

Driver Specification for Linear Motor Drive Tables

■ 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 oscilloscope 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.

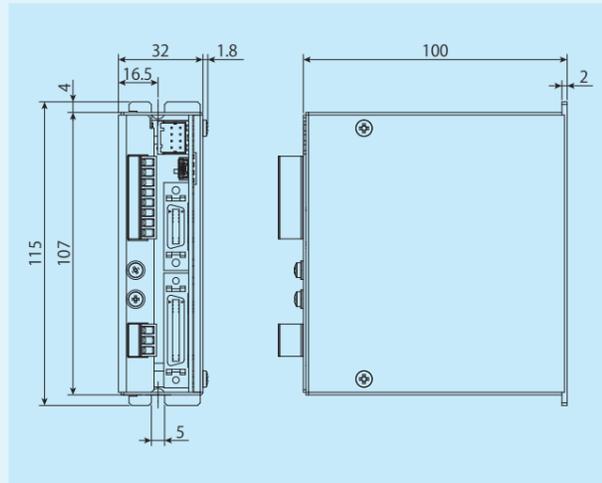


Table 1 Specifications for NCR

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	
	Speed control operation		Inching, 7 positioning points, return to origin, 2 acceleration / deceleration points, S acceleration / deceleration (command averaging function used)
			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 oscilloscope 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).

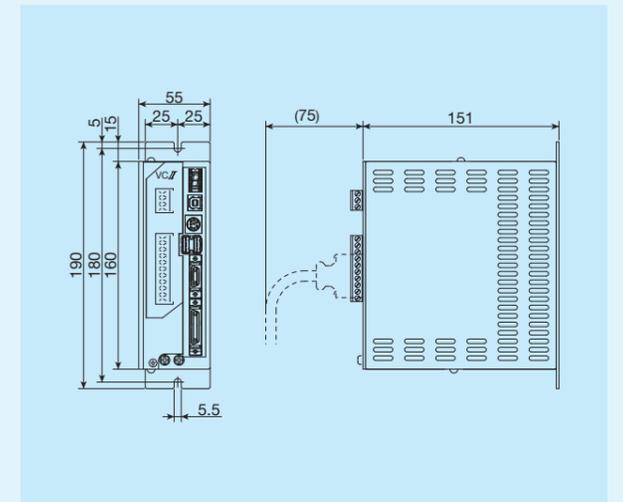


Table 2 Specifications for NCR

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)
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
Input/Output function	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	
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

Specifications for ADVA

Applicable model numbers

NT series: NT55V, NT80V, NT...XZ, NT...XZH

SA series: all model numbers

LT series: LT100CEG, LT150CEG, LT130LDG, LT170LDG, LT170LDV

- 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.

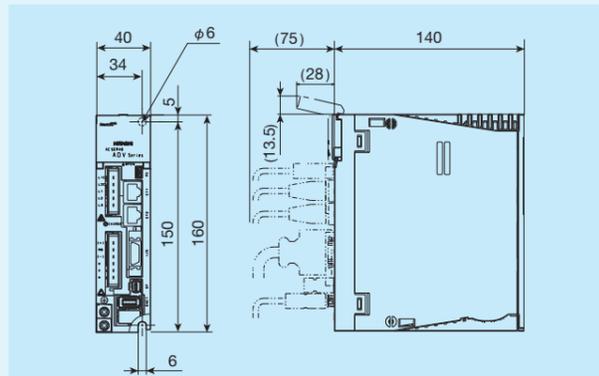


Table 3 Specifications for ADVA (pulse train command specification)

