

**Network
Linear Motor Control
Servo Catalog**

MINAS A5N

MINAS A4A

MINAS A5L

[Drive]

Network

Linear motor control

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RTEX
 Realtime Express

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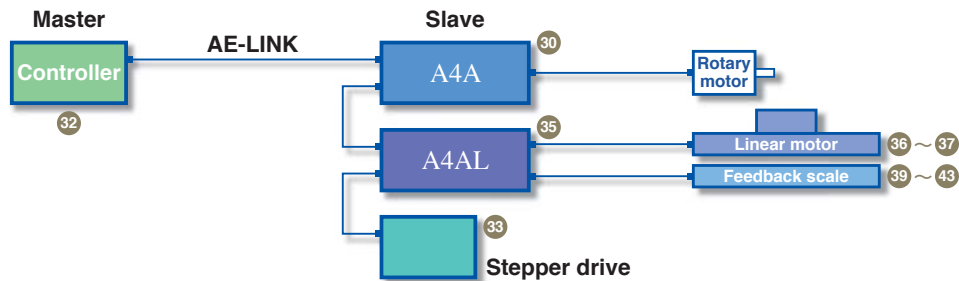
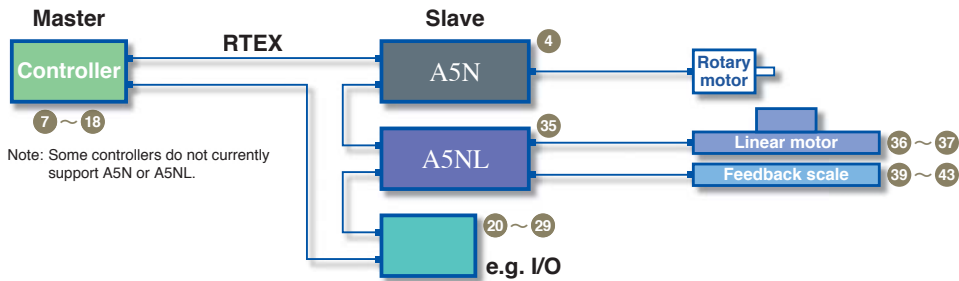


- Ultra high-speed 100 Mbps
- Supports all modes, position, velocity and torque
- Uses Ethernet cable

- RS485
- Built-in PTP positioning
- Uses Ethernet cable

- Max. 4 Mpps pulse/analog command
- Automatic setup
- Automatic magnetic pole detection

[System configuration] Encircled number represents the page on which the product is described.



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for RTEX

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for MINAS A5L, A5NL, A4AL (Compatible drives will differ depending on products.)

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Ultra High-Speed Network Servo MINAS A5N



Realtime Express (RTEX) New Generation Servos Debut!

Ultimate Real-time performance

- Velocity response **2300Hz**
- Com. speed **100Mbps Full-duplex**
- Com. period min. **0.083ms** Below 0.1ms!

Functionality to meet various needs

- Pos./Vel./Torq. all modes
- Accurate position latch
- IEC safety I/F model available^{*1}

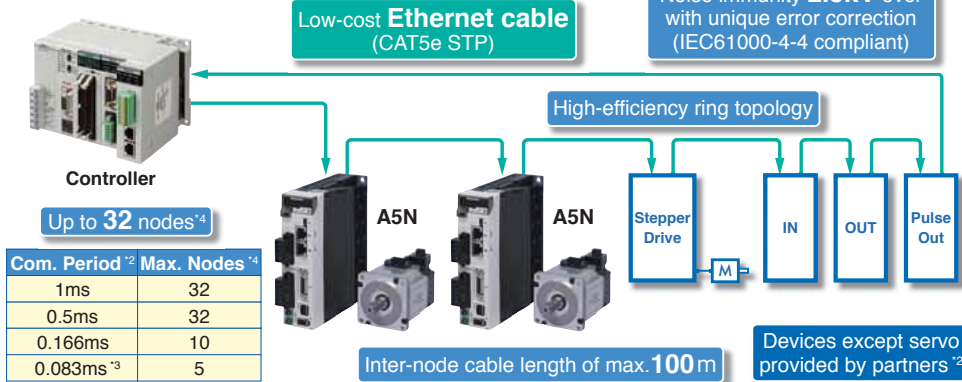
Simple network

- High-performance & Low-cost
- Isochronous established by ASIC
- Easy device development



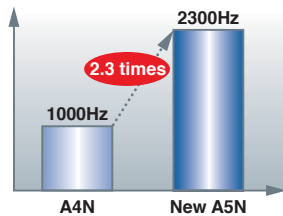
MINAS A5 Performance + Extended Protocol

[Typical system configuration]

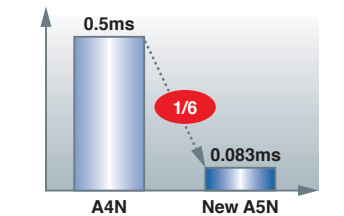


^{*1}: Special model. IEC61800-5-2 STO, IEC61508 SIL2. ^{*2}: The communication period and connection of slave devices depend on the controller specification. ^{*3}: For communication period 0.083ms, command update period is 0.166ms only. ^{*4}: Slave nodes.

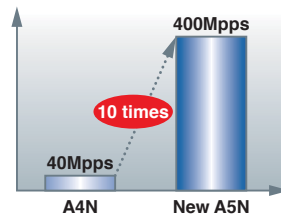
• Speed response frequency



• Minimum communication period



• Maximum pulse frequency



Note: Max. frequency is 4 Mpps when A/B phase feedback scale is used.

Drive list

| | Motor rated output | | | | | | | | | | |
|---------------------------|----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | 50 W | 100 W | 200 W | 400 W | 750 W | 1 k to 1.5 kW | 2 kW | 3 kW | 4 k to 5 kW | 7.5 kW | 11 k to 15 kW |
| Drive power supply | Single phase 100 to 120 VAC | A | A | B | C | | | | | | |
| | | MADH T1105 NA1 | MADH T1107 NA1 | MBDH T2110 NA1 | MCDH T3120 NA1 | | | | | | |
| | Single/3-phase 200 to 240 VAC | A | | A | B | C | D | | | | |
| | | MADH T1505 NA1 | | MADH T1507 NA1 | MBDH T2510 NA1 | MCDH T3520 NA1 | MDDH T5540 NA1 | | | | |
| 3-phase 200 to 230 VAC | | | | | | | E | F | F | G | H |
| | | | | | | | MEDH T7364 NA1 | MFDH TA390 NA1 | MFDH TB3A2 NA1 | MGDH TC3B4 NA1 | MHDH TC3B4 NA1 |
| 3-phase 380 to 480 VAC | | | | | D | D | E | F | F | G | H |
| | | | | | MDDH T2412 NA1 | MDDH T3420 NA1 | MEDH T4430 NA1 | MFDH T5440 NA1 | MFDH TA464 NA1 | MGDH TB4A2 NA1 | MHDH TB4A2 NA1 |

Upper line: Frame size symbol Lower line: Typical model No.

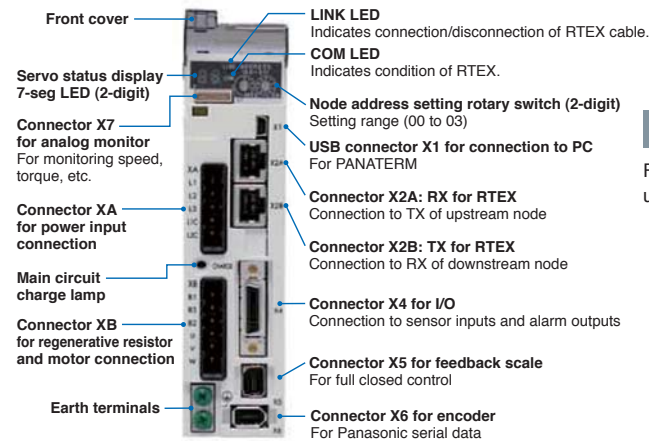
Note 1: Some motors do not match model numbers in the table. Check correct combination in the A5 series catalog.
Note 2: Trailing NA1 in the part number for product with safety I/F option is replaced with N01.

Applicable standards

- UL, cUL
- TUV
- CE
- RoHS



Drive external view



Dimensions (mm): W40 x H150 x D135 (A-frame)

MINAS A4N

For a controller not compatible with A5N, use A4N.



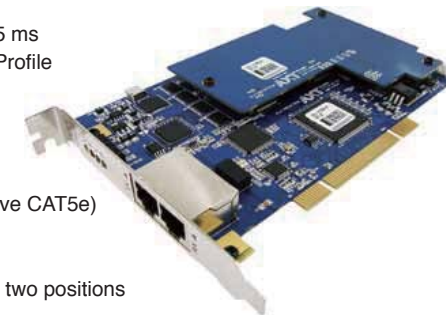
| Partner | Master | | | | Slave | | | | |
|---|--------|-----|-------------|-----|-------------|------------|--------------|---------------|---------|
| | PCI | USB | Stand-alone | PLC | Digital I/O | Analog I/O | Pulse output | Stepper drive | Gateway |
| AJINEXTEK CO., LTD. | ● | | | | ● | ● | ● | | |
| Anywire Corporation | | | | | | | | | ● |
| Asahi Engineering Co., Ltd. | | | ● | | | | | ● | |
| Aurotek Corporation | ● | | | | ● | | | | |
| Shanghai Bitpass Automation Technology Development Co.,Ltd. | ● | | | | | | | | |
| HI-P Tech Corporation | ● | ● | | | ● | ● | ● | | |
| Panasonic Electric Works SUNX Co., Ltd. | | | | ● | | | | | |
| Delta Tau Data Systems, Inc. | | | ● | | | | | | |
| Prime Motion Inc. | | | ● | | ● | | | | |
| SOFT SERVO SYSTEMS, INC. | ● | | | | | | | | |
| TIETECH Co.,Ltd. | ● | | | ● | | | | | |
| Trio Motion Technology Ltd. | | | ● | | | | | | |

RTEX Master Board

PCI-R1604

► Features

- RTEX network Master Board
- Network Speed 100 Mbps, Communication Period 0.5 ms
- Support RTEX Standard Servo Profile, Standard I/O Profile
- Basic configuration is 16 axes control (Can be expanded to 20,24,28, and 32 axes)
- Easy to wire, saving wiring working-hour
- Max. 32 nodes
- Network connection - 100 BASE-TX, STP Cable (above CAT5e)
- Excellent Error correction
- Multi-axes linear / circular interpolation
- Limit setting functions soft stop, emergency stop, and two positions



► Specification

| Item | Description |
|------------------------------------|--|
| RTEX Master Board | |
| Max. number of nodes | 32 |
| Max. ring loop length | 200 meters |
| Max. node to node length | 60 meters |
| Connector / cable type | RJ45 RX/TX, STP (Shielding type) |
| Power supply / current consumption | 5 VDC / 1.0 A |
| Position range | 32 bits (±2,147,483,648) |
| Motion | |
| Interpolation | Max. 32 synchronized drive, 2 to 4 axes linear interpolation, and 2axes arc interpolation, |
| Gantry motion | Max. 32 slave axes can follow the master axis to move synchronously |
| Position compare signal | All servo axis, up to 1 kHz |
| Software | |
| User Agent Software | EzSoftware RM |
| Operating System | Windows XP (32 bit, 64 bit), Windows 2000 |
| General specification | |
| Dimension | 174.63 × 106.00 mm |
| Weight | 120 g (Expend 32axes-161 g) |
| Operation temperature | 0°C to 60°C |

Communication ASIC MNM1221

For developing RTEX product, this ASIC is necessary. (See note)



| | Specification |
|-------------------------------|---|
| Part No. for ordering | DV0P444-9 |
| Packing quantities | 90 |
| Power supply voltage | 3.3 V |
| Current consumption | Max. approx. 100 mA (for reference) |
| Operating ambient temperature | -40 to +85°C |
| Package | LQFP100pin 14 × 14 mm Lead pitch 0.5 mm |
| RoHS | Compliant |
| Operation mode | Master/slave |

Note: As long as the target is noncompetitive to Panasonic products. For disclosure of technical data, nondisclosure agreement (NDA) is required. For details, consult us.

Contact to: **AJINEXTEK CO., LTD.**

9-3, Horim-dong, Dalseo-gu, Daegu-city, Korea
TEL: +82-593-3700 FAX: +82-593-3703

URL: www.ajinextek.com
E-mail: marketing@ajinextek.com

PLC Direct Access RTEX Motion Controller

PI-2000

► Features

Building a leading edge high speed motion network at low cost under PLC

● Direct PLC access

The controller runs the motion program installed in PI while accessing PLC data register.

- Preparation of ladder program for communication is not required on PLC.
- No CPU burden on PLC.

● Simple motion control through data register

Motor can be controlled by operating PLC data register.

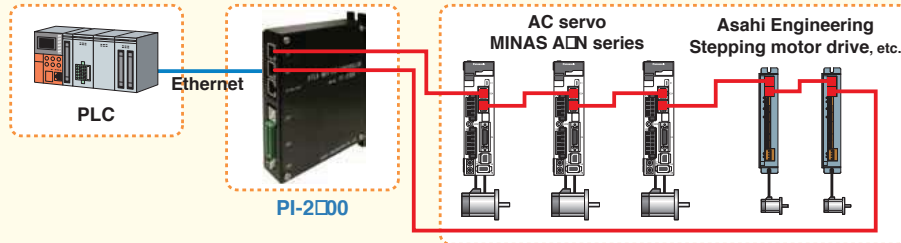
- Multi-axial motor can be controlled/monitored by simply operating numeric values on the data register.
- PLC operator having no knowledge on communication of motion (RTEX) can control the motor.

● Stepping motor can be mixed

- The motion network can contain servo motor and stepping motor.
- Ultra high-speed fully-synchronized motion system can be built.



Typical system configuration



- (1) Accessing PLC data register from PI-2300 over Ethernet
- (2) Based on the contents of data register, the PI sends command to each axis (motor operation).
- (3) The PI writes status information of each axis to data register.

