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MA Catalog EN
Vol. MA 4.07.07

Machine Automation

Motion Total Solution

EtherCAT®
Remote Motion Solutions

PC-Based Motion Control Cards

PAC & Motion Module Solutions

Ethernet Remote Motion Solutions

CANopen Remote Motion Solutions

Serial Communication Remote Motion Solutions

Motionnet Remote Motion Solutions

MA

Table of Contents

Overview

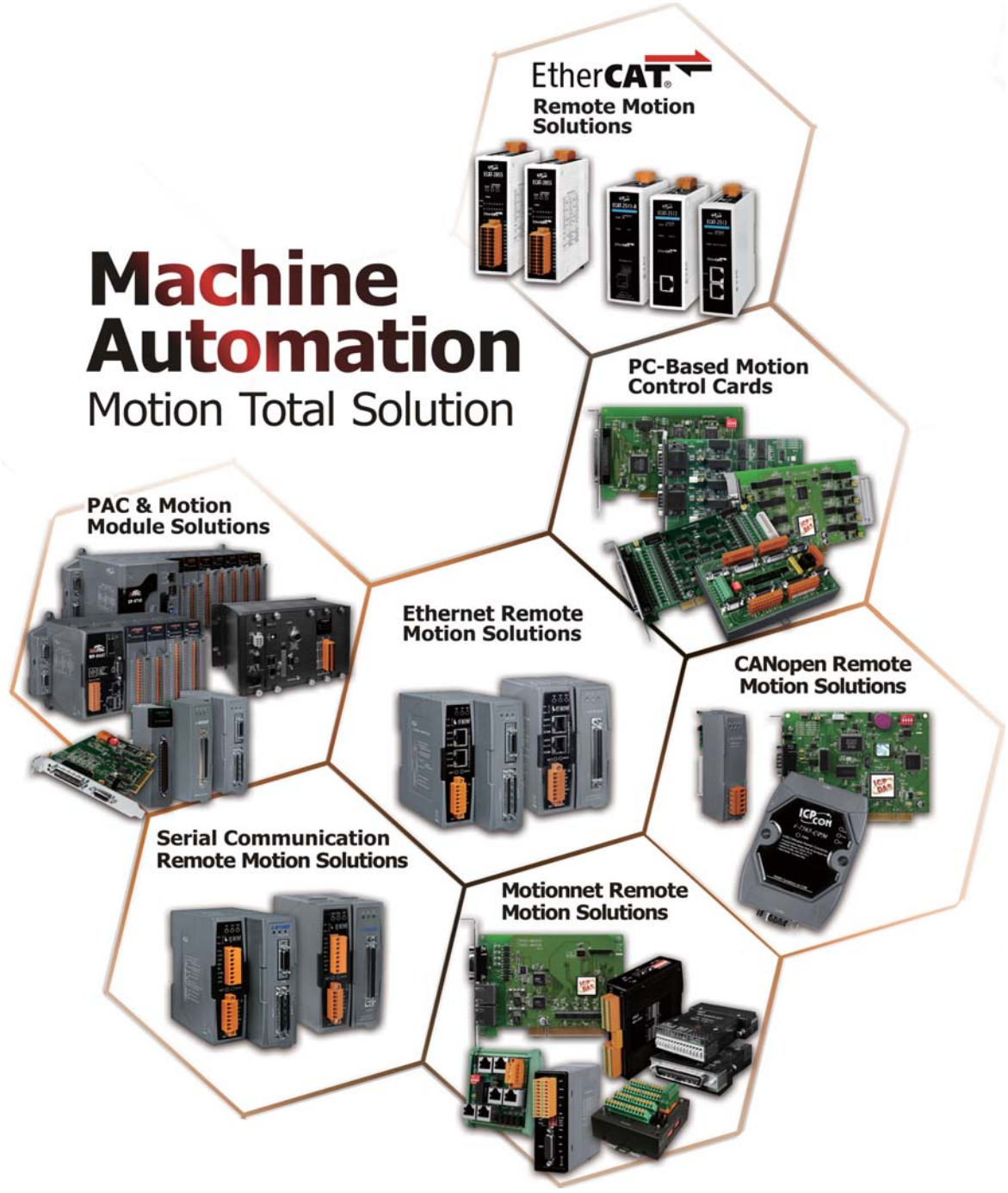
1. Overview

1. Overview

Total Solutions for Machine Automation

Total Solutions

As a leading automation solutions provider, ICP DAS provides a wide range of motion solutions for machine automation systems, including **PAC solutions** that using Motion modules on the standard PAC or ISaGRAF XPAC products based on a variety of development software such as VC, C#, VB .NET or ISaGRAF for PAC motion control systems, **PC-based solutions** developed using PCI/ISA bus motion control products for PC-based motion control systems, and **Remote motion solutions** using Ethernet, Serial Communication, Motionnet, EtherCAT or CANopen motion control products for remote motion control systems.



• PAC Solutions

As a leading automation solutions provider, ICP DAS provides a wide range of motion solutions for machine automation systems, including PAC solutions that using motion control modules based on the PAC products. There is a variety of development software such as VC, C#, VB .NET or ISaGRAF supporting the PAC Solutions that apply to the PAC motion control systems.

1. Standard PAC Motion Control Solutions

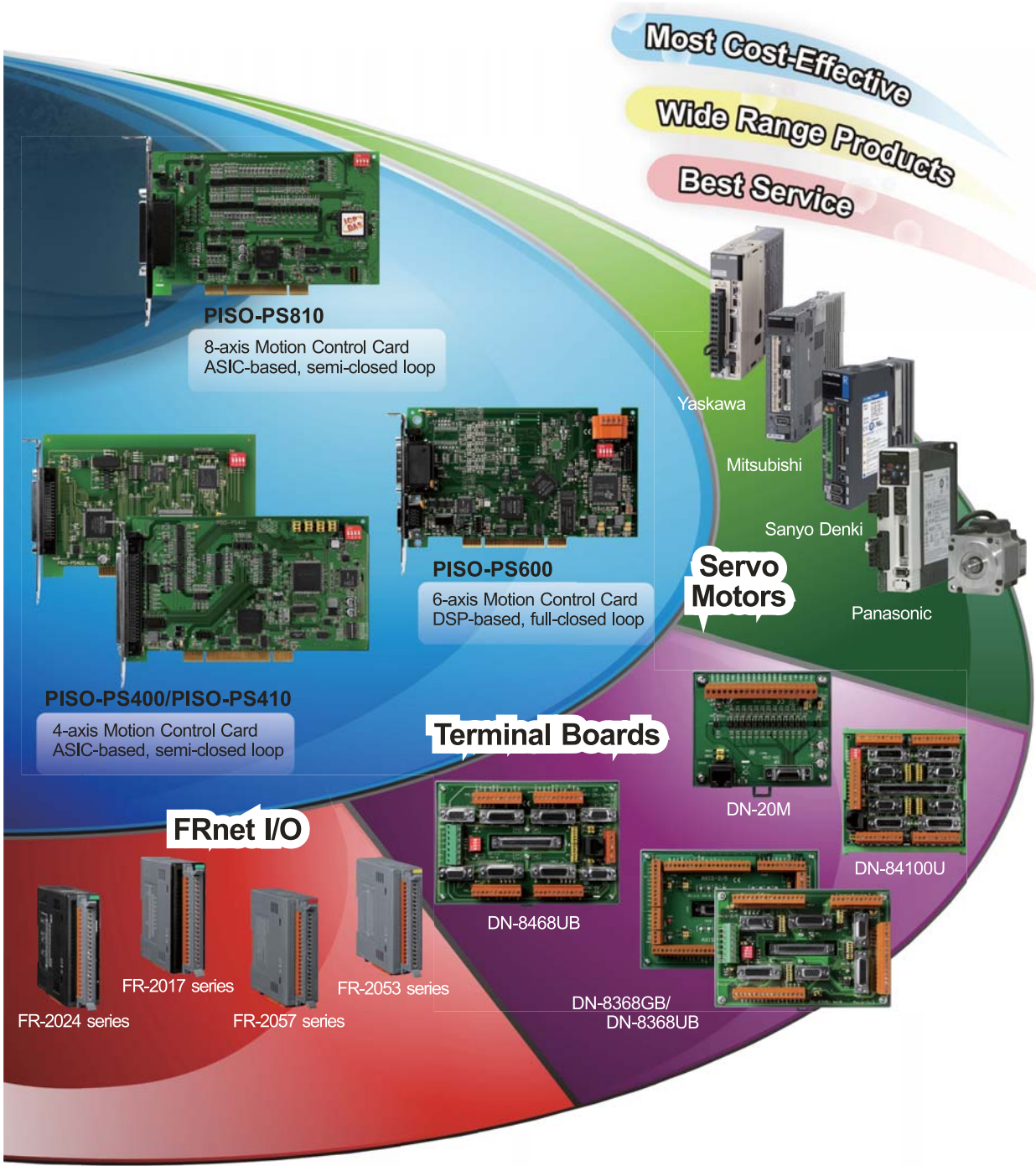
As a pioneer of PAC, ICP DAS provides a powerful PAC motion control solution - Standard PAC Motion Control Solution. This solution uses motion control modules based on the powerful standard PAC products. There is a variety of development software such as VC, C#, VB .NET supporting the PAC Solutions that apply to the PAC motion control systems.

2. ISaGRAF XPAC Motion Control Solutions

The ISaGRAF XPAC Motion Control Solution. Integrating with the ISaGRAF development software for SoftLogic control and the HMI software for web page design, the XPAC series plus the I-8094F/8094/8092F motion control solution allows users to easily design and implement a professional and user-friendly system with effective integration of motion controls, logic controls and I/O device controls.

PC-based Solutions

As a leading automation solutions provider, ICP DAS not only provides PAC motion control modules for use with our own PAC systems, but also develops a wide range of PCI bus and ISA bus motion control products for PC-based control systems.

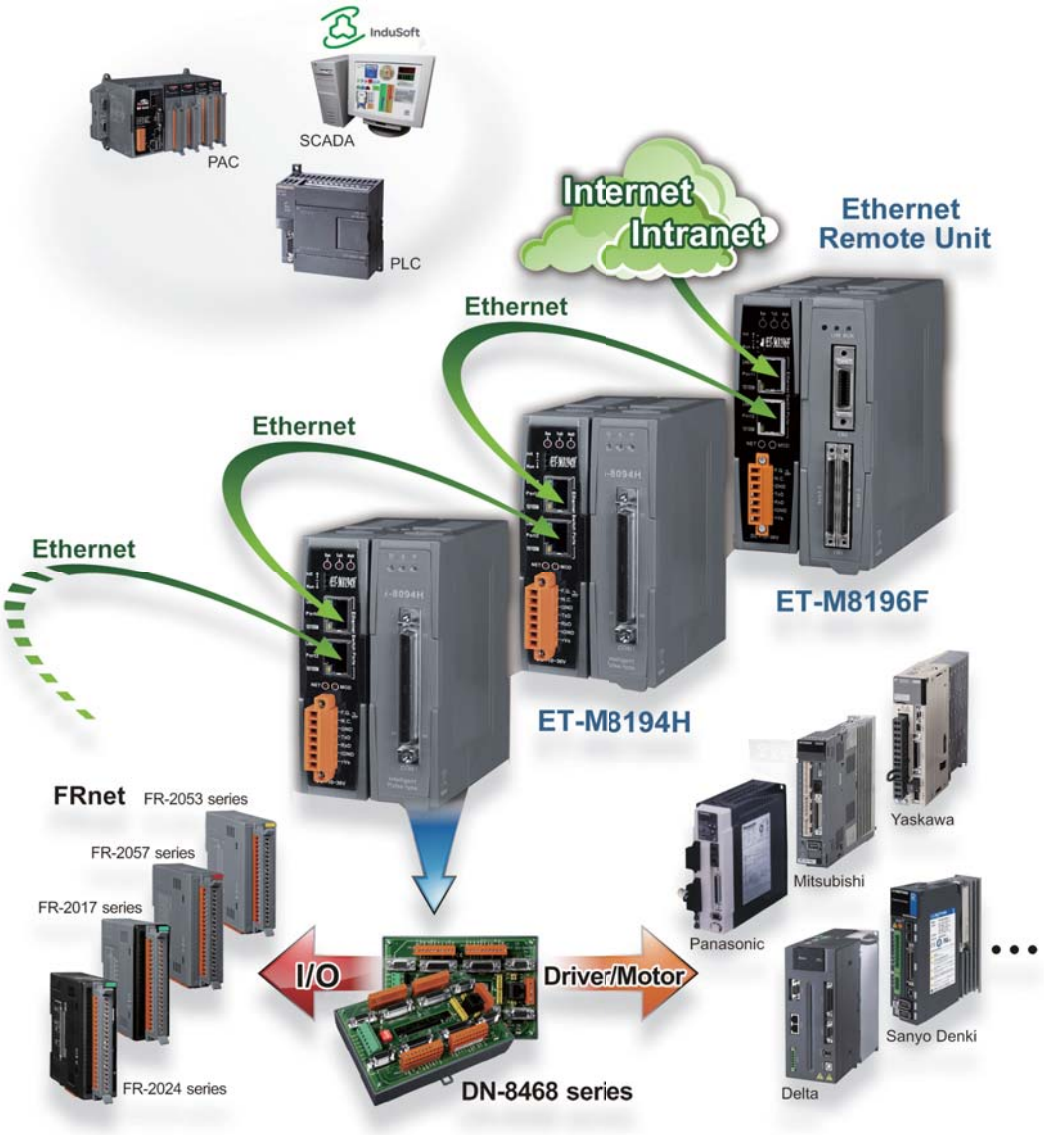


• Remote Motion Solutions

ICP DAS provides a range of remote motion control solutions that allows motion control anywhere at any time.

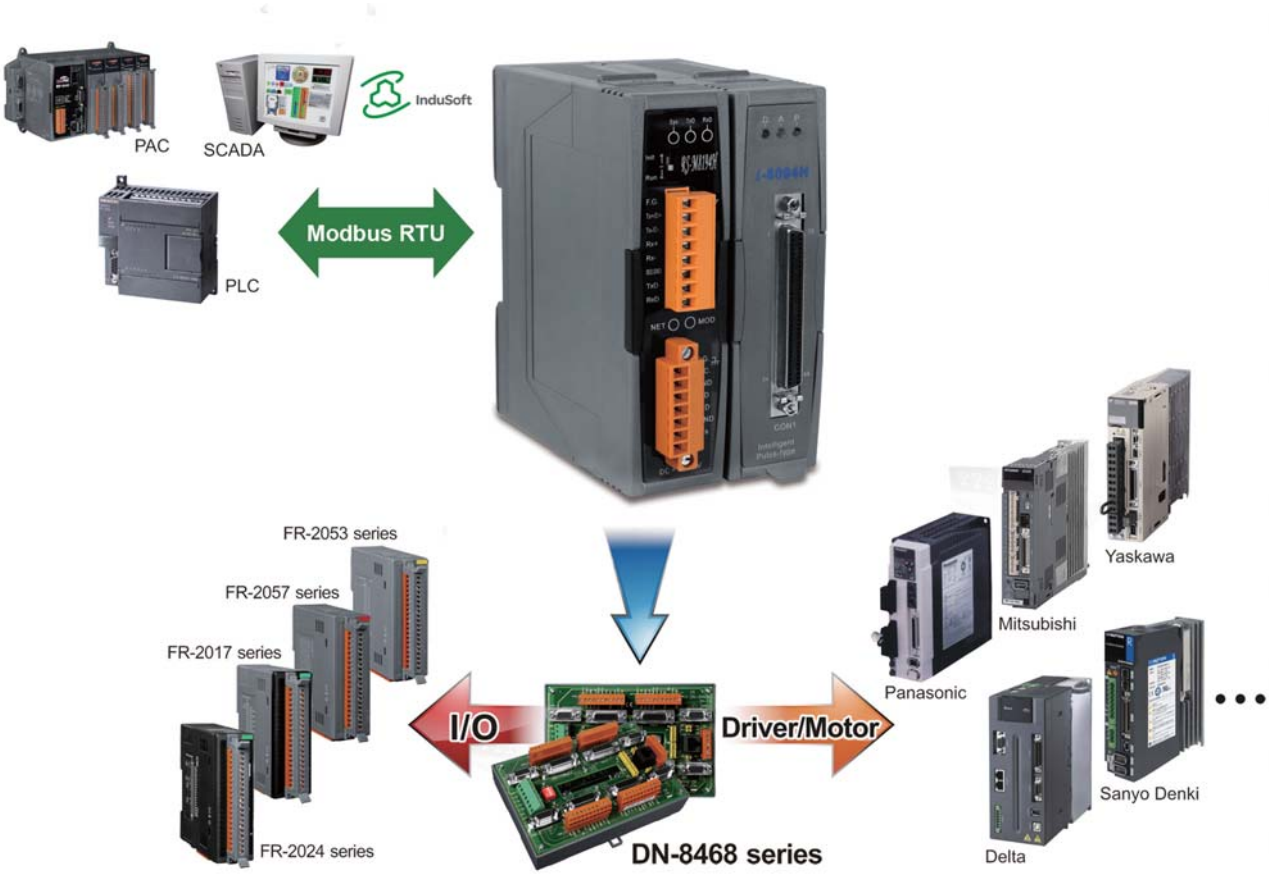
1. Ethernet Remote Motion Solutions

Ethernet Motion Control Unit provides the Ethernet motion solution for customers. It can be configured and control via an Ethernet port with Modbus TCP capability. Any PC, PLC or SCADA system which has an Ethernet port running Modbus TCP protocol can control one or several Ethernet Motion Control Units to do complex motion.



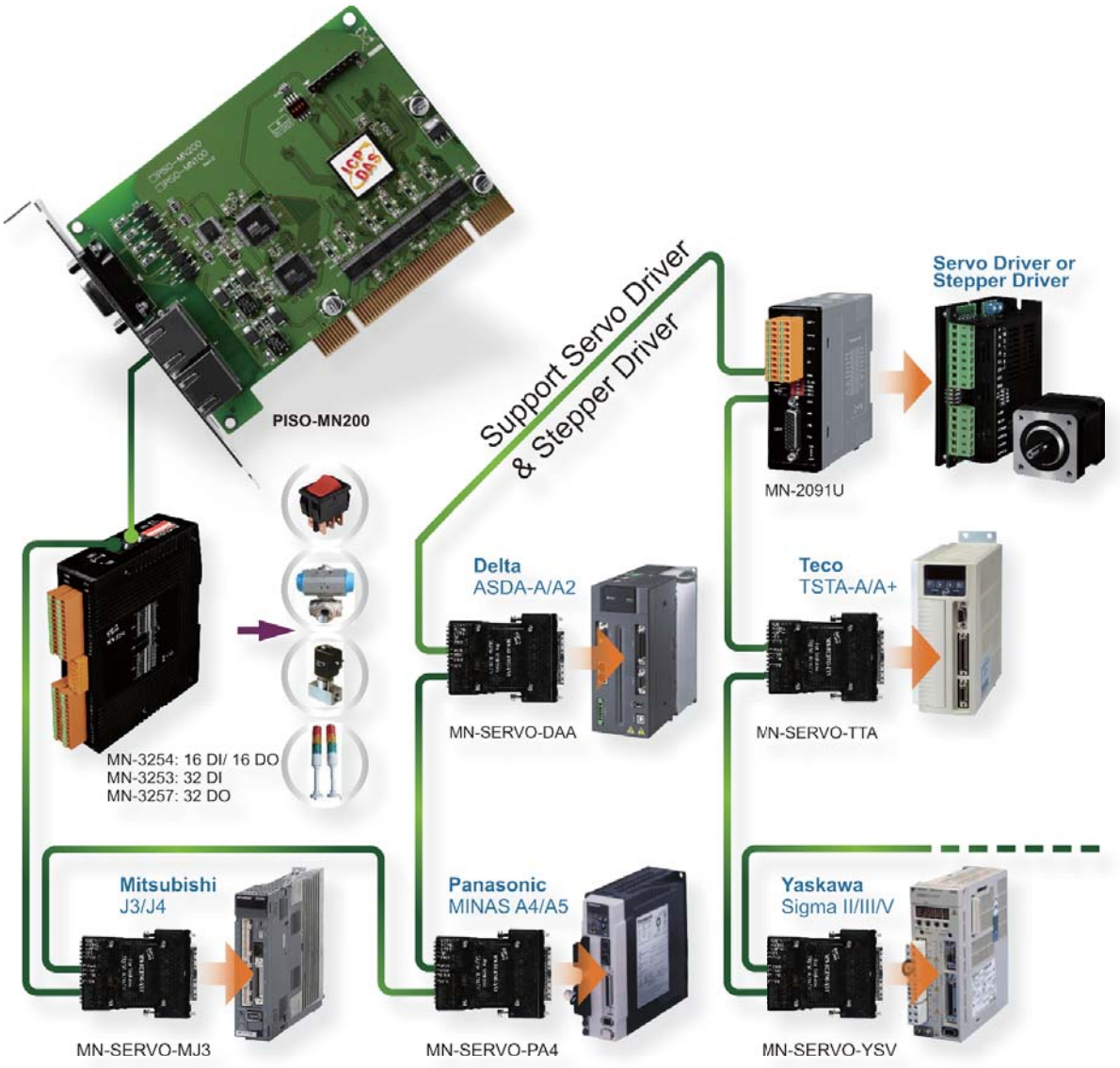
2. Serial Communication Remote Motion Solutions

There are a lot of controllers on the working field which need to add functions or enhance their performance for new requirements, such as providing powerful motion functions. In general, these controllers already have one or several serial ports with Modbus RTU capability. Via an RS-232 or RS-422 or RS-485 port, the RS-M8194H is capable for providing motion functions.



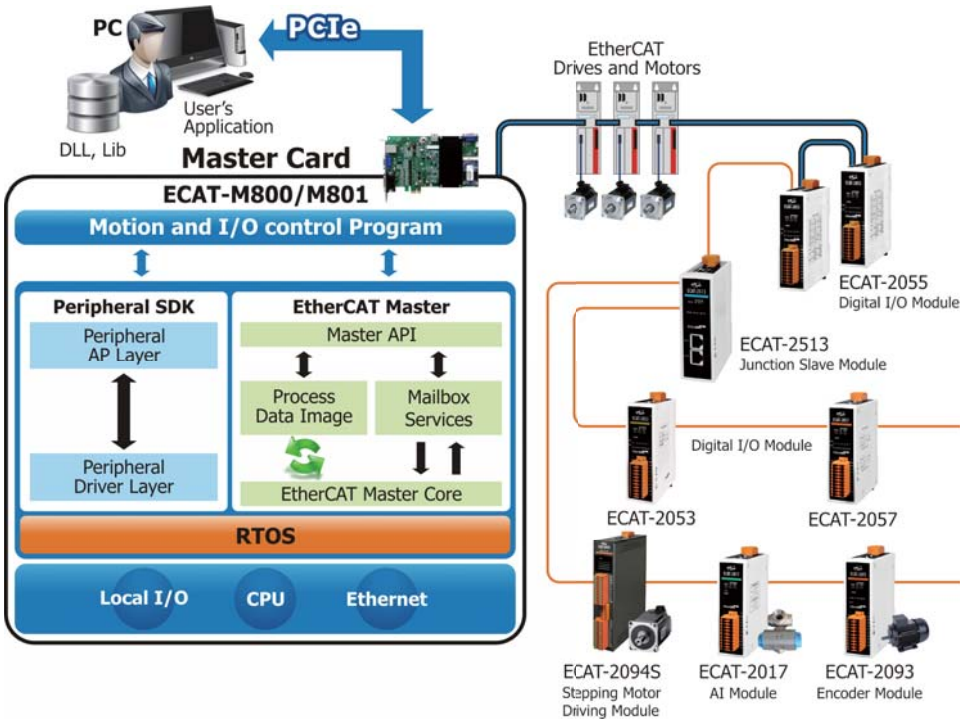
3. Motionnet Remote Motion Solutions

The **Motionnet motion solutions** provide a high-speed serial communication system that operates with either a Servo motor or a Stepping motor. Motionnet communication is based on a proprietary RS-485 technology (Multi-drop, Half-duplex) that allows considerable savings in wiring requirements, provides effective long-distance high-speed communication.



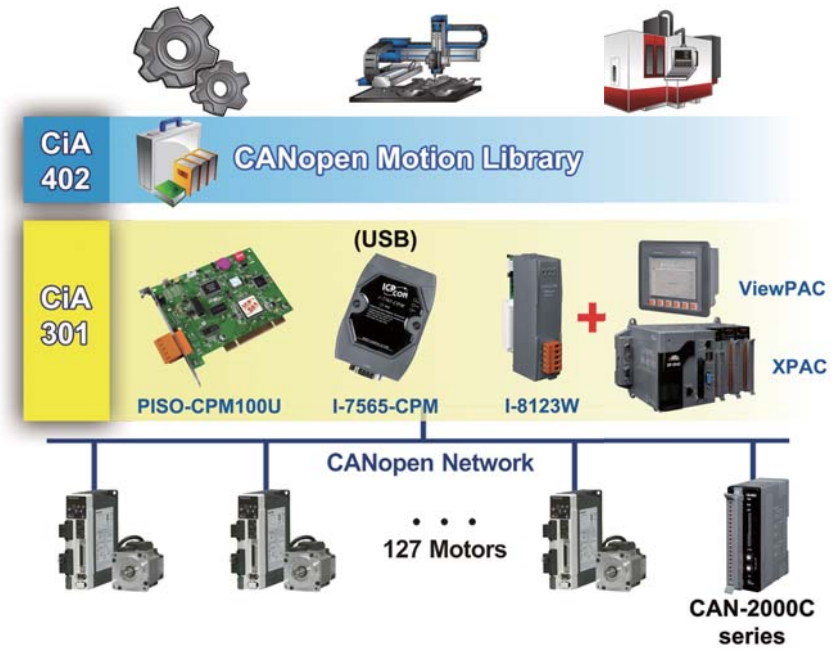
4. EtherCAT Remote Motion Solutions

The **EtherCAT** (Ethernet for Control Automation Technology) **motion solution** is an open, high-performance fieldbus system that makes Ethernet technologies available at the I/O level. EtherCAT provides flexible wiring, fast communication and many other nice features.



5. CANopen Remote Motion Solutions

The **CANopen motion solutions** integrate a motion control system with a CANopen network using the CANopen Master devices. Users are able to control CANopen motors and remote I/O devices located on the same network, making wiring connections and control both easy and more efficient.



PAC Solutions

2. PAC Solutions

PAC Solutions - Motion Modules

Introductions

As a leading automation solutions provider, ICP DAS provides a wide range of motion solutions for machine automation systems, including PAC solutions that using motion control modules based on the PAC products. There is a variety of development software such as VC, C#, VB .NET or ISaGRAF supporting the PAC Solutions that apply to the PAC motion control systems.

- Standard PAC Motion Control Solutions
- ISaGRAF XPAC Motion Control Solutions
- Motion Modules for PAC

2.1 Standard PAC Motion Solutions

As a pioneer of PAC, ICP DAS provides a powerful PAC motion control solution - Standard PAC Motion Control Solution. This solution uses motion control modules based on the powerful standard PAC products. There is a variety of development software such as VC, C#, VB .NET supporting the PAC Solutions that apply to the PAC motion control systems.

Standard PAC : XP-9000/WP-9000 Series

XP-9000 and WP-9000 Series		OS	CPU	Flash	SDRAM	VGA Resolution	Ethernet	Serial	I/O Slot
XP-9171-WES7		WES7	E3827 1.75 GHz dual core	32 GB	DDR3 x 2 GB	1280 x 1024 to 1920 x 1080 (16:9); 640 x 480 to 1024 x 768 (4:3)	2	4	1
XP-9371-WES7									3
XP-9771-WES7									7
XP-9181-WES7		WES7	E3845 1.91 GHz quad core	32 GB	DDR3 x 4 GB	1280 x 1024 to 1920 x 1080 (16:9); 640 x 480 to 1024 x 768 (4:3)	2	4	1
XP-9381-WES7									3
XP-9781-WES7									7
WP-9221-CE7		CE 7.0	Cortex-A8, 1.0 GHz	256 MB	DDR3 x 512 MB	1024 x 768	2	4	2
WP-9421-CE7									4
WP-9821-CE7									8

Standard PAC : XPAC-8000 Series

XP-8000 Series XPAC		OS	CPU	Flash	SDRAM	VGA Resolution	Ethernet	Serial	I/O Slot
XP-8031-WES7		WES7	x86 CPU, 1 GHZ, dual-core	32 GB	DDR3 x 2 GB	1600 x 1200	2	4	0
XP-8131-WES7									1
XP-8331-WES7									3
XP-8731-WES7									7
XP-8031-CE6		CE 6.0	x86 CPU, 1 GHZ, dual-core	32 GB	DDR3 x 2 MB	1024 x 768			0
XP-8131-CE6									1
XP-8331-CE6									3
XP-8731-CE6									7

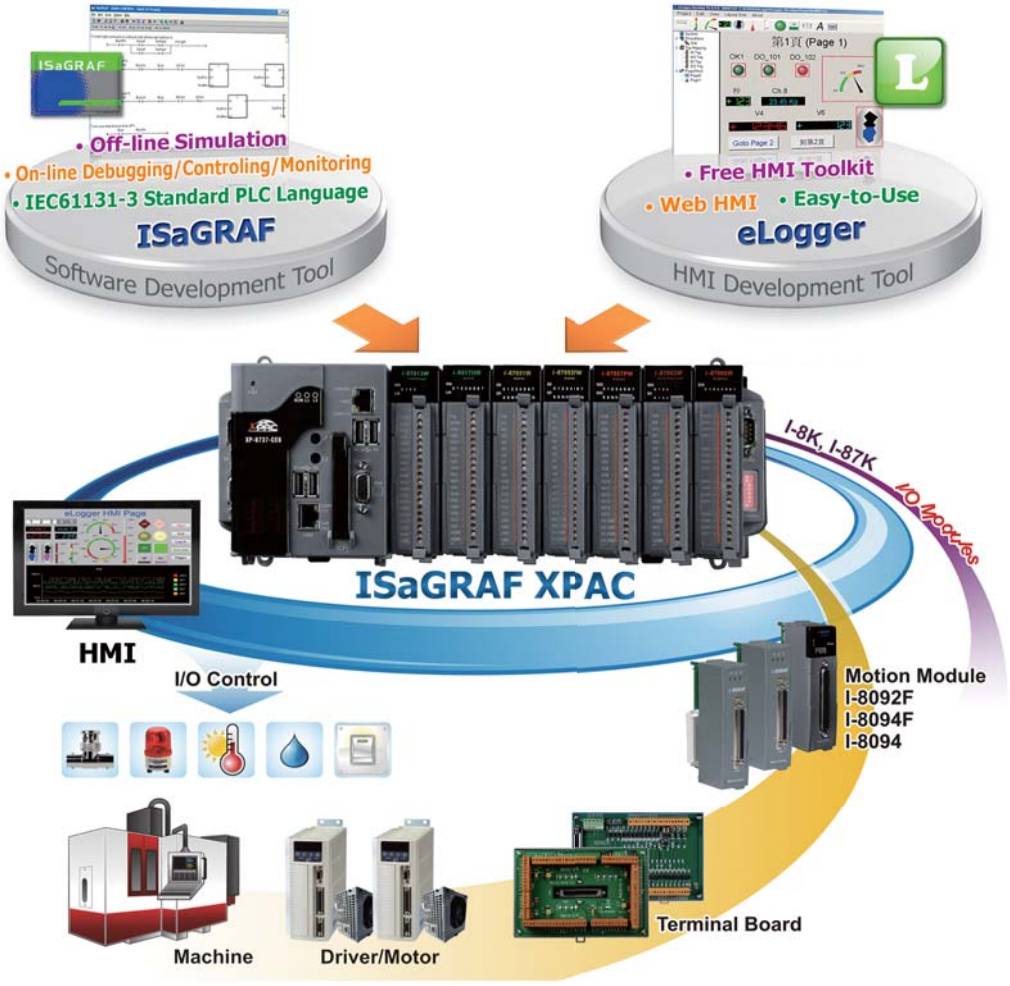
Standard PAC : WinPAC-8000 Series

WP-8000 Series WinPAC		OS	CPU	Flash	SDRAM	VGA Resolution	Ethernet	Serial	I/O Slot
WP-8121-CE7		CE 7.0	Cortex-A8, 1.0 GHz	512 MB DDR3	512 MB DDR3	1024 x 768	2	2	1
WP-8421-CE7								4	4
WP-8821-CE7									8

Standard PAC : iPAC Series

iP-8000 Series iPAC		OS	CPU	Flash	SRAM	Expansion Memory	Ethernet	Serial	I/O Slot
iP-8411		MiniOS7	80186, 80 MHz	512 KB	512 KB	microSD	-	4	4
iP-8811									8
iP-8441					768 KB	microSD	2		4
iP-8841									8
iP-8441-FD						microSD + 256 MB NAND Flash			4
iP-8841-FD									8

2.2 ISaGRAF XPAC Motion Solutions



Introduction

As a pioneer of PAC, ICP DAS provides a new PAC motion control solution - ISaGRAF + XPAC Motion Control Solution. Integrating with the ISaGRAF development software and the eLogger HMI, the XPAC series plus the I-8094F/8094/8092F motion control solution allows users to easily design and implement a professional and user-friendly system with effective integration of motion controls, logic controls and I/O device controls.

Features

- ISaGRAF provides IEC 61131-3 standard PLC open Syntax: Motion control design is easy and professional.
- Using XPAC-CE6 is more effective than using PLC: Using XPAC-CE6 for motion control is more effective when integrating motion controls, logic controls and I/O controls.
- Support free eLogger HMI Software: The control logic via ISaGRAF & the HMI Screen via eLogger.

Motion Functions

- Independent 4-axis motion control
- Support manual pulse generator and jog functions
- 2/3-axis linear interpolation function
- 2-axis circular interpolation function
- Programmable T/S-curve acceleration and deceleration
- A maximum pulse output rate of 4M pps for each axis
- Pulse Output Types: CW/CCW or PULSE/DIR
- 32-bit encoder counter for each axis
- Encoder pulse input types: A/B phase or Up/Down
- Programmable automatic homing for each axis
- Position comparison management and software limits
- Expandable remote I/O: 128 DI and 128 DO via a two-wire FRnet interface
- Require low CPU loading for motion function processing
- Multiple motion modules can be used with a single XPAC-CE6 and the status of other I/O devices can be monitored at the same time

Development Software - Control SoftLogic

The SoftLogic Solution: ISaGRAF

ISaGRAF is the most powerful SoftLogic package on the market. ISaGRAF is a PLC-like software running on Windows 95, 98, NT 2000, XP, Vista and Windows7. It supports IEC 61131-3 standard PLC programming languages - Quick Ladder (LD), Function Block Diagram (FBD), Sequential Function Chart (SFC), Structured Text (ST), Instruction List (IL) plus Flow Chart (FC) and can run the application generated by the workbench on any ISaGRAF PACs. Additionally, for the ultimate in power and flexibility, ISaGRAF supports off-line simulation, on-line debugging, monitoring and control.

ISaGRAF Workbench Features:

- Support IEC 61131-3 Standard Open PLC Languages (1~5) + Flow Chart (FC):
  1. Quick Ladder (LD)
  2. Function Block Diagram (FBD)
  3. Sequential Function Chart (SFC)
  4. Structured Text (ST)
  5. Instruction List (IL)
  6. Flow Chart (FC)
- Online debugging/control/monitoring
- Offline simulation
- Online change (For ISaGRAF WinCE series only)
- Spotlight: Simple graphic HMI
- Auto-scan I/O
- Lock & unlock I/O
- Uploading the program in the PAC

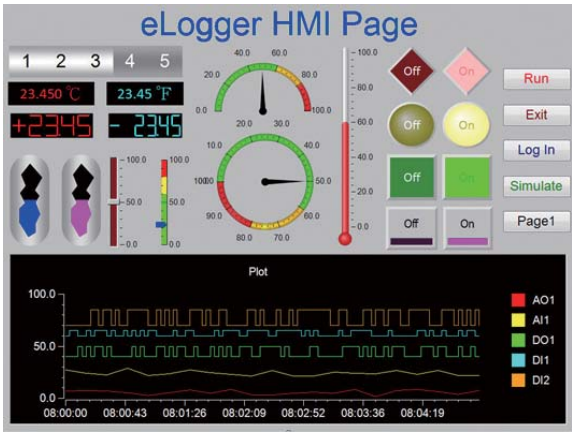
ISaGRAF Solution Features:

- Support eLogger HMI
  - A free HMI software on the WinPAC, XPAC and ViewPAC
  - An easy and useful HMI development tool
- Modbus Master Protocol - RTU, ASCII, RS-232/485/422, TCP Master
- Modbus Slave Protocol - RTU (RS-232/485/422), TCP/IP Slave
- Data-Recorder & Data-Logger
- Data Exchange - Ebus (via Ethernet), Fbus (via RS-485), PAC to PAC
- CAN/CANopen - Via I-7530 to connect CAN/CANopen devices, ex. meters...
- FRnet I/O
- Motion Control: For controlling servo motors (P-command)
- PAC can send e-mail to the internet
- SMS: GSM modem, For reporting data and alarms to the operators
- Wireless Communication: GPS, ZigBee & Radio
- Auto-report Acquisition/Control Data
- Redundant Solution: Hot-swap/Ethernet
- Schedule-Control

Development Software - HMI Screens

Free HMI Designer: eLogger

eLogger is a free charge and easy-to-use software to implement HMI and data logger on Windows CE 5.0 based PACs (WinPAC and ViewPAC of ICP DAS), Windows CE 6.0 based PACs (XPAC-8000 of ICP DAS), Windows CE 7.0 based PACs and Windows Embedded Standard 2009 based PACs for simple I/O monitor and system control. It could reduce the cost and shorten the time to market.



eLogger Features:

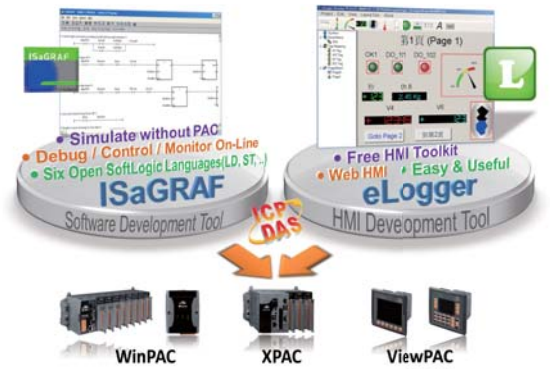
- PAC Support:
  - Developer: Windows 2K,Windows XP, Windows Vista, Windows7
  - Runtime: on Windows CE.NET 5.0/6.0/7.0 or XPE; XP, WP, VP, SV Series
- Driver Support:
  - Module on slot, Modbus RTU/ASCII/TCP master, MQTT Client
- HMI:
  - Elements: Button, Text Box, Linear Gauge, Angular Gauge, LED, Switch, Tank, Label, Plot, Seven Segment, Thermometer, Slider, Odometer.
  - Pages: Maximum of 32 pages.
- Web Page Converter:
  - Elements: Text Box, Seven Segment, Label, Button, Picture Toggle
  - Support administrator login.
  - Support browsers: Google Chrome, IE, Firefox, Safari, Opera
- Real Time Data Trend: Maximum of 5 trend line in one plot
- Value Scaling
- Account Management: 3 levels (Admin, Power User, User)
- Remote Maintenance
- Data Log: Local Data Log, Remote database
- Logic Control Programming
  - ISaGRAF (IEC61131-3 standard PLC languages)
  - Visual Studio .NET (C#, VB.NET)
- Support ISAPI
- Support Modbus TCP Server
- Support Runtime Executing in Background Mode

ISaGRAF XPAC : XP-8000-CE6 Series

ISaGRAF Series XPAC	Pre-Installed Software	OS	CPU	Flash	DDR SDRAM	VGA Resolution	Ethernet	Serial	I/O Slot
XP-8037-CE6	ISaGRAF	CE 6.0	x86 CPU, 1 GHZ, dual-core	32 GB	2 GB DDR3	1024 x 768	2	4	0
XP-8137-CE6									1
XP-8337-CE6									3
XP-8737-CE6									7

Applications

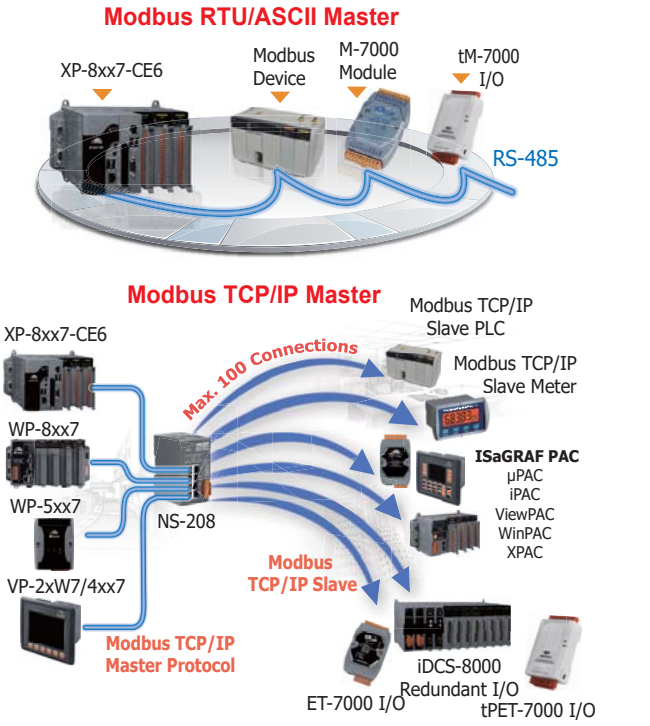
eLogger HMI Application



Schedule Control

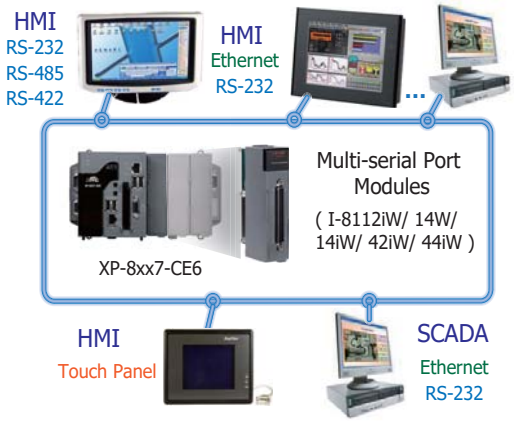
Motion Control: Using I-8094F/8092F/8094

Modbus Master Ports



Modbus Slave : RTU / TCP

- Modbus RTU (RS-232/485/422) Slave: max. 9 ports
- Modbus TCP/IP Slave: max. 64 connections



2.3 Motion Modules for PAC Solutions


I-8092F


I-8094F


I-8196F


I-8093W


I-8094


I-8094A


I-8094H


I-9196F


I-9093

Motion Control Modules For PAC Motion Control Solutions

Models	Encoder Input				Command Pulse Output				Daughter Board	Other Functions	Supported PAC	Supported Drivers or Software
	Axis	Counter (bits)	Counting Rate (cps)	Signal	Axis	Speed (pps)	Counter (bits)	Signal				
I-8092F-G	2	32	4 M	CW/CCW, A/B	2	4 M	32	CW/CCW, PULSE/DIR	DN-8237	FRnet Master	XP-8000 WP-8000 iP-8000	VC C# VB .NET ISaGRAF (ISaGRAF supports the ISaGRAF XPAC ONLY)
I-8094-G	4				4				DN-8468	-		
I-8094F-G										FRnet Master		
I-8094A-G										CPU Inside		
I-8094H-G										FRnet Master, CPU Inside		
I-8196F	6		12 M		6			CW/CCW, PULSE/DIR, A/B	DN-8368	FRnet Master	XP-8000 WP-8000	
I-9196F											XP-9000 WP-9000	

Note: I-8094A-G, I-8094H-G, I-8196F, and I-9196F do not support ISaGRAF PAC.

Models	Encoder Input					Compare Trigger Output	
	Axis	Counter (bits)	Counting Rate (cps)	Signal	Hardware Latch/Reset	Channel	Type
I-8093W	3	32	4 M (CW/CCW, Pulse/Dir) 1 M (A/B)	CW/CCW, PULSE/DIR, A/B	-	-	-
I-9093	3		6 M (CW/CCW, Pulse/Dir) 2 M (A/B)		3	3	Open collector

Note: I-9093 do not support ISaGRAF PAC.

- I-8K Motion Control Modules: http://www.icpdas.com/root/product/solutions/remote_io/rs-485/i-8k_i-87k/i-8k_i-87k_motion.html
- I-9K Motion Control Modules: http://www.icpdas.com/root/product/solutions/remote_io/i-9k_i-97k/i-9k_i-97k_motion.html

PAC I-8000 DI/DO AI/AO High Profile Modules Selection Guide:

Analog Input Modules:

Model	Analog Input					Isolation Voltage	Voltage Overload Protection	Power Consumption
	Resolution	Input Channels	Sampling Rate	Voltage Input	Current Input			
I-8017HW	14 bit	8 diff.	100 KHz (total)	+/-10 V, +/-5 V +/-2.5 V, +/-1.25 V	+/-20 mA	3000 Vrms	+/-35 V	2 W

Analog Output Modules:

Models	Analog Output				Voltage Output Driver	Accuracy	Isolation Voltage	Power Consumption
	Resolution	Output Channels	Voltage Output	Current Output				
I-8024W	14 bit	4	+/-10 V	0-20 mA	5 mA max.	±0.1% of FSR	3000 V	2 W

Digital I/O Modules:

Models	Digital Input Channels	Digital Output Channels	LED Display	Power Consumption
I-8037W	-	16 (Open Source) / Isolation 3750 V	Yes	0.9 W
I-8040W	32 (Sink/Source) / Isolation 3750 V	-	Yes	0.65 W
I-8040PW	32 (Sink/Source) / Isolation 3750 V	-	Yes	1 W
I-8041W	-	32 (Open-collector) / Isolation 3750 V	Yes	1.5 W
I-8041AW	-	32 (Open-collector) / Isolation 3750 V	Yes	1.5 W
I-8042W	16 (Sink/Source) / Isolation 3750 V	16 (Open-collector) / Isolation 3750 V	Yes	1.5 W
I-8048W	8 (Sink/Source) / Isolation 1500 V		Yes	1.75 W
I-8051W	16 (Source) / Non-isolated		Yes	1.1 W
I-8052W	8 (Differential) / Isolation 5000 V		Yes	0.3 W
I-8053W	16 Isolation 3750 V		Yes	0.4 W
I-8053PW	16 (Sink/Source) / Isolation 3750 V with Low Pass Filter		Yes	0.45 W
I-8054W	8 (Sink/Source) / Isolation 3750 V	8 (Open-collector) / isolation 3750 V	Yes	0.55 W
I-8055W	8 (Source) / Non-isolated	8 (Open-collector) / Non-isolated	Yes	1 W
I-8056W	-	16 (Open-collector) / Non-isolated	Yes	0.9 W
I-8057W	-	16 (Open-collector) / Isolation 3750 V	Yes	0.9 W
I-8058W	8 AC/DC 250 V max. / Isolation 5000 V	-	Yes	0.6 W
I-8060W	-	6 / (Power Relay Form C)	Yes	1 W
I-8063W	4 (Sink/Source) / Isolation 3750 V	4 / (Power Relay Form C)	Yes	2 W
I-8064W	-	8 / (Power Relay Form A)	Yes	1.1 W
I-8068W	-	8 (Power Relay Form A x 4 Form C x 4)	Yes	2.5 W
I-8069W	-	8 (PhotoMos Relay Form A x 8)	Yes	0.6 W
I-8172W	FRnet Master. Up to 256 DI or 256 DO channels can be added using remote modules		Yes	2 W

I-8092F-G

High-speed 2-axis Motion Control Module with FRnet Master

Features:

- Independent 2-axis motion control
- Support for hand wheel and jog functions
- 2-axis linear / 2-axis circular interpolation function
- Continuous interpolation function
- Programmable T/S-curve acceleration and deceleration
- A maximum pulse output rate of 4 Mpps for each axis
- Pulse Output Types: CW/CCW or PULSE/DIR
- 32-bit encoder counter for each axis
- Encoder Pulse Input Types: A/B Phase or Up/Down
- Programmable automatic homing for each axis
- Programmable software limits
- Expandable Remote I/O: 128 DI and 128 DO via a two-wire FRnet interface

Introduction:

The I-8092F is a **2-axis** stepping/pulse-type servo motor control module that can be used on any of the ICP DAS I-8000 and PAC series controllers, and is suitable for general-purpose motion control applications. The I-8092F is equipped with one FRnet master, which allows fast remote I/O to be easily expanded. The two-wire FRnet interface can be used automatically scan its 128 DI and 128 DO channels with a scan period of 2.88 ms.

