⚠ Safety Precautions

- Important Notes on exporting this product or equipment containing this product;
  If the end-user or application of this product is related to military affairs or weapons, its export may be controlled by "Foreign Exchange and Foreign Trade Control Law" of Japan where export license will be required before product can be exported from Japan.
- This product is designed and manufactured for use in General Purpose Industrial Equipment and it is not intended to be used in equipment or system that may cause personal injury or death.
- All servicing such as installation, wiring, operation, maintenance and etc., should be performed by qualified personnel only.
- Tighten mounting screws with an adequate torque by taking into consideration strength of the screws and the characteristics of material to which the product will be mounted. Over tightening can damage the screw and/or material; under tightening can result in loosening.
- Install safety equipment to prevent serious accidents or loss that is expected in case of failure of this product.
- Consult us before using this product 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 our products, however, some applications with exceptionally large 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 the product 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.
- Do not input a supply voltage which significantly exceeds the rated range to the power supply of this product. Failure to heed this caution may lead to damage of the internal parts, causing smoke and/or fire and other troubles.
- 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.
- Manufacturer's warranty will be invalid if the product has been used outside its stated specifications.
- Component parts are subject to minor change to improve performance.
- Read and observe the instruction manual to ensure correct use of the product.

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; industrial.panasonic.com/ac/e/

● Contact to :

Panasonic
INDUSTRY
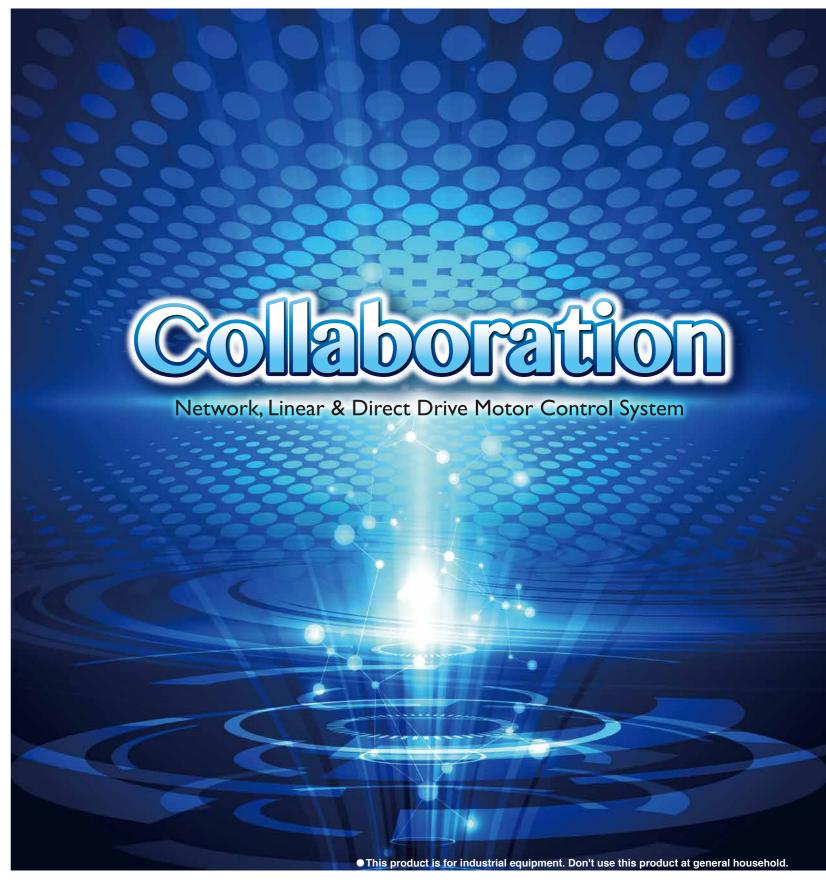
AC Servo Motor & Driver
Network/ Linear and Direct Drive Control

Collaboration
Network, Linear & Direct Drive Motor Control System

● This product is for industrial equipment. Don't use this product at general household.

2019.10   industrial.panasonic.com/ac/e/

Line-up

Servo motor that brings out potential of the machine.

"Realtime Express" model

A6N series

- Com. period min. 0.0625 ms
- Standard Ethernet cable [*1] using

EtherCAT communication type

A6B series

- CiA 402 protocol is available
- Standard Ethernet cable [*1] using

Linear and DD motor control type

A6L series

- Position, Speed, Thrust control and Block operation
- Drastically reduced setup time by automatic setup

Ultra compact DC Servo

A5M series

- Line-up: DC24 V/48 V and up to 30 W rotary motor and linear
- Control Line-up: Pulse train, RTEX and EtherCAT
- Applicable motor: Rotating motor/ Linear motor/ Direct drive motor

*1 Shielded twisted pair cable (CAT5e or higher)

INDEX

[Partner product] (Quality of partner product is guaranteed by the manufacturer and distributor.)

RTEX

EtherCAT

LINEAR MOTOR and DIRECT DRIVE MOTOR

FEED BACK SCALE

ACTUATOR

SYSTEM SOLUTIONS

Ultra High-Speed Network Servo

MINAS A6N series

Manufacturer/Distributor: Panasonic Corporation

RTEX Realtime Express

Realtime Express (RTEX)

Ultimate **Real-time** performance
- Com. period min. **0.0625 ms** Max **16000** times/s
- Com. speed **100 Mbps** Full-duplex
- Velocity response **3200 Hz**

Functionality to meet various needs
- Precise position latch & comparing
- Infinitely rotatable absolute encoder
- IEC safety I/F model available [1]

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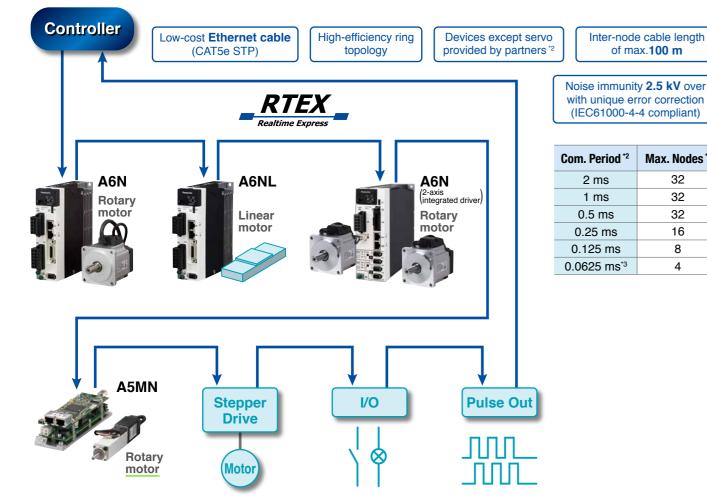- Isochronous established by ASIC
- Easy device development

[Typical system configuration]

Controller

| Low-cost **Ethernet cable** (CAT5e STP) | High-efficiency ring topology | Devices except servo provided by partners [2] | Inter-node cable length of max. **100 m** |

RTEX Realtime Express

Noise immunity **2.5 kV** over with unique error correction (IEC61000-4-4 compliant)

A6N Rotary motor   **A6NL** Linear motor   **A6N** (2-axis integrated driver) Rotary motor

Com. Period [2]	Max. Nodes [4]
2 ms	32
1 ms	32
0.5 ms	32
0.25 ms	16
0.125 ms	8
0.0625 ms [3]	4

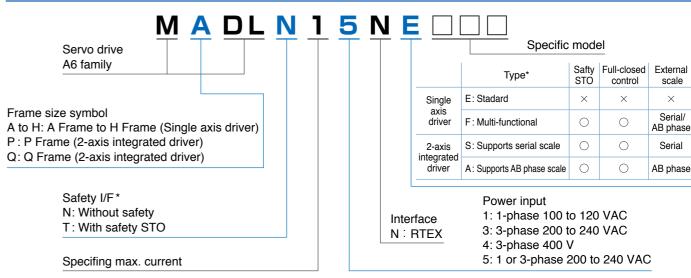**A5MN** Rotary motor   **Stepper Drive** Motor   **I/O**   **Pulse Out**

*1: Multi-functional type F. IEC61800-5-2 STO, IEC61508 SIL3.   *2: The communication period and connection of slave devices depend on the controller specification.
*3: For communication period 0.0625 ms, command update period is 0.125 ms only.   *4: Slave nodes.

Drive list

			Motor rated output													
Drive power supply		50 W	100 W	200 W	400 W	750 W	1 kW	1.5 kW	2 kW	3 kW	4 kW to 5 kW	7.5 kW	11 kW to 15 kW	22 kW		
Single axis driver	1-phase 100 V to 120 V AC	Frame size	A	A	B	C										
		Model No.	MADLT 01NE	MADLT 11NE	MBDLT 21NE	MCDLT 31NE										
	1 or 3-phase 200 V to 240 V AC	Frame size	A		A	B	C	D	D							
		Model No.	MADLT 05NE		MADLT 15NE	MBDLT 25NE	MCDLT 35NE	MDDLT 45NE	MDDLT 55NE							
	3-phase 200 V to 240 V AC	Frame size								E	F	F	G	H	H	
		Model No.								MEDLT 83NE	MFDLT A3NE	MFDLT B3NE	MGDLT C3NF	MHDLT E3NF	MHDLT F3NF	
	3-phase 380 V to 480 V AC	Frame size					D		D	E	F	F	G	H	H	
		Model No.					MDDLT 54NF		MDDLT 64NF	MEDLT 84NF	MFDLT A4NF	MFDLT B4NF	MGDLT C4NF	MHDLT E4NF	MHDLT F4NF	
2-axis integrated driver	1 or 3-phase 200 V to 240 V AC	Model No.	← MPDLT15N△ → MPDLT 25N△ → MQDLT 35N△ →													
	3-phase 200 V to 240 V AC	Model No.		MQDLT 43N△ →												

• The above table shows a drive model number (Type E) in typical combination. (400 V specification, G frame and H frame are only multi-function type.)
• Since some motors are not suitable for the model number listed above, confirm the valid combination by the A6 family catalog.
• △ part 2-axis integrated driver   S: Serial scale type   A: AB phase scale type   Refer to the specifications for details.
• For the 2-axis integrated driver, the rated motor output applicable to each axis is shown. Refer to catalogs and specifications for details on combinations.

Model nomenclature

M A D L N 1 5 N E ☐☐☐

Servo drive A6 family

Frame size symbol
A to H: A Frame to H Frame (Single axis driver)
P : P Frame (2-axis integrated driver)
Q: Q Frame (2-axis integrated driver)

Safety I/F *
N: Without safety
T : With safety STO

Specifing max. current

Interface N : RTEX

Power input
1: 1-phase 100 to 120 VAC
3: 3-phase 200 to 240 VAC
4: 3-phase 400 V
5: 1 or 3-phase 200 to 240 VAC

Specific model

	Type*	Safty STO	Full-closed control	External scale
Single axis driver	E : Stadard	×	×	×
	F : Multi-functional	○	○	Serial/AB phase
2-axis integrated driver	S: Supports serial scale	○	○	Serial
	A: Supports AB phase scale	○	○	AB phase

* The combination has the following limitation. The standard type E is without safety I/F, and the muti-functional type F is with safety I/F.
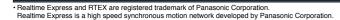
Compliance

CE   c UL us   c UL us LISTED   TÜV Rheinland Product Safety BAUART GEPRÜFT TYPE APPROVED   TÜV SÜD EMC (Type E)   TÜV SÜD Functional Safety (Type F)   KC   RoHS

Ultra High-Speed Network Servo
MINAS A6N series

RTEX Realtime Express
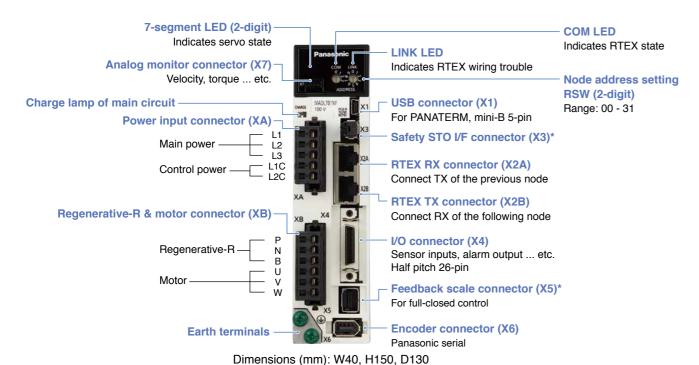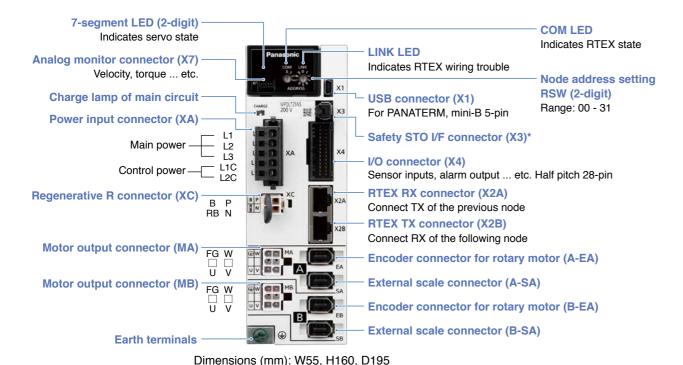
Drive appearance

A6N size A

* This photo shows multi-functional type F. Standard type E does not have X3 and X5 connectors.
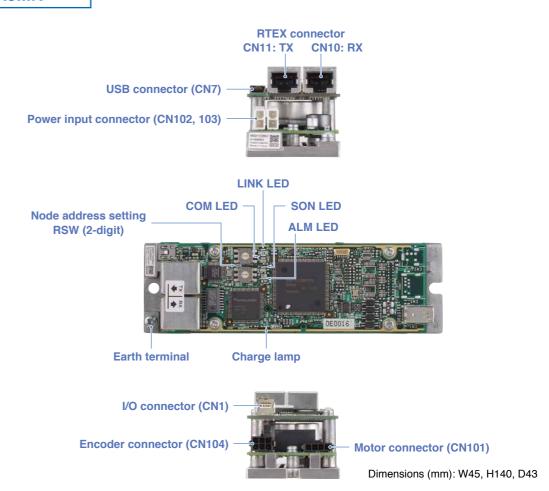
- **7-segment LED (2-digit)** — Indicates servo state
- **COM LED** — Indicates RTEX state
- **LINK LED** — Indicates RTEX wiring trouble
- **Analog monitor connector (X7)** — Velocity, torque ... etc.
- **Node address setting RSW (2-digit)** — Range: 00 - 31
- **Charge lamp of main circuit**
- **USB connector (X1)** — For PANATERM, mini-B 5-pin
- **Power input connector (XA)**
- Main power — L1 L2 L3
- Control power — L1C L2C
- **Safety STO I/F connector (X3)***
- **RTEX RX connector (X2A)** — Connect TX of the previous node
- **RTEX TX connector (X2B)** — Connect RX of the following node
- **Regenerative-R & motor connector (XB)**
- Regenerative-R — P N B
- Motor — U V W
- **I/O connector (X4)** — Sensor inputs, alarm output ... etc. Half pitch 26-pin
- **Feedback scale connector (X5)*** — For full-closed control
- **Earth terminals**
- **Encoder connector (X6)** — Panasonic serial

Dimensions (mm): W40, H150, D130

A6N size P (2-axis integrated driver)

- **7-segment LED (2-digit)** — Indicates servo state
- **COM LED** — Indicates RTEX state
- **LINK LED** — Indicates RTEX wiring trouble
- **Analog monitor connector (X7)** — Velocity, torque ... etc.
- **Node address setting RSW (2-digit)** — Range: 00 - 31
- **Charge lamp of main circuit**
- **USB connector (X1)** — For PANATERM, mini-B 5-pin
- **Power input connector (XA)**
- Main power — L1 L2 L3
- Control power — L1C L2C
- **Safety STO I/F connector (X3)***
- **I/O connector (X4)** — Sensor inputs, alarm output ... etc. Half pitch 28-pin
- **Regenerative R connector (XC)**
- B P RB N
- **RTEX RX connector (X2A)** — Connect TX of the previous node
- **RTEX TX connector (X2B)** — Connect RX of the following node
- **Motor output connector (MA)**
- FG W U V
- **Encoder connector for rotary motor (A-EA)**
- **External scale connector (A-SA)**
- **Motor output connector (MB)**
- FG W U V
- **Encoder connector for rotary motor (B-EA)**
- **External scale connector (B-SA)**
- **Earth terminals**

Dimensions (mm): W55, H160, D195

Low voltage small servo MINAS A5MN (DC24 V/48 V 10 W to 30 W)

● This product is not A6N, but A5N series for specific customers. For more details, refer to the specifications.

Drive appearance

A5MN

- **RTEX connector CN11: TX   CN10: RX**
- **USB connector (CN7)**
- **Power input connector (CN102, 103)**
- **LINK LED**
- **COM LED**
- **SON LED**
- **Node address setting RSW (2-digit)**
- **ALM LED**
- **Earth terminal**
- **Charge lamp**
- **I/O connector (CN1)**
- **Encoder connector (CN104)**
- **Motor connector (CN101)**

Dimensions (mm): W45, H140, D43

List of drivers

Driver power		Rated output of motor		
		10 W	20 W	30 W
DC 24 V	Frame symbol	M		
	Driver model number	MMDHT2C09ND1		
DC 48 V	Frame symbol	M		
	Driver model number	MMDHT2B09ND1		

• Depending on the motor series, there may be a combination different from the model number in the table, so be sure to check the specifications.

Super high speed network RTEX compatible PLC　positioning unit

FP0H series, FPXH series

- Corresponding to network servo MINAS A5N / A6N, wiring man-hours are greatly reduced.
- High-speed 100Mbps communication supports high-precision circular / straight / spiral interpolation.
- Realizes multi-axis synchronous control corresponding to electronic gear / electronic clutch / electronic cam.
- FP0H has a maximum of 16 axes. Up to two 8-axis units can be installed. FP-XH can control 8 axes.
- Position command points up to 600 points / axis, position command speed up to 2 Gbps for extra performance.
- Manual pulsar input is installed to enable fine teaching.

FP0H

FP-XH
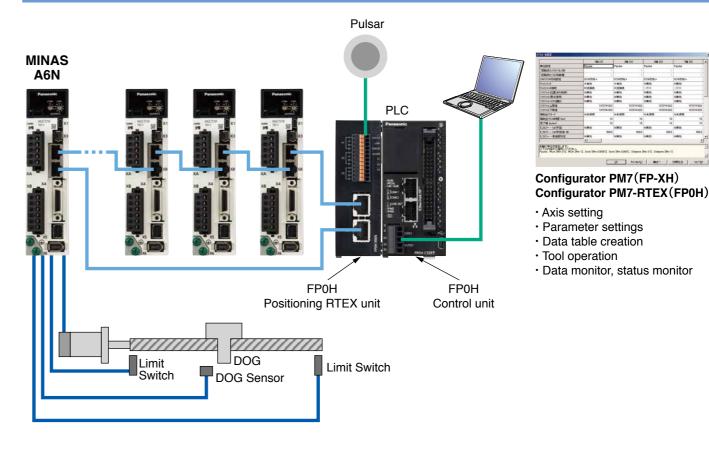
Specification

Model number		FP0H		FP-XH M8N
		AFP0HM4N	AFP0HM8N	AFPXHM8N16T
Number of control axes		4-axis	8-axis	8-axis
Interpolation control		2-axis, 3-axis linear interpolation, 2-axis circular interpolation, 3-axis spiral interpolation		
Position control function	Positioning method	Absolute, increment		
	Positioning unit	pulse/μm/inch/degree		
	Positioning range	pulse；−2147482624 to 2147482624		
	Acceleration / deceleration method	Linear acceleration / deceleration, S-curve acceleration / deceleration		
	Acceleration / deceleration time	0 to 10000 ms (Can be set in 1 ms units)		
	Number of positioning tables	Each axis standard area 600 points, expansion area 89 points		
	Control method	PTP control, CP control, JOG positioning control		
Synchronous operation	**Number of axes** Number of sync groups	4 groups		
	Master axis	Select from existing axis, virtual axis, pulse input		
	Slave axis	Up to 8 axes per master axis		
	Electronic gear Operation setting	Gear ratio setting		
	Operation method	Direct method, linear acceleration / deceleration method		
	Electronic clutch Trigger type	Clutch ON trigger: Contact type, Clutch OFF trigger: Contact input, contact input + phase designation Edge and level selectable for contact method		
	Connection method	Direct method, linear acceleration / deceleration method		
	Electronic cam Cam curve	Select from 20 types, multiple curves can be specified within phase (0 – 100 %)		
	Resolution	1024, 2048, 4096, 8192, 16384, 32768		
	Number of cam patterns	4 – 16 (Depending on resolution)		
	Cam pattern setting method	Cam curve method, cam point method (Set from Configurator PM7-RTEX)		Cam curve method (Set from Configurator PM7)
その他		Pulsar input operation / High-speed counter function / Dwell time / Torque limit		

System Configuration

Pulsar

MINAS A6N

PLC

Configurator PM7（FP-XH）
Configurator PM7-RTEX（FP0H）

・Axis setting
・Parameter settings
・Data table creation
・Tool operation
・Data monitor, status monitor

FP0H
Positioning RTEX unit

FP0H
Control unit

Limit Switch

DOG
DOG Sensor

Limit Switch

Application Sample

- Rotary cutter
- Printing machine
- Inserting machine
- Inspection equipment
- Other general machinery

ACE Automation Co., Ltd.

RTEX Network Motion Controller

PMC-KM2500P

Features

- RTEX (Realtime Express) Network
- PCI Interface
- Max. 16 Axes
- Max. 32 Nodes
- Multi-Axes Motion
- Linear / Circular Interpolation
- Synchronous Control, Gantry Control
- 1D / 2D Position Error Compensation
- Motion API
- Controller Setup Software
- High Speed, High Precision and High Performance
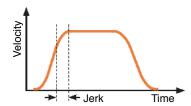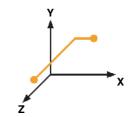- Very Simple and Easy to Develop Applications

Specification

Item	Description	Item	Description
Interface	PCI 32 bit	Operation System	Windows 7/8/10 (32 bit, 64 bit)
Network	RTEX (100 Mbps)	Network Cable	RJ45, CAT5e STP (Shielded)
Max. Axes	16	Max. Nodes	32
Local I/O	EMG, DI (4 Ch), DO (2 Ch)	Local Counter	2 Ch
Weight	125 g	Operation Temperature	0 °C ~ 50 °C
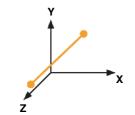
● **Velocity Profile**

● **Motion Command**
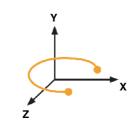
● **Change of Command**

● **Gantry Control**
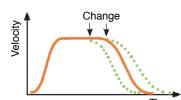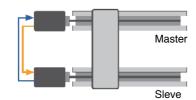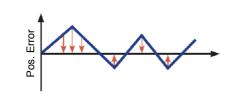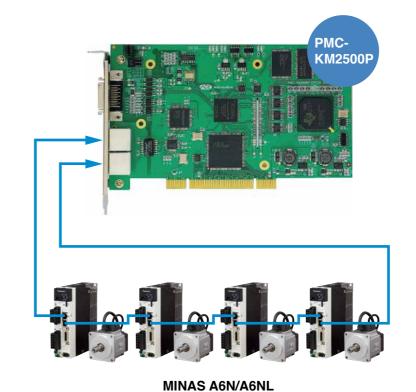
● **Position Error Compensation**

Application Sample

- Semiconductor / FPD Equipment
- Industrial Robot
- Machine Tool
- Other Industrial Equipment

System Configuration

PMC-KM2500P

● **Controller Setup Software**

MINAS A6N/A6NL

- Controller / Device / Motion Configuration
- Single / Multi / Coordinate Motion
- Path Graph, Realtime Scope
- Servo Configuration
- Monitoring, Diagnosis

Sales area

- Korea
- United States of America
- Japan
- China

Please contact the following address for details.

Language

- Korean
- English
- Japanese
- Chinese

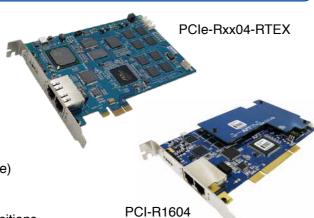## For more information

URL : http://www.aceautomation.co.kr

RTEX Master Board
PCIe-Rxx04-RTEX, 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
- PCIe-Rxx04-RTEX Basic configuration is 8 axes control
  (Can be expanded to 16, 24 and 32axes)
- PCI-R1604 Basic configuration is 16 axes control
  (Can be expanded to 20, 24, 28 and 32axes)
- 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

PCIe-Rxx04-RTEX

PCI-R1604

Specification

Item	Description
RTEX Master Board	
Max. number of nodes	32
Max. ring loop length	200 m
Max. node to node length	60 m
Connector / cable type	RJ45 RX/TX, STP (Shielding type)
Power supply / current consumption	3.3 Vdc / 1.5 A (PICe-Rxx04-RTEX) 5 Vdc / 1.0 A (PCI-R1604)
Position range	32-bit (±2147483648)
Motion	
Interpolation	Max. 32 synchronized drive, 2 to 4 axes linear interpolation, and 2 axes arc interpolation
Gantry motion	Max. 32 slave axes can follow the master axis to move synchronously

| Item	Description
Software	
User Agent Software	EzSoftware UC
Operating System	Windows 7 (32-bit, 64-bit) Windows 10 (32-bit, 64-bit)
General specification (PCIe-Rxx04-RTEX)	
Dimension	167.65 mm × 111.15 mm
Weight	116 g
Operation temperature	0 °C to 55 °C
General specification (PCI-R1604)	
Dimension	174.63 mm × 106.00 mm
Weight	120 g (Expend 32axes-161 g)
Operation temperature	0 °C to 60 °C
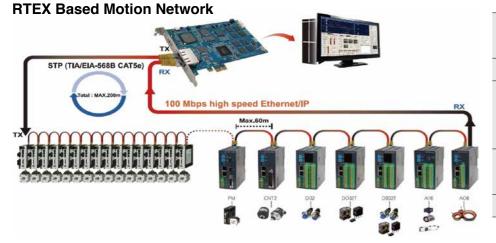
Application Sample

- Semiconductor front/back end process field
- Solar Energy/FPD/PCB field
- Processing machine field

Please contact the following address for details
URL : http://eng.ajinextek.com/customer/solution.php

System Configuration

RTEX Based Motion Network

STP (TIA/EIA-568B CAT5e)
TX
RX
Total : MAX.200m
100 Mbps high speed Ethernet/IP
Max.60m
RX
TX
PM CNT2 DI32 DO32T DB32T AI16 AO8

Master Board	PCIe-Rxx04-RTEX
	PCI-R1604
Motion Module	N3RTEX-PM2Q/4Q
DIO Module	N3RTEX-DI32
	N3RTEX-DO32T
	N3RTEX-DB32T
AIO Module	N3RTEX-AI16
	N3RTEX-AO8
Counter Module	N3RTEX-CNT2

Motion Function Module - N3RTEX-PM2Q/4Q, N3RTEX-CNT2

Item	Description		
	N3RTEX-PM2Q	**N3RTEX-PM4Q**	**N3RTEX-CNT2**
Model	2Axes Motion Control Module	4Axes Motion Control Module	2ch Counter Module Encoder count range : 28 Bit
Node ID setting	Decimal number rotary switch x 2 (0~31)		
Power supply	DC 24 V / 200 mA		
LED display	Power(Yellow), Link(Green), Error(Red), Communication(Green)		
Pulse output	Interface : Differential Speed : Max. 10 MPPS		None
Encoder input Interface	High-speed Photo-coupler		Line Receiver
Trigger output	Differential, Open collector (24 VDC Level)		Differential, TTL (5 VDC Level), Open-collector (24 VDC Level)
Connector	Comm. : RJ45 LAN x 2EA 26pin axis connector x 2EA 26pin Motion I/O connector x 1EA	Comm. : RJ45 LAN x 2EA 26pin axis connector x 4EA 26pin Motion I/O connector x 2EA	Comm. : RJ45 LAN X 2EA Cnt : D-SUB 25pin X 1EA

Digital Input / Output Function Module - N3RTEX-DI32, N3RTEX-DO32T, N3RTEX-DB32T

Item	Description		
	N3RTEX-DI32	**N3RTEX-DO32T**	**N3RTEX-DB32T**
Model	32ch Digital Input Module	32ch Digital Output Module	16ch Digital Input & 16ch Digital Output Module
Node ID setting	Decimal number rotary switch x 2 (0~31)		
Power supply	DC 24 V / 300 mA		
LED display	Power(Yellow), Link(Green), Error(Red), Communication(Green)		
	IN1 ~ IN32(Green)	OUT1 ~ OUT32(Red)	IN1 ~ IN16(Green), OUT1 ~ OUT16(Red)
Connector	Comm. : RJ45 LAN x 2EA DINKLE 16 x 2EA (ESC381VM-16P)	Comm. : RJ45 LAN x 2EA DINKLE 16 x 2EA (ESC381VM-16P)	Comm. : RJ45 LAN x 2EA DINKLE 16 x 2EA (ESC381VM-16P)

Analog Input / Output Function Module - N3RTEX-AI16, N3RTEX-AO8

Item	Description	
	N3RTEX-AI16	**N3RTEX-AO8**
Model	16ch Analog Input Module	8ch Analog Output Module
Node ID setting	Decimal number rotary switch x 2 (0~31)	
Power supply	DC 24 V / 150 mA	
LED display	Power(Yellow), Link(Green), Error(Red), Communication(Green)	
Connector	Comm. : RJ45 LAN x 2EA DINKLE 16 x 2EA (ESC381VM-16P)	Comm. : RJ45 LAN x 2EA DINKLE 16 x 1EA (ESC381VM-16P)

General Specification

- Dimension (HxDxW) : 112 mm × 90 mm × 54 mm (N3RTEX-PM4Q, DI32, DO32T, DB32T, AI16)
  112 mm × 90 mm × 44 mm (N3RTEX-PM2Q, CNT2, AO8)
- Operation temperature : 0 ~ 55 °C

Sales area

- Korea
- China
- Taiwan
- Malaysia
- Singapore
- Vietnam
- Philippines

Language

- Korean
- Chinese
- English

Please contact the following address for details.

For more information

URL : http://eng.ajinextek.com/

PLC Direct Access RTEX Motion Controller

PI-2300

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.
- Multiaxial 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.

Specification

Item	Description
Power supply	24 V$_{DC}$±10 % 300 mA MAX
Operating temperature and humidity	0 °C 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	PI Assistance (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

2-phase Microstep Drive

D4610 (1 Axis type) / D4620 (2 Axis type)

Features

Leading Edge High Speed Motion Network (RTEX) At Low Cost

● **High performance CPU enhances drive capability**
- Step-out detection
- Motor over current protection
- Brake control (only D4610)
- Closed loop control by encoder signal (only D4610)
- Triangle drive prevention
- Vibration suppression

● **RTEX in motion network**

● **Network can connect up to 32 axes (depending on master specification)**

● **Simultaneous multiaxial control within 0.16 ms, 0.5 msec, 1 msec communication period**

D4610   D4620

Specification

Item	Description	
	D4610	D4620
Axis	1	2
Power supply	Main power supply : 24 VDC±10 % (3.0 A MAX) Control power supply : 24 VDC±10 % (1.0 A MAX) Sensor power supply : 24 VDC±10 % (0.1 A)	Main power supply : 24 VDC±10 % (5.0 A MAX) Control power supply : 24 VDC±10 % (1.0 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	
Micro step resolution	Basic step divided by 200 (for 40000 p/r basic step 1.8 deg motor)	
Communication specification	Realtime Express (RTEX)	
Input signal	Sensor input 4 (HOME, EX, CWLS, CCWLS), encoder input (only D4610) and stop input	
Output signal	Brake output and alarm output	Alarm output
Protective function	Over current, power supply voltage monitoring and step-out detection(only D4610)	
Environment — Ambient temperature	0 °C to 50 °C (no freezing), Storage: –20 °C to 60 °C (no freezing)	
Environment — Ambient humidity	90 %RH max. (no dewing). Storage: 90 %RH max. (no dewing)	
Environment — Atmosphere	Indoor (no direct sunshine). No corrosive gas, flammable gas, oil mist, dust, etc.	
Environment — Altitude	Max. 1000 m above sea level	
Environment — Operating vibration (shock) environment	Max. 2 G (10 Hz to 250 Hz, in X,Y,Z direction 1 hour), max. 10 G (Ones)	
Outline dimensions (mm)	160 × 95 × 29	180 × 85 × 35
Mass	275 g	308 g

Application Sample

This controller is suitable for semiconductor manufacturing equipment, machine tools, measuring machines, and other machinery.

System Configuration

PLC   Ethernet   PI-2300   AC servo MINAS A6N series   Asahi Engineering Stepping motor drive etc.

(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.

Sales area

- Japan
- China

Language

- Japanese
- English

Only Japanese is used for inquiry over the phone.
When making an inquiry in English, please send it to the following address.

For more information

URL : http://www.asahi-engineering.co.jp/english

Aurotek. Aurotek Corporation

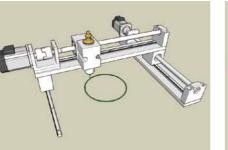# RTEX Network Motion Control board

MCN-8032P

Features

- RTEX (Real Time Express) servo network
- Network Speed 100 Mbps, communication period 1 ms
- Easy to wire, saving wiring working-hour
- Up to 32 nodes
- Excellent error correction
- Multi-axis linear / circular interpolation
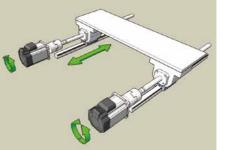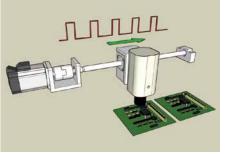- Multi-axis synchronous motion (for gantry)
- Up to 16 boards in one PC

Specification

| Item	Description
RTEX motion control	
Module type support	Servo motor, Linear motor, Stepper motor, I/O module, Pulse module
Max. number of nodes	32 (MCN-8032P)
Max. ring loop length	200 m
Max. node to node length	60 m
Connector / cable type	RJ45 8 pins, STP (Shielding type)
Isolation voltage	1500 Vrms
Noise immunity	Over 2.5 kV
LED loop status	Link / Comm (two elements LED)
Position range	32-bit (±2147483648)
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
Driver / LIB	Driver for Windows 7 (64 / 32 bits), Windows XP (32 bits), DLL function for windows applications
General specification	
Certification	CE (applying)
Dimension(L×W×H)	175 mm × 107 mm × 20 mm
Power consumption	5 V / 3.3 V @ 1 A (Max.)
Operation temperature	0 °C to 60 °C

Application Sample
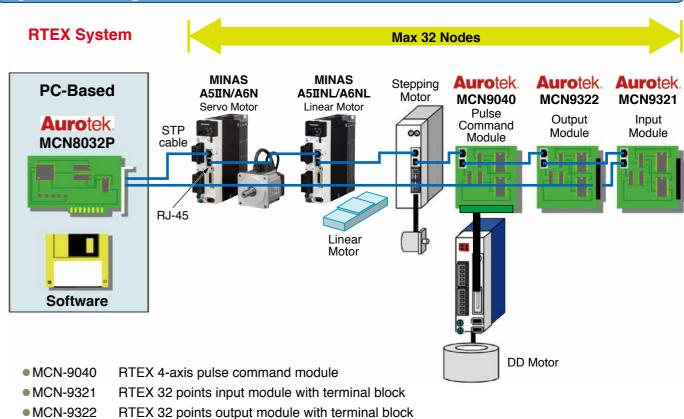
Linear and Circular Interpolations

Gantry Motion

Position Comparing & Triggering Function

System Configuration

RTEX System — Max 32 Nodes

- MCN-9040 — RTEX 4-axis pulse command module
- MCN-9321 — RTEX 32 points input module with terminal block
- MCN-9322 — RTEX 32 points output module with terminal block

Sales area

- Japan
- China
- Taiwan
- Thailand

Language

- English
- Chinese

For more information

URL : http://www.robot.com.tw/EN/Default.aspx

Universal Control for Electric Motors OPDE Series

Features

- Synchronous and Torque, Asynchronous and Reluctance Motor Control in a single drive.
- OPD Explorer dedicated tool for drive configuration.
- On Board PLC according to IEC 61131-3 standard.
- Safe Torque Off (STO) function.
- Control of two motors (not simultaneously)
- Variable gain according to the speed
- Positioning and Spindle Indexing (Stop in Position) Application Software
- Notch filters for removing common noise frequencies
- Output Frequency 0 -1300 Hz.
- Switching Frequency (PWM) 3 – 16 kHz.
- Speed loop bandwidth 150 Hz (delay 45°)
- Current loop bandwidth up to 1500 Hz (delay 45°)
- Update cycle internal loop: speed, current, positioning and speed task (62,5 µs)
- PLC Cycle equal to the PWM Cycle.
- 3 fast inputs with sampling time 150 MHz

ENERGY SAVING:

Converter Active Front End acts as an ac/dc rectifier, controlling two-direction exchange of power (absorption or power regeneration) according to the needs of the load.

AFE provides energy savings for all applications that require regeneration of energy in mains, as an alternative to the dissipative braking resistors.

Converter Fundamental Front End acts as an ac-dc rectifier, controlling two-direction exchange of power, according to the needs of the load, without adjusting the Bus DC voltage and THD current.
It works like a diode bridge but it allows to recover energy to the grid as well.
Compared to the AFE there is an increase in current size with a saving in terms of cost and space.

Specification

Size		OPDE																		
		S		M			L 32	X			1				2			3		
		03	07	12	15	22	32	40	48	60	70	90	110	150	175	220	250	310	370	460
Overload 120 % x 30 s	POWER kW	1.5	3	5.5	7.5	11	15	20	22	30	37	45	55	75	90	110	132	160	200	250
	I rates (A rms)	3.6	8.3	14.2	17.8	26	37.9	47.4	54.5	68.1	79.3	103	118.4	165.8	195.4	248.6	281.8	348.1	414.4	522.1
Overload 150 % x 30 s	POWER kW	1.5	3	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200	250
	I rates (A rms)	3.2	7.4	12.6	15.8	23.2	33.7	42.2	48.5	60.6	70.6	91.7	105.4	147.6	173.9	221.3	250.9	309.9	368.9	464.8
Overload 200% x 30 s	POWER kW	1.1	2.2	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	200
	I rates (A rms)	2.6	6	10.2	12.8	18.8	27.3	34.2	39.3	49.1	57.2	74.3	85.4	119.6	140.9	179.3	203.3	251.1	298.8	376.6
Overload 200 % x 3 s +155 % x 30 s	POWER kW	1.5	3	5.5	7.5	11	15	18.5	22	30	30	37	45	55	75	110	110	132	160	200
	I rates (A rms)	3	7	12	15	22	32	40	46	57.5	67	87	100	140	165	210	238	294	350	441
Size (mm) H W D	H	303		303			322	322			675				900			900		
	W	89		116			137	194			251				478			678		
	D	253		253			253	273			290				296			296		
Weight (kg)		3.5		4.8		5.5	6.4	9.3		10	22				65			80		

Application Sample
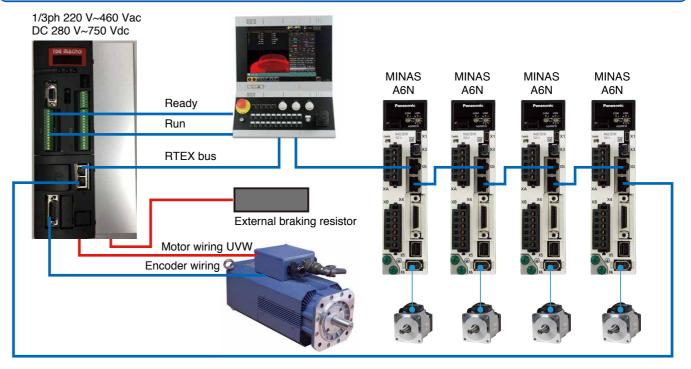
- CNC machine tools Spindle motor
- Five-axis rotary table
- Bending machine
- Cutting machine

System Configuration

1/3ph 220 V~460 Vac
DC 280 V~750 Vdc

Ready
Run
RTEX bus

MINAS A6N   MINAS A6N   MINAS A6N   MINAS A6N

External braking resistor
Motor wiring UVW
Encoder wiring

Feedback:
- TTL Encoder
- TTL Encoder and Hall sensors
- Resolver
- Sin-Cos encoder (incremental and absolute)
- Endat 2.1 and 2.2 encoder
- Biss encoder
- High resolution resolver
- Hiperface
- Hiperface DSL
- Smart-ABS

Fieldbus:
- Rtex
- Ethercat
- Profinet
- Profibus DP
- CANopen
- Anybus CC

Sales area

Language

For more information

URL : https://www.bdfdigital.com/

Contact: **BDF DIGITAL S.P.A.**
HEAD OFFICE
Via dell'Oreficeria, 41- 36100 - Vicenza (VI) - Italy   TEL: +39 0444 343555   FAX: +39 0444 343509

PCI-Express RTEX Motion Controller
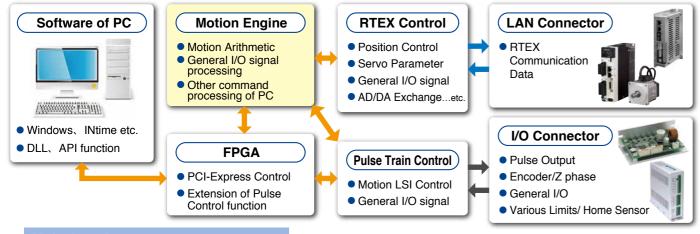## PXRP-3216CN

Features

- 32 axes for RTEX, 4 axes for Pulse Control, total up to 36 axes.
- A device that cannot be connected to network, such as Stepping motor or Hollow motor, can be controlled by pulse train or I/O Control.
- the Input signal of I/O connector can use either Sink or Source.
- Torque Control or Position Control can be changed freely in Servo Amplifier, Various parameters can be set from Controller directly.
- It is expert in start with Liner or Circular, then Special interpolation control, such as, Ellipse, Cubic Interpolation or Cam action etc.

Specification

Item	Description	
	RTEX Control	Pulse Control
Number of Axis	32 axes	4 axes
Pulse Frequency	1 pps to 400 Mpps	8.191 Mpps
Accelerating/Decelerating function	Liner/S-Curve Acceleration/Deceleration (Asymmetric is OK), Stop Speed	Liner/S-Curve Acceleration/Deceleration (Asymmetric is OK)
Drive function	Absolute (relative) position drive, Continuous drive	
Interpolation function	Liner, Circular, Helical, 3 dimension	—
Synchronous function	Synchronous start, Axle linkage, Gantry Axis	Synchronous start
Override function	Acceleration time, Deceleration time, Object speed, Movement distance	Object speed, Movement distance
Command method	Realtime Express®	DIR/PULSE, CW/CCW, A phase /B phase
Communication/Update period	0.5 msec	—
Bus	PCI-Express Rev1.1	
OS	Windows (32 bit/64 bit) 7 / 8 / 10, INtime, Linux Ubuntu etc.	
Development environment	After Visual studio 2010	

System Configuration

Software of PC
- Windows、INtime etc.
- DLL、API function

Motion Engine
- Motion Arithmetic
- General I/O signal processing
- Other command processing of PC

FPGA
- PCI-Express Control
- Extension of Pulse Control function

RTEX Control
- Position Control
- Servo Parameter
- General I/O signal
- AD/DA Exchange…etc.

Pulse Train Control
- Motion LSI Control
- General I/O signal

LAN Connector
- RTEX Communication Data

I/O Connector
- Pulse Output
- Encoder/Z phase
- General I/O
- Various Limits/ Home Sensor

Main functions

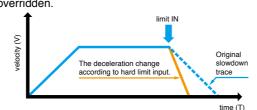### Free acceleration and deceleration setting

Starting speed and stopping speed set separately, during working, acceleration time, deceleration time, object speed, movement overrides is possible. Between 1 PPS and 400 MPPS, acceleration and deceleration setting can be set freely in 1msec as a unit.

velocity (V)

V1

time (T)

accelerate | reaccelerate | constant speed | speed override (V1) | deceleration stop

Hard limit deceleration stop function

The Deceleration while hard limit is collided can be overridden.

velocity (V)

limit IN

The deceleration change according to hard limit input.

Original slowdown trace

time (T)

Main functions

Interpolation Control function

Interpolation data up to 5000 steps can be recorded. During working, changing Interpolation data, changing/revising object position, pausing interpolation actions is possible at any time. In addition, from pausing to restarting, exchanging interpolation axis etc, is possible.
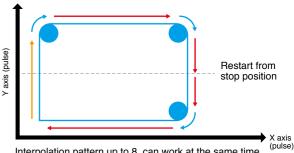
example)
The arrival position change image when interpolation is working

Y axis (pulse)

Step3 is working now Wish to change arrival position of final Step5.

Step5
Step4
Step3
Step2
Step1

Change step5. →blue arrow is arrival position.

X axis (pulse)

Data which is changing, will be work in the next time.
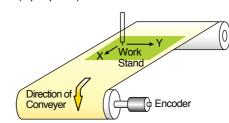
The following image when 7Step is working continuously, it can be stopped at any position.

Y axis (pulse)

Restart from stop position

X axis (pulse)

Interpolation pattern up to 8, can work at the same time. (8 buffer Max5000 Step)
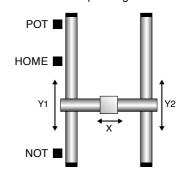
Axle linkage function

Axle linkage function is on one axis we can addition and subtraction command position (output pulse) or actual position (input pulse) of another axis.

Y
X — Work Stand

Direction of Conveyer

Encoder

Connect Work Stand (XYZ axis) to the encoder of conveyer, we do not need to stop conveyer to control Work Stand.

Gantry Axis Control

Gantry Axis Control is carried as a base function. Using axle linkage function, connect axis Y2 to axis Y1, then send command to axis Y1 only, axis Y2 is also operating.
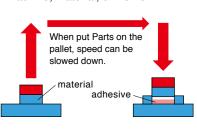
POT
HOME
Y1   Y2
X
NOT

Soft landing function

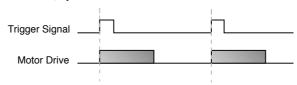When to stop the bonding equipment etc., according to the overshoot, shock will happen. Parts may be damaged. Soft landing function can control the overshoot, protects machine, material, or worker.

When put Parts on the pallet, speed can be slowed down.

material
adhesive

Trigger Input Drive function

Using General input as trigger signal, executing actions that was set beforehand. This function can be used for drive start, synchronous start.

Trigger Signal

Motor Drive

Timing Output function

In the designated position or schedule time, sending output signal. This function can be used for ON/OFF Control of strobe light, camera shutter, sensor etc.

Motion Range (pulse counter)

Sales area

- Japan
- China

Please contact the following address for details.

Language

- Japanese
- Chinese

For more information

URL : http://www.cosmotechs.co.jp/   http://www.shhuitong.net/ (chinese)

Contact: **COSMOTECHS CO., LTD.**
2-6-1 Matsue Atsugi Kanagawa 245-0005 Japan   TEL: +81-49-222-7351   FAX: +81-46-222-7355

PCI Bus RTEX Motor Control Board
PCPG-168N-V / PCMC-168N

Features

PCPG-168N-V
- Control up to 16 axes in 0.5 ms period, accurate and fast control is possible.
- 4 axes pulse train output is possible. Also it can be performed by mixing with Network Control.
- Provide standard device driver, DLL, API

PCMC-168N
- CP Control : besides 16 axes, it can be performed up to 16 axes by PP control or connected to 16 I/O board.
- Max. 32 block can be controlled in 0.5 ms period.
- Provide standard device driver, DLL. We provide sample API to reduce the pressure of user application.

