NIKKI DENSO

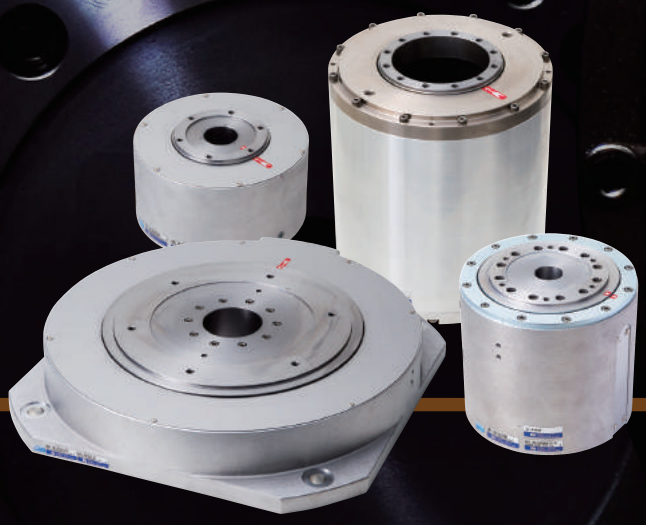
τENGINE Powered by NIKKI DENSO

τDISC Servo Motor ND-s series

τDISC Servo Motor ND-sHS series

τDISC Servo Motor DD-s series

τDISC Servo Motor HD-s series



Direct Drive Servo Motor

tau

τDISC

English

Creating a New Way of Driving Direct Drive Motor

tau
τDISC®
Servo Motor

High precision

Speed stability

High response

High efficiency

Hollow structure

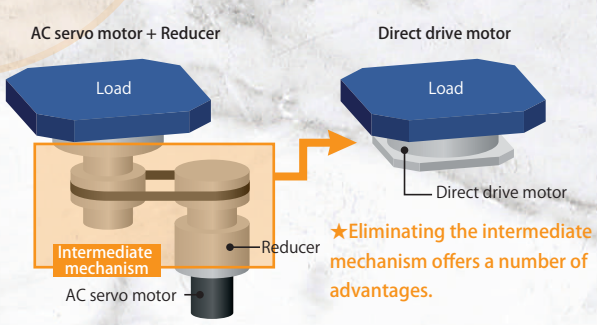
Quietness

Maintainability

Simple structure

Evolving Smart Direct Drive

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



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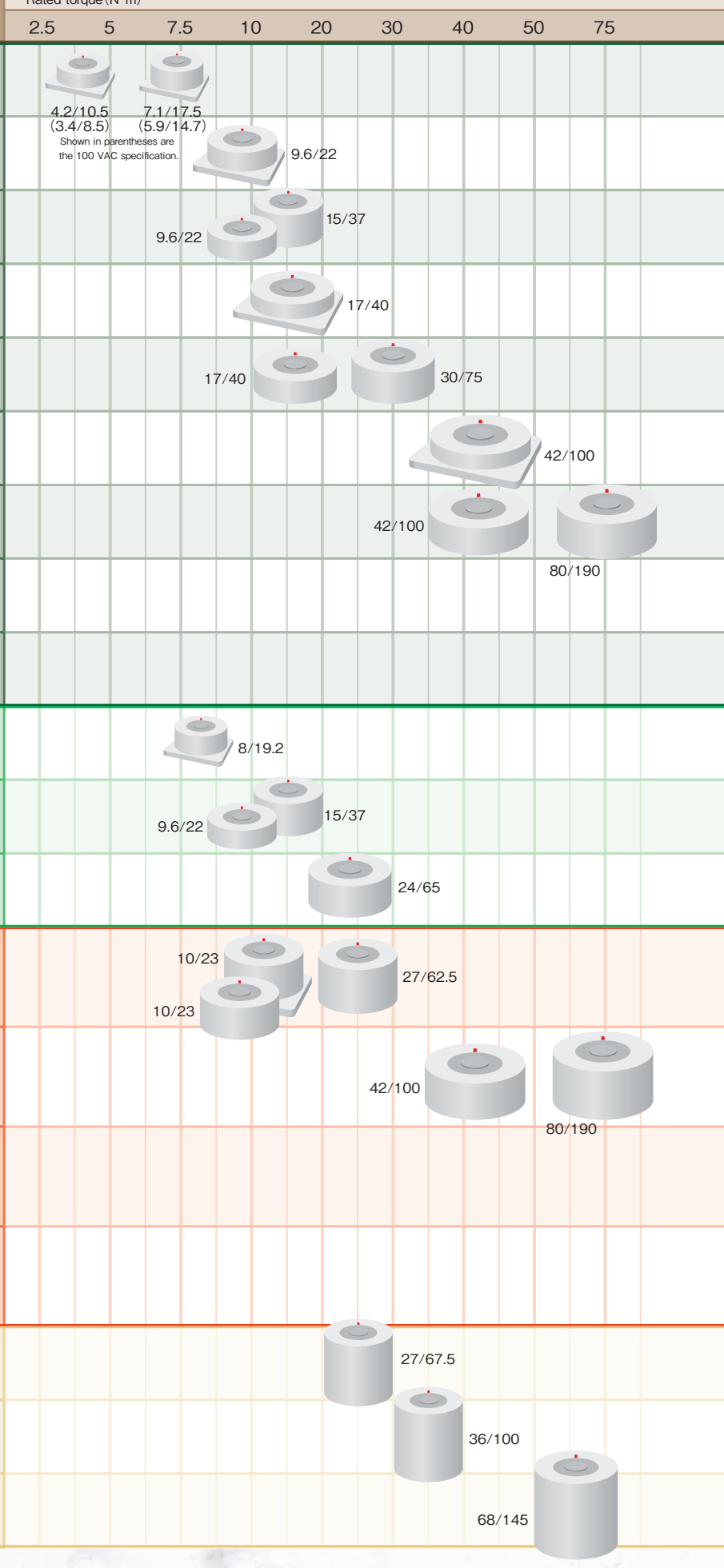
τDISC Lineup list

Motor Type	Rated rotation speed (rps)	Outside diameter (mm)	Middle hole diameter (mm)	Specifications page	Dimensions page
ND110-65-FS(P) ND110-85-FS(P)	5	112	19	P.16	P.18
ND140-65-FS(P)	5	145	19	P.16	P.19
ND140-70-LS(P) ND140-95-LS(P)	5	145	19	P.16	P.19 P.20
ND180-55-FS(P)	5	180	30	P.16	P.20
ND180-70-LS(P) ND180-95-LS(P)	5	180	35	P.17	P.21
ND250-55-FS(P)	3	254	65	P.17	P.22
ND250-70-LS(P) ND250-95-LS(P)	3	260	65	P.17	P.22 P.23
ND400-65-FS(P)	2	408	65	P.17	P.23
ND400-70-LS(P) ND400-95-LS(P) ND400-160-LS(P)	2	408	65	P.17	P.24 P.25
ND110-85-FS(P)-HS	15	112	19	P.26	P.27
ND140-70-LS(P)-HS ND140-95-LS(P)-HS	11	145	19	P.26	P.27 P.28
ND180-95-LS(P)-HS	11	180	35	P.26	P.28
DD160-96-LS(P5/P3) DD160-105-FS(P5/P3) DD160-146-LS(P5/P3)	4	160	25 60 25	P.30	P.32 P.33
DD250-90-LS(P5/P3) DD250-138-LS(P5/P3) DD250-163-LS(P5/P3)	2	265	65	P.30	P.33 P.34
DD400-150-LS(P5/P3) DD400-200-LS(P5/P3) DD400-250-LS(P5/P3)	2 2 1/1.5/2	420	65	P.31	P.35 P.36 P.37
DD630-175-LS(P10/P5) DD630-225-LS(P10/P5)	1	663	150	P.31	P.37 P.38
HD140-160-LS(P)	6	140	30	P.39	P.40
HD140-185-LS(P)	5.5	140	30	P.39	P.41
HD180-200-LS(P)	6	180	35	P.39	P.41



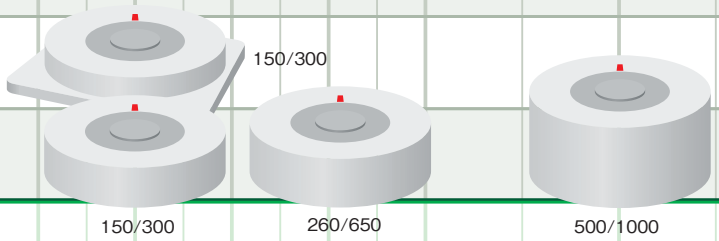
Shape：Flange less Type
Rated torque/Max torque（N・m）

Shape：Flange Type
Rated torque/Max torque（N・m）

100 125 150 200 250 300 500 1000 1500 3000

τDISC® Servo Motor ND-s series

Standard Type

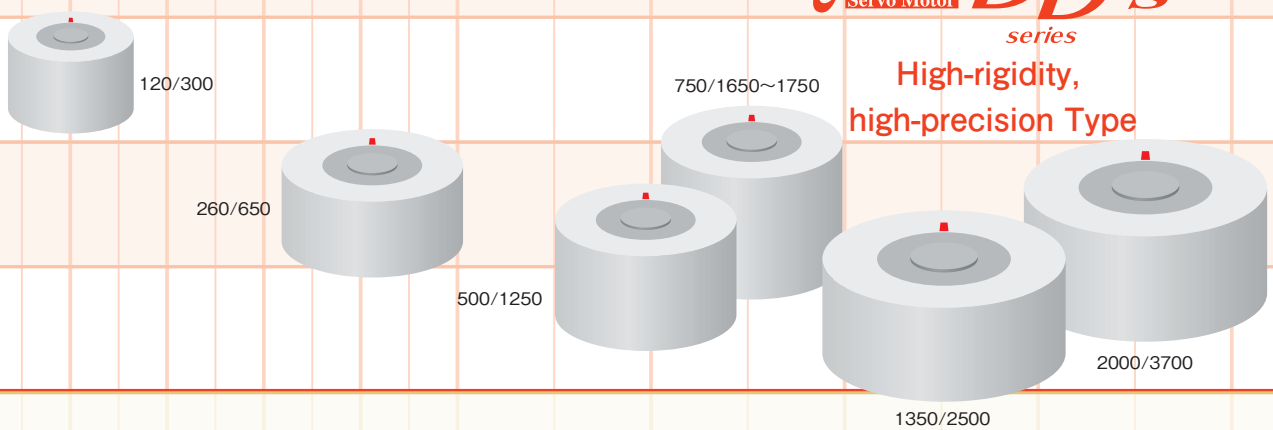


τDISC® Servo Motor ND-s HS series

High-speed rotation Type

τDISC® Servo Motor DD-s series

High-rigidity,
high-precision Type



τDISC® Servo Motor HD-s series

High-response Type

τDISC® Servo Motor ND-s series

Standard

Rated torque：3.4～500 N·m

◎Popular standard Type pursuing cost performance. Suitable for various applications.

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

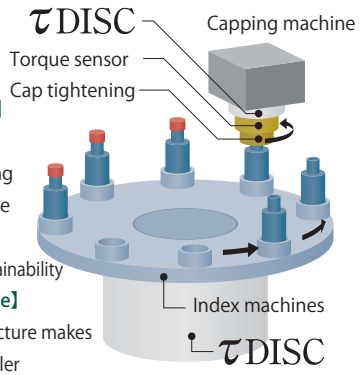
Point!

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

Application examples

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

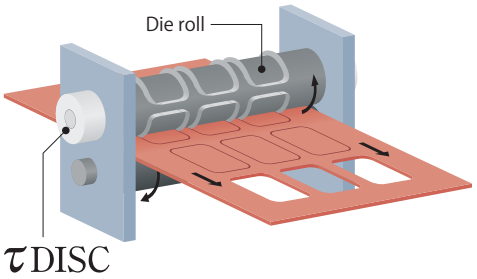
Index drive and tightening drive：
Index machines, capping machines, etc.



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

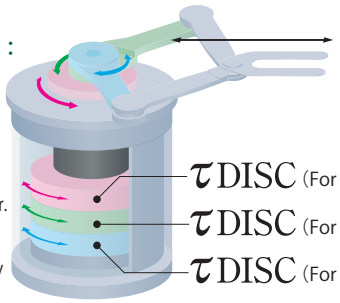
【Capping machine】
- The hollow structure makes the device simpler
- Faster response

Rotary drive：
Die cutters, printing machines, etc.



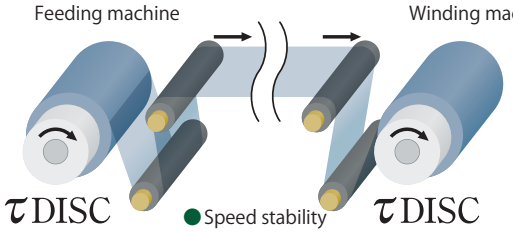
- Speed stability
- Simple structure
- Improved maintainability

Transport robot drive：
Wafer transport robots, etc.



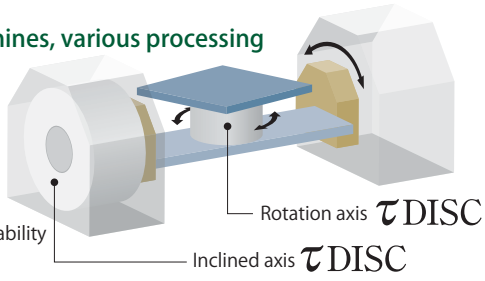
- The hollow structure makes the device simpler.
- Quietness
- Improved maintainability

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



- Speed stability
- Quietness
- Improved maintainability
- Easy adjustment

Table drive：
Laser beam machines, various processing machines, etc.

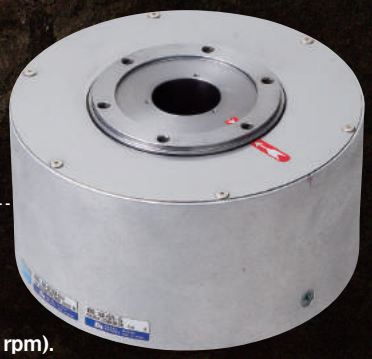


- Stable operation
- High precision
- Improved maintainability

τDISC® Servo Motor ND-s HS series

Rated torque：8~24 N·m

High-speed rotation



◎High-speed rotation specification model of the ND-s Series.

◎Pursuing compactness and high-speed operation.

◎Lineup of motors whose rated rotation speed ranges from 11 to 15 rps (660 to 900 rpm).

Point!

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

Application examples

- Die bonders
- Sorters
- Spin coaters
- Spin washers

High-speed positioning examples

90-degree positioning time：36 msec

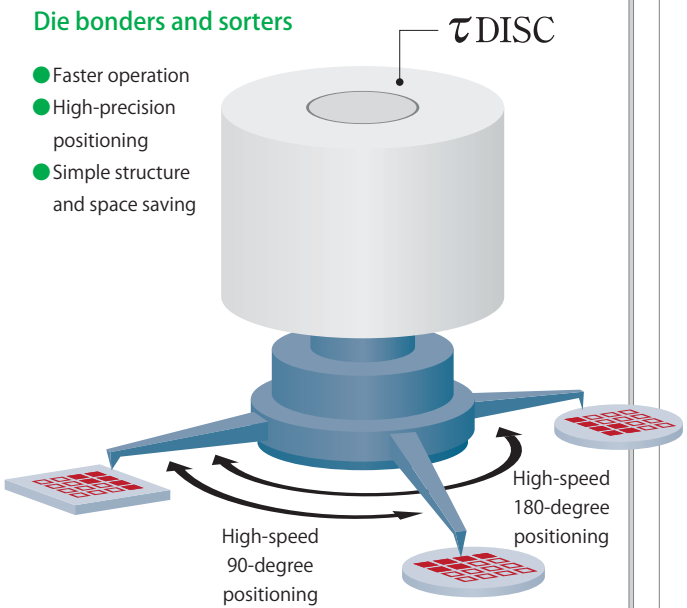
180-degree positioning time：60 msec

Accuracy at the arm tip: ±4 μm (completion range: ±10 pulses)

- Used motor Type and specifications
  ND140-95-LS-HS Type
  Rated/maximum torque：15/37 N·m
  Rated rotation speed：11 rps
  Rotor moment of inertia：0.00134 kg·m²
  Detection pulse：1,600,000 ppr
- 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

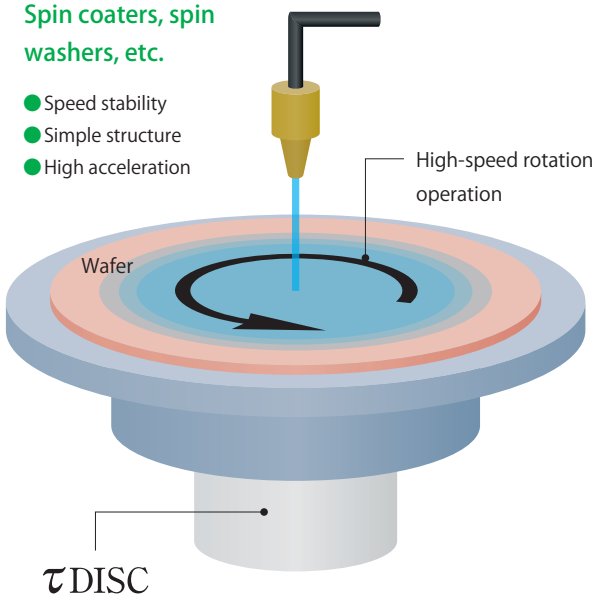
High-speed pick-and-place drive：
Die bonders and sorters

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



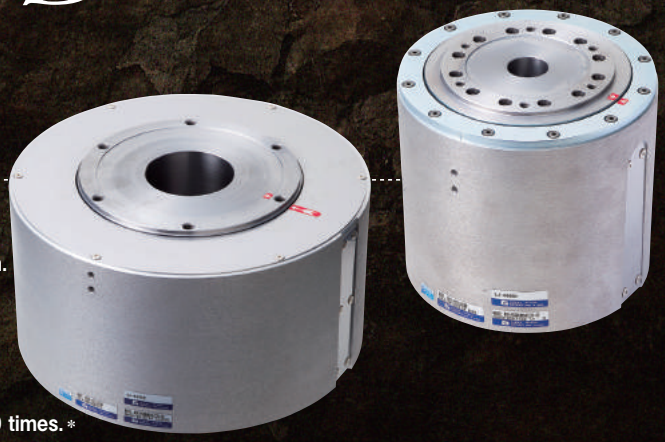
Spin drive：
Spin coaters, spin washers, etc.

- Speed stability
- Simple structure
- High acceleration



τDISC® Servo Motor DD-s series

High rigidity and high precision



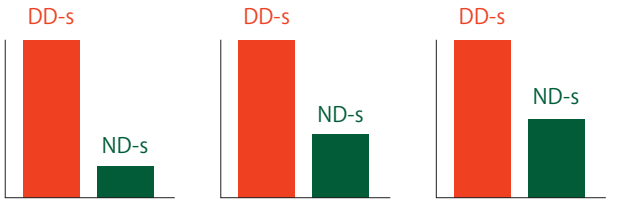
Rated torque：10～2000 N·m

◎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.*

* They are not guaranteed values. They depend on the installation status, operation conditions, mechanical rigidity, etc.

Point!

Ideal for applications that require stable operation for a load with large inertia

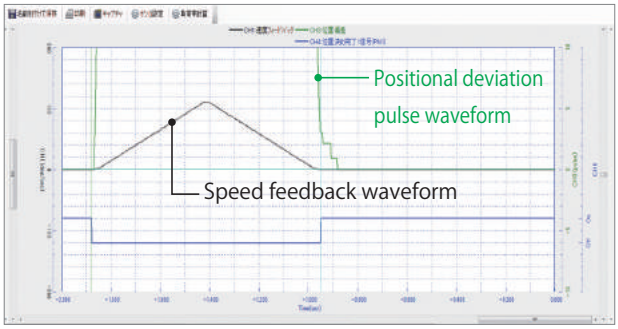


5 times Greater than ND-s
Moment rigidity
The motor inclination due to the moment load is reduced to 1/5

2.5 times Greater than ND-s
Axial rigidity
The amount of sinking due to the vertical load is reduced by 60%

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



【Used motor Type and specifications】 DD160-146-LS Type

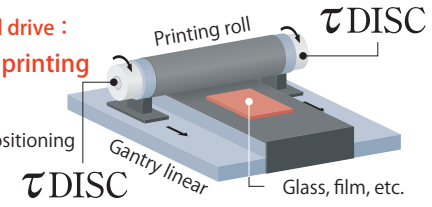
- Rated/maximum torque：27/62.5 N·m
- Rotor moment of inertia：0.0074 kg·m²
- Load specifications (disk) Load inertia moment： 3.9 kg·m²
  (527 times larger than rotor moment of inertia)
- Positioning operation：90°
- Paired servo driver：VPH-HA Type

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

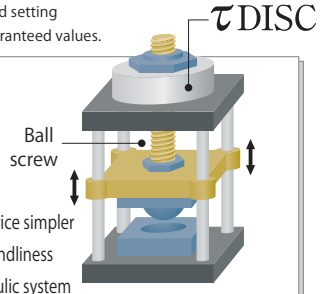
Application examples

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

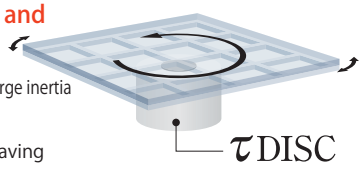
High-precision roll drive：
Roll coaters, PE printing machines, etc.
- High-precision positioning
- Speed stability



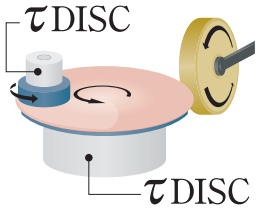
Ball screw drive：
Die casting machines, servo presses, etc.
- High-response operation
- The hollow structure makes the device simpler
- Improvement in environmental friendliness and safety due to not using a hydraulic system



Large inertia load turning drive：
FPD turning, alignment, and inspection machines
- Stable operation for a load with large inertia
- High-precision positioning
- Simple structure and space saving



Continuous rotation drive：
Surface polishing machines, chamfering machines, etc.
- High-precision positioning
- Speed stability



τDISC® Servo Motor HD-s series

Rated torque：27～68 N·m

High response

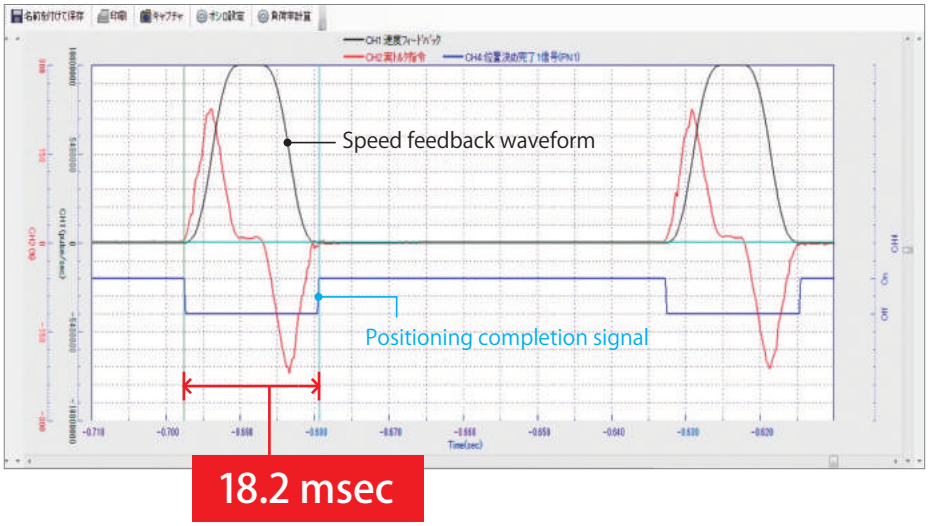
◎High-response Type pursuing high-speed operation.

◎World's top level high response performance with a high-torque, low-inertia structure.

Point

Ideal for applications that require a small operation angle and high-speed operation

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



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

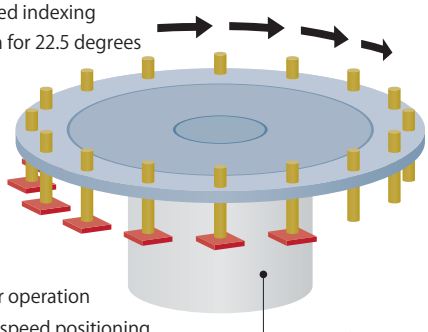
* These values may vary depending on the load setting condition and other factors. They are not guaranteed values.

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

High-speed index drive：

High-speed test handlers and taping machines

High-speed indexing operation for 22.5 degrees

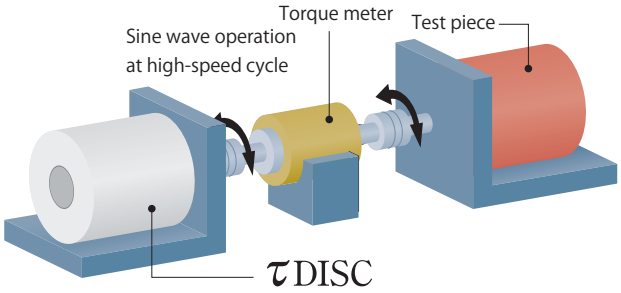


- Faster operation
- High-speed positioning
- Simple structure and space saving

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



τDISC® Servo Motor Customization

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

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%

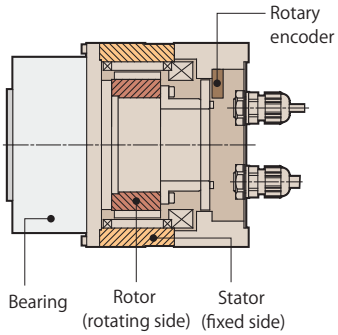
Actual value obtained under our measurement conditions

Custom Made 2

Built-in motor

【Example】

We provide an air bearing or ball bearing spindle with a rotor and a stator built in it or only a rotor and a stator.



Custom Made 3
Anti-fretting specifications

Custom Made 4
Improved positioning accuracy and rotation accuracy

Custom Made 5
Improved torque accuracy

Custom Made 6
Improved flatness and parallelism

Custom Made 7
Increased rotation speed and torque

Custom Made 8
Anti-dust specification

Custom Made 9
Material and appearance changes

Custom Made 10
Wider middle hole diameter and change in the mounting shape

Custom Made 11
Connector and cable changes

We can support any special shipping inspection.

By conducting a dedicated inspection not supported as standard, it is possible to check whether your required specifications are met, regarding the specifications not provided as such.

- ●Positioning accuracy measurement using laser length measurement and a high-precision encoder
- ●Table rotation axis run out accuracy using a true sphere
- ●Load displacement amount measurement
- ●Speed stability, output torque accuracy, etc.

* For information about the availability of customization, contact our sales staff.
* Our website offers "List of Practical Examples of Custom-Made Direct Drive Motors".
  https://www.nikkidenso.co.jp/product/custom/

Features of τDISC-compatible servo drivers

VPH Series

Developed exclusively for direct drive.
Maximizes the motor performance.
Output capacity 100 W～15 kW

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	SSCNET Ⅲ/H specification	Supports SSCNET Ⅲ/H and SSCNET Ⅲ. 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, and 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

Features

Superb speed stability

Significant reduction in torque ripples

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

Easy tuning even for a load with large inertia

Automatic feedback filter setting function

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

Improved stability during stop

Filtering function during stop
Improved torque accuracy during stop

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

Enhanced low-speed gain switching function

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

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 and reduces the positioning time without causing vibration even when the acceleration and deceleration is shortened.

For the VPH Series

System support tool

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

Analysis functions

Oscilloscope function

- The servo data of up to 11 channels can be displayed in real time.
  (* Data resolution: 0.4 ms or more; Only IO setting for Channel 4 and later)
- The motor load ratio during repeated operations can be displayed easily.
- The normal trigger function makes it easy to identify changes before and after adjustment.

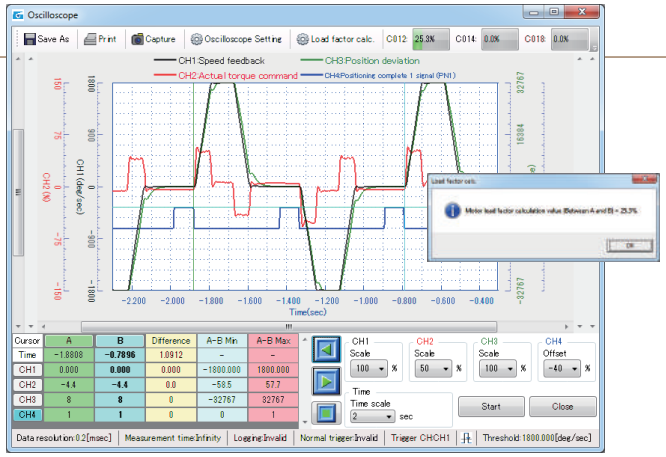
Frequency response measurement function

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

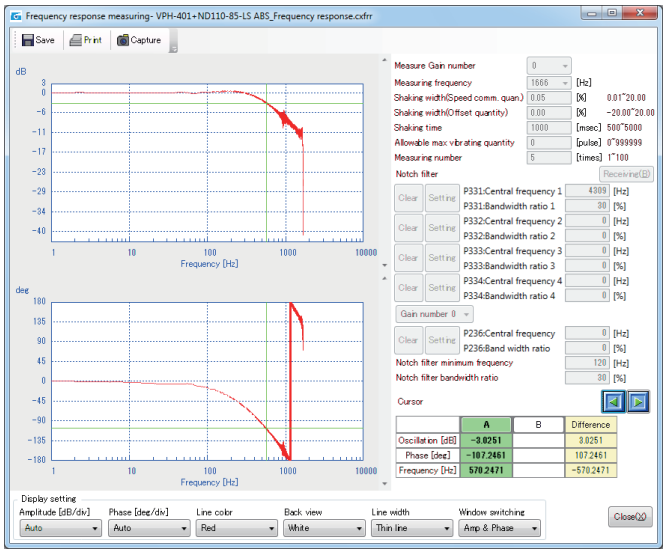
Frequency spectrum measurement function

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

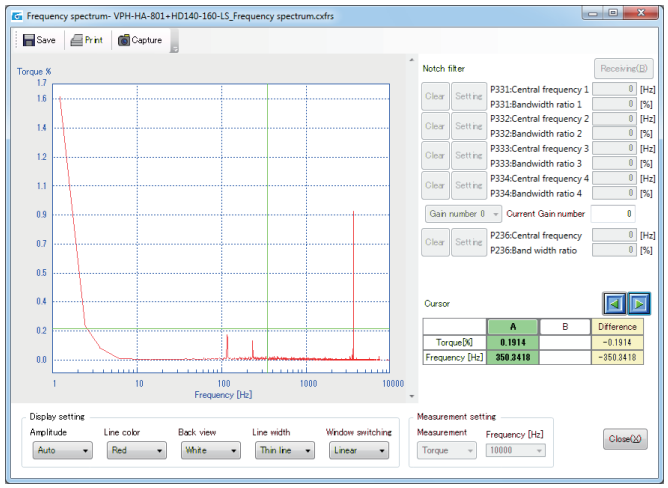
Oscilloscope screen



Frequency response measurement screen



Frequency spectrum measurement screen



Status display

Status display function

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

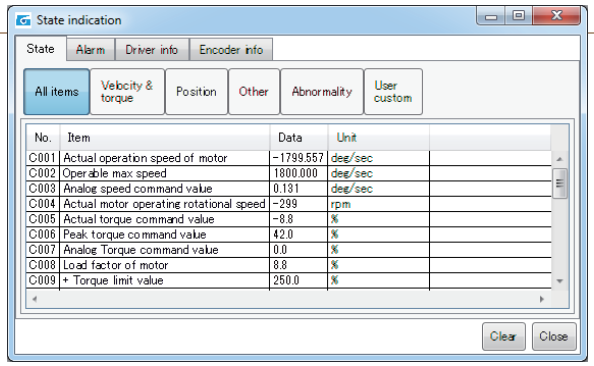
Input/output signal status display function

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

Device monitoring function

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

Status display screen



Data Editing Software

* Download the latest version of the VPH Series system support tool from our website.
https://www.nikkidenso.co.jp/systemtool/

Data editing

Parameter editing function

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

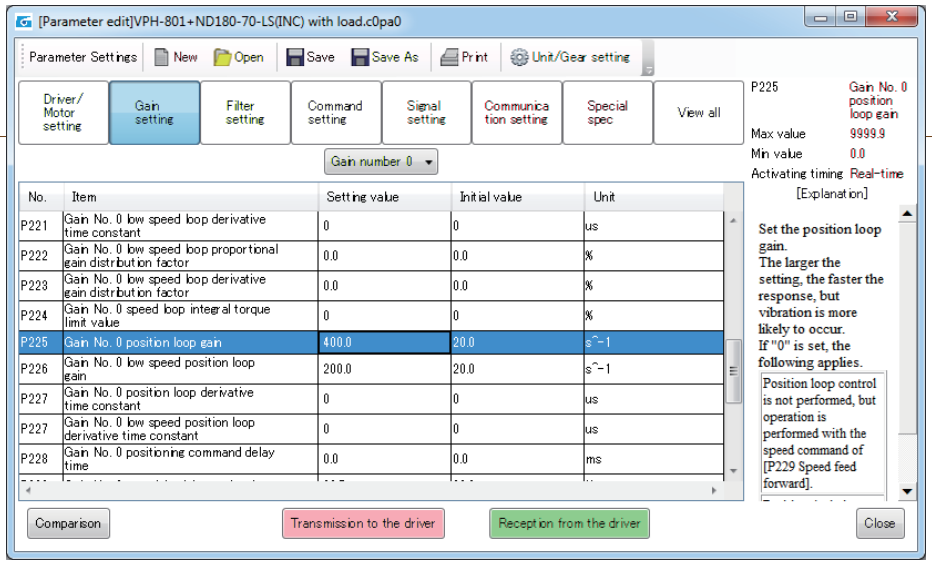
Program editing function

● 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.

Parameter editing screen

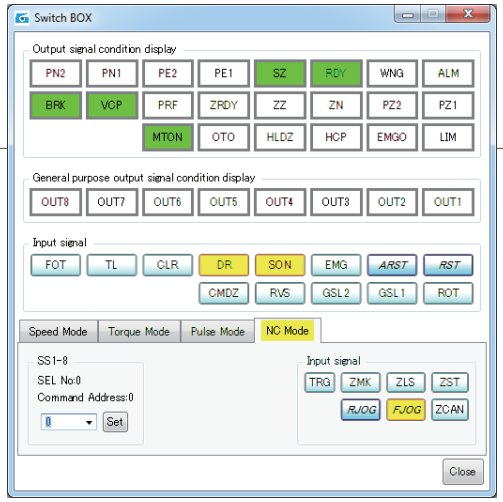


Remote operation

Switch box function

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

Switch box screen



Automatic servo gain adjustment function "NiEAT"

New functions of the system support tool (For details, refer to p.13 to p.14.)

● Interactive initial setup is supported for the major control method.
● Enter selection conditions to the direct drive motor selection calculation tool, and you can have the filter and gain value automatically adjusted until the selection conditions are met.
● A special motor parameter read function has been added. Special motor parameters can be created easily.

NiEAT Nikkidenso Engineering Auto Tuning

Supported OS

● Windows10 32bit/64bit
● Windows8.1 32bit/64bit
● Windows7 32bit/64bit

Supported languages

● Japanese, English, and Korean
Chinese (simplified/traditional)

New!
Automatic servo gain adjustment function

NiEAT
Nikkidenso Engineering Auto Tuning

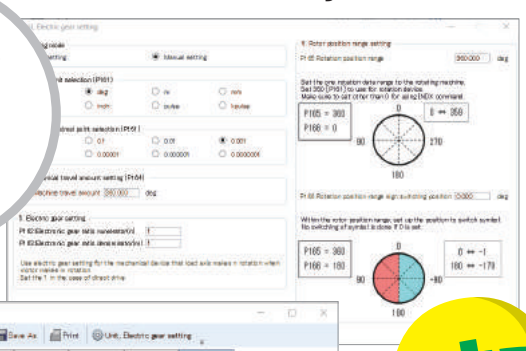
The system support tool features a new function - the automatic servo gain adjustment function “NiEAT”!

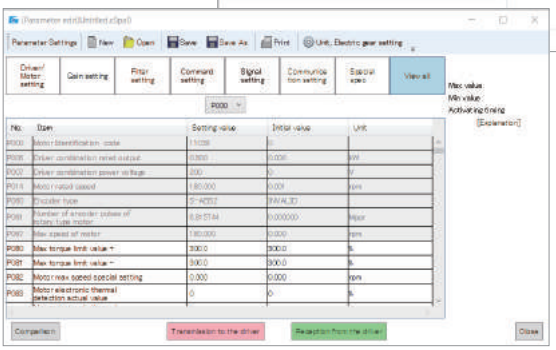
The formerly difficult task of adjusting the direct drive motor gain is now easy to do!

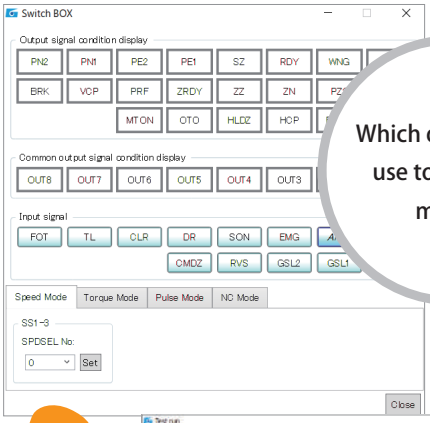
Comparison between automatic servo gain adjustment of NiEAT and conventional adjustment

Conventional adjustment...

Setting a large number of parameters is cumbersome.

