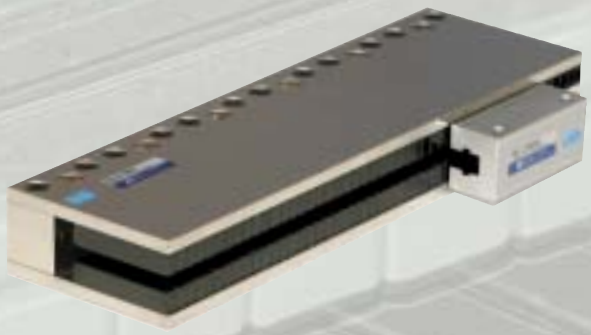
NIKKI DENSO
The Next Servo Power

English

τ Linear Servo Motor

τ Linear Servo System realizes high quality and high performance machines.



Nikki Denso Co., Ltd.

τLinear Servo Motor

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Rich Lineups Satisfying Various Applications

Coreless NVA Series
High-performance type providing speed stability, space saving, fast acceleration, and the like

Coreless NLD Series
Economic class standard type having highly efficient magnet arrangement and best suitable for long strokes

Coreless and Core NLA Series
Wide-ranging type supporting lineups from rated thrust 7N (coreless) to 1500N (core)

Providing High-Precision and High-Speed

High-precision, high-speed positioning with the In-house production interpolator unit (IPU)

Resolution 20 nm, maximum speed 1.6 m/s (for details, see p.16 to p.18.)

Enabling Water-Cooling and Air-Cooling

Water-cooling and air-cooling types available as a dedicated use

If you have a request for this, contact our sales representatives.

Enabling Increase in Absolute Position Precision after Device Insertion

Positioning precision can be increased by incorporating position measurement data into the combined servo driver.

Absolute position correction function option (for details, see p.20.)

Providing Scaleless Linear Sensor

A position can be detected without a linear scale.

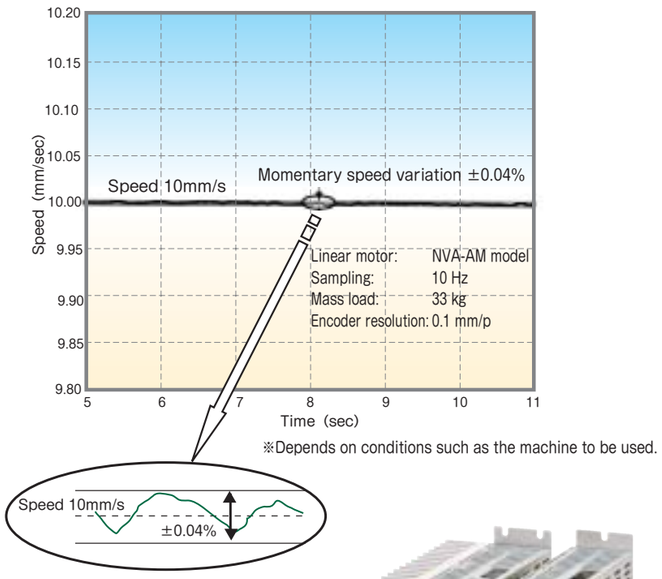
This function is best-suitable for long-stroke transportation. *(For details, see p.21.)*

■Common Specifications

Item		Description
Ambient condition	Temperature	0-C to 40-C
	Humidity	85% or below (no condensation)
	Installation location	Do not install the servo motor in any harmful atmosphere such as corrosive gas, cutting oil, metal dust, or oil.
Rating type		Continuation (S1)
Mounting method		Horizontal or vertical
Thrust method		Both directions
Cooling method		Natural air cooling
Insulation grade		F type
Insulation withstand pressure		1500 VAC (for one minute)
Vibration resistance		1 G (3 directions: 2 hours for each of them)
Sock resistance		NVA-AM/BM model/NLA-S/MA/NA model: 5 G (3 directions: 3 times for each of them)
		NVA-BL model/NLD-AM/FL model: 10 G (3 directions: 3 times for each of them)
Protection type		Open

Outstanding Speed Stability

■Speed Stability Performance



※Depends on conditions such as the machine to be used.

τ Providing the maximum level speed stability with the t Linear Servo motor and high-performance servo driver VC Ⅱ combined

VC Ⅱ series

NIKKI DENSO

CONTENTS

τLinear Motor Selection Guide P.3~P.4

τLinear Servo Motor

NVA Series Coreless Type

Features, explanation of the model number, and motor characteristic chart P.5
Flat-type NVA-AM model Rating and specifications P.6
Flat-type NVA-AM model External dimensions P.6
High-thrust type NVA-BM model Rating and specifications P.7
High-thrust type NVA-BM model External dimensions P.7
Large-thrust type NVA-BL model Rating ad specifications P.8
Large-thrust type NVA-BL model External dimensions P.8

NLD Series Coreless Type

Features, explanation of the model number, and motor characteristic chart P.9
Standard-type NLD-AM model Rating and specifications P.10
Standard-type NLD-AM model External dimensions P.10
Standard-type large-thrust type NLD-FL model Rating and specifications P.11
Standard-type large-thrust type NLD-FL model External dimensions P.11

NLA Series Coreless and Core Types

Features, explanation of the model number, and motor characteristic chart P.12
Small-thrust type NLA-S model Rating and specifications P.13
Small-thrust type NLA-S model External dimensions P.13
Core type NLA-MA model Rating and specifications P.14
Core type NLA-MA model External dimensions P.14
Core type NLA-NA model Rating and specifications P.15
Core type NLA-NA model External dimensions P.15

τLinear Servo Motor Options

Linear encoders P.16~P.20
Absolute position correction function option P.20
Magnetic pole sensor units P.21
Scaleless linear sensors P.21
Sensor power cables P.22~P.25

Supported Servo Drivers P.26

◆VC Ⅱ Series

Explanation of the model number P.27
General specifications P.27
Electrical specifications P.27
Functional specifications P.28
External connection diagram P.29
External dimensions P.30
Configuration of options P.31

◆VPS Series

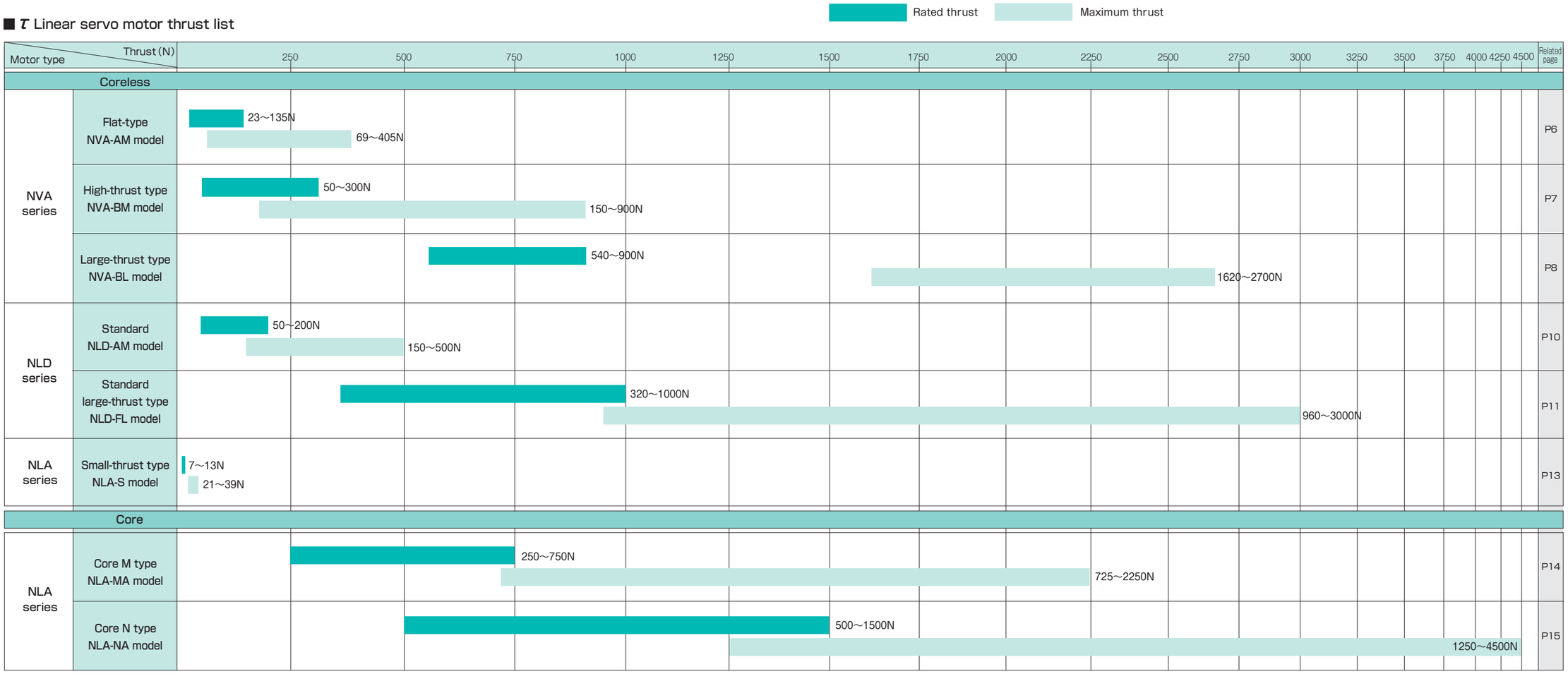
Explanation of the model number P.32
General specifications P.32
Electrical specifications P.32
Functional specifications P.33
External connection diagram P.34
External dimensions P.35
Configuration of options P.36
VC Ⅱ/VPS accessory/option external dimensions P.37

Direct Drive Product Lineups P.38

Selection Guide

τ Linear Servo Motor Selection Guide

■ τ Linear servo motor thrust list



■Calculating the Required Magnet Base Length

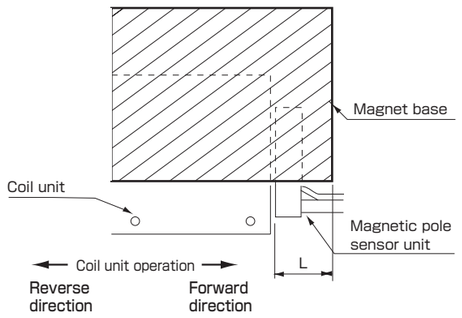
Select the τ Linear servo motor magnet base with the following calculation method:

Total of the magnet base lengths ≧ maximum mobile length + total coil unit length + required magnetic pole sensor length

The required magnetic pole sensor length is generated when the magnetic pole sensor unit is installed.
(It is not generated for automatic magnetic pole detection.)
The required magnetic pole sensor length depends on the t Linear servo motor type. For details of the required magnetic pole sensor lengths, see the table shown below.

τ Linear servo motor type		Required magnetic pole sensor length (L)	
		Reverse direction (L1)	Forward direction (L2)
Flat type	NVA-AM model	13mm	40mm
High-thrust type	NVA-BM model	13mm	40mm
Large-thrust type	NVA-BL model	18mm	70mm
Standard type	NLD-AM model	25.5mm	70mm
Standard large-thrust type	NLD-FL model	21mm	81mm
Small-thrust type	NLA-S model	Only for automatic magnetic pole detection	
Core M type	NLA-MA model	14.5mm	50mm
Core N type	NLA-NA model	14.5mm	50mm

※The required magnetic pole sensor length depends on the coil unit operation direction after power-on.
Movement to L2 in the reverse direction is required as the reverse direction (L1) condition.



■Calculating the Required Encoder Scale Length

Determine the linear encoder scale length and effective length from the following calculation methods:

◎Open type incremental encoder Renishaw-manufactured RGH-22/24 type

Tape scale length = Maximum mobile length + 40 mm (40 mm is the mounting allowance.)

◎Assembly type incremental encoder Mitutoyo-manufactured AT211 type
Open type absolute encoder Mitutoyo-manufactured ST701/702/703/704 type

Effective encoder length ≧ maximum mobile length

■Magnetic Pole Detection Method

The magnetic pole can be detected with the automatic magnetic pole detection function (standard function, magnetic pole sensor unit unused) of our servo driver.
However, the automatic magnetic pole detection function may not operate normally depending on the condition used. So, it is recommended to use the magnetic pole sensor unit (option) for the following typical use conditions or when a use condition is unknown:

- ●The microscopic operation of automatic magnetic pole detection cannot be allowed.
- ●The microscopic operation of automatic magnetic pole detection is impossible (mechanical lock, and so on)
- ●Guide sliding resistance is very small (air guide, and so on)
- ●Guide sliding resistance, load resistance, and load mass are very large (total system load containing the guide and load resistance/linear motor peak thrust ウ 5 times (actual value))
- ●Mechanical rigidity is low (cantilever axis structure, and so on)
- ●Structure has mechanical coupling and interference for multiple axes such as gantry drive and robot drive.
- ●Motor stroke direction is set to a direction other than the horizontal one.

NVA Series Coreless Type

■Features

Flat-Type NVA-AM Model Rated Thrust:23N to 135N

Since the coil slide has the straddle structure, stable operation is realized from creep speed to high speed.

High-Thrust Type NVA-BM Model Rated Thrust:50N to 300N

Since magnetic flux density is made to be sufficient, the coil unit is compacted.

The freedom degree of mechanical design is improved substantially.

Large-Thrust Type NVA-BL Model Rated Thrust:540N to 900N

High-acceleration and high-frequency operation of the large load are possible without eliminating the coreless feature.

■Explanation of the Model Number

Motor Model Number **NVA-BM C 00 A2 A -S01**
① ② ③ ⑤ ⑥ ⑦ ⑧

Coil Unit Model Number **CLV-BM C 00 A2 A -S01**
① ② ③ ⑤ ⑥ ⑦ ⑧

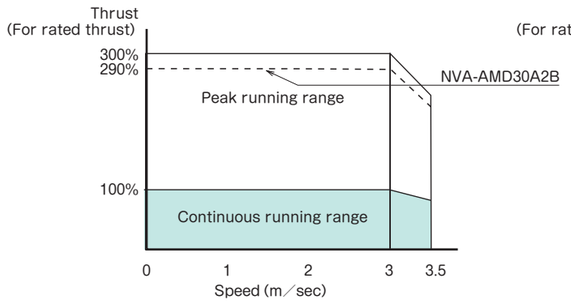
Magnet Base Model Number **MBV-BM B 00 A -S01**
① ② ④ ⑤ ⑦ ⑧

①	τ Linear servo motor series name		NVA : NVA series
			CLV : NVA series Coil unit
			MBV : NVA series Magnet base
②	Motor type		AM : Flat, BM : High thrust, BL : Large thrust
③	Approx. coil unit length ※		A : 60mm、B : 120mm、C : 180mm、D : 240mm、E/F : 360mm、G : 480mm、H : 600mm
④	Total magnet base length		A/M : 96mm、B/R : 144mm
⑤	Subclassification	Motor/coil unit	30 : Mounting height (flat type) 00 : Lateral side mounting 01 : Underside mounting (only the high-thrust type)
		Magnet base	00 : Standard specification
⑥	Voltage specification		A2 : 200-VAC specification
⑦	Design order		A (1st version) ⇒B (2nd version) ⇒C···
⑧	Dedicated device number		None : Standard specification, S01 S02··· : Dedicated device serial number

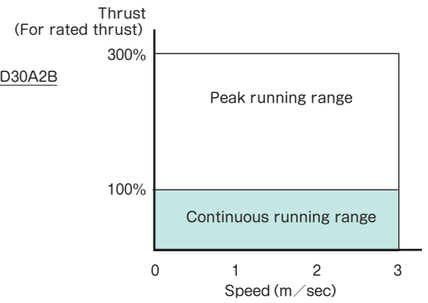
※ For details of the above values, see the respective external dimensions.

■Motor Characteristic Chart

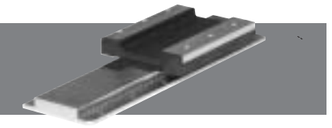
Flat Type **NVA-BL Model**
High-Thrust Type **NVA-BM Model**



Large-Thrust Type **NVA-BL Model**



Flat-Type NVA-AM Model



■Rating and Specifications

Motor model number		NVA-AM	A30A2B	B30A2B	C30A2B	D30A2B	E30A2B
Rated thrust		N	23	45	68	90	135
Maximum thrust		N	69	135	204	261	405
Rated output		W	69	135	204	270	405
Rated current		A	0.85	1.7	2.55	3.4	5.1
Maximum speed		m/sec	3.5 (see the motor characteristic chart.) ※1				
Power supply voltage specification		ACV	200 ※2				
Coil unit model number		CLV-AM	A30A2B	B30A2B	C30A2B	D30A2B	E30A2B
Magnet base model number		MBV-AM	Selected from A00B (96mm) ／B00B (144mm)				
Combination driver	VCⅡ series	NCR-□D	A□A2A-101D	A□A2A-201D	A□A2A-401D	A□A2A-401D	A□A2A-801D※3
	VPS series	NCR-DC	□0A2B-401□	□0A2B-401□	□0A2B-401□	□0A2B-401□	□0A2B-801□

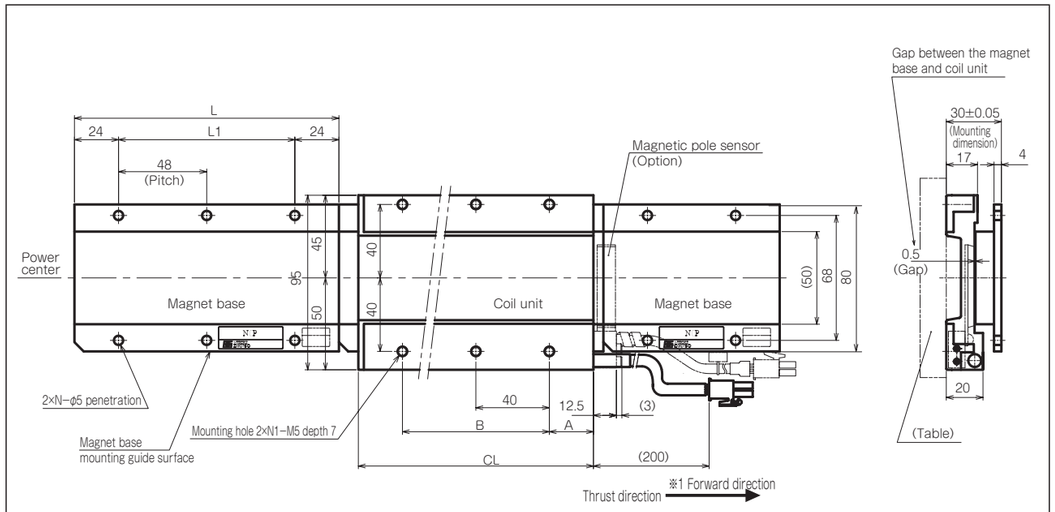
※ The above specifications indicate the values generated when operation is performed with the heat sink (aluminum plate) installed in the coil unit at the ambient temperature of 25℃.
Heat sink size (mm): 250×250×15 (NVA-AMA/AMB/AMC30A2AB model)
450×450×15 (NVA-AMD/AME30A2B model)

※1 The maximum motor speed is provided and the actual speed depends on the sensor resolution.
(See the table of the relationships between resolutions and speeds for each linear encoder unit on p.17.)

※2 The combination with the 100-VAC specification servo driver may be possible.
However, the rating is reduced. So, contact our sales representatives after clarifying the specifications.

※3 To fit the servo driver to the UL standard, it is necessary to set the continuous output current value of this combination driver within 5 A.
(Driver allowance: 6.8 A)

■External Dimensions



※1 The coil unit thrust direction is determined to be the forward direction for the cable side.
As the initial parameter value of our servo driver, the forward direction of the coil unit and that of the linear encoder (see p.17 to p.20) are defined as the same one.
If necessary, change the forward and reverse directions with parameters.

