

## NIKKI DENSO Lineup Catalog

*T* DISC Servo Motor D Series  
*T* DISC Servo Motor HD Series  
*T* DISC Servo Motor ND/ND-c Series  
*T* Linear Servo Motor  
*T* Servo Compass  
*T* iD Roll Servo Motor ID Series  
*T* Linear Stage  
AC Servo Motor NA Series  
AC Servo Driver/Controller VCI Series  
AC Servo Driver VPS Series



#### Overseas Sales Dept.

Address: 1-4-2, Osaku, Sakura-shi, Chiba-ken 285-0802 Japan  
E-Mail: [overseas@nikkidenso.co.jp](mailto:overseas@nikkidenso.co.jp) Website: <http://www.nikkidenso.co.jp>

TEL: +81-43-498-2315/ FAX: +81-43-498-4654

#### Head office

Address: 2-8-24, Arima, Miyamae-ku, Kawasaki-shi, Kanagawa-ken 216-0003 Japan

TEL: +81-44-855-4311/ FAX: +81-44-856-4831



## Developing Industrial Drive Systems of the New Era.

Since its foundation and through years of manufacturing DC servo systems, Nikki Denso has been devoted to the development of unique technologies with the aim of creating motors that work just the way human operators want. Committed to this field of technology, we specialize in drive control systems for industrial equipment and devices, which form the basis of the manufacturing industry that is the mainstay of the industrial economy. By providing more accurate, faster, and more stable drive control systems, we intend to help boost the productivity of all industrial equipment and devices, thus contributing to the industrial growth.

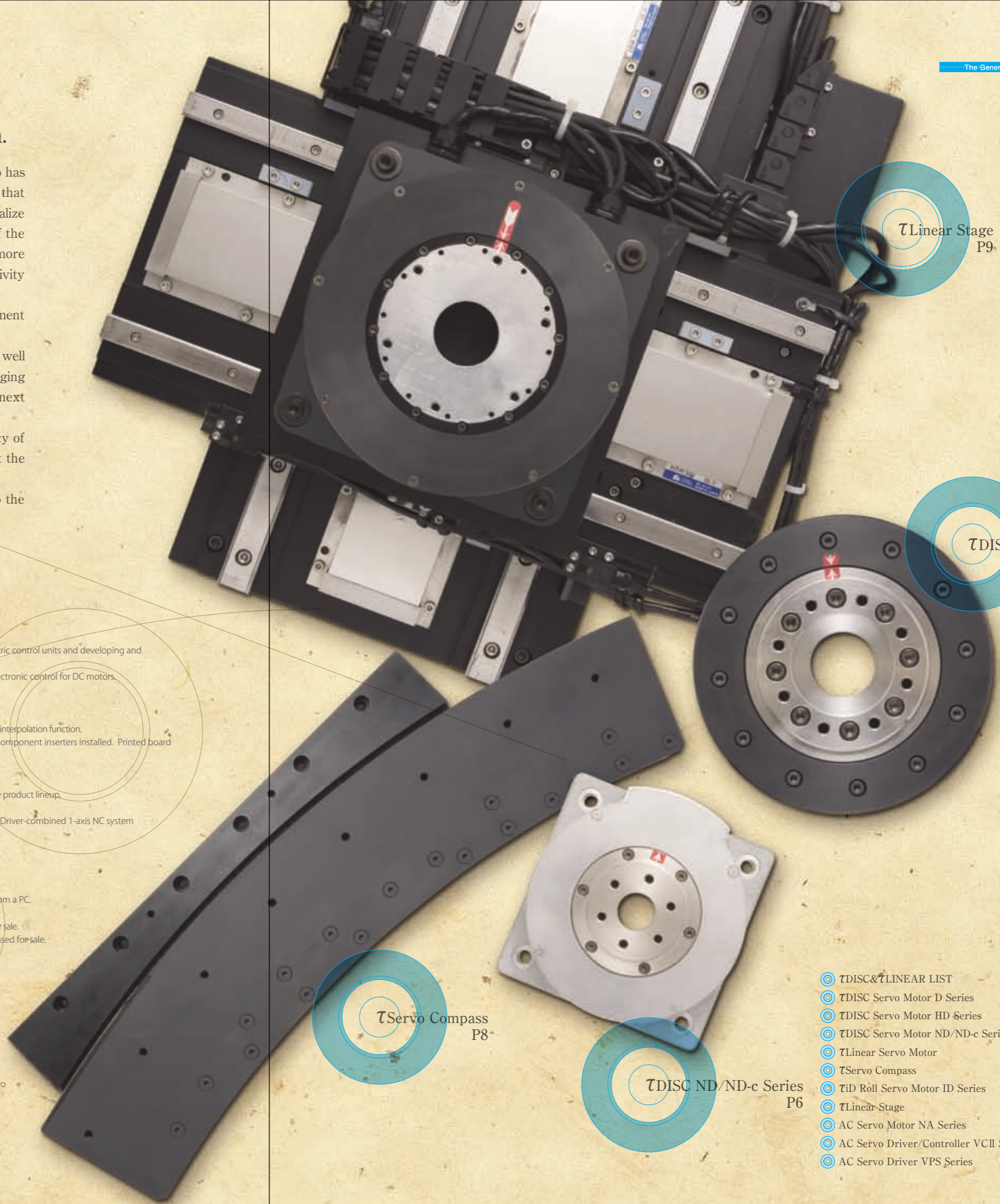
Technology does not exist just for itself; it exists so as to increase the value of all the equipment and devices to which it is applied.