Item	Identification Number	ADVA-R5ML	ADVA-01NL
Basic specification	Maximum rated current	1.2 Arms	
	Max. momentary current	3.6 Arms	
	Power plant capacity	0.3kVA	
	Input power (main circuit)	Single-phase 100 to 115V +10/-15%	Single-phase / Three-phase 200 to 230V +10/-15% 50/60Hz ±5%
	Input power (control circuit)	50/60Hz ±5%	Single-phase 200 to 230V +10/-15% 50/60Hz ±5%
	Protective structure (1)	Open type IP00	
	Control method	Line-line sinusoidal pulse width modulation (PWM) method	
Control mode	Position control / Speed control / Thrust force control		
Supported linear scale	A, B and Z signals (line driver output: AM26C31 or AM26LS31 equivalent) Recommended encoder: LIE5 series (manufactured by JENA)		
Linear scale maximum frequency	20 Mpps (after 4-time multiplication) [5 Mpps (original signal)]		
Speed command / Limit input	Analog input: 0 to ±10 V / Maximum speed (gain configurable)		
Thrust force command / Limit input	Analog input: 0 to ±10 V / Maximum thrust (gain configurable)		
Input/ Output relation function	Position command input	Line driver signal: 20 Mpps or lower (after 4-time multiplication, non-isolated input) 2 Mpps (after 4-time multiplication, insulated input) ① Two phase pulse with phase difference ② Forward / backward direction pulse input ③ Command pulse + sign input Select from ① to ③ Electronic gear function is available	
	Contact input signal	Intelligent terminal selects 10 input terminal function by parameter (DC12 / 24 V Contact signal / Open collector signal input with internal DC24 V power supply) ① Servo ON / ② Alarm reset / ③ Control mode switch / ④ Thrust force limit / ⑤ Forward direction driving prohibited / ⑦ Multistage speed 1 to 3 / ⑧ Speed proportional control / ⑨ Zero speed clamp / ⑩ Origin limit switch / ⑪ Return to origin / ⑫ Pulse train input enable / ⑬ Deviation counter clear / ⑭ Forward direction signal / ⑮ Reverse direction signal / ⑯ Gain switching / ⑰ Integration clamp / ⑱ Electronic gear switching 1, 2 / ⑲ External trip (temperature sensor (Temp. signal)) / ⑳ Thrust force bias / in emergency stop	
	Contact output signal	Intelligent terminal selects 6 output terminal function by parameter (open collector signal output: sink output) ① Servo ready / ② Alarm / ③ Positioning complete / ④ Up to speed / ⑤ Zero speed detection / ⑥ Brake release / ⑦ Servo ON answer / ⑧ Thrust force limit / ⑨ Overload notice / ⑩ Magnetic pole position estimation completed / ⑪ Speed limit / ⑫ Return to origin complete / ⑬ DB status / ⑭ FOT signal monitor / ⑮ ROT signal monitor / ⑯ Driving prohibited / ⑰ Pulse train input permission answer / ⑱ In emergency stop	
	Signal monitor output	A and B phase signal output: Line driver signal output, (output dividing ratio configurable) Z phase signal output: Line driver / open collector signal output	
	Monitor output	2ch, 0 to ±5 V, to be selected by parameter from the following functions Speed detection value / thrust force command value / speed detection value / speed deviation / position deviation / current value / command pulse frequency / regenerative brake usage ratio / electronic thermal integrated value / main circuit voltage (PN voltage) / analog input value (AI 1 to 4) / output thrust force limit / forward thrust force limit / reverse thrust force limit	
	Built-in operator	Five digit numeric display, five key push button / DIP switch (Modbus communication setting)	
	External operator	Windows XP / Vista (32 bit) PC can be connected (USB 2.0 full speed)	
Internal function	Regenerative braking circuit	Built-in (but no braking resistance)	
	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 error, 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	
Operating environment	Ambient temperature / Storage temperature (3)	0 to 55°C / -10 to 70°C	
	Ambient humidity	20 to 90%RH (keep condensation free)	
	Vibration resistance (4)	5.9m/s ² (0.6G) 10 to 55Hz	
	Service space	Altitude of 1000 m or below, indoor (no corrosive gas and dust)	
Mass		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 IS C60068-2-6:2010.

Table 4 Specifications for ADVA (EtherCAT specification)

