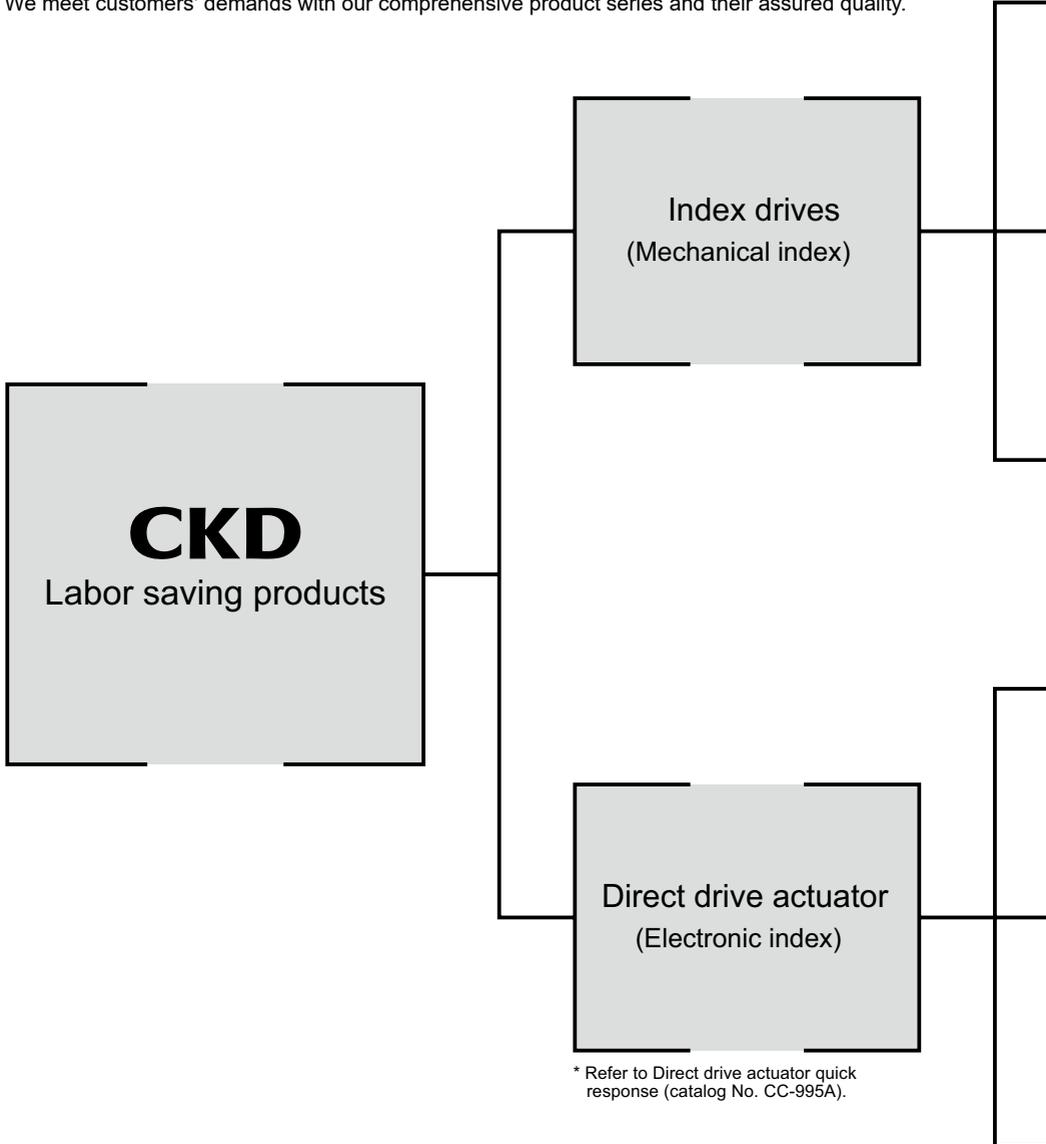


# Product overview

## ● CKD labor saving products

- CKD power-saving products are manufactured with the highest precision employing technologies in automated machines, valves, cylinders and solenoids.  
We meet customers' demands with our comprehensive product series and their assured quality.



\* Refer to Direct drive actuator quick response (catalog No. CC-995A).

Roller gear cam drive



Parallel cam drive



Pick and place drive



Direct drive actuator



Driver/controller

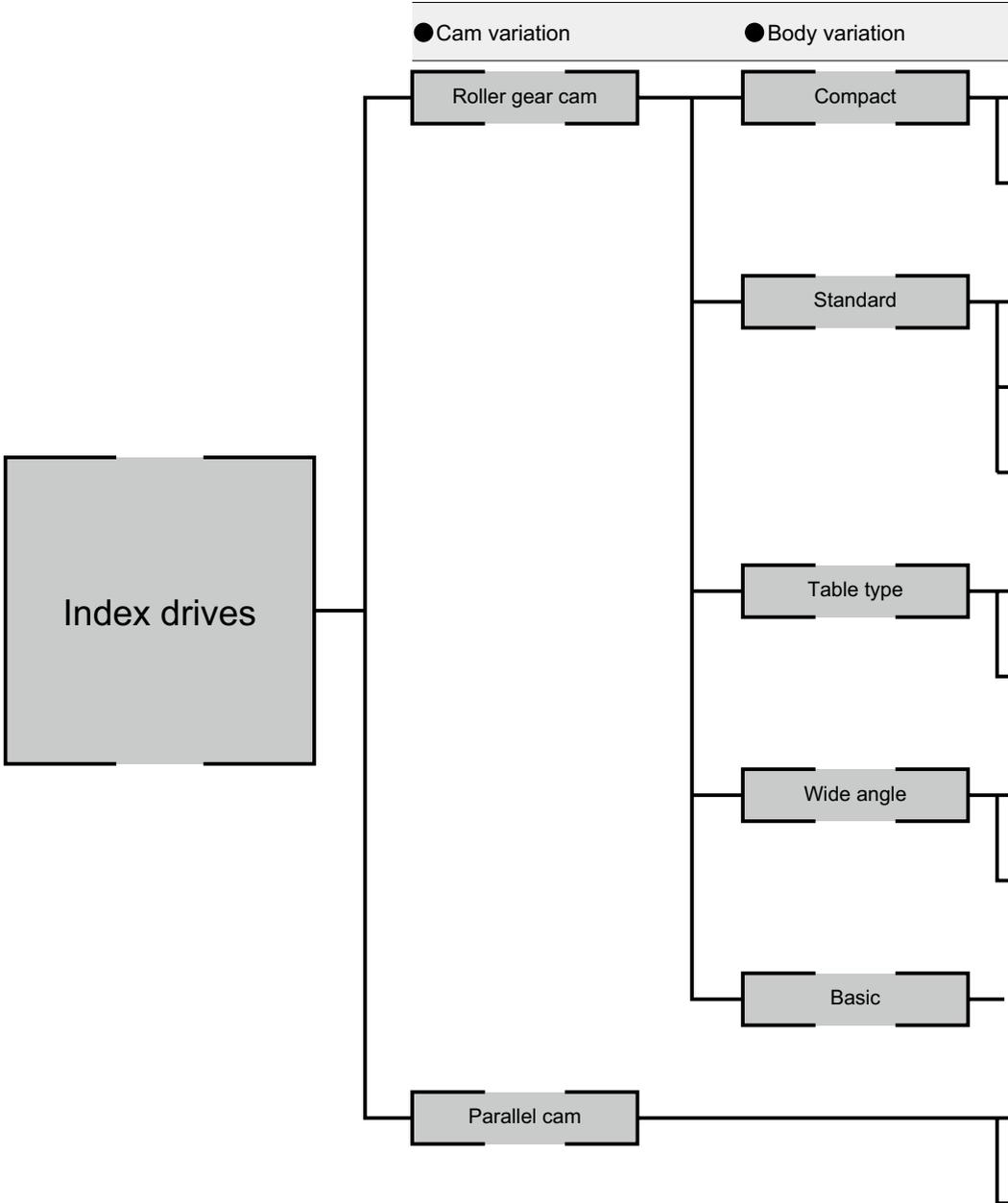


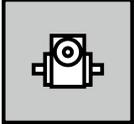
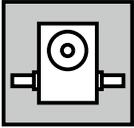
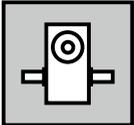
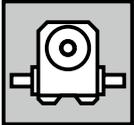
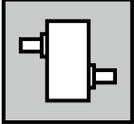
Dedicated terminal