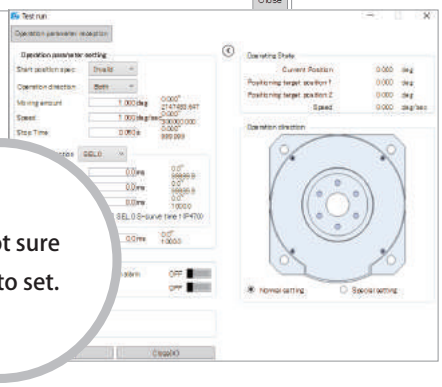


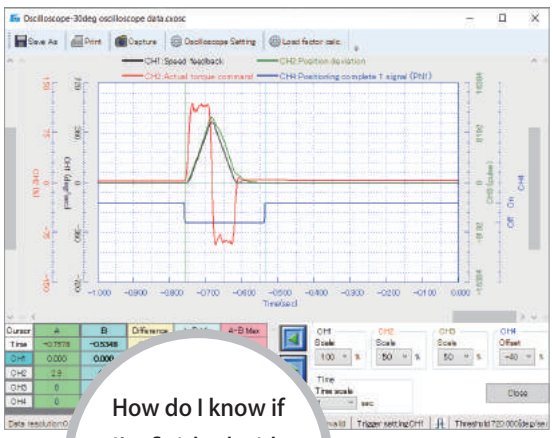


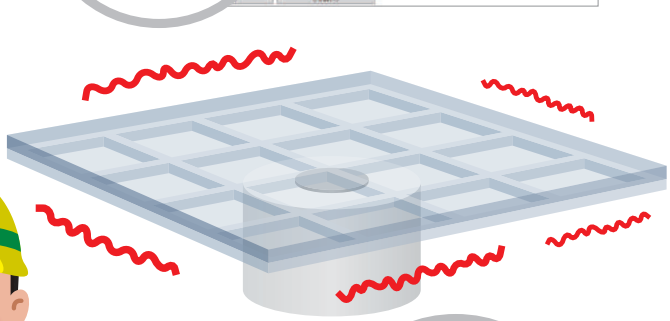


Which do I need to use to drive the motor?

I’m not sure what to set.





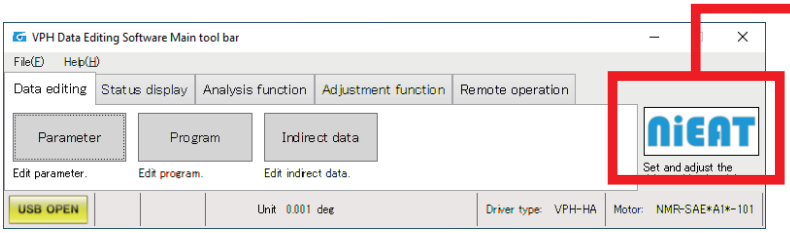


How do I know if I’m finished with adjusting the gain waveform?

I don’t know how to cope with mechanical resonance.

“NiEAT” solves all these problems!

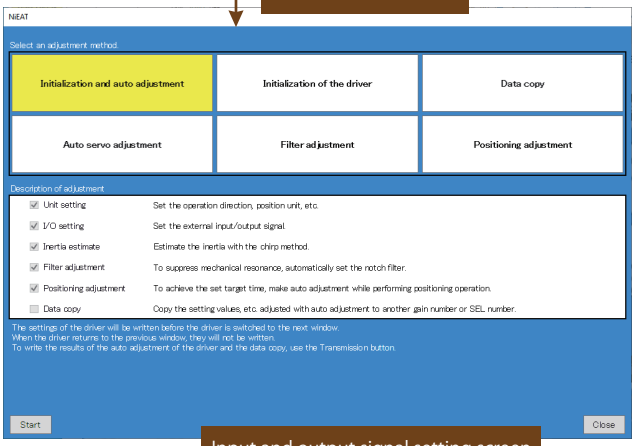
[VPH system support tool screen]



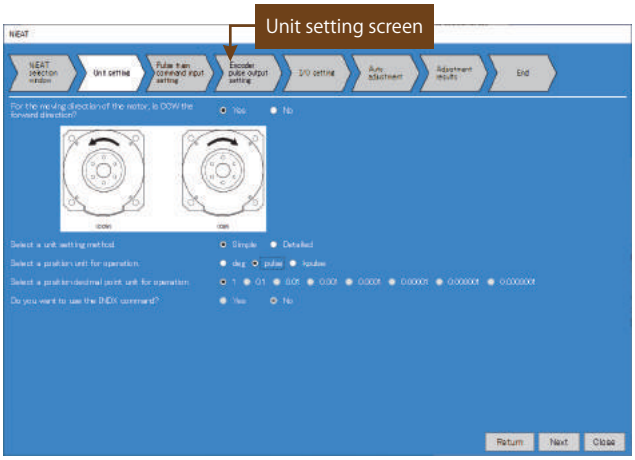
To start the tool, click the NiEAT button!

The wizard takes you through the adjustment process. All you need to do is make settings according to on-screen instructions!

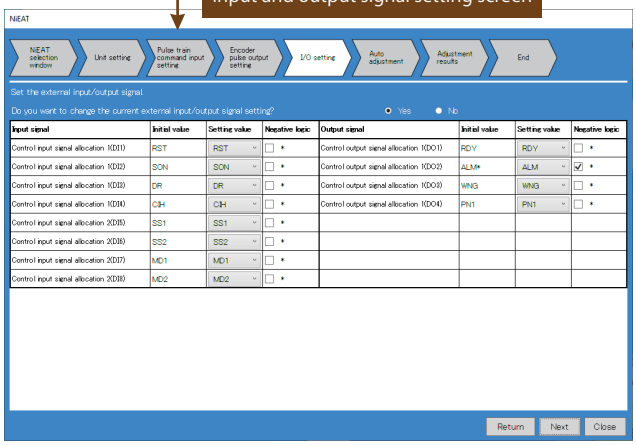
Main selection screen



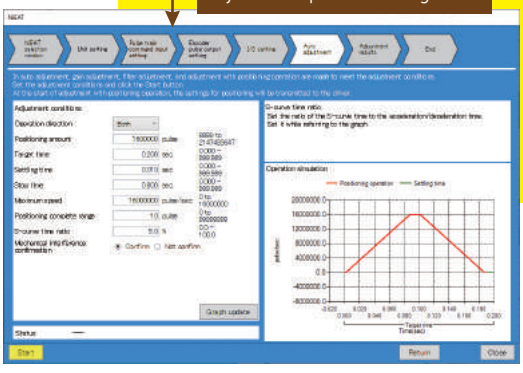
Unit setting screen



Input and output signal setting screen

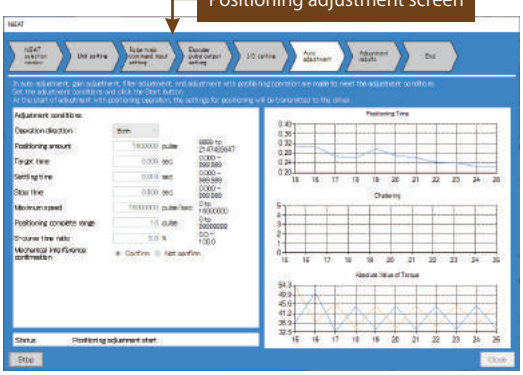


Adjustment operation setting screen

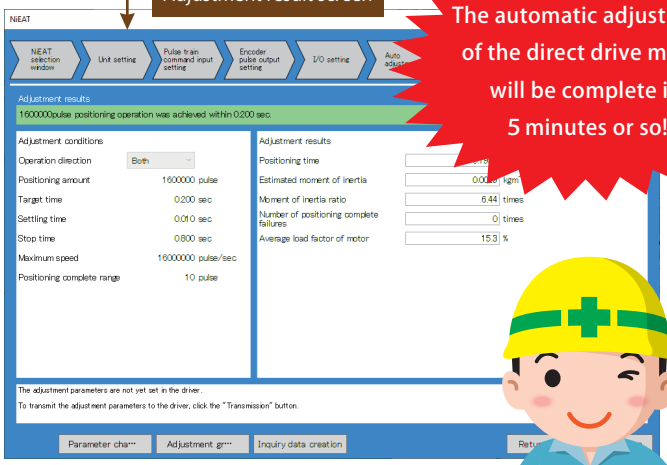


Input the adjustment conditions and click the Start button, and automatic adjustment will start! There is no need to check the adjustment status by monitoring waveforms or set a filter for the mechanical resonance point by using another function.

Positioning adjustment screen



Adjustment result screen



The automatic adjustment of the direct drive motor will be complete in 5 minutes or so!

* If NiEAT cannot automatically adjust the motor, you need to make adjustments individually.
* The NiEAT function does not include adjustments other than the gain adjustment, such as the height and level adjustments for motor parallelism.

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 119 mm)	R…140(Actual range 140 to 149 mm)
			C…140(Actual range 140 to 149 mm)	S…180(Actual range 180 to 189 mm)
			D…180(Actual range 180 to 189 mm)	T…250(Actual range 250 to 269 mm)
			E…250(Actual range 250 to 269 mm)	U…400(Actual range 400 to 409 mm)
			F…400(Actual range 400 to 409 mm)	
⑤	Nominal height *1		With flange	Flange less
			M…55(Actual range 50 to 59 mm)	M…70(Actual range 60 to 69 mm)
			E…65(Actual range 60 to 79 mm)	E…70/95(Actual range 70 to 95 mm)
			U…85(Actual range 80 to 99 mm)	F…95(Actual range 96 to 119 mm)
				H…160(Actual range 150 to 169 mm)
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 *2		Example) 131 … 13 1 =13×10[1] =130 W Exponential part of powers of 10 Significant figures	
⑪	Brake(with or without)		A…Without brake	
⑫	Table surface rotation accuracy		Without…Standard specification	P…High accuracy type(option)
⑬	Special model symbol		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.

*2 Approximate value.

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

About the encoder type

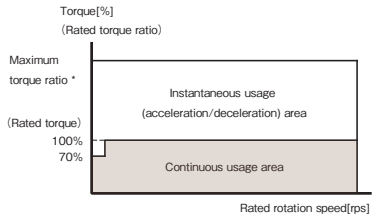
The absolute encoder is the standard type of encoder in the ND-s Series lineup. Note that, since this is a battery-less type encoder, it cannot hold multiple turn data.

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 our website.

Common specifications

Ambient operating temperature	0 to 40℃
Ambient operating humidity	85%RH or less; no condensation
Installation location	Do not install in a harmful atmosphere containing corrosive gas, grinding oil, metal dust, oil, etc. Install in an indoor place not exposed to direct sunlight.
Installation direction	Horizontal with the rotor facing upward. * When 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



* The maximum torque ratio depends on the motor type.
(Maximum torque/Rated torque)

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 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		ACV	100		200	100	200
Outside diameter		mm	112			112	
Height *2		mm	66(65.8)			86(85.8)	
Rated torque *3		N·m	3	3.4	4.2	5.9	7.1
Max torque *3		N·m	7.5	8.5	10.5	14.7	17.5
Rated rotation speed *3		rps	5			5	
Rated output *3		W	94	106	131	185	223
Rated current *3		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 *4		N·m	6.1			6.1	
Allowable axial load *4		kN	1.1			1.1	
Table surface rotation accuracy *5	Radial run out(no load)	μm	30(Standard)/10(High accuracy type)				
	Axial run out(no load)	μm	30(Standard)/10(High accuracy type)				
Absolute Positioning accuracy *6		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 servo driver	VPH Series	NCR-H□	1101A-A-□□□	1201A-A-□□□	2201A-A-□□□	1201A-A-□□□	2401A-A-□□□

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		ACV	200	200	200
Outside diameter		mm	145	145	145
Height *2		mm	71(70.8)	73(72.8)	98(97.8)
Rated torque *3		N·m	9.6	9.6	15
Max torque *3		N·m	22	22	37
Rated rotation speed *3		rps	5	5	5
Rated output *3		W	301	301	471
Rated current *3		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 *4		N·m	17.3	17.3	17.3
Allowable axial load *4		kN	2.4	2.4	2.4
Table surface rotation accuracy *5	Radial run out(no load)	μm	40(Standard)/10(High accuracy type)		
	Axial run out(no load)	μm	40(Standard)/10(High accuracy type)		
Absolute Positioning accuracy *6		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 servo driver	VPH Series	NCR-H□	2401A-A-□□□	2401A-A-□□□	2801A-A-□□□

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

*2 Shown in parentheses is the value of the high accuracy type(option).

*3 The specification values are those obtained when the τDISC is mounted on a heat sink(aluminum plate) of one of the following sizes and operated at the ambient operating temperature.
- ND110 Type 300mm×300mm×22mm
- ND140 Type 640mm×450mm×50mm

*4 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.

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

*6 For details, refer to "τDISC 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		ACV	200	200	200
Outside diameter		mm	180	180	180
Height *2		mm	58(57.8)	67(66.8)	94(93.8)
Rated torque *3		N·m	17	17	30
Max torque *3		N·m	40	40	75
Rated rotation speed *3		rps	5	5	5
Rated output *3		W	534	534	942
Rated current *3		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 *4		N·m	20.5	27.3	27.3
Allowable axial load *4		kN	2	2.9	2.9
Table surface rotation accuracy *5	Radial run out(no load)	μm	50(Standard) / 10(High accuracy type)		
	Axial run out(no load)	μm	50(Standard) / 10(High accuracy type)		
Absolute Positioning accuracy *6		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 servo driver	VPH Series	NCR-H□	2801A-A-□□□	2801A-A-□□□	2801A-A-□□□

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		ACV	200	200	200
Outside diameter		mm	254	260	260
Height *2		mm	58(57.8)	73(72.8)	98(97.8)
Rated torque *3		N·m	42	42	80
Max torque *3		N·m	100	100	190
Rated rotation speed *3		rps	3	3	3
Rated output *3		W	791	791	1,507
Rated current *3		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 *4		N·m	60	244	244
Allowable axial load *4		kN	3.5	12.9	12.9
Table surface rotation accuracy *5	Radial run out(no load)	μm	50(Standard) / 10(High accuracy type)		
	Axial run out(no load)	μm	50(Standard) / 10(High accuracy type)		
Absolute Positioning accuracy *6		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 servo driver	VPH Series	NCR-H□	2801A-A-□□□	2801A-A-□□□	2152A-A-□□□

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		ACV	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 *3		N·m	150	150	260	500
Max torque *3		N·m	300	300	650	1,000
Rated rotation speed *3		rps	2	2	2	2
Rated output *3		W	1,884	1,884	3,267	6,283
Rated current *3		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 *4		N·m	315	315	315	315
Allowable axial load *4		kN	14.5	14.5	14.5	14.5
Table surface rotation accuracy *5	Radial run out(no load)	μm	50(Standard) / 10(High accuracy type)			
	Axial run out(no load)	μm	50(Standard) / 10(High accuracy type)			
Absolute Positioning accuracy *6		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 servo driver	VPH Series	NCR-H□	2222A-A-□□□	2222A-A-□□□	2332A-A-□□□	2702A-A-□□□

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

*2 Shown in parentheses is the value of the high accuracy type(option).

*3 The specification values are those obtained when the τDISC is mounted on a heat sink (aluminum plate) of one of the following sizes and operated at the ambient operating temperature.
- ND180 Type 640 mm×450 mm×50 mm
- ND250 Type 640 mm×450 mm×50 mm
- ND400 Type 1140 mm×700 mm×80 mm
  +490 mm×490 mm×40 mm(Two plates stacked)

*4 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.

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

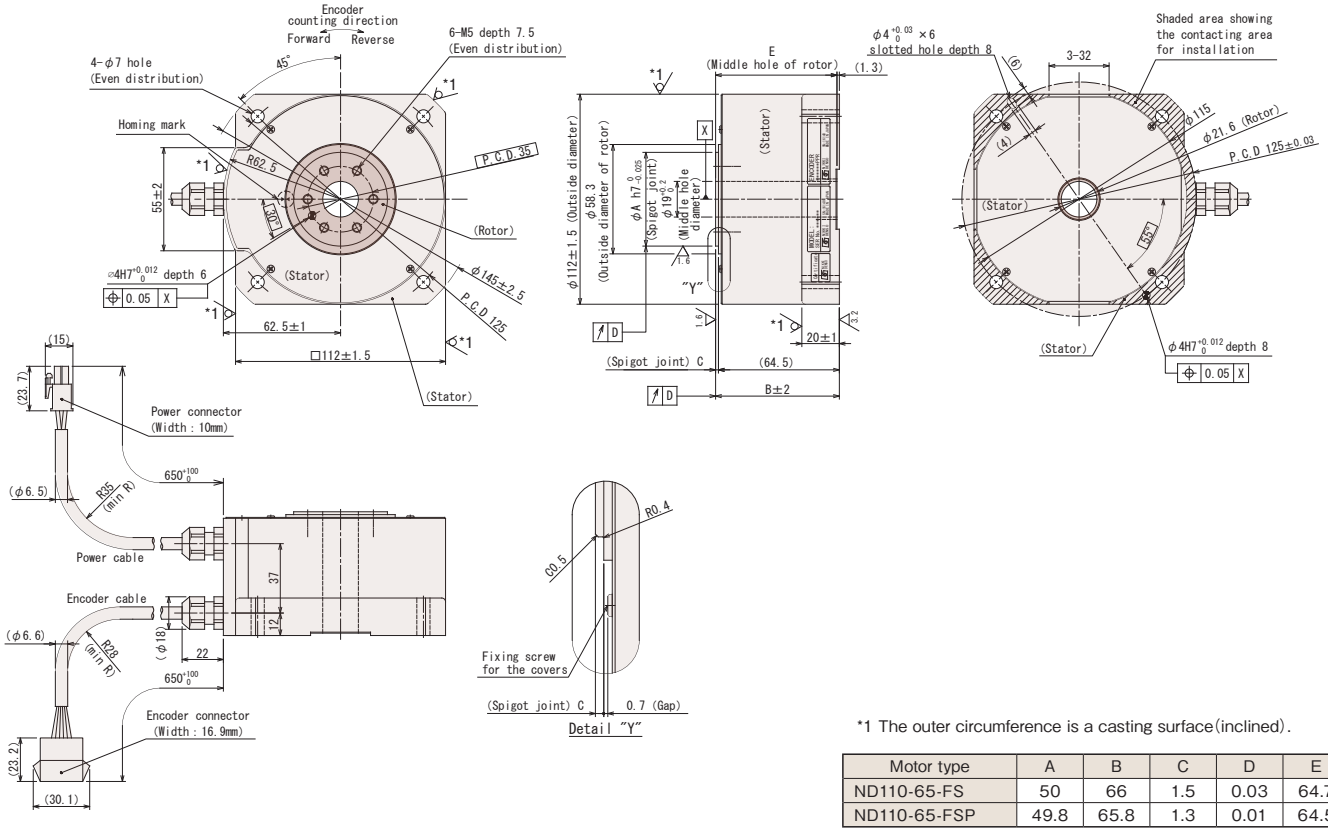
*6 For details, refer to "τDISC Absolute position compensation function option" on p.42.

τDISC ND-s Series Dimensions

◎ND110-65-FS(P)

NMR-SAEJA1A-101A(P)

NMR-SAEJA2A-131A(P)



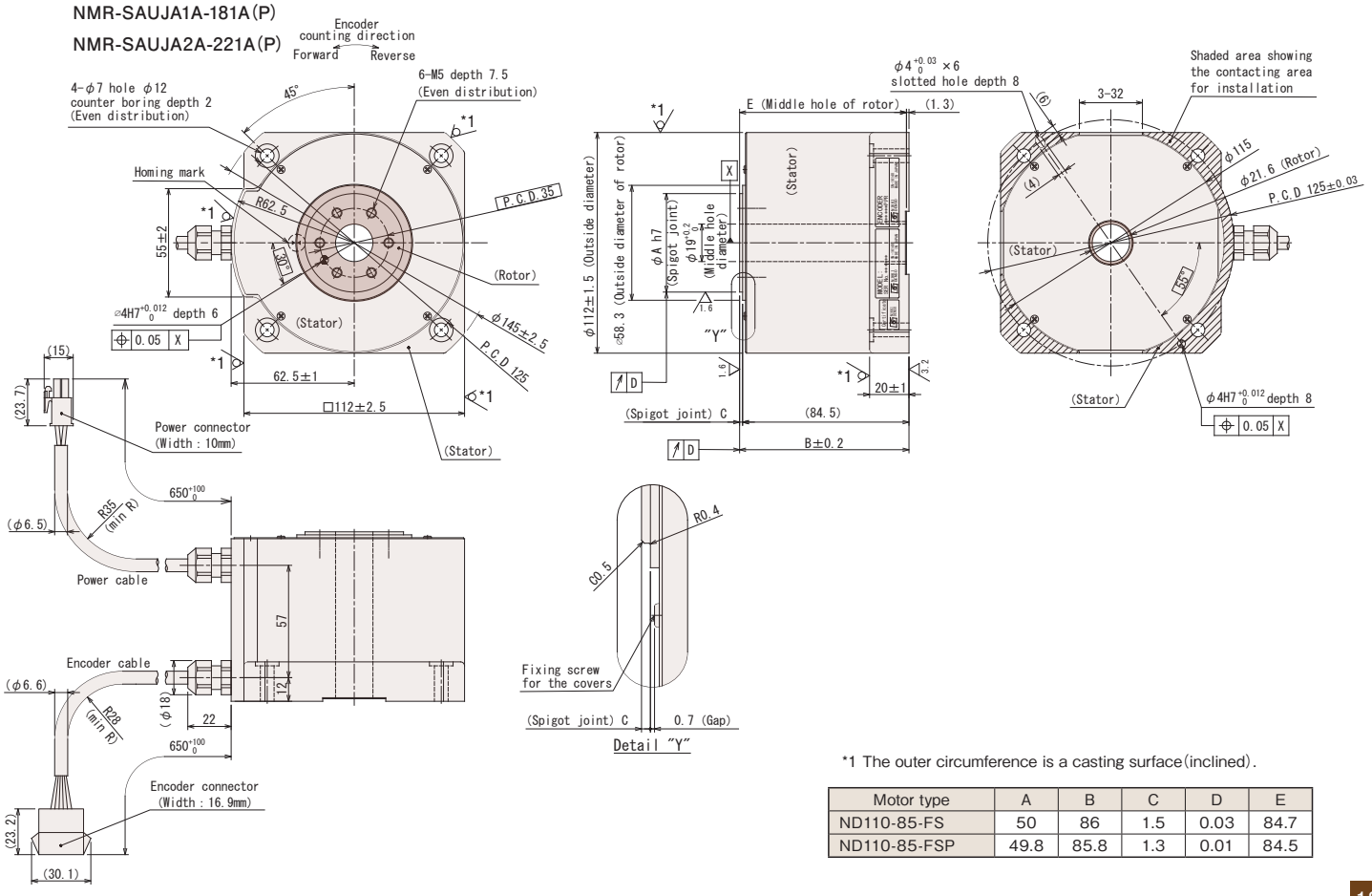
*1 The outer circumference is a casting surface(inclined).

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)



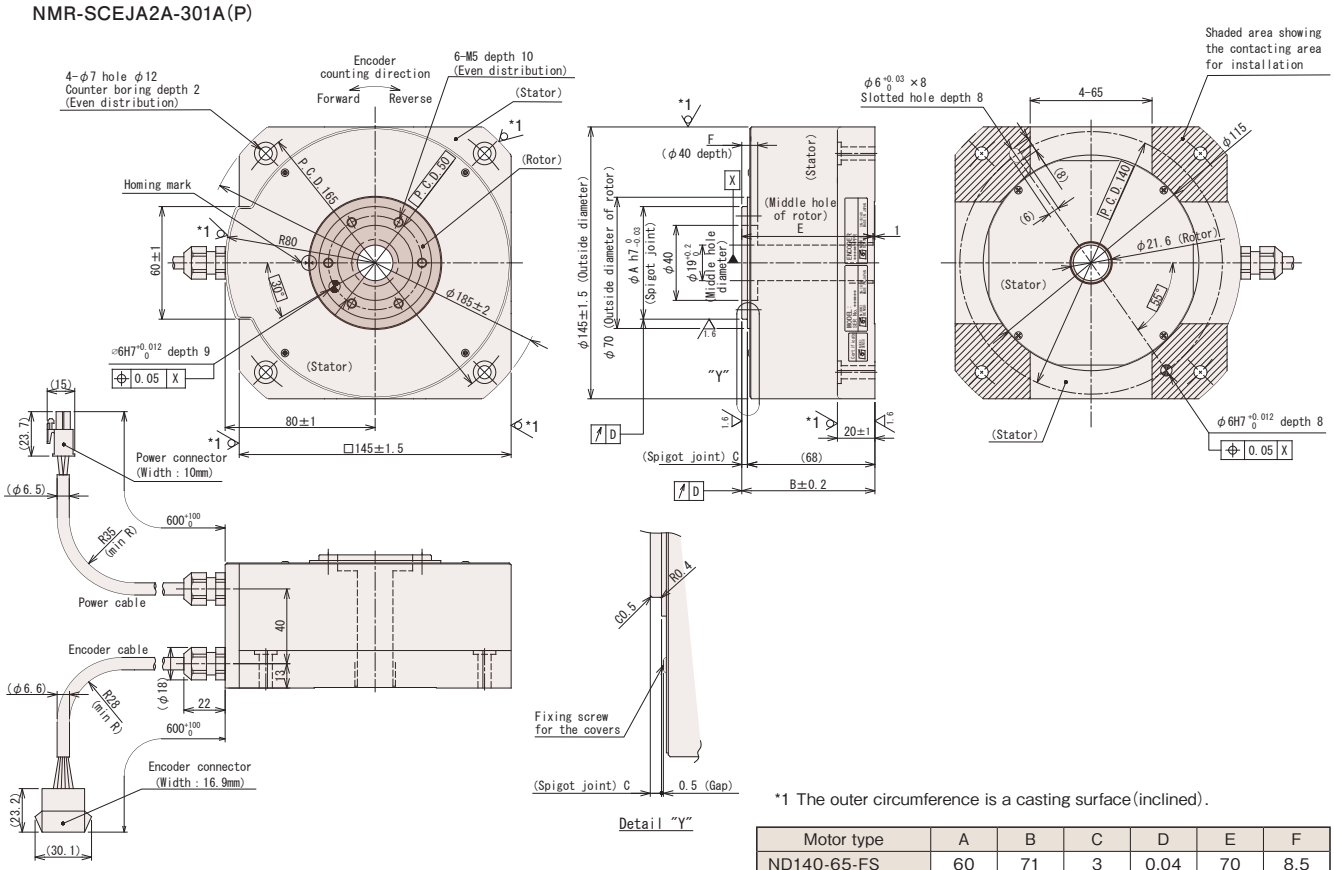
*1 The outer circumference is a casting surface(inclined).

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)

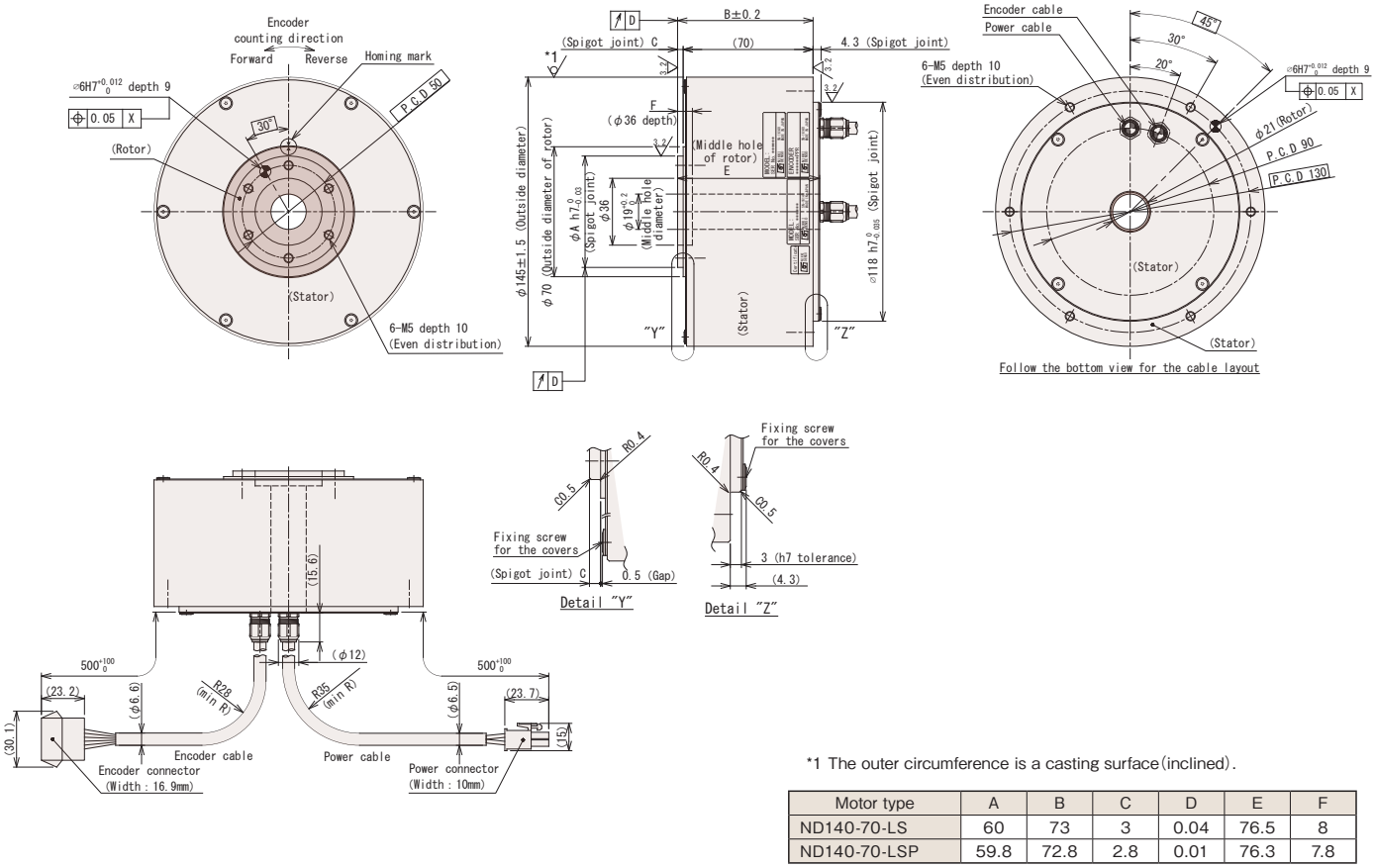


*1 The outer circumference is a casting surface(inclined).

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)



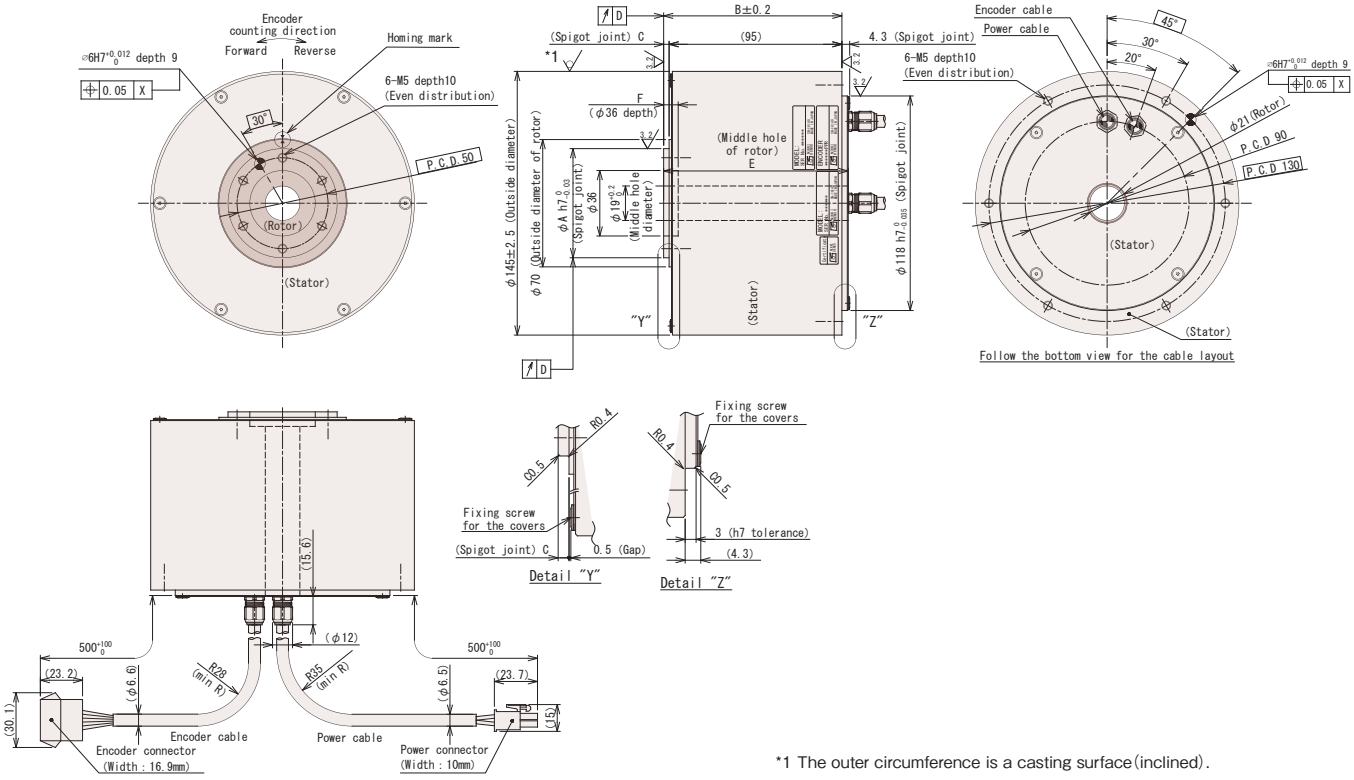
*1 The outer circumference is a casting surface(inclined).

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)

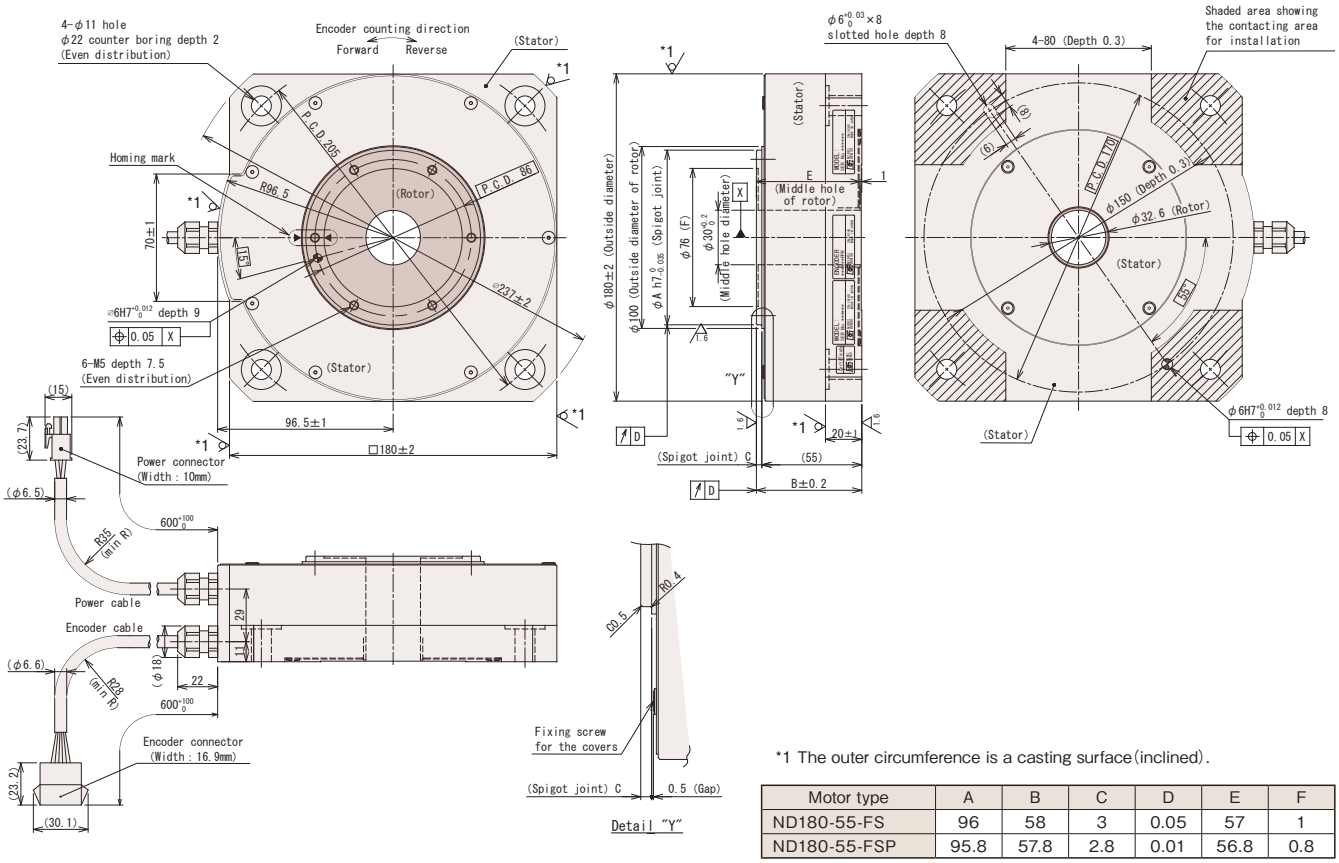


*1 The outer circumference is a casting surface(inclined).

