

τDISC[®] Servo Motor ND-s series

Standard

Rated torque: 3.4 to 500N·m



◎ Popular standard type pursuing cost performance.

Suitable for various applications.

◎ Compact design. Higher torque density and optimized thermal structure and magnetic circuitry have reduced the volume ratio by 25% from previous models (ND and ND-c Series).

Point!



Ideal for converting the AC servo motor + reducer mechanism into a direct drive system

Application examples

- Wafer carrier devices/ ■ Food carrier devices/ ■ Filling machines/ ■ Capping machines/ ■ Roll feeders/
- Laser beam machines/ ■ Laminating machines/ ■ FPD pasting machines/ ■ Die cutters/
- Screen printing machines/ ■ Contact and non-contact inspection machines ■ Index tables

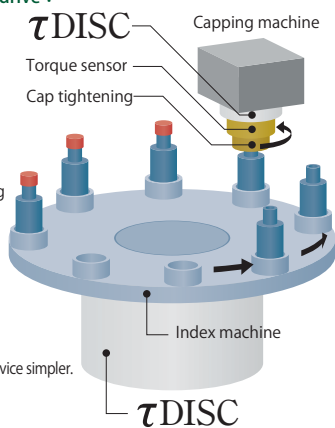
Index drive and tightening drive :
Index machines,
capping machines, etc.

[Index machine]

- High-precision, flexible indexing
- Simple structure
- Quietness
- Improved maintainability

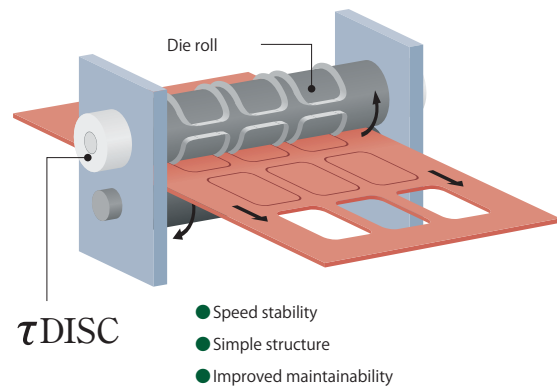
[Capping machine]

- The hollow structure makes the device simpler.
- Faster response



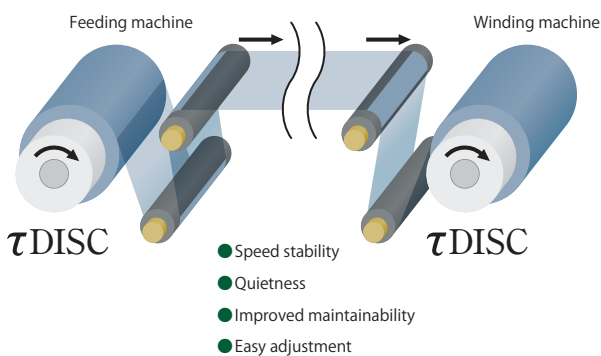
Rotary drive :

Die cutters, printing machines, etc.



- Speed stability
- Simple structure
- Improved maintainability

Feeding and winding drive (roll-to-roll application devices):
Laminating machines, coaters, surface inspection machines, etc.
Replacing a powder clutch or brake

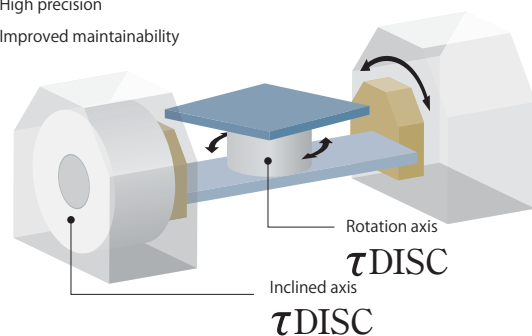


- Speed stability
- Quietness
- Improved maintainability
- Easy adjustment

Table drive :

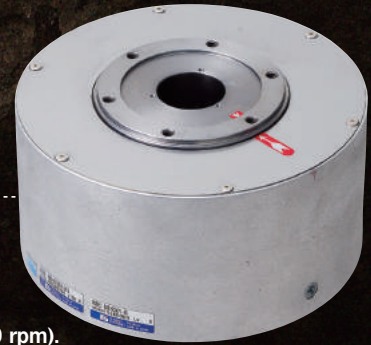
Laser beam machines, various processing machines, etc.

- Stable operation
- High precision
- Improved maintainability



DISC[®] Servo Motor **ND-s HS** series

High-speed rotation Rated torque: 8 to 24N·m



- High-speed rotation specification model of the ND-s Series.
- Pursuing compactness and high-speed operation.
- Lineup of motors whose rated rotation speed ranges from 11 to 15 rps (660 to 900 rpm).

Point!