► Specification

| Item | Description |
|------------------------------------|---|
| Power supply | 24 VDC±10% 300 mA MAX |
| Operating temperature and humidity | 0 to 50°C, 90% RH max. (no dewing) |
| Outline dimensions [mm] | W24.5 × D105 × H160 |
| Communication with PLC | Ethernet 10/100 BASE-T Conforms to MC protocol |
| Setting tool | PIAssistance (complimentary) |
| Control signal I/O | Initialization input, system alarm output and node alarm output |
| Motion network | RTEX command updating period: 1 ms |
| No. of connection nodes | Max. 16 |
| Motion control | Positioning and synchronized operation |

Contact to: **Asahi Engineering Co., Ltd. Kodaira Works**

3-3-22, Gakuen-Higashicho, Kodaira-shi, Tokyo 187-0043, Japan
TEL: +81-42-342-4422 FAX: +81-42-342-4423

URL: <http://www.asahi-engineering.co.jp/>
E-mail: ae-sales@asahi-engineering.co.jp



RTEX Network Motion Control board

MCN-0002P

► Features

- RTEX (Real Time Express) servo network
- Network Speed 100 Mbps, communication period 0.5ms
- Easy to wire, saving wiring working-hour
- Up to 32 nodes
- Excellent error correction
- Multi-axis linear / circular interpolation
- Multi-axis synchronous motion (for gentry)
- Up to 16 boards in one PC



► Specification

| Item | Description |
|------------------------------|--|
| RTEX motion control | |
| Module type support | Servo motor drive, Linear motor drive, Stepper drive, I/O module, Pulse module |
| Max. number of nodes | 32 (MCN-8032P) |
| Max. ring loop length | 200 meters |
| Max. node to node length | 60 meters |
| Connector / cable type | RJ45 8 pins, STP (Shielding type) |
| Isolation voltage | 1500 Vrms |
| Noise immunity | □ver 2.5 KV |
| LED loop status | Link / Comm (two elements LED) |
| Position range | 32 bits (±2,147,483,648) |
| Motion | |
| Interpolation | 32-axes linear interpolation / 2-axes circular interpolation (max. 16 pairs 2-axes circular interpolation) |
| Gantry motion | Max. 31 slave axes can follow the master axis to move synchronously |
| Position compare signal | All servo axis, up to 1 kHz |
| Software | |
| Software utility | MCN80XXP series utility for motion test and diagnosis |
| Drive/LIB | Drive for Windows XP, DLL function for windows applications |
| General specification | |
| Certification | CE (applying) |
| Dimension [LxWxH] | 175 × 100 × 20 mm |
| Power consumption | 5 V @ 500 mA |
| Operation temperature | 0°C to 60°C |

Contact to: **Aurotek Corporation**

1st. Floor No. 60, Jhou-Dih St. Nei-Hu District, Taipei 114, Taiwan
TEL: +886-2-6600-7574 FAX: +886-2-8752-3347

URL: www.robot.com.tw
E-mail: sales@robot.com.tw



Turbo PMAC2 Realtime Express Controller

Turbo-PMAC2-RTEX series

► Features

High specification motion controller with built-in PLC

- **Stand alone specification with built-in high-speed DSP [max. 240 MHz]**
Provided with USB 2.0, Ethernet or RS232C as standard port to communicate with host PC. Memory sharing with DPRAM option is possible.
- **Advanced trajectory calculations such as inverse kinematics and look ahead**
Advanced trajectory calculations necessary for linear interpolation, arc interpolation and spline interpolation, and robot control, and CP control by micro line segment feed are provided as standard features. All Turbo PMAC functions such as 2D and 3D positional compensation are available.
- **Various field networks promote multivendor environment (option)**
By adding CC-Link/DeviceNet/Profibus communication module, different manufacturers' devices can be connected.
- **I/O, pulse I/O, A/D and D/A function without intervention of network**
To standard accessories such as universal I/O, pulse input and pulse output, optional A/D and D/A can be added. By using the remote I/O unit ACC-34AA, expansion of 32 inputs, 32 outputs and universal I/O are possible. Because these can directly access the memory without intervention of a network, they can be easily handled.



► Specification

| Hardware specification | | Software specification | |
|--------------------------------|---|---|---|
| Item | Description | Item | Description |
| Processor | DSP56300 series (Freescale) Standard 80 MHz (option 240 MHz) | No. of control axes | Max. 32 axes/16 coordinate systems |
| Memory | Built-in 128 K × 24-bit SDRAM (option 512 K × 24-bit) | Controlling method | PTP control, trajectory (CP) control |
| Backup | Settings and program can be stored to Flash RAM. | Interpolation control | 2-axis to 9-axis linear interpolation, 2-axis arc interpolation (rotatable) 3-axis spiral interpolation, spline interpolation |
| Communication interface | USB 2.0/Ethernet 100 BASE-TX (concurrent use is not possible), RS232C | Unit of control | Pulse, or other desired industrial metrological unit |
| Power supply | 24 VDC 900 mA Min. | Accelerating/decelerating method | Trapezoid/ S-curve [optional acceleration/deceleration pattern (PVT mode)] |
| Pulse input | A/B phase rectangular input × 1-ch (6 MHz before multiplied by 4) | Accelerating/decelerating time | Min. 1 ms |
| Pulse output | Pulse/direction output × 1-ch (max. 1.31 MHz) | Positioning range | 2 ³⁵ counts |
| Universal I/O | Input 8 points, output 4 points (sink/source selectable) Remote I/O expandable (ACC-34AA) | Position compensation | Ball screw pitch error correction, orthogonal axis correction, plane correction |
| Universal A/D | 12-bit × 2-ch (option) | Other correcting functions | Backlash compensation, tool diameter compensation |
| Universal D/A | 10 V 12-bit × 1-ch (option) | PLC function | Interpreter/compile type total: 64 programs |
| | | Synchronous control | Electronic gear, electronic cam, motion synchronous I/O output (synchronous M variable) |
| | | Advanced trajectory calculation | Look ahead, forward/inverse kinematics operation |

Contact to: **Delta Tau Data Systems, Inc. USA West Coast Headquarters**
 21314 Lassen Street Chatsworth, CA 91311, United States
 TEL: +1-818-998-2095 FAX: +1-818-998-7807
 URL: <http://www.deltatau.com>
 E-mail: sales@deltatau.com

Motion Master Control Board

HCRTEXsd [PCI]

► Features

- **Motion of up to 32 axes [nodes] can be controlled from the single board.**
The board can control up to 32 nodes of axes and peripheral devices.
- **Simple sequence function reduces the load on host PC.**
- **Parameters and status of servo drive and motor can be uniformly managed from the host.**
Parameter setting and changing of servo drive (MINAS-A5N), various monitoring (alarm, limit signal, etc.), diagnosis of condition and troubleshooting can be easily performed.
- **Flexible expandability by expanding peripheral lineup**
In addition to control of MINAS-A5N, system can be extended to the desired degree by making use of peripheral boards (DI/DI board, Stepper drive board and pulse output board).
- **Full software control**
Speed (linear, S-curve acceleration/deceleration) and trajectory (linear and arc interpolation) are fully controlled by software, precisely at a low cost.



HCRTEXsd



HCRTEXsd-PCI

► For typical system configuration, see p. 28.

► Specification

| | Item | Description | |
|---------------------|---|---|---|
| | Part number | HCRTEXsd | HCRTEXsd-PCI |
| Board specification | Host interface | USB2.0 Highspeed (480 Mbps) | PC15V/3.3V signal environment compatible (PCI Spec2.1 Target) |
| | Power supply | 24 VDC [15] 300 mA MAX | +3.3 VDC, 0.96 A (TYP) +5 VDC, 0.2 A (TYP) |
| | Operating temperature and humidity | 0 to 50°C, 85%RH max. (no dewing) | |
| | Outline dimensions [mm] | W130 × D150 × H30 | W167.64 × D64.41 (PCB only) 1 slot, LowProfile compatible |
| Board function | No. of control nodes | 32 | |
| | Motion control | Positioning control by software | |
| | Motion function | <ul style="list-style-type: none"> • Positioning, linear and arc (continuous) • Linear, S-curve acceleration/deceleration (triangle driving avoidance function) • Software accurately maintains arc circumferential velocity constant • Simple sequence function • Setting and reading of servo drive (MINAS-A5N) parameters • Other motion functions | |

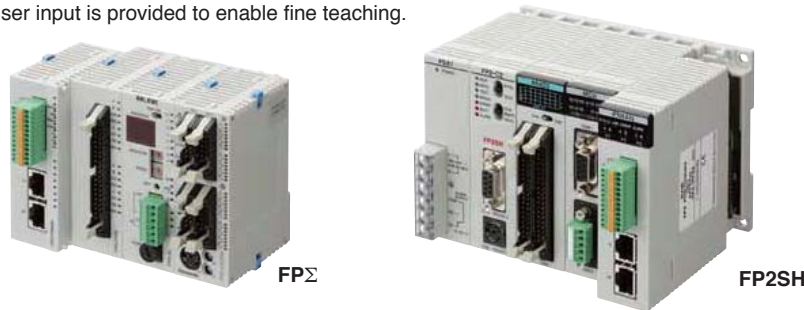
Contact to: **HI-P Tech Corporation Sales Dept.**
 1-27-23, Higashitokorozawa, Tokorozawa-shi, Saitama 359-0021, Japan
 TEL: +81-4-2951-5381 FAX: +81-4-2951-5383
 URL: <http://www.hptec.co.jp/>

PLC Positioning Unit RTEX

AFP4G4□□610, etc.

► Features

- Compact PLC is easier to operate to control network servo MINAS A4N/A5N. (Units of Ver.1.3 or later will support A5N.)
- High speed 100 Mbps communications enable high precision arc/linear/spiral interpolation.
- 2-axis, 4-axis and 8-axis units are lined up and can be used to configure system of up to 16 axes with FPΣ and 256 axes with FP2SH.
- User-friendly tool software [Configurator PM] provides strong support for setup, start and monitor.
- Max. No. of position command points is 600/axis and max. position command rate is 32 Mpps, assuring margin of performance.
- Manual pulser input is provided to enable fine teaching.



► Specification

| Part No. (FPΣ/FP2SH) | | AFP4G4□□610/AFP24□□610 | AFP4G4□□620/AFP24□□620 | AFP4G4□□6□□/AFP24□□6□□ |
|---------------------------|-----------------------------------|--|----------------------------|----------------------------|
| No. of control axes | | 2-axis (2 axes × 1 system) | 4-axis (4 axes × 1 system) | 8-axis (8 axes × 1 system) |
| Position control function | Control method | PTP control, trajectory (CP) control | | |
| | Interpolation control | 2-axis, 3-axis linear interpolation, 2-axis arc interpolation, 3-axis spiral interpolation | | |
| | Control unit | pulse/ μm/ inch/ degree | | |
| | Positioning data | 600 points/axis | | |
| | Backup | Parameter and data table can be stored to FRDM. | | |
| | Accelerating/ decelerating method | Linear acceleration/deceleration and S-curve acceleration/deceleration | | |
| | Accelerating/ decelerating time | 0 to 10,000 ms (in unit of 1 ms) | | |
| Positioning range | | Signed 32-bit (-1,073,741,823 to 1,073,741,823 pulses) increment, absolute designation | | |
| Velocity control function | | With JOG operation (infinite feed operation) | | |
| Torque control function | | With real time torque limit function | | |
| Origin return | Searching method | Near home (□□□) search, limit search, □ phase search, hit and stop | | |
| | Creep velocity | Setting is optional | | |
| Other | | Pulsar input operation/ auxiliary output code, auxiliary output contact/ dwell time/ in position contact/ 2-axis synchronization operation | | |

□MINAS A4N and A5N cannot be mixed in a system.

Contact to: **Panasonic Electric Works SUNX Co., Ltd.**

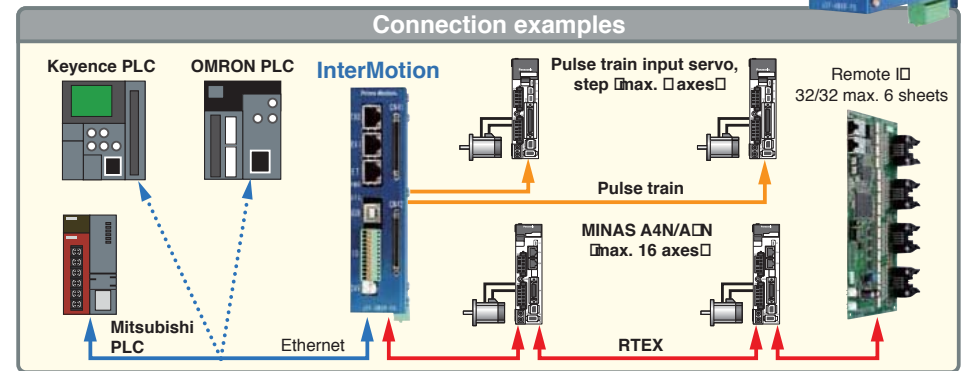
2431-1, Ushiyama-cho, Kasugai, Aichi 486-0901, Japan
URL: <http://panasonic-electric-works.net/sunx>

Multi PLC Direct Connection 16-axis Motion Controller

□InterMotion□Series JOY-AMXR-P□, etc.

► Features

- Directly connectable to Mitsubishi Electric PLC (CPU with Ethernet: e.g. Q03UDECPU) References CPU D register according to MC protocol.
- Directly connectable to □MRON PLC (CPU with Ethernet: e.g. CJ1M-CPU11-ETN)
- Directly connectable to Keyence PLC KV-5000
- Internal control program of [InterMotion] can be developed in the machine control script language [MOS language]. Motion, I/□, communication and sequence can be controlled.
- 1 ms scan □□UT interlocked trajectory control (coating valve control, spray valve control, etc.) is possible.



