	{27.0}	216	{22.0}
	1150	1.43	11.7	{1.19}	323	{33.0}	235	{24.0}
	870	1.12	12.1	{1.23}	402	{41.0}	255	{26.0}
	580	0.74	12.1	{1.23}	549	{56.0}	314	{32.0}
	300	0.39	12.3	{1.26}	696	{71.0}	392	{40.0}
	100	0.13	12.7	{1.30}	980	{100}	588	{60.0}
	10	0.01	13.0	{1.33}	980	{100}	588	{60.0}

## Shaft end detail of lateral shaft, cross shaft



Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

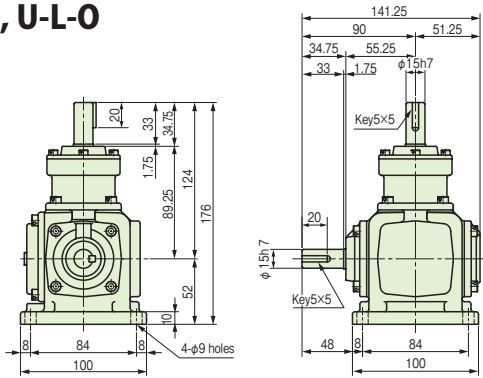
Note 2) When it is used at a rotational speed of [ ], it corresponds to the specification of oil lubrication. Refer to the item on special specification (p.69).

Note 3) For the operating position of radial load, refer to the item on Selection (p.15).

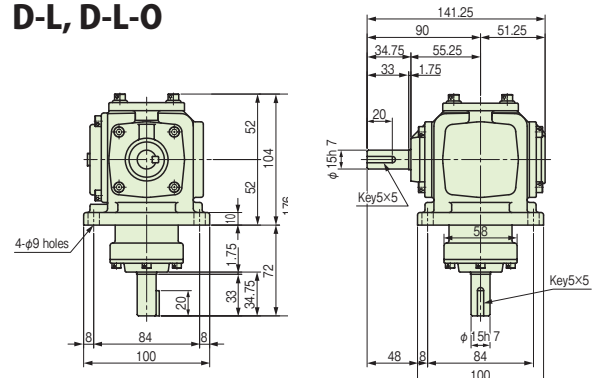
Approximate mass : 2.0kg Grease lubrication : 150g

\* Phase of key groove does not always match.

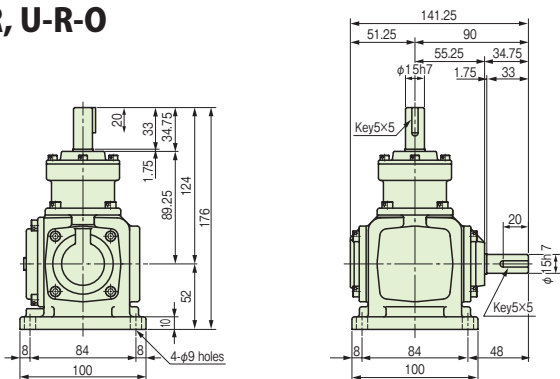
**U-L, U-L-0**



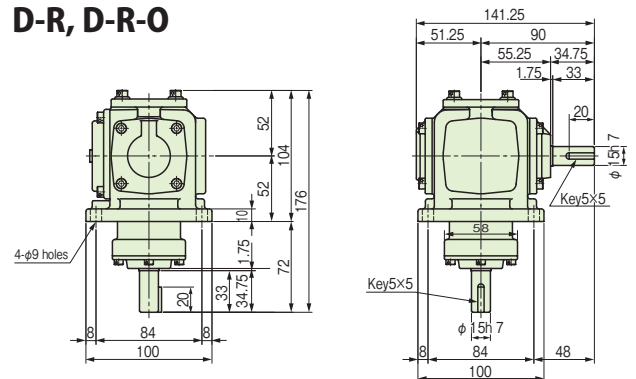
**D-L, D-L-0**



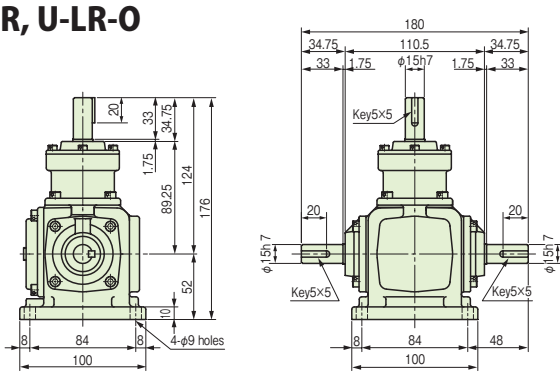
**U-R, U-R-0**



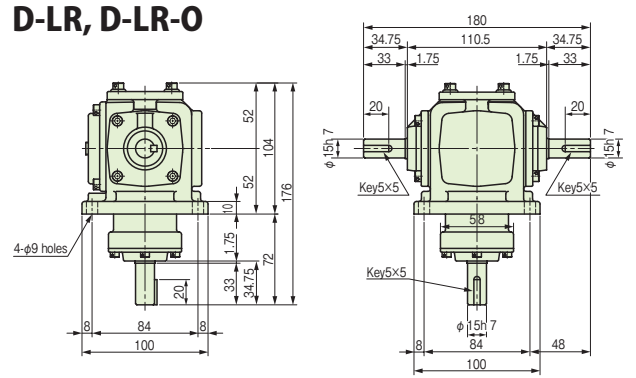
**D-R, D-R-0**



**U-LR, U-LR-0**



**D-LR, D-LR-0**



# ED2

## Lateral dual-shaft type

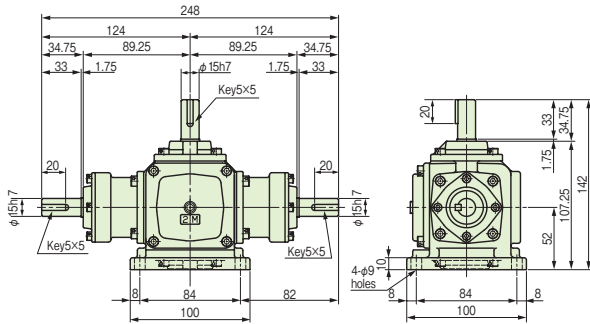
Approximate mass : 2.6kg  
Grease lubrication : 180g

■ Speed ratio : M (1:1) ■ Type of mounting : Y (Free mounting direction)

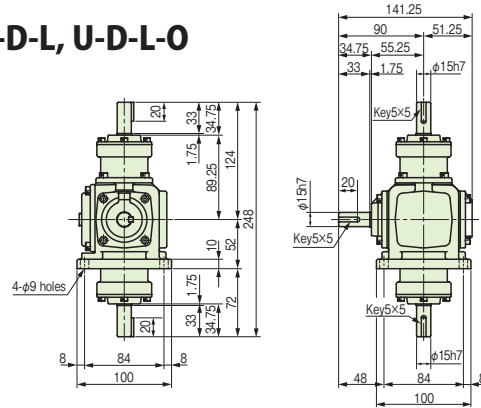
### Dimensional drawing

\* Phase of key groove does not always match.

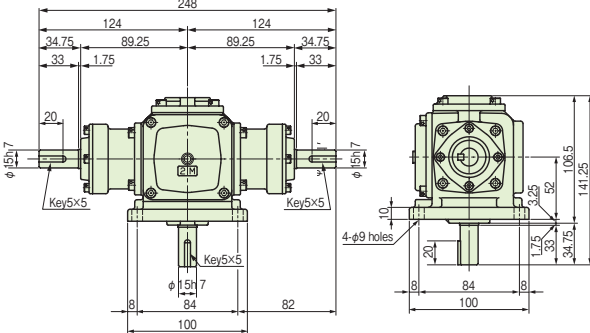
#### 1-1-U, 1-1-U-0



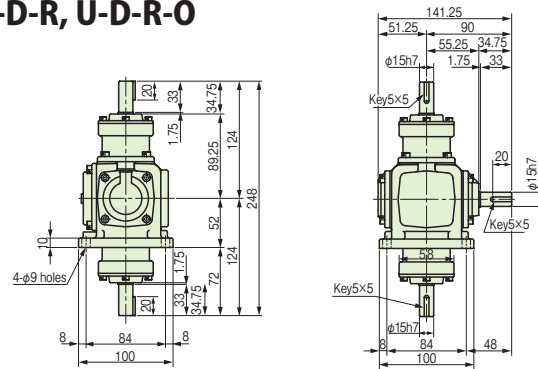
#### U-D-L, U-D-L-0



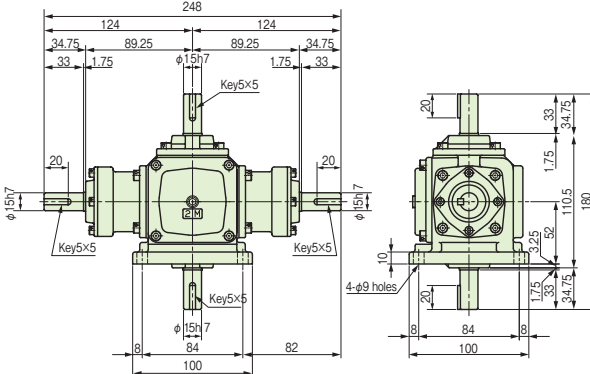
#### 1-1-D, 1-1-D-0



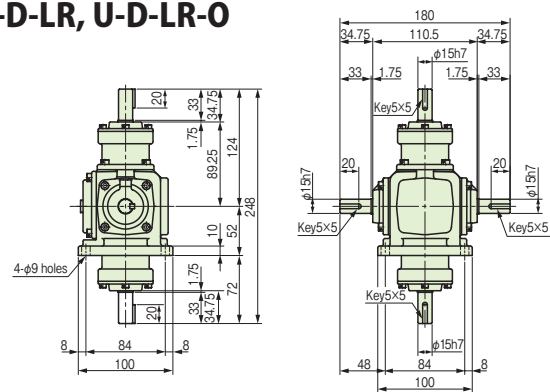
#### U-D-R, U-D-R-0



#### 1-1-UD, 1-1-UD-0



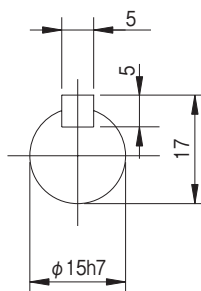
#### U-D-LR, U-D-LR-0



### Transmission capacity table

Size	Rotational speed of lateral shaft rpm	M Speed ratio 1 : 1						
		Input kW	Cross shaft torque		Allowable radial load N {kgf}			
			N · m	{kgf · m}	Lateral shaft	Cross shaft		
ED2	3000	2.38	7.42	{0.75}	127	{13.0}	117	{12.0}
	2000	1.70	7.91	{0.81}	186	{19.0}	176	{18.0}
	1750	1.50	8.05	{0.81}	216	{22.0}	196	{20.0}
	1450	1.25	8.12	{0.82}	265	{27.0}	216	{22.0}
	1150	1.00	8.19	{0.83}	323	{33.0}	235	{24.0}
	870	0.78	8.47	{0.86}	402	{41.0}	255	{26.0}
	580	0.51	8.47	{0.86}	549	{56.0}	314	{32.0}
	300	0.27	8.61	{0.88}	696	{71.0}	392	{40.0}
	100	0.09	8.89	{0.91}	980	{100}	588	{60.0}
	10	0.01	9.10	{0.93}	980	{100}	588	{60.0}

#### Shaft end detail of lateral shaft, cross shaft



Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used at a rotational speed of [ ] , it corresponds to the specification of oil lubrication. Refer to the item on special specification (p.69).

Note 3) For the operating position of radial load, refer to the item on Selection (p.15).





Type ED

ED4

Lateral single-shaft type

■ Speed ratio : M (1 : 1), B20 (2 : 1) ■ Type of mounting : Y (Free mounting direction)

Dimensional drawing

1-L, 1-L-0

Front view dimensions: 257.5, 77.5, 180, 140.5, 39.5, 1.5, 38, 25, 15, 125, 117.5, 155.

Side view dimensions: 190.5, 116, 74.5, 39.5, 76.5, 38, 1.5, 25, 136, 60, 19, 76, 17, 4-φ10.5 drilled holes, 53.5, 125, 155, 15, 17, φ19/7, Key 6×6.

1-U, 1-U-0

Front view dimensions: 257.5, 77.5, 180, 140.5, 39.5, 1.5, 38, 25, 15, 125, 117.5, 155.

Side view dimensions: 192, 25, 38, 1.5, 38, 152.5, 76, 17, 4-φ10.5 drilled holes, 15, 125, 155, 15, 17, φ19/7, Key 6×6.

1-R, 1-R-0

Front view dimensions: 257.5, 77.5, 180, 140.5, 39.5, 1.5, 38, 25, 15, 125, 117.5, 155.

Side view dimensions: 190.5, 74.5, 116, 76.5, 39.5, 1.5, 38, 25, 136, 60, 19, 76, 17, 4-φ10.5 drilled holes, 53.5, 125, 155, 15, 17, φ19/7, Key 6×6.

1-D, 1-D-0

Front view dimensions: 257.5, 77.5, 180, 140.5, 39.5, 1.5, 38, 25, 15, 125, 117.5, 155.

Side view dimensions: 190.5, 150.5, 76, 38, 40, 2, 4-φ10.5 drilled holes, 15, 125, 155, 15, 17, φ19/7, Key 6×6.

1-LR, 1-LR-0

Front view dimensions: 257.5, 77.5, 180, 140.5, 39.5, 1.5, 38, 25, 15, 125, 117.5, 155.

Side view dimensions: 232, 153, 39.5, 38, 1.5, 38, 25, 136, 60, 19, 76, 17, 4-φ10.5 drilled holes, 53.5, 125, 155, 15, 17, φ19/7, Key 6×6.

1-UD, 1-UD-0

Front view dimensions: 257.5, 77.5, 180, 140.5, 39.5, 1.5, 38, 25, 15, 125, 117.5, 155.

Side view dimensions: 232, 25, 38, 1.5, 38, 152.5, 76, 40, 2, 4-φ10.5 drilled holes, 15, 125, 155, 15, 17, φ19/7, Key 6×6.

Transmission capacity table

Size	Rotational speed of lateral shaft rpm r/min	M Speed ratio 1 : 1					B20 Speed ratio 2 : 1								
		Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)					
			N · m	(kgf · m)	Lateral shaft	Cross shaft		N · m	(kgf · m)	Lateral shaft	Cross shaft				
ED4	3000	7.71	24.0	{2.45}	647	{66.0}	764	{78.0}	5.56	34.6	{3.53}	686	{70.0}	1569	{160}
	2000	5.96	27.9	{2.84}	745	{76.0}	862	{88.0}	4.30	40.2	{4.10}	833	{85.0}	1765	{180}
	1750	5.61	30.0	{3.06}	784	{80.0}	902	{92.0}	3.97	42.4	{4.33}	1078	{110}	1960	{200}
	1450	4.94	31.9	{3.25}	833	{85.0}	951	{97.0}	3.32	42.8	{4.37}	1078	{110}	1960	{200}
	1150	4.19	34.1	{3.48}	882	{90.0}	1029	{105}	2.67	43.4	{4.43}	1078	{110}	1960	{200}
	870	3.46	37.2	{3.80}	960	{98.0}	1127	{115}	2.04	43.8	{4.47}	1078	{110}	1960	{200}
	580	2.45	39.5	{4.03}	1078	{110}	1323	{135}	1.38	44.4	{4.53}	1078	{110}	1960	{200}
	300	1.30	40.5	{4.13}	1519	{155}	1960	{200}	0.72	45.5	{4.64}	1078	{110}	1960	{200}
	100	0.44	41.9	{4.28}	1911	{195}	1960	{200}	0.24	46.6	{4.76}	1078	{110}	1960	{200}
	10	0.04	43.0	{4.39}	1911	{195}	1960	{200}	0.02	48.5	{4.95}	1078	{110}	1960	{200}

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used at a rotational speed of [ ], it corresponds to the specification of oil lubrication. Refer to the item on special specification (p.69).

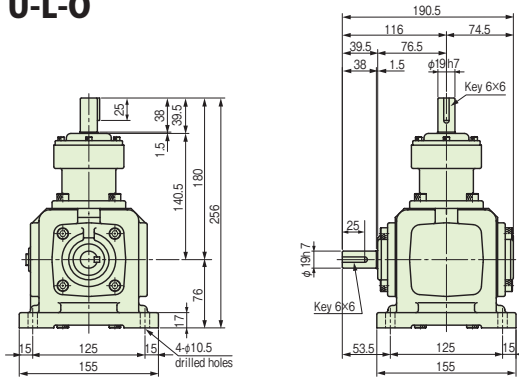
Note 3) For the operating position of radial load, refer to the item on Selection (p.15).

25

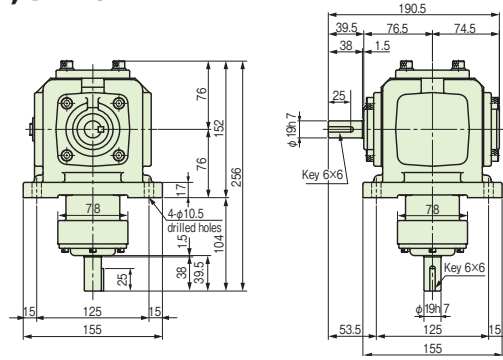
Approximate mass : 10kg Grease lubrication : 350g

\* Dimensional drawings correspond to the shaft diameter size of the speed ratio: M (1:1).  
Because shaft diameter size differs depending on speed ratio, confirm with the following detail drawings.

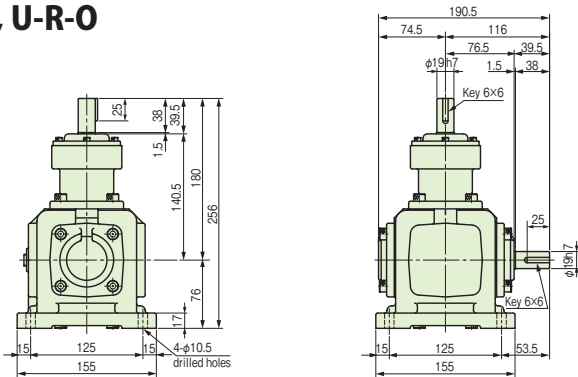
**U-L, U-L-O**



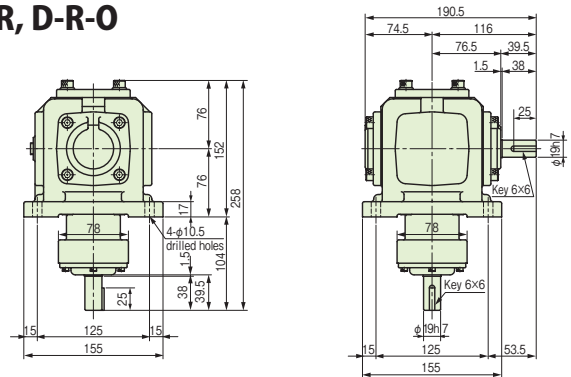
**D-L, D-L-O**



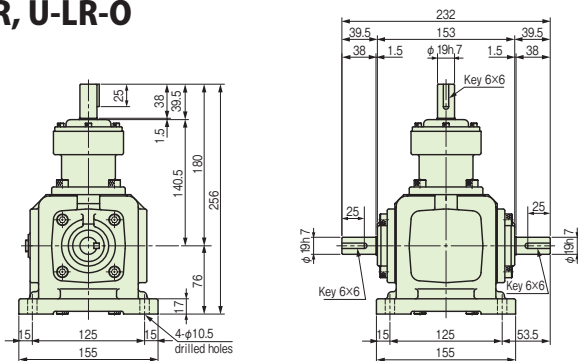
**U-R, U-R-O**



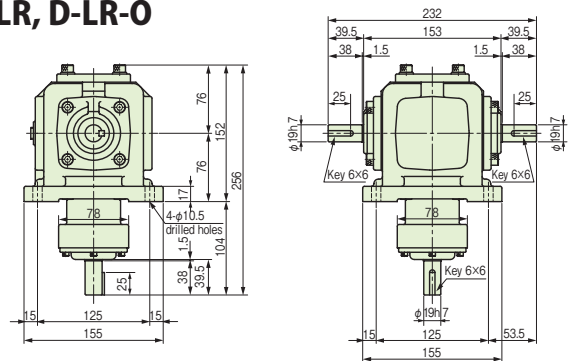
**D-R, D-R-O**



**U-LR, U-LR-O**



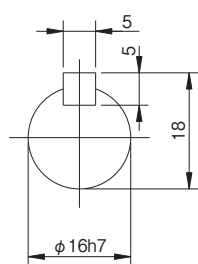
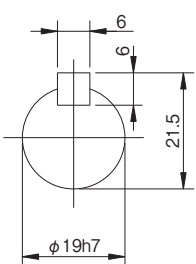
**D-LR, D-LR-O**



**Shaft end detail of lateral shaft, cross shaft**

4M Lateral shaft, Cross shaft,  
4B Cross shaft

4B Lateral shaft



Type ED

# ED4

## Lateral dual-shaft type

■ Speed ratio : M (1 : 1), B20 (2 : 1) ■ Type of mounting : Y (Free mounting direction)

### Dimensional drawing

#### 1-1-L, 1-1-L-0

#### 1-1-U, 1-1-U-0

#### 1-1-R, 1-1-R-0

#### 1-1-D, 1-1-D-0

#### 1-1-LR, 1-1-LR-0

#### 1-1-UD, 1-1-UD-0

### Transmission capacity table

Size	Rotational speed of lateral shaft rpm /r/min	M Speed ratio 1 : 1				B20 Speed ratio 2 : 1			
		Input kW	Cross shaft torque		Input kW	Cross shaft torque		Allowable radial load N (kgf)	
			N · m (kgf · m)	Lateral shaft		Cross shaft	N · m (kgf · m)		Lateral shaft
ED4	3000	5.39	16.8 {1.71}	647 {66.0}	764 {78.0}	3.89	24.2 {2.47}	686 {70.0}	1569 {160}
	2000	4.17	19.5 {1.99}	745 {76.0}	862 {88.0}	3.01	28.1 {2.87}	833 {85.0}	1765 {180}
	1750	3.92	21.0 {2.14}	784 {80.0}	902 {92.0}	2.77	29.6 {3.02}	1078 {110}	1960 {200}
	1450	3.45	22.3 {2.27}	833 {85.0}	951 {97.0}	2.32	29.9 {3.05}	1078 {110}	1960 {200}
	1150	2.93	23.8 {2.43}	882 {90.0}	1029 {105}	1.86	30.3 {3.10}	1078 {110}	1960 {200}
	870	2.42	26.0 {2.65}	960 {98.0}	1127 {115}	1.42	30.6 {3.12}	1078 {110}	1960 {200}
	580	1.71	27.6 {2.82}	1078 {110}	1323 {135}	0.96	31.0 {3.17}	1078 {110}	1960 {200}
	300	0.91	28.3 {2.89}	1519 {155}	1960 {200}	0.50	31.8 {3.25}	1078 {110}	1960 {200}
	100	0.30	29.3 {2.99}	1911 {195}	1960 {200}	0.16	32.6 {3.32}	1078 {110}	1960 {200}
	10	0.02	30.1 {3.07}	1911 {195}	1960 {200}	0.01	33.9 {3.46}	1078 {110}	1960 {200}

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used at a rotational speed of , it corresponds to the specification of oil lubrication. Refer to the item on special specification (p.69).

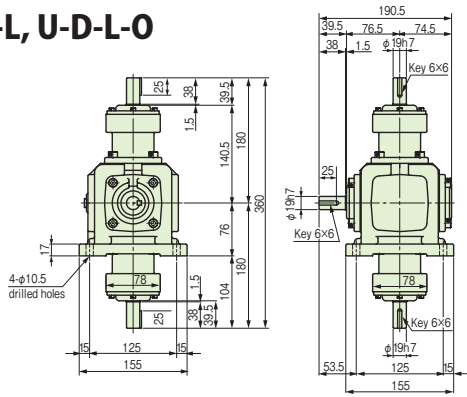
Note 3) For the operating position of radial load, refer to the item on Selection (p.15).

27

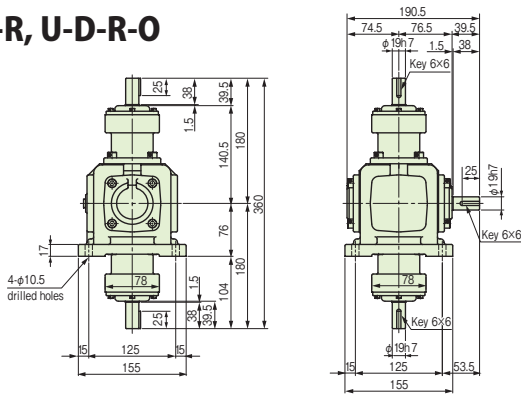
Approximate mass : 12.5kg Grease lubrication : 450g

\* Dimensional drawings correspond to the shaft diameter size of the speed ratio: M (1:1).  
Because shaft diameter size differs depending on speed ratio, confirm with the following detail drawings.

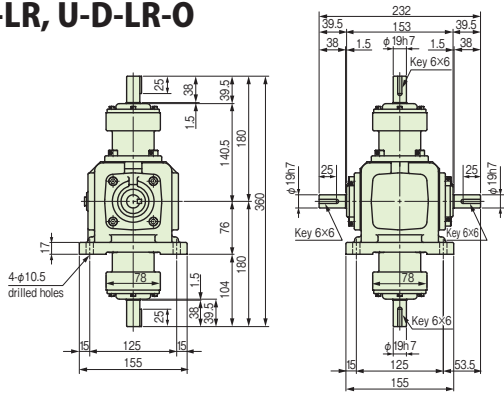
**U-D-L, U-D-L-0**



**U-D-R, U-D-R-0**

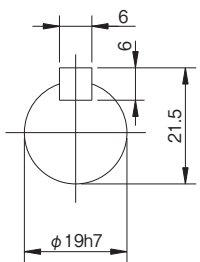


**U-D-LR, U-D-LR-0**

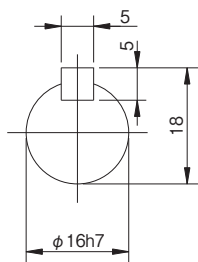


**Shaft end detail of lateral shaft, cross shaft**

**4M Lateral shaft, Cross shaft,  
4B Cross shaft**



**4B Lateral shaft**



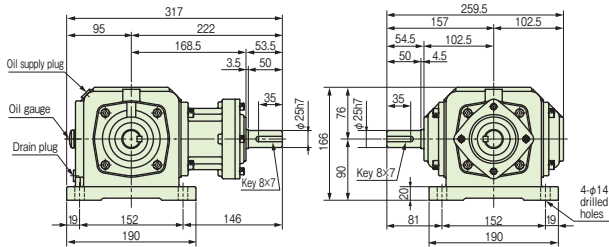
# ED6

## Lateral single-shaft type

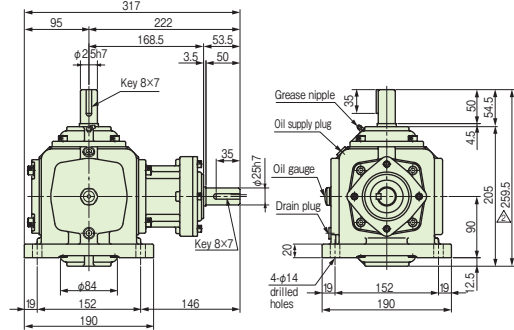
■ Speed ratio : M (1:1), B15 (1.5:1), B20 (2:1), B25 (2.5:1), B30 (3:1)    ■ Type of mounting : Y (T, K1, K2, K3, K4)

### Dimensional drawing

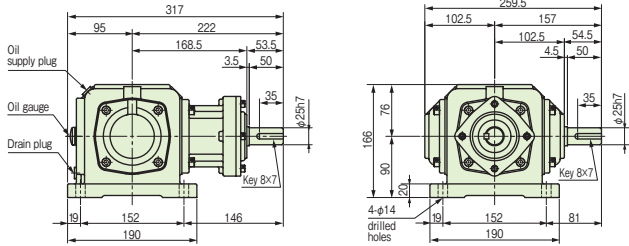
#### 1-L, 1-L-O



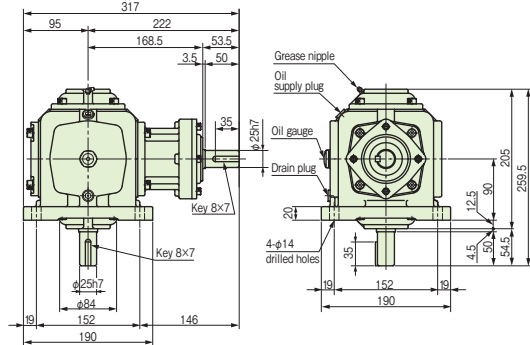
#### 1-U, 1-U-O



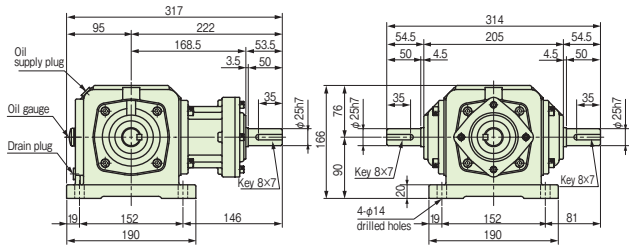
#### 1-R, 1-R-O



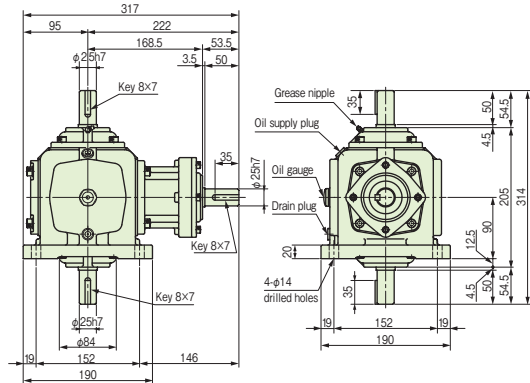
#### 1-D, 1-D-O



#### 1-LR, 1-LR-O



#### 1-UD, 1-UD-O



### Transmission capacity table

Size	Rotational speed of lateral shaft rpm /min	M Speed ratio 1 : 1				B15 Speed ratio 1.5 : 1				B20 Speed ratio 2 : 1												
		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}							
			N · m	{ kgf · m }	Lateral shaft	Cross shaft		N · m	{ kgf · m }	Lateral shaft	Cross shaft		N · m	{ kgf · m }	Lateral shaft	Cross shaft						
ED6	3000	22.8	71.1	{ 7.25 }	1520	{ 155 }	1912	{ 195 }	19.7	92.1	{ 9.39 }	1274	{ 130 }	2255	{ 230 }	15.6	97.3	{ 9.92 }	1274	{ 130 }	2255	{ 230 }
	2000	18.6	87.0	{ 8.87 }	1716	{ 175 }	2157	{ 220 }	14.9	105	{ 10.7 }	1814	{ 185 }	2500	{ 255 }	10.7	100	{ 10.2 }	1814	{ 185 }	2500	{ 255 }
	1750	17.1	91.1	{ 9.30 }	1813	{ 185 }	2303	{ 235 }	13.7	110	{ 11.2 }	2205	{ 225 }	2744	{ 280 }	9.44	101	{ 10.3 }	2205	{ 225 }	2744	{ 280 }
	1450	14.9	96.0	{ 9.80 }	1911	{ 195 }	2450	{ 250 }	12.1	117	{ 11.9 }	2548	{ 260 }	2842	{ 290 }	7.90	102	{ 10.4 }	2548	{ 260 }	2842	{ 290 }
	1150	12.7	103	{ 10.5 }	2058	{ 210 }	2597	{ 265 }	9.96	122	{ 12.4 }	3038	{ 310 }	3087	{ 315 }	6.39	104	{ 10.6 }	3038	{ 310 }	3087	{ 315 }
	870	10.5	113	{ 11.5 }	2205	{ 225 }	2842	{ 290 }	7.66	123	{ 12.6 }	3430	{ 350 }	3332	{ 340 }	4.88	105	{ 10.7 }	3430	{ 350 }	3332	{ 340 }
	580	7.35	119	{ 12.1 }	2499	{ 255 }	3185	{ 325 }	5.23	126	{ 12.9 }	3430	{ 350 }	3528	{ 360 }	3.34	108	{ 11.0 }	3430	{ 350 }	3528	{ 360 }
	300	3.93	123	{ 12.5 }	3430	{ 350 }	3528	{ 360 }	2.77	129	{ 13.2 }	3430	{ 350 }	3528	{ 360 }	1.76	110	{ 11.2 }	3430	{ 350 }	3528	{ 360 }
	100	1.36	127	{ 13.0 }	3430	{ 350 }	3528	{ 360 }	0.95	134	{ 13.7 }	3430	{ 350 }	3528	{ 360 }	0.60	114	{ 11.6 }	3430	{ 350 }	3528	{ 360 }
	10	0.14	132	{ 13.5 }	3430	{ 350 }	3528	{ 360 }	0.09	139	{ 14.2 }	3430	{ 350 }	3528	{ 360 }	0.06	116	{ 11.8 }	3430	{ 350 }	3528	{ 360 }

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of [ ], the specification with forced lubrication might be necessary. In such a case, please consult our company.

