

Industrial Controller, μ PIBOC-I Model 1100

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Abstract

Industrial computers are often used with manufacturing and inspection equipment. Recently, its functions are increasing and the market demands higher performance. At the same time, long-term stable supply of the industrial computers is always required despite the constant renewal of electronic parts specifications.

Our industrial controller, μ PIBOC-I Model 1100, is the latest model with a high-performance Central Processing Unit (CPU). It comes with a compact design embedded unit. It has the same shape and size of the previous model, μ PIBOC-I Model 1000, to secure interchangeability and high performance with the user's manufacturing equipment.

1 Preface

With the wider applications of electronic device products, the device equipment for manufacturing and inspection market has been growing in the field of semiconductors and Liquid Crystal Displays (LCDs). In this connection, countries overseas (mostly China and other Asian countries), semiconductor plants are expanded and existing production lines are renovated. In such cases, highly reliable industrial controllers with the assurance of long-term parts supply are mostly adopted as industrial controllers as an embedded device for the semiconductor manufacturing equipment. We recently released high-performance, high-reliability, and compact-design Industrial Controllers, μ PIBOC Series, and received positive reviews from many of our customers in the field of semiconductors. We have been supplying our controllers reliably for many years and.

This paper introduces the major features of μ PIBOC-I Model 1100, the latest model of the μ PIBOC-I Series where a 4th-generation Intel Core Processor is installed as the Central Processing Unit (CPU).

controller in the shape of a box. There are four types of model lineups where the memory mediums are different from each other. Fig. 1 shows the external appearance of each type. μ PIBOC-I Series has been updated: Model 700 \rightarrow 750 \rightarrow 800/850 \rightarrow 950 \rightarrow 1000 \rightarrow 1100. We maintained the same design concept on the external dimensions and maintenance parts are configured on the front panel. The performance improved CPU has been selected in consideration of efficient equipment maintainability. The latest industrial controller is the 6th generation model.

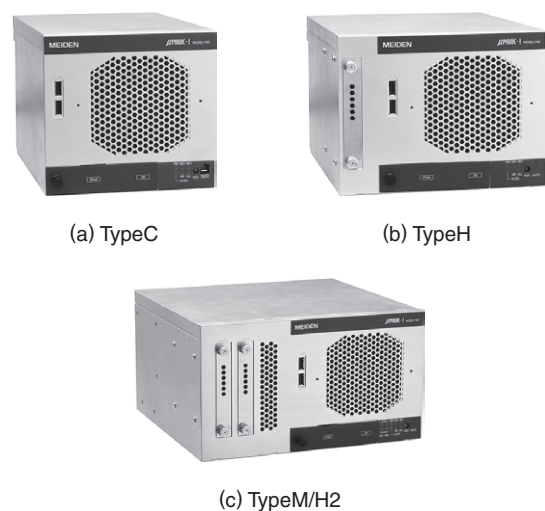


Fig. 1 μ PIBOC-I Model 1100 Series

This Series comes in a compact body. According to its application, an optimal module unit can be selected.

2 Features of μ PIBOC-I Model 1100

2.1 Features of Hardware

Our μ PIBOC-I Model 1100 is an industrial

(1) High performance

Table 1 shows the basic specifications. μ PIBOC-I Model 1100 is equipped with the Intel Xeon E3-1268L v3 (2.30 GHz) series CPU – a 4th generation Intel Core processor which is mostly for servers and workstations. The 4-core and 8-thread processors are used so that the processing speed is almost doubled compared with Model 1000. In addition, Celeron G1820TE (2.20 GHz) is available as a low-priced version.

(2) Compact box design

The basic unit of μ PIBOC-I Model 1100 comes in a box-shaped body with the size of W160 × H148 × D250mm. This profile is common with all models of μ PIBOC-I Series. The overall product lineups are as itemized below.

(a) Diskless type (TypeC)

(b) HDD or SSD type (TypeH)

(c) Mirror disk type (TypeM)

(d) HDD × 2 units or SSD × 2 units type (TypeH2)
(3) High scalability

While we realized compact design dimensions, we also realized a PCI bus (short size) × 2 slots and PCI Express bus (×8) × 2 slots. (PCI bus × 3 slots for TypeC) Since the PCI Express bus (×8) is adopted, it is possible to install an image processing board that requires high-speed data transfer processing. In combination with the control I/O board, images from various kinds of cameras can be picked up and controlled.

(4) High reliability

Since a dedicated and enhanced power supply and a long-life fan are adopted, it is possible to assure the operating temperature range of 5 ~ 45°C

Table 1 Basic Specifications

The basic specifications of μ PIBOC-I Model 1100 are shown.

