HISTORY

1994	**11**	Entered into a partnership contract with Sankyo seisakusho in Japan
1995	**03**	Established Sankyo Korea (Sihwa industrial complex 3ra816ho)
	08	Manufacture and sell the SANDEX DL Series. Also Export to japan Samgong production center, Inc
1997	**10**	Installed 5 faces machine tool for SANDEX case processing
	12	Built new building at Sihwa complex 1na304ho
1998	**01**	Exported SANDEX DL SERIES to Japan and the East Asia
	08	Develop and start to sell the SANDEX MOTOR integrated type alpha series
1999	**12**	Manufactured our own M/C which is only for fabricating CAM and start to manufacture order made cam which is known as CUSTOM CAM.
2000	**08**	Developed & sold the super high speed type FH handler index (Axial distance 60, 80 mm/600rpm)
2002	**03**	Manufactured our own M/C which is only for fabricating Roller gear cam.
	11	Certified as a clean business place
2003	**07**	Manufactured our own high speed M/C which is only for fabricating Custom Cam.
	09	Manufacture and sell the SANDEX PXK Series.
		Purchased 2nd M/C which is only for fabricating Sandex Housing.
2005	**05**	Obtained the ISO9001:2000 quality system certification
		Manufactured our own 2nd M/C which is only for fabricating Roller gear cam.
	10	Purchased M/C which is only for fabricating turret.
2006	**01**	Localized the SANDEX alpha series (Center distance 190, 230mm)
2007	**10**	Obtained a reliability certifcation for parts materials of a roller gear cam(indexing drive)
2008	**02**	Purchased M/C for fabricating FMS Housing. (10 Pallet)
2009	**12**	Localized 8FH(800RPM) high-speed. indexing handlers
2011	**09**	Exellent capital goods development in the korea machinery Fair
2013	**01**	Acquisition of the new trademark
		INDXIA
		Torque Shield
		DynaStation
2013	**12**	Termination of join veture and technical cooperation
2014	**04**	Acquisition of the Inno-Biz Certification
	06	Changed company name
		Sankyo Korea Co., Ltd ➞ HANNZ MOTROL Co., Ltd.
	12	Completion of the 2nd factory construction and beginning of manufacture

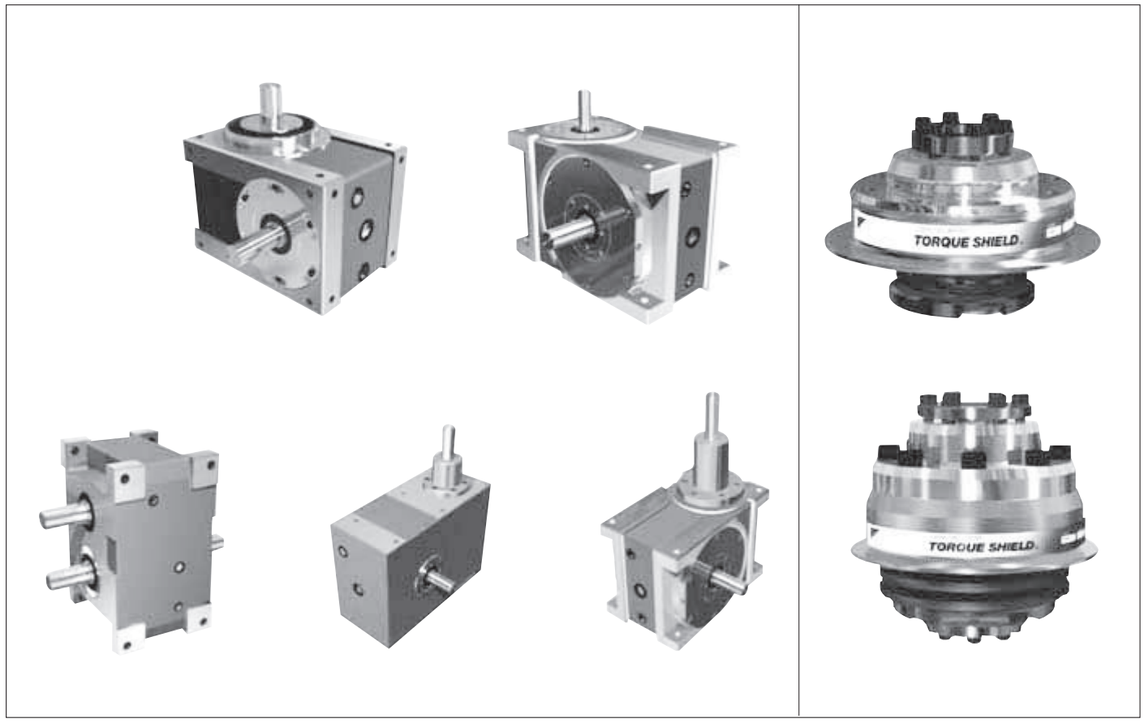
contents

1 INDXIA HD Series
2 Overview
4 Product Selection
8 Product Code
12 Product Specifications
19 Motor Built-in Type
22 Option
24 Reducer
28 TORQUE SHIELD
32 Torque transmission capacity table
48 Handling procedures
51 INDXIA HA Series
86 INDXIA HP Series
109 Pick & Place Unit
132 CUSTOM CAM

≫About Roller Gear Cam mechanism



Roller gear cam mechanism is composed of the roller gear cam, cam follower and turret. The characteristic of this mechanism is that the precise delivery of the motion is possible since there s no backlash regarding the rated load, as the 2 cam followers are solidarized as the pre load state to the taper lib of roller gear cam. The configuration of roller gear cam and turret enables the gaining of balance in terms of mechanics, so that it is ideal-istic, compact and strong. Moreover, every conveyance of the load is done by the rolling contact, which minimizes the friction loss and motor loss. The grading device of the roller cam device which has the feature of splendid high speed • spotting is creating the broad demand of the industry.



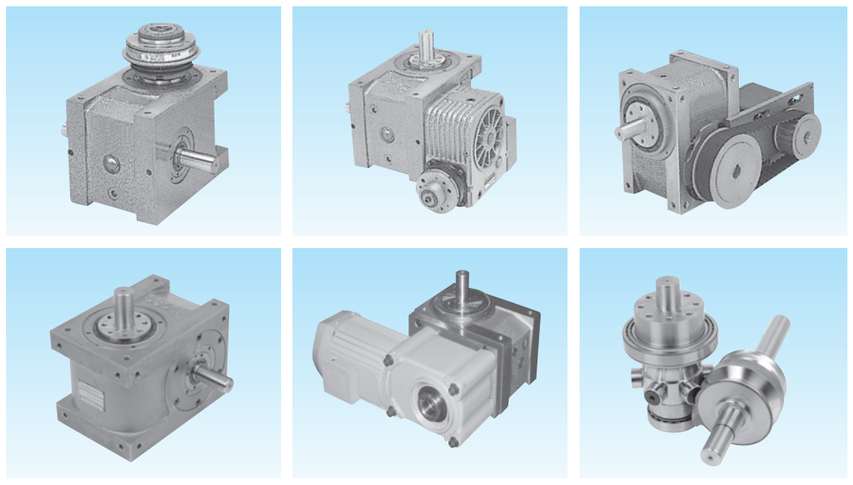
INDXIA

Roller Gear Cam Type Index Device

Type with the integration of shaft type and flange-type

HDseries

• INDEXING DRIVE • OSCILLATING DRIVE • REDUCER TYPE • REDUCER • TORQUE SHIELD



Option Specifications

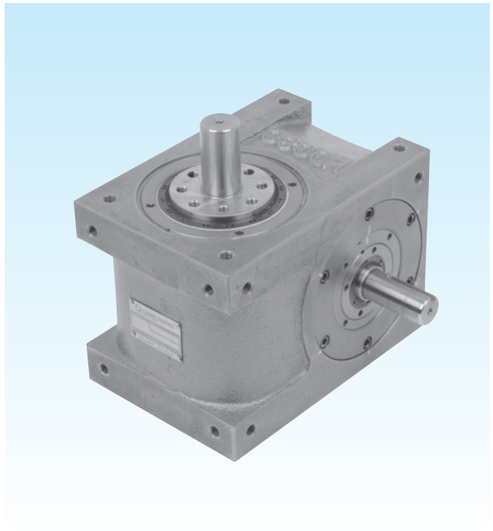
- Mounting of TORQUE SHIED
- Mounting of Speed Reducer
- Mounting of Motor

Characteristics of HD Series

- The completed type of roller cam which is the main drive unit in the automation equipment.
- Applicable in every industry area which requires the automated manufacturing line and save of manpower.
- Prompt response, fast delivery and reasonable price (All CAD data are available on our home page)
- The quality of all models such as accuracy of dividing angle, repeatability and etc are controlled by our QC department and Roller gear cam is fabricated by our own M/C which is used only for fabricating the roller gear cam.
- Released the new product which mounted the hollow axis Geared Motor which is integrated type of Index and Motor (Inverter control)
- Center distance 45~170mm (7 types of machine)

Specifications of Shaft • Flange

HD Series



■ Overview

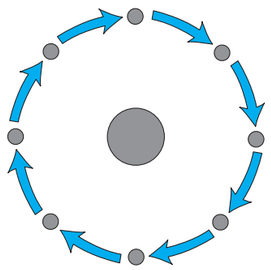
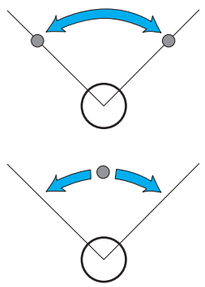
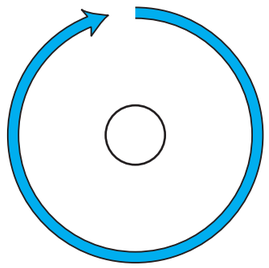
INDXIA is the intermittent device of the roller gear cam equipment which has been developed with the theme of "faster, more precise, and easier to use". This HD Series can be used according to the purpose of use, as it has been made as the integrated form of the straight shaft of the output shaft and the flange surface. The table, arm, sprocket, gear, etc. can be directly connected to the flange surface, and the mounting of the torque safety device which protects the grading device from the overload by utilizing the shaft part can be simply done.
INDXIA has the splendid safety, credibility, and high speed; it can be utilized for driving conveyer, as well as the rotary type automatic device. It is the INDEX which contributes to the cost performance as well as enhances the overall credibility of the total machines, in the current era requiring the manpower saving, and high productivity.

■ Characteristic

- Standardizing from the small size to the midsize machine (center distance 45~170mm)
- Number of STOPs are availablefrom 2 to 16.
- Output shaft is the integrated type of shaft and flange, which has the enhanced convenience of component mounting
- Attachment posture and attachment direction are flexible so that it can be utilized in many ways.

■ Basic Motions

Table A-1

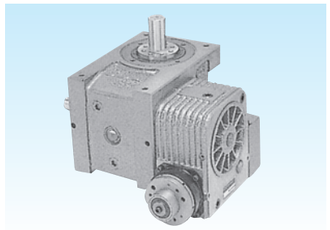
● Indexing Drive	● Oscillating Drive	● Reducer Type
		
• Stop → Dividing → Stop → Dividing: the intermittent rotation movement is done. • The output shaft divides and stops (once each) for 1 rotation of the input shaft. • It can be used as the core grading device of the rotary type automatic machine which is with the rotation table. • It can be used as the grading device of the in line automatic machine which conducts the intermittent transfer of conveyer.	• It is the device with the output shaft doing the reciprocating motion, utilizing the input shaft rotating at the continuous constant velocity. • Simple reciprocating motion and the stopping condition at the intermediate location of the motion can be set, and the stopping angle can also be freely designated. • Oscillating cam can be mounted at the output shaft, and the motion can be changed to a straight line motion by utilizing the roller and guide at the fleet, which enables the use as the carrier device of work.	• Precise reducing TYPE. • It is suitable for the speed reducer of the machine which has the small delivery loss & back lash, and wants the smooth rotation and high torque. • It can be used for dividing table into the multi sections, and also it can be used for randomly dividing table.

■ Mounting of Option

(a) Specification of mounting of the reducer <Size of related type HD060~HD170>

This specification whichmounted the precise worm reducer, is developed to maximize the characteristics of Indxia. Because this reducer is mounted directly to the body of input axis, it actualized the compact size and eliminated the transfer loss. Moreover, due to the pre-load adjusting tools, it can obtain fine rotation with less backlash.
Mouting the clutch and brake are possible.
【R48, R65, R80, R100】

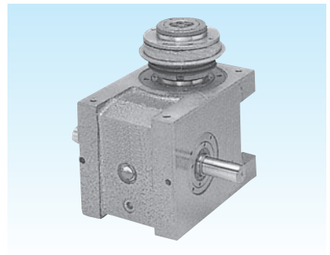
Referring to 24P



(b) Specification of mounting of the torque shield <Size of related type HD045~HD170>

Big trouble will be generated to the body of Indxia if the load applied to the output axis of Indxia is more than its specification. The torque shield is the safety device to prevent such accident to happen. When excessive torque is applied to the output, it will block corresponding torque and protect the product. There are flange type and coupling types are available therefore, please select the correct type upon your usage.
【TO6F~TI8F, TO6C~TI8C】

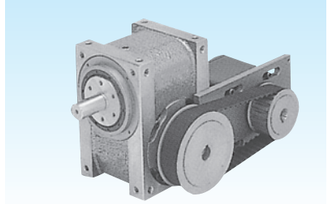
Referring to 22 P



(c) Specification of mounting of the induction motor <Size of related type HD045~HD060>

This is compact unit which integrated the drive source by applying the best suitable timing belt for operation. For the drive source, it has applied the induction motor which as characteristics of high efficiency, high power and less power consumption. It will provide the rotation with characteristics of stable, high rigidity and less backlash.
【60W, 90W】

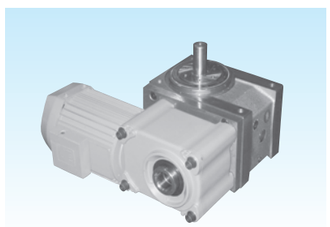
Referring to 23P



(d) Specification of mounting of the geared motor <Size of related type HD070~HD170>

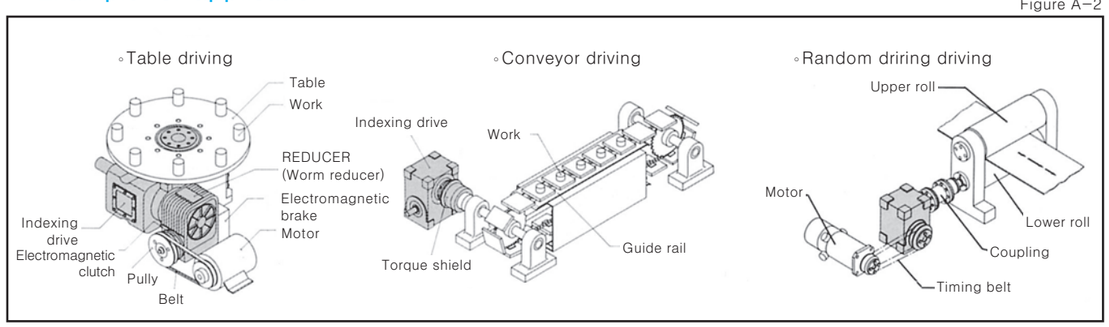
This is indexing drive which has applied the geared motor as a input drive source. The output of this type will repeat rotate and stop which is known as intermittent dividing operation. This is motor integrated compact product which kept its advantage characteristics such as high speed, high rigidity and high reliability.
【0.2kw, 0.4kw, 0.75kw, 1.5kw, 2.2kw】

Referring to 19P



■ Example for application

Figure A-2



■ Regarding the selecting the machine type

Purpose and usage of index device are various. The important fact of selecting the model is to clear the usage and purpose first and then sufficiently understand the characteristics and operation of device. Regarding the selecting models, please sufficiently check the constraint conditions.

(1) Maximum Load

It allowed THRUST load and RADIAL load of output shaft of the roller gear cam index device. Maintaining the accuracy will become difficult if the loading capacity exceeds this value.

(2) Bending of output shaft

It shows the moment of allowed bending of the shaft in case of receiving the load of overhang. The shaft tends to be cut from the one part of shaft by the fatigue phenomenon of shaft in case of exceeding this value.

(3) Rigidity of torsion of shaft

It means that the rotation must be constant in case of input shaft and the vibration of torsion is controlled in case of output shaft. It needs especially the rigidity of torsion of shaft.

(4) Degree of dividing

In case of requiring high dividing accuracy, please select 1DWELL CAM. (please refer to the characteristic table)

(5) The distance between shaft distance and table.

Please consider the following values and select the model in case of mounting the table and arm to the flange surface of output as considering the operation and safety. (Below values are based on our experience)

Diameter of table --> 6 times max allowable value of shaft distance
Length of arm --> 5 times max allowable value of shaft distance

(6) Applying RPM

It can apply RPM up to the value of torque written on the torque table.

(7) Environment temperature

The standard surrounding temperature for INDXIA is 0 ~ 40. Please contact us for not using the product under the condition of given temperature.

(8) Static rated output Torque

It displays the allowable limit of torque which can be applied to output axis. (Please refer to the torque table)

(9) Dynamic rated output Torque

This is allowable limit value which calculated the life cycle as 12,000 hours. The torque calculation of model selection is usually based on this value and also life cycle is calculated. (Please refer to the torque table)

■ The driving device and surround device of input/output

In order to constitute an excellent automatic machine, it is very important to selecting the proper model.

Therefore, please sufficiently check about the input drive system from drive source to input axis and the output drive system from output axis to final position. By doing so, it can increase the accuracy, reliability and ability.

(1) Component of input shaft

It requires actions such as selecting the machine without backlash, shortening the power transferring path to the input axis from the motor and etc. Motor, reducer, timing belt, clutch, brake, coupling, locking factors.

(2) Componet of output shaft

Static exciting force is being applied to the rotating output when performing stop or dividing, it is important to decrease the output load, eliminate the bending and backlash. Table, conveyor, torque shield

(3) Unit

We have prepared various of surrounding devices in order to maximize our Index drive to perform in 100% condition.

• Sign used at the formula

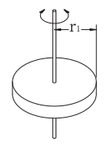
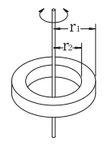
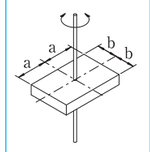
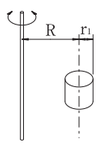
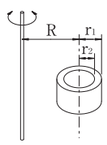
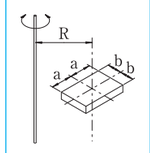
a_4	: Backlash Factor	No	: Initial RPM(rpm)	Top	: Dynamic rated output torque(N • m)
Am	: Non-dimensional maximum acceleration	m	: Number of dwells	Ts	: Static rated output torque(N • m)
Amax	: Maximum acceleration(m/s²)	θ	: Index angle(deg)	Tt	: Output shaft reguired torque(N • m)
D	: Diameter of rotation(m)	P	: Transfer pitch(m)	Tw	: Work load torque(N • m)
F	: Work load(N)	Pa	: Average Load Motor Power(Kw)	Tx	: Camshaft friction torque(N • m)
J	: moment of inertia(kg • m²)	Ps	: Motor power(Kw)	Ve	: Straight line velocity(m/s)
J_0	: Internal moment of inertia(kg • m²)	Qm	: Dimensionless Maximum CAM SHAFT torque coefficient	Vm	: Dimensionless Maximum velocity
g	: Acceleration of gravity(m/s²)	R	: Radius of rotation pitch(m)	Vmax	: Maximum velocity(m/s)
K	: Radius of rotation(m)	S	: Number of stop	Ww	: Work load load(N)
Lf	: Life coefficient	Tc	: Camshaft torque(N • m)	β	: Angle of action(deg)
Lh	: Expected life time(hr)	Td	: Start/Stop torque(N • m)	γ	: Rotating speed ratio(γ>1)
M	: Mass(kg)	Tf	: Friction torque(N • m)	μ	: Frictional coefficient
N	: Revolutions Per Minute(rpm)	Ti	: Inertial torque(N • m)	φ	: Oscillation angle(deg)
Na	: Capability Table RPM(rpm)	Toi	: Internal Inertia load torque(N • m)		

Table B-2

	Rotary motion	Lirear motion
(A) Moment of inertia J	$J = MK^2 = \frac{1}{4}MD^2$ (kg • m²)	$J = M\left(\frac{S \cdot P}{2\pi}\right)^2$ (kg • m²) $J = M\left(\frac{60 \cdot Ve}{2\pi \cdot N}\right)^2$ (kg • m²)
(B) Inertial torque Ti	$Ti = 226.2Am \frac{J \cdot N^2}{S \cdot (\theta/m)^2}$ (N • m) $= 226.2Am \frac{M \cdot K^2 \cdot N^2}{S \cdot (\theta/m)^2}$ (N • m)	$Ti = 5.73Am \frac{M \cdot S \cdot P^2 \cdot N^2}{(\theta/m)^2}$ (N • m)
(C) Friction torque Tf	$Tf = W \cdot \mu \cdot R \cdot g$ (N • m)	$Tf = \frac{W \cdot \mu \cdot S \cdot P \cdot g}{2\pi}$ (N • m)
(D) Work load torque Tw	$Tw = R \cdot F \cdot \cos\beta$ (N • m)	$Tw = \frac{F \cdot S \cdot P}{2\pi} \cos\beta$ (N • m)
(E) Required torque Tt	$Tt = Ti + Tf + Tw$ (N • m)	
(F) Cam shaft torque Tc, Tce	Real camshaft torque of indexing drive. $Tc = 500Qm \frac{1}{S \cdot \theta}(Tt + Toi) + Tx$ (N • m) Real camshaft torque of oscillating drive. $Tc = 1.389Qm \frac{\varphi}{\theta}(Tt + Toi) + Tx$ (N • m) In case of acting the friction torque Tf or the work load torque TW on the output load. $Tce = 360Vm \frac{1}{S \cdot \theta}(Tf + Tw) + Tx$ (N • m) In case of acting inertial torque Ti on the output load. $Tce = 360Qm \frac{1}{S \cdot \theta}(Ti + Toi) + Tx$ (N • m)	In case of acting the Frictional force by direct motion or work load. $Tce = 57.32Vm \frac{P(W \cdot \mu + Ww)}{\theta}$ (N • m) In case of acting the inertial force only by the direct motion. $Tce = 2063Am \cdot Qm \frac{P^2 \cdot N^2 \cdot M}{(\theta/m)^3}$ (N • m)
(G) Motor power Ps	$Ps = \frac{Tc \cdot N}{9550}$ (Kw) Motor power of average load [In case of Ti>(Tf+Tw)] $Pa = \frac{1}{2} Ps$ (Kw)	
(H) Life time Lh	$Lh = 12000Lf^{10/3}$ (hr) $Lf = \frac{Top}{a_4(Ti + Toi) + Tf + Tw}$	

■ Radius of gyration K

Table B-3

			
K^2	$\frac{r_1^2}{2}$	$\frac{r_1^2 + r_2^2}{2}$	$\frac{a^2 + b^2}{3}$
			
K^2	$\frac{r_1^2}{2} + R^2$	$\frac{r_1^2 + r_2^2}{2} + R^2$	$\frac{a^2 + b^2}{3} + R^2$

■ Life factor Lf and life hour Lh(hr)

Table B-4

Lh (hr)	Lf	Lh (hr)	Lf	Lh (hr)	Lf
2000	0.584	16000	1.09	50000	1.53
3000	0.660	18000	1.13	55000	1.58
4000	0.719	20000	1.17	60000	1.62
5000	0.769	22000	1.20	65000	1.66
6000	0.812	24000	1.23	40000	1.70
7000	0.851	26000	1.26	75000	1.73
8000	0.885	28000	1.29	80000	1.77
9000	0.917	30000	1.32	90000	1.83
10000	0.947	35000	1.38	100000	1.89
12000	1.00	40000	1.44	110000	1.98
14000	1.05	45000	1.49	120000	2.00

In case of indirect driving

Please calculate as below in case of gaining the indirect rotation from the output shaft or the direct movement.

inertial moment	$Je = J/\gamma^2$
frictional torque	$Tfe = Tf/\gamma$
working load torque	$Twe = Tw/\gamma$
inertial torque	$Tie = Ti/\gamma$

Choosing the indexing drive (In case of driving the table)

■ Required Data

① Number of stop
② Stop time(t_1) and Indexing time(t_2)
③ Mass and external diameter of table
④ Number and mass of Jig
⑤ Number and mass of work
⑥ Whether the option is installed or not
⑦ Expected life time

■ Selecting procedure

(1) Decision on the number of stop (S)
Select the proper number of stops for using condition from the torque table.

(2)Decision of indexing angle (θ)
Decide by the ratio of stop time and indexing time. Also, select the nearest indexing angle from the torque table.
$t_1 : t_2 = (360-\theta) : \theta$
In case of increasing the ratio of stop time, clutch and brake are used. For general indexing angle, please select 270° and 300°.

(3) Calculation of RPM of input axis (N)

$$N = \frac{60}{t_2} \cdot \frac{\theta}{360 \cdot m}$$

(4) Calculation of load (J)
Calculate the moment of inertia (J) by the table, jig and Mass(M) of each work.
[Formula (A)]

(5) Calculation of necessary torque (Tt)
• Inertial TORQUE (Ti) [Formula B]
Am = 5.53(MS curve)
• Friction TORQUE(Tf) [Formula C]
• Work load TORQUE(Tw) [Formula D]
• Needed TORQUE(Tt) [Formula E]

(6) Selecting type
Dynamic rated output torque TOP (refer to torque table) will select the SIZE which will exceed the required torque from considering the number of STOP, indexing angle, CAM curve and RPM.

(Just, $\frac{\text{External diameter of Table}}{\text{Distance between the shafts}} < 6$)

(7) Calculation of camshaft torque(Tc)
Qm=0.987(MS curve) [Figure (F)]
Tx: Frictional torque of camshaft.
(Refer to torque table)
Toi: Internal inertia load torque
(Refer to torque table)

(8) Motor
Power of required MOTOR(PS) [Formula (G)]
Selecting the motor of power to exceed the PS value
[In case of Ti > (Tf+Tw)]
Selecting at the power of motor of average load (Pa)

$$Pa = \frac{1}{2} Ps$$

(9) Checking life time
Calculation of Backlash coefficient a_4.
In case of reducer is mounted, backlash coefficient a4 = 1.2.
• Expected life time (Lh) [Formula H]
Calculate the Lh after calculating the life coefficient Lf.
Calculate the outline value from table (B-4)

Selecting the indexing drive (In case of driving conveyor)

■ Required DATA

① Transmitting PITCH(P′)
② Stop time(t_1) and indexing time(t_2)
③ WORK or mass of attachment(M)
④ Connected status of guide rail and chain
(A) Rolling friction
(B) Contacting friction
⑤ Type of re-transferring method
ⓐ Conveyor of horizontal re-transferring
ⓑ Conveyor of slope re-transferring
ⓒ Conveyor of vertical re-transferring

■ Selecting procedure

(1) Decision on the indexing angle(θ)

(2) Decision on the number of stop(S)
Among the selected indexing angle, select the minimum number of stops with condition of where assembly is possible.

(3) Calculation of RPM of input axis

(4) PITCH diameter of driving sprocket (Dp)

$$Dp = \frac{S \cdot P'}{\pi}$$

Select from the products available on the market and calculate the exact moving PITCH.

(5) Calculation of load of sprocket(J)

(6) Calculation of Required torque(Tt)
• Inertia torque(Ti)
Inertia torque of rotating subject (Sprocket) (Ti_1)
[Rotating of formula (B)]
Inertia torque of direct moving subject (Work, Jig and chain) (Ti_1)
[Rotating of formula (B)]
$Ti = Ti_1 + Ti_2$
• Friction torque(Tf)
Decision of coefficient of friction μ
(A) In case of rolling friction μ = 0.2~0.3
(B) In case of contacting friction, the target is
μ = 0.4~0.5
• Work load TORQUE(Tw) [Formula (D)]
• Required TORQUE(Tt) [Formula (E)]
In case of Ⓐ Tt=Ti+Tf
In case of Ⓑ and Ⓒ Tt=Ti+Tf+Tw

(7) Selecting type
Select the type of Tt < Top from the Torguetable.

(8) Camshaft torque (Tc) [Formula (F)]

(9) Selecting motor
Required motor power (Ps) [Formula (G)]

$$Ps = \frac{Tc \cdot N}{9550} Kw$$

(10) Checking life time
• Calculation of Back Lash factor a_4
• Expected life time(Lh) [Formula (H)]

(11) Option

Selecting the oscillating drive

■ Required DATA

① Rocking angle
② Desired stop time
③ Desired moving time necessary for one way movement
④ Desired moving time necessary for two way movement
⑤ WORK or zig mass
⑥ Shape and mass of rocking arm

■ Selecting procedure

(1) Decision of output device

(2) Temporal selection of model
Temporarily select the model by considering the following fact. (5 times bigger from the max allowable value of arm length and axis distance)
In case of you have desired rocking angle, please check the oscillate angle from the torque table.

(3) Calculation of the number of equiavalent stops (Se)

Se = 360/φ

(4) Decision of the oscillation index angle(θ f, θ b)
Oscillate indexing angle for one way movement
Oscillate indexing angle for two way movement

N: Oscillating device input axis RPM

Please adjust (t_2)/(t_3) and N to make the above interaction formula valid. Please refer to the torque table for oscillate indexing angle and try to make this value as big as possible.

(5) Decision of the Decision of commutation angle (θ dl, θ du)
θ dl + θ du = 360−(θ f + θ b)

(6) Make the timing chart

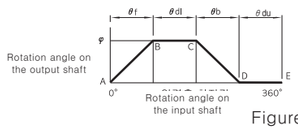


Figure B-1

(7) Calculation of load [Formula (A)]

(8) Required torque(Tt) [Formula (E)]

(9) Selecting the model
Compare the calculated value Tt with the torque of temporarily selected device. By doing so, please check and select where following condition becomes valid. Tf<Top

(10) Camshaft torque(Tc) [Formula (F)]

(11) Selecting motor(Ps) [Formula (G)]

Selecting REDUCER TYPE

Unlike typical indexing drive, the reducer type does not have to consider the movement characteristics of cam. Therefore, it generally based on the selection of reducer. Please select the most suitable product considering the following facts. (Desired position, accuracy, indexing accuracy, mounting, handling and etc)

■ Required DATA

① Reduction gear ratio
② Acceleration and deceleration output of RPM
③ The time it takes on acceleration and deceleration.
④ Table, zig, inertia of work, mass, mounting pitch

■ Selecting procedure

(1) Selection of the Deceleration ratio(Number of stop)

(2) Calculation of start • stop torque (Td)

$$Td = \frac{J}{9.55}\left(\frac{N'-N_0}{t}\right) \cdot C$$

C : Factor to be decided by the characteristic of acceleration • deceleration
(C ≧ 2)
N′ : Output axis RPM
N_0 : IInitial RPM
t : Acceleration and deceleration time.

(3) Calculation of friction torque [Formula (C)]

(4) Calculation of torque of work load (Tw) [Formula(D)]

(5) Calculation of required torque (Tt)
Tt = Td + Tf + Tw [Formula(E)]

(6) Selecting the type
Select where the dynamic load rating output torque TOP exceeds the required torque Tt within the selected reduction ratio (Number of stops) and RPM

(7) Camshaft torque(Tc) [Formula (F)]

(8) Selecting motor(Ps) [Formula (G)]

Selecting reducer

HD Series is standard product which can be mounted with the reducer shown in page 22. (Drawing OP-1) Please select proper reducer depends on applying load condition.

Required DATA

① Camshaft torque of indexing drive (Tc)
② RPM on input of indexing drive (N)
③ Attachment posture of indexing drive
④ Attachment posture of reducer
⑤ Deceleration ratio of reducer (iN)
⑥ Operation time per day
⑦ The number of running/stopping times per hour
⑧ Work load per hour.
⑨ Surrounding temperature

Selecting procedure

(1) Decision of use factor (f)
Please calculate $ff_M = f_1 \cdot f_2$ of factor to revise the mechanical effect and $f_T = f_3 \cdot f_4 \cdot f_5$ of factor to revise the thermal effect after referring to the table(B-5)~table(B-9).
The bigger value becomes the use factor (f) compared with the fM value and fT value.

(2) Calculating equivalence output torque(Tce)
The camshaft torque of indexing drive (Tc) to install the reducer multiplied by the use factor (f) is the equivalence output torque(Tce) needed to the reducer.

Tce = Tc × f (N • m)

(3) Decision of reducer size
Decide the size to be Tce < T_{2N} to compare with the equivalence output torque(Tce) and successive output torque to be allowed (T_{2N}) to be shown at the torque table of output of reducer

f_1 : Factor regarding the operation condition and operation time

Table B-5

Operation time per 1 day / Operating status	Under ½H	Under 2H	Under 10H	Under 24H
Indxing • Oscillating • Driving reducer type	0.95	1.1	1.25	1.5

(The prime motor is applied when using the motor, hydraulic motor and using the turbine)

f_2 : This is calculated the number of start • stop per hour

Table B-6

Starting frequency		
Number of starting per hour(times)		
Under 10	Over 10 under 100	Over 100 under 500
1	1.1	1.2

f_3: load hour - rate, factor of surrounding temperature.

Table B-7

Surrounding temperature of load hour-rat	20°C	30°C	40°C	50°C
100%	1.0	1.2	1.4	1.7
60%	0.9	1.0	1.2	1.4
20%	0.6	0.7	0.8	1.0

Load hour-rate(%) = $\frac{\text{The time to take the load per 1 hour (minute)}}{60} \times 100$

f_4: factor on the location of worm and foil

Table B-8

Position / Size	When the worm is locked (Including when the worm is horizontality)	When the wheel is locked(Including when the worm is verticality)
R48~R80	1	1
R100	1.2	1.3

f_5: Difference of the thermal dissipation by whether the cooling fan exists or not.

Table B-9

In case the cooling fan exists, f_5=1						
In case the cooling fan does not exist.						
RPM of worm / Size	1800	1500	1000	750	500	300
R48~R80	1	1	1	1	1	1
R100	1.4	1.45	1.65	1.65	1.5	1.3

(4) Others
Please refer to the 25 pages (Table R 3) regarding selecting the size in case the clutch and brake is installed.

Selection of TORQUE SHIELD

When selecting the model of torque shield, please consider the purpose of usage and select the model. Calculate the tripping torque and compare it with each size of torque adjustable range. After that, select the size after checking the mounting method and allowable RPM.

(1) Type Selection
1) Flange type
In case the factor of transmitting rotation such as the table, arm or gear and the sprocket are directly attached to the torque limiter.
2) Coupling type
In case of using the connection of the shaft to shaft

(2) Required torque for normal operation
1) Calculate the required torque (Tt) of the output shaft to the required torqued in case of mounting to the output shaft of HD series.
2) Calculate the cam shaft torque (TC) to the required torque in case of mounting to the input shaft of HD series.

(3) Selection of SERVICE FACTOR (F)

SERVICE FACTOR(F)

RPM	Under 40rpm	40~200rpm	Over 200rpm
Output shaft	1.5~2	1.75~2.2	2~3
Input shaft	1.4~1.75	1.6~2	1.75~2.5

(4) Tripping torque
The required torque calculated per use condition multiplied by the SERVICE FACTOR(F) decided is the Tripping torque(T).

T = F • Tt (Or Tc)

(5) Selecting the size
1) Please decide the size after checking whether the radial load, structure load and bending MOMENT meet the allowed value of characteristic table and whether the tripping torque decided exists within the scope adjusting the torque in case of using the flange type.

2) Please let the tripping torque decided determines the size within the scope to adjust the torque to consider the installed axial gradient, the error of parallel and deflection error in case of using the coupling type.

⚠ Check that the maximum tripping torque doesn't exceed the torque of static rated output of roller gear cam device (Ts).

Product code

Indexing drive

ex.) HD 080 — 08 12 2 R — S 3 VW 1 / X

a b c_1 c_2 d e f g h i j

a Model	b Size	c_1 Number of stop (S)	c_2 Indexing angle (θ)	d Cam curve	e Rotational direction of input/output axis
HD Model name	080 Center distance 80mm	08 8stop	12 120°	2 MS Curve	R 1 DWELL and right hand side cam
HD Indicating HD Series	Indicating the center distance of input and output axis.	Indicating the number of stops of output axis per 1 rotation of output axis.	Indicating the indexing angle of required input axis for 1 indexing action.	1 Modified trapezoid curve MT 2 Modified sine curve MS 3 Modified equivalent accelera-tion MCV50 4 SHP-5 9 Order made cam curve Please inquire regarding the other curve.	Indicating the rotational direction of output axis toward the rotational direction of input axis and indicating the number of stops (DWELL) of output axis per 1 rotation of input axis. In case of 2DWELL, output axis will stop 2 times per 1 rotation of input axis. 1DWELL is standard for DL type Please contact us for 2DWELL type or others.

	1 DWELL	2 DWELL	3 DWELL	4DWELL
Right hand side cam	R	R2	R3	R4
Left hand side cam	L	L2	L3	L4

〈Standard cam of indexing drive〉

2 Modified sine curve(MS)

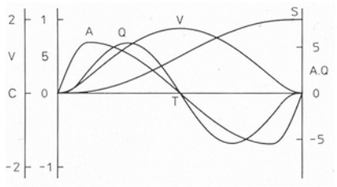
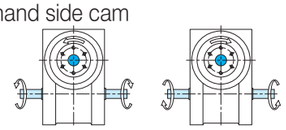


Figure C-1

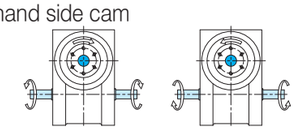
Vm = 1.76
Am = ±5.53
Qm = ±0.987

A = Acceleration
V = Velocity
S = Motion curve (Displacement)

R Right hand side cam

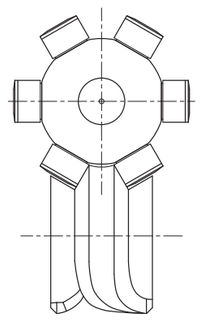


L Left hand side cam

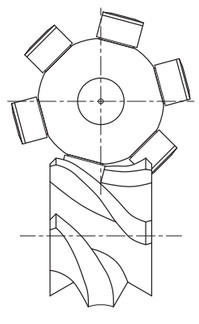


Input axis Output axis Figure C-2

Regarding the Indexing and stopping



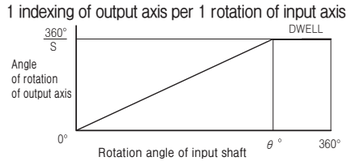
When stopping



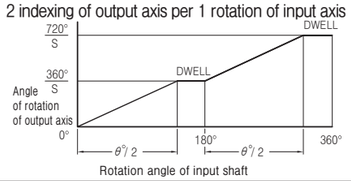
When indexing

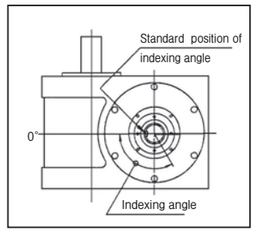
■ Timing chart

• 1 DWELL
1 indexing of output axis per 1 rotation of input axis



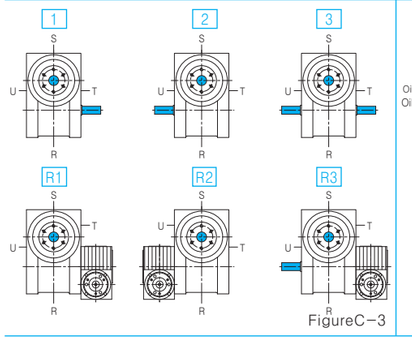
• 2 DWELL
2 indexing of output axis per 1 rotation of input axis



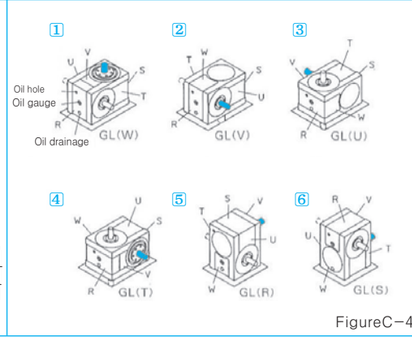


The product code is composed of size, number of stops, indexing angle, cam curve, cam rotational direc-tion, output axis type, input axis type, fabricated side of mounting hole, position and special specification. Therefore, this device is much more complicated compare to the general machine device and the corre-sponding composition is extensively massive. It is almost impossible to operate the machine if the code is incorrect. Therefore, please make sure to know the using condition and then select the product code. Please provide us the using RPM, required accuracy and etc. Lastly, there are separate products code for reducer, torque shield and induction motor.

f Specification of output shaft	g Specification of input shaft	h Fabricated side of mounting hole	i Mounting position	j Special Insturction
S Standard shaft type	3 Both T and U surface sides input extension	VW V and W side of fabri-cated mounting tap hole.	1 Mounting position	X Special instruction
S Standard shaft type L Torque shield H Hollow shaft (separate consultation)	1 One side input axis (T side) 2 One side input axis (U side) 3 Double side input axis R1 One side input axis and R mounted (T side) R2 One side input axis and R mounted (U side) R3 Double input axis and R mounted M1 One side input axis and M mounted (T side) M2 One side input axis and M mounted (U side) M3 Double side input axis and M mounted (T side) M4 Double side input axis and M mounted (U side) 〈R: Reducer M: Motor〉	■ The mounting hole of HD Series is standard which the tap hole fab-rication has been done in both side of VW. ■ In case of requiring tap holes on the side of R, S, T, V, please indicate the corresponding side on the code. ■ A is fabrication of all sides.	Position 1 ··· W face is GL Position 2 ··· V face is GL Position 3 ··· U face is GL Position 4 ··· T face is GL Position 5 ··· R face is GL Position 6 ··· S face is GL Caution) GL(Ground Level)	Please mark X in case of special spec-ificationbesides the standard product. Standard product (Do not mark anything) X Special specification X Example) 1) Change or indication of size, tolerance and etc 2) Fabrication of mounting holes other than additional fabrication and standard position. 3) Special order of indexing angle 4) Special order of cam curve 5) Special order of indexing accuracy 6) Change or indication of oil, level, drain 7) The other special specifications Cautious) Please provide us further notice for special order.



FigureC-3



FigureC-4

Specification of HD series

• Standard specification of indexing drive

Table HD-1

Model	Number of STOP									
	2	3	4	5	6	8	10	12	15	16
HD045	●	●	●		●	●				
HD060	●	●	●	●	●	●	●	●		
HD070	●	●	●	●	●	●	●	●		
HD080	●	●	●	●	●	●	●	●		●
HD110	●	●	●	●	●	●	●	●	●	●
HD140	●	●	●	●	●	●	●	●	●	●
HD170	●	●	●	●	●	●	●	●	●	●

Cautious) Possible to handle specification other than specifications on the above. In such cases, please contact us.

Product code

Oscillating drive

ex.) HD | 110E — 0128 | 2 | R — S | 3 | VW | 1 / X

a b c d e f g h i j

a Model	b Size	c Organizing number	d Cam curve	e Rotational direction of input/ output axis
HD Model name	110E Center distance 110mm	0128 0128	2 MS curve	R Right hand side cam
HD Indicating HD Series	Indicating the center distance of input and output axis. E : Indicating oscillator drive	The timing of input axis is order made for oscillating drive. Therefore, our company will decide the 4 digits of organizing number.	1 Modified trapezoid curve MT 2 Modified sine curve MS 3 Modified equivalent acceleration MCV50 4 Residual vibration con–trolling curve SHP–5 9 Order made cam curve and also including the reciprocation movement. ● Please contact us for curves other than above curves.	The right hand side cam and left hand side cam is decided by the rotating direction of output axis towards the rotational direction of input axis from the input standard position (input 0 degree) of timing chart. R Right hand side cam L Left hand side cam ⚠ Cautious Code list of f ~ i are same as the HD indexing drive product code.

Reducer TYPE

ex.) HD | 140R — 12 | 36 | 0 | R — S | 3 | VW | 1 / X

a b c_1 c_2 d e f g h i j

a Model	b Size	C_1 Reduction ratio	C_2 Indexing angle	d Cam curve	e Direction of rotation of output shaft
HD Model name	140R Center distance 140mm	12 Deceleration ratio 1/12	36 Indexing angle 360°	0 Cam curve for constant rotation	R Right hand side cam
HD Indicating HD series.	Indicating the center distance of input and output axis. R : Indicating reducer type	The required number of rotation of input axis for 1 rota–tion of out–put axis.	36 enters all of the reducer types	Cam curve of Constant velocity	Right hand side cam and left hand side cam are decided by the rotational direction of output axis towards the rotational direc–tion of input axis. R Right hand side cam L Left hand side cam ⚠ Cautious Code list of f ~ i are same as the HD indexing drive product code

Code of part (Reducer)

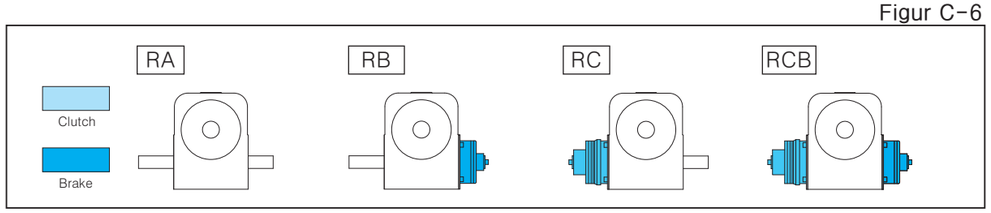
Code Example) R80 — 40 — R | CB | 3 / 1

a b c d e f

a Reducer model	b Nominal reduction ratio	c Twisted direction of worm axis.	d Clutch brake specification	e Mounting position of reducer	f Mounting position of indexing device
Ex. R80 Center distance 80mm	Ex. 40 Nominal reduction ratio 40	Ex. R Right side twisted	Ex. CB Specification of clutch/brake	Ex. 3 Mounting Position 3	Ex. 1 Mounting Position 1 (W side is GL)
R indicates the reducer. A number indicates the centhe distance	Indicating nominal reduction ratio. Nominal reduction ratio iN and actual reduction ratio I are vary depends on the model. Thus please carefully check and fill in the sheet.	Indicating the twisted direc–tion of gear set. But, gear set is only available with right side twisted direc–tion.	A Clutch and Brake do not exist. B Attachment the only brake. C Attachment the only Clutch. CB Attachment clutch/ attachment brake. (Refer to figure C– 6)	Indicating the reducer mount–ing position when installing it to input axis of indexing drive.	Indicating the position of body of indexing drive which of the reducer is being mounted.

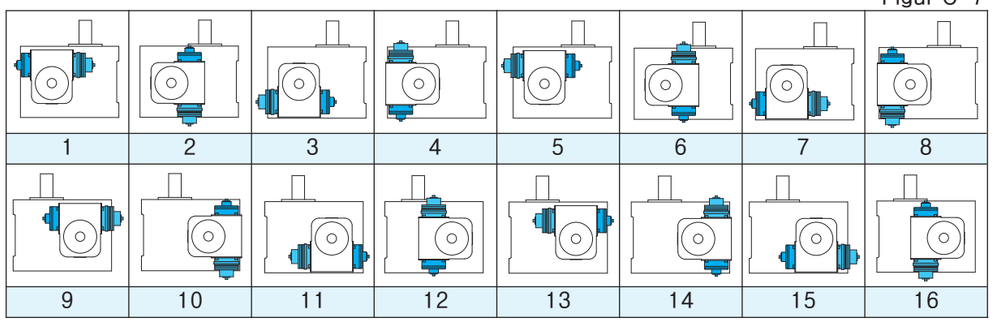
Mounting Position

Figur C-6



Mounting posture of reducer

Figur C-7



HD045/HD045E/HD045R

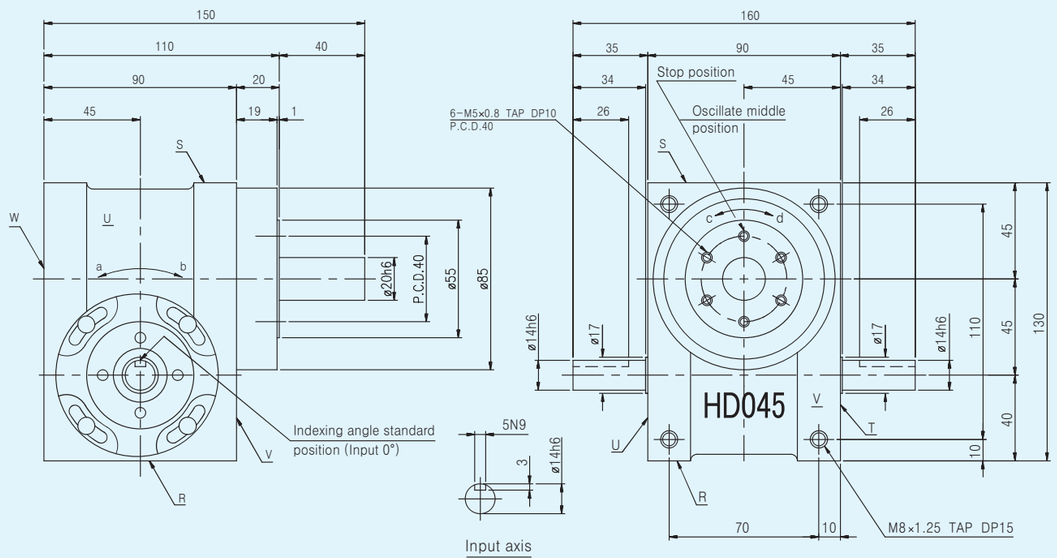
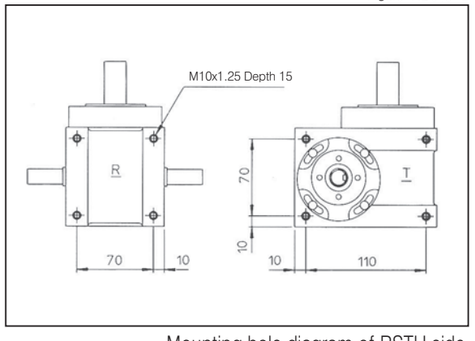


Figure HD045-1

• Mounting hole position

Figure HD045-2



Mounting hole diagram of RSTU side

• Specification

Table HD045-1

Item	Symbol	Unit	Value	Item	Symbol	Unit	Value	Item	Unit	Symbol	Value
Allowable THRUST load of output axis	P_1	N	1275	Allowable THRUST load of input axis	P_4	N	833	Indexing accuracy 1DWELL	SEC		±60
Allowable THRUST RADIAL load of output axis	P_2	N	980	Allowable RADIAL load of input axis	P_5	N	735	Indexing accuracy 2DWELL	SEC		±120
Output static torque	T_S	N • m	Refer to Torque Capacity Table	Maximum repeatable allowed torque of input axis	P_6	N • m	39	Indexing accuracy 3DWELL	SEC		±180
Output torsional rigidity	K_1	N • m /rad	16.7×10^3	Input torsional rigidity	K_2	N • m /rad	2.74×10^3	Indexing accuracy 4DWELL	SEC		±240
Output Inertia	J_0	kg • m^2	0.36×10^{-3}	Input inertia	J_1	kg • m^2	0.08×10^{-3}	Repeatability	SEC		30
Allowable bending moment of output axis	P_3	N • m	34.3					Product weight	Kg		About 6

Cautious) J of input shaft is the values in case of the rectification. Please re check it when ordering since the specification and all values can be changed without the notice.
(1N≒0.102kgf • m)

HD060/HD060E/HD060R

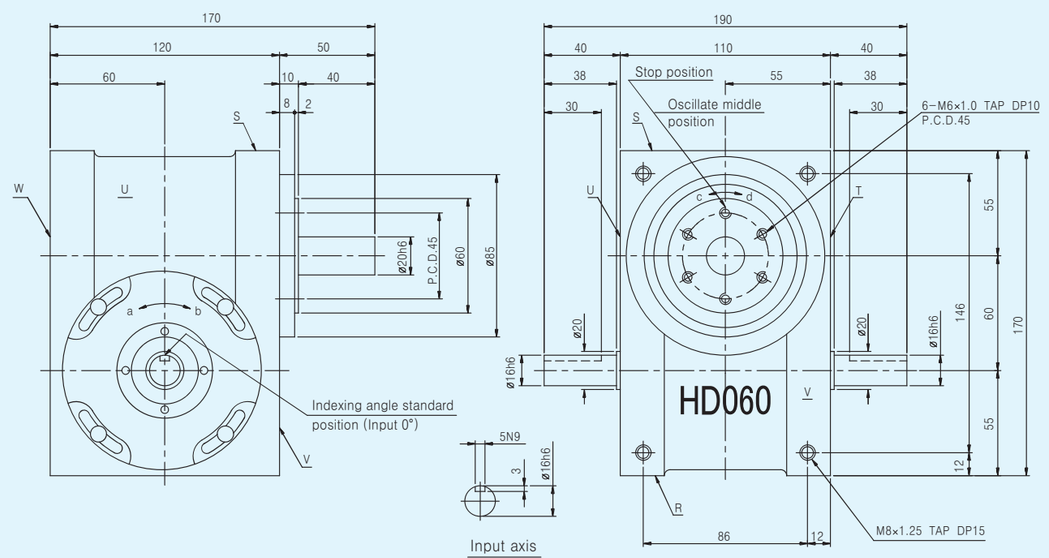
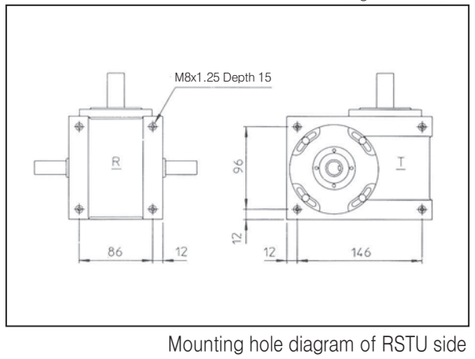


Figure HD060-1

• Mounting hole locations

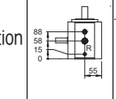
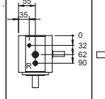
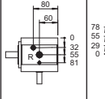
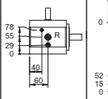
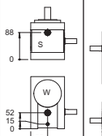
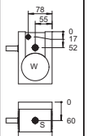
Figure HD060-2



Mounting hole diagram of RSTU side

• Location of oilplug, etc., and oil oilevel

Figure HD060-3

Mouting Position	1	2	3	4	5	6
Location						
Oil level	0.5	0.37	0.35	0.35	0.3	0.3

⚠ Precautions

- The order is PLUG(PT3/8), LEVEL(VA-01) and DRAIN(PT1/4) from the top regarding each location according to the position.
- The position responds to the code i of indxing drive.
- TThe oil level indicated in Figure HD060-3 are given in general figures and will differ according to the profile of cam and the number of cam follower.

• Specification

Table HD060-1

Item	Symbol	Unit	Value	Item	Symbol	Unit	Value	Item	Unit	Symbol	Value
Allowable THRUST load of output axis	P_1	N	1372	Allowable THRUST load of input axis	P_4	N	980	Indexing accuracy 1DWELL	SEC		±45
Allowable THRUST RADIAL load of output axis	P_2	N	1372	Allowable RADIAL load of input axis	P_5	N	931	Indexing accuracy 2DWELL	SEC		±90
Output static torque	T_S	N • m	Refer to Torque Capacity Table	Maximum repeatable allowed torque of input axis	P_6	N • m	59	Indexing accuracy 3DWELL	SEC		±135
Output torsional rigidity	K_1	N • m /rad	18.6×10^3	Input torsional rigidity	K_2	N • m /rad	4.12×10^3	Indexing accuracy 4DWELL	SEC		±180
Output Inertia	J_0	kg • m^2	0.53×10^{-3}	Input inertia	J_1	kg • m^2	0.23×10^{-3}	Repeatability	SEC		20
Allowable bending moment of output axis	P_3	N • m	44.1					Product weight	Kg		About 10

Cautious) J of input shaft is the values in case of the rectification. Please re check it when ordering since the specification and all values can be changed without the notice.
(1N≒0.102kgf • m)

HD070/HD070E/HD070R

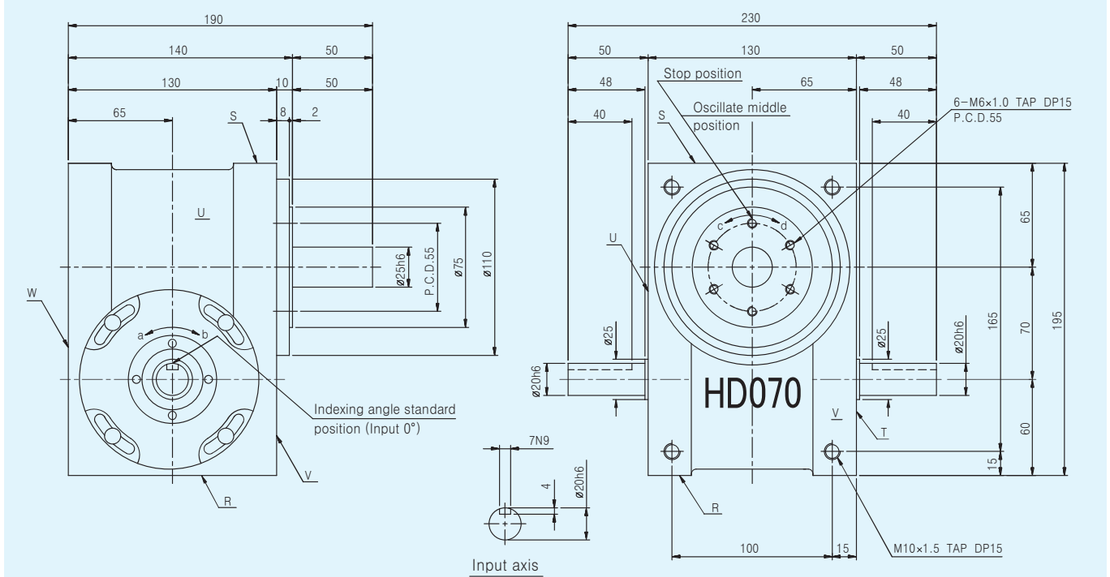
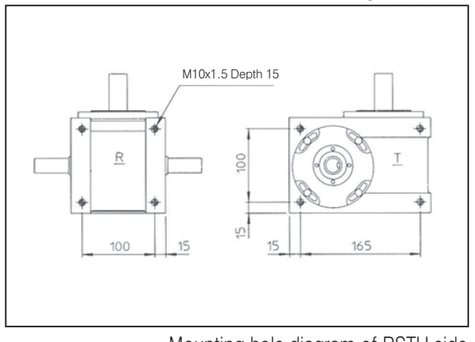


Figure HD070-1

• Mounting hole locations

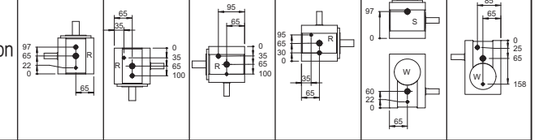
Figure HD070-2



Mounting hole diagram of RSTU side

• Location of oilplug, etc., and oil oilevel

Figure HD070-3

Mouting Position	1	2	3	4	5	6
Location						
Oil level	0.6	0.6	0.55	0.55	0.4	0.4

⚠ Precautions

- The order is PLUG(PT3/8), LEVEL(VA-01) and DRAIN(PT1/4) from the top regarding each location according to the position.
- The position responds to the code i of indxing drive.
- The oil level indicated in Figure HD070-3 are given in general figures and will differ according to the profile of cam and the number of cam follower.

• Specification

Table HD070-1

Item	Symbol	Unit	Value	Item	Symbol	Unit	Value	Item	Unit	Symbol	Value
Allowable THRUST load of output axis	P_1	N	2156	Allowable THRUST load of input axis	P_4	N	1470	Indexing accuracy 1DWELL	SEC		±30
Allowable THRUST RADIAL load of output axis	P_2	N	2156	Allowable RADIAL load of input axis	P_5	N	1078	Indexing accuracy 2DWELL	SEC		±60
Output static torque	T_S	N • m	Refer to Torque Capacity Table	Maximum repeatable allowed torque of input axis	P_6	N • m	93.1	Indexing accuracy 3DWELL	SEC		±90
Output torsional rigidity	K_1	N • m /rad	32.3×10^3	Input torsional rigidity	K_2	N • m /rad	8.43×10^3	Indexing accuracy 4DWELL	SEC		±120
Output Inertia	J_0	kg • m^2	1.72×10^{-3}	Input inertia	J_1	kg • m^2	1.5×10^{-3}	Repeatability	SEC		15
Allowable bending moment of output axis	P_3	N • m	69					Product weight	Kg		About 16

Cautious) J of input shaft is the values in case of the rectification. Please re check it when ordering since the specification and all values can be changed without the notice.
(1N≒0.102kgf • m)

HD080/HD080E/HD080R

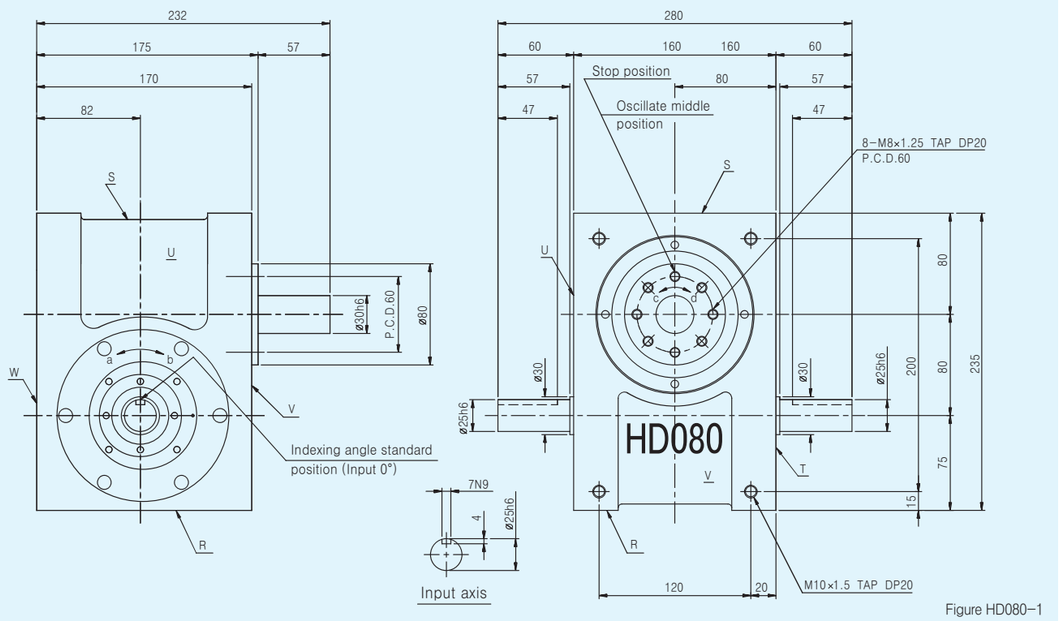
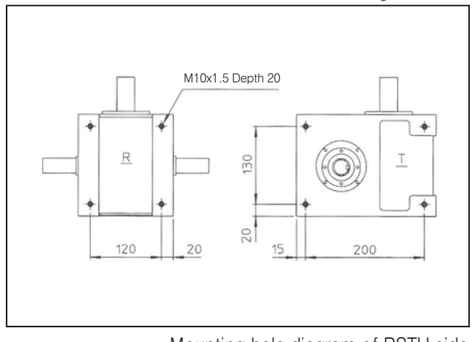


Figure HD080-1

• Mounting hole locations

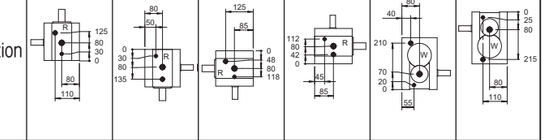
Figure HD080-2



Mounting hole diagram of RSTU side

• Location of oilplug, etc., and oil oilevel

Figure HD080-3

Mouting Position	1	2	3	4	5	6
Location						
Oil level	1.2	0.8	1.4	1.2	0.7	1.4

⚠ Precautions

- The order is PLUG(PT1/2), LEVEL(VA), DRAIN(PT1/2) from the top regarding each location according to the position.
- The position responds to the code i of indxing drive.
- The oil level indicated in Figure HD080-3 are given in general figures and will differ according to the profile of cam and the number of cam follower.

• Specification

Table HD080-1

Item	Symbol	Unit	Value	Item	Symbol	Unit	Value	Item	Unit	Symbol	Value
Allowable THRUST load of output axis	P_1	N	3038	Allowable THRUST load of input axis	P_4	N	2058	Indexing accuracy 1DWELL	SEC		±30
Allowable THRUST RADIAL load of output axis	P_2	N	2450	Allowable RADIAL load of input axis	P_5	N	1862	Indexing accuracy 2DWELL	SEC		±60
Output static torque	T_S	N • m	Refer to Torque Capacity Table	Maximum repeatable allowed torque of input axis	P_6	N • m	181.3	Indexing accuracy 3DWELL	SEC		±90
Output torsional rigidity	K_1	N • m /rad	98×10^3	Input torsional rigidity	K_2	N • m /rad	16.7×10^3	Indexing accuracy 4DWELL	SEC		±120
Output Inertia	J_0	kg • m^2	4.6×10^{-3}	Input inertia	J_1	kg • m^2	2.3×10^{-3}	Repeatability	SEC		15
Allowable bending moment of output axis	P_3	N • m	88					Product weight	Kg		About 29

Cautious) J of input shaft is the values in case of the rectification. Please re check it when ordering since the specification and all values can be changed without the notice.
(1N≒0.102kgf • m)

HD110/HD110E/HD110R

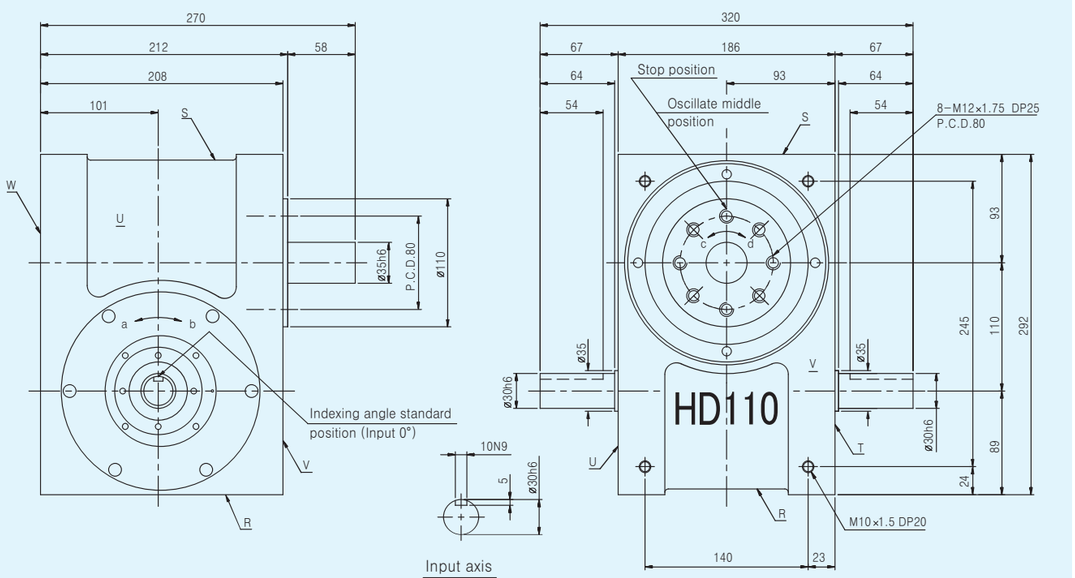
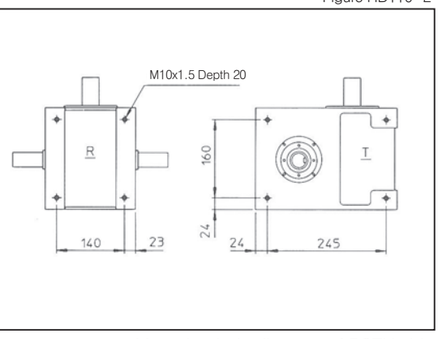


Figure HD110-1

• Mounting hole locations

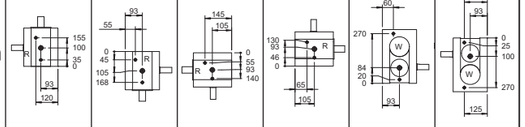
Figure HD110-2



Mounting hole diagram of RSTU side

• Location of oilplug, etc., and oil oilevel

Figure HD110-3

Mouting Position	1	2	3	4	5	6
Location						
Oil level	2.0	1.4	0.9	0.9	1.2	1.3

⚠ Precautions

- The order is PLUG(PT1/2), LEVEL(VA) and DRAIN(PT1/2)rom the top regarding each location according to the position.
- The position responds to the code i of indxing drive.
- The oil level indicated in Figure HD110-3 are given in general figures and will differ according to the profile of cam and the number of cam follower.

• Specification

Table HD110-1

Item	Symbol	Unit	Value	Item	Symbol	Unit	Value	Item	Unit	Symbol	Value
Allowable THRUST load of output axis	P_1	N	3920	Allowable THRUST load of input axis	P_4	N	3528	Indexing accuracy 1DWELL	SEC		±30
Allowable THRUST RADIAL load of output axis	P_2	N	4312	Allowable RADIAL load of input axis	P_5	N	2842	Indexing accuracy 2DWELL	SEC		±60
Output static torque	T_S	N • m	Refer to Torque Capacity Table	Maximum repeatable allowed torque of input axis	P_6	N • m	314	Indexing accuracy 3DWELL	SEC		±90
Output torsional rigidity	K_1	N • m /rad	196 X 10^3	Input torsional rigidity	K_2	N • m /rad	30.4 X 10^3	Indexing accuracy 4DWELL	SEC		±120
Output Inertia	J_0	kg • m^2	22.6 X 10^{-3}	Input inertia	J_1	kg • m^2	7.0 X 10^{-3}	Repeatability	SEC		15
Allowable bending moment of output axis	P_3	N • m	137					Product weight	Kg		About 51

Cautious) J of input shaft is the values in case of the rectification. Please re check it when ordering since the specification and all values can be changed without the notice.
(1N≒0.102kgf • m)

HD140/HD140E/HD140R

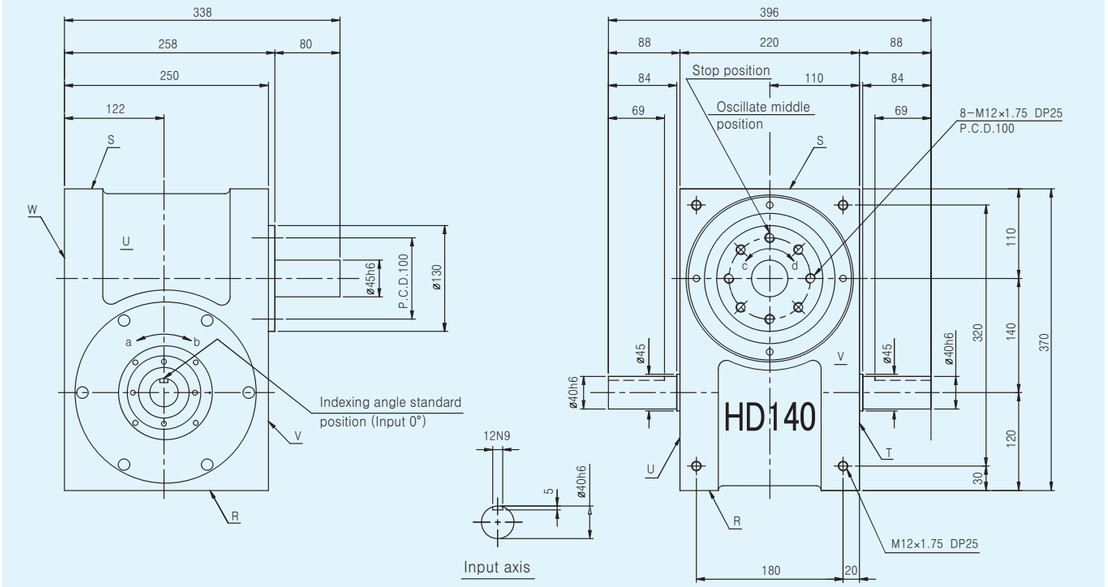
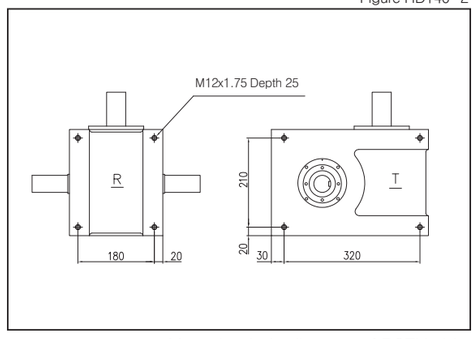


Figure HD140-1

• Mounting hole locations

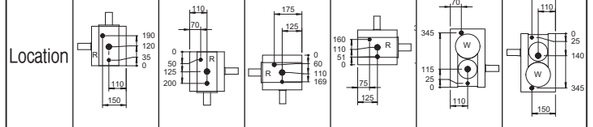
Figure HD140-2



Mounting hole diagram of RSTU side

• Location of oilplug, etc., and oil oilevel

Figure HD140-3

Mouting Position	1	2	3	4	5	6
Location						
Oil level	4.3	4.3	4.1	4.1	2.7	5.1

⚠ Precautions

- The order is PLUG(PT1/2), LEVEL(VA) and DRAIN(PT1/2) from the top regarding each location according to the position.
- The position responds to the code i of indxing drive.
- The oil level indicated in Figure HD140-3 are given in general figures and will differ according to the profile of cam and the number of cam follower.

• Specification

Table HD140-1

Item	Symbol	Unit	Value	Item	Symbol	Unit	Value	Item	Unit	Symbol	Value
Allowable THRUST load of output axis	P_1	N	5880	Allowable THRUST load of input axis	P_4	N	4312	Indexing accuracy 1DWELL	SEC		±30
Allowable THRUST RADIAL load of output axis	P_2	N	6860	Allowable RADIAL load of input axis	P_5	N	5488	Indexing accuracy 2DWELL	SEC		±60
Output static torque	T_S	N • m	Refer to Torque Capacity Table	Maximum repeatable allowed torque of input axis	P_6	N • m	735	Indexing accuracy 3DWELL	SEC		±90
Output torsional rigidity	K_1	N • m /rad	392 X 10^3	Input torsional rigidity	K_2	N • m /rad	78 X 10^3	Indexing accuracy 4DWELL	SEC		±120
Output Inertia	J_0	kg • m^2	49 X 10^{-3}	Input inertia	J_1	kg • m^2	27 X 10^{-3}	Repeatability	SEC		15
Allowable bending moment of output axis	P_3	N • m	255					Product weight	Kg		About 120

Cautious) J of input shaft is the values in case of the rectification. Please re check it when ordering since the specification and all values can be changed without the notice.
(1N≒0.102kgf • m)

HD170/HD170E/HD170R

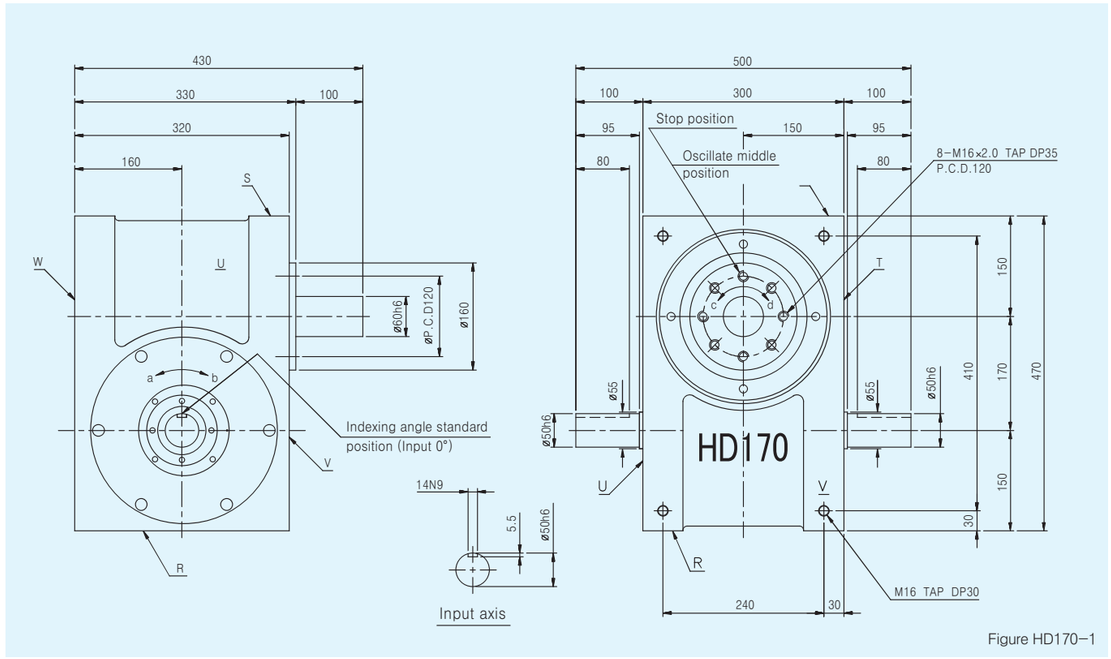
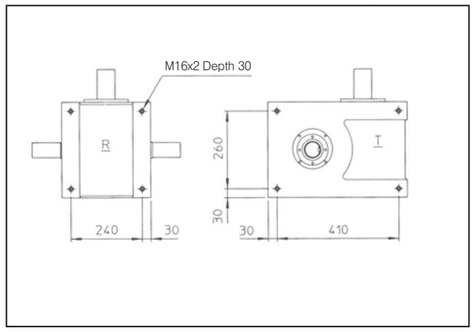


Figure HD170-1

• Mounting hole locations

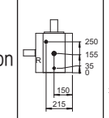
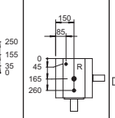
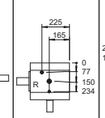
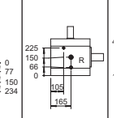
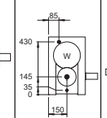
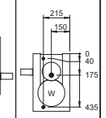
Figure HD170-2



Mounting hole diagram of RSTU side

• Location of oilplug, etc., and oil oilevel

Figure HD170-3

Mouting Position	1	2	3	4	5	6
Location						
Oil level	10	9	9	9	4	7

⚠ Precautions

- The order is PLUG(PT3/4), LEVEL(VB) and DRAIN(PT3/4) from the top regarding each location according to the position.
- The position responds to the code i of indxing drive.
- The oil level indicated in Figure HD170-3 are given in general figures and will differ according to the profile of cam and the number of cam follower.

• Specification

Table HD170-1

Item	Symbol	Unit	Value	Item	Symbol	Unit	Value	Item	Unit	Symbol	Value
Allowable THRUST load of output axis	P_1	N	7448	Allowable THRUST load of input axis	P_4	N	5782	Indexing accuracy 1DWELL	SEC		±30
Allowable THRUST RADIAL load of output axis	P_2	N	8722	Allowable RADIAL load of input axis	P_5	N	9800	Indexing accuracy 2DWELL	SEC		±60
Output static torque	T_S	N • m	Refer to Torque Capacity Table	Maximum repeatable allowed torque of input axis	P_6	N • m	1421	Indexing accuracy 3DWELL	SEC		±90
Output torsional rigidity	K_1	N • m /rad	0.98×10^6	Input torsional rigidity	K_2	N • m /rad	137×10^3	Indexing accuracy 4DWELL	SEC		±120
Output Inertia	J_0	kg • m^2	0.19	Input inertia	J_1	kg • m^2	0.07	Repeatability	SEC		15
Allowable bending moment of output axis	P_3	N • m	353					Product weight	Kg		About 200

Cautious) J of input shaft is the values in case of the rectification. Please re check it when ordering since the specification and all values can be changed without the notice.
(1N≒0.102kgf • m)

Shaft and section of HD Series

Figure HD-2

Stepped cone, shaft detail drawing

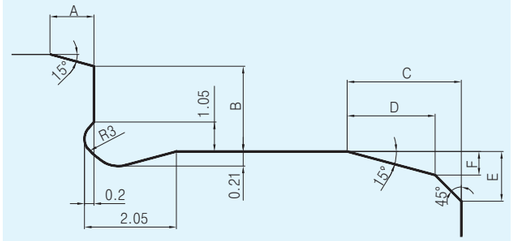


Figure HD-3

Chamfer of inner section detail drawing

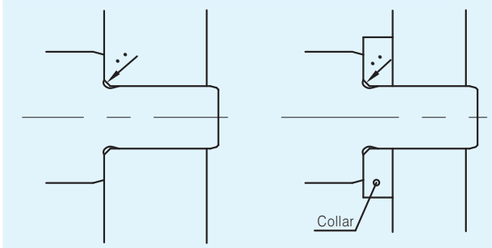


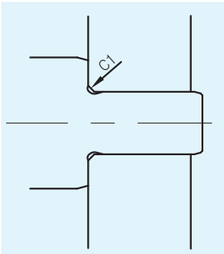
Figure table

Table HD-4

Model		A	B	C	D	E	F
Input shaft	HD040,HD060	Section r is R0.5					
	HD070~HD170	2.05	1.9	2.24	0.55	1.0	0.45
Output shaft	HD045	Section r is R0.5					
	HD060	—	—	2.24	0.55	1.0	0.45
	HD070	—	—	2.24	0.55	1.0	0.45
	HD080	—	—	2.24	0.55	1.0	0.45
	HD110	—	—	2.24	0.55	1.0	0.45
	HD140	—	—	2.24	0.55	1.0	0.45
	HD170	—	—	3.73	1.37	2.0	0.63

How to chamfer inner section.

Figure HD-4

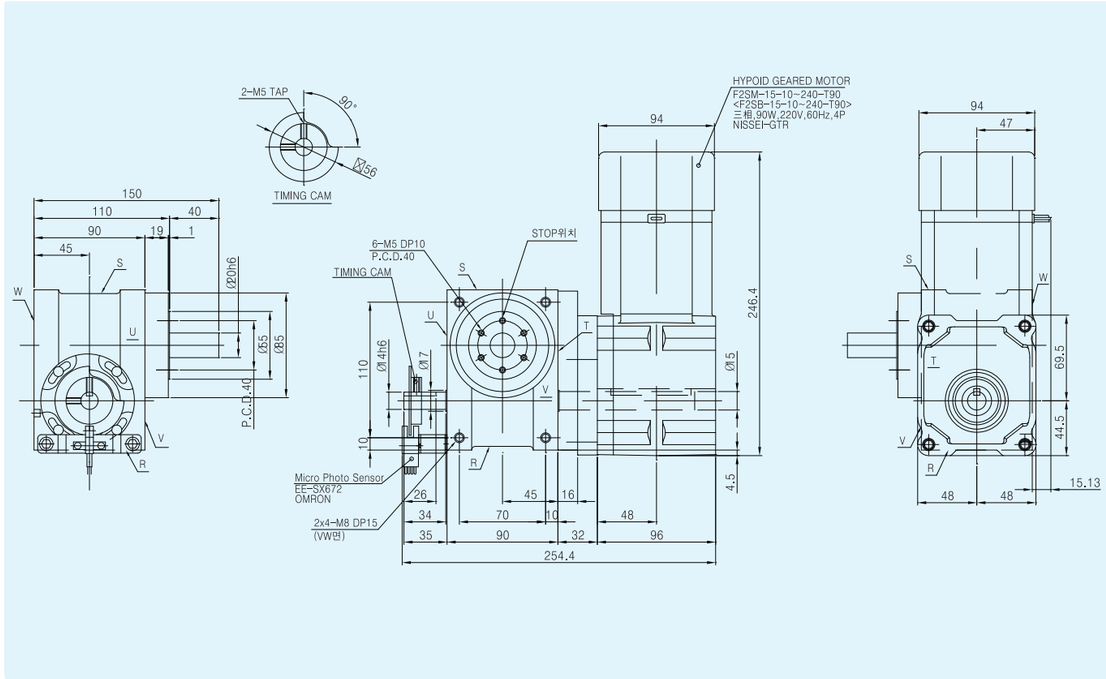


Precautions) Please perfom the method of chamfering the internal diameter section of the input shaft of HD045 and HD060 and the output shaft of HD045 as C 0.5.