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)



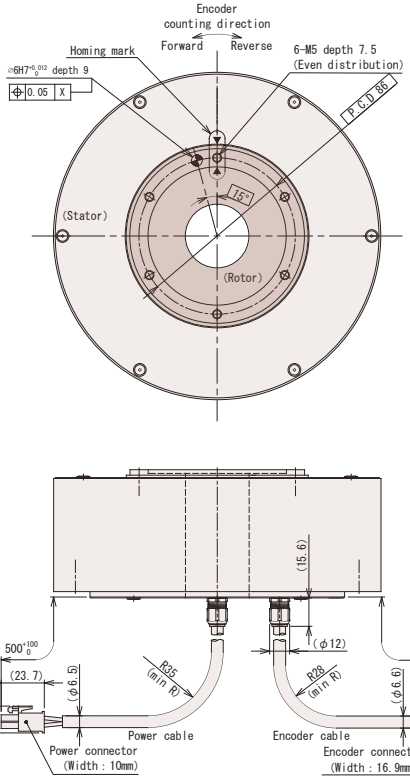
*1 The outer circumference is a casting surface(inclined).

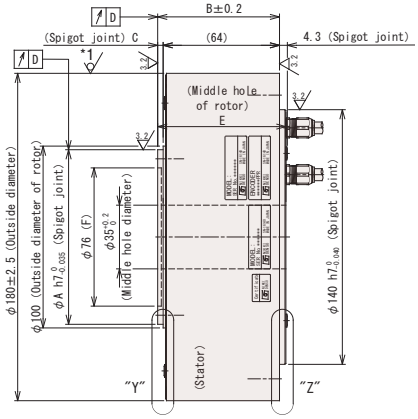
Motor type	A	B	C	D	E	F
ND180-55-FS	96	58	3	0.05	57	1
ND180-55-FSP	95.8	57.8	2.8	0.01	56.8	0.8

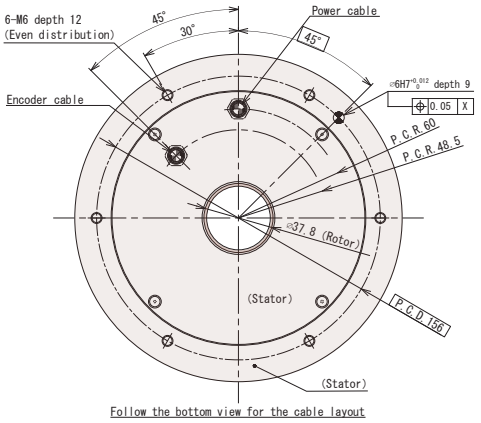
τDISC ND-s Series Dimensions

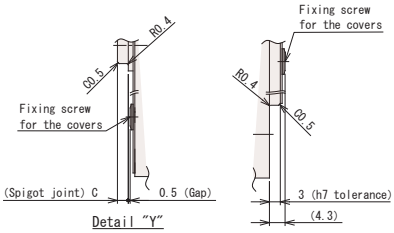
◎ND180-70-LS(P)

NMR-SSMJA2A-531A(P)







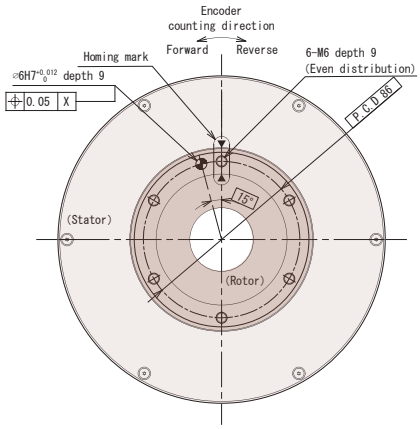


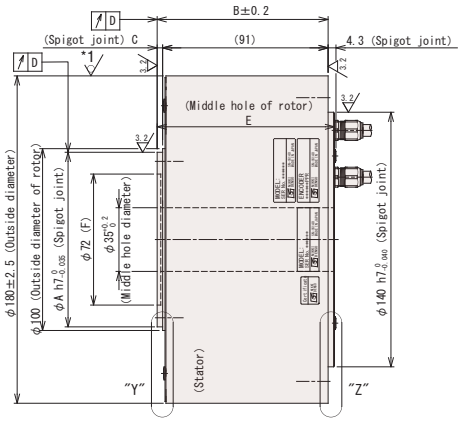
*1 The outer circumference is a casting surface(inclined).

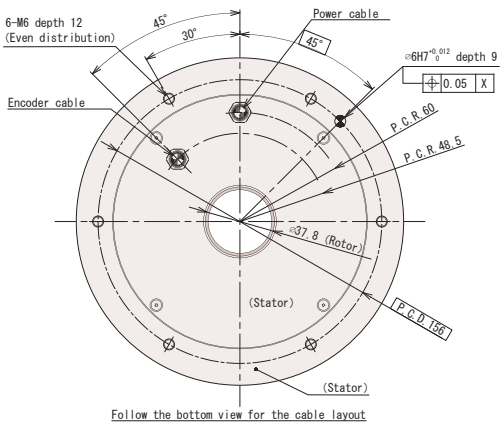
Motor type	A	B	C	D	E	F
ND180-70-LS	96	67	3	0.05	70.5	2
ND180-70-LSP	95.8	66.8	2.8	0.01	70.3	1.8

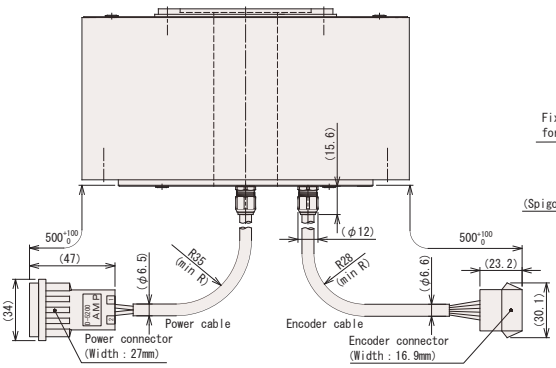
◎ND180-95-LS(P)

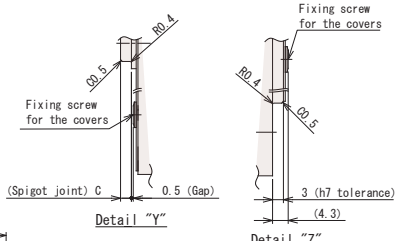
NMR-SSEJA2A-941A(P)











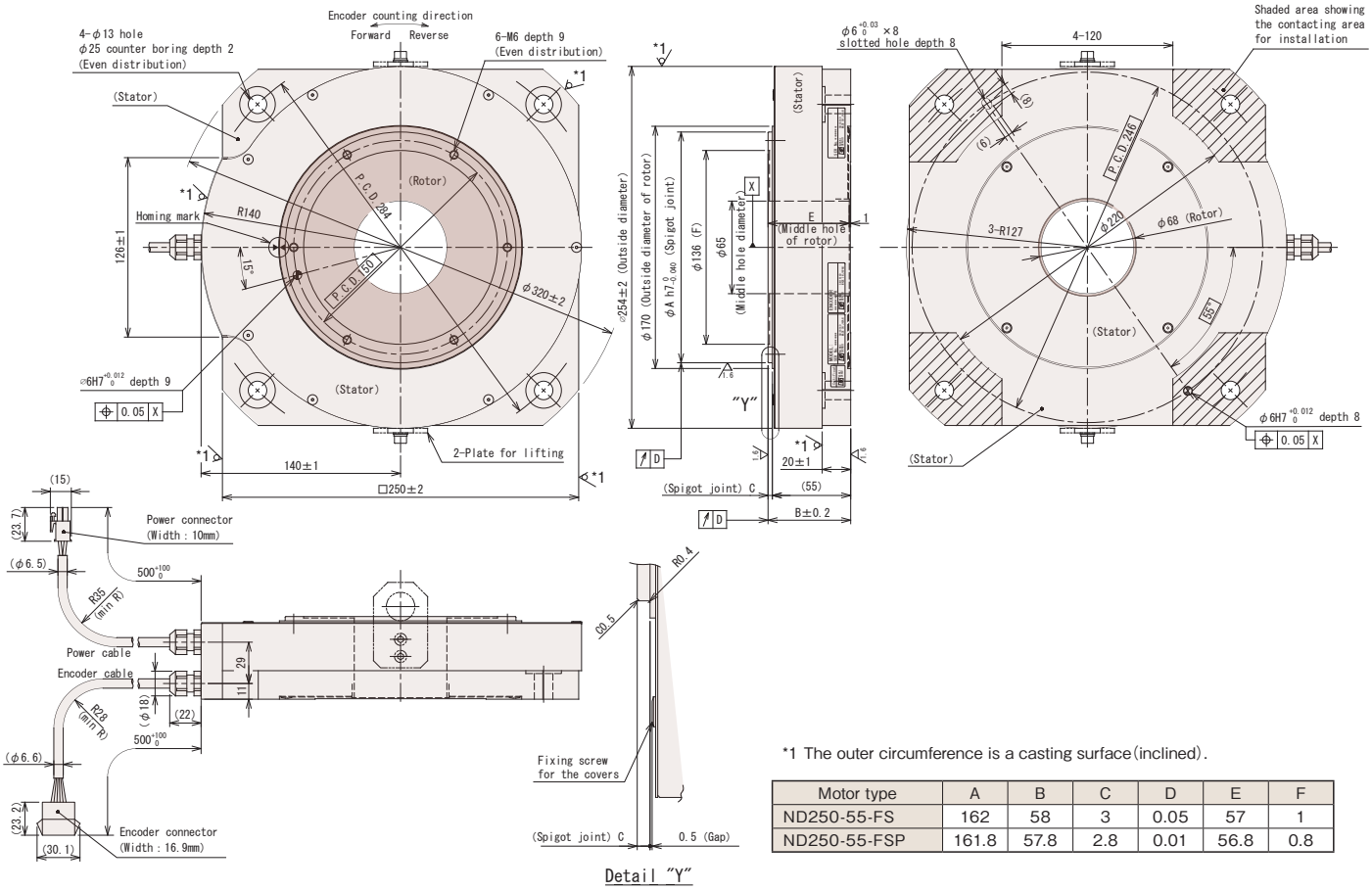
*1 The outer circumference is a casting surface(inclined).

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

τDISC ND-s Series Dimensions

◎ND250-55-FS(P)

NMR-SEMJA2A-791A(P)

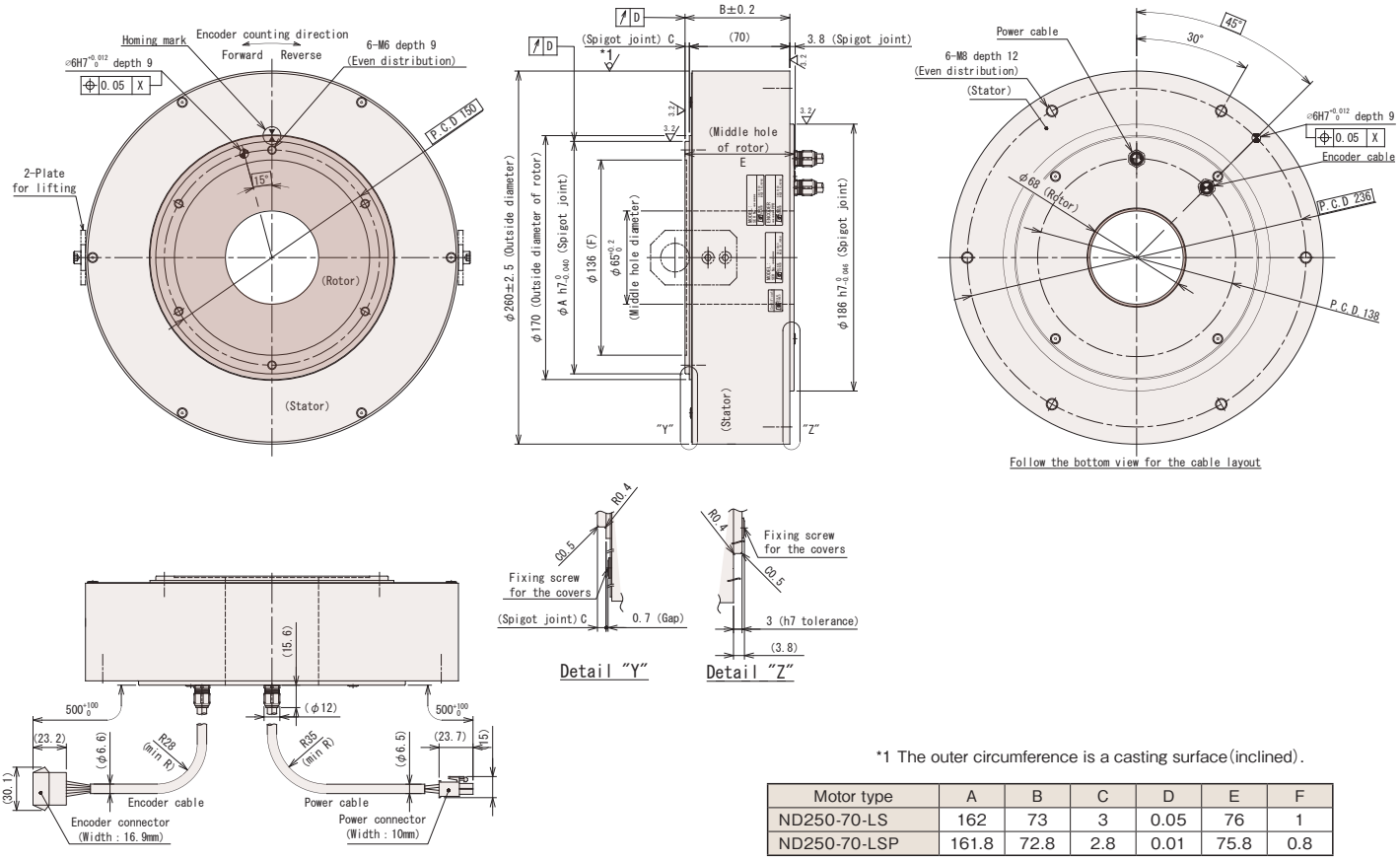


*1 The outer circumference is a casting surface(inclined).

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

◎ND250-70-LS(P)

NMR-STEJA2A-791A(P)



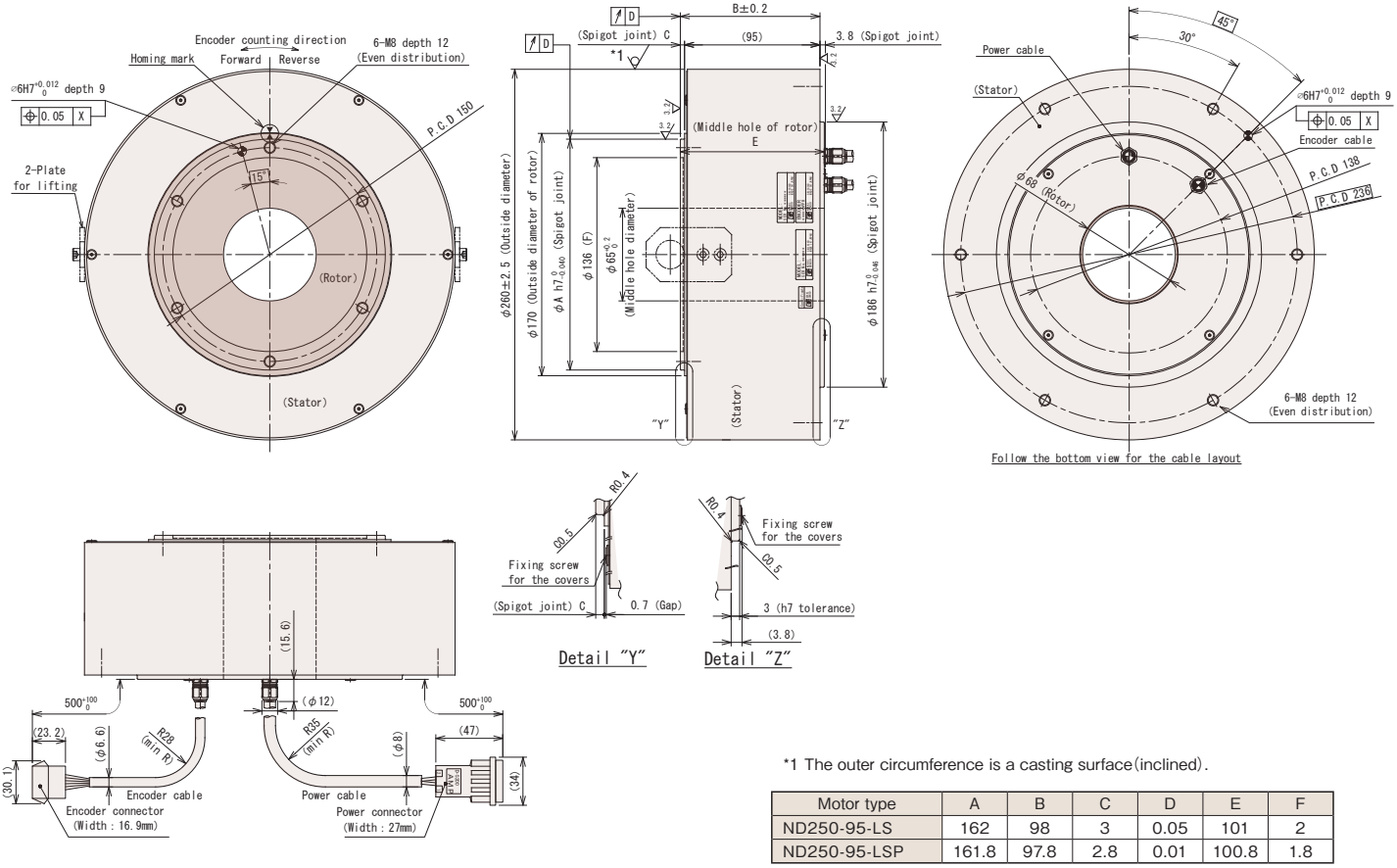
*1 The outer circumference is a casting surface(inclined).

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)

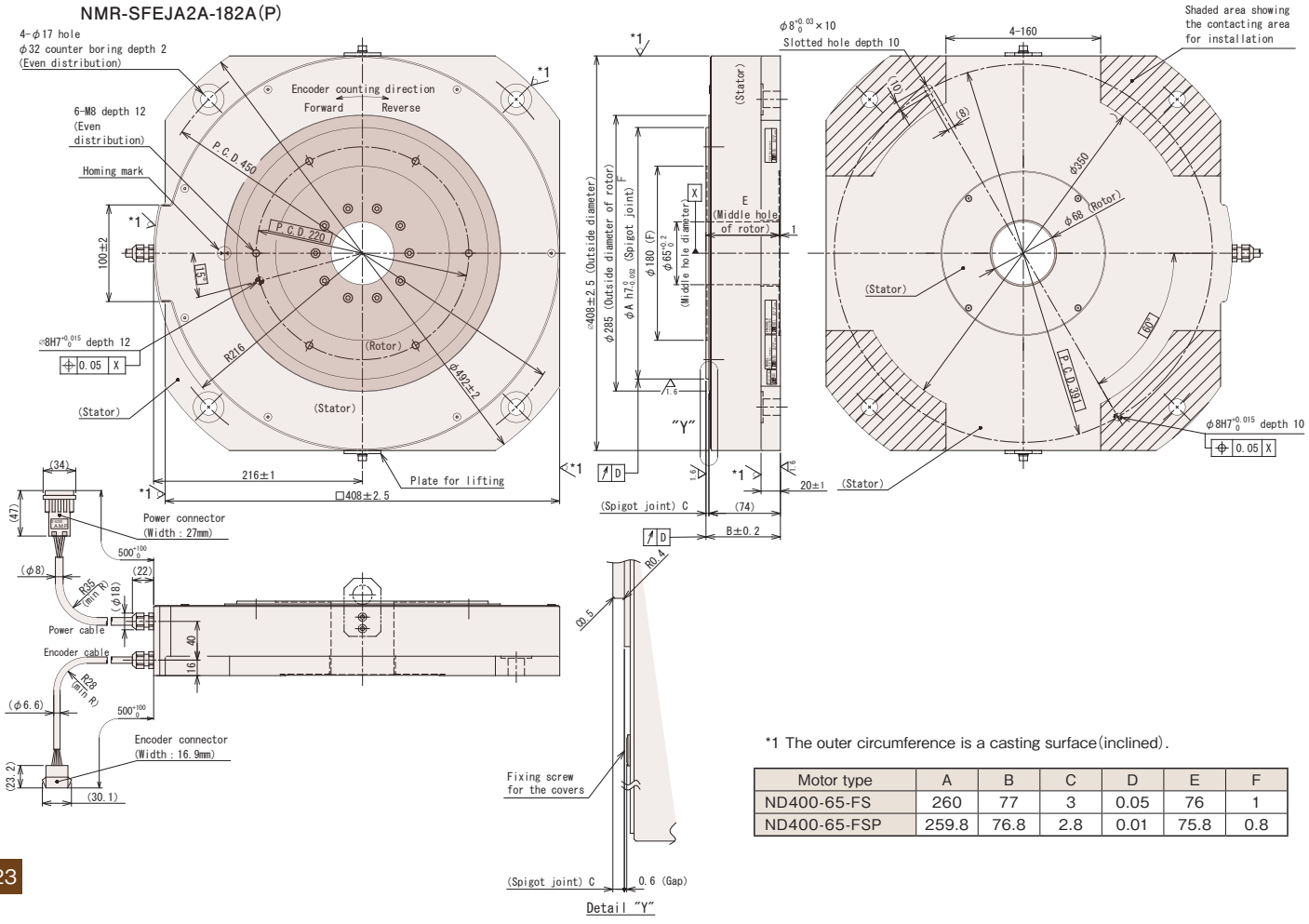


*1 The outer circumference is a casting surface(inclined).

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)



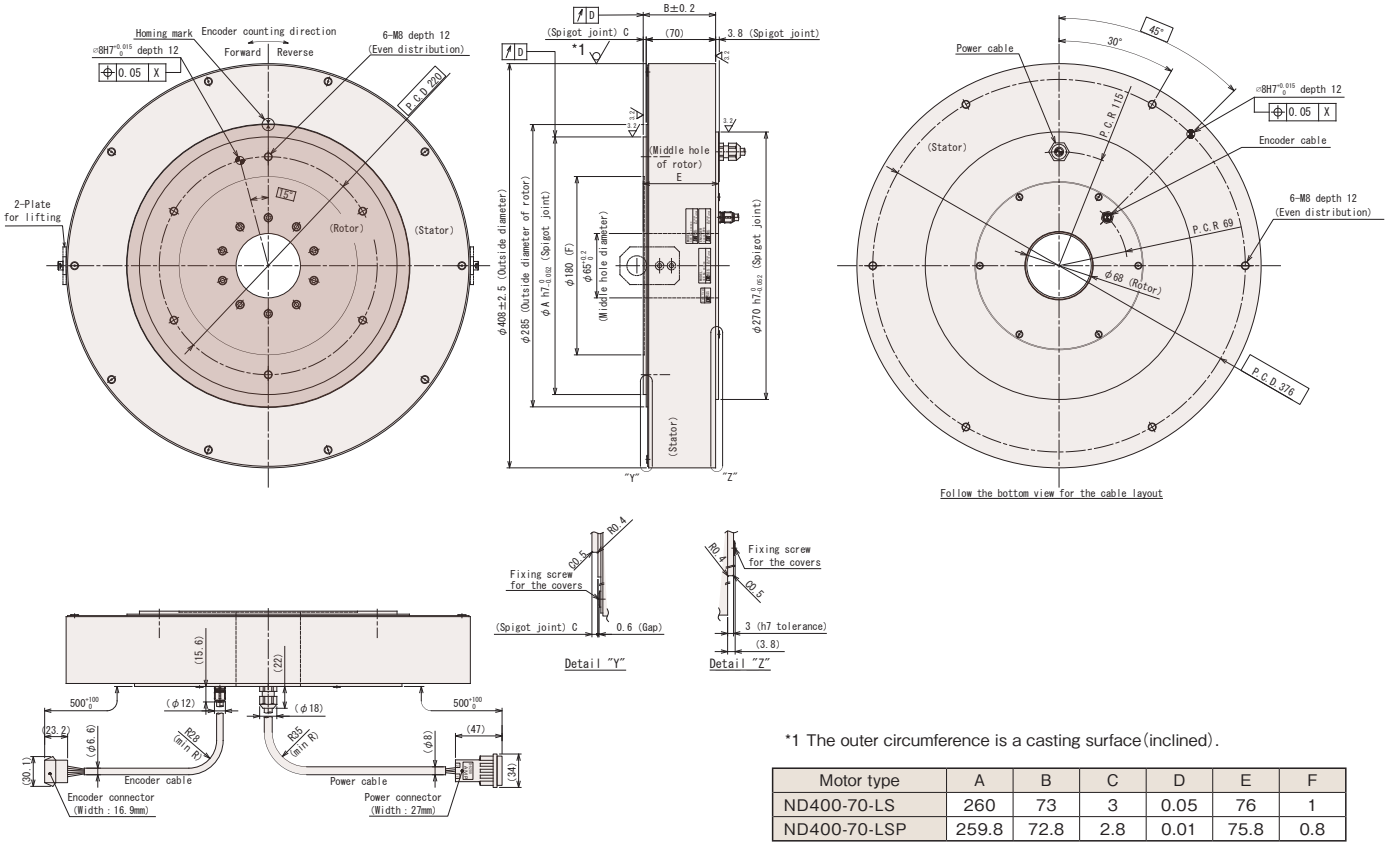
*1 The outer circumference is a casting surface(inclined).

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

τDISC ND-s Series Dimensions

◎ND400-70-LS(P)

NMR-SUEJA2A-182A(P)

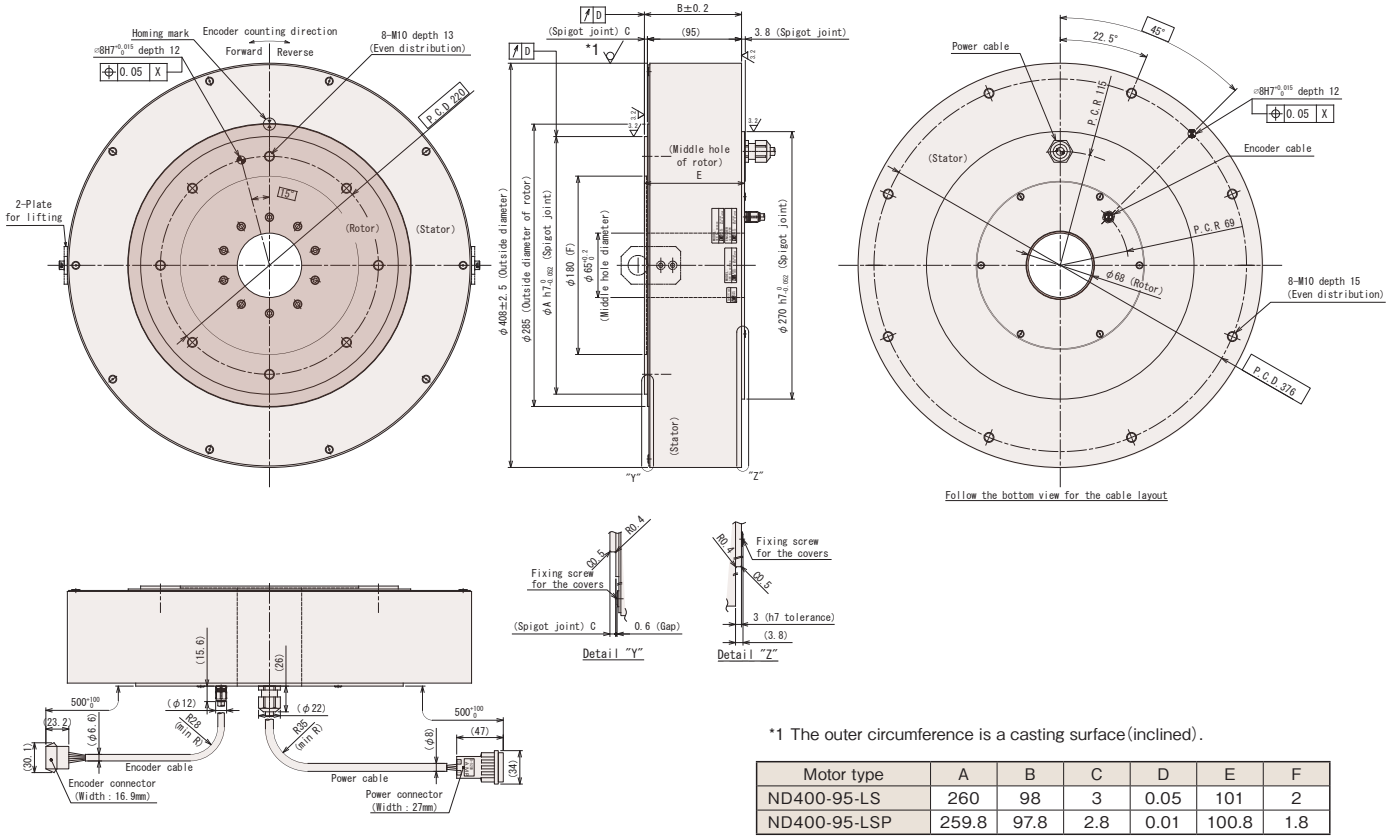


*1 The outer circumference is a casting surface(inclined).

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)



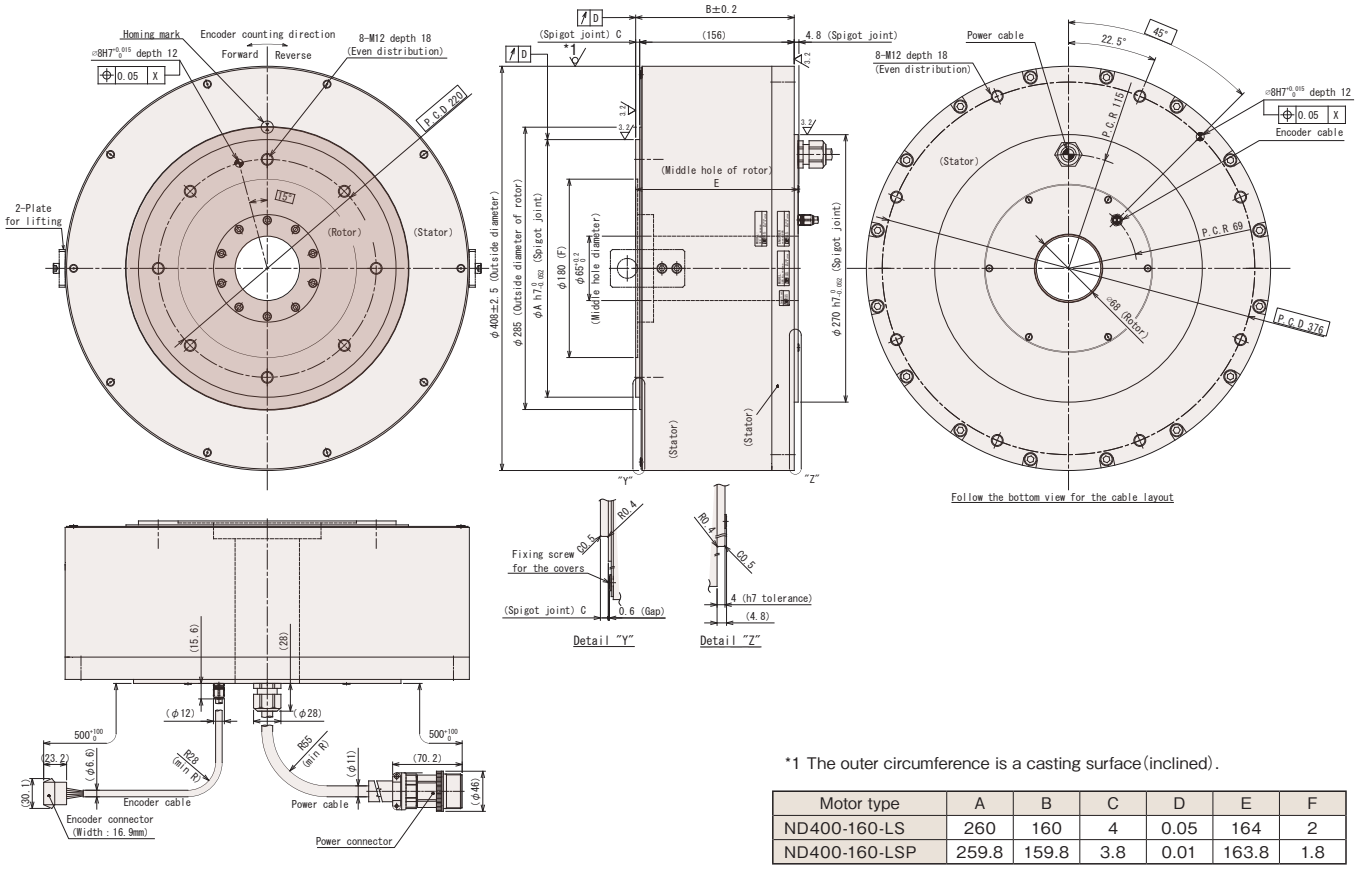
*1 The outer circumference is a casting surface(inclined).

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

τDISC 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

τDISC 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 119 mm)	R…140(Actual range 140 to 149 mm)	S…180(Actual range 180 to 189 mm)
⑥	Nominal height *1		With flange	Flange less	
			U…85(Actual range 80 to 99 mm)	E…70/95(Actual range 70 to 95 mm)	F…95(Actual range 96 to 119 mm)
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 *2		Example) 551 … 55 1 =55×10^{1} =550W Exponential part of powers of 10 Significant figures		
⑫	Brake(with or without)		A…Without brake		
⑬	Table surface rotation accuracy		Without…Standard specification	P…High accuracy type(option)	
⑭	Special model symbol		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.

*2 Approximate value.

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

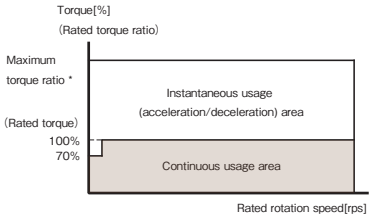
About the encoder type

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%RH or less; no condensation
Installation location	Do not install in a harmful atmosphere containing corrosive gas, grinding oil, metal dust, oil, etc. Install in an indoor place not exposed to direct sunlight.
Installation direction	Horizontal with the rotor facing upward. *When 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



* The maximum torque ratio depends on the motor type.
(Maximum torque/Rated torque)

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		ACV	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 *3		N·m	5.9	8	9.6	15	24
Max torque *3		N·m	14.1	19.2	22	37	65
Rated rotation speed *3		rps	15		11	11	11
Rated output *3		W	556	753	663	1,036	1,658
Rated current *3		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 *4		N·m	6.1		17.3	17.3	27.3
Allowable axial load *4		kN	1.1		2.4	2.4	2.9
Table surface rotation accuracy *5	Radial run out(no load)	μm	30(Standard)/10(High accuracy type)		40(Standard)/10(High accuracy type)		50(Standard)/10(High accuracy type)
	Axial run out(no load)	μm	30(Standard)/10(High accuracy type)		40(Standard)/10(High accuracy type)		50(Standard)/10(High accuracy type)
Absolute Positioning accuracy *6		arcsec	±15(When the absolute position compensation function option is used)				
Repeated Positioning accuracy(when reciprocating)		arcsec	±2		±1		
Rotor moment of inertia		kg·m^2	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				
Paired servo driver	VPH Series	NCR-H□	2401A-A-□□□	2801A-A-□□□	2801A-A-□□□	2152A-A-□□□	2152A-A-□□□

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

*2 Shown in parentheses is the value of the high accuracy type(option).

*3 The specification values are those obtained when the τDISC is mounted on a heat sink(aluminum plate) of one of the following sizes and operated at the ambient operating temperature.
・ND110-HS type 300 mm×300 mm×22 mm／・ND140-HS type 640 mm×450 mm×50 mm
・ND180-HS type 640 mm×450 mm×50 mm

*4 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.

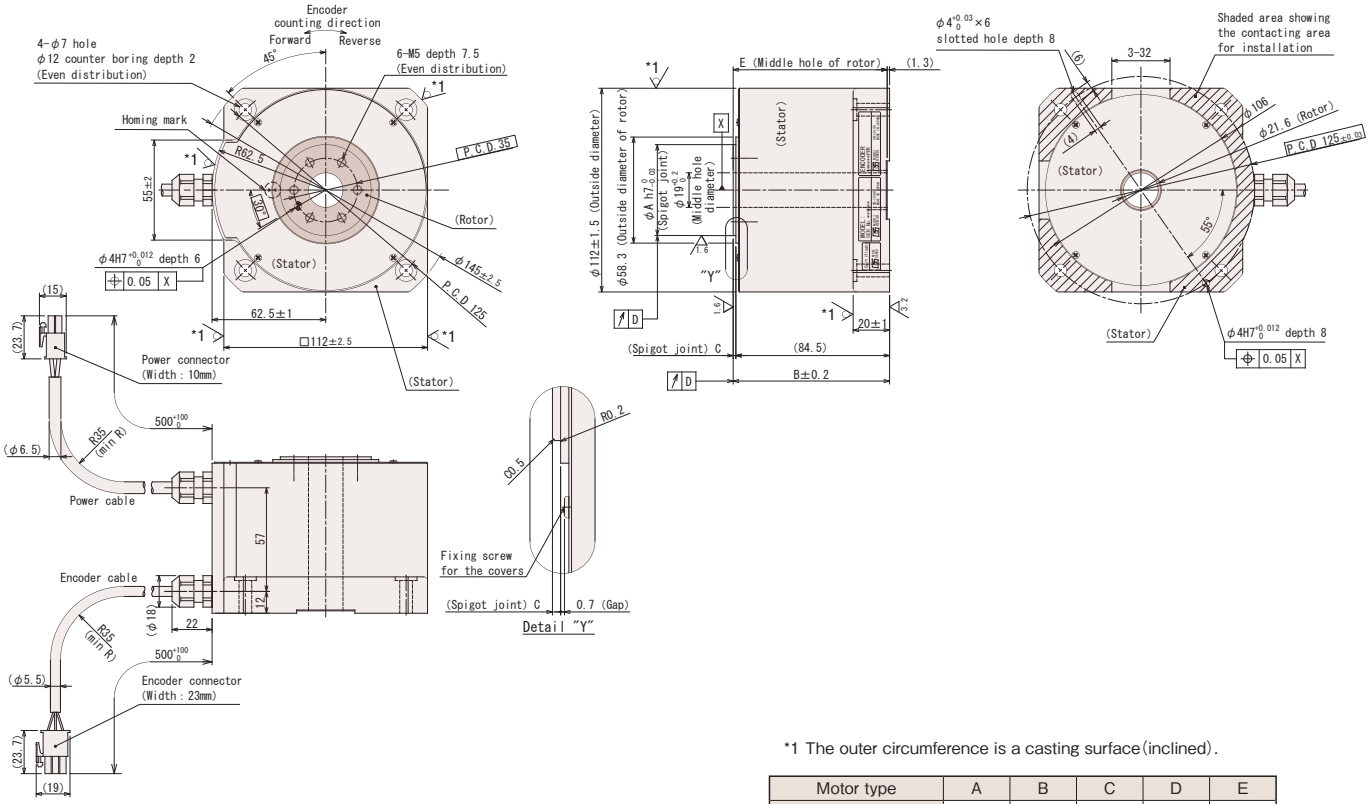
*5 For details, refer to "High accuracy type option for τDISC table surface rotation accuracy" on p.43.