We not only develop technologies but also create customers who use those technologies as well as the value of the equipment and devices that the technologies generate. Tackling emerging challenges one by one for customers, we will continue our tireless efforts to pursue the next generation of motor control, without ever becoming complacent about the current situation.

In 2010, we announced the "τ (Tau) Engine", our new trademark, and unveiled our policy of developing industrial motors and equipment drive systems of the coming era that meet the global environmental issues.

Under this "τ (Tau) Engine" development policy, we intend to contribute extensively to the industrial community.

- 1967 March • Established in 1-5-7, Yakumo, Meguro Ward, Tokyo, with a capital of 3.5 million yen, for purposes of designing electric control units and developing and researching semiconductor application products.
- 1968 April • Kawasaki Plant constructed in 2-8-24, Arima, Takatsu Ward (now Miyamae Ward), Kawasaki City. R&D started on electronic control for DC motors.
- 1970 October • Headquarters relocated to 2-8-24, Arima, Takatsu Ward (now Miyamae Ward), Kawasaki City.
- 1974 February • Digital DC servo drive developed for positioning control. Manufacturing of NC units started.
- 1978 July • Digital S Pack NDS-300 developed and released for sale.
- 1983 May • Development of NDS-302C, the 1-axis programmable NC model, and PNC, the programmable NC model with a 2-/3-axis interpolation function.
- 1984 April • Manufacturing of AC servo motors started. Phase 2 of the 2nd Plant construction completed, with two electronic component inserters installed. Printed board assembly automated and quality improved.
- July • Development of NDS-402 and NDS-412, the 2-axis-NC units featuring a 16-bit CPU
- 1985 June • Development of three models of the 1-axis NC system "Digital S Pack" NDS-500 series
- 1986 September • Multi-axis control driver NPSA-MU (1.6 kW - 3.5 kW) for AC servo system "Actus Power" developed and included in the product lineup.
- 1987 May • Compact positioning AC servo driver G series for AC servo system "Actus Power" developed and announced.
- 1992 January • Integrated CNC "Super Multicom" with independent/simultaneous 4-axis control developed and released for sale. Driver-combined 1-axis NC system "NDS-502CD" developed and released for sale.
- 1993 January • 1-axis NC servo controller "NEXSRT" series developed and released for sale.
- October • Software AC servo driver NPSA-T series for AC servo system "Actus Power" developed and released for sale.
- 1996 May • Induction motor function-specific type NCS-E series for "NEXSRT" series developed and released for sale.
- September • Synchronous motor function-specific type NCS-ZE series for "NEXSRT" series developed and released for sale.
- OCX developed and released for sale as an NCS communication system enabling a servo motor to be controlled from a PC.
- 1998 November • Hollow shaft induction motor BSM series for AC servo system "Actus Power" developed and released for sale.
- 1999 August • NPSR series with a built-in electric power regeneration function for AC servo system "Actus Power" developed and released for sale.
- 2000 May • Linear servo system NLA series developed and released for sale. Disc servo system NMR series developed and released for sale.
- 2001 June • Liquid crystal glass carrying device using a disc servo motor developed and released for sale.
- 2003 March • Disc servo motor renamed τ DISC servo motor. Decision made to refer to linear servo motors and τ DISC servo motors collectively as τ servo motors, and a flangeless, τ DISC model added to complete the 18-model series.
- April • Software technology developed to optimize the motor operation to enable faster position control for linear servo motors.
- December • D630-225 developed and exhibited at SEMICON Japan 2003. Developed for semiconductor manufacturing devices for crystal liquid substrates of the eighth generation, D630-225 was the largest τ DISC servo motor in Japan with a diameter of 630 mm and a maximum torque of 3000 N·m.
- 2004 September • Circular linear servo motor for driving the alignment table developed and released for sale.
- 2005 December • Precision XY stage NST-D included in the product lineup and exhibited at SEMICON Japan 2005.
- 2006 April • Precision machine factory constructed on the premises of Sakura Plant.
- Machining center and vertical lathes and other machining instruments prepared to increase the production of servo motors and robot machines.
- 2010 April • Direct drive ID series for general industrial equipment developed.
- July • Development policy "τ Engine" announced at Techno Frontier 2010.
- 2011 July • ID series with maximum torque of 20,000 N·m exhibited at Techno Frontier 2011.



