

Option

● Worm reducer (**CRG25/32 HO32 to 135 TE35 to 150**)

■ Features

1. Taking full advantage of the index drive performance

These are specially designed worm reducers for the index drive. By directly mounting them onto the input shaft, optimum rotation and braking can be achieved, and you can take full advantage of the performance of the index drive series.

2. Space saving

By mounting them directly onto the input shaft, you will get a compact drive system. In addition, you can reduce the steps for designing and assembling the drive system.

3. Clutch/Brake

The 2 types of reducers are available: the 1 with clutch/brake and the other without. (except for CRG reducers)

4. Series expanding to 3 models in 16 sizes

The wide range of sizes are standard in the series.



Roller gear cam drive	Compact
	Standard
	Table
Wide angle	
Basic	

Parallel cam drive	

Pick and Place drive	Linear
	Circular

Option

When designing or selecting

⚠ CAUTION

- 1 The reducer load torque should be smaller than the dynamic rated output torque.
- 2 When the index drive is operated intermittently using clutch/brake, check the motion time of the clutch/brake.
The motion time of the clutch/brake varies depending on the characteristics of the clutch/brake itself and the rotational speed and moment of inertia of the shaft/pulley to be operated.
- 3 When you install a detection switch, check the response time of the detection switch.
If the input shaft speed is fast, the detection switch may not be able to detect it.
- 4 When you use a reducer for the purpose other than using with index drive, confirm the characteristics values.
Please note that the nominal reduction ratio may vary from the actual reduction ratio for CRG reducers.
- 5 When you design the mounting and installation, take into consideration that inspection, disassembly and assembly should be easily conducted. And the oil level gauge should be accessible.
- 6 Piping for replacing the lubricating oil (not required for CRG reducer)
When you install a reducer in an automated machine, replacing oil may become impossible. In this case, we recommend you provide piping for draining and refilling oil before installation to the automated machine so that you can replace it easily.
- 7 Reducers are filled with lubricating oil. Oil may seep out of the oil seal while being used. Conduct periodic inspection and provide countermeasures such as an oil drip pan if this may cause a product defect.

Installation & adjustment

⚠ CAUTION

- 1 When you install a pulley, sprocket, or table to the worm shaft, do not apply impact with a hammer. When you apply impact, the reducer may become damaged.
For a reducer with a clutch, if you tighten a mounting bolt deeper than the specification, internal components may become damaged. (Refer to the dimensions.)
- 2 When you install a pulley or sprocket to the worm shaft to drive the system, pay attention to the allowable OHL, and apply appropriate tension. Excessive tension may cause noise, shorten service life, damage the worm shaft and result in malfunction of the clutch/brake.
- 3 When you connect shafts, align the centers of the shafts.
If the centers are not aligned, noise may leak, the bearing service life may be shortened and the unit may break.
- 4 Install the unit in the position specified in the specifications.
- 5 Clutch/Brake is a dry. If water or oil is present on the friction surfaces, the transmission torque may be reduced. Avoid getting water or oil on the friction surfaces.
When you use this unit in an environment where dust such as iron or sand powders are present, the dust may shorten the service life significantly if you get it on the friction surfaces. Be particular careful to avoid dust.
- 6 Rotate the input shaft at speeds specified in the specifications.
- 7 Be sure to attach the grease nipple to the HO reduction gear of the 5, 6 reducer before operation.

Option

● Worm reducer (CRG25/32 HO32 to 135 TE35 to 150)

- 8** The reducers are sealed with lubricating oil. There is no need for initial lubrication. The product is sealed with a plug when shipped. Before operation, replace the plug with the one with breather holes included in the shipment. (TE reducers have a pressure vent. For TE35 and TE42, there is no need for replacement.)
If not replaced, oil leak may occur leading to a fire.

- 9** Do not use this product in an environment where ignition, explosion, or fire may occur.

- 10** Do not touch any moving parts while the reducer is running. This would lead to injury.

11 Clutch/Brake wiring

The ground terminals of the motor and the controller should be grounded. We recommend the Class III ground (100 Ω or less and $\phi 1.6$ mm or greater) as the grounding method. Choose the correct wire size for the power supply capacity. If a wire smaller in capacity is used, the insulation coating may melt resulting in electric shock or leakage leading to a fire.

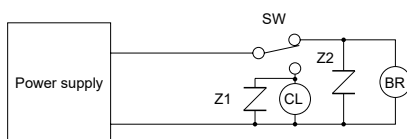
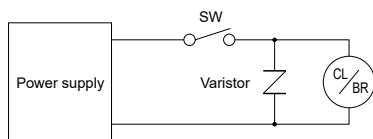
(1) Connection

Power required for operating clutch/brake is 24 VDC. Control the voltage fluctuation within $\pm 10\%$. If voltage varies, the performance will deteriorate resulting in coil overheating and/or damage. If the circuit is long, the voltage supplied to the clutch/brake may drop due to resistance of the circuit even if the power supply generates proper voltage. Check the voltage at the terminals of the clutch/brake. A switch on the DC side should turn on or off the clutch/brake. If this is done on the AC side, motion is delayed. In this case, allow time lag for switching.

Do not pull or bend the lead wires.

(2) Surge absorbing protective element (varistor)

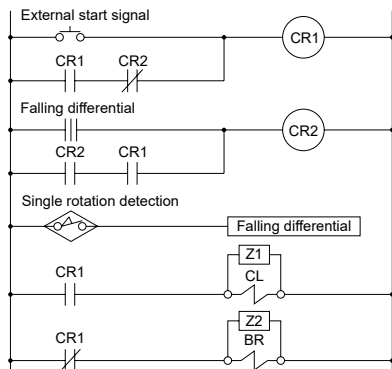
The surge absorbing protective element (varistor) which comes with the product should be connected in parallel to the clutch (or brake). This element does not have polarity.



Clutch/Brake connection circuit

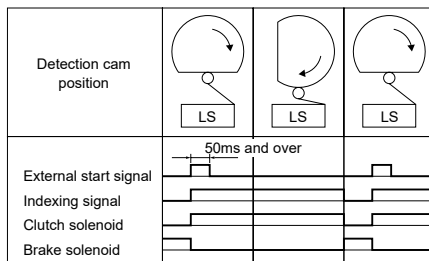
12 Example circuit

Design the circuit based on universal electrical designing.



● Timing chart example

Single rotation detection: For a limit switch (LS)



During use & maintenance

CAUTION

- 1** Inspect for any loosened bolts or screws.
- 2** Do not service or inspect the units while power is being supplied.
It may sudden run due to an error or control circuit failure resulting in injury.
- 3** If any abnormal noise is heard, immediately stop the machine.
Internal parts may be damaged. Contact your dealer of CKD.
- 4** Replacing lubricating oil
Replace lubricating oil in the following manner.
Be sure to perform the initial replacement in order to remove initial wear particles after running-in.
The temperature of lubricating oil is very high immediately after the operation is stopped. Replace oil 1 to 2 hours after stopping the operation. Check the oil level every week. Be sure to refill oil with the identical manufacturer, brand and grade as necessary. If you recognize significant deterioration of oil performance (viscosity, color, etc.), shorten the replacement intervals.
(1) HO reducer
The first replacement should be done 50 hours after starting the operation. Afterward, replace it every 6 months. Supply with grease from the lubricating oil at the time of replacing the grease nipple.
Model No.: Albania Grease S2 (Showa Shell)
(2) TE reducer
The first replacement should be done at 2,000 hours after starting the operation. Afterward, replace it every 2,000-8,000 hours.
- 5** Adjusting the gap
When clutch/brake gap becomes as listed in the chart below, adjust the gap properly. When you adjust the gap, the brake time of the clutch/brake will change. Confirm that start and stop occur in a dwell section of index drive input shaft. Adjust the timing of clutch/brake with the input shaft detection cam.

