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The editors of Design World explain basic linear-bearing terminology and detail the most common linear-bearing types.



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What is a rotary indexing table?

FEBRUARY 16, 2018 BY [MILES BUDIMIR](#) — [LEAVE A COMMENT](#)



Rotary indexing is a process where repeated angular displacement during a machine cycle is followed by motionless dwell. A rotary indexing table is specifically designed to make

repetitive moves around a platform. Essentially, they are highly precise work-positioning devices that index parts to be worked or machined in multiple operations.

A rotary indexing table is an integrated motion system. They typically consist of motors and mechanical power transmission devices along with encoders, sensors and controllers. Tables use electric motors for either cam drives or servo tables. Mechanical cam indexers are relatively low cost and only index to set angles, but are capable of precision moves.

Important parameters for rotary indexing tables include the needed resolution of the application (or the smallest increment to move or measure), the required repeatability and accuracy, and other mechanical parameters such as acceptable levels of backlash or hysteresis. Another key parameter is the loading including torque, axial, radial, and moment loads. These can impact the type and size of the indexer used in a given application.

A rotary indexing table can be used in many applications including manufacturing, inspection, and assembly tasks. For instance, assembly, machining, and bottling machines all use indexers. Usually, they take one piece around to work areas or move arrays of relatively small parts around stations for sequential machining or assembly tasks.



The PRD ring drive system from Nexen is a high-resolution indexing system. It features precision to ± 11 arc-sec, repeatability to ± 1.2 arc-sec, and can handle loads up to 1,575 kN and speeds to 94 rpm.

You may also like:



Drives aide in baggage handling system upgrade



Nexen introduces ring drive with built-in brake, zero backlash



Sizing and selecting servos: The need for a system approach



Direct-drive (DDR) rotary servo tables from IntelLiDrives have tighter resolution



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Rotary Indexing Tables Search Form

Search manufacturer catalogs by these specifications:

Minimum Indexing Increment:

[Less than 0.0003 degrees](#)

Work Table Diameter:

[Less than 6 inch](#)

Thru Hole Diameter:

[Less than 1 inch](#)

Maximum Axial load:

[Less than 110 lbs](#)

Maximum Radial Load:

[Less than 30 lbs](#)

Mounting Capability:

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[Vertical](#)

[Inverted](#)

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[More Specifications >>](#)

Rotary Indexing Tables Information

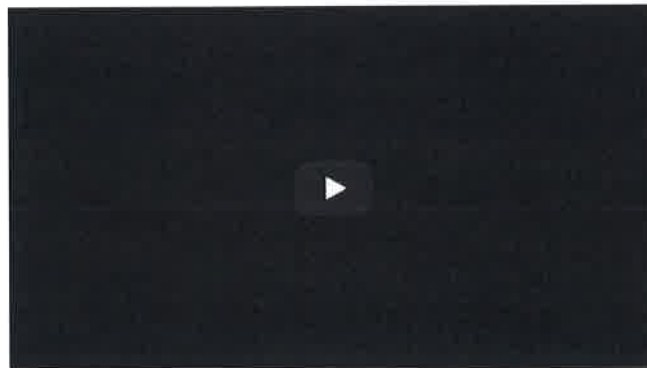
[Show all Rotary Indexing Tables Manufacturers](#)

Rotary indexing tables are machine tool positioning devices used to index parts in defined, angular increments so that they can be machined or assembled. During operation, the table indexes around a central axis, stops at a predetermined location, dwells in that position while an operation is performed, and then indexes to the next position.

A typical rotary indexing table may consist of a circular steel plate, one or more spindles, a drive system, encoders, sensors, controllers, and slots or mounting holes used to hold components in place. Rotary Indexing tables have either fixed or adjustable indexing angles. During each revolution, the table stops for a specified period of time so that an operation can be performed at each station. The bearings that support rotary indexing tables determine both the load capacity and accuracy. Angular contact bearings are more expensive than recirculating ball bearings, but provide better load capacity and axial stiffness. Cross-roller bearings are also commonly available.



Rotary indexing tables are powered by pneumatic and electric motors, hydraulic drives, and manual actuation. Drive mechanisms can be located above, below, behind, or to the side of the table surface. Pneumatic rotary indexing tables are suitable for small and medium loads. They are powered by one or more pneumatic cylinders, each of which represents an index. During the return stroke, a pawl locks the table in place. With some devices, the pawl can be adjusted to change the number of indexes. Electrically-powered tables are generally faster than pneumatic devices and can handle heavier loads. Tables that are powered by hydraulic drives use a pressurized fluid that transfers rotational kinetic energy. Manually-actuated rotary indexing tables often include a hand crank or are loosened, turned, and adjusted by hand.