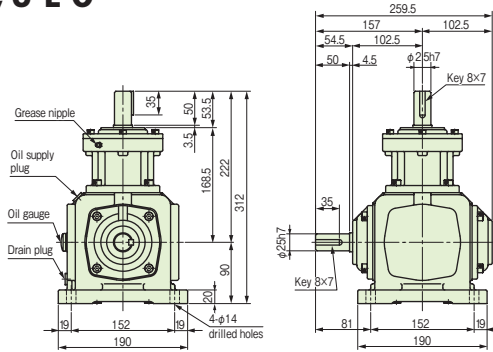
Note 3) In the case of a rotational speed between a rotational speed of [ ] and a lower rotational speed, also please consult our company.

Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

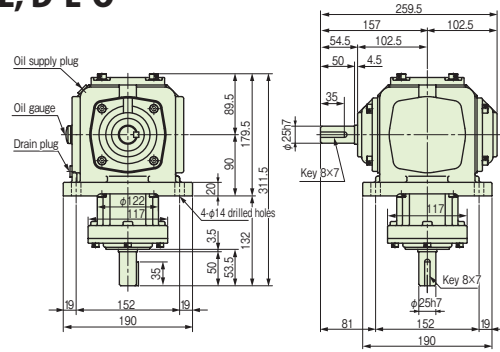
Approximate mass : 21kg      Approximate oil quantity : 0.95L

\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

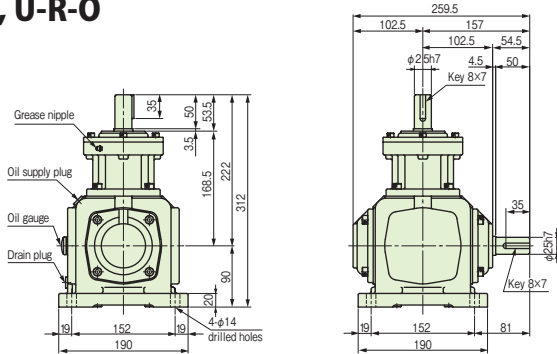
### U-L, U-L-0



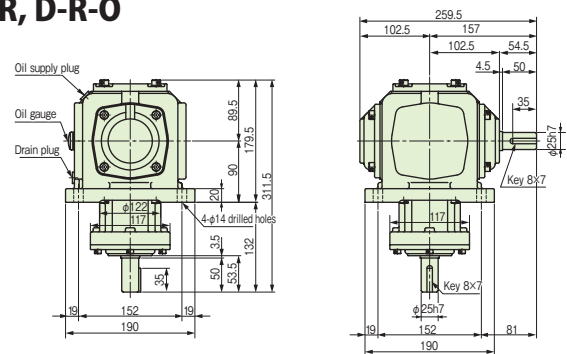
### D-L, D-L-0



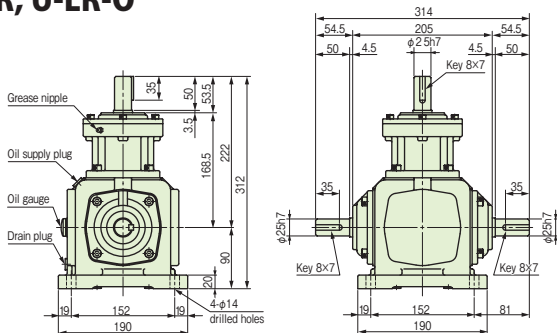
### U-R, U-R-0



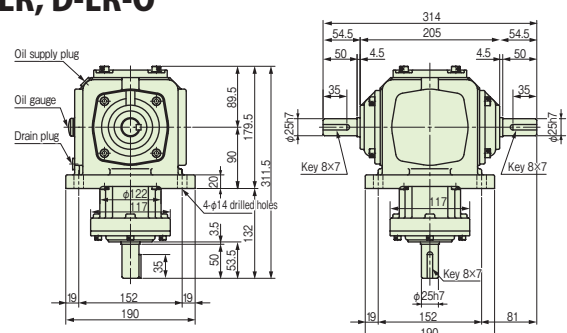
### D-R, D-R-0



### U-LR, U-LR-0

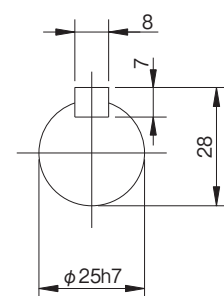


### D-LR, D-LR-0



Input kW	B25 Speed ratio 2.5 : 1			B30 Speed ratio 3 : 1			
	Cross shaft torque N·m (kgf·m)	Allowable radial load N (kgf)		Cross shaft torque N·m (kgf·m)	Allowable radial load N (kgf)		
		Lateral shaft	Cross shaft		Lateral shaft	Cross shaft	
11.7	91.1   9.29	1274   130	2255   230	9.59	89.7   9.14	1274   130	2255   230
8.00	93.5   9.53	1814   185	2500   255	6.56	92.0   9.38	1814   185	2500   255
7.13	95.3   9.72	2205   225	2744   280	5.78	92.7   9.46	2205   225	2744   280
5.97	96.2   9.82	2548   260	2842   290	4.84	93.6   9.55	2548   260	2842   290
4.78	97.2   9.92	3038   310	3087   315	3.88	94.8   9.67	3038   310	3087   315
3.68	99.0   10.1	3430   350	3332   340	2.97	95.9   9.79	3430   350	3332   340
2.48	100   10.2	3430   350	3528   360	2.02	97.6   9.96	3430   350	3528   360
1.32	102   10.5	3430   350	3528   360	1.07	100   10.2	3430   350	3528   360
0.44	104   10.7	3430   350	3528   360	0.36	102   10.4	3430   350	3528   360
0.04	107   11.0	3430   350	3528   360	0.03	104   10.6	3430   350	3528   360

#### Shaft end detail of lateral shaft, cross shaft



Type ED

# ED6

## Lateral dual-shaft type

■Speed ratio : M (1:1), B15 (1.5:1), B20 (2:1), B25 (2.5:1), B30 (3:1)    ■Type of mounting : Y (T, K1, K2, K3, K4)

Dimensional drawing

### 1-1-L, 1-1-L-0

Dimensional drawing of ED6 1-1-L, 1-1-L-0. Front view shows overall width 444mm, with shaft center-to-center distance of 222mm. Side view shows height 166mm and shaft diameter  $\phi 25h7$ . Components labeled include Oil supply plug, Oil gauge, Drain plug, Key 8x7, and 4- $\phi 14$  drilled holes.

### 1-1-U, 1-1-U-0

Dimensional drawing of ED6 1-1-U, 1-1-U-0. Front view shows overall width 444mm. Side view shows height 259.5mm. Components labeled include Grease nipple, Oil supply plug, Oil gauge, Drain plug, Key 8x7, and 4- $\phi 14$  drilled holes.

### 1-1-R, 1-1-R-0

Dimensional drawing of ED6 1-1-R, 1-1-R-0. Front view shows overall width 444mm. Side view shows height 166mm. Components labeled include Oil supply plug, Oil gauge, Drain plug, Key 8x7, and 4- $\phi 14$  drilled holes.

### 1-1-D, 1-1-D-0

Dimensional drawing of ED6 1-1-D, 1-1-D-0. Front view shows overall width 444mm. Side view shows height 269.5mm. Components labeled include Grease nipple, Oil supply plug, Oil gauge, Drain plug, Key 8x7, and 4- $\phi 14$  drilled holes.

### 1-1-LR, 1-1-LR-0

Dimensional drawing of ED6 1-1-LR, 1-1-LR-0. Front view shows overall width 444mm. Side view shows height 166mm. Components labeled include Oil supply plug, Oil gauge, Drain plug, Key 8x7, and 4- $\phi 14$  drilled holes.

### 1-1-UD, 1-1-UD-0

Dimensional drawing of ED6 1-1-UD, 1-1-UD-0. Front view shows overall width 444mm. Side view shows height 314mm. Components labeled include Grease nipple, Oil supply plug, Oil gauge, Drain plug, Key 8x7, and 4- $\phi 14$  drilled holes.

Transmission capacity table

Size	Rotational speed of lateral shaft rpm r/min	M Speed ratio 1 : 1					B15 Speed ratio 1.5 : 1					B20 Speed ratio 2 : 1										
		Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)							
			N · m	(kgf · m)	Lateral shaft	Cross shaft		N · m	(kgf · m)	Lateral shaft	Cross shaft		N · m	(kgf · m)	Lateral shaft	Cross shaft						
ED6	3000	15.9	49.7	{5.07}	1520	{155}	1912	{195}	13.7	64.4	{6.57}	1274	{130}	2255	{230}	10.9	68.1	{6.95}	1274	{130}	2255	{230}
	2000	13.0	60.9	{6.21}	1716	{175}	2157	{220}	10.4	73.5	{7.50}	1814	{185}	2500	{255}	7.49	70.0	{7.14}	1814	{185}	2500	{255}
	1750	11.9	63.7	{6.50}	1813	{185}	2303	{235}	9.59	77.0	{7.85}	2205	{225}	2744	{280}	6.6	70.7	{7.21}	2205	{225}	2744	{280}
	1450	10.4	67.2	{6.85}	1911	{195}	2450	{250}	8.47	81.9	{8.35}	2548	{260}	2842	{290}	5.53	71.4	{7.28}	2548	{260}	2842	{290}
	1150	8.89	72.1	{7.35}	2058	{210}	2597	{265}	6.97	85.4	{8.71}	3038	{310}	3087	{315}	4.47	72.8	{7.42}	3038	{310}	3087	{315}
	870	7.35	79.1	{8.07}	2205	{225}	2842	{290}	5.36	86.1	{8.78}	3430	{350}	3332	{340}	3.41	73.5	{7.50}	3430	{350}	3332	{340}
	580	5.14	83.3	{8.50}	2499	{255}	3185	{325}	3.66	88.2	{9.00}	3430	{350}	3528	{360}	2.33	75.6	{7.71}	3430	{350}	3528	{360}
	300	2.75	86.1	{8.78}	3430	{350}	3528	{360}	1.93	90.3	{9.21}	3430	{350}	3528	{360}	1.23	77.0	{7.85}	3430	{350}	3528	{360}
	100	0.95	88.9	{9.07}	3430	{350}	3528	{360}	0.66	93.8	{9.57}	3430	{350}	3528	{360}	0.42	79.8	{8.14}	3430	{350}	3528	{360}
	10	0.09	92.4	{9.42}	3430	{350}	3528	{360}	0.06	97.3	{9.92}	3430	{350}	3528	{360}	0.04	81.2	{8.28}	3430	{350}	3528	{360}

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of  $\square$ , the specification with forced lubrication might be necessary. In such a case, please consult our company.

Note 3) In the case of a rotational speed between a rotational speed of  $\square$  and a lower rotational speed, also please consult our company.

Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

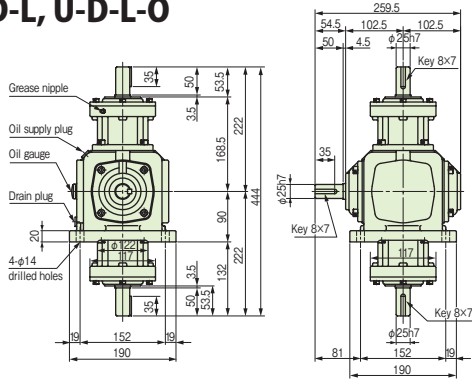
31



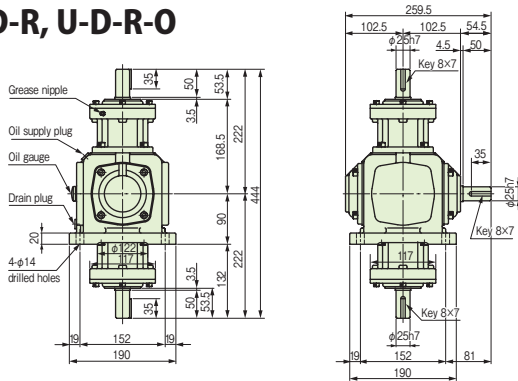
Approximate mass : 27kg    Approximate oil quantity : 1.0L

\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

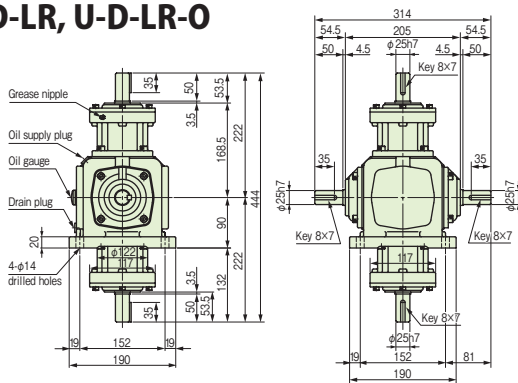
### U-D-L, U-D-L-O



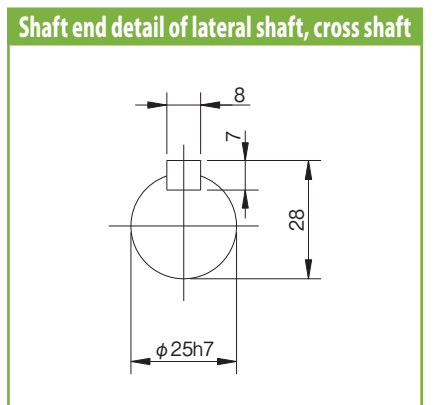
### U-D-R, U-D-R-O



### U-D-LR, U-D-LR-O



B25 Speed ratio 2.5 : 1					B30 Speed ratio 3 : 1								
Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)					
	N·m	(kgf·m)	Lateral shaft	Cross shaft		N·m	(kgf·m)	Lateral shaft	Cross shaft				
8.19	63.7	{6.50}	1274	{130}	2255	{230}	6.71	62.7	{6.4}	1274	{130}	2255	{230}
5.60	65.4	{6.67}	1814	{185}	2500	{255}	4.59	64.4	{6.57}	1814	{185}	2500	{255}
4.99	66.7	{6.80}	2205	{225}	2744	{280}	4.04	64.8	{6.62}	2205	{225}	2744	{280}
4.17	67.3	{6.87}	2548	{260}	2842	{290}	3.38	65.5	{6.68}	2548	{260}	2842	{290}
3.34	68.0	{6.94}	3038	{310}	3087	{315}	2.71	66.3	{6.77}	3038	{310}	3087	{315}
2.57	69.3	{7.07}	3430	{350}	3332	{340}	2.07	67.1	{6.85}	3430	{350}	3332	{340}
1.73	70.0	{7.14}	3430	{350}	3528	{360}	1.41	68.3	{6.97}	3430	{350}	3528	{360}
0.92	71.4	{7.28}	3430	{350}	3528	{360}	0.74	70.0	{7.14}	3430	{350}	3528	{360}
0.30	72.8	{7.42}	3430	{350}	3528	{360}	0.25	71.4	{7.28}	3430	{350}	3528	{360}
0.02	74.9	{7.64}	3430	{350}	3528	{360}	0.02	72.8	{7.42}	3430	{350}	3528	{360}



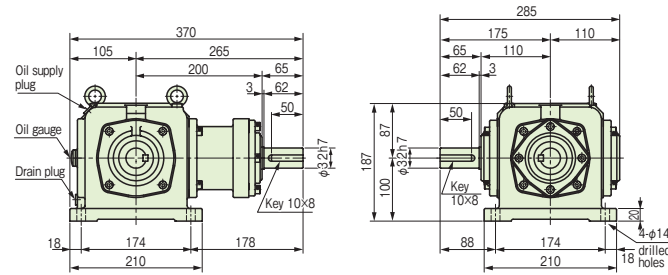
# ED7

## Lateral single-shaft type

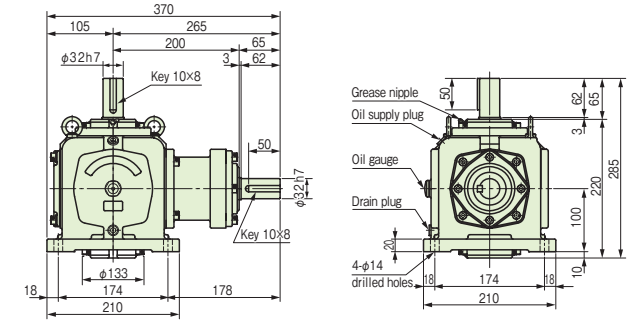
■ Speed ratio : M (1:1), B15 (1.5:1), B20 (2:1), B25 (2.5:1), B30 (3:1)    ■ Type of mounting : Y (T, K1, K2, K3, K4)

### Dimensional drawing

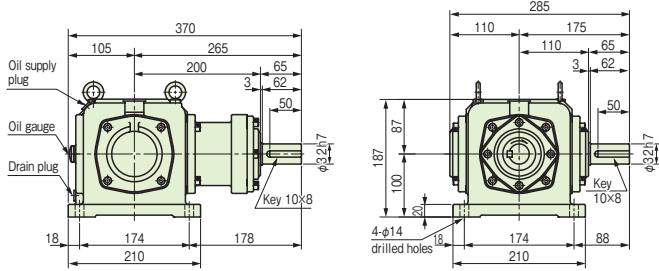
#### 1-L, 1-L-0



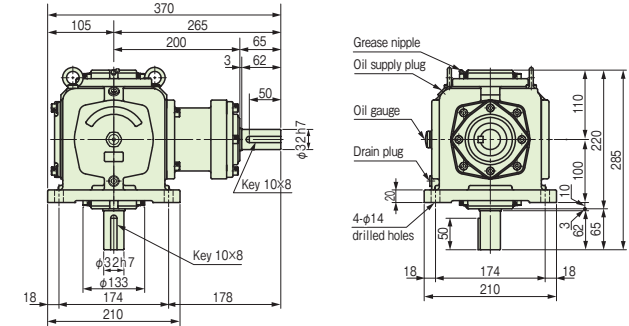
#### 1-U, 1-U-0



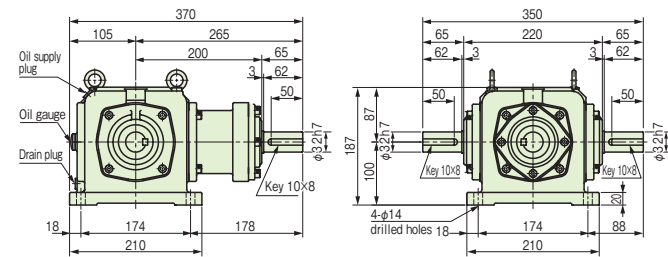
#### 1-R, 1-R-0



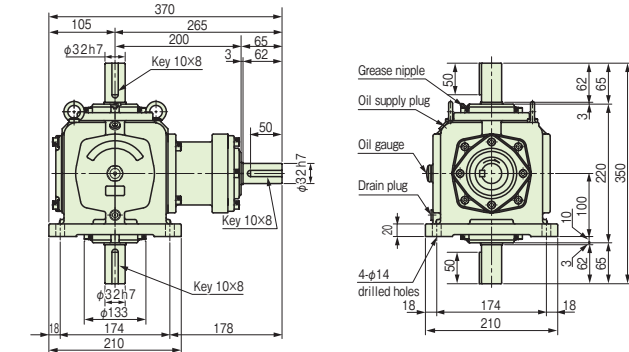
#### 1-D, 1-D-0



#### 1-LR, 1-LR-0



#### 1-UD, 1-UD-0



### Transmission capacity table

Size	Rotational speed of lateral shaft rpm /min	M Speed ratio 1 : 1					B15 Speed ratio 1.5 : 1					B20 Speed ratio 2 : 1										
		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}							
			N · m	{kgf · m}	Lateral shaft	Cross shaft		N · m	{kgf · m}	Lateral shaft	Cross shaft		N · m	{kgf · m}	Lateral shaft	Cross shaft						
ED7	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—					
	2000	27.1	105	{12.9}	2010	{300}	2500	{310}	19.2	135	{13.7}	2696	{275}	4756	{485}	14.2	133	{13.5}	2696	{275}	4756	{485}
	1750	24.8	132	{13.5}	2156	{220}	2842	{290}	17.4	139	{14.2}	3038	{310}	4998	{510}	12.7	135	{13.8}	3038	{310}	4998	{510}
	1450	22.0	142	{14.5}	2450	{250}	3136	{320}	15.0	145	{14.8}	3430	{350}	5390	{550}	10.6	137	{14.0}	3430	{350}	5390	{550}
	1150	18.4	150	{15.3}	2744	{280}	3234	{330}	12.0	147	{15.0}	4067	{415}	5978	{610}	8.55	139	{14.2}	4067	{415}	5978	{610}
	870	15.2	164	{16.7}	2989	{305}	3381	{345}	9.30	150	{15.3}	4753	{485}	6076	{620}	6.56	141	{14.4}	4753	{485}	6076	{620}
	580	11.4	184	{18.8}	3381	{345}	3822	{390}	6.32	153	{15.6}	5096	{520}	6174	{630}	4.47	144	{14.7}	5096	{520}	6174	{630}
	300	6.35	198	{20.2}	4410	{450}	5537	{565}	3.35	157	{16.0}	5096	{520}	6272	{640}	2.37	148	{15.1}	5096	{520}	6272	{640}
	100	2.20	206	{21.0}	5096	{520}	6272	{640}	1.16	163	{16.6}	5096	{520}	6272	{640}	0.81	152	{15.5}	5096	{520}	6272	{640}
	10	0.22	214	{21.8}	5096	{520}	6272	{640}	0.12	169	{17.2}	5096	{520}	6272	{640}	0.08	157	{16.0}	5096	{520}	6272	{640}

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of [ ] , the specification with forced lubrication might be necessary. In such a case, please consult our company.

Note 3) In the case of a rotational speed between a rotational speed of [ ] and a lower rotational speed, also please consult our company.

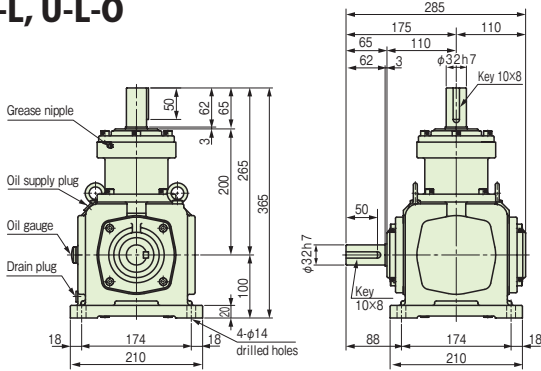
Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

Approximate mass : 32kg    Approximate oil quantity : 1.5L

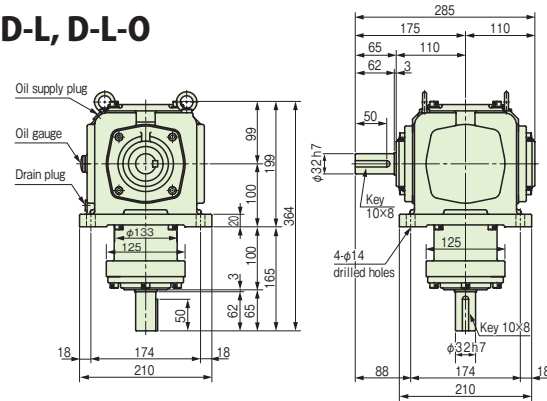
\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

\* Dimensional drawings correspond to the shaft diameter size of the speed ratio: M (1:1). Because the shaft diameter size differs depending on the speed ratio, confirm with the following detail drawings.

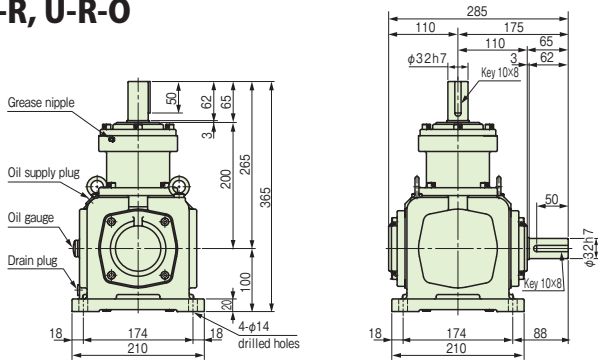
### U-L, U-L-O



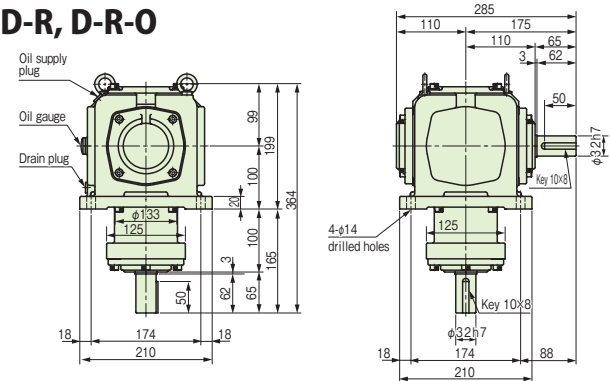
### D-L, D-L-O



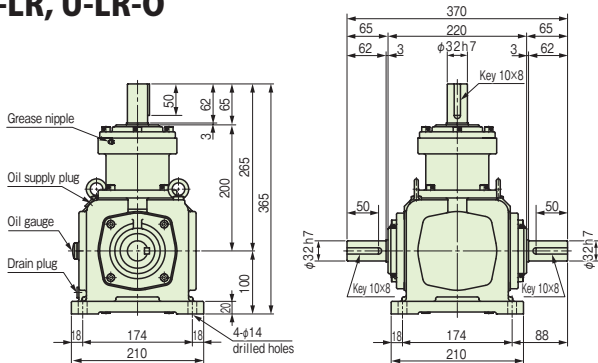
### U-R, U-R-O



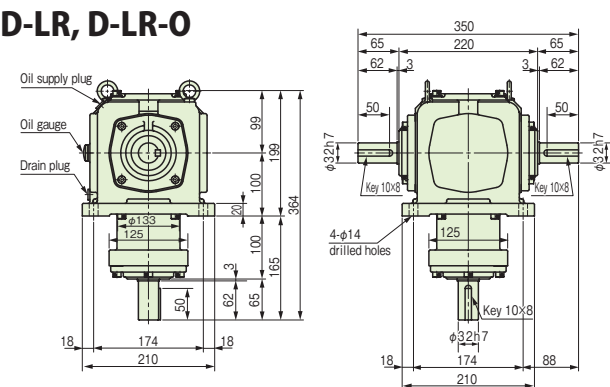
### D-R, D-R-O



### U-LR, U-LR-O



### D-LR, D-LR-O

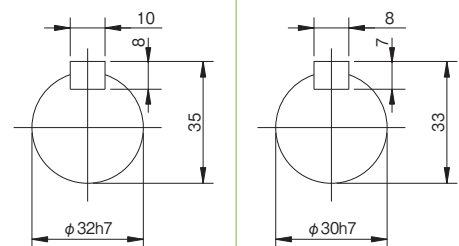


Input kW	B25 Speed ratio 2.5 : 1				B30 Speed ratio 3 : 1			
	Cross shaft torque		Allowable radial load N (kgf)		Cross shaft torque		Allowable radial load N (kgf)	
	N·m	{kgf·m}	Lateral shaft	Cross shaft	N·m	{kgf·m}	Lateral shaft	Cross shaft
9.40	110	{11.2}	2696 {275}	4756 {485}	7.30	102 {10.4}	2696 {275}	4756 {485}
8.36	112	{11.4}	3038 {310}	4998 {510}	6.48	104 {10.6}	3038 {310}	4998 {510}
6.99	113	{11.5}	3430 {350}	5390 {550}	5.42	105 {10.7}	3430 {350}	5390 {550}
5.64	115	{11.7}	4067 {415}	5978 {610}	4.34	106 {10.8}	4067 {415}	5978 {610}
4.30	116	{11.8}	4753 {485}	6076 {620}	3.34	108 {11.0}	4753 {485}	6076 {620}
2.92	118	{12.0}	5096 {520}	6174 {630}	2.25	109 {11.1}	5096 {520}	6174 {630}
1.55	121	{12.3}	5096 {520}	6272 {640}	1.18	111 {11.3}	5096 {520}	6272 {640}
0.52	123	{12.6}	5096 {520}	6272 {640}	0.40	115 {11.7}	5096 {520}	6272 {640}
0.05	126	{12.9}	5096 {520}	6272 {640}	0.04	118 {12.0}	5096 {520}	6272 {640}

### Shaft end detail of lateral shaft, cross shaft

7M Lateral shaft, Cross shaft  
7B15 Lateral shaft  
7B15, 20, 25, 30 Cross shaft

7B20, 25, 30  
Lateral shaft



Type ED

# ED7

## Lateral dual-shaft type

■ Speed ratio : M (1:1), B15 (1.5:1), B20 (2:1), B25 (2.5:1), B30 (3:1)    ■ Type of mounting : Y (T, K1, K2, K3, K4)

### Dimensional drawing

#### 1-1-L, 1-1-L-0

#### 1-1-U, 1-1-U-0

#### 1-1-R, 1-1-R-0

#### 1-1-D, 1-1-D-0

#### 1-1-LR, 1-1-LR-0

#### 1-1-UD, 1-1-UD-0

### Transmission capacity table

Size	Rotational speed of lateral shaft rpm	M Speed ratio 1 : 1				B15 Speed ratio 1.5 : 1				B20 Speed ratio 2 : 1												
		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque									
			N · m	{kgf · m}	Lateral shaft	Cross shaft		N · m	{kgf · m}	Lateral shaft	Cross shaft		N · m	{kgf · m}	Lateral shaft	Cross shaft						
ED7	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—					
	2000	18.9	73.5	{ 7.5 }	2010	{ 300 }	2500	{ 310 }	13.4	94.5	{ 9.64 }	2696	{ 275 }	4756	{ 485 }	9.94	93.1	{ 9.5 }	2696	{ 275 }	4756	{ 485 }
	1750	17.3	92.4	{ 9.42 }	2156	{ 220 }	2842	{ 290 }	12.1	97.3	{ 9.92 }	3038	{ 310 }	4998	{ 510 }	8.89	94.5	{ 9.64 }	3038	{ 310 }	4998	{ 510 }
	1450	15.4	99.4	{ 10.1 }	2450	{ 250 }	3136	{ 320 }	10.5	101	{ 10.3 }	3430	{ 350 }	5390	{ 550 }	7.42	95.9	{ 9.78 }	3430	{ 350 }	5390	{ 550 }
	1150	12.8	105	{ 10.7 }	2744	{ 280 }	3234	{ 330 }	8.4	102	{ 10.5 }	4067	{ 415 }	5978	{ 610 }	5.98	97.3	{ 9.92 }	4067	{ 415 }	5978	{ 610 }
	870	10.6	114	{ 11.7 }	2989	{ 305 }	3381	{ 345 }	6.51	105	{ 10.7 }	4753	{ 485 }	6076	{ 620 }	4.59	98.7	{ 10.0 }	4753	{ 485 }	6076	{ 620 }
	580	7.98	128	{ 13.1 }	3381	{ 345 }	3822	{ 390 }	4.42	107	{ 10.9 }	5096	{ 520 }	6174	{ 630 }	3.12	100	{ 10.2 }	5096	{ 520 }	6174	{ 630 }
	300	4.44	138	{ 14.1 }	4410	{ 450 }	5537	{ 565 }	2.34	109	{ 11.2 }	5096	{ 520 }	6272	{ 640 }	1.65	103	{ 10.5 }	5096	{ 520 }	6272	{ 640 }
	100	1.54	144	{ 14.7 }	5096	{ 520 }	6272	{ 640 }	0.81	114	{ 11.6 }	5096	{ 520 }	6272	{ 640 }	0.56	106	{ 10.8 }	5096	{ 520 }	6272	{ 640 }
	10	0.15	149	{ 15.2 }	5096	{ 520 }	6272	{ 640 }	0.08	118	{ 12.0 }	5096	{ 520 }	6272	{ 640 }	0.05	109	{ 11.2 }	5096	{ 520 }	6272	{ 640 }

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of [ ], the specification with forced lubrication might be necessary. In such a case, please consult our company.

Note 3) In the case of a rotational speed between a rotational speed of [ ] and a lower rotational speed, also please consult our company.

Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

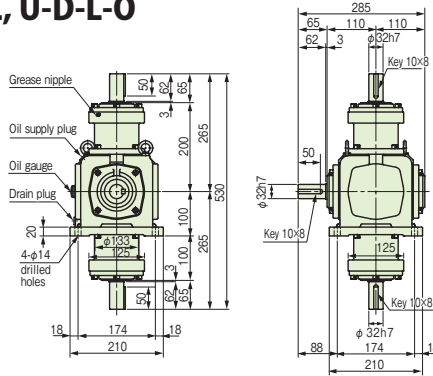
35

Approximate mass : 41kg    Approximate oil quantity : 1.6L

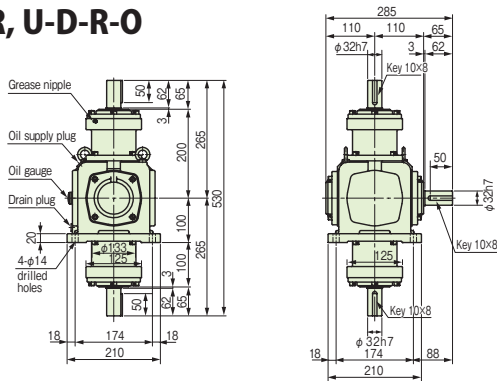
\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

\* Dimensional drawings correspond to the shaft diameter size of the speed ratio: M (1:1). Because the shaft diameter size differs depending on the speed ratio, confirm with the following detail drawings.

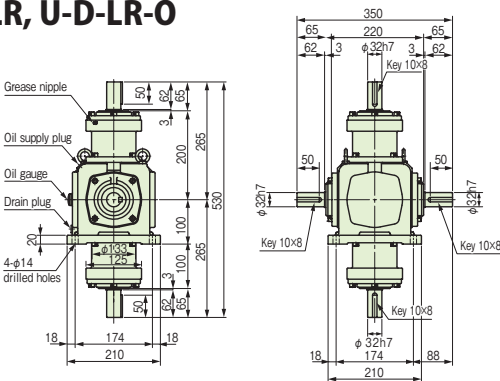
### U-D-L, U-D-L-O



### U-D-R, U-D-R-O



### U-D-LR, U-D-LR-O

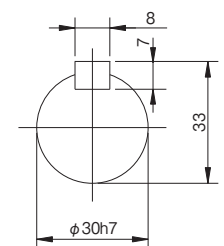
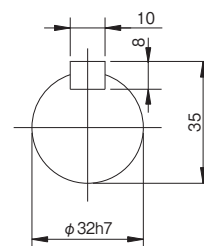


Input kW	B25 Speed ratio 2.5 : 1				B30 Speed ratio 3 : 1			
	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)
	N·m	{kgf·m}	Lateral shaft	Cross shaft		N·m	{kgf·m}	Lateral shaft
6.58	77.0	{7.85}	2696 {275}	4756 {485}	5.11	71.4 {7.28}	2696 {275}	4756 {485}
5.85	78.4	{8.00}	3038 {310}	4998 {510}	4.53	72.8 {7.42}	3038 {310}	4998 {510}
4.89	79.1	{8.07}	3430 {350}	5390 {550}	3.79	73.5 {7.50}	3430 {350}	5390 {550}
3.94	80.5	{8.21}	4067 {415}	5978 {610}	3.03	74.2 {7.57}	4067 {415}	5978 {610}
3.01	81.2	{8.28}	4753 {485}	6076 {620}	2.33	75.6 {7.71}	4753 {485}	6076 {620}
2.04	82.6	{8.42}	5096 {520}	6174 {630}	1.57	76.3 {7.78}	5096 {520}	6174 {630}
1.08	84.7	{8.64}	5096 {520}	6272 {640}	0.82	77.7 {7.92}	5096 {520}	6272 {640}
0.36	86.1	{8.78}	5096 {520}	6272 {640}	0.28	80.5 {8.21}	5096 {520}	6272 {640}
0.03	88.2	{9.00}	5096 {520}	6272 {640}	0.02	82.6 {8.42}	5096 {520}	6272 {640}

### Shaft end detail of lateral shaft, cross shaft

7M Lateral shaft, Cross shaft  
7B15 Lateral shaft  
7B15, 20, 25, 30 Cross shaft

7B20, 25, 30  
Lateral shaft



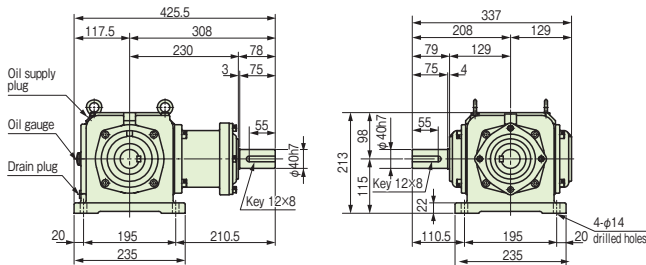
# ED8

## Lateral single-shaft type

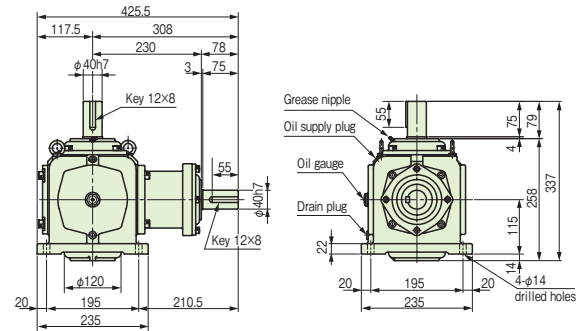
■ Speed ratio : M (1:1), B15 (1.5:1), B20 (2:1), B25 (2.5:1), B30 (3:1)    ■ Type of mounting : Y (T, K1, K2, K3, K4)

### Dimensional drawing

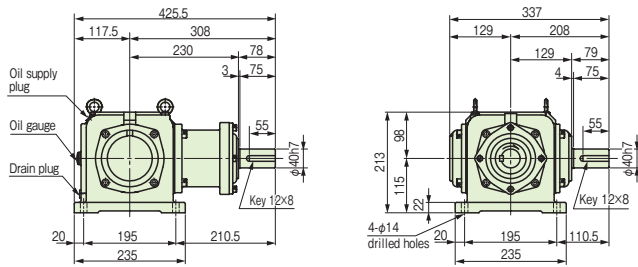
#### 1-L, 1-L-0



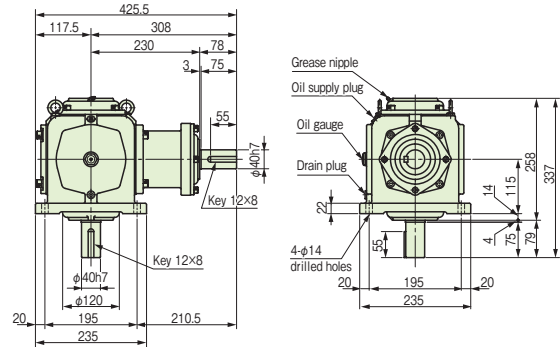
#### 1-U, 1-U-0



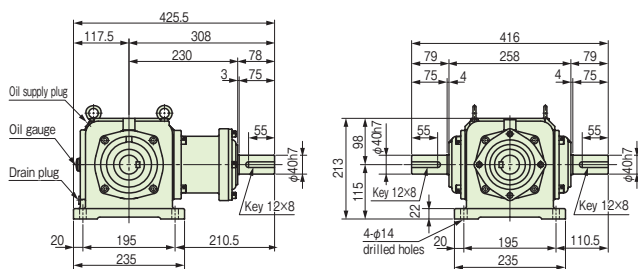
#### 1-R, 1-R-0



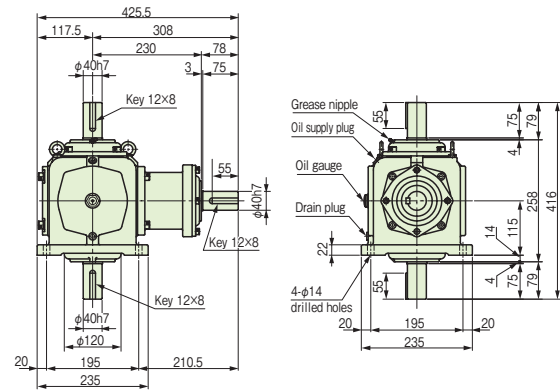
#### 1-D, 1-D-0



#### 1-LR, 1-LR-0



#### 1-UD, 1-UD-0



### Transmission capacity table

Size	Rotational speed of lateral shaft rpm	M Speed ratio 1 : 1				B15 Speed ratio 1.5 : 1				B20 Speed ratio 2 : 1												
		Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)							
			N · m	[kgf · m]	Lateral shaft	Cross shaft		N · m	[kgf · m]	Lateral shaft	Cross shaft		N · m	[kgf · m]	Lateral shaft	Cross shaft						
ED8	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
	2000	57.3	268	[27.3]	2941	[300]	3040	[310]	25.8	181	[18.5]	3432	[350]	6864	[700]	18.9	176	[18.0]	3432	[350]	6864	[700]
	1750	52.3	279	[28.5]	3087	[315]	3234	[330]	22.7	182	[18.6]	3822	[390]	7252	[740]	16.9	180	[18.4]	3822	[390]	7252	[740]
	1450	45.6	294	[30.0]	3234	[330]	3381	[345]	19.1	185	[18.9]	4361	[445]	7987	[815]	14.0	180	[18.4]	4361	[445]	7987	[815]
	1150	37.5	305	[31.1]	3479	[355]	3626	[370]	15.4	188	[19.2]	5096	[520]	8820	[900]	11.3	183	[18.7]	5096	[520]	8820	[900]
	870	29.0	312	[31.8]	3773	[385]	3969	[405]	11.8	191	[19.5]	6076	[620]	8820	[900]	8.70	187	[19.1]	6076	[620]	8820	[900]
	580	19.8	319	[32.6]	4263	[435]	4459	[455]	8.14	197	[20.1]	7644	[780]	8820	[900]	5.92	191	[19.5]	7644	[780]	8820	[900]
	300	10.6	331	[33.8]	5243	[535]	6958	[710]	4.34	203	[20.7]	8428	[860]	8820	[900]	3.14	196	[20.0]	8428	[860]	8820	[900]
	100	3.70	346	[35.3]	8428	[860]	8820	[900]	1.49	210	[21.4]	8428	[860]	8820	[900]	1.08	202	[20.6]	8428	[860]	8820	[900]
	10	0.38	361	[36.8]	8428	[860]	8820	[900]	0.15	218	[22.2]	8428	[860]	8820	[900]	0.11	209	[21.3]	8428	[860]	8820	[900]

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of [ ], the specification with forced lubrication might be necessary. In such a case, please consult our company.

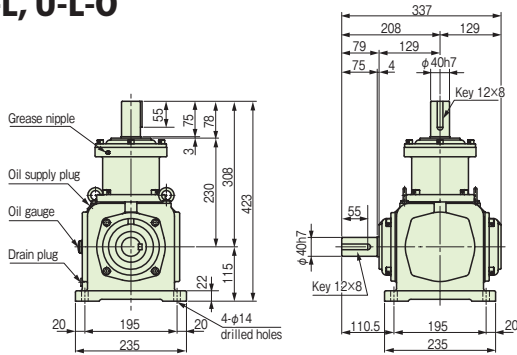
Note 3) In the case of a rotational speed between a rotational speed of [ ] and a lower rotational speed, also please consult our company.

Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

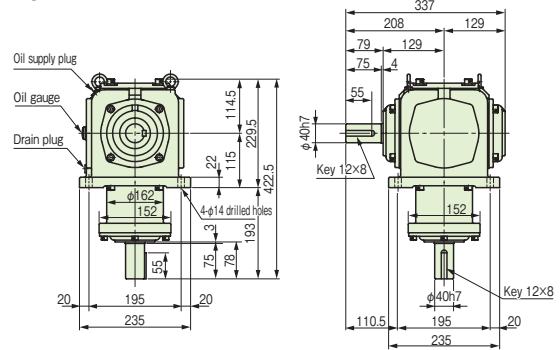
Approximate mass : 49kg    Approximate oil quantity : 1.9L

\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

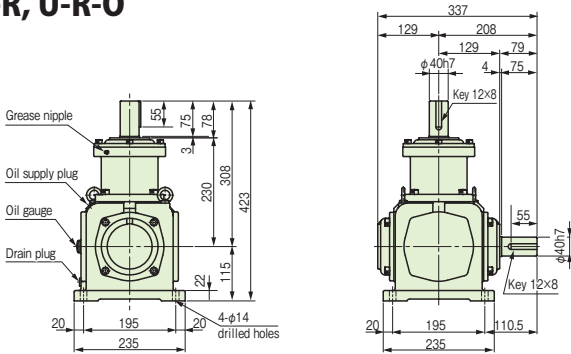
### U-L, U-L-O



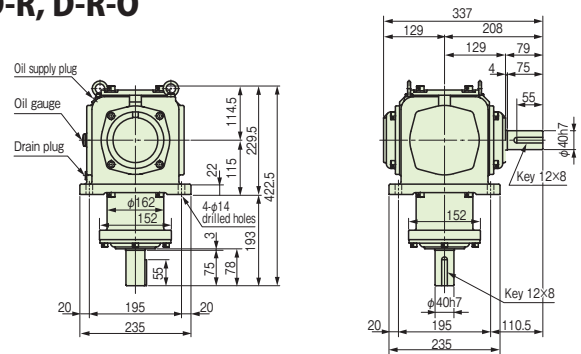
### D-L, D-L-O



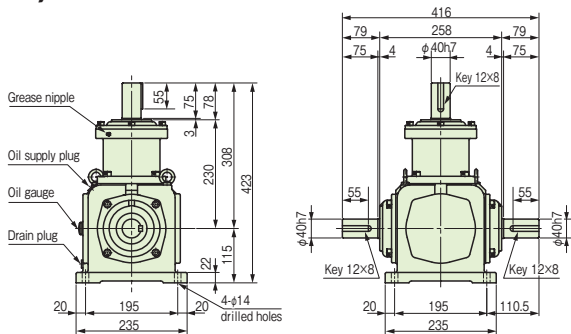
### U-R, U-R-O



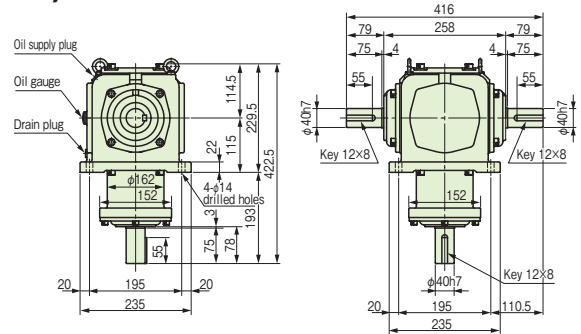
### D-R, D-R-O



### U-LR, U-LR-O

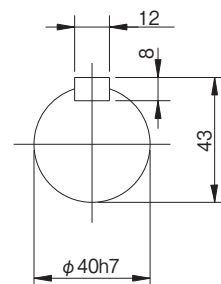


### D-LR, D-LR-O



Input kW	B25 Speed ratio 2.5 : 1				B30 Speed ratio 3 : 1								
	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)					
	N·m	(kgf·m)	Lateral shaft	Cross shaft		N·m	(kgf·m)	Lateral shaft	Cross shaft				
15.2	177	[18.1]	3432	{350}	6864	{700}	10.9	152	[15.6]	3432	{350}	6864	{700}
13.5	180	[18.4]	3822	{390}	7252	{740}	9.78	157	[16.0]	3822	{390}	7252	{740}
11.4	184	[18.8]	4361	{445}	7987	{815}	8.20	159	[16.2]	4361	{445}	7987	{815}
9.11	185	[18.9]	5096	{520}	8820	{900}	6.55	160	[16.3]	5096	{520}	8820	{900}
7.00	188	[19.2]	6076	{620}	8820	{900}	5.04	163	[16.6]	6076	{620}	8820	{900}
4.76	192	[19.6]	7644	{780}	8820	{900}	3.42	166	[16.9]	7644	{780}	8820	{900}
2.53	197	[20.1]	8428	{860}	8820	{900}	1.80	169	[17.2]	8428	{860}	8820	{900}
0.86	203	[20.7]	8428	{860}	8820	{900}	0.61	173	[17.7]	8428	{860}	8820	{900}
0.08	208	[21.2]	8428	{860}	8820	{900}	0.06	179	[18.3]	8428	{860}	8820	{900}

#### Shaft end detail of lateral shaft, cross shaft



Type ED

# ED8

## Lateral dual-shaft type

■ Speed ratio : M (1:1), B15 (1.5:1), B20 (2:1), B25 (2.5:1), B30 (3:1)    ■ Type of mounting : Y (T, K1, K2, K3, K4)

### Dimensional drawing

#### 1-1-L, 1-1-L-0

#### 1-1-U, 1-1-U-0

#### 1-1-R, 1-1-R-0

#### 1-1-D, 1-1-D-0

#### 1-1-LR, 1-1-LR-0

#### 1-1-UD, 1-1-UD-0

### Transmission capacity table

Size	Rotational speed of lateral shaft rpm	M Speed ratio 1 : 1				B15 Speed ratio 1.5 : 1				B20 Speed ratio 2 : 1												
		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}							
			N · m	{kgf · m}	Lateral shaft	Cross shaft		N · m	{kgf · m}	Lateral shaft	Cross shaft		N · m	{kgf · m}	Lateral shaft	Cross shaft						
ED8	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
	2000	40.1	187	{19.1}	2941	{300}	3040	{310}	18.0	126	{12.9}	3432	{350}	6864	{700}	13.2	123	{12.5}	3432	{350}	6864	{700}
	1750	36.6	195	{19.9}	3087	{315}	3234	{330}	15.8	127	{13.0}	3822	{390}	7252	{740}	11.8	126	{12.8}	3822	{390}	7252	{740}
	1450	31.9	205	{21}	3234	{330}	3381	{345}	13.3	129	{13.2}	4361	{445}	7987	{815}	9.80	126	{12.8}	4361	{445}	7987	{815}
	1150	26.2	213	{21.7}	3479	{355}	3626	{370}	10.7	131	{13.4}	5096	{520}	8820	{900}	7.91	128	{13.0}	5096	{520}	8820	{900}
	870	20.3	218	{22.2}	3773	{385}	3969	{405}	8.26	133	{13.6}	6076	{620}	8820	{900}	6.09	130	{13.3}	6076	{620}	8820	{900}
	580	13.8	223	{22.7}	4263	{435}	4459	{455}	5.69	137	{14.0}	7644	{780}	8820	{900}	4.14	133	{13.6}	7644	{780}	8820	{900}
	300	7.42	231	{23.6}	5243	{535}	6958	{710}	3.03	142	{14.5}	8428	{860}	8820	{900}	2.19	137	{14.0}	8428	{860}	8820	{900}
	100	2.59	242	{24.7}	8428	{860}	8820	{900}	1.04	147	{15}	8428	{860}	8820	{900}	0.75	141	{14.4}	8428	{860}	8820	{900}
	10	0.26	252	{25.7}	8428	{860}	8820	{900}	0.10	152	{15.5}	8428	{860}	8820	{900}	0.07	146	{14.9}	8428	{860}	8820	{900}

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of [ ] , the specification with forced lubrication might be necessary. In such a case, please consult our company.

Note 3) In the case of a rotational speed between a rotational speed of [ ] and a lower rotational speed, also please consult our company.

Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

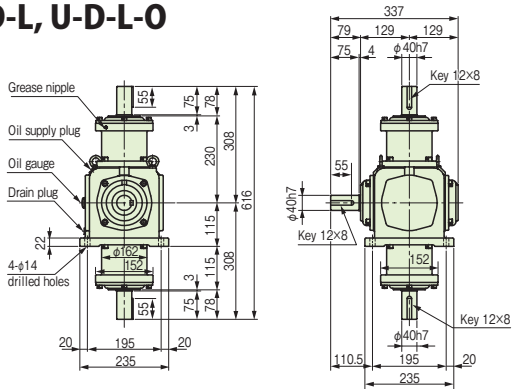
39



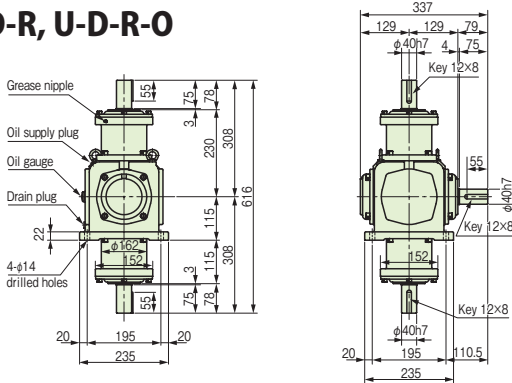
Approximate mass : 62kg    Approximate oil quantity : 2.1L

\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

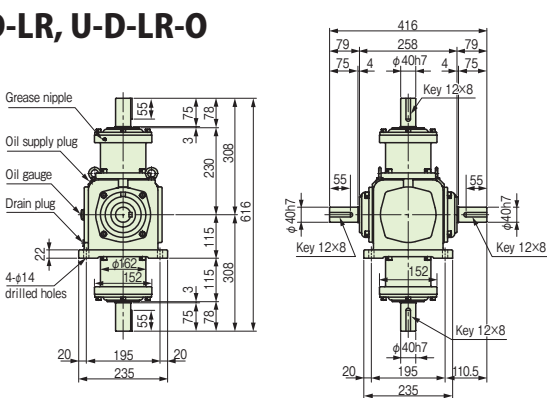
### U-D-L, U-D-L-O



### U-D-R, U-D-R-O

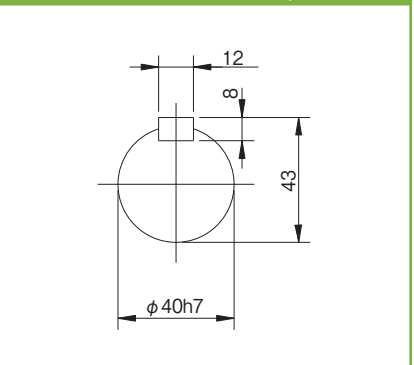


### U-D-LR, U-D-LR-O



Input kW	B25 Speed ratio 2.5 : 1				B30 Speed ratio 3 : 1				
	Cross shaft torque		Allowable radial load N (kgf)		Cross shaft torque		Allowable radial load N (kgf)		
	N·m	(kgf·m)	Lateral shaft	Cross shaft	N·m	(kgf·m)	Lateral shaft	Cross shaft	
10.6	123	[12.6]	3432	[350]	7.63	106	[10.8]	3432	[350]
9.45	126	[12.8]	3822	[390]	6.84	109	[11.2]	3822	[390]
7.98	128	[13.1]	4361	[445]	5.74	111	[11.3]	4361	[445]
6.37	129	[13.2]	5096	[520]	4.58	112	[11.4]	5096	[520]
4.9	131	[13.4]	6076	[620]	3.52	114	[11.6]	6076	[620]
3.33	134	[13.7]	7644	[780]	2.39	116	[11.8]	7644	[780]
1.77	137	[14.0]	8428	[860]	1.26	118	[12.0]	8428	[860]
0.6	142	[14.5]	8428	[860]	0.42	121	[12.3]	8428	[860]
0.05	145	[14.8]	8428	[860]	0.04	125	[12.7]	8428	[900]

### Shaft end detail of lateral shaft, cross shaft

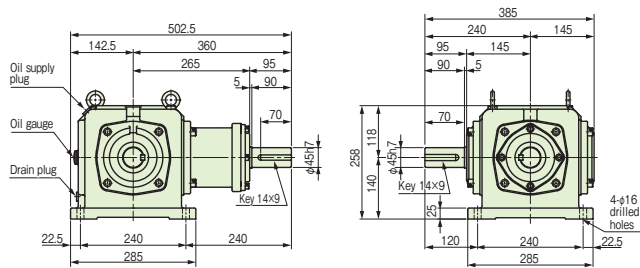


# ED10 Lateral single-shaft type

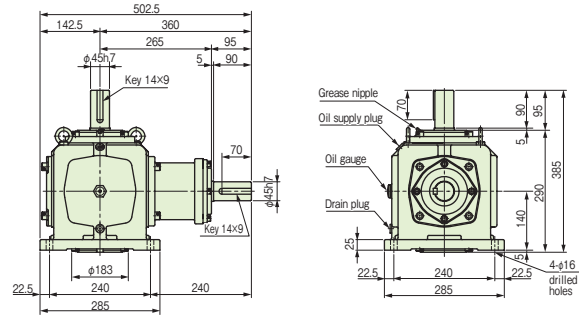
■ Speed ratio : M (1:1), B15 (1.5:1), B20 (2:1), B25 (2.5:1), B30 (3:1)    ■ Type of mounting : Y (T, K1, K2, K3, K4)

## Dimensional drawing

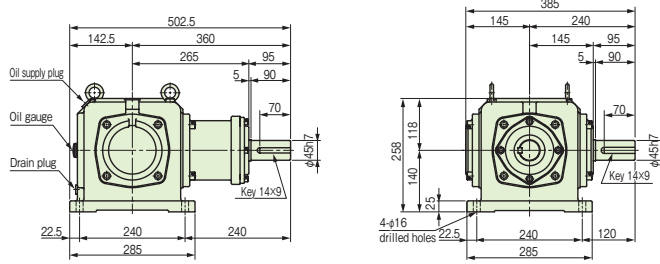
### 1-L, 1-L-0



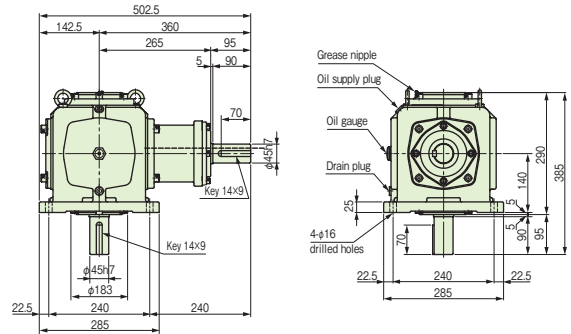
### 1-U, 1-U-0



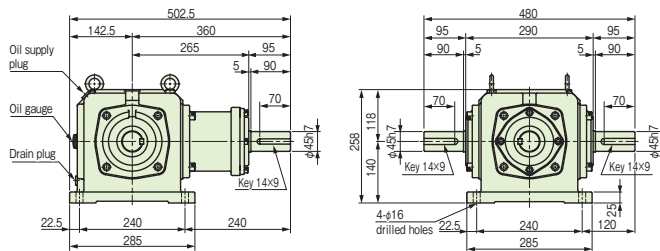
### 1-R, 1-R-0



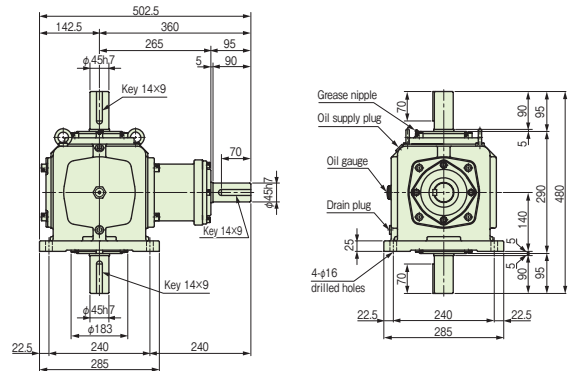
### 1-D, 1-D-0



### 1-LR, 1-LR-0



### 1-UD, 1-UD-0



## Transmission capacity table

Size	Rotational speed of lateral shaft rpm	M Speed ratio 1 : 1				B15 Speed ratio 1.5 : 1				B20 Speed ratio 2 : 1												
		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}							
			N·m	{kgf·m}	Lateral shaft	Cross shaft		N·m	{kgf·m}	Lateral shaft	Cross shaft		N·m	{kgf·m}	Lateral shaft	Cross shaft						
ED10	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—						
	2000	79.0	358	{36.5}	3677	{375}	4069	{415}	49.5	336	{34.3}	4167	{425}	7845	{800}	32.0	290	{29.6}	4167	{425}	7845	{800}
	1750	74.6	399	{40.7}	3969	{405}	4263	{435}	46.0	368	{37.6}	4459	{455}	8232	{840}	28.2	302	{30.8}	4459	{455}	8232	{840}
	1450	65.3	421	{43.0}	4165	{425}	4508	{460}	38.7	374	{38.2}	5194	{530}	9212	{940}	23.6	305	{31.1}	5194	{530}	9212	{940}
	1150	55.7	453	{46.2}	4459	{455}	4851	{495}	31.2	380	{38.8}	6174	{630}	10486	{1070}	19.0	309	{31.5}	6174	{630}	10486	{1070}
	870	44.6	479	{48.9}	4851	{495}	5292	{540}	24.1	389	{39.7}	7448	{760}	11760	{1200}	14.6	315	{32.1}	7448	{760}	11760	{1200}
	580	30.6	493	{50.3}	5488	{560}	5880	{600}	16.4	396	{40.4}	9555	{975}	11760	{1200}	10.0	322	{32.9}	9555	{975}	11760	{1200}
	300	16.4	513	{52.3}	9713	{985}	7987	{815}	8.78	411	{41.9}	9996	{1020}	11760	{1200}	5.33	332	{33.9}	9996	{1020}	11760	{1200}
	100	5.72	535	{54.6}	9996	{1020}	11760	{1200}	3.04	426	{43.5}	9996	{1020}	11760	{1200}	1.84	344	{35.1}	9996	{1020}	11760	{1200}
	10	0.59	561	{57.2}	9996	{1020}	11760	{1200}	0.31	443	{45.2}	9996	{1020}	11760	{1200}	0.19	357	{36.4}	9996	{1020}	11760	{1200}

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of [ ], the specification with forced lubrication might be necessary. In such a case, please consult our company.

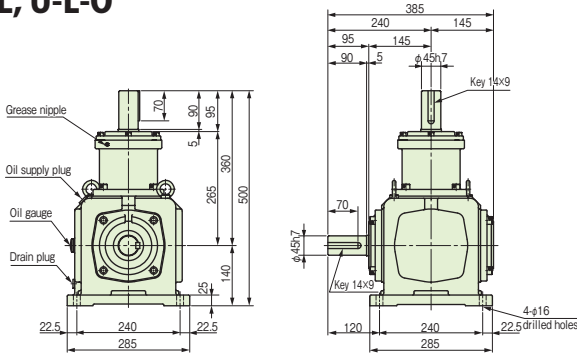
Note 3) In the case of a rotational speed between a rotational speed of [ ] and a lower rotational speed, also please consult our company.

Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

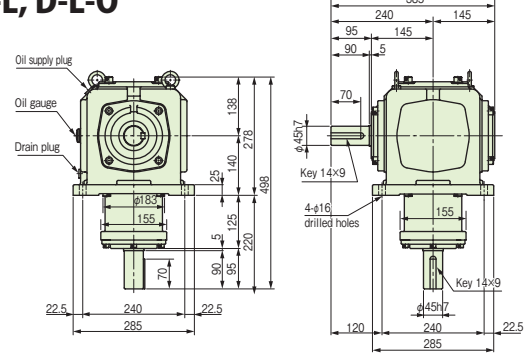
Approximate mass : 78kg    Approximate oil quantity : 3.5L

\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

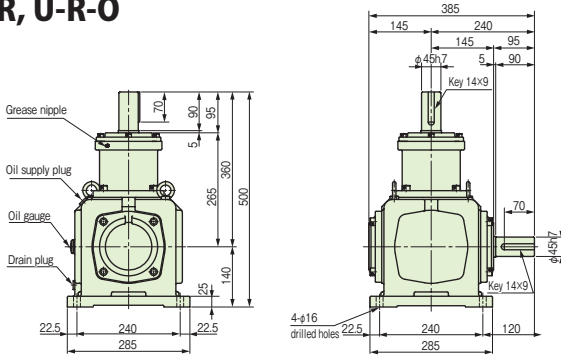
**U-L, U-L-0**



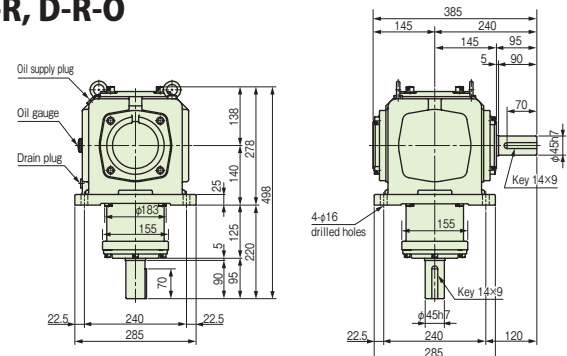
**D-L, D-L-0**



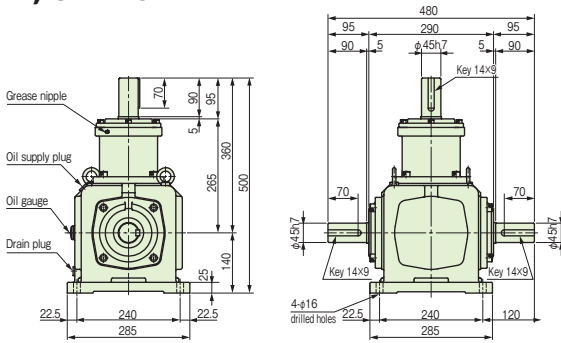
**U-R, U-R-0**



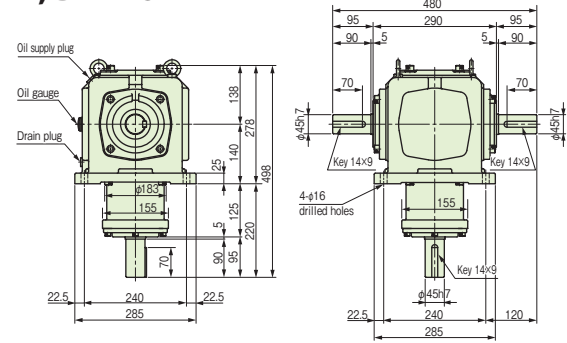
**D-R, D-R-0**



**U-LR, U-LR-0**

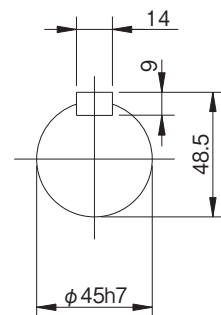


**D-LR, D-LR-0**



B25 Speed ratio 2.5 : 1					B30 Speed ratio 3 : 1								
Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)					
	N·m	(kgf·m)	Lateral shaft	Cross shaft		N·m	(kgf·m)	Lateral shaft	Cross shaft				
24.3	275	[28.1]	4167	{ 425}	7845	{ 800}	18.6	252	[25.8]	4167	{ 425}	7845	{ 800}
21.7	290	[29.6]	4459	{ 455}	8232	{ 840}	16.8	270	[27.5]	4459	{ 455}	8232	{ 840}
18.2	293	[29.9]	5194	{ 530}	9212	{ 940}	14.0	270	[27.6]	5194	{ 530}	9212	{ 940}
14.7	298	[30.4]	6174	{ 630}	10486	{ 1070}	11.3	275	[28.1]	6174	{ 630}	10486	{ 1070}
11.2	302	[30.8]	7448	{ 760}	11760	{ 1200}	8.66	279	[28.5]	7448	{ 760}	11760	{ 1200}
7.68	310	[31.6]	9555	{ 975}	11760	{ 1200}	5.89	285	[29.1]	9555	{ 975}	11760	{ 1200}
4.06	317	[32.3]	9996	{ 1020}	11760	{ 1200}	3.11	291	[29.7]	9996	{ 1020}	11760	{ 1200}
1.40	326	[33.3]	9996	{ 1020}	11760	{ 1200}	1.07	300	[30.6]	9996	{ 1020}	11760	{ 1200}
0.14	336	[34.3]	9996	{ 1020}	11760	{ 1200}	0.11	308	[31.4]	9996	{ 1020}	11760	{ 1200}

**Shaft end detail of lateral shaft, cross shaft**



Type ED

# ED10

## Lateral dual-shaft type

■ Speed ratio: M (1:1), B15 (1.5:1), B20 (2:1), B25 (2.5:1), B30 (3:1)

■ Type of mounting: Y (T, K1, K2, K3, K4)

### Dimensional drawing

#### 1-1-L, 1-1-L-0

#### 1-1-U, 1-1-U-0

#### 1-1-R, 1-1-R-0

#### 1-1-D, 1-1-D-0

#### 1-1-LR, 1-1-LR-0

#### 1-1-UD, 1-1-UD-0

### Transmission capacity table

Size	Rotational speed of lateral shaft rpm	M Speed ratio 1 : 1				B15 Speed ratio 1.5 : 1				B20 Speed ratio 2 : 1						
		Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)	
			N·m	[kgf·m]	Lateral shaft	Cross shaft		N·m	[kgf·m]	Lateral shaft	Cross shaft		N·m	[kgf·m]	Lateral shaft	Cross shaft
ED10	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	55.3	250 [25.5]	3677 [375]	4069 [415]	34.6	235 [24.0]	4167 [425]	7845 [800]	22.4	203 [20.7]	4167 [425]	7845 [800]			
	1750	52.2	279 [28.5]	3969 [405]	4263 [435]	32.2	257 [26.2]	4459 [455]	8232 [840]	19.7	211 [21.5]	4459 [455]	8232 [840]			
	1450	45.7	294 [30.0]	4165 [425]	4508 [460]	27.0	261 [26.7]	5194 [530]	9212 [940]	16.5	213 [21.7]	5194 [530]	9212 [940]			
	1150	38.9	317 [32.3]	4459 [455]	4851 [495]	21.8	266 [27.1]	6174 [630]	10486 [1070]	13.3	216 [22.0]	6174 [630]	10486 [1070]			
	870	31.2	335 [34.2]	4851 [495]	5292 [540]	16.8	272 [27.7]	7448 [760]	11760 [1200]	10.2	220 [22.5]	7448 [760]	11760 [1200]			
	580	21.4	345 [35.2]	5488 [560]	5880 [600]	11.4	277 [28.2]	9555 [975]	11760 [1200]	7.00	225 [23.0]	9555 [975]	11760 [1200]			
	300	11.4	359 [36.6]	9713 [855]	7987 [815]	6.14	287 [29.3]	9996 [1020]	11760 [1200]	3.73	232 [23.7]	9996 [1020]	11760 [1200]			
	100	4.00	374 [38.2]	9996 [1020]	11760 [1200]	2.12	298 [30.4]	9996 [1020]	11760 [1200]	1.28	240 [24.5]	9996 [1020]	11760 [1200]			
	10	0.41	392 [40.0]	9996 [1020]	11760 [1200]	0.21	310 [31.6]	9996 [1020]	11760 [1200]	0.13	249 [25.5]	9996 [1020]	11760 [1200]			

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of [ ], the specification with forced lubrication might be necessary. In such a case, please consult our company.

Note 3) In the case of a rotational speed between a rotational speed of [ ] and a lower rotational speed, also please consult our company.

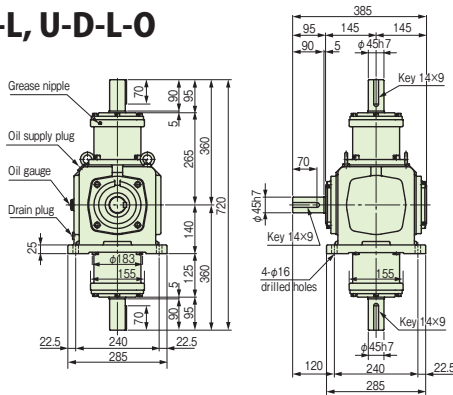
Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

43

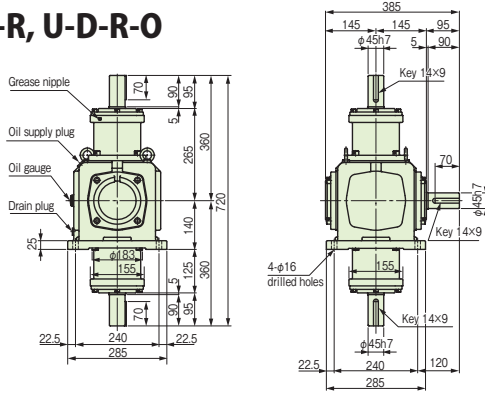
Approximate mass : 100kg    Approximate oil quantity : 3.7L

\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

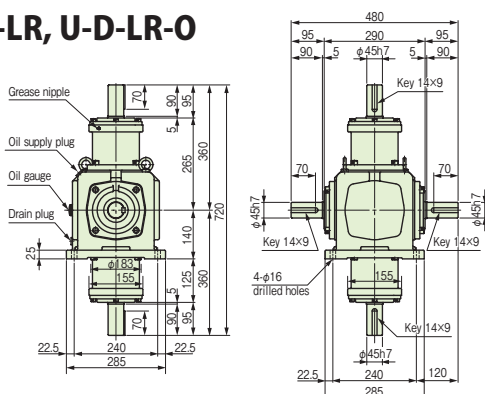
### U-D-L, U-D-L-0



### U-D-R, U-D-R-0

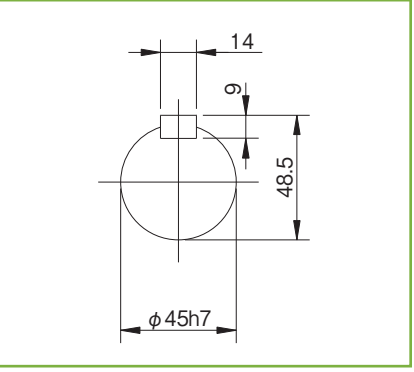


### U-D-LR, U-D-LR-0



B25 Speed ratio 2.5 : 1					B30 Speed ratio 3 : 1								
Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)					
	N·m	{kgf·m}	Lateral shaft	Cross shaft		N·m	{kgf·m}	Lateral shaft	Cross shaft				
—	—	—	—	—	—	—	—	—	—				
17.0	192	{19.6}	4167	{ 425}	7845	{ 800}	13.0	176	{18.0}	4167	{ 425}	7845	{ 800}
15.1	203	{20.7}	4459	{ 455}	8232	{ 840}	11.7	189	{19.2}	4459	{ 455}	8232	{ 840}
12.7	205	{20.9}	5194	{ 530}	9212	{ 940}	9.80	189	{19.2}	5194	{ 530}	9212	{ 940}
10.2	208	{21.2}	6174	{ 630}	10486	{1070}	7.91	192	{19.6}	6174	{ 630}	10486	{1070}
7.84	211	{21.5}	7448	{ 760}	11760	{1200}	6.06	195	{19.9}	7448	{ 760}	11760	{1200}
5.37	217	{22.1}	9555	{ 975}	11760	{1200}	4.12	199	{20.3}	9555	{ 975}	11760	{1200}
2.84	221	{22.6}	9996	{1020}	11760	{1200}	2.17	203	{20.7}	9996	{1020}	11760	{1200}
0.98	228	{23.2}	9996	{1020}	11760	{1200}	0.74	210	{21.4}	9996	{1020}	11760	{1200}
0.09	235	{24.0}	9996	{1020}	11760	{1200}	0.07	215	{22.0}	9996	{1020}	11760	{1200}

### Shaft end detail of lateral shaft, cross shaft



Type ED

# ED12

## Lateral single-shaft type

■ Speed ratio : M (1:1), B15 (1.5:1), B20 (2:1), B25 (2.5:1), B30 (3:1)    ■ Type of mounting : Y (T, K1, K2, K3, K4)

### Dimensional drawing

#### 1-L, 1-L-0

Front view dimensions: 585 (total width), 170 (to oil supply plug), 415 (to pressure vent), 105.5 (to shaft), 5.5 (to drain plug), 75 (to oil gauge), 25 (to drain plug), 290 (to center), 270 (to shaft).

Side view dimensions: 444.5 (total height), 275 (to top), 169.5 (to center), 105.5 (to shaft), 100 (to drain plug), 5.5 (to oil gauge), 75 (to shaft), 340 (to center), 130 (to drain plug), 25 (to shaft), 4-φ21 drilled holes.

#### 1-U, 1-U-0

Front view dimensions: 585 (total width), 170 (to grease nipple), 415 (to pressure vent), 105.5 (to shaft), 5.5 (to drain plug), 75 (to oil gauge), 25 (to drain plug), 290 (to center), 270 (to shaft).

Side view dimensions: 450 (total height), 75 (to top), 100 (to center), 104.5 (to shaft), 4.5 (to drain plug), 345.5 (to center), 175 (to shaft), 32 (to drain plug), 25 (to shaft), 4-φ21 drilled hole.

#### 1-R, 1-R-0

Front view dimensions: 585 (total width), 170 (to oil supply plug), 415 (to pressure vent), 105.5 (to shaft), 5.5 (to drain plug), 75 (to oil gauge), 25 (to drain plug), 290 (to center), 270 (to shaft).

Side view dimensions: 444.5 (total height), 275 (to top), 169.5 (to center), 105.5 (to shaft), 100 (to drain plug), 5.5 (to oil gauge), 75 (to shaft), 340 (to center), 130 (to drain plug), 25 (to shaft), 4-φ21 drilled holes.

#### 1-D, 1-D-0

Front view dimensions: 585 (total width), 170 (to grease nipple), 415 (to pressure vent), 105.5 (to shaft), 5.5 (to drain plug), 75 (to oil gauge), 25 (to drain plug), 290 (to center), 270 (to shaft).

Side view dimensions: 444.5 (total height), 75 (to top), 100 (to center), 100 (to shaft), 175 (to drain plug), 345.5 (to center), 75 (to shaft), 4-φ21 drilled holes.

#### 1-LR, 1-LR-0

Front view dimensions: 585 (total width), 170 (to oil supply plug), 415 (to pressure vent), 105.5 (to shaft), 5.5 (to drain plug), 75 (to oil gauge), 25 (to drain plug), 290 (to center), 270 (to shaft).

Side view dimensions: 550 (total height), 550 (to top), 339 (to center), 105.5 (to shaft), 100 (to drain plug), 5.5 (to oil gauge), 75 (to shaft), 340 (to center), 130 (to drain plug), 25 (to shaft), 4-φ21 drilled holes.

#### 1-UD, 1-UD-0

Front view dimensions: 585 (total width), 170 (to grease nipple), 415 (to pressure vent), 105.5 (to shaft), 5.5 (to drain plug), 75 (to oil gauge), 25 (to drain plug), 290 (to center), 270 (to shaft).

Side view dimensions: 550 (total height), 75 (to top), 100 (to center), 104.5 (to shaft), 4.5 (to drain plug), 345.5 (to center), 175 (to shaft), 32 (to drain plug), 25 (to shaft), 4-φ21 drilled holes.

### Transmission capacity table

Size	Rotational speed of lateral shaft rpm	M Speed ratio 1 : 1				B15 Speed ratio 1.5 : 1				B20 Speed ratio 2 : 1						
		Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)	
			N·m	(kgf·m)	Lateral shaft	Cross shaft		N·m	(kgf·m)	Lateral shaft	Cross shaft		N·m	(kgf·m)	Lateral shaft	Cross shaft
ED12	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1750	109.6	586	[59.8]	4851   495	5341   545	65.9	528	[53.9]	5096   520	9212   940	48.3	516	[52.7]	5096   520	9212   940
	1450	96.0	619	[63.2]	5096   520	5586   570	58.3	564	[57.6]	5978   610	10486   1070	40.0	516	[52.7]	5978   610	10486   1070
	1150	81.8	665	[67.9]	5488   560	6076   620	49.2	601	[61.3]	7252   740	12151   1240	31.7	516	[52.7]	7252   740	12151   1240
	870	67.5	726	[74.1]	5880   600	6566   670	40.7	656	[66.9]	8869   905	14504   1480	24.0	516	[52.7]	8869   905	14504   1480
	580	49.7	802	[81.8]	6713   685	7301   745	28.9	699	[71.3]	11466   1170	14504   1480	16.3	524	[53.5]	11466   1170	14504   1480
	300	26.8	835	[85.2]	8232   840	9065   925	15.5	724	[73.9]	11858   1210	14504   1480	8.71	543	[55.4]	11858   1210	14504   1480
	100	9.36	875	[89.3]	11368   1160	12593   1285	5.37	754	[76.9]	11858   1210	14504   1480	3.01	563	[57.4]	11858   1210	14504   1480
	10	0.98	919	[93.8]	11858   1210	14504   1480	0.56	785	[80.1]	11858   1210	14504   1480	0.31	586	[59.8]	11858   1210	14504   1480

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of [ ], the specification with forced lubrication might be necessary. In such a case, please consult our company.

Note 3) In the case of a rotational speed between a rotational speed of [ ] and a lower rotational speed, also please consult our company.

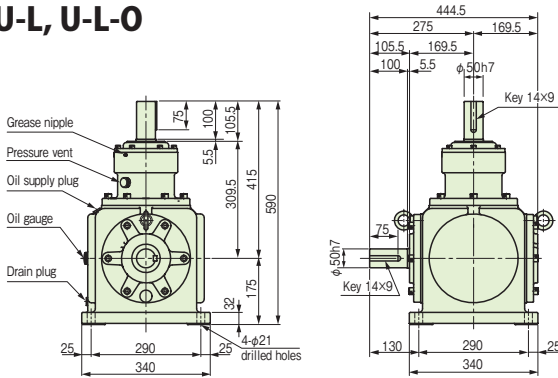
Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

45

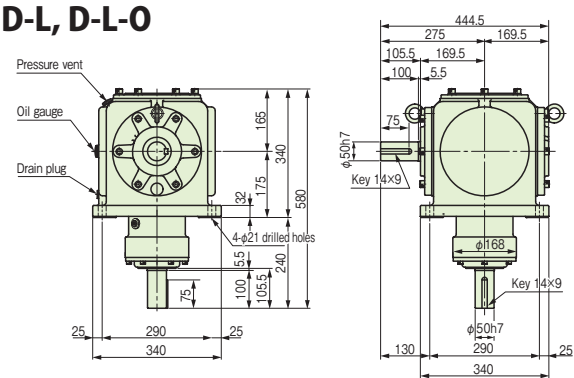
Approximate mass : 124kg    Approximate oil quantity : 7.0L

\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

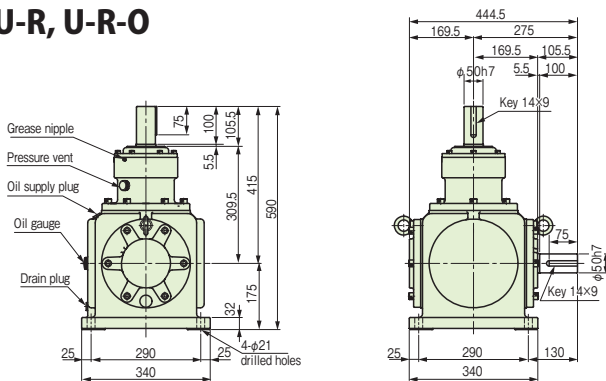
**U-L, U-L-0**



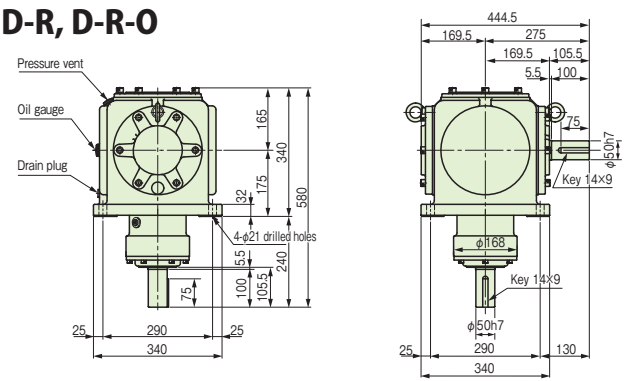
**D-L, D-L-0**



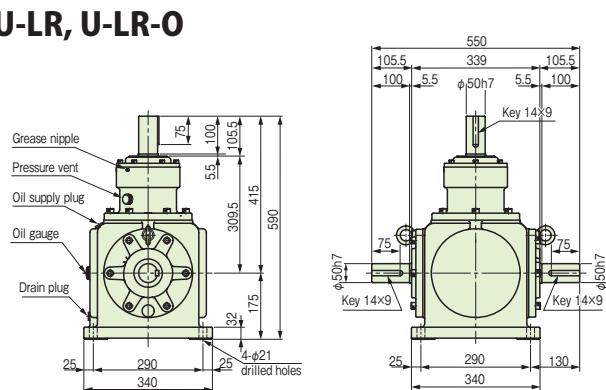
**U-R, U-R-0**



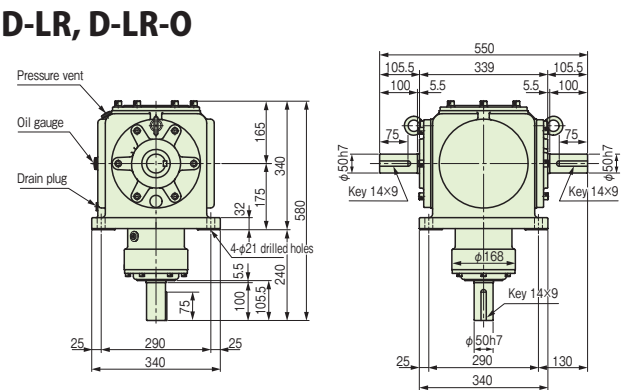
**D-R, D-R-0**



**U-LR, U-LR-0**

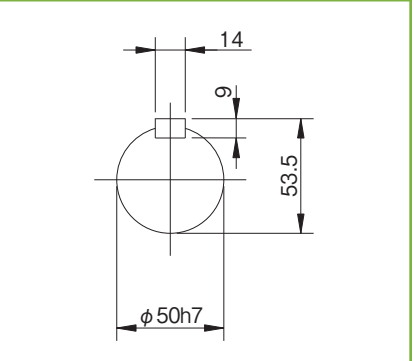


**D-LR, D-LR-0**



Input kW	B25 Speed ratio 2.5 : 1				B30 Speed ratio 3 : 1				
	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)	
	N·m	(kgf·m)	Lateral shaft	Cross shaft		N·m	(kgf·m)	Lateral shaft	Cross shaft
—	—	—	—	—	—	—	—	—	—
37.4	500	[51.0]	5096 { 520}	9212 { 940}	28.2	452 [46.1]	5096 { 520}	9212 { 940}	
31.4	507	[51.7]	5978 { 610}	10486 { 1070}	23.6	458 [46.7]	5978 { 610}	10486 { 1070}	
25.3	514	[52.4]	7252 { 740}	12151 { 1240}	19.0	464 [47.3]	7252 { 740}	12151 { 1240}	
19.5	523	[53.4]	8869 { 905}	14504 { 1480}	14.6	469 [47.9]	8869 { 905}	14504 { 1480}	
13.3	535	[54.6]	11466 { 1170}	14504 { 1480}	9.92	480 [49.0]	11466 { 1170}	14504 { 1480}	
7.08	552	[56.3]	11858 { 1210}	14504 { 1480}	5.29	495 [50.5]	11858 { 1210}	14504 { 1480}	
2.43	568	[58.0]	11858 { 1210}	14504 { 1480}	1.82	510 [52.0]	11858 { 1210}	14504 { 1480}	
0.25	588	[60.1]	11858 { 1210}	14504 { 1480}	0.18	527 [53.8]	11858 { 1210}	14504 { 1480}	

**Shaft end detail of lateral shaft, cross shaft**



Type ED

# ED12

## Lateral dual-shaft type

■ Speed ratio : M (1:1), B15 (1.5:1), B20 (2:1), B25 (2.5:1), B30 (3:1)    ■ Type of mounting : Y (T, K1, K2, K3, K4)

### Dimensional drawing

#### 1-1-L, 1-1-L-0

Front view dimensions: 830 (total width), 415 (shaft offset), 105.5 (shaft offset), 309.5 (shaft offset), 309.5 (shaft offset), 105.5 (shaft offset), 100 (shaft offset), 5.5 (shaft offset), 75 (shaft offset), 25 (base offset), 290 (base offset), 340 (base offset), 270 (base offset). Labels: Oil supply plug, Pressure vent, Oil gauge, Drain plug, Key 14x9,  $\phi 50h7$ .

Side view dimensions: 444.5 (total width), 107.5 (shaft offset), 167.5 (shaft offset), 169.5 (shaft offset), 100 (shaft offset), 7.5 (shaft offset), 4.5 (shaft offset), 340 (total height), 165 (total height), 175 (total height), 75 (total height), 32 (total height), 130 (total height), 290 (total height), 340 (total height), 25 (total height), 4- $\phi 21$  drilled holes.

#### 1-1-U, 1-1-U-0

Front view dimensions: 830 (total width), 415 (shaft offset), 105.5 (shaft offset), 309.5 (shaft offset), 309.5 (shaft offset), 105.5 (shaft offset), 100 (shaft offset), 5.5 (shaft offset), 75 (shaft offset), 25 (base offset), 290 (base offset), 340 (base offset), 270 (base offset). Labels: Grease nipple, Pressure vent, Oil supply plug, Oil gauge, Drain plug, 4- $\phi 21$  drilled holes, Key 14x9,  $\phi 50h7$ .

Side view dimensions: 445 (total width), 107.5 (shaft offset), 167.5 (shaft offset), 169.5 (shaft offset), 100 (shaft offset), 7.5 (shaft offset), 4.5 (shaft offset), 340 (total height), 165 (total height), 175 (total height), 75 (total height), 32 (total height), 130 (total height), 290 (total height), 340 (total height), 25 (total height), 4- $\phi 21$  drilled holes.

#### 1-1-R, 1-1-R-0

Front view dimensions: 830 (total width), 415 (shaft offset), 105.5 (shaft offset), 309.5 (shaft offset), 309.5 (shaft offset), 105.5 (shaft offset), 100 (shaft offset), 5.5 (shaft offset), 75 (shaft offset), 25 (base offset), 290 (base offset), 340 (base offset), 270 (base offset). Labels: Oil supply plug, Pressure vent, Oil gauge, Drain plug, Key 14x9,  $\phi 50h7$ .

Side view dimensions: 442.5 (total width), 167.5 (shaft offset), 169.5 (shaft offset), 105.5 (shaft offset), 100 (shaft offset), 5.5 (shaft offset), 100 (shaft offset), 340 (total height), 165 (total height), 175 (total height), 75 (total height), 32 (total height), 130 (total height), 290 (total height), 340 (total height), 25 (total height), 4- $\phi 21$  drilled holes.

#### 1-1-D, 1-1-D-0

Front view dimensions: 830 (total width), 415 (shaft offset), 105.5 (shaft offset), 309.5 (shaft offset), 309.5 (shaft offset), 105.5 (shaft offset), 100 (shaft offset), 5.5 (shaft offset), 75 (shaft offset), 25 (base offset), 290 (base offset), 340 (base offset), 270 (base offset). Labels: Grease nipple, Pressure vent, Oil supply plug, Oil gauge, Drain plug, 4- $\phi 21$  drilled holes, Key 14x9,  $\phi 50h7$ .

Side view dimensions: 445 (total width), 107.5 (shaft offset), 167.5 (shaft offset), 169.5 (shaft offset), 100 (shaft offset), 7.5 (shaft offset), 4.5 (shaft offset), 340 (total height), 165 (total height), 175 (total height), 75 (total height), 32 (total height), 130 (total height), 290 (total height), 340 (total height), 25 (total height), 4- $\phi 21$  drilled holes.

#### 1-1-LR, 1-1-LR-0

Front view dimensions: 830 (total width), 415 (shaft offset), 105.5 (shaft offset), 309.5 (shaft offset), 309.5 (shaft offset), 105.5 (shaft offset), 100 (shaft offset), 5.5 (shaft offset), 75 (shaft offset), 25 (base offset), 290 (base offset), 340 (base offset), 270 (base offset). Labels: Oil supply plug, Pressure vent, Oil gauge, Drain plug, Key 14x9,  $\phi 50h7$ .

Side view dimensions: 550 (total width), 107.5 (shaft offset), 167.5 (shaft offset), 169.5 (shaft offset), 105.5 (shaft offset), 100 (shaft offset), 7.5 (shaft offset), 4.5 (shaft offset), 340 (total height), 165 (total height), 175 (total height), 75 (total height), 32 (total height), 130 (total height), 290 (total height), 340 (total height), 25 (total height), 4- $\phi 21$  drilled holes.

#### 1-1-UD, 1-1-UD-0

Front view dimensions: 830 (total width), 415 (shaft offset), 105.5 (shaft offset), 309.5 (shaft offset), 309.5 (shaft offset), 105.5 (shaft offset), 100 (shaft offset), 5.5 (shaft offset), 75 (shaft offset), 25 (base offset), 290 (base offset), 340 (base offset), 270 (base offset). Labels: Grease nipple, Pressure vent, Oil supply plug, Oil gauge, Drain plug, 4- $\phi 21$  drilled holes, Key 14x9,  $\phi 50h7$ .

Side view dimensions: 550 (total width), 107.5 (shaft offset), 167.5 (shaft offset), 169.5 (shaft offset), 105.5 (shaft offset), 100 (shaft offset), 7.5 (shaft offset), 4.5 (shaft offset), 340 (total height), 165 (total height), 175 (total height), 75 (total height), 32 (total height), 130 (total height), 290 (total height), 340 (total height), 25 (total height), 4- $\phi 21$  drilled holes.

### Transmission capacity table

Size	Rotational speed of lateral shaft rpm	M Speed ratio 1 : 1				B15 Speed ratio 1.5 : 1				B20 Speed ratio 2 : 1						
		Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)	
			N·m	[kgf·m]	Lateral shaft	Cross shaft		N·m	[kgf·m]	Lateral shaft	Cross shaft		N·m	[kgf·m]	Lateral shaft	Cross shaft
ED12	3000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	1750	76.7	410	[41.8]	4851   495	5341   545	46.1	369	[37.7]	5096   520	9212   940	33.8	361	[36.8]	5096   520	9212   940
	1450	67.2	433	[44.2]	5096   520	5586   570	40.8	394	[40.2]	5978   610	10486   1070	28.0	361	[36.8]	5978   610	10486   1070
	1150	57.2	465	[47.5]	5488   560	6076   620	34.4	420	[42.9]	7252   740	12151   1240	22.1	361	[36.8]	7252   740	12151   1240
	870	47.2	508	[51.8]	5880   600	6566   670	28.4	459	[46.8]	8869   905	14504   1480	16.8	361	[36.8]	8869   905	14504   1480
	580	34.7	561	[57.2]	6713   685	7301   745	20.2	489	[49.9]	11466   1170	14504   1480	11.4	366	[37.4]	11466   1170	14504   1480
	300	18.7	584	[59.6]	8232   840	9065   925	10.8	506	[51.7]	11858   1210	14504   1480	6.09	380	[38.7]	11858   1210	14504   1480
	100	6.55	612	[62.5]	11368   1160	12593   1285	3.75	527	[53.8]	11858   1210	14504   1480	2.10	394	[40.2]	11858   1210	14504   1480
	10	0.68	643	[65.6]	11858   1210	14504   1480	0.39	549	[56.0]	11858   1210	14504   1480	0.21	410	[41.8]	11858   1210	14504   1480

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of  , the specification with forced lubrication might be necessary. In such a case, please consult our company.

Note 3) In the case of a rotational speed between a rotational speed of   and a lower rotational speed, also please consult our company.

Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

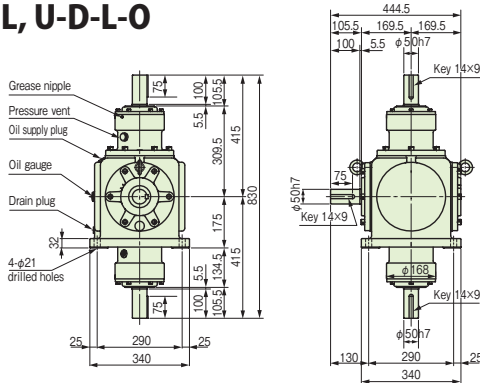
47



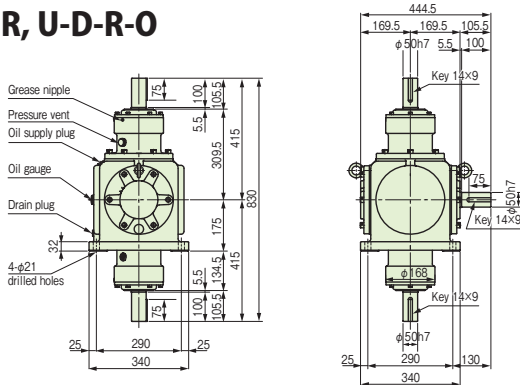
Approximate mass : 159kg    Approximate oil quantity : 7.4L

\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

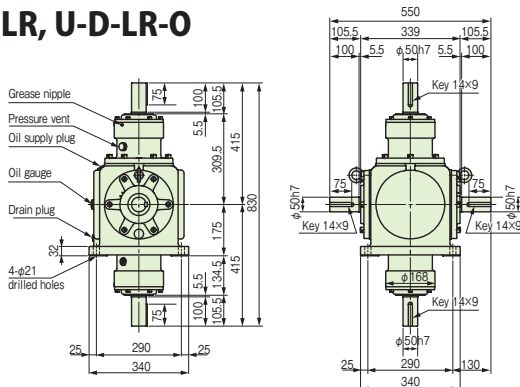
### U-D-L, U-D-L-O



### U-D-R, U-D-R-O

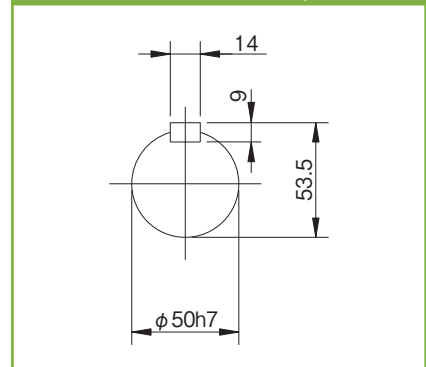


### U-D-LR, U-D-LR-O



B25 Speed ratio 2.5 : 1					B30 Speed ratio 3 : 1								
Input kW	Cross shaft torque		Allowable radial load N (kgf)		Input kW	Cross shaft torque		Allowable radial load N (kgf)					
	N·m	(kgf·m)	Lateral shaft	Cross shaft		N·m	(kgf·m)	Lateral shaft	Cross shaft				
—	—	—	—	—	—	—	—	—	—				
26.1	350	[35.7]	5096	{ 520}	9212	{ 940}	19.7	316	[32.2]	5096	{ 520}	9212	{ 940}
21.9	354	[36.2]	5978	{ 610}	10486	{1070}	16.5	320	[32.7]	5978	{ 610}	10486	{1070}
17.7	359	[36.7]	7252	{ 740}	12151	{1240}	13.3	324	[33.1]	7252	{ 740}	12151	{1240}
13.6	366	[37.3]	8869	{ 905}	14504	{1480}	10.2	328	[33.5]	8869	{ 905}	14504	{1480}
9.31	374	[38.2]	11466	{1170}	14504	{1480}	6.94	336	[34.2]	11466	{1170}	14504	{1480}
4.95	386	[39.4]	11858	{1210}	14504	{1480}	3.70	346	[35.3]	11858	{1210}	14504	{1480}
1.70	397	[40.5]	11858	{1210}	14504	{1480}	1.27	357	[36.4]	11858	{1210}	14504	{1480}
0.17	411	[42.0]	11858	{1210}	14504	{1480}	0.12	368	[37.6]	11858	{1210}	14504	{1480}

#### Shaft end detail of lateral shaft, cross shaft

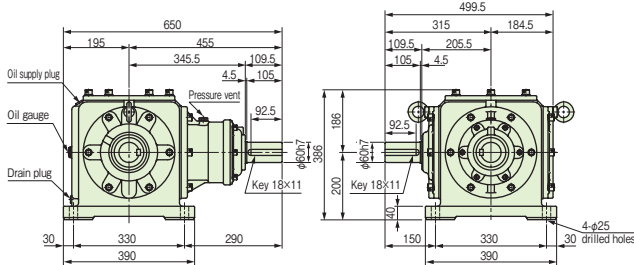


# ED16 Lateral single-shaft type

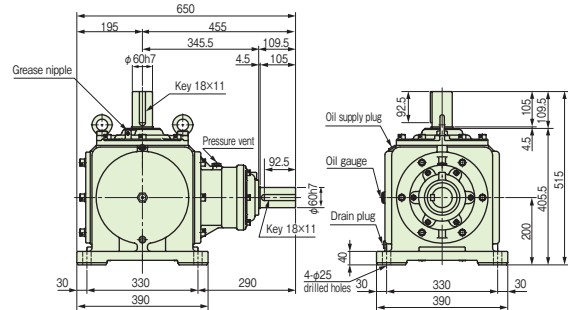
■ Speed ratio : M (1 : 1), B20 (2 : 1) ■ Type of mounting : Y (T, K1, K2, K3, K4)

## Dimensional drawing

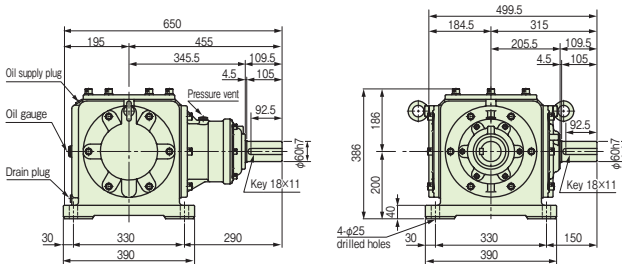
### 1-L, 1-L-O



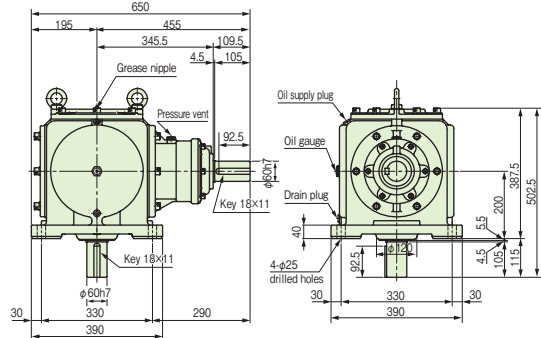
### 1-U, 1-U-O



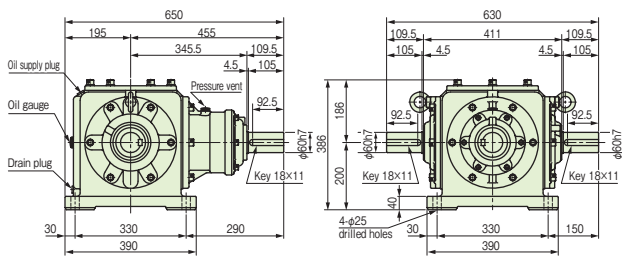
### 1-R, 1-R-O



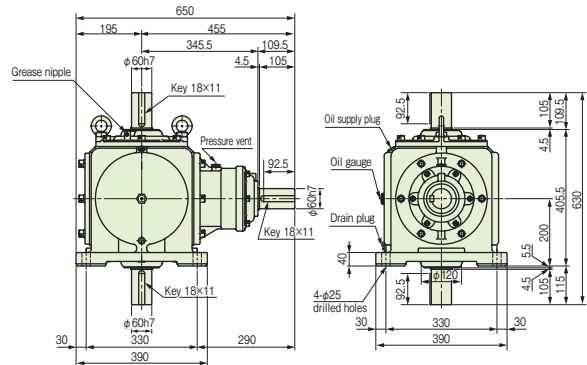
### 1-D, 1-D-O



### 1-LR, 1-LR-O



### 1-UD, 1-UD-O



## Transmission capacity table

Size	Rotational speed of lateral shaft rpm	M Speed ratio 1 : 1				B20 Speed ratio 2 : 1					
		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}	
			N·m {kgf·m}	Lateral shaft	Cross shaft	N·m {kgf·m}		Lateral shaft	Cross shaft		
ED16	3000	—	—	—	—	—	—	—	—	—	—
	2000	—	—	—	—	—	—	—	—	—	—
	1750	—	—	—	—	87.7	908 { 92.7 }	5439 { 555 }	10339 { 1055 }	—	—
	1450	163	1091 { 104 }	10633 { 1085 }	10976 { 1120 }	73.7	921 { 94.0 }	5978 { 610 }	12152 { 1240 }	—	—
	1150	139	1098 { 112 }	11368 { 1160 }	11760 { 1200 }	59.5	938 { 95.7 }	6419 { 655 }	13083 { 1335 }	—	—
	870	114	1186 { 121 }	12446 { 1270 }	12740 { 1300 }	46.0	958 { 97.8 }	6958 { 710 }	14210 { 1450 }	—	—
	580	85.9	1343 { 137 }	14014 { 1430 }	14504 { 1480 }	31.3	980 { 100 }	7840 { 800 }	16072 { 1640 }	—	—
	300	54.1	1637 { 167 }	17150 { 1750 }	17640 { 1800 }	16.7	1009 { 103 }	9604 { 980 }	19600 { 2000 }	—	—
	100	20.3	1842 { 188 }	22540 { 2300 }	22540 { 2300 }	5.84	1058 { 108 }	13328 { 1360 }	22540 { 2300 }	—	—
	10	2.14	1940 { 198 }	22540 { 2300 }	22540 { 2300 }	0.60	1098 { 112 }	22540 { 2300 }	22540 { 2300 }	—	—

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of  , the specification with forced lubrication might be necessary. In such a case, please consult our company.

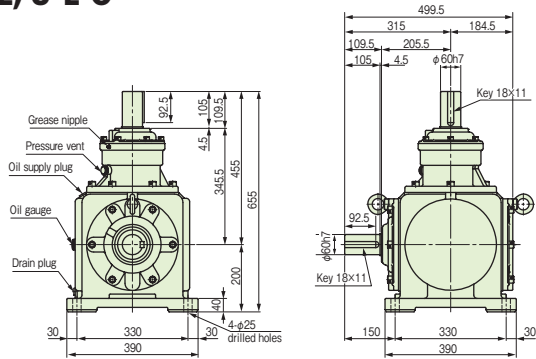
Note 3) In the case of a rotational speed between a rotational speed of   and a lower rotational speed, also please consult our company.

Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

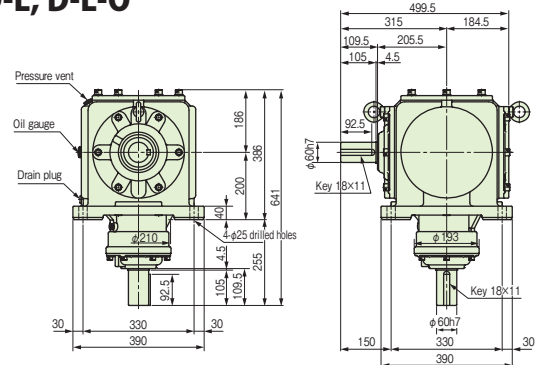
Approximate mass : 188kg    Approximate oil quantity : 10L

\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

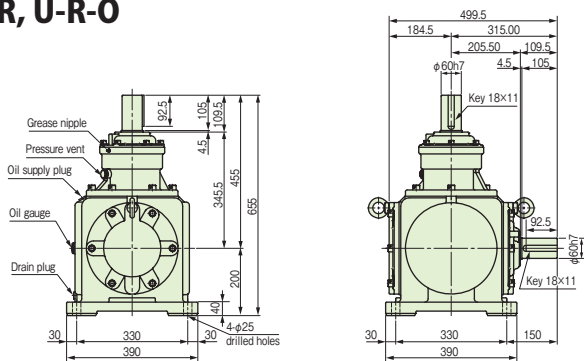
### U-L, U-L-O



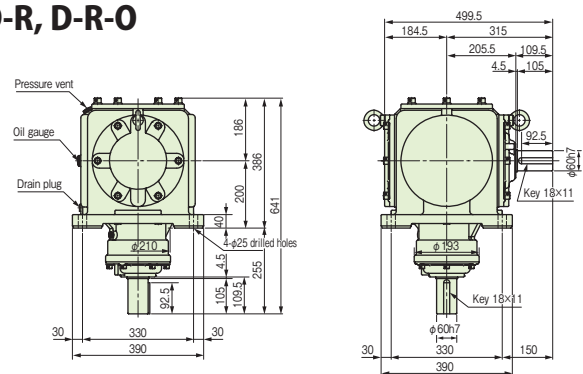
### D-L, D-L-O



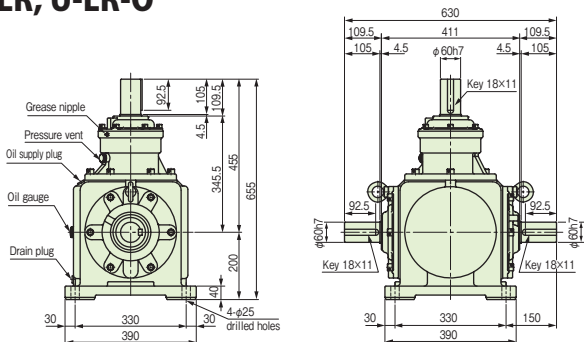
### U-R, U-R-O



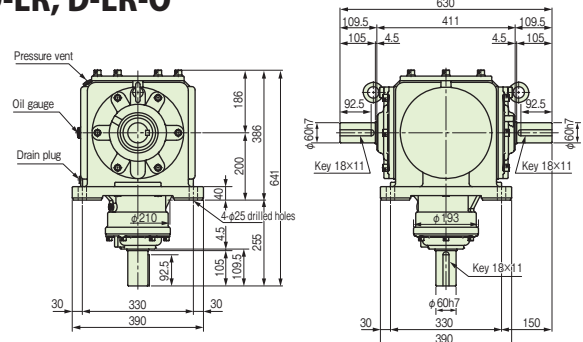
### D-R, D-R-O



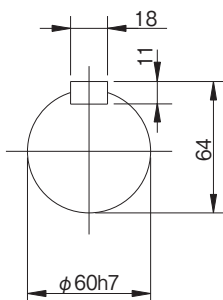
### U-LR, U-LR-O



### D-LR, D-LR-O



#### Shaft end detail of lateral shaft, cross shaft

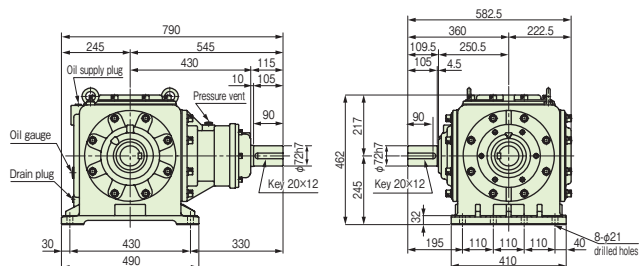


# ED20 Lateral single-shaft type

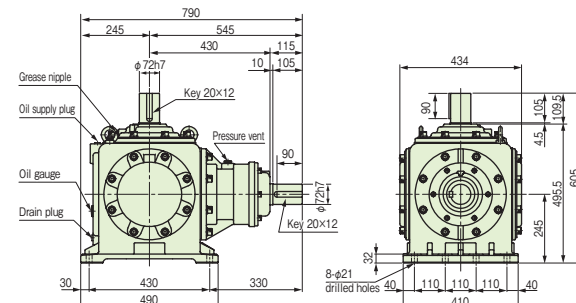
■ Speed ratio : M (1 : 1), B20 (2 : 1) ■ Type of mounting : Y (T, K1, K2, K3, K4)

## Dimensional drawing

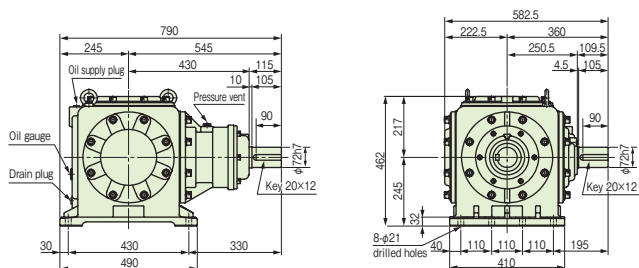
### 1-L, 1-L-0



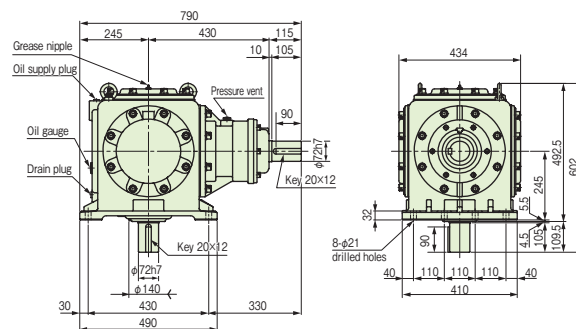
### 1-U, 1-U-0



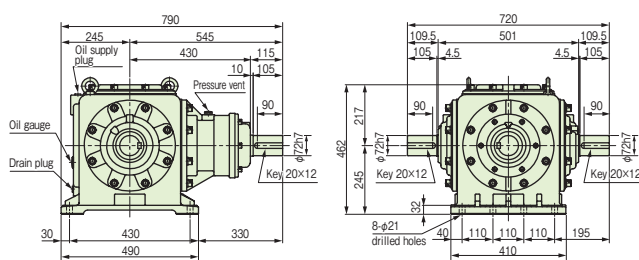
### 1-R, 1-R-0



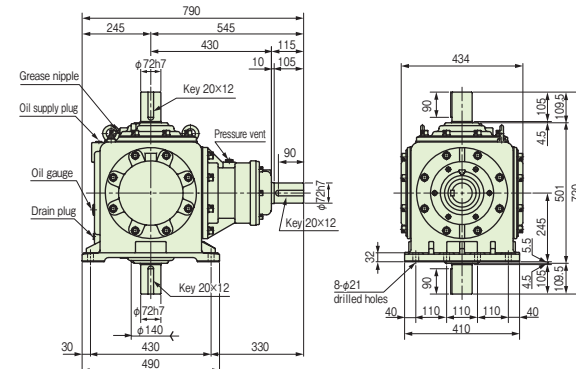
### 1-D, 1-D-0



### 1-LR, 1-LR-0



### 1-UD, 1-UD-0



## Transmission capacity table

Size	Rotational speed of lateral shaft rpm r/min	M Speed ratio 1 : 1				B20 Speed ratio 2 : 1						
		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}		
			N · m	{kgf · m}	Lateral shaft	Cross shaft		N · m	{kgf · m}	Lateral shaft	Cross shaft	
ED20	3000	—	—	—	—	—	—	—	—	—	—	
	2000	—	—	—	—	—	—	—	—	—	—	
	1750	—	—	—	—	—	—	—	—	—	—	
	1450	—	—	—	—	126	1578 {161}	7693 {785}	14602 {1490}	—	—	—
	1150	234	1842 {188}	15386 {1570}	15680 {1600}	102	1607 {164}	8771 {895}	17934 {1830}	—	—	—
	870	193	2009 {205}	16660 {1700}	17150 {1750}	79.0	1646 {168}	9506 {970}	19453 {1985}	—	—	—
	580	145	2274 {232}	18816 {1920}	19404 {1980}	54.2	1695 {173}	10780 {1100}	22001 {2245}	—	—	—
	300	90.8	2744 {280}	23422 {2390}	24108 {2460}	29.0	1754 {179}	13132 {1340}	27342 {2790}	—	—	—
	100	35.3	3205 {327}	28420 {2900}	32928 {3360}	10.1	1833 {187}	18228 {1860}	33320 {3400}	—	—	—
	10	3.53	3205 {327}	28420 {2900}	33320 {3400}	1.06	1921 {196}	28420 {2900}	33320 {3400}	—	—	—

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of [ ], the specification with forced lubrication might be necessary. In such a case, please consult our company.

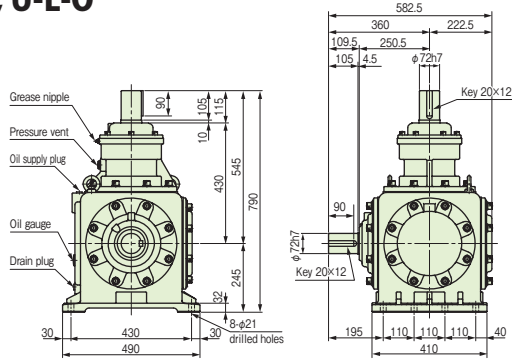
Note 3) In the case of a rotational speed between a rotational speed of [ ] and a lower rotational speed, also please consult our company.

Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

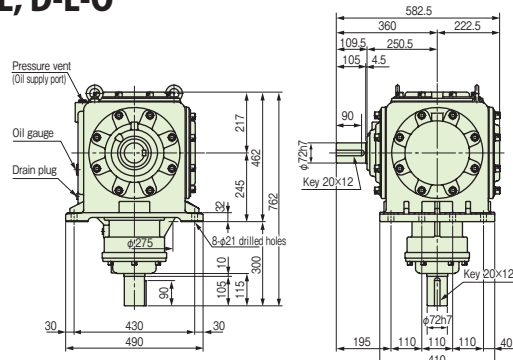
Approximate mass : 297kg    Approximate oil quantity : 11L

\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

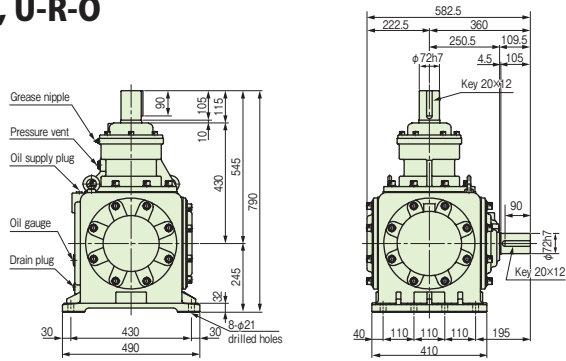
### U-L, U-L-0



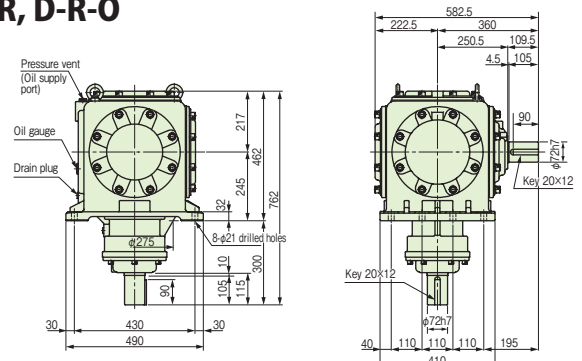
### D-L, D-L-0



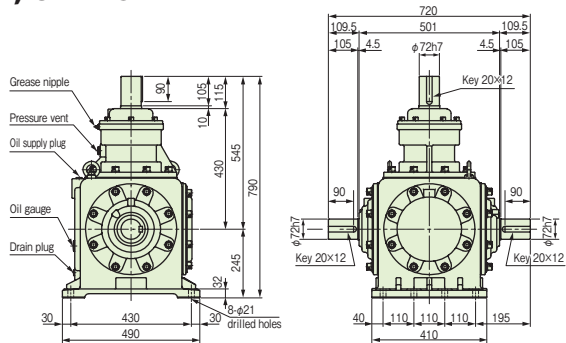
### U-R, U-R-0



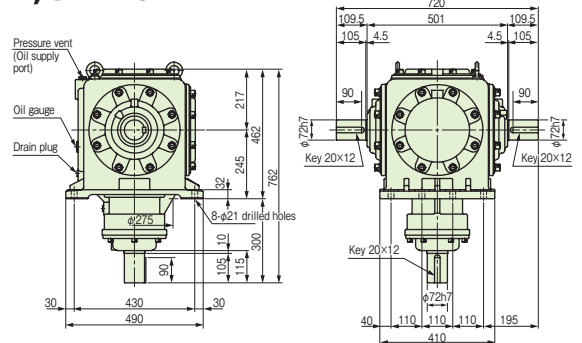
### D-R, D-R-0



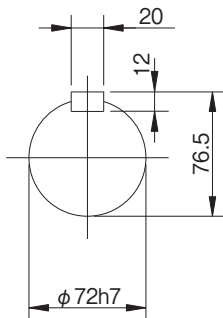
### U-LR, U-LR-0



### D-LR, D-LR-0



#### Shaft end detail of lateral shaft, cross shaft

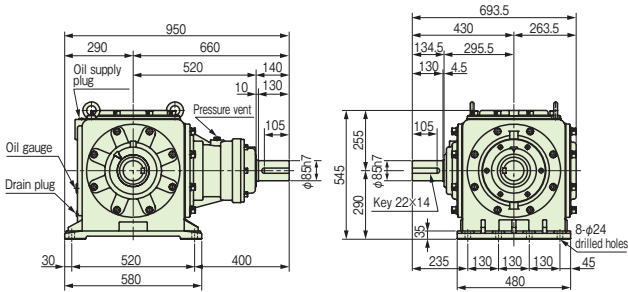


# ED25 Lateral single-shaft type

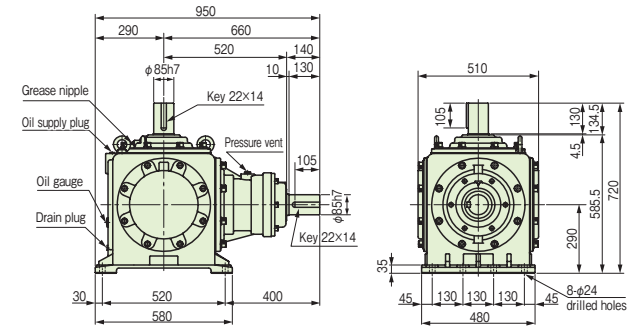
■ Speed ratio : M (1 : 1), B20 (2 : 1) ■ Type of mounting : Y (T, K1, K2, K3, K4)

## Dimensional drawing

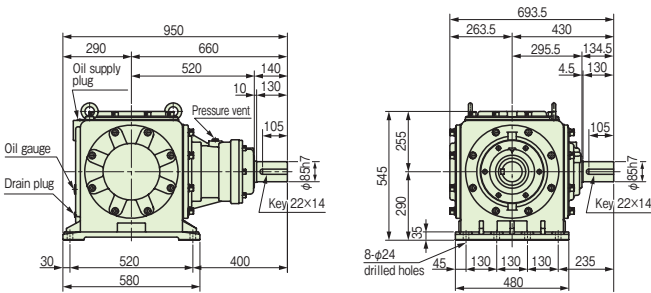
### 1-L, 1-L-0



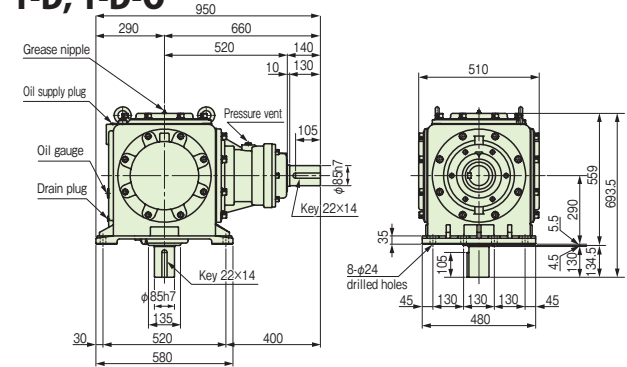
### 1-U, 1-U-0



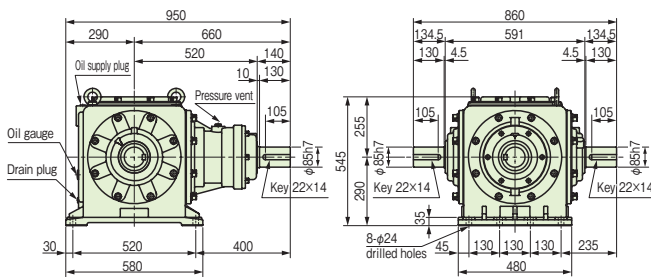
### 1-R, 1-R-0



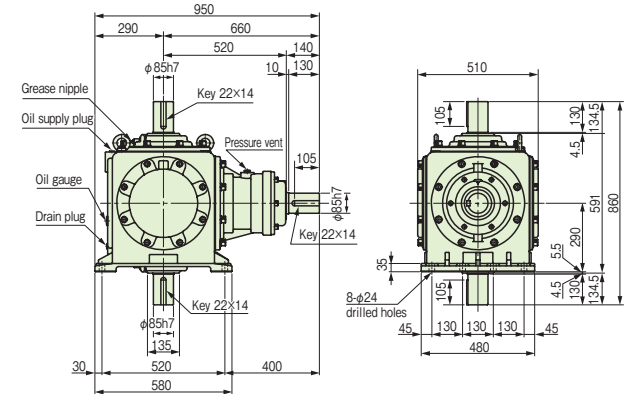
### 1-D, 1-D-0



### 1-LR, 1-LR-0



### 1-UD, 1-UD-0



## Transmission capacity table

Size	Rotational speed of lateral shaft rpm r/min	M Speed ratio 1 : 1				B20 Speed ratio 2 : 1						
		Input kW	Cross shaft torque		Allowable radial load N {kgf}		Input kW	Cross shaft torque		Allowable radial load N {kgf}		
			N · m	{kgf · m}	Lateral shaft	Cross shaft		N · m	{kgf · m}	Lateral shaft	Cross shaft	
ED25	3000	—	—	—	—	—	—	—	—	—	—	
	2000	—	—	—	—	—	—	—	—	—	—	
	1750	—	—	—	—	—	—	—	—	—	—	
	1450	—	—	—	—	—	—	—	—	—	—	
	1150	—	—	—	—	199	3146 {321}	12985 {1325}	24647 {2515}	—	—	—
	870	335	3489 {356}	24794 {2530}	25480 {2600}	155	3224 {329}	13573 {1385}	29400 {3000}	—	—	—
	580	252	3940 {402}	28028 {2860}	28910 {2950}	107	3332 {340}	15680 {1600}	33222 {3390}	—	—	—
	300	159	4792 {489}	34300 {3500}	35280 {3600}	57.5	3479 {355}	19159 {1955}	40474 {4130}	—	—	—
	100	60.0	5439 {555}	39200 {4000}	49000 {5000}	20.1	3646 {372}	26656 {2720}	49000 {5000}	—	—	—
10	6.30	5713 {583}	39200 {4000}	49000 {5000}	2.11	3822 {390}	39200 {4000}	49000 {5000}	—	—	—	

Note 1) For a case between the respective rotational speeds of the lateral shaft, calculate the values by interpolation. Furthermore, when the rotational speed of the lateral shaft is less than 10 rpm, use it with the torque at 10 rpm.

Note 2) When it is used under conditions exceeding the rotational speed of [ ], the specification with forced lubrication might be necessary. In such a case, please consult our company.

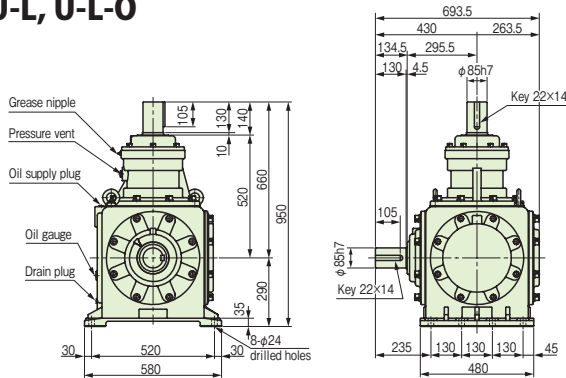
Note 3) In the case of a rotational speed between a rotational speed of [ ] and a lower rotational speed, also please consult our company.

Note 4) For the operating position of radial load, refer to the item on Selection (p.15).

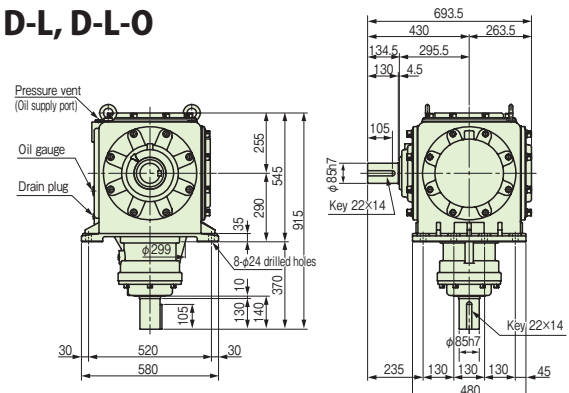
Approximate mass : 488kg    Approximate oil quantity : 18L

\* Positions of each plug, oil gauge, and grease nipple correspond to mounting type Y. \* Phase of the key groove does not always match.