In addition to its wide speed range, this intelligent motion controller also has a variety of motion control functions built in, such as 2-axis linear interpolation, 2-axis circular interpolation, T/S-curve acceleration/deceleration, and others. A major advantage is that the majority of the I-8092F motion control functions are performed by the high-performance motion ASIC with little load on the processor. While driving the motors, the motion status, and the status of the other I/O channels on the I-8000 or PAC modules, can still be monitored.

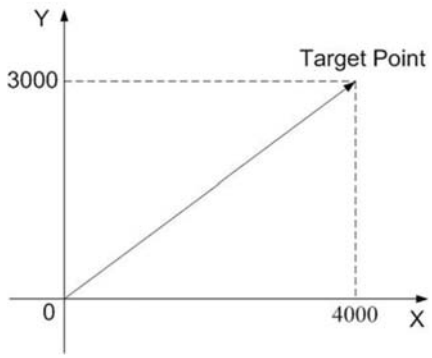
As a result of the low CPU loading requirements of the I-8092F, one or more motion modules may be used on a single I-8000 or PAC controller. ICP DAS provides a wide range of functions and examples that can be used to reduce the need for programming by users, making it a highly cost-effective solution for motion control application developers.

Specifications:

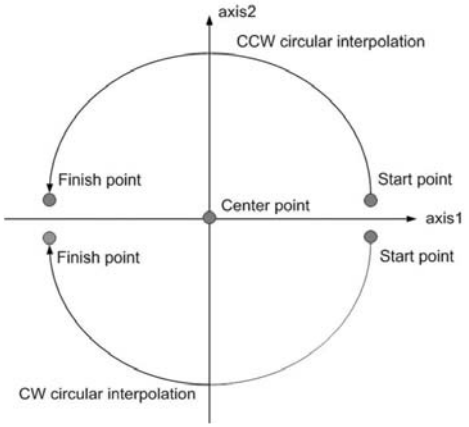
Number of Axes	2
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse command
Resolution	32-bit
Pulse Output Mode	CW/CCW, PULSE/DIR
Operation Mode	Semi-closed Loop
Linear Interpolation	2 axes
Circular Interpolation	2 axes
Speed Curve Profile	T/S curve
Motion Relative I/O	Home, LMT+/-, NHOME, EMG, INP, ALM, SVON
Synchronous Action	-
Ring Counter Mode	32-bit
Position Control Mode	Incremental mode
Position Compare Trigger	-
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Encoder Rate	4 MHz
Digital Input Channels	Expandable: 128 DI
Digital Output Channels	Expandable: 128 DO
I/O Isolation (with DN-8237)	2500 Vrms optical isolation
Connector	37-pin D-sub
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	-20 ~ +75°C
Storage Temperature	-30 ~ +85°C
Ambient Relative Humidity	5 ~ 90% RH, non-condensing

Features of Motion Function:

2-Axis Linear Interpolation

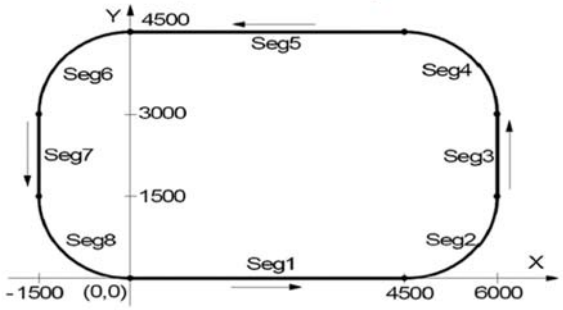


2-Axis Circular Interpolation

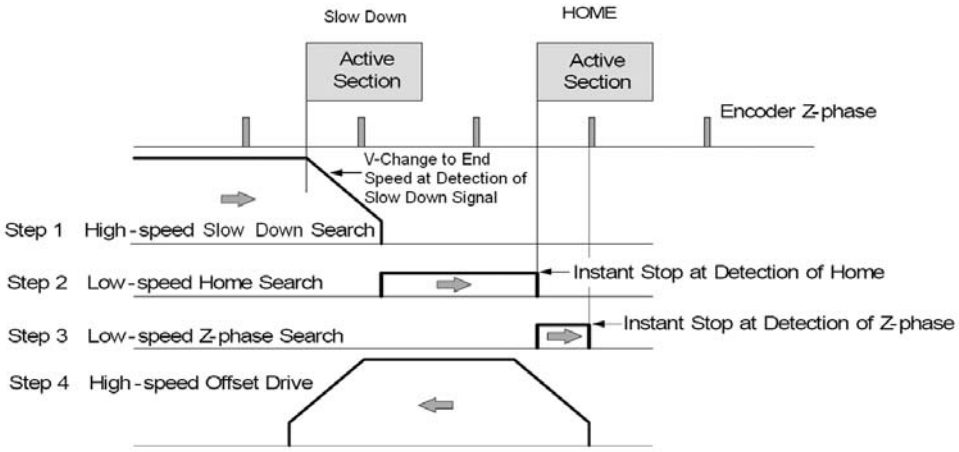


Continuous interpolation

8 Segments Continuous Interpolation Motion
(Linear+ Circular)



4 Steps Automatic Home Searching



Ordering Information/Accessories:

Module	Description
I-8092F-G	High-speed 2-axis Motion Control Module with FRnet Master
DN-8237UB	Photo-isolated Universal Snap-on Wiring Terminal Board
DN-8237GB	Photo-isolated General Purpose Wiring Terminal Board
DN-8237MB	Photo-isolated Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
DN-8237PB	Photo-isolated Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
DN-8237YB	Photo-isolated Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
DN-8237DB	Photo-isolated Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
CA-3715DM-H / CA-3730DM-H / CA-3750DM-H	37-pin D-Sub Male-Male Cable for Terminal Board (180°), Length 1.5 M / 3.0 M / 5.0 M

I-8094-G

High-speed 4-axis Motion Control Module

Features:

- Independent 4-axis motion control
- Support for hand wheel and jog functions
- 2/3-axis linear / 2-axis circular interpolation function
- Continuous interpolation function
- Programmable T/S-curve acceleration and deceleration
- A maximum pulse output rate of 4 Mpps for each axis
- Pulse Output Types: CW/CCW or PULSE/DIR
- 32-bit encoder counter for each axis
- Encoder Pulse Input Types: A/B Phase or Up/Down
- Programmable automatic homing for each axis
- Position comparison management and software limits
- A wide range of synchronous actions (event-triggered actions)

Introduction:

The I-8094 is a **4-axis** stepping/pulse-type servo motor control module that can be used on any of the ICP DAS I-8000 and PAC series controllers, and is suitable for general-purpose motion applications. In addition to its wide speed range, this intelligent motion controller also has a variety of motion control functions built in, such as 2/3-axis linear interpolation, 2-axis circular interpolation, T/S-curve acceleration/deceleration, a range of synchronous actions, automatic homing, and others.

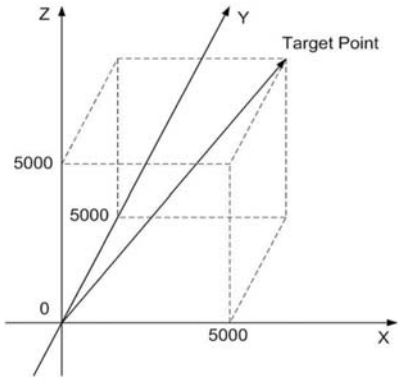
A major advantage is that the majority of the I-8094 motion control functions are performed by the high-performance motion ASIC with little load on the processor. While driving the motors, the motion status, and the status of other I/O channels on the I-8000 or PAC modules, can still be monitored. As the CPU loading requirements of the I-8094 is minimal, one or more motion modules may be used with a single I-8000 or PAC controller. ICP DAS also provides a wide range of functions and examples that can be used to reduce the need for additional programming, making it a highly cost-effective solution for motion control application developers.

Specifications:

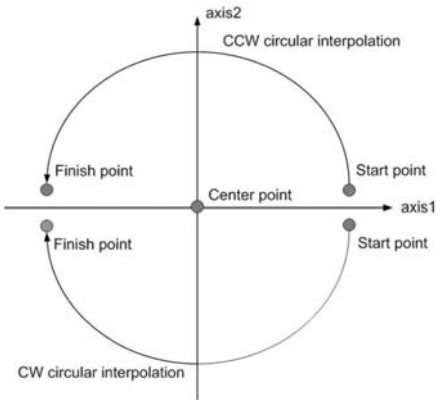
Number of Axes	4
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse Command
Resolution	32-bit
Pulse Output Mode	CW/CCW, PULSE/DIR
Operation Mode	Semi-closed Loop
Linear Interpolation	Any 2 to 3 of 4 axes
Circular Interpolation	Any 2 axes
Speed Curve Profile	T/S-curve
Motion Relative I/O	Home, LMT+/-, NHOME, EMG, INP, ALM, SVON
Synchronous Action	10 activation factors and 14 actions
Ring Counter Mode	32-bit
Position Control Mode	Incremental mode and absolute mode
Position Compare Trigger	10 KHz
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Encoder Rate	4 MHz
Digital Input Channels	-
Digital Output Channels	-
I/O Isolation (with DN-8468)	2500 Vrms optical isolation
Connector	68-pin SCSI-II connector
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	-20 ~ +75°C
Storage Temperature	-30 ~ +85°C
Ambient Relative Humidity	5 ~ 90% RH, non-condensing

Features of Motion Function:

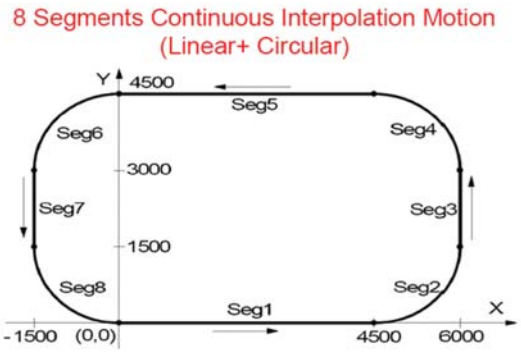
2 or 3-Axis Linear Interpolation



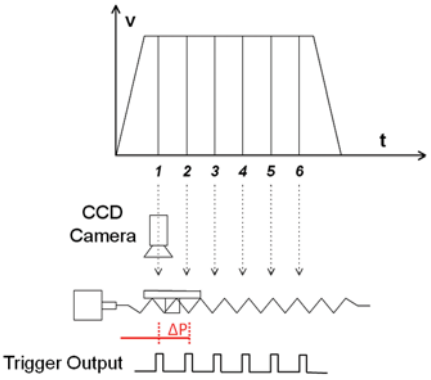
2-Axis Circular Interpolation



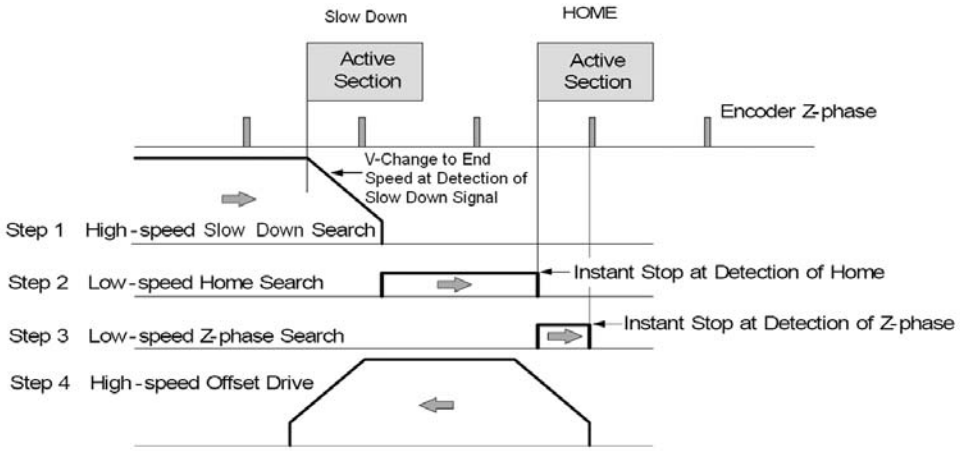
Continuous interpolation



High Speed Position Compare



4 Steps Automatic Home Searching



Ordering Information/Accessories:

Module	Description
I-8094-G	High-speed 4-axis Motion Control Module
DN-8468UB	Photo-isolated Universal Snap-on Wiring Terminal Board
DN-8468GB	Photo-isolated General Purpose Wiring Terminal Board
DN-8468MB	Photo-isolated Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
DN-8468PB	Photo-isolated Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
DN-8468YB	Photo-isolated Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
DN-8468DB	Photo-isolated Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
DN-8468FB	Photo-isolated Snap-on Wiring Terminal Board for Fuji FALDIC-W Servo Amplifier
CA-SCSI15-H / CA-SCSI30-H / CA-SCSI50-H	68-pin SCSI-II Male-Male Connector Cable, Length 1.5 M / 3.0 M / 5.0 M

I-8094F-G

High-speed 4-axis Motion Control Module with FRnet Master

Features:

- Independent 4-axis motion control
- Support for hand wheel and jog functions
- 2/3-axis linear / 2-axis circular interpolation function
- Continuous interpolation function
- Programmable T/S-curve acceleration and deceleration
- A maximum pulse output rate of 4 Mpps for each axis
- Pulse Output Types: CW/CCW or PULSE/DIR
- 32-bit encoder counter for each axis
- Encoder Pulse Input Types: A/B Phase or Up/Down
- Programmable automatic homing for each axis
- Position comparison management and software limits
- A wide range of synchronous actions (event-triggered actions)
- Expandable Remote I/O: 128 DI and 128 DO via a two-wire FRnet interface

Introduction:

The I-8094F is a **4-axis** stepping/pulse-type servo motor control module that can be used on any of the ICP DAS I-8000 and PAC series controllers, and is suitable for general-purpose motion applications. The I-8094F has the full functions of the I-8094 with the addition of an FRnet port, which allows the fast remote I/O of the module to be expanded easily. This two-wired FRnet can automatically scan its 128 DI and 128 DO channels within a period of 2.88 ms.

In addition to its wide speed range, this intelligent motion controller also has a variety of motion control functions built in, such as 2/3-axis linear interpolation, 2-axis circular interpolation, T/S-curve acceleration/deceleration, numerous synchronous actions, automatic homing, and others. A major advantage is that the majority of the I-8094F motion control functions are performed by the high-performance motion ASIC with little load on the processor. While driving the motors, the motion status, and the status of the other I/O channels on the I-8000 or PAC modules, can still be monitored.

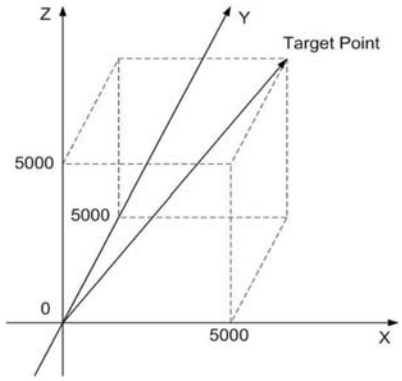
As the CPU loading requirements of the I-8094F is minimal, one or more motion modules may be used with a single I-8000 or PAC controller. ICP DAS also provides a wide range of functions and examples that can be used to reduce the need for additional programming, making it a highly cost-effective solution for motion control application developers.

Specifications:

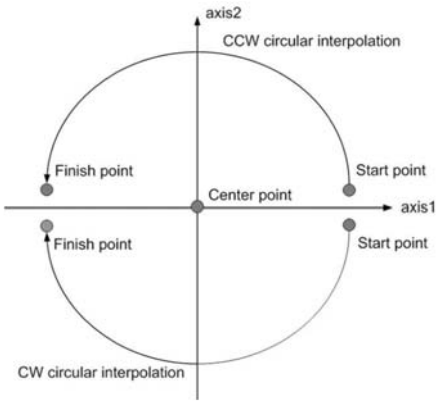
Number of Axes	4
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse Command
Resolution	32-bit
Pulse Output Mode	CW/CCW, PULSE/DIR
Operation Mode	Semi-closed Loop
Linear Interpolation	Any 2 to 3 of 4 axes
Circular Interpolation	Any 2 axes
Speed Curve Profile	T/S-curve
Motion Relative I/O	Home, LMT+/-, NHOME, EMG, INP, ALM, SVON
Synchronous Action	10 activation factors and 14 actions
Ring Counter Mode	32-bit
Position Control Mode	Incremental mode and absolute mode
Position Compare Trigger	10 KHz
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Encoder Rate	4 MHz
Digital Input Channels	Expandable : 128 DI
Digital Output Channels	Expandable : 128 DO
I/O Isolation (With DN-8468)	2500 Vrms optical isolation
Connector	68-pin SCSI-II connector
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	-20 ~ +75°C
Storage Temperature	-30 ~ +85°C
Ambient Relative Humidity	5 ~ 90% RH, non-condensing

Features of Motion Function:

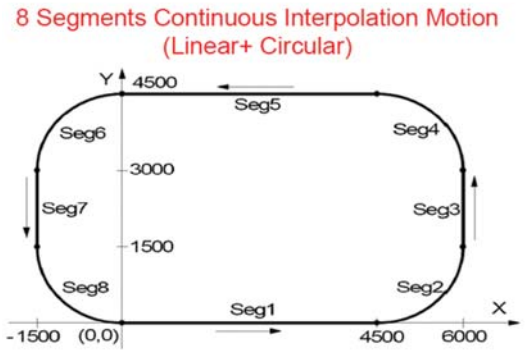
2 or 3-Axis Linear Interpolation



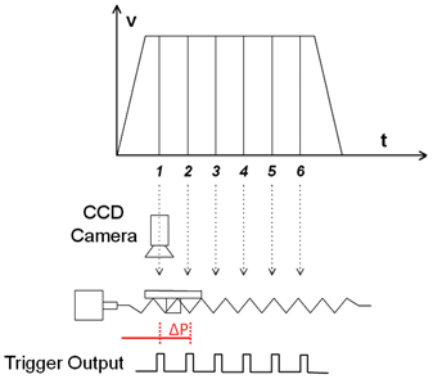
2-Axis Circular Interpolation



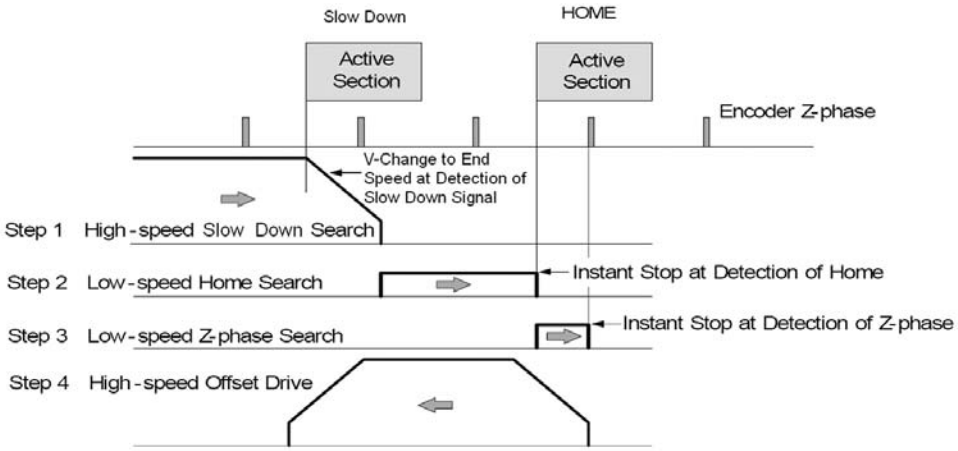
Continuous interpolation



High Speed Position Compare



4 Steps Automatic Home Searching



Ordering Information/Accessories:

Module	Description
I-8094F-G	High-speed 4-axis Motion Control Module with FRnet Master
DN-8468UB	Photo-isolated Universal Snap-on Wiring Terminal Board
DN-8468GB	Photo-isolated General Purpose Wiring Terminal Board
DN-8468MB	Photo-isolated Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
DN-8468PB	Photo-isolated Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
DN-8468YB	Photo-isolated Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
DN-8468DB	Photo-isolated Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
DN-8468FB	Photo-isolated Snap-on Wiring Terminal Board for Fuji FALDIC-W Servo Amplifier
CA-SCSI15-H / CA-SCSI30-H / CA-SCSI50-H	68-pin SCSI-II Male-Male Connector Cable, Length 1.5 M / 3.0 M / 5.0 M

I-8094A-G

High-speed 4-axis Motion Control Module with Internal CPU

Features:

- Independent 4-axis motion control
- Support for hand wheel and jog functions
- 2/3-axis linear / 2-axis circular interpolation function
- Continuous interpolation function
- Programmable T/S-curve acceleration and deceleration
- A maximum pulse output rate of 4 Mpps for each axis
- Pulse Output Types: CW/CCW or PULSE/DIR
- 32-bit encoder counter for each axis
- Encoder Pulse Input Types: A/B Phase or Up/Down
- Programmable automatic homing for each axis
- Position comparison management and software limits
- A wide range of synchronous actions (event-triggered actions)
- Can operate as a standalone module or in conjunction with a PAC

Introduction:

The I-8094A is a **4-axis** stepping/pulse-type servo motor control module that can be used on any of the ICP DAS PAC series controllers, and is suitable for general-purpose motion applications. The I-8094A has the full functions of the I-8094 and has an internal 80186 CPU allowing the module to be used to perform additional functions, including the ability to perform motion operations without requiring a PAC. When working with a PAC, it also allows users to perform additional functions by calling user-defined subroutines (Macro functions). Users can embed their customized processes (know-how) inside this module.

In addition to its wide speed range, this intelligent motion controller also has a variety of motion control functions built in, such as 2/3-axis linear interpolation, 2-axis circular interpolation, T/S-curve acceleration/deceleration, numerous synchronous actions, automatic homing, and others. A major advantage is that the majority of the I-8094A motion control functions are performed by the high-performance motion ASIC with little load on the processor. While driving the motors, the motion status, and the status of the other I/O channels on the PAC modules, can still be monitored.

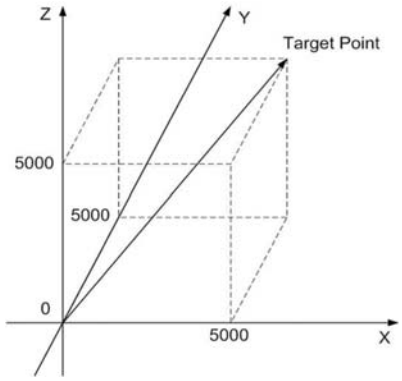
As the CPU loading requirements of the I-8094A is minimal, one or more motion modules may be used with a single PAC controller. ICP DAS also provides a variety of functions, and examples that can be used to reduce the need for additional programming by users, making it a highly cost-effective solution for motion control application developers.

Specifications:

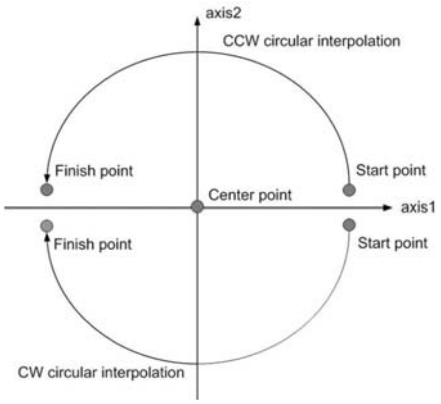
Number of Axes	4
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse Command
Resolution	32-bit
Pulse Output Mode	CW/CCW, PULSE/DIR
Operation Mode	Semi-closed Loop
Linear Interpolation	Any 2 to 3 of 4 axes
Circular Interpolation	Any 2 axes
Speed Curve Profile	T/S-curve
Motion Relative I/O	Home, LMT+/-, NHOME, EMG, INP, ALM, SVON
Synchronous Action	10 activation factors and 14 actions
Ring Counter Mode	32-bit
Position Control Mode	Incremental mode and absolute mode
Position Compare Trigger	10 KHz
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Encoder Rate	4 MHz
Digital Input Channels	-
Digital Output Channels	-
I/O Isolation(with DN-8468)	2500 Vrms optical isolation
Connector	68-pin SCSI-II connector
Power Consumption	+5 V @ 500 mA
Macro Functions	•User-defined subroutines •The contents of subroutines can be different depending on the users custom designs •Functions can be loaded as a macro on-line •Macro can be run as default function calls •User's know-how can be maintained in privacy
Environmental	
Operating Temperature	-20 ~ +75°C
Storage Temperature	-30 ~ +85°C
Ambient Relative Humidity	5 ~ 90% RH, non-condensing

Features of Motion Function:

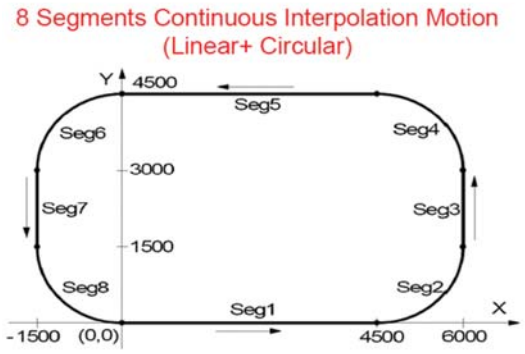
2 or 3-Axis Linear Interpolation



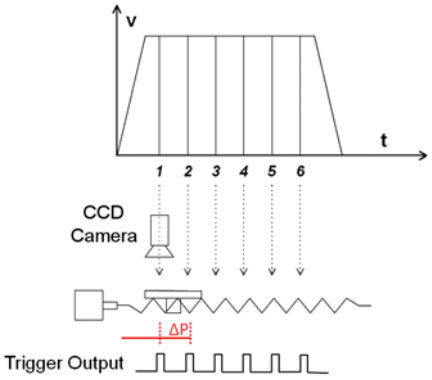
2-Axis Circular Interpolation



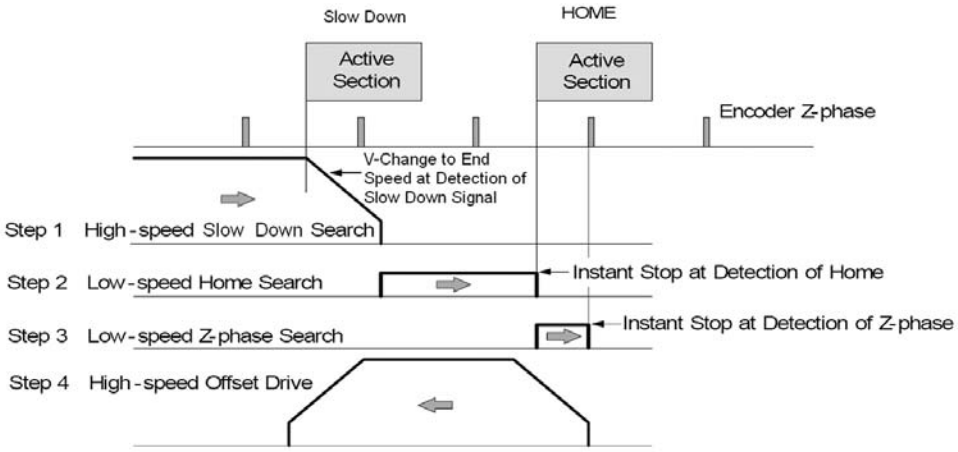
Continuous interpolation



High Speed Position Compare



4 Steps Automatic Home Searching



Ordering Information/Accessories:

Module	Description
I-8094A-G	High-speed 4-axis Motion Control Module with Internal CPU
DN-8468UB	Photo-isolated Universal Snap-on Wiring Terminal Board
DN-8468GB	Photo-isolated General Purpose Wiring Terminal Board
DN-8468MB	Photo-isolated Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
DN-8468PB	Photo-isolated Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
DN-8468YB	Photo-isolated Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
DN-8468DB	Photo-isolated Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
DN-8468FB	Photo-isolated Snap-on Wiring Terminal Board for Fuji FALDIC-W Servo Amplifier
CA-SCSI15-H / CA-SCSI30-H / CA-SCSI50-H	68-pin SCSI-II Male-Male Connector Cable, Length 1.5 M / 3.0 M / 5.0 M

I-8094H-G

High-speed 4-axis Motion Control Module with FRnet Master & Internal CPU

Features:

- Independent 4-axis motion control
- Support for hand wheel and jog functions
- 2/3-axis linear / 2-axis circular interpolation function
- Continuous interpolation function
- Programmable T/S-curve acceleration and deceleration
- A maximum pulse output rate of 4 Mpps for each axis
- Pulse Output Types: CW/CCW or PULSE/DIR
- 32-bit encoder counter for each axis
- Encoder Pulse Input Types: A/B Phase or Up/Down
- Programmable automatic homing for each axis
- Position comparison management and software limits
- A wide range of synchronous actions (event-triggered actions)
- Expandable Remote I/O: 128 DI and 128 DO via a two-wire FRnet interface

Introduction:

The I-8094H is a **4-axis** stepping/pulse-type servo motor control module that can be used on any of the ICP DAS PAC series controllers, and is suitable for general-purpose motion applications. The I-8094H has the full functions of the I-8094A with the addition of an FRnet port, which allows the fast remote I/O of the module to be expanded easily. This two-wired FRnet can automatically scan its 128 DI and 128 DO channels within a period of 2.88 ms.

The internal CPU allows the module to be used to perform motion operations without requiring a PAC. When working with a PAC, it also allows users to perform additional functions by integrating user-defined subroutines (Macro functions) from an external source, meaning that customized proprietary processes (know-how) can be embedded in the module. The I-8094H module also contains a high-performance motion ASIC.

In addition to its wide speed range, this intelligent motion controller also has a variety of motion control functions built in, such as 2/3-axis linear interpolation, 2-axis circular interpolation, T/S-curve acceleration/deceleration, numerous synchronous actions, automatic homing, and others. A major advantage is that the majority of the I-8094H motion control functions are performed by the high-performance motion ASIC with little load on the processor. While driving the motors, the motion status, and the status of the other I/O channels on the PAC modules, can still be monitored.

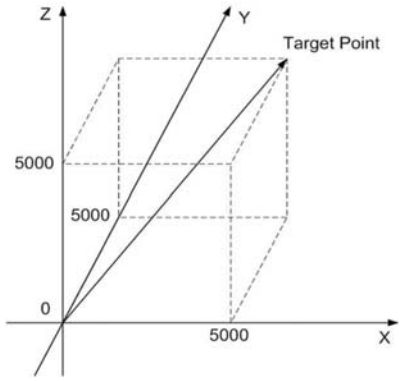
As the CPU loading requirements of the I-8094H is minimal, one or more motion modules may be used with a single PAC controller. ICP DAS also provides a variety of functions and examples that can be used to reduce the need for additional programming by users, making it a highly cost-effective solution for motion control application developers.

Specifications:

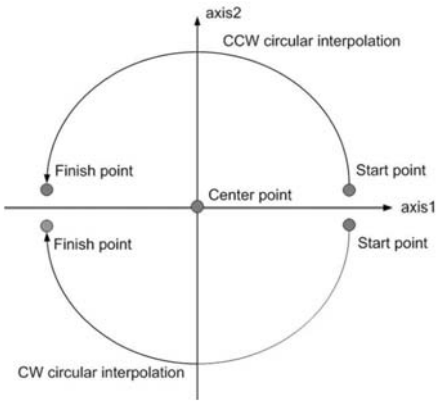
Number of Axes	4
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse Command
Resolution	32-bit
Pulse Output Mode	CW/CCW, PULSE/DIR
Operation Mode	Semi-closed Loop
Linear Interpolation	Any 2 to 3 of 4 axes
Circular Interpolation	Any 2 axes
Speed Curve Profile	T/S-curve
Motion Relative I/O	Home, LMT+/-, NHOME, EMG, INP, ALM, SVON
Synchronous Action	10 activation factors and 14 actions
Ring Counter Mode	32-bit
Position Control Mode	Incremental mode and absolute mode
Position Compare Trigger	10 KHz
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Encoder Rate	4 MHz
Digital Input Channels	Expandable : 128 DI
Digital Output Channels	Expandable : 128 DO
I/O Isolation(with DN-8468)	2500 Vrms optical isolation
Connector	68-pin SCSI-II connector
Power Consumption	+5 V @ 500 mA
Macro Functions	•User-defined subroutines •The contents of subroutines can be different depending on the users custom designs •Functions can be loaded as a macro on-line •Macro can be run as default function calls •User's know-how can be maintained in privacy
Environmental	
Operating Temperature	-20 ~ +75°C
Storage Temperature	-30 ~ +85°C
Ambient Relative Humidity	5 ~ 90% RH, non-condensing

Features of Motion Function:

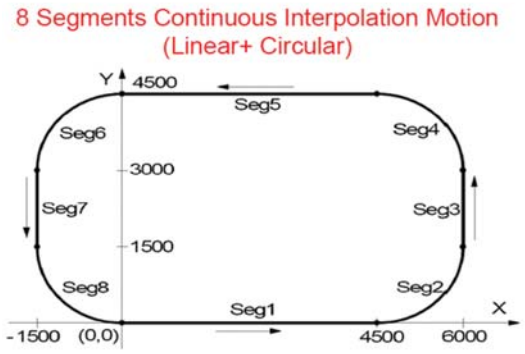
2 or 3-Axis Linear Interpolation



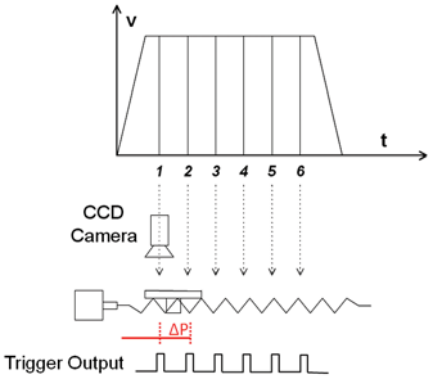
2-Axis Circular Interpolation



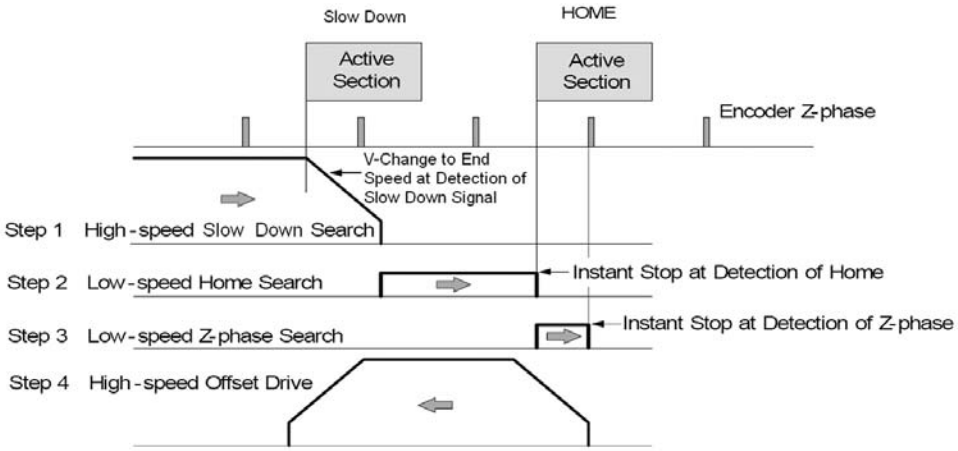
Continuous interpolation



High Speed Position Compare



4 Steps Automatic Home Searching



Ordering Information/Accessories:

Module	Description
I-8094H-G	High-speed 4-axis Motion Control Module with FRnet Master and Internal CPU
DN-8468UB	Photo-isolated Universal Snap-on Wiring Terminal Board
DN-8468GB	Photo-isolated General Purpose Wiring Terminal Board
DN-8468MB	Photo-isolated Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
DN-8468PB	Photo-isolated Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
DN-8468YB	Photo-isolated Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
DN-8468DB	Photo-isolated Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
DN-8468FB	Photo-isolated Snap-on Wiring Terminal Board for Fuji FALDIC-W Servo Amplifier
CA-SCSI15-H / CA-SCSI30-H / CA-SCSI50-H	68-pin SCSI-II Male-Male Connector Cable, Length 1.5 M / 3.0 M / 5.0 M

I-8196F / I-9196F

High-speed, DSP-based, 6-axis Motion Control Module with FRnet Master

Features:

- Expansion card for ICPDAS programmable automation controller (PAC)
- DSP-based motion control module
- Maximum pulse output frequency: 4 MHz
- Maximum Encoder input frequency: 12 MHz
- Independent 6-axis motion control
- 2- to 6-axis linear/ 2- to 3-axis circular/ helical interpolation function
- Continuous interpolation
- 4-step home mode with auto-searching
- Synchronized start motion
- Programmable T/S-curve acceleration and deceleration
- Software limit protection
- Software FIFO for arbitrary curve motion
- High-speed position latch
- High-speed compare trigger and auto-increment compare mode
- Expandable remote I/O: 128 DI and 128 DO via a two-wire FRnet interface.

Introduction:

The I-8196F and I-9196F are 6-axis stepping/ pulse-type servo motor control modules. Both modules are expansion units for the programmable automation controller (PAC) series provided by ICPDAS. The I-8196F module is an expansion card for the XP-8000 and WP-8000 series. The I-9196F module is a plug-in card for the XP-9000 and WP-9000 series.

A digital signal processor (DSP) calculates the commanded move trajectory and manages supervisory control by monitoring the limits and emergency stops to ensure safe operation. I/O control output (e.g. latch, compare, encoder counter etc.) is realized in a Field Programmable Gate Array (FPGA).

The motion controller is suitable for general-purpose motion control applications. In additions to its wide speed range, this intelligent motion controller also has a variety of built-in motion control functions, such as 2- to 6-axis linear interpolation, 2- and 3-axis circular interpolation, helical interpolation, T/S-curve acceleration/deceleration, and automatic home search, etc.

The motion controller uses FRnet as a communication protocol to control distributed remote I/O modules. In an FRnet network the motion controller acts as a master and can control up to 128 digital outputs and 128 digital inputs. The FRnet scan interval is 0.72 ms. FRnet is a two-wire serial bus and is specifically designed for easy and cost effective wiring. ICPDAS provides a large range of FRnet I/O terminal boards and modules.

Libraries and DLL are provided for the following operation systems: Windows embedded, WinCE 5.0 and 6.0. A software utility enables the user to initialize the motion controller and execute motion commands.

Specifications:

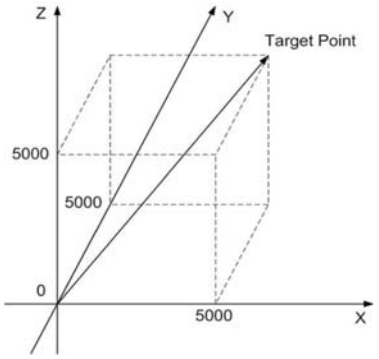
Number of Axes	6
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse command
Pulse Output Mode	CW/CCW, PULSE/DIR, A/B pulse
Linear Interpolation	Any 2- to 6-axis
Circular/Helical Interpolation	Any 2- or 3-axis
Speed Curve Profile	T/S-curve
Mechanical Switch Input	Home, LMT+/-, NHOME, LTC, EMG
Servo I/O Interface	Input: INP, ALM, RDY Output: SVON, ALM_RST, ERC
Ring Counter Mode	32-bit
Position Control Mode	Relative and absolute position
Position Compare Trigger	4 MHz
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Maximum Encoder Counting Rate	12 MHz
Digital Input Channels	Local: 12 DI Expandable: 128 DI
Digital Output Channels	Local: 3 DO Expandable: 128 DO
I/O Isolation (with DN-8368)	2500 Vrms optical isolation
Connector	68-pin VHDCI connector and 20-pin SCSI-II
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	0 ~ +60 °C
Storage Temperature	-20 ~ +80 °C
Ambient Relative Humidity	5 ~ 90 % RH, non-condensing

Software Support:

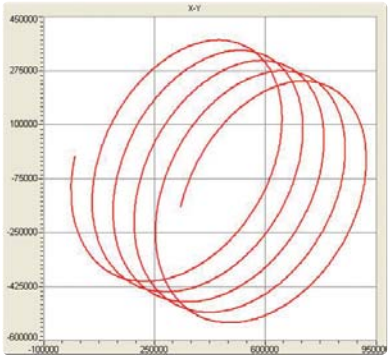
WES WinCE	32 bit: Visual C++ lib/DLL C#, VB.Net LabVIEW Configuration utility Demo programs

Features of Motion Function:

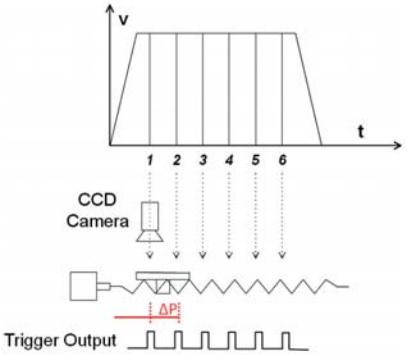
2 to 6-Axis Linear Interpolation



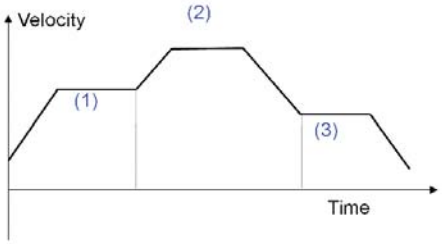
3-Axis Circular or Helical Interpolation



High Speed Position Compare

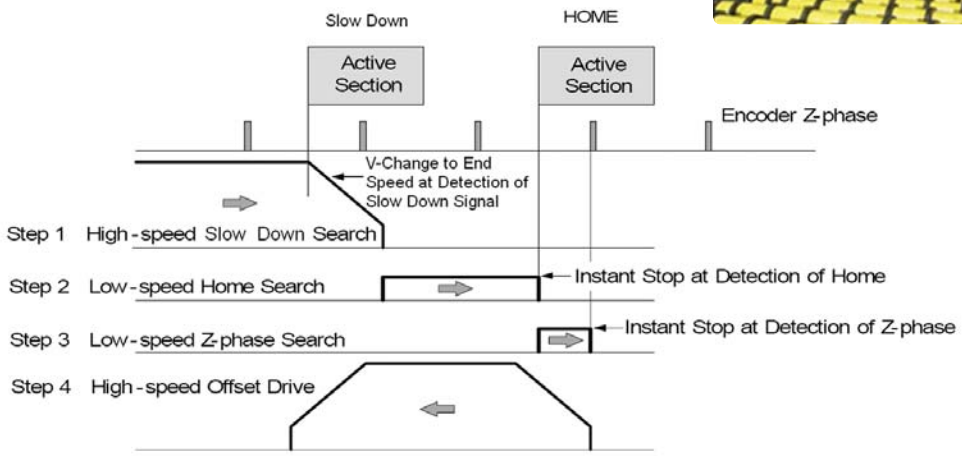


Multi-Axis Continuous Interpolation (With Acc. and Dec.)



Huge Command Buffer and Real Time Coordinate Transformation Suitable for Robotic Control

4 Steps Automatic Home Searching



Ordering Information/Accessories:

Model No.	Description
I-8196F	**High-Speed 6-axis Motion Control Module with FRnet Master (For XP-8000/WP-8000 PAC)**
I-9196F	**High-Speed 6-axis Motion Control Module with FRnet Master (For XP-9000/WP-9000 PAC)**
DN-8368UB	Photo-isolated Universal Snap-on wiring terminal board
DN-8368GB	Photo-isolated General-purpose wiring terminal board
DN-8368MB	Photo-isolated Snap-on wiring terminal board for Mitsubishi MELSERVO-J2 servo amplifier
DN-20M	General purpose digital input and remote digital I\O (FRnet) extension board
CA-MINI68-15	68-pin VHDCI to SCSI-II Connector Cable, Length 1.5 M
CA-SCSI20-M1/M3/M5	20-pin SCSI-II Male connector cable (for Mitsubishi J2 series motor), Length 1 M / 3 M / 5 M.
CA-26-MJ3-15/30/50	26-pin HD D-Sub Male Cable for Mitsubishi Servo Amplifier, 1.5/3/5 M. (for MELSERVO-J3/J4 Series)
CA-26-PA4-15/30/50	26-pin HD D-Sub Male Cable for Panasonic Servo Amplifier, 1.5/3/5 M. (for MINAS A4/A5 Series)
CA-26-YSV-15/30/50	26-pin HD D-Sub Male Cable for Yaskawa Servo Amplifier, 1.5/3/5 M. (for Sigma II/III/V Series)
CA-26-TTA-15/30/50	26-pin HD D-Sub Male Cable for Teco Servo Amplifier, 1.5/3/5 M. (for TSTA-A/A+ Series)
CA-26-DAA2-15/30/50	26-pin HD D-Sub Male Cable for Delta A2 Servo Amplifier, 1.5/3/5 M. (for ASDA-A2 Series)
CA-26-DAB2-15/30/50	26-pin HD D-Sub Male Cable for Delta B2 Servo Amplifier, 1.5/3/5 M. (for ASDA-B2 Series)
CA-26-FFW-15/30/50	26-pin HD D-Sub Male Cable for Fuji Servo Amplifier, 1.5/3/5 M. (for FALDIC-W and ALPHA5 Smart Series)

I-8093W

High-speed 3-axis Encoder Module

Features:

- 3-axis Encoder Inputs
- 1 MHz Input Rate for Quadrant Input Mode
- 4 MHz Input Rate for Pulse/Direction and cw/ccw Input Modes
- 32-bit Count Range
- 2500 Vrms Optical Isolation

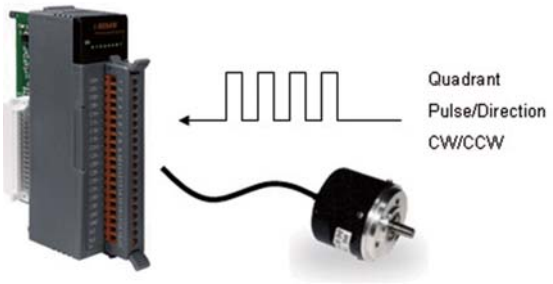
Introduction:

The I-8093W is a **3-axis** high speed encoder module. Its each axis can be independently configured as one of Quadrant, Pulse/Direction or CW/CCW input mode. The maximum input rate for Quadrant mode is 1 MHz, and for Pulse/Direction and CW/CCW modes is 4 MHz.

The high-end specifications of I-8093W and complete software support make it ideal for wide range applications in position measurement of motion systems for industrial and laboratory environment.