# Product overview

## ● Index drive series variation



		● Cam motion variation	● Model/size	● Shape of the output shaft		
				Straight	Flange	
	Index series	RGIS	025 032			
	Oscillating series	RGOS				
	Index series	RGIS	040 050 063 080 110 140 180 250			
	Oscillating series	RGOS				
	Reducer series	RGCS				
	Index series	RGIT				
	Reducer series	RGCT				
	Index series	RGIL	063 080 110 140 180 250			
	Oscillating series	RGOL				
	Index series	RGIB	250			
	Index series	PCIS	040 050 063 080 100 125 160 200 250			
	Oscillating series	PCOS				

# Product overview

## ● Index drive selection procedure

Models	<p><b>Selection guide</b></p> <ul style="list-style-type: none"> <li>● Index drive series variation ————— A-5</li> <li>● Feature table ————— A-8</li> <li>● Description of each type ————— A-19</li> <li>● Index number and angle combinations ————— A-9</li> </ul>	● Page
Working condition	<p><b>Confirming operating conditions</b></p> <ul style="list-style-type: none"> <li>● Index number ————— B-5</li> <li>● Index angle ————— B-5</li> <li>● Input shaft rotational speed (cycle time) ————— B-6</li> <li>● Cam curve ————— B-11</li> </ul>	
	<p><b>Confirming load conditions</b></p> <ul style="list-style-type: none"> <li>● Weight, dial plate diameter, table support, external load, etc. — C-3</li> </ul>	
Size selection procedure	<p><b>Dynamic rated torque output</b></p> <ul style="list-style-type: none"> <li>● Calculating moment of inertia ————— C-4</li> <li>● Calculating max. angular acceleration ————— C-4</li> <li>● Calculating load torque ————— C-4                             <ul style="list-style-type: none"> <li>● Calculating inertia torque ————— C-4</li> <li>● Calculating frictional torque ————— C-4</li> <li>● Calculating work torque ————— C-5</li> </ul> </li> <li>● Selecting the usage factors ————— C-6</li> <li>● Calculating actual load torque ————— C-6</li> <li>● Size selection ————— C-7                             <ul style="list-style-type: none"> <li>● Checking service life ————— C-7</li> <li>● Checking max. table diameter — C-7</li> </ul> </li> </ul>	
	<p><b>Static rated torque output</b></p> <ul style="list-style-type: none"> <li>● Applied load torque when the input shaft is stopped</li> </ul>	
	<p><b>Checking the characteristics</b></p> <ul style="list-style-type: none"> <li>● Thrust force ————— B-27</li> <li>● Radial force ————— B-27</li> <li>● Bending moment ————— B-28</li> <li>● Accuracy ————— B-29</li> </ul>	
	<p><b>Selecting peripheral devices</b></p> <ul style="list-style-type: none"> <li>● Overload protection unit ————— D-633</li> <li>● Worm reducer ————— C-9</li> <li>● Calculating the motor capacity ————— C-9</li> </ul>	
	<p><b>How to write out the model No.</b></p> <ul style="list-style-type: none"> <li>● Model No. table</li> <li>● Roller gear cam drive                             <ul style="list-style-type: none"> <li>● Compact ————— D-5</li> <li>● Standard ————— D-41</li> <li>● Table type ————— D-275</li> <li>● Wide angle ————— D-353</li> <li>● Basic ————— D-391</li> </ul> </li> <li>● Parallel cam drive ————— D-407</li> </ul>	
Model No.		

Using index drive selection guide service

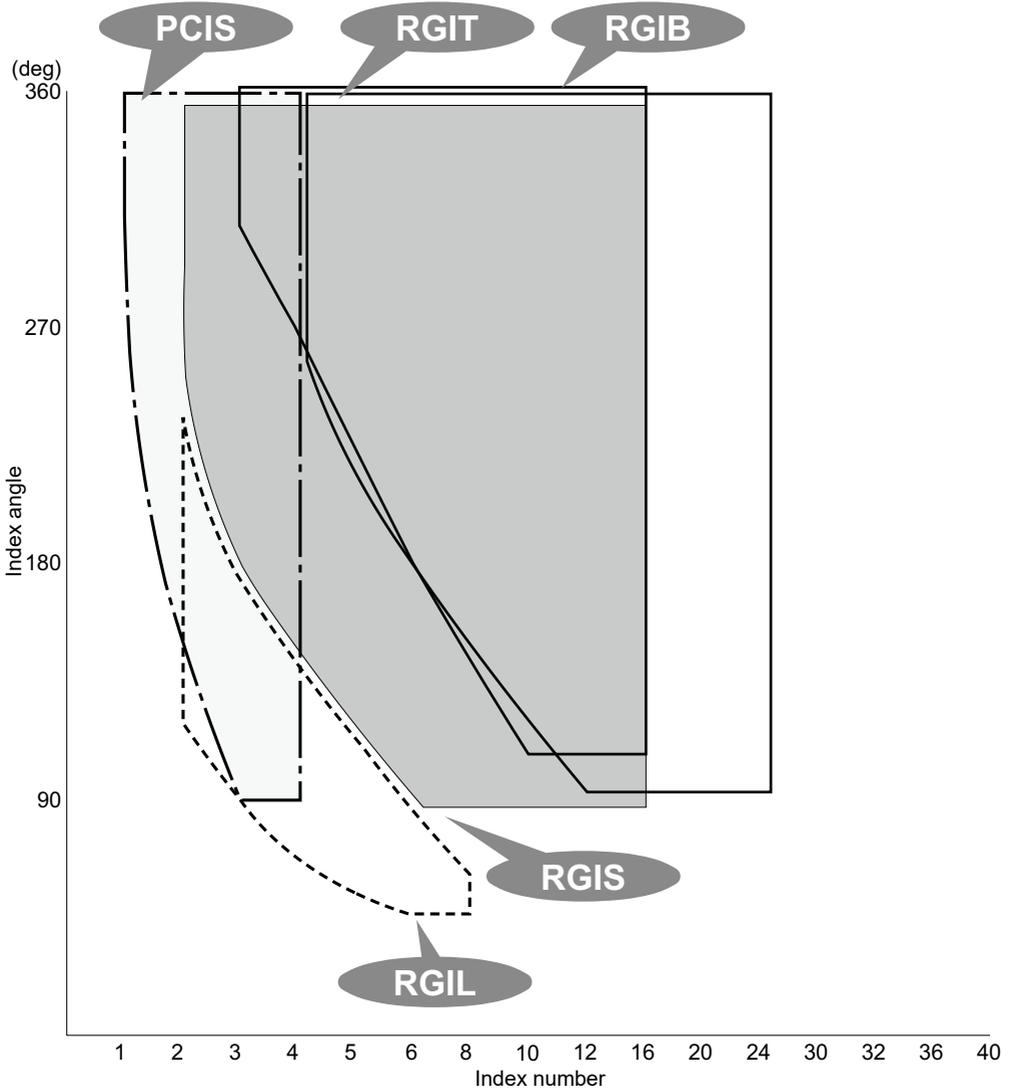
# ● Feature table

Unit	Roller gear cam					Parallel cam
	Compact	Standard	Table	Wide angle	Basic	
Type						
Specifications						
 Table drive						
 Conveyer drive						
 Hollow shaft						
 Wide angle						
 Torque saver						
 Select mounting surface						
 Slim design						
 High speed						
 Motor body						
 Aluminum light weight						
 Oilless						
 Cost (CKD comparison)						
 Delivery schedule (CKD comparison)						

# Product overview

## ● Range of the index number / index angle combinations

Index series single-dwell cam



This shows the range of the index number and index angle combinations of the index drive (single-dwell cam).