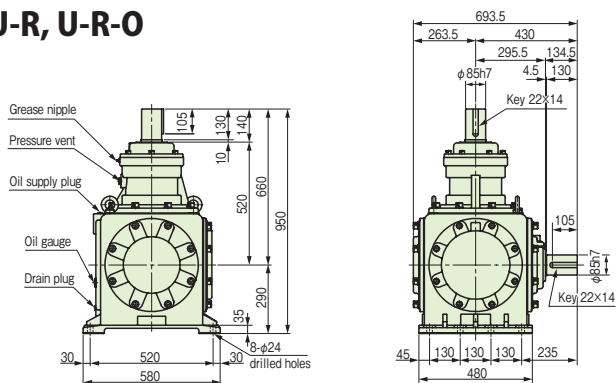
### U-L, U-L-O



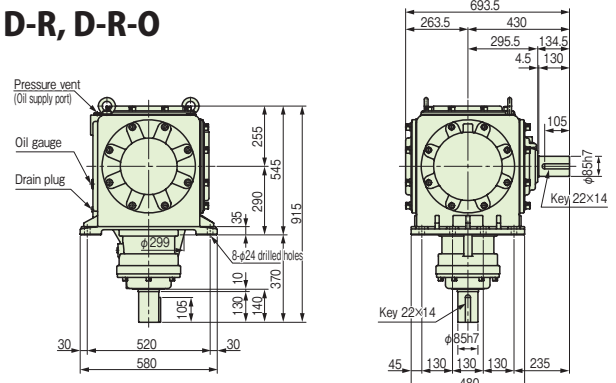
### D-L, D-L-O



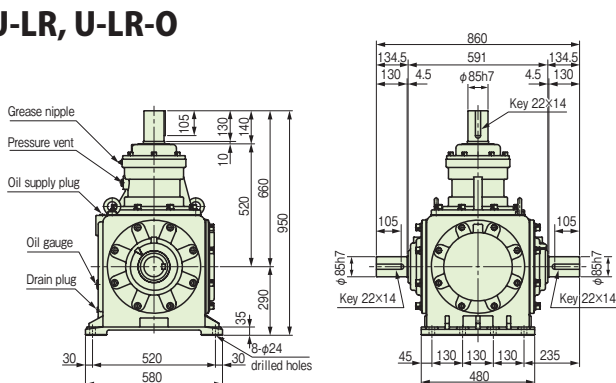
### U-R, U-R-O



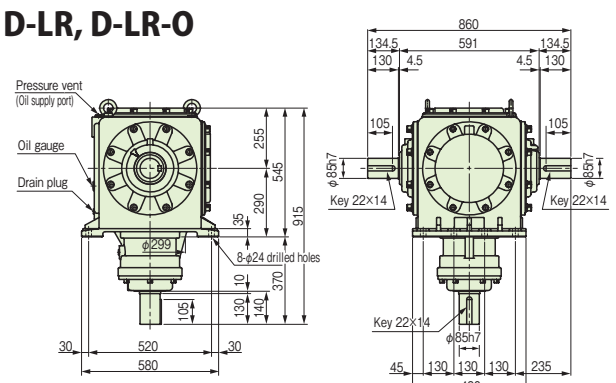
### D-R, D-R-O



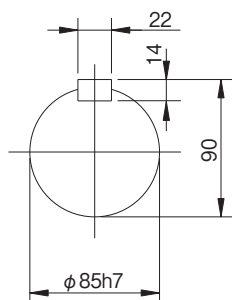
### U-LR, U-LR-O



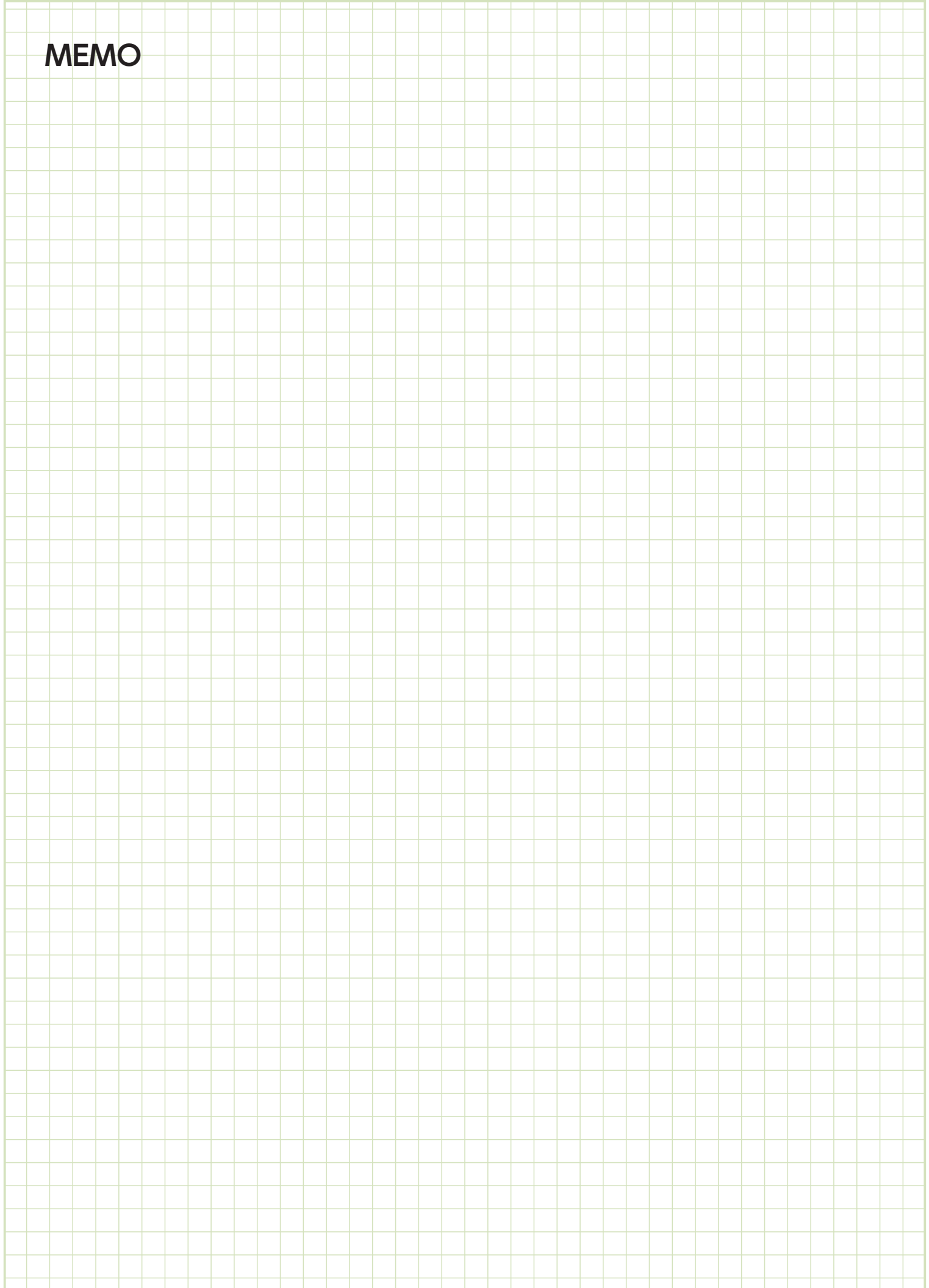
### D-LR, D-LR-O



#### Shaft end detail of lateral shaft, cross shaft



# MEMO





# Type ARA

## C O N T E N T S

Features, Model list, Standard specification .....	p.57
Indication of model number, Selection .....	p.58
Transmission capacity table, Dimensional drawing .....	p.59

## Type ARA

# Features, Model list, Standard specification

## Features

### Compact, lightweight, fine

Aluminum die-casting (ADC) is adopted for the casing.

### Corrosion resistance

Stainless steel (SUS304) which has excellent corrosion resistance is adopted for the shaft material.

### Universal mounting

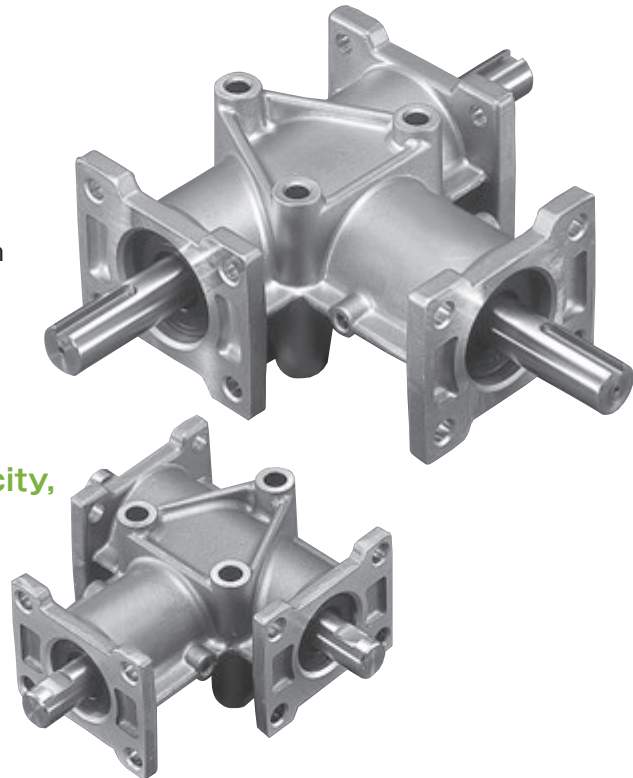
It can be mounted in all directions, and mounting is also easy.

### High efficiency, high transmission capacity, low noise, low vibratio

Because a high-precision spiral bevel gear is adopted, high performance can be obtained over a wide range.

### Quick delivery

All models are in stock.



## Model list

● : Standard item

ARA	Speed ratio	1 : 1	2 : 1
	3	●	●
5	●	●	
6	●	●	

## Standard specification

Gear box	Speed reduction system	Spiral bevel gear
	Lubrication system	Grease lubrication
	Specification of key	New JIS regular class, JIS B1301-1976 Parallel key (Size 3 is D cut.)
	Material of casing	ADC (Aluminum die-casting)
	Structure of seal	Single oil seal
	Painting specification	No painting
Ambient conditions	Installation site	Indoor
	Ambient temperature	-10° C to 50° C
	Humidity	95% or less
	Altitude	1,000 m or lower
	Atmosphere	There shall be no corrosive or explosive gas, vapor, or dew condensation, and there shall be minimal dust.
Type of mounting		Free mounting direction

# Indication of model number, Selection

## Indication of model number

**ARA 3 10 LR**

Type

Size

Speed ratio

Shaft arrangement • Rotational relationship

Speed ratio  $\begin{cases} 10 = 1 : 1 \\ 20 = 2 : 1 \end{cases}$

## Shaft arrangement • Rotational relationship

	LR type	SN type	SF type
Plug with hole in the rear face A			
Plug with hole in the front face B			

1. Input is possible from both lateral shaft and cross shaft. Furthermore, rotational direction of the input shaft in both right and left directions is possible.
2. In the case of a speed ratio of 2:1, driving from the lateral shaft to cross shaft reduces speed, and when motive power is input from the cross shaft, it increases speed.
3. A and B are identical products.

## Selection

### Selection conditions

- ① Load torque or transmission kW ② Rotational speed at input ③ Speed ratio ④ Characteristics of load ⑤ Frequency of start-stop

### Selection procedure

Make the selection according to the following procedure, considering conditions.

#### 1. Decision on service factor

All transmission capacity tables in the catalog show values with the service factor set at 1.0. Depending on service conditions, decide the service factor using the Service factor table on Table 1.

Table 1 Service factor

Operating time Characteristics of load	2 hrs	10 hrs	24 hrs
Uniform load	1.00 (1.00)	1.00 (1.25)	1.25 (1.50)
Load with some shock	1.00 (1.25)	1.25 (1.50)	1.50 (1.75)
Load with large shock	1.25 (1.50)	1.50 (1.75)	1.75 (2.00)

Note 1) When frequency of starting and stopping is not less than 10 times an hour, or the prime mover is a multi-cylinder engine, use the values in ( ).  
 Note 2) The service factors above are general guidelines. Make a decision considering service conditions.

#### 2. Decision on corrected torque or corrected kW

Decide corrected torque or corrected kW considering the service factor (Table 1).

Corrected torque or Corrected kW = (Load torque or transmission kW applied to ARA Gear Box) × Service factor (Table 1)

#### 3. Decision of model

- For the rotational speed used, select the size that satisfies corrected torque or corrected kW, from the transmission capacity table (P.59). Furthermore, check whether the peak torque at starting and stopping is kept to within 200% of the transmission capacity of the selected size.
- For the shaft arrangement and rotational relationship, decide the suitable model number from the Shaft arrangement • Rotational relationship above.

#### 4. Confirmation of radial load

When driving is performed in a state with sprocket, gear, or pulley, etc. mounted on the lateral shaft and/or cross shaft, confirm the radial load with the following formula.

#### ■ Formula for confirming radial load

$$\text{Allowable radial load} \geq \frac{T \times f \times L_f}{R}$$

(Allowable radial load → p.64)

T = Corrected torque N•m (kgf•m)  
 f = O.H.L. factor (Table 2)  
 L<sub>f</sub> = Operating position factor (Table 3)  
 R = Pitch circle radius of sprocket, pulley, etc. m

Table 2 O.H.L. factor (f)

Chain	1.00
Gear	1.25
Toothed belt	1.25
V-belt, Strong toothed belt	1.50

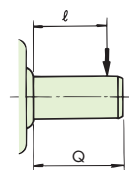


Table 3 Operating position factor (L<sub>f</sub>)

When load is applied to the center of shaft or inside	$l \leq \frac{Q}{2}$	L <sub>f</sub> = 1
When load is applied to outside rather than the center of the shaft	$l > \frac{Q}{2}$	L <sub>f</sub> = $\frac{2l}{Q}$

Q = Length of output shaft end  
 l = Operating position of radial load  
 Note) If radial load and axial load are applied at the same time, please consult our company.

Note) If the formula above is not satisfied as a result of confirming the radial load, it is necessary to increase "R," namely the pitch circle radius of the sprocket, pulley, etc.

# Type ARA

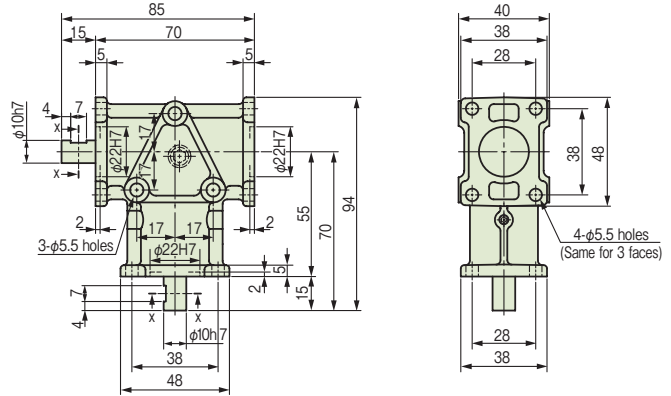
## Transmission capacity table, Dimensional drawing

### ARA3

■ Speed ratio: 10 (1 : 1) 20 (2 : 1) ■ Type of mounting: Free mounting direction

Rotational speed of lateral shaft rpm r/min	1 : 1			2 : 1		
	Input kW	Cross shaft torque N·m {kgf·m}		Input kW	Cross shaft torque N·m {kgf·m}	
3600	0.52	1.37 {0.14}		0.28	1.37 {0.14}	
2750	0.45	1.47 {0.15}		0.24	1.56 {0.16}	
1900	0.37	1.76 {0.18}		0.18	1.66 {0.17}	
1750	0.36	1.96 {0.20}		0.17	1.76 {0.18}	
1450	0.31	1.96 {0.20}		0.14	1.76 {0.18}	
1150	0.28	2.25 {0.23}		0.11	1.76 {0.18}	
870	0.24	2.55 {0.26}		0.08	1.76 {0.18}	
580	0.18	2.94 {0.30}		0.05	1.76 {0.18}	
400	0.14	3.23 {0.33}		0.04	1.76 {0.18}	
300	0.12	3.72 {0.38}		0.03	1.76 {0.18}	
200	0.08	3.72 {0.38}		0.02	1.76 {0.18}	
150	0.06	3.72 {0.38}		0.014	1.76 {0.18}	
100	0.04	3.72 {0.38}		0.010	1.76 {0.18}	
50	0.02	3.72 {0.38}		0.005	1.76 {0.18}	

SN

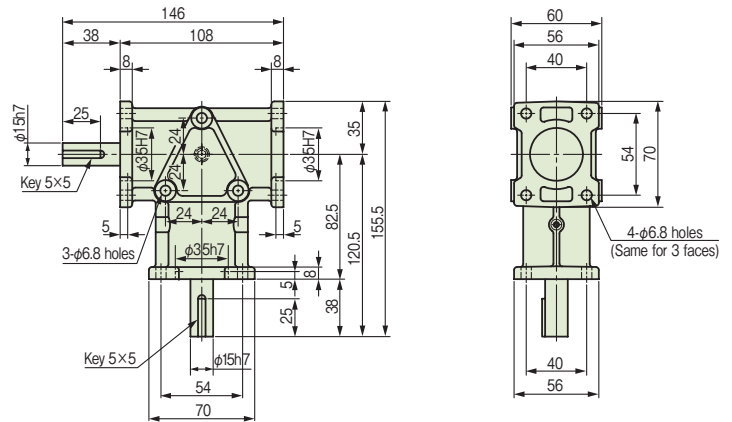


### ARA5

■ Speed ratio: 10 (1 : 1) 20 (2 : 1) ■ Type of mounting: Free mounting direction

Rotational speed of lateral shaft rpm r/min	1 : 1			2 : 1		
	Input kW	Cross shaft torque N·m {kgf·m}		Input kW	Cross shaft torque N·m {kgf·m}	
3600	2.11	5.49 {0.56}		1.35	6.95 {0.71}	
2750	1.82	6.17 {0.63}		1.03	6.95 {0.71}	
1900	1.45	7.15 {0.73}		0.71	6.95 {0.71}	
1750	1.34	7.15 {0.73}		0.66	6.95 {0.71}	
1450	1.11	7.15 {0.73}		0.55	6.95 {0.71}	
1150	0.88	7.15 {0.73}		0.43	6.95 {0.71}	
870	0.66	7.15 {0.73}		0.33	6.95 {0.71}	
580	0.44	7.15 {0.73}		0.22	6.95 {0.71}	
400	0.30	7.15 {0.73}		0.15	6.95 {0.71}	
300	0.23	7.15 {0.73}		0.11	6.95 {0.71}	
200	0.15	7.15 {0.73}		0.075	6.95 {0.71}	
150	0.11	7.15 {0.73}		0.056	6.95 {0.71}	
100	0.08	7.15 {0.73}		0.038	6.95 {0.71}	
50	0.04	7.15 {0.73}		0.018	6.95 {0.71}	

SN

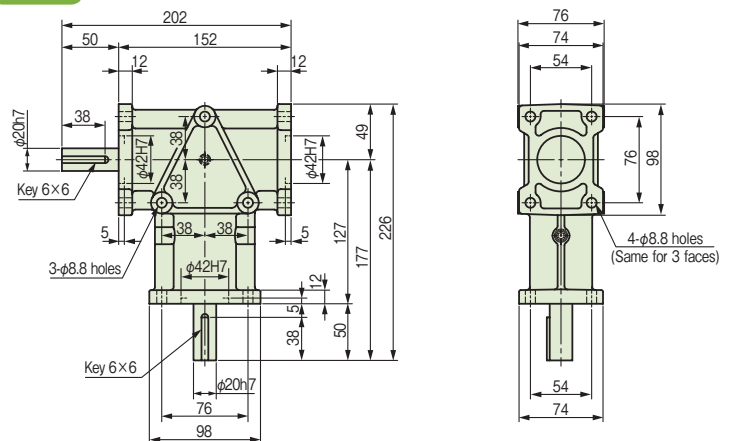


### ARA6

■ Speed ratio: 10 (1 : 1) 20 (2 : 1) ■ Type of mounting: Free mounting direction

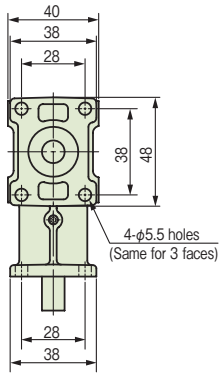
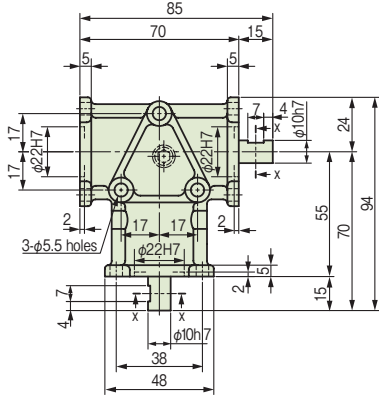
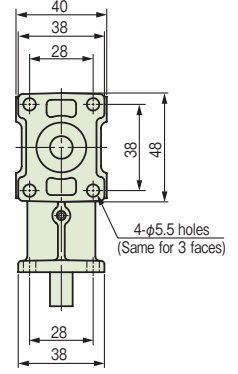
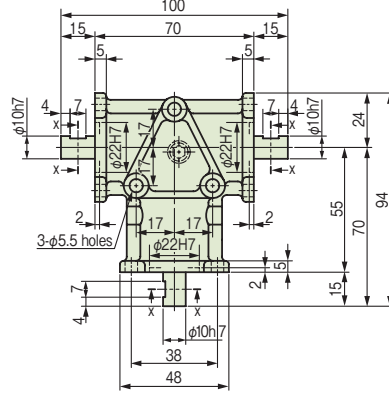
Rotational speed of lateral shaft rpm r/min	1 : 1			2 : 1		
	Input kW	Cross shaft torque N·m {kgf·m}		Input kW	Cross shaft torque N·m {kgf·m}	
3600	3.15	8.13 {0.83}		1.81	9.41 {0.96}	
2750	2.75	9.31 {0.95}		1.58	10.78 {1.10}	
1900	2.26	11.07 {1.13}		1.22	11.96 {1.22}	
1750	2.19	11.66 {1.19}		1.12	11.96 {1.22}	
1450	1.92	12.25 {1.25}		0.94	11.96 {1.22}	
1150	1.73	14.01 {1.43}		0.74	11.96 {1.22}	
870	1.47	15.78 {1.61}		0.56	11.96 {1.22}	
580	1.10	17.74 {1.81}		0.37	11.96 {1.22}	
400	0.76	17.74 {1.81}		0.26	11.96 {1.22}	
300	0.57	17.74 {1.81}		0.19	11.96 {1.22}	
200	0.38	17.74 {1.81}		0.13	11.96 {1.22}	
150	0.28	17.74 {1.81}		0.10	11.96 {1.22}	
100	0.19	17.74 {1.81}		0.064	11.96 {1.22}	
50	0.095	17.74 {1.81}		0.032	11.96 {1.22}	

SN

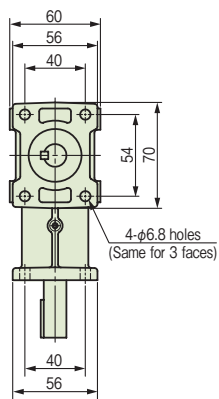
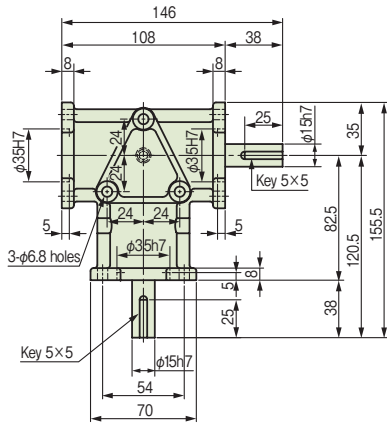
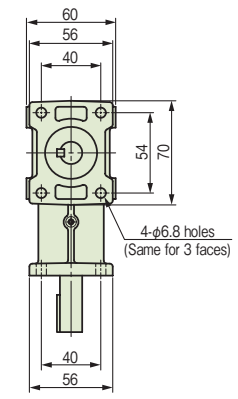
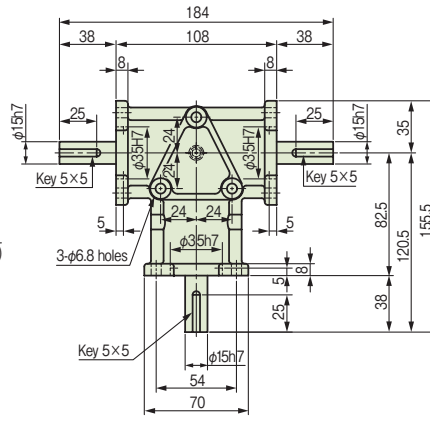


Type ARA

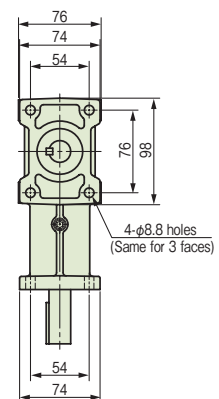
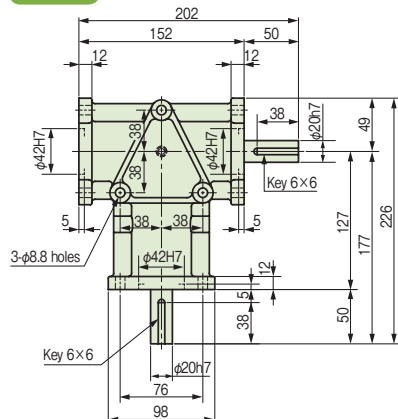
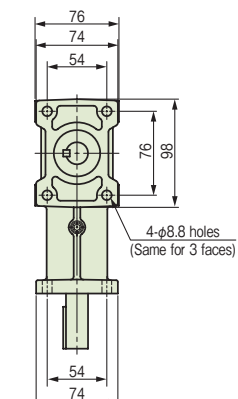
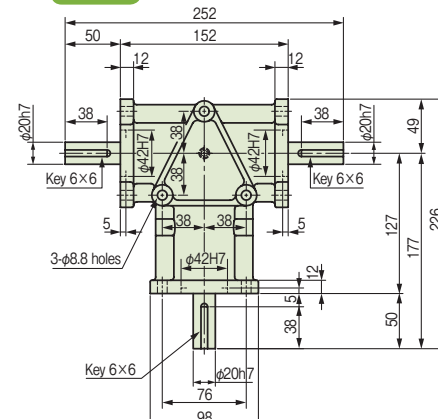
Approximate mass: 0.4 kg

**SF****LR**

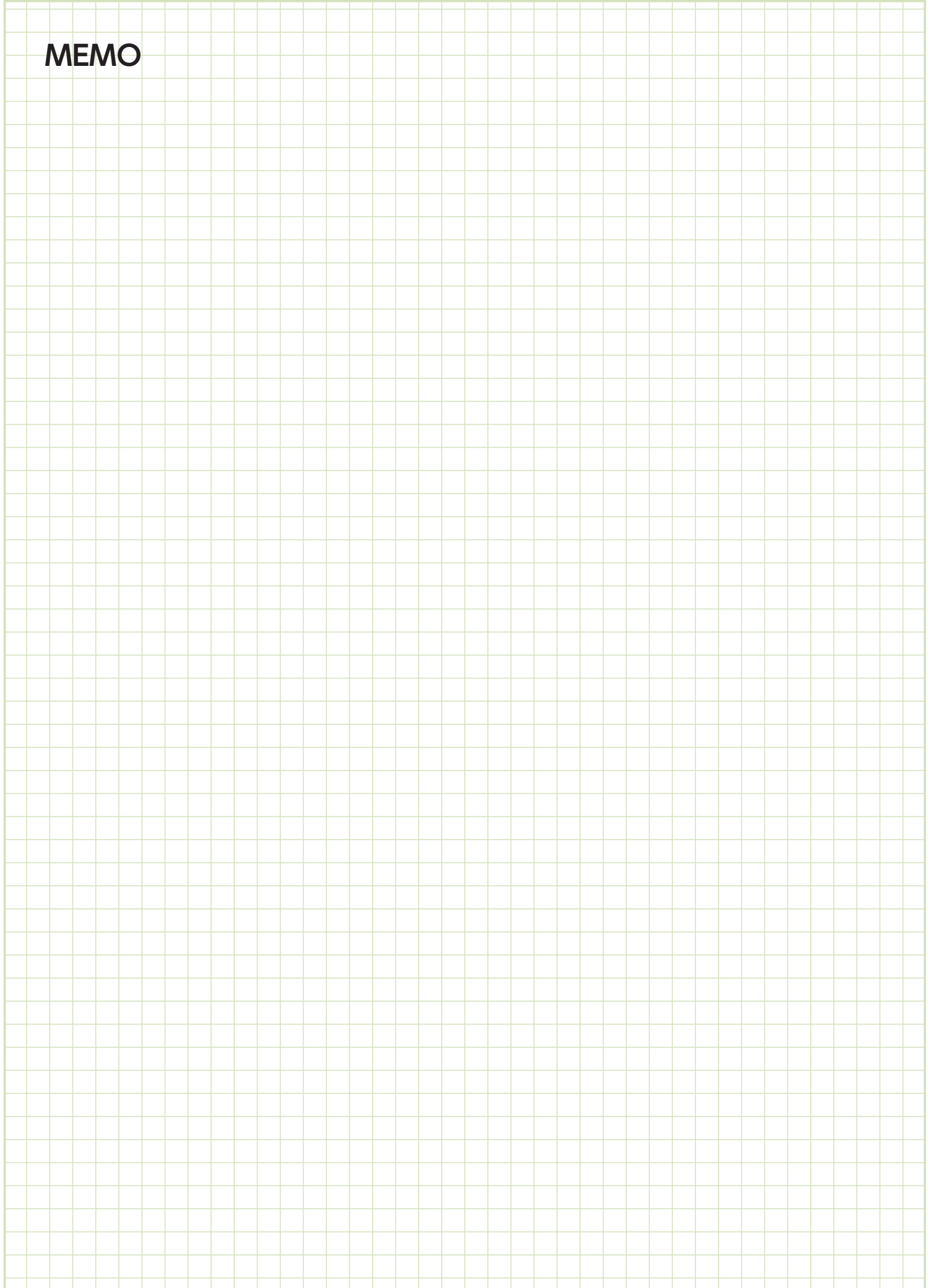
Approximate mass: 1.3 kg

**SF****LR**

Approximate mass: 3.1 kg

**SF****LR**

# MEMO



# Technical document

## C O N T E N T S

Technical data ·····	p.63
Option ·····	p.66
Special specification ·····	p.69
Handling ·····	p.73
Confirmation sheet for selected specification ·····	p.78

# Technical data

## 1. Efficiency

The type ED and type ARA maintain high levels of efficiency because they adopt a high-precision spiral bevel gear.

① ED2 to ED12: 98% ② ED16 to ED25: 95% ③ ARA3 to ARA6: 98%

However, it varies depending on rotational speed, ambient temperature, and load factor.

## 2. Backlash

Denotes the total value of the mechanical clearance that can be measured in the rotational direction on the cross shaft when the lateral shaft is fixed.

### 2-1. Type ED

Speed ratio	1 : 1	1.5 : 1	2 : 1	2.5 : 1	3 : 1
2	0.20 ~ 1.51	—	—	—	—
4	0.15 ~ 1.16	—	0.12 ~ 0.65	—	—
6	0.19 ~ 1.00	0.17 ~ 0.85	0.17 ~ 0.59	0.09 ~ 0.51	0.09 ~ 0.51
7	0.24 ~ 0.94	0.17 ~ 0.79	0.15 ~ 0.50	0.17 ~ 0.53	0.08 ~ 0.45
8	0.19 ~ 0.82	0.14 ~ 0.70	0.12 ~ 0.45	0.14 ~ 0.47	0.07 ~ 0.40

Speed ratio	1 : 1	1.5 : 1	2 : 1	2.5 : 1	3 : 1
10	0.18 ~ 0.75	0.16 ~ 0.65	0.11 ~ 0.58	0.12 ~ 0.42	0.12 ~ 0.42
12	0.16 ~ 0.65	0.13 ~ 0.57	0.12 ~ 0.53	0.13 ~ 0.40	0.10 ~ 0.37
16	0.16 ~ 0.66	—	0.12 ~ 0.51	—	—
20	0.16 ~ 0.60	—	0.09 ~ 0.43	—	—
25	0.15 ~ 0.53	—	0.09 ~ 0.38	—	—

Note) When positional accuracy is required, a product with a "low-backlash specification" can be manufactured. (Refer to p.72.)

