



**EMP-9051-16/EMP-9051-32/EMP-9091-16/EMP-9091-32  
EMP-9251-16/EMP-9251-32/EMP-9651-16/EMP-9651-32**  
EtherCAT Master based 9000 series PAC

### Features

- Windows 10 IoT Enterprise (64-bit)
- VGA and HDMI Port Output
- 2 10/100/1000M Ethernet Ports
- Redundant Power Input
- Synchronized motion (E-GEAR, E-CAM)
- Virtual axes
- Multi-axis linear interpolation
- Coupled Control System
  - > Built with a second CPU that supports EtherCAT communication retention technology, this system ensures seamless EtherCAT communication and uninterrupted process recipe, even in the event of an OS system or program crash.



### 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 EtherCAT Master based PAC for users to build their motion related applications.

EtherCAT Master can offer multi-axis motion and I/O control functions by its own built-in CPU. In this way, the CPU loading of PAC 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.

### What is Windows 10 IoT ?



Windows 10 IoT is a member of the Windows 10 family that brings enterprise-class power, security, and manageability to the Internet of Things. It leverages Windows' embedded experience, ecosystem, and cloud connectivity, allowing organizations to create their Internet of Things with secure devices that can be quickly provisioned, easily managed, and seamlessly connected to an overall cloud strategy.

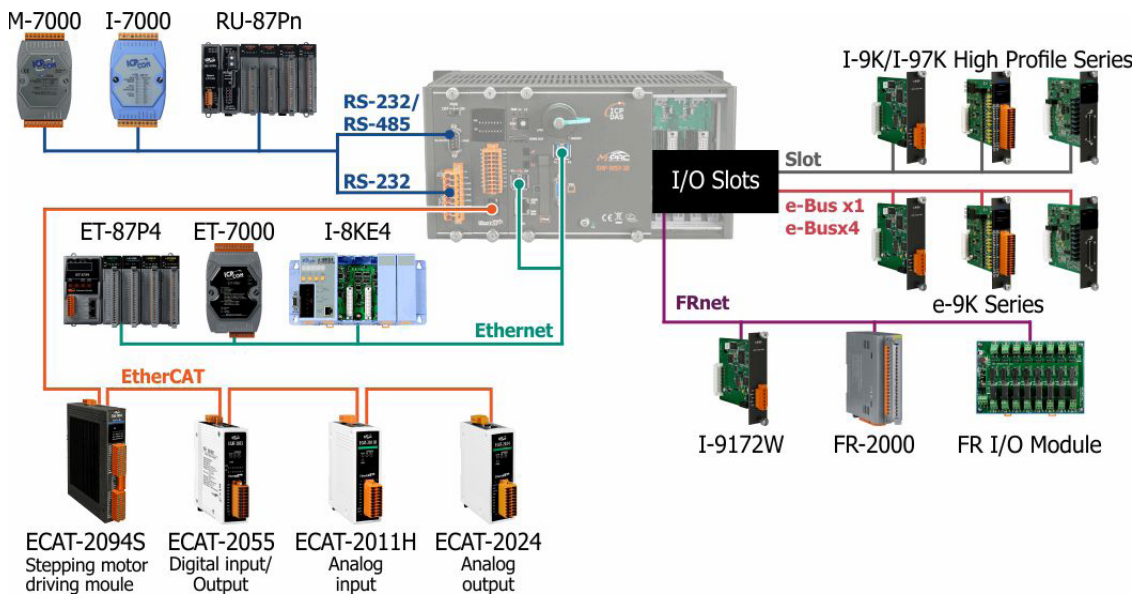
- Traditional Windows Shell with Advanced Lockdown Features
- Full Windows UI support (e.g. UWP, WinForms, etc)

