NIKKI DENSO

τ ENGINE
Powered by NIKKIDENSO

τDISC Servo Motor® **ND-s** series

τDISC Servo Motor® **ND-s HS** series

τDISC Servo Motor® **DD-s** series

τDISC Servo Motor® **HD-s** series

Direct Drive Servo Motor

tau

τDISC
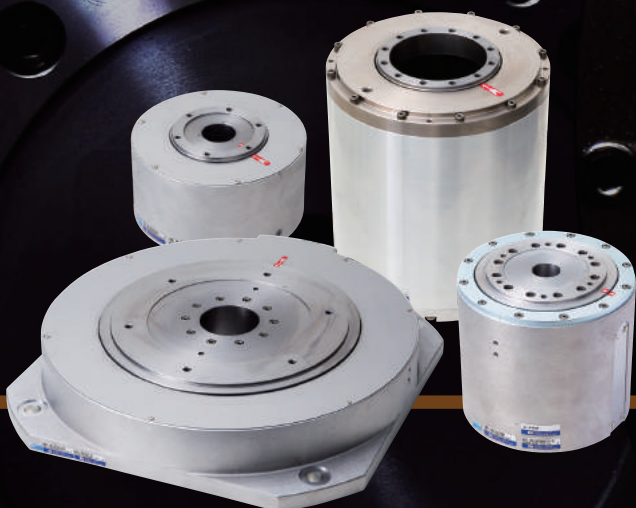
Creating a New Way of Motion
Direct Drive Motors

タウ
τ DISC®
Servo Motor

High precision

Speed stability

High response

High efficiency

Hollow structure

Quietness

Maintainability

Simple structure

Evolving Smart Direct Drives

The direct drive motor connects directly to a load and transmits power and motion without the intervention of any intermediate mechanism such as reducers or belts. Eliminating the intermediate mechanism makes the power transmission system more rigid and backlashless, enabling high speed and precise driving. This offers a number of advantages, including improved mechanical performance, space savings, reduced maintenance increased environmental friendliness, etc.

AC servo motor + Reducer

Load

Intermediate mechanism

Reducer

AC servo motor

Direct drive motor

Load

Direct drive motor

★Eliminating the intermediate mechanism offers a number of advantages.

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ND-s Series
Standard type suitable for various applications

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ND-s HS Series
High-speed rotation type pursuing high-speed operation

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DD-s Series
High-rigidity, high-precision type
pursuing high rigidity and high precision

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HD-s Series
High-response type pursuing high-speed operation

Features **P.8** Details **P.39**

τDISC Lineup list

Motor type	Rated rotation speed (rps)	Outside diameter (mm)	Middle hole diameter (mm)	Spec page	Dimensions page	Rated torque (N·m)
ND110-65-FS ND110-85-FS	5	112	19	P.16	P.18	4.2/10.5 (3.4/8.5) 7.1/17.5 (5.9/14.7) Shown in parentheses are the 100 VAC specification.
ND140-65-FS	5	145	19	P.16	P.19	9.6/22
ND140-70-LS ND140-95-LS	5	145	19	P.16	P.19 P.20	9.6/22 15/37
ND180-55-FS	5	180	30	P.16	P.20	17/40
ND180-70-LS ND180-95-LS	5	180	35	P.17	P.21	17/40 30/75
ND250-55-FS	3	254	65	P.17	P.22	42/100
ND250-70-LS ND250-95-LS	3	260	65	P.17	P.22 P.23	42/100 80/190
ND400-65-FS	2	408	65	P.17	P.23	
ND400-70-LS ND400-95-LS ND400-160-LS	2	408	65	P.17	P.24 P.25	
ND110-85-FS-HS	15	112	19	P.26	P.27	8/19.2
ND140-70-LS-HS ND140-95-LS-HS	11	145	19	P.26	P.27 P.28	9.6/22 15/37
ND180-95-LS-HS	11	180	35	P.26	P.28	24/65
DD160-96-LS DD160-105-FS DD160-146-LS	4	160	25 60 25	P.30	P.32 P.33	10/23 27/62.5 10/23
DD250-90-LS DD250-138-LS DD250-163-LS	2	265	65	P.30	P.33 P.34	42/100 80/190
DD400-150-LS DD400-200-LS DD400-250-LS	2 2 1/1.5/2	420	65	P.31	P.35 P.36 P.37	
DD630-175-LS DD630-225-LS	1	663	150	P.31	P.37 P.38	
HD140-160-LS	6	140	30	P.39	P.40	27/67.5
HD140-185-LS	5.5	140	30	P.39	P.41	36/100
HD180-200-LS	6	180	35	P.39	P.41	68/145

* In addition to the series listed above, we offer the FD-s Series of the large middle hole diameter type. For the specifications and other details, refer to our FD-s Series catalog.
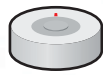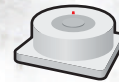
100	125	150	200	250	300	500	1000	1500	3000

τ DISC Servo Motor ND-s series

Standard type

150/300

150/300   260/650   500/1000
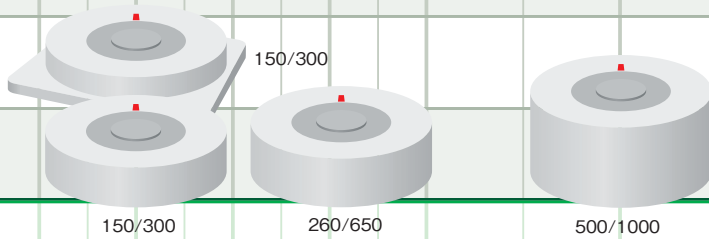
τ DISC Servo Motor ND-s HS series

High-speed rotation type
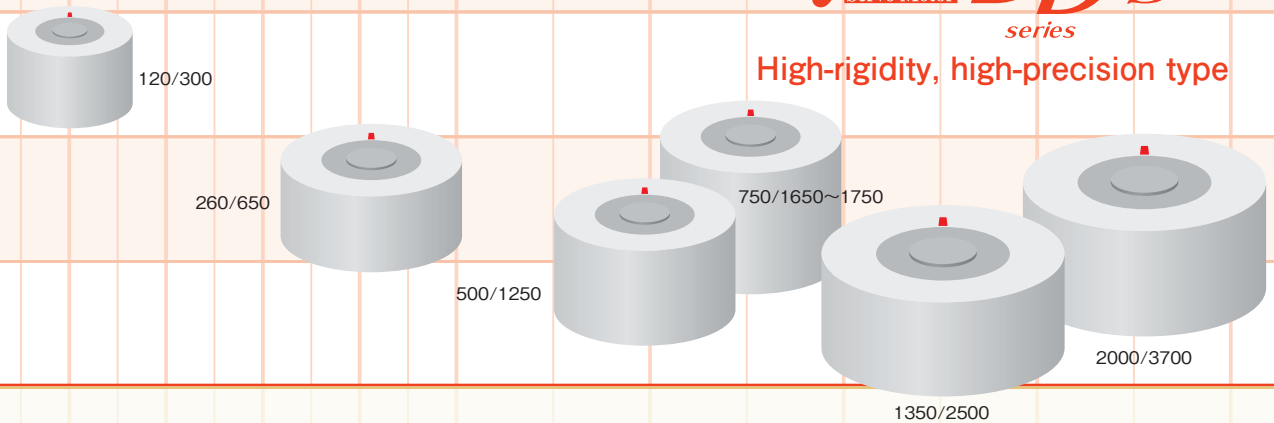
τ DISC Servo Motor DD-s series

High-rigidity, high-precision type

120/300

260/650

500/1250

750/1650～1750

1350/2500

2000/3700

τ DISC Servo Motor HD-s series

High-response type

4

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

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

Capping machine
τDISC
Torque sensor
Cap tightening

【Index machine】
● High-precision, flexible indexing
● Simple structure
● Quietness
● Improved maintainability

【Capping machine】
● The hollow structure makes the device simpler.
● Faster response

Index machine
τDISC
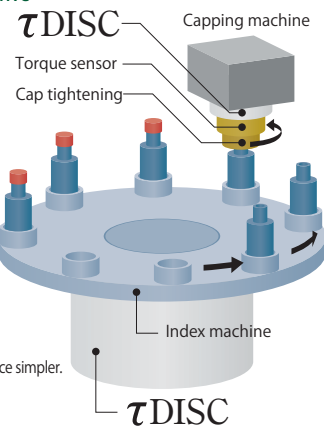
Rotary drive :
Die cutters, printing machines, etc.

Die roll
τDISC
● Speed stability
● Simple structure
● Improved maintainability
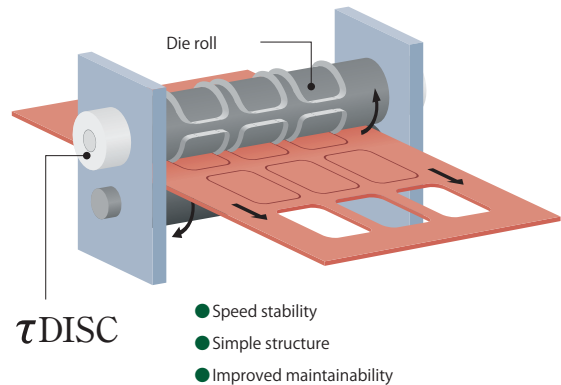
Feeding and winding drive (roll-to-roll application devices) :
Laminating machines, coaters, surface inspection machines, etc.
Replacing a powder clutch or brake

Feeding machine
Winding machine
τDISC
τDISC
● Speed stability
● Quietness
● Improved maintainability
● Easy adjustment
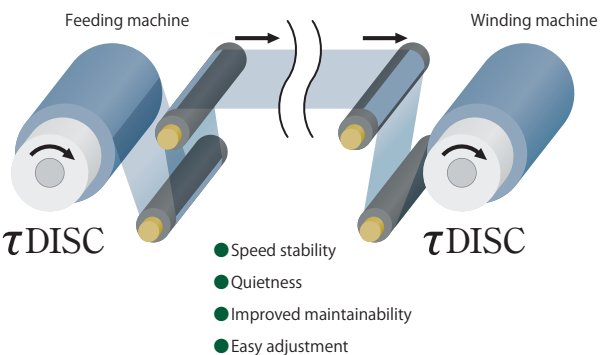
Table drive :
Laser beam machines, various processing machines, etc.

● Stable operation
● High precision
● Improved maintainability

Rotation axis
τDISC
Inclined axis
τDISC
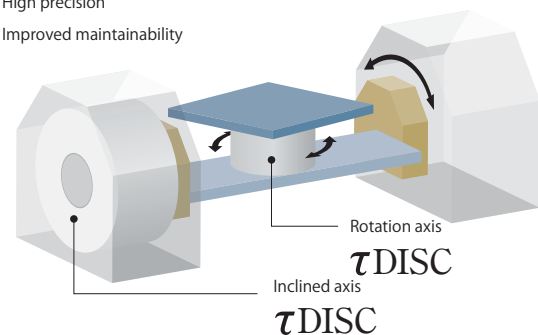
τDISC Servo Motor ND-s HS series

High-speed rotation

Rated torque: 8 to 24N·m
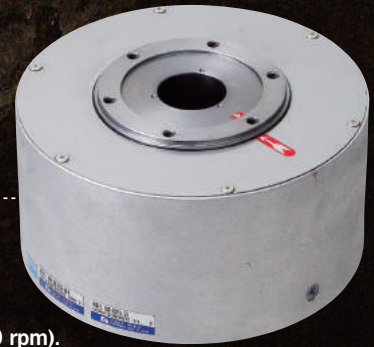
◎ High-speed rotation specification model of the ND-s Series.

◎ 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

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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: ±4 μm (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·㎡
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

τDISC

High-speed 90-degree positioning

High-speed 180-degree positioning
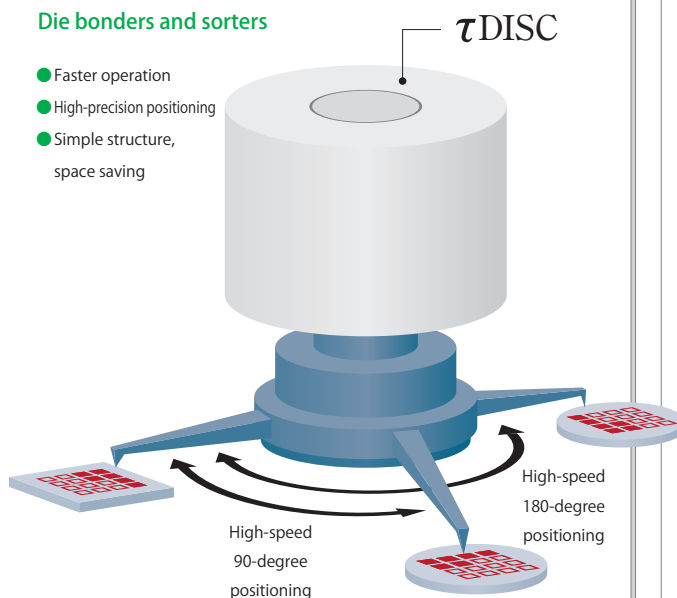
Spin drive：
Spin coaters, spin washers, etc.

● Speed stability
● Simple structure
● High acceleration

High-speed rotation operation

Wafer

τDISC

τ DISC® Servo Motor *DD-s* series

タウ
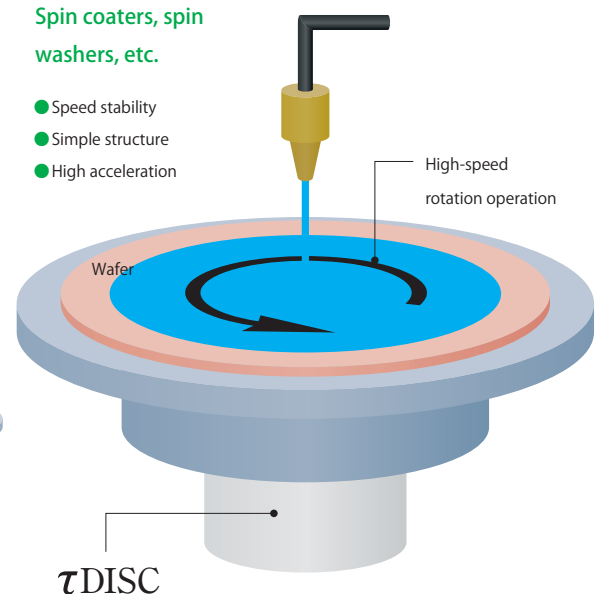
High rigidity and high precision

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.

Point!
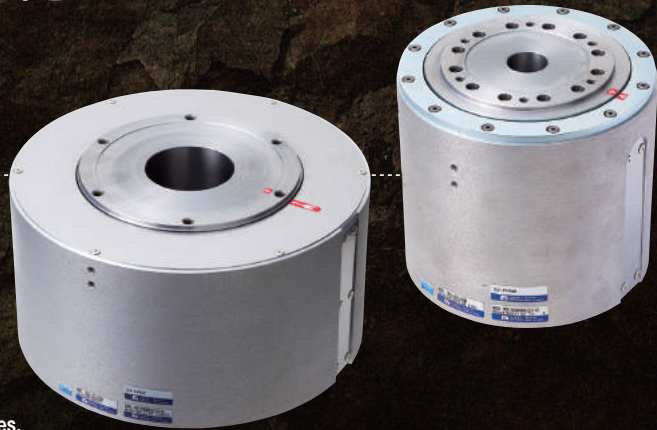
! **Ideal for applications that require stable operation for loads with large inertia**

DD-s / ND-s **5 times greater** than ND-s

Moment rigidity
The motor inclination due to the moment load is reduced to 1/5.

DD-s / ND-s **2.5 times greater** than ND-s

Axial rigidity
The amount of sinking due to the vertical load is reduced by 60%.

DD-s / ND-s **2 times greater** than ND-s

Rotor torsional rigidity
Improved control response leads to a shorter settling time.
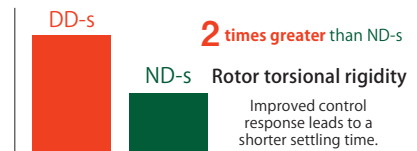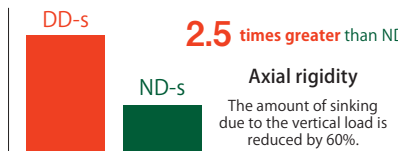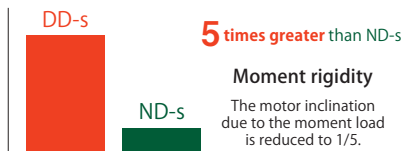
▼Positioning operation waveforms when the inertia ratio is 527 times

Positional deviation pulse waveform

Speed feedback waveform
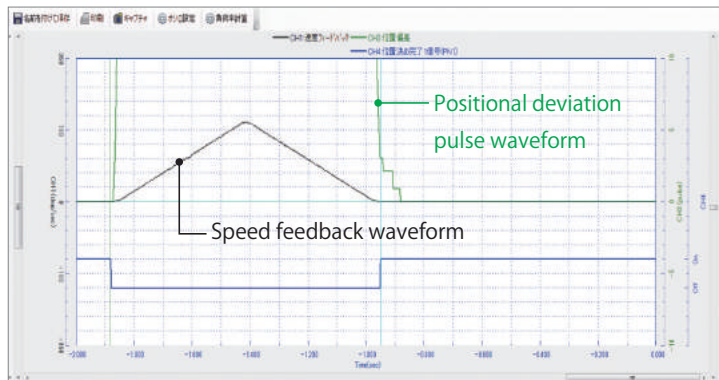
【Motor used and specifications】 **DD160-146-LS Type**

● Rated/maximum torque：27/62.5N・m

● Rotor moment of inertia：0.0074kg・㎡

● Load specifications (disk)

　Load inertia moment：3.9kg・㎡ (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

■ Scribers/■ 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

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● 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

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Printing roll

Glass, film, etc.

Gantry linear

τDISC

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

τDISC

Ball screw

τDISC® Servo Motor 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.

POINT

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

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

Speed feedback waveform

Positioning completion signal

18.2msec
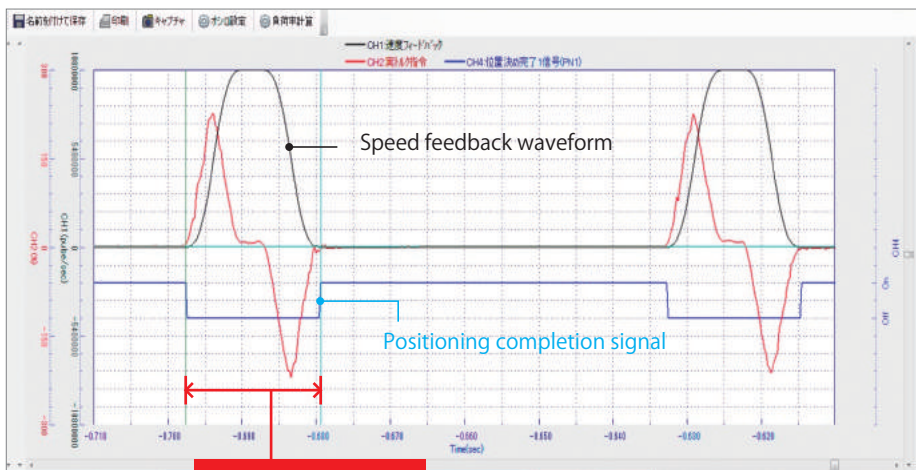
● Motor used and specifications

HD140-160-LS Type

Rated/maximum torque：27/67.5N・m

Rotor moment of inertia：0.0027kg・㎡

● Load specifications (disk)

Load weight：0.79kg

Load inertia moment：0.00297kg・㎡

（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

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High-speed index drive：

High-speed test handlers and taping machines

High-speed indexing operation for 22.5 degrees

● Faster operation

● High-speed positioning

● Simple structure and space saving

τDISC
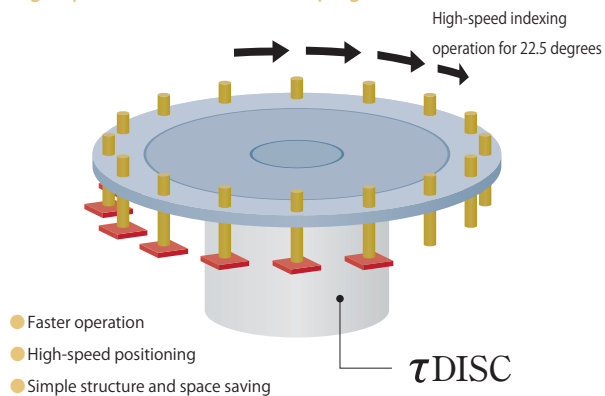
Testing machine drive：

Torque testing machines, material testing machines, durability testing machines, etc.

● High-response operation

● Space savings and improved quietness

● Improvement in environmental friendliness and safety

Sine wave operation at high-speed cycle

Torque meter

Test piece

τDISC

τDISC Servo Motor ® *Customization*
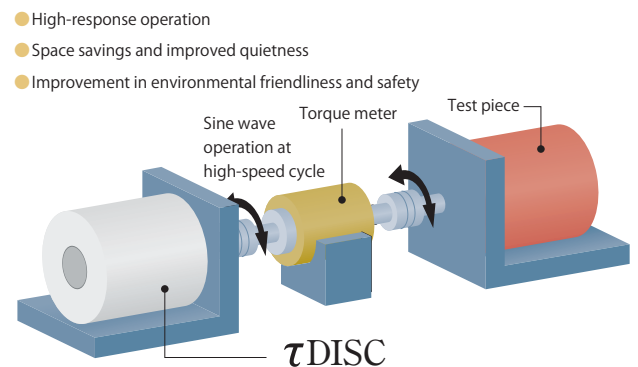
Custom Made

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

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.

Reciprocation within a very small range of angles

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.
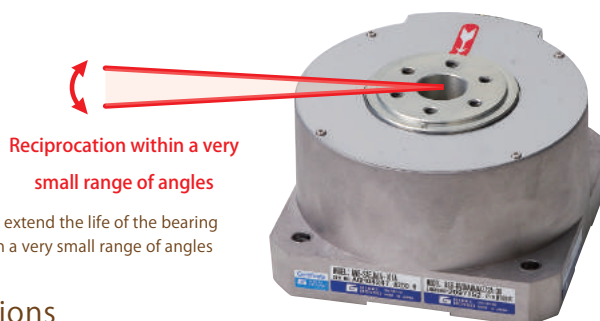
Custom Made 3

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.

Rotary encoder

Bearing   Rotor (rotating side)   Stator (fixed side)
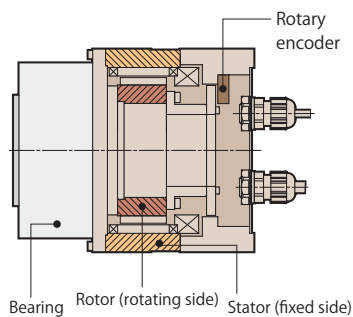
Custom Made 4 Improved positioning accuracy	**Custom Made 5** Improved rotation accuracy	**Custom Made 6** Improved torque accuracy
Custom Made 7 Improved flatness and parallelism	**Custom Made 8** Increased rotation speed and torque	**Custom Made 9** Anti-dust specification
Custom Made 10 Material and 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.

τDISC Servo Motor — Paired Servo driver

VPH Series VCII Series VPS Series

List of paired servo drivers of each τDISC Series

○：Pairing possible
△：Connector and cable changes

τDISC / Servo driver	VPH Series		VCII Series		VPS Series	
	Supported networks: SSCNET Ⅲ/H, CC-Link, EtherCAT, MECHATROLINK-Ⅲ		Supported networks: SSCNET Ⅲ/H, CC-Link, MECHATROLINK-Ⅲ		Supported networks: CC-Link	
	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.

10

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.

● Waveform at single-stage, s-curve acceleration and deceleration

Speed feedback
Positional deviation pulse
Torque command
Positioning completion signal

● Waveform at two-stage, s-curve acceleration and deceleration

Quiet, smooth positioning
Positioning time can be reduced as well.
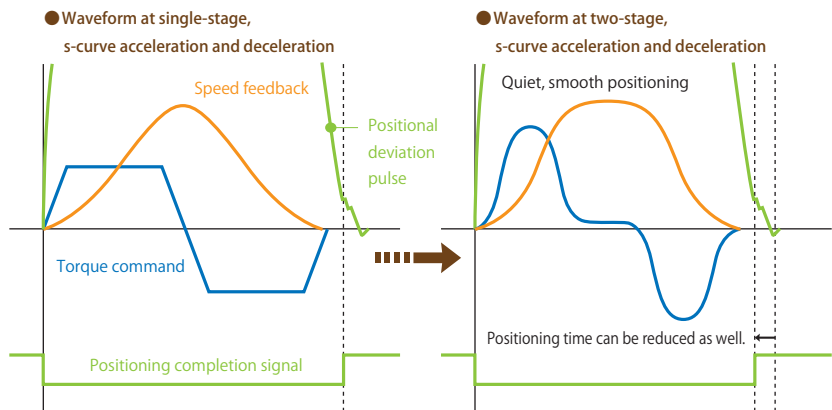
Improved accuracy of the feed forward (FF) command

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.

● Positioning waveform of the conventional model

Speed feedback
Positional deviation pulse
Torque command
Positioning settlement time
Positioning completion signal

● Positioning waveform of VPH

Positioning settlement time is reduced.
* 50% compared to the conventional model
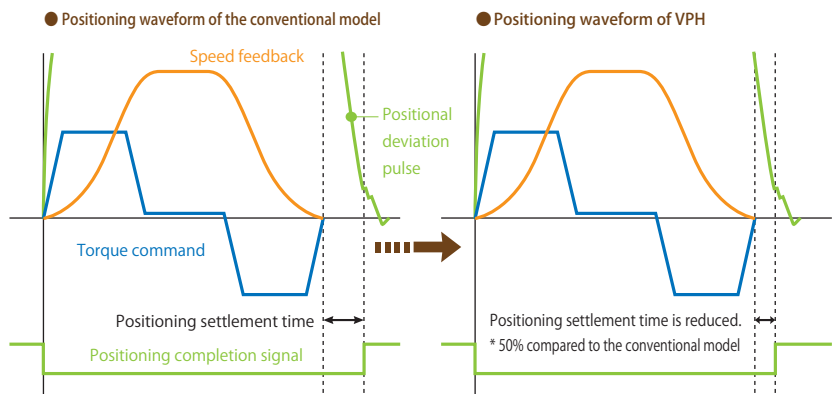
Even greater speed stability

Significant reduction in torque ripples

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

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.

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.

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

SSCNETⅢ/H
SERVO SYSTEM CONTROLLER NETWORK

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

MECHATROLINK   **CC-Link**

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.

CC-Link

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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 VCⅡ Series are different.

Analysis functions

Oscilloscope screen

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.
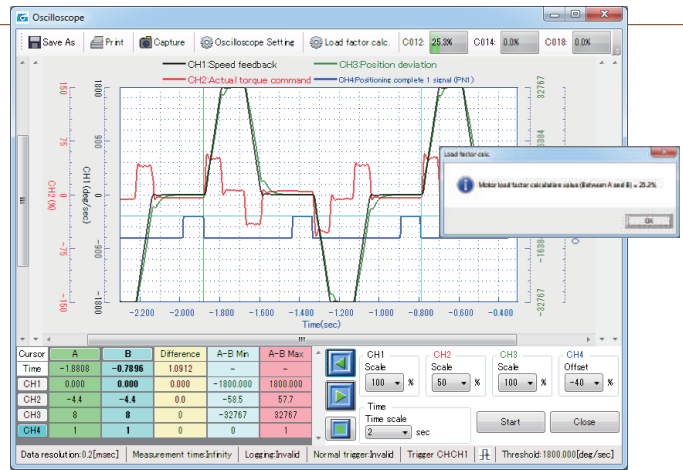
Frequency response measurement screen
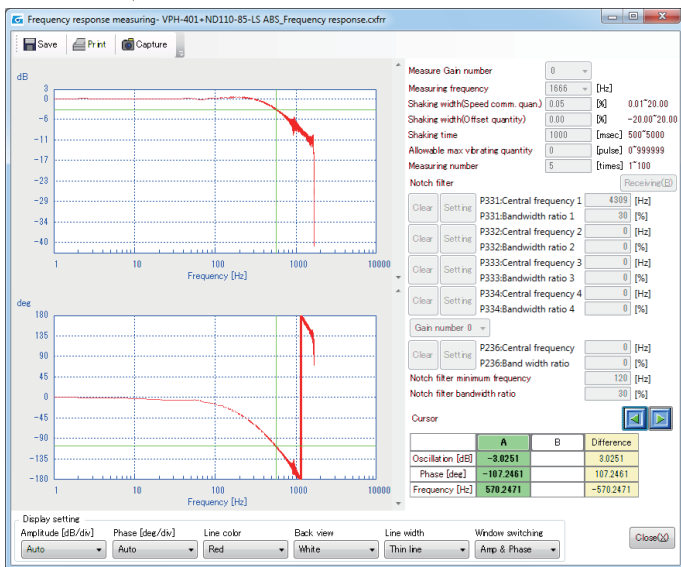
Frequency spectrum measurement screen
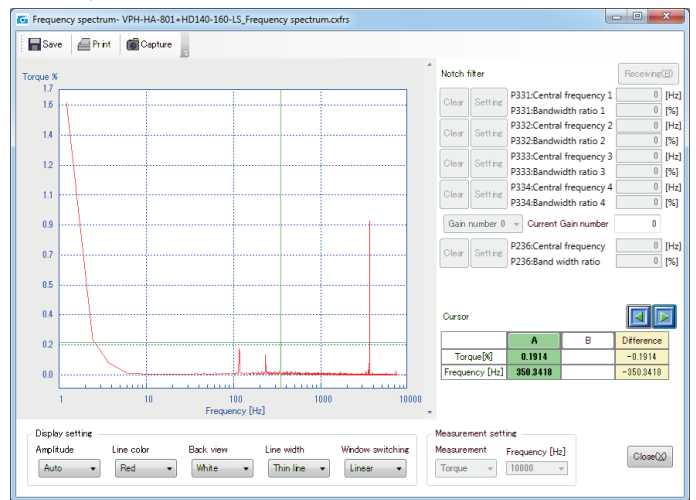
Status display

Status display screen

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.

13
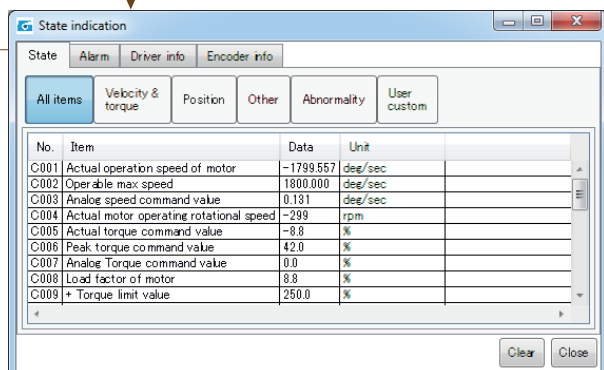
Adjustment functions

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.

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.

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.
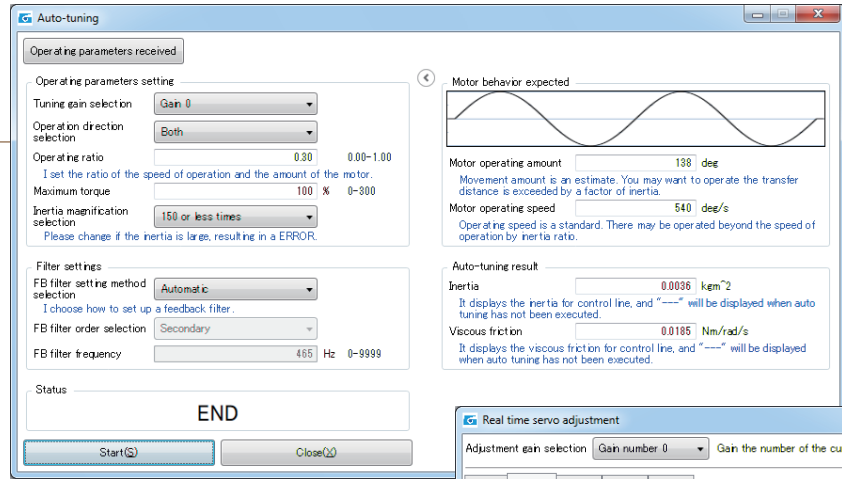
Auto tuning screen
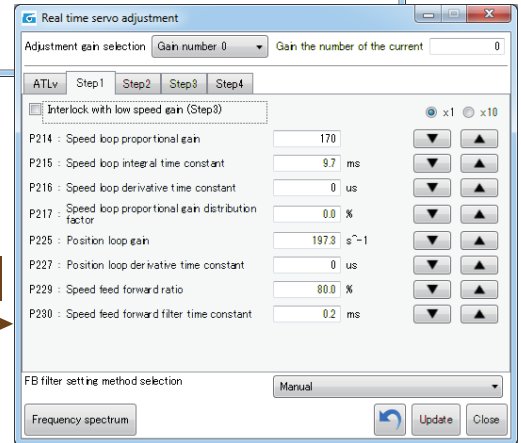
Real-time servo adjustment screen

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.
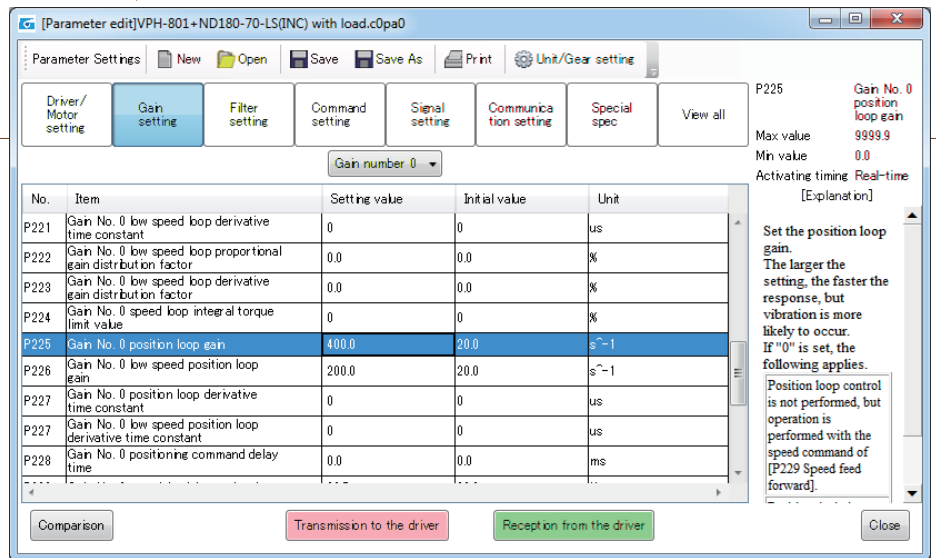
Remote operation

Switch box function

● Remote operation can be done easily from a PC with the master controller disconnected.
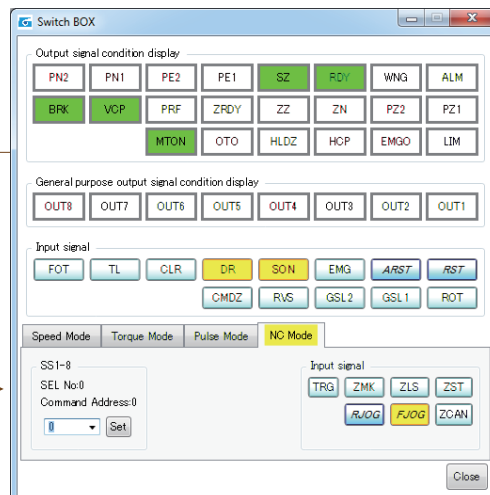
Switch box screen

Supported OS

● Windows10   32bit／64bit
● Windows8／8.1   32bit／64bit
● Windows7   32bit／64bit

■ τ DISC ND-s Series Model and motor type description

◎ **Motor type**

ND	110	-	65	-	F	S	P	
②	④		⑤		⑥	③	⑫	⑬

◎ **Model**

NMR	-	S	A	E	J	A2	A	-	131	A	P	
①		②	④	⑤	⑦	⑧	⑨		⑩	⑪	⑫	⑬

①			NMR···Direct drive motor Series	
②	Middle product classification（1）	Motor type	ND···ND-s Series／ ND-s HS Series	
		Model	S···ND-s Series／ ND-s HS Series	
③	Middle product classification（2）		S···ND-s Series／ ND-s HS Series／ DD-s Series／ HD-s Series	
④	Nominal diameter *1		**With flange**	**Flange less**
			A···110（Actual range 110 to 119mm）	R···140（Actual range 140 to 149mm）
			C···140（Actual range 140 to 149mm）	S···180（Actual range 170 to 189mm）
			D···180（Actual range 170 to 189mm）	T···250（Actual range 250 to 269mm）
			E···250（Actual range 250 to 269mm）	U···400（Actual range 400 to 409mm）
			F···400（Actual range 400 to 409mm）	
⑤	Nominal height *1		**With flange**	**Flange less**
			M···55（Actual range 50 to 59mm）	M···70（Actual range 60 to 69mm）
			E···65（Actual range 60 to 79mm）	E···70／95（Actual range 70 to 95mm）
			U···85（Actual range 80 to 99mm）	F···95（Actual range 96 to 119mm）
				H···160（Actual range 150 to 169mm）
⑥	Motor flange		F···With flange	L···Flange less
⑦	Encoder type		J···Absolute encoder（absolute value for one revolution）	I···Incremental encoder
⑧	Power supply voltage		A2···200 VAC	
			A1···100 VAC（ND110-s Type only）	
⑨	Order of design		A→B→C···Starting from A	
⑩	Rated output		Example） 131 ··· 13　1 =13×10¹ =130W　Exponent part of the power of 10　Significant figures	
⑪	Brake（with or without）		A···Without brake	
⑫	Table surface rotation accuracy		Without···Standard specification	P···High accuracy specification（option）
⑬	Special model code		Without···Standard specification	
			-R + sequential number···Quasi standard specification	-S + sequential number···Special model specification

*1 The motor type is represented by a numerical value. Nominal dimensions may be different from actual dimensions. For details, refer to the dimensions.

* Dimensions are subject to change without prior notice to improve the product. Before designing, download the latest dimensions from the CKD Nikki Denso website.

■ About the encoder type

The absolute encoder is the standard type of encoder in the ND-s Series lineup.

Note that, since this is a battery-less type encoder, it cannot hold multiple turn data.

An incremental encoder type is available on request.

This catalog only contains the specifications and dimensions of the absolute encoder type.

The incremental encoder type differs in the detection pulse, resolution, cable diameter, connector shape,

cable outlet（for the flange less type only）, etc.

For details, visit the CKD Nikki Denso website.

■ Common specifications

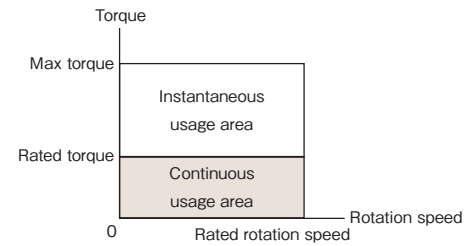|	
Ambient operating temperature	0 to 40℃
Ambient operating humidity	85% or less; no condensation
Installation location	Do not install in a harmful atmosphere containing corrosive gas, grinding oil, metal dust, oil, etc. Install indoors, do not exposed to direct sunlight.
Installation direction	Horizontal with the rotor facing upward. *If the installation direction is not horizontal with the rotor facing upward, consult with our sales staff.
Cooling method	Natural air cooling
Insulation class	Class F
Withstand voltage	1,500 VAC, 1 minute
Protection class	IP42
Height above sea level	1,000 m or less
Vibration resistance	1G（3 directions, 2 hours each）
Shock resistance	30G（3 directions, 2 times each）

■ Torque characteristics

* If the locking operation or an equivalent operation （ultra low speed rotation or reciprocation within a very small range of angles） is performed continuously, the electronic thermal value may be reduced for motor protection. When you plan to perform the above operation, contact our sales staff.

■ τ DISC ND-s Series Individual specifications

Motor type *1			ND110-65-FS（P）		ND110-85-FS（P）	
Model *1	NMR-	SAEJA1A-101A（P）	SAEJA2A-131A（P）	SAUJA1A-181A（P）	SAUJA2A-221A（P）	
Flange type		With flange		With flange		
Power supply used	VAC	100	200	100	200	
Outside diameter	mm	112		112		
Height *2	mm	66（65.8）		86（85.8）		
Rated torque	N·m	3	3.4	4.2	5.9	7.1
Max torque	N·m	7.5	8.5	10.5	14.7	17.5
Rated rotation speed	rps	5		5		
Rated output	W	94	106	131	185	223
Rated current	A	2	2.3	2	3.4	2.5
Encoder type		Absolute		Absolute		
Detection pulse	ppr	2,097,152		2,097,152		
Detection resolution	arcsec	0.618		0.618		
Allowable moment load *3	N·m	6.1		6.1		
Allowable axial load *3	kN	1.1		1.1		
Table surface rotation accuracy *4	Radial run out（no load） μm	30（Standard）/10（High accuracy specification）				
	Axial run out（no load） μm	30（Standard）/10（High accuracy specification）				
Absolute positioning accuracy *5	arcsec	±15（When the absolute position compensation function option is used）				
Repeated positioning accuracy（when reciprocating）	arcsec	±2				
Rotor moment of inertia	kg·m²	0.00039		0.00061		
Weight	kg	2.2		3.1		
Magnetic pole detection method		Absolute position detection		Absolute position detection		
Paired driver	VPH Series NCR-H□	1101□-A-□□	1201□-A-□□	2201□-A-□□	1201□-A-□□	2401□-A-□□
	VCⅡ Series NCR-□DA□	A1A-101J	A1A-201J	A2A-201J	A1A-201J	A2A-401J

Motor type *1		ND140-65-FS（P）	ND140-70-LS（P）	ND140-95-LS（P）
Model *1	NMR-	SCEJA2A-301A（P）	SREJA2A-301A（P）	SRFJA2A-471A（P）
Flange type		With flange	Flange less	Flange less
Power supply used	VAC	200	200	200
Outside diameter	mm	145	145	145
Height *2	mm	71（70.8）	73（72.8）	98（97.8）
Rated torque	N·m	9.6	9.6	15
Max torque	N·m	22	22	37
Rated rotation speed	rps	5	5	5
Rated output	W	301	301	471
Rated current	A	3.4	3.4	4
Encoder type		Absolute	Absolute	Absolute
Detection pulse	ppr	2,097,152	2,097,152	2,097,152
Detection resolution	arcsec	0.618	0.618	0.618
Allowable moment load *3	N·m	17.3	17.3	17.3
Allowable axial load *3	kN	2.4	2.4	2.4
Table surface rotation accuracy *4	Radial run out（no load） μm	40（Standard）/10（High accuracy specification）		
	Axial run out（no load） μm	40（Standard）/10（High accuracy specification）		
Absolute positioning accuracy *5	arcsec	±15（When the absolute position compensation function option is used）		
Repeated positioning accuracy（when reciprocating）	arcsec	±1		
Rotor moment of inertia	kg·m²	0.00077	0.00084	0.00134
Weight	kg	4.2	4.1	5.9
Magnetic pole detection method		Absolute position detection	Absolute position detection	Absolute position detection
Paired driver	VPH Series NCR-H□	2401□-A-□□	2401□-A-□□	2801□-A-□□
	VCⅡ Series NCR-□DA□	A2A-401J	A2A-401J	A2A-801J

*1 Shown in parentheses are the motor type and model of the High accuracy specification（option）.

*2 Shown in parentheses is the value of the High accuracy specification（option）.

*3 The life of the bearing and the run out accuracy differ depending on the load.
　For the points to note with regard to the allowable loads, refer to "About the allowable loads of τ DISC" on p.44.

*4 For details, refer to "High accuracy specification option for τ DISC table surface rotation accuracy" on p.43.

*5 For details, refer to "τ DISC absolute position compensation function option" on p.42.

■ τDISC ND-s Series Individual specifications

Motor type *1			ND180-55-FS(P)	ND180-70-LS(P)	ND180-95-LS(P)
Model *1		NMR-	SDMJA2A-531A(P)	SSMJA2A-531A(P)	SSEJA2A-941A(P)
Flange type			With flange	Flange less	Flange less
Power supply used		VAC	200	200	200
Outside diameter		mm	180	180	180
Height *2		mm	58(57.8)	67(66.8)	94(93.8)
Rated torque		N·m	17	17	30
Max torque		N·m	40	40	75
Rated rotation speed		rps	5	5	5
Rated output		W	534	534	942
Rated current		A	5	5	6.5
Encoder type			Absolute	Absolute	Absolute
Detection pulse		ppr	2,097,152	2,097,152	2,097,152
Detection resolution		arcsec	0.618	0.618	0.618
Allowable moment load *3		N·m	20.5	27.3	27.3
Allowable axial load *3		kN	2	2.9	2.9
Table surface rotation accuracy *4	Radial run out(no load)	μm	50(Standard) / 10(High accuracy specification)		
	Axial run out(no load)	μm	50(Standard) / 10(High accuracy specification)		
Absolute positioning accuracy *5		arcsec	±15(When the absolute position compensation function option is used)		
Repeated positioning accuracy(when reciprocating)		arcsec	±1		
Rotor moment of inertia		kg·m²	0.0027	0.0031	0.0053
Weight		kg	5.3	5.8	8.8
Magnetic pole detection method			Absolute position detection	Absolute position detection	Absolute position detection
Paired driver	VPH Series	NCR-H□	2801□-A-□□□	2801□-A-□□□	2801□-A-□□□
	VCⅡ Series	NCR-□DA□	A2A-801J	A2A-801J	A2A-801J

Motor type *1			ND250-55-FS(P)	ND250-70-LS(P)	ND250-95-LS(P)
Model *1		NMR-	SEMJA2A-791A(P)	STEJA2A-791A(P)	STFJA2A-152A(P)
Flange type			With flange	Flange less	Flange less
Power supply used		VAC	200	200	200
Outside diameter		mm	254	260	260
Height *2		mm	58(57.8)	73(72.8)	98(97.8)
Rated torque		N·m	42	42	80
Max torque		N·m	100	100	190
Rated rotation speed		rps	3	3	3
Rated output		W	791	791	1,507
Rated current		A	6	6	10
Encoder type			Absolute	Absolute	Absolute
Detection pulse		ppr	6,815,744	6,815,744	6,815,744
Detection resolution		arcsec	0.191	0.191	0.191
Allowable moment load *3		N·m	60	244	244
Allowable axial load *3		kN	3.5	12.9	12.9
Table surface rotation accuracy *4	Radial run out(no load)	μm	50(Standard) / 10(High accuracy specification)		
	Axial run out(no load)	μm	50(Standard) / 10(High accuracy specification)		
Absolute positioning accuracy *5		arcsec	±15(When the absolute position compensation function option is used)		
Repeated positioning accuracy(when reciprocating)		arcsec	±1		
Rotor moment of inertia		kg·m²	0.022	0.023	0.039
Weight		kg	10.7	12.5	18.5
Magnetic pole detection method			Absolute position detection	Absolute position detection	Absolute position detection
Paired driver	VPH Series	NCR-H□	2801□-A-□□□	2801□-A-□□□	2152□-A-□□□
	VCⅡ Series	NCR-□DA□	A2A-801J	A2A-801J	A2A-152J

Motor type *1			ND400-65-FS(P)	ND400-70-LS(P)	ND400-95-LS(P)	ND400-160-LS(P)
Model *1		NMR-	SFEJA2A-182A(P)	SUEJA2A-182A(P)	SUFJA2A-322A(P)	SUHJA2A-622A(P)
Flange type			With flange	Flange less	Flange less	Flange less
Power supply used		VAC	200	200	200	200
Outside diameter		mm	408	408	408	408
Height *2		mm	77(76.8)	73(72.8)	98(97.8)	160(159.8)
Rated torque		N·m	150	150	260	500
Max torque		N·m	300	300	650	1,000
Rated rotation speed		rps	2	2	2	2
Rated output		W	1,884	1,884	3,267	6,283
Rated current		A	15	15	24	36
Encoder type			Absolute	Absolute	Absolute	Absolute
Detection pulse		ppr	6,815,744	6,815,744	6,815,744	6,815,744
Detection resolution		arcsec	0.191	0.191	0.191	0.191
Allowable moment load *3		N·m	315	315	315	315
Allowable axial load *3		kN	14.5	14.5	14.5	14.5
Table surface rotation accuracy *4	Radial run out(no load)	μm	50(Standard) / 10(High accuracy specification)			
	Axial run out(no load)	μm	50(Standard) / 10(High accuracy specification)			
Absolute positioning accuracy *5		arcsec	±15(When the absolute position compensation function option is used)			
Repeated positioning accuracy(when reciprocating)		arcsec	±1			
Rotor moment of inertia		kg·m²	0.142	0.142	0.224	0.393
Weight		kg	32	32	45	75
Magnetic pole detection method			Absolute position detection	Absolute position detection	Absolute position detection	Absolute position detection
Paired driver	VPH Series	NCR-H□	2222□-A-□□□	2222□-A-□□□	2332□-A-□□□	2702□-A-□□□
	VCⅡ Series	NCR-□DA□	A2A-222J	A2A-222J	A2B-402J	A2A-752J

*1 Shown in parentheses are the motor type and model of the High accuracy specification(option).

