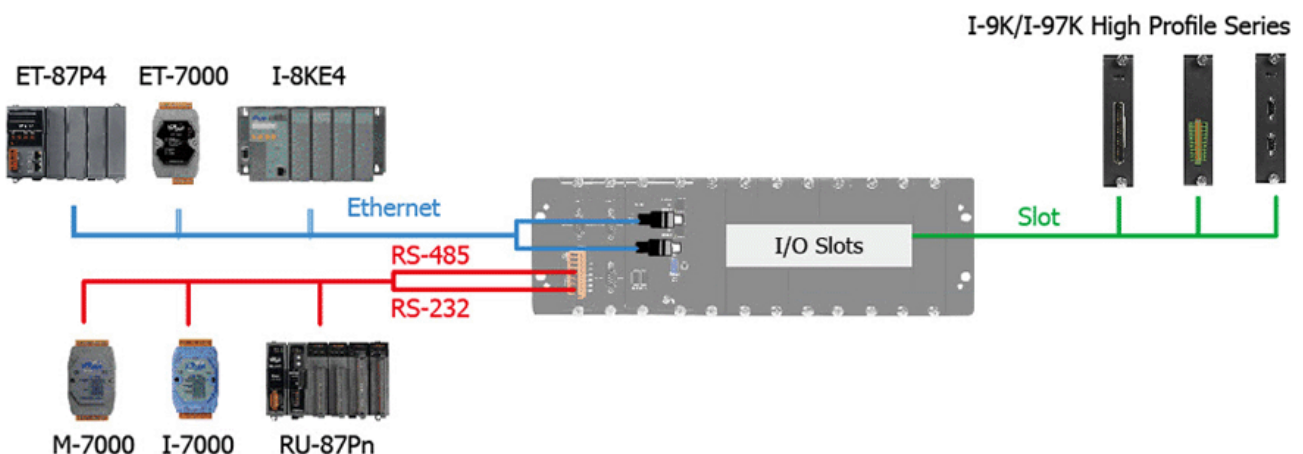


# Introduction

The LX-9000 are Linux OS based PACs that combine computing, I/O, and operator interface into a single unit, and provide the perfect solution for integrating HMI, data acquisition and control in an individual PAC. It is equipped with an x86 CPU, 1/3/7 I/O expansion slots and a variety of connectives including dual Gigabit Ethernet, VGA , USB port, RS-232 and RS-485 interface. Local I/O slots are available to use our I-9K and I-97K series I/O modules and remote I/O expansions are available to use our Ethernet I/O modules and RS-485 I/O modules.

User's programs can be saved in external storage device, such as CF Card or USB mass storage device. LinPAC SDK is provided for users to develop LinPAC I/O applications rapidly and easily when I-7000/9000/97k series I/O modules are used in the LinPAC. Users can develop LinPAC applications by using GNU C Language. In the meanwhile, all kinds of servers and functions built-in make the LinPAC more powerful and users will be able to operate LinPAC to achieve their own project smoothly.

# Applications



# Features

The LX-9000 offers the most comprehensive configuration and remote system upgrade solutions to meet specific application requirements. The following list shows the hardware and software features designed to simplify installation, configuration and application.

- Powerful CPU Module
    - E3845 (1.91 GHz, 64-bit quad core) for LX-9181/ LX-9381/ LX-9781
    - E3827 (1.75 GHz, 64-bit dual core) for LX-9171/ LX-9371/ LX-9771
  
  - Linux OS
    - Linux Kernel 3.2 for LX-9x31 series
    - Linux Kernel 4.4 for LX-9x71/9x81 series
  
  - Memory Size:
    - SDRAM (2 GB DDR3)
    - Flash (32 GB SSD)
    - CF Card (support up to 32 GB)
  
  - 64-bit Hardware Serial Number
  
  - Rich I/O Expansion Ability
    - RS-232/RS-485
    - USB
  
  - Redundant Power Input
  - Operating Temperature :
    - -25 °C to +60 °C for LX-9x81 series
    - -25 °C to +75 °C for LX-9x31/9x71 series
-

# Specifications

The table below summarizes the specifications of LX-9x31 series.