Design World — "What is a Rotary Index Table?"

Specifications

Selecting rotary indexing tables requires an analysis of specifications and features.

Specifications include:

- maximum indexing increment
- work table diameter
- maximum axial load
- maximum radial load

Features

A variety of features are available. Some table surfaces can be raised or lowered at a controlled angle. Others have more than one rotating work surface. Computer numerically controlled (CNC) devices provide greater accuracy and repeatability. Rotary encoders are often used to relay the position of the table surface. Both four-axis tables and five-axis tables provide variable X, Y, and Z axis motion. Four-axis tables also provide part rotation along the X axis. Five-axis tables provide part rotation along both the X axis and the Y axis.

Applications

Applications for rotary indexing tables include assembly and equipment positioning, as well as various automation, inspection, and machining applications. Most devices work well with machines that perform fast and simple vertical operations. Examples include industrial presses, screwdrivers, riveters, dispensers, pick-and-place units, and ultrasonic or resistance welders. Parts can be loaded and unloaded manually or automatically.

Related Information

[Engineering360—Rotary Union Design Factors and Sealing Technologies for Machining Center Applications](#)

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Engineering 360 Products & Services

Rotary tables are used to position items so that they can be machined, worked, or assembled.

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Horizontal Index Tables

We offer precision horizontal rotary indexing tables for both manual and automated manufacturing processes.

CNC Index Tables

The HHI Series horizontal CNC index table from TJR Precision Technology employs a hydraulic braking system and is designed to be incorporated into a machine's CNC control or operated with TJR's SAC (Single Axis Controller).

Manual Index Tables

The GCT series from Ganro Industrial Corp. is clamped and unclamped pneumatically or hydraulically. Once unclamped the GCT series is manually indexed to the desired degree and securely clamped into position.

CNC Index Table (HHI Series)

[Specifications](#)

Manual Index Table (GCT Series)

[Specifications](#)

More About Index Rotary Tables

CNC machining, or computer numerical control, refers to machines that are used for milling work. This industrial process, created to operate without the need for human supervision, allowing companies to create parts with accuracy and little down time.

The machine receives coded instructions, sent by a computer for precision fabrication. Whereas old CNC machines received code through wired controllers, newer models operate computer software. Communication between the devices works via CD, USB drive or even over a shared network.

There are actually several kinds of CNC machines that work with the almost limitless number of different parts that might be needed. These milling machines, machining centers and lathes work most effectively with accessories that maximize their capabilities and efficiency. One of the most effective of these is the Ganro Industrial Corp.'s index rotary tables, available through CNC Indexing & Feeding Technologies.

How does an index rotary table work?

Let's start with the parts of an index rotary table. Among these parts is an indexing head. This spiral head is a specially made tool that allows a workpiece to be indexed in a circular fashion. Indexing means that the piece can be easily rotated to a specific angle. Indexing heads can be placed on milling machine tables, as well as other CNC machining devices.

What's the difference between a rotary head and a rotary table? The rotary table is made to tilt, and to rotate. This ability lets the piece positive-lock at finer

gradations of rotation. It is held the same way as the indexing head, even though the function is slightly different. Tables use an indexing head to better cut and shape to perfection, using pre-set angles, circles or dividers.

The rotary table's contribution to metalworking is in the fact that it lets the operate drill or cut a piece around a fixed axis. In addition, it can be fitted with plates that provide divisions that cannot work with regular indexing plates.

What is the difference between a manual and CNC index rotary table?

First, understand that CNC rotary tables are a type of automated rotary tables. The difference comes in the manually controlled rotary tables that operate via lever or a hand wheel.

What makes these CNC rotary tables automatic is the fact that commands are being programmed into the machine via Computer Numerical Control. Some machines are controlled by computer-aided design programs, and this also increases efficiency. The indexing heads are also available in manual or automatic function.

Index rotary tables allow for more precise and elegant work, whereas CNC controlled systems specialize in faster and more efficient production.

What are common uses of indexing rotary tables?

The primary use of an index rotary table is to make arcs and circles in part fabrication. Many workpieces must be rotated at a precise angle or division and in between operations.