*2 Shown in parentheses is the value of the High accuracy specification(option).

*3 The life of the bearing and the run out accuracy differ depending on the load.

　For the points to note with regard to the allowable loads, refer to "About the allowable loads of τDISC" on p.44.

*4 For details, refer to "High accuracy specification option for τDISC table surface rotation accuracy" on p.43.

*5 For details, refer to "τDISC absolute position compensation function option" on p.42.

■ τ DISC ND-s Series Dimensions

◎ ND110-65-FS（P）

NMR-SAEJA1A-101A（P）
NMR-SAEJA2A-131A（P）

*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E
ND110-65-FS	50	66	1.5	0.03	64.7
ND110-65-FSP	49.8	65.8	1.3	0.01	64.5
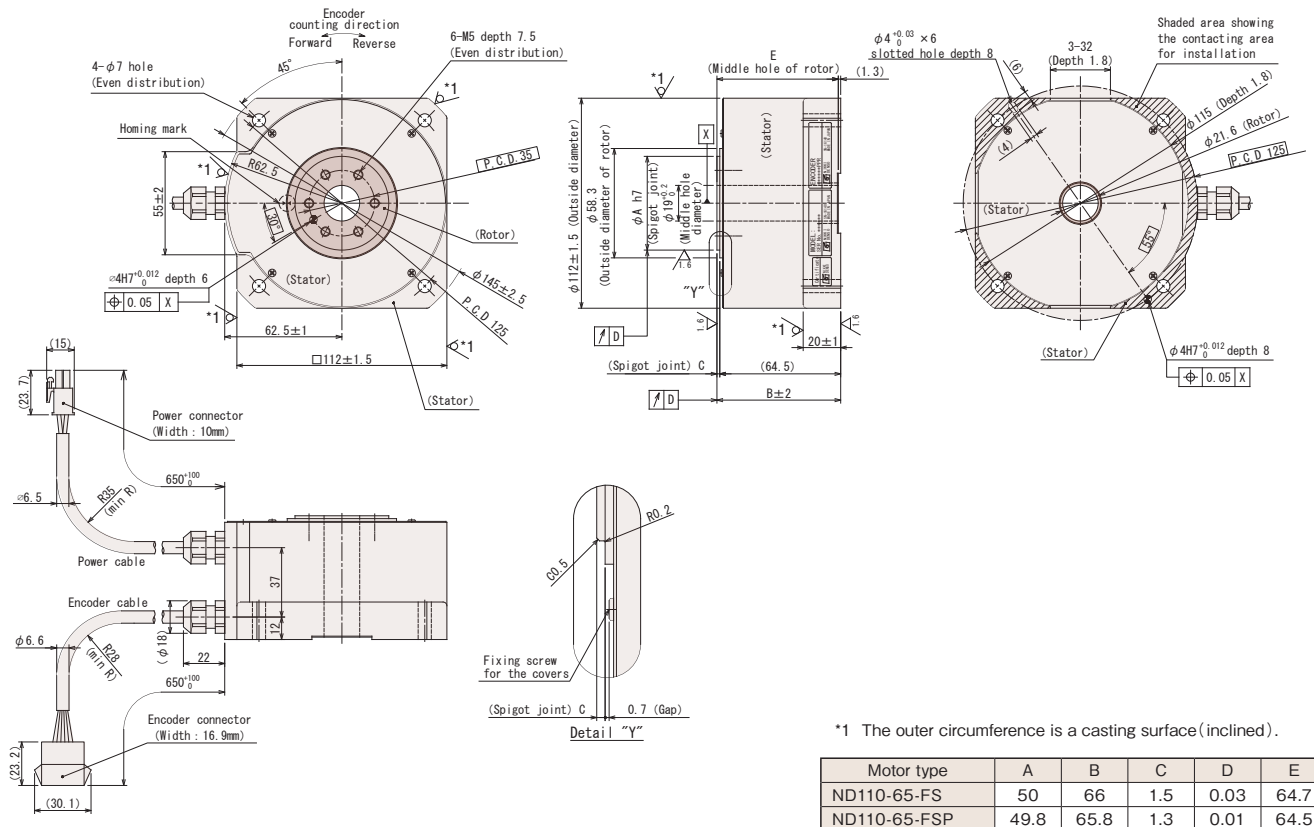
◎ ND110-85-FS（P）

NMR-SAUJA1A-181A（P）
NMR-SAUJA2A-221A（P）

*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E
ND110-85-FS	50	86	1.5	0.03	84.7
ND110-85-FSP	49.8	85.8	1.3	0.01	84.5
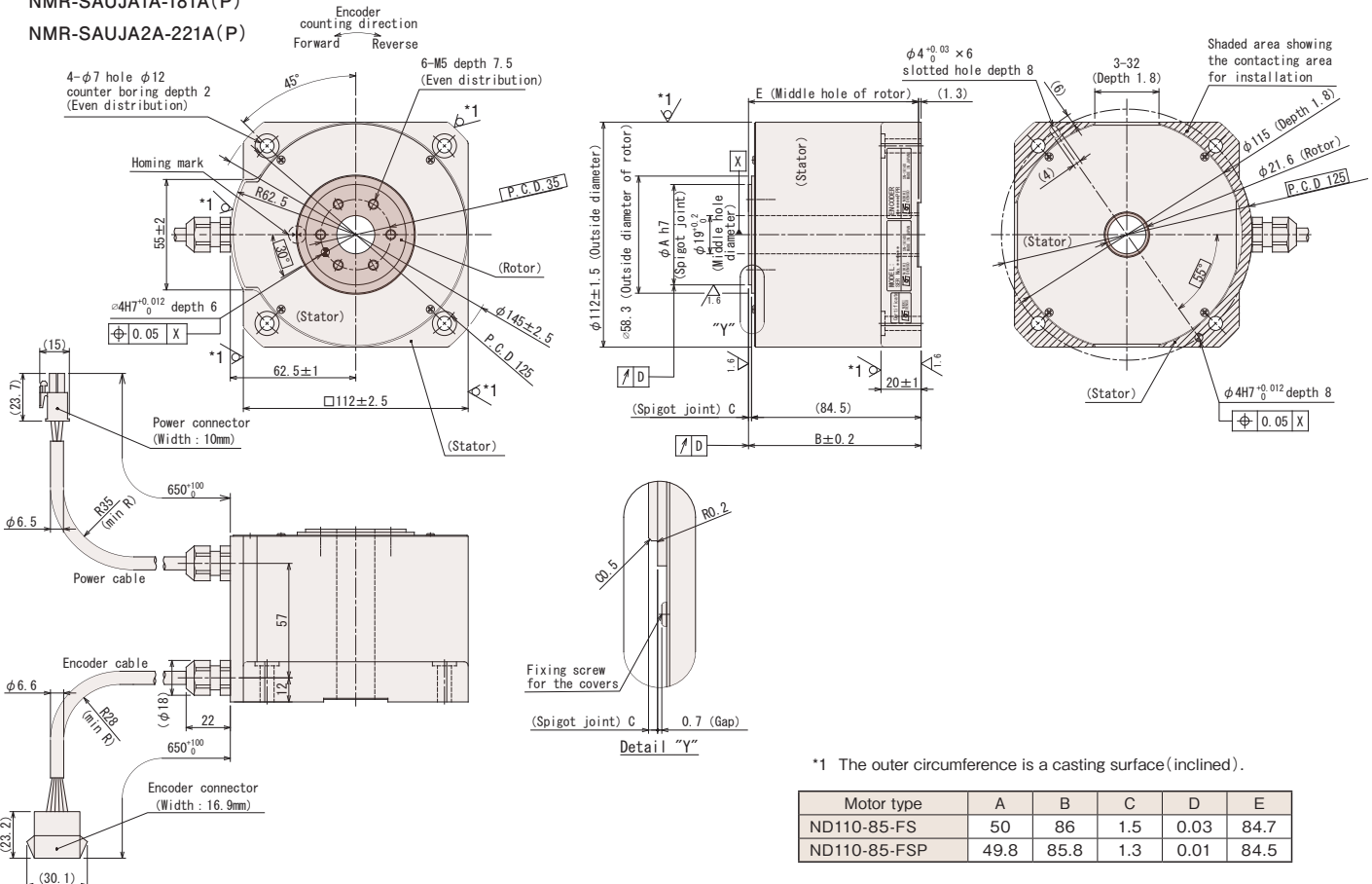
■ τDISC ND-s Series Dimensions

◎ ND140-65-FS(P)

NMR-SCEJA2A-301A(P)

Detail "Y"

*1 The outer circumference is a casting surface(inclined).

Motor type	A	B	C	D	E	F
ND140-65-FS	60	71	3	0.04	70	8.5
ND140-65-FSP	59.8	70.8	2.8	0.01	69.8	8.3

◎ ND140-70-LS(P)

NMR-SREJA2A-301A(P)

Detail "Y"   Detail "Z"

*1 The outer circumference is a casting surface(inclined).

Motor type	A	B	C	D	E	F
ND140-70-LS	60	73	3	0.04	76.5	8
ND140-70-LSP	59.8	72.8	2.8	0.01	76.3	7.8

■ τDISC ND-s Series Dimensions

◎ ND140-95-LS（P）

NMR-SRFJA2A-471A（P）

Motor type	A	B	C	D	E	F
ND140-95-LS	60	98	3	0.04	101.5	8
ND140-95-LSP	59.8	97.8	2.8	0.01	101.3	7.8

◎ ND180-55-FS（P）

NMR-SDMJA2A-531A（P）

*1 The outer circumference is a casting surface（inclined）.

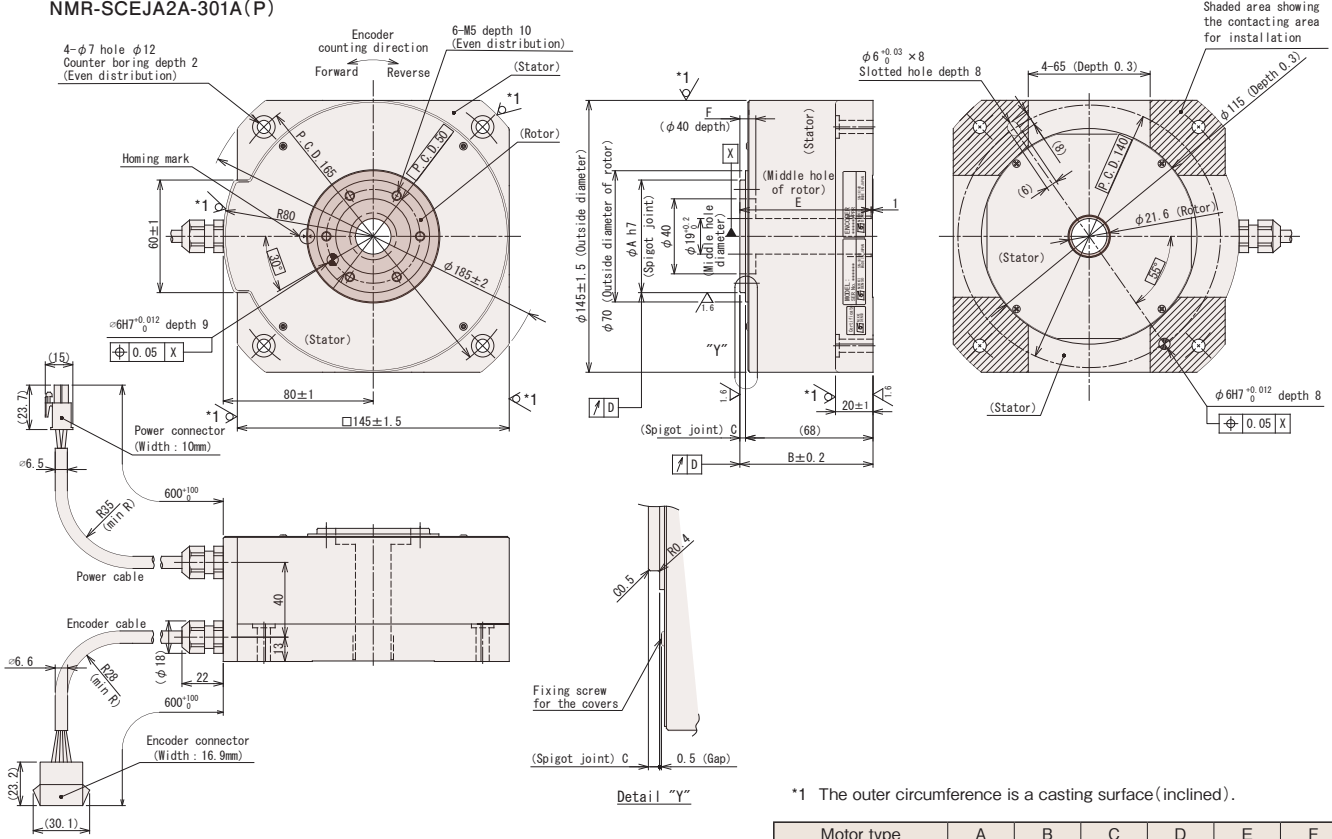| Motor type	A	B	C	D	E	F
ND180-55-FS	96	58	3	0.05	57	1
ND180-55-FSP	95.8	57.8	2.8	0.01	56.8	0.8

■ τDISC ND-s Series Dimensions

◎ ND180-70-LS(P)

NMR-SSMJA2A-531A(P)
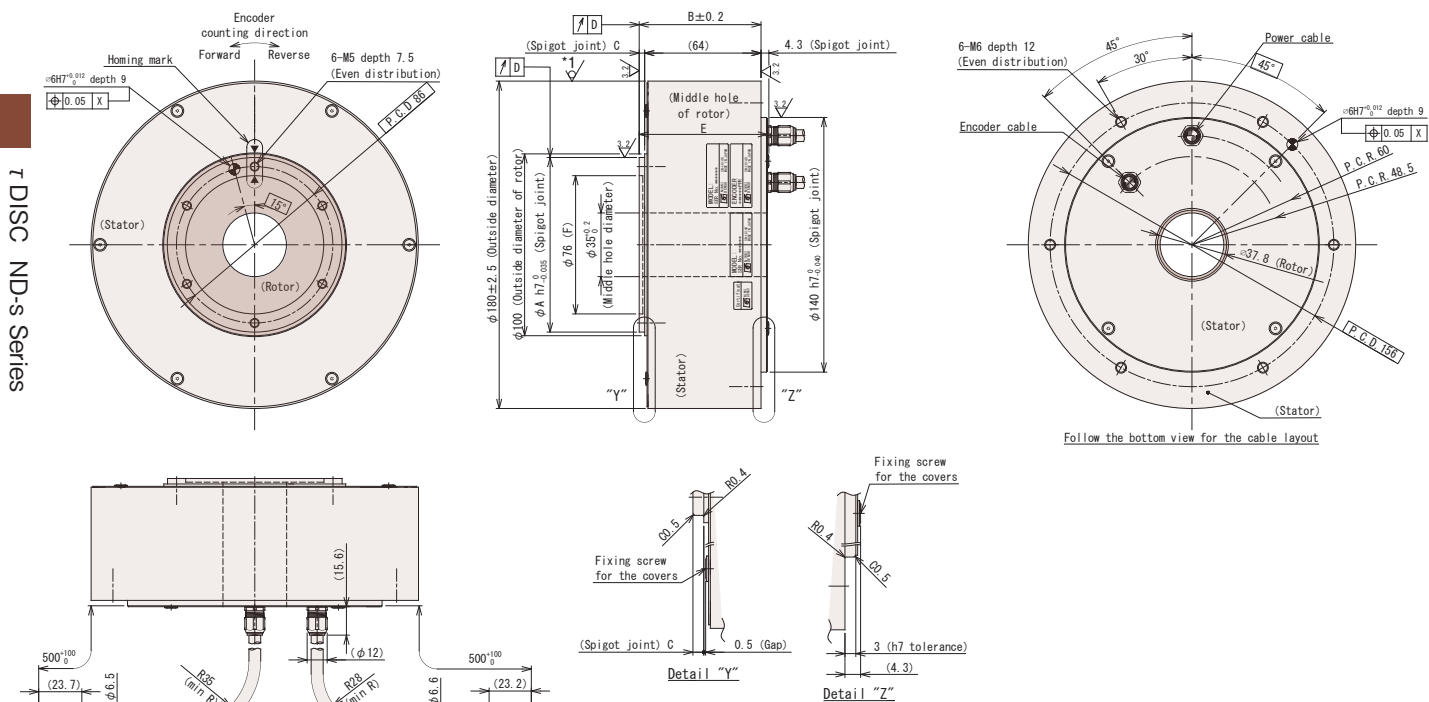
*1 The outer circumference is a casting surface(inclined).

Motor type	A	B	C	D	E	F
ND180-70-LS	96	67	3	0.05	70.5	2
ND180-70-LSP	95.8	66.8	2.8	0.01	70.3	1.8

◎ ND180-95-LS(P)

NMR-SSEJA2A-941A(P)
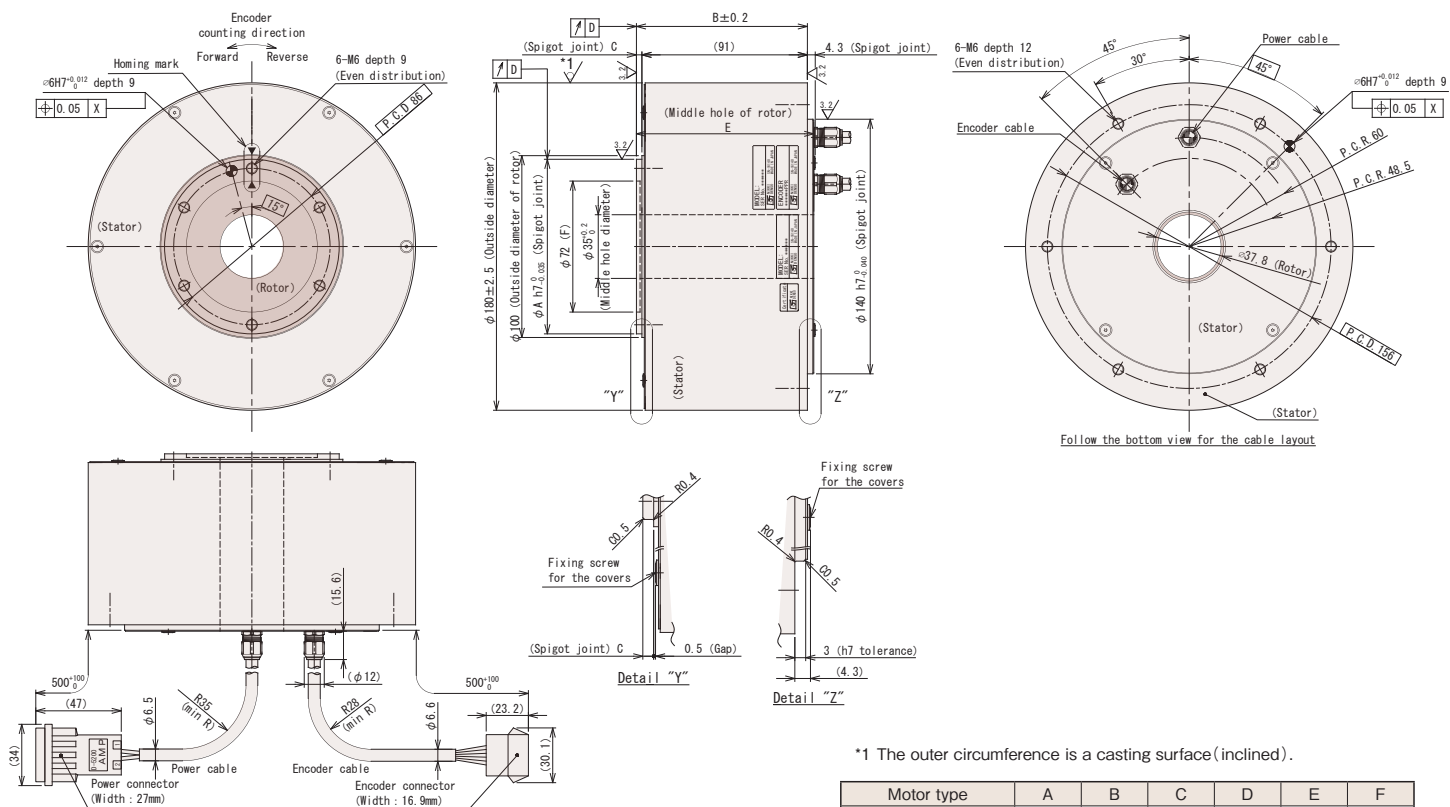
*1 The outer circumference is a casting surface(inclined).

Motor type	A	B	C	D	E	F
ND180-95-LS	96	94	3	0.05	97.5	2
ND180-95-LSP	95.8	93.8	2.8	0.01	97.3	1.8

■ τ DISC ND-s Series Dimensions

◎ ND250-55-FS（P）

NMR-SEMJA2A-791A（P）

*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F
ND250-55-FS	162	58	3	0.05	57	1
ND250-55-FSP	161.8	57.8	2.8	0.01	56.8	0.8

Detail "Y"
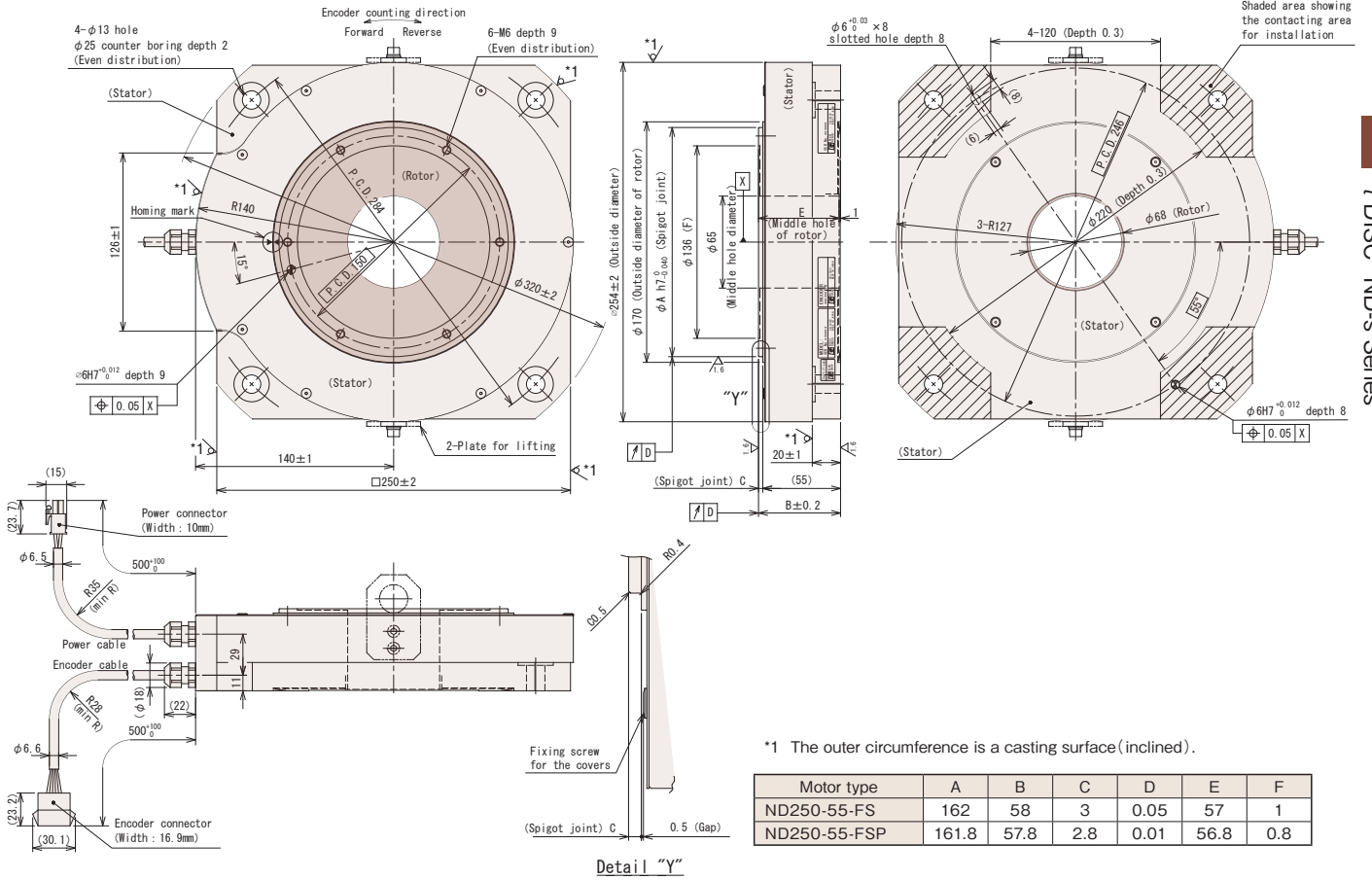
◎ ND250-70-LS（P）

NMR-STEJA2A-791A（P）

Follow the bottom view for the cable layout

Detail "Y"   Detail "Z"

*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F
ND250-70-LS	162	73	3	0.05	76	1
ND250-70-LSP	161.8	72.8	2.8	0.01	75.8	0.8
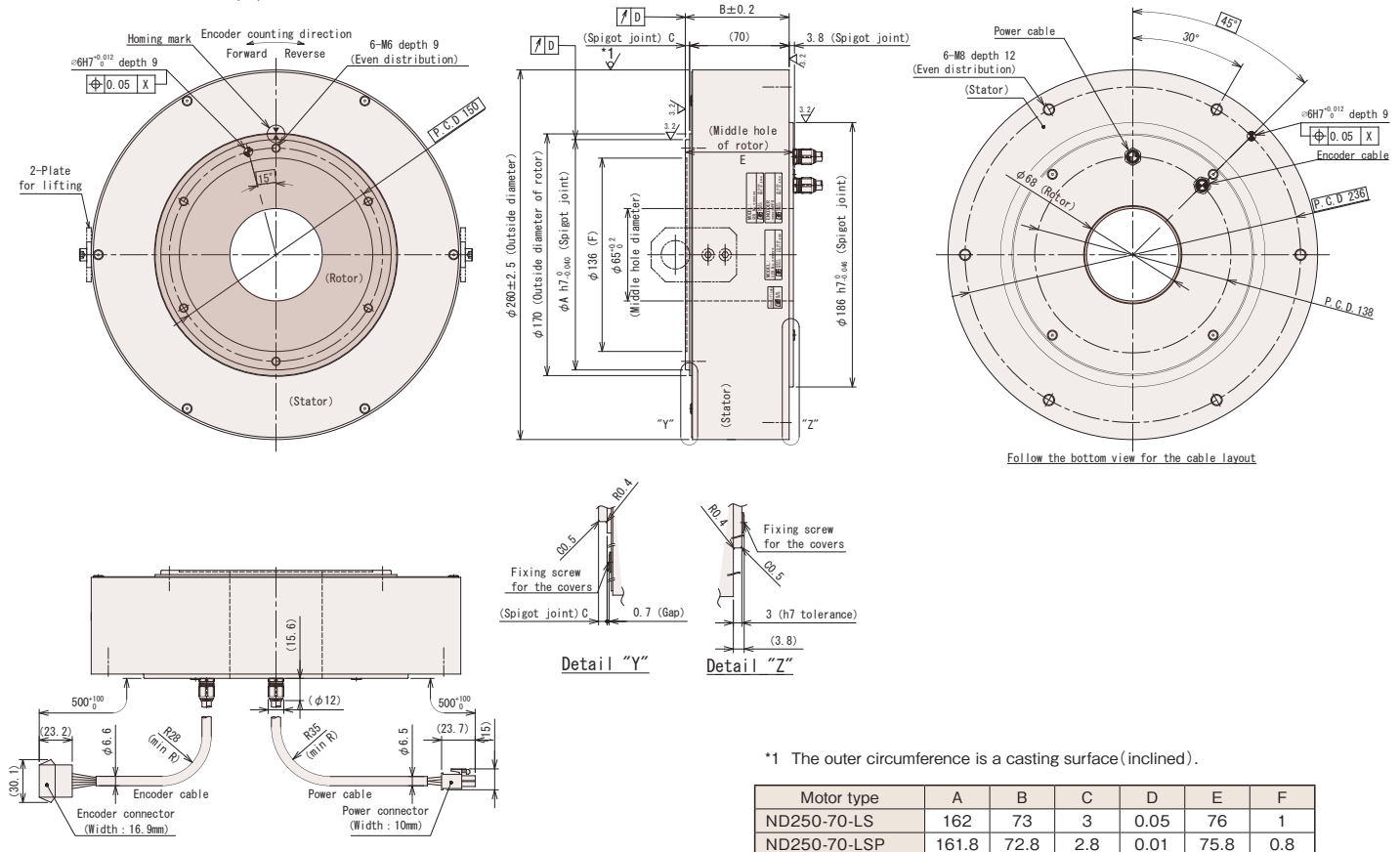
■ τDISC ND-s Series Dimensions

◎ ND250-95-LS(P)

NMR-STFJA2A-152A(P)
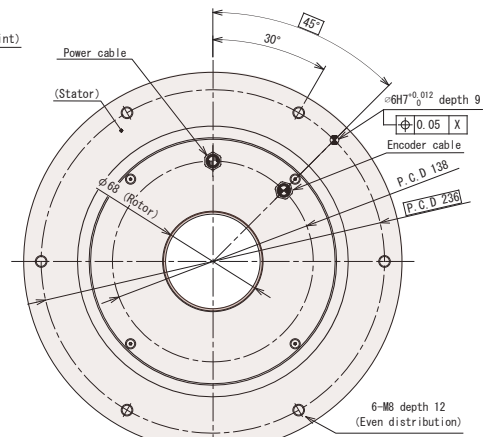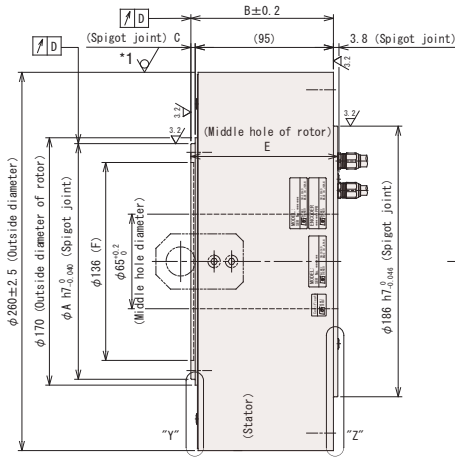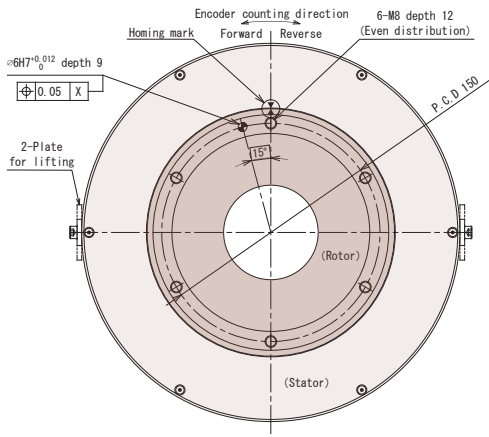
Follow the bottom view for the cable layout

Detail "Y"

Detail "Z"
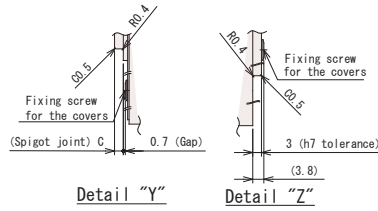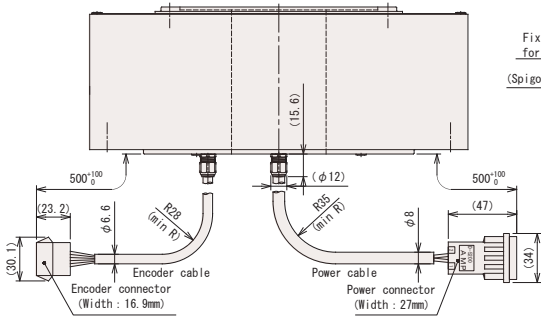
*1 The outer circumference is a casting surface(inclined).

Motor type	A	B	C	D	E	F
ND250-95-LS	162	98	3	0.05	101	2
ND250-95-LSP	161.8	97.8	2.8	0.01	100.8	1.8

◎ ND400-65-FS(P)

NMR-SFEJA2A-182A(P)

Detail "Y"
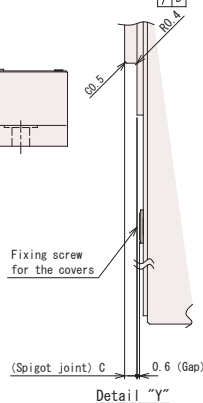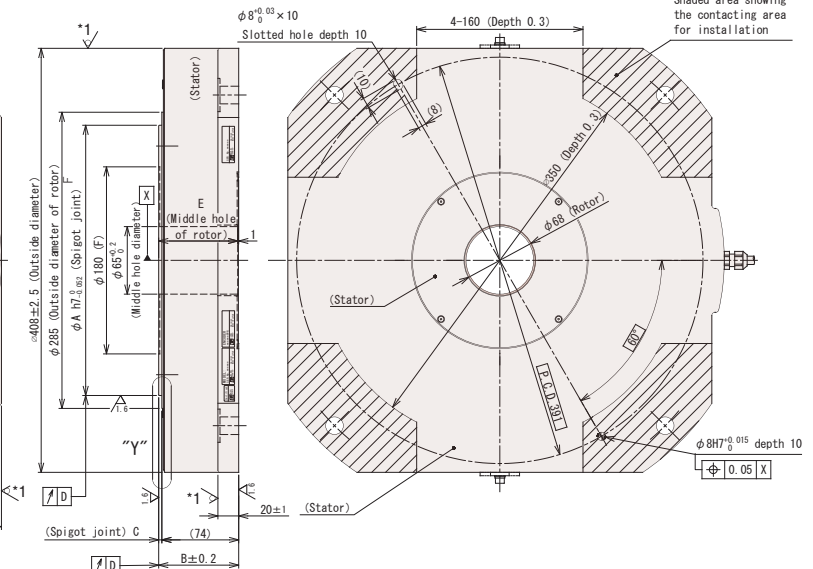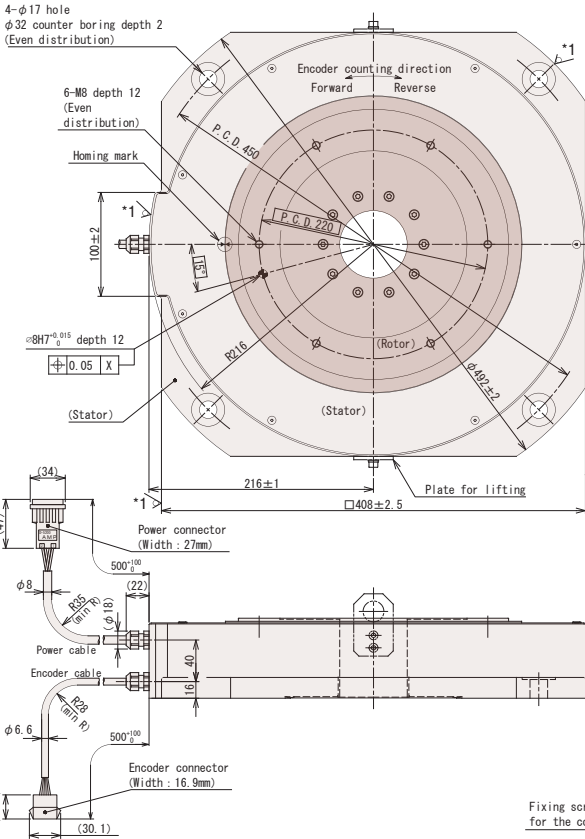
*1 The outer circumference is a casting surface(inclined).

Motor type	A	B	C	D	E	F
ND400-65-FS	260	77	3	0.05	76	1
ND400-65-FSP	259.8	76.8	2.8	0.01	75.8	0.8

■ τ DISC ND-s Series Dimensions

◎ ND400-70-LS（P）

NMR-SUEJA2A-182A（P）
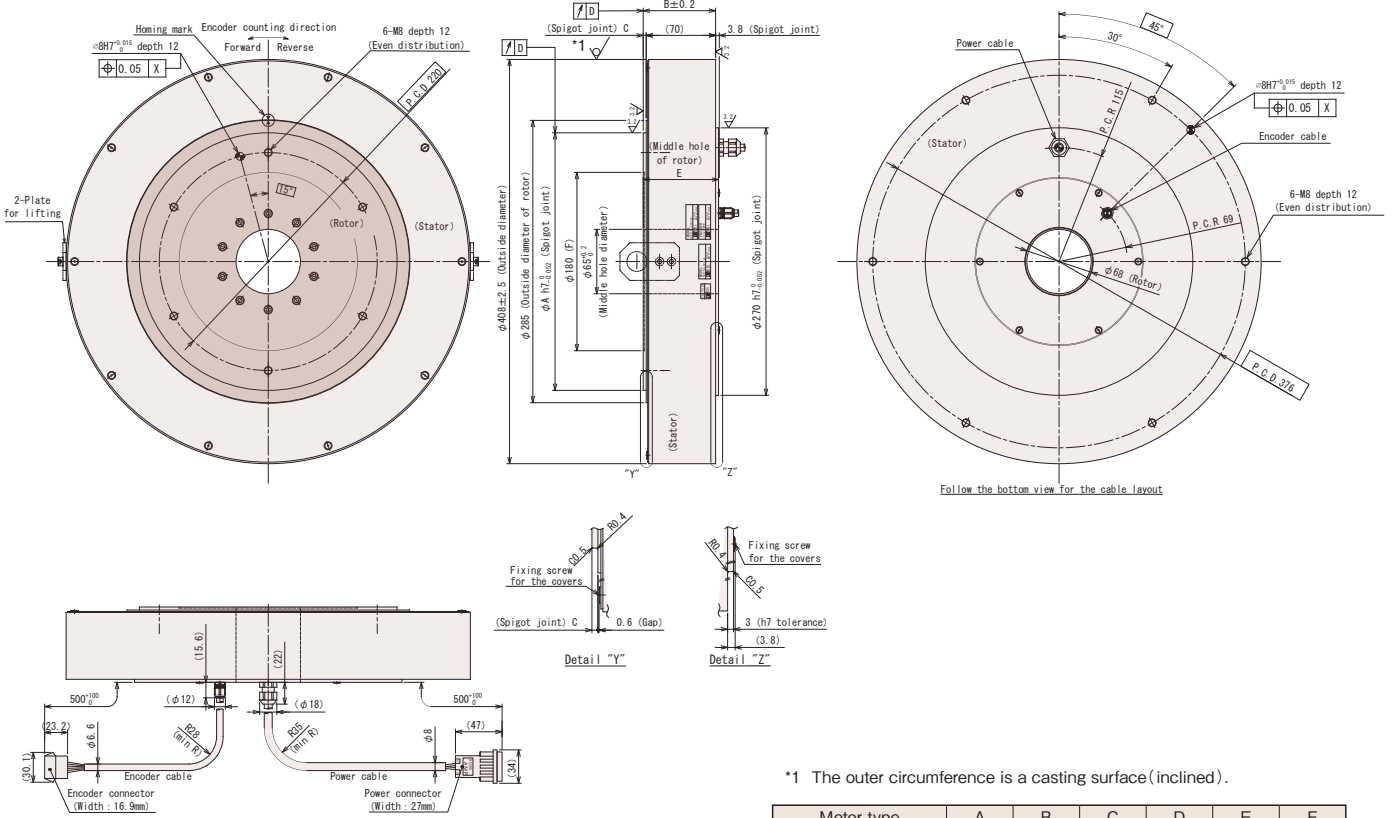
*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F
ND400-70-LS	260	73	3	0.05	76	1
ND400-70-LSP	259.8	72.8	2.8	0.01	75.8	0.8

◎ ND400-95-LS（P）

NMR-SUFJA2A-322A（P）
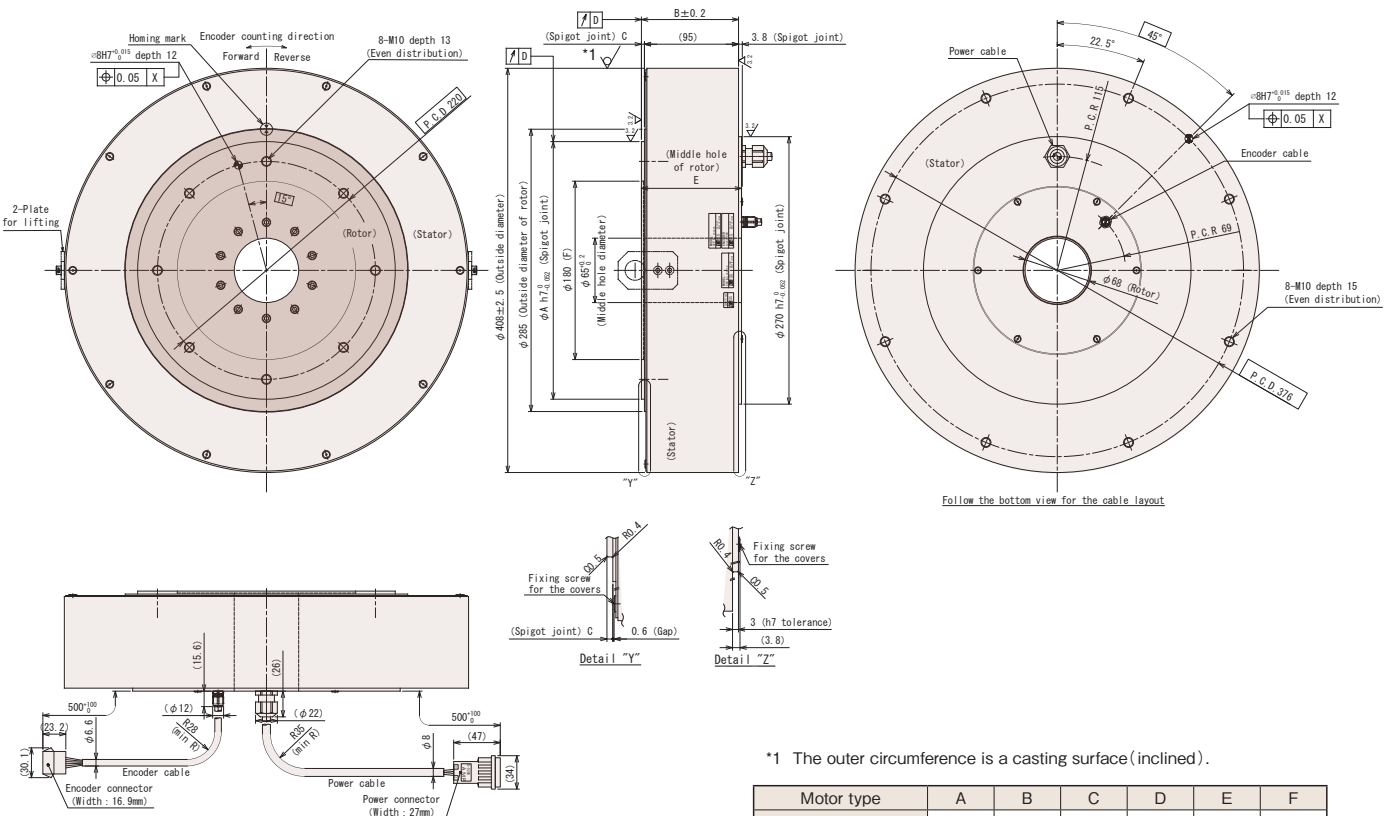
*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F
ND400-95-LS	260	98	3	0.05	101	2
ND400-95-LSP	259.8	97.8	2.8	0.01	100.8	1.8

■ τ DISC ND-s Series Dimensions

## ◎ ND400-160-LS（P）

NMR-SUHJA2A-622A（P）

*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F
ND400-160-LS	260	160	4	0.05	164	2
ND400-160-LSP	259.8	159.8	3.8	0.01	163.8	1.8

■ τ DISC ND-s HS Series Model and motor type description

◎ **Motor type**

ND	110	-	85	-	F	S	P	-	HS	
②	⑤		⑥		⑦	③	⑬		④	⑭

◎ **Model**

NMR	-	S	A	U	I	A2	A	-	551	A	P	
①		②	⑤	⑥	⑧	⑨	⑩		⑪	⑫	⑬	⑭

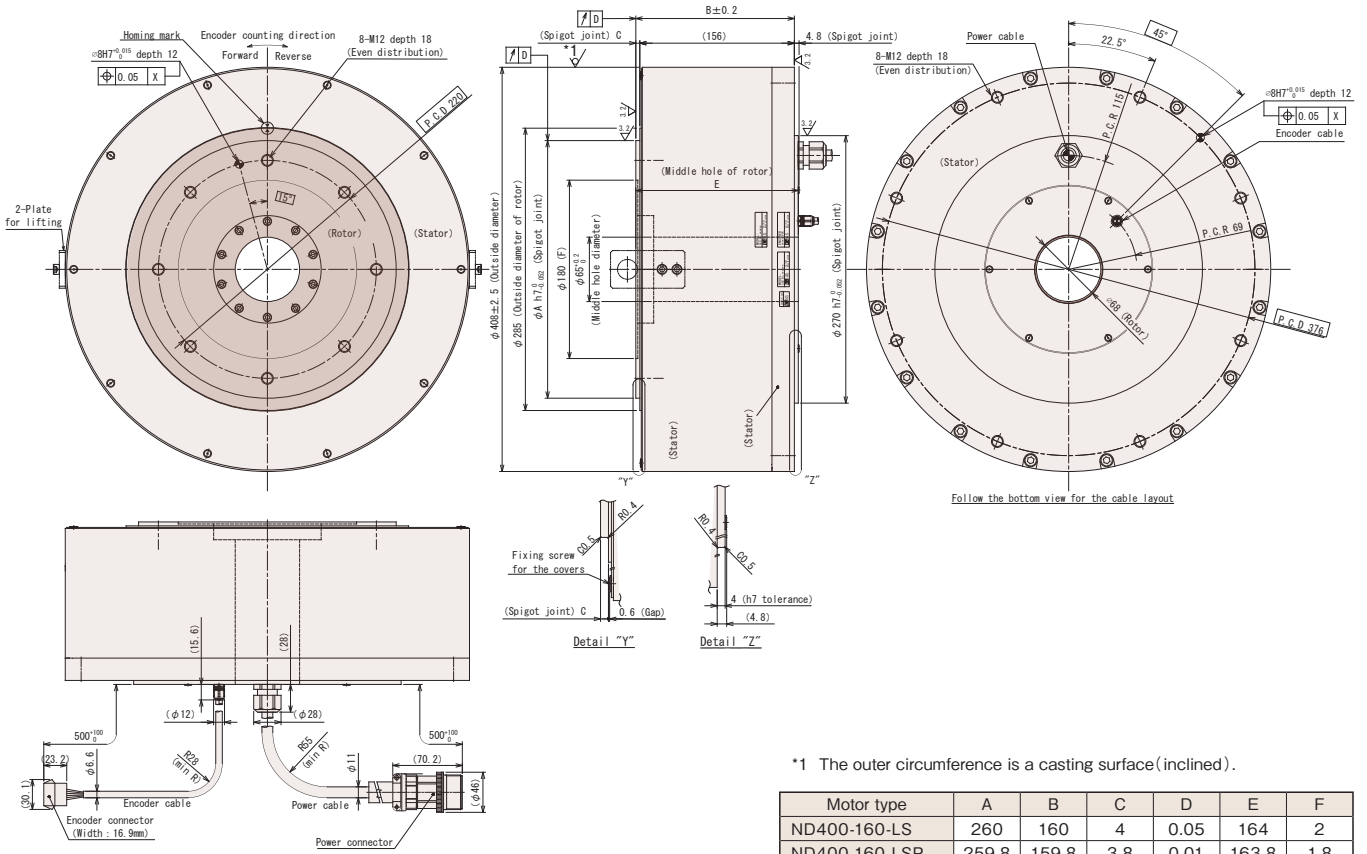| ①			NMR···Direct drive motor Series		
②	Middle product classification (1)	Motor type	ND···ND-s Series / ND-s HS Series		
		Model	S···ND-s Series / ND-s HS Series		
③	Middle product classification (2)		S···ND-s Series / ND-s HS Series / DD-s Series / HD-s Series		
④	Middle product classification (3)		HS···ND-s HS Series		
⑤	Nominal diameter *1		**With flange**	**Flange less**	
			A···110 (Actual range 110 to 119mm)	R···140 (Actual range 140 to 149mm)	S···180 (Actual range 170 to 189mm)
⑥	Nominal height *1		**With flange**	**Flange less**	
			U···85 (Actual range 80 to 99mm)	E···70/95 (Actual range 70 to 95mm)	F···95 (Actual range 96 to 119mm)
⑦	Motor flange		F···With flange	L···Flange less	
⑧	Encoder type		I···Incremental encoder		
⑨	Power supply voltage		A2···200 VAC		
⑩	Order of design		A→B→C···Starting from A		
⑪	Rated output		Example) 551 ··· 55　1 =55×10¹ =550W　Exponent part of the power of 10　Significant figures		
⑫	Brake (with or without)		A···Without brake		
⑬	Table surface rotation accuracy		Without···Standard specification	P···High accuracy specification (option)	
⑭	Special model code		Without···Standard specification	-R + sequential number···Quasi standard spec	-S + sequential number···Special model spec

*1　The motor type is represented by a numerical value. Nominal dimensions may be different from actual dimensions. For details, refer to the dimensions.