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

τDISC ND-s HS Series Dimensions

◎ND110-85-FS(P)-HS

NMR-SAUIA2A-551A(P)

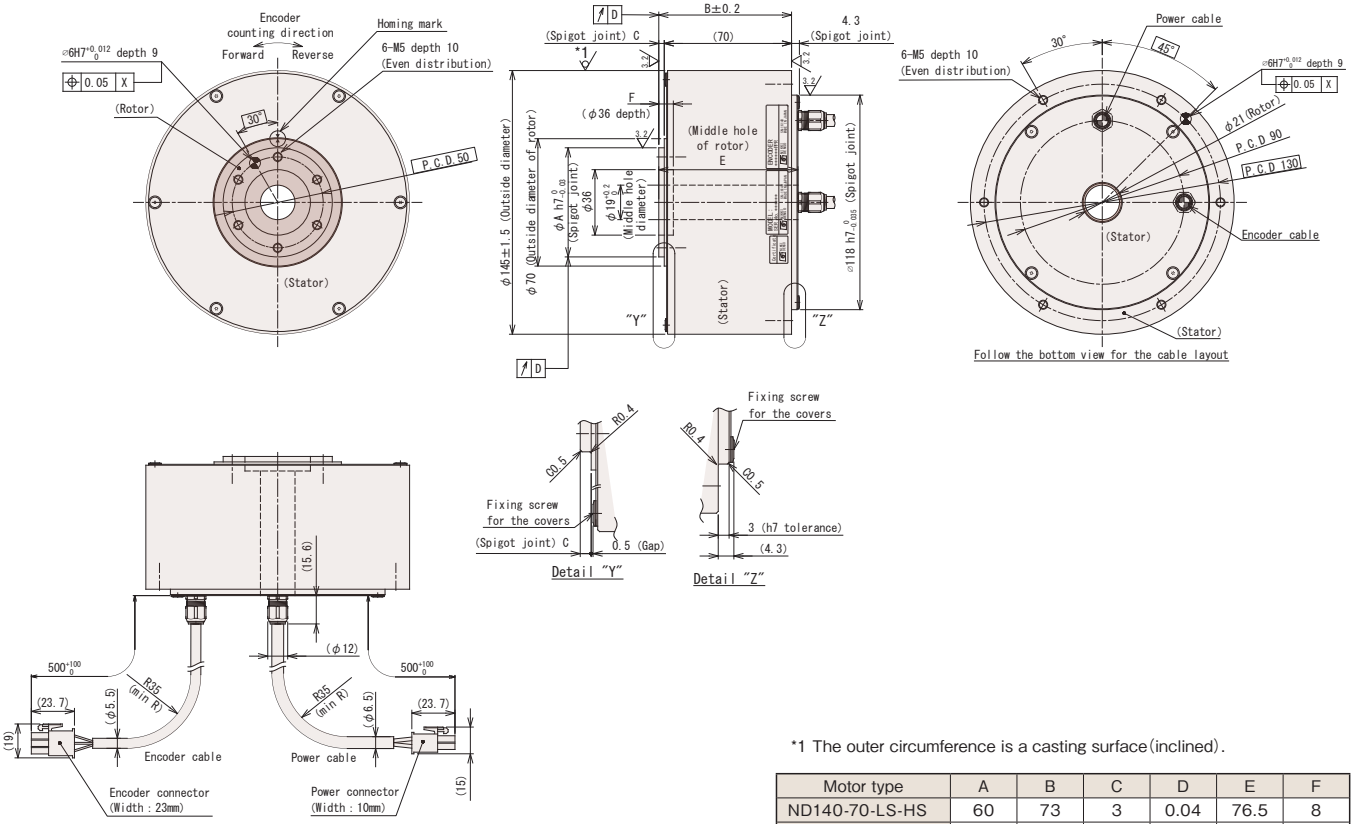


*1 The outer circumference is a casting surface(inclined).

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)



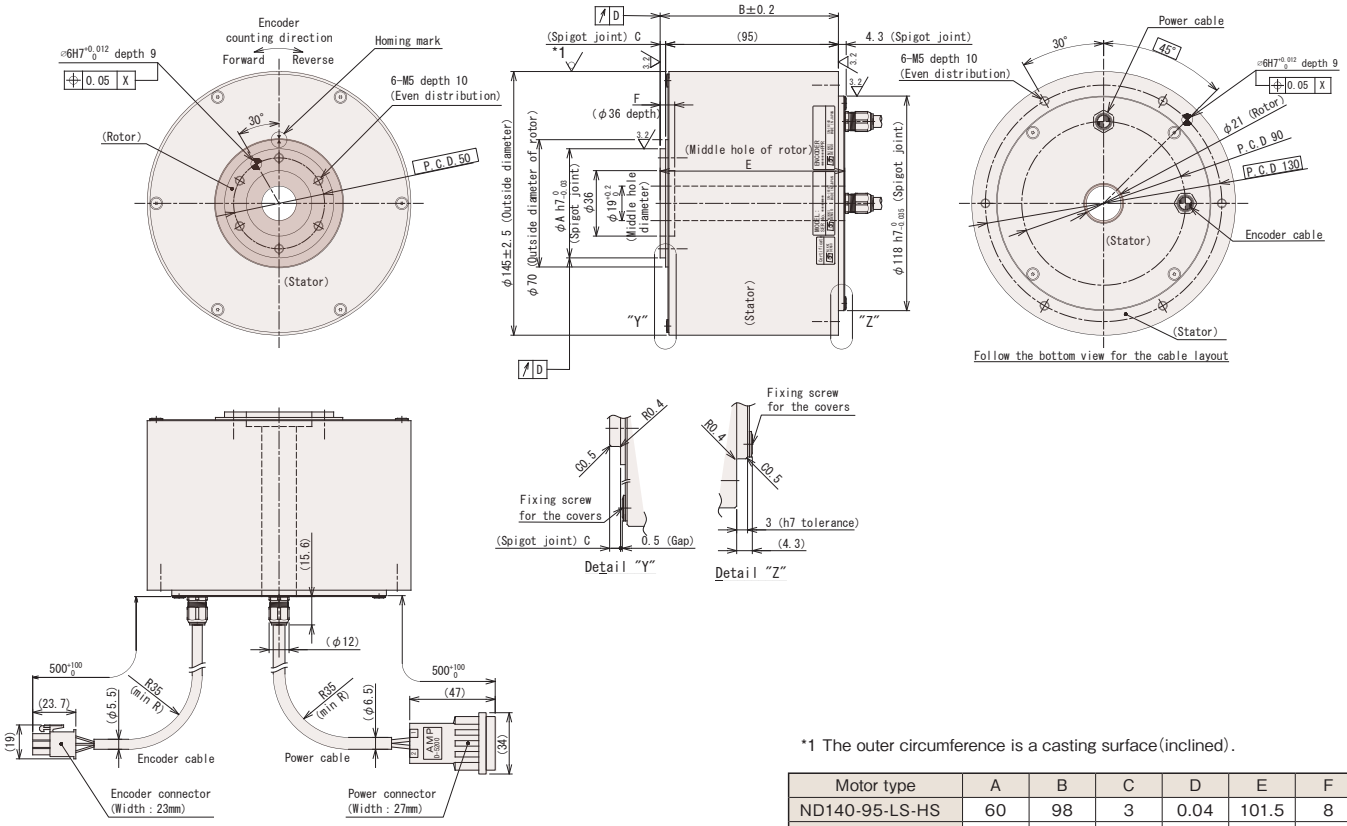
*1 The outer circumference is a casting surface(inclined).

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

τDISC ND-s HS Series Dimensions

◎ND140-95-LS(P)-HS

NMR-SRFIA2A-102A(P)

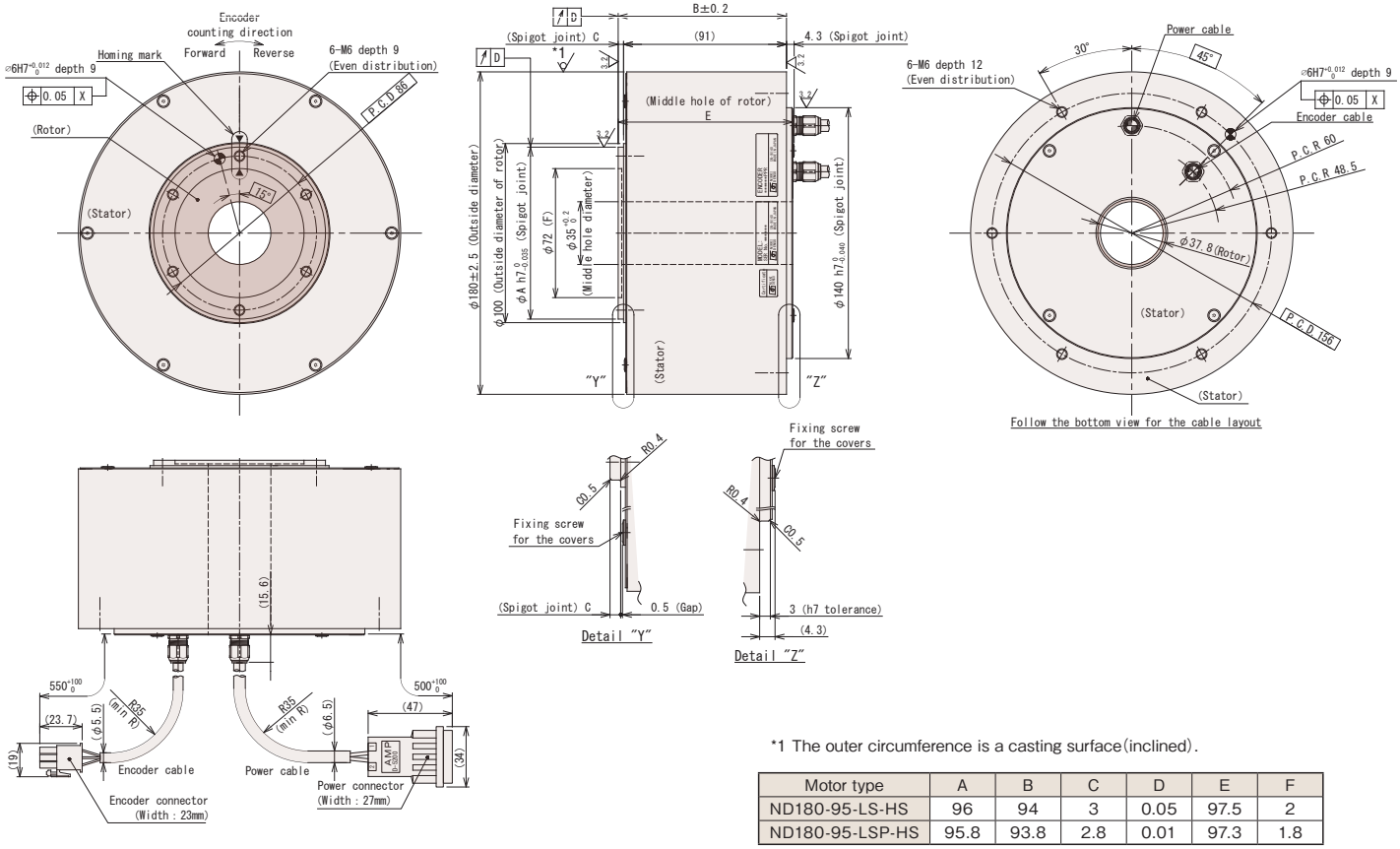


*1 The outer circumference is a casting surface(inclined).

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…160 mm 250…265 mm 400…420 mm 630…663 mm	
		Model	16…160 mm 25…265 mm 40…420 mm 63…663 mm	
④	Height		Example) 96 …96 mm	
⑤	Rated output *1		Example) 251 … 25 1 =25×10[1] =250 W Exponential part of powers 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…4 rps	
⑧	Encoder type		C…Absolute encoder(absolute value for one revolution)	A…Incremental encoder
			H…DD630 system absolute encoder IPU built-in type absolute encoder(absolute value for one revolution)	
⑨	Cooling method		N…Natural air cooling	
⑩	Overseas standards		N…None	
⑪	Special model symbol		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 10 μm type(option)	
			P5 …High accuracy 5 μm type(option)	
			P3 …High accuracy 3 μm type(option)	
		Model	None …Standard specification	
			-P …DD160/250/400 Type: High accuracy 5 μm type(option) DD630 Type: High accuracy 10 μm type(option)	
			-P5 …DD630 Type: High accuracy 5 μm type(option)	
			-P3 …DD160/250/400 Type: High accuracy 3 μm type(option)	
⑬	Parallelism		Without…Standard specification	
			H…Parallelization processing specification(option) *Not supported for the DD630 Type.	
⑭	Absolute position compensation option *3		Without…Without the Absolute position compensation option	
			-0…Compensation data to be transfered to the VPH servo driver by the user.	

*1 Approximate value.

*2 The high accuracy type of the DD160/250/400 Type supports 5 μm and 3 μm. The high accuracy type of the DD630 Type supports 10 μm and 5 μm.

*3 For details, refer to "Absolute position compensation function option system table" on p.42.

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

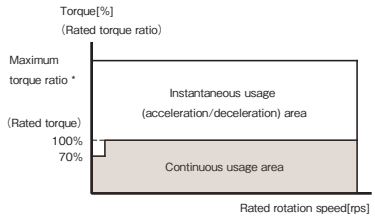
・DD160-96/146-LS(P5/P3) ・DD250-90/138/163-LS(P5/P3)

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 our website.

Common specifications

Ambient operating temperature	0 to 40℃
Ambient operating humidity	85%RH or less; no condensation
Installation location	Do not install in a harmful atmosphere containing corrosive gas, grinding oil, metal dust, oil, etc. Install in an indoor place not exposed to direct sunlight.
Installation direction	Horizontal with the rotor facing upward or downward. *When 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



* The maximum torque ratio depends on the motor type.
(Maximum torque/Rated torque)

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			ACV	200	200	200
Outside diameter			mm	160	160	160
Height *2			mm	96(95.8)	105(104.8)	146(145.8)
Rated torque *3			N·m	10	10	27
Max torque *3			N·m	23	23	62.5
Rated rotation speed *3			rps	4	4	4
Rated output *3			W	251	251	678
Rated current *3			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 *4			N·m	280	280	280
Allowable axial load *4			kN	22.5	22.5	22.5
Table surface rotation accuracy *5	Radial run out(no load)		μm	30(Standard)/5(High accuracy type)/3(High accuracy type)		
	Axial run out(no load)		μm	30(Standard)/5(High accuracy type)/3(High accuracy type)		
Parallelism *6			μm	40(Standard)/20(Parallelization processing spec)	50(Standard)/20(Parallelization processing spec)	40(Standard)/20(Parallelization processing spec)
Absolute Positioning accuracy *7			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 servo driver	VPH Series	NCR-H□		2401A-A-□□□	2401A-A-□□□	2801A-A-□□□

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			ACV	200	200	200
Outside diameter			mm	265	265	265
Height *2			mm	90(89.8)	138(137.8)	163(162.8)
Rated torque *3			N·m	42	80	120
Max torque *3			N·m	100	190	300
Rated rotation speed *3			rps	2	2	2
Rated output *3			W	528	1,005	1,507
Rated current *3			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 *4			N·m	315	450	450
Allowable axial load *4			kN	22.5	30	30
Table surface rotation accuracy *5	Radial run out(no load)		μm	40(Standard)/5(High accuracy type)/3(High accuracy type)		
	Axial run out(no load)		μm	40(Standard)/5(High accuracy type)/3(High accuracy type)		
Parallelism *6			μm	60(Standard)/20(Parallelization processing specification)		
Absolute Positioning accuracy *7			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 servo driver	VPH Series	NCR-H□		2801A-A-□□□	2152A-A-□□□	2152A-A-□□□

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

*2 Shown in parentheses is the value of the high accuracy type(option).

*3 The specification values are those obtained when the τDISC is mounted on a heat sink(aluminum plate) of one of the following sizes and operated at the ambient operating temperature.
・DD160 Type 640 mm×450 mm×50 mm／・DD250 Type 640 mm×450 mm×50 mm

*4 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.

*5 For details, refer to "High accuracy type 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.

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

*7 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		ACV	200	200
Outside diameter		mm	420	420
Height *2		mm	150(149.8)	200(199.8)
Rated torque *3		N·m	260	500
Max torque *3		N·m	650	1,250
Rated rotation speed *3		rps	2	2
Rated output *3		W	3,267	6,283
Rated current *3		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 *4		N·m	2,000	2,000
Allowable axial load *4		kN	44	44
Table surface rotation accuracy *5	Radial run out(no load)	μm	40(Standard)/5(High accuracy type)/3(High accuracy type)	
	Axial run out(no load)	μm	40(Standard)/5(High accuracy type)/3(High accuracy type)	
Parallelism *6		μm	100(Standard)/20(Parallelization processing specification)	
Absolute Positioning accuracy *7		arcsec	±50(Standard)/±10(When the absolute position compensation function option is used)	
Repeated Positioning accuracy(when reciprocating)		arcsec	±1	
Rotor moment of inertia		$kg·m^2$	0.402	0.648
Weight		kg	76	109
Magnetic pole detection method			Absolute position detection	Absolute position detection
Paired servo driver	VPH Series	NCR-H□	2332A-A-□□□	2702A-A-□□□

Motor type *1			DD400-250-LS(P5/P3) (1.5rps spec)	DD400-250-LS(P5/P3) (1rps spec)	DD400-250-LS(P5/P3) (2rps spe)
Model *1		DD40-	702L01CNN(-P/-P3)	472L01CNN(-P/-P3)	942L02CNN(-P/-P3)
Flange type			Flange less	Flange less	Flange less
Power supply used		ACV	200	200	200
Outside diameter		mm	420	420	420
Height *2		mm	250(249.8)	250(249.8)	250(249.8)
Rated torque *3		N·m	750	750	750
Max torque *3		N·m	1,750(1,390 *7)	1,700	1650
Rated rotation speed *3		rps	1.5	1	2
Rated output *3		W	7,068	4,712	9,400
Rated current *3		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 *4		N·m	3,000	3,000	3,000
Allowable axial load *4		kN	55	55	55
Table surface rotation accuracy *5	Radial run out(no load)	μm	40(Standard)/5(High accuracy type)/3(High accuracy type)		
	Axial run out(no load)	μm	40(Standard)/5(High accuracy type)/3(High accuracy type)		
Parallelism *6		μm	100(Standard)/20(Parallelization processing specification)		
Absolute Positioning accuracy *7		arcsec	±50(Standard)/±10(When the absolute position compensation function option is used)		
Repeated Positioning accuracy(when reciprocating)		arcsec	±1		
Rotor moment of inertia		$kg·m^2$	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 servo driver	VPH Series	NCR-H□	2153A-A-□□□(2702A-A-□□□ *7)	2702A-A-□□□	2153A-A-□□□

Motor type *1			DD630-175-LS(P10/P5)	DD630-225-LS(P10/P5)
Model *1		DD63-	842L01HNN(-P/-P5)	123L01HNN(-P/-P5)
Flange type			Flange less	Flange less
Power supply used		ACV	200	200
Outside diameter		mm	663	663
Height *2		mm	175(174.8)	225(224.8)
Rated torque *3		N·m	1,350	2,000
Max torque *3		N·m	2,500	3,700
Rated rotation speed *3		rps	1	1
Rated output *3		W	8,400	12,600
Rated current *3		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 *4		N·m	7,000	7,000
Allowable axial load *4		kN	100	100
Table surface rotation accuracy *5	Radial run out(no load)	μm	100(Standard)/10(High accuracy type)/5(High accuracy type)	
	Axial run out(no load)	μm	100(Standard)/10(High accuracy type)/5(High accuracy type)	
Parallelism *6		μm	200(Standard)	
Absolute Positioning accuracy *7		arcsec	±50(Standard)/±10(When the absolute position compensation function option is used)	
Repeated Positioning accuracy(when reciprocating)		arcsec	±1	
Rotor moment of inertia		$kg·m^2$	4.3	5.2
Weight		kg	231	290
Magnetic pole detection method			Absolute position detection	Absolute position detection
Paired servo driver	VPH Series	NCR-H□	2702A-A-□□□	2153A-A-□□□

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

*2 Shown in parentheses is the value of the high accuracy type(option).

*3 The specification values are those obtained when the τDISC is mounted on a heat sink (aluminum plate) of one of the following sizes and operated at the ambient operating temperature.
- DD400 Type 1140 mm×700 mm×80 mm+490 mm×490 mm×40 mm(Two plates stacked)
- DD630 Type 1140 mm×700 mm×80 mm+700 mm×700 mm×80 mm(Two plates stacked)

*4 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.

*5 For details, refer to "High accuracy type 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.

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

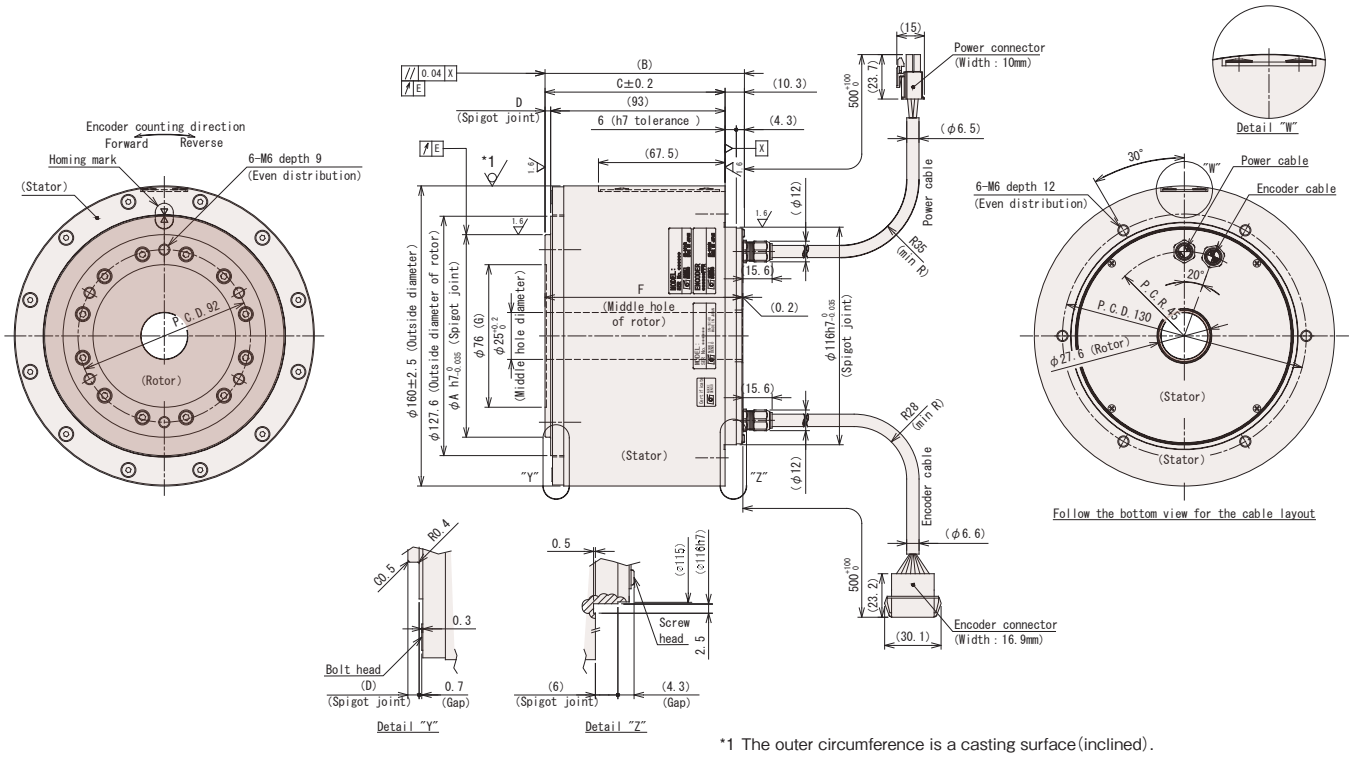
*7 For details, refer to "τDISC Absolute position compensation function option" on p.42.

*8 Shown in parentheses is the maximum torque of the Paired servo driver.

τDISC DD-s Series Dimensions

◎DD160-96-LS(P5/P3)

DD16-251L04CNN(-P/-P3)

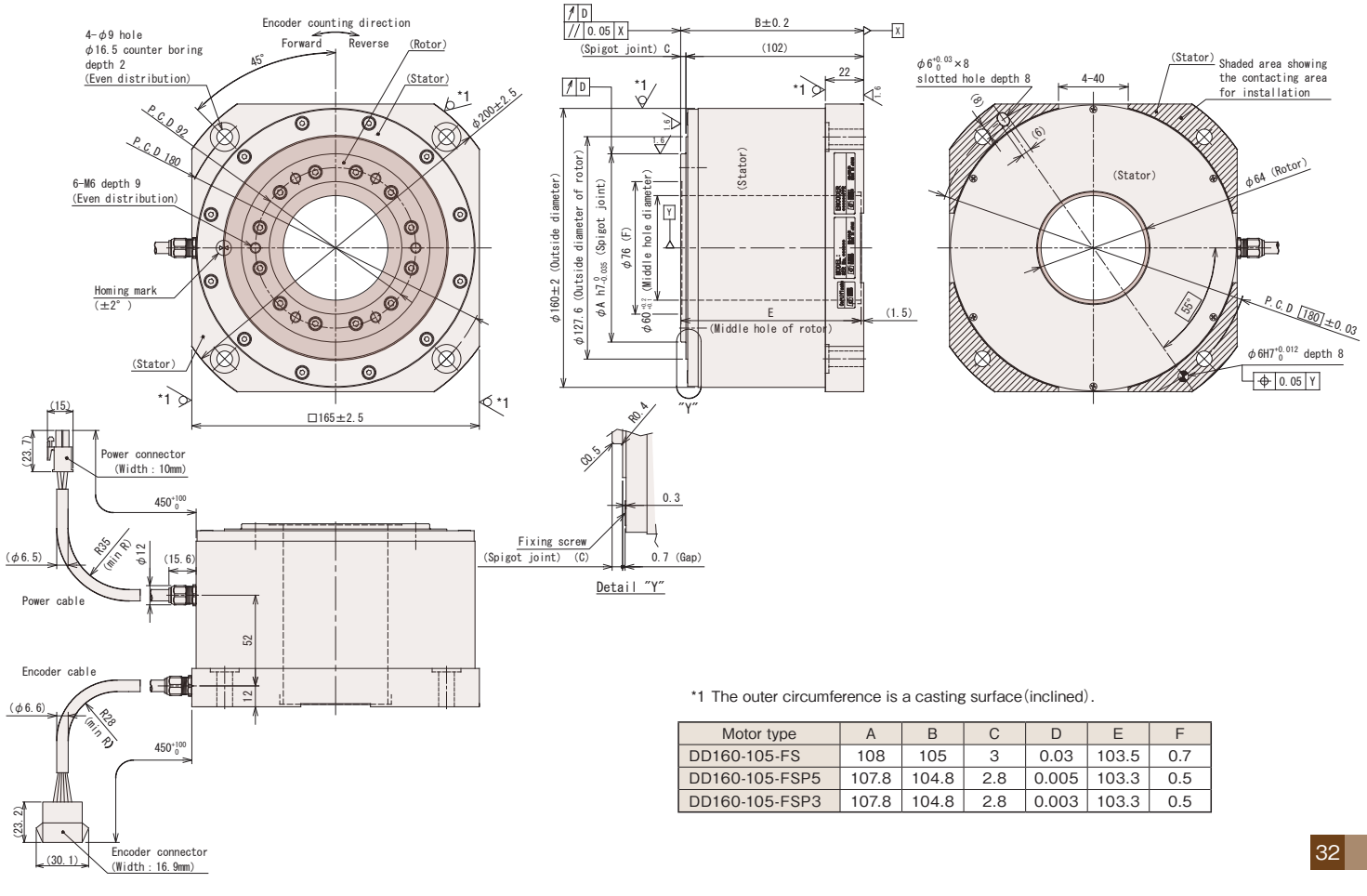


*1 The outer circumference is a casting surface(inclined).

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)



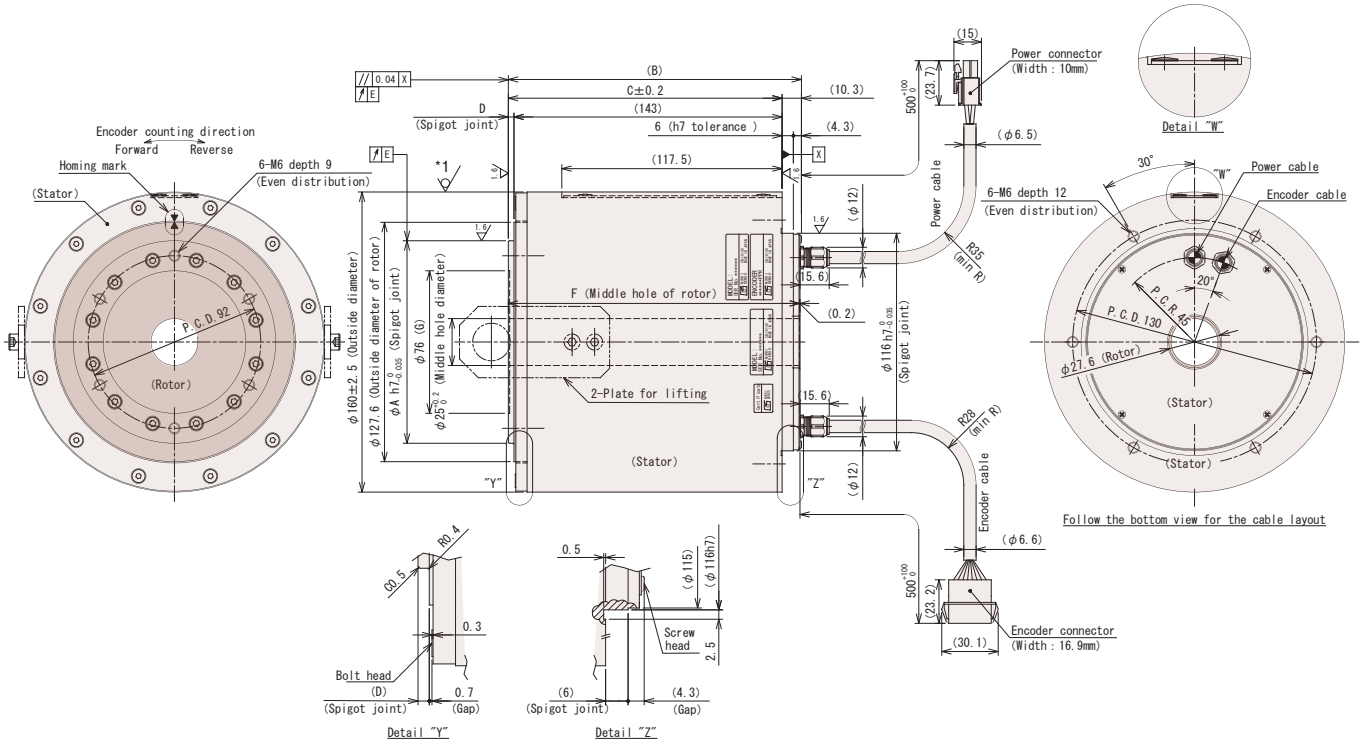
*1 The outer circumference is a casting surface(inclined).

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)

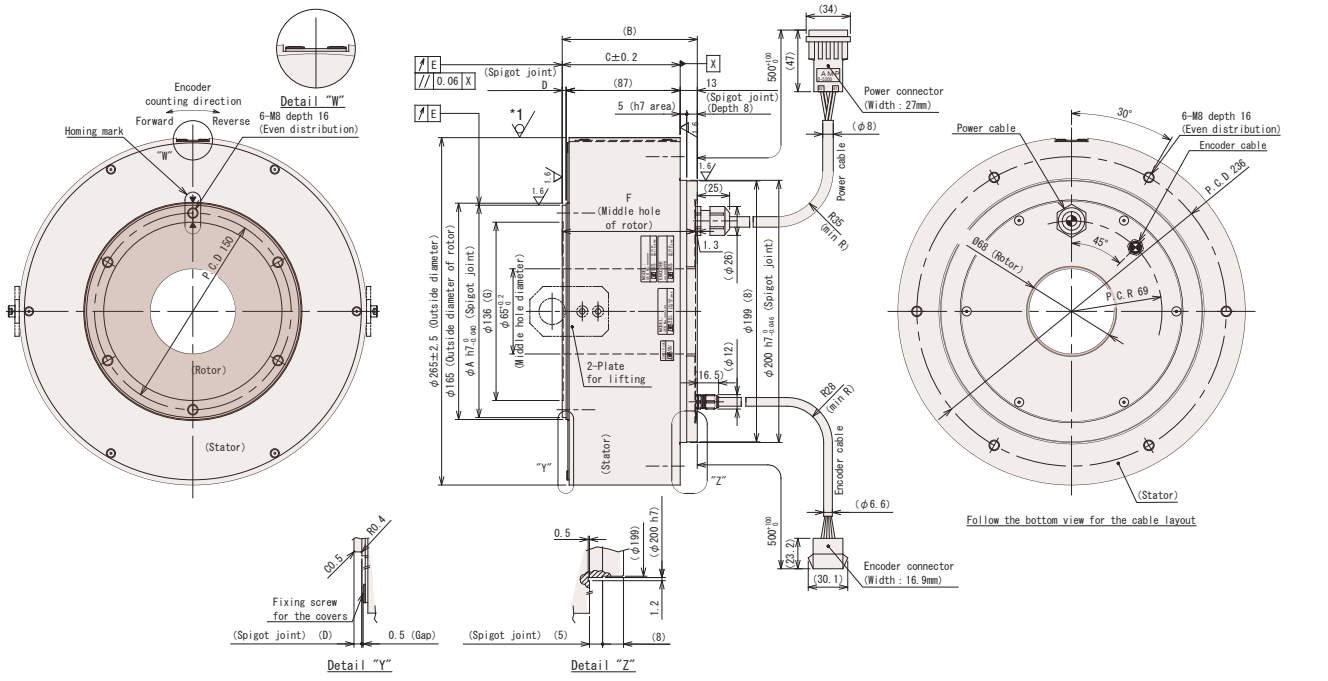


*1 The outer circumference is a casting surface(inclined).

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)



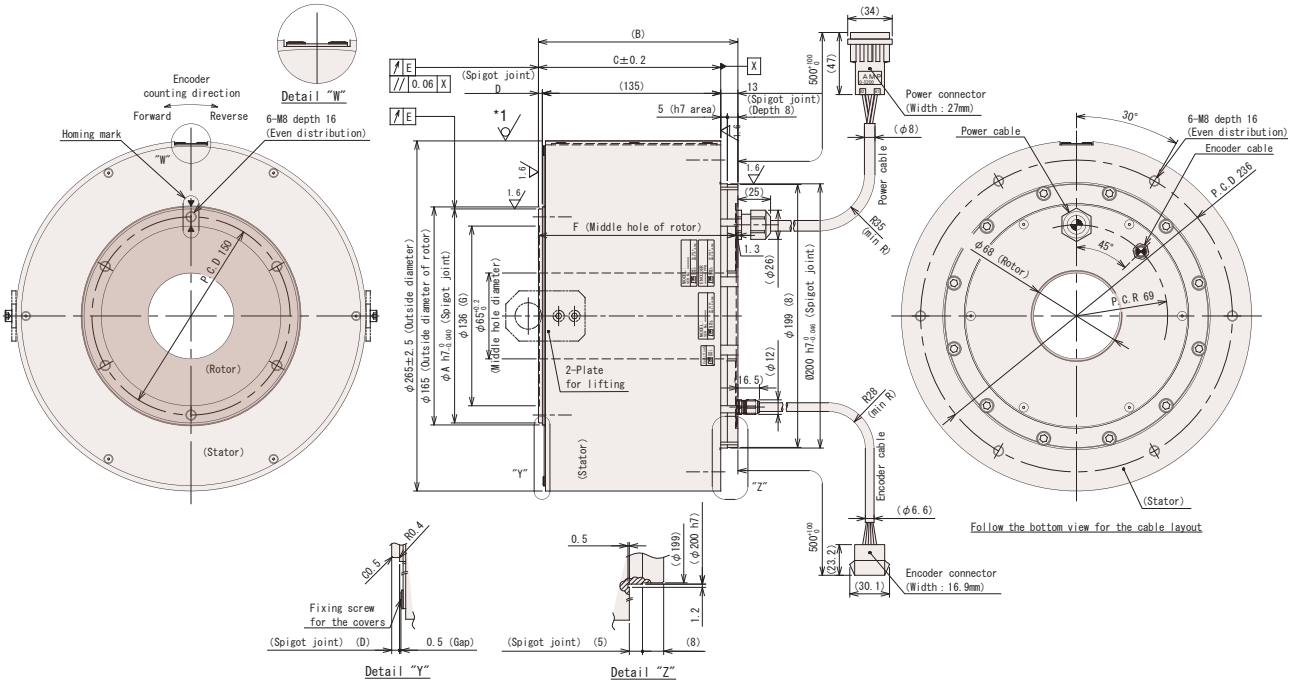
*1 The outer circumference is a casting surface(inclined).