Find the most suitable model for the combination of required index number and index angle, and determine the operational conditions for the index drive. For the “index number and index angle,” refer to the “Technical Explanation” section.

● Options

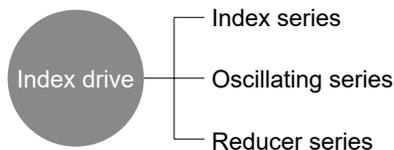
Options	Worm reducer	<b>CRG25/32</b>		
		<b>HO32 to 135</b>		
		<b>TE35 to 150</b>		
	Torque saver	<b>TSF2 to 18</b>		
		<b>TST6 to 11</b>		
		<b>TGX20 to 70</b>		
Others	<b>With geared motor or With switch</b>			

Others			
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# Basic Operation of the Index Drives

## ● Single-dwell cam index / multi-dwell cam index

The basic functions of the index drives are classified into 3 categories: indexer, oscillator and reducer based on its operation. CKD offers all 3 types of index drives with a wide variety of models.




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### Indexing

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The index drive repeats a sequence of motions of rotating the output shaft by certain degrees while the input shaft is continuously rotating at a constant speed. The cam attached to the input shaft has a geometrically defined motion curve. The cam follower on the output shaft converts this curve into the optimal movement.

This mechanism has the following characteristics:

#### 1 Synchronization properties

The rotation of the input shaft is functionally converted into the operation of output shaft. Since the motion is determined in time, it is possible to synchronize this motion with others.

#### 2 Motion characteristics

The smooth curve of the cam allows the output shaft to rotate and stop at high speeds and with high frequency. Speed and acceleration can be controlled with the appropriate motion curve.

#### 3 Repeatability

The index drive repeats a sequence of motions of rotating and stopping the output shaft at the specified degree and speed while the input shaft is continuously rotating at a constant speed. This also enables outstanding accuracy.

Among the index drives using a cam, the roller gear cam, the parallel cam and the barrel cam are very popular.

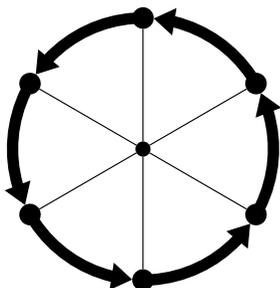
In terms of the mechanism, they are different, but combining "index number," "index angle," and "cam curve," they all can achieve various operations.

\* Note: In this catalog, the term "index" means "precise motion or rotation to a new specified position with the use of cams" with a drive which can achieve this.

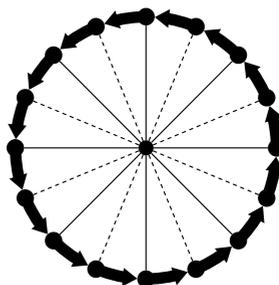
Single-dwell cam index and multi-dwell cam index

For a general index drive, the index angle which corresponds to 1 full 360 degree turn of the input shaft and single dwell angle which corresponds to a dwell interval are set up. This is called a "single-dwell (1 dwell ) cam."

However, when you need multiple index numbers, you can set up multiple index angles and dwell angles. This is called a "multi-dwell cam." Compared to a single-dwell cam, the multi-dwell cam is inferior in accuracy but superior in rigidity. We suggest that you compare and consider type, size and accuracy depending on your application.

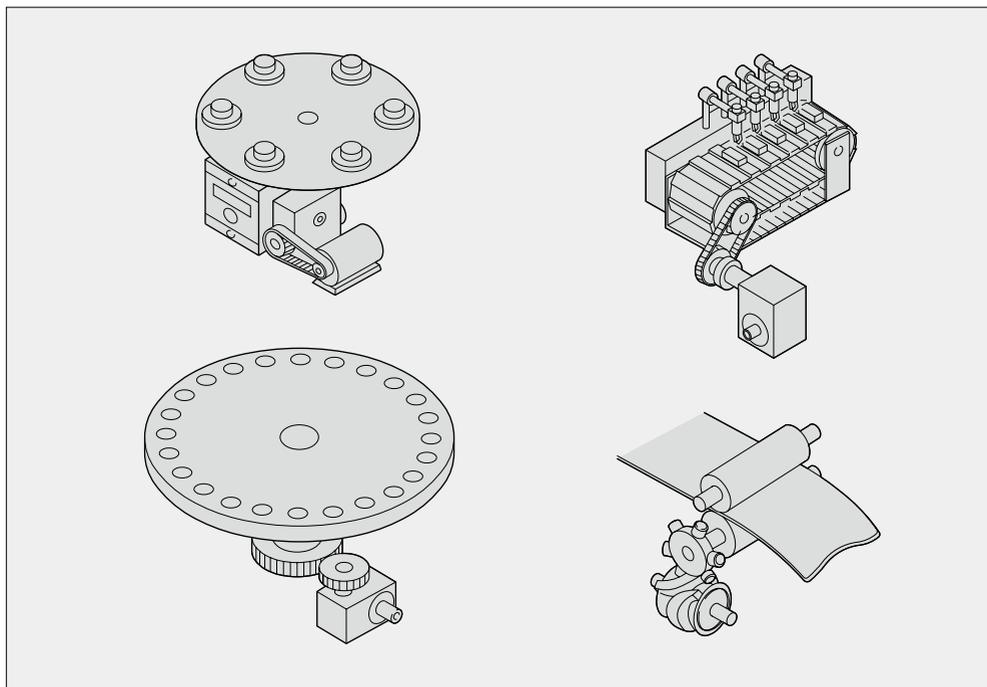


● Single-dwell cam index of 6 divisions



● 2 dwell cam index of 16 divisions

General application of index drive is the drive source for intermittent table, intermittent conveyor and roller used for unidirectional indexing.



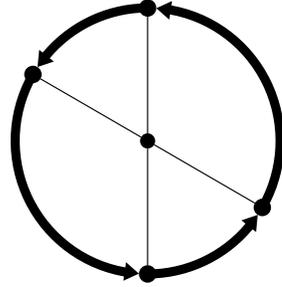
# Basic Operation of the Index Drives

## ● Special index drive / Oscillator

### Special index drive

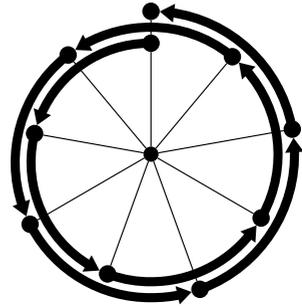
#### (1) Unequal division index

Normally, the index angle of the output shaft is equally divided, but depending on the design conditions, an unequal division index can be manufactured.



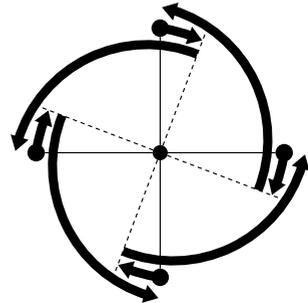
#### (2) Irregularly divided index drive

Normally, the output shaft stops at the same spot for every turn repeatedly. However, when you create an index which turns by 80 degrees (4.5 divisions), the output shaft stops at the same spot not at every turn but every other turn. This can be used as the drive source of a reduction mechanism with gears.



#### (3) Return motion index

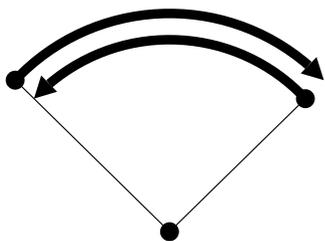
In some cases, you may want to move a workpiece to a certain direction with another unit after it is conveyed to the specified position with an intermittent conveyor. In this case, you have to release the workpiece from the jig pressure. We can create a cam which moves back slightly after moving to a specified position, i.e., a cam that is a combination of index and oscillator, which we'll explain below.