* Dimensions are subject to change without prior notice to improve the product. Before designing, download the latest dimensions from the CKD Nikki Denso website.
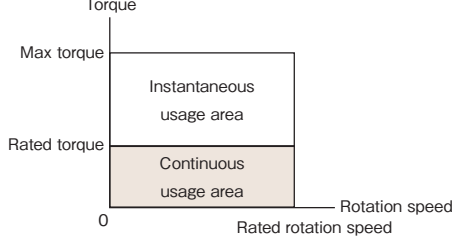
■ About the encoder type

The encoder type of the ND-s HS Series is the incremental encoder only.

■ Common specifications

Ambient operating temperature	0 to 40℃
Ambient operating humidity	85% or less; no condensation
Installation location	Do not install in a harmful atmosphere containing corrosive gas, grinding oil, metal dust, oil, etc. Install indoors, do not exposed to direct sunlight.
Installation direction	Horizontal with the rotor facing upward. *If the installation direction is not horizontal with the rotor facing upward, consult with our sales staff.
Cooling method	Natural air cooling
Insulation class	Class F
Withstand voltage	1,500 VAC, 1 minute
Protection class	IP42
Height above sea level	1,000 m or less
Vibration resistance	1G (3 directions, 2 hours each)
Shock resistance	30G (3 directions, 2 times each)

■ Torque characteristics

* If the locking operation or an equivalent operation (ultra low speed rotation or reciprocation within a very small range of angles) is performed continuously, the electronic thermal value may be reduced for motor protection. When you plan to perform the above operation, contact our sales staff.

■ Individual specifications

Motor type *1			ND110-85-FS(P)-HS		ND140-70-LS(P)-HS	ND140-95-LS(P)-HS	ND180-95-LS(P)-HS
Model *1		NMR-	SAUIA2A-551A(P)		SREIA2A-661A(P)	SRFIA2A-102A(P)	SSEIA2A-162A(P)
Flange type			With flange		Flange less	Flange less	Flange less
Power supply used		VAC	200		200	200	200
Outside diameter		mm	112		145	145	180
Height *2		mm	86 (85.8)		73 (72.8)	98 (97.8)	94 (93.8)
Rated torque		N·m	5.9	8	9.6	15	24
Max torque		N·m	14.1	19.2	22	37	65
Rated rotation speed		rps	15		11	11	11
Rated output		W	556	753	663	1,036	1,658
Rated current		A	3.4	5	5.6	8.1	8.4
Encoder type			Incremental		Incremental	Incremental	Incremental
Detection pulse		ppr	1,280,000		1,600,000	1,600,000	1,680,000
Detection resolution		arcsec	1.02		0.810	0.810	0.772
Allowable moment load *3		N·m	6.1		17.3	17.3	27.3
Allowable axial load *3		kN	1.1		2.4	2.4	2.9
Table surface rotation accuracy *4	Radial run out (no load)	μm	30 (Standard) / 10 (High accuracy spec)		40 (Standard) / 10 (High accuracy spec)		50 (Standard) / 10 (High accuracy spec)
	Axial run out (no load)	μm	30 (Standard) / 10 (High accuracy spec)		40 (Standard) / 10 (High accuracy spec)		50 (Standard) / 10 (High accuracy spec)
Absolute positioning accuracy *5		arcsec	±15 (When the absolute position compensation function option is used)				
Repeated positioning accuracy (when reciprocating)		arcsec	±2		±1		
Rotor moment of inertia		kg·m²	0.00061		0.00084	0.00134	0.0053
Weight		kg	3.1		4.1	5.9	8.8
Magnetic pole detection method			Selection of magnetic pole sensor detection or automatic magnetic pole detection		Selection of magnetic pole sensor detection or automatic magnetic pole detection	Selection of magnetic pole sensor detection or automatic magnetic pole detection	Selection of magnetic pole sensor detection or automatic magnetic pole detection
Paired driver	VPH Series	NCR-H□	2401□-A-□□□	2801□-A-□□□	2801□-A-□□□	2152□-A-□□□	2152□-A-□□□
	VCⅡ Series	NCR-□DA□	A2A-401J	A2A-801J	A2A-801J	A2A-152J	A2A-152J

*1　Shown in parentheses are the motor type and model of the High accuracy specification (option).

*2　Shown in parentheses is the value of the High accuracy specification (option).

*3　The life of the bearing and the run out accuracy differ depending on the load. For the points to note with regard to the allowable loads, refer to "About the allowable loads of τ DISC" on p.44.

*4　For details, refer to "High accuracy specification option for τ DISC table surface rotation accuracy" on p.43.

*5　For details, refer to "τ DISC absolute position compensation function option" on p.42.

■ τDISC ND-s HS Series Dimensions

◎ ND110-85-FS（P）-HS

NMR-SAUIA2A-551A（P）
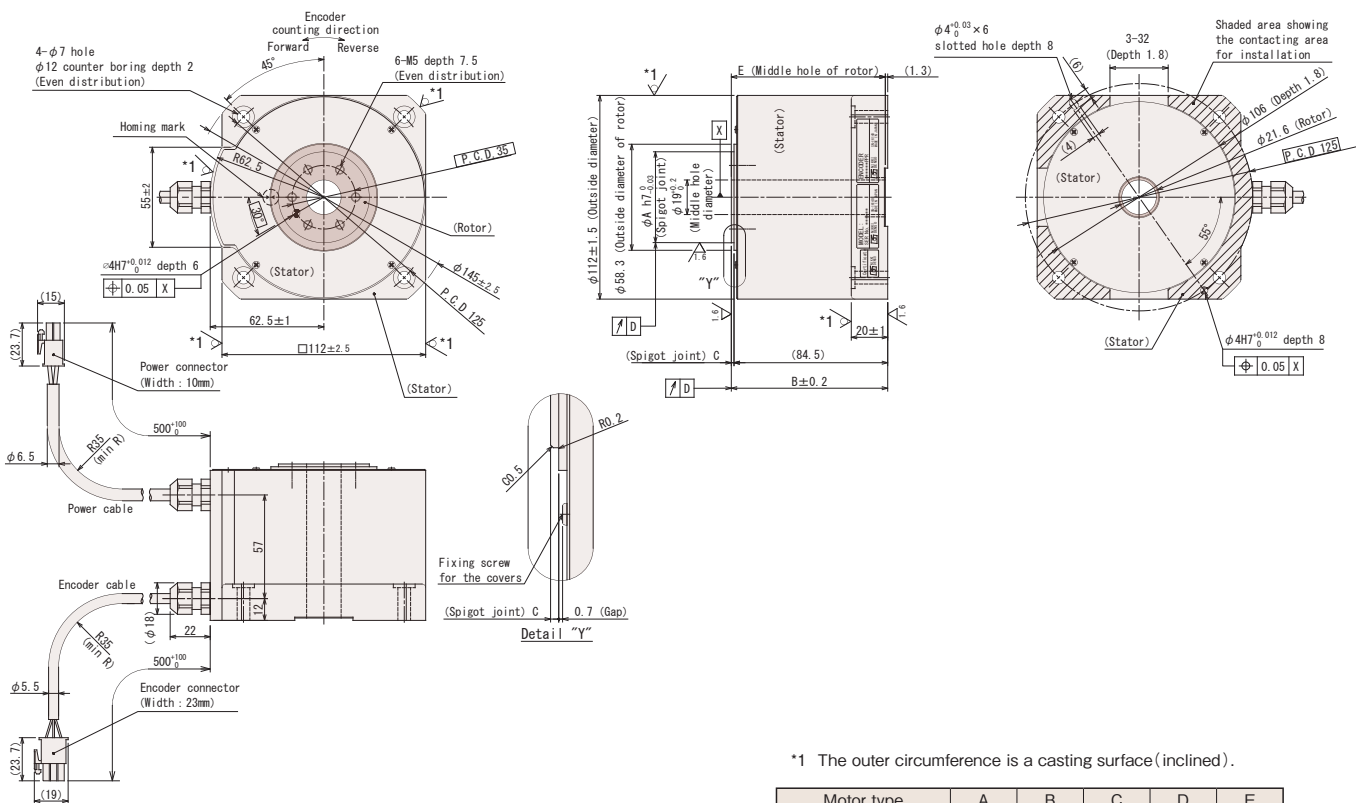
*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E
ND110-85-FS-HS	50	86	1.5	0.03	84.7
ND110-85-FSP-HS	49.8	85.8	1.3	0.01	84.5

◎ ND140-70-LS（P）-HS

NMR-SREIA2A-661A（P）
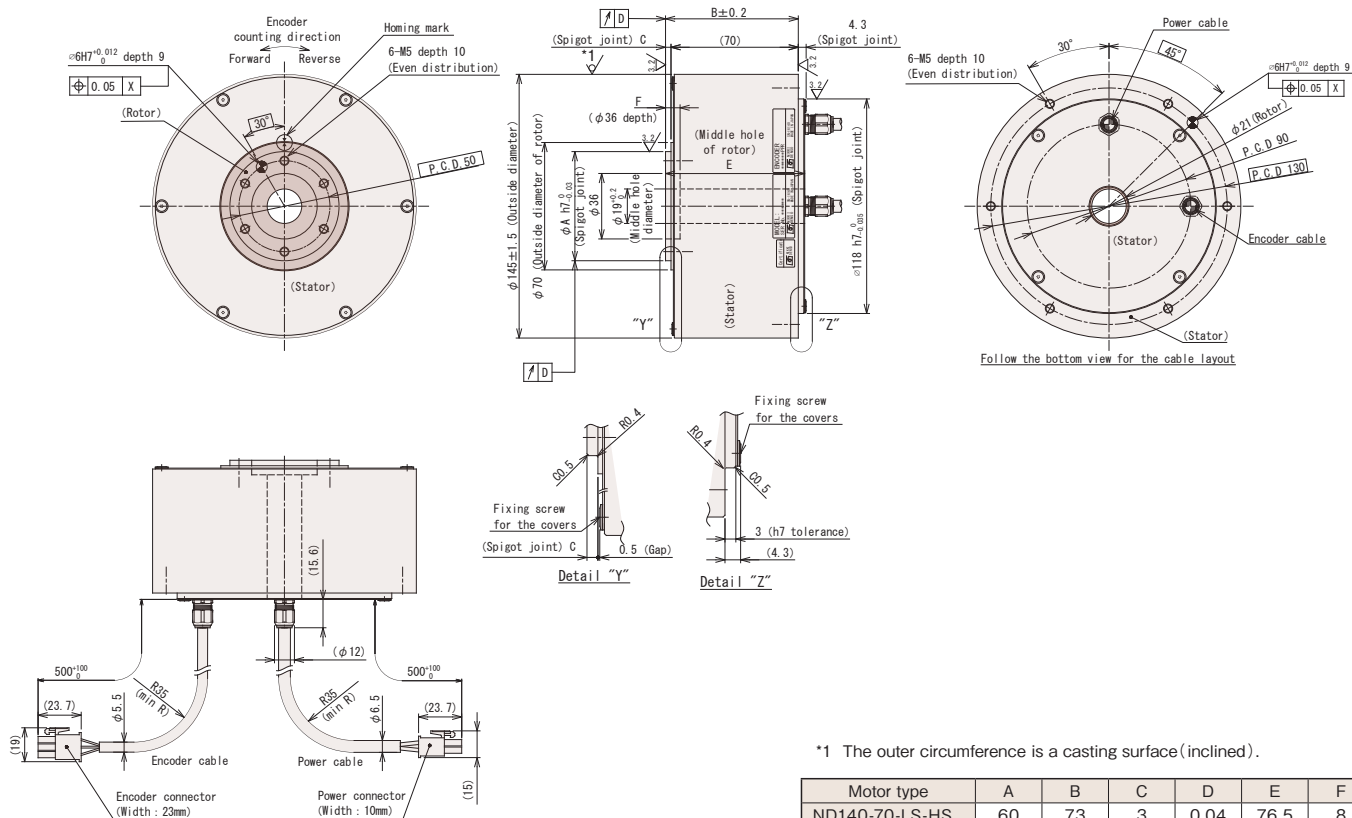
*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F
ND140-70-LS-HS	60	73	3	0.04	76.5	8
ND140-70-LSP-HS	59.8	72.8	2.8	0.01	76.3	7.8

■ τ DISC ND-s HS Series Dimensions

◎ ND140-95-LS(P)-HS

NMR-SRFIA2A-102A(P)

*1 This positioning pin hole will standard in 2018.
For details about when this will occur, contact our sales staff.

*2 The outer circumference is a casting surface(inclined).

Motor type	A	B	C	D	E	F
ND140-95-LS-HS	60	98	3	0.04	101.5	8
ND140-95-LSP-HS	59.8	97.8	2.8	0.01	101.3	7.8

◎ ND180-95-LS(P)-HS

NMR-SSEIA2A-162A(P)

*1 The outer circumference is a casting surface(inclined).

Motor type	A	B	C	D	E	F
ND180-95-LS-HS	96	94	3	0.05	97.5	2
ND180-95-LSP-HS	95.8	93.8	2.8	0.01	97.3	1.8
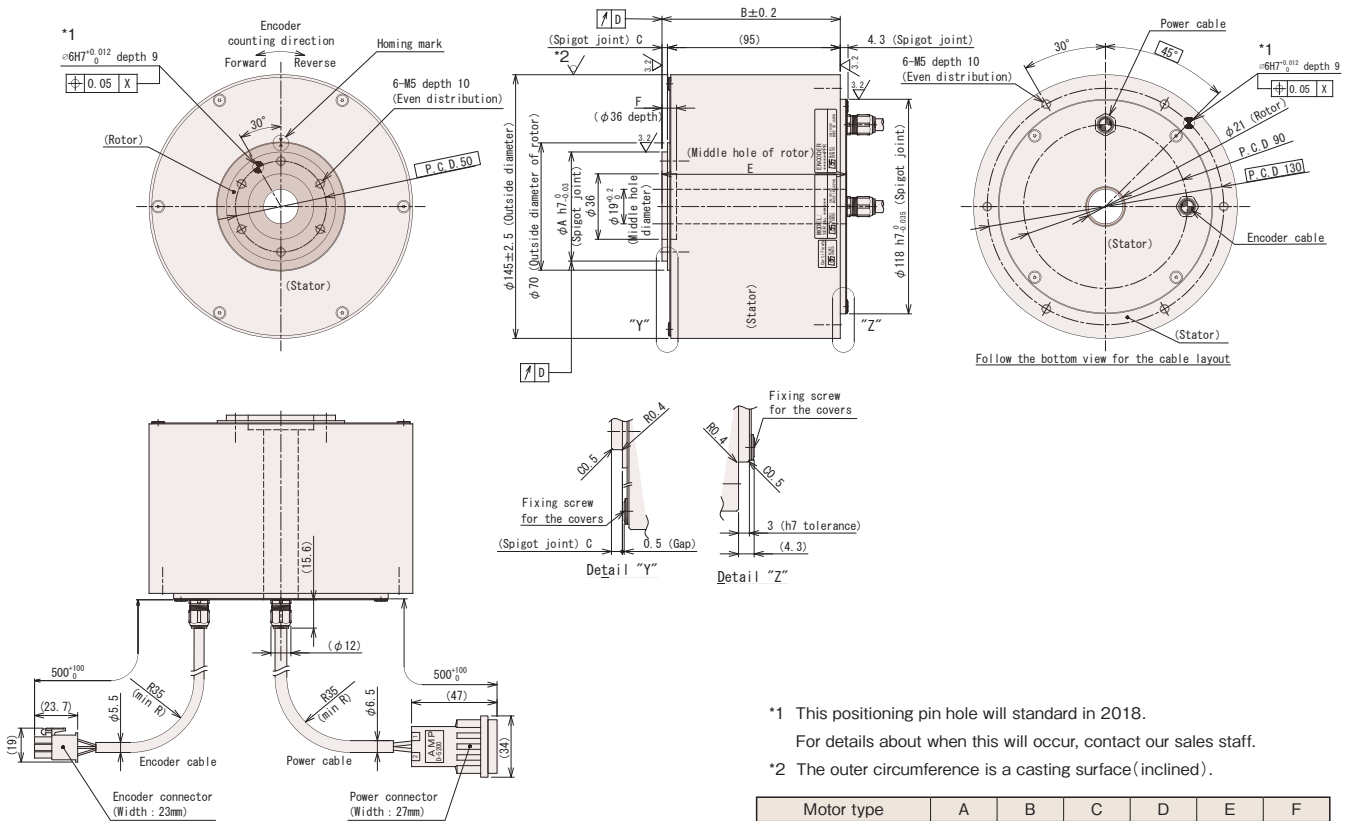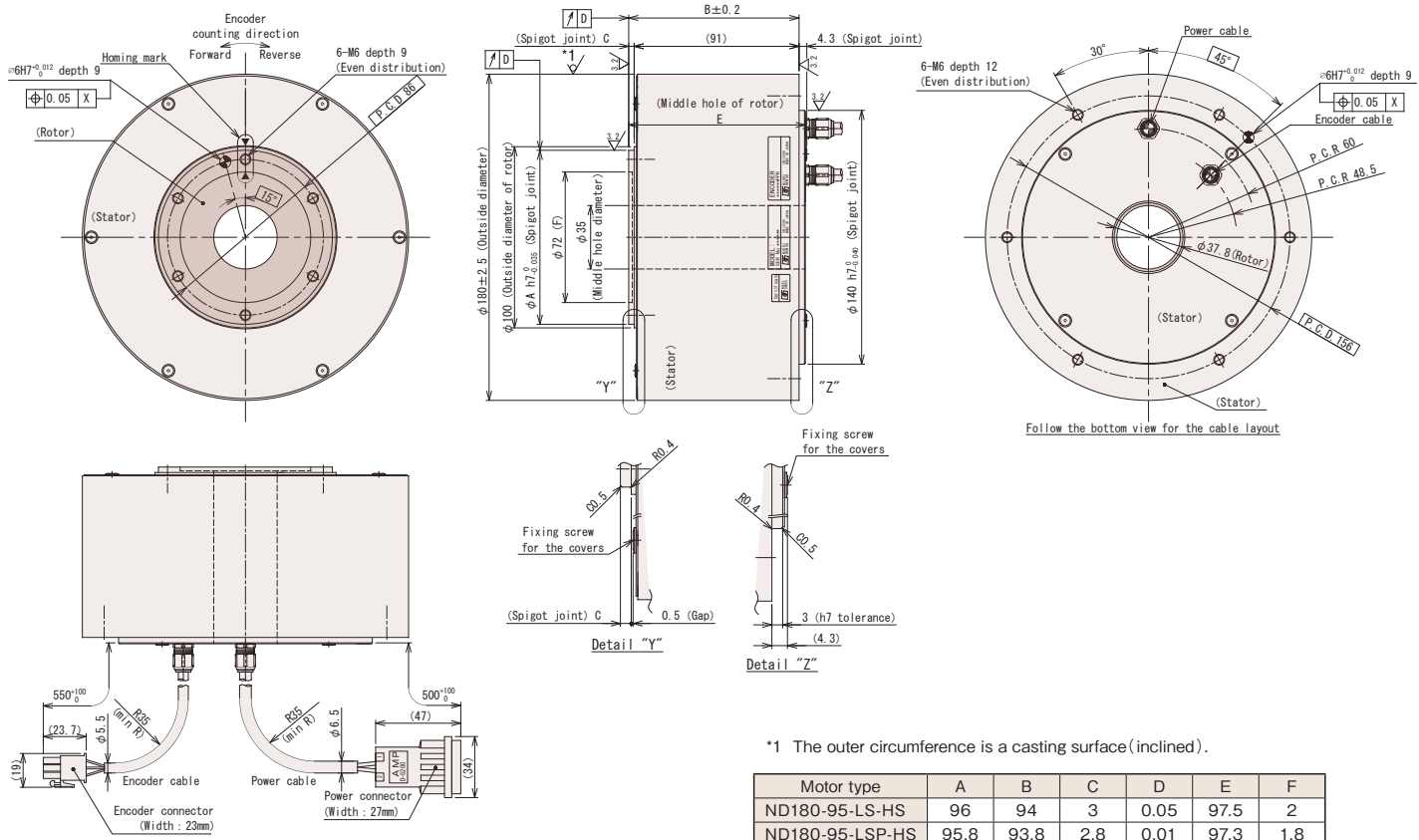
■ τ DISC DD-s Series Model and motor type description

◎ **Motor type**

DD | 160 | - | 96 | - | L | S | P5 | ☐ | ☐
① | ③ | | ④ | | ⑥ | ② | ⑫ | ⑬ | ⑪

◎ **Model**

DD | 16 | - | 251 | L | 04 | C | N | N | ☐ | -P | ☐ | -1
① | ③ | | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ | ⑩ | ⑪ | ⑫ | ⑬ | ⑭

①	Product classification（1）		DD…τ DISC DD-s Series
②	Product classification（2）	Motor type	S…ND-s Series / ND-s HS Series / DD-s Series / HD-s Series
③	Outside diameter	Motor type	160…160mm 250…265mm 400…420mm 630…663mm
		Model	16…160mm 25…265mm 40…420mm 63…663mm
④	Height		Example）96 …96mm
⑤	Rated output *1		Example）251 … 25 1 =$25×10^1$ =250W └ Exponent part of the power of 10 └ Significant figures
⑥	Motor flange		F…With flange L…Flange less
⑦	Rated rotation speed		Rated rotation speed（unit：rps; to be rounded down to the whole number） Example）04 …4rps
⑧	Encoder type		C…Absolute encoder（absolute value for one revolution） A…Incremental encoder
⑨	Cooling method		N…Natural air cooling
⑩	Overseas standards		N…None
⑪	Special model code		Without…Standard specification
			R + sequential number…Quasi standard spec S + sequential number…Special model spec
⑫	Table surface rotation accuracy *2	Motor type	None…Standard specification
			P10 …High accuracy 10μm type（option）
			P5 …High accuracy 5μm type（option）
			P3 …High accuracy 3μm type（option）
		Model	None…Standard specification
			-P…DD160/250/400 Type：High accuracy 5μm type（option） DD630 Type：High accuracy 10μm type（option）
			-P5…DD630 Type：High accuracy 5μm type（option）
			-P3…DD160/250/400 Type：High accuracy 3μm type（option）
⑬	Parallelism		Without…Standard specification
			H…Parallelization processing specification（option）*Not supported for the DD630 type.
⑭	Absolute position compensation option		Without…Without the absolute position compensation option
			-0…Compensation data to be transfered to the VPH servo driver by the user.
			-1…Compensation data（Japanese version）to be transfered to the VCⅡ servo driver by the user.
			-2…Compensation data（English version）to be transfered to the VCⅡ servo driver by the user.
			-5…Compensation data to be built in the VPH servo driver by CKD Nikki Denso before shipment.
			-6…Compensation data（Japanese version）to be built in the VCⅡ servo driver by CKD Nikki Denso before shipment.
			-7…Compensation data（English version）to be built in the VCⅡ servo driver by CKD Nikki Denso before shipment.

*1 The value has its last digit rounded off.

*2 The High accuracy specification of the DD160/250/400 Type supports 5μm and 3μm.

The High accuracy specification of the DD630 Type supports 10μm and 5μm.

* Dimensions are subject to change without prior notice to improve the product. Before designing, download the latest dimensions from the CKD Nikki Denso website.

■ About the encoder type

The absolute encoder is the standard type of encoder in the DD-s Series lineup.

Note that, since this is a battery-less type encoder, it cannot hold multiple turn data.

An incremental encoder type is also available on request for the following motor types.

・DD160-96/146-LS（P5／P3） ・DD250-90/138/163-LS（P5／P3）

This catalog only contains the specifications and dimensions of the absolute encoder type.
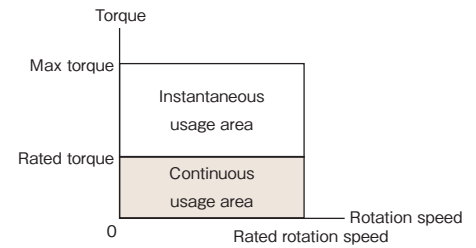
The incremental encoder type differs in the detection pulse, resolution, cable diameter, connector shape, cable outlet, etc.

For details, visit the CKD Nikki Denso website.

■ Common specifications

Ambient operating temperature	0 to 40℃
Ambient operating humidity	85% or less; no condensation
Installation location	Do not install in a harmful atmosphere containing corrosive gas, grinding oil, metal dust, oil, etc. Install indoors, do not exposed to direct sunlight.
Installation direction	Horizontal with the rotor facing upward or downward. *If the installation direction is not horizontal, consult with our sales staff.
Cooling method	Natural air cooling
Insulation class	Class F
Withstand voltage	1,500 VAC, 1 minute
Protection class	IP44
Height above sea level	1,000 m or less
Vibration resistance	1G（3 directions, 2 hours each）
Shock resistance	30G（3 directions, 2 times each）

■ Torque characteristics

* If the locking operation or an equivalent operation （ultra low speed rotation or reciprocation within a very small range of angles）is performed continuously, the electronic thermal value may be reduced for motor protection. When you plan to perform the above operation, contact our sales staff.

■ τDISC DD-s Series Individual specifications

Motor type *1			DD160-96-LS（P5/P3）	DD160-105-FS（P5/P3）	DD160-146-LS（P5/P3）
Model *1	DD16-		251L04CNN（-P/-P3）	251F04CNN（-P/-P3）	681L04CNN（-P/-P3）
Flange type			Flange less	With flange	Flange less
Power supply used		VAC	200	200	200
Outside diameter		mm	160	160	160
Height *2		mm	96（95.8）	105（104.8）	146（145.8）
Rated torque		N·m	10	10	27
Max torque		N·m	23	23	62.5
Rated rotation speed		rps	4	4	4
Rated output		W	251	251	678
Rated current		A	3.1	3.1	5
Encoder type			Absolute	Absolute	Absolute
Detection pulse		ppr	2,097,152	6,815,744	2,097,152
Detection resolution		arcsec	0.618	0.191	0.618
Allowable moment load *3		N·m	280	280	280
Allowable axial load *3		kN	22.5	22.5	22.5
Table surface rotation accuracy *4	Radial run out（no load）	μm	30（Standard）/5（High accuracy specification）/3（High accuracy specification）		
	Axial run out（no load）	μm	30（Standard）/5（High accuracy specification）/3（High accuracy specification）		
Parallelism *5		μm	40（Standard）/20（Parallelization processing spec）	50（Standard）/20（Parallelization processing spec）	40（Standard）/20（Parallelization processing spec）
Absolute positioning accuracy *6		arcsec	±50（Standard）/±10（When the absolute position compensation function option is used）		
Repeated positioning accuracy（when reciprocating）		arcsec	±1		
Rotor moment of inertia		kg·m²	0.0058	0.0058	0.0074
Weight		kg	8.2	7.3	13.5
Magnetic pole detection method			Absolute position detection	Absolute position detection	Absolute position detection
Paired driver	VPH Series	NCR-H□	2401□-A-□□	2401□-A-□□	2801□-A-□□
	VCⅡ Series	NCR-□DA□	A2A-401J	A2A-401J	A2A-801J

Motor type *1			DD250-90-LS（P5/P3）	DD250-138-LS（P5/P3）	DD250-163-LS（P5/P3）
Model *1	DD25-		521L02CNN（-P/-P3）	102L02CNN（-P/-P3）	152L02CNN（-P/-P3）
Flange type			Flange less	Flange less	Flange less
Power supply used		VAC	200	200	200
Outside diameter		mm	265	265	265
Height *2		mm	90（89.8）	138（137.8）	163（162.8）
Rated torque		N·m	42	80	120
Max torque		N·m	100	190	300
Rated rotation speed		rps	2	2	2
Rated output		W	528	1,005	1,507
Rated current		A	6.3	10	10
Encoder type			Absolute	Absolute	Absolute
Detection pulse		ppr	6,815,744	6,815,744	6,815,744
Detection resolution		arcsec	0.191	0.191	0.191
Allowable moment load *3		N·m	315	450	450
Allowable axial load *3		kN	22.5	30	30
Table surface rotation accuracy *4	Radial run out（no load）	μm	40（Standard）/5（High accuracy specification）/3（High accuracy specification）		
	Axial run out（no load）	μm	40（Standard）/5（High accuracy specification）/3（High accuracy specification）		
Parallelism *5		μm	60（Standard）/20（Parallelization processing specification）		
Absolute positioning accuracy *6		arcsec	±50（Standard）/±10（When the absolute position compensation function option is used）		
Repeated positioning accuracy（when reciprocating）		arcsec	±1		
Rotor moment of inertia		kg·m²	0.04	0.08	0.105
Weight		kg	20	34	42
Magnetic pole detection method			Absolute position detection	Absolute position detection	Absolute position detection
Paired driver	VPH Series	NCR-H□	2801□-A-□□	2152□-A-□□	2152□-A-□□
	VCⅡ Series	NCR-□DA□	A2A-801J	A2A-152J	A2A-152J

*1 Shown in parentheses are the motor type and model of the High accuracy specification（option）.

*2 Shown in parentheses is the value of the High accuracy specification（option）.

*3 The life of the bearing and the run out accuracy differ depending on the load.
   For the points to note with regard to the allowable loads, refer to "About the allowable loads of τDISC" on p.44.

*4 For details, refer to "High accuracy specification option for τDISC table surface rotation accuracy" on p.43.
   If you need radial or axial run out accuracy of more than 3 μm, contact our sales staff.

*5 The parallelization processing specification is an option that is added to the High accuracy specification for table surface rotation accuracy.For details,
   refer to "τDISC parallelization processing specification option" on p.43.

*6 For details, refer to "τDISC absolute position compensation function option" on p.42.

■ τDISC DD-s Series Individual specifications

Motor type *1			DD400-150-LS(P5/P3)	DD400-200-LS(P5/P3)
Model *1	DD40-		322L02CNN(-P/-P3)	622L02CNN(-P/-P3)
Flange type			Flange less	Flange less
Power supply used		VAC	200	200
Outside diameter		mm	420	420
Height *2		mm	150(149.8)	200(199.8)
Rated torque		N·m	260	500
Max torque		N·m	650	1,250(1,000 *7)
Rated rotation speed		rps	2	2
Rated output		W	3,267	6,283
Rated current		A	24	34
Encoder type			Absolute	Absolute
Detection pulse		ppr	6,815,744	6,815,744
Detection resolution		arcsec	0.191	0.191
Allowable moment load *3		N·m	2,000	2,000
Allowable axial load *3		kN	44	44
Table surface rotation accuracy *4	Radial run out(no load)	µm	40(Standard)/5(High accuracy specification)/3(High accuracy specification)	
	Axial run out(no load)	µm	40(Standard)/5(High accuracy specification)/3(High accuracy specification)	
Parallelism *5		µm	100(Standard)/20(Parallelization processing specification)	
Absolute positioning accuracy *6		arcsec	±50(Standard)/±10(When the absolute position compensation function option is used)	
Repeated positioning accuracy(when reciprocating)		arcsec	±1	
Rotor moment of inertia		kg·m²	0.402	0.648
Weight		kg	76	109
Magnetic pole detection method			Absolute position detection	Absolute position detection
Paired driver	VPH Series	NCR-H□	2332□-A-□□□	2702□-A-□□□
	VCⅡ Series	NCR-□DA□	A2B-402J	A2A-113J(A2A-752J *7)

Motor type *1			DD400-250-LS(P5/P3)(1.5rps spec)	DD400-250-LS(P5/P3)(1rps spec)*8	DD400-250-LS(P5/P3)(2rps spec)*8
Model *1	DD40-		702L01CNN(-P/-P3)	472L01CNN(-P/-P3)	942L02CNN(-P/-P3)
Flange type			Flange less	Flange less	Flange less
Power supply used		VAC	200	200	200
Outside diameter		mm	420	420	420
Height *2		mm	250(249.8)	250(249.8)	250(249.8)
Rated torque		N·m	750	750	750
Max torque		N·m	1,750(1,390 *9)	1,700	1650
Rated rotation speed		rps	1.5	1	2
Rated output		W	7,068	4,712	9,400
Rated current		A	47	33	51
Encoder type			Absolute	Absolute	Absolute
Detection pulse		ppr	6,815,744	6,815,744	6,815,744
Detection resolution		arcsec	0.191	0.191	0.191
Allowable moment load *3		N·m	3,000	3,000	3,000
Allowable axial load *3		kN	55	55	55
Table surface rotation accuracy *4	Radial run out(no load)	µm	40(Standard)/5(High accuracy specification)/3(High accuracy specification)		
	Axial run out(no load)	µm	40(Standard)/5(High accuracy specification)/3(High accuracy specification)		
Parallelism *5		µm	100(Standard)/20(Parallelization processing specification)		
Absolute positioning accuracy *6		arcsec	±50(Standard)/±10(When the absolute position compensation function option is used)		
Repeated positioning accuracy(when reciprocating)		arcsec	±1		
Rotor moment of inertia		kg·m²	0.915	0.915	0.915
Weight		kg	140	140	140
Magnetic pole detection method			Absolute position detection	Absolute position detection	Absolute position detection
Paired driver	VPH Series	NCR-H□	2702□-A-□□□	2702□-A-□□□	—
	VCⅡ Series	NCR-□DA□	A2A-153J	A2A-752J	A2A-153J

Motor type *1			DD630-175-LS(P10/P5)	DD630-225-LS(P10/P5)
Model *1	DD63-		842L01CNN(-P/-P5)	123L01CNN(-P/-P5)
Flange type			Flange less	Flange less
Power supply used		VAC	200	200
Outside diameter		mm	663	663
Height *2		mm	175(174.8)	225(224.8)
Rated torque		N·m	1,350	2,000
Max torque		N·m	2,500	3,700
Rated rotation speed		rps	1	1
Rated output		W	8,400	12,600
Rated current		A	46	62
Encoder type			Absolute	Absolute
Detection pulse		ppr	12,582,912	12,582,912
Detection resolution		arcsec	0.103	0.103
Allowable moment load *3		N·m	7,000	7,000
Allowable axial load *3		kN	100	100
Table surface rotation accuracy	Radial run out(no load)	µm	100(Standard)/10(High accuracy specification)/5(High accuracy specification)	
	Axial run out(no load)	µm	100(Standard)/10(High accuracy specification)/5(High accuracy specification)	
Parallelism		µm	200(Standard)	
Absolute positioning accuracy *6		arcsec	±50(Standard)/±10(When the absolute position compensation function option is used)	
Repeated positioning accuracy(when reciprocating)		arcsec	±1	
Rotor moment of inertia		kg·m²	4.3	5.2
Weight		kg	231	290
Magnetic pole detection method			Absolute position detection	Absolute position detection
Paired driver	VPH Series	NCR-H□	2702□-A-□□□ *10	—
	VCⅡ Series	NCR-□DA□	A2A-113J	A2A-153J

*1 Shown in parentheses are the motor type and model of the High accuracy specification(option).
*2 Shown in parentheses is the value of the High accuracy specification(option).
*3 The life of the bearing and the run out accuracy differ depending on the load.
　For the points to note with regard to the allowable loads, refer to "About the allowable loads of τDISC" on p.44.
*4 For details, refer to "High accuracy specification option for τDISC table surface rotation accuracy" on p.43.
　If you need radial or axial run out accuracy of more than 3 µm, contact our sales staff.