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

τDISC DD-s Series Dimensions

◎DD250-138-LS(P5/P3)

DD25-102L02CNN(-P/-P3)

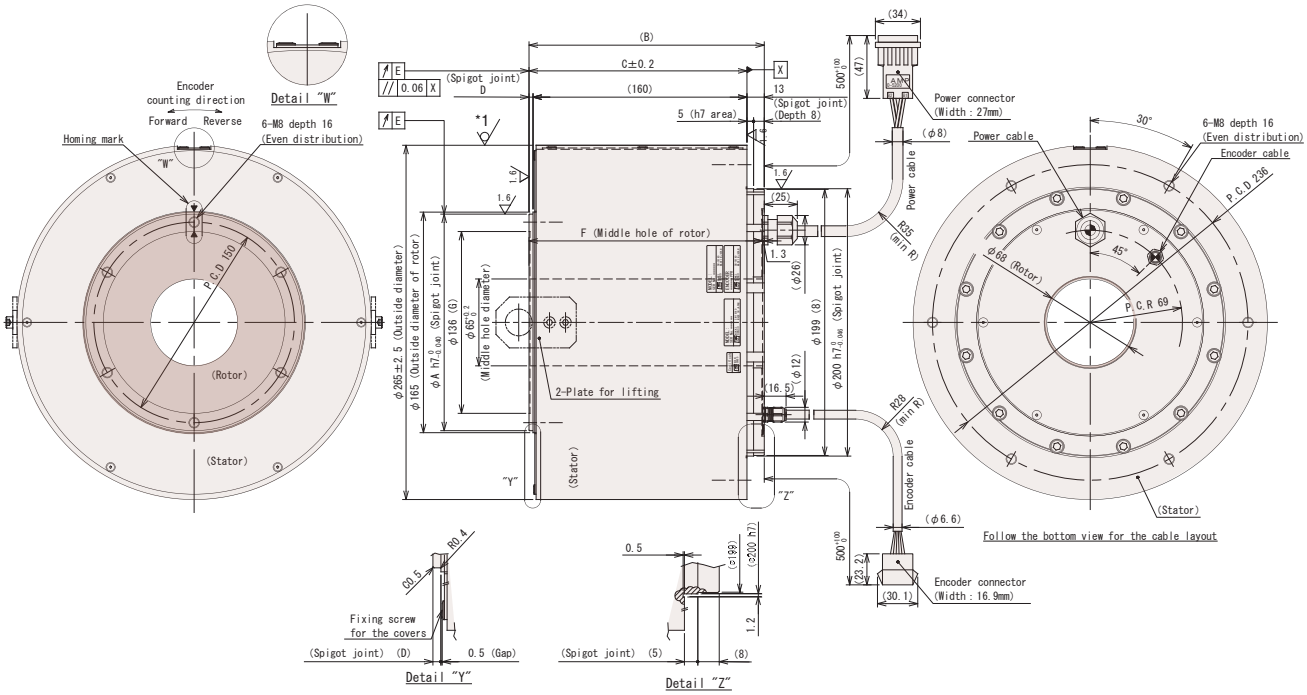


*1 The outer circumference is a casting surface(inclined).

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)



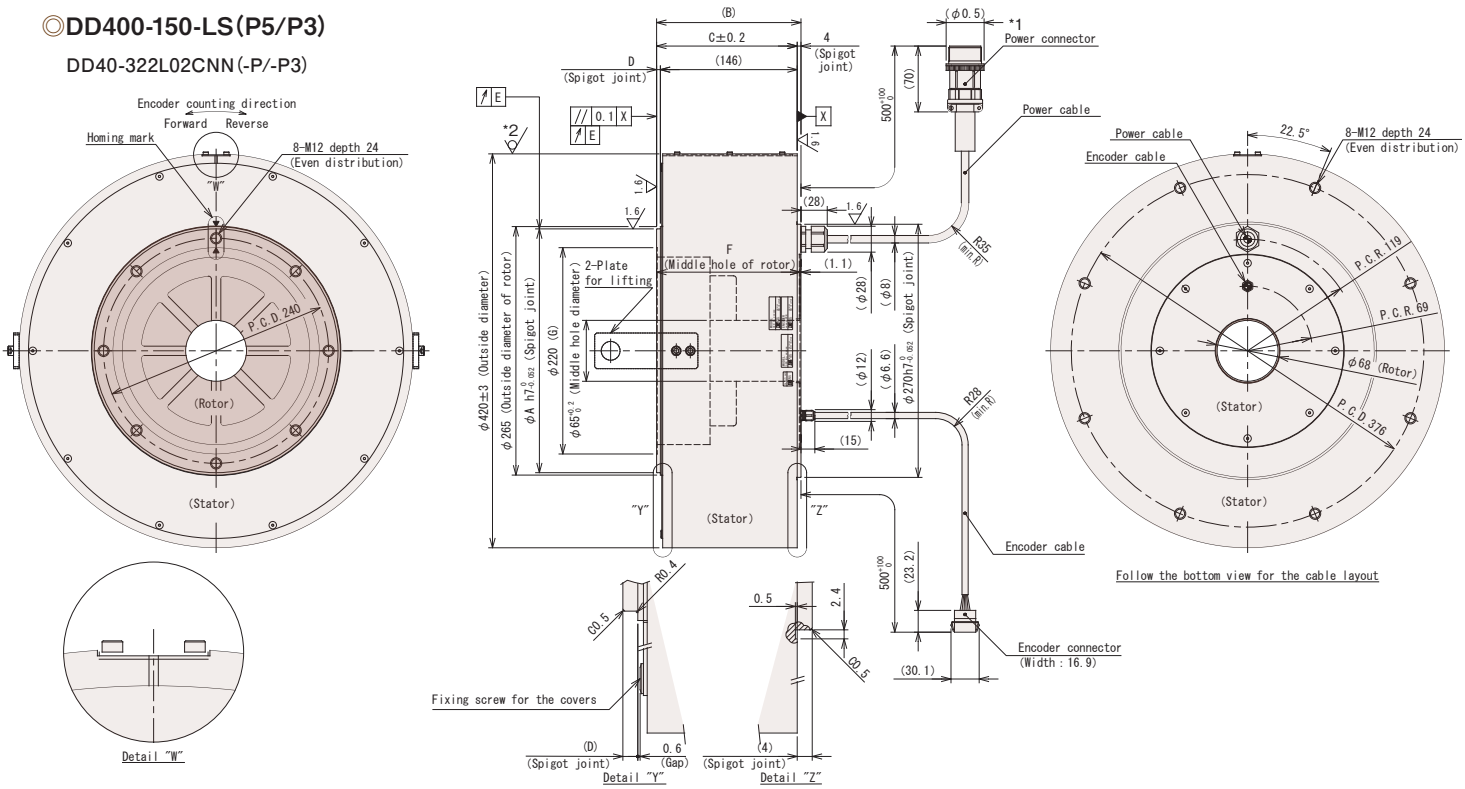
*1 The outer circumference is a casting surface(inclined).

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)



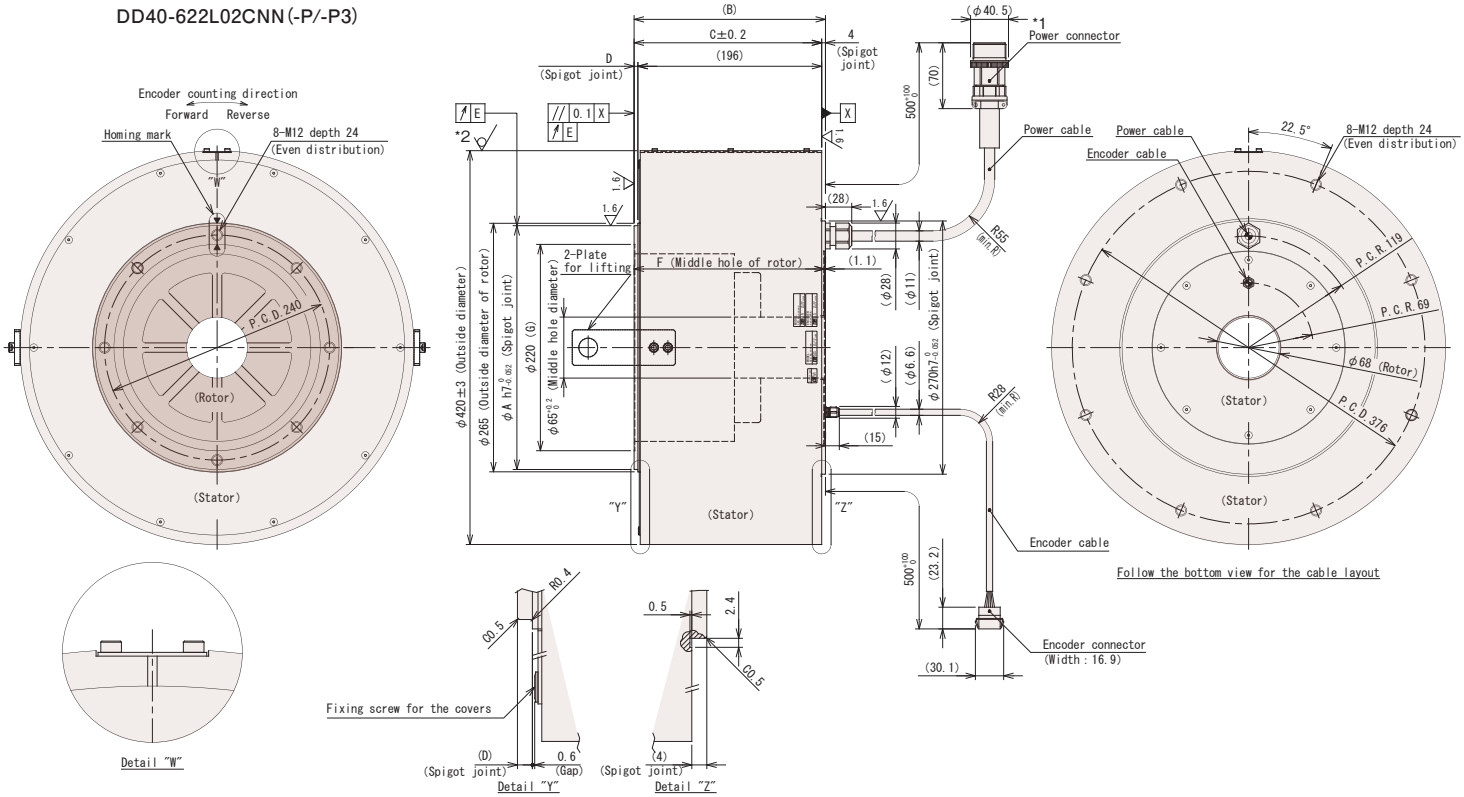
Motor type	A	B	C	D	E	F	G
DD400-150-LS	260	154	150	4	0.04	152.9	0.7
DD400-150-LSP5	259.8	153.8	149.8	3.8	0.005	152.7	0.5
DD400-150-LSP3	259.8	153.8	149.8	3.8	0.003	152.7	0.5

*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).

◎DD400-200-LS(P5/P3)

DD40-622L02CNN(-P/-P3)



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

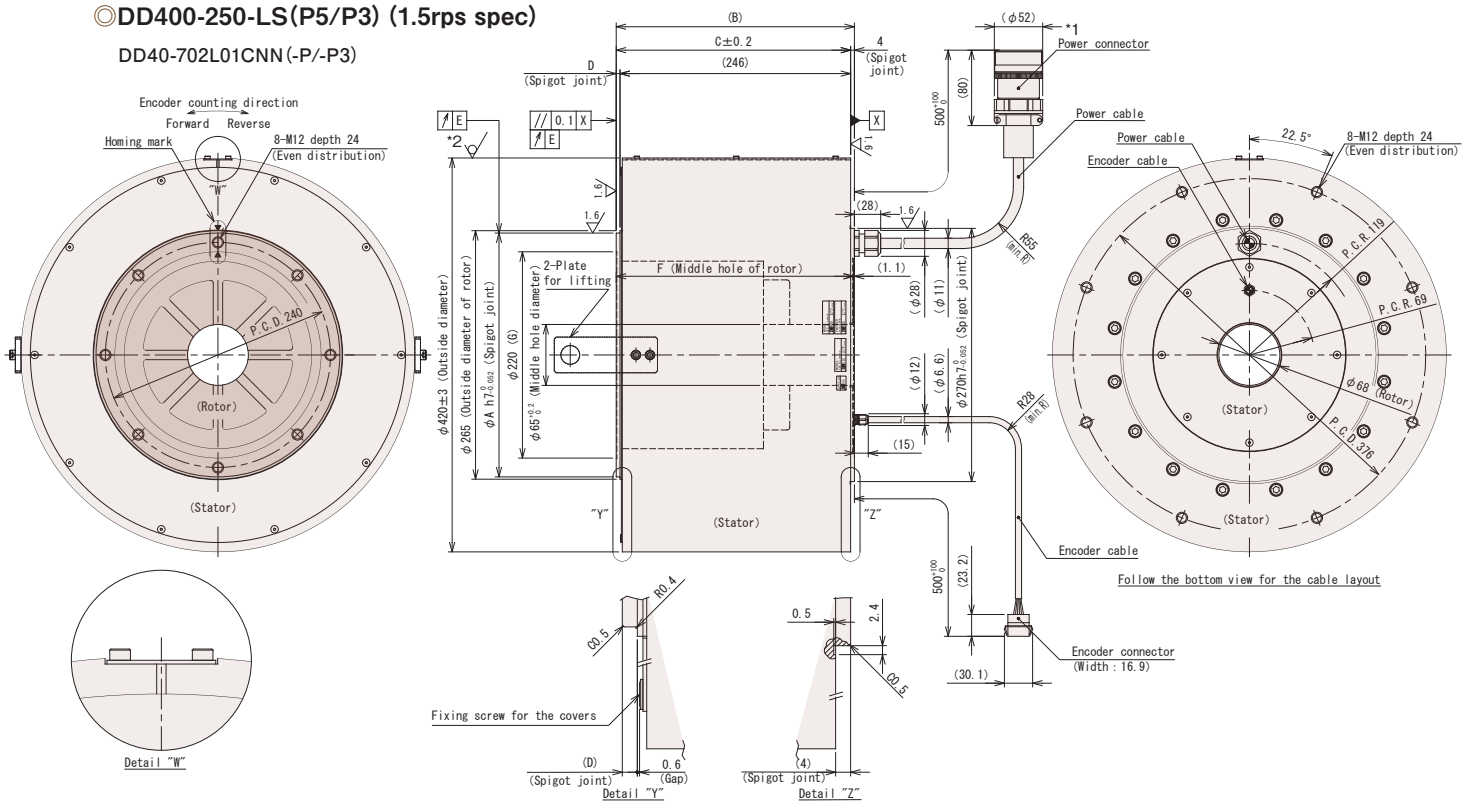
*1 The diameter of the panel guide insertion and removal hole for the power connector should be ϕ50 as the standard.

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

τDISC DD-s Series Dimensions

◎DD400-250-LS(P5/P3) (1.5rps spec)

DD40-702L01CNN(-P/-P3)



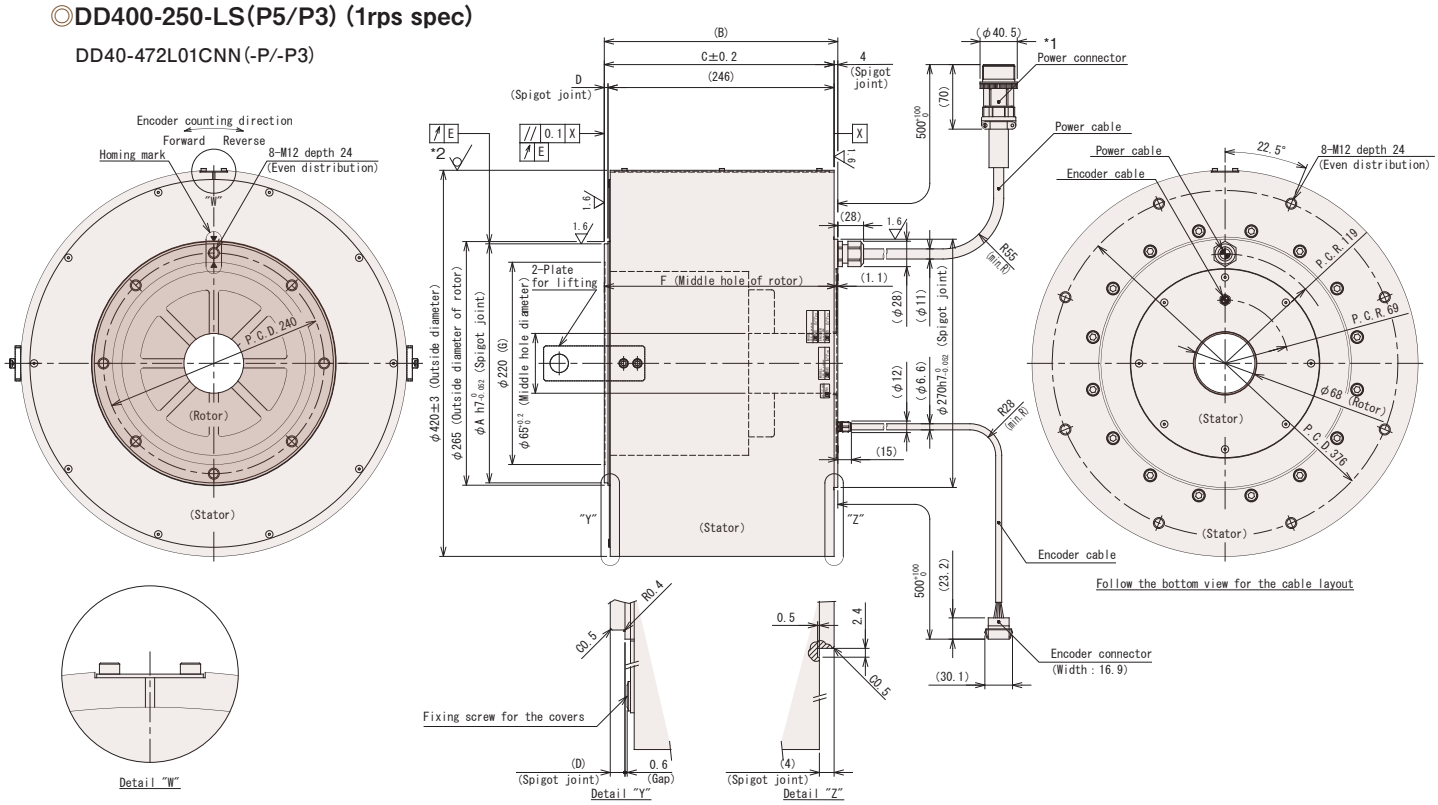
Motor type	A	B	C	D	E	F	G
DD400-250-LS(1.5rps spec)	260	254	250	4	0.04	252.9	0.7
DD400-250-LSP5(1.5rps spec)	259.8	253.8	249.8	3.8	0.005	252.7	0.5
DD400-250-LSP3(1.5rps spec)	259.8	253.8	249.8	3.8	0.003	252.7	0.5

*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).

◎DD400-250-LS(P5/P3) (1rps spec)

DD40-472L01CNN(-P/-P3)



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

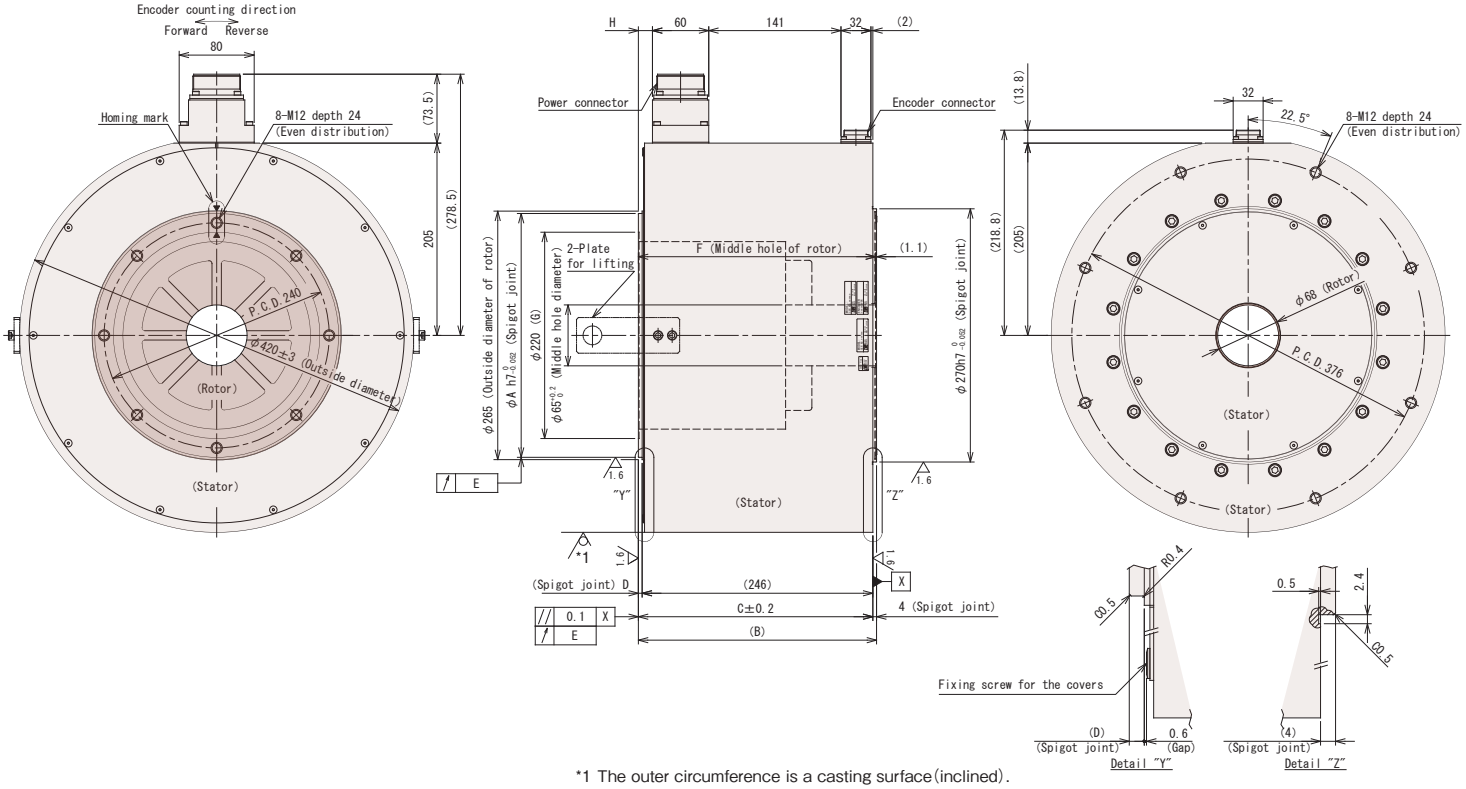
*1 The diameter of the panel guide insertion and removal hole for the power connector should be ϕ50 as the standard.

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

τDISC DD-s Series Dimensions

◎DD400-250-LS(P5/P3) (2rps spec)

DD40-942L02CNN(-P/-P3)

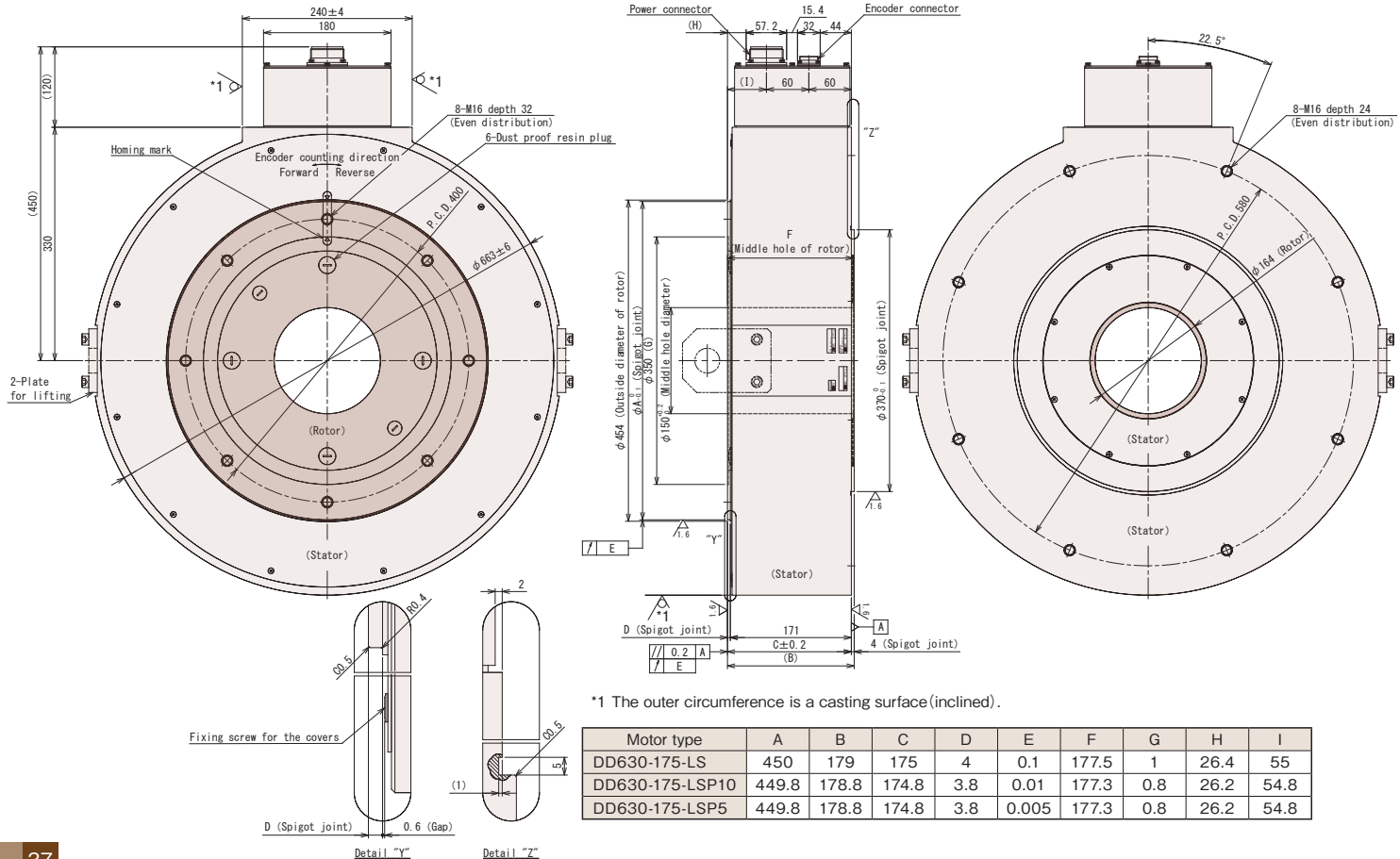


*1 The outer circumference is a casting surface(inclined).

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

◎DD630-175-LS(P10/P5)

DD63-842L01HNN(-P/-P5)



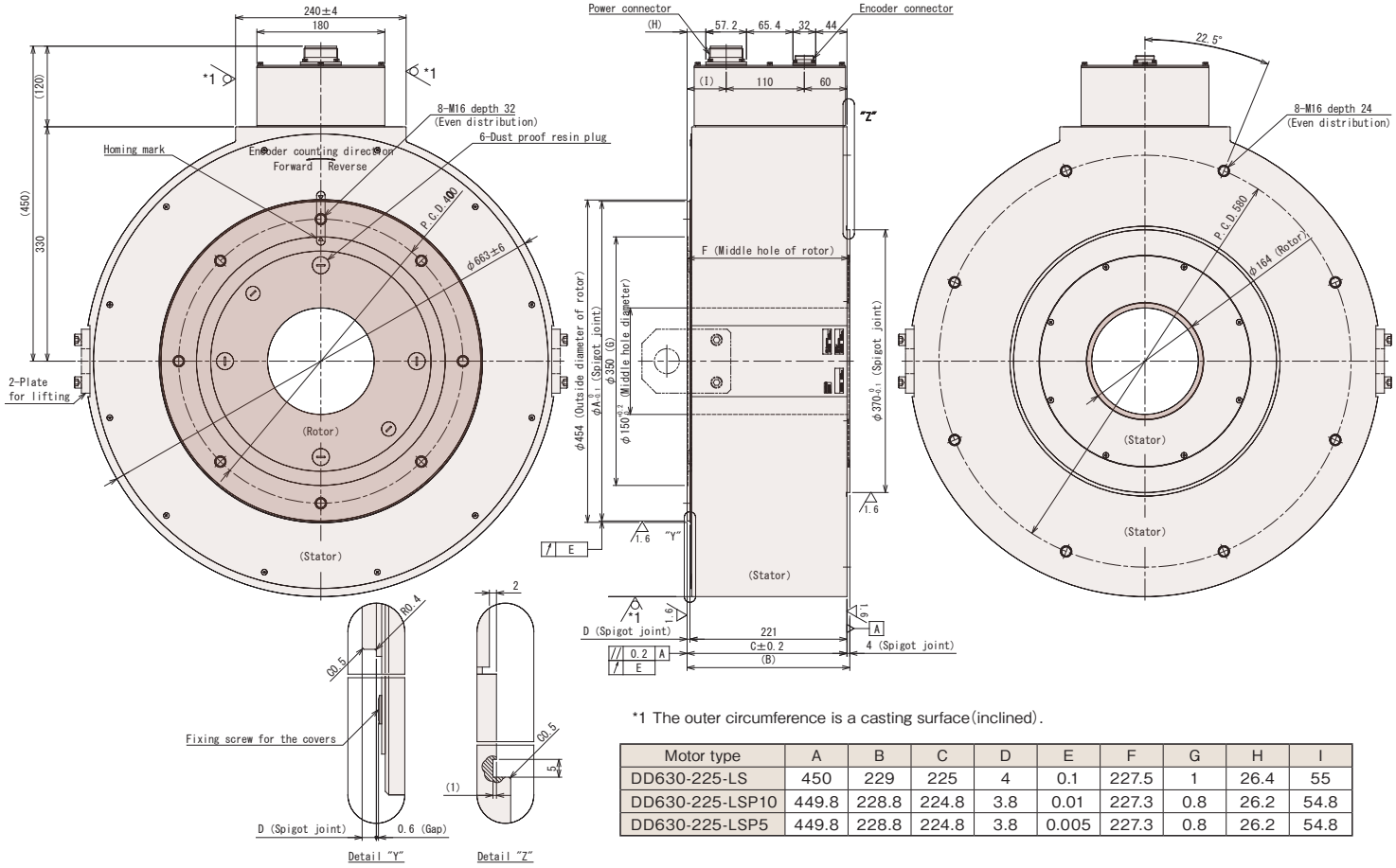
*1 The outer circumference is a casting surface(inclined).

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

τDISC DD-s Series Dimensions

◎DD630-225-LS(P10/P5)

DD63-123L01HNN(-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

τ DISC 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		Flange less	
			R…140(Actual range 140 to 149 mm)	
			S…180(Actual range 180 to 189 mm)	
⑤	Nominal height *1		Flange less	
			H…160(Actual range 150 to 169 mm)	
			I…185(Actual range 170 to 199 mm)	
			J…200(Actual range 200 to 219 mm)	
⑥	Motor 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 *2		Example) 102 … 10 2 =10×10^2 =1000W Exponential part of powers of 10 Significant figures	
⑪	Brake(with or without)		A…Without brake	
⑫	Table surface rotation accuracy		Without…Standard specification	P…High accuracy type(option)
⑬	Motor structure		Without…Standard specification	
⑭	Special model symbol		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.

*2 Approximate value.

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

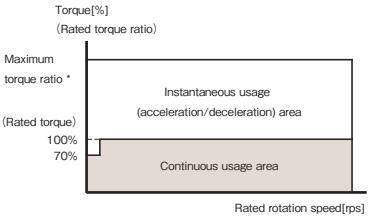
About the encoder type

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%RH or less; no condensation
Installation location	Do not install in a harmful atmosphere containing corrosive gas, grinding oil, metal dust, oil, etc.Install in an indoor place not exposed to direct sunlight.
Installation direction	Horizontal with the rotor facing upward. * When 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



* The maximum torque ratio depends on the motor type.
(Maximum torque/Rated torque)

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		ACV	200	200	200
Outside diameter		mm	140	140	180
Height *2		mm	160(159.8)	185(184.8)	200(199.8)
Rated torque *3		N·m	27	36	68
Max torque *3		N·m	67.5	100	145
Rated rotation speed *3		rps	6	5.5	6
Rated output *3		W	1,017	1,244	2,563
Rated current *3		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 *4		N·m	31.9	31.9	31.9
Allowable axial load *4		kN	3.2	3.2	3.2
Table surface rotation accuracy *5	Radial run out(no load)	μm	50(Standard) / 10(High accuracy type)		
	Axial run out(no load)	μm	50(Standard) / 10(High accuracy type)		
Absolute Positioning accuracy *6		arcsec	±15(When the absolute position compensation function option is used)		
Repeated Positioning accuracy(when reciprocating)		arcsec	±1		
Rotor moment of inertia		$kg·m^2$	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 servo driver	VPH Series	NCR-H□	2801A-A-□□□	2152A-A-□□□	2222A-A-□□□

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

*2 Shown in parentheses is the value of the high accuracy type(option).

*3 The specification values are those obtained when the τDISC is mounted on a heat sink(aluminum plate) of one of the following sizes and operated at the ambient operating temperature.

・HD140 Type 640 mm×450 mm×50 mm

・HD180 Type 640 mm×450 mm×50 mm

*4 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.

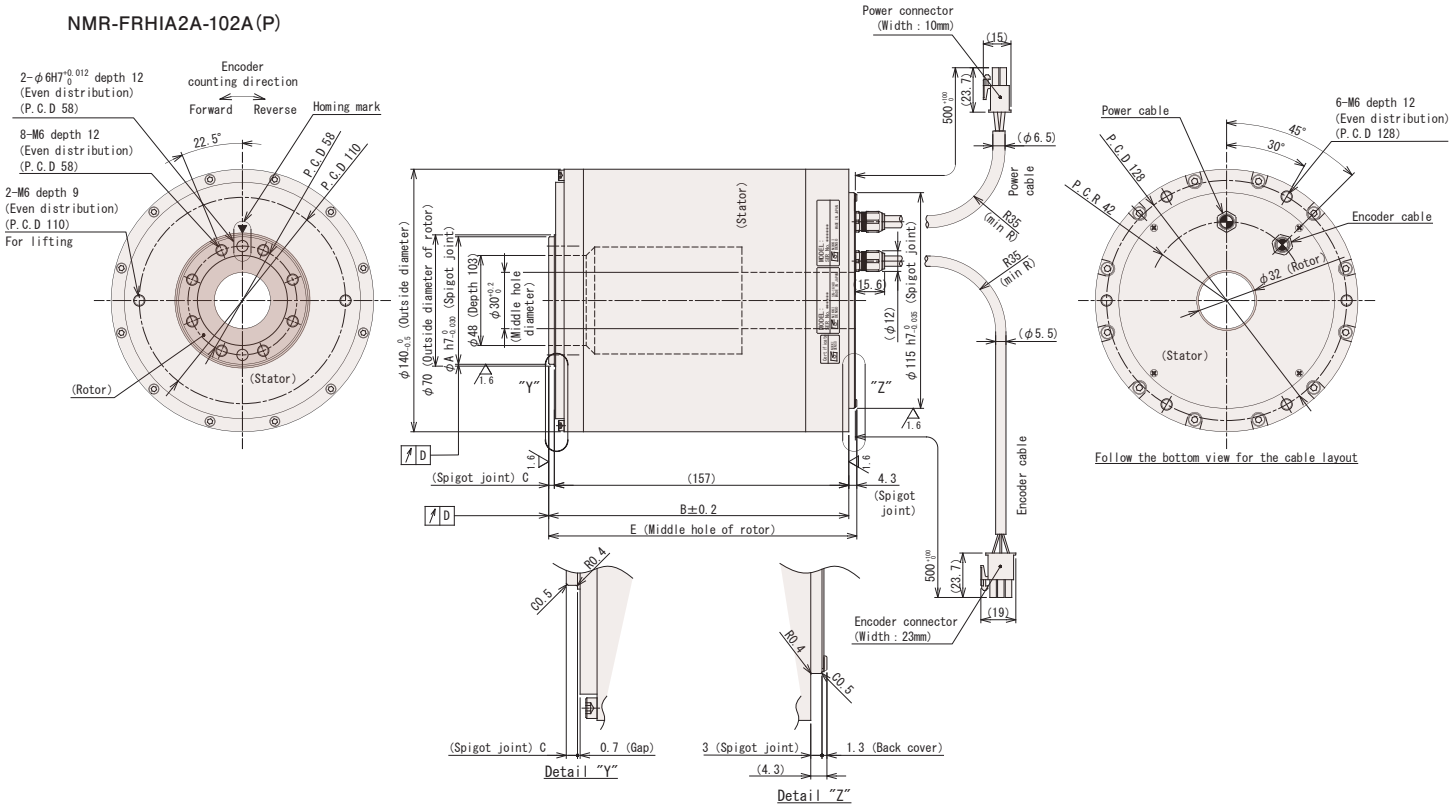
*5 For details, refer to "High accuracy type option for τDISC table surface rotation accuracy" on p.43.

