



# Motion Control

## Panasonic Drive

**NPM** Nippon Pulse  
*Your Partner in Motion Control*



# Panasonic A5L Series

## Smart

Advanced real-time auto-gain tuning  
Manual/auto notch filter  
Manual/auto damping filter  
Motion simulation

## Fast

2.0kHz frequency response  
Input/output pulse: 4Mpps

## Simple

Set-up support software  
Four languages  
Service life prediction

## Safe

Complies w/ Europe standards  
Low noise



### Motor

The A5L series is compatible with Nippon Pulse's Linear Shaft Motor.

### Scale

The drive is compatible with incremental/absolute and A/B/Z phase scale serial communication devices.

### Magnetic Pole Detection

The A5L series is compatible with devices both with and without a CS signal (Hall effects/auto detection)

### Setup

Automatic setup of magnetic pole, scale direction, gain, etc.



# Smart

Advanced real-time auto-gain tuning  
Manual/auto notch filter  
Manual/auto damping filter  
Motion simulation

## Advanced real-time auto-gain tuning

The A5L series employs the industry's fastest high-performance real-time auto-gain tuning and also features easy set-up. After installation, tuning will be completed automatically after several operations. When the response is adjusted, simple tuning is supported with a change of one parameter value.

Use of the gain adjustment mode in the setup support software contributes to optimum adjustment. The built-in auto vibration suppression function reduces equipment damage. Appropriate modes are provided for various machines such as vertical axis machines and high friction machines with belts.

This makes it possible to perform simple optimal adjustments simply by selecting the mode and stiffness.

## Manual/auto notch filter

The A5L series is equipped with auto-setting notch filters for greater convenience. With this drive, there is no need to measure troublesome vibration frequencies. The notch filters automatically detect vibration and provide simple auto-setting.

The notch filters also greatly reduce noise and vibration caused by equipment resonant and respond quickly during operation.

The A5L series features and industry-best four notch filters with setup frequencies of 50 to 50,000Hz. This enables depth adjustment within this frequency range (two of the filters share the auto set-up).

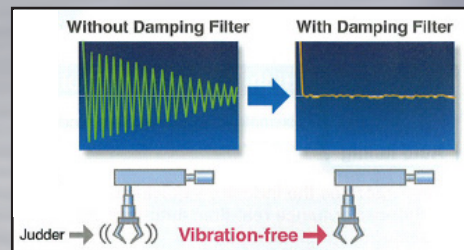
## Motion simulation

The A5L drive is equipped with a simplified machine simulation function, which uses frequency response data acquired from the actual machine. It also features a machine simulation function for performing simulated operation.

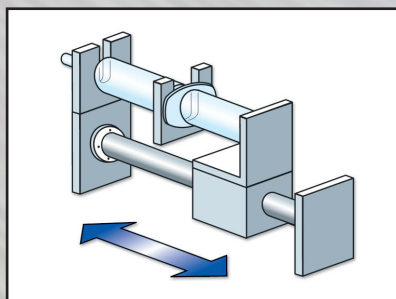
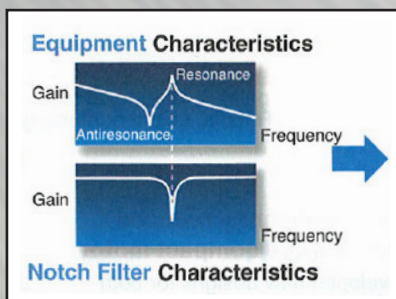
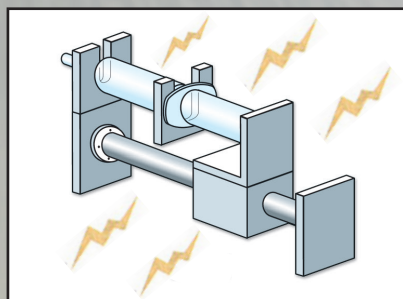
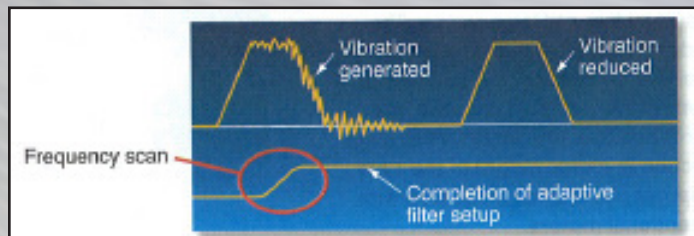
This allows the user to easily confirm the effects of gain and various filters without adjusting the actual equipment.