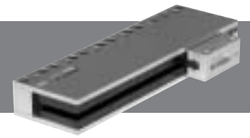
Coil Unit

Model number	Rated thrust (N)	CL	A	B	N1	Mass (kg)
CLV-AMA30A2B	23	68	14	40	2	0.24
CLV-AMB30A2B	45	128	24	80	3	0.48
CLV-AMC30A2B	68	188	14	160	5	0.72
CLV-AMD30A2B	90	248	24	200	6	0.96
CLV-AME30A2B	135	368	24	320	9	1.44

Magnet Base

Model number	L	L1	N	Mass (kg)
MBV-AMA00B	96	48	2	0.6
MBV-AMB00B	144	96	3	0.9

High-Thrust Type NVA-BM Model



■Rating and Specifications

Motor model number		NVA-BM	A00A2B/A01A2B	B00A2B/B01A2B	C00A2B/C01A2B	D00A2B/D01A2B	E00A2B/E01A2B
Rated thrust		N	50	100	150	200	300
Maximum thrust		N	150	300	450	600	900
Rated output		W	150	300	450	600	900
Rated current		A	0.95	1.9	2.85	3.8	5.7
Maximum speed		m/sec	3.5 (see the motor characteristic chart.) ※1				
Power supply voltage specification		ACV	200 ※2				
Coil unit model number		CLV-BM	A0□A2B	B0□A2B	C0□A2B	D0□A2B	E0□A2B
Magnet base model number		MBV-BM	Selected from A00B (96mm) ／B00B (144mm)				
Combination driver	VCⅡ series	NCR-□D	A□A2A-101D	A□A2A-201D	A□A2A-401D	A□A2A-801D	A□A2A-801D※3
	VPS series	NCR-DC	□0A2B-401□	□0A2B-401□	□0A2B-401□	□0A2B-801□	□0A2B-801□

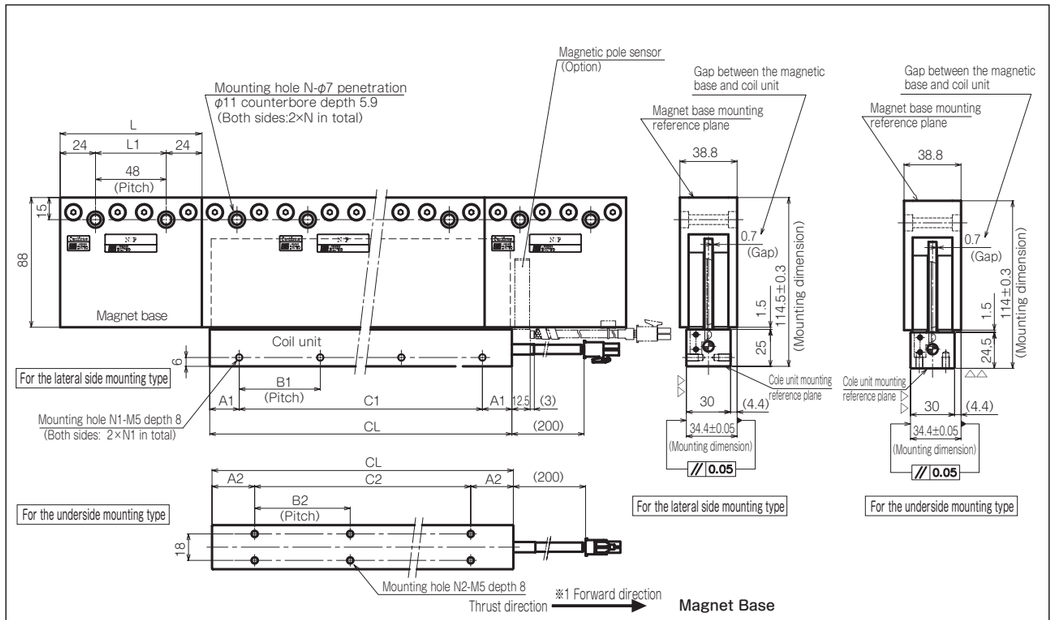
※ The above specifications indicate the values generated when operation is performed with the heat sink (aluminum plate) installed in the coil unit at the ambient temperature of 25℃.
Heat sink size (mm): 250×250×15 (NVA-BMA/BMB/BMC0□A2B model)
450×450×15 (NVA-BMD/BME0□A2B model)

※1 The maximum motor speed is provided and the actual speed depends on the sensor resolution.
(See the table of the relationships between resolutions and speeds for each linear encoder unit on p.17.)

※2 The combination with the 100-VAC specification servo driver may be possible.
However, the rating is reduced. So, contact our sales representatives after clarifying the specifications.

※3 To fit the servo driver to the UL standard, it is necessary to set the continuous output current value of this combination driver within 5 A.
(Driver allowance: 6.8 A)

■External Dimensions



※1 The coil unit thrust direction is determined to be the forward direction for the cable side.
As the initial parameter value of our servo driver, the forward direction of the coil unit and that of the linear encoder (see p.17 to p.20) are defined as the same one.
If necessary, change the forward and reverse directions with parameters.

Magnet Base

Model number	L	L1	N	Mass (kg)
MBV-BMA00B	96	48	2	2.0
MBV-BMB00B	144	96	3	3.0

Coil Unit (Lateral Side Mounting Type)

Model number	Rated thrust (N)	CL	A1	B1	C1	N1	Mass (kg)
CLV-BMA00A2B	50	68	9	50	50	2	0.24
CLV-BMB00A2B	100	128	14	50	100	3	0.48
CLV-BMC00A2B	150	188	19	50	150	4	0.72
CLV-BMD00A2B	200	248	14	55	220	5	0.96
CLV-BME00A2B	300	368	19	55	330	7	1.44

Coil Unit (Underside Mounting Type)

Model number	Rated thrust (N)	CL	A2	B2	C2	N2	Mass (kg)
CLV-BMA01A2B	50	68	14	40	40	4	0.24
CLV-BMB01A2B	100	128	31.5	65	65	4	0.48
CLV-BMC01A2B	150	188	29	65	130	6	0.72
CLV-BMD01A2B	200	248	26.5	65	195	8	0.96
CLV-BME01A2B	300	368	21.5	65	325	12	1.44

Large-Thrust Type NVA-BL Model

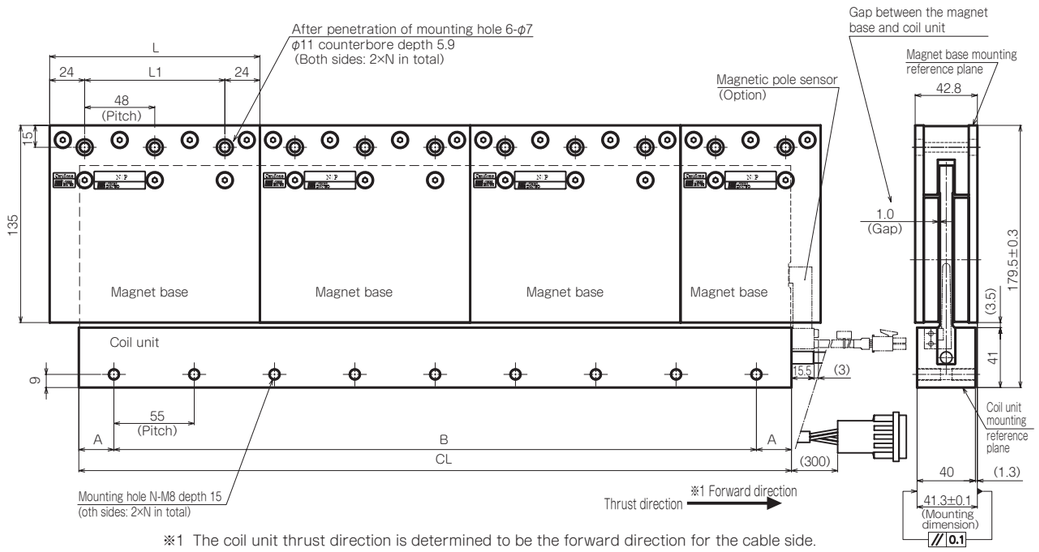
■Rating and Specifications

Motor model number		NVA-BL	F00A2B	G00A2B	H00A2B
Rated thrust		N	540	720	900
Maximum thrust		N	1620	2160	2700
Rated output		W	1620	2160	2700
Rated current		A	9.3	12.5	15.5
Maximum speed		m/sec	3.0 (see the motor characteristic chart.) ※1		
Power supply voltage specification		ACV	200		
Coil unit model number		CLV-BL	F00A2B	G00A2B	H00A2B
Magnet base model number		MBV-BL	Selected from M00B (96mm) ／R00A (144mm)		
Combination driver	VCⅡ series	NCR-□D	A□A2A-152D	A□A2A-222D	A□A2A-222D
	VPS series	NCR-DC	□0A2B-162□	-	-

※ The above specifications indicate the values generated when operation is performed with the heat sink (aluminum plate) installed in the coil unit at the ambient temperature of 25℃.
Heat sink size (mm): 450×450×20 (NVA-BLF00A2B model)
700×500×20 (NVA-BLG/BLH00A2B model)

※1 The maximum motor speed is provided and the actual speed depends on the sensor resolution.

■External Dimensions



※1 The coil unit thrust direction is determined to be the forward direction for the cable side.
As the initial parameter value of our servo driver, the forward direction of the coil unit and that of the linear encoder (see p.17 to p.20) are defined as the same one.
If necessary, change the forward and reverse directions with parameters.

Coil Unit

Model number	Rated thrust (N)	CL	A	B	N1	Mass (kg)
CLV-BLF00A2B	540	368	19	330	7	2.9
CLV-BLG00A2B	720	488	24	440	9	3.9
CLV-BLH00A2B	900	608	29	550	11	5.2

Magnet Base

Model number	L	L1	N	Mass (kg)
MBV-BLM00B	96	48	2	3.3
MBV-BLR00A	144	96	3	4.5

NLD Series Coreless Type

■Features

Standard-Type NLD-AM Model Rated Thrust:50N to 200N

The economical coreless type linear has been realized with highly efficient magnetic arrangement.
The longer the stroke, the more economical.

Standard Large-Thrust Type NLD-FL Model Rated Thrust:320N to 1000N

The coreless large-thrust type provides up to 3000N of thrust force while supporting the standard type features.

■Explanation of the Model Number

Motor Model Number **NLD-AM 10 S A2 A -S01**
① ② ③ ⑤ ⑥ ⑦ ⑧

Coil Unit Model Number **CLD -AM 10 S A2 A -S01**
① ② ③ ⑤ ⑥ ⑦ ⑧

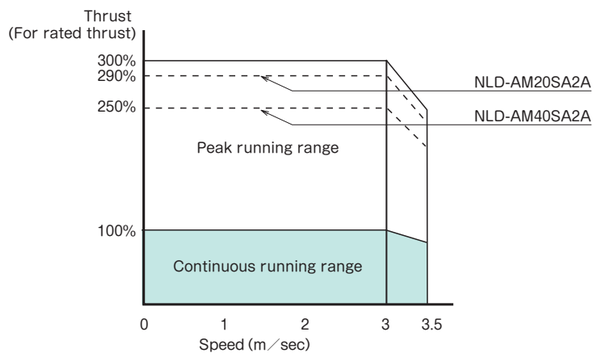
Magnet Base Model Number **MBD-AM 12 S A -S01**
① ② ④ ⑤ ⑦ ⑧

①	τ Linear servo motor series name	NLD : NLD series CLD : NLD series Coil unit MBD : NLD series Magnet base
②	Motor type	AM : Standard, FL : Standard large thrust
③	Coil unit official length ※	Approx. coil unit length (represented value 10 mm)
④	Magnet base official length ※	Approx. magnet base length (represented value 10 mm)
⑤	Subclassification	S : Lateral side mounting
⑥	Voltage specification	A2 : 200-VAC specification
⑦	Design order	A (1st version) ⇒B (2nd version) ⇒C···
⑧	Dedicated device number	None : Standard specification, S01 S02··· : Dedicated device serial number

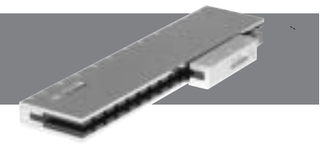
※ For details of the above values, see the respective external dimensions.

■Motor Characteristic Chart

Standard-Type **NLD-AM Model**
Standard Large-Thrust Type **NLD-FL Model**



Standard-Type NLD-AM Model

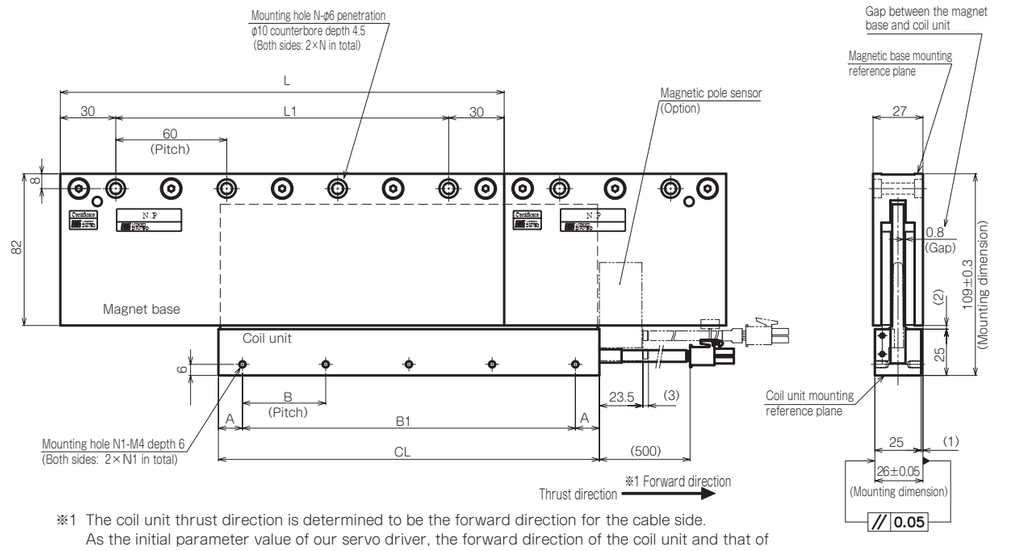


■Rating and Specifications

Motor model number		NLD-AM	10SA2A	20SA2A	30SA2A	40SA2A
Rated thrust		N	50	95	150	200
Maximum thrust		N	150	275 ※1	450	500
Rated output		W	150	285	450	600
Rated current		A	1.8	3.4	5.2	6.8
Maximum speed		m/sec	3.5 (see the motor characteristic chart.) ※2			
Power supply voltage specification		ACV	200 ※3			
Coil unit model number		CLD-AM	10SA2A	20SA2A	30SA2A	40SA2A
Magnet base model number		MBD-AM	Selected from 12SA (120mm) ／24SA (240mm)			
Combination driver	VCⅡ series	NCR-□D	A□A2A-201D	A□A2A-401D	A□A2A-801D ※4	A□A2A-801D ※4
	VPS series	NCR-DC	□0A2B-401□	□0A2B-401□	□0A2B-801□	□0A2B-801□

※ The above specifications indicate the values generated when operation is performed with the heat sink (aluminum plate) installed in the coil unit at the ambient temperature of 25℃.
Heat sink size (mm): 250×250×15 (NLD-AM10/20SA2A model)
450×450×15 (NLD-AM30/40SA2A model)
※1 The maximum thrust becomes 240N in combination with the VPS series.
※2 The maximum motor speed is provided and the actual speed depends on the sensor resolution. (See the table of the relationships between resolutions and speeds for each linear encoder unit on p.17.)
※3 The combination with the 100-VAC specification servo driver may be possible.
However, the rating is reduced. So, contact our sales representatives after clarifying the specifications.
※4 To fit the servo driver to the UL standard, it is necessary to set the continuous output current value of this combination driver within 5 A.
(Driver allowance: 6.8 A)

■External Dimensions



※1 The coil unit thrust direction is determined to be the forward direction for the cable side.
As the initial parameter value of our servo driver, the forward direction of the coil unit and that of the linear encoder (see p.17 to p.20) are defined as the same one.
If necessary, change the forward and reverse directions with parameters.

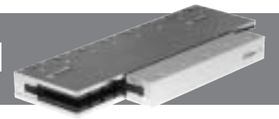
Coil Unit

Model number	Rated thrust (N)	CL	A	B	B1	N1	Mass (kg)
CLD-AM10SA2A	50	106	13	40	80	3	0.4
CLD-AM20SA2A	95	206	13	45	180	5	0.7
CLD-AM30SA2A	150	306	18	45	270	7	1.1
CLD-AM40SA2A	200	406	23	45	360	9	1.4

Magnet Base

Model number	L	L1	N	Mass (kg)
MBD-AM12SA	120	60	2	1.4
MBD-AM24SA	240	180	4	2.7

Standard Large-Thrust Type　NLD-FL Model



■Rating and Specifications

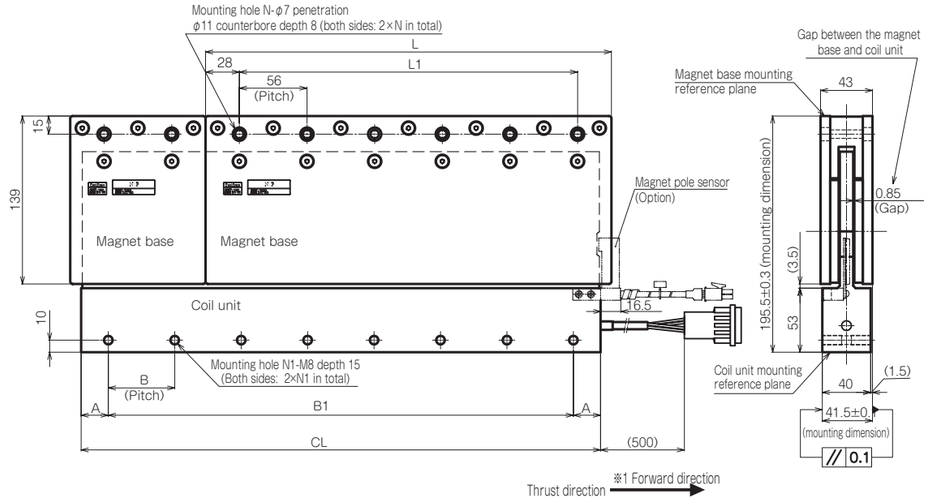
Motor model number		NLD-FL	30SA2A	40SA2A	60SA2A	70SA2A	85SA2A
Rated thrust		N	320	480	640	800	1000
Maximum thrust		N	960	1440	1920	2400	3000
Rated output		W	960	1440※1	1920	2400	3000
Rated current		A	4.6	6.8	9.2	11.5	14.7
Maximum speed		m/sec	3.5 (see the motor characteristic chart.) ※2				
Power supply voltage specification		ACV	200				
Coil unit model number		CLD-FL	30SA2A	40SA2A	60SA2A	70SA2A	85SA2A
Magnet base model number		MBD-FL	Selected from 11SA (112mm) ／33SA (336mm)				
Combination driver	VCⅡ series	NCR-□D	A□A2A-801D	A□A2A-801D※1 A□A2A-152D	A□A2A-152D	A□A2A-222D	A□A2A-222D
	VPS series	NCR-DC	□0A2B-801D	□0A2B-801□※1 □0A2B-162□	□0A2B-162□	-	-

※ The above specifications indicate the values generated when operation is performed with the heat sink (aluminum plate) installed in the coil unit at the ambient temperature of 25℃.
Heat sink size (mm): 700×450×40 (NLD-FL30/40/60SA2A model)
900×450×40 (NLD-FL70/85SA2A model)

※1 The maximum thrust becomes 1200N in combination with NCR-□DA□A2A-801D.

※2 The maximum motor speed is provided and the actual speed depends on the sensor resolution. (See the table of the relationships between resolutions and speeds for each linear encoder unit on p.17.)

■External Dimensions



※1 The coil unit thrust direction is determined to be the forward direction for the cable side.
As the initial parameter value of our servo driver, the forward direction of the coil unit and that of the linear encoder (see p.17 to p.20) are defined as the same one.
If necessary, change the forward and reverse directions with parameters.