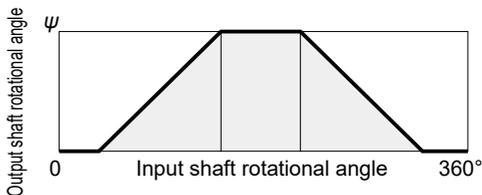
## Oscillator

While the index gives a sequence of motions in 1 direction, the oscillator rotates the output shaft by the specified angle and stops. Then, it goes back to the original position with the input shaft continuously rotating at a constant speed. Within 1 full 360 degree rotation of the input shaft, it sets up the dwell angle, the index angle (forward),

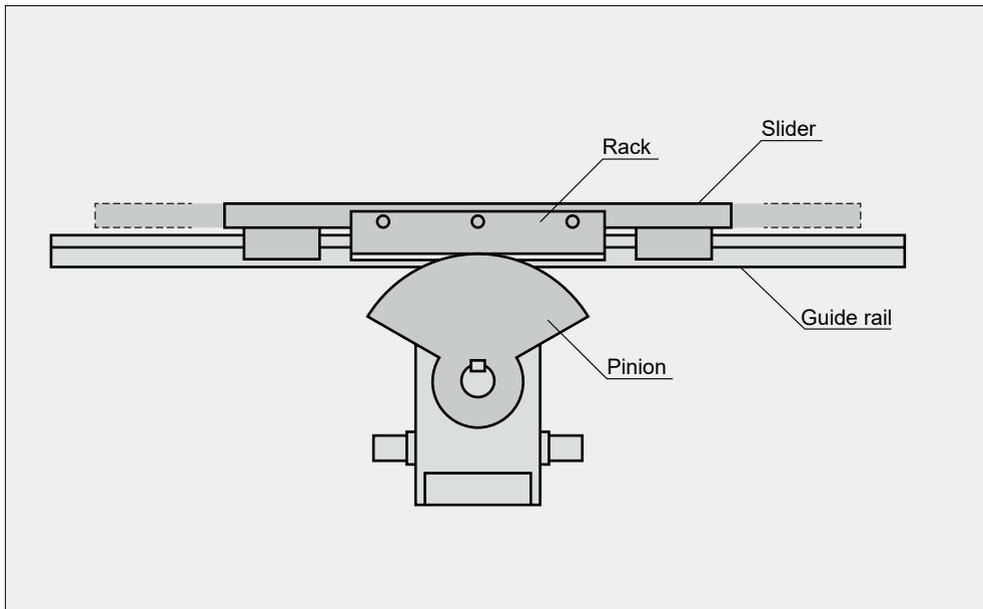
the dwell angle and the index angle (return). Compared with the index of the same size whose output shaft turns only in 1 direction, the oscillating angle of the output shaft and the index angle of the input shaft may be restricted, which requires consideration on timing.



● Timing chart



This can be used for the drive source of the reciprocating motion of a slider, swing arm, pick-and-place, and gripper feed.



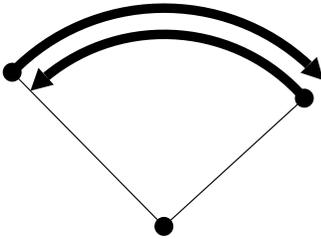
# Basic Operation of the Index Drives

## ● Special oscillator / Reducer / Special reducer

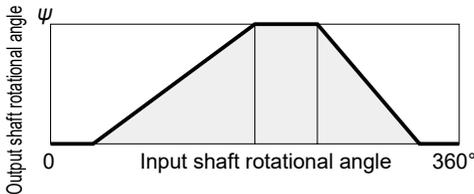
### Special oscillator

#### (1) Oscillator with different reciprocating times

Normally for the oscillator series, the index angle and the dwell angle are the same for either direction. Yet, it is possible to change the dwell time at the end of the oscillator or the movement time for 1 of the reciprocating motions with the input shaft continuously rotating at a constant speed. This means, you can freely set up the ratio of index angle and dwell angle within 360 degrees of the input shaft.

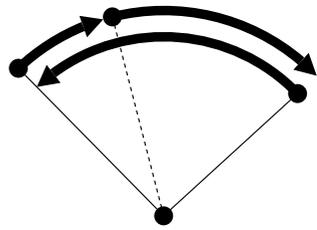


#### ● Timing chart

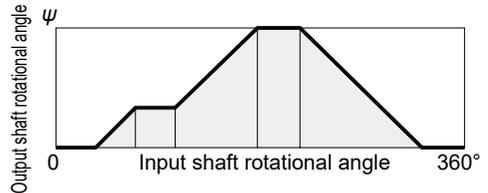


#### (2) Oscillator with 3 or more stop positions

When work is done at the end of the oscillator, there are some cases in which an arm or jig on the output shaft may interfere with another drive direction when it comes to the end of the oscillator. If this happens, you should set up a standby point in addition to the end of the oscillator. That is, a compact dwell angle on the input shaft side should be set up and the drive within that angle stopped until the work is completed. This solution may become critical to set up the standby point for the machine configuration when stopping a cycle, work supply (input) is stopped or when movement is halted at the specified stopping point.



#### ● Timing chart



To manufacture these special oscillators, you should determine the specifications including the rotational direction of the input/output shaft, the relationship between the output shaft keyway and the tap hole, and set up the timing chart.

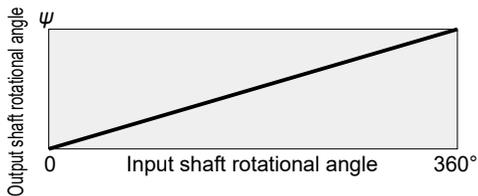
## Reducer

Instead of this solution, in which the dwell angle is set up so that the index stops at a specified point, you can obtain a reduction mechanism of the reduction ratio corresponding to the index number if a constant velocity curve is employed as the cam curve with the dwell angle selected to be zero.

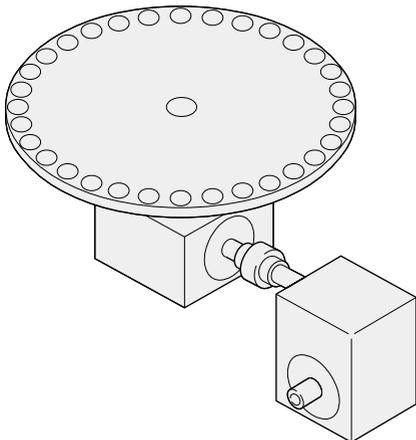
This reducer cam:

- (1) Has compact backlash,
- (2) Changes less over time due to wear and it has higher reduction efficiency because of the rolling contact mechanism, which is beneficial in various applications.

● Timing chart

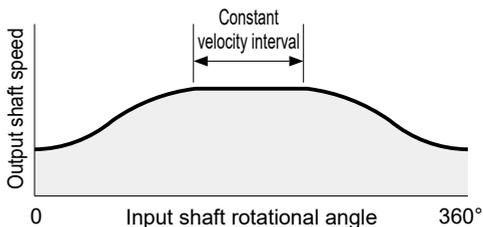
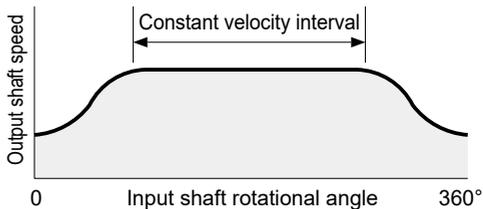
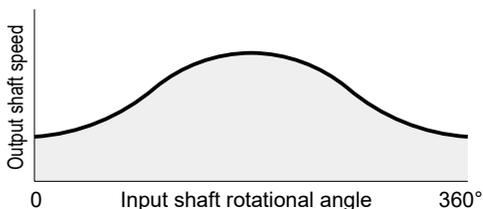


- Applications
- Servo motor reducer
- By combining with an index, multiple indexing can be achieved.
- Precision transmission element between 2 shafts in place of gears.