## Manual/auto damping filter

The damping feature on the A5L series removes the natural vibration frequency component from the command input, greatly reducing vibration of the axis stopping.



The number of filters has been increased to four from the conventional two filters (two for simultaneous use). The adaptive frequency has also been significantly expanded from 1 to 200Hz.



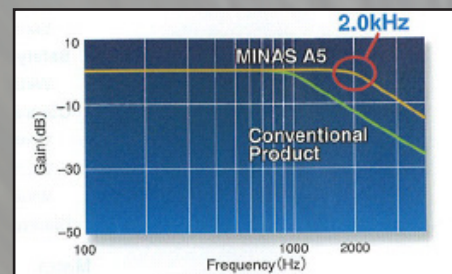


## Fast

2.0kHz frequency response  
Input/output pulse: 4Mpps

### Industry's fastest frequency response - 2.0kHz

With the A5L series drive, which offers industry's fastest speed and positioning response, a highly advanced system can be created. With a newly developed LSI and high response control, operation speed is increased.



### Input/Output pulse rate: 4Mpps



Ideal for semiconductor production equipment and machine tools, the extremely high pulse rate of 4Mpps highlights the industry's leading positioning resolution commands.

## Simple

Set-up support software  
Service life prediction

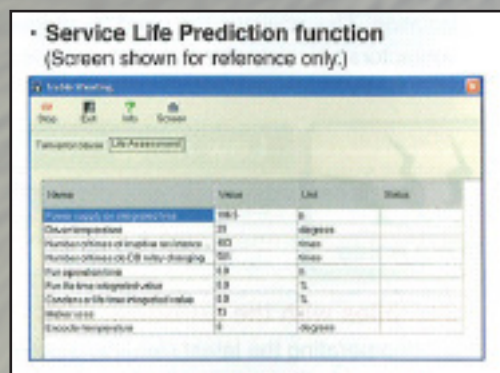
### Set-up support software

The Panasonic drive employs a service life prediction system, preventing unexpected suspension of operation and allowing for the planning of system maintenance. Sensing the internal temperature for the main components, like the fan and condenser, an alarm is displayed when the rated value is exceeded.

Other functions of the A5L series include data register of load factor, voltage, and drive temperature. Also included is a logging function to record the interface history.

### Additional Software Features

- Command control mode is available for position and speed
- Using the parameter settings, user can set up one optional command control mode or two command control modes by switching
- With a suitable application utility, users can choose an optional command control mode
- Users are able to use the AB-phase linear scale (for general all-purpose products) for supported scales
- Includes a function compliant with SEMI47 for standard voltage sag under no or a limited load
- The A5L series comes standard with a rush current preventative resistor to prevent the circuit breaker from shutting off the power supply as a result of in-rush current occurring at power-on





# Safe

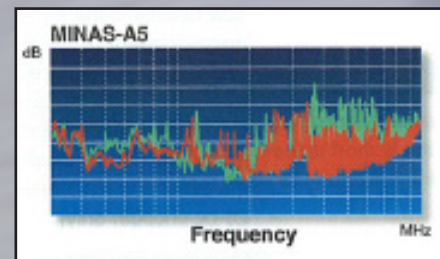
Complies w/ Europe standards  
Low noise

## Complies with European standards

This series offers non-software based independent redundant circuitry for motor power isolation. This eliminates the need for magnetic contactors to isolate the required motor in order to accommodate low-voltage machinery commands (the final safety compliance must be applied at the machine).

## Low noise

The incorporation of the latest circuit technology allows the A5L series to further reduce noise. This series of drives complies with the European EMC Directive.