*5 The parallelization processing specification is an option that is added to the High accuracy specification for table surface rotation accuracy.
　For details, refer to "τDISC parallelization processing specification option" on p.43.
*6 For details, refer to "τDISC absolute position compensation function option" on p.42.
*7 When the paired driver is the VCⅡ Series of 7.5 kW, the maximum torque is 1,000 N·m.
*8 This is a quasi standard product. If you need one, contact our sales staff.
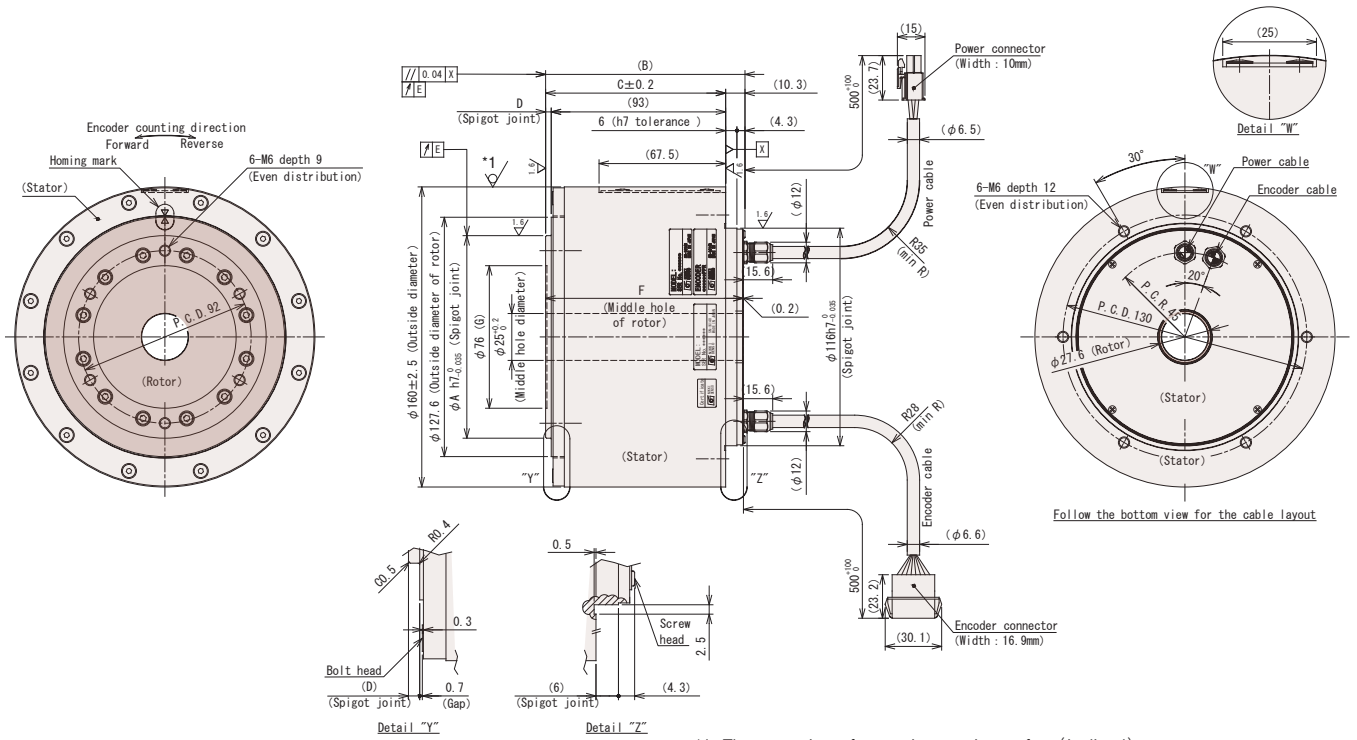*9 Shown in parentheses is the maximum torque when the paired driver is the VPH Series.
*10 Paring to be made possible around July 2018

■ τ DISC DD-s Series Dimensions
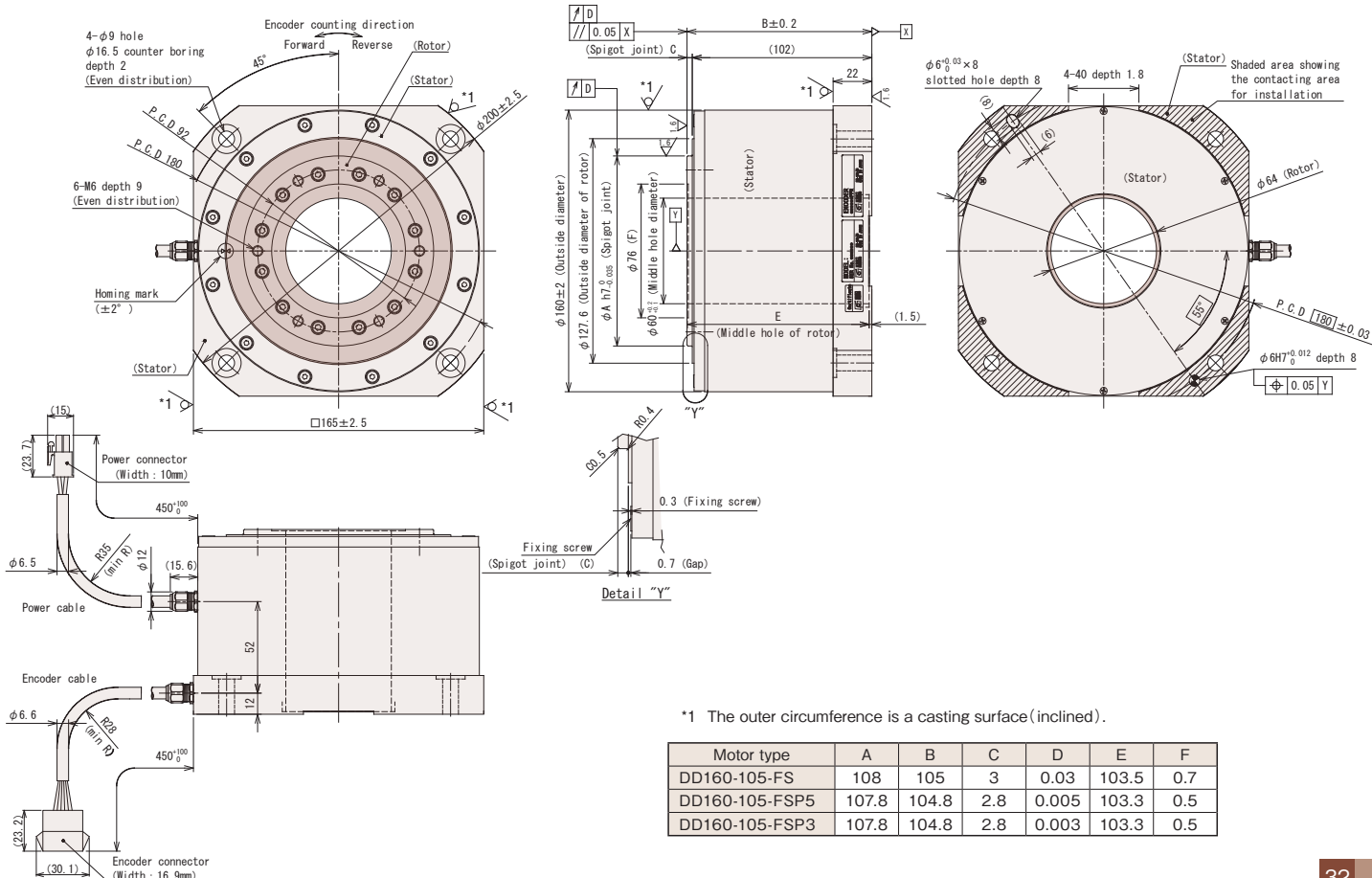
◎ DD160-96-LS（P5／P3）

DD16-251L04CNN（-P／-P3）

*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F	G
DD160-96-LS	108	106.3	96	3	0.03	105.3	0.7
DD160-96-LSP5	107.8	106.1	95.8	2.8	0.005	105.1	0.5
DD160-96-LSP3	107.8	106.1	95.8	2.8	0.003	105.1	0.5

◎ DD160-105-FS（P5／P3）

DD16-251F04CNN（-P／-P3）

*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F
DD160-105-FS	108	105	3	0.03	103.5	0.7
DD160-105-FSP5	107.8	104.8	2.8	0.005	103.3	0.5
DD160-105-FSP3	107.8	104.8	2.8	0.003	103.3	0.5

■ τDISC DD-s Series Dimensions

◎ DD160-146-LS（P5／P3）

DD16-681L04CNN(-P/-P3)
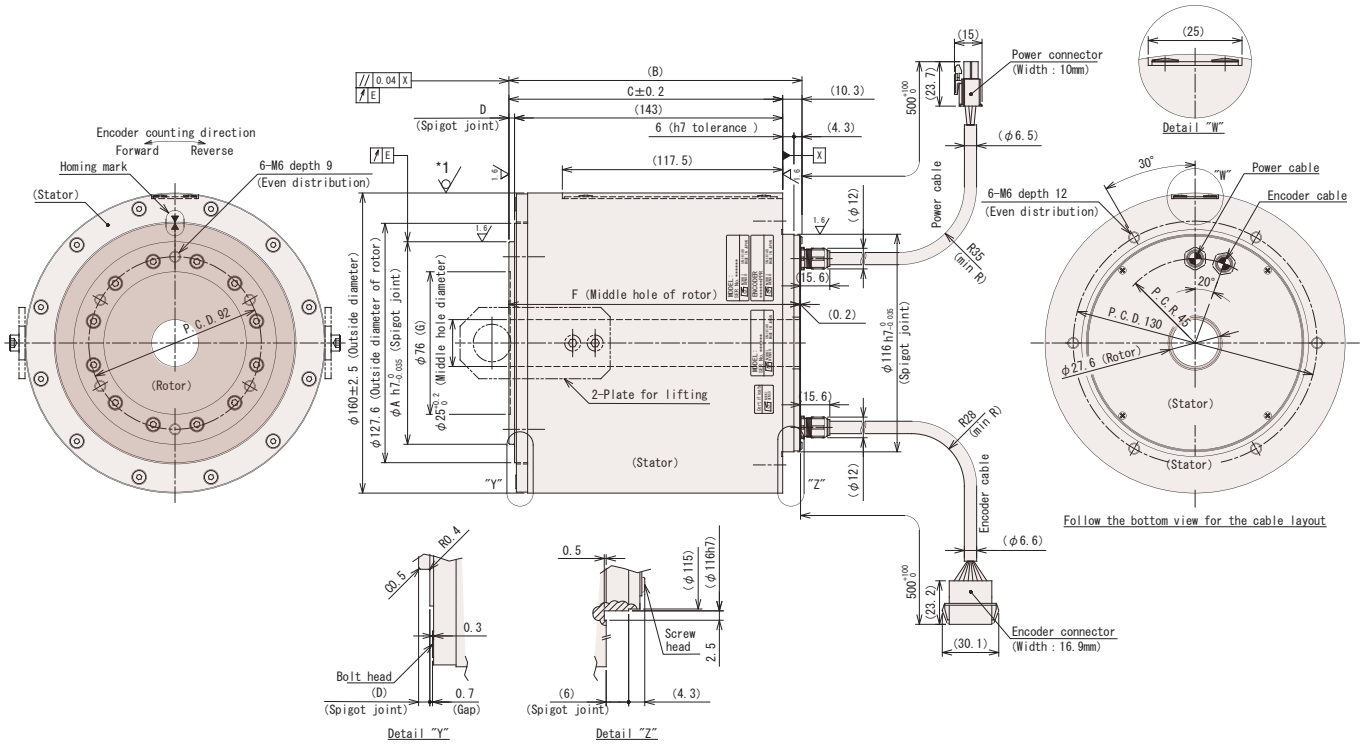
*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F	G
DD160-146-LS	108	156.3	146	3	0.03	155.3	0.7
DD160-146-LSP5	107.8	156.1	145.8	2.8	0.005	155.1	0.5
DD160-146-LSP3	107.8	156.1	145.8	2.8	0.003	155.1	0.5

◎ DD250-90-LS（P5／P3）

DD25-521L02CNN(-P/-P3)
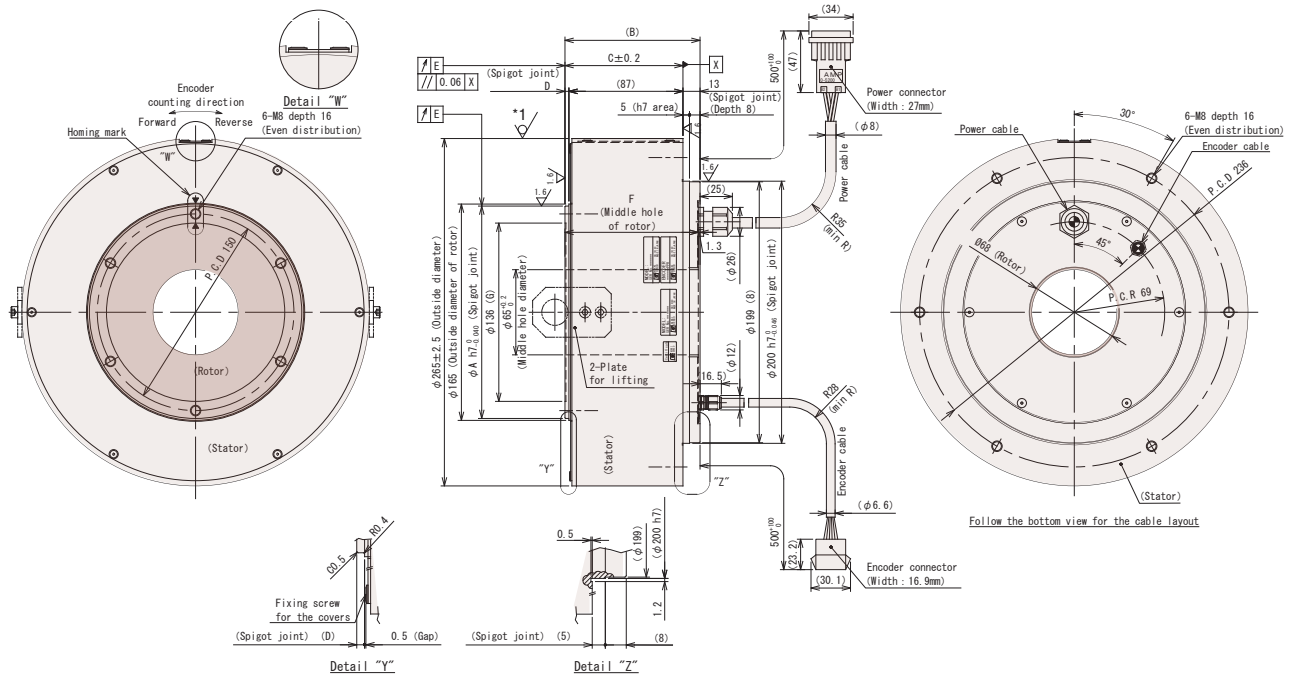
*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F	G
DD250-90-LS	162	103	90	3	0.04	101.7	0.7
DD250-90-LSP5	161.8	102.8	89.8	2.8	0.005	101.5	0.5
DD250-90-LSP3	161.8	102.8	89.8	2.8	0.003	101.5	0.5

■ τ DISC DD-s Series Dimensions

◎ DD250-138-LS（P5／P3）

DD25-102L02CNN(-P/-P3)
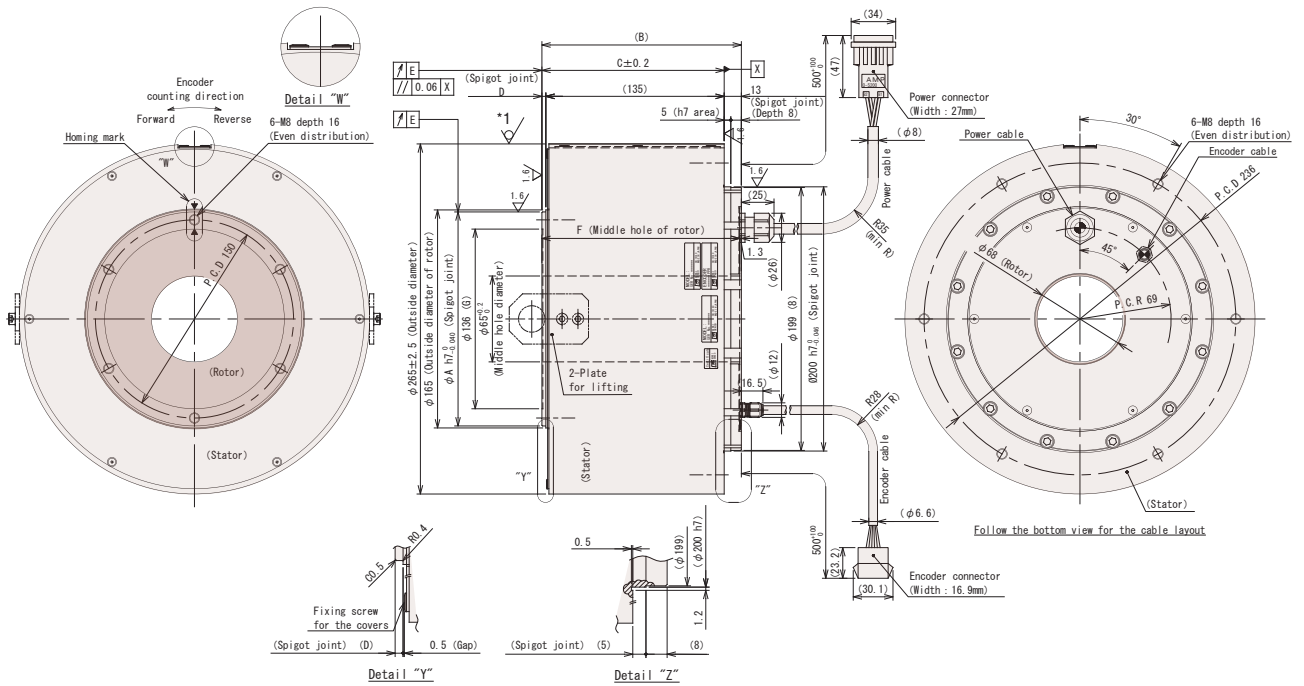
*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F	G
DD250-138-LS	162	151	138	3	0.04	149.7	0.7
DD250-138-LSP5	161.8	150.8	137.8	2.8	0.005	149.5	0.5
DD250-138-LSP3	161.8	150.8	137.8	2.8	0.003	149.5	0.5

◎ DD250-163-LS（P5／P3）

DD25-152L02CNN(-P/-P3)
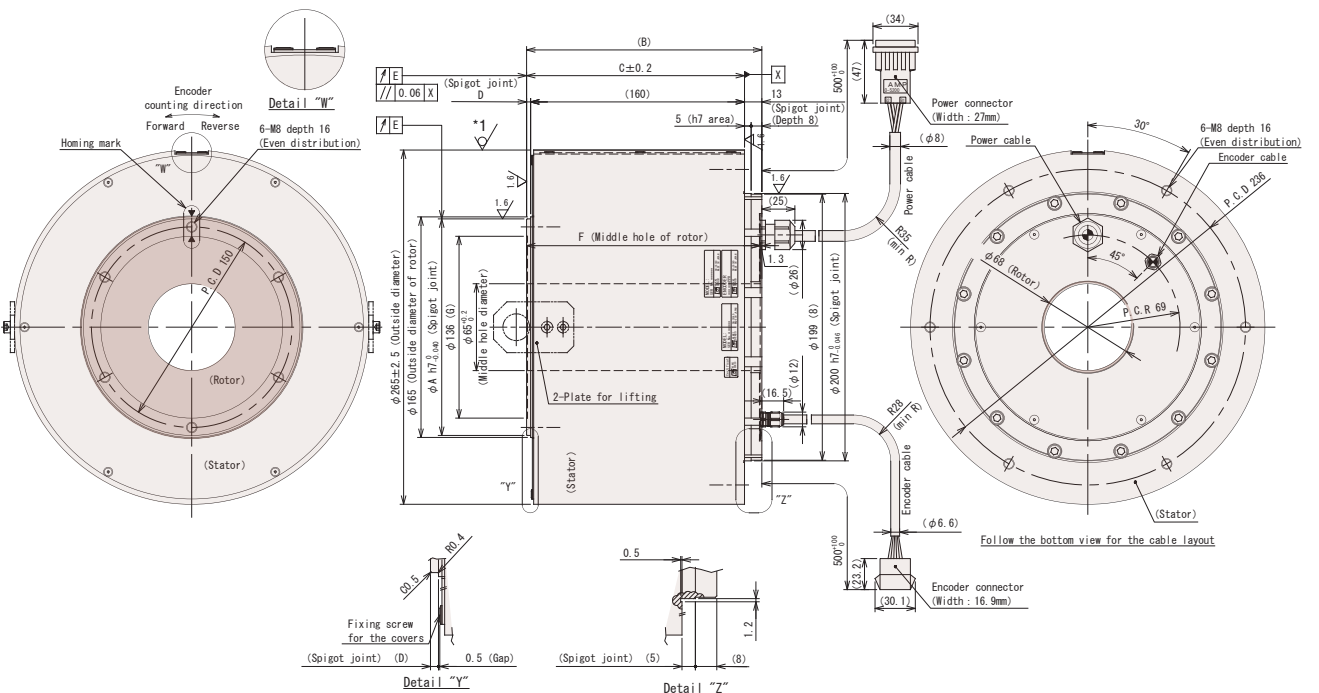
*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F	G
DD250-163-LS	162	176	163	3	0.04	174.7	0.7
DD250-163-LSP5	161.8	175.8	162.8	2.8	0.005	174.5	0.5
DD250-163-LSP3	161.8	175.8	162.8	2.8	0.003	174.5	0.5

■ τDISC　DD-s Series　Dimensions

◎ DD400-150-LS（P5／P3）

DD40-322L02CNN（-P/-P3）
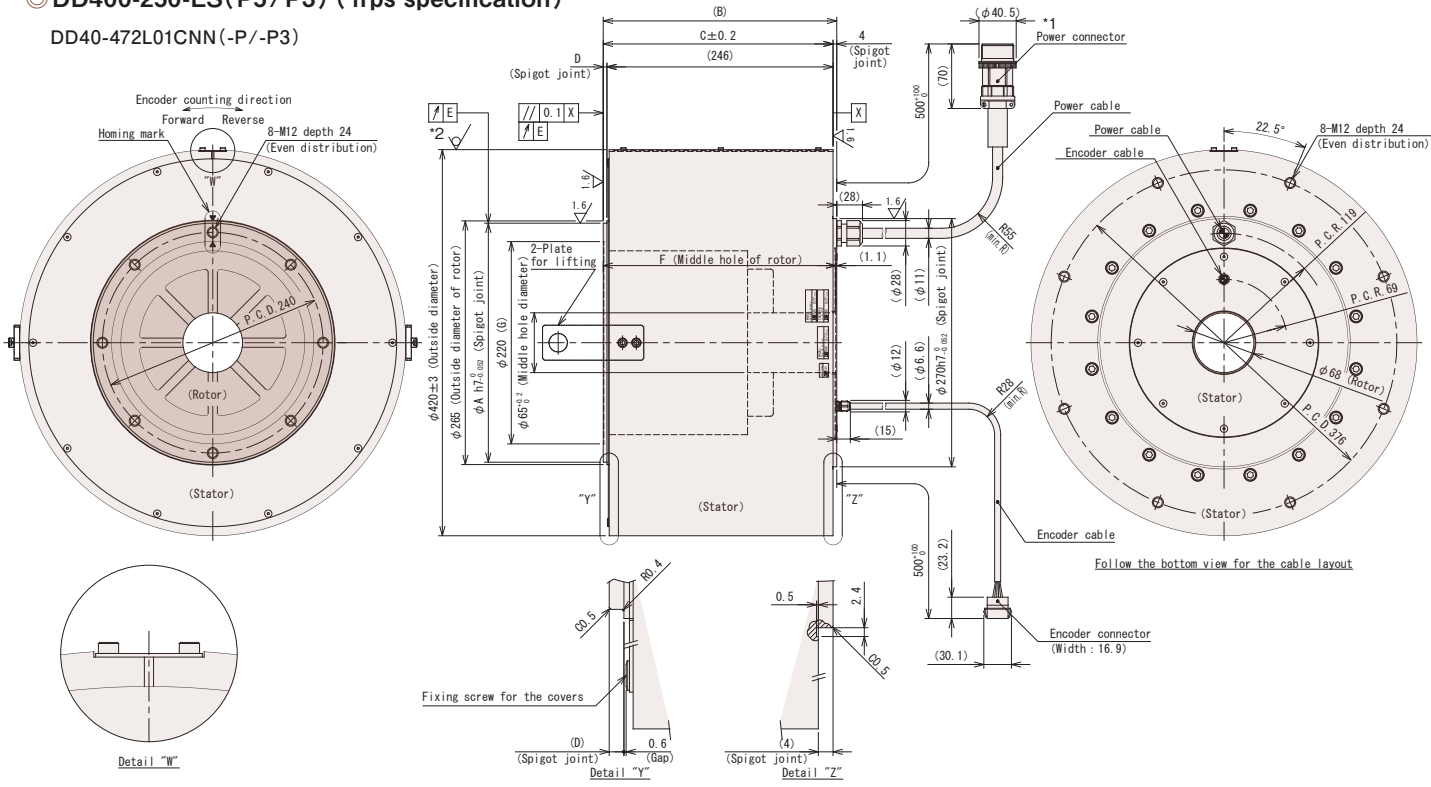

*1 The diameter of the panel guide insertion and removal hole for the power connector should be φ50 as the standard.

*2 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F	G
DD400-150-LS	260	154	150	4	0.04	152.9	0.7
DD400-150-LSP5	259.8	153.8	149.8	3.8	0.005	152.7	0.5
DD400-150-LSP3	259.8	153.8	149.8	3.8	0.003	152.7	0.5

◎ DD400-200-LS（P5／P3）

DD40-622L02CNN（-P/-P3）

*1 The diameter of the panel guide insertion and removal hole for the power connector should be φ50 as the standard.
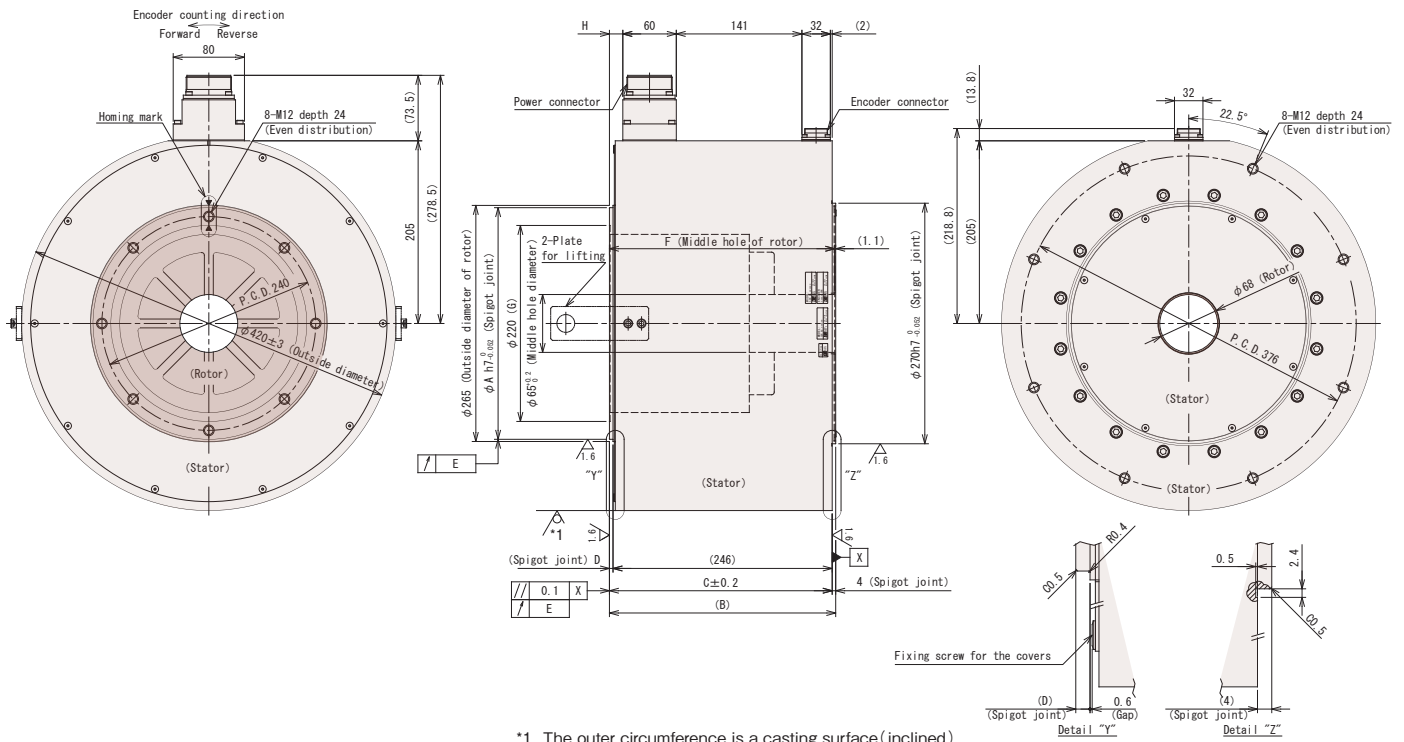
*2 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F	G
DD400-200-LS	260	204	200	4	0.04	202.9	0.7
DD400-200-LSP5	259.8	203.8	199.8	3.8	0.005	202.7	0.5
DD400-200-LSP3	259.8	203.8	199.8	3.8	0.003	202.7	0.5

■ τDISC DD-s Series Dimensions

◎ DD400-250-LS(P5/P3)(1.5rps specification)

DD40-702L01CNN(-P/-P3)

*1 The diameter of the panel guide insertion and removal hole for the power connector should be φ75 as the standard.

*2 The outer circumference is a casting surface(inclined).

Motor type	A	B	C	D	E	F	G
DD400-250-LS(1.5rps specification)	260	254	250	4	0.04	252.9	0.7
DD400-250-LSP5(1.5rps specification)	259.8	253.8	249.8	3.8	0.005	252.7	0.5
DD400-250-LSP3(1.5rps specification)	259.8	253.8	249.8	3.8	0.003	252.7	0.5

◎ DD400-250-LS(P5/P3)(1rps specification)

DD40-472L01CNN(-P/-P3)

*1 The diameter of the panel guide insertion and removal hole for the power connector should be φ50 as the standard.

*2 The outer circumference is a casting surface(inclined).

Motor type	A	B	C	D	E	F	G
DD400-250-LS(1rps specification)	260	254	250	4	0.04	252.9	0.7
DD400-250-LSP5(1rps specification)	259.8	253.8	249.8	3.8	0.005	252.7	0.5
DD400-250-LSP3(1rps specification)	259.8	253.8	249.8	3.8	0.003	252.7	0.5

■ τ DISC　DD-s Series　Dimensions

◎ DD400-250-LS（P5／P3）（2rps specification）

DD40-942L02CNN(-P/-P3)

*1　The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F	G	H
DD400-250-LS（2rps specification）	260	254	250	4	0.04	252.9	0.7	15
DD400-250-LSP5（2rps specification）	259.8	253.8	249.8	3.8	0.005	252.7	0.5	14.8
DD400-250-LSP3（2rps specification）	259.8	253.8	249.8	3.8	0.003	252.7	0.5	14.8

◎ DD630-175-LS（P10／P5）

DD63-842L01CNN(-P/-P5)
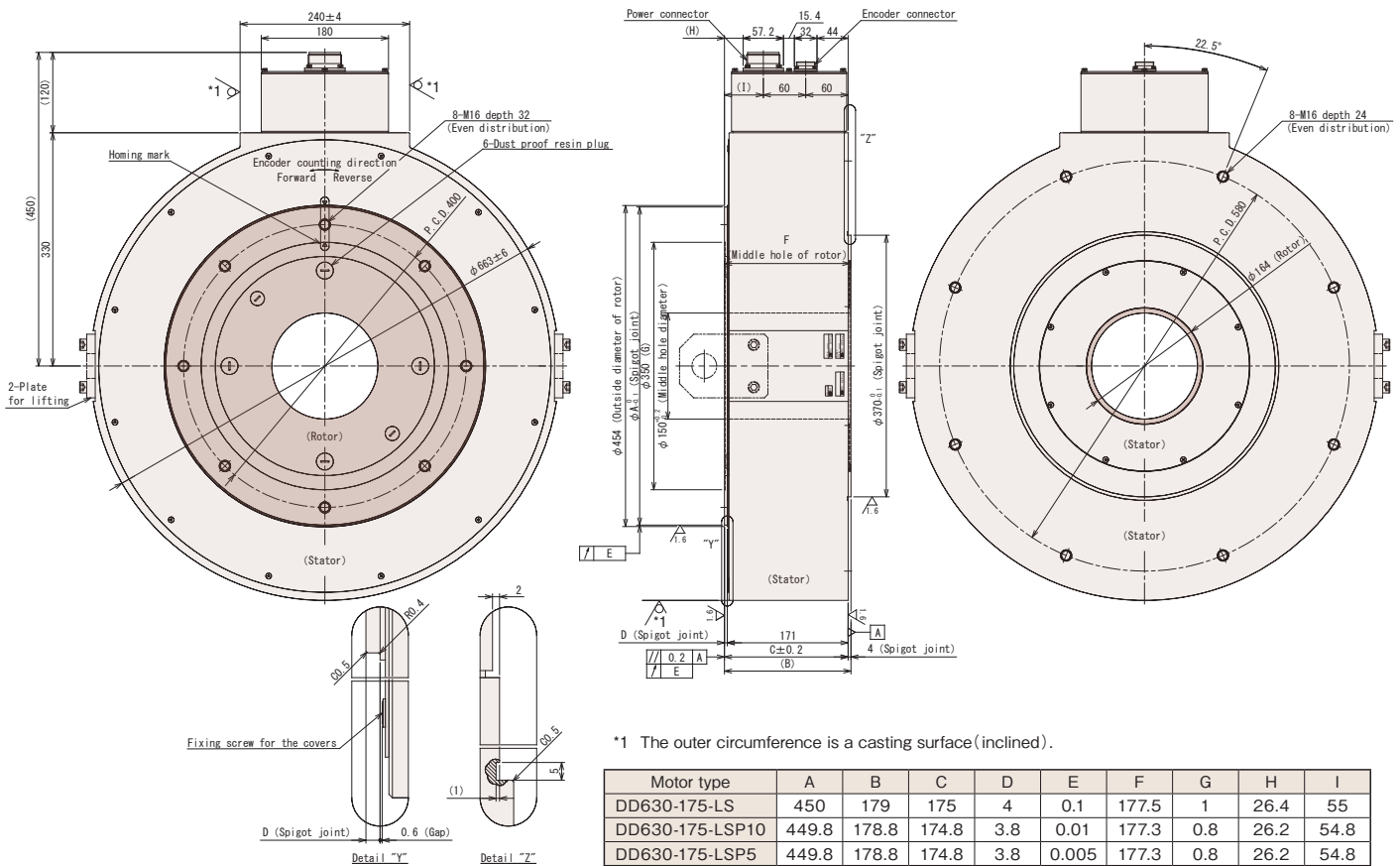
*1　The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F	G	H	I
DD630-175-LS	450	179	175	4	0.1	177.5	1	26.4	55
DD630-175-LSP10	449.8	178.8	174.8	3.8	0.01	177.3	0.8	26.2	54.8
DD630-175-LSP5	449.8	178.8	174.8	3.8	0.005	177.3	0.8	26.2	54.8

■ τ DISC DD-s Series Dimensions

◎ DD630-225-LS（P10／P5）

DD63-123L01CNN(-P/-P5)
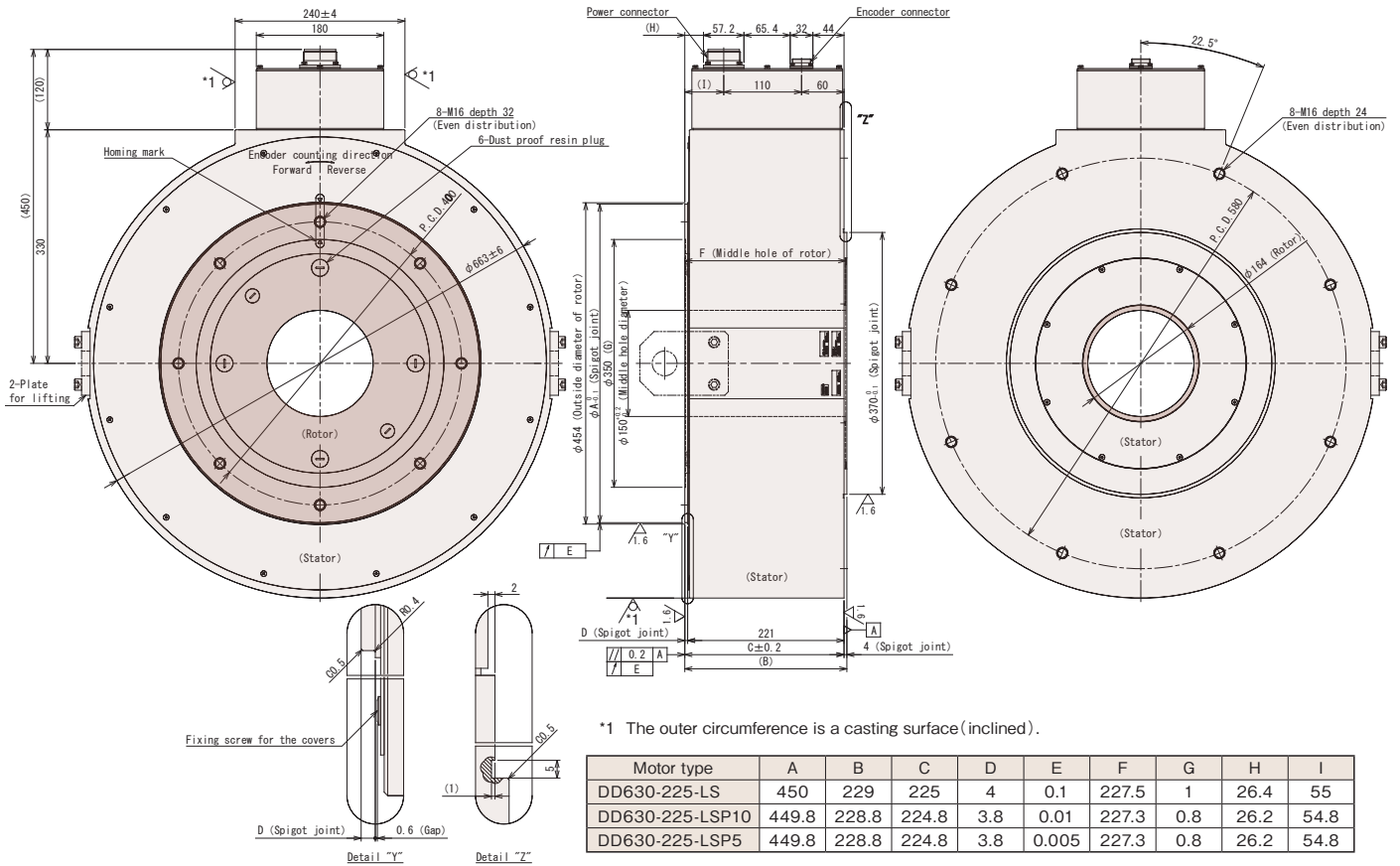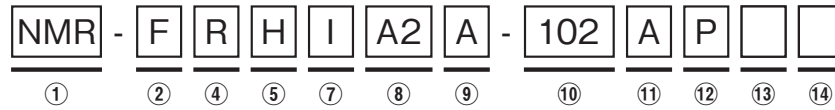

*1 The outer circumference is a casting surface（inclined）.

Motor type	A	B	C	D	E	F	G	H	I
DD630-225-LS	450	229	225	4	0.1	227.5	1	26.4	55
DD630-225-LSP10	449.8	228.8	224.8	3.8	0.01	227.3	0.8	26.2	54.8
DD630-225-LSP5	449.8	228.8	224.8	3.8	0.005	227.3	0.8	26.2	54.8

■ τDISC HD-s Series Model and motor type description

◎ **Motor type**　HD 140 - 160 - L S P ☐
　　　　　　　　　②　④　　⑤　　⑥ ③ ⑫ ⑭

◎ **Model**　NMR - F R H I A2 A - 102 A P ☐ ☐
　　　　　　①　② ④ ⑤ ⑦ ⑧ ⑨　⑩　⑪ ⑫ ⑬ ⑭

①		NMR···Direct drive motor Series		
②	Middle product classification（1）	Motor type	HD···HD-s Series	
		Model	F···HD-s Series	
③	Middle product classification（2）	S···ND-s Series／ ND-s HS Series／ DD-s Series／ HD-s Series		
④	Nominal diameter *1		With flange	Flange less
				R···140（Actual range 140 to 149mm）
				S···180（Actual range 170 to 189mm）
⑤	Nominal height *1		With flange	Flange less
				H···160（Actual range 150 to 169mm）
				I···185（Actual range 170 to 199mm）
				J···200（Actual range 200 to 219mm）
⑥	Motor flange	F···With flange		L···Flange less
⑦	Encoder type	I···Incremental encoder		
⑧	Power supply voltage	A2···200 VAC		
⑨	Order of design	A→B→C···Starting from A		
⑩	Rated output	Example）102 ··· 10　2 =10×10² =1000W　Exponent part of the power of 10　Significant figures		
⑪	Brake（with or without）	A···Without brake		
⑫	Table surface rotation accuracy	Without···Standard specification		P···High accuracy specification（option）
⑬	Motor structure	Without···Standard specification		Z···Reserved for manufacturer
⑭	Special model code	Without···Standard specification		
		-R + sequential number···Quasi standard specification		-S + sequential number···Special model specification

*1 The motor type is represented by a numerical value. Nominal dimensions may be different from actual dimensions. For details, refer to the dimensions.

* Dimensions are subject to change without prior notice to improve the product. Before designing, download the latest dimensions from the CKD Nikki Denso website.
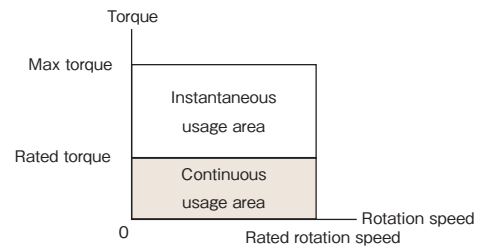
■ About the encoder type

The encoder type of the HD-s Series is the incremental encoder only.

■ Common specifications

Ambient operating temperature	0 to 40℃
Ambient operating humidity	85% or less; no condensation
Installation location	Do not install in a harmful atmosphere containing corrosive gas, grinding oil, metal dust, oil, etc. Install indoors, do not exposed to direct sunlight.
Installation direction	Horizontal with the rotor facing upward. *If the installation direction is not horizontal with the rotor facing upward, consult with our sales staff.
Cooling method	Natural air cooling
Insulation class	Class F
Withstand voltage	1,500 VAC, 1 minute
Protection class	IP42
Height above sea level	1,000 m or less
Vibration resistance	1G（3 directions, 2 hours each）
Shock resistance	30G（3 directions, 2 times each）

■ Torque characteristics

* If the locking operation or an equivalent operation
（ultra low speed rotation or reciprocation within a very small range of angles）is performed continuously, the electronic thermal value may be reduced for motor protection. When you plan to perform the above operation, contact our sales staff.

■ Individual specifications

Motor type *1			HD140-160-LS（P）	HD140-185-LS（P）	HD180-200-LS（P）
Model *1		NMR-	FRHIA2A-102A（P）	FRIIA2A-122A（P）	FSJIA2A-252A（P）
Flange type			Flange less	Flange less	Flange less
Power supply used		VAC	200	200	200
Outside diameter		mm	140	140	180
Height *2		mm	160（159.8）	185（184.8）	200（199.8）
Rated torque		N·m	27	36	68
Max torque		N·m	67.5	100	145
Rated rotation speed		rps	6	5.5	6
Rated output		W	1,017	1,244	2,563
Rated current		A	6.8	9.6	15.7
Encoder type			Incremental	Incremental	Incremental
Detection pulse		ppr	3,360,000	3,360,000	3,360,000
Detection resolution		arcsec	0.386	0.386	0.386
Allowable moment load *3		N·m	31.9	31.9	31.9
Allowable axial load *3		kN	3.2	3.2	3.2
Table surface rotation accuracy *4	Radial run out（no load）	µm	50（Standard）/ 10（High accuracy specification）		
	Axial run out（no load）	µm	50（Standard）/ 10（High accuracy specification）		
Absolute positioning accuracy *5		arcsec	±15（When the absolute position compensation function option is used）		
Repeated positioning accuracy（when reciprocating）		arcsec	±1		
Rotor moment of inertia		kg·m²	0.0027	0.0033	0.012
Weight		kg	10	12	19
Magnetic pole detection method			Automatic magnetic pole sensing	Automatic magnetic pole sensing	Selection of magnetic pole sensor detection or automatic magnetic pole detection
Paired driver	VPH Series	NCR-H□	2801□-A-□□□	2152□-A-□□□	2222□-A-□□□
	VCⅡ Series	NCR-□DA□	A2A-801J	A2A-152J	A2A-222J

*1 Shown in parentheses are the motor type and model of the High accuracy specification（option）.

*2 Shown in parentheses is the value of the High accuracy specification（option）.

*3 The life of the bearing and the run out accuracy differ depending on the load.

　For the points to note with regard to the allowable loads, refer to "About the allowable loads of τ DISC" on p.44.
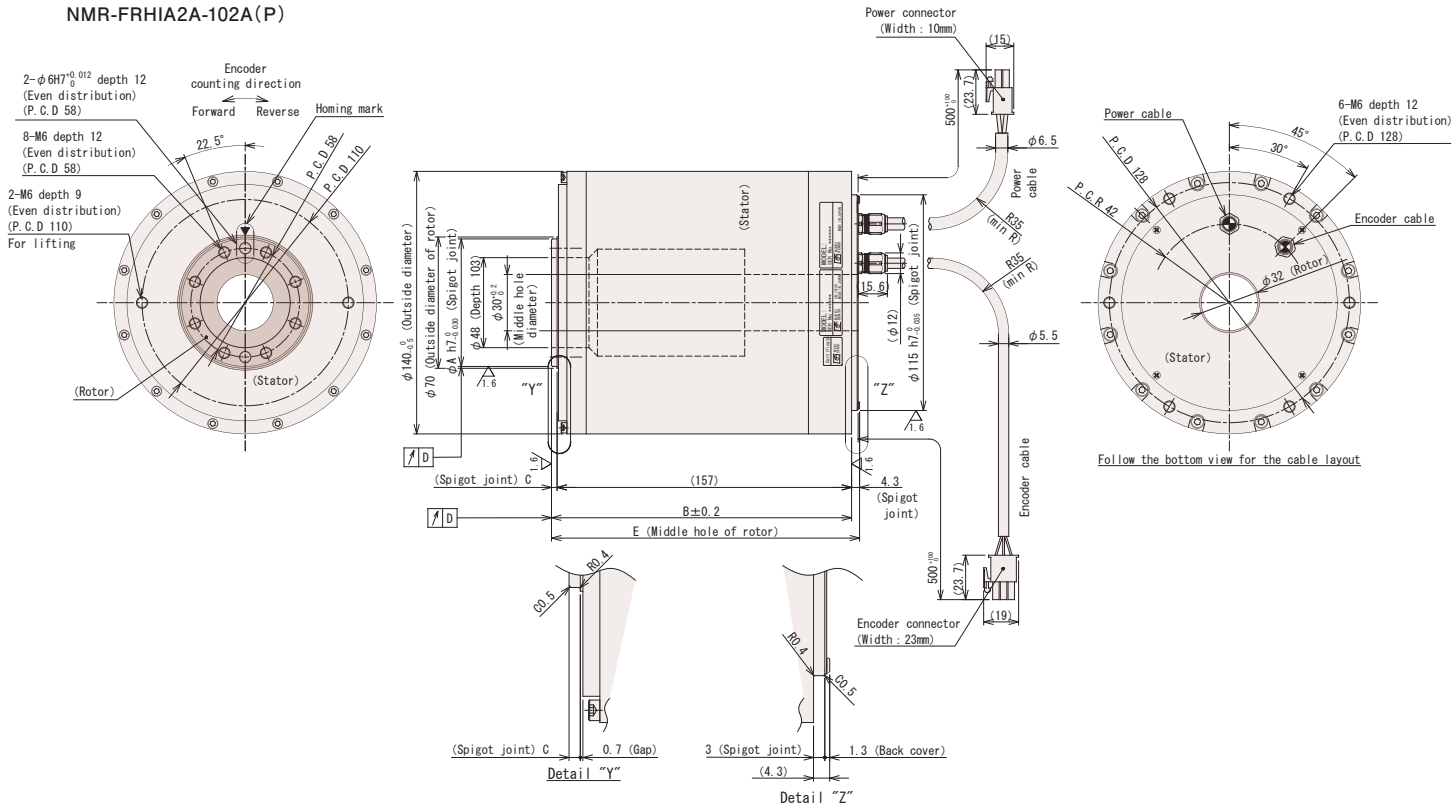
*4 For details, refer to "High accuracy specification option for τ DISC table surface rotation accuracy" on p.43.

*5 For details, refer to "τ DISC absolute position compensation function option" on p.42.