Ideal for applications that require high-speed and high-precision operation

Application examples

- Die bonders
- Sorters
- Spin coaters
- Spin washers

High-speed positioning examples

90-degree positioning time: 36msec

180-degree positioning time: 60msec

Accuracy at the arm tip: $\pm 4 \mu\text{m}$ (completion range: ± 10 pulses)

● Motor used and specifications

ND140-95-LS-HS Type

Rated/maximum torque: 15/37N·m

Rated rotation speed: 11rps

Rotor moment of inertia: 0.00134kg·m²

Detection pulse: 1,600,000ppr

● Load specifications

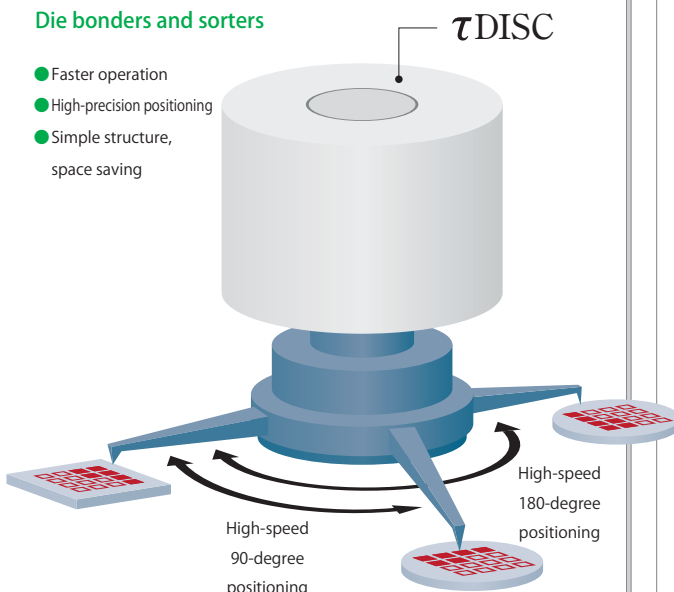
Arm load (double edge): Weight of 0.086 kg
(208 mm from center to tip)

Load inertia moment ratio: Approx. 0.5 times

High-speed Pick & Place drive :

Die bonders and sorters

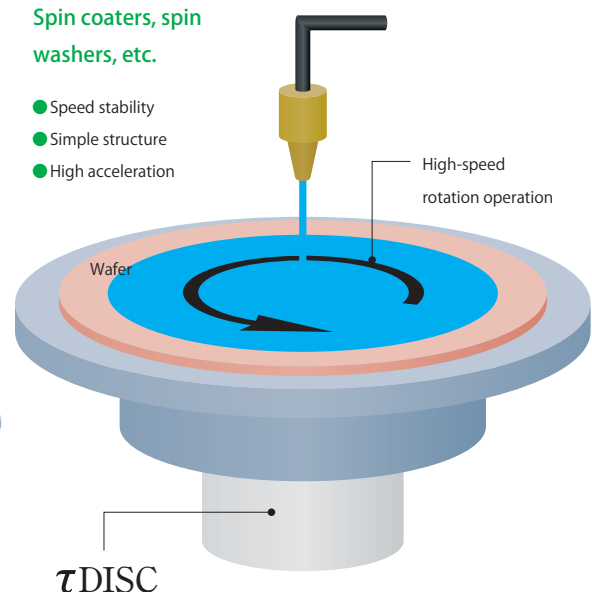
- Faster operation
- High-precision positioning
- Simple structure, space saving



Spin drive :

Spin coaters, spin washers, etc.

- Speed stability
- Simple structure
- High acceleration

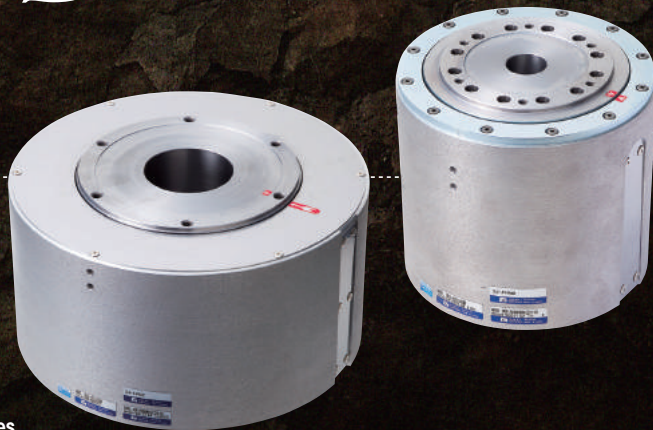


タウ τ DISC[®] Servo Motor DD-s series

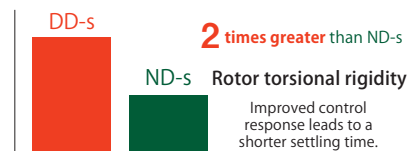
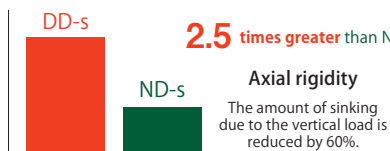
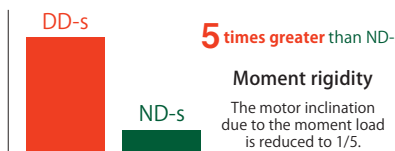
High rigidity and high precision