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

τDISC HD-s Series Dimensions

◎HD140-160-LS(P)

NMR-FRHIA2A-102A(P)

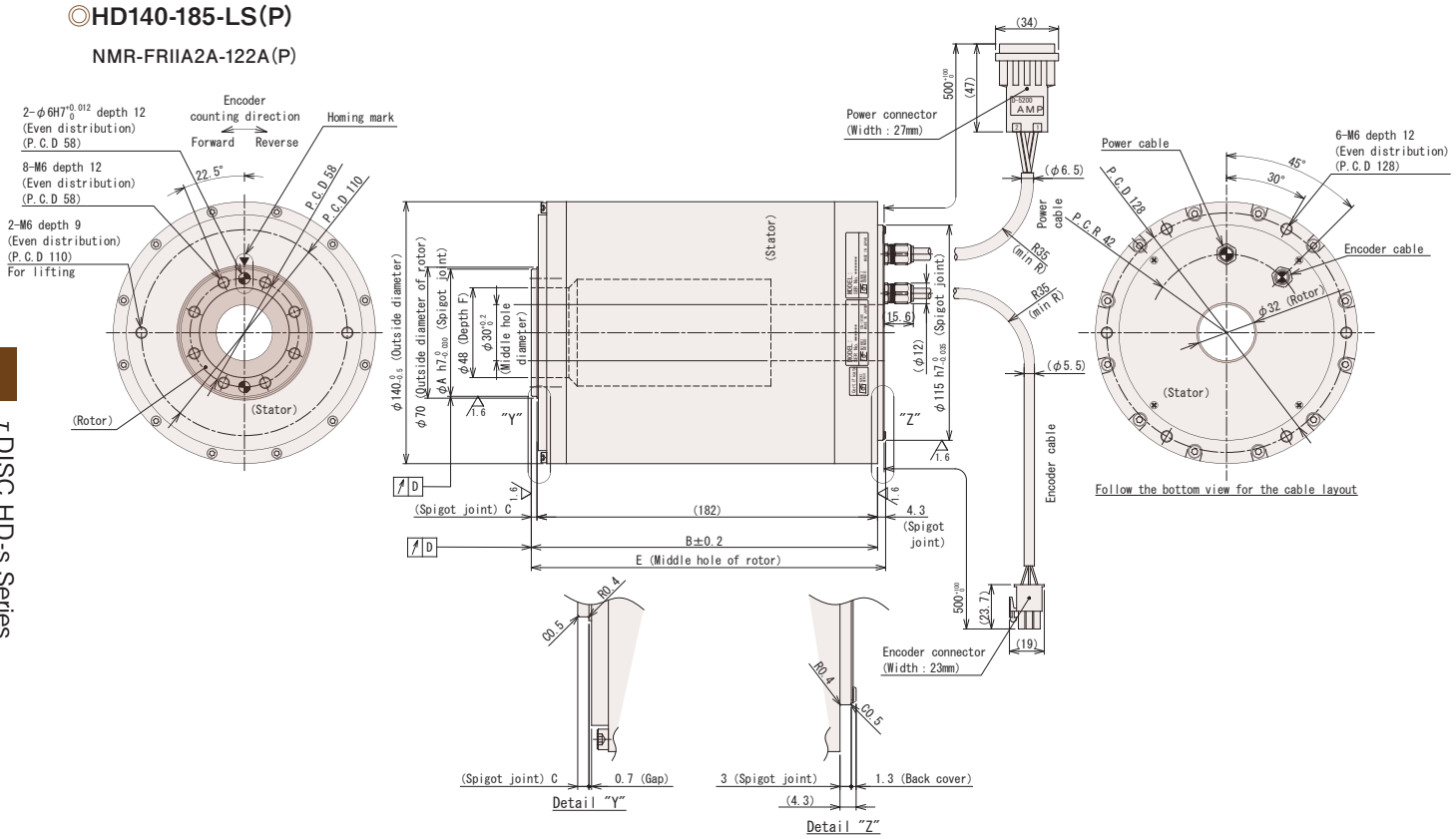


Motor type	A	B	C	D	E	F
HD140-160-LS	68	160	3	0.05	164.3	103
HD140-160-LSP	67.8	159.8	2.8	0.01	164.1	102.8

τDISC HD-s Series Dimensions

◎HD140-185-LS(P)

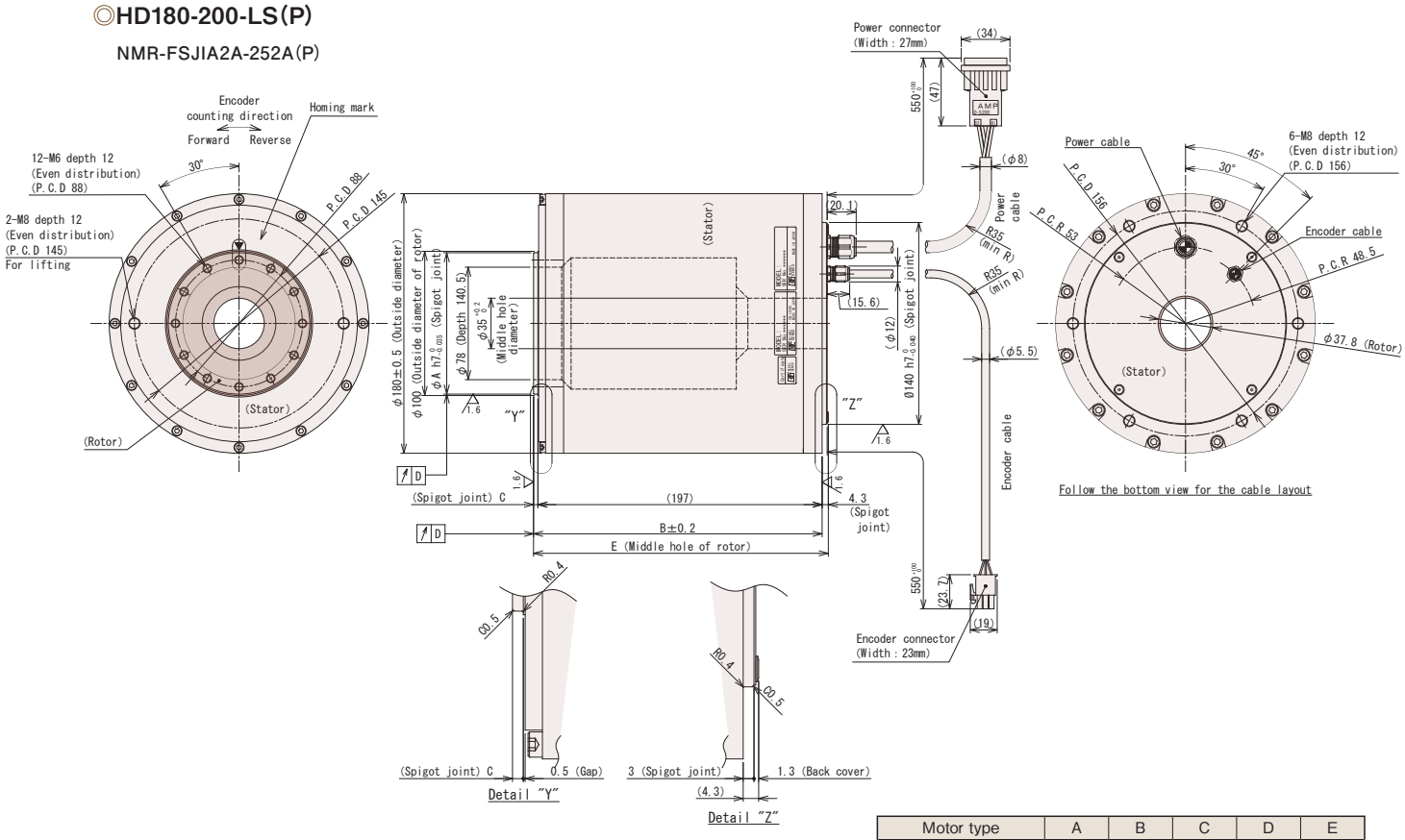
NMR-FRIIA2A-122A(P)



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

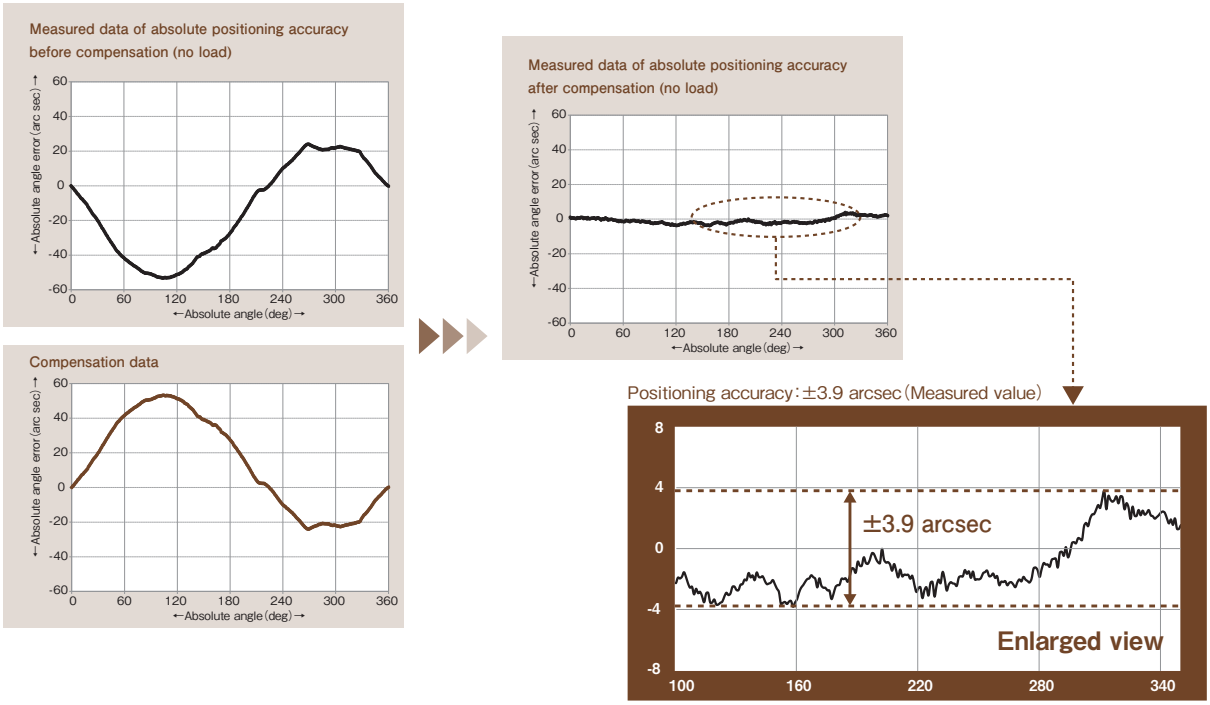
τDISC Absolute position compensation function option

This is an option that guarantees the absolute Positioning accuracy of 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



◎Absolute position compensation function option system table

τDISC		Ordered product model	
		Compensation data to be measured by us and to be transferred by the user *2 *3	
Motor type	Encoder type	τDISC	Servo driver(VPH Series *4)
ND-s	Absolute/ Incremental *1	ND-s SeriesModel+ **NMR-X00**(Option)	NCR-H□□□□□A-A-□**0**□
ND-s HS HD-s	Incremental	ND-s HS/HD-s SeriesModel+ **NMR-X00**(Option)	NCR-H□□□□□A-A-□**0**□
DD-s	Absolute/ Incremental *1	DD□□-□□□□□□□□□-**0**	NCR-H□□□□□A-A-□**0**□

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

*2 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).

*3 We can ship the VPH Series with compensation data built in it. In that case, the ordered product model shown in red in the system table is different. Contact our sales staff.

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

■τDISC High accuracy type 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.

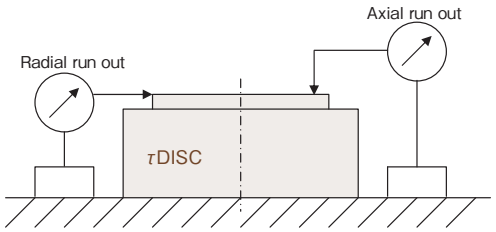
◎Radial run out and axial run out accuracy guaranteed by the high accuracy type option

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



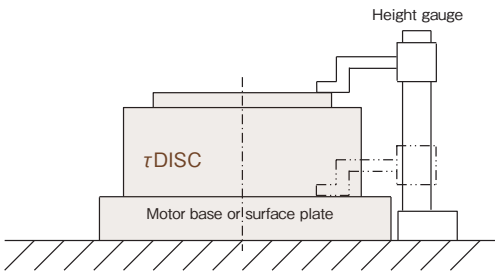
■τDISC Parallelization processing specification option

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 type option for table surface rotation accuracy.

◎Parallelism measurement method

For the standard specification, 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, with the output axis rotary table stopped at the origin position. The parallelism is the difference between the maximum and minimum values.

For the parallelization processing specification, use a 3D measuring instrument for measurement.

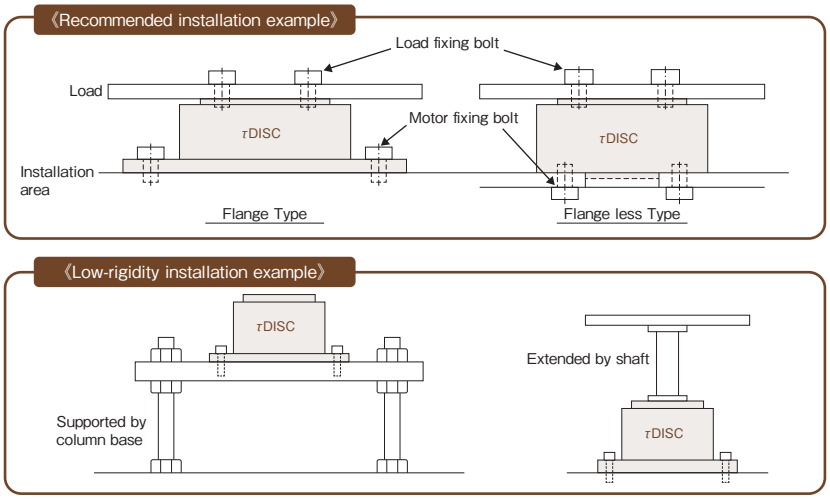


τDISC Notes on selection and design

◎About installation of τDISC

When installing the τDISC, 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 are 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.



◎About the allowable loads of τDISC

- The allowable axial load and allowable moment load shown in the individual specifications of the τDISC 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.

Installation direction	Series	Allowance value guide
When using the motor with the rotor facing upward or sideways	All τDISC Series	70% or less of each allowable value *
When using the motor with the rotor facing downward	DD-s Series	30% or less of allowable axial load, 70% or less of allowable moment load
	Other than the DD-s Series	Consult with our sales staff.

* If you have the motor keep rotating with a load applied, make sure that each load is within 30% of the relevant allowable value.

◎About magnetic pole detection of τDISC

- The τDISC 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 ompleted 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 τDISC servo motor.

◎About the small angle operation of τDISC

- 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.

◎About the selection calculation of τDISC

- The selection calculation sheet for rotor index positioning can be downloaded from our website.

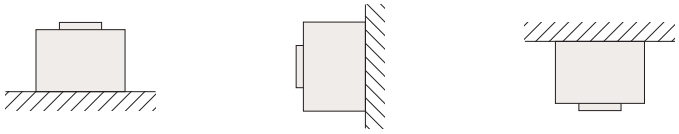
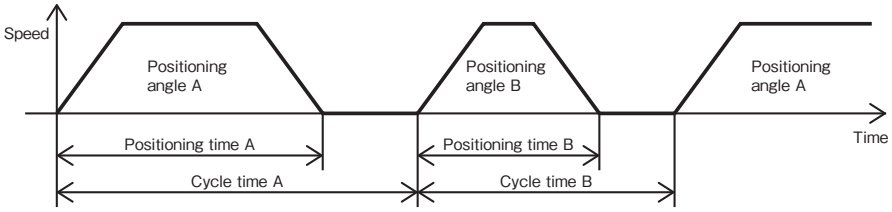
* For information about the selection of the HD-s Series, contact our sales staff.

Details about τDISC mounting, installation, usage instructions, etc. are given in the instruction manual of the τDISC servo 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( ) mm Repeated Positioning accuracy ±( ) μm Absolute Positioning accuracy ±( ) μm Table surface rotation accuracy — Axial run out ( ) μm Radial run out ( ) μm
Outline requirements	Size limitations — Height ( )mm or less Outside diameter ( )mm or less Use of middle hole diameter ☐None ☐With ( )mm or more
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 =200 W Exponential part of powers of 10 Significant figures
⑥	Hardware specification	A…Standard specification
⑦	Paired motor	A…τDISC
⑧	Analog option *1	0…None
		1…With
⑨	Absolute position compensation data incorporation	0…None
⑩	STO option *2	0…None
		1…With
⑪	Special model symbol	Without…Standard specification
		-S + sequential number…Special model specification

*1 Only the VPH-HA Type(I/O type) is supported.

*2 This option provides a safety function(Safe Torque Off: STO) to shut down the power supply to the τDISC 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 functions and safety performance of this option, refer to "Servo driver VPH Series function specifications" on pp. 50 - 53. For details, refer to the "VPH Series STO Option Manual".

■Common specifications

Ambient condition	Temperature			During operation: 0 to 55℃ During storage: -20 to 65℃
	Humidity			During operation and storage: 90%RH or less; no condensation
	Installation location			Do not install in a harmful atmosphere containing corrosive gas, grinding oil, metal dust, oil, etc. Install in an indoor place 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 *2	Speed control	Speed control range *3		1:5000 For the analog speed command 1:2000 *4
		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 *4
	Torque control	Resolution		1:1000(Up to the rated torque)
		Reproducibility		±1%(Up to the rated torque)

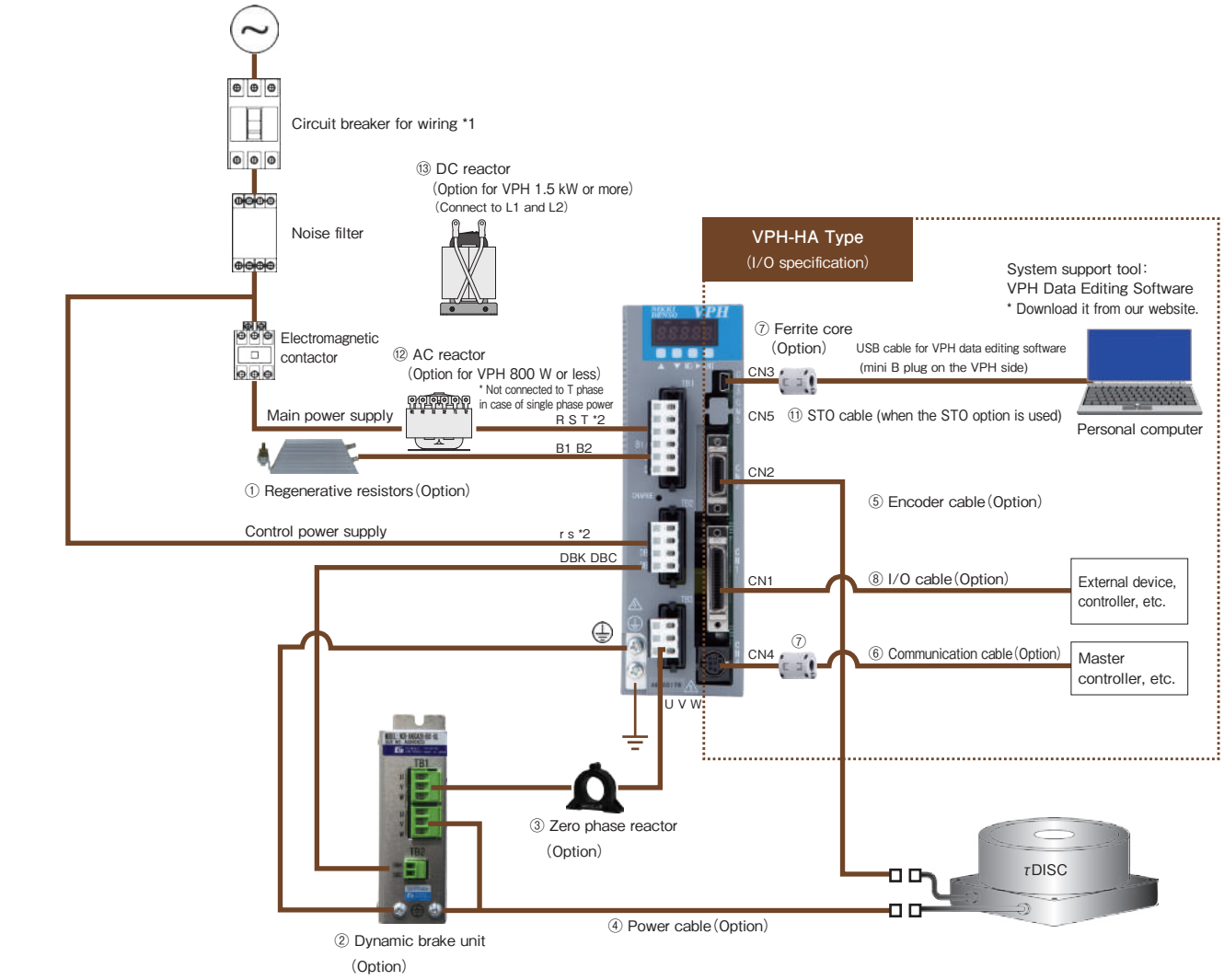
*1 The regenerative resistor is optional.

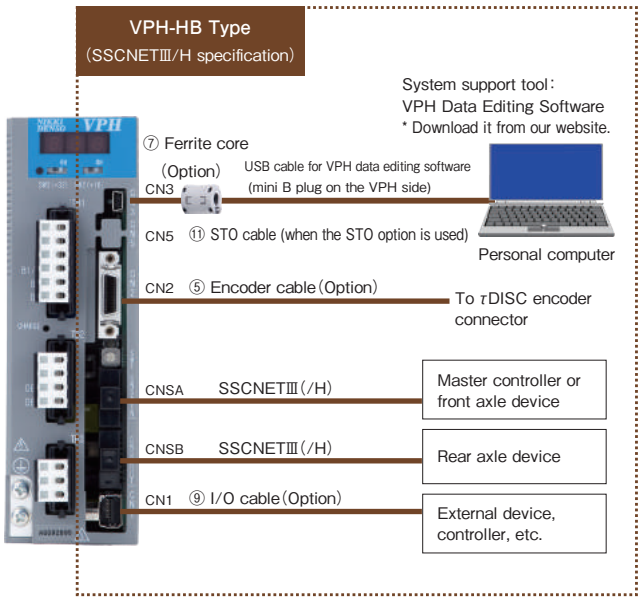
*2 The performance values are those of the servo driver itself. Depending on the combination with a motor, the performance values may not be met.

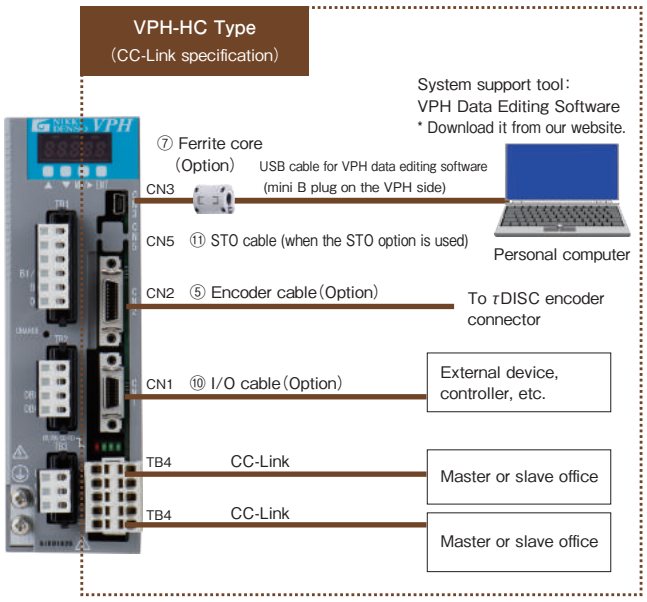
*3 It is assumed that the motor does not stop when the load is 100%.

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

Servo driver VPH Series System configuration



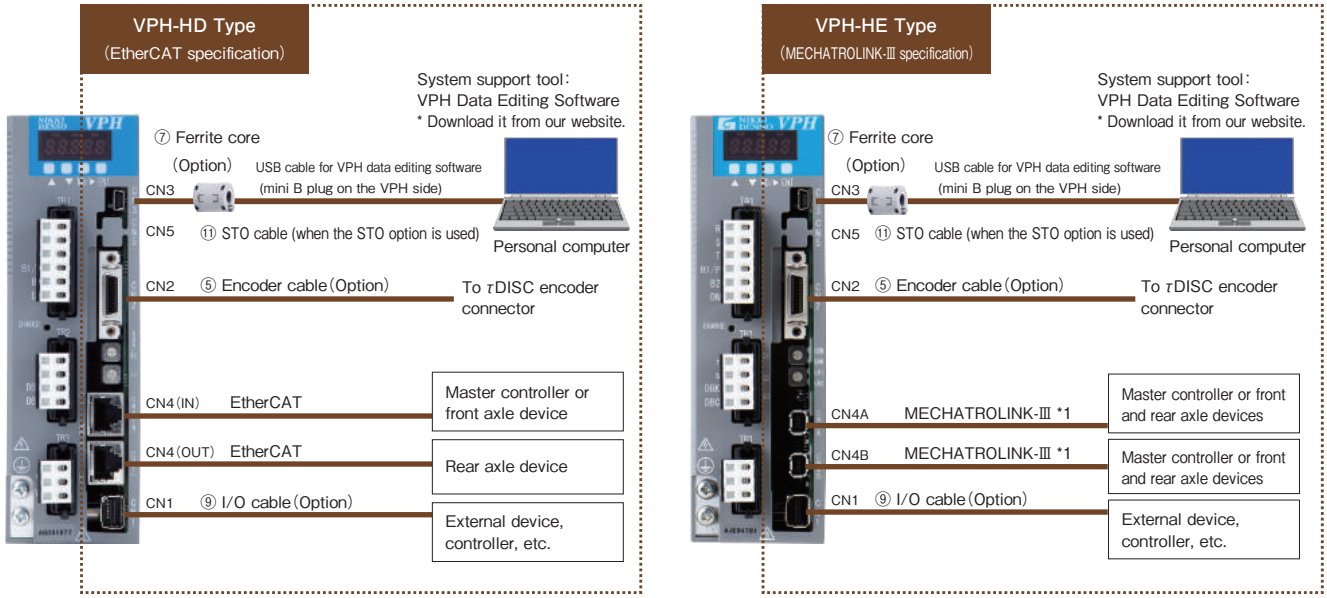




*1 When selecting the circuit breaker for wiring, refer to the values of the rated capacity in "Individual specifications for the VPH Series" on p.49.

*2 For details of the electric wire, refer to the section of the instruction manual of the relevant type of the VPH Series describing the application electric wire.

Servo driver VPH Series System configuration



*1 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 our website and make a check.	P.73
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.72
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.69
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.61,63-65
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.61-62
⑥	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.68
⑦	Ferrite core	This option prevents malfunctions due to noise, such as monitor display interruption and the forced shutdown of the editing software.	P.68
⑧	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.66
⑨	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.67
⑩	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.67
⑪	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.67
⑫	AC reactor	This reactor makes the waveform of the input current approximate to that of a sine wave to suppress harmonics. Option for the VPH Series products with an output capacity of 800 W or less.	P.70
⑬	DC reactor	This reactor makes the waveform of the input current approximate to that of a sine wave to suppress harmonics. Option for the VPH Series products with an output capacity of 1.5 kW or more.	P.71

*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□	1101A-A-□□□	1201A-A-□□□	2101A-A-□□□	2201A-A-□□□	2401A-A-□□□
Output capacity		W	100	200	100	200	400
Main circuit input power supply	Rated voltage	V	AC100 to 120 1φ		AC200 to 240 1φ or 3φ		
	Frequency	Hz	50/60		50/60		
	Permissible voltage fluctuation	V	AC85 to 132		AC170 to 264		
	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	A	23【12ms】*1	23【12ms】*1	45【5ms】*2	45【5ms】*2	45【5ms】*2
Control circuit input power supply	Rated voltage	V	AC100 to 120 1φ		AC200 to 240 1φ		
	Frequency	Hz	50/60		50/60		
	Permissible voltage fluctuation	V	AC85 to 132		AC170 to 264		
	Input rated current	Arms	0.24	0.24	0.12	0.12	0.12
	Power consumption	W	15	15	15	15	15
	Inrush current	A	17【5ms】*1	17【5ms】*1	17【3ms】*2	17【3ms】*2	17【3ms】*2
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□	2801A-A-□□□	2152A-A-□□□	2222A-A-□□□	2332A-A-□□□
Output capacity		W	800	1.5k	2.2k	3.3k
Main circuit input power supply	Rated voltage	V	AC200 to 240 1φ or 3φ	AC200 to 240 3φ		
	Frequency	Hz	50/60	50/60		
	Permissible voltage fluctuation	V	AC170 to 264			
	Input rated current	Arms	9.0(1φ) 5.2(3φ)	9.6	13.5	17.0
	Rated capacity	kVA	1.8	3.0	4.2	5.9
	Inrush current	A	45【9ms】*2	33【18ms】*2	33【18ms】*2	85【10ms】*2
Control circuit input power supply	Rated voltage	V	AC200 to 240 1φ			
	Frequency	Hz	50/60			
	Permissible voltage fluctuation	V	AC170 to 264			
	Input rated current	Arms	0.12	0.15	0.15	0.18
	Power consumption	W	15	18	18	20
	Inrush current	A	17【3ms】*2	17【3ms】*2	17【3ms】*2	34【2ms】*2
Continuous output current		Arms	6.8	10.0	16.0	24.0(25.0) *3
Instant output current		Arms	17.0	30.0	35.0	63.0
Structure(IP code)			Forced cooling(IP20)			
Weight		kg	Approx.1.5	Approx.2.3	Approx.2.3	Approx.3.7

Model		NCR-H□	2702A-A-□□□	2153A-A-□□□
Output capacity		W	7k	15k
Main circuit input power supply	Rated voltage	V	AC200 to 240 3φ	
	Frequency	Hz	50/60	
	Permissible voltage fluctuation	V	AC170 to 264	
	Input rated current	Arms	44.0	68.0
	Rated capacity	kVA	16.0	23.5
	Inrush current	A	73【30ms】*2	73【38ms】*2
Control circuit input power supply	Rated voltage	V	AC200 to 240 1φ	
	Frequency	Hz	50/60	
	Permissible voltage fluctuation	V	AC170 to 264	
	Input rated current	Arms	0.4	0.4
	Power consumption	W	45	45
	Inrush current	A	26【3ms】*2	26【3ms】*2
Continuous output current		Arms	48.0	62.6
Instant output current		Arms	96.0	125.2
Structure(IP code)			Forced cooling(IP00)	
Weight		kg	Approx.7.5	Approx.9.5

*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.

*2 Value applicable when the rated voltage is 240 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.

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

■Servo driver VPH Series Functional specifications

◎VPH-HA Type(I/O specification)

Item \ Type(Model)		VPH-HA Type(NCR-HA□□□□A-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 the rated torque.
	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 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		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 to MD2(mode selection 1 to 2) / GSL1 to GSL2(gain selection 1 to 2) RVS(command direction reversal) / SS1 to SS8(command selection 1 to 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 to PE2(position deviation range 1 to 2) / PN1 to PN2(positioning complete 1 to 2) PZ1 to PZ2(positioning complete response 1 to 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 to OUT8(common output) SMOD(speed command mode in process) / TMOD(torque command mode in process) / PMOD(Pulse train command mode in process) NMOD(Built-in command mode in process) / OCEM(Marker output in process) 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, power LED, front data display 5-digit LED panel
Communication function		USB 2.0(full speed) standard compliance: 1 channel for connection between personal computer(VPH data editing software) and device RS-422：1ch
SEMI F47 compatible function		Torque limit function when the main circuit voltage drops(The control power must be supplied from a UPS.)
Safety function(Option)		STO(IEC/EN61800-5-2)
Safety performance(Option)		EN ISO13849-1 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.56.

■Servo driver VPH Series Functional specifications

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

Item \ Type(Model)			VPH-HB Type(NCR-HB□□□□A-A-□□□)	VPH-HD Type(NCR-HD□□□□A-A-□□□)
Communication mode	Operation mode		Speed command operation, torque command operation, and position control operation	
	Speed command	Command input	Command by 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	Command by 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	Command by 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 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)	5 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) GSL1 to GSL2(gain selection 1 to 2) ZLS(zero point deceleration) ZMK(external zero point marker) IN1 to IN2(common input 1 to 2) MTOH(motor overheat)
			When assigned to an external input signal, the signal logic can be changed. The status of the control input signal can be fixed to ON or OFF.	
Control output signal			2 external output signals In communication mode, the following signals can be assigned. *2 ALM(alarm) WNG(warning) RDY(servo ready) SZ(speed zero) PE1 to PE2(position deviation range 1 to 2) PN1 to PN2(positioning complete 1 to 2) 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) OTO(over travel in process) MTON(motor on) SMOD(speed command mode in process) TMOD(torque command mode in process) PMOD(position control mode in process) NMOD(Built-in command mode in process) OCEM(marker output)	3 external output signals In communication mode, the following signals can be assigned. *2 ALM(alarm) WNG(warning) RDY(servo ready) SZ(speed zero) PE1 to PE2(position deviation range 1 to 2) PN1 to PN2(positioning complete 1 to 2) 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) OTO(over travel in process) MTON(motor on) SMOD(speed command mode in process) TMOD(torque command mode in process) PMOD(position control mode in process) NMOD(Built-in command mode in process) 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, 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.	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, power LED, front data display 5-digit LED panel
Communication function			USB 2.0(full speed) standard compliance: 1 channel for connection between personal computer(VPH data editing software) 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 function(Option)			STO(IEC/EN61800-5-2)	
Safety performance(Option)			EN ISO13849-1 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.
For the initial assignment of the external input and output signals, refer to "Servo driver VPH Series external connection diagram VPH-HB Type" on P.57 and "Servo driver VPH Series external connection diagram VPH-HD Type" on P.59.

◎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 later
Q Series	·QD77MS□	Supported serial number: First 5 digits 17102 or later
L Series	·LD77MS□	Supported serial number: First 5 digits 17102 or later
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-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 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. 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 to MD2(mode selection 1 to 2) / GSL1 to GSL2(gain selection 1 to 2) RVS(command direction reversal) / SS1 to SS8(command selection 1 to 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 to PE2(position deviation range 1 to 2) / PN1 to PN2(positioning complete 1 to 2) PZ1 to PZ2(positioning complete response 1 to 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 to OUT8(common output) SMOD(speed command mode in process) / TMOD(torque command mode in process) / PMOD(Pulse train command mode in process) NMOD(Built-in command mode in process) / 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, power LED, front data display 5-digit LED panel
Communication function		・USB 2.0(full speed) standard compliance: 1 channel for connection between personal computer(VPH data editing software) and device ・CC-Link(Ver.1.10) : 1ch
SEMI F47 compatible function		Torque limit function when the main circuit voltage drops(The control power must be supplied from a UPS.)
Safety function(Option)		STO(IEC / EN61800-5-2)
Safety performance(Option)		EN ISO13849-1 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.58.