## Special reducer (surf motion)

A common reducer is a constant speed reduction mechanism, but as a special case, it is possible to cyclically fluctuate the output shaft speed even though the input shaft turns at a constant speed. For instance, with the 1:1 reducer, the output shaft turns 1 full turn at a constant speed when the input shaft turns 1 full turn at a constant speed. For the special reducer, which is called "surf motion," you can freely set up an acceleration range and a deceleration range in addition to a constant speed range within 1 turn of the input shaft. This is similar to the non-circular gear, but the reducer cam is superior because the design flexibility is much higher and the backlash is smaller. In other words, this is a speed conversion unit without vibration and having excellent motion characteristics with a cam curve.



# Features and Applications of the Index Drives

## ● Introduction

### Roller gear cam

This employs a drum-shaped cam called "concave globoidal cam" with the input shaft and the output shaft crossing at a right angle. The cam followers are arranged radially on the turret on the output shaft, and they are driven while the tapered ribs on the cam attached to the input shaft apply preload. Hence, no backlash exists between the cam and the cam followers, and this is considered to be one of the most reliable cam mechanisms.

### ● Main features

#### (1) Index number of 2 to 16 (single-dwell cam)

The cam followers of the roller gear cam drive are arranged radially on the turret on the output shaft. For a single-dwell cam, the common (standard) type has 6 to sixteen cam followers to achieve 2 to sixteen indexes. Since the cam followers are arranged on the turret, the size of the cam followers decreases compact when the index number increases. This may adversely affect the rigidity in some cases. For these cases, other than the issue of accuracy, you can choose a multi-dwell cam in place of a single-dwell cam to improve rigidity.

#### (2) Smooth indexing

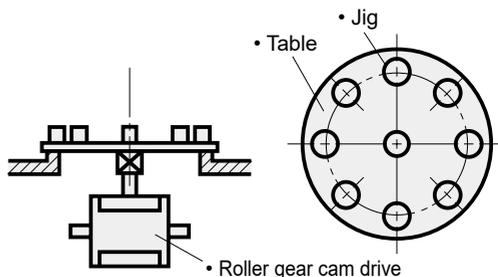
Backlash between the cam and the cam followers is eliminated with preload from the eccentric mechanism of the input shaft. In addition, the cam curve with excellent motion characteristics is adopted as standard to achieve smooth indexing. (Refer to "Cam curve.")

#### (3) High output and rigidity

The cam and the cam followers that are precision ground and heat-treated constant contact against each other at multiple spots to provide excellent transmission efficiency. Compared to the parallel cam, since the pressure angle becomes zero at the dwell interval, residual vibration is less and positioning with high rigidity can be achieved.

#### (4) High speed operation

Preload always exists between the cam and the cam followers that are precision machined, eliminating backlash, and the cam curve with excellent motion characteristics allows high speed operation. Depending on the load conditions, the input shaft can be turned at 1,000 rpm or faster. This type of unit is employed for the feed unit (roller feed and gripper feed) for press materials, for which high speed indexing is a must. We are ready to provide you with separate data so that the optimum model can be selected depending on expected service life, load and operating conditions.



### ● Applications

- Driving source of index tables with large inertia.
- Intermittent conveyor
- Roller feed and gripper feed (press material feed)
- Oscillator and reciprocating linear motion using the oscillation cam
- Smooth transfer positioning using the cam curve (filling machine and packaging machine)

## Parallel cam

The parallel cam is a type of conjugate cam. Both the input shaft and the output axis are parallel in the drive. Two plate cams are arranged on the input shaft. The cam followers are alternately placed on either side of the turret, which is a 1-piece construction with the output shaft. One of the parallel cams pushes up the cam follower in the rising process while the other cam turns the output shaft with the cam follower in the falling process to reach a dwell interval, and this motion is repeated.

In the same manner as the roller gear cam, the eccentric mechanism of the input shaft generates preload between the cam and the cam follower during operation. Hence, backlash does not exist, and motion characteristics of the continuous cam curve are achieved. For a mechanical reason, the parallel cam system will go into a restraining condition with the pressure angle slightly higher because there are 2 cams, while the pressure angle at the dwell interval for the roller gear cam system is zero. Hence, residual vibration tends to occur due to the rigidity of the driving system if the load has significant moment of inertia. This system is considered to be more suitable for the conveyor drive, whose frictional load is relatively greater compared with the table drive, whose moment of inertia is significant.

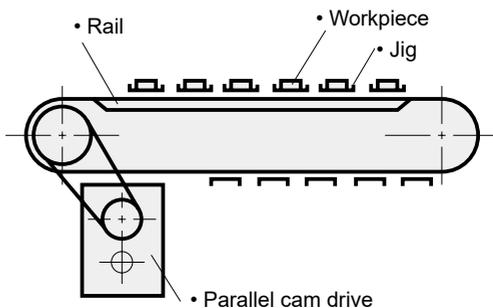
### ● Main features

#### (1) Parallel input and output axes

Since the input and output axes are arranged in parallel, the driving system configuration can be different from that of the roller gear cam system (crossing at the right angle). For the parallel cam system, it is easy to intermittently drive the output shaft parallel to the drive shaft (counter shaft). Combinations of rotating directions of the input and the output shafts are the same as those for a spur gear system or Geneva drive.

#### (2) 1 to 4 division index number

From the practical perspective, the parallel cam system is most suitable for a compact index number such as 1, 2, 3, or 4. Since a compact index angle is effectively employed compared to the roller gear cam system, these systems are helpful to add flexibility in terms of timing to the machine design as the supplementary unit for the roller gear cam system. For the 1 to 4 division index number, a single-dwell cam, which has 1 index angle and single dwell angle, is used. On the contrary, for the index number of 6 to 8, a 2 dwell cam, which has 2 of each in symmetrical layout for 1 rotation of the input shaft, is used.



### ● Applications

- Intermittent conveyor
- Intermittent drive source using parallel shaft
- Roller feed
- Oscillator and reciprocating linear motion using the oscillation cam
- Smooth transfer positioning using the cam curve (filling machine and packaging machine)

# Features and Applications of the Index Drives

## ● Roller gear cam

### Compact

- RGIS 025/032
- RGOS 025/032

These 2 compact models are suitable for compact equipment. These types are most suitable to provide the drive source for indexing compact precision parts and transporting operation.

#### 1. High speed rotation

As miniature cam followers with needle bearing are used, this achieves smooth and high speed driving.

#### 2. Two miniature models

Two miniature models with the shaft interval of 25 mm and 23 mm are offered.

#### 3. Large flexibility of index angle

Compared to the standard, this type is easier to synchronize with other devices since a wide index angle is permitted for a wide angle swivel.

#### 4. Lightweight and clean environment compatible

The housing is made of aluminum, and grease is used for lubrication. This type is capable to be used in a clean environment as no other lubrication is required.

#### 5. Option

A miniature worm reducer, geared motor and torque saver can be installed.



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## Standard

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- RGIS 040 to 250
- RGOS 040 to 250
- RGCS 040 to 250

This type is widely used for general purposes. You can select either the flange shaft or the straight shaft depending on the connection of the application such as the table, the sprocket, the gear and the shaft.

### 1. Wider variations in size

Covering the shaft interval of 40 to 250 mm with the standard products, these can be used in a wide range of applications from transporting compact parts such as electronic parts and ICs to large parts for automotive industry.

### 2. High output

The cams and the cam followers are precision-ground and heat-treated so that they are capable of handling high power relative to their housing size.