■ τ DISC HD-s Series Dimensions
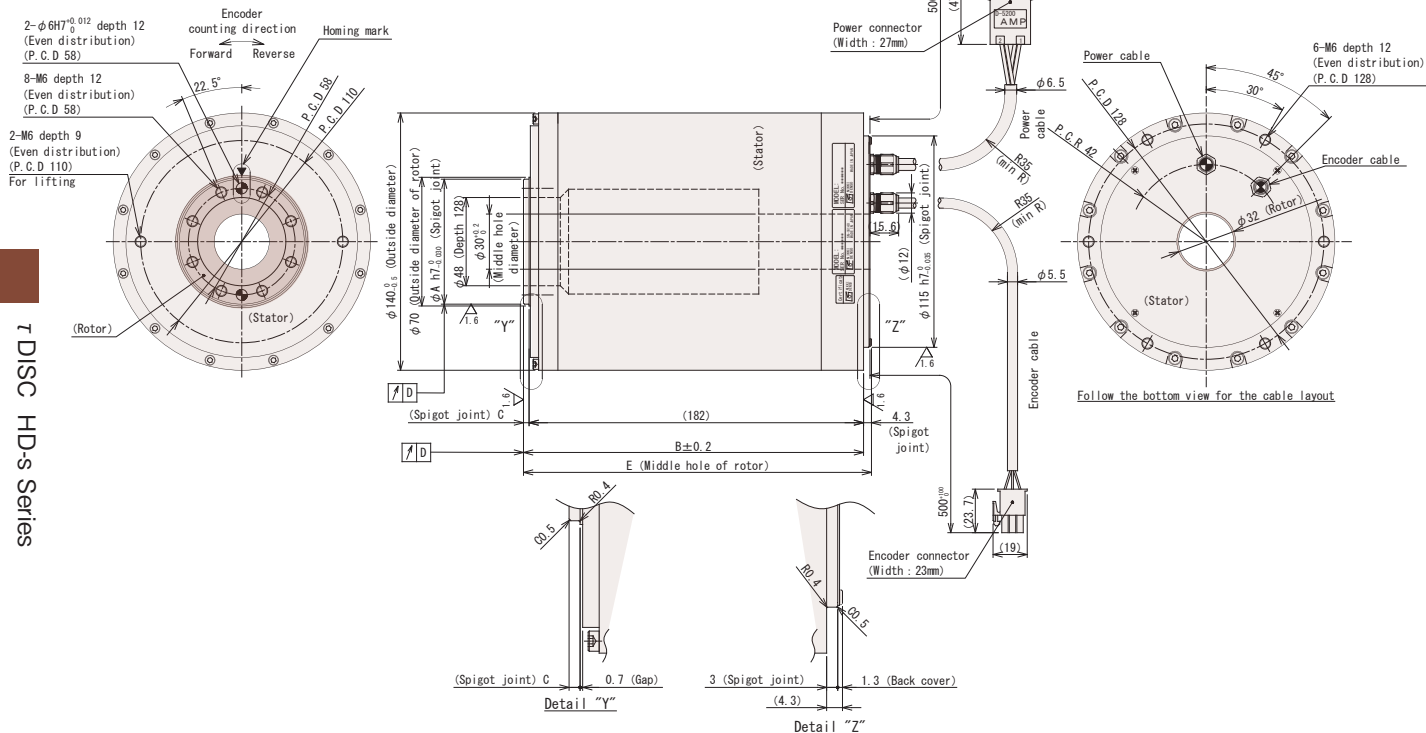
◎ HD140-160-LS（P）

NMR-FRHIA2A-102A（P）

Motor type	A	B	C	D	E	F
HD140-160-LS	68	160	3	0.05	164.3	103
HD140-160-LSP	67.8	159.8	2.8	0.01	164.1	102.8

■ τDISC HD-s Series Dimensions

◎ HD140-185-LS(P)

NMR-FRIIA2A-122A(P)

Motor type	A	B	C	D	E	F
HD140-185-LS	68	185	3	0.05	189.3	128
HD140-185-LSP	67.8	184.8	2.8	0.01	189.1	127.8

◎ HD180-200-LS(P)

NMR-FSJIA2A-252A(P)
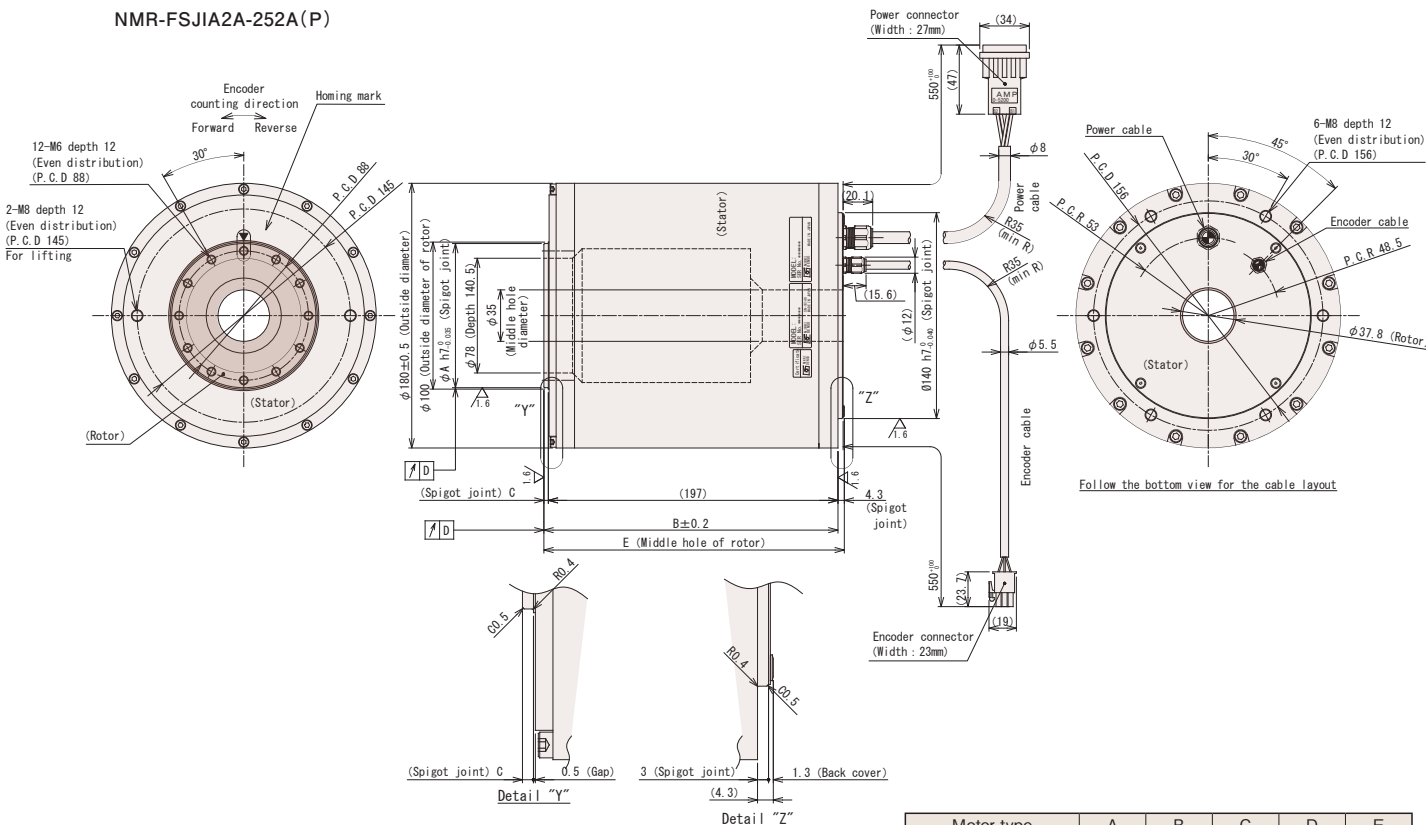
Motor type	A	B	C	D	E
HD180-200-LS	98	200	3	0.05	204.3
HD180-200-LSP	97.8	199.8	2.8	0.01	204.1

■ τDISC　Absolute position compensation function option

This is an option that guarantees the absolute positioning accuracy of the τDISC.

◎ Accuracy guaranteed by the absolute position compensation function option（no load）

τDISC Series	Guaranteed absolute positioning accuracy
ND-s／ND-s HS/HD-s	±15 arcsec
DD-s	±10 arcsec

◎ Examples of positioning accuracy measurements before and after compensation

Measured data of absolute positioning accuracy before compensation (no load)

Measured data of absolute positioning accuracy after compensation (no load)

Compensation data

Positioning accuracy：±3.9arcsec（Measured value）

±3.9arcsec

Enlarged view
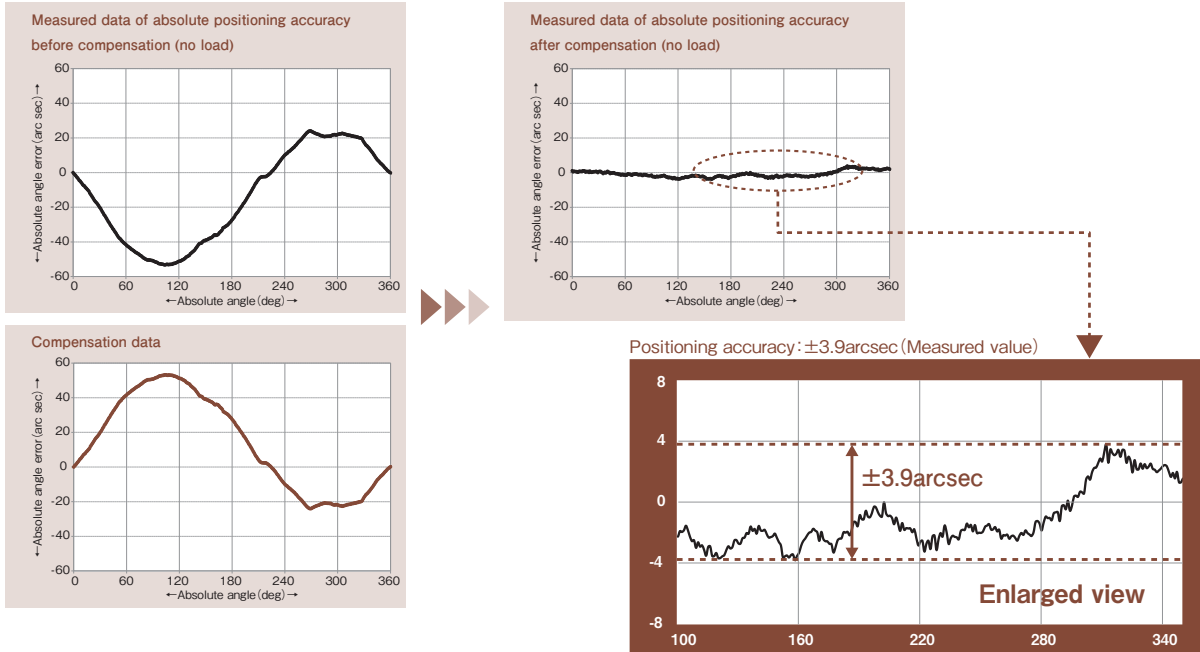
◎ Absolute position compensation function option system table

The absolute position compensation function option system differs depending on the combination of the τDISC Series, encoder type, servo driver Series, etc.
Select an absolute position compensation function option according to the table below.

τDISC Series	Servo driver Series *1	Encoder type	Language（Japanese／English）	Ordered product model（to be specified for both τDISC and servo driver）			
				Compensation data to be measured and incorporated by CKD Nikki Denso Compensation data not to be transferred by the user		Compensation data only to be measured by CKD Nikki Denso Compensation data to be transferred by the user *3	
				τDISC	Servo driver	τDISC	Servo driver
ND-s	VPH *2	Absolute／Incremental *4	Common	ND-s Series model + **NMR-X05**（Option）	NCR-H□□□□□-A-□1□	ND-s Series model + **NMR-X00**（Option）	NCR-H□□□□□-A-□0□
	VCⅡ	Absolute	Japanese	ND-s Series model + **NCR-XABCD1**（Option）	VCⅡ Series model + **NCR-XABJD1**（Option）	ND-s Series model + **NCR-XABDD1**（Option）	VCⅡ Series model + **NCR-XABID1**（Option）
			English	ND-s Series model + **NCR-XABGD1**（Option）		ND-s Series model + **NCR-XABHD1**（Option）	
		Incremental *4	Japanese	ND-s Series model + **NCR-XABAD1**（Option）		ND-s Series model + **NCR-XABBD1**（Option）	
			English	ND-s Series model + **NCR-XABED1**（Option）		ND-s Series model + **NCR-XABFD1**（Option）	
ND-s HS HD-s	VPH *2	Incremental	Common	ND-s HS Series/HD-s Series model + **NMR-X05**（Option）	NCR-H□□□□□-A-□1□	ND-s HS Series/HD-s Series model + **NMR-X00**（Option）	NCR-H□□□□□-A-□0□
	VCⅡ	Incremental	Japanese	ND-s Series model + **NCR-XABAD1**（Option）	VCⅡ Series model + **NCR-XABJD1**（Option）	ND-s Series model + **NCR-XABBD1**（Option）	VCⅡ Series model + **NCR-XABID1**（Option）
			English	ND-s Series model + **NCR-XABED1**（Option）		ND-s Series model + **NCR-XABFD1**（Option）	
DD-s	VPH *2	Absolute／Incremental *4	Common	DD□□-□□□□□□□□□-**5**	NCR-H□□□□□-A-□1□	DD□□-□□□□□□□□□-**0**	NCR-H□□□□□-A-□0□
	VCⅡ	Absolute／Incremental *4	Japanese	DD□□-□□□□□□□□□-**6**	VCⅡ Series model + **NCR-XABJD1**（Option）	DD□□-□□□□□□□□□-**1**	VCⅡ Series model + **NCR-XABID1**（Option）
			English	DD□□-□□□□□□□□□-**7**		DD□□-□□□□□□□□□-**2**	

*1　The compensation data differs for each servo driver Series. When you change the servo driver Series, you need to create compensation data again for the Series you will use and to transfer the data. When creating compensation data again, contact our sales staff.

*2　To enable the absolute position compensation function, you need to change the setting described on p.104 to "Correction effective"（which is set to "Ineffective" by default）.

*3　When the encoder type is absolute, it is not necessary to transfer the compensation data to the servo driver（the same also applies when the servo driver is replaced）.

*4　The incremental encoder type of the ND-s and DD-s Series is available on request.

■ τDISC High accuracy specification option for table surface rotation accuracy

This is an option that guarantees the rotation accuracy（radial run out and axial run out）of the τDISC table surface as shown below.

◎ Radial run out and axial run out accuracy guaranteed by the High accuracy specification option

The accuracy guaranteed for the standard specification differs depending on the motor type. For details, refer to the individual specifications of the relevant Series.

τDISC Series		Guaranteed radial run out and axial run out accuracy
ND-s		10 μm
ND-s HS		10 μm
DD-s	DD160 / 250 / 400 Type	5 μm / 3 μm
	DD630 Type	10 μm / 5 μm
HD-s		10 μm

* Note that the spigot joint of the table surface is shorter than the that of the standard specification.

◎ Table surface rotation accuracy measurement method
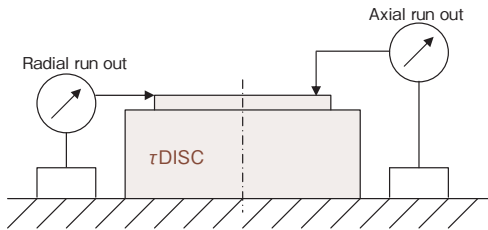
■ τDISC Parallelization processing specification option

This is an option that guarantees that the parallelism accuracy of the τDISC DD-s Series（excluding the DD630 type）is 20 μm.

The option is added to the High accuracy specification option for table surface rotation accuracy.

◎ Parallelism measurement method

With the output axis rotary table stopped at the origin position, measure the height from the motor base or surface plate to the rotary table at 4 points（0, 90, 180, and 270 degrees）by using a height gauge. The parallelism is the difference between the maximum and minimum values.
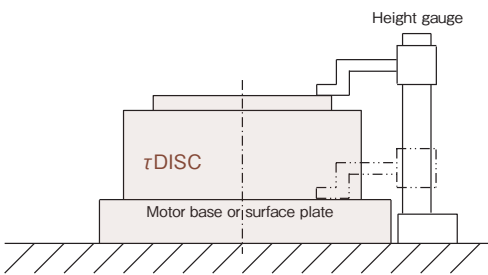
■ τ DISC Notes on selection and design

◎ About installation of τ DISC

When installing the τ DISC motor, follow the instructions below to maximize its performance.

・To ensure motor accuracy and heat radiation, install the motor on a highly rigid surface having a sufficiently large radiation area.
  Make sure that the entire base of the motor firmly adheres to the installation surface with no space between the base and the surface.

・If the motor is to be installed in a small installation surface with poor radiation performance, consult with our sales staff.
  Especially, in cases where a sufficiently large installation surface cannot be secured, such as when the motor is hung from the ceiling or supported
  by column bases, heat radiation conditions may be poor, potentially preventing the motor from fulfilling its performance.

・Make sure that the entire load table firmly adheres to the rotating surface of the motor with no space between the table and the surface.
  Low rigidity prevents the motor from fulfilling its performance. Be sure to have as much rigidity as possible when installing the motor.

[Recommended installation example]

Load fixing bolt

Load

τDISC

Motor fixing bolt

τDISC

Installation area

Flange type

Flange less type

[Low-rigidity installation example]

τDISC

Extended by shaft

Supported by column base
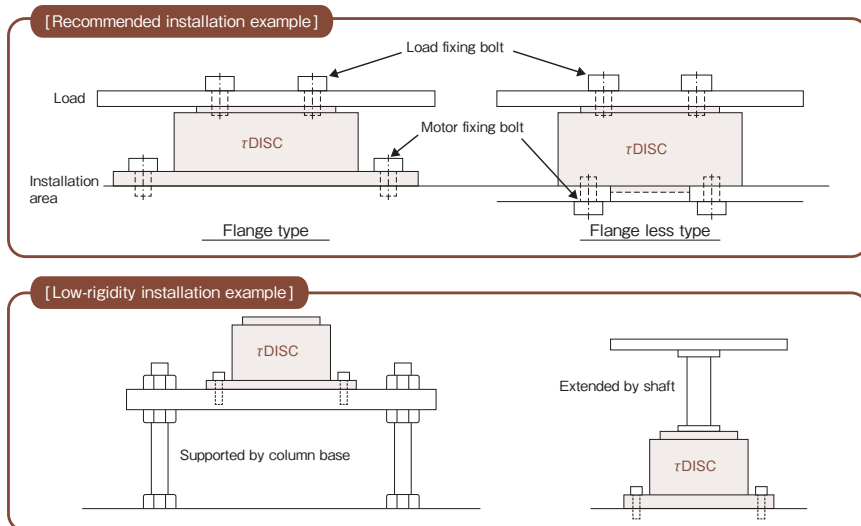
τDISC

◎ About the allowable loads of τ DISC

・The allowable axial load and allowable moment load shown in the individual specifications of the τ DISC motor are the maximum loads that are allowed
  when they are applied independently. If the combined load of an axial load, radial load, and moment load is applied, contact our sales staff.

・An excessive load or unbalanced load may cause rotor deformation or bearing abnormality.
  When selecting the motor, ensure that there is enough allowance in the allowable axial load and allowable moment load.
  Use the following allowable values as a guide. If these allowable values are exceeded, consult with our sales staff.

  ■ When using the motor with the rotor facing upward or sideways（all τ DISC Series）： 70% or less of each allowable load value
  ■ When using the motor with the rotor facing downward（DD-s Series）： 30% or less of each allowable load value. For the ND-s, ND-s-HS, or HD-s Series,
    consult with our sales staff.

  If you perform the rotation operation continuously with each load constantly applied, make sure that each load is within 30% of the relevant allowable load value.

◎ About magnetic pole detection of τ DISC

・The τ DISC motor is a synchronous AC servo motor.
  Exercise due care because the output toque may fall below the specification value if magnetic pole detection is not completed normally.

・For a motor equipped with an incremental encoder, magnetic pole detection can be done in two ways. One is to use the magnetic pole sensor built in the motor,
  and the other is to use the automatic magnetic pole detection function of the servo driver.
  When the magnetic pole is detected using the magnetic pole sensor, magnetic pole detection may fail to be completed normally unless the rotor of the motor is
  moved several degrees from the power-on position.
  In the case of automatic magnetic pole detection, the magnetic pole is automatically detected as the rotor makes an oscillatory movement at the first servo-on
  after the power is turned ON.
  The oscillation angle in each of these cases differs depending on the motor type.
  For details, refer to "Notes on magnetic pole detection" of the instruction manual of the τ DISC servo motor.

◎ About the small angle operation of τ DISC

・For a machine that is operated in a small range of angles, turn the rotary table of the motor by 90° or more on a regular basis to prevent uneven wear due to
  lack of grease in the bearing as well as to maintain accuracy.

・When the motor is reciprocated continuously within a small range of angles or torque is output without rotating the motor, make sure that the effective torque is
  70% or less of the rated torque of the motor.
  We can also meet the anti-fretting specifications intended to extend the life of the bearing when the rolling elements reciprocate repeatedly within a very small
  range of angles and cannot turn periodically. For details, refer to the anti-fretting measures in "Customization" on p.9.

◎ About the selection calculation of τ DISC

・The selection calculation sheet for rotor index positioning can be downloaded from the CKD Nikki Denso website.

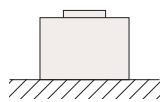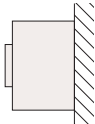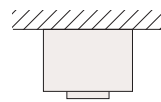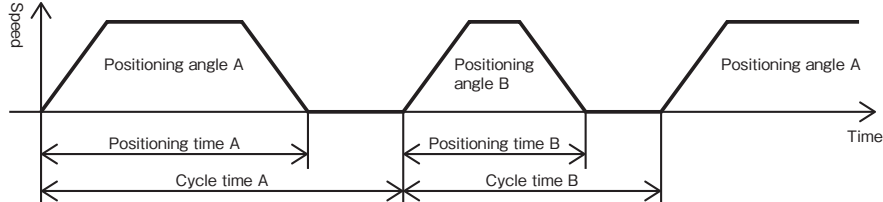* For information about the selection of the HD-s Series, contact our sales staff.

⚠ Details about τ DISC motor mounting, installation, usage instructions, etc., are given in the instruction manual of the τ DISC motor.
Read the manually carefully before use.
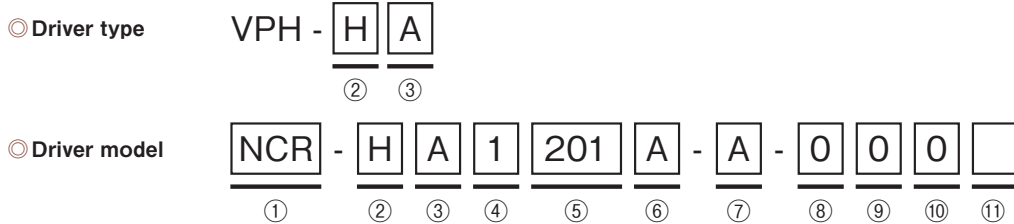
■ τ DISC Required specification sheet

Fill out the sheet according to your required specifications. Check the box corresponding to your requirement, or put necessary information in parentheses.

If you are not sure or have no specific requirement about an item, you may skip it.

After completing this sheet, fax it to your local distributor or contact our sales staff.

Entry date：

Purpose and device name	
Motor installation and fixing conditions	☐Rotor facing upward　☐Rotor facing sideways　☐Rotor facing downward Whether the motor can be moved　☐ No　☐ Yes（when the motor is mounted on an XY stage, vertically moving mechanism, etc.） Fixing conditions：Put the shape, material, thickness, etc., of the stator of the motor. Separate document(s)　☐ Not attached　☐ Attached
Load specifications and mounting condition	Load inertia moment on the motor　（　　　　）kg·m²　　Load weight（　　　　）kg Also, describe the shapes, weights, materials, and quantities of the tables, workpieces, tools, etc. that constitute the load on the motor, as well as the load mounting condition（even load or unbalanced load）. Separate document(s)　☐ Not attached　☐ Attached Outline, numerical values, etc.
External force	☐None　☐With（　　　　）N Direction and position of the external force　（　　　　　　　　　　　　　） ☐ At all times　　☐ When stopped　　☐ When rotating
Operation specifications	Positioning angle A（　　　）°　　　　Positioning angle B（　　　）° Positioning time A（　　　）sec　　　Positioning time B（　　　）sec Cycle time A（　　　）sec　　　　　Cycle time B（　　　）sec
Required accuracy	Positioning accuracy　　Repeated positioning accuracy　±（　　　）arcsec 　　　　　　　　　　　　Absolute positioning accuracy　±（　　　）arcsec 　　　　　　　　　　　　Or distance from the rotation center　Accuracy at the radius of R（　　）mm 　　　　　　　　　　　　Repeated positioning accuracy　±（　　　）μm 　　　　　　　　　　　　Absolute positioning accuracy　±（　　　）μm Table surface rotation accuracy　Axial run out　（　　　）μm 　　　　　　　　　　　　Radial run out　（　　　）μm
Other requirements	

■ Your company name	
■ Your department name	■ Your name
■ E-mail	■ Tel

■ Servo driver VPH Series Model／Driver type description

◎ **Driver type**   VPH - [H][A]
                              ② ③

◎ **Driver model**   [NCR] - [H][A][1][201][A] - [A] - [0][0][0][ ]
                           ①   ② ③ ④   ⑤   ⑥   ⑦   ⑧ ⑨ ⑩ ⑪

①		NCR···Servo driver Series
②	Series name	H···VPH Series
③	Machine model type	A···I/O specification
		B···SSCNETⅢ/H specification
		C···CC-Link specification
		D···EtherCAT specification
		E···MECHATROLINK-Ⅲ specification
④	Input power supply specification	1···100 VAC system
		2···200 VAC system
⑤	Output capacity	Example）201 ··· 20 1 =20×10^1 =200W 　　　　　 └─ Exponent part of the power of 10 　　　　 └── Significant figures
⑥	Hardware specification	A···Standard specification
		B···Coating specification *1
⑦	Paired motor	A···τDISC Series
⑧	Analog option	0···None
		1···With
⑨	Absolute position compensation option	0···None
		1···Absolute position compensation data incorporation
⑩	STO option *2	0···None
		1···With
⑪	Special model code	Without···Standard specification
		-R + sequential number···Quasi standard specification
		-S + sequential number···Special model specification

*1 A coating agent is applied to the internal board of the motor to reduce salt damage when used in a coastal area, corrosion due to corrosive gas in the atmosphere, etc.

*2 This option provides a safety function（Safe Torque Off：STO）to shut down the power supply to the τDISC motor connected to the VPH Series. It is intended for use to prevent an accident from occurring when the motor is powered on unexpectedly. For information about the safety measures and functions of this option, refer to "Servo driver VPH Series function specifications" on pp. 50 - 53.
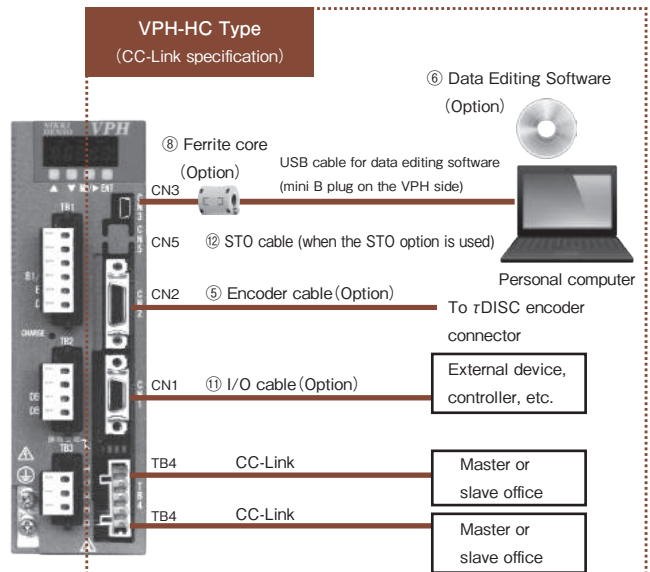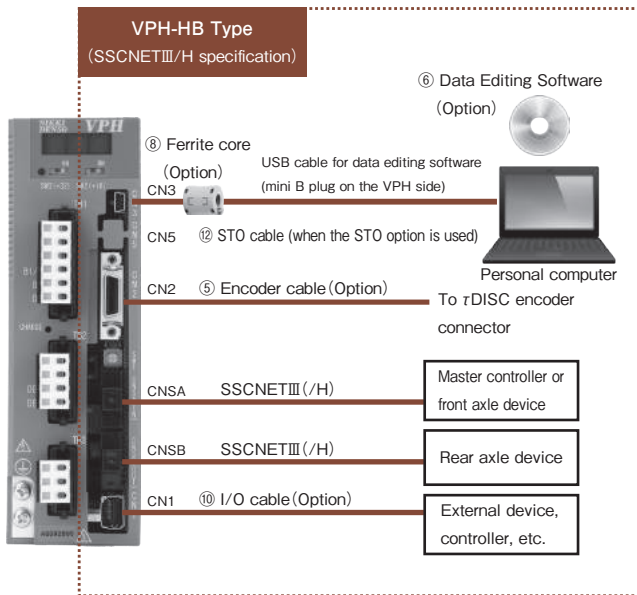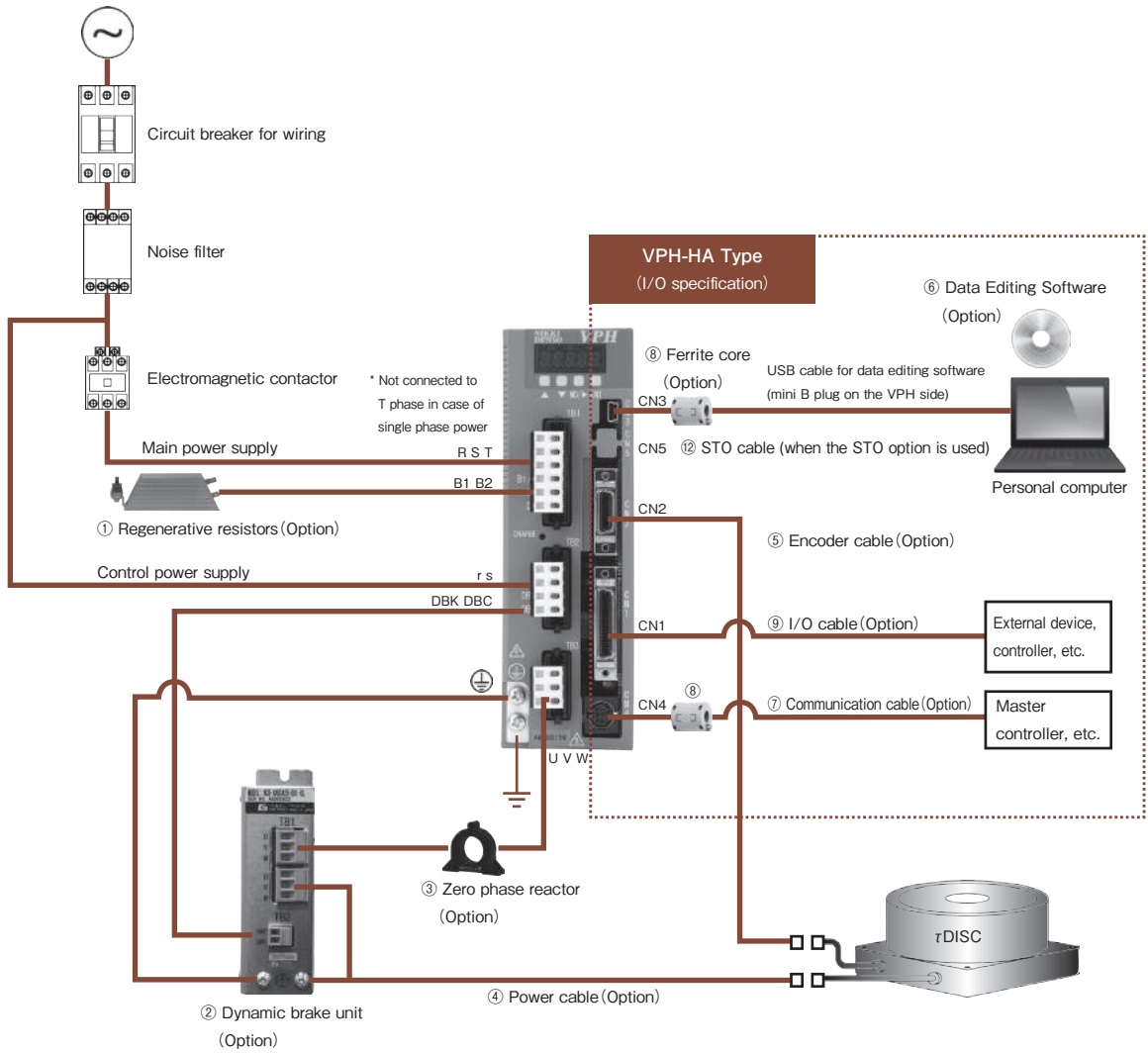
■ Common specifications

Ambient condition	Temperature		During operation：0 to 55℃
			During storage：-20 to 65℃
	Humidity		During operation and storage：90% or less; no condensation
	Installation location		Do not install in a harmful atmosphere containing corrosive gas, grinding oil, metal dust, oil, etc. Install indoors, do not exposed to direct sunlight.
	Height above sea level		1,000 m or less
Vibration resistance			5.9 m/s^2（10 to 55Hz）No resonance is allowed.
Drive method			3-phase sine wave PWM
Brake method			Regenerative brake：External regenerative resistor *1
Mounting type			Panel mounting
Performance	Speed control	Speed control range *2	1：5000 For the analog speed command 1：2000 *3
		Speed variation	Load characteristics	0 to 100% load：±0.01% or less（at the rated speed）
			Voltage characteristics	Rated voltage ±10%：0%（at the rated speed）
			Temperature characteristics	0 to 40℃：±0.1% or less（at the rated speed） For the analog speed command ±0.2% or less *3
	Torque control	Resolution	1：1000（Up to the rated torque）
		Reproducibility	±1%（Up to the rated torque）

*1 The regenerative resistor is optional.

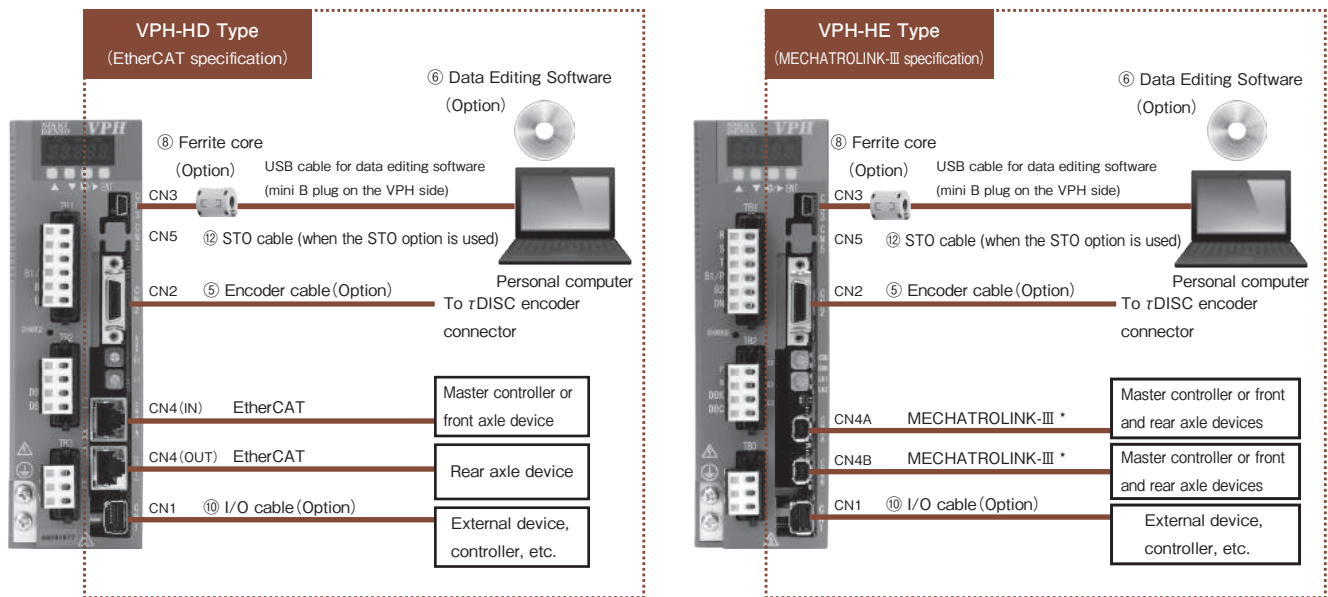*2 It is assumed that the motor does not stop when the load is 100%.

*3 Applicable only to the VPH-HA Type（I/O specification）.

■ Servo driver VPH Series System configuration

Circuit breaker for wiring

Noise filter

Electromagnetic contactor

* Not connected to
T phase in case of
single phase power

Main power supply   R S T

B1 B2

① Regenerative resistors（Option）

Control power supply   r s

DBK DBC

② Dynamic brake unit
（Option）

③ Zero phase reactor
（Option）

④ Power cable（Option）

VPH-HA Type
（I/O specification）

⑧ Ferrite core
（Option）

CN3

CN5   ⑫ STO cable (when the STO option is used)

CN2

⑥ Data Editing Software
（Option）

USB cable for data editing software
(mini B plug on the VPH side)

Personal computer

⑤ Encoder cable（Option）

CN1   ⑨ I/O cable（Option）

External device,
controller, etc.

CN4   ⑧

⑦ Communication cable（Option）

Master
controller, etc.

U V W

τDISC

VPH-HB Type
（SSCNETⅢ/H specification）

⑧ Ferrite core
（Option）

CN3

CN5   ⑫ STO cable (when the STO option is used)

CN2   ⑤ Encoder cable（Option）

CNSA   SSCNETⅢ（/H）

CNSB   SSCNETⅢ（/H）

CN1   ⑩ I/O cable（Option）

⑥ Data Editing Software
（Option）

USB cable for data editing software
(mini B plug on the VPH side)

Personal computer

To τDISC encoder
connector

Master controller or
front axle device

Rear axle device

External device,
controller, etc.

VPH-HC Type
（CC-Link specification）

⑧ Ferrite core
（Option）

CN3

CN5   ⑫ STO cable (when the STO option is used)

CN2   ⑤ Encoder cable（Option）

CN1   ⑪ I/O cable（Option）

TB4   CC-Link

TB4   CC-Link

⑥ Data Editing Software
（Option）

USB cable for data editing software
(mini B plug on the VPH side)

Personal computer

To τDISC encoder
connector

External device,
controller, etc.

Master or
slave office

Master or
slave office

■ Servo driver VPH Series System configuration

VPH-HD Type
(EtherCAT specification)

⑥ Data Editing Software
（Option）

⑧ Ferrite core
　（Option）
USB cable for data editing software
(mini B plug on the VPH side)

CN3

CN5　⑫ STO cable (when the STO option is used)

Personal computer

CN2　⑤ Encoder cable（Option）
To τDISC encoder connector

CN4（IN）　EtherCAT
Master controller or front axle device

CN4（OUT）　EtherCAT
Rear axle device

CN1　⑩ I/O cable（Option）
External device, controller, etc.

VPH-HE Type
(MECHATROLINK-Ⅲ specification)

⑥ Data Editing Software
（Option）

⑧ Ferrite core
　（Option）
USB cable for data editing software
(mini B plug on the VPH side)

CN3

CN5　⑫ STO cable (when the STO option is used)

Personal computer

CN2　⑤ Encoder cable（Option）
To τDISC encoder connector

CN4A　MECHATROLINK-Ⅲ *
Master controller or front and rear axle devices

CN4B　MECHATROLINK-Ⅲ *
Master controller or front and rear axle devices

CN1　⑩ I/O cable（Option）
External device, controller, etc.

* When connected to the KV-X controller manufactured by KEYENCE Corp.,
the connector on the KV-X side is an RJ-45 connector.
Use the MECHATROLINK-Ⅲ conversion cable（RJ-45／IMI conversion）
SV2-L□A Type manufactured by KEYENCE Corp.

◎ Optional product description

No.	Product name／specifications	Description	Page
①	Regenerative resistors	Required when the smoothing capacitor of the VPH Series servo driver cannot consume all regenerative power. To determine whether this resistor is required, download the motor selection calculation tool（*1） from the CKD Nikki Denso website and make a check.	P.80
②	Dynamic brake unit	An auxiliary brake unit that prevents the connected motor from free-running due to an error in the VPH Series, power failure, etc.	P.79
③	Zero phase reactor	This reactor absorbs the noise generated by the VPH Series servo driver to reduce the effect of noise on the driver main unit and peripheral equipment.	P.77
④	Power cable	This cable is used to connect the motor power connector or terminal of the VPH Series servo driver with the power cable of the motor.	P.69,71-72
⑤	Encoder cable	This cable is used to connect the encoder feedback pulse input connector（CN2）of the VPH Series servo driver with the encoder and magnetic pole sensor.	P.69-70
⑥	Data Editing Software	This software is used to edit the parameters of the VPH Series, operate the servo driver remotely, check the operation status and the status of each signal, and measure oscilloscope data and others from a personal computer.	P.78
⑦	Communication cable（For VPH-HA）	This cable is connected with the serial communication connector（CN4）of the VPH-HA Type servo driver to input and output data between the higher-level PLC computer link module or personal computer and the VPH Series.	P.76
⑧	Ferrite core	This option prevents malfunctions due to noise, such as monitor display interruption and the forced shutdown of the editing software.	P.76
⑨	I/O cable（For VPH-HA）	This cable is connected with the control input／output connector（CN1）of the VPH-HA Type servo driver to input and output signals.	P.73
⑩	I/O cable（For VPH-HB/HD/HE）	This cable is connected with the control input／output connector（CN1）of the VPH-HB/HD/HE Type servo driver to input and output signals.	P.74
⑪	I/O cable（For VPH-HC）	This cable is connected with the control input／output connector（CN1）of the VPH-HC Type servo driver to input and output signals.	P.74
⑫	STO cable	This cable is connected with the control input／output connector（CN5）of the VPH Series servo driver to input and output signals when the STO option is selected.	P.74

*1 For information about the motor selection calculation tool of the τDISC HD-s Series, contact our sales staff.

■ Servo driver VPH Series Individual specifications

Model	NCR-H□		1101□-A-□□□	1201□-A-□□□	2101□-A-□□□	2201□-A-□□□	2401□-A-□□□
Rated output		W	100	200	100	200	400
Main circuit input power supply	Rated voltage	V	100 to 120 AC 1φ		200 to 240 AC 1φ or 3φ		
	Frequency	Hz	50/60		50/60		
	Permissible voltage fluctuation	V	85 to 132 AC		170 to 264 AC		
	Input rated current	Arms	3.0	6.0	1.5(1φ) 0.9(3φ)	3.0(1φ) 1.7(3φ)	5.5(1φ) 3.2(3φ)
	Rated capacity	kVA	0.3	0.6	0.3	0.6	1.1
	Inrush current *1	A	23【12ms】	23【12ms】	45【5ms】	45【5ms】	45【5ms】
Control circuit input power supply	Rated voltage	V	100 to 120 AC 1φ		200 to 240 AC 1φ		
	Frequency	Hz	50/60		50/60		
	Permissible voltage fluctuation	V	85 to 132 AC		170 to 264 AC		
	Input rated current	Arms	0.24	0.24	0.12	0.12	0.12
	Power consumption	W	15	15	15	15	15
	Inrush current *1	A	17【5ms】	17【5ms】	17【3ms】	17【3ms】	17【3ms】
Continuous output current		Arms	2.0	3.5	1.1	2.0	3.5
Instant output current		Arms	6.0	9.9	3.3	6.0	9.9
Structure(IP code)			Natural cooling(IP20)				
Weight		kg	Approx.1.0	Approx.1.0	Approx.1.0	Approx.1.0	Approx.1.0

Model	NCR-H□		2801□-A-□□□	2152□-A-□□□	2222□-A-□□□	2332□-A-□□□	2702□-A-□□□
Rated output		W	800	1.5k	2.2k	3.3k	7k
Main circuit input power supply	Rated voltage	V	200 to 240 AC 1φ or 3φ50/60	200 to 240 AC 3φ			
	Frequency	Hz		50/60			
	Permissible voltage fluctuation	V		170 to 264AC			
	Input rated current	Arms	9.0(1φ) 5.2(3φ)	9.6	13.5	17.0	44.0
	Rated capacity	kVA	1.8	3.0	4.2	5.9	16.0
	Inrush current *1	A	45【9ms】	33【18ms】	33【18ms】	85【10ms】	73【30ms】
Control circuit input power supply	Rated voltage	V	200 to 240 AC 1φ				
	Frequency	Hz	50/60				
	Permissible voltage fluctuation	V	170 to 264AC				
	Input rated current	Arms	0.12	0.15	0.15	0.18	0.4
	Power consumption	W	15	18	18	20	45
	Inrush current *1	A	17【3ms】	17【3ms】	17【3ms】	34【2ms】	26【3ms】
Continuous output current		Arms	6.8	10.0	16.0	25.0	48.0
Instant output current		Arms	17.0	30.0	35.0	63.0	96.0
Structure(IP code)			Forced cooling(IP20)				Forced cooling(IP00)
Weight		kg	Approx.1.5	Approx.2.3	Approx.2.3	Approx.3.7	Approx.7.5

*1 Value applicable when the rated voltage is 120 VAC. The value shown in brackets is the time constant of the inrush current.
Roughly three times the value in brackets is equivalent to the time it takes before the inrush current dies down.

■ Servo driver VPH Series Functional specifications

◎ VPH-HA Type（I/O specification）

Type（Model） Item		VPH-HA Type（NCR-HA□□□□-A-□□□）		
Operation mode		Speed command operation, torque command operation, and pulse train command operation, and built-in command operation		
Speed command	Internal speed command	7 points; Selected by the control signal（setting unit： speed specification）		
	Analog command（Option）	1 point; Input voltage range： -12 to +12 V（resolution： 14 bits） Any voltage can be set for the maximum speed.		
	Acceleration／deceleration	Values between 0 and 99.999 sec can be set for acceleration and deceleration, respectively.		
Torque command	Internal torque command	7 points; Selected by the control signal（setting unit： 0.1%）		
	Analog command（Option）	1 point; Input voltage range： -12 to +12 V（resolution： 14 bits） Any voltage can be set for when the torque is 300%（the rated torque is 100%）.		
	Torque increase／decrease time	0 to 9.999 sec		
Pulse command	Command style	Line driver method： Up to 6.25 Mpps（1-time multiplication） 90° phase difference pulse（1-, 2-, and 4-time multiplication）, directional pulse（1- and 2-time multiplication）, or directional signal + feed pulse（1- and 2-time multiplication）can be selected.		
	Pulse command compensation	8 points A／B（A、B： 1 to 99999999）		
	S-curve acceleration／deceleration	8 points（0 to 1.000 sec）		
Built-in command	Setting unit	deg、mm、inch、µm、pulse、kpulse		
	Jog	8 speeds		
	Command	256 points; 3 types 　POS（positioning）　　　　　： ABS／INC 　INDX（index positioning）　： Shortcut／unidirectional 　HOME（zero return）　　　　： STD, LS LESS, OT HOME, CURRENT POSITION, OT HOME LS LESS, SET ABS, OUT POS		
	Acceleration／deceleration	8 points（Values between 0 and 99.999 sec can be set for acceleration and deceleration, respectively.）		
	S-curve acceleration／deceleration	8 points（0 to 1.000 sec）		
	Coordinate management	Infinite feed Absolute position management -2147483648 to +2147483647 Load axis one rotation position management（e.g., 0 to 359 degrees or -179 to +180 degrees）		
Servo adjustment item	Gain change	4 points（changed according to the GSEL1 and GSEL2 signals and operation conditions）		
	Feed forward	Speed feed forward ratio, speed feed forward shift ratio, inertia torque feed forward ratio, viscous friction torque feed forward ratio		
	Filter	Feedback filter, torque command filter, 5 torque command notch filters, speed feed forward filter, torque feed forward filter		
	Auto-tuning	Position gain, speed loop gain／integral time constant setting		
Control input signal		8 external input signals. The following signals can be assigned to these signals. *1		
		RST（reset）	ARST（alarm reset）	EMG（emergency stop）
		SON（servo on）	DR（drive）	CLR（deviation clear）
		CIH（pulse train command prohibition）	TL（torque limit）	FOT（forward direction over travel）
		ROT（reverse direction over travel）	MD1 - MD2（mode selection 1 - 2）	GSL1 - GSL2（gain selection 1 - 2）
		RVS（command direction reversal）	SS1 - SS8（command selection 1 - 8）	
		ZST（positioning start）	ZLS（zero point deceleration）	ZMK（external marker）
		TRG（external trigger）	CMDZ（command zero）	ZCAN（positioning cancellation）
		FJOG（forward direction jog）	RJOG（reverse direction jog）	MTOH（motor overheat）
		The status of the control input signal can be fixed to ON or OFF. When assigned to an external input signal, the signal logic can be changed.		
Control output signal		4 external output signals. The following signals can be assigned to these signals. *1		
		ALM（alarm）	WNG（warning）	RDY（servo ready）
		SZ（speed zero）	PE1 - PE2（position deviation range 1 - 2）	PN1 - PN2（positioning complete 1 - 2）
		PZ1 - PZ2（positioning complete response 1 - 2）	ZN（command complete）	ZZ（command complete response）
		ZRDY（command start ready）	PRF（rough match）	VCP（speed reached）
		BRK（break release）	LIM（limited）	EMGO（emergency stop in process）
		HCP（zero return complete）	HLDZ（command zero in process）	OTO（over travel in process）
		MTON（motor on）	OUT1 - OUT8（common output）	
		SMOD（speed command mode）	TMOD（torque command mode）	PMOD（pulse train command mode）
		NMOD（built-in command mode）	OCEM（marker output）	
		When assigned to an external output signal, the signal logic can be changed（except OCEM）.		
Error detection		Encoder error, over speed error, motor overload error, device overload error, under voltage error, over voltage error, over current error, servo control error, cable disconnection error, magnetic pole error, deviation error, backup data error, CPU error, etc. 5 alarms stored in the history		
Holding break（BRK signal）		BRK（break release）signal set to OFF in the motor power off status With control for vertical axis drop prevention（drop prevention control disabled in case of a power error）		
Dynamic brake		External dynamic brake unit（option） Activated in the motor power off status		
Encoder pulse output		Line driver method： 90° phase difference pulse + marker The marker output signal can also be output as the control output signal. The maximum width that can be set is 2 ms. Dividing frequency output by hardware： Maximum output frequency of 25 Mpps（4-time multiplication） Control output by software： Maximum output frequency of 20.46 Mpps（4-time multiplication） Pulse output division ： A／B（A、B： 1 to 99999999） Current position data pulse output function（outputs as many pulses as the value of the current position.）		
Torque limit command		Set in units of 0.1% by the relevant parameter.		
Compensation function		Absolute position compensation（option; refer to p.42）, torque compensation		
Display function		CHARGE, 5-digit LED data display in the front		
Communication function		USB 2.0（full speed）standard compliance： 1 channel for connection between personal computer（VPH data editing software option）and device RS422 ： 1ch		
SEMI F47 compatible function		Torque limit function when the main circuit voltage drops（The control power must be supplied from a UPS.）		
Safety measure		STO（IEC／EN61800-5-2）（Option）		
Safety performance		EN ISO13849 Cat3 PL e　EN61508 SIL3		

*1 For the initial assignment of the 8 external input signals and 4 external output signals, refer to "Servo driver VPH Series external connection diagram VPH-HA Type" on p.55.