■Servo driver VPH Series Functional specifications

◎VPH-HE Type(MECHATROLINK-Ⅲ specification)

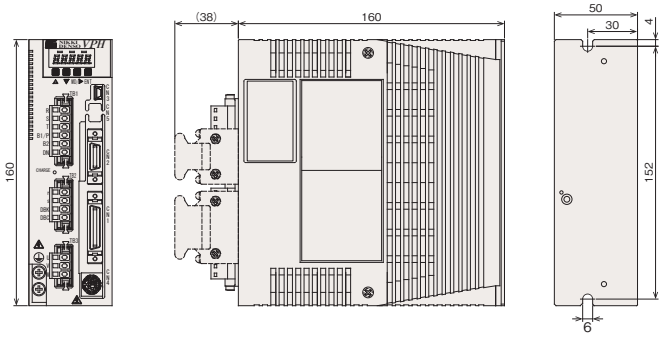
Item \ Type(Model)			VPH-HE Type (NCR-HE□□□□A-A-□□□)
Communication mode	Operation mode		Speed command operation, torque command operation, and position control operation
	Speed command	Command input	Issued from MECHATROLINK-Ⅲ
	Torque command	Command input	Issued from MECHATROLINK-Ⅲ
	Position control	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	8 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	8 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 INDEX(index positioning) : Shortcut/unidirectional HOME(zero point return) : STD HOME, LS LESS, OT HOME, STOP HOME, OT LSLESS, 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 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			5 external input signals. In communication mode, the following signals can be assigned. *2 ARST(alarm reset) EMG(emergency stop) TL(torque limit) FOT(forward direction over travel) ROT(reverse direction over travel) GSL1 to GSL2(gain selection 1 to 2) ZLS(zero point deceleration) ZMK(external zero point marker) MTOH(motor overheat) EXT1 to EXT3(1st to 3rd external latch inputs) When assigned to an external input signal, the signal logic can be changed. The status of the control input signal can be fixed to ON or OFF.
Control output signal			3 external output signals. In communication mode, the following signals can be assigned. *2 ALM(alarm) WNG(warning) RDY(servo ready) SZ(speed zero) PE1 to PE2(position deviation range 1 to 2) PN1 to PN2(positioning complete 1 to 2) 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) OTO(over travel in process) MTON(motor on) PMOD(position control mode in process) NMOD(Built-in command mode in process) 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, 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, power LED, front data display 5-digit LED panel
Communication function			・MECHATROLINK-Ⅲ:2ch ・USB 2.0(full speed) standard compliance: 1 channel for connection between personal computer(VPH data editing software) 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 function(Option)			STO(IEC/EN61800-5-2)
Safety performance(Option)			EN ISO13849-1 Cat3 PL e EN61508 SIL3

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

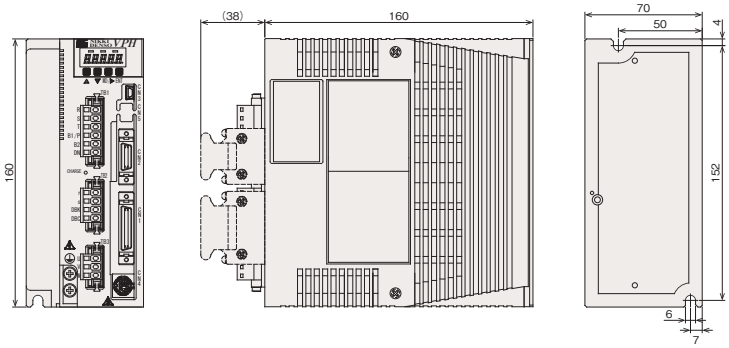
*2 The signals that can be assigned in maintenance mode are different. For details, refer to the section of the instruction manual of the relevant VPH type describing the control input and output signals. For the initial assignment of the external input and output signals, refer to "Servo driver VPH Series external connection diagram VPH-HE Type" on P.60.

Servo driver VPH Series Dimensions

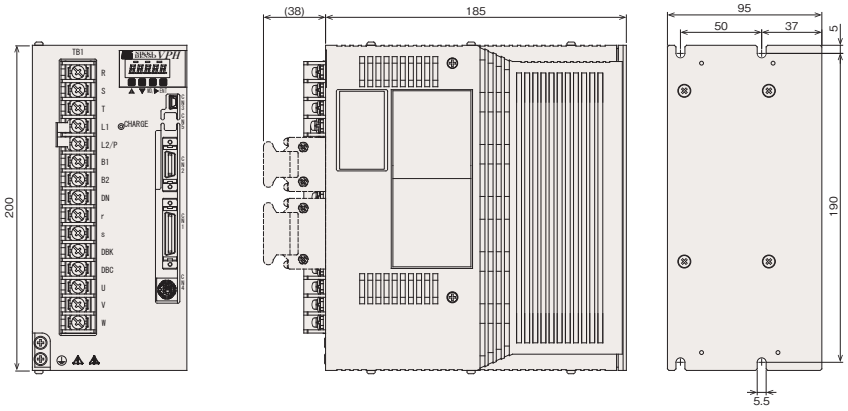
NCR-H□1101A/1201A-A-□□□
NCR-H□2101A/2201A/2401A-A-□□□



NCR-H□2801A-A-□□□



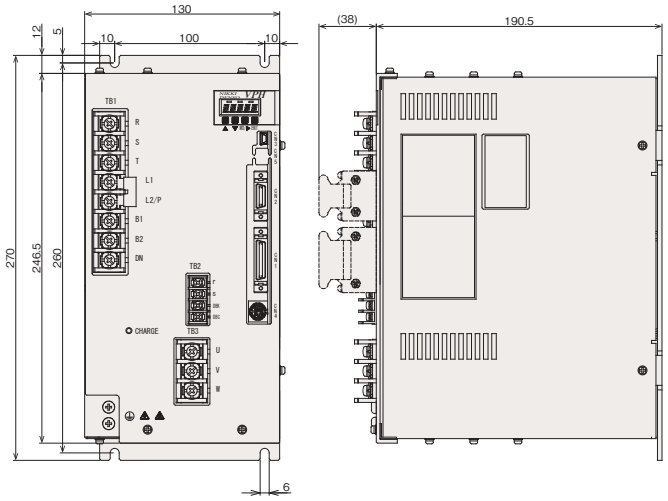
NCR-H□2152A/2222A-A-□□□



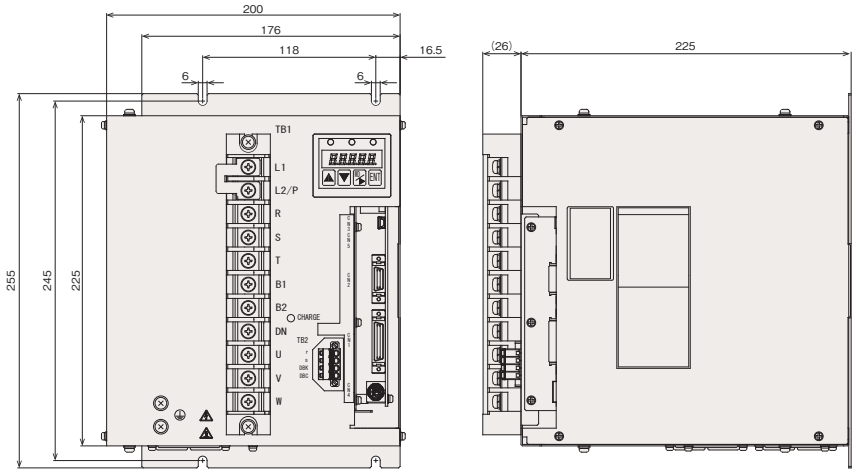
* The above dimensions are those of the VPH-HA Type. The dimensions of the VPH-HB/HC/HD/HE Type are the same.

■Servo driver VPH Series Dimensions

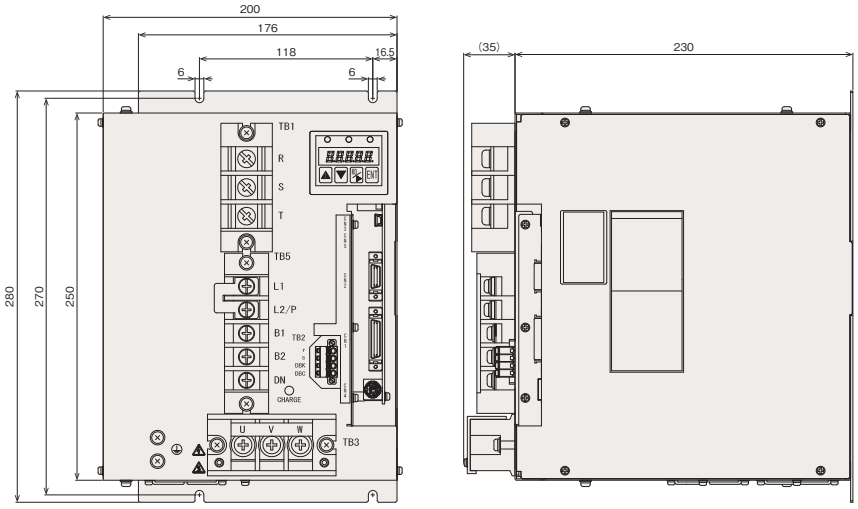
NCR-H□2332A-A-□□□



NCR-H□2702A-A-□□□



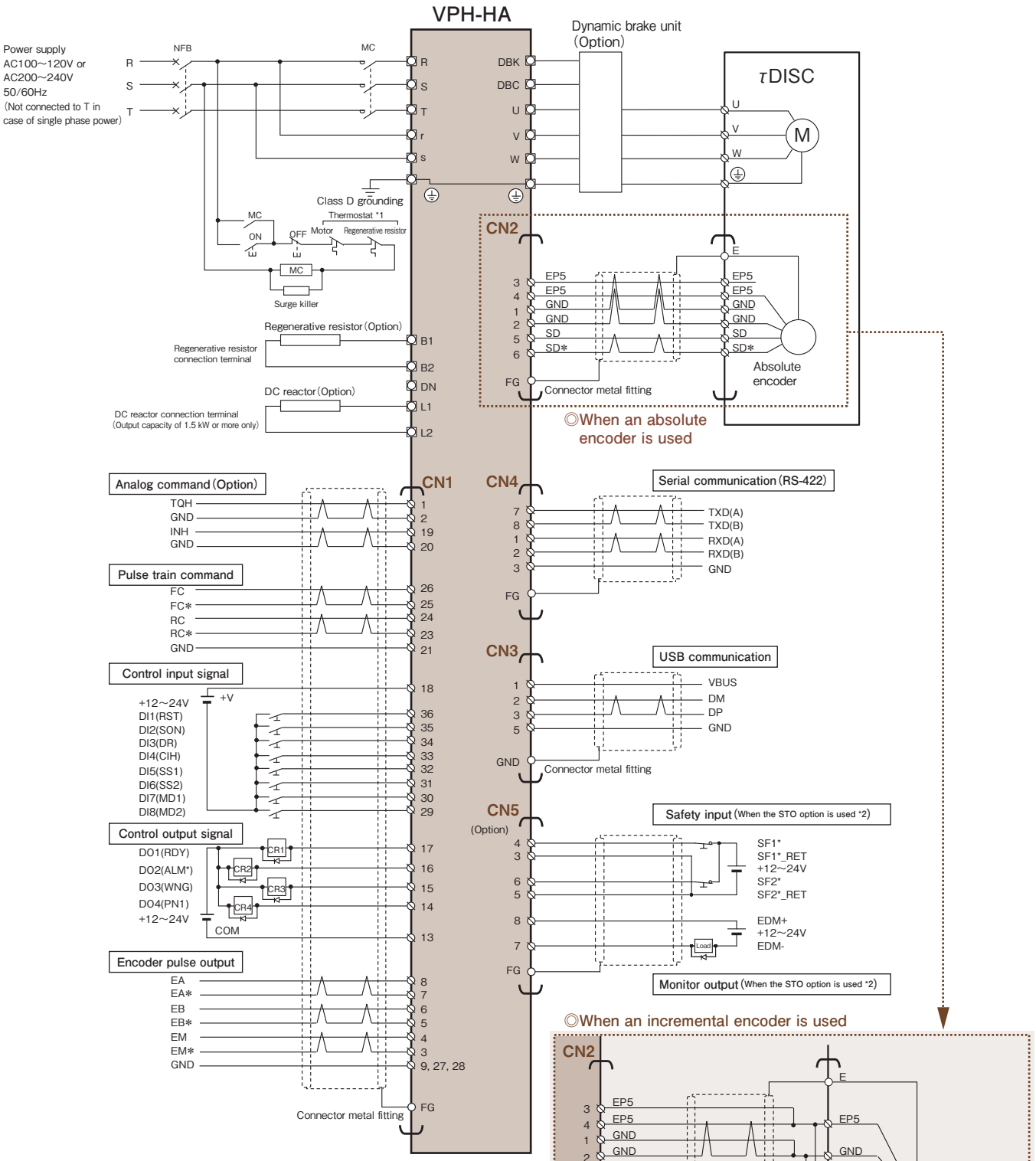
NCR-H□2153A-A-□□□



* The above dimensions are those of the VPH-HA Type. The dimensions of the VPH-HB/HC/HD/HE Type are the same.

■Servo driver VPH Series External wiring diagram

◎VPH-HA Type(I/O specification)



* 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.

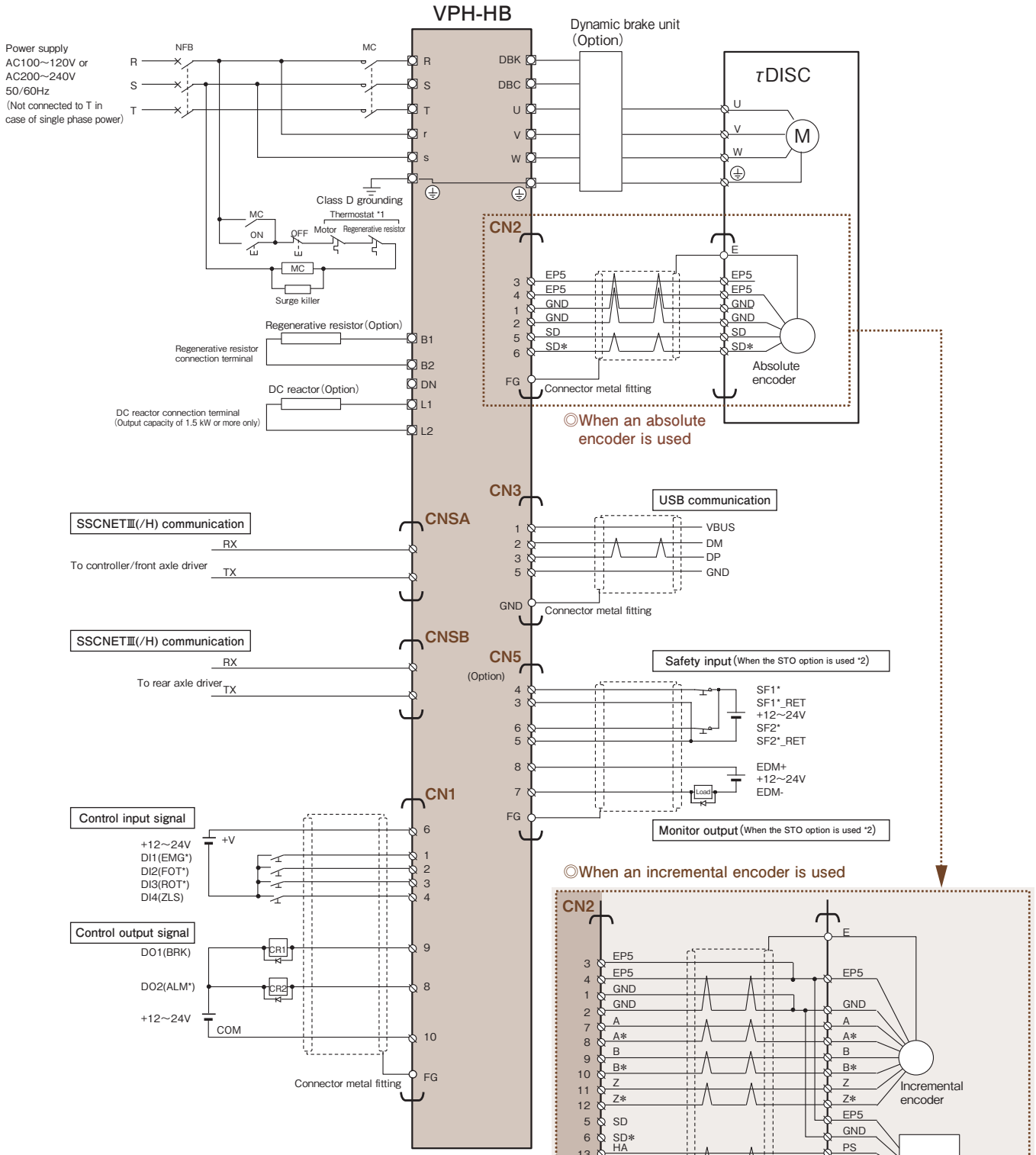
* A control input signal power supply(+12 V, 2.5 mA to +24 V, 5 mA) must be prepared by the user.

*1 The motor is not equipped with a thermostat.

*2 When the STO option is used, the servo driver is shipped with the STO short-circuit plug(for details, refer to P.67) connected to CN5 as an accessory.

■Servo driver VPH Series External wiring diagram

◎VPH-HB Type(SSCNETⅢ/H specification)



* 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.

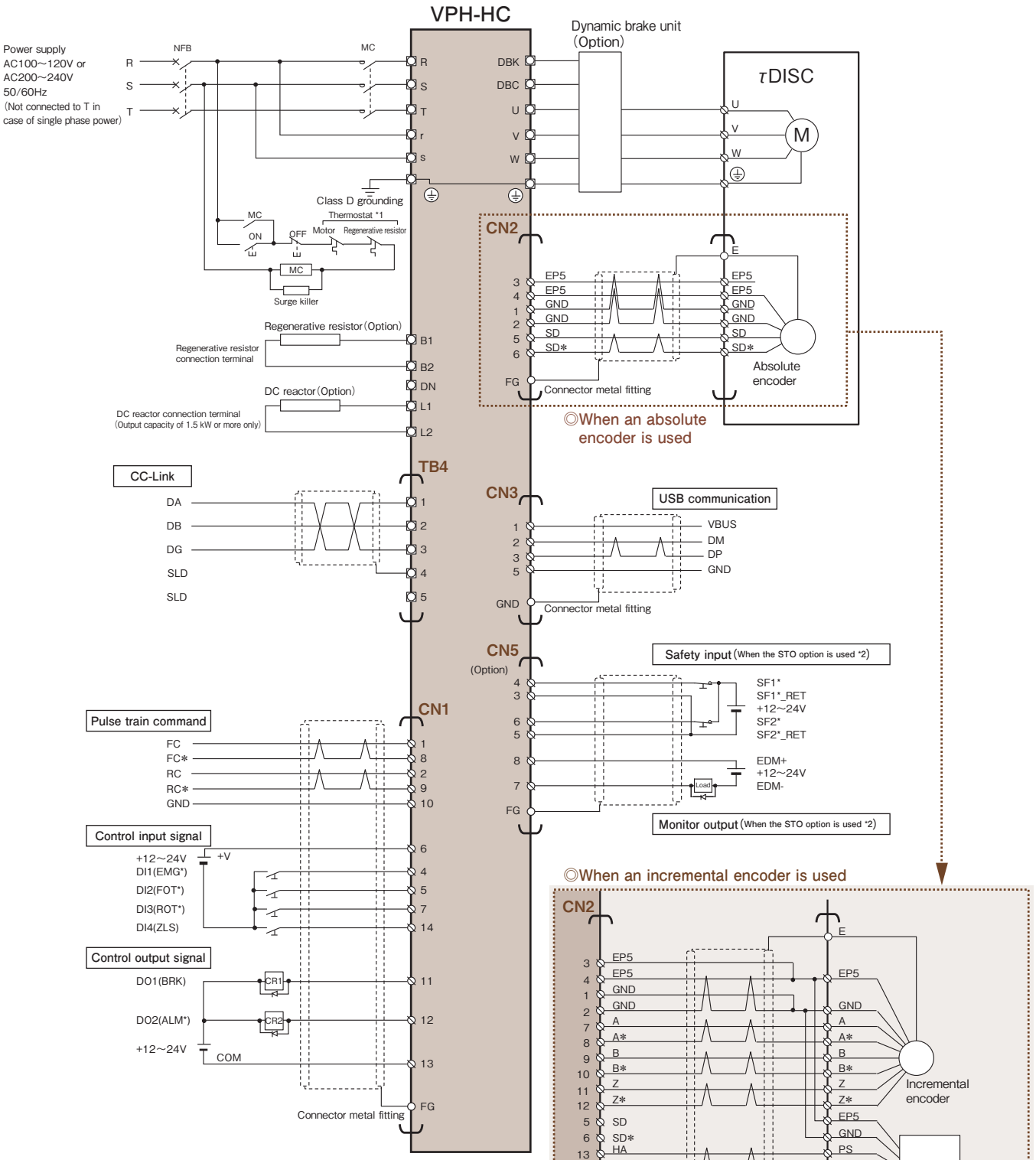
* A control input signal power supply(+12 V, 2.5 mA to +24 V, 5 mA) must be prepared by the user.

*1 The motor is not equipped with a thermostat.

*2 When the STO option is used, the servo driver is shipped with the STO short-circuit plug(for details, refer to P.67) connected to CN5 as an accessory.

■Servo driver VPH Series External wiring diagram

◎VPH-HC Type(CC-Link specification)



* 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.

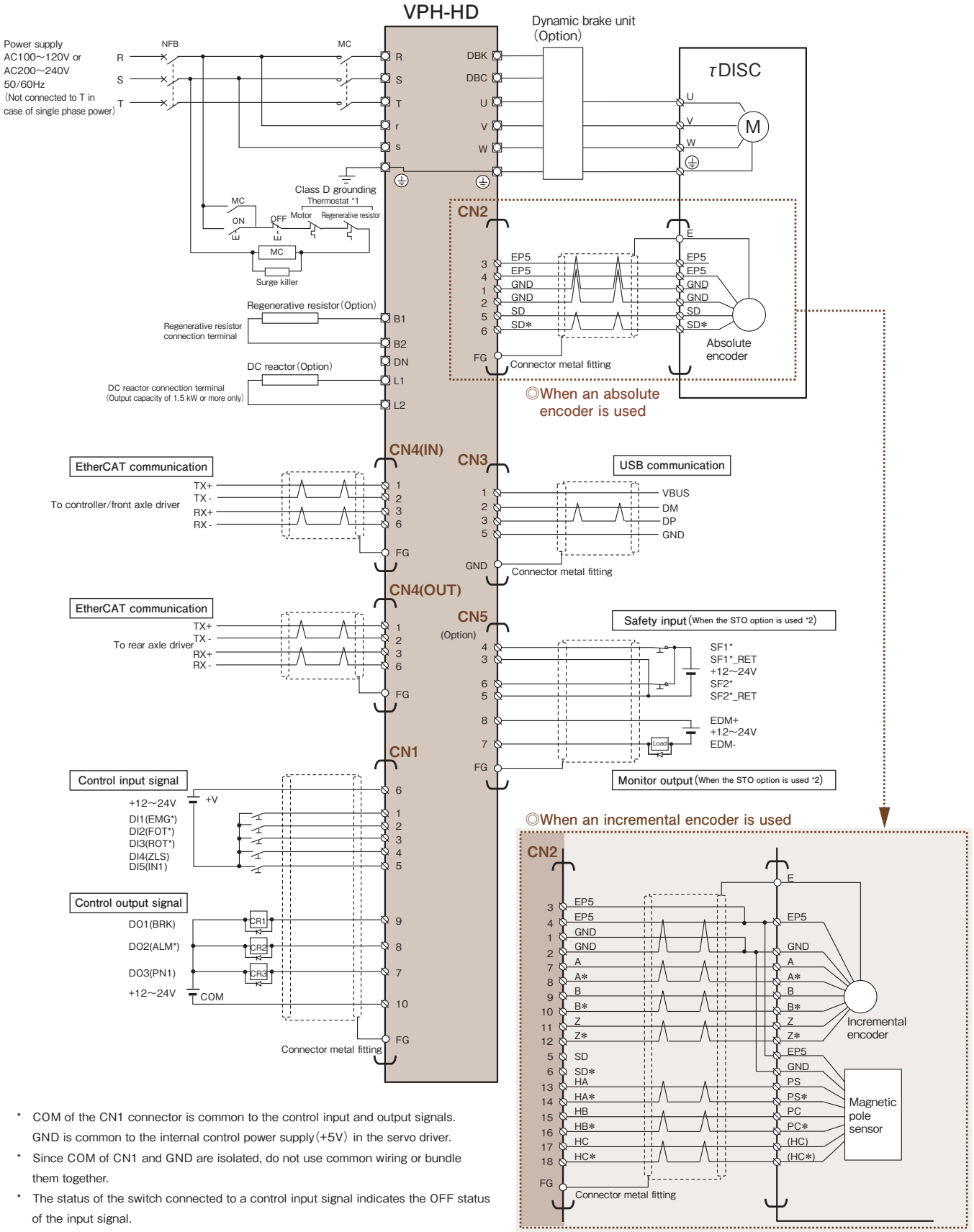
* A control input signal power supply(+12 V, 2.5 mA to +24 V, 5 mA) must be prepared by the user.

*1 The motor is not equipped with a thermostat.

*2 When the STO option is used, the servo driver is shipped with the STO short-circuit plug(for details, refer to P.67) connected to CN5 as an accessory.

■Servo driver VPH Series External wiring diagram

◎VPH-HD Type (EtherCAT specification)



* 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.

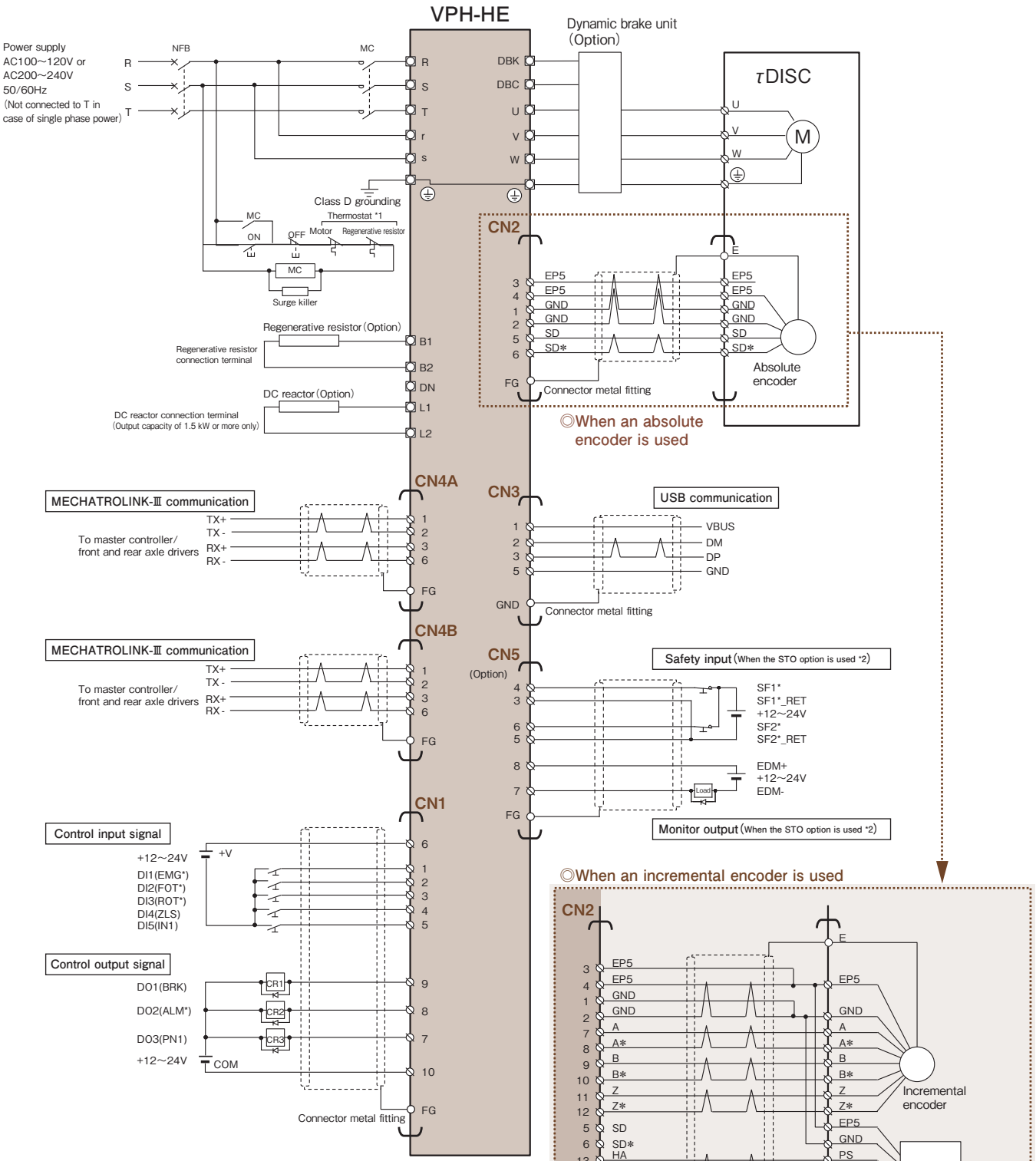
* A control input signal power supply (+12 V, 2.5 mA to +24 V, 5 mA) must be prepared by the user.

*1 The motor is not equipped with a thermostat.

*2 When the STO option is used, the servo driver is shipped with the STO short-circuit plug (for details, refer to P.67) connected to CN5 as an accessory.

■Servo driver VPH Series External wiring diagram

◎VPH-HE Type(MECHATROLINK-Ⅲ specification)



* 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 The motor is not equipped with a thermostat.

*2 When the STO option is used, the servo driver is shipped with the STO short-circuit plug (for details, refer to P.67) connected to CN5 as an accessory.

■Encoder cable and power cable combination list

τDISC				Encoder cable		Power cable	
				Absolute (For movable motor)	Incremental (For movable motor)	Not shielded (For movable motor)	Shielded (For movable motor)
Series	Motor type		Motor model *2	**Description No.** Model	**Description No.** Model	**Description No.** Model	**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-7** *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-8** *3 NCR-XBBFA-
	ND250-	55-FS(P)	NMR-SEM□A2A-791A(P)			**P-1** *3 NCR-XBBBA-	**P-7** *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-8** *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-9** *3 NCR-XBBIA-
		160-LS(P)	NMR-SUH□A2A-622A(P)			**P-4** NCR-XBEMA-	**P-10** *3 NCR-XBENA-
ND-s HS	ND110-	85-FS(P)-HS	NMR-SAUIA2A-551A(P)	–	**E-3** NCR-XBCNA-	**P-1** *3 NCR-XBBBA-	**P-7** *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-8** *3 NCR-XBBFA-
	ND180-	95-LS(P)-HS	NMR-SSEIA2A-162A(P)				
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-7** *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-8** *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-10** *3 NCR-XBENA-
		200-LS(P5/P3)	DD40-622L02CNN(-P/-P3)				
		250-LS(P5/P3) (1.5rps spec)	DD40-702L01CNN(-P/-P3) * Paired servo driver model: NCR-H□2702□-A-□□□			**P-5** NCR-XBBTA-	**P-12** NCR-XBBVA- (for fixed motor)
			DD40-702L01CNN(-P/-P3) * Paired servo driver model: NCR-H□2153□-A-□□□			**P-6** NCR-XBEZA-	**P-13** NCR-XBL1A- (for fixed motor)
		250-LS(P5/P3) (1rps spec)	DD40-472L01CNN(-P/-P3)			**P-4** NCR-XBEMA-	**P-10** *3 NCR-XBENA-
		250-LS(P5/P3) (2rps spec)	DD40-942L02CNN(-P/-P3)	**E-2** NCR-XBGFB-		–	**P-13** NCR-XBL1A- (for fixed motor)
	DD630-	175-LS(P10/P5)	DD63-842L01HNN(-P/-P5)			**P-5** NCR-XBBTA-	**P-11** *3 NCR-XBETA-
		225-LS(P10/P5)	DD63-123L01HNN(-P/-P5)			–	**P-13** NCR-XBL1A- (for fixed motor)
HD-s	HD140-	160-LS(P)	NMR-FRHIA2A-102A(P)	–	**E-3** NCR-XBCNA-	**P-1** *3 NCR-XBBBA-	**P-7** *3 NCR-XBBCA-
		185-LS(P)	NMR-FRIIA2A-122A(P)			**P-2** *3 NCR-XBBEA-	**P-8** *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	NCR-XBGGA -030	3m	Twisted pair shield cable 0.5SQ×1P+0.2SQ×4P P1 J1 L	◎NCR-XBDVA		P1(Driver side) / J1(Encoder side)
	-050	5m				
	-070	7m				
	-100	10m				
	-150	15m				
	-200	20m				
	NCR-XBGGA -250-Z	25m	Twisted pair shield cable 0.5SQ×1P+0.2SQ×4P P1 J1 Mark tube P2 1000±30 L * 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) P2 signal chart
	-300-Z	30m				
E-2	NCR-XBGFB -030	3m	Twisted pair shield cable 0.5SQ×1P+0.2SQ×4P P1 J1 L	◎NCR-XBDWA		P1(Driver side) / J1(Encoder side)
	-050	5m				
	-070	7m				
	-100	10m				
	-150	15m				
	-200	20m				
	NCR-XBGFB -250-Z	25m	Twisted pair shield cable 0.5SQ×1P+0.2SQ×4P P1 J1 Mark tube P2 1000±30 L * 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) P2 signal chart
	-300-Z	30m				
E-3	NCR-XBCNA -030	3m	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 P1 J1 L	◎NCR-XBC8A		P1(Driver side) / J1(Encoder side) * NCR-XBCNA-160 to NCR-XBCNA-200 are not connected.
	-050	5m				
	-070	7m				
	-100	10m				
	-150	15m				
	-200	20m				

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

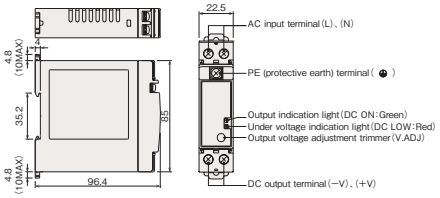
* Optionally, the encoder cable can also be purchased in units of 1 meter.

*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

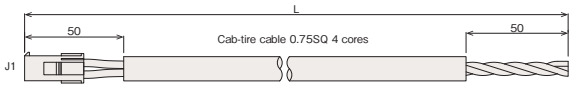


■Unshielded power cable list

Description No.	Model	Length (L)	Power cable dimensions	Signal chart

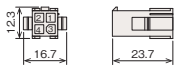
P-1

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



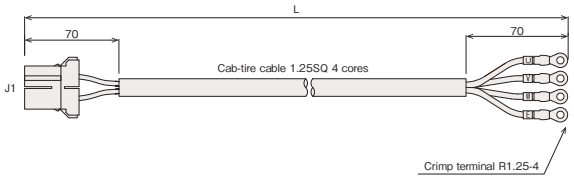
Signal name	J1 pin name	Cable color
U	1	Red
V	2	White
W	3	Black
E	4	Green

Power cable connector kit
CSZ-MOT



P-2

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

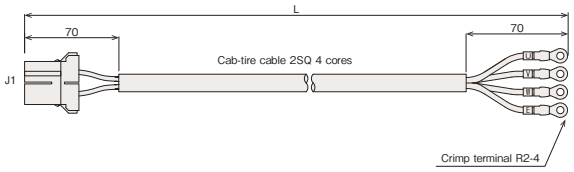


Signal name	J1 pin name	Cable color
U	B1	Red
V	B2	White
W	A1	Black
E	A2	Green

Power cable connector kit
NCR-XBB4A

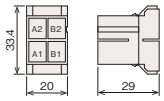
P-3

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



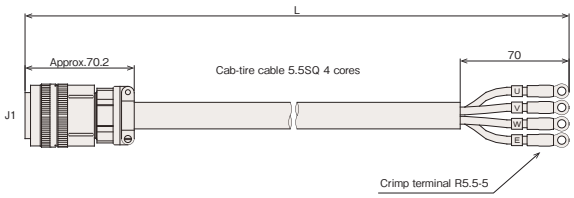
Signal name	J1 pin name	Cable color
U	B1	Red
V	B2	White
W	A1	Black
E	A2	Green

Power cable connector kit
NCR-XBB4A



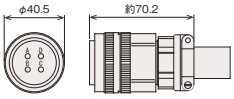
P-4

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



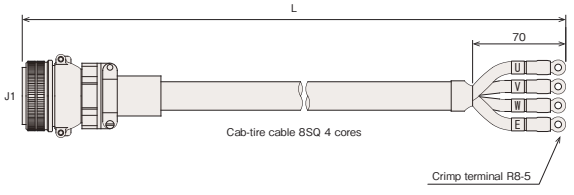
Signal name	J1 pin name	Cable color
U	A	Red
V	B	White
W	C	Black
E	D	Green

Power cable connector kit
CSZ5-MOT-B



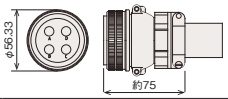
P-5

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



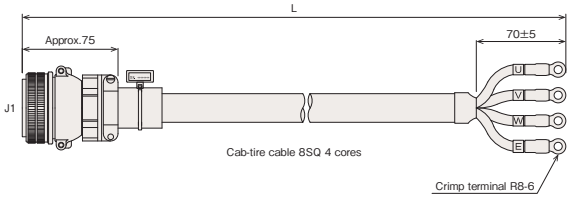
Signal name	J1 pin name	Cable color
U	A	Red
V	B	White
W	C	Black
E	D	Green

Power cable connector kit
NCR-XBD9A



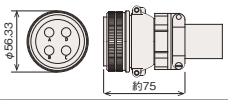
P-6

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



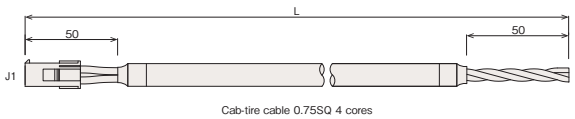
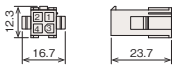
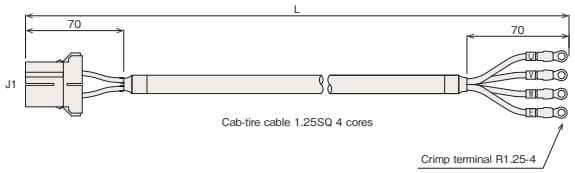
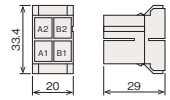
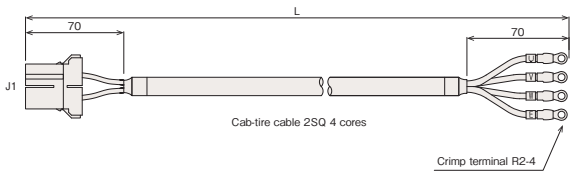
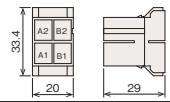
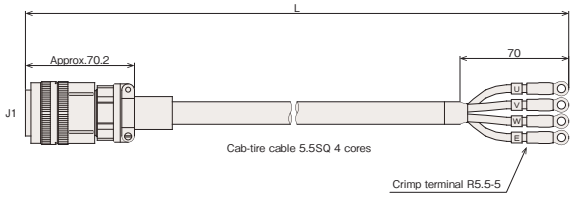
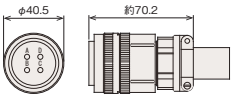
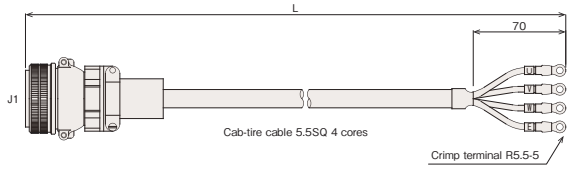
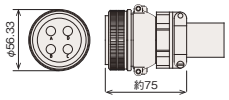
Signal name	J1 pin name	Cable color
U	A	Red
V	B	White
W	C	Black
E	D	Green

Power cable connector kit
NCR-XBD9A



* 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
P-7	NCR-XBBCA -030	3m		Signal name / J1 pin name / Cable color U / 1 / Red V / 2 / White W / 3 / Black E / 4 / Green/Yellow Power cable connector kit CSZ-MOT 
	-050	5m		
	-070	7m		
	-100	10m		
	-150	15m		
	-200	20m		
	-250	25m		
	-300	30m		
P-8	NCR-XBBFA -030	3m		Signal name / J1 pin name / Cable color U / B1 / Red V / B2 / White W / A1 / Black E / A2 / Green/Yellow Power cable connector kit NCR-XBB4A 
	-050	5m		
	-070	7m		
	-100	10m		
	-150	15m		
	-200	20m		
	-250	25m		
	-300	30m		
P-9	NCR-XBBIA -030	3m		Signal name / J1 pin name / Cable color U / B1 / Red V / B2 / White W / A1 / Black E / A2 / Green/Yellow Power cable connector kit NCR-XBB4A 
	-050	5m		
	-070	7m		
	-100	10m		
	-150	15m		
	-200	20m		
	-250	25m		
	-300	30m		
P-10	NCR-XBENA -030	3m		Signal name / J1 pin name / Cable color U / A / Red V / B / White W / C / Black E / D / Green/Yellow Power cable connector kit CSZ5-MOT-B 
	-050	5m		
	-070	7m		
	-100	10m		
	-150	15m		
	-200	20m		
	-250	25m		
	-300	30m		
P-11	NCR-XBETA -030	3m		Signal name / J1 pin name / Cable color U / A / Red V / B / White W / C / Black E / D / Green/Yellow Power cable connector kit NCR-XBD9A 
	-050	5m		
	-070	7m		
	-100	10m		
	-150	15m		
	-200	20m		
	-250	25m		
	-300	30m		

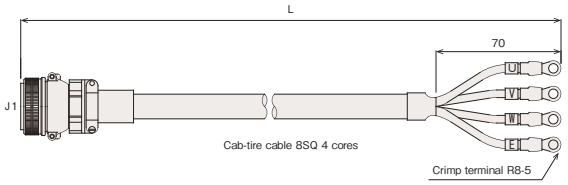
* Optionally, the power cable can also be purchased in units of 1 meter.