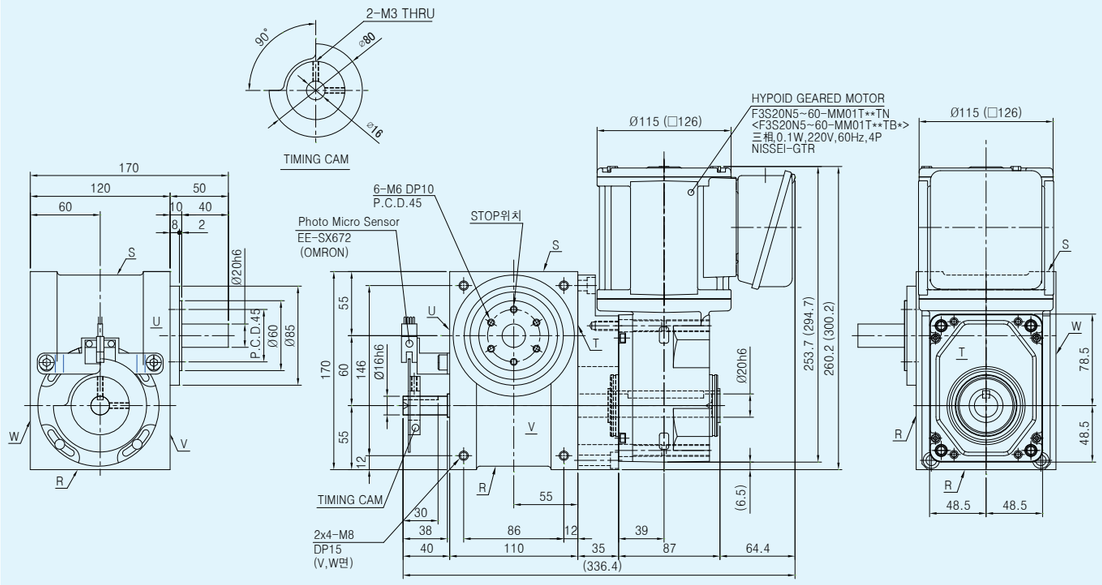
⚠ Cautious

Input/output axis and section part of HD series is fabricated as 2 layer R, 2 layer chamfer and etcconsidering the decrease of fatigue failure and material of mounting state, pressing in oil seal according to the stress concentration. Chamfering of inner section of pulley, table and etc should be fabricated after considering the shape of shaft axis.

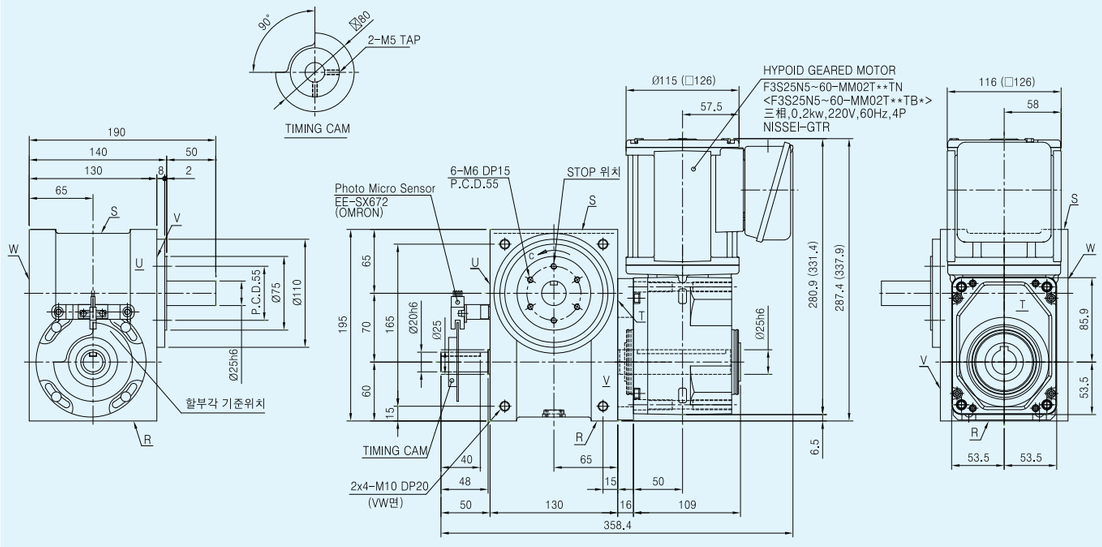
HD045 + Integral type hypoid geared motor (90W)



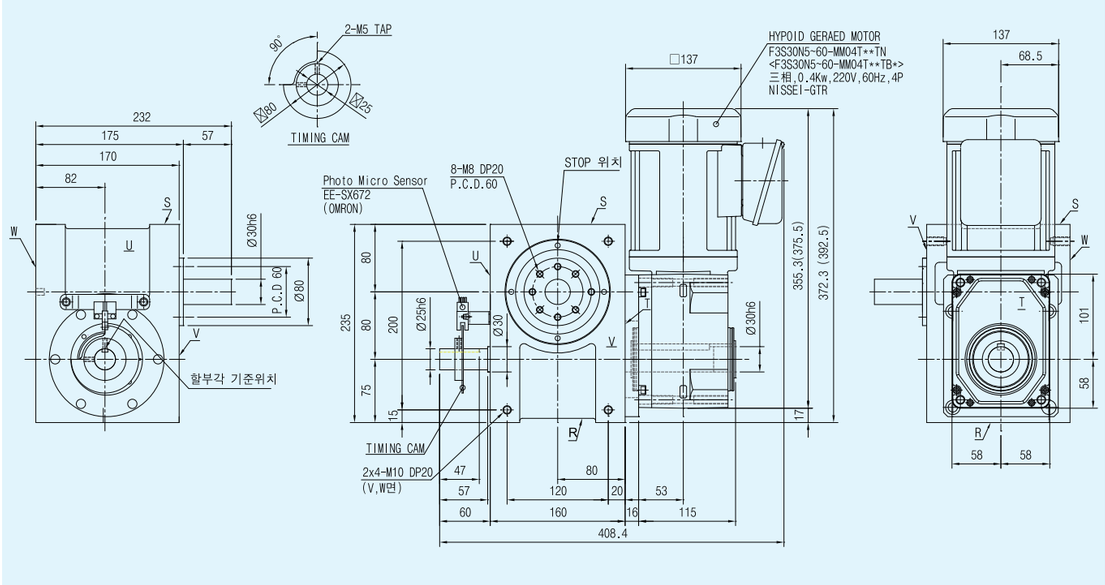
HD060 + Integral type hypoid geared motor(0.1kw)



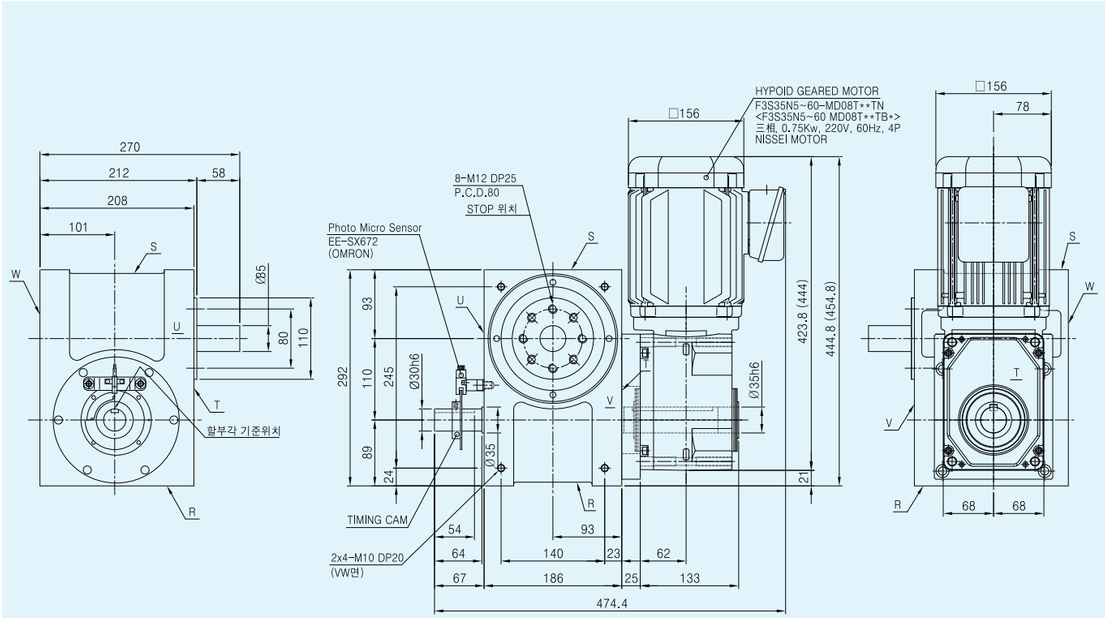
HD070 + Integral type hypoid geared motor(0.2kw)



HD080 + Integral type hypoid geared motor(0.4kw)

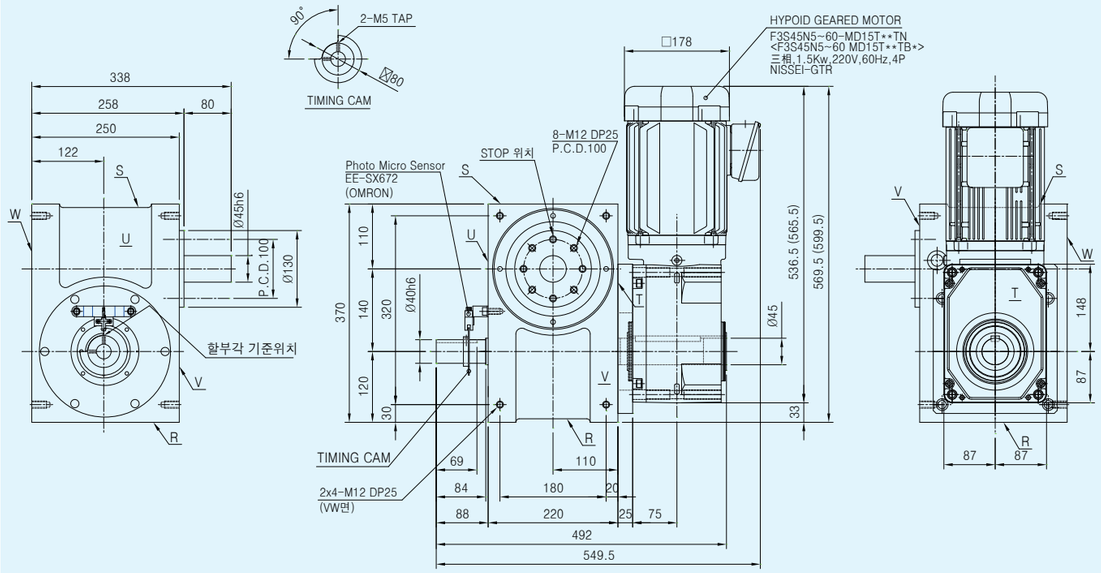


HD110 + Integral type hypoid geared motor(0.75kw)

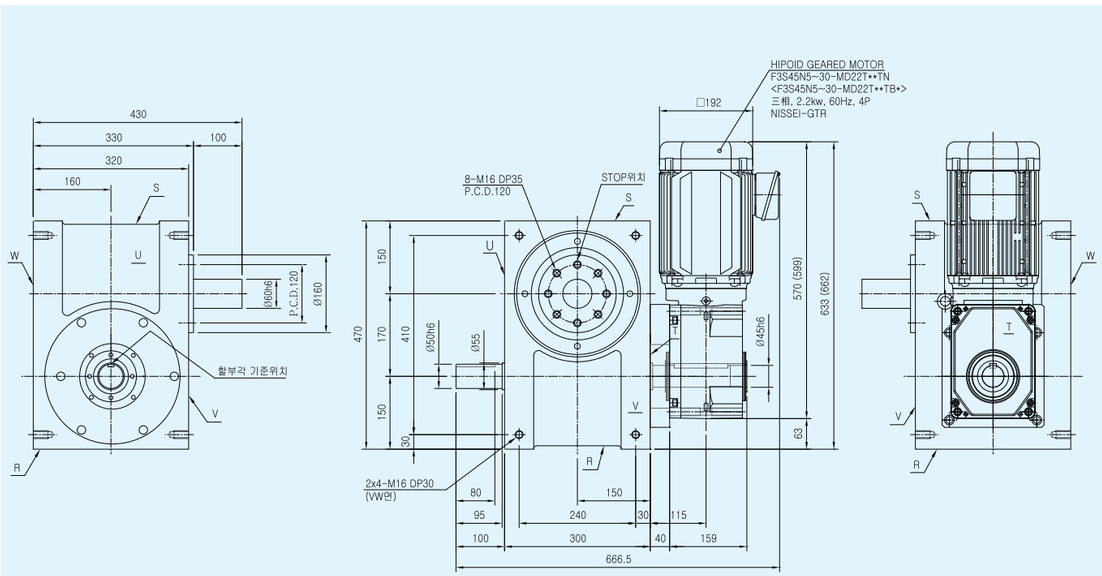


Integral type hypoid geared motor HD series

HD140 + Integral type hypoid geared motor(1.5kw)



HD170 + Integral type hypoid geared motor(2.2kw)



Option

Reducer mounted type specification

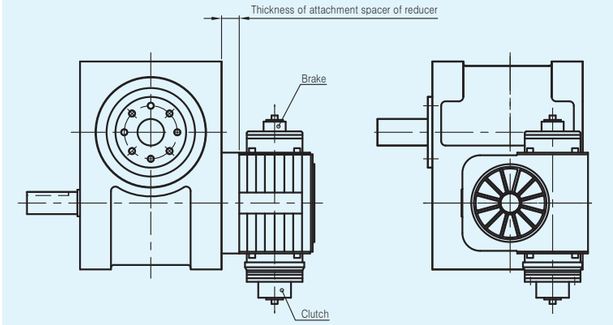


Figure OP-1

For mounting position values, please refer to the dimensions of each product.

Mounted model

Table OP-1

	HD 045	HD 060	HD 070	HD 080	HD 110	HD 140	HD 170
R48		● (15)	● (15)				
R65			● (15)	● (–)	● (–)	● (25)	
R80					● (–)	● (–)	● (30)
R100						● (–)	● (–)

⚠ Precautions

The figure in ( ) is the thickness of spacer to enter the gap between the torque shield and indexing drive. But, with the sign of (–), it does not require spacer.

Torque shield mounted type specification

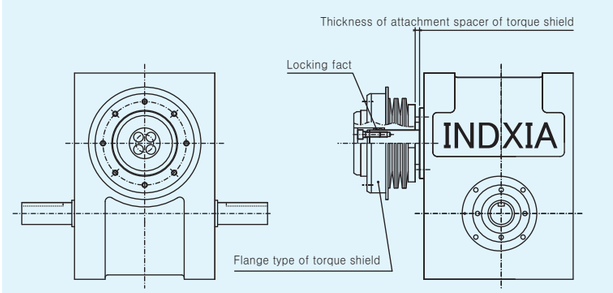


Figure OP-2

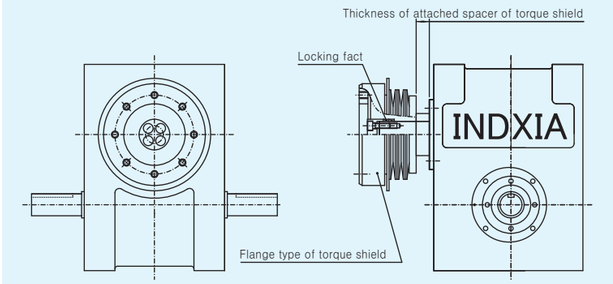


Figure OP-3

For mounting position values, please refer to the dimensions of each product.

Mounted model

Table OP-2

	HD 045	HD 060	HD 070	HD 080	HD 110	HD 140	HD 170
T06F	● (5)	● (5)	● (5)				
T07F			● (5)	● (5)	● (5)		
T08F					● (5)	● (14)	
T11F						● (5)	● (21)
T14F							● (20)
T06C	● (8)	● (10)	● (19)				
T07C			● (7)	● (15)	● (17)		
T08C					● (9)	● (34)	
T11C						● (24)	● (46)
T14C							● (20)

⚠ Precautions

The figure in ( ) is the thickness of spacer to enter the gap between the torque shield and indexing drive. But, with the sign of (–), it does not require spacer.

RGB Dimension

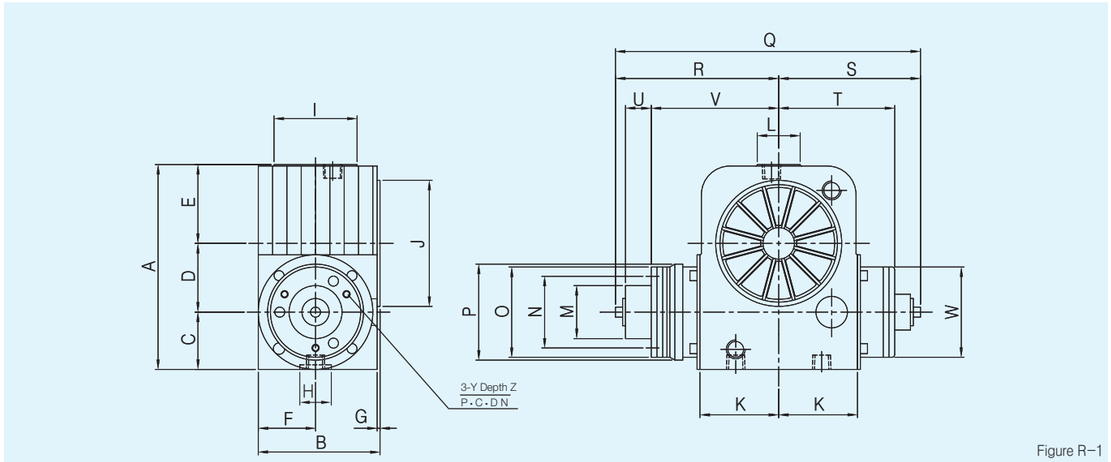


Figure R-1

• Dimensions table

Table R-1

Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	Y	Z
R48	143	85	40	48	55	40	2	22	58	88	55	30	37h7	50	63	67	213	114	99	81	18	89	64	M5	6
R65	180	95	45	65	70	45	2	30	62	120	75	40	45h7	60	80	85	275	143	127	103.8	20	114	81	M6	8
R80	224	117	54	80	90	55	2	30	80	150	90	60	60h7	76	100	106	327	171	151	122.9	24	136	101	M6	8
R100	278	142	68	100	110	70	2	33	93	180	110	80	70h7	95	125	133	387	202	180	147.3	25	163	126	M8	12.5

※ Please compare the figure R-1 and figure R-2 with the RC type of clutch and RB type of brake.

⚠ Precautions Please check the length of bolt when locking the pulley. (Please refer to Y and Z in the dimension table.)

RA Dimension

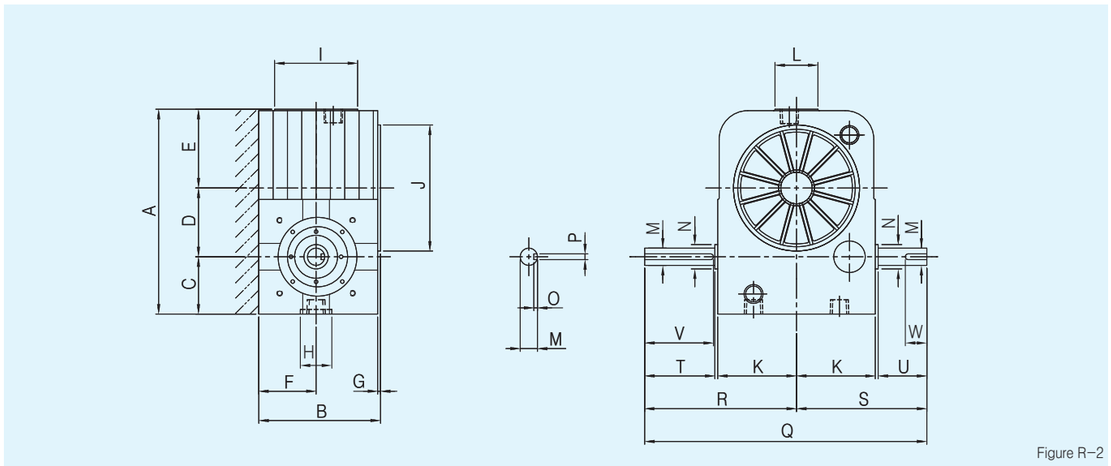


Figure R-2

• Dimensions table

Table R-2

Type	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
R48	143	85	40	48	55	40	2	22	58	88	55	30	12h7	17	2.5	4N9	197	106	91	49	34	48	15
R65	180	95	45	65	70	45	2	30	62	120	75	40	17h7	20	3	5N9	252	133	119	55.5	41.5	52	18
R80	224	117	54	80	90	55	2	30	80	150	90	60	25h7	30	4	7N9	301	159	142	66	49	62	22
R100	278	142	68	100	110	70	2	33	93	180	110	80	30h7	35	4	7N9	357	187	170	73.5	56.5	70	25

※ Specification and values can be changed without prior notice. Therefore. please double check before ordering.

Table R-3

Contents	Unit	Symbol	R48	R65	R80	R100
Maximum speed	rpm	Nw	1800	1800	1800	1800
Moment of inertia of worm shaft	kg • m²	C_2	1.81 X 10^{-3}	8.01 X 10^{-3}	0.023	0.077
Moment of inertia of worm gear	kg • m²	C_3	0.22 X 10^{-3}	0.53 X 10^{-3}	0.123 X 10^{-2}	0.325X 10^{-2}
Backlash on wheel shaft	degee	b	(0.26)	(0.22)	(0.1)	(0.16)
Friction torque of worm shaft	N • m	Txw	(0.441)	(0.588)	(0.98)	(1.47)
Product weight	Kg		3	10	18	30
Clutch specification			101-06 Type	101-08 Type	101-10 Type	101-12 Type
Static friction torque	N • m	Tsc	5.39	10.8	21.6	44.1
Dynamic friction torque	N • m	Tdc	4.9	9.8	19.6	39.2
Stator • rotor weight	kg	Wsc	0.4	0.725	1.26	2.3
Armature weight	kg	Wac	0.06	0.1	0.24	0.46
Rotor inertial weight	kg • m²	C_4	0.074 X 10^{-3}	0.224 X 10^{-3}	0.68 X 10^{-3}	2.14 X 10^{-3}
Armature inertial weight	kg • m²	C_5	0.042 X 10^{-3}	0.118 X 10^{-3}	0.48 x 10^{-3}	1.31 X 10^{-3}
Rated voltage	V		DC24	DC24	DC24	DC24
Minimum power	W		11	15	20	25
Brake specification			111-06 Type	111-08 Type	111-10 Type	111-12 Type
Static friction torque	N • m	Tsb	5.39	10.8	21.6	44.1
Dynamic friction torque	N • m	Tdb	4.9	9.8	19.6	39.2
Stator • rotor weight	kg	Wsb	0.22	0.4	0.67	1.22
Armature weight	kg	Wab	0.06	0.1	0.24	0.46
Armature inertial weight	kg • m²	C_6	0.042 X 10^{-3}	0.118 X 10^{-3}	0.48 X 10^{-3}	1.31 X 10^{-3}
Rated voltage	V		DC24	DC24	DC24	DC24
Minimum power	W		11	15	20	25

1N • ≒0.102kgf • m

⚠ Precautions

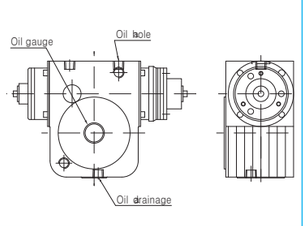
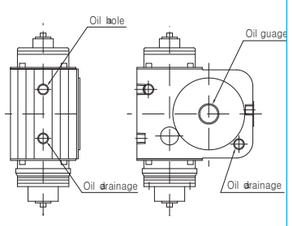
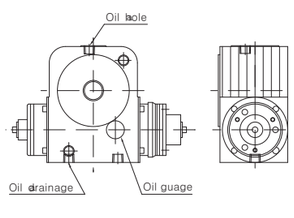
1. Tdc and Tdb (Dynamic friction torque) at the specification table is the value in case the relative velocity is 100rpm.
2. Equivalent Moment of inertia:J^2

$$J_2 = \frac{C_1 + C_2}{i^2} + C_3 + C_4 + C_6$$

i ····· Real deceleration ratio
C_1 ····· Moment of inertia of input shaft (Cam shaft)

Location of Oil plug, oil gauge and oil drain

Table R-4

Mout		Worm shaft is on top	Worm shaft positioned up right	Worm shaft on the bottom
Location				
Oil level ℓ	Attachment is impossible.	0.23	0.30	0.20
	Attaching pen is possible.	0.41	0.59	0.27
		0.71	0.87	0.45
		1.34	1.73	0.80

Input power • Output torque table

(a) If the operating time is less than 10 times per hour, the input torque will be allowed 2.5 times of input torque which is calculated from the temporal input power NiN.

(b) Allowable max output torque T2max is indicating the allowable torque considering the max load which is based on the normal operation.

(c) The temporal reduction ratio (iN) and actual reduction ratio (i) may be slightly different depending on the model.

(d) The life time of reducer is 25,000 hour based on the proper usage.

R48 Input porosity • output torque table

Table R48-1

Gear ratio (Real decelera-tion ratio)	RPM of input shaft rpm	RPM of output shaft rpm	Input porosity N_{IN}/kw	Allowble successive output torque allowed continuation N_{2N}/Nm	Allowable max output torque N_{2MAX}/Nm
10 (10)	1800	180	0.52	18.3	82.9
	1500	150	0.51	20.9	88.7
	1000	100	0.39	23.7	100.2
	750	75	0.33	25.9	107.3
	500	50	0.26	30.5	115.4
	300	30	0.19	38.1	122.8
	150	15	0.12	49.3	128.8
20 (20)	1800	90	0.25	18.0	91.8
	1500	75	0.23	19.3	98.1
	1000	50	0.18	20.4	110.1
	750	37.5	0.15	20.6	117.6
	500	25	0.12	23.7	126.1
	300	15	0.08	26.4	133.8
	150	7.5	0.05	33.0	140.2
30 (30)	1800	60	0.18	16.7	98.4
	1500	50	0.16	17.1	105.9
	1000	33.3	0.13	18.5	120.4
	750	25	0.12	20.3	129.1
	500	16.7	0.09	20.7	139.1
	300	10	0.06	23.0	148.6
	150	5	0.04	30.7	155.9
50 (50)	1800	36	0.1	7.0	55.1
	1500	30	0.09	7.1	59.5
	1000	20	0.08	8.0	68.5
	750	15	0.06	6.8	74.2
	500	10	0.05	6.6	80.9
	300	6	0.04	8.8	87.2
	150	3	0.03	13.2	92.5

1Nm≒0.102kgf • m

R65 Input porosity • Output torque table

Table R65-1

Gear ratio (Real decelera-tion ratio)	RPM of input shaft rpm	RPM of output shaft rpm	Input porosity N_{IN}/kw	Allowble successive output torque allowed continuation N_{2N}/Nm	Allowable max output torque N_{2MAX}/Nm
10 (10.33)	1800	174.19	2.1	87.4	185.7
	1500	145.16	1.9	94.7	200.6
	1000	96.77	1.45	105.5	232.1
	750	72.58	1.25	117.2	251.8
	500	48.39	1.05	136.6	274.9
	300	29.03	0.79	173.0	297.2
	150	14.52	0.42	184.8	316.3
	60	5.81	0.174	192.0	328.4
	10	0.97	0.029	196.1	336.3
20 (20.5)	1800	87.80	1.4	100.7	240.6
	1500	73.17	1.3	111.5	256.9
	1000	48.78	1	121.8	289.8
	750	36.59	0.88	135.4	309.4
	500	24.39	0.76	174.0	331.3
	300	14.63	0.535	206.0	352.0
	150	7.32	0.28	215.9	369.4
	60	2.93	0.115	221.7	379.8
	10	0.49	0.02	225.6	386.3
31.5 (31)	1800	58.06	0.855	70.5	214.6
	1500	48.39	0.79	78.8	232.6
	1000	32.26	0.64	102.7	270.4
	750	24.19	0.55	107.4	294.7
	500	16.13	0.46	113.1	322.9
	300	9.68	0.4	159.5	350.1
	150	4.84	0.274	218.5	374.0
	60	1.94	0.114	228.1	389.7
	10	0.32	0.02	233.2	398.3
40 (41)	1800	43.90	0.8	86.8	231.5
	1500	36.59	0.74	99.8	247.5
	1000	24.39	0.59	115.7	279.9
	750	18.29	0.53	123.2	299.4
	500	12.20	0.45	145.5	322.0
	300	7.32	0.345	185.9	342.7
	150	3.66	0.195	210.1	359.9
	60	1.46	0.081	217.1	371.8
	10	0.24	0.014	219.8	378.3
50 (51)	1800	35.29	0.695	98.3	212.8
	1500	29.41	0.64	103.8	228.1
	1000	19.61	0.51	108.2	258.1
	750	14.71	0.45	111.7	276.7
	500	9.80	0.38	128.5	286.1
	300	5.88	0.295	166.3	310.5
	150	2.94	0.173	195.0	334.2
	60	1.18	0.071	201.5	345.2
	10	0.20	0.012	204.6	350.0

1Nm≒0.102kgf • m

R80 Input power • Output torque table

Table R80-1

Gear ratio (Real decelera-tion ratio)	RPM of input shaft rpm	RPM of output shaft rpm	Input porosity N_{IN}/kw	Allowble successive output torque allowed continuation N_{2N}/Nm	Allowable max output torque N_{2MAX}/Nm
10 (10.33)	1800	174.19	3.35	147.3	332.2
	1500	145.16	3.05	160.9	361.0
	1000	96.77	2.35	182.5	423.0
	750	72.58	2.05	207.1	461.8
	500	48.39	1.65	235.0	509.8
	300	29.03	1.35	314.2	555.9
	150	14.52	0.746	348.5	595.9
	60	5.81	0.311	364.1	623.0
	10	0.97	0.053	373.3	639.3
20 (20.5)	1800	87.80	2.1	154.7	345.6
	1500	73.17	1.95	172.2	374.8
	1000	48.78	1.5	191.8	436.3
	750	36.59	1.35	221.0	475.2
	500	24.39	1.1	250.1	522.3
	300	14.63	0.896	331.6	567.4
	150	7.32	0.479	354.6	606.3
	60	2.93	0.2	369.8	632.2
	10	0.49	0.034	378.6	647.4
31.5 (31)	1800	58.06	1.35	128.1	425.7
	1500	48.39	1.25	143.2	462.2
	1000	32.26	1.0	168.0	539.0
	750	24.19	0.87	191.0	587.9
	500	16.13	0.73	217.3	645.9
	300	9.68	0.61	291.3	701.9
	150	4.84	0.46	439.3	751.5
	60	1.94	0.192	458.4	784.2
	10	0.32	0.033	469.8	803.6
40 (41)	1800	43.90	1.25	141.1	347.3
	1500	36.59	1.15	157.8	376.4
	1000	24.39	0.89	189.1	437.6
	750	18.29	0.78	201.7	477.1
	500	12.20	0.65	212.0	523.7
	300	7.32	0.56	294.8	568.0
	150	3.66	0.337	354.8	606.4
	60	1.46	0.141	369.8	631.7
	10	0.24	0.024	379.0	647.5
50 (51)	1800	35.29	1.05	142.8	366.8
	1500	29.41	1.0	180.0	396.1
	1000	19.61	0.81	196.7	456.5
	750	14.71	0.71	205.8	494.3
	500	9.80	0.6	219.8	529.8
	300	5.88	0.43	262.6	574.6
	150	2.94	0.28	341.9	616.7
	60	1.18	0.123	374.3	639.6
	10	0.20	0.021	382.8	654.0

1Nm≒0.102kgf • m

R100 Input power • Output torque table

Table R100-1

Gear ratio (Real decelera-tion ratio)	RPM of input shaft rpm	RPM of output shaft rpm	Input porosity N_{IN}/kw	Allowble successive output torque allowed continuation N_{2N}/Nm	Allowable max output torque N_{2MAX}/Nm
10 (10.33)	1800	174.19	7.42	344.7	589.1
	1500	145.16	6.79	378.0	645.8
	1000	96.77	5.46	450.0	769.5
	750	72.58	4.62	497.8	851.1
	500	48.39	3.61	556.7	951.9
	300	29.03	2.525	615.0	1050.5
	150	14.52	1.367	667.5	1142.1
	60	5.81	0.575	703.2	1203.4
	10	0.97	0.099	724.8	1240.4
20 (20.5)	1800	87.80	4.2	351.8	762.4
	1500	73.17	4	401.2	826.5
	1000	48.78	3.7	543.7	961.3
	750	36.59	3	564.8	1046.6
	500	24.39	2.1	544.1	1148.4
	300	14.63	1.4	598.3	1245.1
	150	7.32	0.9	774.1	1329.2
	60	2.93	0.376	810.5	1384.9
	10	0.49	0.064	829.7	1418.2
31.5 (31)	1800	58.06	3.7	410.7	758.9
	1500	48.39	3.3	436.7	830.0
	1000	32.26	2.7	520.0	984.4
	750	24.19	2.1	515.3	1085.5
	500	16.13	1.6	547.9	1208.9
	300	9.68	1.2	621.3	1330.9
	150	4.84	0.8	828.6	1439.7
	60	1.94	0.342	885.6	1514.8
	10	0.32	0.059	912.0	1559.8
40 (41)	1800	43.90	2.7	373.9	768.8
	1500	36.59	2.5	412.8	832.2
	1000	24.39	2.1	499.9	965.9
	750	18.29	1.8	547.1	1051.3
	500	12.20	1.3	525.6	1152.2
	300	7.32	0.9	596.6	1246.3
	150	3.66	0.587	778.3	1325.8
	60	1.46	0.245	810.3	1385.5
	10	0.24	0.042	829.3	1418.0
50 (50)	1800	36.00	2.1	317.9	700.6
	1500	30.00	1.9	343.8	760.9
	1000	20.00	1.7	456.6	885.5
	750	15.00	1.4	478.0	966.3
	500	10.00	1	436.7	1061.1
	300	6.00	0.7	491.3	1151.1
	150	3.00	0.4	561.5	1232.5
	60	1.20	0.2	701.9	1284.5
	10	0.20	0.036	768.6	1316.0

1Nm≒0.102kgf • m

Torque shield

Dimensions(Flange type)

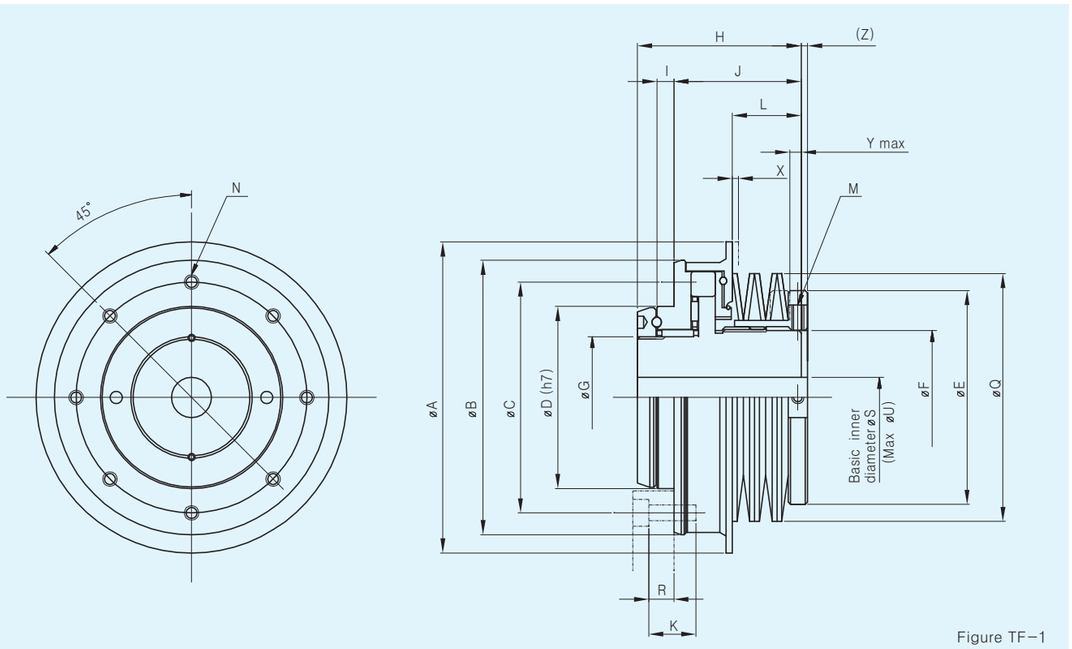


Figure TF-1

Dimensions table(Flange type)

Table TF-1

Form	T (N • m)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Q	S	U	X	(z)
T06F-07M T06F-10M T06F-30M T06F-50M	3~7 5~10 10~30 15~50	108 (88)	88	P.C.D 75	60 h7	58	40	M40 P1.5	60	5	48	R+7	25.0 25.5 25.0 25.5	2-M5 P0.8	8-M6 P1 Depth 7	52	12.5	30	1.3 2.0 1.3 2.0	3.9 3.2 3.9 3.2
T07F-68M T07F-12L T07F-25L T07F-40L	35~68 44~120 100~250 100~400	128	113	P.C.D 95	75 h7	88	55	M52 P1.5	70	6.6	55	R+9	30.0 31.0 30.0 31.0	2-M5 P0.8	8-M6 P1 Depth 9	102	16.5	40	1.6 2.5 1.6 2.5	1.7 0.9 1.4 0.6
T08F-12L T08F-20L T08F-40L T08F-60L	35~120 48~200 75~400 132~600	164	138	P.C.D 120	100 h7	108	75	M72 P1.5	82	7.6	65	R+11	37.5 38.5 37.5 38.5	2-M5 P0.8	8-M8 P1.25 Depth 11	130	16.5	52	1.6 2.5 1.6 2.5	0 0.8 −0.7 −1.5
T11F-25L T11F-35L T11F-85L T11F-12X	120~250 140~350 192~850 295~1200	198	170	P.C.D 148	120 h7	134	96	M90 P1.5	95	9.6	75	R+13	42.0 43.0 42.0 43.0	2-M5 P0.8	8-M10 P1.5 Depth 13	160	27	68	2.0 3.0 2.0 3.0	2.0 1.0 −0.5 −1.5
T14F-30L T14F-45L T14F-12X T14F-18X	110~300 150~450 420~1200 600~1800	236	206	P.C.D 180	150 h7	158	120	M120 P1.5	105	10.4	85	R+15	43.5 44.5 43.5 44.5	2-M6 P0.75	8-M12 P1.75 Depth 15	186	27	90	2.2 3.5 2.2 3.5	4.2 2.9 3.2 1.9

※ Please double-check it when ordering since the specification and dimensionas can be changed without prior notice.

⚠ Cautious

T : Adjustment range of tripping torque
S : Basic inner diameter
U : Max value of fabrication for inner diameter
Kmax : Max length for applicable locking bolt. (Please use it with N value)
X : Overload detecting panel will move Xmm if overload is applied. Please perform operation control and use the detection SWITCH by using such movement.
(Z) : This is the height when spring is in free state. Please refer to Z when calculating tripping torque.
M : This is the diameter of set bolt and pitch within the torque adjustment nut.
Tmax : Max tripping torque
Ymax : Max tightening value
P : Thread pitch of torque adjustment nut
a : Max allowable RADIAL load
b : Max allowable THRUST load
c : Max allowable bending moment.
Nmax : Max allowable RPM
J : Inertia moment of torque shield
W : weight
Cautious 1 : Please contact us in case the RPM exceeds the Tmax
Cautious 2 : Please select the length of attachment bolt after checking the depth of tap (N). If bolt is too long, flange and boss will be LOCK and in case of that, rotation cannot be performed.

Reference (Overload detection SWITCH)

The torque shield by the overload is operated and the panel of the detection of overload moves to Xmm. The detection of overload is performed by using such movement.

(1) Proximity Switch
Since it can detect whether object is in the position or not by non-contacting detection, this Switch is most suitable for detecting the movement of torque shield while rotating.

(2) Micro Switch
This can be used as low-speed rotation because it is contacting detection type. However, please check about the distance after switch operation sufficiently.

Proximity SWITCH

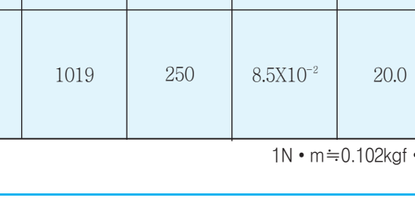


Figure TF-2

Dimensions table(Flange type)

Table TF-2

Form	Tmax (N • m)	Ymax (mm)	P (mm)	a (N)	b (N)	c (N • m)	Nmax (rpm)	J (kg • m²)	W (kg)
T06F-07M T06F-10M T06F-30M T06F-50M	7 10 30 50	9.0 7.6 9.5 9.8	1.5	3830	7950	118	800	$1.3X10^{-3}$	1.5
T07F-68M T07F-12L T07F-25L T07F-40L	68 120 250 400	5.3 4.9 6.2 6.2	2	7160	10800	196	600	$4.8X10^{-3}$	3.4
T08F-12L T08F-20L T08F-40L T08F-60L	120 200 400 600	6.2 6.2 7.5 7.0	2	10500	15000	380	400	$1.5X10^{-2}$	6.2
T11F-25L T11F-35L T11F-85L T11F-12X	250 350 850 1200	7.3 5.0 7.7 7.4	2	14800	22200	666	300	$3.5X10^{-2}$	11.4
T14F-30L T14F-45L T14F-12X T14F-18X	300 450 1200 1800	6.4 5.5 9.0 8.6	2	23700	28500	1019	250	$8.5X10^{-2}$	20.0

1N • m≒0.102kgf • m

Torque Shield

Dimensions(Coupling type)

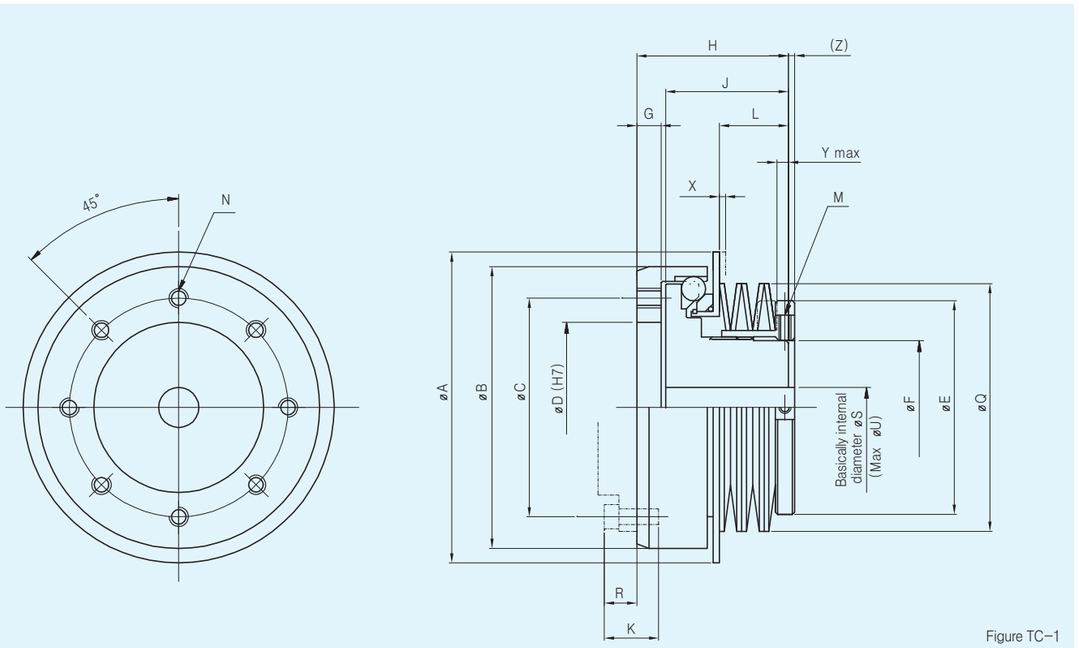


Figure TC-1

Dimensions table(Coupling type)

Table TC-1

Form	T (N • m)	A	B	C	D	E	F	G	H	J	K	L	M	N	Q	S	U	X	(z)
T06C-06M	3~6	108	95	P.C.D 70	50 H7	58	40	9	52	40	R+8	18.5	2-M5 P0.8	8-M6 P1 Depth 9	52	12.5	30	1.4	3.2
T06C-10M	6~10											19.0						2.2	2.8
T06C-30M	10~30											18.5						1.4	3.2
T06C-50M	14~50											19.0						2.2	2.8
T07C-68M	28~68	128	116	P.C.D 90	70 H7	88	55	10	65	52	R+9	30.0	2-M5 P0.8	8-M8 P1.25 Depth 10	102	16.5	40	1.6	2.0
T07C-10L	30~100											31.0						2.6	0.9
T07C-20L	80~200											30.0						1.6	1.7
T07C-35L	87~350											31.0						2.6	0.6
T08C-12L	51~120	164	142	P.C.D 110	90 H7	108	75	12	75	60	R+11	35.0	2-M5 P0.8	8-M8 P1.25 Depth 12	130	16.5	52	1.7	2.5
T08C-15L	62~150											36.0						2.7	1.6
T08C-35L	139~350											35.0						1.7	1.8
T08C-45L	160~450											36.0						2.7	0.9
T11C-20L	105~200	198	176	P.C.D 130	110 H7	134	96	16	90	70	R+15	41.5	2-M5 P0.8	8-M10 P1.5 Depth 16	160	27	68	2.0	2.4
T11C-35L	112~350											43.0						3.2	1.0
T11C-65L	185~680											41.5						3.0	-0.1
T11C-10X	240~1000											43.0						3.2	-1.5
T14C-30L	220~310	236	208	P.C.D 160	130 H7	158	120	16	100	80	R+15	44.0	2-M6 P0.75	8-M12 P1.75 Depth 16	186	27	90	2.1	4.5
T14C-45L	365~510											44.0						3.7	4.5
T14C-13X	660~1340											44.0						2.1	3.5
T14C-20X	1070~2000											44.0						3.7	3.5

※ Please re-check when ordering since the specification and all sizes can be changed without the notice.

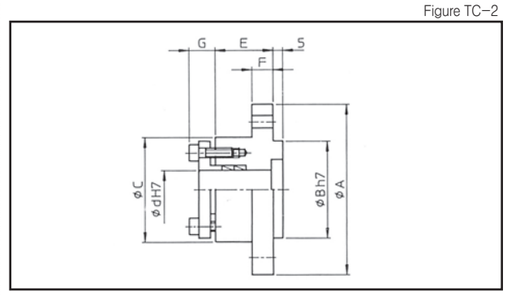
⚠ Precautions

T : Adjustment range of tripping torque
S : Basic inner diameter
U : Max value of fabrication for inner diameter
Kmax : Max length for applicable locking bolt. (Please use it with N value)
X : Overload detecting panel will move Xmm if overload is applied. Please perform operation control and use the detection SWITCH by using such movement.
(Z) : This is the height when spring is in free state. Please refer to Z when calculating tripping torque.
M : This is the diameter of set bolt and pitch within the torque adjust-ment nut.
Tmax : Max tripping torque
Ymax : Max tightening value
P : Thread pitch of torque adjustment nut
δ : Max allowable angular error
α : Max allowable gap error
ε : Max allowable parallel error
Nmax : Max allowable RPM
J : Inertia moment of torque shield
W : weight
Note ① The values of angular error () is the allowed amount of movement to the direction of shaft based on H. So, please comply with the value H when you assemble.
Note ② The e values of parallel error () is the maximum amount of absorption in case of the location of ball for sending the torque of the torque shield.
Note ③ Please contact us in case the RPM exceeds the Nmax.

Flange of shaft part

It needs the flange to attach the boss to the opposite side in case of using the coupling. We prepare for the option to set this flange of shaft part and the locking fact of the pressure flange.

Figure TC-2



Size table

Table TC-2

	A	B	C	D	E	F	G
T06C	88	50	54	16~25	30	11	(13.6)
T07C	108	70	70	20~40	35	15	(16)
T08C	126	90	90	30~45	40	15	(20)
T11C	152	110	108	40~60	40	15	(26)
T14C	185	130	135	50~65	55	15	(33)

Dimensions table(Coupling type)

Table TC-2

Form	Tmax (N • m)	Ymax (mm)	P (mm)	δ (deg)	α (mm)	ε (mm)	Nmax (rpm)	J (kg • m^2)	W (kg)
T06C-06M	6	8.7	1.5	1.5	±1.5	0.1	1000	$1.7X10^{-3}$	1.5
T06C-10M	10	5.7							
T06C-30M	30	10.0							
T06C-50M	50	9.6							
T07C-68M	60	6.4	2	1.2	±1.8	0.1	700	$5.7X10^{-3}$	3.2
T07C-10L	100	7.1							
T07C-20L	200	6.4							
T07C-35L	350	6.2							
T08C-12L	120	10.8	2	1.2	±2.0	0.1	500	$1.4X10^{-2}$	5.3
T08C-15L	150	5.9							
T08C-35L	350	6.9							
T08C-45L	450	5.7							
T11C-20L	200	10.8	2	1.0	±2.5	0.1	400	$3.4X10^{-2}$	10.8
T11C-35L	350	11.2							
T11C-65L	650	7.4							
T11C-10X	1000	6.7							
T14C-30L	300	7.5	2	0.7	±3.5	0.1	300	$9.2X10^{-2}$	20.0
T14C-45L	450	6.0							
T14C-13X	1300	10.0							
T14C-20X	2000	10.2							

1N • m≒0.102kgf • m

Torque Shield

토크 조정 기준표

(Nm)

T06F				
너트 눈금 Y	07M	10M	30M	50M
0.00	2.6	4.9	9.7	14.8
0.75	3.2	5.5	12.4	18.5
1.50	3.8	6.3	15.0	21.8
2.25	4.4	7.2	17.5	25.8
3.00	5.0	8.0	20.0	29.4
3.75	5.8	9.2	22.8	33.4
4.50	6.5	10.0	25.5	38.0
5.25	7.3		29.0	42.0
6.00			32.4	47.0
6.75				52.2
7.00				

T07F				
너트 눈금 Y	68M	12L	25L	40L
0.00	35.0	44.0	100.0	100.0
1.00	48.0	66.0	134.0	180.0
2.00	57.0	85.0	168.0	243.0
3.00	68.0	106.0	200.0	292.0
4.00	72.0	120.0	232.0	336.0
5.00			265.0	378.0
6.00				410.0
7.00				
8.00				
9.00				
10.00				

T08F				
너트 눈금 Y	12L	20L	40L	60L
0.00	35.0	-	-	-
1.00	50.0	48.0	75.0	-
2.00	60.0	74.0	135.0	132.0
3.00	75.0	100.0	192.0	250.0
4.00	88.0	120.0	242.0	336.0
5.00	105.0	145.0	288.0	408.0
6.00	120.0	172.0	327.0	478.0
7.00		200.0	364.0	535.0
8.00			400.0	585.0
9.00				
10.00				

T11F				
너트 눈금 Y	25L	35L	85L	12X
0.00	120.0	140.0	-	-
1.00	150.0	200.0	192.0	-
2.00	180.0	260.0	296.0	295.0
3.00	200.0	310.0	400.0	450.0
4.00	220.0	350.0	495.0	600.0
5.00	250.0		593.0	740.0
6.00			678.0	875.0
7.00			762.0	1000.0
8.00			850.0	1115.0
9.00				1200.0
10.00				

T14F				
너트 눈금 Y	30L	45L	12X	18X
0.0	225.0	302.0	578.0	680.0
1.0	270.0	378.0	705.0	878.0
2.0	306.0	436.0	818.0	1070.0
3.0			922.0	1240.0
4.0			1018.0	1420.0
5.0			1103.0	1580.0
6.0			1200.0	1725.0
7.0				1800.0
8.0				
9.00				
10.00				

주의

- 토크 값은 기준이므로 실제 설정 토크 조정 시에는 반드시 토크 렌치 등을 이용하여 차단 토크를 확인하신 후 사용하십시오.
- "-" 표시는 스프링력 발생 하한 이하가 되므로 이보다 높은 체결이 필요합니다.
- 회색 영역은 체결량 오버가 되므로, 이것 이하로 사용하십시오.

토크 조정 기준표

(Nm)

T06C				
너트 눈금 Y	06M	10M	30M	50M
0.00	3.2	5.8	10.3	14.0
0.75	3.6	7.0	12.2	17.9
1.50	4.0	8.2	14.2	21.9
2.25	4.4	9.2	16.3	25.8
3.00	4.7	10.2	18.5	30.0
3.75	5.2		20.7	33.9
4.50	5.7		22.9	38.0
5.25	6.3		25.2	41.9
6.00			27.7	46.0
6.75			30.0	49.8
7.00				

T07C				
너트 눈금 Y	68M	10L	20L	35L
0.00	28.0	30.0	80.0	87.0
1.00	38.0	45.0	110.0	145.0
2.00	48.0	58.0	139.0	200.0
3.00	57.0	71.0	165.0	248.0
4.00	65.0	82.0	187.0	293.0
5.00	71.0	93.0	207.0	333.0
6.00		99.0		370.0
7.00		106.0		
8.00				
9.00				
10.00				

T08C				
너트 눈금 Y	12L	15L	35L	45L
0.00	51.0	62.0	139.0	163.0
1.00	63.0	85.0	187.0	240.0
2.00	74.0	108.0	233.0	307.0
3.00	84.0	128.0	276.0	365.0
4.00	93.0	148.0	315.0	417.0
5.00	101.0	167.0	350.0	460.0
6.00	107.0			
7.00	112.0			
8.00	117.0			
9.00	123.0			
10.00				

T11C				
너트 눈금Y	20L	35L	65L	10X
0.00	105.0	112.0	-	-
1.00	122.0	148.0	185.0	-
2.00	140.0	180.0	255.0	240.0
3.00	155.0	210.0	335.0	375.0
4.00	165.0	235.0	415.0	515.0
5.00	178.0	260.0	482.0	650.0
6.00	185.0	282.0	558.0	770.0
7.00	190.0	305.0	618.0	890.0
8.00	200.0	320.0	680.0	1000.0
9.00		342.0		
10.00		355.0		

T14C				
너트 눈금 Y	30L	45L	13X	20X
0.00	220.0	365.0	640.0	1070.0
1.00	250.0	440.0	750.0	1260.0
2.00	290.0	510.0	860.0	1400.0
3.00	300.0		960.0	1540.0
4.00			1060.0	1680.0
5.00			1160.0	1790.0
6.00			1270.0	1930.0
7.00				
8.00				
9.00				
10.00				

주의

- 토크 값은 기준이므로 실제 설정 토크 조정 시에는 반드시 토크 렌치 등을 이용하여 차단 토크를 확인하신 후 사용하십시오.
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- 회색 영역은 체결량 오버가 되므로, 이것 이하로 사용하십시오.

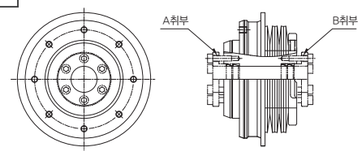
토크 실드 제품 코드표



■ 플랜지 타입

T □ □ F

테이블 구동 등 동작 대상물을 직접 장착하는 경우에 적합합니다.

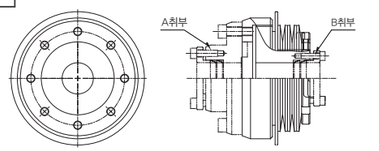




■ 커플링 타입

T □ □ C

컨베이어나 축을 연결하여 구동 경우에 적합하며, 2 축 간의 오차를 흡수 할 수 있습니다.



축경 권장표

사이즈	형식	토크 폭	권장설정토크 (Nm)	취부타입	취부 축경 øsA / sB(mm)
T06	F	07M	3 ~ 7	A	16 17 18 20
		10M	5 ~ 10	B	
		30M	10 ~ 30		
		50M	15 ~ 50		
T07	F	68M	35 ~ 68	A	20 22 24 25 28 30
		12L	44 ~ 120	B	
		25L	100 ~ 250		
		40L	100 ~ 400		
T08	F	12L	35 ~ 120	A	30 32 35 38 40
		20L	48 ~ 200	B	
		40L	75 ~ 400		
		60L	132 ~ 600		
T11	F	25L	120 ~ 250	A	35 38 40 45 50 55
		35L	140 ~ 350	B	
		85L	192 ~ 850		
		12X	295 ~ 1200		
T14	F	30L	110 ~ 300	A	50 55 60
		45L	150 ~ 450	B	
		12X	420 ~ 1200		
		18X	680 ~ 1800		

사이즈	형식	토크 폭	권장설정토크 (Nm)	취부타입	취부 축경 øsA (mm)	부착타입	취부 축경 ø sB (mm)
T06	C	06M	3 ~ 6	A	16 20	B	16 17 18 20
		10M	6 ~ 10				
		30M	10 ~ 30				
		50M	14 ~ 50				
T07	C	68M	28 ~ 68	A	20 25 30 35	B	20 22 24 25 28 30
		10L	30 ~ 100				
		20L	80 ~ 200				
		35L	87 ~ 350				
T08	C	12L	51 ~ 120	A	30 35 40	B	30 32 35 38 40
		15L	62 ~ 150				
		35L	139 ~ 350				
		45L	163 ~ 450				
T11	C	20L	105 ~ 200	A	40 45 50 55	B	35 38 40 45 50 55
		35L	112 ~ 350				
		65L	185 ~ 680				
		10X	240 ~ 1000				
T14	C	30L	220 ~ 310	A	50 55 60	B	50 55 60
		45L	365 ~ 510				
		13X	660 ~ 1340				
		20X	1070 ~ 2000				

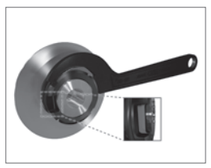
주문 예

사이즈	형식	-	토크 폭	-	설정토크	-	A취부	축경	-	B취부	축경	-	특주
T08F		-	20L	-	N	-	N		-	B60			
T06C		-	30M	-	N	-	A20		-	B20			
T11F		-	12X	-	800	-	A40		-	N		-	X

- 기호 N은 설정 안 함을 의미합니다. 지정이 없는 경우 반드시 N을 기입해 주세요.
- 설정 토크 기호 N일때는, 조정 너트는 최소 체결 눈금으로 토크 설정을 하지 않고 출하합니다. 토크 설정은 고객에서 실시하세요.
- 플랜지 형식(F)의 장착 타입은 동시 병행은 할 수 없습니다.
- A 취부／B 취부 지정시 설치에 필요한 체결 링, 압착 플랜지, 볼트 등의 부속품은 모두 세트로 출하합니다.
- 취부타입, 축경을 선택하지 않는 경우, 보스부는 최소 경으로 출하됩니다.
- 그외의 부착에 관한 형상은 상담해 주시기 바랍니다.
- 사양 및 치수 등은 예고 없이 변경되는 경우가 있습니다.
- 각 모델의 상세 사양에 대해서는 당사로 문의 바랍니다.

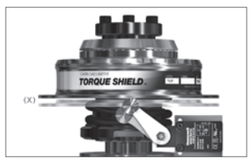
차단 토크 조정

토크쉴드 시리즈는 고정 보스 단면을 기준 (0)으로하는 메모리 위치를 기준으로 조정 너트를 조임으로써 차단 토크를 설정하는 것이 가능합니다. 실제 기계의 구동 토크 변동에 대해 30 % 정도의 마진을 마련하고 설정하도록합니다. 너트의 조정에 시판 후크 렌치를 사용하실 수 있습니다.



차단 동작 감지용 센서 설치

토크 쉴드는 동작 감지용 플랜지의 스트로크를 이용하여 차단 동작을 감지하는 것이 가능합니다. 설치 고정부에 근접 스위치 및 롤러 된 리미트 스위치를 설치하여 치수표에 기재된 스트로크 값 (x)으로 검출 신호가 나오도록 설치 위치를 조정합니다.



Torque chart for indexing drive(1)

Table H-1

Number of stop S	Index period θ(deg)	CODE	Static-rated output torque Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal inertia load TORQUE (N • m) Input shaft speed (rpm) 50	100	150	200	300	400	500	700	Camshaft frictional torque Tx (N • m)	Cam follower. SCF (mm)
2	270	HD045 0227 2R	12.0	4.7	3.9	3.4 0.1	3.1 0.1	2.8 0.3	2.5 0.5	2.4 0.8		1.2	12
		HD060 0227 2R	42.6	13.9	11.3	10.0 0.1	9.1 0.2	8.1 0.4	7.4 0.7	6.9 1.1	6.3 2.2	2.7	14
		HD070 0227 2R	111.2	42.4	34.5 0.1	30.5 0.3	28.0 0.6	24.8 1.3	22.7 2.3	21.3 3.6	19.2 7.1	4.6	19
		HD080 0227 2R	198.0	77.0 0.1	62.5 0.4	55.4 0.8	50.8 1.5	45.0 3.3	41.2 6.0	38.6 9.3		8.3	22
		HD110 0227 2R	512.8	195.7 0.5	158.9 1.8	140.7 4.1	129.1 7.4	114.3 16.5	104.9 29.4	98.1 45.9		15.4	30
		HD140 0227 2R	852.7	303.3 1.0	246.3 4.1	218.1 9.1	200.1 16.2	177.2 36.5	162.5 64.9			22.2	35
		HD170 0227 2R	1290.2	445.6 3.7	362.0 14.7	320.5 33.0	294.0 58.7					31.8	40
	300	HD045 0230 2R	12.9	4.8	3.9	3.4 0.1	3.1 0.1	2.8 0.2	2.6 0.4	2.4 0.6		1.1	12
		HD060 0230 2R	44.6	13.7	11.2	9.9 0.1	9.1 0.1	8.0 0.3	7.4 0.6	6.9 0.9	6.2 1.8	2.6	14
		HD070 0230 2R	118.5	42.5	34.5 0.1	30.5 0.3	28.0 0.5	24.8 1.1	22.7 1.9	21.3 2.9	19.2 5.8	4.4	19
		HD080 0230 2R	211.5	77.1 0.1	62.6 0.3	55.4 0.7	50.9 1.2	45.0 2.7	41.3 4.8	38.6 7.5	34.9 14.8	8.0	22
		HD110 0230 2R	546.6	195.7 0.4	159.0 1.5	140.8 3.3	129.1 6.0	114.3 13.4	104.9 23.8	98.1 37.2		14.7	30
		HD140 0230 2R	903.9	302.5 0.8	245.7 3.3	217.6 7.4	199.6 13.1	176.7 29.6	162.1 52.6			21.1	35
		HD170 0230 2R	1366.0	444.3 3.0	360.9 11.9	319.5 26.7	293.1 47.5	259.5 106.9				30.4	40
3	180	HD045 0318 2R	12.0	5.7	4.6	4.1 0.1	3.8 0.2	3.3 0.4	3.1 0.7	2.9 1.1		1.2	12
		HD060 0318 2R	42.6	16.6	13.5 0.1	12.0 0.2	11.0 0.3	9.7 0.6	8.9 1.1	8.3 1.7	7.5 3.3	2.7	14
		HD070 0318 2R	111.2	50.9 0.1	41.4 0.2	36.6 0.5	33.6 0.9	29.8 2.0	27.3 3.5	25.5 5.5	23.1 10.7	4.6	19
		HD080 0318 2R	198.0	92.4 0.1	75.0 0.6	66.4 1.3	60.9 2.2	54.0 5.0	49.5 8.9	46.3 14.0		8.3	22
		HD110 0318 2R	512.8	234.8 0.7	190.7 2.8	168.9 6.2	154.9 11.0	137.2 24.8	125.8 44.1			15.4	30
		HD140 0318 2R	852.7	364.0 1.5	295.6 6.1	261.8 13.7	240.1 24.3	212.6 54.8	195.0 97.3			22.2	35
		HD170 0318 2R	1290.2	543.8 5.5	434.4 22.0	384.7 49.5	325.9 88.0					31.8	40
	240	HD045 0324 2R	28.6	12.1	9.8	8.7 0.1	8.0 0.1	7.1 0.2	6.5 0.4	6.1 0.6	5.5 1.3	1.2	14
		HD060 0324 2R	47.9	16.2	13.1	11.6 0.1	10.7 0.2	9.5 0.3	8.7 0.6	8.1 1.0	7.3 1.9	2.4	14
		HD070 0324 2R	143.6	58.7	47.7 0.1	42.2 0.3	38.7 0.5	34.3 1.1	31.4 2.0	29.4 3.1	26.6 6.1	4.5	22
		HD080 0324 2R	234.1	92.1 0.1	74.8 0.3	66.3 0.7	60.8 1.3	53.8 2.8	49.4 5.0	46.2 7.9	41.7 15.4	7.4	22
		HD110 0324 2R	602.7	233.5 0.4	189.7 1.6	168.0 3.5	154.1 6.2	136.4 14.0	125.1 24.8	117.0 38.8		13.6	30
		HD140 0324 2R	1227.7	468.5 0.9	380.5 3.5	337.0 7.9	309.1 14.1	273.7 31.8	251.1 56.5	234.8 88.2		22.4	40
		HD170 0324 2R	2033.7	772.1 3.2	627.1 12.9	555.3 29.0	509.4 51.5	451.0 116.0	413.7 206.2			33.9	47

Note) The torque ability is the same whethe the rotarong direcion of the input/output sheft are indicated as right cams or left hand cams.

1N • m≒0.102kgf • m

Torque chart for indexing drive(2)

Table H-2

Number of stop S	Index period θ(deg)	CODE	Static-rated output torque Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal inertia load TORQUE (N • m) Input shaft speed (rpm) 50	100	150	200	300	400	500	700	Camshaft frictional torque Tx (N • m)	Cam follower. SCF (mm)
3	270	HD045 0327 2R	30.4	12.0	9.8	8.0	7.9 0.1	7.0 0.2	6.4 0.3	6.0 0.5	5.4 1.0	1.1	14
		HD060 0327 2R	120.2	42.2	34.3	30.3 0.1	27.8 0.1	24.6 0.3	22.6 0.6	21.1 0.9	19.1 1.7	2.6	16
		HD070 0327 2R	151.7	58.2	47.3 0.1	41.9 0.2	38.4 0.4	34.0 0.9	31.2 1.6	29.2 2.5	26.4 4.8	4.3	22
		HD080 0327 2R	247.7	91.5 0.1	74.3 0.2	65.8 0.6	60.4 1.0	53.5 2.2	49.0 4.0	45.9 6.2	41.5 12.2	7.1	22
		HD110 0327 2R	636.4	231.6 0.3	188.1 1.2	166.6 2.8	152.8 4.9	135.3 11.0	124.1 19.6	116.1 30.6		13.0	30
		HD140 0327 2R	1288.1	463.2 0.7	376.3 2.8	333.2 6.3	305.6 11.2	270.6 25.1	248.2 44.6	232.2 69.7		21.4	40
		HD170 0327 2R	2136.6	763.9 2.5	620.5 10.2	549.4 22.9	504.0 40.7	446.3 91.6	409.4 162.9			32.4	47
	300	HD045 0330 2R	32.0	11.9	9.7	8.6	7.9 0.1	7.0 0.1	6.4 0.3	6.0 0.4	5.4 0.8	1.1	14
		HD060 0330 2R	124.8	41.6	33.8	30.0 0.1	27.5 0.1	24.3 0.3	22.3 0.4	20.9 0.7	18.9 1.4	2.5	16
		HD070 0330 2R	158.4	57.6	46.8 0.1	41.4 0.2	38.0 0.3	33.7 0.7	30.9 1.3	28.9 2.0	26.1 3.9	4.1	22
		HD080 0330 2R	259.1	90.7 0.1	73.6 0.2	65.2 0.5	59.8 0.8	53.0 1.8	48.6 3.2	45.4 5.0	41.1 9.8	6.8	22
		HD110 0330 2R	664.2	229.3 0.2	186.2 1.0	164.9 2.2	151.3 4.0	133.9 8.9	122.9 15.9	114.9 24.8	103.9 48.6	12.5	30
		HD140 0330 2R	1337.2	457.3 0.6	371.4 2.3	328.9 5.1	301.7 9.0	267.2 20.3	245.1 36.1	229.2 56.5		20.6	40
		HD170 0330 2R	2220.6	754.5 2.1	612.9 8.2	542.7 18.6	497.8 33.0	440.8 74.2	404.3 132.0			31.2	47
4	120	HD070 0412 2R	35.7	19.2 0.1	15.6 0.3	13.8 0.7	12.7 1.3	11.2 2.8	10.3 5.1			6.5	14
		HD080 0412 2R	57.1	30.6 0.2	24.9 0.9	22.0 1.9	20.2 3.5	17.9 7.8				7.9	14
		HD110 0412 2R	244.4	126.2 1.1	102.5 4.4	90.8 9.8	83.3 17.4					12.2	19
	150	HD060 0415 2R	18.9	8.2	6.6 0.1	5.9 0.2	5.4 0.3	4.8 0.7	4.4 1.2	4.1 1.8		2.3	12
		HD070 0415 2R	40.9	19.2 0.1	15.6 0.2	13.8 0.5	12.7 0.8	11.2 1.8	10.3 3.2			4.8	14
		HD080 0415 2R	181.9	74.4 0.1	72.1 0.6	63.9 1.3	58.6 2.3	51.9 5.2	47.6 9.3	44.5 14.5		6.9	16
		HD110 0415 2R	306.9	147.4 0.7	119.7 2.8	106.0 6.4	97.3 11.4	86.1 25.6				10.1	22
		HD140 0415 2R	594.8	270.4 1.6	219.6 6.3	194.4 14.1	178.4 25.1	157.9 56.5				14.9	26
		HD170 0415 2R	902.1	425.9 5.9	345.9 23.6	306.3 53.2	281.0 94.5					23.5	32
	180	HD045 0418 2R	11.5	5.2	4.2	3.7 0.1	3.4 0.1	3.0 0.3	2.8 0.5	2.6 0.9		0.8	10
		HD060 0418 2R	20.2	8.0	6.5 0.1	5.7 0.1	5.3 0.2	4.7 0.5	4.3 0.8	4.0 1.3		2.2	12
		HD070 0418 2R	123.5	56.1	45.6 0.1	40.3 0.3	37.0 0.6	32.8 1.3	30.1 2.3	28.1 3.7	25.4 7.2	3.9	16
		HD080 0418 2R	213.1	99.3 0.1	80.7 0.4	71.4 0.9	65.5 1.7	58.0 3.7	53.2 6.6	49.8 10.4	45.0 20.3	6.8	19
		HD110 0418 2R	496.4	230.5 0.5	187.2 2.0	165.8 4.6	152.1 8.2	134.7 18.4	123.5 32.7	115.5 51.2		11.6	26
		HD140 0418 2R	790.3	344.3 1.1	279.6 4.5	247.6 10.2	227.1 18.1	201.1 40.7	184.5 72.3			16.2	30
		HD170 0418 2R	1200.1	530.7 4.2	431.1 16.7	381.7 37.5	350.1 66.7	310.0 150.2				24.9	35
	240	HD045 0424 2R	16.4	7.0	5.7	5.0	4.6 0.1	4.1 0.2	3.8 0.3	3.5 0.5	3.2 0.9	1.0	12
		HD060 0424 2R	51.9	19.0	15.5	13.7 0.1	12.6 0.1	11.1 0.3	10.2 0.5	9.5 0.7	8.6 1.5	2.2	14
		HD070 0424 2R	139.5	54.7	44.4 0.1	39.3 0.2	36.1 0.3	31.9 0.7	29.3 1.3	27.4 2.1	24.8 4.0	3.5	16
		HD080 0424 2R	241.9	97.0 0.1	78.8 0.2	69.8 0.5	64.0 0.9	56.7 2.1	52.0 3.7	48.6 5.8	44.0 11.4	6.2	19
		HD110 0424 2R	563.1	225.2 0.3	182.9 1.2	162.0 2.6	148.6 4.6	131.6 10.4	120.7 18.4	12.9 28.8		10.4	26

Note) The torque ability is the same whethe the rotarong direcion of the input/output sheft are indicated as right cams or left hand cams.

1N • m≒0.102kgf • m

Torque chart for indexing drive(3)

Table H-3

Number of stop S	Index period θ(deg)	CODE	Static-rated output torque Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal inertia load TORQUE (N • m) Input shaft speed (rpm) 50	100	150	200	300	400	500	700	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
4	240	HD140 0424 2R	885.4	334.3 0.6	271.5 2.5	240.4 5.7	220.5 10.2	195.3 22.9	179.1 40.7	167.5 63.6		14.6	30
		HD170 0424 2R	1692.4	675.0 2.4	548.3 9.6	485.5 21.5	445.3 38.3	394.3 86.1	361.7 153.0			25.5	40
	270	HD045 0427 2R	17.2	6.9	5.6	5.0	4.6 0.1	4.0 0.1	3.7 0.2	3.5 0.4	3.1 0.7	0.9	12
		HD060 0427 2R	53.2	18.6	15.1	13.4 0.1	12.3 0.1	10.9 0.2	10.0 0.4	9.3 0.6	8.4 1.1	2.2	14
		HD070 0427 2R	145.0	53.8	43.7 0.1	38.7 0.1	35.5 0.3	31.4 0.6	28.8 1.0	27.0 1.6	24.4 3.2	3.4	16
		HD080 0427 2R	251.9	95.6	77.6 0.2	68.7 0.4	63.1 0.7	55.8 1.7	51.2 3.0	47.9 4.6	43.3 9.0	6.0	19
		HD110 0427 2R	586.2	221.8 0.2	180.2 0.9	159.5 2.0	146.3 3.6	129.6 8.2	118.9 14.6	111.2 22.7	100.5 44.6	10.1	26
		HD140 0427 2R	917.5	328.5 0.5	266.8 2.0	236.3 4.5	216.7 8.0	191.9 18.1	176.0 32.1	164.6 50.2		14.1	30
		HD170 0427 2R	1761.5	664.7 1.9	539.9 7.6	478.1 17.0	438.6 30.2	388.3 68.0	356.2 120.9			24.7	40
	300	HD045 0430 2R	17.8	6.8	5.5	4.9	4.5	4.0 0.1	3.7 0.2	3.4 0.3	3.1 0.6	0.9	12
		HD060 0430 2R	54.2	18.2	14.8	13.1	12.0 0.1	10.6 0.2	9.7 0.3	9.1 0.5	8.2 0.9	2.1	14
		HD070 0430 2R	149.3	52.9	43.0 0.1	38.1 0.1	34.9 0.2	30.9 0.5	28.4 0.8	26.5 1.3	24.0 2.6	3.3	16
		HD080 0430 2R	259.9	94.1	76.4 0.1	67.7 0.3	62.1 0.6	54.9 1.3	50.4 2.4	47.1 3.7	42.6 7.3	5.8	19
		HD110 0430 2R	604.9	218.2 0.2	177.3 0.7	157.0 1.7	144.0 2.9	127.5 6.6	117.0 11.8	109.4 18.4	98.9 36.1	9.8	26
		HD140 0430 2R	978.2	342.2 0.4	277.9 1.7	246.1 2.7	225.8 6.6	199.9 14.9	183.4 26.5	171.5 41.4		14.2	32
		HD170 0430 2R	1816.4	654.0 1.5	531.2 6.1	470.4 13.8	431.5 24.5	382.1 55.1	350.5 97.9	327.8 153.0		23.9	40
5	120	HD080 0512 2R	310.6	169.5 0.2	137.7 0.8	121.9 1.8	111.8 3.1	99.0 7.0	90.8 12.5	85.0 19.5	76.8 38.3	9.8	26
	150	HD080 0515 2R	350.9	168.5 0.1	136.9 0.5	121.2 1.1	111.2 2.0	98.4 4.5	90.3 8.0	84.4 12.5	76.3 24.5	9.0	26
	180	HD060 0518 2R	17.3	6.8	5.5	4.9 0.1	4.5 0.2	3.9 0.4	3.6 0.6	3.4 1.0		1.7	10
		HD070 0518 2R	49.5	22.4	18.2 0.1	16.1 0.3	14.8 0.5	13.1 1.0	12.0 1.8	11.2 2.9		2.6	14
		HD080 0518 2R	380.5	166.1 0.1	134.9 0.3	119.5 0.8	109.6 1.4	97.1 3.1	89.0 5.6	83.3 8.7	75.3 17.0	8.4	26
		HD110 0518 2R	374.1	170.8 0.4	138.8 1.6	122.9 3.6	112.7 6.4	99.8 14.5	91.5 25.7	85.6 40.2		8.7	22
		HD140 0518 2R	487.9	202.0 0.9	164.1 3.5	145.3 7.8	133.3 13.8	118.0 31.1				10.4	22
		HD170 0518 2R	1061.8	468.1 3.3	380.2 13.2	336.6 29.7	308.8 52.8	273.4 118.8				19.6	30
	240	HD060 0524 2R	22.9	8.5	6.9	6.1 0.1	5.6 0.1	5.0 0.2	4.5 0.4	4.3 0.6	3.8 1.2	1.9	12
		HD070 0524 2R	54.2	21.5	17.5 0.1	15.5 0.1	14.2 0.3	12.6 0.6	11.5 1.0	10.8 1.6	9.7 3.2	2.5	14
		HD080 0524 2R	419.1	159.9	129.9 0.2	115.0 0.4	105.5 0.8	93.4 1.8	85.7 3.1	80.2 4.9	72.5 9.6	7.7	26
		HD110 0524 2R	411.7	164.4 0.2	133.5 0.9	118.2 2.0	108.5 3.6	96.0 8.1	88.1 14.5	82.4 22.6		8.0	22
		HD140 0524 2R	782.8	300.5 0.5	244.1 2.0	216.1 4.5	198.2 8.0	175.5 18.0	161.0 32.0	150.6 50.1		11.7	26
		HD170 0524 2R	1215.5	478.0 1.9	388.3 7.5	343.8 16.9	315.4 30.0	279.3 67.5	256.2 120.0			18.8	32
	270	HD060 0527 2R	23.3	8.3	6.7	5.9	5.4 0.1	4.8 0.2	4.4 0.3	4.1 0.5	3.7 0.9	1.9	12
		HD070 0527 2R	55.8	21.0	17.1 0.1	15.1 0.1	13.9 0.2	12.3 0.5	11.3 0.8	10.5 1.3	9.5 2.5	2.4	14
		HD080 0527 2R	431.7	156.7	127.3 0.2	112.7 0.3	103.4 0.6	91.5 1.4	84.0 2.5	78.5 3.9	71.0 7.6	7.5	26
		HD110 0527 2R	424.0	161.0 0.2	130.8 0.7	115.8 1.6	106.2 2.9	94.1 6.4	86.3 11.4	80.7 17.8	73.0 35.0	7.8	22
		HD140 0527 2R	804.0	294.0 0.4	238.8 1.6	211.4 3.6	193.9 6.3	171.7 14.2	157.5 25.3	147.3 39.6		11.3	26

Note) The torque ability is the same whethe the rotarong direcion of the input/output sheft are indicated as right cams or left hand cams.

1N • m≒0.102kgf • m

Torque chart for indexing drive(4)

Table H-4

Number of stop S	Index period θ(deg)	CODE	Static-rated output torque Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal inertia load TORQUE (N • m) Input shaft speed (rpm) 50	100	150	200	300	400	500	700	Camshaft frictional torque Tx (N • m)	Cam follower. SCF (mm)
5	270	HD170 0527 2R	1252.8	468.5 1.5	380.5 5.9	336.9 13.3	309.1 23.7	273.7 53.3	251.0 94.8			18.3	32
	300	HD060 0530 2R	23.6	8.0	6.5	5.8	5.3 0.1	4.7 0.1	4.3 0.2	4.0 0.4	3.6 0.7	1.8	12
		HD070 0530 2R	57.0	20.6	16.7	14.8 0.1	13.6 0.2	12.0 0.4	11.0 0.7	10.3 1.0	9.3 2.0	2.4	14
		HD080 0530 2R	441.4	153.5	124.7 0.1	110.4 0.3	101.3 0.5	89.7 1.1	82.3 2.0	76.9 3.1	69.5 6.1	7.3	26
		HD110 0530 2R	433.4	157.8 0.1	128.1 0.6	113.5 1.3	104.1 2.3	92.2 5.2	84.5 9.3	79.1 14.5	71.5 28.3	7.6	22
		HD140 0530 2R	820.4	287.7 0.3	233.7 1.3	206.9 2.9	189.8 5.1	168.1 11.5	154.2 20.5	144.2 32.0	30.3 62.8	11.1	26
		HD170 0530 2R	1281.7	459.1 1.2	372.9 4.8	330.2 10.8	302.9 19.2	268.2 43.2	246.0 76.8			17.9	32
6	90	HD045 0609 2R	12.0	7.8	6.3 0.1	5.6 0.2	5.1 0.4	4.5 0.8	4.2 1.5			1.2	12
		HD060 0609 2R	42.6	22.7	18.5 0.1	16.3 0.3	15.0 0.5	13.3 1.2	12.2 2.2	11.4 3.4		2.7	14
		HD070 0609 2R	122.1	80.6 0.1	65.4 0.4	57.9 1.0	53.2 1.8	47.1 4.0	43.2 7.1	40.4 11.0		5.1	22
		HD080 0609 2R	198.0	126.2 0.3	102.5 1.1	90.8 2.5	83.3 4.5	73.7 10.0	67.6 17.9	63.2 27.9		8.3	22
		HD110 0609 2R	521.8	320.8 1.4	260.6 5.5	230.7 12.4	211.6 22.1	187.4 49.6				15.4	30
		HD140 0609 2R	852.7	497.2 3.0	403.8 12.2	357.6 27.4	328.0 48.7	290.4 109.5				22.2	35
		HD170 0609 2R	1290.2	730.6 11.0	593.5 44.0	525.5 99.0	482.0 176.0					31.8	40
	120	HD045 0612 2R	28.6	16.5	13.4 0.1	11.9 0.1	10.9 0.2	9.6 0.5	8.8 0.8	8.3 1.3	7.5 2.5	1.2	14
		HD060 0612 2R	114.6	56.6	47.3 0.1	41.9 0.2	38.5 0.4	34.0 0.8	31.2 1.4	29.2 2.2	26.4 4.3	2.7	16
		HD070 0612 2R	143.6	80.2 0.1	65.1 0.2	57.6 0.6	52.9 1.0	46.8 2.2	43.0 4.0	40.2 6.2	36.3 12.2	4.5	22
		HD080 0612 2R	343.8	196.4 0.2	159.6 0.7	141.3 1.5	129.6 2.7	114.8 6.0	105.3 10.7	98.5 16.7	89.0 32.8	9.1	26
		HD110 0612 2R	625.3	338.8 0.8	275.2 3.2	243.6 7.1	223.5 12.6	197.9 28.4	181.5 50.6	169.8 79.0		14.2	32
		HD140 0612 2R	1227.7	640.0 1.8	519.8 7.1	460.3 15.9	422.2 28.2	373.9 63.5	343.0 112.9			22.4	40
		HD170 0612 2R	2033.7	1054.7 6.4	856.7 25.8	758.6 58.0	695.8 103.1	616.1 232.0				33.9	47
	150	HD045 0615 2R	32.0	16.3	13.2	11.7 0.1	10.8 0.1	9.5 0.3	8.7 0.5	8.2 0.8	7.4 1.6	1.1	14
		HD060 0615 2R	124.8	56.9	46.2 0.1	40.9 0.1	37.5 0.2	33.2 0.5	30.5 0.9	28.5 1.4	25.8 2.7	2.5	16
		HD070 0615 2R	158.4	78.7	63.9 0.2	56.6 0.4	51.9 0.6	46.0 1.4	42.2 2.5	39.5 4.0	35.7 7.8	4.1	22
		HD080 0615 2R	380.5	193.3 0.1	157.0 0.4	139.0 1.0	127.5 1.7	112.9 3.9	103.6 6.9	96.9 10.7	87.6 21.0	8.4	26
		HD110 0615 2R	689.1	332.6 0.5	270.1 2.0	239.2 4.6	219.4 8.1	194.3 18.2	178.2 32.4	166.7 50.6		13.0	32
		HD140 0615 2R	1337.2	624.7 1.1	507.4 4.5	449.3 10.2	412.1 18.1	364.9 40.7	334.8 72.3	313.1 112.9		20.6	40
		HD170 0615 2R	2220.6	1030.7 4.1	837.2 16.5	741.3 37.1	680.0 66.0	602.1 148.5	552.4 263.9			31.2	47
	180	HD045 0618 2R	34.3	16.0	13.0	11.5 0.1	10.6 0.1	9.3 0.3	8.6 0.4	8.0 0.6	7.2 1.1	1.1	14
		HD060 0618 2R	131.7	55.3	44.9	39.8 0.1	36.5 0.2	33.2 0.4	29.6 0.6	27.7 1.0	25.1 1.9	2.3	16
		HD070 0618 2R	168.6	76.9	62.5 0.1	55.3 0.2	50.7 0.4	44.9 1.0	41.2 1.8	38.5 2.8	34.8 5.4	3.9	22
		HD080 0618 2R	406.2	189.1 0.1	153.6 0.3	136.0 0.7	124.8 1.2	110.5 2.7	101.3 4.8	94.8 7.4	85.7 14.6	7.9	26
		HD110 0618 2R	884.6	404.9 0.4	328.9 1.5	291.2 3.3	267.2 5.8	236.6 13.1	217.0 23.3	202.9 36.4	183.5 71.4	14.1	35
		HD140 0618 2R	1410.6	607.4 0.8	493.4 3.1	436.9 7.1	400.8 12.5	354.9 28.2	325.5 50.2	304.4 78.4		19.3	40
		HD170 0618 2R	2346.6	1003.2 2.9	814.8 11.5	721.5 25.8	661.8 45.8	586.0 103.1	537.6 183.3			29.5	47

Note) The torque ability is the same whethe the rotarong direcion of the input/output sheft are indicated as right cams or left hand cams.