Item	Identification Number	ADVA-R5MLEC	ADVA-01NLEEC
Basic specification	Maximum rated current	1.2 Arms	
	Max. momentary current	3.6 Arms	
	Power plant capacity	0.3kVA	
	Input power (main circuit)	Single-phase 100 to 115V +10/-15%	Single-phase / Three-phase 200 to 230V +10/-15% 50/60Hz ±5%
	Input power (control circuit)	50/60Hz ±5%	Single-phase 200 to 230V +10/-15% 50/60Hz ±5%
	Control method	Line-line sinusoidal pulse width modulation (PWM) method	
Control mode	Position control / Speed control / Thrust force control		
Input/ Output relation function	Analog thrust force limitation	Analog input: 0 to ±10 V / Maximum speed (gain configurable)	
	Contact input signal	Intelligent terminal selects 6 input terminal function by parameter (DC12 / 24 V Contact signal / Open collector signal input with internal DC24 V power supply) ① Thrust force limit / ② Forward direction driving prohibited / ③ Backward direction driving prohibited / ④ Speed proportional control / ⑤ Zero speed clamp / ⑥ Origin limit switch / ⑦ Deviation counter clear / ⑧ Gain switching / ⑨ Integration clamp / ⑩ Encoder clear / ⑪ External trip (temperature sensor (Temp. signal)) / ⑫ Probe 1 ⑬ Probe 2 ⑭ Emergency stop	
	Contact output signal	Intelligent terminal selects 4 output terminal function by parameter (open collector signal output: sink output) ① Servo ready / ② Alarm / ③ Positioning complete / ④ Up to speed / ⑤ Zero speed detection / ⑥ Brake release / ⑦ Servo ON answer / ⑧ Thrust force limit / ⑨ Overload notice / ⑩ Alarm code 1 to 7 ⑪ Magnetic pole position estimation complete / ⑫ Near signal output ⑬ Speed limit / ⑭ Return to origin complete / ⑮ DB status / ⑯ FOT signal monitor / ⑰ ROT signal monitor / ⑱ Driving prohibited / ⑲ In emergency stop	
	Monitor output	2ch, 0 to ±5 V, to be selected by parameter from the following functions Speed detection value / thrust force command value / speed detection value / speed deviation / position deviation / current value / regenerative brake usage ratio / electronic thermal integrated value / main circuit voltage (PN voltage) / analog input value (AI 3 to 4) / output thrust force limit / forward thrust force limit / reverse thrust force limit	
Internal function	Built-in operator	2-digit numeric display, DIP switch (node address setting for EtherCAT)	
	External operator	Windows XP / Vista (32 bit) PC can be connected (USB 2.0 full speed)	
	Regenerative braking circuit	Built-in	
	Dynamic brake (1)	Built-in (motion condition configurable)	
Protective function	Overcurrent, overload, braking resistor overload, main circuit overvoltage, memory error, main circuit under voltage, CT error, CPU error 1, external trip (motor temperature error), servo ON ground detection, momentary power failure, control circuit under voltage, servo amplifier temperature error, main circuit power supply failure, drive prohibition error, power module failure, safety circuit failure, emergency shutdown, encoder failure, mismatch error, power reactivation request, network communication error, DC synchronization error, magnetic pole position estimation error, magnetic pole position estimation not executed, position deviation error, speed deviation error, overspeed error, drive range error, under voltage display		
Operating environment	Ambient temperature / Storage temperature (2)	0 to 55°C / -10 to 70°C	
	Ambient humidity	20 to 90%RH (keep condensation free)	
	Vibration resistance (3)	5.9m/s ² (0.6G) 10 to 55Hz	
Service space	Altitude of 1000 m or below, indoor (no corrosive gas and dust)		
Mass		0.7kg	

Notes (1) Use the dynamic brake for emergency stop.

(2) The storage temperature is the temperature during transportation.

(3) Compliant with IS 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 5 Operating environment of the setup software

Item	Operating conditions
PC	DOS/ PC
	CPU: Pentium 4 1.8 G or higher
	HDD free space: 1 GB or more Display resolution: 1024x768 or higher recommended
OS	Windows Vista 32-bit SP1
	Windows XP SP2
	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.

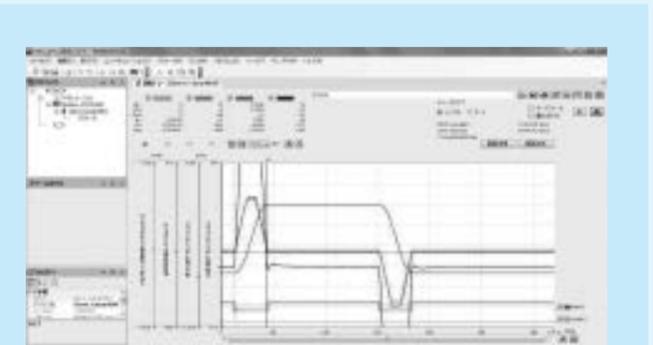


Fig. 1 Operation trace function

● 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: $\pm 5\mu\text{m}$ Traveling distance: 10mm