### 2-2. Type ARA

Speed ratio	10 (1 : 1)	20 (2 : 1)
3	0.31 ~ 1.97	0.31 ~ 1.75
5	0.24 ~ 1.42	0.19 ~ 1.15
6	0.18 ~ 1.16	0.16 ~ 0.94

## 3. Moment of inertia {GD<sup>2</sup>} converted to lateral shaft

### 3-1. Type ED

Lateral single-shaft type Unit:kg·m<sup>2</sup> {kgf·m<sup>2</sup>}

Speed ratio	1 : 1	1.5 : 1	2 : 1	2.5 : 1	3 : 1
2	0.05 × 10 <sup>-3</sup> {0.20 × 10 <sup>-3</sup> }	—	—	—	—
4	0.15 × 10 <sup>-3</sup> {0.60 × 10 <sup>-3</sup> }	—	0.12 × 10 <sup>-3</sup> {0.48 × 10 <sup>-3</sup> }	—	—
6	1.40 × 10 <sup>-3</sup> {5.60 × 10 <sup>-3</sup> }	0.90 × 10 <sup>-3</sup> {3.60 × 10 <sup>-3</sup> }	0.67 × 10 <sup>-3</sup> {2.68 × 10 <sup>-3</sup> }	0.58 × 10 <sup>-3</sup> {2.32 × 10 <sup>-3</sup> }	0.50 × 10 <sup>-3</sup> {2.00 × 10 <sup>-3</sup> }
7	3.50 × 10 <sup>-3</sup> {14.0 × 10 <sup>-3</sup> }	1.70 × 10 <sup>-3</sup> {6.80 × 10 <sup>-3</sup> }	1.40 × 10 <sup>-3</sup> {5.60 × 10 <sup>-3</sup> }	1.10 × 10 <sup>-3</sup> {4.40 × 10 <sup>-3</sup> }	0.93 × 10 <sup>-3</sup> {3.72 × 10 <sup>-3</sup> }
8	4.80 × 10 <sup>-3</sup> {19.2 × 10 <sup>-3</sup> }	4.30 × 10 <sup>-3</sup> {17.2 × 10 <sup>-3</sup> }	3.50 × 10 <sup>-3</sup> {14.0 × 10 <sup>-3</sup> }	3.20 × 10 <sup>-3</sup> {12.8 × 10 <sup>-3</sup> }	2.90 × 10 <sup>-3</sup> {11.6 × 10 <sup>-3</sup> }
10	23.0 × 10 <sup>-3</sup> {92.0 × 10 <sup>-3</sup> }	9.60 × 10 <sup>-3</sup> {38.4 × 10 <sup>-3</sup> }	6.80 × 10 <sup>-3</sup> {27.2 × 10 <sup>-3</sup> }	5.70 × 10 <sup>-3</sup> {22.8 × 10 <sup>-3</sup> }	4.60 × 10 <sup>-3</sup> {18.4 × 10 <sup>-3</sup> }
12	25.0 × 10 <sup>-3</sup> {100 × 10 <sup>-3</sup> }	22.0 × 10 <sup>-3</sup> {88.0 × 10 <sup>-3</sup> }	14.0 × 10 <sup>-3</sup> {56.0 × 10 <sup>-3</sup> }	13.0 × 10 <sup>-3</sup> {52.0 × 10 <sup>-3</sup> }	11.0 × 10 <sup>-3</sup> {44.0 × 10 <sup>-3</sup> }
16	85.0 × 10 <sup>-3</sup> {340 × 10 <sup>-3</sup> }	—	37.0 × 10 <sup>-3</sup> {148 × 10 <sup>-3</sup> }	—	—
20	255 × 10 <sup>-3</sup> {1020 × 10 <sup>-3</sup> }	—	76.0 × 10 <sup>-3</sup> {304 × 10 <sup>-3</sup> }	—	—
25	733 × 10 <sup>-3</sup> {2932 × 10 <sup>-3</sup> }	—	217 × 10 <sup>-3</sup> {868 × 10 <sup>-3</sup> }	—	—

Lateral dual-shaft type Unit:kg·m<sup>2</sup> {kgf·m<sup>2</sup>}

Speed ratio	1 : 1	1.5 : 1	2 : 1	2.5 : 1	3 : 1
2	0.08 × 10 <sup>-3</sup> {0.32 × 10 <sup>-3</sup> }	—	—	—	—
4	0.23 × 10 <sup>-3</sup> {0.92 × 10 <sup>-3</sup> }	—	0.18 × 10 <sup>-3</sup> {0.72 × 10 <sup>-3</sup> }	—	—
6	2.00 × 10 <sup>-3</sup> {8.00 × 10 <sup>-3</sup> }	1.40 × 10 <sup>-3</sup> {5.60 × 10 <sup>-3</sup> }	1.10 × 10 <sup>-3</sup> {4.40 × 10 <sup>-3</sup> }	0.94 × 10 <sup>-3</sup> {3.76 × 10 <sup>-3</sup> }	0.83 × 10 <sup>-3</sup> {3.32 × 10 <sup>-3</sup> }
7	5.30 × 10 <sup>-3</sup> {21.2 × 10 <sup>-3</sup> }	2.50 × 10 <sup>-3</sup> {10.0 × 10 <sup>-3</sup> }	2.20 × 10 <sup>-3</sup> {8.80 × 10 <sup>-3</sup> }	1.70 × 10 <sup>-3</sup> {6.80 × 10 <sup>-3</sup> }	1.60 × 10 <sup>-3</sup> {6.40 × 10 <sup>-3</sup> }
8	7.10 × 10 <sup>-3</sup> {28.4 × 10 <sup>-3</sup> }	6.40 × 10 <sup>-3</sup> {25.6 × 10 <sup>-3</sup> }	5.50 × 10 <sup>-3</sup> {22.0 × 10 <sup>-3</sup> }	5.40 × 10 <sup>-3</sup> {21.6 × 10 <sup>-3</sup> }	5.00 × 10 <sup>-3</sup> {20.0 × 10 <sup>-3</sup> }
10	38.0 × 10 <sup>-3</sup> {152 × 10 <sup>-3</sup> }	14.0 × 10 <sup>-3</sup> {56.0 × 10 <sup>-3</sup> }	11.0 × 10 <sup>-3</sup> {44.0 × 10 <sup>-3</sup> }	9.10 × 10 <sup>-3</sup> {36.4 × 10 <sup>-3</sup> }	7.80 × 10 <sup>-3</sup> {31.2 × 10 <sup>-3</sup> }
12	130 × 10 <sup>-3</sup> {520 × 10 <sup>-3</sup> }	33.0 × 10 <sup>-3</sup> {132 × 10 <sup>-3</sup> }	21.0 × 10 <sup>-3</sup> {84.0 × 10 <sup>-3</sup> }	20.0 × 10 <sup>-3</sup> {80.0 × 10 <sup>-3</sup> }	19.0 × 10 <sup>-3</sup> {76.0 × 10 <sup>-3</sup> }
16	—	—	—	—	—
20	—	—	—	—	—
25	—	—	—	—	—

### 3-2. Type ARA

Unit:kg·m<sup>2</sup> {kgf·m<sup>2</sup>}

Speed ratio	10 (1 : 1)	20 (2 : 1)
3	0.45 × 10 <sup>-5</sup> {1.80 × 10 <sup>-5</sup> }	0.28 × 10 <sup>-5</sup> {1.10 × 10 <sup>-5</sup> }
5	3.70 × 10 <sup>-5</sup> {14.8 × 10 <sup>-5</sup> }	2.10 × 10 <sup>-5</sup> {8.20 × 10 <sup>-5</sup> }
6	22.0 × 10 <sup>-5</sup> {87.0 × 10 <sup>-5</sup> }	13.0 × 10 <sup>-5</sup> {51.0 × 10 <sup>-5</sup> }

## 4. Allowable torque of cross shaft

Denotes the allowable torsional transmission capacity of only the cross shaft (allowable torque of cross shaft).

In the case of a line shaft drive, it is necessary to confirm the torque applied to the cross shaft. (Refer to Example 2 on selection on p.16.)

ED	2	4	6	7	8	10	12	16	20	25
Allowable torque of only the cross shaft	32.0 {3.30}	66.0 {6.80}	152 {15.6}	320 {32.7}	627 {64.0}	891 {91.0}	1225 {125}	2116 {216}	3626 {370}	6017 {614}

Note) By adopting a special material for the shaft, allowable torque can be increased. (Refer to p.70.)



## 5. Allowable radial load

Radial load denotes the load in the vertical direction applied to the shaft. It is absolutely necessary for this to be confirmed during the investigation/study of the Miter Gear Box and ARA Gear Box.

(Refer to P.15 for the type ED, and P.58 for type ARA.) When it exceeds the allowable value, please consult our company.

### 5-1. Type ED

Unit:N {kgf}

Speed ratio	ED	Rotational speed of lateral shaft rpm r/min	2		4		6		7		8		10		12		16		20		25	
			Lateral shaft	Cross shaft	Lateral shaft	Cross shaft	Lateral shaft	Cross shaft	Lateral shaft	Cross shaft	Lateral shaft	Cross shaft	Lateral shaft	Cross shaft	Lateral shaft	Cross shaft	Lateral shaft	Cross shaft	Lateral shaft	Cross shaft	Lateral shaft	Cross shaft
1 : 1	3000	3000	127	117	647	764	1520	1912	—	—	—	—	—	—	—	—	—	—	—	—	—	—
			{13.0}	{12.0}	{66.0}	{78.0}	{155}	{195}	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	2000	186	176	745	862	1716	2157	2010	2500	2941	3040	3677	4069	—	—	—	—	—	—	—	—
			{19.0}	{18.0}	{76.0}	{88.0}	{175}	{220}	{300}	{310}	{300}	{310}	{375}	{415}	—	—	—	—	—	—	—	—
	1750	1750	216	196	784	902	1813	2303	2156	2842	3087	3234	3969	4263	4851	5341	—	—	—	—	—	—
			{22.0}	{20.0}	{80.0}	{92.0}	{185}	{235}	{220}	{290}	{315}	{330}	{405}	{435}	{495}	{545}	—	—	—	—	—	—
	1450	1450	265	216	833	951	1911	2450	2450	3136	3234	3381	4165	4508	5096	5586	10633	10976	—	—	—	—
			{27.0}	{22.0}	{85.0}	{97.0}	{195}	{250}	{250}	{320}	{330}	{345}	{425}	{460}	{520}	{570}	{1085}	{1120}	—	—	—	—
	1150	1150	323	235	882	1029	2058	2597	2744	3234	3479	3626	4459	4851	5488	6076	11368	11760	15386	15680	—	—
			{33.0}	{24.0}	{90.0}	{105}	{210}	{265}	{280}	{330}	{355}	{370}	{455}	{495}	{560}	{620}	{1160}	{1200}	{1570}	{1600}	—	—
	870	870	402	255	960	1127	2205	2842	2989	3381	3773	3969	4851	5292	5880	6566	12446	12740	16660	17150	24794	25480
			{41.0}	{26.0}	{98.0}	{115}	{225}	{290}	{305}	{345}	{385}	{405}	{495}	{540}	{600}	{670}	{1270}	{1300}	{1700}	{1700}	{1750}	{2530}
580	580	549	314	1078	1323	2499	3185	3381	3822	4263	4459	5488	5880	6713	7301	14014	14504	18816	19404	28028	28910	
		{56.0}	{32.0}	{110}	{135}	{255}	{325}	{345}	{390}	{435}	{455}	{560}	{600}	{685}	{745}	{1430}	{1480}	{1920}	{1980}	{2860}	{2950}	
300	300	696	392	1519	1960	3430	3528	4410	5537	5243	6958	9713	7987	8232	9065	17150	17640	23422	24108	34300	35280	
		{71.0}	{40.0}	{155}	{200}	{350}	{360}	{450}	{565}	{535}	{710}	{685}	{815}	{840}	{925}	{1750}	{1800}	{2390}	{2460}	{3500}	{3600}	
100	100	980	588	1911	1960	3430	3528	5096	6272	8428	8820	9996	11760	11368	12593	22540	22540	28420	32928	39200	49000	
		{100}	{60.0}	{195}	{200}	{350}	{360}	{520}	{640}	{860}	{900}	{1020}	{1200}	{1160}	{1285}	{2300}	{2300}	{2900}	{3360}	{4000}	{5000}	
10	10	980	588	1911	1960	3430	3528	5096	6272	8428	8820	9996	11760	11858	14504	22540	22540	28420	33320	39200	49000	
		{100}	{60.0}	{195}	{200}	{350}	{360}	{520}	{640}	{860}	{900}	{1020}	{1200}	{1210}	{1480}	{2300}	{2300}	{2900}	{3400}	{4000}	{5000}	
1.5 : 1 2 : 1 2.5 : 1 3 : 1	3000	3000	—	—	686	1569	1274	2255	—	—	—	—	—	—	—	—	—	—	—	—	—	
			—	—	{70.0}	{160}	{130}	{230}	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	2000	2000	—	—	833	1765	1814	2500	2696	4756	3432	6864	4167	7845	—	—	—	—	—	—	—	—
			—	—	{85.0}	{180}	{185}	{255}	{275}	{485}	{350}	{700}	{425}	{800}	—	—	—	—	—	—	—	—
	1750	1750	—	—	1078	1960	2205	2744	3038	4998	3822	7252	4459	8232	5096	9212	5439	10339	—	—	—	—
			—	—	{110}	{200}	{225}	{280}	{310}	{510}	{390}	{740}	{455}	{840}	{520}	{940}	{555}	{1055}	—	—	—	—
	1450	1450	—	—	1078	1960	2548	2842	3430	5390	4361	7987	5194	9212	5978	10486	5978	12152	7693	14602	—	—
			—	—	{110}	{200}	{260}	{290}	{350}	{550}	{445}	{815}	{530}	{940}	{610}	{1070}	{610}	{1240}	{785}	{1490}	—	—
	1150	1150	—	—	1078	1960	3038	3087	4067	5978	5096	8820	6174	10486	7252	12151	6419	13083	8771	17934	12985	24647
			—	—	{110}	{200}	{310}	{315}	{415}	{610}	{520}	{900}	{630}	{1070}	{740}	{1240}	{655}	{1335}	{895}	{1830}	{1325}	{2515}
	870	870	—	—	1078	1960	3430	3332	4753	6076	6076	8820	7448	11760	8869	14504	6958	14210	9506	19453	13573	29400
			—	—	{110}	{200}	{350}	{340}	{485}	{620}	{620}	{900}	{760}	{1200}	{905}	{1480}	{710}	{1450}	{970}	{1985}	{1385}	{3000}
580	580	—	—	1078	1960	3430	3528	5096	6174	7644	8820	9555	11760	11466	14504	7840	16072	10780	22001	15680	33222	
		—	—	{110}	{200}	{350}	{360}	{520}	{630}	{780}	{900}	{975}	{1200}	{1170}	{1480}	{800}	{1640}	{1100}	{2245}	{1600}	{3390}	
300	300	—	—	1078	1960	3430	3528	5096	6272	8428	8820	9996	11760	11858	14504	9604	19600	13132	27342	19159	40474	
		—	—	{110}	{200}	{350}	{360}	{520}	{640}	{860}	{900}	{1020}	{1200}	{1210}	{1480}	{980}	{2000}	{1340}	{2790}	{1955}	{4130}	
100	100	—	—	1078	1960	3430	3528	5096	6272	8428	8820	9996	11760	11858	14504	13328	22540	18228	33320	26656	49000	
		—	—	{110}	{200}	{350}	{360}	{520}	{640}	{860}	{900}	{1020}	{1200}	{1210}	{1480}	{1360}	{2300}	{1860}	{3400}	{2720}	{5000}	
10	10	—	—	1078	1960	3430	3528	5096	6272	8428	8820	9996	11760	11858	14504	22540	22540	28420	33320	39200	49000	
		—	—	{110}	{200}	{350}	{360}	{520}	{640}	{860}	{900}	{1020}	{1200}	{1210}	{1480}	{2300}	{2300}	{2900}	{3400}	{4000}	{5000}	

Note 1) These are the values at shaft center of the lateral shaft and cross shaft.

Note 2) When it is used between the respective rotational speeds, calculate the values by interpolation.

### 5-2. Type ARA

Unit:N {kgf}

Speed ratio	ARA	3	5	6
1 : 1, 2 : 1		108 {11.0}	216 {22.0}	441 {45.0}

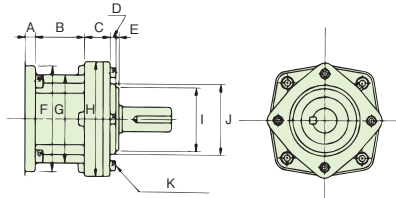
Note 1) These are the values at shaft center of the lateral shaft and cross shaft.

Note 2) When it is used between the respective rotational speeds, calculate the values by interpolation.

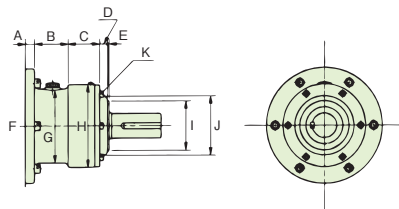
# Technical data

## 6. Detailed dimensions of bracket part

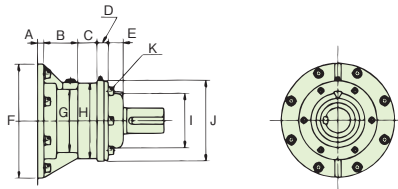
ED2 ~ 10



ED12 ~ 16



ED20 ~ 25



Unit: mm

ED	A	B	C	D	E	F	G	H	I	J	K
2	5	22	26	7	—	60	50	58	—	36	4-M4 hex socket head cap bolts PCD 48
4	8	34.5	31.5	8	—	82	60	78	—	50	4-M4 hex socket head cap bolts PCD 62
6	10	49	26	6	3	108	90	117	65	72	4-M8 hex socket head cap bolts PCD 95
7	12	57.5	35	8	3	125	100	124	70	80	4-M8 hex socket head cap bolts PCD 100
8	15	78	29	8	4	145	120	152	85	105	4-M8 hex socket head cap bolts PCD 130
10	15	94.5	30	10	—	165	135	154	—	110	4-M8 hex socket head cap bolts PCD 130
12	18	73	58	16	3	232	150	168	100	120	6-M8 hex socket head cap bolts PCD 148
16	18	107	30	25	10	272	180	193	105	140	6-M10 hex socket head cap bolts PCD 170
20	17.5	152	32	41	2	325	215	230	125	155	6-M12 hex socket head cap bolts PCD 195
25	20	179.5	50	47	3	395	250	270	140	190	6-M14 hex socket head cap bolts PCD 230

# Option

## 1. Material of casing and bracket : FCD (ductile cast iron)

Depending on service conditions, it is possible to change the material of the casing and bracket from standard FC (gray cast iron) to FCD (ductile cast iron).

The transmission capacity, dimensions, and shape are the same as standard items.

For applicable models, refer to the Model list (p.9).

Furthermore, ED2M is aluminum die-cast (ADC).

## 2. Lateral shaft, cross shaft : Specification of former JIS key

When the former JIS key (JIS B 1301-1959 parallel key, class 2) is needed, it can be handled by manufacturing a new shaft.

## 3. Changing individual plug positions

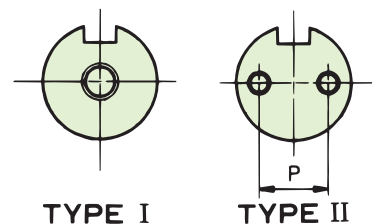
The position of each plug for the oil gauge, pressure vent, drain plug, etc. can be changed to an arbitrary position with additional processing of the casing.

## 4. Tapping at shaft end

When the end plate is used for retaining the sprocket or gear mounted on the lateral shaft or cross shaft, tapping at the shaft end is processed. Dimensions of tapping at the shaft end are as follows.

ED	TYPE	No. of taps	Size	Dept (L)	Pitch (P)
2	I	1	M6	12	—
4	I	1	M6	12	—
6	I	1	M8	12	—
7	I	1	M8	12	—
8*	II (I)	2 (1)	M8 (M12)	12 (22)	20 (—)
10*	II (I)	2 (1)	M8 (M12)	12 (22)	22 (—)
12*	II (I)	2 (1)	M10 (M12)	15 (22)	26 (—)
16	II	2	M10	15	36
20	II	2	M12	18	44
25	II	2	M12	18	54

Note) \*Pay attention because tapping at the lateral shaft for ED8B20/25, 30, ED10B25/30, ED12B25/30 is TYPE I, and at the cross shaft is TYPE II.



## 5. Lateral shaft, cross shaft : Specification of hard chrome plating

By applying hard chrome plating to the lateral shaft and cross shaft, corrosion resistance and abrasion resistance at the oil seal part can be improved.

(Partial plating specification is applied to the oil seal part.)

# Option

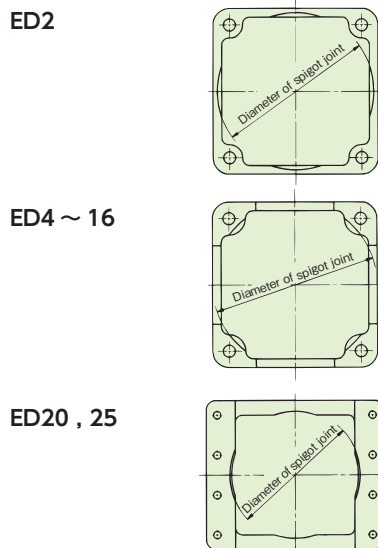
## 6. Spigot joint processing at the bottom face of casing

This applies if spigot joint processing at the bottom face of the casing is necessary to perform centering with the mating part at installation.

The Miter Gear Box side becomes the female spigot joint.

ED	Dimension of female spigot joint	
	Diameter of spigot joint	Depth of spigot joint mm
2	φ 94H8	3
4	φ 155H8	5
6	φ 190H8	5
7	φ 220H8	5
8	φ 250H8	5
10	φ 305H8	5
12	φ 370H8	7
16	φ 420H8	7
20	φ 360H8	10
25	φ 430H8	10

Unit: mm

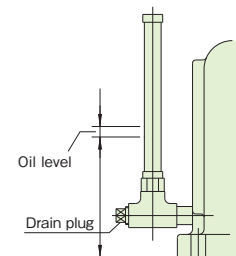


## 7. Various oil gauges

To check the oil level, a rising-sun (hinomaru) type gauge is mounted as standard. However, various oil gauges are available upon request.

### 7-1. Vertical type oil gauge

A visible gauge is mounted for confirming the oil level during operation. However, it is for indoor use.

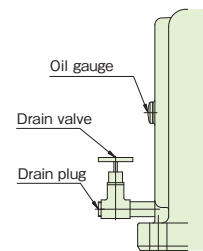


### 7-2. Metallic oil gauge

An oil gauge made of resin, which is the standard specification, can be changed to a metallic oil gauge.

## 8. Drain valve

A drain valve is attached for effectiveness of draining oil when changing oil or installing piping, etc.



## 9. Inspection cover Mounting

It is possible to mount an inspection cover for easy check at maintenance and inspection.

Although the material of the inspection cover is FC (gray cast iron), a cover made of transparent acryl can be manufactured upon request.

## 10. Various painting specifications

When non-standard painting is required, special painting in accordance with the ambient atmosphere can be provided upon request.

Classification	Kind of painting		Painting specification				Weather resistance	Water resistance	Acid resistance	Alkali resistance	Use
	Painting system	Common name									
Standard	Indoor standard	Under coating	Lacquer system primer		-	-	△	△		Standard painting specification	
		Finish coating	Acryl lacquer system								
Semi-standard	Outdoor standard	Under coating	Lacquer system primer		△	△	△	△		Outdoor standard painting specification	
		Finish coating	Phthalic acid resin system paint (Alkyd resin paint)								
	Waterproof standard	Under coating	Special modified epoxy		○	◎	○	◎		Waterproof standard painting specification	
		Finish coating	Two-pack type urethane resin paint								
Special painting	Long-oil phthalic acid resin system	Under coating	Long-oil alkyd resin system anti-corrosive paint		○	○	△	△		Ships, bridges, coastal zone, outdoor humid atmosphere	
		Finish coating	Long-oil alkyd resin system top coat paint								
	Phenol resin system	Under coating	Anti-corrosive paint JIS K 5623 class 2		○	○	◎	△		Indoor and outdoor chemical plant area and floating parts where acid is used	
		Finish coating	Phenol resin system acid resistant paint								
	Chlorinated rubber	Under coating	Epoxy resin system primer		◎	○	○	○		Ships, bridges, coastal zone, outdoor humid atmosphere, corrosive gas	
		Intermediate coating	Chlorinated rubber system intermediate coating paint								
		Finish coating	Chlorinated rubber system top coat paint								
	Heat-resistant type	Under coating	Heat-resistant special alkyd resin under coating		○	×	×	×		Painting that endures a constant 100° C, and an instantaneous maximum temperature of 150° C	
		Finish coating	Heat-resistant special alkyd resin finish coating								
	Epoxy resin system	Under coating	Epoxy resin system primer		○	◎	○	◎		Excellent seawater resistance and chemical resistance	
		Finish coating	Epoxy resin system top coat paint								
	Tar epoxy	Under coating	Organic zinc rich primer		×	◎	◎	◎		Excellent chemical resistance, oil resistance, seawater resistance, and water resistance	
Finish coating		Tar epoxy resin paint JIS K 5664 class 1									

Note) For details of use, please consult our company. ◎···Suitable (notably excellent) ○···Suitable △···Pay attention for selection ×···Not suitable

## 11. Special corrosion-preventative specification

When long-term corrosion prevention that is superior to standard corrosion prevention or corrosion prevention for export products is necessary, we can respond to requests. So, please consult our company.

(Period of standard rust-preventative specification is six months after shipment from our factory under indoor storage conditions.)

# Special specification

## 1. Responding to high rotational speeds

When the type ED is used at high rotational speeds, our company applies a special specification to prevent heat generation.

(Note) For high rotational speeds, service range and transmission capacity are limited depending on operating time, operation cycle, ambient temperature, and load condition. Therefore, please consult our company.

### 1-1. ED2 & 4 Oil lubricating specification

The standard item adopts the grease lubrication method. However, if either one of the rotational speed of input shaft or rotational speed of output shaft exceeds 1,750 rpm during use, the temperature of the gear box sometimes exceeds the allowable temperature, depending on operating time, load, etc. In such a case, it is necessary to adopt the oil lubrication method. By adopting the oil lubrication method, it is possible to have an input rotational speed up to 3,000 rpm.

For the transmission capacity, refer to the section on  in the transmission capacity tables (pp.17 to 20).

### 1-2. ED6 to 25 Auxiliary cooling specification

When the gear box is used at a rotational speed of  sections of the transmission capacity tables (pp.17 to 20), the temperature of the gear box sometimes exceeds the allowable temperature depending on operating time, load, etc. in the case of the standard specification (oil lubrication method). With such a case, an auxiliary cooling specification, such as forced lubrication method, fan mounting method, fin attachment method is necessary.

#### Auxiliary cooling specification 1 Forced lubrication method

Temperature rise is suppressed by forcibly lubricating the gear and bearings.

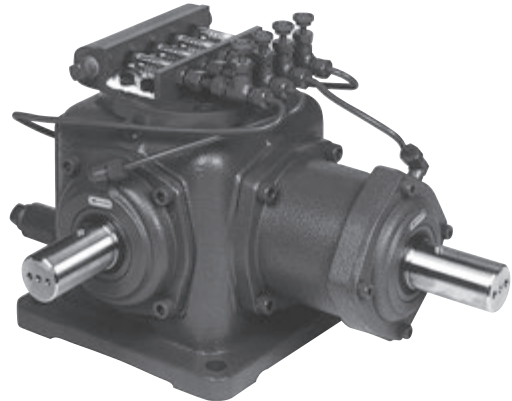
In the transmission capacity table (pp.17 to 20), the forced lubrication method is recommended when the gearbox is used at a rotational speed of .

#### (1) Approximate oiling quantity and tank capacity

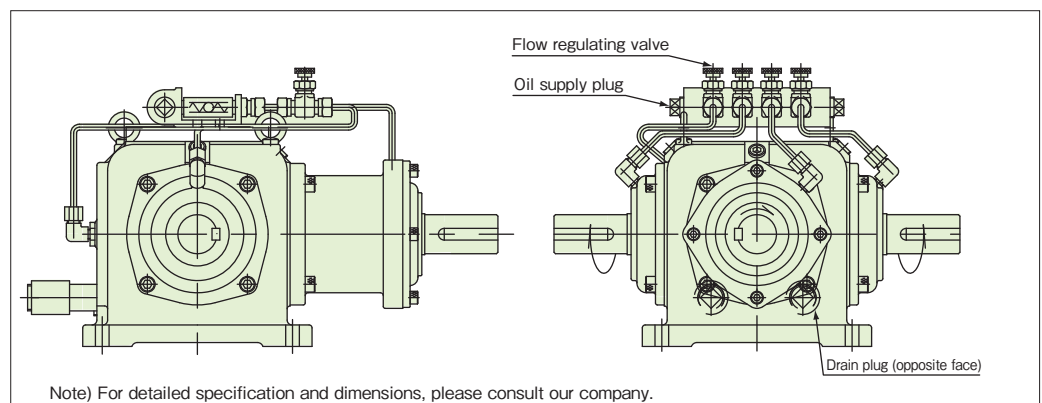
ED	Oiling quantity (L/min)		
	Gear part	Bearing part	Total
6	0.8	0.3	2
7	1	0.5	3
8	1	0.5	3
10	1.5	0.7	4.3
12	2	1	6
16	2.5	1	6.5
20	3	1.5	9
25	4	1.5	10

Note 1) The tank capacity above is a rough guideline, and it should be decided considering pipe length, etc.

Note 2) A forced lubrication device will be prepared because it is required for the forced lubrication method.

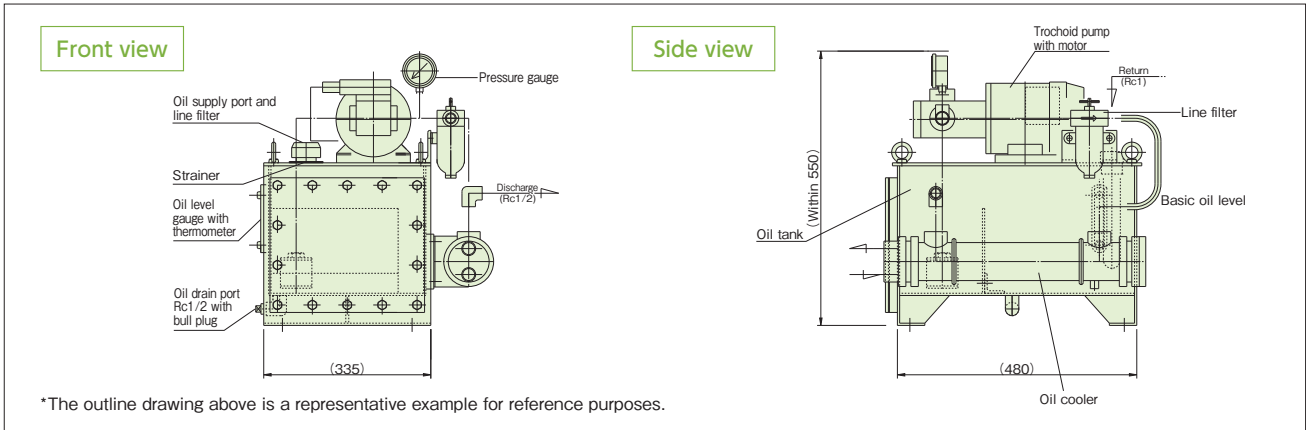


#### (2) Outline drawing for reference



### (3) Forced lubrication device

It can be used when the type ED is operated with the forced lubrication method.  
Regarding the forced lubrication device, please consult a specialized manufacturer.



### Auxiliary cooling specification 2 Fan mounting method

Mounting a cooling fan suppresses heat generation in the gear box.  
However, it cannot be used when the rotational speed is low and with the dual-shaft type cross shaft.

### Auxiliary cooling specification 3 Fin attachment method

Cooling is assisted by attaching fins to the surface of the gear box casing. However, the method cannot be used in an atmosphere with poor ventilation characteristics, etc.

## 2. Responding to a special atmosphere

When the gear box is used in a special environmental atmosphere outside the range described in the catalog, it is necessary to adopt special specifications. Respective specifications in a special environmental atmosphere are as follows.

### 2-1. Heat-resistant, cold-resistant specification

When ambient temperature is below  $-10^{\circ}\text{C}$  or above  $50^{\circ}\text{C}$ , the service range is sometimes limited depending on operating time, load, operating condition, etc. Oil seal, oil, casing, bracket, shaft material, etc. selected are changed as needed.

### 2-2. Special material specification of lateral shaft, cross shaft

It is possible to change the shaft material depending on service conditions and ambient atmosphere.

#### (1) Shaft material SCM440 Specification with refined material

When it is required to increase torsional strength and/or bending strength of the shaft compared to the standard material (S45C), the material can be changed to the refined material of SCM440.

For models ED4B20, ED6B20/25/30, ED7B20/25/30, ED8B20/25/30, ED10B25/30, and ED12B25/30, the standard material used for the lateral shaft is a carburized and quenched material of SCM415.

#### (2) Shaft material of stainless steel specification

When the usage environment is a poor atmosphere with the generation of corrosion, rust should be avoided, so it is possible to change the shaft material to stainless steel.

However, it cannot be manufactured for models ED4B20, ED6B20/25/30, ED7B20/25/30, ED8B20/25/30, ED10B25/30, and ED12B25/30.

### 2-3. Casing and bracket material with steel plate specification

The casing and bracket can be manufactured with steel plates (SS400) having the same main dimensions (shaft diameter, shaft length, height of the shaft center, mounting pitch, etc.) as the standard item.

# Special specification

## 3. Responding to special layout

### 3-1. Large size

When the gear box is used under conditions exceeding the transmission capacity (pp.17 to 20), a larger size than ED25 can be manufactured. The transmission capacity of ED28M is described below. For specification, dimensions, etc., please consult our company.

Moreover, as an even larger size can also be manufactured, please consult our company.