1N • m≒0.102kgf • m

Torque chart for indexing drive(5)

Table H–5

Number of stop S	Index angle θ(deg)	CODE	Static-rated output torque Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal inertia load TORQUE (N • m) Input shaft speed (rpm) 50	100	150	200	300	400	500	700	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
6	240	HD045 0624 2R	37.3	15.3	12.4	11.0	10.1 0.1	8.9 0.1	8.2 0.2	7.7 0.3	6.9 0.6	1.0	14
		HD060 0624 2R	139.7	52.3	42.5	37.6	34.5 0.1	30.5 0.2	28.0 0.4	26.2 0.5	23.7 1.1	2.1	16
		HD070 0624 2R	180.9	73.1	59.4 0.1	52.6 0.1	48.2 0.2	42.7 0.6	39.2 1.0	36.6 1.6	33.1 3.0	3.6	22
		HD080 0624 2R	437.8	180.1	146.3 0.2	129.5 0.4	118.8 0.7	105.2 1.5	96.5 2.7	90.2 4.2	81.6 8.2	7.3	26
		HD110 0624 2R	949.1	384.7 0.2	312.5 0.8	276.7 1.8	253.8 3.3	224.8 7.4	206.2 13.1	192.8 20.5	174.3 40.1	13.0	35
		HD140 0624 2R	1496.9	574.0 0.4	466.2 1.8	412.8 4.0	378.7 7.1	335.3 15.9	307.6 28.2	287.7 44.1	160.1 86.5	17.8	40
		HD170 0624 2R	2930.0	1155.5 1.7	938.6 6.6	831.1 14.9	762.4 26.5	675.1 59.6	619.2 105.9	579.1 165.5		31.0	52
	270	HD045 0627 2R	38.3	14.9	12.1	10.7	9.9	8.7 0.1	8.0 0.2	7.5 0.3	6.8 0.5	1.0	14
		HD060 0627 2R	142.2	50.9	41.3	36.6	33.6 0.1	29.7 0.2	27.3 0.3	25.5 0.4	23.1 0.8	2.1	16
		HD070 0627 2R	184.8	71.3	57.9	51.3 0.1	47.0 0.2	41.6 0.4	38.2 0.8	35.7 1.2	32.3 2.4	3.5	22
		HD080 0627 2R	447.6	175.8	142.8 0.1	126.4 0.3	116.0 0.5	102.7 1.2	94.2 2.1	88.1 3.3	79.6 6.5	7.1	26
		HD110 0627 2R	969.0	375.3 0.2	304.8 0.6	269.9 1.5	247.6 2.6	219.2 5.8	201.1 10.4	188.1 34.9	170.0 31.7	12.6	35
		HD140 0627 2R	1523.0	558.9 0.3	454.0 1.4	402.0 3.1	368.7 5.6	326.5 12.5	299.5 22.3	280.1 34.9	253.2 68.3	17.2	40
		HD170 0627 2R	2983.3	1125.5 1.3	914.2 5.2	809.5 11.8	742.6 20.9	657.5 47.1	603.2 83.7	564.1 130.8		30.1	52
	300	HD045 0630 2R	39.0	14.6	11.9	10.5	9.6	8.5 0.1	7.8 0.1	7.3 0.2	6.6 0.4	0.9	14
		HD060 0630 2R	144.0	49.6	40.3	35.7	32.7 0.1	29.0 0.1	26.6 0.2	24.9 0.4	22.5 0.7	2.0	16
		HD070 0630 2R	187.7	69.6	56.5	50.1 0.1	45.9 0.2	40.7 0.4	37.3 0.6	34.9 1.0	31.5 1.9	3.4	22
		HD080 0630 2R	455.1	171.7	139.5 0.1	123.5 0.2	113.3 0.4	100.3 1.0	92.0 1.7	86.1 2.7	77.8 5.3	7.0	26
		HD110 0630 2R	984.1	366.4 0.1	297.6 0.5	263.5 1.2	241.7 2.1	214.0 4.7	196.3 8.4	183.6 13.1	166.0 25.7	12.3	35
		HD140 0630 2R	1542.6	545.0 0.3	442.7 1.1	392.0 2.5	359.6 4.5	318.4 10.2	292.0 18.1	273.1 28.2	246.9 55.3	16.8	40
		HD170 0630 2R	3023.3	1097.8 1.1	891.7 4.2	789.6 9.5	724.3 16.9	641.3 38.1	588.3 67.8	550.2 105.9	497.4 207.6	29.4	52
8	90	HD045 0809 2R	14.7	9.4	7.6 0.1	6.7 0.2	6.2 0.3	5.5 0.6	5.0 1.1	4.7 1.7		0.8	10
		HD060 0809 2R	20.2	10.9	8.9 0.1	7.9 0.2	7.2 0.4	6.4 0.9	5.9 1.6	5.5 2.6		2.2	12
		HD070 0809 2R	123.5	68.0 0.1	62.2 0.3	55.1 0.7	50.6 1.2	44.8 2.6	41.1 4.7	38.4 7.3	34.7 14.3	3.9	16
		HD080 0809 2R	211.3	111.3 0.2	111.3 0.8	100.4 1.9	92.1 3.4	81.5 7.6	74.8 13.4	69.9 21.0		6.8	19
		HD110 0809 2R	496.4	314.9 1.0	255.8 4.1	226.5 9.2	207.8 16.4	184.0 36.8	168.8 65.5			11.6	26
		HD140 0809 2R	790.3	470.3 2.3	382.0 9.0	338.3 20.3	310.3 36.2	274.7 81.4				16.2	30
		HD170 0809 2R	1200.1	724.9 8.3	588.8 33.4	521.4 75.1	478.3 133.5					24.9	35
	120	HD045 0812 2R	21.1	12.3	10.0	8.9 0.1	8.1 0.2	7.2 0.3	6.6 0.6	6.2 1.0	5.6 1.9	1.0	12
		HD060 0812 2R	51.9	26.0	21.1 0.1	18.7 0.1	17.1 0.2	15.2 0.5	13.9 0.9	13.0 1.5	11.8 2.9	2.2	14
		HD070 0812 2R	139.5	72.2	60.7 0.2	53.7 0.4	49.3 0.7	43.6 1.5	40.0 2.6	37.4 4.1	33.8 8.1	3.5	16
		HD080 0812 2R	241.9	116.4 0.1	107.7 0.5	95.3 1.1	87.5 1.9	77.4 4.2	74.0 7.5	66.4 11.7	60.1 22.9	6.2	19
		HD110 0812 2R	563.1	307.6 0.6	249.9 2.3	221.3 5.2	203.0 9.2	179.7 20.7	164.9 36.8	154.2 57.6		10.41	26
		HD140 0812 2R	918.6	484.3 1.3	393.4 5.2	348.3 11.6	319.5 20.7	282.9 46.6	259.5 82.8			15.2	32
		HD170 0812 2R	1692.4	922.1 4.8	749.0 19.1	663.2 43.0	608.4 76.5	538.7 172.2				25.5	40

Note) The torque ability is the same whethe the rotarong direcion of the input/output sheft are indicated as right cams or left hand cams.

1N • m≒0.102kgf • m

Torque chart for indexing drive(6)

Table H–6

Number of stop S	Index angle θ(deg)	CODE	Static-rated output torque Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal inertia load TORQUE (N • m) Input shaft speed (rpm) 50	100	150	200	300	400	500	700	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
8	150	HD045 0815 2R	22.8	12.0	9.7	8.6 0.1	7.9 0.1	7.0 0.2	6.4 0.4	6.0 0.6	5.4 1.2	0.9	12
		HD060 0815 2R	54.2	24.8	20.2	17.9 0.1	16.4 0.2	14.5 0.3	13.3 0.6	12.4 0.9	11.2 1.9	2.1	14
		HD070 0815 2R	149.3	72.3	58.7 0.1	52.0 0.2	47.7 0.4	42.2 0.9	38.7 1.7	36.2 2.6	32.7 5.2	3.3	16
		HD080 0815 2R	259.9	120.7 0.1	104.4 0.3	92.4 0.7	84.8 1.2	75.1 2.7	68.9 4.8	64.4 7.5	58.2 14.6	5.8	19
		HD110 0815 2R	604.6	298.1 0.4	242.2 1.5	214.4 3.3	196.7 5.9	174.2 13.3	159.8 23.6	149.4 36.8		9.8	26
		HD140 0815 2R	978.2	467.4 0.8	379.7 3.3	336.2 7.5	308.4 13.3	273.1 29.8	250.5 53.0	234.3 82.8		14.2	32
		HD170 0815 2R	1816.4	893.4 3.1	725.7 12.2	642.6 27.5	589.4 49.0	521.9 110.2	478.8 195.9			23.9	40
	180	HD045 0818 2R	24.0	11.6	9.4	8.4	7.7 0.1	6.8 0.2	6.2 0.3	5.8 0.4	5.3 0.8	0.9	12
		HD060 0818 2R	55.5	23.8	19.3	17.1 0.1	15.7 0.1	13.9 0.2	12.8 0.4	11.9 0.7	10.8 1.3	2.0	14
		HD070 0818 2R	164.8	78.5	63.8 0.1	56.5 0.2	51.8 0.3	45.9 0.7	42.1 1.3	39.4 2.0	35.6 4.0	3.3	19
		HD080 0818 2R	298.1	143.8 0.1	116.8 0.2	103.4 0.5	94.8 0.9	84.0 2.0	77.0 3.5	72.1 5.4	65.1 10.7	6.0	22
		HD110 0818 2R	765.6	367.8 0.3	298.7 1.1	264.5 2.4	242.7 4.3	214.9 9.7	197.1 17.2	184.3 26.9	166.6 52.6	10.9	30
		HD140 0818 2R	1203.2	545.3 0.6	443.0 2.4	392.2 5.3	359.8 9.4	318.6 21.3	292.2 37.8	273.3 59.0	247.1 115.7	15.5	35
		HD170 0818 2R	2613.9	1273.1 2.3	1034.1 9.0	915.7 20.3	840.0 36.1	743.8 81.3	682.3 144.6	638.1 225.9		27.2	47
	240	HD045 0824 2R	25.3	10.9	8.9	7.9	7.2	6.4 0.1	5.9 0.2	5.5 0.2	5.0 0.5	0.8	12
		HD060 0824 2R	57.0	22.1	18.0	15.9	14.6 0.1	12.9 0.1	11.8 0.2	11.1 0.4	10.0 0.7	1.9	14
		HD070 0824 2R	172.3	73.7	59.8	53.0 0.1	48.6 0.2	43.0 0.4	39.5 0.7	36.9 1.1	33.4 2.2	3.1	19
		HD080 0824 2R	312.6	135.0	109.7 0.1	97.1 0.3	89.1 0.5	78.9 1.1	72.4 2.0	67.7 3.1	61.2 6.0	5.7	22
		HD110 0824 2R	802.6	354.4 0.2	280.6 0.6	248.5 1.4	227.9 2.4	201.8 5.4	185.1 9.7	173.1 15.1	156.5 29.6	10.2	30
		HD140 0824 2R	1248.3	509.5 0.3	413.9 1.3	366.5 3.0	336.2 5.3	297.7 12.3	273.1 21.3	255.4 33.2	230.9 65.1	14.5	35
		HD170 0824 2R	2749.7	1197.8 1.3	927.9 5.1	861.5 11.4	790.3 20.3	699.8 45.7	641.9 81.3	600.3 127.1	542.7 249.0	25.6	47
	270	HD045 0827 2R	25.7	10.6	8.6	7.7	7.0	6.2 0.1	5.7 0.1	5.3 0.2	4.8 0.4	0.8	12
		HD060 0827 2R	57.4	21.4	17.4	15.4	14.1	12.5 0.1	11.5 0.2	10.7 0.3	9.7 0.6	1.9	14
		HD070 0827 2R	174.5	71.6	58.1	51.5 0.1	47.2 0.1	41.8 0.3	38.3 0.6	35.9 0.9	32.4 1.8	3.0	19
		HD080 0827 2R	316.9	131.3	106.6 0.1	94.4 0.2	86.6 0.4	76.7 0.9	70.3 1.5	65.8 2.4	59.5 4.7	5.6	22
		HD110 0827 2R	813.6	335.7 0.1	272.7 0.5	241.5 1.1	221.5 1.9	196.1 4.3	179.9 7.6	168.3 11.9	152.1 23.4	10.0	30
		HD140 0827 2R	1261.4	494.4 0.3	401.6 1.0	355.6 2.4	326.2 4.2	288.8 9.4	265.0 16.8	247.8 26.2	224.0 51.4	14.2	35
		HD170 0827 2R	2790.2	1164.7 1.0	946.0 4.0	837.7 9.0	768.4 16.1	680.4 36.1	624.2 64.2	583.7 100.4	527.7 196.8	25.0	47
	300	HD045 0830 2R	26.0	10.4	8.4	7.5	6.8	6.1 0.1	5.6 0.1	5.2 0.2	4.7 0.3	0.8	12
		HD060 0830 2R	57.7	20.8	16.9	15.0	13.7	12.2 0.1	11.1 0.2	10.4 0.2	9.4 0.5	1.9	14
		HD070 0830 2R	176.2	69.7	56.6	50.1 0.1	46.0 0.1	40.7 0.3	37.3 0.5	34.9 0.7	31.6 1.4	3.0	19
		HD080 0830 2R	320.1	127.8	103.8 0.1	91.9 0.2	84.3 0.3	74.7 0.7	68.5 1.3	64.1 2.0	57.9 3.8	5.5	22
		HD110 0830 2R	821.7	326.9 0.1	265.5 0.4	235.1 0.9	215.7 1.5	191.0 3.5	175.2 6.2	163.8 9.7	148.1 19.0	9.8	30
		HD140 0830 2R	1271.0	480.9 0.2	390.6 0.9	345.8 1.9	317.2 3.4	280.9 7.7	257.7 13.6	241.0 21.3	217.9 41.7	13.9	35
		HD170 0830 2R	2820.2	1134.5 0.8	921.5 3.3	816.0 7.3	748.5 13.0	662.8 29.3	608.0 52.0	568.6 81.3	514.0 159.4	24.5	47

Note) The torque ability is the same whethe the rotarong direcion of the input/output sheft are indicated as right cams or left hand cams.

1N • m≒0.102kgf • m

Torque chart for indexing drive(7)

Table H-7

Number of stop S	Index angle θ(deg)	CODE	Static-rated output torque Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal inertia load TORQUE (N • m) Input shaft speed (rpm) 50	100	150	200	300	400	500	700	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
10	90	HD060 1009 2R	17.3	9.2	7.5 0.1	6.6 0.2	6.1 0.3	5.4 0.7	4.9 1.3	4.6 2.0		2.0	10
		HD070 1009 2R	49.2	29.8 0.1	24.2 0.2	21.5 0.5	19.7 0.9	17.4 2.1	16.0 3.7	15.0 5.7		2.6	14
		HD080 1009 2R	222.9	82.4 0.2	82.4 0.7	82.4 1.5	82.4 2.6	81.4 5.9	74.6 10.5	69.8 16.4		6.0	16
		HD110 1009 2R	373.0	230.0 0.8	186.9 3.2	165.5 7.2	151.8 12.8	134.4 28.8	123.3 51.3			8.7	22
		HD140 1009 2R	487.9	276.0 1.7	224.1 6.9	198.5 15.5	182.1 27.6	161.2 62.2				10.4	22
		HD170 1009 2R	1061.8	639.4 6.6	519.3 26.4	459.9 59.4	421.8 105.6					19.6	30
	120	HD060 1012 2R	22.9	11.6	9.4	8.3 0.1	7.6 0.2	6.8 0.4	6.2 0.8	5.8 1.2	5.2 2.3	1.9	12
		HD070 1012 2R	53.5	28.6	23.2 0.1	20.5 0.3	18.8 0.5	16.7 1.2	15.3 2.1	14.3 3.2	12.9 6.3	2.5	14
		HD080 1012 2R	245.5	86.4 0.1	86.4 0.4	86.4 0.8	86.4 1.5	78.3 3.3	71.8 5.9	67.2 9.2	60.7 18.1	5.5	16
		HD110 1012 2R	408.6	220.9 0.5	179.4 1.8	158.9 4.1	145.7 7.2	129.0 16.2	118.4 28.8	110.7 45.1		8.0	22
		HD140 1012 2R	782.8	410.5 1.0	333.4 4.0	295.2 9.0	270.8 16.0	239.8 36.1	220.0 64.1	205.7 100.1		11.7	26
		HD170 1012 2R	1215.5	653.0 3.7	530.4 15.0	169.7 33.7	430.8 60.0	381.5 134.9				18.8	32
	150	HD060 1015 2R	23.6	11.0	8.9	7.9 0.1	7.3 0.1	6.4 0.3	5.9 0.5	5.5 0.8	5.0 1.5	1.8	12
		HD070 1015 2R	56.0	17.3	22.2 0.1	19.7 0.2	18.0 0.3	16.0 0.7	14.6 1.3	13.7 2.1	12.4 4.0	2.4	14
		HD080 1015 2R	258.5	88.7 0.1	88.7 0.2	88.7 0.5	84.9 0.9	75.2 2.1	69.0 3.8	64.5 5.9	58.3 11.6	5.2	16
		HD110 1015 2R	429.0	211.7 0.3	171.9 1.2	152.2 2.6	139.6 4.6	123.7 10.4	113.4 18.5	106.1 28.8		7.6	22
		HD140 1015 2R	820.4	393.0 0.6	319.2 2.6	282.7 5.8	259.3 10.3	229.6 23.1	210.6 41.0	197.0 64.1		11.1	26
		HD170 1015 2R	1555.7	788.5 2.5	640.5 9.8	567.1 22.1	520.2 39.2	460.6 88.2	422.5 156.8			20.1	35
	180	HD060 1018 2R	24.0	10.5	8.5	7.5	6.9 0.1	6.1 0.2	5.6 0.3	5.3 0.5	4.8 1.0	1.8	12
		HD070 1018 2R	57.5	26.2	21.3 0.1	18.9 0.1	17.3 0.2	15.3 0.5	14.0 0.9	13.1 1.4	11.9 2.8	2.3	14
		HD080 1018 2R	266.6	90.1	90.1 0.2	89.0 0.4	81.6 0.7	72.3 1.5	66.3 2.6	62.0 4.1	56.0 8.0	5.1	16
		HD110 1018 2R	441.4	203.3 0.2	165.1 0.8	146.2 1.8	134.1 3.2	118.8 7.2	108.9 12.8	101.9 20.0	92.1 39.2	7.3	22
		HD140 1018 2R	843.2	377.2 0.4	306.4 1.8	271.3 4.0	248.9 7.1	220.4 16.0	202.1 28.5	198.1 44.5		10.6	26
		HD170 1018 2R	1607.2	758.8 1.7	616.3 6.8	545.7 15.3	500.6 27.2	443.3 61.3	406.6 108.9	380.3 170.2		19.4	35
	240	HD060 1024 2R	24.4	9.7	7.9	70.0	6.4	5.7 0.1	5.2 0.2	4.9 0.3	4.4 0.6	1.7	12
		HD070 1024 2R	59.1	24.4	19.8	17.5 0.1	16.1 0.1	14.2 0.3	13.1 0.2	12.2 0.8	11.0 1.6	2.2	14
		HD080 1024 2R	275.3	91.5	91.5 0.1	82.9 0.2	76.1 0.4	67.4 0.8	61.8 1.5	57.8 2.3	52.3 4.5	4.8	16
		HD110 1024 2R	454.9	189.3 0.1	153.8 0.5	136.1 1.0	124.9 1.8	110.6 4.1	101.4 7.2	94.9 11.3	85.8 22.1	7.0	22
		HD140 1024 2R	867.9	351.1 0.3	285.1 1.0	252.5 2.3	321.6 4.0	205.1 9.0	188.1 16.0	175.9 25.0	159.1 49.1	10.1	26
		HD170 1024 2R	1663.9	708.2 1.0	575.3 3.8	509.4 8.6	467.3 15.3	413.7 34.5	379.5 61.3	355.0 95.7		18.5	35
	270	HD060 1027 2R	24.5	9.4	7.6	6.8	6.2	5.5 0.1	5.0 0.1	4.7 0.2	4.3 0.5	1.7	12
		HD070 1027 2R	59.5	23.6	19.2	17.0 0.1	15.6 0.1	13.8 0.2	13.8 0.2	11.8 0.6	10.7 1.2	2.2	14
		HD080 1027 2R	277.9	92.0	90.8 0.1	80.4 0.2	73.8 0.3	65.3 0.7	65.3 0.7	56.0 1.8	50.7 3.6	4.7	16
		HD110 1027 2R	458.8	183.5 0.1	149.0 0.4	132.4 0.8	121.1 1.4	107.2 3.2	107.2 3.2	92.0 8.9	83.1 17.4	6.8	22
		HD140 1027 2R	874.9	340.2 0.2	276.4 0.8	244.7 1.8	224.5 3.2	198.8 7.1	198.8 7.1	170.5 19.8	154.4 38.8	9.9	26

Note) The torque ability is the same whethe the rotarong direcion of the input/output sheft are indicated as right cams or left hand cams. 1N • m≒0.102kgf • m

Torque chart for indexing drive(8)

Table H-8

Number of stop S	Index angle θ(deg)	CODE	Static-rated output torque Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal inertia load TORQUE (N • m) Input shaft speed (rpm) 50	100	150	200	300	400	500	700	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
10	270	HD170 1027 2R	1680.3	687.0 0.8	558.0 3.0	494.1 6.8	453.2 12.1	401.3 27.2	368.1 48.4	344.3 75.6	311.3 148.2	18.2	35
	300	HD060 1030 2R	24.6	9.1	7.4	6.6	6.0	5.3 0.1	4.9 0.1	4.6 0.2	4.1 0.4	1.7	12
		HD070 1030 2R	59.8	22.9	18.6	16.5	15.1 0.1	13.4 0.2	12.3 0.3	11.5 0.5	10.4 1.0	2.2	14
		HD080 1030 2R	279.7	92.3	88.3 0.1	78.2 0.1	71.7 0.2	63.5 0.5	58.3 0.9	54.5 1.5	19.3 2.9	1.7	16
		HD110 1030 2R	461.6	178.3 0.1	144.9 0.3	128.3 0.6	117.7 1.2	104.2 2.6	95.6 4.6	89.4 7.2	80.8 14.1	6.8	22
		HD140 1030 2R	880.1	330.6 0.2	268.5 0.6	237.8 1.4	218.1 2.6	193.1 5.8	177.2 10.3	165.7 16.0	149.8 31.4	9.8	26
		HD170 1030 2R	1692.3	668.0 0.6	542.6 2.5	480.4 5.5	440.7 9.8	390.2 22.1	358.0 39.2	334.8 61.3	302.6 120.1	17.9	35
12	90	HD060 1209 2R	9.2	4.8	3.9 0.1	3.5 0.1	3.2 0.3	2.8 0.6	2.6 1.0			1.9	8
		HD070 1209 2R	26.0	15.6	12.7 0.2	11.2 0.4	10.3 0.8	9.1 1.7	8.4 3.0			2.0	12
		HD080 1209 2R	238.0	85.1 0.1	85.1 0.6	85.1 1.3	85.1 2.2	85.1 5.0	82.5 8.9	77.2 14.0	69.8 27.4	5.7	16
		HD110 1209 2R	365.3	164.9 0.7	164.9 2.6	163.6 6.0	150.0 10.6	132.9 23.8	121.9 42.4			7.6	19
		HD140 1209 2R	512.0	296.2 1.4	240.6 5.8	213.1 13.0	195.4 23.2	173.1 52.2				9.9	22
		HD170 1209 2R	935.9	557.3 5.4	425.6 21.7	400.8 48.9	367.7 87.0					16.3	26
	120	HD060 1212 2R	18.7	9.4	7.6	6.8 0.1	6.2 0.2	5.5 0.3	5.0 0.6	4.7 0.9	4.3 1.9	1.9	10
		HD070 1212 2R	27.8	14.8	12.0 0.1	10.6 0.2	9.8 0.4	8.6 1.0	7.9 1.7	7.4 2.7		2.0	12
		HD080 1212 2R	256.3	88.3 0.1	88.3 0.3	88.3 0.7	88.3 1.3	85.7 2.8	78.6 5.0	73.5 7.9	66.4 15.4	5.3	16
		HD110 1212 2R	395.0	171.5 0.4	171.5 1.5	156.0 3.4	143.1 6.0	126.7 13.4	116.3 23.8	108.7 37.2		7.1	19
		HD140 1212 2R	544.9	280.3 0.8	227.7 3.3	201.6 7.3	184.9 13.0	163.8 29.4	150.2 52.2			9.2	22
		HD170 1212 2R	1010.2	531.1 3.1	434.4 12.2	382.0 27.5	250.4 48.9	310.3 110.0				15.3	26
	150	HD060 1215 2R	19.1	8.9	7.2	6.4 0.1	5.9 0.1	5.2 0.2	4.8 0.4	4.5 0.6	4.0 1.2	1.8	10
		HD070 1215 2R	28.7	14.1	11.4 0.1	10.1 0.2	9.3 0.3	8.2 0.6	7.5 1.1	7.1 1.7		2.0	12
		HD080 1215 2R	266.6	90.1 0.1	90.1 0.2	90.1 0.5	90.1 0.8	81.7 1.8	74.9 3.2	70.1 5.0	63.4 9.8	5.1	16
		HD110 1215 2R	411.5	175.1 0.2	168.2 1.0	148.9 2.1	136.6 3.8	121.0 8.6	111.0 15.3	103.8 23.8	93.8 46.7	6.7	19
		HD140 1215 2R	562.4	266.3 0.5	216.3 2.1	191.6 4.7	175.7 8.4	155.6 18.8	142.7 33.4	133.5 52.2		8.8	22
		HD170 1215 2R	1274.7	643.7 2.0	522.8 8.0	463.0 18.0	424.7 32.0	376.0 72.0	344.9 128.1			16.7	30
	180	HD060 1218 2R	19.4	8.5	6.9	6.1	5.6 0.1	4.9 0.2	4.5 0.3	4.2 0.4	3.8 0.8	1.8	10
		HD070 1218 2R	29.3	13.4	10.9	9.7 0.1	8.9 0.2	7.9 0.4	7.2 0.8	6.7 1.2	6.1 2.3	2.0	12
		HD080 1218 2R	272.6	91.1	91.1 0.1	91.1 0.3	88.3 0.6	78.2 1.3	71.8 2.2	67.1 3.5	60.7 6.8	4.9	16
		HD110 1218 2R	421.4	177.2 0.2	161.2 0.7	142.7 1.5	130.9 2.6	115.9 6.0	106.3 10.6	99.4 16.4	89.9 32.4	6.5	19
		HD140 1218 2R	840.9	394.5 0.4	320.4 1.5	283.7 3.4	260.3 6.0	230.5 13.5	211.4 24.0	197.7 37.5	178.7 73.5	10.3	26
		HD170 1218 2R	1304.3	616.5 1.4	500.7 5.6	443.4 12.5	406.7 22.2	360.1 50.0	330.4 88.9	309.0 139.0		16.2	30
	240	HD060 1224 2R	19.6	7.8	6.3	5.6	5.2	4.6 0.1	4.2 0.2	3.9 0.2	3.5 0.5	1.7	10
		HD070 1224 2R	29.9	12.5	10.1	9.0 0.1	8.2 0.1	7.3 0.2	6.7 0.4	6.2 0.7	5.6 1.3	2.0	12
		HD080 1224 2R	279.0	92.1	92.1 0.1	89.4 0.2	82.0 0.3	72.6 0.7	66.6 1.3	62.3 2.0	56.3 3.8	4.7	16
		HD110 1224 2R	431.9	179.4 0.1	149.7 0.4	132.5 0.8	121.6 1.5	107.6 3.4	98.7 6.0	92.4 9.3	83.5 18.3	6.3	19

Note) The torque ability is the same whethe the rotarong direcion of the input/output sheft are indicated as right cams or left hand cams. 1N • m≒0.102kgf • m

Torque chart for indexing drive(9)

Table H-9

Number of stop S	Index period θ(deg)	CODE	Static-rated output torque Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal inertia load TORQUE (N • m) Input shaft speed (rpm) 50	100	150	200	300	400	500	700	Camshaft frictional torque Tx (N • m)	Cam follower SCF (mm)
12	240	HD140 1224 2R	856.7	365.2 0.2	296.7 0.8	262.7 1.9	241.0 3.4	213.4 4.6	195.7 13.5	183.1 21.1	165.5 41.4	9.8	26
		HD170 1224 2R	1336.0	572.3 0.8	464.9 3.1	411.6 7.0	377.6 12.5	334.3 28.1	306.7 50.0	286.8 78.2		15.6	30
	270	HD060 1227 2R	19.7	7.6	6.1	5.4	5.0	4.4 0.1	4.0 0.1	3.8 0.2	3.4 0.4	1.7	10
		HD070 1227 2R	30.0	12.1	9.8	8.7	8.0 0.1	7.0 0.2	6.5 0.3	6.0 0.5	5.5 1.0	2.0	12
		HD080 1227 2R	280.8	92.4	92.4 0.1	86.5 0.1	76.4 0.2	70.3 0.6	64.5 1.0	60.3 1.6	54.5 3.0	4.6	16
		HD110 1227 2R	477.6	205.7 0.1	167.1 0.3	147.9 0.7	135.7 1.2	120.2 2.7	110.2 4.8	103.1 7.6	93.2 14.8	6.7	22
		HD140 1227 2R	861.1	353.5 0.2	287.1 0.7	254.2 1.5	233.2 2.7	206.5 6.0	189.4 10.7	177.2 16.7	160.1 32.7	9.7	26
		HD170 1227 2R	1344.6	554.3 0.6	450.2 2.5	398.7 5.6	365.7 9.9	323.8 22.2	297.0 39.5	277.8 61.8	251.1 121.1	15.4	30
	300	HD060 1230 2R	19.7	7.3	6.0	5.3	4.8	4.3 0.1	3.9 0.1	3.7 0.2	3.3 0.3	1.7	10
		HD070 1230 2R	30.1	11.7	9.5	8.4	7.7 0.1	6.8 0.2	6.3 0.3	5.9 0.4	5.3 0.8	2.0	12
		HD080 1230 2R	282.2	92.7	92.7 0.1	84.1 0.1	77.1 0.2	68.3 0.5	62.6 0.8	58.6 1.3	52.9 2.5	4.6	16
		HD110 1230 2R	480.0	199.8 0.1	162.3 0.2	143.7 0.6	131.8 1.0	116.7 2.2	107.1 3.9	100.1 6.1	90.5 12.0	6.6	22
		HD140 1230 2R	864.3	343.1 0.1	278.7 0.5	246.8 1.2	226.4 2.2	200.4 4.9	183.9 8.6	172.0 13.5	155.5 26.5	9.6	26
		HD170 1230 2R	1351.4	538.3 0.5	437.3 2.0	387.2 4.5	355.2 8.0	314.5 18.0	288.5 32.0	269.8 50.0	243.9 98.1	5.2	30
15	90	HD110 1509 2R	367.7	121.9 0.5	121.9 2.1	121.9 4.7	121.9 8.4	121.9 18.9	121.6 33.7	113.8 52.6		6.9	16
		HD140 1509 2R	486.1	202.5 1.1	202.5 4.6	201.9 10.3	185.2 18.4	164.0 41.4	150.5 73.5			8.6	19
		HD170 1509 2R	693.4	424.1 4.3	344.5 17.3	305.0 38.9	279.8 69.2					13.2	22
	120	HD110 1512 2R	388.8	125.4 0.3	125.4 1.2	125.4 2.7	125.4 4.7	125.1 10.7	114.7 18.9	107.3 29.6		6.5	16
		HD140 1512 2R	506.5	206.7 0.6	206.7 2.6	189.1 5.8	173.5 10.3	153.6 23.3	140.9 41.4	131.8 64.6		8.1	19
		HD170 1512 2R	740.2	402.0 2.4	326.5 9.7	289.1 21.9	265.2 38.9	234.8 87.6				12.6	22
	150	HD110 1515 2R	406.2	127.1 0.2	127.1 0.8	127.1 1.7	127.1 3.0	118.6 6.8	108.8 12.1	101.8 18.9	92.0 37.1	6.2	16
		HD140 1515 2R	522.8	208.8 0.4	201.8 1.7	178.6 3.7	163.9 6.6	145.1 14.9	133.1 26.5	124.5 41.4		7.8	19
		HD170 1515 2R	1154.9	599.5 1.6	486.9 6.4	431.2 14.3	395.5 25.5	350.2 57.4	321.3 102.0			14.2	26
	180	HD110 1518 2R	412.9	128.2 0.1	128.2 0.5	128.2 1.2	127.8 2.1	113.2 4.7	103.8 8.4	97.1 13.2	87.8 25.8	6.1	16
		HD140 1518 2R	528.8	210.0 0.3	192.1 1.1	170.1 2.6	156.0 4.6	138.2 10.3	126.7 18.4	118.5 28.7		7.6	19
		HD170 1518 2R	1179.0	573.3 1.1	465.6 4.4	412.3 10.0	378.2 17.7	334.9 39.8	307.2 70.8	287.3 110.7		13.9	26
	240	HD110 1524 2R	414.8	129.2 0.1	129.2 0.3	128.9 0.7	118.2 1.2	104.7 2.7	96.0 4.7	98.8 7.4	81.2 14.5	5.9	16
		HD140 1524 2R	530.5	211.2 0.2	177.2 0.6	156.9 1.5	1440.0 2.6	127.5 5.8	116.9 10.3	109.4 16.2	98.9 31.7	7.4	19
		HD170 1524 2R	1185.8	531.3 0.6	431.6 2.5	382.2 5.6	350.6 10.0	310.4 22.4	284.7 39.8	266.3 62.2		13.5	26
	270	HD110 1527 2R	416.1	129.5 0.1	129.5 0.2	124.7 0.5	114.4 0.9	101.3 2.1	92.9 3.7	86.9 5.8	78.5 11.5	5.8	16
		HD140 1527 2R	531.7	211.0 0.1	171.4 0.5	151.7 1.1	139.2 2.0	123.2 4.6	113.1 8.2	105.7 12.8	95.6 25.0	7.3	19
		HD170 1527 2R	1185.8	514.4 0.5	417.8 2.0	369.9 4.4	339.4 7.9	300.5 17.7	275.6 31.5	257.8 49.2	233.0 96.4	13.3	26
	300	HD110 1530 2R	416.1	129.7	129.7 0.2	121.0 0.4	111.0 0.8	98.3 1.7	90.2 3.0	84.3 4.7	76.2 9.3	5.8	16
		HD140 1530 2R	531.7	204.6 0.1	166.2 0.4	147.2 0.9	135.0 1.7	119.5 3.7	109.7 6.6	102.6 10.3	92.7 20.3	7.2	19
		HD170 1530 2R	1190.7	499.4 0.4	405.6 1.6	359.2 3.6	329.5 6.4	291.7 14.3	267.6 6.6	250.3 39.8	226.3 78.1	13.2	26

Note) The torque ability is the same whethe the rotarong direcion of the input/output sheft are indicated as right cams or left hand cams. 1N • m≒0.102kgf • m

Torque chart for indexing drive(10)

Table H-10

Number of stop S	Index angle θ(deg)	CODE	Static-rated output torque Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal inertia load TORQUE (N • m) Input shaft speed (rpm) 50	100	150	200	300	400	500	700	Camshaft frictional torque Tx (N • m)	Cam follower SCF (mm)
16	90	HD080 1609 2R	46.6	29.2 0.1	23.7 0.4	21.0 0.9	19.3 1.6	17.1 3.5	15.6 6.3			2.8	12
		HD110 1609 2R	373.3	122.8 0.5	122.8 2.0	122.8 4.5	122.8 7.9	122.8 17.8	122.8 31.7	117.1 49.5		6.8	16
		HD140 1609 2R	491.5	203.6 1.1	203.6 4.3	203.6 9.7	190.3 17.3	168.5 38.9	154.6 69.2			8.5	19
		HD170 1609 2R	705.4	437.4 4.1	355.3 16.3	314.6 36.6	288.6 65.1					13.1	22
	120	HD080 1612 2R	48.8	27.4 0.1	22.3 0.2	19.7 0.5	18.1 0.9	16.0 2.0	14.7 3.5	13.7 5.5		2.7	12
		HD110 1612 2R	392.4	126.0 0.3	126.0 1.1	126.0 2.5	126.0 4.5	126.0 10.0	117.8 17.8	110.2 27.9		6.4	16
		HD140 1612 2R	509.9	207.4 0.6	207.4 2.4	193.8 5.5	177.8 9.7	157.4 21.9	144.4 38.9	135.1 60.8		8.0	19
		HD170 1612 2R	748.4	413.3 2.3	335.7 9.1	297.2 20.6	272.7 36.6	241.4 82.3				12.5	22
	150	HD080 1615 2R	50.0	26.0	21.1 0.1	18.7 0.3	17.1 0.6	15.2 1.3	13.9 2.3	13.0 3.5		2.6	12
		HD110 1615 2R	402.3	127.5 0.2	127.5 0.7	127.5 1.6	127.5 2.9	121.6 6.4	111.6 11.4	104.3 17.8	94.3 34.9	6.2	16
		HD140 1615 2R	519.2	209.2 0.4	206.6 1.6	182.9 3.5	167.8 6.2	148.6 14.0	136.3 24.9	127.5 38.9		7.8	19
		HD170 1615 2R	771.1	392.4 1.5	318.7 5.9	282.2 13.2	258.9 23.4	229.2 52.7	210.3 93.7			12.1	22
	180	HD080 1618 2R	50.7	24.7	20.1 0.1	17.8 0.2	16.3 0.4	14.5 0.9	13.3 1.6	12.4 2.5	11.2 4.8	2.6	12
		HD110 1618 2R	408.0	128.4 0.1	128.4 0.5	128.4 1.1	128.4 2.0	116.0 4.5	106.4 7.9	99.5 12.4	89.9 24.3	6.0	16
		HD140 1618 2R	524.4	210.3 0.3	196.6 1.1	174.1 2.4	159.7 4.3	141.4 9.7	129.7 17.3	121.3 27.0	109.6 53.0	7.6	19
		HD170 1618 2R	784.3	374.6 1.0	304.3 4.1	26935 9.1	247.2 16.3	218.9 36.6	200.8 65.1			11.9	22
	240	HD080 1624 2R	51.4	22.9	18.6 0.1	16.4 0.1	15.1 0.2	13.4 0.5	12.2 0.9	11.5 1.4	10.4 2.7	2.5	12
		HD110 1624 2R	414.0	129.4 0.1	129.4 0.3	129.4 0.6	121.0 1.1	107.1 2.5	98.3 4.5	91.9 7.0	83.1 13.7	5.8	16
		HD140 1624 2R	529.8	211.4 0.2	181.2 0.6	160.5 1.4	147.2 2.4	130.4 5.5	119.6 9.7	111.8 15.2	101.1 29.8	7.3	19
		HD170 1624 2R	798.2	346.7 0.6	281.6 2.3	249.3 5.1	228.7 9.1	202.5 20.6	185.8 36.6	173.8 57.2		11.6	22
	270	HD080 1627 2R	51.5	22.1	18.0	15.9 0.1	14.6 0.2	12.9 0.4	11.8 0.7	11.1 1.1	10.0 2.1	2.5	12
		HD110 1627 2R	415.6	129.8 0.1	129.6 0.2	127.6 0.5	117.0 0.9	103.6 2.0	95.1 3.5	88.9 5.5	80.4 10.8	5.8	16
		HD140 1627 2R	531.3	211.7 0.1	175.2 0.5	155.1 1.1	142.3 1.9	126.0 4.3	115.6 7.7	108.1 12.0	97.7 23.5	7.3	19
		HD170 1627 2R	1188.9	526.6 0.5	427.7 1.9	378.7 4.2	347.4 7.4	307.6 16.7	282.2 29.6	263.9 46.3	238.6 90.7	13.3	26
	300	HD080 1630 2R	51.7	21.4	17.4	15.4 0.1	14.1 0.1	12.5 0.3	11.5 0.6	10.7 0.9	9.7 1.7	2.5	12
		HD110 1630 2R	416.8	129.8	129.8 0.2	123.8 0.4	113.5 0.7	100.5 1.6	92.2 2.9	86.3 4.5	78.0 8.7	5.7	16
		HD140 1630 2R	532.3	209.2 0.1	169.9 0.4	150.5 0.9	138.0 1.6	122.2 3.5	112.1 6.2	104.8 9.7	94.8 19.1	7.2	19
		HD170 1630 2R	1193.2	511.1 0.4	415.2 1.5	367.6 3.4	337.2 6.0	298.6 13.5	273.9 24.0	256.2 37.5	231.6 73.5	13.2	26

Note) The torque ability is the same whethe the rotarong direcion of the input/output sheft are indicated as right cams or left hand cams. 1N • m≒0.102kgf • m

⚠ Precautions

There are any standard cam curve (MS) are included in the torque ability chare.
However, it cah@ customized by using other types of com curve. If you need other cam curve, please contect us.

Torque chart for oscillating drive(1)

Table H-11

Oscillation angle φ (deg)	Index angle of oscillate θf・θb (deg)	CODE	Torque of static rated output Ts (N・m)	Dynamic rated output torque Top (N・Y) Internal inertia load TORQUE (N・m) Input shaft speed (rpm) 20	40	60	80	100	120	150	200	Camshaft frictional torque Tx (N・m)	Cam follower SCF (mm)
15	53	HD045E	36.1	17.0	14.3	13.1 0.1	12.0 0.1	11.2 0.2	10.6 0.3	9.9 0.4	9.1 0.7	1.0	14
	Index angle of mini-mum oscill ate 45	HD060E	120.8	55.3	46.4 0.1	42.5 0.1	39.0 0.2	36.5 0.4	34.6 0.5	32.3 0.8	29.6 1.4	2.5	16
	49	HD070E	157.3	71.4	59.9 0.1	54.9 0.3	50.4 0.5	47.1 0.8	44.6 1.2	41.7 1.8	38.3 3.2	3.5	19
	46	HD080E	253.6	113.8	95.4 0.2	87.5 0.4	90.3 0.7	75.1 1.1	71.1 1.5	66.5 2.4	61.0 4.3	5.9	19
	44	HD110E	578.8	262.3 0.2	219.9 0.9	201.7 2.1	185.0 3.7	173.1 5.7	163.8 8.2	153.2 12.8	140.6 22.8	10.1	26
	39	HD140E	877.9	402.0 0.6	337.0 2.5	309.2 5.7	283.6 10.1	265.2 15.7	251.1 22.7	234.9 35.4	215.4 63.0	14.7	30
	39	HD170E	1347.6	621.0 2.4	520.6 9.5	477.6 21.3	438.1 37.9	409.7 59.2	387.9 85.3	362.8 133.2		22.8	35
	60	HD045E	37.3	16.7	14.0	12.8 0.1	11.8 0.1	11.0 0.1	10.4 0.2	9.7 0.3	8.9 0.6	1.0	14
		HD060E	128.2	52.3	43.8	40.2 0.1	36.9 0.1	34.5 0.2	32.7 0.3	30.5 0.5	28.0 0.8	2.3	16
		HD070E	180.9	79.7	66.8 0.1	61.3 0.2	56.2 0.3	52.6 0.5	49.8 0.8	46.5 1.2	42.7 2.1	3.6	22
		HD080E	443.1	200.4	168.0 0.1	154.1 0.2	141.4 0.4	132.2 0.7	125.2 1.0	117.1 1.5	107.4 2.7	7.3	26
		HD110E	786.6	336.4 0.1	282.0 0.5	258.7 1.1	237.3 2.0	222.0 3.1	210.1 4.5	196.5 7.1	180.3 12.6	11.3	32
		HD140E	1496.9	625.8 0.3	524.6 1.1	481.2 2.5	441.4 4.5	412.8 7.1	390.9 10.2	365.6 15.9	335.3 28.2	17.8	40
		HD170E	2495.8	1034.6 1.1	867.3 4.3	795.6 9.8	729.8 17.3	682.6 27.1	646.2 39.0	604.4 61.0	554.4 108.4	27.2	47
	90	HD045E	40.0	15.3	12.8	11.7	10.8	10.1 0.1	9.5 0.1	8.9 0.1	8.2 0.2	0.9	14
		HD060E	134.4	47.4	39.7	36.4	33.4 0.1	31.3 0.1	29.6 0.1	27.7 0.2	25.4 0.4	2.1	16
		HD070E	191.7	72.6	60.9	55.8 0.1	51.2 0.2	47.9 0.2	45.3 0.3	42.4 0.5	38.9 1.0	3.3	22
		HD080E	473.6	183.5	153.8	141.1 0.1	129.4 0.2	121.0 0.3	114.6 0.4	107.2 0.7	98.3 1.2	6.7	26
		HD110E	832.8	306.5 0.1	257.0 0.2	235.7 0.5	216.2 0.9	202.2 1.4	191.5 2.0	179.1 3.1	164.3 5.6	10.4	32
		HD140E	1569.3	567.3 0.1	475.6 0.5	436.3 1.1	400.2 2.0	374.3 3.1	354.4 4.5	331.4 7.1	304.0 12.5	16.2	40
		HD170E	2621.6	938.9 0.5	787.1 1.9	722.0 4.3	662.3 7.7	619.4 12.0	586.5 17.3	548.5 27.1	503.1 48.2	25.0	47
	120	HD045E	41.1	14.2	11.9	10.9	10.0	9.4	8.9 0.1	8.3 0.1	7.6 0.1	0.9	14
		HD060E	136.8	43.9	36.8	33.7	30.9	28.9 0.1	27.4 0.1	25.6 0.1	23.5 0.2	2.1	16
		HD070E	195.9	67.3	56.4	51.8	47.5 0.1	44.4 0.1	42.1 0.2	39.3 0.3	36.1 0.5	3.1	22
		HD080E	485.9	170.5	142.9	131.1 0.1	120.2 0.1	112.5 0.2	106.5 0.2	99.6 0.4	91.3 0.7	6.4	26
		HD110E	851.0	284.2	238.3 0.1	218.6 0.3	200.5 0.5	187.5 0.8	177.5 1.1	166.0 1.8	152.3 3.1	9.9	32
		HD140E	1597.2	525.0 0.1	440.1 0.3	403.8 0.6	370.4 1.1	346.4 1.8	327.9 2.5	306.7 4.0	281.4 7.1	15.4	40
		HD170E	2670.4	869.2 0.3	728.7 1.1	668.5 2.4	613.2 4.3	573.5 6.8	543.0 9.8	507.8 15.2	465.8 27.1	23.9	47
	150	HD045E	41.6	13.4	11.2	10.3	9.4	8.8	8.4	7.8 0.1	7.2 0.1	0.9	14
		HD060E	137.9	41.2	34.5	31.7	29.1	27.2	25.7	24.1 0.1	22.1 0.1	2.0	16
		HD070E	197.9	63.3	53.1	48.7	44.7 0.1	41.8 0.1	39.5 0.1	37.0 0.2	33.9 0.3	3.0	22
		HD080E	491.9	160.4	134.5	123.4	113.2 0.1	105.8 0.1	100.2 0.2	93.7 0.2	86.0 0.4	6.3	26
		HD110E	859.8	267.2	224.0 0.1	205.5 0.2	188.5 0.3	176.3 0.5	166.9 0.7	156.1 1.1	143.2 2.0	9.6	32
		HD140E	1610.6	493.1	413.4 0.2	379.2 0.4	347.8 0.7	325.3 1.1	308.0 1.6	288.1 2.5	264.2 4.5	15.0	40
		HD170E	2693.9	816.5 0.2	684.5 0.7	627.9 1.6	576.0 2.8	538.7 4.3	510.0 6.2	477.0 9.8	437.6 17.3	23.2	47

Note) The standard cam curve of the oscillating drive is the MS curve. Please inquire us in case of hoping the curve except MS curve.

1N・m≒0.102kgf・m

Torque chart for oscillating drive(2)

Table H-12

Oscillation angle φ (deg)	Index angle of oscillate θf・θb (deg)	CODE	Torque of static rated output Ts (N・m)	Dynamic rated output torque Top (N・Y) Internal inertia load TORQUE (N・m) Input shaft speed (rpm) 20	40	60	80	100	120	150	200	Camshaft frictional torque Tx (N・m)	Cam follower SCF (mm)
15	180	HD045E	41.9	12.7	10.6	9.8	9.0	8.4	7.9	7.4	6.8 0.1	0.8	14
		HD060E	138.5	39.1	32.8	30.1	27.6	25.8	24.4	22.8 0.1	20.9 0.1	2.0	16
		HD070E	199.1	60.1	50.4	46.2	42.4	39.7 0.1	37.5 0.1	35.1 0.1	32.2 0.2	3.0	22
		HD080E	495.2	152.4	127.7	117.2	107.5	100.5 0.1	95.2 0.1	89.0 0.2	81.7 0.3	6.1	26
		HD110E	864.7	253.7	212.7 0.1	195.1 0.1	179.0 0.2	167.4 0.3	158.5 0.5	148.2 0.8	135.9 1.4	9.4	32
		HD140E	1618.1	467.9	392.3 0.1	359.8 0.3	330.1 0.5	308.7 0.8	292.3 1.1	273.4 1.8	250.8 3.1	14.6	40
		HD170E	2707.0	774.9 0.1	649.6 0.5	595.9 1.1	546.7 1.9	511.3 3.0	484.0 4.3	452.7 6.8	415.3 12.0	22.8	47
30	Index angle of mini-mum oscill ate 75	HD045E	32.0	14.4	21.1	11.1 0.1	10.2 0.1	9.5 0.2	9.0 0.3	8.4 0.4	7.7 0.7	1.1	14
	64	HD060E	108.0	47.1	39.5 0.1	36.2 0.1	33.2 0.2	31.1 0.4	29.4 0.5	27.5 0.8	25.2 1.4	2.8	16
	69	HD070E	139.4	60.7	50.9 0.1	46.7 0.3	42.8 0.5	40.0 0.8	37.9 1.2	35.4 1.8	32.5 3.2	3.9	19
	66	HD080E	223.3	95.8	80.3 0.2	73.7 0.4	67.6 0.7	63.2 1.0	59.9 1.5	56.0 2.3	51.4 4.1	6.6	19
	62	HD110E	504.9	221.0 0.2	185.3 0.9	170.0 2.1	155.9 3.7	145.8 5.8	138.1 8.3	129.1 12.9	118.5 23.0	11.4	26
	55	HD140E	757.5	336.9 0.6	282.4 2.5	259.0 5.7	237.6 10.1	222.2 15.8	210.4 22.8	196.8 35.6	180.3 63.3	16.8	30
	55	HD170E	1146.2	516.6 2.4	433.1 9.5	397.3 21.4	364.4 38.1	340.8 59.5	322.7 85.7	301.8 134.0		25.7	35
	75	HD045E	32.0	14.4	12.1	11.1 0.1	10.2 0.1	9.5 0.2	9.0 0.3	8.4 0.4	7.7 0.7	1.1	14
		HD060E	114.5	46.2	38.7	35.5 0.1	32.6 0.2	30.5 0.3	28.9 0.4	27.0 0.6	24.8 1.0	2.7	16
		HD070E	158.4	69.7	58.4 0.1	53.6 0.2	49.2 0.4	46.0 0.7	43.5 1.0	40.7 1.5	37.4 2.8	4.1	22
		HD080E	381.4	173.9	145.8 0.1	133.7 0.3	122.7 0.6	114.7 0.9	108.6 1.3	101.6 2.0	93.2 3.5	8.4	26
		HD110E	689.1	294.5 0.2	246.9 0.6	226.5 1.4	207.7 2.6	194.3 4.0	184.0 5.8	172.0 9.1	157.8 16.1	13.0	32
		HD140E	1337.2	553.1 0.4	463.7 1.4	425.4 3.3	390.2 5.8	364.9 9.0	345.5 13.0	323.1 20.3	296.4 36.1	20.6	40
		HD170E	2220.6	912.7 1.4	765.1 5.5	701.9 12.5	643.8 22.2	602.1 34.7	570.1 49.9	533.2 78.0	489.1 138.7	31.2	47
	90	HD045E	34.3	14.2	11.9	10.9	10.0 0.1	9.3 0.1	8.8 0.2	8.3 0.3	7.6 0.5	1.1	14
		HD060E	120.8	44.9	37.7	34.6 0.1	31.7 0.1	29.6 0.2	28.1 0.3	26.2 0.4	24.1 0.7	2.5	16
		HD070E	168.6	68.1	57.1 0.1	52.4 0.2	48.0 0.3	44.9 0.5	42.5 0.7	39.8 1.1	36.5 1.9	3.9	22
		HD080E	408.9	170.5	142..9 0.1	131.1 0.2	120.3 1.8	112.5 0.6	106.5 0.9	99.6 1.4	91.3 2.4	7.9	26
		HD110E	733.2	287.6 0.1	241.1 0.4	221.2 1.0	202.9 0.4	189.7 2.8	179.6 4.0	168.0 6.3	154.1 11.2	12.3	32
		HD140E	1410.6	537.6 0.3	450.9 1.0	413.6 2.3	379.4 4.0	354.9 6.3	336.0 9.0	314.2 14.1	288.2 25.1	19.3	40
		HD170E	2346.6	888.3 1.0	744.7 3.9	683.1 8.7	626.6 15.4	568.0 24.1	554.8 34.7	518.9 54.2	476.0 96.3	29.5	47
	120	HD045E	37.3	13.5	11.4	10.4	9.6	8.9 0.1	8.5 0.1	7.9 0.2	7.3 0.3	1.0	14
		HD060E	120.8	42.5	35.6	32.7	30.0 0.1	28.0 0.1	26.5 0.1	24.8 0.2	22.8 0.4	2.3	16
		HD070E	180.9	64.7	54.2	49.8 0.1	45.6 0.2	42.7 0.3	40.4 0.4	37.8 0.6	34.7 1.1	3.6	22
		HD080E	443.1	162.8	136.5 0.1	125.2 0.1	114.8 0.2	107.4 0.3	101.7 0.5	95.1 0.8	87.2 1.4	7.3	26
		HD110E	786.6	273.3 0.1	229.1 0.3	210.2 0.6	192.8 1.0	180.3 1.6	170.7 2.3	159.6 3.5	146.4 6.3	11.3	32
		HD140E	1496.9	508.3 0.1	426.1 0.6	390.9 1.3	358.5 2.3	335.3 3.5	317.5 5.1	296.9 7.9	272.4 14.1	17.8	40
		HD170E	2495.8	840.3 0.5	704.5 2.2	646.2 4.9	592.8 8.7	554.4 13.5	524.9 19.5	490.9 30.5	450.3 54.2	27.2	47

Note) The standard cam curve of the oscillating drive is the MS curve. Please inquire us in case of hoping the curve except MS curve.

1N・m≒0.102kgf・m

Torque chart for oscillating drive(3)

Table H-13

Oscillation angle φ (deg)	Index angle of oscillate θf • θb (deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal in ertia load torque Toi of lower side (N • m) Number of rotation of input shaft N (rpm) 20	40	60	80	100	120	150	200	Camshaft frictional torque Tx (N • m)	Cam follower. SCF (mm)
30	150	HD045E	39.0	12.9	10.9	10.0	9.1	8.5	8.1 0.1	7.6 0.1	6.9 0.2	0.9	14
		HD060E	132.1	40.3	33.8	31.0	28.4	26.6 0.1	25.2 0.1	23.6 0.1	21.6 0.3	2.2	16
		HD070E	187.7	61.6	51.7	47.4 0.1	43.5 0.1	40.7 0.2	38.5 0.2	36.0 0.4	33.0 0.7	3.4	22
		HD080E	462.2	155.5	130.3	119.6 0.1	109.7 0.1	102.6 0.2	97.1 0.3	90.8 0.5	83.3 0.9	7.0	26
		HD110E	815.6	260.2	218.2 0.2	200.1 0.4	183.6 0.6	171.7 1.0	162.5 1.4	152.0 2.3	139.5 4.0	10.7	32
		HD140E	1542.6	482.6 0.1	404.5 0.4	371.1 0.8	340.4 1.4	318.4 2.3	301.4 3.3	281.9 5.1	258.6 9.0	16.8	40
		HD170E	2575.2	798.3 0.3	669.3 1.4	613.9 3.1	563.2 5.5	526.7 8.7	498.7 12.5	466.4 19.5	427.8 34.7	25.9	47
	180	HD045E	40.0	12.4	10.4	9.5	8.8	8.2	7.8	7.3 0.1	6.7 0.1	0.9	14
		HD060E	134.4	38.5	32.3	29.6	27.2	25.4	24.0 0.1	22.5 0.1	20.6 0.2	2.1	16
		HD070E	191.7	59.0	49.4	45.3	41.6 0.1	38.9 0.1	36.8 0.2	34.4 0.3	31.6 0.5	3.3	22
		HD080E	473.6	149.0	124.9	114.6 0.1	105.1 0.1	98.3 0.2	93.1 0.2	87.1 0.3	79.9 0.6	6.7	26
		HD110E	832.8	249.0	208.7 0.1	191.5 0.3	175.6 0.4	164.3 0.7	155.5 1.0	145.4 1.6	133.4 2.8	10.4	32
		HD140E	1569.3	460.8 0.1	386.3 0.3	345.5 0.6	325.1 1.0	304.0 1.6	287.8 2.3	269.2 3.5	246.9 6.3	16.2	40
		HD170E	2621.6	762.6 0.2	639.3 1.0	586.5 2.2	538.0 3.9	503.1 6.0	476.4 8.7	445.5 13.5	408.7 24.1	25.0	47
45	90	HD045E	28.6	12.9	10.8	9.9 0.1	9.1 0.1	8.5 0.2	8.1 0.3	7.6 0.4	6.9 0.7	1.2	14
	Index angle of mini-mum oscil-late 78	HD060E	98.3	42.3	35.5 0.1	32.5 0.1	29.8 0.2	27.9 0.4	26.4 0.5	24.7 0.8	22.7 1.4	3.1	16
	85	HD070E	127.0	54.4	45.6 0.1	41.8 0.3	38.4 0.5	35.9 0.8	34.0 1.2	31.8 1.8	29.2 3.2	4.2	19
	80	HD080E	200.0	85.6	71.8 0.2	65.8 0.4	60.4 0.7	56.5 1.1	53.5 1.5	50.0 2.4	45.9 4.2	7.1	19
	76	HD110E	454.2	197.2 0.2	165.3 0.9	151.7 2.1	139.1 3.7	130.1 5.7	123.2 8.3	115.2 12.9	105.7 23.0	12.4	26
	75	HD140E	720.1	299.2 0.5	250.9 2.0	230.1 4.6	211.1 8.2	197.4 12.8	186.4 18.4	174.8 28.7	160.4 51.1	17.5	30
	75	HD170E	1085.2	458.0 1.9	284.0 7.7	352.2 17.3	323.1 30.7	302.2 48.0	286.1 69.2	267.6 108.1		26.7	35
	90	HD045E	28.6	12.9	10.8	9.9 0.1	9.1 0.1	8.5 0.2	8.1 0.3	7.6 0.4	6.9 0.7	1.2	14
		HD060E	105.1	41.9	35.1	32.2 0.1	29.6 0.2	27.7 0.3	26.2 0.4	24.5 0.6	22.5 1.1	2.9	16
		HD070E	143.6	62.8	52.7 0.1	48.3 0.3	44.3 0.5	41.5 0.7	39.9 1.0	36.7 1.6	33.7 2.9	4.5	22
		HD080E	342.6	156.0	130.8 0.1	120.0 0.3	110.1 0.6	102.9 0.9	97.5 1.3	91.2 2.0	83.6 3.6	9.1	26
		HD110E	625.3	265.6 0.2	222.7 0.7	204.2 1.5	187.4 2.7	175.2 4.2	165.9 6.0	155.2 9.4	142.3 16.8	14.2	32
		HD140E	1227.7	501.8 0.4	420.7 1.5	385.9 3.4	354.0 6.0	331.1 13.5	313.4 13.5	293.1 21.2	268.9 37.6	22.4	40
		HD170E	2033.7	826.9 1.4	693.2 5.8	635.9 13.0	583.3 23.1	545.6 36.1	516.5 52.0	483.1 81.3	443.1 145.5	33.9	47
	120	HD045E	32.8	12.7	10.7	9.8	9.0 0.1	8.4 0.1	7.9 0.2	7.4 0.2	6.8 0.4	1.1	14
		HD060E	116.9	40.5	34.0	31.2 0.1	28.6 0.1	26.7 0.2	25.3 0.2	23.7 0.3	21.7 0.6	2.6	16
		HD070E	162.2	61.3	51.4 0.1	47.1 0.1	43.2 0.3	40.4 0.4	38.3 0.6	35.8 0.9	32.8 1.6	4.0	22
		HD080E	391.6	153.0	128.3 0.1	117.7 0.2	108.0 0.3	101.0 0.5	95.6 0.7	89.4 1.1	82.0 2.0	8.2	26
		HD110E	705.6	258.8 0.1	217.0 0.4	199.0 0.8	182.6 1.5	170.8 2.4	161.7 3.4	151.2 5.3	138.7 9.4	12.7	32
		HD140E	1364.9	485.3 0.2	406.9 0.8	373.2 1.9	324.4 3.4	320.2 5.3	303.2 7.6	283.5 11.9	260.1 21.2	20.1	40
		HD170E	2268.1	801.1 0.8	671.6 3.3	616.0 7.3	565.1 13.0	528.5 20.3	500.4 29.3	468.0 45.7	429.3 81.3	30.6	47

Note) The standard cam curve of the oscillating drive is the MS curve. Please inquire us in case of hoping the curve except MS curve.

1N • m≒0.102kgf • m

Torque chart for oscillating drive(4)

Table H-14

Oscillation angle φ (deg)	Index angle of oscillate θf • θb (deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal in ertia load torque Toi of lower side (N • m) Number of rotation of input shaft N (rpm) 20	40	60	80	100	120	150	200	Camshaft frictional torque Tx (N • m)	Cam follower. SCF (mm)
45	150	HD045E	35.5	12.4	10.4	9.5	8.7	8.2 0.1	7.7 0.1	7.2 0.2	6.6 0.3	1.0	14
		HD060E	123.8	39.0	32.7	30.0	27.5 0.1	25.8 0.1	24.4 0.1	22.8 0.2	20.9 0.4	2.5	16
		HD070E	173.6	59.3	49.7	45.6 0.1	41.8 0.2	39.1 0.33	37.0 0.4	34.6 0.6	31.8 1.0	3.8	22
		HD080E	422.7	148.7	124.7 0.1	114.4 0.1	104.9 0.2	98.1 0.3	92.9 0.5	86.9 0.7	79.7 1.3	7.7	26
		HD110E	755.0	250.4 0.1	209.9 0.2	192.5 0.5	176.6 1.0	165.2 1.5	156.4 2.2	146.3 3.4	134.2 6.0	11.9	32
		HD140E	1446.2	467.2 0.1	391.7 0.5	359.3 1.2	329.6 2.2	308.3 3.4	291.9 4.9	273.0 7.6	250.4 13.5	18.7	40
		HD170E	2408.0	772.0 0.5	647.2 2.1	593.7 4.7	544.6 8.3	509.3 13.0	482.2 18.7	451.0 29.3	413.7 52.0	28.6	47
	180	HD045E	37.3	12.0	10.1	9.2	8.5	7.9	7.5 0.1	7.0 0.1	6.4 0.2	1.0	14
		HD060E	128.2	37.6	31.5	28.9	26.5	24.8 0.1	23.5 0.1	22.0 0.2	20.1 0.3	2.3	16
		HD070E	180.9	57.3	48.0	44.1 0.1	40.4 0.1	37.8 0.2	35.8 0.3	33.5 0.4	30.7 0.7	3.6	22
		HD080E	443.1	144.1	120.8	110.8 0.1	101.7 0.1	95.1 0.2	90.0 0.3	84.2 0.5	77.2 0.9	7.3	26
		HD110E	786.6	242.0	202.8 0.2	186.1 0.4	170.7 0.7	159.6 1.0	151.1 1.5	141.3 2.4	129.7 4.2	11.3	32
		HD140E	1496.9	450.1 0.1	377.3 0.4	346.1 0.85	317.5 1.5	296.9 2.4	281.1 3.4	262.9 5.3	241.2 9.4	17.8	40
		HD170E	2495.8	744.1 0.4	623.8 1.4	572.2 3.3	524.9 5.8	490.9 9.0	464.8 13.0	434.7 20.3	398.7 36.1	27.2	47
60	120	HD045E	28.6	11.9	9.9	9.1 0.1	8.4 0.1	7.8 0.1	7.4 0.2	6.9 0.3	6.4 0.6	1.2	14
	Index angle of mini-mum oscill ate 91	HD060E	91.4	39.0	32.7 0.1	30.0 0.1	27.5 0.2	25.7 0.4	24.3 0.5	22.8 0.8	20.9 1.4	3.3	16
	100	HD070E	130.2	58.0	48.6 0.1	44.6 0.3	40.9 0.5	38.2 0.8	36.2 1.1	33.9 1.7	31.1 3.1	4.8	22
	100	HD080E	211.5	90.9	76.2 0.1	69.9 0.3	64.1 0.6	60.0 0.9	56.8 1.3	53.1 2.1	48.7 3.6	8.0	22
	90	HD110E	512.8	230.7 0.2	193.4 0.9	177.4 2.0	162.8 3.5	152.2 5.5	144.1 8.0	134.8 12.5	123.6 22.1	15.4	30
	90	HD140E	852.7	357.6 0.5	299.8 1.9	275.0 4.4	252.3 7.7	235.9 12.1	223.4 17.4	208.9 27.2	191.6 48.4	22.2	35
	90	HD170E	1264.5	546.7 1.8	458.3 7.3	420.4 16.3	385.7 29.0	360.7 45.3	341.5 65.3	319.4 102.0		31.8	40
	120	HD045E	28.6	11.9	9.9	9.1 0.1	8.4 0.1	7.8 0.1	7.4 0.2	6.9 0.3	6.4 0.6	1.2	14
		HD060E	105.1	38.5	32.2	29.6 0.1	27.1 0.1	25.4 0.2	24.0 0.3	22.5 0.5	20.6 0.8	2.9	16
		HD070E	143.6	57.6	48.3 0.1	44.3 0.2	40.7 0.3	38.0 0.5	36.0 0.8	33.7 1.2	30.9 2.1	4.5	22
		HD080E	342.6	143.1	120.0 0.1	110.1 0.2	101.0 0.4	94.4 0.7	89.4 1.0	83.6 1.5	76.7 2.7	9.1	26
		HD110E	625.3	243.6 0.1	204.2 0.5	187.4 1.1	171.9 2.0	160.7 3.1	152.2 4.5	142.3 7.1	130.6 12.6	14.2	32
		HD140E	1227.3	460.3 0.3	385.9 1.1	354.0 2.5	324.7 4.5	303.7 7.1	287.5 10.2	268.9 15.9	246.7 28.2	22.4	40
		HD170E	2033.7	758.6 1.1	635.9 4.3	583.3 9.8	535.1 17.3	500.5 27.1	473.8 39.0	443.1 61.0	406.5 108.4	33.9	47
	150	HD045E	32.0	11.7	9.8	9.0	8.3 0.1	7.7 0.1	7.3 0.1	6.8 0.2	6.3 0.4	1.1	14
		HD060E	114.5	37.5	31.5	28.9	26.5 0.1	24.8 0.1	23.4 0.2	21.9 0.3	20.1 0.5	2.7	16
		HD070E	158.4	56.6	47.5 0.1	43.5 0.1	39.9 0.1	37.4 0.3	35.4 0.5	33.1 0.8	30.3 1.4	4.1	22
		HD080E	381.4	141.2	118.4 0.1	108.6 0.2	99.6 0.3	93.2 0.4	88.2 0.6	82.5 1.0	75.7 1.7	8.4	26
		HD110E	689.1	239.2 0.1	200.5 0.3	184.0 0.7	168.7 1.3	157.8 2.0	149.4 2.9	139.7 4.5	128.2 8.0	13.0	32
		HD140E	1337.2	449.3 0.2	376.7 0.7	345.5 1.6	316.9 2.9	296.4 4.5	280.6 6.5	262.5 10.2	240.8 18.1	20.6	40
		HD170E	2220.6	741.3 0.7	621.5 2.8	570.1 6.2	523.0 11.1	489.1 17.3	463.1 39.0	433.1 39.0	397.3 69.4	31.2	47

Note) The standard cam curve of the oscillating drive is the MS curve. Please inquire us in case of hoping the curve except MS curve.

1N • m≒0.102kgf • m

Torque chart for oscillating drive(5)

Table H-15

Oscillation angle φ (deg)	Index angle of oscillate θf • θb (deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal in ertia load torque Toi of lower side (N • m) Input shaft N (rpm) 20	40	60	80	100	120	150	200	Camshaft frictional torque Tx (N • m)	Cam follower SCF (mm)
60	180	HD045E	34.3	11.5	9.6	8.8	8.1	7.6 0.1	7.2 0.1	6.7 0.1	6.2 0.2	1.1	14
		HD060E	120.8	36.5	30.6	28.1	25.7 0.1	24.1 0.1	22.8 0.1	21.3 0.2	19.6 0.4	2.5	16
		HD070E	168.6	55.3	46.4	42.5 0.1	39.0 0.2	36.5 0.2	34.5 0.3	32.3 0.5	29.6 1.0	3.9	22
		HD080E	408.9	138.5	116.1	106.5 0.1	97.7 0.2	91.3 0.3	86.5 0.4	80.9 0.7	74.2 1.2	7.9	26
		HD110E	733.2	233.6 0.1	195.8 0.2	179.6 0.5	164.8 0.9	154.1 1.4	145.9 2.0	136.5 3.1	125.2 5.6	12.3	32
		HD140E	1410.6	436.9 0.1	366.3 0.5	336.0 1.1	308.2 2.0	288.2 3.1	272.9 4.5	255.2 7.1	234.1 12.5	19.3	40
		HD170E	2346.6	721.5 0.5	604.9 1.9	554.8 4.3	509.0 7.7	476.0 12.0	450.7 17.3	421.5 27.1	386.6 48.2	29.5	47
90	180	HD045E	28.6	10.7	9.0	8.2	7.5 0.1	7.1 0.1	6.7 0.1	6.2 0.2	5.7 0.4	1.2	14
	Index angle of mini- mum oscill ate 150	HD060E	96.3	35.0	29.4	26.9 0.1	24.7 0.1	23.1 0.2	21.9 0.3	20.5 0.4	18.8 0.8	3.1	16
	120	HD070E	35.7	13.7	11.5 0.1	10.5 0.3	9.7 0.5	9.0 0.7	8.6 1.1	8.0 1.7	7.3 3.0	3.2	14
	120	HD080E	166.5	70.4	59.0 0.2	54.1 0.3	49.7 0.6	46.4 0.9	44.0 1.4	41.1 2.1	37.7 3.8	8.0	19
	120	HD110E	266.5	104.5 0.2	87.6 0.7	80.3 1.6	73.7 2.8	68.9 4.4	65.2 6.4	61.0 9.9	56.0 17.6	11.1	22
	135	HD140E	852.7	322.3 0.3	270.2 1.3	247.8 2.9	227.3 5.2	212.6 8.1	201.3 11.6	188.3 18.2	172.7 32.3264	22.2	35
	135	HD170E	1264.5	492.7 1.2	413.1 4.7	378.9 10.6	347.6 18.8	325.1 29.3	307.8 42.2	287.8 66.0	.0 117.2	31.8	40
	150	HD060E	96.3	35.0	29.4	26.9 0.1	24.7 0.1	23.1 0.2	21.9 0.3	20.5 0.4	18.8 0.8	3.1	16
		HD070E	40.9	13.7	11.5 0.1	10.5 0.2	9.7 0.3	9.0 0.5	8.6 0.7	8.0 1.1	7.4 1.9	3.0	14
		HD080E	192.6	70.8	59.4 0.1	54.5 0.2	50.0 0.4	46.7 0.6	44.2 0.9	41.4 1.4	38.0 2.4	7.3	19
		HD110E	546.6	208.0 0.1	174.4 0.5	160.0 1.1	146.7 2.0	137.2 3.1	129.9 4.4	121.5 6.9	111.5 12.3	14.7	30
		HD140E	903.9	321.5 0.3	269.5 1.0	247.2 2.4	226.8 4.2	212.1 6.5	200.8 9.4	187.8 14.7	172.3 26.1	21.1	35
		HD170E	1350.1	493.9 0.9	413.5 3.8	379.3 8.5	348.0 15.2	325.4 23.7	308.1 34.2	288.2 53.4	264.3 95.0	30.4	40
	180	HD060E	105.1	34.7	29.1	26.7	24.4 0.1	22.9 0.1	21.6 0.2	20.2 0.3	18.6 0.5	2.9	16
		HD070E	143.6	52.0	43.6 0.1	40.0 0.1	36.7 0.2	34.3 0.4	32.5 0.5	30.4 0.8	27.8 1.4	4.5	22
		HD080E	234.1	81.6	68.4 0.1	62.7 0.2	57.6 0.3	53.8 0.4	51.0 0.6	47.7 1.0	43.7 1.7	7.4	22
		HD110E	625.3	219.6 0.1	184.1 0.3	168.9 0.8	154.9 1.4	144.9 2.2	137.2 3.1	128.3 4.9	117.7 8.7	14.2	32
		HD140E	986.8	318.0 0.2	266.6 0.7	244.6 1.6	224.4 2.9	209.8 4.5	198.7 6.5	185.8 10.2	170.4 18.2	19.5	35
		HD170E	2033.7	683.6 0.7	573.1 2.7	525.7 6.2	482.3 11.0	451.0 17.2	427.0 24.7	399.4 38.6	366.4 68.7	33.9	47

Note) The standard cam curve of the oscillating drive is the MS curve. Please inquire us in case of hoping the curve except MS curve.

1N • m≒0.102kgf • m

Torque ability of reducer type(1)

Table H-16

Deceleration ratio R	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top (N • Y) Internal in ertia load torque Toi of lower side (N • m) N (rpm) 50	100	200	300	400	500	600	700	Camshaft frictional torque Tx (N • m)	Cam follower SCF (mm)
3	360	HD045R 0336 OR	39.3	12.1	9.8	7.9	7.1	6.5	6.1	5.7	5.5	1.0	14
		HD060R 0336 OR	144.7	41.4	33.6	27.2	24.1	22.1	20.7	19.6	18.7	2.1	16
		HD070R 0336 OR	188.8	57.6	46.8	38.0	33.7	30.9	28.9	27.3	26.2	3.3	22
		HD080R 0336 OR	458.2	141.9	115.2	93.6	82.9	76.0	71.1	67.3	64.3	6.9	26
		HD110R 0336 OR	820.8	243.4	197.8	160.6	142.2	130.4	122.0	115.5		10.6	32
		HD140R 0336 OR	1550.4	453.9	368.7	299.5	265.2	243.2	227.5	215.4		16.7	40
		HD170R 0336 OR	3039.3	913.4	741.9	602.6	533.6	489.5	457.8			29.0	52
4	360	HD045R 0436 OR	20.3	6.8	5.5	4.4	3.9	3.6	3.3	3.2	3.0	0.8	12
		HD060R 0436 OR	57.7	17.5	14.3	11.6	10.3	9.4	8.8	8.3	7.9	1.9	14
		HD070R 0436 OR	176.8	58.4	47.4	38.5	34.1	31.3	29.3	27.7	26.5	2.9	19
		HD080R 0436 OR	321.3	107.0	86.9	70.7	62.5	57.3	53.6	50.8	48.5	5.4	22
		HD110R 0436 OR	680.1	214.7	174.4	141.7	125.4	115.1	107.6	101.9		8.3	26
		HD140R 0436 OR	1306.2	416.9	338.6	275.1	243.5	223.4	208.9	197.9		13.8	35
		HD170R 0436 OR	2041.6	643.3	522.5	424.4	375.8	344.8	322.4			20.5	40
5	360	HD060R 0536 OR	24.6	7.7	6.3	5.1	4.5	4.1	3.9	3.6	3.5	1.7	12
		HD070R 0536 OR	61.4	20.0	16.3	13.2	11.7	10.7	10.0	9.5	9.0	2.2	14
		HD080R 0536 OR	291.7	94.9	78.4	63.7	56.4	51.7	48.4	45.8	43.7	4.6	16
		HD110R 0536 OR	469.7	153.5	124.7	101.2	89.7	82.2	76.9	72.8		6.7	22
		HD140R 0536 OR	1069.3	355.0	288.3	234.2	207.4	190.2	177.9	168.5		11.3	30
		HD170R 0536 OR	1392.8	446.9	363.0	294.8	261.1	239.4	223.9			15.9	32
6	360	HD045R 0636 OR	41.7	14.1	11.5	9.3	8.2	7.5	7.1	6.8	6.4	0.9	14
		HD060R 0636 OR	150.4	47.7	38.7	31.5	27.8	25.6	23.9	22.6	21.6	1.9	16
		HD070R 0636 OR	198.2	67.1	54.5	44.3	39.2	36.0	33.6	31.9	30.4	3.0	22
		HD080R 0636 OR	482.4	165.8	134.7	109.4	96.8	88.9	83.1	78.7	75.1	6.2	26
		HD110R 0636 OR	1038.7	353.3	286.9	233.0	206.4	189.3	177.1	167.6		10.9	35
		HD140R 0636 OR	1612.0	523.3	425.3	345.5	306.0	280.7	262.4	248.5		14.8	40
		HD170R 0636 OR	3165.7	1055.6	857.4	696.4	616.6	565.7	529.0			26.1	52
8	360	HD045R 0836 OR	27.0	10.0	8.0	6.6	5.8	5.3	5.0	4.7	4.5	0.8	12
		HD060R 0836 OR	58.7	19.8	16.1	13.0	11.6	10.6	9.9	9.4	9.0	1.8	14
		HD070R 0836 OR	181.8	66.6	54.1	44.0	38.9	35.7	33.4	31.7	30.2	2.7	19
		HD080R 0836 OR	331.1	122.4	99.4	80.8	71.5	65.6	61.3	58.1	55.5	5.0	22
		HD110R 0836 OR	849.7	313.0	254.2	206.5	182.9	167.8	156.9	148.5		8.9	30
		HD140R 0836 OR	1303.5	459.1	372.9	302.9	268.2	246.1	230.1	217.9		12.6	35
		HD170R 0836 OR	2924.9	1087.4	883.3	717.5	635.2	582.7	545.0			22.4	47
10	360	HD060R 1036 OR	24.8	8.6	7.1	5.7	5.1	4.6	4.3	4.1	3.9	1.6	12
		HD070R 1036 OR	61.0	21.9	17.7	14.4	12.7	11.8	11.0	10.4	9.9	2.1	14
		HD080R 1036 OR	285.9	92.9	84.2	68.4	60.6	55.6	51.9	49.2	4.9	4.4	16
		HD110R 1036 OR	691.7	264.1	214.5	174.2	154.3	141.5	132.4	125.3		7.5	26
		HD140R 1036 OR	1088.0	400.7	325.5	264.4	234.1	214.7	200.8	190.1		10.5	30
		HD170R 1036 OR	1732.6	637.4	517.7	420.5	372.4	341.6	319.5			16.8	35
12	360	HD060R 1236 OR	19.9	7.0	5.7	4.6	4.0	3.7	3.5	3.3	3.1	1.7	10
		HD070R 1236 OR	30.5	11.2	9.0	7.4	6.5	6.0	5.6	5.3	5.0	1.3	12
		HD080R 1236 OR	286.5	93.1	90.4	73.4	65.0	59.6	55.8	52.7	50.4	4.3	16
		HD110R 1236 OR	487.8	190.1	154.4	125.4	111.1	101.9	95.3	90.3		6.3	22
		HD140R 1236 OR	874.6	326.0	264.8	215.1	190.5	174.7	163.5	154.7		9.0	26
		HD170R 1236 OR	1372.7	521.2	416.1	338.0	299.3	274.5	256.8			14.4	30

1N • m≒0.102kgf • m

■ How to handing indexing drive?

Roller gear cam mechanisms has very high degree of precisin Make sure you thoroughly understand the knowledge of its mechanisms.
This will enable you to practice proper handling procedures and there fare prevent major accidents fronm occurring.

(1) Installation

Please remove to use the emulsion in case the crack, impurity and stamp, etc remain.
Please install the equipment after applying the grease and mineral oil for preventing the rust of mounting face after cleaning up.Please attach on the stable bottom stably since the load of large fluctuation is acted at the device.

(2) Environment

The use environment of grading device makes largely the performance of device. Taking the measures is necessary to examine and research for the environment of the location to install it.

a) The environment temperature to use the grading device of standard specification is 0˚C ~ 40˚C.
b) Producing the rust is easy in case of using at the environment containing lots of water.
Please perform the treatment to prevent the rust carefully.
c) The input output shaft is sealed by the oil seal. Please examine the protective cover since it causes the wear of seal side and the leak of oil according to the amount and type of impurity.
d) Please perform the insulation thoroughly since the electric current causes the degradation of device.