τLinear Stage  
P9

τDISC HD Series  
P6

τServo Compass  
P8

τDISC ND/ND-c Series  
P6

⊙ τDISC&τLINEAR LIST	P3·P4
⊙ τDISC Servo Motor D Series	P5·P6
⊙ τDISC Servo Motor HD Series	P5·P6
⊙ τDISC Servo Motor ND/ND-c Series	P5·P6
⊙ τLinear Servo Motor	P7·P8
⊙ τServo Compass	P7·P8
⊙ τiD Roll Servo Motor ID Series	P7·P8
⊙ τLinear Stage	P9
⊙ AC Servo Motor NA Series	P9
⊙ AC Servo Driver/Controller VCII Series	P10
⊙ AC Servo Driver VPS Series	P10

### T Series Torque and Thrust List

T DISC D/HD series	Rated torque (N·m)	2.5	5	10	20	30	40
<b>T DISC D series</b> Low-profile, high-performance type Large-capacity type	D110						
	D170						
<b>T DISC HD series</b> Fast response type	D250						
	D400						
	D630						

T DISC ND-c series	Rated torque (N·m)	2.5	5	10	20	30	40
<b>T DISC ND series</b> Standard type	ND/ND-c 110						
	ND-c 140						
ND/ND-c 180 ND/ND-c 250 ND/ND-c 400	ND/ND-c 180						
	ND/ND-c 250						
	ND/ND-c 400						

T Linear series	Rated thrust (N)	5	10	20	30	50	75
<b>T Linear series</b> Coreless Core	NLA-S / Low-thrust type (7~13N)						
	NVA-AM / Flat type (23~135N)						

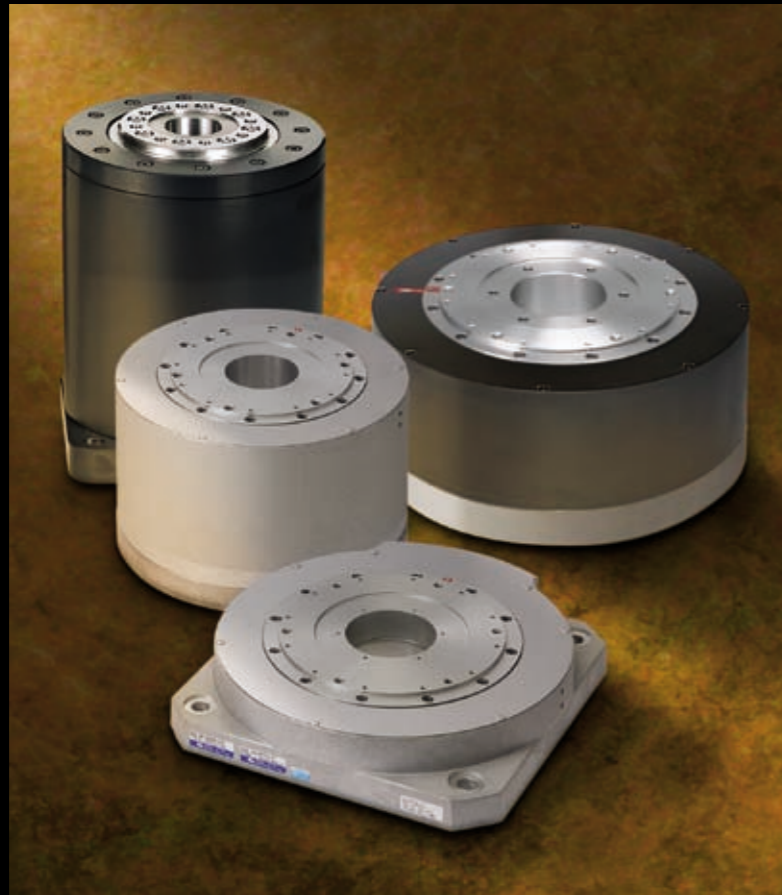
T Servo Compass	Rated torque (N·m)	5	10	20	30	50	75
Coreless							