Coil Unit

Model number	Rated thrust (N)	CL	A	B1	N1	Mass (kg)
CLD-FL30SA2A	320	290	35	220	5	3.4
CLD-FL40SA2A	480	430	22.5	385	8	5
CLD-FL60SA2A	640	570	37.5	495	10	6.7
CLD-FL70SA2A	800	710	25	660	13	8.2
CLD-FL85SA2A	1000	850	40	770	15	9.9

Magnet Base

Model number	L	L1	N	Mass (kg)
MBD-FL11SA	112	56	2	3.7
MBD-FL33SA	336	280	6	10.9

NLA Series Coreless and Core Types

NLA Series

■Features

Small-Thrust Type　NLA-S Model　Rated Thrust:7N to 13N

Small high-performance coreless type with magnet base width 38 mm and height 21 mm.
It is best suited for small high-precision stage construction.

Core Type　NLA-MA Model　Rated Thrust:250N to 750N
Core Type　NLA-NA Model　Rated Thrust:500N to 1500N

Thrust density is high, providing large thrust (maximum thrust 4500N).
The rigidity of the motor drive division is high. So, these types are best suited for high-speed positioning of large mass load.

■Explanation of the Model Number

Motor Model Number　NLA -7 S L B-S01
①　②　③　⑤　⑥　⑦

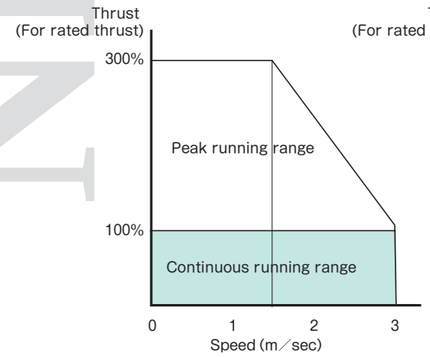
Coil Unit Model Number　CL S 7 L B -S01
①　③　②　⑤　⑥　⑦

Magnet Base Model Number　MB S 48 B -S01
①　③　④　⑥　⑦

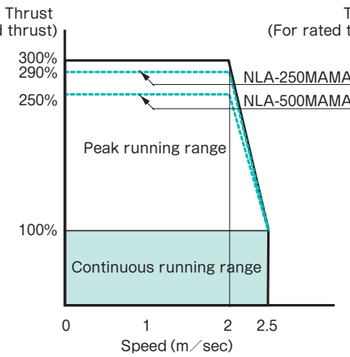
①	τ Linear servo motor series name	NLA : NLA series
		CL : Coil unit
		MB : Magnet base
②	Rated thrust	7 : 7N, 13 : 13N, 250 : 250N
③	Motor type	S : Small thrust, MA : Core M, NA : Core N …
④	Magnet base length	48 : 47.8mm, 64 : 63.8mm… (Symbol column dimension-0.2 mm = actual dimension)
⑤	Voltage specification	L : 100 VAC, M : 200-VAC specification
⑥	Design order	A (1st version) ⇒B (2nd version) ⇒C…
⑦	Dedicated device number	None : Standard specification S01 S02… : Dedicated device serial number

■Motor Characteristic Chart

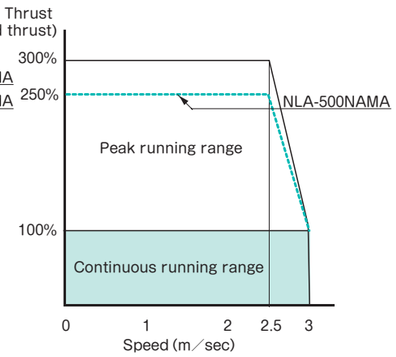
Small-Thrust Type **NLA-S Model**



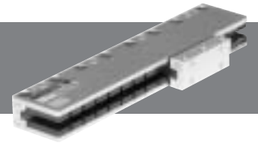
Core Type **NLA-MA Model**



Core Type **NLA-NA Nodel**



Small-Thrust Type NLA-S Model



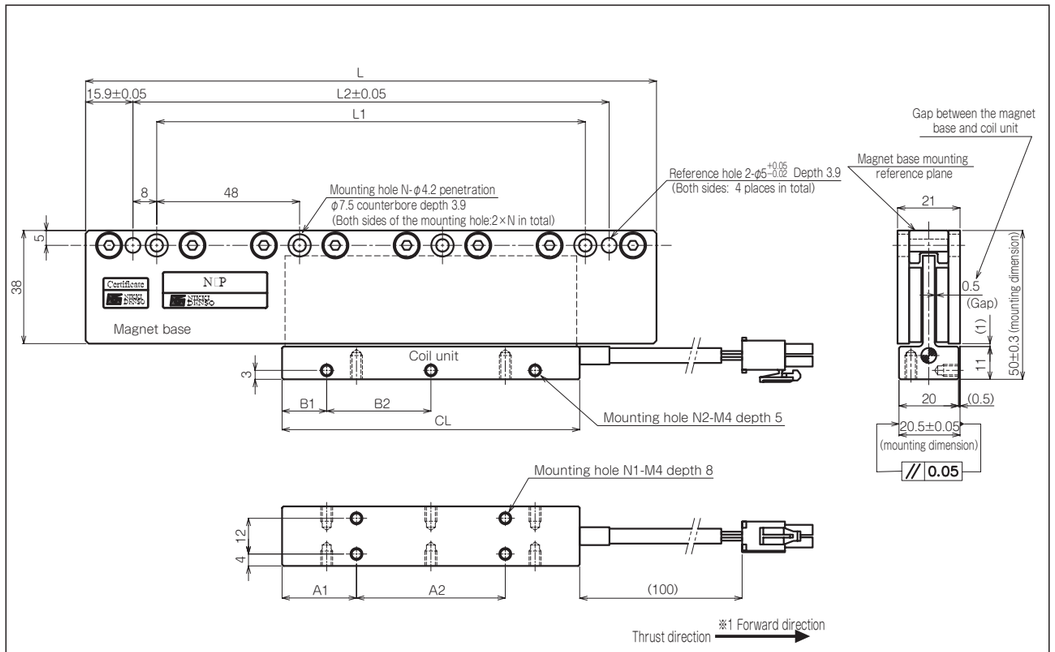
■Rating and Specifications

Motor model number		NLA-	7SLB	13SLB
Rated thrust		N	7	13
Maximum thrust		N	21	39
Rated current		A	1.0	2.0
Maximum speed		m/sec	3.0 (see the motor characteristic chart.) ※1	
Power supply voltage specification		ACV	100	
Coil unit model number		CLS	7LB	13LB
Magnet base model number		MBS	Selected from 48B (47.8mm) ／96B (95.8mm) ／192B (191.8mm)	
Combination driver	VCⅡ series	NCR-□D	A□A1A-051C	A□A1A-101C
	VPS series	NCR-DC	□0A1B-201□	□0A1B-201□

※ The above specifications indicate the values generated when operation is performed with the heat sink (aluminum plate) installed in the coil unit at the ambient temperature of 25℃.

※1 The maximum motor speed is provided and the actual speed depends on the sensor resolution. (See the table of the relationships between resolutions and speeds for each linear encoder unit on p.17.)

■External Dimensions



※1 The coil unit thrust direction is determined to be the forward direction for the cable side.
As the initial parameter value of our servo driver, the forward direction of the coil unit and that of the linear encoder (see p.17 to p.20) are defined as the same one.
If necessary, change the forward and reverse directions with parameters.

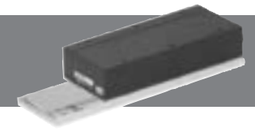
Coil Unit

Model number	Rated thrust (N)	CL	A1	A2	B1	B2	N1	N2	Mass (kg)
CLS7LB	7	50	10	30	5	20	4	6	0.05
CLS13LB	13	100	25	50	15	35	4	6	0.1

Magnet Base

Model number	L	L1	L2	N	Mass (kg)
MBS48B	47.8	–	16	1	0.25
MBS96B	95.8	48	64	2	0.45
MBS192B	191.8	144	160	4	0.9

Core Type NLD-AM Model



■Rating and Specifications

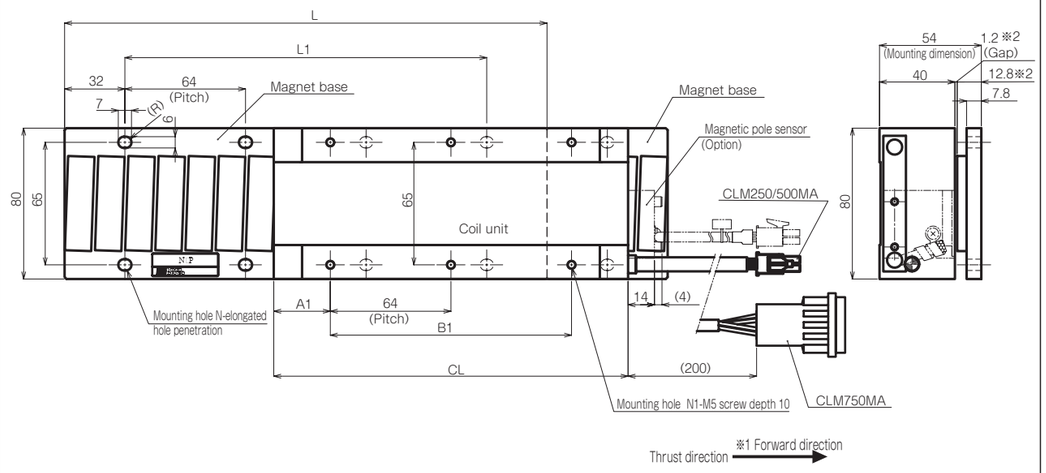
Motor model number		NLA-	250MAMA	500MAMA	750MAMA
Rated thrust		N	250	500	750
Maximum thrust		N	725	1250	2250
Rated output		A	3.4	6.8	10.2
Rated current		N	3000	6000	9000
Maximum speed		m/sec	2.5 (see the motor characteristic chart.) ※1		
Power supply voltage specification		ACV	200		
Coil unit model number		CLM	250MA	500MA	750MA
Magnet base model number		MBMA	Selected from 64A (63.8mm) ／256A (255.8mm)		
Combination driver	VCⅡ series	NCR-□D	A□A2A-401B	A□A2A-801B※2	A□A2A-222B
	VPS series	NCR-DC	□0A2B-401□	□0A2B-801□	-

※ The above specifications indicate the values generated when operation is performed with the heat sink (aluminum plate) installed in the coil unit at the ambient temperature of 25℃.

※1 The maximum motor speed is provided and the actual speed depends on the sensor resolution. (See the table of the relationships between resolutions and speeds for each linear encoder unit on p.17.)

※2 To fit the servo driver to the UL standard, it is necessary to set the continuous output current value of this combination driver within 5 A. (Driver allowance: 6.8 A)

■External Dimensions



※1 The coil unit thrust direction is determined to be the forward direction for the cable side.
As the initial parameter value of our servo driver, the forward direction of the coil unit and that of the linear encoder (see p.17 to p.20) are defined as the same one.
If necessary, change the forward and reverse directions with parameters.

※2 When the magnet cover is mounted, the total height of the magnet base is 13 mm and the gap is 1 mm.

※ This drawing indicates that the optional magnet cover is not mounted.

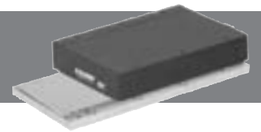
Coil Unit

Model number	Rated thrust (N)	CL	A1	N1	Mass (kg)
CLM250MA	250	188	30	6	3.0
CLM500MA	500	348	46	10	6.0
CLM750MA	750	508	30	16	9.0

Magnet Base

Model number	L	L1	N	Mass (kg)
MBMA64A	64	-	2	0.5
MBMA256A	256	192	8	1.7

Core Type NLA-NA Model



■Rating and Specifications

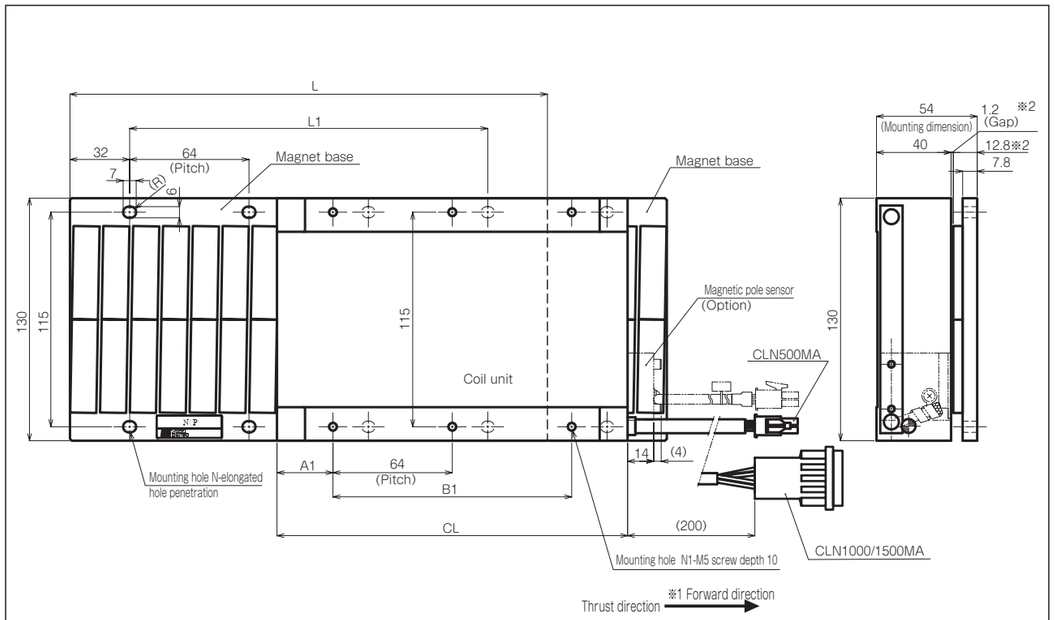
Motor model number		NLA-	500NAMA	1000NAMA	1500NAMA
Rated thrust		N	500	1000	1500
Maximum thrust		N	1250	3000	4500
Rated output		A	6.8	14	21
Rated current		N	6000	12000	18000
Maximum speed		m/sec	3.0 (see the motor characteristic chart.) ※1		
Power supply voltage specification		ACV	200		
Coil unit model number		CLN	500MA	1000MA	1500MA
Magnet base model number		MBNA	Selected from 64A (64mm) ／256A (256mm)		
Combination driver	VC Ⅱ series	NCR-□D	A□A2A-801B ※2	A□A2A-222B	A□A2A-402B
	VPS series	NCR-DC	□0A2B-801□	-	-

※ The above specifications indicate the values generated when operation is performed with the heat sink (aluminum plate) installed in the coil unit at the ambient temperature of 25-C.

※1 The maximum motor speed is provided and the actual speed depends on the sensor resolution. (See the table of the relationships between resolutions and speeds for each linear encoder unit on p.17.)

※2 To fit the servo driver to the UL standard, it is necessary to set the continuous output current value of this combination driver within 5 A. (Driver allowance: 6.8 A)

■External Dimensions



※1 The coil unit thrust direction is determined to be the forward direction for the cable side. As the initial parameter value of our servo driver, the forward direction of the coil unit and that of the linear encoder (see p.17 to p.20) are defined as the same one. If necessary, change the forward and reverse directions with parameters.

※2 When the magnet cover is mounted, the total height of the magnet base is 13 mm and the gap is 1 mm.

※ This drawing indicates that the optional magnet cover is not mounted.

Coil Unit

Model number	Rated thrust (N)	CL	A1	N1	Mass (kg)
CLN500MA	500	188	30	6	5.5
CLN1000MA	1000	348	46	10	11.0
CLN1500MA	1500	508	30	16	17.0

Magnet Base

Model number	L	L1	N	Mass (kg)
MBNA64A	64	-	2	0.9
MBNA256A	256	192	8	3.0

τLinear Motor Options

Linear Encoders

The following linear encoder units are assorted.
Select one of them in consideration of the resolution, speed, used environment, and the like.

Open-Type Incremental Encoder Renishaw-Manufactured RGH-22/24 Type

Since the sensor head is small, this encoder can be installed in a location nearer to a drive source.
The scale can be used by cutting it to any length according to the required stroke.
The maximum speed of 1.6 m/sec can be achieved for resolution 20/1024 mm (approx. 20 nm) in combination with the Nikki Denso-manufactured interpolator unit (IPU).

Open-Type Absolute Encoder Mitutoyo-Manufactured ST701/702/703/704 Type

Origin return and magnetic pole detection are not necessary.
This encoder is effective for multiple drive tables.
It provides superior environment resistance.

Assembly-Type Lncremental Encoder Mitutoyo-Manufactured AT211 Type

It provides superior environment resistance.

●Resolution and Product Model Number of Each Linear Encoder Unit

Open-Type Lncremental Encoder Renishaw-Manufactured RGH-22 Type

Resolution	Nikki Denso model number
5μm	NSR-LABAAGA1A05
1μm	NSR-LABABGA1A05
0.5μm	NSR-LABACGA1A05
0.1μm	NSR-LABAE□A1A05 ※1
0.05μm	NSR-LABAF□A1A05 ※1
20/1024μm(20nm)	NSR-LAACS2A2A05 ※2

※ The linear scale (A/9517/0004 model) is prepared according to the required stroke length (in units of 0.01 m).

※1 A letter in □ in the model number becomes F when the combination driver is VC II series or D for VPS.

※2 The Nikki Denso-manufactured interpolator unit (IPU) is separately placed.

Open-Type Lncremental Encoder Renishaw-Manufactured RGH-24 Type

Resolution	Nikki Denso model number
5μm	NSR-LBBAAGA□A05
1μm	NSR-LBBABGA□A05
0.5μm	NSR-LBBACGA□A05
0.1μm	NSR-LBBAEEA□A05
0.05μm	NSR-LBBAFEA□A05
20/1024μm(20nm)	NSR-LBACS2A□A05 ※1

※ The linear scale (A/9517/0004 model) is prepared according to the required stroke length (in units of 0.01 m).

※ A number in] in the model number becomes 1 for the origin marker adhesion mounting type and 2 for the bolt mounting type. (For details of the mounting method, see the linear encoder external dimensions on p.18.)

※1 The Nikki Denso-manufactured interpolator unit (IPU) is separately placed.

Open-Type Absolute Encoder Mitutoyo-Manufactured ST701/703 Type (Wide Read Head Type)

Resolution	Nikki Denso model number
0.5μm	NSR-LFDAC2E5A10-□□□
0.1μm	NSR-LFDAE2E5A10-□□□

※ Numbers in □□□ in the model number indicate an effective measurement length. 100 mm to 3000 mm (in units of 100 mm)
001:100mm 002 : 200mm ··· 030 : 3000mm

Open-Type Absolute Encoder Mitutoyo-Manufactured ST702/704 Type (Narrow Read Head Type)

Resolution	Nikki Denso model number
0.5μm	NSR-LGAC2E5A10-□□□
0.1μm	NSR-LGAC2E5A10-□□□

※ Numbers in □□□ in the model number indicate an effective measurement length. 100 mm to 3000 mm (in units of 100 mm)
001:100mm 002 : 200mm ··· 030 : 3000mm

Assembly-Type Lncremental Encoder Mitutoyo-Manufactured AT211 Type

Resolution	Nikki Denso model number	Effective measurement length						
		100mm	200mm	300mm	500mm	600mm	800mm	1000mm
		Model number in □						
5μm	AT211-□Y1-DZ	100B4H	200B4H	300B4H	500B4H	600B4S	800B4S	1000B4S
1μm	AT211-□R1-DZ							
0.5μm	AT211-□A1-DZ							

●Relationships Between Resolutions and Speeds of Each Linear Encoder Unit

The maximum speed of the τ Linear servo motor depends on the type and resolution of the linear encoder used. For details, see the following table.

