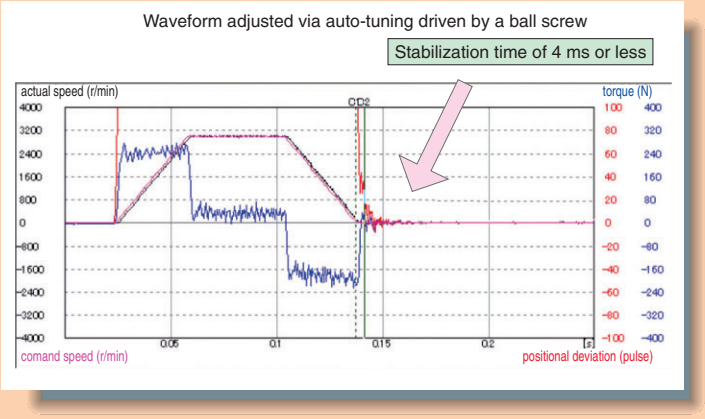
# Details of Features

## 1. Further Adjustment-Free Operation

### High-functionality Real-Time Auto-Gain Tuning

- Corresponds to even variation of load inertia. Offers real automatic gain tuning to low and high stiffness machines with a combination of an adaptive filter.
- Supports the vertical axis application where the load torque is different in rotational direction.
- Prevents the machine from over-traveling during automatic gain tuning with over-travel detecting function.
- Enables you to set and check while monitoring real-time automatic gain tuning conditions on the front panel.

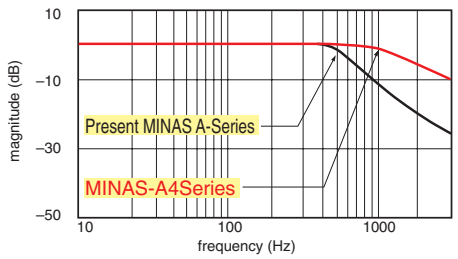


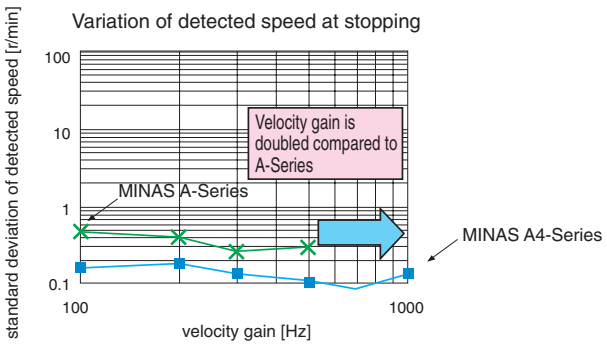

## 2. Further High-Speed and High-Response

### Velocity response (bandwidth) of 1kHz

- Implementation of Instantaneous Velocity Observer realizes a detection of motor speed with higher speed and higher resolution.

*) In case of high stiffness machine



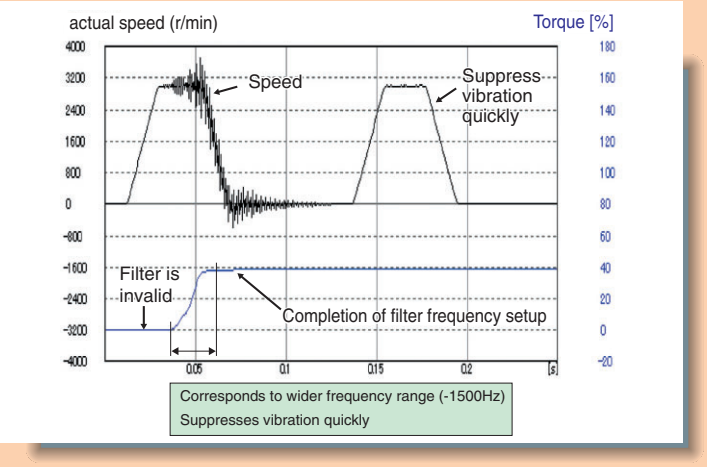

### High-functionality Real-Time Auto-Gain Tuning

- Supports the low stiffness machine of belt-driven and the high stiffness machine of short stroke ball screw driven, and enables to realize high-speed positioning with high-functionality real-time auto-gain tuning.