HO reducer (unit: mm)

	HO size	32	40	50	60	80	100	135
Clutch	Limit gap	0.4	0.5	0.5	0.5	0.5	0.75	0.75
	Initial gap setting	0.15	0.2	0.2	0.2	0.2	0.3	0.3
Brake	Limit gap	0.4	0.5	0.5	0.5	0.5	0.75	0.75
	Initial gap setting	0.15	0.2	0.2	0.2	0.2	0.3	0.3

TE reducer (common to Clutch/Brake) (unit: mm)

TE size	35	42	51	63	80	100	150
Guidelines for re-adjusting the gap	0.4	0.4	0.4	0.5	0.6	0.6	0.8
Specified gap	0.15 to 0.25	0.15 to 0.25	0.15 to 0.25	0.15 to 0.25	0.20 to 0.35	0.20 to 0.35	0.20 to 0.35

Option

● Worm reducer

■ Standard worm reducers

The chart below indicates the combinations of standard installations.

Check the reducer load torque (Ter) and the worm reducer rated output torque before use.

Roller gear cam drive

For Compact

Main model No.		CRG reducer Size	Reduction ratio
RGIS RGOS	025	CRG25	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	032	CRG32	1/10, 1/20, 1/30 1/40, 1/50, 1/60

The reduction ratio is 1/19.5 for 1/20 and 1/39 for 1/40.

For Standard

Discontinued model

Main model No.		HO reducer Size	Reduction ratio Value in () represents the special reduction ratio.	TE reducer Size	Reduction ratio
RGIS	040	HO32	1/20, 1/40, 1/60 (1/30, 1/50)	-	-
	050	HO32	1/20, 1/40, 1/60 (1/30, 1/50)	TE35	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	063	HO40	1/20, 1/40, 1/60 (1/30, 1/50)	TE42	1/10, 1/20, 1/30 1/40, 1/50, 1/60
RGOS	080	HO50	1/20, 1/30, 1/40 1/50, 1/60	TE51	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	110	HO60	1/20, 1/30, 1/40 1/50, 1/60	TE63	1/10, 1/20, 1/30 1/40, 1/50, 1/60
RGCS	140	HO80	1/20, 1/30, 1/40 1/50, 1/60	TE80	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	180	HO100	1/20, 1/30, 1/40 1/50, 1/60	TE100	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	250	HO135	1/20, 1/40, 1/60 (1/30, 1/50)	TE150	1/10, 1/20, 1/30 1/40, 1/50, 1/60

For Table type

Main model No.		HO reducer Size	Reduction ratio Value in () represents the special reduction ratio.	TE reducer Size	Reduction ratio
RGIT	063	HO32	1/20, 1/40, 1/60 (1/30, 1/50)	TE35	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	080	HO40	1/20, 1/40, 1/60 (1/30, 1/50)	TE42	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	110	HO50	1/20, 1/30, 1/40 1/50, 1/60	TE51	1/10, 1/20, 1/30 1/40, 1/50, 1/60
RGCT	140	HO60	1/20, 1/30, 1/40 1/50, 1/60	TE63	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	180	HO80	1/20, 1/30, 1/40 1/50, 1/60	TE80	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	250	HO100	1/20, 1/30, 1/40 1/50, 1/60	TE100	1/10, 1/20, 1/30 1/40, 1/50, 1/60

For Wide angle

Discontinued model

Main model No.		HO reducer Size	Reduction ratio Value in () represents the special reduction ratio.	TE reducer Size	Reduction ratio
RGIL	063	HO32	1/20, 1/40, 1/60 (1/30, 1/50)	TE35	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	080	HO40	1/20, 1/40, 1/60 (1/30, 1/50)	TE42	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	110	HO50	1/20, 1/30, 1/40 1/50, 1/60	TE51	1/10, 1/20, 1/30 1/40, 1/50, 1/60
RGOL	140	HO60	1/20, 1/30, 1/40 1/50, 1/60	TE63	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	180	HO80	1/20, 1/30, 1/40 1/50, 1/60	TE80	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	250	HO100	1/20, 1/30, 1/40 1/50, 1/60	TE100	1/10, 1/20, 1/30 1/40, 1/50, 1/60

Parallel cam drive

Main model No.		HO reducer Size	Reduction ratio Value in () represents the special reduction ratio.	TE reducer Size	Reduction ratio
PCIS PCOS	040	-	-	-	-
	050	HO32	1/20, 1/40, 1/60 (1/30, 1/50)	TE35	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	063	HO40	1/20, 1/40, 1/60 (1/30, 1/50)	TE42	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	080	HO50	1/20, 1/30, 1/40 1/50, 1/60	TE51	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	100	HO60	1/20, 1/30, 1/40 1/50, 1/60	TE63	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	125	HO80	1/20, 1/30, 1/40 1/50, 1/60	TE80	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	160	HO100	1/20, 1/30, 1/40 1/50, 1/60	TE100	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	200	HO100	1/20, 1/30, 1/40 1/50, 1/60	TE100	1/10, 1/20, 1/30 1/40, 1/50, 1/60
		HO135	1/20, 1/40, 1/60 (1/30, 1/50)	TE150	1/10, 1/20, 1/30 1/40, 1/50, 1/60
	250	HO135	1/20, 1/40, 1/60 (1/30, 1/50)	TE150	1/10, 1/20, 1/30 1/40, 1/50, 1/60

Product specifications

Compact

Standard

Table

Wide angle

Basic

Parallel cam drive

Pick and
Place drive
Linear Circular

Option

Option

● Worm reducer

■ How to display the unit model number

Worm reducer CRG Series

CRG25 - 1/20

A

B

(A) Model No.	(B) Reduction ratio
CRG25	1/10
CRG32	1/20
	1/30
	1/40
	1/50
	1/60

Note. The actual reduction ratio of CRG25 and CRG32 is 1/19.5 for 1/20 and 1/39 for 1/40.

Worm reducer HO Series

HO50 - 1/40 - Y - A - 5

A

B

C

D

E

(A) Model No.	(B) Reduction ratio
HO32	1/20
HO40	1/30
HO50	1/40
HO60	1/50
HO80	1/60
HO100	
HO135	

(C) Clutch/Brake
Y Clutch/Brake: Yes
N Clutch/Brake: No

Note. Those of 1/30 and 1/50 for HO32, HO40 and HO135 have special ratio. Verify the delivery schedule.

(D) Worm shaft layout		
	Clutch/Brake: Yes	Clutch/Brake: No
A	 Electromagnetic clutch Electromagnetic brake	
B	 Electromagnetic brake Electromagnetic clutch	

* A: Input shaft comes to the left when you face it.
B: Input shaft comes to the right when you face it.