Models	LX-9131	LX-9331	LX-9731
OS	Linux OS with kernel 3.2		
Embedded Service	SFTP server, Web server, SSH		
SDK Provided	Standard LinPAC SDK for Linux by GNU C language		
<b>CPU Module</b>			
CPU	x86 CPU, 1 GHz, dual-core		
SDRAM	2 GB DDR3		
MRAM, Non-volatile Memory	512 KB (retain memory without battery support)		
Flash	32 GB		
EEPROM	16 KB; Data Retention: 40 years; 1,000,000 erase/write cycles		
CF Card	CF slot with one CF card (support up to 32 GB)		
RTC (Real Time Clock)	Provide second, minute, hour, date, day of week, month, year		
64-bit Hardware Serial Number	Yes, for software copy protection		
Dual Watchdog Timers	Yes (0.8 second)		
Rotary Switch	Yes (0 to 9)		
Programmable LED Indicator	3 (Run, L1 and L2)		
<b>VGA &amp; Communication Ports</b>			
VGA Resolution	1600 x 1200, 1024 x 768, 800 x 600, 640 x 480		
Dual Ethernet Port	RJ-45 x 2, 10/100/1000 Base-T (Auto-negotiating, Auto MDI/MDI-X, LED indicators)		
USB 2.0	4		
ttySA0	Internal communication with high profile I-87K series modules in slots		
Console	RS-232 (RxD, TxD and GND); non-isolated		
ttyS0	RS-485 (Data+, Data-) with internal self-tuner ASIC; 3000 V <sub>DC</sub> isolated		
ttyS1	RS-232/RS-485 (RxD, TxD, CTS, RTS and GND for RS-232, Data+ and Data- for RS-485); non-isolated		
ttyS34	RS-232 (RxD, TxD, CTS, RTS, DSR, DTR, CD, RI and GND); non-isolated		
Audio	Microphone-in and Earphone-out		
<b>I/O Expansion Slots</b>			

Number of I/O slots	1	3	7
Supported I/O modules	I-8K and I-87K series I/O Modules		
<b>Mechanical</b>			
Dimensions (W x L x H), unit: mm	169 x 132 x 125	231 x 132 x 125	355 x 132 x 125
Installation	DIN-Rail or Wall Mounting		
<b>Environmental</b>			
Operating Temperature	-25 °C to +75 °C		
Storage Temperature	-30 °C to + 80 °C		
Ambient Relative Humidity	10 % to 90 % RH (non-condensing)		
<b>Power</b>			
Input Range	+10 V <sub>DC</sub> to +30 V <sub>DC</sub>		
Redundant Power Inputs	Yes, with one power relay (1 A @ 24 V <sub>DC</sub> ) for alarm		
Isolation	1 kV		
Capacity	3.7 A, 5 V supply to CPU and backplane, 1.3 A, 5 V supply to I/O expansion slots, 25 W in total	3.8 A, 5 V supply to CPU and backplane, 3.2 A, 5 V supply to I/O expansion slots, 30 W in total	4.0 A, 5 V supply to CPU and backplane, 3.0 A, 5 V supply to I/O expansion slots, 35 W in total
Consumption	16.6 W (0.69 A @ 24 VDC)	16.8 W (0.7 A @ 24 VDC)	18 W (0.75 A @ 24 VDC)

The table below summarizes the specifications of LX-9x81 series.