# 3. Further Reduction of Vibration

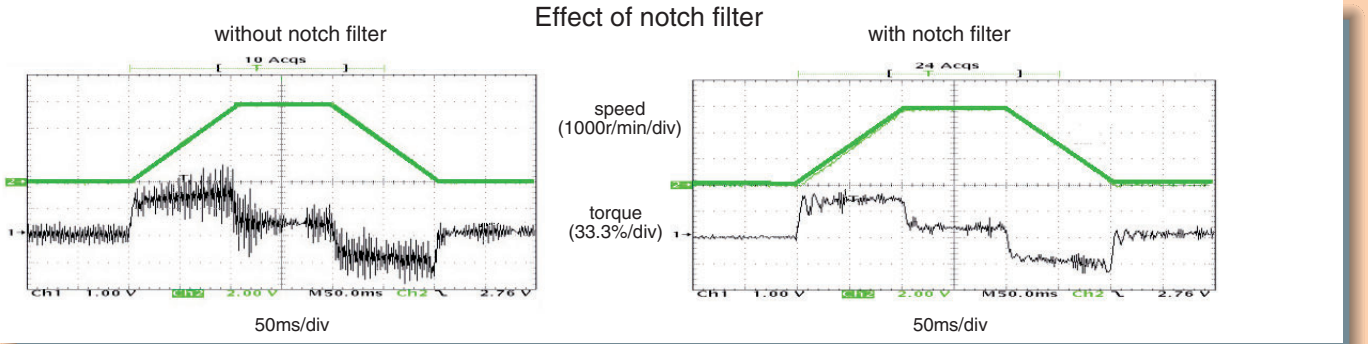
## Adaptive filter

- Makes the notch filter frequency automatically follow the machine resonance frequency.
- Suppression of "Judder" noise of the machine can be expected which is caused by variation of the machines or resonance frequency due to aging.



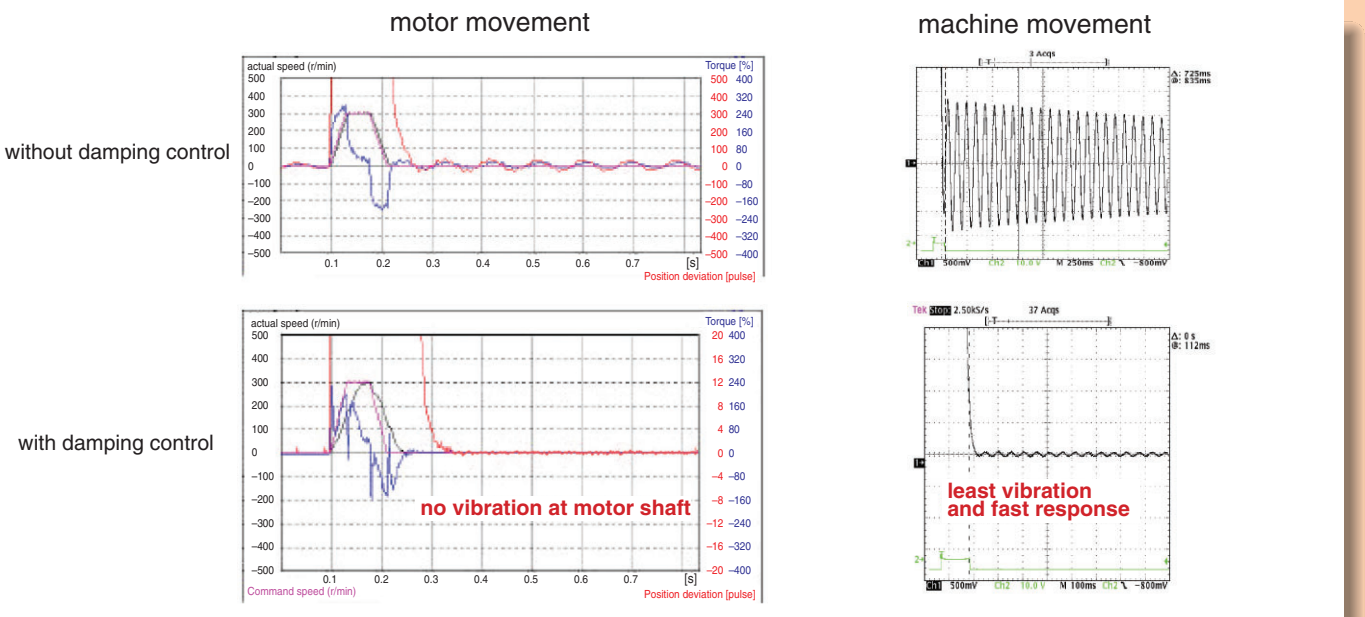

## 2-channel notch filters

- 2-channel notch filters are equipped in the driver independent from adaptive filter.
- You can set up both frequency and width for each of 2 filters, and set up frequency in unit of 1Hz.
- Suppression of "Judder" noise of the machine which has multiple resonance points can be expected




## Damping control

- 2-channel damping filters are equipped in this driver. You can suppress vibration occurring at both starting and stopping in low stiffness machine, by manually setting up vibration frequency in 0.1Hz unit.
- You can also switch the vibration frequency set by 2-channel with rotating direction or with an external input to correspond to the variation of vibration frequency caused by the machine position.
- Easy setup with entry of only frequency and filter value. Improper setup values do not result in unstable operation



# 4. Further Flexibility and Multiplicity

## Setup support with substantial monitoring function

- Faster communication speed of RS232/RS485 (Max.57600bps) establishes an easy and comfortable operating condition for setup support software, "PANATERM".
- Displays the factors of no-motor run and helps you to analyze the causes of troubles.
- You can set up the panel operation lock to inhibit the operation from the front panel, thus enables you to prevent miss-operation such as unintentional change of parameters.

*Note) Refer to page "F2" for setup support software.