#### ■ ED28M Transmission capacity (for reference)

Rotational speed of lateral shaft rpm r/min		870	580	300	100	10
		ED28M (1 : 1)				
Input kW		—	563	308	109	11.8
Cross shaft torque	N · m	—	8820	9314	9954	10689
	{kgf · m}	—	{899}	{949}	{1015}	{1089}

When it is used at a rotational speed of  , it becomes the auxiliary cooling specification (refer to pp.69 to 70).

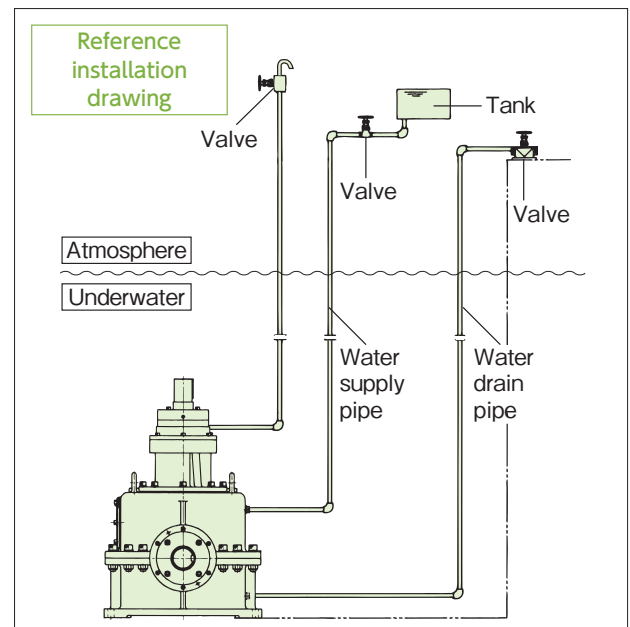
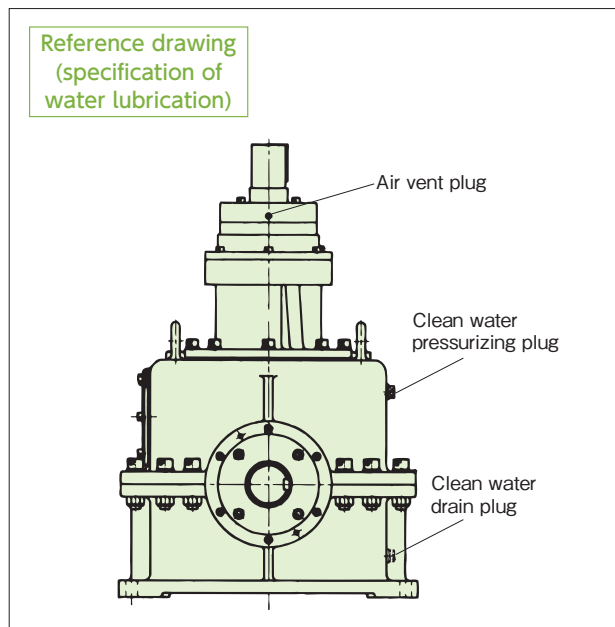
### 3-2. Underwater specification

It is possible to use it under water (scraper in water, low-speed conveyer in water, etc.).

Although oil lubrication is usually adopted, harmony with the environment can be promoted by adopting water lubrication.

Furthermore, in the case of water lubrication, separate piping, pump, valve, etc. are required.

For detailed specification, dimensions, etc., please consult our company.





## 4. Responding to high-precision specification

### 4-1. Specification with low backlash

When positional accuracy is requested, a gear box with a low backlash specification can be manufactured.

(For backlash with standard items, refer to Technical data, 2. Backlash in p.63.)

It denotes the total value of the mechanical clearance that can be measured in the rotational direction on the cross shaft when the lateral shaft is fixed.

Unit: Angle°

Speed ratio ED	1 : 1	1.5 : 1	2 : 1	2.5 : 1	3 : 1
2	0.18 ~ 0.42	—	—	—	—
4	0.14 ~ 0.32	—	0.11 ~ 0.26	—	—
6	0.17 ~ 0.29	0.16 ~ 0.27	0.15 ~ 0.27	0.08 ~ 0.19	0.08 ~ 0.18
7	0.21 ~ 0.34	0.15 ~ 0.27	0.13 ~ 0.23	0.15 ~ 0.26	0.08 ~ 0.18
8	0.17 ~ 0.27	0.13 ~ 0.23	0.11 ~ 0.20	0.12 ~ 0.21	0.06 ~ 0.14
10	0.16 ~ 0.25	0.15 ~ 0.23	0.11 ~ 0.20	0.11 ~ 0.18	0.11 ~ 0.19
12	0.14 ~ 0.22	0.12 ~ 0.19	0.11 ~ 0.18	0.12 ~ 0.19	0.09 ~ 0.15
16	0.14 ~ 0.24	—	0.11 ~ 0.17	—	—
20	0.14 ~ 0.22	—	0.09 ~ 0.13	—	—
25	0.14 ~ 0.21	—	0.08 ~ 0.12	—	—

### 4-2. Lateral shaft, cross shaft Specification of keyless shaft

When the lateral shaft and cross shaft are used with a fastener other than key fastening, such as power lock fitting (friction fastener), a keyless shaft can be manufactured.

The basic dimensions are same as those of the outline dimensional drawings in the catalog.

## 5. Others Special specification

### 5-1. ED6 or larger Specification of grease lubrication

Regarding a gear box of ED6 or larger, it is possible to change the lubrication method to the specification of grease lubrication (NIGTITE LMS No.000) due to a mounting layout issue, etc.

Because a detailed investigation/study becomes necessary depending on size, rotational speed, etc., please consult our company.

### 5-2. Lateral shaft • Cross shaft Special dimensions

When shaft dimensions other than the standard dimensions are necessary, please consult our company.

### 5-3. Special speed ratio

When a speed ratio other than the standard speed ratios (1:1, 1.5:1, 2:1, 2.5:1, 3:1) is required, please consult our company.

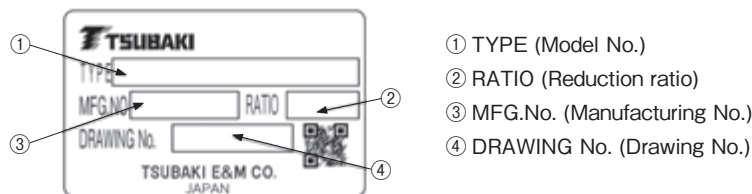
# Handling

This section describes general matters related to handling.  
For details, refer to the "Instruction manual" attached to the product.

## 1. At use

- (1) Before installation, check whether the specification described on the name plate is the requested specification.  
 Note) In particular, check whether the mounting model is the same from the positions of the oil gauge and each plug. Also check the rotational relationship at the same time. (There is no oil gauge on ED2, 4, and the ARA Gear Box, because they are of the grease lubrication type.)
- (2) Check for any damage caused during transportation in the external appearance of the product.
- (3) Check for loose bolts.

### ■ How to view the name plate



## 2. Installation

### 2-1. Ambient conditions

Install the product at a place with good ventilation and minimal dust, low humidity, and with an ambient temperature of  $-10^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ . Avoid use at a place with corrosive liquid or gas, and a place with flammable or explosive materials. Furthermore, when used out of doors, etc., attach a cover, etc. to avoid direct contact with raindrops, etc.

### 2-2. Transportation

During transportation, be sure to use the eyebolt or hanging metal fitting at the upper face of the casing, but never hang wires, etc. at the lateral shaft and cross shaft. This will shorten the life and/or cause trouble, due to the eccentricity of shafts, etc.

Note) There is no eyebolt on ED2, 4, 6, and the type ARA.

### 2-3. Installation

At installation, securely fasten the product at a strong, flat place. Mount the Miter Gear Box carefully so that its mounting surface makes close contact with the base plane and no vibration, etc. is generated. For the mounting angle, although there are no limitations for ED2, 4, and the type ARA, ED6 to 16 shall be  $\pm 5^{\circ}$  or less, and ED20, 25 shall be  $\pm 2^{\circ}$  or less. When mounting the type ARA, use the three mounting holes at the center or the four mounting holes at the flange face.

< Recommended size of installation bolt >

ED	2	4	6	7	8	10	12	16	20	25
Bolt	M8	M8	M12	M12	M12	M14	M18	M20	M18	M20

Note 1) Mounting direction of ED2, 4 can be chosen freely. However, for ED6 to 25, avoid a mounting direction other than that indicated at order placement. (If the Example of mounting is to be changed, please consult our company because positions of oil gauge, grease nipple, etc. are changed.)

Note 2) It is necessary to attach the pressure vent for ED12 or larger. In such a case, replace the plug having a hole at the designated position with the attached pressure vent after completing installation.

### 2-4. Coupling

- When mounting a pulley, sprocket, and coupling on the lateral shaft and cross shaft of the type ED, as well as the type ARA, pay attention not to bend the shaft and not to damage bearing, oil seal, etc.
- Center accurately. Eccentricity of shaft and radial load of more than the allowable limit will shorten the life of the gear, bearing, and shaft, and cause noise and vibration.
- When a coupling is used, mount it as precisely as possible within the allowable centering range recommended by each manufacturer. Our company has many kinds of optimum flexible coupling.

## 3. Lubrication

### 3-1. Preface

At shipment, NIGTITE LMS No.000 of NIPPON GREASE CO., LTD. is enclosed in ED2 & 4, Shell Omala S2G150 of Showa Shell Sekiyu K.K. is enclosed in ED6 to 25, and grease (Mobilux EPO) is enclosed in the type ARA. Do not use another lubricant.

However, regarding ED6 or larger, be sure to check the oil level with the oil gauge after mounting is completed. If the oil level cannot be checked with the oil gauge, supply lubricant of the same brand until it can be checked.

\* When the rotational speed of the lateral shaft is less than 200 rpm, or when the gear box is used at an ambient temperature between  $35^{\circ}\text{C}$  and  $50^{\circ}\text{C}$ , it cannot be used with the specification of the enclosed lubricant. In this case it is necessary to change the specification of the lubricant.

Refer to table of Recommended lubricants (p.74, Table 1) and change to the corresponding lubricant.  
(For ED2, 4, and ARA, do not change the lubricant.)

### 3-2. Replacing lubricant

- For ED2 & 4, replacing lubricant is basically not required because the lubricant used is grease. However, replacing grease at the target of 20,000 hrs. can increase life. At replacement, use the grease described on p.73 item 3-1, in an amount of approx. 150 g for ED2, and approx. 350 g for ED4.
- For ED6 to 25, replace with new oil 500 hrs. after starting operation for the 1st time. The purpose is to clean initial abrasion powder, etc. generated when running in (warming up) each part. It also improves performance and life. At the second time and thereafter, replace with new lubricant at the target of after 2,500 hrs. or six months, whichever is earlier, depending on operating conditions. (However, if the product is operated continuously for a long time and/or in a high-temperature atmosphere, or in an environment with humidity or corrosive gas, it is necessary to shorten the oil replacement interval.)
- Select from recommended lubricants in the following Table 1, referring to rotational speed and ambient temperature.
- In the case of the ARA Gear Box, replacing lubricant is basically not required due to grease lubrication.
- In the case of the forced lubrication specification, refer to the special-purpose "Instruction manual."

Table 1 Recommended lubricant

Rotational speed of lateral shaft rpm r/min	Name of maker	Ambient temperature		Rotational speed of lateral shaft rpm r/min	Name of maker	Ambient temperature	
		-10° C to 35° C	35° C to 50° C			- 10° C ~ 35° C	35° C ~ 50° C
1750 } 200	Industrial gear oil, class 2	ISO VG150	ISO VG 220	Less than 200	Industrial gear oil, class 2	ISO VG 220	ISO VG 320
	Showa Shell Sekiyu	Shell Omala S2G150	Shell Omala S2G220		Showa Shell Sekiyu	Shell Omala S2G220	Shell Omala S2G320
	Idemitsu Kosan	Daphne Super Gear Oil 150	Daphne Super Gear Oil 220		Idemitsu Kosan	Daphne Super Gear Oil 220	Daphne Super Gear Oil 320
	Exxon Mobil	Mobilgear 600XP-150	Mobilgear 600XP-220		Exxon Mobil	Mobilgear 600XP-220	Mobilgear 600XP-320
	COSMO OIL	Cosmo Gear Oil SE150	Cosmo Gear Oil SE220		COSMO OIL	Cosmo Gear Oil SE220	Cosmo Gear Oil SE320
	JX Nippon Oil & Energy	BONNOC M150	BONNOC M220		JX Nippon Oil & Energy	BONNOC M220	BONNOC M320

Table 2 Approximate oil quantity

Unit:L

	ED	6	7	8	10	12	16	20	25
Lateral single-shaft type		0.95	1.5	1.9	3.5	7	10	11	18
Lateral dual-shaft type		1.0	1.6	2.1	3.7	7.4	—	—	—

### 3-3. Supplying grease (For gear boxes with shaft arrangement of shaft oriented in the vertical direction, for ED6 or larger)

- When a bearing is positioned above the oil level, it is not sufficiently lubricated by splashes of oil alone. Therefore, the following grease is enclosed in this bearing part at shipment.  
Exxon Mobil Mobilux EP2
  - Because it is necessary to supply grease to this bearing periodically (approx. every 1,000 hrs), replace the stop plug with the attached grease nipple at the designated position of the Type of mounting (pp.13, 14), and supply grease.
- Note) A grease nipple is attached to products with all kinds of shaft arrangement at shipment.

Table 3 Recommended grease

メーカー名	Brand
Showa Shell Sekiyu	Alvania EP2
Idemitsu Kosan	Daphne Eponex SR2
Exxon Mobil	Mobilux EP2
COSMO OIL	Cosmo Dynamax No.2
JX Nippon Oil & Energy	EPNOC Grease AP2

Table 4 Recommended amount of grease

Unit:g

	ED	6	7	8	10	12	16	20	25
Lateral shaft		22	35	70	100	170	270	370	640
Output bearing support I		3	7	12	17	20	55	90	150
Output bearing support II		6	9	12	17	20	70	85	135

### 3-4. Inspecting and replacing oil seal

- Oil seals also wear and have a useful life, and can cause an oil leakage. When they are used under notably severe conditions (severe environmental conditions such as high temperature, high rotational speeds, outdoors), there is a possibility of life being shortened. Perform periodic inspection, and if there is an oil leakage, promptly replace the oil seal. When replacing an oil seal, be sure to use an oil seal of same type and material. (Using an oil seal of a different material may cause an oil leakage.) Furthermore, when replacing oil seals, refer to the catalogs of oil seal manufacturers.
- When starting operation for the first time, surplus grease sometimes exudes that has been filled up to the lip of the oil seal at assembly. However, this does not indicate that the functions of the gear box are impaired.

# Handling

## 4. Operation

### 4-1. Prestart inspection

When installation is completed, inspect the following points before starting operation.

- Whether rotational relationships are correct.
- Whether coupling with the driven shaft is correct.
- Whether there is a loose mounting bolt, tightening bolt, etc.

### 4-2. Test operation

Before starting regular operation, carry out a no-load operation to check whether rotational relationships are correct, and that there is no abnormal vibration, noise, heat generation, etc. Then, apply a load gradually.

### 4-3. Regular operation

After starting operation, check the following items.

- Whether there is abnormal vibration, noise, heat generation, etc.
- Whether shock and/or overload is applied.

Note) Slight heat generation may occur during the first two or three days after starting operation. However, if the surface temperature of the casing exceeds 93°C, insufficient or too much lubricant, installation failure, etc. should be considered. Therefore, check each part.

## 5. Daily inspection, maintenance

### 5-1. At maintenance

- For maintenance, wear suitable clothes for work and suitable protective gear (safety glasses, gloves, safety shoes, etc.).
- Tidy up the surrounding area and carry out work so as not to cause a secondary accident.
- Be sure to turn off the power supply, and carry out work with the machine completely stopped. Also, make be sure that the power supply cannot be turned on accidentally.
- The type ED and type ARA are hot during operation, and there is a risk of a burn if they are touched directly. So, be careful.

### 5-2. Daily inspection

Perform regular maintenance according to the following procedure, while paying attention to operating condition, using the necessary measuring instruments.

Be sure to perform daily inspection according to the following table. If daily inspection is neglected, trouble may be caused.

Inspection item	Contents of inspection
Noise	Whether noise is greater than usual. Whether abnormal sound is generated.
Vibration	Whether there is abnormal vibration. Also, whether a rapid change occurs.
Surface temperature	Whether it is abnormally high. Also, whether there is a rapid increase.
Oil level,	In a stopped state, whether oil level is at the specified position.
Installation bolt	Whether installation bolts are loose.
Chain, belt	Whether anything is loose.
Dirtiness of lubricant	Whether there is any dirt due to abrasion powder, etc.
Leakage of lubricant	Whether an oil leakage is generated at each joint, oil seal part, or cover of reduction gear.
Pressure vent	Whether the air vent hole is choked.

If any trouble is observed at daily inspection, take measures according to "10. Handling method at generation of trouble." If normal operation cannot be recovered despite taking countermeasures, please inform the vendor.

## 6. Disassembling, assembling

- Never disassemble the product.
- In this machine, tooth contact adjustment and bearing adjustment are carried out to maximize performance.
- If disassembly is necessary, please inform our company.

## 7. Parts list

ED	Bearing size and quantity	Oil seal and quantity	Plug size	Oil gauge	Grease nipple	ED	Bearing size and quantity	Oil seal and quantity	Plug size	Oil gauge	Grease nipple
2	6203R SH Lateral 2 pcs Cross 2 pcs	D16.28.7 Lateral 1 pc Cross 1/2 pc	1/8"	—	—	10	30310 Lateral 2 pcs Cross 2 pcs	DM48.70.12 Lateral 1 pc Cross 1/2 pc	1/2"	1/2"	A-M6F (Bracket part)
4	6304R SH Lateral 2 pcs Cross 2 pcs	DM20.35.10 (* DM17.35.8) Lateral 1 pc Cross 1/2 pc	1/4"	—	—	12	30312 Lateral 2 pcs Cross 2 pcs	DM52.75.12 Lateral 1 pc Cross 1/2 pc	1/2"	1/2"	B-M6F
6	30306 Lateral 2 pcs Cross 2 pcs	DM28.48.11 (* DM26.48.11) Lateral 1 pc Cross 1/2 pc	3/8"	3/8"	A-M6F (Bracket part) B-M6F	16	32314 Lateral 2 pcs Cross 2 pcs	DM65.88.12 Lateral 1 pc Cross 1/2 pc	1/2"	1/2"	A-PT 1/8"
7	30307 Lateral 2 pcs Cross 2 pcs	DM35.52.11 (* DM32.52.11) Lateral 1 pc Cross 1/2 pc	3/8"	3/8"		20	32316 Lateral 2 pcs Cross 2 pcs	DM75.100.13 Lateral 1 pc Cross 1/2 pc	1/2"	VAB	A-PT 1/4"
8	30309 Lateral 2 pcs Cross 2 pcs	DM42.65.12 Lateral 1 pc Cross 1/2 pc	3/8"	3/8"		25	32319 Lateral 2 pcs Cross 2 pcs	DM90.115.13 Lateral 1 pc Cross 1/2 pc	1/2"	VAB	

Note 1) Quantity of bearings, oil seals

- Lateral 2 pcs denotes the quantity used for the lateral part. So, in the lateral dual-shaft type, 2 pcs × 2 positions = 4 pcs are necessary.
- Cross 1/2 pc denotes one piece at a single shaft, and 2 pcs at double shafts.
- For 4B, 6B, 7B, an oil seal with the mark \* is used for the lateral shaft side, and an oil seal without the mark \* is used for the cross shaft side.

Note 2) Sizes 20, 25 for the oil gauge are model Nos. of Koho Kosan.

## 8. Recombination of shaft arrangement

Models of the Miter Gear Box that can be recombined with common parts are as follows. For recombination of shaft arrangement, please consult our company.

Basic shaft arrangement	→	Shaft arrangement that can be recombined
1-LR	→	1-LR-O
1-R	→	1-L-O
1-L	→	1-R-O

Basic shaft arrangement	→	Shaft arrangement that can be recombined
1-UD	→	1-UD-O, D-LR, D-LR-O, U-LR, U-LR-O
1-U	→	1-D-O, D-R, D-L-O, U-L, U-R-O
1-D	→	1-U-O, D-L, D-R-O, U-LR, U-L-O

## 9. Storage

If reduction gears are not to going be used soon, store them while paying attention to the following points.

### 9- 1. Storage area

Store them at a clean, dry place indoors.

Do not store them outdoors, or at places with humidity, dust, sharp temperature changes, corrosive gas, etc.

### 9- 2. Posture during storage

Packing and shipping in accordance with the type of mounting (mounting form) are performed at shipment. Store products by keeping the same mounting arrangement (relationship of top & bottom sides, etc.). In the case of special installation, there is a risk that grease at a bearing will mix with lubricant and dissolve out.

### 9- 3. Storage period

- The storage period should be within six months.
- If the storage period is six months or more, a special rustproof specification is required. In such a case, please consult our company.
- In the case of export items, a rustproof specification for export is necessary. In such a case, please consult our company.

### 9- 4. Usage after storage

- Nonmetallic portions such as oil seal, oil gauge, oil supply plug easily deteriorate under environmental influences such as temperature, ultraviolet rays. In such a case, after storage for a long time, check them before starting operation and replace items where deterioration is observed with new items.
- When starting operation, check for abnormal sound, vibration, and/or heat generation. If any trouble is observed, please inform the vendor promptly.

# Handling

## 10. Method of handling trouble

If any trouble is caused, refer to the following table, and take suitable measures at an early stage.

Contents of trouble	Cause	Countermeasure
Temperature has increased.	Overload operation	Decrease load or use larger gear box.
	Contamination, deterioration of lubricant	Replace with new lubricant.
	Insufficient or excessive lubricant	Fill with the correct amount of lubricant.
	Nonconformity of oil type	Replace with recommended lubricant.
	Ambient temperature is high.	Provide a cooling device or change the position of the gear box.
	Pressure vent is not attached.	Attach a pressure vent.
	Nonconformity of centering	Align the center with equipment precisely.
Noise has increased. Vibration has increased.	Overload operation	Decrease load or use larger gear box.
	Contamination, deterioration of lubricant	Replace with new lubricant.
	Insufficient or excessive lubricant	Fill with the correct amount of lubricant.
	Nonconformity of oil type	Replace with recommended lubricant.
	Damage to bearing	Replace bearing with a new one.
	Loose tightening bolt	Perform retightening.
	Nonconformity of centering	Align the center with equipment precisely.
Lubricant leaks.	Damaged, deteriorated oil seal	Replace oil seal with a new one.
	Nonconformity of tightening each plug	Retighten.
	Pressure vent is not attached.	Attach a pressure vent.
	Excessive lubricant	Fill with the correct amount of lubricant.

\* If another trouble has occurred, please consult our company.

# Confirmation sheet for selected specification

When making an inquiry with regard to selection of Miter Gear Box, ARA Gear Box, please let us know the following.

Machine to be used	Name of equipment	
	Contents of equipment	
	Layout	Please enter details in the following columns. (Shaft arrangement, rotational direction, mounting direction, coupling method of shaft, and others)
Operating conditions	Description of prime mover	Motor, servomotor, engine, others ( )
	Load torque or transmission kW	( ) kW or ( ) N · m
	Operating time	( ) hrs/day, continuous · intermittent
	Frequency of start-stop	( ) times/hr
	Rotational speed at input	Regular ( ) rpm · Maximum ( ) rpm
	Direction of input shaft	Lateral shaft · Cross shaft
	Speed ratio of gear box	1 : 1、1.5 : 1、2 : 1、2.5 : 1、3 : 1、( ) : 1
	Load characteristics	Uniform load · Load with extent shock · Load with large shock
Atmosphere where used	Usage environment	Indoor · Outdoor · Near a furnace · Inside a freezer · Others ( )
	Ambient temperature	Regular ( °C) · High temperature ( °C) · Low temperature ( °C)
	Ambient atmosphere	Salt damage · Dust · Acid · Others ( )
Others	Option (pp.66 to 68)	Tapping at shaft end · Material of casing bracket: FCD · Others ( )
	Special specification (pp.69 to 72)	
Outline drawing of equipment		

# MEMO

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.



# Warranty

## 1. Warranty period, free of charge

Our company's warranty period, free of charge, is 18 months after shipment from our factory, or 12 months after starting use (including after incorporating our company's product into the customer's equipment), whichever is shorter.

## 2. Warranty range

Regarding a failure of our company's products during the warranty period, free of charge in case correct installation, usage, maintenance and control according to the "Instruction manual" are performed, the failed portions shall be replaced or repaired free of charge. However, the target of the warranty shall only be our company's products; therefore, the following expenses shall be outside the scope of the warranty.

- (1) Expenses required for dismounting and mounting our company's products from/to the customer's equipment, and expenses for work related to them.
- (2) Expenses required for transporting the customer's equipment to the repair shop, etc.
- (3) Customer's lost profits associated with failure and/or repair, as well as other losses.

## 3. Warranty for a fee

If any trouble is caused due to the following items, in spite of it occurring during the warranty period, free of charge, we will undertake investigation and repair for a fee.

- (1) If the customer has not correctly installed our company's products in accordance with the "Instruction manual"
- (2) Customer's maintenance and control was not sufficient, and handling was not correct
- (3) In case a failure occurs due to defective coupling of our company's products with other equipment
- (4) If the structure of our company's products has been changed, such as modification by the customer.
- (5) If the products were repaired by a firm/factory, other than our company or a factory designated by our company
- (6) If our company's products were used under conditions other than the correct operating environment in accordance with the "Instruction manual"
- (7) If a failure is generated due to force majeure such as an accident or due to an illegal act by a third party
- (8) If a failure of our company's products is generated secondarily due to any defect in the customer's equipment
- (9) If a failure is generated due to a part/component supplied by the customer that was incorporated in our product, or due to a part/component used as designated by the customer, etc.
- (10) If consumable parts such as bearings, oil seals that were incorporated in our company's products run out, become worn, or deteriorate
- (11) In addition, any damage generated due to a cause that is outside our company's responsibility



## Precautions for safety

### (General)

- Comply with safety regulations for the place of installation and the equipment used. ("Ordinance on Industrial Safety and Hygiene," "Guide book of electrical equipment," "Building Standards Act," etc.)
- Before use, read the "Instruction manual" thoroughly, and use the products correctly. If the "Instruction manual" is not found, request the vendor or our company to provide it. Be sure to deliver the "Instruction manual" to the end user.

### (Selection)

- Select a product that is suitable for the usage environment and application.
- When our company's products are used for equipment that transports people or hoisting equipment, provide a safety device at the equipment side for safety purposes.
- Use an explosion-proof motor in an explosive atmosphere. Furthermore, use an explosion-proof motor with a specification that conforms to hazardous places.
- When an explosion-proof motor is driven by an inverter, the only combination of motor and inverter allowed is in the ratio of 1:1. Be sure to operate it with the indicated specialized inverter. Moreover, because the inverter has a non-explosion-proof structure, be sure to install it at a place where there is no explosive gas.
- When the motor is driven by a 400 V class inverter, install a suppression filter or reactor at the inverter side, or use a motor of a reinforced insulation type.
- For equipment in which oil contamination should not occur, such as food-processing machinery, attach a loss prevention device such as an oil pan in case of accidental oil leakage caused by failure, end of useful life, etc.



### Caution

**This catalog mainly refers to the selection of models. For actual usage, read the "Instruction manual" thoroughly before use, and use products correctly.**



## TSUBAKIMOTO CHAIN CO.

### Headquarters

Nakanoshima Mitsui Building  
3-3-3 Nakanoshima, Kita-ku  
Osaka, 530-0005, Japan  
Phone : +81-6-6441-0011  
URL : <http://tsubakimoto.com>

### Chain & Power Transmission Sales

1-3 Kannabidai, 1-chome  
Kyotanabe,  
Kyoto, 610-0380, Japan  
Phone : +81-774-64-5022

### Group companies

#### NORTH and SOUTH AMERICA

**U.S. TSUBAKI POWER TRANSMISSION, LLC**  
301 E. Marquardt Drive, Wheeling, IL 60090, U.S.A.  
Phone : +1-847-459-9500  
URL : <http://ustsubaki.com/>

**TSUBAKI of CANADA LIMITED**  
1630 Drew Road, Mississauga, Ontario, L5S 1J6, Canada  
Phone : +1-905-676-0400  
URL : <http://tsubaki.ca>

**TSUBAKI BRASIL EQUIPAMENTOS INDUSTRIAIS LTDA.**  
R. Pamplona, 1018, C.J. 73/74, Jd. Paulista  
CEP 01405-001, São Paulo, S.P.Brazil  
Phone : +55-11-3253-5656  
URL : <http://tsubaki.ind.br>

#### EUROPE

**TSUBAKIMOTO EUROPE B.V.**  
Aventurijn 1200, 3316 LB Dordrecht, The Netherlands  
Phone : +31-78-620-4000  
URL : <http://tsubaki.eu>

**TSUBAKIMOTO U.K. LTD**  
Osier Drive, Sherwood Park, Annesley, Nottingham  
NG15 0DX, United Kingdom  
Phone : +44-1623-688-700  
URL : <http://tsubaki.eu>

**TSUBAKI DEUTSCHLAND GmbH**  
ASTO Park Oberpfaffenhofen, Friedrichshafener Straße 1  
D-82205, Gilching, Germany  
Phone : +49-8105-7307100  
URL : <http://tsubaki.de/>

**OOO "TSUBAKI KABELSCHLEPP"**  
Prospekt Andropova 18, Building 6  
115432 Moscow, Russia  
Phone : +7-499-418212  
URL : <http://kabelschlepp.ru/>

#### ASIA and OCEANIA

**TAIWAN TSUBAKIMOTO CO.**  
No. 33, Lane 17, Zihciang North Road  
Gueishan Township Taoyuan County Taiwan R.O.C.  
Phone : +886-3-3293827/8/9  
URL : <http://tsubakimoto.com.tw>

**TSUBAKIMOTO CHAIN (SHANGHAI) CO. LTD.**  
Room 601, Urban City Centre, 45 Nanchang Road  
Huangpu District, Shanghai 2000020, People's Republic of China  
Phone : +86-21-5396-6651/2  
URL : <http://tsubaki.cn/>

**TSUBAKI INDIA POWER TRANSMISSION PVT. LTD.**  
Chandrika Chambers No.4, 3rd Floor, Anthony Street  
Royapettah, Chennai, Tamil Nadu 600014, India  
Phone : +91-44-4231-5251  
URL : <http://tsubaki.in/>

**TSUBAKIMOTO SINGAPORE PTE. LTD.**  
25 Gul Lane, Jurong, Singapore 629419  
Phone : +65-6861-0422/3/4  
URL : <http://tsubaki.sg>

**TSUBAKIMOTO SINGAPORE PTE. LTD.**  
**VIETNAM REPRESENTATIVE OFFICE**  
H&H Building 8F, 209 Hoàng V□n Th□  
Phú Nhu□n District, H□ Chi Minh City, Vietnam  
Phone : +84-8-3999-0131/2  
URL : <http://tsubaki.net.vn/>

**PT. TSUBAKI INDONESIA TRADING**  
Wisma 46 - Kota BNI, 24th Floor, Suite 24.15  
Jl. Jend. Sudirman, Kav. 1, Jakarta 10220, Indonesia  
Phone : +62-21-571-4230/31  
URL : <http://tsubakimoto.co.id/>

**TSUBAKI POWER TRANSMISSION (MALAYSIA) SDN. BHD.**  
No. 22, Jalan Astaka U8/84A,  
Bukit Jelutong Industrial Park  
Section U8, 40150 Shah Alam, Selangor, Malaysia  
Phone : +60-3-7859-8585  
URL : <http://tsubaki.sg>

**TSUBAKI AUSTRALIA PTY. LTD.**  
Unit E, 95-101 Silverwater Road  
Silverwater NSW 2128, Australia  
Phone : +61-02-9704-2500  
URL : <http://tsubaki.com.au>

**TSUBAKI AUSTRALIA PTY. LTD.**  
**NEW ZEALAND BRANCH**  
2 Kalmia Street, Eilerslie, Auckland 1051, New Zealand  
Phone : +64-275-082-726  
Phone : <http://tsubaki.com.au>

**TSUBAKIMOTO (THAILAND) CO. LTD.**  
388 Exchange Tower, 19th Floor Unit 1902  
Sukhumvit Road, Klongtoey, Bangkok 10110, Thailand  
Phone : +66-2-262-0667/8/9  
URL : <http://tsubaki.co.th>

**TSUBAKIMOTO KOREA CO., LTD.**  
#1004/1005 East Wing, Hanshin Intervalley 24, 707-34  
Yeoksam-dong, Gangnam-gu, Seoul, Korea  
Phone : +82-02-2183-0311  
URL : <http://tsubakimoto.com>

Distributed by: