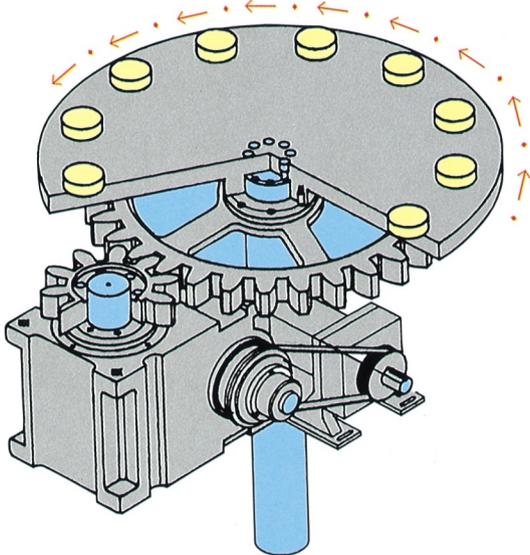




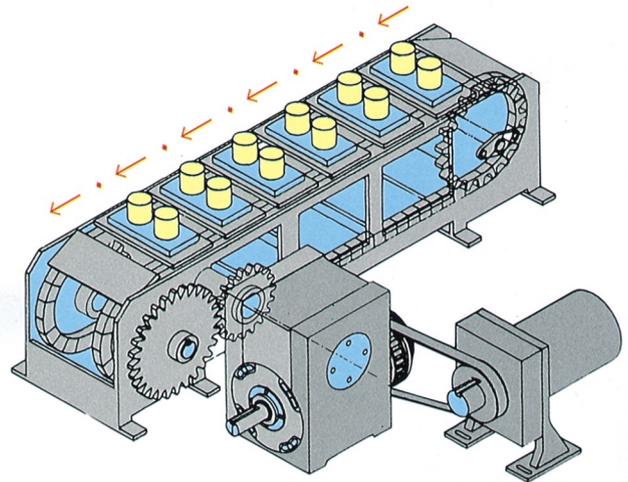
Deshi Cams

Precision Cam Indexing Drives

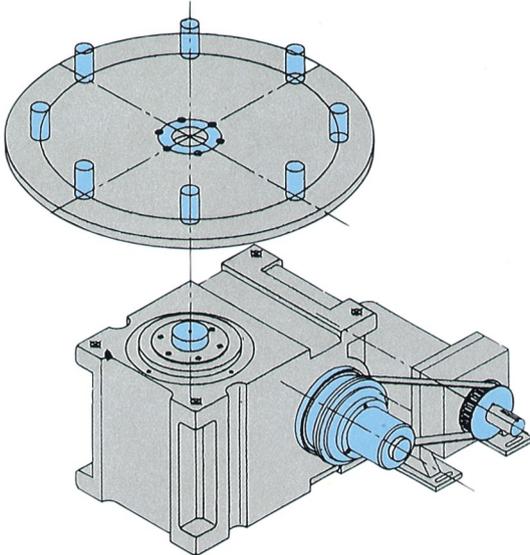
• Intermittent Transmission



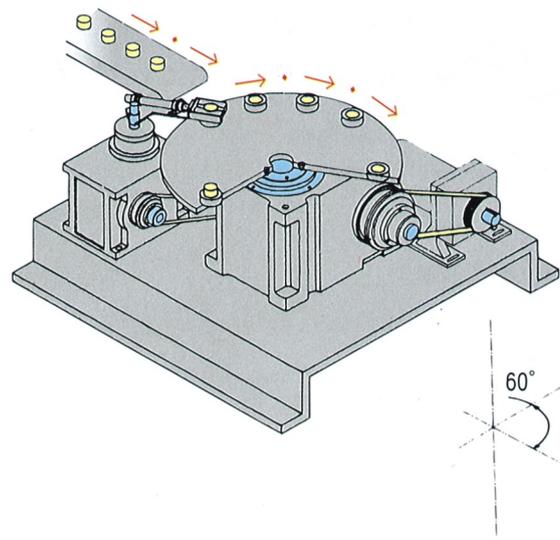
• Transmission By Conveyor Belts



• Direct Transmission



• Direct Transmission



Deshi Cam CO., LTD.

No.88, Chajhuan 1st St., Gueishan Township,
Taoyuan County 333, Taiwan (R.O.C.)

TEL : 886-3-349-3596. 349-3598

FAX : 886-3-349-3600

E-mail: cams@ms22.hinet.net

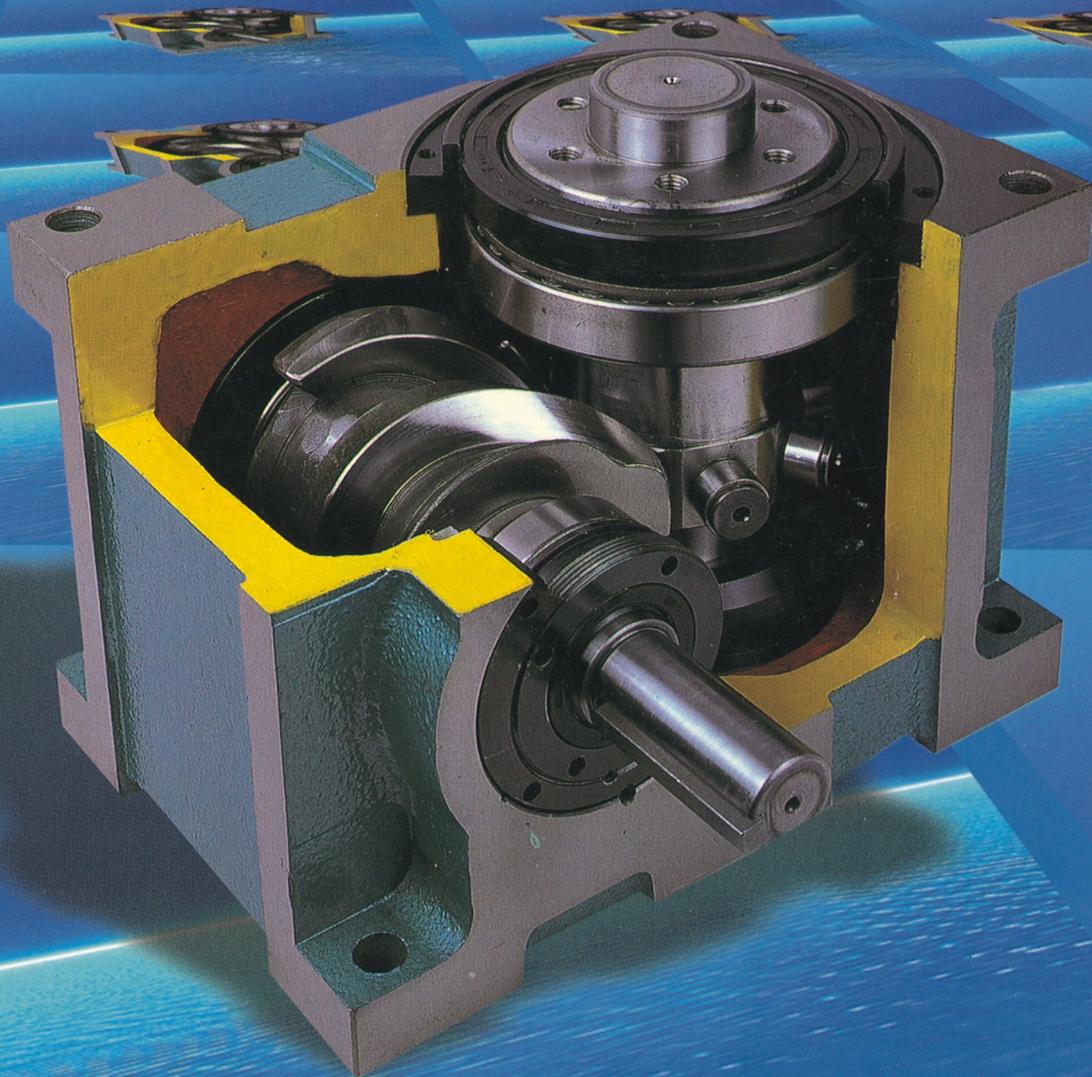
<http://www.teshin.com.tw>



Deshi Cams

Precision Cam Indexing Drives

Made in Taiwan



**Quality Excellence
Aiming for Precision**

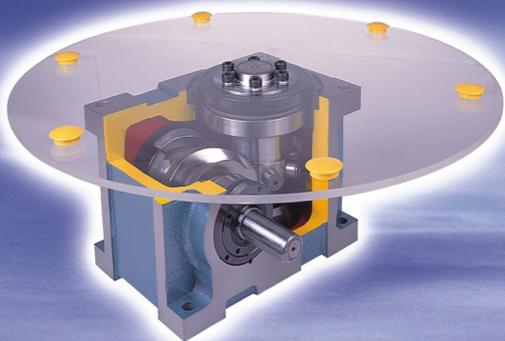
2006.08.20

Wisdom sublimated from statistics and dynamics

**Reliable quality, leading technology,
international achievements
Taiwan's market leader by long long way.**

- Our Company Has Huge Depths Of Experiencegained In The Professional Manufacture Of Curve Cams For The Past 25 Years. Under The Leadership Of Our President, Mr. Yi-chien Lee, And By The Combination Of Theory With Practicality Under The Instruction Of Local And International Experts, Along With Our Consistent Research And Development, Dex Has Built A Product Line Including Atc Automatic Cutter Changing Devices, And A Range Of Of Intermittent Indexing Drives. These Products Have Been Widely Accepted And Highly Valued By Industry. Recently, In Order To Improve Productivity And Product Quality, We Have Also Made A Large Capital Investment In Precision Processing And Grinding Equipment For Professional Manufacturing. This Will Ensure That Our Products Can Better Satisfy The Development Needs Of The High-level Precision Industry.

- In 1990, At The Taichung Exhibition Mutually Held By The Industrial Development Bureau, Ministry Of Economic Affairs And The Association For Precision Machinery Industry Development, Our Company Provided The Atc Automatic Cutter Changing System, Various Types Of Intermittent Indexing Drives And Other Products For The Industrial User's Conference. The Products Were Highly Valued, But Our Company Was Not Satisfied With These Achievements. We Keep On Providing Excellent Quality, And Friendly And Speedy Service To Win The Best Ratings From Our Customers. We Even Won The Gold Prize For The Excellent Domestic Machinery Product In 1993. Our Company's Goal Is The Pursuit Of Ever-higher Operational Levels And A Focus On The Research And Development Of High Quality Products. Using Total Quality Control And Products With High Precision, To Achieve The Goal Of Keeping Ahead Of Competitors From Around The World Is The Consistent Goal Of Our Company. If You Have Any Questions Regarding The Production Operations, Other Than The Basic Information Provided, You Are Welcome To Contact Us. We Have On Hand Experienced Professionals Who Are Always Ready To Provide Detailed Instructions And Technical Consultation Services, And To Design Appropriate Products For You To Achieve Your Automation Goals.





• President Mr. Yi-Chien Lee



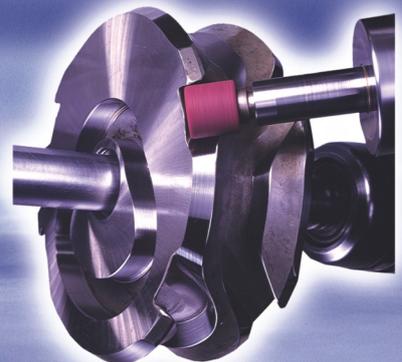
• Beautiful Garden inside the Complex



• The Magnificent Plant Exterior



• Comfortable Office Space





Quality Excellence
Aiming for Precision

Content

Core Shaft <ds>

- Output Shaft Is Core Shaft
- Suitable As Power Sources For Mechanisms Such As Intermittent Transport Conveyor Belts, Engagement Of Gears, Etc.



Flange Type <df>

- Outline Of The Output Shaft Is A Flange.
- Suitable For Fixing Heavily Loaded Rotating Disks And All Kinds Of Disk Processing Machines.



Hollow Flange Type <dfh>

- Outline Dimensions And Functions Are Similar To Flange Type, Except That The Shaft Is Hollow At The Flange Area.
- Suitable For Cross Linking Of Electric Wiring And Piping And Space-saving.



Content



Combined Lift Type

- Output shaft can not only perform intermittent circular motions but also can perform up-and-down lifting motions and left-and-right swing motions during the arbitrarily divided movements.
- After simple integration, pick-and-place and transport motions of high efficiency and precision can be achieved.



Separated Lift Type

- Output shaft only performs regular up-and-down core shaft motions and comprises the flange responding to intermittent dividing motions.
- Based on practical applications, complex motions such as press-in, liquid filling, and assembly can be easily achieved.



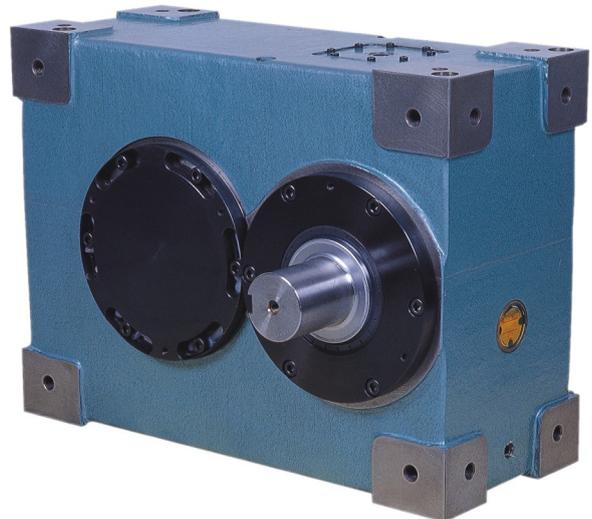
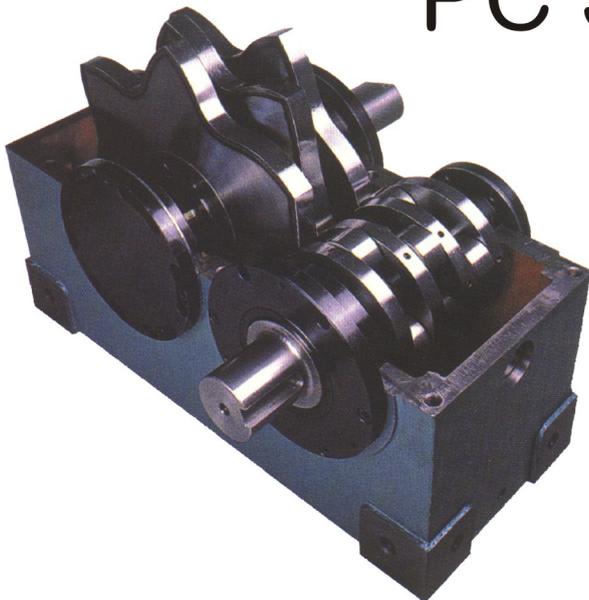
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DT Series, P Series, PC Series

DT Series



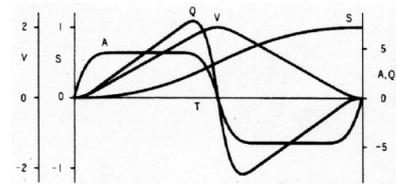
P Series PC Series



Characteristics of Curves

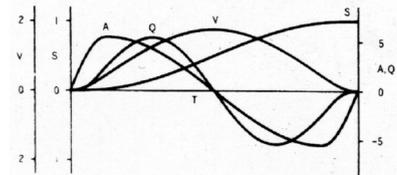
Modified Trapezoid Curve (M. T. Curve)

- The modified trapezoid curve is the most popular curve used for the cam in the high-speed automatic machines today. It has gradually replaced cycloid curves and is used for indexing cams. Its distinguishing feature is a low value of maximum acceleration (AM), so it will perform well in high-speed cam applications if precisely processed.



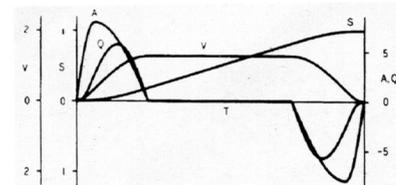
Modified Sinusoidal Curve (M. S. Curve)

- This curve is an extremely stable and smooth curve. Because it satisfies the continuity of curve and lowers the value of maximum acceleration (AM), it is the least dangerous for using on occasions that the loadings and the variations are unknown.



Modified Constant Velocity Curve (M. C. V. Curve)

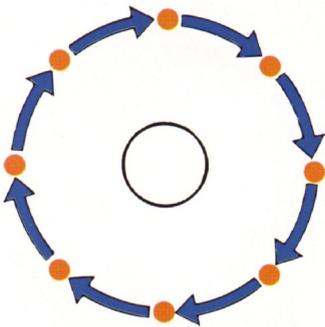
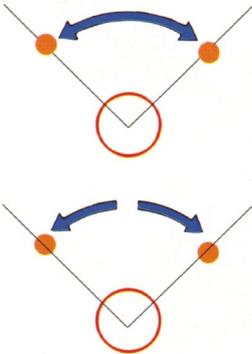
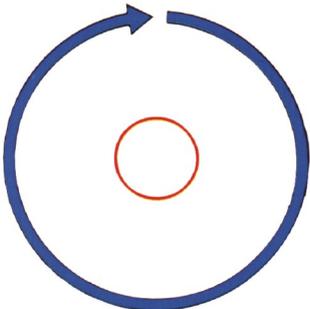
- It can be shown from the right figure that modified constant velocity curve is suitable for using on occasions when constant velocity is needed during the stroke. However, if the value of maximum acceleration (AM) is excessively large, its relative inertia will also be large. Therefore, it should be avoided except for cases where constant velocity is necessary.



Selection of Curves

Name	Applications	Maximum Velocity, V_m	Maximum Acceleration, A_m	Maximum Jittering Speed, J_m	Maximum Torque Coefficient, Q_m
Modified Trapezoid Curve M. T. Curve	High speed Light loading	2.00	± 4.89	± 61.4	± 1.65
Modified Sinusoidal Curve M. S. Curve	Medium speed Heavy loading	1.76	± 5.53	+ 69.5 - 23.2	± 0.99
Modified Constant Velocity Curve M. C. V. Curve	Low speed Heavy loading	1.28	± 8.01	+ 201.4 - 67.1	± 0.72

Introduction to the Motions

	<ul style="list-style-type: none"> • The so-called indexing device is to perform (stop dividing stop dividing) intermittent dividing revolving motion. • The dwelling [DWELL] is the section in which the input shaft is not revolving, i.e., the status where the roller, the driven object of the roller cam, is tightly engaging with the cam curve. • The 'dividing' is the section in which the input shaft is revolving, i.e., the status that the roller, the driven object of the roller cam, is tightly engaging with the cam curve. • When a typical input shaft finishes one revolution, the output shaft will perform one count of dividing and one count of dwelling. • The counts of dwelling after each revolution of the output shaft are the counts of impact. After determining these dwelling points, a check of the processing assembly and other activities can be done. • If the revolving disk of the output shaft is connected with the rotating type automatic machine, it can also be used as the main power source. • If sprockets and pulleys are installed on the output shaft and integrated with chains and belts, they can be used as the on-line type automatic machine with intermittent conveying belts.
	<ul style="list-style-type: none"> • The swing device is the device in which the input shaft performs continuously constant-speed rotation, whereas the output shaft performs cyclic revolving motion. • Not only it can perform simple a cyclic revolving motion but also rotation to a middle position and a stop to some extent. • Position and rotating angle can be randomly defined. • When using a pair of cams and their driven components to drive the roller cam gapless surfaces of the circumferential boundary of the roller cam, an excellent revolving motion without reverse rotation can be achieved if appropriate pressure is constantly acting between the roller cam and its driven components. • If a rocker bar is installed on the output shaft and a guiding wheel and a guiding bar are also installed on the front end for linear movement, it can be used as a working transport cart. • During the design of dividing and dwelling of the intermittent dividing device, if a vibrating device can be operating simultaneously, reliability of the automatic machine can be improved, and high speeds can be realized as well.
	<ul style="list-style-type: none"> • The so-called roller device is the speed reducer. In order to obtain uniform rotation, excellent reverse rotation and high torque, the speed reducer is the best choice. • According to the distinguishing feature of this mechanism, if the roller cam and its driven components engage well, then extremely high transmission efficiency can be obtained. • Other than its application in speed reduction, the speed reducer can also be used for dividing and positioning of the last driven component of the indexing disk.

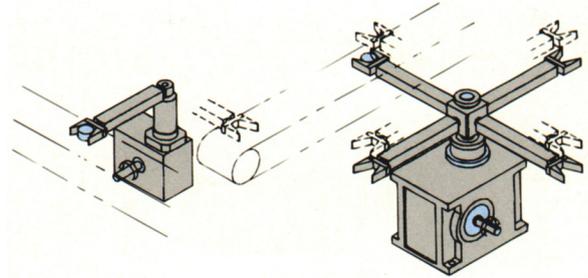
Time and Motion Diagram

<p>Stop Divide</p>	<p>● 1 DWELL</p> <p>Revolving angle of the input shaft</p>	<p>● 2 DWELL</p> <p>Revolving angle of the input shaft</p>
<p>• Left-to-right swing</p> <p>While dwelling While revolving</p>	<p>● TYPE 1</p> <p>Revolving angle of the input shaft</p>	<p>● TYPE 2</p> <p>Revolving angle of the input shaft</p>
<p>• Continuous operation</p>	<p>● Reduction ratio 8</p> <p>Revolving angle of the input shaft</p>	<p>● Reduction ration 12</p> <p>Revolving angle of the input shaft</p>

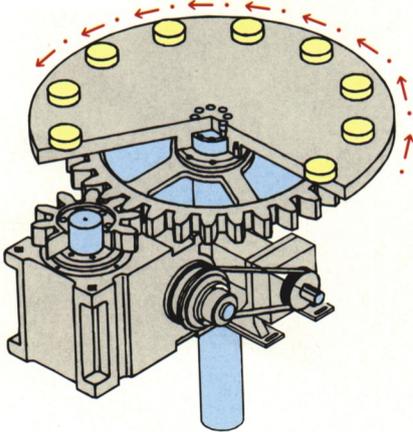
Applications:

- Automatic assembling machines, conveyors
- Machines for pharmaceuticals, machines for food processing
- Automatic feeding mechanism for punching machines
- Automatic cutter changing device for integrated processing machines
- Intermittent transmission machines for other industries

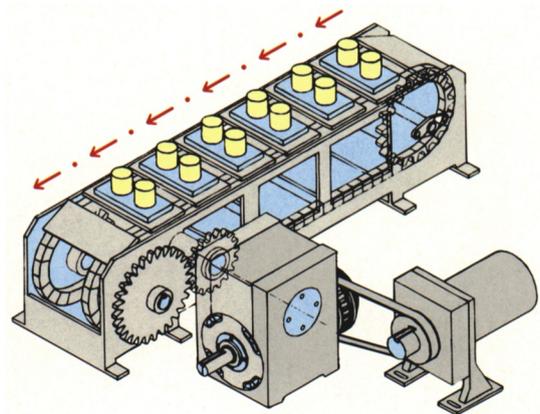
- Conveyor belt transport type



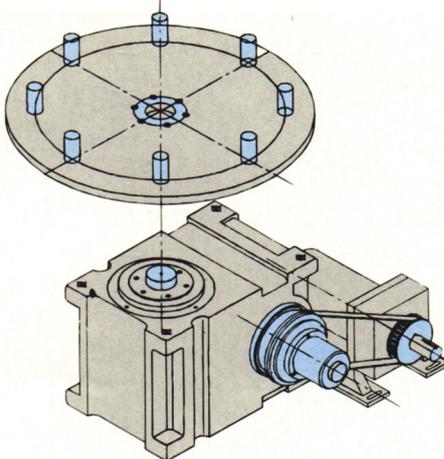
- Combined indexing lift type



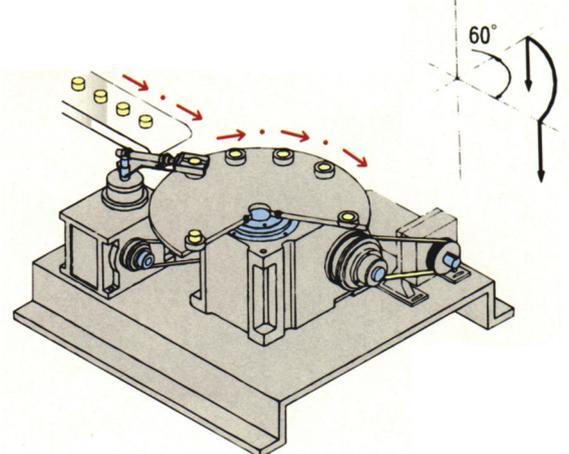
- Direct transmission type



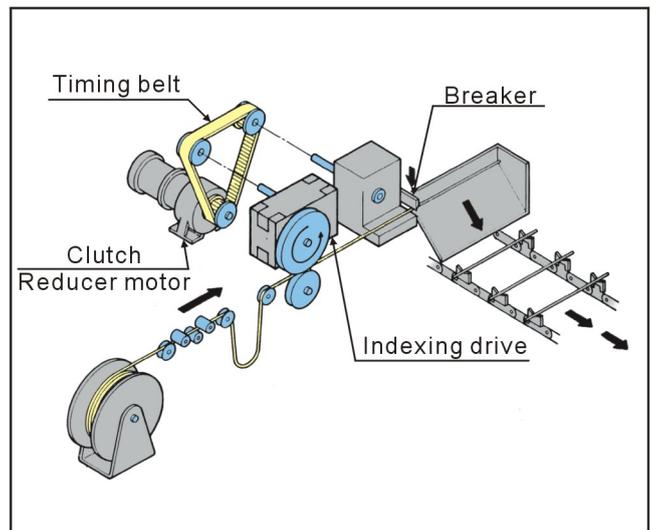
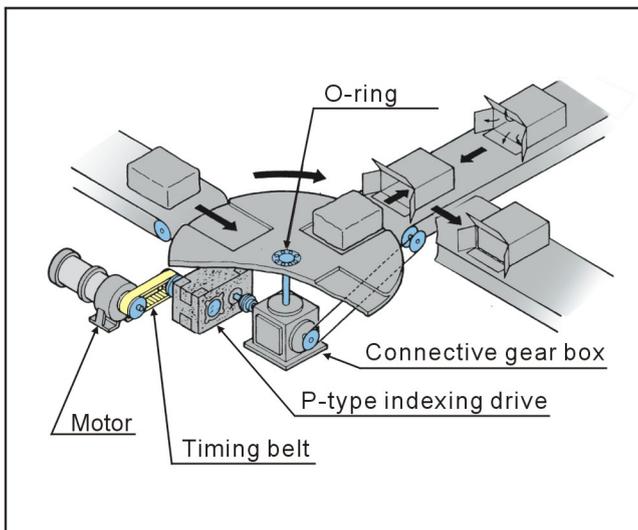
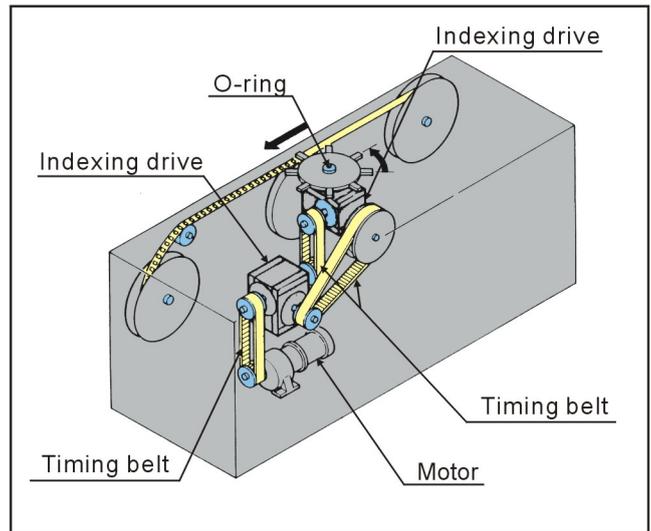
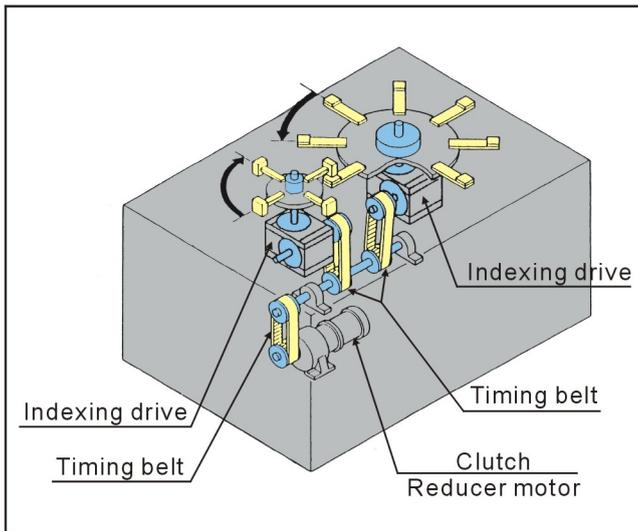
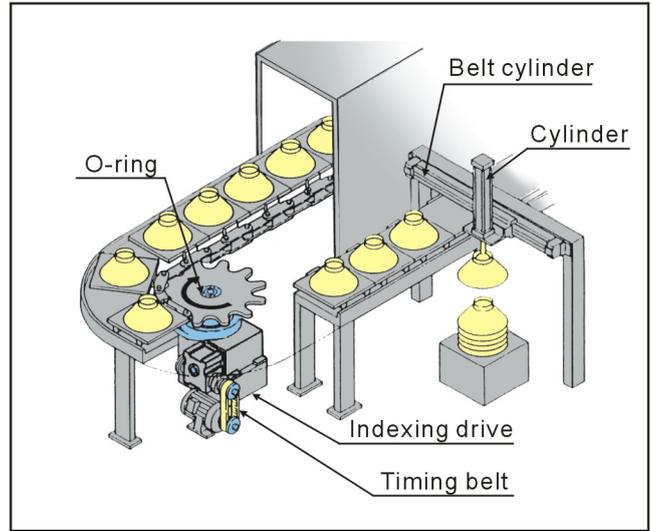
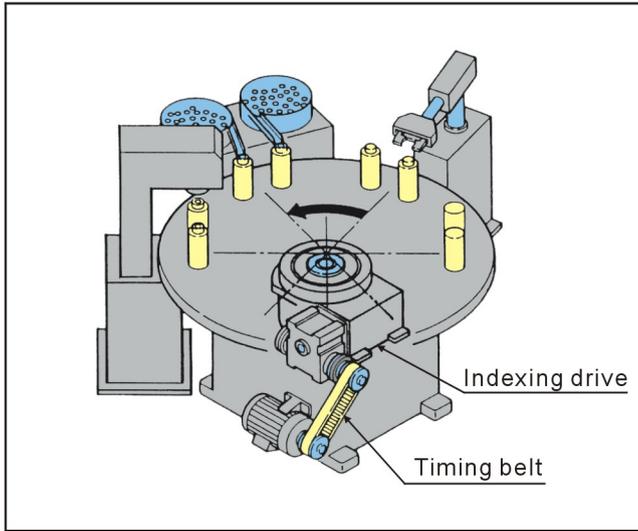
- Indirect transmission type



- Direct transmission type



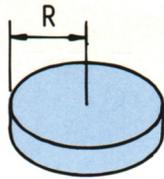
Application Examples of the Indexing Drive



Equations for calculation of the moment of inertia

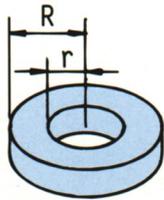
Center of rotation is at the center of the gravity

● Solid circular plate



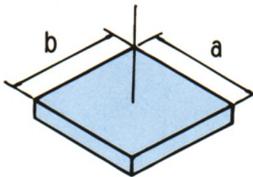
$$I = \frac{WR^2}{2G}$$

● Hollow circular plate



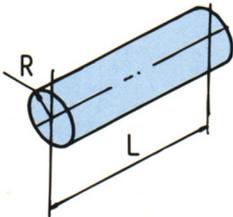
$$I = \frac{W(R^2+r^2)}{2G}$$

● Flat plate



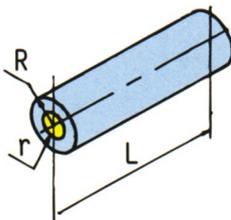
$$I = \frac{W(a^2+b^2)}{12G}$$

● Solid shaft



$$I = \frac{W(3R^2+L^2)}{12G}$$

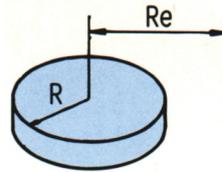
● Hollow shaft



$$I = \frac{W(R^2-r^2+L^2/3)}{4G}$$

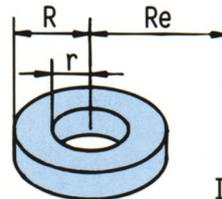
Distance between center of rotation and the center of the gravity is Re

● Solid circular plate



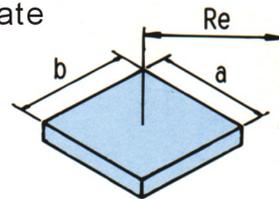
$$I = \frac{W(R^2+Re^2)}{G}$$

● Hollow circular plate



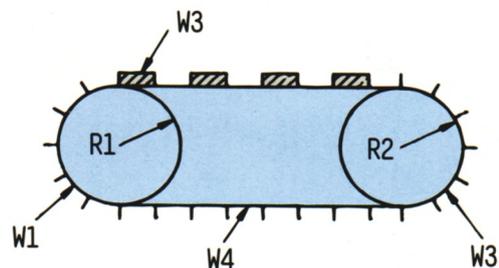
$$I = \frac{W(R^2+r^2+2Re^2)}{G}$$

● Flat plate



$$I = \frac{W(a^2+b^2)/12+Re^2}{G}$$

● Conveyor belt



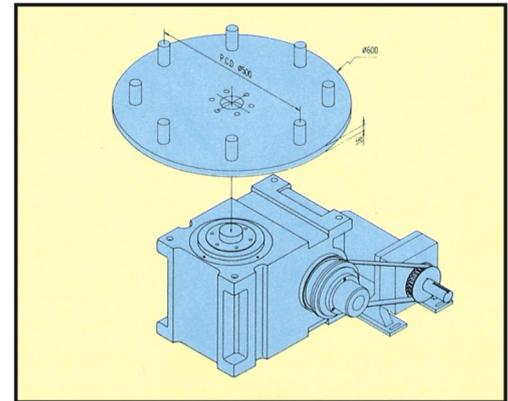
W1: Weight of the driving wheel
W2: Weight of the driven wheel
W3: Total weight of the processed object
W4: Total weight of the fixture
R1: Radius of the driving wheel
R2: Radius of the driven wheel

$$I = \frac{W_1 R_1^2 + W_2 R_2^2}{2G} + \frac{W_3 R_1^2 + W_4 R_1^2}{G}$$

Example 1 : For the indexing drives used in the intermittent rotating circular plate, utilize intermittent indexing drives with appropriate sizes and specifications and required motor power. Please utilize the following calculation and refer to Figure 1.

Given conditions and design information

- (1) Intermittent indexing portions of positioning: S=8,
(S: counts of equally divided portions)
- (2) Driving time for each equally divided portions: 1/3 second,
positioning time: 2/3 sec
- (3) Counts of revolutions of the input shaft: N=60rpm: speed of the cam shaft
(revolutions per minute)
- (4) Cam curve: modified sinusoid curve
- (5) Size of the revolving disk: ϕ 600mm x 16t
- (6) Weight of the clamp: 2.5kgf/set
- (7) Weight of the object to be processed: 0.3kgf/set
- (8) Effective radius of the revolving disk according to the loading from its own weight supported by the sliding surface of its base: R=250mm
- (9) Clamp to be fixed at a pitch circle of 500mm in diameter
- (10) Driving angle $\theta = 360 \times \text{driving time} / (\text{driving time} + \text{positioning time}) = 120 \text{ deg}$



Solution

- Intermittent indexing portions of positioning: S=8
- Counts of revolutions of the input shaft: N=60rpm
- Cam curve is the modified sinusoid curve, so $V_m=1.76$, $A_m=5.53$, $Q_m=0.99$
- Loading torque: Tt

(1) Torque of inertia: Ti

(a) Weight of the revolving disk: W_1 , weight of the clamp: W_2 , Weight of the object to be processed, thus

$$W_1 = \pi R^2 t \times 7.8 \times \frac{1}{1000} = \pi \times 30^2 \times 1.6 \times 7.8 \times \frac{1}{1000} = 35.29(\text{kgf})$$

$$W_2 = 2.5 \times 8 = 20(\text{kgf})$$

(b) Moment of inertia of the revolving disk: I_1 , moment of inertia of the clamp: I_2 , moment of inertia of the object to be processed: I_3 are

$$I_1 = \frac{W_1 R^2}{2G} = \frac{35.29 \times 0.3^2}{2 \times 9.8} = 0.16 (\text{kgf} \cdot \text{m} \cdot \text{s}^2)$$

$$I_2 = \frac{W_2 R_e^2}{G} = \frac{20 \times 0.25^2}{9.8} = 0.13 (\text{kgf} \cdot \text{m} \cdot \text{s}^2)$$

$$I_3 = \frac{W_3 R_e^2}{G} = \frac{2.4 \times 0.25^2}{9.8} = 0.015 (\text{kgf} \cdot \text{m} \cdot \text{s}^2)$$

(c) Total moment of inertia: I

$$I = I_1 + I_2 + I_3 = 0.16 + 0.13 + 0.015 = 0.305(\text{kgf} \cdot \text{m} \cdot \text{s}^2)$$

(d) Maximum angular acceleration of the output shaft: α

$$\alpha = A_m \times \frac{2\pi}{S} \times \left(\frac{360}{\theta h} \times \frac{N}{60} \right)^2 = 5.53 \times \frac{2\pi}{8} \times \left(\frac{360}{120} \times \frac{60}{60} \right)^2 = 39.09(\text{rad/s}^2)$$

(e) Torque of inertia: Ti

$$T_i = I \cdot \alpha = 0.305 \times 39.09 = 11.92 (\text{kgf} \cdot \text{m})$$

(2) Frictional torque: Tf

$$T_f = \mu \cdot W \cdot R = 0.15 \times (35.29 + 20 + 2.4) \times 0.25 = 2.16 (\text{kgf} \cdot \text{m})$$

(3) Workable torque: Tw

There is no work during intermittent indexing, therefore, $T_w = 0$.

(4) Total loading torque of the above: Tt

$$T_t = T_i + T_f + T_w = 11.92 + 2.16 + 0 = 14.08 (\text{kgf} \cdot \text{m})$$

• Actual loading torque: Te, safety factor for loading $f_e = 1.8$

$$T_e = T_t \cdot f_e = 14.08 \times 1.8 = 25.34 (\text{kgf} \cdot \text{m})$$

• Torque at the input shaft: Tc, notes: the starting loading torque of the input shaft is given as 0, so $T_{ca} = 0$.

$$T_c = \frac{360}{\theta h \cdot s} \times Q_m \times T_e = \frac{360}{120 \times 8} \times 0.99 \times 25.34 = 9.41 (\text{kgf} \cdot \text{m})$$

• Calculate required horse power: P

$$P = \frac{T_c \times N}{716 \times f} (\text{HP}) \text{ or } P = \frac{T_c \times N}{975 \times f} (\text{kw})$$

• If efficiency $f = 60\%$, then

$$P = \frac{9.41 \times 60}{716 \times 0.6} = 1.31(\text{HP}) \text{ or } P = \frac{9.41 \times 60}{975 \times 0.6} = 0.97(\text{KW})$$

• In fact, the values calculated above are the maximum horsepower at the start, whereas the required horsepower for continuous transmission is 1/2.

• Select appropriate indexing drives

Select according to the above calculated data and revolving speed of the input shaft at 60rpm. Please refer to the content in the manual.

All output shafts with torque higher than the calculated value of Te can be selected.

Because $T_e = 25.34 (\text{kgf} \cdot \text{m})$, 11D should be selected.

V_m : maximum non-directional velocity

A_m : maximum non-directional acceleration

Q_m : maximum torque coefficient of the cam shaft

θ h : rotated position of the input shaft
(driving angle)

μ : friction coefficient = 0.15

Ω : angular velocity (rad/sec)

α : angular acceleration (rad/sec²)

The maximum reference value of the safety factor Fe recommended by our company is:

When driving angle is 90° , safety factor = loading torque (Tt) x 2.2 (times)

When driving angle is above 120° , safety factor = loading torque (Tt) x 2.0 (times)

Notes: for safety factor concerns, use 35rpm for calculation when the output shaft is rotating at a speed lower than 35rpm.



• If you have any question about the specifications of indexing drives, please call for more information. We will reply and answer to your questions sincerely. Or please fill out the following information and fax it to our company, we will calculate the specifications you need as soon as possible.