► Specification

| Item | Description |
|--------------------------------------|--|
| No. of control axes | For max. 8 axes, 10 Mpps pulse train position command can be used as necessary. (Low cost version is available: RTEX axis only without pulse train output) |
| Controlling method | Each axis is independent PTP. Max. 8 axes sync PTP. Linear interpolation, 2-axis arc interpolation, 3-axis spiral interpolation, 32-bit length. 1 ms scan □□UT interlocked trajectory control option (coating valve control, spray valve control) |
| Internal control program development | Control program can be developed by using the C-like multiprocessing machine control language □□□S language]. Motion, I/□, communication and sequence can be controlled. As the development environment, □□□S Bench AM] is required. |
| Accessory IO | ±CW, ±CCW pulse output, ±A, ±B, ±Z input. Servo on, reset output. ±OT, alarm input, for 8 axes. Universal IN 8 points. Universal OUT 8 points. Non-insulated RS232 1 ch, Insulated RS485 1 ch. (By adding remote I/O, 192 IN and 192 OUT are available.) |
| Host controller | Mitsubishi Electric PLC with CPU with Ethernet (reference CPU D register) Keyence PLC KV-5000 (reference data memory) □MRON PLC with CPU with Ethernet (reference data memory) □r, Windows PC with Ethernet (DLL for XP supplied) |

Contact to: **Prime Motion Inc.** (InterMotion - Special site: <http://www.intermotion.jp>)

1134-12, Akaho, Komagane-shi, Nagano, 399-4117, Japan
TEL:+81-265-82-2990 FAX:+81-265-82-2292 URL: <http://www.primemotion.com/>

RTEX motion controller Board

JES-PCI2N

► Features

- Real-time communication based on 100BASE-TX
- 0.5ms cycle with up to 32 axes
- High-speed DSP, FPGA as a master device
- Complex multi-card support up to 4 cards, the maximum control 128-Axis (customizable)
- Acceleration and deceleration control mode:
T-shaped, S-shaped, trigonometric-shaped
- High-speed position capture by hardware interrupt
- Synchronous control mode



► Specification

| Item | Description | |
|---------------|-------------------------------|--|
| Motor control | Number of control-Axis | 32 |
| | DSP LSI | TMS320F28335PGFA (Texas Instruments) |
| | Control Mode | Command mode |
| | Drive Function | Linear interpolation, Circular interpolation |
| | Other function | Virtual axis, Axis overlay, Master-Slave, Position Capture, Non-linear error compensation, Electronic gear, Electronic cam |
| | Acc-Dec Mode | T-shaped, S-shaped, trigonometric-shaped |
| I/O | Input | 48 (24 VDC±10%) |
| | Output | 32 (24 VDC/10V) |
| Communication | NetWork | RealtimeExpress (RTEX) |
| | Communication speed | 100 Mbps |
| | Physical Layer | 100 BASE-TX full duplex (by IEEE 802.3u) |

Contact to: **Shanghai Bitpass Automation Technology Development Co.,Ltd.**

floor1601 jinyi Mansion.441He Nan N.Rd, Shanghai, China

TEL: +86-21-63570803 FAX: +86-21-63570802

URL: <http://www.shhuitong.net>

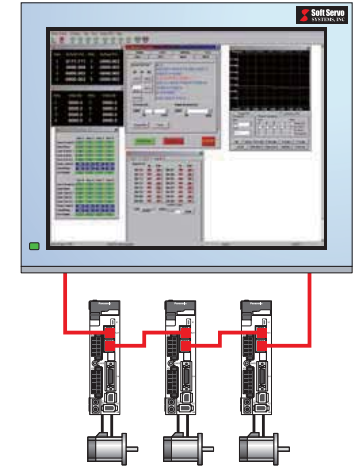
Universal motion controller

SMP series

► Features

Full software motion controller

- Windows real time extension enables high performance software control from PC
- Hardware saving and cost saving with full software motion control
- Can be flexibly used to meet various control specifications and applications with wide variety of functions including NC Multisystem independent control function divides 32 axes into up to 32 systems
Machine elements such as electronic cam, electronic gear and electronic clutch can be defined and virtually operated
- NET compatible
Real time API can also be used for flexible application development
- PLC (ladder control) can be used with accompanying LadderWorks PLC



► Specification

| | SMP40 | SMPI0 | SMP1600 | SMPI200 |
|---|--|--|---------|---------------------------------|
| Max. No. of control axes | 4 | 8 | 16 | 32 |
| Max. No. of interpolation control axes | Linear interpolation | 4 | 8 | 16 |
| | Arc interpolation | Simultaneous 2-axis (helical) | | |
| Acceleration/deceleration profile | Can be individual set by using linear, bell, exponential function, jerk control and motion profile function. | | | |
| No. of full synchronization control GantryCombinations | 2 | 4 | 8 | 16 |
| Max. No. of PLC axes | 4 | 8 | 16 | 32 |
| Interpolation period | 1 ms (with 0.5 ms option) | | | |
| Max. command value | Linear axis | □99999.999999999 mm, □99999.999999999 inch | | |
| | Rotation axis | □99999.999999999 deg | | |
| Min. setting unit | Linear axis | 0.000000001 mm, 0.000000001 inch | | |
| | Rotation axis | 0.000000001deg | | |
| Programmed operation | Execution of G code file | ○ | ○ | ○ (up to 8 axes) (up to 8 axes) |
| | Functional computation and conditional branch | ○ | ○ | ○ (up to 8 axes) (up to 8 axes) |
| User motion profile (with buffer function) | Continuous 500 steps | | | |
| Major trajectory control functions | Automatic corner deceleration, corner in position, automatic arc speed limit, high accuracy contour look ahead control | | | |
| I/O control By LadderWorks PLC | Control period | 5 ms | | |
| | Max. No. of steps | 10000 | | |
| | Max. No. of control points | I: 4000 / □: 4000 | | |

Contact to: **SOFT SERVO SYSTEMS, INC.**

272-1 Norieda-cho, Minami-ku Hamamatsu, Shizuoka 432-8053, Japan

TEL: +81-53-444-5771 FAX: +81-53-444-5773

URL: <http://www.softservo.co.jp/>

PCI Motion Control Board

16□02-MBP-LE01/01, etc.

► Features

Motion control board best suited to build motion control system

- **□ axes synchronous control**
 - Servo control of 32 axes in 1 ms period for various applications.
- **Wide array of external interfaces**
 - Because the board is provided with such external interfaces as RS485 communication, 2 external inputs (24 V compatible) and 1 external output, it can be connected to various devices.
 - When multiple inputs/outputs are required, it supports remote I/□ function (CUnet).



► Specification

| Series list | | | |
|--------------------|---------------------|--|--------------|
| Model | No. of control axes | Built-in pulse train conversion software | Built-in PLC |
| 169002-MBP-LE01/01 | 32 | — | — |
| 169002-MBP-LE01/02 | 32 | ○ | — |
| 169002-MBP-LE01/11 | 16 | — | — |
| 169002-MBP-LE01/12 | 16 | ○ | — |
| 169002-MBP-LE01/21 | 8 | — | — |
| 169002-MBP-LE01/22 | 8 | ○ | — |
| 169002-MBP-LE01/23 | 8 | — | ○ |

| Item | Description | Remarks | |
|--------------------------------|-------------------------------------|--|---|
| Architecture | CPU | SH4 HD6417750R 200 MHz | |
| | Memory | FLASH ROM 8 MB | with backup function For data transfer |
| | | SDRAM 16 MB | |
| | | SRAM 128 KB | |
| | | EEPROM 8 KB | |
| Shared memory 128 KB | | | |
| Servo interface | Connector | RJ-45 × 2 | |
| | Interface | Compatible with MINAS A4N/A5N series | |
| External input | 2 P□RT (with sink/source switching) | | |
| External output | 1 P□RT (with sink/source switching) | | |
| Remote I/O | CUnet | | |
| Serial interface specification | Interface | RS-485 | MK□40 (Step Technica Co., Ltd.) |
| | Transmission rate | 115.2 Kbps (Max.) | |
| Compatible OS | Microsoft Windows XP | If you use a different □S, consult us. | |

Contact to: **TIETECH Co.,Ltd.**

1-3-4 Shioya-cho, Minami-ku, Nagoya 457-0078, Japan
TEL: +81-52-824-7375 FAX: +81-52-811-4737

URL: <http://www.tietech.co.jp/>

PLC Motion Unit

B□□2101-UNT-LE02

► Features

PLC motion unit best suited to build motion control system

- **□ axes synchronous control**
 - All servos sync to the host device assuring precise CP control. Communication period is 1 ms over max. 32 axes allowing various control settings.
- **Software interface easily transportable from pulse train type software**
 - Command functions such as single axis PTP control, linear interpolation, arc interpolation, origin return and drive parameter change are provided. The unit will operate as the host controller sets the parameters and calls DLL functions. (DLL functions will be disclosed.)
- **Connection of Yokogawa PLC to Panasonic network servo**
 - By connecting the unit to the host PLC via PCI bus and to the driving section via network interface, various monitoring operations can be performed without stress. The combination of the unit and PLC expands functions such as to external signal interface.

A4N/A□N series
Servo drive compatible



Yokogawa Electric
e-RT□2.0 series
PLC compatible



► Specification

| Specification | | Item | Description | Remarks | |
|--------------------------------|---|-------------------|--|--|----------------------------------|
| Max. No. of control axes | 32 | CPU | SH4 7750□ 200 MHz (Renesas) Peripheral clock 50 MHz Bus clock 50 MHz | | |
| Positioning data quantity | No limit | | Memory | Flash ROM 8 Mbyte EEPROM 8 Kbyte | |
| Computing period | 1.0 ms | | | RAM | SDRAM 8 Mbyte DPRAM 256 Kbyte |
| PLC connection | PCI | Bus | Bus width 32-bit Clock 33 MHz PCI Rev.2.3 compatible | | |
| Interface to servo drive | RTEX 100 Mbps | | PCI bus interface | | |
| Continuous servo drive | MINAS A4N/A5N series | Power supply | Main power supply 5 V / 3.3 V CPU power supply 3.3 V, 1.5 V F□□A 3.3 V, 2.5 V, 1.2 V | | |
| Emergency stop input | According to host PLC specification [□] | | Internal power supply | | |
| External signal interface | According to host PLC specification [□] | | F□□A | | |
| Manual signal pulser interface | According to host PLC specification [□] | Watchdog function | WDT | Watching time 1.6 s | |
| Various monitoring | High-speed data processing via PCI bus | | LED | 2 points RUN □reen LINK □reen | Blinks during operation |
| Interpolation | Linear, arc, continuous, multiplex, helical pressure control [□] | Communication | RS2□2C 1-ch RTEX 1-ch | | |
| | | Setup | DIPSW | Universal input 4 For JTA□.ICE connection 1 For F□□A setting 2 | |
| | | | OS | VxWorks6.4 | |

*1 May be separately defined.

Contact to: **TIETECH Co.,Ltd.**

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URL: <http://www.tietech.co.jp/>

Motion Coordinator and RTX Interface Module

Motion Coordinator MC464 / Panasonic RTX Interface Module

► Features

- Supports digital drive systems up to 64 axes using multiple RTX
- Based on 64bit 400MHz MIPS processor
- Anybus-CC Module support allowing flexible factory communication options
- High accuracy double floating point / 64 bit integer resolution
- Multi-tasking BASIC programming
- IEC 61131-3 programming support
- Backlit LCD display
- Ethernet programming interface
- Expansion flexibility with clip on modules allowing quick interchangeability
- Built-in Ethernet-IP connectivity



► Specification

| Item | | Description |
|------------------|--|----------------------------|
| MC464 | | |
| System | Axes Controlled | Up to 64 |
| | RTX Drive Networks | Up to 7 |
| | Built-in Synchronization Encoder Input | Des |
| Programming | Multi-Tasking TrioBASIC | Des |
| | Number of Simultaneous Programs | 30 |
| | Motion Perfect Windows Software | Des |
| | Stand-Alone operation | Des |
| | Permanent Flash EPROM for program storage | Des |
| | Available memory for user programs | 8MByte |
| | User table memory | 512,000 |
| | Accurate and fast real number mathematics | 64 Bit Int / Double Floats |
| | Program Trace Debugger | Des |
| | Named Constants and variables | Des |
| Motion Functions | Linear, Circular, Helical, Spherical Interpolation | Des |
| | Cams, Gearbox, Clutches | Des |
| | 64 bit position storage | Des |
| | Acceleration/Deceleration □ S-Ramp Controls | Des |
| | 5 Term Control | Des |
| Interfaces | Max Interpolated Axes | 64, Multiple groups |
| | Hardware Position Capture (Registration) | 1us |
| | Ethernet port | 10/100 Base-T |
| | RS232 Serial Port | 128kbits/sec |
| | RS485 Multi-Drop | Des |
| | Ethernet IP | Des |
| | Modbus TCP | Des |
| | Anybus Module | Des |
| | □pto-Isolated Inputs | 16 |
| | □pto-Isolated □ Outputs with current limit | 8 |
| | Max Input / □ Output Expansion Channels | 512 |
| | CAN Analogue Inputs Capability | Des |
| | Real Time Clock | Des |
| | SD Card | Programs and data |
| Packaging | Module case style | DIN Rail / Panel Mount |
| | Module size (H x W x D) | 201 x 155 x 56 mm |
| | UL and CE marked for EMC | Des |

| Item | Description |
|--|--|
| Panasonic RTX Interface Module | |
| Network | Ethernet based MINAS A4N / A5N |
| Network Speed | 100Mbps 1msec or 500usec update operation |
| Topology | Ring |
| Max Slaves per Interface Ring | 32 |
| Max Interfaces per MC464 | 7 |
| Max Axes per MC464 | 64 |
| Bus to MC464 | 32 Bit |
| Registration Inputs | 8 x 24V Inputs + 1 Drive Registration Input/Axis |
| □ optically Isolated registration Inputs | □ |
| Map Any I/O to Any Axis | □ |
| Supported Modes | Cyclic Position, Cyclic Speed, Cyclic Torque |

Contact to: **Trio Motion Technology Ltd.**

Shannon Way, Tewkesbury, Gloucestershire, GL20 8ND, United Kingdom
 TEL: +44-1684-292333 FAX: +44-1684-297929 URL: <http://www.triomotion.com>

Motion Function Module

RTEX-PM

► Features

- Single axis (selectable from two(2) to four(4) axes) slave motion function extension module for RTEX
- Max 32 modules can be mounted on the PCI-Rxx04 board
- Synchronizing start/stop function for each node
- Digital control input / output for servo control
- Motion control signal input/output
- Sensor input and universal digital input/output function



► Specification

| Item | Description |
|---|---|
| RTEX-PM | |
| Module function | RTEX based 1axis of slave motion function module |
| NODE ID setting | Decimal number rotary switch × 2 (0 to 31) |
| Mounting Method | Standard 35 mm DIN rail mounting |
| Power supply / current consumption | 24 VDC / 200 mA (Connected to TB1 outside the module, without external I/O power) |
| LED display | Power (Yellow), Live (Green), Error (Red), Com (Yellow) |
| Pulse output | PULSE+, PULSE-, DIR+, DIR- LINE TRANSMITTER (5 VDC, MAX. 13MPPS) |
| Encoder input | ENC-A, /A, B, /B, Z, /Z : High-speed Photo-coupler (5 VDC, MAX. 8 MPPS) ENCPWR, DIND : 5 VDC output (when using the encoder for step motors) |
| Motion control Input / Output | ALARM, INP, RDI (IN4) : Photo-coupler (24 VDC Level) SVON, ALMC, DCC, TRDI (I) : Dalington Photo-coupler (24 VDC Level) LIMIT+, LIMIT-, ORG : Photo-coupler (24 VDC Level) TRG+, TRG- : Line Transmitter (5 VDC Level) BRK (OUT4) : Photo-coupler + Drive IC (24 VDC Level) PCOM, NCOM : Digital I/O Positive and Negative Common Motion Connector : Honda 26 pin X 1 EA Motion I/O Connector : 3M 26 pin X 1 EA |
| Universal input | IN2, IN3 : Photo-coupler (24 VDC Level) |
| Universal output | OUT2, OUT3 : Photo-coupler + Drive IC (24 VDC Level) |
| Software | |
| User Agent Software | EzSoftware RM |
| Operating System | Windows XP (32bit, 64bit), Windows 2000 |
| General specification | |
| Dimension [HxDxD] | 120 × 110 × 25 mm |
| Weight | 192 g |
| Operation temperature | 0°C to 60°C |

