

Hamyar Nik Azaran *drives*

Precision Cam Indexing Drives

Indexing Solutions

Product Catalogue 2012



Use index drives for:

Auto assembly machines and processing machines;
printing machines, pad printing machines, screen
printing machines and gold stamping machines;
packing machines and vacuum forming machines;
automatic testing machines, sorting machines and
counting machines;
food processing machines; filling machines;
pharmaceutical machines, sealing and capping
machines and bottle filling machines;
Any application where precision and/or high speed
indexing is required, choose hamyar nik azaran

Indexing Solutions.



PROPERTIES



Unique Mechanical Features

1. Simplicity and Reliability

A high precision mechanism consisting of only two main moving parts, is capable of providing various types of indexing motions.

2. Inherent Accuracy

During the index drive's dwell (stationary) period, the output shaft (or flange) is accurately fixed in position, eliminating the need for a locking device. CAMDEX standard models are manufactured with an accuracy tolerance of ± 30 seconds ($1/120^{\text{th}}$ of a degree). Higher accuracy is available upon request.

3. Motion Curves

For different applications:

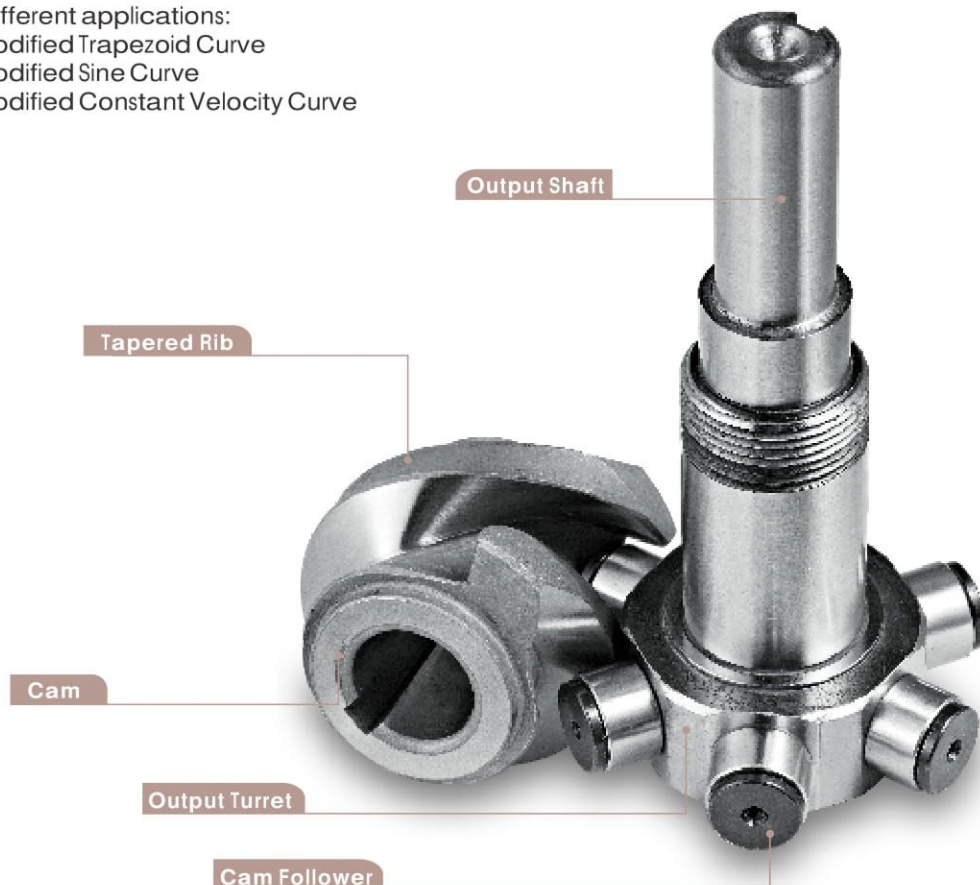
1. Modified Trapezoid Curve
2. Modified Sine Curve
3. Modified Constant Velocity Curve

4. Operation at High Speed

Precision cam followers and tapered ribs are preloaded to avoid gaps and thus capable of providing reliable high-speed operation. The controlled acceleration and deceleration minimizes the impact caused by working loads.

5. Noise and vibration

CAMDEX index drives are designed to operate in any position, and customers will enjoy their quiet running and minimal vibration.



STRUCTURAL PRINCIPLE



Operating Principle and Structure

The structure of an index drive is quite simple. The cam, assembled with the input shaft, interfaces with the output turret. (Fig. 1) The cam followers are fixed in radials around the output turret and linearly contact the working surface of the tapered cam ribs.

The input shaft rotates, and the cam followers drive the output turret in accordance with the designed motion curve as they roll along the working surfaces of the cam. During the dwelling period, the cam followers do not drive the output turret, though they are still connecting it to the cam. They are locked in a steady and accurate dwell position by the cam. At all times, at least two followers are in continuous contact with the cam, ensuring input shaft rotation is evenly transmitted to the output shaft. This is what provides the smoothness of the indexing motion.

Terms and Definitions

1. Roller Gear Cam

A cam fluted into the surface of its barrel type solid body, and fixed to the input shaft.

2. Tapered Rib

The ribs which form the separate cam grooves. The polished sides of the ribs are the cam's working surfaces.

3. Cam Followers

A precision needle roller bearing, capable of working at high speed and heavy load.

4. Output Turret

The extension of the output shaft, driven by the roller gear cam and cam followers.

5. Number of Stops

The number of dwell periods per one revolution of the output shaft.

6. Index Angle

The rotational angle of the input shaft during an index period of the output turret.

7. Dwell Angle

The rotational angle of the input shaft during a dwell period; the sum of dwell angle and index angle is 360° .

8. Number of Rotations

The number of input shaft rotations required to produce one full rotation of the output turret.

9. Steady State Torque

The maximum permissible external torque that may be exerted upon the output shaft by the machine during a dwell period.

10. Dynamic Torque

The maximum torque exerted to the output shaft during an index period.

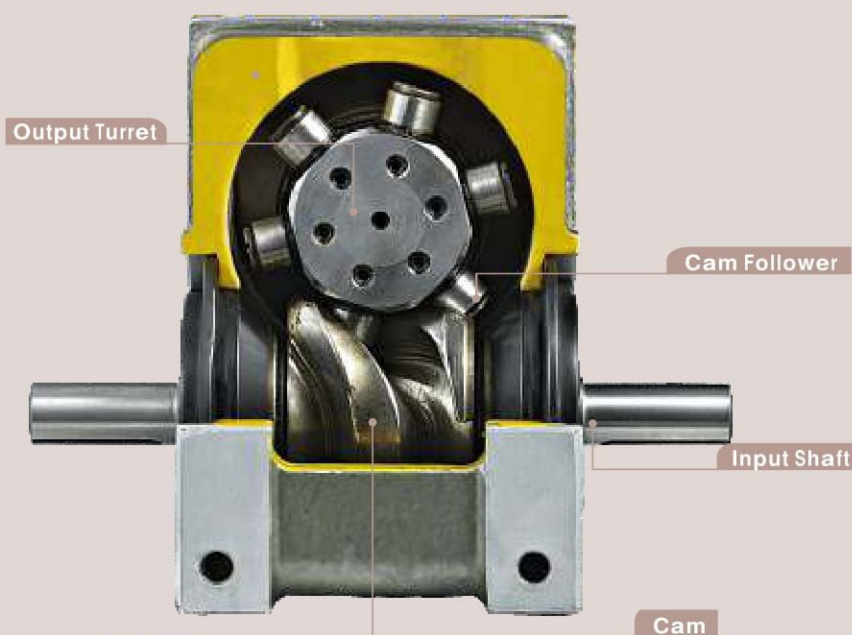


fig.1

STRUCTURAL PRINCIPLE



The motion diagram of an index drive is formed by connecting the start and end of all its motion curves. Indexing motions are designed to make the transition between curves and plateaus as smooth as possible to minimize vibration and noise. Material characteristics are taken into close consideration to produce maximum reliability, lifespan, load and speed ratings. Our indexers are designed to effect the best compromise between all factors. Custom designs can be requested to tilt the balance more towards one area.

The displacement curve shows the relationship between displacements of input shaft (indexing time and angle, etc.) and displacement of output shaft (fig.2). In the diagram, the horizontal axis represents the displacement of input shaft, ' θ ' while the vertical axis stands for the displacement of output shaft with a given number of stops, 'S'.

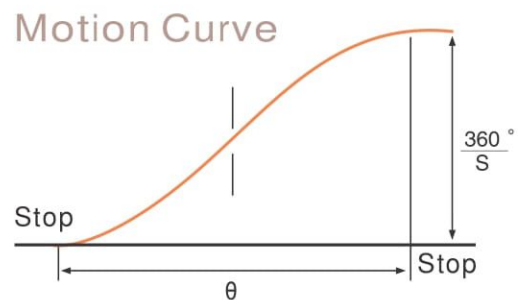


fig. 2

While selecting a cam curve, the values of the following properties must be considered:

- V_m The maximum velocity
- A_m The maximum acceleration

When V_m is greater, there will be a greater force exerted to the cam when it suddenly stops. Therefore, generally a curve with less V_m should be selected, especially when the load is heavier. V_m is also closely related to the cam size. The size of a cam with a less V_m curve is smaller. Note that the value of V_m shall not greater than 1.

When A_m is greater, the maximum load allowed is lighter. Therefore, a curve with less A_m should be selected in a hi-speed operation, where A_m shall not be less than 4.

STRUCTURAL PRINCIPLE



There are 3 standard indexing curves:

Modified Trapezoid Curve (MT)

For high speed and light load: fig.3

Modified Sine Curve (MS)

For moderate to high speed and moderate load: fig.4

Modified Constant Velocity Curve (MCV50)

For low speed and heavy load: fig.5

Modified Trapezoid Curve (MT)

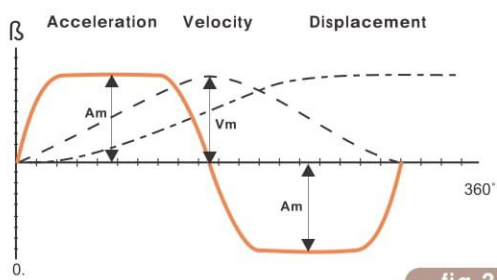


fig.3

Modified Sine Curve (MS)

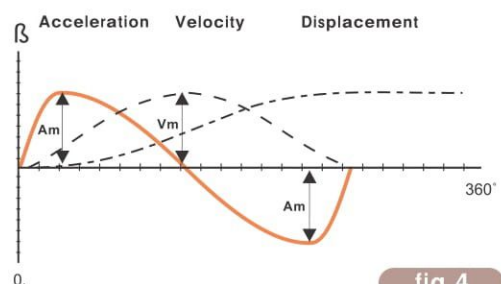


fig.4

Modified Constant Velocity Curve (MCV50)

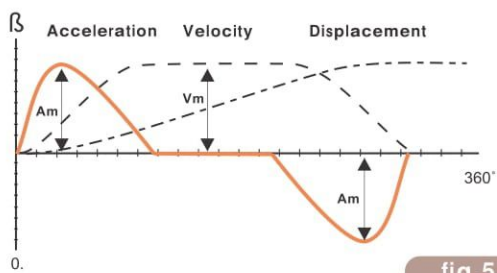


fig.5

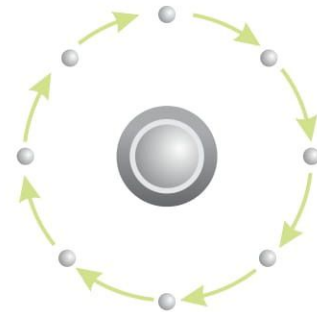
TYPES OF MOTION



Different Types of Drives Available

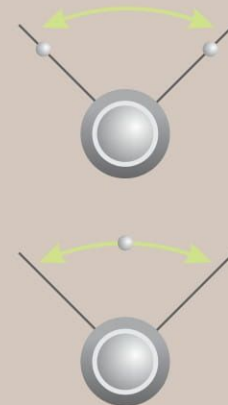
Indexing Drives:

- Convert continuous rotary input into a stop-move-stop motion.



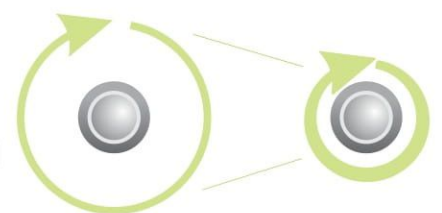
Oscillating Index Drives:

- Convert continuous rotary input into a left-right (back and forth) motion
- Can also produce a right-center-left-center motion.
- Are very stable and are suitable for high speed.



Roller Drives:

- Roller drive speed reducers are superior to worm gear and other types in several ways, such as zero backlash, significantly higher efficiency and required lower input torque.



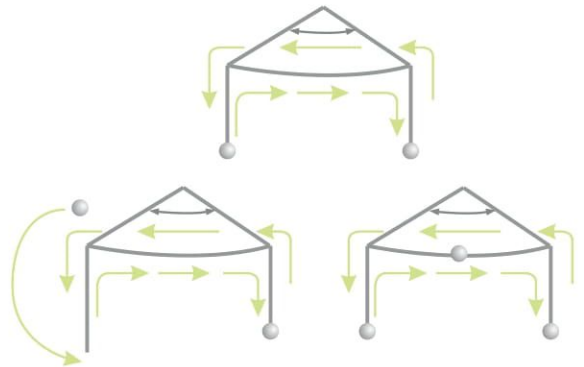
TYPES OF MOTION



Different Types of Drives Available

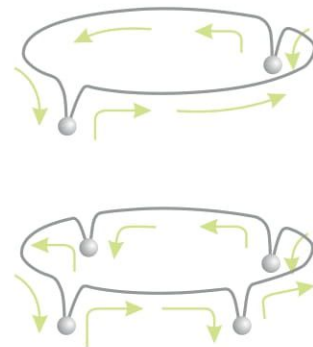
Oscillating and Conveying Drives:

- Oscillating and conveying drives operate similarly to standard oscillating drives, but incorporate a longitudinal reciprocating movement of the output as well. Different configurations of oscillation and reciprocation may be utilized.
- The output shaft oscillation can be set to stop at the middle point of the rotation. The rotation angle and lifting height can be set accordingly as well.



Indexing and Conveying Drives:

- Indexing and conveying drives operate similarly to standard indexing drives, but incorporate a longitudinal reciprocating movement of the output as well. The stop can be set at the middle point of the rotation. The rotation angle and lifting height can be set accordingly as well.



MODEL SELECTION AND CALCULATION



Symbols and Descriptions

a4	Dwell Coefficient	Lf	Lifespan Factor	Ti	Inertia Torque (kgf.m)
Am	Non-dimensional Acceleration Maximum	Lh	Estimated Lifespan (hr)	Tt	Total Torque needed for Output Shaft (kgf.m)
Amax	Acceleration Maximum(m.s ⁻²)	M	Mass (kg)	Tw	Working Torque (kgf.m)
C	Factor of Maximum Acceleration (C>=1)	N	Speed of Cam Shaft (rpm)	Tx	Torque of Camshaft Friction (kgf.m)
D	Rotation Diameter(m)	No	Original Speed of Cam Shaft (rpm)	Ve	Linear Velocity (m.s ⁻¹)
E	Energy of Rotator(kgf.m.rpm ²)	P	Travel (m)	Vm	Non-dimensional Velocity Maximum
Eo	Energy of Rotator (kgf.m.rad ²)	Pa	Motor Power (kw)	Vmax	Linear Velocity Maximum (m.s ⁻¹)
Ee	Energy of Linear Moving Object (kgf.m.s ²)	Ps	Motor Power Maximum	W	Weight (kg)
F	Centrifugal Force (kgf)	Qm	Cam Shaft Torque Factor Maximum	α	Functional Angle (deg)
G	Weight/Gravity (kgf)	R	Follower Pitch Radius (m)	θ	Indexing Cycle (deg)
GD ²	Moment of Inertia (kgf.m ²)	r	Speed Ratio	μ	Friction Factor
g	Gravity Acceleration (m.s ⁻²)	S	Number of Brakes		
I	Polar Moment of Inertia (kgf.m.s ²)	Tc	Torque of Camshaft (kgf.m)		
K	Rotation Radius (m)	Td	Torque of Start/Stop (kgf.m)		
Ke	Equivalent Rotation Radius of Output Shaft (m)	Tf	Torque of Friction (kgf.m)		

Table 1: Lifespan Factor Lf and Estimated Lifespan Lh

Lifespan (hrs)	Factor	Lifespan (hrs)	Factor	Lifespan (hrs)	Factor	Lifespan (hrs)	Factor
2000	0.617	10000	1.00	26000	1.33	60000	1.71
3000	0.697	12000	1.06	28000	1.36	65000	1.75
4000	0.760	14000	1.11	30000	1.39	70000	1.79
5000	0.812	16000	1.15	35000	1.46	75000	1.83
6000	0.858	18000	1.19	40000	1.52	80000	1.87
7000	0.899	20000	1.23	45000	1.57	90000	1.93
8000	0.935	22000	1.27	50000	1.62	100000	2.00
9000	0.969	24000	1.30	55000	1.67		

Table 2: Technical Data of Motion Curves

Motion Curves	(MT)	(MS)	(MCV)
Symbol	1	2	3
V m	2.00	1.76	1.28
A m	+/-4.89	+/-5.53	+/-8.01
Q m	+/-1.655	+/-0.987	+/-0.715

Table 3: Reference Drawings of Radius of Gyration

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

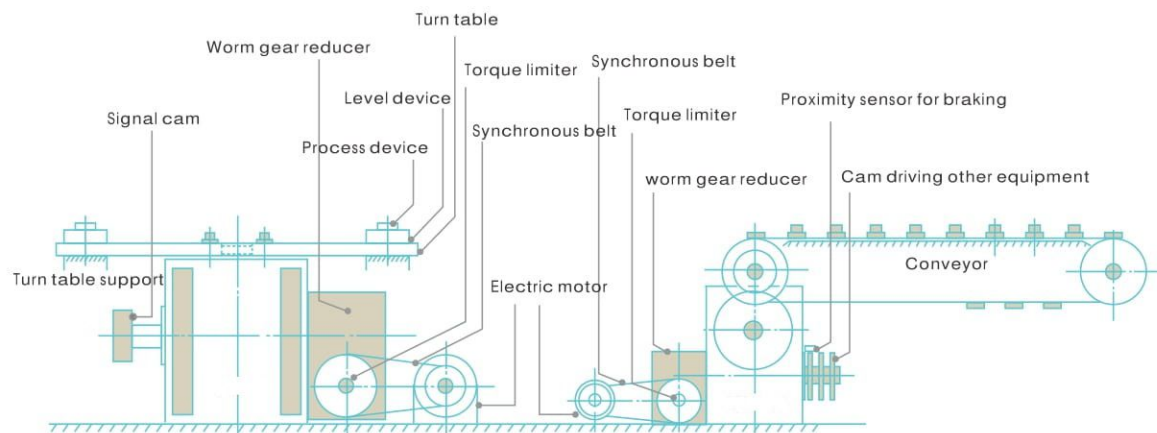
SERVICE EXAMPLES



Basic Examples

Auto Assembly Machine Series

This mechanism can be used in Auto Assembly Machines; Process Machines; Metal Process Machines; Step Drive Conveyors; FMS Relevant Equipment; Packing Machines; Food Machines; Sorting Machines; Medicine Machines; Printing Machines; Auto Detection Machines; Extrusion Feeding Devices, and indexing machines of other uses.



Examples using this device



Capacitor Production Machine



Capacitor Sorting Machine



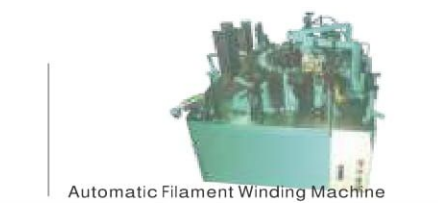
Diode Production Machine



Automatic Balers



Lead Wire Welding and Stamping Machine

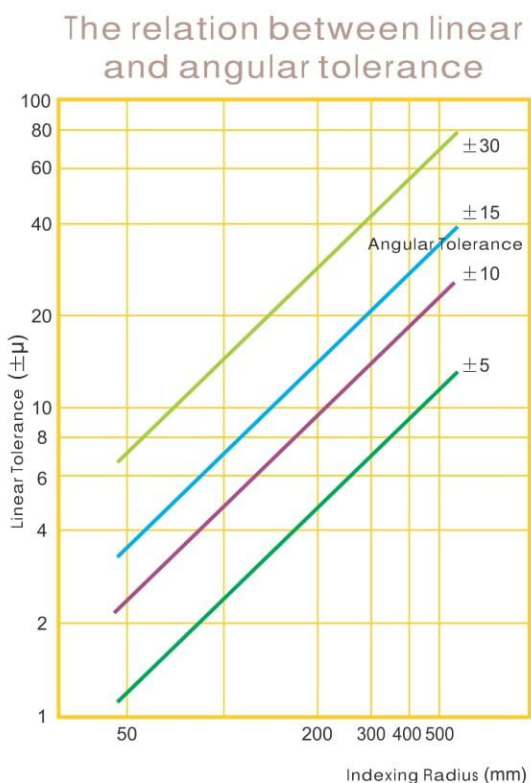


Automatic Filament Winding Machine

ACHIEVING PRECISION



Indexing Accuracy



Turn Table Size

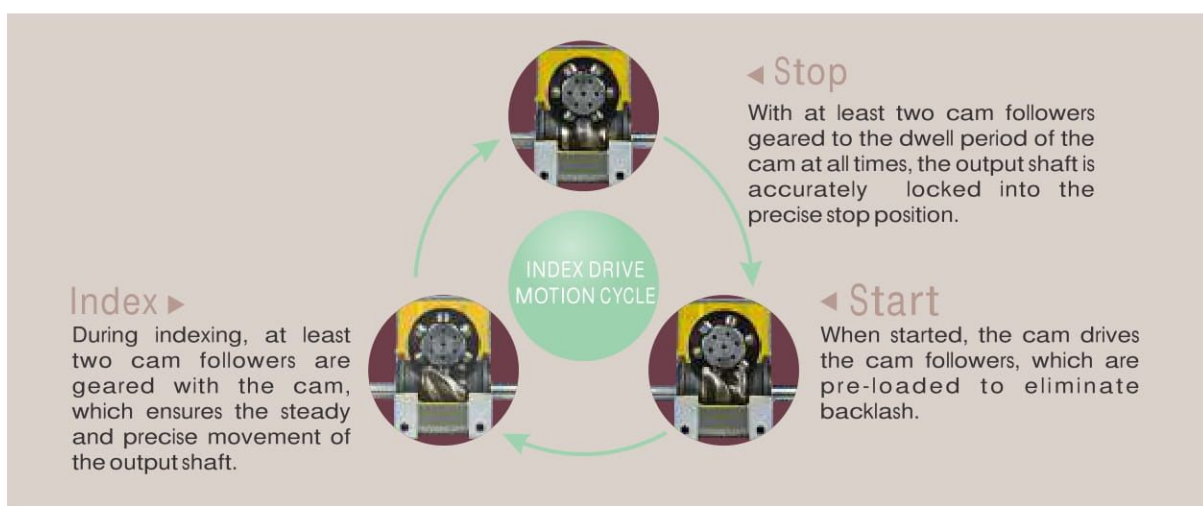
- To mount a turn table on the output shaft, the size of the turn table should be based on the load capacity of the output shaft torque allowed by Torque (T_e).
- When high accuracy is required, Torque (T_e) should be 2-3 times greater than the output shaft torque allowed; hence, the torque value of the output shaft should be reduced.
- The largest diameter of the turn table should be less than 5 times the distance of shaft centers. (fig. 6).

Indexing Accuracy

- The indexing accuracy is 30 seconds for standard level models, and 15 seconds for precision level models. Please note that the displacement will influence the accuracy when the turn table is mounted on the output shaft.

The largest diameter allowed of a standard turntable (mm)

Center distance	45	60	70	80	100	110	140	180	250
Largest diameter	225	300	350	400	500	550	700	900	1250



LUBRICATION AND MAINTENANCE



Lubrication and Maintenance

Proper lubrication and maintenance practices are extremely important to preserve the condition of, and maximize the lifespan of index drives. Proper lubrication is effective in reducing heat generation, preventing rust and reducing wear. Failure to observe recommended lubrication and maintenance practices will result in reduced lifespan, inaccuracy due to wear, and premature failure.

The selection of lubricant is also very important. For example, if the lubricant viscosity is too low, operational temperature rise will lower the dynamic viscosity. This will cause more heat, a resulting further degradation of dynamic viscosity and lead to oil film breakdown and rapid failure of the index drive.

Lubricating Oil Change

Improperly lubricated internals will lead to rapid wear. This in turn will adversely affect accuracy. Please make sure the index drive is no less than 1/3 full of oil, and observe the lubrication level indicator whenever installation orientation allows.

The first lubricating oil change must be performed between 500 to 1000 working hours (2-4 months) of the index drive. Regardless of the working hours, any lubricant will degrade over time, therefore regular lubricating oil changes are necessary.

Choice of Lubricants

- Lubrication is an important factor to maintain the accuracy and lifespan of index drives. When choosing lubricants, the conditions of use such as working environment and speed, etc. should be taken into full consideration.
- High quality gear oil should be used, with additives to strengthen oil film, and provide suitable anti corrosion properties also.
- Mixing lubricants from different manufacturers should be avoided.
- Oil viscosity varies due to different speed and device size. Please choose according to the following guidelines.
- Oil viscosity also changes as the environment temperature changes. The working temperature range of index drives is 0-40 celcius. Please refer to the following viscosity-temperature table and please contact us if your application exceeds this standard.

Note

- A. Lubricating Oil Change Cycle
 - The first oil change shall be performed in 500-1000 working hours (2-4 months)
 - Afterwards, change oil every 3000 working hours (6 months to 1 year)
- B. When changing oil, ensure the filling hole area is clean to avoid the entry of any contaminants.
- C. Temperature rise will increase the internal pressure, which may cause oil leakage. This should not be ignored. Regularly clean the filling hole and check ventilation hole, oil tubing and oil level, and add lubricant when necessary.



Lubrication and Maintenance

Lubricating Oil Viscosity, Table 4

Input Shaft Speed (rpm)	0~20	20~100	100~200	200~300	300~400	>400
Viscosity (cSt/40°C)	>680	680~460	460~320	320~220	220~150	150~68

- If input shaft speed is not steady, the viscosity can be determined with the speed of the longest-term operation or the geometric average of the maximum speed (Nmax) and the minimum speed (Nmin) $\sqrt{(N_{max}) \times (N_{min})}$
- Choose higher viscosity oil when the correspondent viscosity of the input shaft speed falls in between 2 viscosity ranges.

Lubricant Recommended, Table 5

Viscosity (cSt/40°C)	Supplier		
	(Caltex)	(Shell)	(Mobil)
>600	Meropa680	Shell Omala Oil 680	Mobil Gear 636
680~460	Meropa460	Shell Omala Oil 460	Mobil Gear 633
460~320	Meropa320	Shell Omala Oil 320	Mobil Gear 632
320~220	Meropa220	Shell Omala Oil 220	Mobil Gear 630
220~150	Meropa150	Shell Omala Oil 150	Mobil Gear 629
150~68	Meropa68	Shell Omala Oil 68	Mobil Gear 626

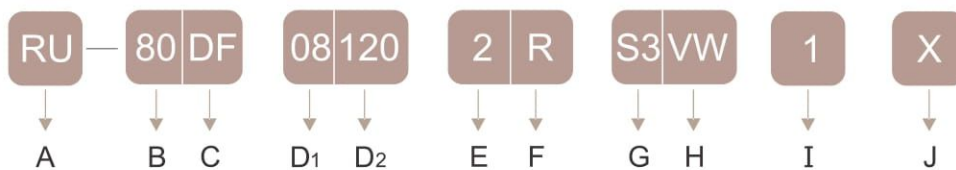
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■ Outstanding Quality, Continuous Improvement

MODEL CODE

Model Code Designation:



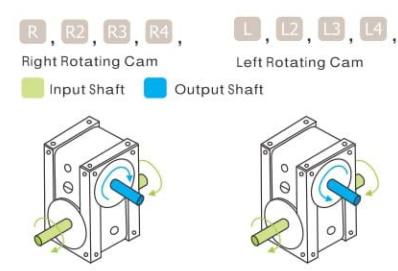
A Machine Type	RU	Roller Gear Cam	
B Specification	80	80mm	The distance between the output shaft center and the input shaft center
C Type	DF	type	DS-Shaft; DF-Flange; (DFH-Flange Hole); DT-Table; DA-Hyperpliod
D ₁ No. of Stop (s)	08	8 stops	No. of Stops available: 2, 3, 4, 5, 6, 8, 10, 12, 16, 20, 24, 30, 32, 36, 40, 48.
D ₂ Indexing Angle(θ h)	120	120°	The number of degrees the input shaft rotates to effect one index motion of the output shaft. 90°/120° 150°/180° 210°/240° 270°/300° 310°/330° 330°/360°.



E Motion Curve	2	MS Curve	1, 2, 3 Three types of curves available.	1 MT (Modified Trapezoid) 2 MS(Modified Sine) 3 MCV50(Modified Constant Velocity 50)
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F Cam Rotation Direction	R	Right Rotating Cam	The input shaft can rotate in either direction. If no fixed direction is required, simply change the motor direction to reverse the output shaft rotating direction. Standard Models are in right direction.
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	1Dwell	2Dwell	3Dwell	4Dwell
Right Rotating Cam	R	R2	R3	R4
Left Rotating Cam	L	L2	L3	L4



Other Types Available

- H. Hollow flange type output shaft (applicable to 45D-250D)
- Hollow output shaft is usually for electric and pneumatic lines. Please specify the hole diameter and the application when placing orders.
- If not specified, the output shaft will be made solid.

Ordering Procedure

- Indexer mounting position: there are six faces available for mounting, V. W. P. S. T. and U. Please specify which face to be mounted on according to the application.
- The model code indicates the positions of the input shaft, the output shaft and the mounting.
- Please specify the model code of the indexing drives needed when placing the order. There are criteria for choosing the correct cam (right rotating or left rotating); as well as choice criteria for the 3 motion curves (MT, MS and MCV50).

Contact our sales staff for assistance in selecting the most appropriate model for you needs.

MODEL CODE

G Input Shaft Configuration		
<p>S₃</p> <p>Double Input on side T and side U.</p>	<p>S1 Side T only</p> <p>S2 Side U only</p> <p>S3 Both sides T and U</p>	<p>S1 S2 S3</p>
<p>H The mounting sides</p> <p>VW</p> <p>There are mounting bolt holes on side V and side W. P, S, T and U are optional.</p>		
<p>I The mounting position</p> <p>1</p> <p>Shown in the figure to the right.</p>		
<p>J Special Model Mark</p> <p>X</p> <p>The custom special requirement</p> <p><input type="checkbox"/> standard with no mark</p> <p><input checked="" type="checkbox"/> Special model</p>		
<p>1 GL(W) 2 GL(V) 3 GL(U)</p> <p>4 GL(T) 5 GL(P) 6 GL(S)</p>		

DF DF-Flange



DS DS-Shaft



DFH DFH-Flange Hole



PU Parallel



DT DT-Table



DA DA-Hyperpliod Table



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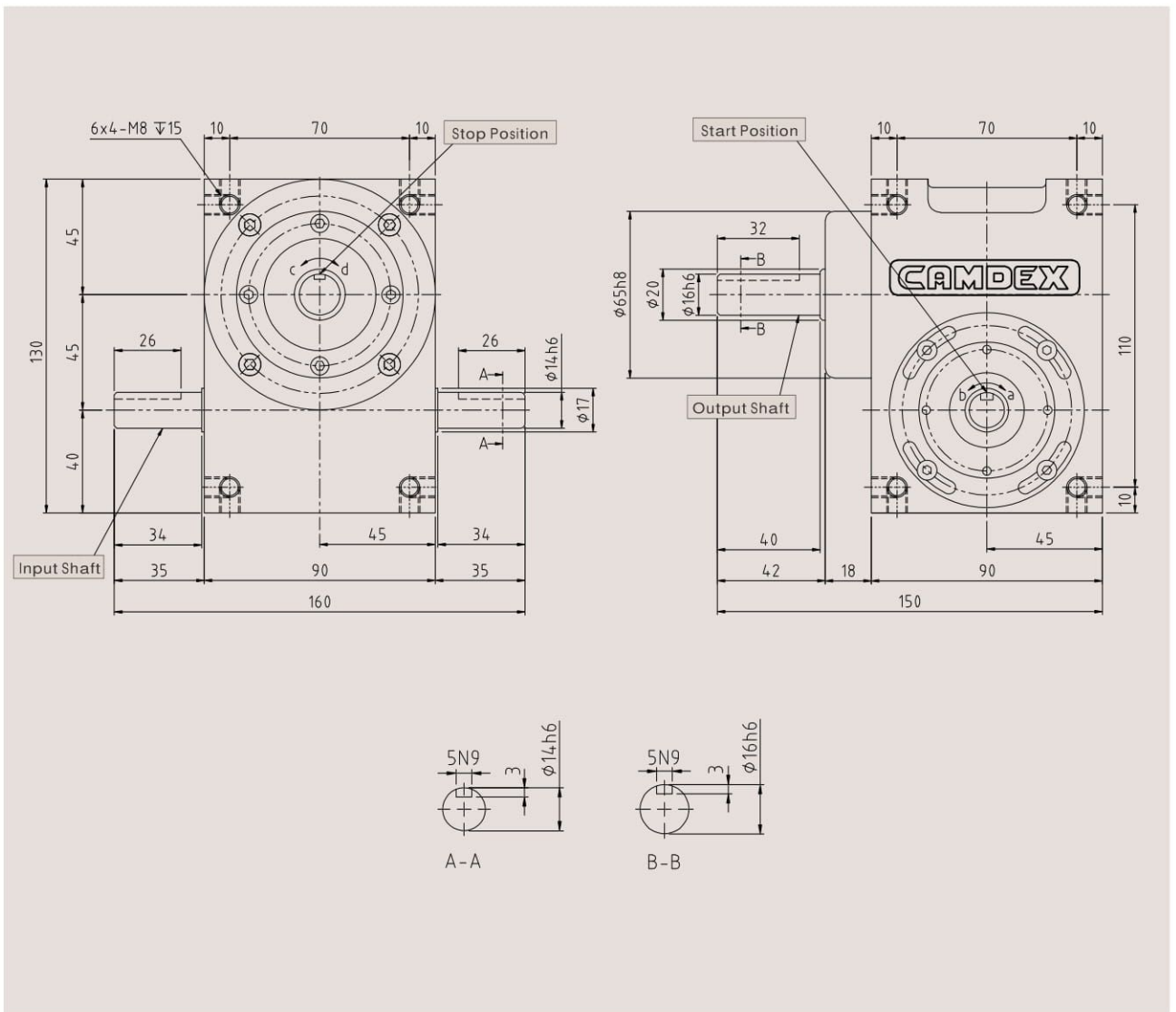
DS Series

45DS / 60DS / 70DS / 80DS / 83DS / 100DS
110DS / 125DS / 140DS / 180DS

Product Features

This series of models feature the traditional shaft style. They are installed with some accessories like gears, couplings or clutches. Particular attention should be paid on the diameter tolerances (+0.015 / -0). They are used mostly in belt conveyor drives, gear drives and gap coupling combination drives.