(3) Operation

The problem generates in case of driving rightly after terminating the attachment of parts since the automatic machine to use the grading device is complicatedly made by the many parts. Please check if the obstacle is generated to operate by using the hand whenever the major parts are attached to think that the input shaft can be operated by the hand. Please check if it operates rightly to perform the operation at low speed or to act it by hand.

(4) Handing of input shaft

It becomes the standard location of the index angle when the main line of the gap of key of input shaft exits on the direction of turret. The origin is the opening location to be dividing in case of indexing drive and is the timing chart in case of oscillating. The key is used for deciding the location and for completely sending the impulsive load. Please choose the other sending method in case of normal operation while depending on the sending key.

(5) Handling of output shaft

Please install it to increase the torsional rigidity to install the attachment flange to move closely to the one side of shaft as possible regarding the location of attachment when attaching the table. Please decrease the overhang load after the acting point for sending the power moves closely to the one side of shaft in case of performing the indirect driving to use the gear etc.

(6) Lubrication

There is the important role such as the decrease of frictional heat of each part of electricity body, the removal of frictional heat and the preventing the rust on electricity side etc. in case of lubrication.
However, it causes the extent decline and lifetime decline in case the correct lubricating oil is not selected. Thus, please decide it to consider of use condition. We recommend the quality thing including the additive material of extreme pressure in case of lubricating oil. But, please do not mix the oil of the other company's oil. Please select the proper things at below table since the viscosity is different according to the number of rotation.

(7) Repair • maintenance

a) The size of backlash of input output type increases as the year changes. Please perform the regular check and adjustment.
b) Please keep the adequate amount since it causes the abnormal temperature rise and the flowing oil in case of having a lot of flux of lubricating oil.
c) Please exchange the lubricating oil once per year and 3,000 time per operation even though the operation time is short.

■ Viscosity of lubricating oil (Unit:cSt)

Table I-1

RPM of input shaft of grading device (rpm)	Viscosity cSt/40˚C	Lubricating oil			Viscosity cSt/40˚C (For use of reducer)
		KOREA SHELL	KOREA MOBIL	Japan Oil	
0~20	>680	Shell omala 680	Mobil gear 636	M680	>300
20~100	680~460	Shell omala 460	Mobil gear 634	M460	270~230
100~200	460~320	Shell omala 320	Mobil gear 632	M320	190~150
200~400	320~220	Shell omala 220	Mobil gear 630	M220	–
Excess 400	220~150	Shell omala 150	Mobil gear 629	M150	–
–	150~68	Shell omala 68	Mobil gear 626	M68	–

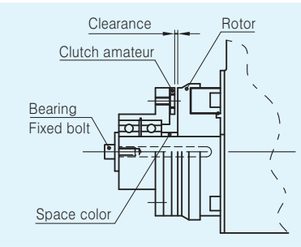
⚠ Precautions Please select the highest viscosity (the biggest number) in case the number of rotation of input shaft is the edge point.

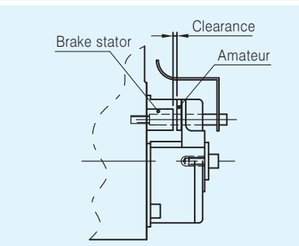
■ Handling of reducer

(1) The clearance of the adjusting clearance of clutch/brake is the GAP of the lining and the amateur. It is adjusted as the proper value when shipping. However, the GAP is expanded to wear the friction surface of lining slowly according to the operation. Please adjust it in order that this clearance can be the proper value of the next table in case the error is generated by the clearance.

(2) Exchange of bearing

The deep ball bearing of 2ea are used at the clutch part. Please exchange the bearing when adjusting the clearance.





• Proper clearance

Table I-2

	Proper clearance	Bearing
R48	0.15~0.25 (0.4)	6202LLU
R65	0.15~0.25 (0.4)	6203LLU
R80	0.15~0.25 (0.5)	6205LLU
R100	0.2~0.35 (0.6)	6206LLU

( ) is possible when adjusting the gap

(3) Lubrication

The grading device follows the lubrication.
The exchange is
once after 1.000 hourst
wice per 3,000 hours
Just, even though the peration time is shortplease exchange it once per 1year.

■ Viscosity of lubricating oil

Table I-3

Form		In case the worm is soaked in oil					In case the worm is not soaked in oil				
Type	Norminal deceleration ratio	Number of rotation of worm shaft (rpm)					Number of rotation of worm shaft (rpm)				
		1800~1500	1500~1000	1000~750	750~500	Below 500	1800~1500	1500~1000	1000~750	750~500	Below 500
R48	10										
	20										
	30 • 50										
R65	5										
	10 • 31.5										
	20 • 40										
	50										
R80	5										
	10 • 31.5										
	20 • 40										
	50										
R100	5										
	10 • 31.5										
	20 • 40										
	50										

Viscosity over 300이상 Viscosity 270~230 Viscosity 190~150 Unit:cSt/50˚C

■ Handling of TORQUE SHIELD

(1) Adjustment of FLANGE TYPE

Please pay attention to the eccentric of table of the table about the main rotation of output in case of attaching the table etc. to the flange part.
RADIAL concentricity: 0.02mm T.I.R

(2) Adjustment of COUPLING TYPE

The coupling type is made of the structure to be able to absorb the misalignment such as the angular misalignment, the clearance error and the parallel fault to be generated in case of the attachment between 2 shaftes.

(3) Repair • Inspection Please

Please follow the proper method even though it is the maintenance free. Please be careful that the impurity, acid, alkali, and the water etc are stained. The grease is used for the lubrication. Please supply it per 1,000~2,000 hours since it can be simply used as the nut of adjusting torque is unloosed. Please use the grease of lithium type (Illumination 2) in case of grease.

Recommended grease
SHELL-ALVANIA EP2
MOBIL-MOBILUX EP2

HANNZ MOTROL CO.,LTD.

FAX SHEET
Please use to copy the fax sheet.

Dear Sir(Sirs)

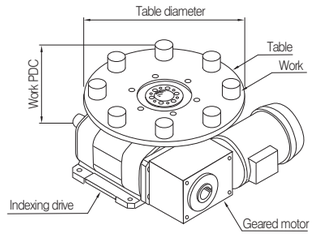
Selected data of INDXIA-HD type

Company name			
Department name			
Name of person in charge			
Phone number	(Extension number)	Fax number	

- Selecting the HD series is required to choose the proper type on the use condition.
- We are selecting the type by the torque calculation as the service to the customers.
- Pleases send it to use after writing the use condition to this fax sheet.

- Number of stop ..... S ☐
- Dividing time ..... t_1 ☐ sec
- Stopping time ..... t_2 ☐ sec

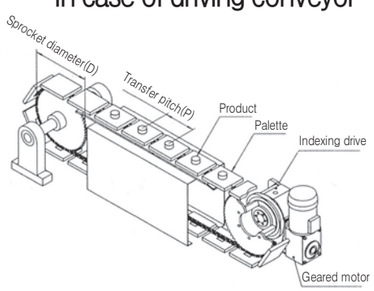
In case of driving the data



- Table diameter ..... D ☐ mm
- Table mass ..... W_1 ☐ kg
- Jig : P.C.D ..... D_2 ☐ mm
- Jig mass per 1ea ..... W_2 ☐ kg
- Quantity of jig ..... n_2 ☐
- Work P.C.D ..... D_3 ☐ mm
- Work mass per 1ea ..... W_3 ☐ kg
- Quantity of work ..... n_3 ☐

- Transfer pitch ..... P ☐ mm
- Chain and attachment mass ..... W_1 ☐ kg
- Jig mass g ..... W_2 ☐ kg
- Work mass ..... W_3 ☐ kg
- Sprocket diameter ..... D ☐ mm
- Sprocket mass per 1ea ..... W_4 ☐ kg
- Quantity of sprocket ..... n_4 ☐
- Fact of friction ..... μ ☐

In case of driving conveyor



Geared motor	Whether it exists • not	Inverter	Whether it exists • not
Torque shield	Whether it exists • not	Timing cam	(Whether it exists: set) • not

Note

INDXIA

Index device of roller gear cam type

Indexing drive of integrally fix shaft time with is compact and simple installation

HAseries

• INDEXING DRIVE • TORQUE SHIELD
• GEARED MOTOR • TIMING CAM



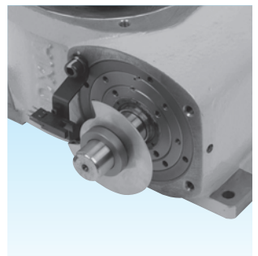


Option specification

▼ Mounting torque shield



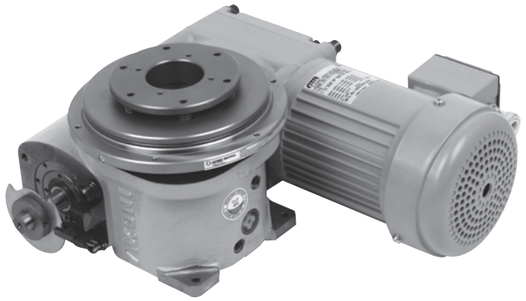
▼ Timing cam & sensor



Characteristic of HA series

- Distance between the shaft 70, 90, 110, 150, 190, 230, 330mm Standardization of 7 types
- The number of stop is widely responded from 2 to 32 stop.
- The output part is made of Hollow flange form that the torsion is high.
- Design of compact as housing of thin film
- Standard installation of fixed hollow shaft on the center of flange of output.
- Mounting the timing cam and sensor is possible on the input shaft.
- Mounting the torque shield is possible to the output shaft.
- Specification of inverter control to install the geared motor of the hollow shaft type by the standard
- CAD drawing of all types (Referring to Homepage)

Activating the resources saving while promoting the efficiency according to the guide line that the international standard presents becomes the essential theme as all over the world signizes the ISO14000 at the time that the global environmental problems is closed up. We develop 「INDXIA HA SERIES」 and sell it after we examine the specification of 「HANNZ MOTROL CO.,LTD.」 used widely now at the view point of ECONOMY TYPE about the grading device of high reliability to meet the requirement (demand) such as the soft movement, completed movement and the movement of high reliability etc. like this.
This product is presented after examining efficiently in order that the treating such as the output of the hollow flange form to be able to attach directly the table etc. and the standard installation of inverter control not to need the exchange of part of the clutch/brake etc. is easily per-formed to focus on the improvement of cost such as choosing the geared motor of cost performance to come in to the market and the housing of thin film to minimized the machined surface. We are very pleased to introduce the 「INDXIA-HA SERIES」 as the best product to let adapt to the times in the real world to increase the expectation gradually about the index device to take the charge of the backbone of the automatic device of the high reliability in the industrial world.



■ Product outline

It is the INDEX UNIT of integral driving part being compact that the geared motor of shaft mount type of the excellent cost performance is installed at the housing of thin film. It is index device to be easy to handle after examining newly from the internal structure of merit in itself of the device of roller gear cam of the HANNZ MOTROL CO.,LTD. to have the abundant production results. In addition, the maintenance free of the machine part is actualized in order that the movement/stopping by the inverter control are performed without the clutch/brake and the cost down is done.

■ Characteristic

- Distance between the shaft from 70mm to 450mm Standardization of 8 types
- The number of stop is widely responded from 2 to 32 stop.
- The output part is made of Hollow flange form that the tor-sion is high.
- Design of compact as housing of thin film
- Standard installation of fixed hollow shaft on the center of flange of output.
- Mounting the timing cam and sensor is possible on the input shaft.
- Mounting the torque shield is possible to the output shaft.
- Specification of inverter control to install the geared motor of the hollow shaft type by the standard

contents

54 Product outline, Characteristic
53 Standard specification
56 Product code
58 HA 070 dimension diagram, Characteristic table
60 HA 090 dimension diagram, Characteristic table
62 HA 110 dimension diagram, Characteristic table
64 HA 150 dimension diagram, Characteristic table
66 HA 190 dimension diagram, Characteristic table
68 HA 230 dimension diagram, Characteristic table
70 HA 330 dimension diagram, Characteristic table
72 Torque delivery ability chart
86 Selecting type
88 Selecting inverter
91 Torque shield
92 Handling
93 Data of selecting type

⚠ Attention on unit

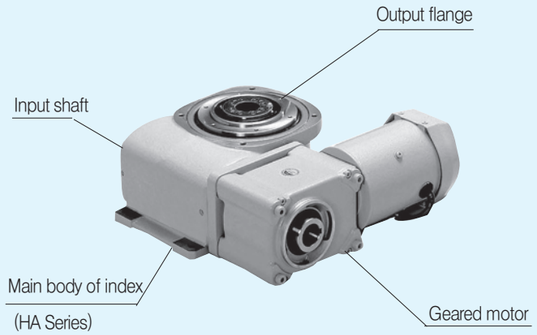
The catalog uses the SI unit. Please check the figure and the unit in case of referring to the characteristic table of each product specification and the Torque delivery ability chart . In addition, please pay attention sufficiently in case of selecting the type since it is shown as the 1/4 figure about the J of gravitational system of units regarding the moment of inertia.

Standard PACKAGE

- Main body of index(HA)
- Geared motor
- Timing cam, sensor 1SET

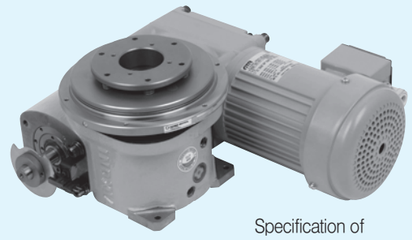


Timing cam, Sensor



Option

- Torque shield



Specification of selecting torque shield



Specification of main body

• Product specification of HA series

1DWELL(HA070~HA450)

S \ θ	120°	150°	180°	210°	240°	270°	300°	330°
2								△
3						△	△	
4					△	◬		
5				△	◬	○		
6			◬	◬	○	○		
8		△	◬	○	○	○		
10	△	△	○	○	○	○		
12	◬	◬	○	○	○	○		
15	△	◬	○	○	○	○		
16	△	◬	○	○	○	○		

2DWELL(HA070~HA450)

S \ θ	120°	150°	180°	210°	240°	270°	300°	330°
16				○	○	○		
20			○	○	○	○		
24			○	○	○	○		
32			○	○	○	○		

S : Number of STOP,
θ : Index angle
◬ SMS curve, Standardization of SMCV curve figure
○ SMS 3 curve , △ SMCV 3 curve

It is impossible to produce as the alpha.

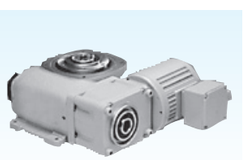
Please consult us since the part can respond to the special specification.

The rotation of one times at the input shaft and grading and stopping of two times at the same cycle are performed in case of 2DWELL. The index angle is the total index angle of input shaft of the rotation of one time.

Index		HA070	HA090	HA110	HA150	HA190	HA230
Geared motor capacity (Kw)		0.1/0.2	0.2/0.4	0.4/0.75	0.75/1.5 (2.2)	1.5/2.2	2.2/3.7 (5.5)
Timing cam + sensor		Installing up to 3 sets on the input shaft of specification of both shafts is possible.					
Option	Torque shield	T07B	T09B	T11B	T15B	T19B	T23B
	Inverter	We select it according to the requirement.					

The geared motor of capacity of ( ) is the special specification.

HA070

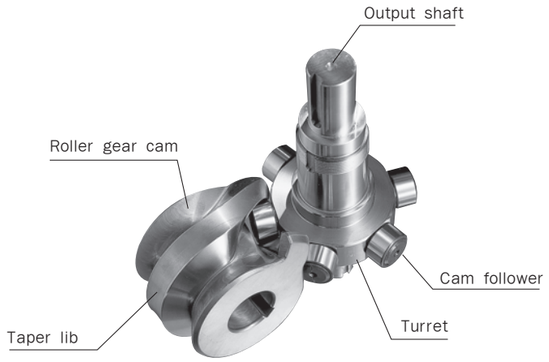


⚠ Please re-check it when ordering since the specification and values are changed without the notice.

ex.) HA 090 — 08 18 7 R — S M3 VW 1 / X

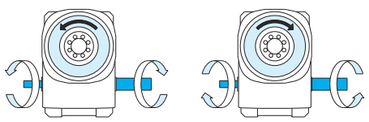
a b c_1 c_2 d e f g h i j

a Model	b Size	c_1 Number of stop (S)	c_2 Index angle (θ)	d Cam curve	e Direction of rotation of input–output shaft
HA Model name	090 Center distance 90mm	08 8 stop	18 180°	7 SMS–3 curve	R 1Dwell and Cam of right hand
HA It shows the HA series.	It shows the distance between the shaft of input–output.	It is the number of stop of output shaft per one rotation of the output shaft.	It is the angle of rotation of the input shaft required when dividing one time. Angle of rotation of 2 times in case of 2DWELL.	7 SMS–3 curve 8 SMCV–3 curve 9 Cam curve except above thing (Special specification)	It shows the direction of rotation of output shaft about the direction of rotation of input shaft and the number of stop(DWELL) of output shaft per one rotation of input shaft. 1DWELL 2DWELL Cam of right hand R R2 Cam of left hand L L2

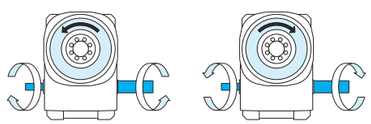


Input shaft Output shaft

R R2 Cam of right hand



L L2 Cam of left hand(Special specification)

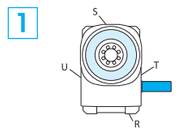


About the decision of product

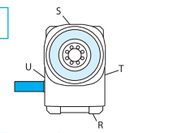
The scope of combination is large since the product code of HA series is made of the combination of the number and the sign. Please decide the correct product code after selecting the type and define the use condition clearly since the right use of product if the number of product is wrong. In addition, please pay attention to it to be the same to the index since the geared motor and torque shield have the product code. Just, there is the condition to be able to respond to the stamp of appointed color except the content of written code , the deceleration ratio except the characteristic table, the attachment of motor from the other voltage and the attachment of terminal of half space etc. in case of the characteristic specification. Please consult us after checking the price to hope, the number of product and the time limit for delivery date etc. at the required specification.

f Specification of output shaft	g Specification of input shaft	h Processing side of attachment hole	i Position of attachment	j Special Insturction
S Standard shaft type	M3 Input shaft of both sides	VW Processing of attachment hole of V surface and W surface	1 Position of attached part (W face is GL)	X (Option) – Gear motor – Limiter
S Standard shaft type L Mounting torque	The one side type 1 2 M1 M2 and both sides type 3 4 M3 M4 exist. (Referring to below figure) Note) The one shaft is the special specification in case of HA070~HA230.	The hole of penetration on V face and W face are processed as the attachment hole is the standard specification	Position 1 W face is GL Position 2 V face is GL Position 3 U face is GL Position 4 T face is GL Position 5 R face is GL. Note) GL(Ground Level)	Please add the X in case the special specification exists. Standard specification X Special specification Note) Please attach the specification separately regarding the contents of special specification.

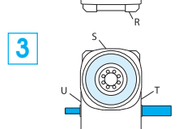
1



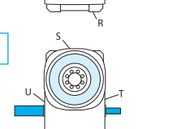
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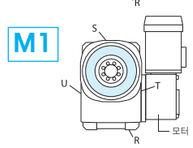
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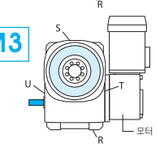
4



M1

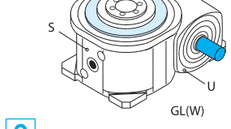


M3

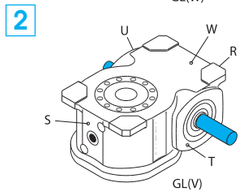


One side M1 (Mounting motor of T surface) M2 (Mounting motor of U surface) / Both sides M3 (Mounting motor of T surface) M4 (Mountingmotor of U surface)

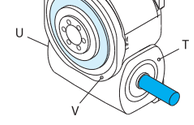
1



2



5



Geared Motor

Product code Example)

GM 0.2 — 30 A S — HA090

a b c d e f

a Form	b Amount of motor	c Reduction ratio	d Use voltage	e Specification	f Mounting type
GM Geared motor	It shows the output of motor. Example) 0.2 ····· 0.2Kw 0.75 ··· 0.75Kw 3.7 ····· 3.7Kw 11 ····· 11Kw	It shows the deceleration ratio. Example) 10 ·····10 20 ·····20 20.37 ···20.37	It shows the use voltage. A 200/220V B 230V C Other voltage	S Standard	Size of main body of index to install the geared motor

⚠ Attention of geared motor

- Please pay attention sufficiently to selecting it since the geared motor installed to HA series is different from the form and maker according to the size. Please tell the sign of product code of characteristic table of geared motor of each product specification when ordering.
- Please discuss separately the other specification as the geared motor is the standard of the 200/220V on the 3 types for common use and the 50/60 HZ specifications.
- Please discuss separately when mounting the brake.

Timing cam, sensor

Product code Ex.) TC - 1 - HA090

a b c

a Form	b EA	c Model
TC Timing cam + senor	1 ····1 SET 2 ····2 SET 3 ····3 SET	Please writhe the type of main body of HA series to install the timing cam.

Torque shield (Option)

Product code Ex.) T09 B — 20 L

a b c d

a Size	b Form	c Maximum blocked torque	d Type of spring
It shows the size of torque shield. 7, 9, 11, 15, 19, 23 Please select it that is the same size to the main body of HA series.	It shows the form of torque shield. Use for HA series.	It shows the maximum blocked torqued (Tmax). Example) 20 Tmax=200N • m	There is 2 types of L, H in case of the spring. L Coil spring for use for light load H Coil spring for use for heavy load

HA 070 Dimension

[Unit:mm]

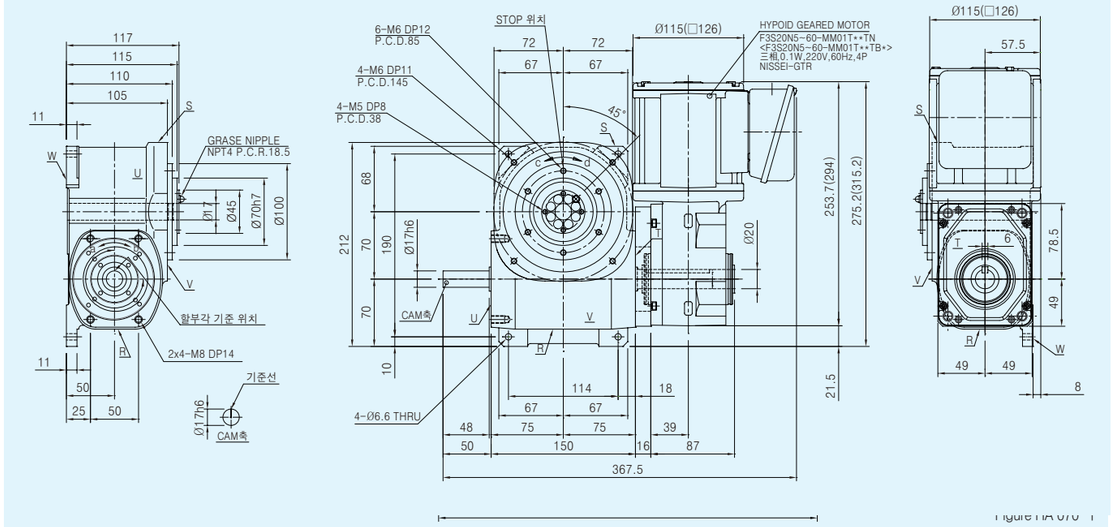


Figure HA 070-1

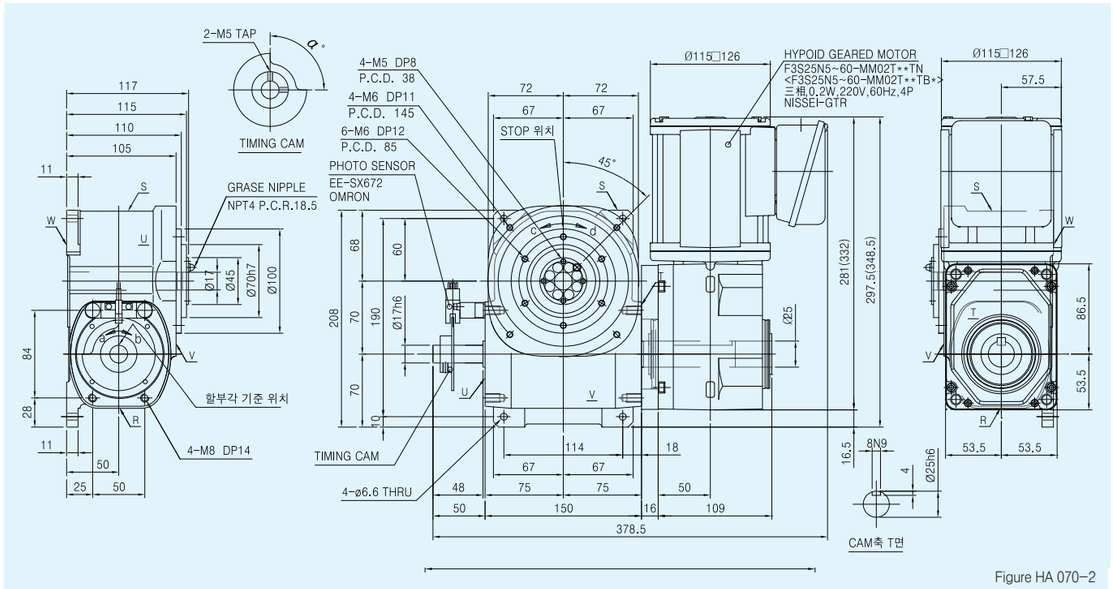


Figure HA 070-2

• Characteristic table of index

Table HA 070-1

Characteristics items	Sign	Unit	Values	Characteristics items	Sign	Unit	Values	Characteristics items	Sign	Unit	Values
Load of allowable THRUST of output axis	P_1	N	3100	Load of allowable THRUST of input axis	P_4	N	1860	Dividing extent of 1DWELL		sec	±30
Load of allowable RADIAL of output axis	P_2	N	1400	Allowable TORQUE of maximum repeating at maximum of input axis	P_5	N	1600	Dividing extent of 2DWELL		sec	±60
Allowable TORQUE of output axis	T_S	N • m	Refer to Torque Capacity Table	TORQUE of allowable repeating at maximum of input axis	P_6	N • m	93.1	Repeating extent		sec	30
Rigidity of torsion of output axis	K_1	N • m /rad	$1.39X10^5$	Rigidity of torsion of input axis	K_2	N • m /rad	$2.62X10^4$	Product mass (Main body of index)		kg	15
Inertial moment of output axis	J_0	kg • m^2	$3.4X10^{-3}$	Inertial moment of input axis	J_C	kg • m^2	$1.9X10^{-3}$	Stamp color of housing		Ivory	
Allowable moment of bending of output axis	P_3	N • m	32								

Note1) The moment of inertia J of input shaft is the values in case of the rectification.

1N • m≒0.102kgf • m

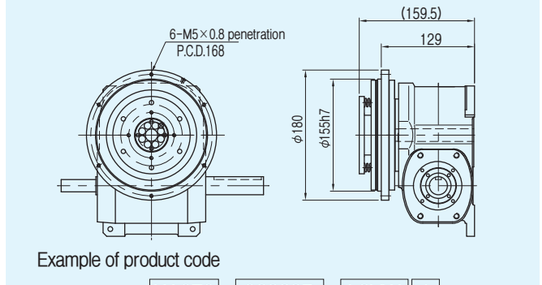
• Characteristic table of geared motor [GM0.1/0.2]

Table HA 070-2

Product code		Motor output (Kw)	Real reduction ratio (i)	RPM of output shaft Nм(rpm)		Allowed output torque Tʀ(N • m)		Moment of inertia of motor Jм(kg • m²)	Mass (kg)
200/220V specification	230V specification			50Hz	60Hz	50Hz	60Hz		
GM0.1-20AS	GM0.1-20BS-US	0.1	20	75	90	11	8.6	4.75×10^{-4}	6
GM0.1-25AS	GM0.1-25BS-US		25	60	72	13	11		
GM0.1-30AS	GM0.1-30BS-US		30	50	60	16	13		
GM0.1-40AS	GM0.1-40BS-US		40	37.5	45	21	18		
GM0.1-50AS	GM0.1-50BS-US		50	30	36	25	22		
GM0.2-10AS	GM0.2-10BS-US	0.2	10	150	180	11	9.2	7.25×10^{-4}	7.5
GM0.2-15AS	GM0.2-15BS-US		15	100	120	17	14		
GM0.2-20AS	GM0.2-20BS-US		20	75	90	23	19		
GM0.2-25AS	GM0.2-25BS-US		25	60	72	27	24		
GM0.2-30AS	GM0.2-30BS-US		30	50	60	33	27		
GM0.2-40AS	GM0.2-40BS-US		40	37.5	45	44	37		
GM0.2-50AS	GM0.2-50BS-US		50	30	36	55	46		

Installation of torque shield (Option)

Figure HA 070-3



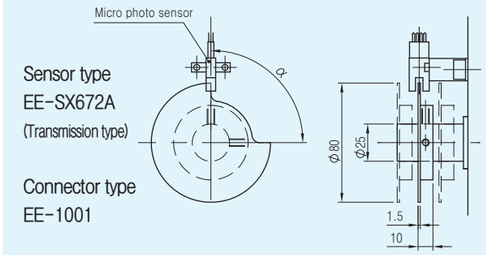
Example of product code

Indexing drive HA070 - 02338R - L3VW 1

Torque shield T07 B - 15 L

Installation of Timing cam-Photo sensor

Figure HA 070-4



Example of product code

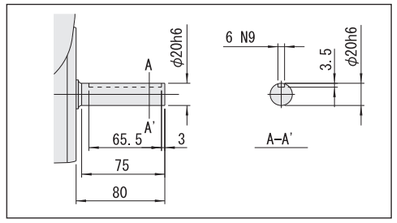
Timing cam and sensor TC - 1 - HA070

⚠ Attention

- Attachment posture of geared motor is the standard specification that it is written at the dimension diagram (Drawing HA070 1, Drawing HA070 2)
- In case of HA070, mounting the motor of 0.1KW and 0.2Kw is possible. The exchange is impossible after buying since the hollow hole of attached hollow hole of geared motor by an amount of condenser. Please pay attention since the part of motor protrudes from the flange face of index in case of the installation of 0.2Kw.
- In case of HA070, mounting the T07B of torque shield is possible.
- Mounting the timing cam and sensor is possible to 3 set according to the requirement in case of the input of both sides.

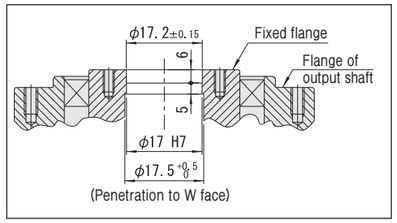
Input shaft of standard specification of main body (Side of T surface)

Figure HA070-5



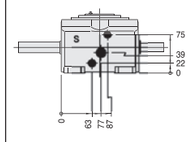
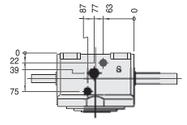
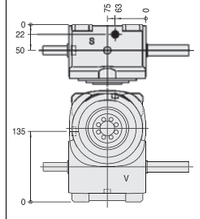
Detailed degree of fixed flange of output

Figure HA070-6



Location of oil-hole, oil gauge and oil drain part according to position and flow

Figure HA070-7

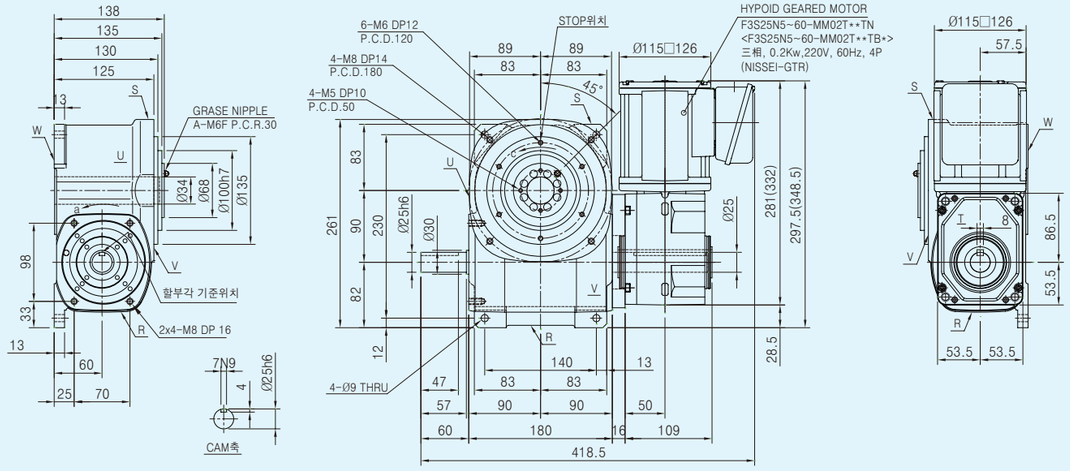
Position	1	2	5
Location			
Oil level (ℓ)	0.4	0.7	0.8

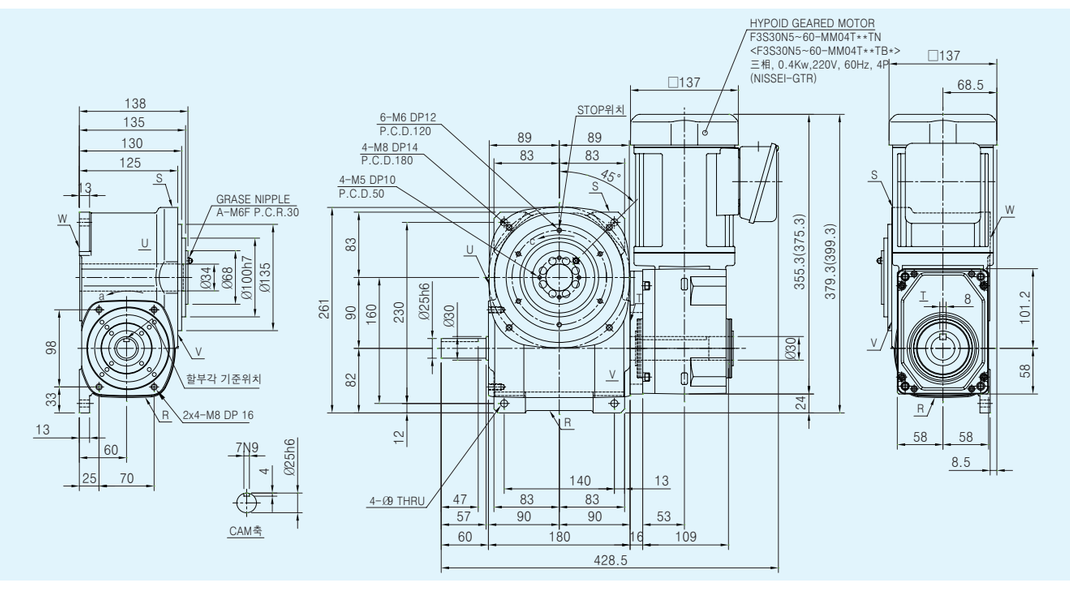
⚠ Attention

- The order is the location of PLUG(PT 3/8), LEVEL(VA-01) and DRAIN(PT1/4) from the top regarding each location according to the position.(Drawing HA 090-7).
- The position responds to the code I of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

HA 090 Dimension

[Unit:mm]





• Characteristic table of index

Table 9AD-1

Characteristics items	Sign	Unit	Values	Characteristics items	Sign	Unit	Values	Characteristics items	Sign	Unit	Values
Load of allowable THRUST of output shaft	P_1	N	4900	Load of allowable THRUST of input shaft	P_4	N	2500	Dividing extent of 1DWEL		sec	±30
Load of allowable RADIAL of output shaft	P_2	N	2100	Allowed TORQUE of maximum repeating at maximum of input shaft	P_5	N	2500	Dividing extent of 2DWELL		sec	±60
Allowable TORQUE of output shaft	T_S	N • m	Referring to ability chart of torque	TORQUE of allowed repeating at maximum of input shaft	P_6	N • m	245	Repeating extent		sec	30
Rigidity of torsion of output shaft	K_1	N • m /rarad	$2.64X10^5$	Rigidity of torsion of input shaft	K_2	N • m /rad	$3.36X10^4$	Product mass (Main body of index)		kg	24
Moment of inertia of output shaft	J_O	kg • m^2	$1.11X10^{-2}$	Moment of inertia of input shaft	J_C	kg • m^2	$2.5X10^{-3}$	Stamp color of housing		Ivory	
Allowable moment of bending of output shaft	P_3	N • m	98								

Note1) The moment of inertia J of input shaft is the values in case of the rectification.

1N • m≒0.102kgf • m

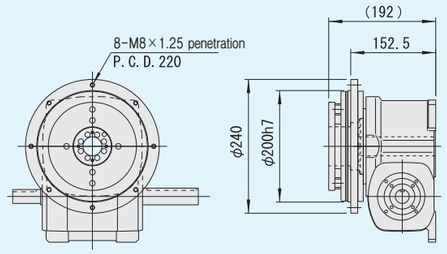
• Characteristic table of geared motor [GM0.2/0.4]

Table HA 090-2

Product code		Motor output (Kw)	Real reduction ratio (i)	RPM of output shaft NM(rpm)		Allowed output torque TR(N • m)		Moment of inertia of motor JM(kg • m^2)	Mass (kg)
200/220V specification	230V 사양 specification			50Hz	60Hz	50Hz	60Hz		
GM 0.2 - 20AS	GM 0.2 - 20BS-US	0.2	20	75	90	23	19	0.81×10^{-3}	9.8
GM 0.2 - 25AS	GM 0.2 - 25BS-US		25	60	72	27	24		
GM 0.2 - 30AS	GM 0.2 - 30BS-US		30	50	60	33	27		
GM 0.2 - 40AS	GM 0.2 - 40BS-US		40	37.5	45	44	37		
GM 0.2 - 50AS	GM 0.2 - 50BS-US		50	30	36	55	46		
GM 0.4 - 10AS	GM 0.4 - 10BS-US	0.4	10	150	180	23	19	0.98×10^{-3}	10.2
GM 0.4 - 15AS	GM 0.4 - 15BS-US		15	100	120	33	27		
GM 0.4 - 20AS	GM 0.4 - 20BS-US		20	75	90	44	37		
GM 0.4 - 25AS	GM 0.4 - 25BS-US		25	60	72	55	46		
GM 0.4 - 30AS	GM 0.4 - 30BS-US		30	50	60	67	55		
GM 0.4 - 40AS	GM 0.4 - 40BS-US		40	37.5	45	88	74		
GM 0.4 - 50AS	GM 0.4 - 50BS-US		50	30	36	111	92		

Installation of torque shield (Option)

Figure HA090-3



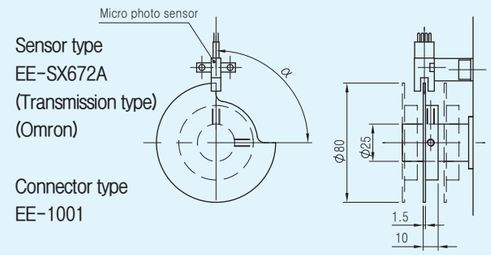
Example of product code

Indexing drive | HA090 | - | 02338R | - | L3VW | 1 |

Torque shield | T09 | B | - | 20 | L |

Installation of Timing cam-Photo sensor

Figure HA090-4



Example of product code

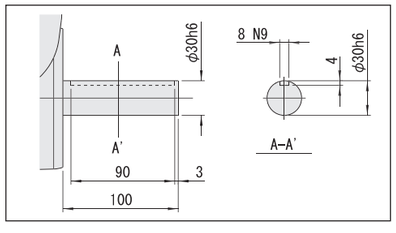
Timing cam and sensor | TC | - | 1 | - | HA090 |

⚠ Attention

- Attachment posture of geared motor is the standard specification that it is written at the Dimension diagram (Drawing HA090 1, Drawing HA090 2)
- In case of HA090, mounting the motor of 0.2KW and 0.4Kw is possible. Please pay attention since the part of motor protrudes from the flange face of index in case of the installation of 0.2Kw and 0.4Kw.
- In case of HA090, mounting the T09B of torque shield is possible.
- Mounting the timing cam and sensor is possible to 3 set according to the requirement in case of the input of both sides.

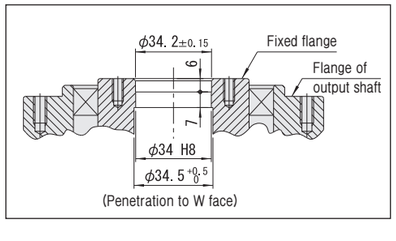
Input shaft of standard specification of main body (Side of T surface)

Figure HA090-5



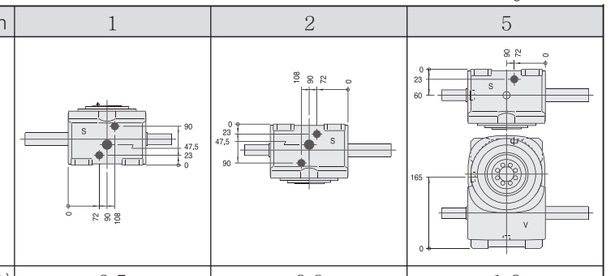
Detailed degree of fixed flange of output

Figure HA090-6



Location of oil-hole, oil gauge and oil drain part according to position and flow

Figure HA090-7

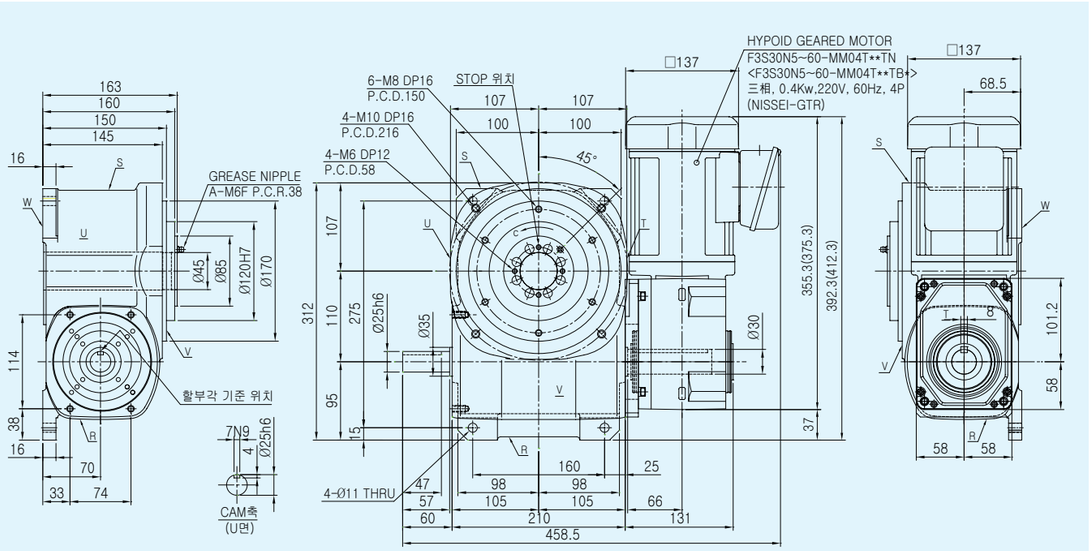
Position	1	2	5
Location			
Oil level (ℓ)	0.5	0.9	1.0

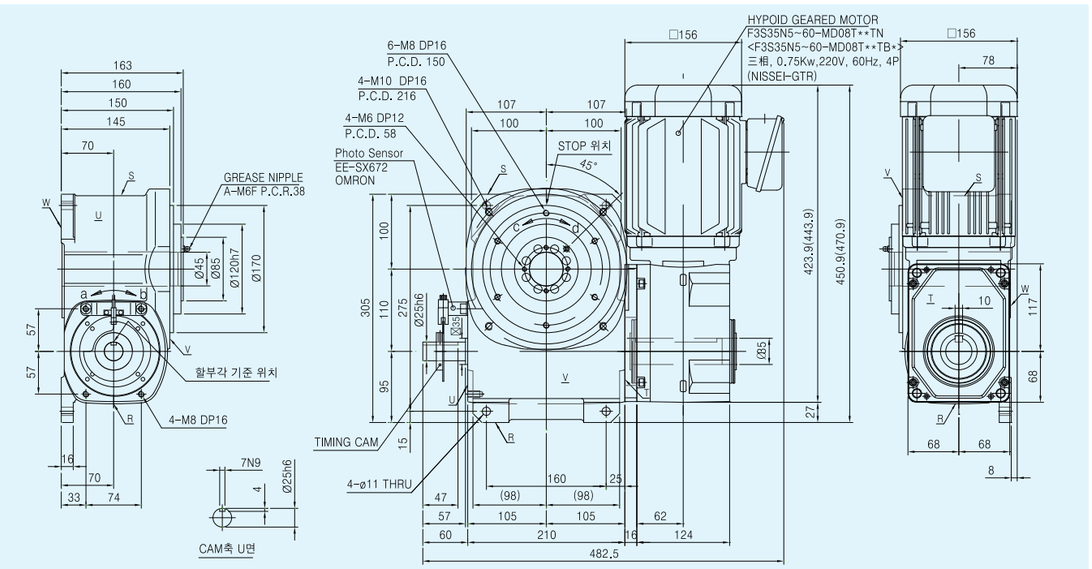
⚠ Attention

- The order is the location of PLUG(PT 3/8), LEVEL(VA 01) and DRAIN(PT1/4) from the top regarding each location according to the position.(Drawing HA 090 7).
- The position responds to the code I of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

HA 110 Dimension

[Unit:mm]





• Characteristic table of index

Table HA110HA090-1

Characteristics items	Sign	Unit	Number	Characteristics items	Sign	Unit	Number	Characteristics items	Sign	Unit	Number
Load of allowable THRUST of output shaft	P_1	N	6800	Load of allowable THRUST of input shaft	P_4	N	3000	Dividing extent of 1DWELL		sec	±30
Load of allowable RADIAL of output shaft	P_2	N	3400	Allowed TORQUE of maximum repeating at maximum of input shaft	P_5	N	3500	Dividing extent of 2DWELL		sec	±60
Allowable TORQUE of output shaft	T_S	N • m	Referring to ability chart of torque	TORQUE of allowed repeating at maximum of input shaft	P_6	N • m	294	Repeating extent		sec	30
Rigidity of torsion of output shaft	K_1	N • m /rad	$4.43X10^5$	Rigidity of torsion of input shaft	K_2	N • m /rad	$3.98X10^4$	Product mass (Main body of index)		kg	42
Moment of inertia of output shaft	J_0	kg • m^2	$3.47X10^{-2}$	Moment of inertia of input shaft	J_C	kg • m^2	$6.0X10^{-3}$	Stamp color of housing		Ivory	
Allowable moment of bending of output shaft	P_3	N • m	147								

Note1) The moment of inertia J of input shaft is the values in case of the rectification.

1N • m≒0.102kgf • m

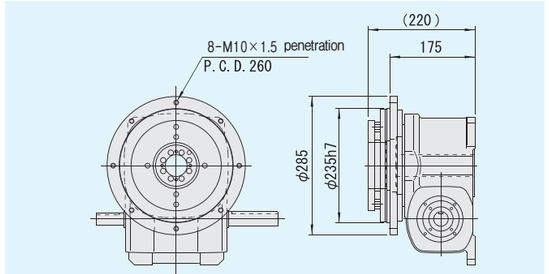
• Characteristic table of geared motor [GM0.4/0.75]

Table HA110-2

Product code		Motor output (Kw)	Real reduction ratio (i)	RPM of output shaft Nм(rpm)		Allowed output torque Tʀ(N • m)		Moment of inertia of motor Jм(kg • m²)	Mass (kg)
200/220V specification	230V specification			50Hz	60Hz	50Hz	60Hz		
GM 0.4-20AS	GM 0.4-20BS-US	0.4	20	75	90	44	37	0.98×10^{-3}	10.2
GM 0.4-25AS	GM 0.4-25BS-US		25	60	72	55	46		
GM 0.4-30AS	GM 0.4-30BS-US		30	50	60	67	55		
GM 0.4-40AS	GM 0.4-40BS-US		40	37.5	45	88	74		
GM 0.4-50AS	GM 0.4-50BS-US		50	30	36	111	92		
GM 0.75-10AS	GM 0.75-10BS-US	0.75	10	150	180	41	34	1.43×10^{-3}	19
GM 0.75-15AS	GM 0.75-15BS-US		15	100	120	63	52		
GM 0.75-20AS	GM 0.75-20BS-US		20	75	90	83	70		
GM 0.75-25AS	GM 0.75-25BS-US		25	60	72	104	86		
GM 0.75-30AS	GM 0.75-30BS-US		30	50	60	124	104		
GM 0.75-40AS	GM 0.75-40BS-US		40	37.5	45	166	138		
GM 0.75-50AS	GM 0.75-50BS-US		50	30	36	208	173		

Installation of torque shield (Option)

Figure HA110-3



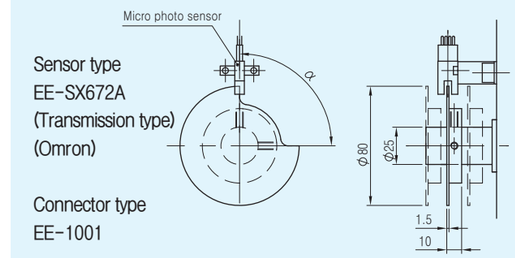
Example of product code

Indxing drive HA110 - 08277R - L3VW 1

Torque shield T11 B - 23 L

Installation of Timing cam-Photo sensor

Figure HA110-4



Example of product code

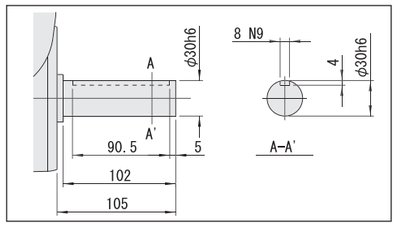
Timing cam and sensor TC - 1 - HA110

⚠ Attention

- Attachment posture of geared motor is the standard specification that it is written at the dimension diagram (Drawing HA110 1, Drawing HA110 2)
- In case of HA110, mounting the motor of 0.4KW and 0.75Kw is possible. Just, the exchange is impossible after buying since the hollow hole of attached hollow hole of geared motor by an amount of condenser.
- Please pay attention since the part of motor protrudes from the flange face of index in case of the installation of motor 0.75Kw. In addition, please design the base face of geared motor because of the casting surface to consider not being interference to the base etc. when mounting it.
- In case of HA110, mounting the T11B of torque shield is possible.
- Mounting the timing cam and sensor is possible to 3 sets according to the requirement in case of the input of both sides.

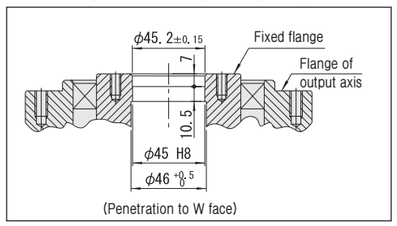
Input shaft of standard specification of main body (Side of T surface)

Figure HA110-5



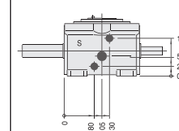
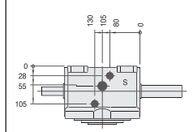
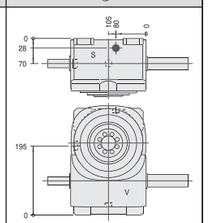
Detailed degree of fixed flange of output

Figure HA110-6



Location of Oil-hole, oil gauge and oil drain part according to position and flow

Figure HA110-7

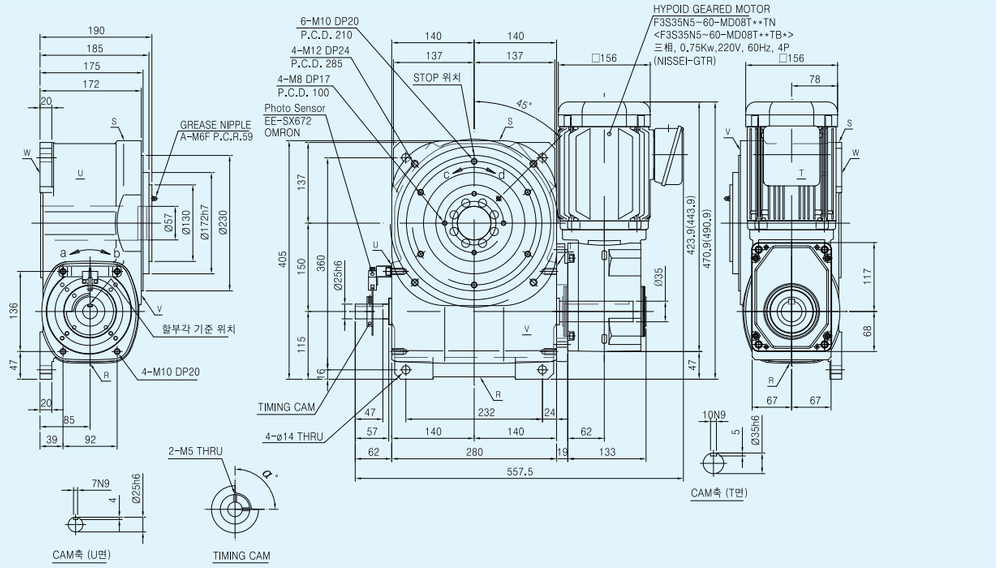
Position	1	2	5
Location			
Oil level (ℓ)	0.8	1.4	1.6

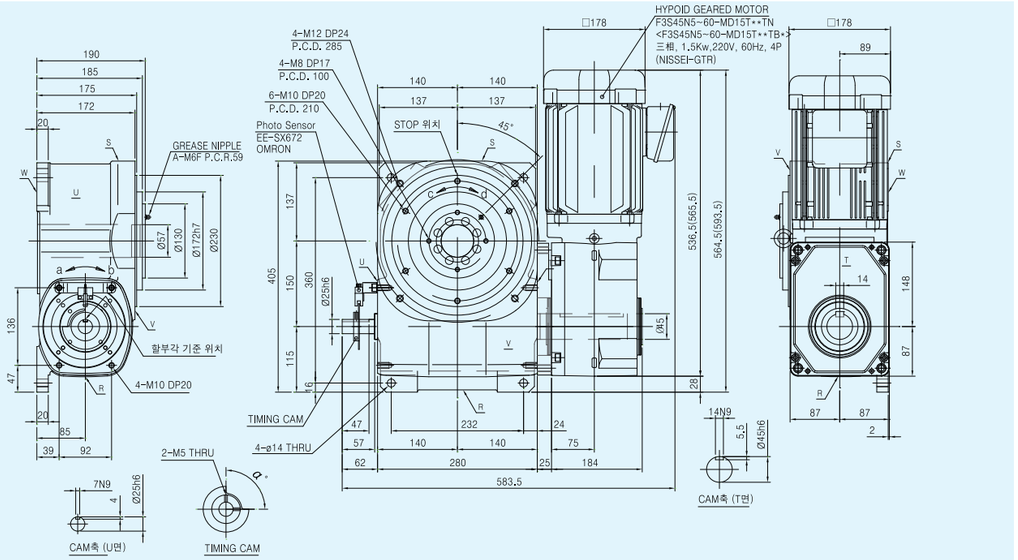
⚠ Attention

- The order is the location of Oil hole(PT 1/2), oil gauge(VA) and oil drain part (PT1/2) from the top regarding each location according to the position.(Drawing HA 110 7).
- The position responds to the code I of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

HA 150 Dimension

[Unit:mm]





• Characteristic table of index

Table HA150-1

Characteristics items	Sign	Unit	Values	Characteristics items	Sign	Unit	Values	Characteristics items	Sign	Unit	Values
Load of allowable THRUST of output shaft	P_1	N	11000	Load of allowable THRUST of input shaft	P_4	N	4000	Dividing extent of 1DWELL		sec	±30
Load of allowable RADIAL of output shaft	P_2	N	6800	Allowed TORQUE of maximum repeating at maximum of input shaft	P_5	N	4000	Dividing extent of 2DWELL		sec	±60
Allowable TORQUE of output shaft	T_S	N • m	Referring to ability chart of torque	TORQUE of allowed repeating at maximum of input shaft	P_6	N • m	392	Repeating extent		sec	30
Rigidity of torsion of output shaft	K_1	N • m /rad	$2.37X10^6$	Rigidity of torsion of input shaft	K_2	N • m /rad	$6.64X10^4$	Product mass (Main body of index)		kg	85
Moment of inertia of output shaft	J_0	kg • m^2	0.162	Moment of inertia of input shaft	J_C	kg • m^2	0.020	Stamp color of housing		Ivory	
Allowable moment of bending of output shaft	P_3	N • m	333.2								

Note1) The moment of inertia J of input shaft is the values in case of the rectification. 1N • m≒0.102kgf • m

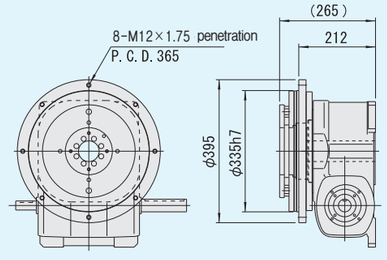
• Characteristic table of geared motor [GM 0.75/1.5]

Table HA150-2

Product code		Motor output (Kw)	Real reduction ratio (i)	RPM of output shaft Nм(rpm)		Allowed output torque Tr(N • m)		Moment of inertia of motor JM(kg • m^2)	Mass (kg)
200/220V specification	230V specification			50Hz	60Hz	50Hz	60Hz		
GM 0.75 - 20AS	GM 0.75 - 20BS-US	0.75	20	75	90	83	70	1.43×10^{-3}	19
GM 0.75 - 25AS	GM 0.75 - 25BS-US		25	60	72	104	86		
GM 0.75 - 30AS	GM 0.75 - 30BS-US		30	50	60	124	104		
GM 0.75 - 40AS	GM 0.75 - 40BS-US		40	37.5	45	166	138		
GM 0.75 - 50AS	GM 0.75 - 50BS-US		50	30	36	208	173		
GM 1.5 - 10AS	GM 1.5 - 10BS-US	1.5	10	150	180	83	70	6.90×10^{-3}	45
GM 1.5 - 15AS	GM 1.5 - 15BS-US		15	100	120	124	104		
GM 1.5 - 20AS	GM 1.5 - 20BS-US		20	75	90	166	138		
GM 1.5 - 25AS	GM 1.5 - 25BS-US		25	60	72	208	173		
GM 1.5 - 30AS	GM 1.5 - 30BS-US		30	50	60	249	208		
GM 1.5 - 40AS	GM 1.5 - 40BS-US		40	37.5	45	332	276		
GM 1.5 - 50AS	GM 1.5 - 50BS-US		50	30	36	416	345		

Installation of torque shield(Option)

Figure HA150-3



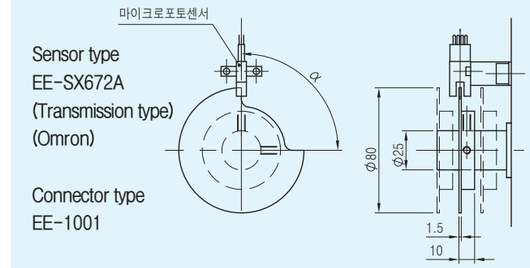
Example of product code

Indxing drive HA150 - 06187R - L3VW 1

Torque shield T15 B - 220 H

Installation of Timing cam-Photo sensor

Figure HA150-4



Example of product code

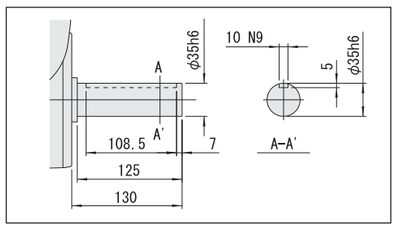
Timing cam and sensor TC - 1 - HA150

⚠ Attention

- Attachment posture of geared motor is the standard specification that it is written at the dimension diagram (Drawing HA150 1, Drawing HA150 2)
- In case of HA150, mounting the motor of 0.75KW and 1.5Kw is possible. Just, the exchange is impossible after buying since the hollow hole of attached hollow hole of geared motor by an amount of condenser. **In addition, please inquiry since mounting motor of 2.2Kw as the special specification is possible**
- Please pay attention since the part of motor protrudes from the flange face of index in case of the installation of motor 1.5 Kw. In addition, please design the base face of geared motor because of the casting surface to consider not being interference to the base etc. when mounting it.
- In case of HA150, mounting the T15B of torque shield is possible.
- Mounting the timing cam and sensor is possible to 3 sets according to the requirement in case of the input of both sides.

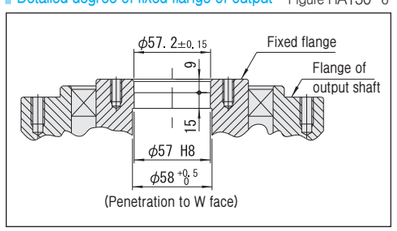
Input shaft of standard specifi cation of main body (Side of T surface)

Figure HA150-5



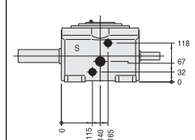
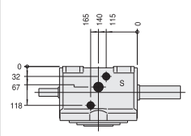
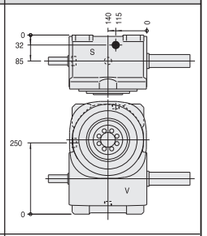
Detailed degree of fixed flange of output

Figure HA150-6



Location of Oil hole, oil gauge and oil drain part according to position and flow

Figure HA150-7

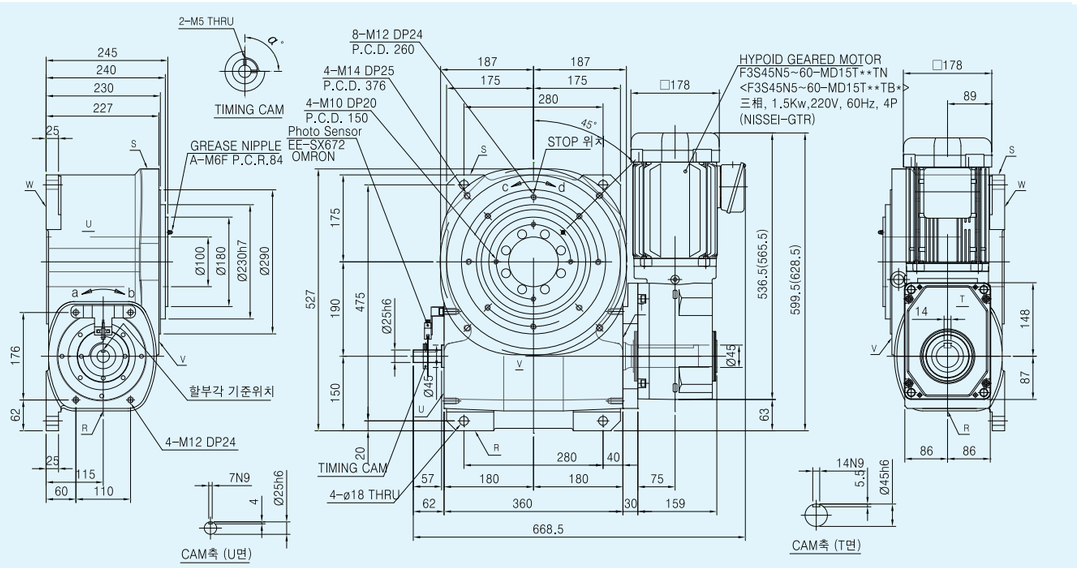
Position	1	2	5
Location			
Oil level (ℓ)	2.2	3	3.3

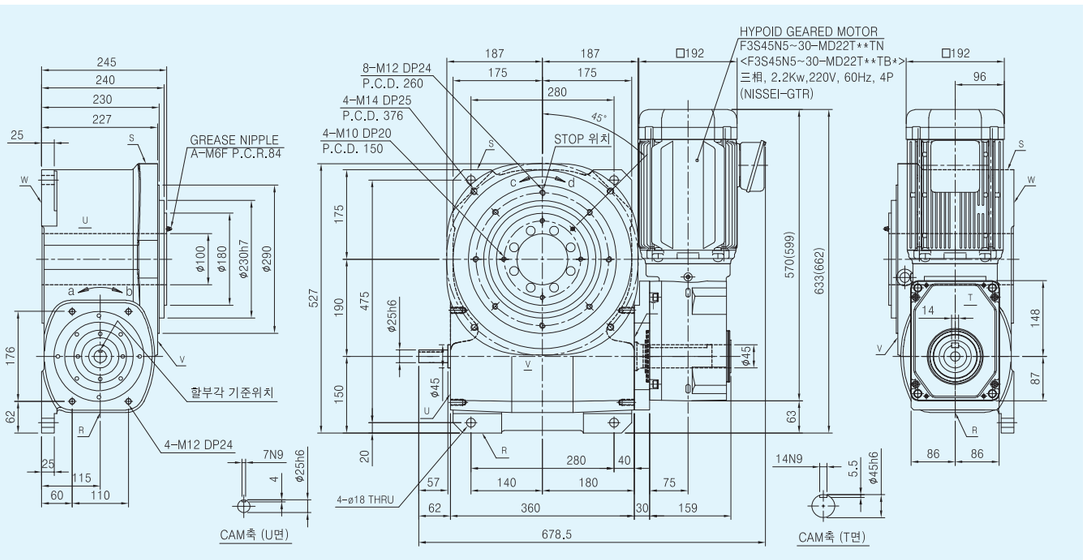
⚠ Attention

- The order is the location of Oil hole(PT 1/2), oil gauge(VA) and oil drain part (PT1/2) from the top regarding each location according to the position.(Drawing HA 150 7).
- The position responds to the code I of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

HA 190 Dimension

[Unit:mm]





• Characteristic table of index

Table HA190-1

Characteristics items	Sign	Unit	Values	Characteristics items	Sign	Unit	Values	Characteristics items	Sign	Unit	Values
Load of allowable THRUST of output shaft	P_1	N	18000	Load of allowable THRUST of input shaft	P_4	N	5000	Dividing extent of 1DWELL		sec	±30
Load of allowable RADIAL of output shaft	P_2	N	9000	Allowed TORQUE of maximum repeating at maximum of input shaft	P_5	N	5000	Dividing extent of 2DWELL		sec	±60
Allowable TORQUE of output shaft	T_S	N • m	Referring to ability chart of torque	TORQUE of allowed repeating at maximum of input shaft	P_6	N • m	600	Repeating extent		sec	30
Rigidity of torsion of output shaft	K_1	N • m /rad	$3.5X10^6$	Rigidity of torsion of input shaft	K_2	N • m /rad	$8.4X10^4$	Product mass (Main body of index)		kg	180
Moment of inertia of output shaft	J_0	kg • m^2	0.549	Moment of inertia of input shaft	J_C	kg • m^2	0.105	Stamp color of housing		Ivory	
Allowable moment of bending of output shaft	P_3	N • m	600								

Note1) The moment of inertia J of input shaft is the values in case of the rectification. 1N • m≒0.102kgf • m

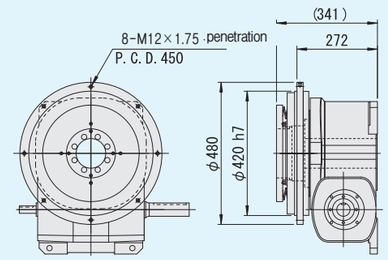
• Characteristic table of geared motor [GM 1.5/2.2]

Table HA190-2

Product code		Motor output (Kw)	Real reduction ratio (i)	RPM of output shaft NM(rpm)		Allowed output torque TR(N • m)		Moment of inertia of motor JM(kg • m^2)	Mass (kg)
200/220V specification	230V specification			50Hz	60Hz	50Hz	60Hz		
GM 1.5 - 20AS	GM 1.5 - 20BS-US	1.5	20	75	90	166	138	3.41×10^{-3}	29
GM 1.5 - 25AS	GM 1.5 - 25BS-US		25	60	72	208	173		
GM 1.5 - 30AS	GM 1.5 - 30BS-US		30	50	60	249	208		
GM 1.5 - 40AS	GM 1.5 - 40BS-US		40	37.5	45	332	276		
GM 1.5 - 50AS	GM 1.5 - 50BS-US		50	30	36	416	345		
GM 2.2 - 10AS	GM 2.2 - 10BS-US	2.2	10	150	180	122	102	4.79×10^{-3}	34
GM 2.2 - 15AS	GM 2.2 - 15BS-US		15	100	120	182	152		
GM 2.2 - 20AS	GM 2.2 - 20BS-US		20	75	90	244	203		
GM 2.2 - 25AS	GM 2.2 - 25BS-US		25	60	72	305	254		
GM 2.2 - 30AS	GM 2.2 - 30BS-US		30	50	60	366	305		
GM 2.2 - 40AS	GM 2.2 - 40BS-US		40	37.5	45	487	406		
GM 2.2 - 50AS	GM 2.2 - 50BS-US		50	30	36	609	508		

Installation of torque shield(Option)

Figure HA190-3



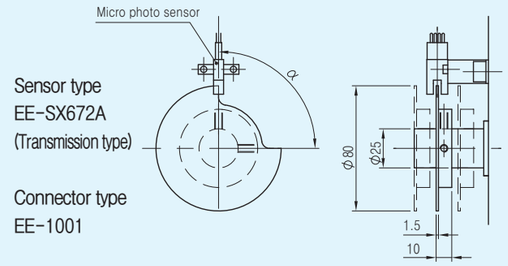
Example of product code

Indxing drive | HA190 | - | 08217R | - | L3VW | 1 |

Torque shield | T19 | B | - | 200 | L |

Installation of Timing cam-Photo sensor

Figure HA190-4



Example of product code

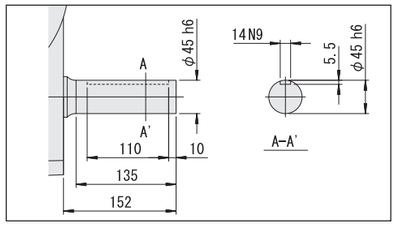
Timing cam and sensor | TC | - | 1 | - | HA190 |

⚠ Attention

- Attachment position of geared motor is the standard specification that it is written at the size figure (Figure HA190 1, Figure HA190 2).
- In case of HA190, installing the motor of 1.5KW and 2.2Kw is possible. Just, the exchange is impossible after buying since the hollow hole of attached hollow hole of geared motor by an amount of condenser. In addition, please inquiry since installing motor of 2.2Kw as the special specification is possible.
- Please pay attention since the part of motor protrudes from the flange face of index in case of the installation of motor 3.7 Kw. In addition, please design the base face of geared motor because of the casting surface to consider not being interference to the base etc. when installing it.
- In case of HA190, installing the T19B of torque shield is possible.
- Installing the timing cam and sensor is possible to 3 sets according to the requirement in case of the input of both sides.

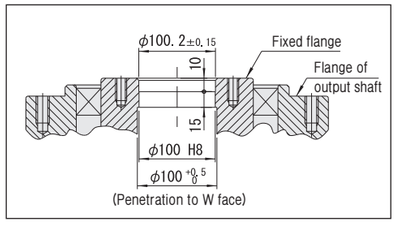
Input axis of standard specification of main body (Side of T face)

Figure HA190-5



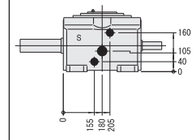
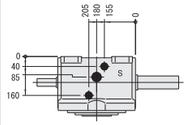
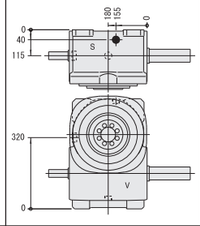
Detailed degree of fixed flange of output

Figure HA190-6



Location of refueling part, oil gauge and oil drain part according to position and amount of oil

Figure HA190-7

Position	1	2	5
Location			
Oil level (ℓ)	5	6	6.5

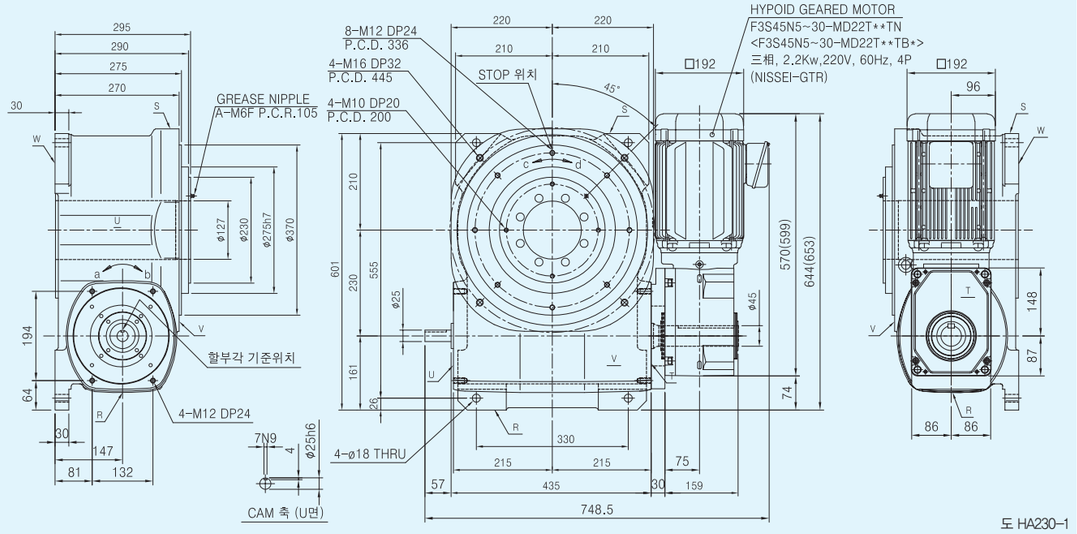
⚠ Attention

- The order is the location of refueling part(PT 1/2), oil gauge(VA) and oil drain part (PT1/2) from the top regarding each location according to the position.(Figure HA 190 7).
- The position responds to the code I of indxing drive.
- The rough value is written since an amount of oil changes according to the cam type and the number of cam follower.

HA 230 Dimension

[Unit:mm]

(a) Mounted motor 2.2Kw



도 HA230-1

(b) Mounted motor 3.7Kw

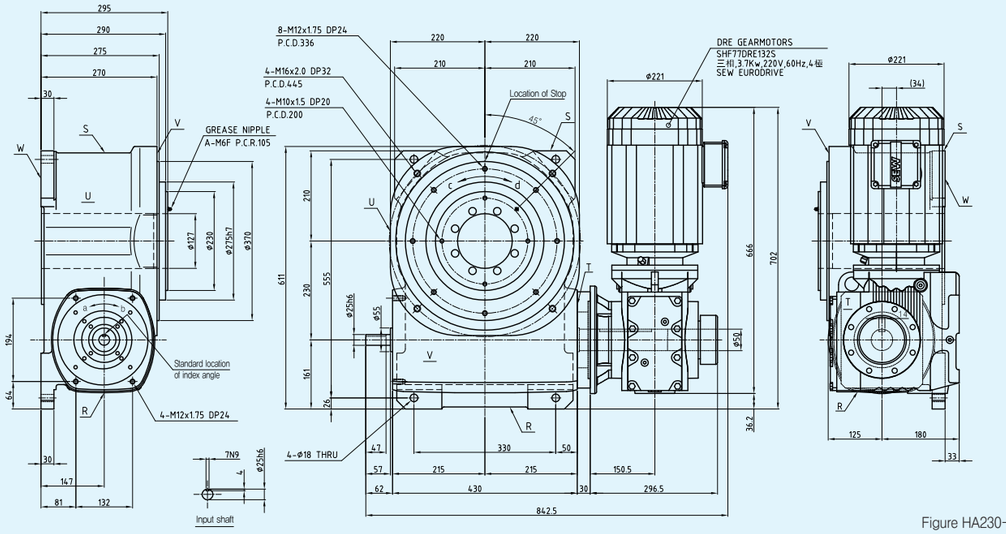


Figure HA230-2

• Characteristic table of index

Table HA230-1

Characteristics items	Sign	Unit	Values	Characteristics items	Sign	Unit	Values	Characteristics items	Sign	Unit	Values
Load of allowable THRUST of output shaft	P_1	N	27000	Load of allowable THRUST of input shaft	P_4	N	6000	Dividing extent of 1DWELL		sec	±30
Load of allowable RADIAL of output shaft	P_2	N	12000	Allowed TORQUE of maximum repeating at maximum of input shaft	P_5	N	6000	Dividing extent of 2DWELL		sec	±60
Allowable TORQUE of output shaft	T_S	N • m	Referring to ability chart of torque	TORQUE of allowed repeating at maximum of input shaft	P_6	N • m	784	Repeating extent		sec	30
Rigidity of torsion of output shaft	K_1	N • m /rad	$6.2X10^6$	Rigidity of torsion of input shaft	K_2	N • m /rad	$1.14X10^5$	Product mass (Main body of index)		kg	285
Moment of inertia of output shaft	J_0	kg • m^2	1.685	Moment of inertia of input shaft	J_C	kg • m^2	0.136	Stamp color of housing		Ivory	
Allowable moment of bending of output shaft	P_3	N • m	980								

Note1) The moment of inertia J of input shaft is the values in case of the rectification.

1N • m≒0.102kgf • m

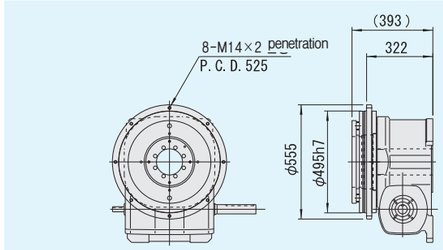
• Characteristic table of geared motor [GM 2.2/3.7]

Table HA230-2

Product code		Motor output (Kw)	Real reduction ratio (i)	RPM of output shaft NM(rpm)		Allowed output torque TR(N • m)		Moment of inertia of motor JM(kg • m^2)	Mass (kg)
200/220V specification	230V specification			50Hz	60Hz	50Hz	60Hz		
GM 2.2 - 10AS	GM 2.2 - 10BS-US	2.2	10	150	180	122	102	4.79×10^{-3}	34
GM 2.2 - 15AS	GM 2.2 - 15BS-US		15	100	120	182	152		
GM 2.2 - 20AS	GM 2.2 - 20BS-US		20	75	90	244	203		
GM 2.2 - 25AS	GM 2.2 - 25BS-US		25	60	72	305	254		
GM 2.2 - 30AS	GM 2.2 - 30BS-US		30	50	60	366	305		
GM 2.2 - 40AS	GM 2.2 - 40BS-US		40	37.5	45	487	406		
GM 2.2 - 50AS	GM 2.2 - 50BS-US		50	30	36	609	508		
GM 3.7 - 10AS	GM 3.7 -10BS-US	3.7	10	150	180	205	171	7.6×10^{-3}	70
GM 3.7 - 15AS	GM 3.7 -15BS-US		15	100	120	308	256		
GM 3.7 - 20AS	GM 3.7 -20BS-US		20	75	90	410	341		
GM 3.7 - 25AS	GM 3.7 -25BS-US		25	60	72	189	407		
GM 3.7 - 30AS	GM 3.7 -30BS-US		30	50	60	586	489		
GM 3.7 - 40AS	GM 3.7 -40BS-US		40	37.5	45	782	652		
GM 3.7 - 50AS	GM 3.7 -50BS-US		50	30	36	977	814		

Mounting torque shield (Option)

Figure HA230-3



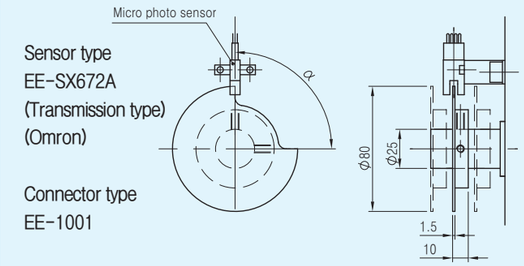
Example of product code

Indxing drive HA230 – 06187R – L3VW 1

Torque shield T23 B – 350 L

Mounting Timing cam-Photo sensor

Figure HA230-4



Example of product code

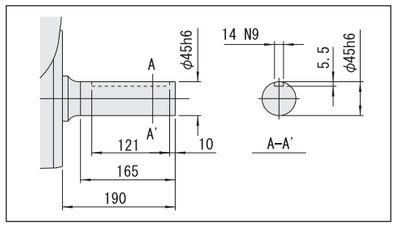
Timing cam and sensor TC – 1 – HA230

⚠ Attention

- Attachment posture of geared motor is the standard specification that it is written at the dimension diagram (Drawing HA230 1, Drawing HA230 2)
- In case of HA230, mounting the motor of 2.2KW and 3.7Kw is possible. Just, the exchange is impossible after buying since the hollow hole of attached hollow hole of geared motor by an amount of condenser. In addition, please inquiry since mounting motor of 5.5Kw as the special specification is possible
- Please pay attention since the box of reducer protrudes from the flange face of index in case of the installation of motor 3.7 Kw.
- In case of HA230, mounting the T23B of torque shield is possible.
- Mounting the timing cam and sensor is possible to 3 sets according to the requirement in case of the input of both sides.