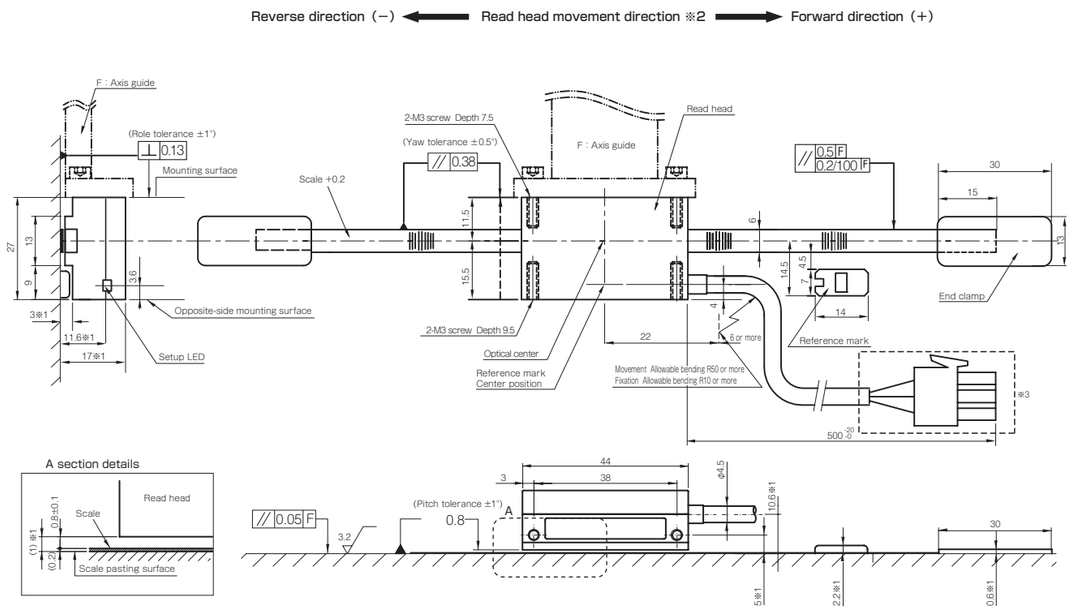
Encoder type	Encoder resolution	τ Linear servo motor series/type name							
		NVA series			NLD series		NLA series		
		Flat	High thrust	Large thrust	Standard	Standard large thrust	Small thrust	Core M	Core N
		NVA-AM	NVA-BM	NVA-BL	NLD-AM	NLD-FL	NLA-S	NLA-MA	NLA-NA
Open-type incremental Renishaw RGH-22	5μm	3.5m/s		3.0m/s	3.5m/s		3.0m/s	2.5m/s	3.0m/s
	1μm								
	0.5μm	2.5m/s (2.0m/s)							
	0.1μm	1.3m/s (0.7m/s)							
	0.05μm	0.6m/s (0.3m/s)							
	20/1024μm (20nm)	1.6m/s※1 (1.562m/s)							
Open-type incremental Renishaw RGH-24	5μm	3.5m/s		3.0m/s	3.5m/s		3.0m/s	2.5m/s	3.0m/s
	1μm								
	0.5μm	2.5m/s (2.0m/s)							
	0.1μm	0.7m/s							
	0.05μm	0.35m/s							
	20/1024μm (20nm)	1.6m/s※1 (1.562m/s)							
Open-type absolute Mitutoyo ST701/2/3/4	0.5μm	3.5m/s		3.0m/s	3.5m/s		3.0m/s	2.5m/s	3.0m/s
	0.1μm								
Assembly-type incremental Mitutoyo AT-211	5μm	2.0m/s							
	1μm	2.0m/s							
	0.1μm	0.7m/s							

※ A speed in ( ) is used when the combination driver is VPS series.

※1 For a VC Ⅱ series combination driver, the maximum speed is 0.4 m/s when the command unit is used as 10 nm (minute positioning usage).

●External Dimensions of Each Linear Encoder Unit

Open-Type Lncremental Encoder Renishaw-Manufactured RGH-22 Type

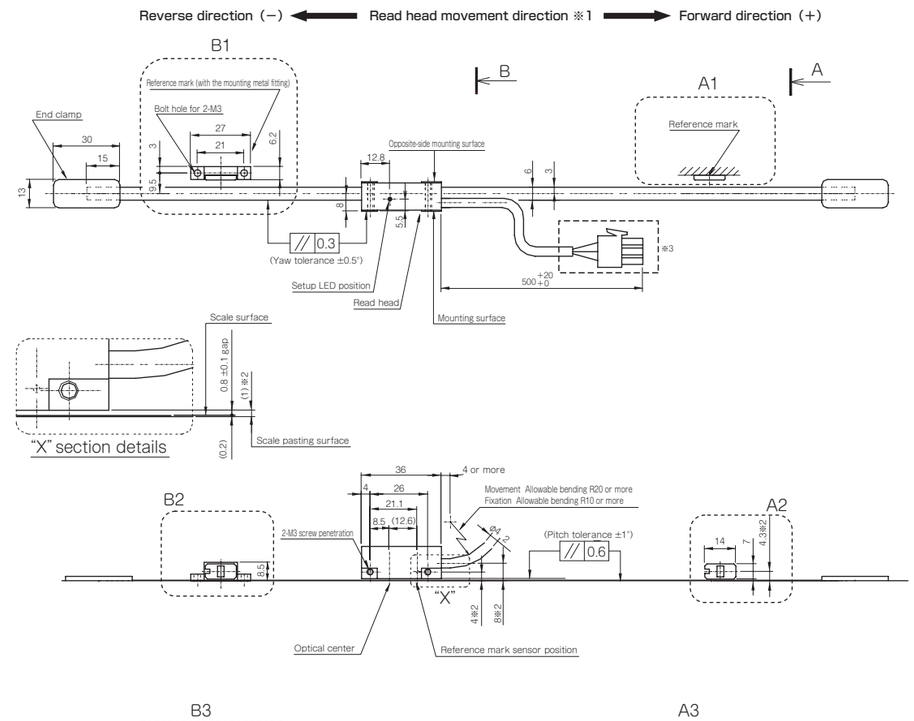


※1 Dimension from the scale pasting surface (including the scale thickness)

※2 The output direction during encoder read head movement conforms to this drawing.
(If the combination driver is VC Ⅱ series, forward and reverse directions can be changed with parameters.)

※3 For encoder resolution 20/1024 mm (20 nm), the connector shape is different because of connection to the interpolator unit (IPU) on p.18.

Open-Type Lncremental Encoder Renishaw-Manufactured RGH-24 Type



※ There are two methods of fixing the reference mark: with adhesive (see A1 to A3 in the drawing) and the screw (see B1 to B3 in the drawing). Specify one of them.

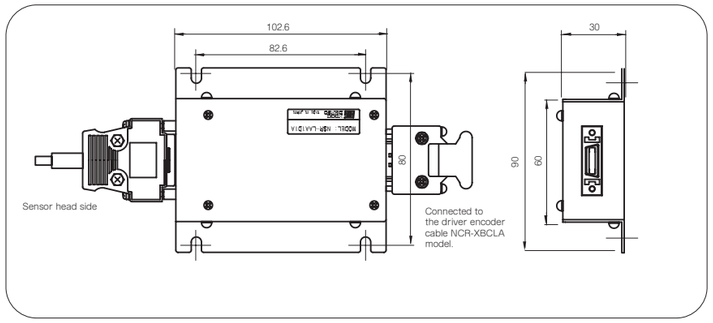
※1 The output direction during encoder read head movement conforms to this drawing. (If the combination driver is VC Ⅱ series, forward and reverse directions can be changed with parameters.)

※2 Dimension from the scale pasting surface (including the scale thickness)

※3 For encoder resolution 20/1024 mm (20 nm), the connector shape is different because of connection to the interpolator unit (IPU) shown in the drawing below.

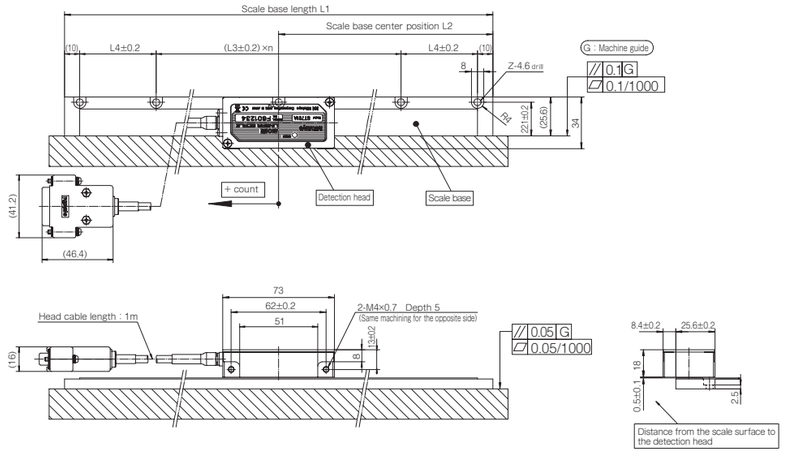
Interpolator Unit (IPU) External Dimensions

This interpolator unit (IPU) is separately placed when resolution 20/1024 mm (20 nm) of the open-type incremental encoder is used.



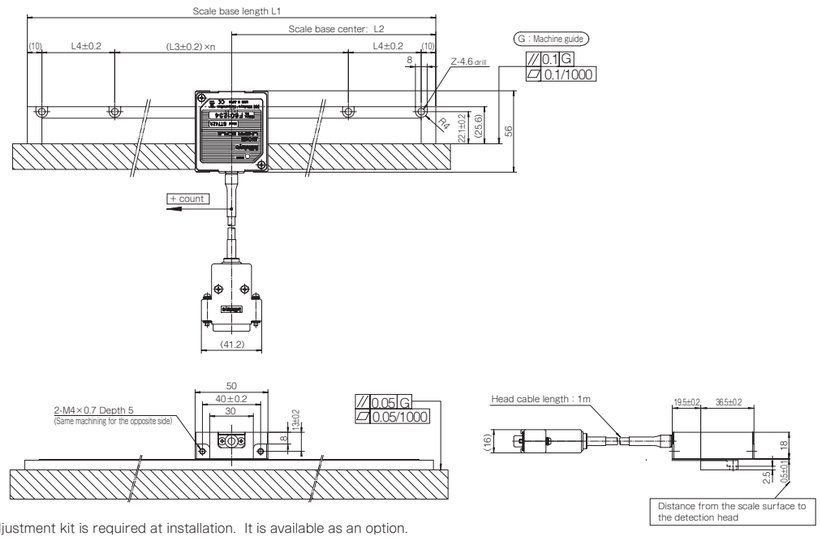
Open-Type Absolute Encoder　Mitutoyo-Manufactured ST701/703 Type (Wide Read Head Type)

Reverse direction (−) ⟵ Read head movement direction ※1 ⟶ Forward direction (+)



Open-Type Absolute Encoder　Mitutoyo-Manufactured ST702/704 Type (Narrow Read Head Type)

Reverse direction (−) ⟵ Read head movement direction ※1 ⟶ Forward direction (+)



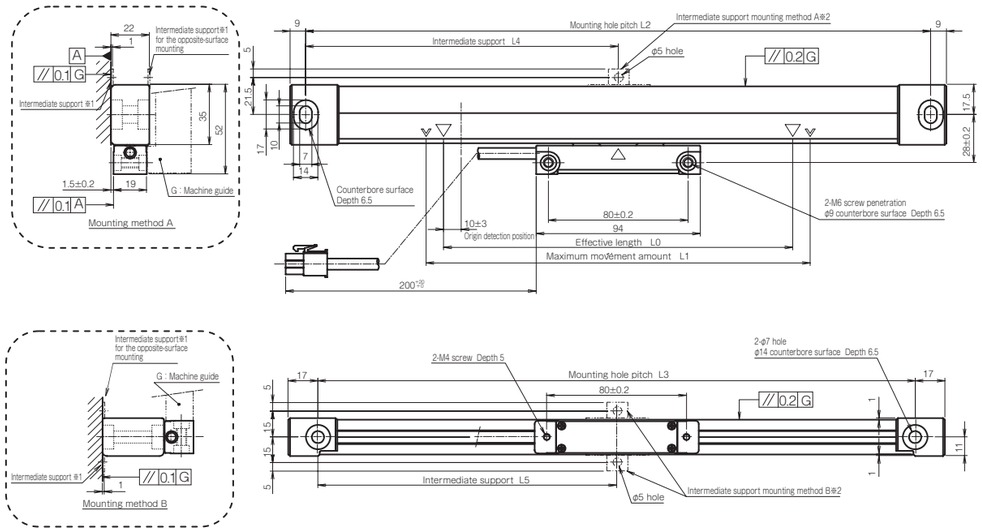
※　The signal adjustment kit is required at installation. It is available as an option.
※1 The output direction during encoder read head movement conforms to this drawing.
(If the combination driver is VC Ⅱ series, forward and reverse directions can be changed with parameters.)

Effective length (mm)	Maximum movement length (mm)	L1 (mm)	L2 (mm)	L3 (mm)	n	L4 (mm)	z
100	110	180	90	80	2		3
200	210	280	140	130			
300	310	380	190	180			
400	410	480	240	230			
500	510	580	290	200		80	5
600	610	680	340			130	
700	710	780	390			180	
800	810	880	440			230	
900	910	980	490		4	80	7
1000	1010	1080	540			130	
1100	1110	1180	590			180	
1200	1210	1280	640			230	
1300	1310	1380	690		6	80	9
1400	1410	1480	740			130	
1500	1510	1580	790			180	
1600	1610	1680	840			230	

Effective length (mm)	Maximum movement length (mm)	L1 (mm)	L2 (mm)	L3 (mm)	n	L4 (mm)	z
1700	1710	1780	890	200	8	80	11
1800	1810	1880	940			130	
1900	1910	1980	990			180	
2000	2010	2080	1040			230	
2100	2110	2180	1090		10	80	13
2200	2210	2280	1140			130	
2300	2310	2380	1190			180	
2400	2410	2480	1240			230	
2500	2510	2580	1290		12	80	15
2600	2610	2680	1340			130	
2700	2710	2780	1390			180	
2800	2810	2880	1440			230	
2900	2980	2890	1490		14	80	17
3000	3010	3080	1540			130	

Assembly-Type Lncremental Encoder　Mitutoyo-Manufactured AT211 Type

Reverse direction (−) ⟵ Read head movement direction ※1 ⟶ Forward direction (+)



Model number ※3	Dimension (mm)			
	L0	L1	L2	L3
AT211-100B4H-□1-DZ	100	120	258	242
AT211-200B4H-□1-DZ	200	220	358	342
AT211-300B4H-□1-DZ	300	320	468	452

Model number	Dimension (mm)					
	L0	L1	L2	L3	L4	L5
AT211-500B4H-□1-DZ	500	540	678	662	339	331
AT211-600B4S-□1-DZ	600	640	778	762	389	381
AT211-800B4S-□1-DZ	800	840	978	962	489	481
AT211-500B4S-□1-DZ	1000	1040	1178	1162	589	581

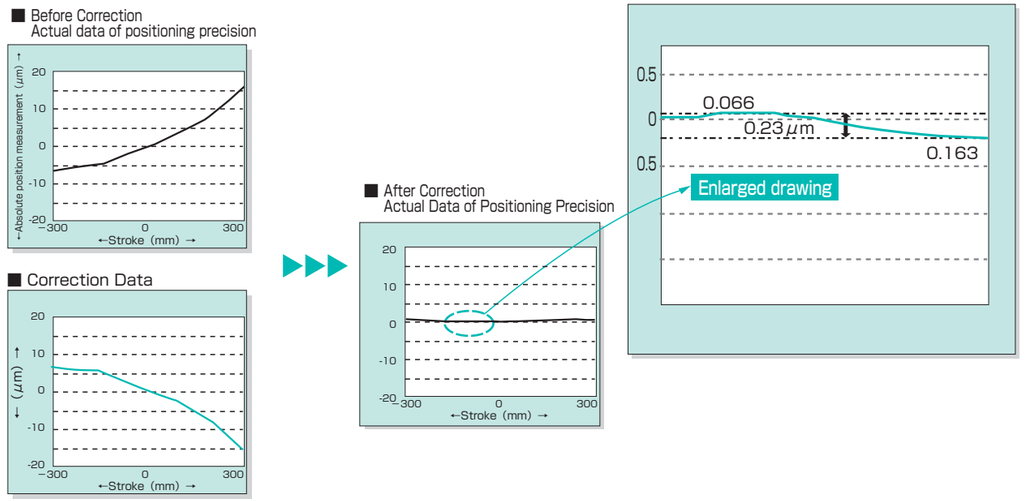
※1　The output direction during encoder read head movement conforms to this drawing.
(Forward and reverse directions can be changed with combination driver parameters.)
※2　When effective length L0 is 500 mm or more, the scale main body is fixed with the additional and attached intermediate support.
As shown in the drawing, there are two methods of mounting the intermediate support in each of mounting directions A and B.
During mounting, select each of them.
※3　A value in □in the model number indicates a resolution. (A: 0.1 mm, R: 0.5 mm, Y: 5 mm)

Absolute Position Correction Function Option

After inserting the τ Linear servo motor in the device, the positioning precision can be improved by incorporating the position data measured by a customer into the Nikki Denso servo driver as compensation data.

●The following is an example of actual measurement for the positioning precision when the absolute position correction function option is used in the 600 mm stroke 1-axis linear stage.

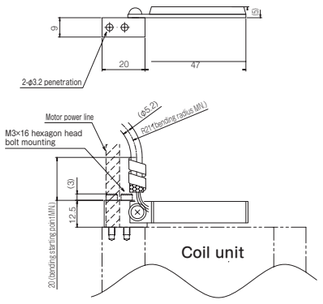
Position measuring instrument : Renishaw-manufactured laser measuring instrument



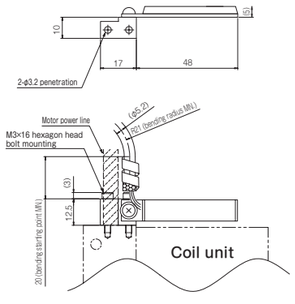
Magnetic Sensor Units

●External Dimensions

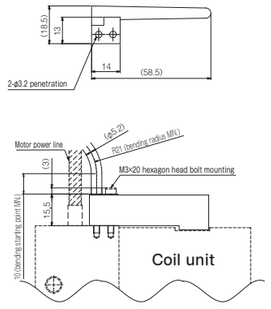
For the flat-type NVA-AM model
Model number:NSR-PAA5D1B-□□□



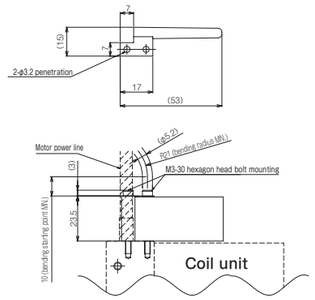
For the high-thrust type NVA-BM model
Model number:NSR-PAA6D1C-□□□



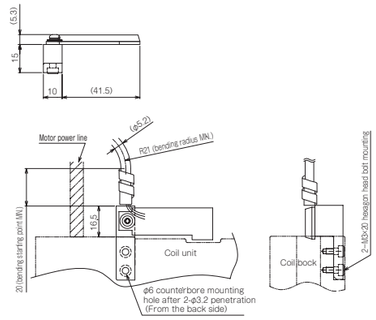
For the large-thrust type NVA-BL model
Model number:NSR-PAA9D1C-□□□



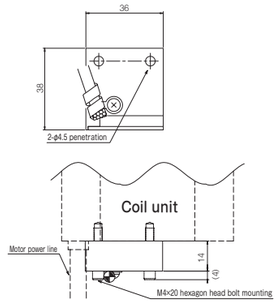
For the standard-type NLD-AM model
Model number:NSR-PAB2D1B-□□□



For the standard large-thrust type NLD-FL model
Model number:NSR-PAB4D1A-□□□

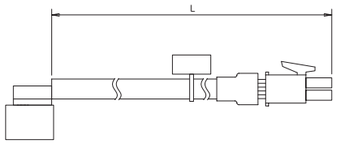


For the core M/N type NLA-MA/NA model
Model number:NSR-PAA7D1B-□□□



※A value in □□□ in the above model number indicates a cable length (L).