Specification

Item	Description	
Series	PCPG-168N-V	PCMC-168N
Max . Number of Axes	16 axes (CP Control)	CP Control : 16 axes + 16 blocks (I/O or PP Control)
Pulse Control	4 axes (output with RTEX at the same time is possible)	none
Interpolation Control	Liner Interpolation, Circular Interpolation, Continuous Interpolation	Liner Interpolation, Circular Interpolation, Continuous Interpolation
Accelerating / Decelerating Control	Liner Acceleration/Deceleration, S-Curve Acceleration/Deceleration	Liner Acceleration/Deceleration, S-Curve Acceleration/Deceleration
Max . Pulse Frequency	8 Mpps	8 Mpps
Command Updating Period	0.5 ms	0.5 ms

Line-up

● **RTEX Stepping Driver**

CTDR-0514NS
- 5-phase stepping driver
  CP Control method

CTDR-0514NS-4L
- 5-phase stepping driver
  PP Control method
  4-axis type

● **RTEX Input/Output Module**

CTI-16NSW
- 16-point input
  WAGO733 connector
  2 mA to 5 mA

CTO-16NSW
- 16-point output
  WAGO733 connector
  output : 100 mA

CTI-32NS
- 32-point input
  WAGO733 connector
  2 mA to 5 mA

CTO-32NS
- 32-point output
  WAGO733 connector
  output : 100 mA

● **RTEX Analog Input/Output Module**

CTAD-08NSB
- AD converter : 8CH
  Analog ⇒ Digital exchange

CTADA-44NS
- AD/DA converter : 4CH
  Analog ⇔ Digital exchange

● **RTEX Pulse Train Output Module**

CTPG-48HNS
- Used for PP Control up to 4 axes
- RTEX ⇔ Pulse Train exchange

Stand-Alone Series RTEX Motor Controller
CSRC-32CN

Features

- A Stand-Alone motor control which can control up to 32 axes.
- ECAM, Liner Interpolation, Circular Interpolation, Ellipse Interpolation, Synchronous Control is possible.
- Max. Velocity can reach to 400 M pps, velocity can be changed in 1 ms, and accurate control is possible.
- Positioning data and feedback can be controlled by 32-bit counter. The resolution of Servo can be used flexibly.
- Modbus Touch Panel can be controlled, Stand-Alone Control is also possible.

Specification

Item	Description
Max . Number of Axes	CP Control : 32 axes + Dummy-Axis : 1 axis
Position Control	−2147483648 to 2147483647
Interpolation Control	Liner, Circular, Ellipse, Continuous Interpolation, EAM
Accelerating / Decelerating Control	1 ms to 65535 ms
Pulse Frequency	1 pps to 400 Mpps
Command Updating Period	0.5 ms
Others	It can be used with Modbus. We provide a multiple support tool.

PLC RTEX Motor Controller Module
CPLM-3216N-YE

Features

- Connect to Yokogawa PLC FA-M3.
- CP Control up to 16 axes, also PP Control up to 16 nodes.
- Special Interpolation mix with Liner, Circular, Ellipse Interpolation is possible.
- Max. Velocity can reach to 200 Mpps, velocity can be changed in 1 ms.
- Positioning data and feedback can be controlled by 32-bit counter. The resolution of Servo can be used flexibly.

Specification

Item	Description
Max . Number of Axes	CP Control : 16 axes + 16 blocks (I/O or PP Control)
Position Control	−2147483648 to 2147483647
Interpolation Control	Liner, Circular, Ellipse, Continuous Interpolation, Special Interpolation
Accelerating / Decelerating Control	1 ms to 65535 ms
Pulse Frequency	1 pps to 200 Mpps
Command Updating Period	0.5 ms
Others	WideField3 (Ladder). Provide motion data creating tool.

Sales area

- Japan
- China

Please contact the following address for details.

Language

- Japanese
- Chinese

For more information

URL : http://www.cosmotechs.co.jp/
http://www.shhuitong.net/ (chinese)

Contact: **COSMOTECHS CO., LTD.**
2-6-1 Matsue Atsugi Kanagawa 245-0005 Japan
TEL: +81-49-222-7351   FAX: +81-46-222-7355

Motion Controller (Stand-alone & Remote Control type)
SNET-RTEX Series

Features

- Both Stand-alone & Remote Control
- Adopt standard G code and used Motion Instruction
- Position, Speed change and intervariable calculation using L variable, Macro Function
- PTP/CP/Helical
- Supports communication protocol with PLC, Touch Panel (Melsec etc.)
- 16 Axes - 6 Channel - Multi Tasking
- 2 Port – Supplied external Encoder Input
- Analog In/Out (Option)
- Gantry and Synchronous operation, S-curve, etc
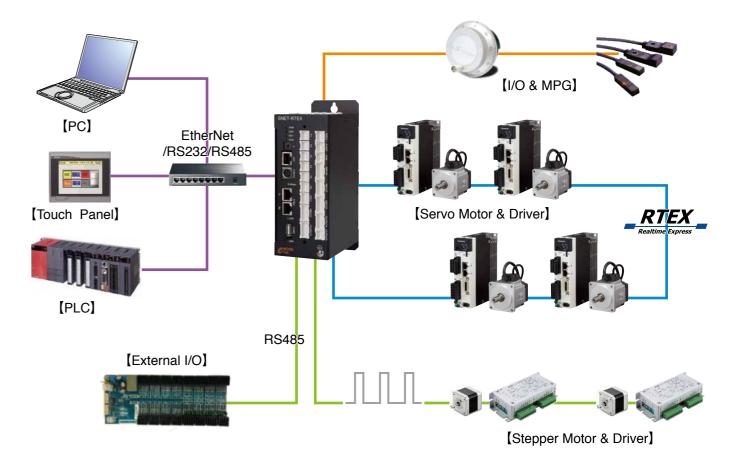- Remote I/O expansion using RS-485

Specification

Item	Description
Outline dimensions (W × D × h)	70 mm × 199 mm × 109 mm
Motion Control	
Max. Control Axes	16 (Both Pulse Output)
Motion Control cycle	1 ms
Control Method	RTEX (Real time Express)
I/O Control (PLC)	10 ms
Multi Channel	6
SNET-Main	
EtherNet Port	1ea(100 Mbps)
RTEX Port	Each 1ea (Rx/Tx)
RS232 Port	1ea
RS485 Port	2ea (PLC, Touch etc.)
SNET-P B'd (Basic)	
User I/O	16/16
Pulse Out (Pulse)	6ea (Line Driver)
External Encoder input1	1ea (Line Driver)
SNET-A B'd (Basic)	
User I/O	Each 32/16
Relay Output	4ea (Max. 800 mA)
External Encoder input2	1ea (Line Driver)
Option	
Analog In-Put	4ea (±10 V, 16 Bit)
Analog Out-Put	2ea (±10 V, 16 Bit)
Environment Operating temperature	0 °C to 55 °C
Storage temperature	−20 °C to 70 °C
Power Power supply	DC 24 V / 0.75 A / 17 W
Memory Flash RAM	1.8 M bytes

Application Sample

- Dispenser
- SPI
- AOI
- Packaging Machine
- Laser Application
- Lens Cell Assembly
- OIS Lens Module Assembly
- Lens Module Inspection
- Pick & Place

System Configuration

【PC】
【Touch Panel】
【PLC】
【External I/O】
EtherNet /RS232/RS485
RS485
【I/O & MPG】
【Servo Motor & Driver】
RTEX Realtime Express
【Stepper Motor & Driver】

Sales area

- Korea
- China
- United States of America

Please contact the following address for details.

Language

- Korean
- English

For more information

URL : http://www.emotiontek.com/

Leadshine **Leadshine Technology Co., Ltd.** RTEX

Network Stepper Drive

EM3RT Series

Features

- Support RTEX network protocol
- Perfectly combine with RTEX servo
- Matched motor from NEMA 8 to NEMA 34
- Excellent performance & High reliability
- Easy development & Low cost
- 7 input signals, include 2 differential connections (200 KHz, 3.3 V - 5 V input voltage) and 5 single – ended connections (20 KHz, 12 V or 24 V input voltage)
- 2 output signals, optically isolated, maximum 24 mA/100 mA
- 1 brake output signal, maximum 24 mA/100 mA

Overview

EM3RT series drives are based on Panasonic RTEX network which supports CP operating mode (built in HM mode) and connect up to 32 axes. The products can be combined with RTEX servo drives perfectly and matched with various stepper motors from NEMA 8 to NEMA 34. The EM3RT series has excellent performance including enhanced reliability, super-low stepper noise, anti-resonance and low-speed ripple smoothing and remains low cost.
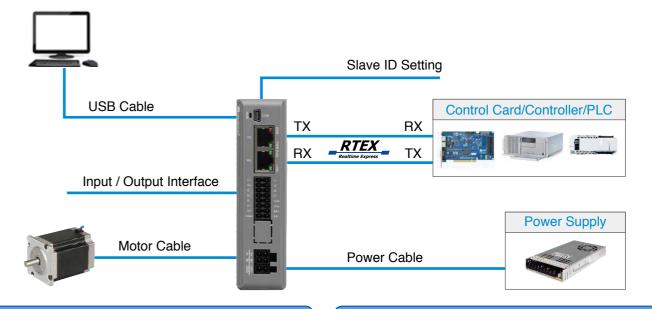
Specification

Drive Specifications

Models			
	EM3RT-522	EM3RT-556	EM3RT-870
Operationg Voltage	20 VDC - 50 VDC	20 VDC - 50 VDC	20 VDC - 80 VDC
Output Current	0.3 A - 2.2 A (RMS 1.5 A)	2.1 A - 5.6 A (RMS 4.0 A)	2.1 A - 7.0 A (RMS 5.0 A)
Matched Motor	NEMA 8, 11, 14	NEMA 23, 24	NEMA 34

RTEX Specifications

Item	Description
Communication Rate	100 Mbps full duplex
Physical Level	100BASE-TX full duplex (IEEE 802.3u)
Cable	Shielding Ethernet cable (TIA/EIA-568B CAT5e)
Network Topology	Annular
Insulation	Pulsing transformer (in CMV inductor)
Connector	RJ45*2
Max. Cable Length	Node to node:100 m; whole network: 200 m
Noise Immunity	IEC61000-4-4 Level4
Communication Cycle (*)	2 ms - 0.250 ms
Instruction Update Cycle (*)	4 ms - 0.250 ms
Max. Node	32
Synchronization Instruction	CP
Asynchronous Instruction	PP, restart, system ID, home, alarm, parameter, monitor
Data Length	RX: 16 bytes; TX: 16 bytes
Communication Checkout	CRC-CCITT
LED indication (on Rj45)	ERR*1, PWR*1, RUN*1, LINK*1
Application layer	Panasonic RTEX standard

Application Sample

- Automatic production line
- Automation equipment

System Configuration

Slave ID Setting

USB Cable

Input / Output Interface

Motor Cable

TX   RX

RTEX
Realtime Express

RX   TX

Control Card/Controller/PLC

Power Supply

Power Cable

Sales area

- China
- Worldwide response

Language

- English
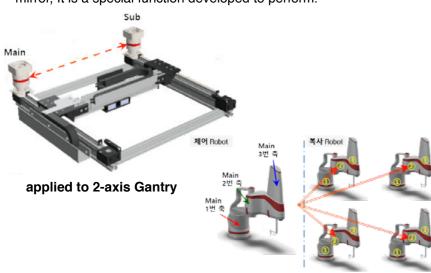- Chinese

For more information

URL: http://www.leadshine.com

ETHERNET to RTEX Motion Controller

NMC-XR Series

Features

- 32 axes control is possible with one NMC-XR motion controller.
- It is possible to connect up to 255 NMC-XRs with one low-specification PC.
- **Provide SDK in various languages**
  - Dynamic Linking Library (x32, x64), C, C++, Visual C
  - Labview DLL
- Provide various motion function
  - Multi axis, circular arc, helical, continuous interpolation, list motion, torque value monitoring, etc.
- All 32 SERVO parameters connected to the NMC-XR
  Editing is possible at once, You can check motor status information in real time
- Provide a protocol for ModBus.
- **Provide** Mirror function
  - Mirror function copies the motion motion of the main axis like a mirror, It is a special function developed to perform.
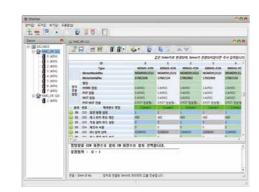

NMC-XR

applied to 2-axis Gantry

applied to 3-axis robot system
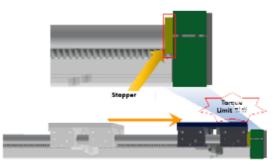

"EtherPara" software

- Real-time Torque Monitoring and Torque Limit
  - You can set the limit range of the instrument as well as perform the origin with the stopper of the instrument.

Product Line-up

NMC-XR040
32 axes
(CP 4 axis + PP 28 axis)
digital 8 input + 8 output

NMC-XR080
32 axes
(CP 8 axis + PP 24 axis)
digital 8 input + 8 output

NMC-XR120
32 axes
(CP 12 axis + PP 20 axis)
digital 8 input + 8 output

NMC-XR160
32 axes
(CP 16 axis + PP 16 axis)
digital 8 input + 8 output
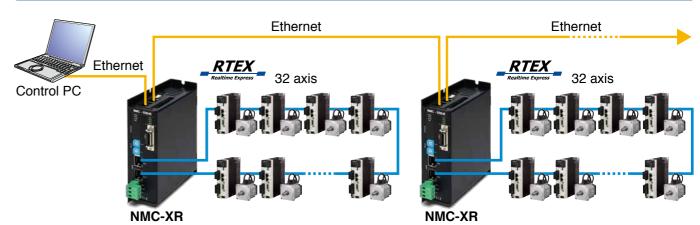
NMC-XRDI32
digital 32 input

NMC-XRDO32
digital 32 output

Products that can be used with the NMC-XR

ETHERNET to PULSE

NMC2E
NMC2E-220 : 2 axis
NMC2E-420 : 4 axis
NMC2E-620 : 6 axis
NMC2E-820 : 8 axis

System Configuration

Control PC Ethernet Ethernet Ethernet

RTEX Realtime Express 32 axis
RTEX Realtime Express 32 axis

NMC-XR   **NMC-XR**

Sales area

- Korea

Language

- Korean

For more information

URL : http://www.paix.co.kr

Multi PLC Direct Connection 16-axis Motion Controller
"InterMotion" Series JOY-AMXR-P8 Including PLC (Using a C-like Language)

Features

- Directly connectable to Mitsubishi PLC (CPU with Ethernet: e.g. Q03UDECPU). Reference to the CPU D register in accordance with MC Protocol.
- Directly connectable to Keyence PLC KV-5000. Reference to the CPU D register in accordance with MC Protocol.
- Directly connectable to OMRON PLC (CPU with Ethernet: e.g.CJ1M-CPU11-ETN). Reference to CPU the Data Memory in accordance with FINS commands.
- Control with the .NET Framework interface on a Windows PC with Ethernet is possible.
- Position command generation and DIN/DOUT scan controls with the cycle time of 1ms.

Specification

Item	Description
No. of control axes	16: Max. 16-axis RTEX interface. For max. 8 axes out of the 16 axes, 10Mpps pulse train position command is possible.
Controlling method	Independent PTP control for each axis. Max. 8-axis synchronized PTP control. Linear interpolation, 2-axis arc interpolation, 3-axis spiral interpolation. 32-bit length.
Internal control program development	Control program can be developed using the C-like multiprocessing machine control language "MOS language." Motion control, IO control, communication control, and sequence control are possible. "MOS Bench AM" is required as a development environment.
Accessory IO	±CW/±CCW pulse output, ±A/±B/±Z input. Servo on, reset output. ±OT, alarm input. (The above-mentioned items are for 8 axes.) General-purpose IN 8 points. General-purpose OUT 8 points. Non-insulated RS232-1ch. Insulated RS485-1ch.
Optional functions	Camera trigger function using ±A/±B input counter and general-purpose OUT.
Optional devices	192IN, 192OUT are available by adding 6 general-purpose 32/32 IO boards. Non-insulated RS232-6ch is available using a RS232C extender board.

PCIExpress-40-axis Motion Control Board, PCI-40-axis Motion Control Board
"RT40PRE", "RT40PR" Including PLC (Using a C-like Language)

Features

- Max. 40 axes: 32-axis RTEX Interface and 10Mpps pulse train position command for 8 axes.
- Synchronization of axes controlled by RTEX and those controlled by pulse train output is possible.
- Windows Real-time software PLC using the C-like multiprocessing machine control language "MOS language."
- Windows7 Professional 64 bit and 32 bit are supported.
- Windows10 IoT Enterprise LTSB High End is supported.
- DIN, DOUT, AD, DA, RS232, and RS485 can be controlled in real time as well as motion control boards.

General Purpose 32/32 Input/Output Board
InterMotion Series JOY-RIO3232

Features
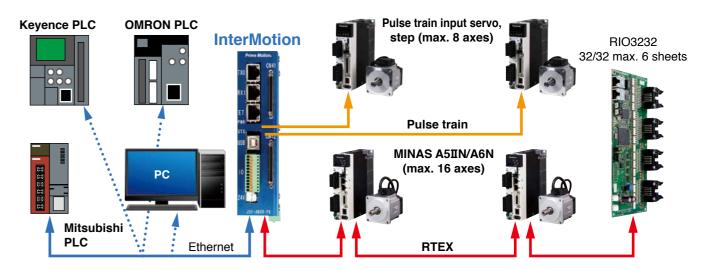
- Single board with 32 IN points and 32 OUT points
- 10 PIN connector for 8-point IN and 8-point OUT. Can be directly connected to terminal block PRS-DG10-O8 (TOYOGIKEN Co., Ltd).
- 24 V DC supply

Specification

Item	Description
Input	32 points (8 points × 4 ports), 24 V$_{DC}$, 4.7 kΩ
Output	32 points (8 points × 4 ports), 24 V$_{DC}$, 100 mA
Max. No. of connectable boards	6 (IN 192 points, OUT 192 points)

System Configuration

Keyence PLC

OMRON PLC

InterMotion

Pulse train input servo, step (max. 8 axes)

RIO3232 32/32 max. 6 sheets

Pulse train

MINAS A5ⅡN/A6N (max. 16 axes)

PC

Mitsubishi PLC

Ethernet

RTEX

Sales area

- Japan
- Taiwan
- China
- Korea

Language

- Japanese

Please contact the following address directly in Japanese.
Note) Now preparing for a document in English.

For more information

URL : https://primemotion.com/

Soft Servo Systems, Inc.

64-Axis Multi-Function Soft Motion Controller
WMX3 for Realtime Express

Features

RTEX and EtherCAT. Soft Motion technology gets the best of both worlds.

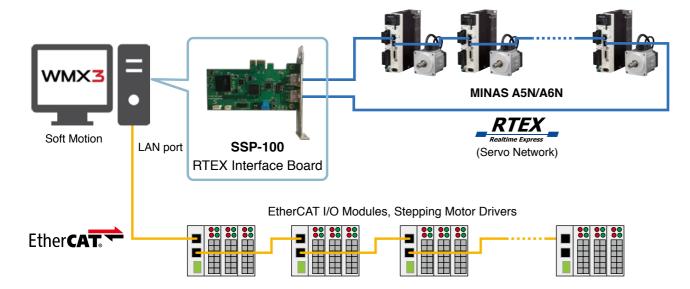- Proven high-performance motion controller WMX3 (patented) now supports "hybrid" networks that simultaneously communicate with the high-speed networks RTEX and EtherCAT. Up to 64 axis synchronous control is possible.
- Applying RTEX to the servo network and EtherCAT to the sub-network enables using cost effective EtherCAT I/O modules.
- Advanced functions such as gantry control and various acceleration/deceleration profiles can be easily realized.

WMX3

Soft Motion

LAN port

SSP-100
RTEX Interface Board

MINAS A5N/A6N

RTEX
Realtime Express
(Servo Network)

EtherCAT I/O Modules, Stepping Motor Drivers

EtherCAT

\<Advantages of hybrid controls\>

If you feel...	Hybrid Network can provide solutions
☑ Not enough I/O points left for operations.	➡ High-performance RTEX servo network for axis control requiring high synchronization
☑ A large number of nodes sacrifices the communication cycle.	➡ High cost performance EtherCAT modules for I/O control and stepper motors.
☑ I/O modules are too costly.	➡ Soft motion enables high-speed real time control over the servo network and I/O network.
☑ Want to choose the right I/O module from a lot of options.	

Integrated into one PC. Slimming. Networking.

- WMX3 enables the integration of operation screens, image processing, and motion control applications of up to 64-axis for a slimmer control device.
- Reduced wiring man-hours and material costs by reducing wiring through networking. Contributes to noise immunity.
- Use a commercially available Windows PC: Users can freely choose between PCs for small embedded applications as well as high-spec industrial applications depending on the user's application and concept.

Specification (RTEX)

Interface Board (SSP-100)	Low Profile PCI Express, Supports 32-Axis RTEX Communication (64 Axes with two Boards)
Number of control axes	Maximum 64 axes (CP, PTP. when using two SSP-100 boards)
Interpolation Types	Linear (Maximum 32-axis), Arc (2-axis), 3D Arc (3-axis), Helical (3-axis)
Communication/ Command Cycle	0.25 ms (16-axis), 0.5 ms (32-axis), 0.5 ms (64-axis, requires two SSP-100 Boards)
Command Modes	Position, Velocity, Torque

Specification (Motion)

Positioning	64-axis * Simultaneous override (Dynamic destination can be changed)
Acceleration / Deceleration Profiles	Speed curve: Trapezoid, S-Curve, Jerk, Two-Step Speed, Acceleration time specification trapezoid, Acceleration curve: S-Curve, Quadratic Curve, Sine Curve
Interpolation Types	Linear, Arc, 3D Arc, Helical, PVT
Continuous Trajectory	Combination of straight line and Arc, Spline interpolation, Automatic prefetch speed control, Linear / Circular continuous trajectory with rotating stage
Gantry Control	Complete synchronous gantry control
Event	Register triggers (reach axis target value, I / O input, etc.) and actions (start axis movement, I / O output, etc.) and execute real-time operations
API Buffer	Register the motion API in the buffer and perform real-time operation. Execution waits and branches can be made depending on conditions.
Position synchronization output (PSO)	Real-time output of I / O at the specified position (position comparison performance depends on the communication cycle). When more precise operation is required, position comparison at 1 pulse level is possible with a dedicated hardware option.
Synchronization Control	Simple synchronization, synchronous gear ratio / offset specification, synchronization deviation correction, dynamic synchronization axis setting / change / cancel. Multiple axes (up to 32 sets for EtherCAT and up to 32 sets for RTEX) can be defined for single-axis to multi-axis synchronization.
Electronic Cam	8 cam curves can be defined. Cam curve for each communication cycle. Phase manipulation. clutch.
Return to Origin	Index pulse, origin sensor, limit sensor, limit proximity sensor, external input signal, mechanical end, etc. It is possible to return to the origin of the gantry axis.
I/O	11600 inputs / 11600 outputs, Supports most commercial EtherCAT I/O modules
Compensation Function	Pitch error, Backlash, Straightness correction
API Supported Language	C Language (C/C++), .NET Languages (C#,VB), .NET Framework: 4.0 or later
Development Environment	Microsoft Visual Studio 2012, 2013, 2015, 2017, LabVIEW, Python 3.6
Recommended Operating Environment	OS: Windows 7(32-bit/64-bit), Windows 10 (64-bit), IoT Enterprise LTSC CPU: Min. ATOM 2 GHz (E3845, etc.) 2 cores or more, Memory: 4 GB or more

Sales area

- Japan
- China
- United States of America
- Korea
- Taiwan

Language

- English
- Korean
- Japanese
- Chinese

For more information

URL WMX3 for RTEX : https://softservo.co.jp/technology/platform/rtex/

Contact: **Soft Servo Systems, Inc.**   [E-mail: sales@softservo.com]

3-1-13 AS Building 2F, Nishiki-cho, Tachikawa, Tokyo 190-0022, Japan

TEL: +81-42-512-5377   FAX: +81-42-512-5388

SYNTEC Ethernet-base Controller

Features

- Provide eHMI application for users to customize operation interface conveniently.
- Customized G/M code, dedicated machine can be used easily.
- Provide dipole architecture, users can integrate the customized software on PC.
- Provide optional vision system or pick-and-place equipment for highly automated integration solutions.
- Also supports EtherCAT communication

SYNTEC –E Controller | Keyboard | Control Panel for Mill | Control Panel for Lathe

Specification

Item	Description			
Type	General Mill-Turn	Multi-Function Milling	Multi-Axis Group Mill-Turn	Five-Axis
	21TA-E	21TB-E	21MA-E	210TB-E5	210MB-E5
Axis no.	4	6(8)	6	12(16)	12(16)
DA	2		2	2	2
Max I/O	96/96		96/96	128/128 (RIO, M3IO, SRI)	128/128
Display	8"/10.4"		8"/10.4"/15"	8"/10.4"	10.4"
Servo	RTEX/ECAT		RTEX/ECAT	RTEX/ECAT	RTEX/ECAT
VGA	—		—	1	○*
Connection	Ethernet/RS485/SRI		Ethernet/RS485/SRI	Ethernet/RS485/SRI	Ethernet/RS485/SRI
Multi-Program No.	2		2	4	4
Memory	512 MB		512 MB	4 GB	4 GB
RTCP	—		—	△	△
HPCC	—		—	△	○

* VGA is only provided for the rear half.
- Marking: "○" denotes standard function; "△" denotes optional function; "—" denotes none.
- There are other SYNTEC Ethernet-base Controllers, only a few representatives are listed.

Application Sample

- **Standard Machine:**
  Lathe, milling machining center, engraving and milling machine, mill-turn machine.
- **Dedicated machine:**
  Tapping center, glass cutting machine, cutter grinding machine, PCB molding machine, spring machine, laser processing machine, flame cutting machine, stone processing machine...etc.
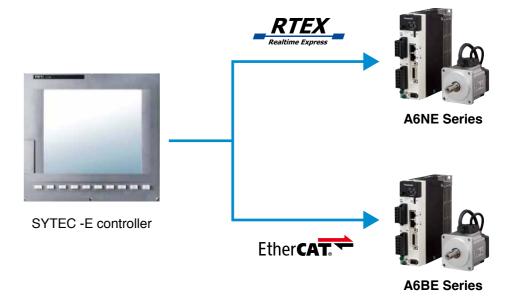
System Configuration

RTEX
Realtime Express

A6NE Series

SYTEC -E controller

EtherCAT

A6BE Series

Sales area

- Taiwan
- China
- United States of America
- Malaysia
- Thailand
- Vietnam
- Turkey
- Indonesia

Language

- English
- S/T Chinese

For more information

URL : https://www.syntecclub.com

TIETECH **TIETECH Co.,Ltd.**

PCI Motion Control Board
169002-MBP-LE01/01, etc.

Features

Motion control board best suited to build motion control system

● **32 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/O 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	–	○
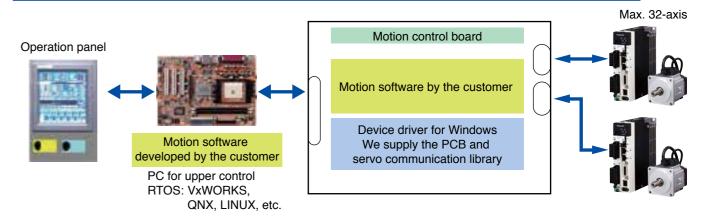
Item		Description	Remarks
Architecture	**CPU**	SH4 HD6417750R 200 MHz	
	Memory	FLASH ROM 8 MB SDRAM 16 MB SRAM 128 KB EEPROM 8 KB Shared memory 128 KB	with backup function For data transfer
Servo interface	**Connector**	RJ-45 × 2	
	Interface	Compatible with MINAS A4N/A5IIN series	
External input		2 PORT (with sink/source switching)	
External output		1 PORT (with sink/source switching)	
Remote I/O		CUnet	
Serial interface specification	**Interface**	RS-485	MKY40 (Step Technica Co., Ltd.)
	Transmission rate	115.2 kbps (Max.)	
Compatible OS		Microsoft Windows XP	If you use a different OS, consult us.

Application Sample
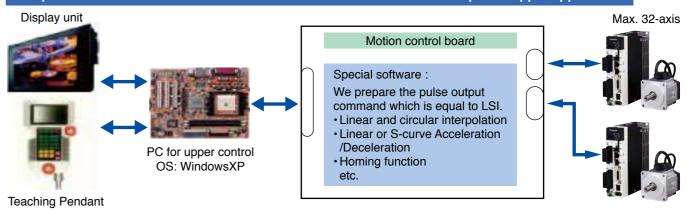
● Semiconductor equipment
● Chip-Mounter
● Machine tool
● Industrial Robot

System Configuration

Sample 1 : In case that the customer develops the motion software

Operation panel

Max. 32-axis

Motion control board

Motion software by the customer

Device driver for Windows
We supply the PCB and
servo communication library

Motion software
developed by the customer

PC for upper control
RTOS: VxWORKS,
QNX, LINUX, etc.

Sample 2 : In case that the customer uses installed software and develops the upper application.

Display unit

Max. 32-axis

Motion control board

Special software :
We prepare the pulse output
command which is equal to LSI.
・Linear and circular interpolation
・Linear or S-curve Acceleration
 /Deceleration
・Homing function
 etc.

PC for upper control
OS: WindowsXP

Teaching Pendant

Sales area

・ Japan   ・ China

Language

・ English
・ Japanese

For more information

URL : http://www.tietech.co.jp/english/index.html (Japan)
URL : http://www.tietech.com.cn (China)

Contact: **TIETECH Co.,Ltd.**
1-3-4 Shioya-cho, Minami-ku, Nagoya 457-0078, Japan   TEL: +81-52-824-7375 FAX: +81-52-811-4737

PLC Motion Unit

B3632101-UNT-LE02

Features

PLC motion unit best suited to build motion control system

A4N/A5 Ⅱ N series Servo drive compatible

- **32 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.)

Yokogawa Electric e-RT3 2.0 series PLC compatible

- **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.

Specification

Specification	
Max. No. of control axes	32
Positioning data quantity	No limit
Computing period	1.0 ms
PLC connection	PCI
Interface to servo drive	RTEX 100 Mbps
Continuous servo drive	MINAS A4N/A5ⅡN series
Emergency stop input	According to host PLC specification [*1]
External signal interface	According to host PLC specification [*1]
Manual signal pulser interface	According to host PLC specification [*1]
Various monitoring	High-speed data processing via PCI bus
Interpolation	Linear, arc, continuous, multiplex, helical pressure control [*1]

*1 May be separately defined.

| Item			Description		Remarks
CPU			SH4 7750R 200 MHz (Renesas) Peripheral clock 50 MHz Bus clock 50 MHz		
Memory	ROM	Flash ROM	8 Mbyte		
		EEPROM	8 kbyte		
	RAM	SDRAM	8 Mbyte		
		DPRAM	256 kbyte		
Bus	PCI bus interface	Bus width	32-bit		
		Clock	33 MHz PCI Rev.2.3 compatible		
Power supply	Internal power supply	Main power supply	5 V/ 3.3 V		
		CPU power supply	3.3 V, 1.5 V		
		FPGA	3.3 V, 2.5 V, 1.2 V		
Watchdog function	WDT	Watching time	1.6 s		
Monitor	LED	2 points	RUN Green	Blinks during operation	
			LINK Green		
Communication	RS232C	1-ch			
	RTEX	1-ch			
Setup	DIPSW	Universal input 4 For JTAG.ICE connection 1 For FPGA setting 2			
OS		VxWorks6.4			

Application Sample

- Semiconductor equipment
- Chip-Mounter
- Machine tool
- Industrial Robot

System Configuration

Sample 1 : In case that the customer develops the motion software

Operation panel

Motion software developed by the customer

PC for upper control
RTOS: VxWORKS, QNX, LINUX, etc.

Max. 32-axis

Motion control board

Motion software by the customer

Device driver for Windows
We supply the PCB and servo communication library

Sample 2 : In case that the customer uses installed software and develops the upper application.

Display unit

PC for upper control
OS: WindowsXP

Teaching Pendant

Max. 32-axis

Motion control board

Special software :
We prepare the pulse output command which is equal to LSI.
・Linear and circular interpolation
・Linear or S-curve Acceleration /Deceleration
・Homing function etc.

Sales area

- Japan
- China

Language

- English
- Japanese

For more information

URL : http://www.tietech.co.jp/english/index.html (Japan)
URL : http://www.tietech.com.cn (China)

TRIO Trio Motion Technology Ltd.

Motion Coordinator and RTEX Interface Module
MC664 / MC664-X

Features

- Up to 128 Axes
- Servo period 50 µsec minimum (8 axes)
- Precise 64 Bit Motion Calculations with Quad Core Cortex A9 1 GHz Processor (P862)
- Dedicated Communications Core (P862)
- Built-in EtherCAT Port
- EtherCAT, Sercos, SLM and RTEX Digital Drive Interfaces
- Linear, Circular, Helical and Spherical Interpolation
- Flexible CAM shapes, Linked Motion
- EnDAT, BISS and SSI Absolute Encoder Supported
- Hardware Linked Outputs for Camera / Laser Control
- Ethernet-IP / Modbus TCP / Ethernet Interface Built-In

- Anybus-CC Module for Flexible Factory Comms Including ProfiNet/Profibus
- IEC 61131-3 Programming
- Multi-tasking BASIC Programming
- Text File Handling
- Robotic Transformations
- SD Memory Card Slot
- CANopen + EtherCAT I/O Expansion
- Backlit LCD Display
- RoHS and CE Approved

Specification

MC664 / MC664-X

Item		Description
Configuration	Axis 0	Extended
Axes	Max axes	128
	Max discrete wired axes	24
	Max Networked axes	128 (P862) 64 (P861)
	Max virtual axes	128
Performance	Processor	ARM A9 (Single/Quad core)
	Clock frequency	1000 MHz (Max)
	Servo update rate	2 ms (4 ms = MC664) –50 µs (8 axes at 50 µs)
	Encoder input frequency	6 MHz
	Stepper output frequency	2 MHz
	User memory	8 Mbyte
	Max data table size	512000
	Flash data memory	32 × 16000
	VR	65536
	Position register precision	64 bit
	Maths precision	Double FP
	Real time clock	Yes
Drive Interfaces	Stepper (Step & Direction)	Option
	Servo (±10 V & Encoder)	Option
	Piezo	Option
	Panasonic RTEX	Option
	Hydraulic	Option
	EtherCAT	YES/Option
Communication	Profibus	Option
	DeviceNet	Yes (slave)
	CANopen	Yes (server)
	USB (V1.1)	Option
	Ethernet (10/100) base-T	Yes
	Ethernet IP	Yes (server)
	MODBUS-RTU	Yes
	MODBUS-TCP/IP	Yes
	RS232/RS485	Yes
	CC-Link	Option
	ProfiNet	Option
	Bluetooth	Option
	Anybus support	Option
	Hostlink	Yes

Item		Description
Encoder Ports	Feedback input	Option
	Reference input	Yes
	Pulse + direction output	Yes
	Incremental (A+B) output	Yes
	SSI Absolute	Yes
	EnDat	Yes
	Biss	Yes
Built-In I/O	Inputs 24 VDC	8
	Bi-directional I/O 24 VDC	8
	0 - 10 V analogue inputs	2 × 12 bit
	# registration inputs	58 max
	Registration input speed	1 µs
	WDOG output	1
Expansion I/O	Digital I/O points	2048 on EherCAT
	12 bit ±10 V analogue inputs	32
	12 bit ±10 V analogue outputs	16
Programming	TrioBASIC	Yes
	# programs	32
	# tasks	22
	IEC61131 Runtime	Yes
	Kinematic Runtime	Option
	G-Code	Application option
	HPGL	Application option
	DXF import	PC application
Software	Motion Perfect v4	Yes
	All Support Software	Yes
Expansion	Max expansion modules	6 + 1
	Memory slot card	SD up to 16 GB
Physical	Width × Height × Depth (mm)	56 × 201 × 155
	Weight	750 g
	Mounting	DIN / Panel
	Operating Temp	0 - 45 °C
Power	Supply Voltage DC	24 V
	Consumption (exc. I/O)	625 mA
Certification	CE approval	Yes
	RoHS Compliant	Yes

Item	Description	Item	Description
RTEX Interface Specification			
Network	Ethernet based MINAS A4N / A5N / A6N	Bus to MC664	32 Bit
Network Speed	100 Mbps 1 msec or 500 usec update operation	Registration Inputs	8 × 24 V Inputs + 1 Drive Registration Input / Axis
Topology	Ring	Optically Isolated registration inputs	Yes
Max Slaves per Interface Ring	32	Map Any I/O to Any Axis	Yes
Max Interfaces per MC664	6 (7 with Ethercat)	Supported Modes	Cyclic Position, Cyclic Speed, Cyclic Torque
Max Axes per MC664	128	Axis Feature Enable Codes	P914
Cable	STP Cat 5-e or Better	Certification	UL and CE marked for EMC RoHs Compliant
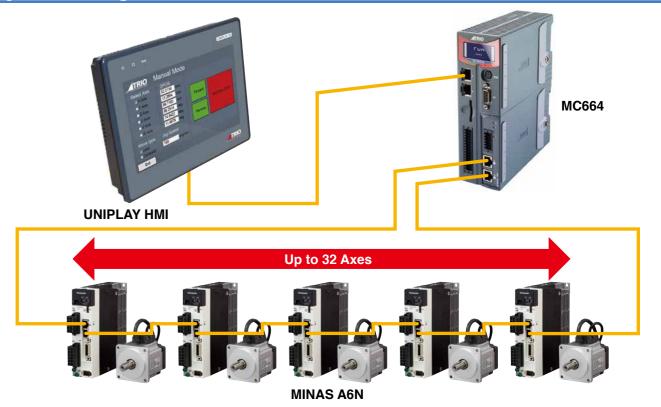
Application Sample

URL : Sample applications

http://www.triomotion.uk/public/applications/applications.php

Please refer to the sample and typical applications for the MC464 with A6N as shown above URL.

System Configuration

MC664

UNIPLAY HMI

Up to 32 Axes

MINAS A6N

Sales area

- United Kingdom
- China
- United States of America
- India

Language

- English

Please contact the following address for details.

For more information

URL: Panasonic Expansion Module

http://www.triomotion.uk/public/products/clipOnExpansion.php?tabno=1

URL: The specifications for the MC664

http://www.triomotion.uk/public/products/p862.php

Contact: **Trio Motion Technology Ltd.**
Shannon Way, Tewkesbury, Gloucestershire, GL20 8ND, United Kingdom TEL: +44-1684-292333 FAX: +44-1684-297929

TRIO Trio Motion Technology Ltd.

Motion Coordinator and RTEX Interface Module

MC4N-RTEX

Features

- Up to 32 RTEX Digital Drive Axes
- Supports Position, Speed and Torque Drive Modes
- Up to 1024 I/O
- Linear, Circular, Helical and Spherical Interpolation
- Flexible CAM shapes, Linked Motion
- Isolated Encoder Port
- EnDAT and SSI Absolute Encoder Supported
- Hardware Linked Output for Camera / Laser Control
- Ethernet-IP / Modbus TCP / Trio ActiveX /TCIP / Uniplay HMI / UDP / Ethernet Interface Built-In
- Precise 64 Bit Motion Calculations with 532 MHz ARM 11 Processor

- IEC 61131-3 Programming
- Multi-tasking BASIC Programming
- Text File Handling
- Robotic Transformations
- 4 high speed registration inputs
- Isolated RS232 and RS485 ports
- SD Memory Card Slot
- CANopen I/O Expansion
- Backlit LCD Display
- RoHS and CE Approved

Specification

Item		Description		Item	Description
MC4N-Mini RTEX					
Configuration	Axis 0	Extended	Built-in I/O	Inputs 24 VDC	8
Axes	Max axes	32		Bi-directional I/O 24 VDC	8
	Networked axes	32		# registration inputs	4
	Max virtual axes	32		Registration input speed	1 µs
Performance	Processor	ARM11		WDOG output	1
	Clock frequency	532 MHz	Expansion I/O	Digital I/O points	1024
	Servo update rate	1 ms - 500 µs		12 bit ±10 V analogue inputs	32
	Encoder input frequency	6 MHz		12 bit ±10 V analogue outputs	16
	Stepper output frequency	2 MHz	Programming	TrioBASIC	Yes
	User memory	8 MByte		# programs	32
	Max data table size	512000		# tasks	22
	Flash data memory	32 × 16000		IEC61131 Runtime	Yes
	VR	4096		Kinematic Runtime	Option
	Position register precision	64 bit		G-Code	Application option
	Maths precision	Double FP		HPGL	Application option
	Real time clock	Yes		DXF import	PC Application
Drive interfaces	Panasonic RTEX	Yes	Software	Motion Perfect v4	Yes
	Auxiliary Axis	Yes		All Support Software	Yes
Communication	DeviceNet	Yes (slave)	Expansion	Memory slot card	SD
	CANopen	Yes (server)	Physical	Width × Height × Depth (mm)	40 × 157 × 120
	Ethernet (10/100) base-T	Yes		Weight	432 g
	Ethernet IP	Yes (server)		Mounting	Panel
	TCIP Client	Yes		Operating Temp	0 - 45 °C
	MODBUS-RTU	Yes	Power	Supply Voltage DC	24 V
	MODBUS-TCP/IP	Yes		Consumption (exc. I/O)	350 mA
	RS232/RS485	Yes	Certification	UL Listed	Yes
	Hostlink	Yes		CE approval	Yes
Encoder ports	Reference input	Yes		RoHS Compliant	Yes
	Pulse + direction output	Yes			
	Incremental (A+B) output	Yes			
	SSI Absolute	Yes			
	EnDat Abs	Yes			

| Item	Description	Item	Description
RTEX Interface Specification			
Max Slaves per Interface Ring	32	Optically Isolated registration Inputs	Yes
Max Axes per MC664	128	Map Any I/O to Any Axis	Yes
Cable	STP Cat 5-e or Better	Supported Modes	Cyclic Position, Cyclic Speed, Cyclic Torque
Bus to MC664	32 Bit	Axis Feature Enable Codes	P914
Registration Inputs	8 x 24V Inputs + 1 Drive Registration Input / Axis	Certification	UL and CE marked for EMC RoHs Compliant
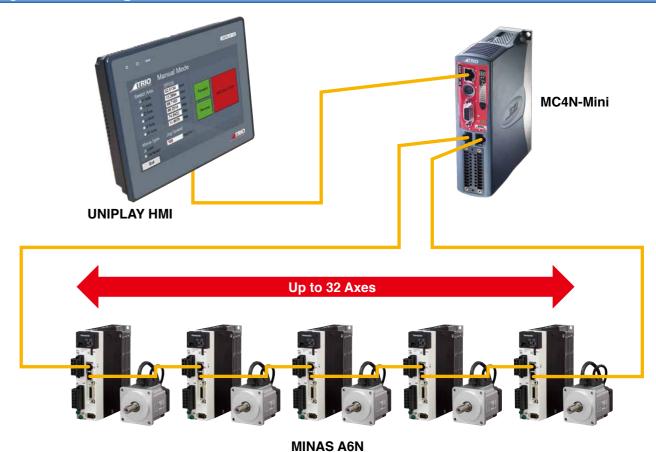
Application Sample

URL : Sample applications

http://www.triomotion.uk/public/applications/applications.php

Please refer to the sample and typical applications for the MC4N with A6N as shown above URL.

System Configuration

UNIPLAY HMI

MC4N-Mini

Up to 32 Axes

MINAS A6N

Sales area

- United Kingdom
- China
- United States of America
- India

Please contact the following address for details.

Language

- English

For more information

URL: Specification for the MC4-N RTEX Mini Master

http://www.triomotion.uk/public/products/p906.php

Contact: **Trio Motion Technology Ltd.**
Shannon Way, Tewkesbury, Gloucestershire, GL20 8ND, United Kingdom   TEL: +44-1684-292333   FAX: +44-1684-297929

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/O and AI/O 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 mm^2 to 1.25 mm^2: transmission only (D, G) · General purpose (VCTF) 4-core /0.75 mm^2 to 1.25 mm^2: including power supply (D, G, 24 V, 0 V) · Other general purpose cables /0.9 mm^2 to 1.25 mm^2: e.g. parallel · Special flat cable /0.75 mm^2 to 1.25 mm^2: including power supply (D, G, 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.

Sales area

· Japan

Only Japanese is used for inquiry over the phone.
When making an inquiry in English, please send it to the following address.

Language

· English
· Japanese

For more information

URL: http://www.anywire.jp/

Contact: **Anywire corporation   Headquarters**   [E-mail: info_e@anywire.jp]
1 Babazusho, Nagaokakyo-city, Kyoto 617-8550, Japan
TEL: +81-75-956-4911(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_e@anywire.jp.

RTEX partner products

【Corresponding table】

Partner	Master				Slave							
	PCI	PCI-e	Stand Alone	PLC	Digital I/O	Analog I/O	Pulse Output	Stepper Driver	Counter	Gateway	Motor Driver	Servo
Panasonic Corporation				●								●
ACE Automation Co., Ltd.												
AJINTEK CO., LTD.	●	●			●	●	●		●			
Anywire Corporation										●		
Asahi Engineering Co., Ltd.			●						●			
Aurotek Corporation	●				●		●					
BDF DIGITAL												●
COSMOTECHS	●	●	●	●	●	●	●					
eMotionTek Co., Ltd.			●									
Leadshine Technology Co., Ltd.								●				
PAIX CO., LTD.			●									
Prime Motion Inc.	●	●	●		●							
Soft Servo Systems, Inc.	●											
SYNTEC Technology Co., Ltd.			●									
TIETECH Co., Ltd.	●			●								
Trio Motion Technology Ltd.			●									

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 °C to +85 °C
Package	LQFP100pin 14 mm × 14 mm Lead pitch 0.5 mm
RoHS	Compliant
Operation mode	Master/slave

Note: As long as the target is noncompetitive to Panasonic products.

EtherCAT communication driver

MINAS A6B series

Manufacturer/Distributor: **Panasonic Corporation**

EtherCAT

High-Performance

- Frequency response: **3200 Hz**
- Supports network communication "**EtherCAT**".
- High-Speed **100 Mbps**
- Real-time auto tuning function, Anti-vibration filters are available.

Operability

- Smallest **EtherCAT** drive in market.
- **Wireless connection** using wireless LAN dongle (option)
  - Wireless connection with PC and smartphone via access point by just mounting to servo driver.
- Supports pc setup software "**PANATERM**"
- Lifespan diagnosis/Deterioration diagnosis
  - Warning output for Servo (motor and driver) lifespan and machine deterioration limit.
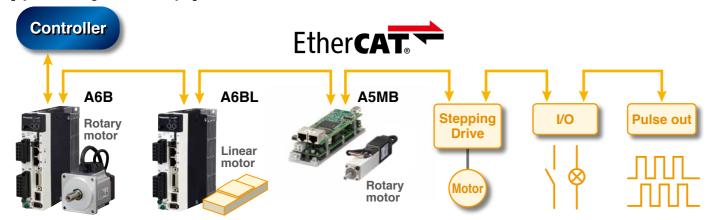

- Record/play objects by waveform function
- Status monitor (with playback function)
- Deterioration diagnosis setting screen

Standards

EtherCAT

- Official EtherCAT Conformance Tested model available.
- IEC safety I/F model available.[1] [1]:Supported by multifunction type. EN61800-5-2 STO, EN61508 SIL3.

High-functions

- **EtherCAT** with many supported applications
  <7 control modes, 32 hm methods, DC(Synch), SM2(Synch), FreeRUN (Non-synch)>
- System-up possible with various slaves.
- Supports PC-based controller.
- A6BL/A6BM (for Linear Motor) will be available soon.

