Driver Specification for Linear Motor Drive Tables

NCR

■ Specification of driver NCR for NT38V

- Low-voltage (DC24V) specification and compact design of 115 x 100 x 33.8 mm. It contributes to miniaturization of devices and compactness.
- Settling time is reduced by setting two types of parameters, inertia and viscous friction, and performing feed forward torque control.
- The PC editing software has 4ch real-time oscillometer function, remote operation function and resonance frequency measurement function, etc. as well as parameter edit functions, allowing for easy machine diagnosis and startup / adjustment of the linear motor.

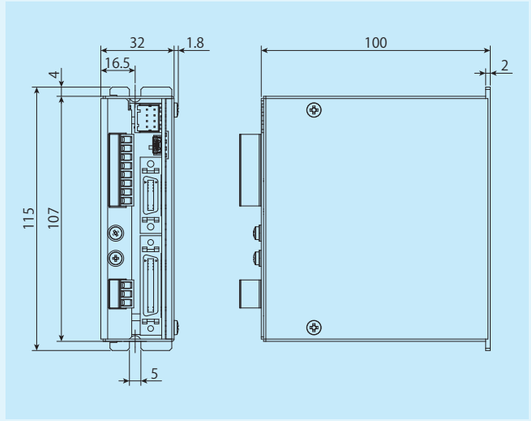


Table 1 Specifications for NCR

Item \ Identification Number			NCR-DCE0D3B-021D-S135
Electric specification	Input power	Type	Main power supply and control circuit power supply separating type
		Voltage specification	Continuous: DC24V ±5% (min. 22.8V to max 25.2V)
			Instantaneous: DC21.6V to DC28V (outside torque compensation range)
		Current specification	DC8.0 A (at rated output)
	Continuous output current		6.5 Arms
	Maximum output current		13.0 Arms
	Carrier frequency		10 kHz
	Input/Output signal		8 input points and 4 output points (DC12～24 V; photo coupler insulated)
	Communication		USB 2.0 (full speed): 1ch, RS-422A serial communication: 1ch
Functional specification	Main function		Speed control / pulse train operation, torque limit, self-diagnosis and forward / backward switching
	Operation mode	Pulse train operation	External pulse train command
			Switching of directional pulse / directional + shift pulse / Pulse with 90-degree phase difference
			Line driver: 4 MHz (16 MHz at 4-time multiplication)
			Phase sequence switching, electronic gear (pulse train command ratio), and command averaging function
			Internal pulse train command
			Inching, 7 positioning points, return to origin, 2 acceleration / deceleration points, S acceleration / deceleration (command averaging function used)
		Speed control operation	Analog command voltage gain switching, 7 internal speed command points
			Acceleration/deceleration time: 0～9.999 sec
	Torque limitation		2 parameter setting points (forward / backward separately)
	Servo performance improvement function		Speed gain switching: 3 points (normal, low speed and GSEL switching), torque command filter Feed forward (speed, inertia and viscous friction) and 5 notch filter points
	Control input signal (8 points)		Startup, servo on, torque limit, speed gain selection, reset, mode selection, command selection, command pulse input prohibition, command direction inversion, emergency stop, internal pulse startup, origin LS, origin marker forward direction overtravel, reverse direction overtravel, current position data output request forward inching, backward inching, alarm code output request and command data reflection prohibition
	Control output signal (4 points)		Ready, alarm, deviation range A and B, brake release, speed zero, marker output, in emergency stop, return to origin complete
	Monitoring function		Confirmation of status by 4-point status indicator LEDs PWR (green), RDY (green), RUN (green), ALM (red) The following monitor can be used in the optional dedicated editing software Various status indications, alarm indication, status indication by oscillometer function, etc.
	Protective function		Encoder failure, magnetic pole detection failure, overspeed, overload, under voltage, overvoltage, overcurrent failure, deviation error, DSP error and overheat protection
Environment	Ambient temperature		0 to 55˚C Storage: -20 to 60˚C
	Ambient humidity		90%RH or lower (keep condensation free), Storage: 85%RH or lower (keep condensation free)
	Vibration resistance		0.5 G (10～50 Hz) However, keep resonance free
	Shock resistance		5 G
Mass			0.41kg