### Specifications

Model	EMP-9091-32	EMP-9091-16	EMP-9051-32	EMP-9051-16	EMP-9251-32	EMP-9251-16	EMP-9651-32	EMP-9651-16
<b>Software</b>								
OS	Windows 10 IoT Enterprise (64-bit)							
Framework Support	.Net Framework 3.5 ~ 4.8							
Service	IE11, FTP Server, IIS 7.0, ASP (Java Script, VB Script)							
SDK	Dll for VC, Dll for Visual Studio.Net							
Multilanguage Support	English, German, French, Spanish, Portuguese, Russian, Italian, Korean, Japanese, Simplified Chinese, Traditional Chinese							
<b>Main Unit</b>								
CPU	Intel Atom E3950 (1.6 ~ 2.0 GHz, 4C4T)		Intel® Core™ i5-8365UE Processor (1.6 ~ 4.1 GHz, 4C8T)					
64-bit Hardware Serial Number	Yes							
System Memory	8 GB DDR4 SDRAM		16 GB DDR4 SDRAM					
Non-Volatile Memory	128 KB MRAM, 16 KB EEPROM							
Storage	64 GB SSD(mSATA), 32 GB CFast card							
Real Time Clock	Provide seconds, minutes, hours, dates, day of week, month, year							
Watchdog Timer	Dual Watchdog Timer							

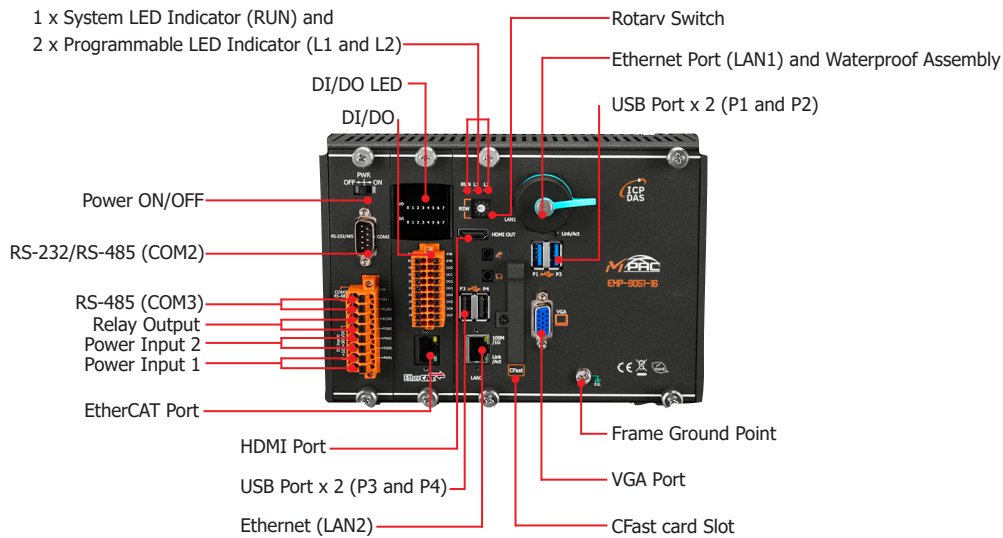
<b>Display</b>								
Signal	VGA, HDMI							
Resolution	VGA 1280 x 1024 ~ 1920 x 1080 (16 : 9), 640 x 480 ~ 1024 x 768 (4 : 3) HDMI 2560 x 1600 @ 24bpp							
<b>LED Indicators</b>								
Status	1 x System, 2 x Programmable							
<b>COM Ports</b>								
Ports	1 x RS-485 (3000 VDC Isolated), 1x RS-232/RS-485 (3000 VDC Isolated)							
<b>HMI</b>								
Buzzer	Yes							
Rotary Switch	1 x 10 Position (0 ~ 9)							
<b>Ethernet</b>								
Ports	2 x RJ-45 10/100/1000 Base-TX							
<b>USB</b>								
Ports	4 x USB 2.0							
<b>Power</b>								
Input Range	+10 ~ 30 VDC (1 kV Isolated )							
Redundant Power Inputs	Yes							
Consumption	18.5W							
<b>I/O Expansion</b>								
I/O Type	e9K, I-9K, I-97K series							
Slots	-	-	2		6			
<b>Digital Input</b>								
Channels	8							
Type	Sink/Source							
ON Voltage Level	+19V~+24V							
OFF Voltage Level	+11V Max.							
Isolation	3000VDC							
<b>Digital Output</b>								
Channels	8							
Type	Sink(open collector)							
Load Voltage	+24V							
Max. Load Current	1000 mA/ch							
Isolation	3000Vrms							
<b>EtherCAT</b>								
Ports	1 x RJ-45							
No. of Axes	Max. 32	Max. 16	Max. 32	Max. 16	Max. 32	Max. 16	Max. 32	Max. 16
No. of Nodes	Max. 512							
Data Transfer Medium	Ethernet Cable (Min. CAT 5e), Shielded							
<b>Interpolation</b>								
Cicular	Any 2- or 3-axis							
Helical	Any 3-axis							
Linear	Any 2- or 32-axis							
<b>Mechanical</b>								
Dimensions (mm)	239 x 164 x 133(W x L x H)				300 x 164 x 133(W x L x H)		422 x 164 x 133(W x L x H)	
Installation	DIN-Rail, Wall mounting							
<b>Environmental</b>								
Humidity	10 ~ 90 % RH, Non-condensing							
Operating Temperature	-25 ~ +60 °C							
Storage Temperature	-30 ~ +80 °C							