Wireless LAN Dongle (Option)

[System configuration example]

Controller

EtherCAT

- **A6B** — Rotary motor
- **A6BL** — Linear motor
- **A5MB** — Rotary motor
- **Stepping Drive** — Motor
- **I/O**
- **Pulse out**

EtherCAT specification for A6B series

Device profile	CoE (CANOpen over EtherCAT)
Control mode	csp, pp, hm, csv, cst, pv, tq
hm method (homing mode)	1 to 14, 17 to 30, 33, 34, 35, 37
Synchronized mode	DC (Synch.), SM2 (Synch.), FreeRUN (Non-synch.)
Supported cycle time	125 μs, 250 μs, 500 μs, 1 ms, 2 ms, 4 ms

Drive list

Drive power supply		Motor rated output												
		50 W	100 W	200 W	400 W	750 W	1 kW	1.5 kW	2 kW	3 kW	4 kW to 5 kW	7.5 kW	11 kW to 15 kW	22 kW
1-phase 100 to 120 VAC	Frame	A	A	B	C									
	Driver Part No.	MADL□01B☆	MADL□11B☆	MBDL□21B☆	MCDL□31B☆									
1 or 3-phase 200 to 240 VAC	Frame	A	A	A	B	C	D	D						
	Driver Part No.	MADL□05B☆		MADL□15B☆	MBDL□25B☆	MCDL□35B☆	MDDL□45B☆	MDDL□55B☆						
3-phase 200 to 230 VAC	Frame								E	F	F	G	H	H
	Driver Part No.								MEDL□83B☆	MFDL□A3B☆	MFDL□B3B☆	MGDLC3BF	MHDLE3BF	MHDLF3BF
3-phase 380 to 480 VAC (Under development)	Frame					D	D	E	F	F	G	H	H	
	Driver Part No.					MDDLT54BF	MDDLT64BF	MEDLT84BF	MFDLTA4BF	MFDLTB4BF	MGDLTC4BF	MHDLTE4BF	MHDLTF4BF	

- Because there is the case that is different from the part number in the table by the motor, please check the combination in the catalog of the A6 series always.
- □ : Drivers specification..... N : Without safety function   T : With safety function
- ☆ : Drivers specification..... E : For rotary motor (standard)   F : For rotary motor (multifunction)
  - L : For linear/DD motor (standard)   M : For linear/DD motor (multifunction)*
  - * 400 V specification, G frame and H frame are only multi-function type

Compliance

CE   c**UL**us   c(UL)us LISTED   BAUART GEPRÜFT TYPE APPROVED   TÜV SÜD   KC   RoHS
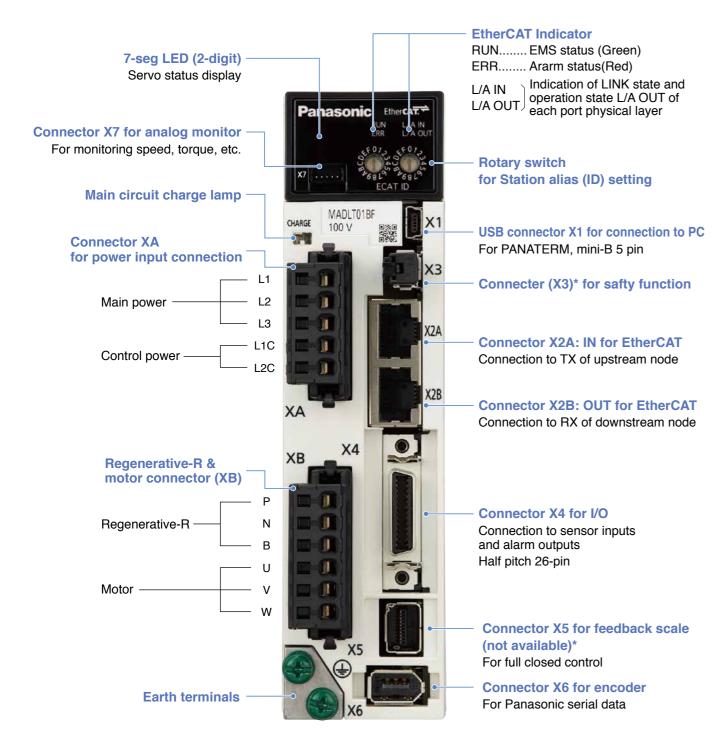
EtherCAT communication driver

MINAS A6B series

Drive appearance

A6B size A

* This photo shows multi-functional type. Standard type does not have X3 and X5 connectors.
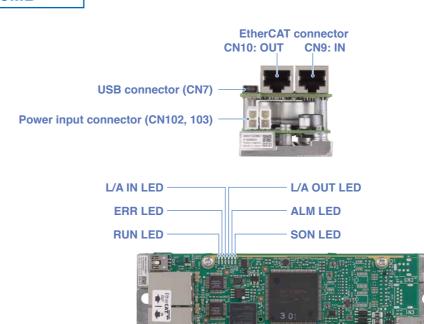
7-seg LED (2-digit)
Servo status display

EtherCAT Indicator
RUN........ EMS status (Green)
ERR........ Ararm status(Red)

L/A IN ⎫ Indication of LINK state and
L/A OUT ⎭ operation state L/A OUT of each port physical layer

Connector X7 for analog monitor
For monitoring speed, torque, etc.

Rotary switch for Station alias (ID) setting

Main circuit charge lamp

Panasonic EtherCAT
MADLT01BF
100 V
ECAT ID

Connector XA for power input connection

USB connector X1 for connection to PC
For PANATERM, mini-B 5 pin

L1
L2
L3
Main power

L1C
L2C
Control power

Connecter (X3)* for safty function

Connector X2A: IN for EtherCAT
Connection to TX of upstream node

Connector X2B: OUT for EtherCAT
Connection to RX of downstream node

XA

XB X4

Regenerative-R & motor connector (XB)

P
N
B
Regenerative-R

U
V
W
Motor

Connector X4 for I/O
Connection to sensor inputs and alarm outputs
Half pitch 26-pin

Connector X5 for feedback scale (not available)*
For full closed control

X5

Earth terminals

X6

Connector X6 for encoder
For Panasonic serial data
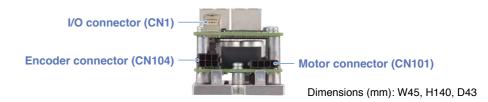
Dimensions (mm): W40 × H150 × D130

Low voltage small servo MINAS A5MB (DC24 V/48 V 10 W to 30 W)

● This product is not A6B, but A5B series for specific customers. For more details, refer to the specifications.

Drive appearance

A5MB

EtherCAT connector CN10: OUT CN9: IN

USB connector (CN7)

Power input connector (CN102, 103)

L/A IN LED   **L/A OUT LED**
ERR LED   **ALM LED**
RUN LED   **SON LED**

Earth terminal   **Charge lamp**

I/O connector (CN1)

Encoder connector (CN104)   **Motor connector (CN101)**

Dimensions (mm): W45, H140, D43

List of drivers

Driver power		Rated output of motor		
		10 W	20 W	30 W
DC 24 V	Frame symbol		M	
	Driver model number		MMDHT2C09BD1	
DC 48 V	Frame symbol		M	
	Driver model number		MMDHT2B09BD1	

• Depending on the motor series, there may be a combination different from the model number in the table, so be sure to check the specifications.

EtherCAT compatible PCL motion control unit

FP7 series

EtherCAT®

- **A single FP7 Motion Control Unit can control 64 axes of MINAS A5B, A6B and 32 virtual axes.**
- **Up to 32 synchronous groups (32 groups of 2 axes to 2 groups of 32 axes)**
- **Control system: Cyclic position control**
- **Equipped with SD memory card. Communications log can be analyzed at startup which makes debugging easy.**
- **Through use of Web server function on FP7 CPU unit, remote monitoring is possible of things such as torque, speed and position of the motor.**

| FP7 CPU | 16 axes type | 32 axes type | 64 axes type |

Specification

■ Motion Control Unit

Product name	Number of axis		Part No.
	Real axis	Virtual axis	
Motion Control Unit EtherCAT type	16	8	AFP7MC16EC
	32	16	AFP7MC32EC
	64	32	AFP7MC64EC

■ Motion Control Setting Tool

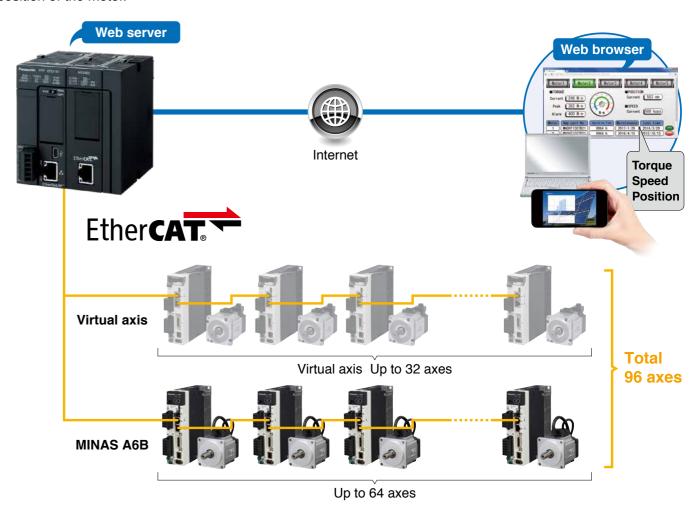| Product name	Description	Part No.
Motion control setting tool Control Motion Integrator	Windows version. Downloadable free of charge from our website. Please purchase Key unit separately.	AFPSMTEN
Control Motion Integrator Key unit	License key for Control Motion Integrator. 1 license. For USB port.	AFPSMTKEY

Control Motion Integrator facilitates setting of parameters such as the unit's motion control parameter.

System Configuration

A single FP7 Motion Control Unit can control 64 axes of MINAS A5B, A6B and 32 virtual axes. Through use of Web server function on FP7 CPU unit, remote monitoring is possible of things such as torque, speed and position of the motor.

Web server

Web browser

Internet

Torque Speed Position

Virtual axis

Virtual axis Up to 32 axes

MINAS A6B

Up to 64 axes

Total 96 axes

Application Sample

- Semiconductor manufacturing system
- LCD/FPD manufacturing device
- Electronic component manufacturing device
- Industrial machine
- Food processing machine
- Automatic warehouse system
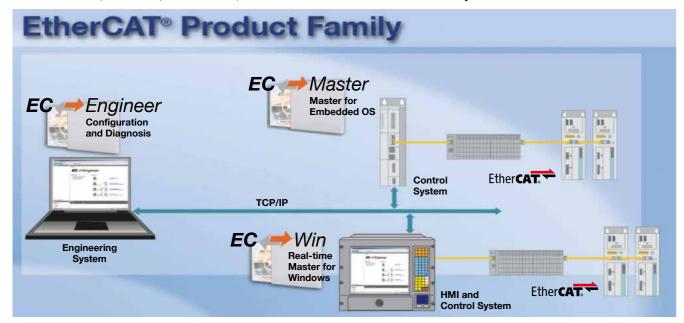- Physical distribution conveyance system

EtherCAT

EtherCAT® Product Family

Features

EtherCAT® Master Stack software, available for real-time OS as well as Windows
- Ready-to-run implementations for many embedded operating systems
- EC-Win: high performance Windows Real-time extension included to achieve up to 50 μsec cycle time on Windows!
- Use multiple CPU cores on Windows for distributed EtherCAT applications
- CPU architectures: x86, ARM, PowerPC, SH, MIPS
- Reliable and well proven in many customer applications worldwide. Market leading companies in the Semiconductor, Robotics, PLC/Motion, Measurement and other industries rely on this software.

Specification

EC-Master according to ETG.1500 Master Classes Directive

Class A Core
- Compare network configuration
- Cyclic process data exchange
- All mailbox protocols: CoE, SoE, EoE, FoE, AoE, VoE
- Slave to slave communication
- **Distributed Clocks with master synchronization**

Class B Core
- Compare network configuration
- Cyclic process data exchange
- Mailbox protocol CoE
- Mailbox protocol SoE
- Mailbox protocol EoE
- Slave to slave communication

Feature Pack Cable Redundancy	Feature Pack Hot Connect	Feature Pack Remote Access
Feature Pack Superset ENI	Feature Pack EoE Endpoint	Feature Pack Master Obj. Dict.

The ETG (EtherCAT Technology Group) has defined EtherCAT Master Classes (ETG.1500) with a well defined set of Master functionalities.

2 Master Classes are defined:
- Class A: Standard EtherCAT Master Device
- Class B: Minimum EtherCAT Master Device

Additional functionality is described by Feature Packs. Acontis supports all Feature Packs in industry proven quality.

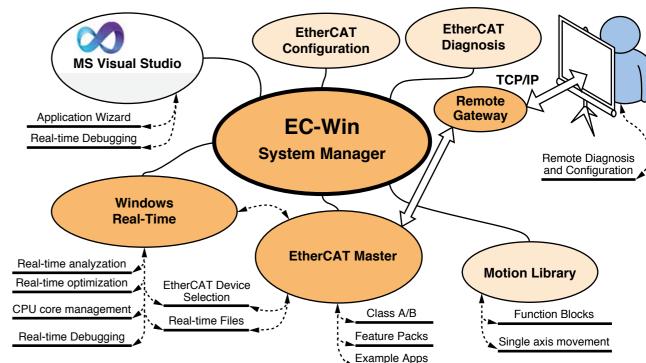## Application Sample

On Windows

Robotics	Semiconductor	CNC

On Embedded Systems

Industrial Automation	CNC	Test & Measurement

System Configuration

Sales area

- United States of America
- Japan   • Taiwan   • Korea   • China

Language

- English
- Japanese

For more information

URL : http://www.acontis.com/eng/index.php

Contact: **acontis technologies GmbH**
Gartenstr. 46, 88212 Ravensburg /Germany

[E-mail: sales@acontis.com]
TEL: +49-751-560-3030

EtherCAT Master Controller
Talos-3012

Features

- Powered by ADLINK Softmotion
- Supports IEC 61131-3-compliant programming environment
- Minimal control cycle time as low as 250 μs
- Motion control of up to 64 axes and up to 10000 I/O points of control
- Supports EtherCAT COE, FOE as well as EOE protocols
- Code executable when host Windows system crashed
- Built-in SD socket for logging manufacturing data
- 3 user-defined indicators for CTR diagnostic
- Rugged, compact construction with fanless design at −20 °C to 60 °C

EtherCAT®

Specification

Model Name	Talos-3012	
Processor	Intel® Atom™ Processor E3845 1.9 GHz	
Controllable Motion Axis	64	
Controllable I/O Points	Up to 10000 points	
Control Cycle Time	250 μs (min.)	
Memory	RAM (Program & Data Memory)	2 GB DDR3
	Retain Memory	Configurable on SD card
	Storage (Date Usage)	16 GB SSD / SD Card
Field Bus Connectivity	I for EtherCAT	
Ethernet Connectivity	I GbE	
System Indicators	3 User-defined	
Programming Environment	CoDesys v3	
	IEC 61131-3-Compliant	
Supply Voltage	9-32 VDC wide-range DC input	
Environment Certificate	Vibration: 5 Grms, 5 - 500 Hz	
	Shock: 50 G, Half Sine II ms duration	
	EMC: EN 550111 class A	
Operating Temperature	−20 °C to 60 °C (−4 °F to 140 °F)	
Dimension	120 (W) × 100 (D) × 55 (H) mm (4.68" × 3.9" × 2.17")	

Software Support

- **IEC-61131-3 compliant Environment**

  Support 5 different PLC Programming Languages

  - **LD**
  - **IL**
  - **FBD**
  - **ST**
  - **SFC**

- **ADLINK Softmotion Inside**

CODESYS   IEC 61131-3

EtherCAT Slave System and Modules
EPS Series

Features

- EtherCAT COE, FOE, AOE protocols supported
- Communication quality diagnostic
- Slave module status monitoring
- Wide operation temperature range: −20 °C to 60 °C
- Compact size: 130 (L) × 110 (W) × 105 (H) mm
- SMART mechanical design for convenient installation
- IEC-61131 compliant

EtherCAT

Specification

Model Name	EPS-9905 with EPS-6000
Installed Slots	5 (max.)
Protection Type	IP31
Hot Swap	Yes
Operating Temp.	−20 °C to 60 °C
Dimension (mm)	130 (L) × 110 (W) × 105 (H)
Weight (estimated)	< 1000 gram
Power Consumption	6.6 W
Supply Voltage	24 VDC (±10 %)
Environment Certificate	Vibration: 5 Grms, 5 - 500 Hz
	Shock: 50 G, Half Sine 11 ms duration
	EMC: EN 55011 class A

Model Name	EPS-1132	EPS-2032	EPS-2132
I/O Type	Digital Input	Digital Output	Digital Output
Channel	32	32	32
Hot Swap	Yes		
Input / Output Type	Sinking	Sourcing	Sinking
Input Range (by Voltage/Current)	IEC 61131-2 Type 1/3, 2.3 mA	–	
Sampling Rate	<1 ms	4 kHz	4 kHz
Resolution	–	–	–
Output Current Capacity	–	300 mA / ch	300 mA / ch
Connector Type	Phoenix Contact DFMC		

Model Name	EPS-2308	EPS-3216	EPS-3032	EPS-3504	EPS-4008	EPS-7002
I/O Type	Relay Output	Analog Input	Analog Input	Thermal Input	Analog Output	Motion Control
Channel	8	16	32	4	8	2
Hot Swap	Yes					
Input / Output Type	Relay	Differential	Single-ended /Differential	RTD	Single-ended	Pulse-Train
Input Range (by Voltage/Current)	–	0 mA to 20 mA	+/– 10 V	RTD (PT100, 500, 1000)	± 10 V	PUS/DIR: 4 MHz ENC: 20 MHz
Sampling Rate	5 ms	100 kHz	100 kHz	5 - 20 Hz	100 kHz	–
Resolution	–	16 bit	16 bit	24 bit	16 bit	32 bit
Output Current Capacity	AC: 125 V @ 0.5 A DC: 30 V @ 2 A	–	–	–	5 mA	–
Connector Type	Phoenix Contact DFMC					SCSI VHDCI 68p

Sales area

- Worldwide response

Language

- English
- S/T Chinese

For more information

URL : http://www.adlinktech.com/EtherCAT/index.php

Contact: **ADLINK Technology, Inc.**   [E-mail: service@adlinktech.com]

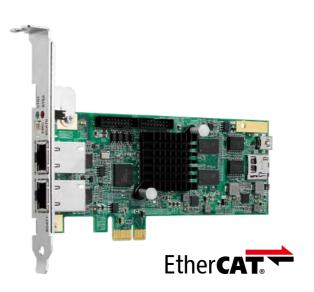9F, No.166 Jian Yi Road, Zhonghe District, New Taipei City 235, Taiwan   TEL: +886-2-8226-5877 FAX: +886-2-8226-5717

PCIe EtherCAT Master Motion Controller

PCIe-8338

Features

- PCI Express® x 1 compliant
- Up to 64-axis motion control & 10000 I/O point control via EtherCAT
- EtherCAT cycle times up to 250 µs
- Broad range of compatible EtherCAT slaves
- Dedicated emergency stop input
- 4CH isolated digital input/4CH isolated digital output
- 1CH pulsar input
- Point-table functions for contouring application
- Support for up to 16D linear interpolation, 3D circular and 3D spiral interpolation
- 8 program tasks downloadable for standalone application
- Card ID selection

Specification

Model Name	PCIe-8338
EtherCAT Cycle Time	1CH @ 250 µs / 500 µs / 1000 µs / 2000 µs
EtherCAT Motion	Up to 64 axes
EtherCAT I/O	Up to 10000 Points
Motion I/O Interface Signals	
Emergency Stop In	1CH
Isolated I/O Signals	
Digital Input	4CH (2CH configured as Pulsar Input)
Pulsar Input Mode	CW/CCW; 1x/2x/4x AB Phases
Pulsar Input Frequency	Up to 1 MHz
Digital Input Voltage	24 Vdc (typ.) / 5 Vdc for pulsar connection
Digital Input Type	Sourcing type
Digital Output	4CH, Isolated
Digital Output Voltage	24 V (typ.)
Digital Output Type	90 mA, NPN sinking type
General Specification	
Operating Temp	0 °C to +60 °C (32 °F to 140 °F)
Humidity	5 % to 95 %, non-condensing
Environmental Specification	
Safety compliance	CE/FCC, RoHS

EtherCAT Master Controller with 4CH GigE Vision Support

Talos-2000 Series

Features

- 6th Generation Intel® Core™ i7/i5/i3 Processor
- Up to 64-axis motion control & 10000 I/O point control via EtherCAT
- Up to 4CH Gigabit PoE (power over Ethernet)
- EtherCAT cycle time up to 250µs
- Broad AVL of EtherCAT slaves, PoE cameras
- Point-table functions enabling application contouring
- Support for up to 16D linear, 3D circular, and 3D spiral interpolation
- Easy installation and maintenance with flexible function extensions via Ethernet connection
- 4CH isolated digital input/4CH isolated digital output

Talos-2000 Series
EtherCAT-based Vision-integrated Automation Control System

EtherCAT Motion Control
Machine Vision Application
Reliable and Powerful Computing Ability

EtherCAT®
Modbus
GigE VISION
intel) IoT Solutions Alliance Premier

Specification

Model Name	Talos-2000
CPU	Intel® Core™ i7-6700 Intel® Core™ i5-6500 Intel® Core™ i3-6100 Intel® Celeron® G3900
Chipset	Intel® H110 chipset
System Memory	Up to 32 GB DDR4 at 2133 MHz
EtherCAT Comm.	1 CH @ 250 µs (min. cycle time)
EtherCAT Motion	Up to 64 axes
EtherCAT I/O	Up to 10000 points
Camera Interface	4-CH Gigabit power over Ethernet IEEE 802.3af compliant, total max. power output 32 W
Display	2x DisplayPort with resolutions up to 4096 x 2160
USB	4x USB 2.0 ports, 4x USB 3.0 ports (internal USB 2.0 x1)
COM Ports	1x RS-232/422/485, 3x RS-232
Emergency Stop In	1CH
Digital Input	4 CH (2 CH configured as Pulsar Input)

Pulsar Input Mode	CW/CCW; 1x/2x/4x AB Phases
Pulsar Input Frequency	Up to 1 MHz
Digital Input Voltage	24 VDC (typ.) / 5 VDC for pulsar connection
Digital Input Type	Sourcing type
Digital Output	4 CH, Isolated
Digital Output Voltage	24 V (typ.)
Digital Output Type	90 mA, NPN sinking type
Power Supply	DC 24 V, AT mode
Operating Temp	0 ˚C to +55 ˚C (32 ˚F to 131 ˚F)
Humidity	0 % to 90 %
Dimensions	232(W) x 181 (D) x 86.3 (H) mm
Power Consumption	Up to 160 W
Storage	One 2.5" SATA interface
Random Vibration	Operating 0.5 Grms, 5-500 Hz, 3 axes w/ HDD
Safety compliance	CE/FCC, UL, RoHS

Sales area

- Worldwide response

Language

- English
- S/T Chinese

For more information

URL : http://www.adlinktech.com/EtherCAT/index.php

Contact: **ADLINK Technology, Inc.** [E-mail: service@adlinktech.com]
9F, No.166 Jian Yi Road, Zhonghe District, New Taipei City 235, Taiwan TEL: +886-2-8226-5877 FAX: +886-2-8226-5717

Intelligent EtherCAT® Master Board

Low CPU load EtherCAT® Master Communication

Features

Low CPU load EtherCAT® Master Communication

EtherCAT® environment is enabled typically by implementing the master stack on Ethernet hardware.
Advanet provides EtherCAT® master communications on-board by implementing the Xilinx Zynq® with ARM® Cortex®-A9 on a board to minimize the impact for the host CPU as bus master.

Secure Cable Redundancy

The redundant cable configuration adopting ring topology which recovers the communication cable failure in the EtherCAT® system allows the communications to reach any branch even in case of cable fracturing happened at any point.
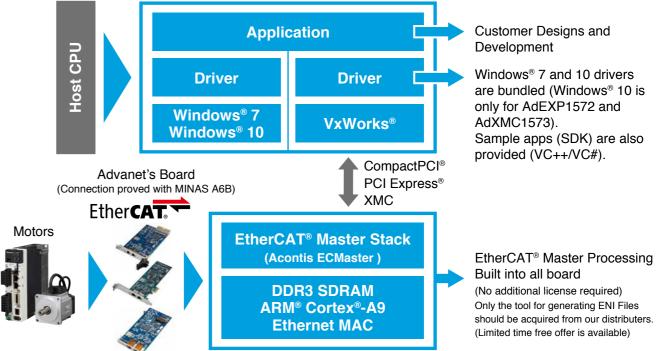
Hot Connect Responds to Unexpected Replacement

The protocol of the EtherCAT® system utilizing a hot connect capability provides flexible and responsive functionalities to change the system configuration which allows you to connect/disconnect or reconfigure any part of the network "on-the-fly".
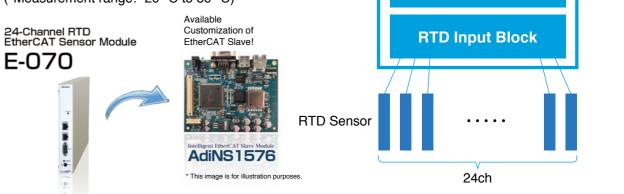
Specification

	A3pci1571	AdEXP1572	AdXMC1573
Form Factor	3U CompactPCI®	PCI Express®	XMC
CPU	ARM® Cortex®-A9 Dual-Core (Xilinx: Included in Zynq®-7010)		
Main Memory	DDR3 SDRAM 256 MB		
Boot ROM1	SPI-FLASH 16 MB		
Boot ROM2	microSD (Spare)		
Shared Memory	256 KB (Included in Zynq® PL)		
EtherCAT®	Master Class A Compliant / Redundant Cable, Hot Connect / Controllable Cycle 100 μs to 10 ms		
Front IO	2× EtherCAT® ports, 100BASE-TX, RJ45 Connector		
Bus Interface	PCI Local Bus Specification Revision 2.2 Compliant PCIMG 2.0 R3.0 CompactPCI® Specification Compliant PCIMG 2.1 R2.0 CompactPCI® Hot Swap Specification Compliant	PCI Express Base Specification Revision 1.0a Compliant PCI Express Card Electromechanical Specification Revision 1.1 Compliant	IEEE1386.1-2001 ANSI/VITA42.3-2006 PCI Express Base Specification Revision 1.0a Compliant
Power Supply	DC5 V ±5 %	DC12 V ±8 % DC3.3 V ±9 %	DC12 V ±5 % DC3.3 V ±0.3 V
Dimension	160 mm × 100 mm (3U Size CompactPCI® Bus 1 Slot width)	167.5 mm × 68.75 mm (Low Profile or Standard Height)	74 mm × 139 mm
Operating Environment	Operating Temperature Range : 0 °C to 55 °C Operating Humidity Range : 35 % to 80 %RH (non-condensing) Non-Operating Temperature Range : −10 °C to 70 °C Non-Operating Humidity Range : Under 90 %RH (non-condensing)		
Device Driver	Wind River® VxWorks® 6.9.x, Microsoft® Windows® 7 (Driver Implementation Document is available)		

System Configuration

Host CPU

Application → Customer Designs and Development

Driver | Driver → Windows® 7 and 10 drivers are bundled (Windows® 10 is only for AdEXP1572 and AdXMC1573). Sample apps (SDK) are also provided (VC++/VC#).

Windows® 7 Windows® 10 | VxWorks®

Advanet's Board (Connection proved with MINAS A6B)

EtherCAT®

Motors

CompactPCI® PCI Express® XMC

EtherCAT® Master Stack (Acontis ECMaster)

DDR3 SDRAM ARM® Cortex®-A9 Ethernet MAC

→ EtherCAT® Master Processing Built into all board
(No additional license required)
Only the tool for generating ENI Files should be acquired from our distributers. (Limited time free offer is available)

Features of Advanet EtherCAT Slave

- Simultaneous measurement of 24ch in 1 slave
- Connectable 4-wire Pt100 or JPt100
- Temperature conversion on module
- Measurement overall precision at±0.1 °C (*Measurement range: -20 °C to 80 °C)

24-Channel RTD EtherCAT Sensor Module
E-070

Available Customization of EtherCAT Slave!

AdiNS1576
* This image is for illustration purposes.

EtherCAT Slave Stack ⟷ EtherCAT

ARM Cortex-A8

RTD Input Block

RTD Sensor

24ch

Sales area

- Worldwide response except for some areas.
Please contact the following address for details.

Language

- Japanese
- English

For more information

URL : https://www.advanet.co.jp/ethercat/

2-Port EtherCAT PCI/PCIe Motion Control Master Card
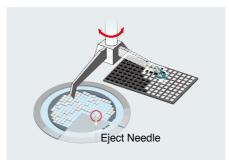## PCI-1203/PCIE-1203/PCIE-1203L

Features

- Dual EtherCAT ports for high-performance of Motion and I/O applications
- Up to 64 axes support for motion control
- Motion cycle time: 32 axes = 500 μs; 64 axes = 1 ms; I/O cycle time=200 μs
- Supports ready-to-use API for rapid application development
- Multi-axis synchronous motion
- Trace logger for fast error diagnostics
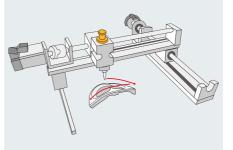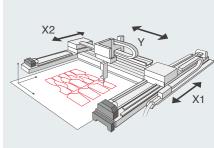- Easy to wire, saving wiring working-hour

Specification

Item	Description		
EtherCAT Master	**PCI-1203**	**PCIE-1203**	**PCIE-1203L**
Port	32	64	
Motion Ring Cycle Time	500 μs	500 μs @ 32 Axes, 1000 μs @ 64 Axes	
I/O Ring Cycle Time	200 μs		
Motion Control			
Single-Axis Motion	JOG Move		
	Position/Velocity/Time Planning		
	Position/Torque Limit		
Motion Trajectory Planning	2/3-axis Line Interpolation;	N/A	
	1~8 axis Direct Interpolation		
	2/3-axis Circular Interpolation		
	Support 6 Path Table (size: 7k points / table)		
Master & Slave Synchronized Motion	Gantry	N/A	
	E-Gear		
	E-CAM		
	Tangential Following		
	Position Latch		
Software			
Utility	Common Motion Utility		
Driver	Windows XP/7/8/10		
Example	VC, VB, VB.NET, C#, BCB, LabVIEW		

Application Sample
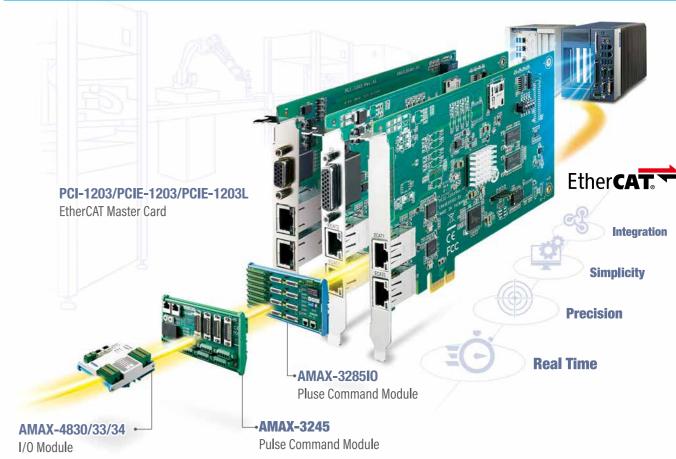
Torque Limit Table   3D Arc Interpolation   Gantry

System Configuration

PCI-1203/PCIE-1203/PCIE-1203L
EtherCAT Master Card

EtherCAT

Integration

Simplicity

Precision

Real Time

AMAX-3285IO
Pluse Command Module

AMAX-4830/33/34
I/O Module

AMAX-3245
Pulse Command Module

Sales area

- Worldwide response

Please contact the following address for details.

Language

- Chinese   • English

For more information

URL : http://www.advantech.com/products/machine-automation/sub_machine_automation
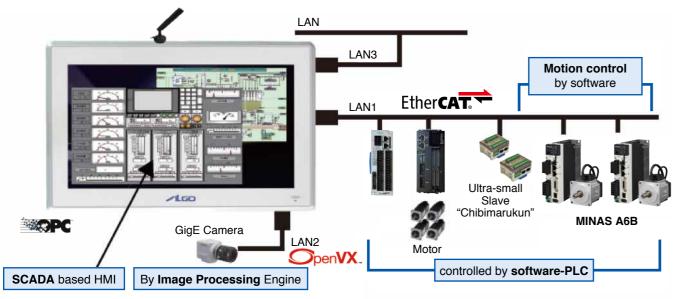
EtherCAT

EtherCAT master

EC ➡ Master

"All-in-one Controller", based on the Industrial PC equipped with EtherCAT master stack

Features

All-in-one controller can execute SCADA, synchronous motion control and image processing just by itself.

- International standard (IEC 61131-3) compliant software PLC
- PLCopen compliant positioning/synchronous motion control software
- OpenCV, OpenVX compliant image processing engine (option)
- SCADA-based HMI software

LAN
LAN3
Motion control by software
LAN1
EtherCAT
LAN2
OpenVX
GigE Camera
Motor
Ultra-small Slave "Chibimarukun"
MINAS A6B

SCADA based HMI | By Image Processing Engine | controlled by software-PLC

Specification

- Intel® high-performance processor, Atom E3845 Quad Core 1.91GHz
- Real time OS (INtime). High-speed 28000 steps/50 μs processing.
- Windows10 IoT Enterprise allows effective utilization of various software
- Top-class ultra-thin compact design and lower power consumption allow for installing in small space for new, expanded use. Free switch off. Multi-touch panel. Multilingual
- Fanless, diskless, completely spindleless. 2 storage, mini m-SATA, slots. support.

| UPS equipped standardly | GPIO, 6 IN∕4 OUT, equipped standardly |
| LTE equipped, can access directly to Cloud | Suitable for dedicated controller |

Application Sample

ALGOSYSTEM's All-in-one Controller had replaced PLC and has been adopted as de facto standard controller of the minimalfab for processing a half-inch wafer to make semiconductors in high-mix low-volume production. Minimalfab is the national project carried out by the National Institute of Advanced Industrial Science and Technology (AIST).The key to adoption of the All-in-one Controller is its high performance and space saving, it can support multi-vendors' products and encrypt, it can be programmed by either C or software PLC compliant to IEC61131-3 Standard which provides 5 languages: LD, FBD, IL, ST and SFC.

EtherCAT slaves

EtherCAT

Features/ Specification

Digital input/output (NPN/PNP)

- 16-point input unit
- 16-point output unit
- 32-point input unit
- 32-point output unit
- 16-point input/16-point output unit

<"Chibimarukun" series>

e-CON connector
- 8-point input unit
- 8-point output unit
- 4-point input/4-point output unit

MIL connector terminal block
- 16-point input unit
- 16-point output unit
- 8-point input/8-point output unit

Relay output (terminal block)
- 4-point relay output unit

Analog input/output

- 4ch analog input unit
- 4ch analog output unit

IO-Link, Modbus, 4ch SIO Gateway

to EtherCAT

* IO-Link, Modbus, Serially controlled devices such as RS-232C and RS-485 devices are converted to EtherCAT. EtherCAT can be installed without putting old assets to waste.

Barcode reader
Thermometer, etc.
RS232C device
Label printer

Motion controller

- Up to 4-axis control
  Execute from high-order PC, etc. via restricted EtherCAT connection

Encoder input

- Line receiver input
- Open collector input

Contract-based Development

Interface board example

Sales area

- Japan
- Korea
- United States of America
- China

Language

- Japanese
- English

For more information
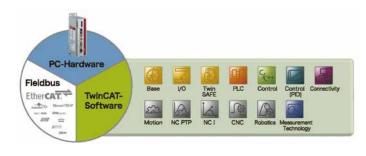
Software PLC/ NC/ CNC

TwinCAT 3

Features

PC base automated control

- One tool for PLC, motion and HMI
- Scalable performance and lower cost by using general-purpose CPU
- Fusion of automation and IT

Real-time control system in PC base system
Software PLC/ NC/ CNC TwinCAT 3

1) IEC 61131-3 3rd edition

Intergration of Microsoft Visual Studio

Support for IEC61131-3 (IL, ST, FBD, LD, SFC) +CFC and object-oriented extension of the 3rd edition
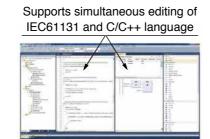
2) Development environment

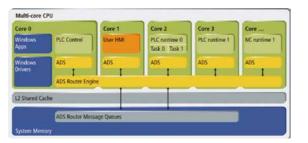Support for C/C++, real-time environment in MATLAB®/ Simulink®, programing in .NET/C#.

3) Link to MATLAB®/Simulink®

Link to MATLAB®/Simulink® optimizes development and simulation

4) Multi-core CPU support

Impressive real-time performance and high level integration by assigning HMI, PLC, NC, CNC tasks to individual CPU cores..

Supports simultaneous editing of IEC61131 and C/C++ language

System Configuration

TwinCAT CNC

CX5100 series controller + EtherCAT Terminals

- PC base controller with TwinCAT supporting multi-core maximizes EtherCAT performance
- Compact controller on DIN rail (CX5100 series)
- TwinCAT PLC processes minimum 50 µs real-time task, and controls motion system in minimum 125 µs

MINAS A6B

Industrial PC

C6015 / C6030

Features

The Ultra Compact IPC Generation

Ultra small

Ultra powerful

C6015: Ultra small   **C6030: Ultra powerful**

Specification

Technical data	C6015	C6030
Processor	Intel® Atom™ x7-E3950, 1.6 GHz, 4 cores	Intel® Core™ i7-7700, 3.6 GHz, 4 cores
Internal main memory	8 GB DDR4L RAM	32 GB DDR4 RAM
Flash memory	30 GB M.2 SSD, 3D flash, expandable to 60 GB	40 GB M.2 SSD, 3D flash, expandable to 160 GB
Interfaces	USB 3.0 × 2/ DisplayPort × 1 / Gbit Ethernet Port × 2	USB 3.0 × 4/ DisplayPort × 2 / Gbit Ethernet Port × 4
Operating system	Windows 10 IoT Enterprise	
Power supply	24 V DC	
Dimensions (W × H × D)	compact dimensions (W × H × D) 82 mm × 82 mm × 40 mm (3.2" × 3.2" × 1.6") without mounting plate	compact dimensions (W x H x D) 129 mm × 133 mm × 78.6 mm (5.1" × 5.2" × 3.1") without mounting plate
Operating/storage temperature	operating temperature 0 °C to 50 °C	operating temperature 0 °C to 55 °C
Protection class	IP20	

Sales areas

Local support: Japan, China, Korea, south-eastern Asia, Europe, the Americas, etc. More than 75 contries

For more information

URL : www.beckhoff.com
Beckhoff worldwide : https://www.beckhoff.com/english/beckhoff/world.htm

Contact: **Beckhoff Automation GmbH&Co.KG**   [E-mail: info@beckhoff.com]
TEL: +49 5246 963-0

CODESYS

IEC 61131-3 Engineering / Software PLC / Motion / CNC / HMI

Features

CODESYS

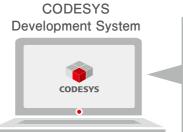CODESYS is the number one hardware-independent IEC 61131-3 software suite for the automation industry. The tool is used to develop application software for compatible hardware and software PLCs, professional HMI screens and motion control projects with CNC or robotics for example using EtherCAT.
More than 400 device manufacturers worldwide use the tool to engineer their intelligent devices. Well over one million such devices are used to operate different industrial machines and plants every year.

System Configuration

CODESYS
Development System

- Logic, motion and HMI applications, as well as EtherCAT configurations can easily be engineered using the CODESYS Development System.
- Depending on the requirements of the application, such as the number of control axes and motion cycles, compatible controllers and drives can be combined.

Controller with
CODESYS Runtime

EtherCAT

Specification

Fully integrated: Realize PLC, Motion and HMI functions on a single device with CODESYS.

PLC Programming
Engineering
IEC 61131-3-compliant, all languages (ST, Ladder, FBD, SFC, CFC) supported, plus real object oriented programming

SoftMotion
Motion CNC Robotics
For single axis control, electric cam and gear, using the integrated FBs (PLCopen Motion Control part 1, 2 compliant)

SoftMotion CNC+Robotics
Motion CNC Robotics
For complex coordinated motion control tasks such as robotics/CNC applications using the integrated FBs (PLCopen Motion Control part 4); linear / circular interpolation, various kinematics, G-code programming, comfortable axis configuration etc.
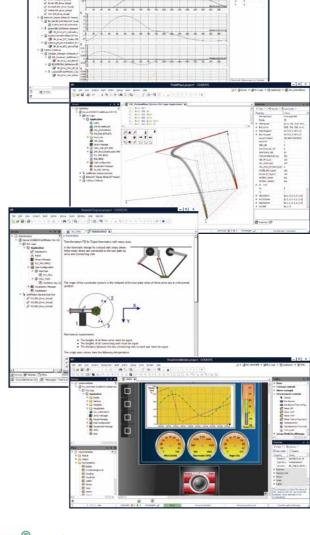
HMI, Visualization
Visualization
Integrated visualization editor in the CODESYS Development System: easy creation of modern operation screens and linking to IEC 61131-3 variables; display of the generated screens on IPCs, on panel PLCs with CODESYS TargetVisu, on standard Web browsers with CODESYS WebVisu (via HTML5) or in the engineering tool

Fieldbus
Fieldbus
Integrated fieldbus configurators and protocol stacks as CODESYS libraries seamlessly integrated in the CODESYS Development System for numerous fieldbus systems, such as EtherCAT, PROFINET, Ethernet/IP

EtherCAT   EtherNet/IP   PROFINET   Modbus   CANopen

Sales area

- Japan
- Russia
- Italy
- Germany
- EU
- France
- China
- United Kingdom
- Netherlands
- Korea

Language

- Japanese
- German
- Spanish
- English
- Italian
- French
- Chinese
- Russian

For more information

URL : https://www.codesys.com

IEC61131-3 Standard Industrial IoT Controller

CONPROSYS PAC(Programmable Automation Controller) Solution

Features

Configurable Type

EtherCAT Module
CPS-PCS341EC-DS1-1201
Modbus Module
CPS-PCS341MB-DS1-1201

IEC 61131-3 Standard
CODESYS Programming

Equipped with the PLC engine "CODESYS," which continues to be used more and more commonly in the global market. Applications can be developed in programming languages, such as Ladder/SFC/Function Block etc., that comply with international standard IEC 61131-3.

Integrated Development Environment Provided free of charge

An integrated development environment for developing applications is provided free of charge. This makes it possible to seamlessly perform all the required development such as control logic and field bus I/O.

Supported integrated development environment: V3.5 SP7 Patch 2 or later
Supported languages: LD / SFC / FBD / ST / IL / CFC

Integrated Type

EtherCAT Module
CPS-PC341EC1-9201
Modbus Module
CPS-PC341MB-ADSC1-9201

Equipped with Field-Bus Master Functions
EtherCAT / Modbus Supported

Equipped with an open-field network EtherCAT / Modbus master function. In the CODESYS integrated development environment, fieldbus I/O can be directly assigned to variables in the same manner as the built-in I/O and the stack I/O.

SCADA / MES / ERP Linking
Built-in OPC-UA Server

OPC-UA is essential for the M2M communication. The controller has a built-in server function. This enables the safe and stable exchange of data with SCADA software and MES/ERP systems.

Equipped with a Web HMI Engine
Web Monitor Function

The controller has a built-in web server function and tools for creating screens for use on the web. This makes it possible to easily view equipment information without using a cloud server or a similar device.

Specification

Item		EtherCAT Module	Modbus Module
CODESYS Function	Version	V3.5 SP7 Patch2 or later version	
	Languages	LD, SFC, FBD, ST, IL, CFC (IEC61131-3 compliant)	
	Field Bus	EtherCAT Master, Modbus TCP Slave	Modbus TCP Master / Slave
	Communication Protocol	OPC-UA Server	
Program size	ROM Size	1 MB	
	Maximum Steps	250 K Steps	
CPU basic performance	Basic Instruction Execution Speed (LD)	1.6 ns	
	Application Instruction Execution Speed (ST)	5.8 ns	
	Variance	Maximum 300 µs	
	Scan Time	74 µs (20000 steps)	
EtherCAT Performance	Input Processing Time (LD)	144 ns	–
	Output Processing Time (ST)	138 ns	–
	Scan time	166 µs (64 Input and 64 Outputs)	–

Application Sample

- ● Electronic Component Mounting Machine
- ● Semiconductor Manufacturing Equipment
- ● LCD/FPD Manufacturing Equipment
- ● Industrial Robot / Arm
- ● Machine Tools and Processing Machine

System Configuration

SCADA / MES / ERP Linking
OPC-UA

Big Data Analysis
Cloud Service
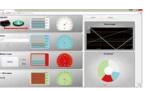
Web Monitoring
Web HMI

Host Network

CONPROSYS PAC
IEC 61131-3 standard
PLC Programming System
LD / SFC / FBD / ST / IL / CFC

CODESYS

BUS

EtherCAT
Motion Control, Switch On/Off, Flow Rate, Pressure, Temperature, Voltage, Current

Stack I/O

MINAS A6B

Sales area

- • Japan
- • Singapore
- • China
- • India
- • Korea
- • Taiwan

Language

- • Japanese
- • English

For more information

URL : https://www.contec.com

EtherCAT

CNC with EtherCAT Master integrated

CNC 8060/65/70 families

Features

- Easy programming. There is no need to know ISO programming language.
- Algorithm that provides the best performance, speed and accuracy in the machining process.
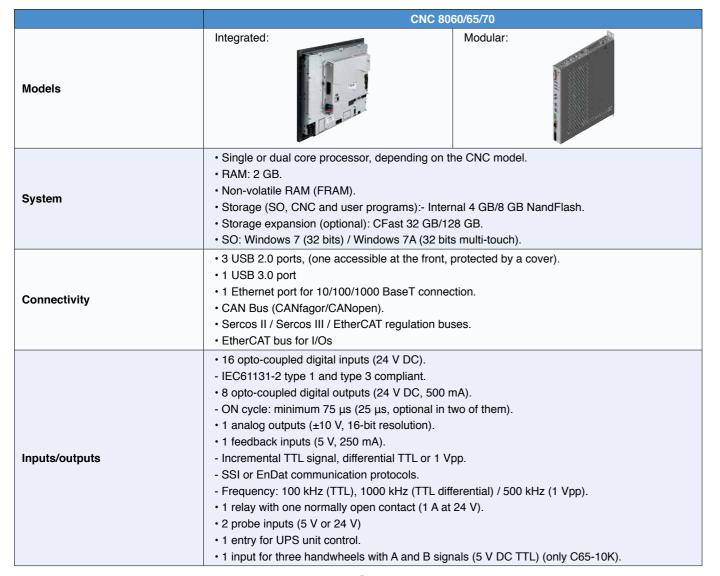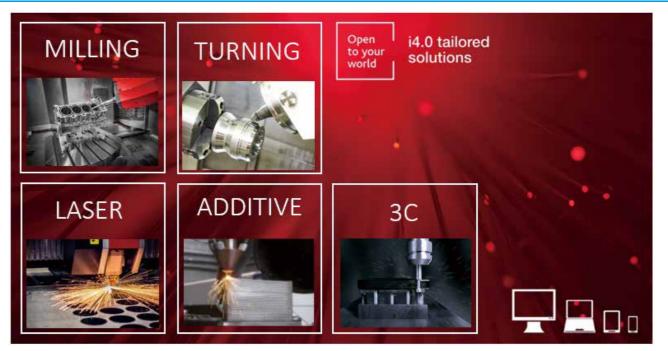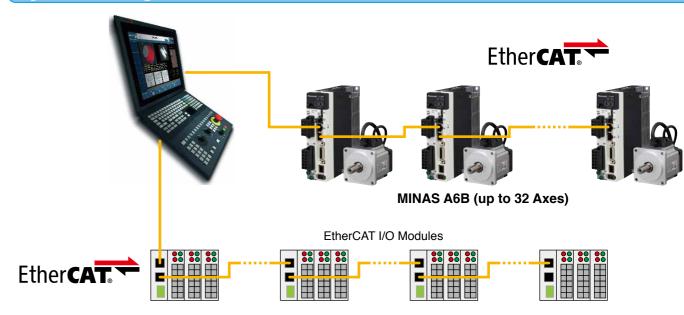- Ergonomic and functional design (touch-screen, easy navigation, integrated manuals, sms communication, high-resolution graphics, keyboards and monitors with the highest level of sealing protection, etc.)
- Interface customizing tools.
- Free software download with no time limit to work at any PC.
- Axis position control (position loop) every 250 µs.
- High Speed Machining and Look-Ahead up to 2400 blocks and block processing time of 0.25 ms.
- EtherCAT master integrated in the CNC, with the following operation modes implemented: interpolated position mode, cyclic sync position mode, cyclic sync velocity mode, cyclic sync torque mode, homing mode.
- "KPA Studio" EtherCAT configurator, from Koening-pa GmbH, supplied under license.