Rated torque: 10 to 2000N·m

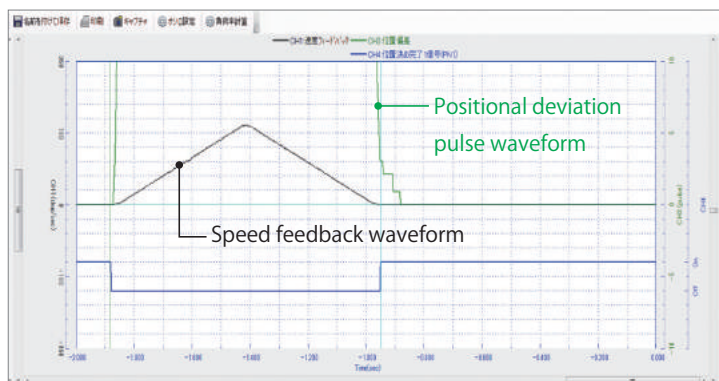
- ◎ High-rigidity type pursuing high rigidity and high precision.
- ◎ Significant improvement in moment rigidity, axial rigidity, and rotor torsional rigidity.
- ◎ Pursuing positioning accuracy and run out accuracy.
- ◎ Enabling stable operation even at the inertia ratio of 2,000 times.



Ideal for applications that require stable operation for loads with large inertia



▼ Positioning operation waveforms when the inertia ratio is 527 times



[Motor used and specifications]

DD160-146-LS Type

- Rated/maximum torque: 27/62.5N·m
- Rotor moment of inertia: 0.0074kg·m²
- Load specifications (disk)
Load inertia moment: 3.9kg·m² (527 times larger than rotor moment of inertia)
- Positioning operation: 90°
- Paired servo driver: VPH-HA Type

* These values may vary depending on the load setting condition and other factors. They are not guaranteed values.

Application examples

- Scribes/■ FPD pasting machines/■ Screen printing machines/■ FPD inspection machines/■ Wafer dicing machines/
- Packaging machines/■ Wafer processing machines/■ Wafer inspection machines/■ X-ray analyzers/
- PE printing machines/■ Precision processing and measurement machines/■ Die casting machines

Large inertia load turning drive :
FPD turning, alignment, and inspection machines

- Stable operation for a load with large inertia
- High-precision positioning
- Simple structure and space saving

High-precision roll drive :
Roll coaters, PE printing machines, etc.

- High-precision positioning
- Speed stability

Ball screw drive :
Die casting machines, servo presses, etc.

- High-response operation
- The hollow structure makes the device simpler
- Improvement in environmental friendliness and safety due to not using a hydraulic system

τ DISC[®] HD-s series

High response Rated torque: 27 to 68N·m

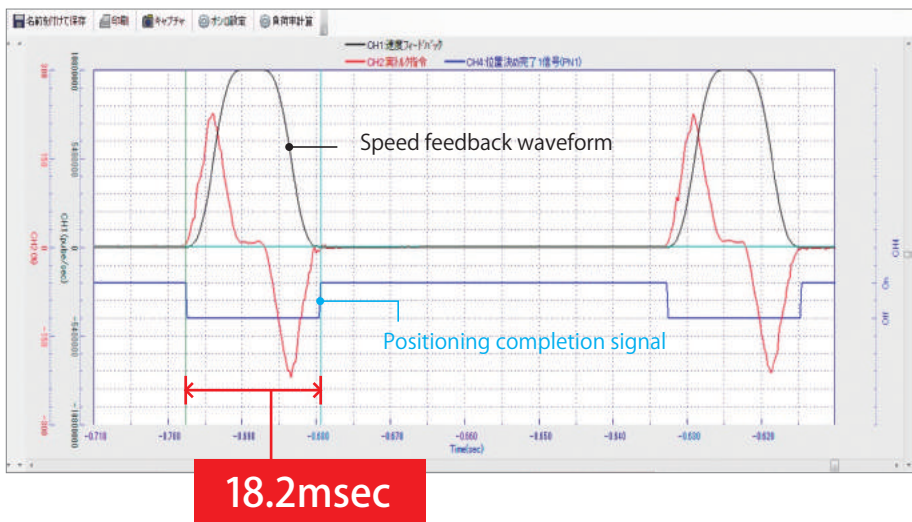


- High-response type pursuing high-speed operation.
- World's top class high response performance with high-torque, low-inertia structure.