Models	LX-9181	LX-9381	LX-9781
<b>System Software</b>			
OS	Linux OS with kernel 4.4		
Embedded Service	SFTP server, Web server, SSH		
SDK Provided	Standard LinPAC SDK for Linux by GNU C language		
<b>CPU Module</b>			
CPU	E3845 (1.91 GHz, 64-bit quad core)		
SDRAM	2 GB DDR3		
MRAM	128 KB		
Flash(SSD)	mSATA slot with one 32 GB SSD		
EEPROM	16 KB		
Memory Expansion	CF socket with one 16GB CF card (support up to 32 GB)		
RTC (Real Time Clock)	Provide second, minute, hour, date, day of week, month, year		
64-bit Hardware Serial Number	Yes, for software copy protection		
Dual Watchdog Timers	Yes (0.8 second)		
Programmable LED Indicator	3 (Run, L1, L2)		
Rotary Switch	Yes (0 ~ 9)		
<b>VGA &amp; Communication Ports</b>			
VGA Resolution	1280 x 1024 to 1920 x 1080 (16 : 9) /640 x 480 to 1024 x 768 (4 : 3)		
Ethernet Port	RJ-45, 10/100/1000M Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)		
USB 2.0	4		
ttySA0	Internal communication with the I-97K series modules in slots		
Console	RS-232/485 (RxD, TxD and GND for RS-232; Data+, Data- for RS-485); 3000 V <sub>DC</sub> isolated		
ttyS0	RS-485 (Data+, Data-); 3000 V <sub>DC</sub> isolated		
ttyS1	RS-232/485 (RxD, TxD, CTS, RTS and GND for RS-232; Data+, Data- for RS-485); 3000 V <sub>DC</sub> isolated		
ttyS34	RS-232 (RxD, TxD, CTS, RTS, DSR, DTR, CD, RI and GND); 3000 V <sub>DC</sub> isolated		

Audio	Mic-in and Earphone-out		
I/O Expansion Slot	1	3	7
<b>Mechanical</b>			
Dimensions (W x H x D, unit: mm)	239 x 164 x 133	300 x 164 x 133	422 x 164 x 133
Installation	Wall mounting / DIN-rail mounting		
<b>Environmental</b>			
Operating Temperature	-25 °C to +60 °C		
Storage Temperature	-30 °C to +80 °C		
Ambient Relative Humidity	10 % to 90 % RH (non-condensing)		
<b>Power</b>			
Input Range	+10 V <sub>DC</sub> to +30 V <sub>DC</sub>		
Isolation	1 kV		
Redundant Power Inputs	Yes, with one power relay (1 A @ 24 V <sub>DC</sub> ) for alarm		
Capacity	4.1 A, 5 V supply to CPU and backplane, 2.5 A, 5 V supply to I/O expansion slots, 33 W in total	4.2 A, 5 V supply to CPU and backplane, 2.4 A, 5 V supply to I/O expansion slots, 33 W in total	4.4 A, 5 V supply to CPU and backplane, 2.2 A, 5 V supply to I/O expansion slots, 33 W in total
Consumption	18.5 W (0.77 A @ 24 V <sub>DC</sub> )	18.7 W (0.78 A @ 24 V <sub>DC</sub> )	20.4 W (0.85 A @ 24 V <sub>DC</sub> )

The table below summarizes the specifications of LX-9x71.

Models	LX-9171	LX-9371	LX-9771
<b>System Software</b>			
OS	Linux OS with kernel 4.4		
Embedded Service	SFTP server, Web server, SSH		
SDK Provided	Standard LinPAC SDK for Linux by GNU C language		
<b>CPU Module</b>			
CPU	E3827 (1.75 GHz, 64-bit dual core)		
SDRAM	2 GB DDR3		
MRAM	128 KB		
Flash(SSD)	mSATA slot with one 32 GB SSD		
EEPROM	16 KB		
Memory Expansion	CF socket with one 16GB CF card (support up to 32 GB)		
RTC (Real Time Clock)	Provide second, minute, hour, date, day of week, month, year		
64-bit Hardware Serial Number	Yes, for software copy protection		
Dual Watchdog Timers	Yes (0.8 second)		
Programmable LED Indicator	3 (Run, L1, L2)		
Rotary Switch	Yes (0 ~ 9)		
<b>VGA &amp; Communication Ports</b>			
VGA Resolution	1280 x 1024 to 1920 x 1080 (16 : 9) /640 x 480 to 1024 x 768 (4 : 3)		
Ethernet Port	RJ-45, 10/100/1000M Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)		
USB 2.0	4		
ttySA0	Internal communication with the I-97K series modules in slots		
Console	RS-232/485 (RxD, TxD and GND for RS-232; Data+, Data- for RS-485); 3000 V <sub>DC</sub> isolated		
ttyS0	RS-485 (Data+, Data-); 3000 V <sub>DC</sub> isolated		
ttyS1	RS-232/485 (RxD, TxD, CTS, RTS and GND for RS-232; Data+, Data- for RS-485); 3000 V <sub>DC</sub> isolated		
ttyS34	RS-232 (RxD, TxD, CTS, RTS, DSR, DTR, CD, RI and GND); 3000 V <sub>DC</sub> isolated		