●Cable Lengths



An L dimension is selected from the following table.

τ Linea servo motor type	Model number □□□ section020	L (mm)
NVA-AM/BM,NLD-AM,NLA-MA/NA	030	230±20
NVA-BL,NLD-FL	050	330±20
All	100	530±20
All		1000±50

Scaleless Linear Sensors

A linear servo system requiring no linear scale can be constructed by magnetically detecting a position from the τ Linear servo motor. This linear servo system is best suitable for transportation.

●Features

This system has superior environment resistance since no linear scale is used.
It can be easily installed since no linear scale is adjusted.
It provides better cost merit for a long stroke since no linear scale is used.

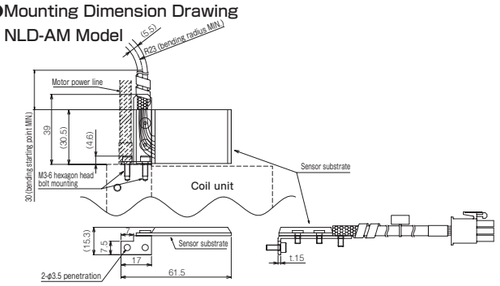
●Applicable τ Linear Servo Motors and Positioning Resolutions

Applicable τ Linear servo motor	Positioning resolution
Coreless standard type (NLD-AM model)	40/8196 (approx. 4.9 mm)
Coreless flat type (NVA-AM model)	20/8196(approx. 2.9 mm)

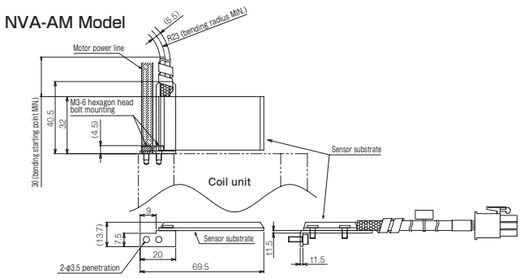
※For further information about other supported τ Linear servo motors, contact our sales representatives.

●Mounting Dimension Drawing

NLD-AM Model

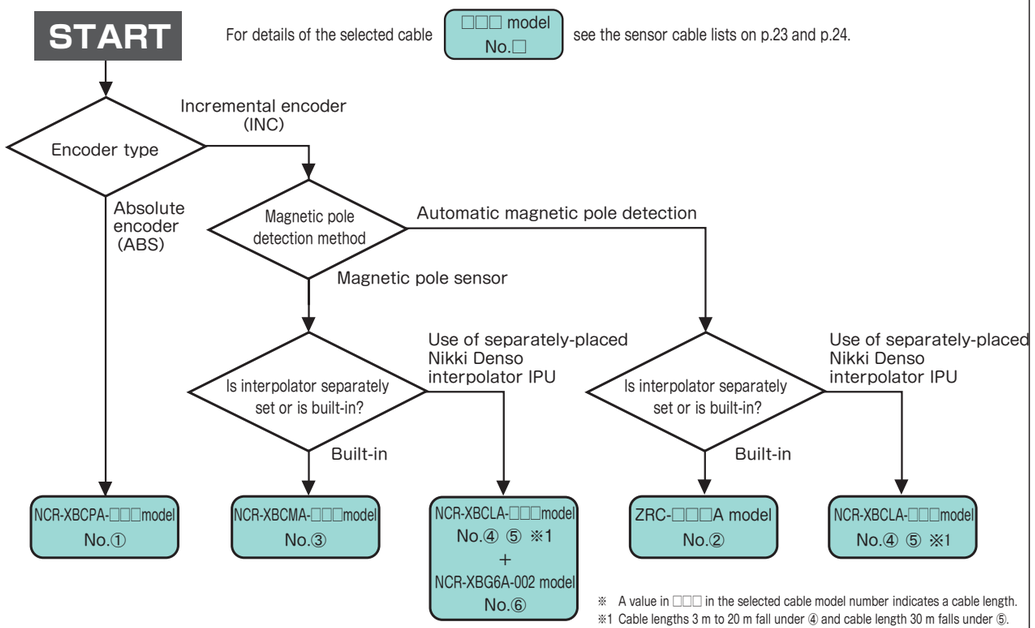


NVA-AM Model



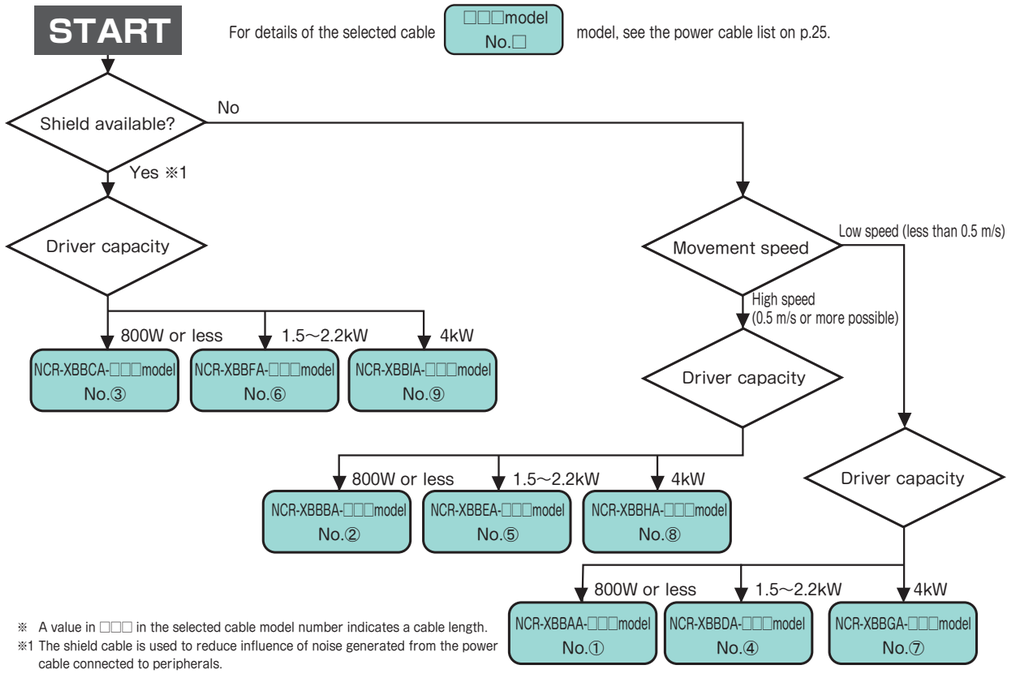
Sensor Power Cables

■Sensor Cable Selection Chart



※ A value in □□□ in the selected cable model number indicates a cable length.
※1 Cable lengths 3 m to 20 m fall under ④ and cable length 30 m falls under ⑤.

■Power Cable Selection Chart

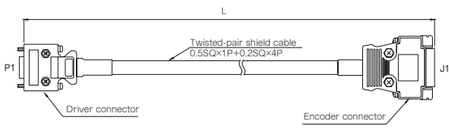


※ A value in □□□ in the selected cable model number indicates a cable length.
※1 The shield cable is used to reduce influence of noise generated from the power cable connected to peripherals.
The shield cable is a high-speed movement type (0.5 m/s or more possible).

■Sensor Cable List

①

Type	Model number	Length (L)
For Mitutoyo ABS encoder for ST70＊A/ ST70＊AL	NCR-XBCPA-030	3m
	NCR-XBCPA-050	5m
	NCR-XBCPA-100	10m
	NCR-XBCPA-150	15m
	NCR-XBCPA-200	20m
	NCR-XBCPA-300	30m

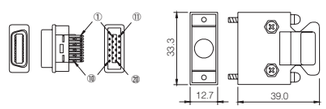


Finished outside diameter Approx. 8.5 mm Recommended bending radius Approx. 55 mm or more

P1 (driver side) signal table		J1 (encoder side) signal table	
Signal name	Pin No.	Signal name	Pin No.
GND	1	GND	1
GND	2	GND	2
+5V	3	+5V	3
+5V	4	+5V	4
SD	5	-	5
SD＊	6	-	6
-	7	SD	7
-	8	SD＊	8
-	9	-	9
-	10	-	10
-	11	+5V	11
-	12	-	12
-	13	GND	13
-	14	-	14
-	15	-	15
-	16	FG	Connector shell
-	17		
-	18		
-	19		
-	20		
FG (grounding)	Metal fitting		

Sensor cable connector kit : NCR-XBDQA

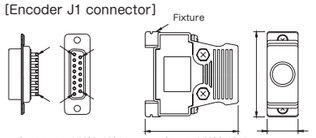
[Driver P1 connector]



Connector : 10120-3000PE (Manufactured by Sumitomo 3M Limited)

Cover : 10320-52A0-008 (Manufactured by Sumitomo 3M Limited)

[Encoder J1 connector]

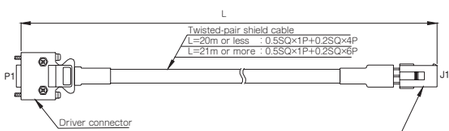


Connector : XM2D-1501 (Manufactured by OMRON Corporation)

Cover : XM2S-1511
Fixture : XM2Z-0001 (manufactured by OMRON Corporation)
※ A customer mounts the fixture.

②

Type	Model number	Length (L)
Encoder:INC Interpolator:Built-in Magnetic pole detection:Automatic	ZRC-030A	3m
	ZRC-050A	5m
	ZRC-100A	10m
	ZRC-150A	15m
	ZRC-200A	20m
	ZRC-300A	30m

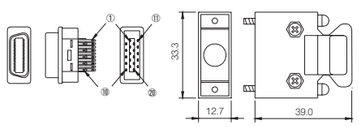


Finished outside diameter Approx. 9.5 mm Recommended bending radius Approx. 57 mm or more

P1 (driver side) signal table		J1 (encoder side) signal table	
Signal name	Pin No.	Signal name	Pin No.
GND	1	B	1
GND	2	B＊	2
+5V	3	A	3
+5V	4	A＊	4
-	5	Z	5
-	6	Z＊	6
A	7	+5V	7
A＊	8	GND	8
B	9	FG (grounding)	9
B＊	10		
Z	11		
Z＊	12		
-	13		
-	14		
-	15		
-	16		
RX ※1	17		
RX＊ ※2	18		
-	19		
-	20		
FG (grounding)	Metal fitting		

Sensor cable connector kit : ZCK-ENC model

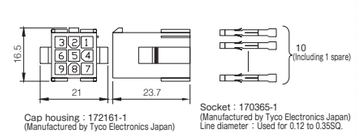
[Driver P1 connector]



Connector : 10120-3000PE (Manufactured by Sumitomo 3M Limited)

Cover : 10320-52A0-008 (Manufactured by Sumitomo 3M Limited)

[Encoder J1 connector]



Cap housing : 172161-1 (Manufactured by Tyco Electronics Japan)

Socket : 170365-1 (Manufactured by Tyco Electronics Japan) Line diameter : Used for 0.12 to 0.35SQ.

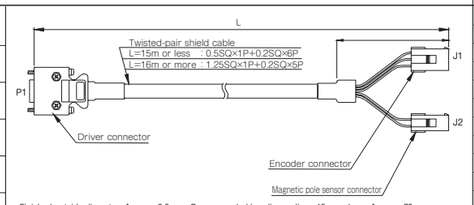
Socket : 170366-1 (Manufactured by Tyco Electronics Japan) Line diameter : Used for 0.3 to 0.89SQ.

※1 RX is connected to +5 V within the P1 connector.
※2 RX＊ is connected to GND within the P1 connector.

Use socket 170366-1 when using a 0.3SQ or more electric wire for power supply (+5 V, GND) and for a ground wire.

③

Type	Model number	Length (L)
Encoder:INC Interpolator:Built-in Magnetic pole detection:Magnetic pole sensor	NCR-XBCMA-030	3m
	NCR-XBCMA-050	5m
	NCR-XBCMA-100	10m
	NCR-XBCMA-150	15m
	NCR-XBCMA-200	20m
	NCR-XBCMA-300	30m

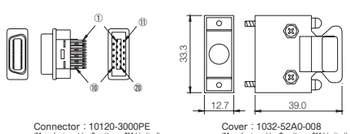


Finished outside diameter Approx. 9.5 mm Recommended bending radius 15 m or less: Approx. 73 mm
20 m to 30 m: Approx. 73 mm or more

P1 (driver side) signal table		J1 (encoder side) signal table	
Signal name	Pin No.	Signal name	Pin No.
GND	1	B	1
GND	2	B＊	2
+5V	3	A	3
+5V	4	A＊	4
-	5	Z	5
-	6	Z＊	6
A	7	+5V(1)	7
A＊	8	GND(3)	8
B	9	FG (grounding)	9
B＊	10		
Z	11	J2 (magnetic pole sensor side) signal table	
Z＊	12	Signal name	Pin No.
PS	13	+5V	1
PS＊	14	PS	2
PC	15	PC	3
PC＊	16	GND	4
-	17	PS＊	5
-	18	PC＊	6
-	19		
-	20		
FG (grounding)	Metal fitting		

Sensor cable connector kit: NCR-XBC2A model

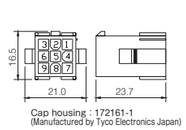
[Driver connector]



Connector : 10120-3000PE (Manufactured by Sumitomo 3M Limited)

Cover : 1032-52A0-008 (Manufactured by Sumitomo 3M Limited)

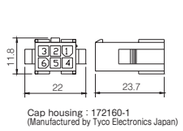
[Sensor J1 encoder connector]



Cap housing : 172161-1 (Manufactured by Tyco Electronics Japan)

Socket : 170365-1 (Manufactured by Tyco Electronics Japan) Line diameter : Used for 0.12 to 0.35SQ.

[Sensor J2 magnetic pole sensor connector]



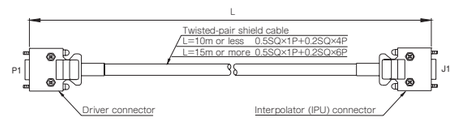
Cap housing : 172160-1 (Manufactured by Tyco Electronics Japan)

Socket : 170366-1 (Manufactured by Tyco Electronics Japan) Line diameter : Used for 0.30 to 0.89SQ.

Use socket 170366-1 when using an electric wire for power supply (+5 V, GND) and for a ground wire.

④

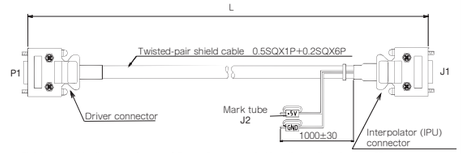
Type	Model number	Length (L)
Encoder:INC Interpolator:Use of separately-placed Nikki Denso IPU	NCR-XBCLA-030	3m
	NCR-XBCLA-050	5m
	NCR-XBCLA-100	10m
	NCR-XBCLA-150	15m
	NCR-XBCLA-200	20m



Finished outside diameter Approx. 9.5 mm Recommended bending radius Approx. 57 mm or more

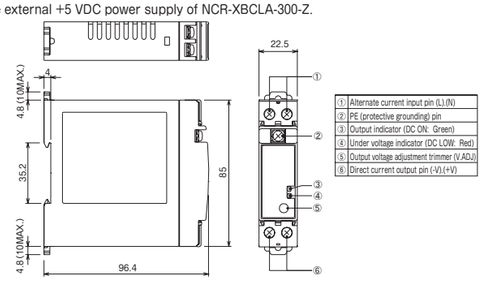
⑤

Type	Model number	Length (L)
Encoder:INC Interpolator: Use of separately-placed Nikki Denso IPU	NCR-XBCLA-300-Z	30m



Finished outside diameter Approx. 9.5 mm Recommended bending radius Approx. 57 mm or more

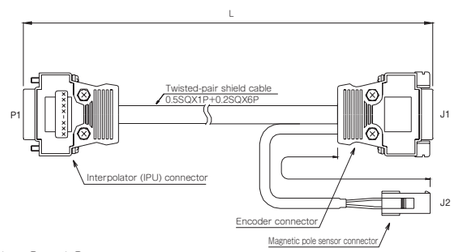
External power supply unit : NCR-XAD1A model
The optional NCR-XAD1A model is provided as the external +5 VDC power supply of NCR-XBCLA-300-Z.



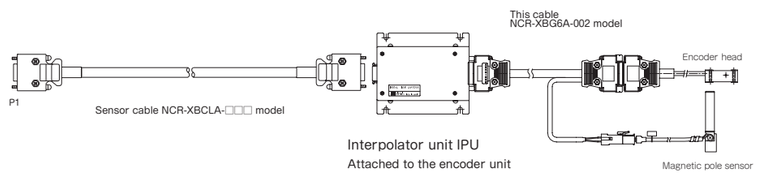
NCR-XAD1A is a power supply unit manufactured by OMRON Corporation.
For details of the specifications, characteristics, and the like, see catalog data offered by OMRON Corporation.

⑥

Type	Model number	Length (L)
Encoder:INC Interpolator: Use of separately-placed Nikki Denso IPU Magnetic pole detection:Magnetic pole sensor	NCR-XBG6A-002	0.2m



Cable connection diagram
Use this cable together with sensor cables Nos. ④ and ⑤.



P1 (IPU side) signal table		J1 (encoder side) signal table	
Signal name	Pin No.	Signal name	Pin No.
PS＊	1	-	1
PC＊	2	-	2
+5V	3	-	3
REF＊	4	REF＊	4
COS＊	5	COS＊	5
SIN＊	6	SIN＊	6
-	7	-	7
+5V	8	+5V	8
GND	9	GND	9
PS	10	-	10
PC	11	-	11
REF	12	REF	12
COS	13	COS	13
SIN	14	SIN	14
GND	15	-	15
FG (grounding)	Metal fitting	FG (grounding)	Metal fitting

※Other optional sensor cables

Encoder cables are also assorted which can be connected to open linear encoders manufactured by HEIDENHAIN.
Check the model number and resolution of the cable used, and contact our sales representative. (Some cables cannot be used with the combination driver because of the relationship between the resolution and speed of the cables.)

Type	Cable model number	Length
Encoder : INC Interpolator : Built-in Magnetic pole detection : Magnetic pole sensor	NCR-XBCZA-030	3m
	NCR-XBCZA-050	5m
	NCR-XBCZA-100	10m
	NCR-XBCZA-150-Z	15m
	NCR-XBCZA-200-Z	20m

※15 m and 20 m are used for external power supply (+5 VDC) type.

P1 (driver side) signal table		J1 (encoder side) signal table	
Signal name	Pin No.	Signal name	Pin No.
GND	1	GND	1
GND	2	GND [—]	2
+5V	3	+5V [—]	3
+5V	4	+5V [—]	4
SD	5	SD	5
SD＊	6	SD＊	6
-	7	-	7
-	8	-	8
-	9	-	9
-	10	-	10
Z	11	Z	11
Z＊	12	Z＊	12
-	13	-	13
-	14	-	14
-	15	-	15
-	16	-	16
-	17	-	17
-	18	-	18
-	19	-	19
-	20	-	20
FG (grounding)	Metal fitting	FG (grounding)	Metal fitting

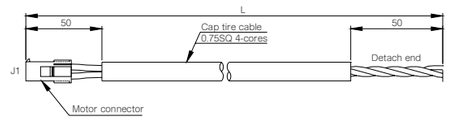
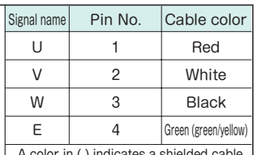
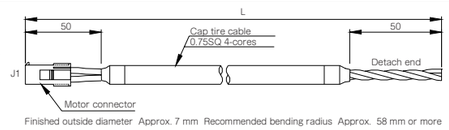
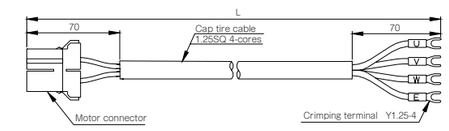
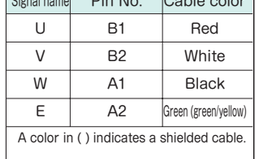
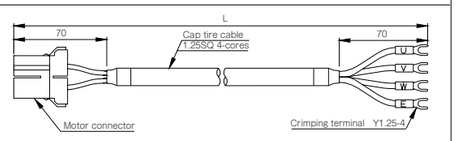
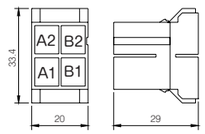
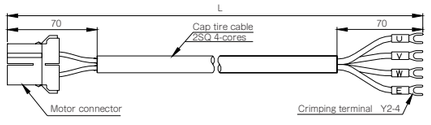
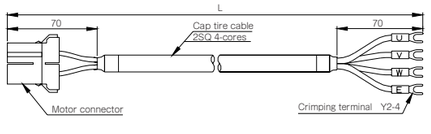
A symbol in [ ] indicates the use of the NCR-XBCLA-300-Z model.