■ Servo driver VPH Series Functional specifications

◎ VPH-HB Type（SSCNETⅢ/H specification）/◎ VPH-HD Type（EtherCAT specification）

Type（Model） Item			VPH-HB Type（NCR-HB□□□□-A-□□□）	VPH-HD Type（NCR-HD□□□□-A-□□□）
Communication mode	Operation mode		Speed command operation, torque command operation, and position control operation	
	Speed command	Command input	From SSCNETⅢ（/H）	Issued from the CoE object dictionary （Cyclic synchronous speed mode）
		Acceleration／deceleration	Values between 0 and 99.999 sec can be set for acceleration and deceleration, respectively.	
	Torque command	Command input	From SSCNETⅢ（/H）	Issued from the CoE object dictionary （Cyclic synchronous torque mode）
		Torque increase／decrease time	0 to 9.999 sec	
	Position control	Command input	From SSCNETⅢ（/H）	Issued from the CoE object dictionary （Cyclic synchronous position mode, profile position mode, zero return mode）
		S-curve acceleration／deceleration	2 points（0 to 1.000 sec）	8 points（0 to 1.000 sec）（changed by the CoE object dictionary）
	Servo adjustment item	Gain change	2 points（changed according to the gain change command from SSCNETⅢ（/H） and operating conditions）	4 points（changed by the CoE object dictionary）
		Feed forward	Speed feed forward ratio, speed feed forward shift ratio, inertia torque feed forward ratio, viscous friction torque feed forward ratio	
		Filter	Feedback filter, torque command filter, 5 torque command notch filters, speed feed forward filter, torque feed forward filter	
Maintenance mode *1	Operation mode		Speed command, torque command, and built-in command operation modes	
	Speed command	Internal speed command	7 points; Selected by the control signal（setting unit： speed specification）	
		Acceleration／deceleration	Values between 0 and 99.999 sec can be set for acceleration and deceleration, respectively.	
	Torque command	Internal torque command	7 points; Selected by the control signal（setting unit： 0.1%）	
		Torque increase／decrease time	0 to 9.999 sec	
	Built-in command	Setting unit	pulse	
		Jog	8 speeds	
		Command	256 points; 3 types POS（positioning）　　　 ： ABS／INC INDX（index positioning） ： Shortcut／unidirectional HOME（zero return）　　 ： STD, LS LESS, OT HOME, CURRENT POSITION, OT HOME LS LESS, SET ABS	
		Acceleration／deceleration	8 points（Values between 0 and 99.999 sec can be set for acceleration and deceleration, respectively.）	
		S-curve acceleration／deceleration	8 points（0 to 1.000 sec）	
		Coordinate management	Infinite feed Absolute position management -2147483648 to +2147483647 Load axis one rotation position management（e.g., 0 to 359 degrees or -179 to +180 degrees）	
	Servo adjustment item	Gain change	4 points（changed according to the GSL1 and GSEL2 signals and operation conditions）	
		Feed forward	Speed feed forward ratio, speed feed forward shift ratio, inertia torque feed forward ratio, viscous friction torque feed forward ratio	
		Filter	Feedback filter, torque command filter, 5 torque command notch filters, speed feed forward filter, torque feed forward filter	
		Auto-tuning	Position gain, speed loop gain／integral time constant setting	
Control input signal			4 external input signals In communication mode, the following signals can be assigned. *2	5 external input signals In communication mode, the following signals can be assigned. *2

Control input signal (VPH-HB)

ARST（alarm reset）	EMG（emergency stop）
TL（torque limit）	FOT（forward direction over travel）
ROT（reverse direction over travel）	ZLS（zero point deceleration）
MTOH（motor overheat）	

Control input signal (VPH-HD)

EMG（emergency stop）	FOT（forward direction over travel）
ROT（reverse direction over travel）	ZLS（zero point deceleration）
ZMK（external zero point marker）	IN1 - IN2（common input 1 - 2）
MTOH（motor overheat）	

When assigned to an external input signal, the signal logic can be changed（except OCEM）.

Control output signal		
2 external output signals In communication mode, the following signals can be assigned. *2	3 external output signals In communication mode, the following signals can be assigned. *2

Control output signal (VPH-HB)

ALM（alarm）	WNG（warning）
RDY（servo ready）	SZ（speed zero）
PE1（position deviation range 1）	PN1（positioning complete 1）
VCP（speed reached）	BRK（break release）
LIM（limited）	EMGO（emergency stop in process）
MTON（motor on）	SMOD（speed command mode in process）
TMOD（torque command mode in process）	PMOD（position control mode in process）
OCEM（marker output）	

Control output signal (VPH-HD)

ALM（alarm）	WNG（warning）
RDY（servo ready）	SZ（speed zero）
PE1 - PE2（position deviation range 1 - 2）	PN1 - PN2（positioning complete 1 - 2）
PRF（rough match）	VCP（speed reached）
BRK（break release）	LIM（limited）
EMGO（emergency stop in process）	OTO（over travel in process）
MTON（motor on）	OUT1 - OUT2（common output 1 - 2）
OCEM（marker output）	

When assigned to an external output signal, the signal logic can be changed（except OCEM）.

Item			Specification	
Error detection			Encoder error, over speed error, motor overload error, device overload error, under voltage error, over voltage error, over current error, servo control error, phase error, magnetic pole error, deviation error, backup data error, CPU error, etc. 5 alarms stored in the history	
Holding break（BRK signal）			BRK（break release） signal set to OFF in the motor power off status With control for vertical axis drop prevention（drop prevention control disabled in case of a power error）	
Dynamic brake			External dynamic brake unit（option） Activated in the motor power off status	
Encoder pulse output			Servo driver encoder pulse output function not available	
Torque limit command			Set in units of 0.1% by the relevant parameter.	Issued from the CoE object dictionary（set in units of 0.1%）
Compensation function			Absolute position compensation（option; refer to p.42）, torque compensation	
Display function			CHARGE, 3-digit LED data display in the front	CHARGE, 5-digit LED data display in the front
Communication function			USB 2.0（full speed） standard compliance： 1 channel for connection between personal computer（VPH data editing software option） and device	
SEMI F47 compatible function			Torque limit function when the main circuit voltage drops（The control power must be supplied from a UPS.）	
Safety measure			STO（IEC／EN61800-5-2）（Option）	
Safety performance			EN ISO13849 Cat3 PL e EN61508 SIL3	

*1 In maintenance mode, the VPH servo driver operates independently.

*2 The signals that can be assigned in maintenance mode are different. For details, refer to the section of the instruction manual of the relevant type of the VPH Series describing the control input and output signals.

◎ Mitsubishi Electric controllers that can be connected to SSCNETⅢ（/H）

●Motion controller

iQ-R Series　・R32MTCPU、R16MTCPU
　　　　　　　Supported OS version： 07 or later

Q Series　・Q173DSCPU、Q172DSCPU、Q170MSCPU（Stand-alone type）
　　　　　　Supported OS： Transport and assembly（SV13） and automatic equipment（SV22）
　　　　　　Supported OS version： 00J or later

●Simple motion unit

iQ-R Series　・RD77MS□　Supported serial number： First 2 digits 07 or greater
Q Series　　・QD77MS□　Supported serial number： First 5 digits 17012 or greater
L Series　　・LD77MS□　Supported serial number： First 5 digits 17012 or greater
iQ-F Series　・FX5-□□SSC-S　Supported version： 1.004 or later

●Position board　MR-MC1□□、MR-MC2□□

■ Servo driver VPH Series Functional specifications

◎ VPH-HC Type（CC-Link specification）

Item Type（Model）			VPH-HC Type（NCR-HC□□□□-A-□□□）
Operation mode			Speed command operation, torque command operation, and pulse train command operation, and built-in command operation
Speed command	Internal speed command		7 points; Selected by the control signal（setting unit： speed specification）
	Acceleration / deceleration		Values between 0 and 99.999 sec can be set for acceleration and deceleration, respectively.
Torque command	Internal torque command		7 points; Selected by the control signal（setting unit： 0.1%）
	Torque increase / decrease time		0 to 9.999 sec
Pulse command	Command style		Line driver method： Up to 6.25 Mpps（1-time multiplication） 90° phase difference pulse（1-, 2-, and 4-time multiplication）, directional pulse（1- and 2-time multiplication）, or directional signal + feed pulse（1- and 2-time multiplication）can be selected.
	Pulse command compensation		8 points A / B（A、B： 1 to 99999999）
	S-curve acceleration / deceleration		8 points（0 to 1.000 sec）
Built-in command	Setting unit		deg、mm、inch、μm、pulse、kpulse
	Jog		8 speeds
	Command		256 points; 3 types 　POS（positioning）： ABS / INC 　INDEX（index positioning）： Shortcut / unidirectional 　HOME（zero return）： STD, LS LESS, OT HOME, CURRENT POSITION, OT HOME LS LESS, SET ABS
	Acceleration / deceleration		8 points（Values between 0 and 99.999 sec can be set for acceleration and deceleration, respectively.）
	S-curve acceleration / deceleration		8 points（0 to 1.000 sec）
	Coordinate management		Infinite feed Absolute position management -2147483648 to +2147483647 Load axis one rotation position management（e.g., 0 to 359 degrees or -179 to +180 degrees）
Servo adjustment item	Gain change		4 points（changed according to the GSEL1 and GSEL2 signals and operation conditions）
	Feed forward		Speed feed forward ratio, speed feed forward shift ratio, inertia torque feed forward ratio, viscous friction torque feed forward ratio
	Filter		Feedback filter, torque command filter, 5 torque command notch filters, speed feed forward filter, torque feed forward filter
	Auto-tuning		Position gain, speed loop gain / integral time constant setting
Control input signal			4 external input signals. The following signals can be assigned to these signals. *1
	RST（reset）	ARST（alarm reset）	EMG（emergency stop）
	SON（servo on）	DR（drive）	CLR（deviation clear）
	CIH（pulse train command prohibition）	TL（torque limit）	FOT（forward direction over travel）
	ROT（reverse direction over travel）	MD1 - MD2（mode selection 1 - 2）	GSL1 - GSL2（gain selection 1 - 2）
	RVS（command direction reversal）	SS1 - SS8（command selection 1 - 8）	
	ZST（positioning start）	ZLS（zero point deceleration）	ZMK（external marker）
	TRG（external trigger）	CMDZ（command zero）	ZCAN（positioning cancellation）
	FJOG（forward direction jog）	RJOG（reverse direction jog）	MTOH（motor overheat）
	The status of the control input signal can be fixed to ON or OFF. When assigned to an external input signal, the signal logic can be changed.		
Control output signal			2 external output signals. The following signals can be assigned to these signals. *1
	ALM（alarm）	WNG（warning）	RDY（servo ready）
	SZ（speed zero）	PE1 - PE2（position deviation range 1 - 2）	PN1 - PN2（positioning complete range 1 - 2）
	PZ1 - PZ2（positioning complete response 1 - 2）	ZN（command complete）	ZZ（command complete response）
	ZRDY（command start ready）	PRF（rough match）	VCP（speed reached）
	BRK（break release）	LIM（limited）	EMGO（emergency stop in process）
	HCP（zero return complete）	HLDZ（command zero in process）	OTO（over travel in process）
	MTON（motor on）	OUT1 - OUT8（common output）	
	SMOD（speed command mode）	TMOD（torque command mode）	PMOD（pulse train command mode）
	NMOD（built-in command mode）	OCEM（marker output）	
	When assigned to an external output signal, the signal logic can be changed（except OCEM）.		
Error detection			Encoder error, over speed error, motor overload error, device overload error, under voltage error, over voltage error, over current error, servo control error, cable disconnection error, magnetic pole error, deviation error, backup data error, CPU error, etc. 5 alarms stored in the history
Holding break（BRK signal）			BRK（break release）signal set to OFF in the motor power off status With control for vertical axis drop prevention（drop prevention control disabled in case of a power error）
Dynamic brake			External dynamic brake unit（option） Activated in the motor power off status
Torque limit command			Set in units of 0.1% by the relevant parameter.
Compensation function			Absolute position compensation（option; refer to p.42）, torque compensation
Display function			CHARGE, 5-digit LED data display in the front
Communication function			・USB 2.0（full speed）standard compliance： 1 channel for connection between personal computer （VPH data editing software option）and device
SEMI F47 compatible function			Torque limit function when the main circuit voltage drops（The control power must be supplied from a UPS.）
Safety measure			STO（IEC / EN61800-5-2）（Option）
Safety performance			EN ISO13849 Cat3 PL e EN61508 SIL3

*1 For the initial assignment of the 8 external input signals and 4 external output signals, refer to "Servo driver VPH Series external connection diagram VPH-HC Type" on p.57.

■ Servo driver VPH Series Functional specifications

◎ VPH-HE Type（MECHATROLINK-Ⅲ specification）

Item	Type（Model）		VPH-HE Type （NCR-HE□□□□-A-□□□）
Communication mode	Operation mode		Speed command operation, torque command operation, position control operation, and built-in command operation
	Speed command	Command input	Issued from MECHATROLINK-Ⅲ
		Acceleration／deceleration	Values between 0 and 99.999 sec can be set for acceleration and deceleration, respectively.
	Torque command	Command input	Issued from MECHATROLINK-Ⅲ
		Torque increase／decrease time	0 to 9.999 sec
	Position control	Command input	Issued from MECHATROLINK-Ⅲ
		S-curve acceleration／deceleration	8 points（0 to 1.000 sec）
	Servo adjustment item	Gain change	4 points（changed to the gain number specified in network selection and changed according to operation conditions）
		Feed forward	Speed feed forward ratio, speed feed forward shift ratio, inertia torque feed forward ratio, viscous friction torque feed forward ratio
		Filter	Feedback filter, torque command filter, 5 torque command notch filters, speed feed forward filter, torque feed forward filter
Maintenance mode *1	Operation mode		Speed command, torque command, and built-in command operation modes
	Speed command	Internal speed command	7 points; Selected by the control signal（setting unit： speed specification）
		Acceleration／deceleration	Values between 0 and 99.999 sec can be set for acceleration and deceleration, respectively.
	Torque command	Internal torque command	7 points; Selected by the control signal（setting unit： 0.1%）
		Torque increase／decrease time	0 to 9.999 sec
	Built-in command	Setting unit	deg、mm、inch、μm、pulse、kpulse
		Jog	8 speeds
		Command	256 points; 3 types POS（positioning）： ABS／INC INDEX（index positioning）： Shortcut／unidirectional HOME（zero return）： STD, LS LESS, OT HOME, CURRENT POSITION, OT HOME LS LESS, SET ABS
		Acceleration／deceleration	8 points（Values between 0 and 99.999 sec can be set for acceleration and deceleration, respectively.）
		S-curve acceleration／deceleration	8 points（0 to 1.000 sec）
		Coordinate management	Infinite feed Absolute position management -2147483648 to +2147483647 Load axis one rotation position management（e.g., 0 to 359 degrees or -179 to +180 degrees）
	Servo adjustment item	Gain change	4 points（changed according to the GSEL1 and GSEL2 signals and operation conditions）
		Feed forward	Speed feed forward ratio, speed feed forward shift ratio, inertia torque feed forward ratio, viscous friction torque feed forward ratio
		Filter	Feedback filter, torque command filter, 5 torque command notch filters, speed feed forward filter, torque feed forward filter
		Auto-tuning	Position gain, speed loop gain／integral time constant setting

Control input signal	5 external input signals. In communication mode, the following signals can be assigned.		
	EMG（emergency stop）	FOT（forward direction over travel）	ROT（reverse direction over travel）
	ZLS（zero point deceleration）	ZMK（external marker）	EXT1 - EXT3（1st - 3rd external latch inputs）
Control output signal	3 external output signals. In communication mode, the following signals can be assigned.		
	ALM（alarm）	WNG（warning）	RDY（servo ready）
	SZ（speed zero）	PE1 - PE2（position deviation range 1 - 2）	PN1 - PN2（positioning complete range 1 - 2）
	PRF（rough match）	VCP（speed reached）	BRK（break release）
	LIM（limited）	EMGO（emergency stop in process）	HCP（zero return complete）
	OTO（over travel in process）	MTON（motor on）	PMOD（pulse train command mode）
	NMOD（built-in command mode）	OCEM（marker output）	
	When assigned to an external output signal, the signal logic can be changed（except OCEM）.		
Error detection	Encoder error, over speed error, motor overload error, device overload error, under voltage error, over voltage error, over current error, servo control error, cable disconnection error, phase error, magnetic pole error, deviation error, backup data error, CPU error, etc. 5 alarms stored in the history		
Holding break（BRK signal）	BRK（break release） signal set to OFF in the motor power off status With control for vertical axis drop prevention（drop prevention control disabled in case of a power error）		
Dynamic brake	External dynamic brake unit（option） Activated in the motor power off status		
Torque limit command	Set in units of 0.1% by the relevant parameter.		
Compensation function	Absolute position compensation（option; refer to p.42）, torque compensation		
Display function	CHARGE, 5-digit LED data display in the front		
Communication function	・USB 2.0（full speed） standard compliance： 1 channel for connection between personal computer （VPH data editing software option） and device		
SEMI F47 compatible function	Torque limit function when the main circuit voltage drops（The control power must be supplied from a UPS.）		
Safety measure	STO（IEC／EN61800-5-2）（Option）		
Safety performance	EN ISO13849 Cat3 PL e EN61508 SIL3		

*1 In maintenance mode, the VPH servo driver operates independently.

*2 The signals that can be assigned in maintenance mode are different. For details, refer to the section of the instruction manual of the relevant VPH type describing the control input and output signals.

For the initial assignment of the external input and output signals, refer to "Servo driver VPH Series external connection diagram VPH-HE Type" on p.59.
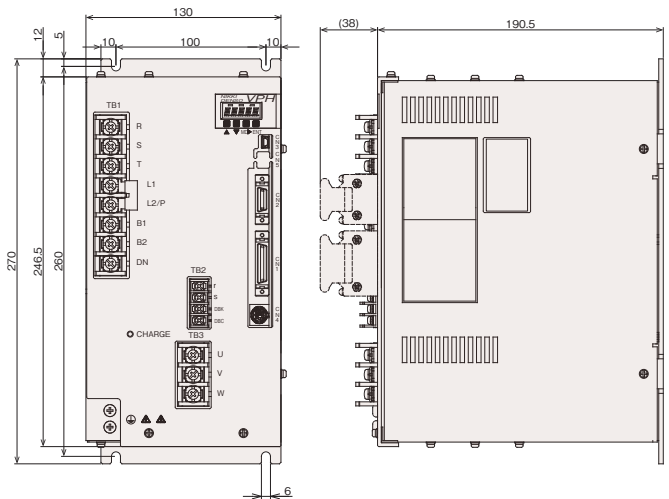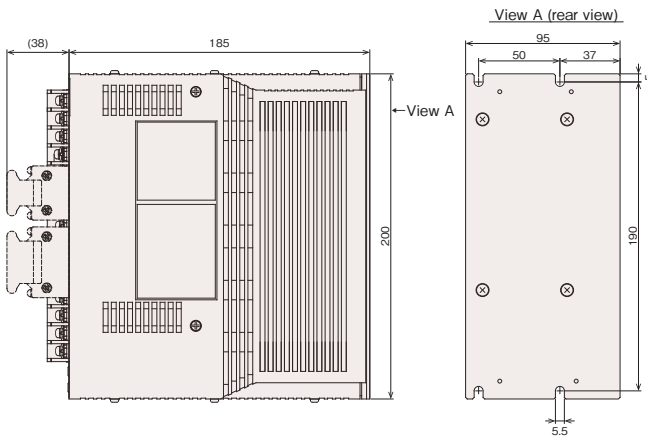
■ Servo driver VPH Series Dimensions
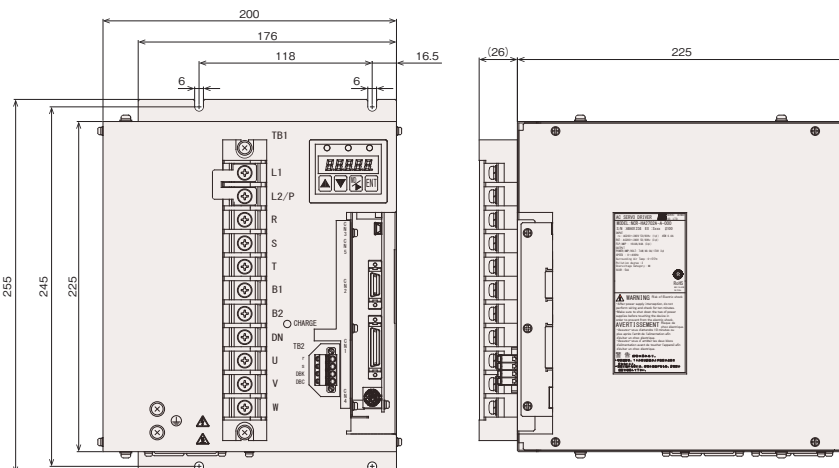
NCR-H□1101□/1201□-A-□□□
NCR-H□2101□/2201□/2401□-A-□□□

View A (rear view)

← View A

NCR-H□2801□-A-□□□

View A (rear view)

← View A

NCR-H□2152□/2222□-A-□□□

View A (rear view)
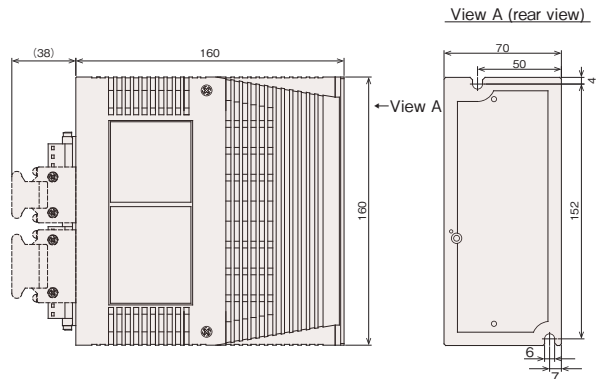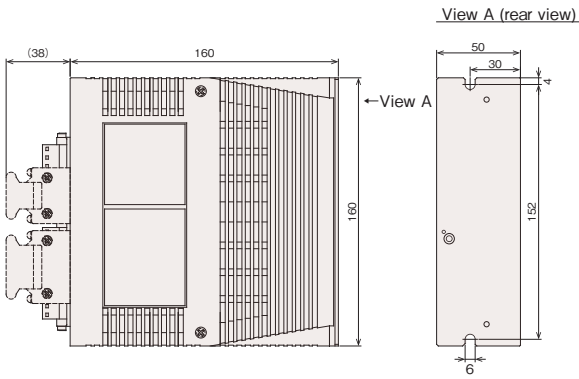
← View A

NCR-H□2332□-A-□□□

NCR-H□2702□-A-□□□

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■ Servo driver VPH Series External wiring diagram

◎ VPH-HA Type（I/O specification）

VPH-HA

Dynamic brake unit
（Option）

τDISC

Power supply
100 to 120 VAC or
200 to 240 VAC
50/60Hz
（Not connected to
T in case of single
phase power）

NFB   MC

R
S
T
r
s

DBK
DBC
U
V
W

U
V
W

M

Class D grounding

Thermostat
Motor Regenerative resistor
MC
ON   OFF
MC
Surge killer

CN2

3 EP5
4 EP5
1 GND
2 GND
5 SD
6 SD*
FG

E
EP5
EP5
GND
GND
SD
SD*

Absolute
encoder

Connector metal fitting

Regenerative resistor（Option）

Regenerative resistor connection terminal

B1
B2
DN
L1
L2

*1 DC reactor connection terminal
（Output capacity of 1.5 kW or more only）

◎When an absolute
encoder is used

Analog command（Option）

TQH
GND
INH
GND

CN1

1
2
19
20

CN4   Serial communication（RS-422A）

7 TXD(A)
8 TXD(B)
1 RXD(A)
2 RXD(B)
3 GND
FG

Pulse train command

FC
FC*
RC
RC*
GND

26
25
24
23
21

CN3   USB communication

1 VBUS
2 DM
3 DP
5 GND
GND

Connector metal fitting

Control input signal

+12 to 24V   +V
DI1(RST)
DI2(SON)
DI3(DR)
DI4(CIH)
DI5(SS1)
DI6(SS2)
DI7(MD1)
DI8(MD2)

18
36
35
34
33
32
31
30
29

CN5
（Option）   Safety input（When the STO option is used *2）

4 SF1*
3 SF1*_RET
6 SF2*
5 SF2*_RET
+12 to 24V
8 EDM+
7 EDM-
FG   +12 to 24V
Load

Control output signal

DO1(RDY)
DO2(ALM*)
DO3(WNG)
DO4(PN1)
+12 to 24V
COM

CR1
CR2
CR3
CR4

17
16
15
14

13

Monitor output（When the STO option is used *2）

◎When an incremental encoder is used

Encoder pulse output

EA
EA*
EB
EB*
EM
EM*
GND

8
7
6
5
4
3
9, 27, 28

FG

Connector metal fitting

CN2

3 EP5
4 EP5
1 GND
2 GND
7 A
8 A*
9 B
10 B*
11 Z
12 Z*
5 SD
6 SD*
13 HA
14 HA*
15 HB
16 HB*
17 HC
18 HC*
FG

E
EP5
GND
A
A*
B
B*
Z
Z*
EP5
GND
PS
PS*
PC
PC*
(HC)
(HC*)

Incremental
encoder

Magnetic
pole
sensor

Connector metal fitting

* COM of the CN1 connector is common to the control input and output signals.
  GND is common to the internal control power supply（+5V）in the servo driver.
* Since COM of CN1 and GND are isolated, do not use common wiring or bundle them together.
* The status of the switch connected to a control input signal indicates the OFF status of the input signal.
* A control input or output signal whose name is shown in parentheses is used as the initial value of the relevant parameter.
* A control input or output signal marked with a * mark uses negative logic as the initial value.
* A control input signal power supply（+12 V, 2.5 mA to +24 V, 5 mA）must be prepared by the user.

*1 When a DC reactor is to be used, it must be prepared by the user.
   Recommended specifications：Rated current 18 A or more; Inductance 3 mH or less
   （Output capacity：1.5 kW to 3.3 kW）
   An option is available when the output capacity of the servo driver is 7 kW.（For details, refer to p.78.）
*2 When the STO option is used, the servo driver is shipped with the STO short-circuit plug
   （for details, refer to p.74）connected to CN5 as an accessory.

■ Servo driver VPH Series External wiring diagram

◎ VPH-HB Type（SSCNETⅢ/H specification）

VPH-HB

Dynamic brake unit（Option）

τDISC

Power supply
100 to 120 VAC or
200 to 240 VAC
50/60Hz
（Not connected to
T in case of single
phase power）

NFB   MC

R   S   T   r   s

DBK   DBC   U   V   W

U   V   W   M

Class D grounding

MC   Thermostat
ON   OFF   Motor   Regenerative resistor

MC

Surge killer

Regenerative resistor（Option）

Regenerative resistor connection terminal   B1   B2   DN

*1 DC reactor connection terminal
（Output capacity of 1.5 kW or more only）   L1   L2

CN2

3 EP5   4 EP5   1 GND   2 GND   5 SD   6 SD*   FG

E   EP5   EP5   GND   GND   SD   SD*

Absolute encoder

Connector metal fitting

◎When an absolute encoder is used

CN3

SSCNETⅢ(/H) communication   RX

To controller/front axle driver   TX

CNSA

USB communication

1 VBUS   2 DM   3 DP   5 GND

GND   Connector metal fitting

CNSB

SSCNETⅢ(/H) communication   RX

To rear axle driver   TX

CN5
（Option）

Safety input（When the STO option is used *2）

4 SF1*   3 SF1*_RET   6 SF2*   5 SF2*_RET
+12 to 24V
8 EDM+   7 EDM-
+12 to 24V   Load

FG

Monitor output（When the STO option is used *2）

CN1

Control input signal

+12 to 24V   +V
DI1(EMG*)   1
DI2(FOT*)   2
DI3(ROT*)   3
DI4(ZLS)   4   6

Control output signal

DO1(BRK)   CR1   9
DO2(ALM*)   CR2   8
+12 to 24V   COM   10

Connector metal fitting   FG

◎When an incremental encoder is used

CN2

3 EP5   4 EP5   1 GND   2 GND   7 A   8 A*   9 B   10 B*   11 Z   12 Z*   5 SD   6 SD*   13 HA   14 HA*   15 HB   16 HB*   17 HC   18 HC*   FG

E   EP5   GND   A   A*   B   B*   Z   Z*   EP5   GND   PS   PS*   PC   PC*   (HC)   (HC*)

Incremental encoder

Magnetic pole sensor

Connector metal fitting

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* COM of the CN1 connector is common to the control input and output signals.
  GND is common to the internal control power supply（+5V）in the servo driver.
* Since COM of CN1 and GND are isolated, do not use common wiring or bundle them together.
* The status of the switch connected to a control input signal indicates the OFF status of the input signal.
* A control input or output signal whose name is shown in parentheses is used as the initial value of the relevant parameter.
* A control input or output signal marked with a * mark uses negative logic as the initial value.
* A control input signal power supply（+12 V, 2.5 mA to +24 V, 5 mA）must be prepared by the user.

*1 When a DC reactor is to be used, it must be prepared by the user.
   Recommended specifications： Rated current 18 A or more; Inductance 3 mH or less
   （Output capacity： 1.5 kW to 3.3 kW）
   An option is available when the output capacity of the servo driver is 7 kW.（For details, refer to p.78.）

*2 When the STO option is used, the servo driver is shipped with the STO short-circuit plug
   （for details, refer to p.74）connected to CN5 as an accessory.

■ Servo driver VPH Series External wiring diagram

◎ VPH-HC Type（CC-Link specification）

VPH-HC

Power supply
100 to 120 VAC or
200 to 240 VAC
50/60Hz
（Not connected to
T in case of single
phase power）

NFB   MC

R — R
S — S
T — T
r
s

Class D grounding

MC   ON   OFF   Thermostat   Motor   Regenerative resistor

MC

Surge killer

Regenerative resistor（Option）

Regenerative resistor connection terminal — B1

B2
DN

*1 DC reactor connection terminal
（Output capacity of 1.5 kW or more only） — L1
L2

Dynamic brake unit
（Option）

DBK
DBC
U
V
W

τDISC

U
V
W

M

CN2

3 EP5 — EP5
4 EP5 — EP5
1 GND — GND
2 GND — GND
5 SD — SD
6 SD* — SD*

FG

Connector metal fitting

Absolute encoder

E

◎When an absolute
encoder is used

TB4

CC-Link

DA — 1
DB — 2
DG — 3
SLD — 4
SLD — 5

CN3

USB communication

1 — VBUS
2 — DM
3 — DP
5 — GND

GND

Connector metal fitting

CN5
（Option）

Safety input（When the STO option is used *2）

4 — SF1*
3 — SF1*_RET
6 — SF2*
5 — SF2*_RET
+12 to 24V

8 — EDM+
7 — EDM-
Load   +12 to 24V

FG

Monitor output（When the STO option is used *2）

CN1

Pulse train command

FC — 1
FC* — 8
RC — 2
RC* — 9
GND — 10

Control input signal

+12 to 24V   +V — 6
DI1(EMG*) — 4
DI2(FOT*) — 5
DI3(ROT*) — 7
DI4(ZLS) — 14

Control output signal

DO1(BRK)   CR1 — 11
DO2(ALM*)   CR2 — 12
+12 to 24V   COM — 13

FG

Connector metal fitting

◎When an incremental encoder is used

CN2

3 EP5 — EP5
4 EP5
1 GND — GND
2 GND
7 A — A
8 A* — A*
9 B — B
10 B* — B*
11 Z — Z
12 Z* — Z*
5 SD — EP5
6 SD* — GND
13 HA — PS
14 HA* — PS*
15 HB — PC
16 HB* — PC*
17 HC — (HC)
18 HC* — (HC*)

FG

Connector metal fitting

Incremental encoder

E

Magnetic pole sensor

* COM of the CN1 connector is common to the control input and output signals.
  GND is common to the internal control power supply（+5V）in the servo driver.
* Since COM of CN1 and GND are isolated, do not use common wiring or bundle them together.
* The status of the switch connected to a control input signal indicates the OFF status of the input signal.
* A control input or output signal whose name is shown in parentheses is used as the initial value of the relevant parameter.
* A control input or output signal marked with a * mark uses negative logic as the initial value.
* A control input signal power supply（+12 V, 2.5 mA to +24 V, 5 mA）must be prepared by the user.

*1 When a DC reactor is to be used, it must be prepared by the user.
   Recommended specifications：Rated current 18 A or more; Inductance 3 mH or less
   （Output capacity：1.5 kW to 3.3 kW）
   An option is available when the output capacity of the servo driver is 7 kW.（For details, refer to p.78.）

*2 When the STO option is used, the servo driver is shipped with the STO short-circuit plug
   （for details, refer to p.74）connected to CN5 as an accessory.

■Servo driver VPH Series External wiring diagram

◎VPH-HD Type（EtherCAT specification）

VPH-HD

Dynamic brake unit（Option）

τDISC

Power supply
100 to 120 VAC or
200 to 240 VAC
50/60Hz
（Not connected to
T in case of single
phase power）

NFB   MC

R   S   T   r   s

DBK   DBC   U   V   W

M

Class D grounding

MC   ON   OFF   Thermostat   Motor   Regenerative resistor

Surge killer

Regenerative resistor（Option）

B1

Regenerative resistor connection terminal

B2   DN

*1 DC reactor connection terminal
（Output capacity of 1.5 kW or more only）

L1   L2

CN2

3 EP5   4 EP5   1 GND   2 GND   5 SD   6 SD*

FG   Connector metal fitting

E   EP5   EP5   GND   GND   SD   SD*

Absolute encoder

◎When an absolute encoder is used

CN4(IN)

EtherCAT communication
To controller/front axle driver

TX+ 1   TX- 2   RX+ 3   RX- 6   FG

CN3   USB communication

1 VBUS   2 DM   3 DP   5 GND

GND   Connector metal fitting

CN4(OUT)

EtherCAT communication
To rear axle driver

TX+ 1   TX- 2   RX+ 3   RX- 6   FG

CN5（Option）

Safety input（When the STO option is used *2）

4 SF1*   3 SF1*_RET   6 SF2*   5 SF2*_RET   +12 to 24V

8 EDM+   7 EDM-   +12 to 24V

FG

Monitor output（When the STO option is used *2）

CN1

Control input signal

+12 to 24V   +V   6

DI1(EMG*) 1   DI2(FOT*) 2   DI3(ROT*) 3   DI4(ZLS) 4   DI5(IN1) 5

Control output signal

DO1(BRK) CR1 9   DO2(ALM*) CR2 8   DO3(PN1) CR3 7   +12 to 24V COM 10   FG

Connector metal fitting

◎When an incremental encoder is used

CN2

3 EP5   4 EP5   1 GND   2 GND   7 A   8 A*   9 B   10 B*   11 Z   12 Z*   5 SD   6 SD*   13 HA   14 HA*   15 HB   16 HB*   17 HC   18 HC*   FG

E   EP5   GND   A   A*   B   B*   Z   Z*   EP5   GND   PS   PS*   PC   PC*   (HC)   (HC*)

Incremental encoder

Magnetic pole sensor

Connector metal fitting

* COM of the CN1 connector is common to the control input and output signals.
  GND is common to the internal control power supply（+5V）in the servo driver.
* Since COM of CN1 and GND are isolated, do not use common wiring or bundle them together.
* The status of the switch connected to a control input signal indicates the OFF status of the input signal.
* A control input or output signal whose name is shown in parentheses is used as the initial value of the relevant parameter.
* A control input or output signal marked with a * mark uses negative logic as the initial value.
* A control input signal power supply（+12 V, 2.5 mA to +24 V, 5 mA）must be prepared by the user.

*1 When a DC reactor is to be used, it must be prepared by the user.
   Recommended specifications： Rated current 18 A or more; Inductance 3 mH or less
   （Output capacity： 1.5 kW to 3.3 kW）
   An option is available when the output capacity of the servo driver is 7 kW.（For details, refer to p.78.）
*2 When the STO option is used, the servo driver is shipped with the STO short-circuit plug
   （for details, refer to p.74）connected to CN5 as an accessory.

■ Servo driver VPH Series External wiring diagram

◎ VPH-HE Type（MECHATROLINK-Ⅲ specification）

VPH-HE

Power supply
100 to 120 VAC or
200 to 240 VAC
50/60Hz
(Not connected to
T in case of single
phase power)

NFB

MC

R
S
T
r
s

Class D grounding

DBK
DBC
U
V
W

Dynamic brake unit
(Option)

τDISC

U
V
W

M

MC
ON   OFF

Thermostat
Motor Regenerative resistor

MC

Surge killer

Regenerative resistor (Option)

Regenerative resistor connection terminal

B1
B2
DN

*1 DC reactor connection terminal
(Output capacity of 1.5 kW or more only)

L1
L2

CN2

3 EP5
4 EP5
1 GND
2 GND
5 SD
6 SD*
FG

E
EP5
EP5
GND
GND
SD
SD*

Absolute
encoder

Connector metal fitting

◎ When an absolute
encoder is used

CN4A

MECHATROLINK-Ⅲ communication

To master controller/front
and rear axle drivers

TX+ 1
TX - 2
RX+ 3
RX - 6
FG

CN3

USB communication

1 VBUS
2 DM
3 DP
5 GND
GND

Connector metal fitting

CN4B

MECHATROLINK-Ⅲ communication

To master controller/front
and rear axle drivers

TX+ 1
TX - 2
RX+ 3
RX - 6
FG

CN5
(Option)

Safety input (When the STO option is used *2)

4 SF1*
3 SF1*_RET
6 SF2*
5 SF2*_RET
+12 to 24V
8 EDM+
7 EDM-
FG   +12 to 24V

Load

Monitor output (When the STO option is used *2)

CN1

Control input signal

+12 to 24V   +V

6

DI1(EMG*) 1
DI2(FOT*) 2
DI3(ROT*) 3
DI4(ZLS)   4
DI5(IN1)   5

Control output signal

DO1(BRK)   9   CR1
DO2(ALM*) 8   CR2
DO3(PN1)   7   CR3
+12 to 24V COM   10

FG

Connector metal fitting

◎ When an incremental encoder is used

CN2

3 EP5
4 EP5
1 GND
2 GND
7 A
8 A*
9 B
10 B*
11 Z
12 Z*
5 SD
6 SD*
13 HA
14 HA*
15 HB
16 HB*
17 HC
18 HC*
FG

E
EP5
GND
A
A*
B
B*
Z
Z*
EP5
GND
PS
PS*
PC
PC*
(HC)
(HC*)

Incremental
encoder

Magnetic
pole
sensor

Connector metal fitting

* COM of the CN1 connector is common to the control input and output signals.
  GND is common to the internal control power supply (+5V) in the servo driver.
* Since COM of CN1 and GND are isolated, do not use common wiring or bundle them together.
* The status of the switch connected to a control input signal indicates the OFF status of the input signal.
* A control input or output signal whose name is shown in parentheses is used as the initial value of
  the relevant parameter.
* A control input or output signal marked with a * mark uses negative logic as the initial value.
* A control input signal power supply (+12 V, 2.5 mA to +24 V, 5 mA) must be prepared by the user.

*1 When a DC reactor is to be used, it must be prepared by the user.
   Recommended specifications: Rated current 18 A or more; Inductance 3 mH or less
   (Output capacity: 1.5 kW to 3.3 kW)
   An option is available when the output capacity of the servo driver is 7 kW. (For details, refer to p.78.)

*2 When the STO option is used, the servo driver is shipped with the STO short-circuit plug
   (for details, refer to p.74) connected to CN5 as an accessory.

■ Servo driver VCⅡ Series Model / Driver type description

◎ **Driver type**

VCⅡ - [D] [ ]
　　　 ②　⑤

◎ **Driver model**

NCR - [D] [D] [A] [0] [A2] [A] - [201] [J] [ ]
　①　　②　③　④　⑤　⑥　⑦　　⑧　⑨　⑩

①		NCR···Servo driver Series
②	Product classification	D···Driver type
		C···Controller type
③	Series name	D···VCⅡ Series
④	Model type	A···For the τ DISC motor
⑤	Machine model type	0（Without）...Driver（type name not indicated）
		1···Positioning controller
		6···Free-curve controller
		7···SSCNETⅢ/H specification driver
⑥	Input power supply specification	A1···100 VAC system
		A2···200 VAC system
⑦	Order of design	A→B→C···Starting from A
⑧	Output capacity	Example） 401 ··· 40 1 =40×10¹ =400W　Exponent part of the power of 10　Significant figures
⑨	Paired motor	J···τ DISC ND-s Series / ND-s HS Series / DD-s Series/HD-s Series
⑩	Special model code	Without···Standard specification
		-R + sequential number···Quasi standard specification
		-S, -T + sequential number···Special model specification

■ Common specifications

Ambient condition	Temperature	During operation： 0 to 55°C（0 to 50°C when UL standard compliance is required） During storage：-20 to 60℃
	Humidity	During operation and storage： 85% or less; no condensation
	Atmosphere	Do not install in a harmful atmosphere containing corrosive gas, grinding oil, metal dust, oil, etc. Install indoors, do not exposed to direct sunlight.
	Height above sea level	1,000 m or less
Vibration resistance		4.9 m／s²（10 to 50Hz）No resonance is allowed.
Drive method		3-phase sine wave PWM
Brake method		Regenerative brake： External regenerative resistor *1
Mounting type		Panel mounting
Performance	Speed control range *2	1：5000

*1 Supplied when the rated output of the servo driver is 800 W or more.

*2 It is assumed that the motor does not stop when the load is 100%.

■ Servo driver VCII Series System configuration

VCII-D/C1/C6 Type

- Circuit breaker for wiring
- Noise filter
- Electromagnetic contactor
- Control power supply r s(*1)
- * Not connected to T phase in case of single phase power
- Main power supply
- ① Regenerative resistors （Accessory/option）
- ③ Zero phase reactor （Option）
- ② Dynamic brake unit （Option）
- ④ Power cable（Option）

- ⑪ SDI Device （Option *2）
- Connector in the upper part of the driver
- ⑧ Ferrite core （Option）
- USB cable for data editing software （B plug on the VCII side）
- ⑥ Data Editing Software （Option）
- Personal computer
- ⑦ Communication cable（Option）
- Master controller, etc.
- ⑩ Synchronous communication cable （Option）
- VCII
- ⑨ I/O cable（Option）
- External device or controller
- ⑭ Control input/output expansion unit（Option）
- ⑤ Encoder cable（Option）
- τDISC

TB1, TB2, R S T, B1 B2, U V W, DBK DBC, J3, J1, J2, CN2, CN1

VCII-C1 Type＋MECHATROLINK-III I/F unit

- ⑫ MECHATROLINK-III I/F unit （Option）
- ⑥ Data Editing Software （Option）
- Personal computer
- ⑧ Ferrite core （Option）
- USB cable for data editing software （B plug on the VCII side）
- ⑦ Communication cable（Option）
- Master controller, etc.
- CN2 ⑤ Encoder cable（Option）
- To τDISC encoder connector
- PORT2 MECHATROLINK-III *3
- Master controller or front and rear axle devices
- PORT1 MECHATROLINK-III *3
- Master controller or front and rear axle devices
- CN1 ⑨ I/O cable（Option）
- External device, controller, etc.

*1 When the output capacity is 7.5 kW or more, the control power supply is 24 VDC.（Connected terminal 24V 0V）

*2 When the output capacity is 1.5 kW or more, this device is a standard component of the servo driver.

*3 When connected to the KV-X controller manufactured by KEYENCE Corp., the connector on the KV-X side is an RJ-45 connector. Use the MECHATROLINK-III conversion cable （RJ-45／IMI conversion）SV2-L□A Type manufactured by KEYENCE Corp.