■ Specification of NCR, a driver for NT...H

- The driver and positioning unit are integrated, and the system is miniaturized with its wiring streamlined.
- Higher reliability and usability such as driftless, elimination of adjustment fluctuation, improvement of man-machine interface have been pursued with digital control.
- Easy positioning operation and pulse train operation are supported by mode selection, for applications to wide range of usages.
- Torque control and speed control are available.
- Control suitable for machine rigidity is made possible by full-scale software servo functions such as linear / S-curve acceleration and deceleration, feed forward, torque command filter, gain switching at shutdown and low speed, disturbance compensation control, etc.
- Peripheral devices such as touch panel, higher-level controller, etc. can be connected via serial communication.
- Dedicated editing software can be connected via USB 2.0 (full speed).

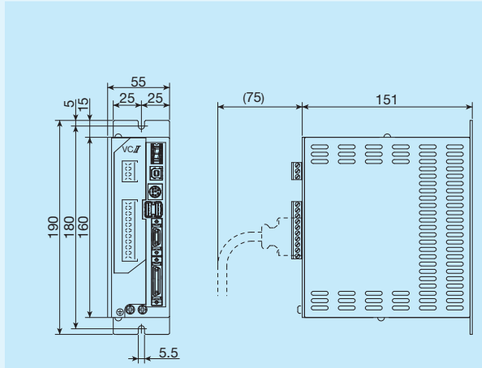


Table 2 Specifications for NCR

Item \ Identification Number			NCR-DDA0A1A-051D-T08
Basic specification	Maximum rated current		1.1 Arms
	Max. momentary current		3.3 Arms
	Power plant capacity		0.15kVA
	Input power (main circuit and control circuit)		Single-phase AC100～115V (allowable power fluctuation AC90～121V) 50/60Hz ±5%
	Control method		Three-phase sine wave PWM method
	Control mode		Position (position control data / pulse train)
Input/ Output function	Command input	Pulse train command	Line driver system is supported The maximum input frequency is indicated below (1) Pulse with 90-degree phase difference: 4Mpps (16Mpps after 4-time multiplication) (2) Directional pulse: 4Mpps (3) Directional + shift pulse: 4 Mpps
		Speed control operation	Analog speed command and internal speed command (3 points)
		Torque control operation	Analog torque command and internal torque command (3 points)
		Easy positioning operation	3 positioning modes: Manual mode / Return to origin mode / Easy positioning mode
	Contact input signal		[8 basic input signal points (initial value)] Servo on, reset, command pulse input prohibition, mode selection 1, mode selection 2, startup, speed selection, torque selection <Following signals are used by assigning remote control or input signals> Emergency stop, proportional control, address specification, speed override, deviation clear, torque limit, forward direction overtravel, reverse direction overtravel, etc.
	Contact output signal		[4 basic output signal points (initial value)] Servo ready, alarm, warning, positioning complete <Following signals are used by assigning remote control or output signals> Torque limit, speed zero, in speed operation mode, in torque operation mode, in easy positioning mode, in pulse train operation mode, encoder marker, etc.
	Encoder feedback pulse output		Pulse train output with 90-degree phase difference (frequency dividing output allowed. The maximum output frequency of 2 signals of A / B phase is 20Mpps after 4-time multiplication)
	Encoder feedback pulse input		Pulse train input with 90-degree phase difference (The maximum input frequency of 2 signals of A / B phase is 20Mpps after 4-time multiplication)
	Monitor output		(1) Analog monitor: 2 points (2 points selected by parameters from various motion status can be monitored.) (2) Various types of monitoring is possible with USB-ready dedicated editing software.
Internal function	Protective function		IPM failure, overvoltage, undervoltage, overspeed, overload, regeneration resistance overload, deviation overflow, communication failure, data error, CPU failure, encoder failure, automatic magnetic pole detection failure, absolute encoder failure, etc.
	Communication function		Various data can be transmitted / received via serial communication (RS-422A). Dedicated editing software can be connected via USB 2.0 (full speed)
Operating environment	Ambient temperature in operation / Storage temperature		0 to 55˚C / -20 to 66˚C
	Operating humidity		85%RH or lower (keep condensation free)
	Vibration resistance		0.5G 10～55Hz
	Service space		Altitude of 1000 m or below, indoor (no corrosive gas and dust)
Mass			1.0kg