Audio	Mic-in and Earphone-out		
I/O Expansion Slot	1	3	7
<b>Mechanical</b>			
Dimensions (W x H x D, unit: mm)	239 x 164 x 133	300 x 164 x 133	422 x 164 x 133
Installation	Wall mounting /DIN-rail mounting		
<b>Environmental</b>			
Operating Temperature	-25 °C to +75 °C		
Storage Temperature	-30 °C to +80 °C		
Ambient Relative Humidity	10 % to 90 % RH (non-condensing)		
<b>Power</b>			
Input Range	+10 V <sub>DC</sub> to +30 V <sub>DC</sub>		
Isolation	1 kV		
Redundant Power Inputs	Yes, with one power relay (1 A @ 24 V <sub>DC</sub> ) for alarm		
Capacity	3.7 A, 5 V supply to CPU and backplane, 3.3 A, 5 V supply to I/O expansion slots, 35 W in total	3.8 A, 5 V supply to CPU and backplane, 3.2 A, 5 V supply to I/O expansion slots, 35 W in total	4.0 A, 5 V supply to CPU and backplane, 3.0 A, 5 V supply to I/O expansion slots, 35 W in total
Consumption	16.6 W (0.69 A @ 24 V <sub>DC</sub> )	16.8 W (0.7 A @ 24 V <sub>DC</sub> )	18 W (0.75 A @ 24 V <sub>DC</sub> )