◎ Optional product description

No.	Product name／specifications	Description	Page
①	Regenerative resistors	This is an option when the output capacity is 400 W or less and a standard component when the output capacity is 800 W or more.	P.80
②	Dynamic brake unit	An auxiliary brake unit that prevents the connected motor from free-running due to an error in the VCII Series, power failure, etc.	P.79
③	Zero phase reactor	This reactor absorbs the noise generated by the VCII Series servo driver to reduce the effect of noise on the driver main unit and peripheral equipment.	P.77
④	Power cable	This cable is used to connect the motor power connector or terminal of the VCII Series servo driver with the power cable of the motor.	P.69,71-72
⑤	Encoder cable	This cable is used to connect the encoder feedback pulse input connector（CN2）of the VCII Series servo driver with the encoder and magnetic pole sensor.	P.69-70
⑥	Data Editing Software	This software is used to edit the parameters of the VCII Series, operate the servo driver remotely, check the operation status and the status of each signal, and measure oscilloscope data and others from a personal computer.	P.78
⑦	Communication cable	This cable is connected with the serial communication connector（J1）of the VCII Series servo driver to input and output data between the higher-level PLC computer link module or personal computer and the VCII Series.	P.76
⑧	Ferrite core	This option prevents malfunctions due to noise, such as monitor display interruption and the forced shutdown of the editing software.	P.76
⑨	I/O cable	This cable is connected with the control input／output connector（CN1）to input and output signals.	P.73
⑩	Synchronous communication cable	This cable is used for synchronous operation between VCII Series servo drivers.	P.77
⑪	SDI device	This unit is used to input the parameters and various data of the VCII Series as well as to display the status of the VCII Series.	P.78
⑫	MECHATROLINK-III I/F unit	This I/F unit is used to connect the open field network MECHATROLINK-III.（This option is built in the servo driver at the factory before shipment.）	P.66
⑬	CC-Link I/F unit	This I/F unit is used to connect the open field network CC-Link.（This option is built in the servo driver at the factory before shipment.）	P.66
⑭	Control input／output expansion unit	This unit is used to expand the I/O ports of the VCII Series servo driver.（This option is built in the servo driver at the factory before shipment.）	P.66
⑮	Control input／output unit （for VCII-D7）	This unit is intended to use input and output signals for the VCII-D7 Type.（This option is built in the servo driver at the factory before shipment.）	P.66

Servo driver VCII Series

■ Servo driver VC II Series System configuration

VC II-D/C1/C6 Type+CC-Link I/F unit

⑬ CC-Link I/F unit (Option)

⑥ Data Editing Software (Option)

Personal computer

⑧ Ferrite core (Option)

USB cable for data editing software (B plug on the VC II side)

J3

J1 ⑧

⑦ Communication cable（Option） → Master controller, etc.

CN2 ⑤ Encoder cable（Option） → To τDISC encoder connector

TB7 CC-Link → CC-Link device

CN1 ⑨ I/O cable（Option） → External device or controller

VC II-D7 Type （SSCNETIII/H specification）

⑥ Data Editing Software (Option)

⑧ Ferrite core (Option)

USB cable for data editing software (B plug on the VC II side)

J3

Personal computer

CNSA SSCNETIII（/H） → Master controller or front axle device

CNSB SSCNETIII（/H） → Rear axle device

⑤ Encoder cable （Option）

CN2 → To τDISC encoder connector

⑮ Control input/output unit（Option）

■ Servo driver VC II Series Individual specifications

Model	NCR-□DA□		A1A-101J	A1A-201J	A2A-201J	A2A-401J	A2A-801J	A2A-152J	A2A-222J	A2B-402J
Rated output		W	100	200	200	400	800	1.5k	2.2k	4k
Main circuit input power supply	Rated voltage	V	100 to 115 AC 1φ		200 to 230 AC 3φ					
	Frequency	Hz	50/60		50/60					
	Permissible voltage fluctuation	V	90 to 121 AC		180 to 242 AC					
	Input rated current	Arms	3.0	6.0	1.7	3.2	5.2	12.2	15.9	25.0
	Rated capacity	kVA	0.3	0.6	0.6	1.1	1.8	3.0	4.7	7.8
	Inrush current *1	A	32【10ms】	32【10ms】	64【4ms】	64【4ms】	64【4ms】	18【30ms】	18【30ms】	165【6ms】
Control circuit input power supply	Rated voltage	V	100 to 115 AC 1φ		200 to 230 AC 1φ					
	Frequency	Hz	50/60		50/60					
	Permissible voltage fluctuation	V	90 to 121 AC		180 to 242 AC					
	Input rated current	Arms	0.2	0.2	0.1	0.1	0.1	0.17	0.17	0.22
	Power consumption	W	13	13	13	13	13	22	22	24
	Inrush current *1	A	13【2ms】	13【2ms】	25【2ms】	25【2ms】	25【2ms】	52【2ms】	52【2ms】	34【2ms】
Continuous output current		Arms	2.0	3.4	2.0	3.4	5.0(6.8) *2	10.0	16.0	24.0(27.0) *2
Instant output current		Arms	6.0	9.9	6.0	9.9	17.0	30.0	48.0	78.0
Structure（IP code）			Natural cooling（IP00）					Forced cooling（IP00）		
Weight		kg	1.0	1.0	1.0	1.4	2.4	4.0	4.0	6.0

Model	NCR-□DA□		A2A-752J	A2A-113J	A2A-153J
Rated output		W	7.5k	11k	15k
Main circuit input power supply	Rated voltage	V	200 to 230 AC 3φ		
	Frequency	Hz	50/60		
	Permissible voltage fluctuation	V	180 to 242 AC		
	Input rated current	Arms	35.0	50.0	72.2
	Rated capacity	kVA	15.0	20.0	25.0
	Inrush current *1	A	85【18ms】	85【22ms】	100【27ms】
Control circuit input power supply	Rated voltage	V	24 DC *3		
	Permissible voltage fluctuation	V	20.4 to 27.6 DC		
	Input rated current	A	1.5	1.5	1.5
	Power consumption	W	36	36	36
Continuous output current		Arms	41.8	47.7	62.6
Instant output current		Arms	83.6	95.4	125.2
Structure（IP code）			Forced cooling（IP00）		
Weight		kg	7.4	7.7	10.0

*1 The value shown in brackets is the approximate time it takes before the inrush current dies down.

*2 Shown in parentheses is the value applicable when UL standard compliance is not required.

*3 Depending on the operating conditions, the inrush current may trigger over current protection for the 24 VDC power supply.
  It is therefore recommended to use a power supply whose capacity is twice the rated capacity or more.

■ Servo driver VCⅡ Series Functional specifications

◎ VCⅡ-D/C1/C6 Type

Item / Type (Model)		VCⅡ-D Type (NCR-DDA0A□A-□□□□)	VCⅡ-C1 Type (NCR-CDA1A□A-□□□□)	VCⅡ-C6 Type (NCR-CDA6A□A-□□□□)
Operation mode		Speed control operation, torque control operation / Pulse train operation, simple positioning operation	Auto operation, manual operation / Zero return operation, pulse train operation	Auto operation, manual operation / Zero return operation, servo lock
Command input mode	Pulse train command (VCⅡ-D/C1) Master axis position command (VCⅡ-C6)	Line driver method： Up to 6.25 Mpps(1-time multiplication)　Open collector method(option)： Up to 250 kpps(1-time multiplication) *The line driver method is recommended due to its noise resistance. 90° phase difference pulse(1-, 2-, and 4-time multiplication), directional pulse(1-time multiplication), or directional signal + feed pulse(1-time multiplication) can be selected.		
		Pulse command compensation function, pulse train averaging filter time setting function		—
		—		Internal master axis command
	Analog command DC-10V to +10V	Speed control operation, torque control operation	The analog speed command and analog torque command can be input by a special command.	Not supported
	Internal command (VCⅡ-D) Auto operation (VCⅡ-C1/C6)	Internal speed command(3 points) Internal torque command(3 points) Simple positioning / zero return / manual operation by internal pulse train command	Program operation by a special command / Internal stored data 280 points(control signal address： 0 to 255) / Special command	
			Positioning, simple continuous positioning, continuous control, four arithmetic and logical operations, timer, conditional and unconditional jumps, subroutines, spinner control, etc.	Free-curve control, positioning, simple continuous positioning, four arithmetic and logical operations, timer, conditional and unconditional jumps, subroutines, spinner control, etc.
Acceleration pattern		Linear acceleration / deceleration, S-curve acceleration / deceleration		
Servo adjustment item	Gain change	By combining the GSEL signals, 4 types of gain can be selected.		
	Feed forward	Feed forward ratio, feed forward shift ratio, inertia feed forward ratio, viscous friction feed forward ratio		
	Filter	Torque command filter, 5 notch filters, disturbance correction filter, vibration control filter		
	Auto-tuning	By setting the parameter, auto-tuning is possible even if the inertia ratio is relatively large.		
Control input signal		8 standard external input signals *1 SON(*)(servo on)　RST(reset)　MD1 - MD2(mode selection)　CIH(*)(command pulse input prohibition) EMG*(emergency stop)　PC(proportional control)　FJOG(forward direction jog)　RJOG(reverse direction jog) ZLS(zero point deceleration)　OR1 - OR4(speed override)　CLR(deviation clear)　TL(torque limit) GSEL(gain selection)　GSEL2(gain selection 2)　BRON(compulsory brake ON)　FOT(*)(forward direction over travel) ROT(*)(reverse direction over travel)		
		SSD(command direction selection)		—
		DR(drive) ORG(origin return) SS1 - SS2(speed / torque selection) PST(simple positioning start) PS1 - PS3(address specification)	HLD(hold)　TRG(external trigger)　PST(automatic start) PS1 - PS8(address specification)　BSTP(block stop)　JOSP(jog speed selection) MFIN (M finish)　PCAN (program cancellation)　EPIH (external automatic start prohibition)	
			—	MSSP(internal master axis speed selection)
				D11(phase lead)　D12(phase delay)
				D14　D18 (electronic clutch)　(master axis selection)
				D21(cycle end)
				D22 / 24 / 28(pattern selection)
Control output signal		4 standard external output signals *1 ALM(*)(alarm)　WNG(*)(warning)　RDY(servo ready)　SZ(speed zero) PN(positioning complete)　BRK(break release)　SLSA(soft limit switch A)　SLSB(soft limit switch B) PNB(positioning complete B)　HCPM(zero return complete)		
		PMOD(pulse train operation mode in process)		PMOD(servo lock mode in process)
				FCRP(electronic clutch stopped)
				FC(free-curve operation in process)
				MSZ(master axis speed zero)
		LIM(speed / torque limit in process)	PRF(rough match)　LIM(torque limit in process)　PEND(program end)	
		SMOD (speed control operation mode in process)	PRDY (automatic operation ready)　MMOD (manual operation mode in process)　HMOD (zero return operation mode in process)	
		TMOD (torque control operation mode in process)	AMOD (automatic operation mode in process)　OUT1 - OUT8 (common output 1 - 8)　MSTB (M strobe)	
		NMOD(simple positioning mode in process)	M01 - M80(M output)	
Error detection		IPM error, over voltage, under voltage, over speed, overload(electronic thermal), regenerative resistor overload, deviation overflow, communication error, data error, CPU error, encoder error, etc. Alarm history. A history of the last 5 alarms is retained.		
Dynamic brake		External dynamic brake unit(option) Activated in the motor power off status		
Encoder pulse output		90° phase difference pulse train output(Division output is possible. The maximum output frequency of 2 signals of phases A and B is 20 Mpps at 4-time multiplication.)		
Compensation function		Absolute position compensation(option; refer to p.42.)		
Operation / display function		Various data can be input and various statuses can be displayed using the LCD module on the servo driver front side or the optional SDI device.		
Monitoring function		①Control signal statuses are displayed using the LCD module on the front side of the servo driver or the signal display part of the optional SDI device. ②Operation statuses, setting statuses(data), and error detection history are displayed using the LCD module on the front side of the servo driver or the data display part of the optional SDI device. ③2 analog monitors(Two operation statuses selected by the parameter can be monitored.) ④Various types of monitoring can be performed using the data editing software.		
Communication function		Various data can be transmitted and received via serial communication(RS-422A). Communication with the data editing software is possible via USB(compliant with the 1.1 or 2.0 standard).		

*1 For the initial assignment of the 8 external input signals and 4 external output signals, refer to "Servo driver VCⅡ Series external connection diagram VCⅡ-D/C1/C6 Type" on p.67.
　A signal whose code is marked with a * mark uses negative logic. A (*) mark indicates that the logic of the signal can be changed using a parameter.

■ Servo driver VCII Series Functional specifications

◎ VCII-D7 Type(SSCNETIII/H specification)

Item	Type(Model)		VCII-D7 Type(NCR-DDA7A□A-□□□)
Communication mode	Operation mode		Speed control operation, torque control operation, position control operation
	Command input mode		Command input by SSCNETIII(/H)
	Servo adjustment item	Gain change	By using the gain change command from SSCNETIII(/H), 2 types of gain can be selected.
		Feed forward	Feed forward ratio, feed forward shift ratio, inertia feed forward ratio, viscous friction feed forward ratio
		Filter	Torque command filter, 5 notch command filters, disturbance correction filter, vibration control filter
		Auto-tuning	By setting the parameter, auto-tuning is possible even if the inertia ratio is relatively large.
Maintenance mode*1	Operation mode		Speed control operation, torque control operation, simple position control operation, servo lock
	Command input mode		Speed control operation： Internal speed command(3 points)
			Torque control operation： Internal torque command(3 points)
			Simple positioning operation： Manual mode, zero return mode, simple positioning mode
	Servo adjustment item	Gain change	By combining the GSEL signals, 4 types of gain can be selected.
		Feed forward	Feed forward ratio, feed forward shift ratio, inertia feed forward ratio, viscous friction feed forward ratio
		Filter	Torque command filter, 5 notch filters, disturbance correction filter, vibration control filter
		Auto-tuning	By setting the parameter, auto-tuning is possible even if the inertia ratio is relatively large.
Control input signal（When the control input/output unit（option）is installed）			4 external input signals In communication mode, the following signals can be assigned. *2
			EMG*(emergency stop)　　　　　　　　FOT*(forward direction over travel)
			ROT*(reverse direction over travel)　　　ZLS(zero point deceleration)
Control output signal（When the control input/output unit（option）is installed）			1 external output signal The following signals can be assigned. *3
			ALM(*) (alarm)　　　　　　　　　　　WNG(*) (warning)
			RDY(servo ready)　　　　　　　　　　SZ(speed zero)
			PN(positioning complete)　　　　　　　BRK(break release)
			LIM(speed/torque limit in process)　　　SMOD(speed control operation mode in process)
			TMOD(torque control operation mode in process)　　PMOD(servo lock mode in process)
			NMOD(simple positioning mode in process)　　HCPM(zero return complete)
			PNB(positioning complete B)　　　　　SLSA(soft limit switch A)
			SLSB(soft limit switch B)
Error detection			IPM error, over voltage, under voltage, over speed, overload(electronic thermal), regenerative resistor overload, deviation overflow, communication error, data error, CPU error, encoder error, etc. Alarm history. A history of the last 5 alarms is retained.
Dynamic brake			External dynamic brake unit(option) Activated in the motor power off status
Encoder pulse output			Servo driver encoder pulse output function not available
Compensation function			Absolute position compensation(option; refer to p.42.)
Operation/display function			Various data can be input and various statuses can be displayed using the LCD module on the servo driver front side or the optional SDI device.
Monitoring function			①Control signal statuses are displayed using the LCD module on the front side of the servo driver or the signal display part of the optional SDI device. ②Operation statuses, setting statuses(data), and error detection history are displayed using the LCD module on the front side of the servo driver or the data display part of the optional SDI device. ③Various types of monitoring can be performed using the data editing software.
Communication function			Communication with the data editing software is possible via USB(compliant with the 1.1 or 2.0 standard).

*1 In maintenance mode, the VCII-D7 servo driver operates independently.

*2 The signals that can be assigned in maintenance mode are different. For details, refer to the section of the instruction manual of the relevant type of the VCII-D7 Type describing the input and output signals. A signal whose code is marked with a * mark uses negative logic.

3 The logic of a signal whose code is marked with a （) mark can be changed using a parameter.

◎ Mitsubishi Electric controllers that can be connected to SSCNETIII(/H)

● Motion controller

iQ-R Series　・R32MTCPU, R16MTCPU
　　　　　　　Supported OS version： Not limited

Q Series　・Q173DSCPU, Q172DSCPU, Q170MSCPU(Stand-alone type)
　　　　　　　Supported OS： Transport and assembly(SV13) and automatic equipment(SV22)
　　　　　　　Supported OS version： SSCNETIII/H 00C or later; SSCNETIII Not limited
　　　　　　・Q173DCPU, Q172DCPU, Q170MCPU(Stand-alone type)
　　　　　　　Supported OS： Transport and assembly(SV13) and automatic equipment(SV22)
　　　　　　　Supported OS version： SSCNETIII/H Not supported; SSCNETIII 00L or later

● Simple motion unit

iQ-R Series　・RD77MS□
Q Series　　・QD77MS□
L Series　　・LD77MS□
iQ-F Series　・FX5-□□SSC-S　　　　　　Supported version： 1.004 or later

● Position board　　MR-MC1□□、MR-MC2□□

■ Servo driver VCⅡ Series Dimensions

NCR-□DA□A1A-101J
NCR-□DA□A2A-201J
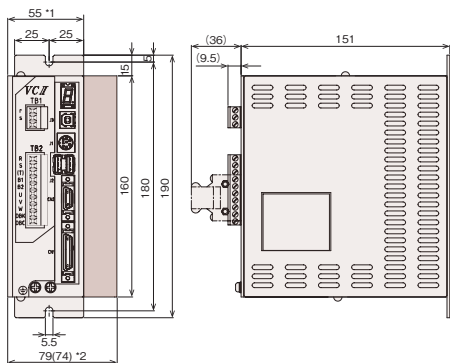
NCR-□DA□A1A-201J
NCR-□DA□A2A-401J
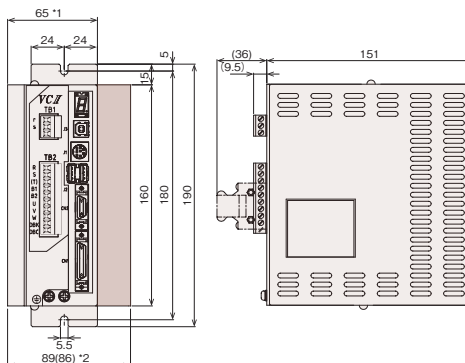
NCR-□DA□A2A-801J
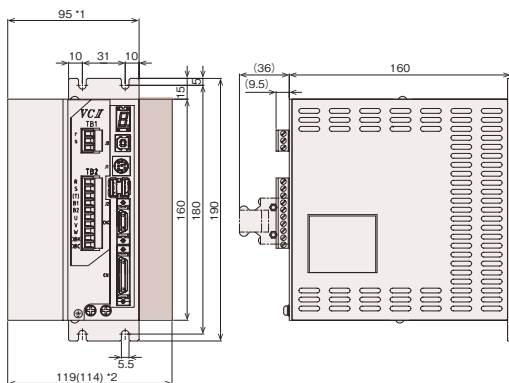
NCR-□DA□A2A-152J/222J
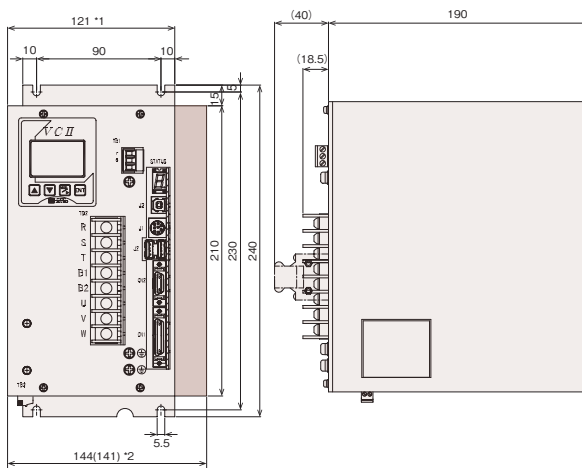
NCR-□DA□A2B-402J
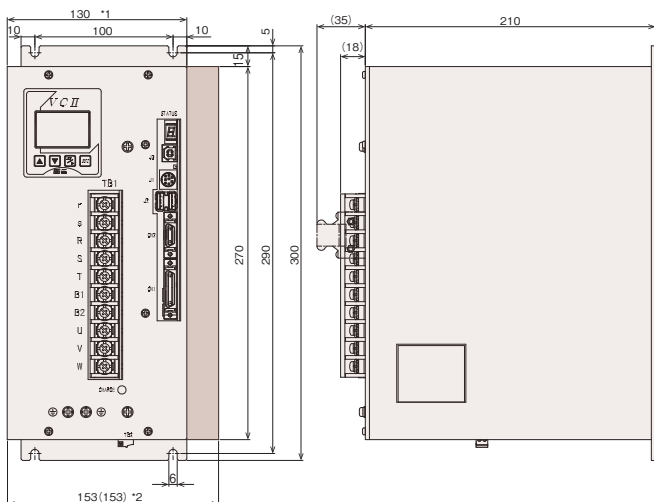
NCR-□DA□A2A-752J/113J
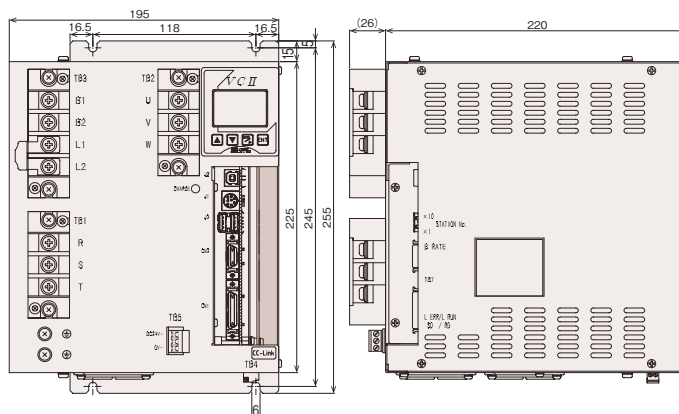
* The size is the same when the optional I/F unit is installed.

*1 This is the size of the VCⅡ Series servo driver. The VCⅡ-D7 Type（SSCNETⅢ/H specification）is also the same size.

*2 This is the size when the VCⅡ Series features the optional CC-Link, MECHATROLINK-Ⅲ I/F, or VCⅡ-D7 control input／output unit.

Shown in parentheses is the size when the control input／output expansion unit is mounted.

For information about the model of each option, refer to "Servo driver VCⅡ Series built-in options" on p.66.

■ Servo driver VCⅡ Series Dimensions

NCR-□DA□A2A-153J
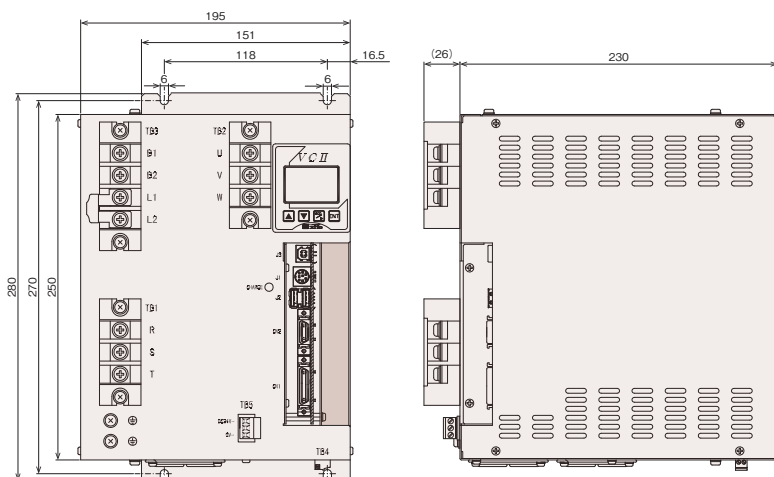
   * The size is the same when the optional I/F unit is installed.

*1 This is the size of the VCⅡ Series servo driver. The VCⅡ-D7 Type（SSCNETⅢ/H specification）is also the same size.

*2 This is the size when the VCⅡ Series features the optional CC-Link, MECHATROLINK-Ⅲ I/F, or VCⅡ-D7 control input/output unit.
    Shown in parentheses is the size when the control input/output expansion unit is mounted.
    For information about the model of each option, refer to "Servo driver VCⅡ Series built-in options" below.

■ Servo driver VCⅡ Series Built-in options

These options are built in at the factory before shipment. Specify a desired one when placing your order.

Note that you cannot install these options on the VCⅡ servo driver later.

I/F unit option

The following network I/F unit or control input/output expansion unit can be installed on the VCⅡ servo driver（no more than one unit can be installed）.

The network I/F unit enables a device corresponding to a specific network to connect to that network.

The control input/output expansion unit increases input and output signals for I/O connection（without the expansion unit, there are 8 input signals and 4 output signals）.

■ I/F unit option product model list

I/F unit VCⅡ model	Network I/F unit		Control input/output expansion unit	VCⅡ-D7 control input/output unit
	MECHATROLINK-Ⅲ I/F unit	CC-Link I/F unit		
NCR-□DA□A□A-101J				
NCR-□DA□A□A-201J	NCR-XABPD1A-201/401	NCR-XAB7D1A-201/401	NCR-XAA2D1A-201/401	NCR-XAABD1A-201/401
NCR-□DA□A2A-401J				
NCR-□DA□A2A-801J	NCR-XABPD1A-801	NCR-XAB7D1A-801	NCR-XAA2D1A-801	NCR-XAABD1A-801
NCR-□DA□A2A-152J	NCR-XABPD1A-152/222	NCR-XAB7D1B-152/222	NCR-XAA2D1B-152/222	NCR-XAABD1A-152/222
NCR-□DA□A2A-222J				
NCR-□DA□A2B-402J	NCR-XABPD1B-402	NCR-XAB7D1B-402	NCR-XAA2D1C-302/402	NCR-XAABD1B-302/402
NCR-□DA□A2A-752J	NCR-XABPD1A-153	NCR-XAB7D1A-153	NCR-XAA2D1A-153	NCR-XAABD1A-153
NCR-□DA□A2A-113J				
NCR-□DA□A2A-153J				

Pulse train command open collector receiving unit

This unit enables the photo coupler-based open collector method for the pulse train command for the VCⅡ servo driver.

Product model
NCR-XAD2D0A

■ Servo driver VCⅡ Series External wiring diagram

◎ VCⅡ-D／C1／C6 Type

◎ When the output capacity of 4 kW or less is used
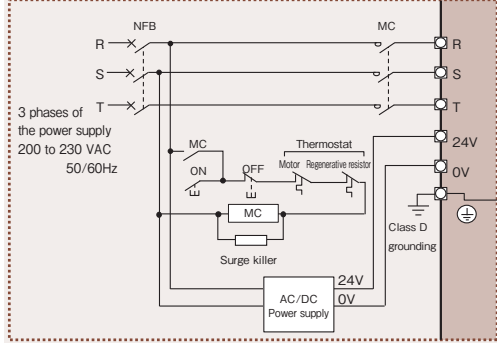
VCⅡ-D/C1/C6

Dynamic brake unit（Option）

τDISC

Power supply
100 to 115 VAC or
200 to 230 VAC
50/60Hz
（Not connected to
T in case of single
phase power）

NFB MC

R S T r s

DBK DBC U V W

M
U V W

Class D grounding

◎ When the output capacity of 7.5 kW or more is used

NFB MC

R S T

3 phases of
the power supply
200 to 230 VAC
50/60Hz

MC ON OFF
Thermostat
Motor Regenerative resistor

Surge killer

MC

Class D grounding

AC/DC Power supply

24V 0V

24V 0V

R S T 24V 0V

MC ON OFF
Thermostat
Motor Regenerative resistor

MC

Surge killer

Regenerative resistor

B1
B2

Regenerative resistor connection terminal

DC reactor connection terminal
（Output capacity of 7.5 kW or more only）
DC reactor option (See P.78.)

L1
L2

Analog command

(The VCⅡ-C6 type is not supported.)

CN1

TQH — 1
GND — 2
INH — 19
GND — 20

Pulse train command

Open collector（Option）   Line driver

+5 to 12V   FC — FC — 26
FC*   FC* — 25
+5 to 12V   RC — RC — 24
RC*   RC* — 23
             GND — 21

The initial values of the parameters of
the control input and output signals are
assigned as shown in the following tables.

Control input signal	VCⅡ-D	VCⅡ-C1	VCⅡ-C6
DI1	RST	RST	D11
DI2	SON	SON	D12
DI3	DR	PST	D14
DI4	CIH	FJOG	D18
DI5	SS1	RJOG	D21
DI6	SS2	ZLS	D22
DI7	MD1	MD1	D24
DI8	MD2	MD2	D28

Control output signal	VCⅡ-D	VCⅡ-C1	VCⅡ-C6
DO1	RDY	RDY	FCRP
DO2	ALM	ALM	FC
DO3	WNG	WNG	MSZ
DO4	PN	PN	-

Control input signal

+12 to 24V +V — 18
DI1 — 36
DI2 — 35
DI3 — 34
DI4 — 33
DI5 — 32
DI6 — 31
DI7 — 30
DI8 — 29

Control output signal

DO1 — 17 CR1
DO2 — 16 CR2
DO3 — 15 CR3
DO4 — 14 CR4
+12 to 24V COM — 13

Encoder pulse output

EA — 8
EA* — 7
EB — 6
EB* — 5
EM — 4
EM* — 3
GND — 9

Analog monitor

MON2 — 10
GND
MON1 — 11
GND — 27

Connector metal fitting FG

CN2

E

EP5 — 3 — EP5
EP5 — 4 — EP5
GND — 1 — GND
GND — 2 — GND
SD — 5 — SD
SD* — 6 — SD*
FG

Connector metal fitting

Absolute encoder

◎ When an absolute encoder is used

J1 Serial communication (RS-422A)

7 — TXD(A)
8 — TXD(B)
1 — RXD(A)
2 — RXD(B)
3 — GND
FG

J3 USB communication

2 — -D
3 — +D
4 — GND
GND

Connector metal fitting

J2 Servo control communication (RS-485)

3, 7 — DT
4, 8 — DT*
1, 5 — CK
2, 6 — CK*
FG

◎ When an incremental encoder is used

CN2

E

EP5 — 3
EP5 — 4 — EP5
GND — 1
GND — 2 — GND
A — 7
A* — 8 — A*
B — 9 — B
B* — 10 — B*
Z — 11 — Z
Z* — 12 — Z*
SD — 5 — EP5
SD* — 6 — GND
PS — 13 — PS
PS* — 14 — PS*
PC — 15 — PC
PC* — 16 — PC*
FG

A
A*
B
B*
Z
Z*
Incremental encoder

EP5
GND
PS
PS*
PC
PC*
Magnetic pole sensor

Connector metal fitting

* COM of the CN1 connector is common to the control input and output signals.
  GND is common to the internal control power supply（+5V）in the servo driver.
* Since COM of CN1 and GND are isolated, do not use common wiring or
  bundle them together.
* The status of the switch connected to a control input signal indicates
  the OFF status of the input signal.
* When using the control input／output expansion unit, refer to
  the VC／VCⅡ Series option instruction manual.
* Connect GND of the pulse train command at the time of line receiver input.
* A control input signal power supply（+12 V, 2.5 mA to +24 V, 5 mA）must be
  prepared by the user.

Servo driver VCⅡ Series

■Servo driver VCⅡ Series External wiring diagram

◎VCⅡ-D7 Type(SSCNETⅢ/H specification)

◎When the output capacity of 4 kW or less is used

VCⅡ-D7

Power supply
100 to 115 VAC or
200 to 230 VAC
50/60Hz
(Not connected to T
in case of single
phase power)

NFB   MC   R
R ─╳─   S
S ─╳─   T
T ─╳─   r
            s

Class D grounding

MC   Thermostat
ON   OFF   Motor Regenerative resistor
            MC
Surge killer

Dynamic brake unit
(Option)

DBK
DBC
U
V
W

τDISC

M

U
V
W

◎When the output capacity of 7.5 kW or more is used

NFB   MC
R ─╳─   R
3 phases of   S ─╳─   S
the power supply   T ─╳─   T
200 to 230 VAC   24V
50/60Hz   0V

MC   Thermostat
ON   OFF   Motor Regenerative resistor
            MC
Surge killer   Class D
grounding

24V
AC/DC   0V
Power supply

Regenerative resistor

Regenerative resistor connection terminal   B1
                                              B2

DC reactor connection terminal
(Output capacity of 7.5 kW
or more only)   L1
DC reactor option (See P.78.)   L2

CN2

3 EP5   EP5
4 EP5   EP5
1 GND   GND
2 GND   GND
5 SD   SD
6 SD*   SD*
FG   E
Connector metal fitting

Absolute
encoder

◎When an absolute
encoder is used

CNSA

RX   SSCNETⅢ(/H) communication
TX   To controller/front axle driver

CNSB

RX   SSCNETⅢ(/H) communication
TX   To rear axle driver

CN1

Control input signal (Option)

+12 to 24V +V   18
DI1   36
DI2   35
DI3   34
DI4   33

Connector metal fitting

Control output signal (Option)

DO1   CR   17
+12 to 24V
COM   13

FG

J3

2   - D   USB communication
3   +D
5   GND
GND
Connector metal fitting

---

* The control input and output signals of the CN1 connector can be used when the optional control input/output unit 4 is installed.
* COM of the CN1 connector is common to the control input and output signals. GND is common to the internal control power supply(+5V) in the servo driver.
* Since COM of CN1 and GND are isolated, do not use common wiring or bundle them together.
* The status of the switch connected to a control input signal indicates the OFF status of the input signal.
* To use the following signals when the optional control input/output unit 4 is not installed, input them from the controller.
  - Forward direction over travel(FOT)
  - Reverse direction over travel(ROT)
  - Zero point deceleration(ZLS)
* When the optional control input/output unit 4 is installed, the control signals are as follows depending on the start mode.
  ◎ In SSCNETⅢ(/H) communication mode, the following signals are permanently assigned.
    DI1：EMG(emergency stop) DI2：FOT(forward direction over travel)
    DI3：ROT(reverse direction over travel) DI4：ZLS(zero point deceleration)
  ◎ In maintenance mode, all the control input signals can be assigned.
* When the CNSA(IN) and CNSB(OUT) connectors are not connected, cap them.

◎When an incremental encoder is used

CN2

3 EP5   EP5
4 EP5
1 GND   GND
2 GND
7 A   A
8 A*   A*
9 B   B
10 B*   B*
11 Z   Z
12 Z*   Z*
5 SD   EP5
6 SD*   GND
13 PS   PS
14 PS*   PS*
15 PC   PC
16 PC*   PC*
FG   E
Connector metal fitting

Incremental
encoder

Magnetic
pole
sensor
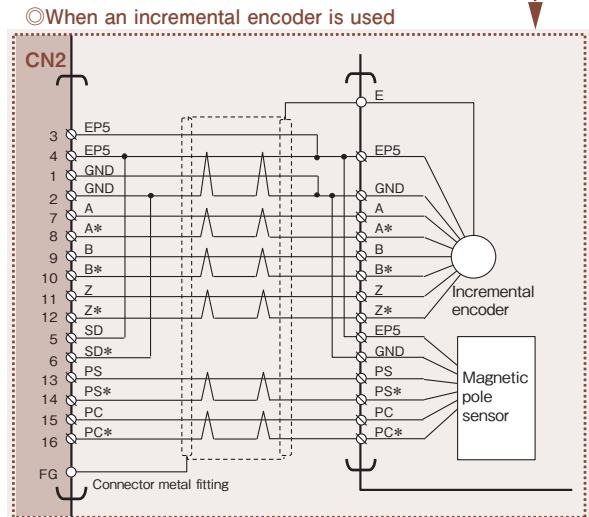
■ Encoder cable and power cable combination list

τDISC

Series	Motor type		Motor model *2	Encoder cable — Absolute (For movable motor) Description No. / Model	Encoder cable — Incremental (For movable motor) Description No. / Model	Power cable — Not shielded (For movable motor) Description No. / Model	Power cable — Shielded (For movable motor) Description No. / Model
ND-s *1	ND110-	65-FS(P)	NMR-SAE□A1A-101A(P)	E-1 NCR-XBGGA-	E-3 NCR-XBCNA-	P-1 *3 NCR-XBBBA-	P-6 *3 NCR-XBBCA-
			NMR-SAE□A2A-131A(P)				
		85-FS(P)	NMR-SAU□A1A-181A(P)				
			NMR-SAU□A2A-221A(P)				
	ND140-	65-FS(P)	NMR-SCE□A2A-301A(P)				
		70-LS(P)	NMR-SRE□A2A-301A(P)				
		95-LS(P)	NMR-SRF□A2A-471A(P)				
	ND180-	55-FS(P)	NMR-SDM□A2A-531A(P)				
		70-LS(P)	NMR-SSM□A2A-531A(P)				
		95-LS(P)	NMR-SSE□A2A-941A(P)			P-2 *3 NCR-XBBEA-	P-7 *3 NCR-XBBFA-
	ND250-	55-FS(P)	NMR-SEM□A2A-791A(P)			P-1 *3 NCR-XBBBA-	P-6 *3 NCR-XBBCA-
		70-LS(P)	NMR-STE□A2A-791A(P)				
		95-LS(P)	NMR-STF□A2A-152A(P)			P-2 *3 NCR-XBBEA-	P-7 *3 NCR-XBBFA-
	ND400-	65-FS(P)	NMR-SFE□A2A-182A(P)				
		70-LS(P)	NMR-SUE□A2A-182A(P)				
		95-LS(P)	NMR-SUF□A2A-322A(P)			P-3 *3 NCR-XBBHA-	P-8 *3 NCR-XBBIA-
		160-LS(P)	NMR-SUH□A2A-622A(P)			P-4 NCR-XBEMA-	P-9 *3 NCR-XBENA-

Series	Motor type		Motor model *2	Absolute	Incremental Description No. / Model	Not shielded Description No. / Model	Shielded Description No. / Model
ND-s HS	ND110-	85-FS(P)-HS	NMR-SAUIA2A-551A(P)	–	E-3 NCR-XBCNA-	P-1 *3 NCR-XBBBA-	P-6 *3 NCR-XBBCA-
	ND140-	70-LS(P)-HS	NMR-SREIA2A-661A(P)				
		95-LS(P)-HS	NMR-SRFIA2A-102A(P)			P-2 *3 NCR-XBBEA-	P-7 *3 NCR-XBBFA-
	ND180-	95-LS(P)-HS	NMR-SSEIA2A-162A(P)				

Series	Motor type		Motor model *2	Absolute Description No. / Model	Incremental Description No. / Model	Not shielded Description No. / Model	Shielded Description No. / Model
DD-s *1	DD160-	96-LS(P5/P3)	DD16-251L04□NN(-P/-P3)	E-1 NCR-XBGGA-	E-3 NCR-XBCNA-	P-1 *3 NCR-XBBBA-	P-6 *3 NCR-XBBCA-
		105-FS(P5/P3)	DD16-251F04CNN(-P/-P3)		–		
		146-LS(P5/P3)	DD16-681L04□NN(-P/-P3)		E-3 NCR-XBCNA-		
	DD250-	90-LS(P5/P3)	DD25-521L02□NN(-P/-P3)			P-2 *3 NCR-XBBEA-	P-7 *3 NCR-XBBFA-
		138-LS(P5/P3)	DD25-102L02□NN(-P/-P3)				
		163-LS(P5/P3)	DD25-152L02□NN(-P/-P3)				
	DD400-	150-LS(P5/P3)	DD40-322L02CNN(-P/-P3)		–	P-4 NCR-XBEMA-	P-9 *3 NCR-XBENA-
		200-LS(P5/P3)	DD40-622L02CNN(-P/-P3)				
		250-LS(P5/P3) (1.5rps specification)	DD40-702L01CNN(-P/-P3)			P-5 NCR-XBBTA-	P-11 NCR-XBBVA- (for fixed motor)
		250-LS(P5/P3) (1rps specification)	DD40-472L01CNN(-P/-P3)			P-4 NCR-XBEMA-	P-9 *3 NCR-XBENA-
		250-LS(P5/P3) (2rps specification)	DD40-942L02CNN(-P/-P3)			–	P-11 NCR-XBBVA- (for fixed motor)
	DD630-	175-LS(P10/P5)	DD63-842L01CNN(-P/-P5)	E-2 NCR-XBGFB-		P-5 NCR-XBBTA-	P-10 *3 NCR-XBETA-
		225-LS(P10/P5)	DD63-123L01CNN(-P/-P5)			–	P-11 NCR-XBBVA- (for fixed motor)

Series	Motor type		Motor model *2	Absolute	Incremental Description No. / Model	Not shielded Description No. / Model	Shielded Description No. / Model
HD-s	HD140-	160-LS(P)	NMR-FRHIA2A-102A(P)	–	E-3 NCR-XBCNA-	P-1 *3 NCR-XBBBA-	P-6 *3 NCR-XBBCA-
		185-LS(P)	NMR-FRIIA2A-122A(P)			P-2 *3 NCR-XBBEA-	P-7 *3 NCR-XBBFA-
	HD180-	200-LS(P)	NMR-FSJIA2A-252A(P)				

*1 The incremental encoder type of the ND-s Series and DD-s Series is available on request.
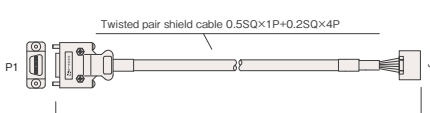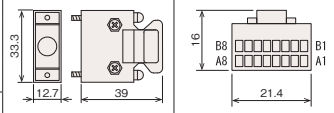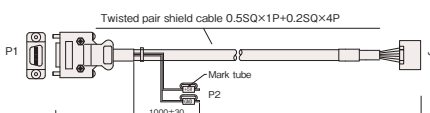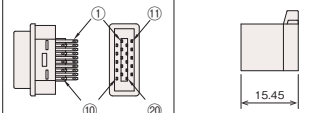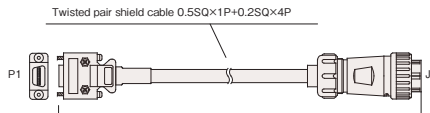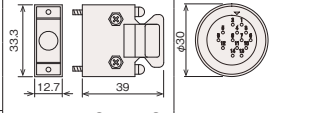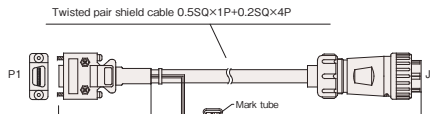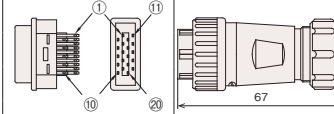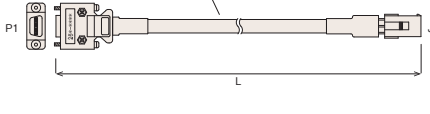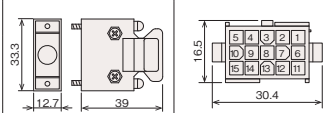
*2 One of the following letters appears in □ of the model name.
   ND-s Series：J for the absolute encoder or I for the incremental encoder
   DD-s Series：C for the absolute encoder or A for the incremental encoder

*3 The motor movement speeds of 0.5 m/s and higher are supported.

■ Encoder cable list

Description No.	Model	Length (L)	Encoder cable dimensions	Encoder connector kit *1		Signal chart
				P1 driver-side connector	J1 motor-side connector	

E-1

Model	Length (L)
NCR-XBGGA -030	3m
-050	5m
-070	7m
-100	10m
-150	15m
-200	20m
NCR-XBGGA -250-Z	25m
-300-Z	30m

Twisted pair shield cable 0.5SQ×1P+0.2SQ×4P

◎ NCR-XBDVA

* If the cable is longer than 25 m, an external 5 VDC power supply is required separately.
The external power supply unit NCR-XAD1A is available as an option.

P1 (Driver side) / J1 (Encoder side)

Signal name	Pin name	Signal name	Pin name
GND	1	+5V	A1
GND	2	+5V	A2
+5V	3	SD	A3
+5V	4		A4
SD	5		A5
SD*	6		A6
	7		A7
	8	FG(Ground)	A8
	9	GND	B1
	10	GND	B2
	11	SD*	B3
	12		B4
	13		B5
	14		B6
	15		B7
	16	FG(Ground)	B8
	17		
	18		
	19		
	20		
FG(Ground)	Metal		

P2 signal chart

Signal name	Cable color
+5V	Red
GND	Black

E-2

Model	Length (L)
NCR-XBGFB -030	3m
-050	5m
-070	7m
-100	10m
-150	15m
-200	20m
NCR-XBGFB -250-Z	25m
-300-Z	30m

Twisted pair shield cable 0.5SQ×1P+0.2SQ×4P

◎ NCR-XBDWA

* If the cable is longer than 25 m, an external 5 VDC power supply is required separately.
The external power supply unit NCR-XAD1A is available as an option.

P1 (Driver side) / J1 (Encoder side)

Signal name	Pin name	Signal name	Pin name
GND	1	+5V	1
GND	2	GND	2
+5V	3	+5V	3
+5V	4	GND	4
SD	5	FG(Ground)	5
SD*	6	SD	6
	7	SD*	7
	8		8
	9		9
	10		10
	11		11
	12	FG(Ground)	12
	13		13
	14		14
	15		15
	16		
	17		
	18		
	19		
	20		
FG(Ground)	Metal		

P2 signal chart

Signal name	Cable color
+5V	Red
GND	Black

E-3

Model	Length (L)
NCR-XBCNA -030	3m
-050	5m
-070	7m
-100	10m
-150	15m
NCR-XBCNA -200	20m
-250	25m
-300	30m

L=15 m or less → Twisted pair shield cable 0.5SQ×1P+0.2SQ×6P
L=16 m or more → Twisted pair shield cable 1.25SQ×1P+0.2SQ×5P

◎ NCR-XBC8A

P1 (Driver side) / J1 (Encoder side)

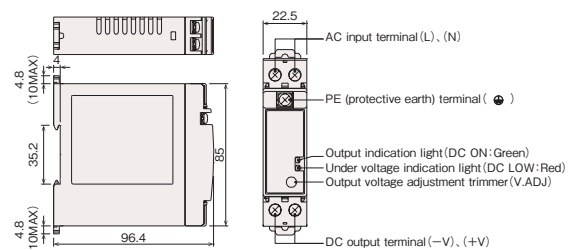| Signal name	Pin name	Signal name	Pin name
GND	1	A	1
GND	2*	A*	2
+5V	3	B	3
+5V	4*	B*	4
	5	Z	5
	6	Z*	6
A	7	PS	7
A*	8	PS*	8
B	9	PC	9
B*	10	PC*	10
Z	11	+5V	11
Z*	12	GND	12
PS	13	+5V	13
PS*	14	GND	14
PC	15	FG(Ground)	15
PC*	16		
	17		
	18		
	19		
	20		
FG(Ground)	Metal		

*NCR-XBCNA-160 to NCR-XBCNA-300 are not connected.

* Optionally, the encoder cable can also be purchased in units of 1 meter.

*1 When you create a cable using the connector kit, you need to take into account voltage drops due to the cable length during cabling. Contact our sales staff.

■ External power supply unit

This unit is used for **E-1** NCR-XBGGA-250/300-Z and **E-2** NCR-XBGFB-250/300-Z.