Specification

	CNC 8060/65/70	
Models	Integrated:	Modular:
System	• Single or dual core processor, depending on the CNC model. • RAM: 2 GB. • Non-volatile RAM (FRAM). • Storage (SO, CNC and user programs):- Internal 4 GB/8 GB NandFlash. • Storage expansion (optional): CFast 32 GB/128 GB. • SO: Windows 7 (32 bits) / Windows 7A (32 bits multi-touch).	
Connectivity	• 3 USB 2.0 ports, (one accessible at the front, protected by a cover). • 1 USB 3.0 port • 1 Ethernet port for 10/100/1000 BaseT connection. • CAN Bus (CANfagor/CANopen). • Sercos II / Sercos III / EtherCAT regulation buses. • EtherCAT bus for I/Os	
Inputs/outputs	• 16 opto-coupled digital inputs (24 V DC). - IEC61131-2 type 1 and type 3 compliant. • 8 opto-coupled digital outputs (24 V DC, 500 mA). - ON cycle: minimum 75 µs (25 µs, optional in two of them). • 1 analog outputs (±10 V, 16-bit resolution). • 1 feedback inputs (5 V, 250 mA). - Incremental TTL signal, differential TTL or 1 Vpp. - SSI or EnDat communication protocols. - Frequency: 100 kHz (TTL), 1000 kHz (TTL differential) / 500 kHz (1 Vpp). • 1 relay with one normally open contact (1 A at 24 V). • 2 probe inputs (5 V or 24 V) • 1 entry for UPS unit control. • 1 input for three handwheels with A and B signals (5 V DC TTL) (only C65-10K).	

Application Sample

MILLING TURNING Open to your world i4.0 tailored solutions

LASER ADDITIVE 3C

System Configuration

MINAS A6B (up to 32 Axes)

EtherCAT I/O Modules

Sales area

- Japan
- Singapore
- EU
- China
- India
- Worldwide response
- Korea
- United States of America
- Taiwan

Language

- English
- French
- Russian
- Spanish
- Basque
- Czech
- Italian
- Portuguese
- Korean
- German
- Chinese
- Dutch

For more information

URL: https://www.fagorautomation.com/en/

Contact: **Fagor Automation, S. Coop.**
Bo San Andrés No19 E-20500 – Arrasate/Mondragón, Spain

[E-mail: info@fagorautomation.es]
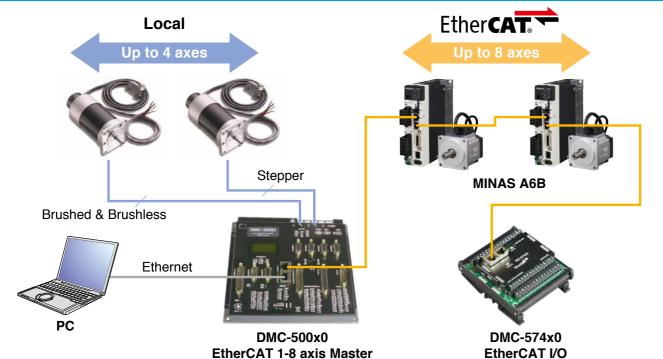TEL: +34 943 039 800   FAX: +34 943 791 712

Manufacturer/
Distributor:
GALIL
WE MOVE THE WORLD

Galil Motion Control, Inc.

EtherCAT

EtherCAT Master Controller
Model DMC-50000

Features

- Configurable controller for up to 8 axes of EtherCAT Master with any of the first 4 axes for local control or EtherCAT Master
- 10/100BASE-T Ethernet port; (1) EtherCAT Port; (2) RS232 ports up to 115 kbaud
- Available with internal, multi-axis servo or stepper drives. Or, connect to conventional external drives (only first four axes)
- For local axes, accepts up to 22 million counts per second of quadrature encoder for servos; Outputs up to 6 MHz for steppers; EtherCAT command speed up to 1 billion counts per second
- Sample times as low as 375 microseconds for 1-4 axes and 750 microseconds for 5-8 axes
- First four axes, advanced PID compensation with velocity and acceleration feedforward, integration limits, notch filter and low-pass filter
- Modes of motion include jogging, point-to-point positioning, position tracking, contouring, linear and circular interpolation, electronic gearing, ECAM and PVT
- Ellipse scaling, slow-down around corners, infinite segment feed and feed rate override
- Multitasking for concurrent execution of up to eight application programs
- Non-volatile memory for application programs (4000 Lines), variables and arrays (2400)
- Dual encoders for every local servo axis
- Optically isolated home input and forward and reverse limits for every local axis; Uses EtherCAT drive for home and limit switches
- Uncommitted, I/O: • 8 optically isolated inputs and 8 optically isolated outputs
  - Isolated, high-power outputs for driving brakes or relays (local axis only)
  - 8 uncommitted analog inputs
  - High speed position latch and output compare
  - 32 additional 3.3 V TTL I/O (5 V option)
  - More I/O available with RIO PLC
- 2 line x 8 character LCD
- Accepts single 20 - 80 VDC input
- Communication drivers for Windows and Linux
- Custom hardware and firmware options available

System Configuration

Local
Up to 4 axes

EtherCAT
Up to 8 axes

Stepper

Brushed & Brushless

MINAS A6B

Ethernet

PC

DMC-500x0
EtherCAT 1-8 axis Master

DMC-574x0
EtherCAT I/O

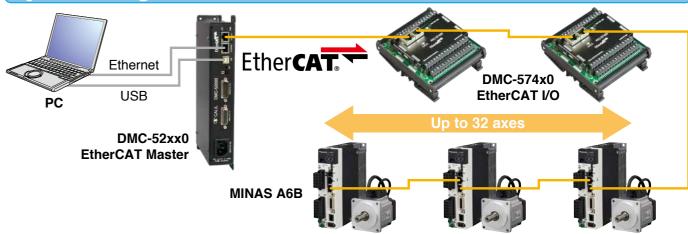# EtherCAT Master Controller
Model DMC-52000

Features

- Available in 2, 4, 8, 16, and 32 axis configurations
- 10/100BASE-T Ethernet port; (1) EtherCAT Port; (1)
- USB port
- EtherCAT cycle time 1000 microseconds
- Cyclic Synchronous Position mode (CSP)
- Modes of motion include jogging, point-to-point positioning, position tracking, contouring, linear and circular interpolation, electronic gearing, ECAM and PVT
- Ellipse scaling, slow-down around corners, infinite segment feed and feed rate override
- Multitasking for concurrent execution of up to eight application programs
- Non-volatile memory for application programs (4000 Lines), variables and arrays (2400)
- Inputs including forward limits, reverse limits, and homing inputs are located on drives that support these inputs
- Uncommitted, I/O: • 8 optically isolated inputs
  - 8 optically isolated high powered outputs
  - 8 uncommitted analog inputs
  - 8 uncommitted analog outputs
  - More I/O available with the RIO-47xxx or RIO-574x0
- Accepts single 120 - 240 VAC input
- Communication drivers for Windows and Linux

Application Sample

Customer Stories   URL: http://www.galil.com/learn/customer-stories
Sample DMC Code   URL: http://www.galil.com/learn/sample-dmc-code

System Configuration

Ethernet

USB

PC

EtherCAT

DMC-574x0
EtherCAT I/O

Up to 32 axes

DMC-52xx0
EtherCAT Master

MINAS A6B

Sales area

- United States of America
Galil Headquarters in California
World-wide sales network

Please see our rep finder tool or contact us for more details.
URL : http://www.galil.com/order/find-reps-and-distributors

Language

- English

For more information
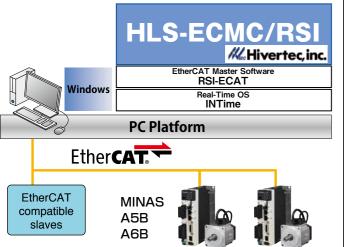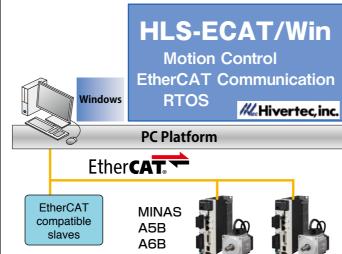
URL : http://www.galil.com/

Motion Control Software · Software Modules

HLS-ECAT02xx/Win, HLS-ECMC02xx/RSI (xx: represents the number of axes)

Features

HLS-ECMC/RSI	HLS-ECAT · Win
EtherCAT multi-axis positioning software module	**EtherCAT that can be developed with VC ++, VC #, VB**
● The software module that performs motion control on real time OS ● Controling servo driver with EtherCAT communication (CiA 402 drive profile) ● Control axes will be from 6 up to 64 axes (can be handled in by 1 axis unit) ● The program is written in C language ● API functions conforming to international standard specifications ● Development environment: Visual Studio + INtime SDK ※ The cycle time will depend on the PC (PDO cycle: 125 μs possible)	● EtherCAT motion control software by Windows PC ● Execute real-time processing on the RTOS with Windows as the interface. Easy developing the EtherCAT system ● Control axes will be 32 axes ● Motion control can be embedded into Windows application development ● Development environment: Visual Studio 2008 or later (VC++, VC#, VB) ※ The cycle time will depend on the PC (PDO cycle: 125 μs possible)

HLS-ECMC/RSI

Hivertec,inc.

EtherCAT Master Software RSI-ECAT
Real-Time OS INTime

Windows

PC Platform

EtherCAT

EtherCAT compatible slaves — MINAS A5B A6B

HLS-ECAT/Win

Motion Control EtherCAT Communication RTOS

Hivertec,inc.

Windows

PC Platform

EtherCAT

EtherCAT compatible slaves — MINAS A5B A6B

Specification

● API Function List (not all)

Administrative	Motion	I/O
MC_InitAxisSetting Initializes axis setting	**MC_Home** Homing	**IO_inp** Reads address 1 byte within slave
MC_GetAxisSetting Acquires axis setting	**MC_MoveAbsolute** Absolute positioning	**IO_inpw** Writes address 1 byte within slave
MC_SetAxisSetting Configures axis settings	**MC_MoveRelative** Relative positioning	**IO_inpdw** Reads address 2 byte within slave
MC_Power Enables / disables operation	**MC_MoveVelocity** Continuous feed by constant velocity	**IO_outp** Writes address 2 byte within slave
MC_Reset Resets errors	**MC_MoveAdditive** Relative position override	**IO_outpw** Reads address 4 byte within slave
MC_ReadActualPosition Reads current position	**MC_Stop** Stop	**IO_outpdw** Writes address 4 byte within slave
MC_ReadActualVelocity Reads current velocity	**MC_ReadFunctionResult** Acquire execution result	
MC_ReadStatus Reads motion state machine	**MC_WaitForNextInterrupt** Event waiting	
MC_SetPosition Writes setting position in axis	**MC_CancelWaitInterrupt** Cancel event waiting	
MC_SetOverride Executes velocity override	**MC_MoveLinearAbsolute** Absolute linear interpolation	
MC_TouchProve Latches with trigger input	**MC_MoveLinearRelative** Relative linear interpolation	
	MC_GroupStop Group stop	
	MC_MovePath Curving interpolation	

■ **Common Spec.**
● Acquire slave information
● Homing
● Continuous feed
● Relative/absolute Positioning
● Velocity override etc.
● Aquire current position, velocity
● Aquire axis sensor information

■ **Below is only for "HLS-ECAT/Win"**
● Relative/absolute Linear Interpolation
● Interpolation (by specified passing points)
● Aquire Diagnosis message
● Various parameter input/output via SDO communication
● Data input/output to peripheral devices (analog devices, Digital input/output devices, etc.) etc.

IPC base PAC (Programmable Automation Controller)

HCOS series

Features

● **Easy to use**
  → The open international standard IEC 61131-3
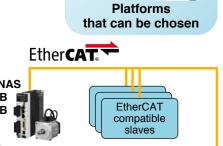● **Stable supply**
  → Cooperated with IPC manufacturers
● **Benefits of using a PC**
  → Huge memory, storage, connectivity with the network, Windows
● **Real time**
  → PLC operating on RTOS
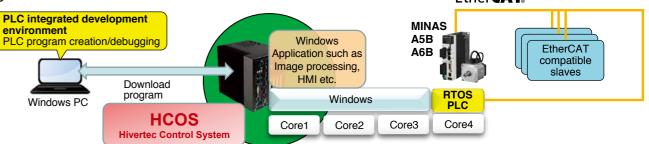
CODESYS

Platforms that can be chosen

Programmable Automation Controller to realize the above

PLC integrated development environment PLC program creation/debugging

Windows PC

Download program

Windows Application such as Image processing, HMI etc.

HCOS **Hivertec Control System**

Windows

| Core1 | Core2 | Core3 | Core4 |

RTOS PLC

MINAS A5B A6B

EtherCAT

EtherCAT compatible slaves

Specification

● **IPC**
A variety of platforms that can be chosen, such as BOX PC, 19 inch rack, Wall mount, Panel PCs etc. Customizable for such as CPU, Mmemory, Storage, External interface (Such as RS-232C, USB, Expansion slot etc.), Response to standards etc.

● **EtherCAT Specification**
EtherCAT Master Class A + Cable Redundancy + Motion Control

● **PLC Specification**
・**Task**
  Task type : Cyclic task, Event task, Freewheeling, Status task
  Number of Task : up to 100
  Task Priority : 32 Levels
  Period of cyclic task : Minimum 50 μs
・**Development Language**
  Corresponds to 6 development languages, such as IL, LD, FBD, ST, SFC, CFC
・**Debugging**
  Capable of Writing during operation, Editing online, Tracing

● **Motion Functions**
These functions are possible such as Continuous feed, Relative/Absolute positioning, Velocity override, Acquisition of current position/velocity, Acquisition of axis sensor information and others. Fuctions such as Interpolation including kinematics are to be added sequentially

Sales area

・Japan ・Korea
・Taiwan

Language

・English
・Japanese

For more information

URL : http://www.hivertec.co.jp/

Contact: **Hivertec, Inc.** [E-mail: sales@hivertec.co.jp]
Taijuseimei shin-ohashi Bldg., 1-8-11 Shin-ohashi Koto-ku, Tokyo, 135-0007, Japan
TEL: +81-3-3846-3801 FAX: +81-3-3846-3773

EtherCAT

Industrial plate, sheet, and pipe/tube cutting CNC
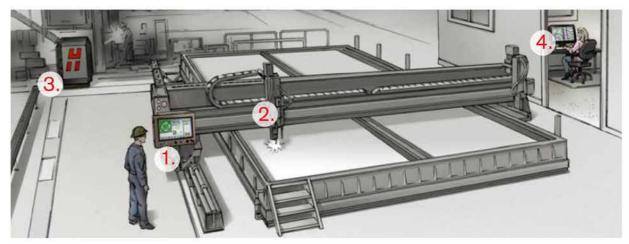
EDGE® Connect CNC

Features

- Industrial PC-based CNC for X/Y gantry machines.
- Built-in motion control logic for straight "I", Bevel, & Pipe/Tube cutting.
- Two hardware configurations
  - 495 mm (19.5" in) touchscreen display with integrated hardware operator's panel.
  - Compact PC for integration of custom operator's panel and display.
- A proprietary graphical User Interface (GUI) for intuitive machine operation.
- Integrated torch height control (positioner) for plasma cutting.
- Real-time operating system for precise motion and process control.
- Embedded process control for oxyfuel, plasma, and waterjet.
- On-screen operator's console for station and process control.
- Optional PLC available to add custom functionality (IEC 61131 compliant).
- ProNest® CNC nesting software for optimal plate utilization and embedded process control.
- SureCut™ technologies (True Hole®, Rapid Part™ and True Bevel™) for improved cut quality, productivity, and operating cost.
- Remote Help™ for system diagnostics and troubleshooting via the internet.
- Global sales and service.

Companion products available

- ProNest® CAD/ CAM Software
- Conventional Plasma Systems
- HyPerformance® Plasma Systems
- Plasma Consumables
- Torch Height Controls
- HyPrecison™® WaterJet Pumps
- Waterjet Consumables

Application Sample
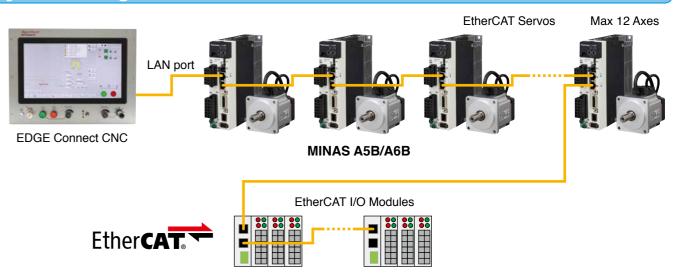
1. CNC control **2. THC lifter** **3. Plasma cutting tool** **4. Office CAM**

System Configuration

EtherCAT Servos   Max 12 Axes

LAN port

EDGE Connect CNC

MINAS A5B/A6B

EtherCAT I/O Modules

EtherCAT®

Sales area

- Worldwide response

Please contact the following address for details.

Language

For more information

URL : www.Hypertherm.com

Software CNC
COSTANTINO CNC

Features

Costantino is a **SoftCNC** that can be completely customized by OEM customer to create their own CNC solution, using proven and robust components.

Costantino **runs on any** IPC so you can choose your favorite brand that can guarantee international support on hardware components. It runs completely independent on Windows using its dedicated CPU processors in a multicore environment using its dedicated memory amount and its Ethernet controller. Costantino connects with servo and IO devices of any brand using its integrated **EtherCAT master and configurator**. If customer wishes to use different fieldbus such as **Mechatrolink or CANopen**, Costantino can interface an ISAC-provided EtherCAT slave device that provides compatibility with all of these interfaces, and more. In addition to the natively supported fieldbuses, OEM customers can add support to any other fieldbus using an SDK that allow to easily develop by themselves or using ISAC engineering help.

Costantino comes with a PLC environment that is compatible **IEC61131-3**, so you can program it with any of the languages that are part of the standard: ST, IL, LD, FBD, SCD. In addition, you can create FBs in C language and thus reuse components written for different hardware solutions.

Costantino CNC interprets **G-codes** (ISO6983) with some features that are important in many application; with 25000 blocks/sec and more than 250 blocks of look ahead, it is one of the fastest CNC in the market.

- All movements are under **Jerk** control for tooltip and joints, this guarantees the best mechanics lifetime and performance;
- It runs up to 8 different interpolation programs at the same time, and handle auxiliary axes for clams, loaders and unloaders, or tool change, for a total of 128 axes;
- It supports **High Speed Machining**, that keeps cutting feedrate constant, reduces machining timing, and reduces machine vibrations;
- It comes with high accurate vibration suppression algorithms, following error compensation, velocity feed forward and many other tools to achieve the best cutting results;
- It compensates **tool length and radius**;
- It can handle online tool measures, tool wearing and life, and complex tool change procedure;
- It includes **5 axis machining interpolator** to program tool tip in machines equipped with bi-rotative heads, tilting tables, and even robots.
- It comes with a powerful **simulation engine** capable of showing results on the material before machining takes part.
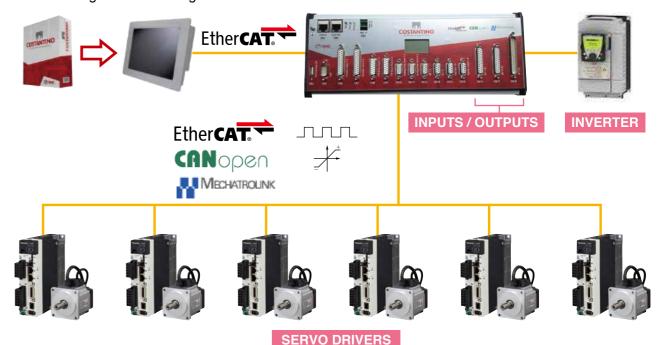
Application Sample

- Stone Cutting
- Metal Milling
- Thermal Cutting (Plasma, Laser, Oxi)
- Waterjet
- Glass Cutting
- Glass Engraving
- Wood Working
- Dental Applications

System Configuration

- Software CNC Costantino
- Panel PC or Industrial PC
- EtherCAT Bridge for connecting servodrivers and I/Os

INPUTS / OUTPUTS   INVERTER

SERVO DRIVERS

MINAS A6B

Sales area

- EU
- China
- United States of America
- Korea

Please contact us for details.

Language

- English
- Chinese
- Italian
- Portuguese
- Turkish

For more information

URL : www.costantinocnc.com

EtherCAT

ISAC

All that technology can do.

ISAC

Programmable Automation Control
PAC ILIUM

Features

Ilium is a newly developed PAC (Programmable Automation Controller) based on more than 10 years of ISAC experience in the field. It includes all main functionalities needed to build an Industrial Automation application, all in one device: **PLC Logic Execution + Motion Control + Communication and integration with other software components + HMI**.

Those functionalities **do not interfere between each other**, as it is possible to use more than one core of the processor; all of the tasks are executed with **high precision** and with **defined execution times**.

Ilium interfaces with other devices through an Ethernet port that supports **EtherCAT** or **Powerlink**. Using the ISAC Bridge, Ilium supports many other fieldbuses (**CANopen, Mechatrolink, Analog interface** with position reading through **Encoder, SSI or ENDAT, Pulse/Direction** or **Stepper** interface). Ilium offers complete diagnostic tools for faults and anomalies detected on the I/Os peripherals and on the servo drivers. All of the errors are stored, allowing to analyze them at a later time, even in the case of unattended operation.

Ilium is available in **two formats**: the application is **portable** between different formats, the development tools are the same, as well as the application libraries.

Ilium Embedded is a compact device, powerful enough to drive **up to 11 EtherCAT axes**. It is available with **touch screen**, it supports **USB**, **COM** ports, external **HDMI** video, one **Ethernet** port for programming and Web interfaces.

It does not contain moving parts, all of the components are non-removable, few Watts are enough to allow it to run.

Ilium soft-Motion is a **real-time software** that runs on an IPC; it uses exclusively **a part of the hardware resources**: one or more cores of the CPU, a portion of RAM, one Ethernet port; communication and HMI is managed by Windows. **You can choose the PC**: choose the ISAC model that suits your needs, or your preferred IPC supplier.

Ilium soft-Motion comes with no performance compromises, and offers the flexibility and the power of the PC to realize a customized user interface, using ISAC tools or alternative ones.

Ilium offers powerful and integrated development tools in order to make easier the PLC logic development and its debug, the start-up of the machine or of the plant, and its maintenance. You can develop the application in the IEC61131 standard languages (ST, IL, LD, FBD, SCD). Program the PLC logic with Multiprog, from Phoenix Contact Software. You can also use ANSI C, and compile in native code, in order to obtain the maximum performance and reliability, to create whole tasks with this language, or to create FBs to be used inside Multiprog. Ilium supports PLCopen MC part 1 and 2, version 2.0. The supplied FBs includes Cams (programmable from PLC logic or to be created from sampling), Gears, Electric Shafts, Phasing, Slave Synchronous Movement (referred on more Masters), all movements based on space or speed control, with speed, acceleration and Jerk control to assure fluid movements and the dampening of the resonances. The servo drivers can be tuned using the integrated diagnostic tools, as the oscilloscope, and all of the parameters will be stored and sent to the servo drivers by Ilium itself, making the replacing of servo drivers very easy.

ISAC ILIUM: TRY TO STOP IT!

Application Sample

- Packaging
- Material Handling
- Printing machines
- Building Automation
- Textile machines
- Paper processing machines

System Configuration

x86 version	EMBEDDED version
- Software PAC ILIUM x86 - Panel PC or Industrial PC - EtherCAT Bridge for connecting servo drivers and I/Os	- ISAC ILIUM Carrier Board - Software PAC ILIUM Embedded - Optional EtherCAT Bridge for connecting servo drivers and I/Os

Sales area

- EU
- China
- United States of America
- Korea

Please contact us for details.

Language

- English
- Chinese
- Italian
- Portuguese
- Turkish

For more information

URL : www.isacsrl.it

Contact: **ISAC s.r.l.**
Via Maestri del Lavoro, 30, 56021 CASCINA (PI) - Italy
[E-mail: isacsrl@isacsrl.eu]   URL: www.isacsrl.eu
TEL: +39 (0)50 711131 FAX: +39 (0)50 711472

GTT co. LTD (Stone Market representative for China)
Mr. Jason Ou
[E-mail: 46092672@qq.com]
TEL: +86 139 5951 0697

EtherCAT Closed Loop Stepper Drives
CS3E Series

Features

- No loss of step, Smooth, Quick, Accurate, Low heating
- Support CANopen over EtherCAT (CoE) control and CiA 402
- Operation modes: Cyclic Synchronous Position (CSP), Profile Position (PP), Profile Velocity (PV) and Homing (HM)
- Compatible with major EtherCAT masters and slaves
- Stepper motors with 1000, 2500, 5000, and 10000 PPR encoders

EtherCAT

Specification

Drive Specifications

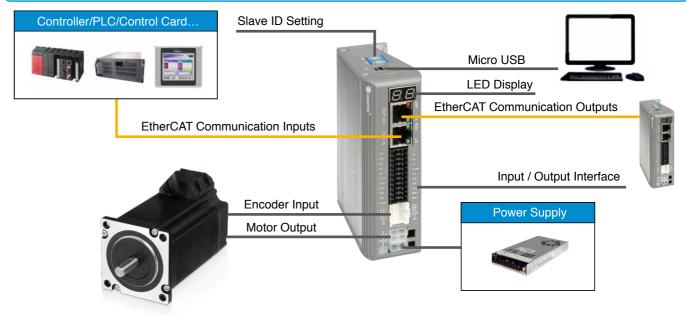| Models	CS3E-D503	CS3E-D507	CS3E-D728	CS3E-D1008
Operationg Voltage	20 VDC - 50 VDC	20 VDC - 50 VDC	20 VDC - 72 VDC	20 VDC - 80 VAC or 30 VDC - 110 VDC
Output Current	0.3 A - 2.5 A (RMS 1.8 A)	1.0 A - 7.0 A (RMS 5 A)	2.1 A - 8.0 A (RMS 6 A)	3.2 A - 8.2 A (RMS 6 A)
Matched Motor	NEMA 11, 14, 17	NEMA 23, 24	NEMA 23, 24, 34	NEMA 34

EtherCAT Specifications

Item	Description
Physical Layer	100 BASE-TX full duplex
Communication Connector	RJ45 × 2 (ECATIN, ECATOUT)
Topology	Line, tree or star
Baud Rate	2 × 100 Mbps (full-duplex channel)
Frame Data Length	1484 bytes (Max)
Number of Axes	64
Number of Nodes	128 slave nodes max
Cable	Shielded twisted pair, 100 m max between nodes
Synchronization Mode	DC Synchronization (SYNC0) Free Run
Communication Event	SDO, PDO, EMCY
Application Layer	IEC61800-7 CiA402 Drive Profile
Operation Modes	CSP, PV, PP, HM
Cycle Period	500 µs, 750 µs, 1 ms, 2 ms, 3 ms, 4 ms, 5 ms

Matching Closed-loop Stepper Motor

Motor Size		Motor Model			Holding Torque (N·m)	Length (mm)		
		Standard Model	With Brake	Waterproof		Standard	Brake	Waterproof
NEMA17		CS-M21702			0.2	56		
		CS-M21704			0.4	63		
		CS-M21706			0.6	70		
		CS-M21708			0.8	83		
NEMA23		CS-M22306			0.6	60		
		CS-M22313	CS-M22313B	CS-M22313WP	1.3	75	109	94
		CS-M22323	CS-M22323B	CS-M22323WP	2.3	95	131	115
		CS-M22326			2.6	103		
		CS-M22321-L			2.1	86		
		CS-M22331-L			3.1	105		
NEMA24		CS-M22422	CS-M22422B	CS-M22422WP	2.2	89	129	113
		CS-M22430	CS-M22430B	CS-M22430WP	3.0	107	143	130
NEMA34		CS-M23435			3.5	95		
		CS-M23445	CS-M23445B	CS-M23445WP	4.5	109	134	115
		CS-M23480		CS-M23480WP	8.0	127		133
		CS-M23485	CS-M23485B	CS-M23485WP	8.5	147	172	153
		CS-M234120	CS-M234120B	CS-M234120WP	12	158	183	164

Application Sample

- Packing machines
- Electronic equipment
- Stage entertainment equipment
- CNC Machines

System Configuration

Controller/PLC/Control Card…

Slave ID Setting

Micro USB

LED Display

EtherCAT Communication Outputs

EtherCAT Communication Inputs

Input / Output Interface

Encoder Input

Power Supply

Motor Output

Sales area

- China
- Worldwide response

Language

- English
- Chinese

For more information

URL: http://www.leadshine.com

EtherCAT Stepper Drives
EM3E Series

Features

- Low noise and vibration, smooth motion
- CANopen over EtherCAT (CoE) with full support of CiA402, 100 Mbps full-duplex
- Support operation modes: Profile Position, Profile Velocity, Cyclic Synchronous Position, Homing
- 5 digital inputs, 2 optically isolated digital outputs for EM3E-522 / 556 / 870
  7 digital inputs, 7 optically isolated digital outputs for EM3E-A882
- Operation modes: Cyclic Synchronous Position (CSP), Profile Position (PP), Profile Velocity (PV) and Homing (HM)
- Compatible with major EtherCAT masters and slaves

EtherCAT®

Specification

Drive Specifications

Models	EM3E-522	EM3E-556	EM3E-870	EM3E-A882
Operationg Voltage	20 VDC - 50 VDC	20 VDC - 50VDC	20 VDC - 80 VDC	20 VDC - 80 VAC or 30 VDC - 110 VDC
Output Current	0.3 A - 2.2 A (RMS 1.6 A)	1.0 A - 5.6 A (RMS 4 A)	2.1 A - 7.0 A (RMS 5 A)	3.2 A - 8.2 A (RMS 6 A)
Matched Motor	NEMA 8, 11, 14, 17	NEMA 23, 24	NEMA 23, 24, 34	NEMA 34

EtherCAT Specifications

Item	Description
Communication protocol standard	CoE (CANopen over EtherCAT)
Equipment protocol standard	IEC61800-7 CiA 402 Drive Profile
Control Modes	CSP (Cyclic Synchronous Position) pp (Profile Position) PV (Profile Velocity) HM (Homing)
Synchronization Modes	DC Synchronization and Free-run mode
Synchronization cycle	250 μs, 500 μs, 750 μs, 1 ms, 2 ms, 4 ms

Matching Stepper Motor

Motor Size		Motor Model			Holding Torque (N·m)	Length (mm)		
		Standard Model	With Brake	Waterproof		Standard	Brake	Waterproof
NEMA17		42CM02			0.2	33		
		42CM04			0.4	40		
		42CM06	42CM06-BZ		0.6	47	79	
		42CM08	42CM06-BZ		0.8	60	92	
NEMA23		57CM06			0.6	41		
		57CM13	57CM13-BZ	57CM13-FS	1.3	55	96	65
		57CM23	57CM23-BZ	57CM23-FS	2.3	76	116	90
		57CM26			2.6	84		
		D57CM21			2.1	67		
		D57CM31			3.1	88		
NEMA24		60CM22X			2.2	67		
		60CM30X	60CM30X-BZ		3.0	85	124	
NEMA34		86CM35			3.5	65		
		86CM45	86CM45-BZ	86CM45-FS	4.5	80	114	90
		86CM80			8.0	98		
		86CM85	86CM85-BZ	86CM85-FS	8.5	118	152	130
		86CM120			12	129		

Application Sample
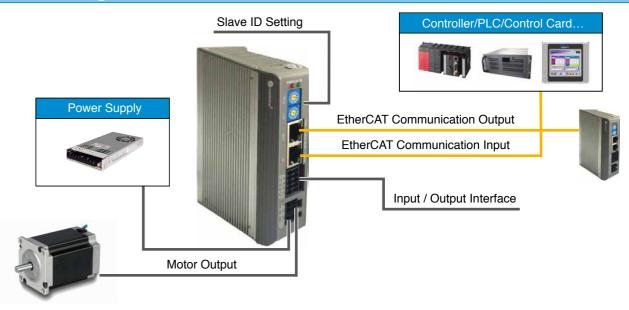
- Packing machines
- Electronic equipment
- Stage entertainment equipment
- CNC Machines

System Configuration

Slave ID Setting

Controller/PLC/Control Card…

Power Supply

EtherCAT Communication Output

EtherCAT Communication Input

Input / Output Interface

Motor Output

Sales area

- China
- Worldwide response

Language

- English
- Chinese

For more information

URL: http://www.leadshine.com

EtherCAT

EtherCAT

PC Based Controller
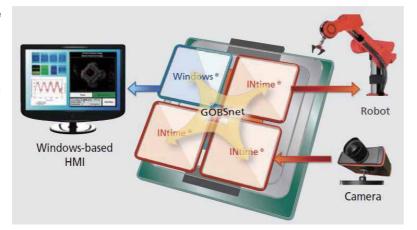## RT-C Language Controller

Features

RT-C Language Controller for Windows can give determinism to ensure predictable behaviors and can support real-time tasks to standard Windows platforms.

Though Windows is a global standard on human machine interfaces (HMI) and on other general purpose operating system (GPOS) functions, but only Windows cannot provide deterministic supports for real-time application needs.

Windows-based HMI

Windows® INtime®

GOBSnet

INtime® INtime®

Robot

Camera

● **Complete RTOS for Windows platforms**

RT-C Language Controller is a controller which can achieve 100 µs period high-speed real time control.

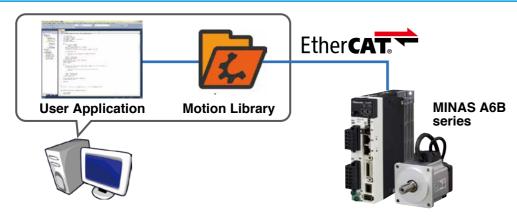You can realize both real time instrument control function and multi-purpose Windows function on 1 PC platform.

since it can also run on Windows.

● **Machine control by RT-C Language Controler**

RT-C Language Controller which makes use of PC platfrom can offer unmatched performance since it uses latest Intel CPU.

In developing control program, since it adopts the integrated development environment "Visual Studio" which is the most popular all over the world, if you have experienced Windows programs with C# language, you can smoothly introduce it to your systems.

System Configuration

User Application   Motion Library

EtherCAT®

MINAS A6B series

Specification

Priority Scheduling	0 (highest) - 16 (lowest) 16 levels
Constant Scan Time	More than 0.1 ms
Number of Maximum Tasks	16
Data Area Size	64 MB
Supported OS	Windows10, Windows8.1, Windows8, Windows7 [32 bit/64 bit]
Development languages and Environments	Visual Studio 2008/2010/2013/2015 * More than Professional Edition

---

EtherCAT

PC Based Controller
INplc PLC based on IEC61131-3

Features

● **INplc-Controller with "INplc Runtime License"**

The most advantageous point of INplc is that it can be used with Windows together.

It is a multifunctional controller equipped with not only PLC applications but also C language applications / HMI applications.

You can use add-in boards or field buses as I/O interfaces of INplc.

EtherCAT is also contained in the field bus category which INplc supports.
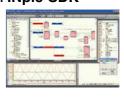
INplc-Controller
• Real-time sequence control
• Network communication function
• High functionality human interface
• Motion Control function

Development Tool INplc-SDK
• IEC 61131-3 Conforming
• Motion Function Block
• Supports language mix

EtherCAT

MINAS A6B series

You can develop and maintain PLC programs on standard Windows PC platforms using it. The created PLC programs can be downloaded to PLC controllers via network.

• INplc has corresponded to 5 languages in accordance with IEC61131-3 that IEC (International-Electrotechnical Commission) provides.
• You can code different languages together in INplc-SDK environment.
• INplc-SDK also allows you to convert across languages.

INplc is a real software-PLC in accordance with IEC61131-3.

INplc adopts MULTIPROG & ProConOS (by PHOENIX CONTACT Software, Germany) which have achieved a lot of satisfactory results in the world. And INplc-Controller adopts INtime and a standard Windows computer as its basic structure.

Therefore,
• No specialized hardware is needed.
• Efficient hardware can be selected from among marketed commodities. From high-end systems to embedded-systems, you can construct various systems with a high-flexibility.

Specification

Priority Scheduling	0 (highest) - 16 (lowest) 16 levels
Constant Scan Time	More than 0.1 ms
Number of Maximum Tasks	16
Data Area Size	64 MB
Supported OS	Windows10, Windows8.1, Windows8, Windows7 [32 bit/64 bit]
Development languages and Environments	IEC61131-3 Language (IL, ST, LD, FBD, SFC), C♯

Sales area

• Japan   • Korea
• China   • Taiwan

Language

• English
• Japanese

For more information

URL : http://www.mnc.co.jp/index_E.htm

Contact: **Micronet Company**
TMY Building 9F,17-13, Hacchobori 3-chome,
Cyuuou-ku, Tokyo, Japan (Zip 104-0032)

[E-mail: cde@mnc.co.jp]

TEL: +81-3-6909-3371 FAX: +81-3-6909-3373

EtherCAT
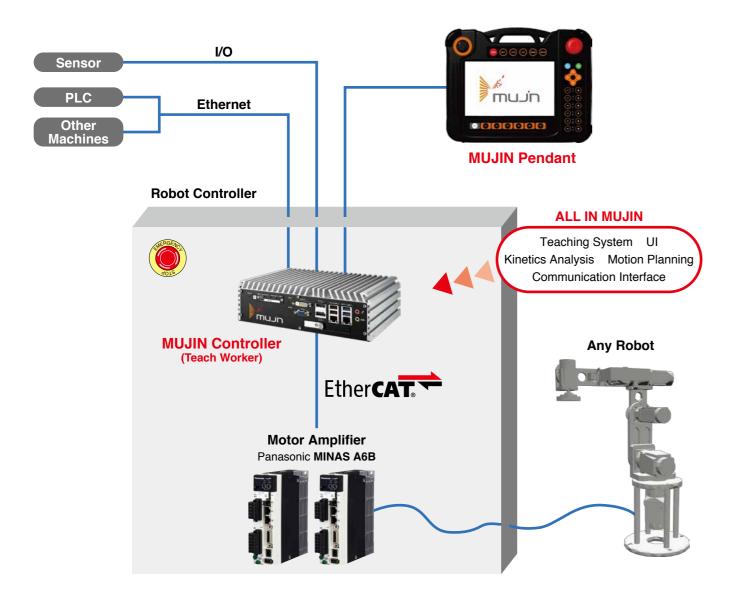
Teach Worker Intelligent Robot Controller for Any Robot

The World's First Robot Controller with Motion Planning

Features

Industrial Robots for Everyone

I/O

Sensor

PLC

Other Machines

Ethernet

MUJIN Pendant

Robot Controller

ALL IN MUJIN

Teaching System   UI
Kinetics Analysis   Motion Planning
Communication Interface

MUJIN Controller
(Teach Worker)

EtherCAT.

Any Robot

Motor Amplifier
Panasonic **MINAS A6B**

Panasonic "AC Servo Motor"

Integration of Mujin's Teach Worker with "AF Series" or "SHA-P Series" gearbox equipped Panasonic servo motors can be completed within 1 month.

Custom robots only require
1 month or less to integrate
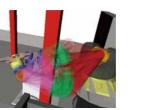
Specification

Innovative User Interface(UI)

"Teach Worker" removes the burden of traditional complex task programming by presenting an interactive user interface with 3D graphics and support for Mujin's optimized programming language ITL.

Less Teaching (Autonomous Collision Avoidance)

Mujin's motion planning technology with advanced collision avoidance logic can be configured easily, enabling robotics systems to operate in small footprint and complex environments without risk of collision.

CAD/CAM

Welding, laser cutting, and deburring related data can be imported using standard CAD formats to easily produce production-ready tasks.

3D Simulator

A simulator is included that can be used to validate tasks before deployment in real-world environments, reducing overall time to deployment and manual tuning on-site.

Remote Maintenance

You can support robots within your facility remotely regardless of robots location via Mujin's Teach Worker.

EtherCAT

Sales area

• Japan   • Worldwide response

Language

• English   • Japanese
• Chinese

For more information

URL : http://www.mujin.co.jp

Contact: **Mujin, Inc.**
1-1-9 Narihira, Sumida, Tokyo, 130-0002, JAPAN

[E-mail: info@mujin.co.jp]
TEL: +81-3-4577-7638

Rugged, Reconfigurable Smart Machine Controller
CompactRIO Performance Controller (cRIO-9034, cRIO-9039)

Features

- Motion, Vision, signal-conditioned I/O, and HMI integration on one platform
- High Performance Real-Time processor
- User-Programmable FPGA
- Over 100 signal-conditioned I/O modules to customize your application
- EtherCAT, Ethernet/IP, ProfiBus, ProfiNet, Modbus, OPC UA, and other common buses supported
- Pre-written motion control and vision analysis libraries for real-time and FPGA

Specification
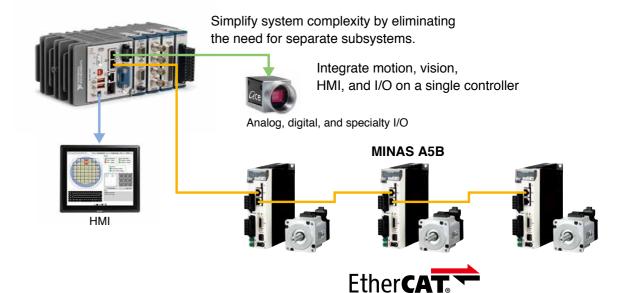
	4-slot Performance	8-slot Performance
Processor	Up to Quad-Core Intel Atom E3845, 1.91 GHz	
Modular C Series I/O Slots	4	8
Control Cycle Time	250 µs (min.) over EtherCAT	
RAM	Up to 2 GB DDR3 + 128 MB DDR3 for FPGA	
Storage	Up to 16 GB + SDHC Card Slot	
Programming Environments	LabVIEW, C/C++, IEC 61131-3	
Shock/Vibration Ratings	50 G Operational shock; 10 Hz – 500 Hz Random Vibration	
Operating Temperature	−20 °C to 55 °C (−40 °C to 70 °C extended temp models available)	
Operating System	NI Linux Real-Time, 64-bit	
FPGA Type	Up to Kintex-7 325T	
Certifications		

Application Sample

- Machine control systems
- Manufacturing machines
- Pick-and-place machines
- Industrial robotics and automation
- CNC machines
- Vision-guided motion
- Material handling machines
- Hydraulic control
- Power conversion equipment
- Mining and drilling equipment
- Multi-axis motion control
- Machine tools
- Condition Monitoring

System Configuration

Simplify system complexity by eliminating the need for separate subsystems.

Integrate motion, vision, HMI, and I/O on a single controller

Analog, digital, and specialty I/O

MINAS A5B

HMI

Sales area

- Worldwide response

Please contact us for details.

Language

- Operations in over 50 countries
- Support for dozens of languages
- Global training and support

For more information

URL : http://www.ni.com/motion

EtherCAT General Motion Controller

NET200-GMC

Features

- Standardized EtherCAT master
- Built-in integrated development environment: NexMotion Studio
- Master control cycle: 1ms

Specification
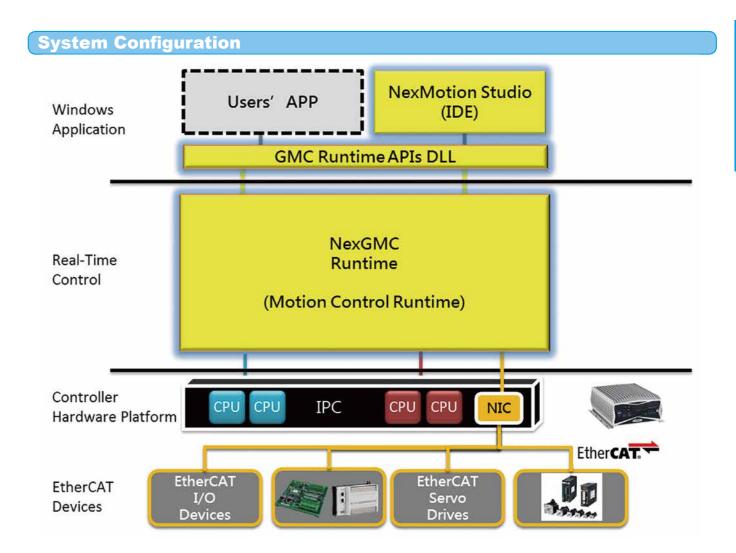
Item	Description
NexGMC Runtime	
Axis No.	8 Axes
Cycle Time	1 ms
Single Axis Control Functions	PTP/ Jog/ Halt/ Stop
Single Axis Blending Motion	Aborting/ Buffered/ Blending
Single Axis Command Override	Position/ Velocity/ Acceleration/ Deceleration
Axes Group Types	Cartesian Coordinated
Axes Group Control Functions	PTP/ Linear/ 2D Arc/3D Arc
Axes Group Blending Motion	Aborting/ Buffered/ Blending
Platform Specifications	
CPU	Intel® Celeron® processor J1900 Quad Cord 2.0 GHz
Memory	4 GB RAM (2 x DDR3L)
Display	Dual independent display: DVI-I and DP

I/O Interface-Front	● ATX power on/off switch LEDs for HDD LED, Batty LEDs, Power LED, COM port Tx/Rx, 5x programmable GPO LEDs
	● 1 x External SD Card
	● 1 x SIM card holder
	● 2 x Intel® I210AT GbE LAN ports, support WoL, Teaming and PXE
	● 1 x DP display output
	● 1 x DVI-I display output
	● 1 x USB 3.0 (900 mA per each)
	● 3 x USB 2.0 (500 mA per each)
	● 2 x RS232/422/485 support auto flow control
	   - Jumper-free setting on RS232/422/485
	   - Support 2.5 KV isolation protection on COM1
	● 1 x 3-pin DC input, Typical 24 V DC input with +/–20 % range

Dimensions	85 mm (W) x 157 mm (D) x 214 mm (H)
Certifications	CE/FCC Class A
Operation Environment	Operating system: Windows Embedded Standard 7 Real-time extension: RTX

NexMotion Studio

- EtherCAT devices online scan and offline edit
- EtherCAT master configuration
- PDO mapping edit, online SDO edit
- Import ESI and export ENI
- CiA 402 device operation: CSP
- Single axis operation
- Group axes operation
- I/O mapping edit and operation
- Support simulation mode

System Configuration

For more information
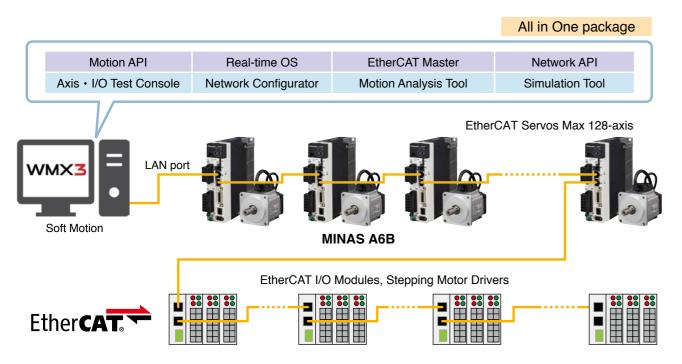
EtherCAT

PC-Based, Advanced Soft Motion Controller
WMX3 for EtherCAT

EtherCAT

Features
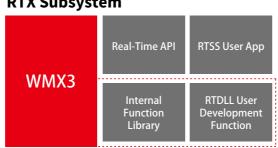
- Soft Motion Controller WMX3 is a patented software which turns any Windows PC with multi-core CPU a high-speed real time controller for intricated industrial machines. No additional proprietary hardware interface modules or components are necessary.
- WMX3 streamlines its operation systems; it integrates operation screens, image processing and device control applications up to 128-axis.
- Wiring can be reduced by networking. Furthermore, wiring man-hours and material reduction can be realized. Contributes to noise immunity.
- Small cost effective Windows PC enables real time logging simultaneously with controlling various industrial devices. Allows the accumulation of data in the edge PC and instantly retrieves it whenever necessary for its host systems.
- Over 500 API functions for C/C++and .NET functions for EitherCAT communications, motion control, and I/O control are available to develop original user motion applications.
- Exclusively developed EtherCAT SoftMaster is highly compatible with other slave machines on the market. Allows 32-axis high-speed synchronous communication at 250 μs. Full customer support for transmission and connection problems.
- SDK installed with WMX3 allows for customized motion control systems for various operation needs.