From: _____ company To: Design Department, DEX Cams

Contact: _____ Tel: 886-3-3493596~8

Tel: _____ Fax: _____ Fax: 886-3-3493600

**(I). Indexing drive with intermittent revolving disk
(direct transmission)**

1. Number of indexing portions: $S =$ _____

2. Driving angle $\theta h =$ _____

3. Operating time of each stroke =
revolving time + positioning time
_____ Sec = _____ Sec + _____ Sec

4. Counts of revolution of the input shaft = _____ RPM

5. Cam curve = MS (Standard) MT MCV

6. Material of the circulate plate: Steel Aluminum Other

Outer diameter = _____ mm thickness $t =$ _____ mm

7. Weight of the object to be processed: _____ kg/each

8. Weight of the clamp: _____ kg/each

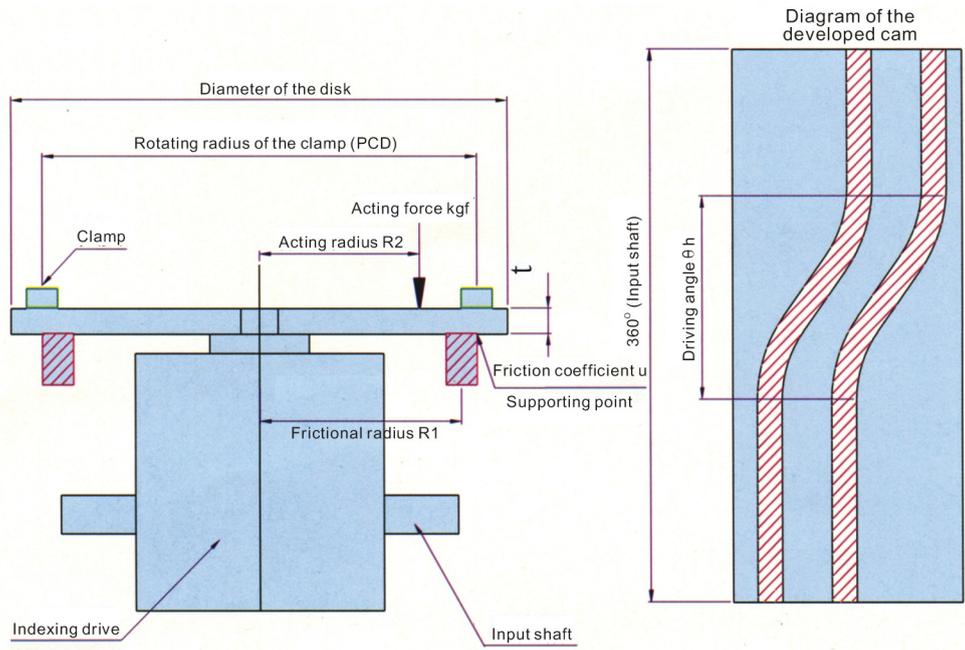
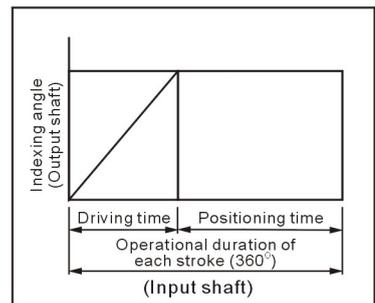
Rotating diameter of the clamp (P.C.D.) = _____ mm

9. Lower support of the disk:

Yes No Frictional radius $R1 =$ _____ Friction coefficient $\mu =$ _____

10. Acting force of the loading during indexing:

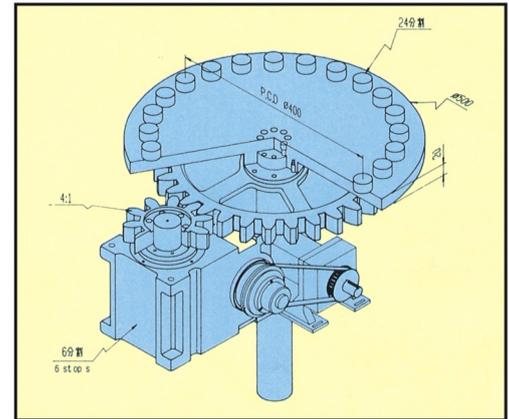
Yes No Acting force = _____ kgf Acting radius $R2 =$ _____ mm



Example 2 : For the intermittent revolving disk, select an appropriate intermittent indexing drive and a motor with required power. Please utilize the following calculation and refer to Figure 2.

Design information for the intermittent indexing drive:

- | | |
|--|--|
| (1) Intermittent indexing portions of positioning: S=6 | (8) Weight of the object to be processed: 1.5kgf |
| (2) Revolving time for each equally divided portions: 2.8 seconds | (9) Weight of the fixture: 2kgf |
| (3) Counts of revolutions of the input shaft: N=80rpm | (10) Size of the revolving disk: $\phi 500\text{mm} \times 20\text{t}$ |
| (4) Cam curve: modified sinusoid curve | (11) Number of the fixtures: 24 pieces |
| (5) Outer diameter of the small gear: 120
Outer diameter of the large gear: 480 | (12) Friction coefficient: 0.2 |
| (6) Weight of the small gear: 3kg | (13) Fixtures to be fixed at a pitch circle of 400mm in diameter |
| (7) Weight of the large gear: 30kgf | (14) Loading of its own weight of the revolving disk is supported by the sliding surface of its base Effective radius: R=200mm |
| | (15) Driving angle $\theta=120$ |



Solution

- Intermittent indexing portions of positioning: S=6
- Counts of revolutions of the input shaft: N=80rpm
- Driving angle: 120°
- Cam curve is the modified sinusoid curve, so $V_m=1.76$, $A_m=5.53$, $Q_m=0.99$
- Loading torque: T_t

(1) Torque of inertia: T_i

(a) Weight of the revolving disk: $W_1 = \frac{1}{1000} \pi R^2 t \times 7.8 = \frac{1}{1000} \pi \times 25^2 \times 2 \times 7.8 = 30.63 \text{ (kgf)}$
 Weight of the object to be processed: $W_2 = 1.5 \times 24 = 36 \text{ (kgf)}$
 Weight of the fixture: $W_3 = 2 \times 24 = 48 \text{ (kgf)}$

(b) Moment of inertia of the small gear: I_1 , moment of inertia of the large gear: I_2 , moment of inertia of the fixture: I_3
 Moment of inertia of the object to be processed: I_4 , Moment of inertia of the revolving disk: I_5

$$I_1 = \frac{WR^2}{2G} = \frac{3 \times 0.06^2}{2 \times 9.8} = 0.00055 \text{ (kgf} \cdot \text{m} \cdot \text{s}^2)$$

$$I_2 = \frac{WR^2}{2G} = \frac{30 \times 0.24^2}{2 \times 9.8} = 0.088 \text{ (kgf} \cdot \text{m} \cdot \text{s}^2)$$

$$I_3 = \frac{WR^2}{2G} = \frac{48 \times 0.2^2}{2 \times 9.8} = 0.20 \text{ (kgf} \cdot \text{m} \cdot \text{s}^2)$$

$$I_4 = \frac{WRe^2}{G} = \frac{36 \times 0.2^2}{9.8} = 0.15 \text{ (kgf} \cdot \text{m} \cdot \text{s}^2)$$

$$I_5 = \frac{WR^2}{2G} = \frac{30.63 \times 0.25^2}{2 \times 9.8} = 0.098 \text{ (kgf} \cdot \text{m} \cdot \text{s}^2)$$

(c) Maximum angular acceleration of the output shaft: α

$$\alpha = A_m \times \frac{2\pi}{S} \times \left(\frac{360}{\theta h} \times \frac{N}{60} \right)^2 = 5.53 \times \frac{2\pi}{6} \times \left(\frac{360}{120} \times \frac{80}{60} \right)^2 = 92.66 \text{ (rad/s}^2)$$

(d) Static torque of inertia: T_i ($T_{i1} + T_{i2}$)

$$T_{i1} = I_1 \cdot \alpha = 0.00055 \times 92.66 = 0.051 \text{ (kgf} \cdot \text{m)}$$

$$T_{i2} = (I_2 + I_3 + I_4 + I_5) \left(\frac{S}{S_e} \right)^2 \cdot \alpha \cdot \left(\frac{S}{S_e} \right) = (0.088 + 0.2 + 0.15 + 0.098) \left(\frac{6}{24} \right)^2 \times 23.16 \times \left(\frac{6}{24} \right) = 3.10 \text{ (kgf} \cdot \text{m)}$$

$$T_{i3} = T_{i1} + T_{i2} = 0.051 + 3.1 = 3.15 \text{ (kgf} \cdot \text{m)}$$

(2) Frictional torque: T_f

$$T_f = \mu \cdot W \cdot R \cdot \left(\frac{S}{S_e} \right) = 0.2 \times (36 + 48 + 30.63 + 30) \times 0.2 \times \left(\frac{6}{24} \right) = 1.54 \text{ (kgf} \cdot \text{m)}$$

(3) Workable torque: T_w

There is no work during intermittent indexing, therefore, $T_w=0$.

(4) Total loading torque of the above: T_t

$$T_t = T_i + T_f + T_w = 3.15 + 1.54 + 0 = 4.69 \text{ (kgf} \cdot \text{m)}$$

• Actual loading torque: T_e , safety factor for loading $f_e = 1.8$

$$T_e = T_t \cdot f_e = 4.69 \times 1.8 = 8.44 \text{ (kgf} \cdot \text{m)}$$

• Torque at the input shaft: T_c

$$T_c = \frac{360}{S \cdot \theta h} \times Q_m \times T_e = \frac{360}{6 \times 120} \times 0.99 \times 8.44 = 4.18 \text{ (kgf} \cdot \text{m)}$$

• Calculate required horse power: P

$$P = \frac{T_c \times N}{716 \times f} \text{ (HP)} \text{ or } P = \frac{T_c \times N}{975 \times f} \text{ (kw)}$$

• If efficiency $f = 60\%$, then

$$P = \frac{4.18 \times 8.0}{716 \times 0.6} = 0.78 \text{ (HP)} \text{ or } P = \frac{4.18 \times 8.0}{975 \times 0.6} = 0.57 \text{ (kw)}$$

The maximum reference value of the safety factor F_e recommended by our company is:

When driving angle is 90° , safety factor = loading torque (T_t) $\times 2.2$ (times)

When driving angle is above 120° , safety factor = loading torque (T_t) $\times 2.0$ (times)

Notes: for safety factor concerns, use 35rpm for calculation when the output shaft is rotating at a speed lower than 35rpm.

• In fact, the values calculated above are the maximum horsepower at the start, whereas the required horsepower for continuous transmission is 1/2.

• Select appropriate indexing drives

Select according to the above calculated data and revolving speed of the input shaft at 80rpm. Please refer to the content in the manual. All output shafts with torque higher than the calculated value of T_e can be selected.

Because $T_e = 8.44 \text{ (kgf} \cdot \text{m)}$, 8D should be selected.



• If you have any question about the specifications of indexing drives, please call for more information. We will reply and answer to your questions sincerely. Or please fill out the following information and fax it to our company, we will calculate the specifications you need as soon as possible.

From: _____ company To: Design Department, DEX Cams

Contact: _____ Tel: 886-3-3493596~8

Tel: _____ Fax: _____ Fax: 886-3-3493600

**(II). Intermittent Indexing Drive with Revolving Disk
(Indirect Transmission)**

1. Number of indexing portions: $S =$ _____

2. Driving angle $\theta h =$ _____

3. Operating time of each stroke =
revolving time + positioning time
_____ Sec = _____ Sec + _____ Sec

4. Counts of revolution of the input shaft = _____ RPM

5. Cam curve = MS (Standard) MT MCV

6. Material of the circulate plate: Steel Aluminum Other

Outer diameter = _____ mm thickness $t =$ _____ mm

7. Weight of the object to be processed: _____ kg/each

8. Weight of the clamp: _____ kg/each

Rotating diameter of the clamp (P.C.D.) = _____ mm

9. Lower support of the disk:

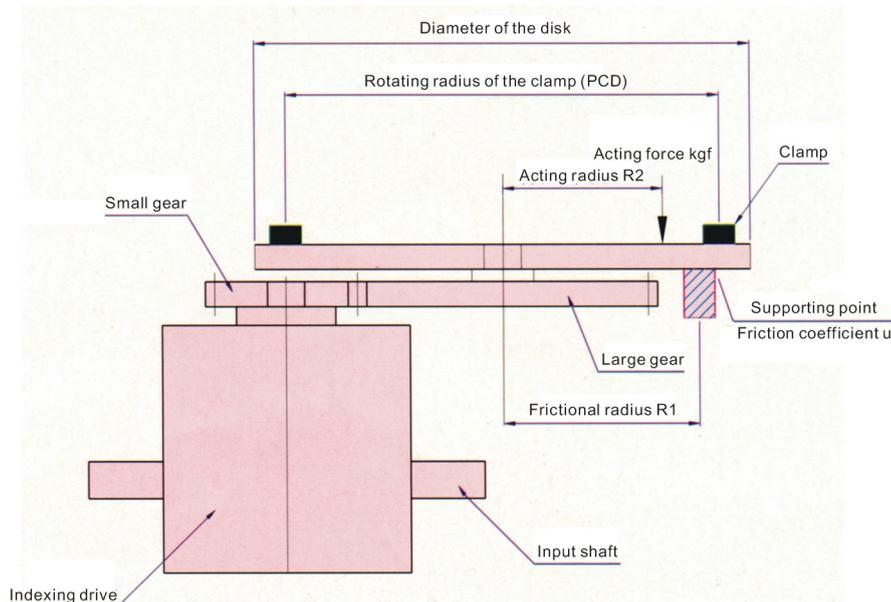
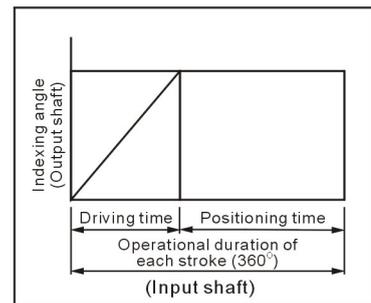
Yes No Frictional radius $R1 =$ _____ Friction coefficient $\mu =$ _____

10. Acting force of the loading during indexing:

Yes No Acting force = _____ kgf Acting radius $R2 =$ _____ mm

11. Outer diameter of the large gear = _____ mm weight = _____ kg

12. Outer diameter of the small gear = _____ mm weight = _____ kg



Example 3 : For the condition that Where the intermittent indexing drive is applied with the conveyor belt. The intermittent indexing drive is collaboratively working with the gears of the output shaft for the conveyer belt, in which the calculation of the movement of the conveyer belt is listed below :

Design information for the intermittent indexing drive:

- (1) Driving angle: $\theta h=120^\circ$
- (2) Operating duration of each stroke: 2 sec/period
- (3) Speed ratio: $i = \frac{n}{m} = \frac{200}{100} = 2$
- (4) Cam curve: modified sinusoid curve
- (5) Counts of the divided portions of the cam: $S=8$
- (6) Pitch: $P=1" = 25.4 \text{ mm}$
- (7) Number of gear teeth in a pitch: $T=40$
- (8) Distance between processing stops= 254 mm

Solution

• Assume 2sec/period for the counts of revolution of the input shaft

$$N = \frac{60}{2} = 30 \text{rpm}$$

• Diameter of the pitch circle of the sprocket

$$Dc = \frac{P}{\sin \frac{180}{T}} = \frac{25.4}{\sin \frac{180}{40}} = 323.74(\text{cm}) = 32.374(\text{cm}) \quad rc = 16.19(\text{cm})$$

- Cam curve is the modified sinusoidal curve, therefore, $V_m=1.76, A_m=5.53, Q_m=0.99$
- Loading torque: T_t

Static torque (torque of inertia): T_i

(a) Weight of the active gear: W_1 pitch diameter = $\phi 200$ pitch radius = $R_1=100(\text{mm})=10(\text{cm})$, thus the moment of inertia of the active gear: I_A ,

$$I_A = (I_1) = \frac{W_1 \cdot R_1^2}{2G} = \frac{10 \times 10^2}{2 \times 980} = 0.51(\text{kgf} \cdot \text{cm} \cdot \text{s}^2)$$

(b) Moment of inertia of the conveyor belt:

(1) Moment of inertia of the driven gear: I_2 , pitch radius of the driven gear, $R_2=5(\text{cm})$ radius of the shaft of the sprocket $r=2.5(\text{cm})$

$$I_2 = \frac{W_2(R_2^2 + r^2)}{2G} = \frac{5 \times (5^2 + 2.5^2)}{2 \times 980} = 0.08(\text{kgf} \cdot \text{cm} \cdot \text{s}^2)$$

(2) Moment of inertia of the transmission shaft: I_3

$$I_3 = \frac{W_3 r^2}{2G} = \frac{4 \times 2.5^2}{2 \times 980} \times 2 = 0.026(\text{kgf} \cdot \text{cm} \cdot \text{s}^2)$$

(3) Moment of inertia of the sprocket: I_4

$$I_4 = \frac{W_4(rc^2 + r^2)}{2G} = \frac{5 \times (16.19^2 + 2.5^2)}{2 \times 980} \times 4 = 2.74(\text{kgf} \cdot \text{cm} \cdot \text{s}^2)$$

(4) Moment of inertia of the chain: I_5

$$I_5 = \frac{W_5 \cdot rc^2}{G} = \frac{10 \times 16.19^2}{980} \times 2 = 5.35(\text{kgf} \cdot \text{cm} \cdot \text{s}^2)$$

(5) Moment of inertia of the clamp: I_6

$$I_6 = \frac{W_6 \cdot rc^2}{G} = \frac{0.5 \times 16.19^2}{980} \times 16 = 2.14(\text{kgf} \cdot \text{cm} \cdot \text{s}^2)$$

(6) Moment of inertia of the object to be processed: I_7

$$I_7 = \frac{W_7 \cdot rc^2}{G} = \frac{1 \times 16.19^2}{980} \times 6 = 1.61(\text{kgf} \cdot \text{cm} \cdot \text{s}^2)$$

(7) Total moment of inertia of the conveyor belt: I_B

$$I_B = I_2 + I_3 + I_4 + I_5 + I_6 + I_7 = 0.08 + 0.026 + 2.74 + 5.35 + 2.14 + 1.61 = 11.95(\text{kgf} \cdot \text{cm} \cdot \text{s}^2)$$

(c) Total effective moment of inertia of the conveyor belt: I_{Be}

$$I_{Be} = I_B \left(\frac{n}{m}\right)^2 = 11.95 \times \left(\frac{200}{100}\right)^2 = 47.8(\text{kgf} \cdot \text{cm} \cdot \text{s}^2)$$

(d) Total moment of inertia is the sum of (a)+(c)

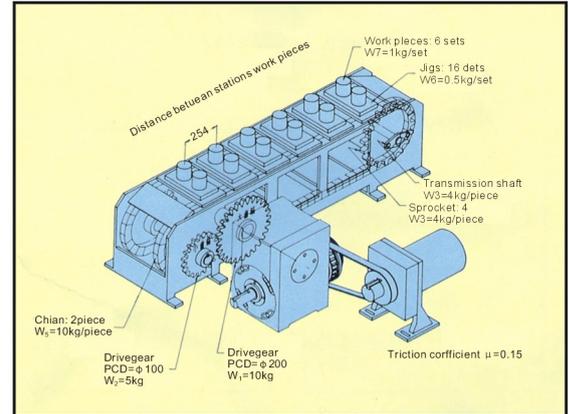
$$I = I_A + I_{Be} = 0.51 + 47.8 = 48.31(\text{kgf} \cdot \text{cm} \cdot \text{s}^2)$$

(e) Maximum angular acceleration of the output shaft: α

$$\alpha = A_m \times \frac{2\pi}{S} \times \left(\frac{360}{\theta h} \times \frac{N}{60}\right)^2 = 5.53 \times \frac{2\pi}{8} \times \left(\frac{360}{120} \times \frac{30}{60}\right)^2 = 9.77(\text{rad/s}^2)$$

(f) Static torque (torque of inertia):

$$T_{i1} = I \cdot \alpha = 48.31 \times 9.77 = 472(\text{kgf} \cdot \text{cm})$$



Notes:

- Dc: pitch diameter of the transmission gear
- Pc: transverse pitch of the conveyor belt
- I: speed ratio

The maximum reference value of the safety factor F_e recommended by our company is:
 When driving angle is 90° , safety factor = loading torque (T_t) x 2.2 (times)
 When driving angle is above 120° , safety factor = loading torque (T_t) x 2.0 (times)
Notes: for safety factor concerns, use 35rpm for calculation when the output shaft is rotating at a speed lower than 35rpm.

• Frictional torque: Tf

(a) Frictional torque on the conveyor belt :

$$Tf = \mu \cdot W \cdot R = 0.15 \times \left(\frac{20}{2} + \frac{0.5 \times 16}{2} + 6 \times 1 \right) \times 16.19 = 48.57 \text{ (kgf} \cdot \text{cm)}$$

(b) Effective frictional torque on the conveyor belt : Tfe

$$Tfe = Tf \left(\frac{n}{m} \right) = 48.57 \times \frac{200}{100} = 97.14 \text{ (kgf} \cdot \text{cm)}$$

• Workable torque: Tw

There is no work during intermittent indexing, therefore, Tw=0

• Loading torque: Tt

$$Tt = Ti \cdot Tf + Tw = 472 + 97.14 + 0 = 569.14 \text{ (kgf} \cdot \text{cm)} = 5.69 \text{ (kgf} \cdot \text{m)}$$

The maximum reference value of the safety factor Fe recommended by our company is:

When driving angle is 90° , safety factor = loading torque (Tt) x 2.2 (times)

When driving angle is above 120° , safety factor = loading torque (Tt) x 2.0 (times)

Notes: for safety factor concerns, use 35rpm for calculation when the output shaft is rotating at a speed lower than 35rpm.

• Safety factor for loading fe = 1.8, actual loading torque: Te,

$$Te = Tt + fe = 5.69 \times 1.8 = 10.24 \text{ (kgf} \cdot \text{m)}$$

• Toque at the input shaft: Tc

$$Tc = \frac{360}{s} \cdot \frac{1}{\theta h} \cdot Qm \cdot Te$$

$$Tc = \frac{360}{8} \times \frac{1}{120} \times 0.99 \times 10.24 = 3.80$$

• Required horse power: P

$$P = \frac{Tc \cdot n}{716 \cdot f} \text{ (HP)} \quad \text{or} \quad P = \frac{Tc \cdot n}{975 \cdot f} \text{ (kw)}$$

• If efficiency of the motor f = 60%, then

$$P = \frac{3.80 \times 6.0}{716 \times 0.6} = 0.266 \text{ (HP)} \quad \text{or} \quad P = \frac{3.80 \times 30}{975 \times 0.6} = 0.195 \text{ (KW)}$$

• The value calculated above is the maximum horse power at the initial stage, whereas the calculated value of horse power for continuous transmission is 1/2

• According to the calculated actual loading torque (Te) = 10.24, and counts of revolution of the input shaft = 30rpm.

By referring to the manual, all output shafts with torque higher than 10.24 (kgf · m) can be selected. Therefore, 8D should be selected.

• If you have any question about the specifications of indexing drives, please call for more information. We will reply and answer to your questions sincerely. Or please fill out the following information and fax it to our company, we will calculate the specifications you need as soon as possible.

From: _____ company To: Design Department, DEX Cams

Contact: _____ Tel: 886-3-3493596~8

Tel: _____ Fax: _____ Fax: 886-3-3493600

**(III). Indexing drive with intermittent revolving disk
(direct transmission)**

1. Number of indexing portions: $S = \underline{\hspace{2cm}}$

2. Driving angle $\theta h = \underline{\hspace{2cm}}$

3. Operating time of each stroke =
revolving time + positioning time
 $\underline{\hspace{1cm}}$ Sec = $\underline{\hspace{1cm}}$ Sec + $\underline{\hspace{1cm}}$ Sec

4. Counts of revolution of the input shaft = $\underline{\hspace{2cm}}$ RPM

5. Cam curve = MS (Standard) MT MCV

6. Weight of the object to be processed: $\underline{\hspace{2cm}}$ kg/each
Number of the objects to be processed = $\underline{\hspace{2cm}}$ pieces

7. Weight of the clamp: $\underline{\hspace{2cm}}$ kg/each
Number of the clamps = $\underline{\hspace{2cm}}$ pieces

8. Diameter of the active gear = $\underline{\hspace{2cm}}$ mm Weight = $\underline{\hspace{2cm}}$ kg

9. Diameter of the driven gear = $\underline{\hspace{2cm}}$ mm Weight = $\underline{\hspace{2cm}}$ kg

10. Diameter of the conveyor shaft = $\underline{\hspace{2cm}}$ mm Weight = $\underline{\hspace{2cm}}$ kg

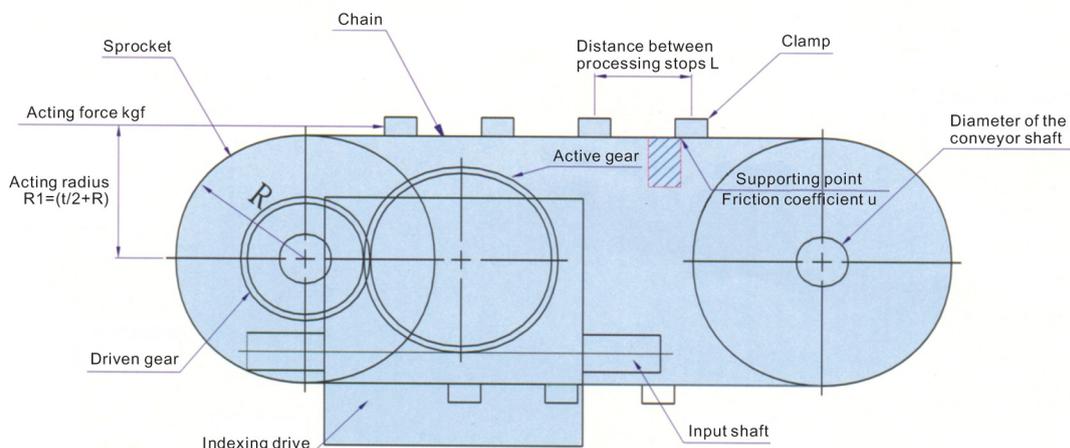
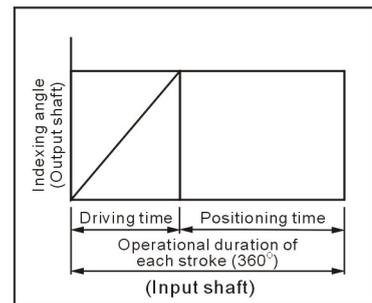
11. Pitch radius of the sprocket R: $\underline{\hspace{2cm}}$ mm Weight = $\underline{\hspace{2cm}}$ kg

12. Weight of the chain: $\underline{\hspace{2cm}}$ kg

13. Distance between processing stops $L = \underline{\hspace{2cm}}$ mm

14. Friction coefficient of the conveyor belt $u = \underline{\hspace{2cm}}$

10. Acting force of the loading during indexing:
 Yes No Acting force = $\underline{\hspace{2cm}}$ kgf Acting radius $R1 = \underline{\hspace{2cm}}$ mm





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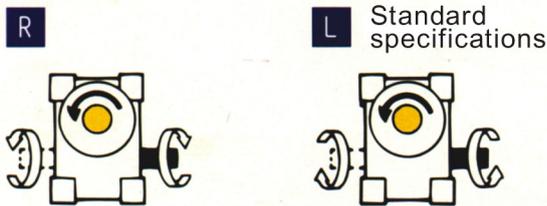
Selection of the flange type and core shaft type indexing drives

A B C - D - E F G - H I

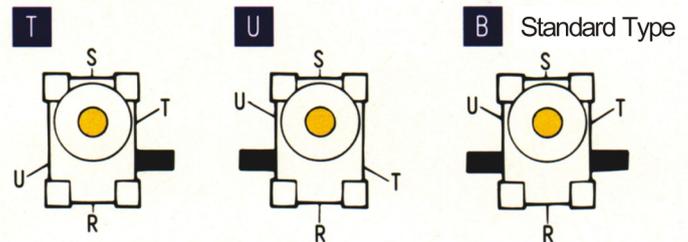
EXAMPLE : 8D F 8 - 120 - S L B - 1 R

A	Distance between shafts	2.5D,4.5D,6D,7D,8D,11D,14D,18D EXP: 6D Distance between shafts=60mm
B	Type of indexing drive	F (Flange type) S (Core shaft type) FE (Swing flange type) FH (Hollow flange) SE (Swing type shaft)
C	Number of divided portions	2,3,4,6,8,10,12,16,24,32...Swing angle (5° ~90°) <i>Notes: 2-12 indexing is 1DWELL (R1 single guiding stroke) 16 indexing is 2DWELL (R2 double guiding stroke) above 16, it will be R3, R4... etc.</i>
D	Driving angle of the curve of the input shaft	90, 120, 180, 270 FE type SE type with additional timing diagram attached
E	Cam curve	S (M.S. Curve) V (M.C.V. Curve) T (M.T. Curve)
F	Direction of rotation	L (left rotation) standard type N (allow left and right rotation) R (right rotation)
G	Direction of the input shaft	T (input from T-side) B (input from both sides) standard type U (input from U-side)
H	Installation and fixation	Refer to the figure below (W, V, U, T, R, S): 6 planes (Figure 1, 5 are the standard type)
I	Planes of oil hole	Standard plane is R, S, U plane