Product model
NCR-XAD1A

- AC input terminal (L)、(N)
- PE (protective earth) terminal (⏚)
- Output indication light (DC ON：Green)
- Under voltage indication light (DC LOW：Red)
- Output voltage adjustment trimmer (V.ADJ)
- DC output terminal (−V)、(+V)

■ Unshielded power cable list

Description No.	Model	Length (L)	Power cable dimensions	Signal chart		
P-1	NCR-XBBBA -030	3m		Signal name	J1 pin name	Cable color
	-050	5m		U	1	Red
	-070	7m	Cab-tire cable 0.75SQ 4 cores	V	2	White
	-100	10m		W	3	Black
	-150	15m		E	4	Green
	-200	20m		Power cable connector kit CSZ-MOT		
	-250	25m				
	-300	30m				
P-2	NCR-XBBEA -030	3m		Signal name	J1 pin name	Cable color
	-050	5m		U	B1	Red
	-070	7m	Cab-tire cable 1.25SQ 4 cores	V	B2	White
	-100	10m		W	A1	Black
	-150	15m		E	A2	Green
	-200	20m	Crimp terminal R1.25-4	Power cable connector kit NCR-XBB4A		
	-250	25m				
	-300	30m				
P-3	NCR-XBBHA -030	3m		Signal name	J1 pin name	Cable color
	-050	5m		U	B1	Red
	-070	7m	Cab-tire cable 2SQ 4 cores	V	B2	White
	-100	10m		W	A1	Black
	-150	15m		E	A2	Green
	-200	20m	Crimp terminal R2-4	Power cable connector kit NCR-XBB4A		
	-250	25m				
	-300	30m				
P-4	NCR-XBEMA -030	3m		Signal name	J1 pin name	Cable color
	-050	5m		U	A	Red
	-070	7m	Cab-tire cable 5.5SQ 4 cores	V	B	White
	-100	10m		W	C	Black
	-150	15m		E	D	Green
	-200	20m	Crimp terminal R5.5-5	Power cable connector kit CSZ5-MOT-B		
	-250	25m				
	-300	30m				
P-5	NCR-XBBTA -030	3m		Signal name	J1 pin name	Cable color
	-050	5m		U	A	Red
	-070	7m		V	B	White
	-100	10m		W	C	Black
	-150	15m	Cab-tire cable 8SQ 4 cores	E	D	Green
	-200	20m		Power cable connector kit NCR-XBD9A		
	-250	25m	Crimp terminal R8-5			
	-300	30m				

* Optionally, the power cable can also be purchased in units of 1 meter.

■ Shielded power cable list（for movable motor）

Description No.	Model		Length (L)	Power cable dimensions	Signal chart		
					Signal name	J1 pin name	Cable color
P-6	NCR-XBBCA	-030	3m		U	1	Red
		-050	5m		V	2	White
		-070	7m		W	3	Black
		-100	10m		E	4	Green / Yellow
		-150	15m		Power cable connector kit		
		-200	20m		CSZ-MOT		
		-250	25m				
		-300	30m				
P-7	NCR-XBBFA	-030	3m		U	B1	Red
		-050	5m		V	B2	White
		-070	7m		W	A1	Black
		-100	10m		E	A2	Green / Yellow
		-150	15m		Power cable connector kit		
		-200	20m		NCR-XBB4A		
		-250	25m				
		-300	30m				
P-8	NCR-XBBIA	-030	3m		U	B1	Red
		-050	5m		V	B2	White
		-070	7m		W	A1	Black
		-100	10m		E	A2	Green / Yellow
		-150	15m		Power cable connector kit		
		-200	20m		NCR-XBB4A		
		-250	25m				
		-300	30m				
P-9	NCR-XBENA	-030	3m		U	A	Red
		-050	5m		V	B	White
		-070	7m		W	C	Black
		-100	10m		E	D	Green / Yellow
		-150	15m		Power cable connector kit		
		-200	20m		CSZ5-MOT-B		
		-250	25m				
		-300	30m				
P-10	NCR-XBETA	-030	3m		U	A	Red
		-050	5m		V	B	White
		-070	7m		W	C	Black
		-100	10m		E	D	Green / Yellow
		-150	15m		Power cable connector kit		
		-200	20m		NCR-XBD9A		
		-250	25m				
		-300	30m				

■ Shielded power cable list（for fixed motor）

Description No.	Model		Length (L)	Power cable dimensions	Signal chart		
					Signal name	J1 pin name	Cable color
P-11	NCR-XBBVA	-030	3m		U	A	Black（1）
		-050	5m		V	B	Black（2）
		-070	7m		W	C	Black（3）
		-100	10m		E	D	Green / Yellow
		-150	15m		Power cable connector kit		
		-200	20m		NCR-XBD9A		
		-250	25m				
		-300	30m				

* Optionally, the power cable can also be purchased in units of 1 meter.

■ I/O-related options

◎ I/O cable VCIC Series

This cable is connected with the control input／output connector（CN1）of the VPH-HA Type or VCII-D/C1/C6 Type servo driver or the VCII-D7 Type control input／output unit（built-in option）to input and output signals.

Product model	Cable length L（mm）
NCR-XBA1A-010	1000±30
NCR-XBA1A-020	2000±30
NCR-XBA1A-030	3000±30
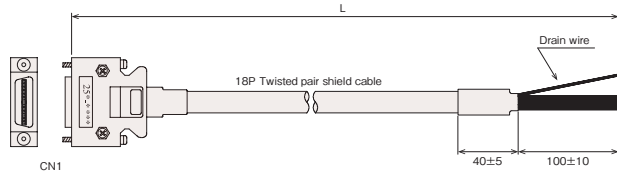
◎ I/O terminal block cable VCTC Series

This cable is used to connect the control input／output connector（CN1）of the VPH-HA Type or VCII-D/C1/C6 Type servo driver or the VCII-D7 Type control input／output unit（built-in option）with the I/O terminal block unit（40 pins）.

Product model	Cable length L（mm）
NCR-XBA2A-010	1000±30
NCR-XBA2A-020	2000±30
NCR-XBA2A-030	3000±30
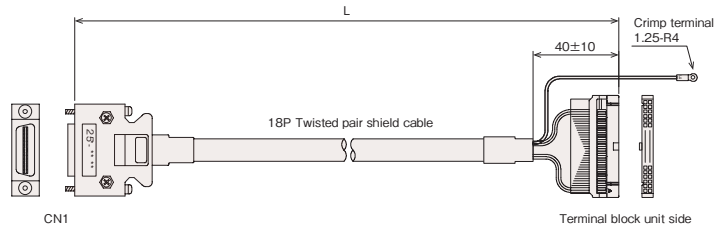
◎ I/O terminal block unit（screw type）

This unit is used to convert an input connector into a terminal block.
Screws are used for connection.
To connect the servo driver requires the I/O terminal block cable（VCTC Series）.

Product model	Number of pins
ZTB-400	40 pins
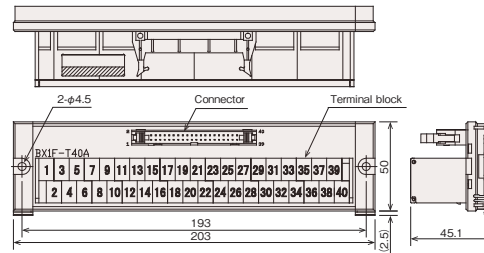
◎ I/O terminal block unit（cage clamp type）

This unit is used to convert an input connector into a terminal block. Cage clamps are used for connection. To connect the servo driver requires the I/O terminal block cable（VCTC Series）.

Product model	Number of pins
NCR-XABND3A	40 pins

■ Cage clamp type common terminal block

Use this block to connect two or more cables to a terminal.

Product model	Number of pins
NCR-XABQD3A	8×2

■ Tool to use Connector key

Product model
NCR-XABRD0A
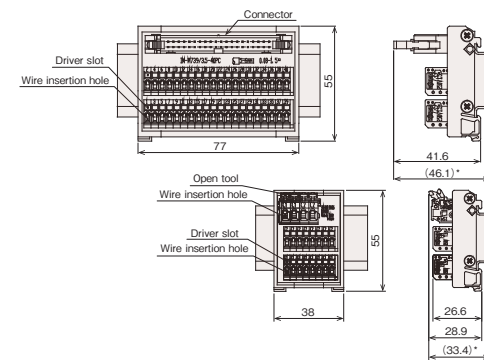
*The dimensions are those applicable when a 35-mm DIN rail is mounted.

◎ I/O signal connector kit

This is a connector kit used to connect the control input／output connector（CN1）of the VPH-HA Type or VCII-D/C1/C6 Type servo driver or the VCII-D7 Type control input／output unit（built-in option）.

Product model
CSZ-INF

Cover   Connector

Optional products
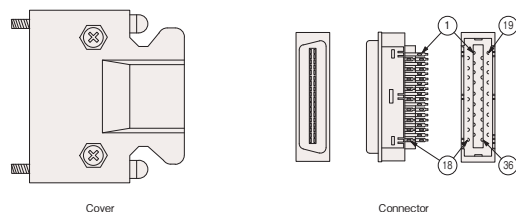
■ I/O-related options

<table>
<tr><td>Applicable servo drivers</td><td>・VPH Series： VPH-HB/HD/HE Type</td></tr>
</table>

◎ I/O cable

This cable is connected with the control input / output connector（CN1）
of the VPH-HB/HD/HE Type to input and output signals.

Product model	Cable length L（mm）
NCR-XBANA-010	1000±30
NCR-XBANA-020	2000±30
NCR-XBANA-030	3000±30

L

5P Twisted pair shield cable

40±5 100±10

CN1
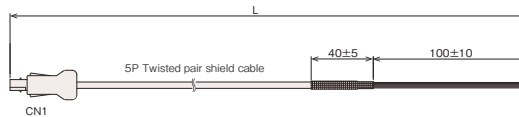
◎ I/O connector kit

This is an I/O cable connector kit used to connect the control input / output
connector（CN1）of the VPH-HB/HD/HE Type.

Product model
NCR-XBDYA

13.6 42.5 18.5
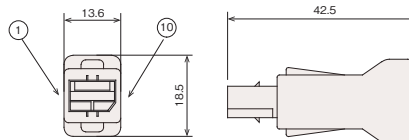
<table>
<tr><td>Applicable servo drivers</td><td>・VPH Series： VPH-HC Type</td></tr>
</table>

◎ I/O cable

This cable is connected with the control input / output connector（CN1）
of the VPH-HC Type to input and output signals.

Product model	Cable length L（mm）
NCR-XBARA-010	1000±30
NCR-XBARA-020	2000±30
NCR-XBARA-030	3000±30

L

39 7P Twisted pair shield cable 40 100

CN1
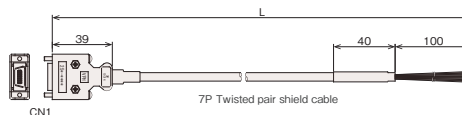
◎ I/O connector kit

This is a cable connector kit that is connected with the control input / output
connector（CN1）of the VPH-HC Type to input and output signals.

Product model
ZCK-COM
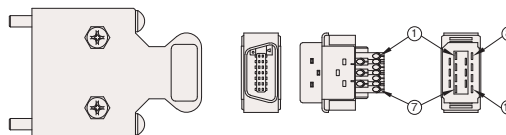
<table>
<tr><td>Applicable servo drivers</td><td>・VPH Series： All Types</td></tr>
</table>

◎ STO cable

This cable is connected with the VPH Series servo driver to input and output STO signals.

Product model	Cable length L（mm）
NCR-XBASA-010	1000±30
NCR-XBASA-020	2000±30
NCR-XBASA-030	3000±30

L

33 4P Twisted pair shield cable 40±5 100±10
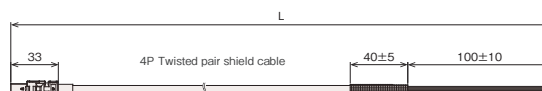
◎ STO connector kit

This is an STO cable connector kit used to connect the VPH Series servo driver.

Product model
NCR-XBJ5A

10 33 11
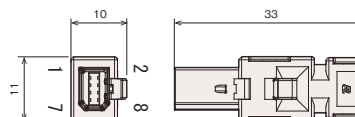
◎ STO short-circuit plug

This plug is used to release the blocked power supply to the motor connected to the VPH Series.
It is an accessory provided when the STO option is used.（The VPH Series servo driver is shipped
with this plug connected to its safety input connector（CN5）.）

Product model
NCR-XBJ6A
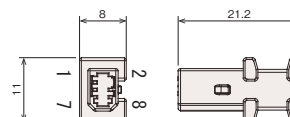
8 21.2 11

■ I/O-related options

Applicable servo drivers	・VCⅡ Series： VCⅡ-D／C1／C6 Type control input／output expansion unit

◎ Control input／output expansion unit I/O cable VCIC Series

This cable is connected with the control input／output connector（CN3） of the VCⅡ Series control input／output expansion unit（built-in option） to input and output signals.

Product model	Cable length L（mm）
NCR-XBA3A-010	1000±30
NCR-XBA3A-020	2000±30
NCR-XBA3A-030	3000±30
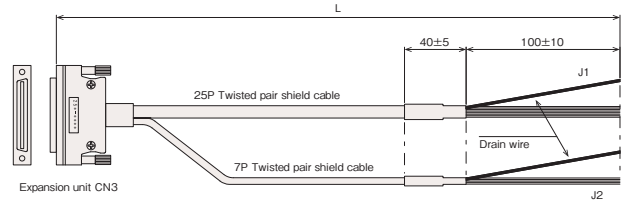
◎ Control input／output expansion unit I/O terminal block cable FTTC Series

This cable is used to connect the control input／output connector（CN3） of the VCⅡ Series control input／output expansion unit（built-in option） with the I/O terminal block unit（50 or 20 pins）.

Product model	Cable length L（mm）
FTTC-010	1000
FTTC-020	2000
FTTC-030	3000
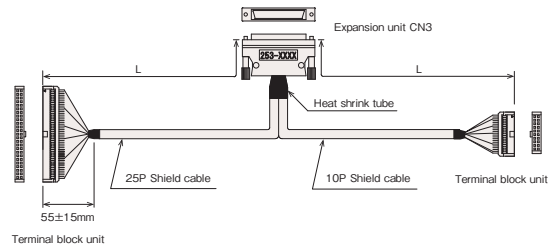
Applicable servo drivers	・VCⅡ Series： VCⅡ-D／C1／C6 Type control input／output expansion unit

◎ I/O terminal block unit（screw type）

This unit is used to convert an input connector into a terminal block. Screws are used for connection.
To connect the servo driver requires the I/O terminal block cable（VCTC Series）.

Product model	Number of pins	L1 dimension（mm）	L2 dimension（mm）
ZTB-200	20 pins	118	108
ZTB-500	50 pins	245	235
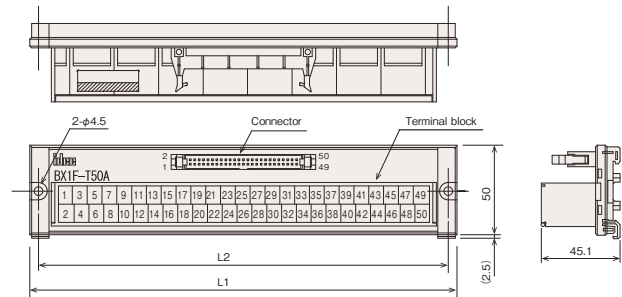
◎ I/O terminal block unit（cage clamp type）

This unit is used to convert an input connector into a terminal block. Cage clamps are used for connection.
To connect the servo driver requires the I/O terminal block cable（VCTC Series）.

Product model	Number of pins	L dimension（mm）
NCR-XABMD3A	20 pins	52
NCR-XABSD3A	50 pins	95
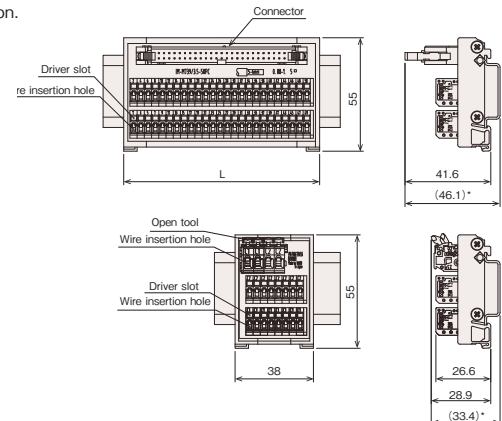
■ Cage clamp type common terminal block

Use this block to connect two or more cables to a terminal.

Product model	Number of pins
NCR-XABQD3A	8×2

■ Tool to use Connector key

Product model
NCR-XABRD0A

* The dimensions are those applicable when a 35-mm DIN rail is mounted.

Optional products

■ Serial communication-related options

Applicable servo drivers	・VPH Series： VPH-HA Type ・VCⅡ Series： VCⅡ-D／C1／C6 Type

◎ RS-422 communication cable

This cable is used to input and output servo driver data using a touch panel,
PLC computer link module, etc.（RS-422 I/F）.

* A communication cable is also available that allows two to four servo drivers
  to be connected to a single personal computer.

VPH product model	VCⅡ product model	Cable length L（mm）
NCR-XBFJA-010	NCR-XBF5A-010	1000±30
NCR-XBFJA-030	NCR-XBF5A-030	3000±50
NCR-XBFJA-050	NCR-XBF5A-050	5000±100
NCR-XBFJA-100	NCR-XBF5A-100	10000±100
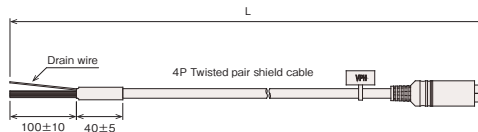
◎ Serial communication connector kit

This connector kit is used to connect the RS-422 serial communication
connector of the servo driver.

Product model
NCR-XBDPA

Pin arrangement
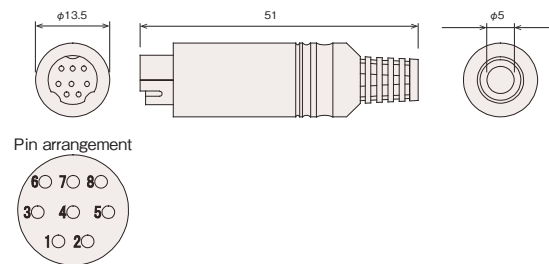
◎ RS-232C communication cable

This cable is used to input and output servo driver data from a general-purpose
personal computer（RS-232C I/F）.

* A communication cable is also available that allows two to four servo drivers
  to be connected to a single personal computer.

VPH product model	VCⅡ product model	Cable length L（mm）
NCR-XBFGA-010	NCR-XBF1A-010	1000±30
NCR-XBFGA-030	NCR-XBF1A-030	3000±50
NCR-XBFGA-050	NCR-XBF1A-050	5000±100
NCR-XBFGA-100	NCR-XBF1A-100	10000±100
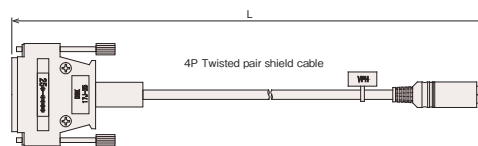
Applicable servo drivers	・VPH Series： All Types ・VCⅡ Series： All Types

◎ Noise protection ferrite core

This option is used to prevent malfunctions due to noise（monitor display
interruption, forced shutdown of the editing software, etc.,）.

Product model
NCR-XAA9A
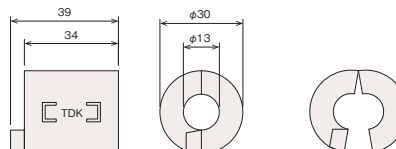
Optional products

■ Serial communication-related options

Applicable servo drivers	・VCⅡ Series： VCⅡ-D／C1／C6 Type

◎ Synchronous communication cable SHCC Series

This cable is used for synchronous operation between VCⅡ Series servo drivers.

The synchronous communication termination resistor SHCC-R shown at the right must be connected at both ends of the cable.

Product model	Cable length L（mm）
SHCC-005	500
SHCC-010	1000
SHCC-030	3000

AWG28 2-pair 4-core shield cable

A side connector

B side connector
(* Same specifications as the A side connector)

Enlarged view

No.4
No.3
No.2
No.1

■ Synchronous communication termination resistor

Shrinkable tube

Product model	Note
SHCC-R	One set consisting of 2 resistors
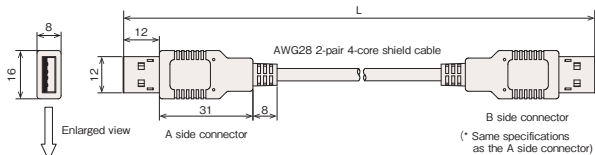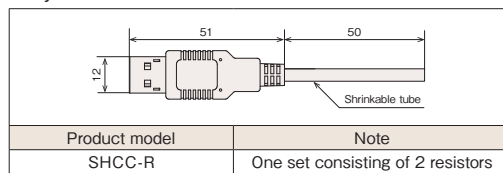
■ Noise protection

Applicable servo drivers	・VPH Series： All Types ・VCⅡ Series： All Types

◎ Zero phase reactor（for common mode）

This reactor absorbs the noise generated by the servo driver to reduce the effect of noise on the driver main unit and peripheral equipment.

* The effectiveness of this option greatly depends on how the cables are routed and how the device is connected to ground.

Product model
NCR-XAB4A
NCR-XAB5A
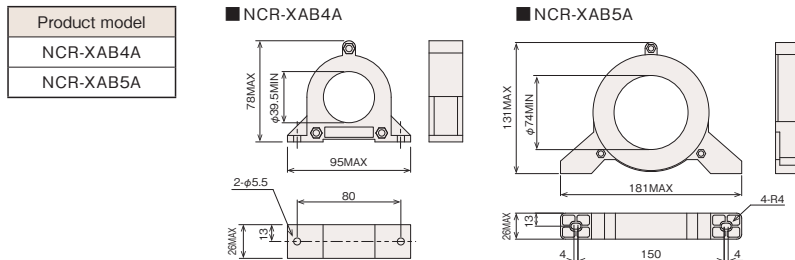
■NCR-XAB4A

■NCR-XAB5A

■ Zero phase reactor to use and the number of reactors

● Relationship between AWG cable size（mm²） and zero phase reactor

Zero phase reactor	Inner diameter	AWG cable size（mm²）	
		18 to 10（0.75 to 5.5）	8 to 6（8.0 to 14.0）
NCR-XAB4A	39.5mm	3 - 5 turns 1 reactor	
NCR-XAB5A	74.0mm		3 - 5 turns 1 reactor

The values in this table are calculated from the AWG size（mm²） of the MLFC cable（600 V, 110°C） and the inner diameter of the zero phase reactor.

This table is for reference purposes because the diameter and stiffness vary depending on the cable used. It is assumed that the cable is wound 3 to 5 times.

■ Installation examples

● Wire winding method

Wires are wound 3 to 5 times around a zero phase reactor.

Servo driver

AC servo motor
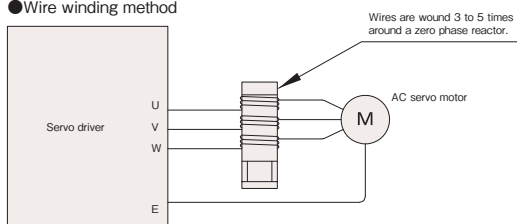
● Wire penetration method

Wires penetrate 3 zero phase reactors or so.

Servo driver

AC servo motor

Optional products

■ Noise protection

◎ **DC reactor**

This reactor makes the waveform of the input current approximate to that of a sine wave to suppress harmonics.

Even when the power supply capacity is 500 KVA, install the reactor to protect the main circuit.

Servo driver		Paired DC reactor	
Series	Model	Model	AWG diameter of the cable used（SQ）
VPH	NCR-H□2702□-A-□□□	NCR-XABU2A-752	8（8）
VCⅡ	NCR-□DA□A2A-752J	NCR-XABU2A-752	8（8）
	NCR-□DA□A2A-113J	NCR-XABU2A-113	6（14）
	NCR-□DA□A2A-153J	NCR-XABU2A-153	4（22）
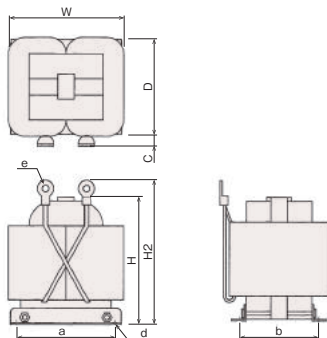
Model	W	D	C	H	H2	a	b	d（Screw）	e（Screw）
NCR-XABU2A-752	100	100	15	160	180	80	80	5.5（M5）	（M5）
NCR-XABU2A-113	125	105	15	160	180	105	80	5.5（M5）	（M6）
NCR-XABU2A-153	125	105	20	165	190	105	80	5.5（M5）	（M6）

■ **DC reactor installation**

Wire the DC reactor as shown at the right.

Remove the short bar that short-circuits L1 and L2, and connect the DC reactor.

For the cable diameter, see the diameter of the cable used in the table above, and be sure to minimize the cable length when connecting the reactor.

The DC reactor does not have polarity.

●DC reactor wiring diagram
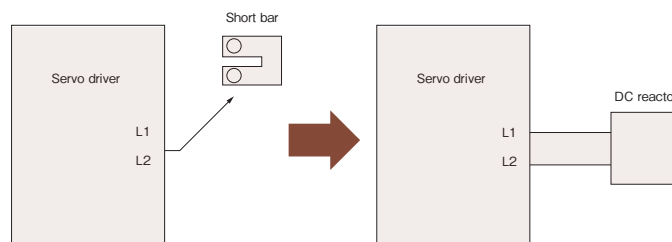
■ System support tool

◎ **Data Editing Software（Data Editing Software）**

This software allows you to execute various tasks from a personal computer, such as editing servo driver parameters and programs, measuring and viewing oscilloscope data, and performing remote operations and self-diagnoses.

For details, refer to "System support tool Data Editing Software" on pp.13 - 14.

VPH product model	VCⅡ product model
NPS-VPHDESN1	NCR-XCR000

■ Other options

◎ **SDI device**

This unit is used to input various parameters and data to a VCⅡ Series servo driver with an output capacity of 800 W or less as well as to display the status of the controller.

* For the VCⅡ Series servo drivers whose output capacity is 1.5 kW or more, this option is the standard function.

Product model
NCR-XAA1D1B
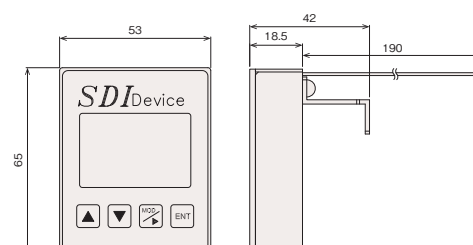
■ Other options

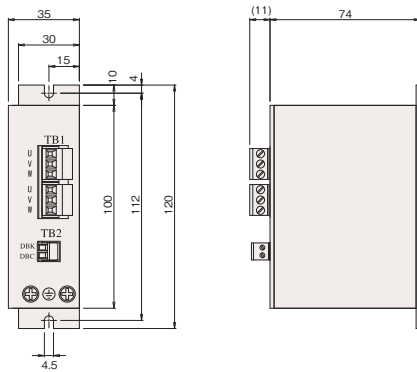| Applicable servo drivers	・VPH Series： All Types
	・VCⅡ Series： All Types

◎ Dynamic brake unit

This is an auxiliary brake unit that helps decelerate the motor.

It prevents the connected motor from free-running due to an error in the servo driver, power failure, etc.

Servo driver		Paired dynamic brake unit
Series	Model	Model
VPH	NCR-H□1101□/1201□-A-□□□	NCR-XABCA2B-801-UL
	NCR-H□2101□/2201□/2401□/2801□-A-□□□	
	NCR-H□2152□/2222□-A-□□□	NCR-XABCA2B-222-UL
	NCR-H□2332□-A-□□□	NCR-XABCA2B-402-UL
	NCR-H□2702□-A-□□□	NCR-XABCA2B-752-UL
VCⅡ	NCR-□DA□A1A-101J/201J	NCR-XABCA2B-801-UL
	NCR-□DA□A2A-201J/401J/801J	
	NCR-□DA□A2A-152J/222J	NCR-XABCA2B-222-UL
	NCR-□DA□A2B-402J	NCR-XABCA2B-402-UL
	NCR-□DA□A2A-752J	NCR-XABCA2B-752-UL
	NCR-□DA□A2A-113J	NCR-XABCA2B-113-UL
	NCR-□DA□A2A-153J	NCR-XABCA2C-153

NCR-XABCA2B-801-UL

NCR-XABCA2B-222-UL
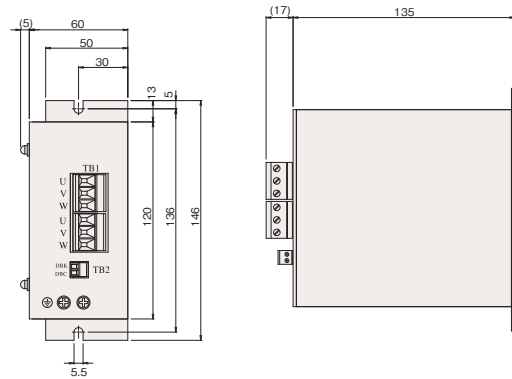
NCR-XABCA2B-402-UL
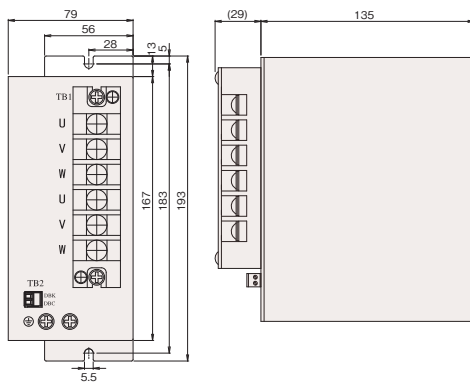
NCR-XABCA2B-752-UL
NCR-XABCA2B-113-UL

NCR-XABCA2C-153

Optional products
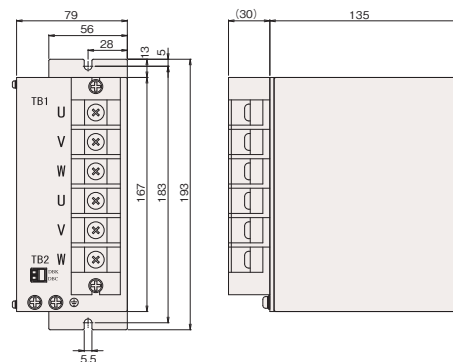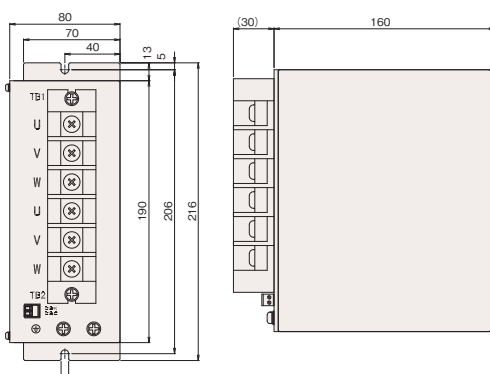
■ Regenerative resistor（option／accessory）

Applicable servo drivers	・VPH Series： All Types ・VCⅡ Series： All Types

Servo driver			Regenerative resistors		
Series	Model	Classification	Option model	Regenerative resistor description	Dimensions
VPH	NCR-H□1101／1201□-A-□□□	Option *	NCR-XAE1A2A	Cement resistor CAN60UT 82-ohm J 60 W 82 Ω × 1	A-①
	NCR-H□2101／2201／2401／2801□-A-□□□				
	NCR-H□2152／2222□-A-□□□		NCR-XAE2A2A	Cement resistor CAN200UT 24-ohm J 200 W 24 Ω × 1	A-①
	NCR-H□2332□-A-□□		NCR-XAE3A2A	Cement resistor CAN400UR 20-ohm J 400 W 20 Ω × 1	A-②
	NCR-H□2702□-A-□□		NCR-XAE4A2A	Vitreous enamel resistor RGH-300-0S30J 300 W 30 Ω × 3（connected in parallel with a total of 900 W and 10 Ω）	B-①
VCⅡ	NCR-□DA□A1A-101J／201J	Option *	NCR-XAE1A2A	Cement resistor CAN60UT 82-ohm J 60 W 82 Ω × 1	A-①
	NCR-□DA□A2A-201J／401J				
	NCR-□DA□A2A-801J	Accessory	－	Cement resistor CAN60UT 82-ohm J 60 W 82 Ω × 1	A-①
	NCR-□DA□A2A-152／222J		－	Cement resistor CAN200UT 24-ohm J 200 W 24 Ω × 1	A-①
	NCR-□DA□A2B-402J		－	Cement resistor CAN400UR 20-ohm J 400 W 20 Ω × 1	A-②
	NCR-□DA□A2A-752J		－	Vitreous enamel resistor RGH-300-0S30J 300 W 30 Ω × 3（connected in parallel with a total of 900 W and 10 Ω）	B-①
	NCR-□DA□A2A-113J		－	Vitreous enamel resistor RGH-500-0S22J 500 W 22 Ω × 3（connected in parallel with a total of 1.5 kW and 7.3 Ω）	B-①
	NCR-□DA□A2A-153J		－	Vitreous enamel resistor RGH-500-0S22J 500 W 22 Ω × 4（connected in parallel with a total of 2 kW and 5.5 Ω）	B-①

* To determine whether the optional regenerative resistor is required, download the motor selection tool from the CKD Nikki Denso website and make a check.
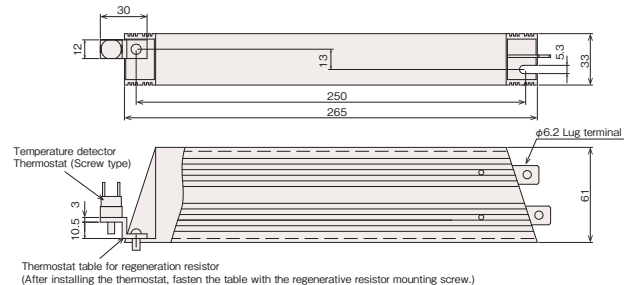（If you have selected the HD-s Series, contact our sales staff.）

A-①：Cement resistor
CAN60UT 82-ohm J ／ CAN200UT 24-ohm J
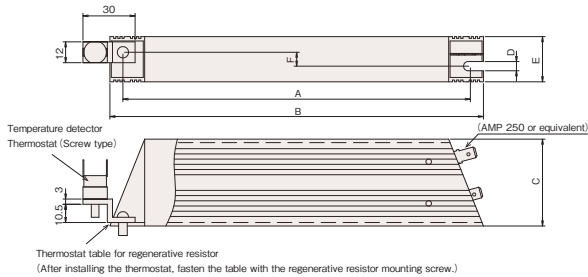
Model	A	B	C	D	E	F
CAN60UT 82-ohm J	100	115	40	4.3	20	5
CAN200UT 24-ohm J	200	215	50	5.3	26	8

A-②：Cement resistor
CAN400UR 20-ohm J

B-①：Vitreous enamel resistor
RGH-300-0S30J ／ RGH-500-0S22J
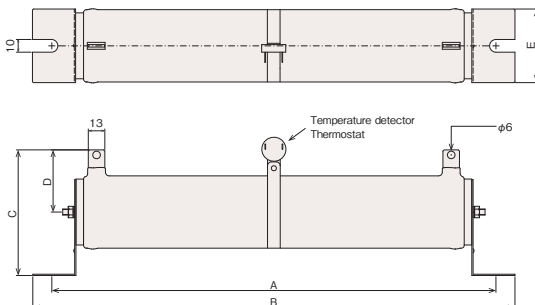
Model	A	B	C	D	E
RGH-300-0S30J	304	334	84	44	40
RGH-500-0S22J	350	380	99	49	58

Optional products・Accessory

■ Compliance with overseas standards and regulations

◎ τ DISC

・Overseas standards

Series	Names of the motor types compliant with overseas standards	Compliance with overseas standards		Names of the standard specification motor types mentioned in this catalog（Not compliant with overseas standards）
		UL／cUL standard（File No：E254021）	CE marking	
ND-s	ND110-65／85-FSB-UC（100V）	○	○	ND110-65／85-FS（100V）
	ND110-65／85-FSB-UC（200V）	○	○	ND110-65／85-FS（200V）
	－	－	－	ND140-65／70／95-FS
	ND180-55／70／95-FSB-UC	○	○	ND180-55／70／95-FS
	ND250-55／70／95-FSB-UC	○	○	ND250-55／70／95-FS
	ND400-65／70／95／160-FSB-UC	○	○	ND400-65／70／95／160-FS
ND-s HS	－	－	－	All Types
DD-s	－	－	－	All Types
HD-s	－	－	－	All Types

* The motor types listed above that are compliant with overseas standards are different from the standard specification motor types mentioned in this catalog.

 For details of the motor types compliant with overseas standards, refer to the "τ DISC ND-s Series UL/CE specification" catalog.

* The dimensions and shapes of the motor main units are the same as the standard specification. All encoders are the absolute encoder type.

* The rated torque and maximum torque of some motor types may differ from the standard specification.

* The positions and shapes of the power cable and cable gland of some motor types may differ from the standard specification. For details, contact our sales staff.

・Compliance with EU RoHS Directive and Chinese RoHS Directive

### ◎ Servo driver

・Overseas standards

Series	Input power supply	Servo driver model（output capacity）	Servo driver type（specification）	Compliance with overseas standards		
				UL／cUL standard（File No：E251116）	CE marking	KC mark
VPH	100 VAC system	NCR-H□1101□-A-□□□（100W）NCR-H□1201□-A-□□□（200W）	VPH-HA（I/O）	○	－	－
			VPH-HB（SSCNETⅢ/H）			
			VPH-HC（CC-Link）			
			VPH-HD（EtherCAT）			
			VPH-HE（MECHATROLINK-Ⅲ）			
	200 VAC system	NCR-H□2101□-A-□□□（100W）NCR-H□2201□-A-□□□（200W）NCR-H□2401□-A-□□□（400W）NCR-H□2152□-A-□□□（1.5kW）	VPH-HA（I/O）	○	○	○
			VPH-HB（SSCNETⅢ/H）			○
			VPH-HC（CC-Link）			－
			VPH-HD（EtherCAT）			○
			VPH-HE（MECHATROLINK-Ⅲ）			－
		NCR-H□2801□-A-□□□（800W）NCR-H□2222□-A-□□□（2.2kW）	VPH-HA（I/O）	○	○	○
			VPH-HB（SSCNETⅢ/H）			○
			VPH-HC（CC-Link）			－
			VPH-HD（EtherCAT）			○
			VPH-HE（MECHATROLINK-Ⅲ）			○
		NCR-H□2332□-A-□□□（3.3kW）	VPH-HA（I/O）	○	○	○
			VPH-HB（SSCNETⅢ/H）			○
			VPH-HC（CC-Link）			Certification planned to be obtained in 2018
			VPH-HD（EtherCAT）			○
			VPH-HE（MECHATROLINK-Ⅲ）			○
		NCR-H□2702□-A-□□□（7kW）	VPH-HA（I/O）	Certification planned to be obtained in 2018	Certification planned to be obtained in 2018	○
			VPH-HB（SSCNETⅢ/H）			Certification planned to be obtained in 2018
			VPH-HC（CC-Link）			Certification planned to be obtained in 2018
			VPH-HD（EtherCAT）			○
			VPH-HE（MECHATROLINK-Ⅲ）			－
VCⅡ	100 VAC system	NCR-□DA□A1A-101J（100W）NCR-□DA□A1A-201J（200W）	VCⅡ-D/C1/C6	○	○	○
			VCⅡ-D7（SSCNETⅢ/H）			－
	200 VAC system	NCR-□DA□A2A-101J（100W）NCR-□DA□A2A-201J（200W）NCR-□DA□A2A-401J（400W）NCR-□DA□A2A-801J（800W）NCR-□DA□A2A-152J（1.5kW）NCR-□DA□A2A-222J（2.2kW）NCR-□DA□A2A-402J（4kW）NCR-□DA□A2A-752J（7.5kW）NCR-□DA□A2A-113J（11kW）	VCⅡ-D/C1/C6	○	○	○
			VCⅡ-D7（SSCNETⅢ/H）			－
		NCR-□DA□A2A-153J（15kW）	VCⅡ-D/C1/C6	－	－	－
			VCⅡ-D7（SSCNETⅢ/H）			

・Compliance with EU RoHS Directive and Chinese RoHS Directive

Lineup of other direct drive products
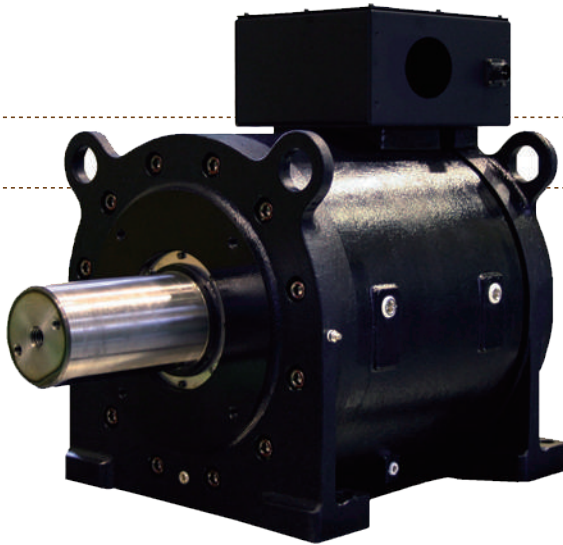
【τiD Roll】

Large torque, high-precision cylinder type

Direct drive motor

Gear-less, non-hydraulic direct drive makes industrial machines more precise and more efficient and provides greater space savings and improvements in environmental friendliness and safety.

◎**Water cooling type iD Series**

　Rated torque：550 to 7500N・m

　Max torque：1100 to 12000N・m

◎**Fan cooling type iD Series**

　Rated torque：150 to 5200N・m

　Max torque：450 to 12000N・m

【τLinear】

Linear servo motor that achieves high quality & high performance for machines

A diverse lineup of coreless type and core type models is provided so that the desired operation specifications, thrust and stroke can be selected.

◎**NVA Series** (Coreless・High-performance type) Rated thrust：23 to 900N

◎**NLD Series** (Coreless・Standard type)　　　Rated thrust：50 to 1000N

◎**NLA-S Type** (Coreless・Small-thrust type)　Rated thrust：7 to 13N

◎**NLA-MA/NA Type** (Core type)　　　　　　Rated thrust：250 to 1500N
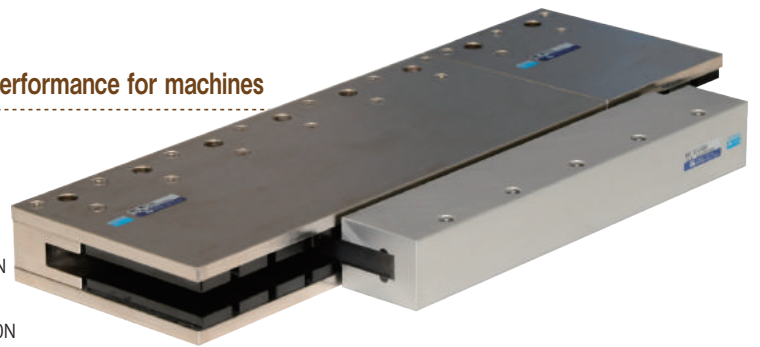
【τLinear Stage】

combined with servo control technology

High-performance control stage

This product meets various needs for positioning accuracy, speed stability, long stroke, customization, etc. The X, XY, Xθ, and XYθ axis stages can be built as well.

◎ **τ Linear Stage** (High precision type)

Positioning accuracy and speed stability are guaranteed.

◎**Stage Block** (Low cost/for transportation)

　Stroke：100 to 21300mm

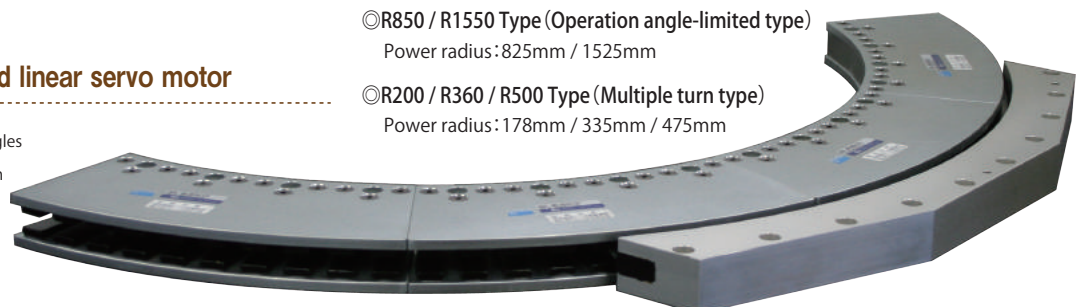## 【τServo Compass】

Innovative arc-shaped linear servo motor

Supporting various operation angles from small angles to multiple turn operations, this product provides a space-saving, cost effective alignment stage.

◎**R850 / R1550 Type** (Operation angle-limited type)

　Power radius：825mm / 1525mm

◎**R200 / R360 / R500 Type** (Multiple turn type)

　Power radius：178mm / 335mm / 475mm

🛑 Warranty

The warranty period of our products is one year after shipment from our factory.
Please note that any failure or abnormality resulting from the following causes is not covered by the warranty.
◎ Modification by parties other than us.
◎ Uses other than those specified in this catalog and the relevant instruction manual.
◎ Natural disasters.
◎ Connection with another maker's product not approved by us.
The scope of the warranty is limited to repairs of the main unit of the product.
The warranty does not cover damage caused by failure of the delivered product and does not compensate
for your opportunity loss, profit loss, secondary damage, or accident.

⚠️ Notes on use

◎Handle this product with due care. Dropping or hitting the product may damage it.
◎When this product is to be used in equipment in which a failure of the product is likely to cause a serious accident or loss,
  install a safety device.
◎While we have made the utmost effort to ensure the quality of this product, it may behave in an unintended way due to an
  unexpected external noise or static electricity or an unexpected failure of the input power, wiring, parts, etc. We therefore ask
  you to give consideration to a fail-safe design and secure safety within the operation area.
◎To ensure proper use, carefully read the instruction manual and fully understand its contents. Observe the instructions on
  the handling of the product.
◎The motor of this product uses strong magnets. Thorough care should be exercised because a person with a cardiac
  pacemaker or other electronic device may experience a serious accident if he or she comes in the vicinity of the product.
◎Before installing, adjusting, inspecting, or maintaining the servo motor, the driver, and the related devices connected to the
  controller, unplug the power supply cables of all these devices and take a measure, such as locking them or using safety
  plugs, to prevent a person other than the operator from turning the power back ON.

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