Ideal for applications that require small operation angles and high-speed operation

▼ Positioning operation waveform at 22.5° Positioning time: 18.2msec

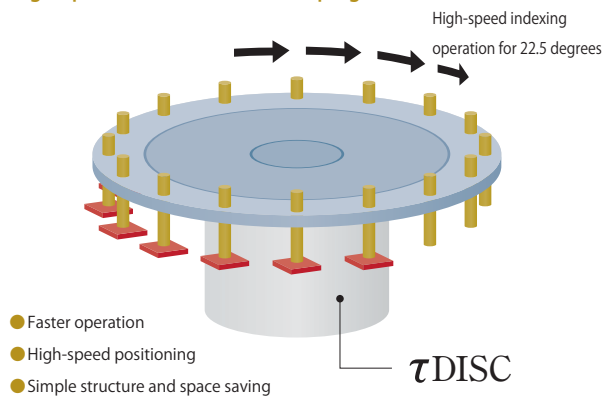


- Motor used and specifications
HD140-160-LS Type
Rated/maximum torque: 27/67.5N·m
Rotor moment of inertia: 0.0027kg·m²
- Load specifications (disk)
Load weight: 0.79kg
Load inertia moment: 0.00297kg·m²
(1.1 times larger than rotor moment of inertia)
- Positioning operation: 22.5°
Completion range: ±10 pulses
(Load disk circumference conversion: ±1.5μm)
Dwell time: 50msec
- Paired servo driver: VPH-HA Type

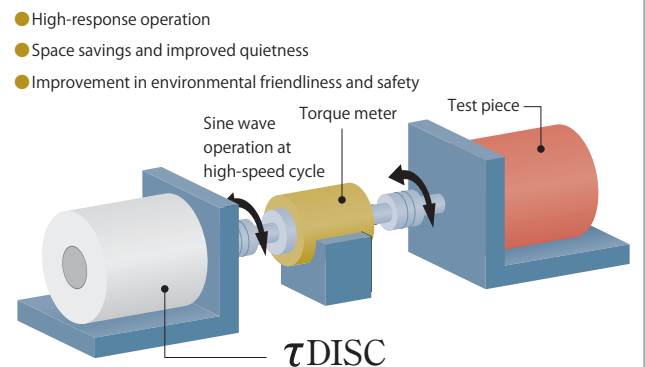
* These values may vary depending on the load setting condition and other factors. They are not guaranteed values.

- Application examples
- Test handlers/■ Taping machines/■ Appearance inspection machines/■ Vibration generators
 - Automotive parts testing machines/■ Torque testing machines/■ Various testing machines

High-speed index drive : High-speed test handlers and taping machines



Testing machine drive : Torque testing machines, material testing machines, durability testing machines, etc.



In addition to the standard τ DISC lineup, we can offer custom-made features, such as those shown below, to meet your needs for special specifications.

Custom Made

Custom Made

1

Improved speed stability

Based on the ND250-s and ND400-s Types of the ND-s Series, speed stability is improved by reducing motor torque ripples, mounting a high-precision encoder, etc.

Speed variation
[At speed of 2 rpm]

±0.1%

Load condition: No load

Custom Made

2

Anti-fretting measures

Fretting is a phenomenon that occurs when the rolling elements (e.g., rollers) of a bearing reciprocate repeatedly, as if to vibrate, against the metal surfaces of the inner and outer rings at the same location within a very small range of angles. In this case, as new oil films do not form, and parts that are in contact with the metal surfaces wear out.

We have taken measures to reduce bearing fretting and extend the life of the bearing when the rolling elements reciprocate repeatedly within a very small range of angles and cannot turn periodically.

τ DISC anti-fretting specifications

We optimize the bearing preload and select the suitable bearing grease through actual product evaluation, appropriate for your operating conditions.

Reciprocation within a very
small range of angles



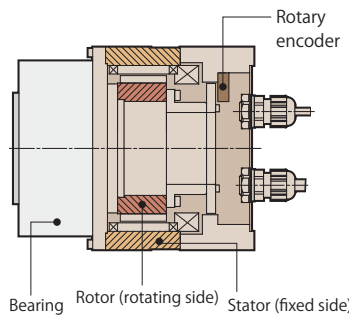
Custom Made

3

Built-in motor

[Example]

We provide an air bearing or ball bearing spindle with a built-in rotor and stator or just the rotor and stator.



Custom Made

4

Improved positioning
accuracy

Custom Made

5

Improved rotation
accuracy

Custom Made

6

Improved torque
accuracy

Custom Made

7

Improved flatness
and parallelism

Custom Made

8

Increased rotation
speed and torque

Custom Made

9

Anti-dust specification

Custom Made

10

Material and
appearance changes

Custom Made

11

Wider middle hole
diameter and change
in the mounting shape

Custom Made

12

Connector and cable
changes

* For information about the availability of customization, contact our sales staff.