ADVA

■ Specifications for ADVA

■ Applicable model numbers
NT series: NT55V, NT80V, NT...XZ, NT...XZH
SA series: all model numbers
LT series: all model numbers

- In addition to the conventional pulse train command input, high speed motion network EtherCAT is also supported.
- 10 input terminals, 6 output terminals, and analog input (0 to ±10 V) can be controlled by intelligent terminals.
- The high controllability shortens the settling time, realizing further improvement of productivity.
- Machine diagnosis, startup and adjustment of linear motor can be easily performed thanks to parameter settings, monitor display, operation trace and automatic tuning function of the setup software.

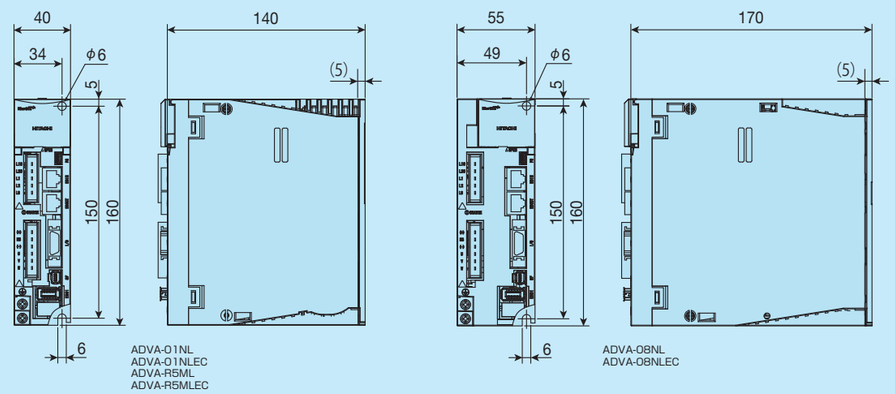


Table 3 Specifications for ADVA

Item \ Identification number		ADVA-01NL ADVA-01NLEC	ADVA-08NL ADVA-08NLEC	ADVA-R5ML ADVA-R5MLEC
Basic specification	Input power	Single-phase / Three-phase AC 200 to 230 V 50 / 60Hz		Single-phase AC100 to 115V 50 / 60Hz
	Rated current / momentary current	1.2Arms / 3.6Arms	5.1Arms / 15.3Arms	1.2Arms / 3.6Arms
	Power plant capacity	0.3kVA	1.3kVA	0.3kVA
	Protective structure (1)	Semi-enclosed IP20		
	Control mode	Position control / Speed control / Thrust force control		
Input/Output relation function	Speed command	Analog input: 0 to ±10 V / Maximum speed (gain configurable) or EtherCAT		
	Thrust force command	Analog input: 0 to ±10 V / Maximum thrust force (gain configurable) or EtherCAT		
	Position command	Line driver signal: 20 Mpps (non-isolated input / after 4-time multiplication) Open collector signal: 2 Mpps (isolated input / after 4-time multiplication) or EtherCAT		
	Contact input / output	[Input] Intelligent terminal selects 10 input terminal (6 input terminal for EtherCAT specification) function by parameter DC12 / 24 V Contact signal / Open collector signal input (with internal DC24 V power supply) [Output] Intelligent terminal selects 6 output terminal (4 output terminal for EtherCAT specification) function by parameter (Open collector signal output: sink output)		
Internal function	Built-in operator	Pulse train command specification: Five digit numeric display, five key push button / DIP switch (Modbus communication setting)		
		EtherCAT specification: 2-digit numeric display, DIP switch (node address setting for EtherCAT)		
	External operator	Windows 7/8 (32-bit, 64-bit) PC can be connected (USB 2.0 full speed)		
	Regenerative braking circuit	Built-in		
	Dynamic brake (2)	Built-in (motion condition configurable)		
	Protective function	Overcurrent, overload, braking resistor overload, main circuit overvoltage, memory error, main circuit under voltage, CT failure, CPU error 1, external trip (motor temperature error), servo ON ground detection, control circuit under voltage, servo amplifier temperature error, drive prohibition error, power module failure, safety circuit failure, emergency shutdown, encoder failure, mismatch error, power reactivation request, magnetic pole position estimation error, magnetic pole position estimation not executed, position deviation error, speed deviation error, overspeed error, momentary power failure, main circuit power supply failure, drive range error (network communication error, DC synchronization error, under voltage display)		
Operating environment	Ambient temperature in operation/ Storage temperature (3)	0 ～ 55℃ / −10 ～ 70℃		
	Operating humidity	20 to 90% RH (keep condensation free)		
	Vibration resistance (4)	5.9m/s² (0.6G) 10 to 55Hz		
	Service space	Altitude of 1000 m or below, indoor (no corrosive gas and dust)		
Mass		0.7kg	1.2kg	0.7kg