■ Direction of rotation

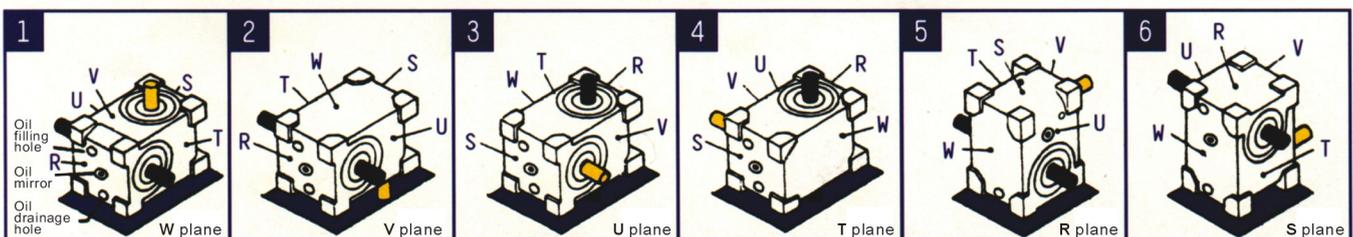


■ Direction of the input shaft

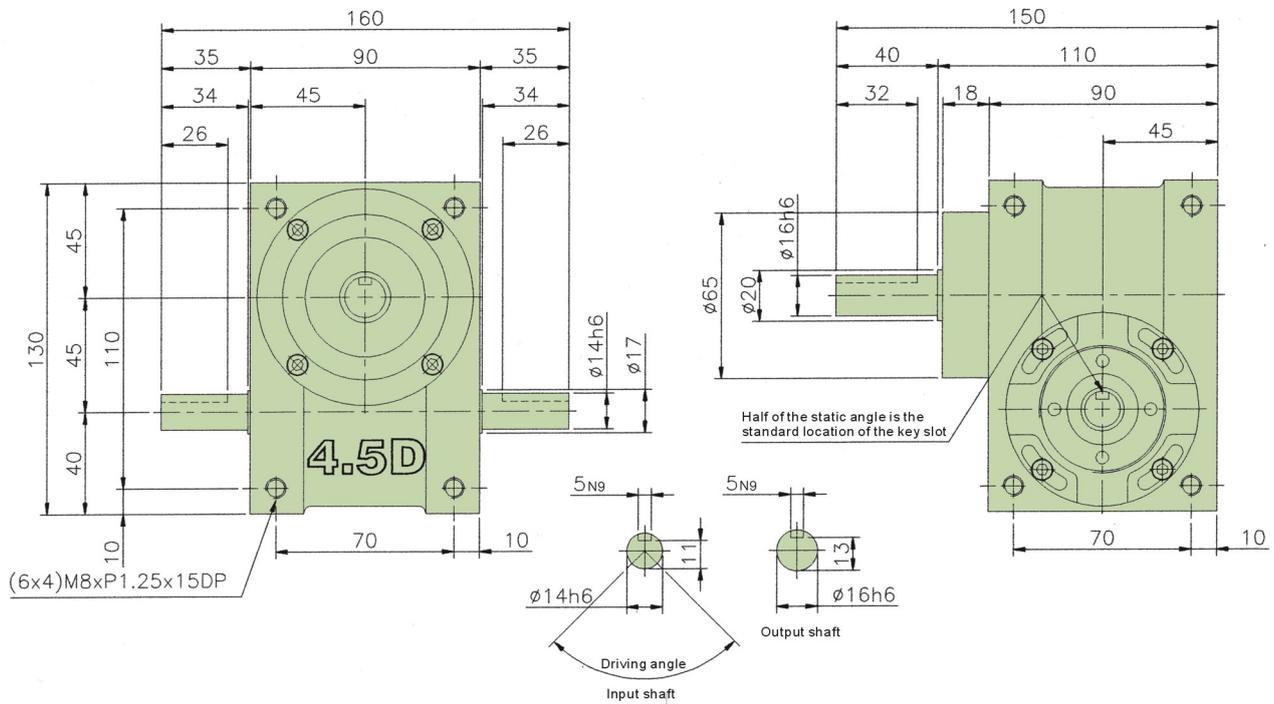


■ Datum for installation and the location of oil drainage hole

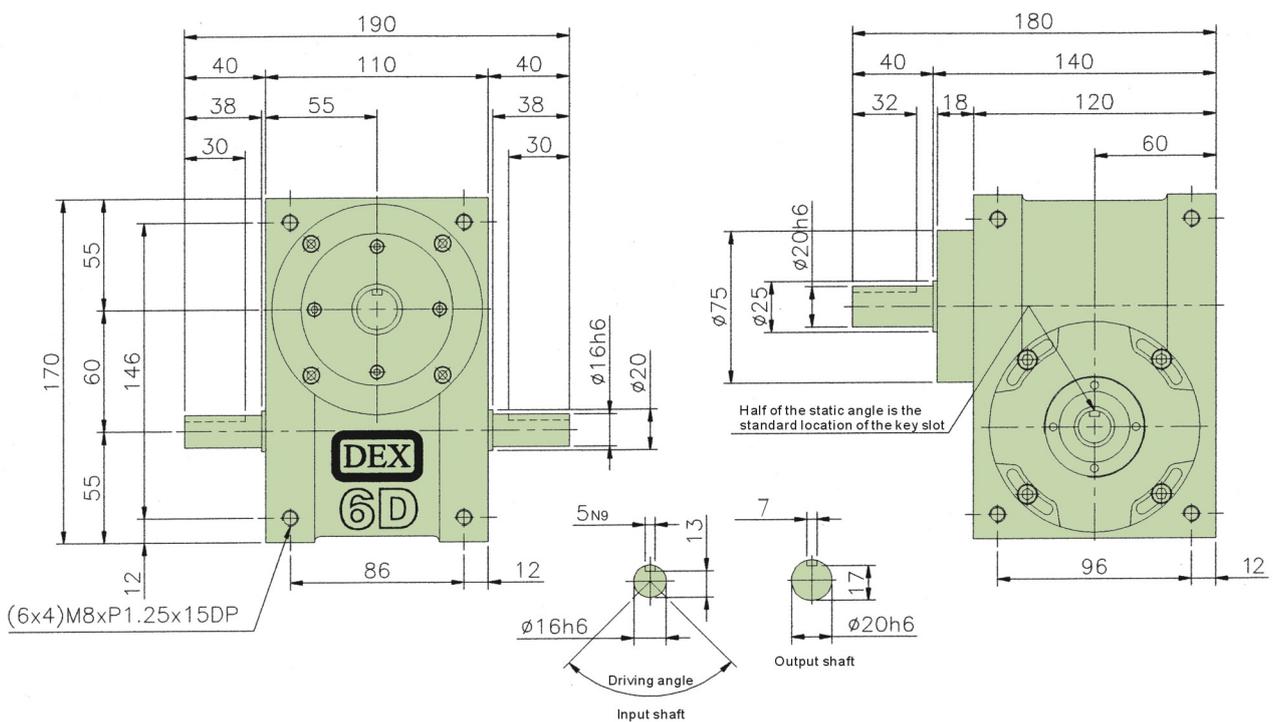
■ : Input shaft ■ : Output shaft



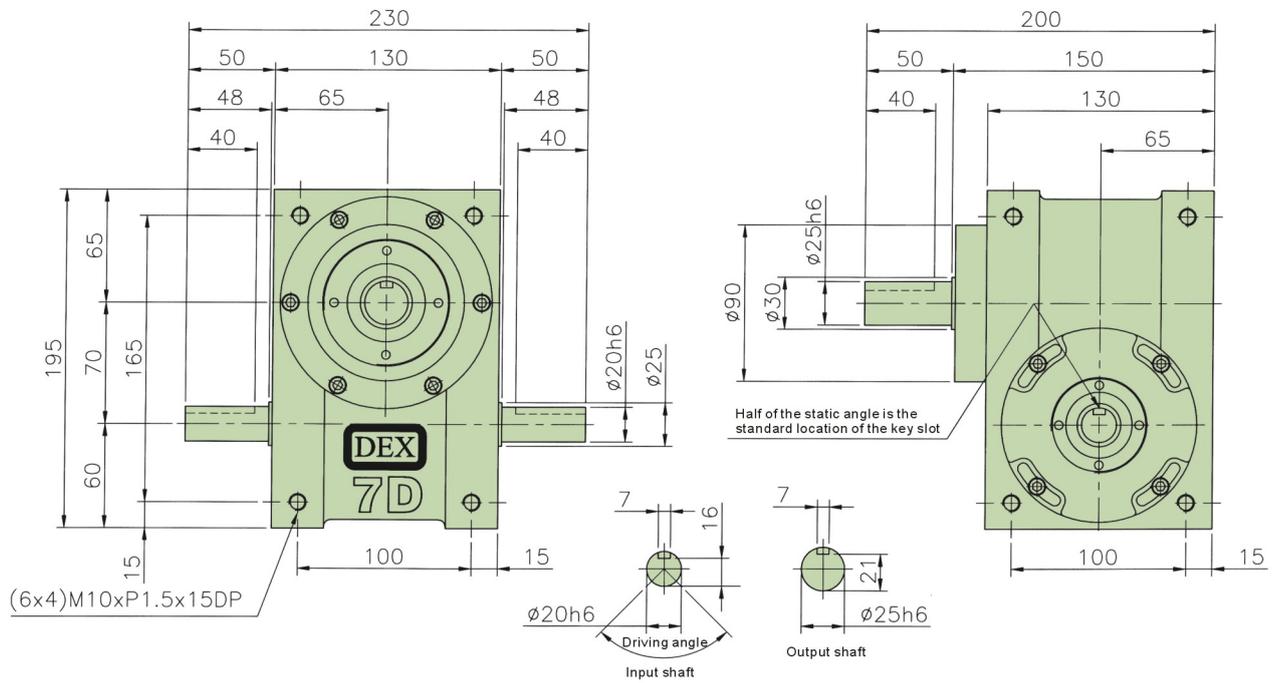
4.5DS



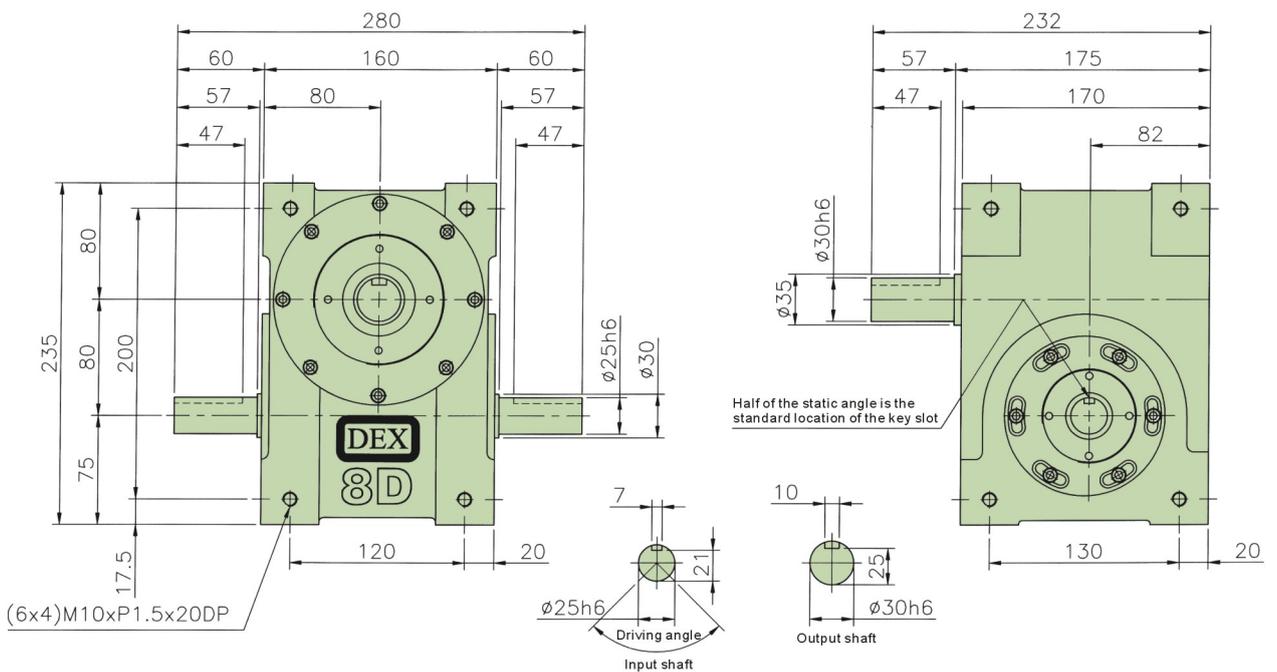
6DS



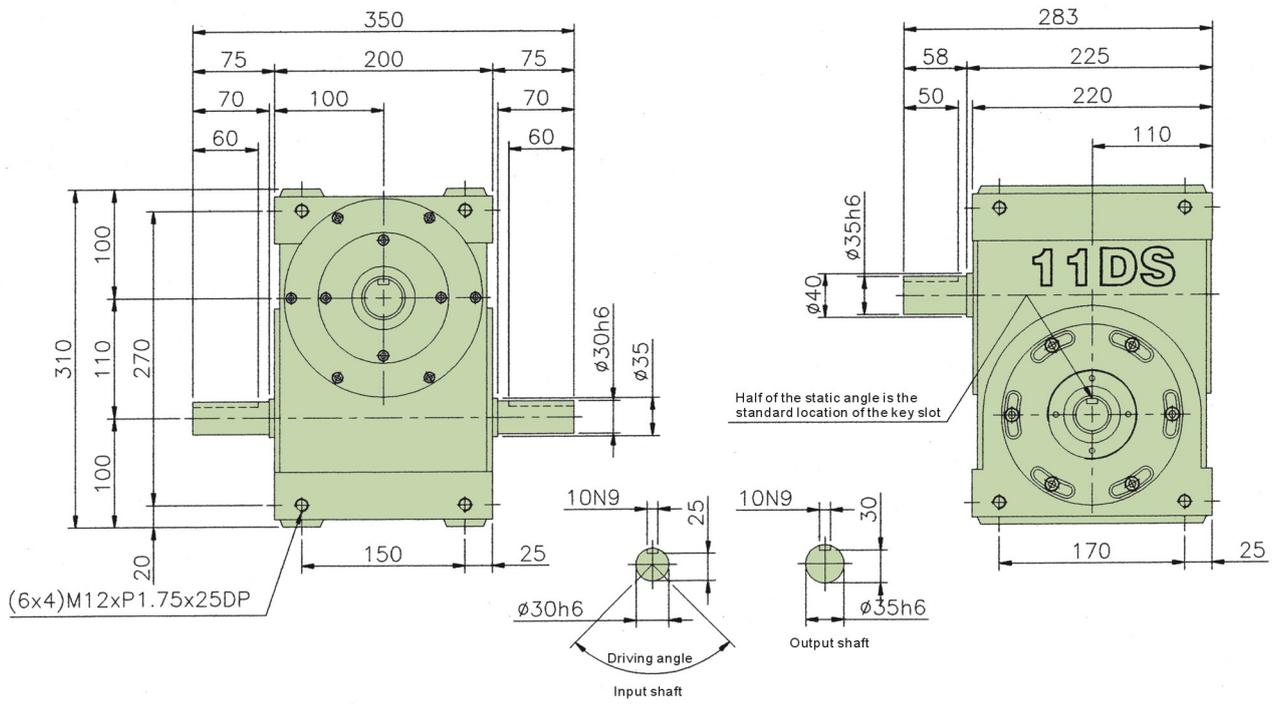
7DS



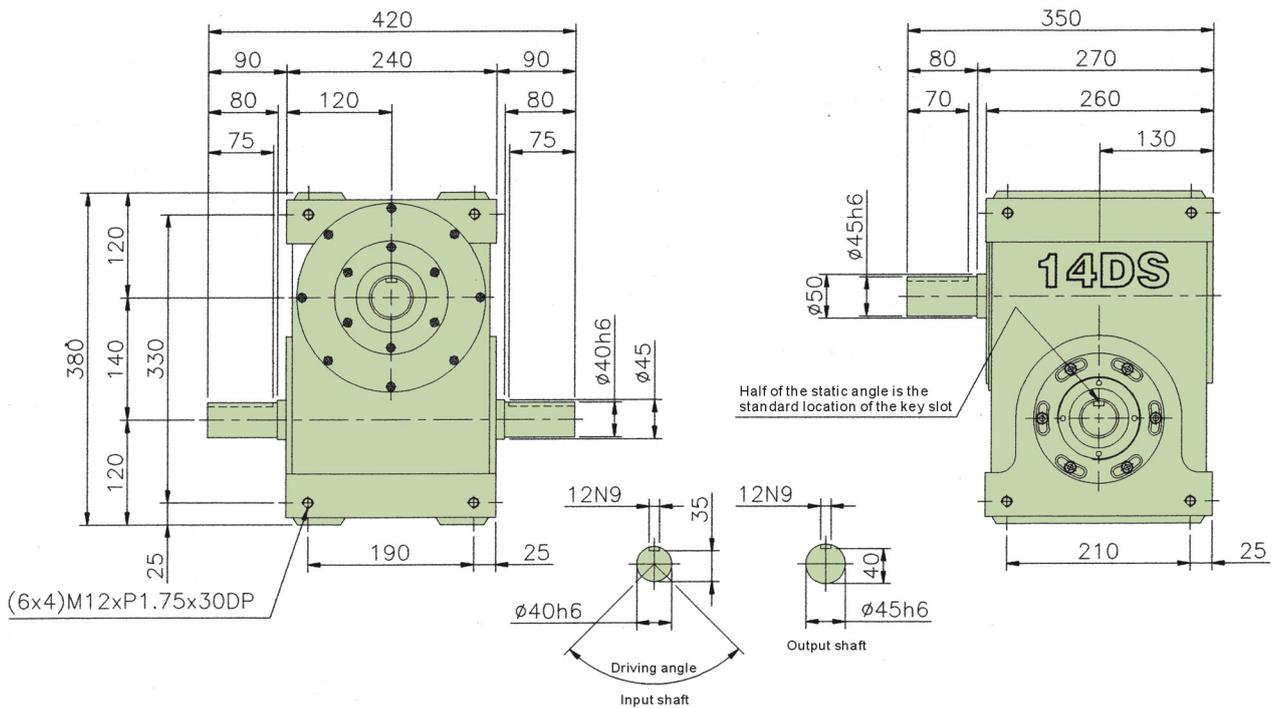
8DS



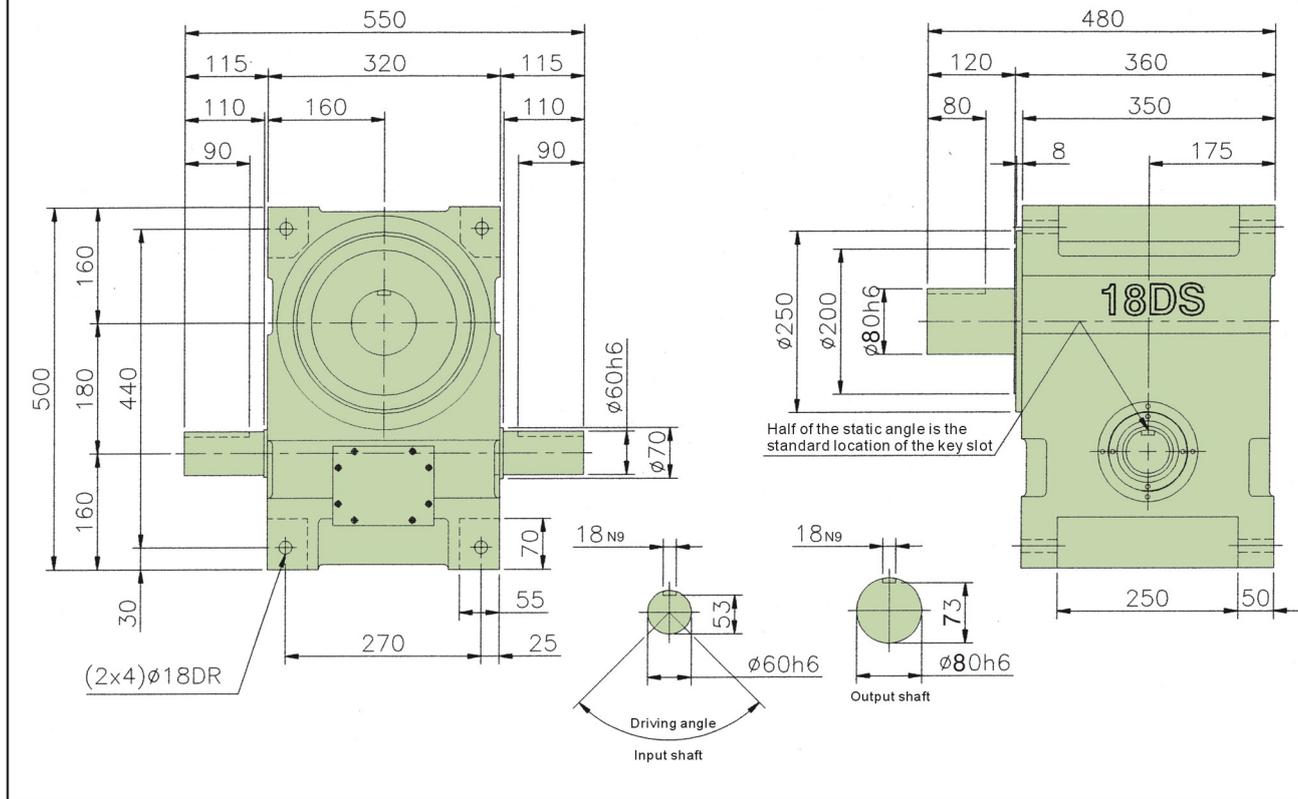
11DS



14DS



18DS



Technical parameters 2.5DS

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	15	Allowable radial loading of the input shaft	C3	kgf	10	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	9.6×10^{-5}
Allowable axial loading of the output shaft	C2	kgf	20	Allowable axial loading of the input shaft	C4	kgf	15	Accuracy of positioning indexing		sec.	± 75
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	2	Weight		Kg	1.0

Technical parameters 3.2DS

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	20	Allowable radial loading of the input shaft	C3	kgf	18	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	30×10^{-4}
Allowable axial loading of the output shaft	C2	kgf	30	Allowable axial loading of the input shaft	C4	kgf	20	Accuracy of positioning indexing		sec.	± 75
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	3	Weight		Kg	1.4

Technical parameters 4.5DS

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	80	Allowable radial loading of the input shaft	C3	kgf	85	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	3.2×10^{-4}
Allowable axial loading of the output shaft	C2	kgf	72.5	Allowable axial loading of the input shaft	C4	kgf	75	Accuracy of positioning indexing		sec.	± 60
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	4	Weight		Kg	6

Technical parameters 6DS

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	180	Allowable radial loading of the input shaft	C3	kgf	100	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	1.9×10^{-3}
Allowable axial loading of the output shaft	C2	kgf	150	Allowable axial loading of the input shaft	C4	kgf	95	Accuracy of positioning indexing		sec.	± 45
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	6	Weight		Kg	10

Technical parameters 7DS

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	220	Allowable radial loading of the input shaft	C3	kgf	150	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	1.9×10^{-3}
Allowable axial loading of the output shaft	C2	kgf	220	Allowable axial loading of the input shaft	C4	kgf	110	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	9.5	Weight		Kg	16

Technical parameters 8DS

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	220	Allowable radial loading of the input shaft	C3	kgf	210	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	1.9×10^{-3}
Allowable axial loading of the output shaft	C2	kgf	220	Allowable axial loading of the input shaft	C4	kgf	190	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	18.5	Weight		Kg	29

Technical parameters 11DS

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	500	Allowable radial loading of the input shaft	C3	kgf	360	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	2.8×10^{-2}
Allowable axial loading of the output shaft	C2	kgf	550	Allowable axial loading of the input shaft	C4	kgf	290	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	32	Weight		Kg	51

Technical parameters 14DS

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	730	Allowable radial loading of the input shaft	C3	kgf	440	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	0.11
Allowable axial loading of the output shaft	C2	kgf	860	Allowable axial loading of the input shaft	C4	kgf	560	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	75	Weight		Kg	120

Technical parameters 18DS

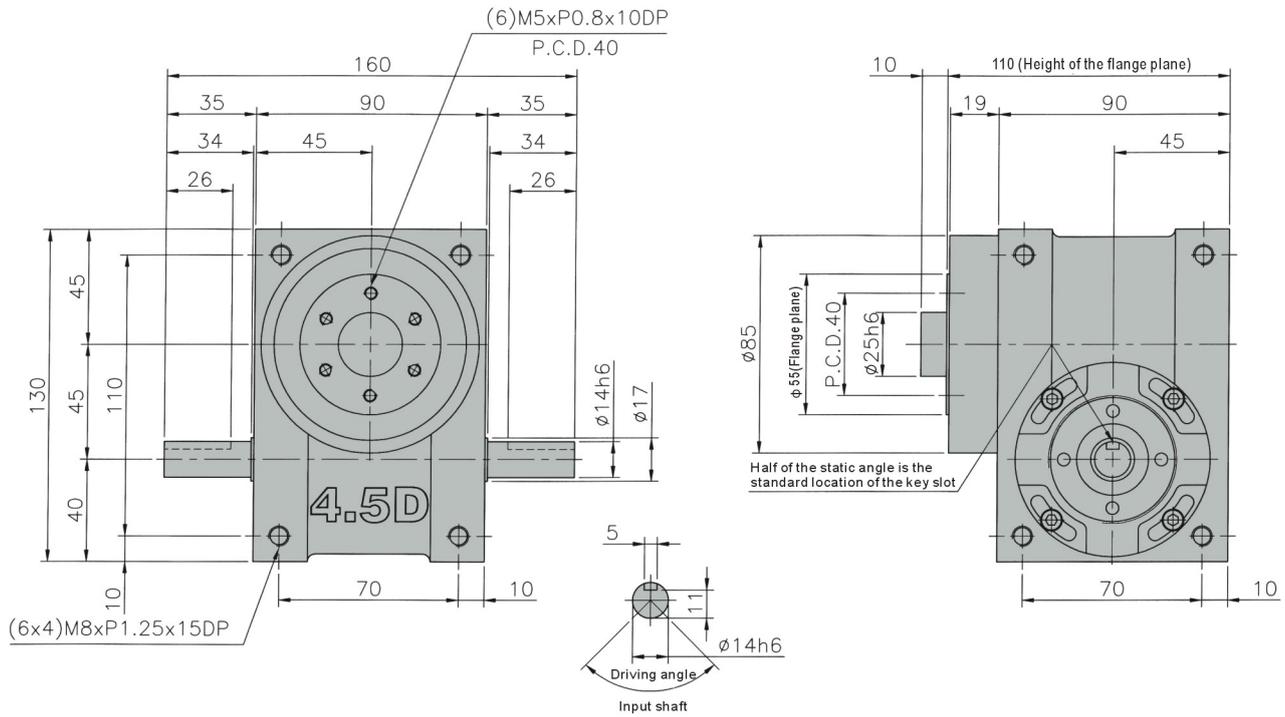
Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	1200	Allowable radial loading of the input shaft	C3	kgf	590	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	0.39
Allowable axial loading of the output shaft	C2	kgf	1500	Allowable axial loading of the input shaft	C4	kgf	1045	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	147	Weight		Kg	220

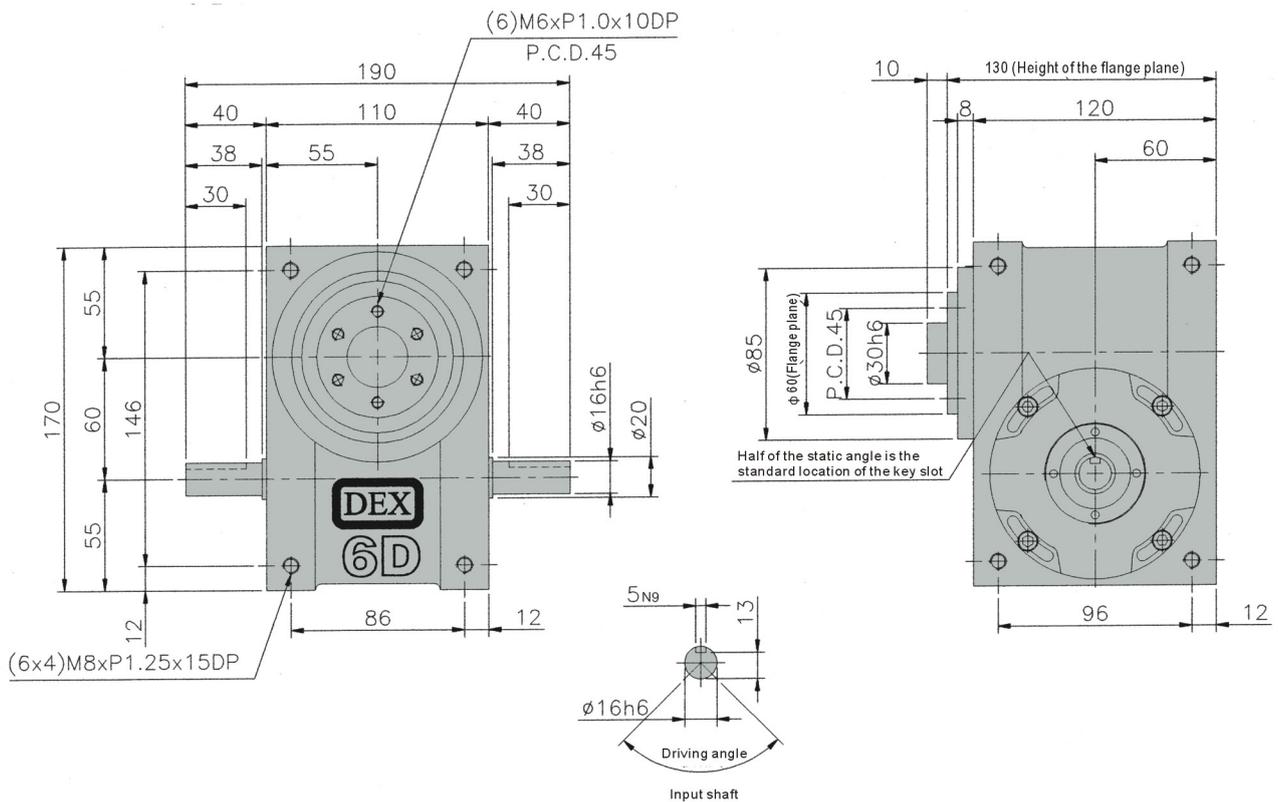
Notes on the use of lubricant

1. After installation and fixation of the indexing drive, the exhaust cap on the oil-filling hole should be replaced (attached to the core of the input shaft) in order to release high pressure generated by thermal expansion during the operation.
2. This indexing drive should use:
CPC #90 gear oil, Mobil #630 gear oil, or Shell #220 gear oil.
3. Period for oil change:
1000 hours (about half year) after the first operation.
Change oil once a year after that.

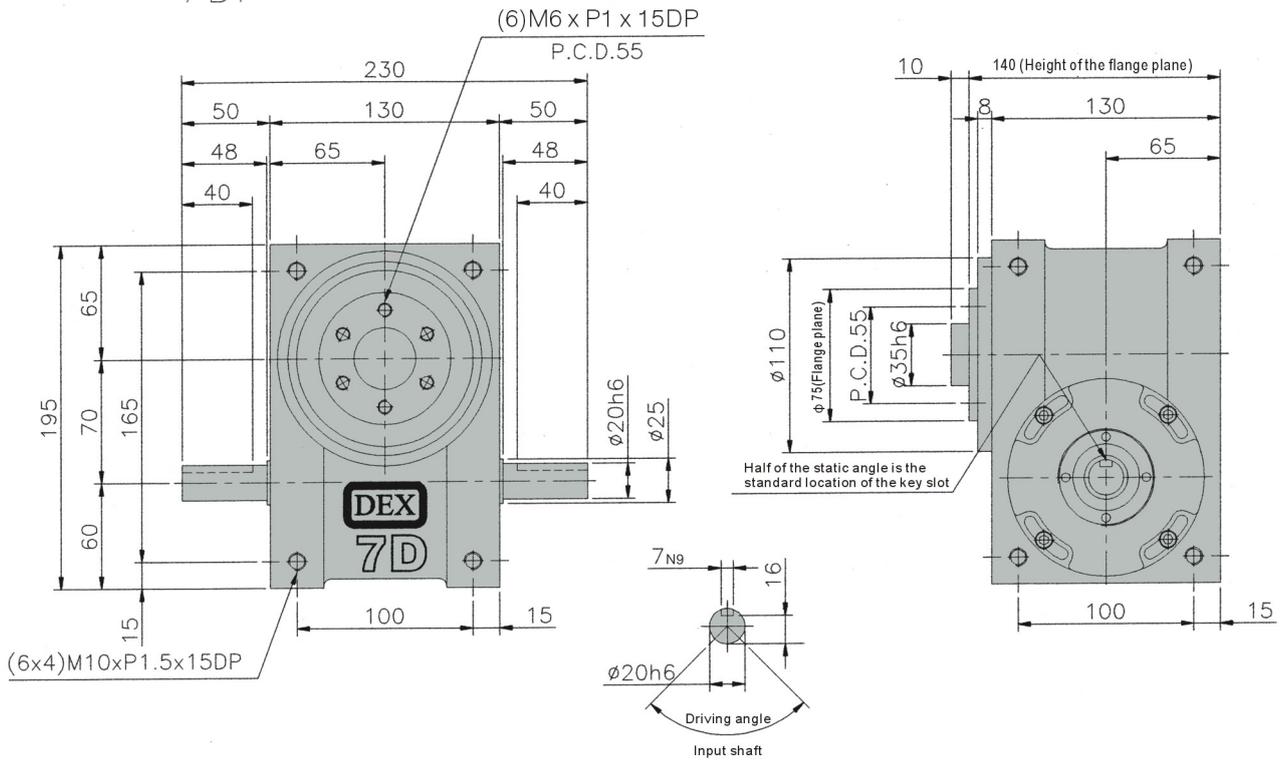
4.5DF



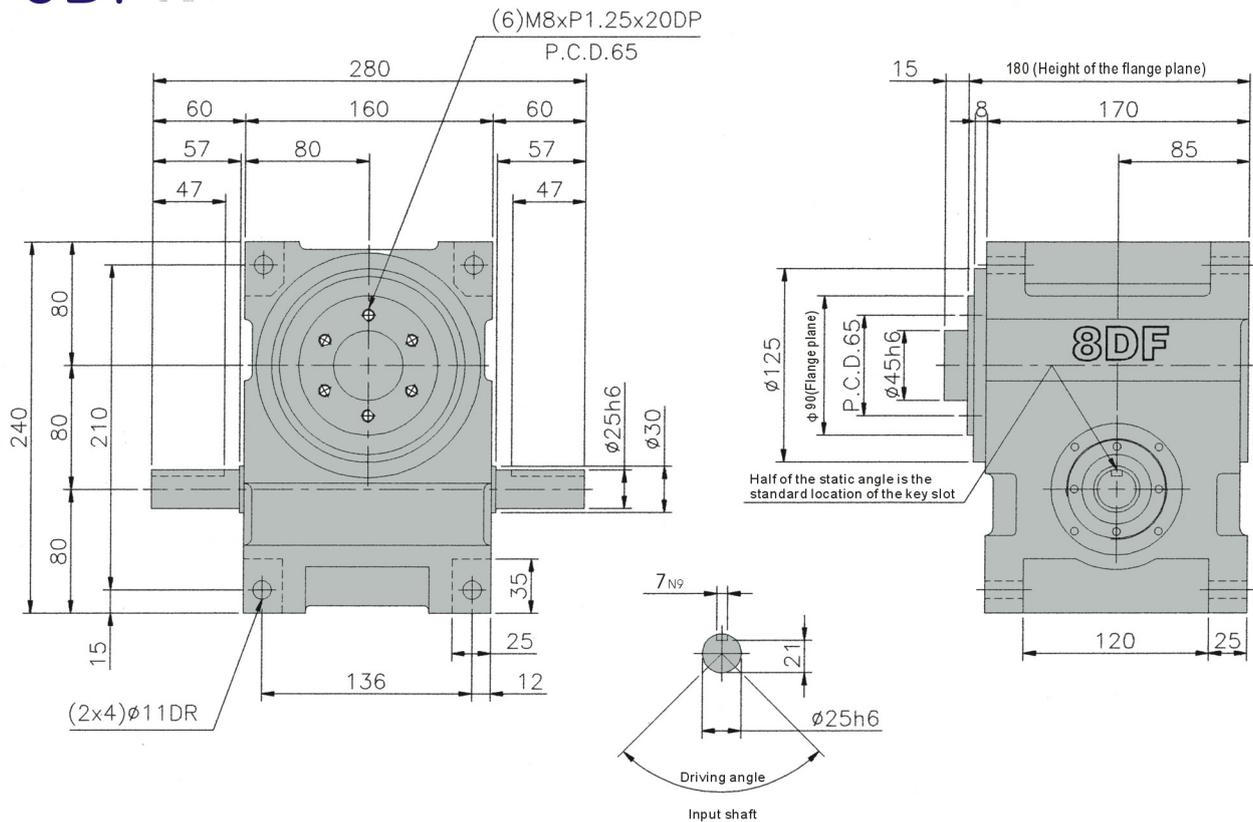
6DF



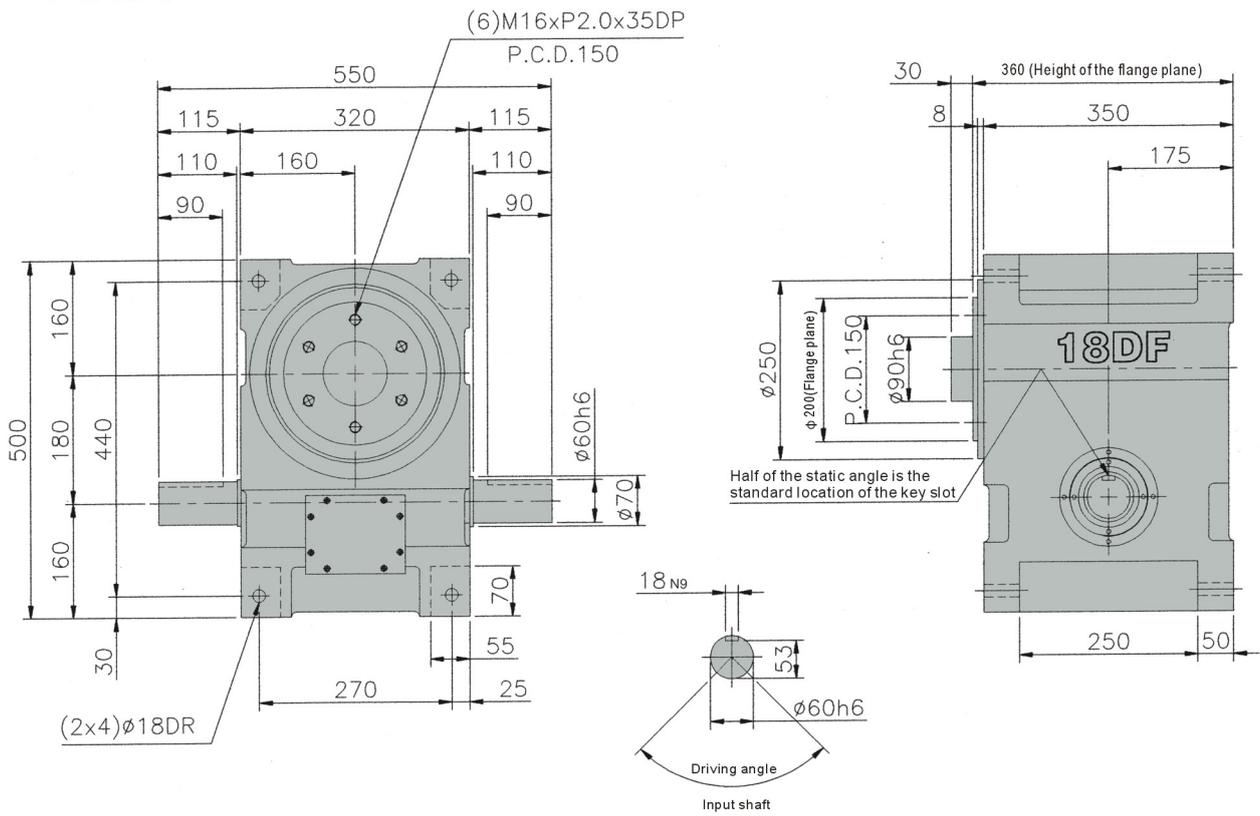
7DF



8DF

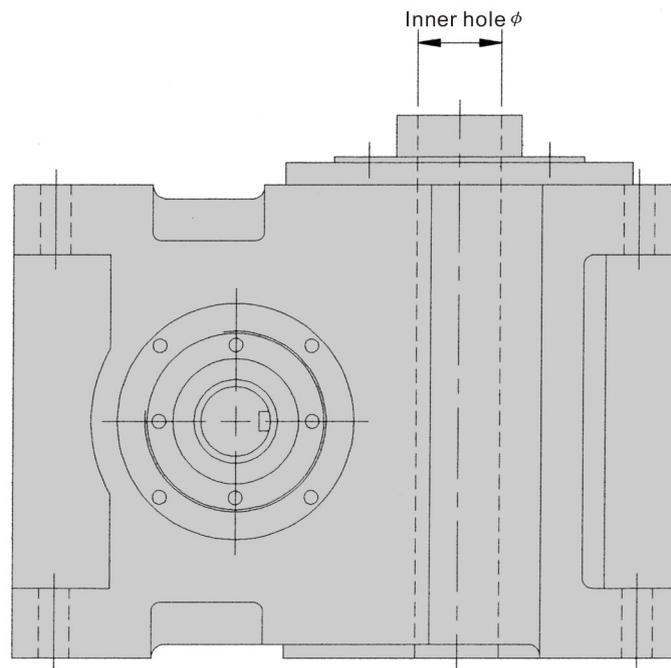


18DF



Checklist of the inner diameter of the hollow flange type

Type	4.5D	6D	7D	8D	11D	14D	18D
Inner diameter	$\phi 8$	$\phi 20$	$\phi 20$	$\phi 30$	$\phi 45$	$\phi 50$	$\phi 60$



Technical parameters 4.5DF

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	130	Allowable radial loading of the input shaft	C3	kgf	85	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	3.2×10^{-4}
Allowable axial loading of the output shaft	C2	kgf	140	Allowable axial loading of the input shaft	C4	kgf	110	Accuracy of positioning indexing		sec.	± 60
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	4	Weight		Kg	6.5

Technical parameters 6DF

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	140	Allowable radial loading of the input shaft	C3	kgf	100	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	1.9×10^{-3}
Allowable axial loading of the output shaft	C2	kgf	142	Allowable axial loading of the input shaft	C4	kgf	150	Accuracy of positioning indexing		sec.	± 45
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	6	Weight		Kg	10

Technical parameters 7DF

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	220	Allowable radial loading of the input shaft	C3	kgf	150	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	6×10^{-3}
Allowable axial loading of the output shaft	C2	kgf	300	Allowable axial loading of the input shaft	C4	kgf	110	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	9.5	Weight		Kg	18

Technical parameters 8DF

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	330	Allowable radial loading of the input shaft	C3	kgf	350	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	9×10^{-3}
Allowable axial loading of the output shaft	C2	kgf	420	Allowable axial loading of the input shaft	C4	kgf	260	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	25	Weight		Kg	35

Technical parameters 11DF

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	560	Allowable radial loading of the input shaft	C3	kgf	480	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	2.8×10^{-2}
Allowable axial loading of the output shaft	C2	kgf	700	Allowable axial loading of the input shaft	C4	kgf	415	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	40	Weight		Kg	60

Technical parameters 14DF

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	760	Allowable radial loading of the input shaft	C3	kgf	550	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	0.11
Allowable axial loading of the output shaft	C2	kgf	1000	Allowable axial loading of the input shaft	C4	kgf	750	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	100	Weight		Kg	90

Technical parameters 18DF

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	1200	Allowable radial loading of the input shaft	C3	kgf	1100	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	0.39
Allowable axial loading of the output shaft	C2	kgf	1500	Allowable axial loading of the input shaft	C4	kgf	1960	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	340	Weight		Kg	220

Notes on the use of lubricant

1. After installation and fixation of the indexing drive, the exhaust cap on the oil-filling hole should be replaced (attached to the core of the input shaft) in order to release high pressure generated by thermal expansion during the operation.
2. This indexing drive should use:
CPC #90 gear oil, Mobil #630 gear oil, or Shell #220 gear oil.
3. Period for oil change:
1000 hours (about half year) after the first operation.
Change oil once a year after that.



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Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	500	700		
2	180	2.5D	0.12	0.03	0.03	0.03	0.02	0.02	0.02		0.04	6
	270	2.5D	0.12	0.03	0.02	0.02	0.01	0.01	0.01		0.04	6
		4.5D	1.22	0.48	0.39	0.35	0.32	0.28	0.24		0.12	12
		6D	4.34	1.41	1.15	1.02	0.93	0.83	0.71	0.64	0.22	14
		7D	11.3	4.3	3.5	3.1	2.9	2.5	2.2	2.0	0.50	19
		8D	20.2	7.8	6.4	5.6	5.2	4.6	3.9	3.6	0.80	22
		11D	49.8	19.0	15.4	13.7	12.5	11.1	9.5		1.60	30
		14D	80.4	28.6	23.2	20.6	18.9	16.7			2.30	35
		18D	175.4	62.9	51.1	45.2	41.5	36.7			4.10	47
25D	377.2	136.1	110.5	97.9	89.9				7.20	60		
3	180	2.5D	0.12	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.04	6
		4.5D	1.22	0.58	0.47	0.42	0.38	0.34	0.29		0.12	12
		6D	4.34	1.70	1.38	1.22	1.12	0.99	0.85	0.77	0.22	14
		7D	11.3	5.2	4.2	3.7	3.4	3.0	2.6	2.4	0.50	19
		8D	20.2	9.4	7.7	6.8	6.2	5.5	4.7		0.80	22
		11D	49.8	22.8	18.5	16.4	15.0	13.3	11.2		1.60	30
		14D	80.4	34.3	27.9	24.7	24.7	20	18.4		2.30	35
		18D	175.4	75.4	61.3	54.3	19.8	44.1			4.10	47
	25D	377.2	16.3	132.7	117.5	107.8				7.20	60	
	270	2.5D	0.54	0.18	0.14	0.12	0.12	0.11	0.11	0.10	0.04	8
		4.5D	3.10	1.23	1.00	0.88	0.81	0.72	0.61	0.56	0.12	14
		6D	12.26	4.30	3.49	30.9	2.84	2.51	2.16	1.95	0.28	16
		7D	15.5	5.9	4.8	4.30	3.90	3.50	3.00	2.70	0.40	22
		8D	25.3	9.30	7.6	6.70	6.20	5.50	4.7	4.20	0.70	22
		11D	61.8	22.5	18.3	16.2	14.8	13.1	11.3		1.30	30
		14D	97.6	33.5	27.2	24.1	22.1	19.6	16.8		1.90	35
		18D	251.9	93.7	76.1	67.4	61.8	54.7			4.00	52
		25D	588.0	230.5	187.3	165.8	152.1	134.7			7.00	70
4		180	2.5D	0.14	0.05	0.04	0.04	0.04	0.04	0.03	0.03	0.03
	4.5D		1.17	0.53	0.43	0.38	0.35	0.31	0.27		0.09	10
	6D		2.06	0.81	0.66	0.59	0.54	0.48	0.41		0.13	12
	7D		12.6	5.70	4.60	4.10	3.80	3.30	2.9	2.60	0.40	16
	8D		21.7	10.1	8.20	7.30	6.70	5.90	5.1	4.60	0.70	19
	11D		48.2	22.4	18.2	16.1	14.8	13.1	11.2		1.20	26
	14D		74.5	32.4	26.4	23.3	21.4	19.0			1.70	30
	18D		149.2	66.0	53.6	47.5	43.5	38.6			3.00	40
	25D	327.0	152.3	123.7	109.6	100.5				5.30	52	
	270	2.5D	0.17	0.06	0.06	0.04	0.04	0.04	0.03	0.02	0.04	6
		4.5D	1.75	0.71	0.57	0.51	0.47	0.41	0.35	0.32	0.10	12
		6D	5.42	1.90	1.54	1.36	1.25	1.11	0.95	0.86	0.18	14
		7D	14.8	5.50	4.50	3.90	3.60	3.20	2.70	2.50	0.30	16
		8D	25.7	9.70	7.90	7.0	6.4	5.70	4.90	4.40	0.60	19
		11D	56.9	21.5	17.5	14.2	12.6	11.5	9.80		1.00	26
		14D	86.5	31.0	25.1	22.3	20.4	18.1	15.5		1.40	30
		18D	239.2	93.4	75.9	67.2	61.6	54.6	46.8		3.20	47
		25D	528.5	210.1	170.7	151.1	138.6	122.8			5.50	60
6		90	2.5D	0.12	0.06	0.04	0.04	0.03	0.03	0.03	0.02	0.05
	4.5D		1.22	0.79	0.64	0.57	0.52	0.46			0.12	12
	6D		4.34	2.32	1.88	1.67	1.53	1.35	1.16		0.22	14
	7D		12.5	8.20	6.70	5.90	5.40	4.80	4.1		0.50	22
	8D		20.2	12.9	10.5	9.30	8.50	7.50	6.40		0.80	22

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Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	500	700		
6	90 1DWELL	11D	49.8	31.1	25.3	22.4	20.6	18.2			1.60	30
		14D	80.4	46.9	38.1	33.7	30.9	27.4			2.30	35
		18D	175.4	103.1	83.7	74.1	68.0				4.10	47
		25D	377.2	223.1	181.2	160.5					7.20	60
	120	2.5D	0.52	0.25	0.20	0.17	0.15	0.14	0.13	0.12	0.04	8.5
		4.5D	2.92	1.68	1.37	1.21	1.11	0.98	0.84	0.76	0.12	14
		6D	11.69	5.77	4.83	4.27	3.92	3.47	2.98	2.69	0.30	16
		7D	14.6	8.20	6.60	5.90	5.40	4.80	4.10	3.70	0.50	22
		8D	35.1	20.0	16.3	14.4	13.2	11.7	10.0	9.10	0.90	26
		11D	60.7	32.9	26.7	23.7	21.7	19.2	16.5		1.40	32
		14D	115.7	60.3	49.0	43.4	39.8	35.2			2.30	40
		18D	238.5	129.0	104.8	92.8	85.1	75.3			4.20	52
	25D	550.0	315.5	256.3	226.9	208.3				7.40	70	
	180	2.5D	0.62	0.26	0.20	0.20	0.17	0.15	0.14	0.13	0.03	8.5
		4.5D	3.50	1.63	1.32	1.17	1.08	0.95	0.82	0.74	0.11	14
		6D	13.43	5.64	4.58	4.06	3.72	3.30	2.83	2.56	0.26	16
		7D	17.2	7.80	6.40	5.60	5.20	4.60	3.90	3.60	0.40	22
		8D	41.4	19.3	15.7	13.9	12.7	11.3	9.70	8.70	0.80	26
		11D	85.9	39.3	31.9	28.3	25.9	23.0	19.7	17.8	1.40	35
		14D	133.0	57.3	46.5	41.2	37.8	33.4	28.7		2.00	40
		18D	375.5	176.6	143.5	127.0	116.5	103.2	88.5		4.30	60
	25D	873.9	425.4	345.5	305.9	280.7	248.5			8.00	80	
	270	2.5D	0.70	0.25	0.21	0.18	0.16	0.15	0.14	0.12	0.02	8.5
		4.5D	3.90	1.52	1.24	1.10	1.01	0.89	0.76	0.69	0.10	14
		6D	14.5	5.19	4.22	3.73	3.42	3.03	2.60	2.35	0.23	16
		7D	18.8	7.30	5.90	5.20	4.80	4.20	3.60	3.30	0.40	22
		8D	45.6	17.9	14.6	12.9	11.8	10.8	9.00	8.10	0.70	26
		11D	94.1	36.4	29.6	26.2	24.0	21.3	18.3	16.5	1.30	35
14D		143.6	52.7	42.8	37.9	34.8	30.8	26.4	23.9	1.80	40	
18D		414.0	164.2	133.4	118.1	108.4	96.0	82.3	74.4	3.8	60	
25D	995.3	402.0	326.6	289.1	265.2	234.8	201.5		7.1	80		
8	90	2.5D	0.14	0.07	0.06	0.05	0.05	0.04	0.04	0.03	0.03	6
		4.5D	1.50	0.96	0.78	0.69	0.63	0.56	0.48		0.09	10
		6D	2.06	1.11	0.90	0.80	0.73	0.65	0.56		0.13	12
		7D	12.6	6.90	6.30	5.60	5.20	4.60	3.90	3.50	0.40	16
		8D	21.5	11.4	11.4	10.2	9.40	8.30	7.10		0.70	19
		11D	48.2	30.6	24.8	22.0	20.2	17.9			1.20	26
		14D	74.5	44.3	36.0	31.9	29.2	25.9			1.70	30
		18D	149.2	90.2	73.2	64.8	59.5				3.00	40
	25D	327.0	208.1	169.0	149.7					5.30	52	
	120	2.5D	0.16	0.07	0.05	0.05	0.05	0.05	0.04	0.04	0.03	6
		4.5D	2.15	1.25	1.02	0.90	0.83	0.73	0.63	0.57	0.10	12
		6D	5.29	2.65	2.15	1.91	1.75	1.55	1.33	1.20	0.18	14
		7D	14.2	7.40	6.20	5.50	5.00	4.40	3.8	3.50	0.40	16
		8D	24.7	11.9	11.0	9.70	8.90	7.90	6.8	6.10	0.60	19
		11D	54.7	29.9	24.3	21.5	19.7	17.5	15.0		1.10	26
		14D	86.6	45.6	37.1	32.8	30.1	26.7	22.9		1.60	32
18D		167.3	87.6	71.2	63.0	57.8	51.2			2.80	40	
25D	503.2	290.2	235.7	208.7	191.4				5.70	60		



Quality Excellence
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Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	500	700		
8	180	2.5D	0.1875	0.085	0.0625	0.0625	0.054	0.054	0.035	0.035	0.025	6
		4.5D	2.44	1.18	0.96	0.85	0.78	0.69	0.59	0.54	0.09	12
		6D	5.66	2.43	1.97	1.75	1.60	1.42	1.22	1.10	0.17	14
		7D	16.8	8.00	6.50	5.80	5.30	4.70	4.00	3.60	0.30	19
		8D	30.4	14.7	11.9	10.5	9.70	8.60	7.30	6.60	0.60	22
		11D	74.3	35.7	29.0	25.7	23.6	20.9	17.9	16.2	1.10	30
		14D	113.4	51.4	41.8	37.0	33.9	30.0	25.8	23.3	1.60	35
		18D	257.3	121.4	98.6	87.3	80.1	70.9	60.9		2.90	47
	25D	739.7	373.0	303.0	268.3	246.1	217.9			5.80	70	
	270	2.5D	0.72	0.29	0.23	0.1875	0.1875	0.19	0.16	0.143	0.03	8
		4.5D	2.62	1.09	0.88	0.78	0.72	0.63	0.54	0.49	0.08	12
		6D	5.85	2.18	1.77	1.57	1.44	1.28	1.09	0.99	0.16	14
		7D	17.8	7.30	5.90	5.20	4.80	4.30	3.70	3.30	0.30	19
		8D	32.3	13.4	10.9	9.60	8.80	7.80	6.70	6.10	0.60	22
		11D	79.0	32.6	26.5	23.4	21.5	19.0	16.3	14.8	1.00	30
		14D	118.9	46.4	37.9	33.5	30.7	27.2	23.4	21.1	1.40	35
18D		320.6	134.8	109.5	96.9	88.9	78.7	67.6	61.1	3.00	52	
25D	802.2	344.0	279.4	274.4	226.9	200.9	172.4		5.30	70		
10	90	2.5D	0.18	0.08	0.07	0.065	0.06	0.055	0.05	0.045	0.03	6
		4.5D	1.25	0.84	0.68	0.59	0.50	0.43	0.33		0.08	9
		6D	1.76	0.94	0.76	0.68	0.62	0.55	0.47		0.10	10
		7D	5.00	3.00	2.50	2.20	2.00	1.80	1.50		0.30	14
		8D	22.7	8.40	8.40	8.30	8.20	8.00	7.10	6.40	0.60	16
		11D	36.2	22.3	18.1	16.1	14.7	13.1			0.90	22
		14D	46.0	26.0	21.1	18.7	17.2	15.2			1.10	22
		18D	108.7	63.2	51.4	45.5	41.7				2.20	32
	25D	312.7	198.4	161.1	142.7					4.30	47	
	120	2.5D	0.17	0.09	0.08	0.07	0.065	0.06	0.055	0.05	0.03	6
		4.5D	1.34	0.90	0.72	0.67	0.62	0.54	0.41		0.09	9
		6D	2.33	1.18	0.96	0.85	0.78	0.69	0.59	0.54	0.12	12
		7D	5.50	2.90	2.40	2.10	1.90	1.70	1.50	1.30	0.30	14
		8D	25.0	8.80	8.65	8.5	8.4	7.80	6.90	6.20	0.60	16
		11D	39.7	21.4	17.4	15.4	14.2	12.5	10.8		0.80	22
		14D	73.8	38.7	31.4	27.8	25.5	22.6	19.4		1.20	26
		18D	114.1	76.8	62.4	55.2	50.7	44.9			2.30	35
	25D	410.8	235.1	190.9	169.1	155.1				4.50	52	
	180	2.5D	0.20	0.09	0.08	0.065	0.065	0.05	0.045	0.04	0.03	6
		4.5D	1.46	0.88	0.72	0.63	0.52	0.40	0.31		0.09	9
		6D	2.44	1.07	0.87	0.77	0.71	0.63	0.54	0.48	0.11	12
		7D	5.90	2.70	2.20	1.90	1.80	1.60	1.30	1.20	0.20	14
		8D	27.2	9.20	9.10	9.00	8.30	7.40	6.30	5.70	0.50	16
		11D	42.9	19.7	16.0	14.2	13.0	11.5	9.90	8.90	0.70	22
14D		79.5	35.6	28.9	25.6	23.5	20.8	17.8	16.1	1.10	26	
18D		191.7	90.7	73.7	65.3	59.9	53.0	45.5		2.40	40	
25D	453.9	218.8	177.7	157.4	144.4	127.8			4.00	52		
270	2.5D	0.20	0.085	0.071	0.065	0.06	0.055	0.05	0.04	0.03	6	
	4.5D	1.58	0.86	0.70	0.60	0.49	0.37	0.28		0.10	9	
	6D	2.50	0.96	0.78	0.69	0.63	0.56	0.48	0.43	0.10	12	
	7D	6.10	2.40	2.00	1.70	1.60	1.40	1.20	1.10	0.20	14	
	8D	28.3	9.40	9.30	8.20	7.5	6.70	5.70	5.20	0.50	16	