Contact to: **AJINEXTEK CO., LTD.**

9-3, Horim-dong, Dalseo-gu, Daegu-city, Korea
TEL: +82-593-3700 FAX: +82-593-3703

URL: www.ajinextek.com
E-mail: marketing@ajinextek.com

Digital Input/Output Function Module

RTEX-DB02T

► Features

- Slave digital input/output function extension module for RTEX
- Used by connecting to PCI-R1604 - RTEX communication master board
- Max 32 slave modules can be connected (node ID setting is required)
- 16 channels digital input control (Above Min 2 mA / channel, 24V level)
- 16 channels digital output control (below max 50 mA / channel, 24V level)
- Caution must be taken in system configuration to limit the maximum Current to 800 mA (50 mA / channel * 16 channels) when all 16 channels are used



► Specification

| Item | Description |
|---|---|
| RTEX-DB02T | |
| Module function | RTEX based slave 16ch digital input 16ch digital output function module |
| NODE ID setting | Decimal number rotary switch × 2 (0 to 31) |
| Mounting Method | Standard 35 mm DIN rail mounting |
| Power supply / current consumption | 24 VDC / Max. 500 mA (TB1 Connection to Outside Module) |
| LED display | Power (Yellow), Live (Green), Error (Red), Com (Yellow) IN1 to IN16 (Yellow) OUT1 to OUT16 (Red) |
| Digital input/output | 32 channels, 24 VDC Level (16ch Input / 16ch Output) IN1 to IN16 : Photo-coupler isolation (More over MIN. 2 mA/ch) OUT1 to OUT16 : Photo-coupler isolation (Below MAX. 50 mA/channel) PCOM, NCOM : Digital I/O Positive and Negative Common Connector : Phoenix 16 X 2 (MCD 1,5/16-GIF-3,81) |
| Software | |
| User Agent Software | EzSoftware RM |
| Operating System | Windows XP (32bit, 64bit), Windows 2000 |
| General specification | |
| Dimension [HxDxD] | 100 × 90 × 40 mm |
| Weight | 245 g |
| Operation temperature | 0°C to 60°C |

Contact to: **AJINEXTEK CO., LTD.**

9-3, Horim-dong, Dalseo-gu, Daegu-city, Korea
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URL: www.ajinextek.com
E-mail: marketing@ajinextek.com

Digital Input Function Module

RTEX-DI32

► Features

- Slave digital input function extension module for RTEX
- Used by connecting to PCI-R1604 - RTEX communication master board
- Max 32 slave modules can be connected (node ID setting is required)
- 32 channels digital input control (Above Min 2 mA / channel, 24V level)



► Specification

| Item | Description |
|---|--|
| RTEX-DI32 | |
| Module function | RTEX based slave 32ch digital input function module |
| NODE ID setting | Decimal number rotary switch × 2 (0 to 31) |
| Mounting Method | Standard 35 mm DIN rail mounting |
| Power supply / current consumption | 24 VDC / Max. 500 mA (TB1 Connection to Outside Module) |
| LED display | Power (Yellow), Live (Green), Error (Red), Com (Yellow) IN1 to IN32 (Yellow) |
| Digital input | Input 32 channels, 24 VDC Level IN1 to IN32 : Photo-coupler isolation (More over MIN. 2 mA/ch) PCOM, NCOM : Digital I/O Positive and Negative Common Connector : Phoenix 16 X 2 (MCD 1,5/16-GIF-3,81) |
| Software | |
| User Agent Software | EzSoftware RM |
| Operating System | Windows XP (32bit, 64bit), Windows 2000 |
| General specification | |
| Dimension (HxDxD)mm | 100 × 90 × 40 mm |
| Weight | 245 g |
| Operation temperature | 0°C to 60°C |

Contact to: **AJINEXTEK CO., LTD.**

9-3, Horim-dong, Dalseo-gu, Daegu-city, Korea
TEL: +82-593-3700 FAX: +82-593-3703

URL: www.ajinextek.com
E-mail: marketing@ajinextek.com

Digital Output Function Module

RTEX-DO32

► Features

- Slave digital output function extension module for RTEX
- Used by connecting to PCI-R1604 - RTEX communication master board
- Max 32 slave modules can be connected (node ID setting is required)
- 32 channels digital output control (below max 50 mA / channel, 24 V level)
- Caution must be taken in system configuration to limit the maximum current to 1600 mA (50 mA / channel × 32 channels) when all 32 channels are used



► Specification

| Item | Description |
|---|---|
| RTEX-DO32 | |
| Module function | RTEX based slave 32ch digital output function module |
| NODE ID setting | Decimal number rotary switch × 2 (0 to 31) |
| Mounting Method | Standard 35 mm DIN rail mounting |
| Power supply / current consumption | 24 VDC / Max. 500 mA (TB1 Connection to Outside Module) |
| LED display | Power (Yellow), Live (Green), Error (Red), Com (Yellow) OUT1 to OUT32 (Red) |
| Digital input | Output 32 channels, 24 VDC Level OUT1 to OUT32 : Photo-coupler isolation (Below MAX. 50 mA/channel) PCOM, NCOM : Digital I/O Positive and Negative Common Connector : Phoenix 16 X 2 (MCD 1,5/16-GIF-3,81) |
| Software | |
| User Agent Software | EzSoftware RM |
| Operating System | Windows XP (32bit, 64bit), Windows 2000 |
| General specification | |
| Dimension (HxDxD)mm | 100 × 90 × 40 mm |
| Weight | 245 g |
| Operation temperature | 0°C to 60°C |

Contact to: **AJINEXTEK CO., LTD.**

9-3, Horim-dong, Dalseo-gu, Daegu-city, Korea
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E-mail: marketing@ajinextek.com

Analog Input Function Module

RTEX-AI0H

► Features

- Slave Analog input function extension module for RTEX
- Used by connecting to PCI-R1604 - RTEX communication master board
- Max 32 slave modules can be connected (node ID setting is required)
- 8 channels analog input control



► Specification

| Item | Description |
|---|---|
| RTEX-AI0H | |
| Module function | RTEX based slave 8ch analog input function module |
| NODE ID setting | Decimal number rotary switch × 2 (0 to 31) |
| Mounting Method | Standard 35 mm DIN rail mounting |
| Power supply / current consumption | 24 VDC / Max. 500 mA (TB1 Connection to Outside Module) |
| LED display | Power (Yellow), Live (Green), Error (Red), Com (Yellow) |
| Number of input channels | 8 channels |
| Resolution | 16 bit |
| Analog input | Input 8 channel Voltage mode: -10V to +10V, Electric current mode : 4 to 20 mA (control the switch) Resolution: 16 Bit Sampling speed: 100 KHz Connector: Phoenix 10 X 2 (MCD 1,5/20-G1F-3,81) |
| Software | |
| User Agent Software | EzSoftware RM |
| Operating System | Windows XP (32bit, 64bit), Windows 2000 |
| General specification | |
| Dimension [mm] | 100 × 90 × 40 mm |
| Weight | 244 g |
| Operation temperature | 0°C to 60°C |

Contact to: **AJINEXTEK CO., LTD.**

9-3, Horim-dong, Dalseo-gu, Daegu-city, Korea
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URL: www.ajinextek.com
E-mail: marketing@ajinextek.com

Analog Output Function Module

RTEX-AO4H

► Features

- Slave Analog output function extension module for RTEX
- Used by connecting to PCI-R1604 - RTEX communication master board
- Max 32 slave modules can be connected (node ID setting is required)
- 4 channels analog output control



► Specification

| Item | Description |
|---|---|
| RTEX-AO4H | |
| Module function | RTEX based slave 4ch analog output function module |
| NODE ID setting | Decimal number rotary switch × 2 (0 to 31) |
| Mounting Method | Standard 35 mm DIN rail mounting |
| Power supply / current consumption | 24 VDC / Max. 500 mA (TB1 Connection to Outside Module) |
| LED display | Power (Yellow), Live (Green), Error (Red), Com (Yellow) |
| Number of output channels | 4 channels |
| Resolution | 16 bit |
| Analog output | Output 4 channel Voltage mode : -10V to +10V Resolution : 16 Bit Sampling speed : 100KHz Connector : Phoenix 10 X 1 (MCD 1,5/10-G1F-3,81) |
| Software | |
| User Agent Software | EzSoftware RM |
| Operating System | Windows XP (32bit, 64bit), Windows 2000 |
| General specification | |
| Dimension [mm] | 100 × 90 × 40 mm |
| Weight | 246 g |
| Operation temperature | 0°C to 60°C |

Contact to: **AJINEXTEK CO., LTD.**

9-3, Horim-dong, Dalseo-gu, Daegu-city, Korea
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RTEX/AnyWire Gateway

AG42-R1

► Features

Connect AnyWire Reduced Wiring I/O System to RTEX

- AnyWire reduced wiring system has Dual-Bus function which transfers DI and AI on the same transfer line but independent of each other.
- AnyWire reduced wiring system is cable free specification and uses general purpose wires
- Layout free, e.g. T branch, multi drop and tree wiring
- Simple one-touch connection, branch and extension by using insulation displacement connector
- Max. No. of I/O points is 2560 and max. No. of units connected to I/O terminal is 128
- Max. connecting route length 1000 m



► Specification

| Item | | Description | |
|--|---|--|--|
| RTEX | No. of exclusive blocks | 3 to 11 (depending on No. of points used) | |
| | Effective data transmission rate | 183 kbps/256 points (@ transfer clock: 62.5 kHz) | |
| | Transmission scheme | Full quadruplex total frame cyclic system | |
| | Synchronization system | Frame/bit synchronization system | |
| | Data length/frame | 1-bit to 1024-bit | |
| | Connection topology | Bus (multi drop, T branch, tree) | |
| | Transmission protocol | Dedicated protocol (AnyWireBus) | |
| | Error control | Double check | |
| | AnyWire | Max. No. of connecting I/O points ¹ | Bit-Bus 512 points (IN 256 points + OUT 256 points) Word-Bus 2048 points (IN 1024 points + OUT 1024 points) or 128 words (IN 64 words + OUT 64 words) |
| | | Max. No. of connected units | 128 (Total of Bit-Bus terminals and Word-Bus terminals) |
| Max. cycle time ² | | [0.85 ms/128 points], [1.4 ms/256 points], [2.4 ms/512 points], [4.4 ms/1024 points] (transfer clock @62.5 kHz) | |
| RAS function | | Transmission line breakage position detection and transmission line short-circuit detection | |
| Transmission cable ³ | | Cable free • General purpose (VCTF) 2-core /0.75 to 1.25 mm ² : transmission only (D, □) • General purpose (VCTF) 4-core /0.75 to 1.25 mm ² : including power supply (D, □, 24 V, 0 V) • Other general purpose cables /0.9 to 1.25 mm ² : e.g. parallel • Special flat cable /0.75 to 1.25 mm ² : including power supply (D, □, 24 V, 0 V) | |
| Max. transmission distance ⁴ | [1 km/7.8 kHz] [500 m/15.6 kHz] [200 m/31.3 kHz] [100 m/62.5 kHz] | | |

□1: The number depends on the master. □2: Typical values at the top speed. □3: Diameter varies with transmission distance.
□4: Distance is the cable total length.

Contact to: **Anywire corporation Headquarters**

8-1 Shimoinden, Inouchi, Nagaokakyo-city, Kyoto 617-0813, Japan
 TEL: +81-75-956-1611 (Japanese only) FAX: +81-75-356-1613
 URL: <http://www.anywire.jp/>
 E-mail: info@anywire.jp
 □ Only Japanese is used for inquiry over the phone. When making an inquiry in English, send it to: info@anywire.jp.

2-phase Microstep Drive

D4610

► Features

Leading Edge High Speed Motion Network RTX At Low Cost

- **High performance CPU enhances drive capability**
 - Step-out detection
 - Triangle drive prevention
 - Motor over current protection
 - Vibration suppression
 - Brake control
 - Closed loop control by encoder signal
- **RTEX in motion network**
- **Network can connect up to 12 axes (depending on master specification)**
- **Simultaneous multiaxial control within 1 ms communication period**



► Specification

| Item | | Description |
|------------------------------------|---|---|
| Power supply | | Main power supply: 24 VDC □10 □ (4.0 A max.) Sensor power supply: 24 VDC □10 □ (0.1 A) |
| Applicable motor | | 2.55 A/phase or less 2-phase HB type stepping motor |
| Driving capacity | | 2.55 A/phase |
| Micro step resolution | | Basic step divided by 200 (for 40,000 p/r basic step 1.8 deg motor) |
| Communication specification | | Realtime Express (RTEX) |
| Input signal | | Sensor input 4 (H□ ME, EX, CWLS, CCWLS), encoder input and stop input |
| Output signal | | Brake output and alarm output |
| Protective function | | □ver current, power supply voltage monitoring and step-out detection |
| Environment | Ambient temperature | 0 to 50°C (no freezing), Storage: □20 to 60°C (no freezing) |
| | Ambient humidity | 90□ RH max. (no dewing). Storage: 90□ RH max. (no dewing) |
| | Atmosphere | Indoor (no direct sunshine). No corrosive gas, flammable gas, oil mist, dust, etc. |
| | Altitude | Max. 1,000 m above sea level |
| | Operating vibration Shock Environment | Max. 2□ (10 to 250 Hz, in X, □, □ direction 1 hour), max. 10□ (1) |
| Outline dimensions □mm□ | | 160 × 92 × 29 |
| Mass | | Approx. 300 g |

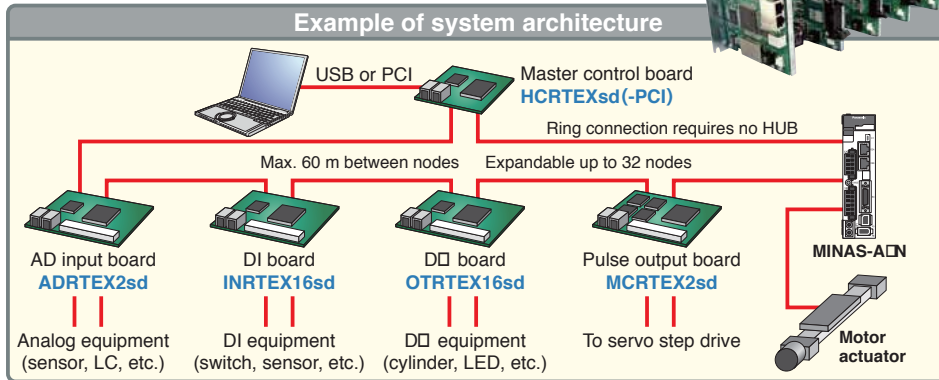
Contact to: **Asahi Engineering Co., Ltd. Kodaira Works**

3-3-22, Gakuen-Higashicho, Kodaira-shi, Tokyo 187-0043, Japan
 TEL: +81-42-342-4422 FAX: +81-42-342-4423
 URL: <http://www.asahi-engineering.co.jp/>
 E-mail: ae-sales@asahi-engineering.co.jp

Slave Family

► Features

- Common communication system (RTX) optimizes control method and connections, facilitating building of simple system.