All in One package

Motion API	Real-time OS	EtherCAT Master	Network API
Axis・I/O Test Console	Network Configurator	Motion Analysis Tool	Simulation Tool

EtherCAT Servos Max 128-axis

LAN port

Soft Motion

MINAS A6B

EtherCAT I/O Modules, Stepping Motor Drivers

EtherCAT®

Real Time SDK Package

- Integration with various users' algorithms and control functions on real time kernel RTX provides high-end application development environment.
- Integrates users' real time motion library as RTDLL with existing functions on WMX3.
- Open platform formation allows high performance motion control customized for user needs.

RTX Subsystem

WMX3	Real-Time API	RTSS User App
	Internal Function Library	RTDLL User Development Function

Specification

Number of Axes	Max 128-axis
Interpolation Types	Linear, Arc, 3D Arc, Helical, PVT
Communication / Command cycle	Standard: 1 ms, Shortest: 0.125 ms (Depends on PC performance, axis count)
Command Modes	Position (Standard), Velocity, Torque, Dynamic command mode can be changed. *Depends on servo specifications
Positioning	128-axis * Simultaneous override (Dynamic destination can be changed)
Acceleration / Deceleration Profiles	Speed curve: Trapezoid, S-Curve, Jerk, Two-Step Speed, Acceleration time specification trapezoid, Acceleration curve: S-Curve, Quadratic Curve, Sine Curve
Interpolation Types	Linear, Arc, 3D Arc, Helical, PVT
Continuous Trajectory	Combination of straight line and Arc, Spline interpolation, Automatic prefetch speed control, Linear / Circular continuous trajectory with rotating stage
Gantry Control	Complete synchronous gantry control
Event	Register triggers (reach axis target value, I / O input, etc.) and actions (start axis movement, I / O output, etc.) and execute real-time operations
API Buffer	Register the motion API in the buffer and perform real-time operation. Execution waits and branches can be made depending on conditions.
Position synchronization output (PSO)	Real-time output of I / O at the specified position (position comparison performance depends on the communication cycle). When more precise operation is required, position comparison at 1 pulse level is possible with a dedicated hardware option.
Synchronization Control	Simple synchronization, synchronous gear ratio / offset specification, synchronization deviation correction, dynamic synchronization axis setting / change / cancel. Multiple axes (up to 64 sets for EtherCAT and up to 32 sets for RTEX) can be defined for single-axis to multi-axis synchronization.
Electronic Cam	8 cam curves can be defined. Cam curve for each communication cycle. Phase manipulation. clutch.
Return to Origin	Index pulse, origin sensor, limit sensor, limit proximity sensor, external input signal, mechanical end, etc. It is possible to return to the origin of the gantry axis.
I/O	11600 inputs / 11600 outputs, Supports most commercial EtherCAT I/O modules
Compensation Function	Pitch error, Backlash, Straightness correction
API Supported Language	C Language (C/C++), .NET Languages (C#,VB), .NET Framework: 4.0 or later
Development Environment	Microsoft Visual Studio 2012, 2013, 2015, 2017, LabVIEW, Python 3.6
Recommended Operating Environment	OS: Windows 7 (32-bit/64-bit), Windows 10 (64-bit), IoT Enterprise LTSC CPU: Min. ATOM 2 GHz (E3845, etc.) 2 cores or more, Memory: 4 GB or more

Utility Tools
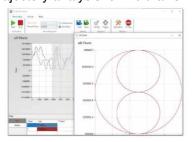
EcConfigurator
- Communication setting, status monitoring tool
- Parameter upload / download via network
- Network topology display function
- Network diagnosis function

Profile Analyzer
- Tool for displaying multi-axis motion in real time or from log data graphically
- Timing control by trigger setting is possible
- Trajectory analysis for multi-axis interpolation

Sales area
- Japan
- China
- United States of America
- Korea
- Taiwan

Language
- English
- Korean
- Japanese
- Chinese

For more information

URL WMX3 for EtherCAT : https://softservo.co.jp/products/wmx3/

PC Based Fine Motion
RTMC64-EC

Features

● **PC Based Fine Motion is a controller software for EtherCAT.**
Your PC becomes a high performance motion controller. PC Based Fine Motion whose ability is several hold higher than that of a general NC or a robot controller controls at most eight precise machines by one PC.
The reliability of your controller can be improved by "INtime" and FAPC(Factory Automation PC).

PC Based Fine Motion

Specification

High-speed
0.25 msec / 32-Axis
0.5 msec / 64-Axis

Reliability
Not depend on Windows

Multi Axis Control
64-Axis / 8 task

8 task controlled simultaneously
One PC controls 8 machines

PC Based Fine Motion

EtherCAT

Batch control
Control multiple machines such as precision cutting, robot, molding, injection, deburring.

- Precision cutting
- Bending Robot
- Jointed Robot
- Coordinate Measuring Machine
- Servo Press
- SCARA Robot
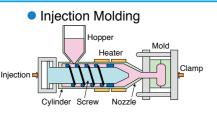
G code / Techno code
Simple operating program

Abundant motions
Fully equipped motion functions Operate immediately

PLC/Image processing
Easily cooperate with various software

· High reliability by INtime, not depending on Windows
· Make user enable to control precise machines without special knowledge

Application Sample

- Precision cutting
- Robot
- Laser cutting
- Injection Molding
- Winding machine

System Configuration

FAPC (Factory Automation PC)

- PC applications
- C Language
- Software PLC ProConOS

PC Based Fine Motion
Automatic machine control
Precision cutting · Winding Rollcontrol · Film control Robot · Injection Molding

EtherCAT Master Stack

Core i7 | Windows

INtime

EtherCAT
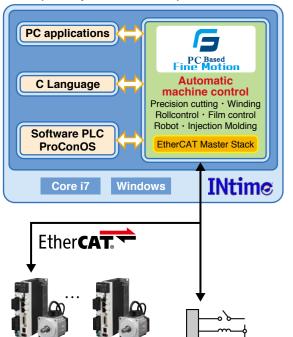
Multi axis servo driver/motor | I/O | DA/AD
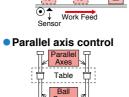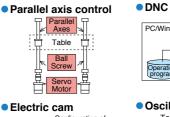
- ● **Synchronous feed Synchronous follow**
- ● **Parallel axis control**
- ● **Electric cam**
- ● **Thread-cutting**
- ● **Roll/Tension control**
- ● **DNC**
- ● **Oscillation**
- ● **Diameter compensation**
- ● **Tangent control**
- ● **High-precision position measurement** · No delay · Precise
- ● **Winding command**
- ● **Robot mechanism kinematics**
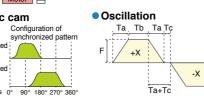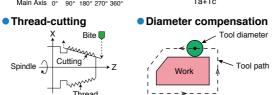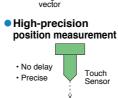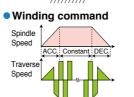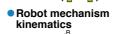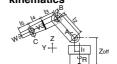
PC Based Motion Library
RTPL-EC

Features

- ● PC Based Motion Library is a motion development software for EtherCAT user. (Function group for carious motion)
- ● In-house development of motion controller by C language with Visual Studio.
- ● Sample sources are prepared.
- ● High-speed operation with an efficient CPU. (0.25 msec/32-axis 0.5 msec/64-axis)
- ● High reliability by INtime, not depending on Windows. / High reliability by FAPC(Fanless/SSD)
- ● Easily operate from an application software on Windows.
- ● Easily cooperate with software such as image processing.

Motion Library

Specification

Example of Function Call Flow

- · RtplECTInitializeLib ()
- · RtplECTClearAlarm ()
- · RtplECTServoON ()
- · RtplECTLinInterpolate ()
- · RtplECTCmdActive ()
- · RtplECTResWait ()
- · RtplECTServoOFF ()
- · RtplECTCloseLib ()

PC Based Motion Library function

Library initialization	RtplECTInitializeLib();	Pause	RtplECTHoldAxis();
Library Close	RtplECTCloseLib();	Set Synchronous Axis	RtplECTSetGantryAxis();
Execute command	RtplECTCmdActive();	Set Override	RtplECTSetOverride();
Wait for Response	RtplECTResWait();	Return to origin	RtplECTHomePosition();
Monitor Status	RtplECTGetStatus();	Positioning	RtplECTPositioning();
SDO Write	RtplECTSetSDO();	Latch Positioning	RtplECTLatchPositioning();
PDO Write	RtplECTSetPDO();	Linear Interpolation	RtplECTLinInterpolate();
Servo ON	RtplECTServoON();	Circular arc Interpolation	RtplECTCirInterpolate();
Servo OFF	RtplECTServoOFF();	JOG Stop	RtplECTJOGStop();
Servo Alarm Clear	RtplECTClearAlarm();	Torque control start	RtplECTTorqueCtrlStart();
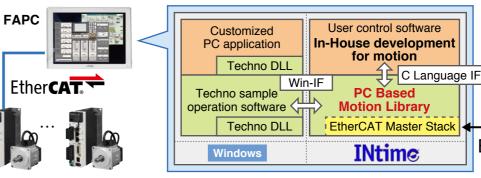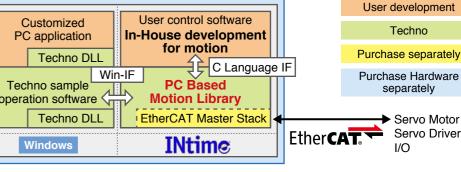
Application Sample

- ● Semiconductor-fabrication equipment
- ● Electronic equipment production line
- ● Printing System
- ● Other multi axis control devices

System Configuration

FAPC

EtherCAT

Customized PC application
Techno DLL

User control software
In-House development for motion

Win-IF | C Language IF

Techno sample operation software
Techno DLL

PC Based Motion Library
EtherCAT Master Stack

Windows | INtime

EtherCAT

Servo Motor Servo Driver I/O

User development
Techno
Purchase separately
Purchase Hardware separately

Sales area

· Japan   · All over the world
Please contact the following address for details.

Language

· English
· Japanese

For more information

PC Based Fine Motion   URL: http://www.open-mc.com/products/pdt05.html
PC Based Motion Library URL: http://www.open-mc.com/products/pdt06.html
INtime   URL: http://www.mnc.co.jp/INtime/

Programmable Automation Controllers
Power Family

Features

All controllers of the **Power family** are equipped with 32 bit Risc (Reduced Instruction Set Computer) CPU to allow use of a sole **Real Time Multitasking Operative System (OS)** to manage PLC, CNC, HMI and IT tasks. The scale between the different models depends on:

- CPU with different clock (132 or 264 MHz) and cores (1 or 2)
- Memory architectures with different parallelism (16 or 32 bit)

The **compiler**, which generates the executable code, is integrated in the firmware of the controller so the system becomes completely autonomous and independent from the evolutions of the consumer world (PC) and **unaffected by computer viruses**.

There are two main executors, each one with its set of instructions:

- **PLC executor** which cycles continuously between the first and the last instruction of the PLC program
- **CNC executor** which starts only on request, it can be put on hold or deleted and it ends after the last instruction of the CNC program

CNC executor can process up to **5 CNC** task at the same time. Their execution are transfered in a buffer (**Look Ahead**) where they are processed to obtain effective trajectories of the interpolated axes. The commands inserted in ISO editor (the user program written in **G-code**) are interpreted and executed launching the execution of different blocks present in the BLC editor.

The OS manages many types of communication ports:
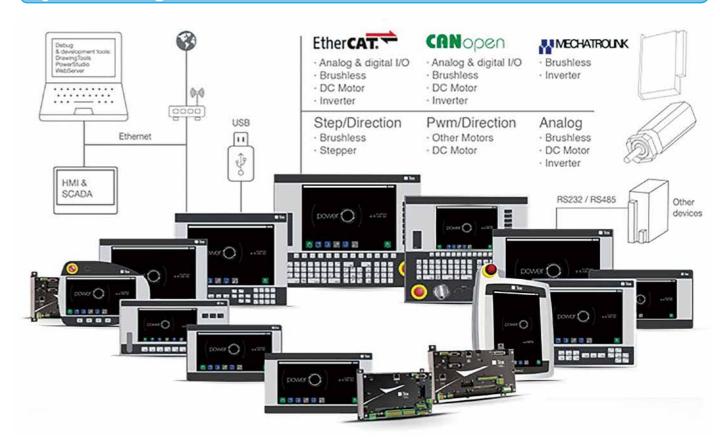
- **Ethernet** with the support of TCP/IP, FTP and ModbusTCP protocols; **OPC server** and **WEB server** are also available
- **RS232/RS485** serials with **Modbus** protocol (ASCII and RTU)
- **USB** which can connect **MSD** (Mass Storage Device) of different types and with more memory volumes, **HID** (Human Interface Device) like keypads / mouse and tracking devices like Gamepad

It can manage up to **28 axes** in point to point, gearing, camming and interpolation mode. Their trajectory can be shaped via many different levels of **Jerk** in order to reduce the inertial effect of load without great loses in performances.

Application Sample

- Plane cutting machines (Plasma, Laser, Oxy, Waterjet, Diamond disk)
- Stone working machines (Bridge saws, Polishing, CNC contouring)
- Woodworking machines (CNC for drilling, routing, tenoning, sawing)
- Metal machining (3-5 axes milling, parallel & automatic lathe turning)
- Textile (Cutting, Sewing, Labelling, Finishing & Washing)
- Pick & Place with Articulated, Cartesian, SCARA or DELTA robots
- Packaging and all sort of automatic machines

System Configuration

Sales area

- China
- India
- Brazil
- Europe

Please contact us for details.

Language

- Italian
- English

For more information

URL: www.texcomputer.com

TRIO MOTION TECHNOLOGY **Trio Motion Technology Ltd.**

Motion Coordinator and EtherCAT Interface Module

Motion Coordinator MC664 /MC664-X Panasonic EtherCAT Interface Module

Features

- Up to 128 Axes
- Servo period 50 µsec minimum (8 axes)
- Precise 64 Bit Motion Calculations with Quad Core Cortex A9 1 GHz Processor (P862)
- Dedicated Communications Core (P862)
- Built-in EtherCAT Port
- EtherCAT, Sercos, SLM and RTEX Digital Drive Interfaces
- Linear, Circular, Helical and Spherical Interpolation
- Flexible CAM shapes, Linked Motion
- EnDAT, BISS and SSI Absolute Encoder Supported
- Hardware Linked Outputs for Camera / Laser Control
- Ethernet-IP / Modbus TCP / Ethernet Interface Built-In

- Anybus-CC Module for Flexible Factory Comms Including ProfiNet/Profibus
- IEC 61131-3 Programming
- Multi-tasking BASIC Programming
- Text File Handling
- Robotic Transformations
- SD Memory Card Slot
- CANopen + EtherCAT I/O Expansion
- Backlit LCD Display
- RoHS and CE Approved

Specification

MC664 / MC664-X

Item		Description
Configuration	Axis 0	Encoder / Pulse out
Axes	Max axes	128
	Max discrete wired axes	24
	Max Networked axes	128 (P862) 64 (P861)
	Max virtual axes	128
Performance	Processor	ARM A9 (Quad)
	Clock frequency	1000 MHz (Max)
	Servo update rate	2 ms (4 ms = MC664) −50 µs (8 axes at 50 µs)
	Encoder input frequency	6 MHz
	Stepper output frequency	2 MHz
	User memory	8 Mbyte
	Max data table size	512000
	Flash data memory	32 × 16000
	VR	65536
	Position register precision	64 bit
	Maths precision	Double FP
	Real time clock	Yes
Drive Interfaces	Stepper (Step & Direction)	Option
	Servo (±10 V & Encoder)	Option
	Piezo	Option
	Panasonic RTEX	Option
	Hydraulic	Option
	EtherCAT	YES/Option
Communication	Profibus	Option
	DeviceNet	Yes (slave)
	CANopen	Yes (server)
	USB (V1.1)	Option
	Ethernet (10/100) base-T	Yes
	Ethernet IP	Yes (server)
	MODBUS-RTU	Yes
	MODBUS-TCP/IP	Yes
	RS232/RS485	Yes
	CC-Link	Option
	ProfiNet	Option
	Bluetooth	Option
	Anybus support	Option
	Hostlink	Yes

Item		Description
Encoder Ports	Feedback input	Option
	Reference input	Yes
	Pulse + direction output	Yes
	Incremental (A+B) output	Yes
	SSI Absolute	Yes
	EnDat	Yes
	Biss	Yes
Built-In I/O	Inputs 24 VDC	8
	Bi-directional I/O 24 Vdc	8
	0 - 10 V analogue inputs	2 × 12 bit
	# registration inputs	58 max
	Registration input speed	1 µs
	WDOG output	1
Expansion I/O	Digital I/O points	2048
	12 bit ±10 V analogue inputs	32
	12 bit ±10 V analogue outputs	16
Programming	TrioBASIC	Yes
	# programs	32
	# tasks	22
	IEC61131 Runtime	Yes
	Kinematic Runtime	Option
	G-Code	Application option
	HPGL	Application option
	DXF import	PC application
Software	Motion Perfect v4	Yes
	All Support Software	Yes
Expansion	Max expansion modules	6 + 1
	Memory slot card	SD up to 16 GB
Physical	Width × Height × Depth (mm)	56 × 201 × 155
	Weight	750 g
	Mounting	DIN / Panel
	Operating Temp	0 - 45 °C
Power	Supply Voltage DC	24 V
	Consumption (exc. I/O)	625 mA
Certification	CE approval	Yes
	RoHS Compliant	Yes

Item	Description
EtherCAT Interface Specification	
Max Slaves per chain	128
Cable	Cat 5e or better
Regist Inputs	8 x 24 V
Supported modes	CSP, CSV, CST, Open speed
Axis Feature Enable Codes	P914

Application Sample

URL : Sample applications

http://www.triomotion.uk/public/applications/applications.php

Please refer to the sample and typical applications for the MC664 with A6B as shown above URL.

System Configuration

UNIPLAY HMI

MC664

Up to 128 Axes

MINAS A6B

Sales area

- United Kingdom
- China
- United States of America
- India

Please contact the following address for details.

Language

- English

For more information

URL: Specification for the MC664 / MC664-X

http://www.triomotion.uk/public/products/p862.php

Motion Coordinator and EtherCAT Interface Module
Motion Coordinator MC6N-ECAT

Features

- Up to 64 EtherCAT Digital Drive Axes
- Supports Position, Speed and Torque Drive Modes
- Up to 1024 EtherCAT I/O
- EtherCAT CoE, SoE, FoE
- Linear, Circular, Helical and Spherical Interpolation
- Flexible CAM shapes, Linked Motion
- Isolated Encoder Port
- EnDAT and SSI Absolute Encoder Supported
- Hardware Linked Output for Camera / Laser Control
- Ethernet-IP / Modbus TCP / Trio ActiveX / TCIP/ Uniplay HMI / UDP / Ethernet Interface Built-In
- 1GHz i.MX7 Dual ARM Cortex A7 Core Process

- IEC 61131-3 Programming
- Multi-tasking BASIC Programming
- Text File Handling
- Robotic Transformations
- 4 high speed registration inputs
- Isolated RS232 and RS485 ports
- SD Memory Card Slot
- EtherCAT I/O Expansion
- CANopen I/O Expansion
- Backlit LCD Display
- RoHS and CE Approved

Specification

MC4N-ECAT
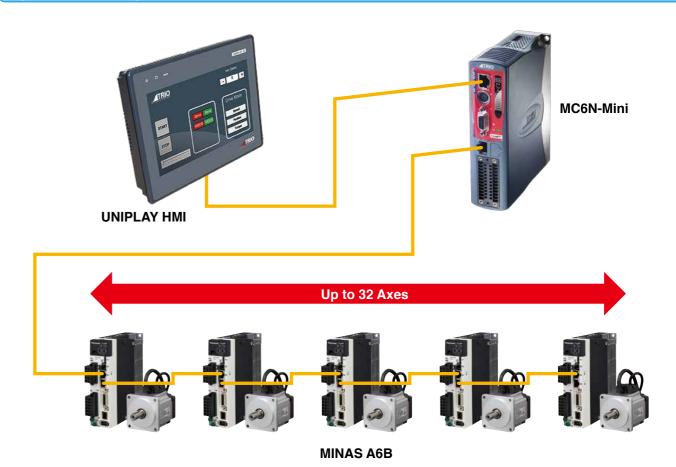
Item		Description		Item	Description
Configuration	Axis 0	Extended		Inputs 24 VDC	8
Axes	Max axes	64	Built-in I/O	Bi-directional I/O 24 VDC	8
	Networked axes	64		# registration inputs	4
	Max virtual axes	64		Registration input speed	1 μs
Perfomance	Processor	i.MX7 Dual ARM Cortex A7 Core		WDOG output	1
	Clock frequency	1 GHz	Expansion I/O	Digital I/O points	1024
	Servo update rate	2 ms-125 μs		12 bit ±10 V analogue inputs	32
	Encoder input frequency	6 MHz		12 bit ±10 V analogue outputs	16
	Stepper output frequency	2 MHz	Programming	TrioBASIC	Yes
	User memory	8 MByte		# programs	32
	Max data table size	512000		# tasks	22
	Flash data memory	32 × 16000		IEC61131 Runtime	Yes
	VR	4096		Kinematic Runtime	Option
	Position register precision	64 bit		G-Code	Application option
	Maths precision	Double FP		HPGL	Application option
	Real time clock	Yes		DXF import	PC Application
Drive Interfaces	EtherCAT	Yes	Software	Motion Perfect v4	Yes
	Auxiliary Axis	Yes		All Support Software	Yes
Communication	DeviceNet	Yes (slave)	Expansion	Memory slot card	SD 16 GB max
	CANopen	Yes (master)	Physical	Width × Height × Depth (mm)	40 × 157 × 120
	Ethernet (10/100) base-T	Yes		Weight	432 g
	Ethernet IP	Yes (server)		Mounting	Panel
	MODBUS-RTU	Yes		Operating Temp	0 - 45 ℃
	MODBUS-TCP/IP Client	Yes	Power	Supply Voltage DC	24 V
	RS232/RS485	Yes		Consumption (exc. I/O)	350 mA
	Hostlink	Yes	Certification	UL Listed	Yes
Encoder Ports	Reference input	Yes		CE approval	Yes
	Pulse + direction output	Yes		RoHS Compliant	Yes
	Incremental (A+B) output	Yes			
	SSI Absolute	Yes			
	EnDat Abs	Yes			

Application Sample

System Configuration

UNIPLAY HMI

MC6N-Mini

Up to 32 Axes

MINAS A6B

Sales area

- United Kingdom
- China
- United States of America
- India

Language

- English

Please contact the following address for details.

For more information

EtherCAT

TRIO **Trio Motion Technology Ltd.**

Motion Coordinator and EtherCAT Interface Module

Motion Coordinator PC-MCAT Ethercat Master

Features

- Motion + PC Solution for Automation Machinery
- Fanless compact PC with E3845 Quad Core Atom Processor at 1.91 GHz
- Powerful up to 64 Axis EtherCAT Based Trio Motion Coordinator
- RTX64 Real Time Extension to allow Motion + Windows Running Directly on Their Own Processor Cores
- Plug and Play EtherCAT Configuration Expandable Support for Servo Drives, I/O and Devices From Over 100 Manufacturers
- Programmable In Easy Trio BASIC, built-in IEC 61131 or PC based Programming Languages Such As 'C'
- 4 GByte RAM + 64 GByte Upgradable SSD
- Windows Operating System
- Built-in Additional GBit Ethernet Port For Vision Cameras

Specification

Item	Description
PC-MCAT	
Motion Axes	2 / 4 / 8 / 16 / 32 / 64
Servo Cycle	250 / 500 / 1000 / 2000 µsec
Drive Modes	Position / Speed / Torque
Interpolation	Linear / Circular / Helical / Spherical / Transition Curves / Tangential
Linked Modes	Cam, Cambox, Flexlink, Movelink, Camlink

Item	Description
EtherCAT Specification	
Speed	100 Mbps
Physical Layer	100BASE-TX full duplex (IEEE 802.3)
Cable	Shielded Twisted Pair (TIA/EIA-568B CAT5e)
Topology	Line, tree or star
Isolation	Pulse transformer with common-mode choke
Connector	RJ45
Cable Length	100 m max between nodes
Cyclic period	250 µsec, 500 µsec, 1000 µsec or 2000 µsec
Synchronisation	Distributed Clocks technology. Jitter <1 µsec
Protocol	CoE, SoE
Number of Axes	64
Number of Nodes	128 slave nodes maximum
Motion modes	Cyclic Synchronous Position, Cyclic Synchronous Velocity, Cyclic Synchronous Torque
Parameter transfe	CoE Object read/write. SoE IDN read/write
In put/Ou tput	Up to 8192
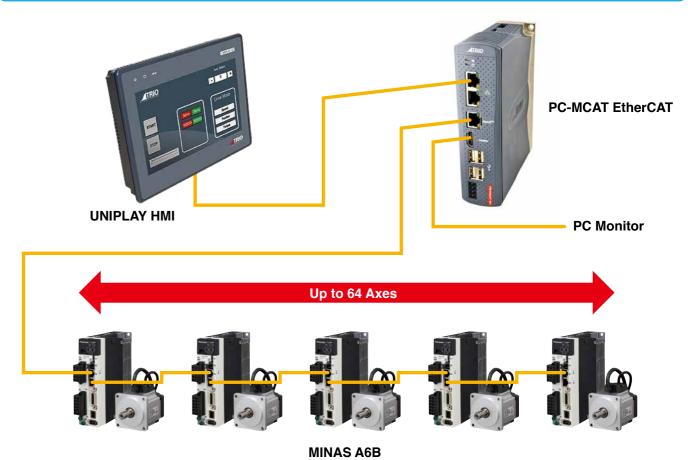
Item	Description
PC Specification	
Processor	Intel® Atom ™ E3845 Quad Core 1.91 GHz
Memory	4 GBytes DDR3
Ethernet	2 x Gb Ethernet + EtherCAT port
HDMI	2560 x 1600 @ 60 Hz Max
Audio	Via HDMI
USB	5 USB ports
Battery	8 Year life PLC compatible type. Replaceable without opening case.
Power Supply	24 V +/–20 % Isolated Power Supply
Operating Temp	0 deg – 55 deg C
Cooling	Fanless
Operating System	Windows with RTX64 Real Time Extension

Application Sample

URL : Sample applications
http://www.triomotion.uk/public/applications/applications.php

System Configuration

UNIPLAY HMI

PC-MCAT EtherCAT

PC Monitor

Up to 64 Axes

MINAS A6B

Sales area

- United Kingdom
- China
- United States of America
- India

Language

- English

Please contact the following address for details.

For more information

URL: Specification for the PC-MCAT Ethercat Master
http://www.triomotion.uk/public/products/p760.php

Contact: **Trio Motion Technology Ltd.**
Shannon Way, Tewkesbury, Gloucestershire, GL20 8ND, United Kingdom   TEL: +44-1684-292333   FAX: +44-1684-297929

EtherCAT partner products

Corresponding table

Partner	Master					
	Software	PC Board	IPC	Panel PC	Stand Alone	PLC
Panasonic Corporation						●
acontls technologles GmbH	●					
ADLINK Technology, Inc.			●			
Advanet Inc.		●				
Advantech Co., Ltd.		●				
ALGO System Co.,Ltd			●	●		
Beckhoff Automation GmbH & Co.KG	●		●	●		●
CODESYS	●					
CONTEC Co., Ltd.			●			
FAGOR AUTOMATIO					●	
Galil Motion Control, Inc.		●				
Hivertec, Inc.	●					
Hypertherm, Inc.					●	
ISAC	●				●	
Leadshine Technology Co., Ltd.						
Micronet Company	●		●	●		●
Mujin, Inc.					●	
National Instruments Corporation					●	
NEXCOM International Co., Ltd.			●			
Soft Servo Systems, Inc.	●					
TECHNO Co., Ltd.	●					
Tex Computer srl					●	
Trio Motion Technology Ltd.					●	

EtherCAT

MEMO

Linear and direct drive (DD) motor control

MINAS A6L series

A6SL, A6SM

High-precision and high-speed advancement of linear motor / direct drive motor control driver inheriting the basic control performance of the A6 series

Motor
- Various motors such as 3-phase cored/coreless, shaft motor and DD motor

Scale
- Serial communication incremental/absolute and A/B/Z phase pulse scale
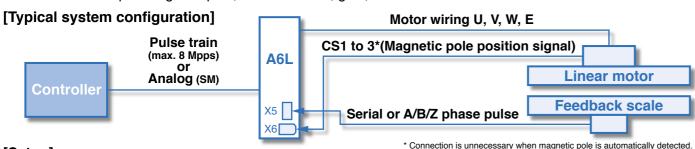
Magnetic pole detection
- Both with and without hole sensor signal (automatic detection)

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

[Typical system configuration]

Pulse train (max. 8 Mpps) or Analog (SM)

Controller

A6L

Motor wiring U, V, W, E

CS1 to 3*(Magnetic pole position signal)

X5
X6

Serial or A/B/Z phase pulse

Linear motor

Feedback scale

* Connection is unnecessary when magnetic pole is automatically detected.

[Setup] · Please ask us to get this software.

Automatic Setup
Automatically sets various parameters such as magnetic pole, scale orientation and gain accordingly to the motor specification.
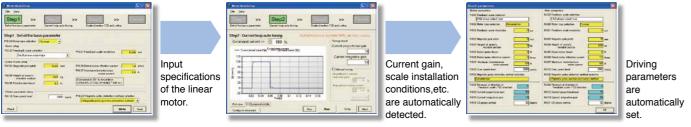
Drastically reduced setup time.

Automatic Magnetic Pole Detection
When CS signal is not available, the automatic magnetic pole detection function will detect the magnetic pole position of the linear motor.

Short adjustment time without magenetic pole sensor

Simple setup for easy and speedy adjustment

Input specifications of the linear motor.

Current gain, scale installation conditions,etc. are automatically detected.

Driving parameters are automatically set.

[Lineup]

SM [Standard]	Specifications	SL [Pulse and I/O input only]
Position, speed and thrust command, Block operation	Instruction	Position command, Block operation
Capable	Two-degree-of-freedom control	Capable
Capable	RS232, RS485	Capable
Compliant	Safety function (STO)	N/A
Capable	Analog input	N/A

A6NL — RTEX compatible linear control driver

[Typical system configuration] For linear motor

Controller — RTEX — A6NL

U, V, W, E
CS1 to 3

X5
X6

Serial or A/B/Z phase pulse

Linear motor

Feedback scale

A6N — M — Rotating motor

· Two-axis integrated type is also available. For details, refer to the specifications.
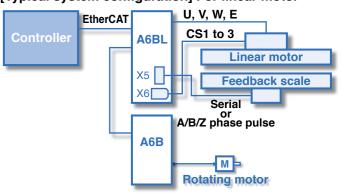
A6BL — EtherCAT compatible linear control driver

[Typical system configuration] For linear motor

Controller — EtherCAT — A6BL

U, V, W, E
CS1 to 3

X5
X6

Serial or A/B/Z phase pulse

Linear motor

Feedback scale

A6B — M — Rotating motor

Drive List

Power supply	Drive Part No. (Note 1)	Motor rated current [Arms] (Note 2)	Motor max. current [Arms] (Note 2)
1-phase 100 to 120 VAC	MADL□01△△	1.1	3.7
	MADL□11△△	1.6	5.5
	MBDL□21△△	2.5	7.4
	MCDL□31△△	4.6	14.3
1-phase or 3-phase 200 to 240 VAC	MADL□05△△	1.1	3.8
	MADL□15△△	1.5	4.8
	MBDL□25△△	2.4	7.3
	MCDL□35△△	4.1	13.2
	MDDL□45△△	5.2	15.5
	MDDL□55△△	9.3	26.1
3-phase 200 to 240 VAC	MEDL□83△△	12.5	37.4
	MEDL□93△△	16	48
	MFDL□A3△△	18.1	54.4
	MFDL□B3△△	27.1	72.1
	MGDLTC3△△	44	116.6
	MHDLTE3△△	66.1	167.2
	MHDLTF3△△	80.2	207.9
3-phase 380 to 480 VAC (Under development)	MDDLT44△△	1.5	4.5
	MDDLT54△△	2.9	8.7
	MDDLT64△△	4.7	14.1
	MEDLT84△△	6.7	19.7
	MFDLTA4△△	9.4	28.2
	MFDLTB4△△	16.5	42.4
	MGDLTC4△△	22	58.7
	MHDLTE4△△	33.1	83.7
	MHDLTF4△△	40.1	103.9

Note 1: Please refer to "□" and "△△" as per below ;
- □ Common   N : Without Safety)
  - T : With Safety STO)
- △△ A6L   SM : Full Version)
  - SL : Only Pulse control)
- A6NL   NM : Multi-function type
  - NL : Standard type
- A6BL   BM : Multi-function type
  - BL : Standard type

There are restrictions on combinations. Multi-function type (M suffix is M) has safety function (T in the 5th digit of model number), Position control type, standard type (L at the end of the model number) No safety function (5th digit in the model number is N).

Note 2: According to the setting value of carrier frequency, we have the possibility of derating. In detail, please refer to the A6L driver specification.
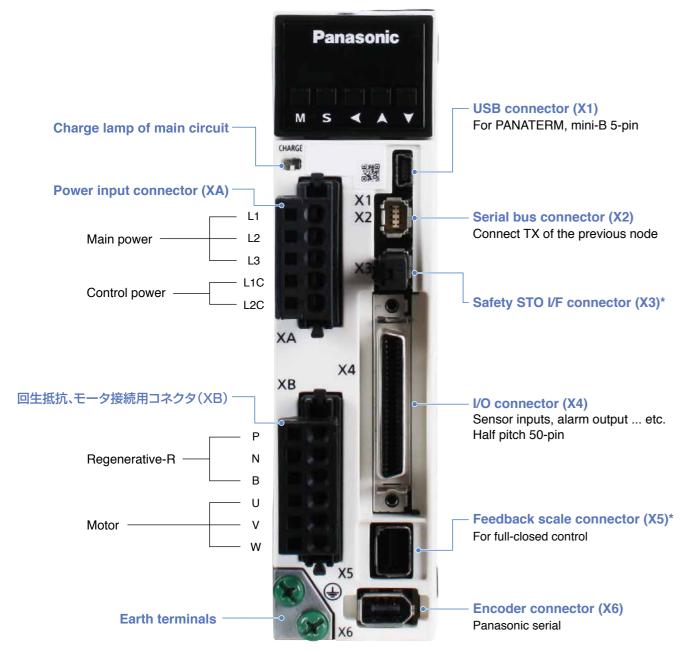
Linear and direct drive (DD) motor control

MINAS A6L series

Drive appearance

A6SM size A

* This photo shows multi-functional type. The position control type does not have an X3 connector.

Charge lamp of main circuit

Power input connector (XA)

Main power — L1, L2, L3

Control power — L1C, L2C

回生抵抗、モータ接続用コネクタ（XB）

Regenerative-R — P, N, B

Motor — U, V, W

Earth terminals

USB connector (X1)
For PANATERM, mini-B 5-pin

Serial bus connector (X2)
Connect TX of the previous node

Safety STO I/F connector (X3)*

I/O connector (X4)
Sensor inputs, alarm output ... etc.
Half pitch 50-pin

Feedback scale connector (X5)*
For full-closed control

Encoder connector (X6)
Panasonic serial

Dimensions (mm): W40, H150, D130

Low voltage small servo

MINAS A5ML, A5MNL, A5MBL
(DC24 V/48 V)

● This product is not A6, but A5M series for specific customers. For more details, refer to the specifications.

Drive appearance

A5ML

I/O connector (CN1)

USB connector (CN7)

Power input connector (CN102, 103)

Alarm indicator LED

Earth terminal

Charge lamp

External scale connector (CN3)

Serial bus connector (CN4)

CS signal connector (CN2)

External scale connector (CN104)

Motor connector (CN101)

Dimensions (mm): W45, H140, D43

List of drivers

Driver power	I/F	Series	Driver model number	Motor rated current [Arms][1]	Motor maximum current [Arms][1]
DC 24 V	Pulse train	A5ML	MMDHT2C09LA4	2.8	7.5
	RTEX	A5MNL	MMDHT2C09NL1		
	EtherCAT	A5MBL	MMDHT2C09BL1		
DC 48 V	Pulse train	A5ML	MMDHT2B09LA4	2.2	6.5
	RTEX	A5MNL	MMDHT2B09NL1		
	EtherCAT	A5MBL	MMDHT2B09BL1		

[1] According to the setting value of carrier frequency, we have the possibility of derating.
In detail, please refer to the A6L driver specification.

Direct Drive Rotary Motor

ADR Series / ACD Series / AXD Series / ACW Series / AXM Series

Features

- Direct drive. Brushless motor fully integrated with encoder and bearing.
- Preparing multiple series using Akribis's patented * technology for stator design. Available for semi-custom.

ADR (A/B/F) Series :

The own stator design realizes low cogging while maintaining high torque. Multiple center holes can be selected and a small build-in type is available.

ACD Series :

Coreless stator design realizes zero-cogging with direct drive mechanism.

AXD Series :

Despite its small size, this series achieve the highest torque in the same range.
This series have flat design and large center hole through unique mechanical design.

ACW Series :

37mm thinnest type. Zero-cogging design.

[New] AXM Series :

Smaller series than ACD series.

* Including patent applying

Line up

ADR-A Series

Standard type

- Through our unique winding design, our ADR-A series have high slot fill factor and produce very high torque.
- Rated torque : min. 1.9 N·m to max. 477.9 N·m
- Encoder can be optionally customized

ADR-B Series
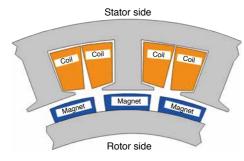
Bigger center hole type

- ADR series common high torque and low cogging design
- Bigger center hole series than ADR-A series.
- Rated torque : min. 1.9 N·m to max. 94.9 N·m
- Encoder can be optionally customized

Stator side

| Coil | Coil | Coil | Coil |

| Magnet | Magnet | Magnet |

Rotor side

ADR-F Series

Built-in type
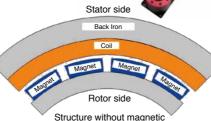
- Line-up of small build-in type that are rarely handled in the market 45 mm to 90 mm
- For flexible design
- Low cogging design

ACD Series

Zero-Cogging type

- Magnetic attraction that causes cogging is eliminated by not forming a core in the stator, and it realizes zero-cogging.
- High response performance

Stator side

Back Iron

Coil

| Magnet | Magnet | Magnet |

Rotor side

Structure without magnetic attraction that causes cogging

Recommended A6L series driver :

For the recommended driver, refer to the page of A6L series and select the part number with the optimum current value. Please contact us for details.

AXM Series

- Smaller size series than ACD series. Min. diameter 80 mm
- High Torque, compact size
  AXM40 : Diameter 40 mm
  AXM60 : Diameter 60 mm
- Low cogging

ACW Series
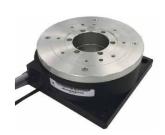
Flat type

- Low profile, Large Center hole
- High precision control
- Zero-cogging design
- Center hole size φ37 mm to 70 mm

[New] AXD Series

- High torque, compact size,
- Large center hole, and low cogging
- High resolution optical encoder feedback

Specification

		ADR-A Series	ADR-B Series	ADR-F Series	ACD Series	AXM Series	ACW Series
Table diameter	mm	110 to 360	110 to 220	45 to 90	62 to 120	40 to 60	120 to 220
Table height	mm	75 to 215	113 to 217	14.0 to 58.5	60 to 175	43 to 50	37 to 42
Number of poles		16 to 32	16 to 24	14 to 16	8 to 12	–	16
Continuous torque	N·m	1.9 to 377.9	1.9 to 94.9	0.05 to 3.75	0.115 to 9.216	0.12 to 0.68	0.6 to 10.3
Peak torque	N·m	5.8 to 1133.8	5.8 to 284.6	0.15 to 11.26	0.40 to 32.25	0.35 to 2.03	2.1 to 35.9
Max. Cogging torque (peak to peak)	N·m	0.0024 to 4.090	0.002 to 0.736	4.16E-04 to 1.10E-02	0	low cogging torque	0
Continuous current	Arms	3.0 to 20.0	3.00 to 16.20	0.60 to 13.40	2.8 to 5.1	1.25 to 3.00	5.0
Peak current	Arms	9.0 to 60.0	9.00 to 48.60	1.80 to 40.20	9.7 to 17.9	3.75 to 9.00	17.5
Motor constant	N·m/ Sqrt(W)	0.36 to 16.90	0.36 to 5.47	0.04 to 0.61	0.028 to 0.901	0.027 to 0.103	0.10 to 0.91
Rotor inertia	kg·m^2	0.0003086 to 0.322304	0.000309 to 0.025216	2.60E-06 to 2.04E-04	0.0000216 to 0.0032075	0.0000118 to 0.0000738	0.000658 to 0.008354
Max speed @230 V AC (DIGITAL)	r/min	30 to 1200	50 to 1200	–	–	–	300 to 400
Resolution (at 64X interpolation)	Counts/ rev	192320 to 480000	192320 to 324544	–	103680 to 183552	–	251776 to 480000
Resolution (at 512X interpolation)	Counts/ rev	1538560 to 3840000	1538560 to 2596352	–	829440 to 1468416	–	2014208 to 3840000
Resolution (at 4096X interpolation)	Counts/ rev	12308480 to 30720000	12308480 to 20770816	–	6635520 to 11747328	–	16113664 to 30720000
Accuracy	arc sec	±20 to ±30	±20 to ±25	–	±30	–	±30
Repeatability	arc sec	±2 to ±2.7	±2 to ±2.7	–	±3	±10	±3
Axial runout	μm	15 to 40	15 to 25	–	12 to 15	25	Max.15 to 18
Radial runout	μm	15 to 40	15 to 25	–	10	25	Max.15 to 18
Max axial load	N	700 to 11200	439 to 1669	–	10 to 150	6 to 15	150.0 to 300.0
Max moment load	N·m	20 to 245	25 to 85	–	10.0	0.1 to 0.2	14.7 to 55.2

Sales area

- Singapore
- Malaysia
- Thailand
- China
- Taiwan
- Korea
- Japan
- USA (Silicon Valley)
- USA (Boston)
- Germany
- Israel

Language

- English
- Japanese
- Chinese
- Korean
- Thai

For more information

URL: http://www.akribis-sys.com/

Contact: **Akribis Systems Pte Ltd**   [E-mail: cust-service@akribis-sys.com]
5012 Techplace II Ang Mo Kio Ave 5 #01-05 Singapore 569876   TEL: +65-6484-3357   FAX: +65-6484-3361

LINEAR MOTOR and DIRECT DRIVE MOTOR

Voice Coil Motor & Single - Axis Actuator

AVM Series / AVA Series

Features

- Compact, cogging and backlash less, enabling high speed operation and high accuracy positioning
- Smooth operating at low speed
- Line up : Cylindrical type for standard, High power and customized model
- Flat type is also prepared for flexible application
- Support semi custom such as hole diameter change and screwing

Specification

Cylindrical Type Voice Coil Motor AVM Series

		AVM series (9 types)	AVM-HF (High Force) series (9 types)	AVM Custom series (19 types)
Diameter D	mm	12.7、19、20、24、30、40、60、90	35、40、50、60、90、100、130、250	14.2、20、24、30、35、40、50、75、80、90、130、150
Stroke	mm	5 to 30	6.5 to 25	4 to 38
Force sensitivity at mid stroke	N/A	0.57 to 22.50	16.00 to 168.40	0.82 to 97.63
Back EMF constant	V/(m/s)	0.57 to 22.50	16.00 to 168.40	0.82 to 97.63
Continuous force (at 100°C)	N	0.91 to 89.10	14.40 to 1111.44	0.98 to 585.77
Peak force	N	3.53 to 315.00	72.00 to 4715.20	2.95 to 1757.30
Continuous current (coile at 100°C)	A	0.63 to 3.96	0.80 to 6.60	0.70 to 6.00
Peak current	A	3.80 to 14.00	4.50 to 28.00	3.60 to 18.00
Max coil temperature	°C		100	
Coil assembly mass	g	5.0 to 820.0	53.0 to 5900.0	3.0 to 1500.0

Planar Type Voice Coil Motor AVA Series

		AVA1-20	AVA2-20	AVA3-20
Stroke	mm	20	20	20.0
Force sensitivity at mid stroke	N/A	1.92	8.35	9.40
Back EMF constant	V/(m/s)	1.92	8.35	9.40
Continuous force (at 100°C)	N	3.84	11.69	26.32
Peak force	N	11.5	35.1	79.0
Continuous current (coile at 100°C)	A	2.00	1.40	2.80
Peak current	A	6.0	4.2	8.4
Max coil temperature	°C		155.0	
Coil assembly mass	g	17.0	45.0	72.0

Line up for Voice Coil Motor Single - Axis Actuator • Stage

- Prepare the actuator and stage for the target application as a standard product.
- Simply connecting to the servo driver enables easy system integration.

Single-axis actuator	Cross roller · Bearing	Z-axis · W guide	Hollow · Cross roller

* Please consult us about applicable type number of servo driver.

Linear Motor
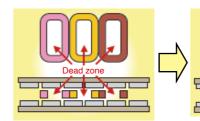
AUM Series / AJM, AQM, AKM Series / ACR Series

Features

- Wide range product
  Coreless, zero cogging type (AUM series), vacuum compatible type (AWM series) and so on.
- Coreless type uses a special winding method that eliminates the dead zone between the coils. Compared to the same size linear motor, higher force and motor constant are achieved.
- Prepare standard modules with encoder and guide.
- AJM, AQM and AKM series
- Newly ACR series is developed as a curved large diameter linear motor

Iron Core Type Linear Motor

- AJM, AQM and AKM series
- Higher force and low price

Ironless Type Linear Motor AUM Series / AHM Series (High Force Type)

- Unique winding technology achieves top level force and motor constant with the same size and keeping the coil length short
- Prepare standard modules with encoder and guide.

Dead zone

General products   Akribis products
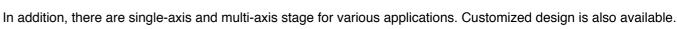
ACR Series

- The large diameter ACR series is a new curved linear motor.
  Limit angle and 360° type are available.

In addition, there are single-axis and multi-axis stage for various applications. Customized design is also available.