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Stops	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	500	700		
10	270	11D	44.6	17.8	14.5	12.8	11.8	10.4	8.9	8.1	0.70	22
		14D	82.5	32.1	26.0	23.1	21.2	18.7	16.1	14.5	1.00	26
		18D	198.6	81.8	66.4	58.8	54.0	47.8	41.0	37.1	2.20	40
		25D	643.9	282.8	229.7	203.4	186.6	165.2			4.40	60
12	90	6D	0.94	0.49	0.48	0.35	0.30	0.29			0.10	8.5
		7D	2.70	1.60	1.30	1.10	1.10	0.90			0.20	12
		8D	24.3	8.70	8.50	8.35	8.20	8.00			0.60	16
		11D	35.5	16.8	16.8	15.9	14.6	12.9			0.80	19
		14D	48.3	27.9	22.7	20.1	18.4	16.3			1.00	22
		18D	110.9	65.7	53.3	47.2	43.3	38.4			2.00	30
		25D	246.7	151.7	123.3	109.1					3.40	40
	120	4.5D	1.42	0.90	0.74	0.64	0.58	0.51			0.09	8.5
		6D	1.91	0.96	0.78	0.69	0.63	0.56	0.48	0.43	0.09	10
		7D	2.80	1.50	1.20	1.10	1.00	0.90	0.80		0.20	12
		8D	26.1	9.50	9.00	8.50	7.80	6.70	5.30	6.80	0.50	16
		11D	37.8	17.5	17.1	15.2	13.9	12.3	10.6		0.70	19
		14D	51.4	26.4	21.5	19.0	17.4	15.4			0.90	22
		18D	118.2	62.2	50.5	44.7	41.0	36.3			1.90	30
	25D	367.6	211.5	171.8	152.1	139.6				3.70	47	
	180	4.5D	1.57	0.80	0.62	0.54	0.43	0.39			0.10	8.5
		6D	1.97	0.86	0.70	0.62	0.57	0.50	0.43	0.39	0.10	10
		7D	3.00	1.40	1.10	1.00	0.90	0.80	0.70	0.60	0.20	12
		8D	27.8	9.40	9.25	9.10	9.00	8.00	6.80	6.20	0.50	16
		11D	40.9	18.1	15.6	13.9	12.7	11.3	9.70	8.70	0.70	19
		14D	79.3	37.2	30.2	26.7	24.5	21.7	18.0	16.8	1.00	26
		18D	157.1	75.3	61.2	54.2	49.7	44.0	37.7		2.00	35
	25D	395.5	194.3	157.8	139.7	128.2	113.5			3.40	47	
	270	4.5D	1.68	0.68	0.52	0.48	0.41	0.36			0.10	8.5
		6D	2.01	0.77	0.63	0.55	0.51	0.45	0.39	0.35	0.10	10
		7D	3.10	1.20	1.00	0.90	0.80	0.70	0.60	0.60	0.20	12
		8D	28.6	9.40	9.10	8.80	8.10	7.20	6.10	5.60	0.50	16
		11D	46.4	20.0	16.2	14.4	13.2	11.7	10.0	9.00	0.70	22
14D		81.2	33.3	27.1	24.0	22.0	19.5	16.7	15.1	1.00	26	
18D		161.3	67.5	54.8	48.6	44.6	39.4	33.8	30.6	1.90	35	
25D	484.4	214.6	174.3	154.3	141.6	125.3	107.5		3.70	52		
16	90 1DWELL	8D	4.70	3.0	2.40	2.10	2.00	1.70			0.30	12
		11D	36.2	12.5	12.5	12.5	12.5	12.5	11.4		0.70	16
		14D	46.3	20.8	20.8	19.6	17.9	15.9			0.90	19
		18D	65.9	37.6	30.5	27.0	24.8				1.40	22
		25D	178.6	108.6	88.2	78.1					2.50	32
	90 2DWELL (R2)	6D	2.06	1.11	0.90	1.80	0.73	0.65			0.13	12
		7D	12.6	6.90	6.30	5.60	5.20	4.60	3.90		0.40	16
		8D	21.5	11.4	11.4	10.2	9.40	8.30			0.70	19



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Stops	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	500	700		
16	120 1DWELL	8D	5.00	2.80	2.30	2.00	1.80	1.60	1.40		0.3	12
		11D	38.1	12.8	12.8	12.8	12.5	10.7			0.7	16
		14D	48.1	21.1	20.6	18.3	16.8	14.8	12.7		0.8	19
		18D	68.5	35.2	28.6	25.3	23.2	20.5			1.40	22
		25D	228.5	128.1	104.0	92.1	84.5				2.70	35
	120 2DWELL (R2)	4.5D	1.67	0.98	0.79	1.70	0.64	0.57	0.49		0.10	12
		6D	5.29	2.65	2.15	1.91	1.75	1.55	1.33	1.20	0.18	14
		7D	15.1	8.60	7.00	6.20	5.60	5.00	4.30	3.90	0.40	16
		8D	24.8	12.2	11.4	10.1	9.20	8.20	7.00		0.60	19
	180 1DWELL	8D	5.20	2.50	2.00	1.80	1.70	1.50	1.30	1.10	0.30	12
		11D	39.6	13.1	13.1	13.1	12.7	11.3	9.70	8.70	0.60	16
		14D	49.4	21.4	18.5	16.4	15.0	13.3	11.4	10.3	0.80	19
		18D	104.5	49.6	40.3	35.6	32.7	29.0	24.3		1.50	26
		25D	295.1	149.1	121.1	107.3	98.4	87.1			2.80	40
	180 2DWELL (R2)	4.5D	1.90	0.92	0.75	0.66	0.61	0.54	0.46	0.42	0.09	12
		6D	5.66	2.43	1.97	1.75	1.60	1.42	1.22	1.10	0.17	14
		7D	16.8	8.00	6.50	5.80	5.30	4.70	4.00	3.60	0.3	19
		8D	31.4	15.6	12.7	11.3	10.3	9.10	7.8	7.10	0.6	22
	270 1DWELL	8D	5.30	2.30	1.30	1.60	1.50	1.30	1.10	1.00	0.3	12
		11D	40.4	13.2	13.2	12.4	11.4	10.1	8.60	7.80	0.60	16
		14D	50.1	20.3	16.5	14.6	13.4	11.9	10.2	9.20	0.70	19
		18D	106.0	44.2	35.9	31.8	29.2	25.8	22.1	20.0	1.40	26
		25D	301.0	133.4	108.9	95.9	88.0	77.9	66.8		2.70	40
	270 2DWELL (R2)	4.5D	2.04	0.84	0.69	0.61	0.56	0.49	0.42	0.38	0.08	12
6D		5.85	2.18	1.77	1.57	1.44	1.28	1.09	0.99	0.16	14	
7D		17.8	7.30	5.90	5.20	4.80	4.30	3.7	3.30	0.30	19	
8D		33.9	14.4	11.7	10.4	9.50	8.40	7.2	3.50	0.60	22	
20	180 2DWELL (R2)	6D	2.44	1.07	0.87	0.77	0.71	0.63	0.54	0.48	0.11	12
		7D	5.90	2.70	2.20	1.90	1.80	1.60	1.30	1.20	0.20	14
		8D	28.0	9.50	9.20	9.00	8.70	7.70	6.60	6.00	0.50	16
		11D	42.9	19.7	16.0	14.2	13.0	11.5	9.90		0.70	22
		14D	79.6	35.6	28.9	25.6	23.5	20.8	17.8		1.10	26
		18D	191.7	90.7	73.7	65.3	59.9	53.0			2.40	40
		25D	453.9	218.8	177.7	157.4	144.4				4.00	52
	270 2DWELL (R2)	6D	2.50	0.96	0.78	0.69	0.63	0.56	0.48	0.43	0.10	12
		7D	6.10	2.40	2.00	1.70	1.60	1.40	1.20	1.10	0.20	14
		8D	29.4	9.80	9.30	8.70	7.90	7.0	6.00	5.50	0.50	16
		11D	44.6	17.8	14.5	12.8	11.8	10.4	8.90	8.10	0.70	22
		14D	82.5	32.1	26.0	23.1	21.2	18.7	16.1	14.5	1.00	26
		18D	198.6	81.8	66.4	58.8	54.0	47.8	41.0		2.20	40
25D	643.9	232.8	229.7	203.4	186.6	165.2			4.40	60		
24	180 3DWELL (R3)	4.5D	1.90	0.92	0.75	0.66	0.61	0.54	0.46		0.09	12

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Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)	
				Index Per Min N (rpm)									
				50	100	150	200	300	500	700			
24	180 2DWELL (R2)	6D	1.97	0.86	0.70	0.62	0.57	0.50	0.43	0.39	0.09	10	
		7D	3.00	1.40	1.10	1.00	0.90	0.80	0.70		0.20	12	
		8D	28.8	9.75	9.70	9.60	9.50	8.40	7.20	6.50	0.50	16	
		11D	40.9	18.1	15.6	13.9	12.7	11.3	9.70		0.70	19	
		14D	54.0	24.0	19.5	17.2	15.8	14.0			0.90	22	
		18D	157.1	75.3	61.2	54.2	49.7	44.0			2.00	35	
		25D	395.5	194.3	157.8	139.7	128.2				3.40	47	
	3DWELL (R3)	4.5D	2.04	0.84	0.69	0.61	0.56	0.49	0.42	0.38	0.08	12	
	270 2DWELL (R2)	6D	2.01	0.77	0.63	0.55	0.51	0.45	0.39	0.35	0.09	10	
		7D	3.10	1.20	1.00	0.99	0.80	0.70	0.60	0.60	0.20	12	
		8D	29.8	9.80	9.60	9.30	8.60	7.60	6.50	5.90	0.50	16	
		11D	42.2	17.3	14.1	12.5	11.4	10.1	8.70	7.90	0.60	19	
		14D	55.3	21.5	17.5	15.5	14.2	12.6	10.8		0.80	22	
		18D	161.1	67.5	54.8	48.6	44.6	39.4	33.8		1.90	35	
25D		484.4	214.6	174.3	154.3	141.6	125.3			3.70	52		
30	3DWELL (R3)	7D	5.90	2.70	2.20	1.90	1.80	1.60	1.303		0.20	14	
		8D	28.0	9.50	9.50	9.50	8.70	7.70	6.60	6.00	0.50	16	
	180 2DWELL (R2)	11D	39.4	13.1	13.1	13.1	12.4	11.0	9.40		0.60	16	
		14D	49.3	21.4	18.1	16.0	14.7	13.0	11.2		0.80	19	
		18D	104.2	48.4	46.5	34.8	31.9	28.3			1.50	26	
		25D	293.7	145.6	118.2	104.7	96.0				2.80	40	
	3DWELL (R3)	7D	6.10	2.40	2.00	1.70	1.60	1.40	1.20	1.10	0.20	14	
		8D	29.4	9.80	9.50	8.70	7.90	7.00	6.00	5.50	0.50	16	
	270 2DWELL (R2)	11D	40.3	13.2	13.0	12.1	11.1	9.80	8.40	7.60	0.60	16	
		14D	50.0	19.9	16.2	14.3	13.1	11.6	10.0	9.00	0.70	19	
		18D	105.9	43.2	35.1	31.1	28.5	25.2	21.7		1.50	26	
		25D	300.4	130.3	105.9	93.7	86.0	76.1			2.70	40	
	32	4DWELL (R4)	8D	31.4	15.6	12.7	11.3	10.3	9.10	7.80		0.60	22
		180 2DWELL (R2)	11D	39.6	13.1	13.1	13.1	12.7	11.3	9.70		0.60	16
14D			49.4	21.4	18.5	16.5	15.0	13.3	11.4		0.80	19	
18D			104.5	49.6	40.1	35.6	32.7	29.0			1.50	26	
25D		295.1	149.1	121.1	107.3	98.4				2.80	40		
4DWELL (R4)		8D	33.9	14.4	11.7	11.4	9.50	8.40	7.20	6.50	0.60	22	
270 2DWELL (R2)		11D	40.4	13.2	13.2	12.4	11.4	10.1	8.60	7.80	0.60	16	
		14D	50.1	20.3	16.5	14.6	13.4	11.9	10.2	9.20	0.70	19	
		18D	106.1	44.2	35.9	31.08	29.2	25.8	22.1		1.40	26	
		25D	301.1	133.4	108.3	95.9	88.0	77.9			2.70	40	



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Selection of DT type heavy duty indexing drives

A B - C - D E F - G H

EXAMPLE : 21DT 24 - 180 - L N B - R S

A	Distance between shafts	8AD, 9 AD, 11AD, 15AD, 14DT, 18DT, 21DT, 25DT, 35DT Distance between shafts=65mm
B	Number of divided portions	6, 8, 10, 12, 16, 24, 32.....
C	Driving angle of the curve of the input shaft	90, 120, 180, 270
D	Cam curve	S (M.S. Curve) V (M.C.V. Curve) T (M.T. Curve)
E	Direction of rotation	L (left rotation) standard type N (allow left and right rotation) R (right rotation)
F	Direction of the input shaft	T (input from T-side) B (input from both sides) standard type U (input from U-side)
G	Installation and fixation	Refer to the figure below for standard type
H	Planes of oil hole	Standard planes are S, T, U planes

■ Direction of rotation
 ■ Direction of the input shaft
 ■ Installation and fixation

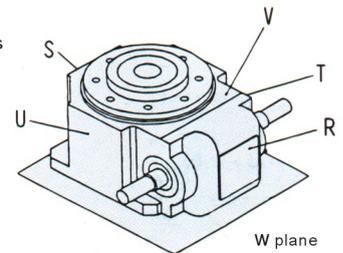
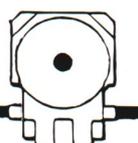
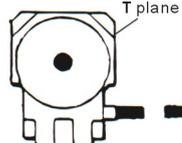
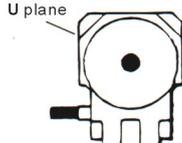
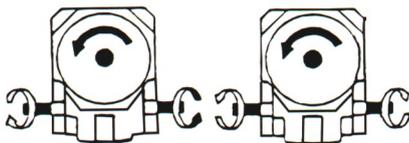
L Left rotation (standard type)

R Right rotation

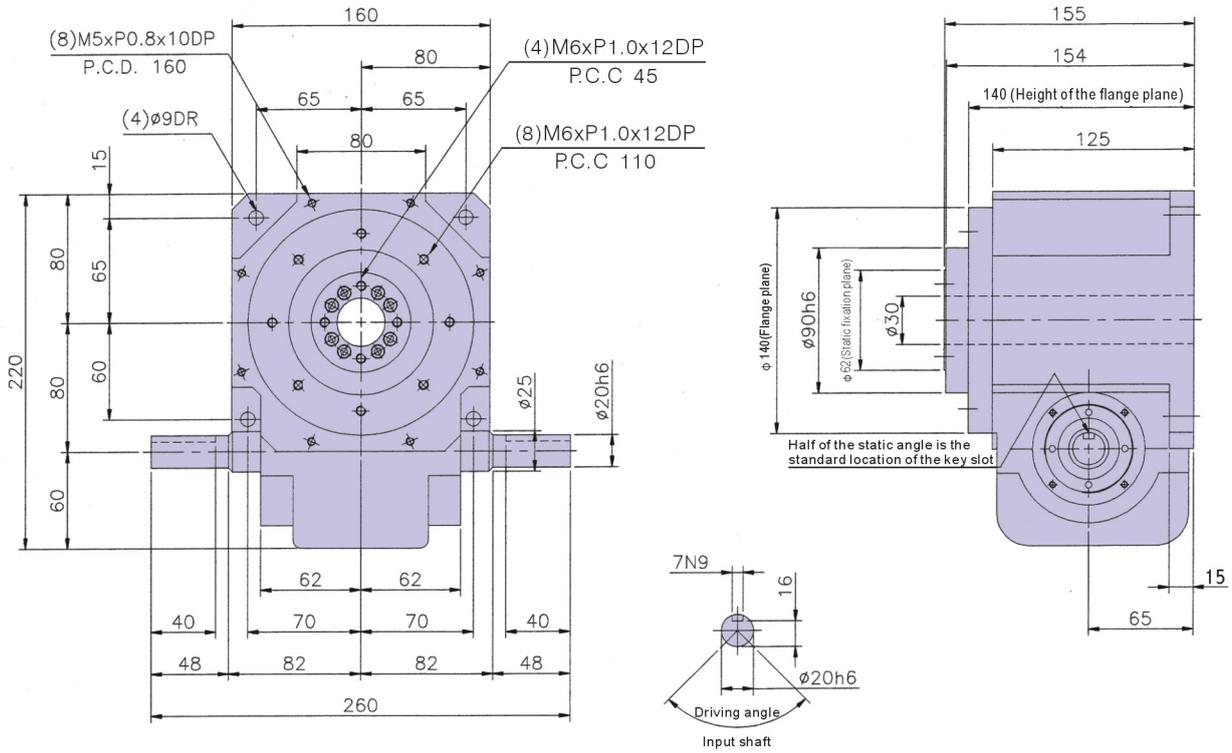
Input from U-side

Input from T-side

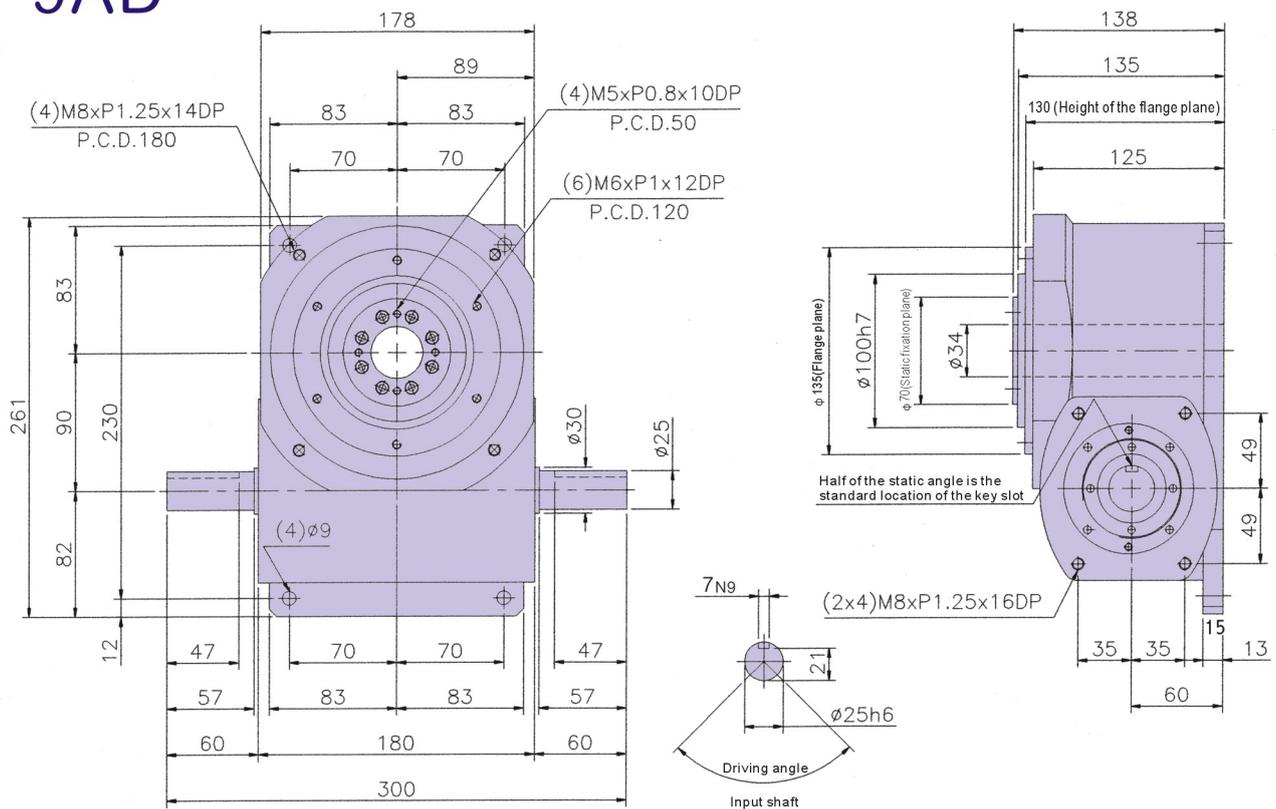
Input from both sides (standard type)



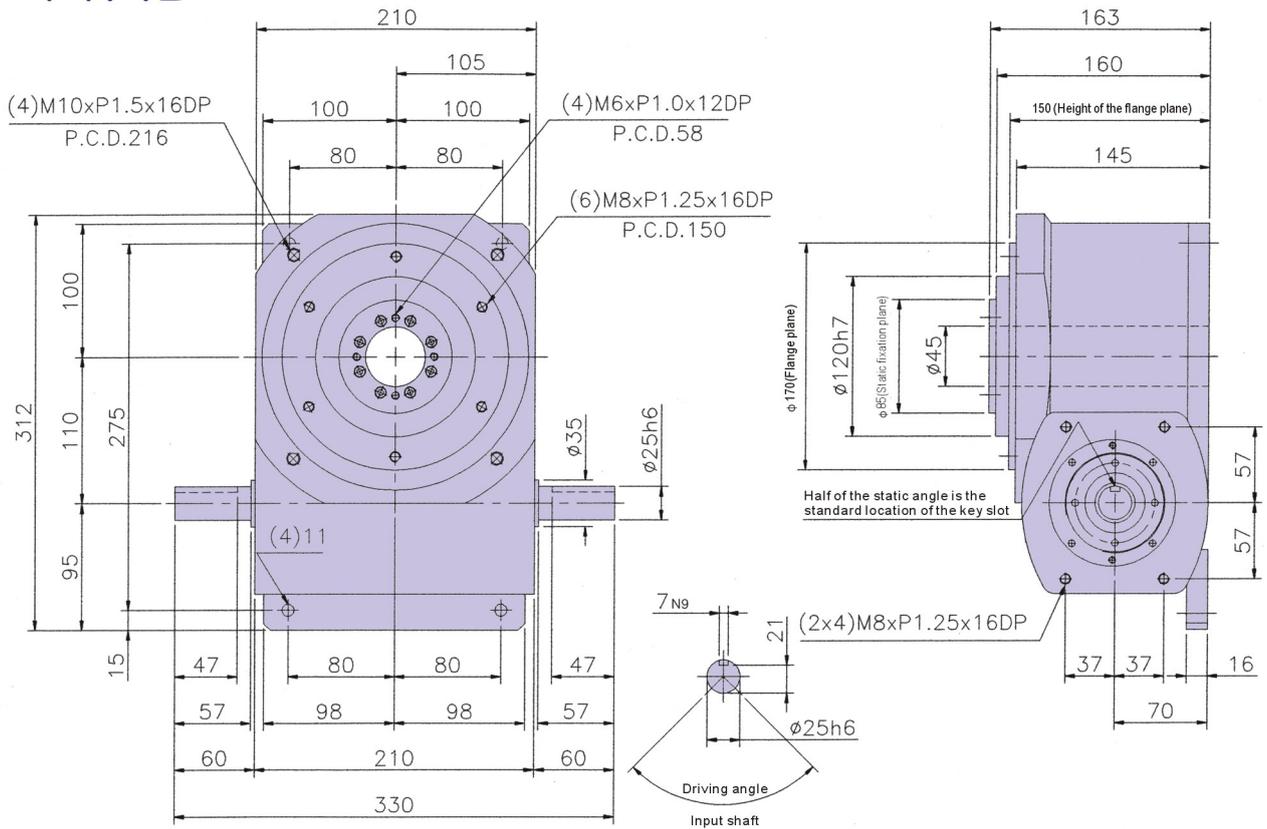
8AD



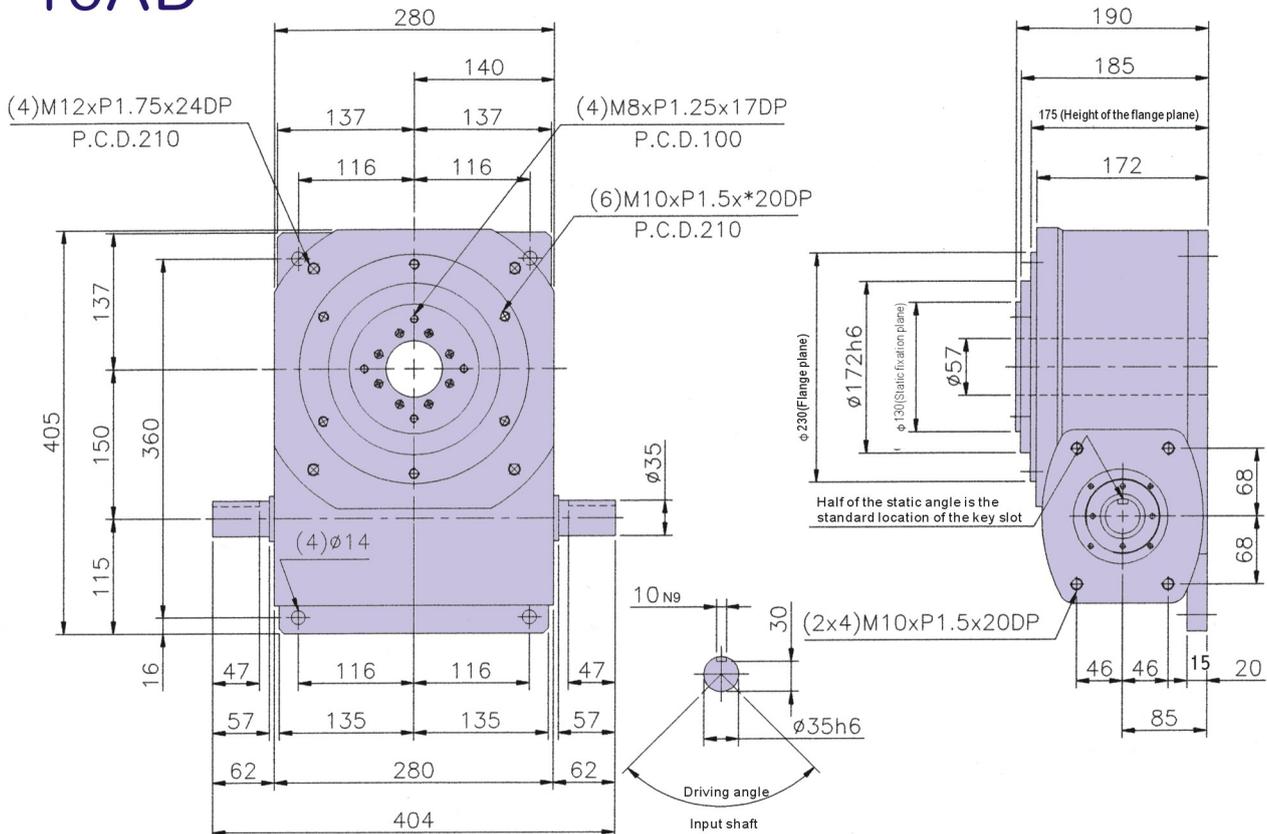
9AD



11AD



15AD



Technical parameters

8AD

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	520	Allowable radial loading of the input shaft	C3	kgf	220	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	0.03
Allowable axial loading of the output shaft	C2	kgf	220	Allowable axial loading of the input shaft	C4	kgf	160	Accuracy of positioning indexing		sec.	±30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m		Weight		Kg	24

Technical parameters

9AD

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	500	Allowable radial loading of the input shaft	C3	kgf	260	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	2.5x10 ⁻⁵
Allowable axial loading of the output shaft	C2	kgf	215	Allowable axial loading of the input shaft	C4	kgf	260	Accuracy of positioning indexing		sec.	±30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	25	Weight		Kg	24

Technical parameters

11AD

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	700	Allowable radial loading of the input shaft	C3	kgf	310	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	3.2x10 ⁻⁴
Allowable axial loading of the output shaft	C2	kgf	350	Allowable axial loading of the input shaft	C4	kgf	360	Accuracy of positioning indexing		sec.	±30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	30	Weight		Kg	42

Technical parameters

15AD

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	1200	Allowable radial loading of the input shaft	C3	kgf	410	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	2.0x10 ⁻³
Allowable axial loading of the output shaft	C2	kgf	700	Allowable axial loading of the input shaft	C4	kgf	410	Accuracy of positioning indexing		sec.	±30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	40	Weight		Kg	85



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8AD 1DWELL												
Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				25	50	75	100	125	150	200		
4	270	8AD	30.5	13.9	11.3	10.0	9.7	9.1	8.1	7.3	0.9	19
5	270	8AD	26.0	10.0	8.1	7.2	6.5	6.1	5.8	5.5	0.7	16
6	180	8AD	23.1	9.5	7.7	6.8	6.2	5.8	5.4	4.6	0.7	16
	210	8AD	24.2	9.5	7.7	6.8	6.0	5.6	5.3	4.4	0.7	16
	270	8AD	27.2	10.3	8.4	7.5	7.0	6.6	6.2	5.7	0.7	16
8	180	8AD	33.4	20.7	16.8	14.9	14.2	13.3	13.1	11.5	0.8	22
	210	8AD	37.1	18.7	15.2	13.5	13.6	12.8	12.6	12.0	0.8	22
	270	8AD	41.0	17.6	14.3	12.7	12.8	12.0	12.1	11.0	1.0	22
10	120	8AD	18.3	7.4	6.1	5.4	4.9	4.6	3.7	3.2	0.7	19
	150	8AD	22.1	8.7	7.0	6.2	5.8	5.5	4.6	3.8	0.7	19
	180	8AD	26.1	10.0	8.1	7.2	6.7	6.3	5.6	4.5	0.7	19
	210	8AD	30.1	11.3	9.2	8.2	7.6	7.1	6.6	5.9	0.7	19
	270	8AD	35.2	10.6	8.6	7.6	7.3	6.9	6.2	5.5	0.7	22
12	120	8AD	20.7	9.1	7.5	6.7	5.6	5.3	5.3	4.3	0.6	16
	150	8AD	22.1	9.8	8.0	7.1	6.2	5.8	5.8	4.9	0.6	16
	180	8AD	23.5	10.5	8.5	7.6	6.8	6.4	6.0	5.2	0.6	16
	210	8AD	29.0	10.1	8.2	7.3	6.8	6.4	6.1	5.2	0.6	16
	270	8AD	31.5	11.3	9.2	8.2	8.0	7.5	7.1	6.3	0.6	16
15	120	8AD	18.1	6.3	5.1	4.5	3.3	3.1	2.3	1.8	0.6	14
	150	8AD	18.9	6.6	5.4	4.8	3.5	3.3	2.6	2.1	0.6	14
	180	8AD	23.2	8.4	6.8	6.0	5.0	4.7	3.7	3.1	0.6	14
	210	8AD	24.5	8.2	6.7	6.0	4.8	4.5	3.8	3.0	0.6	14
	270	8AD	27.5	8.9	7.2	6.4	5.3	5.0	4.4	3.4	0.6	14
16	120	8AD	16.4	5.3	4.3	3.8	3.1	2.9	2.3	1.5	0.6	12
	150	8AD	16.4	5.5	4.5	4.0	3.3	3.1	2.4	1.8	0.6	12
	180	8AD	20.2	6.4	5.2	4.6	3.5	3.3	2.5	1.9	0.6	12
	210	8AD	21.0	6.8	5.5	4.9	3.6	3.4	2.7	2.0	0.6	12
	270	8AD	22.9	6.9	5.6	5.0	4.9	4.6	2.6	1.9	0.6	14

8AD 2DWELL												
20	180	8AD	26.1	10.0	8.1	7.2	6.7	6.3	5.6	4.5	0.7	19
	210	8AD	30.1	11.3	9.2	8.2	7.6	7.1	6.6	5.9	0.7	19
	270	8AD	35.2	10.6	8.6	7.6	7.3	6.9	6.2	5.5	0.7	19
24	180	8AD	23.5	10.5	8.5	7.6	6.8	6.4	6.0	5.2	0.6	16
	210	8AD	29.0	10.1	8.2	7.3	6.8	6.4	6.1	5.2	0.6	16
	270	8AD	31.5	11.3	9.2	8.2	8.0	7.5	7.1	6.3	0.6	16
32	180	8AD	20.2	6.4	5.2	4.6	3.5	3.3	2.5	1.9	0.6	14
	210	8AD	21.0	6.8	5.5	4.9	3.6	3.4	2.7	2.0	0.6	14
	270	8AD	22.9	6.9	5.6	5.0	4.9	4.6	2.6	1.9	0.6	14



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9AD 1DWELL												
Stops	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				25	50	75	100	125	150	200		
4	270	9AD	28.2	19.1	15.5	13.8	12.6	11.8	11.2	10.3	0.7	19
5	270	9AD	31.5	22.4	18.2	16.1	14.8	13.8	13.1	12.0	0.6	19
6	180	9AD	45.1	37.4	30.3	26.9	24.7	23.1	21.8	20.0	0.9	26
	210	9AD	49.0	37.2	30.2	26.7	24.5	22.9	21.7	19.9	0.9	26
	270	9AD	54.6	36.4	29.6	26.2	24.0	22.5	21.3	19.5	0.8	26
8	180	9AD	52.1	46.9	38.1	33.7	30.9	28.9	27.4	25.1	0.8	26
	210	9AD	55.3	46.2	37.5	33.2	30.4	28.5	27.0	24.7	0.8	26
	270	9AD	59.6	44.4	36.1	32.0	29.3	27.4	26.0	23.8	0.8	26
10	120	9AD	35.3	34.0	29.2	25.8	23.8	22.1	21.0	19.1	0.6	22
	150	9AD	36.9	35.0	28.5	25.2	23.2	21.6	20.5	18.7	0.6	22
	180	9AD	38.5	34.2	27.8	24.6	22.6	21.1	20.0	18.3	0.6	22
	210	9AD	40.1	33.4	27.1	24.0	22.0	20.6	19.5	17.9	0.6	22
	270	9AD	42.2	31.7	25.8	22.8	20.9	19.6	18.5	17.0	0.6	22
12	120	9AD	30.6	27.5	25.1	22.2	20.4	19.1	18.1	16.6	0.6	16
	150	9AD	33.1	29.8	24.4	21.6	19.8	18.5	17.6	16.1	0.6	16
	180	9AD	36.8	32.7	26.6	23.5	21.6	20.2	19.1	17.5	0.6	19
	210	9AD	38.0	31.7	25.8	22.8	20.9	19.6	18.5	17.0	0.6	19
	270	9AD	39.4	30.0	24.3	21.6	19.8	18.5	17.5	16.1	0.5	19
15	120	9AD	33.9	30.8	28.2	25.1	23.4	21.6	20.9	18.6	0.6	16
	150	9AD	35.1	31.6	27.3	24.2	22.2	20.8	19.7	18.0	0.6	16
	180	9AD	36.3	32.4	26.3	23.3	21.4	20.0	18.9	17.4	0.5	16
	210	9AD	37.1	31.3	25.4	22.5	20.6	19.3	18.3	16.8	0.5	16
	270	9AD	38.0	29.4	23.9	21.1	19.4	18.1	17.2	15.7	0.5	16
16	120	9AD	34.3	29.8	28.2	24.9	22.7	22.2	21.1	19.3	0.5	16
	150	9AD	35.5	32.0	28.2	24.9	22.9	21.4	20.3	18.6	0.5	16
	180	9AD	36.7	33.0	27.1	24.0	22.0	20.6	19.5	17.9	0.5	16
	210	9AD	37.4	32.1	26.1	23.1	21.2	19.8	18.8	17.2	0.5	16
	270	9AD	38.2	30.1	24.5	21.7	19.9	18.6	17.6	16.2	0.5	16

9AD 2DWELL												
16	210	9AD	37.6	33.9	29.2	25.8	23.7	22.2	21.0	19.2	0.7	22
	270	9AD	59.6	53.8	44.4	39.4	36.1	33.8	32.0	29.3	0.8	26
20	180	9AD	38.5	34.6	34.2	30.3	27.8	26.0	24.6	22.6	0.6	22
	210	9AD	40.1	36.1	33.4	29.5	27.1	25.3	24.0	22.0	0.6	22
	270	9AD	42.2	38.0	31.7	28.1	25.8	24.1	22.8	20.9	0.6	22
24	180	9AD	36.8	33.1	32.7	29.0	26.6	24.8	23.5	21.6	0.6	19
	210	9AD	38.0	34.2	31.7	28.1	25.8	24.1	22.8	20.9	0.6	19
	270	9AD	39.4	35.5	30.0	26.5	24.3	22.8	21.6	19.8	0.6	19
32	180	9AD	36.7	33.0	33.0	29.5	27.1	25.3	24.0	22.0	0.5	16
	210	9AD	37.4	33.6	32.1	28.5	26.1	24.4	23.1	21.2	0.5	16
	270	9AD	38.2	34.4	30.1	26.7	24.5	22.9	21.7	19.9	0.5	16



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1 1AD 1DWELL												
Stops	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				25	50	75	100	125	150	200		
4	270	11AD	55.2	39.6	32.1	28.4	26.1	24.4	23.1	21.2	1.0	26
5	270	11AD	61.9	46.5	37.8	33.4	30.7	28.7	27.2	24.9	1.0	26
6	180	11AD	69.4	57.6	46.8	41.4	38.0	35.5	33.6	30.9	1.3	32
	210	11AD	75.3	57.3	46.5	41.2	37.8	35.3	33.4	30.7	1.2	32
	270	11AD	83.9	56.1	45.5	40.3	37.0	34.6	32.7	30.0	1.1	32
8	180	11AD	76.9	68.6	55.7	49.4	45.3	42.3	40.1	36.8	1.1	30
	210	11AD	85.0	71.1	57.7	51.1	46.9	43.9	41.5	38.1	1.1	32
	270	11AD	91.7	68.4	55.6	49.2	45.1	42.2	40.0	36.7	1.1	32
10	120	11AD	65.2	59.7	52.4	46.5	42.3	39.8	37.8	34.6	0.9	26
	150	11AD	66.1	61.6	51.2	45.4	41.5	38.9	36.9	33.8	0.9	26
	180	11AD	69.2	61.6	50.0	44.3	40.6	38.0	36.0	33.0	0.9	26
	210	11AD	72.3	60.1	48.8	43.2	39.7	37.1	35.1	32.2	0.9	26
	270	11AD	93.2	74.3	60.3	53.4	49.0	45.8	43.4	39.8	1.0	30
12	120	11AD	53.5	48.1	48.1	45.8	42.0	26.2	24.8	22.8	0.7	19
	150	11AD	65.6	59.0	59.0	52.3	48.0	29.9	28.3	26.0	0.8	22
	180	11AD	70.5	63.4	58.0	51.3	47.1	27.8	27.8	25.5	0.7	22
	210	11AD	74.1	66.6	56.7	50.2	46.1	28.7	27.2	24.9	0.7	22
	270	11AD	111.0	62.6	50.9	45.1	41.3	38.7	36.6	33.6	0.8	26
15	120	11AD	61.5	55.4	55.4	53.6	51.3	30.4	28.7	26.4	0.7	19
	150	11AD	65.1	58.6	58.6	58.6	54.8	29.6	28.0	25.7	0.7	19
	180	11AD	68.7	61.8	61.8	58.1	53.3	28.8	27.3	25.0	0.7	19
	210	11AD	71.2	64.1	63.8	56.5	51.8	28.0	26.5	24.3	0.6	19
	270	11AD	74.3	66.8	60.4	53.5	49.1	26.5	25.1	23.0	0.6	19
16	120	11AD	63.2	57.8	57.8	57.8	55.5	31.5	29.8	27.4	0.7	19
	150	11AD	66.5	59.8	59.8	59.8	56.8	30.6	29.0	26.6	0.7	19
	180	11AD	69.8	62.8	62.8	60.0	55.1	29.7	28.2	25.8	0.6	19
	210	11AD	72.1	64.9	64.9	58.2	53.4	28.8	27.3	25.1	0.6	19
	270	11AD	74.9	67.4	62.2	55.1	50.5	27.3	25.8	23.7	0.6	19

1 1AD 2DWELL												
16	210	11AD	85.0	76.5	71.1	62.9	57.7	54.0	51.1	46.9	1.1	32
	270	11AD	91.7	82.5	68.4	60.6	55.6	52.0	49.2	45.1	1.1	32
20	180	11AD	69.2	62.3	61.6	54.5	50.0	46.8	44.3	40.6	0.9	26
	210	11AD	72.3	65.1	60.1	53.2	48.8	45.7	43.2	39.7	0.9	26
	270	11AD	93.2	83.9	74.3	65.8	60.3	56.4	53.4	49.0	1.0	30
24	180	11AD	70.5	63.4	63.4	63.2	58.0	36.1	34.2	31.4	0.7	22
	210	11AD	74.1	66.6	66.6	61.8	56.7	35.4	33.5	30.7	0.7	22
	270	11AD	111.0	77.1	62.6	55.5	50.9	47.6	45.1	41.3	0.8	26
32	180	11AD	69.8	62.8	62.8	62.8	62.8	36.3	34.7	31.8	0.6	19
	210	11AD	72.1	64.9	64.9	64.9	64.9	35.5	33.6	30.8	0.6	19
	270	11AD	74.9	67.4	67.4	67.4	62.2	33.6	31.8	29.2	0.6	19