Notes (1) Protection method is compliant with JEM1030.
(2) Use the dynamic brake for emergency stop
(3) The storage temperature is the temperature during transportation.
(4) Compliant with JIS C60068-2-6:2010.

● Setup software

- Used for setting, referencing, changing, printing and saving driver parameters.
- Allows for real-time monitoring of operational status and output status.
- Indicates speed and current, etc. on charts.
- Supports commissioning and gain tuning.

Table 4 Operating environment of the setup software

Item	Operating conditions
PC	CPU: Pentium 4 1.8 GHz or higher HDD free space: 1 GB or more Display resolution: 1024x768 or higher recommended
OS	Windows Vista 32-bit SP1 Windows 7 (32-bit, 64-bit) Windows 8 (32-bit, 64-bit)

Remark: Windows® is a registered trademark of Microsoft Corporation in USA and other countries.
Pentium is a registered trademark of Intel Corporation in USA and other countries.

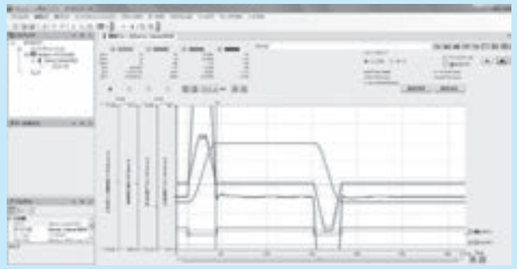


Fig. 1 Operation trace function

● Automatic tuning function

By using the automatic tuning function of the setup software for ADVA, non-expert users can easily perform high-accuracy gain adjustment.

<Operating conditions>

Main body: NT55V25/05R + ADVA-01NL/NT55V25

Carrying mass: 200g　Speed: 500mm/s　Positioning complete width: ±5μm　Traveling distance: 10mm