Applications:

• Position Measure of Motion System



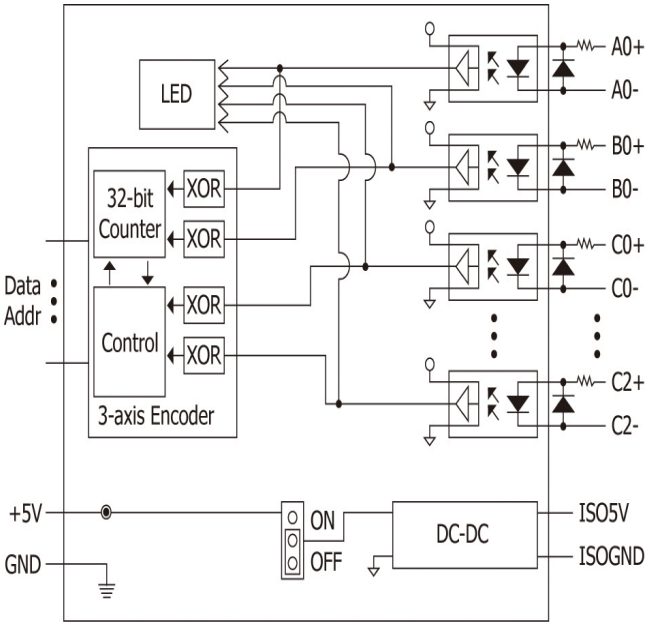
System Specifications:

Display	
LED Display	1 LED as Power Indicator 9 LED as Status Indicator
Isolation	
Intra-module Isolation, Field to Logic	2500 Vrms
ESD Protection	4 KV Contact for each channel
Power	
Power Consumption	2 W Max
Mechanical	
Dimensions (W x L x H)	30 mm x 102 mm x 115 mm
Environment	
Operating Temperature	-25 ~ 75 °C
Storage Temperature	-30 ~ 85 °C
Humidity	5 ~ 95 % RH, Non-condensing

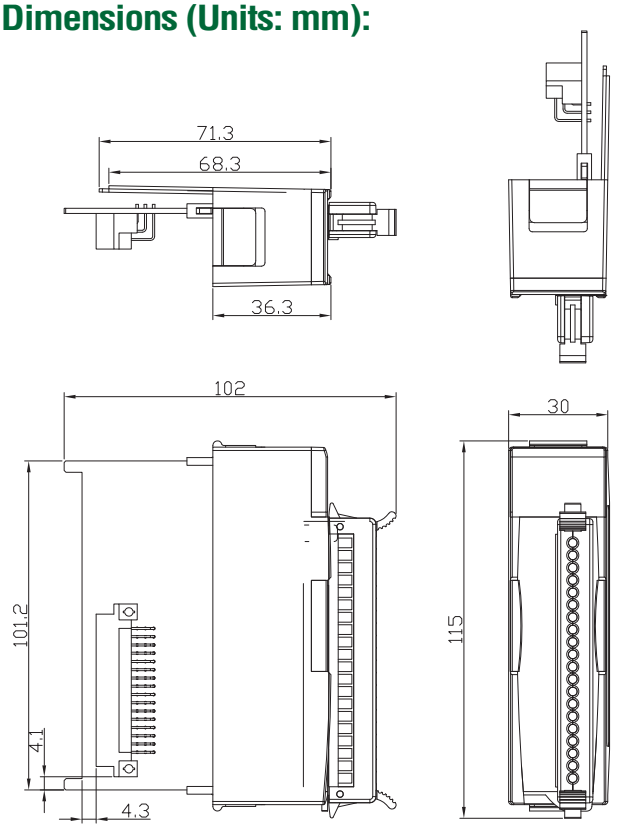
I/O Specifications:

Encoder Input	
Input Axis	3-axis
Encoder Counter	32-bit
Counting Mode	1. Quadrant Counting 2. CW/CCW 3. Pulse/Dir
Maximum Counting Rate	1. Quadrant Counting : 1 MHz 2. CW/CCW : 4 MHz 3. Pulse/Dir : 4 MHz

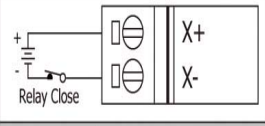
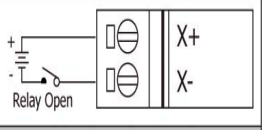
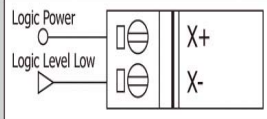
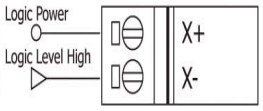
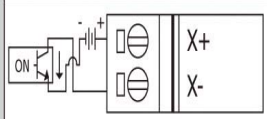
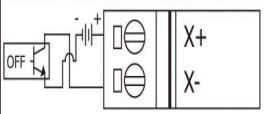
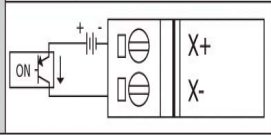
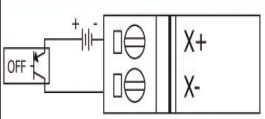
Internal I/O Structure:



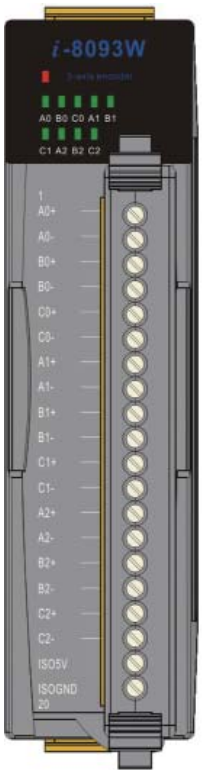
Dimensions (Units: mm):



Wire Connection:

Input Type	ON State LED ON Readback as 0	OFF State LED OFF Readback as 1
Relay Contact	Relay ON	Relay Off
		
TTL/CMOS Logic	Voltage > 4V	Voltage < 0.8V
		
NPN Output	Open Collector On	Open Collector Off
		
PNP Output	Open Collector On	Open Collector Off
		

PIN Assignments:



Terminal No.	Pin Assignment
01	A0+
02	A0-
03	B0+
04	B0-
05	C0+
06	C0-
07	A1+
08	A1-
09	B1+
10	B1-
11	C1+
12	C1-
13	A2+
14	A2-
15	B2+
16	B2-
17	C2+
18	C2-
19	ISO5V
20	ISOGND

Ordering Information:

Module	Description
I-8093W	**High-speed 3-axis Encoder Module**

I-9093

High-speed 3-axis Encoder Module with Compare Trigger Output

Features:

- 3-axis Encoder Inputs
- 32-bit encoder counters
- Encoder pulse input types: A/B phase, CW/CCW, Pulse/Dir
- Compare Trigger Output

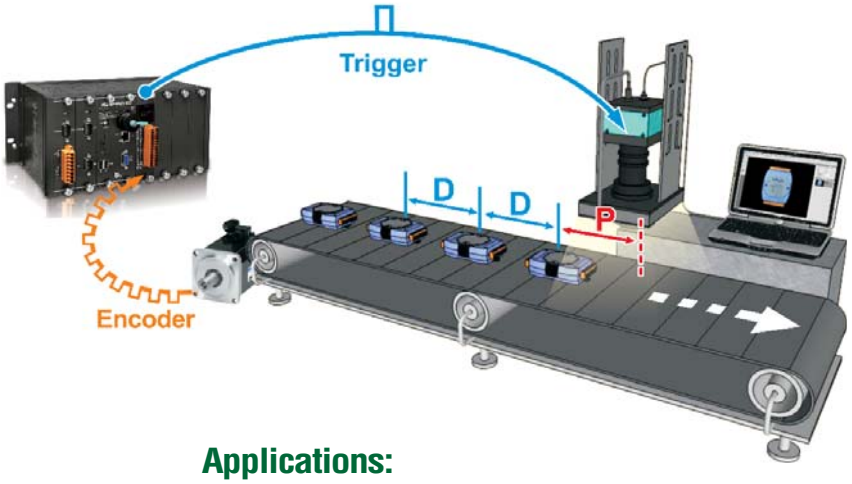
Introduction:

I-9093 includes three axes encoder with position matching circuit. I-9093 can generate a trigger signal when the motor reaches a specified position. The specified position is called a breakpoint and is similar to a switch that is triggered after the motor passes a certain position.

To use the position matching, you have to set an initial point (P) and a trigger period of the following points (D).

The trigger signal is an I/O line that can be used to fire another device. For example, when a motor reaches a certain position, the trigger signal can be used to fire the shutter of a camera to capture an image for the defect detection.

All operations of the position matching are automatically done by the hardware circuit. There is no software calculation effort when the system is operating. I-9093 makes the system design simpler, and significantly increases the system performance.



System Specifications:

LED Display	
System LED Indicator	1 LED as Power Indicator 12 LED as Status Indicator
Isolation	
Intra-module Isolation, Field to logic	3000 VDC
ESD (IEC 61000-4-2)	±4 kV Contact for Each Terminal
	±8 kV Air for Random Point
Power	
Power Consumption	2 W Max.
Mechanical	
Dimensions (L x W x H)	134 mm X 30.3 mm X 144 mm
Environment	
Operating Temperature	-25 ~ +75°C
Storage Temperature	-30 ~ +85°C
Humidity	5 ~ 95% RH, Non-condensing

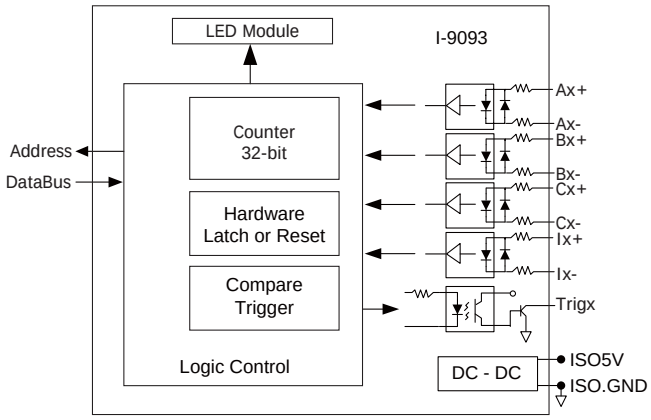
Applications:

- Data acquisition operation
- Optical inspection line-scan systems
- Image capture
- Position Measure

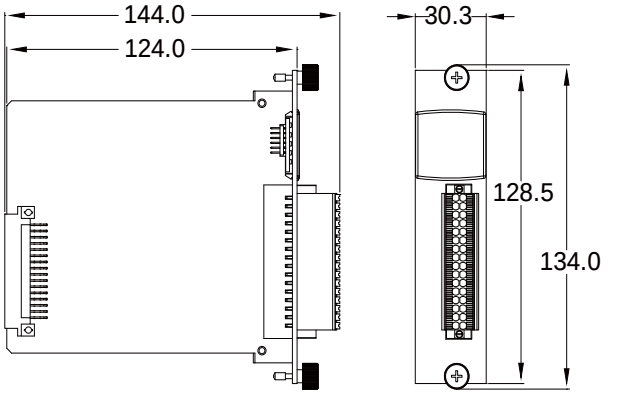
I/O Specifications:

Encoder with Compare Trigger Output	
Encoder Axis	3
Encoder Counter	32-bit
Counting Mode	Quadrant , CW/CCW , Pulse/Dir
Counting Rate	Quadrant (2MHz) CW/CCW, Pulse/Dir (6MHz)
Compare Trigger Out	3 (open collector)

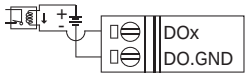
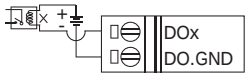
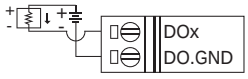
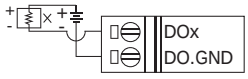
Internal I/O Structure:

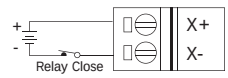
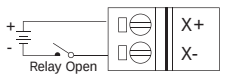
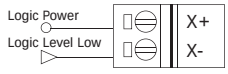
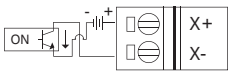
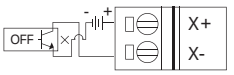
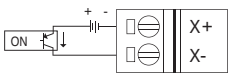
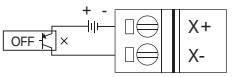


Dimensions (Units: mm):

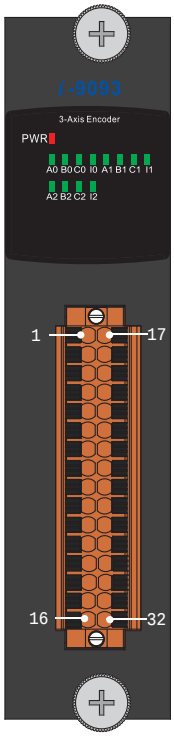


Wire Connection:

Output Type	ON State Readback as 1	OFF State Readback as 0
Drive Relay	Relay ON	Relay OFF
		
Resistance Load		
		

Input Type	ON State LED ON Readback as 1	OFF State LED OFF Readback as 0
Relay Contact	Relay ON	Relay OFF
		
TTL/CMOS Logic	Voltage > 4 V	Voltage < 0.8 V
		
NPN Output	Open Collector ON	Open Collector OFF
		
PNP Output	Open Collector ON	Open Collector OFF
		

PIN Assignments:



Pin Assignment	Terminal No.		Pin Assignment
A0+	01	17	A0-
B0+	02	18	B0-
C0+	03	19	C0-
I0+	04	20	I0-
Trig0	05	21	ISO.GND
A1+	06	22	A1-
B1+	07	23	B1-
C1+	08	24	C1-
I1+	09	25	I1-
Trig1	10	26	ISO.GND
A2+	11	27	A2-
B2+	12	28	B2-
C2+	13	29	C2-
I2+	14	30	I2-
Trig2	15	31	ISO.GND
ISO5V	16	32	ISO.GND

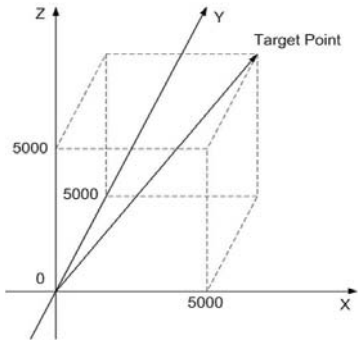
32-pin Connector

Ordering Information:

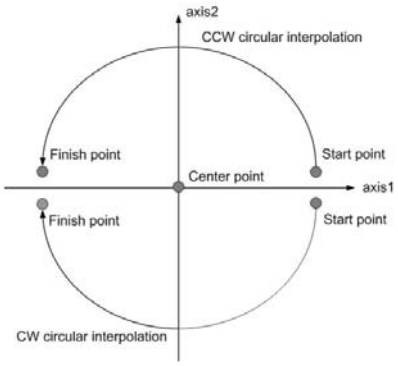
Module	Description
I-9093-G CR	**High-speed 3-axis Encoder Module with Compare Trigger Output**

Features of Motion Function

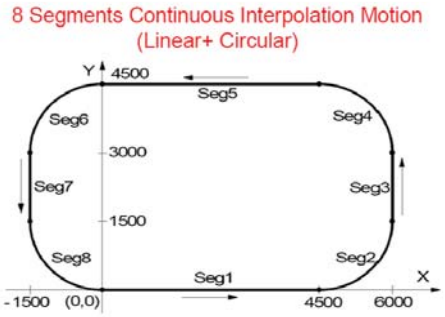
1. Linear Interpolation



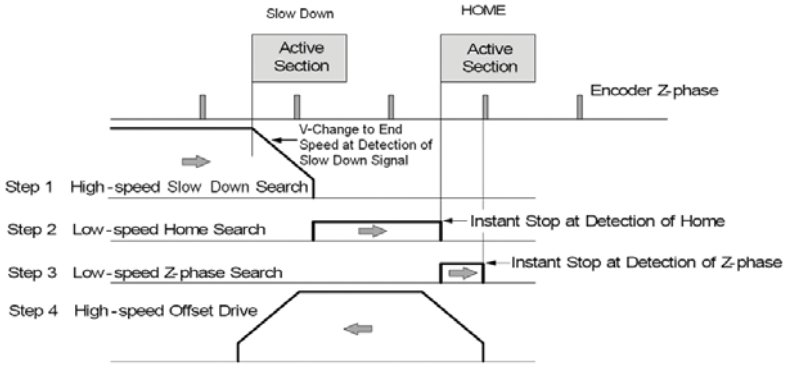
2. Circular Interpolation



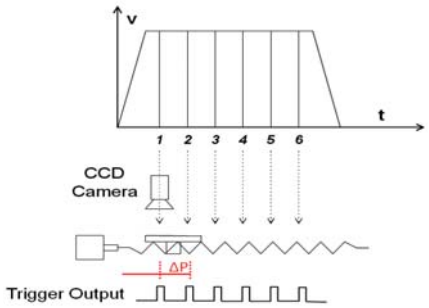
3. Continuous Interpolation



4. Four Steps Automatic Home Searching



5. High Speed Position Compare

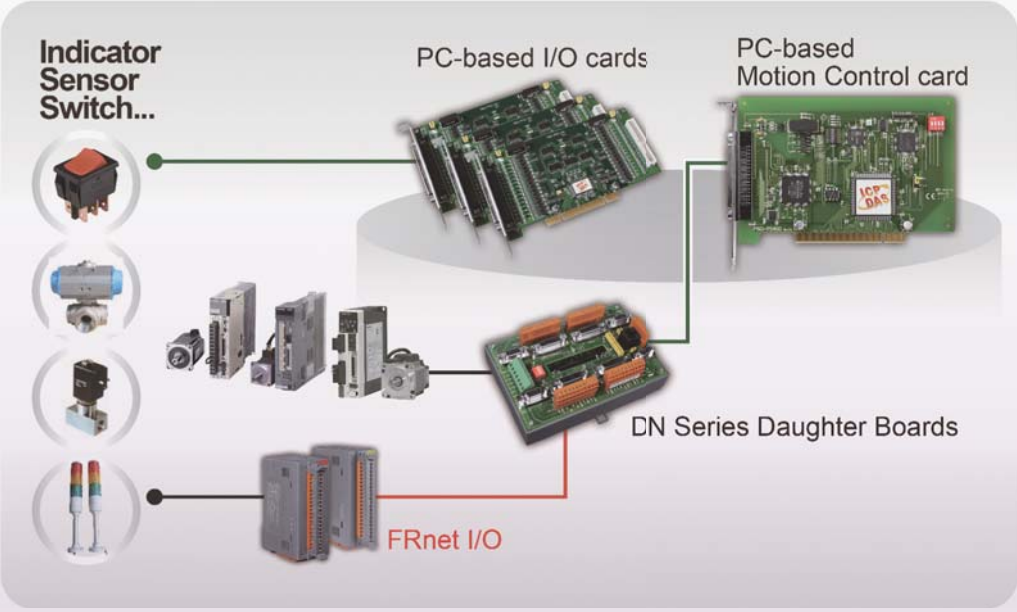


6. Huge Command Buffer and Real Time Coordinate Transformation Suitable for Robotic Control

Motion Products	Features of Motion Functions					
Model	1. Linear Interpolation	2. Circular Interpolation	3. Continuous Interpolation	4. Four Steps Automatic Home Searching	5. High Speed Position Compare	6. Huge Command Buffer and Real Time Coordinate Transformation Suitable for Robotic Control
PC-based Motion Control Cards						
PISO-PS200	2-axis	2-axis	Constant Vector Speed	Yes	-	-
PISO-PS400	3-axis				Yes	
PISO-PS410						
PISO-PS600	6-axis	3-axis	With Acc. and Dec.			Yes
PISO-PS810	2 Groups 3-axis	2 Groups 2-axis	Constant Vector Speed			-
Motion Control Modules for PAC						
I-8092F	2-axis	2-axis	Constant Vector Speed	Yes	-	-
I-8094/I-8094F	3-axis				Yes	
I-8196F/9196F	6-axis	3-axis	With Acc. and Dec.			Yes

PC-based Solutions

3. PC-based Solutions



3. PC-based Solutions

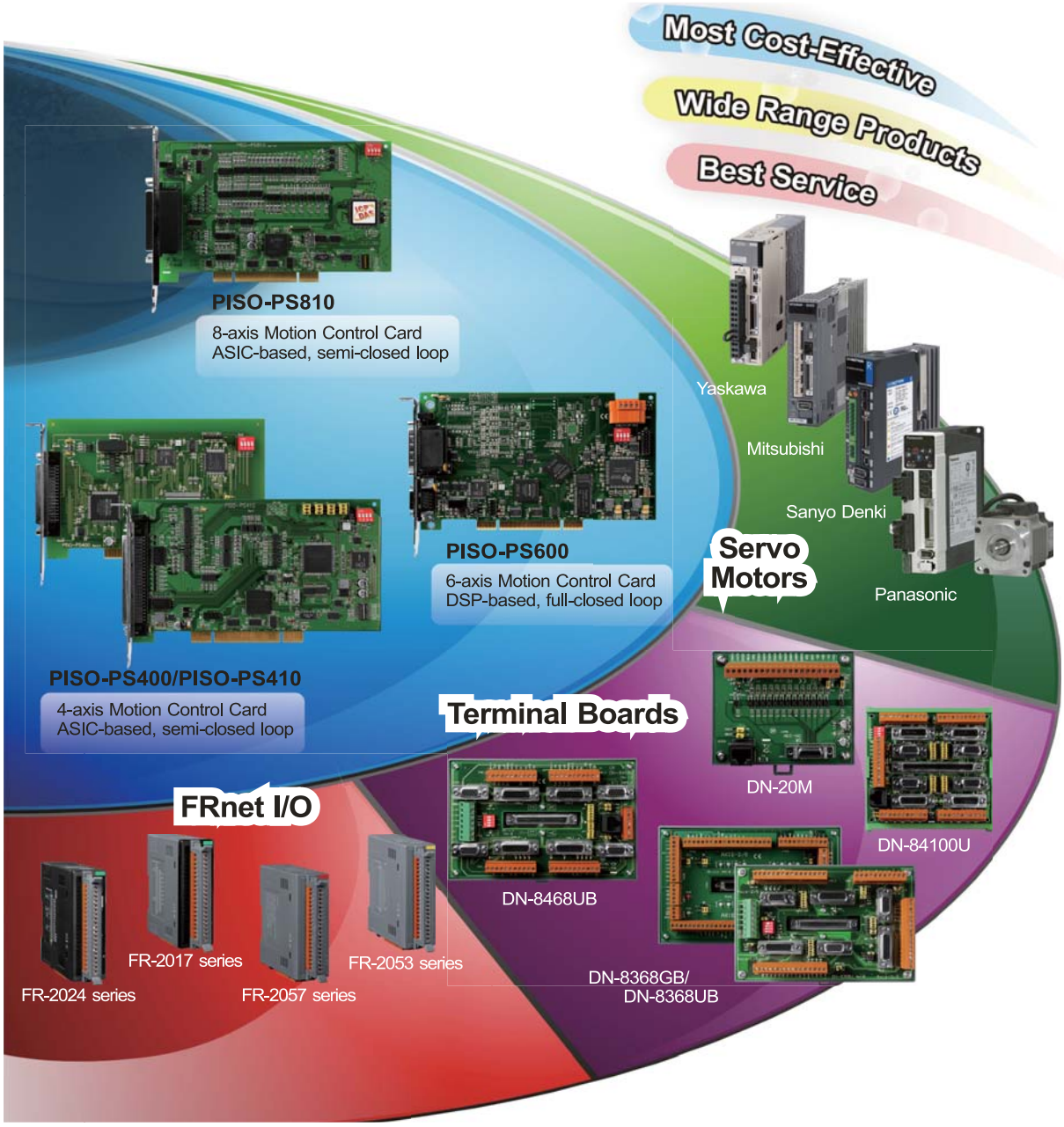
PC-based Motion Control Cards

Overview

Introduction

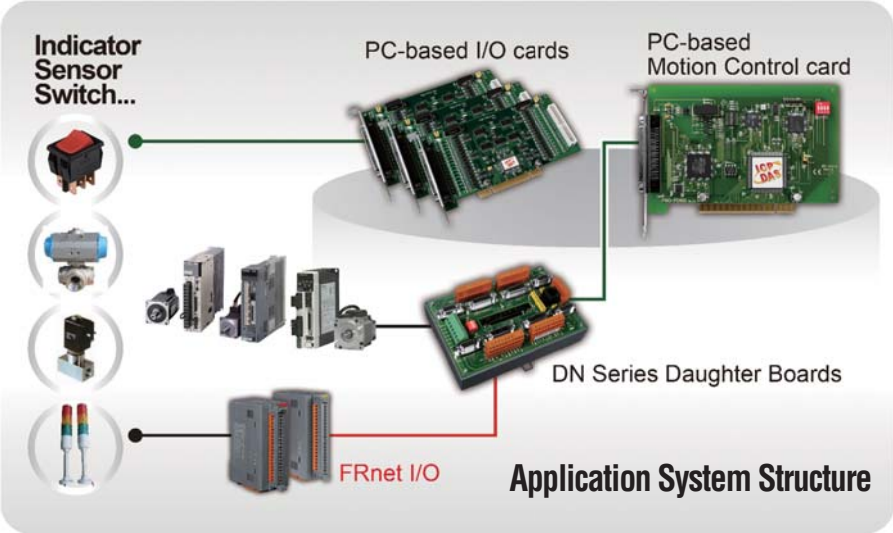
As a leading automation solutions provider, ICP DAS not only provides PAC solutions, but also develops PC-based solutions for machine automation applications, including the PCI bus motion control cards and the ISA bus motion control cards series.

In addition, we also offer a variety of quick-connect terminal blocks for a range of servo motors, including Mitsubishi, Panasonic, Yaskawa, Delta, etc., which helps customers quickly implement the installation and reduce the potential for using the incorrect wiring.



Applications

- Semiconductor Manufacturing
- Component Inspection
- Manufacturing Quality Control
- Food and Beverage Inspection
- Microscopy and Medical Imaging
- Biometrics Applications
- X-Y-Z Table
- Fix-pitch Stamping Machinery
- Transfer Machinery
- Spinner
- Load/Unload



Selection Guide : PC-based PCI/ISA Bus Motion Control Cards and Terminal Boards

PCI Bus Motion Control Cards		
PISO-PS200		PCI Bus, High-speed 2-axis Motion Control Card with FRnet Master
PISO-PS400		PCI Bus, High-speed 4-axis Motion Control Card with FRnet Master
PISO-PS410		PCI Bus, High-speed 4-axis Motion Control Card with FRnet Master
PISO-PS600		PCI Bus, High-speed, DSP-based, 6-axis Motion Control Card with FRnet Master
PISO-PS810		PCI Bus, High-speed 8-axis Motion Control Card with FRnet Master (Available Soon!)
PISO-ENCODER300U		PCI Bus, 3-axis Encoder Input Card
PISO-ENCODER600U		PCI Bus, 6-axis Encoder Input Card
PISO-PS300U		PCI Bus, 3-axis Stepper Motor/Servo Control Card (Limited Function and Economical)
PMDK		PCI Bus, DSP-based Professional Motion Development Kit
ISA Bus Motion Control Cards		
Encoder300		ISA Bus, 3-axis Encoder Interface Card
STEP-200		ISA Bus, 2-axis High-speed Stepper Motor Control Card (Limited Function and Economical)
SERVO-300		ISA Bus, 3-axis High-speed Servo Motor Control Card (V Command)

Terminal Boards for Machine Automation Products		
	DB-8R	Relay Board for Servo-300 and PISO-PS300U
	DB-200	Encoder Input Board for Servo-300
	DN-68 CR	Encoder Input Board for PISO-ENCODER300U/PISO-ENCODER600U
~New~	DN-20M	Manual-Pulse-Generator (MPG) and FRnet Input Board for PISO-PS600/VS600/PMDK
	DN-8237 Series	**Photo-isolated Terminal Board for 2-axis Stepper/Servo Motion Controller**
	DN-8237UB	Universal Snap-on Wiring Terminal Board
	DN-8237GB	General Purpose Wiring Terminal Board
	DN-8237MB	Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
	DN-8237PB	Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
	DN-8237YB	Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
	DN-8237DB	Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
~New~	**DN-8368 Series**	**Photo-isolated Terminal Board for PISO-PS600/VS600/PMDK**
	DN-8368UB	Universal Snap-on Wiring Terminal Board
	DN-8368GB	General Purpose Wiring Terminal Board
	DN-8368MB	Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
	DN-8468 Series	**Photo-isolated Terminal Board for ICP DAS 4-axis Stepper/Servo Motion Controllers**
	DN-8468UB	Universal Snap-on Wiring Terminal Board
	DN-8468GB	General Purpose Wiring Terminal Board
	DN-8468MB	Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
	DN-8468PB	Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
	DN-8468YB	Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
	DN-8468DB	Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
	DN-8468FB	Snap-on Wiring Terminal Board for Fuji FALDIC-W Servo Amplifier
~New~	DN-84100U	Universal Snap-on Wiring Terminal Board for PISO-PS410 and PISO-PS810

PISO-PS200

PCI Bus, High-speed 2-axis Motion Control Card with FRnet Master

Features:

- Independent 2-axis motion control
- Support for hand wheel and jog functions
- 2-axis linear / 2-axis circular interpolation function
- Continuous interpolation function
- Programmable T/S-curve acceleration and deceleration
- A maximum of 4 Mpps pulse output rate for each axis
- Pulse output types: CW/CCW or PULSE/DIR
- 32-bit encoder counter for each axis
- Encoder pulse input types: A/B phase or Up/Down
- Programmable automatic homing for each axis
- Programmable software limits
- Expandable Remote I/O: 128 DI and 128 DO via a two-wire FRnet interface

Introduction:

The **PISO-PS200** is a **2-axis** stepping/pulse-type servo motor control card that can be used on any IPC with a 5 V PCI bus, and is suitable for general-purpose motion control applications. This card equipped with one FRnet Master which allows the fast remote I/O of the IPC to be expanded easily. The two-wired FRnet interface allows a maximum 128 DI and 128 DO channels, which are automatically scanned within a period of **2.88 ms**.

In addition to its wide speed range, this intelligent motion controller also has a variety of motion control functions built in, such as **2-axis** linear interpolation, **2-axis** circular interpolation, T/S-curve acceleration/deceleration, numerous synchronous actions, automatic homing, and others. A major advantage is that the majority of the **PISO-PS200** motion control functions are performed by the high-performance motion ASIC with little load on the processor. The motion status, FRnet I/O, and the other I/O cards on the IPC can still be monitored while driving the motors.

As the low CPU loading requirements of the **PISO-PS200** is minimal, one or more motion cards can be used with a single IPC. ICP DAS also provides a variety of functions and examples that can be used to reduce the need for additional programming, making it a highly cost-effective solution for motion control application developers.

Software Support:

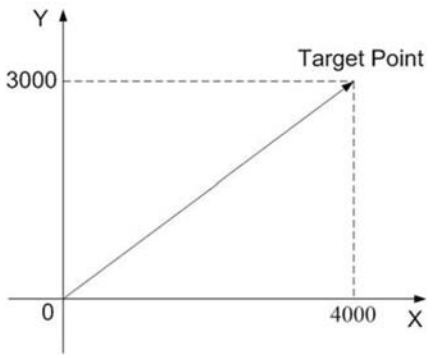
Windows Driver/DLL/Lib	Windows XP/2000
DOS Library	-
Labview Development Kit	-
Linux Library	-

Specifications:

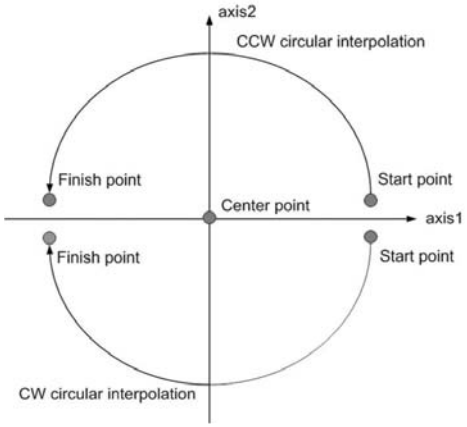
Number of Axes	2
Slot Interface	5 V PCI bus
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse command
Resolution	32-bit
Pulse Output Mode	CW/CCW, PULSE/DIR
Operation Mode	Semi-closed Loop
Linear Interpolation	2 axes
Circular Interpolation	2 axes
Speed Curve Profile	T/S-curve
Motion Relative I/O	Home, LMT+/-, NHOME, EMG, INP, ALM, SVON
Synchronous Action	-
Ring Counter Mode	32-bit
Position Control Mode	Incremental mode
Position Compare Trigger	-
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Encoder Rate	4 MHz
Digital Input Channels	Expandable: 128 DI
Digital Output Channels	Expandable: 128 DO
I/O Isolation (with DN-8237)	2500 Vrms optical isolation
Connector	37-pin D-sub
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	-20 ~ +75°C
Storage Temperature	-30 ~ +85°C
Ambient Relative Humidity	5 ~ 90% RH, non-condensing

Features of Motion Function:

2-Axis Linear Interpolation

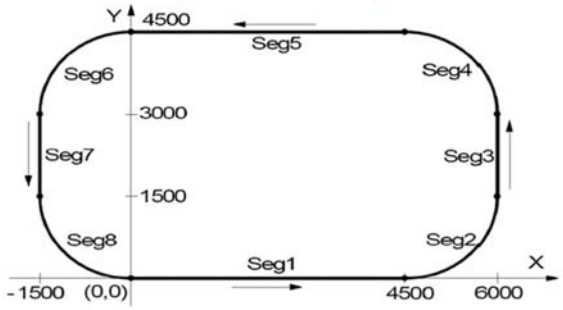


2-Axis Circular Interpolation

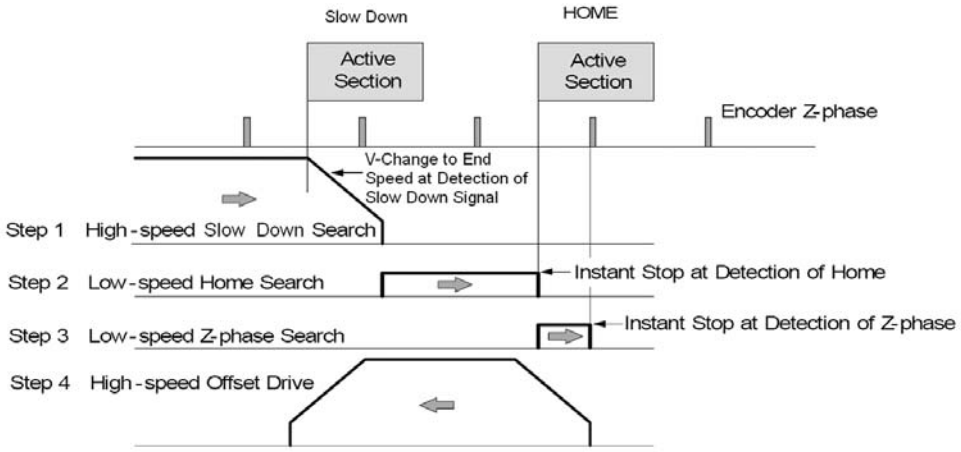


Continuous interpolation

8 Segments Continuous Interpolation Motion
(Linear+ Circular)



4 Steps Automatic Home Searching



Ordering Information/Accessories:

Model No.	Description
PISO-PS200	PCI Bus, High-speed 2-axis Motion Control Card with FRnet Master
DN-8237UB	Photo-isolated Universal Snap-on Wiring Terminal Board
DN-8237GB	Photo-isolated General Purpose Wiring Terminal Board
DN-8237MB	Photo-isolated Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
DN-8237PB	Photo-isolated Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
DN-8237YB	Photo-isolated Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
DN-8237DB	Photo-isolated Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
CA-3715DM-H / CA-3730DM-H / CA-3750DM-H	37-pin D-Sub Male-Male Cable for Terminal Board (180º), Length 1.5 M / 3.0 M / 5.0 M.

PISO-PS400

PCI Bus, High-speed 4-axis Motion Control Card with FRnet Master

Features:

- Independent 4-axis motion control
- Support for hand wheel and jog functions
- 2/3-axis linear / 2-axis circular interpolation function
- Continuous interpolation function
- Programmable T/S-curve acceleration and deceleration
- A maximum pulse output rate of 4 Mpps for each axis
- Pulse output types: CW/CCW or PULSE/DIR
- 32-bit encoder counter for each axis
- Encoder pulse input types: A/B phase or Up/Down
- Programmable automatic homing for each axis
- Programmable software limits
- A wide range of synchronous actions (event-triggered actions)
- Expandable Remote I/O: 128 DI & 128 DO via a two-wire FRnet interface

Introduction:

The **PISO-PS400** is a **4-axis** stepping/pulse-type servo motor control card that can be used on any IPC with a 5 V PCI bus, and is suitable for general-purpose motion control applications. This card equipped with one FRnet Master which allows the fast remote I/O of the IPC to be expanded easily. The two-wired FRnet interface allows a maximum 128 DI and 128 DO channels, which are automatically scanned within a period of **2.88 ms**.

In addition to its wide speed range, this intelligent motion controller also has a variety of motion control functions built in, such as **2/3-axis** linear interpolation, **2-axis** circular interpolation, T/S-curve acceleration/deceleration, numerous synchronous actions, automatic homing, and others. A major advantage is that the majority of the **PISO-PS400** motion control functions are performed by the high-performance motion ASIC with little load on the processor. The motion status, FRnet I/O, and the other I/O cards on the IPC can still be monitored while driving the motors.

As the low CPU loading requirements of the **PISO-PS400** is minimal, one or more motion cards can be used with a single IPC. ICP DAS also provides a variety of functions and examples that can be used to reduce the need for additional programming, making it a highly cost-effective solution for motion control application developers.

Software Support:

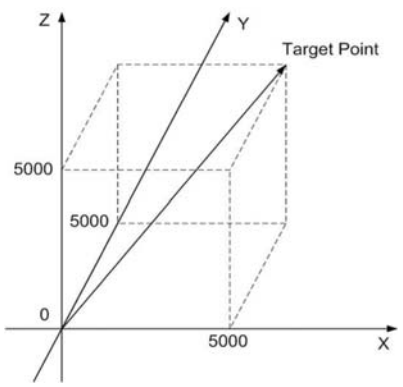
Windows Driver/DLL/Lib	Windows 7 32/64-bit Windows XP/2000 32-bit
DOS Library	-
Labview Development Kit	Labview 5.0 ~ Labview 8.x
Linux Library	-

Specifications:

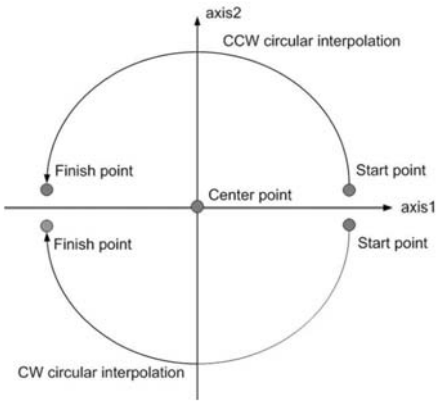
Number of Axes	4
Slot Interface	5 V PCI bus
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse Command
Resolution	32-bit
Pulse Output Mode	CW/CCW, PULSE/DIR
Operation Mode	Semi-closed Loop
Linear Interpolation	Any 2 to 3 of 4 axes
Circular Interpolation	Any 2 axes
Speed Curve Profile	T/S-curve
Motion Relative I/O	Home, LMT+/-, NHOME, EMG, INP, ALM, SVON
Synchronous Action	10 activation factors and 14 actions
Ring Counter Mode	32-bit
Position Control Mode	Incremental mode and absolute mode
Position Compare Trigger	10 KHz
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Encoder Rate	4 MHz
Digital Input Channels	Expandable : 128 DI
Digital Output Channels	Expandable : 128 DO
I/O Isolation (With DN-8468)	2500 Vrms optical isolation
Connector	68-pin SCSI-II connector
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	-20 ~ +75°C
Storage Temperature	-30 ~ +85°C
Ambient Relative Humidity	5 ~ 90% RH, non-condensing

Features of Motion Function:

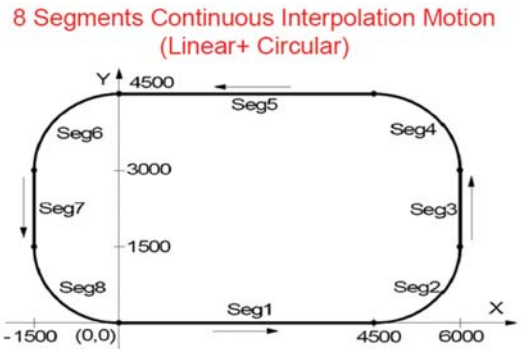
2 or 3-Axis Linear Interpolation



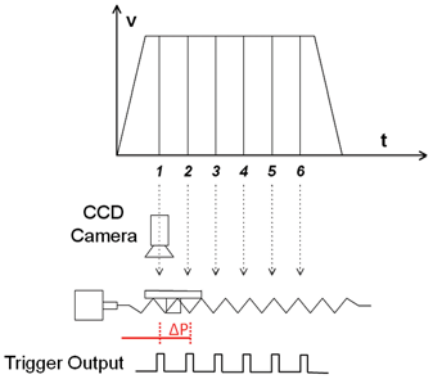
2-Axis Circular Interpolation



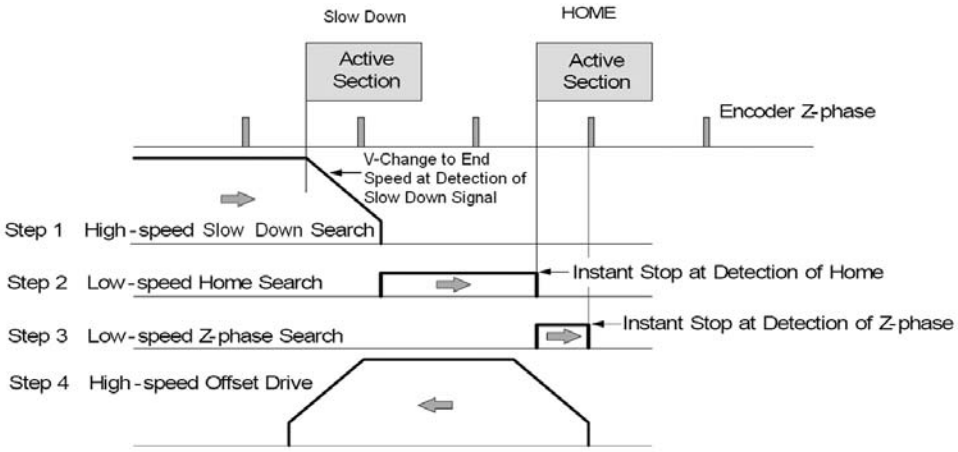
Continuous interpolation



High Speed Position Compare



4 Steps Automatic Home Searching



Ordering Information/Accessories:

Model No.	Description
PISO-PS400	**PCI Bus, High-speed 4-axis Motion Control Card with FRnet Master**
DN-8468UB	Photo-isolated Universal Snap-on Wiring Terminal Board
DN-8468GB	Photo-isolated General Purpose Wiring Terminal Board
DN-8468MB	Photo-isolated Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
DN-8468PB	Photo-isolated Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
DN-8468YB	Photo-isolated Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
DN-8468DB	Photo-isolated Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
DN-8468FB	Photo-isolated Snap-on Wiring Terminal Board for Fuji FALDIC-W Servo Amplifier
CA-SCSI15-H / CA-SCSI30-H / CA-SCSI50-H	68-pin SCSI-II Male-Male Connector Cable, Length 1.5 M / 3 M / 5 M.

PISO-PS410

PCI Bus, High-speed 4-axis Motion Control Card with FRnet Master

Features:

- Independent 4-axis motion control
- Support for hand wheel and jog functions
- 4-step home modes with auto-searching
- 2/3-axis linear interpolation function
- 2-axis circular interpolation function
- Programmable T/S-curve acceleration and deceleration
- Programmable ring counter
- Alarm reset and error counter clear output (ERC)
- High-speed auto incremental and auto reloadable compare output (CMP)
- Expandable remote I/O:
  128 DI and 128 DO via a two-wire FRnet interface.

Introduction:

The **PISO-PS410** is a **4-axis** stepping/pulse-type servo motor control card that can be used on any IPC with a 5 V or 3.3 V PCI bus, and is suitable for general-purpose motion control applications. This card equipped with one FRnet Master which allows the fast remote I/O of the IPC to be expanded easily. The two-wired FRnet interface allows a maximum 128 DI and 128 DO channels, which are automatically scanned within a period of **0.72 ms**.

In addition to its wide speed range, this intelligent motion controller also has a variety of motion control functions built in, such as **2/3-axis** linear interpolation, **2-axis** circular interpolation, T/S-curve acceleration/deceleration, numerous synchronous actions, automatic homing, and others. A major advantage is that the majority of the **PISO-PS410** motion control functions are performed by the high-performance motion ASIC with little load on the processor. The motion status, FRnet I/O, and the other I/O cards on the IPC can still be monitored while driving the motors.

As the low CPU loading requirements of the **PISO-PS410** is minimal, one or more motion cards can be used with a single IPC. ICP DAS also provides a variety of functions and examples that can be used to reduce the need for additional programming, making it a highly cost-effective solution for motion control application developers.