Discontinued model

High torque worm reducer TE Series

TE80 - 1/40 - Y - A - 5

A

B

C

D

E

(A) Model No.	(B) Reduction ratio
TE35	1/10
TE42	1/20
TE51	1/30
TE63	1/40
TE80	1/50
TE100	1/60
TE150	

(C) Clutch/Brake
Y Clutch/Brake: Yes
N Clutch/Brake: No

D Worm shaft layout		
	Clutch/Brake: Yes	Clutch/Brake: No
A	 Electromagnetic clutch Electromagnetic brake	
B	 Electromagnetic brake Electromagnetic clutch	
G		Both shaft (Special specification) 

* A: Input shaft comes to the left when you face it.
B: Input shaft comes to the right when you face it.

Product specifications

Compact

Standard

Table

Wide angle

Basic

Parallel cam drive

Linear Circular
Pico and
Pico drive

Option

* Reducers for PC*S040 to 125, RG*S040 and PPLX are custom order items. Contact CKD for details.

Direction of gravity
↓

(E) Position of the reducer					
"Worm shaft layout" - A		"Worm shaft layout" - B		"Worm shaft layout" - A	
1		2		3	

a: Oil supply port b: Oil level gauge c: Drain port
* Grease nipple is attached at shipment.

(E) Position of the reducer

0

The reducer position is "0" for TE35 and TE42.

Direction of gravity
↓

(E) Position of the reducer					
"Worm shaft layout" - A		"Worm shaft layout" - B		"Worm shaft layout" - A	
1		2		3	

a: Oil supply port (pressure vent) b: Oil level gauge c: Drain port
* Locations of these may vary depending on the reducer position for TE51 or higher.

Option

● Worm reducer (**CRG25/CRG32**)

■ Characteristics table

Standard installation index	CRG25	RG*S025
	CRG32	RG*S032
Nominal reduction ratio		1/10, 1/20, 1/30, 1/40, 1/50, 1/60
Actual reduction ratio		1/10, 1/19.5, 1/30, 1/39, 1/50, 1/60
Max. speed of input shaft		1800 rpm
Allowable OHL of the input shaft		29.4 N
Allowable thrust force of the input shaft		4.91 N
Internal frictional torque (T _{inr})		1.96 × 10 ⁻² N·m
Radial force of the output shaft		196 N
Thrust force of the output shaft		49 N
Allowable runout (radial direction) of input and output shafts		At the tip of the shaft, 0.05 mm T.I.R. or less
Backlash (output shaft)		Absolute value of 0.15 mm or less at the radius of 15 mm
Weight		0.4 kg
Lubrication		Filled with grease No.2 (lithium grease)
Temperature rise		Room temperature + 15 degrees C or less
Worm torsion direction		Right helix

Product specifications

Compact

Standard

Table

Wide angle

Basic

Parallel cam drive

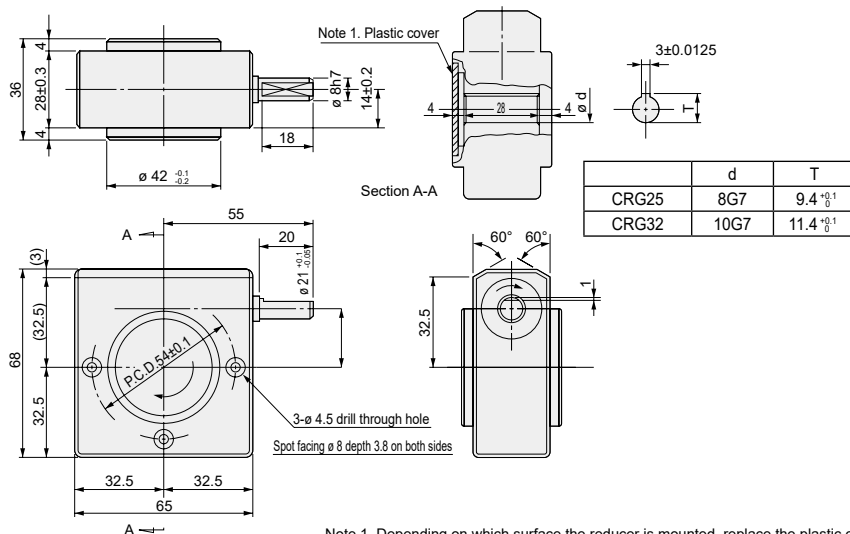
Linear

Option

Circular
Pitch and
Pressure drive



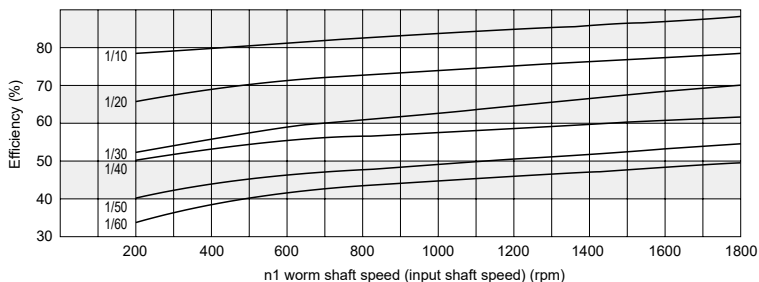
Dimensions



Rated output torque (N·m)

Reduction ratio	1/10	1/20	1/30	1/40	1/50	1/60
Input rpm						
1800	1.8	1.9	1.8	1.9	1.9	1.8
1500	1.9	2.0	2.0	2.1	2.0	2.0
1200	2.1	2.2	2.1	2.3	2.2	2.2
900	2.4	2.5	2.4	2.6	2.5	2.5
600	2.8	2.9	2.8	2.9	2.8	2.8
300	3.7	4.0	3.8	4.0	3.8	3.9

Efficiency (%)



Option

● Worm reducer (HO32)

■ Characteristics table

Standard installation index		RG*S040/050, RG*T063, RG*L063, PC*S050				
Reduction ratio		Value in () represents the special reduction ratio 1/20, 1/40, 1/60, (1/30, 1/50)				
Internal moment of inertia (converted for input shaft)		1/20	(1/30)	1/40	(1/50)	1/60
		$4.28 \times 10^5 \text{ kg}\cdot\text{m}^2$	$3.60 \times 10^5 \text{ kg}\cdot\text{m}^2$	$3.95 \times 10^5 \text{ kg}\cdot\text{m}^2$	$2.88 \times 10^5 \text{ kg}\cdot\text{m}^2$	$3.88 \times 10^5 \text{ kg}\cdot\text{m}^2$
Max. speed of input shaft		1800 rpm				
Allowable OHL of the input shaft	With C/B	78.5 N				
	Without C/B	147 N				
Internal frictional torque (T _{inr}) ISO viscosity grade VG320	5°C (5500 mm ² /s)	0.3 N·m				
	10°C (3200 mm ² /s)	0.24 N·m				
	15°C (2000 mm ² /s)	0.19 N·m				
	20°C (1400 mm ² /s)	0.16 N·m				
	30°C (650 mm ² /s)	0.12 N·m				
Weight	With C/B	5.0 kg				
	Without C/B	4.0 kg				
Lubricating oil (when shipped)		Bonnoc TS320 (ENEOS)				
Oil level		0.05 to 0.10 ℓ				
Worm torsion direction		Right helix				

■ Clutch/brake characteristics table

		Clutch (102-04-13-K-35G)	Brake (112-04-12-K-35G)
Dynamic frictional torque		1.2 N·m	1.2 N·m
Rotor moment of inertia		$1.41 \times 10^5 \text{ kg}\cdot\text{m}^2$	-
Armature moment of inertia		$4.38 \times 10^6 \text{ kg}\cdot\text{m}^2$	$6.15 \times 10^6 \text{ kg}\cdot\text{m}^2$
Exciting voltage		24 VDC	24 VDC
Coil (20°C)	Current	0.33 A	0.33 A
	Capacity	8 W	8 W
	Resistance	72 Ω	72 Ω