► Specification

MCRTEX2sd



2-axis pulse output board

- One board can control 2-axis motor (occupies 2 blocks)
- 1 pulse/2 pulse/2-phase pulse output is possible. Pulse train input type drive can be connected, regardless of stepping or servo. (Differential output)
- Up to 8 Mpps pulse can be output, enabling high speed, high resolution control.
- Feedback pulse counting is possible. UP/DWN, A/B phase (multiplied by 1/2/4) signals can be used for counting.

INRTEX16sd/OTRTEX16sd



DI board and DO board

- INRTEX16sd**
- Input configuration : Photocoupler isolated
 - No. of inputs : 16
 - Rated voltage : +24 VDC
- OTRTEX16sd**
- Output configuration : Photocoupler isolated open collector (sink)
 - No. of outputs : 16
 - Output rated voltage : +24 VDC
 - Output rated current : 100 mA Max.

ADRTEX2sd



2-ch analog input board

- No. of input channels : 2
- Input configuration : Differential/single end
- Input range : 0-10 V, 0-5 V, 0-0 V
- Resolution : 12 bits
- Conversion mode : Free run/external trigger

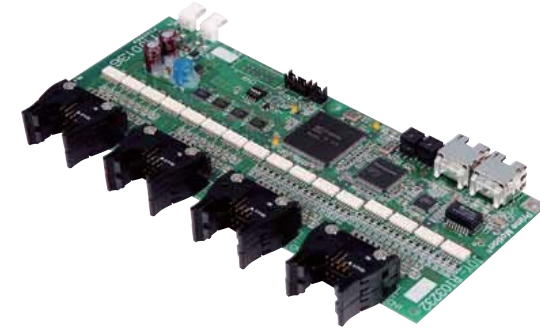
Contact to: **HI-P Tech Corporation Sales Dept.**

1-27-23, Higashitokorozawa, Tokorozawa-shi, Saitama 359-0021, Japan
TEL:+81-4-2951-5381 FAX:+81-4-2951-5383 URL: <http://www.hptec.co.jp/>

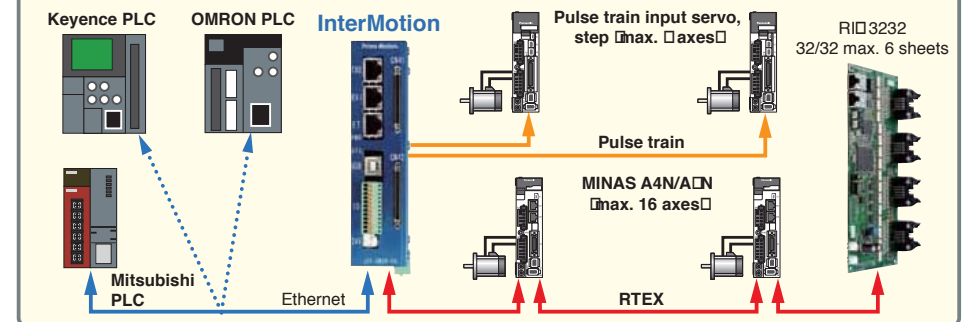
General Purpose RTX Input/Output Board InterMotion Series JOY-RTX

► Features

- Single board with 32 IN points and 32 OUT points
- 10 PIN connector for 8-point IN and 8-point OUT. Can be directly connected to terminal block PRS-DG10-08 (TOYOGIKEN Co., Ltd).
- 24 V DC supply



Connection examples



► Specification

| Item | Description |
|--------------------------------|--|
| Input | 32 points (8 points × 4 ports), 24 VDC, 4.7 kΩ |
| Output | 32 points (8 points × 4 ports), 24 VDC, 100 mA |
| Max. No. of connectable boards | 6 (IN 192 points, OUT 192 points) |

Contact to: **Prime Motion Inc.** (InterMotion - Special site: <http://www.intermotion.jp>)

1134-12, Akaho, Komagane-shi, Nagano, 399-4117, Japan
TEL:+81-265-82-2990 FAX:+81-265-82-2292 URL: <http://www.primemotion.com/>

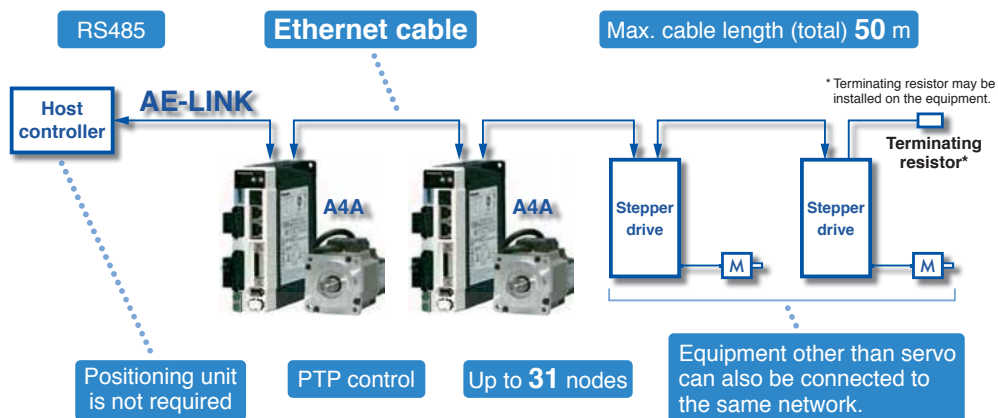
AE-LINK RS485 open network

PTP control by servo built-in positioning function

- Positioning unit is not required
- Universal RS485 communication without using specific IC
- Low cost with Ethernet cable



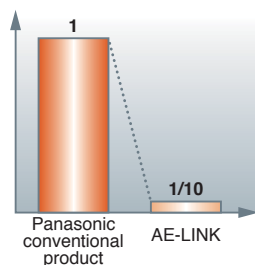
[Typical system configuration]



● Application specific IC is not required.



● Cable cost 1/10



● Network specification

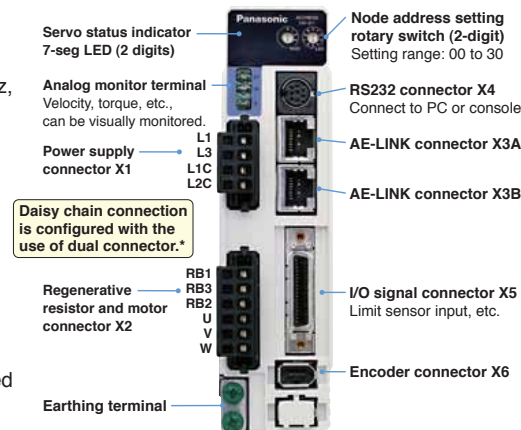
| Item | Description |
|----------------------|--|
| Communication rate | 38.4/307.2 kbps |
| Physical layer | RS485 half duplex |
| Cable | Shielded twisted pair cable |
| Communication period | Approx. 1 ms/axis (@307.2 kbps) |
| Topology | Bus (terminating resistor is required) |
| Operating command | Target position |

Features of drive

- **Simple setup**
Thanks to the proprietary real time auto tuning, gain can be set easily by simple operation.
- **Quick response**
High rigid mechanics can be driven at higher rate, i.e. speed response frequency of 1000 Hz, increasing production efficiency.
- **Low vibration**
Vibration suppression control enables a low rigidity mechanics driven at low vibration.
- **Compact**
Industry's lowest level compact size (1/2 of Panasonic precedent product), contributing space saving of the site.
- **High precision**
The standard model can response to full closed control, achieving high precision positioning.
- **Expandable**
For feedback scale, common A/B/Z phase pulse signal type can be used.

[External view]

Dimensions (mm): W40 × H150 × D132 (A frame)



* Dual connector: J.S.T. Mfg. Co., Ltd. 04JFAT-SAXGSA-C (4-pole)
05JFAT-SAXGSA-C (5-pole)

Drive list

| | | Motor rated output | | | | | | | | | | | |
|--------------------|-------------------------------|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------|------|--------|
| | | 50 W | 100 W | 200 W | 400 W | 750 W | 1 kW | 1.5 kW | 2 kW | 3 kW | 4 kW | 5 kW | 7.5 kW |
| Drive power supply | Single phase 100 to 115 VAC | A | A | B | C | | | | | | | | |
| | | MADD T1105A | MADD T1107A | MBDD T2110A | MCDD T3120A | | | | | | | | |
| | Single phase 200 to 240 VAC | A | A | B | | | | | | | | | |
| | | MADD T1205A | MADD T1207A | MBDD T2210A | | | | | | | | | |
| | Single/3-phase 200 to 240 VAC | | | | C | D | | | | | | | |
| | | | | | MCDD T3520A | MDDD T5540A | | | | | | | |
| | 3-phase 200 to 230 VAC | | | | | | E | F | F | G | | | |
| | | | | | | | MEDD T7364A | MFDD TA390A | MFDD TB3A2A | MGDD TC3B4A | | | |

Upper line: Frame size symbol

Lower line: Typical drive part number

Note: Some motors do not match part numbers in the table.

Applicable standards

- UL, cUL
- TUV
- CE
- RoHS



PLC Direct Access AE-LINK Motion Controller

PI-1200 (RS-232C) / PI-1300 (Ethernet)

► Features

Building a motion network at low cost under PLC

● PLC direct access

The controller runs the motion program installed in PI while accessing PLC data register.

- Preparation of ladder program for communication is not required on PLC.
- No CPU burden on PLC.

● Simple motion control through data register

Motors can be controlled by operating PLC data register.

- Multiaxial motors can be controlled/monitored by simply operating numeric values on the data register.
- PLC operator having no knowledge on communication of motion (AE-LINK) can control the motor.

● Stepping motor can be mixed

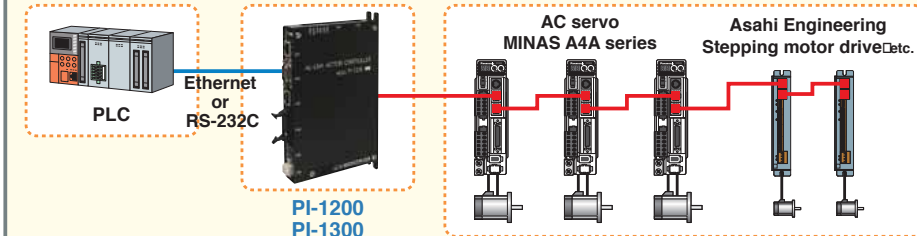
- The motion network can contain servo motor and stepping motor.



PI-1200

PI-1300

Typical system configuration



- (1) Accessing PLC data register from PI controller over Ethernet or RS-232C
- (2) Based on the contents of data register. The PI sends command to each axis (motor operation).
- (3) The PI writes status information of each axis to data register.

► Specification

| Item | Description |
|---|--|
| Power supply | 24 VDC □ 10 □ 300 mA MAX |
| Operating temperature and humidity | 0 to 50°C, 90% RH max. (no dewing) |
| Outline dimensions (mm) | W24 × D110 × H150 (PI-1200), W25 × D109 × H184 (PI-1300) |
| Communication with PLC | PI-1200: RS-232C 115.2 kbps/38.4 kbps Conforms to various corporate protocols. PI-1300: Ethernet 10/100 BASE-T Conforms to various corporate protocols. |
| Program loader | RS-232C 38.4 kbps |
| Control signal I/O | Initialization input, system alarm output and node alarm output |
| Motion network | AE-LINK 307.2 kbps/38.4 kbps (Selection on DIP switch) |
| No. of connection nodes | Max. 16 |
| Motion control | PTP (Point to Point) |

Contact to **Asahi Engineering Co. Ltd. Kodaira Works**

3-3-22, Gakuen-Higashicho, Kodaira-shi, Tokyo 187-0043, Japan
TEL: +81-42-342-4422 FAX: +81-42-342-4423

URL: <http://www.asahi-engineering.co.jp/>
E-mail: ae-sales@asahi-engineering.co.jp

AE-LINK Compatible Stepping Motor Drive Series

► Features

Building servo and step mixed motion network at a low cost

● Drive has built-in software NC, requiring no host NC controller

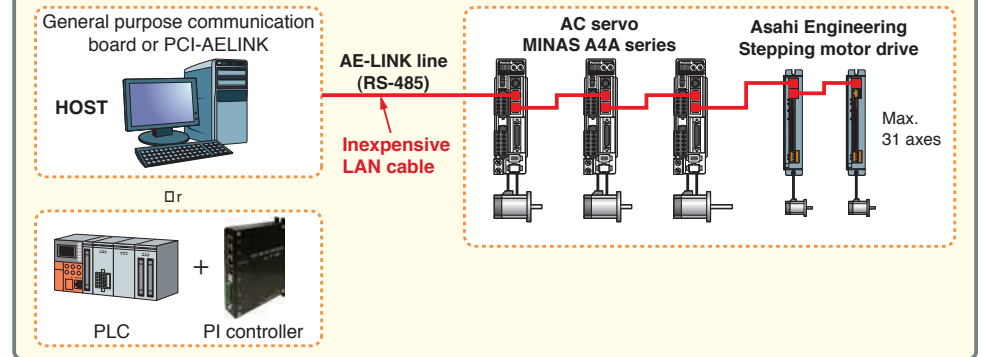
● High performance CPU enhances drive functionalities

- Built-in origin return function
- Triangle driving prevention function
- Step-out detection function
- Motor over current protection function
- Vibration suppression function

● Up to 31 axes can be connected to the same network (Depending on the master specification)