Acceleration/deceleration time: 12ms

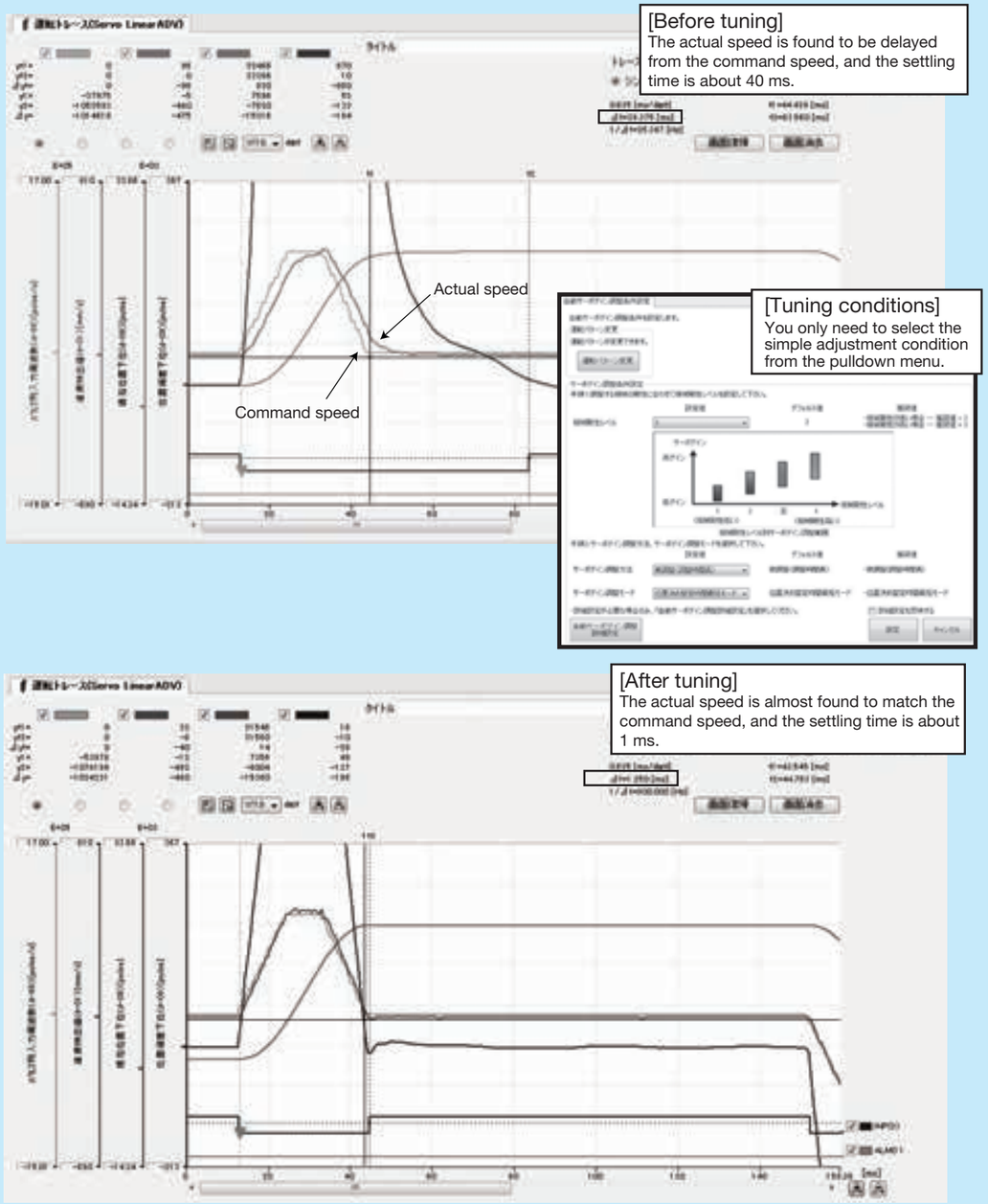


Fig. 2 Automatic tuning

MR-J4

■ Specifications for MR-J4

■ Applicable model numbers
NT series: NT55V, NT80V
SA series: all model numbers

● Supports SSCNET Ⅲ/H (high-speed serial bus). Higher speed and accuracy are realized by optical communication system.
● Servo gain adjustment, including machine resonance suppression filter, advanced vibration control II, and robust filter, can be completed simply by turning on the one-touch tuning function. Easy driving of the cutting-edge vibration suppression function allows the machine to produce its best performance.
● Machine diagnosis, startup and adjustment of linear motor can be easily performed thanks to parameter settings, monitor display and machine analyzer of the setup software (MR Configurator2).