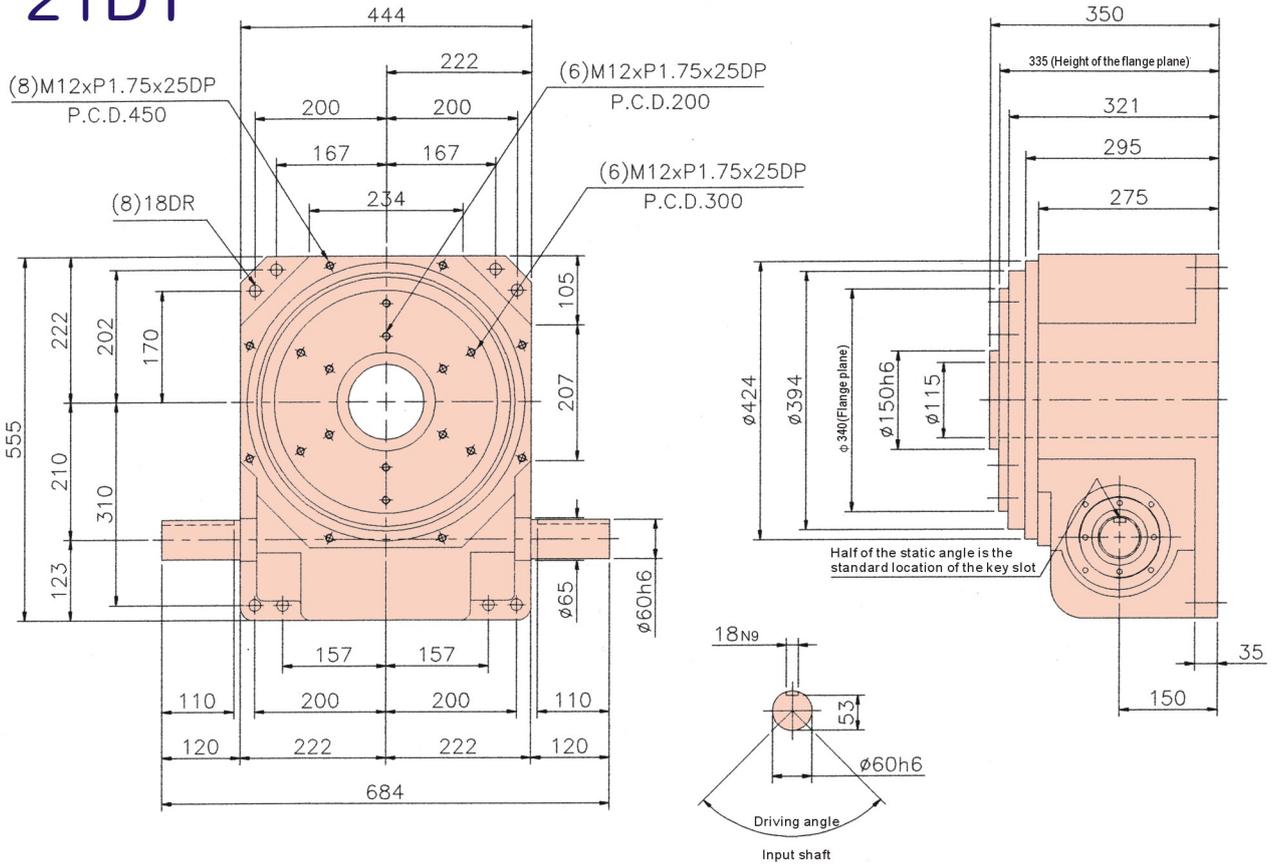


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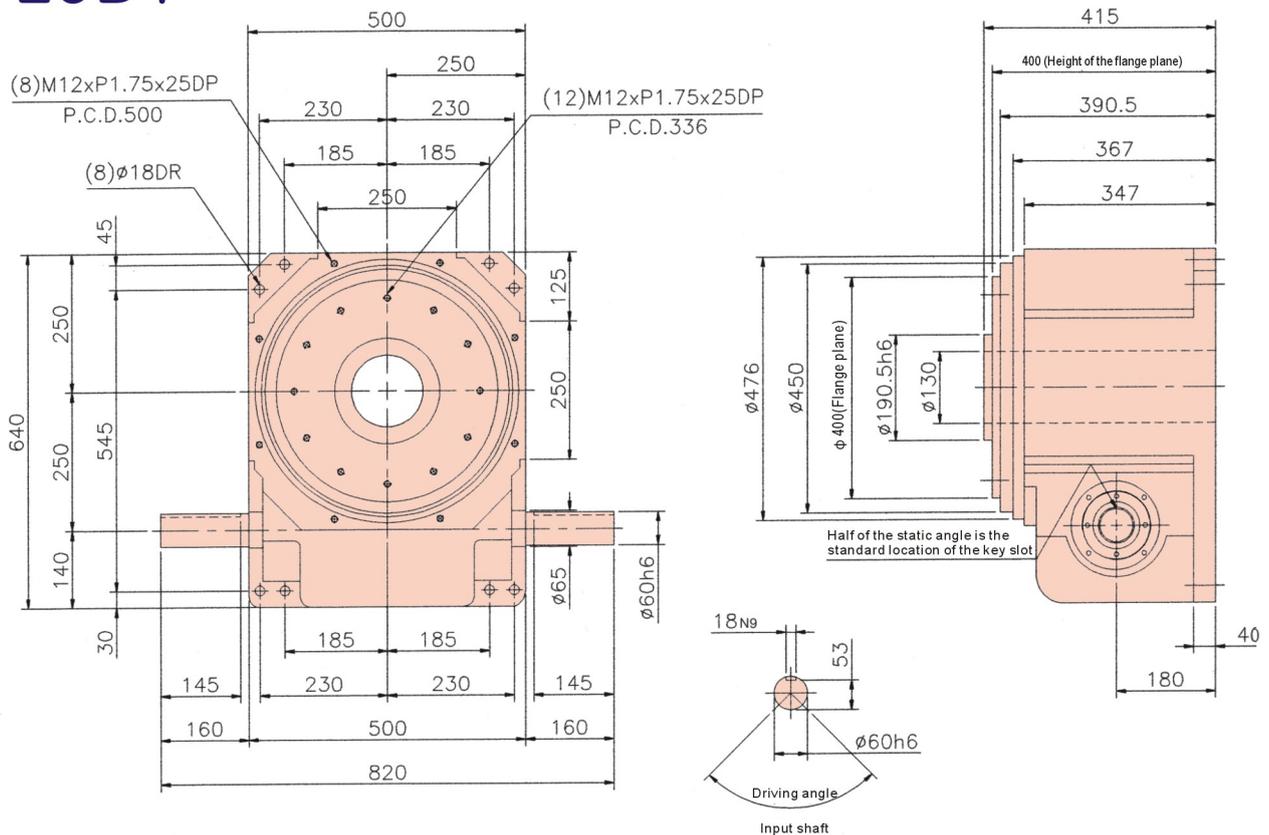
15AD 1DWELL												
Stops	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				25	50	75	100	125	150	200		
4	270	15AD	89.0	67.1	54.5	48.2	44.3	41.4	39.2	35.9	1.7	32
5	270	15AD	98.4	75.7	61.4	54.4	49.9	46.7	44.2	40.5	1.5	30
6	180	15AD	133.6	115.9	94.1	83.4	76.5	71.5	67.7	62.1	2.2	40
	210	15AD	205.6	166.7	135.4	119.9	110.0	102.9	97.4	89.3	2.5	47
	270	15AD	232.3	164.4	133.5	118.2	108.4	101.4	96.0	88.1	2.3	47
8	180	15AD	158.7	142.9	121.1	117.4	98.3	92.0	87.1	79.9	2.0	40
	210	15AD	235.9	209.8	170.4	150.9	138.4	129.5	122.6	112.4	2.3	47
	270	15AD	257.5	203.3	165.1	146.2	134.1	125.4	118.8	108.9	2.2	47
10	120	15AD	125.8	120.9	113.4	100.8	93.1	86.0	81.5	75.0	1.7	35
	150	15AD	132.5	125.3	111.7	98.9	90.7	84.7	80.3	73.8	1.7	35
	180	15AD	141.2	127.1	110.0	97.4	89.3	83.5	79.1	72.6	1.7	35
	210	15AD	150.1	133.3	108.3	95.9	87.9	82.2	77.9	71.4	1.6	35
	270	15AD	201.4	166.0	134.9	119.4	109.5	102.4	97.0	89.0	1.8	40
12	120	15AD	122.5	110.3	110.3	102.7	94.2	58.7	55.6	51.0	1.3	26
	150	15AD	160.2	139.8	113.5	100.5	94.2	71.9	68.0	62.4	1.4	30
	180	15AD	178.0	145.3	118.0	104.5	95.8	74.7	70.7	64.9	1.4	32
	210	15AD	186.4	141.9	115.3	102.1	93.7	73.0	69.1	63.4	1.4	32
	270	15AD	238.7	156.3	127.0	112.4	103.1	87.7	83.0	76.1	1.5	35
15	120	15AD	130.6	123.1	123.1	119.5	115.4	69.5	65.4	60.1	1.2	26
	150	15AD	141.7	127.6	127.6	127.6	124.8	67.4	63.8	58.5	1.2	26
	180	15AD	182.9	154.5	125.5	111.1	101.9	79.4	75.2	69.0	1.3	30
	210	15AD	189.1	150.0	121.8	107.9	98.9	77.1	73.0	67.0	1.3	30
	270	15AD	204.0	150.4	122.2	108.2	99.2	77.3	73.2	67.2	1.3	32
16	120	15AD	136.5	122.4	122.4	120.1	115.8	70.3	67.7	62.0	1.2	26
	150	15AD	145.2	130.7	130.7	130.7	129.5	69.9	66.2	60.7	1.2	26
	180	15AD	153.9	138.5	138.5	137.6	126.3	68.2	64.5	59.2	1.1	26
	210	15AD	160.0	144.0	144.0	134.0	122.9	66.4	62.8	57.6	1.1	26
	270	15AD	198.1	145.8	118.4	104.9	96.2	75.0	71.0	65.1	1.3	30

15AD 2DWELL												
16	210	15AD	136.9	132.2	113.8	100.8	92.4	86.4	81.8	75.1	1.7	35
	270	15AD	257.5	231.7	203.3	180.0	165.1	154.4	146.2	134.1	2.2	47
18	180	15AD	141.2	127.1	127.1	119.9	110.0	102.8	97.4	89.3	1.7	35
	210	15AD	187.1	168.4	168.4	152.8	140.2	131.1	124.1	113.8	1.8	40
	270	15AD	201.4	181.2	166.0	147.0	134.9	126.1	119.4	109.5	1.8	40
24	180	15AD	178.0	160.2	145.3	128.6	118.0	92.0	87.1	79.9	1.4	32
	210	15AD	186.4	167.8	141.9	125.7	115.3	89.9	85.1	78.0	1.4	32
	270	15AD	238.7	192.4	156.3	138.4	127.0	107.9	102.2	93.8	1.5	35
32	180	15AD	153.9	138.5	138.5	138.5	138.5	80.0	79.5	72.9	1.1	26
	210	15AD	160.0	144.0	144.0	144.0	144.0	81.7	77.3	71.0	1.1	26
	270	15AD	198.1	178.3	145.8	129.1	118.4	92.3	87.4	80.2	1.3	30

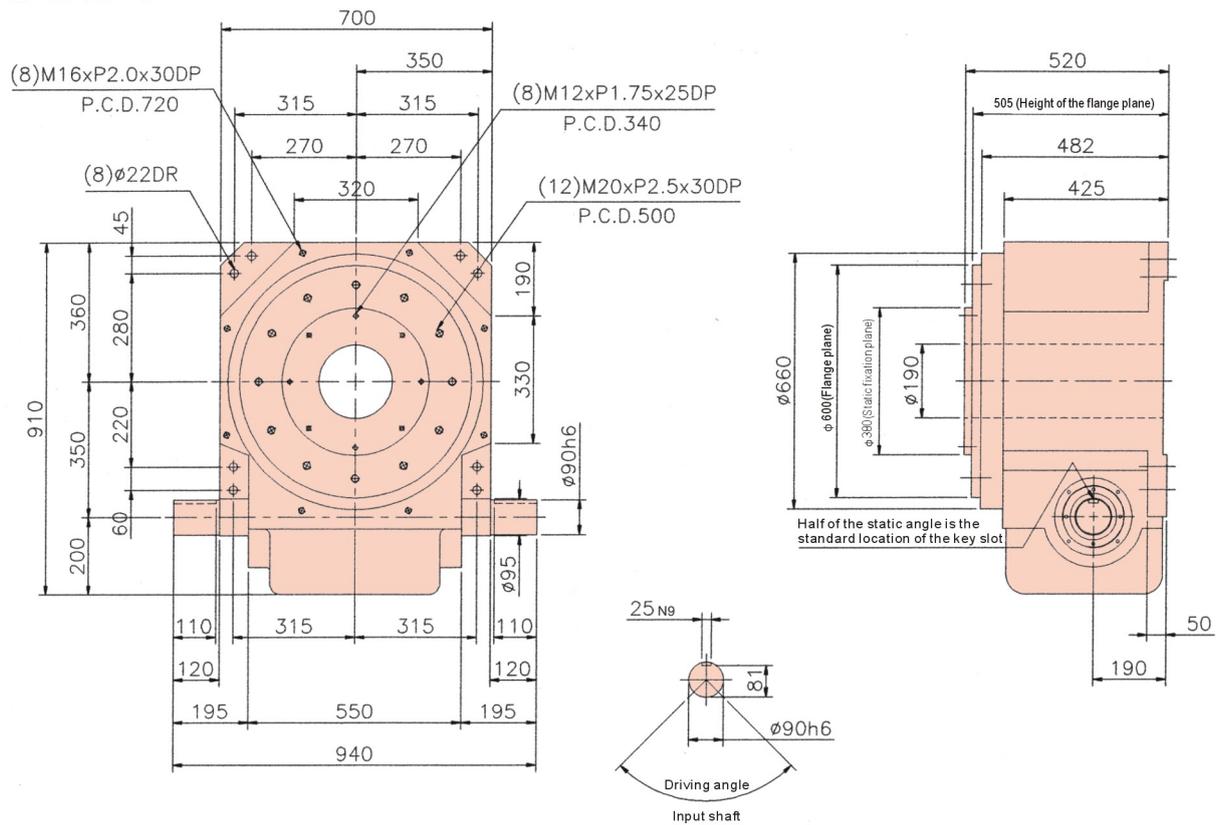
21DT



25DT



35DT



Technical parameters 14DT

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
 Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	1050	Allowable radial loading of the input shaft	C3	kgf	500	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	0.07
Allowable axial loading of the output shaft	C2	kgf	720	Allowable axial loading of the input shaft	C4	kgf	350	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	53	Weight		Kg	80

Technical parameters 18DT

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
 Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	1500	Allowable radial loading of the input shaft	C3	kgf	1200	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	0.23
Allowable axial loading of the output shaft	C2	kgf	1100	Allowable axial loading of the input shaft	C4	kgf	960	Accuracy of positioning indexing		sec.	± 30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	220	Weight		Kg	180

Technical parameters 21DT

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	1900	Allowable radial loading of the input shaft	C3	kgf	1600	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	0.5
Allowable axial loading of the output shaft	C2	kgf	1500	Allowable axial loading of the input shaft	C4	kgf	1300	Accuracy of positioning indexing		sec.	±30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	450	Weight		Kg	380

Technical parameters 25DT

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	2500	Allowable radial loading of the input shaft	C3	kgf	1900	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	0.86
Allowable axial loading of the output shaft	C2	kgf	1800	Allowable axial loading of the input shaft	C4	kgf	2250	Accuracy of positioning indexing		sec.	±30
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	670	Weight		Kg	450

Technical parameters 35DT

Note 1: GD^2 of the input shaft is the value during its motion in the dwelling range.
Note: Values of C1 to C5 are the values when they reach a safety factor of 2.

Term	Symbol	Unit	Value	Term	Symbol	Unit	Value	Term	Symbol	Unit	Value
Allowable radial loading of the output shaft	C1	kgf	4500	Allowable radial loading of the input shaft	C3	kgf	2800	GD^2 of the input shaft (Note 1)	C6	kgf-m ²	2.7
Allowable axial loading of the output shaft	C2	kgf	3300	Allowable axial loading of the input shaft	C4	kgf	3800	Accuracy of positioning indexing		sec.	±20
Allowable torque of the output shaft	Ts	kgf-m	Refer to the torque table	Maximum torque of the input shaft	C5	kgf-m	1000	Weight		Kg	1000

Notes on the use of lubricant

1. After installation and fixation of the indexing drive, the exhaust cap on the oil-filling hole should be replaced (attached to the core of the input shaft) in order to release high pressure generated by thermal expansion during the operation.
2. This indexing drive should use:
CPC #90 gear oil, Mobil #630 gear oil, or Shell #220 gear oil.
3. Period for oil change:
1000 hours (about half year) after the first operation.
Change oil once a year after that.



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DT Type 1DWELL												
Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	400	500		
4	270	14DT	104.6	50.0	40.6	36.0	33.0	29.2	26.8		1.7	35
		18DT	230.4	110.2	89.5	79.3	72.7	64.4	59.1		3.2	47
		21DT	344.7	151.9	123.3	109.3	100.2	88.7			4.1	52
		25DT	527.6	218.7	177.6	157.3	144.3				5.5	60
		35DT	1262.3	533.6	438.1	387.9	355.8				10.6	80
5	180	14DT	43.9	22.2	18.0	15.9	14.6	13.0	11.9		1.1	22
		18DT	102.8	55.3	44.9	39.8	36.5	32.3	29.6	27.7	2.2	32
		21DT	213.3	106.4	86.4	76.5	70.2				3.3	40
		25DT	310.0	151.1	122.7	108.7					4.3	47
		35DT	698.8	343.6	282.0						7.9	60
	210	14DT	70.2	34.6	28.1	24.9	22.8	20.2			1.2	26
		18DT	135.5	69.2	56.2	49.8	45.6	40.4			2.4	35
		21DT	218.2	102.7	83.4	73.9	67.7	59.9			3.1	40
		25DT	333.9	149.7	121.6	107.7	98.8				4.1	47
		35DT	963.1	441.1	378.5	335.1					8.6	70
	270	14DT	96.4	44.0	35.7	31.6	29.0	25.7	23.6	22.0	1.3	30
		18DT	193.3	88.8	72.2	63.9	58.6	51.9	47.6		2.5	40
		21DT	332.5	140.8	114.4	101.3	92.9	82.3			3.5	47
		25DT	432.0	178.0	144.6	128.0	117.4				4.3	52
		35DT	1401.3	593.5	509.2	450.8	413.6				9.9	80
6	180	14DT	48.9	25.3	20.5	18.2	16.7	14.8			1.0	22
		18DT	111.3	59.3	48.1	42.6	39.1				2.0	30
		21DT	179.7	88.0	71.4	63.2	58.0				2.7	35
		25DT	248.2	116.7	94.8	83.9					3.4	40
		35DT	770.5	371.8	319.0	282.5					7.4	60
	210	14DT	52.8	25.1	20.4	18.0	16.5	14.6			1.0	22
		18DT	120.5	58.9	47.8	42.4	38.9	34.4			1.9	30
		21DT	190.7	90.9	73.8	65.4	60.0	53.0			2.5	35
		25DT	359.3	167.8	136.3	120.7	110.7				3.9	47
		35DT	826.1	367.6	315.4	279.3					7.1	60
	270	14DT	85.8	38.0	30.8	27.3	25.1	22.2	20.3	19.0	1.1	30
		18DT	138.9	61.0	49.6	43.9	40.3	35.6	32.7		1.9	32
		21DT	271.8	114.7	93.2	82.5	75.7	67.0			2.8	40
		25DT	388.1	161.8	131.4	116.3	106.7	94.5			3.6	47
		35DT	1150.8	481.7	413.2	365.9	335.7				7.7	70
8	150	14DT	111.4	68.3	55.5	49.1	45.1	39.9	36.6		1.7	35
		18DT	244.9	150.4	122.2	108.2	99.2	87.9	80.6		3.1	47
		21DT	362.9	206.4	167.7	148.5	136.2	120.7			4.0	52
		25DT	551.9	296.0	240.5	212.9	195.3				5.3	60
		35DT	1697.0	931.0	798.7	707.3	648.8				11.7	90
	180	14DT	122.6	67.8	55.1	48.8	44.7	39.6	36.3	34.0	1.6	35
		18DT	315.3	181.7	147.6	130.7	119.9	106.2	97.4	91.9	3.3	50
		21DT	508.9	275.8	224.1	198.4	182.0	161.2			4.4	60
		25DT	751.0	393.6	319.7	283.1	259.7	229.9			5.8	70
		35DT	1837.4	917.2	786.9	696.7	639.1				11.1	90



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DT Type 1DWELL												
Stops	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	400	500		
8	210	14DT	163.7	86.9	70.6	62.5	57.3	50.8	46.6	43.5	1.7	40
		18DT	336.6	179.3	145.6	128.9	118.3	104.7	96.1	89.8	3.2	52
		21DT	536.5	270.5	223.7	194.5	178.5	158.0			4.3	60
		25DT	786.5	384.6	321.4	276.6	253.7	224.7			5.6	70
		35DT	2077.6	997.8	856.0	758.0	695.3				11.5	100
	270	14DT	177.9	84.0	68.2	60.4	55.4	49.1	45.0	42.1	1.7	40
		18DT	365.7	173.3	140.7	124.6	114.3	101.2	92.8		3.0	52
		21DT	572.8	259.3	210.5	186.5	171.0	151.5	138.9		4.0	60
		25DT	831.7	366.8	297.9	263.8	242.0	214.3	196.6		5.3	70
		35DT	2220.6	956.7	820.7	726.7	666.6				10.9	100
10	120	14DT	75.4	47.1	38.3	33.9	31.1	27.5			1.2	26
		18DT	146.0	94.3	76.6	67.8	62.2	55.1			2.3	35
		21DT	224.7	139.1	113.0	100.0	91.8				3.0	40
		25DT	414.1	246.7	200.4	177.4	162.7				4.5	52
		35DT	1027.3	597.9	513.0	454.2					8.3	70
	150	14DT	180.9	59.5	48.4	42.8	39.3	34.8	31.9		1.3	30
		18DT	202.2	120.3	97.7	86.5	79.3	70.3	64.4		2.4	40
		21DT	344.6	189.6	154.2	136.5	125.2				3.5	47
		25DT	446.3	239.5	194.5	172.2	158.0				4.2	52
		35DT	1458.4	801.4	687.5	608.8	558.4				9.7	80
	180	14DT	111.9	61.2	49.7	44.0	40.4	35.8	32.8	30.7	1.3	32
		18DT	216.0	117.7	95.6	84.6	77.6				2.4	40
		21DT	359.5	191.7	155.7	137.8	126.5				3.3	47
		25DT	626.1	329.2	267.4	236.8	217.2	192.3			4.8	60
		35DT	1544.6	780.8	669.9	593.1	544.1				9.2	80
	210	14DT	141.3	75.2	61.1	54.1	49.6	44.0	40.3	37.7	1.5	35
		18DT	309.0	169.9	138.0	122.2	112.1	99.3	91.1	85.2	2.7	47
		21DT	438.7	227.4	184.7	163.5	145.7	132.7	121.7		3.4	52
		25DT	646.1	319.3	259.4	229.7	210.7	186.6	171.1		4.6	60
		35DT	2063.8	1028.2	882.1	781.1	716.5				10.2	90
	270	14DT	149.3	71.7	58.2	51.6	47.3	41.9	38.4	35.9	1.4	35
		18DT	328.2	162.4	131.9	116.8	107.2	94.9	87.0	81.4	2.6	47
		21DT	459.7	215.6	175.5	155.3	142.5	126.2	115.7		3.3	52
		25DT	670.3	301.7	245.0	217.0	199.0	176.2	161.7		4.4	60
		35DT	2165.5	976.8	838.0	742.0	680.6				9.8	90
12	120	14DT	82.2	52.6	42.7	37.8	34.7	30.7	28.2		1.1	30
		18DT	132.7	84.4	68.6	60.7	55.7	49.3			2.0	32
		21DT	262.2	159.6	129.6	114.7	105.2				2.9	40
		25DT	375.6	225.2	182.9	162.0	148.6				3.7	47
		35DT	869.4	494.9	424.6	376.0					6.9	60
	150	14DT	88.8	51.1	41.5	36.8	33.7	29.9	27.4		1.1	30
		18DT	173.6	103.0	83.7	74.1	68.0	60.2	55.2		2.1	35
		21DT	206.4	150.6	122.4	108.4	99.4	88.1			2.7	40
		25DT	468.6	265.2	215.4	190.7	174.9	154.9			4.0	52
		35DT	1186.3	647.3	555.3	491.7	451.0				7.5	70



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DT Type 1DWELL												
Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	400	500		
12	180	14DT	93.2	49.6	40.3	35.7	32.7	29.0	26.6	24.8	1.0	30
		18DT	227.4	130.3	105.9	93.7	86.0	76.1	69.8	6.3	2.3	40
		21DT	438.6	227.3	184.7	163.5	150.0	132.8	121.8		3.4	47
		25DT	485.5	255.5	207.6	183.8	168.6	149.3			3.9	52
		35DT	1237.8	626.0	537.0	475.5	463.2				7.2	70
	210	14DT	117.2	62.0	50.4	44.6	40.9	36.2	33.2	31.1	1.2	30
		18DT	328.2	162.4	131.9	116.8	107.2	94.9	87.0	81.4	2.6	40
		21DT	459.8	215.9	175.4	155.3	142.5	134.0	115.7		3.3	47
		25DT	670.3	301.7	245.0	217.0	199.0	176.2	161.7		4.4	52
		35DT	2165.5	976.8	838.0	742.0	680.6				9.8	70
	270	14DT	126.4	62.2	50.5	44.7	41.0	36.3	33.3	31.2	1.2	32
		18DT	244.8	119.7	97.3	86.1	79.0	70.0	64.2	60.0	2.1	40
		21DT	399.2	185.1	150.4	133.1	122.1	108.1	99.2		3.0	47
		25DT	509.6	231.8	188.3	166.7	153.0	135.4	124.2		3.7	52
		35DT	1313.5	571.0	489.9	433.7	397.9				6.8	70
15	120	14DT	60.5	38.3	31.1	27.6	25.3	22.4			0.9	22
		18DT	114.3	71.1	57.7	51.1	46.9	41.5			1.6	26
		21DT	167.2	98.5	80.0	70.8	65.0	57.5			2.1	30
		25DT	233.3	132.8	107.8	95.5	87.6				2.7	35
		35DT	696.0	349.6	338.5	299.7					5.6	52
	150	14DT	64.0	36.9	30.0	26.5	24.3	21.6	19.8		0.9	22
		18DT	147.5	87.8	71.3	63.2	57.9	51.3	47.1		1.7	30
		21DT	224.6	126.1	102.4	90.7	83.2	73.7			2.3	35
		25DT	301.7	164.4	133.5	118.2	108.5				2.9	40
		35DT	729.3	377.7	324.1	286.9					5.4	52
	180	14DT	62.6	35.5	28.9	25.6	23.4	20.8	19.0	17.8	0.8	22
		18DT	153.0	84.7	68.8	60.9	55.9	49.5	45.4	42.4	1.7	30
		21DT	230.7	121.1	98.3	87.1	79.8	70.7	64.9		2.3	35
		25DT	308.5	157.4	127.9	113.2	103.8	92.0			2.8	40
		35DT	749.5	326.6	311.0	275.4	252.6				5.2	52
	210	14DT	67.7	34.3	27.9	24.7	22.6	20.0	18.4	17.2	0.8	22
		18DT	156.6	81.8	66.5	58.9	54.0	47.8	43.8	41.0	1.7	30
		21DT	234.7	116.5	94.7	83.9	75.1	68.1	62.4		2.3	35
		25DT	312.8	151.3	122.9	108.9	99.9	88.4			2.8	40
		35DT	1023.0	493.2	423.1	374.7	343.7				6.0	60
	270	14DT	69.4	32.2	26.2	23.2	21.2	18.8	17.3	16.1	0.8	22
		18DT	167.0	81.5	66.2	58.6	53.8	47.6	43.7	40.9	1.7	32
		21DT	223.5	104.0	84.5	74.7	68.6	60.7	55.7		2.1	35
		25DT	317.8	141.5	114.9	101.7	93.3	82.6	75.8		2.7	40
35DT		1044.1	462.1	396.4	351.0	322.0				5.8	60	
16	120	14DT	61.6	39.6	32.2	28.5	26.1	23.1	21.2		0.9	22
		18DT	116.5	73.4	59.7	52.8	48.5	42.9			1.6	26
		21DT	169.7	101.5	82.5	73.0	67.0	59.3			2.1	30
		25DT	236.3	136.7	111.0	98.3	90.2				2.7	35
		35DT	706.7	406.7	349.0	309.0					5.5	52



Quality Excellence
Aiming for Precision

DT Type 1DWELL												
Stops	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	400	500		
16	150	14DT	64.9	38.0	30.9	27.3	25.1	22.2	20.4		0.9	22
		18DT	149.6	90.5	73.5	65.1	59.7	52.9	48.5		1.7	30
		21DT	226.9	129.7	105.4	93.2	85.5	75.8			2.3	35
		25DT	304.3	168.9	137.2	121.1	111.4				2.9	40
		35DT	737.1	388.5	333.3	295.1	270.7				5.3	52
	180	14DT	66.9	36.5	29.7	26.3	24.1	21.3	19.6	18.3	0.8	22
		18DT	154.6	87.2	70.8	62.7	57.5	50.9	46.7	43.7	1.7	30
		21DT	232.5	124.3	101.0	89.4	82.0	72.6	66.6		2.3	35
		25DT	310.5	161.5	131.2	116.1	106.5	94.3			2.8	40
		35DT	755.4	372.4	319.5	282.9	259.5				5.2	52
	210	14DT	68.2	35.2	28.6	25.3	23.2	20.6	18.9	17.7	0.8	22
		18DT	157.9	84.1	68.3	60.5	55.5	49.1	45.1	42.2	1.7	30
		21DT	236.1	119.6	97.1	86.1	78.9	69.8	64.1		2.2	35
		25DT	314.3	155.1	126.0	111.6	102.3	90.6			2.7	40
		35DT	1029.3	506.1	434.2	384.5	352.7				5.9	60
	270	14DT	69.7	33.0	26.8	23.8	21.8	19.3	17.7	16.6	0.8	22
		18DT	167.8	83.7	67.9	60.2	55.2	48.9	44.8	41.9	1.7	32
		21DT	224.4	106.6	86.6	76.7	70.3	62.3	57.1		2.1	35
		25DT	318.8	144.9	117.7	104.2	95.6	84.6	77.6		2.7	40
		35DT	1048.2	473.6	406.3	359.8	330.1				5.8	60
20	120	14DT	55.8	19.1	19.1	19.1	19.1	19.1	18.3		0.8	16
		18DT	83.4	52.1	42.3	37.5	34.4	30.4			1.3	22
		21DT	138.9	82.6	67.1	59.4	54.5	48.1			1.8	26
		25DT	194.5	113.1	91.8	81.3	74.6				2.2	30
		35DT	672.9	396.6	317.1	280.8					4.8	47
	150	14DT	57.9	19.5	19.5	19.5	19.5	19.0	17.4	16.3	0.7	16
		18DT	86.5	49.6	40.3	35.7	32.7	29.0			1.3	22
		21DT	134.9	75.5	61.3	54.3	49.8	44.1			1.7	26
		25DT	207.6	114.3	92.8	82.2	75.4				2.2	32
		35DT	646.3	350.7	300.9	266.4	244.4				4.6	47
	180	14DT	62.0	27.2	27.2	24.6	22.6	20.0	18.3	17.2	0.8	19
		18DT	103.5	74.3	60.4	53.2	49.1	43.4	39.8	37.3	1.5	26
		21DT	121.3	80.1	65.1	57.4	52.9	46.7	42.8		1.6	26
		25DT	210.4	108.9	88.5	78.3	71.8	63.6			2.2	32
		35DT	657.1	334.8	287.2	254.3	233.3				4.5	47
	210	14DT	62.8	27.4	26.7	23.6	21.7	19.2	17.6	16.5	0.7	19
		18DT	132.3	71.5	58.1	51.4	47.2	41.8	38.3	35.8	1.4	26
		21DT	185.6	93.4	75.9	67.2	61.7	54.6	50.0		1.9	30
		25DT	212.2	104.4	84.8	75.1	68.9	61.0			2.2	32
		35DT	663.8	321.3	275.7	244.1	223.9				4.5	47
270	14DT	63.7	27.6	24.9	22.1	20.3	17.9	16.4	15.4	0.7	19	
	18DT	134.3	66.8	54.3	48.0	44.1	39.0	35.8	33.5	1.4	26	
	21DT	187.4	87.1	70.7	62.7	57.5	50.8	46.7		1.9	30	
	25DT	214.0	97.3	79.0	70.0	64.2	56.8	52.1		2.1	32	
	35DT	671.4	299.7	257.1	227.7	208.8				4.4	47	



Quality Excellence
Aiming for Precision

DT Type 1DWELL												
Stops	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	400	500		
24	120	14DT	57.5	19.4	19.4	19.4	19.4	19.4	19.4	19.4	0.7	16
		18DT	76.1	33.7	33.7	33.2	30.4	26.9			1.2	19
		21DT	113.2	59.8	52.2	48.1	44.1	39.0			1.5	22
		25DT	162.7	94.7	76.9	68.1	62.5				1.9	26
		35DT	375.9	209.8	180.0	159.4					3.7	35
	150	14DT	59.1	19.7	19.7	19.7	19.7	19.7	18.7	17.5	0.7	16
		18DT	77.8	34.0	34.0	31.4	28.8	25.5	23.4		1.2	19
		21DT	115.3	57.7	50.5	45.4	41.7	36.9			1.5	22
		25DT	165.3	89.3	72.5	64.2	58.9				1.9	26
		35DT	476.9	257.0	220.4	195.2	179.1				3.9	40
	180	14DT	60.0	19.8	19.8	19.8	19.8	19.4	17.8	16.7	0.7	16
		18DT	78.7	34.2	33.7	29.9	27.4	24.3	22.3		1.2	19
		21DT	116.4	55.9	48.8	43.2	39.6	35.1	32.2		1.5	22
		25DT	166.7	84.9	68.9	61.0	56.0	49.6			1.9	26
		35DT	482.2	244.6	209.9	185.8	170.5				3.9	40
	210	14DT	60.5	19.9	19.9	19.9	19.9	18.6	17.1	16.0	0.7	16
		18DT	79.3	34.4	32.3	28.6	26.3	23.3	21.3	19.9	1.2	19
		21DT	117.1	54.5	46.7	41.3	38.0	33.7	30.8		1.5	22
		25DT	167.6	81.3	66.0	58.4	53.6	47.5			1.8	26
		35DT	485.4	234.4	201.1	178.0	163.3				3.8	40
270	14DT	61.2	20.0	20.0	20.0	19.6	17.4	15.9	14.9	0.7	16	
	18DT	79.9	34.5	30.1	26.7	24.5	21.7	19.9	18.6	1.2	19	
	21DT	117.9	52.1	43.5	38.5	35.4	31.3	28.7	26.8	1.5	22	
	25DT	168.7	75.6	61.4	54.4	49.9	44.2	40.5		1.8	26	
	35DT	489.1	218.2	187.2	165.7	152.0				3.8	40	

Notes on the use of lubricant

1. After installation and fixation of the indexing drive, the exhaust cap on the oil-filling hole should be replaced (attached to the core of the input shaft) in order to release high pressure generated by thermal expansion during the operation.
2. This indexing drive should use:
CPC #90 gear oil, Mobil #630 gear oil, or Shell #220 gear oil.
3. Period for oil change:
1000 hours (about half year) after the first operation.
Change oil once a year after that.