	50	75	100	125	150	200	500	1500	3000

	50	75	100	125	150	200	500	1000	1500

	100	125	150	200	300	400	500	1000	1500

	100	125	150	200	300	400	500	1000	1500



## τDISC Servo Motor

The τ DISC servo motor is a direct drive servo motor that uses a cross roller bearing to realize a hollow shaft with high load capacity. Various models are available: the D series offering a line of products developed in the tireless pursuit of higher performance that can be selected according to use and purpose; the HD series intended to enable high precision and high takt operation; and the ND-c series featuring new standard models of direct drive servo motors. This complete, well-organized suite of product series meets a vast variety of needs.

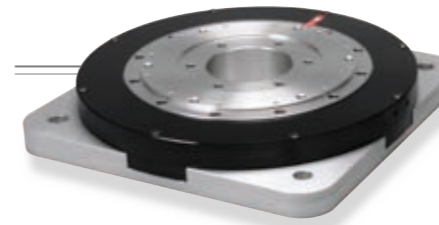


### High-end models developed in pursuit of super performance: stability at constant speed, positioning accuracy, and machine accuracy

The D series offers a rich line of products, such as the low-profile and fast response type and large-capacity type, which can be selected according to use and purpose. All these motors feature fast response time, support strenuous operation patterns requiring reliable positioning, and enable stable operation at constant low speed, among other things, bringing the best direct drive performance that can be achieved by no commercial offering other than the D series. The motors are used widely in various industries where nano-meter order accuracy is demanded. The D series products are the flagship models of the τ DISC direct drive servo motors, and we intend to continue to enhance their specifications in order to achieve even greater performance.

## Low-Profile and High Performance

Low-profile structure based on a new concept



### τ DISC servo motor D series - Low-profile and high performance type

The high magnetic flux density makes these motors overwhelmingly thin - 44.5 mm. They enable smooth rotation motion from low speed with no cogging. With machine accuracy maximized in all aspects including runout, the motors are also very suitable for high accuracy uses.

## Large Capacity

Driving a large object with high accuracy and at high speed with a maximum torque of 5800 N·m



### τ DISC servo motor D series - Large-capacity type

These are large-capacity direct drive servo motors. Their maximum torque ranges from 1000 N·m to 5800 N·m. Type 400 and Type 630 achieve wide mechanical coupling areas that are impossible with other products currently on the market. In order to satisfy the need for highly accurate and high-speed driving, we have designed the motors to enable high-speed rotation of 60 rpm or more at an ultra high resolution of approximately 18.43 million pulses, when combined with the interpolator developed by us. Also, when used in combination with the VC II series that features an excellent servo lock capability, the motors support large capacity, high-speed rotation, and static holding.



### High-end models developed with fast response in mind

A high-level balance between high torque and low inertia structures, coupled with high motor rigidity, give these models fast response performance with excellent stability.

## Fast Response

Possibilities beyond "super fast response"

### τ DISC servo motor HD series - Fast response type

Developed in pursuit of high accuracy and high takt operation, this fast response type of motor enables high-speed rotation of 300 rpm at a high resolution of up to 10.24 million pulses. High motor rigidity and a low inertia structure realize super fast response. Four series are available, from Type 140 to Type 250. When used with a servo control unit of the VC II series, the motors fully exhibit their potential.

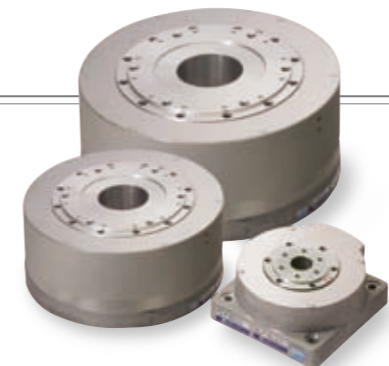


### New standard models equipped with an absolute encoder

The ND series and ND-c series are the new standard models developed on the basis of the technology that we have gained for the D series. The lineup consists of 22 standard models, from ND Type 110 to ND Type 400, which can be applied for various uses.