This machine tool accessory adds extra capability to your equipment, since you can now make straight cuts at multiple angles, cut small circles or arcs into a piece, bore holes, perform spot facing, cut gears, cut holes in a part without having to change machines or a drill bit, cut curves into a piece, or precisely drill holes onto a very small part of the piece.

Important parts to remember include a dividing head and an index plate, since these can help to make the tables rotate in precise and controlled measurements. The tables can also be mounted in a few ways, whether horizontally or flat, or even used with tail stock to help work in between narrow centers.

Another advantage is that index tables can hold round parts for better milling accuracy. However, for this capacity, you must also use a three jaw chuck. They can also be mounted on a tilt table. This lets you mill even if you need compound angles or other complex pieces.

The premise for adding an indexing rotary table to your existing machining tool is to practically and affordably increase the menu of what your equipment can do. This can increase your business's efficiency in production, reduce your down time and increase your profit margin.

What industries use them and for what purposes?

There is a wide variety of companies that use index tables and others that can benefit from these machines, if only they would consider all the options.

Companies that produce new products obviously are the biggest industry that utilizes index rotary tables. However, contract shops and other workpiece producers stand to profit as well.

With the rise of DIY projects, tool producing companies also stand to benefit, by creating tools that can cut easily, or other related fixtures, dies, molds and other miscellaneous pieces. In this age of free invention, prototypes are easier to make now and most products require special pieces to create new products.

Engineering and planning is a major business that is thriving and which requires careful attention to details. This is why product makers use machine accessories like index tables to make precise specifications and to document the process for their own records.

Most companies that create workpieces specialize in a particular type of part, as opposed to custom making any and all orders. Therefore, they may only see fit to have one CNC machine or tool. They may only have one small area for production. This is why efficiency is important for specialization purposes. If the process is not efficient then the work is not profitable.

What benefits do index rotary tables offer?

The benefits come mostly in cost savings. If a part producing company is asked to create a product or product piece from a larger product seller, this means the creating the piece at a fraction of the price and resources that would be available to the larger company — and doing it quickly, beyond the means of what the large company can do.

Planning is key; especially when it comes to saving on resources. CNC machines and index tables are used according to a documented cycle and process, that can match the production volume.

So much of the efficiency relies on the machine's quality. After all, these machines have to work constantly and always be busy in the cycle.

What training/experience is needed to use this type of tool accessory?

The human factor is more important during the shipping process, not the machining process. Of course, there is not a complete absence of the human factor; an experienced supervisor is needed to assume responsibility over a project, which will require setting up the machine, overseeing the production run, and if necessary making adjustments to the software program that works with the machine.

Operating index rotary tables in conjunction with a milling machine or other equipment requires a certain degree of education and work experience. Most CNC machinists have excellent conceptual skills, process improvement knowledge, supply management experience and the ability to manage inventory control. They must also possess careful attention to detail in their everyday behavior, with the ability to make good judgment.

The work load will involve programming or adjusting the software as needed, operated the index table with a CNC machine, maintaining safety and quality standards, managing complex and potentially dangerous equipment, and keeping accurate records for transparency. The ability to study work orders is also important, whether through blueprints, engineering plans, drawings or graphics, mathematical parameters and even the educated interpretation of geometric information.

Is there regular maintenance required for rotary indexing tables?

Lubrication is very important. The rotary indexing tables' gear box and worm shaft require high quality oil (such as ISO 100-150). The oil levels should be monitored on a regular basis. The oil should be completely changed every 6 months if the rotary indexing tables are used in normal operation conditions. This is important to insure high quality function as well as to increase longevity of the index rotary table.

The environment should also be cleaned. Debris on the machine could interfere with production. Clean out the table and wipe it down with oil.

What practices keep these tool accessories in good working order?

Use the machine only as directed. This heavy device cannot be dropped or used recklessly, as this will easily affect or impede performance. Do not hammer the table face. Indexing is about precise shaping, not experimenting with your own tools.

Do not attempt to run the table without lubrication, as indicated, and do not use the machine if any debris is still lodged in between moving parts. The worm assembly part, for instance, must be completely clean. Dry and generally cool temperatures work best; dampness can lead to rusting.

Rotary indexing tables can help to improve your industrial business, and it can not just save money but also increase your income by increasing your market size and production capabilities.

Learn more about our complete line of indexing rotary tables and other [CNC accessories](#) today by contacting us online or calling [513.770.4200](tel:513.770.4200).