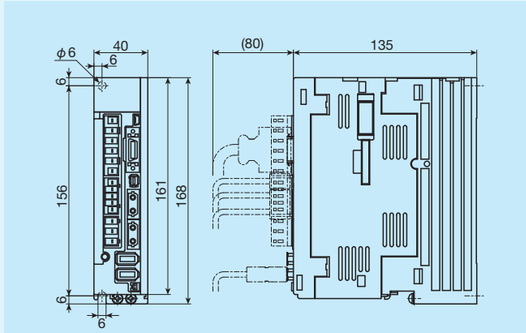


Table 5 Specifications for MR-J4

Item			Identification Number: MR-J4-10B-RJ
Basic specification	Output	Rated voltage	Three-phase AC170V
		Rated current	1.1A
	Main circuit power supply	Voltage / Frequency	Single-phase / Three-phase AC200-240V 50/60Hz
		Allowable power fluctuation	Single-phase / Three-phase AC170-264V
		Allowable frequency fluctuation	Within ± 5%
	Control circuit power supply	Voltage / Frequency	Single-phase AC200-240V 50/60Hz
		Allowable power fluctuation	Single-phase AC170-264V
		Allowable frequency fluctuation	Within ± 5%
		Power consumption	30W
	Power supply for interface		DC24V ± 10% (required current capacity: 0.3A (includes CN8 connector signal))
	Structure (protection class)		Natural air cooling and opening (IP20)
	Control method		Sine wave PWM control/current control method
	Machine end encoder interface		Mitsubishi high-speed serial communication / ABZ-phase differential input signal
Input/Output function	Encoder output pulse		Supported (ABZ-phase pulse)
	Analog monitor		2ch
Internal function	Communication function		USB: connection with personal computer, etc. (MR Configurator2 supported)
	Dynamic brake		Built-in
	Protective function		Overcurrent interrupt, regeneration overvoltage interrupt, overloading interrupt (electric thermal), servomotor overheat protection, encoder error protection, regeneration error protection, undervoltage protection, momentary power failure protection, overspeed protection, excessive error protection, magnetic pole detection protection, linear servo control error protection
Operating environment	Ambient temperature		0 to 55˚ C (keep freeze free), Storage: 20 to 65˚ C (keep freeze free)
	Ambient humidity		90%RH or lower (keep condensation free), Storage: 90%RH or lower (keep condensation free)
	Atmosphere		Indoor (no exposure to direct sun light), must be free from corrosive gas, flammable gas, oil mist and dust
	Altitude		1 000m or lower
	Vibration resistance		5.9m/s^2 or less, 10Hz to 55Hz (X, Y, Z directions)
Mass			0.8kg

NCD

■ Specifications for programmable control unit NCD171G for LT series

- Programmable controller and servo driver are unified into a compact unit.
- This unit requires fewer connection cords, which largely reduces the number of man-hours for wiring.
- Single unit of teaching box is sufficient even for operation of multiple axes.
- DC24V power supply for external I/O and sensor is built in the unit.
- Built-in I/O sequence function does not require use of sequencer if the system is not complicated.
- Various check functions make it easier to check external I/O connection.
- The program is composed of easy-to-understand command language, which helps you easily create a program.
- Flash memory is used for memory backup, so that you don't need battery change.
- Monitoring and limiting thrust force during movement is possible.
- A teaching box is available as an auxiliary storage device.
- Various return to origin methods enable return to origin operation without externally mounting a sensor.
- Using RS232C interface enables the connection to PC.
- Conformance with CE marking (low voltage command and EMC command) is confirmed.

The values in ( ) represent the dimensions of NCD171G-L6820.