## Standard

Easy to use for various purposes including conveyance and index positioning



### τ DISC servo motor ND/ND-c series

In addition to the existing τ DISC standard models of the ND series, we now offer lower-cost models of the ND-c series. With both the incremental encoder type and absolute encoder type available, these models are easy to use and best suited for conveyance and indexing. As the τ DISC diffusion type models, they can be employed in many different situations where the use of direct drive servo motors is considered.



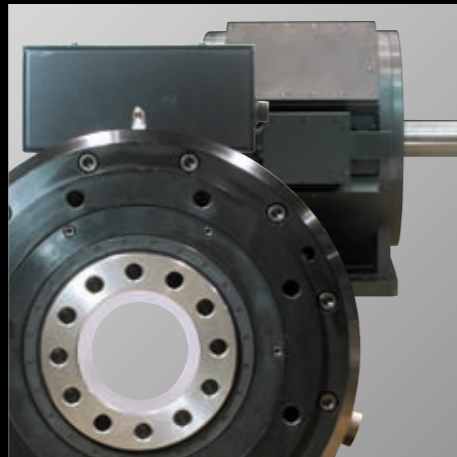
## τ Linear Servo Motor

The τ Linear servo motor comes in two varieties: the coreless model that excels in response performance and the core type that allows high-speed positioning for a large mass load.

The NVA, NLA, and NLD series all make it possible to maximize the machine performance.

Also available is the τ servo compass, which enables circular operation as appropriate for the required angle.

From these diverse models, an optimal motor can be chosen according to purpose and use.



## τ iD Roll Servo Motor

The high-torque direct drive of the τ iD roll enables stability at constant speed, high takt operation, and high accuracy, among other things, delivering the driving power that can never be achieved with a deceleration mechanism.

## High Accuracy and High-Speed Operation

There are a variety of τ Linear servo motors to choose from.

Coreless types supporting a range of 7 to 1000 N and core types supporting a range of 250 to 1500 N



### τ Linear Servo Motor

Several coreless types are available, including the flat type with a sliding structure that can be held at both ends, the high-thrust type that, as a result of redesigning the magnetic alignment, produces high thrust in 70% of the space previously required, and the standard high-thrust type that can support up to 3000 N.

The lineup also includes the core types that can support up to 4500 N. When used in combination with the interpolator developed by us, the motors achieve high speeds of up to 1.6 meters/second at a high resolution of 20 nano-meters. They offer high accuracy and high-speed operation - high-level linear drive that is impossible to realize with ordinary motors.



## Unique Performance

Direct circumference drive brings mechanical simplicity

### τ Servo Compass

This is the τ Linear servo compass of the circular operation type based on a new concept. It is best suited for alignment operation at a small angle and high accuracy positioning within a limited operation area. The compass does not have a rotation axis and drives the work table on the circumference, which makes it immune to the load inertia. In addition, since an encoder sensor can be mounted on the circumference, the product enables high accuracy positioning. When used as a single unit, the compass can operate within a range of  $\pm 3^\circ$ . A sensor-combined type has also been added to the lineup, making it easier to mount magnet bases. Creative ideas lead to simpler mechanisms and higher machine rigidity.

## High Torque

High-torque direct drive power

Rated torque: 550 N·m to 10000 N·m



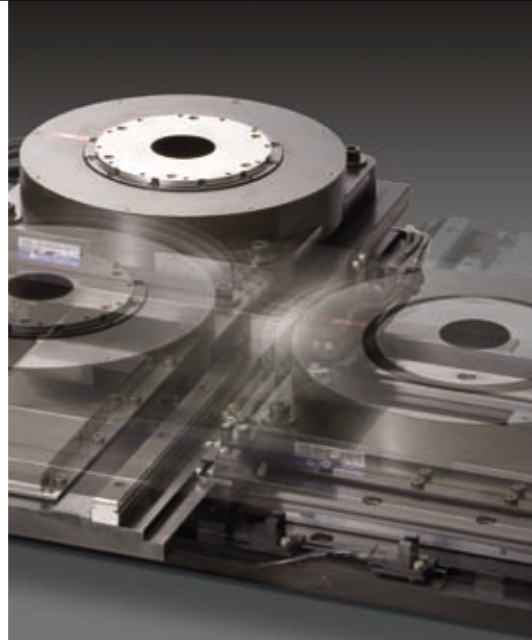
### τ iD roll ID Series

This is the ID series of direct drive motors developed for general industrial equipment in pursuit of high torque, high takt operation, and high accuracy.