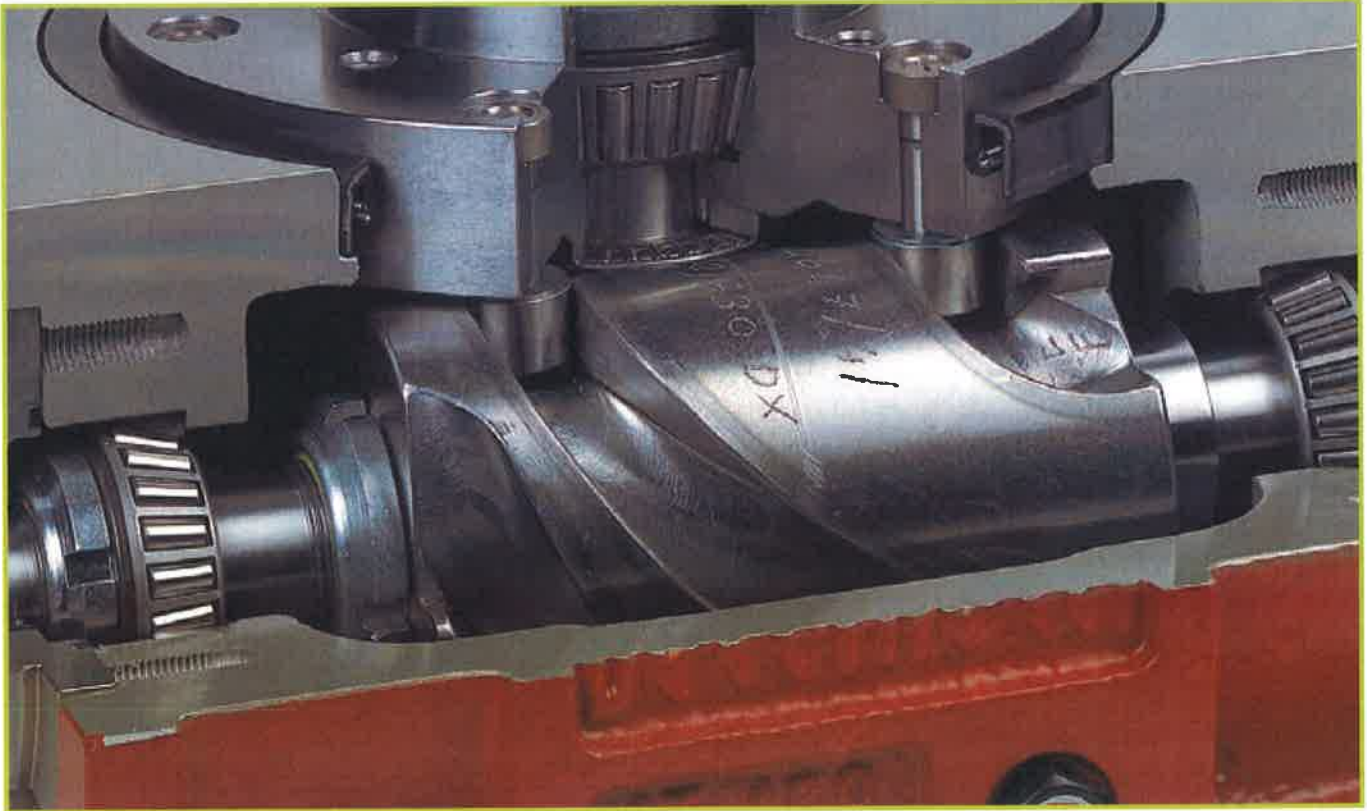
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ROTARY INDEXING TABLES

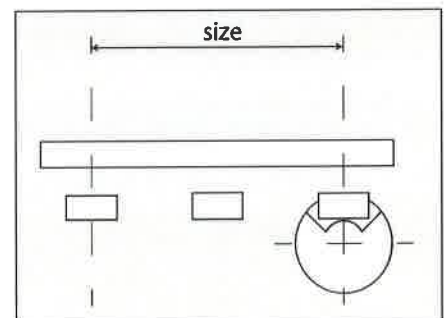


CARACTERISTIQUES

- Carter en alliage d'aluminium et de fonte pour dimensions plus grandes
- Moyeu central fixe avec trou traversant
- Répétabilité de ± 0.02 mm au niveau du rayon du cercle primitif
- Profil de came durci par induction CNC
- Support pour roulement à rouleaux conique surdimensionné
- Positionnement de haute précision avec moteur à induction