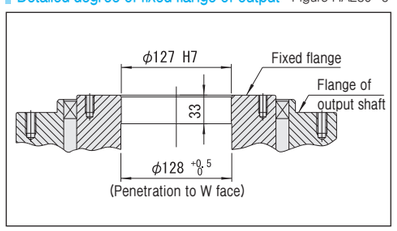
Input shaft of standard specification of main body (Side of T surface)

Figure HA230-5



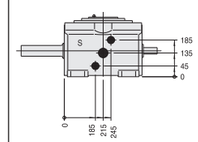
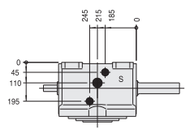
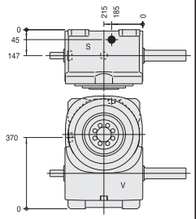
Detailed degree of fixed flange of output

Figure HA230-6



Location of Oil hole, oil gauge and oil drain part according to position and flow

Figure HA230-7

Position	1	2	5
Location			
Oil level (ℓ)	10	12	13

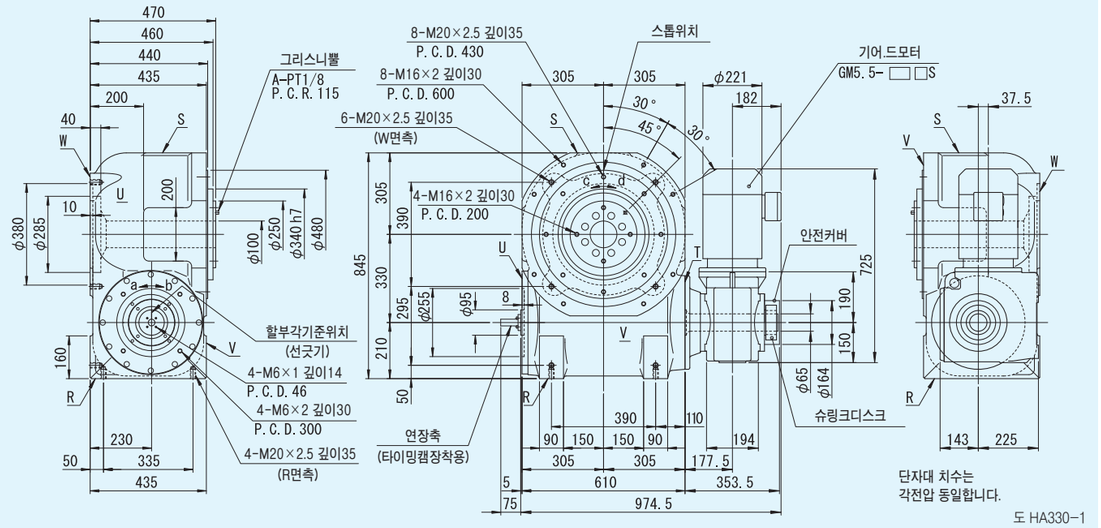
⚠ Attention

- The order is the location of Oil hole(PT 3/4), oil gauge(VB) and oil drain part (PT3/4) from the top regarding each location according to the position.(Drawing HA 230 7).
- The position responds to the code I of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

HA330 치수도

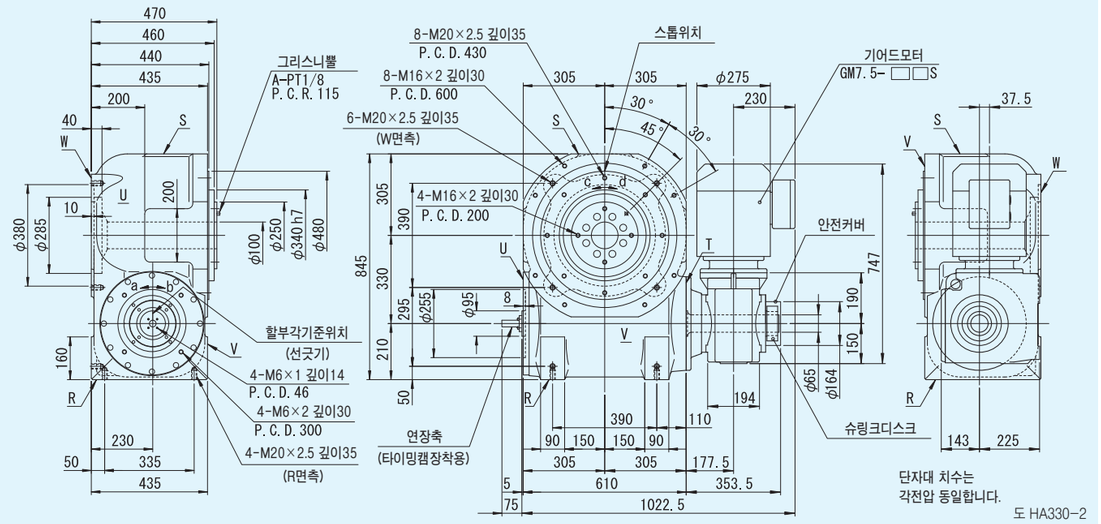
[단위:mm]

(a) 5.5Kw 모터장착



도 HA330-1

(b) 7.5Kw 모터장착



도 HA330-2

• 인덱스특성표

표 HA330-1

특성항목	기호	단 위	수 치	특성항목	기호	단 위	수 치	특성항목	기호	단 위	수 치
출력축의 허용 THRUST하중	P_1	N	34890	입력축의 허용 THRUST하중	P_4	N	18440	1DWELL의 의 할출 정도		sec	±20
출력축의 허용 RADIAL 하중	P_2	N	33570	입력축의 최대 반복굽힘력	P_5	N	20900	2DWELL의 할출 정도		sec	±40
출력축의 허용 토크	T_S	N • m	토크 능력표참조	입력축의 최대 반복허용 토크	P_6	N • m	6400	반복정도		sec	20
출력축의 비틀림강성	K_1	N • m /rad	$1.68X10^7$	입력축의 비틀림강성	K_2	N • m /rad	$4.19X10^5$	제품질량 (인덱스 본체)		kg	1000
출력축의 관성모멘트	J_0	kg • m^2	8.29	입력축의 관성모멘트	J_c	kg • m^2	1.71	하우징 도장색		아이보리	
출력축의 허용 굽힘모멘트	P_3	N • m	2030								

주 1) 입력축의 관성모멘트 J_c는 정류시의 수치입니다.

1N • m≒0.102kgf • m

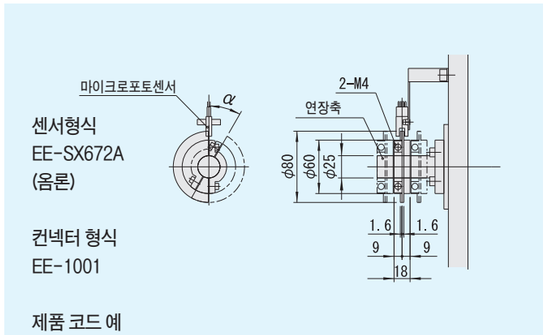
• 기어드모터 특성표 [GM 5.5/7.5]

표 HA330-2

제품 코드		모터출력 (Kw)	실감속비 (i)	출력축회전수 NM(rpm)		출력허용 토크 TR(N • m)		모터관성모멘트 JM(kg • m^2)	질량 (kg)
200/200V 사양	230V 사양			50Hz	60Hz	50Hz	60Hz		
GM 5.5 19.70AS	GM 5.5 - 19.70BS-US	5.5	19.70	73	87	670	565	1.75×10^{-3}	139
GM 5.5 25.50AS	GM 5.5 - 25.50BS-US		25.50	56	67	860	725		
GM 5.5 31.43AS	GM 5.5 - 31.43BS-US		31.43	46	55	1040	870		
GM 5.5 34.96AS	GM 5.5 - 34.96BS-US		34.96	41	49	1150	970		
GM 5.5 39.10AS	GM 5.5 - 39.10BS-US		39.10	37	44	1280	1080		
GM 5.5 44.03AS	GM 5.5 - 44.03BS-US		44.03	33	39	1440	1210		
GM 5.5 47.91AS	GM 5.5 - 47.91BS-US		47.91	30	36	1560	1310		
GM 5.5 57.00AS	GM 5.5 - 57.00BS-US		57.00	25	30	1840	1550		
GM 7.5 10.93AS	GM 7.5 - 10.93BS-US	7.5	10.93	133	159	510	425	28.0×10^{-3}	159
GM 7.5 15.64AS	GM 7.5 - 15.64BS-US		15.64	93	111	720	605		
GM 7.5 19.70AS	GM 7.5 - 19.70BS-US		19.70	74	88	910	760		
GM 7.5 25.50AS	GM 7.5 - 25.50BS-US		25.50	57	68	1170	980		
GM 7.5 31.43AS	GM 7.5 - 31.43BS-US		31.43	46	55	1400	1170		
GM 7.5 34.96AS	GM 7.5 - 34.96BS-US		34.96	41	50	1550	1300		
GM 7.5 39.10AS	GM 7.5 - 39.10BS-US		39.10	37	45	1730	1450		
GM 7.5 44.03AS	GM 7.5 - 44.03BS-US		44.03	33	40	1940	1630		

타이밍캠-포토센서 장착

도 HA330-3



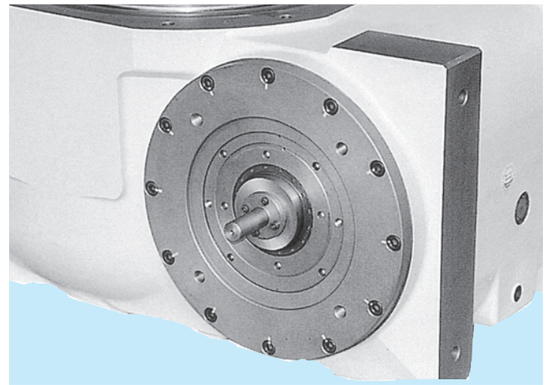
센서형식
EE-SX672A
(옴론)

컨넥터 형식
EE-1001

제품 코드 예

타이밍캠, 센서 TC - 1 - HA330

도 HA330-4



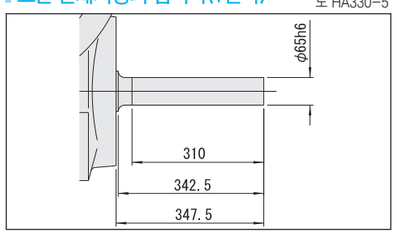
타이밍캠 장착용 연장축

⚠ 주의사항

- 기어드모터의 취부 자세는, 치수도(도 HA330-1, 도 HA330-2)에 기재되어 있는 것이 표준사양 입니다.
- HA330는, 5.5Kw와 7.5Kw의 모터장착이 가능합니다. 또한, 특별사양으로 11Kw의 모터장착이 가능함으로 문의하여 주십시오.
- 연장축을 장착할 경우는, 필요에 따라 3SETS까지 타이밍캠과 센서를 장착할 수 있습니다.

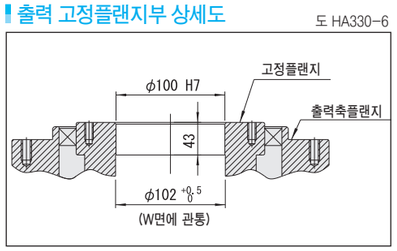
표준 본체사양의 입력축(T면측)

도 HA330-5



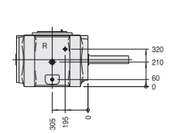
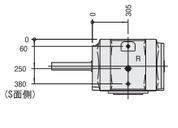
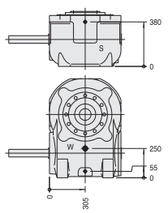
출력 고정플랜지부 상세도

도 HA330-6



자세에 따른 주유구, 유면계 배유구의 위치 및 유량

도 HA330-7

자 세	1	2	5
설명도			
유량(ℓ)	60	55	60

⚠ 주의사항

- 자세에 따른 각 위치는 위에서부터 주유구(PT 3/4), 유면계(VB), 배유구(PT3/4) 의 순서입니다.(도HA330-7)
- 자세는 인덱싱 드라이브의 코드 i에 대응합니다.
- 유량은 캠의 형태, 캠팔로워의 수량에 따라 변하므로 개략치만 기재되어 있습니다.

HA070 torque chart

(1) 1DWELL cam curve SMS 3(Curve code 7)
(2) 1DWELL cam curve SMCV 3(Curve code 8)
(3) 2DWELL cam curve SMS 3(Curve code 7)

⚠ Attention

The top of torque of dynamic rated output presented at the torque table is totally calculated on the standard of the expected life time that is 8,000 time of the condition of normal operation on the attachment and the lubrication etc.

(1) HA070 cam curve SMS 3(Curve code 7) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) TORQUE of load of inner inertial Toi of lower side (N • m) Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower. SCF (mm)
4	270	HA070 0427 7R	204.8	80.3	80.3	80.3 0.1	80.3 0.1	80.3 0.2	80.3 0.3	75.4 0.5	4.9	16
5	240	HA070 0524 7R	78.1	57.9	47.0	41.6 0.1	38.2 0.1	35.7 0.2	33.8 0.3	31.0 0.5	2.5	14
	270	HA070 0527 7R	227.6	84.6	84.6	84.6 0.1	84.6 0.1	84.6 0.2	84.6 0.2	84.6 0.4	4.6	16
6	180	HA070 0618 7R	238.1	191.4	160.5 0.1	142.2 0.1	130.4 0.2	122.0 0.3	115.5 0.4	105.9 0.8	5.6	22
	210	HA070 0621 7R	256.7	196.0	159.2	141.0 0.1	129.3 0.1	120.9 0.2	114.5 0.3	105.0 0.6	5.3	22
	240	HA070 0624 7R	271.5	193.6	157.3	139.3 0.1	127.7 0.1	119.5 0.2	113.1 0.2	103.8 0.4	5.2	22
	270	HA070 0627 7R	283.2	190.9	155.0	137.3 0.1	125.9 0.1	117.8 0.1	111.5 0.2	102.3 0.3	5.0	22
8	180	HA070 0818 7R	247.3	119.1	119.1	119.1 0.1	119.1 0.1	119.1 0.2	119.1 0.3	112.5 0.6	4.7	19
	210	HA070 0821 7R	286.6	209.9	195.7	173.3 0.1	159.0 0.1	148.7 0.2	140.7 0.2	129.1 0.4	5.0	22
	240	HA070 0824 7R	297.8	214.0	191.7	169.7 0.1	155.7 0.1	145.6 0.1	137.8 0.2	126.4 0.3	4.8	22
	270	HA070 0827 7R	306.3	217.1	187.6	166.1	152.4 0.1	142.5 0.1	135.0 0.1	123.8 0.3	4.7	22
10	180	HA070 1018 7R	251.7	89.0	89.0	89.0 0.1	89.0 0.1	89.0 0.2	89.0 0.3	89.0 0.5	4.3	16
	210	HA070 1021 7R	275.9	125.8	125.8	125.8 0.1	125.8 0.1	125.8 0.1	125.8 0.2	125.4 0.3	4.3	19
	240	HA070 1024 7R	283.3	127.5	127.5	127.5	127.5 0.1	127.5 0.1	127.5 0.2	122.1 0.3	4.2	19
	270	HA070 1027 7R	288.6	128.7	128.7	128.7	128.7 0.1	128.7 0.1	128.7 0.1	119.0 0.2	4.2	19
12	120	HA070 1212 7R	84.7	76.2	72.1 0.1	63.8 0.1	58.6 0.2	54.8 0.3	51.9 0.5	47.6 0.9	2.4	14
	150	HA070 1215 7R	91.6	82.4	70.1	62.1 0.1	57.0 0.1	53.3 0.2	50.4 0.3	46.3 0.6	2.3	14
	180	HA070 1218 7R	263.5	91.1	91.1	91.1 0.1	91.1 0.1	91.1 0.1	91.1 0.2	91.1 0.4	4.1	16
	210	HA070 1221 7R	271.5	92.5	92.5	92.5	92.5 0.1	92.5 0.1	92.5 0.2	92.5 0.3	4.0	16
	240	HA070 1224 7R	277.1	93.4	93.4	93.4	93.4 0.1	93.4 0.1	93.4 0.1	93.4 0.2	3.9	16
	270	HA070 1227 7R	281.1	94.1	94.1	94.1	94.1	94.1 0.1	94.1 0.1	94.1 0.2	3.9	16
15	150	HA070 1515 7R	48.7	43.8	37.8	33.4 0.1	30.7 0.1	28.7 0.2	27.2 0.3	24.9 0.4	2.1	12
	180	HA070 1518 7R	50.5	44.8	36.4	32.2	29.6 0.1	27.6 0.1	26.2 0.2	24.0 0.3	2.0	12
	210	HA070 1521 7R	102.5	89.8	72.9	64.6	59.2 0.1	55.4 0.1	52.4 0.1	48.1 0.2	2.2	14
	240	HA070 1524 7R	104.0	86.9	70.6	62.5	57.3	53.6 0.1	50.8 0.1	46.6 0.2	2.1	14
	270	HA070 1527 7R	105.1	84.3	68.5	60.6	55.6	52.0 0.1	49.2 0.1	45.2 0.1	2.1	14
16	150	HA070 1615 7R	49.4	44.4	38.9	34.5 0.1	31.6 0.1	29.6 0.2	28.0 0.2	25.7 0.4	2.0	12
	180	HA070 1618 7R	51.0	45.9	37.4	33.2	30.4 0.1	28.4 0.1	26.9 0.2	24.7 0.3	2.0	12
	210	HA070 1621 7R	52.0	44.5	36.1	32.0	29.3 0.1	27.4 0.1	26.0 0.1	23.8 0.2	2.0	12
	240	HA070 1624 7R	52.8	43.0	34.9	30.9	28.4	26.5 0.1	25.1 0.1	23.1 0.2	2.0	12
	270	HA070 1627 7R	53.3	41.7	33.9	30.0	27.5	25.7	24.4 0.1	22.4 0.1	1.9	12

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft. All of the R (right hand) is shown in the torque delivery ability chart .

1N • m≒0.102kgf • m

(2) HA070 cam curve SMCV 3(Curve code8) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) TORQUE of load of inner inertial Toi of lower side (N • m) Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower. SCF (mm)
2	330	HA070 0233 8R	67.8	39.9	32.4 0.1	28.7 0.1	26.3 0.2	24.6 0.4	23.3 0.6	21.4 1.0	2.6	14
3	270	HA070 0327 8R	76.2	49.5	40.2 0.1	35.6 0.1	32.7 0.2	30.6 0.4	28.9 0.5	26.5 1.0	2.5	14
	300	HA070 0330 8R	221.5	83.5	83.5 0.1	83.5 0.1	83.5 0.2	83.5 0.3	82.3 0.4	75.5 0.8	4.6	16
4	240	HA070 0424 8R	241.4	117.7	117.7 0.1	117.7 0.1	113.2 0.2	105.8 0.4	100.2 0.5	91.9 0.9	4.8	19
	270	HA070 0427 8R	252.3	120.3	120.3 0.1	120.3 0.1	111.7 0.2	104.4 0.3	98.9 0.4	90.7 0.7	4.7	19
5	210	HA070 0521 8R	236.0	86.2	86.2 0.1	86.2 0.1	86.2 0.2	86.2 0.4	86.2 0.5	86.2 1.0	4.5	16
	240	HA070 0524 8R	247.0	88.2	88.2 0.1	88.2 0.1	88.2 0.2	88.2 0.3	88.2 0.4	88.2 0.7	4.3	16
6	180	HA070 0618 8R	277.2	206.5	173.2 0.1	153.4 0.2	140.7 0.3	131.6 0.4	124.6 0.6	114.3 1.1	5.1	22
	210	HA070 0621 8R	291.4	208.8	169.6 0.1	150.2 0.1	137.8 0.2	128.8 0.3	122.0 0.5	111.9 0.8	4.9	22
8	150	HA070 0815 8R	261.0	122.3	122.3 0.1	122.3 0.2	122.3 0.3	122.3 0.5	122.3 0.7	122.1 1.2	4.5	19
	180	HA070 0818 8R	302.0	215.5	210.4 0.1	186.3 0.1	170.9 0.2	159.8 0.3	151.3 0.5	138.8 0.8	4.8	22
10	120	HA070 1012 8R	247.0	88.2	88.2 0.1	88.2 0.2	88.2 0.4	88.2 0.6	88.2 0.8	88.2 1.5	4.3	16
	150	HA070 1015 8R	262.2	90.9	90.9 0.1	90.9 0.1	90.9 0.2	90.9 0.4	90.9 0.5	90.9 0.9	4.1	16
12	120	HA070 1212 8R	94.7	85.2	76.2 0.1	67.5 0.2	61.9 0.3	57.9 0.5	54.8 0.7	50.3 1.2	2.3	14
	150	HA070 1215 8R	271.8	92.5	92.5 0.1	92.5 0.1	92.5 0.2	92.5 0.3	92.5 0.4	92.5 0.8	4.0	16
15	120	HA070 1512 8R	49.9	44.9	40.9 0.1	36.2 0.1	33.2 0.3	31.0 0.4	29.4 0.6	27.0 1.0	2.0	12
	150	HA070 1515 8R	51.7	46.5	38.9	34.4 0.1	31.6 0.2	29.5 0.2	28.0 0.4	25.7 0.6	2.0	12
16	120	HA070 1612 8R	50.5	45.4	42.1 0.1	37.3 0.1	34.2 0.2	32.0 0.4	30.3 0.5	27.8 0.9	2.0	12
	150	HA070 1615 8R	52.1	46.8	40.0	35.4 0.1	32.5 0.2	30.4 0.2	28.7 0.3	26.4 0.6	2.0	12

(3) HA070 cam curve SMS 3(Curve code 7) 2DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) TORQUE of load of inner inertial Toi of lower side (N • m) Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower. SCF (mm)
16	210	HA070 1621 7R2	286.6	209.9	209.9	209.9	195.7 0.1	183.0 0.1	173.3 0.1	159.0 0.2	5.0	22
	240	HA070 1624 7R2	297.8	214.0	214.0	208.9	191.7	179.2 0.1	169.7 0.1	155.7 0.2	4.8	22
	270	HA070 1627 7R2	306.3	217.1	217.1	204.5	187.6	175.5	166.1 0.1	152.4 0.1	4.7	22
20	180	HA070 2018 7R2	251.7	89.0	89.0	89.0	89.0 0.1	89.0 0.1	89.0 0.1	89.0 0.2	4.3	16
	210	HA070 2021 7R2	261.8	90.8	90.8	90.8	90.8	90.8 0.1	90.8 0.1	90.8 0.2	4.1	16
	240	HA070 2024 7R2	269.1	92.1	92.1	92.1	92.1	92.1 0.1	92.1 0.1	92.1 0.1	4.1	16
	270	HA070 2027 7R2	288.6	128.7	128.7	128.7	128.7	128.7	128.7 0.1	128.7 0.1	4.2	19
24	180	HA070 2418 7R2	96.1	86.4	83.7	74.1	68.0 0.1	63.6 0.1	60.2 0.1	55.2 0.2	2.2	14
	210	HA070 2421 7R2	99.1	89.1	81.2	71.9	66.0	61.7 0.1	58.4 0.1	53.6 0.1	2.2	14
	240	HA070 2424 7R2	101.3	91.1	78.8	69.8	64.0	59.9	56.7 0.1	52.0 0.1	2.2	14
	270	HA070 2427 7R2	281.1	94.1	94.1	94.1	94.1	94.1	94.1 0.1	94.1 0.1	3.9	16
32	180	HA070 3218 7R2	51.0	45.9	45.9	40.8	37.4	35.0 0.1	33.2 0.1	30.4 0.1	2.0	12
	210	HA070 3221 7R2	52.0	46.8	44.5	39.4	36.1	33.8	32.0 0.1	29.3 0.1	2.0	12
	240	HA070 3224 7R2	52.8	47.5	43.0	38.1	34.9	32.7	30.9 0.1	28.4 0.1	2.0	12
	270	HA070 3227 7R2	53.3	47.9	41.7	36.9	33.9	31.7	30.0	27.5 0.1	1.9	12

Note) case of 2DWELL, grading and stopping per the rotation of input 1 times are moved at the same cycle 2 times. The index angle is the total index angle of input shaft of the rotation of one time.

1N • m≒0.102kgf • m

HA090 Torque Chart

(1) 1DWELL cam curve SMS 3(Curve code 7)
(2) 1DWELL cam curve SMCV 3(Curve code 8)
(3) 2DWELL cam curve SMS 3(Curve code 7)

⚠ Attention

The top of torque of dynamic rated output presented at the torque table is totally calculated on the standard of the expected life time that is 8,000 time of the condition of normal operation on the attachment and the lubrication etc.

(1) HA090 cam curve SMS 3(Curve code 7) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) TORQUE of load of inner inertial Toi of lower side (N • m) Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
4	270	HA090 0427 7R	276.8	187.6	152.3 0.1	134.9 0.2	123.7 0.4	115.7 0.6	109.6 0.8	100.5 1.5	6.6	19
5	240	HA090 0524 7R	276.3	197.2	160.2 0.1	141.9 0.2	130.1 0.4	121.7 0.6	115.2 0.8	105.7 1.5	6.1	16
	270	HA090 0527 7R	308.9	219.6	178.4 0.1	157.9 0.2	144.9 0.3	135.5 0.5	128.3 0.7	117.7 1.2	6.2	19
6	180	HA090 0618 7R	441.9	366.2	297.4 0.2	263.4 0.3	241.6 0.6	225.9 0.9	213.9 1.4	196.2 2.4	8.8	26
	210	HA090 0621 7R	479.8	364.3	295.9 0.1	262.0 0.2	240.3 0.4	224.8 0.7	212.8 1.0	195.2 1.8	8.4	26
	240	HA090 0624 7R	510.2	360.9	293.2 0.1	259.6 0.2	238.1 0.3	222.7 0.5	210.8 0.8	193.4 1.4	8.1	26
	270	HA090 0627 7R	534.8	356.7	289.7	256.5 0.2	235.3 0.3	220.1 0.4	208.4 0.6	191.1 1.1	7.9	26
8	180	HA090 0818 7R	510.2	459.2	373.4 0.1	330.6 0.3	303.3 0.5	283.6 0.7	268.5 1.1	246.3 1.9	8.1	26
	210	HA090 0821 7R	541.9	452.3	367.4 0.1	325.3 0.2	298.4 0.3	279.1 0.5	264.2 0.8	242.4 1.4	7.8	26
	240	HA090 0824 7R	566.0	444.1	360.7 0.1	319.4 0.1	293.0 0.3	274.0 0.4	259.4 0.6	238.0 1.1	7.6	26
	270	HA090 0827 7R	584.4	435.6	353.8 0.1	313.3 0.1	287.4 0.2	268.8 0.3	254.5 0.5	233.4 0.8	7.4	26
10	180	HA090 1018 7R	377.1	335.3	272.4 0.1	241.2 0.2	221.2 0.4	206.9 0.6	195.9 0.8	179.7 1.4	6.3	22
	210	HA090 1021 7R	393.2	327.0	265.6 0.1	235.2 0.1	215.7 0.3	201.7 0.4	191.0 0.6	175.2 1.1	6.2	22
	240	HA090 1024 7R	404.9	318.7	258.9 0.1	229.2 0.1	210.3 0.2	196.7 0.3	186.2 0.5	170.8 0.8	6.0	22
	270	HA090 1027 7R	413.5	310.9	252.5	223.6 0.1	205.1 0.2	191.8 0.3	181.6 0.4	166.6 0.6	5.9	22
12	120	HA090 1212 7R	299.8	269.8	245.9 0.2	217.8 0.4	199.8 0.	186.8 1.0	176.9 1.4	162.3 2.5	5.9	16
	150	HA090 1215 7R	324.4	292.0	239.2 0.1	211.8 0.2	194.3 0.4	181.7 0.6	172.1 0.9	157.8 1.6	5.6	16
	180	HA090 1218 7R	360.5	320.5	260.3 0.1	230.5 0.2	211.4 0.3	197.7 0.5	187.2 0.7	171.7 1.2	5.7	19
	210	HA090 1221 7R	372.1	310.9	252.5 0.1	223.6 0.1	205.1 0.2	191.8 0.3	181.6 0.5	166.6 0.9	5.5	19
	240	HA090 1224 7R	380.2	301.9	245.2	217.2 0.1	199.2 0.2	186.3 0.3	176.4 0.4	161.8 0.7	5.4	19
	270	HA090 1227 7R	386.2	293.7	238.6	211.2 0.1	193.8 0.1	181.2 0.2	171.6 0.3	157.4 0.5	5.4	19
15	150	HA090 1515 7R	343.6	309.2	267.9 0.1	237.2 0.2	217.6 0.3	203.5 0.5	192.7 0.8	176.7 1.3	5.4	16
	180	HA090 1518 7R	355.7	317.7	258.0	228.5 0.1	209.6 0.2	196.0 0.4	185.6 0.5	170.2 0.9	5.3	16
	210	HA090 1521 7R	363.6	306.7	249.1	220.6 0.1	202.3 0.2	189.2 0.3	179.1 0.4	164.3 0.7	5.2	16
	240	HA090 1524 7R	369.0	296.8	241.1	213.5 0.1	195.8 0.1	183.1 0.2	173.4 0.3	159.1 0.5	5.1	16
	270	HA090 1527 7R	372.8	288.0	233.9	207.1 0.1	190.0 0.1	177.7 0.2	168.2 0.2	154.3 0.4	5.0	16
16	150	HA090 1615 7R	348.3	313.5	276.0 0.1	244.3 0.2	224.1 0.3	209.6 0.5	198.5 0.7	182.1 1.3	5.3	16
	180	HA090 1618 7R	359.2	323.3	265.3 0.1	234.9 0.1	215.5 0.2	201.6 0.3	190.8 0.5	175.1 0.9	5.2	16
	210	HA090 1621 7R	366.3	315.0	255.8	226.5 0.1	207.8 0.2	194.4 0.3	184.0 0.4	168.8 0.6	5.1	16
	240	HA090 1624 7R	371.2	304.6	247.4	219.1 0.1	201.0 0.1	188.0 0.2	178.0 0.3	163.2 0.5	5.0	16
	270	HA090 1627 7R	374.6	295.4	239.9	212.5 0.1	194.9 0.1	182.3 0.2	172.6 0.2	158.3 0.4	5.0	16

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft. All of the R (right hand) is shown in the torque delivery ability chart .

1N • m≒0.102kgf • m

(2) HA090 cam curve SMCV 3(Curve code8) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) TORQUE of load of inner inertial Toi of lower side (N • m) Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
2	330	HA090 0233 8R	253.7	152.4	123.8 0.2	109.6 0.4	100.5 0.7	94.0 1.1	89.0 1.6	81.7 2.9	6.9	19
3	270	HA090 0327 8R	269.4	168.7	137.1 0.2	121.4 0.4	111.3 0.7	104.1 1.1	98.6 1.6	90.4 2.8	6.2	16
	300	HA090 0330 8R	283.7	167.8	136.3 0.1	120.7 0.3	110.7 0.6	103.5 0.9	98.0 1.3	89.9 2.3	6.0	16
4	240	HA090 0424 8R	309.2	205.4	166.8 0.2	147.7 0.4	135.5 0.7	126.7 1.1	120.0 1.5	110.0 2.7	6.2	19
	270	HA090 0427 8R	324.4	203.0	164.9 0.1	146.0 0.3	133.9 0.5	125.3 0.8	118.6 1.2	108.8 2.1	6.1	19
5	210	HA090 0521 8R	303.1	215.0	174.7 0.2	154.7 0.4	141.9 0.7	132.7 1.1	125.6 1.6	115.2 2.9	5.8	16
	240	HA090 0524 8R	318.0	211.6	171.9 0.1	152.2 0.3	139.6 0.6	130.6 0.9	123.6 1.2	113.4 2.2	5.7	16
6	180	HA090 0618 8R	522.1	398.0 0.1	323.3 0.2	286.2 0.5	262.6 0.9	245.6 1.3	232.5 1.9	213.3 3.4	8.0	26
	210	HA090 0621 8R	552.3	390.8	317.5 0.2	281.1 0.4	257.9 0.6	241.2 1.0	228.3 1.4	209.4 2.5	7.7	26
8	150	HA090 0815 8R	369.9	321.0 0.1	260.7 0.2	230.9 0.5	211.8 0.9	198.1 1.4	187.5 2.0	172.0 3.6	6.4	22
	180	HA090 0818 8R	575.0	488.0	396.3 0.2	351.0 0.4	321.9 0.7	301.1 1.0	285.1 1.5	261.5 2.7	7.5	26
10	120	HA090 1012 8R	318.0	286.2 0.1	234.8 0.3	207.9 0.6	190.7 1.1	178.4 1.7	168.9 2.4	154.9 4.3	5.7	16
	150	HA090 1015 8R	358.6	313.2	254.4 0.2	225.2 0.4	206.6 0.7	193.2 1.1	183.0 1.5	167.8 2.7	5.7	19
12	120	HA090 1212 8R	355.0	319.5 0.1	291.7 0.2	258.3 0.5	237.0 0.9	221.6 1.5	209.8 2.1	192.5 3.8	5.7	19
	150	HA090 1215 8R	372.5	335.3	279.5 0.2	247.5 0.3	227.0 0.6	212.3 0.9	201.0 1.4	184.4 2.4	5.5	19
15	120	HA090 1512 8R	351.9	316.7	289.9 0.2	256.7 0.4	235.4 0.7	220.2 1.2	208.5 1.7	191.2 3.0	5.3	16
	150	HA090 1515 8R	363.9	327.5	275.7 0.1	244.1 0.3	223.9 0.5	209.4 0.7	198.3 1.1	181.9 1.9	5.1	16
16	120	HA090 1612 8R	355.8	320.2	298.2 0.2	264.1 0.4	242.2 0.7	226.6 1.1	214.5 1.6	196.8 2.8	5.3	16
	150	HA090 1615 8R	366.6	329.9	283.1 0.1	250.7 0.3	230.0 0.4	215.1 0.7	203.6 1.6	186.8 1.8	5.1	16

(3) HA090 cam curve SMS 3(Curve code 7) 2DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) TORQUE of load of inner inertial Toi of lower side (N • m) Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
16	210	HA090 1621 7R2	368.9	332.0	285.9	253.1 0.1	232.2 0.2	217.2 0.3	205.6 0.4	188.6 0.6	6.4	22
	240	HA090 1624 7R2	384.2	345.0	280.3	248.2 0.1	227.6 0.1	212.9 0.2	201.6 0.3	184.9 0.5	6.3	22
	270	HA090 1627 7R2	584.4	526.0	435.6	385.7 0.1	353.8 0.1	330.9 0.2	313.3 0.2	287.4 0.4	7.4	26
20	180	HA090 2018 7R2	377.1	339.4	335.3	296.9 0.1	272.4 0.2	254.7 0.3	241.2 0.4	221.2 0.7	6.3	22
	210	HA090 2021 7R2	393.2	353.9	327.0	289.5 0.1	265.6 0.1	248.4 0.2	235.2 0.3	215.7 0.5	6.2	22
	240	HA090 2024 7R2	404.9	364.4	318.7	282.2 0.1	258.9 0.1	242.1 0.2	229.2 0.2	210.3 0.4	6.0	22
	270	HA090 2027 7R2	413.5	372.2	310.9	275.3	252.5 0.1	236.2 0.1	223.6 0.2	205.1 0.3	5.9	22
24	180	HA090 2418 7R2	360.5	324.5	320.5	283.8 0.1	260.3 0.1	243.4 0.2	230.5 0.3	211.4 0.6	5.7	19
	210	HA090 2421 7R2	372.1	334.9	310.9	275.3 0.1	252.5 0.1	236.2 0.2	223.6 0.2	205.1 0.4	5.5	19
	240	HA090 2424 7R2	380.2	342.2	301.9	267.3	245.2 0.1	229.4 0.1	217.2 0.2	199.2 0.3	5.4	19
	270	HA090 2427 7R2	386.2	347.6	293.7	260.1	238.6 0.1	223.1 0.1	211.2 0.1	193.8 0.3	5.4	19
32	180	HA090 3218 7R2	359.2	323.3	323.3	289.3 0.1	265.3 0.1	248.2 0.2	234.9 0.2	215.5 0.4	5.2	16
	210	HA090 3221 7R2	366.3	329.7	315.0	278.9	255.8 0.1	239.3 0.1	226.5 0.2	207.8 0.3	5.1	16
	240	HA090 3224 7R2	371.2	334.1	304.6	269.7	247.4 0.1	231.4 0.1	219.1 0.1	201.0 0.2	5.0	16
	270	HA090 3227 7R2	374.6	337.1	295.4	261.6	239.9	224.4 0.1	212.5 0.1	194.9 0.2	5.0	16

Main fact) In case of 2DWELL, dividing and stopping per the rotation of input 1 times are moved at the same cycle 2 times. The angle of dividend part is the total index angle of input axis of the rotation of one time.

1N • m≒0.102kgf • m

HA110 Torque Chart

(1) 1DWELL cam curve SMS 3(Curve code 7)
(2) 1DWELL cam curve SMCV 3(Curve code 8)
(3) 2DWELL cam curve SMS 3(Curve code 7)

⚠ Attention

The top of torque of dynamic rated output presented at the torque table is totally calculated on the standard of the expected life time that is 8,000 time of the condition of normal operation on the attachment and the lubrication etc.

(1) HA090 cam curve SMS 3(Curve code 7) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) — Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
4	270	HA110 0427 7R	540.7	387.7 0.1	314.9 0.3	278.8 0.6	255.8 1.1	239.2 1.7	226.5 2.5	207.8 4.5	10.2	26
5	240	HA110 0524 7R	365.1	307.1 0.1	249.4 0.3	220.8 0.7	202.6 1.3	189.5 2.0	179.4 2.9	164.5 5.2	8.1	22
	270	HA110 0527 7R	606.3	455.5 0.1	370.0 0.2	327.6 0.5	300.5 0.9	281.1 1.4	266.1 2.1	244.1 3.7	9.5	26
6	180	HA110 0618 7R	680.3	564.2 0.1	458.3 0.4	405.8 1.0	372.2 1.8	348.1 2.8	329.6 4.0	302.4 7.1	12.4	32
	210	HA110 0621 7R	738.2	561.2 0.1	455.8 0.3	403.6 0.7	370.3 1.3	346.3 2.0	327.8 2.9	300.7 5.2	11.8	32
	240	HA110 0624 7R	784.9	555.9 0.1	451.6 0.3	399.8 0.6	366.8 1.0	343.0 1.6	324.8 2.3	297.9 4.0	11.4	32
	270	HA110 0627 7R	822.5	549.3	446.2 0.2	395.1 0.4	362.4 0.8	339.0 1.2	320.9 1.8	294.4 3.2	11.1	32
8	180	HA110 0818 7R	756.5	666.3 0.1	541.2 0.3.	479.2 0.7	439.6 1.3	411.1 2.1	389.3 3.0	357.1 5.3	10.9	30
	210	HA110 0821 7R	833.4	696.5 0.1	565.7 0.2	500.9 0.6	459.5 1.0	429.8 1.5	406.9 2.2	373.2 4.0	11.0	32
	240	HA110 0824 7R	870.1	683.7	555.4 0.2	491.8 0.4	451.1 0.8	421.9 1.2	399.4 1.7	366.4 3.0	10.7	32
	270	HA110 0827 7R	898.3	670.6	544.7 0.1	482.3 0.3	442.4 0.6	413.8 0.9	391.8 1.3	359.4 2.4	10.4	32
10	180	HA110 1018 7R	678.0	603.6 0.1	490.3 0.3	434.1 0.6	398.2 1.0	372.4 1.6	352.6 2.3	323.5 4.1	8.9	26
	210	HA110 1021 7R	708.9	589.3	478.7 0.2	423.8 0.4	388.8 0.8	363.6 1.2	344.3 1.7	315.8 3.0	8.7	26
	240	HA110 1024 7R	891.4	745.1	605.2 0.2	535.9 0.3	491.6 0.6	459.7 1.0	435.3 1.4	399.3 2.5	9.8	30
	270	HA110 1027 7R	913.2	727.9	591.3 0.1	523.6 0.3	480.3 0.5	449.2 0.8	425.3 1.1	390.1 2.0	9.6	30
12	120	HA110 1212 7R	524.0	471.6 0.1	471.6 0.5	449.0 1.2	411.9 2.1	256.8 3.3	243.2 4.8	223.1 8.6	7.1	19
	150	HA110 1215 7R	642.7	578.4 0.1	578.4 0.4	512.4 0.8	470.1 1.4	293.1 2.2	277.5 3.2	254.5 5.6	7.4	22
	180	HA110 1218 7R	690.8	621.7 0.1	568.0 0.2	503.0 0.6	461.4 1.0	287.7 1.5	272.4 2.2	249.8 3.9	7.1	22
	210	HA110 1221 7R	725.6	653.0	555.9 0.2	492.2 0.4	451.5 0.7	281.5 1.1	266.5 1.6	244.5 2.9	6.9	22
	240	HA110 1224 7R	751.2	669.0	543.4 0.1	481.1 0.3	441.4 0.6	275.2 0.9	260.5 1.2	239.0 2.2	6.8	22
	270	HA110 1227 7R	1087.2	613.8	498.6 0.1	441.5 0.2	405.0 0.4	378.8 0.6	358.6 0.9	328.9 1.6	8.1	26
15	150	HA110 1515 7R	637.9	574.1 0.1	574.1 0.3	574.1 0.6	537.2 1.1	290.1 1.7	274.6 2.5	251.9 4.5	6.5	19
	180	HA110 1518 7R	673.4	606.0	606.0 0.2	569.6 0.4	522.5 0.8	282.1 1.2	267.1 1.7	245.0 3.1	6.4	19
	210	HA110 1521 7R	697.6	627.8	625.2 0.1	553.6 0.3	507.8 0.6	274.2 0.9	259.6 1.3	238.2 2.3	6.2	19
	240	HA110 1524 7R	714.9	643.4	608.1 0.1	538.4 0.2	493.9 0.4	266.7 0.7	252.5 1.0	231.6 1.7	6.1	19
	270	HA110 1527 7R	727.6	654.8	592.1 0.1	524.3 0.2	481.0 0.3	259.7 0.5	245.9 0.8	225.6 1.4	6.1	19
16	150	HA110 1615 7R	651.2	586.1 0.1	586.1 0.3	586.1 0.6	556.2 1.0	300.3 1.6	284.3 2.4	260.8 4.2	6.5	19
	180	HA110 1618 7R	684.1	615.7	615.7 0.2	588.3 0.4	539.7 0.7	291.4 1.1	275.9 1.6	253.1 2.9	6.3	19
	210	HA110 1621 7R	706.4	635.8	635.8 0.1	570.8 0.3	523.6 0.5	282.7 0.8	267.7 1.2	245.6 2.1	6.2	19
	240	HA110 1624 7R	722.2	650.0	626.2 0.1	554.5 0.2	508.6 0.4	274.7 0.6	260.0 0.9	238.5 1.6	6.1	19
	270	HA110 1627 7R	733.6	660.2	609.2 0.1	539.4 0.2	494.8 0.3	267.2 0.5	253.0 0.7	232.1 1.3	6.0	19

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft.
All of the R (right hand) is shown in the torque delivery ability chart .

1N • m≒0.102kgf • m

(2) HA110 cam curve SMCV 3(Curve code8) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) — Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
2	330	HA110 0233 8R	340.2	200.9 0.1	163.2 0.5	144.5 1.1	132.5 2.0	123.9 3.2	117.3 4.6	107.6 8.1	8.7	22
3	270	HA110 0327 8R	321.8	225.7 0.1	183.3 0.6	162.3 1.3	148.9 2.4	139.2 3.7	131.8 5.3	120.9 9.4	7.5	19
	300	HA110 0330 8R	344.2	226.1 0.1	183.7 0.5	162.6 1.1	149.2 1.9	139.5 3.0	132.1 4.3	121.2 7.6	7.3	19
4	240	HA110 0424 8R	392.8	284.6 0.1	231.2 0.6	204.7 1.3	187.8 2.3	175.6 3.5	166.3 5.1	152.5 9.1	7.8	22
	270	HA110 0427 8R	638.3	421.2 0.1	342.1 0.4	303.0 0.9	277.9 1.6	259.9 2.5	246.1 3.6	225.7 6.3	9.3	26
5	210	HA110 0521 8R	413.0	339.9 0.2	276.1 0.6	244.5 1.4	224.3 2.4	209.8 3.8	198.6 5.4	182.2 9.6	7.7	22
	240	HA110 0524 8R	441.8	337.8 0.1	274.4 0.5	242.9 1.0	222.8 1.8	208.4 2.9	197.3 4.2	181.0 7.4	7.4	22
6	180	HA110 0618 8R	803.0	613.0 0.2	497.9 0.6	440.9 1.4	404.4 2.5	378.2 4.0	358.1 5.7	328.5 10.1	11.2	32
	210	HA110 0621 8R	849.2	601.9 0.1	488.9 0.5	432.9 1.0	397.1 1.9	371.4 2.9	351.6 4.2	322.6 7.4	10.8	32
8	150	HA110 0815 8R	804.6	724.1 0.2	596.2 0.7	527.9 1.5	484.3 2.7	452.9 4.2	428.8 6.1	393.3 10.8	10.5	30
	180	HA110 0818 8R	854.0	716.0 0.1	581.6 0.5	515.0 1.1	472.4 1.9	441.8 2.9	418.3 4.2	383.7 7.5	10.1	30
10	120	HA110 1012 8R	441.8	397.6 0.2	374.8 0.9	331.9 2.1	304.4 3.7	284.7 5.8	269.6 8.3	247.3 14.8	7.4	22
	150	HA110 1015 8R	484.8	436.3 0.1	367.2 0.6	325.1 1.3	298.2 2.4	278.9 3.7	264.1 5.3	242.2 9.5	7.1	22
12	120	HA110 1212 8R	675.2	607.7 0.2	607.7 0.8	561.6 1.8	515.1 3.1	321.2 4.9	304.1 7.0	278.9 12.5	7.2	22
	150	HA110 1215 8R	727.0	654.3 0.1	615.5 0.5	545.0 1.1	499.9 2.0	311.7 3.1	295.1 4.5	270.7 8.0	6.9	22
15	120	HA110 1512 8R	662.0	595.8 0.2	595.8 0.6	595.8 1.4	585.1 2.5	315.9 3.9	299.1 5.6	274.4 9.9	6.4	19
	150	HA110 1515 8R	698.6	628.7 0.1	628.7 0.4	612.8 0.9	562.1 1.6	303.5 2.5	287.4 3.6	263.6 6.3	6.2	19
16	120	HA110 1612 8R	673.6	606.2 0.1	606.2 0.6	606.2 1.3	604.8 2.3	326.6 3.6	309.2 5.2	283.6 9.3	6.4	19
	150	HA110 1615 8R	707.3	636.6 0.1	636.6 0.4	631.8 0.8	579.6 1.5	313.0 2.3	296.3 3.4	271.8 6.0	6.2	19

(3) HA110 cam curve SMS 3(Curve code 7) 2DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) — Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
16	210	HA110 1621 7R2	833.4	750.1	696.5 0.1	616.7 0.3	565.7 0.5	529.1 0.8	500.9 1.1	459.5 2.0	11.0	32
	240	HA110 1624 7R2	870.1	783.1	683.7 0.1	605.4 0.2	555.4 0.4	519.4 0.6	491.8 0.9	451.1 1.5	10.7	32
	270	HA110 1627 7R2	898.3	808.5	670.6 0.1	593.8 0.2	544.7 0.3	509.4 0.5	482.3 0.7	442.4 1.2	10.4	32
20	180	HA110 2018 7R2	678.0	610.2	603.6 0.1	534.5 0.3	490.3 0.5	458.5 0.8	434.1 1.2	398.2 2.1	8.9	26
	210	HA110 2021 7R2	708.9	638.0	589.3 0.1	521.8 0.2	478.7 0.4	447.7 0.6	423.8 0.8	388.8 1.5	8.7	26
	240	HA110 2024 7R2	891.4	802.3	745.1 0.1	659.7 0.2	605.2 0.3	566.0 0.5	535.9 0.7	491.6 1.2	9.8	30
	270	HA110 2027 7R2	913.2	821.9	727.9 0.1	644.6 0.1	591.3 0.2	553.0 0.4	523.6 0.5	480.3 1.0	9.6	30
24	180	HA110 2418 7R2	690.8	621.7	621.7 0.1	619.2 0.3	568.0 0.5	354.2 0.8	335.3 1.1	307.6 2.0	7.1	22
	210	HA110 2421 7R2	725.6	653.0	653.0 0.1	606.0 0.2	555.9 0.4	346.6 0.6	328.1 0.8	301.0 1.4	6.9	22
	240	HA110 2424 7R2	751.2	676.1	669.0 0.1	592.4 0.2	543.4 0.3	338.8 0.4	320.8 0.6	294.2 1.1	6.8	22
	270	HA110 2427 7R2	1087.2	755.7	613.8 0.0	543.5 0.1	498.6 0.2	466.3 0.3	441.5 0.4	405.0 0.8	8.1	26
32	180	HA110 3218 7R2	684.1	615.7	615.7 0.1	615.7 0.2	615.7 0.4	358.8 0.6	339.7 0.8	311.6 1.5	6.3	19
	210	HA110 3221 7R2	706.4	635.8	635.8 0.1	635.8 0.2	635.8 0.3	348.1 0.4	329.6 0.6	302.3 1.1	6.2	19
	240	HA110 3224 7R2	722.2	650.0	650.0 0.1	650.0 0.1	626.2 0.2	338.1 0.3	320.1 0.5	293.7 0.8	6.1	19
	270	HA110 3227 7R2	733.6	660.2	660.2	660.2 0.1	609.2 0.2	329.0 0.3	311.5 0.4	285.7 0.6	6.0	19

Main fact) In case of 2DWELL, dividing and stopping per the rotation of input 1 times are moved at the same cycle 2 times.
The angle of dividend part is the total index angle of input axis of the rotation of one time.

1N • m≒0.102kgf • m

HA150 Torque Chart

(1) 1DWELL cam curve SMS 3(Curve code 7)
(2) 1DWELL cam curve SMCV 3(Curve code 8)
(3) 2DWELL cam curve SMS 3(Curve code 7)

⚠ Attention

The top of torque of dynamic rated output presented at the torque table is totally calculated on the standard of the expected life time that is 8,000 time of the condition of normal operation on the attachment and the lubrication etc.

(1) HA150 cam curve SMS 3(Curve code 7) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) — Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Sankyo Cam follower SCF (mm)
4	270	HA150 0427 7R	872.2	657.4 / 0.3	534.0 / 1.3	472.8 / 3.0	433.7 / 5.4	405.7 / 8.4	384.1 / 12.1	352.3 / 21.6	17.2	32
5	240	HA150 0524 7R	899.6	741.9 / 0.3	602.6 / 1.4	533.6 / 3.1	489.4 / 5.5	457.8 / 8.6	433.4 / 12.3	397.6 / 22.0	16.1	30
	270	HA150 0527 7R	964.3	741.4 / 0.3	602.2 / 1.1	533.3 / 2.4	489.2 / 4.3	457.5 / 6.8	433.1 / 9.8	397.3 / 17.3	15.7	30
6	180	HA150 0618 7R	1309.2	1135.9 / 0.5	922.6 / 2.1	817.0 / 4.7	749.4 / 8.3	700.9 / 12.9	663.6 / 18.6	608.7 / 33.1	22.1	40
	210	HA150 0621 7R	2014.8	1634.0 / 0.4	1327.2 / 1.5	1175.2 / 3.4	1078.0 / 6.1	1008.2 / 9.5	954.5 / 13.7	875.6 / 24.3	25.4	47
	240	HA150 0624 7R	2158.5	1624.8 / 0.3	1319.8 / 1.2	1168.6 / 2.6	1072.0 / 4.7	1002.6 / 7.3	949.2 / 10.5	870.7 / 18.6	24.5	47
	270	HA150 0627 7R	2276.9	1610.9 / 0.2	1308.4 / 0.9	1158.6 / 2.1	1062.8 / 3.7	993.9 / 5.7	941.0 / 8.3	863.2 / 14.7	23.8	47
8	180	HA150 0818 7R	1555.5	1400.0 / 0.4	1186.5 / 1.6	1050.6 / 3.6	963.7 / 6.4	901.3 / 10.0	853.4 / 14.4	782.8 / 25.7	20.5	40
	210	HA150 0821 7R	2311.5	2056.5 / 0.3	1670.4 / 1.2	1479.0 / 2.7	1356.8 / 4.8	1268.9 / 7.5	1201.4 / 10.8	1102.0 / 19.2	23.6	47
	240	HA150 0824 7R	2430.2	2025.8 / 0.2	1645.5 / 0.9	1457.0 / 2.1	1336.5 / 3.7	1250.0 / 5.7	1183.5 / 8.3	1085.6 / 14.7	22.9	47
	270	HA150 0827 7R	2523.1	1992.5 / 0.2	1618.4 / 0.7	1433.0 / 1.6	1314.5 / 2.9	1229.4 / 4.5	1164.0 / 6.5	1067.7 / 11.6	22.4	47
10	180	HA150 1018 7R	1384.0	1245.6 / 0.3	1077.7 / 1.3	954.3 / 2.9	875.4 / 5.1	818.7 / 8.0	775.1 / 11.5	711.0 / 20.5	17.2	35
	210	HA150 1021 7R	1471.4	1306.2 / 0.2	1061.0 / 0.9	939.4 / 2.1	861.8 / 3.8	806.0 / 5.9	763.1 / 8.5	700.0 / 15.0	16.7	35
	240	HA150 1024 7R	1913.0	1659.5 / 0.2	1347.9 / 0.7	1193.5 / 1.7	1094.8 / 3.0	1023.9 / 4.7	969.4 / 6.7	889.3 / 11.9	18.4	40
	270	HA150 1027 7R	1973.6	1627.0 / 0.1	1321.6 / 0.6	1170.2 / 1.3	1073.4 / 2.4	1003.9 / 3.7	950.5 / 5.3	871.9 / 9.4	18.1	40
12	120	HA150 1212 7R	1111.1	1000.0 / 0.6	1000.0 / 2.5	1000.0 / 5.6	923.0 / 10.0	575.5 / 15.7	544.9 / 22.6	499.8 / 40.1	13.5	26
	150	HA150 1215 7R	1569.9	1369.7 / 0.4	1112.6 / 1.5	985.1 / 3.3	903.7 / 6.0	704.3 / 9.3	666.8 / 13.4	611.7 / 23.8	14.7	30
	180	HA150 1218 7R	1744.1	1423.6 / 0.3	1156.3 / 1.1	1023.9 / 2.4	939.2 / 4.2	732.0 / 6.6	693.0 / 9.5	635.7 / 16.8	14.8	32
	210	HA150 1221 7R	1826.7	1391.1 / 0.2	1129.9 / 0.8	1000.5 / 1.7	917.8 / 3.1	715.3 / 4.8	677.2 / 6.9	621.2 / 12.3	14.4	32
	240	HA150 1224 7R	2282.0	1567.5 / 0.2	1273.2 / 0.6	1127.3 / 1.4	1034.1 / 2.5	879.2 / 3.8	832.4 / 5.5	763.6 / 9.8	15.9	35
	270	HA150 1227 7R	2339.4	1531.9 / 0.1	1244.3 / 0.5	1101.8 / 1.1	1010.7 / 1.9	859.3 / 3.0	813.6 / 4.4	746.3 / 7.8	15.7	35
15	150	HA150 1515 7R	1388.9	1250.0 / 0.3	1250.0 / 1.3	1250.0 / 2.9	1223.1 / 5.2	660.4 / 8.2	625.3 / 11.7	573.6 / 20.9	12.4	26
	180	HA150 1518 7R	1792.0	1513.9 / 0.2	1229.6 / 0.8	1088.8 / 1.9	998.8 / 3.4	778.4 / 5.3	737.0 / 7.6	676.0 / 13.5	13.8	30
	210	HA150 1521 7R	1852.5	1469.7 / 0.2	1193.7 / 0.6	1057.0 / 1.4	969.6 / 2.5	755.7 / 3.9	715.5 / 5.6	656.3 / 10.0	13.5	30
	240	HA150 1524 7R	1895.3	1428.1 / 0.1	1160.0 / 0.5	1027.2 / 1.1	942.2 / 1.9	734.3 / 3.0	695.3 / 4.3	637.8 / 7.6	13.3	30
	270	HA150 1527 7R	1998.6	1473.9 / 0.1	1197.1 / 0.4	1060.0 / 0.9	972.4 / 1.5	757.9 / 2.4	717.5 / 3.5	658.2 / 6.1	13.6	32
16	150	HA150 1615 7R	1422.9	1280.6 / 0.3	1280.6 / 1.2	1280.6 / 2.8	1269.3 / 4.9	685.4 / 7.7	648.9 / 11.1	595.3 / 19.7	12.3	26
	180	HA150 1618 7R	1508.2	1357.4 / 0.2	1357.4 / 0.9	1348.8 / 1.9	1237.2 / 3.4	668.1 / 5.3	632.5 / 7.7	580.2 / 13.7	12.0	26
	210	HA150 1621 7R	1567.8	1411.0 / 0.2	1411.0 / 0.6	1313.0 / 1.4	1204.4 / 2.5	650.4 / 3.9	615.7 / 5.6	564.8 / 10.0	11.8	26
	240	HA150 1624 7R	1610.4	1449.4 / 0.1	1443.8 / 0.5	1278.5 / 1.1	1172.8 / 1.9	633.3 / 3.0	599.6 / 4.3	550.0 / 7.7	11.7	26
	270	HA150 1627 7R	1941.1	1428.9 / 0.1	1160.6 / 0.4	1027.7 / 0.8	942.7 / 1.4	734.7 / 2.2	695.6 / 3.2	638.1 / 5.7	13.1	30

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft. All of the R (right hand) is shown in the torque delivery ability chart .

1N • m≒0.102kgf • m

(2) HA150 cam curve SMCV 3(Curve code8) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) — Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
2	330	HA150 0233 8R	757.4	499.0 / 0.6	405.3 / 2.5	358.9 / 5.7	329.2 / 10.1	307.9 / 15.8	291.5 / 22.8	267.4 / 40.5	17.3	30
3	270	HA150 0327 8R	673.7	500.0 / 0.7	406.2 / 2.8	359.6 / 6.2	329.9 / 11.1	308.5 / 17.3	292.1 / 24.9	268.0 / 44.3	14.2	26
	300	HA150 0330 8R	724.6	502.4 / 0.6	408.1 / 2.2	361.4 / 5.0	331.5 / 9.0	310.0 / 14.0	293.5 / 20.2	269.2 / 35.8	13.9	26
4	240	HA150 0424 8R	1001.7	729.9 / 0.6	592.8 / 2.4	524.9 / 5.4	481.5 / 9.7	450.4 / 15.1	426.4 / 21.8	391.1 / 38.7	16.2	32
	270	HA150 0427 8R	1066.4	726.9 / 0.5	590.4 / 1.9	522.8 / 4.3	479.6 / 7.7	448.5 / 12.0	424.7 / 17.2	389.5 / 30.6	15.8	32
5	210	HA150 0521 8R	1013.2	819.5 / 0.6	665.6 / 2.5	589.4 / 5.7	540.7 / 10.2	505.7 / 15.9	478.7 / 22.9	439.2 / 40.7	15.3	30
	240	HA150 0524 8R	1121.1	862.8 / 0.5	700.8 / 2.0	620.5 / 4.4	569.2 / 7.9	532.4 / 12.3	504.0 / 17.8	462.3 / 31.6	15.4	32
6	180	HA150 0618 8R	1600.6	1256.0 / 0.7	1020.2 / 2.9	903.3 / 6.6	828.6 / 11.8	775.0 / 18.4	733.7 / 26.5	673.1 / 47.0	20.2	40
	210	HA150 0621 8R	2362.5	1769.3 / 0.5	1437.2 / 2.2	1272.6 / 4.9	1167.3 / 8.6	1091.7 / 13.5	1033.6 / 19.4	948.2 / 34.5	23.3	47
8	150	HA150 0815 8R	1345.8	1211.2 / 0.8	1003.6 / 3.3	888.7 / 7.4	815.2 / 13.1	762.4 / 20.5	721.8 / 29.5	662.2 / 52.5	17.4	35
	180	HA150 0818 8R	1811.7	1576.5 / 0.1	1280.5 / 0.5	1133.8 / 1.1	1040.1 / 1.9	972.7 / 2.9	921.0 / 4.2	844.8 / 7.5	19.0	40
10	120	HA150 1012 8R	1080.6	972.5 / 1.0	902.2 / 3.9	798.8 / 8.8	732.8 / 15.6	685.3 / 24.3	648.9 / 35.1	595.2 / 62.3	14.9	30
	150	HA150 1015 8R	1224.5	1102.1 / 0.6	935.7 / 2.5	828.5 / 5.7	760.0 / 10.1	710.8 / 15.8	673.0 / 22.8	617.3 / 40.4	14.8	32
12	120	HA150 1212 8R	1706.7	1536.0 / 0.8	1291.8 / 3.3	1143.9 / 7.4	1049.3 / 13.2	817.8 / 20.6	774.3 / 29.7	710.2 / 52.8	14.9	32
	150	HA150 1215 8R	1829.9	1540.2 / 0.5	1251.0 / 2.1	1107.8 / 4.8	1016.2 / 8.4	792.0 / 13.2	749.8 / 19.0	687.8 / 33.8	14.4	32
15	120	HA150 1512 8R	1450.5	1305.5 / 0.7	1305.5 / 2.9	1305.5 / 6.5	1305.5 / 11.6	721.7 / 18.1	683.2 / 26.1	626.8 / 46.3	12.2	26
	150	HA150 1515 8R	1854.9	1626.8 / 0.4	1321.3 / 1.7	1170.0 / 3.9	1073.3 / 6.9	836.5 / 10.8	792.0 / 15.6	726.5 / 27.7	13.5	30
16	120	HA150 1612 8R	1480.9	1332.8 / 0.7	1332.8 / 2.7	1332.8 / 6.1	1332.8 / 10.9	747.6 / 17.1	707.8 / 24.6	649.3 / 43.7	12.1	26
	150	HA150 1615 8R	1570.1	1413.1 / 0.4	1413.1 / 1.7	1413.1 / 3.9	1333.3 / 7.0	720.0 / 10.9	681.6 / 15.7	625.3 / 27.9	11.8	26

(3) HA150 cam curve SMS 3(Curve code 7) 2DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) — Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
16	210	HA150 16217R2	1341.6	1207.4 / 0.1	1115.3 / 0.6	987.5 / 1.3	905.9 / 2.3	847.2 / 3.6	802.1 / 5.2	735.8 / 9.2	17.5	35
	240	HA150 16247R2	1774.5	1597.1 / 0.1	1431.2 / 0.5	1267.3 / 1.0	1162.5 / 1.8	1087.2 / 2.8	1029.3 / 4.1	944.2 / 7.2	19.2	40
	270	HA150 16277R2	2523.1	2270.8 / 0.1	1992.5 / 0.4	1764.3 / 0.8	1618.4 / 1.5	1513.6 / 2.3	1433.0 / 3.3	1314.5 / 5.8	22.4	47
20	180	HA150 20187R2	1384.0	1245.6 / 0.2	1245.6 / 0.6	1174.8 / 1.4	1077.7 / 2.6	1007.9 / 4.0	954.3 / 5.8	875.4 / 10.2	17.2	35
	210	HA150 20217R2	1833.8	1650.4 / 0.1	1650.4 / 0.5	1497.5 / 1.1	1373.6 / 1.9	1284.7 / 3.0	1216.3 / 4.4	1115.7 / 7.8	18.9	40
	240	HA150 20247R2	1913.0	1721.7 / 0.1	1659.5 / 0.4	1469.4 / 0.8	1347.9 / 1.5	1260.6 / 2.3	1193.5 / 3.4	1094.8 / 6.0	18.4	40
	270	HA150 20277R2	1973.6	1776.2 / 0.1	1627.0 / 0.3	1440.7 / 0.7	1321.6 / 1.2	1236.0 / 1.8	1170.2 / 2.7	1073.4 / 4.7	18.1	40
24	180	HA150 24187R2	1744.1	1569.7 / 0.1	1423.6 / 0.5	1260.6 / 1.2	1156.3 / 2.1	901.2 / 3.3	853.2 / 4.7	782.7 / 8.4	14.8	32
	210	HA150 24217R2	1826.7	1644.0 / 0.1	1391.1 / 0.4	1231.8 / 0.9	1129.9 / 1.5	880.6 / 2.4	833.8 / 3.5	764.8 / 6.2	14.4	32
	240	HA150 24247R2	1887.1	1672.4 / 0.1	1358.4 / 0.3	1202.8 / 0.7	1103.3 / 1.2	859.9 / 1.8	814.1 / 2.7	746.8 / 4.7	14.1	32
	270	HA150 24277R2	2339.4	1886.0 / 0.1	1531.9 / 0.2	1356.5 / 0.5	1244.3 / 1.0	1057.9 / 1.5	1001.6 / 2.2	918.8 / 3.9	15.7	35
32	180	HA150 32187R2	1508.2	1357.4 / 0.1	1357.4 / 0.4	1357.4 / 1.0	1357.4 / 1.7	822.5 / 2.7	778.7 / 3.8	714.3 / 6.8	12.0	26
	210	HA150 32217R2	1567.8	1411.0 / 0.1	1411.0 / 0.3	1411.0 / 0.7	1411.0 / 1.3	800.7 / 2.0	758.1 / 2.8	695.4 / 5.0	11.8	26
	240	HA150 32247R2	1610.4	1449.4 / 0.1	1449.4 / 0.2	1449.4 / 0.5	1443.8 / 1.0	779.6 / 1.5	738.1 / 2.2	677.1 / 3.8	11.7	26
	270	HA150 32277R2	1941.1	1747.0 / 0.0	1428.9 / 0.2	1265.2 / 0.4	1160.6 / 0.7	904.6 / 1.1	856.4 / 1.6	785.6 / 2.8	13.1	30

Main fact) In case of 2DWELL, dividing and stopping per the rotation of input 1 times are moved at the same cycle 2 times. The angle of dividend part is the total index angle of input axis of the rotation of one time.

1N • m≒0.102kgf • m

HA190 Torque Chart

(1) 1DWELL cam curve SMS 3(Curve code 7)
(2) 1DWELL cam curve SMCV 3(Curve code 8)
(3) 2DWELL cam curve SMS 3(Curve code 7)

⚠ Attention

The top of torque of dynamic rated output presented at the torque table is totally calculated on the standard of the expected life time that is 8,000 time of the condition of normal operation on the attachment and the lubrication etc.

(1) HA190 cam curve SMS 3(Curve code 7) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) — Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
4	270	HA190 0427 7R	2054.0	1456.1 1.0	1182.8 4.1	1047.3 9.3	960.7 16.5	898.5 25.8	850.7 37.2	780.3 66.1	33.0	40
5	240	HA190 0524 7R	2144.1	1751.8 1.2	1422.9 4.6	1259.9 10.4	1155.8 18.5	1080.0 28.8	1023.4 41.5	938.8 73.8	32.1	40
	270	HA190 0527 7R	2290.2	1747.6 0.9	1419.5 3.6	1256.9 8.2	1153.0 14.6	1078.4 22.8	1021.0 32.8	936.5 58.3	31.1	40
6	180	HA190 0618 7R	2687.7	2320.3 1.8	1884.7 7.1	1668.8 15.9	1530.8 28.2	1431.7 44.1	1355.5 63.5	1243.4 112.8	39.4	52
	210	HA190 0621 7R	3865.9	3278.2 1.4	2662.7 5.5	2357.7 12.3	2162.8 21.9	2022.8 34.2	1915.1 49.2	1756.7 87.5	44.5	60
	240	HA190 0624 7R	4174.2	3272.7 1.0	2658.2 4.2	2353.8 9.4	2159.1 16.7	2019.3 26.2	1911.9 37.7	1753.8 67.0	43.0	60
	270	HA190 0627 7R	4433.9	3255.8 0.8	2644.6 3.3	2341.7 7.4	2148.0 13.2	2009.0 20.7	1902.0 29.8	1744.8 52.9	41.8	60
8	180	HA190 0818 7R	3177.0	2859.3 1.4	2413.2 5.4	2136.8 12.2	1960.1 21.7	1833.2 33.9	1735.6 48.8	1592.1 86.8	36.5	52
	210	HA190 0821 7R	3416.9	2941.9 1.0	2389.6 4.0	2115.9 9.0	1940.9 15.9	1815.2 24.9	1718.6 35.9	1576.5 63.8	35.2	52
	240	HA190 0824 7R	4778.9	4139.9 0.8	3362.6 3.3	2977.5 7.4	2731.3 13.1	2554.4 20.4	2418.5 29.4	2218.5 52.3	40.3	60
	270	HA190 0827 7R	4992.8	4084.6 0.6	3317.7 2.6	2937.7 5.8	2694.8 10.3	2520.3 16.2	2386.2 23.3	2188.9 41.3	39.4	60
10	180	HA190 1018 7R	2995.5	2696.0 1.1	2324.9 4.3	2058.6 9.7	1888.4 17.3	1766.1 27.0	1672.1 38.9	1533.9 69.1	30.9	47
	210	HA190 1021 7R	3168.5	2810.8 0.8	2283.0 3.2	2021.6 7.1	1854.4 12.7	1734.3 19.8	1642.0 28.6	1506.2 50.8	30.1	47
	240	HA190 1024 7R	3872.3	3355.5 0.6	2725.5 2.5	2413.3 5.6	2213.8 10.0	2070.5 15.6	1960.2 22.5	1798.2 40.1	33.0	52
	270	HA190 1027 7R	3988.3	3287.2 0.5	2670.0 2.0	2364.2 4.5	2168.7 7.9	2028.3 12.4	1920.3 17.8	1761.5 31.6	32.4	52
12	120	HA190 1212 7R	1964.9	1768.4 1.9	1768.4 7.8	1661.1 17.4	1523.7 31.0	1187.6 48.5	1124.4 69.8	1031.4 124.1	26.0	35
	150	HA190 1215 7R	3136.3	2674.5 1.2	2172.3 5.0	1923.5 11.2	1764.5 19.8	1650.2 31.0	1562.4 44.7	1433.2 79.4	29.3	40
	180	HA190 1218 7R	3341.0	2613.4 0.9	2122.8 3.4	1879.6 7.8	1724.2 13.8	1612.6 21.5	1526.7 31.0	1400.5 55.1	28.3	40
	210	HA190 1221 7R	3485.6	2548.8 0.6	2070.3 2.5	1833.1 5.7	1681.6 10.1	1572.7 15.8	1489.0 22.8	1365.9 40.5	27.7	40
	240	HA190 1224 7R	3590.2	2018.2 0.5	2485.2 1.9	1787.4 4.4	1639.6 7.8	1533.4 12.1	1451.8 17.4	1331.8 31.0	27.2	40
	270	HA190 1227 7R	4227.1	2974.4 0.4	2415.9 1.6	2139.2 3.7	1962.4 6.5	1835.3 10.2	1737.6 14.7	1593.9 26.1	28.2	47
15	150	HA190 1515 7R	2852.3	2567.1 1.0	2513.8 4.0	2225.9 9.0	2041.8 16.0	1350.3 25.1	1278.4 36.1	1172.7 64.2	24.0	35
	180	HA190 1518 7R	3022.8	2720.5 0.7	2450.1 2.8	2169.5 6.3	1990.1 11.1	1316.1 17.4	1246.0 25.1	1143.0 44.6	23.5	35
	210	HA190 1521 7R	3141.6	2827.4 0.5	2384.9 2.0	2111.8 4.6	1937.1 8.2	1281.1 12.8	1212.9 18.4	1112.6 32.8	23.0	35
	240	HA190 1524 7R	3226.7	2858.8 0.4	2322.1 1.6	2056.1 3.5	1886.1 6.3	1247.3 9.8	1180.9 14.1	1083.3 25.1	22.7	35
	270	HA190 1527 7R	3263.1	2936.8 0.3	2394.1 1.4	2119.9 3.0	1944.6 5.4	1818.7 8.5	1721.9 12.2	1579.5 21.6	26.2	40
16	150	HA190 1615 7R	2764.3	2487.9 0.9	2396.5 3.7	2122.0 8.4	1946.5 14.9	1287.3 23.3	1218.8 33.5	1118.0 59.6	23.2	32
	180	HA190 1618 7R	3075.3	2767.8 0.7	2532.7 2.6	2242.6 5.9	2057.2 10.5	1360.5 16.4	1288.0 23.6	1181.5 41.9	23.3	35
	210	HA190 1621 7R	3184.7	2866.2 0.5	2460.9 1.9	2179.0 4.3	1998.9 7.7	1321.9 12.0	1251.5 17.3	1148.0 30.8	22.9	35
	240	HA190 1624 7R	3262.3	2936.1 0.4	2392.9 1.5	2118.8 3.3	1943.6 5.9	1285.4 9.2	1216.9 13.3	1116.3 23.6	22.6	35
	270	HA190 1627 7R	3318.9	2868.3 0.3	2329.8 1.2	2062.9 2.6	1892.4 4.7	1251.4 7.3	1184.8 10.5	1086.9 18.6	22.4	35

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft.
All of the R (right hand) is shown in the torque delivery ability chart .

1N • m≒0.102kgf • m

(2) HA190 cam curve SMCV 3(Curve code8) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Angle of dividend part θ(deg)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) — Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
2	330	HA190 0233 8R	1866.9	1178.1 2.0	956.9 7.8	847.3 17.7	777.2 31.4	726.9 49.1	688.2 70.6	631.3 125.6	34.5	40
3	270	HA190 0327 8R	2080.7	1491.6 2.1	1211.5 8.6	1072.8 19.3	984.1 34.3	920.3 53.7	871.4 77.3	799.3 137.4	32.5	40
	300	HA190 0330 8R	2213.5	1490.6 1.7	1210.7 7.0	1072.0 15.6	983.4 27.8	919.7 43.5	870.8 62.6	798.8 111.3	31.6	40
4	240	HA190 0424 8R	2618.8	1983.4 2.1	1611.0 8.5	1426.5 19.0	1308.5 33.8	1223.8 52.9	1158.7 76.2	1062.9 135.4	32.9	47
	270	HA190 0427 8R	2781.7	1973.2 1.7	1602.7 6.7	1419.1 15.0	1301.8 26.7	1217.5 41.8	1152.7 60.2	1057.4 107.0	32.0	47
5	210	HA190 0521 8R	2424.9	1897.9 2.0	1541.6 7.8	1365.0 17.6	1252.2 31.4	1171.1 49.0	1108.7 70.5	1017.1 125.4	30.5	40
	240	HA190 0524 8R	2563.5	1874.8 1.5	1522.8 6.0	1348.4 13.5	1263.9 24.0	1156.8 37.5	1095.2 54.0	1004.7 96.0	29.6	40
6	180	HA190 0618 8R	3265.7	2557.6 2.5	2077.4 10.0	1839.5 22.5	1687.4 40.0	1578.1 62.6	1494.1 90.1	1370.6 160.2	36.0	52
	210	HA190 0621 8R	4625.2	3585.7 1.9	2912.5 7.8	2578.9 17.5	2365.7 31.0	2212.5 48.5	2094.8 69.8	1921.5 124.1	40.9	60
8	150	HA190 0815 8R	2918.8	2626.9 2.7	2172.9 10.8	1924.0 24.4	1764.9 43.3	1650.7 67.7	1562.8 97.5	1433.6 173.3	31.3	47
	180	HA190 0818 8R	3677.3	3196.4 1.9	2596.2 7.7	2298.9 17.3	2108.8 30.8	1972.3 48.1	1867.3 69.3	1712.9 123.2	33.9	52
10	120	HA190 1012 8R	2563.5	2307.2 3.0	2080.2 12.0	1841.9 27.0	1689.6 48.0	1580.2 75.0	1496.1 108.0	1372.4 192.0	29.6	40
	150	HA190 1015 8R	2761.4	2485.3 1.9	2019.2 7.7	1787.9 17.3	1640.1 30.7	1533.9 48.0	1452.3 69.1	1332.2 122.9	28.5	40
12	120	HA190 1212 8R	2728.5	2455.7 2.5	2319.2 10.1	2053.6 22.7	1883.8 40.4	1761.8 63.2	1668.0 91.0	1530.1 161.8	28.6	40
	150	HA190 1215 8R	2890.2	2601.2 1.6	2232.4 6.5	1976.7 14.6	1813.2 25.9	1695.8 40.4	1605.6 58.2	1472.8 103.5	27.7	40
15	120	HA190 1512 8R	2968.1	2671.3 2.2	2671.3 8.9	2427.8 20.0	2227.1 35.6	1472.8 55.6	1394.4 80.1	1279.1 142.4	23.6	35
	150	HA190 1515 8R	3146.2	2831.6 1.4	2640.1 5.7	2337.8 12.8	2144.5 22.8	1418.2 35.6	1342.7 51.3	1231.7 91.1	23.0	35
16	120	HA190 1612 8R	2866.9	2580.2 2.1	2580.2 8.3	2310.6 18.6	2119.6 33.1	1401.7 51.6	1327.1 74.4	1217.4 132.2	22.9	32
	150	HA190 1615 8R	3188.9	2870.0 1.3	2724.1 5.4	2412.1 12.1	2212.6 21.4	1463.3 33.5	1385.4 48.2	1270.8 85.7	22.9	35

(3) HA190 cam curve SMS 3(Curve code 7) 2DWELL

S	θ(deg)	CODE	Ts (N • m)	Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Tx (N • m)	SCF (mm)
16	210	HA190 16217R2	2910.5	2619.5 0.5	2414.8 1.9	2138.3 4.4	1961.5 7.8	1834.5 12.2	1736.8 17.5	1593.2 31.1	31.3	47
	240	HA190 16247R2	3605.2	3244.7 0.4	2903.2 1.5	2570.7 3.4	2358.1 6.1	2205.4 9.5	2088.0 13.7	1915.4 24.4	34.3	52
	270	HA190 16277R2	4992.8	4493.5 0.3	4084.6 1.3	3616.8 2.9	3317.7 5.2	3102.9 8.1	2937.7 11.6	2694.8 20.7	39.4	60
20	180	HA190 20187R2	2623.2	2360.9 0.5	2294.0 1.9	2031.2 4.2	1863.3 7.5	1742.6 11.7	1649.9 16.9	1513.4 30.1	29.3	40
	210	HA190 20217R2	3168.5	2851.7 0.4	2810.8 1.6	2488.8 3.6	2283.0 6.3	2135.2 9.9	2021.6 14.3	1854.4 25.4	30.1	47
	240	HA190 20247R2	3872.3	3485.1 0.3	3355.5 1.3	2971.2 2.8	2725.5 5.0	2549.0 7.8	2413.3 11.3	2213.8 20.0	33.0	52
	270	HA190 20277R2	3988.3	3589.5 0.2	3287.2 1.0	2910.7 2.2	2670.0 4.0	2497.1 6.2	2364.2 8.9	2168.7 15.8	32.4	52
24	180	HA190 24187R2	3341.0	3006.9 0.4	2613.4 1.7	2314.1 3.9	2122.8 6.9	1985.3 10.8	1879.6 15.5	1724.2 27.6	28.3	40
	210	HA190 24217R2	3485.6	3137.0 0.3	2548.8 1.3	2256.9 2.8	2070.3 5.1	1936.2 7.9	1833.1 11.4	1681.6 20.3	27.7	40
	240	HA190 24247R2	3590.2	3059.6 0.2	2485.2 1.0	2200.5 2.2	2018.6 3.9	1887.9 6.1	1787.4 8.7	1639.6 15.5	27.2	40
	270	HA190 24277R2	4227.1	3661.9 0.2	2974.4 0.8	2633.7 1.8	2415.9 3.3	2259.5 5.1	2139.2 7.3	1962.4 13.0	28.2	47
32	180	HA190 32187R2	3075.3	2767.8 0.3	2767.8 1.3	2761.0 2.9	2532.7 5.2	1674.9 8.2	1585.8 11.8	1454.7 21.0	23.3	35
	210	HA190 32217R2	3184.7	2866.2 0.2	2866.2 1.0	2682.7 2.2	2460.9 3.9	1627.4 6.0	1540.8 8.7	1413.4 15.4	22.9	35
	240	HA190 32247R2	3262.3	2936.1 0.2	2936.1 0.7	2608.6 1.7	2392.9 2.9	1582.5 4.6	1498.2 6.6	1374.3 11.8	22.6	35
	270	HA190 32277R2	3318.9	2987.0 0.1	2868.3 0.6	2539.8 1.3	2329.8 2.3	1540.7 3.6	1458.7 5.2	1338.1 9.3	22.4	35

Main fact) In case of 2DWELL, dividing and stopping per the rotation of input 1 times are moved at the same cycle 2 times.
The angle of dividend part is the total index angle of input axis of the rotation of one time.

1N • m≒0.102kgf • m

HA230 Torque Chart
(1) 1DWELL cam curve SMS 3(Curve code 7)
(2) 1DWELL cam curve SMCV 3(Curve code 8)
(3) 2DWELL cam curve SMS 3(Curve code 7)

⚠ Attention
The top of torque of dynamic rated output presented at the torque table is totally calculated on the standard of the expected life time that is 8,000 time of the condition of normal operation on the attachment and the lubrication etc.

(1) HA230 cam curve SMS 3(Curve code 7) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) — Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
4	270	HA230 0427 7R	2691.9	2035.7 3.2	1653.5 12.9	1464.1 29.1	1343.0 51.8	1256.1 80.9	1189.2 116.5	1090.9 207.1	38.7	47
5	240	HA230 0524 7R	2963.4	2417.9 3.1	1964.0 12.4	1739.0 27.9	1595.2 49.6	1492.0 77.5	1412.5 111.7	1295.7 198.5	37.6	47
	270	HA230 0527 7R	3169.1	2413.7 2.5	1960.5 9.8	1736.0 22.1	1592.4 39.2	1489.3 61.3	1410.0 88.2	1293.5 156.9	36.5	47
6	180	HA230 0618 7R	4245.3	3684.0 5.0	2992.3 20.0	2649.6 45.0	2430.5 80.0	2273.2 125.0	2152.2 180.0	1974.2 320.0	52.1	60
	210	HA230 0621 7R	5879.5	4985.4 3.6	4049.4 14.5	3585.6 32.6	3289.1 57.9	3076.2 90.5	2912.4 130.4	2671.6 231.7	57.6	70
	240	HA230 0624 7R	6364.0	4983.0 2.8	4047.5 11.1	3583.9 25.0	3287.6 44.4	3074.7 69.3	2911.0 99.8	2670.3 177.4	55.5	70
	270	HA230 0627 7R	6775.0	4962.9 2.2	4031.2 8.8	3569.5 19.7	3274.3 35.0	3062.3 54.8	2899.3 78.9	2659.6 140.2	53.8	70
8	180	HA230 0818 7R	5058.4	4552.6 3.6	3857.2 14.5	3415.4 32.6	3133.0 58.0	2930.2 90.6	2774.2 130.4	2544.8 231.9	48.0	60
	210	HA230 0821 7R	5464.8	4712.8 2.7	3828.0 10.6	3389.5 24.0	3109.3 42.6	2907.9 66.5	2753.2 95.8	2525.5 170.3	46.2	60
	240	HA230 0824 7R	7325.3	6331.5 2.2	5142.8 8.7	4553.8 19.6	4177.3 34.8	3906.8 54.3	3698.8 78.2	3393.0 139.0	51.8	70
	270	HA230 0827 7R	7669.2	6253.5 1.7	5079.5 6.9	4497.7 15.4	4125.8 27.5	3858.6 42.9	3653.3 61.8	3351.2 109.9	50.6	70
10	180	HA230 1018 7R	4187.8	3769.0 3.0	3286.2 12.1	2909.8 27.2	2669.2 48.4	2496.4 75.7	2363.5 108.9	2168.1 193.7	38.6	52
	210	HA230 1021 7R	4469.4	3990.7 2.2	3241.4 8.9	2870.2 20.0	2632.9 35.6	2462.4 55.6	2331.3 80.0	2138.6 142.3	37.4	52
	240	HA230 1024 7R	6252.1	5412.6 1.7	4396.4 6.7	3892.9 15.1	3571.0 26.8	3339.8 42.0	3162.0 60.4	2900.6 107.4	43.0	60
	270	HA230 1027 7R	6456.4	5309.4 1.3	4312.6 5.3	3818.6 11.9	3502.9 21.2	3276.1 33.1	3101.7 47.7	2845.2 84.9	42.2	60
12	120	HA230 1212 7R	3100.4	2790.4 6.6	2661.4 26.3	2356.6 59.3	2161.7 105.3	1684.8 164.6	1595.1 237.0	1463.2 421.4	30.4	40
	150	HA230 1215 7R	5078.9	3778.7 3.6	3069.2 14.4	2717.7 32.3	2493.0 57.5	2331.6 89.9	2207.5 129.4	2024.9 230.0	34.2	47
	180	HA230 1218 7R	6387.4	4562.0 2.6	3705.5 10.3	3281.1 23.1	3009.8 41.1	2814.9 64.2	2665.1 92.5	2444.7 164.4	37.2	52
	210	HA230 1221 7R	6727.8	4470.4 1.9	3631.1 7.5	3215.2 17.0	2949.4 30.2	2758.4 47.2	2611.6 67.9	2395.6 120.8	36.3	52
	240	HA230 1224 7R	6980.2	4374.7 1.4	3553.3 5.8	3146.4 13.0	2886.2 23.1	2699.3 36.1	2555.7 52.0	2344.3 92.5	35.5	52
	270	HA230 1227 7R	7170.6	4280.0 1.1	3476.5 4.6	3078.3 10.3	2823.8 18.3	2640.9 28.5	2500.3 41.1	2293.6 73.1	35.0	52
15	150	HA230 1515 7R	3960.0	3564.0 3.4	3564.0 13.6	3564.0 30.7	3311.8 54.6	1959.1 85.3	1854.8 122.8	1701.5 218.3	28.0	40
	180	HA230 1518 7R	4255.0	3829.5 2.4	3829.5 9.5	3543.1 21.3	3250.2 37.9	1922.7 59.2	1820.3 85.3	1669.8 151.6	27.2	40
	210	HA230 1521 7R	6051.6	4077.3 1.5	3311.8 6.0	2932.5 13.5	2690.0 24.0	2515.8 37.4	2381.9 53.9	2184.9 95.8	31.2	47
	240	HA230 1524 7R	6201.3	3965.3 1.1	3220.8 4.6	2851.9 10.3	2616.1 18.3	2446.7 28.7	2316.5 41.3	2125.0 73.4	30.7	47
	270	HA230 1527 7R	6310.6	3861.2 0.9	3136.3 3.6	2777.1 8.2	2547.5 14.5	2382.5 22.6	2255.7 32.6	2069.2 58.0	30.4	47
16	150	HA230 1615 7R	4069.4	3662.5 3.2	3662.5 12.8	3662.5 28.9	3444.2 51.4	2037.4 80.3	1929.0 115.6	1769.5 205.5	27.7	40
	180	HA230 1618 7R	4348.4	3913.6 2.2	3913.6 8.9	3674.6 20.1	3370.8 35.7	1994.0 55.7	1887.9 80.3	1731.8 142.7	27.0	40
	210	HA230 1621 7R	4547.2	4092.5 1.6	4051.9 6.6	3587.8 14.7	3291.2 26.2	1946.9 40.9	1843.3 59.0	1690.9 104.8	26.5	40
	240	HA230 1624 7R	4691.8	4222.6 1.3	3954.2 5.0	3501.3 11.3	3211.8 20.1	1900.0 31.4	1798.8 45.1	1650.1 80.3	26.1	40
	270	HA230 1627 7R	4799.4	4319.5 1.0	3860.4 4.0	3418.3 8.9	3135.7 15.9	1854.9 24.8	1756.2 35.7	1611.0 63.4	25.8	40

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft. All of the R (right hand) is shown in the torque delivery ability chart .