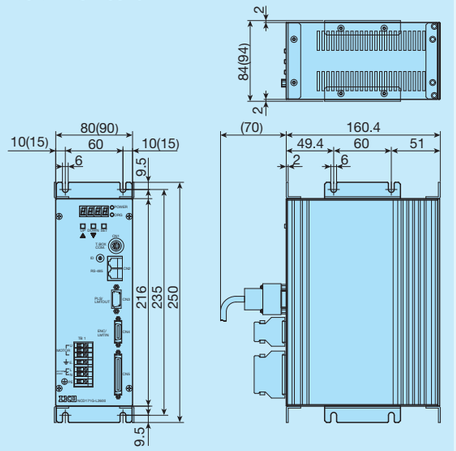


Table 7 Programmable control unit specification

Item \ Identification Number				NCD171G-L2620	NCD171G-L6820
Control specification	Number of control axes			Single-axis	
	Applicable linear motor			LT100CE, LT150CE, LT130LD, LT170LD	LT170H
	Feedback			Incremental linear encoder	
	Resolution			0.1μm, 0.5μm, and 1.0μm	
	Command input	Position control	External	+ direction/- direction pulse, position command pulse/direction command, selection of A/B phase, Max. 5MHz	
			Program	±2147483647 pulse (command maximum value)	
		Speed control	Analog	±10V/rated speed (variable by parameter) resolution 10V/372 interpolation	
Program specification	Input method			MDI, teaching, and PC input via RS232C	
	Command input type			Absolute command or incremental command	
	Program capacity			11K byte (1100 steps or more)	
	Number of positioning points			512 points	
	Function			Jump, call, repeat, speed setting, acceleration/deceleration setting, timer control, I/O control, input condition branching, various editing functions (creating, erasing, deleting, inserting, etc.)	
Input/Output Specification	Input	No. of input points		LS input: 3 points, I/O input: 20 points	
		Control input		Start, stop, emergency stop, +/- direction movement manual operation, return to origin, alarm reset, deviation counter reset, servo control, interrupt, etc. (assignment to I/O input by parameters)	
		Input method		Photo coupler bi-directional input (non voltage contact, open collector, and open emitter are supported)	
	Output	No. of output points		I/O output: 12 points	
		Operational output		In automatic operation, limit actuation, emergency stop, return to origin complete, ready complete, alarm, positioning complete, pre-origin sensor (assignment to I/O output by parameters)	
		Output type		Open emitter output (maximum open / close voltage: 30V Maximum load current: 100mA)	
	Input & output power voltage			DC24V ± 5% 500mA	
Protective function				Overcurrent, overvoltage, overload, voltage drop, encoder failure, deviation error, regeneration resistance overheating, CPU error, etc.	
Other major functions				RS232C (read, write, direct execution, etc.), software limit, thrust force limit, thrust force monitoring, speed control during travel, changing LS logic, various check functions	
General specification	Main power supply voltage			Single-phase AC200～230V±10% (1) 50/60Hz	
	Continuous rated current			0.6 Arms	2.4 Arms
	Max. momentary current			4.7 Arms	15.0 Arms
	Ambient temperature			0 to 40°C Storage -10 to 60°C	
	Ambient humidity			35 to 85%RH (keep condensation free)	
	Measure against power outage			Flash memory (Battery change is not required)	
Mass				Main body : 1.7kg Teaching box: 0.5kg	Main body : 1.9kg Teaching box: 0.5kg

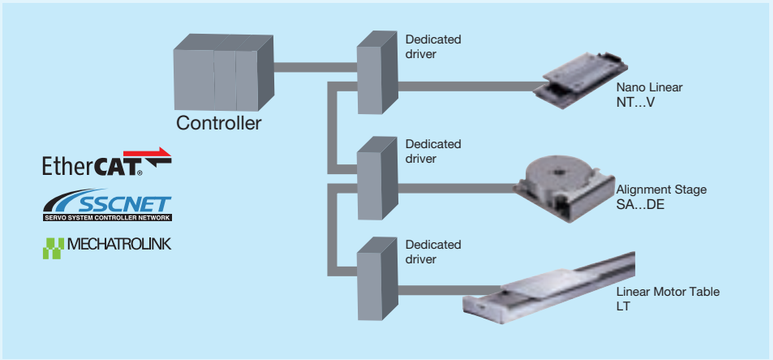
Note (1) If you need AC100V specification for NCD171G-L2620, please contact IKO.

● CE marking

Programmable control unit's CE marking is based on confirmation of conformance with the following evaluation standard.
Low voltage command : EN50178
EMC command : EN55011 Gr1 ClassA and EN61000-6-2
Conformance with EMC command has been confirmed in our selected system configuration. When the unit is incorporated into an actual machine or device, the wiring and installation conditions may be different, so that the conformance with EMC command in the machine or device requires measurement of the machine or device in the final state with LT incorporated.

Motion Network

Drivers for linear motor drive tables include those supporting motion network EtherCAT, SSCNET Ⅲ/H, and MECHATROLINK. Motion network realizes higher performance and higher accuracy of devices free from pulse frequency constraint in pulse train command, noise effects in analog command (voltage command), voltage drop due to cable length and effects of temperature drifting. Reduction of wiring can also be achieved, so synchronization system with more than one table can easily be established.



Model	Features
EtherCAT	This is an Ethernet-based open network communication system developed by Beckhoff of Germany, allowing the real time control. High speed communication and high accuracy inter-node synchronization realize the higher performance and higher accuracy of devices. In addition, Ethernet cables available on the market can be used and various wiring types can be supported.
SSCNET Ⅲ/H	This is a motion network communication system for servo system control developed by Mitsubishi Electric Corporation. It applies the optical fiber cables, so noise immunity is improved relative to conventional SSCNET.
MECHATROLINK	The open field network communication that connects the controller and various components. Developed by Yaskawa Electric Corporation and managed by MECHATROLINK Members Association.