Typical system configuration



► Specification

| Part No. | Input power supply | Applicable motor | Driving capacity | Step-out detection | Drive outline |
|----------|--------------------|------------------|------------------|--------------------|---|
| D3910S | 24 VDC | 2-phase | 1.5 A/phase | | Board type micro step drive |
| D3080S1 | 24 to 48 VDC | 2-phase | 2.55 A/phase | ○ | High precision micro step drive |
| D3080S2 | 24 to 48 VDC | 2-phase | 5.1 A/phase | ○ | High precision high power micro step drive |
| D4390S | 100 VAC | 2-phase | 2.55 A/phase | ○ | AC supply input high precision micro step drive |
| D4370S | 24 VDC | 5-phase | 1.5 A/phase | | Board type half step drive |
| D4130S | 24 VDC | 5-phase | 1.5 A/phase | | High precision micro step drive |

Contact to **Asahi Engineering Co. Ltd. Kodaira Works**

3-3-22, Gakuen-Higashicho, Kodaira-shi, Tokyo 187-0043, Japan
TEL: +81-42-342-4422 FAX: +81-42-342-4423

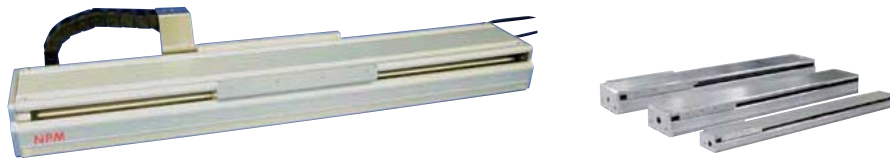
URL: <http://www.asahi-engineering.co.jp/>
E-mail: ae-sales@asahi-engineering.co.jp

High Performance Linear Stage

SLP Series

► Features

- Varied selection to meet diverse needs (SLP15/SLP25/ SLP35)
- High thrust, high speed, quick response, high precision, long stroke
- Coreless design for cogging free (constant velocity)
- Contactless power driving design for low noise, long life and maintenance free
- Double slider design helps a great deal in performing complicated operation and saving space



► Specification

| Item | Unit | Description | | | |
|-----------------------------------|---------------------|------------------------------------|------------------------------------|------------------------------------|---------------------------|
| Part No. | | SLP15 | SLP25 | SLP35 | |
| Resolution | mm | 0.001 (HEIDENHAIN GmbH LIDA279) | 0.001 (HEIDENHAIN GmbH LIDA279) | 0.001 (HEIDENHAIN GmbH LIDA279) | |
| Rated thrust | N | 17 | 80 | 185 | |
| Acceleration thrust | N | 90 | 340 | 970 | |
| Rated current | A | 0.51 | 1.2 | 2.7 | |
| Accelerating current | A | 2.7 | 5.1 | 14.4 | |
| Thrust constant | N/A | 33 | 66 | 68 | |
| Back electromotive force constant | V/m/s | 11 | 22 | 22 | |
| Resistance | Ω | 56 | 22 | 7.2 | |
| Inductance | mH | 24 | 31 | 12 | |
| Magnetic pitch (N-N) | mm | 60 | 90 | 120 | |
| Max. acceleration | G | 3.5 | 3.5 | 3.5 | |
| Max. velocity | m/s | 3.0 | 3.0 | 3.0 | |
| Bi-Directional repeatability | mm | □.0005 | □.0005 | □.0005 | |
| Max. load capacity | Hori□ntal placement | kg | 5 | 30 | 60 |
| | Wall mounted | kg | 3 | 15 | 30 |
| Stroke | Single slider | mm | 100 to 1300 (In 100 step) | 200 to 1200 (In 100 step) | 300 to 1200 (In 100 step) |
| | Double slider | mm | 100 to 1200 (In 100 step) | 200 to 1000 (In 100 step) | 300 to 900 (In 100 step) |
| Operating ambient temperature | °C | 0 to +40 | 0 to +40 | 0 to +40 | |
| Operating ambient humidity | □ | 20~80 (No dewing) | 20~80 (No dewing) | 20~80 (No dewing) | |
| Storage temperature | °C | -20 to +60 | -20 to +60 | -20 to +60 | |
| MINAS A5L | 200 V | MADHT1505L** | MADHT1507L** | MCDHT3520L** | |
| | 100 V | MADHT1105L** | MADHT1107L** | MCDHT3120L** | |

Contact to □ **Nippon Pulse Motor Co. Ltd.**

16-13, 2-chome, Hongo, Bunkyo-ku, Tokyo 113-0033, Japan
TEL: +81-3-3813-8841 FAX: +81-3-3813-8550

URL: <http://www.pulsemotor.com/>

Linear Shaft Motor

S series/L series

► Features

- High thrust (3100N)
- High-speed driving (6.3 m/s) Low-speed driving (8 μm/s)
- Noncontact power drive for low noise, long life and maintenance free
(Mechanical contact is only on linear guide: use of air slider eliminates all contacts.)
- Coreless design for cogging free (constant velocity)
- Simple structure for easy mounting and unitizing
- Highly resistant to environment (operative in water and vacuum)
- Easily replaces ball screw system
- More compact and lightweight than other competitive linear motors



► Specification

| Item | Unit | S080 series | | S120 series | | S160 series | | S200 series | | S250 series | | S320 series | | | |
|-----------------------------------|-------|--------------|-------|-------------|-------|-------------|-------|--------------|-------|-------------|-------|-------------|-------|--------------|--|
| | | S080D | S080T | S080C | S120D | S120T | S120C | S160D | S160T | S160C | S200D | S200T | S200C | | |
| Rated thrust | N | 1.8 | 2.7 | 3.5 | 4.5 | 6.6 | 8.9 | 10 | 15 | 20 | 18 | 28 | 38 | | |
| Rated current | A | 0.8 | 0.8 | 0.8 | 0.4 | 0.4 | 0.4 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 1.3 | | |
| Acceleration thrust | N | 7.2 | 10.7 | 14 | 18 | 27 | 36 | 40 | 60 | 81 | 72 | 112 | 152 | | |
| Accelerating current | A | 3.4 | 3.4 | 3.4 | 1.6 | 1.6 | 1.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 5.1 | | |
| Thrust constant Kf | N/A | 2.1 | 3.2 | 4.2 | 11 | 17 | 22 | 16 | 24 | 33 | 31 | 47 | 64 | | |
| Back electromotive force constant | V/m/s | 0.7 | 1.1 | 1.4 | 3.7 | 5.5 | 7.4 | 5.4 | 8.1 | 11 | 10 | 16 | 21 | | |
| Electric resistance (line) | Ω | 4.7 | 6.8 | 9.0 | 37.0 | 54.0 | 73.0 | 21.0 | 33.0 | 43.0 | 28.7 | 43.0 | 56.0 | | |
| Inductance (line) | mH | 0.7 | 1.0 | 1.3 | 12.0 | 18.0 | 24.0 | 8.2 | 12.0 | 16.0 | 19.3 | 29.0 | 39.0 | | |
| Thermal resistance Kq | °C/W | 33.2 | 22.9 | 17.3 | 18.6 | 12.7 | 9.4 | 13.6 | 8.7 | 6.7 | 11.0 | 7.3 | 5.6 | | |
| Forcer Length | mm | 40 | 55 | 70 | 64 | 88 | 112 | 80 | 110 | 140 | 94 | 130 | 166 | | |
| Forcer Width | mm | 20 | 20 | 20 | 25 | 25 | 25 | 30 | 30 | 30 | 40 | 40 | 40 | | |
| Forcer Weight | kgf | 0.05 | 0.06 | 0.08 | 0.09 | 0.12 | 0.16 | 0.15 | 0.20 | 0.30 | 0.30 | 0.50 | 0.70 | | |
| □ap | mm | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.75 | 0.75 | 0.75 | 0.75 | | |
| Pipe outside diameter | mm | 8 | 8 | 8 | 12 | 12 | 16 | 16 | 16 | 20 | 20 | 20 | 25 | | |
| Magnetic pitch (N-N) | mm | 30 | 30 | 30 | 48 | 48 | 48 | 60 | 60 | 60 | 72 | 72 | 72 | | |
| Max. manufacturable stroke | mm | 230 | 215 | 200 | 1541 | 1517 | 1493 | 1755 | 1745 | 1715 | 2471 | 2435 | 2399 | | |
| Applicable drive | 200V | MADHT1505L** | | | | | | MADHT1507L** | | | | | | MBDHT2510L** | |
| | 100V | MADHT1105L** | | | | | | MADHT1107L** | | | | | | MBDHT2110L** | |

| Item | Unit | S350 series | | S427 series | | S435 series | | S500 series | | S600 series | | L250 series | | L320 series | |
|-----------------------------------|-------|--------------|-------|--------------|-------|--------------|-------|--------------|-------|--------------|---------|--------------|---------|-------------|-------|
| | | S350D | S350T | S350C | S427D | S427T | S435D | S435T | S435C | S500D | S500T | S500C | S605T | S605D | L250D |
| Rated thrust | N | 104 | 148 | 190 | 100 | 150 | 200 | 116 | 175 | 233 | 289 | 440 | 585 | 610 | 780 |
| Rated current | A | 1.5 | 1.5 | 2.7 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.8 | 5.8 | 7.7 | 8.6 | 8.4 | 1.3 |
| Acceleration thrust | N | 416 | 592 | 760 | 400 | 600 | 800 | 464 | 700 | 932 | 1156 | 1760 | 2340 | 2400 | 3100 |
| Accelerating current | A | 6.0 | 6.0 | 10.8 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 15.2 | 23.2 | 30.8 | 34.0 | 34.0 | 5.2 |
| Thrust constant Kf | N/A | 69 | 99 | 70 | 33 | 50 | 67 | 39 | 58 | 78 | 76 | 76 | 71 | 93 | 27 |
| Back electromotive force constant | V/m/s | 23 | 33 | 23 | 11 | 17 | 22 | 13 | 19 | 26 | 25 | 25 | 24 | 31 | 8.8 |
| Electric resistance (line) | Ω | 13.8 | 20.2 | 6.9 | 2.7 | 3.9 | 5.2 | 2.7 | 3.9 | 5.2 | 4.4 | 3.3 | 2.2 | 1.7 | 2.2 |
| Inductance (line) | mH | 21.8 | 33.0 | 10.9 | 7 | 11 | 15 | 7 | 11 | 15 | 27 | 20 | 13 | 10 | 13 |
| Thermal resistance Kq | °C/W | 3.5 | 2.4 | 2.2 | 4.6 | 3.2 | 2.4 | 4.6 | 3.2 | 2.4 | 1.7 | 1.0 | 0.8 | 0.90 | 0.70 |
| Forcer Length | mm | 160 | 220 | 280 | 220 | 310 | 400 | 220 | 310 | 400 | 240 | 330 | 420 | 430 | 550 |
| Forcer Width | mm | 60 | 60 | 60 | 80 | 80 | 80 | 80 | 80 | 80 | 105x100 | 105x100 | 125x120 | 125x120 | 50 |
| Forcer Weight | kgf | 1.3 | 1.9 | 2.4 | 3.0 | 4.2 | 5.4 | 3.0 | 4.2 | 5.4 | 10 | 13 | 15 | 21 | 27 |
| □ap | mm | 1.00 | 1.00 | 1.00 | 1.65 | 1.65 | 1.65 | 1.25 | 1.25 | 1.25 | 1.75 | 1.75 | 1.75 | 1.75 | 2.0 |
| Pipe outside diameter | mm | 35 | 35 | 35 | 42.7 | 42.7 | 42.7 | 43.5 | 43.5 | 43.5 | 50 | 50 | 50 | 60.5 | 60.5 |
| Magnetic pitch (N-N) | mm | 120 | 120 | 120 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 240 | 240 | 90 |
| Max. manufacturable stroke | mm | 2120 | 2060 | 2000 | 3180 | 3090 | 3000 | 2180 | 2090 | 2000 | 3380 | 3290 | 3200 | 3000 | 3000 |
| Applicable drive | 200V | MADHT1507L** | | MCDHT3520L** | | MCDHT3520L** | | MDDHT5540L** | | MDDHT5540L** | | MADHT1507L** | | | |
| | 100V | MADHT1107L** | | MCDHT3120L** | | MCDHT3120L** | | □ | | □ | | MADHT1107L** | | | |

Contact to □ **Nippon Pulse Motor Co. Ltd.**

16-13, 2-chome, Hongo, Bunkyo-ku, Tokyo 113-0033, Japan
TEL: +81-3-3813-8841 FAX: +81-3-3813-8550

URL: <http://www.pulsemotor.com/>

| | Partner | Series | Resolution* [μm] | Max. rate* [m/s] |
|-------------|------------------------------|---------------------|------------------|-----------------------|
| Absolute | FAGOR AUTOMATION | SAP / SVAP / GAP | 0.05 | 2.5 |
| | | LAP | 0.1 | 2 |
| | Magnescale Co., Ltd. | SR77 | 0.01 to 1 | 3.3 |
| | | SR87 | 0.01 to 1 | 3.3 |
| | Mitutoyo Corporation | AT573A | 0.05 | 2.5 |
| | | ST778A(L) | 0.1 | 5 |
| | Renishaw plc | RESOLUTE | 0.001 | 0.4 |
| 0.05 | | | 20 | |
| 0.1 | | | 40 | |
| Incremental | GSI Group Japan Corporation. | M II 5000 | 0.1 (Variable) | 5 (Resolution 0.1 μm) |
| | Magnescale Co., Ltd. | SL700 + PL101RP/RHP | 0.1 | 10 |
| | | SL710 + PL101RP/RHP | 0.1 | 10 |
| | | SR75 | 0.01 to 1 | 3.3 |
| | | SR85 | 0.01 to 1 | 3.3 |

* Figures under Resolution and Max. rate indicate values specified for A5 family drives. These values will be different from those in the feedback scale due to drive max. pulse frequency limit.

Drive and corresponding feedback scale

| | | Linear motor control | | | | Rotary motor full closed control | | | |
|-------------------------------|-----|----------------------|---------------|------------|------------|----------------------------------|--------------|--------|--------|
| | | A5L | A5NL (Note 5) | A4NL | A4AL | A5 | A5N (Note 5) | A4N | A4A |
| Max. pulse frequency (Note 1) | ABS | 400Mpps | 400Mpps | 40Mpps | 40Mpps | 400Mpps | 400Mpps | 40Mpps | 40Mpps |
| Serial (Note 2) | ABS | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | INC | ○ | ○ | ○ (Note 3) | ○ (Note 3) | ○ | ○ | ○ | ○ |
| A/B/□ phase (Note 4) | INC | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

ABS: Absolute INC: Incremental
 (Note 1) Resolution and max. velocity of feedback scale are limited by max. pulse frequency.
 (Note 2) For A4N, A4NL and A4AL, some feedback scales of serial type cannot be connected. For details, consult us.
 (Note 3) Not compatible with A/B/Z phase pulse output from drive.
 (Note 4) Max. pulse frequency is 4 Mpps (A/B phase multiplied by 4). When the frequency is more than 4 Mpps, consult us.
 (Note 5) Not compatible with Z phase pulse output from drive.