### 3. Mounting face

The housing has mounting holes machined on all 6 faces as standard.

### 4. Aluminum light weight available

For those with the shaft interval of 40, 50, 63 and 80 mm, aluminum housing is available. This helps keep the drive system light.

### 5. High speed rotation

The cam, the cam follower and the turret are all precision machined to achieve optimum balance. Among the index drive series, this type is most suitable for high speed operation.

### 6. Options

Various options including a torque saver, the reducer, the clutch/brake and the motor are available, reducing the steps in designing and assembling the drive system.



# Features and Applications of the Index Drives

## ● Roller gear cam

### Table type

- RGIT 063 to 250
- RGCT 063 to 250

This type features a hollow fixed shaft inside the rotating output shaft (flange). Piping, wiring and/or a drive shaft can be put to the hollow shaft.

### 1. Making the unit compact

The entire system can be designed to be compact as an attachment can be mounted inside the rotating table.

### 2. Index number of 4 to 24 (single-dwell cam)

Compared to the standard, the turret diameter of the output shaft is large allowing a larger index number.

### 3. High rigidity and high precision

The table mounting face is large and the rotating flatness accuracy is high, which makes this suitable for table drive.

### 4. Wider variations in size

Eight models with the shaft interval of 63 to 250 mm are available as standard. You can choose the optimum size depending on the load.

### 5. Installation position

The position #1 is the standard installation. Those with the shaft interval of 63 to 110 mm may be installed differently if requested.

### 6. Options

Various options including a torque saver, reducer, clutch/brake and motor are available.



### Wide angle

- RGIL 063 to 250
- RGOL 063 to 250

Compared to the standard roller gear cam drive, the cam diameter is designed to be large. For instance, for the case of wide angle indexing such as when the index number is 2, the index angle required for the standard is 270 degrees while it is just 120 degrees for the wide angle. Hence, the restrictions on timing for the continuous operation are reduced, and by directly driving the unit without any mechanism to increase speed such as gears and pulleys, accurate transport positioning becomes possible.

### 1. Wide angle indexing

As the index angle can be made compact for wide angle indexing and oscillator, the dwell time can be longer in the cycle time.

When the oscillator cam is employed, the dwell time at the end of oscillator can be made quite long, which is most convenient for continuous operation.

### 2. Wider variations in size

Six models with a shaft interval of 63 to 250 mm are available as standard.

### 3. Mounting face

The housing has mounting holes machined on all 6 faces as standard.

### 4. Options

Various options including a torque saver, the reducer, the clutch/brake and motor are available.



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## Basic

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### ● RGIB 250

#### 1. Basic is added to index drive series

Inheriting the advantages of our table type RGIT series (with a fixed hollow shaft), the cost performance is improved with a new design while maintaining its basic performance.

#### 2. Space saving

Coupled with the thin design of the index drive and the compact hollow shaft geared motor, the entire system became shorter and with a smaller footprint.

#### 3. Integrated design of the driving system

Providing optional integrated design of the driving system with the geared motor, the customer's tasks of designing, procuring, assembling and adjusting are eliminated.

#### 4. Maintenance free

Clutch/Brake are eliminated due to the inverter control. This is a true maintenance free system.



# Features and Applications of the Index Drives

## ● Parallel cam

### Parallel cam drive

- PCIS 040 to 250
- PCOS 040 to 250

As the input and output shafts are arranged in parallel, the driving system impossible with a roller gear cam drive or a barrel cam drive is possible. This drive is suitable for a relatively compact index number such as 1, 2, 3, or 4. This is most suitable for long pitch feed drive of a conveyor or a roller feed.

By adding an oscillator cam to the index cam, the automatic drive can be enhanced without plate cams and levers which require time consuming design stages.

#### 1. 1 to 4 division index number

The index angle required for wide angle index such as 1, 2, 3, or 4 indexes, can be compact compared to the roller gear cam drive (standard).

#### 2. Oscillator

The oscillator cam with the oscillating angle of up to 45 degrees can be manufactured.

#### 3. Mounting face

The housing has mounting holes machined on all 6 faces as standard. Any of the 6 installation orientations is possible.

#### 4. Wider variations in size

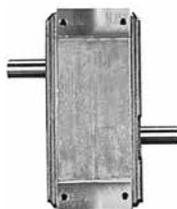
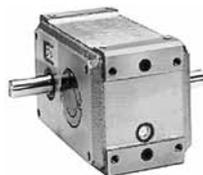
9 models with the shaft interval of 40 to 250 mm are available as standard. You can choose the optimum size depending on the load.

#### 5. Repeatability

The cam followers on the output side continuously receive sufficient preload resulting in no backlash between the cam and the cam followers. This system achieves high repeatability and smooth operation.

#### 6. Options

Various options including a torque saver, the reducer, the clutch/brake and the motor are available. This helps reduce the steps in designing and assembling the drive system.





# Options

In order to make most of the features of the index drive, the functionality of the peripheral devices are critical.

CKD provides various options including reducers, clutches/brakes, torque saver and torque guard so that customers can make the most of index drive's performance.

## CAUTION

To mount optional components, the exterior specification of the index drive may be changed. When you add or change an option due to maintenance or specification change, be sure to check the specifications of the index drive.

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## Worm reducer

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- CRG 25/32
- HO 32 to 135
- TE 35 to 150

This is a dedicated reducer for the index drive. By mounting this directly on the housing, you will get a compact drive system.

To make most of the distinctive features of the index drive, it is extremely important to eliminate factors which cause deflection and backlash not only from the reducer of the drive system but also from various connections and linkages as much as possible.

The dedicated reducer solves this problem by connecting directly to the index drive.

For the worm reducer, you can choose 1 either with clutch/brake or without from HO32 to 135 or a high-torque version from TE35 to 150.

CRG25/32 are also available as the dedicated compact reducers for RGIS025/032.

These reducers are capable of ensuring maximum performance of the index drive. This helps reduce the steps in designing and assembling the drive system.



HO Series



TE Series

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## Overload protection unit for the output shaft

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### ● Torque saver TSF 2 to 18

This dedicated safety unit protects index drive from overload by being mounted on its output shaft.

### ● Torque saver for the table TST 6 to 11

This is a dedicated safety unit to be mounted on the output shaft of the table type index drive to protect it from overload.

### ● Torque saver for coupling TGX 20 to 70

This is a dedicated safety unit with a coupling function that absorbs misalignment caused by errors in angularity, parallelism and axial deflection, protecting the index drive from overload.

#### 1. Accurate release

This works accurately with less variation in the set torque.

#### 2. Small backlash

To maximize the index accuracy of the index drive, backlash is minimized, and the journal has high rigidity in both radial and thrust directions.

#### 3. One-point setting

Not only the positioning accuracy but also the synchronized characteristics with other devices may become an issue on the output shaft of the index drive. This torque saver has the function to restore at a single point for each rotation of the output shaft. The restore accuracy after release can be maintained for an extended period of time.

#### 4. Overload detection

By combining this with a proximity switch, when a torque saver is released due to overload, the detection signal to stop the driving and other devices can be taken out.

#### 5. Release torque adjustment

The release torque is infinitely adjustable. The construction is uniquely designed to maintain the set torque for an extended period of time. This is mounted on the output shaft of the index drive with a tapered ring at our factory. There is no need to prepare connectors or to make installation adjustment. This helps you keep the accuracy of the unit (with the straight output shaft) to extend its service life. (TST is fixed with bolts)



TSF Series



TST Series



TGX Series

# Options

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## With a geared motor

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This transmits power of a standard compact geared motor to index drive to gears and belt. This can be used as drive source for compact index drive (RGIS 025, 032, 040, 050, 063). Its compactness allows space-saving design of the system.

For some of these, the driving method can be chosen from 3 types: gear drive, longitudinal belt drive and lateral belt drive. You can choose any of the "induction," "reversible," "brake-equipped," and "clutch/brake-equipped," motors.




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## RGIS/RGIT series driving system option Hollow shaft geared motor

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### 1. Environmentally Friendly

By eliminating clutch/brake and adopting an inverter for starting/stopping, consumable parts are eliminated. Power consumption is reduced with the improved efficiency of the motor reducer mechanism.

### 2. Maintenance free

With an inverter adopted for starting/stopping, servicing the clutch/brake parts becomes unnecessary.

### 3. Low cost

The hollow shaft geared motor with excellent cost performance achieves low cost.

### 4. Mechatronics design

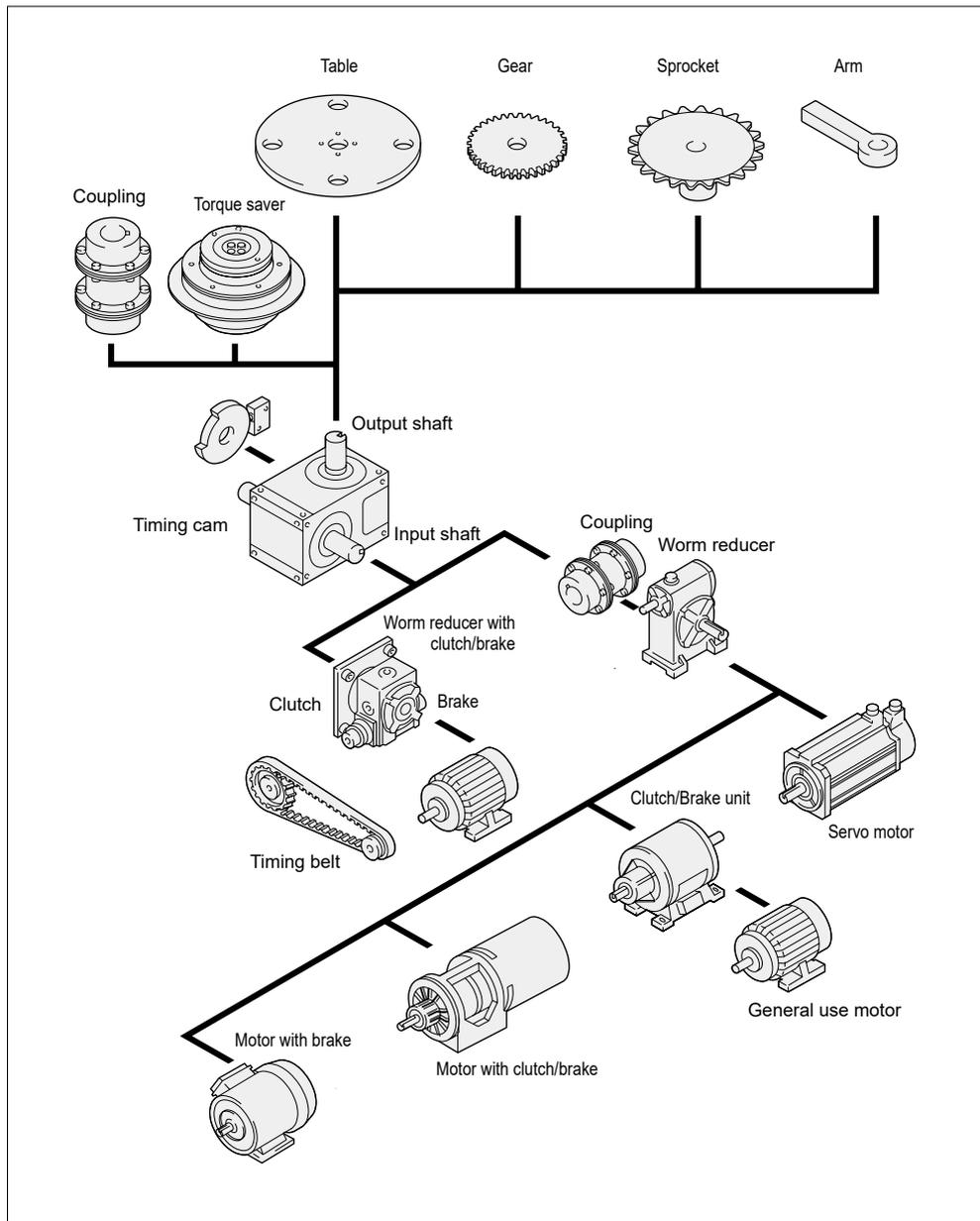
We propose a unit with integrated drive system compatible with DD motor.





# Index Drives and Peripheral Devices

Example of a drive system



## ● Index drive output side

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### Overload protection unit (torque saver)

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For an overload protection unit of the index drive, choose the 1 with min. backlash.

Note also that it should be able to go back to the original position accurately after release. We recommend using our torque saver.

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### Coupling

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Choose the one with min. backlash and high torsional rigidity. You should also remember that the moment of inertia should be compact considering the load of the index drive.

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### Table

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- Fasten the table, flange, arm, etc. in the manner which has no backlash. It is very effective if you could use set bolts, clamping slots, tapered rings, etc., in combination.
- We recommend employing positioning pins in case you remove the table for maintenance.
- Excessive torque may apply while the table or jig is being installed. The allowable rated static output torque of the index drive should be checked to prevent any overload.

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### Gear

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High rigidity mounting is critical just like the table. Backlash between gears and positioning accuracy may affect the service life of the system. Unless the gear system is not hindered, minimize backlash as much as possible. The system is superior in terms of torque and accuracy when the driven speed of the index drive is reduced. We recommend a design where the output drive system and the index drive models are taken into consideration.

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### Sprocket

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Minimize backlash employing a rigid chain tensioner or sprocket center adjusting mechanism which have no cushioning function. Due to the polygonal motion of the chain link, the cam curve may be disturbed.

To minimize this, you should choose a sprocket with a large number of teeth or of a compact chain pitch as long as this does not have an adverse effect on transmission capacity.

# Index Drives and Peripheral Devices

## ● Index drive input side

### Coupling

The index drive ensures the motion characteristics defined by the cam curve only when the input shaft turns at a constant speed. If a fluctuation in rotation occurs due to the coupling, the continuous curve of the cam curve may be disturbed. Choose the one with min. backlash and high rigidity for a coupling whose output shaft rotates at a constant speed.

### Chain

In the same manner as the output shaft, take measures to minimize backlash. Reversed load is applied to the input shaft of index drive periodically. If the rotation fluctuates due to backlash, overload may occur to the index drive. It is very important to eliminate any factors which may cause uneven rotation because of backlash and chain link to maximize the characteristics of the cam curve.

### Timing belt

Generally, a timing belt is used between the reducer and the motor. Minimize pulsation with optimum tension. When a timing belt is used between the input shaft of index drive and the reducer, the following should be checked:

- Is the tension correct?
- Are the rigidity and transmission capacity sufficient?
- Is servicing possible if it gets broken?

The timing belt has the following advantages compared to the chain:

- Less rotational fluctuation as links are not used.
- Min. backlash.
- Min. stretching by long-term use.
- Oilless.

Hence, a timing belt is suitable for driving a relatively compact index drive.

### Reducer

We recommend a worm reducer for driving index drives. Since the output shaft of index drive repeats the turning and stopping frequently, the input shaft receives periodic load in the forward and reverse directions. Hence, the greater the backlash of the reducer, the greater the rotation fluctuation, which generates acceleration greater than the theoretical acceleration defined by the cam curve on the output shaft. The inertia load of the output side is represented with:

Moment of inertia  $\times$  angular acceleration  
Hence, the greater the angular acceleration, the greater the moment of inertia. This increases load fluctuation on the input side and increases backlash in the transmission mechanism leading to a vicious circle. Thus, the following features are required of a reducer:

- Min. backlash
- Self-locking feature
- High rigidity
- Simple connection eliminating backlash factors such as coupling, gear and belt, as much as possible

To satisfy the above requirements, we recommend a worm reducer to drive index drive. If a reducer other than a worm reducer is used, you should choose the size with extra capacity, considering acceleration fluctuation and overload due to rotational fluctuation.