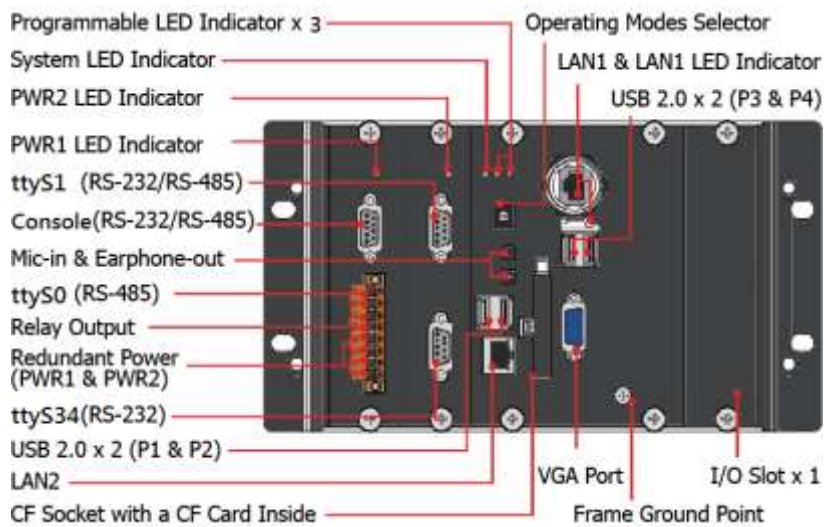


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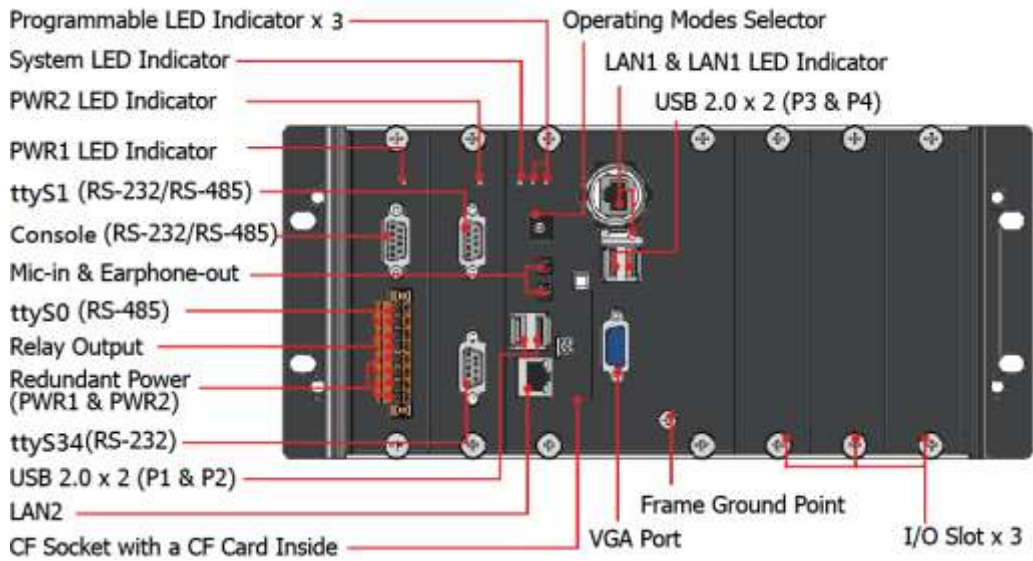
The LX-9000 Series modules are equipped with several interfaces and peripherals that can be integrated with external systems. Here is an overview of the components and its descriptions.

### LX-9131/LX-9171/LX-9181

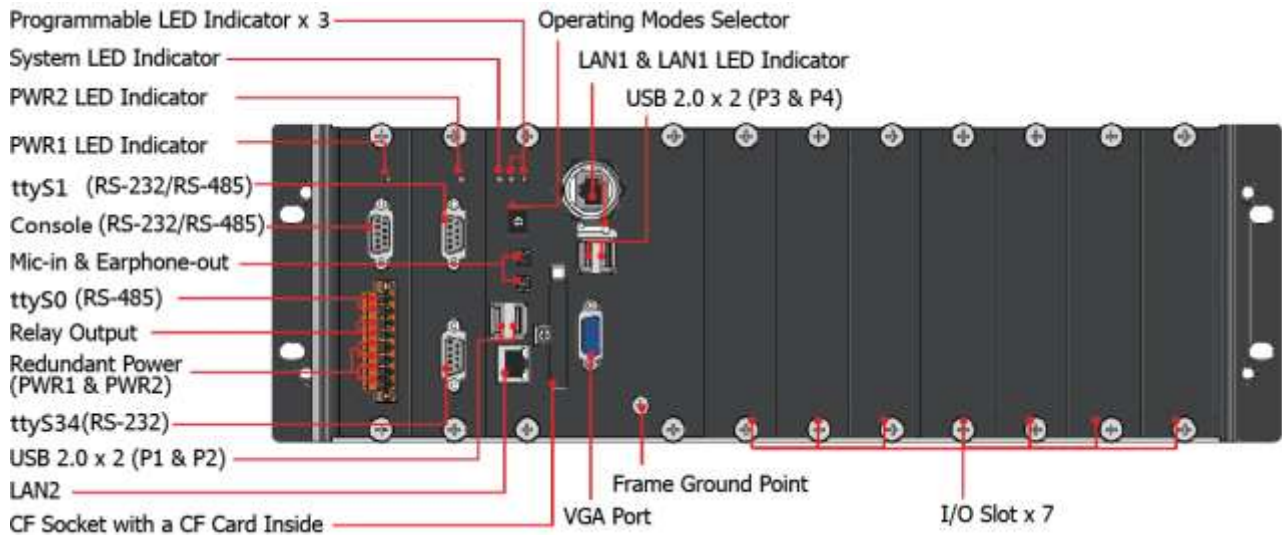
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## LX-9331/LX-9371/LX-9381