Sales area

- Singapore
- Malaysia
- Thailand
- China
- Taiwan
- Korea
- Japan
- USA (Silicon Valley) • USA (Boston) • Germany • Israel

Language

- English
- Japanese
- Chinese
- Korean
- Thai

For more information

URL: http://www.akribis-sys.com/

Contact: **Akribis Systems Pte Ltd**
5012 Techplace II Ang Mo Kio Ave 5 #01-05 Singapore 569876

[E-mail: cust-service@akribis-sys.com]
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LINEAR MOTOR and DIRECT DRIVE MOTOR

Direct drive linear motor
LMA series, LMG series, LMS series, ILF+ series, ILM+ series

Features

IRON CORE LINEAR MOTOR

- LMA series – high continuous force
  - LMG series – compact design and high peak force
  - LMS series – compact design and high continuous force
- Speed   up to 15 m/sec
- Peak force   273 N – 3640 N

<Typical example>

	Peak current/ Continuous current	Continuous force
LMA11-030-3TA	20.5 Arms/3.98 Arms	175 N
LMA11-030-3WTA	40 Arms/7.72 Arms	174 N
LMG05-030-3QA	17.2 Arms/2.56 Arms	66.6 N
LMS05-030-3QA	16.3 Arms/2.13 Arms	82.8 N
LMS05-030-3TA	30.6 Arms/4.10 Arms	84.5 N

IRON CORELESS LINEAR MOTOR
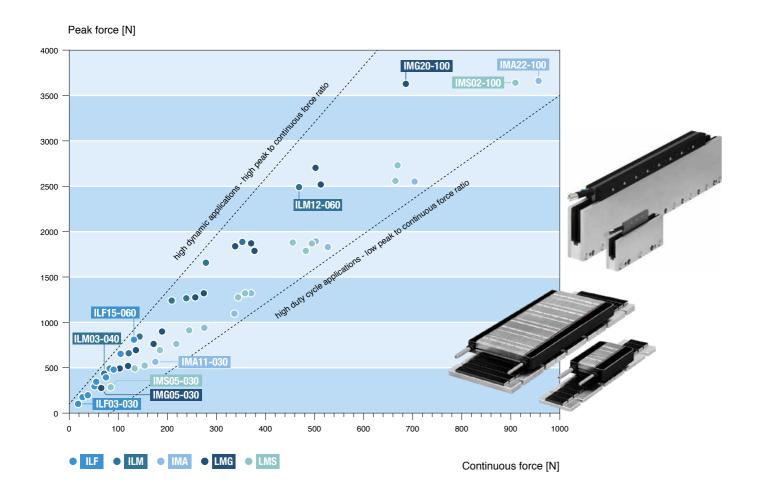
- ILF series – very low mass glider
  - ILM series – compact design and high peak force
                    (Option: forced air cooling)
- Peak force   98 N – 3200 N
- Zero force ripple

<Typical example>

	Peak current/ Continuous current	Continuous force
ILM03-040-3RA	14.3 Arms/2.33 Arms	72.5 N
ILM03-040-3UA	29.8 Arms/4.80 Arms	71.6 N
ILF03-030-3NA	7.11 Arms/1.3 Arms	20.1 N
ILF03-030-3KA	3.5 Arms/0.638 Arms	20.1 N

Peak force [N] vs Continuous force [N] chart with series: ILF, ILM, IMA, LMG, LMS

Direct drive torque motor
TMB+ series, TMK series

Features

TMK

- Large hollow shaft – up to 800 mm
- Peak torque – up to 20800 Nm
- Maximum rated speed – 5450 min^{-1}
- Liquid cooling channels

<Typical example>
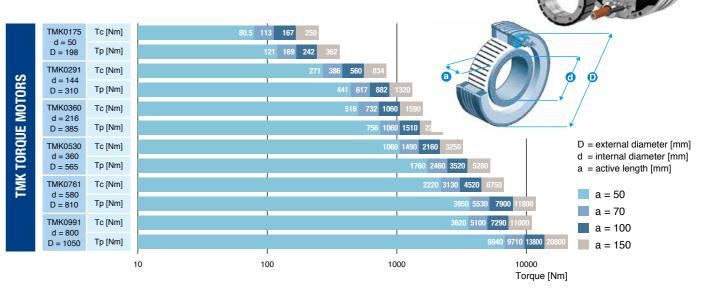
	Peak current/ Continuous current	Continuous torque
TMK0291-050-3VBS	75.6 Arms/32.5 Arms	271 Nm
TMK0291-050-3VDS	151 Arms/64.9 Arms	271 Nm
TMK0291-070-3VBS	75.6 Arms/33.4 Arms	386 Nm
TMK0291-070-3VDS	151 Arms/66.7 Arms	386 Nm

TMB+

- Large hollow shaft – up to 1070 mm
- Peak torque – up to 42900 Nm
- Maximum rated speed – 4590 min^{-1}
- Liquid cooling channels

<Typical example>

	Peak current/ Continuous current	Continuous torque
TMB+0291-030-SA	17.3 Arms/6.32 Arms	137 Nm
TMB+0291-030-SB	34.5 Arms12.6 Arms	137 Nm

TMK TORQUE MOTORS

TMK0175 d = 50 D = 198	Tc [Nm]	80.5	113	167	250
	Tp [Nm]	121	169	242	362
TMK0291 d = 144 D = 310	Tc [Nm]	271	386	560	834
	Tp [Nm]	441	617	882	1320
TMK0360 d = 216 D = 385	Tc [Nm]	516	732	1060	1590
	Tp [Nm]	756	1060	1510	
TMK0530 d = 360 D = 565	Tc [Nm]	1060	1490	2160	3250
	Tp [Nm]	1760	2460	3520	5280
TMK0761 d = 580 D = 810	Tc [Nm]	2220	3130	4520	6750
	Tp [Nm]	3950	5530	7900	11800
TMK0991 d = 800 D = 1050	Tc [Nm]	3620	5100	7290	11000
	Tp [Nm]	6940	9710	13800	20800

Torque [Nm]

D = external diameter [mm]
d = internal diameter [mm]
a = active length [mm]

a = 50
a = 70
a = 100
a = 150

Sales area

- Japan   • United States of America
- German   • China   • Worldwide response

Language

- English   • German
- Japanese   • Chinese

For more information

URL : https://www.etel.ch

Contact: **ETEL S.A.**
Zone Industrielle CH-2112 Môtiers Switzerland

[E-mail: etel@etel.ch]
TEL: +41 (0)32 862 01 00 FAX: +41 (0)32 862 01 01

LINEAR MOTOR and DIRECT DRIVE MOTOR

Manufacturer/Distributor: **JUSTEK** Linear Motion Technology **Justek, Inc.**

Direct Drive Rotary Motor
JTR series

Features

- High precision indexing rotary table
- Minimal cogging design
- High resolution and high torque
- Flexibility in division of angles and control of rotating direction and speed

Specification

PERFORMANCES	UNIT	JTR15T	JTR25T	JTR11 series		JTR15 series				JTR16 series	
				JTR1106	JTR1112	JTR1501E	JTR1503E	JTR1505E	JTR1508E	JTR1604	JTR1608
Continuous Torque	N·m	1.4	9	2	4	5.3	10.7	18.1	28.8	14	27
Peak Torque	N·m	4.2	27	6	12	15.9	32.1	54.3	86.4	40	80
Continuous Current	Arms	1.2	1.1	1.1		1.8	3.7			4.3	9
Peak Current	Arms	3.5	3.3	3.3		5.5	11.1			12.9	27
Torque Constant	N·m/Arms	1.2	8.2	1.8	3.6	2.9	2.9	4.9	7.8	3.3	3
Motor Constant	N·m/W$^{1/2}$	0.3	1	0.4	0.6	0.8	1.3	1.9	2.6	1.4	1.9
Thermal Resistance	°C/W	3.32	1.22	3.72	2.14	2.26	1.41	1.07	0.73	0.87	0.45
Back EMF Constant(ph-ph)	Vrms/rad/s	0.7	4.7	1	2.1	1.7		2.8	4.5	1.9	1.7
Pole Pair	–	8	12	10		10				10	
Max. Speed *	rps	10	3.6	10	8	5			4.5	8	9
Resolution	ppr	655360~8192000	864000~10800000	518400~6480000		655360~8192000				327680~4096000	
Accuracy *	arcsec	±30	±30	±30		±30				±30	
Repeatability *	arcsec	±2	±2	±2.5		±2				±4	
Axial Run-out (no-load)	μm	20/10/5	30	20/10/5		20/10/5				20/10/5	
Radial Run-out (no-load)	μm	20/10/5	30	20/10/5		20/10/5				20/10/5	
Max. Axial Load	kgf	120	410	90		530				120	
Max. Moment Load	N·m	15	80	12		96				15	
Rotor Inertia	kgm²	0.00226	0.0195	0.0007	0.0012	0.012	0.021	0.024	0.029	0.0031	0.0052
Motor Weight	kg	4.4	11	3.9	5.4	6.4	9.8	12.2	15.6	13.9	22
Applicable drive 200 V		MADL□15△△	MADL□05△△	MADL□05△△		MBDL□25△△	MCDL□35△△			MDDL□45△△	MEDL□83△△
Applicable drive 100 V		MADL□11△△	MADL□01△△	MADL□01△△		MBDL□21△△	MCDL□31△△			MCDL□31△△	

PERFORMANCES	UNIT	JTR24 series			JTR30 series			JTR49 series			JTR66 series	
		JTR2403	JTR2408	JTR2413	JTR3015	JTR3030	JTR3045	JTR4960	JTR4990	JTR49C0	JTR6625	JTR6637
Continuous Torque	N·m	9.8	25.3	40.9	50	100	150	200	300	400	1350	2000
Peak Torque	N·m	29.3	75.3	121.8	145	280	420	540	780	1090	2500	3700
Continuous Current	Arms	2.4	3.4	3.2	4.7	9		10.5			60.9	
Peak Current	Arms	7.2	10.2	9.6	14.1	27		35.1			120.9	
Torque Constant	N·m/Arms	4.1	7.4	12.8	10.6	11.1	16.7	19	28.6	38.1	22.2	32.8
Motor Constant	N·m/W$^{1/2}$	1.3	2.5	3.5	3.8	6.3	8.1	10.8	14.5	17.7	21.5	30.2
Thermal Resistance	°C/W	1.52	0.89	0.69	0.53	0.37	0.27	0.27	0.22	0.18	0.024	0.021
Back EMF Constant(ph-ph)	Vrms/rad/s	2.4	4.3	7.4	6.1	6.4	9.6	11	16.5	22	12.8	19
Pole Pair	–	16			16			24			24	
Max. Speed *	rps	5	4.5	2.8	2.9	3	2	2.3	1.4	1	1	
Resolution	ppr	655360~8192000			864000~2160000			1036800~12960000			1036800~12960000	
Accuracy *	arcsec	±30			±30			±30			±30	
Repeatability *	arcsec	±2			±2			±2			±2	
Axial Run-out (no-load)	μm	20/10/5			30/15/5			40/20/10			50	
Radial Run-out (no-load)	μm	20/10/5			30/15/5			40/20/10			50	
Max. Axial Load	kgf	410			1100			1100			9000	
Max. Moment Load	N·m	80			250			250			8000	
Rotor Inertia	kgm²	0.0092	0.0143	0.0203	0.1004	0.1288	0.1576	0.536	0.631	0.762	3.57	4.42
Motor Weight	kg	10.7	14.7	19.7	46.7	58.5	70.2	80.2	91.5	100.5	250	303
Applicable drive 200 V		MBDL□25△△	MCDL□35△△		MDDL□45△△	MEDL□83△△		MEDL□83△△			MHDL□E3△△	
Applicable drive 100 V		MBDL□21△△	MCDL□31△△		□			□			□	

1) Dependent on the encoder resolution.   2) Possible to get more high resolution.

Application Sample

- Alignment and indexing equipment
- Semiconductor test handler
- Glass titler
- Machine tools
- Loader / unloader
- Die bonder, LED handler

Sales area

- China
- Taiwan
- Korea
- United States of America
- Japan

Language

- Chinese
- Japanese
- English
- Korean

For more information

URL: http://www.justek.com

LINEAR MOTOR and DIRECT DRIVE MOTOR

Tubular Linear Motor
Series P10-54

Features

- Controlled by standard third-party servo drives
- 230 VAC and 3x400 VAC Technology
- Forces up to 900 N
- Speed up to 11 m/s
- Stroke range up to 2'000 mm
- A/B incremental encoder 1 µm
- Extremely high dynamics
- Rotating push-pull TWIN connector for power and encoder cables
- One-piece clamping flange
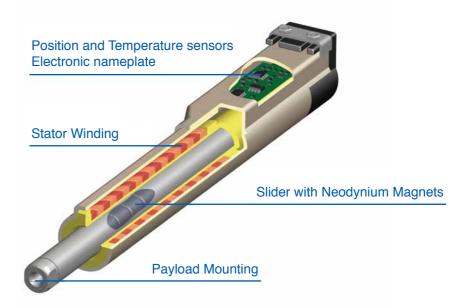
Specification

	PS10-54x120U	PS10-54x180U	PS10-54x240U	PS10-54x330U
Maximum stroke (mm)	2240	2180	2120	2060
Peak force (N) [1]	357	535	714	892
Continuous force (N) [2]/[3]	70 / 102	105 / 153	140 / 204	175 / 255
Peak velocity (m/s)	8.5	11.1	8.4	8.7
Peak acceleration (m/s^2) [1]	245	366	410	413
Force constant (N/Arms)	65	50	66	64
Nominal DC-Link voltage (Vdc)	560			
Applicable MINAS drive [4]	A5BL / A6BL, 1- to 3-phase, 2DOF			

1) Real time calculation of motor winding temperature required (including temperature sensor monitoring)
2) Motor with flange @ 25 °C ambient temperature
3) Motor with flange and fan cooling @ 25 °C ambient temperature
4) Rating (voltage and current) act on application requirements. Please contact us with application details to evaluate appropriate model.

Principle

- Position and Temperature sensors
- Electronic nameplate
- Stator Winding
- Slider with Neodynium Magnets
- Payload Mounting

Sales area

- Germany
- Italy
- United States of America
- Rest of the world

Language

- German
- Italian
- English

Headquarter in Europe and USA. Worldwide representatives.

For more information

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LINEAR MOTOR and DIRECT DRIVE MOTOR

Coreless and Core Linear Motor
U-Coreless/T-Core/Platen-Core Type

Features

U-Coreless Type	T-Core Type	Platen-Core Type

U-Coreless Type
- No Cogging
- No Magnetic Attraction Force
- Fast Setting-time Response
- Easy to install

T-Core Type
- Cogging Optimization
- High-density Force & Attraction Force
- No normal Force
- Easy to install

Platen-Core Type
- Cogging Optimization
- High-density Force & Attraction Force
- Most economic design solution
- Easy to install

Specification

Item	Model	Dimension [mm]	Continu. Force [N]	Continu. Current [Arms]	Max. Force [N]	Max. Current [Arms]	Back EMF [Vrms/ m/sec]	Force Constant [N/Arms]	Magnetic Attraction (N)	Resistance [Ohm]	Inductance [mH]	Weight [kg]	Motor Constant [N/sqrt(W)]	Thermal Resistance [oC/W]	Pole-Pitch (N to S) (mm)	Max Velocity m/sec	MINAS A5L Model Carrier f : 6KHz	MINAS A5L Model Carrier f : 12KHz
U-Coreless (Tiny)	ML-ULT-1SA*	80(L)×37(W)×77.5(H)	21	1.39	63	4.17	5.3	15.3	0	3.3	1.7	0.3	4.29	2.51	15.00	17.3		MADL□15△△
	ML-ULT-2SA*	140(L)×37(W)×77.5(H)	43	1.39	129	4.17	10.7	30.8	0	6.6	3.4	0.6	6.22	1.25		7.2		MADL□15△△
	ML-ULT-3SA*	200(L)×37(W)×77.5(H)	64	1.39	192	4.17	16	46.1	0	9.9	5.1	0.9	7.56	0.84		3.6		MADL□15△△
	ML-ULT-2S2PA*	260(L)×37(W)×77.5(H)	86	2.79	258	8.37	10.7	30.8	0	3.3	1.7	1.1	8.76	0.62		7.2	MCDL□35△△	MDDL□45△△
U-Coreless (Small)	ML-ULS-3SA*	202(L)×38.4(W)×92(H)	97	3.26	292	9.78	10.4	30.0	0	2.0	1.2	0.8	10.86	0.75	15.00	7.3	MCDL□35△△	MDDL□45△△
	ML-ULS-4SA*	262(L)×38.4(W)×92(H)	130	3.26	390	9.78	13.8	39.7	0	2.6	1.7	1.1	12.77	0.58		5.1	MCDL□35△△	MDDL□45△△
	ML-ULS-5SA*	322(L)×38.4(W)×92(H)	162	3.26	486	9.78	17.3	49.8	0	3.3	2.1	1.4	14.13	0.46		3.7	MCDL□35△△	MDDL□45△△
	ML-ULS-6SA*	382(L)×38.4(W)×92(H)	195	3.26	585	9.78	20.8	59.9	0	3.9	2.5	1.6	15.64	0.39		2.8	MCDL□35△△	MDDL□45△△
	ML-ULS-7SA	442(L)×38.4(W)×92(H)	227	3.26	681	9.78	24.2	69.7	0	4.6	2.9	1.9	16.77	0.33		2.1	MCDL□35△△	MDDL□45△△
U-Coreless (Medium)	ML-ULM-1SA(S)	120(L)×47.4(W)×121.5(H)	85	3.00	254	9.00	9.8	28.2	0	0.85	2.05	0.7	15.78	2.09	22.50	11.0	MCDL□35△△	MDDL□45△△
	ML-ULM-2SA(S)	210(L)×47.4(W)×121.5(H)	169	3.00	507	9.00	19.6	56.4	0	1.70	4.10	1.4	22.31	1.05		4.6	MCDL□35△△	MDDL□45△△
	ML-ULM-3SA*	300(L)×47.4(W)×121.5(H)	254	6.00	762	18.00	14.7	42.3	0	1.30	3.10	2.0	19.17	0.34		6.4	MDDL□55△△	MEDL□83△△
	ML-ULM-4SA*	390(L)×47.4(W)×121.5(H)	338	6.00	1014	18.00	19.6	56.4	0	1.70	4.10	2.7	22.31	0.26		4.6	MDDL□55△△	MEDL□83△△
	ML-ULM-5SA*	480(L)×47.4(W)×121.5(H)	424	6.00	1272	18.00	24.5	70.6	0	2.10	5.10	3.3	25.18	0.21		3.6	MDDL□55△△	MEDL□83△△
U-Coreless (Large)	ML-ULL-3PA*	397(L)×50.4(W)×152(H)	506	7.16	1518	21.48	24.6	70.7	0	1.3	2.9	3.4	32.01	0.24	30.00	2.8	MDDL□55△△	MEDL□83△△
	ML-ULL-4PA*	517(L)×50.4(W)×152(H)	675	9.55	2025	28.65	24.6	70.7	0	1.0	2.2	4.5	36.50	0.18		2.8	MEDL□83△△	MEDL□93△△
	ML-ULL-5PA*	637(L)×50.4(W)×152(H)	844	11.94	2531	35.81	24.6	70.7	0	0.8	1.8	5.6	40.81	0.14		2.8	MEDL□83△△	MEDL□93△△
U-Coreless (X-large)	ML-ULX-2PA*	336(L)×66.6(W)×224(H)	771	7.40	2313	22.20	36.2	104.2	0	1.4	4.6	5.5	45.47	0.21	37.50	2.0	MDDL□55△△	MEDL□83△△
	ML-ULX-3PA*	486(L)×66.6(W)×224(H)	1157	11.10	3471	33.30	36.2	104.2	0	1.0	3.1	8.3	53.83	0.13		2.0	MEDL□83△△	MFDL□93△△
	ML-ULX-4PA*	636(L)×66.6(W)×224(H)	1542	14.80	4626	44.40	36.2	104.2	0	0.7	2.3	11.1	64.31	0.10		2.0	MFDL□93△△	MFDL□A3△△
T-Core (Tiny)	ML-TCT-1P	101(L)×38.7(W)×67.5(H)	118	1.3	354	3.9	30.7	92.1	0	17.3	56.4	2.2	13.61	0.80	22.50	2.1		MADL□15△△
	ML-TCT-2P	191(L)×38.7(W)×67.5(H)	236	2.6	708	7.8	30.7	92.1	0	8.7	28.2	4.5	19.25	0.40		2.1	MCDL□35△△	MDDL□45△△
	ML-TCT-3P	281(L)×38.7(W)×67.5(H)	354	3.9	1062	11.7	30.7	92.1	0	5.8	18.8	6.7	23.57	0.27		2.1	MCDL□35△△	MDDL□45△△
	ML-TCT-4P	371(L)×38.7(W)×67.5(H)	472	5.2	1416	15.6	30.7	92.1	0	4.3	14.1	8.9	27.22	0.20		2.1	MDDL□45△△	MDDL□55△△
T-Core (Medium)	ML-TCM-2P	191(L)×72.3(W)×135H)	550	4.5	1650	13.5	37.76	113.3	0	2.0	17.3	4.5	44.85	0.40	22.50	2.0	MDDL□45△△	MDDL□55△△
	ML-TCM-3P	281(L)×72.3(W)×135H)	825	6.8	2475	20.3	37.76	113.3	0	1.3	11.6	6.7	54.93	0.27		2.0	MDDL□55△△	MEDL□83△△
	ML-TCM-4P*	371(L)×72.3(W)×135H)	1100	9.0	3300	27.0	37.76	113.3	0	1.0	8.7	8.9	63.43	0.20		2.0	MEDL□83△△	MEDL□93△△
	ML-TCM-5P	461(L)×72.3(W)×135H)	1375	11	4125	34	37.76	113.3	0	0.8	6.9	11.1	70.92	0.16		2.0	MEDL□83△△	MEDL□93△△
Platen Core (Tiny)	ML-PCT-1SF*	69(L)×55(W)×45(H)	43	1.44	129	4.32	14.6	29.8	192.0	3.4	17.5	0.7	8.42	2.30	15.00	7.30		MADL□15△△
	ML-PCT-2SF*	129(L)×55(W)×45(H)	86	1.44	258	4.32	29.2	59.5	384.0	6.7	35.1	1.4	11.91	1.15		3.10		MADL□15△△
	ML-PCT-3SF	189(L)×55(W)×45(H)	129	1.44	387	4.32	43.8	89.3	576.0	10.1	52.6	2.1	14.59	0.77		1.60		MADL□15△△
	ML-PCT-2S2PF	249(L)×55(W)×45(H)	172	2.88	516	8.64	29.2	59.5	768.0	3.4	17.5	2.8	16.85	0.58		3.10	MCDL□35△△	MDDL□45△△
Platen Core (Small)	ML-PCS-1SE	69(L)×75(W)×46.3(H)	80	2.30	240	6.90	11.6	34.8	320.0	1.4	11.3	0.8	15.18	2.16	15.00	9.00	MBDL□25△△	MCDL□35△△
	ML-PCS-2SE*	129(L)×75(W)×46.3(H)	150	2.25	450	6.75	23.2	69.6	640.0	2.8	22.6	1.6	20.57	1.13		3.70	MBDL□25△△	MCDL□35△△
	ML-PCS-3SE*	189(L)×75(W)×46.3(H)	225	2.25	675	6.75	34.8	104.4	960.0	4.1	33.9	2.4	25.50	0.77		2.10	MBDL□25△△	MCDL□35△△
	ML-PCS-2S2PE*	249(L)×75(W)×46.3(H)	300	4.5	900	13.50	23.2	69.6	1280.0	1.4	11.3	3.2	29.10	0.56		3.70	MDDL□45△△	MDDL□55△△
	ML-PCS-3S2PE	369(L)×75(W)×46.3(H)	450	4.5	1350	13.50	34.8	104.4	1920.0	2.05	17.0	4.8	36.07	0.39		2.10	MDDL□45△△	MDDL□55△△
Platen Core (Large)	ML-PCL-2PE*	251(L)×133(W)×58(H)	670	6.2	2000	18.60	37	111	3200.0	1.2	5.9	6.8	50.94	0.35	30.00	2.3	MDDL□55△△	MDDL□55△△
	ML-PCL-3PE*	371(L)×133(W)×58(H)	1000	9.29	3000	27.87	37	111	4800.0	0.8	4.0	10.2	62.15	0.23		2.3	MEDL□83△△	MEDL□93△△

Application Sample

X-Y Gantry	Compact X-Y Table	High Precision Air-Bearing Stage	Multi-Mover Linear Stage

For Heavy duty Industrial Equipment

Has enough stroke even in a small area

Air Bearing is applied for non-touching moving structure

4sets of independent driving Linear Motor applied in a single line

Selection Guide

Mover — The moving parts are made up of the coll, Frame, and Epoxy Moid

ML - PCL - 2S2PE
① ② ③   ④ ⑤ ⑥

① Shape	② Core	③ Magnet size	④ Number of Serial Coil	⑤ Number of Parallel Coil	⑥ Design oder
U : U shape T : T shape P : Platen	C : Core type L : Core-less	T : Tiny S : Small M : Medium L : Large X : X-Large	1S : 1 serial 2S : 2 serial 3S : 3 serial ...	1P : 1parallel 2P : 2parallel 3P : 3parallel ...	A, B, C, D, E, ...

Stator — The fixed parts are made up of the Magnet and the Back Ilon

ML - PCL - SE - 540
① ② ③   ④   ⑤

① Shape	② Core	③ Magnet size	④ Startor Desgin Oderl	⑤ Stator Length
U : U shape T : T shape P : Platen	C : Core type L : Core-less	T : Tiny S : Small M : Medium L : Large	SA, AB, SC, ...	270 : 270 mm 330 : 330 mm 540 : 540 mm

Stators Specification

Item	Model	Length [mm]
U-Shape Coreless (Tiny model)	ML-ULT-SA-240	240
	ML-ULT-SA-360	360
	ML-ULT-SA-480	480
U-Shape Coreless (Small model)	ML-ULS-SA-360	360
	ML-ULS-SA-480	480
	ML-ULS-SA-600	600
U-Shape Coreless (Medium model)	ML-ULM-SA-270	270
	ML-ULM-SA-360	360
	ML-ULM-SA-450	450
	ML-ULM-SA-540	540
	ML-ULM-SA-630	630
U-Shape Coreless (Medium economic)	ML-ULM(e)-SA-360	360
	ML-ULM(e)-SA-540	540
	ML-ULM(e)-SA-630	630

Item	Model	Length [mm]
U-Shape Coreless (Large model)	ML-ULL-SA-180	180
	ML-ULL-SA-300	300
	ML-ULL-SA-480	480
	ML-ULL-SA-600	600
U-Shape Coreless (X-large model)	ML-ULX-SA-420	420
	ML-ULX-SA-300	300
	ML-ULX-SA-600	600
U-Shape Coreless (X-large economic)	ML-ULX(e)-SA-150	150
	ML-ULX(e)-SA-300	300

Item	Model	Length [mm]
T-Shape Core Type (Tiny model)	ML-TCT-SA-270	270
	ML-TCT-SA-360	360
	ML-TCT-SA-540	540
	ML-TCM-SA-270	270
	ML-TCM-SA-360	360
	ML-TCM-SA-450	450
T-Shape Core Type (Medium model)	ML-TCM-SA-495	495
	ML-TCM-SA-540	540
	ML-TCM-SA-630	630
	ML-TCM-SA-720	720
	ML-TCM-SA-945	945

Item	Model	Length [mm]
Platen Core Type (Tiny model)	ML-PCT-SE-120	120
	ML-PCT-SE-180	180
	ML-PCT-SE-240	240
	ML-PCT-SE-300	300
	ML-PCT-SE-360	360
	ML-PCT-SE-420	420
Platen Core Type (Small model)	ML-PCS-SE-270	270
	ML-PCS-SE-540	540
Platen Core Type (Large model)	ML-PCL-SE-120*	120
	ML-PCL-SE-270*	270
	ML-PCL-SE-540	540

* special

Sales area
- Japan
- China
- United States of America

Language
- Korea   : +82-41-559-8749
- English : +82-41-529-1033
- Chinese : +86-186-2221-7474

For more information

URL: http://www.miraelmt.co.kr

Contact: **Mirae Linear Motor Technology**   [E-mail: lmtsales@mirae.com]
65, Baekseokgongdan 7-ro, Cheonan-si Seobuk-gu, Chungcheongnam-Do, 331-220 Korea
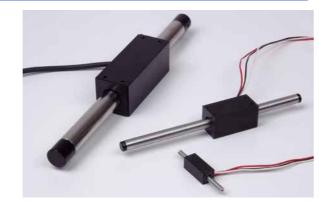TEL: +82-41-621-5070

LINEAR MOTOR and DIRECT DRIVE MOTOR

Linear Shaft Motor

S series/L series

Features

- Coreless Technology
- Zero Cogging
- High Force and High Precision
- Energy Efficient
- Simple Design and Easy Integration

Specification

	Unit	S040 series S040D	S040T	S040Q	S080 series S080D	S080T	S080Q	S120 series S120D	S120T	S120Q	S160 series S160D	S1160T	S160Q	S200 series S200D	S200T	S200Q
Shaft Diameter	mm	4	4	4	8	8	8	12	12	12	16	16	16	20	20	20
Stroke Length Range	mm	20〜40	20〜40	20〜40	〜200	〜200	〜200	〜1050	〜1050	〜1050	〜1050	〜1050	〜1050	〜1550	〜1550	〜1550
Continuous Force	N	0.29	0.45	0.58	1.8	2.7	3.5	4.5	6.6	8.9	10	15	20	18	28	38
Continuous Current	A	0.3	0.3	0.3	0.8	0.8	0.8	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6
Peak Force	N	1.2	1.8	2.3	7.2	11	14	18	27	36	40	60	81	72	112	152
Peak Current	A	1.1	1.1	1.1	3.4	3.4	3.4	1.6	1.6	1.6	2.5	2.5	2.5	2.4	2.4	2.4
Gap	mm	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75
Forcer Length	mm	25	34	43	40	55	70	64	88	112	80	110	140	94	130	166
MINAS A5L Model 200 V		—			MADHT1505L**[*1]			MADHT1505L**								
MINAS A5L Model 100 V		—			MADHT1105L**[*1]			MADHT1105L**								
MINAS A6L Model 200 V		—			MADL□05△△[*1]			MADL□05△△								
MINAS A6L Model 100 V		—			MADL□01△△[*1]			MADL□01△△								
MINAS A5ML Model 24 V		MMDHT2C09LA						—								
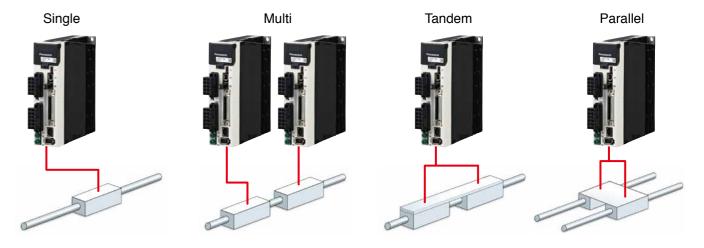
	Unit	S250 series S250D	S250T	S250Q	S320 series S320D	S320T	S320Q	S350 series S350D	S350T	S350Q	S427 series S427D	S427T	S427Q	S435 series S435D	S435T	S435Q
Shaft Diameter	mm	25	25	25	32	32	32	35	35	35	42.7	42.7	42.7	43.5	43.5	43.5
Stroke Length Range	mm	〜1550	〜1550	〜1550	〜2000	〜2000	〜2000	〜2000	〜2000	〜2000	〜2000	〜2000	〜2000	〜2000	〜2000	〜2000
Continuous Force	N	40	60	75	56	85	113	104	148	190	100	150	200	116	175	233
Continuous Current	A	1.3	1.3	1.3	1.2	1.2	1.2	1.5	1.5	2.7	3.0	3.0	3.0	3.0	3.0	3.0
Peak Force	N	160	240	300	226	338	451	416	592	760	400	600	800	464	700	932
Peak Current	A	5.1	5.1	5.1	5.0	5.0	5.0	6.0	6.0	10.8	12.0	12.0	12.0	12.0	12.0	12.0
Gap	mm	0.75	0.75	0.75	1.0	1.0	1.0	1.0	1.0	1.0	1.65	1.65	1.65	1.25	1.25	1.25
Forcer Length	mm	120	165	210	160	220	280	160	220	280	220	310	400	220	310	400
MINAS A5L Model 200 V		MBDHT2510L**			MBDHT2510L**			MBDHT2510L**		MCDHT3520L**			MCDHT3520L**			
MINAS A5L Model 100 V		MBDHT2110L**			MBDHT2110L**			MBDHT2110L**		MCDHT3120L**			MCDHT3120L**			
MINAS A6L Model 200 V		MBDL□25△△			MBDL□25△△			MBDL□25△△		MCDL□35△△			MCDL□35△△			
MINAS A6L Model 100 V		MBDL□21△△			MBDL□21△△			MBDL□21△△		MCDL□31△△			MCDL□31△△			

	Unit	S500 series S500D	S500T	S500Q	S605 series S605D	S605T	S605Q	L250 series L250D	L250T	L250Q	L320 series L320D	L320T	L320Q
Shaft Diameter	mm	50	50	50	60.5	60.5	60.5	25	25	25	32	32	32
Stroke Length Range	mm	〜2000	〜2000	〜2000	〜2000	〜2000	〜2000	〜2000	〜2000	〜2000	〜3000	〜3000	〜3000
Continuous Force	N	289	440	585	420	610	780	34	52	69	55	82	109
Continuous Current	A	3.8	5.8	7.7	8.8	8.6	8.4	1.3	1.3	1.3	1.3	1.3	1.3
Peak Force	N	1156	1760	2340	1700	2400	3100	138	207	276	218	327	436
Peak Current	A	15.2	23.3	30.8	35.0	34.0	34.0	5.2	5.2	5.2	5.0	5.0	5.0
Gap	mm	1.75	1.75	1.75	1.75	1.75	1.75	2.0	2.0	2.0	2.5	2.5	2.5
Forcer Length	mm	240	330	420	310	430	550	120	165	210	160	220	280
MINAS A5L Model 200 V		MDDHT5540L**	MEDHT7364L**	MEDHT7364L**[*1]			MBDHT2510L**						
MINAS A5L Model 100 V		—		—			MBDHT2110L**						
MINAS A6L Model 200 V		MDDL□55△△	MEDL□83△△	MEDL□83△△[*1]			MBDL□25△△						
MINAS A6L Model 100 V		—		—			MBDL□21△△						

- As for ✳✳ mark in the model number, please refer to 00 page.
- As for □△ mark in the model number, please refer to 00 page.

*1 In case you drive around the motor maximum current value, please let us know so that we will select an appropriate driver.

Application Sample

Single	Multi	Tandem	Parallel

Constuction

- Simple
- High Precision
- Non Contact

Construction diagram labels: Shaft, Magnetic Flux, Force, Gap, High Energy Magnet, Stainless Steel Shaft, Motor Coil (Forcer), U V W

Sales area

- Japan
- United States of America
- China
- Korea
- Taiwan
- Worldwide response

Please contact the following address for details.

Language

- English
- Japanese
- Chinese

For more information

URL: https://nipponpulse.com/products/overview/linear-shaft-servomotors/
URL: https://www.pulsemotor.com/global/

Linear Shaft Motor Stage

SLP series / SCR series

Features

SLP-series

- High Force
- High Speed

SCR-series

- High Precision
- Low Ripple at Low Speed
- High Repeatability

Specification

SLP series

	Unit	SLP15	SLP25	SLP35
Resolution	μm	1 (HEIDENHAIN LIDA 279)	1 (HEIDENHAIN LIDA 279)	1 (HEIDENHAIN LIDA 279)
Stroke/Single Slider	mm	100 ～ 1300 (100 interval)	200 ～ 1200 (100 interval)	300 ～ 1200 (100 interval)
Stroke/Double Slider	mm	100 ～ 1200 (100 interval)	200 ～ 1000 (100 interval)	300 ～ 900 (100 interval)
Continuous Force	N	17	80	185
Continuous Current	A	0.51	1.2	2.7
Peak Force	N	90	340	970
Peak Current	A	2.7	5.1	14.4
Max. Velocity	m/s	3.0	3.0	3.0
Load Capacity (Horizontal)	Kg	5	30	60
MINAS A5L Model	200 V	MADHT1505L＊＊	MBDHT2510L＊＊	MDDHT3530L＊＊
	100 V	MADHT1105L＊＊	MBDHT2110L＊＊	—
MINAS A6L Model	200 V	MADL□05△△	MBDL□25△△	MDDL□45△△
	100 V	MADL□01△△	MBDL□21△△	—

SCR series

	Unit	SCR50	SCR75	SCR100	SCR150
Motor part number		S040Q	S080Q	S080Q	S160D
Resolution	μm	1, 0.5, 0.1, 0.05, 0.01	1, 0.5, 0.1, 0.05, 0.01	1, 0.5, 0.1, 0.05, 0.01	1, 0.5, 0.1, 0.05, 0.01
Storke	mm	20、40	50、100、150	50～300 (50 interval)	100～300 (50 interval)
Continuous Force	N	0.58	3.5	3.5	10
Continuous Current	A	0.3	0.84	0.84	0.62
Peak Force	N	2.3	14	14	40
Peak Current	A	1.1	3.4	3.4	2.5
Max. Velocity	m/s	0.5 ～ 0.6 *2	1.1 ～ 1.5 *2	0.9 ～ 1.3 *2	1.3 ～ 1.5 *2
Load Capacity (Horizontal)	Kg	10	45.5	45.5	45.5
MINAS A5L Model	200 V	—	MADHT1505L＊＊ *1		MADHT1505L＊＊
	100 V	—	MADHT1105L＊＊ *1		MADHT1105L＊＊
MINAS A6L Model	200 V	—	MADL □ 05 △△ *1		MADL □ 05 △△
	100 V	—	MADL □ 01 △△ *1		MADL □ 01 △△
MINAS A5ML Model	24 V		MMDHT2C09LA		—

*1 In case you drive around the motor maximum current value, please let us know so that we will select an appropriate driver.
*2 The encoder resolution is 1 μm with no load condition.
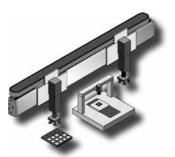- As for ＊＊ mark in the model number, please refer to 00 page.
- As for □△ mark in the model number, please refer to 00 page.

Application Sample
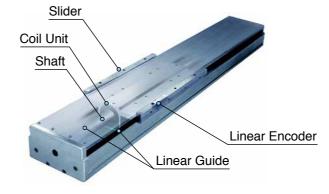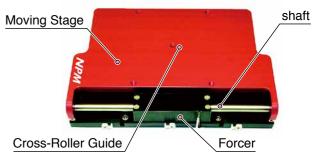
Customized SCR stage

Construction

Slider
Coil Unit
Shaft
Linear Encoder
Linear Guide

Moving Stage
shaft
Cross-Roller Guide
Forcer

Sales area

- Japan
- United States of America
- China
- Korea
- Taiwan
- Worldwide response

Language

- English
- Japanese
- Chinese

Please contact the following address for details.

For more information

<SLP series>
URL: https://www.nipponpulse.com/products/overview/slp-stage/

<SCR series>
URL: https://www.nipponpulse.com/products/overview/linear-shaft-stages

Contact: **Nippon Pulse America., Inc.**
4 Corporate Drive, Radford, Virginia 24141 U.S.A.

[E-mail: info@nipponpulse.com]
TEL: +1-540-633-1677 / +1-540-633-1674

Core and Coreless Linear Motor

Core / Cased-Core / Coreless Type

Features

Core Type	Cased-Core Type	Coreless Type

- High Force
- Optimization Attraction Force

- Low Heat
- Cogging Minimization

- Zero Cogging
- Zero Attraction Force

Specification

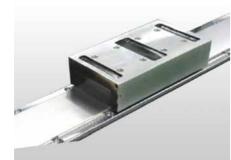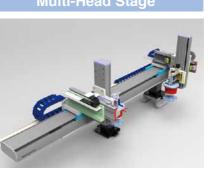| Type	Model	Continuous Force [N]	Continuous Current [Arms]	Max Force [N]	Mover Weight [kg]	Magnet Pole Pitch [mm]	Stator Weight [kg/m]	PANASONIC AMP
Iron Core	SWL-PMI10~40C	18.8~75.2	1.3	56.4~225.7	0.2~0.8	18	1.7	MADL*15**
	SWL-PS10~40C	42.1~166.7	2.0	126.3~500.1	0.4~1.3	24	2.4	MBDL*25**
	SWL-PM10~40C	78.3~315.3	3.8	234.9~945.9	0.6~2.3	30	3.6	MCDL*35**
	SWL-PL10~40C	162.6~639.3	6.4	487.8~1917.9	2.5~7.9	42	6.9	MDDL*55**
	SWL-PE10~40C	401.8~1638	11.3	1205.4~4915	5.3~19	60	13.7	MEDL*83**
Cased-Iron Core	SWL-ePMI10~40C	20~80	1.5	55~205	0.2~0.7	18	1.7	MADL*15**
	SWL-ePS10~40C	55~215	2.3	150~580	0.5~1.6	30	2.6	MBDL*25**
	SWL-ePM10~40C	80~315	3.8	230~885	0.7~2.5	30	4	MCDL*35**
	SWL-ePL20~40C	360~700	6.7	1015~2000	4.7~9.1	60	7	MDDL*55**
	SWL-ePE20~40C	770~1500	10	2165~4300	8.2~16	60	15.8	MEDL*83**
Core less	SWL-DMI20~50	24.7~61.7	1.3	74.1~185.2	0.3~0.6	24	7.9	MADL*15**
	SWL-DS20~50	45.2~113.1	1.96	135.7~339.2	0.4~0.9	24	10.6	MBDL*25**
	SWL-DM20~50	83.3~208.3	3.65	250~624.9	0.6~1.4	30	11.2	MCDL*35**
	SWL-DL20~50	188.5~471.2	10.2	565.4~1413.6	1.3~3.1	42	18.6	MEDL*83**
	SWL-DE10~40	300.9~1203.8	13.9	902.8~3611.3	1.8~6.3	84	29.2	MFDL*A3**
	SWL-DU20~40	1100~2200	12.7~25.4	3300~6600	5.6~11	84	46.3	DU20 : MEDL*83** DU30/DU40 : MFDL*B3**

Application Sample

Linear Stage	Multi-Head Stage	Gantry

Selection Guide

① SL 000 - ② 2 ③ ePMI10C - ④ S1000 ⑤ B - ⑥ 100 ⑦ A

⑦ DESIGN Rev.

① MODEL		③ MOTOR		⑤ BODY COLOR	⑥ ENCODER
SL-160				B: BLACK	010: 0.1 μm
SL-190	② SLIDE Q'ty		④ STROKE	W: WHITE	050: 0.5 μm
SL-250					100: 1 μm
					500: 5 μm
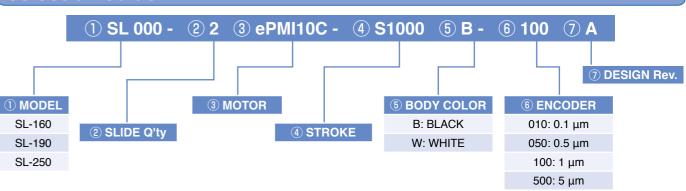
Model	MOTOR / Continuous Force			
SL-160	ePMI10C	20N	PMI10C	18N
	ePMI20C	40N	PMI20C	38N
	ePMI30C	60N	PMI30C	56N
	ePMI40C	80N	PMI40C	75N
	ePS10C	55N	PS10C	42N
	ePS20C	110N	PS20C	84N
	ePS30C	160N	PS30C	125N
	ePS40C	215N	PS40C	166N
SL-190	ePM10C	80N	PM10C	78N
	ePM20C	155N	PM20C	157N
	ePM30C	235N	PM30C	236N
	ePM40C	315N	PM40C	315N
SL-250	—	—	PL10C	162N
	ePL20C	360N	PL20C	319N
	ePL30C	530N	PL30C	480N
	ePL40C	700N	PL40C	639N

Sales area

- Korea • Japan • China • Vietnam

Language

- Korean • English

For more information

URL: http://www.sewoomotor.com

LINEAR MOTOR and DIRECT DRIVE MOTOR

Linear stages with integrated linear motors
MLE-, MLL- and MLU-Series

Features

- Compact and smart design
- Low carriage weight for high dynamic
- High force density
- High resolution encoder
- Long axis up to 10000 mm stroke
- Big range of sizes and options

Competent partner in electromechanical solutions
Standard Plug & Play linear units
Customized and flexible solutions

Specification

Ironcore MLE Series

Performance Parameters		MLE3	MLE5	MLE7
Continuous Force (N)		55 - 315	200 - 800	400 - 1000
Peak Force (N)		105 - 630	400 - 1600	1600 - 4000
Nominal current (Arms)		1.5 - 6.0	2.26 - 9.0	4.1 - 8.5
Peak current (Arms)		3.1 - 12.4	5.0 - 20.0	10 - 20
Thermal Resistance (°C/W)		1.5 - 0.25	0.48 - 0.12	0.15 - 0.06
Coil Unit Mass (kg)		0.6 - 2.3	1.5 - 5.2	4.9 - 11.6
Weight of carriage with coil (kg)		2.2 - 6.2	4.5 - 14.0	10.5 - 21.5
Attraction Force (N)		300 - 1300	950 - 3400	3400 - 8300
Recommended Drivers (230 V)	A6L	MADL*15** to MCDL*35**	MBDL*25** to MFDL*A3**	MCDL*35** to MFDL*A3**
	A5L	MADHT1507L** to MDDHT3530L**	MBDHT2510L** to MFDHTA390L**	MCDHT3520L** to MFDHTA390L**
Recommended Drives (400 V)	A6L	MDDL*44** to MEDL*84**	MDDL*54** to MFDL*B4**	MDDL*64** to MHDL*E4**
	A5L	MDDHT2407L** to MEDHT4430L**	MDDHT2412L** to MFDHTA464L**	MDDHT3420L** to MGDHTB4A2L**

Notes: MLE linear motor stages with incr. encoder SIN/COS 40 μm or abusolute encoder.

Ironless MLU Series

Performance Parameters		MLU30100	MLU30200	MLU30300	MLU30400
Continuous Force (N)		29	58	87	116
Peak Force (N)		100	200	300	400
Thermal Resistance (°C/W)		1.8	0.9	0.6	0.45
Coil Unit Mass (kg)		0.084	0.162	0.240	0.318
Weight of carriage with coil (kg)		0.6	0.7	1.5	2.0
Recommended Drivers (230 V)	A6L	MADL*15**	MCDL*35**	MDDL*45**	MDDL*55**
	A5L	MADHT1507L**	MCDHT3520L**	MDDHT3530L**	MDDHT5540L**

Ironcore MCE3 Series

Performance Parameters		MCE30100
Nominal current (Arms)		1.5
Peak current (Arms)		5.8
Continuous Force (N)		29
Peak Force (N)		99
Thermal Resistance (°C/W)		7.89
Coil Unit Mass (kg)		0.4
Weight of carriage with coil (kg)		1
Recommended Drivers (230 V)	A6L	MBDL*25**
	A5L	MBDHT2510L**

Sales area

- Germany
- Spain
- Russia
- EU

Language

- English
- German
- Spanish
- Russian

For more information

URL : http://www.sinadrives.com/

LINEAR MOTOR and DIRECT DRIVE MOTOR

Servo actuator
DD Motor (ZMD series)

Features

Realizing outstanding high speed and precision performances thanks to its small and compact design

● **Outer rotor mechanism**
The outer diameter's compact design enables to drive directly the roller, making it suitable for indexing rotation

● **High-resistance bearings**
Simple and rigid structure for a higher load resistance

● **Hollow diameter φ50mm**
Wiring and piping can be easily stored in the hollow space of the motor, reducing the istallation space.