J2 (external power supply side) signal table	
Signal name	Line color
+5V	Red
GND	Black

For the use of the NCR-XBCLA-300-Z model

J2 (magnetic pole sensor side) signal table	
Signal name	Pin No.
+5V	1
PS	2
PC	3
GND	4
PS＊	5
PC＊	6

■Power Cable List

No.	Type	Model number	Length (L)	External dimensions	Signal table/connector kit
①	Driver capacity: 800 W or less Shield: None Movement speed: Less than 0.5 m/s	NCR-XBBAA-030	3m		
		NCR-XBBAA-050	5m		
		NCR-XBBAA-100	10m		
		NCR-XBBAA-150	15m		
		NCR-XBBAA-200	20m		
		NCR-XBBAA-300	30m		
②	Driver capacity: 800 W or less Shield: None Movement speed: 0.5 m/s or more possible	NCR-XBBBA-030	3m		
		NCR-XBBBA-050	5m		
		NCR-XBBBA-100	10m		
		NCR-XBBBA-150	15m		
		NCR-XBBBA-200	20m		
		NCR-XBBBA-300	30m		
③	Driver capacity: 800 W or less Shield: Shielded Movement speed: 0.5 m/s or more possible	NCR-XBBCA-030	3m		
		NCR-XBBCA-050	5m		
		NCR-XBBCA-100	10m		
		NCR-XBBCA-150	15m		
		NCR-XBBCA-200	20m		
		NCR-XBBCA-300	30m		
④	Driver capacity: 1.5 to 2.2 kW Shield: None Movement speed: Less than 0.5 m/s	NCR-XBBDA-030	3m		
		NCR-XBBDA-050	5m		
		NCR-XBBDA-100	10m		
		NCR-XBBDA-150	15m		
		NCR-XBBDA-200	20m		
		NCR-XBBDA-300	30m		
⑤	Driver capacity: 1.5 to 2.2 kW Shield: None Movement speed: 0.5 m/s or more possible	NCR-XBBEA-030	3m		
		NCR-XBBEA-050	5m		
		NCR-XBBEA-100	10m		
		NCR-XBBEA-150	15m		
		NCR-XBBEA-200	20m		
		NCR-XBBEA-300	30m		
⑥	Driver capacity: 1.5 to 2.2 kW Shield: Shielded Movement speed: 0.5 m/s or more possible	NCR-XBBFA-030	3m		
		NCR-XBBFA-050	5m		
		NCR-XBBFA-100	10m		
		NCR-XBBFA-150	15m		
		NCR-XBBFA-200	20m		
		NCR-XBBFA-300	30m		
⑦	Driver capacity: 4 kW Shield: None Movement speed: Less than 0.5 m/s	NCR-XBBGA-030	3m		
		NCR-XBBGA-050	5m		
		NCR-XBBGA-100	10m		
		NCR-XBBGA-150	15m		
		NCR-XBBGA-200	20m		
		NCR-XBBGA-300	30m		
⑧	Driver capacity: 4 kW Shield: None Movement speed: 0.5 m/s or more possible	NCR-XBBHA-030	3m		
		NCR-XBBHA-050	5m		
		NCR-XBBHA-100	10m		
		NCR-XBBHA-150	15m		
		NCR-XBBHA-200	20m		
		NCR-XBBHA-300	30m		
⑨	Driver capacity: 4 kW Shield: Shielded Movement speed: 0.5 m/s or more possible	NCR-XBBIA-030	3m		
		NCR-XBBIA-050	5m		
		NCR-XBBIA-100	10m		
		NCR-XBBIA-150	15m		
		NCR-XBBIA-200	20m		
		NCR-XBBIA-300	30m		

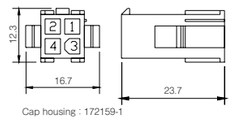
Finished outside diameter NCR-XBBAA-□□□ Approx. 8.9mm
NCR-XBBBA-□□□ Approx. 6.5mm
Recommended bending radius NCR-XBBAA-□□□ Approx. 51mm or more
NCR-XBBBA-□□□ Approx. 58mm or more

※ For the standard large-thrust type NLD-FL model, the shape of the connector section falls on ④ (connector with a driver capacity of 1.5 to 2.2 kW).
In this case, the cable model number is ①NCR-XBEJA-✱✱✱ and ⑦NCR-XBEKA-✱✱✱.

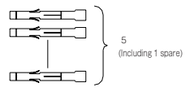
Signal name	Pin No.	Cable color
U	1	Red
V	2	White
W	3	Black
E	4	Green (green/yellow)

A color in ( ) indicates a shielded cable.

Power cable connector kit
CSZ-MOT model



Cap housing : 172159-1
(Manufactured by Tyco Electronics Japan)



Socket : 170366-1
(Manufactured by Tyco Electronics Japan)

Finished outside diameter Approx. 7 mm Recommended bending radius Approx. 58 mm or more

※ For the standard large-thrust type NLD-FL model, the shape of the connector section falls on ④ (connector with a driver capacity 1.5 to 2.2 kW).
In this case, the cable model number is NCR-XBELA-✱✱✱.

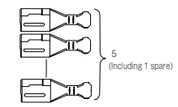
Finished outside diameter NCR-XBBDA-□□□ Approx. 9.6mm
NCR-XBBEA-□□□ Approx. 7.5mm
Recommended bending radius NCR-XBBDA-□□□ Approx. 56mm or more
NCR-XBBEA-□□□ Approx. 73mm or more

Signal name	Pin No.	Cable color
U	B1	Red
V	B2	White
W	A1	Black
E	A2	Green (green/yellow)

A color in ( ) indicates a shielded cable.

Power cable connector kit
NCR-XBB4A model

Receptacle housing : 1-917807-2 (AMP)
(Manufactured by Tyco Electronics Japan)



Receptacle contact : 316040-2 (AMP)
(Manufactured by Tyco Electronics Japan)

Finished outside diameter NCR-XBBGA-□□□ Approx. 10.6mm
NCR-XBBHA-□□□ Approx. 9mm
Recommended bending radius NCR-XBBGA-□□□ Approx. 62mm or more
NCR-XBBHA-□□□ Approx. 89mm or more

Finished outside diameter Approx. 9.5 mm Recommended bending radius Approx. 89 mm or more

AC Servo Driver/Controller

VCⅡ Series

High performance servo driver series that maximizes motor performance from high response operation to ultralow operation
"Versatile servo driver series" including the controller type with the program positioning control function (VCⅡ-C1) or free curve control function (VCⅡ-C6)
Stage positioning accuracy ensured by using the absolute position compensation function option

VCⅡ- Type D
High performance driver
Pulse train control, speed control, torque control, simple positioning, and mode selection

VCⅡ-Type C1
Program positioning controller
Built-in program positioning, speed, torque, and other functions

VCⅡ-Type C6
Free curve controller
Free curve motion enabled

●RoHS Satisfied
●Conforming to CE Marking (all models) and UL/cUL (up to 800 W)
●Network-Compatible (option)

Field network : ≪CC-Link≫·≪DeviceNet≫
Motion network : ≪SSCNETⅢ≫·≪MECHATROLINK-Ⅲ≫

AC Servo Driver

VPS Series

Servo driver series developed in pursuit of user friendliness and cost performance
Equipped with 7-point positioning and zero return functions as standard
Stage positioning accuracy ensured by using the absolute position compensation function option

I/O Type

CC-Link Type
Equipped with a CC-Link interface as standard

●RoHS Satisfied
●Conforming to CE Marking and UL/cUL

Explanation of the Model Number

NCR - D D A 0 A2 A - 401 B - T99
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① AC servo driver/controller series name	
② Product type	D : Driver type C : Controller type
③ Series name	D : VCⅡseries
④ Model type	A : τ linear/τDISC motor B : Synchronous AC servo motor C : Induction AC servo motor
⑤ Function type	0 : Driver function 1 : Positioning control function 6 : Free curve control function
⑥ Input power specification	A1 : 100 VAC system A2 : 200 VAC system
⑦ Design order	A→B→C··· (Starting with A)
⑧ Output capacity	Upper two figures : Significant figures Lower one figure : Power of 10 Example) 40 1=40×10¹= 400W
⑨ Available motor	None : Synchronous/induction AC servo motor B : Linear motor type NLA-M/N or τDISC motor C : τ linear motor type NLA-S D : τ linear motor type NVA/NLD
⑩ Special specification	None : Standard specification T＊＊ : Special specification

General Specifications

Item		Specification
Ambient conditions	Temperature	Operating temperature : 0℃ to 55℃ 0℃ to 50℃ (to comply with UL standards) Storage temperature : 20℃ to 60℃※
	Humidity	85% or less with no condensation ※
	Installation place	Do not install the stage in any harmful atmosphere such as corrosive gas, cutting oil, metal dust, or oil.
	Altitude	1000 m or less
Cooling method		When the capacity is 800 W or less : Natural cooling When the capacity is at least 1.2 kW : Forced air cooling
Mounting orientation		Mounted on a panel
Vibration resistance		0.5G (10～50Hz)
Impact resistance		5G
Noise tolerance		FT/B : ±2000 V (Frequency: 5/100 kHz Cycle: 300 ms) for one minute Radiation noise : ±1000 V (50 ns, 10 cm) for one minute Electrostatic noise : ±10 kVA (between the ground and housing)

※ : Avoid use under a high temperature or humidity condition since the life largely varies depending on the temperature and humidity conditions.

Electrical Specifications

Item			Specification							
Model NCR-□D			A□A1A-051□	A□A1A-101□	A□A2A-201□	A□A2A-401□	A□A2A-801□	A□A2A-152□	A□A2A-222□	A□A2A-402□
Output capacity		W	50	100	200	400	800	1.5k	2.2k	4.0k
Input power supply	Voltage specification		AC100～115V、50／60Hz single-phase		AC200～230V、50／60Hz three-phase					
	Allowable voltage fluctuation		AC90～121V、50／60Hz		AC180～242V、50／60Hz					
Driving method			Three-phase sine wave PWM							
Power capacity (at rated output)		kVA	0.15	0.3	0.6	1.1	1.8	3.0	4.7	7.8
Continuous output current		Arms	1.1	2	2	3.4	5 (6.8) ※5	10	16	27
Instantaneous output current		Arms	3.3	6	6	9.9	17	30	48	78
Control method			Semi-closed loop by encoder (linear sensor) feedback							
Brake method			Regenerative braking : External regenerative resistor							
Carrier frequency		k Hz	25					16		10
Speed control range ※1			1 : 5000							
Maximum speed frequency ※2		Mpps	25(20)							
Circuit breaker (rated current) ※3		A	5	5	5	5	10	10	15	30
Mass ※4		kg	1.0	1.0	1.0	1.4	2.4	4.0	4.0	6.0
Accessories			Regenerative resistor (Values for 400 W or less are optional.)							

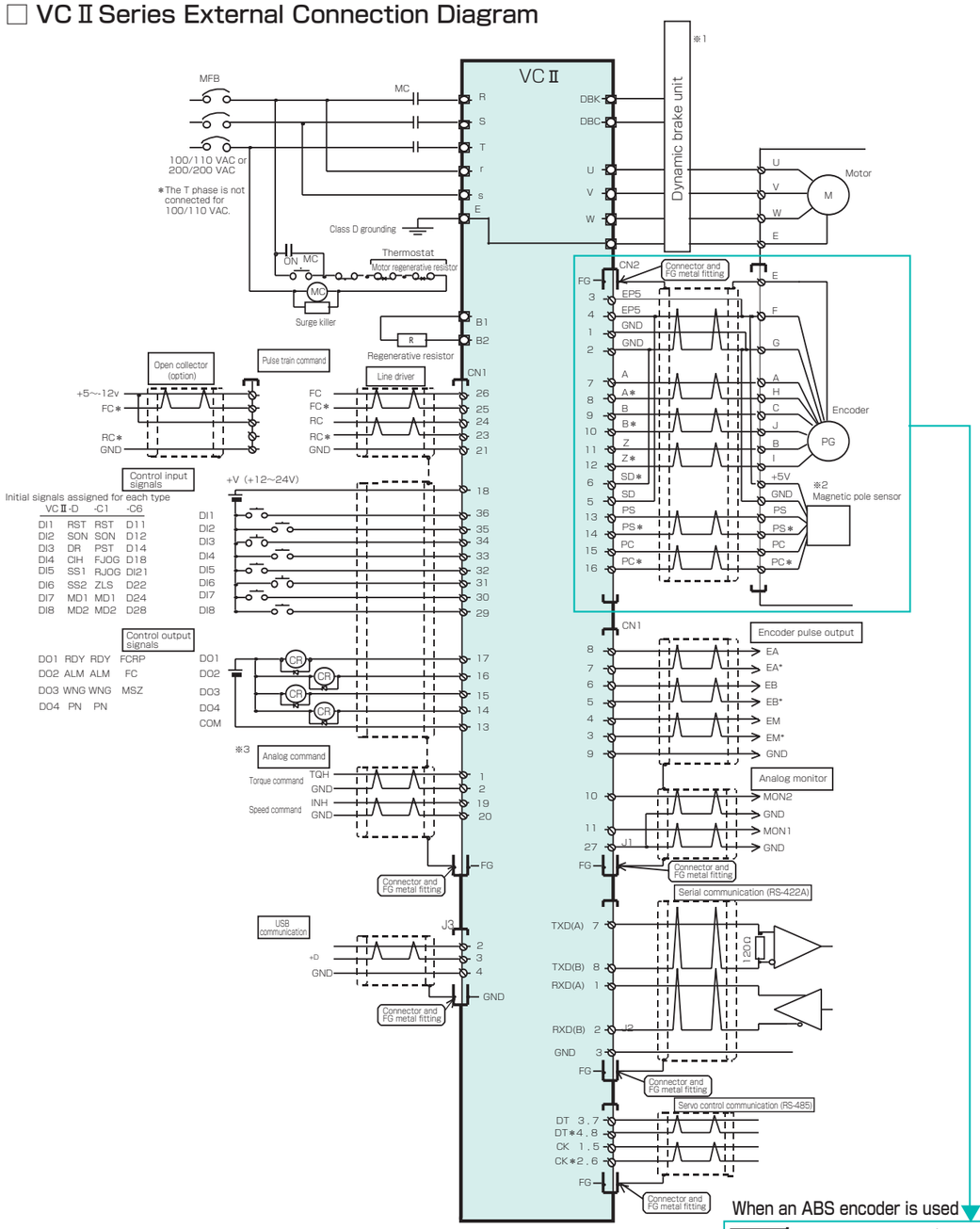
※1 : The condition is that a motor does not stop with 100% load.
※2 : A value in ( ) is for the VCⅡ-C6 type.
※3 : Choose a circuit breaker model having a sufficient shutdown capacity that can conduct protective coordinate with the power supply capacity.
※4 : When no option is attached
※5 : A value in ( ) is used when the UL standard is not adapted.

Function Specifications

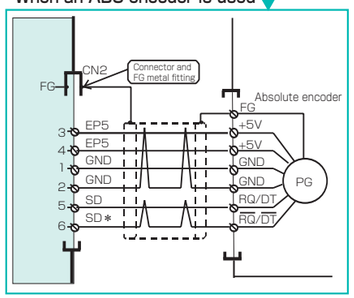
Item		Specification		
Type		VCⅡ-D (NCR-DDA0)	VCⅡ-C1 (NCR-CDA1)	VCⅡ-C6 (NCR-CDA6)
Number of controlled axes		1		
Encoder feedback input frequency		25 Mpps (quadruple of the encoder pulse frequency, however)		20 Mpps (quadruple of the encoder pulse frequency, however)
Run mode		Speed control, torque control, pulse train control, and simple positioning	Auto, manual, zero return, and pulse train	Auto, manual, zero return, and servo lock
Command input system	VCⅡ- type D/C1 Pulse train command VCⅡ- type C6 Master axis position command	①90°different phase pulse ②Directional pulse ③Directional signal + feed pulse		
		≪Line driver or open collector output (option) available. However, the line driver method is recommended for reasons of noise.≫		
		≪Maximum input frequency: 6.25 Mpps≫		≪Maximum input frequency:5 Mpps≫
		≪Be careful about noise since the same GND is used for the line receiver input≫		
		④Servo control communication		
		-		⑤Internal master axis command
	Analog command	Speed control run and torque control run		-
		DC -10V～ +10V、input resolution 14bit		
	Internal command	Simple positioning/zero return/manual run with internal pulse train commands	Program run with 280 internal stored data items (addresses 0 to 255 set by control signals)	
Main functions	Common to each type	Zero return run, manual (jog) run, serial communication run, self-diagnosis, torque limit, and electronic thermal		
	For each type	Pulse train run, simple positioning, and pulse train command compensation	Pulse train run, program run, (positioning, simple continuous positioning, external trigger positioning, four arithmetic/logic operations, timer, unconditional/conditional jump, subroutine, and spinner control), electric gear ratio set, and backlash compensation	
			Program run (continuous control)	Program run (free curve control)
Acceleration/deceleration pattern		Linear acceleration/deceleration and S-curve acceleration/deceleration		
Auto-tuning function		Available, by parameter setting, even when the inertia ratio is a little high		
Gain selection function		①Can select four types of gain by combining GSEL signals.		
		②Can also select position loop gain.		
Control input signals (external input signals, eight basic signals) ※1		Servo ON (SON(＊)), reset (RST), mode select (MD1 and MD2), command pulse input inhibit (CIH(＊)), emergency stop (EMG＊), proportion control (PC), forward jog (FJOG), reverse jog (RJOG), zero point deceleration (ZLS), speed override (OR1 to OR4), deviation clear (CLR), forward overtravel (FOT＊), reverse overtravel (ROT＊), gain select (GSEL), gain select 2 (GSEL2), forced brake ON (BRON), and torque limit (TL)		
		Drive (DR), speed/torque select (SS1 and SS2), simple positioning start (PST), address set (PS1 to PS3), zero return (ORG), and command direction select (SSD)	Auto start (PST), address set (PS1 to PS8), hold (HLD), external trigger (TRG), M complete (MFIN), program cancel (PCAN), block stop (BSTP), external auto start inhibit (EPIH), and jog speed change (JOSP)	
			Command direction select (SSD)	Phase lead (D11), phase delay (D12), electronic clutch (D14), master axis select (D18), cycle end (D21), pattern select (D22/D24/D28), and internal master axis speed select (MSSP)
Output signals (four basic signals) ※1		Servo ready (RDY), alarm (ALM(＊)), warning (WNG(＊)), positioning complete (PN), in torque limit (LIM), speed zero (SZ), break release (BRK), software limit switch (SLSA and SLSB), and encoder marker (OCM)		
		In speed run (SMOD), in torque run (TMOD), in simple positioning run (NMOD), and in pulse train run (PMOD)	Rough matching (PRF), program end (PEND), auto run ready (PRDY), in manual run (MMOD), in auto run (AMOD), in zero return run (HMOD), M strobe (MSTB), general output (OUT1 to OUT8), and M output (MO1 to MO80)	
			In pulse train run (PMOD)	Electronic clutch stop (FCRP), in free curve run (FC), master axis speed zero (MSZ), in servo lock (PMOD)
Encoder pulse output		90- different phase pulse train output (can be output at a divided frequency. The maximum output frequency of the two signals, phase A and B signals, is 20 Mpps when the encoder pulse frequency is quadrupled.)		
Operation and display functions		The LCD module on the front panel or optional SDI device allows the user to input various types of data and display various statuses.		
Filter functions		Notch filter, torque command filter, disturbance compensation filter, and vibration filter		
Monitor functions		①Displays the control signal status in the signal display section on the LCD module on the front panel or optional SDI device. ②Displays various types of operation status and setting status (data), and detected error history in the data display section on the LCD module on the front panel or optional SDI device. ③Analog monitor Two types of operation status (Can monitor two types of operation status selected using the relevant parameter.) ④USB-compatible. Can monitor various types of data using a dedicated editor (option).		
Data retention function		Retains the following data in non-volatile memory. (The non-volatile memory can be rewritten up to 10000 times.): Parameters and alarm history (The last five history items are retained. If any of the five items is the same as the last generated alarm, it is not registered.)		
Protective functions		Provided against the following items: IPM fault, overvoltage, undervoltage, overspeed, overload (electronic thermal), overload on the regenerative resistor, deviation overflow, communication, error, data error, CPU fault, encoder fault, automatic magnetic pole detection error, absolute encoder fault, etc.		
Communication functions		Can transmit and receive various types of data by serial communication (RS-422A).		
		Can communicate with the dedicated editor through USB (compliant with the 1.1 and 2.0 standards).		