Paired Servo driver



List of paired servo drivers of each τDISC Series

○: Pairing possible
△: Connector and cable changes

Servo driver		VPH Series		VCII Series		VPS Series	
		Supported networks		Supported networks		Supported networks	
τDISC							
		Pairing	Servo driver output capacity	Pairing	Servo driver output capacity	Pairing	Servo driver output capacity
ND-s Series	ND110-65-FS (AC100V)	○	100W/200W	○	100W/200W	○	200W
	ND110-65-FS (AC200V)	○	200W	○	200W	○	400W
	ND110-85-FS (AC100V)	○	200W	○	200W	○	200W
	ND110-85-FS (AC200V)	○	400W	○	400W	○	400W
	ND140-65-FS	○	400W	○	400W	○	400W
	ND140-70-LS	○	400W	○	400W	○	400W
	ND140-95-LS	○	800W	○	800W	○	800W
	ND180-55-FS	○	800W	○	800W	○	800W
	ND180-70-LS	○	800W	○	800W	○	800W
	ND180-95-LS	○	800W	○	800W	○	800W
	ND250-55-FS	○	800W	○	800W	○	800W
	ND250-70-LS	○	800W	○	800W	○	800W
	ND250-95-LS	○	1.5kW	○	1.5kW	○	1.6kW
	ND400-65-FS	○	2.2kW	○	2.2kW	-	-
	ND400-70-LS	○	2.2kW	○	2.2kW	-	-
	ND400-95-LS	○	3.3kW	○	4kW	-	-
ND400-160-LS	○	7kW	○	7.5kW	-	-	
ND-s HS Series	ND110-85-FS-HS	○	400W/800W	○	400W/800W	○	400W/800W
	ND140-70-LS-HS	○	800W	○	800W	○	800W
	ND140-95-LS-HS	○	1.5kW	○	1.5kW	○	1.6kW
	ND180-95-LS-HS	○	1.5kW	○	1.5kW	○	1.6kW
DD-s Series	DD160-96-LS	○	400W	○	400W	○	400W
	DD160-105-FS	○	400W	○	400W	○	400W
	DD160-146-LS	○	800W	○	800W	○	800W
	DD250-90-LS	○	800W	○	800W	○	800W
	DD250-138-LS	○	1.5kW	○	1.5kW	○	1.6kW
	DD250-163-LS	○	1.5kW	○	1.5kW	○	1.6kW
	DD400-150-LS	○	3.3kW	○	4kW	-	-
	DD400-200-LS	○	7kW	○	7.5kW/11kW	-	-
	DD400-250-LS 1.5rps	○	7kW	○	15kW	-	-
	DD400-250-LS 1rps	○	7kW	○	7.5kW	-	-
	DD400-250-LS 2rps	-	-	○	15kW	-	-
	DD630-175-LS	△	7kW	○	11kW	-	-
DD630-225-LS	-	-	○	15kW	-	-	
HD-s Series	HD140-160-LS	○	800W	○	800W	-	-
	HD140-185-LS	○	1.5kW	○	1.5kW	-	-
	HD180-200-LS	○	2.2kW	○	2.2kW	-	-





★For detailed specifications, dimensions, etc., of the VPS Series, visit the CKD Nikki Denso website.

VPH Series

Developed exclusively for direct drives.
Maximizes the motor performance.
Output capacity 100W to 7kW



Lineup

◎ VPH-HA Type	I/O specification	Speed command operation, torque command operation, and pulse train command operation, and built-in command operation	
◎ VPH-HB Type	SSCNETIII/H specification	Supports SSCNETIII/H and SSCNETIII. Speed command operation, torque command operation, and position control operation	
◎ VPH-HC Type	CC-Link specification	Supports CC-Link (Version 1.10) communication. Speed command operation, torque command operation, pulse train command operation, and built-in command operation	
◎ VPH-HD Type	EtherCAT specification	Supports EtherCAT communication (CiA402 drive profile). Speed command operation, torque command operation, and position control operation	
◎ VPH-HE Type	MECHATROLINK-III specification	Supports MECHATROLINK-III communication. Speed command operation, torque command operation, and position control operation	

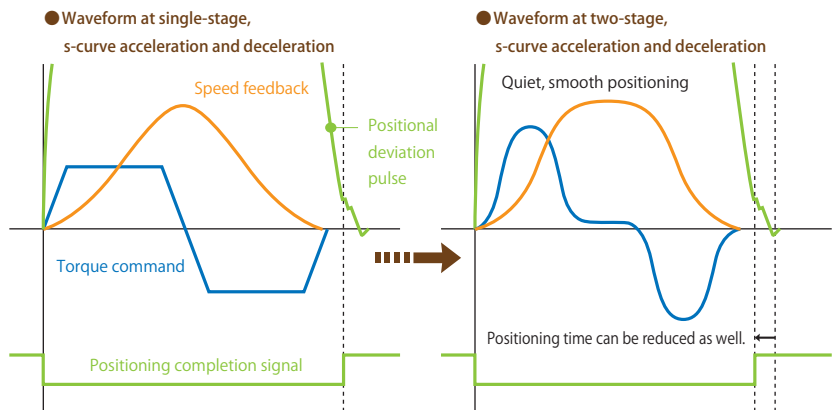
* For information about support of the SEMI-F47 standard, contact our sales staff.