## Command control modes

- Offers you "Position" , "Velocity (including internal 8-speed)" and "Torque" command control modes
- You can set up any one of the command control modes, or selectable two command control mode with parameter.
- You can set up any command control mode depending on your application.

## Monitoring function with front panel

- LED display and analog monitor terminals are installed in the front panel.
- Displays "Motor speed" , "Motor torque" Position deviation" , "Motor load factor" and "Regeneration load factor" on LED.
- You can monitor "Motor speed" ,"Motor torque" and "Position deviation" through analog monitor terminals.

## Trial run (JOG)

- Features the function for trial (JOG) run through the front panel or console (option) without connecting to a host controller.
- You can shorten the machine setup time.

## Full-closed control (High precision positioning)

- Features the full-closed control of position and velocity, using the signals from feedback scale installed on the load side and high resolution encoder.

Note) Applicable feedback scales are as follows,

- Made by Mitsutoyo

| | Resolution(μm) | Max. Speed*(m/s) |
|---|---|---|
| ABS AT573A Series | 0.05 | 2 |
| ABS ST771A Series | 0.5 | 5 |
| ABS ST773A Series | 0.1 | 4 |
| ABS ST771AL Series | 0.5 | 5 |
| ABS ST773AL Series | 0.1 | 4 |

- Made by Sony Manufacturing System

| | Resolution(μm) | Max. Speed*(m/s) |
|---|---|---|
| SR77 Series | 0.05 | 2 |
| SR87 Series | 0.05 | 2 |

High resolution laser scales are also available.

(* The maximum speed depends on the driver performance. It is limited by the machine configuration and system configuration.)

- Best suits to high precision machines.

## Inrush current suppressing function

- Inrush current suppressing resistor is equipped in this driver, which prevents the circuit breaker shutdown of the power supply caused by inrush current at power-on.
- Prevents unintentional shutdown of the power supply circuit breaker in multi-axes application and does not give load to the power line.

## Regeneration discharging function

- Discharges the regenerative energy with resistor, which energy is generated while stopping the load with large moment of inertia, or use in up-down operation, and is returned to the driver from the motor.
- No regeneration discharge resistor is built-in to Frame A driver (MADDT1105 type.), Frame B driver (MBDDT2210 type.) and Frame G driver (MGDDTC3B4 type.) and we recommend you to connect optional regenerative resistor.
- Regenerative resistor is built-in to Frame C to F drivers, however, connection of the optional regenerative resistor bring you further regenerative capability.

## Built-in dynamic brake

- You can select the dynamic brake action which short the servo motor windings of U, V and W, at Servo-OFF, CW/CCW over-travel inhibition, power shutdown and trip.
- You can select the action sequence setup depending on the machine requirement.

## Positioning pulse

- Corresponds up to 2Mpps of pulse input at positioning control.

## Setup support software

- With the setup support software, "PANATERM " via RS232/RS485 communication port, you can monitor the running status of the driver and set up parameters.
- You can read out the absolute position data of the motor with absolute encoder.

## Wave-form graphic function

- With the setup support software, "PANATERM" , you can monitor the "Command speed" , "Actual speed" ,"Torque" , "Position deviation " and "Positioning complete signal" .
- Helps you to analyze the machine and shorten the setup time

*Note) Refer to page "F2" for setup support software.

## Torque limit value switching

- You can setup 2 torque limits and use them for tension control or press & hold control.
- It is possible to apply it to bumping homing.

## SEMI F47 voltage sag immunity

- Features the function which complies to voltage sag immunity standard of SEMI F47 at no load or light load.
- Useful for semiconductor industry.

Notes)
1) Not applicable to single phase, 100V type.
2) Verify with the actual machine condition to F47, voltage sag immunity standard.

## Frequency analyzing function

- You can confirm the response frequency characteristics of total machine mechanism including the servo motor with the setup support software, "PANATERM"
- Helps you to analyze the machine and shorten the setup time

*Note) Refer to page "F2" for setup support software.



## Applicable overseas safety standards

| Subject | Standard conformed | | |
|---|---|---|---|
| Motor | IEC60034-1 IEC60034-5 UL1004 CSA22.2 No.100 | | Conforms to Low-Voltage Directives |
| Motor and driver | EN50178 UL508C CSA22.2 No.14 | | |
| | EN55011 | Radio Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment | Conforms to references by EMC Directives |
| | EN61000-6-2 | Immunity for Industrial Environments | |
| | IEC61000-4-2 | Electrostatic Discharge Immunity Test | |
| | IEC61000-4-3 | Radio Frequency Electromagnetic Field Immunity Test | |
| | IEC61000-4-4 | Electric High-Speed Transition Phenomenon/ Burst Immunity Test | |
| | IEC61000-4-5 | Lightening Surge Immunity Test | |
| | IEC61000-4-6 | High Frequency Conduction Immunity Test | |
| | IEC61000-4-11 | Instantaneous Outage Immunity Test | |

I E C : International Electrotechnical Commission
E N : Europaischen Normen
EMC : Electromagnetic Compatibility
U L : Underwriters Laboratories
CSA : Canadian Standards Association

Pursuant to at the directive 2004/108/EC,article 9(2)

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