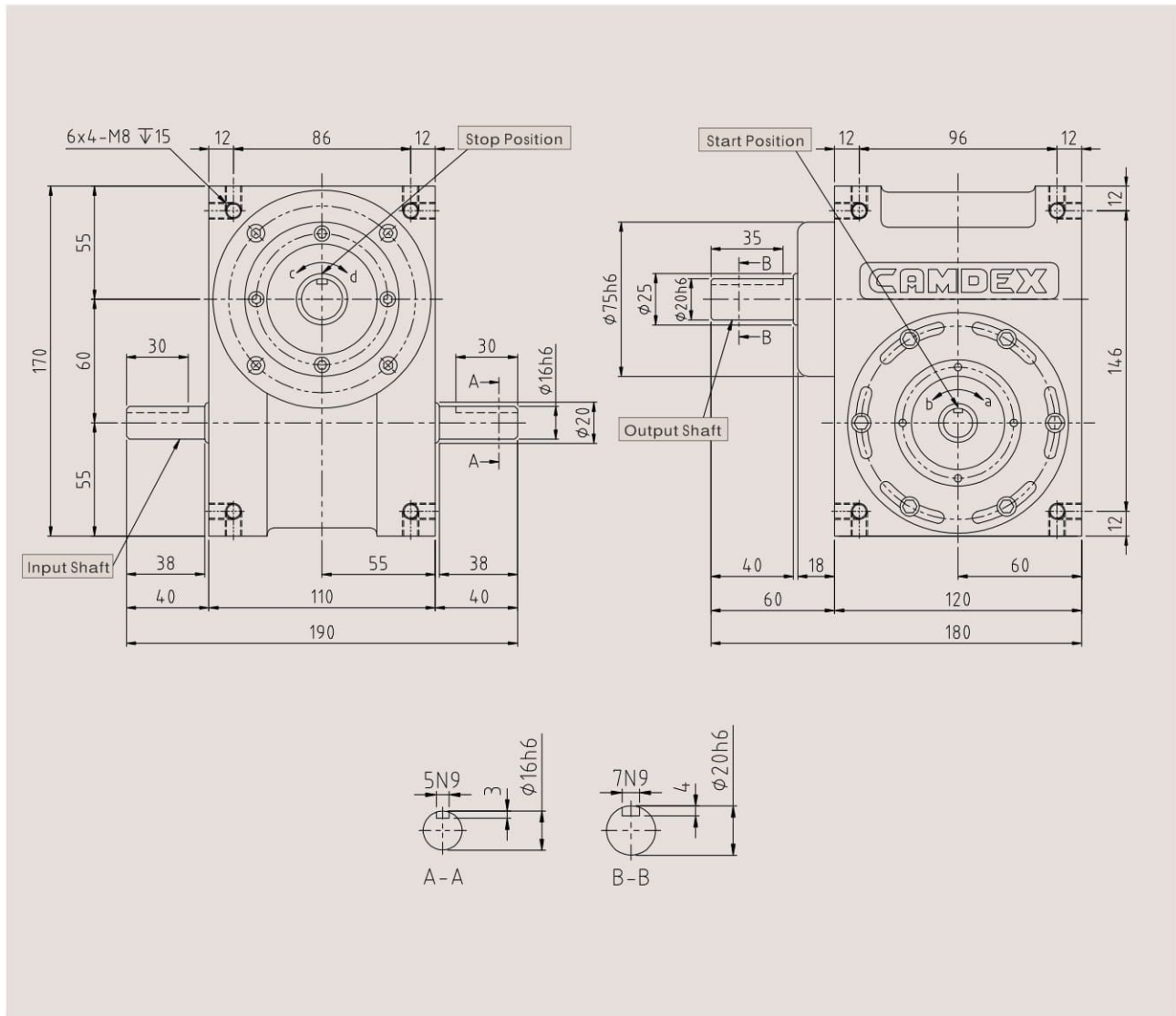
45DS DS Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	80
Allowable Output shaft axial load	C2	kgf	72.5
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	85
Max. Input shaft moment of deflection	C4	kgf	75
Max. Input shaft torque	C5	kgf-m	4
Input shaft GD ²	C6	kgf-m ²	3.2×10^{-4}
Positioning indexing accuracy		sec.	± 60
Weight		kg	7

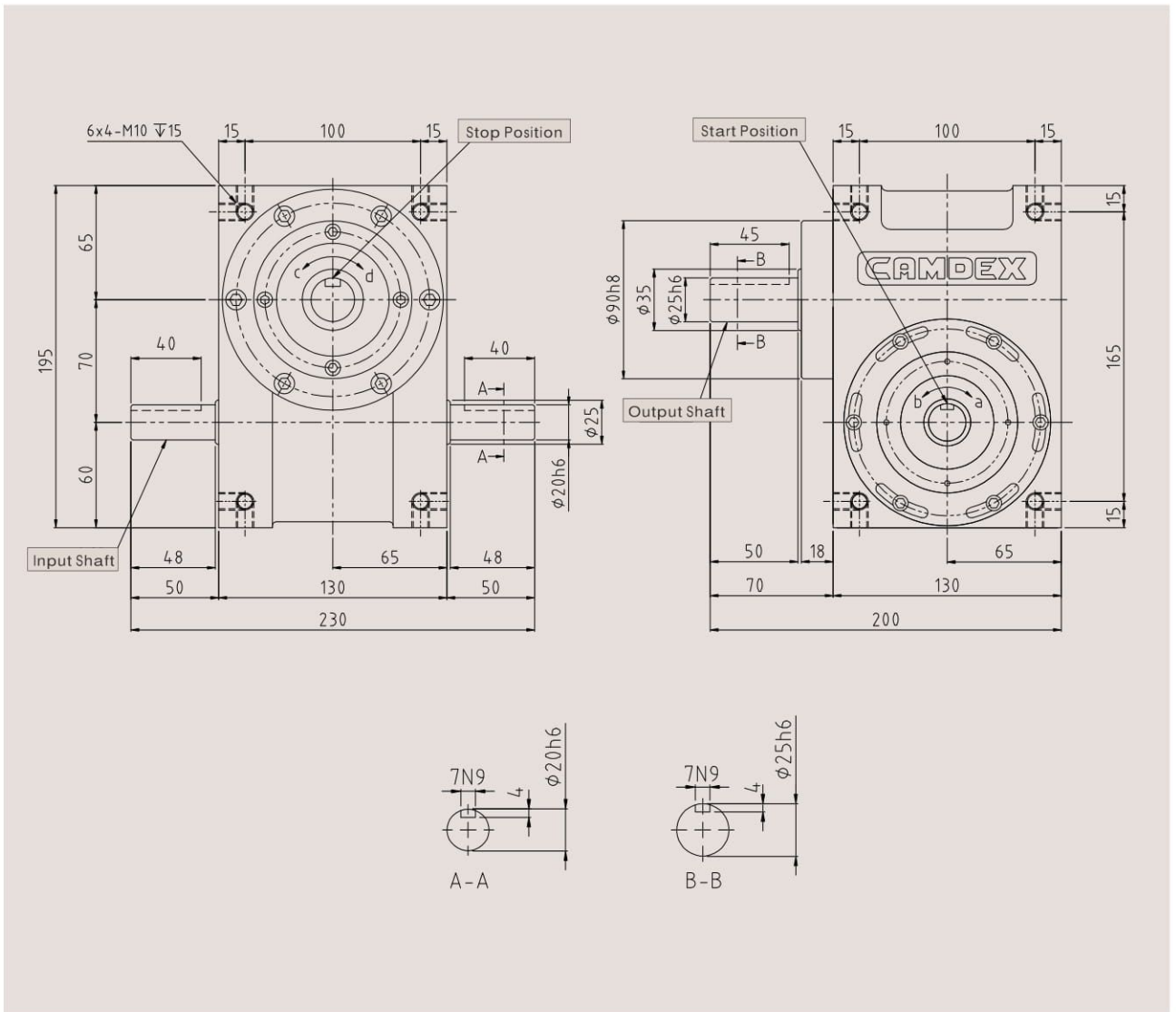
60DS DS Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	180
Allowable Output shaft axial load	C2	kgf	150
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	100
Max. Input shaft moment of deflection	C4	kgf	95
Max. Input shaft torque	C5	kgf-m	6
Input shaft GD ²	C6	kgf-m ²	1.9×10^{-3}
Positioning indexing accuracy		sec.	± 45
Weight		kg	13

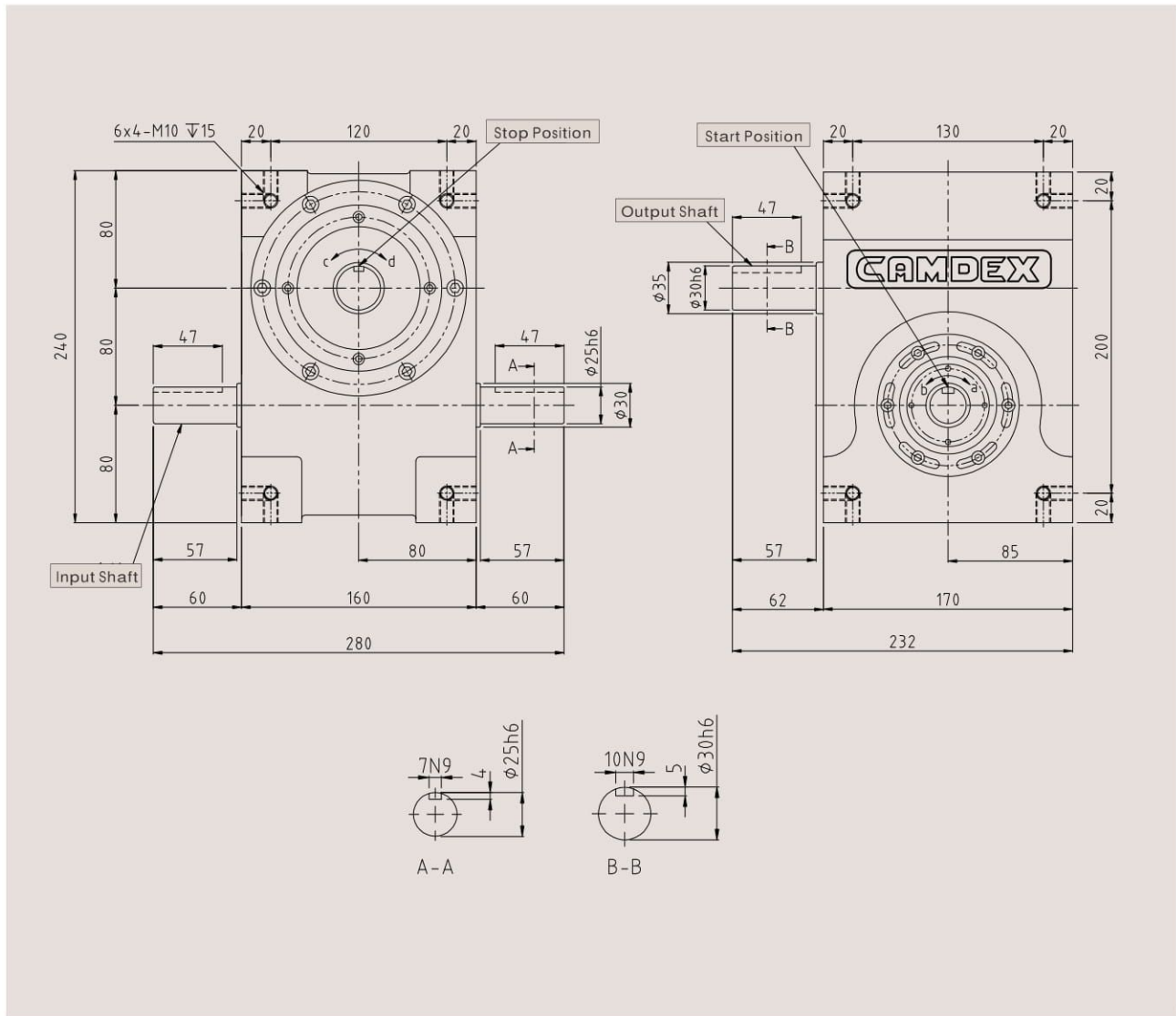
70DS DS Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	220
Allowable Output shaft axial load	C2	kgf	220
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	150
Max. Input shaft moment of deflection	C4	kgf	110
Max. Input shaft torque	C5	kgf-m	9.5
Input shaft GD ²	C6	kgf-m ²	6x10 ⁻³
Positioning indexing accuracy		sec.	±30
Weight		kg	18

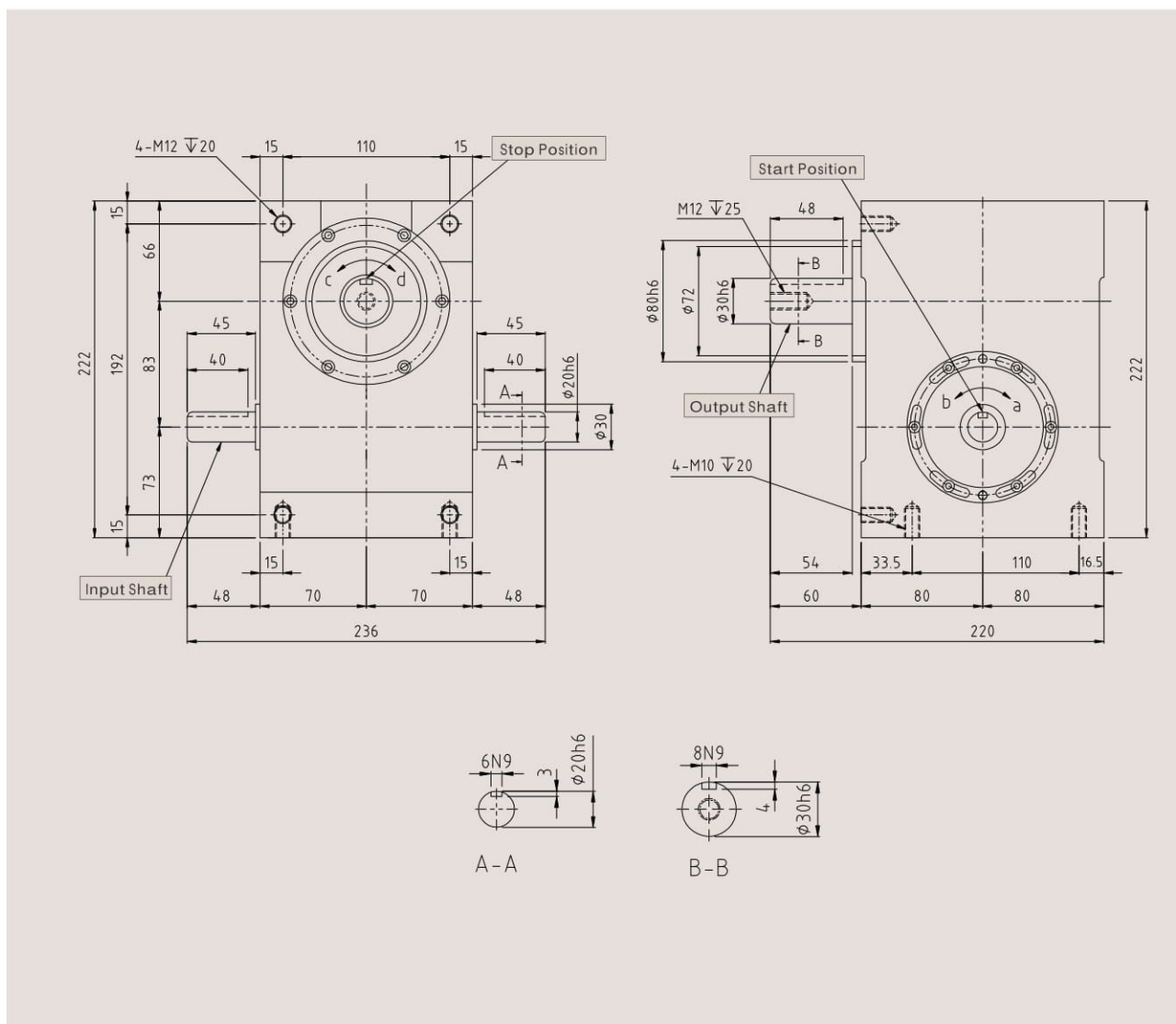
80DS DS Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	220
Allowable Output shaft axial load	C2	kgf	220
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	210
Max. Input shaft moment of deflection	C4	kgf	190
Max. Input shaft torque	C5	kgf-m	18.5
Input shaft GD ²	C6	kgf-m ²	9x10 ⁻³
Positioning indexing accuracy		sec.	±30
Weight		kg	32

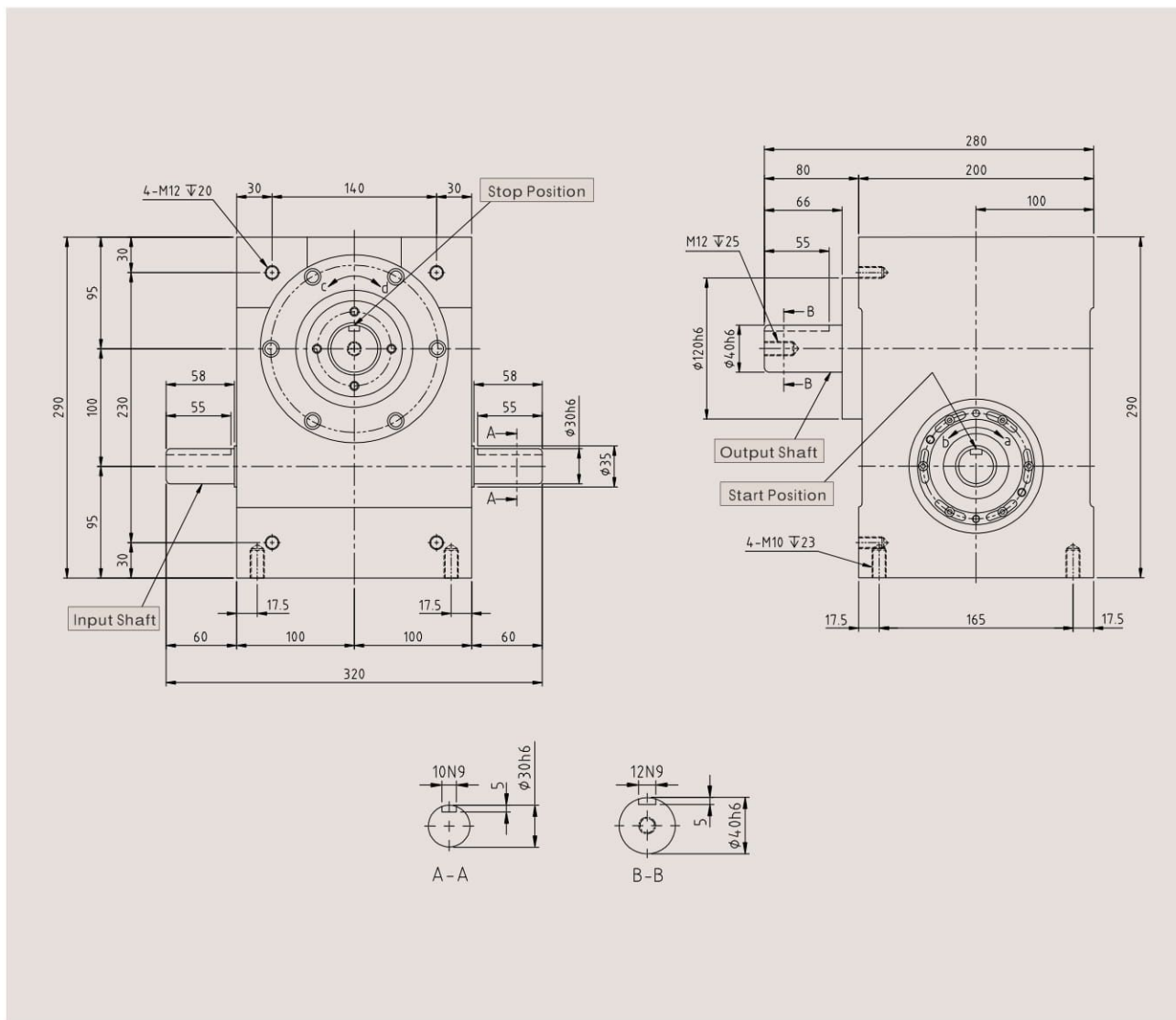
83DS DS Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	330
Allowable Output shaft axial load	C2	kgf	420
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	350
Max. Input shaft moment of deflection	C4	kgf	260
Max. Input shaft torque	C5	kgf-m	25
Input shaft GD ²	C6	kgf-m ²	9x10 ⁻³
Positioning indexing accuracy		sec.	± 30
Weight		kg	26.5

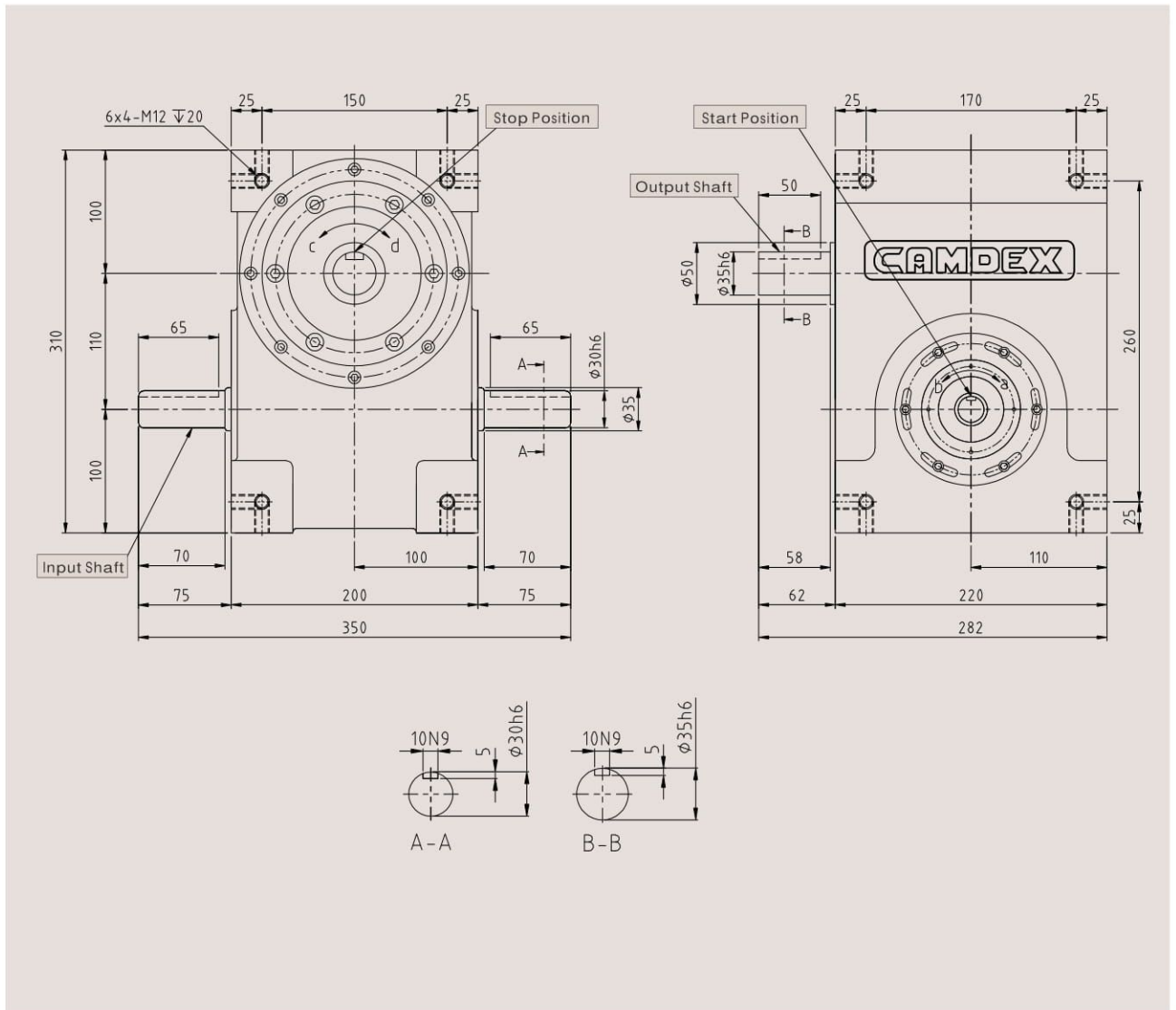
100DS DS Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	400
Allowable Output shaft axial load	C2	kgf	450
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	300
Max. Input shaft moment of deflection	C4	kgf	220
Max. Input shaft torque	C5	kgf-m	26
Input shaft GD ²	C6	kgf-m ²	4x10 ⁻³
Positioning indexing accuracy		sec.	±30
Weight		kg	50

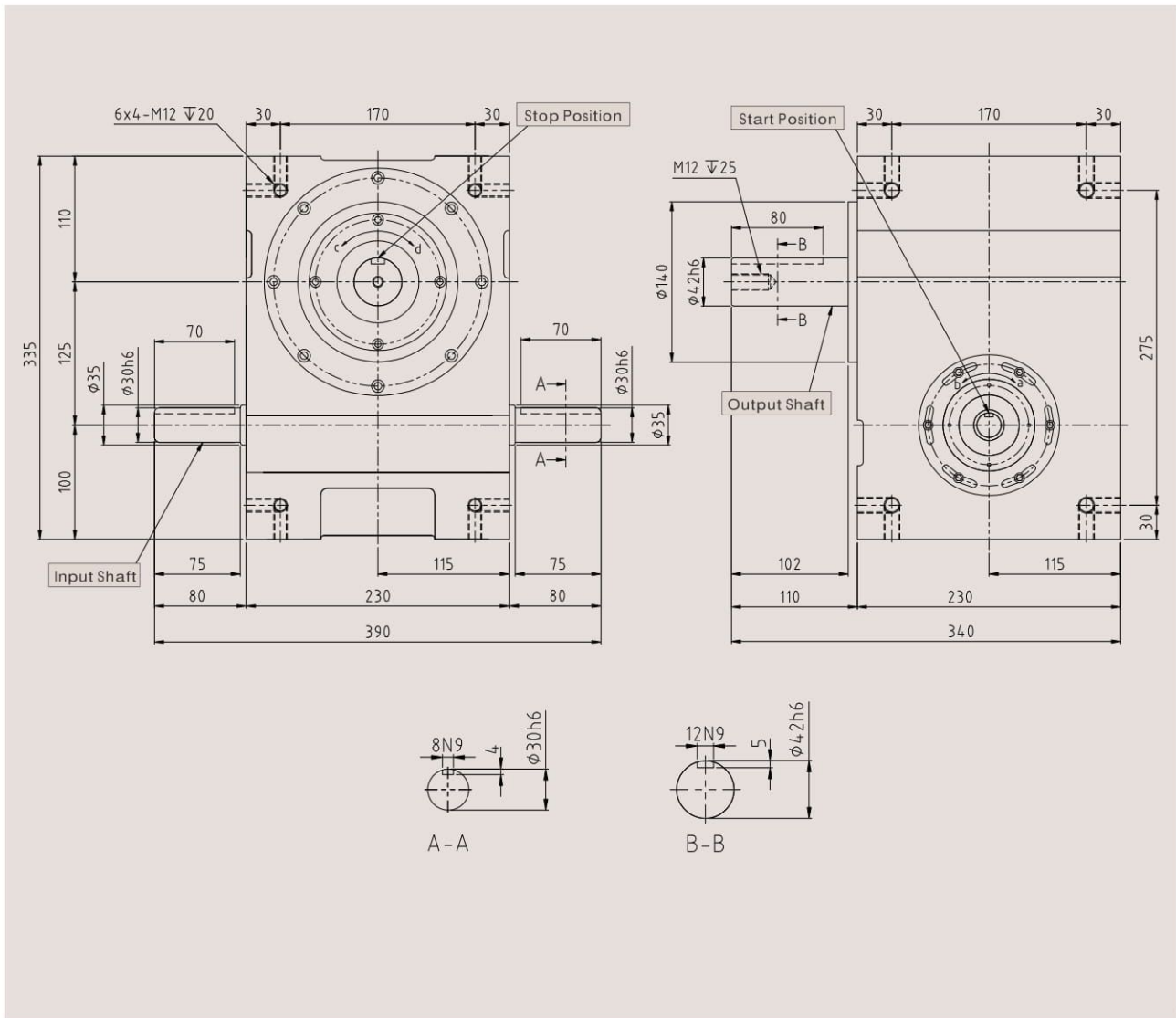
110DS DS Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	500
Allowable Output shaft axial load	C2	kgf	550
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	360
Max. Input shaft moment of deflection	C4	kgf	290
Max. Input shaft torque	C5	kgf-m	32
Input shaft GD ²	C6	kgf-m ²	2.8×10^{-2}
Positioning indexing accuracy		sec.	± 30
Weight		kg	65

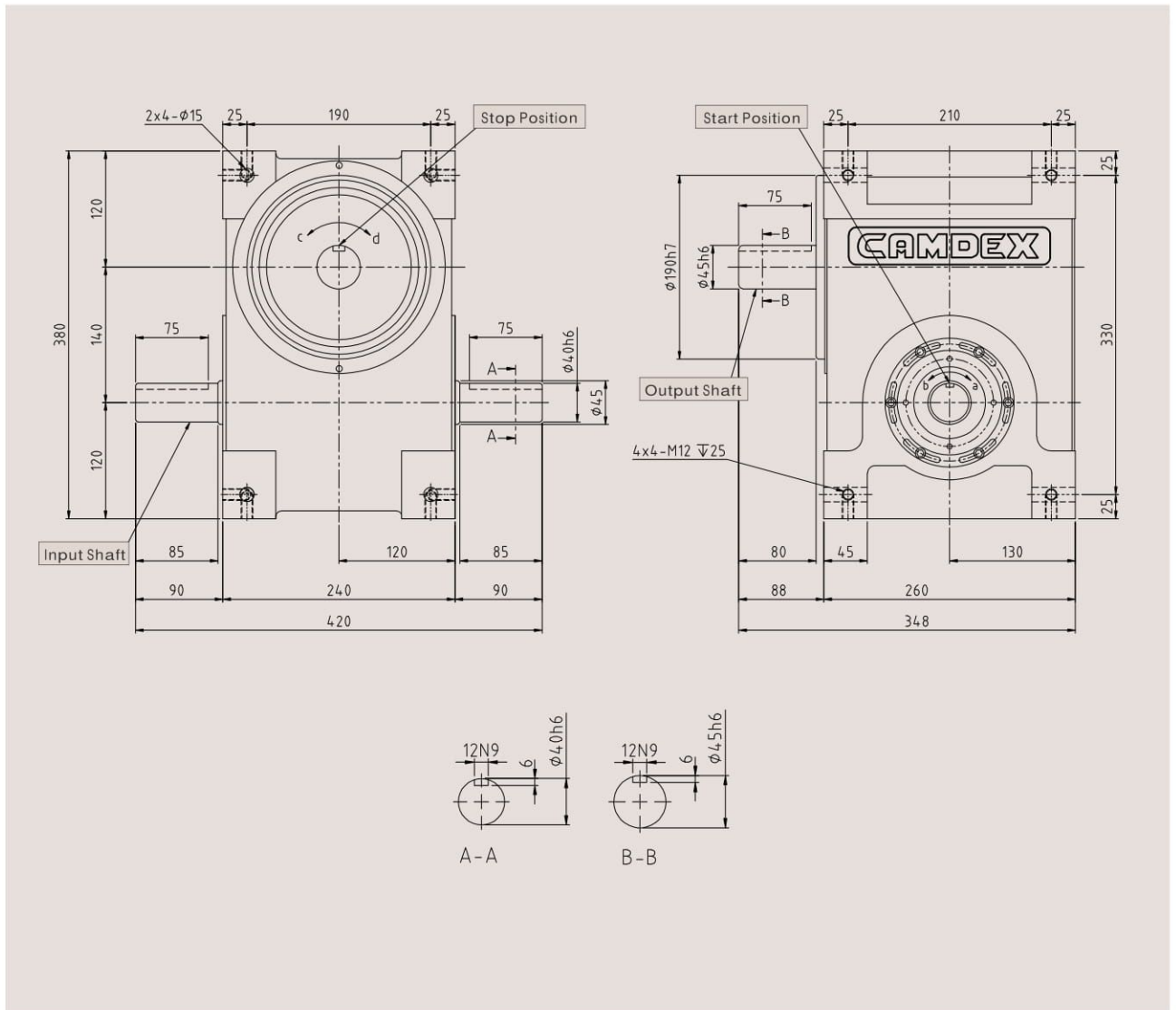
125DS DS Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	610
Allowable Output shaft axial load	C2	kgf	700
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	400
Max. Input shaft moment of deflection	C4	kgf	420
Max. Input shaft torque	C5	kgf-m	51
Input shaft GD ²	C6	kgf-m ²	0.092
Positioning indexing accuracy		sec.	± 30
Weight		kg	75