These motors improve the machine performance by directly driving the drive system, which conventional motors drive via a deceleration mechanism. They also employ the water cooling system, which makes them more compact, less noisy, and friendlier to the environment.

The motors come in two types: shaft type and hollow type. They use the protection structure of IP55 (except for the rotating portion), making them direct drive motors suitable for general industrial equipment.





## τ Linear Stage

This is a suite of high-performance linear stages equipped with linear servo motors.

A variety of stages, including the high accuracy X/XY stage and long stroke stage, are offered to meet diverse needs.

## Fusion

Stage accuracy + Servo control technology = High-performance τ Linear Stage

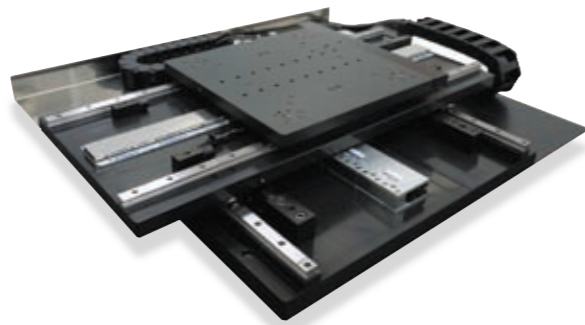
### τ Linear Stage

The fusion with the servo control technology we have amassed over the years has made high-performance control stages a reality.

We offer outstanding stage performance that only excellent servo manufactures can provide, including positioning accuracy guarantee using an absolute position compensation function, speed stability guarantee using speed fluctuation measurement data, gain adjustment, and testing of high takt operation by setting a resonant filter.

In addition to the X/XY stage, the lineup includes the Xθ and XYθ axis stages that use the high accuracy direct drive τ DISC series as the θ axis.

Multi-head and other custom-made models are available.



## High-Speed Conveyance

Long stroke + scaleless linear stage



### Long stroke linear stage

This linear stage consists of two or more base stages concatenated to allow a stroke of up to 20 meters. Supporting a maximum speed of 5 meters/second, this model is best suited for high-speed conveyance.

Also, the use of a scaleless linear encoder that requires no linear scale makes the product even more cost effective.

## Synchronous Type and Induction Type Servo Motors

A wide variation of motors operating at 50 W to 55 kW

### AC servo motor NA series

Both synchronous type and induction type AC servo motors are provided to meet the diverse needs of customers.

The synchronous type AC servo motors NA80/800 series feature a compact design. Also available are the induction type AC servo motors NA100/20 series, which offer a robust structure and high maintainability without using any permanent magnet. There is a variety of models to choose from, including the ones equipped with gears or brakes.



## Importance of Servo Drive

The VC II series, the flagship model that can fairly be said to be a culmination of our technology, and the VPS series developed in pursuit of ease of use and cost performance bring out the best essential servo performance in functionality, control, and other aspects. Based on the servo control technology that we have amassed over 40 years or so as a servo manufacturer, these models can be customized to meet a vast range of customer needs.

## Versatility

A flagship model on which we put our prestige as an AC servo manufacturer

### AC servo driver/controller VC II series

Compatible not only with the direct drive τ series but also with synchronous type and induction type AC servo motors, the VC II series maximizes the motor performance.

In addition to the driver type, the lineup includes the positioning control type that provides programmable control over speed, torque, and positioning and the free curve control type that allows various curve motions. Featuring both the basic servo performance and versatile control functions, the VC II series offers a line of products that boast the collection of our technological expertise.



## Multifunction

VPS series offering a high-level balance between functionality and performance

### AC servo driver VPS series

While developed as drivers, the products of the VPS series feature seven-point positioning and zero point return functions.

Feed forward torque control substantially reduces the position error during the operation, while resulting in remarkable improvements in synchronization and tracking performance. Equipped with the resonance suppression filter and other useful functions, the drivers can improve the takt operation of an actuator to a level that has never been possible before.

The VPS series drivers have many other user-friendly functions in order to increase the ease of use. As multifunctional drivers, they are widely used in various situations.