※1:For the initial signals assigned for eight external input and four output signals, see "External Connection Diagram" on p.29.
For other than the initial signals, signals can be assigned by remote control or external I/O signal assignment.
An asterisk (＊) attached to a signal code indicates negative logic. An asterisk (＊) enclosed with parentheses indicates a signal of which logic can be changed by parameters.

□ VC Ⅱ Series External Connection Diagram



When an ABS encoder is used

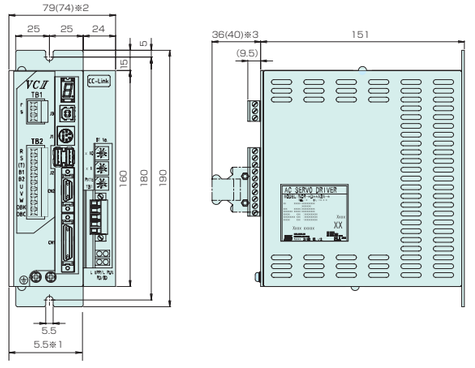


※1 : The dynamic brake unit is optional.
※2 : Connected when a magnetic pole sensor is used.
※3 : The VC Ⅱ-C6 type is not supported.

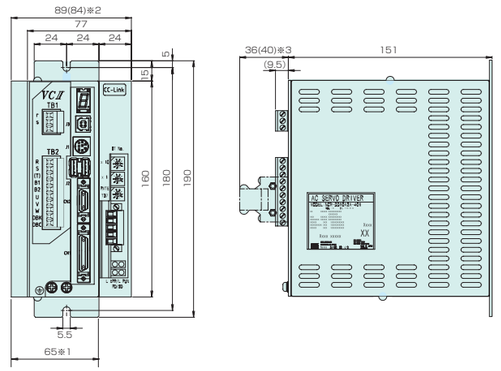
Notes) · Prepare a power supply at the specified voltage and current for the control input signals.
· In connector CN1, COM is common to control I/O signals and GND is common to the internal control power supply (+5 V).
· COM and GND in CN1 are isolated, so do not put them in common cables or bundles.
· The status of the switch connected to each control input signal indicates the OFF condition of the signal.
· Pins not described in this diagram are NC.
· Connect GND for the pulse train command when the line receiver is input.

□ VC Ⅱシリーズ Series External Dimensions

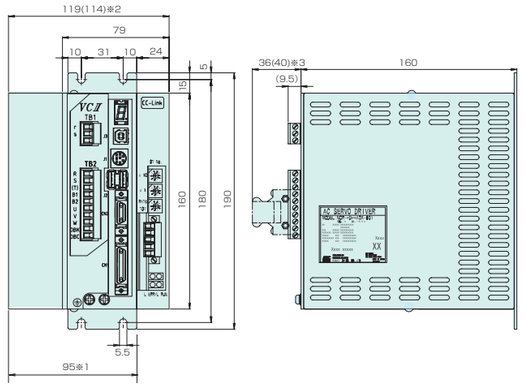
NCR-□DA□A1A-051□
NCR-□DA□A1A-101□
NCR-□DA□A2A-201□



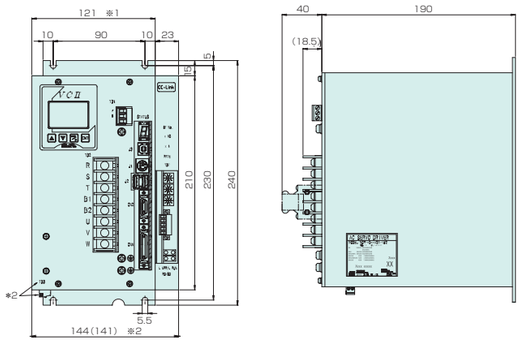
NCR-□DA□A2A-401□



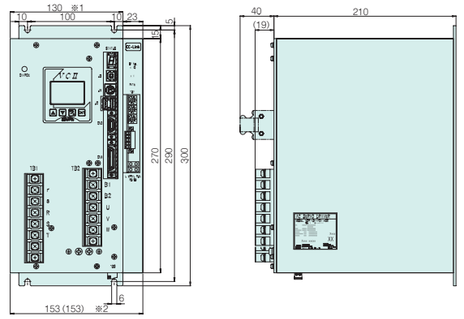
NCR-□DA□A2A-801□



NCR-□DA□A2A-152□/222□

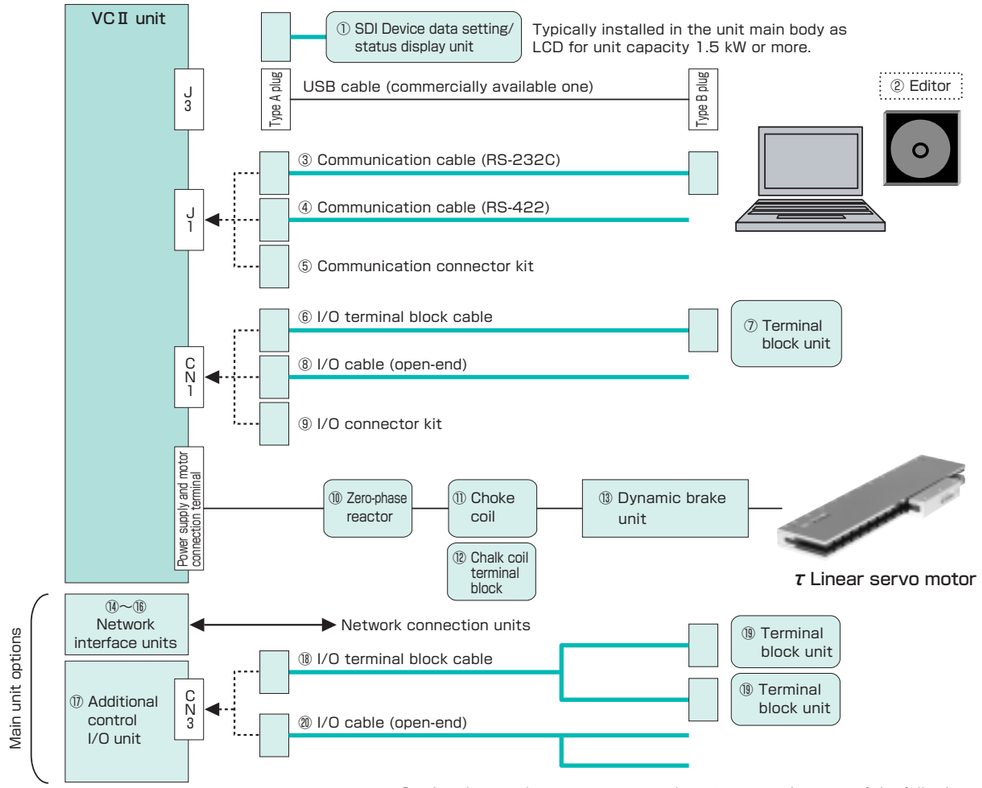


NCR-□DA□A2A-402□



※1 : Indicates the dimension of the VC Ⅱ series main unit.
※2 : Indicates the dimension of the VC Ⅱ series when CC-Link and DeviceNet interface unit options are attached. The value in parentheses indicates the dimension when the additional control I/O unit is attached.
※3 : The value in parentheses indicates the dimension of the projecting connector when the additional control I/O unit is attached.
※ See p.37 for further information on regeneration resistances (accessories) and dynamic break unit (option).

☐ Configuration of VC Ⅱ Options



※Setting data such as parameters and programs requires one of the following :
① SDI Device ② Editor operated on a PC

☐ VC Ⅱ Series Options

Part name/specification			Model number	Description
①	SDI Device data setting/status display unit		NCR-XAA1D1A	
②	PC editor	Japanese version	NCR-XCM000	
		English version	NCR-XCN000	
③	Communication cable (RS-232C)		NCR-XBF1A-□□□	Cable lengths : 1m、3m、5m、10m
④	Communication cable (RS-422)		NCR-XBF5A-□□□	Cable lengths : 1m、3m、5m、10m
⑤	Communication connector kit		NCR-XBDPA	
⑥	I/O terminal block cable		NCR-XBA2A-□□□	Cable lengths : 1m,2m,3m
⑦	Terminal block unit	Screw-in	ZTB-400	40 terminals
		Cage clamp	NCR-XABND3A	40 terminals
			NCR-XABQD3A	Required to insert multiple cables into one terminal.
⑧	I/O cable		NCR-XBA1A-□□□	Cable lengths : 1 m, 2 m, and 3 m Open at either end
⑨	I/O connector kit		CSZ-INF	
⑩	Zero-phase reactor for protection against noise		NCR-XAB4A	For the common mode
⑪	Choke coil for protection against noise		NCR-XAC2A	For the normal mode Connected to U, V, and W in series.
⑫	Chalk coil terminal block		261-206	6 terminals
⑬	Dynamic brake unit		NCR-XABCA2A-801-UL	For external dimensions, see p.37.
⑭	CC-Link interface unit	Main unit option	NCR-XAB7D1A-201/401	Applicable VC Ⅱ unit : NCR-∗A∗-051/101/201/401
			NCR-XAB7D1A-801	Applicable VC Ⅱ unit : NCR-∗A2∗-801
⑮	DeviceNet interface unit	Main unit option	NCR-XAB6D1A-201/401	Applicable VC Ⅱ unit : NCR-∗A∗-051/101/201/401
			NCR-XAB6D1A-801	Applicable VC Ⅱ unit : NCR-∗A2∗-801
⑯	MECHATROLINK-Ⅲ interface unit	Main unit option	NCR-XABPD1A-201/401	Applicable VC Ⅱ unit : NCR-∗A∗-051/101/201/401
			NCR-XABPD1A-801	Applicable VC Ⅱ unit : NCR-∗A2∗-801
⑰	Additional control I/O unit 1	Main unit option	NCR-XAA2D1A-201/401	Applicable VC Ⅱ unit : NCR-∗A∗-051/101/201/401
			NCR-XAA2D1A-801	Applicable VC Ⅱ unit : NCR-∗A2∗-801
⑱	I/O terminal block cable for additional control I/O unit 1		FTTC-□□□	Cable lengths : 1m,2m,3m
⑲	I/O terminal block unit for additional control I/O unit 1	Screw-in	ZTB-500／ZTB-200	50 terminals/20 terminals
		Cage clamp	NCR-XABPD3A／XABMD3A	50 terminals/20 terminals
			NCR-XABQD3A	Required to insert multiple cables into one terminal.
⑳	I/O cable for additional control I/O unit 1		NCR-XBA3A-□□□	Cable lengths : 1 m, 2 m, and 3 m Open at either end

※ □□□in the cable model number indicates the cable length. Example : 5m ⇒ 050
※ The main unit options are incorporated to the VC Ⅱ unit at shipment.
※ For external dimensions and details of each optional product, refer to "VC/VC Ⅱ Series Option Manual".

☐ Explanation of the Model Number

NCR - DCCO A2 B - 401 D - S(T)99
① ② ③ ④ ⑤ ⑥ ⑦

① AC servo driver/controller series name	
② Product type	DCCO : I/O specification type DCDO : CC-Link specification type
③ Input power specification	A1 : 100 VAC system A2 : 200 VAC system
④ Design order	A→B→C･･･ (Starting with A)
⑤ Output capacity	Upper two figures : Significant figures Lower one figure : Power of 10 Example) 40 1 =40×10¹= 400W
⑥ Available motor and encoder type	A : NA80/800 series AC servo motor and serial encoder
	B : NA80/800 series AC servo motor and 90° different phase pulse encoder
	C : τ linear series and IPU separate encoder
	D : τ linear series and 90° different phase pulse encoder
	E : τ DISC series and IPU separate encoder
	F : τ DISC series and 90- different phase pulse encoder
	G : τ linear series and ABS linear scale
⑦ Special specification	None : Standard specification S (T) ∗∗ : Special specification

☐ General Specifications

Item		Specification
Ambient conditions	Temperature	Operating temperature : 0℃ to 55℃ Storage temperature : 20℃ to 60℃ ※
	Humidity	85% or less with no condensation
	Installation place	Do not install the stage in any harmful atmosphere such as corrosive gas, cutting oil, metal dust, or oil.
	Altitude	1000 m or less
Cooling method		When the capacity is 800 W or less : Natural cooling When the capacity is at least 1.6 kW : Forced air cooling
Mounting orientation		Mounted on a panel
Vibration resistance		0.5G (10~50Hz)
Impact resistance		5G
Noise tolerance		Line noise : 2000 V (50 ns, 1 μs) for one minute Radiation noise : 1000 V (50 ns, 10 cm) for one minute Electrostatic noise 10 kVA (between the ground and housing)

※ : Avoid use under a high temperature or humidity condition since the life largely varies depending on the temperature and humidity conditions.

☐ Electrical Specifications

Item			Specification			
Model NCR-DC			□0A1B-201□	□0A2B-401□	□0A2B-801□	□0A2B-162□
Output capacity		W	200	400	800	1.6k
Input power supply	Voltage specification		AC100~115V、50／60Hz single-phase	AC200~230V、50／60Hz single-phase	AC200~230V、50／60Hz three-phase	
	Allowable voltage fluctuation		AC90~121V、50／60Hz	AC180~242V、50／60Hz	AC180~242V、50／60Hz	
Driving method			Three-phase sine wave PWM			
Power capacity (at rated output)		kVA	0.52	0.92	1.8	3.0
Continuous output current		Arms	3.5	3.5	6.8	10
Instantaneous output current		Arms	8.75	8.75	17	30
Control method			Semi-closed loop by encoder (linear sensor) feedback			
Brake method			Regenerative braking : External regenerative resistor			
Carrier frequency		k Hz	10			
Speed control range ※1			1 : 2000			
Maximum speed frequency		Mpps	16			
Circuit breaker (rated current) ※2		A	5		10	15
Mass ※3		kg	Approx. 1.0		Approx. 1.5	Approx. 2.0
Accessories			Regenerative resistor (Values for 400 W or less are optional.)			

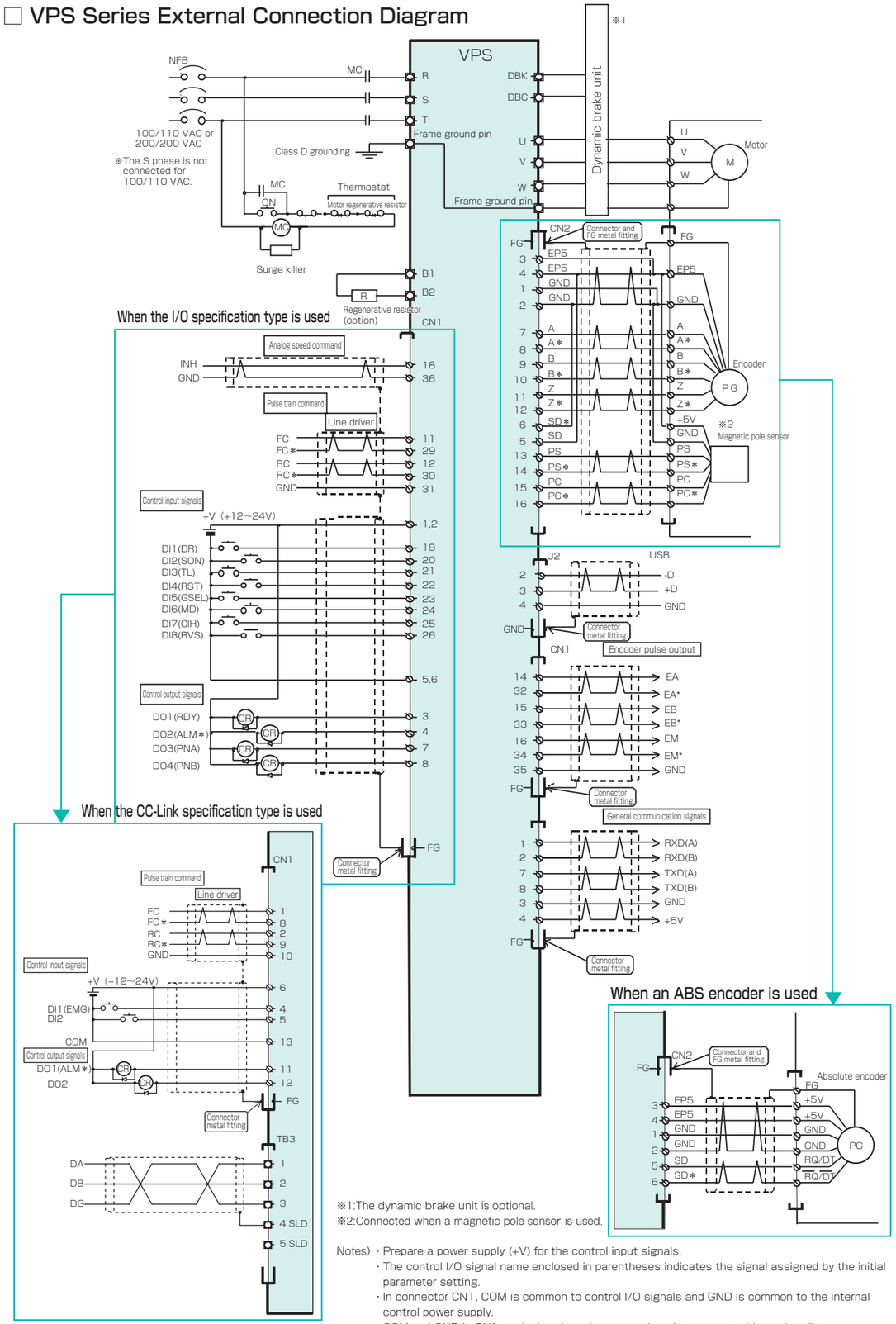
※1 : The condition is that a motor does not stop with 100% load.
※2 : Choose a circuit breaker model having a sufficient shutdown capacity that can conduct protective coordinate with the power supply capacity.
※3 : Mass used when no option is installed.