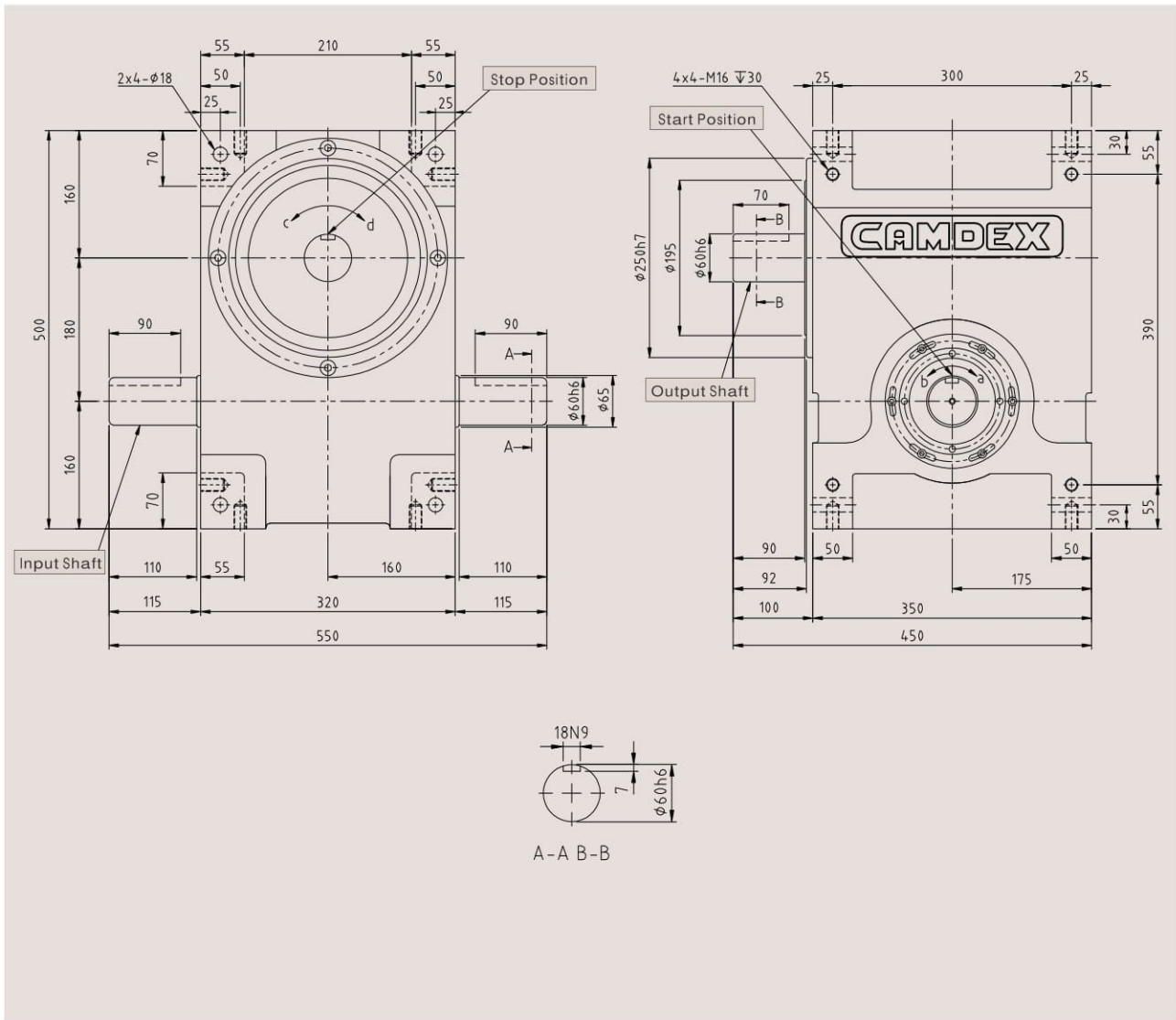
140DS DS Series



Technical Data

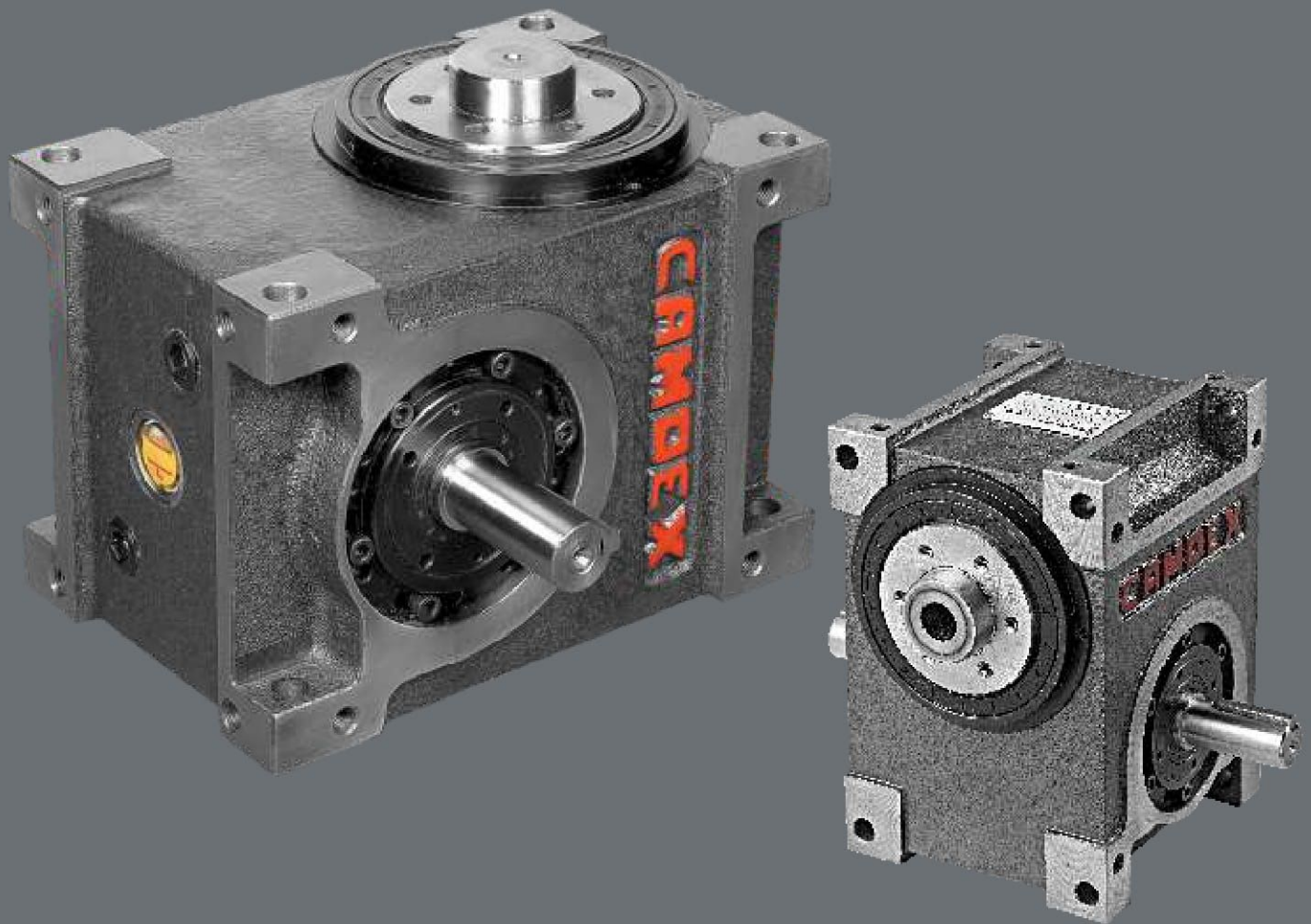
Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	730
Allowable Output shaft axial load	C2	kgf	860
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	440
Max. Input shaft moment of deflection	C4	kgf	560
Max. Input shaft torque	C5	kgf-m	75
Input shaft GD ²	C6	kgf-m ²	0.11
Positioning indexing accuracy		sec.	±30
Weight		kg	90

180DS DS Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	1200
Allowable Output shaft axial load	C2	kgf	1500
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	590
Max. Input shaft moment of deflection	C4	kgf	1045
Max. Input shaft torque	C5	kgf-m	147
Input shaft GD ²²	C6	kgf-m ²	0.39
Positioning indexing accuracy		sec.	±30
Weight		kg	220



DF Series

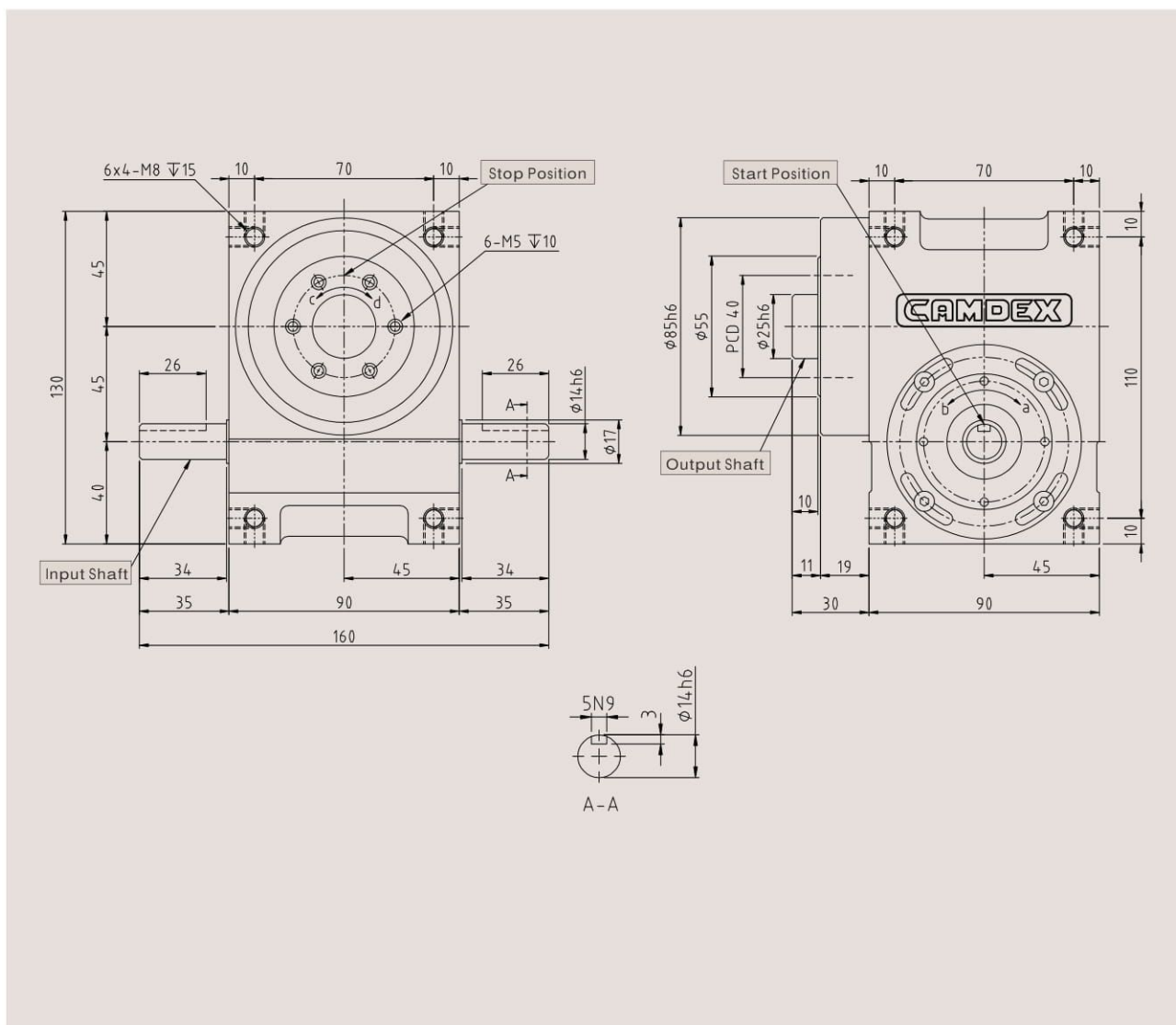
45DF/ 60DF / 70DF / 80DF
110DF/ 125DF / 140DF / 180DF

Product Features

This series of models are designed for heavy load capacity. They can support higher vertical, radial or axial pressure. The output shaft is disk type, with flange center, disk bolt holes and positioning pin holes. It has larger mounting area, which enhances the flatness and stability and further stabilizes the operation. It is mostly applied to the drives with larger load turn tables. This series of models are widely used in all kinds of turn table processing machines and similar application machines, auto indexing drive units and drive discs.

The output shaft of this series can be made into a hollow flange type, DFH, where H means the output shaft is hollow. The hollow output shaft is to allow wiring, hydraulics, compressed air lines, etc to pass through the center. The hollow shaft's inside diameter and application should be specified in the order.

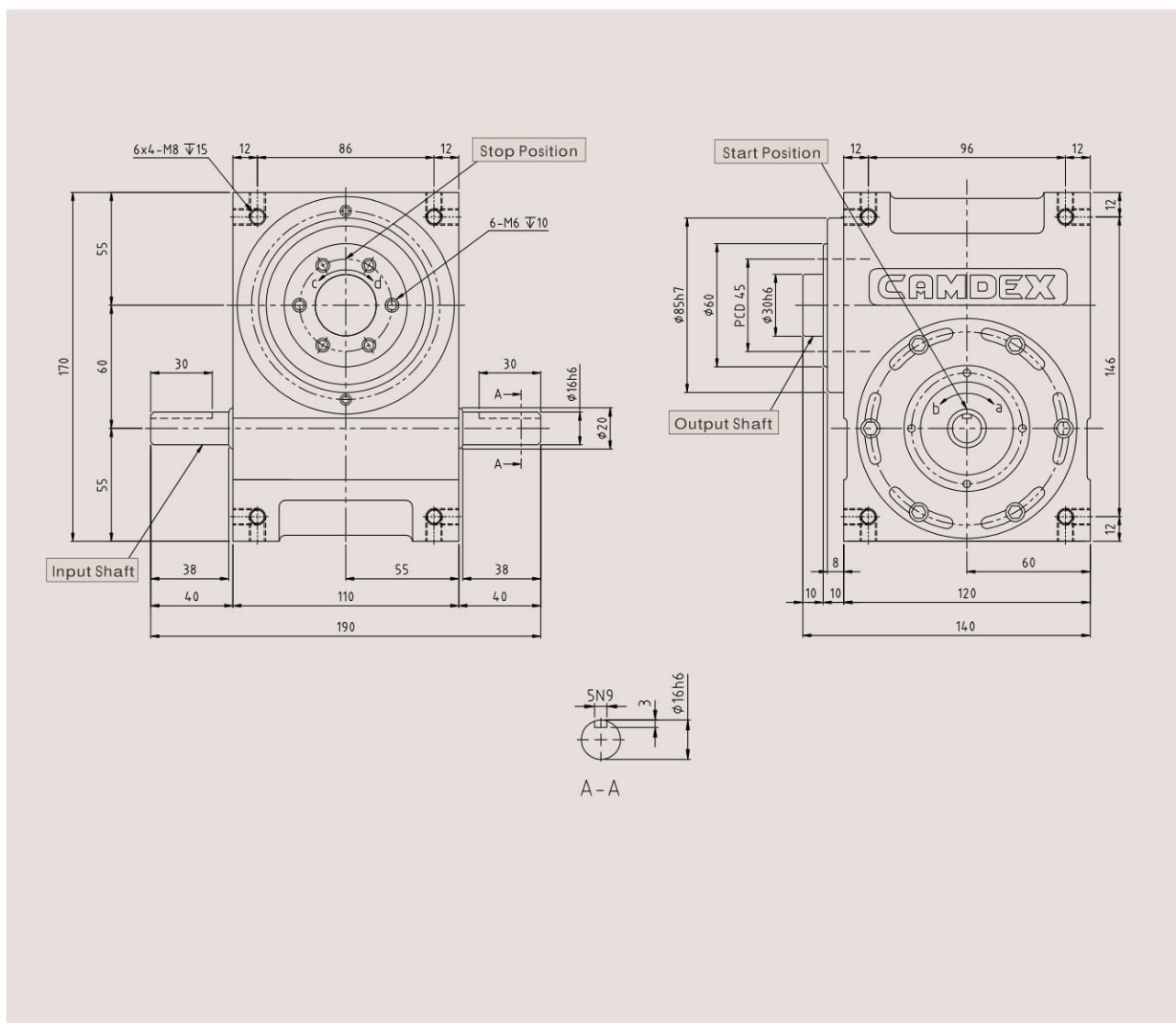
45DF DF Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	130
Allowable Output shaft axial load	C2	kgf	140
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	85
Max. Input shaft moment of deflection	C4	kgf	110
Max. Input shaft torque	C5	kgf-m	4
Input shaft GD ²	C6	kgf-m ²	3.2x10 ⁻⁴
Positioning indexing accuracy		sec.	±60
Weight		kg	7

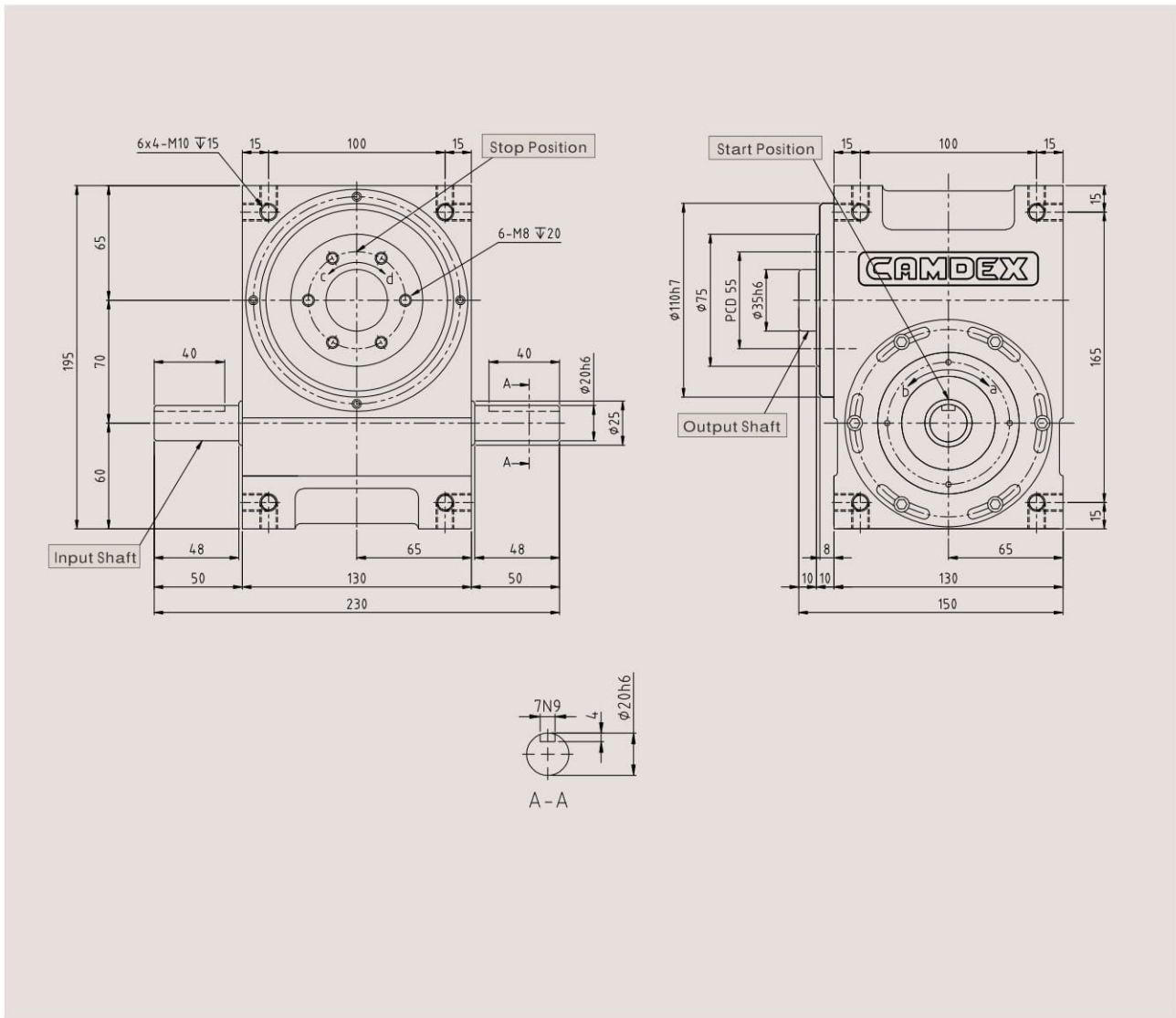
60DF DF Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	140
Allowable Output shaft axial load	C2	kgf	142
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	100
Max. Input shaft moment of deflection	C4	kgf	150
Max. Input shaft torque	C5	kgf-m	6
Input shaft GD ²	C6	kgf-m ²	1.9x10 ⁻³
Positioning indexing accuracy		sec.	±45
Weight		kg	13

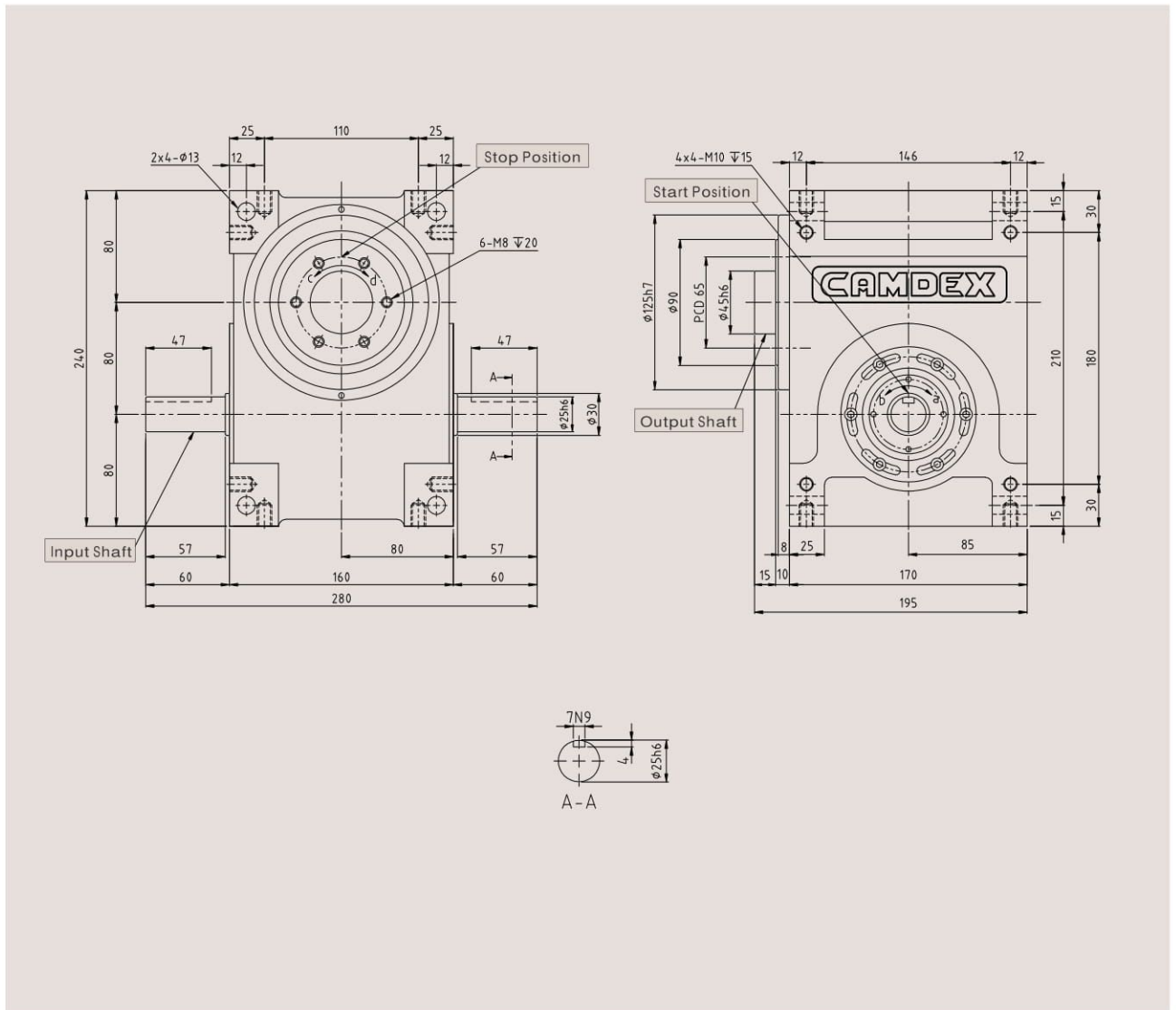
70DF DF Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	220
Allowable Output shaft axial load	C2	kgf	300
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	150
Max. Input shaft moment of deflection	C4	kgf	110
Max. Input shaft torque	C5	kgf-m	9.5
Input shaft GD ²	C6	kgf-m ²	6x10 ⁻³
Positioning indexing accuracy		sec.	±30
Weight		kg	18

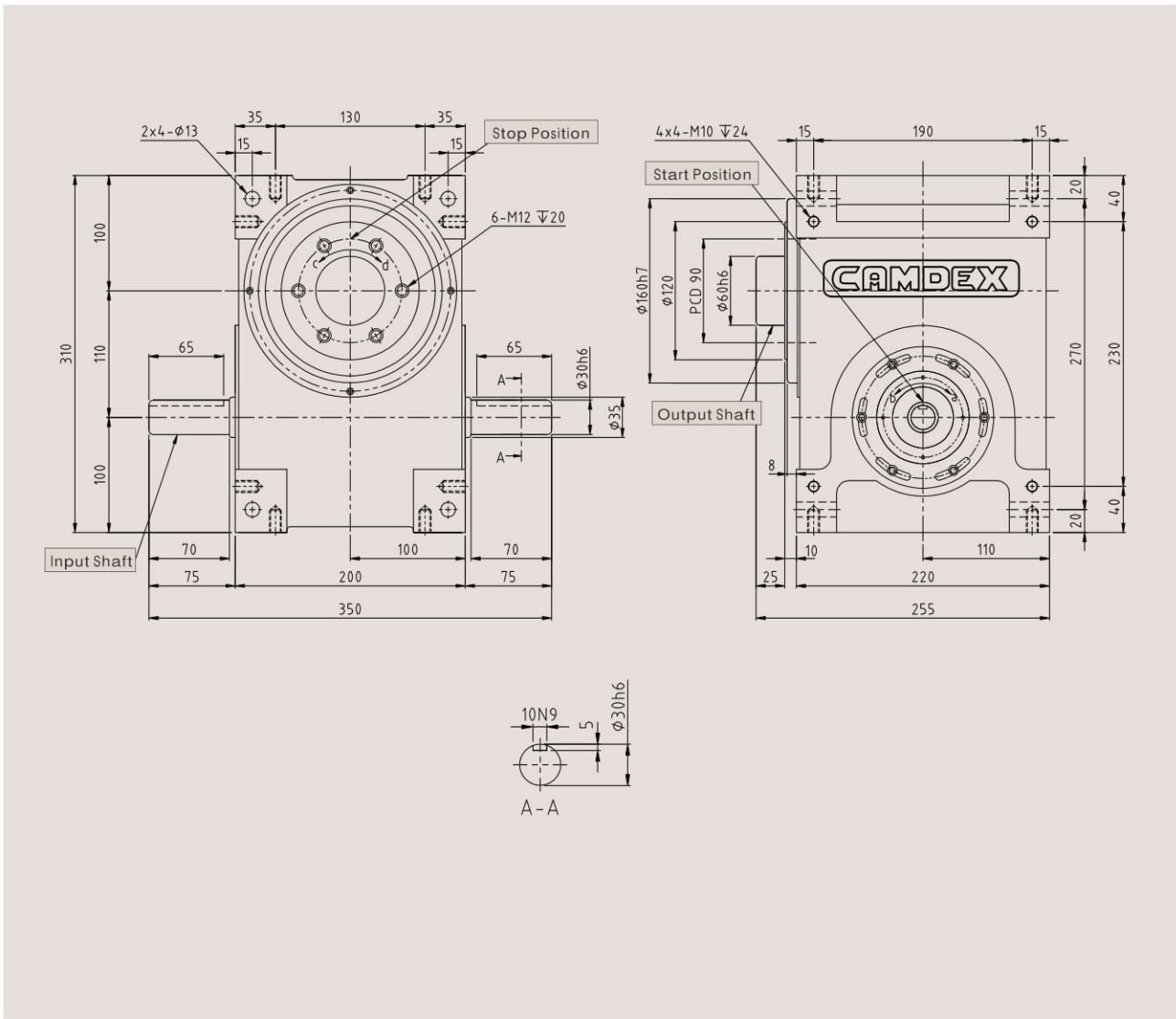
80DF DF Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	330
Allowable Output shaft axial load	C2	kgf	420
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	350
Max. Input shaft moment of deflection	C4	kgf	260
Max. Input shaft torque	C5	kgf-m	25
Input shaft GD ²	C6	kgf-m ²	9x10 ⁻³
Positioning indexing accuracy		sec.	±30
Weight		kg	32

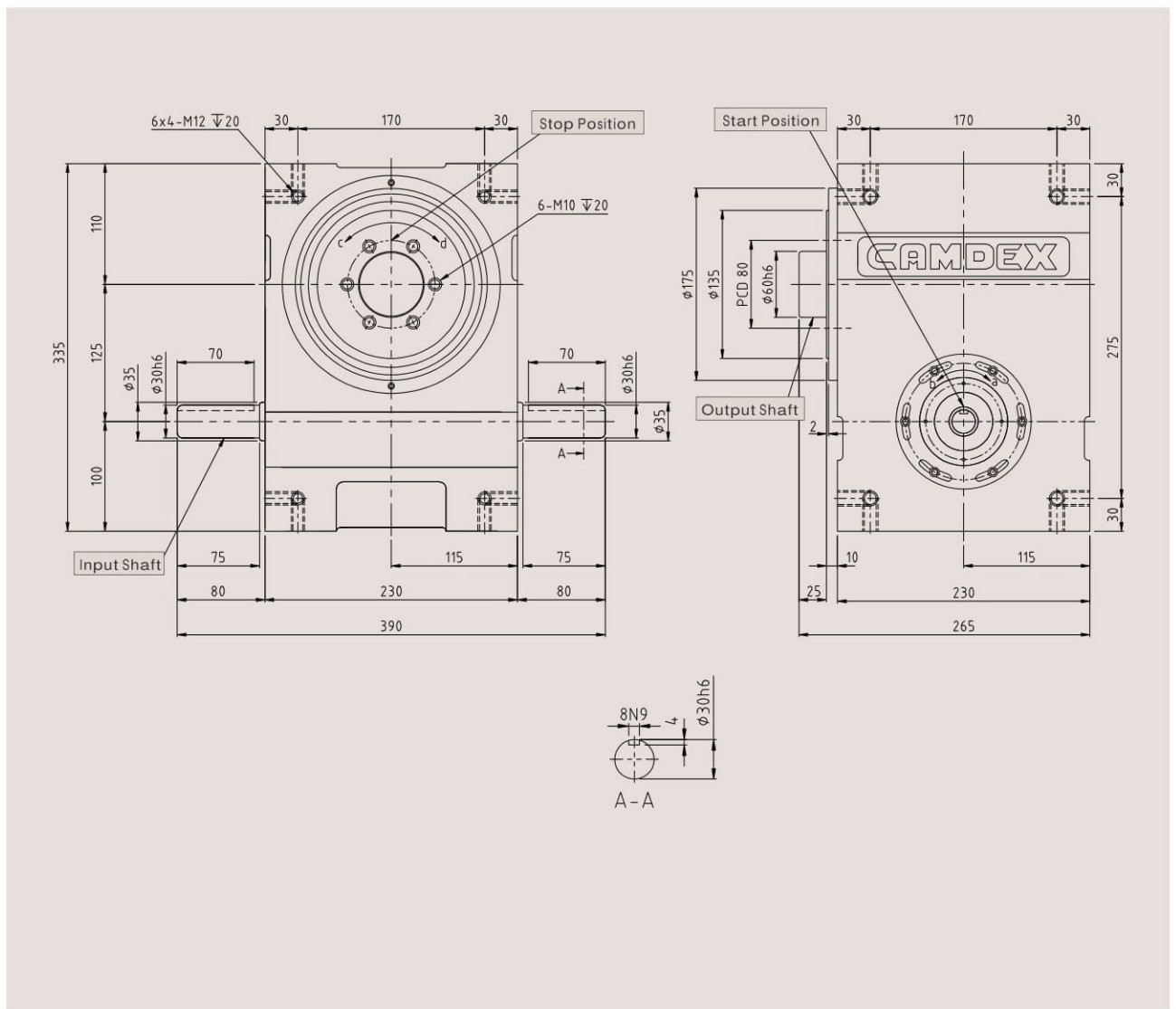
110DF^{DF} Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	560
Allowable Output shaft axial load	C2	kgf	700
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	480
Max. Input shaft moment of deflection	C4	kgf	415
Max. Input shaft torque	C5	kgf-m	40
Input shaft GD ²	C6	kgf-m ²	2.8x18 ⁻²
Positioning indexing accuracy		sec.	±30
Weight		kg	65

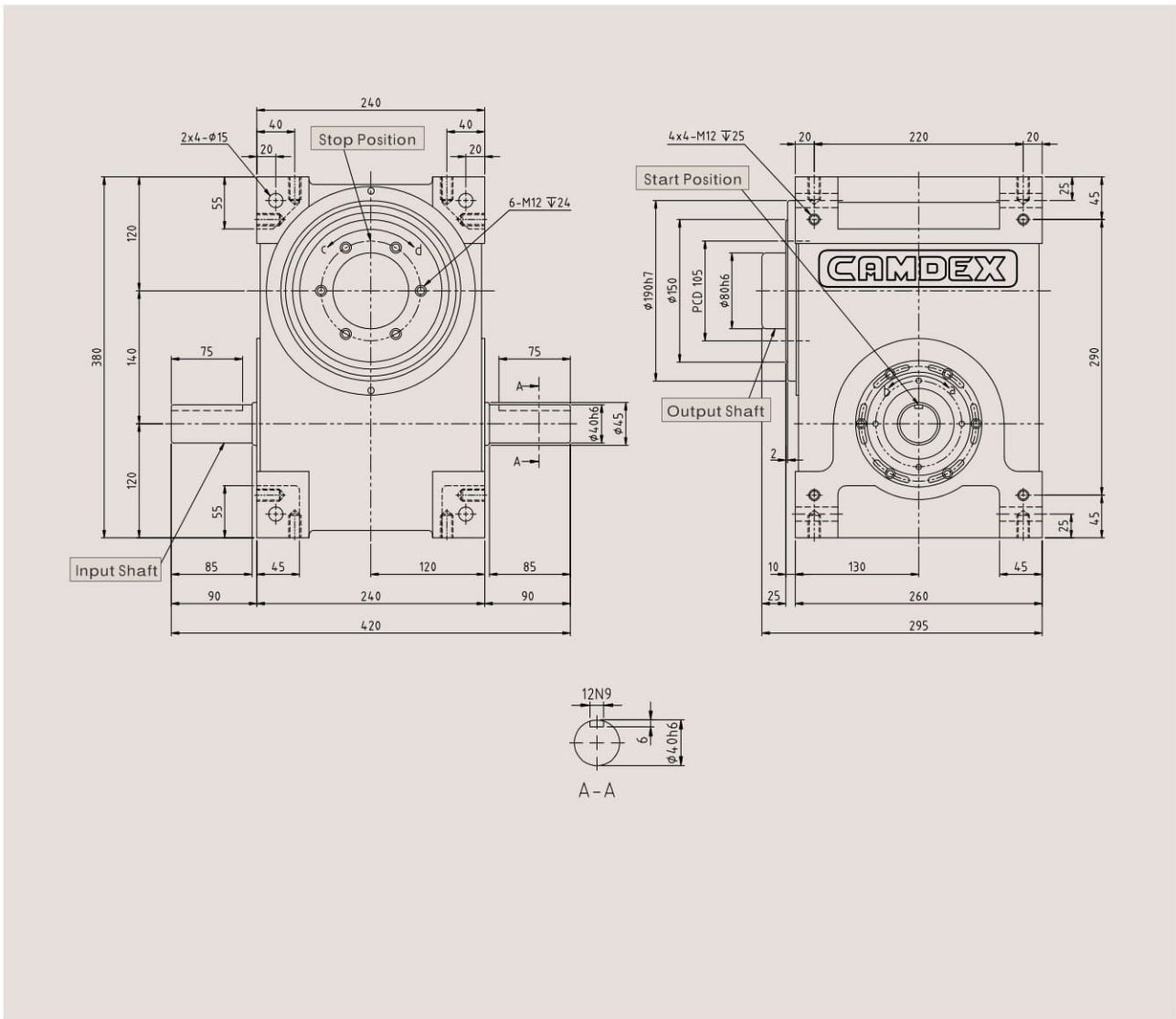
125DF^{DF} Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	630
Allowable Output shaft axial load	C2	kgf	850
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	520
Max. Input shaft moment of deflection	C4	kgf	560
Max. Input shaft torque	C5	kgf-m	65
Input shaft GD ²	C6	kgf-m ²	0.28
Positioning indexing accuracy		sec.	± 30
Weight		kg	78