Quieter, faster, and easier...

Smooth operation reduces the positioning time

Two-stage, s-curve acceleration and deceleration control function

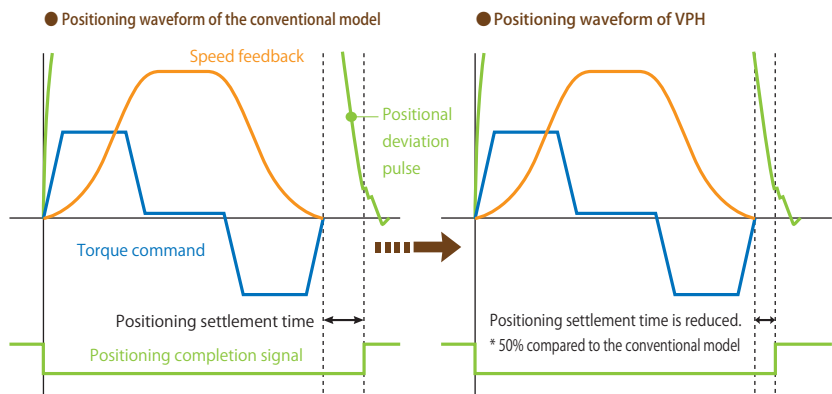
Making the torque waveform a quadratic curve significantly eases the impact at the time of acceleration and deceleration. This reduces the positioning time without causing vibration even when the acceleration and deceleration is shortened.



Improved accuracy of the feed forward (FF) command

Filtering function for the feed forward (FF) command

Increasing the resolution of the FF command enables smoother FF command execution and a shorter positioning settlement time.



Even greater speed stability

Significant reduction in torque ripples

Reducing torque ripples further improves speed stability. (Reduced by 20% from the conventional model.)

Easy tuning even for a load with large inertia

Automatic feedback filter setting function

Since the feedback filter appropriate for the load is automatically set during auto tuning, the speed detection ripples are reduced, allowing easy tuning even for large inertia loads. Smooth operation can be achieved easily.

Improved stability during stop

Filtering function during stop

Improved torque accuracy during stop

Vibration of a load with large inertia during stop is reduced.

Enhanced low-speed gain switching function

Not only speed but also other items, such as deviation and the presence or absence of command, can be set as the conditions for switching between normal and low-speed gains.

Monitoring of multi-axis motion with the master controller

Operation monitoring of speed, torque, deviation, etc., can be done with the master controller when connected to the SSCNETⅢ/H, EtherCAT, or MECHATROLINK-Ⅲ motion network.

VCII Series

High-functionality driver to control a wide range of direct drives
Output capacity 100W to 15kW



Lineup

◎ VCII-D Type Driver specification

Speed command operation, torque command operation, pulse train command operation, and simple positioning operation

◎ VCII-C1 Type Controller specification

Operations such as positioning, spinner, speed control, and torque control can be performed automatically using programs.

◎ VCII-C6 Type Free-curve control specification

Curve operations can be done simultaneously or independently in a flexible manner. Sine wave operation is achieved easily.

◎ VCII-D7 Type SSCNETⅢ/H specification

Supports SSCNETⅢ/H and SSCNETⅢ. Speed command operation, torque command operation, and position control operation



★ Adding the optional interface enables the driver to connect to MECHATROLINK-Ⅲ and CC-Link as well.



VPS Series

Cost-focused servo driver
Output capacity 200W to 1.6kW

★ For detailed specifications, dimensions, etc., of the VPS Series, visit the CKD Nikki Denso website.



Lineup

◎ I/O specification

In addition to pulse train control and speed control, this driver features a 31-point positioning control function.

◎ CC-Link specification

Pulse train control and CC-Link communication are supported.



System support tool Data Editing Software

The enhanced adjustment, monitoring, operation, analysis, and editing functions assist in mechanical system matching and enable efficient start-up.

* Some functions and screens of the system support tool for the VCI Series are different.

Analysis functions

Oscilloscope function

- The servo data of four channels can be displayed in real time.
- The motor load ratio during repeated operations can be displayed easily.
- The normal trigger function makes it easy to identify changes before and after adjustment.

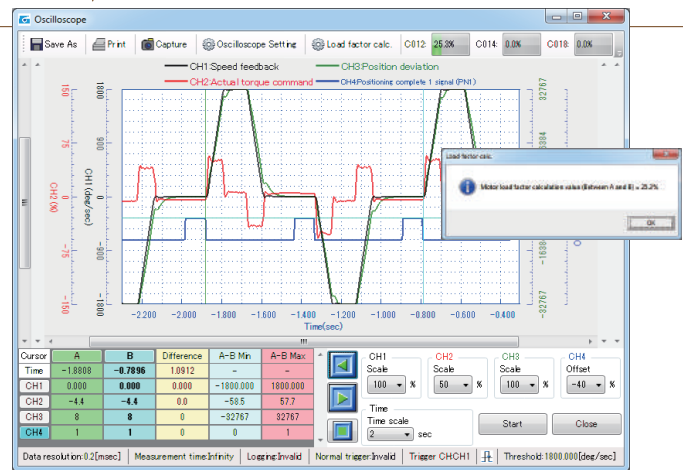
Frequency response measurement function

- By measuring the frequency response of the mechanical system through automatic motor excitation, the mechanical resonance filter can be set easily.