VPS Function Specifications

Item		Specification	
Type		I/O specification (NCR-DCCO)	CC-Link specification (NCR-DCDO)
Number of controlled axes		1	
Encoder feedback input frequency		16 Mpps (quadruple of the encoder pulse frequency, however)	
Run mode		Speed control and pulse train	
Command input system	Pulse train command	①90°different phase pulse ②Directional pulse ③Directional signal + feed pulse	
		≪Line driver output available. The maximum input frequency is 4 Mpps.≫	
	Analog command	Speed control run	-
		DC -10V～+10V、input resolution 13bit	
	Internal command	Positioning (7 points)/zero return/manual run with internal pulse train commands	
Main functions		Speed control run, pulse train run, zero return run, manual (jog) run, torque limit, self-diagnosis, electronic thermal, and auto-tuning function	
Acceleration/deceleration pattern		Linear acceleration/deceleration and S-curve acceleration/deceleration (by using the command averaging function)	
Gain selection function		Speed gain switching among three types (normal, low-speed, and change with GSEL)	
Control input signals (eight external input signals) ※		Drive (DR), servo ON (SON(✻)), reset (RST), mode select (MD), command pulse input inhibit (CIH), emergency stop (EMG), command select (SS1 to SS3), forward jog (FJ), reverse jog (RJ), zero point deceleration (ZLS), forward overtravel (FOT), reverse overtravel (ROT), gain select (GSEL), torque limit (TL), internal pulse start (ZST), zero point marker (ZMK), command direction reverse (RVS), and command data reflection inhibit (NRF)	
		Current position data output request (APRQ), alarm code output request (ALRQ), and ABS data output request (ABRQ)	-
Output signals (four basic signals) ※		Ready (RDY), alarm (ALM), deviation range A (PNA), deviation range B (PNB), speed zero (SZ), break release (BRK), marker output (OCEM), in emergency stop (EMGO), and zero return complete (HCP)	
Encoder pulse output		90° different phase pulse train output (can be output at a divided frequency. The maximum output frequency of the two signals, phase A and B signals, is 7.99 Mpps when the encoder pulse frequency is quadrupled.)	-
Operation and display functions		The operation panel on the front panel allows the user to display various statuses, edit parameters, and execute self diagnosis.	
Filter functions		Notch filter and torque command filter	
Monitor functions		①Displays a selected item including alarms, speed, torque, deviation, speed command input, input signals, and parameter status on the data display LEDs (four 7-segment LEDs) on the front panel. ②USB-compatible. Can monitor various types of data using a dedicated editor (option).	
Protective functions		Provided against the following items: IPM fault, overvoltage, undervoltage, overspeed, overload(electronic thermal), overcurrent on the regenerative resistor, deviation overflow, RAM error, encoder fault, magnetic pole detection error, DSP error, etc. Can display the last five alarm history items.	
Communication functions		Can transmit and receive various types of data by serial communication (RS-422A) or CC-Link.	
		Can communicate with the dedicated editor through USB (compliant with the 1.1 and 2.0 standards).	

※ : For the initial signals assigned for eight input and four output signals, see "External Connection Diagram" on p.34.
※ : For other than the initial signals, signals can be assigned by external I/O signal assignment or can be used for communication and CC-Link. (For CC-Link, OCEM can be used only as an external output signal.)
※ : The status of control input signals can be fixed.
※ : The logic of control output signals other than OCEM can be changed when they are assigned as external output signals.

VPS Series External Connection Diagram

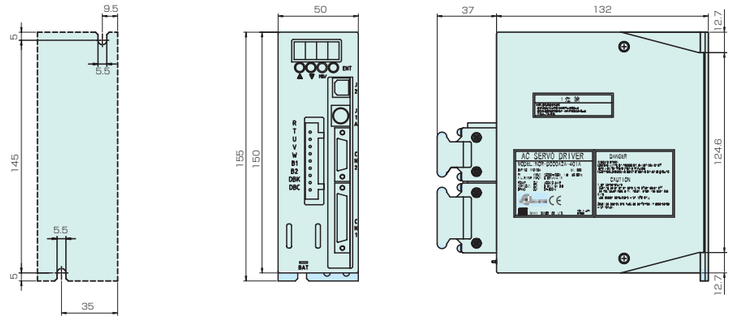


※1:The dynamic brake unit is optional.
※2:Connected when a magnetic pole sensor is used.

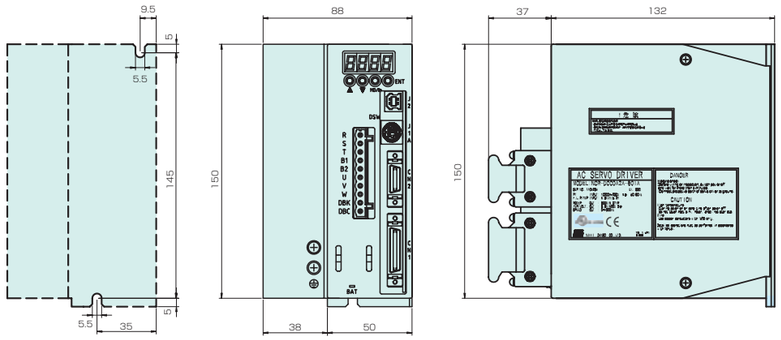
Notes) ・Prepare a power supply (+V) for the control input signals.
・The control I/O signal name enclosed in parentheses indicates the signal assigned by the initial parameter setting.
・In connector CN1, COM is common to control I/O signals and GND is common to the internal control power supply.
・COM and GND in CN1 are isolated, so do not put them in common cables or bundles.

□ VPS Series External Dimensions

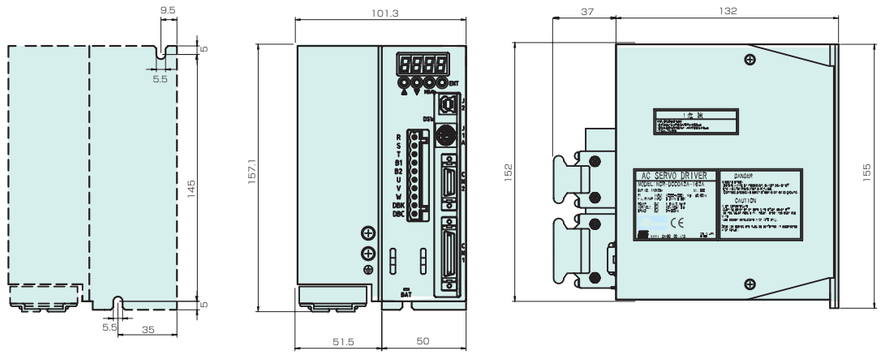
NCR-DC□0A1B-201□
NCR-DC□0A2B-401□



NCR-DC□0A2B-801□



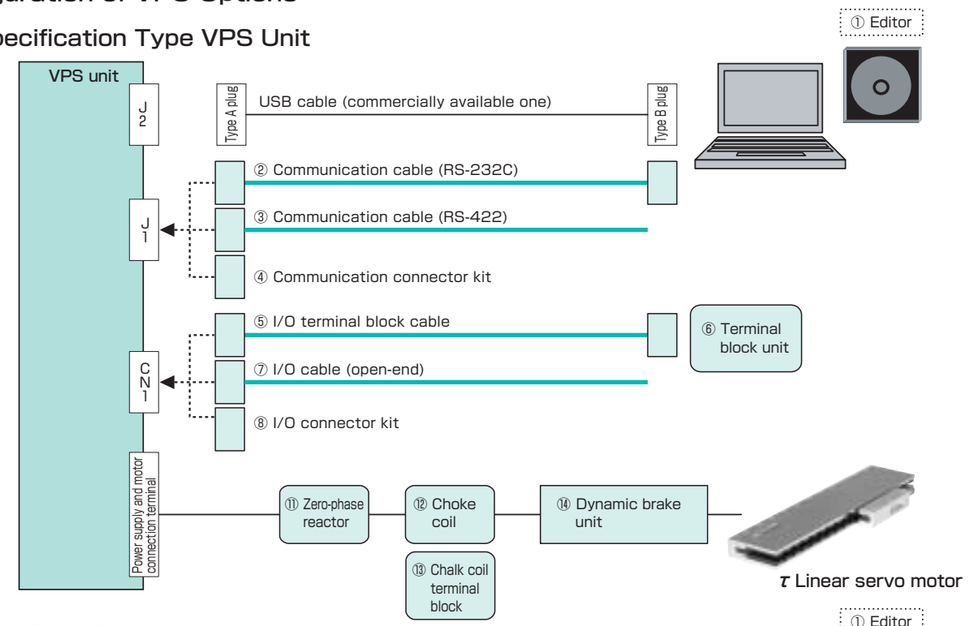
NCR-DC□0A2B-162□



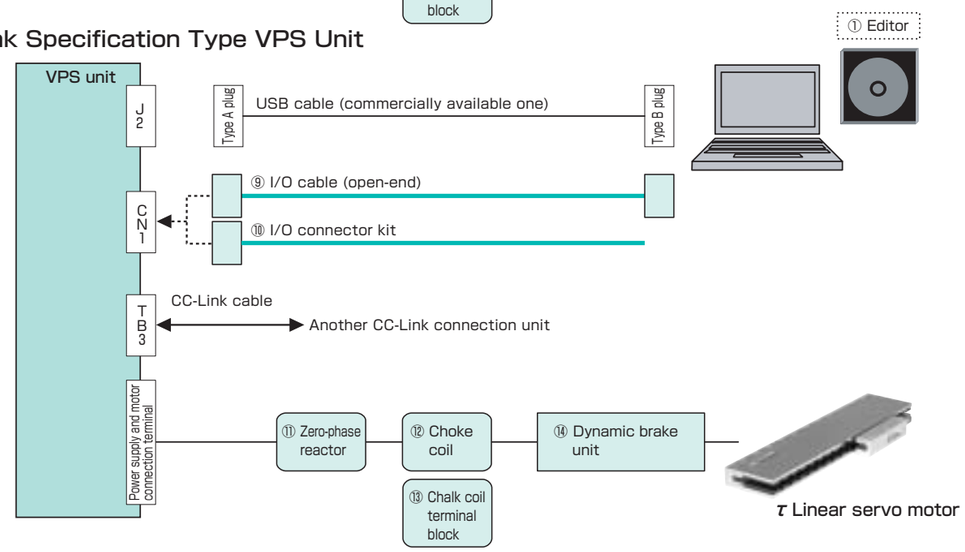
※The above figures show the I/O specification type. (The dimensions of the CC-Link type are the same.)
※See p.37 for further information on regeneration resistances (accessories) and dynamic break unit (option).

□ Configuration of VPS Options

●I/O Specification Type VPS Unit



●CC-Link Specification Type VPS Unit



□ VPS Series Options

	Part name/specification		Model number	Description
①	PC editor	Japanese version	NCR-XCB000	
		English version	NCR-XCE000	
②	Communication cable (RS-232C)		NCR-XBF1A-□□□	Cable lengths : 1m、3m、5m、10m
③	Communication cable (RS-422)		NCR-XBF5A-□□□	Cable lengths : 1m、3m、5m、10m
④	Communication connector kit		NCR-XBDPA	
⑤	I/O terminal block cable (for the I/O specification type VPS unit)		ZTTC-□□□	Cable lengths : 1m、3m
⑥	Terminal block unit (for the I/O specification type VPS unit)	Screw-in	ZTB-400	40 terminals
		Cage clamp	NCR-XABND3A	40 terminals
			NCR-XABQD3A	Required to insert multiple cables into one terminal.
⑦	I/O cable (for the I/O specification type VPS unit)		ZIC-□□□	Cable lengths : 2 m and 3 m Open at either end
⑧	I/O connector kit (for the I/O specification type VPS unit)		CSZ-INF	
⑨	I/O cable (for the CC-Link specification type VPS unit)		NCR-XBA5A-□□□	Cable lengths : 1 m, 2 m, and 3 m Open at either end
⑩	I/O connector kit (for the CC-Link specification type VPS unit)		ZCK-COM	
⑪	Zero-phase reactor for protection against noise		NCR-XAB4A	For the common mode
⑫	Choke coil for protection against noise		NCR-XAC2A	For the normal mode Connected to U, V, and W in series.
⑬	Chalk coil terminal block		261-206	6 terminals
⑭	Dynamic brake unit		NCR-XABCA2A-801-UL	For external dimensions, see p.37.

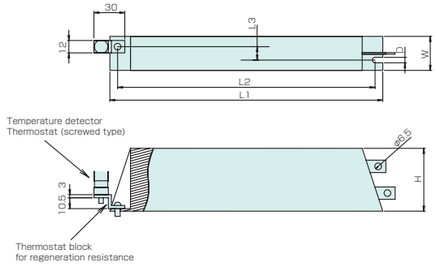
※ □□□ in the cable model number indicates the cable length. Example : 5m ⇒ 050
※ For external dimensions and details of each optional product, refer to "VPS Series Option Manual".

☐ Regeneration Resistors (Accessories)

Servo driver type used		Attached regeneration resistor		
		Model number	Specification/quantity	External dimensions
VC Ⅱ series	NCR-□DA□A1A-051□/101□	None ※		
	NCR-□DA□A2A-201□/401□	None ※		
	NCR-□DA□A2A-801□	CAN60UT 82 ohm J	Cement resistance 60W 82Ω×1 resistor	①
	NCR-□DA□A2A-152□/222□	CAN200UT 24 ohm J	Cement resistance 200W 24Ω×1 resistor	②
	NCR-□DA□A2A-402□	CAN400UR 20 ohm J	Cement resistance 400W 20Ω×1 resistor	③
VPS series	NCR-DC□0A1B-201□	None ※		
	NCR-DC□0A2B-401□	None ※		
	NCR-DC□0A2B-801□	CAN60UT 82 ohm J	Cement resistance 60W 82Ω×1 resistor	①
	NCR-DC□0A2B-162□	CAN200UT 39 ohm J	Cement resistance 200W 39Ω×1 resistor	②

※ If a regeneration resistor is required, CAN60UT82 ohm J (60 W/82 Ω/1 resistor) is available as an option.

◎External Dimensions



(Unit : mm)

External dimensions	L1	L2	W	H	L3	D
①	115	100	20	40	5	4.3
②	215	200	26	50	8	5.3
③	265	250	33	61	13	5.3

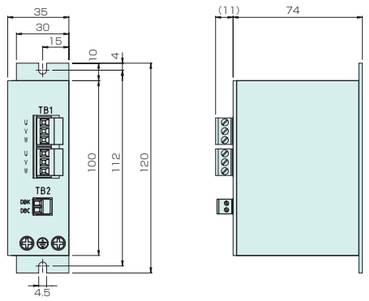
☐ Dynamic Break Unit (Option)

The dynamic break unit is an auxiliary one used as an auxiliary braking unit to reduce a motor speed.
It can prevent a connected motor from freely running due to an error in or electric outage of the driver main body.
The model number and external dimensions depend on the device capacity of the servo driver used.

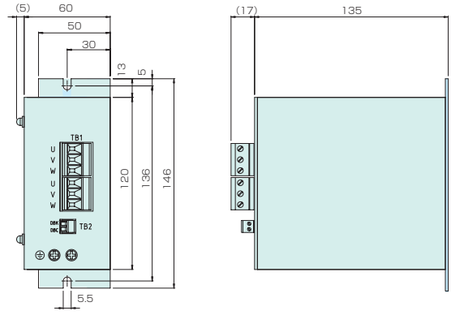
Servo driver model number used		Combination dynamic brake unit model number
VC Ⅱ series	NCR-□DA□A1A-051□/101□	NCR-XABCA2B-801-UL
	NCR-□DA□A2A-201□/401□/801□	
	NCR-□DA□A2A-152□/222□	NCR-XABCA2B-222-UL
	NCR-□DA□A2A-402□	NCR-XABCA2B-402-UL
VPS series	NCR-DC□0A1B-201□	NCR-XABCA2B-801-UL
	NCR-DC□0A2B-401□/801□	
	NCR-DC□0A2B-162□	NCR-XABCA2B-222-UL

◎◎External Dimensions

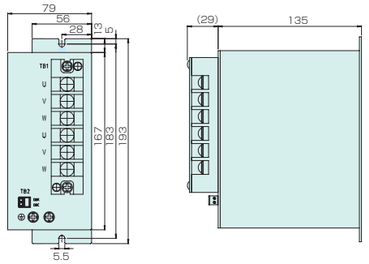
NCR-XABCA2B-801-UL



NCR-XABCA2B-222-UL



NCR-XABCA2B-402-UL



Direct Drive Product Lineups Nikki Denso Offers

τDISC® Servo Motor

First direct drive servo motor that has satisfied stable performance at low speed, high takt operation, stable driving with high inertia, and other needs
τDISC Series developed as a pioneer pursuing performance

【D Series】

Low-Profile High Performance Type

Features	Overwhelming thickness of 44.5 mm that is provided by high magnetic flux density High performance direct drive servo motor having exceptionally stable performance at constant speed and machine accuracy including runout.
Rated torque	2～200N・m
Applications	Wafer chamfering, precision θ-axis, camera platform, electronic drawing machine, and so on

High Torque Type

Features	Large capacity direct drive servo motor which achieves stable positioning with high inertia load
Rated torque	500～3000N・m
Applications	（Maximum torque：1000 to 5800 N・m） Large liquid crystal substrate alignment, roll coater, screen printer, and so on

【HD Series】 **Fast Response Type**

Features	Fast response direct drive servo motor developed in pursuit of fast response performance with excellent stability that satisfies both high torque and low inertia structures in a higher state and has high motor rigidity
Rated torque	21～115N・m
Applications	High-speed indexing, handler, and so on

【ND-c/ND Series】 **Standard Type**

Features	Direct drive providing cost and easy-to-use features that widely support various applications such as transportation, positioning, and indexing
Rated torque	2.4～500N・m
Applications	Liquid crystal transfer, index device, picking and placement, and so on

τServo Compass® Round Operation Type

Unique round type linear servo motor for which magnets are mounted only at the required angle
Direct drive servo motor optimum for alignment applications

Limited Operation Angle Type

Features	Circular operation only within the required operation angle enabled by combining arc magnet bases. Direct drive servo motor optimum for high precision positioning with high inertia load including alignment of a large FPD substrate by direct driving within the required angle.
Operation radius	825mm/1525mm
Applications	Large liquid crystal substrate alignment device

One-Rotation Available Type

Features	Round type direct drive servo motor capable of one rotation by connecting eight 45-degree magnet bases In this case, the bore radius is 250 mm, which is optimum for driving requiring a hollow structure.
Operation radius	178mm
Applications	Wafer inspection device, liquid crystal substrate alignment device, and so on

τLinear Stage

Rich lineups are assorted to support custom-made orders from high-precision types having positioning precision 1 mm guarantee to cost performance types using scaleless linear sensors

High-Precision Linear Stage

Features	Speed stability is guaranteed with speed variation measurement back data. High tact operation is confirmed by setting the gain adjustment and resonance filter. Positioning precision is guaranteed with the absolute position correction function. High-precision direct drive τDISC can be installed in the θ axis in addition to the X/XY stage. Various custom-made orders are supported in addition to the multi-head stage.

Stage Block

Features	Substantial cost down is achieved with the scaleless linear sensor. The direct drive τDISC series is prepared for the θ axis to enable the X/XY/Xθ/XYθ stage to be easily constructed.

For details of each series, see each product brochure.

Details of Warranty

Warranty period of our products is one year after shipment from our factory.
However, please note that any failure or abnormality resulting from the following causes will not be covered by the warranty.

◎ Modification by parties other than CKD Nikki Denso.

◎ Any non-standard operation that is different from rules and regulations stipulated by this catalog or our manual.

◎ Natural disasters.

◎ Connection with another maker's unit which is not approved by CKD Nikki Denso.

Warranty of the device is limited for repairing only. Any damage caused by the fault of delivered device, or lost opportunity on the customer's side, profit loss, secondary damage, and accident will not be covered.

Cautions

◎ The products may be damaged if it is hit or dropped. Please handle carefully.
◎ Please make sure to install the safety device in case the product is used in the system that may have a serious accident or loss if the product is failed.
◎ Since the unexpected noise, electrostatic, or incase of abnormal failure of input power source, wiring, and parts may be occurred although we put our effort to keep the product quality, please consider the fail-safe design and the safety in the range of movement before use.
◎ Please read the instruction manual carefully and understand fully before use the product.
Also, please pay attention to the cautions mentioned in the manual.
◎ In the product, strong magnets are used. Please do not stand near by the product if you have the pace maker device in the heart in order to avoid serious accident.
◎ Please make sure to unplug the all power supply cables before installing, checking, and maintenance of the product. Also, please make sure to take measures such as safety plug or locking the power supply cables to avoid re-inputting the power other than the operator.

NIKKI DENSO CKD NIKKI DENSO CO., LTD.

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