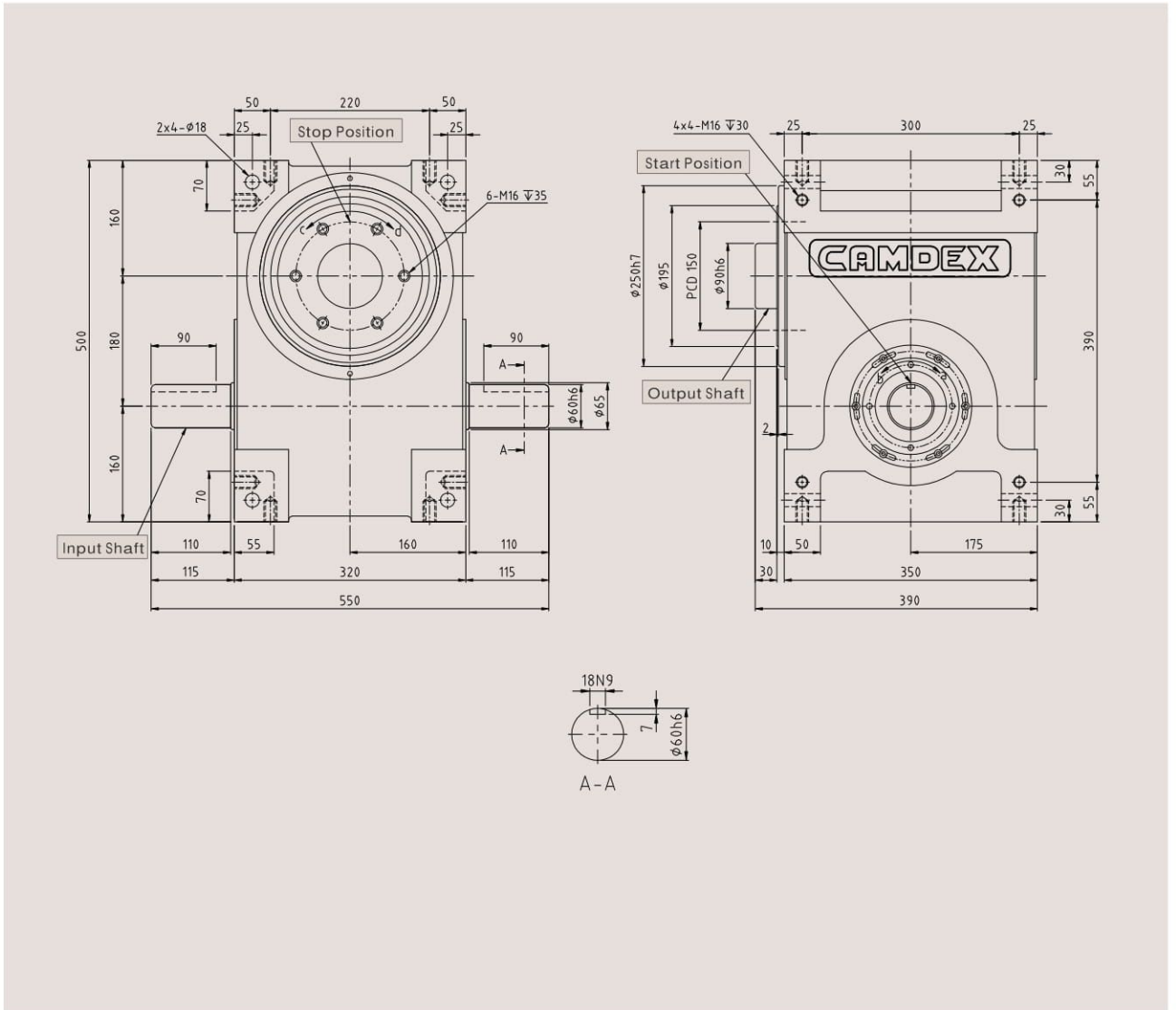
140DF^{DF} Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	760
Allowable Output shaft axial load	C2	kgf	1000
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	550
Max. Input shaft moment of deflection	C4	kgf	710
Max. Input shaft torque	C5	kgf-m	100
Input shaft GD ²	C6	kgf-m ²	0.11
Positioning indexing accuracy		sec.	±30
Weight		kg	90

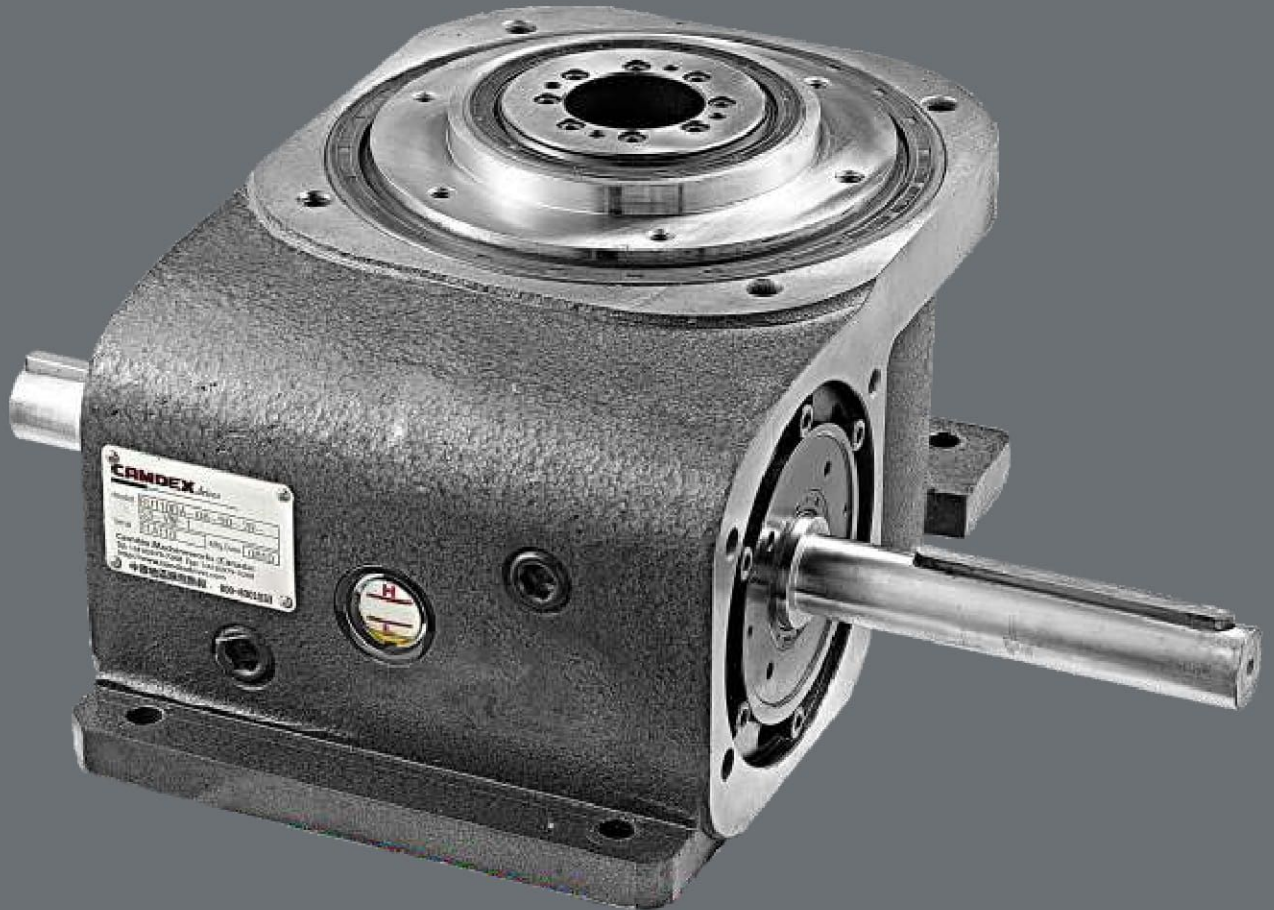
180DF^{DF} Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	1200
Allowable Output shaft axial load	C2	kgf	1500
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	1100
Max. Input shaft moment of deflection	C4	kgf	1960
Max. Input shaft torque	C5	kgf-m	340
Input shaft GD ²	C6	kgf-m ²	0.39
Positioning indexing accuracy		sec.	± 30
Weight		kg	220

Hamyar Nik Azaran *drives*



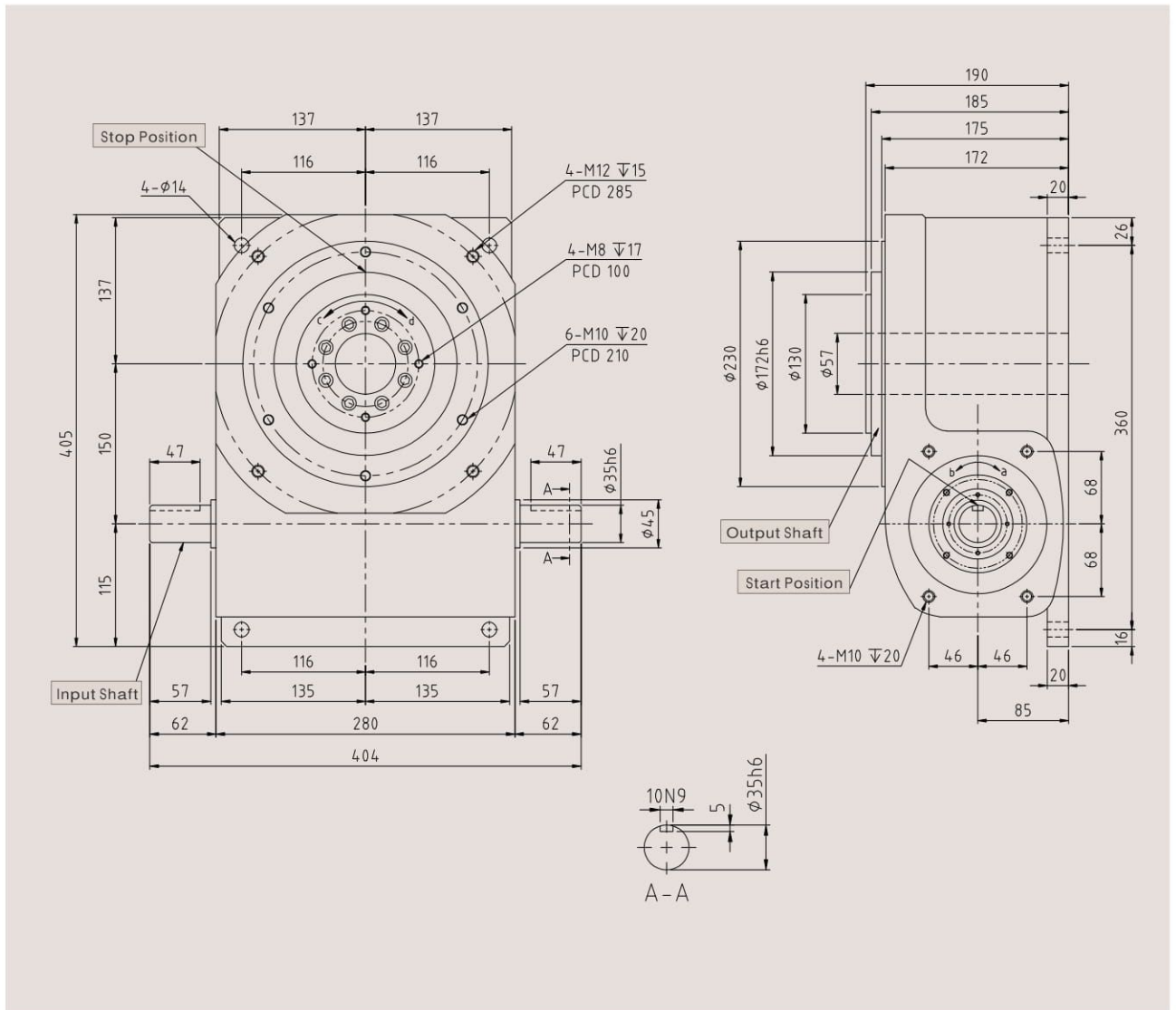
DA Series

90DA / 110DA / 150DA

Product Features

This series of models have similar size and functional features to DT series. The indexing shaft has a very high axial and radial load capacity. There is a fixed mounting flange at the center of the output shaft for installation of both static and moving automation accessories. The hollow output shaft is to allow wiring, hydraulics, compressed air lines, etc to pass through the center. As a synchronous auto index drive, it is designed to work with other dynamic or static auto machines, for heavy load applications.

150DA DA Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	C1	kgf	1200
Allowable Output shaft axial load	C2	kgf	700
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Allowable Input shaft radial load	C3	kgf	410
Max. Input shaft moment of deflection	C4	kgf	410
Max. Input shaft torque	C5	kgf-m	40
Input shaft GD ²	C6	kgf-m ²	2.0x10 ⁻³
Positioning indexing accuracy		sec.	±30
Weight		kg	86

WORKING EXAMPLES AND CALCULATIONS



Working Examples and Calculations - 1

Features of Curves

Velocity (V_m), Acceleration (A_m) and Input torque (Q_m) of a cam curve have a big influence in the accuracy and lifespan of the indexing drives. It is very important to select the proper cam curve.

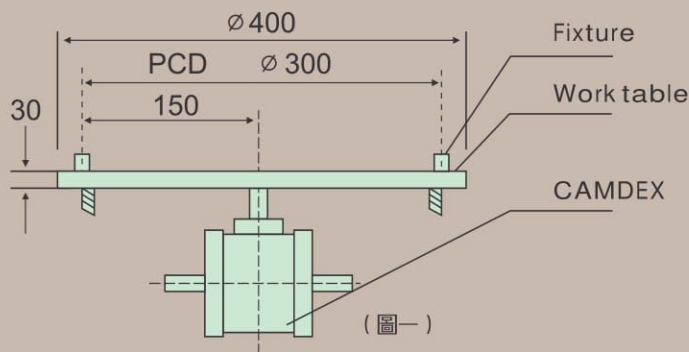
Generally speaking, common curves include Modified Sine Curve (MS), Modified Trapezoid Curve (MT), and Modified Constant Velocity Curve (MV). Principles of selection are shown on the right:

- 1 Constant speed (including start and stop)
- 2 Constant acceleration (including start and stop)
- 3 The maximums of A_m , V_m and Q_m should be as small as possible
- 4 Select MS, MT with small A_m and big V_m for high speed and light load application
- 5 Select MS, MCV with big A_m and small V_m for low speed and heavy load application
- 6 Select MS, when speed and load is not sure

Working Example and Calculation

Example 1: for indexing drives for indexing work table Calculation:

To select indexing drives and matching motors of proper size and specification, the following calculations are performed.



Number of stops	8
Dwelling period	0.5s
Indexing period	0.25s
Table size	Ø400 x 30mm
Fixture weight	4kg/section
Work piece weight	0.5kg/section
Effective rotating radius	150mm
Cam curve	MS

Calculation:

1~1 Number of stops: $S=8$

1~2 Rotating angle $\theta = 360^\circ \times \frac{0.25}{0.25+0.5} = 360^\circ \times \frac{1}{3} = 120^\circ$

1~3 RPM of input shaft $N = \frac{60}{t_2} \times \frac{\theta}{360} = \frac{60}{0.25} \times \frac{120}{360} = 80\text{rpm}$

1~4 Cam Curve: Modified Sine Curve, therefore $V_m=1.76$, $A_m=5.53$ $Q_m=0.987$

1~5 Safety Factor for load: $f_e=1.8$

1~6 Friction coefficient $\mu = 0.2$

WORKING EXAMPLES AND CALCULATIONS



Working Examples and Calculations - 1

(1) T_i : Inertia Torque

(a) Table Weight W_1 , Fixture Weight W_2 , Workpiece W_3 , Hence...

$$W_1 = \pi \times 20^2 \times 3 \times 7.85 \times \frac{1}{1000} = 29.59 \text{ kg}$$

$$W_2 = 4 \times 8 = 32 \text{ kg}$$

$$W_3 = 0.5 \times 8 = 4 \text{ kg}$$

(b) Inertia torque of rotating table: I_1 , Inertia torque of fixture: I_2 , Inertia torque of workpiece: I_3 , they are

$$I_1 = \frac{W_1 R_1^2}{2G} = \frac{29.59 \times 0.2^2}{2 \times 9.8} = 0.060 \text{ kgf} \cdot \text{m} \cdot \text{s}^2$$

$$I_2 = \frac{W_2 R_2^2}{G} = \frac{32 \times 0.15^2}{9.8} = 0.0735 \text{ kgf} \cdot \text{m} \cdot \text{s}^2$$

$$I_3 = \frac{W_3 R_3^2}{G} = \frac{4 \times 0.15^2}{9.8} = 0.0092 \text{ kgf} \cdot \text{m} \cdot \text{s}^2$$

(c) Inertia torque total : I

$$I = I_1 + I_2 + I_3 = 0.060 + 0.0735 + 0.0092 = 0.1427 \text{ kgf} \cdot \text{m} \cdot \text{s}^2$$

as it is single flighted $m = 1$

$$\begin{aligned} T_i &= 226.2 A m \times \frac{I \cdot N^2}{S(\Theta/m)^2} \\ &= 226.2 \times 5.53 \times \frac{0.1427 \times 80^2}{8 \times 120^2} \\ &= 9.916 \text{ kgf} \cdot \text{m} \end{aligned}$$

(2) T_f : Torque of Friction

$$T_f = \mu \cdot W \cdot R = 0.2 \times (29.59 + 32 + 4) \times 0.15 = 1.968 \text{ kgf} \cdot \text{m}$$

(3) T_w : Working Torque

$$T_w = 0$$

(4) T_t : Total Torque needed

$$T_t = T_i + T_f + T_w = 9.916 + 1.968 + 0 = 11.884 \text{ kgf} \cdot \text{m}$$

Actual loaded torque

$$T_e = T_t \cdot f_e = 11.884 \times 1.8 = 21.391 \text{ kgf} \cdot \text{m}$$

input shaft torque T_c , Note: the starting loaded torque is considered 0, hence $T_{ca} = 0$

$$T_c = \frac{360}{\Theta \cdot S} \times Q_m \times T_e = \frac{360}{120 \times 8} \times 0.987 \times 21.391 = 7.917 \text{ kgf} \cdot \text{m}$$

Figure out the power needed, assuming that the motor efficiency is 60%.

$$\begin{aligned} P &= \frac{T_c \times N \times 9.8}{9550 \times 0.6} \\ &= \frac{7.917 \times 80 \times 9.8}{9550 \times 0.6} = 1.083 \text{ kw} \end{aligned}$$

In fact, the calculated result is the maximum starting power, and the normal working power is: $P_a = P \times \frac{1}{2} = 1.083 \times \frac{1}{2} = 0.542 \text{ kw}$

(5) Selecting a proper indexing drive

According to the calculated results and the rotating speed of the input shaft 80RPM, we find from the user manual that indexing drives with output shaft torque greater than T_e can be used. As $T_e = T_t = 21.391 \text{ kgf} \cdot \text{m}$, Ru-110DF should be selected.

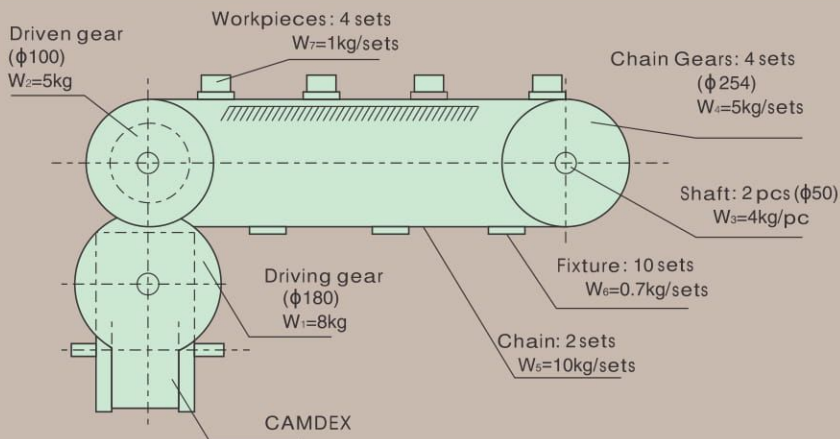
WORKING EXAMPLES AND CALCULATIONS



Working Examples and Calculations -2

Working Example and Calculation

Example 2: indexing drives for conveyor application Indexing drives, with proper gear box for output shaft, can be used in conveyors The relevant calculation of driving the conveyor is as follows:



Designing data and information:

Convey distance :239mm

Rotating angle : $\theta = 120^\circ$

Operation time per conveyance: 2 seconds/cycle

Speed ratio $r = \frac{180}{100} = \left(\frac{n}{m}\right)$

Cam curve: Modified Sine Curve (MS)

Friction coefficient $\mu = 0.2$

Dc = Diameter of conveyor gear pitches

Pc = Horizontal Pitch of Conveyor

r = Speed ratio

Calculation

2~1 Number of stops : N

$$S = \frac{\pi \times Dc \times r}{Pc} = \frac{\pi \times 254 \times 1.8}{23.9} = 6$$

2~2 RPM of input shaft at 2 second/cycle

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

2~3 Cam curve: Modified Sine Curve, hence

$$Vm=1.76, Am=5.53, Qm=0.987$$

2~4 Loaded Torque : Tf

1: Static Torque (Inertia Torque) : Ti

(a) Weight of the driving gear : $W_1=8\text{kg}$, diameter = $\phi 180$

Inertia torque of the driving gear : IA

$$IA = \frac{W_1 R^2}{2G} = \frac{8 \times 9^2}{2 \times 980} = 0.331 (\text{kg} \cdot \text{cm} \cdot \text{s}^2)$$

(b) Inertia torque of the conveyor:

① Inertia torque of the driven gear : I2

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

② Inertia torque of the transmission shaft : I3

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

③ Inertia torque of the chained gears : I4

$$I_4 = \frac{W_4 (R_e^2 + r^2)}{2G} = \frac{5 \times (12.7^2 + 2.5^2)}{2 \times 980} \times 4 = 1.71 (\text{kg} \cdot \text{cm} \cdot \text{s}^2)$$

④ Inertia torque of the chains : I5

$$I_5 = \frac{W_5 R_e^2}{G} = \frac{10 \times 12.7^2}{980} \times 2 = 3.29 (\text{kg} \cdot \text{cm} \cdot \text{s}^2)$$

⑤ Inertia torque of the fixtures : I6

$$I_6 = \frac{W_6 R_e^2}{G} = \frac{0.7 \times 12.7^2}{980} \times 10 = 1.15 (\text{kg} \cdot \text{cm} \cdot \text{s}^2)$$

WORKING EXAMPLES AND CALCULATIONS



Working Examples and Calculations -2

⑥ Inertia torque of the workpieces : I_7

$$I_7 = \frac{W_7 R_e^2}{G} = \frac{1 \times 12.7^2}{980} \times 4 = 0.658 (\text{kg} \cdot \text{cm} \cdot \text{s}^2)$$

⑦ Total inertia torque of the conveyor : I

$$I_B = I_2 + I_3 + I_4 + I_5 + I_6 + I_7 \\ = 0.08 + 0.026 + 1.71 + 3.29 + 1.15 + 0.658 = 6.914 (\text{kg} \cdot \text{cm} \cdot \text{s}^2)$$

(c) Effective inertia torque of the conveyor : I_{Be}

$$I_{Be} = I_B \left(\frac{n}{m} \right)^2 = 6.914 \times \left(\frac{180}{100} \right)^2 = 22.4 (\text{kg} \cdot \text{cm} \cdot \text{s}^2)$$

(d) Total torque (a)+(c)之和

$$I = I_A + I_{Be} = 0.331 + 22.4 = 22.731 (\text{kg} \cdot \text{cm} \cdot \text{s}^2)$$

(e) Angle Acceleration maximum of the input shaft : α

$$\alpha = A_m \frac{2\pi}{S} \left(\frac{360}{\theta} \times \frac{N}{60} \right)^2 = 5.53 \times \frac{2\pi}{6} \left(\frac{360}{120} \times \frac{30}{60} \right)^2 = 13.03 (\text{rad} \cdot \text{s}^2)$$

(f) Static torque (Inertia torque)

$$T_i = I \cdot \alpha = 22.731 \times 13.03 = 296.18 (\text{kg} \cdot \text{cm})$$

2~5 Friction torque : T_f

(a) Friction torque on the conveyor: the friction load should equal the friction caused by half of the weight of the chains and fixtures on the working surface and total weight of the workpieces.

$$T_f = \mu \cdot W \cdot R = 0.2 \times \left(4 + \frac{0.7 \times 10}{2} + \frac{10 \times 2}{2} \right) \times 12.7 \\ = 44.45 (\text{kg} \cdot \text{cm})$$

(b) Effective friction torque of the conveyor : T_{fe}

$$T_{fe} = T_f \left(\frac{n}{m} \right) = 44.45 \times \frac{180}{100} = 80 (\text{kg} \cdot \text{cm})$$

2~6 Inertia torque of the workpieces : T_w

$$T_w = 0$$

2~7 Loaded torque : T_t

$$T_t = T_i + T_{fe} + T_w = 296.18 + 80 + 0 = 376.18 (\text{kg} \cdot \text{cm}) = 3.76 (\text{kg} \cdot \text{m})$$

2~8 Actual loaded torque : T_e , Loaded safety factor $f_e = 2$

$$T_e = T_t \cdot f_e = 3.76 \times 2 = 7.52$$

2~9 Input shaft torque : T_c

$$T_c = \frac{360}{S} \cdot \frac{1}{\theta} \cdot Q_m \cdot T_e + T_{ca} = 0$$

Note: The Starting loaded torque of the input shaft is 0, hence $T_{ca} = 0$

$$T_c = \frac{360}{6} \times \frac{1}{120} \times 0.987 \times 7.52 + 0 = 3.71$$

2~10 Figure out the power needed : P

assuming that the motor efficiency is $\eta = 60\%$

$$P = \frac{T_c \times N}{975 \times \eta} (\text{kw}) \\ = \frac{3.71 \times 30}{975 \times 0.6} = 0.19 (\text{kw})$$

the calculated result is the maximum starting power, and the normal working power is 1/2 of the starting power.

$$0.19 \times \frac{1}{2} = 0.095 \text{kw}$$

2~11 Selecting a proper indexing drive

According to the calculated results, the rotating speed of the input shaft 30RPM, the torques reference chart in this catalogue and other relevant information, RU70DS should be selected.



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
2	270	45D	1.22	0.48	0.39	0.35	0.32	0.28	0.24		0.12	12
		60D	4.34	1.14	1.15	1.02	0.93	0.83	0.71	0.64	0.22	16
		70D	11.3	4.3	3.5	3.1	2.9	2.5	2.2	2	0.5	19
		80D	20.2	7.8	6.4	5.6	5.2	4.6	3.9	3.6	0.8	22
		83D	22.4	8.4	7.1	6.3	5.9	5.2	4.1	3.9	0.9	22
		100D	30.5	14.8	13.7	12.8	11.6	10.2	8.3		1.3	22
		110D	49.8	19	15.4	13.7	12.5	11.1	9.5		1.6	30
		140D	80.4	28.6	23.2	20.6	18.9	16.7			2.3	40
		180D	175.4	62.9	51.1	45.2	41.5	36.7			4.1	45
250D	377.2	136.1	110.5	97.9	89.8				7.2	60		
3	180	45D	1.22	0.58	0.47	0.42	0.38	0.34	0.29		0.12	12
		60D	4.43	1.7	1.38	1.22	1.12	0.99	0.85	0.77	0.22	16
		70D	11.3	5.2	4.2	3.7	3.4	3	2.6	2.4	0.5	19
		80D	20.2	9.4	7.7	6.8	6.2	5.5	4.7		0.8	22
		83D	23.2	11.4	10.2	9.6	7.3	6.1	5.1		0.9	22
		100D	31.7	17.3	16.5	14.3	13.8	11.5			1.3	22
		110D	49.8	22.8	18.5	16.4	15	13.3			1.6	30
		140D	80.4	34.3	27.9	24.7	22.6	20			2.3	40
		180D	175.4	75.4	61.3	54.3	49.8	44.1			4.1	45
	250D	377.2	163.3	132.7	117.5	107.8				7.2	60	
	270	45D	3.1	1.23	1	0.88	0.81	0.72	0.61	0.56	0.12	12
		60D	12.26	4.3	3.49	3.09	2.84	2.51	2.16	1.95	0.28	16
		70D	15.5	5.9	4.8	4.3	3.9	3.5	3	2.7	0.4	19
		80D	25.3	9.3	7.6	6.7	6.2	5.5	4.7	4.2	0.7	22
		83D	29.4	11.3	10.1	9.5	7.1	6	5.1		0.8	22
		100D	38.6	16.9	16.1	14.1	13.2	12.9	10.2		1.2	22
		110D	61.8	22.5	18.3	16.2	14.8	13.1	11.3		1.3	30
		140D	97.6	33.5	27.2	24.1	22.1	19.6	16.8		1.9	40
180D		251.9	93.7	76.1	67.4	61.8	54.7			4	45	
250D	588	230.5	187.3	165.8	152.1	134.7			7	60		
4	180	45D	1.17	0.53	0.43	0.38	0.35	0.31	0.27		0.09	10
		60D	2.06	0.81	0.66	0.59	0.54	0.48	0.41		0.13	14
		70D	12.6	5.7	4.6	4.1	3.8	3.3	2.9	2.6	0.4	16
		80D	21.7	10.1	8.2	7.3	6.7	5.9	5.1	4.6	0.7	19
		83D	24.2	12.3	10.1	9.2	8.1	7.2	6.4	5.8	0.8	19
		100D	30.6	19.2	16.8	15.1	14.1	11.8	9.2		1.2	22
		110D	48.2	22.4	18.2	16.1	14.8	13.1	11.2		1.2	26
		140D	74.5	32.4	26.4	23.3	21.4	19			1.7	35
		180D	149.2	66	53.6	47.5	43.5	38.6			3	40
250D	327	152.3	123.7	109.6	100.5				5.3	50		



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
4	270	45D	1.75	0.71	0.57	0.51	0.47	0.41	0.35	0.32	0.1	12
		60D	5.42	1.9	1.54	1.36	1.25	1.11	0.95	0.86	0.18	14
		70D	14.8	5.5	4.5	3.9	3.6	3.2	2.7	2.5	0.3	16
		80D	25.7	9.7	7.9	7	6.4	5.7	4.9	4.4	0.6	19
		83D	29.7	11.8	9.8	9.2	8.4	7.1	5.7	5.1	0.7	19
		100D	39.1	18.7	16.8	14.2	12.9	11.3	9.5	8.2	0.9	22
		110D	56.9	21.5	17.5	15.5	14.2	12.6	10.8	9.8	1	26
		140D	86.5	31	25.1	22.3	20.4	18.1	15.5		1.4	35
		180D	239.2	93.4	75.9	67.2	61.6	54.6	46.8		3.2	40
	250D	528.5	210.1	170.7	151.1	138.6	122.8			5.5	50	
6	90	45D	1.22	0.79	0.64	0.57	0.52	0.46			0.12	12
		60D	4.34	2.32	1.88	1.67	1.53	1.35	1.16		0.22	16
		70D	12.5	8.2	6.7	5.9	5.4	4.8	4.1		0.5	19
		80D	20.2	12.9	10.5	9.3	8.5	7.5	6.4		0.8	22
		83D	22.3	14.7	12.3	11.4	10.2	9.6	7.5		0.9	22
		100D	33.2	26.5	23.7	21.8	19.6	16.5			1.3	22
		110D	49.8	31.1	25.3	22.4	20.6	18.2			1.6	30
		140D	80.4	46.9	38.1	33.7	30.9	27.4			2.3	40
		180D	175.4	103.1	83.7	74.1	68				4.1	45
		250D	377.2	233.1	181.2	160.5					7.2	60
	120	45D	2.92	1.68	1.37	1.21	1.11	0.98	0.84	0.76	0.12	12
		60D	11.69	5.77	4.83	4.27	3.92	3.47	2.98	2.69	0.3	16
		70D	14.6	8.2	6.6	5.9	5.4	4.8	4.1	3.7	0.5	22
		80D	35.1	20	16.3	14.4	13.2	11.7	10	9.1	0.9	26
		83D	37.2	23.2	17.2	15.1	14.3	12.6	10.7	9.8	1.1	26
		100D	48.4	28.4	24.6	22.3	20.8	18.5	14.7		1.2	26
		110D	60.7	32.9	26.7	23.7	21.7	19.2	16.5		1.4	30
		140D	115.7	60.3	49	43.4	39.8	35.2			2.3	40
		180D	238.5	129	104.8	92.8	85.1	75.3			4.2	45
		250D	550	315.5	256.3	226.9	208.2				7.4	80
	180	45D	3.5	1.63	1.32	1.17	1.08	0.95	0.82	0.74	0.11	12
		60D	13.43	5.64	4.58	4.06	3.72	3.3	2.83	2.56	0.26	16
		70D	17.2	7.8	6.4	5.6	5.2	4.6	3.9	3.6	0.4	22
		80D	41.4	19.3	15.7	13.9	12.7	11.3	9.7	8.7	0.8	26
		83D	43.6	21.8	18.6	15.4	13.7	12.8	10.3	9.2	0.9	26
		100D	57.2	34.5	30.6	27.1	24.6	21.6	18.1	15.9	1.3	26
		110D	85.9	39.3	31.9	28.3	25.9	23	19.7	17.8	1.4	30
140D		133	57.3	46.5	41.2	37.8	33.4	28.7		2	40	
180D		375.5	176.6	143.5	127	116.5	103.2	88.5		4.3	60	
	250D	873.9	425.4	345.5	305.9	280.7	248.5			8	80	