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## Clutch/Brake

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Generally, the clutch/brake is used to stop the input shaft of the index drive for every cycle of an intermittent operation. In this case, starting and stopping with clutch/brake should be conducted within the dwell angle of the input shaft of the index drive. Hence, the moment of inertia and the load which apply to the output shaft of the index drive can be ignored, and the clutch/brake directly connected to the worm shaft is most suitable. In addition, when the clutch/brake is attached to the motor, the moment of inertia of elements such as the timing belt and the pulleys should be taken into consideration. In addition, the frequency of starting and stopping (generally, this is assumed to be 15 times per minute or less), the expected service life and the ambient environment should be also taken into consideration.

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## Brake motor

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The brake motor allows 5 stops per minute while the clutch/brake allows 15 stops per minute or less. However, depending on the model, this may vary. Please refer to the manufacturers' catalog.

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## Servo motor

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If the stopping/starting frequency would exceed the limit for the clutch/brake or when you have to switch the rotational direction often, think about using a servo motor. You should take the reducer, the reduction ratio and the motor characteristics into consideration to choose an optimum model.

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## Motor

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When you choose a general use motor, take the following into consideration.

- Index drive output load
- Frictional load inside the reducer
- Change in viscosity of the lubricating oil due to temperature change
- Efficiency of the reduction mechanism
- Backlash generated in the driving system
- Load from devices other than the index drive

Unless any special restriction exists, we recommend an electric motor. The speed of motors driven by fluids such as air or hydraulics are difficult to control, and it is thought that the environment may cause fluctuations on the load and speed.

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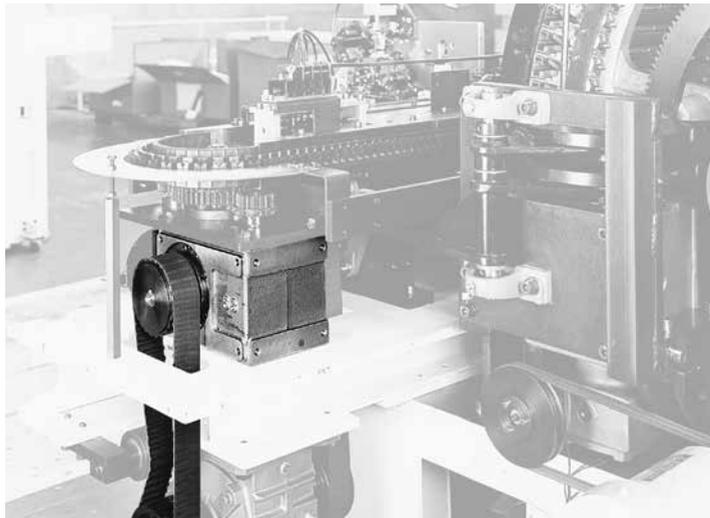
## Detection cam switch

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When the index drive is to be stopped intermittently, the input shaft of the index drive should be accurately stopped within the dwell interval. If it is stopped within the indexing section, the positioning of the output shaft will not be accurate and excessive load will be applied to the cam and cam followers.

# Usage example

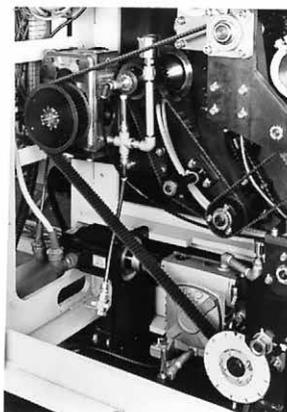
● Assembling machine



● Machine tool

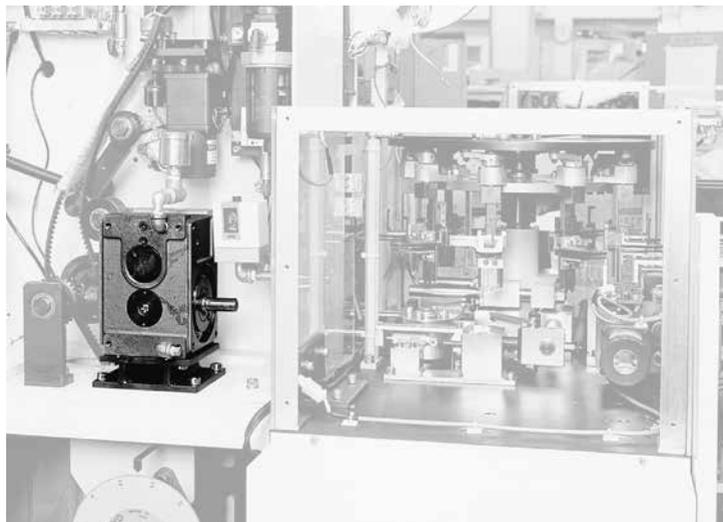


● Packaging machine



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● Packaging machine

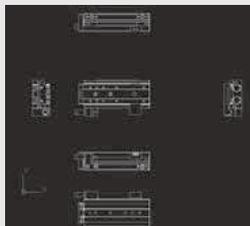


# Guide to CKD's CAD data

## How to use CKD's CAD data

CKD's CAD data is provided as follows for your use in CAD design.

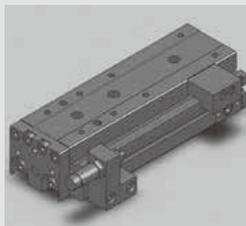
### 2D CAD data



Types of compatible CAD

- DXF
- Dedicated CAD types

### 3D CAD data



Types of compatible CAD

- DXF
- IGES
- SAT
- Palasolid
- Dedicated CAD types

## Homepage

Catalog PDFs and CAD data of CKD products are available for download.



<https://www.ckd.co.jp/en/>

For PDF and DXF data of the general catalogs

**CKD Website**  
Product/Support→ Component Products

>

**Materials: Download digital catalogs/catalog PDFs**

For PDF and DXF data of new products

**CKD Website**  
Product/Support→ Component Products

>

**Search for a product from the product list**

For 2D/3D CAD data

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**Materials: Download 2D CAD data/3D CAD data**

# Guide to the model selection system

## How to use the model selection system

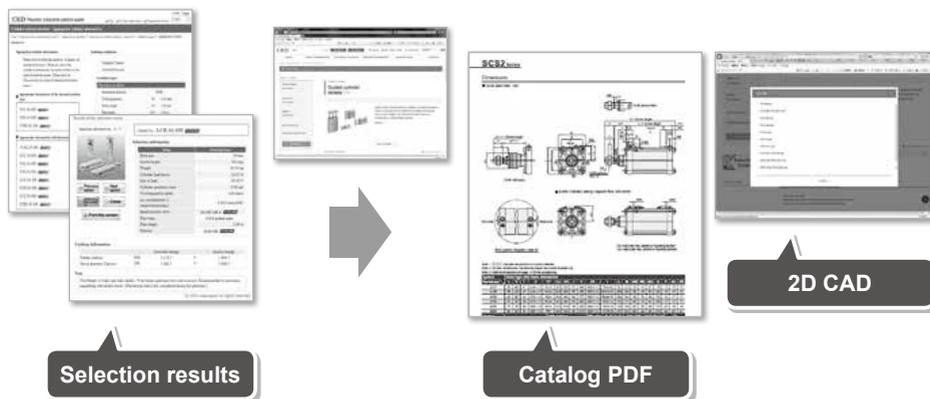
Published on the website

This is a system for selecting products according to the customer's application and working conditions.



\* Software may not be downloadable depending on your security policy.

## Selection results are linked with catalog PDFs and CAD data!



## Registration not required - available at any time!

A variety of services such as CKD product catalogs, PDFs, CAD data, and model selection are available.

Feel free to try them.

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