## Applications

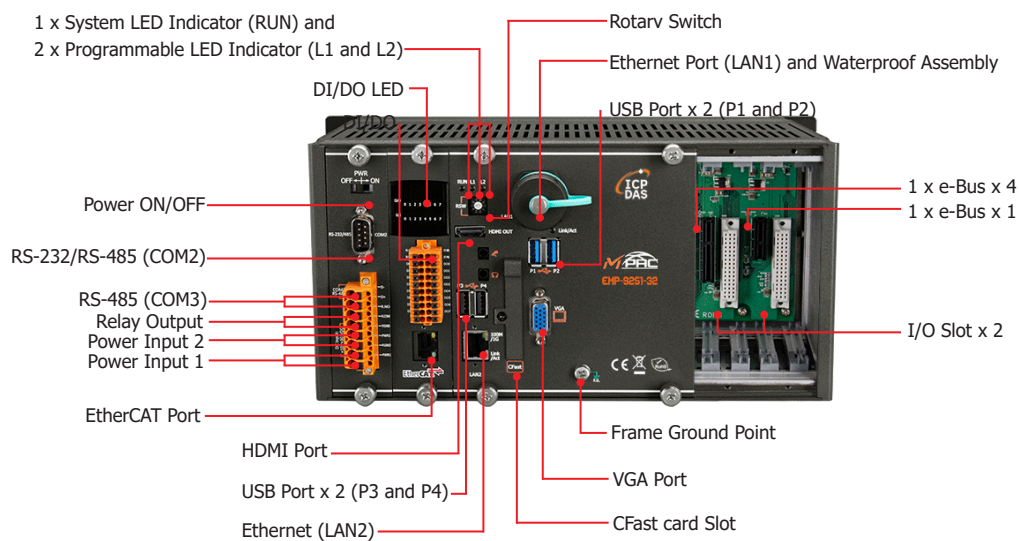


## Appearance

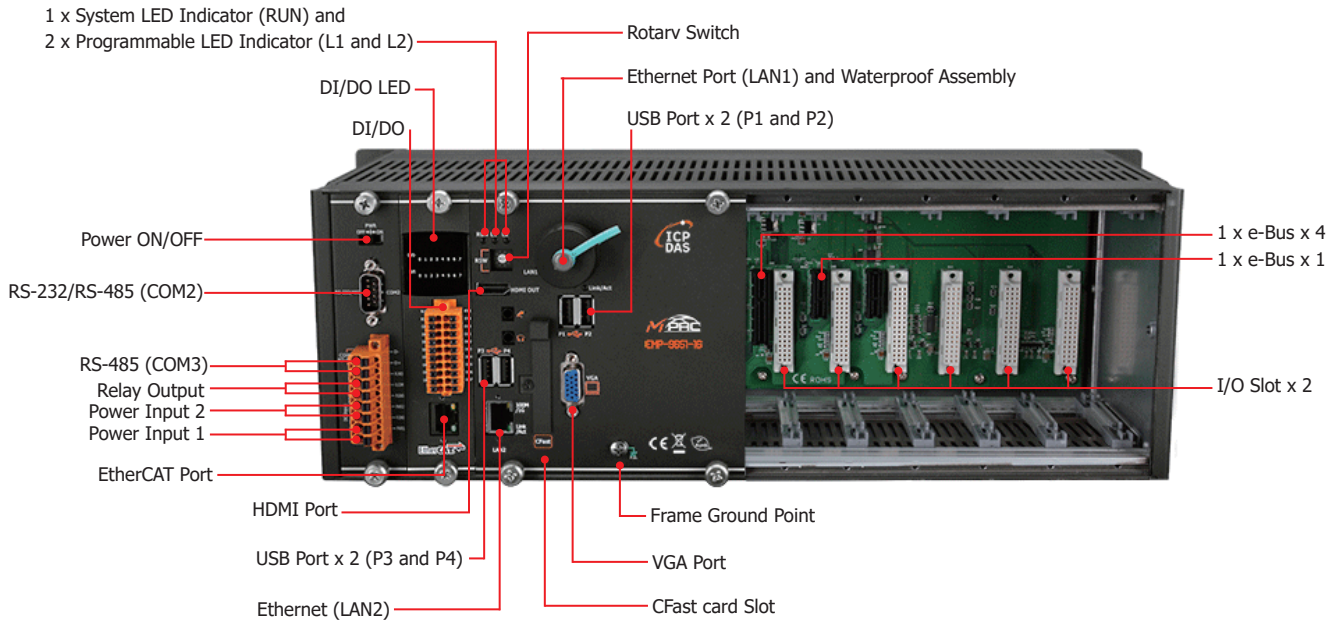
### EMP-90XX



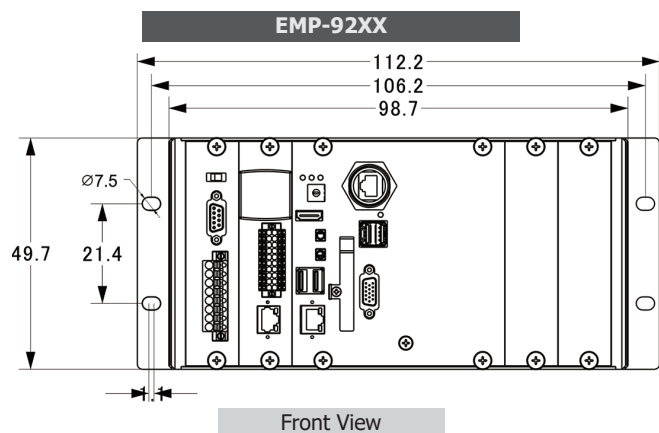