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
6	240	45D	3.8	1.56	1.27	1.12	1.03	0.91	0.78	0.71	0.1	12
		60D	14.25	5.33	4.33	3.83	3.52	3.11	2.67	2.42	0.24	16
		70D	18.5	7.5	6.1	5.4	4.9	4.4	3.7	3.4	0.4	22
		80D	44.6	18.4	14.9	13.2	12.1	10.7	9.2	8.3	0.7	26
		83D	46.7	20.1	18.5	16.1	14.7	13.2	10.5	9.6	0.8	26
		100D	62.9	33.1	28.5	24.3	22.7	20.9	16.4	13.6	1.2	26
		110D	92.2	37.4	30.3	26.9	24.6	21.8	18.7	16.9	1.3	30
		140D	141.1	54.1	43.9	38.9	35.7	31.6	27.1	24.5	1.8	40
		180D	404.8	168.3	136.7	121	111	98.3	84.3	76.2	4	60
	250D	965.3	410.1	333.1	295	270.6	239.6			7.3	80	
	270	45D	3.9	1.52	1.24	1.1	1.01	0.89	0.76	0.69	0.1	12
		60D	14.5	5.19	4.22	3.73	3.42	3.03	2.6	2.35	0.23	16
		70D	18.8	7.3	5.9	5.2	4.8	4.2	3.6	3.3	0.4	22
		80D	45.6	17.9	14.6	12.9	11.8	10.5	9	8.1	0.7	26
		83D	47.3	18.4	16.9	14.1	13.2	11.6	9.6	8.7	0.8	26
		100D	63.3	32.5	27.2	24.6	22.9	20.2	16.9	14.2	1.2	26
		110D	94.1	36.4	29.6	26.2	24	21.3	18.3	16.5	1.3	30
		140D	143.6	52.7	42.8	37.9	34.8	30.8	26.4	23.9	1.8	40
		180D	414	164.2	133.4	118.1	108.4	96	82.3	74.4	3.8	60
	250D	995.3	402	326.5	289.1	265.2	234.8	201.5		7.1	80	
	300	45D	3.97	1.49	1.21	1.07	0.98	0.87	0.75	0.68	0.1	12
		60D	14.68	5.06	4.11	3.64	3.34	2.96	2.54	2.29	0.23	16
		70D	19.1	7.1	5.8	5.1	4.7	4.1	3.6	3.2	0.3	22
		80D	46.4	17.5	14.2	12.6	11.6	10.2	8.8	7.9	0.7	26
		83D	48.3	18.2	15.1	13.6	12.4	11.8	9.2	8.4	0.8	26
		100D	62.5	30.5	24.3	22.1	20.6	18.7	15.4	14.2	1.1	26
		110D	95.6	35.6	28.9	25.6	23.5	20.8	17.8	16.1	1.3	30
		140D	145.4	51.4	41.7	36.9	33.9	30	25.7	23.3	1.7	40
180D		421	160.5	130.3	115.4	105.9	93.7	80.4	72.7	3.8	60	
250D	1018.5	394	320	283.4	259.9	230.2	197.5		6.9	80		
8	90	45D	1.5	0.96	0.78	0.69	0.63	0.56	0.48		0.09	12
		60D	2.06	1.11	0.9	0.8	0.73	0.65	0.56		0.13	14
		70D	12.6	6.9	6.3	5.6	5.2	4.6	3.9	3.5	0.4	16
		80D	21.5	11.4	11.4	10.2	9.4	8.3	7.1		0.7	19
		83D	23.2	13.5	13.1	12.6	11.5	10.4	8.4		0.8	26
		100D	34.5	28.1	23.2	21.1	19.2	16.3			1.1	26
		110D	48.2	30.6	24.8	22	20.2	17.9			1.2	26
		140D	74.5	44.3	36	31.9	29.2	25.9			1.7	35
		180D	149.2	90.2	73.2	64.8	59.5				3	40
250D	327	208.1	169	149.7					5.3	50		



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
8	120	45D	2.15	1.25	1.02	0.9	0.83	0.73	0.63	0.57	0.1	12
		60D	5.29	2.65	2.15	1.91	1.75	1.55	1.33	1.2	0.18	14
		70D	14.2	7.4	6.2	5.5	5	4.4	3.8	3.5	0.4	16
		80D	24.7	11.9	11	9.7	8.9	7.9	6.8	6.1	0.6	19
		83D	26.5	13.2	12.3	11	10.1	9.1	8	7.3	0.7	26
		100D	36.3	21.2	16.6	13.8	12	10.1	8.4		1	26
		110D	54.7	29.9	24.3	21.5	19.7	17.5	15		1.1	26
		140D	86.6	45.6	37.1	32.8	30.1	26.7	22.9		1.6	35
		180D	167.3	87.6	71.2	63	57.8	51.2			2.8	50
	250D	503.2	290.2	235.7	208.7	191.4				5.7	60	
	150	45D	2.33	1.22	0.99	0.88	0.81	0.71	0.61	0.55	0.09	12
		60D	5.52	2.53	2.06	1.82	1.67	1.48	1.27	1.15	0.17	14
		70D	15.2	7.4	6	5.3	4.9	4.3	3.7	3.3	0.3	16
		80D	26.5	12.3	10.6	9.4	8.6	7.7	6.6	5.9	0.6	19
		83D	28.4	14.6	12.9	11.7	10.9	10	8.4	7.4	0.7	26
		100D	38.5	20.5	16.1	13.4	11.3	10.6	9.5		0.9	26
		110D	58.7	29	23.5	20.8	19.1	16.9	14.5		1	26
		140D	92.2	44.1	35.8	31.7	29.1	25.7	22.1		1.4	35
		180D	246.6	125.5	102	90.3	82.8	73.3	62.9		3.1	50
	250D	549.1	283.5	230.3	203.9	187	165.6			5.3	60	
	180	45D	2.44	1.18	0.96	0.85	0.78	0.69	0.59	0.54	0.09	12
		60D	5.66	2.43	1.97	1.75	1.6	1.42	1.22	1.1	0.17	14
		70D	16.8	8	6.5	5.8	5.3	4.7	4	3.6	0.3	16
		80D	30.4	14.7	11.9	10.5	9.7	8.6	7.3	6.6	0.6	19
		83D	32.3	17.1	13.4	12.1	11.3	10.4	8.8	7.8	0.7	26
		100D	40.6	24.3	16.6	13.8	12.3	11.2	9.4	8.5	1	26
		110D	74.3	35.7	29	25.7	23.6	20.9	17.9	16.2	1.1	26
		140D	113.4	51.4	41.8	37	33.9	30	25.8	23.3	1.6	35
		180D	257.3	121.4	98.6	87.3	80.1	70.9	60.9		2.9	50
	250D	739.7	373	303	268.3	246.1	217.9			5.8	60	
	210	45D	2.52	1.15	0.93	0.83	0.76	0.67	0.58	0.52	0.09	12
		60D	5.75	2.33	1.9	1.68	1.54	1.36	1.17	1.06	0.16	14
		70D	17.3	7.7	6.3	5.6	5.1	4.5	3.9	3.5	0.3	16
		80D	31.3	14.2	11.5	10.2	9.4	8.3	7.1	6.4	0.6	19
		83D	34.3	16.8	13.1	11.8	10.2	9.6	7.8	6.6	0.7	26
		100D	42.5	23.4	16.4	13.2	11.5	10.3	8.2	7.2	1	26
110D		76.5	34.6	28.1	24.9	22.8	20.2	17.3	15.7	1.1	26	
140D		115.9	49.6	40.3	35.7	32.7	29	24.9	22.5	1.5	35	
180D		264.5	117.5	95.5	84.5	77.5	68.7	58.9		2.8	50	
250D	767.6	326.8	294.7	261	239.4	212			5.6	60		



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
8	240	45D	2.58	1.12	0.91	0.8	0.74	0.65	0.56	0.51	0.09	12
		60D	5.81	2.25	1.83	1.62	1.49	1.32	1.13	1.02	0.16	14
		70D	17.6	7.5	6.1	5.4	5	4.4	3.8	3.4	0.3	16
		80D	31.9	13.8	11.2	9.9	9.1	8	6.9	6.2	0.6	19
		83D	34.7	15.4	12.8	11.4	10.1	9.4	7.4	6.5	0.7	26
		100D	43.1	22.8	16.2	13	11.1	10.1	8.1	6.8	1	26
		110D	77.9	33.5	27.2	24.1	22.1	19.6	16.8	15.2	1	26
		140D	117.7	48	39	34.5	31.7	28.1	24.1	21.8	1.5	35
		180D	316.4	138.7	112.7	99.8	91.5	81	69.5	62.8	3.1	50
	250D	787.6	353.1	286.8	254	233	206.3	177		5.5	60	
	270	45D	2.62	1.09	0.88	0.78	0.72	0.63	0.54	0.49	0.08	12
		60D	5.85	2.18	1.77	1.57	1.44	1.28	1.09	0.99	0.16	14
		70D	17.8	7.3	5.9	5.2	4.8	4.3	3.7	3.3	0.3	16
		80D	32.3	13.4	10.9	9.6	8.8	7.8	6.7	6.1	0.6	19
		83D	35.6	16.1	12.4	11	9.8	9.1	7.2	6.8	0.7	26
		100D	45.2	21.3	15.8	12.3	10.8	9.3	7.6	7.2	1	26
		110D	79	32.6	26.5	23.4	21.5	19	16.3	14.8	1	26
		140D	118.9	46.6	37.9	33.5	30.7	27.2	23.4	21.1	1.4	35
		180D	320.6	134.8	109.5	96.9	88.9	78.7	67.6	61.1	3	50
	250D	802.2	344	279.4	247.4	226.9	200.9	172.4		5.3	60	
	300	45D	2.65	1.06	0.86	0.76	0.7	0.62	0.53	0.48	0.08	12
		60D	5.88	2.12	1.72	1.53	1.4	1.24	1.06	0.96	0.15	14
		70D	18	7.1	5.8	5.1	4.7	4.1	3.6	3.2	0.3	16
		80D	32.6	13	10.6	9.4	8.6	7.6	6.5	5.9	0.6	19
		83D	36	15.9	12.1	10.7	9.5	8.8	6.9	6.5	0.7	26
		100D	45.8	20.6	15.1	11.6	11.4	9.6	7.9	8.1	1	26
		110D	79.8	31.7	25.8	22.8	20.9	18.5	15.9	14.4	1	26
		140D	119.8	45.3	36.8	32.6	29.9	26.5	22.7	20.5	1.4	35
180D		323.7	131.2	106.6	94.4	86.6	76.7	65.8	59.5	3	50	
250D	813.2	335.5	272.5	241.3	221.4	196	168.2		5.2	60		
10	90	45D	1.15	0.65	0.52	0.4	0.33	0.29	0.21		0.08	10
		60D	1.76	0.94	0.76	0.68	0.62	0.55	0.47		0.1	12
		70D	25	3	2.5	2.2	2	1.8	1.5		0.3	14
		80D	22.7	8.4	8.4	8.4	8.4	8.3	7.1	6.4	0.6	16
		83D	23.1	8.7	8.6	8.7	8.7	8.6	7.4	6.8	0.7	19
		100D	28.4	16.4	14.3	12.2	10.6	10.1			0.8	22
		110D	36.2	22.3	18.1	16.1	14.7	13.1			0.9	22
		140D	46	26	21.1	18.7	17.2	15.2			1.1	22
		180D	108.7	63.2	51.4	45.5	41.7				2.2	35
250D	312.7	198.4	161.1	142.7					4.3	40		



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
10	120	45D	1.15	0.7	0.62	0.49	0.41	0.33	0.25		0.07	10
		60D	2.33	1.18	0.96	0.85	0.78	0.69	0.59	0.54	0.12	12
		70D	5.5	2.9	2.4	2.1	1.9	1.7	1.5	1.3	0.3	14
		80D	23.1	8.8	8.8	8.8	8.8	8	6.9	6.2	0.6	16
		83D	24.8	9.3	9.2	8.9	8.9	8.4	7.4	6.8	0.7	19
		100D	30.2	15.7	14.6	13.1	10.9	10.7			0.8	22
		110D	39.7	21.4	17.4	15.4	14.2	12.5	10.8		0.8	22
		140D	73.8	38.7	31.4	27.8	25.5	22.6	19.4		1.2	26
		180D	144.1	76.8	62.4	55.2	50.7	44.9			2.3	35
	250D	410.8	235.1	190.9	169.1	155.1				4.5	45	
	180	45D	1.35	0.63	0.54	0.43	0.36	0.29	0.2		0.06	10
		60D	2.44	1.07	0.87	0.77	0.71	0.63	0.54	0.48	0.11	12
		70D	5.9	2.7	2.2	1.9	1.8	1.6	1.3	1.2	0.2	14
		80D	27.2	9.2	9.2	9.1	8.3	7.4	6.3	5.7	0.5	16
		83D	28.9	9.8	9.7	9.5	9.2	8.8	7.2	6.8	0.6	19
		100D	35.2	10.6	10.3	9.9	9.7	9.4	8.6	8.4	0.6	22
		110D	42.9	19.7	16	14.2	13	11.5	9.9	8.9	0.7	22
		140D	79.5	35.6	28.9	25.6	23.5	20.8	17.8	16.1	1.1	26
		180D	191.7	90.7	73.7	65.3	59.9	53	45.5		2.4	40
	250D	453.9	218.8	177.7	157.4	144.4	127.8			4	45	
	240	45D	1.45	0.59	0.48	0.37	0.3	0.27	0.18		0.06	10
		60D	2.49	0.99	0.8	0.71	0.65	0.58	0.5	0.45	0.11	12
		70D	6	2.5	2	1.8	1.6	1.5	1.2	1.1	0.2	14
		80D	28.1	9.3	9.3	8.5	7.8	6.9	5.9	5.3	0.5	16
		83D	30.2	10	9.7	9.5	9.1	8.7	7.1	6.5	0.5	19
		100D	36.2	12.5	12.1	11.8	11.3	10.6	9.6	9.1	0.6	22
		110D	44.2	18.4	14.9	13.2	12.1	10.7	9.2	8.3	0.7	22
		140D	81.8	33.1	26.9	23.8	21.8	19.3	16.6	15	1	26
		180D	197.1	84.4	68.6	50.7	55.7	49.3	42.3	38.2	2.2	40
	250D	636.1	291.2	236.6	209.5	192.1	170.1	146		4.5	45	
	270	45D	1.5	0.56	0.45	0.34	0.3	0.26	0.17		0.06	10
		60D	2.5	0.96	0.78	0.69	0.63	0.56	0.48	0.43	0.1	12
		70D	6.1	2.4	2	1.7	1.6	1.4	1.2	1.1	0.2	14
		80D	28.3	9.4	9.3	8.2	7.5	6.7	5.7	5.2	0.5	16
		83D	30.8	9.8	9.5	9.3	8.8	8.4	6.9	6.3	0.5	19
		100D	36.6	12.3	11.8	11.2	10.9	9.5	9.1	8.4	0.6	22
110D		44.6	17.8	14.5	12.8	11.8	10.4	8.9	8.1	0.7	22	
140D		82.5	32.1	26	23.1	21.2	18.7	16.1	14.5	1	26	
180D		198.6	81.8	66.4	58.8	54	47.8	41	37.1	2.2	40	
250D	643.9	282.8	229.7	203.4	186.6	165.2	141.8		4.4	45		



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
10	300	45D	1.52	0.54	0.43	0.33	0.29	0.25	1.6		0.06	10
		60D	2.51	0.93	0.76	0.67	0.61	0.54	0.47	0.42	0.1	12
		70D	6.1	2.3	1.9	1.7	1.5	1.4	1.2	1.1	0.2	14
		80D	28.5	9.4	9	8	7.3	6.5	5.6	5.5	0.5	16
		83D	31.3	9.7	9.4	9.2	9	8.1	6.8	6.2	0.5	19
		100D	37.1	12.1	11.5	10.9	10.4	9.3	8.8	8.1	0.6	22
		110D	44.8	17.3	14.1	12.5	11.4	10.1	8.7	7.8	0.7	22
		140D	83	31.2	25.3	22.4	20.6	18.2	15.6	14.1	1	26
		180D	199.8	79.5	64.6	57.2	52.4	46.4	39.8	36	2.2	40
	250D	649.6	275.3	223.6	198	181.6	160.8	138		4.4	45	
12	90	45D	0.5	0.31	0.21	0.19	0.15	0.13			0.06	10
		60D	0.94	0.49	0.4	0.35	0.32	0.29			0.09	10
		70D	2.7	1.6	1.3	1.1	1.1	0.9			0.2	12
		80D	24.3	8.7	8.7	8.7	8.7	8.7	7.9	7.1	0.6	16
		83D	25.3	8.9	8.9	8.8	8.8	8.8	8.1	7.6	0.7	16
		100D	28.2	12.2	12.1	11.8	11.6	10.2			0.7	19
		110D	35.5	16.8	16.8	15.9	14.6	12.9			0.8	19
		140D	48.3	27.9	22.7	20.1	18.4	16.3			1	22
		180D	110.9	65.7	53.3	47.2	43.3	38.4			2	30
		250D	246.7	151.7	123.3	109.1					3.4	40
	120	45D	1.42	0.8	0.6	0.51	0.45	0.4			0.06	10
		60D	1.91	0.96	0.78	0.69	0.63	0.56	0.48	0.43	0.09	10
		70D	2.8	1.5	1.2	1.1	1	0.9	0.8		0.2	12
		80D	26.1	9	9	9	9	8.7	7.5	6.8	0.5	16
		83D	26.7	9.3	9.3	9.2	9.1	9	8.4	8	0.6	16
		100D	29.3	13.5	13.2	12.8	10.1	9.8	9		0.7	19
		110D	38.4	17.5	17.1	15.2	13.9	12.3	10.6		0.7	19
		140D	51.4	26.4	21.5	19	17.4	15.4			0.9	22
		180D	118.2	62.2	50.5	44.7	41	36.3			1.9	30
		250D	367.6	211.5	171.8	152.1	139.6				3.7	40
	180	45D	1.42	0.71	0.54	0.47	0.4	0.35			0.06	10
		60D	1.97	0.86	0.7	0.62	0.57	0.5	0.43	0.39	0.09	10
		70D	3	1.4	1.1	1	0.9	0.8	0.7	0.6	0.2	12
		80D	27.8	9.3	9.3	9.3	9	8	6.8	6.2	0.5	16
		83D	28.1	9.8	9.8	9.8	9.3	9	7.9	7.5	0.6	16
		100D	31.2	14.6	14.3	12.6	12.3	10.8	8.8	8	0.7	19
		110D	40.9	18.1	15.6	13.9	12.7	11.3	9.7	8.7	0.7	19
140D		79.3	37.2	30.2	26.7	24.5	21.7	18.6	16.8	1	22	
180D		157.1	75.3	61.2	54.2	49.7	44	37.7		2	35	
	250D	395.5	194.3	157.8	139.7	128.2	113.5			3.4	40	



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
12	240	45D	1.5	0.61	0.5	0.43	0.36	0.3			0.06	10
		60D	2	0.8	0.65	0.57	0.53	0.47	0.4	0.36	0.09	10
		70D	3	1.3	1	0.9	0.8	0.7	0.6	0.6	0.2	12
		80D	28.5	9.4	9.4	9.1	8.4	7.4	6.4	5.7	0.5	16
		83D	29.6	9.6	9.6	9.5	8.7	7.7	6.7	6	0.6	16
		100D	33.4	14.3	14.1	11.1	10.9	9.8	8.2	7.6	0.6	19
		110D	41.9	17.9	14.5	12.9	11.8	10.5	9	8.1	0.6	19
		140D	80.7	34.4	28	24.8	22.7	20.1	17.3	15.6	1	22
		180D	160.2	69.8	56.7	50.2	46	40.8	35	31.6	1.9	35
	250D	480.4	221.4	179.8	159.2	146.1	129.3	111		3.7	40	
	270	45D	1.55	0.58	0.49	0.4	0.35	0.29			0.06	10
		60D	2.01	0.77	0.63	0.55	0.51	0.45	0.39	0.35	0.09	10
		70D	3.1	1.2	1	0.9	0.8	0.7	0.6	0.6	0.2	12
		80D	28.6	9.4	9.4	8.8	8.1	7.2	6.1	5.6	0.5	16
		83D	29.8	9.5	9.5	8.9	8.4	7.5	6.7	5.8	0.5	16
		100D	34.3	14.5	14.3	14	13	10.8	9.2	8.9	0.6	19
		110D	46.4	20	16.2	14.4	13.2	11.7	10	9	0.7	19
		140D	81.2	33.3	27.1	24	22	19.5	16.7	15.1	1	22
		180D	161.1	67.5	54.8	48.8	44.6	39.4	33.8	30.6	1.9	35
	250D	484.4	214.6	174.3	154.3	141.6	125.3	107.5		3.7	40	
	300	45D	1.55	0.52	0.47	0.38	0.33	0.27			0.06	10
		60D	2.01	0.75	0.61	0.54	0.49	0.44	0.37	0.34	0.09	10
		70D	3.1	1.2	1	0.9	0.8	0.7	0.6	0.5	0.2	12
		80D	28.8	9.4	9.4	8.6	7.9	7	6	5.4	0.5	16
		83D	30.2	9.5	9.5	8.9	8.7	7.8	6.8	6	0.5	16
		100D	35.1	14.3	14.1	13.6	12.3	10.5	8.8	8.4	0.6	19
		110D	46.6	19.4	15.8	14	12.8	11.3	9.7	8.8	0.7	19
140D		81.5	32.3	26.3	23.3	21.3	18.9	16.2	14.7	1	22	
180D		161.8	65.6	53.2	47.1	43.3	38.3	32.9	29.7	1.9	35	
250D	487.2	208.5	169.4	150	137.6	121.8	104.5		3.6	40		
16	90 1DWELL	110D	36.2	12.5	12.5	12.5	12.5	12.5	11.4		0.7	16
		140D	46.3	20.8	20.8	19.6	17.9	15.9			0.9	19
		180D	65.9	37.6	30.5	27	24.8				1.4	22
		250D	178.6	108.6	88.2	78.1					2.5	30
	90 2DWELL	45D	1.5	0.7	0.51	0.43	0.4	0.35			0.1	12
		60D	2.06	1.11	0.9	0.8	0.73	0.65			0.13	14
		70D	12.6	6.9	6.3	5.6	5.2	4.6	3.9		0.4	16
		80D	21.5	11.4	11.4	10.2	9.4	8.3			0.7	19
		83D	22.5	11.7	11.6	10.5	9.7	8.6			0.7	19
		100D	28.4	12	11.9	10.8	10.1	8.9			0.7	22



DS/DF Series

No. of Stops S	Indexing Angle θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf·m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
16	120 1DWELL	110D	38.1	12.8	12.8	12.8	12.8	12.5	10.7		0.7	16
		140D	48.1	21.1	20.6	18.3	16.8	14.8	12.7		0.8	19
		180D	68.5	35.2	28.6	25.3	23.2	20.5			1.4	22
		250D	228.5	128.1	104	92.1	84.5				2.7	30
	120 2DWELL	45D	1.67	0.98	0.79	0.7	0.6	0.57	0.49		0.1	12
		60D	5.29	2.65	2.15	1.91	1.75	1.55	1.33	1.2	0.18	14
		70D	15.1	8.6	7	6.2	5.6	5	4.3	3.9	0.4	16
		80D	24.8	12.2	11.4	10.1	9.2	8.2	7		0.6	19
		83D	25.3	12.5	11.7	10.4	9.5	8.4	7.4		0.7	19
		100D	29.2	12.6	12.6	12.5	10.1	9.5	9.1		0.7	22
	180 1DWELL	110D	39.6	18.1	18.1	13.1	12.7	11.3	9.7	8.7	0.6	16
		140D	49.4	21.4	18.5	16.4	15	13.3	11.4	10.3	0.8	19
		180D	104.5	49.6	40.3	35.6	32.7	29	24.8		1.5	26
		250D	295.1	149.1	121.1	107.3	98.4	87.1			2.8	35
	180 2DWELL	45D	1.9	0.92	0.75	0.66	0.61	0.54	0.46	0.42	0.09	12
		60D	5.66	2.43	1.97	1.75	1.6	1.42	1.22	1.1	0.17	14
		70D	16.8	8	6.5	5.8	5.3	4.7	4	3.6	0.3	16
		80D	31.4	15.6	12.7	11.3	10.3	9.1	7.8	7.1	0.6	19
		83D	32.5	16.9	13.1	11.7	10.8	9.4	8.1	7.4	0.6	19
		100D	33.2	17.1	13.6	12.5	11.3	10	8.4	7.7	0.6	22
	240 1DWELL	110D	40.2	18.2	16.2	12.8	11.7	10.4	8.9	8.1	0.6	16
		140D	49.9	21	17.1	15.1	13.9	12.3	10.5	9.5	0.7	19
		180D	105.7	45.7	37.1	32.9	30.2	26.7	22.9	20.7	1.5	26
		250D	299.7	137.9	112	99.2	91	80.5			2.7	35
	240 2DWELL	45D	2.01	0.87	0.71	0.62	0.57	0.51	0.44	0.39	0.09	12
		60D	5.81	2.25	1.83	1.62	1.49	1.32	1.13	1.02	0.16	14
		70D	17.6	7.5	6.1	5.4	5	4.4	3.8	3.4	0.3	16
		80D	33.4	14.8	12	10.6	9.8	8.6	7.4	6.7	0.6	19
83D		34.3	15.1	12.3	10.9	9.1	8.9	7.7	7.1	0.6	19	
100D		35.7	15.6	12.8	11.2	9.8	9.2	8.1	7.8	0.6	22	
270 1DWELL	110D	40.4	18.2	16.2	12.4	11.4	10.1	8.6	7.8	0.6	16	
	140D	50.1	20.3	16.5	14.6	13.4	11.9	10.2	9.2	0.7	19	
	180D	106	44.2	35.9	31.8	29.2	25.8	22.1	20	1.4	26	
	250D	301	133.4	108.3	95.9	88	77.9	66.8		2.7	35	
270 2DWELL	45D	2.04	0.84	0.69	0.61	0.56	0.49	0.42	0.38	0.08	12	
	60D	5.85	2.18	1.77	1.57	1.44	1.28	1.09	0.99	0.16	14	
	70D	17.8	7.3	5.9	5.2	4.8	4.3	3.7	3.3	0.3	16	
	80D	33.9	14.4	11.7	10.4	9.5	8.4	7.2	6.5	0.6	19	



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)	
				Indexing Rotating Speed N (rpm)									
				50	100	150	200	300	500	700			
16	300 1DWELL	110D	40.5	18.2	14.2	12	11	9.8	8.4	7.6	0.6	16	
		140D	50.2	19.7	16	14.2	13	11.5	9.9	8.9	0.7	19	
		180D	106.3	42.9	34.8	30.8	28.3	25	21.5	19.4	1.4	26	
		250D	302	129.4	105.1	93.1	85.4	75.6	64.9		2.7	35	
	300 2DWELL	45D	2.06	0.82	0.67	0.59	0.54	0.48	0.41	0.37	0.08	12	
		60D	5.88	2.12	1.72	1.53	1.4	1.24	1.06	0.96	0.15	14	
		70D	18	7.1	5.8	5.1	4.7	4.1	3.6	3.2	0.3	16	
		80D	34.4	14.1	11.4	10.1	9.3	8.2	7	6.4	0.6	19	
		83D	34.9	14.4	12.7	10.5	9.8	8.7	7.3	6.7	0.6	19	
		100D	37.1	15.6	13	11.2	10.2	9	7.6	7.1	0.6	22	
	20	90 2DWELL	45D	1.15	0.65	0.52	0.4	0.33	0.29			0.08	10
			60D	1.76	0.94	0.76	0.68	0.62	0.55			0.1	12
70D			5	3	2.5	2.2	2	1.8			0.3	14	
80D			22.8	8.6	8.6	8.6	8.6	8.6	7.4		0.6	16	
83D			23.4	8.9	8.9	8.9	8.9	8.9	7.7		0.6	16	
100D			28.1	11.2	10.6	10.2	9.6	9.2	8.3		0.8	19	
120 2DWELL		45D	1.15	0.7	0.62	0.49	0.41	0.33	0.25		0.07	10	
		60D	2.33	1.18	0.96	0.85	0.78	0.69	0.59		0.12	12	
		70D	5.5	2.9	2.4	2.1	1.9	1.7	1.5		0.3	14	
		80D	25.4	9.1	9.1	9.1	9.1	8.3	7.2	6.5	0.6	16	
		83D	27.1	9.4	9.4	9.4	9.4	8.6	7.5	6.8	0.6	16	
		100D	29.3	10.6	9.8	9.7	9.7	9.1	8	7.2	0.7	19	
		110D	39.7	21.4	17.4	15.4	14.2	12.5			0.8	19	
		140D	73.8	38.7	31.4	27.8	25.5	22.6			1.2	14	
		180D	144.1	76.8	62.4	55.2	50.7				2.3	16	
250D		410.8	235.1	190.9	169.1					4.5	19		
180 2DWELL		45D	1.35	0.63	0.54	0.43	0.36	0.29	0.2		0.06	10	
		60D	2.44	1.07	0.87	0.77	0.71	0.63	0.54	0.48	0.11	12	
		70D	5.9	2.7	2.2	1.9	1.8	1.6	1.3	1.2	0.2	14	
		80D	28	9.5	9.5	9.5	8.7	7.7	6.6	6	0.5	16	
		83D	29.2	9.8	9.8	9.7	9.1	8.1	6.9	6.3	0.6	16	
		100D	31.2	10.4	10.2	10	9.4	8.6	7.3	6.5	0.7	19	
		110D	42.9	19.7	16	14.2	13	11.5	9.9		0.7	19	
		140D	79.5	35.6	28.9	25.6	23.5	20.8	17.8		1.1	22	
	180D	191.7	90.7	73.7	65.3	59.9	53			2.4	35		
	250D	453.9	218.8	177.7	157.4	144.4				4	40		



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
20	240 2DWELL	45D	1.45	0.59	0.48	0.37	0.3	0.27	0.18		0.06	10
		60D	2.49	0.99	0.8	0.71	0.65	0.58	0.5	0.45	0.11	12
		70D	6	2.5	2	1.8	1.6	1.5	1.2	1.1	0.2	14
		80D	29.1	9.7	9.7	8.9	8.2	7.2	6.2	5.6	0.5	16
		83D	31.5	9.9	9.8	9.1	8.5	7.5	6.6	6	0.6	16
		100D	34.1	10.4	10.3	10	9	8.2	7.1	6.5	0.7	19
		110D	44.2	18.4	14.9	13.2	12.1	10.7	9.2		0.7	19
		140D	81.8	33.1	26.9	23.8	21.8	19.3	16.6		1	22
		180D	197.1	84.4	68.6	60.7	55.7	49.3	42.3		2.2	35
	250D	636.1	291.2	236.6	209.5	192.1	170.1			4.5	40	
	270 2DWELL	45D	1.5	0.56	0.45	0.34	0.3	0.26	0.17		0.06	10
		60D	2.5	0.96	0.78	0.69	0.63	0.56	0.48	0.43	0.1	12
		70D	6.1	2.4	2	1.7	1.6	1.4	1.2	1.1	0.2	14
		80D	29.4	9.8	9.8	8.7	7.9	7	6	5.5	0.5	16
		110D	44.6	17.8	14.5	12.8	11.8	10.4	8.9	8.1	0.7	19
		140D	82.5	32.1	26	23.1	21.2	18.7	16.1	14.5	1	22
		180D	198.6	81.8	66.4	58.8	54	47.8	41		2.2	35
		250D	643.9	232.8	229.7	203.4	186.6	165.2			4.4	40
	300 2DWELL	45D	1.52	0.54	0.43	0.33	0.29	0.25	0.16		0.06	10
		60D	2.51	0.93	0.76	0.67	0.61	0.54	0.47	0.42	0.1	12
		70D	6.1	2.3	1.9	1.7	1.5	1.4	1.2	1.1	0.2	14
		80D	29.7	9.8	9.5	8.4	7.7	6.8	5.9	5.3	0.5	16
		83D	32.3	10.2	10.1	9	8.1	7.1	6.5	6	0.6	16
		100D	35.6	10.8	10.3	9.4	8.6	7.5	6.9	6.3	0.7	19
		110D	44.8	17.3	14.1	12.5	11.4	10.1	8.7	7.8	0.7	19
		140D	83	31.2	25.3	22.4	20.6	18.2	15.6	14.1	1	22
		180D	199.8	79.5	64.6	57.2	52.4	46.4	39.8		2.2	35
250D	649.6	275.3	223.6	198	181.6	160.8			4.4	40		
24	90 2DWELL	45D	0.5	0.31	0.21	0.19	0.15	0.13			0.06	10
		60D	0.94	0.49	0.4	0.35	0.32	0.29			0.09	10
		70D	2.7	1.6	1.3	1.1	1.1	0.9			0.2	12
		80D	24.5	8.9	8.9	8.9	8.9	8.9	8.2		0.6	16
		83D	26.5	9.3	9.3	9.3	9.3	9.3	8.5		0.6	16
		100D	28.5	10.3	9.8	9.8	9.8	9.5	8.8		0.7	19
		110D	35.5	16.8	16.8	15.9	14.6	12.9			0.8	19
		140D	48.3	27.9	22.7	20.1	18.4				1	22
		180D	110.9	65.7	53.3	47.2	43.3				2	30
250D	246.7	151.7	123.3						3.4	40		



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
24	120 2DWELL	45D	1.42	0.8	0.6	0.51	0.45	0.4			0.06	10
		60D	1.93	0.46	0.37	0.33	0.3	0.27			0.09	10
		70D	2.8	1.5	1.2	1.1	1	0.9			0.2	12
		80D	26.8	9.3	9.3	9.3	9.3	9.2	7.9	7.1	0.5	16
		83D	28.8	9.5	9.5	9.5	9.5	9.4	8.1	7.5	0.6	16
		100D	30.8	10.4	10.1	10	9.9	9.7	8.4	7.8	0.7	19
		110D	38.4	17.5	17.1	15.2	13.9	12.3			0.7	19
		140D	51.4	26.4	21.5	19	17.4	15.4			0.9	22
		180D	118.2	62.2	50.5	44.7	41				1.9	30
	250D	367.6	211.5	171.8	152.1	139.6				3.7	40	
	180 2DWELL	45D	1.42	0.71	0.54	0.47	0.4	0.35			0.06	10
		60D	1.97	0.86	0.7	0.62	0.57	0.5	0.43	0.39	0.09	10
		70D	3	1.4	1.1	1	0.9	0.8	0.7		0.2	12
		80D	28.8	9.7	9.7	9.7	9.5	8.4	7.2	6.5	0.5	16
		83D	29.8	10.1	10.1	10.1	9.8	8.7	7.5	6.8	0.6	16
		100D	30.2	11	10.4	10.4	9.9	9.8	7.8	7.2	0.7	19
		110D	40.9	18.1	15.6	13.9	12.7	11.3	9.7		0.7	19
		140D	54	24	19.5	17.2	15.8	14			0.9	22
		180D	157.1	75.3	61.2	54.2	49.7	44			2	30
	250D	395.5	194.3	157.8	139.7	128.2				3.4	40	
	240 2DWELL	45D	1.5	0.61	0.5	0.43	0.36	0.3			0.06	10
		60D	2	0.8	0.65	0.57	0.53	0.47	0.4	0.36	0.09	10
		70D	3	1.3	1	0.9	0.8	0.7	0.6	0.6	0.2	12
		80D	29.6	9.8	9.8	9.6	8.8	7.8	6.7	6.1	0.5	16
		83D	30.5	10.2	10.2	10.1	9.3	8.2	7.1	6.5	0.6	16
		100D	32.8	10.5	10.5	10.2	9.7	8.5	7.4	6.8	0.7	19
		110D	41.9	17.9	14.5	12.9	11.8	10.5	9	8.1	0.6	19
		140D	55	22.2	18	16	14.6	13	11.1		0.8	22
		180D	160.2	69.8	56.7	50.2	46	40.8	35		1.9	30
	250D	480.4	221.4	179.8	159.2	146.1	129.3			3.7	40	
	270 2DWELL	45D	1.55	0.58	0.49	0.4	0.35	0.29			0.06	10
		60D	2.01	0.77	0.63	0.55	0.51	0.45	0.39	0.35	0.09	10
		70D	3.1	1.2	1	0.9	0.8	0.7	0.6	0.6	0.2	12
		80D	29.8	9.8	9.8	9.3	8.6	7.6	6.5	5.9	0.5	16
		83D	30.5	11.3	11.3	11	10.5	9.5	8.5	7.1	0.5	16
		100D	31.6	12.8	12.6	12.5	12.1	11.2	9.8	8.5	0.6	19
110D		42.2	17.3	14.1	12.5	11.4	10.1	8.7	7.9	0.6	19	
140D		55.3	21.5	17.5	15.5	14.2	12.6	10.8		0.8	22	
180D		161.1	67.5	54.8	48.6	44.6	39.4	33.8		1.9	30	
250D	484.4	214.6	174.3	154.3	141.6	125.3			3.7	40		