Software Support:

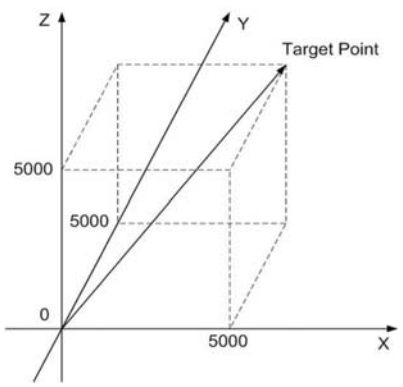
Windows Driver/DLL/Lib	Windows 7 32/64-bit Windows XP/2000 32-bit
DOS Library	-
Labview Development Kit	-
Linux Library	-

Specifications:

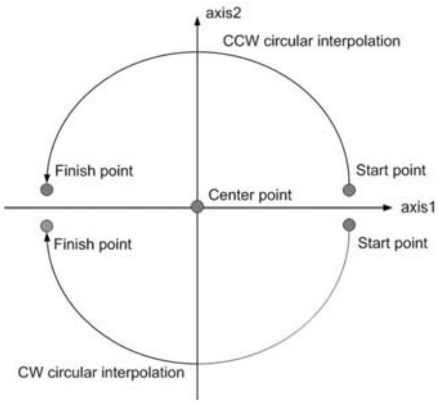
Number of Axes	4
Slot Interface	Universal PCI Bus
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse Command
Pulse Output Mode	CW/CCW, PULSE/DIR
Operation Mode	Semi-closed Loop
Linear Interpolation	Any 2 to 3 of 4 axes
Circular Interpolation	Any 2 axes
Speed Curve Profile	T/S curve
Mechanical Switch Input	Home, LMT+/-, NHOME, EMG
Servo I/O Interface	Input : INP, ALM Output: SVON, ALM_RST, ERC
Synchronous Action	10 activation factors and 14 actions
Ring Counter Mode	32-bit
Position Control Mode	Incremental mode and absolute mode
Position Compare Trigger	4 MHz
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Encoder Counting Rate	4 MHz
Digital Input Channels	Local : 4 DI Expandable : 128 DI
Digital Output Channels	Local : 4 DO Expandable : 128 DO
I/O Isolation	2500 Vrms optical isolation
Connector	100-pin SCSI-II
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	-20 ~ +75 °C
Storage Temperature	-30 ~ +85 °C
Ambient Relative Humidity	5 ~ 90 % RH, non-condensing

Features of Motion Function:

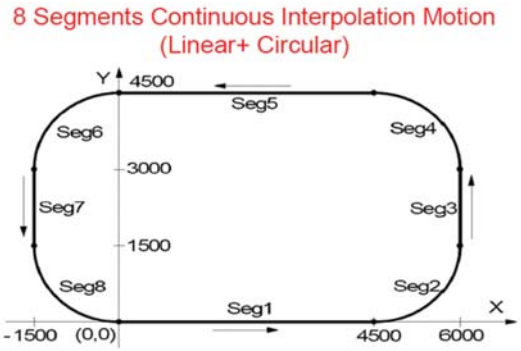
2 or 3-Axis Linear Interpolation



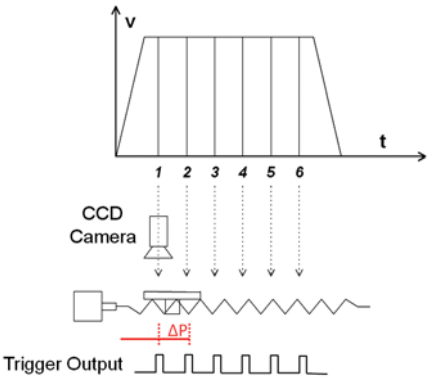
2-Axis Circular Interpolation



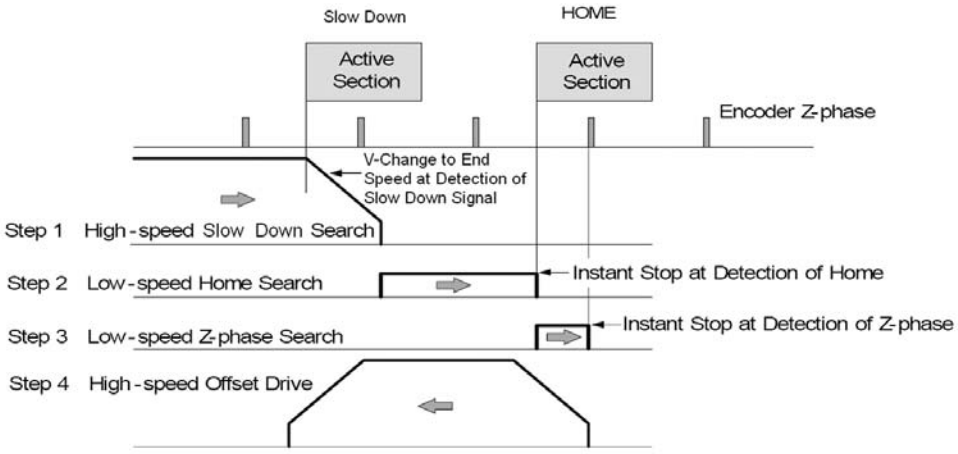
Continuous interpolation



High Speed Position Compare



4 Steps Automatic Home Searching



Ordering Information/Accessories:

Model No.	Description
PISO-PS410	PCI Bus, High-speed 4-axis Motion Control Card with FRnet Master
DN-84100U	Universal Snap-on Wiring Terminal Board for PISO-PS410 and PISO-PS810
CA-SCSI100-15	SCSI-II 100-pin & 100-pin Male Connector Cable, Length 1.5 M.

PISO-PS600

PCI Bus, High-speed, DSP-based, 6-axis Motion Control Card with FRnet Master

Features:

- DSP-based motion control card with PCI interface
- Independent 6-axis motion control
- Support both full-closed and semi-closed control modes
- Maximum pulse output frequency: 4 Mpps
- Maximum Encoder input frequency: 12 MHz
- 4-step home mode with auto-searching
- 2- to 6-axis linear/2- to 3-axis circular interpolation function
- Programmable T/S-curve acceleration and deceleration
- Change speed and position on the fly
- High-speed position latch and compare trigger
- Fully-functional manual-pulse-generator and jog functions
- Expandable remote I/O: 128 DI and 128 DO via a two-wire FRnet interface.

Introduction:

The **PISO-PS600** controller combines a new generation 1600 MIPS digital signal processor with a 9526 logic element FPGA (Field Programmable Gate Array), I/O buffering circuitry, and motion control characterization software to control the position of **6-axis** pulse command servo/stepper motors. The **PISO-PS600** not only realizes motion control using full-closed loop (or semi-closed loop) operations and error handling, but also adopts feed-forward gain to reduce the speed profile following errors to achieve position control.

The **PISO-PS600** can be used on any IPC with a PCI bus, and is suitable for general-purpose motion control applications. This card also contains one FRnet port which allows the fast digital I/O of the IPC to be easily expanded. This two-wired FRnet interface allows a maximum 128 DI and 128 DO channels, which are automatically scanned within a period of **0.72 ms**. In additions to its wide speed range, this intelligent motion controller also has a variety of built-in motion control functions, such as **2- to 6-axis** linear interpolation, **2- to 3-axis** circular interpolation, T/S-curve acceleration/deceleration, and automatic homing, etc.

Specifications:

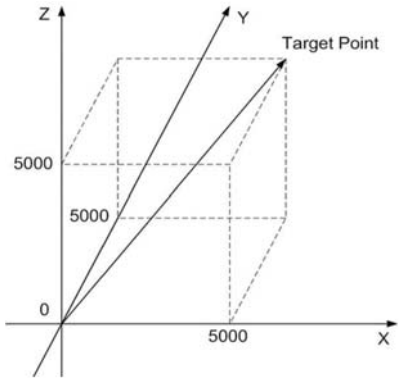
Number of Axes	6
Slot Interface	Universal PCI Bus
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse Command
Servo Update Rate	2 KHz
Pulse Output Mode	CW/CCW, PULSE/DIR, A/B pulse
Operation Mode	Full-closed Loop/Semi-closed Loop
Linear Interpolation	Any 2 to 6 of 6 axes
Circular Interpolation	Any 2 to 3 of 6 axes
Speed Curve Profile	T/S-curve
Mechanical Switch Input	Home, LMT+/-, NHOME, LTC, EMG
Servo I/O Interface	Input: INP, ALM, RDY Output: SVON, ALM_RST, ERC
Ring Counter Mode	32-bit
Position Control Mode	Incremental mode and absolute mode
Position Compare Trigger	4 MHz
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Encoder Counting Rate	12 MHz
Digital Input Channels	Local: 12 DI Expandable: 128 DI
Digital Output Channels	Local: 3 DO Expandable: 128 DO
I/O Isolation (with DN-8368)	2500 Vrms optical isolation
Connector	68-pin VHDCI Connector and 20-pin SCSI-II
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	0 ~ +60 °C
Storage Temperature	-20 ~ +80 °C
Ambient Relative Humidity	5 ~ 90 % RH, non-condensing

Software Support:

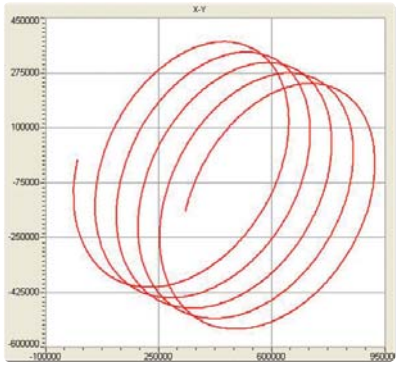
Windows Driver/DLL/Lib	Windows 7 32/64-bit Windows XP/2000 32-bit
DOS Library	-
Labview Development Kit	-
Linux Library	-

Features of Motion Function:

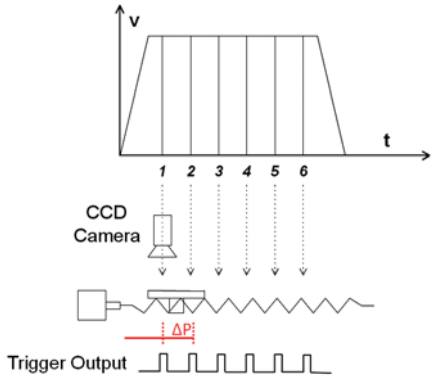
2 to 6-Axis Linear Interpolation



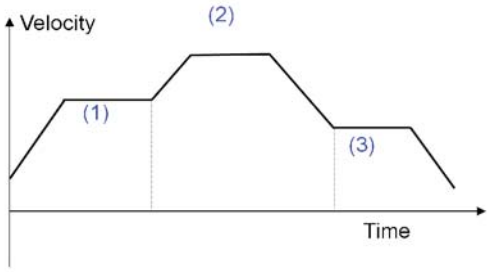
3-Axis Circular or Helical Interpolation



High Speed Position Compare

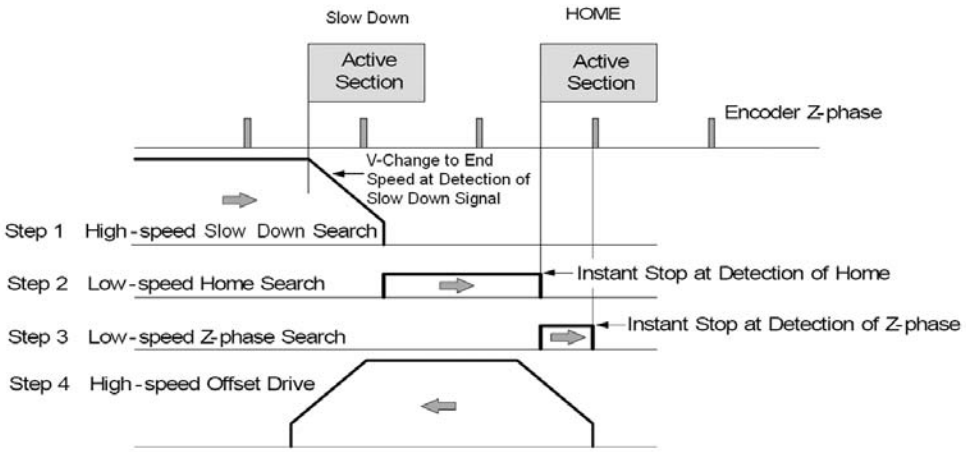


Multi-Axis Continuous Interpolation (With Acc. and Dec.)



Huge Command Buffer and Real Time Coordinate Transformation Suitable for Robotic Control

4 Steps Automatic Home Searching



Ordering Information/Accessories:

Model No.	Description
PISO-PS600	PCI Bus, High-Speed, DSP-based, 6-axis Motion Control Card with FRnet Master
DN-8368UB	Photo-isolated Universal Snap-on wiring terminal board
DN-8368GB	Photo-isolated General-purpose wiring terminal board
DN-8368MB	Photo-isolated Snap-on wiring terminal board for Mitsubishi MELSERVO-J2 servo amplifier
DN-20M	Manual-Pulse-Generator (MPG) and FRnet Input Board for PISO-PS600/VS600/PMDK (RoHS)
CA-MINI68-15	68-pin VHDCI to SCSI-II Connector Cable, Length 1.5 M
CA-SCSI20-M1 / CA-SCSI20-M3 / CA-SCSI20-M5	20-pin SCSI-II Male connector cable (for Mitsubishi J2 series motor), Length 1 M / 3 M / 5 M.

PISO-PS810

PCI Bus, High-speed 8-axis Motion Control Card with FRnet Master

Features:

- Independent 8-axis motion control
- Support for hand wheel and jog functions
- 4-step home modes with auto-searching
- 2/3-axis linear interpolation function
- 2-axis circular interpolation function
- Programmable T/S-curve acceleration and deceleration
- Programmable ring counter
- Alarm reset and error counter clear output (ERC)
- High-speed auto-incremental and auto-reloadable compare output (CMP)
- Expandable remote I/O: 128 DI & 128 DO via a two-wire FRnet interface

Introduction:

The **PISO-PS810** is a 8-axis stepping/pulse-type servo motor control card that can be used on any IPC with a 5 V or 3.3 V PCI bus, and is suitable for general-purpose motion applications. This card equipped with one FRnet Master which allows the fast remote I/O of the IPC to be expanded easily. The two-wired FRnet interface allows a maximum 128 DI and 128 DO channels, which are automatically scanned within a period of **0.72 ms**.

In addition to its wide speed range, this intelligent motion controller also has a variety of motion control functions built in, such as **2/3-axis** linear interpolation, **2-axis** circular interpolation, T/S-curve acceleration/deceleration, numerous synchronous actions, automatic homing, and others. A major advantage is that the majority of the **PISO-PS810** motion control functions are performed by the high-performance motion ASIC with little load on the processor. The motion status, FRnet I/O, and the other I/O cards on the IPC can still be monitored while driving the motors.

As the low CPU loading requirements of the **PISO-PS810** is minimal, one or more motion cards can be used with a single IPC. ICP DAS also provides a variety of functions and examples that can be used to reduce the need for additional programming, making it a highly cost-effective solution for motion control application developers.

Software Support:

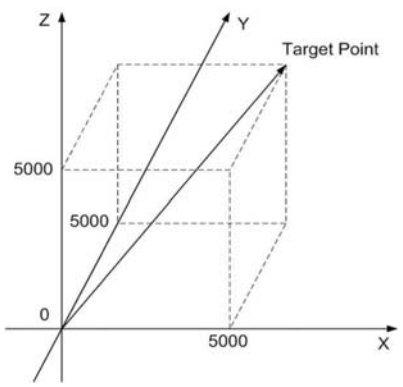
Windows Driver/DLL/Lib	Windows 7 32/64-bit Windows XP/2000 32-bit
DOS Library	-
Labview Development Kit	-
Linux Library	-

Specifications:

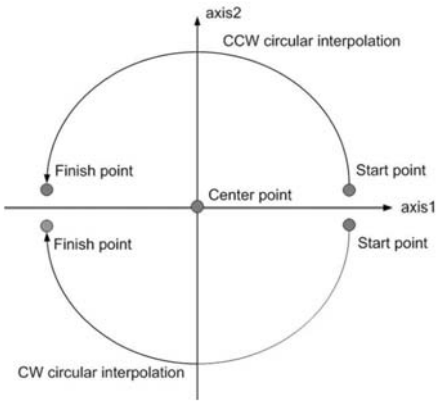
Number of Axes	8
Slot Interface	Universal PCI bus
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse Command
Resolution	32-bit
Pulse Output Mode	CW/CCW, PULSE/DIR
Operation Mode	Semi-closed Loop
Linear Interpolation	2 groups of 2 to 3 axes Interpolation
Circular Interpolation	2 groups of 2 axes Interpolation
Speed Curve Profile	T/S curve
Motion Relative I/O	Home, LMT+/-, NHOME, EMG, INP, ALM, SVON, ALM_RST, ERC
Synchronous Action	10 activation factors and 14 actions
Ring Counter Mode	32-bit
Position Control Mode	Incremental mode and absolute mode
Position Compare Trigger	4 MHz
Encoder Interface	A/B Pulse, Up/Down
Encoder Counter	32-bit
Encoder Rate	4 MHz
Digital Input Channels	Local : 8 DI Expandable : 128 DI
Digital Output Channels	Local : 8 DO Expandable : 128 DO
I/O Isolation	2500 Vrms optical isolation
Connector	100-pin VHDCI
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	-20 ~ +75 °C
Storage Temperature	-30 ~ +85 °C
Ambient Relative Humidity	5 ~ 90 % RH, non-condensing

Features of Motion Function:

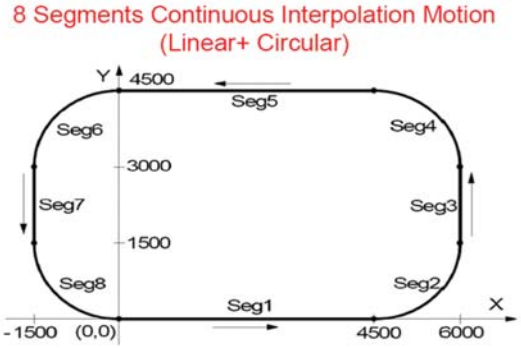
2 or 3-Axis Linear Interpolation



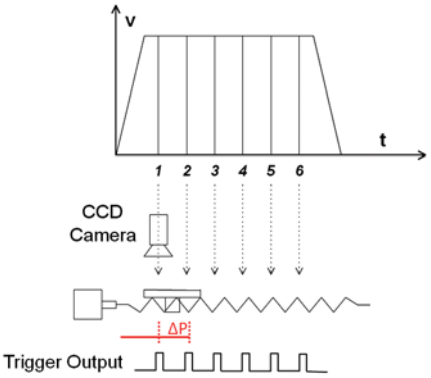
2-Axis Circular Interpolation



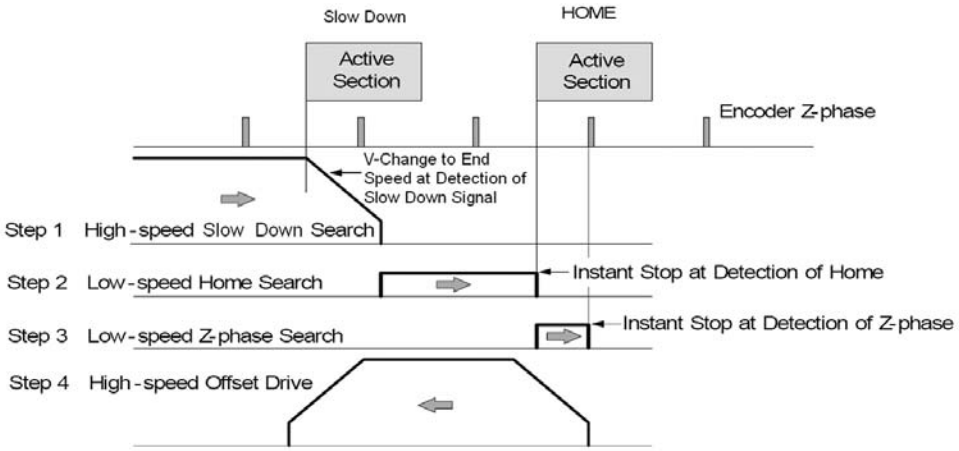
Continuous interpolation



High Speed Position Compare



4 Steps Automatic Home Searching

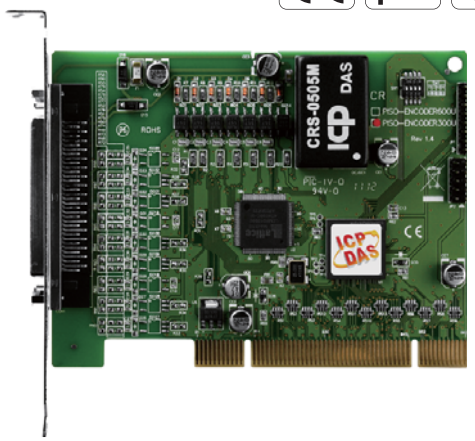


Ordering Information/Accessories:

Model No.	Description
PISO-PS810	PCI Bus, High-speed 8-axis Motion Control Card with FRnet Master
DN-84100U	Universal Snap-on Wiring Terminal Board for PISO-PS410 and PISO-PS810
CA-MINI100-15	100-pin VHDCI to SCSI-II Connector Cable, Length 1.5 M

PISO-ENCODER300U

PCI Bus, 3-axis Encoder Input Card



Features:

- Universal PCI bus
- 3-axis encoder counter
- True 32-bit counter
- Maximum Counting Rate: 1 MHz
- Third-order internal digital filter
- Counting Mode: Quadrant, CW/CCW, PULSE/DIR
- A+, A-, B+, B-, C+, C- inputs
- Programmable reset counter function
- Index (C channel) reset counter function
- Hardware reset (HR1 ~ HR6), reset counter function
- 68-pin SCSI-II connector

Introduction:

The **PISO-ENCODER300U** contains a **3-axis** encoder counter and each axis has a 32-bit, true counter with a maximum counting rate of 1 MHz. The counting mode can be selected from three types: 1. Quadrant mode, 2. CW/CCW mode, and 3. PULSE/DIR mode. There are also three 3 kinds of counter reset modes provided: 1. Register Reset, 2. Index Reset, and 3. Hardware Reset. The "Index Reset" mode resets by using a C+/C- channel, which will reset the counter on each revolution. The "Hardware Reset" mode resets the counter using an external pin (HR1 ~ HR6). The HR1 ~ HR6 pins can also be used as digital input.

The **PISO-ENCODER300U** also provides 8-ch digital outputs. 2500 Vrms photo-couplers are used to isolate the digital I/O to prevent high voltages from affecting the system. Device drivers and function libraries for DOS, Windows 7 and Windows XP/2000 are provided.

Specifications:

Number of Axes	3
Slot Interface	Universal PCI bus
Resolution	32-bit
Encoder Mode	Quadrant, CW/CCW, PULSE/DIR
Maximum Counting Rate	1 MHz
Digital Output Channels	8
I/O Isolation	2500 Vrms optical isolation
Connector	68-pin SCSI-II female connector
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	0 ~ +60°C
Storage Temperature	-20 ~ +80°C
Ambient Relative Humidity	0 ~ 90% RH, non-condensing
Dimensions	120.4 mm x 90.8 mm

Software Support:

Windows Driver/DLL/Lib	Windows 7 32/64-bit Windows XP/2000 32-bit
DOS Library	DOS 6.2
Labview Development Kit	Labview 8.5 and above
Linux Library	-

Ordering Information/Accessories:

Model No.	Description
PISO-ENCODER300U CR	Universal PCI Bus 3-axis Encoder Input Card (RoHS) Includes: CA-SC68, SCSI-II 68-pin Male Connector (Solder Type) with Cover
DN-68 CR	Encoder Input Board for PISO-ENCODER300U / PISO-ENCODER600U

PISO-ENCODER600U

PCI Bus, 6-axis Encoder Input Card

Features:

- Universal PCI bus
- 6-axis encoder counter
- True 32-bit counter
- Maximum Counting Rate: 1 MHz
- Third-order internal digital filter
- Counting Mode: Quadrant, CW/CCW, PULSE/DIR
- A+, A-, B+, B-, C+, C- inputs
- Programmable reset counter function
- Index (C channel) reset counter function
- Hardware reset (HR1 ~ HR6), reset counter function
- 68-pin SCSI-II connector

Introduction:

The **PISO-ENCODER600U** contains a **6-axis** encoder counter and each axis has a 32-bit, true counter with a maximum counting rate of 1 MHz. The counting mode can be selected from three types: 1. Quadrant mode, 2. CW/CCW mode, and 3. PULSE/DIR mode. There are also three 3 kinds of counter reset modes provided: 1. Register Reset, 2. Index Reset, and 3. Hardware Reset. The "Index Reset" mode resets by using a C+/C- channel, which will reset the counter on each revolution. The "Hardware Reset" mode resets the counter using an external pin (HR1 ~ HR6). The HR1 ~ HR6 pins can also be used as digital input.

The **PISO-ENCODER600U** also provides 8-ch digital outputs. 2500 Vrms photo-couplers are used to isolate the digital I/O to prevent high voltages from affecting the system. Device drivers and function libraries for DOS, Windows 7 and Windows XP/2000 are provided.

Specifications:

Number of Axes	6
Slot Interface	Universal PCI bus
Resolution	32-bit
Encoder Mode	Quadrant, CW/CCW, PULSE/DIR
Maximum Counting Rate	1 MHz
Digital Output Channels	8
I/O Isolation	2500 Vrms optical isolation
Connector	68-pin SCSI-II female connector
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	0 ~ +60°C
Storage Temperature	-20 ~ +80°C
Ambient Relative Humidity	0 ~ 90% RH, non-condensing
Dimensions	120.4 mm x 90.8 mm

Software Support:

Windows Driver/DLL/Lib	Windows 7 32/64-bit Windows XP/2000 32-bit
DOS Library	DOS 6.2
Labview Development Kit	Labview 8.5 and above
Linux Library	Linux 2.6

Ordering Information/Accessories:

Model No.	Description
PISO-ENCODER600U CR	Universal PCI Bus 6-axis Encoder Input Card (RoHS) Includes: CA-SC68, SCSI-II 68-pin Male Connector (Solder Type) with Cover
DN-68 CR	Encoder Input Board for PISO-ENCODER300U / PISO-ENCODER600U

PISO-PS300U

PCI Bus, 3-axis Stepper Motor/Servo Control Card (Limited Functions and Economical)

Features:

- Universal PCI Bus
- 3-axis pulse command servo motor board
- Embedded CPU
- Max. Pulse Rate: 1 MHz
- 3-axis linear interpolation, circular interpolation
- Programmable trapezoidal speed profile
- Programmable DDA cycle
- Hardware emergency stop
- Drivers for DOS, Windows XP/2000 and Windows 7
- 8 DI, 7 DO channels

Introduction:

The **PISO-PS300U** is a **3-axis** pulse command, servo motor control board. The embedded CPU of the PISO-PS300U performs the motion commands transferred from a Host PC via a 2 KB FIFO buffer. It also sends the position and status to the Host PC via a second 2 KB FIFO buffer. These buffers provide time buffer and they are very suitable for Windows operating systems. Device drivers and function libraries for DOS, Windows 7 and Windows XP/2000 are provided.

Specifications:

Number of Axes	3
Slot Interface	Universal PCI bus
Resolution	32-bit
Command Type	Pulse command
Maximum Pulse Output Rate	1 MHz
Pulse Output Mode	CW/CCW, PULSE/DIR
Operation Mode	Semi-closed Loop
Linear Interpolation	Any 2 to 3 of 3 axes
Circular Interpolation	Any 2 axes
Speed Curve Profile	T-curve
Motion Relative I/O	Home, forward, backward limit, EMG, SVON
Synchronous Action	-
Ring Counter Mode	-
Position Control Mode	Incremental mode
Position Compare Trigger	-
Encoder Interface	A/B phase, CW/CCW, PULSE/DIR
Encoder Counter	32-bit
Encoder Rate	1 Mz
Digital Input Channels	8
Digital Output Channels	7
I/O Isolation	2500 Vrms optical isolation
Connector	9-pin male and 25-pin female D-sub
Power Consumption	+5 V @ 950 mA
Environmental	
Operating Temperature	0 ~ +60°C
Storage Temperature	-20 ~ +70°C
Ambient Relative Humidity	0~90% RH, non-condensing

Software Support:

Windows Driver/DLL/Lib	Windows 7/XP/2000 32-bit only
DOS Library	DOS 6.2
Labview Development Kit	-
Linux Library	-

Ordering Information/Accessories:

Model No.	Description
PISO-PS300U CR	Universal PCI Bus, 3-axis Stepper Motor/Servo Control Card (Limited Functions and Economical) Includes: CA-9-2502 (9-pin Male and 25-pin Female D-Sub Cable, Length 0.2 M) CA-PC09F (9-pin Female D-Sub Connector with Plastic Cover) CA-PC09M (9-pin Male D-Sub Connector with Plastic Cover) CA-PC25M (25-pin Male D-Sub Connector with Plastic Cover)
DB-8R	Relay Board for SERVO-300 and PISO-PS300U

PMDK

PCI Bus, DSP-based Professional Motion Development Kit

Features:

- DSP-based control card with PCI interface
- Capable of 6-axis motion control
- Maximum Pulse Output Frequency: 4 Mpps
- Maximum Encoder Input Frequency: 12 Mpps
- High-speed position latching and comparing functions
- Home, positive and negative limit sensors for each axis
- Manual-pulse-generator (MPG) interface
- Expandable Remote I/O: 128 DI & 128 DO via a two-wire FRnet interface

Introduction:

The **PMDK** is a DSP-based PCI motion control card suitable for the development of professional motion control applications, and can be used with any IPC that has a 5 V PCI bus. A wide range of applications can be implemented thanks to the integration of a high-speed DSP (TI C672x), an FPGA (Field Programmable Gate Array), and I/O buffering circuitry. A diverse array of I/O interfaces are incorporated into the PMDK, including 6 channels for pulse I/O, 6 channels for AI/AO and a variety of DI/DO channels. The card also includes a single two-wire FRnet port that can be used to remotely control up to 128 DI and 128 DO channels, which, together with the numerous software samples that are provided, allows the rapid development of custom programs.

The PMDK enables users to implement a variety of cost-effective motion control functions, including multi-axis linear and circular interpolation with acceleration/deceleration processing. A variety of synchronous actions are also possible through programming. The included sample software can be used to design custom motion functions which can then be appended to the original motion command set. DSP programs are developed based on a real-time kernel (DSP/BIOS), meaning that motion status, FRnet I/O status and the status of other I/O interfaces can still be monitored while driving operations are being performed, and, as the loading on the CPU is very low, one or more motion cards can be used on a single IPC.

If the PMDK is to be used for signal processing, users can refer to a range of samples provided by ICP DAS illustrating how to implement FFT, FIR and IIR, together with the resources provided by TI. In the future, ICP DAS will be providing a wider library of functions and examples that will further reduce the level of programming required by users in order to implement their custom applications. In summary, the PMDK is a highly cost-effective solution for users intending to develop custom applications for motion control, process control, I/O logic control, digital processing, and applications in a wide range of other domains.

Specifications:

Number of Axes	6
Slot Interface	Universal PCI bus
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse command, V command
Resolution	32-bit
Servo Update Rate	User Programmable
Pulse Output Mode	CW/CCW, PULSE/DIR
Motion Relative I/O	Home, LMT+/-, NHOME, EMG, INP, ALM, SVON, ALM_RST, ERC
Position Compare Trigger	User Programmable
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Encoder Counting Rate	12 MHz
Digital Input Channels	Expandable: 128 DI
Digital Output Channels	Expandable: 128 DO
I/O Isolation (with DN-8368)	2500 Vrms optical isolation
Connector	68-pin SCSI-II connector & 20-pin SCSI-II
Power Consumption	-
Environmental	
Operating Temperature	-20 ~ +75°C
Storage Temperature	-30 ~ +85°C
Ambient Relative Humidity	5 ~ 90% RH, non-condensing

Ordering Information/Accessories:

Model No.	Description
PMDK	PCI Bus DSP-based Professional Motion Development Kit
DN-8368UB	Photo-isolated Universal Snap-on wiring terminal board
DN-8368GB	Photo-isolated General-purpose wiring terminal board
DN-8368MB	Photo-isolated Snap-on wiring terminal board for Mitsubishi MELSERVO-J2 servo amplifier
DN-20M	Manual-Pulse-Generator (MPG) and FRnet Input Board for PISO-PS600/VS600/PMDK (RoHS)
CA-MINI68-15	68-pin VHDCI to SCSI-II Connector Cable, Length 1.5 M
CA-SCSI20-M1 / M3 / M5	SCSI-II 20-pin and 20-pin Male Connector Cable for Mitsubishi Motor, Length 1 M / 3 M / 5 M.
CA-2P4C-0100	The Cable for FRnet Modules, Length 100 M.

ENCODER300

ISA Bus, 3-axis Encoder Interface Card

Features:

- Accepts inputs from incremental or quadrature encoders
- 3 independent axes
- Max. Quadrature Input Frequency: 1 MHz
- Counts per Encoder Cycle: X1, X2, X4 (Software selectable)
- Encoder Input Modes: Quadrature , Up/Down , PULSE/DIR

Introduction:

The **ENCODER300** is a **3-axis** quadrature encoder interface board for IBM PC/AT bus-compatible devices. Phase 0, phase 90 and index pulse inputs are provided for each encoder. Inputs may be single ended (A, B or C) or differential (A+, A-, B+, B-, C+ or C-). Power and ground connections are also provided for use by the encoder if needed. Inputs are conditioned by a four-stage digital filter, and the maximum input rate in quadrature decode mode is 1 MHz. The conditioned inputs are applied to a 16-bit counter, which may be used for quadrature decoding, pules or direction-input counting, or as a pulse input up/down counter.

Specifications:

Number of Axes	3
Slot Interface	ISA bus
Resolution	16-bit
Mode	Quadrant, CW/CCW, PULSE/DIR
Maximum Counting Rate	1 MHz
Digital Output Channels	-
I/O Isolation	-
Connector	25-pin D-Sub
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	0 ~ +60°C
Storage Temperature	-20 ~ +80°C
Ambient Relative Humidity	0 ~ 90 % RH, non-condensing

Software Support:

Windows Driver/DLL/Lib	Windows 95/98/ME/NT4.0
DOS Library	DOS 6.2
Labview Development Kit	-
Linux Library	-

Ordering Information/Accessories:

Model No.	Description
ENCODER300	ISA Bus, 3-axis Encoder Interface Card Includes: CA-PC25M (25-pin Male D-Sub Connector with Plastic Cover)
DN-25	I/O Connector Block with 25-pin/9-pin D-Sub Connector (DIN-Rail Mounting)

STEP-200

ISA Bus, 2-axis High-speed Stepper Motor Control Card
(Limited Functions and Economical)

Features:

- 2-axis independent, simultaneous stepper motor control/servo motor control (Pulse input type)
- Drivers for DOS, Windows 95/98/ME, Windows NT
- Embedded Microprocessor
- Command Type Interface
- Linear and circular interpolation
- Acceleration/deceleration:
  Automatic trapezoidal acceleration/deceleration
- Output polarity can be programmable
- 5 optical isolated digital inputs per axis for limit switches

Introduction:

The **STEP-200** is a **2-axis**, command-based stepper motor controller board for IBM PC/XT/AT bus-compatible devices. The board can also be used for pulse-type servo motor control (pulse input type). The board includes a build-in µP that performs a variety of motion control commands and shares the loading of the host computer. A 2 KB FIFO is included as a command buffer, which provides a buffer time of 1360 ms. The hardware architecture of **STEP-200** is ideal for the Windows operating system, and drivers for DOS and Windows are provided offering real-time motion control solutions for Windows systems.

Software Support:

Windows Driver/DLL/Lib	Windows 95/98/ME/NT4.0
DOS Library	DOS 6.2
Labview Development Kit	-
Linux Library	-

Specifications:

Number of Axes	2
Slot Interface	ISA bus
Maximum Pulse Output Rate	250 Kpps
Command Type	Pulse command
Resolution	32-bit
Servo Update Rate	-
Pulse Output Mode	CW/CCW, PULSE/DIR
Operation Mode	Open loop
Linear Interpolation	-
Circular Interpolation	-
Speed Curve Profile	T-curve
Motion Relative I/O	Home, forward, backward limit, EMG
Synchronous Action	-
Ring Counter Mode	32-bit
Position Control Mode	Incremental mode and absolute mode
Position Compare Trigger	10 KHz
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	-
Encoder Rate	-
Digital Input Channels	-
Digital Output Channels	-
I/O Isolation	2500 Vrms optical isolation
Connector	25-pin D-Sub
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	0 ~ +50°C
Storage Temperature	-20 ~ +70°C
Ambient Relative Humidity	0 ~ 90% RH, non-condensing

Ordering Information/Accessories:

Model No.	Description
STEP-200	ISA Bus, 2-axis High-speed Stepper Motor Control Card (Limited Functions and Economical) Includes: CA-PC25M (25-pin Male D-Sub Connector with Plastic Cover)
DN-25	I/O Connector Block with 25-pin/9-pin D-Sub Connector (DIN-Rail Mounting)

SERVO-300

ISA Bus, 3-axis High-speed Servo Motor Control Card (V Command)

Features:

- ISA bus servo motor control card
- 3-axis high-speed servo motor control card
- V command
- Drivers for DOS and Windows

Introduction:

The **SERVO-300** is a **3-axis**, command-based servo motor control board. The embedded CPU of the SERVO-300 performs the motion commands transferred from a Host PC via a 2 KB FIFO buffer. It also sends the position and status to the Host PC via a second 2 KB FIFO buffer. These buffers provide time buffer and they are very suitable for Windows operating systems. Device drivers and function libraries for DOS, Windows 7 and Windows XP/2000 are provided.

Specifications:

Number of Axes	3
Slot Interface	ISA bus
Maximum Pulse Output Rate	-
Command Type	Voltage command
Resolution	12-bit +/-10 V
Servo Update Rate	3 ms / 3 axes
Pulse Output Mode	-
Operation Mode	Simulation, closed loop, open loop
Linear Interpolation	Any 2 to 3 of 3 axes
Circular Interpolation	Any 2 axes
Speed Curve Profile	T-curve
Motion Relative I/O	Home, forward, backward limit, EMG
Encoder Interface	CW/CCW, PULSE/DIR
Encoder Counter	32-bit
Encoder Rate	1 Mz
Digital Input Channels	8
Digital Output Channels	7
I/O Isolation	2500 Vrms optical isolation
Connector	9-pin male & 25-pin female D-Sub
Power Consumption	+5 V @ 500 mA
Environmental	
Operating Temperature	0 ~ +60°C
Storage Temperature	-20 ~ +80°C
Ambient Relative Humidity	0 ~ 90% RH, non-condensing
Dimensions	120.4 mm * 90.8 mm

Software Support:

Windows Driver/DLL/Lib	Windows 95/98/ME/NT4.0
DOS Library	DOS 6.2
Labview Development Kit	-
Linux Library	-

Ordering Information/Accessories:

Model No.	Description
SERVO-300 CR	ISA Bus, 3-axis High-speed Servo Motor Control Card (V Command) Includes: CA-9-2502 (9-pin Male & 25-pin Female D-Sub Cable 0.2 M) CA-PC09F (9-pin Female D-Sub Connector with Plastic Cover) CA-PC09M (9-pin Male D-Sub Connector with Plastic Cover) CA-PC25M (25-pin Male D-Sub Connector with Plastic Cover)
DB-8R	Relay Board for SERVO-300 and PISO-PS300(U)
DB-200	Encoder Input Board for SERVO-300

Remote Motion Solutions

4. Remote Motion Solutions

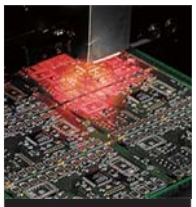
4. Remote Motion Solutions

Remote Motion Solutions

Vertical Market Focus:

Wafer Inspection, PCB Inspection, Plastic Surface Inspection, Drapery Inspection


Dispensing


PCB inspection


Drilling


Flying Shear

Overview:

Wherever motion control solutions are required, ICP DAS provides a range of remote solutions that help users control and configure their motion I/O needs at remote sites, including PC, PLC, SCADA, etc. solutions. Currently, ICP DAS provides options for Ethernet, Motionnet and CANopen, etc. remote motion controls.

- ## Ethernet Remote Motion Solutions

  Ethernet Motion Control Unit provides the Ethernet motion solution for customers. It can be configured and control via an Ethernet port with Modbus TCP capability. Any PC, PLC or SCADA system which has an Ethernet port running Modbus TCP protocol can control one or several Ethernet remote units to do complex motion.

- ## Serial Communication Remote Motion Solutions

  There are a lot of controllers on the working field which need to add functions or enhance their performance for new requirements, such as providing powerful motion functions. In general, these controllers already have one or several serial ports with Modbus RTU capability. Via an RS-232 or RS-422 or RS-485 port, the Serial communication remote unit is capable for providing motion functions.

- ## Motionnet Remote Motion Solutions

  Motionnet is a high-speed serial communication system that includes Master card and Slave modules. ICP DAS provides two categories of Slaves: the first is used for Digital I/O, and the other is used for motion control using these Slave devices, actuators/sensors can easily be directly connected. Motion control modules can be used together with either a Servo motor or a Stepping motor from a variety of vendors.

• EtherCAT Remote Motion Solutions

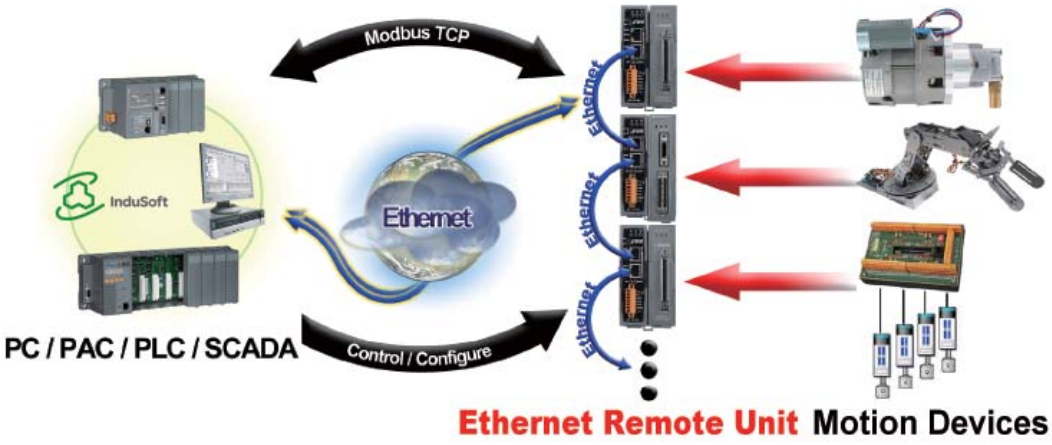
EtherCAT (Ethernet for Control Automation Technology) is an open, high-performance fieldbus system that makes Ethernet technologies available at the I/O level. EtherCAT provides flexible wiring, fast communication and many other nice features. It needs a master to control many slaves. ICP DAS provides PC master cards, ECAT-8000 and ECAT-8001, for users to build their applications including motion control. These cards can off er multi-axis motion and I/O control functions by their own built-in CPU. In this way, the CPU loading of PC can be reduced dramatically. In the mean while, ICP DAS also provides many I/O slave modules for users to choose from. Since EtherCAT technology is an industrial standard, those modules can work together in a system with 3rd-party EtherCAT slaves as well.

• CANopen Remote Motion Solutions

The CAN (Controller Area Network) bus is one of the safest industrial network systems, and ICP DAS now provides a motion control library (CiA 402) for CANopen Master products meaning that users can now integrate motion control systems into a CANopen network.

Remote Motion Solutions Product List:		
Ethernet Solutions		
Remote Units	ET-M8194H	Ethernet Remote Unit with High-speed 4-axis Motion Module
	ET-M8196F	Ethernet Remote Unit with High-speed 6-axis Motion Module
Serial Communication Solutions		
Remote Units	RS-M8194H	Serial Communication Remote Unit with High-speed 4-axis Motion Module
	RS-M8196F	Serial Communication Remote Unit with High-speed 6-axis Motion Module
Motionnet Solutions		
PCI Master Cards	PISO-MN200(T/EC)	PCI bus, Dual-line Motionnet Control Master Card
Motion Control Modules	MN-SERVO (-EC) Series	Distributed Motionnet Single-axis Motion Control Modules
	MN-2091U(-T)	Distributed Motionnet Single-axis Universal Motion Control Module
Digital I/O Modules	MN-3254/3253/3257(T)	Distributed Motionnet Isolated DI/DO Modules
	MN-640/622/604-DIN	Distributed Motionnet Isolated DI/DO Modules (Mini-clamp Connector)
Analog I/O Modules	MN-DA2/AD8-DIN	Distributed Motionnet Analog I/O Modules
Hub Modules	MN-HUB4(EC) Series	Distributed Motionnet 4 port Hub modules
EtherCAT Solutions		
PCIe Master Cards	ECAT-8000/8001	PCIe EtherCAT Master Card
Motion Control Modules	ECAT-2092(T)/2093	EtherCAT Encoder Modules
	ECAT-209xS Series	EtherCAT Stepping Motor Driving Modules
I/O Modules	ECAT-201x/2x Series	EtherCAT Analog I/O Modules
	ECAT-204x/5x/6x Series	EtherCAT Digital I/O Modules
Converters	ECAT-2511-A/-B	EtherCAT to Single-mode Fiber Converters
Junction Slaves	ECAT-2512/2513	EtherCAT Junction Slave Modules
CANopen Solutions		
PCI Master Cards	PISO-CPM100U(-D/-T)	CANopen PCI Master Cards (PCI board for industrial PC)
Converter	I-7565-CPM	CANopen Converter
Master Modules	I-8123W	CANopen Master Module (Module for WinPAC/ViewPAC/XPAC)
I/O Units/Modules	CAN-8x23 & CAN-2000C	CANopen Remote I/O Expansion Unit & Remote I/O Modules

4.1 Ethernet Motion Control Solutions

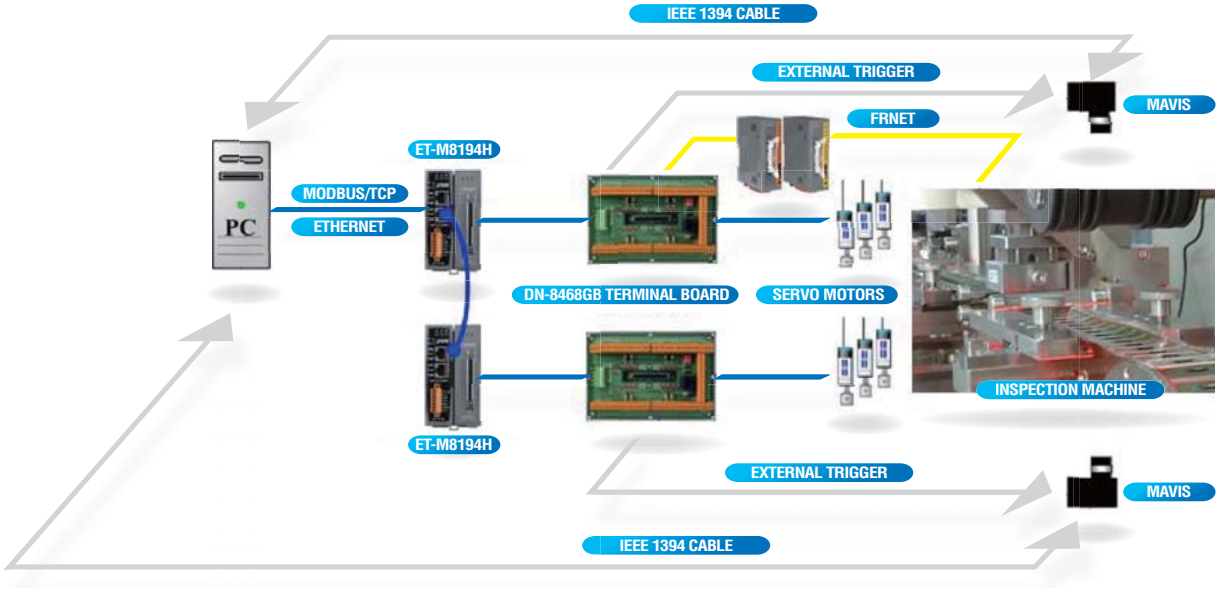


Introduction:

ICP DAS remote Ethernet motion control series consist of a four axis (ET-M8194H) and a six axis (ET-M8196F) stepping/pulse-type servo motion controller. Each motion control device is equipped with an Ethernet communication module and uses Modbus TCP/IP as its communication protocol. In a Modbus TCP network the ET-M8194H/ET-M8196F acts as a server. All standard Modbus function codes are supported and therefore any Modbus TCP master (e.g. PC, PLC, HMI, PAC, etc.) can access the remote motion controller. Each device is equipped with two Ethernet ports which allow daisy chain Ethernet wiring; multiple devices can be connected together in sequence without an additional Ethernet switch. This intelligent motion controller has a variety of built in motion control functions, such as multi-axis linear interpolation, circular interpolation, T/S-curve acceleration/deceleration, various synchronous actions and automatic homing. A software utility assists the user in configuring the Ethernet module and motion card and provides some basic motion commands for testing. An application programming interface (API) allows the programmer to develop an application program to remotely control the motion device.