■Shielded power cable list(for fixed motor)

Description No.	Model	Length (L)	Power cable dimensions	Signal chart

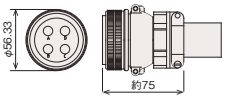
P-12

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



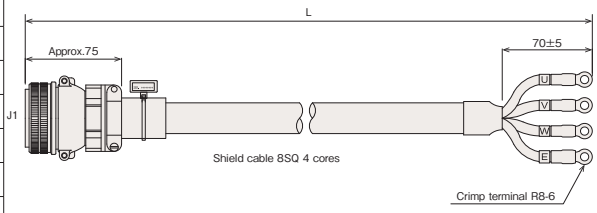
Signal name	J1 pin name	Cable color
U	A	Black(1)
V	B	Black(2)
W	C	Black(3)
E	D	Green/Yellow

Power cable connector kit
NCR-XBD9A



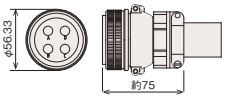
P-13

Model	Length (L)
NCR-XBL1A -030	3m
-050	5m
-070	7m
-100	10m
-150	15m
-200	20m
-250	25m
-300	30m



Signal name	J1 pin name	Cable color
U	A	Black(1)
V	B	Black(2)
W	C	Black(3)
E	D	Green/Yellow

Power cable connector kit
NCR-XBD9A



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

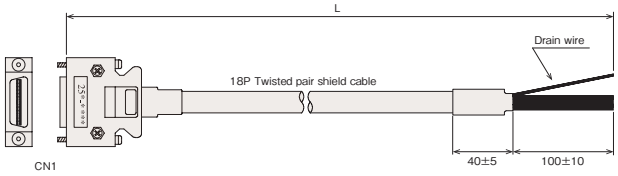
■I/O-related options

Applicable servo drivers	VPH Series: VPH-HA Type(I/O specification)

◎I/O cable VCIC Series

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

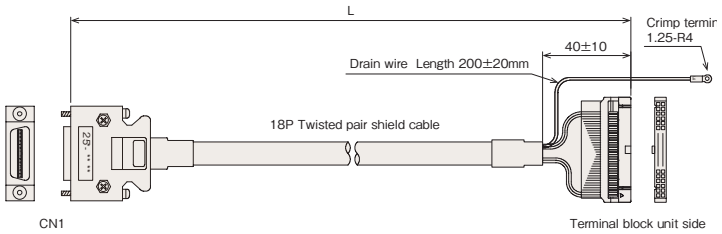
Product model	Cable length L(mm)
NCR-XBA1A-010	1000±30
NCR-XBA1A-020	2000±30
NCR-XBA1A-030	3000±30



◎I/O terminal block cable VCTC Series

This cable is used to connect the control input/output connector (CN1) of the VPH-HA Type and the I/O terminal block unit(40 pins).

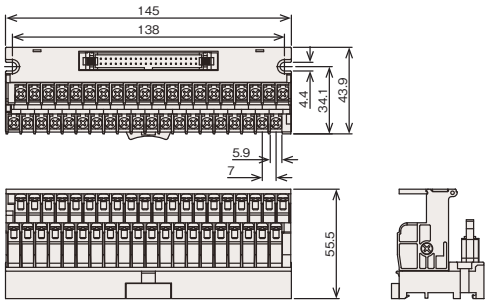
Product model	Cable length L(mm)
NCR-XBA2A-010	1000±30
NCR-XBA2A-020	2000±30
NCR-XBA2A-030	3000±30



◎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-401	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

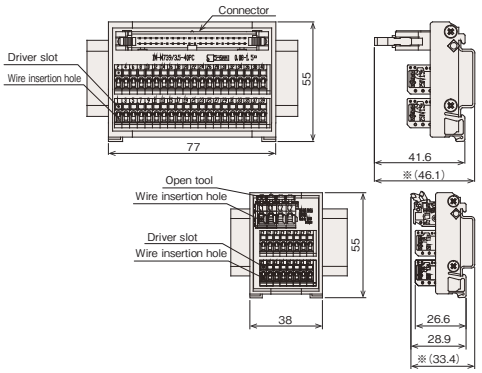
■Cage clamp type common terminal block

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

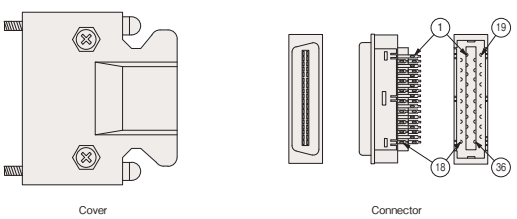


* The dimensions are those applicable when a 35 mm DIN rail is mounted.

◎I/O signal connector kit

This is a connector kit used to connect the control input/output connector (CN1) of the VPH-HA Type.

Product model
CSZ-INF



■I/O-related options

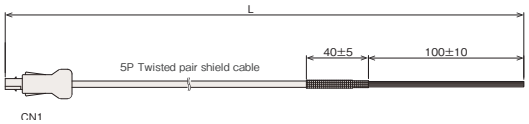
Applicable servo drivers

VPH Series: VPH-HB/HD/HE Type (SSCNETⅢ/H, EtherCAT, and MECHATROLINK-Ⅲ specifications)

◎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.

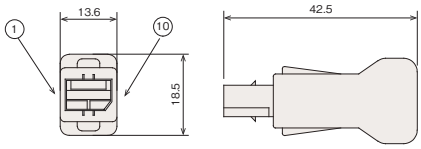
Product model	Cable length L (mm)
NCR-XBANA-010	1000±30
NCR-XBANA-020	2000±30
NCR-XBANA-030	3000±30



◎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



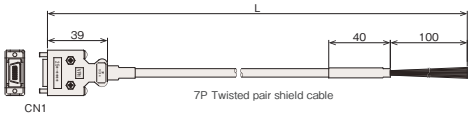
Applicable servo drivers

VPH Series: VPH-HC Type (CC-Link specification)

◎I/O cable

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

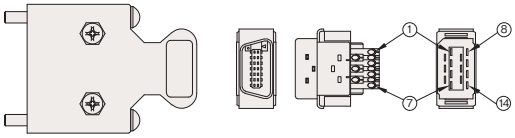
Product model	Cable length L (mm)
NCR-XBARA-010	1000±30
NCR-XBARA-020	2000±30
NCR-XBARA-030	3000±30



◎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



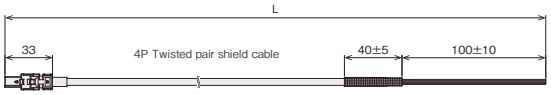
Applicable servo drivers

VPH Series: All types

◎STO cable

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

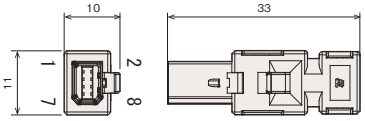
Product model	Cable length L (mm)
NCR-XBASA-010	1000±30
NCR-XBASA-020	2000±30
NCR-XBASA-030	3000±30



◎STO connector kit

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

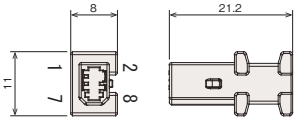
Product model
NCR-XBJ5A



◎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



■Serial communication-related options

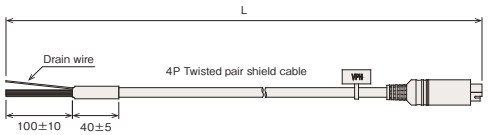
Applicable servo drivers	VPH Series: VPH-HA Type(I/O specification)

◎RS-422 communication cable

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

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

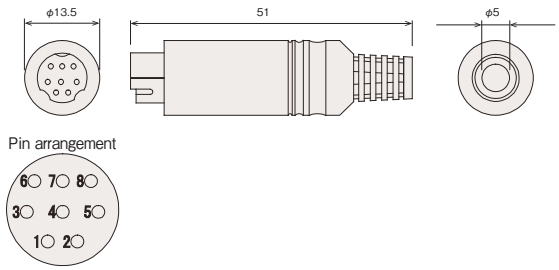
Product model	Cable length L(mm)
NCR-XBFJA-010	1000±30
NCR-XBFJA-030	3000±50
NCR-XBFJA-050	5000±100
NCR-XBFJA-100	10000±100



◎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

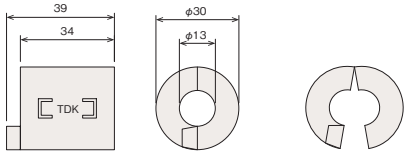


Applicable servo drivers	VPH Series: All types

◎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



■Noise protection

Applicable servo drivers	VPH Series: All types

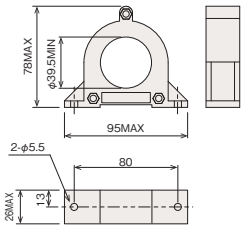
◎Zero phase reactor (for common mode)

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

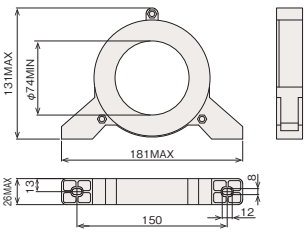
* The effectiveness of this option greatly depends on how the cables are routed and how the device is connected to ground.

Product model
NCR-XAB4A
NCR-XAB5A

■NCR-XAB4A

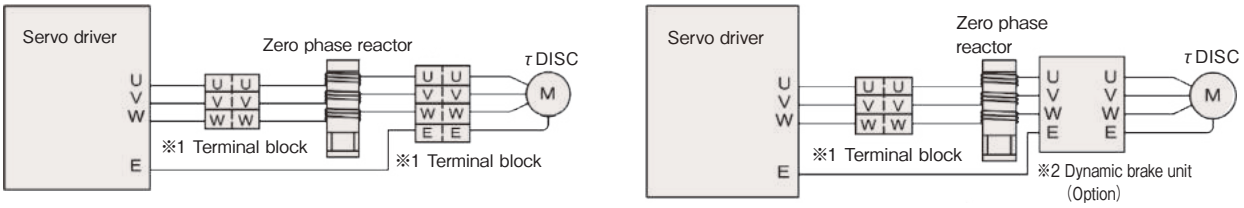


■NCR-XAB5A

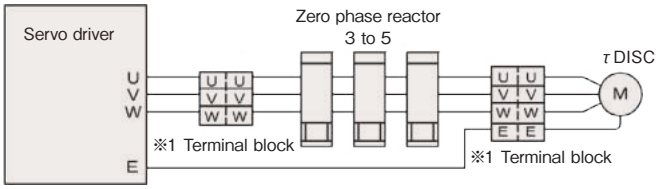


■Installation examples

●Winding



●Penetration (If it is not possible to wind the electric wire)



*1 The customer is requested to supply the terminal block. Supply the terminal block between servo driver and zero-phase reactor, if necessary.

*2 If a dynamic brake unit is present, install the zero-phase reactor between servo driver and dynamic brake unit so that it is as close to the servo driver as possible.

■Zero phase reactor to use and the number of reactors

●Relationship between AWG cable size (mm^2) and zero phase reactor

Zero phase reactor	Inner diameter	AWG cable size (mm^2)			
		18 to 10 (0.75 to 5.5)	8 to 6 (8 to 14)	4 to 2 (22 to 30)	1/0 to (50 to)
NCR-XAB4A	39.5mm	1 reactor; winding three to five times		3 to 5 reactors penetrated	
NCR-XAB5A	74.0mm		1 reactor; winding three to five times		3 to 5 reactors penetrated

The values in this table are calculated from the AWG size (mm^2) 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.

* During operation, the zero-phase reactor generates heat. The electric wire to wind around the zero-phase reactor must have a service temperature of 110°C or more.
* If the noise suppression effect cannot be obtained or the heat generated from the zero-phase reactor is high, increase the number of reactors used.
* For details about usage, refer to the VPH Option Instruction Manual.

■Noise protection

Applicable servo drivers	VPH Series: All types with an output capacity of 800 W or less

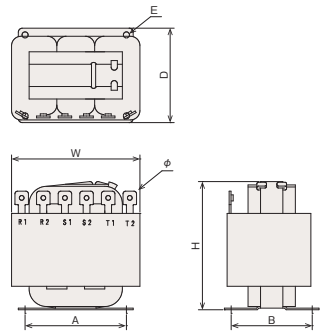
◎AC reactor

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 AC reactor
Model	Model
NCR-H□1101A-A-□□□	NCR-XABT2A-801
NCR-H□2101A/2201A/2401A/2801A-A-□□□	
NCR-H□2801A-A-□□□	NCR-XABT2A-152 *1

*1 AC Reactor to use with a single-phase AC power supply if the load capacity of the applicable motor exceeds 500 W.

NCR-XABT2A-801/152



(Unit:mm)

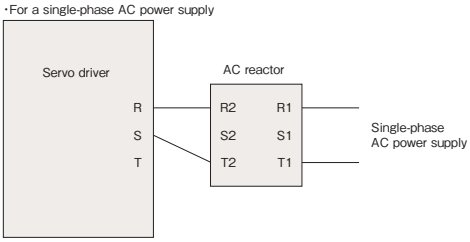
Product model	W	D	H	A	B	E(Applicable screw)	ϕ
NCR-XABT2A-801	(85)	60	(75)	70	49	4.5(M4)	M4 tap
NCR-XABT2A-152	(95)	70	(95)	75	60	4.5(M4)	M4 tap

■AC reactor installation and specification

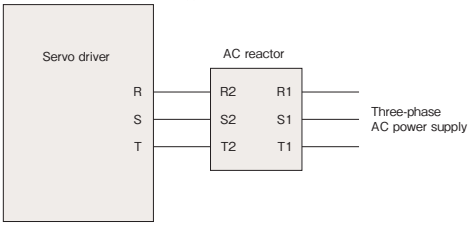
For details about AC reactor installation, wiring, and specification, refer to the VPH Option Instruction Manual.

●AC reactor wiring diagram

・For a single-phase AC power supply



・For a three-phase AC power supply



■Noise protection

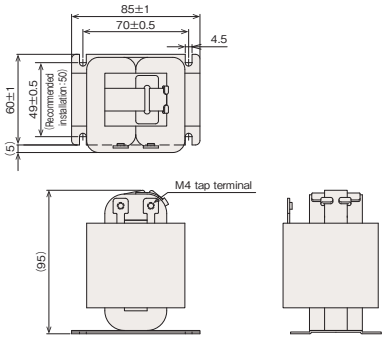
Applicable servo drivers	VPH Series: All types with an output capacity of 1.5 kW or more

◎DC reactor

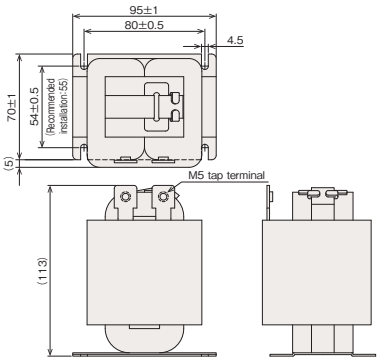
This reactor makes the waveform of the input current approximate to that of a sine wave to suppress harmonics.
Even when the power supply capacity is 500 KVA, install the reactor to protect the main circuit.

サーボドライバ	Paired DC reactor	
Model	Model	AWG diameter of the cable used(SQ)
NCR-H□2152A/2222A-A-□□□	NCR-XABU2A-222	14(2)
NCR-H□2332A-A-□□□	NCR-XABU2A-332	12(3.5)
NCR-H□2702A-A-□□□	NCR-XABU2A-752	8(8)
NCR-H□2153A-A-□□□	NCR-XABU2A-153	4(22)

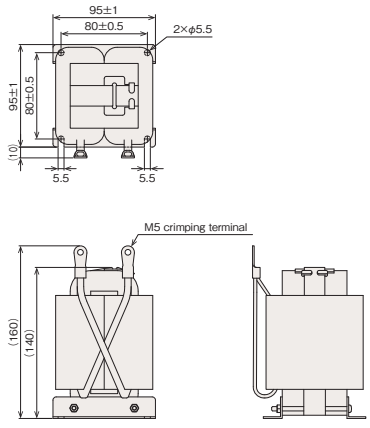
NCR-XABU2A-222



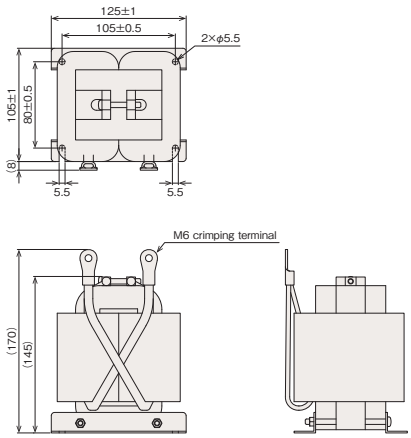
NCR-XABU2A-332



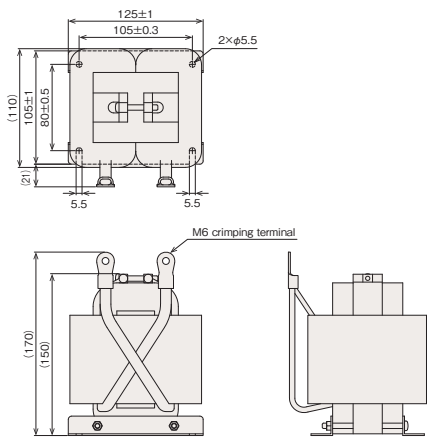
NCR-XABU2A-752



NCR-XABU2A-113



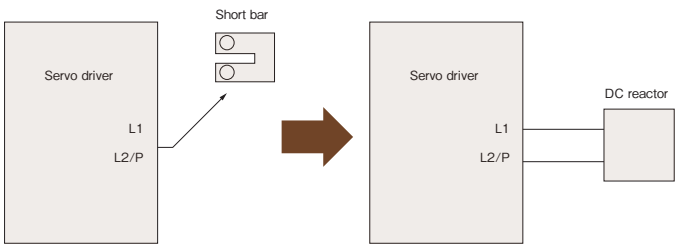
NCR-XABU2A-153



■DC reactor installation, wiring, and specification

The wiring of the DC reactor is as shown below. Remove the short bar that short-circuits L1 and L2/P, and connect the DC reactor. For details about DC reactor installation, wiring, and specification, refer to the VPH Option Instruction Manual. The DC reactor does not have polarity.

●DC reactor wiring diagram



Optional products

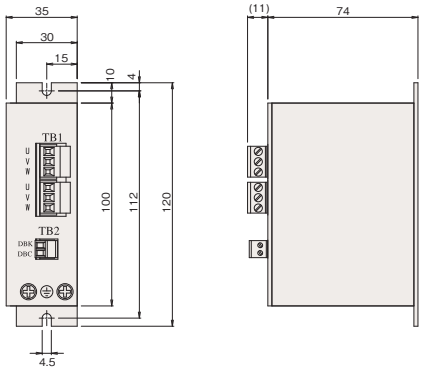
Dynamic brake unit

Applicable servo drivers	VPH Series: All types

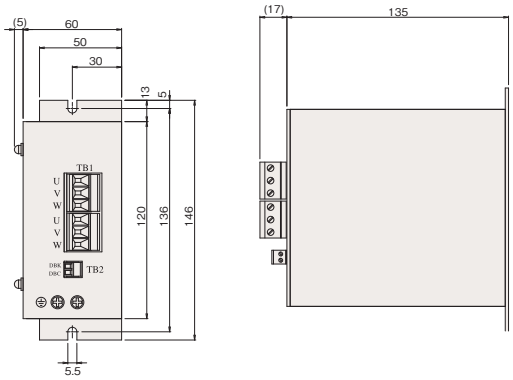
This is an auxiliary brake unit that helps decelerate the motor. It prevents the connected motor from free-running due to an error in the servo driver, power failure, etc.

Servo driver	Paired dynamic brake unit
Model	Model
NCR-H□1101A/1201A-A-□□□	NCR-XABCA2B-801-UL
NCR-H□2101A/2201A/2401A/2801A-A-□□□	
NCR-H□2152A/2222A-A-□□□	NCR-XABCA2B-222-UL
NCR-H□2332A-A-□□□	NCR-XABCA2B-402-UL
NCR-H□2702A-A-□□□	NCR-XABCA2B-752-UL
NCR-H□2153A-A-□□□	NCR-XABCA2C-153

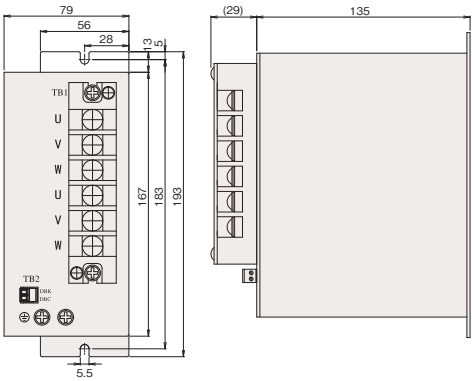
NCR-XABCA2B-801-UL



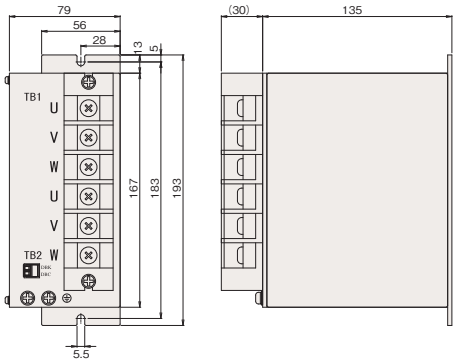
NCR-XABCA2B-222-UL



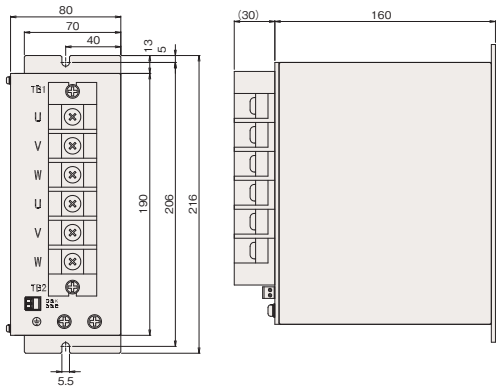
NCR-XABCA2B-402-UL



NCR-XABCA2B-752-UL
NCR-XABCA2B-113-UL



NCR-XABCA2C-153



■Regenerative resistors

Applicable servo drivers	VPH Series: All types

Two series of the regenerative resistors(NCR-XAE Series and NCR-XAF Series) are offered. The specifications of the supplied thermostat differ between these series. For details, see below and refer to the VPH Option Instruction Manual.

Servo driver	Paired regenerative resistors					
Model	Regenerative resistor description	Dimensions	NCR-XAE Series model		NCR-XAF Series model	
NCR-H□1101A/1201A-A-□□□ NCR-H□2101A/2201A-A-□□□ NCR-H□2401A/2801A-A-□□□	Cement resistor CAN60UT 82 Ω J 60 W 82 Ω × 1, set of thermostats *1	A-①	NCR-XAE1A2A	*3	NCR-XAF1A2A	*5
NCR-H□2152A/2222A-A-□□□	Cement resistor CAN200UT 24 Ω J 200 W 24 Ω × 1, set of thermostats *1	A-①	NCR-XAE2A2A		NCR-XAF2A2A	
NCR-H□2332A-A-□□□	Cement resistor CAN400UR 20 Ω J 400 W 20 Ω × 1, set of thermostats *1	A-②	NCR-XAE3A2A		NCR-XAF3A2A	
NCR-H□2702A-A-□□□	Vitreous enamel resistor RGH300G(0S)30 ΩJ 300 W 30 Ω × 3(connected in parallel with a total of 900 W and 10 Ω) Set of thermostats *2	B-①	NCR-XAE4A2A	*4	NCR-XAF4A2A	
NCR-H□2153A-A-□□□	Vitreous enamel resistor RGH500G(0S)22 ΩJ 500 W 22 Ω × 4(connected in parallel with a total of 2 kW and 5.5 Ω) Set of thermostats *2	B-①	NCR-XAE9A2A		NCR-XAF9A2A	

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

*1 A set of thermostats for the cement resistor consists of 1 thermostat and 1 thermostat mounting plate.

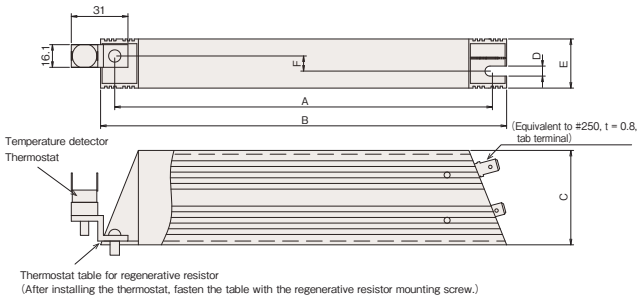
*2 A set of thermostats for the vitreous enamel resistor consists of 1 thermostat, 1 thermostat mounting band, 2 M4 nuts, and 1 M4 screw.

*3 Contact rating of the supplied thermostat 120 VAC:0.1 to 17A、240 VAC:0.1 to 17A

*4 Contact rating of the supplied thermostat 120 VAC:0.1 to 15A、240 VAC:0.1 to 10A

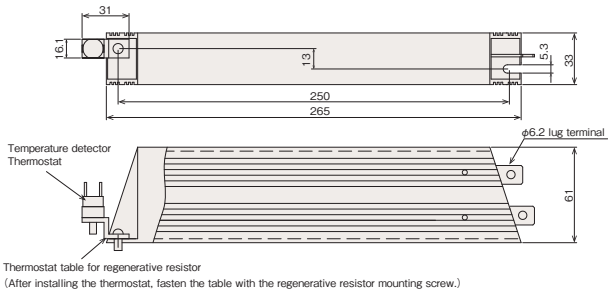
*5 Contact rating of the supplied thermostat 6 to 42 VDC:1 to 200mA、6 to 250 VAC:1 to 200mA

A-①: Cement resistor
CAN60UT 82Ω J/CAN200UT 24Ω J

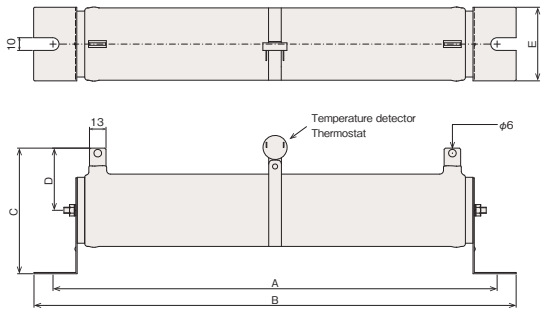


Model	A	B	C	D	E	F
CAN60UT 82Ω J	100	115	40	4.3	21	5
CAN200UT 24Ω J	200	215	50	5.3	26	8

A-②: Cement resistor
CAN400UR 20Ω J



B-①: Vitreous enamel resistor
RGH300G(0S)30ΩJ/RGH500G(0S)22ΩJ



Model	A	B	C	D	E
RGH300G(0S)30ΩJ	304	334	84	44	40
RGH500G(0S)22ΩJ	350	380	99	49	58

Compliance with overseas standards

τ DISC	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-FS(P)B-UC(100V)	○	○	ND110-65/85-FS(P)（100V）
	ND110-65/85-FS(P)B-UC(200V)	○	○	ND110-65/85-FS(P)（200V）
	ND140-65-FS(P)-UC	○	○	ND140-65-FS(P)
	ND140-70/95-LS(P)-UC	○	○	ND140-70/95-LS(P)
	ND180-55-FS(P)B-UC	○	○	ND180-55-FS(P)
	ND180-70/95-LS(P)B-UC	○	○	ND180-70/95-LS(P)
	ND250-55-FS(P)B-UC	○	○	ND250-55-FS(P)
	ND250-70/95-LS(P)B-UC	○	○	ND250-70/95-LS(P)
	ND400-65-FS(P)B-UC	○	○	ND400-65-FS(P)
	ND400-70/95/160-LS(P)B-UC	○	○	ND400-70/95/160-LS(P)
ND-s HS/DD-s/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.

Servo driver	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□1101A-A-□□□(100W) NCR-H□1201A-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□2101A-A-□□□(100W) NCR-H□2201A-A-□□□(200W) NCR-H□2401A-A-□□□(400W) NCR-H□2152A-A-□□□(1.5kW)	VPH-HA(I/O)	○	○	○ *1
			VPH-HB(SSCNETⅢ/H)			–
			VPH-HC(CC-Link)			○ *1
			VPH-HD(EtherCAT)			–
			VPH-HE(MECHATROLINK-Ⅲ)			
		NCR-H□2801A-A-□□□(800W)	VPH-HA(I/O)	○	○	○ *1
			VPH-HB(SSCNETⅢ/H)			–
			VPH-HC(CC-Link)			○ *1
			VPH-HD(EtherCAT)			
			VPH-HE(MECHATROLINK-Ⅲ)			
		NCR-H□2222A-A-□□□(2.2kW) NCR-H□2332A-A-□□□(3.3kW)	VPH-HA(I/O)	○	○	○ *1
			VPH-HB(SSCNETⅢ/H)			
			VPH-HC(CC-Link)			
			VPH-HD(EtherCAT)			
			VPH-HE(MECHATROLINK-Ⅲ)			
		NCR-H□2702A-A-□□□(7kW)	VPH-HA(I/O)	○	○	○ *1
			VPH-HB(SSCNETⅢ/H)			
			VPH-HC(CC-Link)			
			VPH-HD(EtherCAT)			
			VPH-HE(MECHATROLINK-Ⅲ)			–
		NCR-H□2153A-A-□□□(15kW)	VPH-HA(I/O)	–	–	–
			VPH-HB(SSCNETⅢ/H)			
			VPH-HC(CC-Link)			
			VPH-HD(EtherCAT)			
			VPH-HE(MECHATROLINK-Ⅲ)			

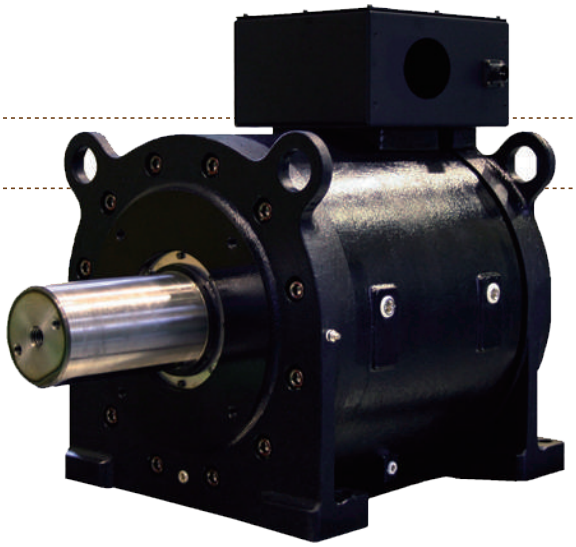
*1 KC marking of VPH-HB, HC, HD, and HE Type with STO option is not supported.

Compliance with regulations

・Compliance with EU RoHS Directive and Chinese RoHS Directive

MEMO

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: 550～7500 N·m
Max torque: 1100～12000 N·m

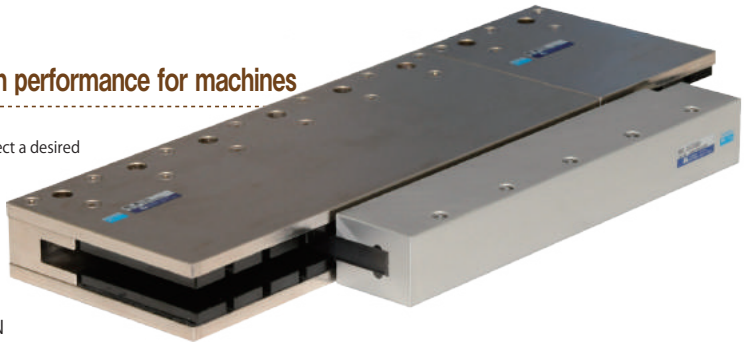
◎Fan cooling Type iD Series
Rated torque: 150～2800 N·m
Max torque: 450～7000 N·m

【τlinear】

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

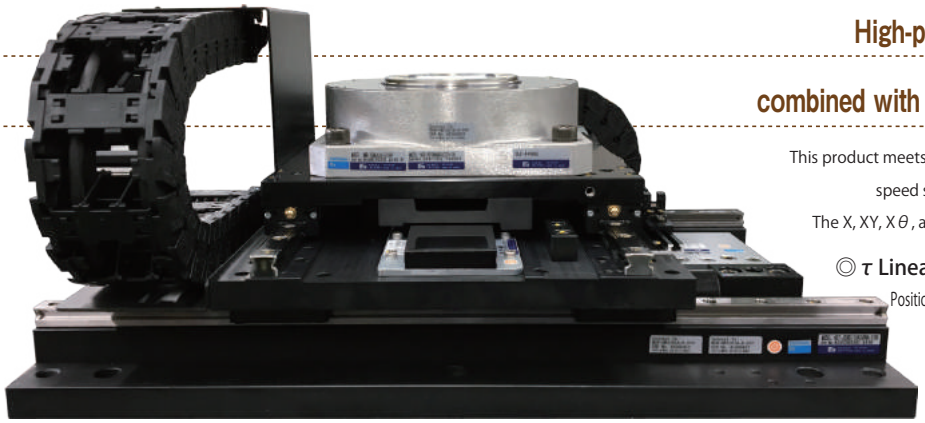
A diverse lineup of coreless type and core type models is provided from which to select a desired one from different perspectives such as operation specifications, thrust, and stroke.

◎NVA Series (Coreless/High-performance type) Rated thrust: 23～900 N
◎NLD Series (Coreless/Standard type) Rated thrust: 50～1000 N
◎NLA-S Type (Coreless/Small-thrust type) Rated thrust: 7～13 N
◎NLA-MA/NA Type (Core type) Rated thrust: 250～1500 N



【τLinear Stage】

High-performance control stage combined with servo control technology



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: 100～21300 mm

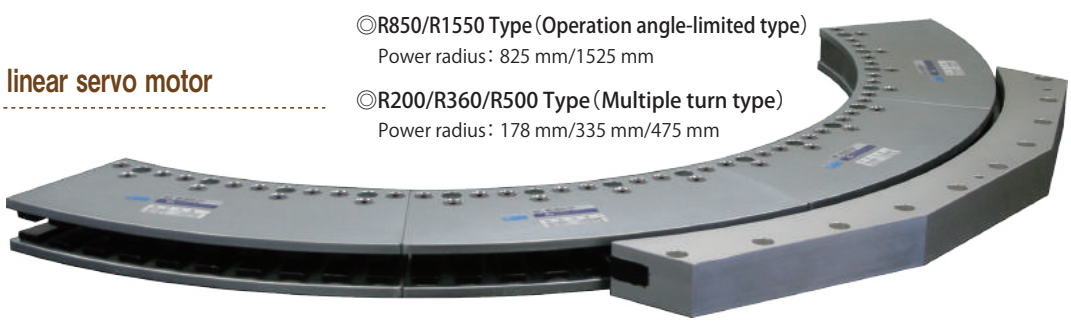
【τServo Compass】

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: 825 mm/1525 mm

◎R200/R360/R500 Type (Multiple turn type)
Power radius: 178 mm/335 mm/475 mm



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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