CARACTERÍSTICAS

- Compartimento de aleación de acero fundido o de aleación de aluminios para grandes tamaños
- Centro agujeros pasantes papelería
- Repetibilidad a ± 0.02 mm en el radio de paso
- Perfil leva endurecido inducción CNC
- Soporte rodamiento rodillo cónico de gran tamaño
- Gran precisión de colocación con motor de inducción



FEATURES

- Optional servo connection for flexible positioning
- Repeatability of ± 0.02 mm at pitch radius
- Load capacities from 20kg to 20ton
- Cast Aluminum alloy (size 80-110) or cast iron alloy housing (160-3000)
- Crossed roller bearings for superior support of heavy loads or unbalanced overturning moments
- Stationery through-hole center post
- CNC hardened cam profile
- Orings and lips seals prevent oil leakage in any working position

CARATTERISTICHE TECNICHE

- Disponibile con predisposizione per servomotori per un posizionamento flessibile
- Ripetibilità di ± 0.02 mm sul raggio primitivo dei perni folli
- Capacità di carico da 20 Kg a 20 ton
- Carcassa in lega di alluminio (taglia 80 e 110) o in fusione di ghisa (160-1100)
- Cuscinetto di base a rulli incrociati per carichi pesanti e momenti ribaltanti
- Mozzo centrale fisso con ampio foro passante
- Profilo camma temprato a induzione a controllo numerico
- Appropriato sistema di guarnizioni per una tenuta stagna in ogni posizione di lavoro

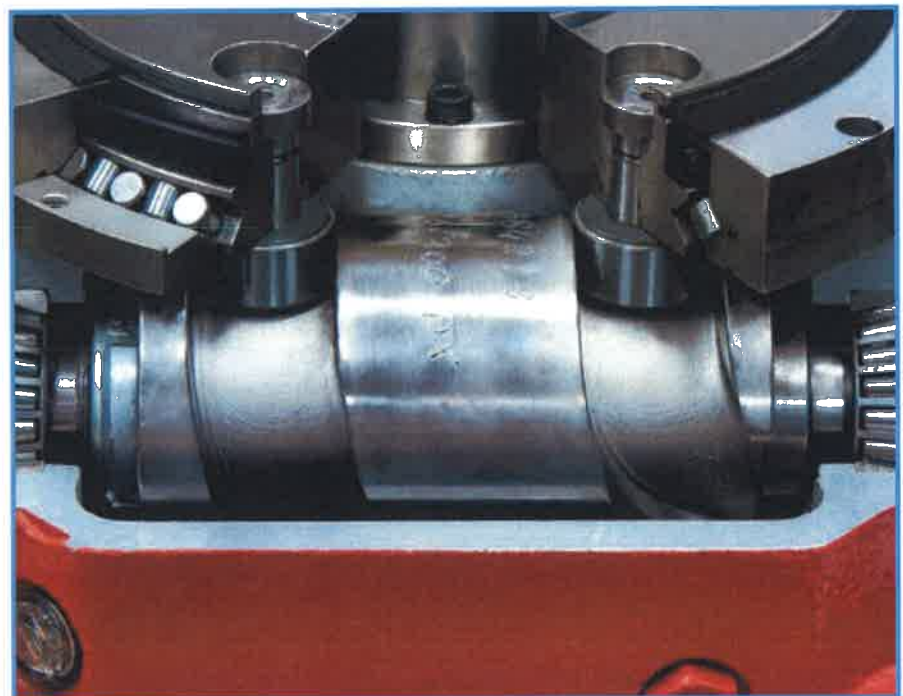
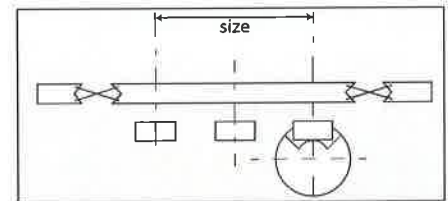
MERKMALE

- Auch mit Vorbereitung für Servomotor für flexibles Positionieren erhältlich
- Wiederholgenauigkeit von ± 0.02 mm am Rollensterndurchmesser
- Ladekapazität von 20kg bis 20 Tonnen
- Gehäuse Aluminium-Gusslegierung (Größe 80-110), Eisen-Legierung (160-1100)
- Überdimensioniertes Kreuzrollenlager für schwere Belastungen und hohe Kippmomente
- Stationäres Durchgangsloch, feststehende Mittelsäule
- CNC induktiv gehärtete Trommelkurve
- Geeignet für alle Einbaulagen