Application Notes:

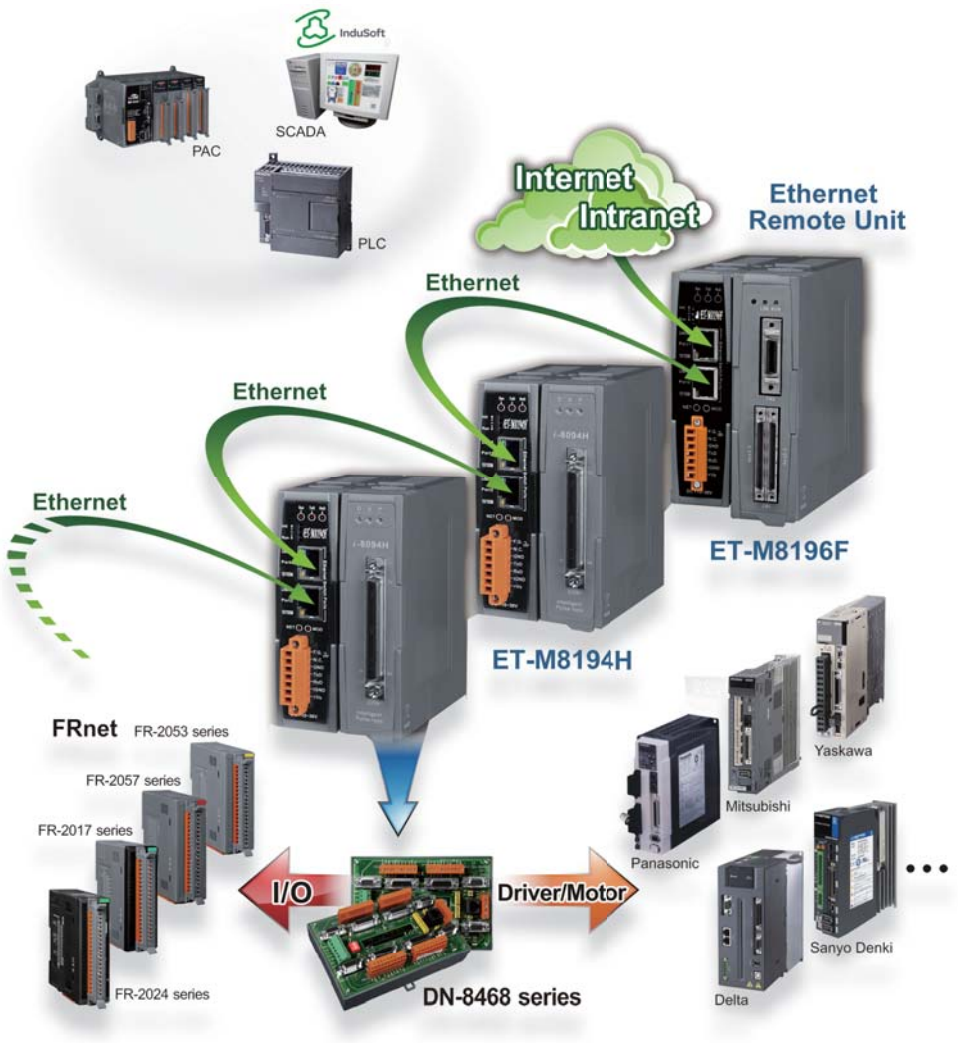
In a recent case, ET-M8194H units were installed on machines performing IC inspection. Each machine was equipped with two ET-M8194H modules to coordinate six motors by taking advantage of the embedded Ethernet switching ports on the ET-M8194H. Therefore six axes motion control could be easily implemented by connecting two ET-M8194H modules in series (daisy-chain topology). The supervisory host PC was used to issue commands and collect information through the Ethernet without the need for additional wiring. The application can also be accomplished by using the ET-M8196F.



Application Structure and Features:

- **Compact Size**
- **Easy to Use**
- **Stand-alone**

- Supports the Modbus TCP protocol
- Easy integration into a SCADA, PAC or PLC Modbus TCP network
- The device can be set as a remote or stand-alone motion controller
- ET-M8194H supports 4-axis motion control: 2/3-axis linear interpolation, etc.
- ET-M8196F supports 6-axis motion control: 2- to 6-axis linear/2- To 3-axis circular interpolation, etc.
- Supports high-speed FRnet I/O: 128 digital outputs and 128 digital inputs
- Supports macro programming (for ET-M8194H only)
- Includes the EzMove utility for system configuration and macro program editing (for ET-M8194H only)
- Supports FRnet DI or event triggered macro program execution (for ET-M8194H only)



Related Products:

Ethernet Communication Solution Products of Remote Motion Solutions		
Ethernet Communication Remote Unit	**ET-M8194H**	Ethernet Remote Unit with High-speed 4-axis Motion Control Module
	ET-M8196F	Ethernet Remote Unit with High-speed 6-axis Motion Control Module

ET-M8194H

Ethernet Remote Unit with High-speed 4-axis Motion Control Module

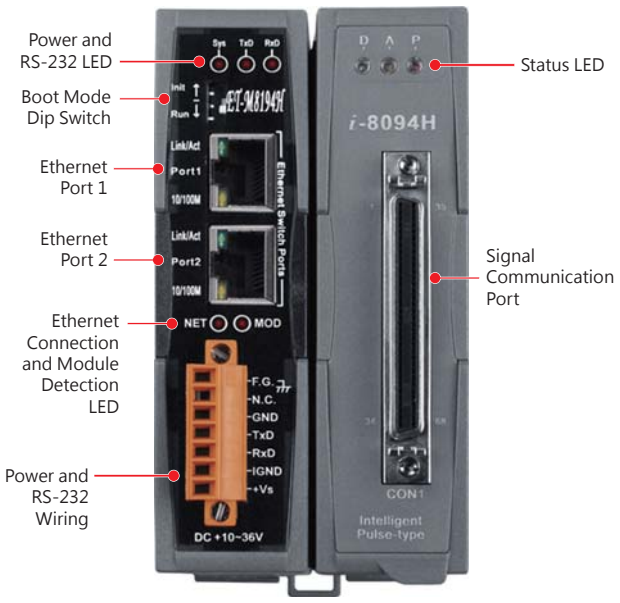
Features:

- Remote control via Modbus TCP
- Can be controlled using SCADA, PAC or PLC, etc.
- Can be integrated into multi-station, multi-axis applications
- 4-axis motion control capability
- 2/3-axis linear interpolation function
- 2-axis circular interpolation function
- Programmable automatic homing function
- EzMove Utility for configuration and macro programming
- Test motion functions via EzMove without compilation
- Library for rapid development of applications
- Easy wiring for multi-station applications
- Can be set as a remote or stand-alone motion controller
- Supports high-speed FRnet I/O: 128 DO and 128 DI

Introduction:

The **ET-M8194H** is a new product from ICP DAS that can be used to implement remote control functionality via the Ethernet and includes an I-8094H module (a 4-axis stepping/pulse-type servo motor control module with an embedded CPU) and an Ethernet communication interface. The intelligent ET-M8194H can provide users with the ability to develop a wide range of remote motion control applications, and can be integrated in any system where the host platform is built on the Modbus TCP protocol (for example: PC, PAC or PLC). In addition, implementing a multi-station, multi-axis motion control solution can easily be achieved by cascading several ET-M8194H devices using Ethernet cables, either with or without Ethernet switches. ICP DAS also provides the EzMove Utility and an API Library that can be used to configure the ET-M8194H and to rapidly develop customized control applications.

Hardware:



ET-M8194H Interface Functions

Software Supported: ET-M8194H SDK

EzMove Utility

EzMove is a configuration utility developed by ICP DAS for the ET-M8194H controller. It is intended to perform motion control tasks and movement test on equipment without the need to first create customized applications. As the EzMove Utility is a Modbus client, it can be used to create and edit Macro Programs (MP), which can then be uploaded to the ET-M8194H. The EzMove Utility can also display and plot position/velocity of all four axes as well as display Modbus TCP messages for easy reference.

API Library

The ET-M8194H API Library is composed of nine groups of functions, which can be utilized to edit Macro Programs (MP) and send Modbus TCP commands required to control or configure the I-8094H. The library provides users with the ability to simultaneously control a large number of ET-M8194H from the PC.

DLL and libraries for the following development environments are provided:

- Visual C++
- BCB 5.0, 6.0
- C#, VB.NET
- Visual Basic 6.0

Specifications:

Interpolation Functions	Linear Interpolation (Interpolation Speed: 4 Mpps): 32-bit max. for any single command Circular Interpolation (Interpolation Speed: 4 Mpps): 32-bit max. for any single command Continuous Interpolation (Interpolation Speed: 2 Mpps): Yes
Drive Speed Curve	Maximum Drive Speed: 4 Mpps Constant Speed Driving Trapezoidal Acc/Dec Driving Asymmetrical Trapezoidal Driving S-curve Acc/Dec Driving Asymmetrical S-curve Driving
Position Control	Logic Position Counter/Bit Length for output pulse: 32-bit Real Position Counter/Bit Length for output pulse: 32-bit Position Compare Register Number/Axis: 2 Software Limit Position Counter Variable Ring
Auto-Home Search	Individual configuration (4-step) for each axis including irregular operation handling
Synchronous Action	10 activation factors (provocatives or events) and 14 actions
External Signal for Driving	Fixed/Continuous Pulse Output Manual Pulse
Other Functions	Drive Speed/Output Pulse Number Change during Driving Triangle Form Prevention of Speed Curve
Servo Motor Signal	Servo Ready and Alarm Input Signals/Axis Servo Enable Output/Axis
Other Input Signals	IN0 (Near Home), IN1 (Home), IN2 (Z-phase), IN3/Axis Emergency Signal
Input Signal Integral Type Filter	Filter Time Constant: 2 ~ 16 ms, 8 stages
Environmental	Operating Temperature: -20 ~ +75°C Storage Temperature: -30 ~ +85°C Operating Humidity: 10 ~ 85% RH, non-condensing Storage Humidity: 5 ~ 90% RH, non-condensing
FRnet Interface	Max. 128 DI and 128 DO channels Hardware auto-scan I/O every 0.72 ms Two-wire Serial Bus to reduce wiring needs Max. communication distance: 100 M A wide range of FRnet I/O terminal boards and modules are available

Applications:

- X-Y-Z Table
- Fix-Pitch Stamping Machine
- Transfer Machine
- Spinner
- Loader/Unloader

Ordering Information/Accessories:

Model No.	Description
ET-M8194H	**Ethernet Remote Automation Unit with High-speed 4-axis Motion Control Module**
DN-8468UB	Photo-isolated Universal Snap-on Wiring Terminal Board
DN-8468GB	Photo-isolated General Purpose Wiring Terminal Board
DN-8468MB	Photo-isolated Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
DN-8468PB	Photo-isolated Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
DN-8468YB	Photo-isolated Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
DN-8468DB	Photo-isolated Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
DN-8468FB	Photo-isolated Snap-on Wiring Terminal Board for Fuji FALDIC-W Servo Amplifier
CA-SCSI15-H CA-SCSI30-H CA-SCSI50-H	68-pin SCSI-II Connector Cable; Length 1.5 M 68-pin SCSI-II Connector Cable; Length 3.0 M 68-pin SCSI-II Connector Cable; Length 5.0 M

ET-M8196F

Ethernet Remote Unit with High-speed, DSP-based, 6-axis Motion Control Module

Features:

- Remote control via Modbus TCP
- DSP-based motion control module
- Maximum pulse output frequency: 4 MHz
- Maximum Encoder input frequency: 12 MHz
- Independent 6-axis motion control
- 2- to 6-axis linear/ 2- to 3-axis circular/ helical interpolation function
- Continuous interpolation
- 4-step home mode with auto-searching
- Synchronized start motion
- Programmable T/S-curve acceleration and deceleration
- Software limit protection
- Software FIFO for arbitrary curve motion
- High-speed position latch
- High-speed compare trigger and auto-increment compare mode
- Expandable remote I/O: 128 DI and 128 DO via a two-wire FRnet interface.

Introduction:

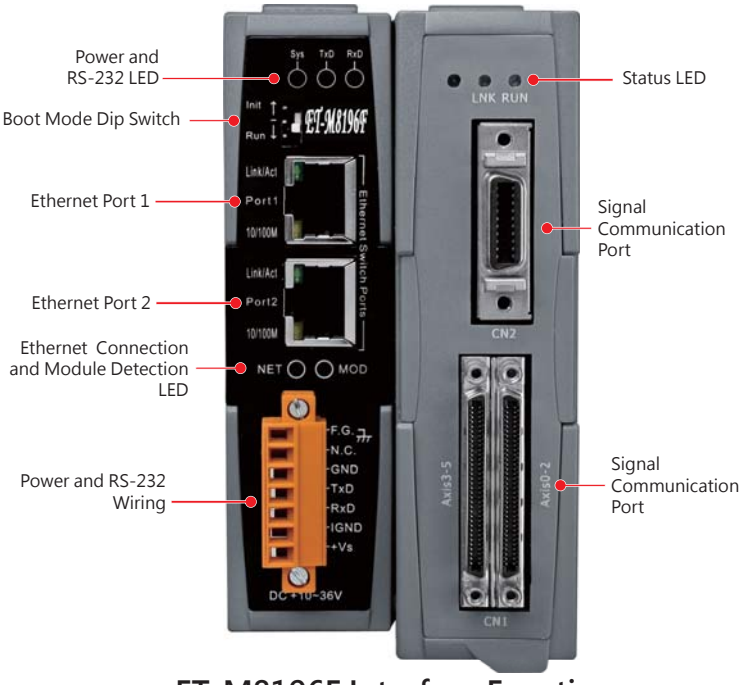
The ET-M8196F is a compact remote motion control device which uses Modbus TCP as its communication protocol. The ET-M8196F acts as a server in a Modbus TCP network and supports all standard Modbus function codes defined by the Modbus TCP protocol. Nowadays many PCs have got limited PCI slots; therefore the ET-M8196F can be used to replace PCI motion control cards. The ET-M8196F has got two Ethernet ports which allow daisy chaining.

The motion controller of the ET-M8196F consists of an Ethernet communication module and a 6-axis motion control card. A digital signal processor (DSP) is the brain of the motion controller which calculates the commanded move trajectory and manages supervisory control by monitoring the limits and emergency stops to ensure safe operation. I/O control output (e.g. latch, compare, encoder counter etc.) is realized in a Field Programmable Gate Array (FPGA).

The motion controller is suitable for general-purpose motion control applications. In additions to its wide speed range, this intelligent motion controller also has a variety of built-in motion control functions, such as 2- to 6-axis linear interpolation, 2- or 3-axis circular interpolation, helical interpolation, T/S-curve acceleration/deceleration, and automatic home search, etc.

In addition the ET-M8196F acts as an FRnet master and can control up to 128 digital outputs and 128 digital inputs. FRnet is a two-wire serial bus and has a scan interval of 0.72 ms and it is specifically designed for easy and cost effective wiring. ICPDAS provides a large range of FRnet I/O terminal boards and modules.

An application programming interface (API) for communicating with the ET-M8196F motion controller is being provided. This enables the user's program on the host computer to easily interact with the motion controller. A software utility for Ethernet configuration and basic motion settings and execution is part of the software package.



ET-M8196F Interface Functions

Specifications:

Communication Protocol	Modbus TCP Modbus TCP server
Number of Axes	6
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse Command
Pulse Output Mode	CW/CCW, PULSE/DIR, A/B pulse
Linear Interpolation	Any 2- to 6-axis
Circular/Helical Interpolation	Any 2- or 3-axis
Speed Curve Profile	T/S-curve
Mechanical Switch Input	Home, LMT+/-, NHOME, LTC, EMG
Servo I/O Interface	Input: INP, ALM, RDY Output: SVON, ALM_RST, ERC
Ring Counter Mode	32-bit
Position Control Mode	Relative and absolute position
Position Compare Trigger	4 MHz
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Encoder Counting Rate	12 MHz
Digital Input Channels	Local: 12 DI Expandable: 128 DI
Digital Output Channels	Local: 3 DO Expandable: 128 DO
I/O Isolation (with DN-8368)	2500 Vrms optical isolation
Connector	68-pin VHDCI Connector and 20-pin SCSI-II
Power Consumption	+24V
Environmental	
Operating Temperature	0 ~ +60 °C
Storage Temperature	-20 ~ +80 °C
Ambient Relative Humidity	5 ~ 90 % RH, non-condensing

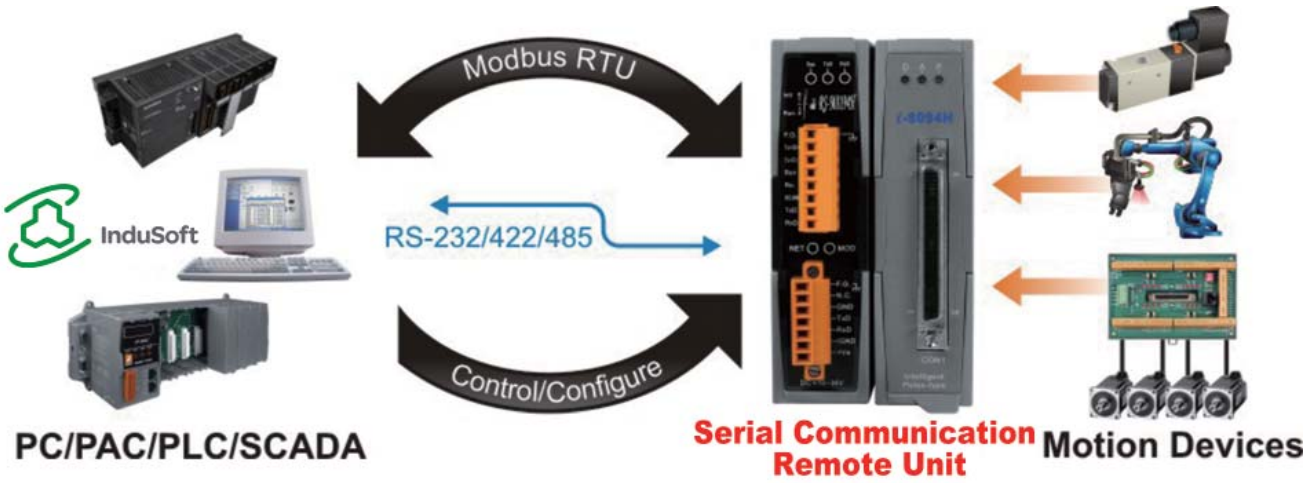
Software Support:

Windows 10 Windows 8 Windows 7 Windows XP	32/64 bit: Visual C++ lib/DLL C#, VB.Net DLL Delphi LabVIEW Visual Basic 6.0 BCB 5.0, 6.0 Configuration utility Demo programs

Ordering Information/Accessories:

Model No.	Description
ET-M8196F	**Ethernet Remote Unit with High-speed, DSP-based, 6-axis Motion Control Module**
DN-8368UB	Photo-isolated Universal Snap-on wiring terminal board
DN-8368GB	Photo-isolated General-purpose wiring terminal board
DN-8368MB	Photo-isolated Snap-on wiring terminal board for Mitsubishi MELSERVO-J2 servo amplifier
DN-20M	General purpose digital input and remote digital I\O (FRnet) extension board
CA-MINI68-15	68-pin VHDCI to SCSI-II Connector Cable, Length 1.5 M
CA-SCSI20-M1/M3/M5	20-pin SCSI-II Male connector cable (for Mitsubishi J2 series motor), Length 1 M / 3 M / 5 M.
CA-26-MJ3-15/30/50	26-pin HD D-Sub Male Cable for Mitsubishi Servo Amplifier, 1.5/3/5 M. (for MELSERVO-J3/J4 Series)
CA-26-PA4-15/30/50	26-pin HD D-Sub Male Cable for Panasonic Servo Amplifier, 1.5/3/5 M. (for MINAS A4/A5 Series)
CA-26-YSV-15/30/50	26-pin HD D-Sub Male Cable for Yaskawa Servo Amplifier, 1.5/3/5 M. (for Sigma II/III/V Series)
CA-26-TTA-15/30/50	26-pin HD D-Sub Male Cable for Teco Servo Amplifier, 1.5/3/5 M. (for TSTA-A/A+ Series)
CA-26-DAA2-15/30/50	26-pin HD D-Sub Male Cable for Delta A2 Servo Amplifier, 1.5/3/5 M. (for ASDA-A2 Series)
CA-26-DAB2-15/30/50	26-pin HD D-Sub Male Cable for Delta B2 Servo Amplifier, 1.5/3/5 M. (for ASDA-B2 Series)
CA-26-FFW-15/30/50	26-pin HD D-Sub Male Cable for Fuji Servo Amplifier, 1.5/3/5 M. (for FALDIC-W and ALPHA5 Smart Series)

4.2 Serial Communication Motion Control Solutions

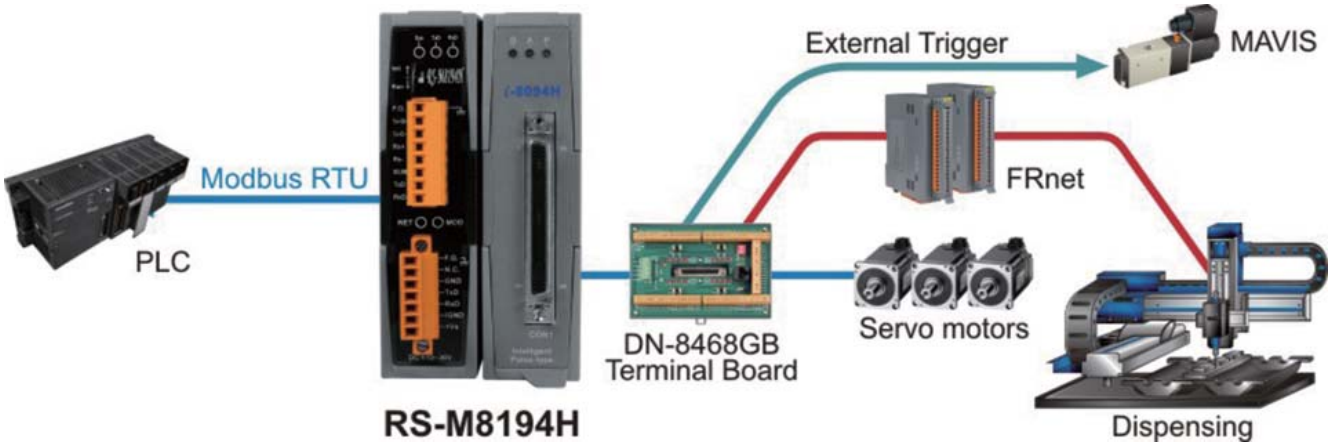


Introduction:

ICP DAS provides two types of remote serial motion controller: 4 and 6 axes stepping/pulse-type motion controller. Both controller types support RS232, RS485 and RS422 serial communication and uses Modbus RTU as a communication protocol. Serial communication speed can be set by selecting a standard baud rate. The remote controllers are defined as a Modbus slave. The standard Modbus functions are supported which enables the user to easily integrate the motion controller into an existing Modbus network. PC, HMI, PAC, PLC and other devices which support Modbus RTU can access, control and monitor the motion controller. Software utilities are provides which allows the user to configure the device and execute simple motion commands for testing purposes. Windows APIs for developing motion control application are included in the software package.

Application Notes:

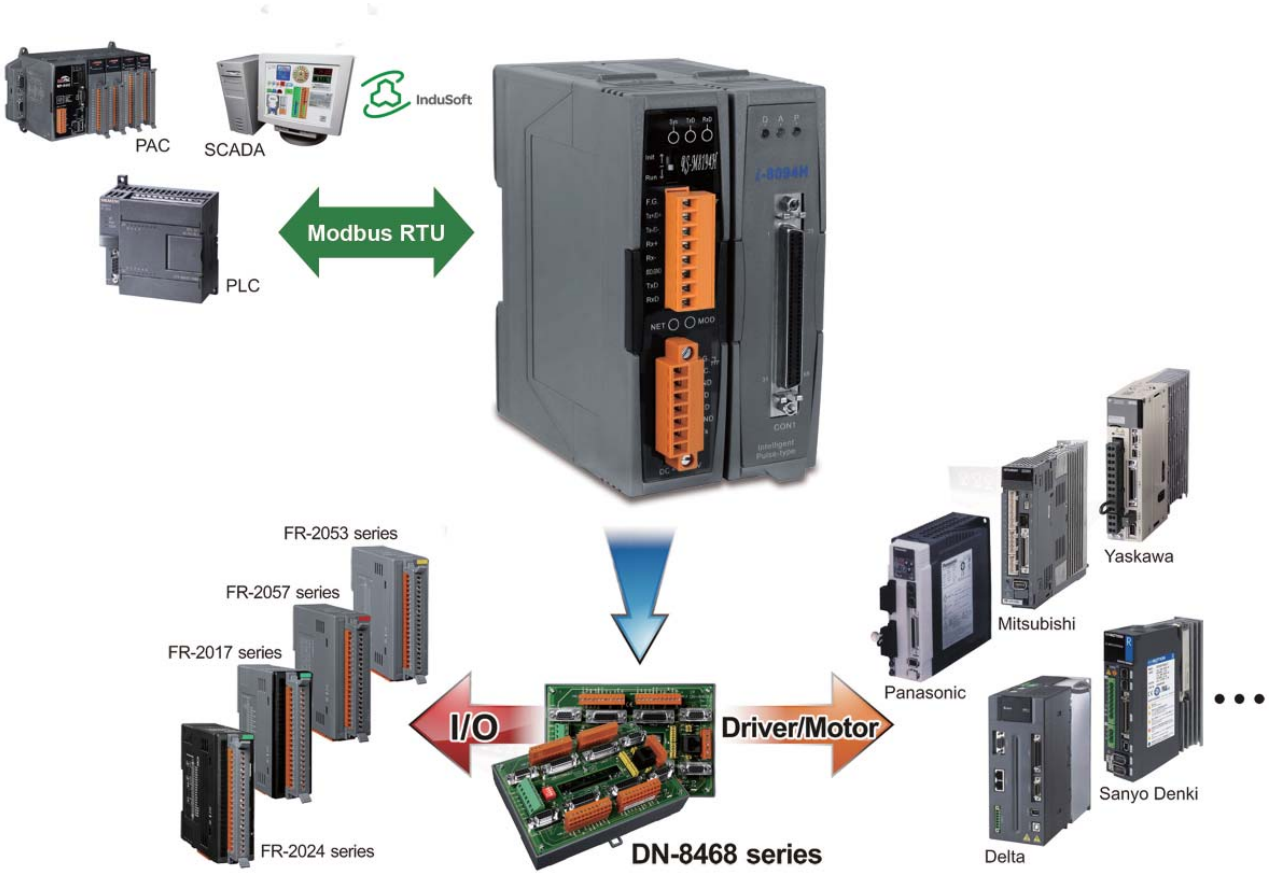
In a recent case, a PLC together with a RS-M8194H was used to control the dispensing path of an automated dispensing system. With the three-axis interpolation function provided by RS-M8194H it was possible to move two dispensing nozzles synchronous along predefined curves with varying velocities. It was a requirement to change the velocity on the fly in order to ensure a set dispensing thickness along the motion path.



Application Structure and Features:

- **Compact Size**
- **Easy to Use**
- **Stand-alone**

- Supports the Modbus RTU protocol
- Easy integration into a SCADA, PAC or PLC Modbus RTU network
- The device can be set as a remote or stand-alone motion controller
- RS-M8194H supports 4-axis motion control: 2/3-axis linear interpolation, etc.
- RS-M8196F supports 6-axis motion control: 2- to 6-axis linear/2- to 3-axis circular interpolation, etc.
- Supports high-speed FRnet I/O: 128 digital outputs and 128 digital inputs
- Supports macro programming (for RS-M8194H only)
- Includes the EzMove utility for system configuration and macro program editing (for RS-M8194H only)
- Supports FRnet DI or event triggered macro program execution (for RS-M8194H only)



Related Products:

Serial Communication Solution Products of Remote Motion Solutions		
Serial Communication Remote Unit	**RS-M8194H**	Serial Communication Remote Unit with High-speed 4-axis Motion Control Module
	RS-M8196F	Serial Communication Remote Unit with High-speed 6-axis Motion Control Module

RS-M8194H

Serial Communication Remote Unit with High-speed 4-axis Motion Control Module

Features:

- Remote control via Modbus RTU
- Can be controlled using SCADA, PAC or PLC, etc.
- Can be integrated into a multi-station, multi-axis applications
- 4-axis motion control capability
- 2/3-axis linear interpolation function
- 2-axis circular interpolation function
- Programmable automatic homing function
- EzMove Utility for configuration and macro programming
- Test motion functions via EzMove without compilation
- API Library for rapid development of applications
- Easy wiring for multi-station applications
- Can be set as a remote or stand-alone motion controller
- Supports high-speed FRnet I/O: 128 DO and 128 DI

Introduction:

The **RS-M8194H** is a new product from ICP DAS that can be used to implement remote control functionality via the serial communication and includes an I-8094H module (a 4-axis stepping/pulse-type servo motor control module with an embedded CPU) and a serial communication interface. The intelligent RS-M8194H can provide users with the ability to develop a wide range of remote motion control applications, and can be integrated in any system where the host platform is built on the Modbus RTU protocol (for example: PC, PAC or PLC). ICP DAS also provides the EzMove Utility and an API Library that can be used to configure the RS-M8194H and to rapidly develop customized control applications.

Hardware Interface:

Software:

EzMove Utility

EzMove is a configuration utility developed by ICP DAS for the RS-M8194H controller. It is intended to perform motion control tasks and movement test on equipment without the need to first create customized applications. As the EzMove Utility is a Modbus client, it can be used to create and edit Macro Programs (MP), which can then be uploaded to the RS-M8194H. The EzMove Utility can also display and plot position/velocity of all four axes as well as display Modbus RTU messages for easy reference.

API Library

The RS-M8194H API Library is composed of nine groups of functions, which can be utilized to edit Macro Programs (MP) and send Modbus RTU commands required to control or configure the I-8094H. The library provides users with the ability to simultaneously control a large number of RS-M8194H from the PC. DLL and libraries for the following development environments are provided:

- Visual C++
- BCB 5.0, 6.0
- C#, VB.NET
- Visual Basic 6.0

Specifications:

Interpolation Functions	Linear Interpolation (Interpolation Speed: 4 Mpps): 32-bit max. for any single command Circular Interpolation (Interpolation Speed: 4 Mpps): 32-bit max. for any single command Continuous Interpolation (Interpolation Speed: 2 Mpps): Yes
Drive Speed Curve	Maximum Drive Speed: 4 Mpps Constant Speed Driving Trapezoidal Acc/Dec Driving Asymmetrical Trapezoidal Driving S-curve Acc/Dec Driving Asymmetrical S-curve Driving
Position Control	Logic Position Counter/Bit Length for output pulse: 32-bit Real Position Counter/Bit Length for output pulse: 32-bit Position Compare Register Number/Axis: 2 Software Limit Position Counter Variable Ring
Auto-Home Search	Individual configuration (4-step) for each axis including irregular operation handling
Synchronous Action	10 activation factors (provocatives or events) and 14 actions
External Signal for Driving	Fixed/Continuous Pulse Output Manual Pulse
Other Functions	Drive Speed/Output Pulse Number Change during Driving Triangle Form Prevention of Speed Curve
Servo Motor Signal	Servo Ready and Alarm Input Signals/Axis Servo Enable Output/Axis
Other Input Signals	IN0 (Near Home), IN1 (Home), IN2 (Z-phase), IN3/Axis Emergency Signal
Input Signal Integral Type Filter	Filter Time Constant: 2 ~ 16 ms, 8 stages
Environmental	Operating Temperature: -20 ~ +75°C Storage Temperature: -30 ~ +85°C Operating Humidity: 10 ~ 85% RH, non-condensing Storage Humidity: 5 ~ 90% RH, non-condensing
FRnet Interface	Max. 128 DI and 128 DO channels Hardware auto-scan I/O every 0.72 ms Two-wire Serial Bus to reduce wiring needs Max. communication distance: 100 M A wide range of FRnet I/O terminal boards and modules are available

Applications:

- X-Y-Z Table
- Fix-Pitch Stamping Machine
- Transfer Machine
- Spinner
- Loader/Unloader

Ordering Information/Accessories:

Model No.	Description
RS-M8194H	**Serial Communication Remote Automation Unit with High-speed 4-axis Motion Control Module**
DN-8468UB	Photo-isolated Universal Snap-on Wiring Terminal Board
DN-8468GB	Photo-isolated General Purpose Wiring Terminal Board
DN-8468MB	Photo-isolated Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
DN-8468PB	Photo-isolated Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
DN-8468YB	Photo-isolated Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
DN-8468DB	Photo-isolated Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
DN-8468FB	Photo-isolated Snap-on Wiring Terminal Board for Fuji FALDIC-W Servo Amplifier
CA-SCSI15-H CA-SCSI30-H CA-SCSI50-H	68-pin SCSI-II Connector Cable; Length 1.5 M 68-pin SCSI-II Connector Cable; Length 3.0 M 68-pin SCSI-II Connector Cable; Length 5.0 M

RS-M8196F Serial Communication Remote Unit with High-speed 6-axis Motion Control Module

Features:

- Remote control via Modbus RTU
- DSP-based motion control module
- Maximum pulse output frequency: 4 MHz
- Maximum encoder input frequency: 12 MHz
- Independent 6-axis motion control
- 2- to 6-axis linear/ 2- to 3-axis circular/ helical interpolation function
- Continuous interpolation
- 4-step home mode with auto-searching
- Synchronized start motion
- Programmable T/S-curve acceleration and deceleration
- Software limit protection
- Software FIFO for arbitrary curve motion
- High-speed position latch
- High-speed compare trigger and auto-increment compare mode
- Expandable remote I/O: 128 DI and 128 DO via a two-wire FRnet interface

Introduction:

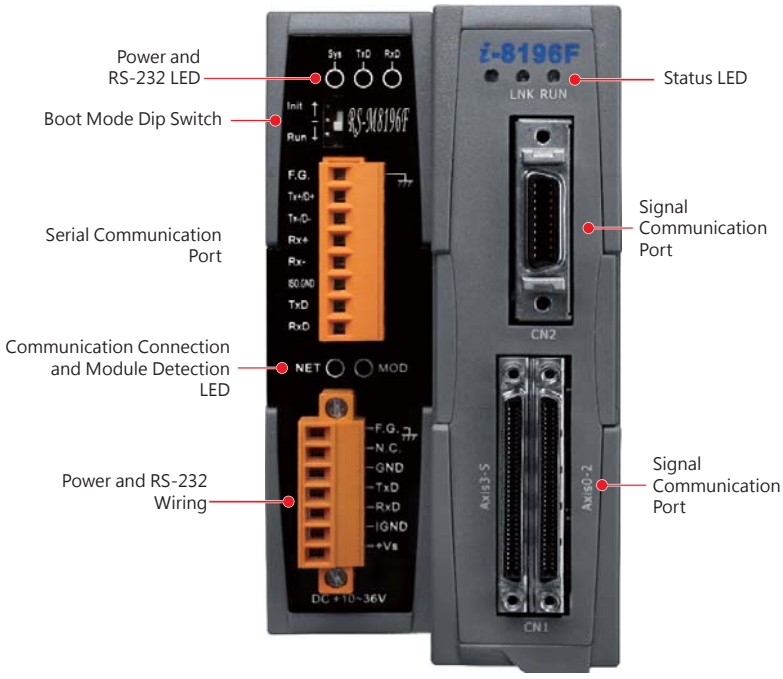
The **RS-M8196F** is a remote serial 6-axis stepping/pulse-type servo motion controller which uses Modbus RTU as its communication protocol. The RS-M8196F is a slave in a Modbus RTU network and supports all standard Modbus function codes. Three serial interfaces are provided (RS232, RS485 and RS422) and the user can select any of the three serial interfaces for communication. The RS-M8196F can expand a PLC system by adding 6-axis motion control support.

The motion controller of the RS-M8196F consists of a serial communication module and a motion control card. A digital signal processor (DSP) is the brain of the motion controller which calculates the commanded move trajectory and manages supervisory control by monitoring the limits and emergency stops to ensure safe operation. A Field Programmable Gate Array (FPGA) controls the input/output (e.g. latch, compare, encoder counter etc.).

The motion controller is suitable for general-purpose motion control applications. In additions to its wide speed range, this intelligent motion controller also has a variety of built-in motion control functions, such as 2- to 6-axis linear interpolation, 2- and 3-axis circular interpolation, 3-axis helical interpolation, T/S-curve acceleration/deceleration, and automatic home search, etc.

In addition the RS-M8196F acts as an FRnet master and can control up to 16 remote DIO slaves (128 digital outputs and 128 digital inputs). FRnet is a two-wire serial bus and has a scan interval of 0.72 ms and it is specifically designed for easy and cost effective wiring. ICPDAS provides a large range of FRnet I/O terminal boards and modules.

DLL, software utilities and demo programs for Win7, Win8 and Win10 are provided.



RS-M8196F Interface Functions

Specifications:

Communication Protocol	Modbus RTU
Number of Axes	6
Maximum Pulse Output Rate	4 MHz
Command Type	Pulse Command
Pulse Output Mode	CW/CCW, PULSE/DIR, A/B pulse
Linear Interpolation	Any 2- to 6-axis
Circular/Helical Interpolation	Any 2- or 3-axis
Speed Curve Profile	T/S-curve
Mechanical Switch Input	Home, LMT+/-, NHOME, LTC, EMG
Servo I/O Interface	Input: INP, ALM, RDY Output: SVON, ALM_RST, ERC
Ring Counter Mode	32-bit
Position Control Mode	Relative and absolute position
Position Compare Trigger	4 MHz
Encoder Interface	A/B pulse, Up/Down
Encoder Counter	32-bit
Maximum Encoder Counting Rate	12 MHz
Digital Input Channels	Local: 12 DI Expandable: 128 DI
Digital Output Channels	Local: 3 DO Expandable: 128 DO
I/O Isolation (with DN-8368)	2500 Vrms optical isolation
Connector	68-pin VHDCI Connector and 20-pin SCSI-II
Power Consumption	+24V
Environmental	
Operating Temperature	0 ~ +60 °C
Storage Temperature	-20 ~ +80 °C
Ambient Relative Humidity	5 ~ 90 % RH, non-condensing

Software Support:

Windows 10 Windows 8 Windows 7 Windows XP	32/64 bit: Visual C++ lib/DLL Configuration utility Demo programs

Ordering Information/Accessories:

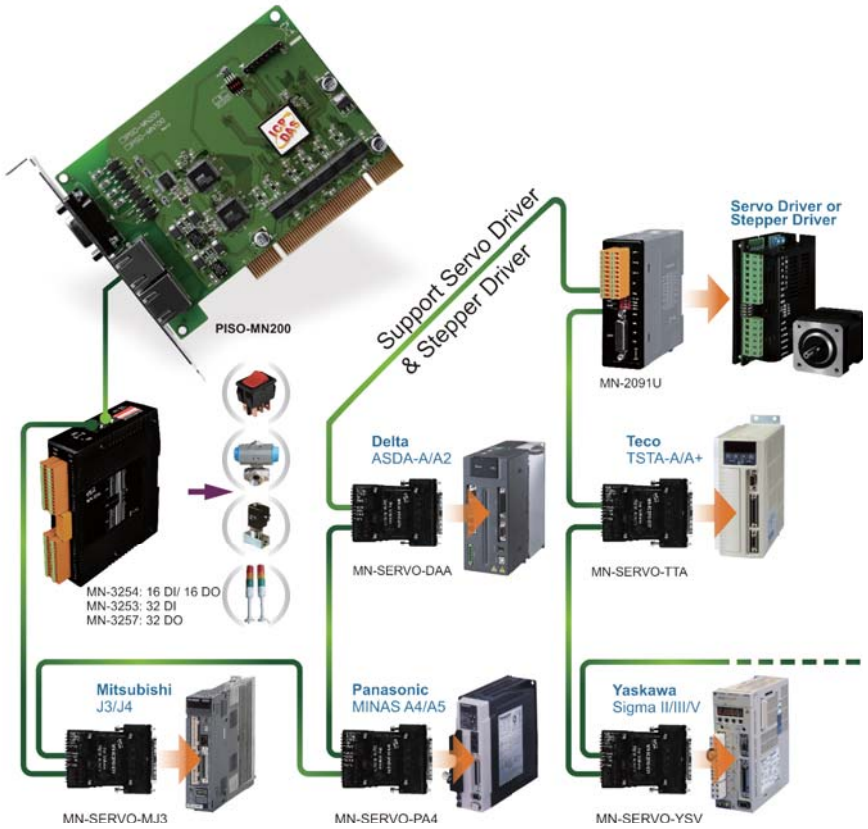
Model No.	Description
RS-M8196F	**Remote serial communication unit with high-speed, DSP-based, 6-axis motion control card**
DN-8368UB	Photo-isolated Universal Snap-on wiring terminal board
DN-8368GB	Photo-isolated General-purpose wiring terminal board
DN-8368MB	Photo-isolated Snap-on wiring terminal board for Mitsubishi MELSERVO-J2 servo amplifier
DN-20M	General purpose digital input and remote digital I/O (FRnet) extension board
CA-MINI68-15	68-pin VHDCI to SCSI-II Connector Cable, Length 1.5 M
CA-SCSI20-M1/M3/M5	20-pin SCSI-II Male connector cable (for Mitsubishi J2 series motor), Length 1 M / 3 M / 5 M.
CA-26-MJ3-15/30/50	26-pin HD D-Sub Male Cable for Mitsubishi Servo Amplifier, 1.5/3/5 M. (for MELSERVO-J3/J4 Series)
CA-26-PA4-15/30/50	26-pin HD D-Sub Male Cable for Panasonic Servo Amplifier, 1.5/3/5 M. (for MINAS A4/A5 Series)
CA-26-YSV-15/30/50	26-pin HD D-Sub Male Cable for Yaskawa Servo Amplifier, 1.5/3/5 M. (for Sigma II/III/V Series)
CA-26-TTA-15/30/50	26-pin HD D-Sub Male Cable for Teco Servo Amplifier, 1.5/3/5 M. (for TSTA-A/A+ Series)
CA-26-DAA2-15/30/50	26-pin HD D-Sub Male Cable for Delta A2 Servo Amplifier, 1.5/3/5 M. (for ASDA-A2 Series)
CA-26-DAB2-15/30/50	26-pin HD D-Sub Male Cable for Delta B2 Servo Amplifier, 1.5/3/5 M. (for ASDA-B2 Series)
CA-26-FFW-15/30/50	26-pin HD D-Sub Male Cable for Fuji Servo Amplifier, 1.5/3/5 M. (for FALDIC-W and ALPHA5 Smart Series)

4.3 Motionnet Solutions

Introduction:

Motionnet is a high-speed serial communication system that includes a Master card and Slave modules. ICP DAS provides three categories of Slaves: Digital I/O, Analog I/O and motion control modules. There are 3 main types of digital I/O modules: 32-ch Input, 32-ch Output and 16-ch Input/Output. Using these Slave devices, customers' actuators/sensors can easily be directly connected. Motion control modules can be used together with either a Servo motor or a Stepping motor from a variety of vendors.

Motionnet communication between a Master and the Slaves is based on a proprietary RS-485 technology (Multi-drop, Half-duplex) and provides the advantage of reduced wiring requirements together with the capability of long-distance and high-speed communication. Data transfer for the I/O modules is cyclical and time deterministic, so can be widely used for industrial automation applications.



Features:

- Communication Speed: Max. 20 Mbps
- Communication Distance: Max. 100 m
- Controllable Modules: 64 modules per line
- Data Transfer Rate:
  * 15.1 μsec/module
    (each module provides 32 I/O points)
  * 2048 points in 0.97 ms
    (when 64 modules are connected)

Related Products:

Motionnet Solution Products of Remote Motion Solutions		
PCI Master Cards	**PISO-MN200(T/EC)**	PCI Bus, Dual-Line Motionnet Master Card
Motion Control Modules	**MN-SERVO-xxx Series**	MN-SERVO-MJ3 / PA4 / YSV / DAA / TTA: Distributed Motionnet Single-axis Motion Control Modules
	MN-SERVO-xxx-EC Series	Distributed Motionnet Single-axis Motion Control Modules with e-CON Mini-Clamp connector
	MN-2091U(-T)	Distributed Motionnet Single-axis Universal Motion Control Module
Digital I/O Modules	**MN-3254(T)**	Distributed Motionnet 16-ch Isolated DI, 16-ch Isolated DO Module
	MN-3253(T)	Distributed Motionnet 32-ch Isolated DI Module
	MN-3257(T)	Distributed Motionnet 32-ch Isolated DO Module
	MN-D622-DIN	Distributed Motionnet 16-ch Isolated DI, 16-ch Isolated DO Module with Mini-clamp Connector
	MN-D640-DIN	Distributed Motionnet 32-ch Isolated DI Module with Mini-clamp Connector
	MN-D604-DIN	Distributed Motionnet 32-ch Isolated DO Module with Mini-clamp Connector
Analog I/O Modules	**MN-DA2-DIN**	Distributed Motionnet 2-ch Analog Output Module
	MN-AD8-DIN	Distributed Motionnet 8-ch Analog Input Module
Hub Modules	**MN-HUB4(EC)**	Distributed Motionnet 4 port Hub module with RJ-45 Jack (RoHS) (EC: with e-CON Mini-Clamp connector)

PISO-MN200/PISO-MN200T/PISO-MN200EC

PCI Bus, Dual-line Motionnet Master Card (For Distributed Motion & I/O Control)

Introduction:

The **PISO-MN200(T/EC)** is a PCI Master card that provides two Motionnet serial communication lines for distributed motion and I/O control in machine automation applications. The Master card can be used to connect up to 128 Slave modules (64 x 2 lines). If one of the Motionnet lines is only used for I/O control, it can send/receive signals to/from 2048 points on 64 local devices within 0.97 msec. When it is used to control motors, it can control up to 64 axes, which can be used to execute continuous positioning motion, zero return and even multi-axis interpolation operations. In addition to serial communication, the PISO-MN200(T/EC) is also equipped with parallel I/O ports (8 input channels and 4 output channels) for rapid and instinctive I/O control.