Linear Encoder

SAP/□AP series/ LAP series/ EXA/EX□/EXT series

► Features

- Extremely robust optoelectronic linear encoders.
- Connectivity to MINAS series drives.
- Great accuracy at high speeds.
- Longest absolute measuring length available up to 30 meters.
- Enclosed and exposed families available.
- Advanced diagnosis tool, via PC connection.



► Specification

| Item | Description | | | | | | | |
|--|---|------------|------------|--|--|---|------|-------|
| Detection system | □pto-electronic absolute linear encoder (Glass) | | | □pto-electronic absolute linear encoder (steel tape) | | □pto-electronic incremental linear encoder (steel tape exposed) | | |
| Compatible drive | A4/A5/A5L | | | | | A5/A5L | | |
| Part No. | SAP | SVAP | □AP | LAP | | EX-A | EX-□ | EX-T |
| Resolution | 0.05 μm | | | 0.10 μm | | 0.1 μm to 5 μm | | |
| Max. effective length | 1240 mm | 2040 mm | 3040 mm | 30 m | | 16 m | 6 m | 30 m |
| Accuracy (μm/m) 20°C | ±3 μm / ±5 μm | | | ±5 μm | | ±10 μm | | ±5 μm |
| Max. response speed | 2.5 m/s | | | 2 m/s | | 4 to 8 m/s | | |
| Vibration resistance/ Shock resistance | 10 G/ 30 G | 20 G/ 30 G | 20 G/ 40 G | 10 G/ 10 G | | 20 G/ 100 G | | |
| Linear coefficient of expansion | (8±0.5) × 10 ⁻⁶ /°C | | | (11□0.5) × 10 ⁻⁶ /°C | | (11□0.5) × 10 ⁻⁶ /°C | | |
| Operating temperature/ Storage temperature range | 0 to 50°C/ -20 to 70°C | | | | | | | |
| Operating/storage humidity | 20 to 80% RH | | | | | | | |
| Power supply | 5 VDC □ 10□ | | | | | | | |
| Max. current consumption | 250 mA | | | | | 150 mA | | |
| Max. cable length | 30 m | | | | | 100 m | | |

Contact to **Fagor Automation S. Coop.**

Bo San Andrés No19 E-20500 Arrasate/Mondragón, Spain
 TEL: +34-943-719200 FAX: +34-943-791712

URL: <http://www.fagorautomation.com/>

Feedback Scale

MII5000si

► Features

Resolution can be multiplied by up to 16384

- Minimal size
- Tape scale compatible (for linear, long axis)
- Glass linear scale compatible (high precision, for X/Z axis)
- Glass rotary scale compatible (for θ axis)



► Specification

| Item | Description |
|-------------------------|--|
| Sensor size | H: 11.03 mm L: 38.50 mm W: 13.50 mm |
| Power supply | 5 VDC @ 172 mA |
| Temperature resistance | During operation: 0 to 70°C During storage: -20 to 85°C |
| Cable | Double shielding 20 × 10 ⁸ cycles @ 20 mm radius |
| Signal period | 20 μ |
| Short-distance accuracy | 30 nm with tape scale 20 nm with glass scale |
| Long-distance accuracy | ±1.5 μ m up to 130 mm |

Contact to **GSI Group Japan Corporation. Encoder group**

KDX Shibadaimon Bldg. 1F, 2-10-12, Shibadaimon, Minato-ku, Tokyo, 105-0012, Japan
TEL: +81-3-6402-9882 FAX: +81-3-6402-9888 URL: <http://www.gsig.co.jp/microe/index.html>

Feedback Magnescale

SR70/SR80/SL700 series

► Features

- High speed response with Serial interfaces for MINAS series.
- Direct connection with servo drive (Total cost reduction)
- Excellent durability to harsh environment (Dirt, oil and Vibration)
- Absolute scales (SR77/SR87) up to 10nm resolution with 200m/min response speed.

Open Type (DIGIRULER)

SL700 + PL101RP/RHP
(A4NL/A5 family)
SL710 + PL101RP/RHP
(A4NL/A5 family)



Slim Type Sealed Scale

SR77 Series
(A4/A4N/A4NL/A5 family)
SR75 Series
(A4NL/A5 family)



Robust Type Sealed Scale

SR87 Series
(A4/A4N/A4NL/A5 family)
SR85 Series
(A4NL/A5 family)



► Specification

| Item | Description | | | | | | | |
|------------------------|---|-----------------------|------------------------|------------------------|--|-------------------|------------------------------|-------------------|
| Type | Open Type (DIGIRULER) | | | | Slim Type Sealed Scale | | Robust Type Sealed Scale | |
| Part No. | SL700 □ PL101RP | SL710 □ PL101RP | SL700 □ PL101RHP | SL710 □ PL101RHP | SR77 | SR75 | SR87 | SR85 |
| Compatible servo drive | A4NL/A5 family | | | | A4/A4N/ A4NL/A5 family | A4NL/A5 family | A4/A4N/ A4NL/A5 family | A4NL/A5 family |
| Effective length | 50 to 100,000 mm | | | | 70 to 2,040 mm | | 140 to 3,040 mm | |
| Accuracy | ±10 μ m (integral number in unit of 1 m when effective length is 3 m or shorter) * When longer than 3 m, consult us. | | | | 3+3L/1,000 μ m-p or 5+5L/1,000 μ m-p * LD Effective length (mm) | | | |
| Resolution | 0.1 μ m | | | | A5 family: 0.01 μ m to 1 μ m A4/A4N/A4NL: 0.05 μ m to 1 μ m | | | |
| Type | Incremental | | | | Absolute | Incremental | Absolute | Incremental |
| Response speed | 10 m/s | | | | 3.3 m/s | | | |
| Output signal | Specific to MINAS series. Serial output | | | | | | | |
| Origin signal | None | 1 point | None | 1 point | - | 1 point | - | 1 point |
| Degree of protection | IP50 equivalent | | IP67 equivalent | | IP54 (without air purge)/IP65 (with air purge) | | | |

* Nanometer resolution level LASERSCALE is also available (Resolution and maximum response speed depends on drive performance)

* High speed, quick response and high reliability are secured through serial communications.

* Conversion cable CK-T185 is required for A5 connection.

Contact to **Magnescale Co., Ltd.**

To identify local distributors, please contact Magnescale Co., Ltd. International Sales Division Isehara Headquarters
45 Suzukawa, Isehara, Kanagawa 259-1146, Japan
TEL: +81-463-92-7971 FAX: +81-463-92-7978
URL: <http://www.mgscale.com/mgs/language/english/>
E-mail: info-mgs-eng@mgscale.com

Linear Scale

ABS AT500 series/ST700 series

► Features

- Encoders of various types, assembly type, separate type, absolute linear support various applications
- Directly connectable to MINAS series servo drive.
- Provide high resolution and high precision. Assembly configuration is best suited to mechanical processing (AT500 series).
- Electromagnetic induction type is resistant to dirt and its separate construction is best suited to semiconductor and liquid crystal devices (ST700 series).

ABS AT500 series (assembly type)



ABS ST700 series (separate type)



► Specification

| Item | Description | | | |
|---|---|----------------|---------------|---|
| | ABS AT5000 series | | | ABS ST7000 series (compact specification) |
| Detection system | Assembly type absolute scale Combined electrostatic capacity and optical ABS linear encoder | | | Electromagnetic induction type ABS linear encoder |
| Part No. | AT573A-SC | AT573A-HC | AT573A-HR/HL | ST778A(L) |
| Resolution | 0.05 □m | | | 0.1 □m |
| Max. effective length | 100 to 2200 mm | 100 to 1000 mm | 100 to 350 mm | 6000 mm (3200 mm and longer: L series) |
| Detection head size (mm) | □ | | | 50 × 28 × 11 |
| Accuracy (μm): 20°C | 3 + 3 Lo/1000 | 2 + 2Lo/1000 | | 5 + 5Lo/1000 |
| Max. response rate | 2.5 m/s | | | 5 m/s |
| Vibration resistance/shock resistance | 20G/35G | 15G/20G | | □ |
| Linear expansivity | (8.5±0.5) × 10 ⁻⁶ /°C | | | (12□1.5) × 10 ⁻⁶ /°C |
| Operating temperature/ storage temperature range | 0 to 45 °C/-20 to 70 °C | | | 0 to 50 °C/-20 to 70 °C |
| Operating humidity/ storage humidity range | 20 to 80%RH (No dewing) | | | |
| Power supply | 5 VDC □5□ | | | 5 VDC □10□ (Ripple + spike noise components should be 100 mV or below.) |
| Max. current consumption | 270 mA (MAX) | | | |
| Head cable length | 2 m (Detection head to interface B□X) | | | 1 m |
| Signal cable length | 3 m | | | □ |
| Max. cable length | 29 m (Including length of head cable) | | | |
| Detection head mount | □ | | | 1 on the top and 1 on one side |

Contact to □ Mitutoyo Corporation

20-1, Sakado 1-Chome, Takatsu-ku, Kawasaki-shi, Kanagawa 213-8533, Japan
TEL: +81-44-813-8234 URL: <http://www.mitutoyo.co.jp/eng/corporate/network/overseas/index.html>

Optical Absolute Linear Encoder

RESOLUTE™ series

► Features

- True absolute encoder
- Resolution (velocity) : 0.1 μm (40 m/s)
: 50 nm (20 m/s)
: 1 nm (0.4 m/s)
- Unique single-track scale eliminates yaw de-phasing problems
- Determines absolute position upon power up
- Range of scales for a variety of applications
- Low SDE for smooth velocity control
- Worldwide subsidiary support network



RESOLUTE™
RELA/RSLA



RESOLUTE™
RTLA-S



RESOLUTE™
FASTRACK/RTLA

► Specification

| Series | RESOLUTE™ RELA | RESOLUTE™ RSLA | RESOLUTE™ FASTRACK/RTLA | RESOLUTE™ RTLA-S |
|----------------------------------|---|--|-------------------------------------|----------------------|
| Feature | Fine precision and low thermal expansion | The world's most accurate long-length scales | Quick and easy scale replacement | Easiest installation |
| Scale material | Invar□ | Stainless steel | Stainless steel tape | Stainless steel tape |
| Thermal expansion coefficient | 0.4 ppm/°C | 10.8 ppm/°C | 10.6 ppm/°C | 10.6 ppm/°C |
| Scale accuracy | ±1 μm | ±1.5 μm/m | ±5 μm/m | ±5 μm/m |
| Scale length | 80 to 1,130mm | 80 to 5,000mm | 100 to 10,000mm | 100 to 5,000mm |
| Scale mounting options | Bonding or Clip/Clamp | Bonding or Clip/Clamp | Track (carrier) mounting | Self-adhesive |
| Read head size H □ L □ W | 18 × 36 × 16.5 mm | | | |
| Scale size H □ W | 1.5 × 15 mm | 1.5 × 15 mm | 0.4 × 18 mm | 0.2 × 8 mm |

Contact to □ Renishaw plc

New Mills Wotton-under-Edge Gloucestershire GL12 8JR, United Kingdom URL: www.renishaw.com
TEL: +44-1453-524524 E-mail: international@renishaw.com

AC Servo Actuator SHA-P Series

SHA25P/SHA32P

► Features

- The AC servo actuator incorporates the precise control speed reducer (Harmonic Drive R) to the flat AC servo motor.
- The design of the actuator is flat and has hollow shaft structure. Piping, wiring, laser light, etc., can be passed through the through-hole in the center.
- Excellent one way positioning accuracy : 50 sec (0.83□) with reduction ratio 1/51, and 40 sec (0.67□) with reduction 1/81 or higher ratio.
- Torque-volume ratio is 5 times or more that of direct drive motor.



► Specification


| Item | Model | SHA25P | | | | | SHA32P | | | | |
|--|--------------------------------------|------------------------------------|------------|------------|------------|------------|---------------------|------------|------------|------------|------------|
| | | 51 | 81 | 101 | 121 | 161 | 51 | 81 | 101 | 121 | 161 |
| Associated drive | | MCDHT3520 | | | | | MDDHT3530 | | | | |
| Max. torque ^{*2} | Nm | 127 | 178 | 204 | 217 | 229 | 277 | 395 | 433 | 459 | 484 |
| Allowable continuous torque ^{*2,3} | Nm | 41 | 67 | 81 | 81 | 81 | 92 | 153 | 178 | 178 | 178 |
| Max. revolution speed | r/min | 109.8 | 69.1 | 55.4 | 46.3 | 34.8 | 94.1 | 59.3 | 47.5 | 39.7 | 29.8 |
| Max. current ^{*2} | A | 8.6 | 7.5 | 7.0 | 6.3 | 5.2 | 17.1 | 15.2 | 13.5 | 12.2 | 9.9 |
| Allowable continuous current ^{*2,3} | A | 3.0 | 3.0 | 2.9 | 2.6 | 2.1 | 6.0 | 6.0 | 5.7 | 5.0 | 4.1 |
| Moment of Inertia | □D ² /4 kg·m ² | 0.56 | 1.42 | 2.2 | 3.2 | 5.6 | 2.0 | 5.1 | 8.0 | 11.0 | 20.0 |
| Reduction ratio | | 1:51 | 1:81 | 1:101 | 1:121 | 1:161 | 1:51 | 1:81 | 1:101 | 1:121 | 1:161 |
| Allowable moment load | Nm | 258 | | | | | 580 | | | | |
| Moment rigidity | Nm/rad | 39.2×10 ⁴ | | | | | 100×10 ⁴ | | | | |
| One way positioning accuracy | sec | 50 | 40 | 40 | 40 | 40 | 50 | 40 | 40 | 40 | 40 |
| Encoder | | Magnetic absolute encoder | | | | | | | | | |
| Output resolution | Pulses/Rev. | 6,684,672 | 10,616,832 | 13,238,272 | 15,859,712 | 21,102,592 | 6,684,672 | 10,616,832 | 13,238,272 | 15,859,712 | 21,102,592 |
| Mass (without brake) | kg | 2.95 | | | | | 5.9 | | | | |
| Mass (with brake) | kg | 3.1 | | | | | 6.2 | | | | |
| Mounting direction | | Can be installed in any direction. | | | | | | | | | |

*1: Values in the table above represent typical values at output shaft.