Quality Excellence
Aiming for Precision

DT Type 2DWELL												
Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	400	500		
30	120	14DT	60.5	38.3	31.1	27.6	25.3				0.9	22
		18DT	143.0	71.1	57.7	51.1	46.9				1.6	26
		21DT	183.1	98.5	79.9	70.8	65.0				2.1	30
		25DT	233.3	132.8	107.8	95.5					2.7	35
		35DT	696.0	394.6	338.5						5.6	52
	150	14DT	64.0	36.9	30.8	26.5	24.3	21.6			0.9	22
		18DT	147.5	87.8	71.3	63.2	57.9	51.3			1.7	30
		21DT	224.6	126.1	102.4	90.7	83.2	73.7			2.3	35
		25DT	301.7	164.4	133.5	118.2	108.5				2.9	40
		35DT	729.3	377.7	324.1						5.4	52
	180	14DT	66.2	35.5	28.9	25.6	23.4	20.8	19.0		0.8	22
		18DT	153.0	84.7	68.8	60.9	55.9	49.5			1.7	30
		21DT	230.7	121.1	98.4	87.1	79.8	70.7			2.3	35
		25DT	308.5	157.4	127.9	113.2	103.8				2.8	40
		35DT	749.5	326.6	311.0	275.4					5.2	60
	210	14DT	67.7	34.3	27.9	24.7	22.6	20.0	18.4		0.8	22
		18DT	156.6	81.8	66.5	58.9	54.0	47.8			1.7	30
		21DT	234.7	116.5	94.7	83.9	76.9	68.1			2.3	35
		25DT	312.8	151.3	122.9	108.9	99.9				2.8	40
		35DT	1023.0	493.2	423.1	374.7	343.7				6.0	60
270	14DT	69.4	32.2	26.2	23.2	21.2	18.8	17.3	16.1	0.8	22	
	18DT	167.0	81.5	66.2	58.6	53.8	47.6	43.7	39.7	1.7	32	
	21DT	223.5	104.0	84.5	74.7	68.6	60.7	55.7		2.1	35	
	25DT	317.8	141.5	114.9	101.7	93.3	82.6			2.7	40	
	35DT	1044.1	462.1	396.4	351.0	322.0				5.8	60	
32	120	14DT	61.6	32.2	28.5	26.1	23.1				0.9	22
		18DT	116.5	73.4	59.7	52.8	48.5				1.6	26
		21DT	169.7	101.5	82.5	73.0	67.1				2.1	30
		25DT	236.3	136.7	111.0	98.3					2.7	35
		35DT	706.7	406.5	349.0						5.5	52
	150	14DT	64.9	38.0	30.9	27.3	25.1	22.2			0.9	22
		18DT	149.6	90.5	90.5	65.1	59.7	52.9			1.7	30
		21DT	226.9	129.7	129.7	94.7	85.6	75.8			2.3	35
		25DT	304.3	168.9	168.9	124.4	111.4				2.9	40
		35DT	737.1	308.5	303.3	295.1					5.3	52
	180	14DT	66.9	36.5	29.7	26.3	24.1	21.3	19.6		0.8	22
		18DT	154.6	87.2	70.8	62.7	57.5	50.9			1.7	30
		21DT	232.5	124.3	101.0	89.4	82.0	72.6			2.3	35
		25DT	310.5	161.5	131.2	116.1	106.5				2.8	40
		35DT	755.4	372.4	319.5	282.9					5.2	52
	210	14DT	68.2	35.2	28.6	25.3	23.2	20.6	18.9		0.8	22
		18DT	157.9	84.1	68.3	60.5	55.5	49.1	45.1		1.7	30
		21DT	236.1	119.5	97.1	86.1	78.9	69.8			2.2	35
		25DT	314.3	155.1	126.0	111.6	102.3				2.7	40
		35DT	1029.3	506.1	434.2	394.5	352.7				5.9	60
270	14DT	69.7	33.0	26.8	23.8	21.8	19.3	17.7	16.6	0.8	22	
	18DT	167.8	83.7	67.9	60.2	55.2	48.9	44.8	41.9	1.7	32	
	21DT	224.4	106.6	86.6	76.7	70.3	62.3	57.1		2.1	35	
	25DT	318.8	144.8	117.7	104.2	95.6	84.6			2.7	40	
	35DT	1048.2	473.6	406.3	359.8	330.1				5.8	60	



Quality Excellence
Aiming for Precision

DT Type 2DWELL												
Stop s	Index Period	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)							Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
				Index Per Min N (rpm)								
				50	100	150	200	300	400	500		
40	120	14DT	55.8	19.1	19.1	19.1	19.1	19.1			0.8	16
		18DT	83.4	52.1	42.3	37.5	34.4				1.3	22
		21DT	138.9	82.6	67.1	59.4	54.5				1.8	26
		25DT	194.5	113.1	91.8	81.3					2.2	30
		35DT	627.9	369.6	317.1						4.8	47
	150	14DT	57.9	19.5	19.5	19.5	19.5	19.0			0.7	16
		18DT	86.5	49.6	40.3	35.7	32.7				1.3	22
		21DT	134.9	75.5	61.3	54.3	49.8				1.7	26
		25DT	207.6	114.3	92.8	82.2	75.4				2.2	32
		35DT	646.3	350.7	300.9	284.9					4.6	47
	180	14DT	62.0	27.2	27.2	24.6	22.6	20.0	18.3		0.8	19
		18DT	130.5	74.3	60.4	53.5	49.1	43.4	39.8		1.5	26
		21DT	183.7	97.4	79.1	70.0	64.2	56.7			2.0	30
		25DT	210.4	108.9	88.5	78.3	71.8				2.2	32
		35DT	657.1	334.8	287.2	287.2	254.3				4.5	47
	210	14DT	62.8	27.4	26.7	23.6	21.7	19.2	17.6	16.5	0.7	19
		18DT	132.2	71.5	58.1	51.4	47.2	41.8	38.3		1.4	26
		21DT	185.5	93.4	75.9	67.2	61.7	54.6			2.0	30
		25DT	212.1	104.4	84.8	75.1	68.9				2.2	32
		35DT	663.8	321.3	275.7	244.1	223.9				4.5	47
270	14DT	63.7	27.6	24.9	22.1	20.3	17.9	16.4	15.4	0.7	19	
	18DT	134.3	66.8	54.3	48.0	44.1	39.0	35.8	33.5	1.4	26	
	21DT	187.4	87.1	70.7	62.7	57.5	50.8			1.9	30	
	25DT	214.0	97.3	79.0	70.0	64.2	56.8			2.1	32	
	35DT	671.4	299.7	257.1	227.7	208.8				4.4	47	
48	120	14DT	57.5	19.4	19.4	19.4	19.4	19.4			0.7	16
		18DT	76.1	33.7	33.7	33.2	30.4				1.2	19
		21DT	113.2	59.8	52.2	48.1	44.1				1.5	22
		25DT	162.7	94.7	76.9	68.1					1.9	26
		35DT	375.9	209.8	180.0						3.7	35
	150	14DT	59.1	19.7	19.7	19.7	19.7	19.7	18.7		0.7	16
		18DT	77.8	34.0	34.0	34.0	31.4	28.8			1.2	19
		21DT	115.3	57.7	50.5	46.9	43.3				1.5	22
		25DT	165.3	89.3	72.5	64.2					1.9	26
		35DT	476.9	257.0	220.4	195.2					3.9	40
	180	14DT	60.0	19.8	19.8	19.8	19.8	19.4	17.8		0.7	16
		18DT	78.7	34.2	33.7	29.9	27.4	24.3			1.2	19
		21DT	116.4	55.9	48.8	43.2	39.6	35.1			1.5	22
		25DT	166.7	84.9	68.9	61.0	56.0				1.9	26
		35DT	482.2	244.6	209.8	201.1	178.0	163.3			3.9	40
	210	14DT	60.5	19.9	19.9	19.9	19.9	18.6	17.1	16.0	0.7	16
		18DT	79.3	34.4	32.3	28.6	24.5	21.7	19.9		1.2	19
		21DT	117.1	54.5	46.7	41.4	36.9	32.7			1.5	22
		25DT	167.6	81.3	66.0	58.4	53.6				1.8	26
		35DT	485.4	234.4	201.1	178.0	163.3				3.8	40
270	35DT	61.2	20.0	20.0	20.0	19.6	17.4	15.9	14.9	0.7	16	
	35DT	79.9	34.5	30.1	24.5	21.7	19.9			1.2	19	
	35DT	117.9	52.1	43.5	37.3	33.8	30.3			1.5	22	
	35DT	168.7	75.6	61.4	54.4	49.9	44.2			1.8	26	
	35DT	489.1	218.2	187.2	165.7	152.0				3.8	40	

Selection of P-type indexing drives

A - B - C - D E - F G

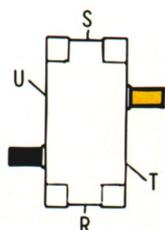
EXAMPLE : P125 - 3 - 120 - S B - 1 R

A	Distance between shafts	P65,P80,P100,P125,P150,P225,P250,P320 EXP:P65 Distance between shafts=65mm
B	Number of divided portions	1,2,3,4,6.....
C	Driving angle of the curve of the input shaft	90,120,150,180,210,270,300
D	Cam curve	S (M.S. Curve) V (M.C.V. Curve)
E	Direction of the input shaft	T (input from T-side) B (input from both sides) standard type U (input from U-side)
F	Installation and fixation	Refer to the figure below 1~5 (Figure 1 are the standard type)
G	Planes of oil hole	R, S, U, W plane (Standard plane is R, S, plane)

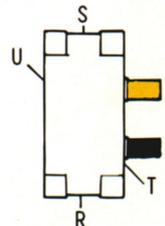
■ : Input shaft ■ : Output shaft

■ Direction of the input shaft

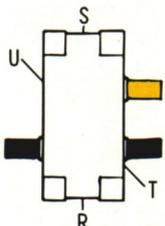
1 Input from U-side



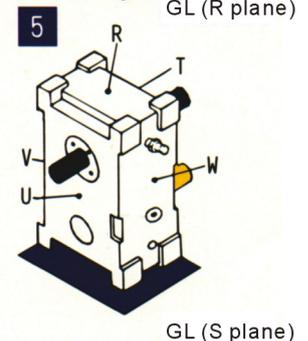
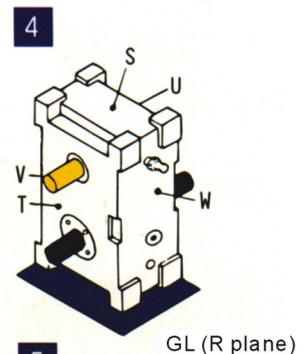
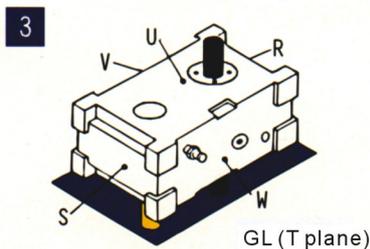
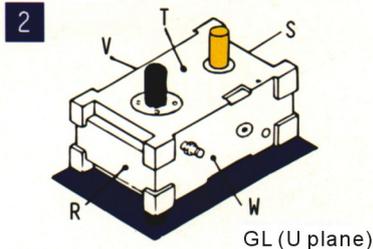
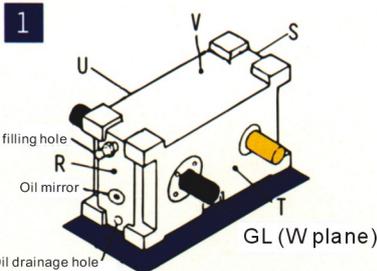
2 Input from T-side



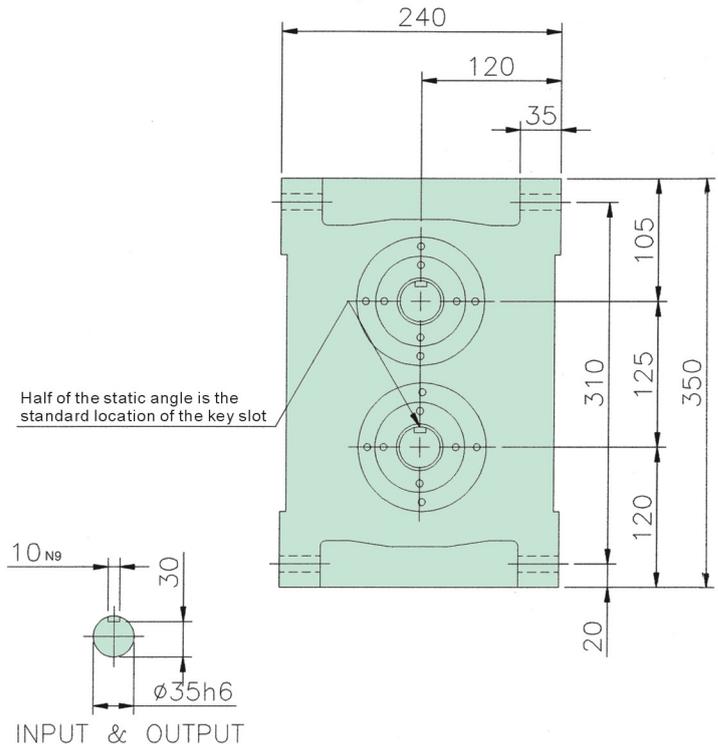
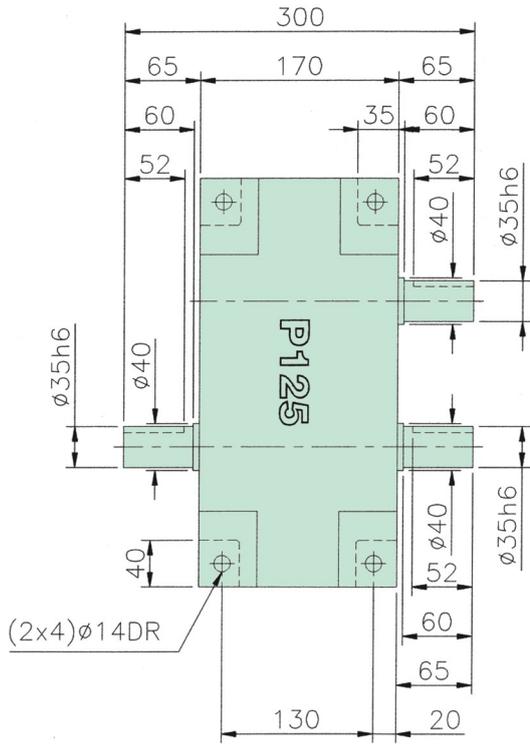
3 Input from both sides



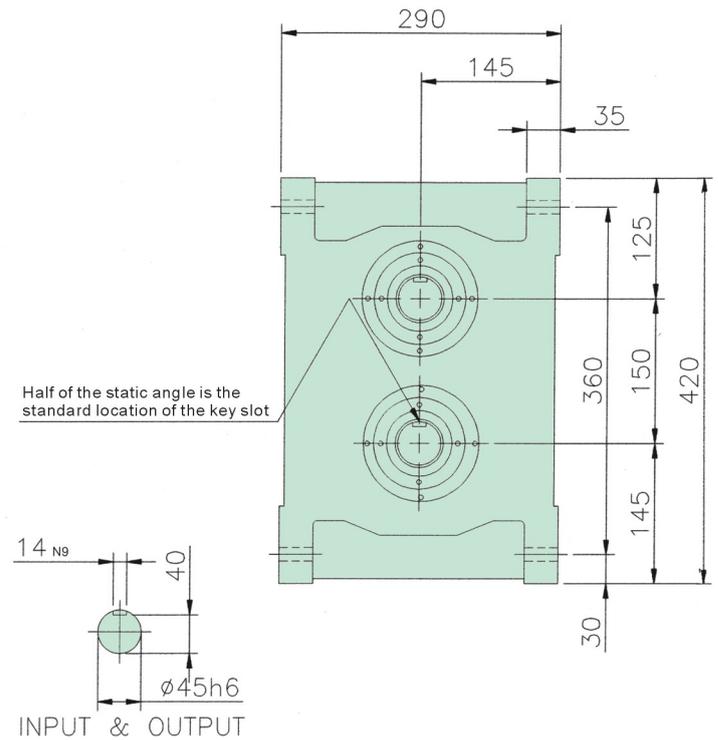
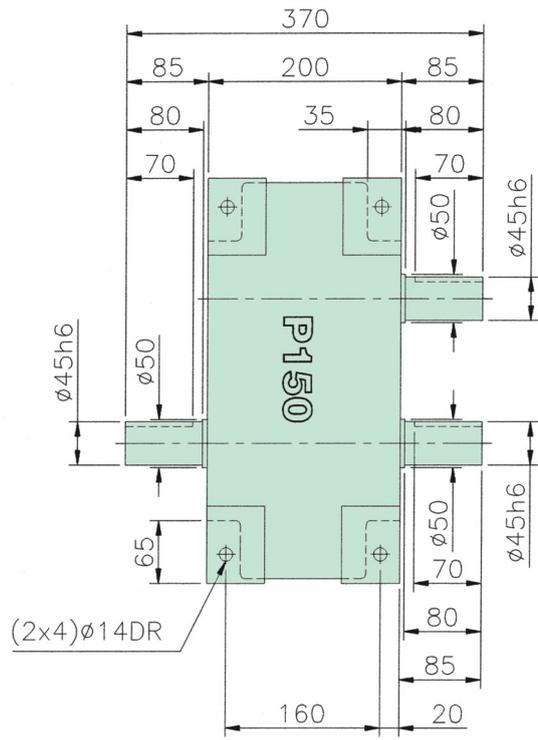
■ Installation and fixation



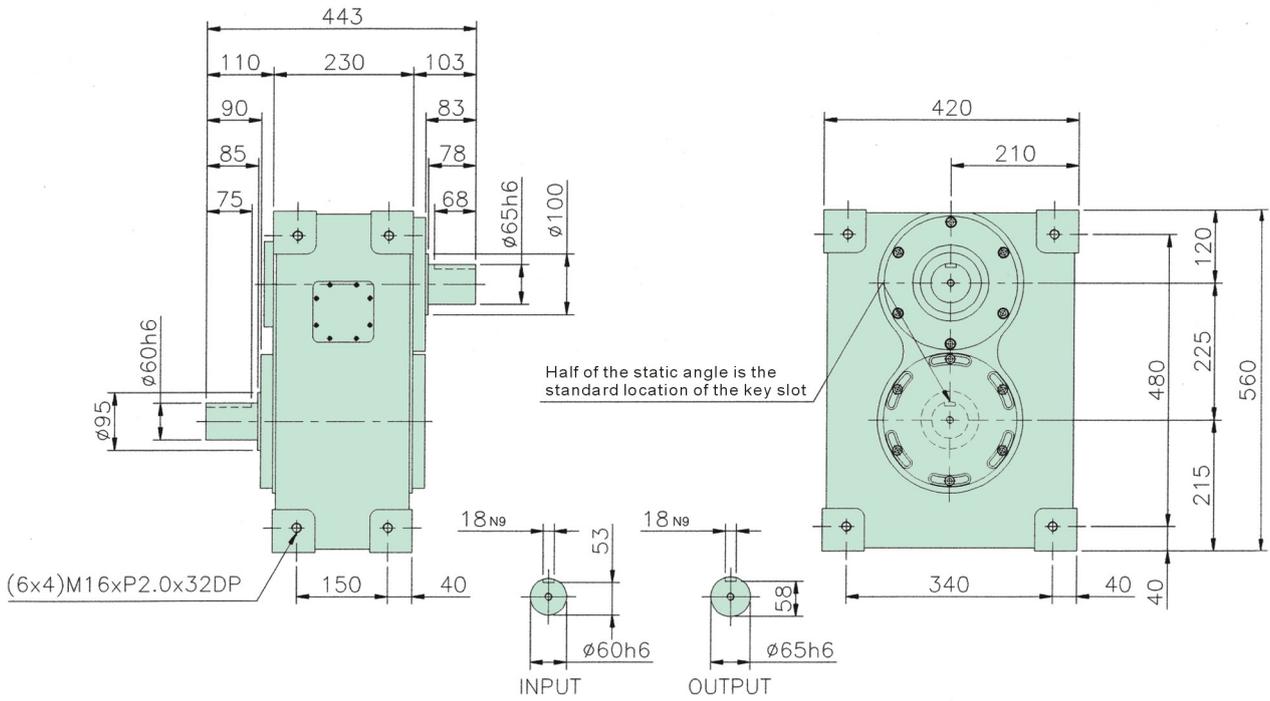
P125



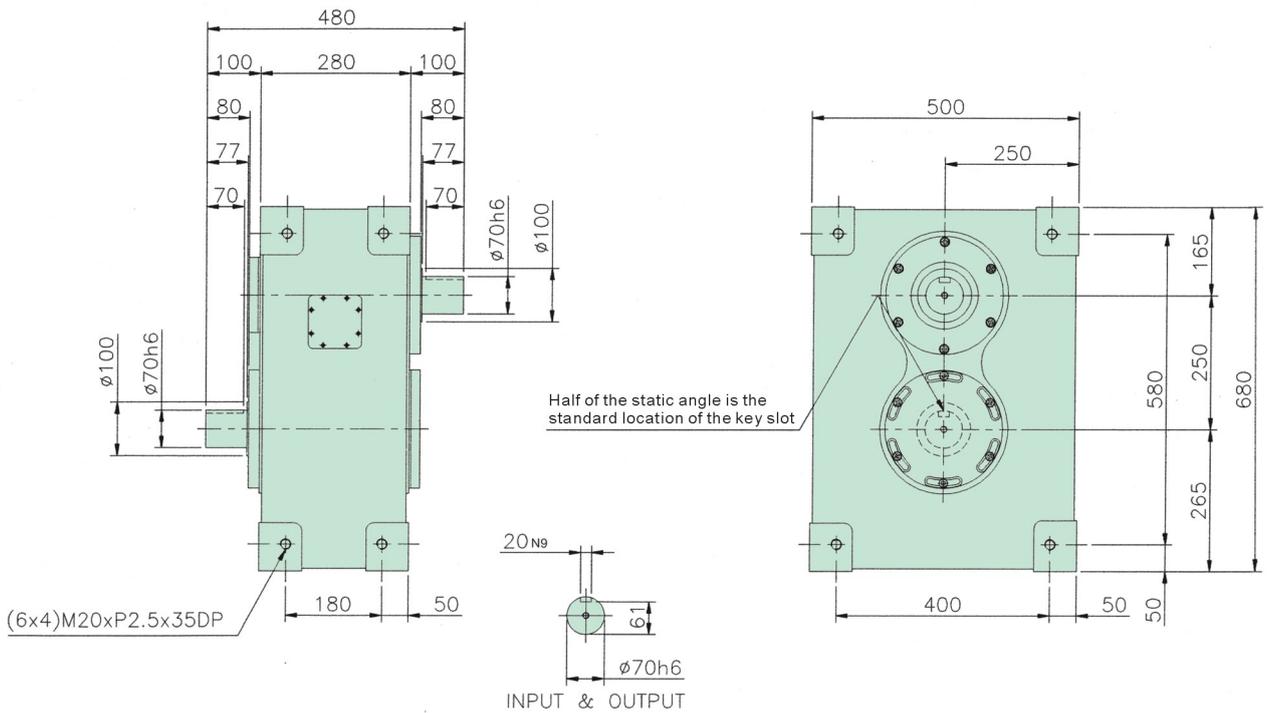
P150



P225



P250



P Type



Quality Excellence
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Stop s	Index Period	Curve	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)						Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)		
					Index Per Min N (rpm)									
					50	75	100	150	200	300				
1	270	MCV50	P050	3.58	1.45	1.10	1.00	0.77	0.79	0.69	0.13	14		
			P065	7.81	3.13	2.77	2.54	2.15	2.06	1.73	0.26	16		
			P080	15.06	6.28	5.56	5.10	1.31	4.14	3.66	0.40	22		
			P100	25.80	10.58	8.37	8.59	7.61	6.98	6.18	0.60	26		
			P125	38.74	17.79	15.55	14.45	12.79	11.74	10.39	0.73	35		
			P150	58.35	26.24	23.24	21.32	18.87	17.31	15.33	1.22	40		
			P175	91.50	41.28	36.64	33.61	29.76	27.30		1.69	47		
			P200	168.85	70.19	62.05	57.01	50.58	46.30		2.64	60		
			P225	254.00	105.56	93.42	85.69	75.97	69.64		3.45	80		
			P250	339.14	140.93	124.79	114.37	101.36	92.98		4.25	80		
			P320	611.11	253.88	224.81	206.22	182.60			8.70	100		
			P400	1261.54	464.08	410.93	376.95	333.78			16.47	120		
	300	MS	P050	3.26	1.05	1.03	0.94	0.83	0.76	0.68	0.15	14		
			P065	7.04	2.73	2.42	2.22	1.96	1.80	1.59	0.30	16		
			P080	13.56	5.35	4.84	4.44	3.93	3.61	3.19	0.46	22		
			P100	23.31	9.11	8.17	7.49	6.41	6.08	5.39	0.68	26		
			P125	38.9	1.38	1.23	1.12	0.99	0.91	0.81	0.12	14		
		MCV50	P065	8.24	3.20	2.63	2.60	2.30	2.00	1.87	0.24	16		
			P080	16.14	6.52	5.77	5.29	4.68	4.30	3.80	0.38	22		
			P100	25.90	10.25	9.08	8.33	7.25	6.76	5.99	0.57	26		
			P125	40.71	18.02	15.96	14.64	12.96	11.89	10.53	0.78	35		
			P150	61.66	26.87	23.79	21.82	19.32	17.72	15.54	1.05	40		
			P175	97.50	42.73	37.83	34.70	30.73	28.19	24.96	1.60	47		
			P200	173.64	69.78	61.89	56.77	50.15	46.11		2.61	60		
			P225	265.16	106.68	94.51	86.69	76.71	70.42		3.42	80		
			P250	356.68	143.57	127.13	116.61	103.26	94.72		4.23	80		
			P320	637.56	256.68	227.28	208.49	184.61	169.34		8.40	100		
			P400	1351.65	481.66	426.58	391.31	346.35			15.72	120		
			330	MS	P050	3.14	1.13	1.00	0.91	0.81	0.74	0.66	0.14	14
					P065	7.04	2.65	2.24	2.15	1.91	1.75	1.55	0.28	16
					P080	13.56	5.32	4.71	4.32	3.82	3.51	3.10	0.43	22
					P100	23.31	8.97	7.94	7.28	6.45	5.86	5.24	0.65	26
					P125	38.9	1.35	1.19	1.09	0.97	0.89	0.65	0.12	14
				MCV50	P065	8.15	3.11	2.75	2.52	2.23	2.05	1.81	0.23	16
					P080	16.14	6.33	5.61	5.14	4.55	4.18	3.70	0.24	22
					P100	29.60	11.39	10.08	9.25	8.19	7.51	6.65	0.53	26
	P125	40.71			17.51	15.31	14.22	12.59	11.55	10.23	0.80	35		
	P150	60.56			25.64	22.71	20.83	18.44	16.92	14.98	1.18	40		
	P175	93.75			39.92	35.35	32.43	28.51	26.34	23.32	1.64	47		
	P200	173.64			67.92	60.14	55.17	48.85	44.81	39.68	2.57	60		
P225	265.16	103.72			91.84	84.21	74.60	68.43	60.60	3.45	80			
P250	356.68	139.52			123.54	113.24	100.35	92.05	81.51	4.32	80			
P320	627.05	245.17			217.19	199.23	176.41	161.83		8.58	100			
P400	1333.63	461.94			409.03	375.21	332.23	304.76		16.22	120			
2	150	MCV50			P050	3.68	1.37	1.22	1.12	0.99	0.90	0.80	0.12	14
					P065	8.24	3.25	3.01	2.76	2.45	2.24	1.99	0.24	16
					P080	15.06	6.08	5.38	4.94	4.37	4.01	3.55	0.38	22
					P100	25.90	10.45	9.25	8.49	7.19	6.89	6.10	0.57	26
			P125	38.94	15.85	14.13	12.96	11.48	10.53		0.65	35		
			P150	58.24	23.50	20.81	19.09	16.90	15.35		1.16	40		
			P175	91.47	37.85	33.52	30.74	27.22	24.85		1.55	47		
			P200	123.27	49.25	43.53	39.93	35.25			2.52	52		
			P225	192.21	78.74	69.68	63.92	56.55			3.30	70		



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P Type

Stops	Index Period	Curve	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)						Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
					Index Per Min N (rpm)							
					50	75	100	150	200	300		
2	150	MCV50	P250	261.14	108.23	95.83	87.91	77.84		0.69	4.08	70
			P320	555.74	228.79	202.59	185.84				8.42	90
			P400	743.96	306.13	271.15	248.77				14.53	100
	180	MS	P050	3.68	1.30	1.15	1.06	0.93	0.86	0.65	0.13	14
			P065	7.81	2.87	2.64	2.42	2.05	1.97	1.74	0.26	16
			P080	15.06	5.75	5.09	4.67	4.14	3.79	3.36	0.41	22
			P100	25.90	9.78	8.66	7.94	7.03	6.45	5.71	0.61	26
			P125	38.94	15.11	13.38	12.16	10.87	9.97	8.83	0.84	35
			P150	58.35	22.25	19.65	18.07	16.00	14.68	13.00	1.24	40
			P175	91.50	35.67	31.73	29.11	25.77	23.64		1.65	47
			P200	123.27	46.55	41.21	37.81	33.48	30.65		2.69	52
			P225	192.18	74.45	65.97	60.52	53.59	49.13		3.51	70
			P250	261.09	102.34	90.73	83.23	73.69	67.60		4.32	70
			P320	555.74	216.61	191.70	175.94	155.79			8.77	90
			P400	743.96	266.20	235.33	216.06	191.23			15.48	100
		MCV50	P050	4.20	1.58	1.40	1.28	1.14	1.04	0.92	0.11	14
			P065	11.00	4.59	4.06	3.73	3.30	3.03	2.68	0.22	19
			P080	17.22	6.99	6.19	5.68	5.03	4.61	4.08	0.34	22
			P100	34.14	13.50	13.28	12.18	10.79	9.89	8.76	0.52	32
			P125	55.05	24.39	21.59	19.81	17.54	16.09	14.24	0.73	40
			P150	89.50	39.87	35.30	32.39	28.68	26.30	23.29	1.09	47
	P175		123.27	53.32	47.22	43.31	38.35	35.18		1.50	52	
	P200		187.72	81.82	72.31	66.46	58.84	53.98		2.38	60	
	P225		287.71	124.13	109.84	100.77	89.27	81.90		3.14	80	
	P250		387.70	166.44	147.37	135.07	119.70	109.81		3.89	80	
	P320		680.19	292.01	258.56	237.18	210.02			7.79	100	
	P400		1441.76	502.68	445.16	408.35				14.88	120	
	210	MS	P050	3.89	1.35	1.19	1.09	0.97	0.89	0.78	0.12	14
			P065	8.24	3.07	2.72	2.39	2.21	2.03	1.79	0.24	16
			P080	16.14	6.07	5.37	4.93	4.36	4.00	3.54	0.38	22
			P100	25.90	9.25	8.26	7.58	6.71	6.16	5.45	0.56	26
			P125	40.71	15.38	13.62	12.49	11.06	10.15	8.98	0.65	35
			P150	58.35	21.25	18.81	17.26	15.28	14.02	12.41	1.15	40
			P175	91.50	34.22	30.30	27.79	24.61	22.57	19.99	1.60	47
			P200	123.16	44.44	39.35	36.10	31.96	29.32		2.43	52
			P225	192.15	71.14	62.99	57.79	51.16	46.86		3.24	70
			P250	261.14	97.83	86.63	79.47	70.36	64.40		4.05	70
			P320	555.74	206.82	183.14	167.99	148.75	136.45		8.37	90
			P400	743.96	253.98	224.70	206.29	182.67			14.53	100
		MCV50	P050	4.73	1.81	1.60	1.47	1.30	1.19	1.06	0.10	14
			P065	12.77	5.47	4.84	4.44	3.93	3.61	3.19	0.20	19
			P080	18.83	7.65	6.78	6.22	5.50	5.05	4.47	0.32	22
			P100	34.14	14.28	12.68	11.63	10.30	9.45	8.36	0.48	32
			P125	55.05	23.28	20.62	18.91	16.75	15.36	13.60	0.68	40
			P150	90.00	38.07	33.71	30.88	27.38	25.12	22.24	1.03	47
	P175		123.27	50.91	45.08	41.35	36.62	33.45	29.74	1.35	52	
	P200		187.66	78.12	69.06	63.45	56.19	51.54		2.17	60	
	P225		287.64	118.52	104.85	96.27	85.24	78.15		2.91	80	
P250	387.62		158.92	140.64	129.08	114.29	104.75		3.65	80		
P320	680.19		278.81	246.88	226.46	200.52			7.41	100		
P400	1441.76		480.02	425.04	389.90	345.24			14.11	120		
240	MS	P050	4.20	1.45	1.28	1.18	1.04	0.96	0.85	0.11	14	
		P065	11.19	4.21	3.73	3.57	3.03	2.78	2.46	0.23	19	

P Type



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Stop s	Index Period	Curve	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)						Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
					Index Per Min N (rpm)							
					50	75	100	150	200	300		
2	240	MS	P080	17.22	6.41	5.68	5.21	4.55	4.23	3.74	0.35	22
			P100	34.14	13.76	12.18	11.17	9.89	9.07	8.03	0.53	32
			P125	55.05	22.37	19.75	18.17	16.09	14.76	13.07	0.74	40
			P150	90.18	36.57	32.39	29.71	26.30	24.13	21.36	1.11	47
			P175	123.27	48.91	43.31	39.57	35.18	32.27	28.57	1.52	52
			P200	187.72	75.05	66.46	60.96	53.98	49.52	43.75	2.33	60
			P225	287.71	113.80	100.83	92.59	81.90	75.13	66.47	3.14	80
			P250	387.70	152.55	135.19	124.21	109.81	100.73	89.19	3.94	80
			P320	680.19	267.86	237.18	217.57	192.65	176.72		7.87	100
			P400	1441.69	567.77	502.54	461.17	408.14	307.59		15.02	120
		MCV50	P050	4.73	1.74	1.37	1.41	1.25	1.15	1.01	0.09	14
			P065	11.00	5.25	4.65	4.27	3.78	3.55	3.07	0.19	19
			P080	19.91	8.03	7.11	6.52	5.89	5.29	4.69	0.30	22
			P100	38.41	16.49	14.60	13.39	11.86	10.87	9.63	0.45	32
			P125	61.66	26.62	23.64	21.62	19.14	17.56	15.55	0.63	40
			P150	101.25	43.83	38.81	35.60	31.52	28.91	25.60	0.96	47
			P175	132.25	54.32	48.10	44.12	39.07	35.84	31.73	1.33	52
			P200	211.23	89.93	79.63	73.05	64.68	59.33		2.10	60
			P225	318.85	133.25	118.01	108.25	95.85	87.93		2.79	80
			P250	426.47	176.57	156.38	143.45	127.02	116.52		3.47	80
	P320	743.96	307.12	271.94	249.46	220.79	202.62		6.89	100		
	P400	1576.92	650.99	576.43	528.77	468.21			13.47	120		
	270	MS	P050	4.20	1.40	1.24	1.14	1.01	0.92	0.82	0.11	14
			P065	11.20	4.06	3.60	3.30	2.92	2.68	2.37	0.21	19
			P080	17.22	6.19	5.33	5.03	4.45	4.08	3.61	0.33	22
			P100	34.14	13.28	11.76	10.79	9.43	8.76	7.76	0.47	32
			P125	55.15	21.59	19.12	17.39	15.53	14.24	12.61	0.70	40
			P150	90.00	35.30	31.26	28.68	25.39	23.29	20.58	1.06	47
			P175	132.08	52.44	46.43	42.59	37.71	34.59	30.63	1.35	52
			P200	211.19	86.81	76.87	70.51	62.44	57.27	50.71	2.26	60
			P225	299.45	117.09	103.68	95.11	84.22	77.25	68.40	3.02	80
			P250	387.70	147.37	130.49	119.70	105.99	97.23	86.09	3.78	80
		P320	680.19	258.56	228.95	210.02	185.96	170.58		7.57	100	
		P400	1441.76	548.06	485.29	445.16	394.18	361.58		14.52	120	
		MCV50	P050	4.73	1.68	1.49	1.36	1.21	1.11	0.87	0.09	14
			P065	11.13	5.07	4.49	4.12	3.65	3.34	2.96	0.18	19
			P080	19.91	7.75	6.86	6.29	5.57	5.11	4.46	0.28	22
			P100	38.41	15.88	14.09	12.94	11.44	10.50	9.29	0.43	32
			P125	61.66	25.69	22.75	20.87	18.48	16.89	15.01	0.61	40
			P150	101.25	42.31	37.46	34.36	30.43	27.91	24.71	0.87	47
P175			140.88	58.13	51.36	47.11	41.72	38.27	33.88	1.26	52	
P200			211.20	86.81	76.87	70.51	62.44	57.27	50.71	2.22	60	
P225	318.79		128.65	113.85	104.49	92.53	84.83		2.79	80		
P250	426.38		170.48	150.82	138.47	122.61	112.39		3.36	80		
P320	770.45	313.11	277.35	254.41	225.28	206.46		6.73	100			
P400	1500.13	656.71	581.43	533.42	472.32	433.27		13.25	120			
300	MS	P050	4.73	1.63	1.44	1.32	1.17	1.23	0.95	0.10	14	
		P065	11.00	4.82	4.35	3.99	3.53	3.24	2.87	0.20	19	
		P080	19.91	7.51	6.65	6.10	5.40	4.95	4.38	0.31	22	
		P100	38.41	15.42	13.75	12.52	11.09	10.01	9.01	0.47	32	
		P125	61.66	24.89	22.04	20.22	17.88	16.42	14.54	0.59	40	
		P150	101.25	40.99	36.29	33.29	29.48	27.04	23.87	0.99	47	
		P175	140.88	56.20	49.76	45.65	40.42	37.08	32.83	1.36	52	



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P Type

Stops	Index Period	Curve	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)						Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)			
					Index Per Min N (rpm)										
					50	75	100	150	200	300					
2	300	MS	P200	211.11	84.11	74.48	68.32	60.49	55.49	49.13	2.17	60			
			P225	318.79	124.70	110.37	101.24	89.65	82.23	72.75	2.88	80			
			P250	426.47	165.28	146.26	134.16	118.80	108.97	96.36	3.58	80			
			P320	770.53	303.48	268.72	246.39	218.27	200.22		7.15	100			
			P400	1621.98	636.28	563.41	516.82	457.63	419.79		13.77	120			
		MCV50	P050	5.25	1.93	1.71	1.56	1.38	1.27	1.12	0.09	14			
			P065	11.00	5.59	4.95	4.54	4.02	3.69	3.27	0.17	19			
			P080	21.52	8.52	7.54	6.92	6.13	5.62	4.97	0.27	22			
			P100	39.99	18.27	16.18	14.84	13.14	12.05	10.67	0.41	32			
			P125	65.00	27.65	24.61	22.57	19.99	18.23	16.23	0.58	40			
			P150	111.00	47.52	42.07	38.59	34.17	31.35	27.76	0.87	47			
			P175	154.09	64.97	57.52	52.69	46.72	42.86	37.95	1.13	52			
			P200	211.19	84.11	74.48	68.32	60.49	55.49	49.29	1.95	60			
			P225	347.87	143.44	127.02	116.51	103.17	94.64		2.59	80			
			P250	484.54	202.77	179.55	164.70	145.84	133.78		3.22	80			
			P320	850.24	355.75	315.00	288.96	255.86	234.71		6.40	100			
			P400	1500.00	754.07	667.70	612.51	542.34	497.46		12.45	120			
			3	120	MCV25	P050	3.87	2.14	1.90	1.74	1.54	1.38	1.25	0.12	14
						P065	10.24	5.84	5.26	4.82	4.40	3.92	3.47	0.24	19
						P080	16.14	9.23	8.17	7.50	6.64	6.09	5.39	0.25	22
P100	31.58	19.04				16.86	15.46	13.69	12.56	11.12	0.56	32			
P125	51.09	30.84				27.31	25.05	22.18	20.34	18.01	0.35	40			
P150	83.25	49.82				44.11	40.46	35.83	32.87	29.10	1.25	47			
P175	114.47	75.76				67.08	61.54	54.49	49.98	44.26	1.61	52			
P200	173.64	114.77				101.62	93.22	82.54	75.71	67.04	2.56	60			
P225	224.86	136.49				120.86	110.81	98.17	90.05		3.28	70			
P250	276.07	158.20				140.10	128.40	113.80	104.39		3.99	70			
P320	595.44	342.98			303.70	278.59	246.68			8.23	90				
P400	797.10	421.18			372.94	342.10	302.88			14.59	100				
MS	P050	4.17			2.15	1.91	1.69	1.55	1.42	1.26	0.12	14			
	P065	11.00			6.15	5.38	5.04	4.46	4.09	3.62	0.23	19			
	P080	17.22			9.44	8.36	7.67	6.79	6.23	5.44	0.36	22			
	P100	34.14			19.84	17.56	16.11	14.26	13.09	11.59	0.40	32			
	P125	56.15			32.89	29.12	26.71	23.65	21.70	19.21	0.69	40			
	P150	90.00			51.90	45.96	42.16	37.20	34.24	30.32	1.14	47			
	P175	123.27			78.51	69.52	63.77	56.47	51.80	45.87	1.56	52			
	P200	187.66			119.57	105.79	97.12	85.99	78.79	69.85	2.48	60			
	P225	287.68		170.72	151.05	138.66	122.78	112.58	99.73	3.32	80				
	P250	387.70		221.86	196.31	180.20	159.56	146.37	129.61	4.16	80				
P320	680.27	389.24		344.66	316.16	279.95	256.80		8.16	100					
P400	1441.76	670.15		593.39	544.33	481.88	442.29		15.25	120					
MS	P050	4.68		2.41	2.27	1.96	1.73	1.49	1.41	0.23	14				
	P065	11.13		6.37	5.78	5.45	4.69	4.30	3.78	0.21	19				
	P080	19.37		10.57	9.36	8.58	7.60	6.97	6.17	0.27	22				
	P100	36.66		20.77	18.42	16.89	14.69	13.65	12.15	0.51	32				
	P125	60.47		34.66	30.69	28.16	24.79	22.87	20.25	0.70	40				
	P150	101.34		58.09	51.44	47.08	41.78	38.33	33.89	1.03	47				
	P175	137.36		86.68	76.75	70.40	62.34	57.18	50.63	1.33	52				
	P200	199.53		123.31	109.21	100.16	88.74	81.35	72.03	2.32	60				
	P225	313.03		181.88	161.06	147.72	130.79	120.05		3.00	80				
	P250	426.53		240.44	212.91	195.28	172.83	158.74		3.67	80				
P320	743.96	418.37		370.45	339.82	300.90	276.02		7.44	100					
P400	1500.00	720.30		637.80	585.06	518.05	475.22		14.25	120					

P Type



Quality Excellence
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Stop s	Index Period	Curve	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)						Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
					Index Per Min N (rpm)							
					50	75	100	150	200	300		
3	210	MS	P050	4.73	2.30	2.04	1.87	1.65	1.52	1.34	0.10	14
			P065	11.00	6.23	5.52	5.06	4.48	4.11	3.64	0.20	19
			P080	19.37	10.09	8.94	8.20	7.26	6.66	5.89	0.30	22
			P100	40.00	23.28	20.62	18.88	16.74	15.36	13.60	0.43	32
			P125	64.41	36.20	32.04	29.39	26.02	23.87	21.15	0.64	40
			P150	105.00	58.47	51.77	47.49	42.05	38.57	34.15	0.97	47
			P175	145.28	89.76	79.48	72.91	64.56	59.22	52.44	1.32	52
			P200	211.19	127.78	113.14	103.79	91.90	84.30	74.65	2.13	60
			P225	338.22	194.10	171.87	157.66	139.60	128.06	113.39	2.79	80
			P250	465.24	260.41	230.59	211.52	187.30	171.81	152.13	3.45	80
			P320	797.10	441.33	390.78	358.47	317.41	291.17		6.99	100
			P400	1500.00	759.83	672.80	617.17	546.49	501.30		13.47	120
	240	MS	P050	5.25	2.58	2.28	2.09	1.85	1.70	1.50	0.09	14
			P065	11.00	7.43	6.58	6.04	5.34	4.90	4.34	0.18	19
			P080	21.52	11.31	10.01	9.18	8.13	7.46	6.60	0.28	22
			P100	40.00	23.75	21.03	19.29	17.08	15.67	13.87	0.43	32
			P125	65.00	36.07	31.94	29.30	25.94	23.80	21.07	0.61	40
			P150	111.00	60.93	53.95	49.49	43.82	40.20	35.60	0.91	47
			P175	154.09	94.02	83.25	76.37	67.62	62.03	54.92	1.25	52
			P200	234.65	143.18	126.78	116.30	102.98	94.46	83.64	1.99	60
			P225	349.95	196.69	174.16	159.76	141.46	129.76	114.90	2.65	80
			P250	465.24	250.19	221.53	203.22	179.94	165.06	146.16	3.31	80
			P320	797.10	424.00	375.44	344.39	304.95	279.73	247.69	6.73	100
			P400	1500.00	729.99	646.38	592.94	525.03	481.61		13.05	120
	270	MS	P050	5.25	2.49	2.20	2.02	1.79	1.64	1.45	0.09	14
			P065	11.20	7.17	6.35	5.83	5.16	4.73	4.19	0.17	19
			P080	21.52	10.92	9.67	8.83	7.85	7.20	6.27	0.16	22
			P100	40.13	22.93	20.23	18.62	16.36	15.13	13.39	0.41	32
			P125	65.00	34.82	30.83	28.28	25.04	22.97	20.34	0.63	40
			P150	111.11	58.73	52.12	47.81	42.22	38.80	34.36	0.79	47
			P175	154.13	90.66	80.36	73.72	65.33	59.93	53.10	1.20	52
			P200	234.53	138.21	122.22	112.26	99.51	91.23	80.74	1.85	60
			P225	359.54	197.33	174.69	160.35	142.02	130.22	115.28	2.54	80
			P250	484.55	256.45	227.15	208.44	184.53	169.21	149.81	3.23	80
			P320	850.33	449.92	398.40	365.45	323.59	296.83	262.87	6.50	100
			P400	1500.15	774.55	685.83	629.22	557.17	511.06		12.52	120
	300	MS	P050	5.29	2.38	2.20	1.89	1.80	1.43	1.47	0.10	14
			P065	11.12	6.83	6.26	5.59	5.13	4.60	4.06	0.12	19
			P080	21.46	10.55	9.40	8.62	7.58	6.89	6.23	0.26	22
			P100	40.20	22.34	19.55	18.10	15.89	14.55	12.89	0.40	32
			P125	65.16	33.60	29.90	27.33	24.30	22.32	19.75	0.56	40
			P150	111.00	56.99	50.33	46.29	40.99	37.60	33.35	0.85	47
			P175	154.09	87.93	77.86	71.36	63.24	58.01	51.37	1.17	52
			P200	234.59	133.91	118.46	108.77	96.40	88.34	78.37	1.86	60
			P225	359.63	191.19	169.24	155.30	137.55	126.10	111.79	2.47	80
			P250	484.66	248.47	220.01	201.82	178.70	163.85	145.20	3.08	80
			P320	850.24	435.92	385.99	354.08	313.52	287.60	254.66	6.30	100
			P400	1500.12	750.52	664.56	609.61	539.79	495.23	438.44	12.25	120
4	90	MS	P050	3.70	2.13	1.92	1.72	1.55	1.43	1.21	0.13	14
			P065	7.81	4.45	3.89	3.47	3.16	2.83	2.56	0.26	16
			P080	15.20	8.41	7.45	6.83	6.12	5.55	4.87	0.41	22
			P100	25.90	14.09	12.53	11.44	10.13	9.29	8.23	0.55	26
			P125	38.94	24.57	21.75	19.95	17.67	16.21	14.35	0.84	35