Item		TypeC UA050/1x1A	TypeH UA050/1x2A	TypeM UA050/1x4A	TypeH2 UA050/1x8A
Dimensions (mm)		W160 × H148 × D250	W197 × H148 × D250	W262 × H148 × D250	W262 × H148 × D250
Mass (kg)		Approx. 4.5	Approx. 5.0	Approx. 6.0	
CPU		Xeon (E3-1268Lv3) 2.30 GHz or Celeron (G1820TE) 2.20 GHz			
Chip set		C226			
Memory	No. of slots	2 slots			
	Installed memory	4GB (ECC functions provided)			
	Maximum	Max. 8GB			
Power source		AC90~264V			
Storage	CFast	16GB			
	HDD	—	500GB	500GB (2 units: mirrored HDDs)	500GB ※A maximum of 2 units can be installed together with SSD.
	SSD	—	200GB	—	200GB ※A maximum of 2 units can be installed together with HDD.
Extension slot	PCI	3 slots	2 slots		
	PCI Express (×8)	—	2 slots		
Graphic	DVI-D	1 port			
	VGA	1 port			
USB	USB2.0	Front 2 ports			
	USB3.0	Rear 4 ports			
LAN (1000Base-T)		2 ports ※Wake-On-LAN Jumbo Frames-compliant			
Serial (RS-232C)		2 ports			
PS/2 connector		—	1 port		
OS	Windows Embedded Standard 7	○ (32bit version)			
	Windows 7 Ultimate	—	○ (32bit version)		
	Windows 10 IoT Enterprise2016 LTSC	○ (64bit version)			

(0~50°C for SSD-loaded model and 0~50°C for TypeC). In addition, it comes with a dedicated Reliability, Availability, and Serviceability (RAS) function as our standard. It monitors hardware and software malfunctions and in the event of a malfunction, it displays error signs and can notify of such error information to the applications. Such a function provides the equipment users with precautions against equipment errors and the means to deal effectively with the failures.

(5) Maintenance by the front panel

μ PIBOC-I has a box-shaped body design in the embedded device for manufacturing and inspection equipment. As a maintenance-friendly design, the components with a certain product life (HDD, SSD, CFast and SD) can be exchanged at the front panel. In the case of a mirrored HDD model, either side of HDD can continue to operate when another side of HDD is out of order. It is, therefore, possible to remove the faulty HDD and replace it with another drive without interruption to the system.

(6) Various standards-compliance

Table 2 shows the environmental (operating conditions) specifications. μ PIBOC-I Model 1100 is designed to meet the various environmental specifications needed for an industrial controller, and has acquired the respective standard certifications, i.e., VCCI, FCC, and UL. We also acquired its Korea Certification (KC) Mark so that our model can be used for manufacturing equipment for Korea. For export to the EU, this product is designed to be compliant with the Low Voltage Directive and EMC Directive whose conditions are essential for

CE marking.

We also made an eco-friendly design to meet the requirements of Restriction of Hazardous Substance (RoHS) Directive.

2.2 Features of Software

(1) OS support by Microsoft

μ PIBOC-I Model 1100 has the lineups of three: Windows 7 Ultimate (other than TypeC), Windows Embedded Standard 7 (TypeC only), and Windows 10 IoT Enterprise 2016 LTSB (64bit version).

(a) Windows 7 Ultimate (other than TypeC) and Windows Embedded Standard 7 (TypeC only)

We adopt above OSs that do not require any activation for the license registration at Microsoft. Consequently, no activities for authentication are required at the time of new controller installation or replacement of hardware for maintenance servicing. Such a feature brings a great advantage in the reduction of system downtime.

(b) Windows 10 IoT Enterprise 2016 LTSB (64bit version)

Since October 2017, we released a model running Windows 10 IoT Enterprise 2016 LTSB which works with 64-bit applications. Due to the big use of memory of image processing applications and its impact to the processing speed, μ PIBOC series is also required to improve the data processing speed performance. We expect the new enhanced model will be widely used in the manufacturing equipment market requiring fast data processing and other markets requiring high-speed image processing.

Table 2 Environmental (Operating Conditions) Specifications

The environmental specifications of μ PIBOC-I Model 1100 are shown.

Item	TypeC UA050/1x1A	TypeH UA050/1x2A	TypeM UA050/1x4A	TypeH2 UA050/1x8A
Operating temperature	0~50°C	5~45°C (with HDD installed) 0~50°C (with SSD installed)	5~45°C (with HDD installed)	5~45°C (with HDD installed) 0~50°C (with SSD installed)
Air cooling system	Forced air cooled by a front fan (suction)			
Vibration resistance during operation in directions XYZ	$\pm 0.625\text{mm}$ (1~14Hz) 4.9m/s ² (14~100Hz) 2-bothway logarithmic sweep in directions XYZ for 27min each JEITA IT-1004A ClassS	<with HDD installed> $\pm 0.25\text{mm}$ (1~14Hz) 2.0m/s ² (14~100Hz) 2-bothway logarithmic sweep in directions XYZ for 27min each JEITA IT-1004A ClassB		<with SSD installed> $\pm 0.625\text{mm}$ (1~14Hz) 4.9m/s ² (14~100Hz) 2-bothway logarithmic sweep in directions XYZ for 27min each JEITA IT-1004A ClassS
Standards with acquired authentication	<ul style="list-style-type: none"> • UL • CSA (cUL) • FCC • VCCI • KC • EMI (Emission Standard) • EMS (Immunity Standard) 			

3 Postscript

This paper introduced the major features of μ PIBOC-I Model 1100. μ PIBOC-I Model 1100 is a dedicated embedded device for manufacturing and inspection equipment. It is a compact industrial controller featuring high performance and high reliability. It can run the latest 64bit Microsoft Embedded OSs. Not being limited to application for only manufacturing and inspection equipment, this model is expected to be applied to various embedded system fields.

We will continue to realize further functional improvements for the embedded industrial control-

lers and promote the development of products according to on-going demands of the markets.

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