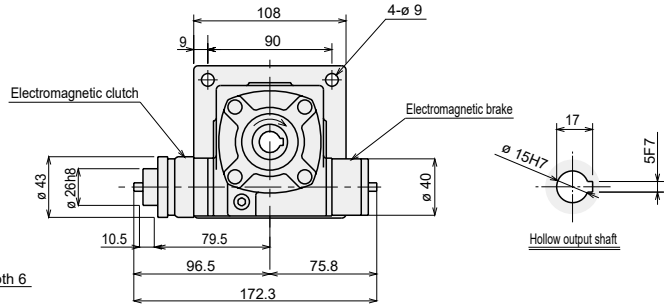
■ HO32Rated output torque (N·m)

Reduction ratio		1/20	1/30	1/40	1/50	1/60
Input rpm						
1800	With C/B	17	22	22	23	19
	Without C/B	20	26	22	23	19
1700	With C/B	17	22	22	23	19
	Without C/B	21	27	22	23	19
1600	With C/B	17	22	23	23	19
	Without C/B	21	27	23	23	19
1500	With C/B	16	22	23	24	20
	Without C/B	22	28	23	24	20
1400	With C/B	16	22	24	24	20
	Without C/B	22	28	24	24	20
1300	With C/B	16	22	25	25	21
	Without C/B	23	29	25	25	21
1200	With C/B	16	22	25	26	21
	Without C/B	23	30	25	26	21
1100	With C/B	16	22	25	26	21
	Without C/B	24	31	26	26	21
1000	With C/B	16	21	25	27	21
	Without C/B	25	32	26	27	21

■ HO32Efficiency (%)

Reduction ratio		1/20	(1/30)	1/40	(1/50)	1/60
Input rpm						
1800		69	62	57	54	48
1700		69	61	56	54	47
1600		69	61	56	53	47
1500		68	61	55	53	47
1400		68	60	55	53	46
1300		68	60	55	52	46
1200		67	60	54	51	45
1100		67	59	53	50	44
1000		66	58	52	50	43

● With C/B



Technical drawing of a gear pump assembly. The main view is a front elevation showing a square housing with a central circular gear assembly. Dimensions include: overall width 108, internal width 90, mounting flange thickness 9, total width including mounting 114, and gear assembly width 70. Four mounting holes are specified as 4-ø 9. A side view shows the housing height with dimensions 20, 22, and 5F7. A detail view of the reducer input shaft shows a shaft with a diameter of ø 10h7, a keyway of 4H9, and a key height of 2.5. The hollow output shaft has a diameter of ø 15H7, a keyway of 17, and a height of 5F7.

Position	1	2	3	4	5	6
Dimensions	Oil supply port Rc1/8 Oil level gauge (Both sides) Drain port Rc1/8	Oil filter port (both sides) Rc1/8 Oil level gauge (Both sides) Drain port Rc1/8	Oil filter port (both sides) Rc1/8 Oil level gauge (Both sides) Drain port Rc1/8	Oil supply port Rc1/8 Oil level gauge (Both sides) Drain port (both sides) Rc1/8	Oil supply port Rc1/8 Oil level gauge Drain port Rc1/8	Oil supply port Rc1/8 Oil level gauge Drain port Rc1/8

Option

● Worm reducer (HO40)

■ Characteristics table

Standard installation index		RG*S063, RG*T080, RG*L080, PC*S063				
Reduction ratio		Value in () represents the special reduction ratio 1/20, 1/40, 1/60, (1/30, 1/50)				
Internal moment of inertia (converted for input shaft)		1/20	(1/30)	1/40	(1/50)	1/60
		$1.44 \times 10^5 \text{ kg}\cdot\text{m}^2$	$1.33 \times 10^5 \text{ kg}\cdot\text{m}^2$	$1.32 \times 10^5 \text{ kg}\cdot\text{m}^2$	$1.15 \times 10^5 \text{ kg}\cdot\text{m}^2$	$1.23 \times 10^5 \text{ kg}\cdot\text{m}^2$
Max. speed of input shaft		1800 rpm				
Allowable OHL of the input shaft	With C/B	104 N				
	Without C/B	196 N				
Internal frictional torque (T _{inr}) ISO viscosity grade VG320	5°C (5500 mm ² /s)	0.53 N·m				
	10°C (3200 mm ² /s)	0.42 N·m				
	15°C (2000 mm ² /s)	0.34 N·m				
	20°C (1400 mm ² /s)	0.29 N·m				
	30°C (650 mm ² /s)	0.20 N·m				
Weight	With C/B	6.0 kg				
	Without C/B	5.0 kg				
Lubricating oil (when shipped)		Bonnoc TS320 (ENEOS)				
Oil level		0.10 to 0.15 ℓ				
Worm torsion direction		Right helix				

■ Clutch/brake characteristics table

		Clutch (102-05-13-K-35G)	Brake (112-05-12-K-35G)
Dynamic frictional torque		2.4 N·m	2.4 N·m
Rotor moment of inertia		$3.15 \times 10^{-5} \text{ kg}\cdot\text{m}^2$	-
Armature moment of inertia		$9.08 \times 10^{-6} \text{ kg}\cdot\text{m}^2$	$1.38 \times 10^{-6} \text{ kg}\cdot\text{m}^2$
Exciting voltage		24 VDC	24 VDC
Coil (20°C)	Current	0.42 A	0.42 A
	Capacity	10 W	10 W
	Resistance	58 Ω	58 Ω

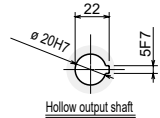
■ HO40 Rated output torque (N·m)

Reduction ratio		1/20	1/30	1/40	1/50	1/60
Input rpm						
1800	With C/B	34	46	42	41	33
	Without C/B	35	47	42	41	33
1700	With C/B	34	45	42	42	33
	Without C/B	36	48	42	42	33
1600	With C/B	34	45	43	43	34
	Without C/B	37	49	43	43	34
1500	With C/B	34	45	44	43	35
	Without C/B	38	51	44	43	35
1400	With C/B	33	45	46	45	35
	Without C/B	39	52	46	45	35
1300	With C/B	33	44	47	46	36
	Without C/B	40	53	47	46	36
1200	With C/B	33	44	48	47	37
	Without C/B	41	54	48	47	37
1100	With C/B	33	43	49	48	38
	Without C/B	43	56	49	48	38
1000	With C/B	33	43	51	50	39
	Without C/B	44	57	51	50	39

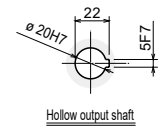
■ HO40Efficiency (%)

Reduction ratio	1/20	(1/30)	1/40	(1/50)	1/60
Input rpm					
1800	71	64	61	56	50
1700	70	63	60	55	49
1600	70	63	60	55	49
1500	70	62	59	54	48
1400	69	62	59	54	48
1300	69	61	58	54	47
1200	68	61	58	53	47
1100	68	60	57	53	46
1000	68	60	56	52	46

● With C/B



Technical drawing of a shaft-hub assembly. The shaft has a diameter of $\varnothing 12h7$. The hub has a bore of $4H9$. The fit allowance is indicated as 2.5 mm.