Acceleration/deceleration time: 12ms

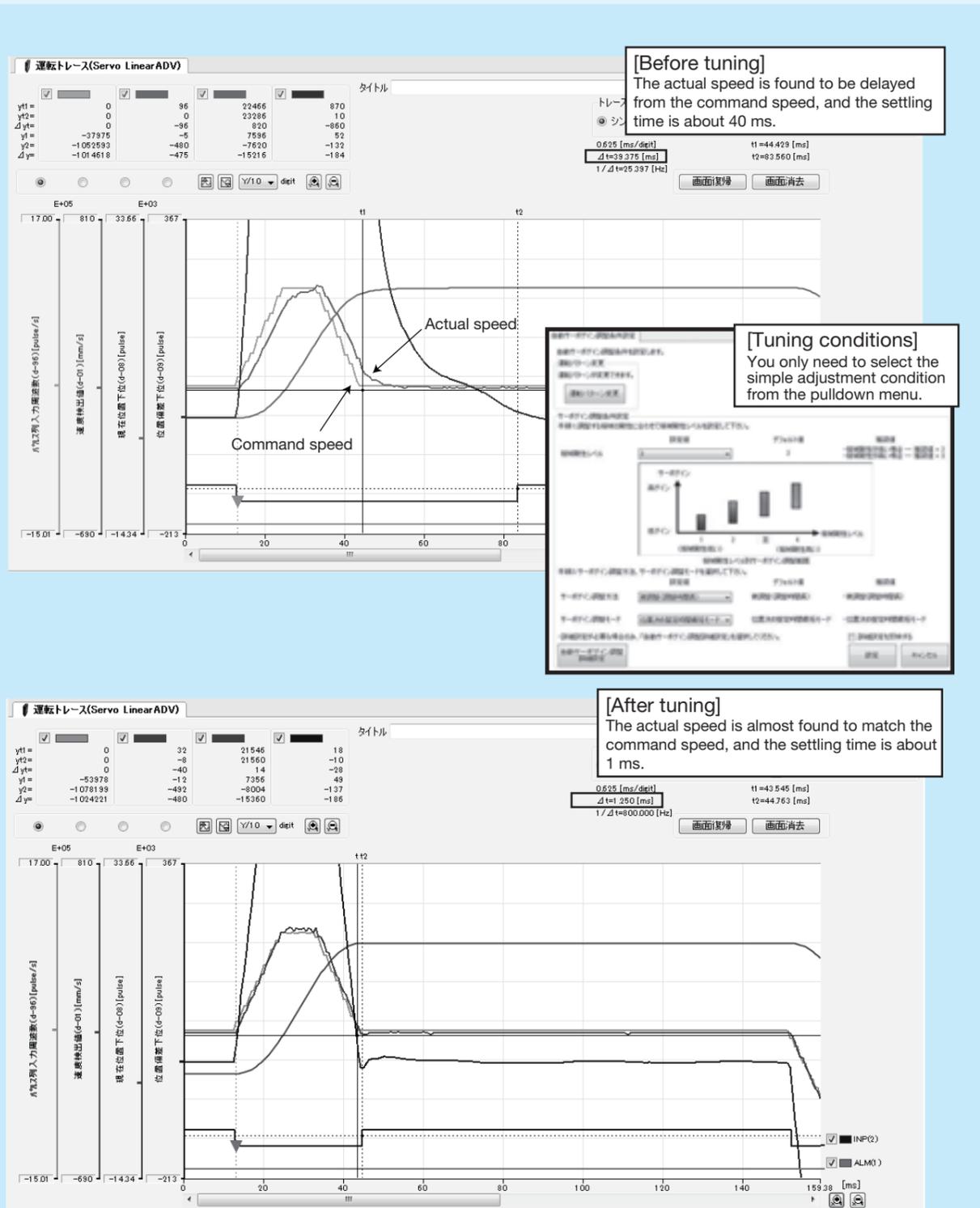


Fig. 2 Automatic tuning

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).

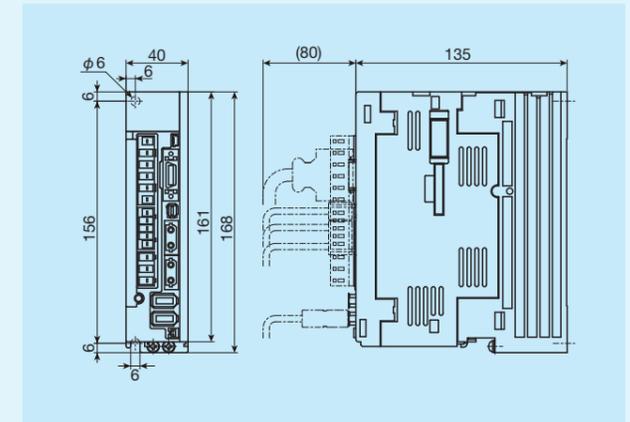


Table 6 Specifications for MR-J4

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
	Control circuit power supply	Allowable frequency fluctuation	Within $\pm 5\%$
		Voltage / Frequency	Single-phase AC200-240V 50/60Hz
		Allowable power fluctuation	Single-phase AC170-264V
		Allowable frequency fluctuation	Within $\pm 5\%$
	Power consumption	30W	
	Power supply for interface	DC24V $\pm 10\%$ (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	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	
Mass	Vibration resistance	5.9m/s ² or less, 10Hz to 55Hz (X, Y, Z directions)	
	Mass	0.8kg	