Specifications:

Bus	32-bit/33 MHz universal PCI-Bus
Communication Speed	2.5, 5, 10, 20 Mbps (Software controlled)
Interface	Half-duplex RS-485
Communication Length	Max. 100 M (20 Mbps; 32 Slave modules) Max. 50 M (20 Mbps; 64 Slave modules) Max. 100 M (10 Mbps; 64 Slave modules)
Communication Connector	PISO-MN200: RJ-45 x 2 PISO-MN200T: 5-pin terminal block PISO-MN200EC: Mini-Clamp connector x 2
I/O Connector	HD D-Sub 15-pin x 1
Parallel I/O	Digital input: 8-ch Photo-coupler Isolated (12-24 V, NPN or PNP) Digital output: 4-ch Photo-coupler Isolated (NPN or PNP)
LED Diagnostics	Connection (green) Communication Error (red)
Interrupts	Input Change of State, Communication Error
Operating Temp.	0 ~ +60 °C
Storage Temp.	-20 ~ +80 °C
Operating Humidity	10 ~ 85%; non-condensing
Storage Humidity	5 ~ 95%; non-condensing

Features:

- Maximum Communication Speed: 20 Mbps
- Distributed motion control up to 128 axes
- Distributed I/O points up to 4096 points
- Easy connection using RJ-45 phone jack, removable terminal block or Mini-Clamp connector
- Parallel I/O Ports: 8 Input and 4 Output channels
- Optional quadrature encoder input for linear scale or manual pulse generator input

Software Support:

Windows Driver/DLL/Lib	Windows 7 32/64-bit Windows XP/2000 32-bit
Programming Tools	VC/VB/BCB

Ordering Information/Accessories:

Model No.	Description
PISO-MN200 CR	**PCI Bus, Dual-line Motionnet Master Card with RJ-45 (RoHS)**
PISO-MN200T CR	**PCI Bus, Dual-line Motionnet Master Card with Terminal Block (RoHS)**
PISO-MN200EC CR	**PCI Bus, Dual-Line Motionnet Master Card with Mini-Clamp connector (RoHS)**
MN-SERVO Series CR MN-SERVO EC Series CR	Distributed Motionnet Single-axis Motion Control Modules (With Spring Type Terminal Blocks; EC: with e-CON Mini-Clamp connector) (RoHS)
MN-HUB4 CR MN-HUB4EC CR	Distributed Motionnet 4 port Hub Module (RoHS)
MN-2091U CR MN-2091U-T CR	Distributed Motionnet Single-axis Universal Motion Control Modules (RoHS)
MN-3254 CR MN-3254T CR	Distributed Motionnet 16-ch Isolated DI, 16-ch Isolated DO Module (RoHS)
MN-3253 CR MN-3253T CR	Distributed Motionnet 32-ch Isolated DI Module (RoHS)
MN-3257 CR MN-3257T CR	Distributed Motionnet 32-ch Isolated DO Module (RoHS)

MN-SERVO Series

MN-SERVO-MJ3 / MN-SERVO-PA4 / MN-SERVO-YSV / MN-SERVO-DAA / MN-SERVO-TTA

Distributed Motionnet Single-axis Motion Control Modules (With Spring Type Terminal Blocks)

Features:

- Maximum communication speed: 20 Mbps
- Maximum pulse output frequency: 6.6 Mpps
- Control up to 64 axes per line
- Multi-axis linear interpolation function
- 2-axis circular interpolation function
- Programmable T/S-curve acceleration and deceleration
- Change speed and position on the fly
- Slow down sensor, home sensor, positive and negative limit sensors for each axis
- Software limit and compare trigger output
- Three-way isolation for power, communication and I/O. (Provide better noise immunity and device protection)
- The standard module equipped with Terminal Blocks for easy wiring (additional terminal board is not required)

Introduction:

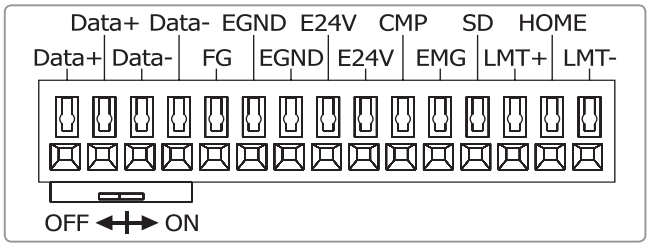
The **MN-SERVO** series is used to expand the number of axes for distributed motion control in Motionnet field bus. These extension slave modules can be directly plugged into the servo driver and being connected serially to the controller by a simple and affordable Cat.5 LAN cable, reducing the wiring effort between drivers and controller. This is very suitable for highly integrated machine automation applications.

After the module is plugged into the servo driver, all you need to do is make the serial LAN cable connect between the modules. One serial line can support up to 64 single-axis modules. ICP DAS provides a variety of motion control modules suitable for a range of brands of servo drivers, such as Mitsubishi MELSERVO-J3/J4, Yaskawa Sigma II/III/V, Panasonic MINAS A4/A5, Delta ASDA-A/A2 and Teco TSTA-A/A+.

Specifications:

Communication Speed	2.5, 5, 10, 20 Mbps
Maximum Pulse Output Frequency	6.6 Mpps
Pulse Output Interface	OUT/DIR, CW/CCW
Pulse Output Counter	28-bit
Encoder Interface	CW/CCW, A/B phase
Encoder Counter	28-bit
Speed Profile	Trapezoidal/S Shaped Acc/Dec Driving
Home Mode	13 Types
Mechanical Switch Input	LMT+, LMT-, HOME, SD, EMG
Servo I/O Interface	Input: ALM, RDY, INP Output: SVON, ERC, ALM_RST
High-Speed Position Compare Output	5 V TTL or 24 V open collector
Led Diagnostics	Communication state (Link, Error) Mechanic Switch Input Internal 3.3 V Power Termination Resistor Switch
Operating Temperature	0 ~ +60 °C
Storage Temperature	-20 ~ +80 °C
Operating Humidity	10 ~ 85%; non-condensing
Storage Humidity	5 ~ 95%; non-condensing

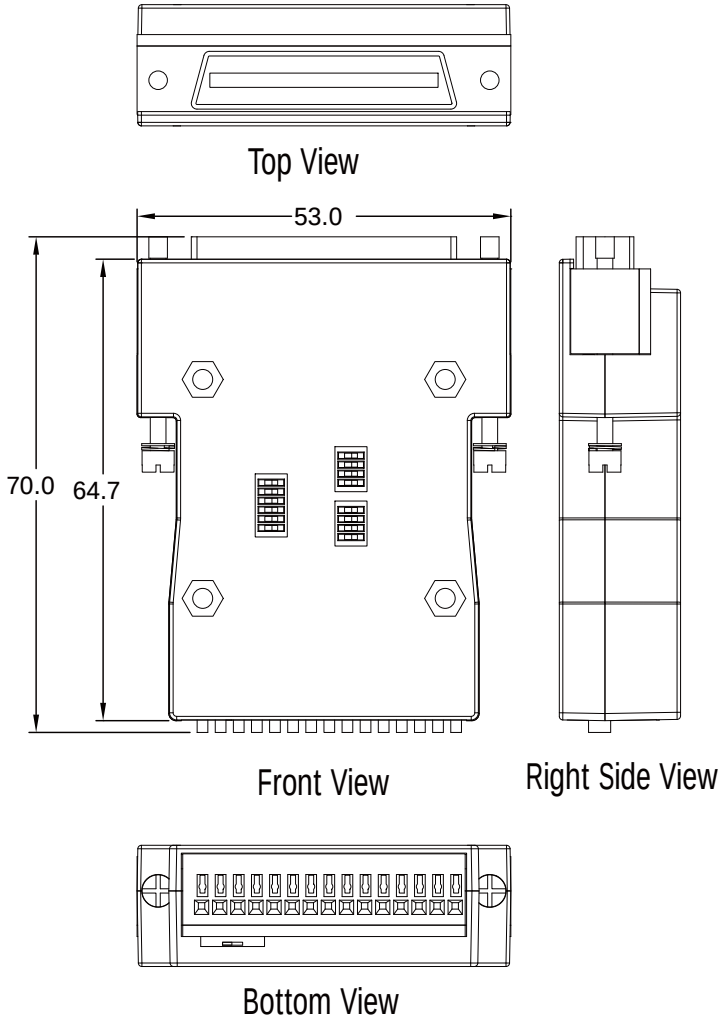
Pin Assignments:



No.	Name	Description	Signal Direction
1 ~ 2	Data+	Serial communication data+	Both
3 ~ 4	Data-	Serial communication data-	Both
5	FG	Frame ground	None
6 ~ 7	EGND	External ground	Input
8 ~ 9	E24V	External power 24V	Input
10	CMP	High-speed position compare	Output
11	EMG	Emergency stop	Input
12	SD	Slowdown	Input
13	LMT+	Positive end limit	Input
14	HOME	Home position	Input
15	LMT-	Negative end limit	Input

Wire Range: 28~20 AWG
Wire Strip Length: 10 mm

Dimensions: (Units: mm)



Ordering Information:

Model No.	Description
MN-SERVO-MJ3 CR	**Distributed Motionnet Single-axis Motion Control Module with Spring Type Terminal Blocks for Mitsubishi MELSERVO-J3/J4 (RoHS)**
MN-SERVO-PA4 CR	**Distributed Motionnet Single-axis Motion Control Module with Spring Type Terminal Blocks for Panasonic MINAS A4 (RoHS)**
MN-SERVO-YSV CR	**Distributed Motionnet Single-axis Motion Control Module with Spring Type Terminal Blocks for Yaskawa Sigma II/III/V (RoHS)**
MN-SERVO-DAA CR	**Distributed Motionnet Single-axis Motion Control Module with Spring Type Terminal Blocks for Delta ASDA-A/A2 (RoHS)**
MN-SERVO-TTA CR	**Distributed Motionnet Single-axis Motion Control Module with Spring Type Terminal Blocks for Teco TSTA-A/A+ (RoHS)**
MN-3254/MN-3253/MN-3257 CR MN-3254T/MN-3253T/MN-3257T CR	Distributed Motionnet 16-ch Isolated DI and 16-ch Isolated DO / 32-ch Isolated DI / 32-ch Isolated DO Module (RoHS)
PISO-MN200(T/EC) CR	PCI Bus, Dual-line Motionnet Control Master Card (RoHS)

Model No.	Description	
4POPP-003F	Pink Cord-End Terminal	
4POPP-003G	Turquoise Cord-End Terminal	

MN-SERVO -EC Series

MN-SERVO-MJ3-EC / MN-SERVO-PA4-EC / MN-SERVO-YSV-EC/ MN-SERVO-DAA-EC / MN-SERVO-TTA-EC

Distributed Motionnet Single-axis Motion Control Modules (With e-CON Mini-Clamp Connector)

Features:

- Maximum communication speed: 20 Mbps
- Maximum pulse output frequency: 6.6 Mpps
- Control up to 64 axes per line
- Multi-axis linear interpolation function
- 2-axis circular interpolation function
- Programmable T/S-curve acceleration and deceleration
- Change speed and position on the fly
- Slow down sensor, home sensor, positive and negative limit sensors for each axis
- Software limit and compare trigger output
- Three-way isolation for power, communication and I/O. (Provide better noise immunity and device protection)
- The EC module equipped with Mini-Clamp connector provide for an easier and debris-free wire termination process.

Introduction:

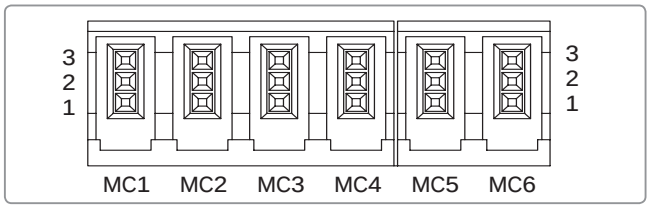
The **MN-SERVO -EC series** is used to expand the number of axes for distributed motion control on a Motionnet field bus. These extension slave modules can be directly connect to the servo driver and are serially connected to the controller using a simple and affordable Cat.5 LAN cable, reducing the amount of wiring required between the drivers and the controller, making this a highly suitable solution for integrated machine automation applications.

After the module is connected to the servo driver, all you need to do is connect a serial LAN cable between the modules. One serial line can support up to 64 single-axis modules. ICP DAS provides a variety of motion control modules suitable for a range of brands of servo drivers, such as Mitsubishi MELSERVO-J3/J4, Yaskawa Sigma II/III/V, Panasonic MINAS A4/A5, Delta ASDA-A/A2 and Teco TSTA-A/A+.

Specifications:

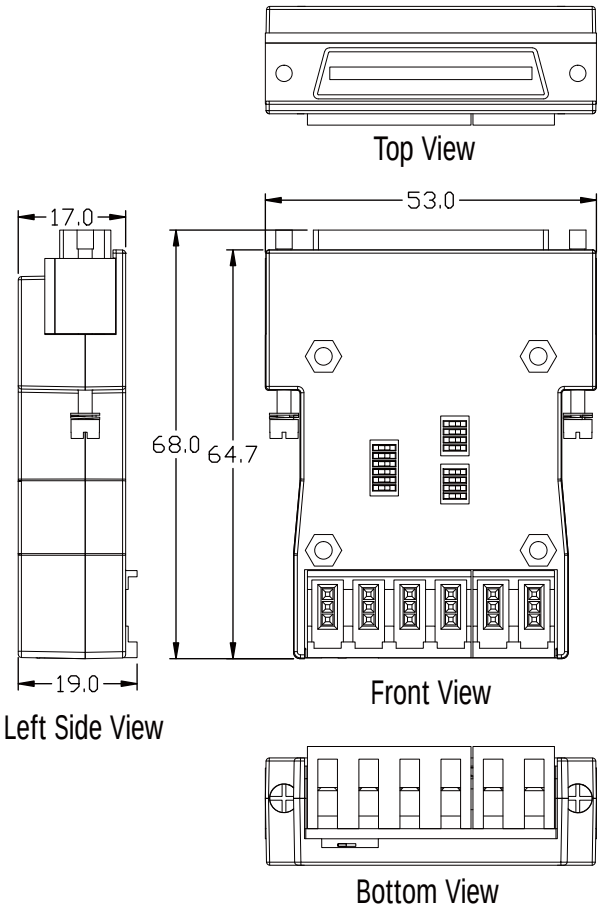
Communication Speed	2.5, 5, 10, 20 Mbps
Maximum Pulse Output Frequency	6.6 Mpps
Pulse Output Interface	OUT/DIR, CW/CCW
Pulse Output Counter	28-bit
Encoder Interface	CW/CCW, A/B phase
Encoder Counter	28-bit
Speed Profile	Trapezoidal/S Shaped Acc/Dec Driving
Home Mode	13 Types
Mechanical Switch Input	LMT+, LMT-, HOME, SD, EMG
Servo I/O Interface	Input: ALM, RDY, INP Output: SVON, ERC, ALM_RST
High-Speed Position Compare Output	5 V TTL or 24 V open collector
Led Diagnostics	Communication state (Link, Error) Mechanic Switch Input Internal 3.3 V Power Termination Resistor Switch
Operating Temperature	0 ~ +60 °C
Storage Temperature	-20 ~ +80 °C
Operating Humidity	10 ~ 85%; non-condensing
Storage Humidity	5 ~ 95%; non-condensing

Pin Assignments:



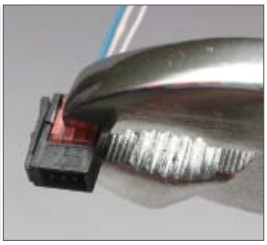
Connector	No.	Name	Description	Signal Direction
MC1	3	Data-	Serial communication data-	Both
	2	Data+	Serial communication data+	Both
	1	F.G.	Frame ground	None
MC2	3	Data-	Serial communication data-	Both
	2	Data+	Serial communication data+	Both
	1	F.G.	Frame ground	None
MC3	3	E24V	External power 24V	Input
	2	EGND	External ground	Input
	1	F.G.	Frame ground	None
MC4	3	E24V	External power 24V	Input
	2	EGND	External ground	Input
	1	F.G.	Frame ground	None
MC5	3	CMP	High-speed position compare	Output
	2	EMG	Emergency stop	Input
	1	SD	Slowdown	Input
MC6	3	LMT+	Positive end limit	Input
	2	HOME	Home position	Input
	1	LMT-	Negative end limit	Input

Dimensions: (Units: mm)



Ordering Information:

Model No.	Description
MN-SERVO-MJ3-EC CR	**Distributed Motionnet Single-axis Motion Control Module with e-CON Mini-Clamp connector for Mitsubishi MELSERVO-J3/J4 (RoHS)**
MN-SERVO-PA4-EC CR	**Distributed Motionnet Single-axis Motion Control Module with e-CON Mini-Clamp connector for Panasonic MINAS A4 (RoHS)**
MN-SERVO-YSV-EC CR	**Distributed Motionnet Single-axis Motion Control Module with e-CON Mini-Clamp connector for Yaskawa Sigma II/III/V (RoHS)**
MN-SERVO-DAA-EC CR	**Distributed Motionnet Single-axis Motion Control Module with e-CON Mini-Clamp connector for Delta ASDA-A/A2 (RoHS)**
MN-SERVO-TTA-EC CR	**Distributed Motionnet Single-axis Motion Control Module with e-CON Mini-Clamp connector for Teco TSTA-A/A+ (RoHS)**
MN-3254/MN-3253/MN-3257 CR MN-3254T/MN-3253T/MN-3257T CR	Distributed Motionnet 16-ch Isolated DI and 16-ch Isolated DO / 32-ch Isolated DI / 32-ch Isolated DO Module (RoHS)
PISO-MN200(T/EC) CR	PCI Bus, Dual-line Motionnet Control Master Card (RoHS)

Mini Clamp Wiremount Plug			Applicable Wire			
ICP DAS Part No.	Cover Color	3M Part No.	AWG No.	Cross-sectional Area (mm^2)	Finished External Diameter Φ (mm)	
4PKD1O0000001	Gray	37103-2206-000FL	20 – 22	0.3 – 0.5	1.6 – 2.0	
4PKD1O0000002	Red	37103-3101-000FL	24 – 26	0.14 – 0.3	0.8 – 1.0	
4PKD1O0000003	Orange	37103-3163-000FL	24 – 26	0.14 – 0.3	1.2 – 1.6	

MN-2091U/MN-2091U-T

Distributed Motionnet Single-axis Universal Motion Control Module

Features:

- Maximum communication speed: 20 Mbps
- Maximum pulse output frequency: 6.6 Mpps
- Control up to 64 axes per line
- Multi-axis linear interpolation function
- 2-axis circular interpolation function
- Programmable T/S-curve acceleration and deceleration
- Change speed and position on the fly
- Slow down sensor, home sensor, positive and negative limit sensors for each axis
- Software limit and compare trigger output
- Three-way isolation for power, communication and I/O. (Provide better noise immunity and device protection)
- Suitable for controlling a variety of servo drivers and stepper drivers

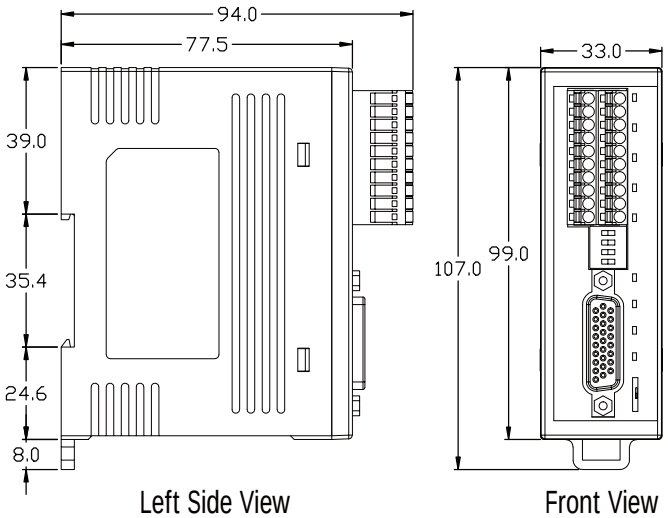
Introduction:

The **MN-2091U(-T)** is used to expand the number of axes for distributed motion control on a Motionnet field bus. These extension slave modules are serially connected to the controller using a simple and affordable Cat.5 LAN cable, and one serial line can support up to 64 single-axis modules. The 26-pin HD D-Sub connector can be used to easily connect with various servo drivers and stepper drivers. ICP DAS also provides a variety of cables suitable for a range of brands of servo drivers, which further reduces the amount of wiring required between the drivers and the controller, making this an ideal solution for highly integrated machine automation applications.

Specifications:

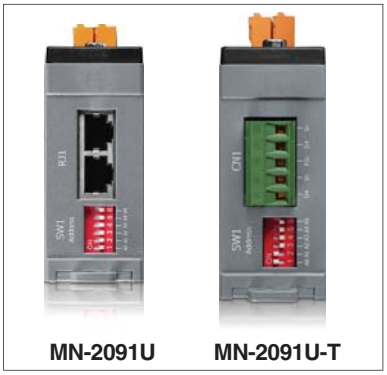
Communication Speed	2.5, 5, 10, 20 Mbps
Maximum Pulse Output Frequency	6.6 Mpps
Pulse Output Interface	OUT/DIR, CW/CCW
Pulse Output Counter	28-bit
Encoder Interface	CW/CCW, A/B phase
Encoder Counter	28-bit
Speed Profile	Trapezoidal/S-shaped Acc/Dec Driving
Home Mode	13 Types
Mechanical Switch Input	LMT+, LMT-, HOME, SD, EMG
Servo I/O Interface	Input: ALM, RDY, INP Output: SVON, ERC, ALM_RST
High-Speed Position Compare Output	5V TTL or 24V open collector
LED Diagnostics	Communication state (Link, Error) Mechanic Switch Input Internal 3.3V Power Termination Resistor Switch
Communication Connector	MN-2091U: RJ-45 x2 MN-2091U-T: 5-pin terminal block
Operating Temperature	0 ~ +60 °C
Storage Temperature	-20 ~ +80 °C
Operating Humidity	10 ~ 85%; non-condensing
Storage Humidity	5 ~ 95%; non-condensing

Dimensions: (Units: mm)



Left Side View

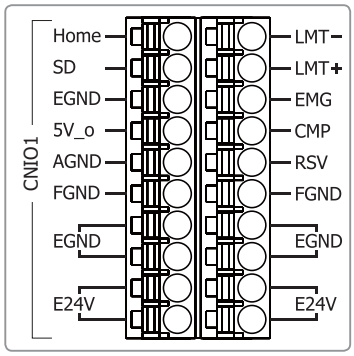
Front View



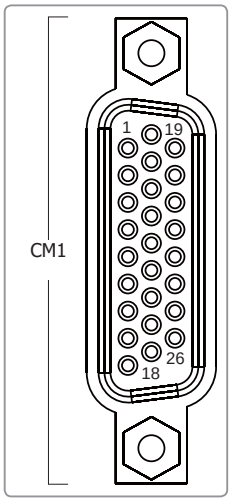
MN-2091U MN-2091U-T

Bottom View

Pin Assignments:



Pin No.	Pin Name	Description	I/O Define.	Pin No.	Pin Name	Description	I/O Define.
CNIO1B (Left) Pin Assignments				CNIO1A (Right) Pin Assignments			
1	HOME	Home position	Input	1	LMT-	Negative end limit	Input
2	SD	Slowdown	Input	2	LMT+	Positive end limit	Input
3	EGND	External ground	Input	3	EMG	Emergency stop	Input
4	5V_o	Internal 5V power de-rived from 24V supply	Output	4	CMP	High-speed position compare	Output
5	AGND	Optional analog ground, no internal connection	Connect to CM1 only	5	RSV	Reserved signal (no internal connection)	Connect to CM1 only
6	FGND	Frame ground	None	6	FGND	Frame ground	None
7 ~ 8	EGND	External ground	Input	7 ~ 8	EGND	External ground	Input
9 ~ 10	E24V	External power 24V	Input	9 ~ 10	E24V	External power 24V	Input



Pin No.	Pin Name	Description	I/O Define.
1	SRV_ON	Servo On	Output
2	INP	In Position	Input
3	ERC	Error Counter Clear	Output
4	RDY	Servo Ready	Input
5	P-	Forward rotation pulse train (differential line driver)	Output
6	P+		Output
7	A-	Encoder A-phase pulse	Input
8	A+		Input
9	N.C.	No internal connection	N.C.
10	RESET	Alarm Reset	Output
11	ALARM	Servo Alarm	Input
12	E24V	External power 24V	Input
13	EGND	External ground	Input
14	N.C.	No internal connection	N.C.

Pin No.	Pin Name	Description	I/O Define.
15	AGND	Optional analog ground (no internal connection)	Connect to CNIO1 only
16	B-	Encoder B-phase pulse	Input
17	B+		Input
18	N.C.	No internal connection	N.C.
19	EMG	Emergency stop	Input
20	RSV	Reserved signal (no internal connection)	Connect to CNIO1 only
21	EGND	External ground	Input
22	EGND	External ground	Input
23	N-	Forward rotation pulse train (differential line driver)	Output
24	N+		Output
25	Z-	Encoder Z-phase pulse	Input
26	Z+		Input

Ordering Information:

Model No.	Description
MN-2091U CR	**Distributed Motionnet Single-axis Universal Motion Control Module with RJ-45 Connector (RoHS)**
MN-2091U-T CR	**Distributed Motionnet Single-axis Universal Motion Control Module with Terminal Block (RoHS)**
MN-SERVO Series CR MN-SERVO -EC Series CR	Distributed Motionnet Single-axis Motion Control Modules (with Spring Type Terminal Blocks; EC: with e-CON Mini-Clamp Connector) (RoHS)
MN-3254/MN-3253/MN-3257 CR MN-3254T/MN-3253T/MN-3257T CR	Distributed Motionnet 16-ch Isolated DI and 16-ch Isolated DO / 32-ch Isolated DI / 32-ch Isolated DO Module (RoHS)
PISO-MN200(T/EC) CR	PCI Bus, Dual-Line Motionnet Master Control Card (RoHS)

Accessories:

Model No.	Description
CA-PC26M	26-pin HD D-Sub solder cup Male connector with plastic cover
CA-26-DAB2-15/30/50	26-pin HD D-Sub Male cable for Delta B2 servo amplifier, 1.5/3/5 M (for ASDA-B2 series)
CA-26-FFW-15/30/50	26-pin HD D-Sub Male cable for Fuji servo amplifier, 1.5/3/5 M (for FALDIC-W and ALPHA5 Smart series)
CA-26-MJ3-15/30/50	26-pin HD D-Sub Male cable for Mitsubishi servo amplifier, 1.5/3/5 M (for MELSERVO-J3/J4 series)
CA-26-YSV-15/30/50	26-pin HD D-Sub Male cable for Yaskawa servo amplifier, 1.5/3/5 M (for Sigma II/III/V series)
CA-26-PA4-15/30/50	26-pin HD D-Sub Male cable for Panasonic servo amplifier, 1.5/3/5 M (for MINAS A4/A5 series)
CA-26-DAA2-15/30/50	26-pin HD D-Sub Male cable for Delta A2 servo amplifier, 1.5/3/5 M (for ASDA-A2 series)
CA-26-TTA-15/30/50	26-pin HD D-Sub Male cable for Teco servo amplifier, 1.5/3/5 M (for TSTA-A/A+ series)

MN-3253/MN-3253T

Distributed Motionnet 32-ch Isolated DI Module

Features:

- Maximum communication speed: 20 Mbps
- 32-ch isolated digital inputs
- Each Motionnet transfer Line: connect modules up to 64
- Designing isolation protection: power, communication, I/O
- LED Diagnostics for communication and I/O status
- Each port can be specified as NPN or PNP (12~24 V)

Introduction:

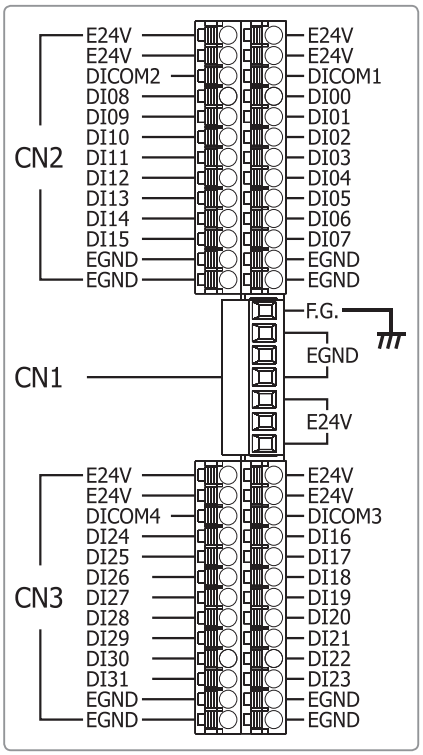
The **MN-3253(T)** is an I/O expansion device for Motionnet systems, and is equipped with **32 isolated digital input channels**. Each Motionnet communication line can be connected to up to 64 modules, meaning that the I/O can be expanded to up to 2048 input channels. The communication time required by each **MN-3253(T)** is 15.1 us. If 64 modules have been connected, signals for 2048 points on 64 modules can be sent and received within 0.97 msec. The update of the I/O status is completed automatically through the Motionnet system at a constant interval, and setting interrupts for specific input points that the customer wants to monitor can help prevent CPU time from being wasted by repetitive polling when there is nothing else for the issuing process to do. Each input port can be specified as either NPN or PNP (12~24 V).

Specifications:

Digital Input	
Input Channels	32
Input Type	Sink/Source (NPN/PNP)
On Voltage Level	+10 ~ 30 VDC
Off Voltage Level	+3 VDC max.
Input Impedance	4.7K Ohm
Isolation Voltage	3000 Vrms
Interface	
LED Indicators	Communication state (Link, Error) Input/output state Internal 3.3 V Power Termination resistor switch
Communication Speed	Selectable 2.5, 5, 10 or 20 Mbps by DIP Switch.
Cyclic Scan Time	15.1 µs per device (20 Mbps)
Communication Connector	MN-3253: RJ-45 x 2 MN-3253T: 5-pin terminal block
I/O Connector	13-Pin pluggable Terminal block x 4

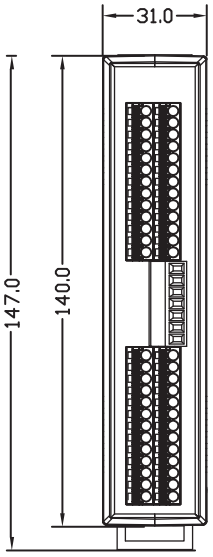
Power	
Voltage Range	24 VDC (1000 V isolated)
Power Consumption	2 W max.
Protection	Reverse voltage and overcurrent protection
Connection	7-pin removable terminal block
Mechanical	
Case	Plastic
Dimensions (W x H x D)	31 mm x 140 mm x 126.6 mm
Installation	DIN-Rail mounting
Environmental	
Operating Temperature	0 ~ + 60°C
Storage Temperature	-20 ~ +80°C
Operating Humidity	10 ~ 85%; Non-condensing
Storage Humidity	5 ~ 95%; Non-condensing

Pin Assignments:

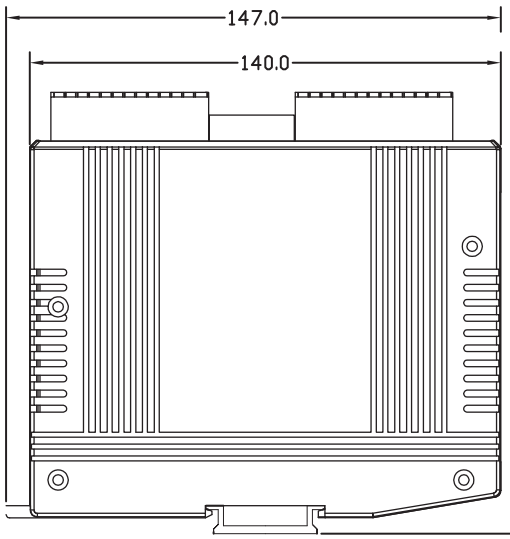


NO.	Pin Define	Specifications	I/O Define
CN1 Pin Assignments			
1	FG	Frame Ground	-
2 ~ 4	EGND	External Ground	Input
5 ~ 7	E24V	External 24V(+)	Input
CN2A (Right) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DICOM1	Common terminal of DI00~DI07	Input
4 ~ 11	DI00~DI07	Digital input channels 00~07	Input
12 ~ 13	EGND	External Ground	Connect to CN1
CN2B (Left) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DICOM2	Common terminal of DI08~DI15	Input
4 ~ 11	DI08~DI15	Digital input channels 08~15	Input
12 ~ 13	EGND	External Ground	Connect to CN1
CN3A (Right) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DICOM3	Common terminal of DI16~DI23	Input
4 ~ 11	DI16~DI23	Digital input channels 16~23	Input
12 ~ 13	EGND	External Ground	Connect to CN1
CN3B (Left) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DICOM4	Common terminal of DI24~DI31	Input
4 ~ 11	DI24~DI31	Digital input channels 24~31	Input
12 ~ 13	EGND	External Ground	Connect to CN1

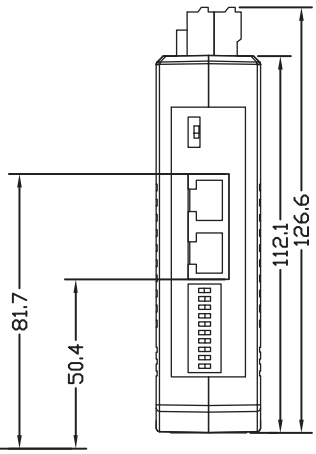
Dimensions: (Units: mm)



Front View



Right Side View



Top View

Ordering Information/Accessories:

Model No.	Description
MN-3253 CR	**Distributed Motionnet 32-ch Isolated DI Module with RJ-45 Connector (RoHS)**
MN-3253T CR	**Distributed Motionnet 32-ch Isolated DI Module with Terminal Block (RoHS)**
PISO-MN200(T/EC) CR	PCI Bus, Dual-Line Motionnet Master Control Card (RoHS)
MN-SERVO Series CR MN-SERVO -EC Series CR	Distributed Motionnet Single-axis Motion Control Modules (with Spring Type Terminal Blocks; EC: with e-CON Mini-Clamp Connector) (RoHS)
MN-2091U CR MN-2091U-T CR	Distributed Motionnet Single-axis Universal Motion Control Module (RoHS)

MN-3254/MN-3254T

Distributed Motionnet 16-ch Isolated DI, 16-ch Isolated DO Module

Features:

- Maximum communication speed: 20 Mbps
- 16-ch isolated digital inputs, 16-ch isolated digital outputs
- Each Motionnet transfer line: connect modules up to 64
- Designing isolation protection: power, communication, I/O
- LED Diagnostics for communication and I/O status
- Each input port can be specified as NPN or PNP (12~24 V)
- The internal flywheel diode of each output ports can be connect to different sources of power individually.
- High current sinking capability (200 mA)

Introduction:

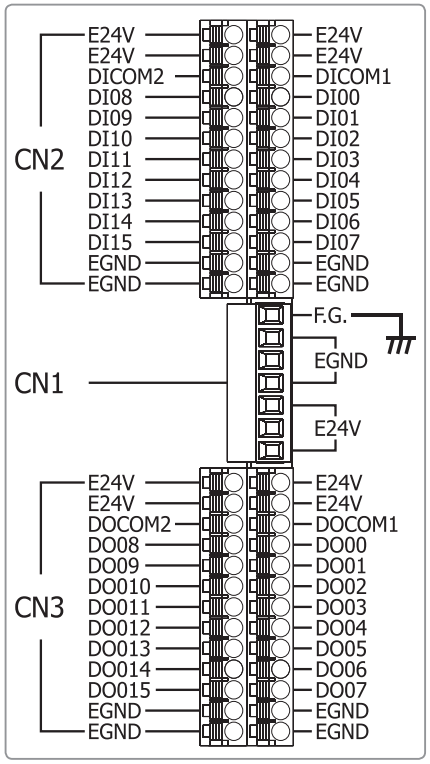
The **MN-3254(T)** is an I/O expansion device for Motionnet systems, and is equipped with **16 isolated digital input channels and 16 isolated digital output channels**. Each Motionnet communication line can be connected to up to 64 modules, meaning that the I/O can be expanded to up to 1024 input channels and 1024 output channels. The communication time required by each MN-325x is 15.1 us. If 64 modules have been connected, signals for 2048 points on 64 modules can be sent and received within 0.97 msec. The update of the I/O status is completed automatically through the Motionnet system at a constant interval, and setting interrupts for specific input points that the customer wants to monitor can help prevent CPU time from being wasted by repetitive polling when there is nothing else for the issuing process to do. Each input port can be specified as either NPN or PNP (12~24 V), and the internal flywheel diodes of each output port can be individually connected to different sources of power (each port is comprised of 8 I/O signals).

Specifications:

Digital Input	
Input Channels	16
Input Type	Sink/Source (NPN/PNP)
On Voltage Level	+10 ~ 30 VDC
Off Voltage Level	+3 VDC max.
Input Impedance	4.7 KΩ
Isolation Voltage	3000 Vrms
Digital Output	
Output Channels	16
Output Type	Open Collector (Sink), with internal flywheel diode
Load Voltage	+30 VDC max.
Load Current	200 mA max. for each channel
Isolation Voltage	3000 Vrms
Interface	
LED Indicators	Communication state(Link, Error) Input/output state Internal 3.3 V Power Termination resistor switch
Communication Speed	Selectable 2.5, 5, 10 or 20 Mbps by DIP Switch.

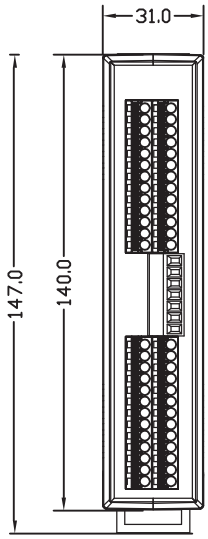
Cyclic Scan Time	15.1 µs per device (20 Mbps)
Communication Connector	MN-3254: RJ-45 x 2 MN-3254T: 5-pin terminal block
I/O Connector	13-Pin pluggable Terminal block x 4
Power	
Voltage Range	24 VDC (1000 V isolated)
Power Consumption	2 W max.
Protection	Reverse voltage and overcurrent protection
Connection	7-pin removable terminal block
Mechanical	
Case	Plastic
Dimensions (W x H x D)	31 mm x 140 mm x 126.6 mm
Installation	DIN-Rail mounting
Environmental	
Operating Temperature	0 ~ + 60°C
Storage Temperature	-20 ~ +80°C
Operating Humidity	10 ~ 85%; Non-condensing
Storage Humidity	5 ~ 95%; Non-condensing

Pin Assignments:

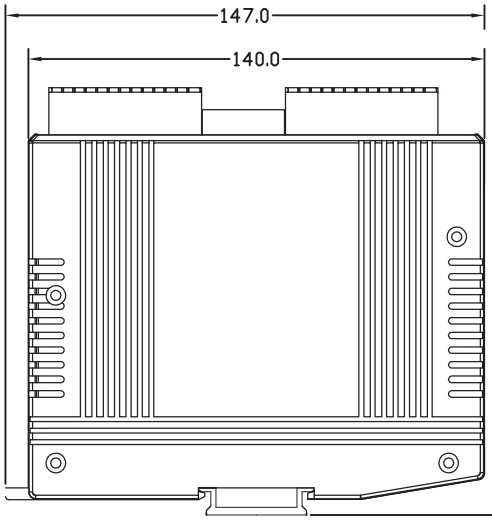


NO.	Pin Define.	Specifications	I/O Define.
CN1 Pin Assignments			
1	FG	Frame Ground	-
2 ~ 4	EGND	External Ground	Input
5 ~ 7	E24V	External 24V(+)	Input
CN2A (Right) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DICOM1	Common terminal of DI00~DI07	Input
4 ~ 11	DI00~DI07	Digital input channels 00~07	Input
12 ~ 13	EGND	External Ground	Connect to CN1
CN2B (Left) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DICOM2	Common terminal of DI08~DI15	Input
4 ~ 11	DI08~DI15	Digital input channels 08~15	Input
12 ~ 13	EGND	External Ground	Connect to CN1
CN3A (Right) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DOCOM1	Common Anode for Flywheel Diodes of DO00~DO07	Input
4 ~ 11	DO00~DO07	Digital output channels 00~07	Output
12 ~ 13	EGND	External Ground	Connect to CN1
CN3B (Left) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DOCOM2	Common Anode for Flywheel Diodes of DO08~DO15	Input
4 ~ 11	DO08~DO15	Digital output channels 08~15	Output
12 ~ 13	EGND	External Ground	Connect to CN1

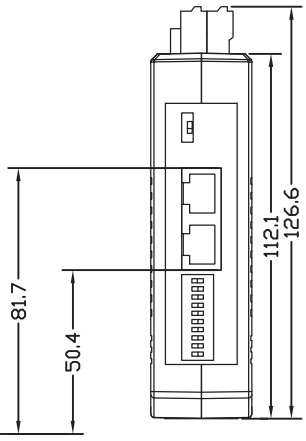
Dimensions: (Units: mm)



Front View



Right Side View



Top View

Ordering Information/Accessories:

Model No.	Description
MN-3254 CR	**Distributed Motionnet 16-ch Isolated DI, 16-ch Isolated DO Module with RJ-45 Connector (RoHS)**
MN-3254T CR	**Distributed Motionnet 16-ch Isolated DI, 16-ch Isolated DO Module with Terminal Block (RoHS)**
PISO-MN200(T/EC) CR	PCI Bus, Dual-Line Motionnet Master Control Card (RoHS)
MN-SERVO Series CR MN-SERVO -EC Series CR	Distributed Motionnet Single-axis Motion Control Modules (with Spring Type Terminal Blocks; EC: with e-CON Mini-Clamp Connector) (RoHS)
MN-2091U CR MN-2091U-T CR	Distributed Motionnet Single-axis Universal Motion Control Module (RoHS)

MN-3257/MN-3257T

Distributed Motionnet 32-ch Isolated DO Module

Features:

- Maximum communication speed: 20 Mbps
- 32-ch isolated digital outputs
- Each Motionnet transfer Line: connect modules up to 64
- Designing isolation protection: power, communication, I/O
- LED Diagnostics for communication and I/O status
- The internal flywheel diode of each output ports can be connect to different sources of power individually.
- High current sinking capability (200 mA)

Introduction:

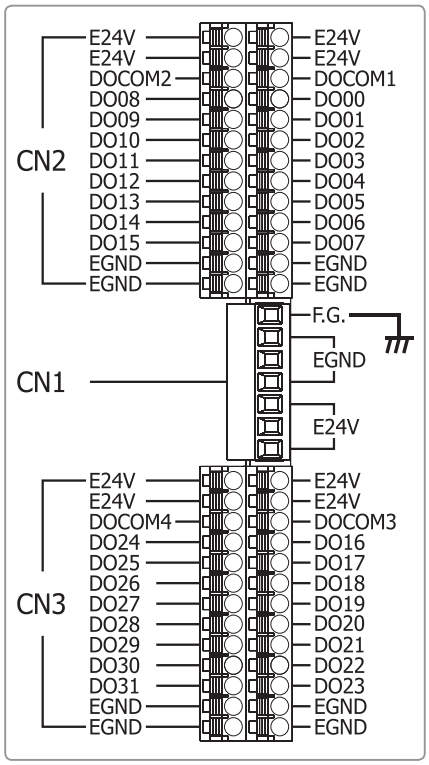
The **MN-3257(T)** is an I/O expansion device for Motionnet systems, and is equipped with 32 isolated digital output channels. Each Motionnet communication line can be connected to up to 64 modules, meaning that the I/O can be expanded to 2048 output channels. The communication time required by each MN-325x is 15.1 us. If 64 modules have been connected, signals for 2048 points on 64 modules can be sent and received within 0.97 msec. The update of the I/O status is completed automatically through the Motionnet system at a constant interval, and setting interrupts for specific input points that the customer wants to monitor can help prevent CPU time from being wasted by repetitive polling when there is nothing else for the issuing process to do. The internal flywheel diodes of each output port can be individually connected to different sources of power (each port is comprised of 8 I/O signals).

Specifications:

Digital Output	
Output Channels	32
Output Type	Open Collector (Sink), with internal flywheel diode
Load Voltage	+30 VDC max.
Load Current	200 mA max. for each channel
Isolation Voltage	3000 Vrms
Interface	
LED Indicators	Communication state (Link, Error) Input/output state Internal 3.3 V power Termination resistor switch
Communication Speed	Selectable 2.5, 5, 10 or 20 Mbps by DIP Switch.
Cyclic Scan Time	15.1 µs per device (20 Mbps)
Communication Connector	MN-3257: RJ-45 x 2 MN-3257T: 5-pin terminal block
I/O Connector	13-pin pluggable Terminal block x 4

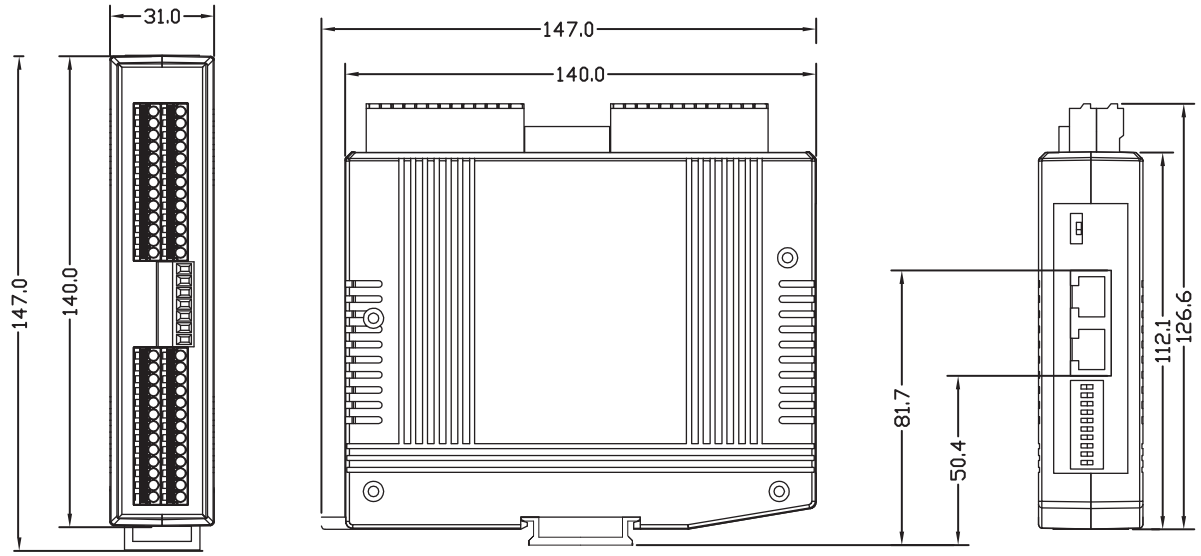
Power	
Voltage Range	24 VDC (1000 V isolated)
Power Consumption	2 W max.
Protection	Reverse voltage and overcurrent protection
Connection	7-pin removable terminal block
Mechanical	
Case	Plastic
Dimensions (W x H x D)	31 mm x 140 mm x 126.6 mm
Installation	DIN-Rail mounting
Environmental	
Operating Temperature	0 ~ + 60°C
Storage Temperature	-20 ~ +80°C
Operating Humidity	10 ~ 85%; Non-condensing
Storage Humidity	5 ~ 95%; Non-condensing

Pin Assignments:



NO.	Pin Define	Specifications	I/O Define
CN1 Pin Assignments			
1	FG	Frame Ground	-
2 ~ 4	EGND	External Ground	Input
5 ~ 7	E24V	External 24V(+)	Input
CN2A (Right) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DOCOM1	Common Anode for Flywheel Diode of DO00~DO07	Input
4 ~ 11	DO00~DO07	Digital output channels 00~07	Output
12 ~ 13	EGND	External Ground	Connect to CN1
CN2B (Left) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DOCOM2	Common Anode for Flywheel Diode of DO08~DO15	Input
4 ~ 11	DO08~DO15	Digital output channels 08~15	Output
12 ~ 13	EGND	External Ground	Connect to CN1
CN3A (Right) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DOCOM3	Common Anode for Flywheel Diode of DO16~DO23	Input
4 ~ 11	DO16~DO23	Digital output channels 16~23	Output
12 ~ 13	EGND	External Ground	Connect to CN1
CN3B (Left) Pin Assignments			
1 ~ 2	E24V	External 24V(+)	Connect to CN1
3	DOCOM4	Common Anode for Flywheel Diode of DO24~DO31	Input
4 ~ 11	DO24~DO31	Digital output channels 24~31	Output
12 ~ 13	EGND	External Ground	Connect to CN1

Dimensions: (Units: mm)



Front View　　Right Side View　　Top View

Ordering Information/Accessories:

Model No.	Description
MN-3257 CR	**Distributed Motionnet 32-ch Isolated DO Module with RJ-45 Connector (RoHS)**
MN-3257T CR	**Distributed Motionnet 32-ch Isolated DO Module with Terminal Block (RoHS)**
PISO-MN200(T/EC) CR	PCI Bus, Dual-Line Motionnet Master Control Card (RoHS)
MN-SERVO Series CR MN-SERVO -EC Series CR	Distributed Motionnet Single-axis Motion Control Modules (with Spring Type Terminal Blocks; EC: with e-CON Mini-Clamp Connector) (RoHS)
MN-2091U CR MN-2091U-T CR	Distributed Motionnet Single-axis Universal Motion Control Module (RoHS)

MN-D640-DIN

Distributed Motionnet 32-ch Isolated DI Module

Features:

- Maximum communication speed: 20 Mbps
- 32-ch isolated digital inputs
- Each Motionnet transfer Line: connect modules up to 64
- Designing isolation protection: power, communication, I/O
- LED Diagnostics for communication and I/O status

Introduction:

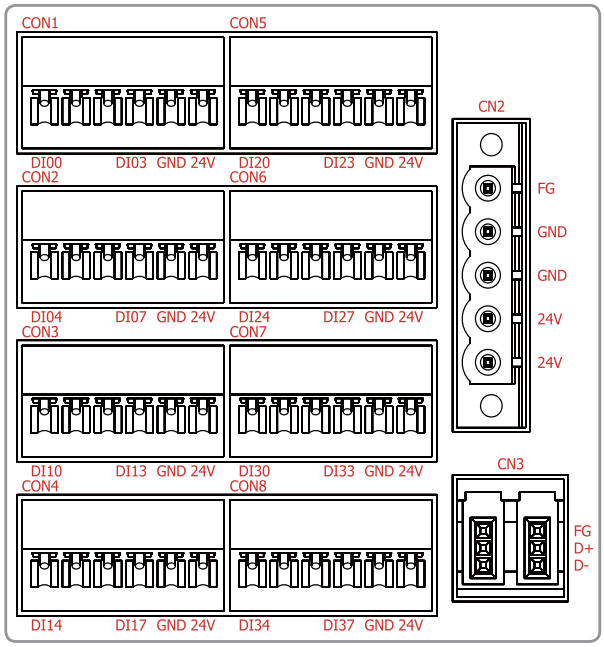
The **MN-D640-DIN** is an I/O expansion device for Motionnet systems, and is equipped with **32 isolated digital input channels**. Each Motionnet communication line can be connected to up to 64 modules, meaning that the I/O can be expanded to up to 2048 input channels. The communication time required by each **MN-D640-DIN** is 15.1 us. If 64 modules have been connected, signals for 2048 points on 64 modules can be sent and received within 0.97 msec. The update of the I/O status is completed automatically through the Motionnet system at a constant interval, and setting interrupts for specific input points that the customer wants to monitor can help prevent CPU time from being wasted by repetitive polling when there is nothing else for the issuing process to do.