## Additional A5L Details

### Dynamic braking

With parameter settings, users can select dynamic braking, which shorts servomotor winding U, V, and W at Servo-OFF, during positive direction/negative direction over-travel inhibition, during power shutdown, and tripping of the circuit breaker.

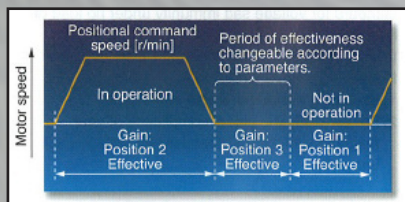
The desired action sequence can be set-up to accommodate your machine requirements.

### Parameter Initialization

Using the front panel or by connecting a PC, users can restore the parameters to the factory settings.

### 3-step gain

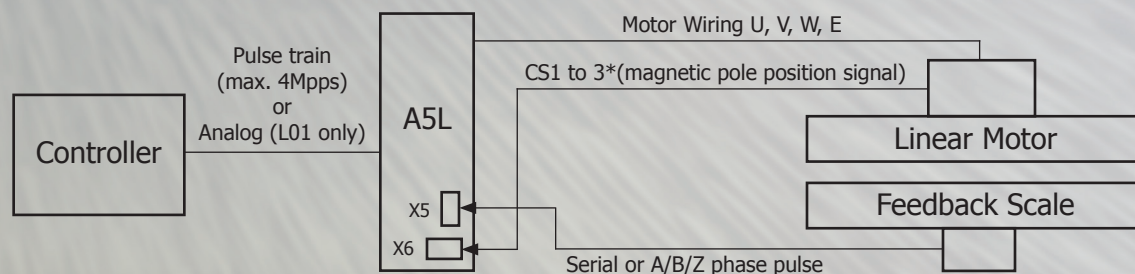
To choose the appropriate gain tunings at both the stopping point and during operation, a 3-step gain switch is available in addition to the normal gain switch. The 3-step gain switch gives users the choice of three different tuning settings for normal operation, stopping for faster positioning, and at stopping.



### Input/Output signal assignment

Users are able to use the parameters to arbitrarily allocate the universal 10 inputs and six outputs (inputs can be selected as either A contacts or B contacts). The Panaterm setup software provides an exclusive screen for simplified operation.

## Typical Wiring Setup



\*Connection is unnecessary when magnetic pole is automatically detected

## Panasonic A5L Part Numbering

Power Supply	Drive Part Number	Corresponding Nippon Pulse Motor	Motor Rated Current (Arms)	Motor max. current (Arms)
Single Phase (120V)	MADHT1105	SLP15, S080~S200	1.2	3.6
	MADHT1107	SLP25, S250, S320, S350, L250~L320	1.7	5.1
	MBDHT2110	S250X, S320X	2.5	7.5
	MCDHT3120	SLP35, S350Q, S427~S435	4.8	13.8
Single/3-phase (230V)	MADHT1505	SLP15, S080~S200	1.2	3.6
	MADHT1507	SLP25, S250, S320, S350, L250~L320	1.6	4.8
	MBDHT2510	S250X, S320X	2.6	7.8
	MCDHT3520	SLP35, S350Q, S427~S435	4.1	12.3
	MDDHT3530		5.9	16.9
	MDDHT5540	S500, S605	9.4	28.2
3-phase (230V)	MEDHT7364		13.4	40.2
	MFDHTA390		18.7	56.1
	MFDHTB3A2		33.0	84.8
	MGDHTC3B4		44.0	116.6
	MHDHTC3B4		66.1	167.2
3-phase (480V)	MDDHT2407		1.5	4.5
	MDDHT2412		2.9	8.7
	MDDHT3420		4.7	14.1
	MEDHT4430		6.7	19.7
	MFDHT5440		9.4	29.2
	MFDHTA464		16.5	42.4
	MGDHTB4A2		22.0	58.7
	MHDHTB4A2		33.1	63.7

MADH T1 5 05 L01

① ② ③ ④ ⑤

**1: Frame Symbol**

MADH - Frame A  
 MBDH - Frame B  
 MCDH - Frame C  
 MDDH - Frame D  
 MEDH - Frame E  
 MFDH - Frame F