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)	
				Indexing Rotating Speed N (rpm)									
				50	100	150	200	300	500	700			
24	300 2DWELL	45D	1.55	0.52	0.47	0.38	0.33	0.27			0.06	10	
		60D	2.01	0.75	0.61	0.54	0.49	0.44	0.37	0.34	0.09	10	
		70D	3.1	1.2	1	0.9	0.8	0.7	0.6	0.5	0.2	12	
		80D	30	9.9	9.9	9.1	8.3	7.4	6.3	5.7	0.5	16	
		83D	30.5	11.4	11.3	10.8	10	9.6	8.7	6.2	0.5	16	
		100D	31.2	12.8	12.6	11.7	11.4	10.9	9.7	7.1	0.6	19	
		110D	42.4	16.8	13.7	12.1	11.1	9.8	8.4	7.6	0.6	19	
		140D	82.5	32.9	26.7	23.7	21.7	19.2	16.5	14.9	1	22	
		180D	161.8	65.6	53.2	47.1	43.3	38.3	32.9		1.9	30	
	250D	487.2	208.5	169.4	150	137.6	121.8			3.6	40		
30	90 3DWELL	45D	1.15	0.65	0.52	0.4	0.33	0.29	0.21		0.08	10	
		60D	1.76	0.94	0.76	0.68	0.62	0.55	0.47		0.1	12	
		70D	5	3	2.5	2.2	2	1.8	1.5		0.3	14	
		80D	22.7	8.4	8.4	8.4	8.4	8.3	7.1	6.4	0.6	16	
		83D	23.4	10.5	10.3	10.1	10	9.8	9.1	8.4	0.7	16	
		100D	24	20.4	16.1	14	12.7	11.2			0.8	19	
		110D	36.2	22.3	18.1	16.1	14.7	13.1			0.9	19	
		140D	46	40.14	37.98	18.7	17.2	15.2			1.1	22	
		180D	108.7	63.2	51.4	45.5	41.7				2.2	35	
		250D	312.7	198.4	161.1	142.7					4.3	40	
		120 3DWELL	45D	1.15	0.7	0.62	0.48	0.41	0.33	0.25		0.07	10
	60D		2.33	1.18	0.96	0.49	0.78	0.69	0.59	0.54	0.12	12	
	70D		5.5	2.9	2.4	0.85	1.9	1.7			0.3	14	
	80D		25.4	9.1	9.1	9.1	9.1	8.3	7.2		0.6	16	
	83D		25.9	11.1	11.1	11.1	11.1	10.3	9.2		0.7	16	
	100D		26.3	19.3	17.1	14.6	12.1	10.4	10.3		0.8	19	
	110D		39.7	21.4	17.4	15.4	14.2	12.5	10.8		0.8	19	
	140D		73.8	38.7	31.4	27.8	25.5	22.6	19.4		1.2	22	
	180D		144.1	76.8	62.4	55.2	50.7	44.9			2.3	35	
		250D	410.8	235.1	190.9	169.1	155.1				4.5	40	
		180 2DWELL	45D	1.35	0.63	0.54	0.43	0.36	0.29	0.22		0.06	10
	60D		2.44	1.07	0.87	0.77	0.71	0.63	0.54	0.48	0.11	12	
	70D		5.9	2.7	2.2	1.9	1.8	1.6	1.3		0.2	14	
	80D		28	9.5	9.5	9.5	8.7	7.7	6.6	6	0.5	16	
	83D		28.7	11.6	11.5	11.5	10.7	9.6	8.6	7.9	0.6	16	
	100D		29.3	17.7	14.2	12.1	11.8	11.2	9.3	8.2	0.7	19	
	110D		42.9	19.7	16	14.2	13	11.5	9.9	8.9	0.7	19	
	140D	79.5	35.6	28.9	25.6	23.5	20.8	17.8	16.1	1.1	22		
	180 3DWELL	180D	191.7	90.7	73.7	65.3	59.9	53	45.5		2.4	35	
		250D	453.9	218.8	177.7	157.4	144.4	127.8			4	40	



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
30	240 3DWELL	45D	1.45	0.59	0.48	0.37	0.3	0.27	0.18		0.06	10
		60D	2.49	0.99	0.8	0.71	0.65	0.58	0.5	0.45	0.11	12
		70D	6	2.5	2	1.8	1.6	1.5	1.2	1.1	0.2	14
		80D	29.1	9.7	9.7	8.9	8.2	7.2	6.2	5.6	0.5	16
		83D	29.6	11.7	11.7	10.9	10.2	8.1	7.1	6.3	0.6	16
		100D	31.3	16.3	12.8	11.6	11.5	9.2	8.4	7.2	0.7	19
		110D	44.2	18.4	14.9	13.2	12.1	10.7	9.2	8.3	0.7	19
		140D	81.8	33.1	26.9	23.8	21.8	19.3	16.6	15	1	22
		180D	197.1	84.4	68.6	60.7	55.7	49.3	42.3	38.2	2.2	35
	250D	636.1	291.2	236.6	209.5	192.1	170.1	146		4.5	40	
	270 3DWELL	45D	1.5	0.56	0.45	0.34	0.3	0.26	0.17		0.06	10
		60D	2.5	0.96	0.78	0.69	0.63	0.56	0.48	0.43	0.1	12
		70D	6.1	2.4	2	1.7	1.6	1.4	1.2	1.1	0.2	14
		80D	29.4	9.8	9.8	8.7	7.9	7	6	5.5	0.5	16
		83D	30.2	11.8	11.8	10.2	9.6	8.2	6.8	6.1	0.6	16
		100D	32.4	15.6	12.3	11.8	11.5	9.4	8.6	7	0.7	19
		110D	44.6	17.8	14.5	12.8	11.8	10.4	8.9	8.1	0.7	19
		140D	82.5	32.1	26	23.1	21.2	18.7	16.1	14.5	1	22
		180D	198.6	81.8	66.4	58.8	54	47.8	41	37.1	2.2	35
	250D	643.9	282.8	229.7	203.4	186.6	165.2	141.8		4.4	40	
	300 3DWELL	45D	1.52	0.54	0.43	0.33	0.29	0.25	0.16		0.06	10
		60D	2.51	0.93	0.76	0.67	0.61	0.54	0.47	0.42	0.1	12
		70D	6.1	2.3	1.9	1.7	1.5	1.4	1.2	1.1	0.2	14
		80D	29.7	9.8	9.5	8.4	7.7	6.8	5.9	5.3	0.5	16
		83D	30.7	11.8	11.5	10	9.1	8.4	7.1	6.4	0.6	16
		100D	32.8	15.4	12.1	11.2	10.9	10	8.6	7.4	0.7	19
		110D	44.8	17.3	14.1	12.5	11.4	10.1	8.7	7.8	0.7	19
140D		83	31.2	25.3	22.4	20.6	18.2	15.6	14.1	1	22	
180D		199.8	79.5	64.6	57.2	52.4	46.4	39.8	36	2.2	35	
250D	649.6	275.3	223.6	198	181.6	160.8	138		4.4	40		
32	120 4DWELL	80D	23.4	8.7	8.7	8.7	8.2	7.3			0.6	19
		83D	23.7	11.8	11.6	11	10.2	9.4			0.6	19
		100D	24.5	12.3	12.2	11.3	10.3	9.8			0.7	19
	120 2DWELL	110D	38.1	12.8	12.8	12.8	12.8	12.5			0.7	16
		140D	48.1	21.1	20.6	18.3	16.8	14.8			0.8	19
		180D	68.5	35.2	28.6	25.3	23.2				1.4	22
		250D	228.5	128.1	104	92.1					2.7	30



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
32	180 4DWELL	80D	31.4	15.6	12.7	11.3	10.3	9.1	7.8		0.6	19
		83D	33.7	12.9	11.6	10.8	9.5	8.5	7.4		0.6	12
	180 2DWELL	100D	35.4	12.9	12.8	12.8	12.7	11.4	8.9		0.6	14
		110D	39.6	13.1	13.1	13.1	12.7	11.3	9.7		0.6	16
		140D	49.4	21.4	18.5	16.5	15	13.3	11.4		0.8	19
		180D	104.5	49.6	40.3	35.6	32.7	29			1.5	22
		250D	295.1	149.1	121.1	107.3	98.4				2.8	30
	240 4DWELL	80D	33.4	14.8	12	10.6	9.8	8.6	7.4	6.7	0.6	19
		83D	35.2	12.6	11.2	10.4	9.1	9.1	7.1	6	0.6	12
	240 2DWELL	100D	38.1	12.9	12.8	12.7	11.6	9.5	8.9	8.1	0.6	14
		110D	40.2	13.2	13.2	12.8	11.7	10.4	8.9	8.1	0.6	16
		140D	49.9	21	17.1	15.1	13.9	12.3	10.5		0.7	19
		180D	105.7	45.7	37.1	32.9	30.2	26.7	22.9		1.5	22
		250D	299.7	137.9	112	99.2	91	80.5			2.7	30
	270 4DWELL	80D	33.9	14.4	11.7	10.4	9.5	8.4	7.2	6.5	0.6	19
		83D	35.7	12.3	11.2	10.2	9.3	8.2	7.1	6	0.6	12
	270 2DWELL	100D	38.3	12.9	12.8	12.1	11.2	9.6	8.6	7.8	0.6	14
		110D	40.4	13.2	13.2	12.4	11.4	10.1	8.6	7.8	0.6	16
		140D	50.1	20.3	16.5	14.6	13.4	11.9	10.2	9.2	0.7	19
		180D	106	44.2	35.9	31.8	29.2	25.8	22.1		1.4	22
		250D	301	133.4	108.3	95.9	88	77.9			2.7	30
	300 4DWELL	80D	34.4	14.1	11.4	10.1	9.3	8.2	7	6.4	0.6	19
		83D	36.2	12.2	11	9.8	9.1	8.1	6.9	5.8	0.6	12
	300 2DWELL	100D	38.5	12.7	12.6	11.9	10.8	10.3	7.4	6.6	0.6	14
110D		40.5	13.2	13.2	12	11	9.8	8.4	7.6	0.6	16	
140D		50.2	19.7	16	14.2	13	11.5	9.9	8.9	0.7	19	
180D		106.3	42.9	34.8	40.8	28.3	25	21.5		1.4	22	
250D		302	129.4	105.1	93.1	85.4	75.6			2.7	30	
36	120 3DWELL	70D	2.8	1.5	1.2	1.1	1	0.9			0.2	12
		80D	26.8	9.3	9.3	9.3	9.3	9.2	7.9		0.5	16
		83D	28.1	11.3	11.3	11.3	11.3	11.2	9.9		0.6	16
		100D	36.7	15.5	15.1	13.2	12.6	11.4			0.7	19
		140D	51.4	26.4	21.5	19	17.4	15.4			0.9	22
		180D	118.2	62.2	50.5	44.7	41	36.3			1.9	30
		250D	367.6	211.5	171.8	152.1	139.6				3.7	40



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
36	180 3DWELL	70D	3	1.4	1.1	1	0.9	0.8			0.2	12
		80D	28.8	9.7	9.7	9.7	9.5	8.4	7.2	6.5	0.5	16
		83D	30.2	12.7	12.7	12.7	12	11	9.1	6.8	0.6	16
		100D	38.6	16.1	15.3	13.6	12.3	11.2			0.7	19
		110D	40.9	18.1	15.6	13.9	12.7	11.3			0.7	19
		140D	54	24	19.5	17.2	15.8	14	37.7		0.9	22
		180D	157.1	75.3	61.2	54.2	49.7	44			2	30
		250D	395.5	194.3	157.8	139.7	128.2	113.5			3.4	40
	240 3DWELL	70D	3	1.3	1	0.9	0.8	0.7	0.6		0.2	12
		80D	29.6	9.8	9.8	9.6	8.8	7.8	6.7	6.1	0.5	16
		83D	31.7	12.8	12.8	10.6	9.4	8.5	7.5		0.5	16
		100D	40.1	16	14.1	11.3	10.5	9.6	8.4		0.6	19
		110D	41.9	17.9	14.5	12.9	11.8	10.5	9		0.6	19
		140D	55	22.2	18	16	14.6	13	11.1		0.8	22
		180D	160.2	69.8	56.7	50.2	46	40.8	35	31.6	1.9	30
		250D	480.4	221.4	179.8	159.2	146.1	129.3	111		3.7	40
	270 3DWELL	70D	3.1	1.2	1	0.9	0.8	0.7	0.6		0.2	12
		80D	29.8	9.8	9.8	9.3	8.6	7.6	6.5	5.9	0.5	16
		83D	31.9	12.8	12.8	10.3	9.2	8.3	7.4	5.7	0.5	16
		100D	40.3	16	13.8	11	10.3	9.3	8.3		0.6	19
		110D	42.2	17.3	14.1	12.5	11.4	10.1	8.7		0.6	19
		140D	55.3	21.5	17.5	15.5	14.2	12.6	10.8		0.8	22
		180D	161.1	67.5	54.8	48.6	44.6	39.4	33.8	30.6	1.9	30
		250D	484.4	214.6	174.3	154.3	141.6	125.3	107.5		3.7	40
	300 3DWELL	70D	3.1	1.2	1	0.9	0.8	0.7	0.6	0.5	0.2	12
		80D	30	9.9	9.9	9.1	8.3	8	6.3	5.7	0.5	16
		83D	32.1	12.9	12.9	10.1	9	8.4	7.3	6.1	0.5	16
		100D	40.5	15.7	12.4	11.2	10.3	9	8.2	7.1	0.6	19
110D		42.4	16.8	13.7	12.1	11.1	9.2	8.4	7.6	0.6	19	
140D		82.5	32.9	26.7	23.7	21.7	19.2	16.5	14.9	1	22	
180D		161.8	65.6	53.2	47.1	43.3	38.3	32.9	29.7	1.9	30	
250D		487.2	208.5	169.4	150	137.6	121.8	104.5		3.6	40	
40	120 4DWELL	70D	5.5	2.9	2.4	2.1	1.9	1.7			0.3	14
		80D	25.4	9.1	9.1	9.1	9.1	8.3	7.2		0.6	16
		83D	27.5	10.6	10.6	10.6	10.6	9.1			0.6	16
		100D	36.9	19.2	15.6	13.7	13.1	9.4			0.7	19
		110D	39.7	21.4	17.4	15.4	14.2	9.7			0.8	19
		140D	73.8	38.7	31.4	27.8	25.5				1.2	22
		180D	144.1	76.8	62.4	55.2	50.7	44.9			2.3	35
		250D	410.8	235.1	190.9	169.1	155.1				4.5	40



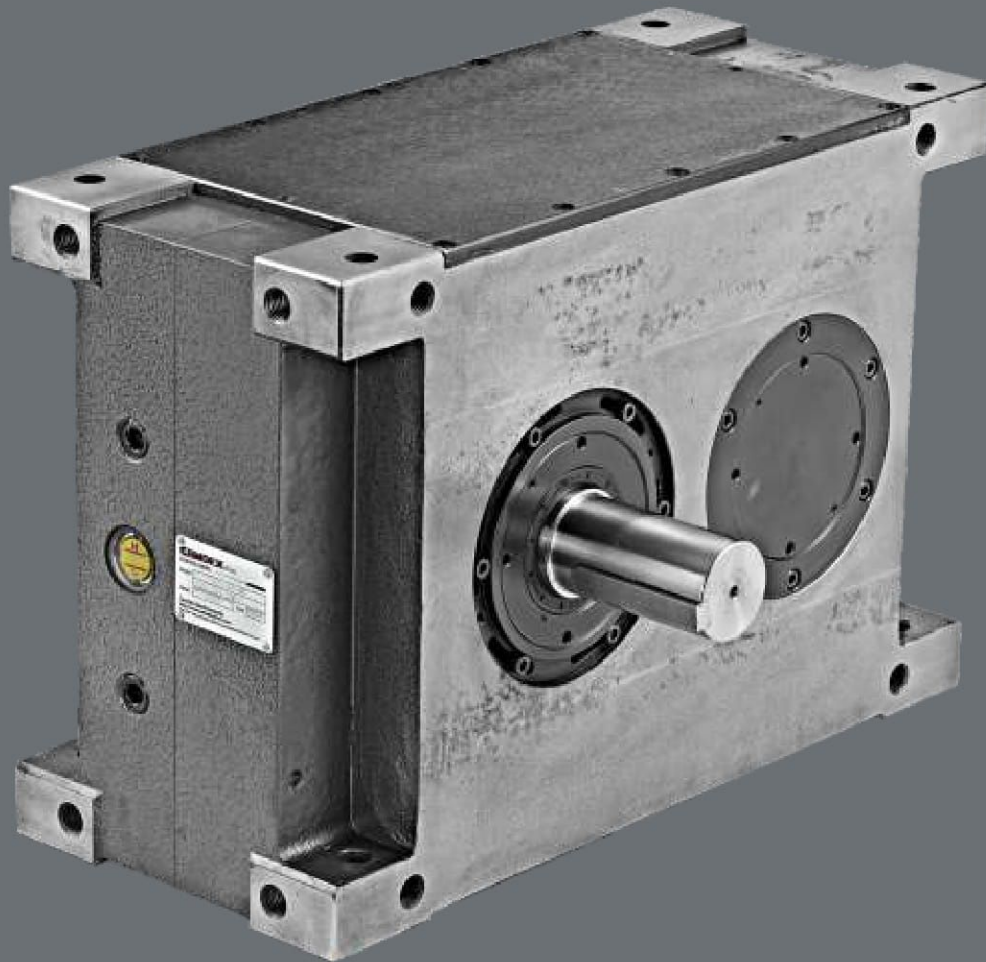
DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
40	180 4DWELL	70D	5.9	2.7	2.2	1.9	1.8	1.6	1.3		0.2	14
		80D	28	9.5	9.5	9.5	8.7	7.7	6.6	6	0.5	16
		83D	30.1	11.4	11.3	11.2	10.2	8.9	7.7	7.2	0.5	16
		100D	38.4	17.6	15.2	13.1	11.8	10.9			0.6	19
		110D	42.9	19.7	16	14.2	13	11.5			0.7	19
		140D	79.5	35.6	28.9	25.6	23.5	20.8			1.1	22
		180D	191.7	90.7	73.7	65.3	59.9	53	45.5		2.4	35
		250D	453.9	218.8	177.7	157.4	144.4	127.8			4	40
	240 4DWELL	70D	6	2.5	2	1.8	1.6	1.5	1.2		0.2	14
		80D	29.1	9.7	9.7	8.9	8.2	7.2	6.2	5.6	0.5	16
		83D	32.1	11.5	11.4	11.2	9.7	8.6	7.5	6.9	0.5	16
		100D	41.7	17.2	14.8	12.7	11.5	10.3	8.6		0.6	19
		110D	44.2	18.4	14.9	13.2	12.1	10.7	9.2		0.7	22
		140D	81.8	33.1	26.9	23.8	21.8	19.3			1	35
		180D	197.1	84.4	68.6	60.7	55.7	49.3	42.3	38.2	2.2	40
		250D	636.1	291.2	236.6	209.5	192.1	170.1	146		4.5	60
	270 4DWELL	70D	6.1	2.4	2	1.7	1.6	1.4	1.2	1.1	0.2	14
		80D	29.4	9.8	9.8	8.7	7.9	7	6	5.5	0.5	16
		83D	32.6	11.6	11.5	11	9.4	8.5	7.3	6.7	0.5	16
		100D	42.1	16.8	13.9	12.5	11.2	10.1	8.6		0.6	19
		110D	44.6	17.8	14.5	12.8	11.8	10.4	8.9		0.7	19
		140D	82.5	32.1	26	23.1	21.2	18.7	16.1		1	22
		180D	198.6	81.8	66.4	58.8	54	47.8	41	37.1	2.2	35
		250D	643.9	282.8	229.7	203.4	186.6	165.2	141.8		4.4	40
	300 4DWELL	70D	6.1	2.3	1.9	1.7	1.5	1.4	1.2	1.1	0.2	14
		80D	29.7	9.8	9.5	8.4	7.7	6.8	5.9	5.3	0.5	16
		83D	32.6	11.6	11.4	10.8	9.2	8.2	7.2	6.4	0.5	16
		100D	42.1	16.5	13.7	12.3	11	9.7	8.3		0.6	19
110D		44.8	17.3	14.1	12.5	11.4	10.1	8.7		0.7	19	
140D		83	31.2	25.3	22.4	20.6	18.2	15.6		1	22	
180D		199.8	79.5	64.6	57.2	52.4	46.4	39.8	36	2.2	35	
250D		649.6	275.3	223.6	198	181.6	160.8	138		4.4	40	
48	120 4DWELL	70D	2.8	1.5	1.2	1.1	1	0.9			0.2	12
		80D	26.8	9.3	9.3	9.3	9.3	9.2	7.9		0.5	16
		83D	28.3	9.6	9.6	9.5	9.5	9.4	8.9		0.5	16
		100D	36.2	11.3	11.3	11	11	10.8			0.6	19
	120 3DWELL	110D	38.1	12.8	12.8	12.8	12.8	12.5			0.7	19
		140D	48.1	21.1	20.6	18.3	16.8	14.8			0.8	22
		180D	118.2	62.2	50.5	44.7	41	36.3			1.9	30
		250D	367.6	211.5	171.8	152.1	139.6				3.7	45



DS/DF Series

No. of Stops S	Indexing Angle Θ	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)							Friction Torque Tx kgf-m	Bearing Dia. (mm)
				Indexing Rotating Speed N (rpm)								
				50	100	150	200	300	500	700		
48	180 4DWELL	70D	3	1.4	1.1	1	0.9	0.8			0.2	12
		80D	28.8	9.7	9.7	9.7	9.5	8.4	7.2	6.5	0.5	16
		83D	29.7	10.1	10.1	9.8	9.8	9.7	8.5	7.8	0.5	16
		100D	37.2	11.6	11.6	11.2	11.2	10.6	9.2		0.6	19
	180 3DWELL	110D	39.6	13.1	13.1	13.1	12.7	11.3	9.7		0.6	19
		140D	49.4	21.4	18.5	16.4	15	13.3			0.8	22
		180D	157.1	75.3	61.2	54.2	49.7	44	37.7		2	22
		250D	395.5	194.3	157.8	139.7	128.2	113.5			3.4	30
	240 4DWELL	70D	3	1.3	1	0.9	0.8	0.7	0.6		0.2	12
		80D	29.6	9.8	9.8	9.6	8.8	7.8	6.7	6.1	0.5	16
		83D	31.5	10.2	10.2	9.9	9.9	8.5	7.9	7.3	0.5	16
		100D	38.6	11.7	11.7	11	10.8	9.9	8.6		0.6	19
	240 3DWELL	110D	40.2	13.2	13.2	12.8	11.7	10.4	8.9		0.6	19
		140D	49.9	21	17.1	15.1	13.9	12.3	10.5		0.7	22
		180D	160.2	69.8	56.7	50.2	46	40.8	35	31.6	1.9	22
		250D	480.4	221.4	179.8	159.2	146.1	129.3	111		1.9	22
	270 4DWELL	70D	3.1	1.2	1	0.9	0.8	0.7	0.6		0.2	12
		80D	29.8	9.8	9.8	9.3	8.6	7.6	6.5	5.9	0.5	16
		83D	32	10.2	10.2	9.9	9.7	8.3	7.7	7.1	0.5	16
		100D	38.7	11.7	11.7	11	10.5	9.7	8.4	8.2	0.6	19
	270 3DWELL	110D	40.4	13.2	13.2	12.4	11.4	10.1	8.6	7.8	0.6	19
		140D	50.1	20.3	16.5	14.6	13.4	11.9	10.2		0.7	22
		180D	161.1	67.5	54.8	48.6	44.6	39.4	33.8	30.6	1.9	22
		250D	484.4	214.6	174.3	154.3	141.6	125.3	107.5		3.7	30
	300 4DWELL	70D	3.1	1.2	1	0.9	0.8	0.7	0.6		0.2	12
		80D	30	9.9	9.9	9.1	8.3	7.4	6.3	5.7	0.5	16
		83D	32.5	10.3	10.3	9.7	9.5	8.1	7.5	6.9	0.5	16
		100D	38.9	11.7	11.7	10.8	10.3	9.6	8.2	8	0.6	19
	300 3DWELL	110D	40.5	13.2	13.2	12	11	9.8	8.4	7.6	0.6	19
		140D	50.2	19.7	16	14.2	13	11.5	9.9		0.7	22
		180D	161.8	65.6	53.2	47.1	43.3	38.3	32.9	29.7	1.9	22
		250D	467.2	208.5	169.4	150	137.6	121.8	104.5		3.6	30




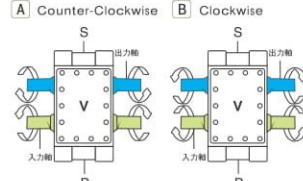


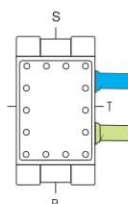
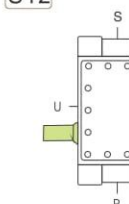
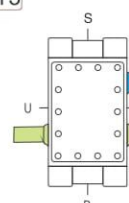
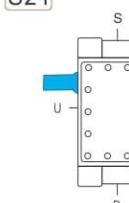
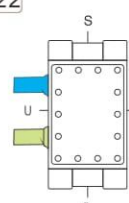
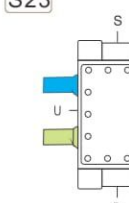
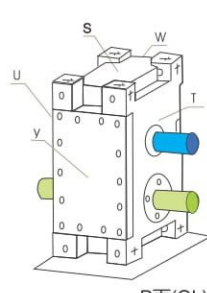
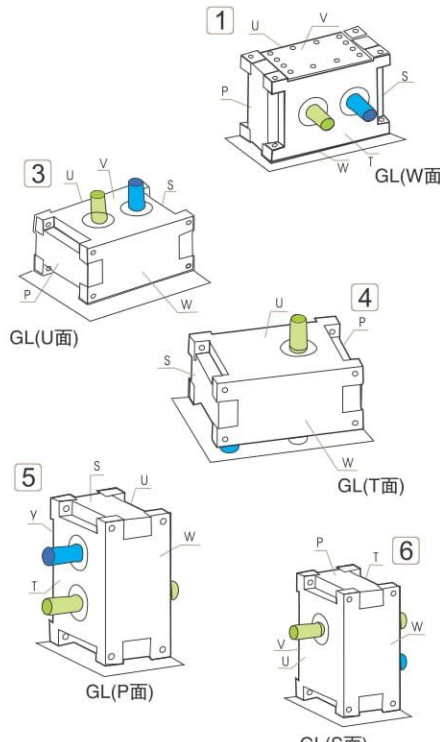
P Series

P065 / P080 / P100 / P125 / P150 / P175
P225 / P250 / P320

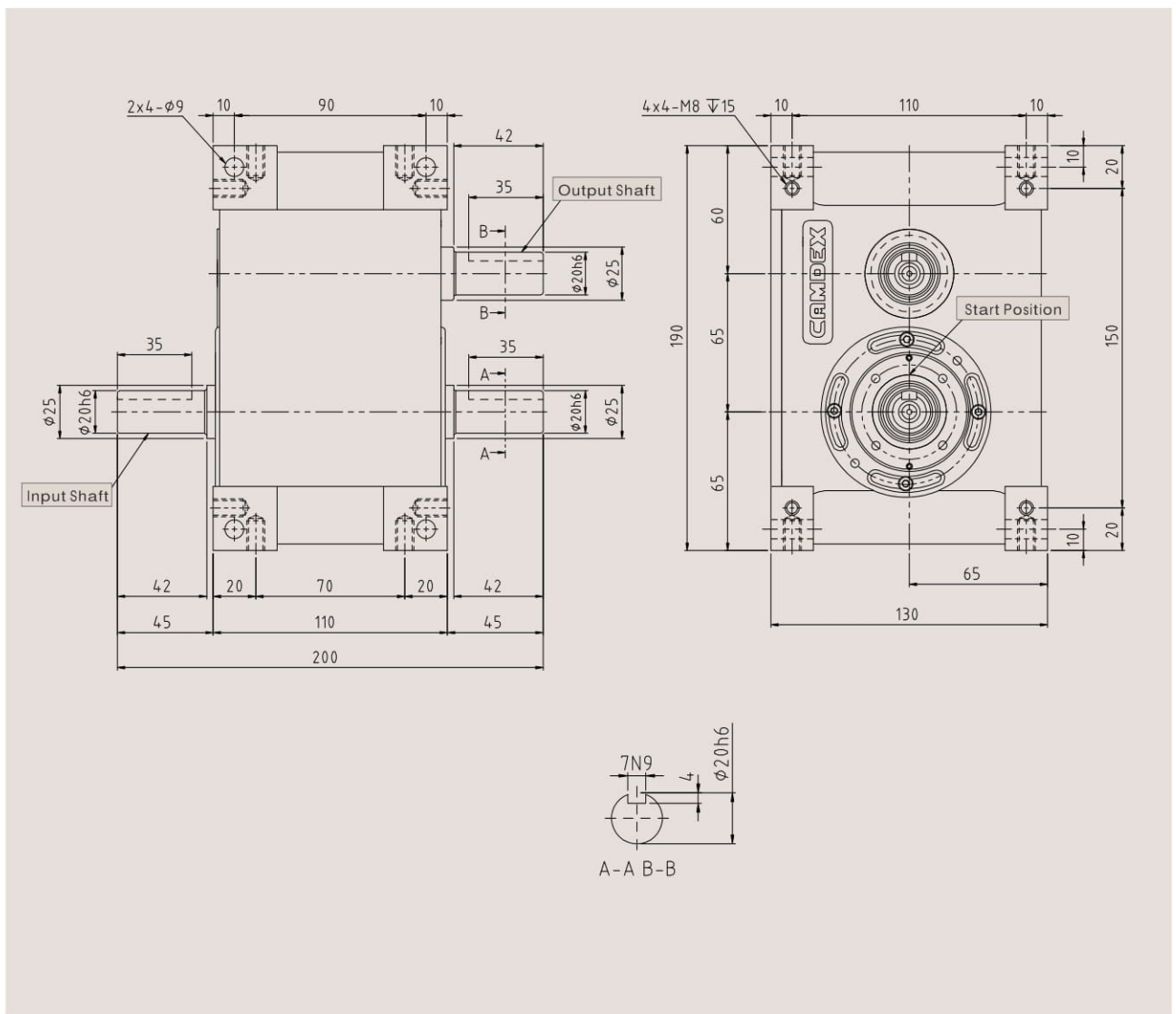
Product Features

Product Features: It contains two plate type cams and the turret driven by the cam followers. This index drive has parallel co-shaft cams, whose rotation drives the cam follower turret to perform indexing. It is most suitable for driving large pitch distance conveyor or for longer dwell indexing. 3-parallel cam type is available for heavier load capacity, suitable for longer pitch distance transportation at a higher speed. The dwell period is also longer than that of 2-parallel cam type.