Specifications:

Digital Input	
Input Channels	32
Input Type	NPN
On Voltage Level	+10 ~ 24 VDC
Off Voltage Level	+3 VDC max.
Input Impedance	4.7K Ohm
Isolation Voltage	2500 Vrms
Interface	
LED Indicators	Communication state (Link, Error) Input/output state Internal 3.3 V Power External 24 V Power
Communication Speed	Selectable 2.5, 5, 10 or 20 Mbps by DIP Switch.
Cyclic Scan Time	15.1 µs per device (20 Mbps)
Communication Connector	Mini-clamp Connector x 2
I/O Connector	6-Pin pluggable Terminal block x 8

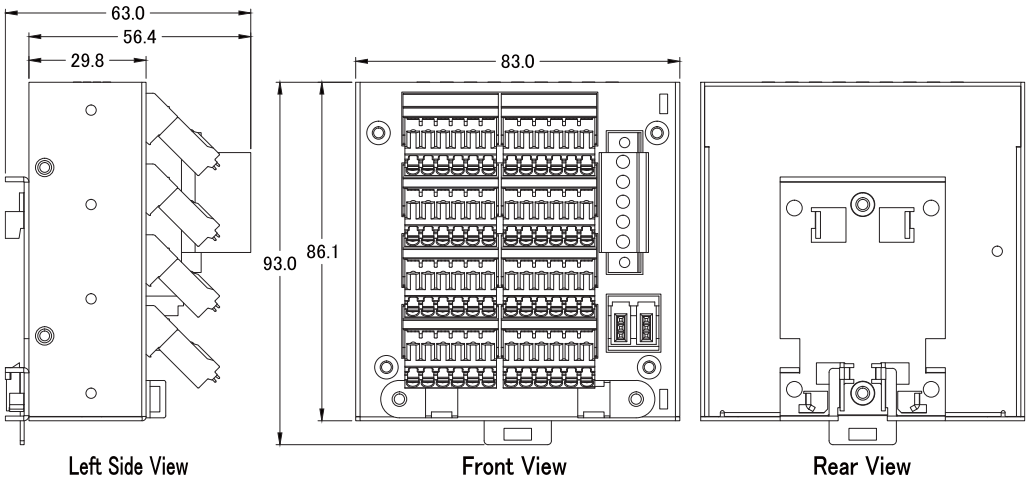
Power	
Voltage Range	24 VDC (1000 V isolated)
Power Consumption	2 W max.
Protection	Reverse voltage and overcurrent protection
Connection	5-pin removable terminal block
Mechanical	
Case	Aluminum
Dimensions (W x H x D)	83 mm x 93 mm x 63 mm
Installation	DIN-Rail mounting
Environmental	
Operating Temperature	0 ~ + 60°C
Storage Temperature	-20 ~ +80°C
Operating Humidity	10 ~ 85%; Non-condensing
Storage Humidity	5 ~ 95%; Non-condensing

Pin Assignments:



NO.	Pin Define	Specifications	I/O Define
CN3 Pin Assignments			
1	F.G.	Frame Ground	-
2	Data+	Positive terminal of differential communication signal	Bidirectional
3	Data−	Negative terminal of differential communication signal	Bidirectional
CN2 Pin Assignments			
1	F.G.	Frame Ground	-
2~3	GND	External Ground	Input
4~5	24V	External 24V(+)	Input
CON1~8 Pin Assignments			
1~4	DIxx	Digital input channels 00~31	Input
5	GND	External Ground	Connect to CN2
6	24V	External 24V(+)	Connect to CN2

Dimensions: (Units: mm)



Ordering Information:

Model No.	Description
MN-D640-DIN CR	**Distributed Motionnet 32-ch Isolated DI Module with Mini-clamp Connector (RoHS)**
PISO-MN200(T/EC) CR	PCI Bus, Dual-Line Motionnet Master Control Card (RoHS)
MN-SERVO Series CR MN-SERVO -EC Series CR	Distributed Motionnet Single-axis Motion Control Modules (with Spring Type Terminal Blocks; EC: with e-CON Mini-Clamp Connector) (RoHS)
MN-2091U CR MN-2091U-T CR	Distributed Motionnet Single-axis Universal Motion Control Module (RoHS)

Accessories:

Mini Clamp Wiremount Plug			Applicable Wire		
ICP DAS Part No.	Cover Color	3M Part No.	AWG No.	Cross-sectional Area (mm^2)	Finished External Diameter Φ (mm)
4PKD1O00000001	Gray	37103-2206-000FL	20 – 22	0.3 – 0.5	1.6 – 2.0
4PKD1O00000002	Red	37103-3101-000FL	24 – 26	0.14 – 0.3	0.8 – 1.0
4PKD1O00000003	Orange	37103-3163-000FL	24 – 26	0.14 – 0.3	1.2 – 1.6

MN-D622-DIN

Distributed Motionnet 16-ch Isolated DI, 16-ch Isolated DO Module

Features:

- Maximum communication speed: 20 Mbps
- 16-ch isolated digital inputs, 16-ch isolated digital outputs
- Each Motionnet transfer line: connect modules up to 64
- Designing isolation protection: power, communication, I/O
- LED Diagnostics for communication and I/O status
- High current sinking capability (200 mA)
- Fast Output Response Time within 0.5 µs

Introduction:

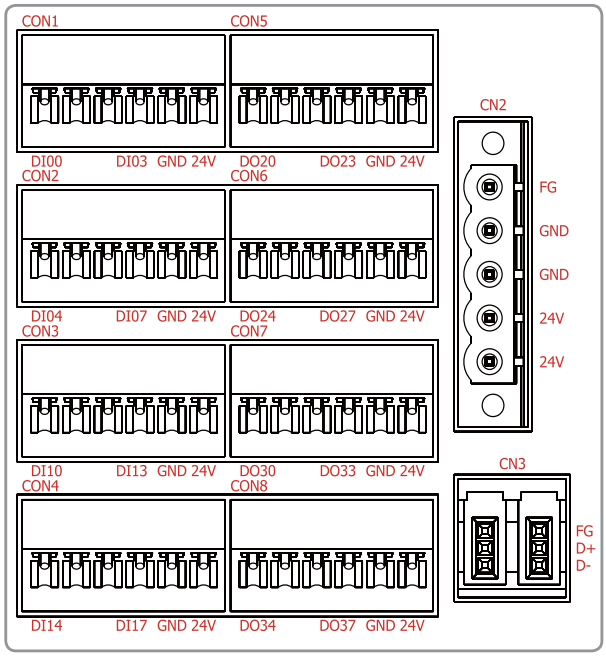
The **MN-D622-DIN** is an I/O expansion device for Motionnet systems, and is equipped with **16 isolated digital input channels and 16 isolated digital output channels**. Each Motionnet communication line can be connected to up to 64 modules, meaning that the I/O can be expanded to up to 1024 input channels and 1024 output channels. The communication time required by each **MN-D622-DIN** is 15.1 us. If 64 modules have been connected, signals for 2048 points on 64 modules can be sent and received within 0.97 msec. The update of the I/O status is completed automatically through the Motionnet system at a constant interval, and setting interrupts for specific input points that the customer wants to monitor can help prevent CPU time from being wasted by repetitive polling when there is nothing else for the issuing process to do.

Specifications:

Digital Input	
Input Channels	16
Input Type	NPN
On Voltage Level	+10 ~ 24 VDC
Off Voltage Level	+3 VDC max.
Input Impedance	4.7 KΩ
Isolation Voltage	2500 Vrms
Digital Output	
Output Channels	16
Output Type	Open Collector (Sink), with internal flywheel diode
Load Voltage	+30 VDC max.
Load Current	200 mA max. for each channel
Isolation Voltage	2500 Vrms
Interface	
LED Indicators	Communication state(Link, Error) Input/output state Internal 3.3 V Power External 24 V Power
Communication Speed	Selectable 2.5, 5, 10 or 20 Mbps by DIP Switch.

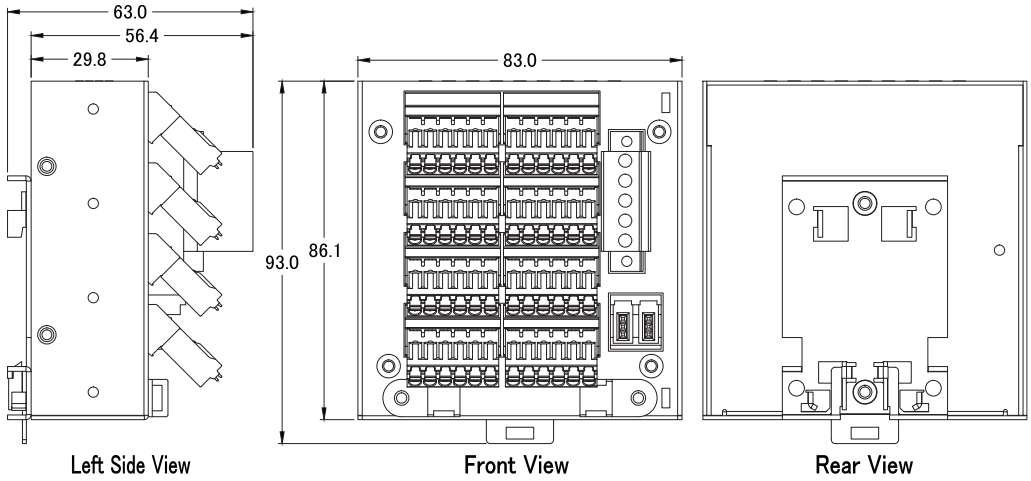
Cyclic Scan Time	15.1 µs per device (20 Mbps)
Communication Connector	Mini-clamp Connector x 2
I/O Connector	6-Pin pluggable Terminal block x 8
Power	
Voltage Range	24 VDC (1000 V isolated)
Power Consumption	2 W max.
Protection	Reverse voltage and overcurrent protection
Connection	5-pin removable terminal block
Mechanical	
Case	Aluminum
Dimensions (W x H x D)	83 mm x 93 mm x 63 mm
Installation	DIN-Rail mounting
Environmental	
Operating Temperature	0 ~ + 60°C
Storage Temperature	-20 ~ +80°C
Operating Humidity	10 ~ 85%; Non-condensing
Storage Humidity	5 ~ 95%; Non-condensing

Pin Assignments:



NO.	Pin Define.	Specifications	I/O Define.
CN3 Pin Assignments			
1	F.G.	Frame Ground	-
2	Data+	Positive terminal of differential communication signal	Bidirectional
3	Data−	Negative terminal of differential communication signal	Bidirectional
CN2 Pin Assignments			
1	F.G.	Frame Ground	-
2~3	GND	External Ground	Input
4~5	24V	External 24V(+)	Input
CON1~4 Pin Assignments			
1~4	DIxx	Digital input channels 00~15	Input
5	GND	External Ground	Connect to CN2
6	24V	External 24V(+)	Connect to CN2
CON5~8 Pin Assignments			
1~4	DOxx	Digital output channels 00~15	Output
5	GND	External Ground	Connect to CN2
6	24V	External 24V(+)	Connect to CN2

Dimensions: (Units: mm)



Ordering Information:

Model No.	Description
MN-D622-DIN CR	**Distributed Motionnet 16-ch Isolated DI, 16-ch Isolated DO Module with Mini-clamp Connector (RoHS)**
PISO-MN200(T/EC) CR	PCI Bus, Dual-Line Motionnet Master Control Card (RoHS)
MN-SERVO Series CR MN-SERVO -EC Series CR	Distributed Motionnet Single-axis Motion Control Modules (with Spring Type Terminal Blocks; EC: with e-CON Mini-Clamp Connector) (RoHS)
MN-2091U CR MN-2091U-T CR	Distributed Motionnet Single-axis Universal Motion Control Module (RoHS)

Accessories:

Mini Clamp Wiremount Plug			Applicable Wire		
ICP DAS Part No.	Cover Color	3M Part No.	AWG No.	Cross-sectional Area (mm^2)	Finished External Diameter Φ (mm)
4PKD1O00000001	Gray	37103-2206-000FL	20 – 22	0.3 – 0.5	1.6 – 2.0
4PKD1O00000002	Red	37103-3101-000FL	24 – 26	0.14 – 0.3	0.8 – 1.0
4PKD1O00000003	Orange	37103-3163-000FL	24 – 26	0.14 – 0.3	1.2 – 1.6

MN-D604-DIN

Distributed Motionnet 32-ch Isolated DO Module

Features:

- Maximum communication speed: 20 Mbps
- 32-ch isolated digital outputs
- Each Motionnet transfer Line: connect modules up to 64
- Designing isolation protection: power, communication, I/O
- LED Diagnostics for communication and I/O status
- High current sinking capability (200 mA)
- Fast Output Response Time within 0.5 μs

Introduction:

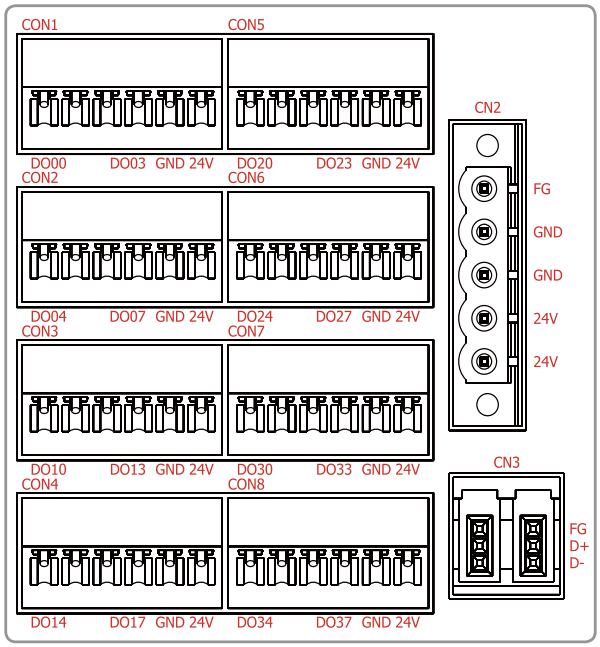
The **MN-D604-DIN** is an I/O expansion device for Motionnet systems, and is equipped with 32 isolated digital output channels. Each Motionnet communication line can be connected to up to 64 modules, meaning that the I/O can be expanded to 2048 output channels. The communication time required by each **MN-D604-DIN** is 15.1 us. If 64 modules have been connected, signals for 2048 points on 64 modules can be sent and received within 0.97 msec. The update of the I/O status is completed automatically through the Motionnet system at a constant interval, and setting interrupts for specific input points that the customer wants to monitor can help prevent CPU time from being wasted by repetitive polling when there is nothing else for the issuing process to do.

Specifications:

Digital Output	
Output Channels	32
Output Type	Open Collector (Sink), with internal flywheel diode
Load Voltage	+30 VDC max.
Load Current	200 mA max. for each channel
Isolation Voltage	2500 Vrms
Interface	
LED Indicators	Communication state (Link, Error) Input/output state Internal 3.3 V power External 24 V Power
Communication Speed	Selectable 2.5, 5, 10 or 20 Mbps by DIP Switch.
Cyclic Scan Time	15.1 μs per device (20 Mbps)
Communication Connector	Mini-clamp Connector x 2
I/O Connector	6-pin pluggable Terminal block x 8

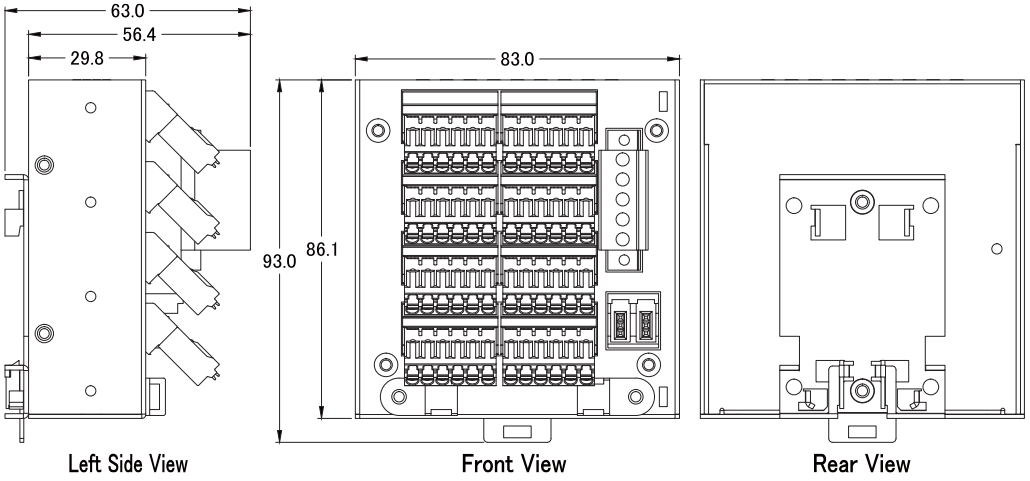
Power	
Voltage Range	24 VDC (1000 V isolated)
Power Consumption	2 W max.
Protection	Reverse voltage and overcurrent protection
Connection	5-pin removable terminal block
Mechanical	
Case	Aluminum
Dimensions (W x H x D)	83 mm x 93 mm x 63 mm
Installation	DIN-Rail mounting
Environmental	
Operating Temperature	0 ~ + 60°C
Storage Temperature	-20 ~ +80°C
Operating Humidity	10 ~ 85%; Non-condensing
Storage Humidity	5 ~ 95%; Non-condensing

Pin Assignments:



NO.	Pin Define	Specifications	I/O Define
CN3 Pin Assignments			
1	F.G.	Frame Ground	-
2	Data+	Positive terminal of differential communication signal	Bidirectional
3	Data−	Negative terminal of differential communication signal	Bidirectional
CN2 Pin Assignments			
1	F.G.	Frame Ground	-
2~3	GND	External Ground	Input
4~5	24V	External 24V(+)	Input
CON1~8 Pin Assignments			
1~4	DOxx	Digital output channels 00~31	Output
5	GND	External Ground	Connect to CN2
6	24V	External 24V(+)	Connect to CN2

Dimensions: (Units: mm)



Ordering Information:

Model No.	Description
MN-D604-DIN CR	**Distributed Motionnet 32-ch Isolated DO Module with Mini-clamp Connector (RoHS)**
PISO-MN200(T/EC) CR	PCI Bus, Dual-Line Motionnet Master Control Card (RoHS)
MN-SERVO Series CR MN-SERVO -EC Series CR	Distributed Motionnet Single-axis Motion Control Modules (with Spring Type Terminal Blocks; EC: with e-CON Mini-Clamp Connector) (RoHS)
MN-2091U CR MN-2091U-T CR	Distributed Motionnet Single-axis Universal Motion Control Module (RoHS)

Accessories:

Mini Clamp Wiremount Plug			Applicable Wire		
ICP DAS Part No.	Cover Color	3M Part No.	AWG No.	Cross-sectional Area (mm^2)	Finished External Diameter Φ (mm)
4PKD1O00000001	Gray	37103-2206-000FL	20 – 22	0.3 – 0.5	1.6 – 2.0
4PKD1O00000002	Red	37103-3101-000FL	24 – 26	0.14 – 0.3	0.8 – 1.0
4PKD1O00000003	Orange	37103-3163-000FL	24 – 26	0.14 – 0.3	1.2 – 1.6

MN-DA2-DIN

Distributed Motionnet 2-ch Analog Output Module

Features:

- Dual channel +/- 10 V analog output
- RJ-45 communication port
- 2 way isolation on power, communication
- Tiny design(90×75×57mm), DIN rail compatible
- 16-bit high resolution, 0.3mV min
- Software calibration of offset/gain
- Rapid output rate, Slew rate = 20 V / us
- High precision, DNL = +/-1 LSB, INL = +/-3 LSB

Introduction:

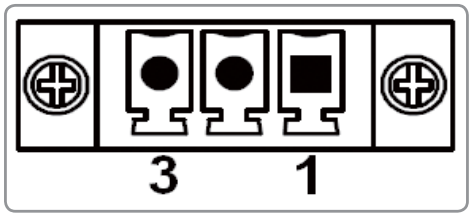
MN-DA2-DIN is a Motionnet 2-channel analog output I/O module. The max device capacity can be loaded 64 I/O modules on each Motionnet communication port. Thus, each port can be expended into 128 analog output points at once. The communication latency between two devices is 15.1μsec so that the max communication latency with 64 I/O modules on one communication port is 0.97 ms. The I/O connection status update is automated and real-time by hardware without occupied CPU time. The 16 bit high precision resolution analog output is provided +/- 10V range, 5V reference voltage with low shift, and hardware calibration in offset and gain for easy usage to customers.

Specifications:

Analog Output	
Output Channels	2
Voltage Level	+/- 10 V
Load Current	+/- 20 mA Max per channel
Response Speed	Slew rate = 20 V / us
Output Accuracy	DNL = +/- 1 LSB INL = +/- 3 LSB
Calibration Function	Offset: provided by software Gain: provided by software
Interface	
LED Indicators	Communication stats(Link, Error) Internal 3.3 V Power Terminal resistor rwitch
Communication Speed	Selectable 2.5, 5, 10 or 20 Mbps by DIP Switch
Cyclic scan time	15.1 μs per device (20 Mbps)

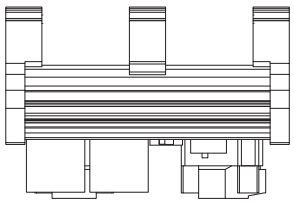
Power	
Voltage Range	24VDC +/-5% (1000 V isolated)
Power Consumption	3W max
Protection	Reverse voltage and overcurrent protection
Connection	5-Pin removable terminal block
Mechanical	
Case	Plastic
Flammability	UL 94V-0 housing
Size	75mm x 90mm x 57 mm (W x L x H)
Installation	DIN-Rail Mounting
Environmental	
Operating Temperature	0 ~ + 60°C
Storage Temperature	-20 ~ +80°C
Operating Humidity	10 ~ 85%; Non-condensing
Storage Humidity	5 ~ 95%; Non-condensing

Pin Assignments:

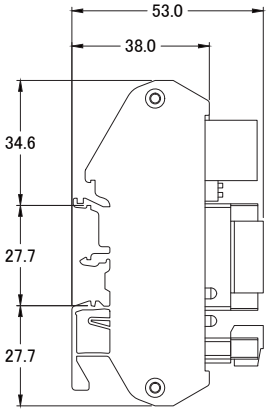


NO.	Name	Specifications	Signal Direction
CN2-CN3 Pin Assignments			
1	FGND	Frame Ground	None
2	AGND	Analog Ground	Output
3	AOx	Analog Output	Output

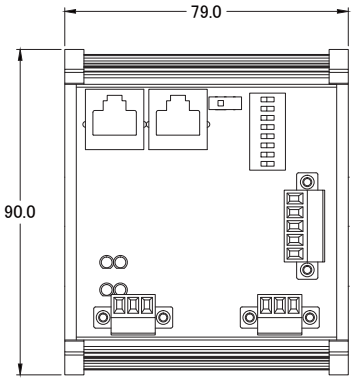
Dimensions: (Units: mm)



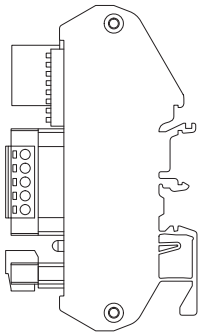
Top View



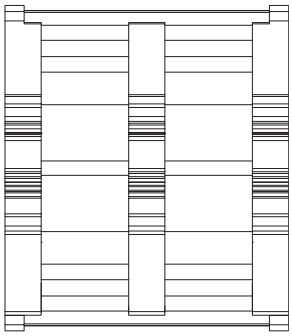
Left Side View



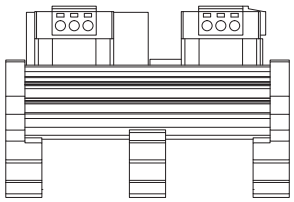
Front View



Right Side View



Rear View



Bottom View

Unit: mm

Ordering Information:

Model No.	Description
MN-DA2-DIN CR	**Distributed Motionnet 2-ch Analog Output Module (RoHS)**
PISO-MN200(T/EC) CR	PCI Bus, Dual-Line Motionnet Master Control Card (RoHS)
MN-SERVO Series CR MN-SERVO -EC Series CR	Distributed Motionnet Single-axis Motion Control Modules (with Spring Type Terminal Blocks; EC: with e-CON Mini-Clamp Connector) (RoHS)
MN-2091U CR MN-2091U-T CR	Distributed Motionnet Single-axis Universal Motion Control Module (RoHS)

MN-AD8-DIN

Distributed Motionnet 8-ch Analog Input Module

Features:

- 8 +/- 10 V analog input
- RJ-45 communication port
- 2 way isolation on power, communication
- Tiny design(90×75×57mm), DIN rail compatible
- 16-bit high resolution, 0.3mV min
- High precision and low shift reference 5V inside
- Hardware offset, gain calibration to EEPROM storage
- Rapid A/D transferation. Sampling rate = 250 ksps

Introduction:

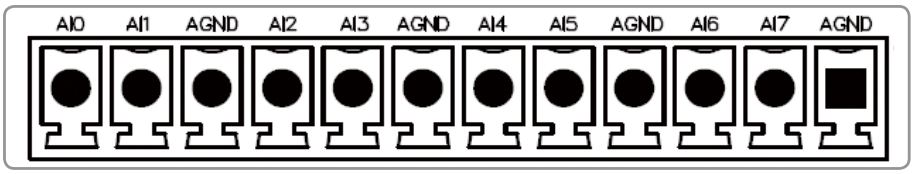
MN-AD8-DIN is a Motionnet 8-channel analog input I/O module. The max device capacity can be loaded 64 I/O modules on each Motionnet communication port. Thus, each port can be expended into 512 analog input points at once. The communication latency between two devices is 15.1μsec so that the max communication latency with 64 I/O modules on one communication port is 0.97 ms. The I/O connection status update is automated and real-time by hardware without occupied CPU time. The 16 bit high precision resolution analog input is provided +/- 10V range, 5V reference voltage with low shift, and hardware calibration in offset and gain for easy usage to customers.

Specifications:

Analog Input	
Input Channels	8
Voltage Level	+/- 10 V
Sampling Frequency	250 k sps
Calibration Function	Offset: provided by hardware Gain: provided by hardware
Interface	
LED Indicators	Communication stats(Link, Error) Internal 3.3 V Power Terminal resistor rwitch
Communication Speed	Selectable 2.5, 5, 10 or 20 Mbps by DIP Switch
Cyclic Scan Time	15.1 μs per device (20 Mbps)

Power	
Voltage Range	24VDC +/-5% (1000 V isolated)
Power Consumption	3W max
Protection	Reverse voltage and overcurrent protection
Connection	5-Pin removable terminal block
Mechanical	
Case	Plastic
Flammability	UL 94V-0 housing
Size	75mm x 90mm x 57 mm (W x L x H)
Installation	DIN-Rail Mounting
Environmental	
Operating Temperature	0 ~ + 60°C
Storage Temperature	-20 ~ +80°C
Operating Humidity	10 ~ 85%; Non-condensing
Storage Humidity	5 ~ 95%; Non-condensing

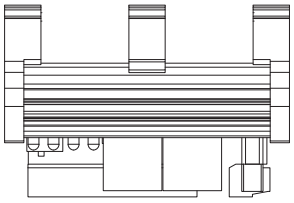
Pin Assignments:



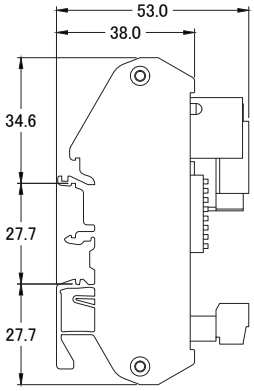
NO.	Name	Specifications	Signal Direction
CN2 Pin Assignments			
12	AI0	Analog input channels 0	Input
11	AI1	Analog input channels 1	Input
10	AGND	Analog Ground	Input
9	AI2	Analog input channels 2	Input
8	AI3	Analog input channels 3	Input
7	AGND	Analog Ground	Input

NO.	Name	Specifications	Signal Direction
CN2 Pin Assignments			
6	AI4	Analog input channels 4	Input
5	AI5	Analog input channels 5	Input
4	AGND	Analog Ground	Input
3	AI6	Analog input channels 6	Input
2	AI7	Analog input channels 7	Input
1	AGND	Analog Ground	Input

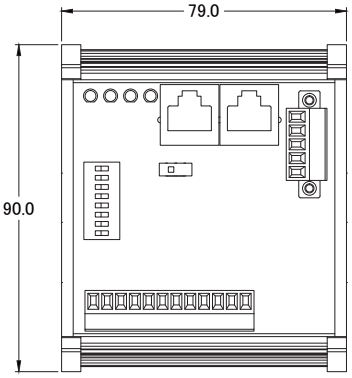
Dimensions: (Units: mm)



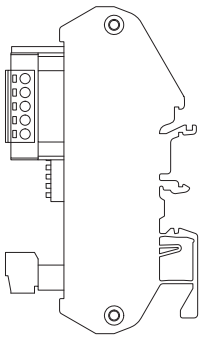
Top View



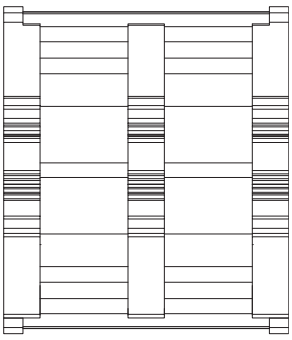
Left Side View



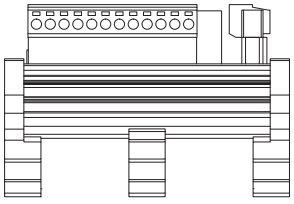
Front View



Right Side View



Rear View



Bottom View

Unit: mm

Ordering Information:

Model No.	Description
MN-AD8-DIN CR	**Distributed Motionnet 8-ch Analog Input Module (RoHS)**
PISO-MN200(T/EC) CR	PCI Bus, Dual-Line Motionnet Master Control Card (RoHS)
MN-SERVO Series CR MN-SERVO -EC Series CR	Distributed Motionnet Single-axis Motion Control Modules (with Spring Type Terminal Blocks; EC: with e-CON Mini-Clamp Connector) (RoHS)
MN-2091U CR MN-2091U-T CR	Distributed Motionnet Single-axis Universal Motion Control Module (RoHS)

MN-HUB4 / MN-HUB4EC

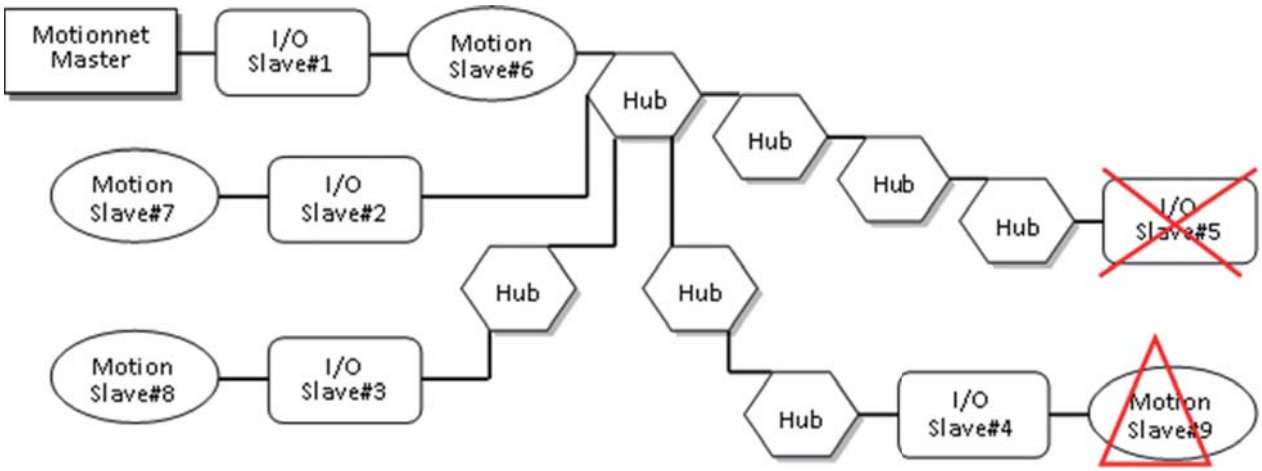
Distributed Motionnet 4 Port Hub Module

Features:

- True Motionnet Star Wiring Hub
- Independent Motionnet transceiver for each channel
- Maximum communication speed: 20 Mbps
- LEDs for indicating each Motionnet activity
- RJ-45 jack for standard module while the EC module equipped with Mini-Clamp connector
- DIN-Rail Mounting

Introduction:

In some user's application, users may encounter some difficulty in wiring since the standard Motionnet only support daisy-chain topology. The MN-HUB4 series modules can help users to use star or tree topology during wiring which not only can make the wiring more easier but also reduce the total wiring distance and cost.



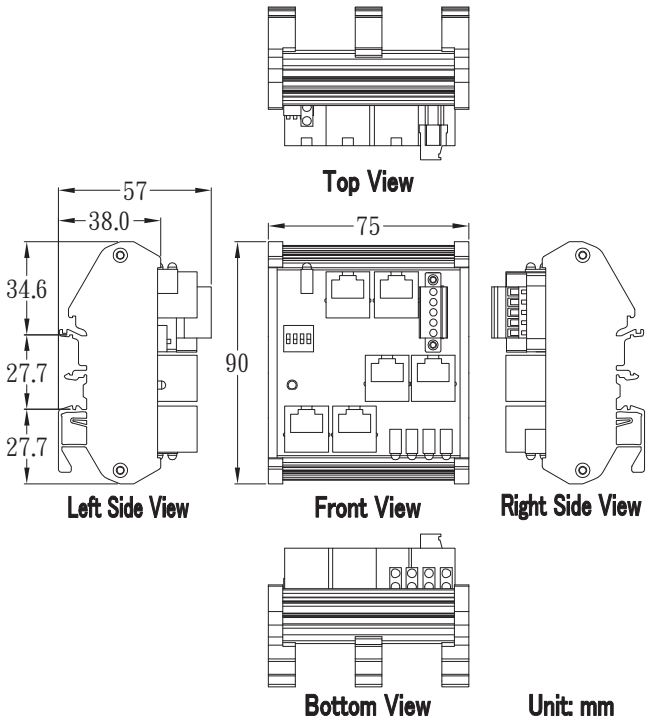
Module ID	No. of Layers to Master	Accessible	Module ID	No. of Layers to Master	Accessible
1 (I/O)	0	Yes	6 (Motion)	0	Yes
2 (I/O)	1	Yes	7 (Motion)	1	Yes
3 (I/O)	2	Yes	8 (Motion)	2	Yes
4 (I/O)	3	Yes	9 (Motion)	3	Yes
5 (I/O)	4	No			

Motion Modules	No. of Layers between Modules	Interpo-lation	Motion Modules	No. of Layers between Modules	Interpolation
6 and 7	1	Yes	7 and 8	2	Yes
6 and 8	2	Yes	7 and 9	3	No
6 and 9	3	No	8 and 9	4	No

Specifications:

Communication Speed	2.5, 5, 10, 20 Mbps
No. of Connection Line	Main Line (same layer): 2 Branch Line (to next layer): 4
Communication Speed	100 M Max. (20 Mbps; up to 32 modules) 50 M Max. (20 Mbps; up to 64 modules) 100 M Max. (10 Mbps; up to 64 modules)
Max. Layers between Modules	I/O or independent axis: 3 Between two interpolation axes: 2
Power Input	12 - 24 V
Operating Temperatures	0 °C ~ + 60 °C
Storage Temperatures	-20 °C ~ +80 °C
Operating Humidity	10 ~ 85%, Non-condensing
Storage Humidity	5 ~ 95%, Non-condensing

Dimensions: (Units: mm)



Ordering Information:

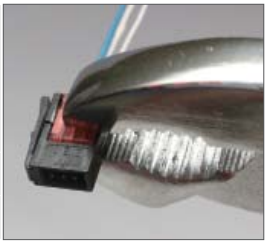
Model No.	Description
MN-HUB4 CR	**Distributed Motionnet 4 port Hub module (with RJ-45 Jack)**
MN-HUB4EC CR	**Distributed Motionnet 4 port Hub module (with e-CON Mini-Clamp connector)**
MN-HUB4EC-O CR	**Distributed Motionnet 4 port Hub module and 6 "4PKD1O0000003" Orange e-CON Mini-Clamp connector**
MN-HUB4EC-R CR	**Distributed Motionnet 4 port Hub module and 6 "4PKD1O0000002" Red e-CON Mini-Clamp connector**

Related Products:

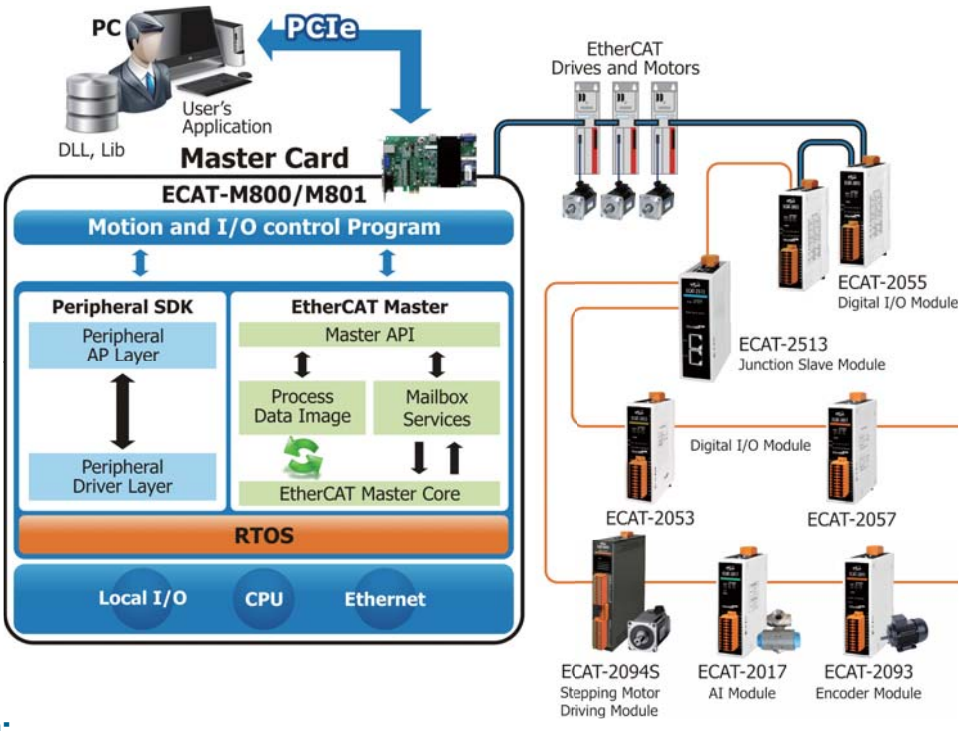
Model No.	Description
PISO-MN200(T/EC) CR	PCI Bus, Dual-Line Motionnet Control Master Card (RoHS)
MN-SERVO Series CR	MN-SERVO-MJ3 / PA4 / YSV / DAA / TTA: Distributed Motionnet Single-axis Motion Control Modules (RoHS)
MN-SERVO -EC Series CR	Distributed Motionnet Single-axis Motion Control Module with e-CON Mini-Clamp connector (RoHS)
MN-3254(T) CR	Distributed Motionnet 16-ch Isolated DI, 16-ch Isolated DO Module (RoHS)
MN-3253(T) CR	Distributed Motionnet 32-ch Isolated DI Module (RoHS)
MN-3257(T) CR	Distributed Motionnet 32-ch Isolated DO Module (RoHS)

Accessories:

Mini Clamp Wiremount Plug			Applicable Wire		
ICP DAS Part No.	Cover Color	3M Part No.	AWG No.	Cross-sectional Area (mm^2)	Finished External Diameter Φ (mm)
4PKD1O0000001	Gray	37103-2206-000FL	20 – 22	0.3 – 0.5	1.6 – 2.0
4PKD1O0000002	Red	37103-3101-000FL	24 – 26	0.14 – 0.3	0.8 – 1.0
4PKD1O0000003	Orange	37103-3163-000FL	24 – 26	0.14 – 0.3	1.2 – 1.6



4.4 EtherCAT Motion Solutions



Introduction:

EtherCAT (Ethernet for Control Automation Technology) is an open, high-performance fieldbus system that makes Ethernet technologies available at the I/O level. EtherCAT provides flexible wiring, fast communication and many other nice features. It needs a master to control many slaves. ICP DAS provides PC master cards, for users to build their applications including motion control. These cards can offer multi-axis motion and I/O control functions by their own built-in CPU. In this way, the CPU loading of PC can be reduced dramatically. In the mean while, ICP DAS also provides many I/O slave modules for users to choose from. Since EtherCAT technology is an industrial standard, those modules can work together in a system with 3rd-party EtherCAT slaves as well.

- **Versatile Motion Functions**
  P-to-P, Line, circle, 3D-arc, helix and other motion functions are provided.

- **Networking Standards**
  The ECAT Master card is based on EtherCAT and CiA402 standards for precise multi-axis control. Third-party EtherCAT I/O slaves are also supported.

- **Programming API**
  Fast application implementation is enabled by using motion API provided by ICP DAS.

- **Flexible and Easy Wiring**
  EtherCAT is a network technology which makes the system wiring easy and cost effective. Various coupler and junction slaves are provided for flexible wiring and less cabling.

Applications:

- Packaging
- Material handling
- Textile
- Printing and automotive applications
- Machine tools
- Robotics
- Industrial automation

Related Products:

EtherCAT Solution Products of Remote Motion Solutions		
Master Cards	**ECAT-M800** **ECAT-M801**	PCIe EtherCAT Master Card
Motion Control Modules	**ECAT-2092(T)** **ECAT-2093**	EtherCAT Encoder Modules
	ECAT-2091S **ECAT-2094S** **ECAT-2098S**	EtherCAT Stepping Motor Driving Modules
I/O Modules	**ECAT-2011H** **ECAT-2015** **ECAT-2018**	EtherCAT Analog Input Modules
	ECAT-2024 **ECAT-2028**	EtherCAT Analog Output Modules
	ECAT-204x **ECAT-205x** **ECAT-206x**	EtherCAT Digital Input/Output Modules
Converters	**ECAT-2511-A** **ECAT-2511-B**	EtherCAT to Single-mode Fiber Converters
Junction Slave Modules	**ECAT-2512** **ECAT-2513**	EtherCAT Junction Slave Modules

EtherCAT Master Cards:

PCIe, EtherCAT Master Card

Model Name	ECAT-M800	ECAT-M801
Pictures		
Communication Interface		
Connector	1x RJ45	
Speed	100 Mbit/s	
Protocol	EtherCAT Master	
No. of Slave Node	Max. 64	
No. of Motion Control	Max. 32-Axis Synchronously	
Digital Output		
Channels	12	13
Output Type	Sink(open collector)	
Max load Current	100mA /ch	
Digital Input		
Channels	12	13
Type	Wet (Sink/Source)	
Encoder		
Axis	-	2
Type	-	A/B Phase, CW/CCW, Pulse/Dir.
Speed, Resolution		1 MHz, 32-bit
Compare Trigger Output		2-ch

EtherCAT Motion Control Modules:

Encoder Module

Model Name	Axis	Type	Operating Voltage	Speed	Counter	Compare Trigger Out	Hardware Latch	Hardware Reset
ECAT-2092	2	1. A/B Phase 2. CW/CCW 3. Pulse/Dir.	5/24 V (Jumper Select)	6 MHz (5V)	32-bit	-	Yes	Yes
ECAT-2092T	2					2 (Open Collector)	Yes	Yes
ECAT-2093	3					-	-	-

Stepping Motor Driving Module

Model Name	Driver					Encoder				
	Axis	Type	Resolution	Output Current	Voltage Range	Axis	Type	Operating Voltage	Resolution	Speed
ECAT-2091S	1	2-phase stepper motor	200 x 256	2A per axis	5 ~ 40 V	1	A/B Phase	5 V	32-bit	1 MHz
ECAT-2094S	4					-	-	-	-	-
ECAT-2098S	8					-	-	-	-	-

EtherCAT I/O Modules:

Analog Input Module

Model Name	Channel	Input Range	Resolution	Accuracy	Output Capability
ECAT-2015	7	Pt100, Pt1000, Ni120, Cu50, Cu100, Cu1000	16-bit	0.1% of FSR	10 Hz (Total)
ECAT-2017	8/16	0~10V, ±10 V, ±5 V, ±2.5 V, 0~ 20 mA, ±20 mA or 4~20mA (Software selectable)	12-bit	0.2% of FSR	1k Hz per channel
ECAT-2018	8	J, K, T, E, R, S, B, N, C, L, M, LDIN43710 (Software selectable)	16-bit	0.1% of FSR	10 Hz (Total)

Analog Output Module

Model Name	Channel	Output Range	Resolution	Accuracy	Output Capability
ECAT-2024	4	±10V, ±5V, 0~10V,0 ~ 5V	12-bit	± 2 LSB	10V @ 5mA
ECAT-2028	8				

Digital I/O Module

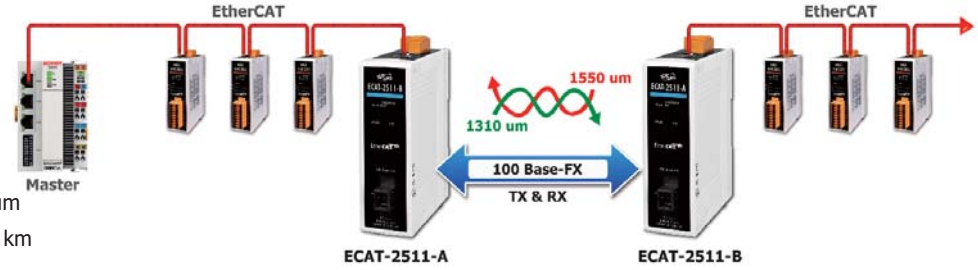
Model Name	Digital Input		Digital Output		
	Channels	Type	Channels	Type	Max. Load
ECAT-2057	-	-	16	Open Collector (Sink)	100 mA
ECAT-2057-PNP	-	-	16	Open Emitter (Source)	100 mA
ECAT-2057-8P8N	-	-	8	Open Collector (Sink)	100 mA
			8	Open Emitter (Source)	100 mA
ECAT-2045	-	-	16	Open Collector (Sink)	700 mA
ECAT-2045-32	-	-	32	Open Collector (Sink)	600 mA
ECAT-2051	16	Dry (Source), Wet (Sink/Source)	-	-	-
ECAT-2051-32	32	Dry (Source), Wet (Sink/Source)			
ECAT-2050	14	Dry (Source), Wet (Sink/Source)	4	Open Collector/ Emitter by Jumper Selectable	100 mA
ECAT-2052	8	Wet (Sink/Source)	8	Open Collector (Source)	100 mA
ECAT-2052-NPN				Open Collector (Sink)	
ECAT-2053	16	Wet (Sink/Source)	-	-	-
ECAT-2055	8	Dry (Source), Wet (Sink/Source)	8	Open Collector (Sink)	700 mA
ECAT-2055-32	16	Dry (Source), Wet (Sink/Source	16	Open Collector (Sink)	700 mA
ECAT-2060	6	Dry (Source), Wet (Sink/Source)	6	Relay, Form A (SPST-NO)	5A

EtherCAT Converter Modules: NEW

ECAT-2511-A **ECAT-2511-B**	**EtherCAT to Single-mode Fiber Converter**

The ECAT-2511-A and ECAT-2511-B are EtherCAT to single-mode fiber optic converter. They are designed not only to convert EtherCAT signals to optical signals on a fiber optic cable, to reshape the EtherCAT signal to compensate for distortion, but to isolate the bus error due to the wire short or disturbance. With the advantage of fiber optic, the ECAT-2511-A and ECAT-2511-B enable secure data transmission via fiber optic transmission, and helps the EtherCAT network to prevent the noise from EMS/RFI interference.