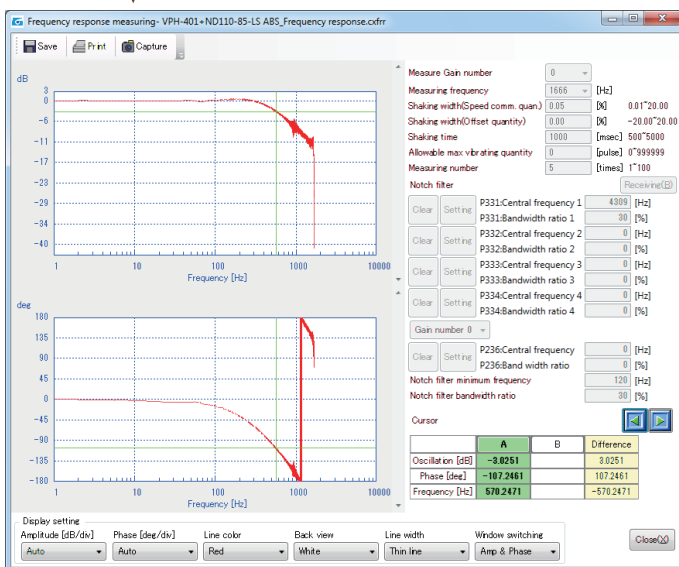
Frequency spectrum measurement function

- By finding the mechanical resonance point through the measurement of the frequency spectrum during the operation, the mechanical resonance filter can be set easily.

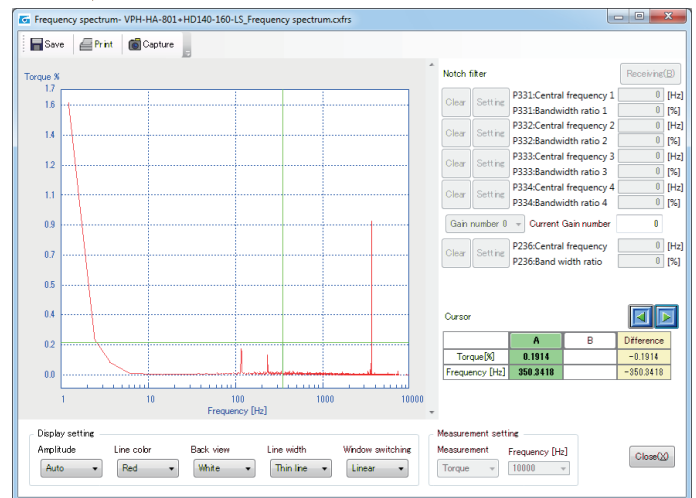
Oscilloscope screen



Frequency response measurement screen



Frequency spectrum measurement screen



Status display

Status display function

- Various operation information, such as the actual motor operation speed, actual torque command, and current position, is displayed in real time.
- The alarm history, device information, and so on are displayed.

Input/output signal status display function

- The input and output signals can be checked easily during the start-up operation.

Device monitoring function

- The memory area inside the driver can be displayed and edited in real time.

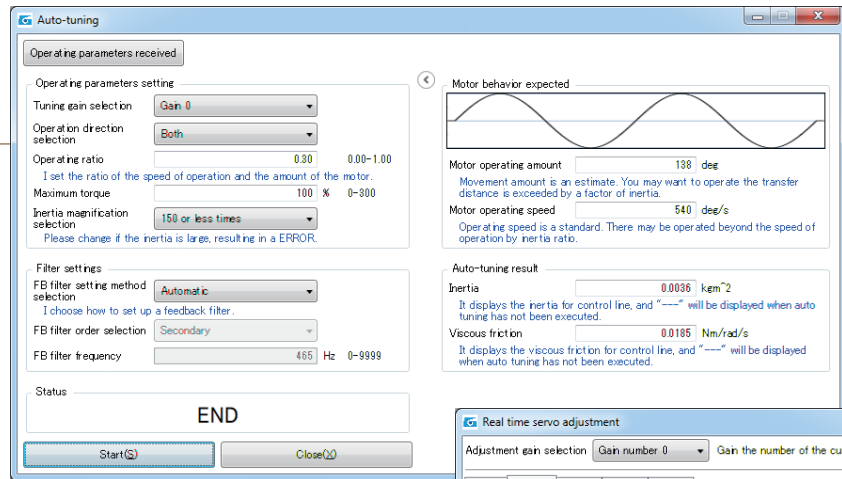
Status display screen

No.	Item	Data	Unit
C001	Actual operation speed of motor	-1799.557	deg/sec
C002	Operable max speed	1800.000	deg/sec
C003	Analog speed command value	0.131	deg/sec
C004	Actual motor operating rotational speed	-299	rpm
C005	Actual torque command value	-8.8	%
C006	Peak torque command value	42.0	%
C007	Analog Torque command value	0.0	%
C008	Load factor of motor	8.8	%
C009	+ Torque limit value	250.0	%