*2: Typical values obtained when standard drives are used (driving with ideal sine wave).

*3: Values obtained at temperature rise saturated with the actuator mounted on the aluminum heatsink shown below.

SHA25P: 350 × 350 × 18 mm SHA32P: 400 × 400 × 20 mm

Contact to  **Harmonic Drive Systems Inc. Overseas Division**

1856-1 Hotakamaki, Azumino-shi, Nagano, 399-8305, Japan

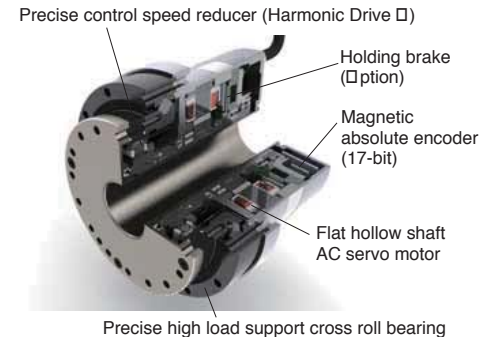
TEL: +81-263-83-6935 FAX: +81-263-83-6518

URL: <http://www.hds.co.jp/>

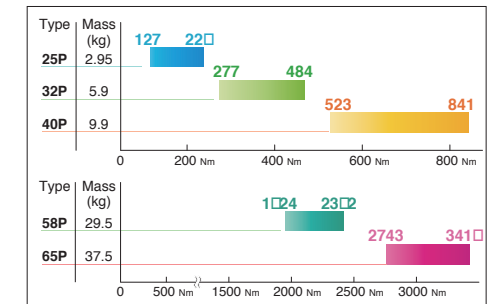
AC Servo Actuator SHA-P Series

SHA40P/SHA58P/SHA65P

► Features



■ Max. torque mapping




► Specification

| Item | Model | SHA40P | | | | | SHA58P | | | | SHA65P | | | |
|--|--------------------------------------|------------------------------------|------------|------------|------------|------------|-----------------------|------------|------------|------------|-----------------------|------------|------------|------------|
| | | 51 | 81 | 101 | 121 | 161 | 81 | 101 | 121 | 161 | 81 | 101 | 121 | 161 |
| Associated drive | | MDDHT5540 | | | | | MFDHTA3□ | | | | MFDHTB3A2 | | | |
| Max. torque ^{*2} | Nm | 523 | 675 | 738 | 802 | 841 | 1924 | 2067 | 2236 | 2392 | 2743 | 2990 | 3263 | 3419 |
| Allowable continuous torque ^{*2,3} | Nm | 160 | 263 | 330 | 382 | 382 | 714 | 905 | 969 | 969 | 921 | 1149 | 1236 | 1236 |
| Max. revolution speed | r/min | 78.4 | 49.4 | 39.6 | 33.1 | 24.8 | 37.0 | 29.7 | 24.8 | 18.6 | 34.6 | 27.7 | 23.1 | 17.4 |
| Max. current ^{*2} | A | 26.7 | 21.8 | 19.4 | 17.9 | 14.6 | 45.0 | 39.0 | 36.0 | 30.0 | 62.0 | 55.0 | 51.0 | 41.0 |
| Allowable continuous current ^{*2,3} | A | 9.0 | 9.0 | 9.0 | 8.8 | 7.2 | 17.7 | 17.8 | 16.4 | 13.4 | 22.0 | 21.9 | 20.1 | 16.3 |
| Moment of Inertia | □D ² /4 kg·m ² | 5 | 13 | 20 | 28 | 50 | 96 | 149 | 214 | 379 | 110 | 171 | 245 | 433 |
| Reduction ratio | | 1:51 | 1:81 | 1:101 | 1:121 | 1:161 | 1:81 | 1:101 | 1:121 | 1:161 | 1:81 | 1:101 | 1:121 | 1:161 |
| Allowable moment load | Nm | 849 | | | | | 2180 | | | | 2740 | | | |
| Moment rigidity | Nm/rad | 179 × 10 ⁴ | | | | | 531 × 10 ⁴ | | | | 741 × 10 ⁴ | | | |
| One way positioning accuracy | sec | 50 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Encoder | | Magnetic absolute encoder | | | | | | | | | | | | |
| Output resolution | Pulses/Rev. | 6,684,672 | 10,616,832 | 13,238,272 | 15,859,712 | 21,102,592 | 10,616,832 | 13,238,272 | 15,859,712 | 21,102,592 | 10,616,832 | 13,238,272 | 15,859,712 | 21,102,592 |
| Mass (without brake) | kg | 9.9 | | | | | 29.5 | | | | 37.5 | | | |
| Mass (with brake) | kg | 10.7 | | | | | 32 | | | | 40 | | | |
| Mounting direction | | Can be installed in any direction. | | | | | | | | | | | | |

*1: Values in the table above represent typical values at output shaft.

*2: Typical values obtained when standard drives are used (driving with ideal sine wave).

*3: Values obtained at temperature rise saturated with the actuator mounted on the aluminum heatsink of 650 × 650 × 30 mm.

Contact to  **Harmonic Drive Systems Inc. Overseas Division**

1856-1 Hotakamaki, Azumino-shi, Nagano, 399-8305, Japan

TEL: +81-263-83-6935 FAX: +81-263-83-6518

URL: <http://www.hds.co.jp/>

• Partners (alphabetical order)





| | |
|---|---|
| <p>AONEXTEK CO. LTD. 9-3, Horim-dong, Dalseo-gu, Daegu-city, Korea TEL: +82-593-3700 FAX: +82-593-3703</p> | <p>E-mail: marketing@aonextek.com www.aonextek.com</p> |
| <p>Anywire corporation Headquarters 8-1 Shimoinden, Inouchi, Nagaokakyo-city, Kyoto 617-0813, Japan TEL: +81-75-956-1611(Japanese only) FAX: +81-75-356-1613 * Only Japanese is used for inquiry over the phone. When making an inquiry in English, send it to: info@anywire.jp.</p> | <p>E-mail: info@anywire.jp http://www.anywire.jp/</p> |
| <p>Asahi Engineering Co. Ltd. Kodaira Works 3-3-22, Gakuen-Higashicho, Kodaira-shi, Tokyo 187-0043, Japan TEL: +81-42-342-4422(Japanese only) FAX: +81-42-342-4423 * Only Japanese is used for inquiry over the phone. When making an inquiry in English, send it to: ae-sales@asahi-engineering.co.jp</p> | <p>E-mail: ae-sales@asahi-engineering.co.jp http://www.asahi-engineering.co.jp/</p> |
| <p>Aurotek Corporation 1st. Floor No. 60, Jhou-Zih St. Nei-Hu District, Taipei 114, Taiwan TEL: +886-2-6600-7574 FAX: +886-2-8752-3347</p> | <p>E-mail: sales@robot.com.tw www.robot.com.tw</p> |
| <p>Delta Tau Data Systems, Inc. USA West Coast Headquarters 21314 Lassen Street Chatsworth, CA 91311, United States TEL: +1-818-998-2095 FAX: +1-818-998-7807</p> | <p>E-mail: sales@deltatau.com http://www.deltatau.com</p> |
| <p>Fagor Automation S. Coop. Bo San Andrés No19 E-20500 Arrasate/Mondragón, Spain TEL: +34-943-719200 FAX: +34-943-791712</p> | <p>http://www.fagorautomation.com/</p> |
| <p>FSI Group Japan Corporation. Encoder group KDX Shibadaimon Bldg. 1F, 2-10-12, Shibadaimon, Minato-ku, Tokyo, 105-0012, Japan TEL: +81-3-6402-9882 FAX: +81-3-6402-9888</p> | <p>http://www.gsig.co.jp/microe/index.html</p> |
| <p>Harmonic Drive Systems Inc. Overseas Division 1856-1 Hotakamaki, Azumino-shi, Nagano, 399-8305, Japan TEL: +81-263-83-6935 FAX: +81-263-83-6518</p> | <p>http://www.hds.co.jp/</p> |
| <p>HI-P Tech Corporation Sales Dept. 1-27-23, Higashitokorozawa, Tokorozawa-shi, Saitama 359-0021, Japan TEL:+81-4-2951-5381 FAX:+81-4-2951-5383</p> | <p>http://www.hptec.co.jp/</p> |
| <p>Magnescale Co. Ltd. To identify local distributors, please contact Magnescale Co., Ltd. International Sales Division Isehara Headquarters 45 Suzukawa, Isehara, Kanagawa 259-1146, Japan TEL: +81-463-92-7971 FAX: +81-463-92-7978</p> | <p>E-mail: info-mgs-eng@mgscale.com http://www.mgscale.com/mgs/language/english/</p> |
| <p>Mitutoyo Corporation 20-1, Sakado 1-Chome, Takatsu-ku, Kawasaki-shi, Kanagawa 213-8533, Japan TEL: +81-44-813-8234</p> | <p>http://www.mitutoyo.co.jp/eng/corporate/network/overseas/index.html</p> |
| <p>Nippon Pulse Motor Co. Ltd. 16-13, 2-chome, Hongo, Bunkyo-ku, Tokyo 113-0033, Japan TEL: +81-3-3813-8841 FAX: +81-3-3813-8550</p> | <p>http://www.pulsemotor.com/</p> |
| <p>Panasonic Electric Works SUNX Co. Ltd. 2431-1, Ushiyama-cho, Kasugai, Aichi 486-0901, Japan</p> | <p>http://panasonic-electric-works.net/sunx</p> |

| | |
|---|---|
| <p>Prime Motion Inc. 1134-12, Akaho, Komagane-shi, Nagano, 399-4117, Japan TEL:+81-265-82-2990 FAX:+81-265-82-2292</p> | <p>InterMotion - Special site: http://www.intermotion.jp http://www.primemotion.com/</p> |
| <p>Renishaw plc New Mills Wotton-under-Edge Gloucestershire GL12 8JR, United Kingdom TEL: +44-1453-524524</p> | <p>E-mail: international@renishaw.com www.renishaw.com</p> |
| <p>Shanghai Bitpass Automation Technology Development Co. Ltd. floor1601 Mhyi Mansion.441He Nan N.Rd,Shanghai, China TEL: +86-21-63570803 FAX: +86-21-63570802</p> | <p>http://www.shhuitong.net</p> |
| <p>SOFT SERVO SYSTEMS INC. 272-1 Norieda-cho, Minami-ku Hamamatsu, Shizuoka 432-8053, Japan TEL: +81-53-444-5771 FAX: +81-53-444-5773</p> | <p>http://www.softservo.co.jp/</p> |
| <p>TIETECH Co. Ltd. 1-3-4 Shioya-cho, Minami-ku, Nagoya 457-0078, Japan TEL: +81-52-824-7375 FAX: +81-52-811-4737</p> | <p>http://www.tietech.co.jp/</p> |
| <p>Trio Motion Technology Ltd. Shannon Way, Tewkesbury, Gloucestershire, GL20 8ND, United Kingdom TEL: +44-1684-292333 FAX: +44-1684-297929</p> | <p>http://www.triomotion.com</p> |

Cautions for Proper Use

- Practical considerations for exporting the product or assembly containing the product
When the end user of the product or end use of the product is associated with military affair or weapon, its export may be controlled by the Foreign Exchange and Foreign Trade Control Law. Complete review of the product to be exported and export formalities should be practiced.
- This product is intended to be used with a general industrial product, but not designed or manufactured to be used in a machine or system that may cause personal death when it is failed.
- Installation, wiring, operation, maintenance, etc., of the equipment should be done by qualified and experienced personnel.
- Apply adequate tightening torque to the product mounting screw by taking into consideration strength of the screw and the characteristics of material to which the product is installed. □vertightening can damage the screw and/or material□ undertightening can result in loosening.
Example) Steel screw (M5) into steel section: 2.7-3.3 N□m.
- Install a safety equipments or apparatus in your application, when a serious accident or loss of property is expected due to the failure of this product.
- Consult us if the application of this product is under such special conditions and environments as nuclear energy control, aerospace, transportation, medical equipment, various safety equipments or equipments which require a lesser air contamination.
- We have been making the best effort to ensure the highest quality of the products, however, application of exceptionally larger external noise disturbance and static electricity, or failure in input power, wiring and components may result in unexpected action. It is highly recommended that you make a fail-safe design and secure the safety in the operative range.
- If the motor shaft is not electrically grounded, it may cause an electrolytic corrosion to the bearing, depending on the condition of the machine and its mounting environment, and may result in the bearing noise. Checking and verification by customer is required.
- Failure of this product depending on its content, may generate smoke of about one cigarette. Take this into consideration when the application of the machine is clean room related.
- Please be careful when using in an environment with high concentrations of sulfur or sulfuric gases, as sulfuration can lead to disconnection from the chip resistor or a poor contact connection.
- Take care to avoid inputting a supply voltage which significantly exceeds the rated range to the power supply of this product. Failure to heed this caution may result in damage to the internal parts, causing smoking and/or a fire and other trouble.
- The user is responsible for matching between machine and components in terms of configuration, dimensions, life expectancy, characteristics, when installing the machine or changing specification of the machine. The user is also responsible for complying with applicable laws and regulations.
- The product will not be guaranteed when it is used outside its specification limits.
- Parts are subject to minor change to improve performance.
- Read and observe the instruction manual without fail for proper usage of the products.

| | |
|---------------|--|
| Repair | Consult to the dealer from whom you have purchased this product for details of repair work. When the product is incorporated to the machine you have purchased, consult to the machine manufacturer or its dealer. |
| URL | Electric data of this product (Instruction Manual, CAD data) can be download from the following web site□ □ http://industrial.panasonic.com/ww/i□e/25000/motor□fa□e/motor□fa□e.html |

| | |
|---|--|
| <p>Contact to :</p> <p>Panasonic Corporation, Appliances Company, Motor Business Unit</p> <p>1-1 Morofuku 7-chome, Daito, □saka 574-0044, Japan Tel : +81-72-871-1212 Fax: +81-72-870-3151</p> | <div style="text-align: center;">   <p>001</p> <p>ISO14001 Certificate division CERTIFICATE OF APPROVAL ISO14001</p> </div> <div style="text-align: center; margin-top: 20px;">   <p>001</p> <p>ISO 9001 Certificate division CERTIFICATE OF APPROVAL ISO 9001</p> </div> <p style="text-align: center; margin-top: 20px;">The contents of this catalog apply to the products as of Jan 1, 2012.</p> |
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• Printed colors may be slightly different from the actual products.
• Specifications and design of the products are subject to change without notice for the product improvement.