1N • m≒0.102kgf • m

(2) HA230 cam curve SMCV 3(Curve code8) 1DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) — Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
2	330	HA230 0233 8R	2506.5	1632.4 5.7	1325.9 23.0	1174.0 51.6	1077.0 91.8	1007.2 143.5	953.6 206.6	874.8 367.3	40.6	47
3	270	HA230 0327 8R	2874.3	2057.5 5.8	1671.2 23.0	1479.8 51.8	1357.5 92.1	1269.6 143.9	1202.0 207.2	1102.6 368.4	38.1	47
	300	HA230 0330 8R	3061.0	2057.2 4.7	1671.0 18.7	1479.6 42.0	1357.3 74.6	1269.4 116.6	1201.8 167.9	1102.4 298.4	37.1	47
4	240	HA230 0424 8R	3598.6	2767.2 5.9	2247.7 23.7	1990.2 53.4	1825.7 94.9	1707.5 148.2	1616.6 213.4	1482.9 379.4	41.2	52
	270	HA230 0427 8R	3849.7	2762.8 4.7	2244.1 18.7	1987.0 42.2	1822.7 74.9	1704.7 117.1	1614.0 168.6	1480.5 299.8	40.0	52
5	210	HA230 0521 8R	3323.5	2665.3 5.8	2164.9 23.0	1917.0 51.8	1758.5 92.0	1644.6 143.8	1557.1 207.0	1428.3 368.1	35.7	47
	240	HA230 0524 8R	3534.9	2640.9 4.4	2145.1 17.6	1899.4 39.6	1742.3 70.5	1629.5 110.1	1542.8 158.5	1415.2 281.8	34.6	47
6	180	HA230 0618 8R	5208.0	4080.4 7.1	3314.3 28.4	2934.7 63.9	2692.1 113.6	2517.7 177.4	2383.7 255.5	2186.6 454.2	47.3	60
	210	HA230 0621 8R	7079.5	5470.5 5.1	4443.4 20.6	3934.5 46.3	3609.2 82.2	3375.5 128.5	3195.8 185.0	2931.6 329.0	52.7	70
8	150	HA230 0815 8R	5481.5	4933.4 7.4	4241.0 29.6	3755.3 66.7	3444.8 118.5	3221.7 185.1	3050.2 266.6	2798.0 474.0	46.2	60
	180	HA230 0818 8R	5912.2	5133.9 5.1	4170.0 20.6	3692.4 46.3	3387.1 82.3	3167.8 128.6	2999.2 185.1	2751.2 329.1	44.4	60
10	120	HA230 1012 8R	3462.9	3116.6 9.4	3005.4 37.7	2661.2 84.9	2441.1 150.9	2283.1 235.8	2161.6 339.6	1982.8 603.7	34.6	47
	150	HA230 1015 8R	4480.8	4032.7 6.2	3590.3 24.7	3179.1 55.7	2916.2 99.0	2727.4 154.6	2582.2 222.7	2368.7 395.9	37.4	52
12	120	HA230 1212 8R	5334.8	4140.8 8.0	3363.4 31.9	2978.2 71.7	2731.9 127.5	2555.0 199.3	2419.0 287.0	2219.0 510.2	33.4	47
	150	HA230 1215 8R	5743.2	4018.2 5.1	3263.8 20.4	2890.0 45.9	2651.0 81.6	2479.4 127.5	2347.4 183.7	2153.3 326.5	32.2	47
15	120	HA230 1512 8R	4159.0	3743.1 7.6	3743.1 30.3	3743.1 68.1	3629.0 121.1	2146.7 189.1	2032.5 272.4	1864.4 484.2	27.5	40
	150	HA230 1515 8R	4476.6	4028.9 4.8	4028.9 19.4	3838.6 43.6	3521.2 77.5	2083.0 121.1	1972.1 174.3	1809.0 309.9	26.7	40
16	120	HA230 1612 8R	4258.2	3832.4 7.1	3832.4 28.5	3832.4 64.1	3767.1 113.9	2228.4 178.0	2109.8 256.3	1935.4 455.7	27.2	40
	150	HA230 1615 8R	4555.0	4099.5 4.6	4099.5 18.2	3972.3 41.0	3643.9 72.9	2155.5 113.9	2040.8 164.1	1872.1 291.7	26.5	40

(3) HA300 cam curve SMS 3(Curve code 7) 2DWELL

Number of stop S	Index angle θ(deg)	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) — Number of INDEX per minute (INDEX/min) 25	50	75	100	125	150	200	Camshaft friction torque Tx (N • m)	Cam follower SCF (mm)
16	210	HA230 1621 7R 2	5464.8	4918.3 1.3	4712.8 5.3	4173.0 12.0	3828.0 21.3	3580.1 33.3	3389.5 47.9	3109.3 85.2	46.2	60
	240	HA230 1624 7R 2	7325.3	6592.8 1.1	6331.5 4.3	5606.4 9.8	5142.8 17.4	4809.8 27.2	4553.8 39.1	4177.3 69.5	51.8	70
	270	HA230 1627 7R 2	7669.2	6902.3 0.9	6253.5 3.4	5537.3 7.7	5079.5 13.7	4750.6 21.5	4497.7 30.9	4125.8 54.9	50.6	70
20	180	HA230 2018 7R 2	3591.8	3232.6 1.5	3232.6 5.9	2919.6 13.3	2678.2 23.6	2504.8 36.9	2371.5 53.2	2175.4 94.5	34.2	47
	210	HA230 2021 7R 2	4469.4	4022.5 1.1	3990.7 4.4	3533.6 10.0	3241.4 17.8	3031.6 27.8	2870.2 40.0	2632.9 71.1	37.4	52
	240	HA230 2024 7R 2	6252.1	5626.9 0.8	5412.6 3.4	4792.7 7.6	4396.4 13.4	4111.7 21.0	3892.9 30.2	3571.0 53.7	43.0	60
	270	HA230 2027 7R 2	6456.4	5810.8 0.7	5309.4 2.7	4701.3 6.0	4312.6 10.6	4033.3 16.6	3818.6 23.9	3502.9 42.4	42.2	60
24	180	HA230 2418 7R 2	5458.1	4566.0 1.2	3708.7 5.0	3283.9 11.2	3012.4 20.0	2817.3 31.2	2667.4 44.9	2446.8 79.9	33.0	47
	210	HA230 2421 7R 2	5732.4	4467.8 0.9	3629.0 3.7	3213.4 8.3	2947.7 14.7	2756.8 22.9	2610.1 33.0	2394.2 58.7	32.2	47
	240	HA230 2424 7R 2	5934.2	4367.3 0.7	3547.3 2.8	3141.1 6.3	2881.3 11.2	2694.8 17.5	2551.3 25.3	2340.4 44.9	31.6	47
	270	HA230 2427 7R 2	7170.6	5269.3 0.6	4280.0 2.3	3789.8 5.1	3476.5 9.1	3251.3 14.3	3078.3 20.5	2823.8 36.5	35.0	52
32	180	HA230 3218 7R 2	4348.4	3913.6 1.1	3913.6 4.5	3913.6 10.0	3913.6 17.8	2454.9 27.9	2324.2 40.1	2132.1 71.3	27.0	40
	210	HA230 3221 7R 2	4547.2	4092.5 0.8	4092.5 3.3	4092.5 7.4	4051.9 13.1	2396.9 20.5	2269.4 29.5	2081.7 52.4	26.5	40
	240	HA230 3224 7R 2	4691.8	4222.6 0.6	4222.6 2.5	4222.6 5.6	3954.2 10.0	2339.1 15.7	2214.6 22.6	2031.5 40.1	26.1	40
	270	HA230 3227 7R 2	4799.4	4319.5 0.5	4319.5 2.0	4208.4 4.5	3860.4 7.9	2283.7 12.4	2162.1 17.8	1983.3 31.7	25.8	40

Main fact) In case of 2DWELL, dividing and stopping per the rotation of input 1 times are moved at the same cycle 2 times. The angle of dividend part is the total index angle of input axis of the rotation of one time.

1N • m≒0.102kgf • m

토크 전달 능력표

HA330토크 전달 능력표

(1) 1DWELL 캠곡선 SMS-3(곡선코드 7)
(2) 1DWELL 캠곡선 SMCV-3(곡선코드 8)
(3) 2DWELL 캠곡선 SMS-3(곡선코드 7)

⚠ 주의사항

토크표에 나타낸 동정격출력 토크Top는 취부, 윤활 등 전반적으로 정상운전상태의 기대수명시간 8,000시간을 기준으로 산출되어 있습니다.

(1) HA330 캠곡선 SMS-3(곡선코드 7) 1DWELL

스톱수 S	할부각 θ(deg)	CODE	정정격 출력 토크 Ts (N • m)	상단 동정격출력 토크 Top(N • m) 하단 내부관성부하토크 Toi(N • m) 매분당 INDEX 수(INDEX/min) 25	50	75	100	125	150	200	캠축 마찰토크 Tx (N • m)	산교 캠팔로워 SCF (mm)
4	270	HA330 0427 7R	6229.4	5606.5 16.3	4772.9 65.3	4226.2 146.8	3876.8 261.0	3625.7 407.8	3432.7 587.3		76.5	70
5	240	HA330 0524 7R	5278.6	4750.8 16.3	2449.9 65.2	3763.1 146.7	3452.0 260.7	3228.4 407.4	3056.6 586.6		63.7	60
	270	HA330 0527 7R	5653.8	5088.5 12.9	4245.6 51.5	3759.4 115.9	3448.5 206.0	3225.2 321.9	3053.6 463.5	2801.1 824.0	61.6	60
6	180	HA330 0618 7R	7933.3	7140.0 24.9	6910.4 99.4	6118.9 223.7	5613.0 397.7	5249.5 621.3	4970.1 894.7		96.0	80
	210	HA330 0621 7R	11122.6	10010.4 19.0	9279.5 75.9	8216.7 170.7	7537.3 303.5	7049.3 474.2	6674.1 682.9	6122.2 1214.1	105.0	90
	240	HA330 0624 7R	12969.3	11672.4 14.9	10330.0 59.7	9146.9 134.2	8390.6 238.6	7847.3 372.8	7429.6 536.9	6815.2 954.4	108.4	100
	270	HA330 0627 7R	13815.1	12433.6 11.8	10291.4 47.1	9112.7 106.1	8359.2 188.5	7817.9 294.6	7401.8 424.2	6789.8 754.1	105.0	100
8	180	HA330 0818 7R	9500.9	8550.8 19.2	8550.8 76.7	7919.7 172.5	7264.9 306.7	6794.5 479.2	6432.8 690.1	5900.9 1226.8	87.8	80
	210	HA330 0821 7R	13094.8	11785.3 14.8	11785.3 59.2	10565.9 133.1	9692.3 236.7	9064.7 369.8	8582.2 532.6	7872.6 946.8	96.8	90
	240	HA330 0824 7R	13930.2	12537.1 11.3	11824.0 45.3	10469.8 101.9	9604.1 181.2	8982.2 283.1	8504.1 407.7	7800.9 724.9	93.8	90
	270	HA330 0827 7R	15661.2	14095.1 9.3	12983.7 37.0	11496.6 83.3	10546.0 148.1	9863.2 231.4	9338.2 333.3	8566.0 592.4	98.1	100
10	180	HA330 1018 7R	8241.5	7417.4 14.9	7471.4 59.8	6807.8 134.5	6244.9 239.1	5840.5 373.5	5529.6 537.9	5072.4 956.3	66.4	70
	210	HA330 1021 7R	11321.8	10189.6 11.6	10189.6 46.3	9239.5 104.2	8475.5 185.3	7926.5 289.5	7504.8 416.9	6884.3 741.1	80.1	80
	240	HA330 1024 7R	11851.3	10666.2 88.9	10256.6 35.5	9081.9 79.8	8331.0 141.9	7791.5 221.6	7376.8 319.2	6766.8 567.4	78.0	80
	270	HA330 1027 7R	15698.4	14128.6 7.4	13573.0 29.7	12018.4 66.9	11024.7 118.9	10310.8 185.8	9762.0 267.6	8954.8 475.8	87.6	90
12	120	HA330 1212 7R	4260.6	3834.5 29.2	3834.5 116.7	3837.5 262.5	3834.5 466.7	3673.5 729.2			50.9	52
	150	HA330 1215 7R	6343.9	5709.5 19.2	5709.5 76.6	5709.5 172.4	5480.0 306.5	5125.2 478.9	4852.4 689.6	4451.2 1226.0	57.3	60
	180	HA330 1218 7R	8715.8	7844.2 13.8	7844.2 55.2	7844.2 124.2	7284.0 220.8	6812.3 345.0	6449.7 496.8	5916.4 883.3	63.8	70
	210	HA330 1221 7R	9226.9	8304.2 10.1	8304.2 40.6	7800.8 91.3	7155.8 162.2	6692.5 253.5	6336.2 365.0	5812.3 648.9	62.0	70
	240	HA330 1224 7R	9611.1	8650.0 7.8	8638.3 31.1	7649.0 69.9	7016.5 124.2	6562.2 194.1	6212.9 279.5	5699.2 496.8	60.7	70
	270	HA330 1227 7R	9904.2	8913.7 6.1	8464.6 24.5	7495.1 55.2	6875.4 98.1	6430.2 153.3	6087.9 220.8	5584.5 392.6	59.6	70
15	150	HA330 1515 7R	5254.7	4729.2 15.1	4729.26 60.4	4729.2 135.9	4472.8 241.6	4183.2 377.5	3960.5 543.6	3633.0 966.4	46.3	52
	180	HA330 1518 7R	7421.0	6678.9 10.8	6678.9 43.3	6678.9 97.5	6152.7 173.2	5754.3 270.7	5448.0 389.8	4997.5 693.0	53.1	60
	210	HA330 1521 7R	7729.3	6954.4 8.0	6956.4 31.8	6535.8 71.6	5995.4 127.3	5607.2 198.9	5308.7 286.4	4869.8 509.1	51.9	60
	240	HA330 1524 7R	7951.2	7156.1 6.1	7156.1 24.4	6368.7 54.8	5842.1 97.5	5463.8 152.3	5173.0 219.3	4745.2 389.8	50.9	60
	270	HA330 1527 7R	8115.0	7303.5 4.8	7013.8 19.3	6210.5 43.3	5697.0 77.0	5328.1 120.3	5044.5 173.2	4627.4 308.0	50.2	60
16	150	HA330 1615 7R	5373.6	4836.2 14.2	4836.2 56.8	4836.2 127.9	4636.7 227.3	4336.5 355.2	4105.7 511.5	3766.2 909.3	45.7	52
	180	HA330 1618 7R	7557.0	6801.3 10.2	6801.3 40.8	6801.3 91.9	6364.5 163.3	5952.4 255.2	5635.5 367.5	5169.6 653.3	52.5	60
	210	HA330 1621 7R	7841.6	7057.4 7.5	7057.4 30.0	6748.2 67.5	6190.2 120.2	5789.4 187.5	5481.2 270.0	5028.0 480.0	51.4	60
	240	HA330 1624 7R	8044.5	7240.0 5.6	7240.0 23.0	6566.5 51.7	6023.6 91.9	5633.5 143.5	5333.7 206.7	4892.7 367.5	50.5	60
	270	HA330 1627 7R	8193.0	7373.7 4.5	7224.2 18.2	6396.8 40.8	5867.9 72.6	5487.9 113.4	5195.8 163.3	4766.2 290.4	49.9	60

주) 입 • 출력축의 회전방향을 나타내는 오른손 캠(R), 왼손 캠(L)에 의한 토크 전달 능력은 변함 없습니다.
토크 전달 능력표 안에는 R(오른손 캠)로써 전체가 표시되어 있습니다.

1N • m≒0.102kgf • m

(2) HA330 캠곡선 SMCV-3(곡선코드 8) 1DWELL

스톱수 S	할부각 θ(deg)	CODE	정정격 출력 토크 Ts (N • m)	상단 동정격출력 토크 Top(N • m) 하단 내부관성부하토크 Toi(N • m) 매분당 INDEX 수(INDEX/min) 25	50	75	100	125	150	200	캠축 마찰토크 Tx (N • m)	산교 캠팔로워 SCF (mm)
2	330	HA3300233 8R	4451.4	3523.1 30.2	2861.6 120.9	2533.9 272.1	2324.4 483.7				69.3	60
3	270	HA3300327 8R	5116.9	4448.5 30.3	3613.3 121.1	3199.4 272.6	2934.9 484.5	2744.9 757.1			64.7	60
	300	HA3300330 8R	6896.9	5988.6 25.2	4864.2 100.9	4307.1 227.1	3951.0 403.7	3695.2 630.7	3498.5 908.2		72.7	70
4	240	HA3300424 8R	7159.8	6526.1 29.3	5300.9 117.2	4693.7 263.8	4305.6 468.9	4026.8 732.7	3812.5 1055.1		71.4	70
	270	HA3300427 8R	9791.9	8812.7 24.2	7246.2 96.8	6416.2 217.7	5885.7 387.0	5504.6 604.7	5211.6 870.8	4780.7 1548.0	86.5	80
5	210	HA3300521 8R	7515.8	6764.3 31.2	6318.0 124.7	5594.4 280.5	5131.8 498.7	4799.5 779.2	4544.0 1122.0	4168.3 1994.7	69.5	70
	240	HA3300524 8R	8019.8	7217.8 23.9	6270.1 95.5	5552.0 214.8	5092.9 381.8	4763.1 596.5	4509.6 859.0	4136.7 1527.2	67.4	70
6	180	HA3300618 8R	12438.2	11194.3 36.7	10277.5 146.6	9100.4 329.9	8347.9 586.4	7807.3 916.3	7391.8 1319.5		99.4	90
	210	HA3300621 8R	14442.9	12998.6 27.6	11346.6 110.6	10047.1 248.9	9216.3 442.4	8619.5 691.2	8160.8 995.4	7486.0 1769.6	102.6	100
8	150	HA3300815 8R	10326.6	9293.9 39.2	9393.9 156.7	8720.9 352.7	7999.8 627.0	7481.8 979.6	7083.6 1410.7	6497.9 2507.8	84.2	80
	180	HA3301818 8R	11175.2	10057.7 27.2	9700.3 108.9	8589.3 244.9	7879.1 435.4	7368.9 680.3	6976.7 979.6	6399.8 1741.5	80.7	80
10	120	HA3301012 8R	8019.8	7217.8 47.7	7217.8 190.9	7217.8 429.5	6957.1 763.6	6506.6 1193.1	6160.3 1718.0		67.4	70
	150	HA3301015 8R	11349.6	10214.6 32.2	10214.6 128.9	10214.6 290.0	9387.2 515.5	8779.4 805.4	8312.1 1159.8	7624.8 2061.9	80.0	80
12	120	HA3301212 8R	6699.6	6029.6 42.5	6029.6 170.0	6029.6 382.4	6021.5 679.9	5631.5 1062.3	5331.8 1529.7		55.9	60
	150	HA3301215 8R	9247.3	8322.6 28.2	8322.6 112.8	8322.6 253.9	7924.6 451.4	7411.4 705.3	7017.0 1015.6	6436.8 1805.5	62.0	70
15	120	HA3301512 8R	7279.8	6551.9 34.6	6551.9 138.3	6551.9 311.3	6551.9 553.3	6436.5 864.6	6093.9 1245.0		53.6	60
	150	HA3301515 8R	7741.2	6967.1 22.1	6967.1 88.5	6967.1 199.2	6637.3 354.1	6207.5 553.3	5877.1 796.8	5391.2 1416.5	51.8	60
16	120	HA3301612 8R	7425.7	6683.1 32.6	6683.1 130.4	6683.1 293.4	6683.1 521.7	6663.6 815.1	6308.9 1173.7		53.1	60
	150	HA3301615 8R	7852.6	7067.3 20.9	7067.3 83.5	7067.3 187.8	6852.5 333.9	6408.8 521.7	6067.6 751.2	5565.9 1335.4	51.4	60

(3) HA330 캠곡선 SMS-3(곡선코드 7) 2DWELL

스톱수 S	할부각 θ(deg)	CODE	정정격 출력 토크 Ts (N • m)	상단 동정격출력 토크 Top(N • m) 하단 내부관성부하토크 Toi(N • m) 매분당 INDEX 수(INDEX/min) 25	50	75	100	125	150	200	캠축 마찰토크 Tx (N • m)	산교 캠팔로워 SCF (mm)
16	210	HA330 1621 7R2	10293.8	9264.4 7.0	9264.4 28.2	9264.4 63.4	8889.1 112.7	8313.5 176.0	7871.0 253.5	7220.2 450.7	84.3	80
	240	HA330 1624 7R2	13930.2	12537.1 5.7	12537.1 22.7	12537.1 51.0	11824.0 90.6	11508.4 141.6	10469.8 203.9	9604.1 362.4	93.8	90
	270	HA330 1627 7R2	15661.2	14095.1 4.6	14095.1 18.5	14095.1 41.7	12983.7 74.1	12143.0 115.7	11496.8 166.6	10546.0 296.2	98.1	100
20	180	HA330 2018 7R2	6496.0	5846.4 7.2	5846.4 29.0	5846.4 65.2	5702.6 115.9	5333.4 181.1	5049.5 260.7	4632.0 463.5	57.3	60
	210	HA330 2021 7R2	11321.8	10189.6 5.8	10189.6 23.2	10189.6 52.1	10189.6 92.6	9758.9 144.7	9239.5 208.4	8475.5 370.5	80.1	80
	240	HA330 2024 7R2	15152.5	13637.2 4.7	13637.2 18.8	13637.2 42.3	13637.2 75.3	12919.9 117.6	12232.2 169.4	11220.8 301.1	89.5	90
	270	HA330 2027 7R2	15698.4	14128.6 3.7	14128.6 14.9	14128.6 33.5	13573.0 59.5	12694.1 92.9	12018.4 133.8	11024.7 237.9	87.6	90
24	180	HA330 2418 7R2	8715.8	7844.2 6.9	7844.2 27.6	7844.2 62.1	7844.2 110.4	7844.2 172.5	7844.2 248.4	7284.0 441.6	63.8	70
	210	HA330 2421 7R2	9226.9	8304.2 5.1	8304.2 20.3	8304.2 45.6	8304.2 81.1	8239.4 126.7	7800.8 182.5	7155.8 324.5	62.0	70
	240	HA330 2424 7R2	12461.1	11215.4 3.7	11215.4 14.8	11215.4 33.2	11215.4 59.1	10669.8 92.3	10101.8 132.8	9266.5 236.1	75.6	80
	270	HA330 2427 7R2	12788.0	11509.2 3.0	11509.2 11.7	11509.2 26.3	11155.7 46.7	10433.3 72.9	9878.0 105.0	9061.2 186.6	74.2	80
32	180	HA330 3218 7R2	7557.0	6801.3 5.1	6801.3 20.4	6801.3 45.9	6801.3 81.7	6801.3 127.6	6801.3 183.7	6364.5 326.7	52.5	60
	210	HA330 3221 7R2	7841.6	7057.4 3.7	7057.4 15.0	7057.4 33.7	7057.4 60.0	7057.4 93.7	6748.2 135.0	6190.2 240.0	51.4	60
	240	HA330 3224 7R2	8044.5	7240.0 2.9	7240.0 11.5	7240.0 25.8	7240.0 45.9	6935.7 71.8	6566.5 103.4	6023.6 183.7	50.5	60
	270	HA330 3227 7R2	8193.0	7373.7 2.3	7373.7 9.1	7373.7 20.4	7224.2 36.3	6756.4 56.7	6396.8 81.7	5867.9 145.2	49.9	60

주) 2DWELL의 경우, 입력축 1회전당, 할출 • 정지를 동일 사이클에서 2회 움직입니다.
할부각은 입력축 1회전 TOTAL의 인덱스각입니다.

1N • m≒0.102kgf • m

■ Regarding the selecting model

Please be cautious when selecting the mode. If users select the wrong model, the performance of the product will not be fully activated and also it may become the reason for early breakage. The input and output conditions are the main factors for selection therefore please make all the condition clear before selecting. Also, there are special calculation, symbols and etc for indexing drive so please do not hesitate to contact us for any further questions. We are providing the model selection by calculating the torque as for service so if you fill out the "Fax Sheet" and give us fax, we will take care of it.

■ Steps for model selection

<Order>

(1) Decision of the number of stop(s)
Select the proper number of stop on the use condition according the list of 「Standard specification」.

(2) Decision of the index angle (θ)
Select the closest index angle from the list of 「Standard specification」 in order to calculate the index angle (θ) according to the stopping time and the ratio of dividing time.
$t_1 : t_2 = (360° - \theta) : \theta$
Select 240°~270° in case of activating and stopping the camshaft by the inverter control and brake motor.

(3) Calculation of number of rotation of input shaft(N)

$$N = \frac{60}{t_2} \cdot \frac{\theta}{360 Xm}$$

(4) Calculation of moment of inertia (J) [Formula (A)]
Calculate the moment of inertia (J) of the table, jig work and etc.

(5) Calculation of required torque (T_t) [Formula (B, C, D, E)]
Calculate the required necessarytorque (T_t) after calculating the inertial torque(T_i), friction torque(T_f), and working load torque(T_W).

(6) Selecting model
Select the size where the dynamic rated output torque Top (refer to torque chart) exceeds the required torque (T_t) considering the selected number of stops, indexing angle, cam curve and RPM.

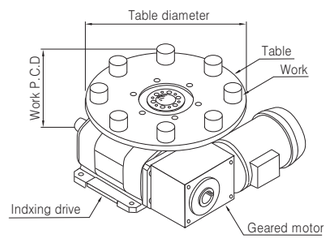
(7) Calculation of camshaft torque (Tc) [Formula (F)]

(8) Selecting motor [Formula (G)]
Select the motor after calculating the necessary motor power (P_S).

(9) Calculation (a_4) of backlash factor (Backlash factor)
1. Decide the backlash of input machine (Backlash factor), torsion, and total amount of bending

Figure 88-1

• In case of table driving



Needed data
① Number of stop
② (t_2)Stopping time(t_1) and Dividing time(t_2)
③ Mass of Table, external diameter
④ Number and mass of Jig, Attachment P.C.D
⑤ Number and mass of work, Attachment P.C.D
⑥ Whether the option is installed or not
⑦ Expected life time

- In case of mounting the hypoid gear reducer ····· Bi=0.6
- In case of mounting the worm gear reducer ····· Bi=0.4

2. Calculation of backlash (Ba) of converting the output shaft

$$Ba = \frac{Bi \times Vm \times 360}{S \cdot \theta}$$

3. Calculation of inertia revival rate (ε)

$$Ba = \frac{T_i + T_{oi} - T_f}{T_S} \times 100$$

4. Decision of backlash factor (a_4)
Calculate the backlash factor to refer to the table 89-5 from the backlash of converting the output shaft calculated and the inertia load rate.

(10) Checking the desired life time(L_h) [Formula H)]
Calculate the L_h after calculating the life coefficient (L_f)
Calculate the summary value on the table 89-4.

(11) Selecting geared motor
1. Check if the motor selected at the (8) of the selected index can be installed at the characteristic table of geared motor. Please check the attention of characteristic table since the big geared motor of one size is installed as the special specification according to the type.
2. Select the rpm of input shaft(N) and the deceleration ratio (i) from the characteristic table.
Please select the deceleration ratio to be the fixed number of rotation at the frequency (40~60HZ) of setting inverter in case of successive rotation when controlling the inverter.
3. Check if the torque of allowed output of geared motor(T_R) exceeds the torque of camshaft(T_C).

• Used sign at selecting the model

a_4	: Backlash factor	L_h	: Expected life time(hr)	S	: Number of stop	T_S	: Static rated output torque(N • m)
Am	: Dimensionless Maximum Acceleration	m	: Number of Dwell	t_1	: Stopping time(sec)	T_t	: Output shaft necessary torque(N • m)
Ba	: Backlash of converting the output shaft	M	: Mass(kg)	t_2	: Grading time(sec)	T_W	: Working load torque (N • m)
E	: Braking efficiency of regenerative inverter	N	: Number of rotation of input shaft(rpm)	t_4	: Breaking time of starting • stoping(sec)	T_X	: Camshaft friction torque (N • m)
F	: Work load (N)	N_D	: Number of rotation of maximum output(rpm)	t_D	: Dwell time	Vm	: Non-dimensional maximum velocity
i	: Deceleration ratio(i>1)	N_M	: Number of rotation of motor(rpm)	T_C	: Camshaft torque(N • m)	W	: Weight(N)
J	: Total moment of inertia of output load(kg • m^2)	N_R	: Number of rotation of output of geared motor(rpm)	T_d	: Start/stop torque(N • m)	β	: Working angle(deg)
J_C	: Moment of inertia of input shaft(kg • m^2)	P	: Transfer pitch(m)	T_f	: Frictional torque(N • m)	γ	: Rotating speed ratio γ>1
J_M	: Moment of inertia of motor(kg • m^2)	P_{INV}	: Amount of inverter(Kw)	T_i	: Inertial torque(N • m)	θ	: Index angle(deg)
J_{MC}	: Moment of inertia of converting the motor shaft(kg • m^2)	P_S	: Motor power(Kw)	T_{oi}	: Internal inertia torque (N • m)	θ_d	: Braking angle of input shaft
K	: Radius of rotation (m)	Qm	: Non-dimensional maximum camshaft fact	T_{op}	: Dynamic rated output torque (N • m)	μ	: Frictional coefficient
L_f	: life coefficient	R	: Rotation pitch cycle radius (m)	T_R	: Allowed torque of output of geared motor (N • m)	ε	: Inertia load rate

Formula

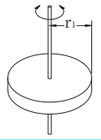
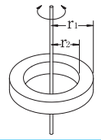
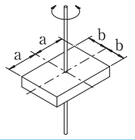
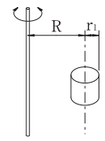
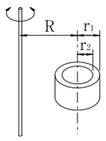
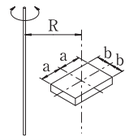
Table 89-1

	In case of rotation movement	In case of direct movement
(A) J Moment of inertia	$J = MK^2$ (kg • m^2)	$J = M\left(\frac{S \cdot P}{2\pi}\right)^2$ (kg • m^2)
(B) Ti Inertial torque	$Ti = 226.2\ Am \frac{J \cdot N^2}{S \cdot (\theta/m)^2}$ (N • m)	$Ti = 5.73Am \frac{M \cdot S \cdot P^2 \cdot N^2}{(\theta/m)^2}$ (N • m)
(C) Tf Friction torque	$Tf = W \cdot \mu \cdot R$ (N • m)	$Tf = \frac{W \cdot \mu \cdot S \cdot P}{2\pi}$ (N • m)
(D) Tw Working load torque	$Tw = R \cdot F \cdot \cos\beta$ (N • m)	$Tw = \frac{F \cdot S \cdot P}{2\pi} \cos\beta$ (N • m)
(E) Tt Necessary torque	$Tt = Ti + Tf + Tw$ (N • m)	
(F) Tc Camshaft torque	$Tc = 500\ Qm \frac{1}{S \cdot \theta}$ (Tt+Toi)+ Tx (N • m)	
(G) Ps Motor power	$Ps = \frac{Tc \cdot N}{9550}$ (Kw)	
(H) Lh Expected life time	$Lh = 8000Lf^{10/3}$ (hr)	단, $Lf = \frac{Top}{a_4(Ti+Toi)+Tf+Tw}$
(I) P_{INV1} Capacity of inverter	$P_{INV1} = \frac{a_4 \times Tc \times N}{9550 \times E}$ (Kw)	

In case of indirect movement	Please calculate as below in case of gaining the indirect rotation from the output shaft or the direct movement.			
	Equivalent inertial moment	$Je = J/\gamma^2$	Equivalent frictional torque	$Tfe = Tf/\gamma$
	Equivalent working load torque	$Twe = Tw/\gamma$	Equivalent inertial torque	$Tie = Ti/\gamma$

■ Radius of rotation K

Table 89-2

			
K^2	$\frac{r_1^2}{2}$	$\frac{r_1^2+r_1^2}{2}$	$\frac{a^2+b^2}{3}$
			
K^2	$\frac{r_1^2}{2}+R^2$	$\frac{r_1^2+r_1^2}{2}+R^2$	$\frac{a^2+b^2}{3}+R^2$

■ Characteristic table of cam curve(Am,Vm,Qm)

Table 89-3

Cam curve	Cam curve	Maximum speed Vm	Maximum acceleration Am	Torque coefficient of maximum camshaft Qm
SMS-3	7	1.818	±4.848	±1.178
SMCV-3	8	1.290	±6.882	±0.836

■ Life factor Lf and life hour Lh(hr)

Table 89-4

Lh(hr)	Lf	Lh(hr)	Lf	Lh(hr)	Lf
2000	0.659	10000	1.06	26000	1.42
3000	0.745	12000	1.12	28000	1.45
4000	0.812	14000	1.18	30000	1.48
5000	0.868	16000	1.23	35000	1.55
6000	0.917	18000	1.27	40000	162
7000	0.960	20000	1.31	45000	1.67
8000	1.00	22000	1.35	50000	1.73
9000	1.03	24000	1.39	55000	1.78

■ Blacklash factor a_4

Table 89-5

Ba \ ε	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
0.05	1.00	1.05	1.07	1.09	1.10	1.12	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.19	1.20	1.21
0.1	1.02	1.11	1.15	1.18	1.21	1.24	1.26	1.27	1.29	1.31	1.33	1.35	1.37	1.39	1.41	1.43	1.44
0.2	1.06	1.21	1.30	1.36	1.42	1.48	1.51	1.54	1.57	1.60	1.63	1.66	1.69	1.72	1.75	1.78	1.81
0.3	1.08	1.28	1.40	1.48	1.56	1.64	1.68	1.72	1.76	1.80	1.84	1.88	1.92	1.96	2.00	2.04	2.08
0.4	1.10	1.35	1.50	1.60	1.70	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35
0.5	1.12	1.42	1.60	1.72	1.84	1.96	2.02	2.08	2.14	2.20	2.26	2.32	2.38	2.44	2.50	2.56	2.62

ε : Inertia load rate, Ba : backlash of converting the output shaft

■ In case of selecting inverter

Please check the capacity according to below order to choose it after referring to the catalog about the maker of basically sufficient capacity and the type since selecting the proper inverter on the use condition is necessary in case the ON and OFF of HA series is controlled by the inverter.

■ Order of selecting inverter

<Order>

Calculate and select the capacity of the inverter (PINV1) to activate and stop the motor at the location of the DWELL to consider the capacity of the inverter (PINV1) needed for the driving index to perform the successive rotation of the input shaft (Cam shaft) of HA series in case of the inverter type and the moment of inertia of geared motor etc.

⚠ An amount of the inverter means the amount of named inverter(Amount of motor of standard application) not the rated capacity.

<Capacity in case of performing the continuous rotation on the input shaft: P_{INV1}>

(1) Decision of efficiency on regenerative braking torque (E)

Please refer to the catalog of inverter to use since the regenerative braking torque (E) is different according to whether the maker of the inverter, the type, the capacity and the external braking resistance are used. That is, the value of E is 150% ... 1.5, 100% ... 1.0, 50% ... 0.5, 20% ... 0.2.

(2) Calculation of capacity of inverter(P_{INV1}) [Formula (1)]

Select the type exceeding the amount of motor of selecting motor(8) in case of calculating the amount of inverter.

<Required capacity for activating and stopping of motor: P_{INV2}>

(1) Calculation of DWELL time(t_D)

Calculate the DWELL time (Stopping time) in case the cam shaft (input shaft) of alpha series is rotated successively as the number of using rotation

$$t_D = \frac{60}{N} \times \frac{360-\theta}{360}$$

(2) Calculation of moment of inertia converting motor shaft(J_{MC})

1. Check the moment of inertia (J_C) of input shaft of index at the characteristic table.
2. Check the moment of inertia of motor of geared motor (J_M) at the characteristic table.
3. Calculate the moment of inertia of converting motor shaft (J_{MC}) excluding the load of the index output.

$$J_{MC} = \frac{J_C}{i^2} + J_M$$

(3) Decision of inverter capacity (P_{INV})

1. Check of rpm of mounted motor (N_M)
   50Hz ··· 1500rpm, 60Hz ··· 1800rpm
2. Calculation of inverter capacity (P_{INV2})

$$P_{INV2} = \frac{J_{MC} \times N_M^2}{91406 \times t_D}$$

3. Decision of amount of inverter necessary on the driving HA series (P_{INV})
   Decide the product to meet the below condition finally in case of the amount of inverter necessary on the driving HA series.
   $P_{INV} \geqq P_{INV1}, P_{INV2}$

(4) Calculation of breaking time of starting • stopping (t_d)

Calculate the breaking time necessary to activate or stop the index of inverter.

$$t_d = \frac{J_{MC} \times N_M^2}{91406 \times P_{IVN}}$$

⚠ There is an case of that the minimum setting ability of breaking time is 0.1 seconds in case of the type of inverter. In this case, please set as 0.1 seconds. In addition, please refer to the catalog of inverter to use since the make, the acceleration according to the type and the setting scope of reduction time is decided.

(5) Braking angle of camshaft (θ_d)

Calculate the braking angle necessary to acquire the sign of sensor by the timing cam etc. on the cam shaft of index.

$\theta_d = 3 \times N \times t_d$

The angle of $2\theta_d$ is needed as the θd is the angle when activating and starting in case of adjusting the timing cam.

(6) Reduction of braking angle of camshaft

The change of inverter is needed according to the below order in case the braking angle of camshaft is required less. (θ_d)

1. Check if the inverter to be able to adjust exists even though the minimum setting of braking time is below 0.1 seconds.
2. Check the braking angle demanded. (θ_d)
3. Calculate the braking time demanded. (t_R)

$$t_R = \frac{\theta_R}{3 \times N}$$

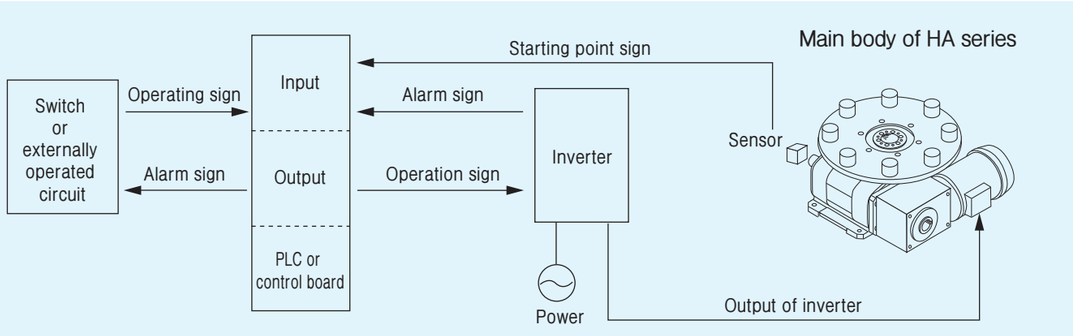
4. Re check the inverter capacity (P_{INVR})

$$t_R = \frac{J_{MC} \times N_M^2}{91406 \times t_R}$$

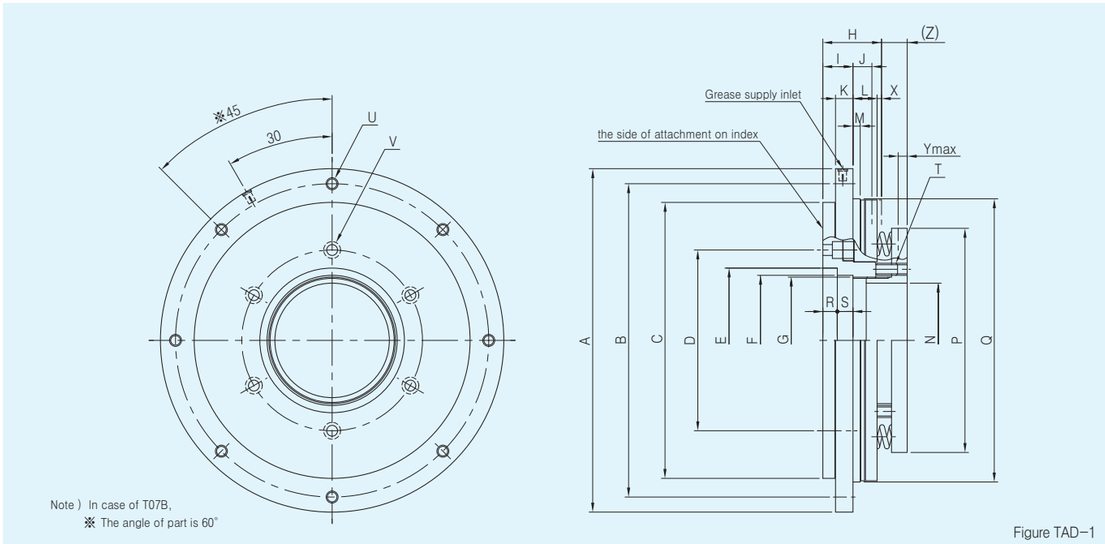
Select the inverter of the larger capacity in case of exceeding the capacity of inverter (P_{INV}) selected at the procedure (3) in case of the figure calculated according to above contents.

Controlling block diagram

Figure 90-1



Dimension diagram



Note) In case of T07B,
※ The angle of part is 60°

Figure TAD-1

• Value table

Table TAD-1

Form	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	X	Ymax	Z
T07B	Ø180	Ø168	Ø152	Ø85	Ø70 H7	Ø60	M55 -2	33	19	14	10.5	14	5	Ø47	Ø107	Ø155 h7	7	10	(4) M5	(6)M5 -0.8	(6) 6.6DR.	3	5	16.5
T09B	Ø240	Ø220	Ø198	Ø120	Ø100 H7	Ø85	M80 -2	39	22.5	16.5	12.5	17.5	5	Ø70	Ø158	Ø200 h7	7	16	(4) M10	(8)M8 -1.25	(6) 6.6DR.	3.5	7	23
T11B	Ø285	Ø260	Ø229	Ø150	Ø120 H7	Ø108	M105 -2	44	25	19	14.5	20	6	Ø95	Ø186	Ø235 h7	12	13	(4) M10	(8)M10 -1.5	(6) 9DR.	3.7	7.5	26
T15B	Ø395	Ø365	Ø328	Ø210	Ø172 H7	Ø155	M145 -2	64	37	27	20	27	6	Ø130	Ø256	Ø335 h7	12	33	(4) M10	(8)M12 -1.75	(6) 11DR.	5.5	7	26
T19B	Ø480	Ø450	Ø419	Ø260	Ø230 H7	Ø186	M180 -2	80	42	38	21	33	8	Ø166	Ø326	Ø420 h7	16	43	(4) M10	(8)M12 -1.75	(8) 14DR.	5.6	7	31
T23B	Ø555	Ø525	Ø494	Ø336	Ø275 H7	Ø262	M260 -2	82	47	35	25	35	9	Ø246	Ø402	Ø495 h7	7	44	(4) M10	(8)M14 -2	(8) 14DR.	6.5	8	36

[Unit:mm]

• Characteristic table

Table TAD-2

Code		Range of adjustment of blocked torque (N • m)	Screw pitch of nut adjusting torque (mm)	Maximum load of allowed RADIAL (N)	Maximum load of allowed THRUST (N)	Maximum bending moment allowed (N • m)	Maximum number of allowed rotation (r.p.m)	Moment of inertia (kg • m²)	Mass (kg)
T07B	15L	40~150	2	2450	2950	45	200	0.02	4.5
	25H	100~250							
T09B	20L	60~200	2	5200	5000	100	200	0.07	9.6
	45H	140~450							
T11B	23L	90~230	2	7300	7000	180	200	0.15	15
	60H	150~600							
T15B	100L	300~1000	2	11800	12000	430	140	0.8	43
	220H	650~2200							
T19B	200L	500~2000	2	16800	17000	750	120	2.1	74
	450H	1500~4500							
T23B	350L	1200~3500	2	24800	35000	1950	100	4.5	110
	550H	2000~5500							

⚠ Attention

1. Please tighten the bolt set correctly after adjusting the torque.
2. Please re check it when ordering since the specification and figure is changed without the notification.

X : The panel of overload detection moves to Xmm if the overload is performed. Please control the driving after using the detection of SWITCH to use this movement.

(Z) : This figure is the amount of protrusion of the nut adjusting torque when the spring is the free height. Please refer to this Z figure in case the blocked torque generates.

Ymax : This figure is the amount of clamping of the adjusting torque nut in case of maximum blocked torque. Please pay attention since the movement is impossible in case of it is clamped over this values.

■ Handling of HA series

Since the accuracy of roller gear cam type index drive has high accuracy, it may cause early breakage or may decrease the performance of mounted automatic machine in case of faulty usage. Therefore, please fully understand the product and use it correctly.

(1) Installation

Please remove to use the emulsion in case the crack, impurity and stamp, etc remain. Please install the equipment after applying the grease and mineral oil for preventing the rust of installed face after cleaning up.Please attach on the stable bottom stably since the load of large fluctuation is acted at the device.

(2) Environment

The environment does critically affect the performance of device. The installation place should be carefully examined and researched and find the solution for any trouble.

a) The proper temperature is 0 ~ 40.

b) Humid environment condition may generate the rust easily. Please perform rust-proof treatment carefully.

c) Input/Output axis are sealed by oil seal. However, it still may generate the leakage of oil or surface abrasion depending on the amount of dust, type of dust and etc. Therefore please consider to use the protection cover.

(3) Operation

The problem generates in case of driving rightly after terminating the attachment of parts since the automatic machine to use the grading device is complicatedly made by the many parts.

Please check if the obstacle is generated by performing the rotation at low speed or by rotating by the hand whenever the major part is attached. Please check if it operates rightly to perform the operation at low speed or to act it by hand. After that, please check that the power driving is acted, abnormal sound or abnormal vibration, change of temperature and the oil leak etc.

(4) Handing of input axis

It becomes the standard location of the index angle when the main line of the gap of key of input shaft exits on the direction of turret. The opening location to be dividing in case of indexing drive and the decision of location and the safely sending impulsive load in case of key are used. Please examine the other sending method not to depend on the sending key in case of acquiring the safe operation.

(5) Handling of output

a) The output part of index device needs the strongly torsional rigidity since the inertial torque of statics load at activating and stopping to be accompanied is acted when attaching. In addition, the motion is not permitted in case of the rotation to keep the extent of decision of location. The output part of HA type is made to be able to perform the attachment simply and to have the high extent of table etc since the flange part to support the table is largely designed

b) Please lock the lock pin according to the requirement, lock the bolt and meet the concentricity while the table is moved toward the axial gradient and the rotation after processing largely the extent of 0.1~0.2mm in case of the hole diameter of focal table. The locking torque of bolt that we recommend at the flange of index is as below.

c) The strongly fixed flange of the penetration hole is set by the standard at the main of output part. The fixed table is possible to attach to this fixed flange directly. In addition, this can be used very conveniently in case of piping and wiring the since the attachment base is performed as the hole processing at the main location of output part.

	Attachment bolt		(Recommendation) LOCK PIN HOLE	
	Size	Locked torque	Location of processing	Depth of processing
HA070	6-M6	13.5N • m	P.C.D.85	12㎜
HA090	6-M6	13.5N • m	P.C.D.120	12㎜
HA110	6-M8	34N • m	P.C.D.150	16㎜
HA150	6-M10	67.5N • m	P.C.D.210	20㎜
HA190	8-M12	84N • m	P.C.D.260	24㎜
HA230	8-M12	84N • m	P.C.D.336	24㎜

(6) Lubrication

There is the important role such as the decrease of frictional heat of each part of electricity body, the removal of frictional heat and the preventing the rust on electricity side etc. in case of lubrication.

However, it causes the extent decline and lifetime decline in case the correct lubricating oil is not selected. Thus, please decide it to consider of use condition. We recommend the quality thing including the additive material of extreme pressure in case of lubricating oil. But, please do not mix the oil of the other company's oil. Please select the proper things at below table since the viscosity is different according to the number of rotation.

(7) Repair • maintenance

a) The size of backlash of input output type increases as the year changes. Please perform the regular check and adjustment.

b) Please keep the adequate amount since it causes the abnormal temperature rise and the flowing oil in case of having a lot of flux of lubricating oil.

c) Please exchange the lubricating oil once per year and 3,000 time per operation even though the operation time is short.

(8) Lubrication of geared motor

• In case of geared motor

The grease lubrication method is chosen in case of lubrication.

The exchange of grease and supply is not required mainly.

• In case of geared motor of helical worm

Please perform the one-to-one exchange once per 2years even though the operation time is short or once after operating 10,000 times.

Lubricating oil	Product name	Viscosity grade of ISO
Mineral oil	Mobil gear 636	VG 680

The amount of supply is changed according to the position of attachment.

	GM 2.2	GM 5.5/7.5	GM 11/15
In case of the main body of index is installed on the position of 1.2	1ℓ	3.8ℓ	7ℓ
In case of the main body of index is installed on the position of 5.	2.9ℓ	11.2ℓ	21ℓ

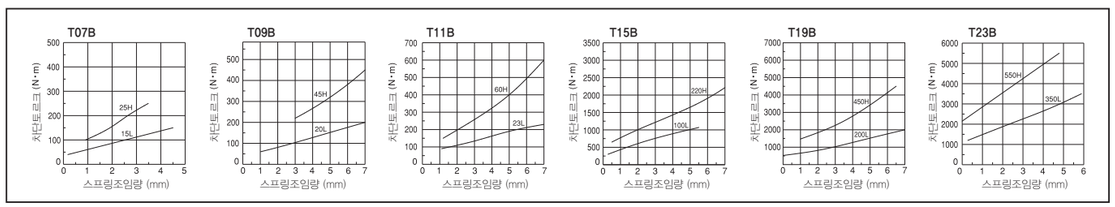
■ Viscosity of lubrication oil(Unit : cSt/40℃)

Table 92-1

Rotation of input shaft of grading device (rpm)	Viscosity cSt/40°C	KOREA SHELL	KOREA MOBIL	Japan Oil
0~20	>680	Shell omala 680	Mobil gear 636	M680
20~100	680~460	Shell omala 460	Mobil gear 634~633	M460
100~200	460~320	Shell omala 320	Mobil gear 632	M320

⚠ Please select the highest viscosity (the biggest number) in case the number of rotation of input shaft is the edge point. (1cSt=1㎟/s)

■ 토르크특성표



HANNZ MOTROL CO.,LTD.

FAX SHEET
Please use to copy the fax sheet.

Dear Sir(Sirs)

Selected data of INDXIA-HD type

Company name			
Department name			
Name of person in charge			
Phone number	(Extension number)	Fax number	

• Selecting the HD series is required to choose the proper type on the use condition.
• We are selecting the type by the torque calculation as the service to the customers.
• Pleases send it to use after writing the use condition to this fax sheet.

- Number of stop ..... S
- Dividing time ..... t_1 sec
- Stopping time ..... t_2 sec

In case of driving the data

- Table diameter ..... D mm
- Table mass ..... W_1 kg
- Jig : P.C.D ..... D_2 mm
- Jig mass per 1ea ..... W_2 kg
- Quantity of jig ..... n_2
- Work P.C.D ..... D_3 mm
- Work mass per 1ea ..... W_3 kg
- Quantity of work ..... n_3

- Transfer pitch ..... P mm
- Chain and attachment mass ..... W_1 kg
- Jig mass g ..... W_2 kg
- Work mass ..... W_3 kg
- Sprocket diameter ..... D mm
- Sprocket mass per 1ea ..... W_4 kg
- Quantity of sprocket ..... n_4
- Fact of friction ..... μ

In case of driving conveyor

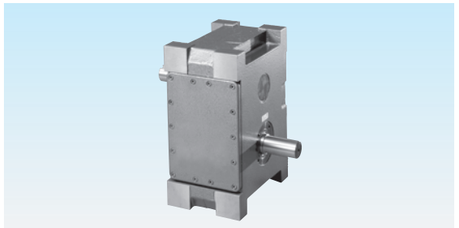
Geared motor	Whether it exists • not	Inverter	Whether it exists • not
Torque shield	Whether it exists • not	Timing cam	(Whether it exists: set) • not

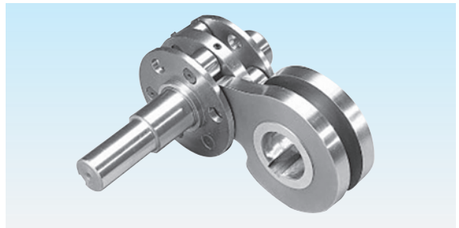
Note

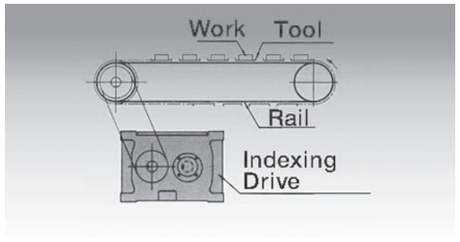
INDXIA

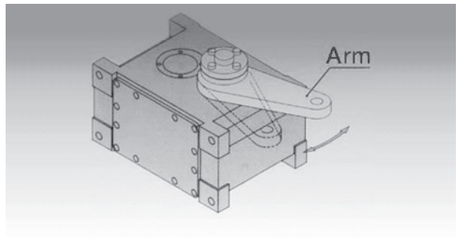
Index device of parallel cam type

HPseries









Characteristic of HP series

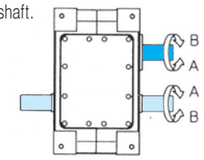
- The PARALLEL INDEX is the indexing device which using the parallel cam mechanism. The roller gear cam mechanism which developed by Hannz Motrol is suitable for heavy load machine since the axis of input and output are being perpendicular. In addition, this PARALLEL cam mechanism is made of the input and output shaft in parallel structure and very suitable device of ideal flat surface cam is on the direct transfer of conveyer to require the small partition such as 1, 2 and 3 partitions especially.
- Parallel index is the intermittent grading device of flat cam device having 2 plate cams fixed in parallel on the input shaft, the spider installed on the output shaft related in parallel to the input shaft, and the cam follower to contact 2 plate cams to this spider.
- The output shaft to have inserted the cam follower rotates intermittently if the 2 plate cams of input shaft. The quality of the dynamic characteristic, the extent and the feature of load etc. is superb when dividing even though the input and output shaft are compared with the Geneva device of the parallel ration.
- The condition of impossible production in the past becomes possible since the characteristic of lead and the dividing extent become better by cancelling the constraint condition on the design to use the parallel cam of HANNZ MOTROL CO.,LTD.

Product code

For the product code selection, please make sure to clearly understand the required specificationand then refer to the below code. In case of wrong product code, you will not be able to use the product. Therefore, please contact us for unclear specification.

ex.) HP200 | 01 | 27 | 2 | A | S | 1 | 2 | VW | 1 / X

a | b | c | d | e | f | g | h | i | j | k

a Housing size	b Number of stop	c Index angle (θ)	d Cam curve	e Direction of rotation of input-output shaft
HP200 200mm	01 1 Stop	27 270°	2 MS (Modified Sine)	A Counterclockwise direction
200: It shows the distance between the axes.	It is the number of stop per one rotation of the output shaft. The method of 2DWELL exists under 1,2,3,4,6,7,8 stop and 6,8 stop.	It is the angle of rotation of the input shaft required when grading one time.	It shows the number of cam curve. 2 MS(Modified Sine) 3 MCV (Modified Constant Velocity 50) 5 MCV (Modified Constant Velocity 25)	It shows the direction of rotation of output shaft about the direction of rotation of input shaft. 

f Form of output shaft	g Direction of output shaft	h Direction of input shaft	i Processing side of hole of attached part	j Attached part and location of Oil-hole	k Special specification
S Direction of output shaft	1 Output shaft of T surface	2 Only U surface side	VW Processing of attachment hole of V face and W surface	1 Position of attached part (The W surface becomes GL)	X Special specification
It shows the form of output shaft. S Standard L Installation of torque shield of output shaft	It shows the protruded side of output shaft. 1 T surface side 2 U surface side	It shows the relation of assembling location of input shaft. 1 Only T surface side 2 Only U surface side 3 Both T and U surface sides input extension 〈In case of mounting the reducer〉 R1 Only T surface side R2 Only U surface side R3 R3 Both T and U surface sides input extension	Install after processing the side of attachment required. The standard is that the 2 sides of VW are processed by the hole of penetration.	Please select the attachment posture since the location of Oil hole, oil gauge and oil drain part according to the attachment posture is changed. In case of high speed, please discuss it since the form of Oil hole etc. is changed. 1, 3, 4, 5, 6(5types)	Please write the X in case the special specification exists except the standard product. Standard specification X Special specification Note) Please attach separately the specification in case of the contents of special specification.

Figure g. h

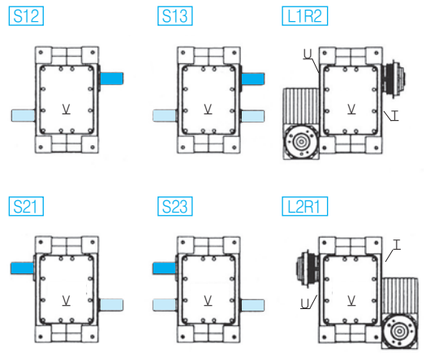


Figure i

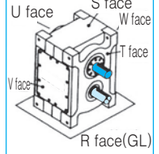
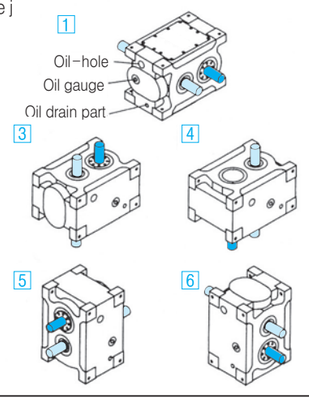


Figure j



Dimension of HP100

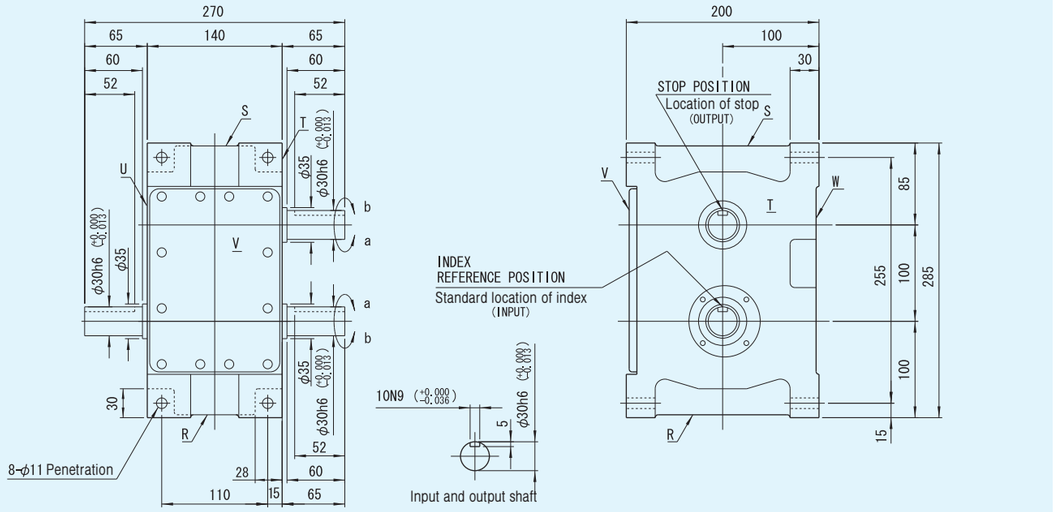
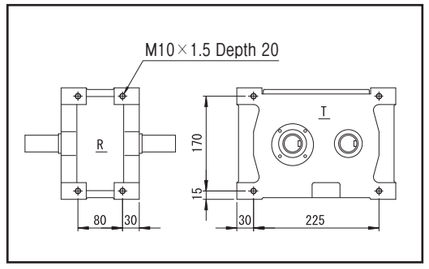


Figure HP 100-1

• Location of attachment hole

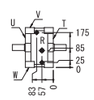
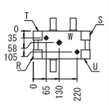
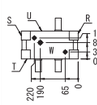
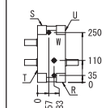
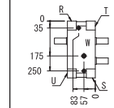
Figure HP 100-2



Dimension diagram of attachment hole of RSTU surface

• Location of Oil hole of oil according to the position and flow

Figure HP 100 -3

Position	1	3	4	5	6
Location					
Oil level (ℓ)	1.5	1.5	1.5	1.5	1.5

⚠ Attention

- The order is the location of Oil hole(PT 3/8), oil gauge(PF3/8) and oil drain part (PT3/8) from the top regarding each location according to the position.
- The position responds to the code J of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

• Characteristic table

Table HP 100-1

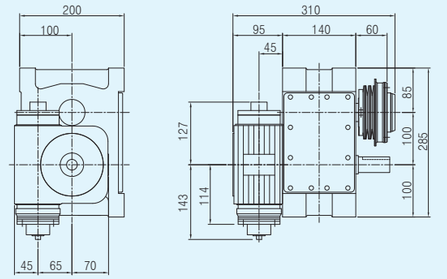
Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values
Load of allowed THRUST of output shaft	P_1	N	4704	Load of allowed THRUST of input shaft	P_4	N	4704	Dividing extent of 1DWELL		sec	±60
Load of allowed RADIAL of output shaft	P_2	N	3920	Load of allowed RADIAL of input shaft	P_5	N	3920	Dividing extent of 2DWELL		sec	±120
Allowed TORQUE of output shaft	T_S	N•m	Referring to table of sending torque	Allowed TORQUE of maximum repetition of input shaft	P_6	N•m	392	Repeating extent		sec	60
Rigidity of torsion of output shaft	K_1	N•m /rad	$3.19X10^4$	Torsional rigidity of input shaft	K_2	N•m /rad	$3.19X10^4$	Product mass (Main body of index)		kg	About 36
Moment of inertia of output shaft	J_0	kg•m²	Referring to table of sending torque	Moment of inertia of inpit shaft	J_1	kg•m²	$6.0X10^{-3}$				

Note) J of input shaft is the value in case of the rectification.

1N•m≒0.102kgf•m

Mounted Option

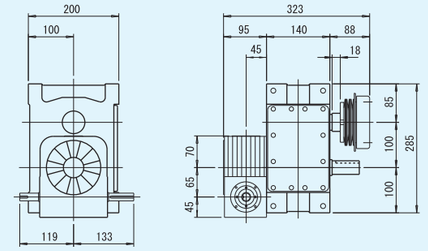
HP100 (a)



Product Example)

Indexing drive	HP100	-	01302A	-	L1R3VW	1
Reducer	R65	-	10	RCB	15	/ 1
Torque shield	T07F	-	12L			

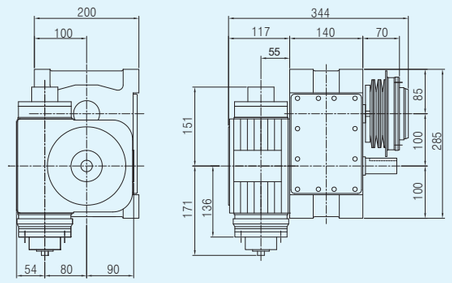
HP100 (b)



Product Example)

Indexing drive	HP100	-	01302A	-	L1R3VW	1
Reducer	R65	-	10	RA	14	/ 1
Torque shield	T07C	-	20L			

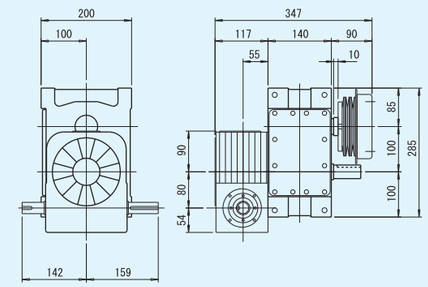
HP100 (c)



Product Example)

Indexing drive	HP100	-	01302A	-	L1R3VW	1
Reducer	R80	-	10	RCB	15	/ 1
Torque shield	T08F	-	20L			

HP100 (d)



Product Example)

Indexing drive	HP100	-	01302A	-	L1R3VW	1
Reducer	R80	-	10	RA	14	/ 1
Torque shield	T08C	-	15L			

⚠ Attention

- Attaching reducer R65 and R80 is possible at HP 100.
- The attachment posture of reducer is standardized as the 16 types such as written part on P11.
- The installation of torque shield T07F, T07C, T08F, T08C is possible at HP100.
- The spacer is required in case of mounting the torque shield.

Dimension of HP125

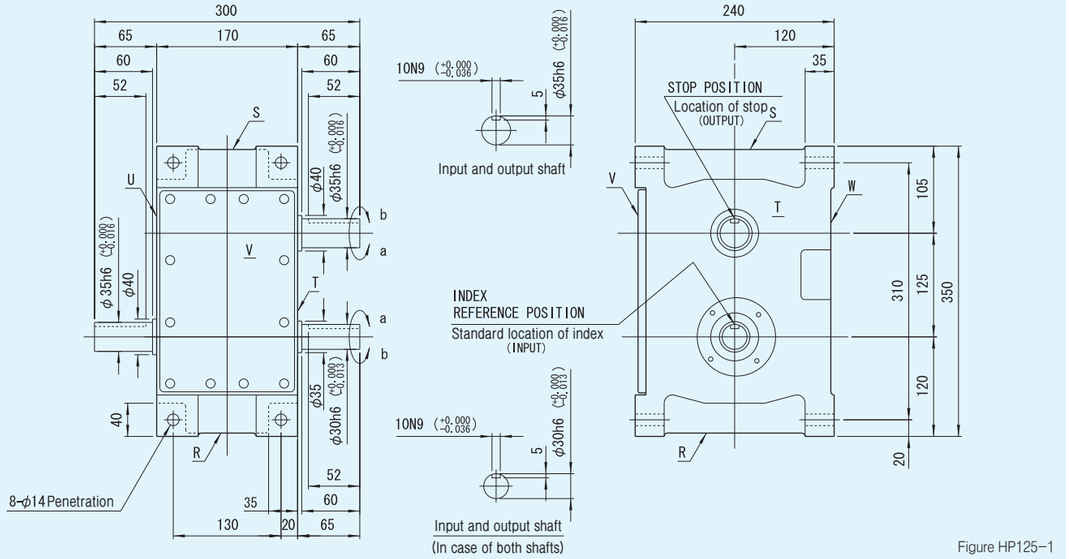
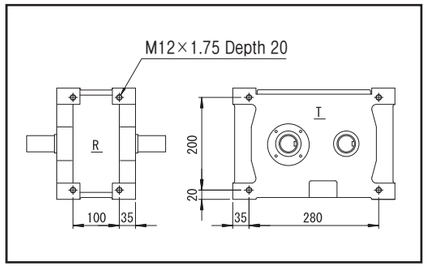


Figure HP125-1

• Location of attachment hole

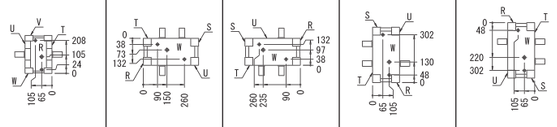
Figure HP125-2



Dimension diagram of attachment hole of RSTU surface

• Location of Oil hole of oil according to the position and flow

Figure HP125-3

Position	1	3	4	5	6
Location					
Oil level (ℓ)	3.2	3.2	3.2	3.2	3.2

⚠ Attention

- The order is the location of Oil hole (PT 3/8), oil gauge(PF3/8) and oil drain part (PT3/8) from the top regarding each location according to the position.
- The position responds to the code J of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

• Characteristic table

Table HP125-1

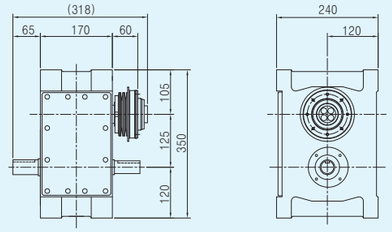
Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values
Load of allowed THRUST of output shaft	P_1	N	5096	Load of allowed THRUST of input shaft	P_4	N	5096	Dividing extent of 1DWELL		sec	±60
Load of allowed RADIAL of output shaft	P_2	N	6174	Load of allowed RADIAL of input shaft	P_5	N	6174	Dividing extent of 2DWELL		sec	±120
Allowed TORQUE of output shaft	T_S	N•m	Referring to table of sending torque	Allowed TORQUE of maximum repetition of input shaft	P_6	N•m	637	Repeating extent		sec	60
Rigidity of torsion of output shaft	K_1	N•m /rad	$4.93X10^4$	Torsional rigidity of input shaft	K_2	N•m /rad	$4.93X10^4$	Product mass (Main body of index)		kg	About 65
Moment of inertia of output shaft	J_0	kg•m²	Referring to table of sending torque	Moment of inertia of inpit shaft	J_1	kg•m²	$1.63X10^{-2}$				

Note) J of input shaft is the value in case of the rectification.

1N • m≒0.102kgf • m

Mounted Option

HP125 (a)

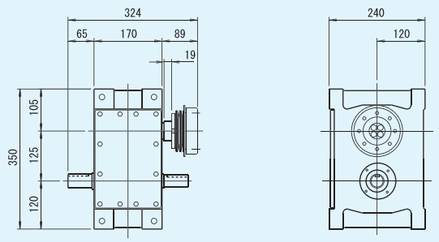


Product Example)

Indexing drive HP125 - 01302A - L1R3VW 1

Torque shield T07F - 40L

HP125 (b)

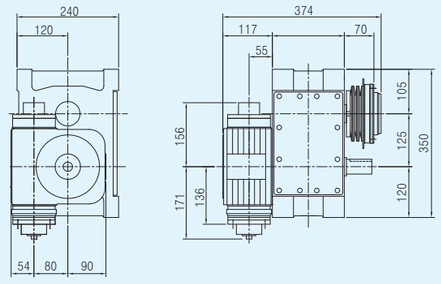


Product Example)

Indexing drive HP125 - 01302A - L1R3VW 1

Torque shield T07C - 35L

HP125 (c)



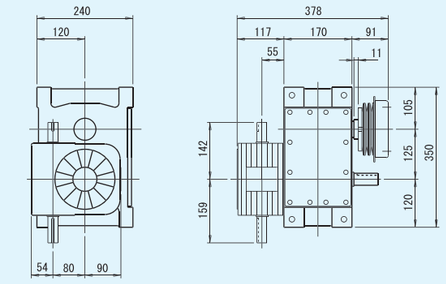
Product Example)

Indexing drive HP125 - 01302A - L1R3VW 1

Reducer R80 - 10 RCB 15 / 1

Torque shield T08F - 40L

HP125 (d)



Product Example)

Indexing drive HP125 - 01302A - L1R3VW 1

Reducer R80 - 10 RA 15 / 1

Torque shield T08C - 45L

⚠ Attention

- Attaching reducer R80 is possible at HP 125.
- The attachment posture of reducer is standardized as the 16 types such as written part on P11.
- The installation of torque shield T07F, T07C, T08F, T08C is possible at HP125.
- The spacer is required in case of mounting the torque shield.

Dimension of HP150

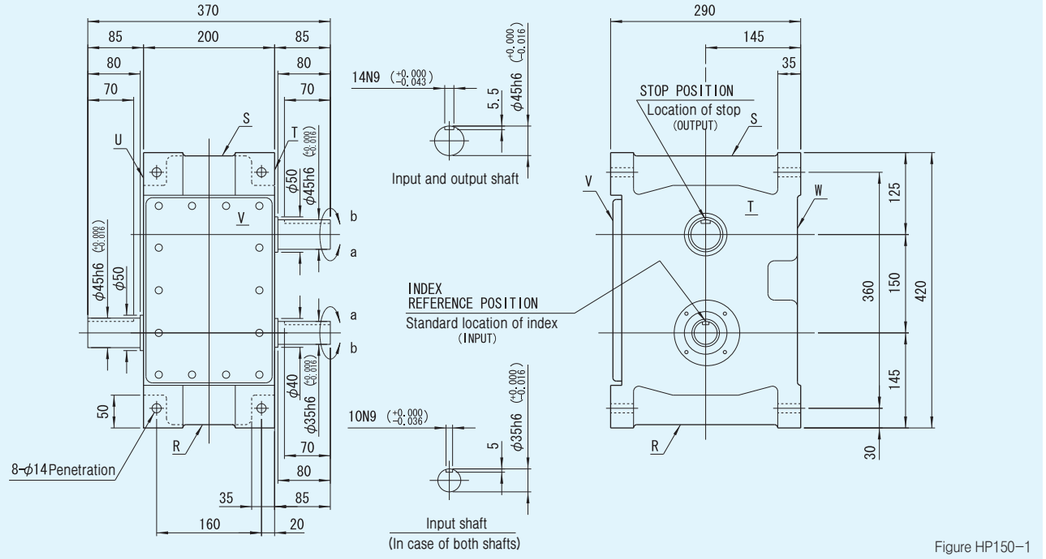
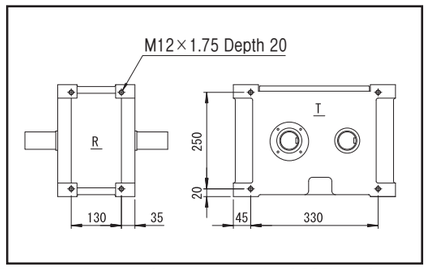


Figure HP150-1

• Location of attachment hole

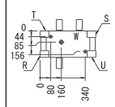
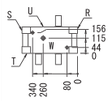
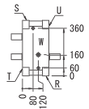
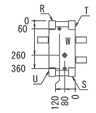
Figure HP150-2



Dimension diagram of attachment hole of RSTU surface

• Location of Oil hole of oil according to the position and flow

Figure HP150-3

Position	1	3	4	5	6
Location					
Oil level (ℓ)	5.5	5.5	5.5	5.5	5.5

⚠ Attention

- The order is the location of Oil hole(PT 1/2), oil gauge(PF1/2) and oil drain part (PT1/2) from the top regarding each location according to the position.
- The position responds to the code J of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

• Characteristic table

Table HP150-1

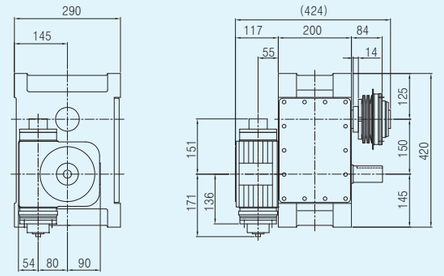
Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values
Load of allowed THRUST of output shaft	P_1	N	5096	Load of allowed THRUST of input shaft	P_4	N	5096	Dividing extent of 1DWELL		sec	±60
Load of allowed RADIAL of output shaft	P_2	N	6174	Load of allowed RADIAL of input shaft	P_5	N	6174	Dividing extent of 2DWELL		sec	±120
Allowed TORQUE of output shaft	T_S	N•m	Referring to table of sending torque	Allowed TORQUE of maximum repetition of input shaft	P_6	N•m	637	Repeating extent		sec	60
Rigidity of torsion of output shaft	K_1	N•m /rad	$4.93X10^4$	Torsional rigidity of input shaft	K_2	N•m /rad	$4.93X10^4$	Product mass (Main body of index)		kg	About 100
Moment of inertia of output shaft	J_0	kg•m²	Referring to table of sending torque	Moment of inertia of inpit shaft	J_1	kg•m²	$1.63X10^{-2}$				

Note) J of input shaft is the value in case of the rectification.

1N•m≒0.102kgf•m

Mounted Option

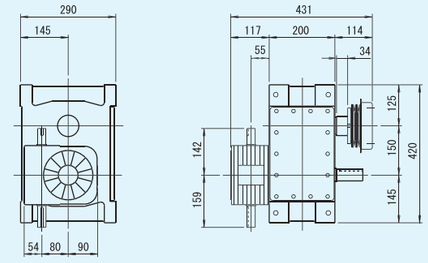
HP150 (a)



Product Example)

Indexing drive	HP150	-	01302A	-	L1R3VW	1
Reducer	R80	-	10	RCB	15	/ 1
Torque shield	T08F	-	60L			

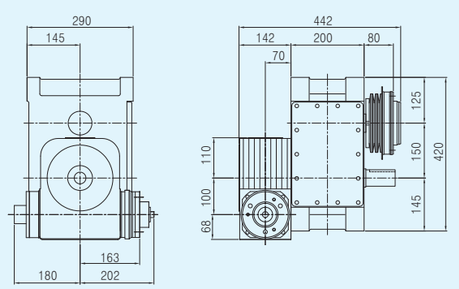
HP150 (b)



Product Example)

Indexing drive	HP150	-	01302A	-	L1R3VW	1
Reducer	R80	-	10	RA	15	/ 1
Torque shield	T08C	-	45L			

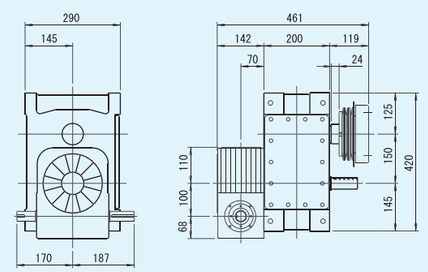
HP150 (c)



Product Example)

Indexing drive	HP150	-	01302A	-	L1R3VW	1
Reducer	R100	-	10	RCB	14	/ 1
Torque shield	T11F	-	35L			

HP150 (d)



Product Example)

Indexing drive	HP150	-	01302A	-	L1R3VW	1
Reducer	R100	-	10	RA	14	/ 1
Torque shield	T11C	-	65L			

⚠ Attention

- Attaching reducer R80 and R100 is possible at HP 150.
- The attachment posture of reducer is standardized as the 16 types such as written part on P11.
- The installation of torque shield T08F, T08C, T11F, T11C is possible at HP150.
- The spacer is required in case of mounting the torque shield.

Dimension of HP175

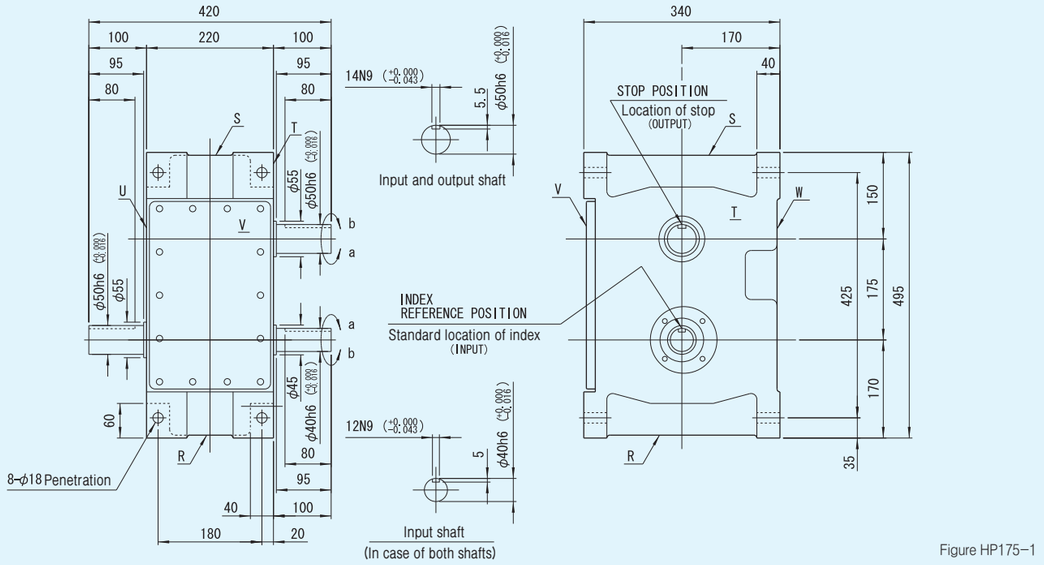
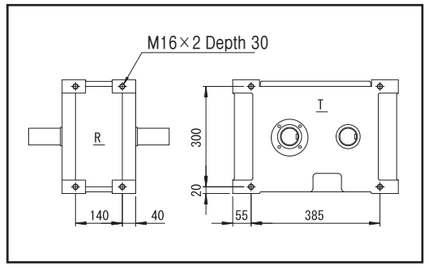


Figure HP175-1

• Location of attachment hole

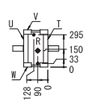
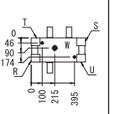
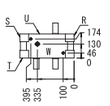
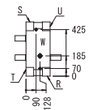
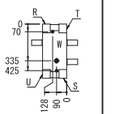
Figure HP175-2



Dimension diagram of attachment hole of RSTU surface

• Location of Oil hole of oil according to the position and flow

Figure HP175-3

Position	1	3	4	5	6
Location					
Oil level (ℓ)	8	8	8	8	8

⚠ Attention

- The order is the location of Oil hole(PT 1/2), oil gauge(PF 3/4) and oil drain part (PT1/2) from the top regarding each location according to the position.
- The position responds to the code J of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

• Characteristic table

Table HP175-1

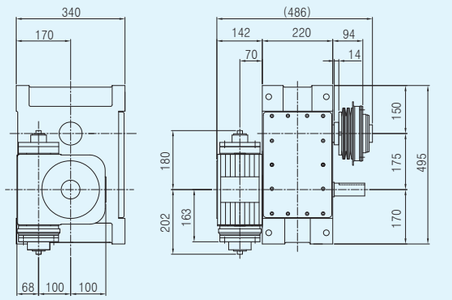
Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values
Load of allowed THRUST of output shaft	P_1	N	9016	Load of allowed THRUST of input shaft	P_4	N	9016	Dividing extent of 1DWELL		sec	±60
Load of allowed RADIAL of output shaft	P_2	N	9800	Load of allowed RADIAL of input shaft	P_5	N	9800	Dividing extent of 2DWELL		sec	±120
Allowed TORQUE of output shaft	T_S	N•m	Referring to table of sending torque	Allowed TORQUE of maximum repetition of input shaft	P_6	N•m	1813	Repeating extent		sec	60
Rigidity of torsion of output shaft	K_1	N•m /rad	$1.65X10^4$	Torsional rigidity of input shaft	K_2	N•m /rad	$1.65X10^5$	Product mass (Main body of index)		kg	About 160
Moment of inertia of output shaft	J_0	kg • m²	Referring to table of sending torque	Moment of inertia of inpit shaft	J_1	kg • m²	$7.5X10^{-2}$				

Note) J of input shaft is the value in case of the rectification.