Quality Excellence
Aiming for Precision

P Type

Stop s	Index Period	Curve	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)						Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)	
					Index Per Min N (rpm)								
					50	75	100	150	200	300			
4	90	MS	P150	58.35	36.32	32.16	29.50	26.12	23.96		1.24	40	
			P175	91.60	56.97	50.33	46.34	41.00	37.62		1.66	47	
			P200	123.27	77.77	68.86	63.17	55.93	51.31		2.69	52	
			P225	192.21	121.26	107.37	98.50	87.21	80.01		3.51	70	
			P250	261.14	164.75	145.88	133.82	118.49	108.70		4.32	70	
			P320	555.74	350.62	310.46	284.79	252.17			8.79	90	
			P400	743.88	469.37	415.55	381.25	337.60			15.50	100	
			120	MS	P050	4.20	1.45	1.29	1.18	1.04	0.96	0.85	
	P065	11.13			4.84	4.29	3.93	3.48	3.19	2.83		0.23	19
	P080	17.22			7.36	6.51	5.97	5.29	4.85	4.30		0.35	22
	P100	34.14			16.26	14.40	13.11	11.69	10.72	9.50		0.44	32
	P125	55.05			29.61	26.22	24.05	21.30	19.40	17.30		0.74	40
	P150	90.01			48.41	42.86	39.32	34.81	31.93	28.28		1.11	47
	P175	123.27			64.44	57.10	52.34	46.34	42.51	37.64		1.49	52
	P200	187.66			98.13	86.89	79.71	70.58	64.74	57.32		2.41	60
	P225	287.68			144.72	128.15	117.55	104.09	95.48			3.18	80
	P250	387.70			191.31	169.40	155.39	137.59	126.21			3.94	80
	P320	680.19			335.64	297.31	272.62	241.40				7.87	100
	P400	1441.82			629.95	557.80	511.68	453.12				15.11	120
	150	MS	P050	4.73	1.63	1.44	1.32	1.20	1.07	1.00		0.10	14
			P065	11.13	5.65	5.03	4.59	4.12	3.72	3.25		0.35	19
			P080	19.91	8.61	7.62	6.99	6.19	5.68	5.03		0.31	22
			P100	38.45	18.22	16.13	14.80	13.10	12.02	10.64		0.50	32
			P125	61.70	29.18	25.84	23.70	20.98	19.25	17.04		0.66	40
			P150	101.25	48.03	42.53	39.01	34.55	31.70	28.06		0.99	47
			P175	140.88	65.60	58.04	53.33	47.15	43.25	38.30		1.36	52
			P200	211.19	97.38	86.22	79.09	70.03	64.24	56.88		2.22	60
			P225	318.85	140.33	124.25	113.91	100.92	92.58			2.90	80
			P250	426.50	183.27	162.28	148.72	131.81	120.91			3.58	80
			P320	743.96	318.69	282.23	258.86	229.21	210.33			7.25	100
			P400	1500.01	675.52	589.15	548.69	485.85				13.94	120
	180	MS	P050	5.25	1.83	1.62	1.51	1.31	1.30	1.07		0.09	14
			P065	11.02	5.63	4.94	4.53	4.01	3.68	3.31		0.21	19
			P080	21.52	8.48	7.51	6.89	6.12	5.62	5.01		0.28	22
			P100	40.03	18.75	16.70	15.23	13.49	12.37	11.00		0.50	32
			P125	65.06	30.84	27.40	25.05	22.22	20.35	18.13		0.61	40
			P150	111.16	52.63	46.71	42.82	37.88	34.80	30.91		2.00	47
			P175	154.09	71.75	65.65	58.27	51.72	47.33	41.83		1.25	52
			P200	234.73	109.26	96.75	88.75	78.58	72.08	63.83		2.00	60
			P225	359.65	161.16	142.68	130.88	115.95	106.32			2.64	80
			P250	484.56	213.05	188.61	173.01	153.31	140.55			3.27	80
			P320	850.24	373.70	330.88	303.54	268.88	246.55			6.70	100
			P400	1500.00	792.12	701.50	643.40	569.71	522.60			12.90	120
	210	MS	P050	5.25	1.75	1.55	1.42	1.25	1.15	1.02		0.08	14
			P065	11.06	5.33	4.80	4.33	3.90	3.52	3.11		0.17	19
			P080	21.52	8.10	7.17	6.58	5.83	5.36	4.73		0.30	22
			P100	40.00	17.84	15.85	14.54	12.92	11.81	10.54		0.44	32
			P125	65.00	29.45	26.07	23.92	21.18	19.43	17.20		0.58	40
P150			111.00	50.34	44.57	40.89	36.20	33.21	29.40		0.87	47	
P175			154.09	68.50	60.66	55.64	49.27	45.19	40.02		1.19	52	
P200			234.69	104.35	92.39	84.65	75.03	68.82	60.94		1.90	60	
P225			359.66	153.87	136.25	124.93	110.67	101.50	89.88		2.53	80	
P250			484.63	203.38	180.11	165.21	146.30	134.18	118.81		3.15	80	

P Type



Quality Excellence
Aiming for Precision

Stop s	Index Period	Curve	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)						Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)		
					Index Per Min N (rpm)									
					50	75	100	150	200	300				
4	210	MS	P320	850.24	356.81	315.95	289.82	256.63	235.41		6.37	100		
			P400	1500.06	756.32	669.70	614.32	543.96	498.98		12.43	120		
	240	MS	P050	5.30	1.68	1.48	1.36	1.21	1.20	1.02		0.08	14	
			P065	11.13	5.12	4.53	4.16	3.68	3.41	3.01		0.16	19	
			P080	21.52	7.80	6.91	6.32	5.68	5.13	4.54		0.25	22	
			P100	40.20	17.31	15.23	13.83	12.37	11.35	10.05		0.41	32	
			P125	65.01	28.32	25.15	22.98	20.35	18.66	16.52		0.60	40	
			P150	111.09	48.36	42.82	39.28	34.80	31.83	28.27		0.83	47	
			P175	154.19	65.87	58.27	53.46	47.33	43.42	38.50		1.14	52	
			P200	234.65	100.23	88.75	81.41	72.08	66.12	58.55		2.00	60	
			P225	359.68	147.87	130.93	120.06	106.32	97.54	86.38		2.52	80	
			P250	484.71	195.50	173.11	158.71	140.55	128.95	114.20		3.04	80	
			P320	850.20	342.80	303.54	278.44	246.66	226.16			6.14	100	
			P400	1500.08	726.65	643.40	590.30	522.71	479.42			12.10	120	
	270	MS	P050	5.25	1.62	1.43	1.31	1.17	1.07	0.94		0.08	14	
			P065	11.12	4.83	4.40	4.07	3.60	3.30	2.89		0.16	19	
			P080	21.52	7.51	6.75	6.14	5.44	4.95	4.40		0.27	22	
			P100	40.16	16.61	14.81	13.50	12.00	11.00	9.70		0.37	32	
			P125	65.00	27.44	24.25	22.18	19.67	18.01	15.95		0.57	40	
			P150	111.15	46.72	41.41	37.85	33.57	30.91	27.32		0.95	47	
			P175	154.13	63.55	56.26	51.62	45.75	41.91	37.11		1.18	52	
			P200	234.65	96.90	85.68	78.65	69.58	63.83	56.52		1.67	60	
			P225	359.68	142.79	126.40	115.96	102.62	94.19	83.38		2.28	80	
			P250	484.70	188.68	167.11	153.27	135.65	124.55	110.23		2.88	80	
			P320	850.27	330.95	293.06	268.91	237.88	218.31	193.41		6.02	100	
			P400	1500.09	701.43	621.09	569.83	504.46	462.75			11.84	120	
	300	MS	P050	5.25	1.60	1.41	1.27	1.13	1.03	0.91		0.13	14	
			P065	11.02	4.77	4.24	3.94	3.50	3.16	2.94		0.21	19	
			P080	21.52	7.33	6.44	5.88	5.23	4.93	4.25		0.30	22	
			P100	40.06	16.12	14.30	13.07	11.57	10.61	9.51		0.53	32	
			P125	65.11	26.50	23.43	21.53	19.11	17.50	15.51		0.65	40	
			P150	111.09	45.23	40.12	36.74	32.53	29.99	26.42		0.83	47	
			P175	154.10	61.57	54.61	49.87	44.27	40.70	35.96		1.10	52	
			P200	234.65	93.73	83.11	76.14	67.41	61.90	54.76		1.80	60	
			P225	359.70	138.24	122.51	112.29	99.48	91.25	80.76		2.40	80	
			P250	484.75	182.74	161.90	148.43	131.55	120.60	106.75		3.00	80	
			P320	850.25	320.67	283.93	260.46	230.61	211.60	187.40		5.90	100	
			P400	1500.11	679.56	601.81	551.88	488.76	448.35	397.12		11.64	120	
	6	180	MS	P050	4.20	1.78	1.57	1.44	1.28	1.17	1.04		0.11	14
				P065	11.00	6.57	5.81	5.23	4.72	4.33	3.83		0.21	19
				P080	17.22	10.15	8.88	8.22	7.32	6.68	6.01		0.32	22
				P100	31.58	19.02	16.84	15.44	13.67	12.54	11.11		0.51	32
				P125	56.19	34.85	30.84	28.32	25.05	22.88	20.35		0.66	40
				P150	93.11	58.89	52.22	47.80	42.41	38.85	34.45		1.00	47
				P175	129.45	80.00	70.82	64.91	57.52	52.65	46.72		1.32	52
				P200	173.64	102.08	90.39	82.91	73.46	67.35	59.63		2.15	60
				P225	224.89	131.62	116.57	106.92	94.66	86.85			2.61	70
				P250	276.13	161.15	142.75	130.92	115.85	106.35			3.06	70
P320				595.46	349.22	309.21	283.75	251.19	230.44			6.01	90	
P400				797.12	428.80	379.75	348.29	308.40				9.50	100	
210		MS	P050	4.75	2.12	1.80	1.63	1.44	1.32	1.17		0.10	14	
			P065	11.00	6.96	6.16	5.65	5.16	4.59	4.06		0.22	19	
			P080	19.37	11.43	10.12	9.28	8.22	7.54	6.67		0.30	22	



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P Type

Stop s	Index Period	Curve	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)						Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
					Index Per Min N (rpm)							
					50	75	100	150	200	300		
6	210	MS	P100	36.07	22.40	19.83	18.19	16.11	14.78	13.08	0.45	32
			P125	60.60	37.03	32.79	30.07	26.63	24.43	21.63	0.61	40
			P150	101.25	63.57	56.29	51.63	45.72	41.94	37.14	0.89	47
			P175	137.36	83.15	73.61	67.52	59.83	54.85	48.59	1.21	52
			P200	206.53	124.28	110.11	100.88	89.38	81.99	72.60	1.89	60
			P225	297.17	178.03	157.62	144.55	128.00	117.45	103.97	2.46	80
			P250	387.81	231.78	205.13	188.22	166.61	152.90	135.33	3.03	80
			P320	680.25	406.43	359.90	330.12	292.40	268.14		5.73	100
			P400	1441.80	699.75	619.71	568.37	503.31	461.66		10.00	120
	240	MS	P050	5.27	2.25	2.01	1.87	1.63	1.48	1.35	0.10	14
			P065	11.11	7.44	6.54	6.13	5.31	4.91	4.31	0.21	19
			P080	20.44	11.90	10.51	9.65	8.54	7.83	6.94	0.28	22
			P100	40.00	25.23	22.34	20.53	18.15	16.70	14.74	0.50	32
			P125	64.41	38.89	34.44	31.59	27.97	25.66	22.72	0.57	40
			P150	105.20	64.38	57.00	52.30	46.30	42.47	37.61	0.84	47
			P175	145.28	86.63	76.71	70.37	62.31	57.15	50.61	1.12	52
			P200	222.95	133.39	118.13	108.34	95.93	88.12	77.92	1.88	60
			P225	344.13	211.19	187.02	171.54	151.92	139.39	123.42	2.30	80
	270	MS	P050	5.25	2.17	1.92	1.80	1.56	1.43	1.27	0.11	14
			P065	11.03	8.02	7.10	6.51	5.80	5.32	4.71	0.17	19
			P080	21.55	12.41	10.94	10.04	8.95	8.16	7.27	0.28	22
			P100	40.01	25.91	22.88	21.01	18.71	17.11	15.13	0.39	32
			P125	65.19	38.95	34.53	31.70	28.02	25.81	22.85	0.55	40
			P150	111.05	67.41	56.69	54.75	48.50	44.53	39.40	0.85	47
			P175	154.13	91.22	80.72	74.05	65.64	60.21	53.26	1.12	52
			P200	234.70	138.83	122.87	112.71	99.99	91.65	81.10	1.70	60
			P225	355.62	243.79	215.92	198.11	175.43	160.87		2.64	80
	120	MS	P050	3.68	1.67	1.48	1.36	1.21	1.13	0.97	0.11	14
			P065	7.81	4.32	3.95	3.51	3.10	2.85	2.52	0.25	16
			P080	15.12	8.27	7.32	6.72	5.95	5.45	4.83	0.41	22
			P100	25.90	13.94	12.34	11.32	10.02	9.19	8.14	0.55	26
			P125	38.94	21.05	18.65	17.06	15.11	13.86	12.27	0.69	35
			P150	58.35	31.75	28.11	25.79	22.83	20.94		0.99	40
			P175	91.56	49.50	43.83	40.20	35.66	32.65		1.36	47
			P200	123.27	66.80	59.15	54.26	48.14	44.17		2.11	52
			P225	132.40	96.05	87.04	78.03	24.07			36.06	70
150	MS	P050	3.93	1.41	1.25	1.18	1.02	0.88	0.85	0.15	14	
		P065	8.24	3.54	3.14	2.88	2.55	2.34	2.07	0.23	16	
		P080	17.25	7.65	6.84	6.26	5.51	5.10	4.51	0.37	22	
		P100	34.14	16.39	14.52	13.32	11.79	10.81	9.58	0.46	32	
		P125	55.13	26.51	23.45	21.46	19.12	17.54	15.46	0.73	40	
		P150	90.13	44.12	39.03	35.79	31.71	29.11	25.80	0.93	47	
		P175	123.29	60.35	53.46	49.13	43.42	39.79		1.26	52	
		P200	187.76	91.89	81.36	74.62	66.12	60.69		1.97	60	

P Type



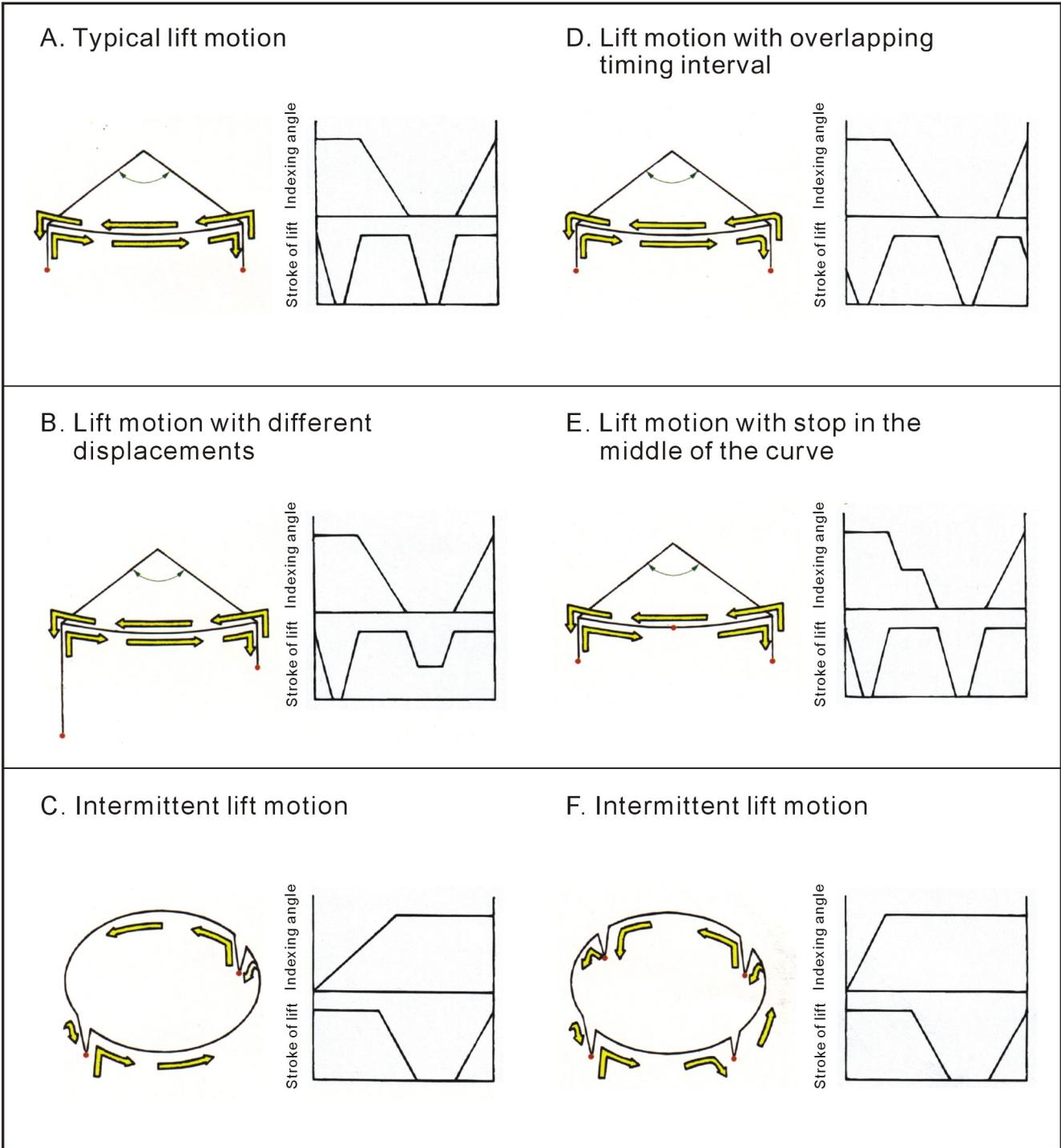
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Stop s	Index Period	Curve	Code	Static Torque (Kgf-m)	Net Dynamic Torques To (Kgf-m)						Cam Shaft Friction Torque Tx (kgf-m)	Diameter of Cam Follower (mm)
					Index Per Min N (rpm)							
					50	75	100	150	200	300		
8	150	MS	P225	178.73	121.10	109.59	98.34	89.06	30.35		40.99	80
			P250	387.81	169.69	150.30	137.81	122.06	112.00		3.05	80
			P320	680.19	321.00	284.23	260.73	230.87			5.82	100
			P400	1441.79	680.45	602.49	552.51	489.25			10.25	120
	180	MS	P050	4.32	1.52	1.36	1.29	1.13	1.01	0.85	0.16	14
			P065	11.20	4.83	4.35	3.86	3.49	3.14	2.81	0.21	19
			P080	20.00	9.13	8.12	7.35	6.44	5.97	5.30	0.31	22
			P100	38.41	18.60	16.47	15.17	13.50	12.30	10.92	0.46	32
			P125	61.69	29.81	26.50	24.25	21.45	19.69	17.51	0.63	40
			P150	101.25	49.88	44.30	40.62	35.96	32.88	29.21	0.89	47
			P175	137.36	67.42	59.73	54.81	48.51	44.51	39.45	1.13	52
			P200	211.21	104.23	92.34	84.73	74.98	68.69		1.83	60
			P225	205.82	140.83	127.55	114.43	103.59	34.35		40.92	80
			P250	426.47	200.42	177.43	162.76	144.12	132.20		2.79	80
			P320	744.00	348.53	308.55	283.15	250.62			5.24	100
			P400	1500.13	738.70	654.01	599.89	531.26			9.31	120
	210	MS	P050	4.85	1.68	1.48	1.41	1.25	1.13	1.01	0.11	14
			P065	11.03	5.11	4.50	4.13	3.65	3.35	2.97	0.18	19
			P080	19.91	8.64	7.65	7.10	6.35	5.75	5.15	0.30	22
			P100	38.55	17.79	15.80	14.45	12.67	11.82	10.42	0.44	32
			P125	61.63	28.45	25.20	23.10	20.50	18.76	16.61	0.54	40
			P150	101.27	47.80	42.26	38.80	34.31	31.47	27.91	0.83	47
			P175	140.92	66.85	59.32	54.46	48.18	44.27	39.14	1.10	52
			P200	211.19	99.52	88.12	80.83	71.57	65.65	58.13	1.69	60
			P225	201.27	134.52	121.84	109.27	98.94	32.83		40.85	80
			P250	426.53	191.35	169.52	155.56	137.71	126.30		2.71	80
			P320	770.53	351.52	311.26	285.52	252.82	231.92		4.93	100
			P400	1500.12	737.02	652.60	598.64	530.12	486.25		8.80	120
	240	MS	P050	5.28	2.00	1.73	1.60	1.50	1.28	1.20	0.16	14
			P065	11.03	6.25	5.51	5.07	4.48	4.11	3.62	0.20	19
			P080	21.52	9.42	8.24	7.73	6.81	6.35	5.57	0.31	22
			P100	40.12	20.25	17.89	16.51	14.60	13.24	11.90	0.26	32
			P125	65.06	30.61	27.13	24.84	21.84	20.21	17.83	0.43	40
			P150	111.09	53.22	47.08	43.20	38.10	35.21	31.11	0.66	47
			P175	154.11	74.48	65.93	60.50	53.44	49.13	43.51	1.13	52
			P200	234.65	113.35	100.40	92.12	81.55	74.84	66.09	1.60	60
			P225	359.68	184.53	150.05	137.69	121.95	111.88		2.05	80
			P250	484.70	255.70	199.70	183.25	162.35	148.91		2.50	80
			P320	850.30	395.95	350.43	321.65	284.84	261.23		4.61	100
			P400	1500.11	839.05	743.15	681.71	603.56	553.70		8.13	120
	270	MS	P050	5.27	1.84	1.64	1.35	1.32	1.21	1.07	0.12	14
			P065	11.03	6.01	5.39	4.74	4.33	4.01	3.32	0.17	19
			P080	21.61	9.21	8.12	7.33	6.57	6.02	5.31	0.30	22
			P100	40.06	19.54	17.33	15.76	14.12	12.91	11.51	0.41	32
			P125	65.08	29.50	26.09	23.88	21.21	19.42	17.23	0.53	40
			P150	111.11	51.32	45.51	41.56	36.79	33.84	29.88	0.65	47
			P175	154.12	71.91	63.52	58.45	51.50	47.38	41.86	1.03	52
			P200	234.93	109.42	96.75	88.90	78.57	72.14	63.91	1.67	60
P225			359.84	163.64	144.76	132.88	117.65	107.90	95.56	2.11	80	
P250			484.75	217.85	192.77	176.85	156.73	143.65	127.20	2.54	80	
P320			850.35	382.20	338.31	310.43	274.79	252.23		4.54	100	
P400			1500.12	810.11	717.30	657.88	582.49	534.51		7.97	120	

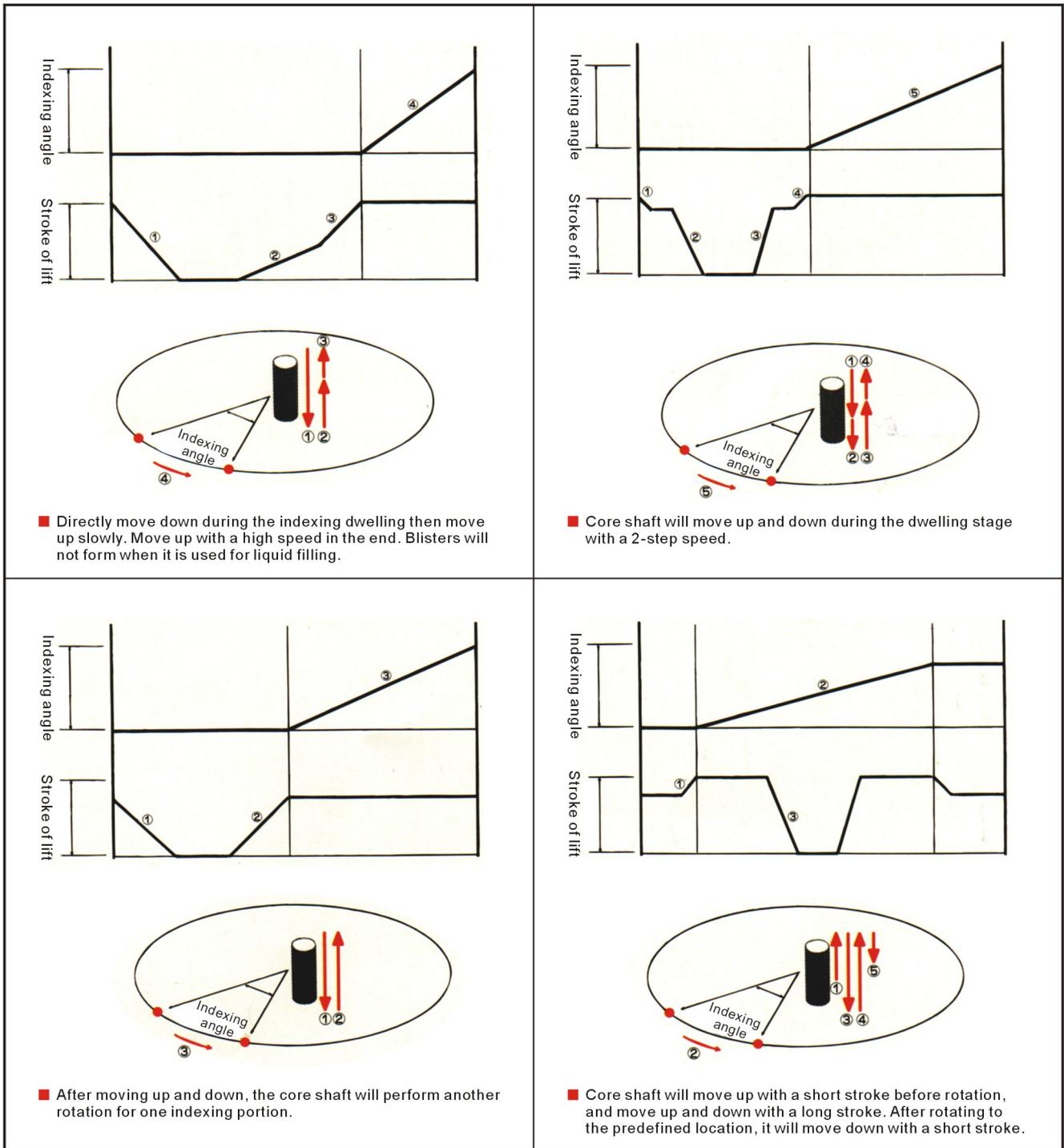


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Motion curve combining lift and indexing



Motion curve with separated lift and indexing motions





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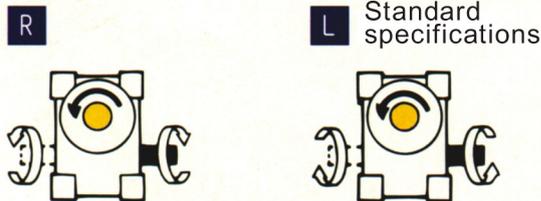
Selection of Composite Type of Indexing Drives

A B C - D - E F G - H I - J K

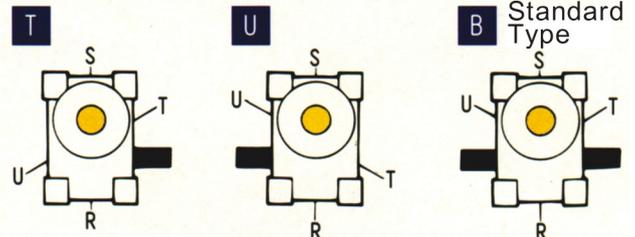
EXAMPLE : 8D SU 6 - 120 - S L B - 1 R - 35 T

A	Distance between shafts	4.5D,7D,8D..... EXP:4.5D Distance between shafts=45mm
B	Type of indexing drive	SU (The type combining indexing, ascending and descending) SUN (The type combining swing, ascending and descending) FSU (The type separating swing, ascending and descending) Notes: FSUH is the hollow type
C	Number of divided portions	2,3,4,6,8,10,12,16,24,32.....
•	Swing angle	1-180 (The type combining swing and lift)
D	Driving angle of the curve of the input shaft	90,120,180,270
E	Cam curve	S (M.S. Curve) V (M.C.V. Curve) T (M.T. Curve)
F	Direction of rotation	L (left rotation) standard type N (allow left and right rotation) R (right rotation)
G	Direction of the input shaft	T (input from T-side) B (input from both sides) standard type U (input from U-side)
H	Installation and fixation	Refer to Figure 1-2 below (W plane, R plane)
I	Planes of oil hole	Standard plane is R, S, U plane
J	Stroke of lift	Customized stroke design based on customer's requirements for motion and timing. (Maximum stroke reference mode)
K	Modes of motion	T (Output shaft will perform angular rotation of indexing after moving up) L (Output shaft will perform angular rotation of indexing after moving down) To be manufactured per customer's requirements

Direction of rotation

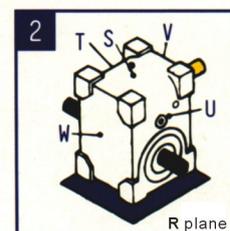
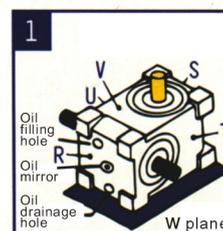


Direction of the input shaft



Datum for installation and the location of oil drainage hole

■ : Input shaft ■ : Output shaft



Application examples of the lift type

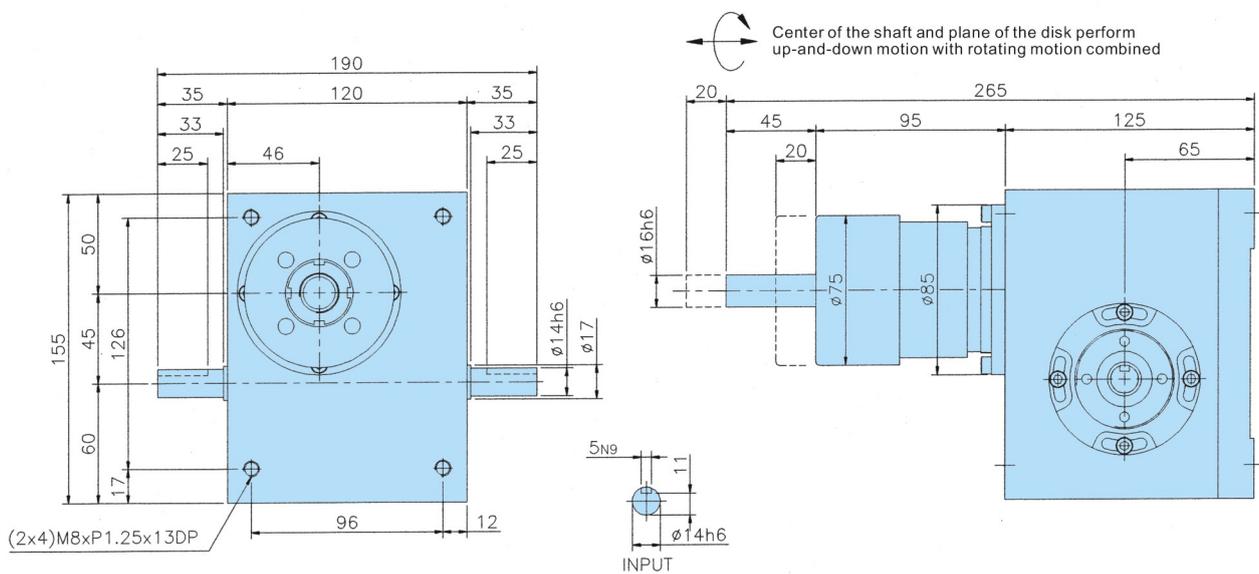


FSUH Separated lift type

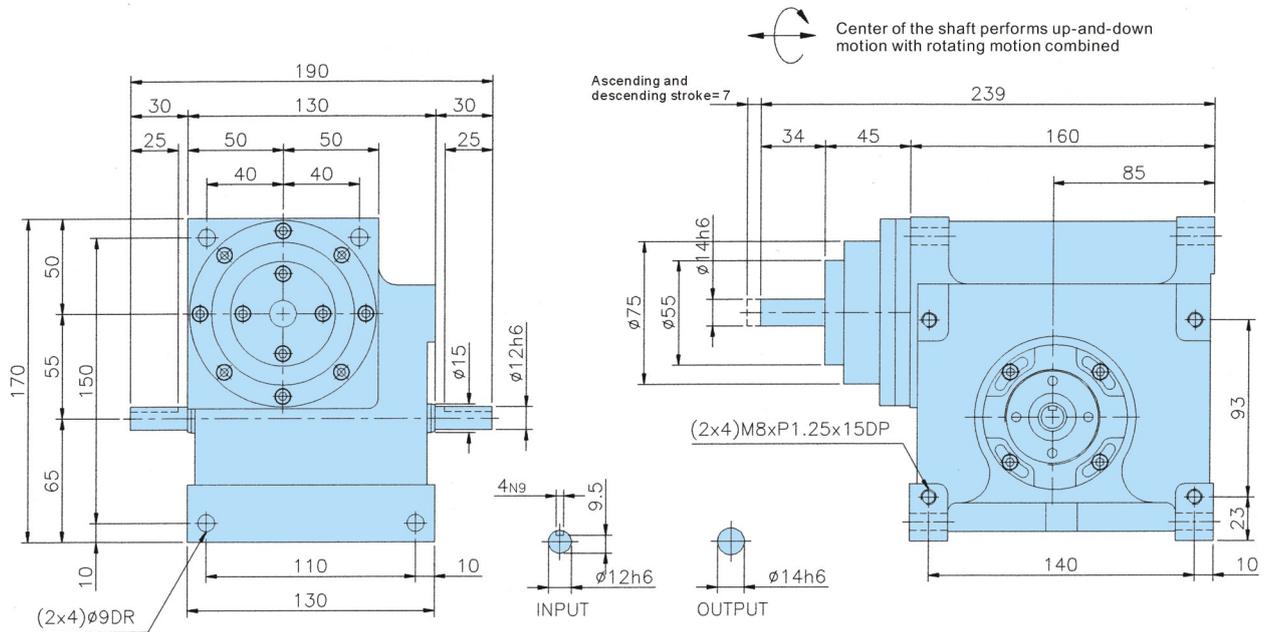


SU Combined lift type

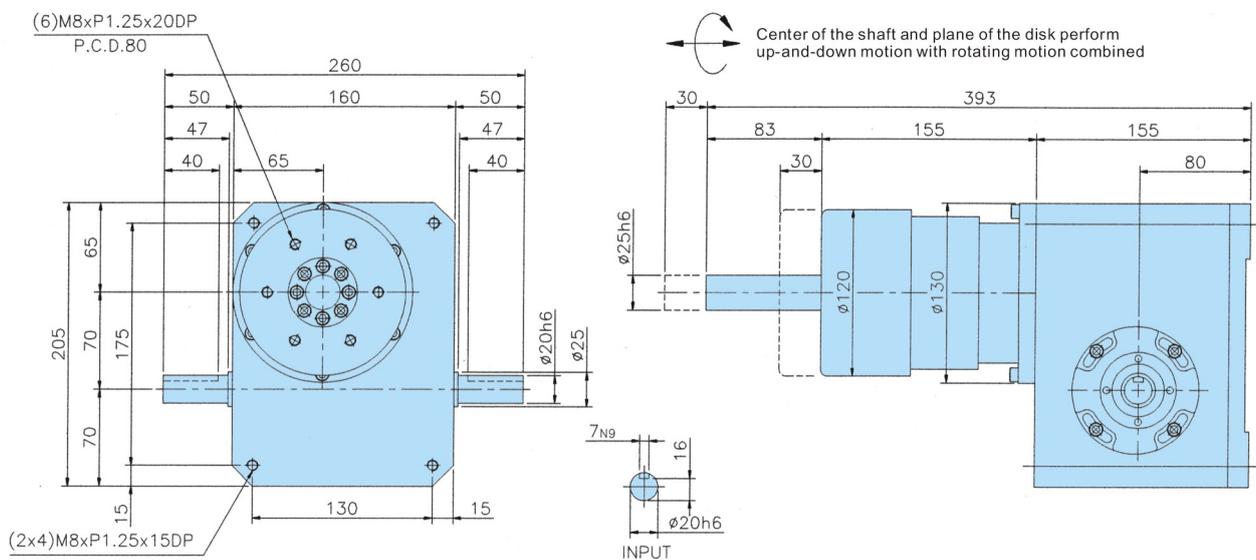
4.5D Combined lift type



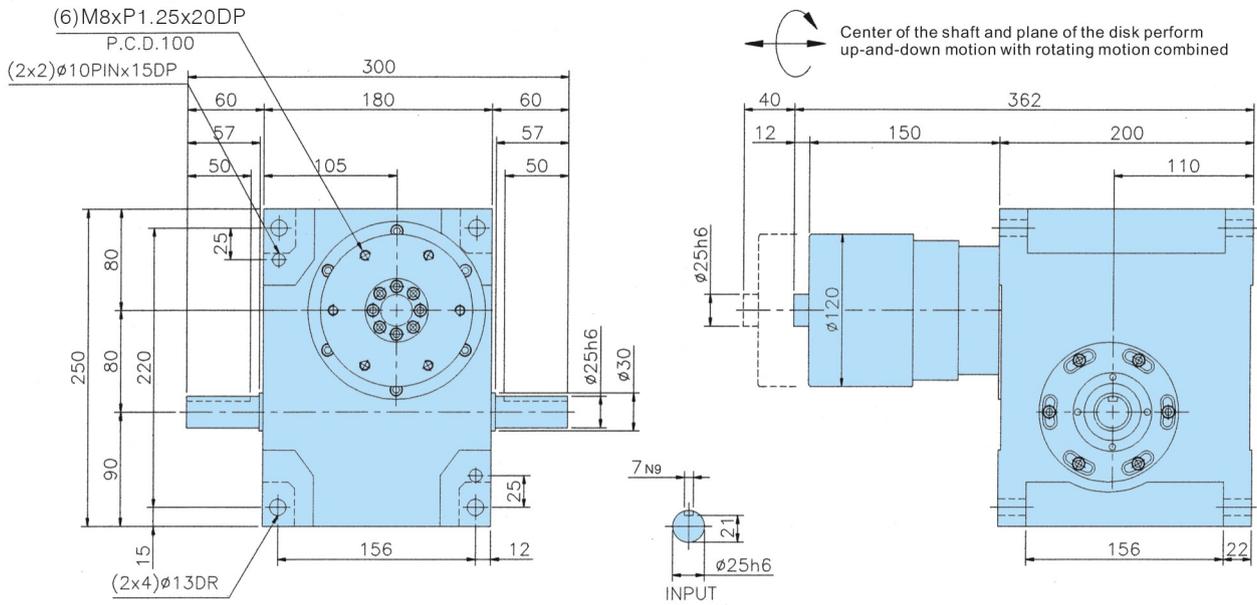
5.5D Ascending-and-descending type



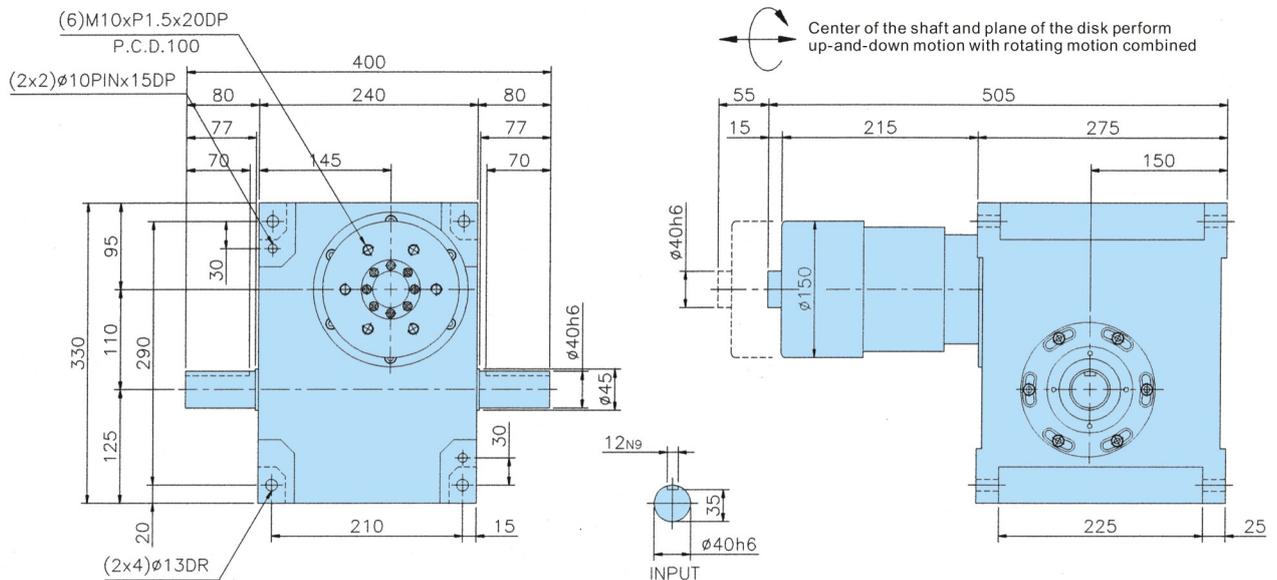
7D Combined lift type



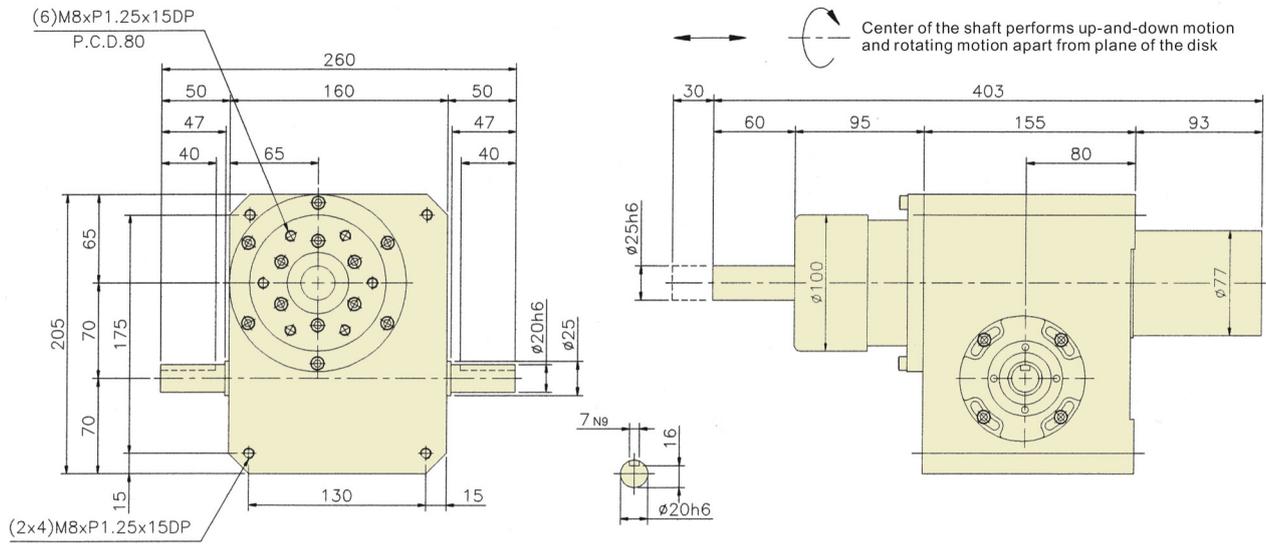
8D Combined lift type



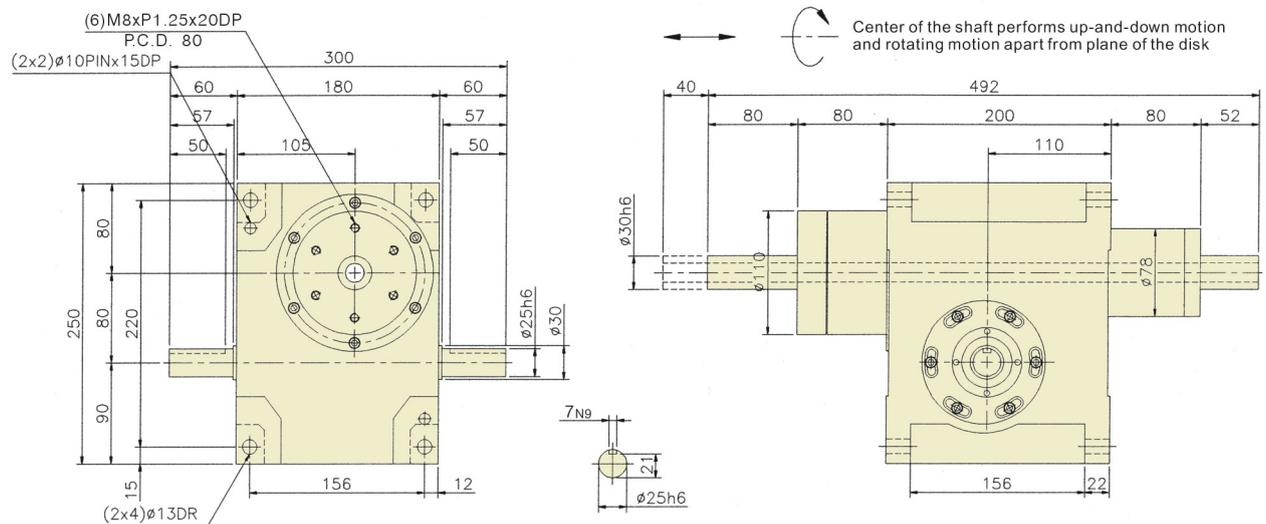
11D Combined lift type



7D Separated lift type



8D Separated lift type





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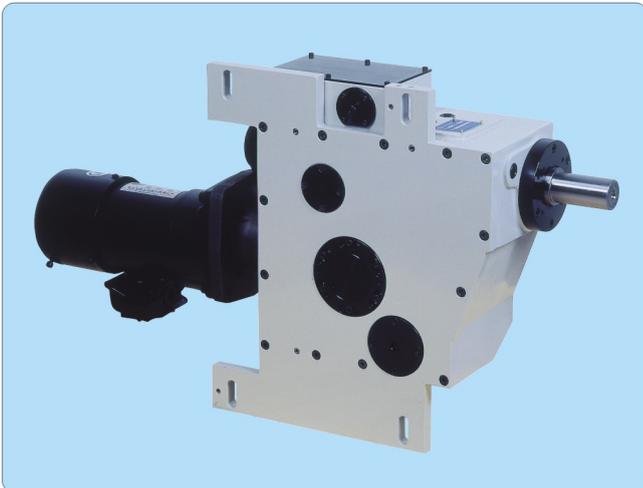
ATC Series

Introduction to ATC

It is well known that roller cams are the most suitable type for ATC.