**2: Max. Current Rating**

T1 - 10A  
 T2 - 15A  
 T3 - 30A  
 T4 - 35A  
 T5 - 50A  
 T7 - 75A  
 TA - 100A  
 TB - 150A

**3: Supply Voltage Specs**

1 - Single-phase, 120V  
 3 - 3-phase, 230V  
 4 - 3-phase, 480V  
 5 - Single/3-phase, 230V

**4: Current Detector Rating**

05 - 5A  
 07 - 7.5A  
 10 - 10A  
 12 - 2A  
 20 - 20A  
 30 - 30A  
 40 - 40A  
 64 - 64A  
 90 - 90A

**5: Pulse Input**

L01 - Standard  
 LA1 - Pulse Only

Specifications	L01 (standard)	LA1 (Pulse only)
Instruction	Position, Speed, Thrust Command	Position Command
RS232/RS485 Interface	Capable	N/A
Safety Function	Compliant (emergency stop)	N/A
Analog Input	Capable (speed/torque limits)	N/A (pulse only)



## Panasonic A5L Specifications

Basic Specifications	Control Method		IGBT PWM method sine wave drive	
	Control Mode		Parameter selectable between 6 modes: 1. Position; 2. Velocity; 3. Thrust; 4. Position/velocity; 5. Position/thrust; 6. Velocity/thrust	
	Feedback Scale		Phase A/B/hone signal differential input, Mitutoyo Corp. AT573A/ST770A/ST770AL Magnescale Co. compatible w/ SR75, SR77, SR85, SR87 Panasonic serial parts	
	Magnetic poles position detection signal		CS signal/Hall effect (CS1, CS2, CS3) or magnetic poles position estimation (CS signal/Hall effect not needed), selected by parameter	
	Control Signal	input	10 multi-function inputs, functions of multi-function inputs; parameter selectable	
		output	6 multi-function outputs, functions of multi-function outputs; parameter selectable	
	Analog signal, monitor output	input	3 inputs (1 16-bit A/D input and 2 12-bit A/D inputs)	
		output	2 outputs (analog monitor 1/2), digital output 1 (digital monitor 1) *1	
	Pulse signal	input	2 inputs each, both line driver interface and open collector interface supported using optocoupler input, line driver interface supported by using line receiver input	
		output	4 outputs each, feedback scale pulses (phase EXA, EXB, EXZ signals) output by line driver, open collector output is also available for phase EXZ signals	
	Communication function safety terminal	USB	Personal computer, etc. can be connected for parameter setting configuration and status monitoring	
		RS232 *1	1:1 communication is available using a device having an RS232 interface as a host	
		RS485 Serial bus *1	1:N communication is available using a device having an RS485 interface as a host	
	Terminal for providing functional safety *1		Terminal for the safety function	
Function	Front panel		1. KEY (5); 2. LED (6); 3. Analog monitor output (analog monitor 1/2); 4. Digital monitor output (1 ch) *1	
	Regeneration		Size D-F; regen resistor provided (external resistor can also be used)	
	Dynamic brake		Provided	
	Position control	Control input		Deviation counter clear, command pulse input inhibition, electronic gear switching, damping control switching, etc.
		Control output		In-position, etc.
		Input pulse	Max. command pulse frequency	500 kkps (w/optocoupler input); 4 Mpps (w/line receiver input)
			Input pulse train	Differential input, parameter selectable; 1. positive/negative; 2. Phase A/Phase B; 3. Command/direction
			Command scaling (electric gear ratio setting)	1/1000 - thousandfold, Feedback scale resolution (numerator) and command pulse count per revolution (denominator) can be arbitrarily specified between 1-2 <sup>20</sup> for numerator and 1-2 <sup>20</sup> for denominator but use within the range above
			Smoothing filter	Selectable between first order filter and FIR filter command input
		Analog input *1	Thrust limit command input	Separate thrust limit can be used for individual direction
		Instantaneous speed observer		Available
		Damping control		Available
	Velocity control	Control input		Internal speed selection 1. Internal speed selection; 2. Internal speed selection; 3. Speed zero clamp, etc.
		Control output		Speed reach, etc.
		Analog input *1	Speed command input	Speed command can be input by analog voltage, scale and command polarity, specifiable with parameters
			Thrust limit command input	Separate thrust limit can be used for individual direction
		Internal speed setup		Selectable between 8 preset velocities by control input
		Soft start/down function		0-10s/1000 mm/s separately selectable for acceleration/deceleration; S-curve accel/decel available
		Speed zero clamp		Internal speed setup can be clamped to 0 by speed zero clamp
		Instantaneous speed observer		Available
		Velocity command filter		Available
	Thrust control *1	Control input		Speed zero clamp, input of thrust command signal
		Control output		Speed reach
		Analog input	Thrust command input	Thrust command can be input by analog voltage; scale and command polarity, specifiable with parameters
		Speed limit function		Speed limit parameter specifiable
	Common	Auto tuning		Identifying load mass real-time and automatically setting gain that meets set stiffness when the motor is driving by an operation command from the host or drive
		Dividing pulse output		Pulse count can be arbitrarily specified (up to encoder pulse count)
		Protective function		Overvoltage, undervoltage, overspeed, overload, overheat, overcurrent, feedback scale abnormalities, position deviation fault, command pulse division, EEPROM error, etc.
		Alarm data traceback function		Alarm data history can be viewed