Position	1	2	3	4	5	6
Dimensions	Oil supply port Rc1/4 25 35 12.5 65 52 Up Down Drain port Rc1/4 Oil level gauge (Both sides)	Oil filler port (both sides) Rc1/4 65 52 35 12.5 Up Down Oil level gauge (Both sides) Drain port Rc1/4 25 65 52	Oil filler port (both sides) Rc1/4 35 12.5 25 Oil level gauge (Both sides) Drain port Rc1/4	25 35 12.5 35 Oil supply port Rc1/4 Oil level gauge (Both sides) Drain port Rc1/4	Oil supply port Rc1/4 Oil level gauge 35 12.5 Drain port Rc1/4	Oil supply port Rc1/4 Oil level gauge 35 12.5 Drain port Rc1/4

Option

● Worm reducer (HO50)

■ Characteristics table

Standard installation index		RG*S080, RG*T110, RG*L110, PC*S080				
Reduction ratio		1/20, 1/30, 1/40, 1/50, 1/60				
Internal moment of inertia (converted for input shaft)		1/20	1/30	1/40	1/50	1/60
		$1.79 \times 10^5 \text{ kg}\cdot\text{m}^2$	$3.15 \times 10^5 \text{ kg}\cdot\text{m}^2$	$1.48 \times 10^5 \text{ kg}\cdot\text{m}^2$	$3.17 \times 10^5 \text{ kg}\cdot\text{m}^2$	$1.23 \times 10^5 \text{ kg}\cdot\text{m}^2$
Max. speed of input shaft		1800 rpm				
Allowable OHL of the input shaft	With C/B	196 N				
	Without C/B	491 N				
Internal frictional torque (T _{inr}) ISO viscosity grade VG320	5°C (5500 mm ² /s)	0.92 N·m				
	10°C (3200 mm ² /s)	0.72 N·m				
	15°C (2000 mm ² /s)	0.59 N·m				
	20°C (1400 mm ² /s)	0.50 N·m				
	30°C (650 mm ² /s)	0.35 N·m				
Weight	With C/B	9.5 kg				
	Without C/B	8.0 kg				
Lubricating oil (when shipped)		Bonnoc TS320 (ENEOS)				
Oil level		0.2 ℓ				
Worm torsion direction		Right helix				

■ Clutch/brake characteristics table

		Clutch (101-06-15-K-35G)	Brake (111-06-12-K-35G)
Dynamic frictional torque		5.5 N·m	5.5 N·m
Dynamic frictional torque		5.0 N·m	5.0 N·m
Rotor moment of inertia		$7.35 \times 10^{-5} \text{ kg}\cdot\text{m}^2$	-
Armature moment of inertia		$1.05 \times 10^{-4} \text{ kg}\cdot\text{m}^2$	$6.03 \times 10^{-5} \text{ kg}\cdot\text{m}^2$
Exciting voltage		24 VDC	24 VDC
Coil (20°C)	Current	0.46 A	0.46 A
	Capacity	11 W	11 W
Coil Resistance		52 Ω	52 Ω

■ HO50 Rated output torque (N·m)

Reduction ratio	Input rpm	1/20	1/30	1/40	1/50	1/60
1800	With C/B	64	70	68	56	59
	Without C/B	64	70	68	56	59
1700	With C/B	65	72	69	57	60
	Without C/B	65	72	69	57	60
1600	With C/B	66	73	70	58	61
	Without C/B	66	73	70	58	61
1500	With C/B	68	74	72	59	63
	Without C/B	68	74	72	59	63
1400	With C/B	70	76	74	61	64
	Without C/B	70	76	74	61	64
1300	With C/B	72	77	76	62	66
	Without C/B	72	77	76	62	66
1200	With C/B	72	79	77	64	67
	Without C/B	75	79	77	64	67
1100	With C/B	72	81	79	65	69
	Without C/B	77	81	79	65	69
1000	With C/B	72	84	81	67	71
	Without C/B	78	84	81	67	71

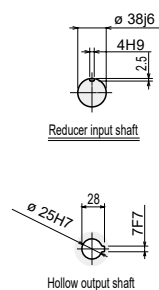
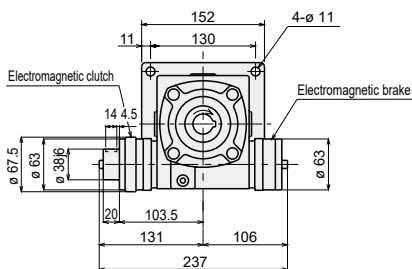
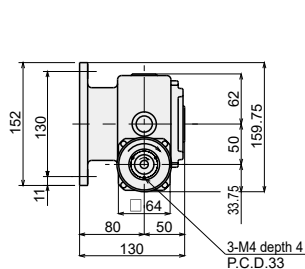
■ HO50Efficiency (%)

Reduction ratio	Input rpm	1/20	1/30	1/40	1/50	1/60
1800		75	67	64	57	58
1700		74	66	64	56	57
1600		74	65	63	55	57
1500		74	65	63	54	56
1400		73	64	62	54	56
1300		73	63	62	53	55
1200		72	63	61	52	55
1100		72	62	61	52	54
1000		72	61	60	51	53

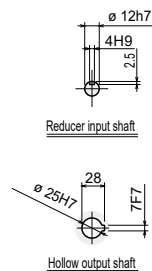
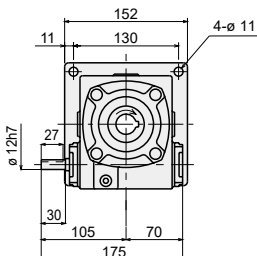
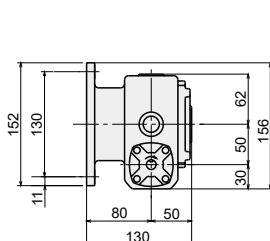


■ Dimensions

● With C/B



● Without C/B



■ Positions of the oil level gauge and the oil fill/drain port determined by the installation position of HO reducer

Position	1	2	3	4	5	6
Dimensions						

Product specifications

Compact

Standard

Table

Wide angle

Basic

Parallel cam drive

Pick and
Place drive
Linear
Circular

Option

Option

● Worm reducer (HO60)

■ Characteristics table

Standard installation index		RG*S110, RG*T140, RG*L140, PC*S100				
Reduction ratio		1/20, 1/30, 1/40, 1/50, 1/60				
Internal moment of inertia (converted for input shaft)		1/20	1/30	1/40	1/50	1/60
		5.64 × 10 ⁵ kg·m ²	7.19 × 10 ⁵ kg·m ²	5.13 × 10 ⁵ kg·m ²	4.85 × 10 ⁵ kg·m ²	2.48 × 10 ⁵ kg·m ²
Max. speed of input shaft		1800 rpm				
Allowable OHL of the input shaft	With C/B	294 N				
	Without C/B	785 N				
Internal frictional torque (Tinr) ISO viscosity grade VG320	5°C (5500 mm²/s)	1.5 N·m				
	10°C (3200 mm²/s)	1.1 N·m				
	15°C (2000 mm²/s)	0.93 N·m				
	20°C (1400 mm²/s)	0.79 N·m				
	30°C (650 mm²/s)	0.56 N·m				
Weight	40°C (320 mm²/s)	0.41 N·m				
	With C/B	14.5 kg				
	Without C/B	11.0 kg				
Lubricating oil (when shipped)		Bonnoc TS320 (ENEOS)				
Oil level		0.3 ℓ				
Worm torsion direction		Right helix				