● **Low price**
Model's size reduction leads to a more competitive price matching today's markets needs

● **Short lead time/ quick delivery**
The reduction of the components and a smarter stock arrangement critically reduce the production lead time

ZMD-1010

ZMD-1007

ZMD-1003

● **What is a Direct Drive Motor?**
A DD Motor can transmit the torque of the electric motor directly to the driving objects, without the use of any reductions such as belts, pulleys or reduction drives.

| High efficiency | Low noise | Outstandig precision | High reliability | Maintenance-free |

Specification

Model		ZMD-1003	ZMD-1007	ZMD-1010
Maximum torque	N·m	30	65	100
Continuos torque	N·m	10	21	33
Maximum current	Arms	3.5	7.1	8.8
Rated current	Arms	1.2	2.4	2.9
Maximum rotation speed	s^{-1}	5	4.5	4
Sensor resolution	ppr	1310720 [*1]		
Repeatability positioning precision	Second	±3		
Allowed axial load	N	3500 [*2]		
Allowed moment load	N·m	150 [*3]		
Axial rigidity	mm/N	2×10^{-6} [*4]		
Moment rigidity	rad/N·m	2×10^{-6}		
Rotor inertia	kg·m^2	0.014	0.017	0.02
Axial run-out/side run-out accuracy	μm	70 [*5]		
Weight	kg	8.2	11.5	14.5
MINAS A5L Model		MBDHT2510L*	MBDHT2510L*	MCDHT3520L*
MINAS A6L Model		MBDL*25S*	MBDL*25S*	MCDL*35S*
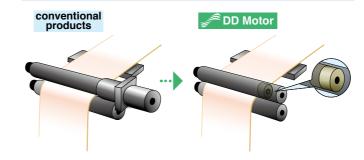
• If using radial load, axial load and moment load at the same time, please contact us.

• This motor can be used with any type of servo driver. However, when using a servo-driver that differs from the one suggested, please be sure to use it below the rated current value.

*1 With the use of RD1416SPW (RD converter)　*2 Horizontal installation　*3 Horizontal installation　*4 By using cross-roller bearings
*5 As option, it is also possible to improve the accuracy of surface deflection. For further details, please contact us.

Application Sample

The installation of the DD Motor enables more efficient operations and it doesn't require any maintenance

Roller-drive application e.g.	Indexing rotation application e.g.

conventional products ···▸ DD Motor

conventional products ···▸ DD Motor
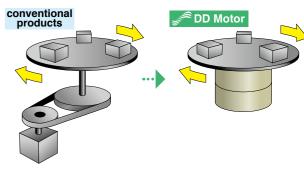
■ Thanks to the outer motor, it's possible to build the motor inside the roller, saving space
■ I works smoothly, avoiding uneven operations or movements

<Other possible applications>
● Printing equipment　● Coating machines
● Film-manufacturing machinery　● Roll-feeders
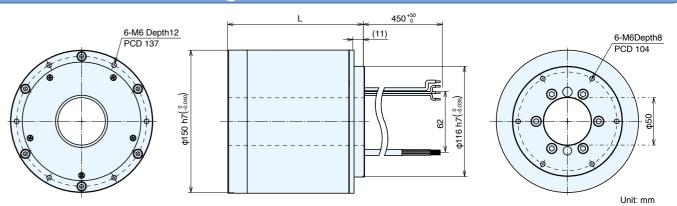
■ Space-saving design for a more compac structure
■ As no reduction device is needed, it's possible to avoid complex installations, improving its efficiency and reliability with no back-lash

<Other possible applications>
● Semiconductor making equipment
● Devices for manufacturing　● liquid crystal display panels
● Assembling robots　● All kind of indexing applications

Dimensional out drawing

6-M6 Depth12
PCD 137

L

450 $^{+50}_{0}$

(11)

φ150 h7($^{0}_{-0.040}$)

φ116 h7($^{0}_{-0.035}$)

62

6-M6Depth8
PCD 104

φ50

Unit: mm

Model		ZMD-1003	ZMD-1007	ZMD-1010
External diameter of the motor	mm	Φ150		
Total length （L）	mm	113	143	173

Sales area

• Japan　　• China　　• United States of America
• Netherlands

Please contact the following address for details.

Language

• Japanese　• English
• Chinese

For more information

URL : http://www.sinfo-t.jp/servo

LINEAR MOTOR and DIRECT DRIVE MOTOR

Coreless Linaer Motor, Special
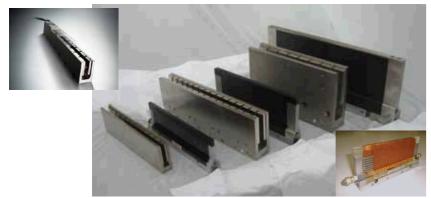
Sodick V series

Features

In linear motors that will be assembled at the internal of machine tools, the generated heat must not influence the machine. Sodick linear motors have special cooling structure internal. And, In servo motors that will be assembled at the side of machine tools, the generated heat influence the machine a little.

Coreless Linear Motors

CA 144N-576N   CAV3 220N-660N
CB SERIES 1200N-2133N
CG SERIES 3432N-4800N

Internal cooling structure * Patented in JAPAN, USA, CHINA

Special Motors

Sodick performs the design of a special motor according to a customer's demand.

← **Circular Arc Motors**
DD motor and the circlar arc motor of ironcore and coreless motors are designed by Sodick.

Ultra Vacuum Linear Motors →
The linear motor corresponding to the vacuum of Sodick is equipped with the system which can be efficiently cooled also in a vacuum.

The configuration example of a linear motor system

Network Servo System by RTEX

KSMC-A4 (Sodick)

MINAS A5ⅡNL, A6NL

Linear motor

Pulse or Analog I/F by MINAS A5L, A6L

Linear motor

A/B/Z RS422 4 MHz

Linear scale

Specification

● Coreless Linear Motor CAV3 Series

Motor Type		CA010v3B□				CA020v3B□				CA030v3B□			
	□:Type	□=3 (High-response)		□=2 (High-speed)		□=3 (High-response)		□=2 (High-speed)		□=3 (High-response)		□=2 (High-speed)	
	Cooling	without fin	with fin	without fin	with fin	without fin	with fin	without fin	with fin	without fin	with fin	without fin	with fin
Driver [12 kHz]		MCDL□35△		MADL□15△		MDDL□55△		MCDL□35△		MEDL□83△		MDDL□45△	
Cont. FORCE	N	32.5	43.5	32.5	43.5	64.9	86.9	64.9	86.9	97.4	130.4	97.4	130.4
Max. FORCE	N	220		220		440		440		660		660	
Rated SPEED	m/sec	6		3.3		6		3.3		6		3.3	
Max. SPEED	m/sec	7		6.1		7		6.1		7		6.1	
SIZE (D × W × L)	mm	35.5 × 66 × 100				35.5 × 66 × 196				35.5 × 66 × 292			
WEIGHT	kg	0.32				0.61				0.9			

● Coreless Linear Motor CA Series
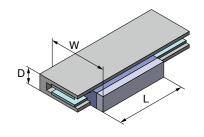
Motor Type	Name	CA010(V)			CA020(V)			CA030(V)			CA040(V)		
	Cooling	Oil	None	Water	Oil	None	Water	Oil	None	Water	Oil	None	Water
Driver [12 kHz]		MCDL□35△			MDDL□55△			MEDL□83△			MEDL□83△		
Cont. FORCE	N	48	16.8	60	96	36	120	134.4	55.2	168	176	72	220
Max. FORCE	N	144			288			432			576		
Rated SPEED	m/sec	7			7			7			7		
Max. SPEED	m/sec	7			7			7			7		
SIZE (D × W × L)	mm	30 × 110 × 130			30 × 110 × 202			30 × 110 × 274			30 × 110 × 346		
WEIGHT	kg	0.5	0.5	0.8	0.8	0.8	1.1	1.1	1.1	1.4	1.4	1.4	1.8

● Coreless Linear Motor CB Series

Motor Type	Name	CB100		CB110		CB160i		CB200i	
	Cooling	None	Water	None	Water	None	Water	None	Water
Driver [6 kHz]		MDDL□55△		MDDL□55△		MEDL□83△		MFDL□A3△	
Cont. FORCE	N	135	350	139	406	188	536	251	744
Max. FORCE	N	1200		1392		1600		2133	
Rated SPEED	m/sec	2.5		1.8		2.7		2.7	
Max. SPEED	m/sec	4		3.6		3		3	
SIZE (D × W × L)	mm	50 × 165 × 303		50 × 165 × 303		50 × 165 × 303		50 × 165 × 375	
WEIGHT	kg	3.5		3.6		3.9		5.0	

● Coreless Linear Motor CG Series

Motor Type	Name	CG300		CG400	
	Cooling	None	Water	None	Water
Driver [6 kHz]		MFDL□B3△		MGDL□C3△	
Cont. FORCE	N	520	1000	700	1300
Max. FORCE	N	3432		4800	
Rated SPEED	m/sec	1.5		1.5	
Max. SPEED	m/sec	2.4		2.4	
SIZE (D × W × L)	mm	62 × 240 × 478		62 × 240 × 595	
WEIGHT	kg	13.3		17.3	

• Please refer to P.00 for driver specifications.

Sales area

• Japan   • China

Please contact the following address for details.

Language

• English   • Chinese   • Japanese

For more information

URL : http://www.sodick.jp/

Contact: **Sodick Co., Ltd.**
3-12-1 Nakamachidai, Tsuzuki-ku, Yokohama-city, Kanagawa-Pref. 224-8522, Japan   TEL: +81-45-948-1403   FAX: +81-45-941-5271

LINEAR MOTOR and DIRECT DRIVE MOTOR

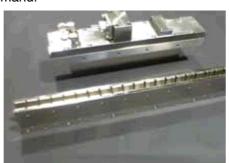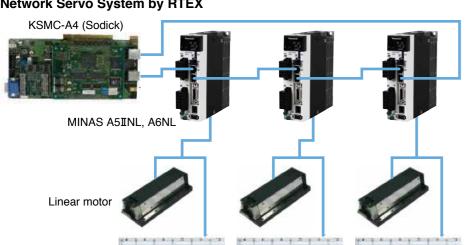# Ironcore Linear Motor, Special

Sodick V series

Features

In linear motors that will be assembled at the internal of machine tools, the generated heat must not influence the machine. Sodick linear motors have special cooling structure internal. And, In servo motors that will be assembled at the side of machine tools, the generated heat influence the machine a little.

Ironcore Linear Motors

CM SERIES 190N-1172N
CE (M) 800N-1600N   CE (L) 1600N-6400N
CE (W) 4800N-7200N   CE (W2) 6400N-9600N

Special Motors

Sodick performs the design of a special motor according to a customer's demand.

← **Circular Arc Motors**
DD motor and the circlar arc motor of ironcore and coreless motors are designed by Sodick.

Ultra Vacuum Linear Motors →
The linear motor corresponding to the vacuum of Sodick is equipped with the system which can be efficiently cooled also in a vacuum.

The configuration example of a linear motor system

Network Servo System by RTEX

KSMC-A4 (Sodick)

MINAS A5ⅡNL, A6NL

Linear motor

Pulse or Analog I/F by MINAS A5L, A6L

Linear motor

A/B/Z RS422 4 MHz

Linear scale
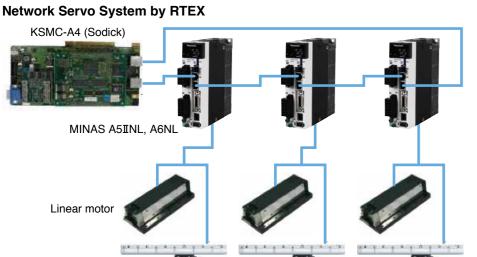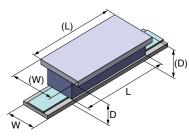
Specification

● **Ironcore Linear Motor CM Series**

Motor Type	Name	CM003(V)		CM007(V)		CM010(V)		CM020(V)	
	Cooling	None	Fin	None	Fin	None	Fin	None	Fin
Driver [6 kHz]		MBDL□25△△		MDDL□45△△		MDDL□55△△		MEDL□83△△	
Cont. FORCE	N	28	41	58	86	89	132	178	264
Max. FORCE	N	190		390		600		1172	
Rated SPEED	m/sec	2.2		2.2		2.2		2.2	
Max. SPEED	m/sec	5		5		5		5	
SIZE (D × W × L)	mm	41 × 50 × 115		41 × 75 × 115		41 × 100 × 115		41 × 100 × 211	
WEIGHT	kg	0.9		1.3		1.7		3.4	

● **Ironcore Linear Motor CE(M) Series**

Motor Type	Name	CE033			CE066L		
	Cooling	Oil	None	Water	Oil	None	Water
Driver [6 kHz]		MEDL□83△△			MFDL□B3△△		
Cont. FORCE	N	400	200	500	800	400	1000
Max. FORCE	N	800			1600		
Rated SPEED	m/sec	4			4		
Max. SPEED	m/sec	6			6		
SIZE (D × W × L)	mm	60 × 81 × 244 (75 × 125 × 247)			60 × 81 × 433 (75 × 125 × 436)		
WEIGHT	kg	7.5			13.8		

● **Ironcore Linear Motor CE(L) Series**

Motor Type	Name	CE066			CE133			CE200			CE266		
	Cooling	Oil	None	Water	Oil	None	Water	Oil	None	Water	Oil	None	Water
Driver [6 kHz]		MEDL□83△△			MFDL□B3△△			MGDL□C3△△			MHDL□E3△△		
Cont. FORCE	N	870	390	900	1740	780	2000	2610	1170	3000	3480	1560	4000
Max. FORCE	N	1600			3200			4800			6400		
Rated SPEED	m/sec	2			2			2			2		
Max. SPEED	m/sec	3			3			3			3		
SIZE (D × W × L)	mm	63 × 150 × 244 (78 × 160 × 247)			63 × 150 × 465 (78 × 160 × 471)			63 × 150 × 641 (78 × 160 × 647)			63 × 150 × 854 (83 × 160 × 860)		
WEIGHT	kg	12			24			33			42		

• Please refer to P.00 for driver specifications.

Sales area

• Japan   • China

Please contact the following address for details.

Language

• English   • Chinese   • Japanese

For more information

URL : http://www.sodick.jp/

LINEAR MOTOR and DIRECT DRIVE MOTOR

Ironcore and ironless linear motors

T- and U-Series

Features

- High force density
  More force in a smaller packing means lowering footprint
- Low thermal resistance
  Allowing good heat transfer
- Ironcore linear motors:
  Low cogging for smooth motion and position accuracy
  Approved for CSA, CE, and RoHS
  Optional watercooling for TL- and TBW-series
- Ironless linear motors:
  High acceleration and dynamics
  No cogging, extremely low force ripple
  Approved for CE and RoHS
  Also available as vacuum-rated motors

Specification

Ironcore T-Series

Performance Parameters	TM	TL	TB	TBW
Continuous Force (N)	60 - 360	200 - 840	760 - 1900	1200 - 3000
Peak Force (N)	120 - 720	450 - 1800	1800 - 4500	2700 - 6750
Maximum Continuous Current (Arms)	1.5 - 9.3	2.26 - 18.1	4.1 - 20.5	6.5 - 32.3
Peak Current (Arms)	3.1 - 18.9	5.0 - 40.0	10.0 - 50.0	15.0 - 75.0
Thermal Resistance (°C/W)	1.5 - 0.38	0.48 - 0.12	0.15 - 0.06	0.10 - 0.04
Coil Unit Mass (kg)	0.6 - 2.3	1.5 - 5.2	4.9 - 11.6	7.3 - 18.2
Attraction Force (N)	300 - 1300	950 - 3400	3400 - 8300	4900 - 12450
MINAS A6L Series Recommended Drivers (1/3-phase 230 V[*1])	MADL*05** to MDDL*55**	MBDL*25** to MFDL*A3**	MCDL*35** to MFDL*B3**	MDDL*55** to MGDL*C3**
MINAS A6L Series Recommended Drivers (3-phase 400 V[*1])	MDDL*44** to MFDL*A4**	MDDL*54** to MGDL*C4**	MDDL*64** to MGDL*C4**	MEDL*84** to MHDL*E4**

*1 Please refer to the suitable driver part number at page of A6L according to supply voltage.

Ironless U-Series

Performance Parameters	UM3	UM6	UM9	UM12
Continuous Force (N)	29	58	87	116
Peak Force (N)	100	200	300	400
Maximum Continuous Current (Arms)	0.8/1.5	1.6/2.9	2.4/4.4	3.2/5.8
Peak Current (Arms)	2.8/5.0	5.5/10.0	8.3/15.0	11.0/20.0
Thermal Resistance (°C/W)	1.8	0.9	0.6	0.45
Coil Unit Mass (kg)	0.084	0.162	0.240	0.318
MINAS A6L Series Recommended Drivers (1/3-phase 230 V)	MADL*05** to MBDL*25**	MBDL*25** to MCDL*35**	MCDL*35** to MDDL*45**	MCDL*35** to MDDL*55**

Sales area

- Netherland   • Germany   • Korea
- Rest of the world

Language

- English   • German
- Korean

Tecnotion has worldwide subsidiaries and representatives:
Please contact the following addresses for details

For more information

URL : http://www.tecnotion.com/

Contact: **Tecnotion**
International:
   Tecnotion BV, Almelo/The Netherlands   [E-mail: sales@tecnotion.com]   TEL: +31 546536 300
For German-speaking countries (DACH):
   Tecnotion GmbH, Munich/Germany   [E-mail: info@tecnotion.de]   TEL: +49 89 381537 400
For Korea:
   Tecnotion Rep. of Korea, 883 Gwangyang 2-Dong   [E-mail: korea@tecnotion.com]   TEL: +82 10 7164 2525

LINEAR MOTOR and DIRECT DRIVE MOTOR

Core and Coreless Linear Motor

F Series, G Series

Features

Core Type

- Rigid Structure
- Low cogging
- High-density Force
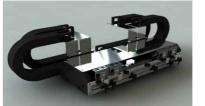- Low thermal resistance
- Approved for CE

Coreless Type

- No cogging, low force ripple
- High-density Force
- Low thermal resistance
- Approved for CE

Application Sample

Single-Axis Stage | Multi-Mover Stage | Linear Desk-Top | Gantry Stage

Selection Guide

Mover | F | SM | 60 | A | - | 110 | S | - | ✱ ✱

- **Customize Code**
- **Mover**

Motor Type
F : Core
G : Coreless

Max. Current
40 : 4.0 Amp
60 : 6.0 Amp

Mover Length
50 : 50 mm
80 : 80 mm

Motor Size
MIC : Micro   LA : Large
MI : Mini   LB : Large-II
SM : Small   EX : Extra-Large
MD : Middle

Mounting
A : Standard
C : Customize

Stator | F | SM | - | 240 | M | - | ✱ ✱

- **Customize Code**
- **Stator**
- **Stator Length**
144 : 144 mm
240 : 240 mm

Motor Type
F : Core
G : Coreless

Motor Size
MIC : Micro   LA : Large
MI : Mini   LB : Large-II
SM : Small   EX : Extra-Large
MD : Middle

MOVER Specification

Item	Model	Dimension (L) × (W) × (H) [mm]	Force [N] Continu.	Force [N] Max.	Current [Arms] Continu.	Current [Arms] Max.	Force Constant [N/Arms]	Back EMF [V/(m/s)]	Motor Constant [N/sqrt(W)]	Resistance [Ohm]	Inductance [mH]	Power [W]	Magnetic Attraction [N]	Weight [kg]	Pole-Pitch (mm)	MINAS A6L Model
Core Type	FMIC40A 50S	44 × 38 × 16.4	8	25	1.3	3.9	6.4	5.5	4.8	2.4	2.0	2.9	42	0.2	18	MADL□15△△
	FMIC40A 80S	80 × 38 × 16.4	16	50			12.8	11.1	6.9	4.8	4.0	5.8	84	0.4		
	FMIC40A 120S	116 × 38 × 16.4	24	75			19.2	16.7	9.7	7.2	6.0	8.7	125	0.6		
	FMIC40A 150S	152 × 38 × 16.4	32	100			25.6	22.2	13.8	9.6	8.0	11.6	167	0.8		
	FMI40A 50S	44 × 42 × 25	20	61	1.3	3.9	15.7	7.9	7.8	5.4	10.7	6.9	102	0.2	18	MADL□15△△
	FMI40A 80S	80 × 42 × 25	40	122			31.3	15.9	11.0	10.8	21.4	13.7	204	0.5		
	FMI40A 120S	116 × 42 × 25	61	183			47.0	23.9	13.5	16.3	32.0	20.7	306	0.7		
	FMI40A 150S	152 × 42 × 25	81	244			62.7	31.8	15.6	21.7	42.8	27.5	407	0.9		
	FSM60A 60S	60 × 54 × 25	41	124	2.0	6.0	20.8	10.8	11.3	4.5	12.6	13.4	208	0.4	24	MBDL□25△△
	FSM60A 110S	108 × 54 × 25	83	249			41.5	21.5	16.0	9.0	25.2	26.9	415	0.8		
	FSM60A 160S	156 × 54 × 25	124	373			62.3	32.3	19.6	13.4	37.8	40.3	623	1.1		
	FSM60A 200S	204 × 54 × 25	166	498			83.1	43.0	22.7	17.9	50.4	53.8	831	1.4		
	FMD110A 70S	71 × 70 × 27	61	184	3.8	11.4	16.1	8.4	13.7	1.8	7.9	19.9	307	0.8	30	MCDL□35△△
	FMD110A 130S	131 × 70 × 27	122	368			32.3	16.7	19.4	3.7	15.8	39.9	613	1.4		
	FMD110A 190S	191 × 70 × 27	184	552			48.4	25.0	23.8	5.5	23.7	59.8	920	1.9		
	FMD110A 250S	251 × 70 × 27	245	736			64.6	33.4	27.5	7.4	31.6	79.7	1227	2.5		
	FMD110A 310S	311 × 70 × 27	306	920			80.7	41.8	30.8	9.2	39.5	99.6	1533	3.0		
	FLA190A 110S	108 × 100 × 41	158	476	6.4	19.2	24.8	19.7	22.5	1.6	13.4	50.0	794	2.1	48	MDDL□55△△
	FLA190A 200S	204 × 100 × 41	317	952			49.6	39.5	31.8	3.3	26.8	100.0	1588	4.2		
	FLA190A 300S	300 × 100 × 41	476	1429			74.5	59.2	38.9	4.9	40.2	150.0	2332	6.3		
	FLA190A 400S	396 × 100 × 41	635	1905			99.3	80.0	44.9	6.5	53.6	200.0	3177	8.4		
	FLB230A 110S	108 × 130 × 41	213	639	7.8	23.4	27.3	14.2	27.4	1.3	11.4	60.4	1065	3.1	48	MDDL□55△△
	FLB230A 200S	204 × 130 × 41	426	1278			54.6	28.4	38.8	2.6	22.8	120.7	2130	6.2		
	FLB230A 300S	300 × 130 × 41	639	1917			81.9	42.6	47.5	4.0	34.2	181.1	3195	9.3		
	FLB230A 400S	396 × 130 × 41	852	2556			109.2	56.8	54.8	5.3	45.6	241.4	4260	12.4		
	FEX450A 150S	146 × 160 × 47	405	1216	15.0	45.0	27.0	17.1	36.3	0.7	11.2	124.9	2027	5.5	66	MEDL□93△△
	FEX450A 280S	278 × 160 × 47	810	2432			54.0	35.8	51.3	1.5	22.5	249.8	4053	10.6		
	FEX450A 410S	410 × 160 × 47	1216	3648			81.1	53.7	62.8	2.2	33.7	374.6	6080	15.9		
	FEX450A 540S	542 × 160 × 47	1621	4864			108.1	71.6	72.5	3.0	44.9	499.5	8107	21.9		
Coreless Type	GMD110A 140S	140 × 37 × 88	91	274	3.8	11.4	24.0	11.2	11.2	5.5	8.4	66.1	0	0.8	30	MCDL□35△△
	GMD110A 200S	200 × 37 × 88	137	411			36.1	16.8	13.8	8.2	12.5	99.1	0	1.2		
	GMD110A 260S	260 × 37 × 88	182	548			48.1	22.4	15.9	10.9	16.7	132.2	0	1.7		
	GMD110A 320S	320 × 37 × 88	228	685			60.1	28.1	17.8	13.7	20.9	165.2	0	2.1		
	GLA190A 220S	223 × 44 × 141	294	882	6.4	19.2	45.9	23.5	21.8	5.3	22.7	181.9	0	2.4	48	MDDL□55△△
	GLA190A 320S	319 × 44 × 141	441	1323			68.9	35.3	26.7	8.0	34.0	272.9	0	3.3		
	GLA190A 420S	415 × 44 × 141	588	1764			91.9	47.0	30.8	10.6	45.4	363.9	0	4.3		
	GLA190A 510S	511 × 44 × 141	735	2205			114.8	58.7	34.5	13.3	56.7	454.8	0	5.3		
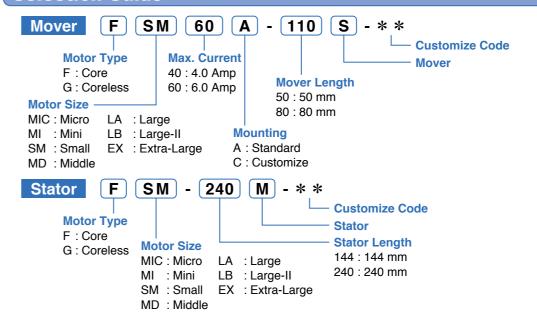
STATOR Specification

Item	Model	Length (mm)
Core Type	FMIC-72M	72
	FMIC-99M	99
	FMIC-144M	144
	FMIC-216M	216
	FMIC-288M	288
	FMI-144M	144
	FMI-252M	252
	FMI-324M	324

Item	Model	Length (mm)
Core Type	FSM-144M	144
	FSM-240M	240
	FSM-336M	336
	FMD-180M	180
	FMD-240M	240
	FMD-360M	360
	FLA-192M	192
	FLA-288M	288
	FLA-384M	384

Item	Model	Length (mm)
Core Type	FLB-192M	192
	FLB-288M	288
	FLB-384M	384
	FEX-264M	264
	FEX-396M	396
	FEX-528M	528

Item	Model	Length (mm)
Coreless Type	GMD-180M	180
	GMD-240M	240
	GMD-360M	360
	GLA-192M	192
	GLA-288M	288
	GLA-384M	384

Sales area

- United States of America
- China
- Vietnam

Language

- Korean : +82-1588-5982
- English : +82-2-2691-8888
- Chinese : +86-21-6727-7733
- Vietnamese : +84-9-0123-6795

Please contact the following address for details.

For more information

URL Korean : http://www.tpcpage.co.kr/   English : http://www.tpcpage.com/
     Chinese : http://www.tpcpage.cn/

LINEAR MOTOR and DIRECT DRIVE MOTOR

Enclosed Linear Encoders
S3 / G3 Series

Features

- The most robust optical encoder
- 3STATECH Technology
- Connectivity to MINAS series
- Vibration resistance of 30 G
- Longest absolute solution
- Angular Resolution up to 10 nm

Absolute glass	Absolute steel tape
S3BP - G3BP SERIES (MINAS A5 & MINAS A6)	LAP SERIES (MINAS A5 & MINAS A6)

3Statech

Specification

Item	Description		
Encoder model	G3BP	S3BP	LAP
Measuring standard	Optical absolute		
Interface	Panasonic communication protocol		
Scale material	Glass		Steel tape
Coef. expansion	≈ 8 µm/m°C		
Resolution	0.05 µm & 0.01 µm		
Max. Length	3040 mm	1240 mm	60 m
Accuracy	± 5 µm/m & ± 3 µm/m		
Max. Travel speed	3 m/s		
Vibration / Shock	30 G / 30 G	10 G / 30 G	10 G / 30 G
Operating temperature	0 ºC to 50 ºC		
Protection	IP53 (standard) / IP64 (with air purge)		
Power supply	DC 5 V ±10 %, 250 mA		
Max. Cable Length	30 m		

Angular Encoders
S2 / H2 Series

Features

- The most robust optical encoder
- 3STATECH Technology
- Connectivity to MINAS series
- Great accuracy at high speeds
- Angular Resolution up to 29 bits

Absolute glass
S2 – H2 SERIES (MINAS A5 & MINAS A6)

Specification

Item	Description			
Encoder Model	H2A-D200i100	H2A-D200i60	H2A-D90	S2A-D90
Measuring standard	Optical absolute			
Shaft diameter (ext/int)	Hollow 200/100	Hollow 200/60	Hollow 90/20	Solid 90
Interface	Panasonic communication protocol			
Scale material	Glass			
Resolution	29 bits (536870912 positions)		26 bits (67108864 positions)	
Max. RPM	750 RPM		1500 RPM	
Accuracy	± 1", ± 2"		± 2.5", ± 5"	
Vibration / Shock	10 G / 100 G			
Operating Temperature	−20 ºC to 70 ºC (± 5") / 0 ºC to 50 ºC (± 2")			
Protection	IP64			
Power supply	DC 5 V (3.6 V to 5,25 V)			
Max. Cable length	30 m			

Sales area

- Japan
- China
- Taiwan
- Worldwide response

Language

- Japanese
- English
- Chinese
- Spanish

For more information

URL: https://www.fagorautomation.com/en/

Contact: **Fagor Automation, S. Coop.**
Bo San Andrés No19 E-20500 – Arrasate/Mondragón, Spain
[E-mail: Jmviniegra@fagorautomation.es]
TEL: +34-943-719200   FAX: +34-943-791712

Exposed Linear Encoders

L2 Series

Features

- The most robust optical encoder
- Connectivity to MINAS series
- All mechanical type solutions
- Longest absolute solution

Absolute type	Incremental type

EXA, EXG & EXT SERIES
(MINAS A5, MINAS A6)

Specification

● **Absolute type**

Item	Description		
Encoder Model	EXA	EXG	EXT
Measuring standard	Optical absolute		
Installation	Adhesive	Guided	Tensioned
Interface	Panasonic communication protocol		
Scale material	Steel tape		
Coef. expansion	≈ 11 µm/m ºC		
Resolution	0.05 µm & 0.01 µm		
Max. Length	9040 mm	4240 mm	30 m
Accuracy	± 10 µm/m	± 10 µm/m	± 5 µm/m
Max. Travel speed	8 m/s		
Vibration / Shock	20 G / 100 G		
Operating Temperature	0 ºC to 50 ºC		
Protection	IP40		
Power supply	DC 5 V ±10 %, 250 mA		
Max. Cable length	30 m		

Specification

● **Incremental type**

Item	Description		
Encoder Model	EXA	EXG	EXT
Measuring standard	Optical absolute		
Installation	Adhesive	Guided	Tensioned
Interface	TTL signals		
Scale material	Steel tape		
Coef. expansion	≈ 11 µm/mºC		
Resolution	Up to 0.1 µm		
Max. Length	16020 mm	6040 mm	30 m
Accuracy	± 10 µm/m	± 10 µm/m	± 5 µm/m
Max. Travel speed	Up to 4 m/s		
Vibration / Shock	20 G / 100 G		
Operating Temperature	0 ºC to 50 ºC		
Protection	IP40		
Power supply	DC 5 V ±10 %, 250 mA		

Sales area

- Japan
- China
- Taiwan
- Worldwide response

Language

- Japanese
- English
- Chinese
- Spanish

For more information

URL: https://www.fagorautomation.com/en/

FEED BACK SCALE

Absolute Exposed Linear Encoder
LIC 2100 Series

Features

- Absolute linear encoder for measuring lengths up to 6 m
- Compact and light scanning head (scanning head weight 20 g without connecting cable)
- High traversing speed and high resolution (10 m/sec , 50 nm)
- Robust to contamination and wide mounting tolerances (nominal gap ± 0.5 mm: LIC 2199P)

LIC 2197P:

Steel scale tape is drawn into aluminum extrusions and fixed at center

LIC 2199P:

Steel scale tape cemented on mounting surface

Specification

	LIC 2197P	LIC 2199P
Measuring standard Coefficient of linear expansion	Steel scale tape with absolute track ≈ 10 ppm/K	
Accuracy grade	± 15 µm	
Resolution	100 nm or 50 nm	
Measuring Length ML (mm)	120 320 520 770 1020 1220 1520 2020 2420 3020 Larger measuring lengths up to 6020 mm available on request	
Interface	Panasonic serial interface (Pana01)	
Voltage supply	DC 3.6 V ~ 14 V	
Operating temperature	−10 °C ~ 70 °C	
Protection degree IEC60529	IP67 Only for scanning head	
Mounting method	Steel scale tape is drawn into aluminum extrusions and fixed at center	Steel scale tape cemented on mounting surface

Absolute Exposed Linear Encoder
LIC 4100 Series

Features

- Absolute linear encoder for measuring lengths up to 28 m (in case of LIC 4195P)
- Compact and light scanning head (scanning head weight 20 g without connecting cable)
- High traversing speed and high resolution (10 m/sec; 1 nm)
- Very small interpolation error
- Contains two tracks: absolute and incremental
- Robust to contamination and wide mounting tolerances (nominal gap ± 0.25 mm: LIC 4199P)
- Glass scale with low thermal expansion co-efficiency available.

LIC 4195P:

steel scale tape is drawn into the aluminum extrusions and tensioned

LIC 4197P:

steel scale tape is drawn into the aluminum extrusions and fixed at center

LIC 4193P/4199P:

Steel scale tape cemented on mounting surface

Specification

	LIC 4193P	LIC 4195P	LIC 4197P	LIC 4199P
Measuring standard Coefficient of linear expansion	Glass or Glass ceramic ≈ 8 ppm/K ≈ 0 ppm/k	Steel tepe Depends on the mounting surface	Steel tepe ≈ 10 ppm/K	Steel tape ≈ 10 ppm/K
Accuracy grade (depends on ML)	± 1 µm/± 3 µm/ ± 5 µm	± 5 µm	± 3 µm/ ± 5 µm/ ± 15 µm	± 3 µm/ ± 15 µm
Resolution	1 nm, 5 nm, 10 nm			
Measuring Length ML (mm)	240 ~ 3040	140 ~ 28840	240 ~ 6040	70 ~ 1020
Interface	Panasonic serial interface (Pana01)			
Voltage supply	DC 3.6 V ~ 14 V			
Operating temperature	−10 °C ~ 70 °C			
Protection degree IEC60529	IP67 Only for scanning head			
Mounting method	cemented on mounting surface	Aluminum extrusion and tensioned	Aluminum extrusion and fixed at center	cemented on mounting surface

Sales area

- Japan
- German
- United States of America
- China
- All over the world

Language

- English
- Japanese
- German
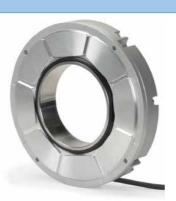- Chinese

For more information

URL : http://www.heidenhain.de

Absolute Angle Encoder
with Integral Bearing RCN series / without Integral Bearing ECA 4490 series

Features - RCN series

- Absolute angle encoder with high accuracy
- Large hollow shaft up to Φ100 mm
- Integrated stator coupling
- Panasonic Serial Interface (Pana01)

RCN 8x90P

Specification - RCN series

	RCN 2590P	RCN 2390P	RCN 5590P	RCN 5390P	RCN 8590P	RCN 8390P
Measuring standard	DIADUR circular scale with absolute and incremental track					
Accuracy grade	±2.5"	±5"	±2.5"	±5"	±1"	±2"
Position error per signal period	≤ ± 0.4"	≤ ± 0.4"	≤ ± 0.4"	≤ ± 0.4"	≤ ± 0.2"	
Position values/Revolution	28 bits	26 bits	28 bits	26 bits	29 bits	
Hollow shaft (mm)	φ20		φ35		φ60 or φ100	
Mechanical permissible speed	≤ 1500 min⁻¹				≤ 500 min⁻¹	
Protection degree IEC60529	IP64					

Features - ECA 4490 series

- Large hollow shaft absolute angle encoder with high accuracy
- Steel scale drum with three-point centering
- Panasonic Serial Interface (Pana01)

ECA 4490P

Specification - ECA 4490 series

	ECA 4490P									
Measuring standard CTE	Steel drum with absolute and incremental track ≈ 10.5 ppm/K									
Accuracy grade	±1.5″ ~ ±3.0″ depends on drum size									
Resolution	27 bits ~ 29 bits depends on drum size									
Drum size in mm	inside diameter	70	80	120	150	185	180	210	270	425	512
	outside diameter	104.6	127.6	178.6	208.9	208.9	254.9	254.9	331.3	484.1	560.5
Protection degree IEC60529	IP67 only for scanning head									

Absolute Linear Encoder with Scale Housing
LC series

Features

- Optical absolute linear encoder up to 4.2 m
- High vibration resistance
- High traversing speed with high resolution (3 m/sec , 1 nm /10 nm)
- High reliability through double sealing lips (LC 195P)

LC 195P

LC 495P

Specification

	LC 195P	LC 495P
Measuring standard CTE	DIADUR glass scale with absolute and incremental track ≈ 8 ppm/K	
Accuracy grade	± 3 µm (up to 3040 mm) or ± 5 µm	
Resolution	± 3 µm : 1 nm ± 5 µm : 10 nm	
Measuring Length ML (mm)	140 mm ~ 4240 mm	70 mm ~ 2040 mm
Interface	Panasonic serial interface (Pana01)	
Voltage supply	DC 3.6 V ~ 14 V	
Operating temperature	0 °C ~ 50 °C	
Protection degree IEC60529	IP53 or IP64 (with compressed air)	

Sales area

- Japan
- German
- United States of America
- China
- All over the world

Language

- English
- Japanese
- German
- Chinese

For more information

URL : http://www.heidenhain.de

FEED BACK SCALE
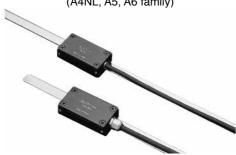
Feedback Scale
SL700 series

Features

- High speed response with serial interface for MINAS series
- High speed response (10 m/s) and high resolution (0.1 μm)
- Magnetic digital scale technology produces real-time measurement data
- Magnetic detection system with excellent resistance to dust, oil and water (Maintenance free, IP67 grade model available)
- Wide variety of measurement length available from 50 mm to 100000 mm

Separate type / Magnetic detection system
Incremental scale
Digiruler

SL700 + PL101RP/RHP
SL710 + PL101RP/RHP
SL720 + PL101RP/RHP (Special model)
(A4NL, A5, A6 family)

• Please contact Panasonic for the combination of A6 series driver and feedback scale.

Specification

Item	Description					
Type	Separate type / Magnetic detection system / Incremental scale Digiruler					
Part No.	SL700 + PL101RP	SL710 + PL101RP	SL720* + PL101RP	SL700 + PL101RHP	SL710 + PL101RHP	SL720* + PL101RHP
Compatible servo drive	A4NL / A5 / A6 family					
Effective length	50 mm to 100000 mm					
Accuracy	±10L μm (Integral number in unit of 1m when effective length is 3 m or less) When longer than 3 m, please contact sales					
Resolution	0.1 μm					
Signal type	Incremental					
Response speed	10 m/s					
Output signal	Dedicated to MINAS series, Serial output					
Origin signal	–	1 point	Multi point	–	1 point	Multi point
Protective design grade	IP50 or equivalent			IP67 or equivalent		

Provide high speed, high response, high reliability are secured through serial communication
CK-T185 conversion cable is required when connecting to A5, A6 family
* SL720 + PL101RP/RHP is special specification model. Please contact sales.

Feedback Scale
SR70/SR80 series

Features

- Magnetic detection system with excellent resistance to dust, oil and water
- Magnetic absolute scales (SR77/SR87) up to 10 nm resolution with 200 m/min response speed
- Slim type allows installation in narrow space (SR77/SR75)
- High rigidity provide resistance to shock and vibration (SR87/85 series)

Slim type / Magnetic detection system Absolute scale	Slim type / Magnetic detection system Incremental scale	Robust type / Magnetic detection system Absolute scale	Robust type / Magnetic detection system Incremental scale
SR77 series (A4, A4N, A4NL, A5, A6 family)	**SR75 series** (A4NL, A5, A6 family)	**SR87 series** (A4, A4N, A4NL, A5, A6 family)	**SR85 series** (A4NL, A5, A6 family)

• Please contact Panasonic for the combination of A6 series driver and feedback scale.

Specification

Item	Description			
Type	Slim type Magnetic detection system Absolute scale	Slim type Magnetic detection system Incremental scale	Robust type Magnetic detection system Absolute scale	Robust type Magnetic detection system Incremental scale
Part No.	SR77	SR75	SR87	SR85
Compatible servo drive	A4/A4N / A4NL/ A5 / A6 family	A4NL / A5 / A6 family	A4 / A4N / A4NL / A5 / A6 family	A4NL / A5 / A6 family
Effective length	70 mm to 2040 mm		140 mm to 3040 mm	
Accuracy	3+3 L/1000 μm p-p or 5+5 L/1000 μm p-p L = Effective length (mm)			
Resolution	A5 family: 0.01 μm to 1 μm A4 / A4N / A4NL: 0.05 μm to 1 μm			
Signal type	Absolute	Incremental	Absolute	Incremental
Response speed	2 m/s			
Output signal	Dedicated to MINAS series, serial output			
Origin signal	–	1 point	–	1 point
Protective design grade	IP54 (Without air purge), IP65 (With air purge)			

Provide high speed, high response, high reliability are secured through serial communication
CK-T185 conversion cable is required when connecting to A5, A6 family

Sales area

- Japan   • United States of America
- German

Please contact the following address for details.

Language

- Japanese   • German
- English

For more information

URL : http://www.magnescale.com/mgs/language/english/

FEED BACK SCALE

Feedback Scale
SmartSCALE

Features

- Maximum response speed 3 m/s, Maximum resolution 0.05 μm, and ±5 μm accuracy
- Individual non-contact component design
- Space-saving small head (W 33 mm × D 16 mm × H 8 mm)
- Signal LED display for ease of installation

Separate type / Magnetic detection system Incremental scale

SQ10 + PQ11
SQ10 + PQ10 + MQ10
(A5, A6 family)

• Please contact Panasonic for the combination of A6 series driver and feedback scale.

Specification

Item	Description	
Type	Separate type / Magnetic detection system Incremental scale	
Part No.	SQ10 + PQ11	SQ10 + PQ10 + MQ10
Configuration	SQ10 scale + PQ11head with interpolator	SQ10 scale + PQ10 interpolator + MQ10 head
Compatible servo drive	A5/A6 family	
Effective length	100 mm to 1000 mm	
Accuracy	±5 μm	
Resolution	0.05 μm / 0.1 μm / 0.5 μm / 1 μm	
Signal type	Incremental	
Response speed	3 m/s	
Output signal	Dedicated to MINAS series, Serial output	
Origin signal	1 point	
Protection grade	IP60 / IP65	

Provide high speed, high response, high reliability are secured through serial communication
CK-T185 conversion cable is required when connecting to A5, A6 family

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Feedback Scale
BF1 series

Features

- High-resolution reflective Laserscale with signal wavelength of 250 nm
- Easy to check signal with LED
- Increase mounting tolerance enable easy installation. (Pitching/Rollin/Yawing : ±20 min)

High-resolution reflective type Laserscale

BF1 series
(A5, A6 family)

• Please contact Panasonic for the combination of A6 series driver and feedback scale.

Specification

Item	Description
Type	High-resolution reflective type Laserscale
Part No.	BF1
Compatible servo drive	A5 / A6 family
Effective length	30 mm to 1400 mm
Accuracy	±0.5 μm (30 mm to 170 mm)/ ±1 μm (220 mm to 370 mm)/ ±3 μm (420 mm to 520 mm)/ ±5 μm (570 mm to 970 mm)/ ±10 μm (1070 mm to 1400 mm)
Resolution	0.001 μm / 0.01 μm
Signal type	Incremental
Response speed	0.4 m/s / 1.8 m/s
Output signal	Dedicated for MINAS series, serial output
Origin signal	1 point

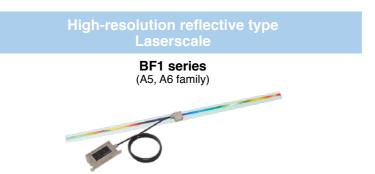Provide high speed, high response, high reliability are secured through serial communication
CK-T185 conversion cable is required when connecting to A5, A6 family

Sales area

- Japan
- United States of America
- German

Language

- Japanese
- German
- English

Please contact the following address for details.

For more information

URL : http://www.magnescale.com/mgs/language/english/
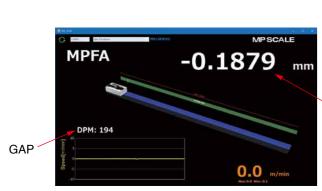
FEED BACK SCALE
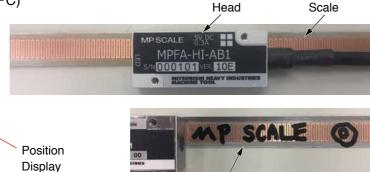
Linear scale
Open type Tape Scale

Features

Tape Scale with 0.4 mm thickness

- Unaffected by dust, oil, and condensation
- 0.1 μm detection at 1800 m / min with MINAS series serial I / F
- Non-contacting! Stable high accuracy lasted a long period
- Easy diagnostic such as GAP adjustment (with PC)

Head   Scale

MP SCALE
MPFA-HI-AB1
S/N 000101 VER. 10E

MPFA -0.1879 mm

Position Display

GAP

DPM: 194

0.0 m/min

Diagnostic display (by PC connection)

MP SCALE

Works properly even if written with permanent marker on Scale

Application Sample

- Feedback for high precision linear stage
- Transport device with positioning function
- Wire cut electrical discharge machine

Linear motor

MPFA Series Scale

Linear motor drive stage with position feedback of MPFA Series Scale

Specification

Item	Contents
Resolution	0.1 μm, 1 μm
Speed	1800 m/min
Accuracy	±15 μm/m
Stroke	Up to 9950 mm (Full length-50mm)
Fixing method	Scale is tape type, bonded to the mounting surface.
Multi head	Possible
Output	Serial output and A, B, Z phase pulse

※ Start of sale: December 2019. Please contact us for the latest information.

Absolute Open Type Rotary Scale
MPZA series, MPRZ series
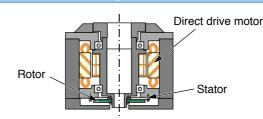
Features

- High accuracy 2sec/MPRZ-18072A
- Unaffected by dust, oil, and condensation
- Non-contact ! High speed 10000 min^{-1}
- Keep High accuracy ! All over circumference pattern detection cancel detecting error caused by eccentricity.
- Large hollow up to 180 mm

Rotor

Stator

Application Sample

Direct drive motor

Rotor

Stator

Rotor

Hollow

Stator

Table using direct drive motor   **High precision indexing table**

Mount Stator on the fixed part and Rotor on the rotating part.

System Configuration

A/D convertor

MPRZ series

MINAS A6/A6L

Stator   Rotor

MPZA series

MINAS A6/A6L

Stator   Rotor
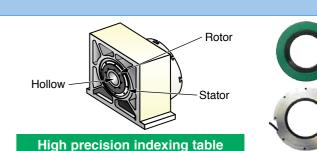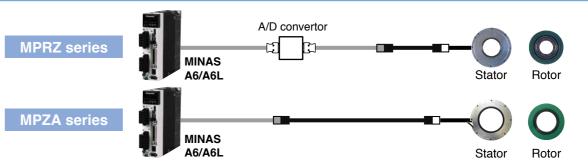
Specification

Scale type	Inner diameter	Outer diameter	Accuracy	Resolution	Speed
MPZA2024A	φ20 mm	φ110 mm	5 sec	2^{23}/rev 0.043×10^{-3} degrees	10000 min^{-1}
MPZA10036A	φ100 mm	φ200 mm	4 sec		
MPRZ-536A	φ27.1 mm	φ127.0 mm	4 sec	2^{23}/rev 0.043×10^{-3} degrees	10000 min^{-1}
MPRZ-736B	φ58.0 mm	φ177.8 mm	3 sec		
MPRZ-1036B	φ90.0 mm	φ251.7 mm	2.5 sec		
MPRZ-1236B	φ120.0 mm	φ302.0 mm	2 sec		
MPRZ-9636A	φ96.0 mm	φ200.0 mm	4 sec		
MPRZ-12536A	φ125.0 mm	φ230.0 mm	4 sec		
MPRZ-18072A	Φ180.0 mm	φ340.0 mm	2 sec		5000 min^{-1}

Sales area

- Japan   - China   - Taiwan   - Korea

Language

- Japanese   - English   - Chinese   - Korean

For more information

URL: https://www.mhi-machinetool.com/en/index.html

Linear Scale

ABS AT500 series /ST700 series/ST1300 series

Features

- Many years of experience that has opened up the absolute system solution in the world with collaboration of MINAS series originally.
- By changing from the Incremental scale system to the absolute scale, machine homing becomes unnecessary for AT500 and ST700 series.
- Absolute use, Photoelectric, Electromagnetic detection method, High resolution, High accuracy, non-contact type and so on support various applications widely.