- EtherCAT Type: RJ45, 100 Base-TX
- Fiber Type:
  SC, Single mode, 100 Base-FX
- Fiber Cable:
  8.3/125, 8.7/125, 9/125 or 10/125 μm
- Max. transmission distance up to 25 km
- Fiber Wavelength:
  - Tx: 1310 nm, Rx: 1550 nm for I-2533CS-A
  - Tx: 1550 nm, Rx: 1310 nm for I-2533CS-B



EtherCAT Junction Slave Modules: NEW

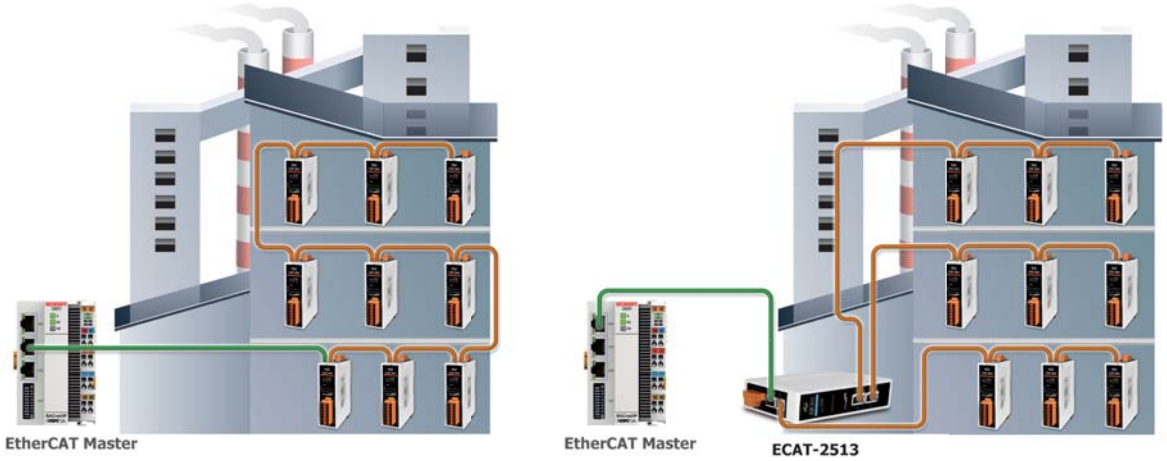
ECAT-2512 ECAT-2513	Junction Slave

ECAT-2512 and ECAT-2513 are 1-to-2 port and 1-to-3 port EtherCAT junction slaves. They are designed for realizing flexible wiring by daisy chain and branch.

Model Number	ECAT-2512 	ECAT-2513 
No. of Port	3 x RJ45 (1 in, 2 out)	4 x RJ45 (1 in, 3 out)
No. of Node	1	2

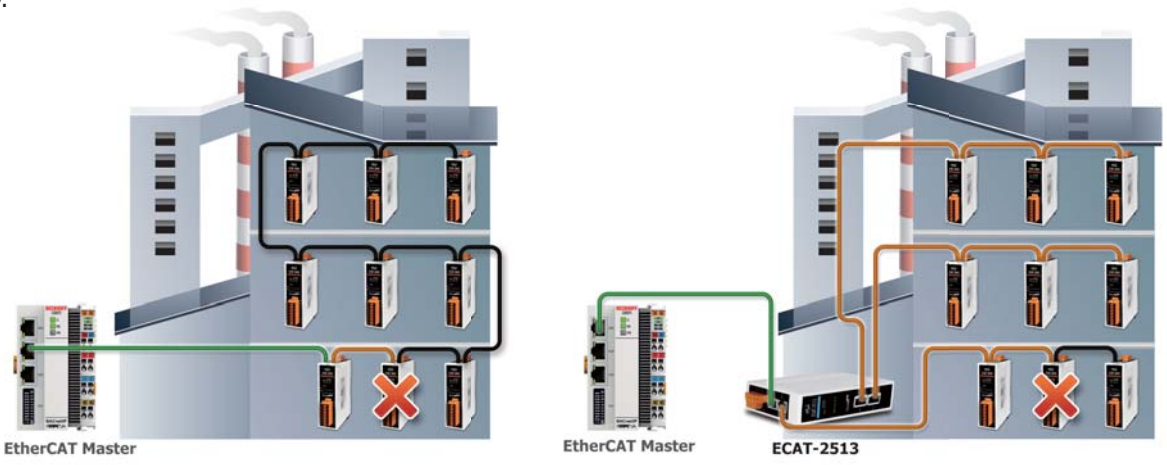
Benefit 1: Translate Daisy-chain to Branch Topology

EtherCAT junction slaves can realize branch topology. This make the cabling easier than daisy-chain topology.



Benefit 2: Improving the Debugging Efficiency

If a slave device is not working or the cable is disconnected, the following slave devices on the same network all not communicate with the master controller. With EtherCAT junction slaves, all slave devices can be wired as separated sections. If one slave device failed, only the slave devices on the same section will be influenced. The EtherCAT junction slave keeps the slave devices on another section communicate with the master controller. Debugging can be made separately, thus improving the debugging efficiency.

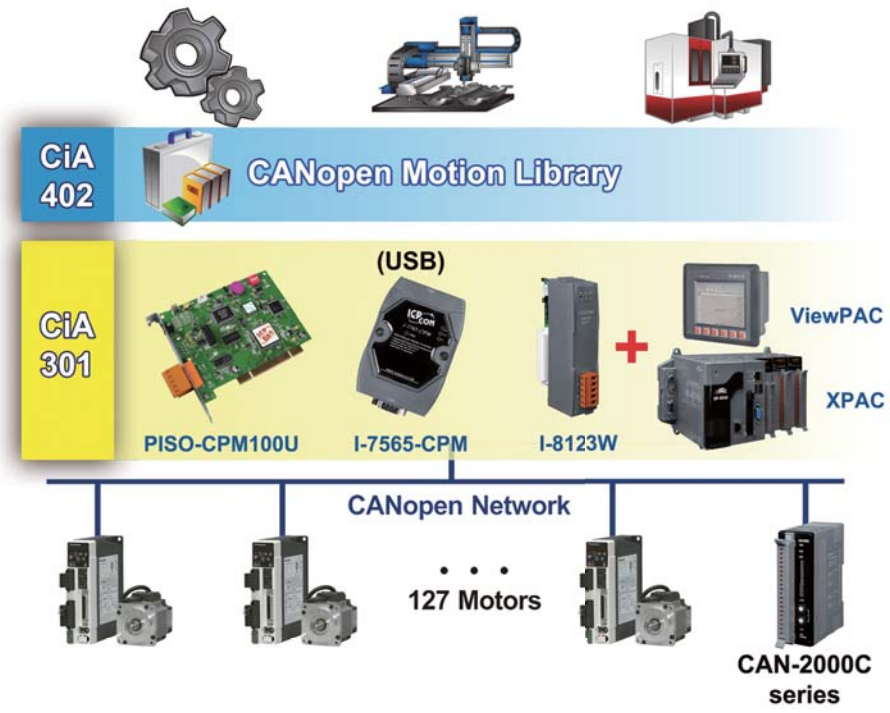


4.5 CANopen Motion Solutions

Introduction:

The **CAN (Controller Area Network) bus** is one of the safest industrial network systems, and CANopen is the standard industrial communication protocol on the CAN bus. CANopen technology has been used in a wide range of application fields, including medical equipment, vehicles, railway applications or building automation. ICP DAS provides a motion control library (CiA 402) for CANopen Master products meaning that users can now integrate motion control systems into a CANopen network, providing the ability to control CANopen-based motors and remote I/O devices within the same network, making wire connections and control easier and more efficient.

The CANopen Motion Library is compliant with the CANopen standard CiA 402, and provides a variety of motion control functions, such as position control, velocity control, torque control, synchronous action etc. The CiA 402 is one of the standard CANopen application profiles, and is specially designed for motion control systems. In addition to making the management of the CANopen-based motors easy, the CANopen protocol, which is based on the CAN bus, can help to reduce the need for wire connections between the controller and the motors, and provides rapid troubleshooting functions. A large number of CANopen-based motors can be linked together so that multi-axis motion control via a single host becomes achievable. While controlling the motors, CANopen-based remote I/O modules that comply with the CiA 402 standard can also be accessed at the same time. Therefore, developing a motion control application becomes easier and more convenient.



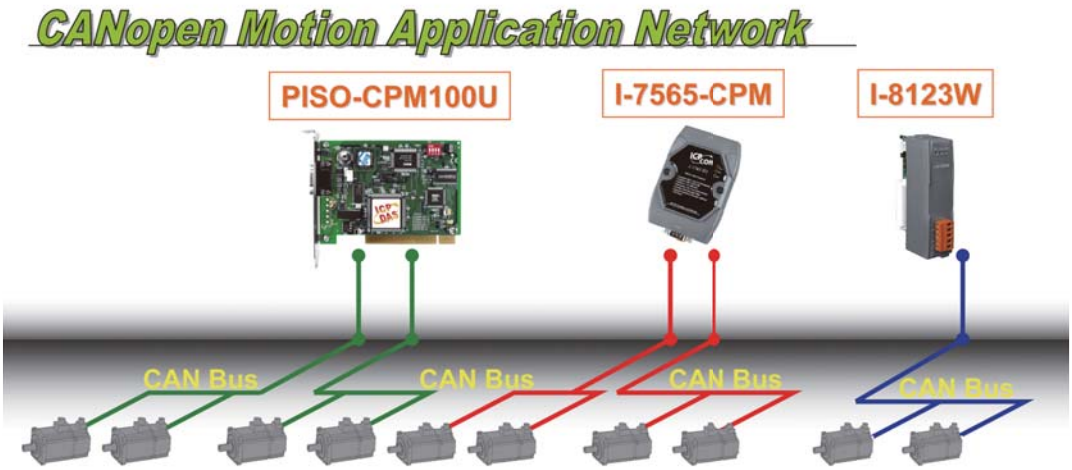
Features:

- Compliant with the CiA 402 v1.1 Standard
- Supports a max. of 127 motors in a single network
- Absolute and relative position control
- Velocity, torque or jog control
- Supports synchronous action for a maximum of 127 motors
- Supports various homing control methods
- Supports torque limitation via CANopen commands
- Supports the node guarding and heartbeat protocols
- Supports dynamic PDO object configuration
- Bus distance ranges between 25 m to 5000 m
- Supports baud rates of 10 Kbps, 20 Kbps, 50 Kbps, 125 Kbps, 250 Kbps, 500 Kbps, 800 Kbps and 1 Mbps.

Benefits:

- Suitable for distributed multi-axis motion control systems. E.g., distributed sun tracker systems, conveyer transmission control systems, and so on.
- Reduces the cost of wiring, especially time requirements.
- Choose from a range of motors with no limit on certain types.
- The CAN hardware has a range of error detection and error correction mechanisms, which provides the safest communication bus.
- Able to use different CANopen I/O modules and motors in the same CANopen network.
- The range of the CANopen bus can be extended for long distance applications. For example, for solar or wind farm application systems.
- The CANopen bus can be converted to fiber to protect against high noise interference.

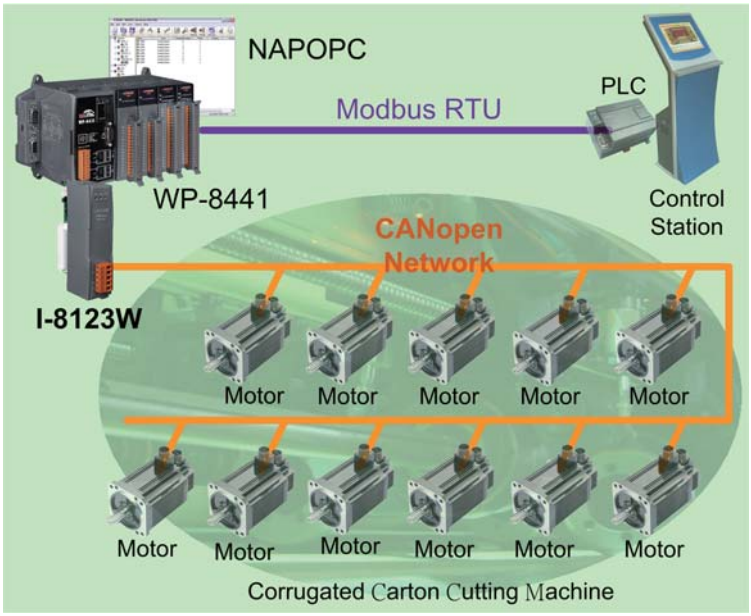
Typical Application Network:



CANopen Motion Applications:

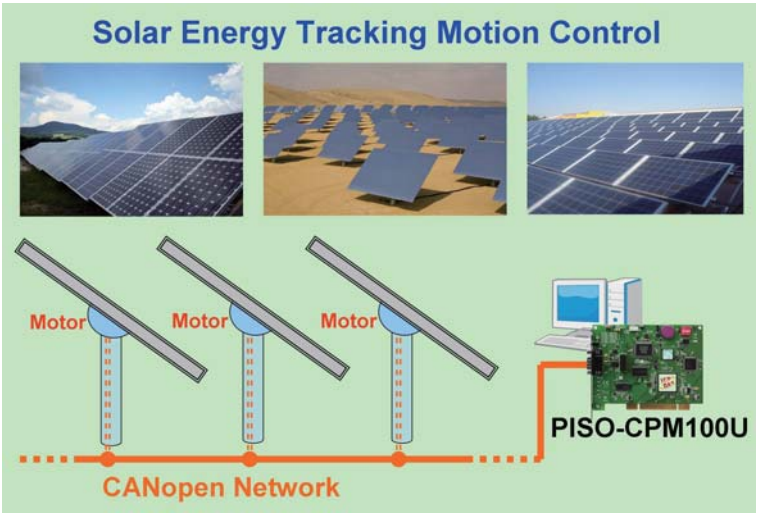
1. Corrugated Carton Cutting Machine

A creasing and cutting machine is one kind of equipment for creasing and cutting ordinary cardboard corrugated board plastic and leather in general, applicable to printing packaging decoration and plastic industries. Machine is characterized by compact structure, fine workman ship, big pressure, and high precision and easy and reliable operation. With high degree of automation, this model can do integrative process of auto-feeding, cutting and auto-unloading. All the cutting knives and rollers are controlled by 31 CANopen motors. The WP-8441 and I-8123W play the role of the CANopen master to control all the motors simultaneously.



2. Solar Tracking System

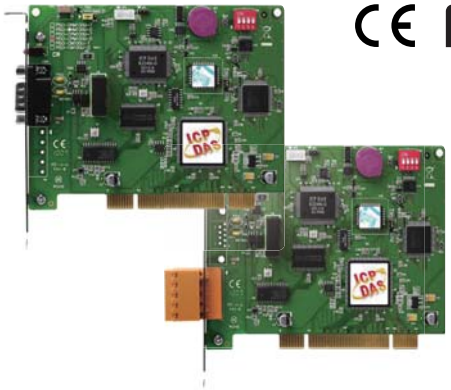
Solar Tracking System is a distribute device for orienting a solar panel or concentrating a solar reflector or lens towards the sun. The sun's position in the sky varies both with the seasons and time of day as the sun moves across the sky. The solar energy intercepted by the solar panels during the course of the day is not maximized if the position of the panel is always static. Dynamically oriented solar panels can track the sun throughout each day to greatly enhance energy collection. There are more than 100 motors in that system. The tracker built-in one or two axis motors. The PC and PISO-CPM100 control parts of the solar panels.



CANopen Master Cards:

PISO-CPM100U

PCI Board for Industrial PC



Features:

- Universal PCI supports both the 5 V and 3.3 V PCI bus
- Embedded 80186, 80 MHz CPU
- Baud Rate: 10, 20, 50, 125, 250, 500 and 800 Kbps, and 1 Mbps
- Comply with the CANopen CiA 301 and CiA 402 profiles
- Support the Guarding and Heartbeat protocol
- Support EMCY receiving
- Provide dynamic PDO functions
- Support Windows 2000/XP, Win 7 (32-bit)
- Libraries for BCB6, VC6, VB6, C#, etc.

Introduction:

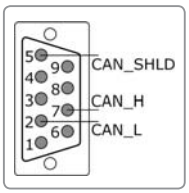
The **PISO-CPM100** is a PCI board for industrial applications compliant with the CiA CANopen specification CiA 301 and CiA 402. The embedded 80186 80M Hz CPU means that the card is highly suitable for high transmission applications, and the 16-bit on-board micro-controller with the real-time MiniOS7 Operating System provides many features, such as real-time message transmission and reception, filtering, preprocessing, and storage of CAN messages. Times tamping of PDO messages with at least 1 ms precision is also supported. Combined with the free CPM Utility, users can easily manage and integrate a range of CANopen industrial devices.

Specifications:

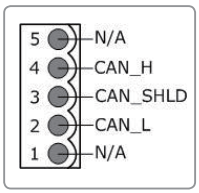
Hardware	
CPU	80186, 80 MHz or compatible
SRAM / Flash / EEPROM	512 KB / 512 KB / 2 KB
Bus Interface	
Type	PCI bus, 5 V, 33 MHz, 32-bit, plug and play.
Board No.	Via DIP switch
CAN Interface	
Controller	NXP SJA1000T with 16 MHz clock
Transceiver	NXP 82C250
Channel Number	1
Connectors	**PISO-CPM100-D:** 9-pin male D-Sub (CAN_L, CAN_SHLD, CAN_H, N/A for others) **PISO-CPM100-D:** 5-pin screwed terminal block (CAN_L, CAN_SHLD, CAN_H, N/A for others)
Baud Rate (bps)	10, 20, 50, 125, 250, 500, 800 Kbps, and 1 Mbps
Transmission Distance (m)	Depend on baud rate (for example, max. 1000 M at 50 Kbps)
Isolation	1000 VDC for DC-to-DC, 2500 Vrms for photocouples
Terminator Resistor	Jumper for 120 Ω terminator resistor
Specifications	ISO-11898-2, CAN 2.0A and CAN 2.0B
Protocols	CANopen CiA 301 v4.02, CiA 402 v1.1

LED	
Round LED	Green, Red
Software	
Driver	Windows 2000/XP, Win 7 (32-bit)
Library	VB 6.0, VC++ 6.0, BCB 6.0.
Power	
Power Supply	Unregulated +10 ~ +30 VDC
Power Consumption	300 mA @ 5 V
Mechanical	
Dimensions	127 mm x 121 mm (W x H)
Environmental	
Operating Temperature	0 ~ 60°C
Storage Temperature	-20 ~ 80°C
Humidity	0 ~ 95% RH, non-condensing

Pin Assignments:



9-pin D-Sub Male Connector



5-pin Screw Terminal Connector

Ordering Information:

Model No.	Description
PISO-CPM100-D	**1 Port Intelligent CANopen Master Universal PCI Board with D-Sub 9-pin male connector**
PISO-CPM100-T	**1 Port Intelligent CANopen Master Universal PCI Board with 5-pin screw terminal connector**
CAN-8x23 Series	CANopen Remote I/O Expansion Unit with 1/2/4/8 slots
CAN-2000C Series	Distributed CANopen I/O Modules

CANopen Converter:

I-7565-CPM

USB to CANopen Master Converter

Features:

- Fully compliant with USB 1.1/2.0 specifications
- Built-in 80186, 80 MHz CPU
- Powered via USB
- Baud Rate: 10, 20, 50, 125, 250, 500 and 800 Kbps, and 1 Mbps
- Compliant with the CANopen CiA 301 and CiA 402 profiles
- Support for the Guarding and Heartbeat protocols
- Support EMCY receiving
- Provide dynamic PDO functions
- Support Windows 2000/XP, Win 7 (32-bit)
- Libraries for BCB6, VC6, VB6 and C#, etc.

Introduction:

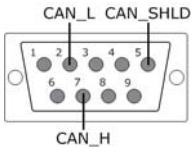
The **I-7565-CPM** was developed as a standardized CANopen network device with highly flexible configuration capabilities, and is a CANopen master solution with a USB interface and an 80 MHz 186 CPU. The module complies with the CANopen CiA 301 and CiA 402. There is a CANopen protocol interpreter, I-7565-CPM firmware, running in the I-7565-CPM. This converter can be used to process the complex CANopen protocol without dramatically increasing the PC load. The rich APIs provided by the I-7565-CPM library together with the easy-to-use utility tool can satisfy the requirements of a wide range of complex CANopen applications.

Specifications:

Hardware	
CPU	80186, 80 MHz.
SRAM/Flash/ EEPROM	512 KB / 512 KB /16 KB
ESD Protection	2 kV class A and 3 kV class B
CAN Interface	
Controller	NXP SJA1000T CAN Controller
Transceiver	NXP 82C250 CAN Transceiver
Interface	ISO/IS 11898-2, 9-pin male D-Sub (GAN_ GND, CAN_L, CAN_SHLD, CAN_H, CAN_ V+, N/A for others)
Transfer Rate	10, 20, 50, 125, 250, 500, 800 Kbps, and 1 Mbps
Specifications	CANopen CiA 301 v4.02, CiA 402 v1.1
USB Interface	
Connector	USB Type B
Transmission Speed	921.6 Kbps
LED	
Round LED	PWR, ACT, ERR, Tx/Rx

Software	
Driver	Windows 2000/XP, Win 7 (32-bit)
Library	VC++6.0, VB6, C#.net, VB.net
Power	
Power Supply	Via USB interface.
Mechanical	
Dimensions	72 mm x 101 mm x 33 mm (W x L x H)
Environmental	
Operating Temperature	-25 ~ +75°C
Storage Temperature	-30 ~ +80°C
Humidity	10 ~ 90% RH, non-condensing

Pin Assignments:



9-pin D-Sub Male Connector

Ordering Information:

Model No.	Description
I-7565-CPM	**USB to CANopen Master Converter**
CAN-8x23 Series	CANopen Remote I/O Expansion Unit with 1/2/4/8 slots
CAN-2000C Series	Distributed CANopen I/O Modules

CANopen Master Module:

I-8123W

High Performance Intelligent CANopen Master Module (For WinPAC/ViewPAC/XPAC)

Features:

- Supports WinPAC/ViewPAC/XPAC series PAC controllers
- Embedded 80186, 80 MHz CPU
- Baud Rate: 10, 20, 50, 125, 250, 500 and 800 Kbps, and 1 Mbps
- Complies with CANopen CiA 301 and CiA 402 profiles
- Supports Guarding and Heartbeat protocols
- Supports EMCY receiving
- Provides dynamic PDO functions
- Supports WinCE 5/6, XPe OS
- Libraries provided for BCB6, VC6, VB6 and C#, etc.

Introduction:

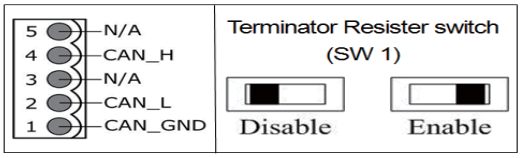
The **I-8123W** is a high-performance/low-cost CANopen Master module that is compliant with CiA CANopen specification CiA 301 and CiA 402. Thanks to the ViewPAC or WinPAC series MCU (main control unit), the module can be generally applied to industrial automation, building automation, vehicle, and embedded control networks. In addition the embedded CANopen protocol firmware means that users can easily access slave devices via the I-8123W without requiring in-depth knowledge of the complex CANopen protocol, which is helpful in reducing the development cycle time and allows users to establish their CANopen applications more quickly and easily.

Specifications:

Hardware	
CPU	80186, 80 MHz or compatible
SRAM/Flash/EEPROM	512 KB / 512 KB / 16 KB
Watchdog	Yes
CAN Interface	
Controller	NXP SJA1000T with 16 MHz clock
Transceiver	NXP 82C250
Channel Number	1
Connector	5-pin screwed terminal block (CAN_GND, CAN_L, CAN_H, N/A for others)
Baud Rate (bps)	10, 20, 50, 125, 250, 500, 800 Kbps, 1 Mbps
Transmission Distance (m)	Depends on baud rate (for example, max. 1000 M at 50 Kbps)
Isolation	3000 V_{DC} for DC-to-DC, 2500 Vrms for photocouples
Terminator Resistor	Switch for 120 Ω terminator resistor
Specifications	ISO-11898-2, CAN 2.0A and CAN 2.0B
Protocols	CANopen CiA 301 v4.02, CiA 402 v1.1

LED	
Round LED	PWR, RUN, ERR
Software	
Driver	Windows CE 5.0 / 6.0
Library	eVC++4.0, VB.Net 2005, C#.Net 2005
Power	
Power Consumption	2 W
Mechanical	
Dimensions	31 mm x 91 mm x 115 mm (W x L x H)
Environmental	
Operating Temp.	-25 ~ +75°C
Storage Temp.	-30 ~ +80°C
Humidity	10 ~ 90% RH, non-condensing

CAN Pin & Terminator Resister Switch:



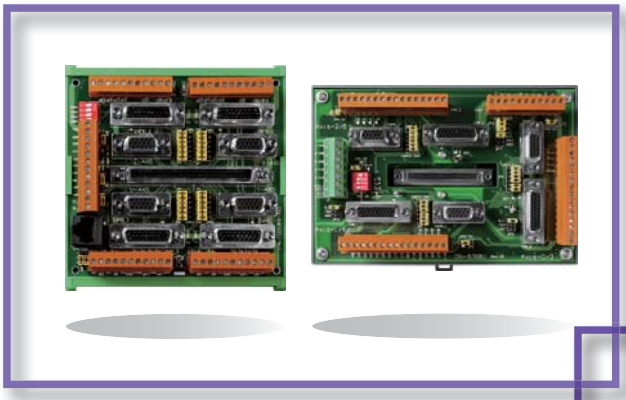
Ordering Information:

Model No.	Description
I-8123W-G	**1 Port High Performance Intelligent CANopen Master Module**
CAN-8x23 Series	CANopen Remote I/O Expansion Unit with 1/2/4/8 slots
CAN-2000C Series	Distributed CANopen I/O Modules

Accessories

5

5. Accessories



5. Accessories

5.1 Terminal Boards

DB-8R — Relay Board for SERVO-300U and PISO-PS300

- I/O connector block with Din-rail mounting
- Connection board for PISO-PS300 or SERVO-300U
- For Limit Switches, Digital Inputs/Outputs
- 25-pin D-Sub connector
- Pin-to-Pin screw terminal for I/O connections
- Screw terminals for easy field wiring

DB-200 — Encoder Input Board for SERVO-300

- I/O connector block with Din-rail mounting
- Connection board for SERVO-300 Driver
- 25-pin D-Sub connector and two 9-pin D-Sub connectors
- Pin-to-Pin screw terminal for I/O connections
- Screw terminals for easy field wiring

DN-68 — Encoder Input Board for PISO-ENCODER300U and PISO-ENCODER600U (RoHS)

- I/O connector block with Din-rail mounting
- 68-pin SCSI-II connector
- Pin-to-Pin screw terminal for I/O connections
- Screw terminals for easy field wiring
- Dimensions: 103 mm x 86 mm

DN-20M — Manual-Pulse-Generator (MPG) and FRnet Input Board for PISO-PS600/VS600/PMDK (RoHS)

- MPG and FRnet connector block with Din-rail mounting.
- 20-pin SCSI-II connector
- Pin-to-Pin screw terminal for manual pulse generator connection
- Screw terminals for easy field wiring
- RJ-45 for FRnet connector

Specifications:

Power	
Nominal Load	0.1 A / 24 V_{DC}
Input Power	20 ~ 26 V_{DC}, 0.1 A
Power Consumption	2.4 W (24 V_{DC})
Environmental	
Operating Temperature	-20 ~ +75°C
Storage Temperature	-30 ~ +85°C
Operating Humidity	20 ~ 80% RH, Non-condensing
Storage Humidity	10 ~ 90% RH, Non-condensing
Mechanical	
Dimensions	103 mm X 86 mm

DN-8237 Series: Photo-isolated Terminal Boards for ICP DAS 2-axis Stepper/Servo Motion Controllers

DN-8237UB	Universal Snap-on Wiring Terminal Board
DN-8237GB	General Purpose Wiring Terminal Board
DN-8237MB	Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
DN-8237PB	Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
DN-8237YB	Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
DN-8237DB	Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier

DN-8237UB

DN-8237GB

DN-8237MB DN-8237PB DN-8237YB DN-8237DB

Features:

- High-speed Photocouple isolation
- Support Pulse Command Type Step Motors or Servo Motors
- Include a Power LED and other status LEDs (Home, Limit Switches, etc.)
- Include an FRnet Terminal for High-speed serial I/O expansion when the controller supports FRnet

Specifications:

Power	
Nominal Load	0.5 A / 24 V_{DC}
Input Power	20 ~ 26 V_{DC}, 0.5 A
Power Consumption	12 W (24 V_{DC})
Environmental	
Operating Temperature	-20 ~ +75°C
Storage Temperature	-30 ~ +85°C
Operating Humidity	20 ~ 80% RH, Non-condensing
Storage Humidity	10 ~ 90% RH, Non-condensing
Mechanical	
Dimensions	110 mm X 107 mm

DN-8368 Series:	Photo-isolated Terminal Board for PISO-PS600/VS600/PMDK
DN-8368UB	Universal Snap-on Wiring Terminal Board
DN-8368GB	General Purpose Wiring Terminal Board
DN-8368MB	Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier


DN-8368UB


DN-8368GB


DN-8368MB

Features:

- High-speed Photocouple isolation
- Support Pulse/Voltage Command Type Step Motors or Servo Motors
- Include a Power LED and other status LEDs (Home, Limit Switches, etc.)

Specifications:

Power	
Nominal Load	0.5 A / 24 V_{DC}
Input Power	20 ~ 26 V_{DC}, 0.5 A
Power Consumption	12 W (24 V_{DC})
Environmental	
Operating Temperature	-25 ~ +75°C
Storage Temperature	-30 ~ +85°C
Operating Humidity	20 ~ 80% RH, Non-condensing
Storage Humidity	10 ~ 90% RH, Non-condensing
Mechanical	
Dimensions	162 mm X 107 mm

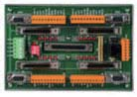
DN-8468 Series:	Photo-isolated Terminal Boards for ICP DAS 4-axis Stepper/Servo Motion Controllers
DN-8468UB	Universal Snap-on Wiring Terminal Board
DN-8468GB	General Purpose Wiring Terminal Board
DN-8468MB	Snap-on Wiring Terminal Board for Mitsubishi MELSERVO-J2 Servo Amplifier
DN-8468PB	Snap-on Wiring Terminal Board for Panasonic MINAS A4/A5 Servo Amplifier
DN-8468YB	Snap-on Wiring Terminal Board for Yaskawa Sigma II/III/V Servo Amplifier
DN-8468DB	Snap-on Wiring Terminal Board for Delta ASDA-A Servo Amplifier
DN-8468FB	Snap-on Wiring Terminal Board for Fuji FALDIC-W Servo Amplifier


DN-8468UB


DN-8468GB


DN-8468MB


DN-8468PB


DN-8468YB


DN-8468DB


DN-8468FB

Features:

- High-speed Photocouple isolation
- Support Pulse Command Type Step Motors or Servo Motors
- Include a Power LED and other status LEDs (Home, Limit Switches, etc.)
- Include an FRnet Terminal for High-speed serial I/O expansion when the controller supports FRnet

Specifications:

Power	
Nominal Load	0.5 A / 24 V_{DC}
Input Power	20 ~ 26 V_{DC}, 0.5 A
Power Consumption	12 W (24 V_{DC})
Environmental	
Operating Temperature	-20 ~ +75°C
Storage Temperature	-30 ~ +85°C
Operating Humidity	20 ~ 80% RH, Non-condensing
Storage Humidity	10 ~ 90% RH, Non-condensing
Mechanical	
Dimensions	162 mm X 107 mm

DN-84100U	Universal Snap-on Wiring Terminal Board for PISO-PS410 and PISO-PS810

Features:

- Support Pulse Command Type Step Motors or Servo Motors
- Include a Power LED and other status LEDs (Home, Limit Switches, etc.)
- Include an FRnet Terminal for High-speed serial I/O expansion when the controller supports FRnet

Specifications:

Power	
Nominal Load	0.5 A / 24 V_{DC}
Input Power	20 ~ 26 V_{DC}, 0.5 A
Power Consumption	12 W (24 V_{DC})
Environmental	
Operating Temperature	-25 ~ +75°C
Storage Temperature	-30 ~ +85°C
Operating Humidity	20 ~ 80% RH, Non-condensing
Storage Humidity	10 ~ 90% RH, Non-condensing
Mechanical	
Dimensions	118 mm X 121 mm

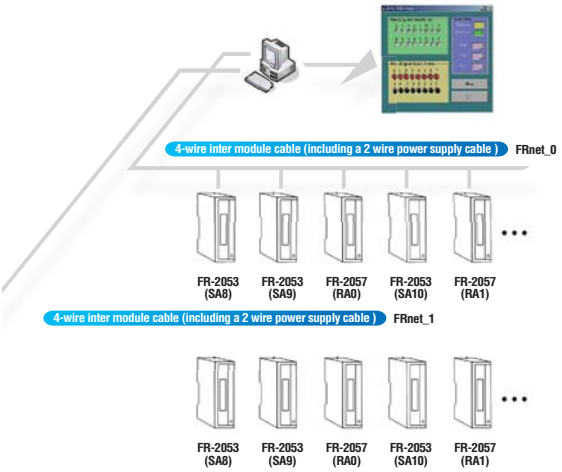
5.2 FRnet Remote I/O Modules

High-speed Synchronization Remote I/O Control

Introduction

FRnet is an innovative industrial field bus. It uses twisted pair cable as the transmission medium. Each FRnet port can link up to 128 DI and 128 DO channels. The whole I/O status are updated at a fixed cycle time (0.72 ms or 2.88 ms) no matter how many FRnet I/O modules are connected to the FRnet network. Furthermore, the update is done by the FRnet chip, there is no need for a communication protocol. Using FRnet, the user can easily and quickly implement high-speed distributed I/O control systems.

FRnet Specification	Normal speed	High-speed
Communication Speed	250 Kbps	1 Mbps
Cycle Time	2.88 ms	0.72 ms
Communication Distance	Max. 400 M	Max. 100 M
I/O Channels	128 DI / 128 DO	128 DI / 128 DO



Applications

Building Automation, Machine Automation, Testing Equipment, etc.

Features

1. Token-stream Communication

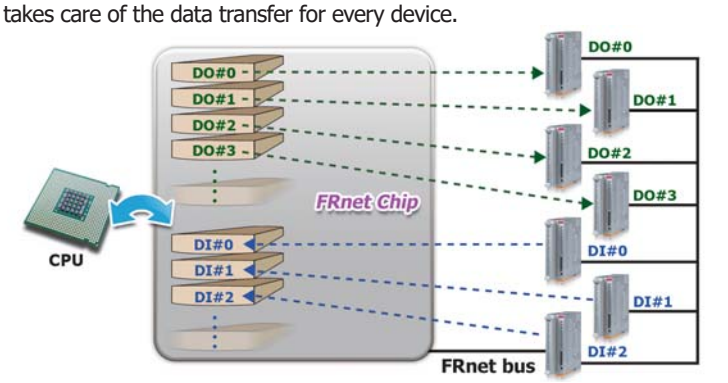
The FRnet chip uses a simple token-stream communication mechanism to provide a fast and fixed cycle time I/O-scanning capability. It doesn't need any special transmission protocol; the chip takes care of the data transfer for every device. The most significant benefits of FRnet are:

- **Fixed cycle time:**

  The cycle time is fixed at 2.88/0.72 ms no matter how many devices connected in the network.

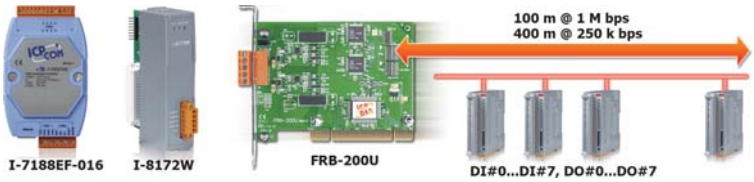
- **Memory-Mapped I/O:**

  The data transfer is automatically done by the FRnet chip. The CPU of the host (PC or PAC) doesn't need to take care of the communication protocol. All I/O status are mapped to the memory of the FRnet chip.



2. Multi-drop Networking

The physical connection is same as the standard RS-485 cabling to implement multi-drop networking. The maximum communication distance is up to 100/400 m at high/normal speed communication.

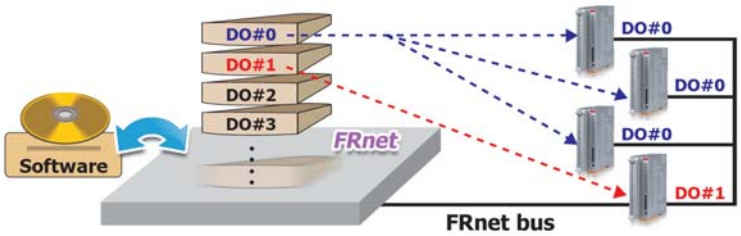


- **I/O expansion up to 128 DI and 128 DO channels**

  Each FRnet chip addresses 8 DI and 8 DO groups which each group contains 16 DI or DO channels

- **DO broadcasting**

  Due to the broadcasting algorithm adopted, the DO group address is not required to be unique. Therefore, it is easy to build a data delivery from one group (16-bit data) to a multi-group.



3. Easy to Diagnose

There are several LED indicators to diagnose whether FRnet I/O modules work properly. And the built-in FRnet terminator switch can be used to improve communication signal quality.

4. Easy to Configure

All basic configurations (address, speed and input/output range of AI/AO modules) are set by DIP switches. The operator can use only one screwdriver to complete the configuration.

FRnet Remote I/O Modules - Selection Guide

Features of FRnet Remote I/O Modules:

- Built-in wire-saving FRnet DI/DO control
- High-speed transmission reliability
- Simple synchronization mechanism
- No software overhead on protocol processing
- Supporting broadcasting (1:n data transmission)
- Easy output duplication
- Fixed I/O scan-time and I/O synchronization
- DIN-Rail mountable

FR-2053 Series (16-ch Isolated DI Module)	
FR-2053iT	16-ch Sink/Source Type Isolated Digital Input Module (with Isolated Communication Line)
FR-2053HTA **FR-2053TA**	16-ch Sink/Source Type Isolated Digital Input Module (H is for high-speed)
FR-2053HT **FR-2053T**	16-ch Sink Type Isolated Digital Input Module (H is for high-speed)
FR-2046 Series (16-ch Isolated DI Module)	
FR-2046iT	16-ch Dry Contact Isolated Digital Input Module (with Isolated Communication Line)

FR-2057 Series (16-ch Isolated DO Module)	
FR-2057iT	16-ch Sink Type Isolated Digital Output Module (with Isolated Communication Line)
FR-2057HTA **FR-2057TA**	16-ch Source Type Isolated Digital Output Module (H is for high-speed)
FR-2057HT **FR-2057T**	16-ch Sink Type Isolated Digital Output Module (H is for high-speed)
FR-2057TW	16-ch Sink Type Isolated High Current Digital Output Module
FR-2054 Series (8-ch DO and 8-ch DI Module)	
FR-2054T	8-ch Digital Output and 8-ch Digital Input Module

FR-2152 Series (8-ch Isolated DI Module)	
FR-2152T	8-ch Isolated Digital Input Module (with 12-pin Screw Terminal Connector)
FR-2156 Series (8-ch Isolated DO Module)	
FR-2156T	8-ch Isolated Digital Output Module (with 12-pin Screw Terminal Connector)

FR-2017 Series (8/16-ch Isolated AI Module)	
FR-2017iT	8/16-ch Isolated Analog Input Module (With High Voltage Protection & Isolated Communication Line)
FR-2024 Series (4-ch Isolated AO Module)	
FR-2024iT	4-ch Isolated Analog Output Module (with Isolated Communication Line)

FR-32iP Series (32-ch Isolated DI Module)	
FR-32iP/DIN	32-ch Sink/Source Type Isolated Digital Input Module (with Isolated Communication Line)
FR-32iR Series (32-ch Isolated DO Module)	
FR-32iR/DIN	32-ch Relay Type Isolated Digital Output Module (with Isolated Communication Line)

5.3 Cables and Connectors

For Motion Card/Module:

CA-3715DM-H CA-3730DM-H CA-3750DM-H		CA-SCSI15-H CA-SCSI30-H CA-SCSI50-H		CA-SCSI15-H CA-SCSI30-H CA-SCSI50	
	DB-37 D-Sub Male-Male Cable for High-speed Motion Applications, 1.5/3/5 M.		68-pin SCSI-II and 68-pin Male Connector Cable for High-speed Motion Applications, 1.5/3/5 M.		68-pin SCSI-II and 68-pin Male Connector Cable, 1.5/3/5 M. (for PISO-ENCODER600/ 600U/300/300U)
CA-SCSI100-15		**CA-MINI100-15**		**CA-MINI68-15**	
	SCSI-II 100-pin & 100-pin Male Connector Cable, 1.5 M.		100-pin VHDCI to SCSI-II Connector Cable, 1.5 M.		68-pin VHDCI to SCSI-II Connector Cable, Length 1.5 M

For Universal Snap-on Wiring Terminal Board:

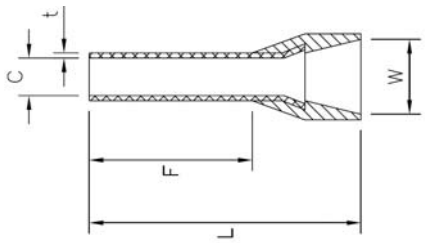
CA-26-MJ3-15 CA-26-MJ3-30 CA-26-MJ3-50		CA-26-PA4-15 CA-26-PA4-30 CA-26-PA4-50		CA-26-YSV-15 CA-26-YSV-30 CA-26-YSV-50	
	26-pin HD D-Sub Male Cable for Mitsubishi Servo Amplifier, 1.5/3/5 M. (for MELSERVO-J3/J4 Series)		26-pin HD D-Sub Male Cable for Panasonic Servo Amplifier, 1.5/3/5 M. (for MINAS A4/A5 Series)		26-pin HD D-Sub Male Cable for Yaskawa Servo Amplifier, 1.5/3/5 M. (for Sigma II/III/V Series)
CA-26-TTA-15 CA-26-TTA-30 CA-26-TTA-50		**CA-26-DAA2-15 CA-26-DAA2-30 CA-26-DAA2-50**		**CA-26-DAB2-15 CA-26-DAB2-30 CA-26-DAB2-50**	
	26-pin HD D-Sub Male Cable for Teco Servo Amplifier, 1.5/3/5 M. (for TSTA-A/A+ Series)		26-pin HD D-Sub Male Cable for Delta A2 Servo Amplifier, 1.5/3/5 M. (for ASDA-A2 Series)		26-pin HD D-Sub Male Cable for Delta B2 Servo Amplifier, 1.5/3/5 M. (for ASDA-B2 Series)
CA-26-FFW-15 CA-26-FFW-30 CA-26-FFW-50					
	26-pin HD D-Sub Male Cable for Fuji Servo Amplifier, 1.5/3/5 M. (for FALDIC-W and ALPHA5 Smart Series)				

For Snap-on Wiring Terminal Board:

CA-SCSI20-M1 CA-SCSI20-M3 CA-SCSI20-M5		CA-SCSI50-D1 CA-SCSI50-D3 CA-SCSI50-D5		CA-SCSI50-PY1 CA-SCSI50-PY3 CA-SCSI50-PY5	
	20-pin SCSI-II and 20-pin Male Connector Cable, 1/3/5 M. (for Mitsubishi J2 Series Motor)		50-pin SCSI-II and 50-pin Male Connector Cable, 1/3/5 M. (for Delta ASDA A Series Motor)		50-pin SCSI-II and 50-pin Male Connector Cable, 1/3/5 M. (for Panasonic & Yaskawa Series Motor)

For Motionnet Module:

CA-PC26M		4POPP-003F		4POPP-003G	
	26-pin HD D-Sub Solder Cup Male Connector With Plastic Cover		Pink Cord-End Terminal		Turquoise Cord-End Terminal



4POPP-003F 4POPP-003G					
F	L	C	W	t	Wire Range (mm2)
8.0	12.0	0.80	1.90	0.15	0.34

4PKD1O0000001		4PKD1O0000002		4PKD1O0000003	
	Gray Mini Clamp Wiremount Plug		Red Mini Clamp Wiremount Plug		Orange Mini Clamp Wiremount Plug

Mini Clamp Wiremount Plug			Applicable Wire		
ICP DAS Part No.	Cover Color	3M Part No.	AWG No.	Cross-sectional Area (mm^2)	Finished External Diameter Φ (mm)
4PKD1O0000001	Gray	37103-2206-000FL	20 – 22	0.3 – 0.5	1.6 – 2.0
4PKD1O0000002	Red	37103-3101-000FL	24 – 26	0.14 – 0.3	0.8 – 1.0
4PKD1O0000003	Orange	37103-3163-000FL	24 – 26	0.14 – 0.3	1.2 – 1.6

For CAN Card/Module:

CNT-CAN		CA-0910-C	
	CAN bus Connector		9-pin Female D-Sub and 3-wire CAN bus cable, 1M. (Pin Assignment)

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Taiwan

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