■ Clutch/brake characteristics table

		Clutch (101-08-15-K-35G)	Brake (111-08-12-K-35G)
Dynamic frictional torque		11 N·m	11 N·m
Dynamic frictional torque		10 N·m	10 N·m
Rotor moment of inertia		$2.24 \times 10^{-4} \text{ kg}\cdot\text{m}^2$	-
Armature moment of inertia		$3.00 \times 10^{-4} \text{ kg}\cdot\text{m}^2$	$1.71 \times 10^{-4} \text{ kg}\cdot\text{m}^2$
Exciting voltage		24 VDC	24 VDC
Coil (20°C)	Current	0.63 A	0.63 A
	Capacity	15 W	15 W
Coil Resistance		38 Ω	38 Ω

■ HO60Rated output torque (N·m)

Reduction ratio		1/20	1/30	1/40	1/50	1/60
Input rpm						
1800	With C/B	90	112	99	101	95
	Without C/B	90	112	99	101	95
1700	With C/B	92	115	101	103	97
	Without C/B	92	115	101	103	97
1600	With C/B	93	118	103	105	99
	Without C/B	93	118	103	105	99
1500	With C/B	96	120	106	107	101
	Without C/B	96	120	106	107	101
1400	With C/B	99	123	108	109	103
	Without C/B	99	123	108	109	103
1300	With C/B	102	126	111	112	106
	Without C/B	102	126	111	112	106
1200	With C/B	105	128	114	115	108
	Without C/B	105	128	114	115	108
1100	With C/B	108	131	117	119	111
	Without C/B	108	131	117	119	111
1000	With C/B	111	136	121	122	114
	Without C/B	111	136	121	122	114

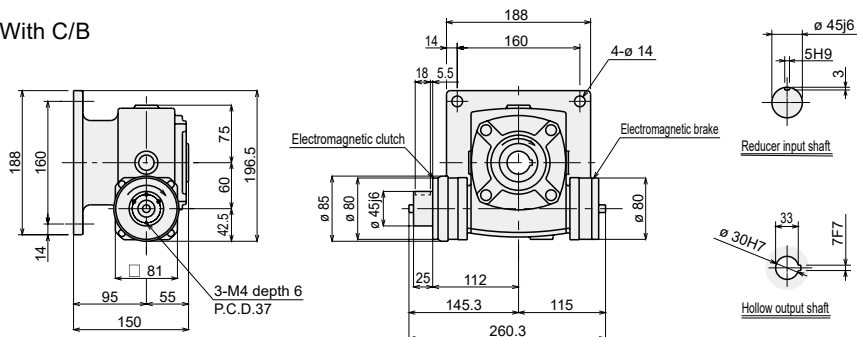
■ HO60Efficiency (%)

Reduction ratio	1/20	1/30	1/40	1/50	1/60
Input rpm					
1800	74	68	63	63	60
1700	74	68	63	62	59
1600	73	67	62	62	59
1500	73	67	61	61	58
1400	72	66	60	61	58
1300	71	65	60	60	57
1200	71	64	59	60	57
1100	70	63	58	59	56
1000	70	63	57	58	56

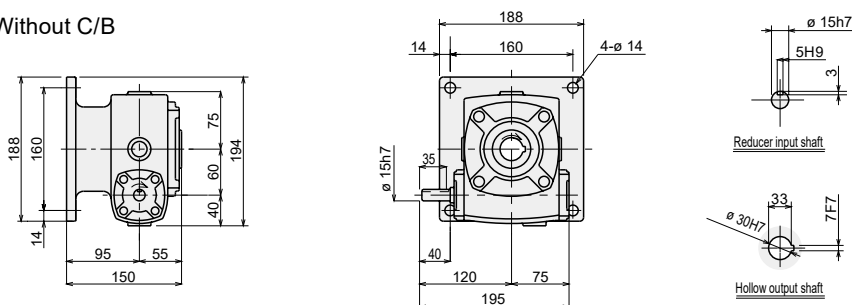


■ Dimensions

● With C/B



● Without C/B



■ Positions of the oil level gauge and the oil fill/drain port determined by the installation position of HO reducer

Position	1	2	3	4	5	6
Dimensions						

Product specifications

Roller gear cam drive

Compact

Standard

Table

Wide angle

Basic

Parallel cam drive

Option

Linear

Circular

Option

● Worm reducer (HO80)

■ Characteristics table

Standard installation index		RG*S140, RG*T180, RG*L180, PC*S125				
Reduction ratio		1/20, 1/30, 1/40, 1/50, 1/60				
Internal moment of inertia (converted for input shaft)		1/20	1/30	1/40	1/50	1/60
		$2.65 \times 10^4 \text{ kg}\cdot\text{m}^2$	$3.20 \times 10^4 \text{ kg}\cdot\text{m}^2$	$2.46 \times 10^4 \text{ kg}\cdot\text{m}^2$	$2.44 \times 10^4 \text{ kg}\cdot\text{m}^2$	$1.62 \times 10^4 \text{ kg}\cdot\text{m}^2$
Max. speed of input shaft		1800 rpm				
Allowable OHL of the input shaft	With C/B	687 N				
	Without C/B	1570 N				
Internal frictional torque (T _{inr}) ISO viscosity grade VG320	5°C (5500 mm ² /s)	2.9 N·m				
	10°C (3200 mm ² /s)	2.2 N·m				
	15°C (2000 mm ² /s)	1.8 N·m				
	20°C (1400 mm ² /s)	1.4 N·m				
	30°C (650 mm ² /s)	1.0 N·m				
Weight	With C/B	35.0 kg				
	Without C/B	30.0 kg				
Lubricating oil (when shipped)		Bonnoc TS320 (ENEOS)				
Oil level		0.7 to 1.0 ℓ				
Worm torsion direction		Right helix				

■ Clutch/brake characteristics table

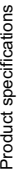
		Clutch (101-10-15-K-35G)	Brake (111-10-12-K-35G)
Dynamic frictional torque		22 N·m	22 N·m
Dynamic frictional torque		20 N·m	20 N·m
Rotor moment of inertia		$6.78 \times 10^{-4} \text{ kg}\cdot\text{m}^2$	-
Armature moment of inertia		$9.45 \times 10^{-4} \text{ kg}\cdot\text{m}^2$	$6.63 \times 10^{-4} \text{ kg}\cdot\text{m}^2$
Exciting voltage		24 VDC	24 VDC
Coil (20°C)	Current	0.83 A	0.83 A
	Capacity	20 W	20 W
Coil Resistance		29 Ω	29 Ω

■ HO80Rated output torque (N·m)