CARACTERISTIQUES

- Possibilité de montage de branchement asservi pour positionnement flexible
- Répétabilité de ± 0.02 mm du rayon du cercle primitif
- Capacité de charge de 20kg à 20 tonnes
- Carter en alliage d'aluminium injecté (dimension 80-110) ou en fonte (160-1100)
- Roulements à rouleaux croisés pour charges lourdes et moments de refoulement
- Moyeu central fixe avec trou traversant
- Profils de came durcis par induction CNC
- Joints adéquats pour éviter les fuites d'huile quelle que soit la position de fonctionnement

ROTARY INDEXING TABLES

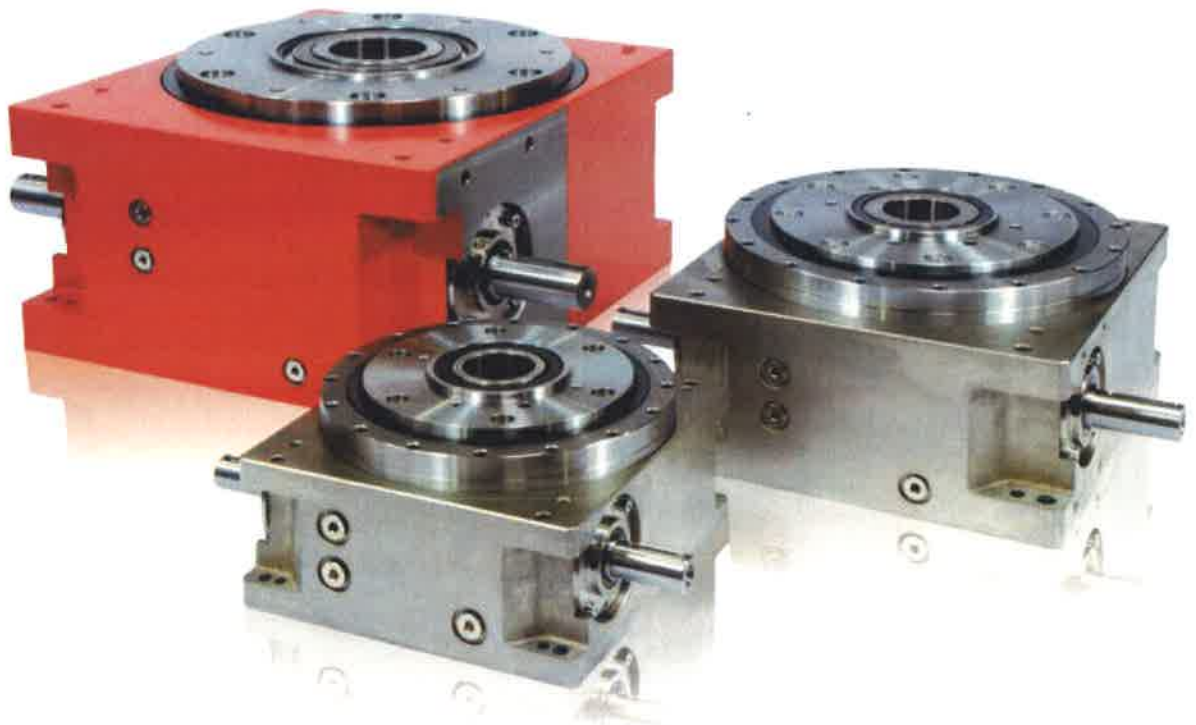


TR Series

Sizes: 80-110-160-210-315-400-470-600-700-850-1100 3000

Stops: from 2 to 36+

The TR series are industrial rotary positioning & indexing tables designed for heavy duty applications. They are totally customizable and can be configured for either programmable positioning via a servo input or cam indexing to a fixed number of stations.