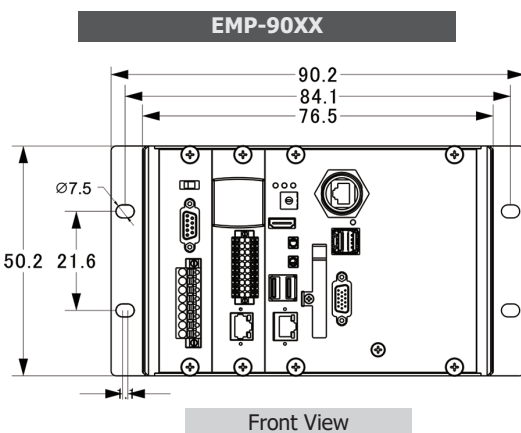
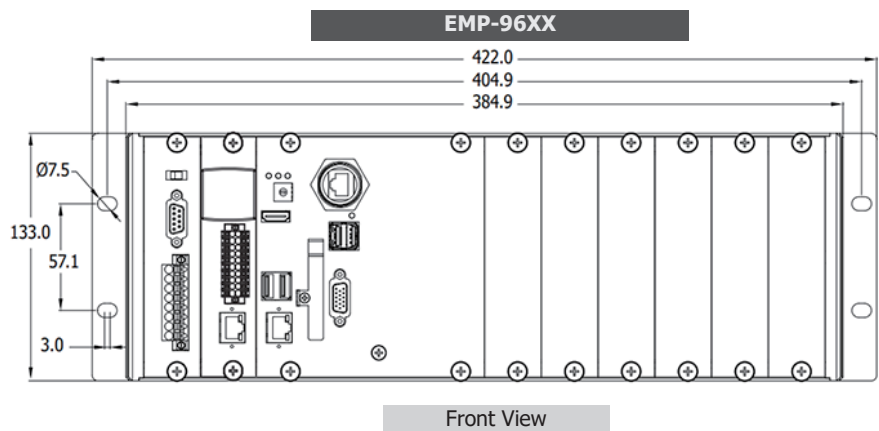
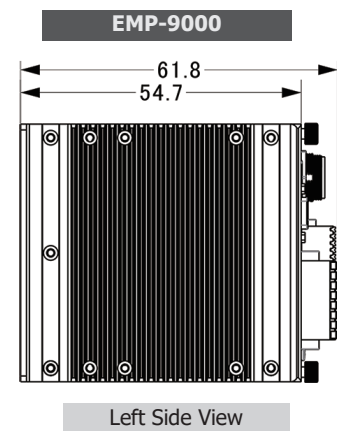
### EMP-92XX