Devices equipped with indexing drives have the following advantages;

1. The moment of inertia of the roller shaft (output shaft) is small.
2. Small in volume, large in output power.
3. Multiple motions can be integrated, and the roller shaft can rotate reversely while the cams are rotating in the same direction.
4. High accuracy, large indexing range, and motion curve can be arbitrarily collocated.
5. Speed of the grabbers is steady and quiet.
6. Stable clamps ensure the accuracy of the main axis head and extend operational



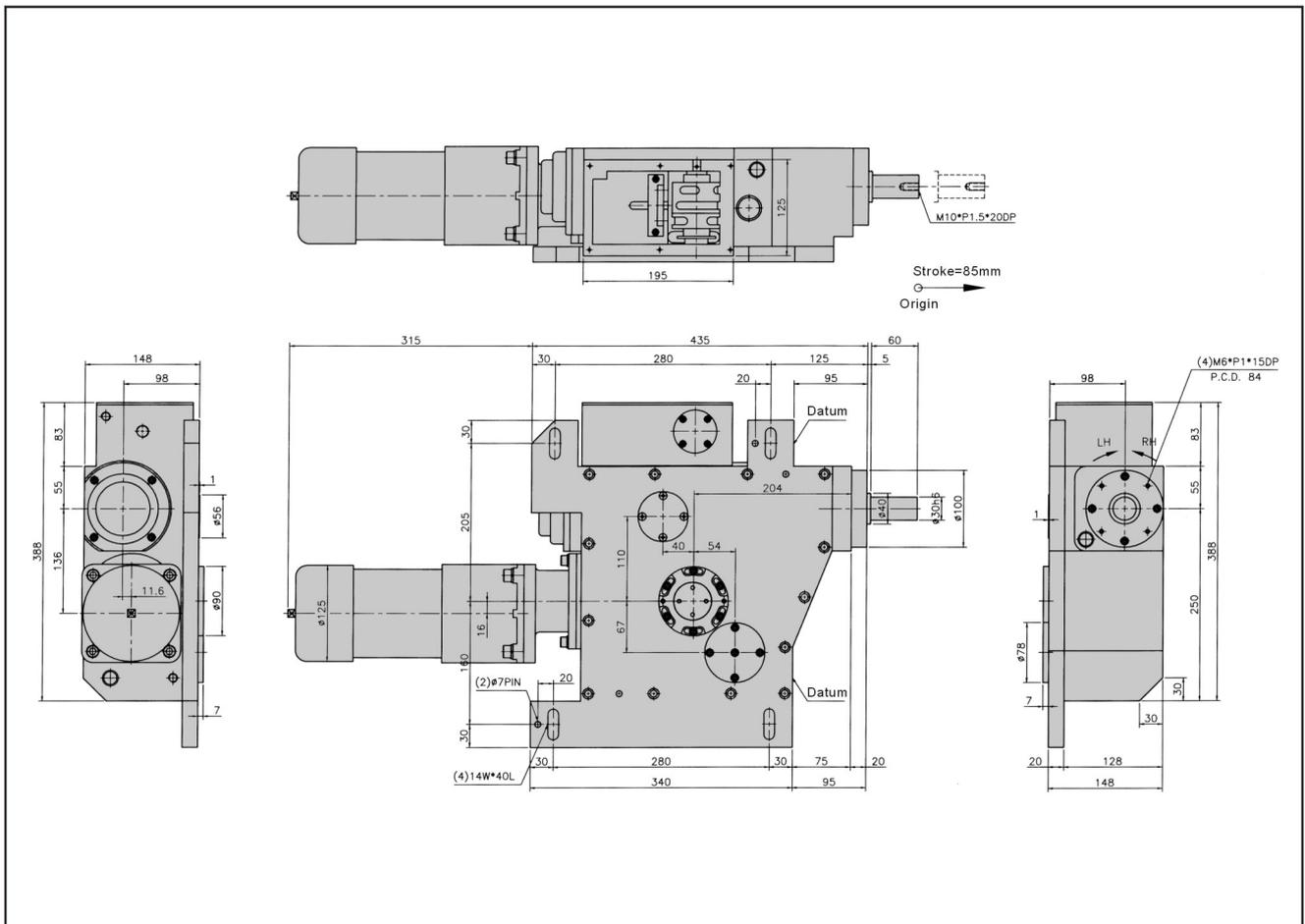
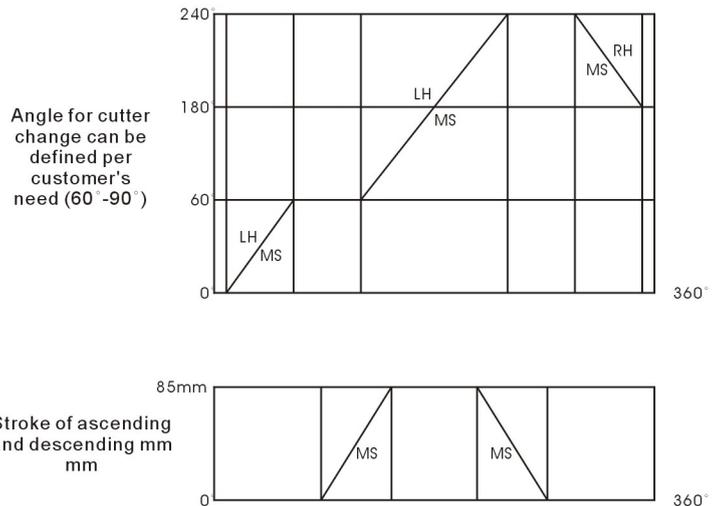


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A301DEX01(BT-30)

Specifications	
Part Number	A301DEX01(BT-30)
Time interval for cutter	50 Hz = 0.99 sec (4kg/side)
	60Hz = 0.84 sec (4kg / side)
Cutter pulling strokechange	85mm
Maximum loading	4.5kg/side (determined by the time interval for cutter change)
Weight of the product	90Kg
Driving horse power	1 / 4HP
Accuracy	Positioning accuracy 60"
	Overlapping accuracy 10"
	Accuracy of the stroke 0.1 mm

Diagram of timing sequence





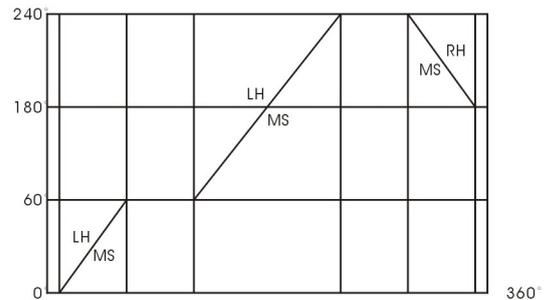
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A402DEX01(BT-40)

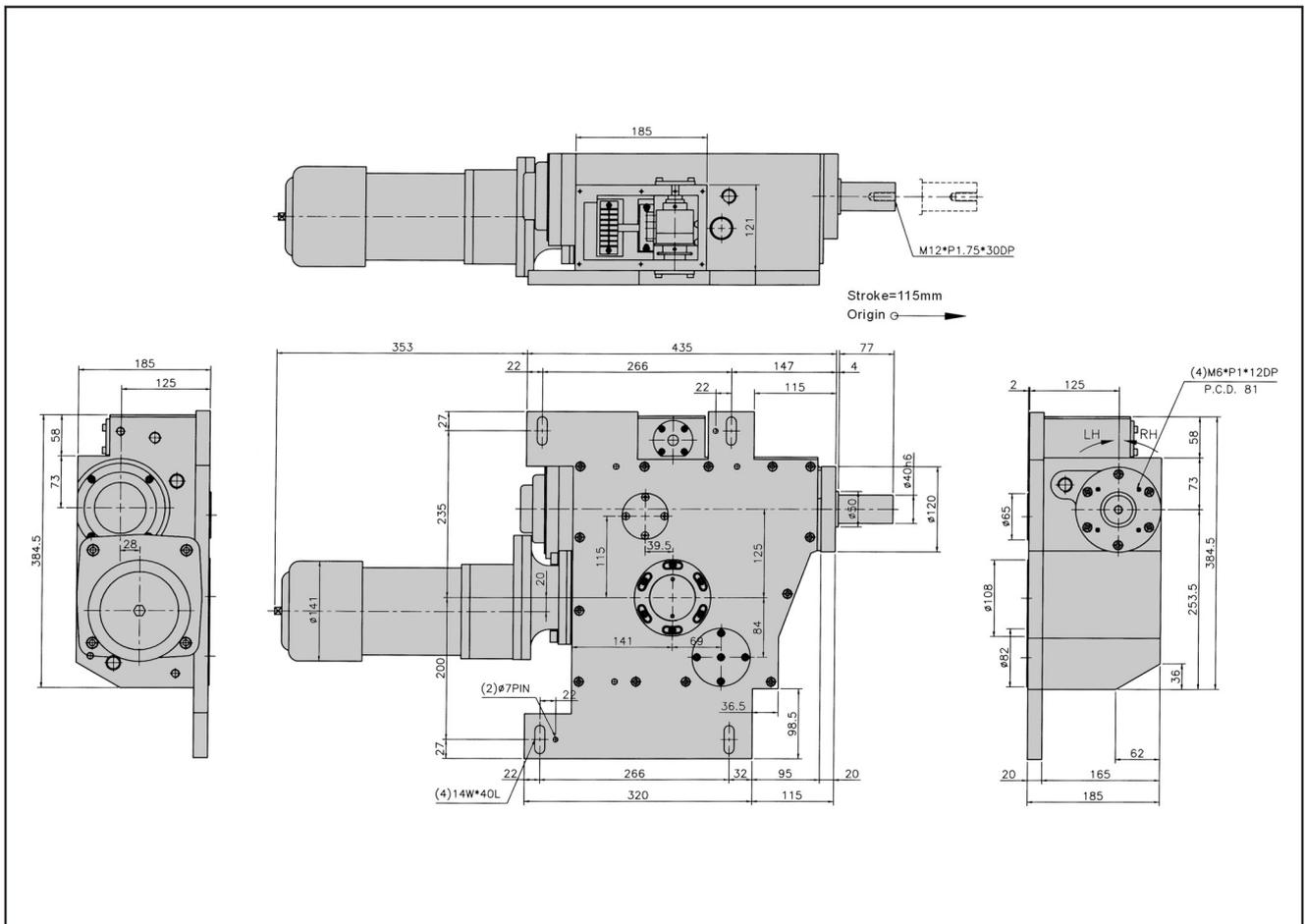
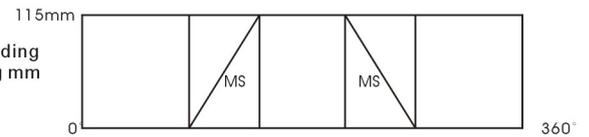
Specifications	
Part Number	A402DEX01(BT-40)
Time interval for cutter	50 Hz = 1.55 sec (8kg/side)
	60Hz = 1.31 sec (8kg / side)
Cutter pulling strokechange	115mm
Maximum loading	8kg/side (determined by the time interval for cutter change)
Weight of the product	115Kg
Driving horse power	3 / 4HP
Accuracy	Positioning accuracy 60"
	Overlapping accuracy 10"
	Accuracy of the stroke 0.1 mm

Diagram of timing sequence

Angle for cutter change can be defined per customer's need (60°-90°)



Stroke of ascending and descending mm



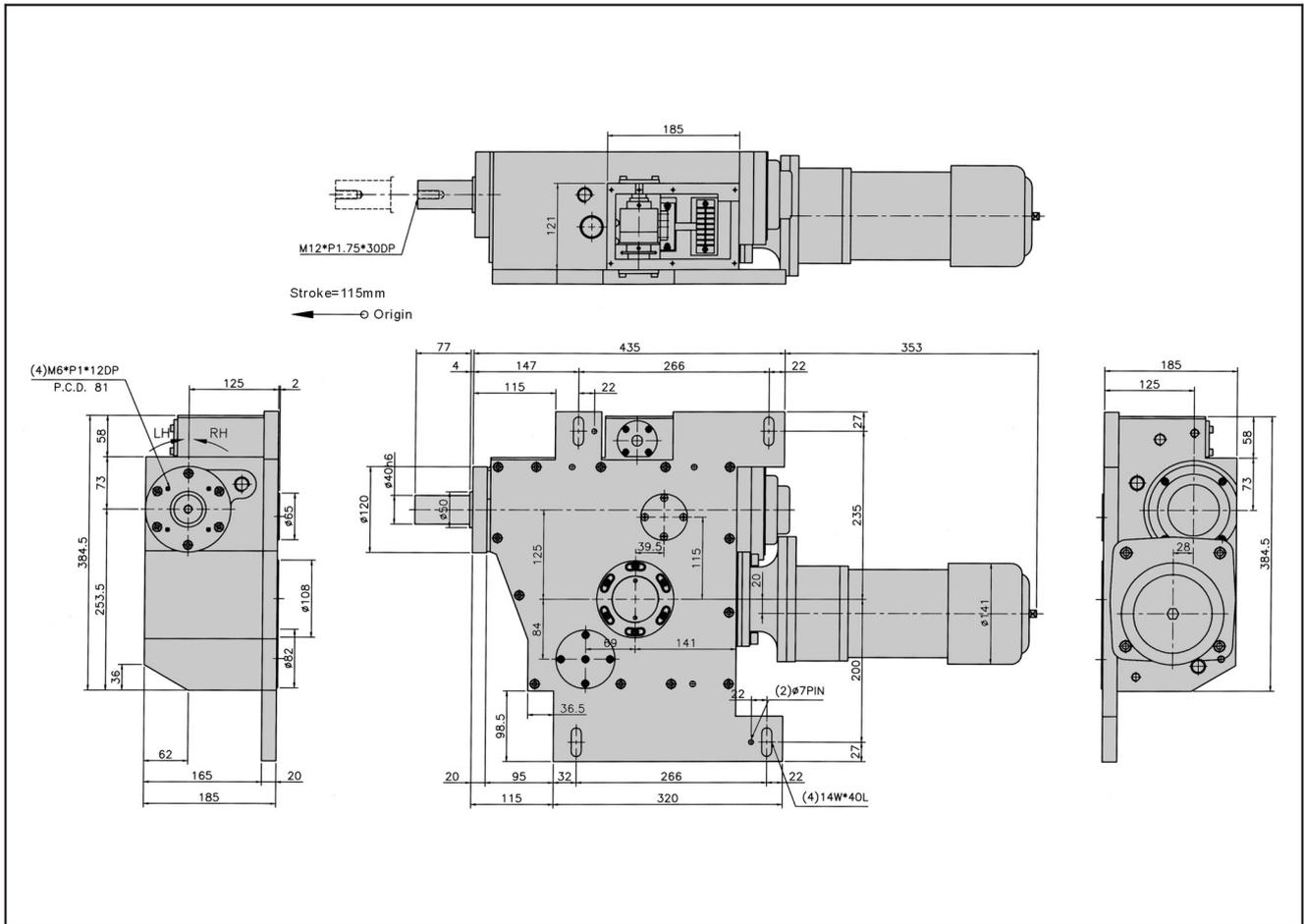
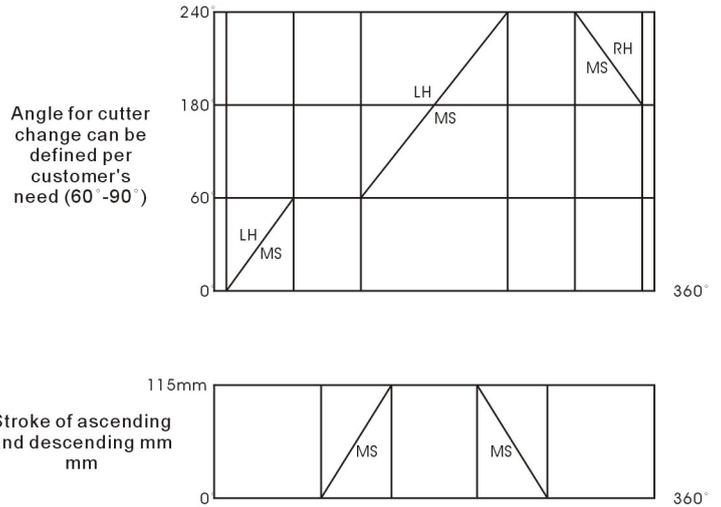


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A402DEX02(BT-40)

Specifications	
Part Number	A402DEX02(BT-40)
Time interval for cutter	50 Hz = 1.55 sec (8kg/side)
	60Hz = 1.31 sec (8kg / side)
Cutter pulling strokechange	115mm
Maximum loading	8kg/side (determined by the time interval for cutter change)
Weight of the product	115Kg
Driving horse power	3 / 4HP
Accuracy	Positioning accuracy 60"
	Overlapping accuracy 10"
	Accuracy of the stroke 0.1 mm

Diagram of timing sequence





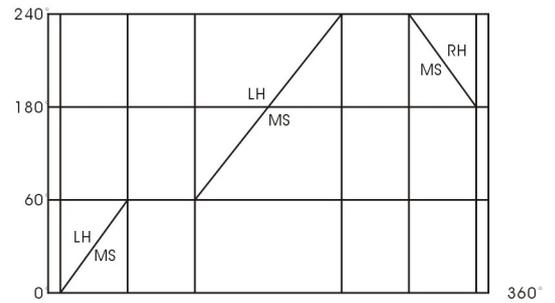
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A502DEX01(BT-50)

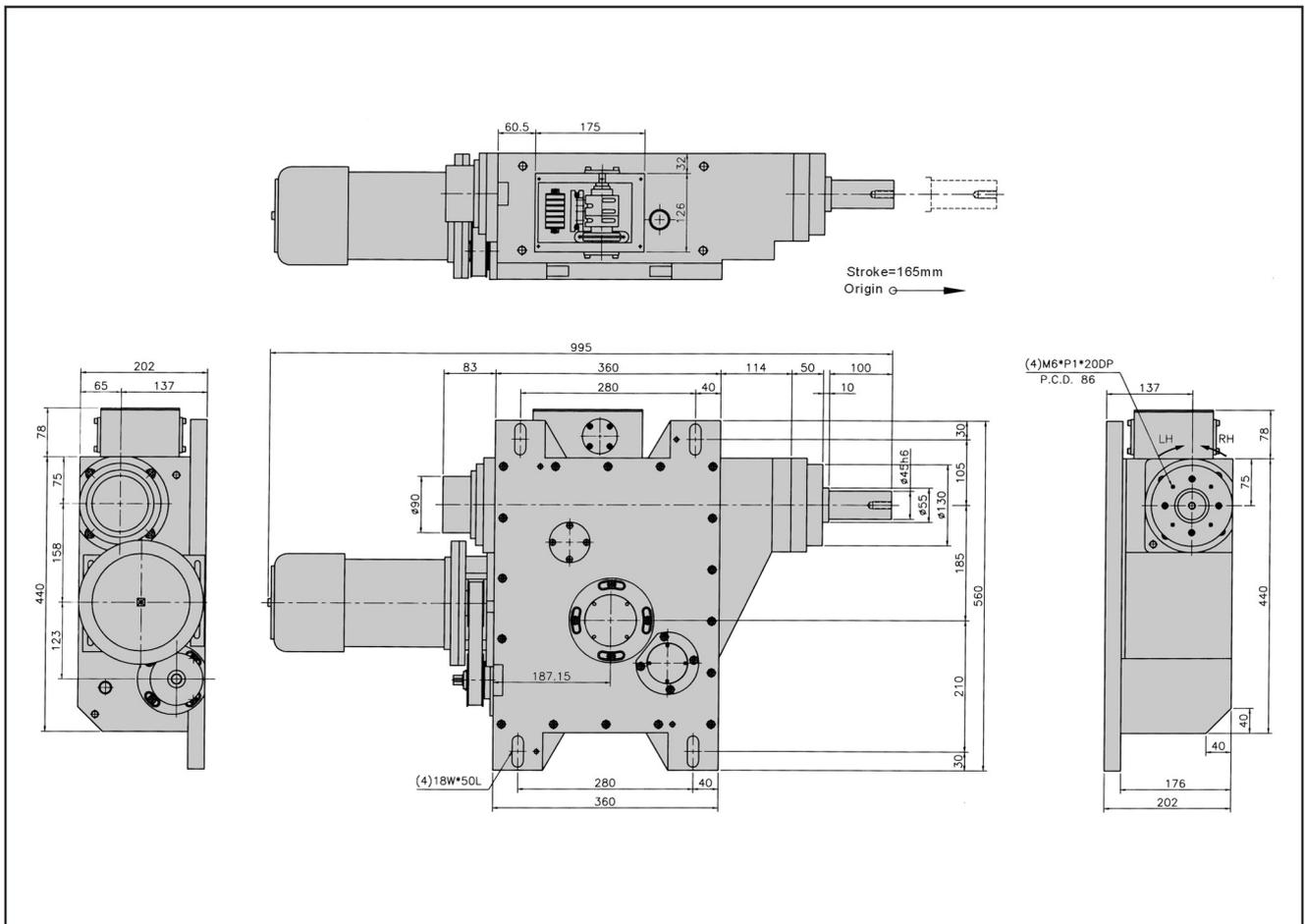
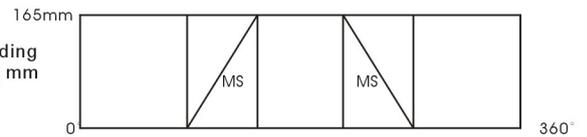
Specifications	
Part Number	A502DEX01(BT-50)
Time interval for cutter	50 Hz = 2.91 sec (17kg/side)
	60Hz = 2.45 sec (17kg / side)
Cutter pulling strokechange	165mm
Maximum loading	20kg/side (determined by the time interval for cutter change)
Weight of the product	200Kg
Driving horse power	1.5 HP
Accuracy	Positioning accuracy 60"
	Overlapping accuracy 10"
	Accuracy of the stroke 0.1 mm

Diagram of timing sequence

Angle for cutter change can be defined per customer's need (60° - 90°)



Stroke of ascending and descending mm



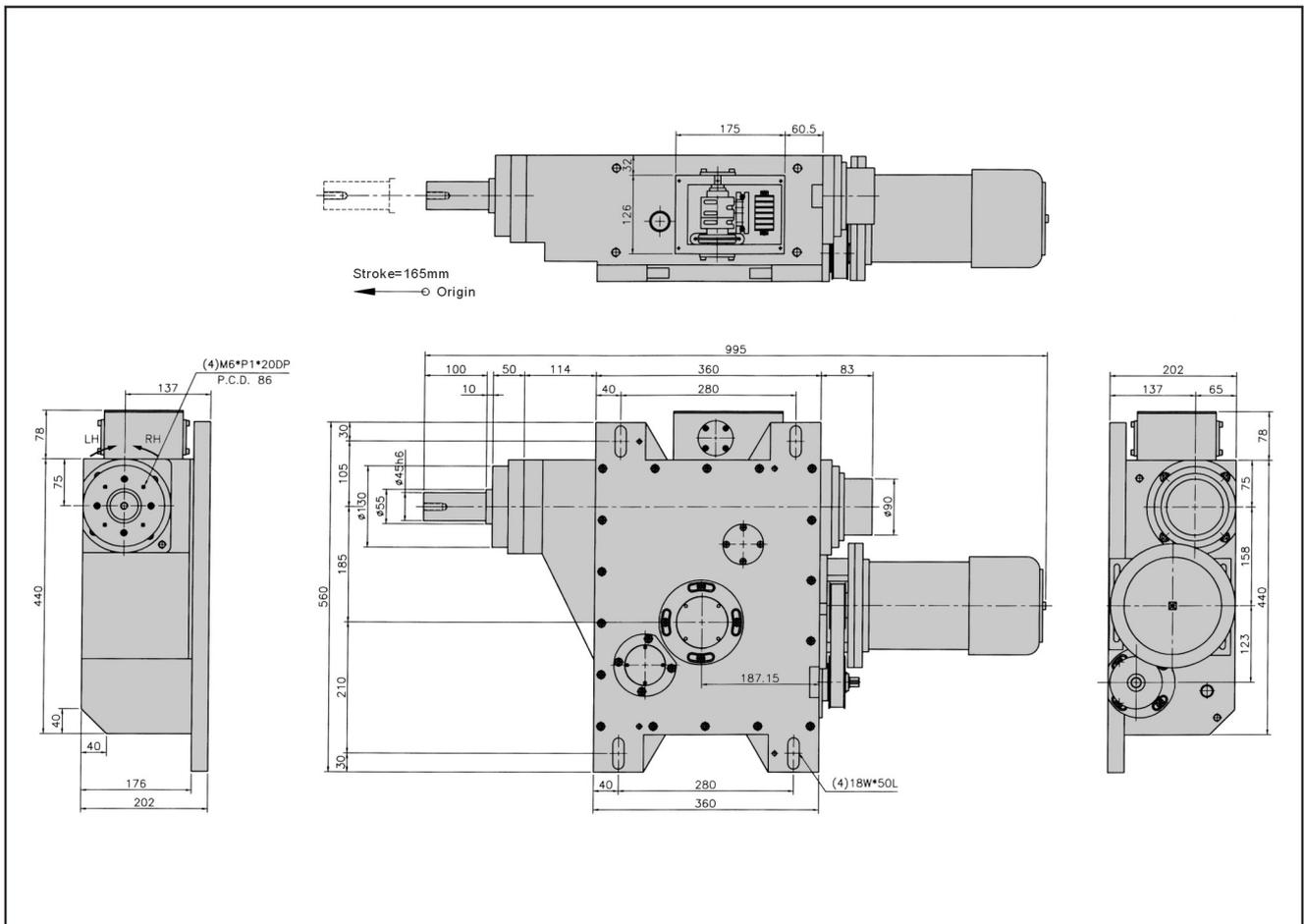
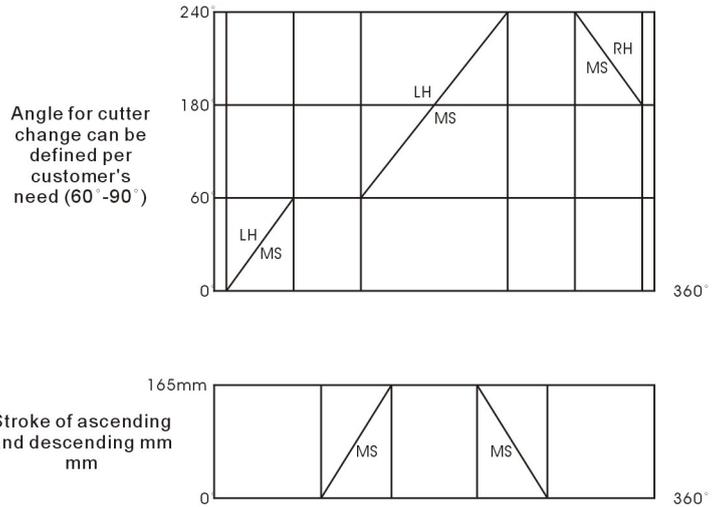


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A502DEX02(BT-50)

Specifications	
Part Number	A502DEX02(BT-50)
Time interval for cutter	50 Hz = 2.91 sec (17kg/side)
	60Hz = 2.45 sec (17kg / side)
Cutter pulling strokechange	165mm
Maximum loading	20kg/side (determined by the time interval for cutter change)
Weight of the product	200Kg
Driving horse power	1.5 HP
Accuracy	Positioning accuracy 60"
	Overlapping accuracy 10"
	Accuracy of the stroke 0.1 mm

Diagram of timing sequence



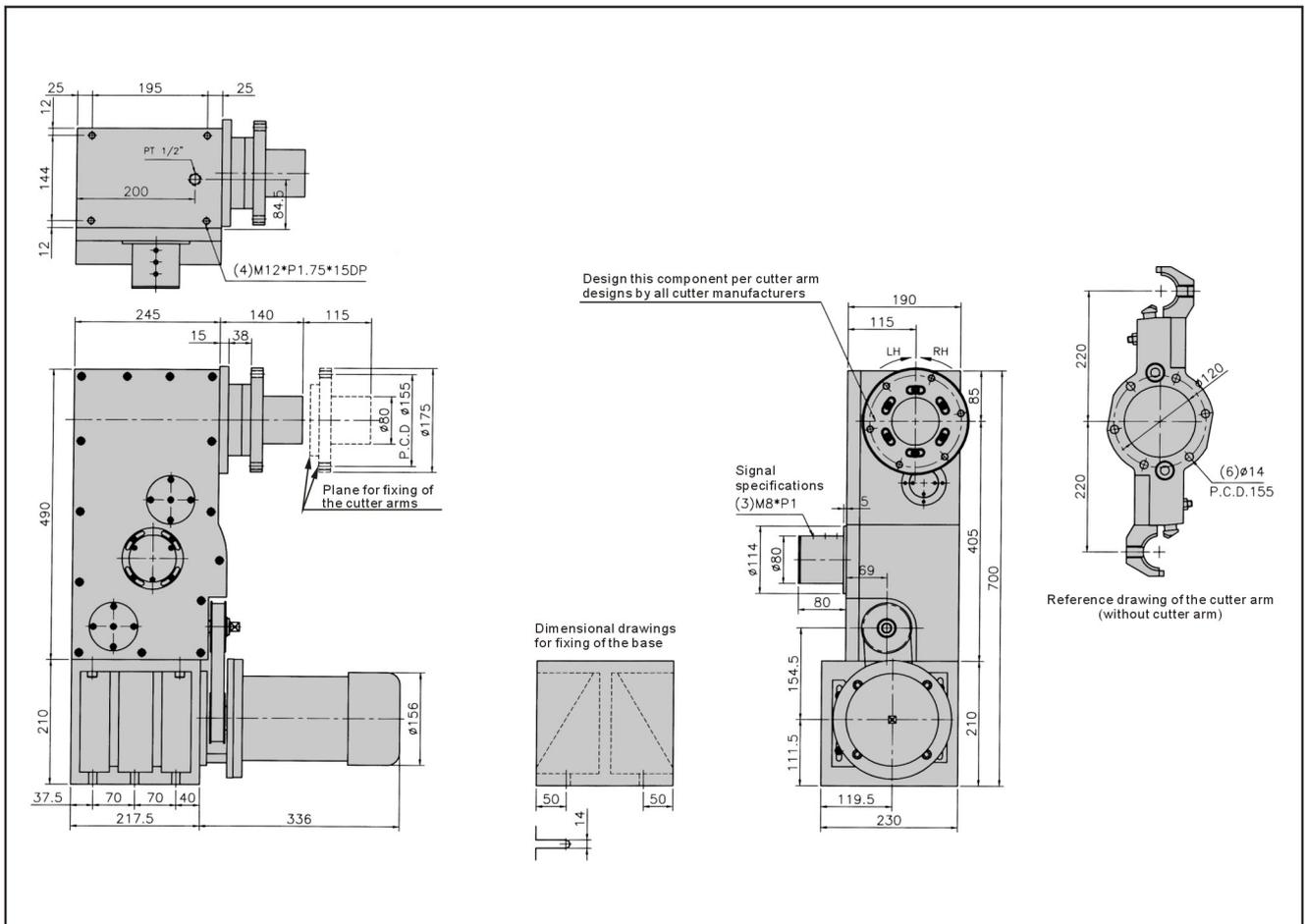
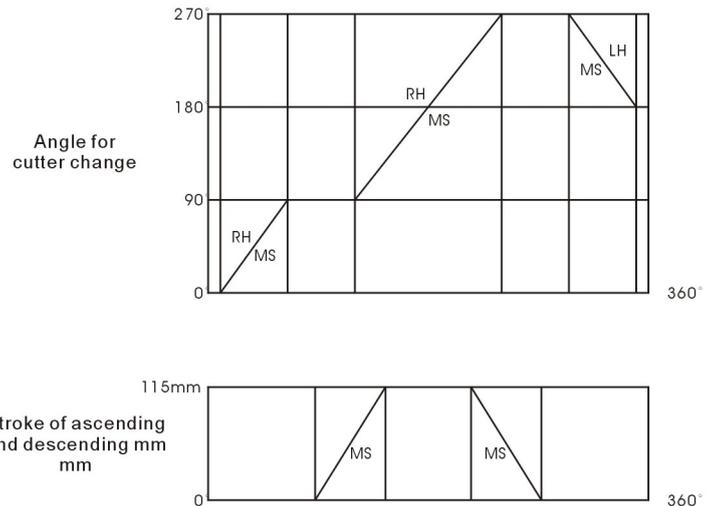


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A405DEX01(BT-40) Horizontal type

Specifications	
Part Number	A405DEX01(BT-40) Horizontal type
Time interval for cutter	50 Hz = 1.98 sec (7kg/side)
	60Hz = 1.61 sec (7kg / side)
Cutter pulling strokechange	115mm
Maximum loading	8kg/side (determined by the time interval for cutter change)
Weight of the product	160Kg
Driving horse power	1.5 HP
Accuracy	Positioning accuracy 60"
	Overlapping accuracy 10"
	Accuracy of the stroke 0.1 mm

Diagram of timing sequence



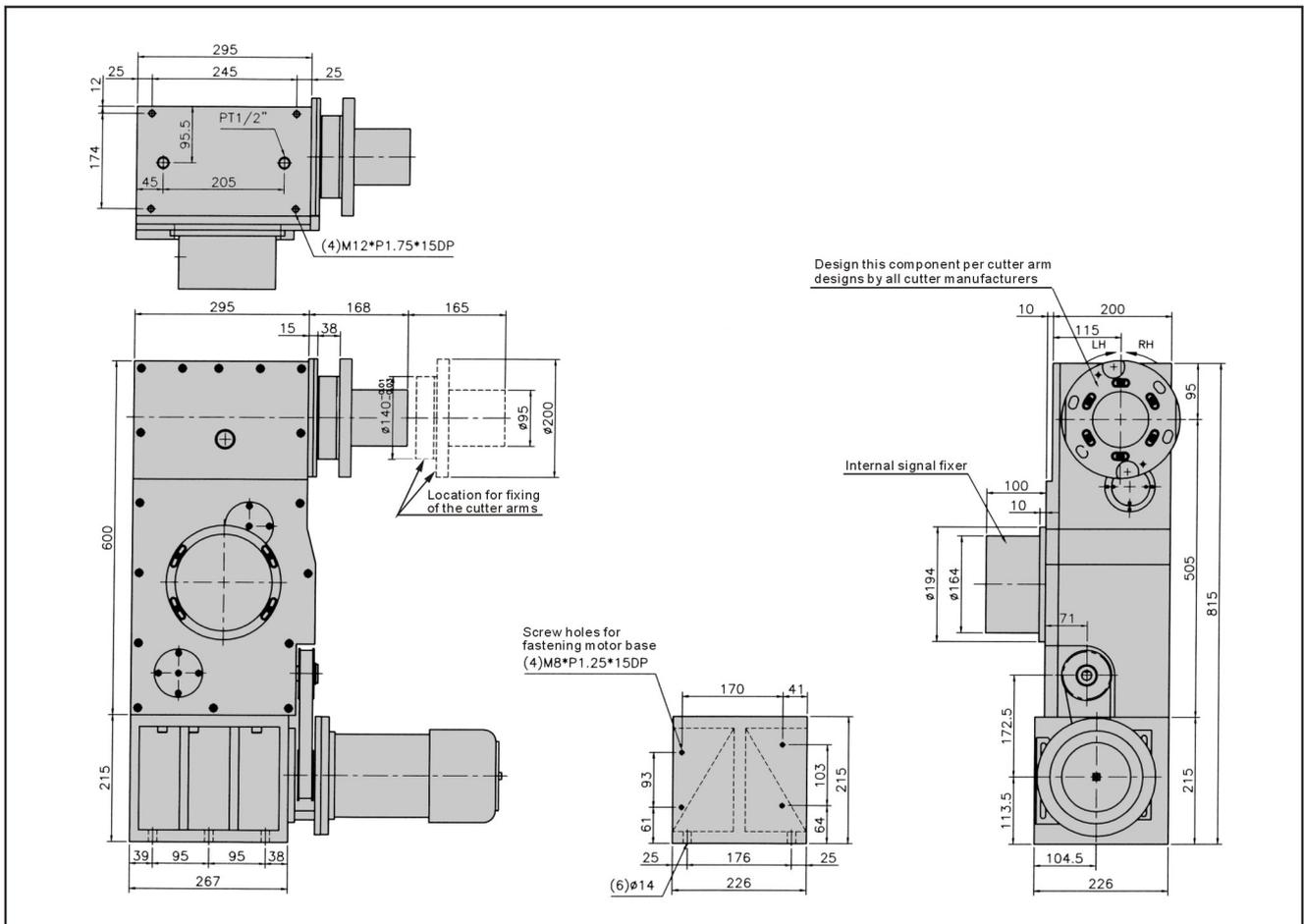
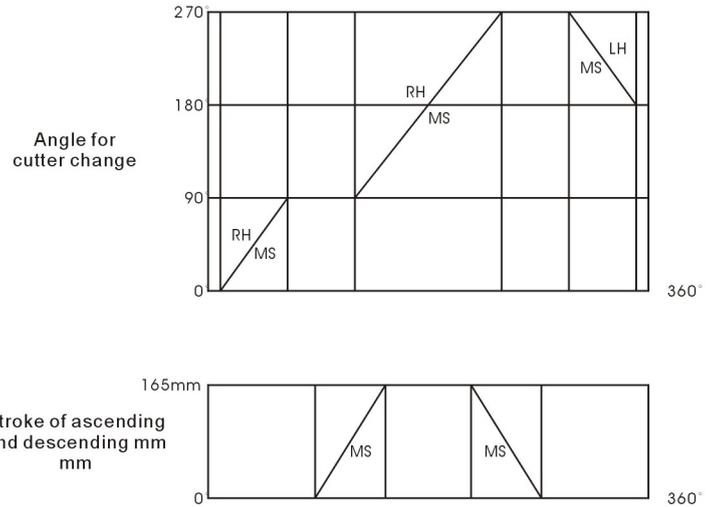


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A505DEX01(BT-50) Horizontal type

Specifications	
Part Number	A505DEX01(BT-50) Horizontal type
Time interval for cutter	50 Hz = 3.45 sec (15kg/side)
	60Hz = 2.90 sec (15kg / side)
Cutter pulling strokechange	165mm
Maximum loading	20kg/side (determined by the time interval for cutter change)
Weight of the product	240Kg
Driving horse power	2 HP
Accuracy	Positioning accuracy 60"
	Overlapping accuracy 10"
	Accuracy of the stroke 0.1 mm

Diagram of timing sequence





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Practical examples of the assembly of indexing drives and ATC