CARACTERÍSTICAS

- Sellos apropiados para prevenir pérdidas de aceite en cualquier posición de trabajo
- Repetibilidad de ± 0.02 mm en el radio de paso
- Capacidades de carga de 20kg a 20ton
- Aleación aluminio fundido (tamaño 80-110) o compartimento aleación acero (160-1100)
- Rodamientos cruzados para momentos de perturbación arena de carga pesada
- Centro agujeros pasantes papelería
- Perfil leva endurecido inducción CNC
- Disponibles movimientos leva compleja oscilantes y personalizados

HP Series

Sizes: 80-110-160

Stops: from 1 to 12 (including odd stops and oscillating) with the shortest index angle available on the market

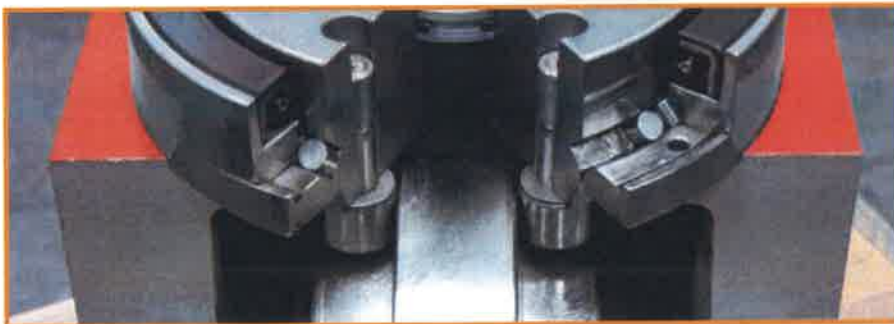
Typical applications include: Rotary dial positioning tables, High speed – long stroke press machinery, Indexing conveyor systems.

FEATURES

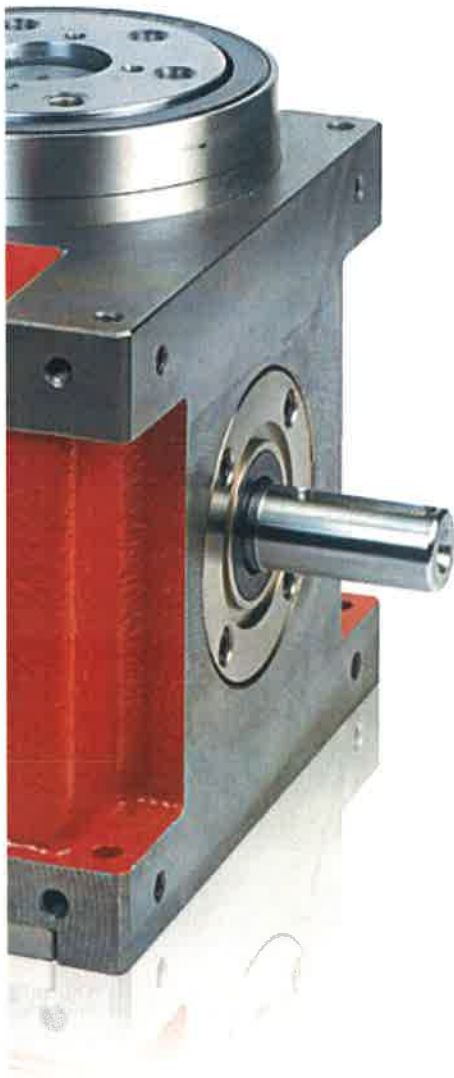
- Unique design combining high load capacity and short index periods
- Provides fast rotary speeds with longer dwell times
- Ideal for continuous motion machines
- Cast iron alloy housing universal mounting position
- Output dial supported by crossed-roller bearing
- High station-to-station accuracy
- High output angle with small input angle
- CNC hardened cam profile
- Complex motions and very short cam-motion periods for wide output displacements available
- Orings and seals prevent oil leakage in any working position
- Can be fitted with reducer and motor

CARATTERISTICHE TECNICHE

- Progetto speciale CDS che combina la possibilità di supportare carichi pesanti con angoli di traslazione molto stretti
- Rende possibili rotazioni veloci con lunga fase di sosta
- Ideali per macchine che lavorano in continuo
- Carcassa in fusione di ghisa per un montaggio universale
- Piatto in uscita supportato da cuscinetto a rulli incrociati
- Elevata precisione di posizionamento
- Ampio angolo in uscita ottenuto con un piccolo angolo in entrata
- Profilo camma temprato a induzione a controllo numerico
- Possibilità di ottenere i più complessi sincronismi con angoli di movimento sulla camma molto stretti ed ampi angoli di sosta
- Un appropriato sistema di guarnizioni garantisce una perfetta tenuta
- Disponibile completo di riduttore e motore