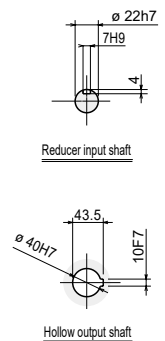
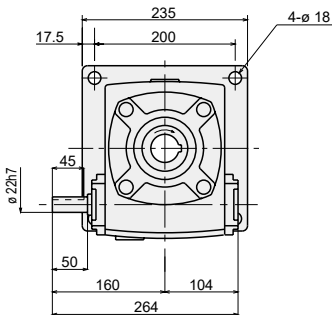
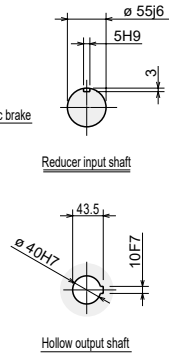
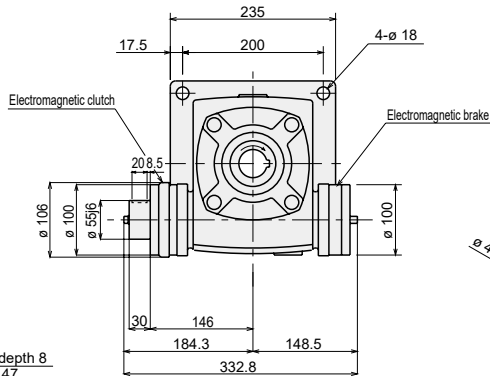
Reduction ratio		1/20	1/30	1/40	1/50	1/60
Input rpm						
1800	With C/B	190	237	210	207	195
	Without C/B	190	237	210	207	195
1700	With C/B	195	242	214	211	200
	Without C/B	195	242	214	211	200
1600	With C/B	200	247	219	217	206
	Without C/B	200	247	219	217	206
1500	With C/B	206	253	225	222	211
	Without C/B	206	253	225	222	211
1400	With C/B	211	260	231	229	215
	Without C/B	211	260	231	229	215
1300	With C/B	216	268	237	233	219
	Without C/B	216	268	237	233	219
1200	With C/B	225	275	245	239	223
	Without C/B	225	275	245	239	223
1100	With C/B	232	284	252	244	230
	Without C/B	232	284	252	244	230
1000	With C/B	238	293	259	252	237
	Without C/B	238	293	259	252	237

■ HO80Efficiency (%)

Reduction ratio	1/20	1/30	1/40	1/50	1/60
Input rpm					
1800	75	70	65	63	61
1700	75	69	64	63	60
1600	75	69	64	62	60
1500	74	69	64	62	60
1400	74	68	63	61	59
1300	74	68	63	61	58
1200	73	67	62	59	57
1100	73	66	61	58	56
1000	72	65	60	57	55



● With C/B



Roller gear cam drive		
Basic	Wide angle	Table
		Standard

Parallel cam drive

Option	Pick and Place drive	
	Linear	Circular

Position	1	2	3	4	5	6
Dimensions	Oil supply port Rc3/8 Drain port (both sides) Rc3/8 Oil level gauge (Both sides) 50 20 65 90 120 20 Up Down	Oil filler port (both sides) Rc3/8 Oil level gauge (Both sides) Drain port Rc3/8 120 50 65 50 20 20 Up Down	Oil filler port (both sides) Rc3/8 Oil level gauge (Both sides) Drain port Rc3/8 65 50 20 20 20 Up Down	Oil supply port Rc3/8 Oil level gauge (Both sides) Drain port (both sides) Rc3/8 50 20 65 20 20 Up Down	Grease nipple Oil supply port Rc3/8 Oil level gauge Drain port Rc3/8 65 20 20 Up Down	Oil supply port Rc3/8 Grease nipple Oil level gauge Drain port Rc3/8 65 20 20 Up Down

Option

● Worm reducer (HO100)

■ Characteristics table

Standard installation index		RG*S180, RG*T250, RG*L250, PC*S160/200				
Reduction ratio		1/20, 1/30, 1/40, 1/50, 1/60				
Internal moment of inertia (converted for input shaft)		1/20	1/30	1/40	1/50	1/60
		$5.96 \times 10^{-4} \text{ kg}\cdot\text{m}^2$	$8.04 \times 10^{-4} \text{ kg}\cdot\text{m}^2$	$5.32 \times 10^{-4} \text{ kg}\cdot\text{m}^2$	$4.64 \times 10^{-4} \text{ kg}\cdot\text{m}^2$	$3.71 \times 10^{-4} \text{ kg}\cdot\text{m}^2$
Max. speed of input shaft		1800 rpm				
Allowable OHL of the input shaft	With C/B	883 N				
	Without C/B	1962 N				
Internal frictional torque (T _{inr}) ISO viscosity grade VG320	5°C (5500 mm ² /s)	4.0 N·m				
	10°C (3200 mm ² /s)	3.1 N·m				
	15°C (2000 mm ² /s)	2.5 N·m				
	20°C (1400 mm ² /s)	2.0 N·m				
	30°C (650 mm ² /s)	1.4 N·m				
Weight	With C/B	60.0 kg				
	Without C/B	50.0 kg				
Lubricating oil (when shipped)		Bonnoc TS320 (ENEOS)				
Oil level		1.5 to 2.0 ℓ				
Worm torsion direction		Right helix				

■ Clutch/brake characteristics table

		Clutch (101-12-15-K-35G)	Brake (111-12-12-K-35G)
Dynamic frictional torque		45 N·m	45 N·m
Dynamic frictional torque		40 N·m	40 N·m
Rotor moment of inertia		$2.14 \times 10^{-3} \text{ kg}\cdot\text{m}^2$	-
Armature moment of inertia		$2.75 \times 10^{-3} \text{ kg}\cdot\text{m}^2$	$1.81 \times 10^{-3} \text{ kg}\cdot\text{m}^2$
Exciting voltage		24 VDC	24 VDC
Coil (20°C)	Current	1.09 A	1.09 A
	Capacity	25 W	25 W
Coil Resistance		23 Ω	23 Ω

■ HO100Rated output torque (N·m)

Reduction ratio		1/20	1/30	1/40	1/50	1/60
Input rpm						
1800	With C/B	392	428	420	381	365
	Without C/B	392	428	420	381	365
1700	With C/B	402	437	427	389	373
	Without C/B	402	437	427	389	373
1600	With C/B	413	447	437	398	382
	Without C/B	413	447	437	398	382
1500	With C/B	424	457	448	408	392
	Without C/B	424	457	448	408	392
1400	With C/B	436	466	461	420	402
	Without C/B	436	466	461	420	402
1300	With C/B	445	478	474	433	411
	Without C/B	445	478	474	433	411
1200	With C/B	463	491	490	442	419
	Without C/B	463	491	490	442	419
1100	With C/B	478	508	503	453	429
	Without C/B	478	508	503	453	429
1000	With C/B	492	529	516	464	443
	Without C/B	492	529	516	464	443

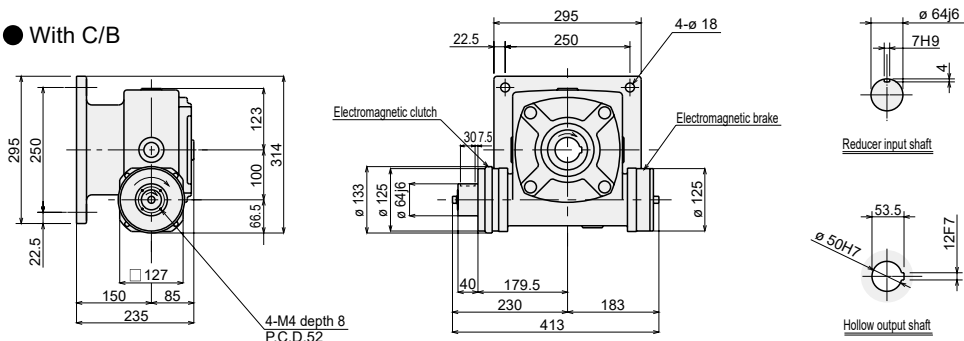
■ HO100Efficiency (%)

Reduction ratio	1/20	1/30	1/40	1/50	1/60
Input rpm					
1800	78	71	70	67	65
1700	78	71	69	67	64
1600	78	70	69	66	64
1500	78	70	69	66	64
1400	77	69	68	65	63
1300	77	69	68	65	62
1200	77	69	67	64	61
1100	76	68	66	63	60
1000	75	68	65	62	59