Adjustment functions

Auto tuning function

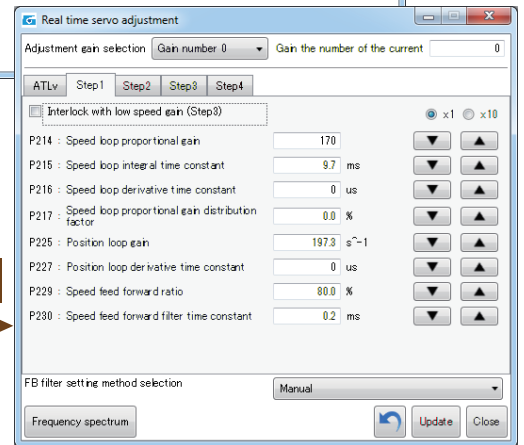
- A separate screen is displayed for auto tuning, making it easy to change the parameters necessary to execute the tuning.
- The automatic feedback setting function automatically sets the feedback filter appropriate for the load inertia ratio, thus enabling smooth operation.
- The expected operation of the auto tuned motor and the result are displayed.



Auto tuning screen

Real-time servo adjustment function

- The function that adjusts the gain level after auto tuning makes the adjustment even easier.
- The speed and position loop gain can be adjusted in real time.



Real-time servo adjustment screen

Test operation function

- A test operation can be executed with the positioning function.

Self-diagnosis function

- Self-diagnosis of the servo driver can be done.

Parameter editing screen

Data editing

Parameter editing function

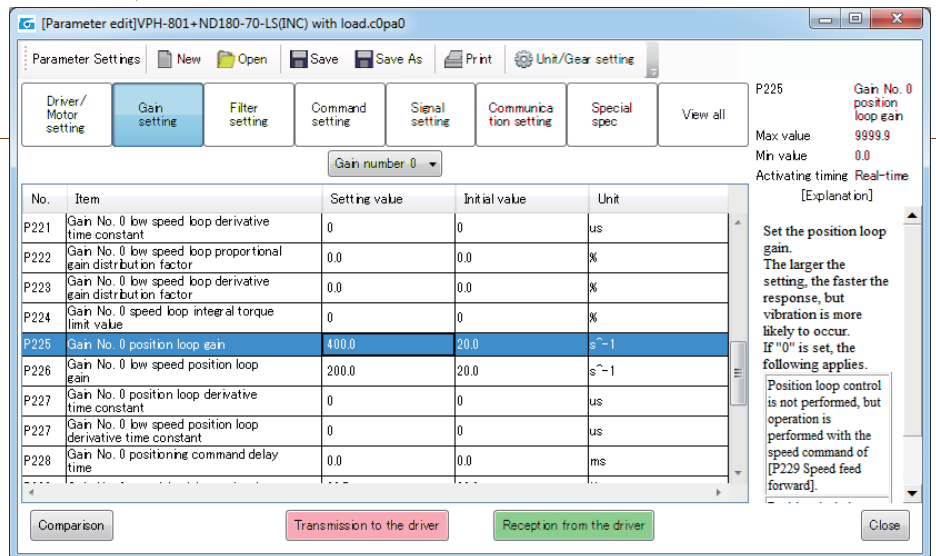
- The parameters such as gain, filter, command, and signal are grouped to make the editing work easier.

Program editing function

- Programs can be created and edited using the operation commands in internal command mode.

Indirect data editing function

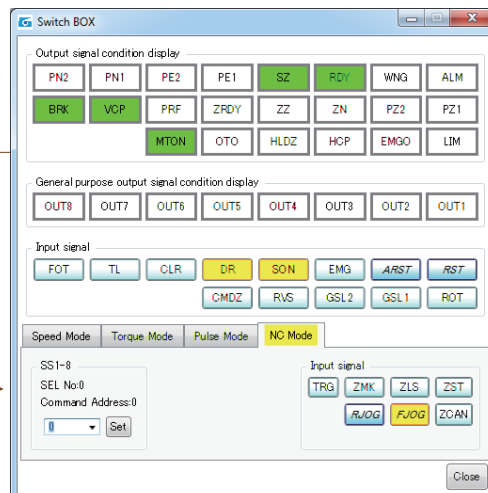
- This function creates and edits the indirect data to be used for program operation.



Remote operation

Switch box function

- Remote operation can be done easily from a PC with the master controller disconnected.



Switch box screen

Supported OS

- Windows 10 32bit/64bit
- Windows 8/8.1 32bit/64bit
- Windows 7 32bit/64bit