Model Code Designation:

P	100D	S	01	270	2	A	S12	VW	1	X
A	B	C	D	E	F G	H	I	J	K	
A Machine Type	B Specification	C Type	D No. of Stop (S)	E Indexing Angle (θ h)	F Motion Curve		G Cam Rotation Direction			
P Parallel	100D 100mm	S Type	01 1 stop	270 270°	2 MS Curve		A Counter-Clockwise			
	65D/80D 100D/125D 150D/175D 225D/250D 320D	S Shaft Type	Numbers of Stop Position 1, 2, 3, 4, 6, 8	The angle where the input shaft drives the output shaft to index 90° / 120° 150° / 180° 210° / 240° 270° / 300°	1 2 3 Three Types of Curve Available 1 MT (Modified Trapezoid) 2 MS (Modified Sine) 3 MCV50 (Modified Constant Velocity 50)		A Counter-Clockwise B Clockwise 			
H Indexing Angle			I Mounting Side		J Mounting Position		K Special Model Mark			
S12 Double Input on side T and side U			VW		1		X			
Input, Output shaft direction and single/double sides selection			There are mounting bolt holes on side V and side W. Besides, P, S, T and U are optional.		As shown in the chart below.		The custom special requirement <input type="checkbox"/> Standard, no mark <input checked="" type="checkbox"/> Special model			
S11 Single side T S21 Single side U & Single side T S12 Single side T & Single side U S22 Single side U S13 Double side T & Single side T, U S23 Single side U & double side T, U										
 Input shaft  Output shaft S11  S12  S13  S21  S22  S23 			 P面(GL)		 1 GL(W面) 3 GL(U面) 4 GL(T面) 5 GL(P面) 6 GL(S面)					

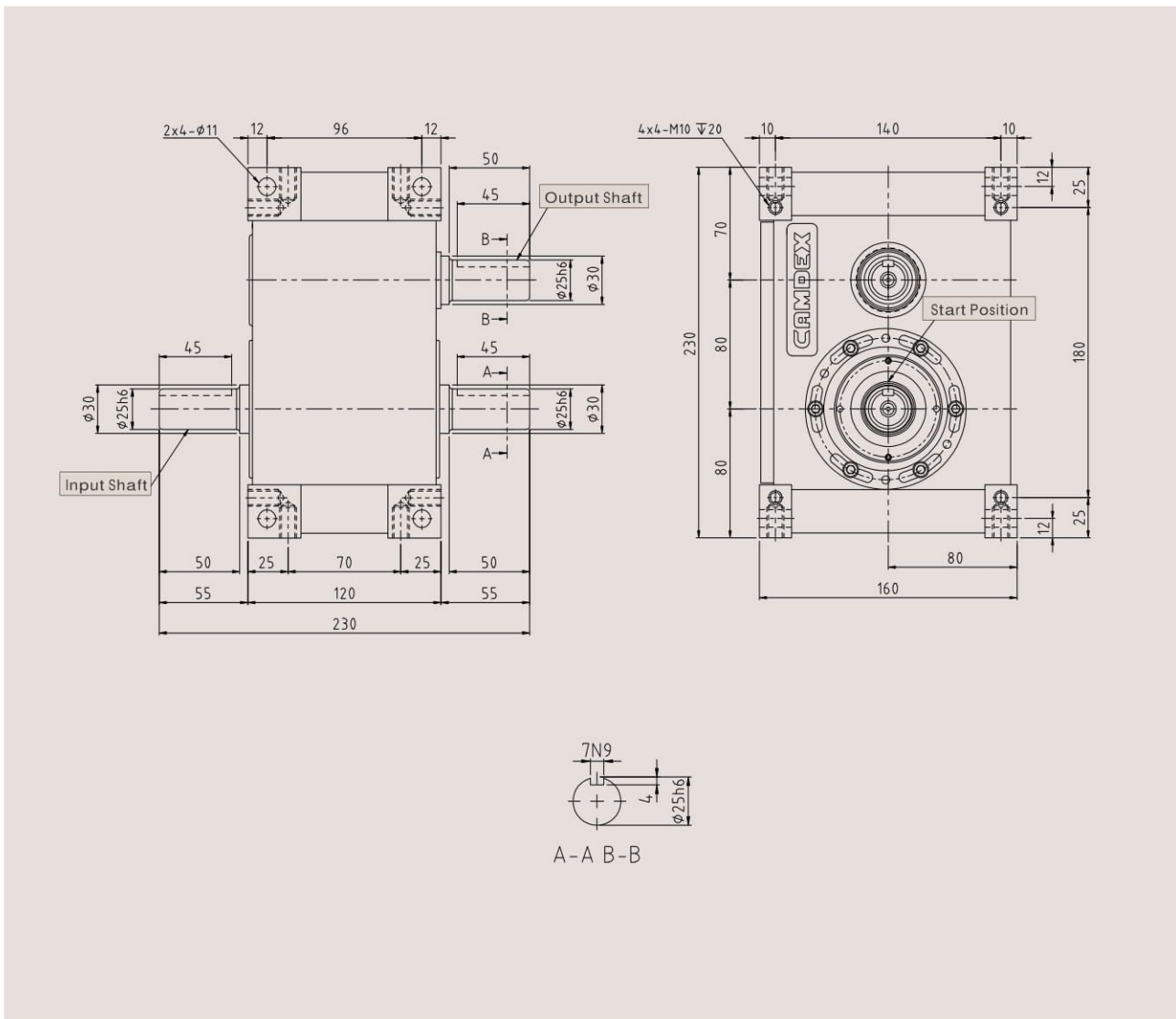
P065 P Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	P1	kgf	250
Allowable Output shaft axial load	P2	kgf	160
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Output shaft moment of deflection	K1	kgf-m/rad	9.2×10^2
Allowable Input shaft radial load	P4	kgf	250
Allowable Input shaft axial load	P5	kgf	160
Allowable Input shaft torque	P6	kgf-m	11
Input shaft moment of deflection	K2	kgf-m/rad	9.2×10^2
1Dwell indexing accuracy		sec.	±60
2Dwell indexing accuracy		sec.	±120
Repeat positioning accuracy		sec.	60
Weight		kg	15

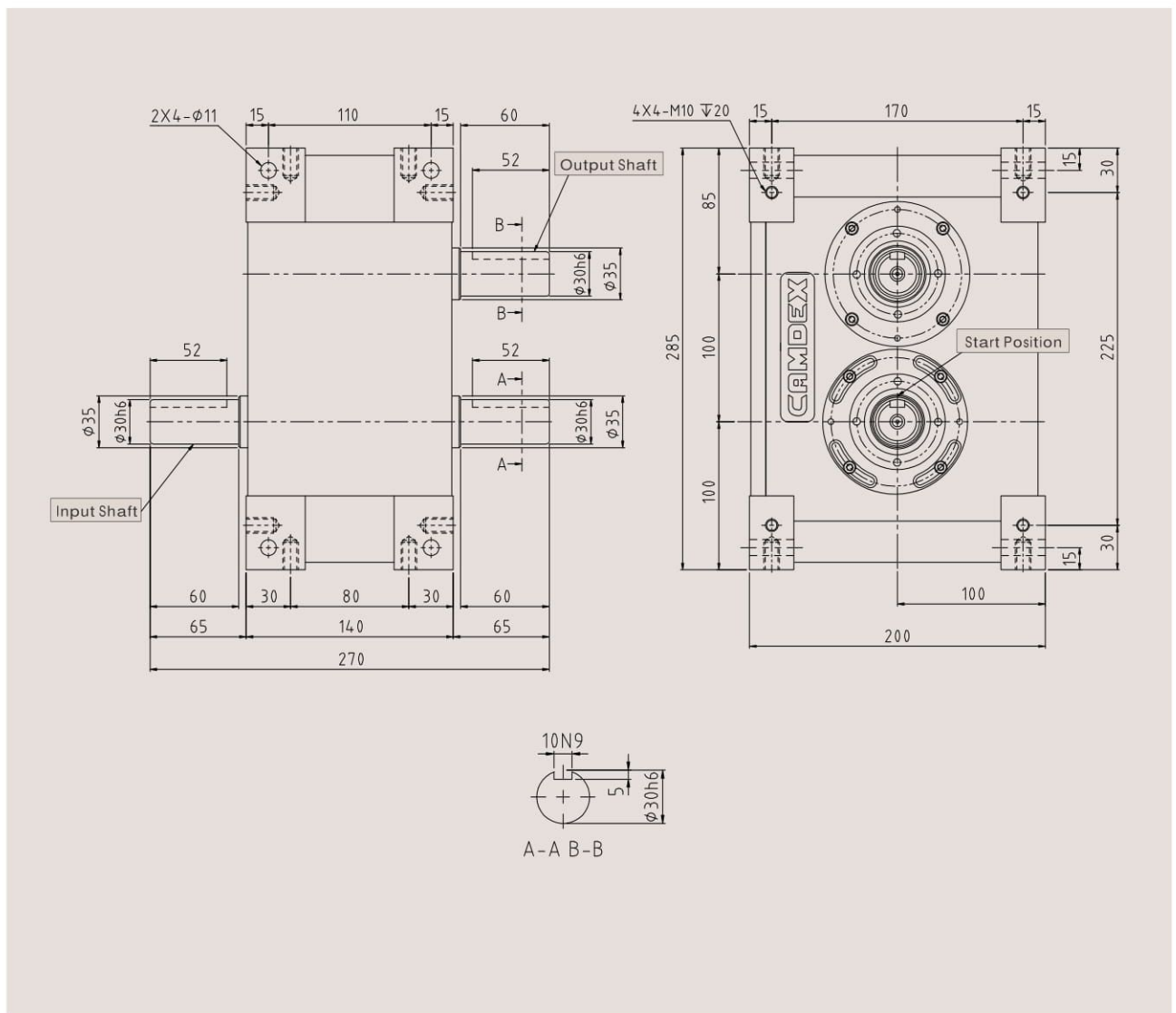
P080 P Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	P1	kgf	360
Allowable Output shaft axial load	P2	kgf	250
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Output shaft moment of deflection	K1	kgf-m/rad	1.85×10^3
Allowable Input shaft radial load	P4	kgf	360
Allowable Input shaft axial load	P5	kgf	250
Allowable Input shaft torque	P6	kgf-m	25
Input shaft moment of deflection	K2	kgf-m/rad	1.85×10^3
1Dwell indexing accuracy		sec.	± 60
2Dwell indexing accuracy		sec.	± 120
Repeat positioning accuracy		sec.	60
Weight		kg	20

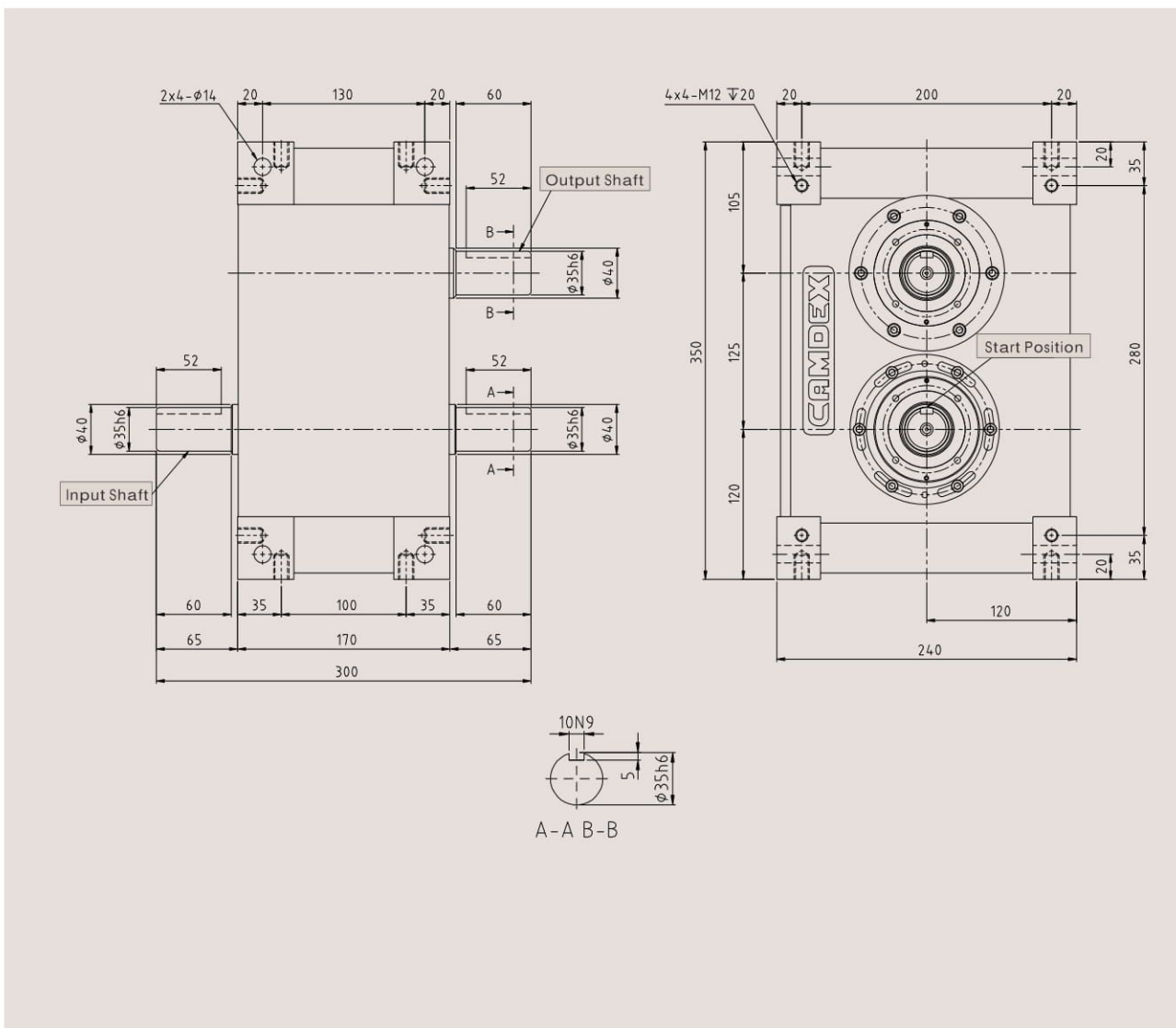
P100 P Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	P1	kgf	480
Allowable Output shaft axial load	P2	kgf	400
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Output shaft moment of deflection	K1	kgf-m/rad	3.26×10^3
Allowable Input shaft radial load	P4	kgf	480
Allowable Input shaft axial load	P5	kgf	400
Allowable Input shaft torque	P6	kgf-m	40
Input shaft moment of deflection	K2	kgf-m/rad	3.26×10^3
1Dwell indexing accuracy		sec.	±60
2Dwell indexing accuracy		sec.	±120
Repeat positioning accuracy		sec.	60
Weight		kg	38

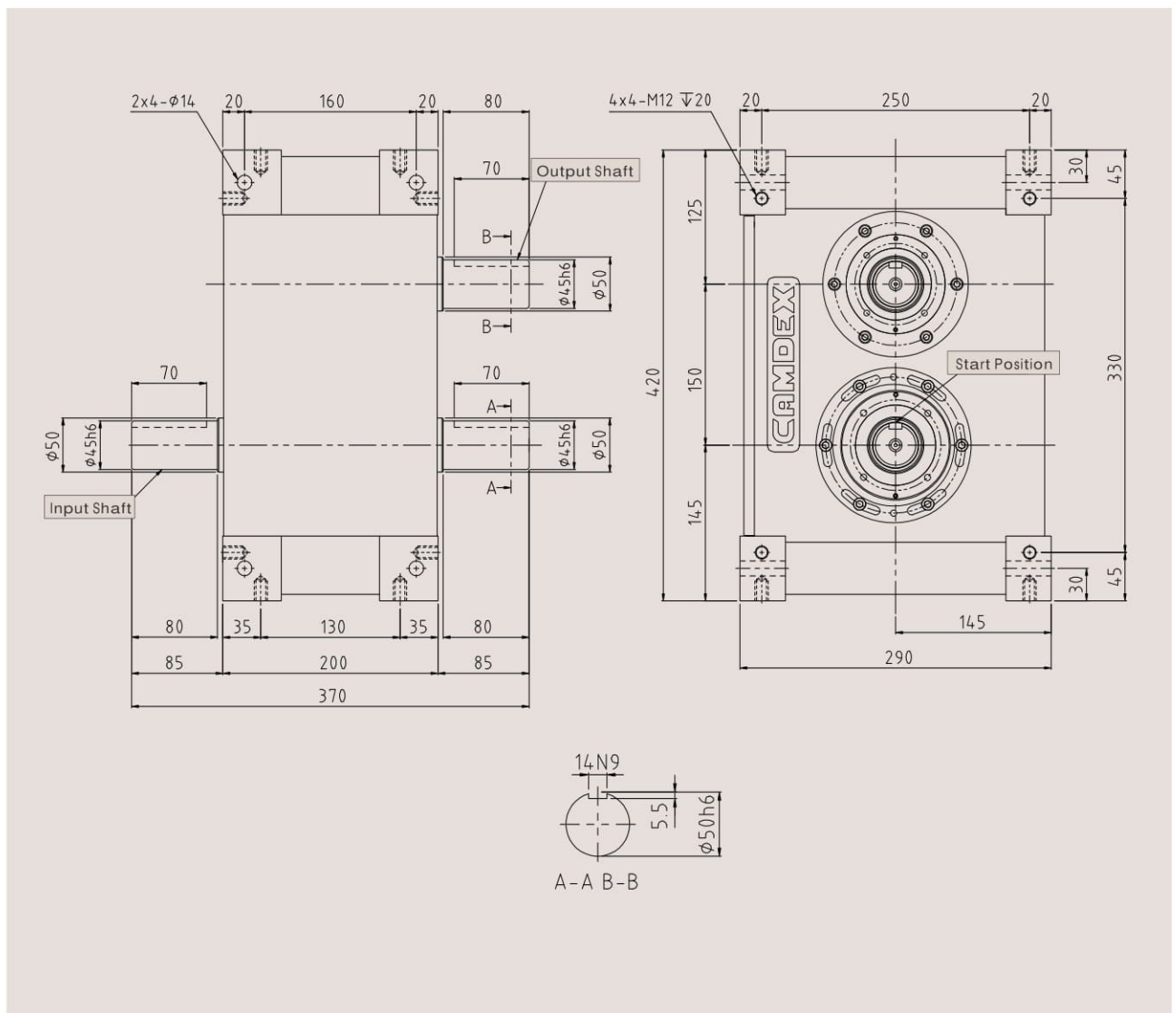
P125 P Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	P1	kgf	520
Allowable Output shaft axial load	P2	kgf	630
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Output shaft moment of deflection	K1	kgf-m/rad	5.03×10^3
Allowable Input shaft radial load	P4	kgf	520
Allowable Input shaft axial load	P5	kgf	630
Allowable Input shaft torque	P6	kgf-m	65
Input shaft moment of deflection	K2	kgf-m/rad	5.03×10^3
1Dwell indexing accuracy		sec.	± 60
2Dwell indexing accuracy		sec.	± 120
Repeat positioning accuracy		sec.	60
Weight		kg	65

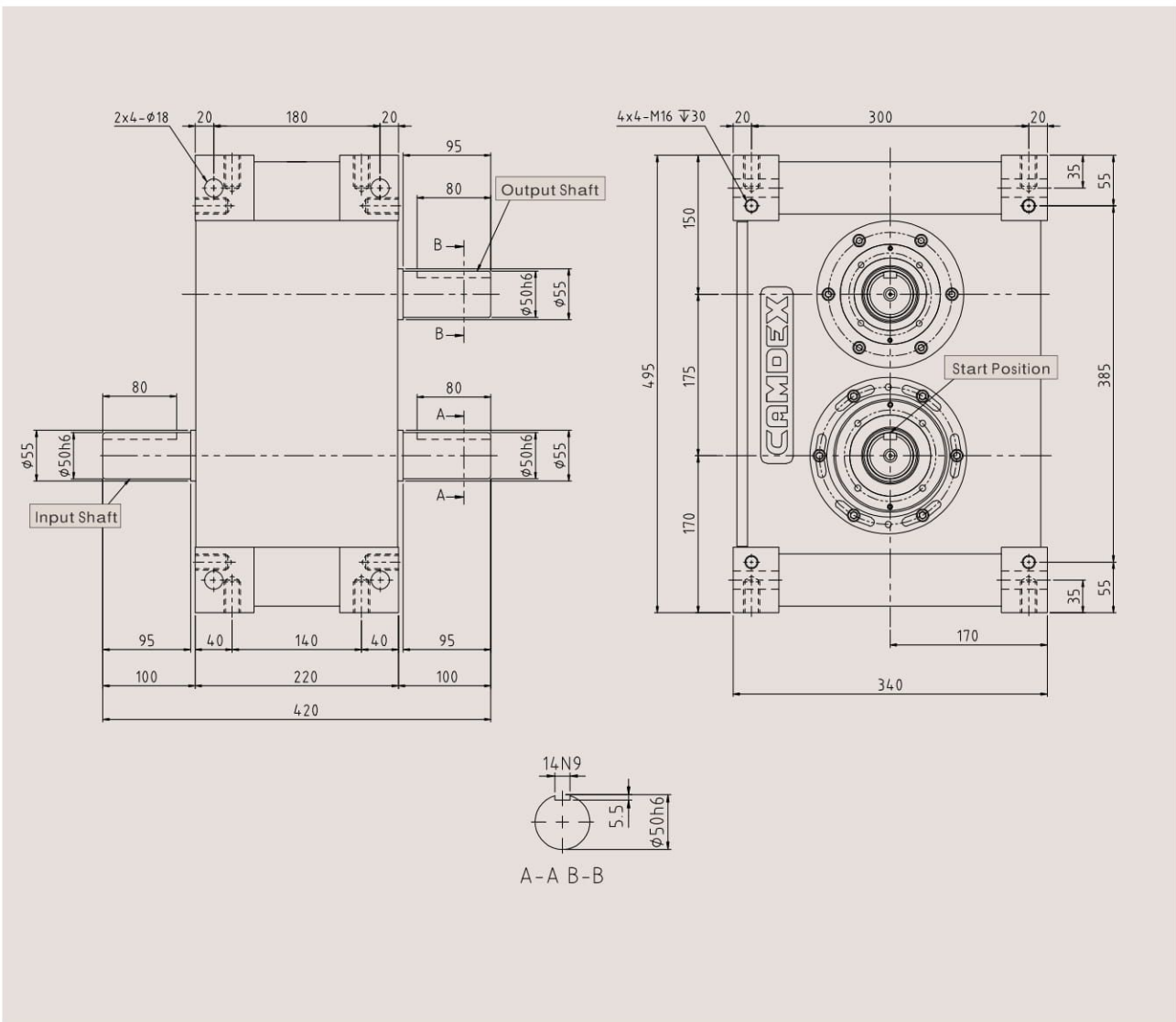
P150 P Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	P1	kgf	750
Allowable Output shaft axial load	P2	kgf	860
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Output shaft moment of deflection	K1	kgf-m/rad	1.8×10^4
Allowable Input shaft radial load	P4	kgf	750
Allowable Input shaft axial load	P5	kgf	280
Allowable Input shaft torque	P6	kgf-m	135
Input shaft moment of deflection	K2	kgf-m/rad	1.8×10^4
1Dwell indexing accuracy		sec.	±60
2Dwell indexing accuracy		sec.	±120
Repeat positioning accuracy		sec.	60
Weight		kg	87

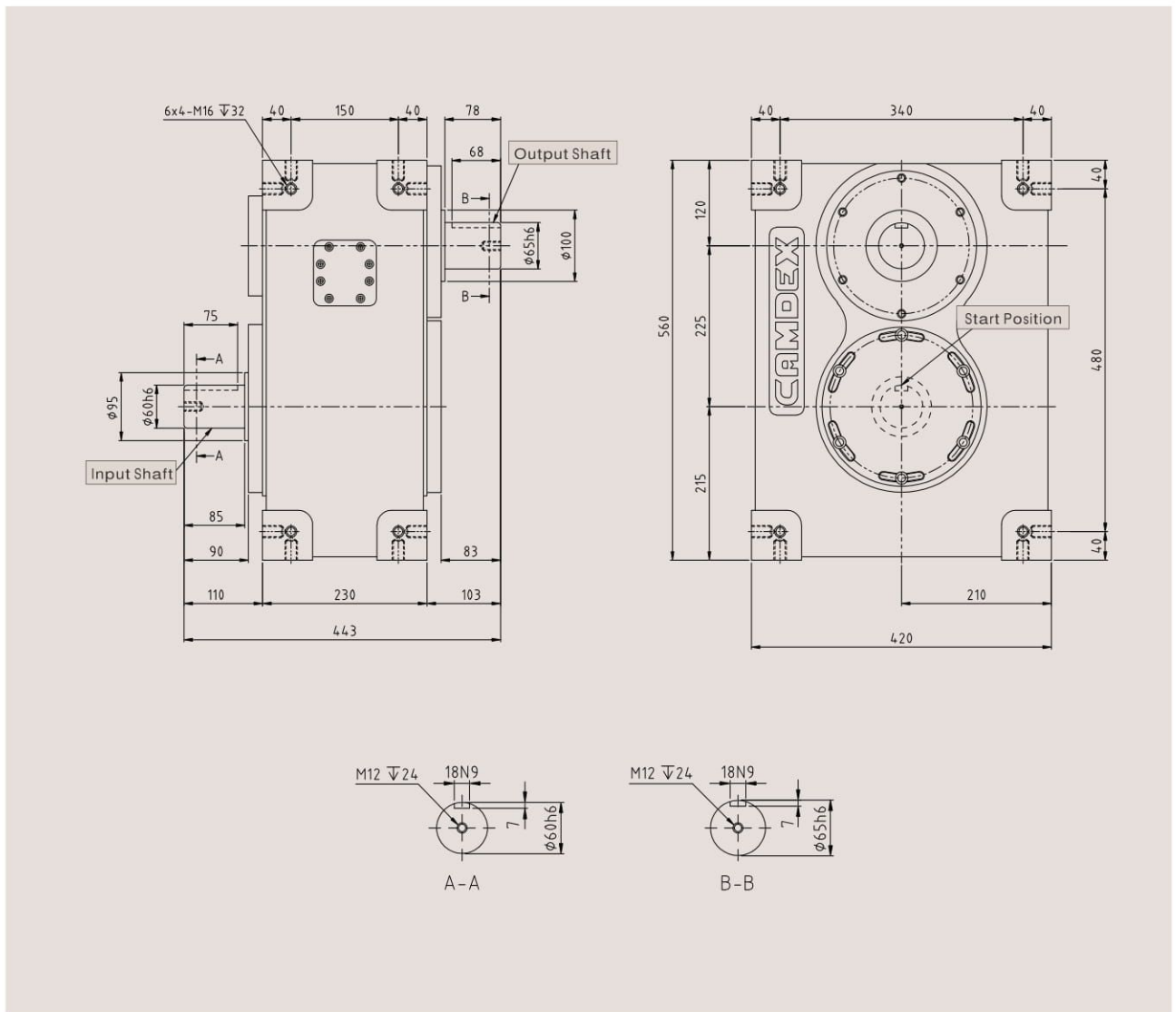
P175 P Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	P1	kgf	920
Allowable Output shaft axial load	P2	kgf	1000
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Output shaft moment of deflection	K1	kgf-m/rad	1.68×10^4
Allowable Input shaft radial load	P4	kgf	920
Allowable Input shaft axial load	P5	kgf	1000
Allowable Input shaft torque	P6	kgf-m	185
Input shaft moment of deflection	K2	kgf-m/rad	1.68×10^4
1Dwell indexing accuracy		sec.	± 60
2Dwell indexing accuracy		sec.	± 120
Repeat positioning accuracy		sec.	60
Weight		kg	127

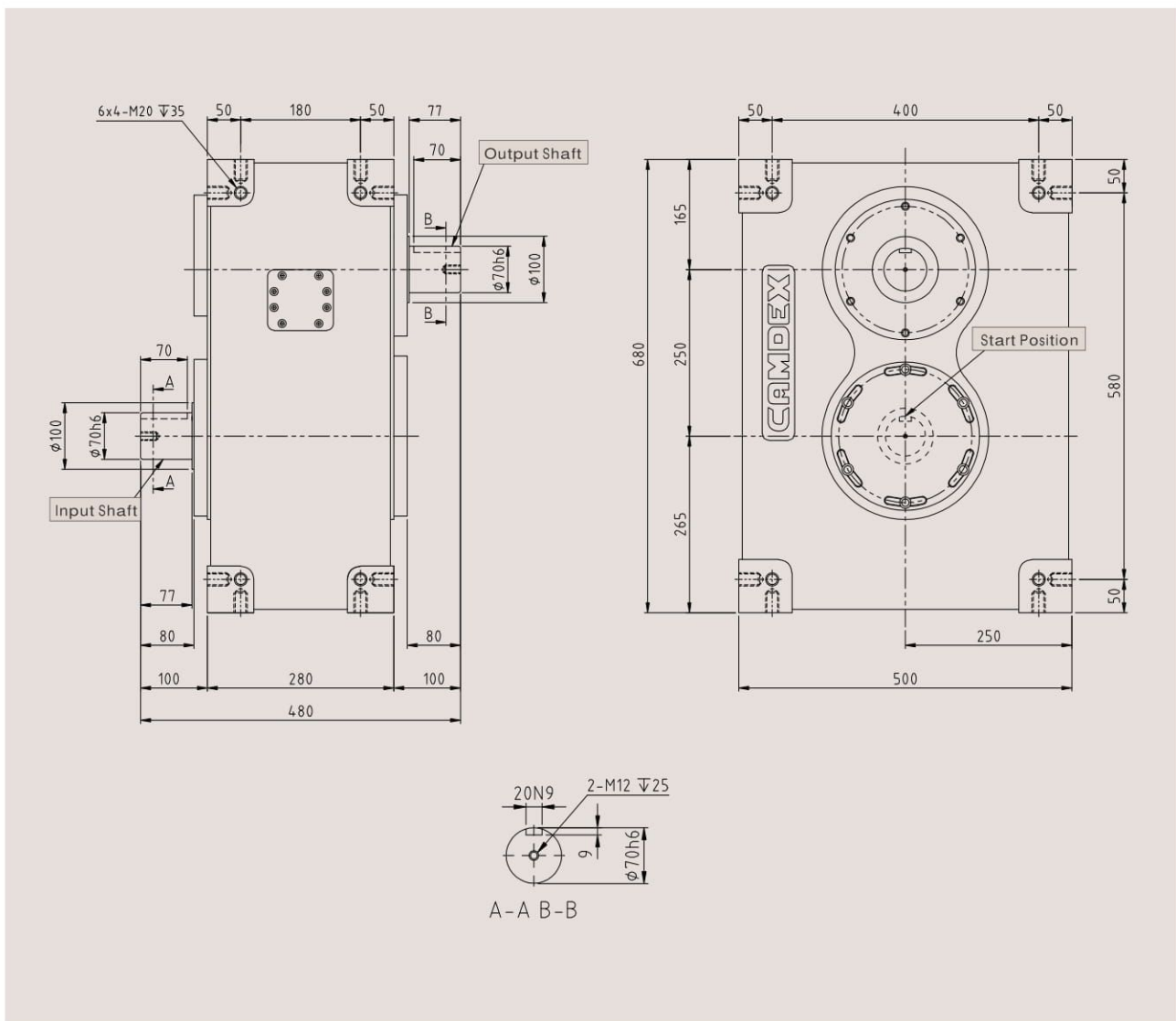
P225 P Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	P1	kgf	1435
Allowable Output shaft axial load	P2	kgf	1470
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Output shaft moment of deflection	K1	kgf-m/rad	4.31×10^4
Allowable Input shaft radial load	P4	kgf	1435
Allowable Input shaft axial load	P5	kgf	2150
Allowable Input shaft torque	P6	kgf-m	410
Input shaft moment of deflection	K2	kgf-m/rad	4.31×10^4
1Dwell indexing accuracy		sec.	± 60
2Dwell indexing accuracy		sec.	± 120
Repeat positioning accuracy		sec.	60
Weight		kg	220

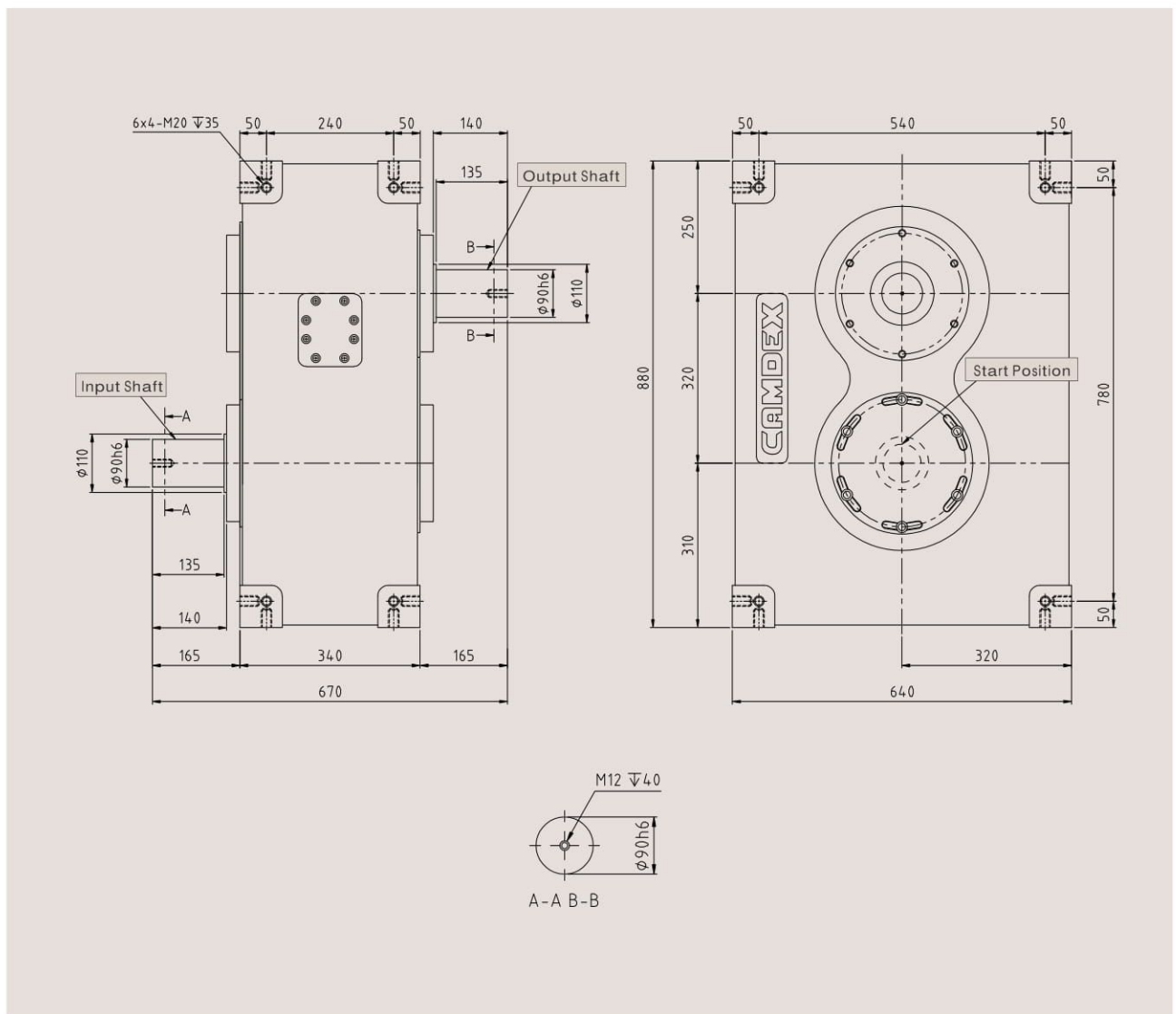
P250 P Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	P1	kgf	1550
Allowable Output shaft axial load	P2	kgf	1560
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Output shaft moment of deflection	K1	kgf-m/rad	5.37×10^4
Allowable Input shaft radial load	P4	kgf	1550
Allowable Input shaft axial load	P5	kgf	2400
Allowable Input shaft torque	P6	kgf-m	500
Input shaft moment of deflection	K2	kgf-m/rad	5.37×10^4
1Dwell indexing accuracy		sec.	± 60
2Dwell indexing accuracy		sec.	± 120
Repeat positioning accuracy		sec.	60
Weight		kg	388

P320 P Series



Technical Data

Properties	Symbol	Unit	Value
Allowable Output shaft radial load	P1	kgf	1720
Allowable Output shaft axial load	P2	kgf	1775
Allowable Output shaft torque	Ts	kgf-m	refer to torque chart
Output shaft moment of deflection	K1	kgf-m/rad	5.8×10^{-4}
Allowable Input shaft radial load	P4	kgf	1690
Allowable Input shaft axial load	P5	kgf	2670
Allowable Input shaft torque	P6	kgf-m	580
Input shaft moment of deflection	K2	kgf-m/rad	5.8×10^{-4}
1Dwell indexing accuracy		sec.	±60
2Dwell indexing accuracy		sec.	±120
Repeat positioning accuracy		sec.	60
Weight		kg	750