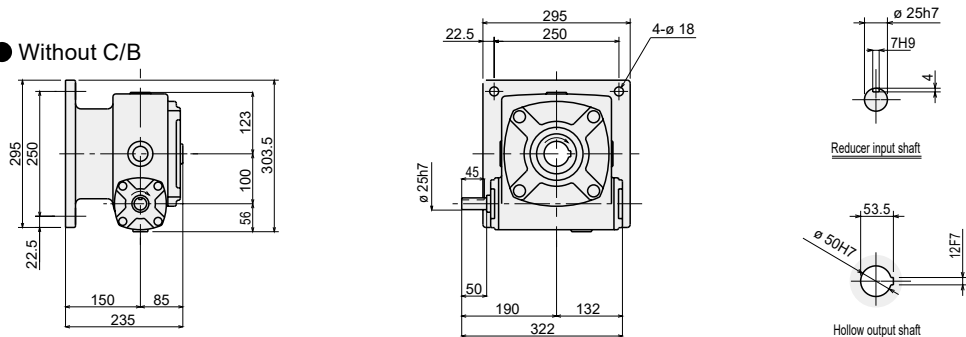


Dimensions

With C/B



Without C/B



Positions of the oil level gauge and the oil fill/drain port determined by the installation position of HO reducer

Position	1	2	3	4	5	6
Dimensions						

Option

● Worm reducer (HO135)

■ Characteristics table

Standard installation index		RG*S250, PC*S200/250				
Reduction ratio Value in () represents the special reduction ratio		1/20, 1/40, 1/60, (1/30, 1/50)				
Internal moment of inertia (converted for input shaft)		1/20	(1/30)	1/40	(1/50)	1/60
		1.97 × 10 ³ kg·m ²	2.80 × 10 ³ kg·m ²	1.74 × 10 ³ kg·m ²	1.78 × 10 ³ kg·m ²	1.17 × 10 ³ kg·m ²
Max. speed of input shaft		1800 rpm				
Allowable OHL of the input shaft	With C/B	1275 N				
	Without C/B	3924 N				
Internal frictional torque (T _{inr}) ISO viscosity grade VG320	5°C (5500 mm ² /s)	5.7 N·m				
	10°C (3200 mm ² /s)	4.5 N·m				
	15°C (2000 mm ² /s)	3.6 N·m				
	20°C (1400 mm ² /s)	2.9 N·m				
	30°C (650 mm ² /s)	2.0 N·m				
	40°C (320 mm ² /s)	1.6 N·m				
Weight	With C/B	120.0 kg				
	Without C/B	105.0 kg				
Lubricating oil (when shipped)		Bonnoc TS320 (ENEOS)				
Oil level		4.5 to 5.0 ℓ				
Worm torsion direction		Right helix				

■ Clutch/brake characteristics table

		Clutch (101-16-15-K-35G)	Brake (111-16-12-K-35G)
Dynamic frictional torque		90 N·m	90 N·m
Dynamic frictional torque		80 N·m	80 N·m
Rotor moment of inertia		$6.30 \times 10^{-3} \text{ kg}\cdot\text{m}^2$	-
Armature moment of inertia		$9.05 \times 10^{-3} \text{ kg}\cdot\text{m}^2$	$6.35 \times 10^{-3} \text{ kg}\cdot\text{m}^2$
Exciting voltage		24 VDC	24 VDC
Coil (20°C)	Current	1.46 A	1.46 A
	Capacity	35 W	35 W
Coil Resistance		16 Ω	16 Ω

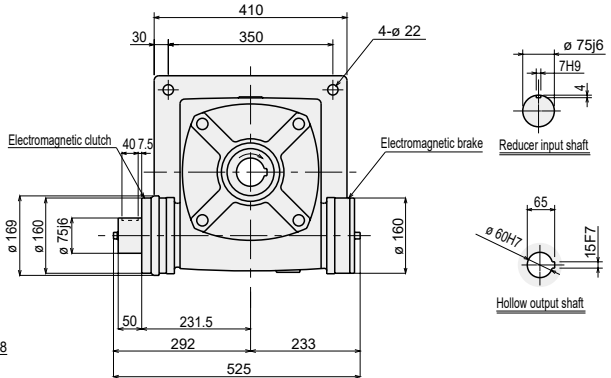
■ HO135Rated output torque (N·m)

Reduction ratio		1/20	1/30	1/40	1/50	1/60
Input rpm						
1800	With C/B	912	1090	970	886	801
	Without C/B	912	1090	970	886	801
1700	With C/B	937	1120	989	908	821
	Without C/B	937	1120	989	908	821
1600	With C/B	960	1140	1010	925	836
	Without C/B	960	1140	1010	925	836
1500	With C/B	985	1170	1040	941	852
	Without C/B	985	1170	1040	941	852
1400	With C/B	1010	1200	1060	967	873
	Without C/B	1010	1200	1060	967	873
1300	With C/B	1030	1230	1090	994	894
	Without C/B	1030	1230	1090	994	894
1200	With C/B	1060	1260	1120	1030	921
	Without C/B	1060	1260	1120	1030	921
1100	With C/B	1100	1300	1160	1060	944
	Without C/B	1100	1300	1160	1060	944
1000	With C/B	1150	1350	1210	1090	971
	Without C/B	1150	1350	1210	1090	971

■ HO135Efficiency (%)

Reduction ratio	1/20	(1/30)	1/40	(1/50)	1/60
Input rpm					
1800	80	74	73	71	68
1700	80	74	72	70	67
1600	80	74	72	70	67
1500	79	74	71	69	66
1400	79	73	71	69	66
1300	79	72	70	68	65
1200	78	72	70	68	65
1100	78	71	70	68	64
1000	78	71	69	67	63

● With C/B



Technical drawing of a motor-reducer assembly, showing front, side, and shaft detail views with dimensions.

Front View Dimensions:

- Overall width: 410
- Distance between mounting holes: 350
- Top flange thickness: 30
- Mounting hole diameter: 4- $\varnothing 22$
- Internal circular feature diameter: $\varnothing 35H7$
- Internal circular feature height: 70
- Internal circular feature offset: 75
- Internal circular feature diameter: 260
- Internal circular feature offset: 175
- Overall width at base: 435

Side View Dimensions:

- Shaft diameter: $\varnothing 35H7$
- Shaft length: 157

Reducer input shaft detail:

- Shaft diameter: $\varnothing 35H7$
- Shaft length: 157

Hollow output shaft detail:

- Shaft diameter: $\varnothing 60H7$
- Shaft length: 157

Position	1	2	3	4	5	6
Dimensions	Oil supply port Rc1/2 Drain port (both sides) Rc1/2 Oil level gauge (Both sides) 70 45 90 134 180 Up Down	Oil filler port (both sides) Rc1/2 Oil level gauge (Both sides) 134 90 70 45 180 Up Down	Oil filler port (both sides) Rc1/2 Oil level gauge (Both sides) Drain port Rc1/2 90 45 70 90	Oil supply port Rc1/2 Oil level gauge (Both sides) Drain port (both sides) Rc1/2 70 45 90	Grease nipple Oil supply port Rc1/2 Oil level gauge Drain port Rc1/2 90	Oil supply port Rc1/2 Grease nipple Oil level gauge Drain port Rc1/2 90