ROTARY INDEXING & OSCILLATING TABLES



MERKMALE

- Einzigartige Kombination zwischen einem Kreuzrollenlager und einem kurzen Schaltwinkel (entwickelt von CDS)
- Ermöglicht eine sehr hohe Drehgeschwindigkeit und eine lange Rastphase
- Ideal für Maschinen mit kontinuierlicher Bewegung
- Gehäuse Gusseisenlegierung, universelle Einbaulage
- Ausgangsflansch gestützt durch Kreuzrollenlager
- Hohe Station-zu-Station-Genauigkeit
- Großer Ausgangswinkel durch kurzen (sehr kleinen) Eingangs-(Schalt-)winkel
- CNC induktiv gehärtete Kurvenprofile
- Ermöglicht komplexe Bewegungen durch sehr kurze Schaltzeiten in Kombination mit großem Ausgangswinkel
- Geeignete Dichtungen verhindern Ölaustritt in jeder Arbeitsposition
- Kann mit Untersetzungsgetriebe und Motor eingebaut werden

CARACTERISTIQUES

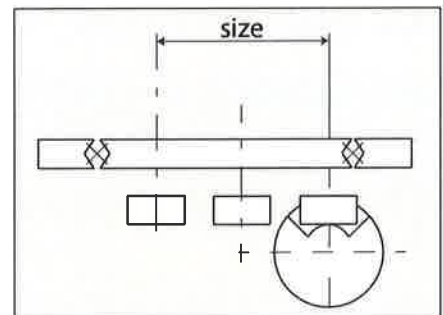
- Un design CDS unique d'un support combiné pour charge lourde et un pas angulaire très faible
- Cela facilite une vitesse de rotation rapide et un temps de pause élevé
- Idéal pour les machines à mouvement continu
- Carter en alliage de fonte avec position de montage universelle
- Cadran de réglage soutenu par un roulement à rouleaux croisés
- Haute précision point à point
- Angle de sortie élevé pour un petit angle d'entrée
- Profils de came durcis par induction CNC
- Mouvements complexes et périodes de mouvement de came très courtes pour des

déplacements de sortie importants disponibles

- Joints adéquats pour éviter les fuites d'huile quelle que soit la position de fonctionnement
- Possibilité de montage d'un réducteur et motoréducteur

CARACTERÍSTICAS

- Diseño único CDS de soporte carga pesada combinado y ángulo índice muy reducido
- Facilita una velocidad de rotación rápida y un tiempo de permanencia elevado
- Ideal para máquinas de movimiento continuo
- Posición de montaje universal compartimento aleación de acero fundido
- Dial de salida sostenido por rodamiento cruzado
- Precisión elevada de estación a estación
- Ángulo de salida elevado para un ángulo de entrada reducido
- Perfil leva endurecido inducción CNC
- Movimientos complejos y periodos de movimiento-leva corta para amplios desplazamientos de salida disponibles
- El sellado apropiado previene las pérdidas de aceite en cualquier posición de trabajo
- Se puede acompañar de reductor y transmisión





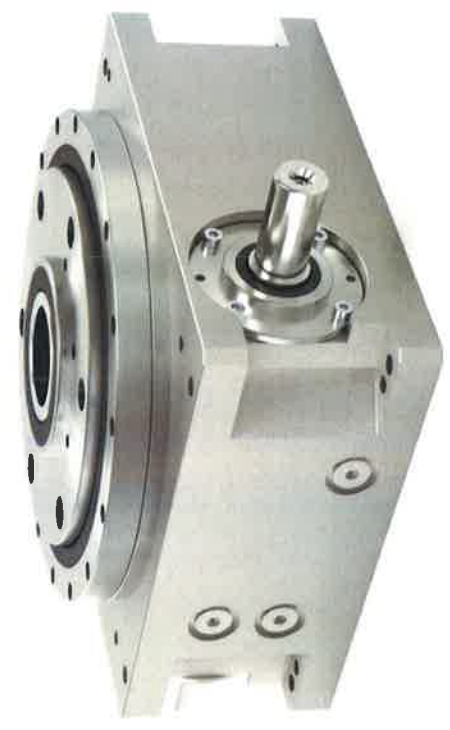
TR SERIES

Product Description

ROTARY INDEXING TABLES

The TR Rotary Table series are available for **fixed or flexible positioning**. This series is the perfect solution for applications with **high inertia and high unbalanced load**.

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