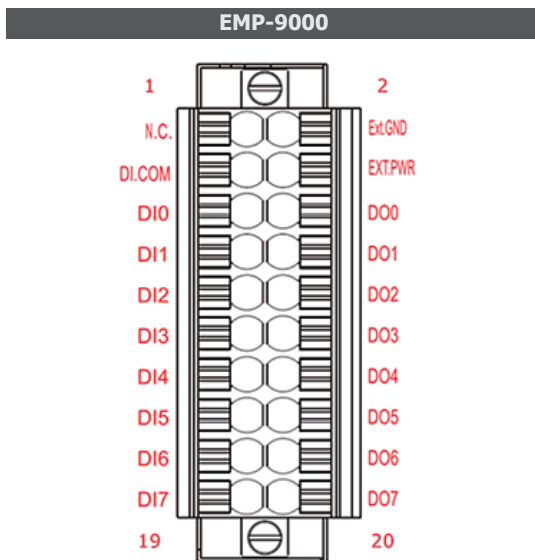
## EMP-96XX



## Dimensions (Units: mm)



## Pin Assignments



## Wire Connections

Digital Input	Readback as 1	Readback as 0
	+19 ~ +24 Vdc	OPEN or < 11 Vdc
Sink		
Source		
Digital Output	ON State Readback as 1	OFF State Readback as 0
Driver Relay		
Resistance Load		

## Ordering Information

<b>EMP-9051-16 CR</b>	16 axes EtherCAT Master, Metal Motion PAC with i5-8365UE CPU and Win10 IoT(RoHS)
<b>EMP-9051-32 CR</b>	32 axes EtherCAT Master, Metal Motion PAC with i5-8365UE CPU and Win10 IoT(RoHS)
<b>EMP-9091-16 CR</b>	16 axes EtherCAT Master, Metal Motion PAC with E3950 CPU and Win10 IoT(RoHS)
<b>EMP-9091-32 CR</b>	32 axes EtherCAT Master, Metal Motion PAC with E3950 CPU and Win10 IoT(RoHS)
<b>EMP-9251-16 CR</b>	16 axes EtherCAT Master, 2-slot Metal Motion PAC with i5-8365UE CPU and Win10 IoT(RoHS)
<b>EMP-9251-32 CR</b>	32 axes EtherCAT Master, 2-slot Metal Motion PAC with i5-8365UE CPU and Win10 IoT(RoHS)
<b>EMP-9651-16 CR</b>	16 axes EtherCAT Master, 6-slot Metal Motion PAC with i5-8365UE CPU and Win10 IoT(RoHS)
<b>EMP-9651-32 CR</b>	32 axes EtherCAT Master, 6-slot Metal Motion PAC with i5-8365UE CPU and Win10 IoT(RoHS)