1N • m≒0.102kgf • m

Mounted Option

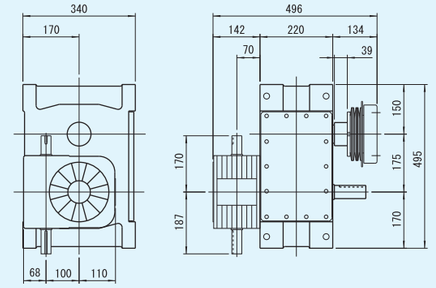
HP175 (a)



Product Example)

Indexing drive	HP175	-	01302A	-	L1R3VW	1
Reducer	R100	-	10	RCB	15	/ 1
토크쉴드	T11F	-	25L			

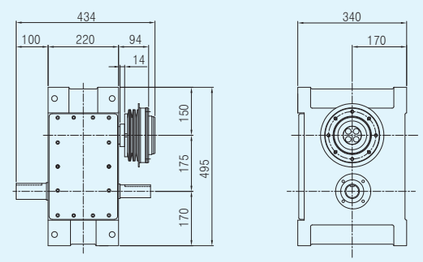
HP175 (b)



Product Example)

Indexing drive	HP175	-	01302A	-	L1R3VW	1
Reducer	R100	-	10	RA	15	/ 1
토크쉴드	T11C	-	35L			

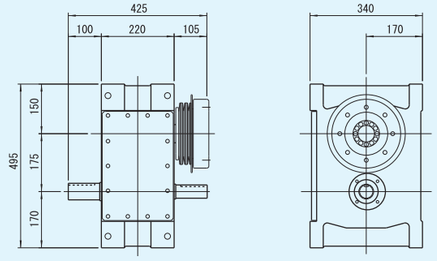
HP175 (c)



Product Example)

Indexing drive	HP175	-	01302A	-	L1R3VW	1
Torque shield	T14F	-	45L			

HP175 (d)



Product Example)

Indexing drive	HP175	-	01302A	-	L1R3VW	1
Torque shield	T14C	-	45L			

⚠ Attention

- Attaching reducer R100 is possible at HP 175.
- The attachment posture of reducer is standardized as the 16 types such as written part on P11.
- The installation of torque shield T11F, T11C, T14F, T14C is possible at HP175.
- The spacer is required in case of mounting the torque shield.

Dimension of HP200

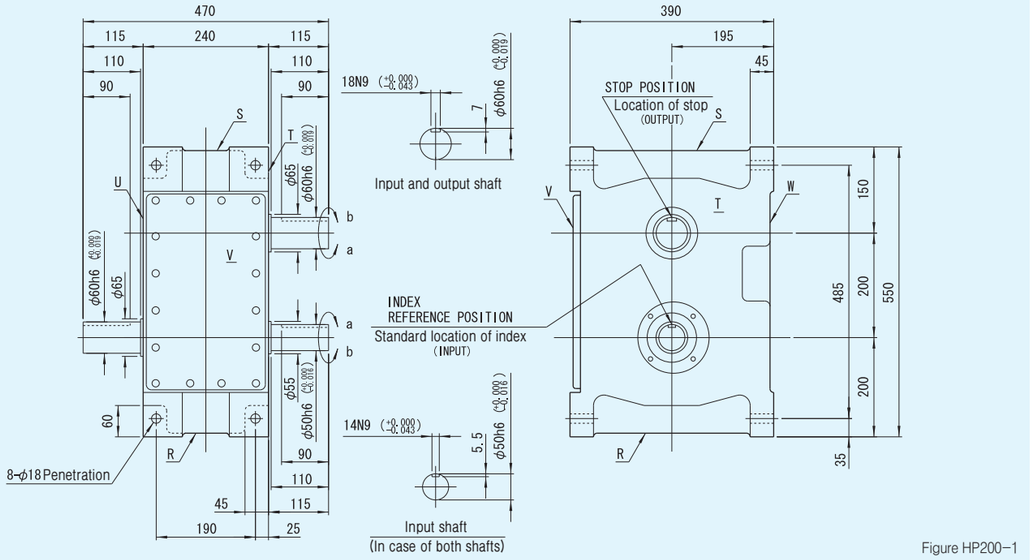
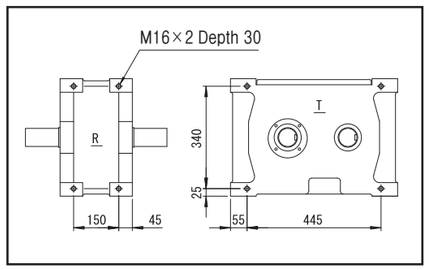


Figure HP200-1

• Location of attachment hole

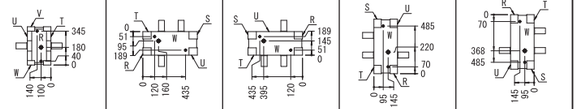
Figure HP200-2



Dimension diagram of attachment hole of RSTU surface

• Location of Oil hole of oil according to the position and flow

Figure HP200-3

Position	1	3	4	5	6
Location					
Oil level (ℓ)	12	12	12	12	12

⚠ Attention

- The order is the location of Oil hole(PT 1/2), oil gauge(PF 3/4) and oil drain part (PT1/2) from the top regarding each location according to the position.
- The position responds to the code J of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

• Characteristic table

Table HP200-1

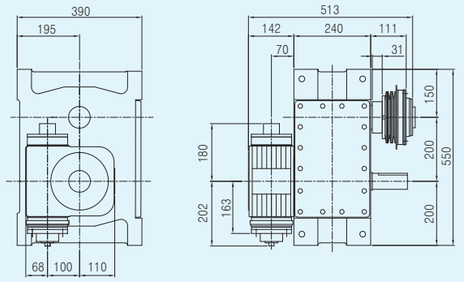
Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values
Load of allowed THRUST of output shaft	P_1	N	12936	Load of allowed THRUST of input shaft	P_4	N	12936	Dividing extent of 1DWELL		sec	±60
Load of allowed RADIAL of output shaft	P_2	N	13524	Load of allowed RADIAL of input shaft	P_5	N	18620	Dividing extent of 2DWELL		sec	±120
Allowed TORQUE of output shaft	T_S	N•m	Referring to table of sending torque	Allowed TORQUE of maximum repetition of input shaft	P_6	N•m	3136	Repeating extent		sec	60
Rigidity of torsion of output shaft	K_1	N•m /rad	$3.19X10^5$	Torsional rigidity of input shaft	K_2	N•m /rad	$3.19X10^5$	Product mass (Main body of index)		kg	About 220
Moment of inertia of output shaft	J_0	kg•m²	Referring to table of sending torque	Moment of inertia of inpit shaft	J_1	kg•m²	0.148				

Note) J of input shaft is the value in case of the rectification.

1N•m≒0.102kgf•m

Mounted Option

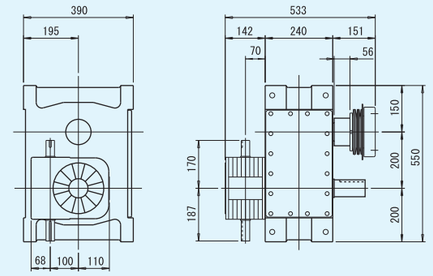
HP200 (a)



Product Example)

Indexing drive	HP200	–	01302A	–	L1R3VW	1
Reducer	R100	–	10	RCB	15	/	1
Torque shield	T11F	–	12X				

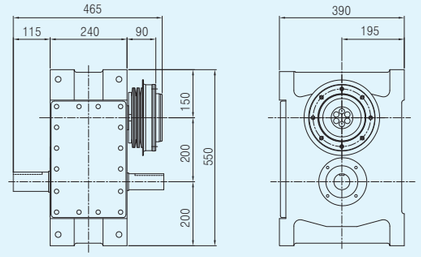
HP200 (b)



Product Example)

Indexing drive	HP200	–	01302A	–	L1R3VW	1
Reducer	R100	–	10	RA	15	/	1
Torque shield	T11C	–	10X				

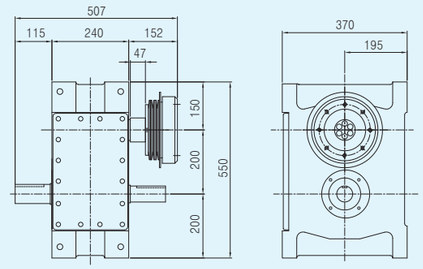
HP200 (c)



Product Example)

Indexing drive	HP200	–	01302A	–	L1R3VW	1
Torque shield	T14F	–	12X			

HP200 (d)



Product Example)

Indexing drive	HP200	–	01302A	–	L1R3VW	1
Torque shield	T14C	–	13X			

⚠ Attention

- Attaching reducer R100 and R125 is possible at HP 200.
- The attachment posture of reducer is standardized as the 16 types such as written part on P11.
- The installation of torque T11F, T11C, T14F, T14C is possible at HP200.
- The spacer is required in case of mounting the torque shield.

Dimension of HP250

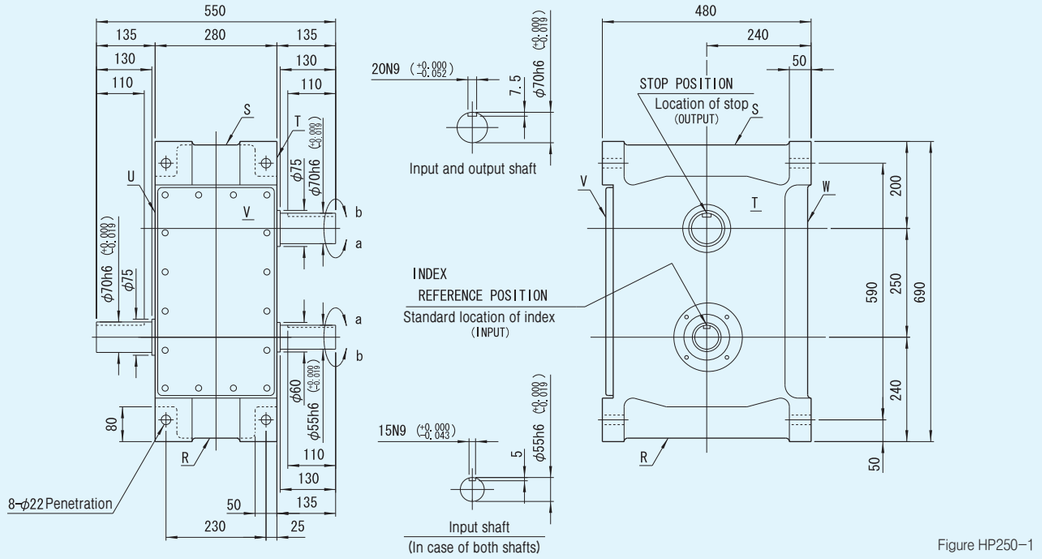
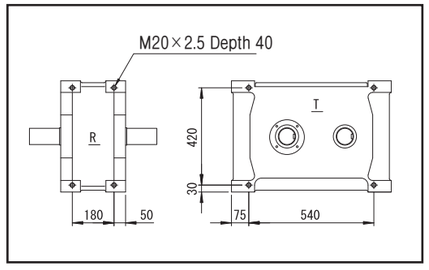


Figure HP250-1

• Location of attachment hole



Dimension diagram of attachment hole of RSTU surface

Figure HP250-2

• Location of Oil hole of oil according to the position and flow

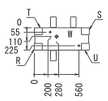
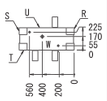
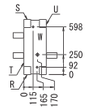
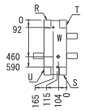
Position	1	3	4	5	6
Location					
Oil level (ℓ)	20	20	20	20	20

Figure HP250-3

⚠ Attention

- The order is the location of Oil hole(PT 1/2), oil gauge(PF3/4) and oil drain part (PT1/2) from the top regarding each location according to the position.
- The position responds to the code J of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

• Characteristic table

Table HP250-1

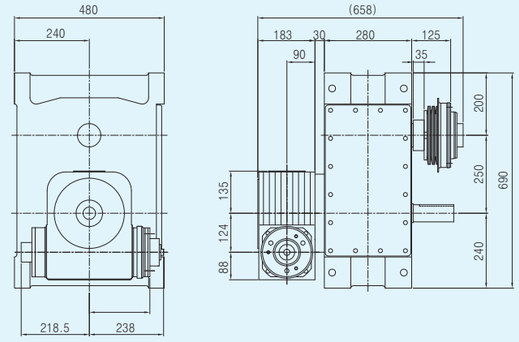
Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values
Load of allowed THRUST of output shaft	P_1	N	15190	Load of allowed THRUST of input shaft	P_4	N	15190	Dividing extent of 1DWELL		sec	±60
Load of allowed RADIAL of output shaft	P_2	N	15288	Load of allowed RADIAL of input shaft	P_5	N	23520	Dividing extent of 2DWELL		sec	±120
Allowed TORQUE of output shaft	T_S	N•m	Referring to table of sending torque	Allowed TORQUE of maximum repetition of input shaft	P_6	N•m	4900	Repeating extent		sec	60
Rigidity of torsion of output shaft	K_1	N•m /rad	$5.26X10^5$	Torsional rigidity of input shaft	K_2	N•m /rad	$5.26X10^5$	Product mass (Main body of index)		kg	About 350
Moment of inertia of output shaft	J_0	kg•m²	Referring to table of sending torque	Moment of inertia of inpit shaft	J_1	kg•m²	0.495				

Note) J of input shaft is the value in case of the rectification.

1N • m≒0.102kgf • m

Mounted Option

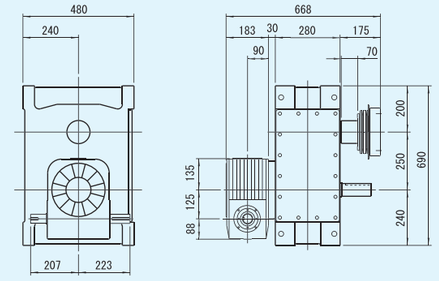
HP250 (a)



Product Example)

Indexing drive	HP250	-	01302A	-	L1R3VW	1	
Reducer	R125	-	10	RCB	14	/	1
Torque shield	T14F	-	18X				

HP250 (b)



Product Example)

Indexing drive	HP250	-	01302A	-	L1R3VW	1	
Reducer	R125	-	10	RA	14	/	1
Torque shield	T14C	-	13X				

⚠ Attention

- Attaching reducer R125 is possible at HP 250.
- The attachment posture of reducer is standardized as the 16 types such as written part on P11.
- The installation of torque shield T14F, T18C, T18F, T18Cis possible at HP 250.
- The spacer is required in case of mounting the torque shield.

Dimension of HP320

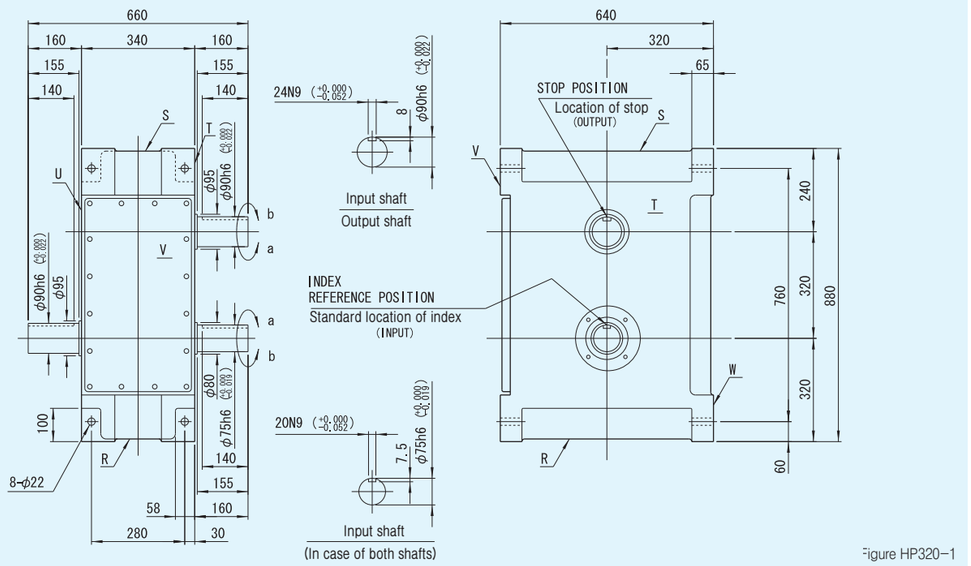
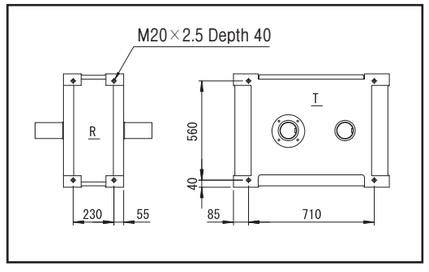


Figure HP320−1

• Location of attachment hole

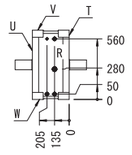
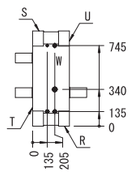
Figure HP320 −2



Dimension diagram of attachment hole of RSTU surface

• Location of Oil hole of oil according to the position and flow

Figure HP320 −3

Position	1	5
Location		
Oil level (ℓ)	45	45

⚠ Attention

- The order is the location of Oil hole(PT 3/8), oil gauge(PF3/8) and oil drain part (PT3/8) from the top regarding each location according to the position.
- The position responds to the code J of indexing drive.
- The rough value is written since an flow changes according to the cam type and the number of cam follower.

• Characteristic table

Table HP320−1

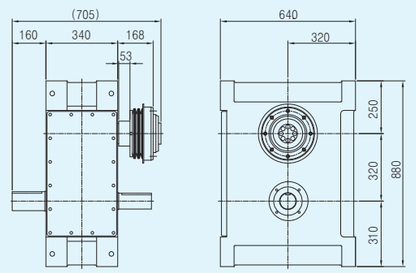
Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values	Characteristics items	Symbol	Unit	Values
Load of allowed THRUST of output shaft	P_1	N	22540	Load of allowed THRUST of input shaft	P_4	N	22540	Dividing extent of 1DWELL		sec	±60
Load of allowed RADIAL of output shaft	P_2	N	23520	Load of allowed RADIAL of input shaft	P_5	N	41160	Dividing extent of 2DWELL		sec	±120
Allowed TORQUE of output shaft	T_S	N•m	Referring to table of sending torque	Allowed TORQUE of maximum repetition of input shaft	P_6	N•m	10780	Repeating extent		sec	60
Rigidity of torsion of output shaft	K_1	N•m /rad	1.08×10^6	Torsional rigidity of input shaft	K_2	N•m /rad	1.08×10^6	Product mass (Main body of index)		kg	About 750
Moment of inertia of output shaft	J_0	kg•m²	Referring to table of sending torque	Moment of inertia of inpit shaft	J_1	kg•m²	1.7				

Note) J of input shaft is the value in case of the rectification.

1N • m≒0.102kgf • m

Mounted Option

HP320 (a)

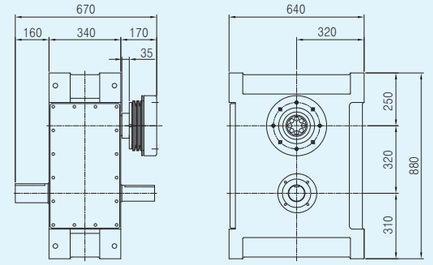


Product Example)

Indexing drive HP320 − 01302A − L1R3VW 1

Torque shield T18F − 13X

HP320 (b)



Product Example)

Indexing drive HP320 − 01302A − L1R3VW 1

Torque shield T18C − 16X

⚠ Attention

- The attachment position of reducer is standardized as the 16 types such as written part on P11.
- The installation of torque shield T18F, T18C is possible at HP320.
- The spacer is required in case of installing the torque shield.

Torque chart of HP TYPE

- 1DEWLL(1,2,3,4 stop)
- 2DWELL(6,8 stop)

Cam curve MS (Curve code 2)
Cam curve MCV 50(Curve code 3)
Cam curve MCV 25(Curve code 5)

HP100, 125, 150, 175, 200, 250, 320

1, 2stop

Number of stop S	Index angle θ(deg)	Cam curve	CODE	Torque of static rated output Ts (N・m)	Dynamic rated output torque Top of upper side (N・m) TORQUE of load of inner inertial Toi of lower side (N・m) Number of INDEX per minute (INDEX/min) 50	75	100	150	200	300	Camshaft friction torque Tx (N・m)	Moment of inertia of output shaft Jo (kg・m²)	Cam follower SCF (mm)
1	270	MCV 50	HP100 0127 3	254.0	103.8 0.3	91.9 0.7	84.3 1.2	74.6 2.6	68.4 4.5	60.6 10.1	5.9	0.0045	26
			HP125 0127 3	381.9	174.5 0.9	154.5 2.0	141.7 3.6	125.5 8.0	115.1 14.2	101.9 31.9	8.1	0.0143	35
			HP150 0127 3	572.2	257.4 2.0	227.9 4.5	209.0 7.9	185.1 17.7	169.8 31.4	150.3 70.6	11.9	0.0315	40
			HP175 0127 3	897.3	405.8 4.1	359.4 9.1	329.6 16.2	291.9 36.3	267.7 64.5		16.6	0.0648	47
			HP200 0127 3	1656.8	688.3 7.1	609.4 16.0	559.0 28.4	495.0 63.8	454.1 113.5		26.9	0.1140	60
			HP250 0127 3	3326.8	1382.1 19.1	1223.8 42.9	1122.6 76.2	994.0 171.4	911.8 304.7		43.6	0.3063	80
			HP320 0127 3	5992.9	2489.7 59.3	2204.6 133.4	2022.3 237.2	1790.7 533.6			86.3	0.9535	100
	300	MS	HP100 0130 2	228.6	90.5 0.2	80.1 0.4	73.5 0.7	65.1 1.4	59.7 2.5	52.8 5.5	6.7	0.0044	26
		MCV 50	HP100 0130 3	254.0	100.5 0.3	89.0 0.6	81.6 1.0	72.3 2.1	66.3 3.7	58.7 8.2	5.6	0.0045	26
			HP125 0130 3	399.2	176.7 0.8	156.5 1.7	143.5 3.0	127.1 6.6	116.6 11.7	103.2 26.3	7.6	0.0145	35
			HP150 0130 3	604.6	263.5 1.7	233.3 3.7	214.0 6.5	189.5 14.7	173.8 26.0	153.9 58.5	11.3	0.0323	40
			HP175 0130 3	956.1	419.0 3.4	371.0 7.6	340.3 13.4	301.3 30.1	276.4 53.4	244.8 120.2	15.7	0.0663	47
			HP200 0130 3	1702.8	685.4 5.9	606.9 13.1	556.7 23.3	492.9 52.4	452.2 93.1		25.5	0.1155	60
			HP250 0130 3	3497.9	1407.9 15.9	1246.7 35.7	1143.6 63.5	1012.6 142.8	928.9 253.9		41.5	0.3150	80
			HP320 0130 3	6253.5	2517.2 49.2	2228.9 110.6	2044.6 196.7	1810.4 442.4	1660.7 786.5		82.4	0.9760	100
	330	MS	HP100 0133 2	228.6	87.9 0.2	77.8 0.3	71.4 0.6	63.2 1.2	58.0 2.1	51.3 4.6	6.3	0.0044	26
		MCV50	HP100 0133 3	290.3	111.7 0.2	98.9 0.5	90.7 0.8	80.3 1.8	73.7 3.2	65.2 7.1	5.2	0.0047	26
		MCV 25	HP125 0133 5	399.2	171.7 0.5	152.1 1.1	139.5 1.9	123.5 4.2	113.3 7.5	100.3 16.8	7.8	0.0145	35
			HP150 0133 5	593.8	251.5 1.1	222.7 2.4	204.2 4.2	180.8 9.3	165.9 16.5	146.9 37.1	11.6	0.0320	40
			HP175 0133 5	919.4	391.5 2.1	346.7 4.8	318.0 8.4	281.6 18.9	258.3 33.6	228.7 75.6	16.1	0.0653	47
			HP200 0133 5	1702.8	666.1 3.8	589.8 8.4	541.0 14.9	479.0 33.5	439.4 59.5	389.1 133.8	26.1	0.1155	60
			HP250 0133 5	3497.9	1368.3 10.2	1211.5 22.8	1111.4 40.6	984.1 91.2	902.7 162.2	799.3 364.8	42.3	0.3150	80
			HP320 0133 5	6149.3	2405.4 31.2	2129.9 70.0	1953.8 124.5	1730.0 280.0	1587.0 497.7		84.1	0.9670	100
2	150	MCV 50	HP100 0215 3	254.0	102.5 0.5	90.8 1.1	83.2 1.9	73.7 4.1	67.6 7.3	59.9 16.4	5.6	0.0045	26
			HP125 0215 3	381.9	156.5 1.5	138.6 3.3	127.1 5.8	112.6 13.0	103.3 23.0		7.7	0.0143	35
			HP150 0215 3	572.2	230.5 3.2	204.1 7.2	187.2 12.7	165.8 28.6	152.0 50.8		11.3	0.0315	40
			HP175 0215 3	897.3	371.2 6.6	328.7 14.7	301.5 26.1	267.0 58.7	244.9 104.4		15.8	0.0648	47
			HP200 0215 3	1208.9	482.1 11.0	426.9 24.7	391.6 43.9	346.7 98.6			24.7	0.1088	52

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft.
All of the R (right hand) is shown in the torque delivery ability chart.

1N・m≒0.102kgf・m

HP100, 125, 150, 175, 200, 250, 320

2stop

Number of stop S	Index angle θ(deg)	Cam curve	CODE	Torque of static rated output Ts (N・m)	Dynamic rated output torque Top of upper side (N・m) TORQUE of load of inner inertial Toi of lower side (N・m) Number of INDEX per minute (INDEX/min) 50	75	100	150	200	300	Camshaft friction torque Tx (N・m)	Moment of inertia of output shaft Jo (kg・m²)	Cam follower SCF (mm)
2	150	MCV 50	HP250 0215 3	2560.9	1061.3 29.3	939.8 65.8	862.1 116.9	763.3 262.9			40.0	0.2900	70
			HP320 0215 3	5450.0	2243.7 96.4	1986.7 216.9	1822.4 385.5				82.6	0.9568	90
	180	MS	HP100 0218 2	254.0	95.9 0.3	84.9 0.5	77.9 0.9	68.9 2.0	63.2 3.5	56.0 7.9	6.0	0.0045	26
			HP125 0218 2	381.9	148.2 0.7	131.2 1.6	120.4 2.8	106.6 6.2	97.8 11.1	86.6 24.8	8.2	0.0143	35
			HP150 0218 2	572.2	218.2 1.6	193.2 3.5	177.2 6.1	156.9 13.7	144.0 24.4	127.5 54.8	12.1	0.0315	40
			HP175 0218 2	897.3	351.4 3.2	311.2 7.1	285.4 12.6	252.7 28.2	231.8 50.1		16.8	0.0648	47
			HP200 0218 2	1208.9	456.5 5.3	404.2 11.9	370.8 21.1	328.3 47.3	301.1 84.1		26.4	0.1088	52
			HP250 0218 2	2560.9	1004.8 14.1	889.7 31.6	816.2 56.1	722.7 126.1	662.9 224.1		42.3	0.2900	70
			HP320 0218 2	5450.0	2124.2 46.2	1880.9 104.0	1725.4 184.9	1527.8 415.9			87.1	0.9568	90
		MCV 50	HP100 0218 3	334.8	147.1 0.4	130.2 0.9	119.5 1.5	105.8 3.3	97.0 5.9	85.9 13.1	5.1	0.0052	32
			HP125 0218 3	539.9	239.1 1.2	211.8 2.6	194.2 4.6	172.0 10.2	157.8 18.2	139.7 40.8	7.1	0.0162	40
			HP150 0218 3	882.6	391.0 2.7	346.2 6.0	317.6 10.6	281.2 23.8	258.0 42.3	228.4 95.1	10.7	0.0378	47
			HP175 0218 3	1208.9	522.9 5.2	463.0 11.6	424.7 20.5	376.1 46.2	345.0 82.0		14.7	0.0733	52
			HP200 0218 3	1840.9	802.4 9.1	710.5 20.5	651.7 36.4	577.1 81.9	529.4 145.5		23.4	0.1300	60
			HP250 0218 3	3802.0	1632.2 26.0	1445.2 58.4	1325.7 103.8	1173.9 233.6	1076.8 415.2		38.2	0.3710	80
			HP320 0218 3	6670.4	2863.6 90.6	2535.6 203.8	2325.9 362.2	2059.5 814.9			76.4	1.2945	100
	210	MS	HP100 0221 2	254.0	91.5 0.2	81.0 0.4	74.3 0.7	65.8 1.5	60.4 2.6	53.5 5.8	5.5	0.0045	26
			HP125 0221 2	399.2	150.8 0.6	133.5 1.2	122.5 2.1	108.5 4.7	99.5 8.3	88.1 18.6	7.6	0.0145	35
			HP150 0221 2	572.2	208.4 1.2	184.5 2.6	169.2 4.5	149.8 10.1	137.4 17.9	121.7 40.3	11.2	0.0315	40
			HP175 0221 2	897.3	335.6 2.3	297.1 5.2	272.5 9.2	241.3 20.7	221.4 36.8	196.0 82.7	15.7	0.0648	47
			HP200 0221 2	1208.9	435.8 3.9	385.9 8.7	354.0 15.5	313.4 34.8	287.5 61.8		24.5	0.1088	52
			HP250 0221 2	2560.9	959.4 10.3	849.5 23.2	779.3 41.2	690.0 92.6	633.0 164.7		39.7	0.2900	70
			HP320 0221 2	5450.0	2028.2 34.0	1795.9 76.4	1647.4 135.8	1458.7 305.5	1338.1 543.1		82.0	0.9568	90
		MCV 50	HP100 0221 3	334.8	140.4 0.3	124.3 0.7	114.1 1.1	101.0 2.5	92.6 4.3	82.0 9.7	4.7	0.0052	32
			HP125 0221 3	539.9	228.3 0.9	202.2 1.9	185.5 3.4	164.2 7.5	150.6 13.4	133.4 30.0	6.7	0.0162	40
			HP150 0221 3	882.6	373.3 2.0	330.6 4.4	303.2 7.8	268.5 17.5	246.3 31.1	218.1 69.9	10.1	0.0378	47
			HP175 0221 3	1208.9	499.3 3.8	442.1 8.5	405.5 15.1	359.1 33.9	329.4 60.3	291.7 135.6	13.8	0.0733	52
			HP200 0221 3	1840.9	766.1 6.7	678.4 15.1	622.3 26.8	551.0 60.2	505.4 106.9		22.0	0.1300	60
			HP250 0221 3	3802.0	1558.4 19.1	1379.9 42.9	1265.8 76.3	1120.8 171.6	1028.2 305.1		36.3	0.3710	80
			HP320 0221 3	6670.4	2734.2 66.6	2421.0 149.7	2220.8 266.1	1966.5 598.7			72.7	1.2945	100
	240	MS	HP100 0224 2	334.8	134.9 0.2	119.5 0.4	109.6 0.6	97.0 1.3	89.0 2.3	78.8 5.1	5.2	0.0052	32
			HP125 0224 2	539.9	219.4 0.5	194.2 1.0	178.2 1.8	157.8 4.0	144.7 7.1	128.1 15.9	7.2	0.0162	40
			HP150 0224 2	882.6	358.7 1.1	317.6 2.4	291.3 4.2	258.0 9.3	236.6 16.5	209.5 37.0	10.9	0.0378	47
			HP175 0224 2	1208.9	479.7 2.0	424.7 4.5	389.6 8.0	345.0 18.0	316.5 31.9	280.2 71.7	14.9	0.0733	52
			HP200 0224 2	1840.9	736.0 3.0	651.7 6.7	597.8 11.9	529.4 26.6	485.6 47.3	430.0 106.4	23.7	0.1088	60
			HP250 0224 2	3802.0	1497.2 10.1	1325.7 22.7	1216.1 40.4	1076.8 90.7	987.8 161.3	874.6 362.8	38.6	0.3710	80
			HP320 0224 2	6670.4	2626.8 35.2	2325.9 79.2	2133.6 140.7	1889.2 316.5	1733.0 562.6		77.2	1.2945	100

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft.
All of the R (right hand) is shown in the torque delivery ability chart.

1N・m≒0.102kgf・m

Torque chart

HP100, 125, 150, 175, 200, 250, 320

2, 3stop

Number of stop S	Index angle θ(deg)	Cam curve	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) TORQUE of load of inner inertial Toi of lower side (N • m) Number of INDEX per minute (INDEX/min) 50	75	100	150	200	300	Camshaft friction torque Tx (N • m)	Moment of inertia of output shaft Jo (kg • m²)	Cam follower SCF (mm)
2	240	MCV 50	HP100 0224 3	376.6	161.7 0.4	143.1 0.8	131.3 1.4	116.3 3.2	106.6 5.7	94.4 12.7	4.4	0.0089	32
			HP125 0224 3	604.6	261.0 1.0	231.1 2.2	212.0 3.9	187.7 8.8	172.2 15.6	152.5 34.9	6.2	0.0246	40
			HP150 0224 3	992.9	429.8 2.4	380.6 5.3	349.1 9.4	309.1 21.1	283.5 37.5	251.1 84.3	9.4	0.0595	47
			HP175 0224 3	1295.2	532.7 3.0	471.7 6.8	432.7 12.0	383.1 27.0	351.4 47.9	311.2 107.7	13.0	0.0760	52
			HP200 0224 3	2071.0	882.0 8.7	780.9 19.4	716.4 34.5	634.3 77.6	581.9 137.9		20.6	0.2190	60
			HP250 0224 3	4182.2	1732.0 25.8	1533.6 58.1	1406.8 103.2	1245.7 232.2	1142.7 412.8		34.1	0.6558	80
			HP320 0224 3	7295.8	3011.8 62.0	2666.9 139.5	2446.3 248.0	2166.2 558.0	1987.0 992.0		68.7	1.5758	100
	270	MS	HP100 0227 2	334.8	130.2 0.2	115.3 0.3	105.8 0.5	93.6 1.1	85.9 1.8	76.1 4.1	4.9	0.0052	32
			HP125 0227 2	539.9	211.8 0.6	187.5 1.2	172.0 2.2	152.3 4.8	139.7 8.5	123.7 19.1	6.9	0.0246	40
			HP150 0227 2	882.6	346.2 1.3	306.6 2.9	281.2 5.2	249.0 11.5	228.4 20.5	202.2 46.0	10.4	0.0595	47
			HP175 0227 2	1295.2	514.2 1.7	455.3 3.7	417.7 6.6	369.8 14.7	339.2 26.1	300.4 58.8	14.0	0.0760	52
			HP200 0227 2	2071.0	851.3 4.7	753.8 10.6	691.5 18.8	612.3 42.4	561.7 75.3	497.3 169.3	22.1	0.2190	60
			HP250 0227 2	3802.0	1445.2 8.0	1279.7 18.0	1173.9 31.9	1039.4 71.7	953.5 127.4	844.3 286.7	37.1	0.3710	80
			HP320 0227 2	6670.4	2535.6 27.8	2245.2 62.6	2059.5 111.2	1823.7 250.1	1672.9 444.6		74.2	1.2945	100
		MCV 50	HP100 0227 3	376.6	156.1 0.3	138.2 0.7	126.7 1.2	112.2 2.5	102.9 4.5	91.1 10.0	4.2	0.0089	32
			HP125 0227 3	604.6	252.0 0.8	223.1 1.8	204.7 3.1	181.2 6.9	166.2 12.3	147.2 27.6	6.0	0.0246	40
			HP150 0227 3	992.9	414.9 1.9	367.3 4.2	337.0 7.4	298.4 16.7	273.7 29.6	242.3 66.6	9.0	0.0595	47
			HP175 0227 3	1381.6	568.8 3.5	503.7 7.9	462.0 14.0	409.1 31.5	375.3 55.9	332.3 125.7	12.4	0.1123	52
			HP200 0227 3	2071.0	851.3 6.9	753.8 15.4	691.5 27.3	612.3 61.3	561.7 109.0	497.3 245.1	19.8	0.2190	60
			HP250 0227 3	4182.2	1671.8 20.4	1480.4 45.9	1358.0 81.6	1202.4 183.5	1103.0 326.2		33.0	0.6558	80
			HP320 0227 3	7556.3	3071.7 61.0	2719.8 137.1	2494.9 243.7	2209.2 548.3	2026.5 974.7		66.0	1.9595	100
	300	MS	HP100 0230 2	376.6	151.2 0.2	133.9 0.4	122.8 0.7	108.7 1.4	99.7 2.5	88.3 5.6	4.6	0.0089	32
			HP125 0230 2	604.6	244.1 0.5	216.2 1.0	198.3 1.8	175.6 3.9	161.0 6.9	142.6 15.5	6.5	0.0246	40
			HP150 0230 2	992.9	402.0 1.1	355.9 2.4	326.5 4.2	289.1 9.4	265.2 16.6	234.8 37.3	9.7	0.0595	47
			HP175 0230 2	1381.6	551.1 2.0	488.0 4.4	447.6 7.9	396.4 17.6	363.6 31.3	321.9 70.3	13.3	0.1123	52
			HP200 0230 2	2071.0	824.8 3.9	730.4 8.6	670.0 15.3	593.2 34.3	544.2 61.0	481.8 137.1	21.3	0.2190	60
			HP250 0230 2	4182.2	1619.8 11.4	1434.3 25.7	1315.7 45.6	1165.0 102.6	1068.7 182.4	946.3 410.4	35.1	0.6558	80
			HP320 0230 2	7556.3	2976.1 34.1	2635.2 76.7	2417.3 136.3	2140.5 306.6	1963.5 545.1		70.1	1.9595	100
		MCV 50	HP100 0230 3	392.3	179.2 0.3	158.7 0.6	145.5 1.0	128.9 2.2	118.2 3.8	104.7 8.5	4.0	0.0093	32
			HP125 0230 3	637.4	272.5 0.7	241.3 1.5	221.4 2.6	196.0 5.8	179.8 10.3	159.2 23.2	5.7	0.0255	40
			HP150 0230 3	1088.5	466.0 1.6	412.6 3.6	378.5 6.3	335.1 14.2	307.4 25.1	272.2 56.5	8.5	0.0623	47
			HP175 0230 3	1511.1	637.1 3.0	564.1 6.7	517.5 11.8	458.2 26.6	420.3 47.2	372.2 106.1	11.7	0.1170	52
			HP200 0230 3	2071.0	824.8 5.6	730.4 12.5	670.0 22.1	593.2 49.7	544.2 88.3	481.8 198.6	19.2	0.2190	60
			HP250 0230 3	4752.5	1988.5 17.9	1760.7 40.1	1615.2 71.3	1430.2 160.3	1311.9 284.9		30.9	0.7070	80
			HP320 0230 3	8338.0	3488.7 56.3	3089.1 126.7	2833.7 225.2	2509.2 506.7	2301.7 900.8		62.7	2.2358	100
3	120	MCV 25	HP100 0312 5	309.7	186.7 0.4	165.3 0.9	151.6 1.6	134.3 3.5	123.2 6.1	109.1 13.8	5.5	0.0047	32
			HP125 0312 5	501.0	302.4 1.2	267.8 2.7	245.6 4.8	217.5 10.7	199.5 18.9	176.7 42.5	7.7	0.0146	40

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft.
All of the R (right hand) is shown in the torque delivery ability chart.

1N • m≒0.102kgf • m

HP100, 125, 150, 175, 200, 250, 320

3stop

Number of stop S	Index angle θ(deg)	Cam curve	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) TORQUE of load of inner inertial Toi of lower side (N • m) Number of INDEX per minute (INDEX/min) 50	75	100	150	200	300	Camshaft friction torque Tx (N • m)	Moment of inertia of output shaft Jo (kg • m²)	Cam follower SCF (mm)
3	120	MCV 25	HP150 0312 5	816.4	488.5 2.8	432.6 6.2	396.8 11.0	351.4 24.7	322.3 43.8	285.4 98.6	11.6	0.0338	47
			HP175 0312 5	1122.5	743.0 5.4	657.9 12.1	603.5 21.5	534.3 48.4	490.1 86.0	434.0 193.4	15.8	0.0663	52
			HP200 0312 5	1702.8	1125.5 8.6	996.6 19.3	914.1 34.3	809.4 77.0	742.5 136.9	657.5 308.0	25.1	0.1055	60
			HP250 0312 5	2707.3	1551.6 22.5	1373.9 50.6	1260.3 90.0	1116.0 202.4	1023.7 359.7		39.1	0.2773	70
			HP320 0312 5	5839.3	3363.5 74.3	2978.3 167.0	2732.0 296.9	2419.1 667.9			80.7	0.9153	90
	150	MS	HP100 0315 2	334.8	194.5 0.3	172.2 0.6	158.0 0.9	139.9 2.1	128.3 3.6	113.6 8.1	5.3	0.0049	32
			HP125 0315 2	550.7	322.5 0.8	285.6 1.6	262.0 2.9	232.0 6.4	212.8 11.3	188.4 25.3	7.4	0.0152	40
			HP150 0315 2	882.6	509.0 1.7	450.7 3.7	413.4 6.5	366.1 14.7	335.8 26.0	297.3 58.5	11.2	0.0350	47
			HP175 0315 2	1208.9	770.0 3.2	681.8 7.2	625.4 12.7	553.8 28.5	508.0 50.7	449.8 113.9	15.3	0.0683	52
			HP200 0315 2	1840.9	1172.6 5.6	1038.3 12.5	952.4 22.2	843.3 49.9	773.6 88.7	685.0 199.5	24.3	0.1195	60
			HP250 0315 2	3802.0	2175.7 15.4	1926.5 34.7	1767.2 61.6	1564.8 138.5	1435.4 246.1	1271.0 553.7	39.5	0.3318	80
			HP320 0315 2	6670.4	3817.1 54.8	3379.9 123.3	3100.4 219.1	2745.3 493.0	2518.3 876.4		78.9	1.1815	100
	180	MS	HP100 0318 2	359.9	204.0 0.3	180.6 0.7	165.7 1.1	146.7 2.5	134.6 4.4	119.1 9.8	4.8	0.0084	32
			HP125 0318 2	593.8	339.9 0.8	301.0 1.7	276.1 3.0	244.5 6.7	224.3 11.9	198.6 26.7	6.8	0.0230	40
			HP150 0318 2	992.9	569.7 1.9	504.4 4.1	462.7 7.3	409.7 16.3	375.8 28.9	332.8 64.9	10.1	0.0560	47
			HP175 0318 2	1347.0	850.0 3.4	752.6 7.6	690.4 13.5	611.3 30.4	560.8 54.0	496.5 121.4	13.9	0.1048	52
			HP200 0318 2	1956.0	1209.2 6.6	1070.7 14.7	982.2 26.1	869.7 58.6	797.8 104.1	706.4 234.2	22.4	0.2020	60
			HP250 0318 2	4182.2	2357.7 19.7	2087.6 44.2	1915.0 78.5	1695.7 176.5	1555.5 313.7		36.3	0.6090	80
			HP320 0318 2	7295.8	4102.8 46.5	3632.9 104.5	3332.5 185.7	2950.8 417.8	2706.8 742.8		73.0	1.4420	100
	210	MS	HP100 0321 2	392.3	228.3 0.3	202.2 0.5	185.5 0.9	164.2 1.9	150.6 3.3	133.4 7.4	4.4	0.0087	32
			HP125 0321 2	631.6	354.9 0.6	314.2 1.3	288.2 2.3	255.2 5.1	234.1 9.0	207.3 20.1	6.3	0.0236	40
			HP150 0321 2	1029.7	573.4 1.4	507.7 3.1	465.7 5.4	412.4 12.1	378.3 21.5	334.9 48.4	9.5	0.0568	47
			HP175 0321 2	1424.7	880.3 2.6	779.5 5.7	715.0 10.1	633.1 22.8	580.8 40.4	514.2 90.9	13.0	0.1068	52
			HP200 0321 2	2071.0	1253.1 4.9	1109.6 11.0	1017.8 19.5	91.2 43.8	826.7 77.9	732.0 175.2	20.9	0.2058	60
			HP250 0321 2	4562.4	2553.8 15.0	2261.3 33.8	2074.3 60.0	1836.7 135.0	1684.9 240.0	1491.9 539.9	33.8	0.6340	80
			HP320 0321 2	7816.9	4327.9 41.0	3832.2 92.2	3515.4 163.9	3112.7 368.6	2855.4 655.3		68.6	1.7315	100
	240	MS	HP100 0324 2	392.3	232.9 0.2	206.3 0.4	189.2 0.7	167.5 1.5	153.7 2.6	136.1 5.8	4.2	0.0088	32
			HP125 0324 2	637.4	353.8 0.5	313.2 1.0	287.3 1.8	254.4 3.9	233.4 6.9	206.6 15.5	5.9	0.0238	40
			HP150 0324 2	1088.5	597.6 1.1	529.1 2.4	485.4 4.3	429.8 9.5	394.2 16.9	349.1 37.9	8.9	0.0580	47
			HP175 0324 2	1511.1	922.0 2.0	816.4 4.5	748.9 8.0	663.1 17.9	608.3 31.7	538.6 71.3	12.2	0.1093	52
			HP200 0324 2	2301.1	1404.1 3.9	1243.3 8.8	1140.5 15.6	1009.9 35.0	926.3 62.2	820.2 139.9	19.5	0.2145	60
			HP250 0324 2	4562.4	2453.5 11.5	2172.5 25.9	1992.9 46.0	1764.6 103.4	1618.7 183.7	1433.3 413.4	32.5	0.6340	80
			HP320 0324 2	7816.9	4158.0 31.4	3681.8 70.6	3377.3 125.5	2990.5 282.2	2743.2 501.7	2429.0 1128.8	66.0	1.7315	100
	270	MS	HP100 0327 2	392.3	224.9 0.2	199.1 0.3	182.6 0.6	161.7 1.2	148.3 2.1	131.3 4.6	4.0	0.0088	32
			HP125 0327 2	637.4	341.5 0.4	302.4 0.8	277.4 1.4	245.6 3.1	225.3 5.5	199.5 12.3	5.7	0.0238	40
			HP150 0327 2	1088.5	576.8 0.9	510.7 1.9	468.5 3.4	414.8 7.5	380.5 13.3	336.9 29.9	8.6	0.0580	47
			HP175 0327 2	1511.1	890.0 1.6	788.1 3.6	722.9 6.3	640.1 14.1	587.2 25.1	519.9 56.3	11.8	0.1093	52

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft.
All of the R (right hand) is shown in the torque delivery ability chart.

1N • m≒0.102kgf • m

HP100, 125, 150, 175, 200, 250, 320

3, 4stop

Number of stop S	Index angle θ(deg)	Cam curve	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) Number of INDEX per minute (INDEX/min) 50	75	100	150	200	300	Camshaft friction torque Tx (N • m)	Moment of inertia of output shaft Jo (kg • ㎡)	Cam follower SCF (mm)
3	270	MS	HP200 0327 2	2301.1	1355.4 3.1	1200.1 7.0	1100.9 12.3	974.8 27.7	894.2 49.2	791.8 110.5	18.8	0.2145	60
			HP250 0327 2	4752.5	2514.9 9.3	2226.8 20.9	2042.7 37.1	1808.7 83.4	1659.2 148.2	1469.1 333.4	31.1	0.6473	80
			HP320 0327 2	8338.0	4412.2 29.6	3906.8 66.5	3583.8 118.1	3173.3 265.8	2910.9 472.4	2577.5 1062.9	63.0	2.0635	100
	300	MS	HP100 0330 2	392.3	217.9 0.2	192.9 0.3	176.9 0.5	156.7 1.0	143.7 1.7	127.3 3.7	3.9	0.0088	32
			HP125 0330 2	637.4	330.8 0.3	292.9 0.7	268.7 1.2	237.9 2.5	218.3 4.5	193.3 10.0	5.5	0.0238	40
			HP150 0330 2	1088.5	558.9 0.7	494.8 1.6	453.9 2.7	401.9 6.1	368.7 10.8	326.5 24.2	8.3	0.0580	47
			HP175 0330 2	1511.1	862.3 1.3	763.5 2.9	700.4 5.1	620.2 11.4	568.9 20.3	503.7 45.6	11.4	0.1093	52
			HP200 0330 2	2301.1	1313.2 2.5	1162.8 5.6	1066.6 10.0	944.5 22.4	866.4 39.8	767.1 89.5	18.2	0.2145	60
			HP250 0330 2	4752.5	2436.6 7.6	2157.5 16.9	1979.1 30.1	1752.5 67.6	1607.6 120.1	1423.4 270.1	30.2	0.6473	80
			HP320 0330 2	8338.0	4274.9 24.0	3785.3 53.9	3472.3 95.7	3074.6 215.3	2820.4 382.7	2497.3 861.0	61.4	2.0635	100
4	90	MS	HP100 0409 2	254.0	138.1 0.5	122.3 1.0	112.2 1.8	99.3 4.0	91.1 7.0	80.7 15.7	6.0	0.0045	26
			HP125 0409 2	381.9	240.9 1.4	213.3 3.1	195.7 5.6	173.3 12.4	158.9 22.1	140.7 49.6	8.2	0.0143	35
			HP150 0409 2	572.2	356.1 3.1	315.3 6.9	289.3 12.2	256.1 27.4	234.9 48.7		12.1	0.0315	40
			HP175 0409 2	897.3	558.5 6.3	494.5 14.1	453.6 25.1	401.6 56.3	368.4 100.1		16.8	0.0648	47
			HP200 0409 2	1208.9	762.6 10.6	675.3 23.7	619.4 42.1	548.6 94.6	503.1 168.1		26.4	0.1088	52
			HP250 0409 2	2560.9	1615.7 28.1	1430.6 63.1	1312.3 112.1	1162.0 252.1	1065.9 448.2		42.3	0.2900	70
			HP320 0409 2	5450.0	3438.4 92.4	3044.6 208.0	2792.9 369.7	2473.0 831.7			87.1	0.9568	90
	120	MS	HP100 0412 2	334.8	159.4 0.3	141.2 0.7	129.5 1.2	114.7 2.6	105.2 4.6	93.1 10.2	5.2	0.0052	32
			HP125 0412 2	539.9	290.4 0.9	257.1 2.0	235.9 3.6	208.8 8.0	191.6 14.1	169.6 31.7	7.2	0.0162	40
			HP150 0412 2	882.6	474.7 2.0	420.3 4.3	385.6 7.7	341.4 17.2	313.2 30.5	277.3 68.5	10.9	0.0350	47
			HP175 0412 2	1208.9	631.9 4.0	559.5 9.0	513.3 16.0	454.5 35.9	416.9 63.7	369.1 143.3	14.9	0.0733	52
			HP200 0412 2	1840.9	962.3 7.1	852.1 15.9	781.6 28.3	692.1 63.6	634.9 113.0	562.2 254.3	23.7	0.1300	60
			HP250 0412 2	3802.0	1876.1 20.2	1661.2 45.4	1523.8 80.7	1349.3 181.4	1237.7 322.5		38.6	0.3710	80
			HP320 0412 2	6670.4	3291.5 70.4	2914.5 158.3	2673.5 281.3	2367.3 633.0			77.2	1.2945	100
	150	MS	HP100 0415 2	376.6	178.7 0.4	158.2 0.7	145.1 1.3	128.5 2.8	117.0 5.0	104.4 11.2	4.6	0.0089	32
			HP125 0415 2	604.6	286.1 0.9	253.4 2.0	232.4 3.5	205.8 7.8	188.8 13.7	167.1 30.9	6.5	0.0246	40
			HP150 0415 2	992.9	471.1 2.1	417.1 4.7	382.6 8.3	338.8 18.7	310.8 33.1	275.2 74.5	9.7	0.0595	47
			HP175 0415 2	1381.6	642.9 4.0	569.2 8.8	522.2 15.7	462.3 35.2	424.1 62.5	375.5 140.5	13.3	0.1123	52
			HP200 0415 2	2071.0	954.9 7.7	845.6 17.2	775.6 30.5	686.8 68.6	630.0 121.9	557.8 274.2	21.3	1.2190	60
			HP250 0415 2	4182.2	1797.2 22.8	1591.4 51.3	1459.8 91.2	1292.6 205.2	1185.7 364.8		35.1	0.6558	80
			HP320 0415 2	7295.8	3125.3 54.8	2767.3 123.3	2538.5 219.2	2247.8 493.1	2061.9 876.6		70.6	1.5758	100
	180	MS	HP100 0418 2	392.3	183.9 0.3	162.8 0.6	149.4 0.9	132.3 2.1	121.3 3.6	107.4 8.1	4.2	0.0093	32
			HP125 0418 2	637.4	302.4 0.7	267.8 1.4	245.7 2.5	217.5 5.6	199.5 9.9	176.7 22.2	5.9	0.0255	40
			HP150 0418 2	1088.5	517.0 1.6	457.8 3.4	419.9 6.1	371.8 13.6	341.1 24.1	302.0 54.2	8.9	0.0623	47
			HP175 0418 2	1511.1	703.6 2.9	623.0 6.4	571.5 11.3	506.0 25.5	464.2 45.2	411.0 101.7	12.2	0.1170	52
			HP200 0418 2	2301.1	1071.5 5.6	948.7 12.6	870.3 22.3	770.6 50.1	706.9 89.0	625.9 200.2	19.5	0.2303	60
			HP250 0418 2	4752.5	2088.8 17.1	1849.6 38.5	1696.7 68.3	1502.3 153.7	1378.1 273.2		32.1	0.7070	80

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft.
All of the R (right hand) is shown in the torque delivery ability chart.

1N • m≒0.102kgf • m

HP100, 125, 150, 175, 200, 250, 320

4stop

Number of stop S	Index angle θ(deg)	Cam curve	CODE	Torque of static rated output Ts (N • m)	Dynamic rated output torque Top of upper side (N • m) / TORQUE of load of inner inertial Toi of lower side (N • m) Number of INDEX per minute (INDEX/min) 50	75	100	150	200	300	Camshaft friction torque Tx (N • m)	Moment of inertia of output shaft Jo (kg • ㎡)	Cam follower SCF (mm)
4	180	MS	HP320 0418 2	8338.0	3664.8 54.0	3245.0 121.5	2976.7 216.0	2635.8 485.9	2417.8 863.7		65.0	2.2358	100
	210	MS	HP100 0421 2	392.3	175.6 0.2	155.5 0.4	142.6 0.7	126.3 1.5	115.8 2.7	102.6 6.0	4.0	0.0093	32
			HP125 0421 2	637.4	288.8 0.5	255.7 1.1	234.5 1.9	207.7 4.1	190.5 7.3	168.7 16.3	5.6	0.0255	40
			HP150 0421 2	1088.5	493.6 1.2	437.1 2.5	400.9 4.5	355.0 10.0	325.7 17.7	288.4 39.8	8.5	0.0623	47
			HP175 0421 2	1511.1	671.8 2.1	594.8 4.7	545.7 8.4	483.2 18.7	443.2 33.3	392.4 74.8	11.7	0.1170	52
			HP200 0421 2	2301.1	1023.0 4.1	905.9 9.2	831.0 16.4	735.8 36.8	674.9 65.4	597.6 147.1	18.6	0.2303	60
			HP250 0421 2	4752.5	1994.4 12.6	1766.0 28.3	1620.0 50.2	1434.4 112.9	1315.8 200.7	1165.1 451.5	30.8	0.7070	80
			HP320 0421 2	8338.0	3499.1 39.7	3098.4 89.3	2842.2 158.7	2516.7 357.0	2308.6 634.6		62.5	2.2358	100
	240	MS	HP100 0424 2	392.3	168.7 0.2	149.4 0.3	137.0 0.6	121.3 1.2	111.3 2.1	98.5 4.6	3.8	0.0093	32
			HP125 0424 2	637.4	277.4 0.4	245.7 0.8	225.3 1.4	199.5 3.2	183.0 5.6	162.1 12.5	5.4	0.0255	40
			HP150 0424 2	1088.5	474.2 0.9	419.9 2.0	385.2 3.4	341.1 7.7	312.9 13.6	277.0 30.5	8.2	0.0623	47
			HP175 0424 2	1511.1	645.4 1.6	571.5 3.6	524.2 6.4	464.2 14.4	425.8 25.5	377.0 57.3	11.2	0.1170	52
			HP200 0424 2	2301.1	982.9 3.2	870.3 7.1	798.3 12.6	706.9 28.2	648.4 50.1	574.2 112.6	17.9	0.2303	60
			HP250 0424 2	4752.5	1916.1 9.7	1696.7 21.7	1556.4 38.5	1378.1 86.5	1264.2 153.7	1119.4 345.7	29.8	0.7070	80
			HP320 0424 2	8338.0	3361.7 30.4	2976.7 68.4	2730.6 121.5	2417.8 273.3	2217.9 485.9		60.6	2.2358	100
	270	MS	HP100 0427 2	392.3	162.8 0.1	144.2 0.3	132.3 0.4	117.1 0.9	107.4 1.6	95.1 3.6	3.6	0.0093	32
			HP125 0427 2	637.4	267.8 0.3	237.1 0.7	217.5 1.1	192.6 2.5	176.7 4.4	156.4 9.9	5.2	0.0255	40
			HP150 0427 2	1088.5	457.8 0.7	405.3 1.6	371.8 2.7	329.2 6.1	302.0 10.7	267.4 24.1	7.9	0.0623	47
			HP175 0427 2	1511.1	623.0 1.3	551.6 2.9	506.0 5.1	448.1 11.3	411.0 20.1	363.9 45.2	10.9	0.1170	52
			HP200 0427 2	2301.0	948.7 2.5	840.1 5.6	770.6 9.9	682.3 22.3	625.9 39.6	554.2 89.0	17.4	0.2303	60
			HP250 0427 2	4752.5	1849.6 7.6	1637.8 17.1	1502.3 30.4	1330.3 68.3	1220.3 121.4	1080.5 273.2	29.0	0.7070	80
			HP320 0427 2	8338.0	3245.0 24.0	2873.4 54.0	2635.8 96.0	2333.9 216.0	2140.9 383.9	1895.7 863.7	59.1	2.2358	100
	300	MS	HP100 0430 2	392.3	157.8 0.1	139.7 0.2	128.1 0.4	113.5 0.8	104.1 1.3	92.2 3.0	3.5	0.0093	32
			HP125 0430 2	637.4	259.5 0.3	229.7 0.5	210.7 0.9	186.6 2.0	171.2 3.6	151.6 8.0	5.1	0.0255	40
			HP150 0430 2	1088.5	443.5 0.6	392.7 1.3	360.3 2.2	319.0 4.9	292.6 8.7	259.1 19.5	7.7	0.0623	47
			HP175 0430 2	1511.1	603.6 1.1	534.5 2.3	490.3 4.1	434.1 9.2	398.2 16.3	352.6 36.7	10.6	0.1170	52
			HP200 0430 2	2301.1	919.2 2.1	813.9 4.6	746.6 8.1	661.1 18.1	606.4 32.1	537.0 72.1	16.9	0.2303	60
			HP250 0430 2	4752.5	1792.0 6.2	1586.8 13.9	1455.6 24.6	1288.9 55.4	1182.3 98.4	1046.9 221.3	28.4	0.7070	80
			HP320 0430 2	8338.0	3144.1 19.5	2784.0 43.8	2553.8 77.8	2261.3 174.9	2074.3 311.0	1836.7 699.6	57.9	2.2358	100

Note) The ability to send the torque by the cam of right hand(R) and the cam of left hand(L) do not changed to show the direction of rotation of input out shaft.
All of the R (right hand) is shown in the torque delivery ability chart.

1N • m≒0.102kgf • m

HANNZ MOTROL CO.,LTD.

FAX SHEET
Please use to copy the fax sheet.

Dear Sir(Sirs)

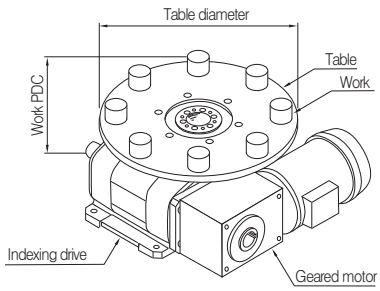
Selected data of INDXIA HD type

Company name			
Department name			
Name of person in charge			
Phone number	(Extension number)	Fax number	

- Selecting the HD series is required to choose the proper model on the use condition.
- We are selecting the type by the torque calculation as the service to the customers.
- Pleases send it to use after writing the use condition to this fax sheet.

- Number of stop ····· S
- Dividing time ····· t_1 sec
- Stopping time ····· t_2 sec

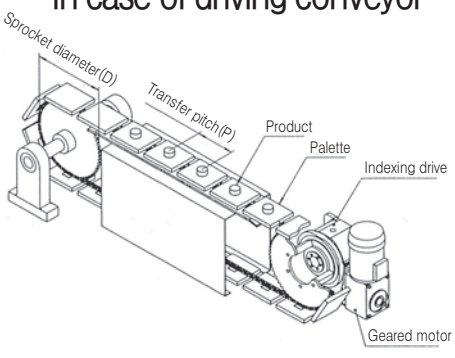
In case of driving the data



- Table diameter ····· D mm
- Table mass ····· W_1 kg
- Jig : P.C.D ····· D_2 mm
- Jig mass per 1ea ····· W_2 kg
- Quantity of jig ····· n_2
- Work P.C.D ····· D_3 mm
- Work mass per 1ea ····· W_3 kg
- Quantity of work ····· n_3

- Transfer pitch ····· P mm
- Chain and attachment mass ····· W_1 kg
- Jig mass g ····· W_2 kg
- Work mass ····· W_3 kg
- Sprocket diameter ····· D mm
- Sprocket mass per 1ea ····· W_4 kg
- Quantity of sprocket ····· n_4
- Coefficient of friction ····· μ

In case of driving conveyor

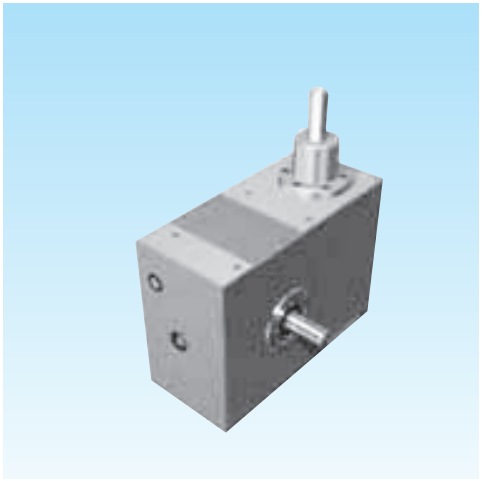


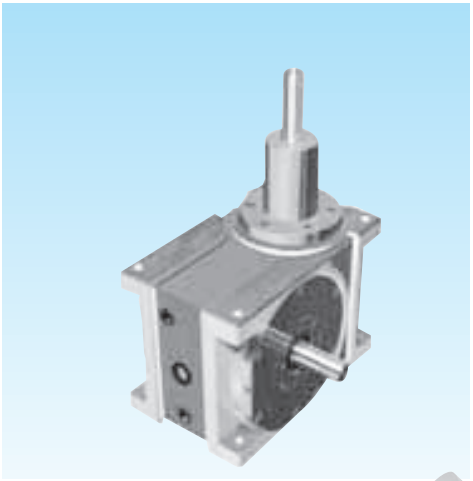
Geared motor	Whether it exists • not	Inverter	Whether it exists • not
Torque shield	Whether it exists • not	Timing cam	(Whether it exists: set) • not

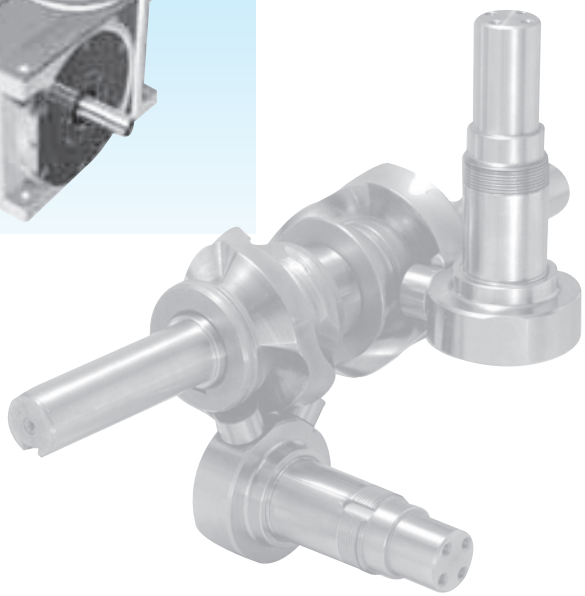
MEMO

INDXIA

Pick&Place Unit







Characteristics of HN, HL Series

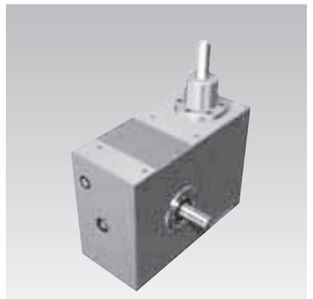
- Pick & Place Unit adopted with roller gear cam and grooved cam
- Excellent in high speed because all movements are consisted of cams
- Unit with a high reliability for long period with its simple structure
- HL type is a Universal Type with big oscillation angle

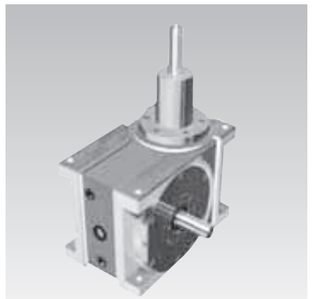
Pick & Place Unit

HN series

With increasing numbers of handle works requiring precise high productivity such as Microelectronice field, Pick & Place Unit with high speed and precise timing is in the spotlight.

Hannz Motrol Co., Ltd. manufactures a number of different types–compact drive of special cam mechanism, high accuracy type resulting rotary motion and rectilinear motion using roller gear cam mechanism, general purpose type using 1pc of roller gear cam and grooved cam to deal with extensive demands.





Characteristics

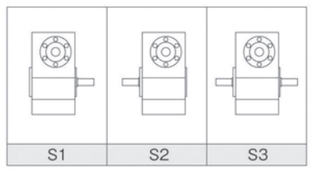
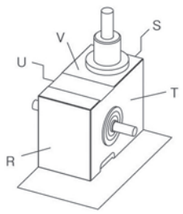
- Return of precise position
- High speed performance and excellent durability
- Available for synchronized operation of other equipments.

Product Code

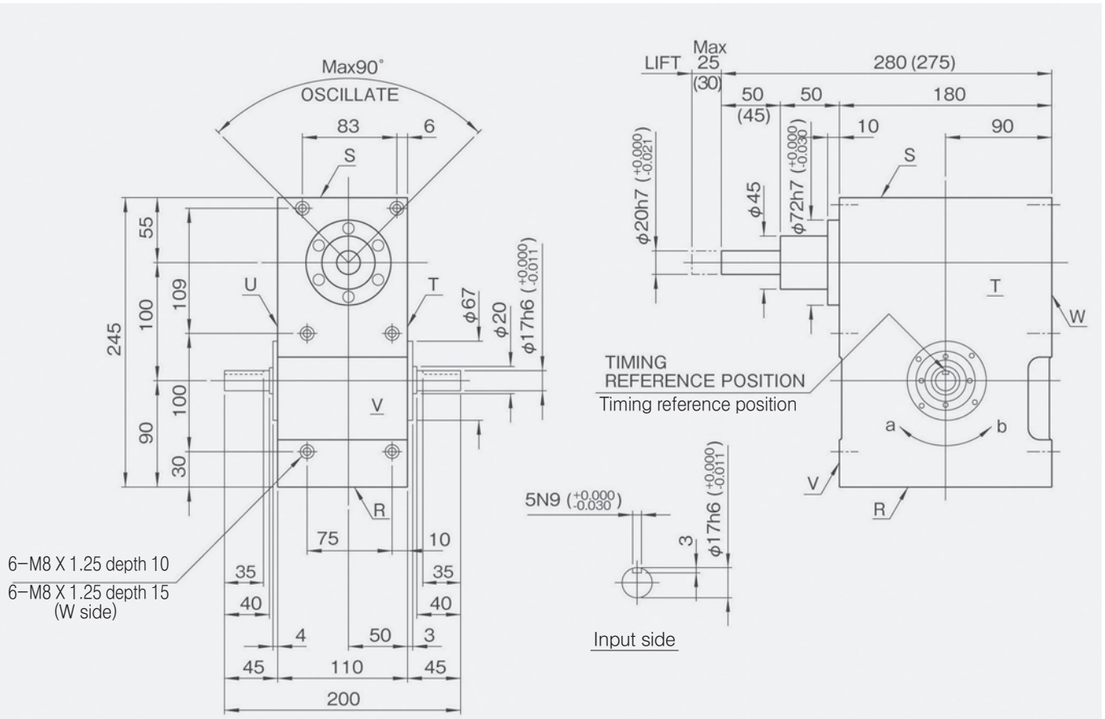
Ex.) HN 110 | 6317 2 R | S 3 VW | 1 X

a b c d e f g h i j

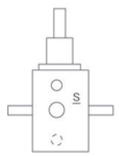
a Form	b Size	c Reference number	d Cam curve	e Rotation direction
HN Oscillating handler HN series	110 Axial distance 110mm	6317 Reference number of Hannz Motrol	2 MS Curve	R Right hand cam
HN HN series HL HL series	It shows the axial distance between input shaft and output shaft.	All oscillating handler is produced by order. Therefore Hannz Motrol decides a 4 digit reference number.	1: Modified trapezoid curve (MT) 2: Modified sine curve (MS) 3: Modified constant velocity (MCV50) 4: SHP 5 Special order curve 9: Custom cam curve Cam curve satisfying customers requests	Decided according to the input shaft rotation direction and output shaft rotation direction Ⓡ Right hand cam Ⓛ Left hand cam

f Specification of output shaft	g Specification of input shaft	h Processing surface of mounting hole	i Mounting Position	j Special Insturction
S Standard shaft type	3 Both T and U surface sides input nsion	VW Processing of tapped mounting holes of V surface and W surface	1 Mounting position (The W surface becomes GL)	X Special instruction
S Standard specification	1. Only T surface side 2. Only U surface side 3. Both T and U surface sides input extension R1 T surface side input extension and reducer mounted R2 U surface side input extension one reducer mounted R3 Only one surface side input extension one reducer mounted Note) If reducer is equipped for both sides input side, the code is the same for both T and U sides.	Please enter the code additionally to the surface to the code in case the tapped hole is required at the R,S,T, U Surface. Processing of all suface is A. Depending on the types, there are sides where the attachment hole processing is impossible. (Refer to the page of each type.)	It is available to use in position that all sides become GL. Position1. W side becomes GL Position 2. V side becomes GL Position 3. U side becomes GL Position 4. T side becomes GL Position 5. R side becomes GL Position 6. S side becomes GL	If there is a special specification apart from the standard product (Catalog expression), enter (X). ( ) Standard product(Blank) (X) Special order product (X) Expression example 1) Determine the changes in figure and tolerance.
The shaft is a standard for output shaft specification.•• S Torque limiter mounted is a special specification. Input shaft specifications are 1 Only T surface side R□ Mounted Reducer 2 Only U surface side M□ Mounted Motor 3 Both T and U surface sides input extension  S1 S2 S3		 V S U T R		

HN100 dimension



The location of oil hole, flow meter and drain and flow depending on the position

Position	1
Location	
Oil level (ℓ)	0.8

⚠ Attention

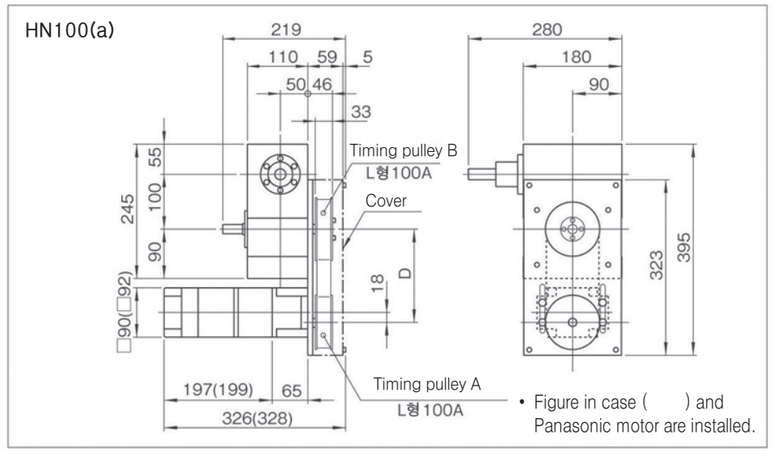
- Position is in order of oil hole, oil gage and oil drainage from the top.
- Flow changes depending on the form of cam, the number of cam followers, etc.

• Characteristic table of index

Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values
Allowed load of output shaft	W_0	N	Refer to the loading capacity table	Allowed THRUST load of input shaft	P_3	N	980	GD2 of oscillate part of output part	J_0	kg • m²	1.2×10^{-3}
Allowed THRUST load of output shaft	P_1	N	245	Maximum repeated bending force of input shaft	P_4	N	1078	Inner load of lift part of output part	W_{a1}	N	19.6
Allowed RADIAL load of output shaft	P_2	N	98	Maximum allowed repeated torque of input shaft	P_5	N • m	68.6	Product weight		kg	27
Allowed torque of output shaft	T_S	N • m	Refer to the torque transmission table	Twisting stiffness of input shaft	K_2	N • m /rad	6664				
Twisting stiffness of output shaft	K_1	N • m /rad	5096	GD2 of input shaft	J_1	kg • m²	1.5×10^{-2}				

1N≒0.102kgf

An example of option being mounted (Small motor equipped specification)



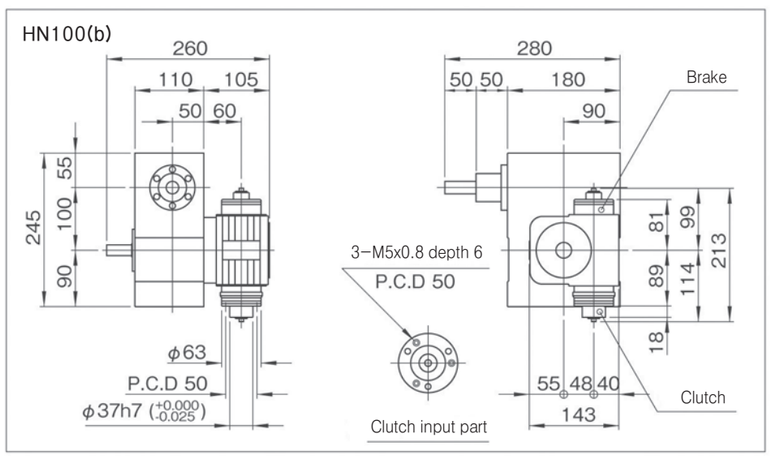
Induction motor continuous rating

Motor type			Output (W)	Frequency (HZ)	Voltage (V)	Current (A)	Starting torque (gcm)	Torque (gcm)	Revolutions Per Minute (rpm)	Capacitance (μF)	Gear head type / Ball bearing type
Oriental motor	No C • B	51K90GU-AF	90	50	100	2.0	0.45	0.68	1300	25.0	5GU□KB
	With C • B	CBI 590-801		60				0.57	1550		5GCH□KB
Panasonic	No C • B	M91C90G4L	90	50	100	1.6	0.470	0.637	1325	25.0	M9GD□B
	With C • B	M9CBIC90G4L		60		1.7		0.519	1625		M9GE□B-CB

※ □에는 감속비가 들어갑니다.

Revolutions Per Minute (rpm)		200	120	100	60	50	30	20	15	10
50Hz deceleration ratio		7.5	12.5	15	25	30	50	75	100	150
60Hz deceleration ratio		9	15	18	30	36	60	90	120	180
Allowed torque	5 IK90GU-AF	4.1	6.2	7.4	11.2	13.5	20	20	20	20
	M91A90G4L	3.43	5.68	6.76	10.88	13.03	19.6	19.6	19.6	19.6

An example of option being mounted (Reducer R48 mounting specification)



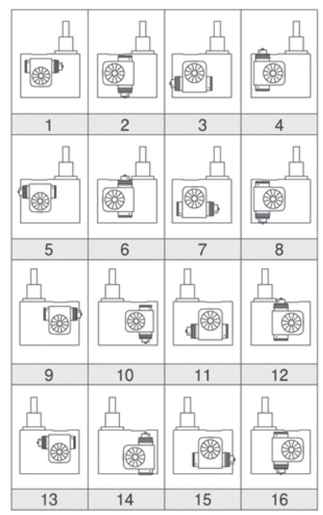
Timing motor specification

Timing pulley reducer	Pulley A size	Pulley B size	D	Separate form
1.4	30	42	170	270L 72치
1.5	28	42	175	270L 72치
1.62	26	42	179	270L 72치

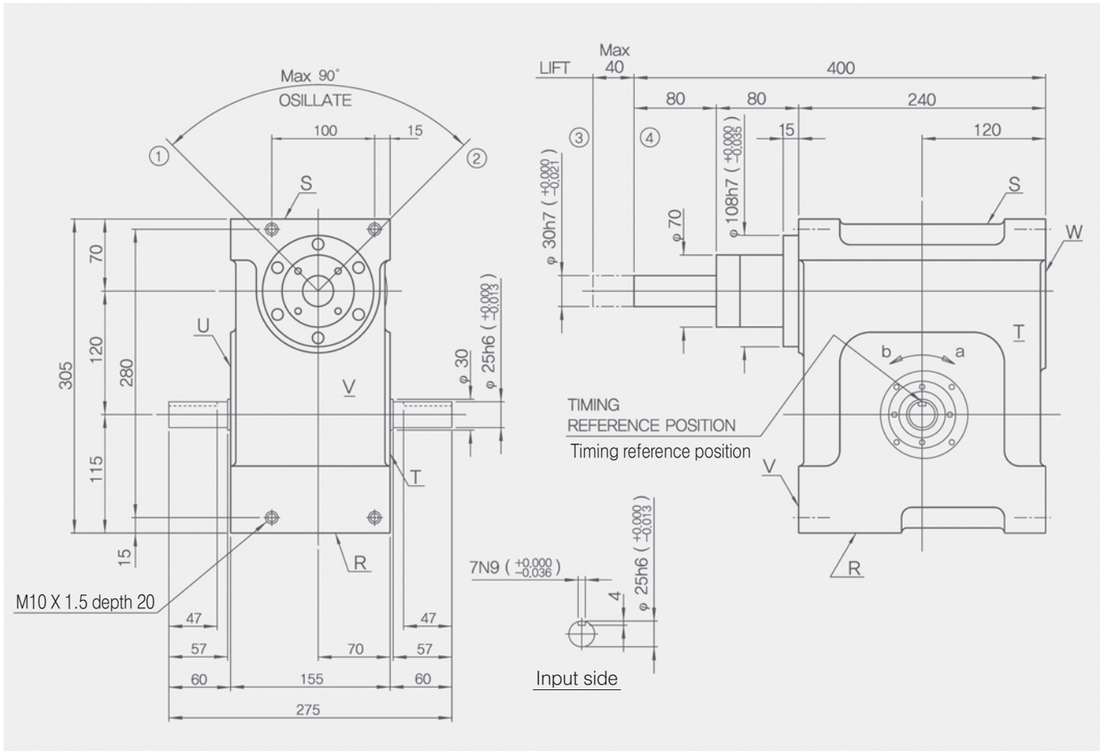
Clutch / Brake part specification

Item \ Motor output	90W	
	Clutch	Brake
Statical friction torque	1.5 N • m	
Dynamic friction torque	1.0 N • m	
Rated voltage	DC24V	
Capacity	7W	5W
Amateur attraction time	15msec	
Amateur diminishing time	25msec	
Torque starting time	20msec	
Operation rate	Max. 100 times/ min	
Total amount of working	15×10^7J	
Allowed amount of working per session	1.47J	

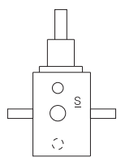
Reducer attached position



HN120 dimension



The location of oil hole, flow meter and drain and flow depending on the position

Position	1
Location	
Oil level (ℓ)	1.4

⚠ Attention

- Position is in order of oil hole, oil gage and oil drainage from the top.
- Flow changes depending on the form of cam, the number of cam followers, etc.