P Series

No. of Stops S	Indexing Angle Θ	Curve	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)						Friction Torque	Bearing Dia.		
					Indexing Rotating Speed N (rpm)									
					50	75	100	150	200	300				
1	270	MCV50	P050	3.68	1.35	1.20	1.10	0.97	0.89	0.79	0.13	16		
			P065	7.81	3.13	2.77	2.54	2.23	2.06	1.83	0.26	16		
			P080	15.06	6.28	5.56	5.10	4.51	4.14	3.66	0.40	22		
			P100	25.90	10.58	9.37	8.59	7.61	6.98	6.18	0.60	26		
			P125	38.94	17.79	15.75	14.45	12.79	11.74	10.39	0.83	35		
			P150	58.35	26.24	23.24	21.32	18.87	17.31	15.33	1.22	40		
			P175	91.50	41.38	36.64	33.61	29.76	27.30		1.69	45		
			P225	256.91	125.61	101.34	95.60	87.52	81.25		3.60	60		
			P250	339.24	140.93	124.79	114.47	101.36	92.98		4.45	80		
	P320	611.11	253.88	224.81	206.22	182.60			8.80	100				
	300	MS	P050	3.26	1.16	1.03	0.94	0.83	0.76	0.68	0.15	16		
			P065	7.04	2.73	2.42	2.22	1.96	1.80	1.59	0.30	16		
			P080	13.56	5.47	4.84	4.44	3.93	3.61	3.19	0.46	22		
			P100	23.31	9.23	8.17	7.49	6.63	6.08	5.39	0.68	26		
		MCV50	P050	3.89	1.38	1.23	1.12	0.99	0.91	0.81	0.12	16		
			P065	8.24	3.20	2.83	2.60	2.30	2.11	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	7.37	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	15.69	1.15	40		
			P175	97.50	42.73	37.83	34.70	30.73	28.19	24.96	1.60	45		
			P225	278.41	128.56	104.41	97.25	90.20	83.51		3.71	60		
			P250	356.68	143.57	127.13	116.61	103.26	94.72		4.23	80		
			P320	637.68	256.68	227.28	208.49	184.61	169.34		8.40	100		
			330	MS	P050	3.26	1.13	1.00	0.91	0.81	0.74	0.66	0.14	16
					P065	7.04	2.65	2.35	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	5.91	5.24	0.65	26
	MCV50	P050		3.89	1.35	1.19	1.09	0.97	0.89	0.78	0.12	16		
		P065		8.24	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	0.36	22		
		P100		29.60	11.39	10.08	9.25	8.19	7.51	6.65	0.53	26		
	MCV25	P125		40.71	17.51	15.51	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	28.71	26.34	23.32	1.64	45		
		P225		278.41	126.71	101.69	94.50	86.73	81.20	76.51	3.70	60		
P250		356.68		139.52	123.54	113.33	100.35	92.05	81.51	4.32	80			
P320		627.05		245.29	217.19	199.23	176.41	161.83		8.58	100			



P Series

No. of Stops S	Indexing Angle Θ	Curve	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)						Friction Torque Tx kgf-m	Bearing Dia. (mm)
					Indexing Rotating Speed N (rpm)							
					50	75	100	150	200	300		
2	150	MCV50	P050	3.68	1.37	1.22	1.12	0.99	0.90	0.80	0.12	14
			P065	8.24	3.40	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	19
			P100	25.90	10.45	9.25	8.49	7.52	6.89	6.10	0.57	26
			P125	38.94	15.96	14.13	12.96	11.48	10.53		0.78	35
			P150	58.35	23.50	20.81	19.09	16.90	15.50		1.16	40
			P175	91.50	37.85	33.52	30.74	27.22	24.97		1.61	45
			P225	202.31	95.61	90.28	82.43	72.70			3.61	60
			P250	261.14	108.23	95.83	87.91	77.84			4.08	70
			P320	555.74	228.79	202.59	185.84				8.42	80
	180	MS	P050	3.68	1.30	1.15	1.06	0.93	0.86	0.76	0.13	14
			P065	7.81	2.98	2.64	2.42	2.14	1.97	1.74	0.26	16
			P080	15.06	5.75	5.09	4.67	4.14	3.79	3.36	0.41	19
			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	12.27	10.87	9.97	8.83	0.84	35
			P150	58.35	22.25	19.70	18.07	16.00	14.68	13.00	1.24	40
			P175	91.50	35.84	31.73	29.11	25.77	23.64		1.72	45
			P225	202.31	90.21	85.14	79.35	67.93	60.25		3.74	60
			P250	261.14	102.47	90.73	83.23	73.69	67.60		4.32	70
			P320	555.74	216.61	191.80	175.94	155.79			8.88	80
		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	16
			P080	17.22	6.99	6.19	5.68	5.03	4.61	4.08	0.34	19
			P100	34.14	15.00	13.28	12.18	10.79	9.89	8.76	0.52	26
			P125	55.05	24.39	21.59	19.81	17.54	16.09	14.24	0.73	35
			P150	90.00	39.87	35.30	32.39	28.68	26.30	23.29	1.09	40
			P175	123.27	53.32	47.22	43.31	38.35	35.18		1.50	45
			P225	325.69	154.21	140.93	132.01	112.45	103.21		3.51	60
	P250	387.70	166.44	147.37	135.19	119.70	109.81		3.89	70		
	P320	680.19	292.01	258.56	237.18	210.02			7.79	80		
	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	2.50	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	19
			P100	25.90	9.33	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	0.77	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	45	
P225			202.31	85.62	81.43	72.58	64.32	59.91		3.85	60	
P250			261.14	97.83	86.63	79.47	70.36	64.54		4.05	70	
P320			555.74	206.82	183.14	167.99	148.75	136.45		8.37	80	



P Series

No. of Stops S	Indexing Angle Θ	Curve	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)						Friction Torque	Bearing Dia.
					Indexing Rotating Speed N (rpm)							
					50	75	100	150	200	300		
2	210	MCV50	P050	4.73	1.81	1.60	1.47	1.30	1.19	1.06	0.10	14
			P065	12.80	5.47	4.84	4.44	3.93	3.61	3.19	0.20	16
			P080	18.83	7.65	6.78	6.22	5.50	5.05	4.47	0.32	19
			P100	34.14	14.32	12.68	11.63	10.30	9.45	8.36	0.48	26
			P125	55.05	23.28	20.62	18.91	16.75	15.36	13.60	0.68	35
			P150	90.00	38.07	33.71	30.92	27.38	25.12	22.24	1.03	40
			P175	123.27	50.91	45.08	41.35	36.62	33.59	29.74	1.41	45
			P225	345.81	143.60	126.51	117.84	109.61	98.69		3.01	60
			P250	387.70	158.92	140.71	129.08	114.29	104.84		3.70	70
	P320	680.19	278.81	246.88	226.46	200.52			7.41	80		
	240	MS	P050	4.20	1.45	1.28	1.18	1.04	0.96	0.85	0.11	14
			P065	11.00	4.21	3.73	3.42	3.03	2.78	2.46	0.23	16
			P080	17.22	6.41	5.68	5.21	4.61	4.23	3.74	0.35	19
			P100	34.14	13.76	12.18	11.17	9.89	9.07	8.03	0.53	26
			P125	55.05	22.37	19.81	18.17	16.09	14.76	13.07	0.74	35
			P150	90.00	36.57	32.39	29.71	26.30	24.13	21.36	1.11	40
			P175	123.27	48.91	43.31	39.73	35.18	32.27	28.57	1.52	45
			P225	345.81	140.51	127.90	118.69	107.51	94.32	83.08	3.18	60
			P250	387.70	152.67	135.19	124.10	109.81	100.73	89.19	3.94	70
		P320	680.19	267.86	237.18	217.57	192.65	176.72		7.87	80	
		MCV50	P050	4.73	1.74	1.54	1.41	1.25	1.15	1.01	0.09	14
			P065	11.00	5.25	4.65	4.27	3.78	3.46	3.07	0.19	16
			P080	19.91	8.03	7.11	6.52	5.77	5.29	4.69	0.30	19
			P100	38.41	16.49	14.60	13.39	11.86	10.87	9.63	0.45	26
			P125	61.66	26.62	23.57	21.62	19.14	17.56	15.55	0.63	35
			P150	101.25	43.88	38.81	35.60	31.52	28.91	25.60	0.96	40
			P175	132.08	54.32	48.10	44.12	39.07	35.84	31.73	1.33	45
			P225	398.95	165.91	158.12	136.91	120.51	109.43		3.10	60
	P250		426.47	176.61	156.38	143.45	127.02	116.52		3.47	70	
	P320	743.96	307.12	271.94	249.46	220.89	202.62		7.00	80		
	270	MS	P050	4.20	1.40	1.24	1.14	1.01	0.92	0.82	0.11	14
			P065	11.00	4.06	3.60	3.30	2.92	2.68	2.37	0.21	16
			P080	17.22	6.19	5.48	5.03	4.45	4.08	3.61	0.33	19
			P100	34.14	13.28	11.76	10.79	9.55	8.76	7.76	0.50	26
			P125	55.05	21.59	19.12	17.54	15.53	14.24	12.61	0.70	35
			P150	90.00	35.30	31.26	28.68	25.39	23.29	20.62	1.06	40
P175			132.08	52.44	46.43	42.59	37.71	34.59	30.63	1.43	45	
P225			345.81	138.65	127.51	114.32	102.69	95.12	84.05	3.02	60	
P250			387.70	147.37	130.49	119.70	105.99	97.23	86.09	3.78	70	
P320	680.19	258.56	228.95	210.02	185.96	170.58		7.57	80			



P Series

No. of Stops S	Indexing Angle Θ	Curve	Model	Static Torque T_s (kgf-m)	Dynamic Torque (kgf-m)						Friction Torque	Bearing Dia.
					Indexing Rotating Speed N (rpm)							
					50	75	100	150	200	300		
2	270	MCV50	P050	4.73	1.68	1.49	1.36	1.21	1.11	0.98	0.09	14
			P065	11.00	5.07	4.49	4.12	3.65	3.34	2.96	0.18	16
			P080	19.91	7.75	6.86	6.29	5.57	5.11	4.52	0.28	19
			P100	38.41	15.91	14.09	12.92	11.44	10.50	9.29	0.43	26
			P125	61.66	26.69	22.75	20.87	18.48	16.95	15.01	0.61	35
			P150	101.25	42.31	37.46	34.36	30.43	27.91	24.71	0.92	40
			P175	140.88	58.00	51.36	47.11	41.72	38.27	33.88	1.26	45
			P225	345.81	163.21	145.51	131.88	118.40	107.69		2.89	60
			P250	426.47	170.48	150.95	138.47	122.61	112.47		3.36	70
			P320	770.53	313.22	277.35	254.41	225.28	206.65		6.73	80
	300	MS	P050	4.73	1.63	1.44	1.32	1.17	1.07	0.95	0.10	14
			P065	11.00	4.91	4.35	3.99	3.53	3.24	2.87	0.20	16
			P080	19.91	7.51	6.65	6.10	5.40	4.95	4.38	0.31	19
			P100	38.41	15.42	13.65	12.52	11.09	10.17	9.01	0.47	26
			P125	61.66	24.89	22.04	20.22	17.90	16.42	14.54	0.66	35
			P150	101.25	40.99	36.29	33.29	29.48	27.04	23.94	0.99	40
			P175	140.88	56.20	49.76	45.65	40.42	37.08	32.83	1.36	45
			P225	345.81	158.42	140.61	128.65	115.02	104.32	92.60	3.02	60
			P250	426.47	165.18	146.26	134.16	118.80	108.97	96.49	3.58	70
		P320	770.53	303.48	268.72	246.50	218.27	200.22		7.15	80	
		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	16
			P080	21.52	8.52	7.54	6.92	6.13	5.62	4.97	0.27	19
			P100	40.00	18.27	16.18	14.84	13.14	12.05	10.67	0.41	26
			P125	65.00	27.79	24.61	22.57	19.99	18.33	16.23	0.58	35
			P150	111.00	47.52	42.07	38.59	34.17	31.35	27.76	0.87	40
			P175	154.09	64.97	57.52	52.77	46.72	42.86	37.95	1.20	45
			P225	345.81	173.81	162.14	146.51	133.20	126.51		2.65	60
P250	484.63		202.77	179.55	164.70	145.84	133.78		3.15	70		
P320	850.24	355.75	315.00	288.96	255.86	234.71		6.40	80			
3	120	MCV25	P050	3.99	2.14	1.90	1.74	1.54	1.41	1.25	0.12	14
			P065	10.24	5.94	5.26	4.82	4.27	3.92	3.47	0.24	19
			P080	16.14	9.23	8.17	7.50	6.64	6.09	5.39	0.37	22
			P100	31.58	19.04	16.86	15.46	13.69	12.56	11.12	0.56	30
			P125	51.09	30.84	27.31	25.05	22.18	20.34	18.01	0.79	35
			P150	83.25	49.82	44.11	40.46	35.83	32.87	29.10	1.18	40
			P175	114.47	75.76	67.08	61.54	54.49	49.98	44.26	1.61	50
			P225	245.39	136.74	128.05	104.31	98.75	94.32		3.24	60
			P250	276.07	158.22	140.10	128.52	113.80	104.39		3.99	80
			P320	595.44	342.98	303.70	278.59	246.68			8.23	100



P Series

No. of Stops S	Indexing Angle Θ	Curve	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)						Friction Torque	Bearing Dia.
					Indexing Rotating Speed N (rpm)							
					50	75	100	150	200	300		
3	150	MS	P050	4.20	2.15	1.91	1.75	1.55	1.42	1.26	0.12	14
			P065	11.00	6.21	5.49	5.04	4.46	4.09	3.62	0.23	19
			P080	17.22	9.44	8.36	7.67	6.79	6.23	5.51	0.36	22
			P100	34.14	19.84	17.56	16.11	14.26	13.09	11.59	0.54	30
			P125	56.15	32.89	29.12	26.71	23.65	21.70	19.21	0.76	35
			P150	90.00	51.90	45.96	42.16	37.33	34.24	30.32	1.14	40
			P175	123.27	78.51	69.52	63.77	56.47	51.80	45.87	1.56	50
			P225	345.61	204.51	176.35	161.20	137.04	118.65	107.66	3.51	60
			P250	387.70	221.86	196.45	180.20	159.56	146.37	129.61	4.03	80
	P320	680.19	389.24	344.66	316.16	279.95	256.80		8.05	100		
	180	MS	P050	4.73	2.41	2.13	1.96	1.73	1.59	1.41	0.10	14
			P065	11.00	6.52	5.78	5.30	4.69	4.30	3.81	0.21	19
			P080	19.37	10.57	9.36	8.58	7.60	6.97	6.17	0.33	22
			P100	36.70	20.80	18.42	16.89	14.96	13.72	12.15	0.49	30
			P125	60.56	34.66	30.69	28.16	24.93	22.87	20.25	0.69	35
			P150	101.25	58.09	51.44	47.18	41.78	38.33	33.94	1.03	45
			P175	137.36	86.68	76.75	70.40	62.34	57.18	50.63	1.42	50
			P225	385.64	226.30	198.66	174.31	150.69	141.25		3.16	60
			P250	426.47	240.42	212.88	195.28	172.91	158.62		3.70	80
	P320	743.96	418.37	370.45	339.82	300.90	276.02		7.44	100		
	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	18.91	16.74	15.36	13.60	0.45	30
			P125	64.41	36.18	32.04	29.39	26.02	23.87	21.14	0.64	35
			P150	105.00	58.47	51.77	47.49	42.05	38.57	34.15	0.97	45
			P175	145.28	89.76	79.48	72.91	64.56	59.22	52.44	1.32	50
			P225	408.61	245.31	212.60	198.60	174.25	163.51	140.89	3.02	60
			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		
	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	30
			P125	65.00	36.07	31.94	29.30	25.94	23.80	21.07	0.61	35
			P150	111.00	60.93	53.95	49.49	43.82	40.20	35.60	0.91	45
P175			154.09	94.02	83.25	76.37	67.62	62.03	54.92	1.25	50	
P225			408.61	235.65	202.63	189.51	163.20	158.47	139.62	2.86	60	
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			



P Series

No. of Stops S	Indexing Angle Θ	Curve	Model	Static Torque T_s (kgf-m)	Dynamic Torque (kgf-m)						Friction Torque	Bearing Dia.
					Indexing Rotating Speed N (rpm)							
					50	75	100	150	200	300		
3	270	MS	P050	5.25	2.49	2.20	2.02	1.79	1.64	1.45	0.09	14
			P065	11.00	7.17	6.35	5.83	5.16	4.73	4.19	0.17	19
			P080	21.52	10.92	9.67	8.87	7.85	7.20	6.38	0.27	22
			P100	40.00	22.93	20.30	18.62	16.49	15.13	13.39	0.41	30
			P125	65.00	34.82	30.83	28.28	25.04	22.97	20.34	0.58	35
			P150	111.00	58.82	52.08	47.77	42.30	38.80	34.36	0.88	45
			P175	154.09	90.76	80.36	73.72	65.27	59.87	53.02	1.20	50
			P225	423.74	241.34	208.52	194.32	170.50	162.31	142.54	2.73	60
			P250	484.63	256.45	227.07	208.30	184.44	169.19	149.81	3.17	80
	P320	850.24	449.92	398.39	365.45	323.59	296.83	262.84	6.43	100		
	300	MS	P050	5.25	2.41	2.14	1.96	1.73	1.59	1.41	0.08	14
			P065	11.00	6.95	6.15	5.65	5.00	4.58	4.06	0.17	19
			P080	21.52	10.58	9.36	8.59	7.61	6.98	6.18	0.26	22
			P100	40.00	22.22	19.67	18.04	15.98	14.66	12.98	0.39	30
			P125	65.00	33.74	29.87	27.40	24.26	22.26	19.71	0.56	35
			P150	111.00	56.99	50.46	46.29	40.99	37.60	33.29	0.85	45
			P175	154.09	87.93	77.86	71.42	63.24	58.01	51.37	1.17	50
			P225	423.74	238.60	202.41	187.65	163.61	157.84	137.21	2.46	60
P250			484.63	248.47	220.01	201.82	178.70	163.93	145.15	3.08	80	
P320	850.24	435.92	385.99	354.08	313.52	287.60	254.66	6.27	100			
4	90	MS	P050	3.68	2.05	1.81	1.66	1.47	1.35	1.19	0.13	14
			P065	7.81	4.39	3.89	3.57	3.16	2.90	2.56	0.26	16
			P080	15.06	8.41	7.45	6.83	6.05	5.55	4.91	0.41	19
			P100	25.90	14.09	12.47	11.44	10.13	9.29	8.23	0.61	26
			P125	38.94	24.57	21.75	19.95	17.67	16.21	14.35	0.84	35
			P150	58.35	36.32	32.16	29.50	26.12	23.96	21.24	1.24	45
			P175	91.50	56.95	50.42	46.25	40.96	37.57	33.29	1.72	50
			P225	223.65	140.25	132.65	122.01	109.33	104.25	94.25	3.74	60
			P250	261.14	164.75	145.88	133.82	118.49	108.70	100.00	4.32	80
	P320	555.74	350.62	310.46	284.79	252.17	224.00	200.00	8.88	100		
	120	MS	P050	4.20	1.45	1.29	1.18	1.04	0.96	0.85	0.11	14
			P065	11.00	4.84	4.29	3.93	3.48	3.19	2.83	0.23	16
			P080	17.22	7.36	6.51	5.97	5.29	4.85	4.29	0.35	19
			P100	34.14	16.26	14.40	13.21	11.69	10.72	9.50	0.53	32
			P125	55.05	29.61	26.22	24.05	21.30	19.53	17.30	0.74	35
			P150	90.00	48.41	42.86	39.32	34.81	31.93	28.28	1.11	45
			P175	123.27	64.44	57.06	52.34	46.34	42.51	37.64	1.52	50
			P225	354.26	178.64	151.20	140.12	128.65	118.45	108.25	3.51	60
P250			387.70	191.31	169.40	155.39	137.59	126.21	116.00	3.94	80	
P320	680.19	335.64	297.20	272.62	241.40	214.00	190.00	7.87	100			

P Series

No. of Stops S	Indexing Angle Θ	Curve	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)						Friction Torque	Bearing Dia.
					Indexing Rotating Speed N (rpm)							
					50	75	100	150	200	300		
4	150	MS	P050	4.73	1.63	1.44	1.32	1.17	1.07	0.95	0.10	14
			P065	11.00	5.65	5.00	4.59	4.06	3.72	3.30	0.20	16
			P080	19.91	8.61	7.62	6.99	6.19	5.68	5.03	0.31	19
			P100	38.41	18.22	16.13	14.80	13.10	12.02	10.64	0.47	30
			P125	61.66	29.18	25.84	23.70	20.98	19.25	17.04	0.66	35
			P150	101.25	48.03	42.53	39.01	34.55	31.69	28.06	0.99	45
			P175	140.88	65.55	58.04	53.24	47.15	43.25	38.29	1.36	50
			P225	387.65	173.31	156.14	141.33	124.52	113.65		3.14	60
			P250	426.47	183.27	162.28	148.86	131.81	120.91		3.58	80
	P320	743.96	318.69	282.19	258.86	229.21	210.26		7.20	100		
	180	MS	P050	5.25	1.83	1.62	1.48	1.31	1.21	1.07	0.09	14
			P065	11.00	5.58	4.94	4.53	4.01	3.68	3.26	0.18	19
			P080	21.52	8.48	7.51	6.89	6.10	5.60	4.95	0.28	22
			P100	40.00	18.75	16.61	15.23	13.49	12.37	10.95	0.43	30
			P125	65.00	30.84	27.31	25.05	22.18	20.35	18.01	0.61	40
			P150	111.00	52.72	46.68	42.82	37.92	34.78	30.80	0.91	45
			P175	154.09	71.75	63.53	58.27	51.60	47.33	41.91	1.25	50
			P225	453.62	202.56	174.92	162.35	147.99	129.85		2.87	60
			P250	484.63	213.00	188.61	173.01	153.20	140.53		3.27	80
	P320	850.24	373.70	330.90	303.54	268.77	246.55		6.63	100		
	210	MS	P050	5.25	1.75	1.55	1.42	1.25	1.15	1.02	0.08	14
			P065	11.00	5.33	4.72	4.33	3.83	3.52	3.11	0.17	19
			P080	21.52	8.10	7.17	6.58	5.83	5.34	4.73	0.27	22
			P100	40.00	17.91	15.85	14.54	12.88	11.81	10.46	0.40	30
			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	45
			P175	154.09	68.50	60.66	55.64	49.27	45.19	40.02	1.19	50
			P225	453.62	195.43	168.52	156.94	143.21	128.50	112.32	2.62	60
			P250	484.63	203.38	180.08	165.19	146.27	134.18	118.81	3.14	80
	P320	850.24	356.81	315.95	289.82	256.63	235.41		6.37	100		
	240	MS	P050	5.25	1.68	1.48	1.36	1.21	1.11	0.98	0.08	14
			P065	11.00	5.12	4.53	4.16	3.68	3.38	2.99	0.16	19
			P080	21.52	7.78	6.89	6.32	5.60	5.13	4.54	0.25	22
			P100	40.00	17.20	15.23	13.97	12.37	11.35	10.05	0.39	30
			P125	65.00	28.29	25.05	22.98	20.35	18.66	16.52	0.55	40
			P150	111.00	48.36	42.82	39.28	34.78	31.90	28.25	0.83	45
P175			154.09	65.81	58.27	53.46	47.33	43.42	38.45	1.14	50	
P225			453.62	190.32	160.21	150.31	138.25	120.34	108.75	2.58	60	
P250			484.63	195.39	173.01	158.71	140.53	128.91	114.14	3.04	80	
P320	850.24	342.80	303.54	278.44	246.55	226.16		6.18	100			



P Series

No. of Stops S	Indexing Angle Θ	Curve	Model	Static Torque T_s (kgf-m)	Dynamic Torque (kgf-m)						Friction Torque	Bearing Dia.
					Indexing Rotating Speed N (rpm)							
					50	75	100	150	200	300		
4	270	MS	P050	5.25	1.62	1.43	1.31	1.16	1.07	0.94	0.08	14
			P065	11.00	4.94	4.38	4.01	3.55	3.26	2.89	0.16	19
			P080	21.52	7.51	6.65	6.10	5.40	4.95	4.39	0.25	22
			P100	40.00	16.61	14.70	13.49	11.94	10.95	9.70	0.37	30
			P125	65.00	27.31	24.18	22.18	19.64	18.01	15.95	0.53	40
			P150	111.00	46.68	41.33	37.92	33.57	30.80	27.27	0.81	45
			P175	154.09	63.53	56.25	51.60	45.69	41.91	37.11	1.11	50
			P225	453.62	183.40	161.25	146.31	128.65	116.51	104.32	2.31	60
			P250	484.63	188.61	167.00	153.20	135.65	124.43	110.18	2.96	80
	P320	850.24	330.90	293.00	268.77	237.99	218.31	193.31	6.02	100		
	300	MS	P050	5.25	1.57	1.39	1.27	1.13	1.03	0.91	0.07	14
			P065	11.00	4.79	4.24	3.89	3.44	3.16	2.80	0.15	19
			P080	21.52	7.28	6.44	5.91	5.23	4.80	4.25	0.24	22
			P100	40.00	16.09	14.25	13.07		10.61	9.40	0.36	30
			P125	65.00	26.46	23.43	21.49	19.03	17.45	15.45	0.52	40
			P150	111.00	45.23	40.05	36.74		29.84	26.42	0.79	45
			P175	154.09	61.55	54.50	49.99	44.27	40.61	35.96	1.08	50
			P225	453.62	178.51	156.82	140.33	124.83	112.37	102.50	2.31	60
P250			484.63	182.74	161.81	148.43	131.43	120.56	106.75	2.90	80	
P320	850.24	320.61	283.89	260.41		211.52	187.29	5.90	100			
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	5.33		4.33	3.83	0.21	19
			P080	17.22	10.12	8.96	8.22	7.28	6.68	5.91	0.32	19
			P100	31.58	19.02	16.84	15.44		12.54	11.11	0.49	30
			P125	56.15	34.84	30.84	28.29	25.05	22.98	20.35	0.66	35
			P150	93.00	58.97	52.22	47.90		38.91	34.45	0.97	40
			P175	129.43	79.98	70.82	64.97	57.52	52.77	46.72	1.29	45
			P225	245.39	139.86	130.21	106.51	101.25	96.38		2.84	60
			P250	276.07	161.08	142.63	130.84	115.85	106.27		3.06	80
	P320	595.44	349.19	309.19	283.63		230.37		6.00	100		
	210	MS	P050	4.73	2.01	1.78	1.63	1.44	1.32	1.17	0.10	14
			P065	11.00	6.96	6.16	5.65		4.59	4.06	0.20	19
			P080	19.37	11.43	10.12	9.28	8.22	7.54	6.67	0.30	19
			P100	36.70	22.40	19.83	18.19		14.78	13.08	0.45	30
			P125	60.56	37.03	32.79	30.07	26.63	24.43	21.63	0.61	35
			P150	101.25	63.57	56.29	51.63		41.94	37.14	0.89	40
			P175	137.36	83.13	73.61	67.52	59.79	54.85	48.56	1.19	45
			P225	354.26	212.01	193.21	167.25	152.01	142.51	130.20	2.76	60
P250			387.70	231.66	205.13	188.16	166.61	152.84	135.33	3.00	80	
P320	678.43	406.43	359.88	330.12	292.31	268.14		5.62	100			

P Series

No. of Stops S	Indexing Angle Θ	Curve	Model	Static Torque Ts (kgf-m)	Dynamic Torque (kgf-m)						Friction Torque	Bearing Dia.
					Indexing Rotating Speed N (rpm)							
					50	75	100	150	200	300		
6	240	MS	P050	5.25	2.25	1.99	1.83	1.62	1.48	1.31	0.09	14
			P065	13.21	7.39	6.54	6.00	5.31	4.87	4.31	0.19	19
			P080	20.44	11.88	10.51	9.65	8.54	7.83	6.94	0.28	19
			P100	34.51	25.23	22.34	20.49	18.15	16.65	14.74	0.41	30
			P125	64.41	38.89	34.44	31.59	27.97	25.66	22.72	0.57	35
			P150	112.63	64.38	57.00	52.29	46.30	42.47	37.61	0.84	40
			P175	145.28	86.63	76.71	70.37	62.31	57.15	50.61	1.12	45
			P225	432.65	262.31	241.86	226.15	201.35	182.31	162.87	2.33	60
			P250	465.24	288.99	255.89	234.73	207.85	190.66	168.82	2.71	80
	P320	723.65	489.75	433.66	397.80	352.24	323.11		5.13	100		
	270	MS	P050	5.25	2.17	1.92	1.76	1.56	1.43	1.27	0.09	14
			P065	14.05	8.02	7.10	6.51	5.77	5.29	4.68	0.17	19
			P080	21.52	12.36	10.94	10.04	8.89	8.15	7.22	0.26	19
			P100	35.62	25.86	22.90	21.01	18.60	17.06	15.11	0.39	30
			P125	65.00	38.95	34.49	31.64	28.02	25.70	22.75	0.54	35
			P150	114.82	67.41	59.69	54.75	48.48	44.47	39.38	0.79	40
			P175	154.09	91.17	80.72	74.05	65.57	60.15	53.26	1.05	45
			P225	546.72	270.31	248.65	231.25	213.01	187.65	168.19	2.21	60
P250			584.63	296.22	262.29	240.60	213.04	195.43	173.04	2.57	80	
P320	831.69	519.69	460.17	422.12	373.77	342.87		4.83	100			
8	120	MS	P050	3.68	1.67	1.48	1.36	1.20	1.10	0.97	0.11	14
			P065	11.00	4.32	3.82	3.51	3.10	2.85	2.52	0.23	16
			P080	15.06	8.27	7.32	6.72	5.95	5.45	4.83	0.35	19
			P100	25.90	13.94	12.34	11.32	10.02	9.19	8.14	0.51	26
			P125	38.94	21.01	18.60	17.06	15.11	13.86	12.27	0.69	30
			P150	58.35	31.75	28.11	25.79	22.83	20.94		0.99	40
			P175	91.50	49.50	43.83	40.20	35.60	32.65		1.36	45
			P225	223.65	128.65	117.36	108.42	96.51			2.91	60
			P250	261.14	141.50	125.29	114.93	101.77			3.25	80
	P320	555.74	301.13	266.64	244.59	216.58			6.38	100		
	150	MS	P050	3.89	1.37	1.22	1.12	0.99	0.90	0.80	0.10	14
			P065	8.24	3.54	3.14	2.88	2.55	2.34	2.07	0.20	16
			P080	17.22	7.63	6.76	6.20	5.49	5.03	4.46	0.31	19
			P100	34.14	16.39	14.52	13.32	11.79	10.81	9.58	0.46	26
			P125	55.05	26.44	23.41	21.47	19.01	17.44	15.44	0.63	30
			P150	90.00	44.04	39.00	35.77	31.68	29.06	25.73	0.93	40
			P175	123.27	60.33	53.42	49.00	43.39	39.80		1.24	45
			P225	354.26	146.37	132.21	122.69	108.95	97.61		2.61	60
P250			387.70	169.67	150.24	137.81	122.03	111.94		3.05	80	
P320	680.19	321.00	284.23	260.73	230.87			5.73	100			



P Series

No. of Stops S	Indexing Angle Θ	Curve	Model	Static Torque T_s (kgf-m)	Dynamic Torque (kgf-m)						Friction Torque	Bearing Dia.
					Indexing Rotating Speed N (rpm)							
					50	75	100	150	200	300		
8	180	MS	P050	4.20	1.46	1.29	1.18	1.05	0.96	0.85	0.09	14
			P065	11.00	4.76	4.21	3.86	3.42	3.14	2.78	0.19	19
			P080	19.91	9.04	8.01	7.35	6.50	5.97	5.28	0.28	22
			P100	38.41	18.60	16.47	15.11	13.38	12.27	10.86	0.42	26
			P125	61.66	29.79	26.37	24.19	21.42	19.65	17.40	0.58	30
			P150	101.25	49.97	44.24	40.59	35.94	32.96	29.19	0.84	40
			P175	137.36	67.42	59.70	54.76	48.49	44.48	39.38	1.13	45
			P225	386.52	184.65	161.30	147.32	136.51	126.51		2.05	60
			P250	426.47	200.38	177.43	162.76	144.12	132.20		2.79	80
			P320	743.96	348.46	308.55	283.03	250.62			5.24	100
	210	MS	P050	4.73	1.67	1.48	1.36	1.20	1.10	0.97	0.09	14
			P065	11.00	5.08	4.50	4.13	3.65	3.35	2.97	0.18	19
			P080	19.91	8.64	7.65	7.01	6.21	5.70	5.04	0.26	22
			P100	38.41	17.76	15.72	14.42	12.77	11.72	10.37	0.40	26
			P125	61.66	28.44	25.18	23.10	20.45	18.76	16.61	0.54	30
			P150	101.25	47.71	42.24	38.75	34.31	31.47	27.87	0.80	40
			P175	140.88	66.99	59.32	54.42	48.18	44.20	39.14	1.07	45
			P225	386.52	178.65	157.31	143.25	130.20	120.51		1.94	60
			P250	426.47	191.33	169.41	155.41	137.61	126.23		2.65	80
			P320	770.53	351.52	311.26	285.52	252.82	231.92		4.93	100
	240	MS	P050	5.25	1.90	1.68	1.54	1.37	1.25	1.11	0.08	14
			P065	11.00	6.20	5.49	5.03	4.46	4.09	3.62	0.16	19
			P080	21.52	9.42	8.34	7.65	6.77	6.21	5.50	0.25	22
			P100	40.00	20.22	17.90	16.42	14.54	13.34	11.81	0.37	26
			P125	65.00	30.50	27.01	24.78	21.94	20.12	17.82	0.51	30
			P150	111.00	53.14	47.05	43.16	38.21	35.05	31.04	0.75	40
			P175	154.09	74.40	65.88	60.43	53.51	49.09	43.46	1.00	45
			P225	420.63	203.60	187.41	171.25	150.65	132.05		1.72	60
			P250	484.63	225.65	199.81	183.28	162.29	148.87		2.44	80
			P320	850.24	395.89	350.55	321.56	284.73	261.19		4.58	100
	270	MS	P050	5.25	1.84	1.63	1.49	1.32	1.21	1.07	0.08	14
			P065	11.00	5.98	5.30	4.86	4.30	3.94	3.49	0.16	19
			P080	21.52	9.09	8.05	7.38	6.54	5.99	5.31	0.24	22
			P100	40.00	19.52	17.28	15.85	14.04	12.88	11.40	0.36	26
			P125	65.00	29.44	26.07	23.91	21.18	19.42	17.20	0.49	30
			P150	111.00	51.29	45.42	41.66	36.89	33.84	29.96	0.72	40
P175			154.09	71.82	63.59	58.34	51.65	47.38	41.96	0.96	45	
P225			420.63	196.31	180.25	162.31	142.50	127.86	112.01	1.68	60	
P250			484.63	217.82	192.87	176.92	156.66	143.70	127.24	2.36	80	
P320			850.24	382.15	338.38	310.40	274.85	252.12		4.42	100	



Note:

The reference value of the safe load F_e is:

When the indexing angle is 90° , the safety factor = load torque (T_t) X2.22 (times)

When the indexing angle is 120° or above, the safety factor = load torque (T_t) x2.0 (times)

Note: For safety factor calculation, when the input shaft speed is lower than 35rpm, it will be considered as 35rpm.



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