ABS AT500 series

High Rigid SC type	High Resolution H type

Specification

Item	Description	
	AT573-SC	AT573-H
Max. effective range	2200 mm	1000 mm
Resolution	0.05 µm	
Max. response rate	2.5 m/sec	
Accuracy (µm) : 20 °C	3 + 3 L/1000 µm *	2 + 2 L/1000 µm *
Vibration resistance	20 G	15 G
Shock resistance	35 G	20 G
Max. current consumption	270 mA	
Operation temperature	0 °C ~ 45 °C	

∗ L = effective length mm

* Please refer to the catalog an manual issued by Mitutoyo.

Application Sample

- Machining Center
- Lathe Machine
- Grinding Machine

ST700 series/ ST1300 series

ABS ST700 series Electromagnetic induction type	ABS ST1300 series Photoelectric type

Small size head

Conventional product

Specification

Item	Description			
	ABS ST700		ABS ST1300	
Detection system	Electromagnetic induction type		Photoelectric type	
Scale type	Scale base	Glass Scale	Metal tape	
			Fixed at both ends	Double-sided tape
Max. effective range	6 m	1.1 m	12 m	3 m
Position accuracy (20 °C)	5 + 5 L/1000 µm *	3 + 3 L/1000 µm *	±5 µm (~1 m) ±5 µm/m (1.1 m~)	
Min. resolution	0.1 µm		0.001 µm ／ 0.01 µm	
Max. response speed	5 m/s		8 m/s	
Coefficient of thermal expansion	≈ 12 × 10⁻⁶ /K	≈ 8 × 10⁻⁶ /K	≈ 10 × 10⁻⁶ /K	

$$\approx 12 \times 10^{-6}\,/K \qquad \approx 8 \times 10^{-6}\,/K \qquad \approx 10 \times 10^{-6}\,/K$$

∗ L = Effective length mm

* Please refer to the catalog an manual issued by Mitutoyo.

Application Sample

- Semiconductor machine
- LCD manufacturing machine

Sales area and Language

North America area: **Mitutoyo America Corporation**
 965 Corporate Blvd., Aurora, IL 60502, U.S.A.
 TEL: +1-630-820-9666   Toll Free No.: +1-888-648-8869
Europe area: **Mitutoyo Europe GmbH**
 Borsigstrasse 8-10, 41469 Neuss, GERMANY   TEL: +49-2137-102-0
Other area: Please contact the following address for details. Or Please contact Mitutoyo JAPAN.

For more information

URL: http://www.mitutoyo.co.jp/eng/

Contact: **Mitutoyo Corporation Overseas Custom Equipment Sales Promotion Section**
[E-mail: kaigaitokuhan3@mitutoyo.co.jp]
20-1, Sakado 1-Chome, Takatsu-ku, Kawasaki-shi, Kanagawa 213-8533, Japan   TEL: +81-44-813-8234
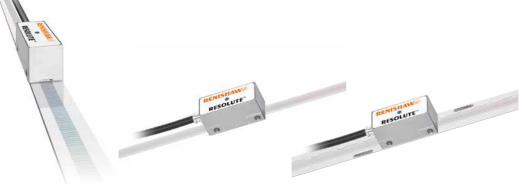
Optical Absolute Linear/Rotary Encoder
RESOLUTE™ series (Panasonic serial output)

Features

- True absolute encoder
- Resolution : 0.1 µm, 50 nm, 1 nm
- Velocity

Resolution	Panasonic A5 series	Panasonic A6 series
100 nm	40 m/s	100 m/s
50 nm	20 m/s	100 m/s
1 nm	0.4 m/s	4 m/s

- The industry's first unique signal-track scale
- 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

RESOLUTE™
RESA/REXA

Specification

Series Feature	RESOLUTE™ RELA High accuracy and low thermal expansion	RESOLUTE™ RSLA World's most accurate long scales	RESOLUTE™ RTLA-S Easiest installation	RESOLUTE™ FASTRACK/RTLA Quick and easy scale replacement	RESOLUTE™ RESA/REXA Rotary encoder
Scale	ZeroMet	Stainless steel	Stainless steel tape	Stainless steel tape	Stainless steel
Thermal expansion coefficient @ 20 °C	0.75 ±0.35 µm/m/°C	10.1 ±0.2 µm/m/°C	10.1 ±0.2 µm/m/°C	10.1 ±0.2 µm/m/°C	10.1 ±0.2 µm/m/°C
Scale accuracy @ 20 °C	±1 µm up to 1 m. ± 1 µm/m for lengths >1 m	±1.5 µm up to 1 m ±2.25 µm from 1 m to 2 m ±3 µm from 2 m to 3 m ±4 µm from 3 m to 5 m	±5 µm/m	±5 µm/m	±0.52 to ±5.49 arc second
Scale length	80 mm to 1500 mm	80 mm to 5000 mm	100 mm to 21000 mm	100 mm to 21000 mm	52 mm to 550 mm diameter
Scale mounting options	Self-adhesive or Clip/Clamp	Self-adhesive or Clip/Clamp	Self-adhesive	Track (carrier) mounting	Taper/flange mount
Read head size H × L × W	18 mm × 36 mm × 16.5 mm				
Scale size H × W	1.6 mm × 15 mm (clip/clamp) 1.8 mm × 15 mm Adhesive tape	1.5 mm × 15 mm (clip/clamp) 1.7 mm × 15 mm Adhesive tape	0.4 mm × 8 mm	0.4 mm × 18 mm	

Optical Incremental linear/Ring(Rotary) Encoder
TONiC, VIONiC & ATOM series (Digital & Analogue output signal)

Features

- Range of linear and rotary (ring or disc) scales for a variety of applications
- Easy installation and diagnostics using set-up LEDs
- Low Sub-Divisional Error (SDE) and Jitter

VIONiC Series

- IN-TRAC optical reference mark (Tonic)
- Auto-phased optical reference mark (ATOM)
- Resolution : 5 µm to 1 nm (TONiC)
  - 5 µm to 2.5 nm (VIONiC)
  - 10 µm to 1 nm (ATOM)
- Velocity : 6.48 m/sec @ 1 µm
  - 0.648 m/sec @ 0.1 µm
  (For clocked input frequency of 8 MHz)

TONiC Series

ATOM Series

Application Sample

Our encoder are suitable to use in a variety of applications that require high positioning accuracy and speed stability.

| Semiconductor | Flat Panel Display | Motion Control | Medical |
| Precision Measurements | Machine Tool | Industrial Robot | Science |

Sales area

- Japan
- United Kingdom
- Worldwide response

Please contact the following address for details.

Language

For more information

URL: http://www.renishaw.jp/ (Japanese)
http://www.renishaw.com/ (English)

Contact: **Renishaw plc**
New Mills Wotton-under-Edge Gloucestershire GL12 8JR, United Kingdom
[E-mail: international@renishaw.com]
TEL:+44-1453-524524

Absolute Exposed Linear encoder
MC 15 series

Features

- Absolute linear encoder for measuring lengths up to 6 m (upon request)
- Very compact (36 x 13.5 x 14.8) and light scanning head (scanning head mass <18 g without connecting cable)
- High traversing speed and high resolution (10 m/sec, 50 nm)
- Wide mounting tolerances (nominal gap ± 0.25 mm)

MC 15P MP:

steel scale tape is drawn into the aluminum extrusions and fixed at center

MC 15P MK:

Steel scale tape cemented on mounting surface

Specification

	MC 15P MP	MC 15P MK
Measuring standard Coefficient of linear expansion	Steel scale tape with absolute track ≈ 10 ppm/K	
Accuracy grade	±15 μm	
Resolution	50 nm, 100 nm	
Measuring Length ML (mm)	Up to 3000 mm Longer lengths on request	
Interface	Panasonic Serial Interface (Pana01)	
Voltage supply	DC 3.6 V ~ 14 V	
Operating temperature	−10 °C ~ 50 °C	
Mounting method	Aluminum extrusion and fixed at center	Cemented on mounting surface

Absolute Angle Encoder without Integral Bearing
MCR 15 series

Features

- Absolute angle encoder
- Steel scale drum with three-point centering
- Large hollow shaft
- Panasonic Serial Interface (Pana01)

MCR 15P

Specification

		MCR 15P									
Measuring standard CTE		Steel drum with absolute track ≈ 16 ppm/K									
Drum size in mm	**inside diameter**	40	55	80	95	130	180	209	230	280	330
	outside diameter	59.93	75.1	100.0	114.2	150.4	200.4	228.8	249.9	299.8	350.2
System Accuracy		±20″	±15″	±10″							
Resolution (bit)		22	23	24						25	
Protection degree IEC60529		IP40 only for scanning head									

Sales area

- Japan
- German
- United States of America
- China
- All over the world

Language

- English
- Japanese
- German
- Chinese

For more information

URL : http://www.heidenhain.de

The incremental linear encoder of a magnetic type
SENSOR / PSLH Series, SCALE / PSLG Series

Features

This encoder has achieved an excellent total performance.

- It is high-speed serial communications corresponding to the MINAS series.
- This encoder is strong in the environment of the magnetic noise, oil, and dust.
- A miniaturization and an excellent cost performance are achieved by the internal manufacturing of the MR element.
- Accuracy is improved by an original magnetization pattern.
- It is a tough encoder structure in the extrinsic noise.

Specification

Item	Description
Model number	sensor PSLH040 + scale PSLG040
Output signals	MINAS series serial output
Resolution (R)	0.1 μm
Power supply voltage	4.6 V_{DC} to 5.5 V_{DC}
Power consumption	250 mA max
Gap of detection	0.25 mm ±0.1 mm
Maximum response speed	6 m/sec
IP code	Correspond to IP50
Detection of reference	Correspond up to three places
Position accuracy	±(5+5×L/1000) μm L=Measuring length (mm) at 20 °C
Measuring length (L)	2400 mm MAX
Thermal expansion coefficient	11.0×10^{-6} / °C
Operating temperature range	0 °C to 50 °C
Preservation temperature range	−15 °C to 70 °C

Another specifications of resolution, the size of the detection head, and the ABZ output, etc. can correspond.

Sales area

- Japan   • Worldwide response

Please contact the following address for details.

Language

For more information

URL: http://www.nidec-sankyo.co.jp/

Contact: **NIDEC SANKYO CORPORATION**   [E-mail: sensor-sales@nidec-sankyo.co.jp]
Tokyo Office, Nidec Tokyo Bldg., 1-20-13, Osaki, Shinagawa-ku, Tokyo 141-0032, Japan
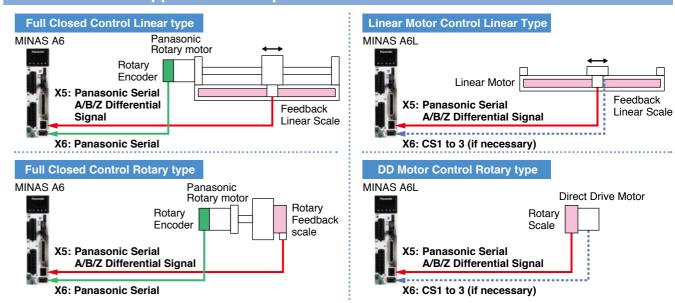TEL: +81-3-5740-3006   FAX: +81-3-6843-3123

Feed back scale selection

Feed back scale table for serial communication

Scale Type	Partner	Series	Resolution*1 [μm]	Max. rate*1 [m/s]
Parallel Type (A/B/Z phase)	General	—	Maximum speed after4× multiplication : 4 Mpps	
Serial communication (Absolute)	FAGOR AUTOMATION	S2AP/SV2AP/G2AP	0.01/0.05	3
		LAP	0.01/0.05	3
		EXA/ EXG/ EXT	0.01/0.05	8
		H2AP-D200/H2AP-D90	29 bit/23 bit	750 r/min/1500 r/min
		S2AP-D170,/S2AP-D90	23 bit	1500 rpm
	HEIDENHAIN	LIC 2197P/LIC 2199P	0.05/0.1	10
		LIC 4193P/LIC 4195P LIC 4197P/LIC 4199P	0.001/0.005/0.01	10
		LC 195P/LC 495P	0.001/0.01	3
		ECA 4490P	27 bits to 29 bits	7000 r/min～550 r/min (Depends on drum size)
		RCN 2x90P/RCN 5x90P	26 bits/28 bits	1500 r/min
		RCN 8x90P	29 bit	500 r/min
	RSF Electronik	MC 15P MP/MC 15P MK	0.05/0.1	10
	Magnescale Co.,Ltd.	SR77	0.01 to 1	3.3
		SR87	0.01 to 1	3.3
	MITSUBISHI HEAVY INDUSTRIES MACHINE TOOL CO., LTD	MPZA/MPRZ	23 bits	10000 r/min, 5000 r/min
	Mitutoyo Corporation	AT573-SC/AT573-H	0.05	2.5
		ST700	0.1	5
		ST1300	0.001/0.01	8
	Renishaw plc	RESOLUTE	0.001	A5/0.4, A6/4
			0.05	A5/20, A6/100
			0.1	A5/40, A6/100
Serial communication (Incremental)	Magnescale Co., Ltd.	SL700+PL101RP/RHP	0.1	10
		SL710+PL101RP/RHP	0.1	10
		SR75/SR85	0.01 to 1	3.3
		BF1	0.001/0.01	0.4/1.8
		SQ10+PQ11	0.05/0.1/0.5/1	3
		SQ10+PQ10+MQ10	0.05/0.1/0.5/1	3
	MITSUBISHI HEAVY INDUSTRIES MACHINE TOOL CO., LTD	MPLIN	0.1	30
	Nidec Sankyo Corporation	PSLH041+PSLG	0.1	6
	Renishaw plc	TONiC	0.001 to 5	6.48 m/s @ 1 μm 0.648 m/s @ 0.1 μm
		ATOM	0.001 to 10	
		VIONIC	0.0025 to 5	

Feed back scale application example

Full Closed Control Linear type
MINAS A6 — Panasonic Rotary motor — Rotary Encoder
X5: **Panasonic Serial A/B/Z Differential Signal**
X6: **Panasonic Serial**
Feedback Linear Scale

Linear Motor Control Linear Type
MINAS A6L — Linear Motor
X5: **Panasonic Serial A/B/Z Differential Signal**
X6: **CS1 to 3 (if necessary)**
Feedback Linear Scale

Full Closed Control Rotary type
MINAS A6 — Panasonic Rotary motor — Rotary Encoder — Rotary Feedback scale
X5: **Panasonic Serial A/B/Z Differential Signal**
X6: **Panasonic Serial**

DD Motor Control Rotary type
MINAS A6L — Direct Drive Motor — Rotary Scale
X5: **Panasonic Serial A/B/Z Differential Signal**
X6: **CS1 to 3 (if necessary)**

*1 There is the difference of resolution and maximum rate from the specification by original supplier as per the servo driver limitation of maximum pulse frequency. The maximum pulse frequency is 400 Mpps for A5 family and 4 Gpps for A6 series. We show the value of A6 family on this table.
- Please contact us when you study the system with a scale because the driver and the scale combination has restriction as per the feedback system between full closed control system and linear system.

FEED BACK SCALE

AC Servo Actuator
SHA-P Series

Features

- The SHA series incorporates the speed reducer HarmonicDrive®, for high precision motion control, to the flat AC servo motor.
- The design of the SHA series is flat and has hollow shaft structure. Piping, wiring, laser light, etc., can be passed through the through-hole in the center.
- Precise one-way positioning accuracy: Gear Ratio 50:1 = 40 arc-sec (0.011 degrees) Gear Ratio 80:1 and higher =30 arc-sec (0.008 degrees) (for SHA32P/40P-CG types)
- Torque-volume ratio is 5 times or more than that of direct drive motor.
- There are two types of option; SHA-SG type, which has compact shape feature, or SHA-CG type, which has improved output flange runout accuracy.

Flat hollow shaft AC servo motor

Precision control speed reducer (HarmonicDrive® reducer)

Holding brake (option)

Absolute encoder (17-bit)

Precision high load support cross roller bearing

Various Choice

SG type features a compact shape
Compact

CG type features an improved output shaft surface runout
High Accuracy

■ Max. Torque Mapping

Model	Type	Mass(kg)
20P	SG	2.0
	CG	2.6
25P	SG	2.95
	CG	3.95
32P	SG	5.9
	CG	7.7
40P	SG	9.9
	CG	13.0

20P: 73–120
25P: 127–229
32P: 281–484
40P: 523–841

0 — 200 N·m — 400 N·m — 600 N·m — 800 N·m

Model	Type	Mass(kg)
45P	SG	12.4
58P	SG	29.5
65P	SG	37.5

45P: 650–1147
58P: 1924–2392
65P: 2743–3419

0 — 500 N·m — 1000 N·m — 1500 N·m — 2000 N·m — 2500 N·m — 3000 N·m

Specification

● SHA-SG Type

Item	Model	SHA20P					SHA25P					SHA32P					SHA40P				
		51	81	101	121	161	51	81	101	121	161	51	81	101	121	161	51	81	101	121	161
Recommended Amplifier *1*2*3	A6N series	MBDL■25N□(All)					MBDL■25N□(161) MCDL■35N□(51~121)					MCDL■35N□(161) MDDL■45N□(121) MDDL■55N□(51~101)					MDDL■55N□(81~161) MEDL■83N□(51)				
	A6B series	MBDL■25B□(All)					MBDL■25B□(161) MCDL■35B□(51~121)					MCDL■35B□(161) MDDL■45B□(121) MDDL■55B□(51~101)					MDDL■55B□(81~161) MEDL■83B□(51)				
	A6S series	MBDL■25S□(All)					MBDL■25S□(161) MCDL■35S□(51~121)					MCDL■35S□(161) MDDL■45S□(121) MDDL■55S□(51~101)					MDDL■55S□(81~161) MEDL■83S□(51)				
Maximum Torque	N·m	73	96	107	113	120	127	178	204	217	229	281	395	433	459	484	523	675	738	802	841
Maximum Speed	r/min	117.6	74.1	59.4	49.6	37.3	108.9	69.1	55.4	46.3	34.8	94.1	59.3	47.5	39.7	29.8	78.4	49.4	39.6	33.1	24.8
Maximum Moment Load	N·m	187					258					580					849				
One-Way Positioning Accuracy	arc sec	60	50	50	50	50	50	40	40	40	40	50	40	40	40	40	50	40	40	40	40
Mass (without brake)	kg	2.0					2.95					5.9					9.9				

Specification

● SHA-SG Type

Item	Model	SHA45P				SHA58P				SHA65P			
		51	81	101	121	161	81	101	121	161	81	101	121	161
Recommended Amplifier *1*2*3	A6N series	MDDL■55N□(161) MEDL■83N□(51~121)				MEDL■93N□(161) MFDL■A3N□(81~121)				MFDL■A3N□(161) MFDL■B3N□(81~121)			
	A6B series	MDDL■55B□(161) MEDL■83B□(51~121)				MEDL■93B□(161) MFDL■A3B□(81~121)				MFDL■A3B□(161) MFDL■B3B□(81~121)			
	A6S series	MDDL■55S□(161) MEDL■83S□(51~121)				MEDL■93S□(161) MFDL■A3S□(81~121)				MFDL■A3S□(161) MFDL■B3S□(81~121)			
Maximum Torque	N·m	650	918	982	1070	1147	1924	2067	2236	2392	2743	2990	3263	3419
Maximum Speed	r/min	74.5	46.9	37.6	31.4	23.6	37.0	29.7	24.8	18.6	34.6	27.7	23.1	17.4
Maximum Moment Load	N·m	1127					2180				2740			
One-Way Positioning Accuracy	arc sec	50	40	40	40	40	40	40	40	40	40	40	40	40
Mass (without brake)	kg	12.4					29.5				37.5			

● SHA-CG Type

Item	Model	SHA20P					SHA25P					SHA32P					SHA40P				
		50	80	100	120	160	50	80	100	120	160	50	80	100	120	160	50	80	100	120	160
Recommended Amplifier *1*2*3	A6N series	MBDL■25N□(All)					MBDL■25N□(160) MCDL■35N□(50~120)					MCDL■35N□(160) MDDL■45N□(120) MDDL■55N□(50~100)					MDDL■55N□(80~160) MEDL■83N□(50)				
	A6B series	MBDL■25B□(All)					MBDL■25B□(160) MCDL■35B□(50~120)					MCDL■35B□(160) MDDL■45B□(120) MDDL■55B□(50~100)					MDDL■55B□(80~160) MEDL■83B□(50)				
	A6S series	MBDL■25S□(All)					MBDL■25S□(160) MCDL■35S□(50~120)					MCDL■35S□(160) MDDL■45S□(120) MDDL■55S□(50~100)					MDDL■55S□(80~160) MEDL■83S□(50)				
Maximum Torque	N·m	73	96	107	113	120	127	178	204	217	229	281	395	433	459	484	523	675	738	802	841
Maximum Speed	r/min	120	75	60	50	37.5	112	70	56	46.7	35	96	60	48	40	30	80	50	40	33.3	25
Maximum Moment Load	N·m	187					258					580					849				
One-Way Positioning Accuracy	arc sec	60	50	50	50	50	50	40	40	40	40	40	30	30	30	30	40	30	30	30	30
Repeatability	arc sec	±5					±5					±4					±4				
Bi-directional Repeatability	arc sec	75	30	30	30	30	60	25	25	25	25	60	25	25	25	25	50	20	20	20	20
Mass (without brake)	kg	2.6					3.95					7.7					13				

The table shows typical output values of actuators.

*1 ■ in the amplifier code indicates the safety function.
　T : With safety function
　N : Without safety function
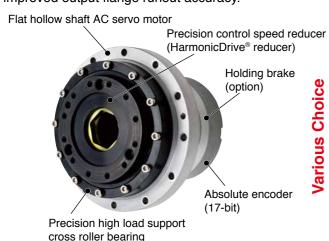
*2 □ in the amplifier code indicates driver specification.
　E : Standard type
　F : Multi-function type
　G : Communication type
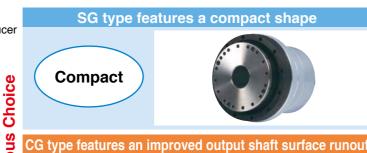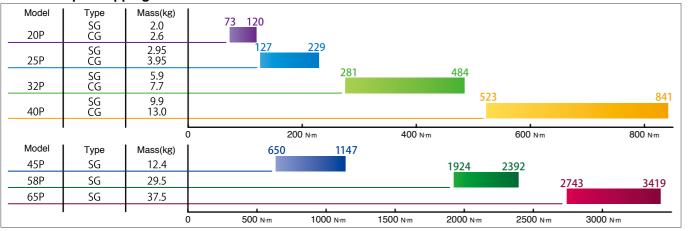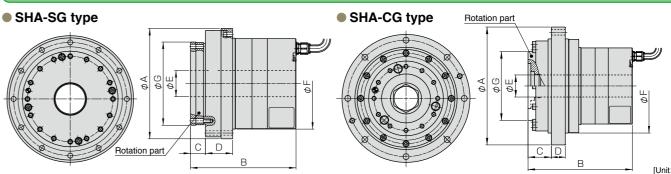
*3 Numbers in ( ) indicates applicable reduction ratio.

External Dimensions

● SHA-SG type

● SHA-CG type

[Unit: mm]

Item	Model	SHA20P		SHA25P		SHA32P		SHA40P		SHA45P	SHA58P	SHA65P
		SG type	CG type	SG type	CG type	SG type	CG type	SG type	CG type	SG type	SG type	SG type
φA		94	117	114	144	146	175	175	225	195	247	284
B		108.5	125.5	109	127.5	125	144	148	170	153.5	213	222
C		15.5	26	15.5	28.5	20	34	26	40	28	37	42.5
D		27	14	28	17	34.5	20	42	22	45.5	74	77.5
φE (Hollow)		17	17	27	27	35	35	45	45	45	65	65
φF		77 h7	95 h7	94 h7	115 h7	122 h7	148 h7	145 h7	180 h7	164 h7	210 h7	236 h7
φG		54 h7	69 h7	86 h7	84 h7	114 h7	110 h7	140 h7	132 h7	160 h7	203 h7	223 h7

Application Sample

URL : http://www.hds.co.jp/english/products/application/

Please refer to the sample and typical applications for the SHA-P Series with Panasonic Servo as shown in the URL above.

Sales area
- Japan　・Global

Language
- Japanese　・English　・Chinese

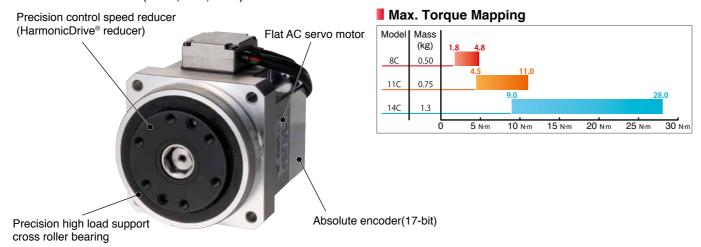**Contact:** **Harmonic Drive Systems Inc.　Overseas Division**
1856-1 Hotakamaki, Azumino-shi, Nagano, 399-8305, Japan　TEL: +81-263-83-6935　FAX: +81-263-83-6901

ACTUATOR

AC Servo Actuator
FHA-Cmini Series

Features

- The FHA-C mini series incorporates the small speed reducer HarmonicDrive®, for high precision motion control, to the flat AC servo motor.
- Three types in outer square size (8C: 50 mm, 11C: 60 mm, 14C: 75 mm) contribute to simplify the equipment structure.
- The thin speed reducer HarmonicDrive® for precision control assures very high torque output compare to a direct drive motor of the same size.
- Three reduction ratio (1/30 ,1/50, 1/80) are available.

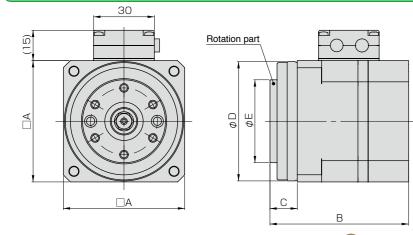Precision control speed reducer (HarmonicDrive® reducer)

Flat AC servo motor

Absolute encoder(17-bit)

Precision high load support cross roller bearing

■ **Max. Torque Mapping**

Model	Mass (kg)						
8C	0.50	1.8 – 4.8					
11C	0.75		4.5 – 11.0				
14C	1.3			9.0 – 28.0			
		0 5 N·m	10 N·m	15 N·m	20 N·m	25 N·m	30 N·m

Specification

	Model	FHA-8C			FHA-11C			FHA-14C		
Item		30	50	100	30	50	100	30	50	100
Recommended Amplifier *1*2*3	A6N series	MADL☐05N☐(All)			MADL☐05N☐(All)			MADL☐05N☐(50,100) MADL☐15N☐(30)		
	A6B series	MADL☐05B☐(All)			MADL☐05B☐(All)			MADL☐05B☐(50,100) MADL☐15B☐(30)		
	A6S series	MADL☐05S☐(All)			MADL☐05S☐(All)			MADL☐05S☐(50,100) MADL☐15S☐(30)		
Maximum Toruqe	N·m	1.8	3.3	4.8	4.5	8.3	11	9	18	28
Maximum Speed	r/min	200	120	60	200	120	60	200	120	60
Maximum Moment Load	N·m	15			40			75		
One-Wayl Positioning Accuracy	arc sec	150	120	120	120	90	90	120	90	90
Mass (without brake)	kg	0.50			0.75			1.3		

The table shows typical output values of actuators.
*1 ■ in the amplifier code indicates the safety function.
　　T : With safety function
　　N : Without safety function
*2 ☐ in the amplifier code indicates driver specification.
　　E : Standard type
　　F : Multi-function type
　　G : Communication type
*3 Numbers in ( ) indicates applicable reduction ratio.

External Dimensions

Rotation part

[Unit: mm]

	Model	FHA-8C	FHA-11C	FHA-14C
Item				
☐A		50	60	75
B		61.8	68.5	78
C		13	13.5	18.5
ΦD		49 h7	59 h7	74 h7
ΦE		33.5 h7	41 h7	52.5 h7

AC Servo Motor
PMA Series

Features

- The hollow shaft design provides the piping/wiring layout on the center of rotation without offsetting the motor.
- The flat structure reduces the size of the device configuration.
- A wide variety of five sizes with the rated output from 163 W to 1320 W has been added to the lineup.
- Integrated brake option is available without dimension change.

Hollow shaft design

Holding brake (option)

Motor shaft material: Stainless Steel

Absolute encoder (17-bit)

Motor flange material: Aluminum

Specification

|	Model	PMAC08	PMAB09	PMAB12	PMAB15	PMAA21A
Item						
Recommended Amplifier *1*2	A6N series	MBDL☐25N☐	MCDL☐35N☐	MDDL☐55N☐	MEDL☐83N☐	MFDL☐B3N☐
	A6B series	MBDL☐25B☐	MCDL☐35B☐	MDDL☐55B☐	MEDL☐83B☐	MFDL☐B3B☐
	A6S series	MBDL☐25S☐	MCDL☐35S☐	MDDL☐55S☐	MEDL☐83S☐	MFDL☐B3S☐
Rated output	W	163	251	406	754	1320
Maximum Toruqe	N·m	1.8	3	7	13	45
Maximum Speed	r/min	6000	5600	4800	4000	3000
Mass (without brake)	kg	1.4	2.0	3.4	5.5	17.5
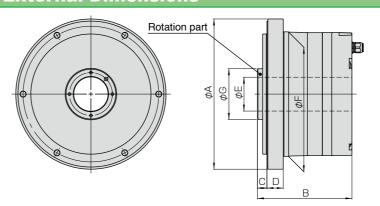
The table shows typical output values of actuators.
*1 ■ in the amplifier code indicates the safety function.
　　T : With safety function
　　N : Without safety function
*2 ☐ in the amplifier code indicates driver specification.
　　E : Standard type
　　F : Multi-function type
　　G : Communication type

External Dimensions

Rotation part

[Unit: mm]

	Model	PMAC08	PMAB09	PMAB12	PMAB15	PMAA21A
Item						
φA		94	114	146	175	247
B		89	88.5	95.5	110	157
C		10	10	10	11	16
D		13	13	15	19	39
φE		16	22	30	40	60
φF		77 h7	94 h7	122 h7	145 h7	210 h7
φG		28 h6	34 h6	43 h6	59 h6	88 h6

Application Sample

URL : http://www.hds.co.jp/english/products/application/

Please refer to the sample and typical applications for the SHA-P Series with Panasonic Servo as shown in the URL above.

Sales area

- Japan　• Global

Language

- Japanese　• English　• Chinese

ACTUATOR

Compact Actuator AF series

AF017N/042N/080N/125N/380N/500N/050C/120C/200C/320C

Features

● **High precision, stiffness, quality**

Integrating Panasonic servo motors with large industrial robot market share Precision Reduction Gear RV
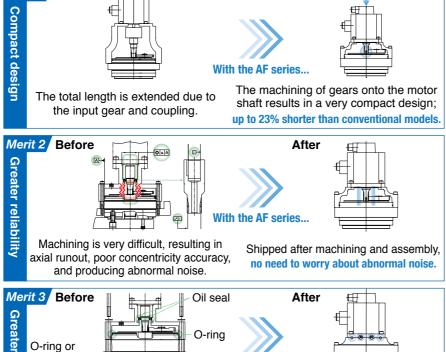
● **Compact**

Compact drive unit is made possible by machining gear directly onto motor shaft

● **High versatility**

Compatible with the MINAS-A5/A6 family of standard servo drivers

Solid type
AF-N

Hollow shaft type
AF-C

Merit 1 | Before | After
Compact design

The total length is extended due to the input gear and coupling.

The machining of gears onto the motor shaft results in a very compact design; **up to 23% shorter than conventional models.**

With the AF series...

Merit 2 | Before | After
Greater reliability

Machining is very difficult, resulting in axial runout, poor concentricity accuracy, and producing abnormal noise.

Shipped after machining and assembly, **no need to worry about abnormal noise.**

With the AF series...

Merit 3 | Before | After
Greater quality

O-ring or liquid sealant

Oil seal
O-ring

Greaseing can be troublesome, If seals are forgotten, grease can leak

Already contains grease; **no need to worry about leaking.**

With the AF series...

Specification

● Motor series: MINAS A6

Item	Model		Solid type				
		AF017N	AF042N		AF080N	AF125N	AF500N
Actuator							
Motor model		MHMF042	MDMF102	MDMF102	MDMF152	MDMF202	MHMF302	MDMF402
Motor rated capacity	kW	0.4	1.0	1.0	1.5	2.0	3.0	4.0
Speed ratio		81	126	126	126	129	102.18 (1737/17)	252.33 (757/3)
Rated torque	Nm	82 *2	415	481	722	986	1169	3856
Momentary max. torque	Nm	289	415	1029	1029	1960	3062	11567
Rated ouput speed	min⁻¹	37.0	15.9	15.9	15.9	15.5	19.6	7.9
Momentary max. speed	min⁻¹	80.2	31.7	31.7	31.7	31.0	39.1	15.1
Allowable load inertia moment	kgm²	11	117	117	164	221	473	3311
Backlash	arc.min.	≦ 1	≦ 1	≦ 1	≦ 1	≦ 1	≦ 1	≦ 1
Motor brake		With / Without	With	With	With	With	With	With
Allowable moment	Nm	784	784	1660	1660	2150	3430	11000
mass	kg	7.2/6.8	15	16	17	26	39.7	91.1
Motor torque limit *1	%	350	86	214	142	198	261	300
Compatible servo driver								
A6SE : Basic type		MBDLN25SE***	MDDLN45SE***	MDDLN45SE***	MDDLN55SE***	MEDLN83SE***	MFDLNA3SE***	MFDLNB3SE***
A6SG : RS485 communication type		MBDLN25SG***	MDDLN45SG***	MDDLN45SG***	MDDLN55SG***	MEDLN83SG***	MFDLNA3SG***	MFDLNB3SG***
A6SF : Multifunction type		MBDLT25SF***	MDDLT45SF***	MDDLT45SF***	MDDLT55SF***	MEDLT83SF***	MFDLTA3SF***	MFDLTB3SF***
A6NE : RTEX network standard type		MBDLN25NE***	MDDLN45NE***	MDDLN45NE***	MDDLN55NE***	MEDLN83NE***	MFDLNA3NE***	MFDLNB3NE***
A6NF : RTEX network multi function		MBDLT25NF***	MDDLT45NF***	MDDLT45NF***	MDDLT55NF***	MEDLT83NF***	MFDLTA3NF***	MFDLTB3NF***
A6BE : EtherCAT network standard type		MBDLN25BE***	MDDLN45BE***	MDDLN45BE***	MDDLN55BE***	MEDLN83BE***	MFDLNA3BE***	MFDLNB3BE***
A6BF : EtherCAT network multi function		MBDLT25BF***	MDDLT45BF***	MDDLT45BF***	MDDLT55BF***	MEDLT83BF***	MFDLTA3BF***	MFDLNB3BF***

*1 Set the torque limit of the servo amplifier so that the torques does not exceed the momentary maximum torque of the compact actuator.
*2 Value calculated from the rated torque of the motor where the ambient temperature is 20 ºC. When the ambient temperature is 40 ºC, the torque will be 75 % of the rated torque.

Specification

● Motor series: MINAS A6

Item	Model	Hollow shaft type		
		AF050C	AF120C	AF320C
Actuator				
Motor model		MDMF102	MDMF202	MHMF502
Motor rated capacity	kW	1.0	2.0	5.0
Speed ratio		120.47(2289/19)	120	157
Rated torque	Nm	460	917	3002
Momentary max. torque	Nm	1225	2746	7840
Rated ouput speed	min⁻¹	16.6	16.7	12.7
Momentary max. speed	min⁻¹	33.2	33.3	22.3
Allowable load inertia moment	kgm²	84	158	1763
Backlash	arc.min.	≦ 1	≦ 1	≦ 1
Motor brake		Without	Without	With
Allowable moment	Nm	1764	3920	20580
mass	kg	32	43	164
Motor torque limit *1	%	266	299	261
Compatible servo driver				
A6SE : Basic type		MDDLN45SE***	MEDLN83SE***	MFDLNB3SE***
A6SG : RS485 communication type		MDDLN45SG***	MEDLN83SG***	MFDLNB3SG***
A6SF : Multifunction type		MDDLT45SF***	MEDLT83SF***	MFDLTB3SF***
A6NE : RTEX network standard type		MDDLN45NE***	MEDLN83NE***	MFDLNB3NE***
A6NF : RTEX network multi function		MDDLT45NF***	MEDLT83NF***	MFDLTB3NF***
A6BE : EtherCAT network standard type		MDDLN45BE***	MEDLN83BE***	MFDLNB3BE***
A6BF : EtherCAT network multi function		MDDLT45BF***	MEDLT83BF***	MFDLTB3BF***

*1 Set the torque limit of the servo amplifier so that the torques does not exceed the momentary maximum torque of the compact actuator.

● Motor series: MINAS A5

Item	Model	Solid type				Hollow shaft type	
		AF042N	AF125N	AF380N	AF500N	AF200C	AF320C
Actuator							
Motor model		MDME102SC	MHME302SC	MDME402SC	MDME402SC	MDME302SC	MDME502SC
Motor rated capacity	kW	1.0	3.0	4.0	4.0	3.0	5.0
Speed ratio		93	102.18 (1737/17)	217.86 (1525/7)	252.33 (757/3)	155.96	157
Rated torque	Nm	355	1169	3329	3856	1784	3002
Momentary max. torque	Nm	1029	3062	9310	11567	4900	7840
Rated ouput speed	min⁻¹	21.5	19.6	9.2	7.9	12.8	12.7
Momentary max. speed	min⁻¹	32.3	29.4	13.8	11.9	19.2	19.1
Allowable load inertia moment	kgm²	51	371	2026	2713	303	1216
Backlash	arc.min.	≦ 1	≦ 1	≦ 1	≦ 1	≦ 1	≦ 1
Motor brake		With	With	With	With	With	With
Allowable moment	Nm	1660	3430	7050	11000	8820	20580
mass	kg	17	40	77	93	116	163
Motor torque limit *1	%	289	261	279	300	274	261
Compatible servo driver							
A5Ⅱ : Analog / pulse		MDDKT3530***	MFDKTA390***	MFDKTB3A2***	MFDKTB3A2***	MFDKTA390***	MFDKTB3A2***
A5ⅡN : RTEX network		MDDHT3530ND1	MFDHTA390ND1	MFDHTB3A2ND1	MFDHTB3A2ND1	MFDHTA390ND1	MFDHTB3A2ND1
A5A : RS485 AE link network		MDDHT3530A**	MFDHTA390A**	MFDHTB3A2A**	MFDHTB3A2A**	MFDHTA390A**	MFDHTB3A2A**
A5B : EtherCAT network		MDDHT3530BD1	MFDHTA390BD1	MFDHTB3A2BD1	MFDHTB3A2BD1	MFDHTA390BD1	MFDHTB3A2BD1

*1 Set the torque limit of the servo amplifier so that the torques does not exceed the momentary maximum torque of the compact actuator.

Application Sample

Pick & Place Robot | **Positioner** | **Gantry Robot** | **Index Table**

Sales area

• Japan   • All over the world

Language

• Japanese   • Chinese   • English

For more information

ACTUATOR

Actuator

Precision Positioning Stage

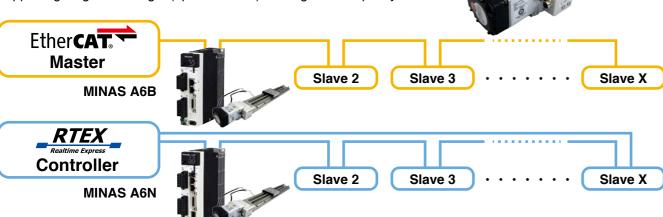## PG Series / KX Series / KXS Series.

Features

- Combine MINAS A6 family (EtherCAT/RTEX supported) with Precision Positioning Stages.
- Ideal for automation process which requires high precision.
- Compact, high rigidity, broad range of travel length selection, weight multiplication accuracy ±0.5 μm.
- Supporting long travel length (up to 500 mm) and high load capacity.

EtherCAT® Master

MINAS A6B

Slave 2 — Slave 3 — ······· — Slave X

RTEX Realtime Express Controller

MINAS A6N

Slave 2 — Slave 3 — ······· — Slave X

Specification

● PG Series

Compact

High Rigidity

Item		Description
Travel length		13 / 15 / 30 / 50 mm
Table size		40×40 mm ~ 70×110 mm
Ball screw	Shaft diameter	φ6 mm
	Lead	1 mm
Main materials		Stainless
Finishing		Electroless nickel plating
Resolution (Pulse)		23 bit encoder (8388608 P/R)
Accuracy	Uni-directional positioning accuracy	6 μm/13 mm ~ 12 μm/50 mm
	Repeatablity	±0.5 μm
	Max Speed	50 mm/sec
	Load capacity	10 kgf (98 N)

(Note) Accuracy specifications are for reference only.

● KXL Series

Broad Selection

High Rigidity

Item		Description	
Travel length		30/50/75/100/150/200/300 mm	
Table size		60×60 mm	
Ball screw	Shaft diameter	φ6 mm	
	Lead	1 mm (TL: 30 mm ~ 75 mm)	2 mm (TL: 30 mm ~ 300 mm)
Main materials		Stainless	
Finishing		Electroless nickel plating	
Resolution (Pulse)		23 bit encoder (8388608 P/R)	
Cover		Covered / Uncovered	
Accuracy	Uni-directional positioning accuracy	5 μm/30 mm ~ 25 μm/300 mm	
	Repeatablity	±0.5 μm	
	Max Speed	50 mm/sec	100 mm/sec
	Load capacity	12 kgf (117.6 N)	

(Note) Accuracy specifications are for reference only.

● KXS Series

Long stroke

High load capacity

Item		Description	
Travel length		100/200/300/400/500 mm	
Table size		180×180 mm	
Ball screw	Shaft diameter	φ15 mm	
	Lead	5 mm	10 mm
Main materials		Aluminum	
Finishing		Anodic oxide coating	
Resolution (Pulse)		23 bit encoder (8388608 P/R)	
Cover		Covered / Uncovered	
Accuracy	Uni-directional positioning accuracy	5 μm/100 mm ~ 40 μm/500 mm	
	Repeatablity	±1 μm	
	Max Speed	200 mm/sec	400 mm/sec
	Load capacity	30 kgf (294 N)	

(Note) Accuracy specifications are for reference only.

【Applicable drive / motor type】 A6 family Drive：M＊DL＊＊＊＊＊   Motor：M＊MF＊＊＊L＊＊＊
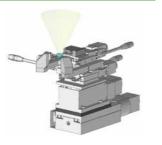Please contact the following address for the details of the combination.
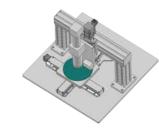
Application Sample

Lens alignment device **XY Stage for microscope** **Wafer inspection unit** **Glass substrate evaluation unit**

XY-axis custom **XYZ-axis custom** **6-axis custom** **High rigidity 6-axis custom**

In addition to standard catalog products, we provide custom made stage products according to your requirement. Please feel free to contact us for details.

Sales area

- Japan
- United States of America
- China
- Korea
- Taiwan

Language

- English
- Japanese
- Chinese
- Korean

For more information

URL: https://eng.surugaseiki.com/

ACTUATOR

IoT Solution

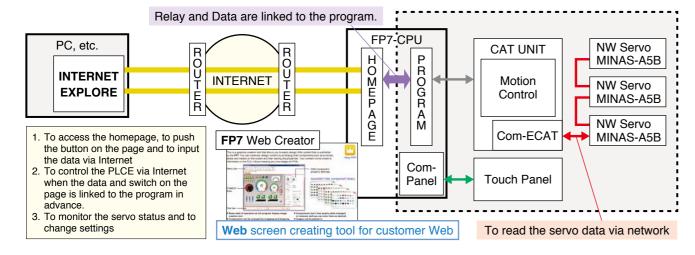## A6 series + FP7, FP0R, FP-XH, FP0H

① Remote monitoring & control System by WebServer and E-Mail function

Solutions

- Remote monitoring not to go the site
- Quick check of machine abnormal condition
- Not sure when trouble occurs in any time
- Remote trouble shooting when trouble occurs after installation at factory
- To collect the data or change parameters when the person cannot touch or reach the machine directly
- Need a guide message for each predetermined period of time in order to judge the exchange timing

FP7 EtherCAT UNIT + (EtherCAT)
A6B SERVO (Max64axes)

100 Mbps CP/PTP

INTERNET

WebServer + High-Performance System

System Configuration

Relay and Data are linked to the program.

PC, etc.

INTERNET EXPLORE

ROUTER INTERNET ROUTER

FP7-CPU
HOMEPAGE
PROGRAM

CAT UNIT
Motion Control
Com-ECAT

NW Servo MINAS-A5B
NW Servo MINAS-A5B
NW Servo MINAS-A5B

Com-Panel   Touch Panel

1. To access the homepage, to push the button on the page and to input the data via Internet
2. To control the PLCE via Internet when the data and switch on the page is linked to the program in advance.
3. To monitor the servo status and to change settings

FP7 Web Creator

Web screen creating tool for customer Web

To read the servo data via network

Another Proposals

FP7 RS485 UNIT + (Modbus-RTU)
A6 SERVO (Max31axes)

115 kbps/PTP
(5 to 6-axis)

WebServer + Low COST System

FP7 RS485/232 UNIT
+ (Serial Communication)
for current equipment
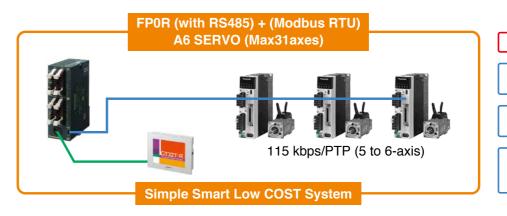
WebServer Low COST Version UP

② Simple Smart Modbus SYSTEM: FP0R(RS485) + A6 SERVO

Solutions

- Less wiring
- To control a trouble by the data of load ratio and torque and so on
- To save the cost of positioning unit
- Improve the roughness of input pulse resolution due to the restriction of command pulse output frequency

FP0R (with RS485) + (Modbus RTU)
A6 SERVO (Max31axes)

115 kbps/PTP (5 to 6-axis)

Simple Smart Low COST System

Easy Support

Quick Start Sample Program for FP0R

Quick Start Sample parameters for A6 series

Option cable for Modbus communication: DV0PM24610

③ High-COST Performance SYSTEM: FPΣ + RTEX UNIT + A6N SERVO
FP2SH + RTEX UNIT + A6N SERVO

Solutions

- To realize the reasonable high speed synchronized operation
- Less wiring
- To read a real time data of load ration and torque value
- To write and change the servo parameters

FPΣ RTEX UNIT + (RTEX)
A6N SERVO (Max8axes/1unit)

100 Mbps CP/PTP

FPΣ RTEX High-Performance System

FP2SH RTEX UNIT + (RTEX)
A6N SERVO (Max8axes/1unit)

100 Mbps CP/PTP

FP2SH RTEX High-Performance System