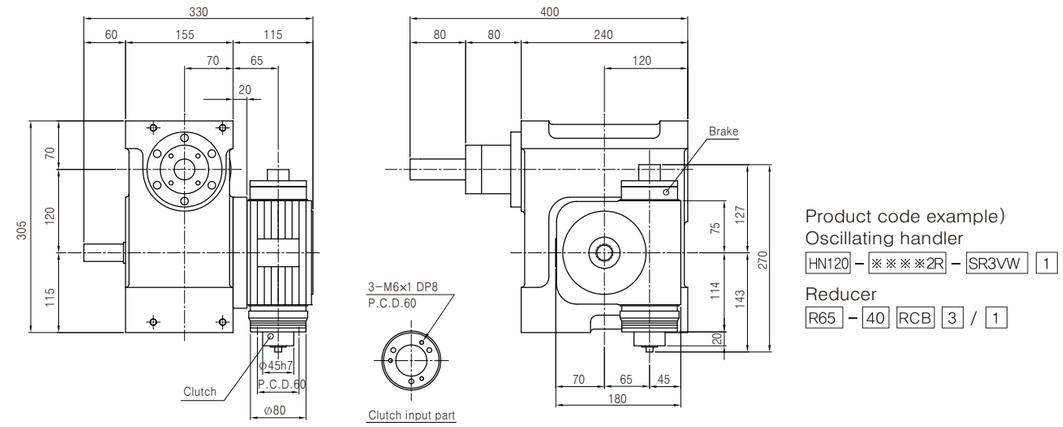
• Characteristic table of index

Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values
Allowed load of output shaft	W_0	N	Refer to the loading capacity table	Allowed THRUST load of input shaft	P_3	N	1470	GD2 of oscillate part of output part	J_0	kg • m²	0.0033
Allowed THRUST load of output shaft	P_1	N	280	Maximum repeated bending force of input shaft	P_4	N	2300	Inner load of lift part of output part	W_{a1}	N	25.5
Allowed RADIAL load of output shaft	P_2	N	200	Maximum allowed repeated torque of input shaft	P_5	N • m	220	Product weight		kg	about 70
Allowed torque of output shaft	Ts	N • m	Refer to the torque transmission table	Twisting stiffness of input shaft	K_2	N • m /rad	1.66×10^4				
Twisting stiffness of output shaft	K_1	N • m /rad	5096	GD2 of input shaft	J_1	kg • m²	6.3×10^{-2}				

1N≒0.102kgf

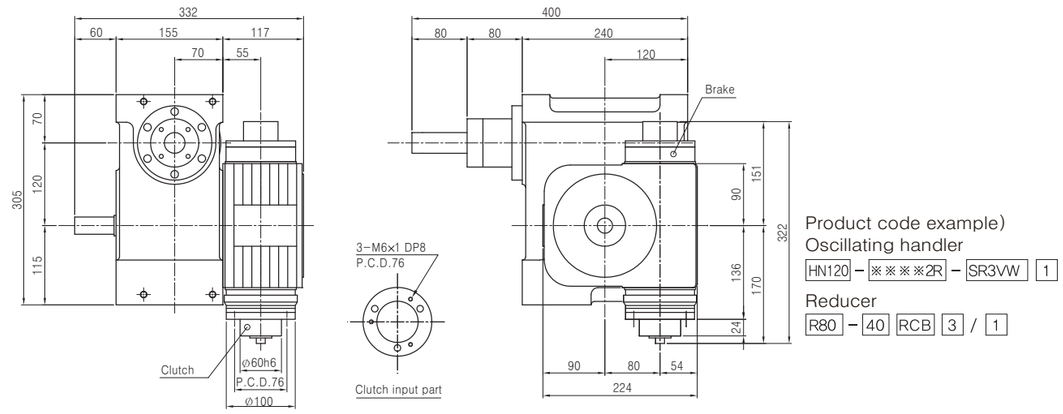
An exampleof option being mounted

HN120(a)



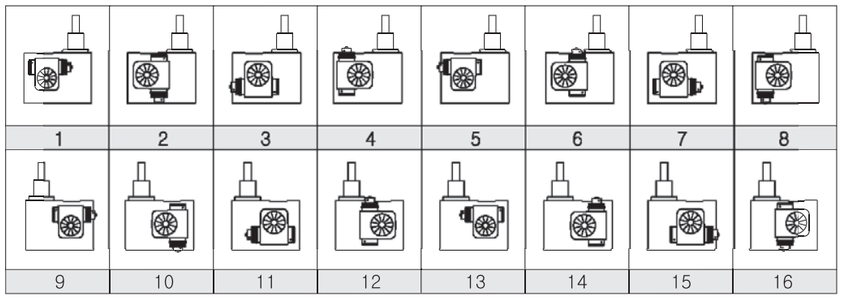
Product code example)
Oscillating handler
HN120 – ※※※※2R – SR3VW 1
Reducer
R65 – 40 RCB 3 / 1

HN120(b)

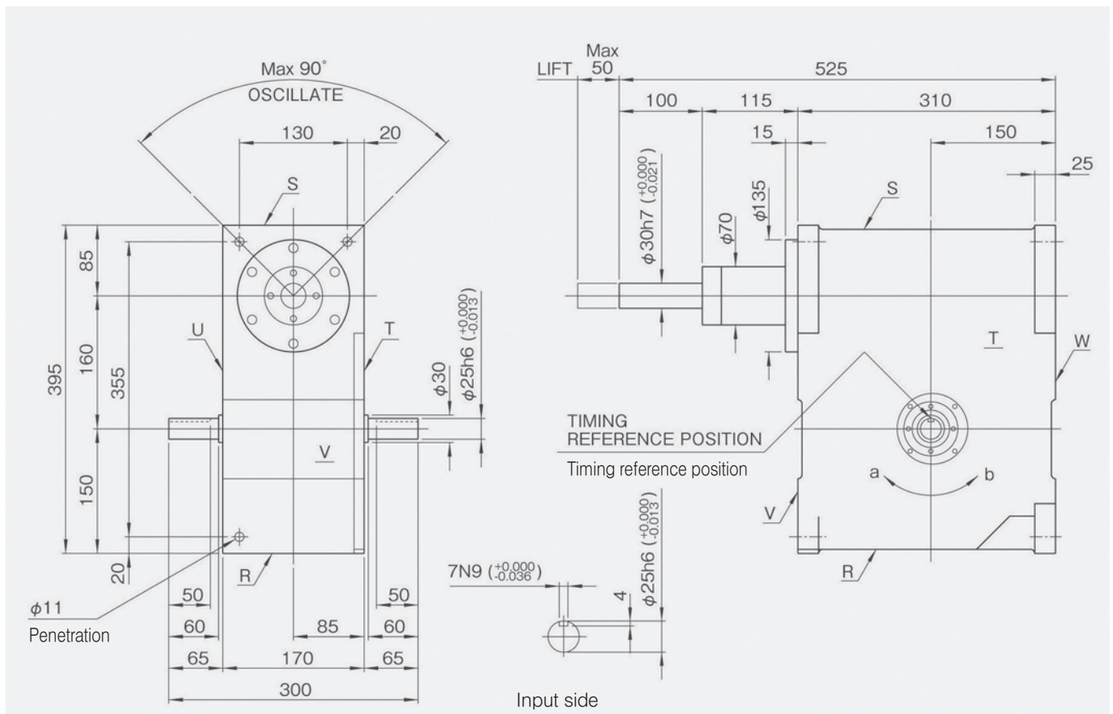


Product code example)
Oscillating handler
HN120 – ※※※※2R – SR3VW 1
Reducer
R80 – 40 RCB 3 / 1

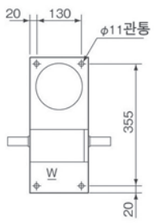
Reducer attached position



HN160 dimension

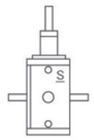


Location of attachment hole



Dimension diagram of attachment hole of W surface

The location of oil hole, flow meter and drain and flow depending on the position

Position	1
Location	
Oil level (ℓ)	2.5

⚠ Attention

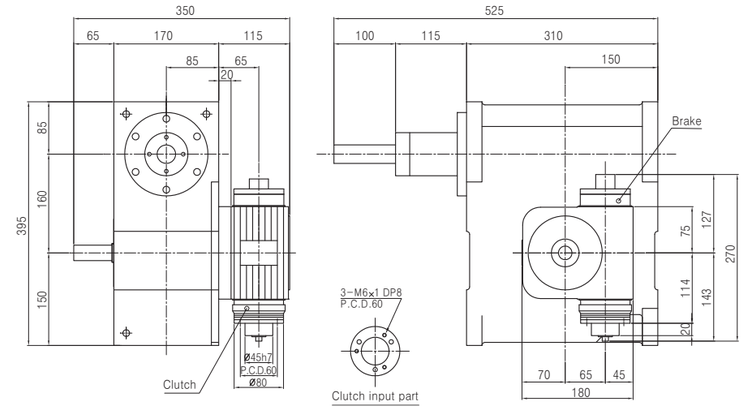
- Position is in order of oil hole, oil gage and oil drainage from the top.
- Flow changes depending on the form of cam, the number of cam followers, etc.

• Characteristic table of index

Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values
Allowed load of output shaft	W_0	N	Refer to the loading capacity table	Allowed THRUST load of input shaft	P_3	N	1470	GD2 of oscillate part of output part	J_0	kg • m²	6.25×10^{-3}
Allowed THRUST load of output shaft	P_1	N	490	Maximum repeated bending force of input shaft	P_4	N	2352	Inner load of lift part of output part	W_{a1}	N	56.8
Allowed RADIAL load of output shaft	P_2	N	274.4	Maximum allowed repeated torque of input shaft	P_5	N • m	225.4	Product weight		kg	110
Allowed torque of output shaft	T_S	N • m	264.6	Twisting stiffness of input shaft	K_2	N • m /rad	2.058×10^4				
Twisting stiffness of output shaft	K_1	N • m /rad	264.6×10^4	GD2 of input shaft	J_1	kg • m²	0.1875				

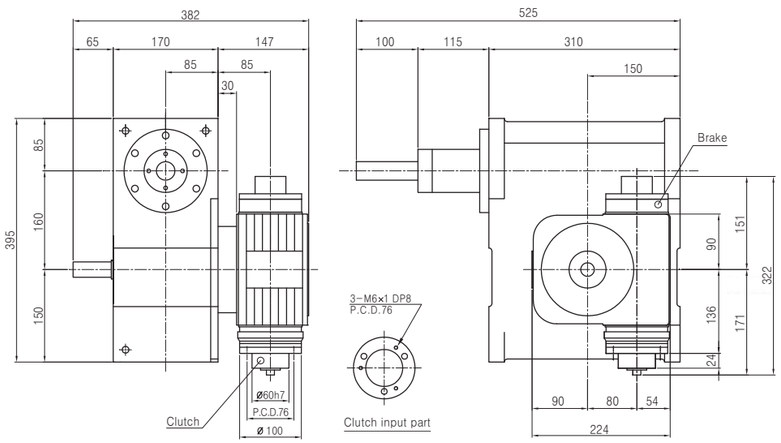
1N≒0.102kgf

HN160(a)



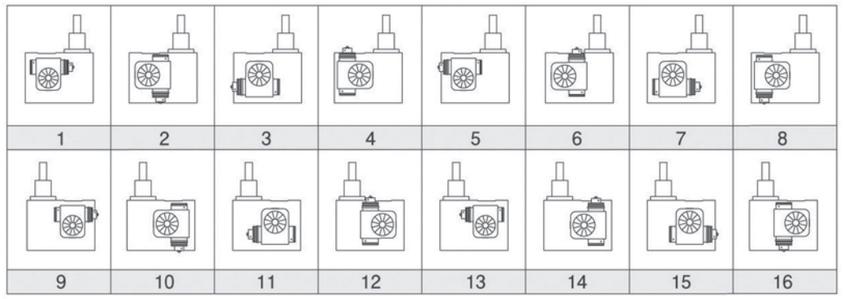
Product code example)
Oscillating handler
HN160 – ※※※※2R – SR3VW 1
Reducer
R65 – 40 RCB 3 / 1

HN160(b)

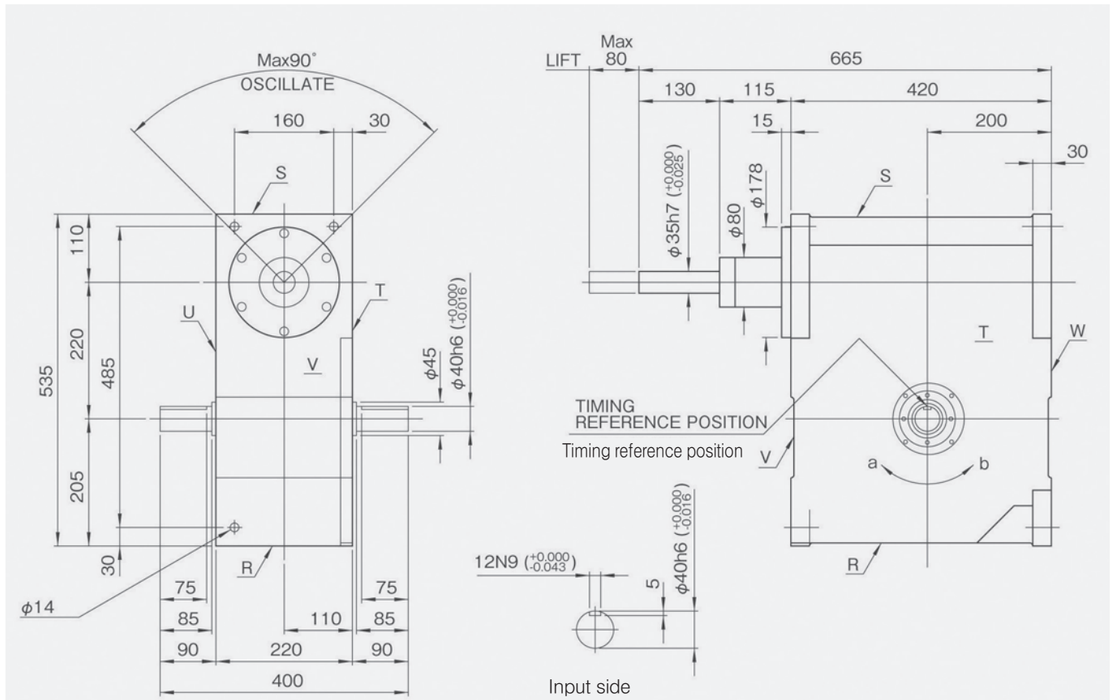


Product code example)
Oscillating handler
HN160 – ※※※※2R – SR3VW 1
Reducer
R80 – 40 RCB 3 / 1

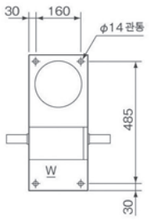
Reducer attached position



HN220 dimension



Location of attachment hole



Dimension diagram of attachment hole of W surface

The location of oil hole, flow meter and drain and flow depending on the position

Position	1
Location	
Oil level (ℓ)	7

⚠ Attention

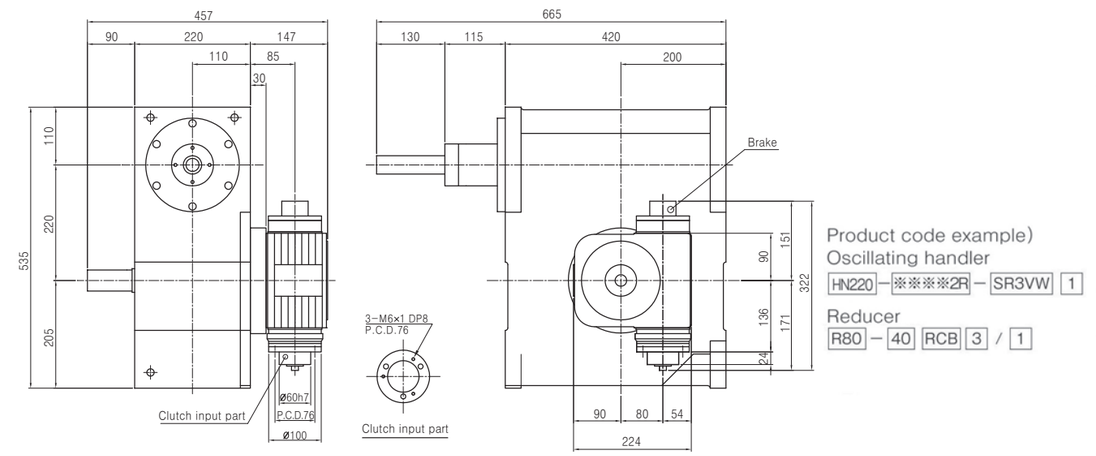
- Position is in order of oil hole, oil gage and oil drainage from the top.
- Flow changes depending on the form of cam, the number of cam followers, etc.

• Characteristic table of index

Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values
Allowed load of output shaft	W_0	N	Refer to the loading capacity table	Allowed THRUST load of input shaft	P_3	N	2940	GD2 of oscillate part of output part	J_0	kg • m²	2.875×10^{-2}
Allowed THRUST load of output shaft	P_1	N	705.6	Maximum repeated bending force of input shaft	P_4	N	6860	Inner load of lift part of output part	W_{a1}	N	151.9
Allowed RADIAL load of output shaft	P_2	N	392	Maximum allowed repeated torque of input shaft	P_5	N • m	921.2	Product weight		kg	240
Allowed torque of output shaft	T_S	N • m	656.6	Twisting stiffness of input shaft	K_2	N • m /rad	9.8×10^{4}				
Twisting stiffness of output shaft	K_1	N • m /rad	3.332×10^{4}	GD2 of input shaft	J_1	kg • m²	0.975				

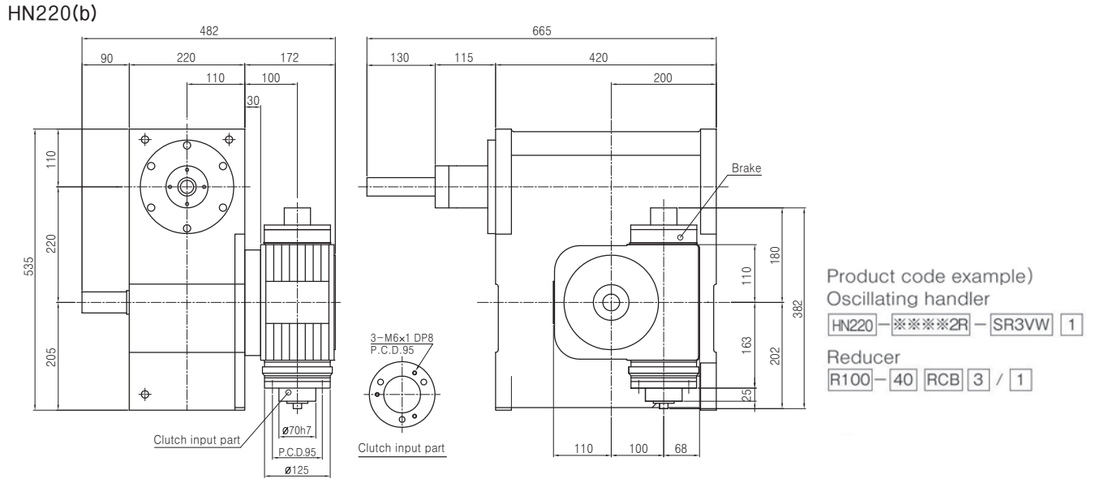
1N≒0.102kgf

HN220(a)



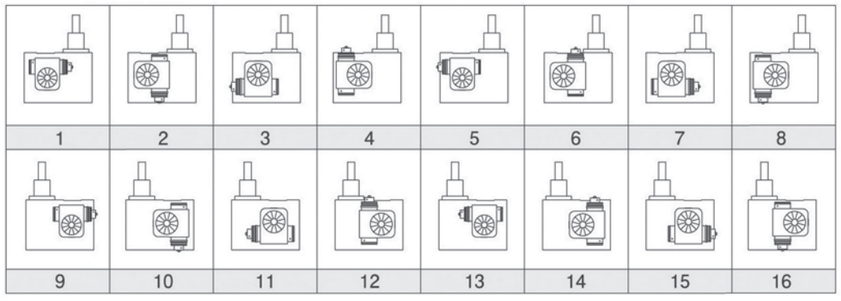
Product code example)
Oscillating handler
HN220 – ※※※※2R – SR3VW 1
Reducer
R80 – 40 RCB 3 / 1

HN220(b)

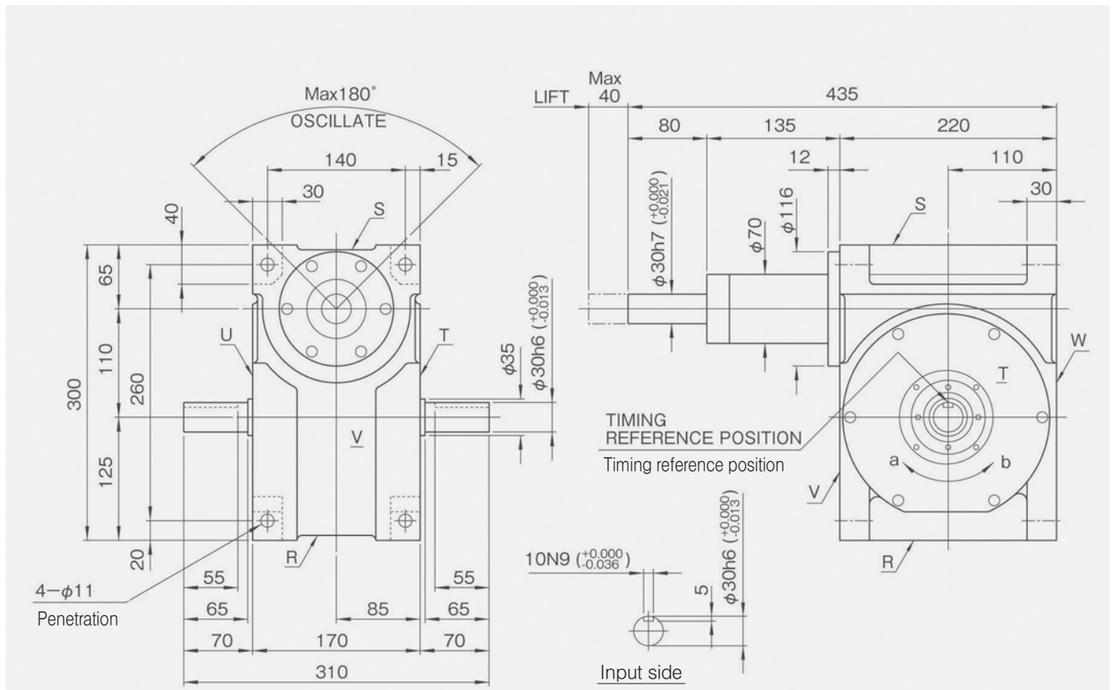


Product code example)
Oscillating handler
HN220 – ※※※※2R – SR3VW 1
Reducer
R100 – 40 RCB 3 / 1

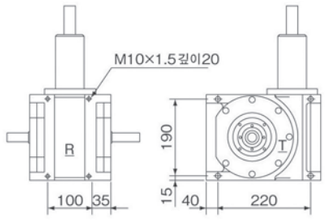
Reducer attached position



HL110 dimension

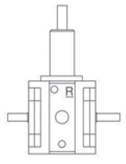


Location of attachment hole



Dimension diagram of attachment hole of R,S,T,U surface

The location of oil hole, flow meter and drain and flow depending on the position

Position	1
Location	
Oil level (ℓ)	2.0

⚠ Attention

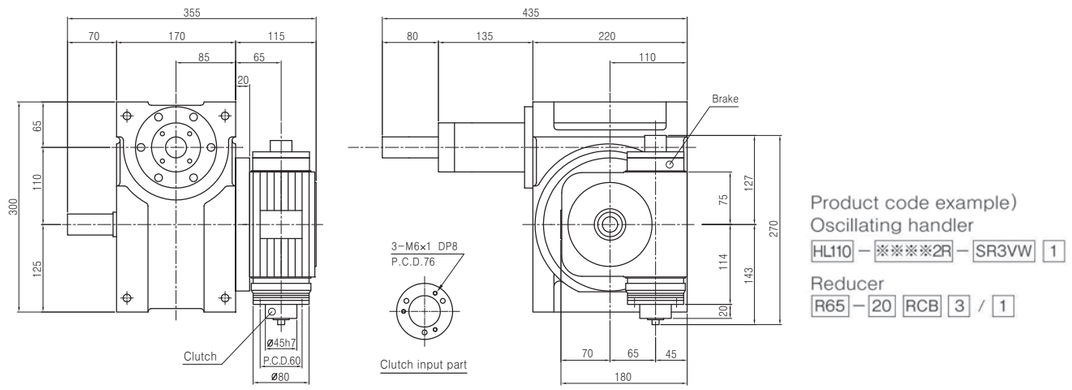
- Position is in order of oil hole, oil gage and oil drainage from the top.
- Flow changes depending on the form of cam, the number of cam followers, etc.

• Characteristic table of index

Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values
Allowed load of output shaft	W_0	N	Refer to the loading capacity table	Allowed THRUST load of input shaft	P_3	N	2940	GD2 of oscillate part of output part	J_0	$kg \cdot m^2$	1.6×10^{-3}
Allowed THRUST load of output shaft	P_1	N	245	Maximum repeated bending force of input shaft	P_4	N	2548	Inner load of lift part of output part	W_{a1}	N	34.3
Allowed RADIAL load of output shaft	P_2	N	176.4	Maximum allowed repeated torque of input shaft	P_5	N • m	392	Product weight		kg	75
Allowed torque of output shaft	T_S	N • m	Refer to the torque transmission table	Twisting stiffness of input shaft	K_2	N • m /rad	2.548×10^{4}				
Twisting stiffness of output shaft	K_1	N • m /rad	1.764×10^{4}	GD2 of input shaft	J_1	$kg \cdot m^2$	3.0×10^{-2}				

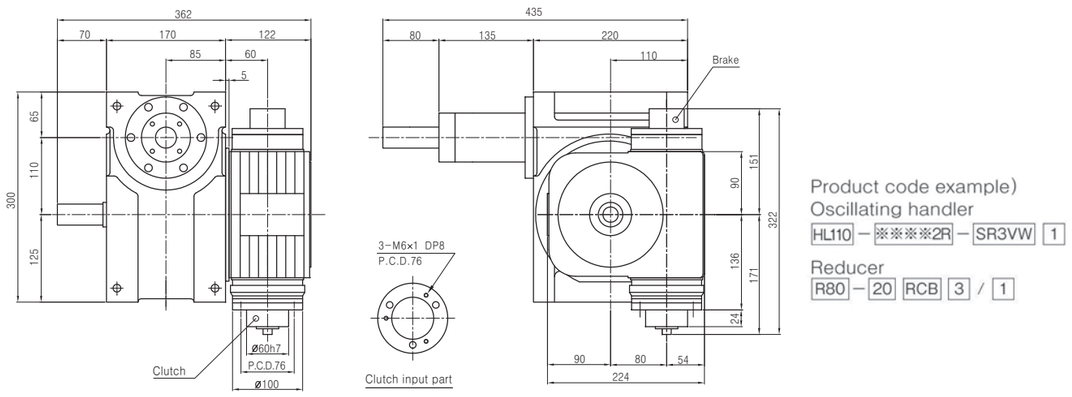
1N≒0.102kgf

HL110(a)



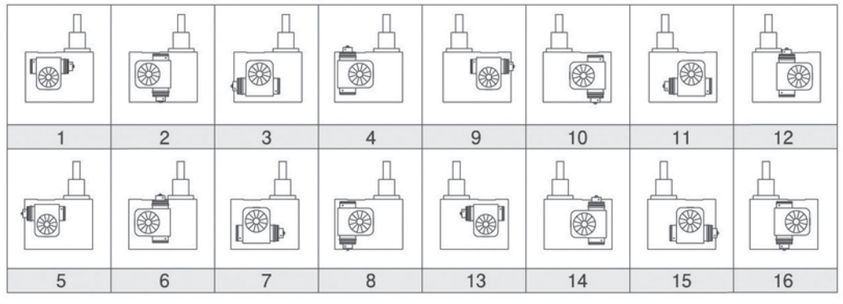
Product code example)
Oscillating handler
HL110 − ※※※2R − SR3VW 1
Reducer
R65 − 20 RCB 3 / 1

HL110(b)

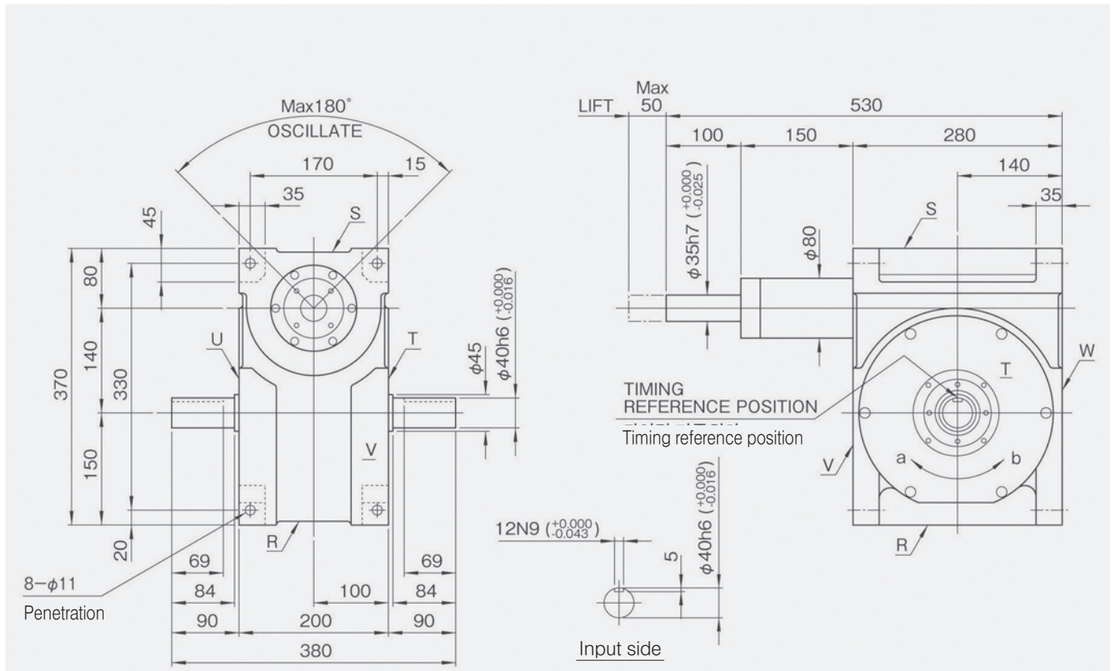


Product code example)
Oscillating handler
HL110 − ※※※2R − SR3VW 1
Reducer
R80 − 20 RCB 3 / 1

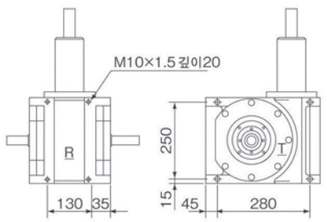
Reducer attached position



HL140 dimension

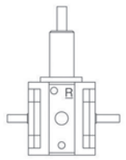


Location of attachment hole



Dimension diagram of attachment hole of R,S,T,U surface

The location of oil hole, flow meter and drain and flow depending on the position

Position	1
Location	
Oil level (ℓ)	3.5

⚠ Attention

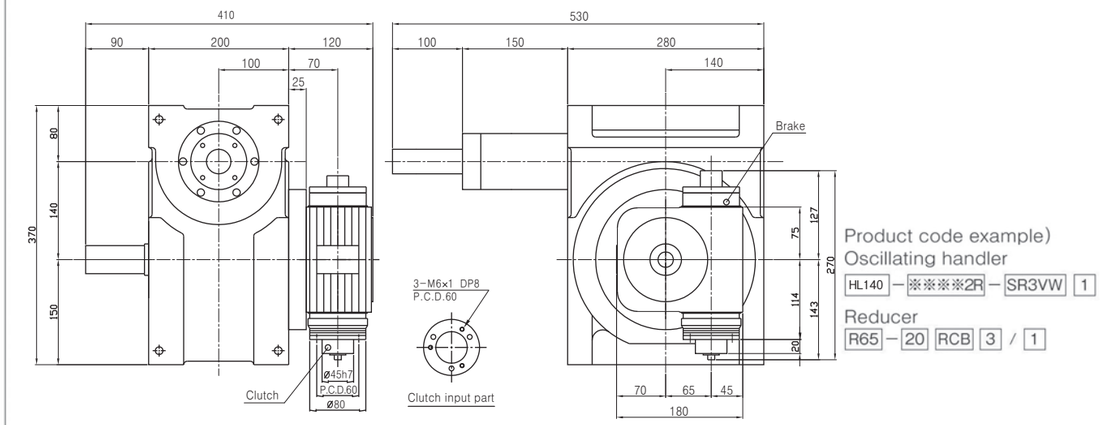
- Position is in order of oil hole, oil gage and oil drainage from the top.
- Flow changes depending on the form of cam, the number of cam followers, etc.

• Characteristic table of index

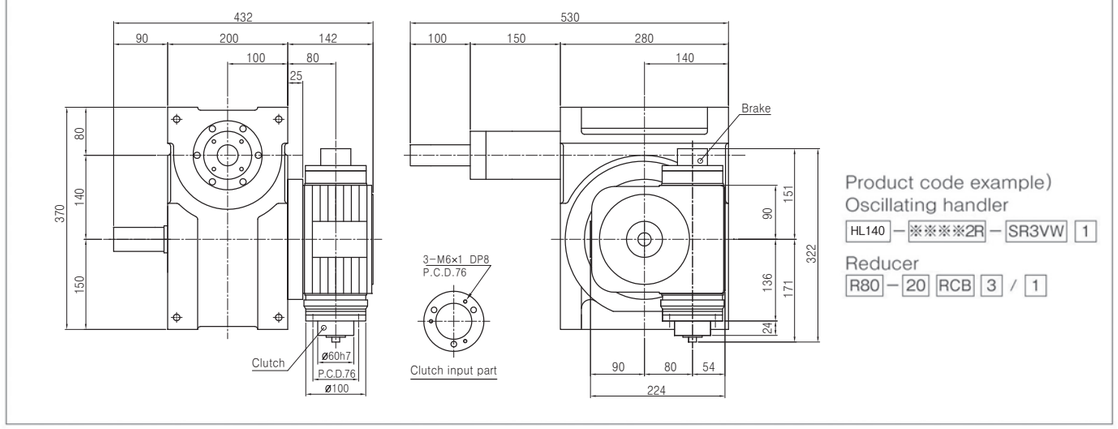
Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values
Allowed load of output shaft	W_0	N	Refer to the loading capacity table	Allowed THRUST load of input shaft	P_3	N	3136	GD2 of oscillate part of output part	J_0	$kg \cdot m^2$	5.0×10^{-3}
Allowed THRUST load of output shaft	P_1	N	372.4	Maximum repeated bending force of input shaft	P_4	N	3822	Inner load of lift part of output part	W_{a1}	N	58.8
Allowed RADIAL load of output shaft	P_2	N	294	Maximum allowed repeated torque of input shaft	P_5	$N \cdot m$	735	Product weight		kg	135
Allowed torque of output shaft	T_S	$N \cdot m$	Refer to the torque transmission table	Twisting stiffness of input shaft	K_2	$N \cdot m/rad$	1.078×10^5				
Twisting stiffness of output shaft	K_1	$N \cdot m/rad$	2.646×10^4	GD2 of input shaft	J_1	$kg \cdot m^2$	0.1075				

1N≒0.102kgf

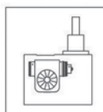
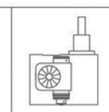
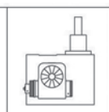
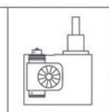
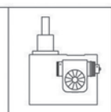
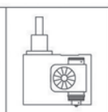
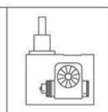
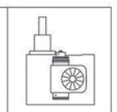
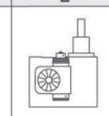
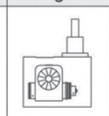
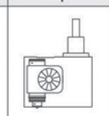
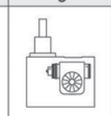
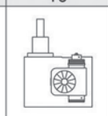
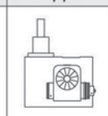
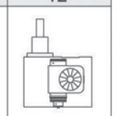
HL140(a)



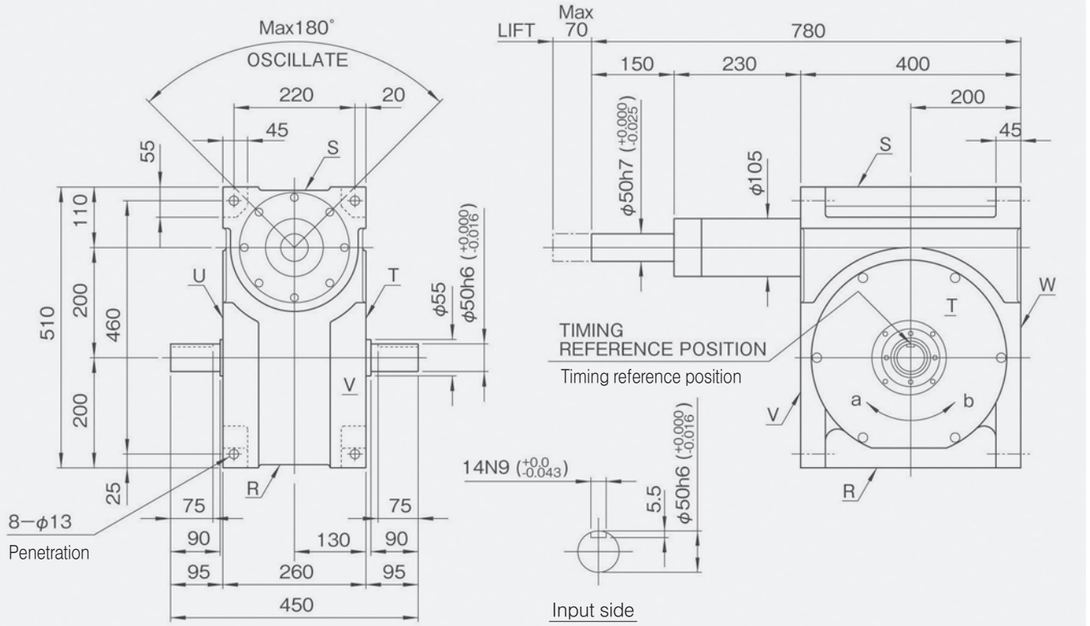
HL140(b)



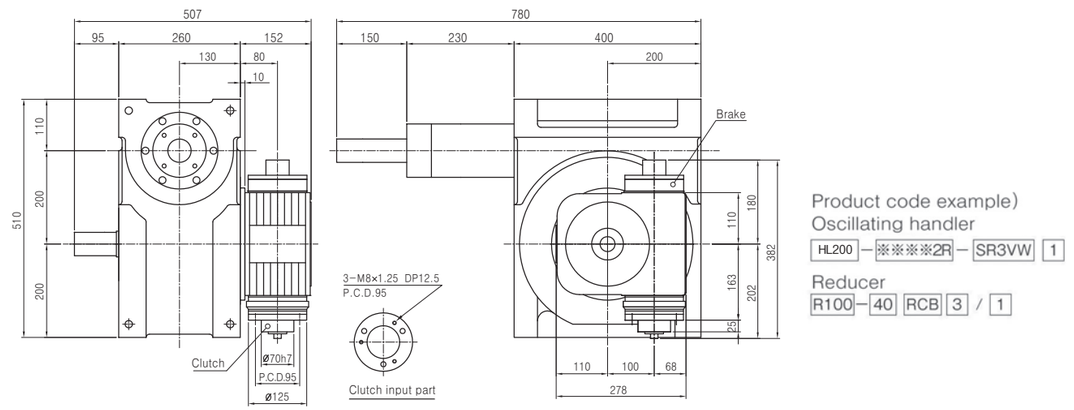
Reducer attached position

							
1	2	3	4	9	10	11	12
							
5	6	7	8	13	14	15	16

HL200 dimension

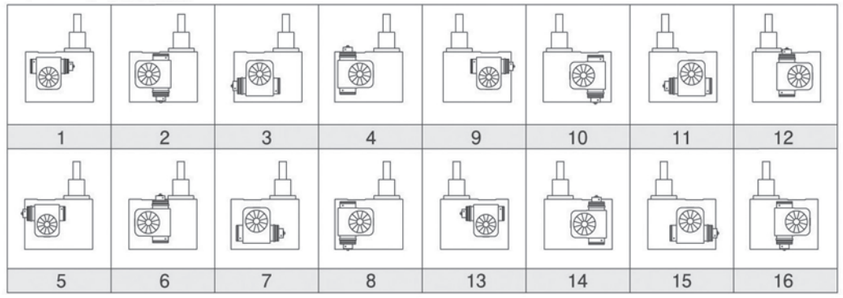


HL200(a)

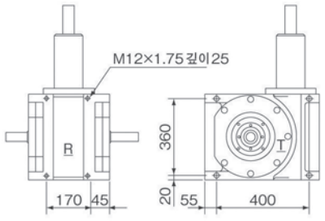


Product code example)
Oscillating handler
HL200 – ※※※2R – SR3VW 1
Reducer
R100 – 40 RCB 3 / 1

Reducer attached position

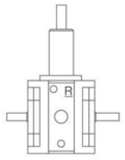


Location of attachment hole



Dimension diagram of attachment hole of R,S,T,U surface

The location of oil hole, flow meter and drain and flow depending on the position

Position	1
Location	
Oil level (ℓ)	9

⚠ Attention

- Position is in order of oil hole, oil gage and oil drainage from the top.
- Flow changes depending on the form of cam, the number of cam followers, etc.

• Characteristic table of index

Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values
Allowed load of output shaft	W_0	N	Refer to the loading capacity table	Allowed THRUST load of input shaft	P_3	N	4900	GD2 of oscillate part of output part	J_0	kg • m²	3.5×10^{-2}
Allowed THRUST load of output shaft	P_1	N	735	Maximum repeated bending force of input shaft	P_4	N	6860	Inner load of lift part of output part	W_{a1}	N	157.8
Allowed RADIAL load of output shaft	P_2	N	352.8	Maximum allowed repeated torque of input shaft	P_5	N • m	1372	Product weight		kg	330
Allowed torque of output shaft	T_S	N • m	Refer to the torque transmission table	Twisting stiffness of input shaft	K_2	N • m /rad	2.646×10^5				
Twisting stiffness of output shaft	K_1	N • m /rad	7.644×10^4	GD2 of input shaft	J_1	kg • m²	0.365				

1N≒0.102kgf

HN100

Torque transmission capacity table (for oscillator)

Oscillating angle	Index angle	Static torque	Dynamic torque To(N •m)						Cam shaft friction torque Tx
φ	θ0	Ts	Revolutions Per Minutes of input shaft N (rpm)						
(deg)	(deg)	(N •m)	20	40	60	80	100	120	(N •m)
30	31	37,2	17,6	13,7	11,8	10,9	9,7	8,5	5,9
	45	43,1	16,7	13,7	11,8	10,9	9,9	9,1	
	60	46,1	15,7	12,7	10,8	10,5	9,7	9,0	
45	45	36,3	15,7	11,8	10,8	9,8	8,8	7,9	
	60	41,2	14,7	11,8	10,8	9,8	9,0	8,2	
	75	44,1	14,7	11,8	9,8	9,7	8,9	8,2	
60	60	36,3	13,7	11,8	9,8	9,3	8,4	7,6	
	75	40,2	13,7	10,8	9,8	9,3	8,5	7,8	
	90	43,1	13,7	10,8	9,8	9,2	8,4	7,8	
90	90	36,3	12,7	9,8	8,8	8,3	7,6	6,9	
	105	39,2	12,7	9,8	8,8	8,3	7,6	7,0	
	120	41,2	11,8	9,8	8,8	8,2	7,6	7,0	

Live load capacity table

Lift amount	Index angle	Allowed dynamic load Wo (N)					
LT	θ0	Revolutions Per Minutes of input shaft N (rpm)					
(mm)	(deg)	20	40	60	80	100	120
10	28	220,5	133,3	79,4	47,5	26,4	12,9
	40	245,0	169,5	119,6	82,7	56,5	37,9
	55	245,0	189,1	146,0	112,5	86,0	65,3
15	33	211,7	125,4	72,5	42,1	22,3	9,9
	45	237,2	159,7	108,8	72,5	47,6	30,4
	60	245,0	181,3	135,2	100,8	74,4	54,2
20	37	203,8	118,6	67,6	36,9	18,5	7,1
	50	229,3	151,9	100,9	66,4	42,6	26,3
	60	239,1	167,6	120,5	85,1	59,4	40,8
25	40	196,0	111,7	62,7	33,0	15,7	
	50	217,6	138,2	87,2	54,2	32,4	18,0
	60	231,3	156,8	107,8	72,9	48,4	31,3
30	43	184,2	103,9	56,8	29,1	12,8	
	55	209,7	133,3	84,3	52,1	31,0	17,0
	65	223,4	150,9	102,9	69,3	45,6	29,1

Torque transmission capacity table (for index)

Number of stops S	Index angle	Static torque	Dynamic torque To(N •m)						Cam shaft friction torque Tx
		Ts	θ0 Revolutions Per Minutes of input shaft N (rpm)						
	(deg)	(N •m)	20	40	60	80	100	120	(N •m)
2	180	36,3	15,7	11,8	10,8	10,2	9,5	8,9	5,9
	210	39,2	14,7	11,8	10,8	10,1	9,5	8,9	
3	180	34,3	14,7	11,8	10,8	10,1	9,4	8,8	
	210	36,3	14,7	11,8	9,8	9,8	9,2	8,7	
	240	37,2	13,7	11,8	9,8	9,7	9,0	8,5	
4	90	36,3	20,6	16,7	14,7	14,0	12,9	11,9	
	120	41,2	20,6	16,7	14,7	13,7	12,7	11,9	
	150	44,1	19,6	15,7	13,7	13,3	12,4	11,6	
5	90	40,2	23,5	18,6	16,7	15,7	14,6	13,6	
	120	44,1	22,5	18,6	15,7	15,2	14,2	13,3	
	150	46,1	21,6	17,6	15,7	14,7	13,7	12,9	
6	90	34,3	20,6	16,7	14,7	13,8	12,8	11,9	
	120	37,2	19,6	15,7	13,7	13,2	12,2	11,5	
	150	38,2	18,6	14,7	12,7	12,6	11,7	11,0	
8	45	34,3	29,4	23,5	20,6	18,9	17,3	15,9	
	60	41,2	28,4	22,5	19,6	18,7	17,2	16,0	
	90	46,1	26,5	21,6	18,6	17,6	16,3	15,3	
	120	48,0	24,5	19,6	17,6	16,6	15,4	14,6	
10	60	44,1	31,4	25,5	22,5	20,7	19,3	18,0	
	90	48,0	28,4	23,5	20,6	19,3	17,9	16,8	
	120	49,0	26,5	21,6	18,6	18,0	16,7	15,8	
12	45	34,3	28,4	22,5	19,6	18,7	17,2	16,0	
	60	37,2	27,4	21,6	19,6	17,9	16,6	15,5	
	90	39,2	24,5	19,6	17,6	16,4	15,3	14,5	
	120	40,2	22,5	18,6	15,7	15,2	14,3	13,5	

HN120

Torque transmission capacity table (for index)

Oscillating angle	Index angle	Static torque	Dynamic torque To(N •m)						Cam shaft friction torque Tx
φ	θ0	Ts	Number of revolutions of input shaft N (rpm)						
(deg)	(deg)	(N •m)	20	40	60	80	100	120	(N •m)
30	31	193,1	92,1	76,4	69,6	62,7	56,8	51,9	15,7
	45	223,4	88,2	73,5	67,6	60,8	56,8	52,9	
	60	240,1	84,3	70,6	63,7	58,8	53,9	51,0	
45	45	190,1	81,3	67,6	61,7	55,9	51,0	47,0	
	60	214,6	79,4	66,6	60,8	54,9	51,0	47,0	
	75	230,3	76,4	64,7	58,8	53,9	50,0	47,0	
60	60	190,1	74,5	62,7	56,8	51,0	47,0	44,1	
	75	209,7	73,5	61,7	55,9	51,0	47,0	44,1	
	90	223,4	71,5	59,8	54,9	50,0	46,1	43,1	
90	90	190,1	67,6	55,9	51,0	47,0	43,1	40,2	
	105	203,8	66,6	55,9	51,0	46,1	43,1	40,2	
	120	214,6	65,7	54,9	50,0	46,1	42,1	40,2	

Torque transmission capacity table (for index)

Number of stops S	Index angle	Static torque	Dynamic torque To(N •m)						Cam shaft friction torque Tx
	θ0	Ts	Revolutions Per Minute of input shaft N (rpm)						
	(deg)	(N •m)	20	40	60	80	100	120	(N •m)
2	180	166,6	68,6	56,8	51,9	48,0	44,1	41,2	15,7
	210	178,4	67,6	56,8	51,9	47,0	44,1	41,2	
3	120	166,6	82,3	68,6	62,7	56,8	52,9	50,0	
	150	184,2	80,4	67,6	61,7	55,9	51,9	49,0	
	180	196,0	78,4	65,7	59,8	54,9	51,0	48,0	
4	105	162,7	86,2	71,5	65,7	59,8	55,9	51,9	
	120	171,5	84,3	70,6	64,7	58,8	54,9	51,9	
	150	183,3	82,3	68,6	62,7	57,8	53,9	50,0	
6	60	143,1	96,0	80,4	73,5	66,6	61,7	56,8	
	90	167,6	92,1	77,4	70,6	64,7	59,8	55,9	
	120	179,3	87,2	73,5	66,6	61,7	56,8	53,9	
8	55	142,1	100	83,3	76,4	69,6	64,7	59,8	
	70	153,9	97,0	81,3	74,5	67,6	62,7	58,8	
	90	163,7	92,1	77,4	70,6	64,7	60,8	52,9	
	120	171,5	87,2	72,5	66,6	60,8	56,8	53,9	

Live load capacity table

Lift amount	Index angle	Allowed dynamic load Wo (N)					
LT	θ0	Revolutions Per Minute of input shaft N (rpm)					
(mm)	(deg)	20	30	40	50	60	80
10	29	240,1	138,2	73,5	32,3		
	40	263,6	175,4	115,6	72,5	41,2	18,6
	50	275,4	195,0	141,1	99,0	66,6	42,1
20	38	222,5	121,5	59,8	21,6		
	50	248,9	157,8	97,0	53,9	25,5	
	60	261,7	177,4	119,6	77,4	46,1	22,5
30	43	206,8	105,8	46,1	10,8		
	55	234,2	141,1	80,4	39,2	12,7	
	56	248,9	161,7	102,9	60,8	30,4	9,8
40	45	189,1	88,2	31,4			
	55	215,6	118,6	58,8	21,6		
	65	233,2	142,1	81,3	41,2	14,7	

HN160

Torque transmission capacity table

Lift amount	Dynamic torque To (N •m)					Cam shaft friction torque Tx
LT	Revolutions Per Minute of input shaft N (rpm)					
(mm)	20	30	40	50	60	(N •m)
10	154,8	137,2	125,4	117,6	110,7	19,6
20	154,8	137,2	125,4	117,6	110,7	
30	154,8	137,2	125,4	117,6	110,7	
40	145,0	127,4	115,6	106,8	100,9	
50	135,2	117,6	106,8	99,0	93,1	

Oscillating angle-Index angle (for oscillator)

Oscillating angle	Minimum index angle
φ (deg)	θ0 (deg)
30	31
45	45
60	60
90	90

Number of stops-Index angle (for index)

Number of stops	Minimum index angle
S	θ0 (deg)
2	180
3	120
4	90
6	60
8	45

Live load capacity table

Lift amount	Index angle	Allowed dynamic load Wo (N)				
LT	θ0	Revolutions Per Minute of input shaft N (rpm)				
(mm)	(deg)	20	30	40	50	60
10	25	490,0	410,6	301,8	216,6	151,9
	35	490,0	488,0	394,0	315,6	249,9
	45	490,0	490,0	444,9	375,3	315,6
20	32	490,0	366,5	257,7	176,4	116,6
	40	490,0	431,2	328,3	247,0	182,3
	50	490,0	481,2	388,1	311,6	247,9
30	35	462,6	317,5	210,7	135,2	80,4
	45	490,0	398,9	295,0	214,6	151,9
	55	490,0	451,8	355,7	277,3	212,7
40	38	430,2	286,2	183,3	110,7	59,8
	50	490,0	380,2	277,3	198,0	137,2
	60	490,0	432,2	335,2	255,8	193,1
50	40	398,9	256,8	157,2	89,2	42,1
	50	474,3	337,1	235,2	158,8	101,9
	60	490	395,9	296,9	217,6	156,8

HN220

Torque transmission capacity table

Lift amount	동적허용하중 To (N •m)					Cam shaft friction torque Tx
LT	Revolutions Per Minute of input shaft N (rpm)					
(mm)	20	30	40	50	60	(N •m)
20	310,7	275,4	251,9	235,2	221,5	37,2
30	293,0	255,8	232,3	215,6	202,9	
40	266,6	232,3	211,7	196,0	184,2	
50	247,0	215,6	196,0	182,3	171,5	
60	232,3	202,9	184,2	171,5	160,7	
70	220,5	193,1	175,4	162,7	152,9	
80	211,7	184,2	167,6	155,8	146,0	

Oscillating angle-Index angle (for oscillator)

Oscillating angle	Minimum index angle
φ (deg)	θ0 (deg)
30	31
45	45
60	60
90	90

Number of stops-Index angle (for index)

Number of stops	Minimum index angle
S	θ0 (deg)
2	180
3	120
4	90
6	60
8	45

Live load capacity table

Lift amount	Index angle	Allowed dynamic load Wo (N)				
LT	θ0	Revolutions Per Minute of input shaft N (rpm)				
(mm)	(deg)	20	30	40	50	60
20	24	576,2	351,8	198,0	94,1	24,5
	35	705,6	520,4	369,5	252,8	164,6
	45	705,6	604,7	469,4	357,7	266,6
30	28	535,1	314,6	166,6	69,6	
	35	633,1	423,4	270,5	159,7	80,4
	45	705,6	529,2	383,2	268,5	179,3
40	30	481,2	265,6	126,4	36,3	
	40	616,4	409,6	258,7	150,9	72,5
	50	697,8	507,6	361,6	247,9	160,7
50	32	443,9	233,2	100,0		
	40	557,6	347,9	200,9	100,0	30,4
	50	651,7	454,7	306,7	195,0	112,7
60	36	447,9	240,1	106,8	22,5	
	45	560,6	354,8	209,7	107,8	37,2
	55	645,8	450,8	304,8	194,0	112,7
70	40	454,7	248,9	115,6	29,4	
	50	567,4	364,6	219,5	116,6	45,1
	60	644,8	451,8	305,8	196,0	114,7
80	45	475,3	271,5	135,2	46,1	
	55	574,3	374,4	230,3	127,4	53,9
	65	644,8	453,7	309,7	199,9	118,6

HL110

Torque transmission capacity table (for index)

Number of stops	Index angle	정적토크	Dynamic torque To(N •m)					Cam shaft friction torque Tx
	θ_0	Ts	Revolutions Per Minute of input shaft N (rpm)					
S	(deg)	(N •m)	20	30	40	50	60	(N •m)
2	100	123	62,7	59,8	54,9	51,0	48,0	24,5
	200	136	62,7	59,8	54,9	51,0	48,0	
	150	153	62,7	58,8	53,9	51,0	48,0	
3	90	111	48,0	48,0	47,0	44,1	42,1	
	120	125	53,9	51,0	46,1	43,1	41,2	
	150	134	51,9	49,0	45,1	42,1	40,2	
4	50	123	86,2	81,3	74,5	69,6	65,7	
	75	153	85,3	80,4	73,5	68,6	65,7	
	90	165	83,3	79,4	72,5	67,6	64,7	
5	40	104	45,1	45,1	45,1	45,1	45,1	
	50	117	50,0	50,0	50,0	50,0	50,0	
	70	131	56,8	56,8	56,8	56,8	56,8	

Live load capacity table

Lift amount	Index angle	Allowed dynamic load Wo (N)				
LT	θ_0	Revolutions Per Minute of input shaft N (rpm)				
(mm)	(deg)	20	30	40	50	60
10	27	189,1	164,6	122,5	89,2	62,7
	35	209,7	187,2	149,9	118,6	93,1
	50	226,4	207,8	176,4	150,9	128,4
20	35	173,5	148,0	106,8	74,5	49,0
	45	198,0	175,4	137,2	105,8	79,4
	55	211,7	191,1	156,8	127,4	102,9
30	39	156,8	131,3	90,2	58,8	36,3
	50	185,2	161,7	122,5	91,1	66,6
	60	201,9	180,3	143,1	113,7	88,2
40	42	139,2	114,7	75,5	46,1	25,5
	50	162,7	139,2	100,0	69,6	46,1
	60	182,3	160,7	122,5	92,1	67,6

Torque transmission capacity table (for oscillator)

Oscillating angle	Index angle	정적토크	Dynamic torque To(N •m)					Cam shaft friction torque Tx
φ	θ_0	Ts	Revolutions Per Minute of input shaft N (rpm)					
(deg)	(deg)	(N •m)	20	30	40	50	60	(N •m)
30	30	165	76,4	72,5	66,6	61,7	58,8	9,8
	40	179	73,5	69,6	63,7	59,8	55,9	
	60	193	67,6	63,7	58,8	54,9	51,9	
60	45	145	63,7	60,8	54,9	51,9	49,0	
	55	160	62,7	59,8	54,9	51,9	48,0	
	70	173	60,8	57,8	52,9	49,0	47,0	
90	50	123	57,8	54,9	50,0	46,1	44,1	
	75	153	56,8	53,9	50,0	46,1	44,1	
	90	165	55,9	52,9	49,0	45,1	43,1	
120	90	145	52,9	50,0	46,1	43,1	40,2	
	120	165	51,9	49,0	45,1	42,1	39,2	
	150	176	50,0	47,0	43,1	40,2	38,2	
180	100	123	51,0	48,0	44,1	41,2	39,2	
	120	136	51,0	48,0	44,1	41,2	39,2	
	150	153	51,0	48,0	44,1	41,2	39,2	

HL140

Torque transmission capacity table (for index)

Number of stops	Index angle	Static torque	Dynamic torque To(N •m)					Cam shaft friction torque Tx
	θ_0	Ts	Revolutions Per Minute of input shaft N (rpm)					
S	(deg)	(N •m)	20	30	40	50	60	(N •m)
2	100	198,0	100,0	94,1	86,2	80,4	75,5	29,4
	120	221,5	100,0	94,1	86,2	80,4	76,4	
	150	247,9	99,0	93,1	85,3	80,4	75,5	
3	90	151,9	73,5	69,6	63,7	58,8	55,9	
	120	171,5	71,5	67,6	61,7	57,8	54,9	
	150	184,2	69,6	65,7	60,8	55,9	52,9	
4	80	198,0	136,2	128,4	117,6	108,8	102,9	
	75	247,9	135,2	127,4	116,6	108,8	102,9	
	90	267,5	132,3	125,4	114,7	106,8	100,9	
6	40	142,1	84,3	84,3	84,3	80,4	75,5	
	50	159,7	95,1	94,1	86,2	80,4	75,5	
	70	180,3	96,0	91,1	83,3	77,4	73,5	

Torque transmission capacity table (for oscillator)

Oscillating angle	Index angle	Static torque	Dynamic torque To(N •m)					Cam shaft friction torque Tx
φ	θ_0	Ts	Revolutions Per Minute of input shaft N (rpm)					
(deg)	(deg)	(N •m)	20	30	40	50	60	(N •m)
30	30	267,5	121,5	114,7	104,9	97,0	91,1	29,4
	40	291,1	116,6	109,8	100,9	94,1	88,2	
	60	312,6	106,8	100,9	93,1	86,2	81,3	
60	45	221,5	100,9	96,0	87,2	81,3	75,5	
	55	258,7	100,0	94,1	86,2	80,4	75,5	
	70	281,3	97,0	91,1	83,3	78,4	73,5	
90	50	198,0	91,1	86,2	78,4	72,5	67,6	
	75	247,9	90,2	85,3	78,4	72,5	68,6	
	90	267,5	89,2	84,3	77,4	71,5	67,6	
120	70	204,8	83,3	79,4	72,5	67,6	62,7	
	90	236,2	83,3	79,4	72,5	67,6	63,7	
	120	267,5	81,3	77,4	70,6	65,7	62,7	
180	100	198,0	80,4	76,4	69,6	64,7	60,8	
	120	221,5	81,3	76,4	70,6	65,7	61,7	
	150	247,9	80,4	75,5	69,6	64,7	60,8	

Live load capacity table

Lift amount	Index angle	Allowed dynamic load Wo (N)				
LT	θ_0	Revolutions Per Minute of input shaft N (rpm)				
(mm)	(deg)	20	30	40	50	60
10	23	270,5	227,4	156,8	103,9	64,7
	35	322,4	288,1	229,3	180,3	140,1
	45	341,0	310,7	259,7	216,6	180,3
20	30	248,9	204,8	136,2	84,3	47,0
	40	294,0	255,8	192,1	140,1	100,0
	50	319,5	285,2	228,3	180,3	140,1
30	35	233,2	190,1	121,5	72,5	37,2
	45	278,3	239,1	173,5	121,5	82,3
	55	305,8	269,5	209,7	159,7	119,6
40	38	215,6	172,5	105,8	58,8	25,5
	50	268,5	229,3	163,7	112,7	73,5
	60	296,0	259,7	198,0	148,0	107,8
50	40	198,9	155,8	91,1	46,1	14,7
	50	246,0	204,8	139,2	89,2	51,9
	60	277,3	240,1	176,4	125,4	86,2

HL200

Torque transmission capacity table (for index)

Number of stops	Index angle	Static torque	Dynamic torque To(N •m)				Cam shaft friction torque Tx
	θ_0	Ts	Revolutions Per Minute of input shaft N (rpm)				
S	(deg)	(N •m)	20	30	40	50	(N •m)
2	120	463,5	219,5	206,8	189,1	175,4	58,8
	150	531,2	219,5	207,8	190,1	176,4	
3	80	419,4	242,1	228,3	207,8	192,1	
	90	452,8	243,0	229,3	208,7	194,0	
	120	529,2	241,1	228,3	208,7	194,0	
4	60	463,5	298,9	282,2	256,8	236,2	
	75	531,2	299,9	283,2	258,7	239,1	
	90	583,1	297,9	281,3	256,8	239,1	
6	40	419,4	329,3	310,7	281,3	258,72	
	50	481,2	331,2	312,6	284,2	63,6	
	70	566,4	325,4	307,7	281,3	261,7	

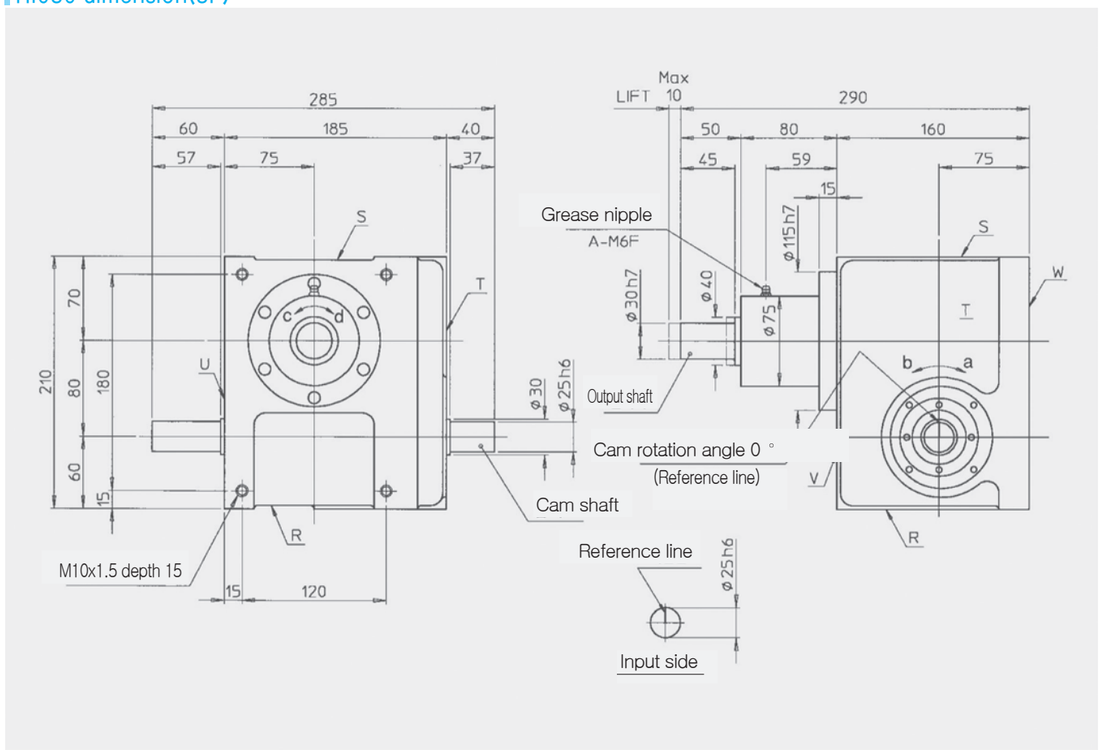
Torque transmission capacity table (for oscillator)

Oscillating angle	Index angle	Static torque	Dynamic torque To(N •m)				Cam shaft friction torque Tx
φ	θ_0	Ts	Revolutions Per Minute of input shaft N (rpm)				
(deg)	(deg)	(N •m)	20	30	40	50	(N •m)
30	30	583,1	271,5	155,8	231,3	211,7	58,8
	40	652,7	264,6	249,9	227,4	209,7	
	60	721,3	247,0	233,2	213,6	198,0	
60	45	463,5	221,5	207,8	187,2	170,5	
	55	558,6	222,5	209,7	190,1	175,4	
	70	622,3	218,5	206,8	188,2	174,4	
90	60	463,5	199,9	188,2	170,5	156,8	
	75	531,2	200,9	189,1	172,5	158,8	
	90	583,1	199,9	188,2	171,5	159,7	
120	80	463,5	184,2	173,5	156,8	145,0	
	100	531,2	184,2	174,4	158,8	147,0	
	120	583,1	183,3	173,5	157,8	147,0	
180	120	463,5	178,4	167,6	152,9	141,1	
	150	531,2	178,4	168,6	153,9	143,1	

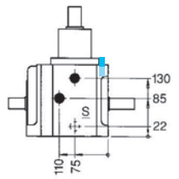
Live load capacity table

Lift amount	Index angle	Allowed dynamic load Wo (N)			
LT	θ_0	Revolutions Per Minute of input shaft N (rpm)			
(mm)	(deg)	20	30	40	50
10	18	465,5	354,8	185,2	66,6
	30	644,8	558,6	410,6	291,1
	40	703,6	630,1	504,7	398,9
20	24	422,4	312,6	148,0	36,3
	30	522,3	420,4	254,8	133,3
	40	622,3	533,1	382,2	261,7
30	28	385,1	278,3	117,6	
	35	492,9	390,0	225,4	106,8
	45	590,0	496,9	343,0	220,5
40	31	353,8	247,9	92,1	
	40	481,2	379,3	216,6	99,0
	50	571,3	478,2	322,4	200,9
50	33	318,5	214,6	64,7	
	40	421,4	317,5	157,8	47,0
	50	523,3	426,3	266,6	147,0
60	35	293,0	192,1	46,1	
	45	429,2	326,3	167,6	55,9
	55	521,4	424,3	266,6	147,0
70	37	275,4	175,4	33,3	
	50	439,0	338,1	179,3	66,6
	60	522,3	426,3	269,5	150,9

HI080 dimension(8F)



• The location of oil hole, flow meter and drain and flow depending on the position

Position	1
Location	
Oil level (ℓ)	1.1

⚠ Attention

- Position is in order of oil hole, oil gage and oil drainage fro m the top.
- Flow changes depending on the form of cam, the number of cam fo llowers, etc.

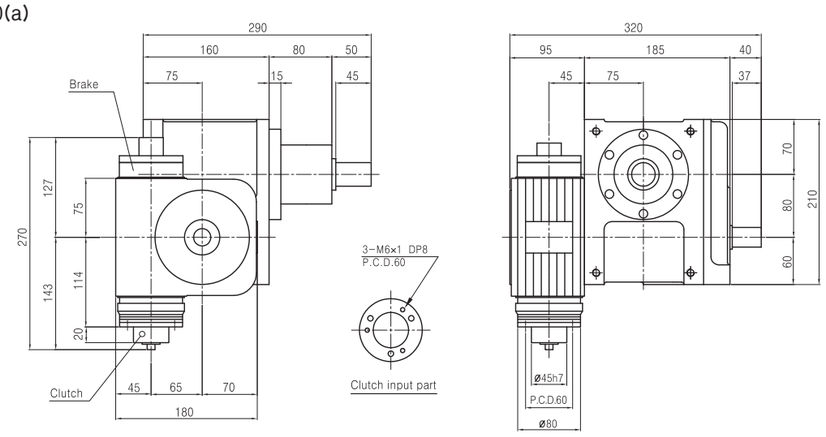
• Characteristic table of index

Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values	Characteristics items	Simbol	Unit	Values
Allowed load of output shaft	W_0	N	Refer to the loading capacity table	Allowed THRUST load of input shaft	P_3	N	2050	GD2 of oscillate part of output part	J_0	kg•m ^{2}	1.93×10^{-2}
Allowed THRUST load of output shaft	P_1	N	147	Maximum repeated bending force of input shaft	P_4	N	1860	Inner load of lift part of output part	W_{a1}	N	22.9
Allowed RADIAL load of output shaft	P_2	N	195	Maximum allowed repeated torque of input shaft	P_5	N•m	220	Product weight		kg	35
Allowed torque of output shaft	T_S	N•m	Refer to the torque transmission table	Twisting stiffness of input shaft	K_2	N•m /rad	1.64×10^4	t weight			±30
Twisting stiffness of output shaft	K_1	N•m /rad	1.65×10^4	GD2 of input shaft	J_1	kg•m ^{2}	4.2×10^{-3}				

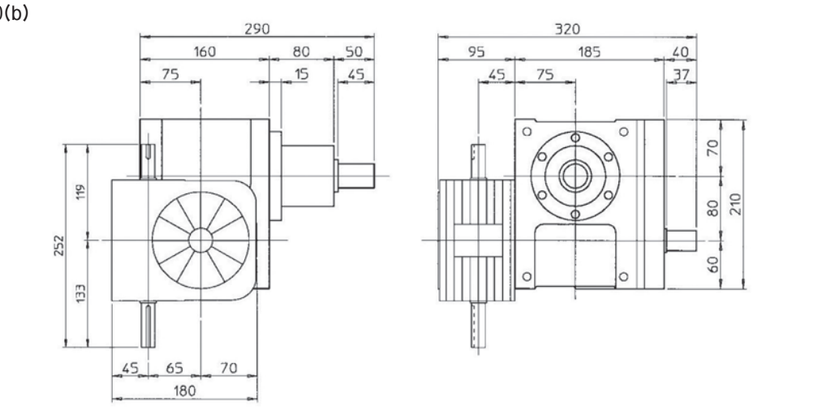
1N≒0.102kgf

An example of option being mounted (Reducer equipped specification)

HI080(a)



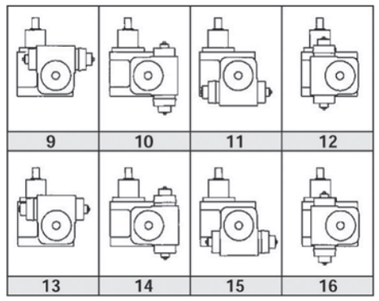
HI080(b)



⚠ Attention

- It is possible to equip R65 reducer at HI080.

Reducer attached position



HI080 • Torque transmission capacity table (for index)

Number of stops	Index angle	Static torque	Dynamic torque To(N •m)								Cam shaft friction torque
	θ_0	Ts	Revolutions Per Minute of input shaft N (rpm)								Tx
S	(deg)	(N •m)	100	150	200	250	300	400	500	600	(N •m)
8	90	191,5	77,8	73,2	66,7	56,9	42,5				10,0
	120	227,1	86,6	84,0	77,1	66,9	56,9	36,2			
	150	251,9	92,1	88,7	78,8	78,7	62,5	47,1	30,7		
	180	269,4	95,7	87,7	78,7	71,3	64,6	52,1	39,5	26,0	
12	120	404,0	95,2	93,5	91,0	87,9	84,0	74,3	61,7	46,3	
	150	430,0	98,8	97,7	96,1	94,1	91,6	85,4	77,3	67,5	
	180	446,5	100,9	100,2	99,1	97,7	96,0	91,6	86,0	79,2	
16	120	153,1	74,9	64,9	57,5	51,1	45,2	33,3	20,7		
	150	157,9	71,5	62,4	55,9	50,6	45,8	36,9	27,7	18,0	
	180	160,8	68,4	60,0	54,1	49,4	45,4	38,0	30,9	23,5	

• Live load capacity table

Lift amount	Index angle	Allowed dynamic load Wo (N)							
LT	θ_0	Revolutions Per Minute of input shaft N (rpm)							
(mm)	(deg)	100	150	200	250	300	400	500	600
4	35	147,0	147,0	147,0	90,8	56,5	20,8		
	70	147,0	147,0	147,0	147,0	147,0	121,6	73,1	44,2
	120	147,0	147,0	147,0	147,0	147,0	147,0	147,0	133,4
6	50	147,0	147,0	147,0	121,6	79,9	34,8	13,1	
	90	147,0	147,0	147,0	147,0	147,0	131,7	80,5	49,8
	120	147,0	147,0	147,0	147,0	147,0	147,0	136,7	93,5
8	65	147,0	147,0	147,0	147,0	101,4	48,2	21,9	7,5
	90	147,0	147,0	147,0	147,0	147,0	100,9	58,1	33,2
	120	147,0	147,0	147,0	147,0	147,0	147,0	106,4	69,5
10	110	147,0	147,0	147,0	147,0	147,0	105,3	62,1	36,5
	130	147,0	147,0	147,0	147,0	147,0	139,9	88,3	56,2
	150	147,0	147,0	147,0	147,0	147,0	147,0	114,5	76,8

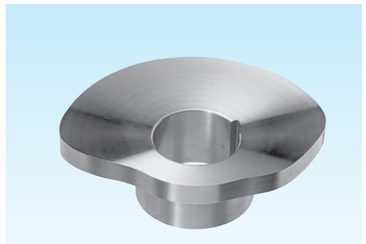
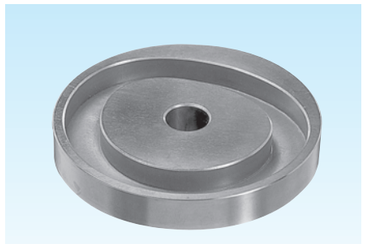
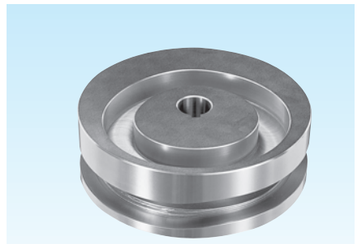
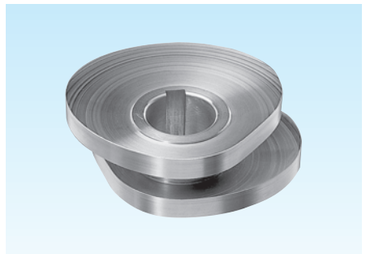
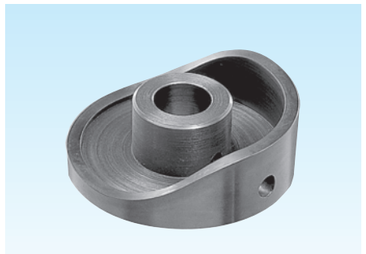
Note) 중간 정지를 필요로 하는 시점이 상기 할부각 능력과 다를 수도 있습니다.

INDXIA

Custom Cam

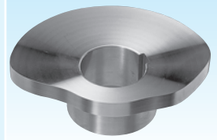
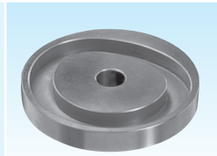
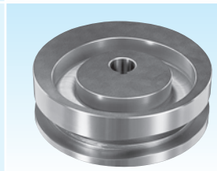
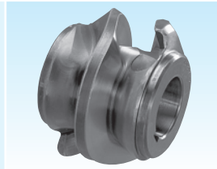
ORDER-MADE CAM

Custom Cam


Features of Custom Cam

There are different types of cams-simple forms such as Flat cam, Grooved cam, End cam, or other forms depending on the requested devices (motion control). Recently, as the request for high speed is increasing, the contour of cam is changing and complex cam type is produced which results multiple movements using one cam. For the production of cams with differences in forms, not only the production system, but also cam movement analysis and curve analysis resulted by users' requests are important. Hannz Motrol has adopted FMS aiming the automatic production of various kinds of cams, developed and installed rotary round table that high precision contour machining of cylinder cams is available. As an example, we have developed SAP CAM that writes all information related to cam design, diagnosis and processes automatically and also tried to improve the total productivity among cam development, technology and production parts. By entering required information when having a discussion, the form of cams and diagnosis list can be seen on the site and it is possible to calculate which form is the best for link output part to move the cam and curve which result the time reduction until the specification is confirmed. As industrial machines develop, the cam technology has been developed. Hannz Motrol is keep trying to strengthen our own technology development to establish the production system as a top cam manufacturer and furthermore, we aim at the realization of evolved motion control.

Flat cam	This is more generally used as the representative of the plate cam.It has no problems in using it for the low speed. However, the spring is needed to pre-vent it since the jumping phenomenon arises to detach the cam follower from the cam surface in case of high speed driving.	
Grooved cam	Jumping is prevented since the both sides of cam groove trammels the cam follower. However, the cam follower cannot work the groove smoothly in case some availablespace does not exist. For this, the backlash cannot be avoided. In addition, the cam increases to compare with the flat cam.	
Cylinder grooved cam & Cylinder lib cam	The cylinder grooved cam is the cubic cam to process the cam groove at the surface side of cylinder. The jumping phenomenon doesn't arise since it is the cam of trammeled type as well as the grooved cam. However, the backlashcannot be avoided. In case of the cylinder lib cam to trammel to the both surfaces of live to do two cam followers as it improve this point, the backlash is removed according to the pre-load controlling instrument and it is able to use for the weight lightening and high-speed.	
Roller gear cam	This is the best degree of cam. The backlash doesn't exist, the rigidity is high, and it is proper in the speed driving since the structure of the taper lib and cam follower is made of the structure of pre-load controlling instrument to add in the trammeled type.	

⚠ Instructions of using cam

- The simple movement is made if possible.
- The most simply turret (link) is made.
- Attention on jumping of turret is required and omitting device to prevent is good.
- Rigidity of rotation increases after external diameter of cam minimizes and the shaft of cam maximizes.
- Desorption of contact material is possible
- It causes the bad effect to the output part in case of the abnormal rotation at the driving part of cam shaft.
- The cover is absolutely necessary at the rotation part for the workability and the stability.
- The contact of the contact material (C/F) set the goal of 30~60%.
- Caution on the lubrication of contact material.
- The rigidity of turret increases and the mass decreases.
- The maximum utilizing of allowed value in case of the diameter of contact material.

Custom Cam

HANNZ MOTROL CO.,LTD.

Dear Sir(Sirs)

Checking sheet on Requirement of customer for CUSTOM CAM

Name of company		Department • Person in charge	
TEL		FAX	

NO.	Checking contents	Requirement for customer and sales
1	Materialsetc	S45C, SCM440, SKA11 and etc.
2	Heat treatment	High frequency, vacuum, cementation and etc.
3	Hardness (HrC)	Hoping hardness.
4	Treatment of surface	SCHP, coloring black, plating and etc.
5	Cam curve	MT, MS, MCV50, SHP-5, MCV25, SMS-3 and etc.
6	Timing line	Please fill in the accompanying paper about the unspecified thing of drawing of customer.
7	Whether the link drawing exists or not	Direct acting turret, oscillation turret.
8	Location of timing °0	Please specify it on the drawing of customer clearly.
9	Standard of stroke	Please specify it on the drawing of customer clearly.
10	External diameter of cam follower	Please specify it on the drawing of customer clearly.
11	Direction of rotation on cam and cam follower	Please specify it on the drawing of customer clearly.
12	Whether the polishing cam is performed or not	Whether it exists or not (Please the check the process in case of processing surface.)
13	Carving, location of carving	Please carve the drawing number of HANNZ MOTROL CO.,LTD. in case of no instruction.
14	Key, tap processing	Please specify the relation of location about the cam and the timing clearly.
15	Tolerance, geometric tolerance	Please specify it on the drawing of customer clearly.
16	ETC	Please specify the special requirement and unusual case separately.



BMTRADA

CERTIFICATE OF REGISTRATION

This is to certify that

HANNZ MOTROL CO., LTD.
(Sihwa Industrial Complex 1 Na 304, Jeongwang-dong),
241, Hyeomnyeok-ro,
Siheung-si,
Gyeonggi-do,
Korea

has been audited and found to meet the requirements of standard
ISO 9001:2008 Quality Management System

Scope of certification
Manufacture and Servicing of Gear Index

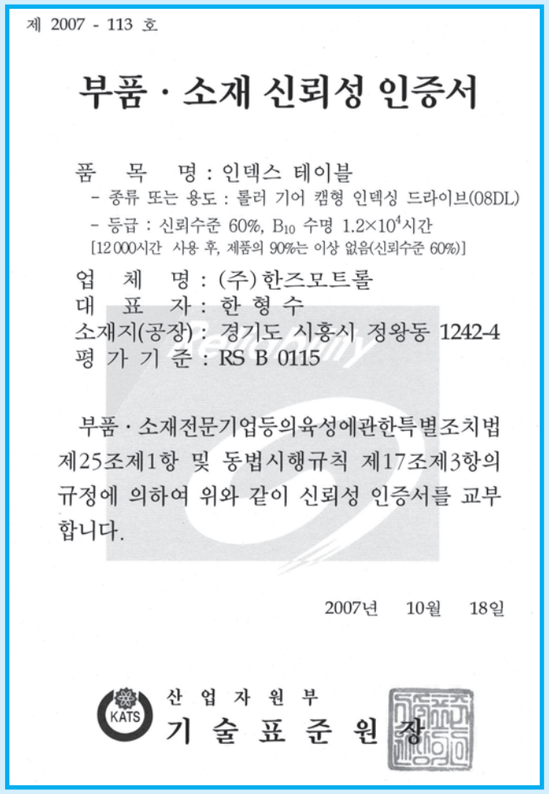
Certificate number: 017431
Issue number: 2014-01
Certificate start date: 17 February 2014
Certificate expiry date: 16 February 2017
Date of initial certification: 18 February 2005

Signed on behalf of Tom Johnston
Chief Operating Officer
Central Certification Services

BM TRADA Certification Ltd, Chiltern House, Stocking Lane, High Wycombe, Buckinghamshire, HP14 4ND, UK

This certificate remains the property of BM TRADA Certification Ltd. This certificate and all copies or reproductions of the certificate shall be returned to BM TRADA Certification Ltd or destroyed if requested. Further clarification regarding the scope of this certificate and verification of the certificate is available through BM TRADA at the above address or at www.bmtrada.com

The use of the UKAS accreditation mark indicates accreditation in respect of those activities covered by the accreditation certification 012



제 2007 - 113 호

부품 · 소재 신뢰성 인증서

품 목 명 : 인덱스 테이블
- 종류 또는 용도 : 롤러 기어 캠형 인덱싱 드라이브(08DL)
- 등급 : 신뢰수준 60%, B_{10} 수명 1.2×10^4시간
[12 000시간 사용 후, 제품의 90%는 이상 없음(신뢰수준 60%)]

업 체 명 : (주)한즈모트롤
대 표 자 : 한 형 수
소재지(공장) : 경기도 시흥시 정왕동 1242-4
평 가 기 준 : RS B 0115

부품 · 소재전문기업등의육성에관한특별조치법 제25조제1항 및 동법시행규칙 제17조제3항의 규정에 의하여 위와 같이 신뢰성 인증서를 교부합니다.

2007년 10월 18일

산 업 자 원 부
기 술 표 준 원 장



중소기업

제 140601 - 00435 호

기술혁신형 중소기업(INNO-BIZ) 확인서

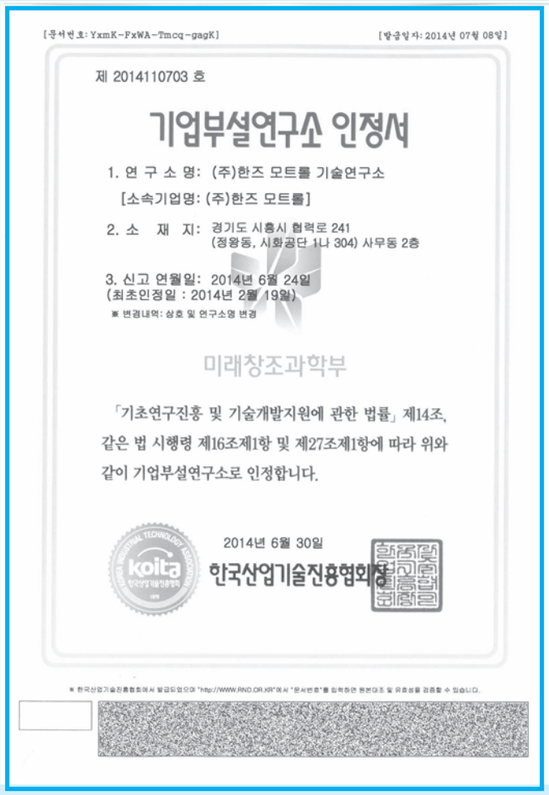
업 체 명 : (주)한즈 모트롤
대 표 자 : 한형수
주 소 : 경기 시흥시 협력로 241 (정왕동,시화공단1나 304)
등 급 : A
유효기간 : 2014. 4. 21 ~ 2017. 4. 20

위 업체는 기술혁신형 중소기업 발굴 육성사업에 의해 선정된 기술혁신형 중소기업(INNO-BIZ)임을 확인합니다.

※ '14.06.24 : 업체명 변경에 의한 재 교부

2014년 6월 24일

중 소 기 업 청 장



[증서번호: YxmK-FxWA-Tmcq-gagK] [발급일자: 2014년 07월 08일]

제 2014110703 호

기업부설연구소 인정서

1. 연 구 소 명: (주)한즈 모트롤 기술연구소
[소속기업명: (주)한즈 모트롤]
2. 소 재 지: 경기도 시흥시 협력로 241 (정왕동, 시화공단 1나 304) 사무동 2층
3. 신고 연월일: 2014년 6월 24일
(최초인정일 : 2014년 2월 19일)
※ 변경내역: 상호 및 연구소명 변경

미래창조과학부

「기초연구진흥 및 기술개발지원에 관한 법률」 제14조, 같은 법 시행령 제16조제1항 및 제27조제1항에 따라 위와 같이 기업부설연구소로 인정합니다.

2014년 6월 30일

한국산업기술진흥협회장

※ 한국산업기술진흥협회에서 발급되었으며 "http://WWW.RND.OR.KR"에서 "문서번호"를 입력하면 원본대조 및 유효성을 검증할 수 있습니다.