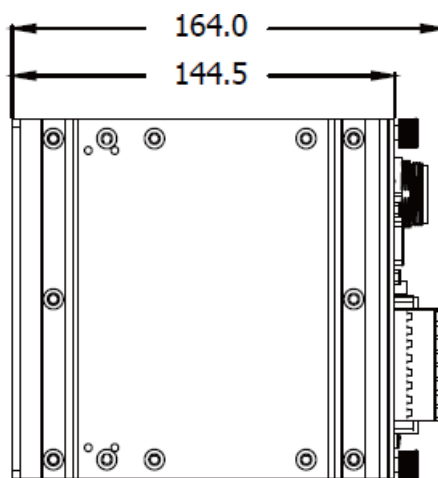
## LX-9731/LX-9771/LX-9781



## 1.5. LX-9000 Series Dimensions

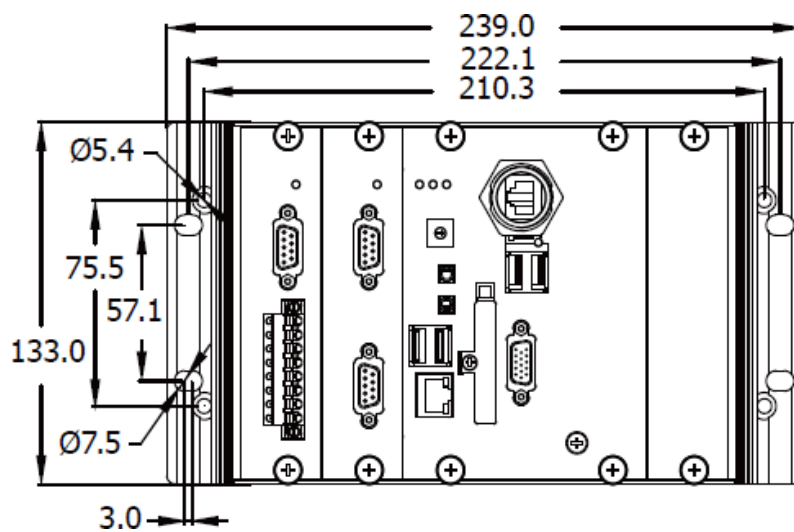
The diagrams below provide the dimensions of the LX-9000 to use in defining your enclosure specifications. Remember to leave room for potential expansion if you are using other components in your system.

The height dimension is the same for all LX-9000. The width depending on your choose of I/O expansion slots. All dimensions are in millimeters.



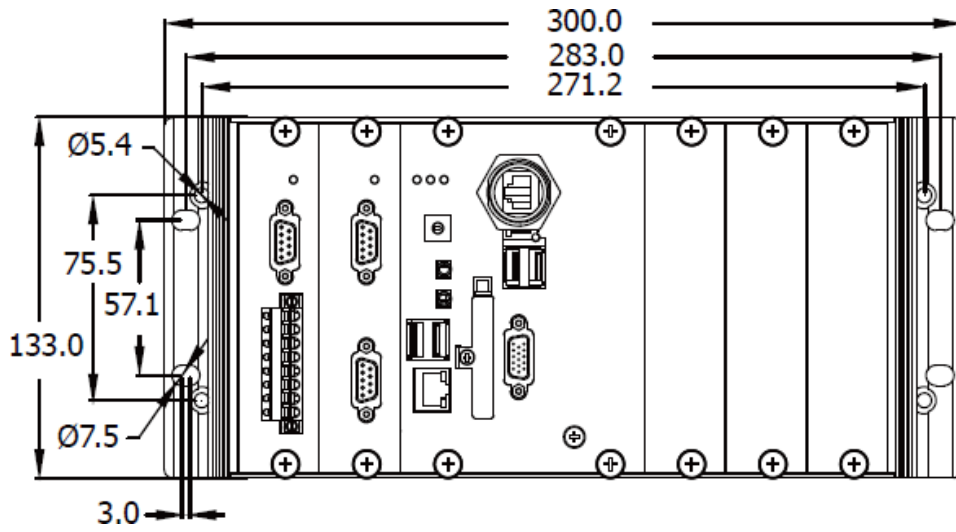
### LX-9131/LX-9171/LX-9181

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LX-9331/LX-9371/LX-9381

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LX-9731/LX-9771/LX-9781

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