Personal Computer	CPU	Pentium III 512MHz or more
	Memory	256MB or more (516MB recommended)
	Hard disk	512MB or more available
	OS	Windows XP SP3, Windows Vista SP1
	Serial Communication Port	USB
Display	Resolution	1024x768 pix or more
	Number of colors	24-bit colors (True Color) or better





# The Nippon Pulse Advantage



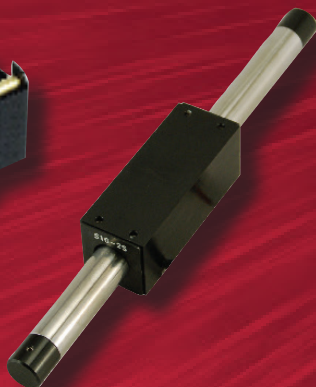
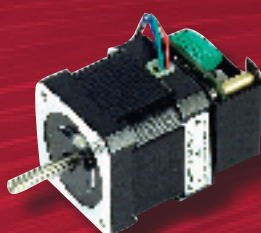
For sixty years, Nippon Pulse has built state-of-the-art products based on a solid foundation of advancing technology and thorough product research.

Nippon Pulse faithfully provides these high-quality products to a wide range of industries in North and South America and Europe. Nippon Pulse has established itself as a leader in stepper motor, driver, and controller technology while introducing innovative products such as the Linear Shaft Motor and Motionnet®. At Nippon Pulse, we believe that by bringing products to market which not only meet customers' requirements, but actually impress them, we contribute to the progression of technology and its positive impact on our society. We pride ourselves on the reputation of our high-quality products that provide that impact. A wholly owned subsidiary of Nippon Pulse Motor Co., Ltd., Nippon Pulse America is headquartered in Radford, Va.

Nippon Pulse has representatives throughout North and South America and Europe to directly assist customers. Limited quantities of stock on standard motors and electronics are available to allow faster response to customer needs. In addition, Nippon Pulse has a model shop in its Radford, Va. headquarters for quick turnaround on custom prototypes and special orders. Nippon Pulse's mission is to faithfully create new products sought by its customers and to contribute to the development of society from a global viewpoint.

When you choose a Nippon Pulse motor, driver, controller, network or stage, you're doing more than just buying a quality product. You're benefitting from what we call the Nippon Pulse Advantage. This includes superior prototyping, complete system engineering, proper compliance, and certification according to international guidelines, and exceptional tailoring to your needs. It also includes unmatched support.

Our biggest asset at Nippon Pulse is our people, both our employees and our customers. We ensure that we have the best people working for us so we are able to build loyalty among our customers. It's an advantage you won't find at any of our competitors and why we take pride in our products and our company.



# NPM

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## Nippon Pulse Representative Information