Industrial PC

# PPC-A55-070



PN: CS10600-RK3568-070P

**Revision 1.1**
**www.chipsee.com**

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# PPC-A55-070

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# Product Overview

The Cortex$^®$-A55 series PPC-A55-070 (PN: CS10600-RK3568-070P) is a high-quality IP65-compliant industrial panel PC. It features a 7" ten-point capacitive touch screen with a resolution of 1024 x 600 pixels and brightness of 500 cd/m$^2$.

Key Applications

- Human Machine Interface  HMI

- Mobile Applications

- Video Processing

- Machine Learning

- Video Gaming

- Process Control

• Process Monitoring

• ATM...

It is available both as an embedded solution and as a device hosed in an aluminum casing with bezels, thus facilitating different installation options:

• Installation on an industrial cabinet

• Integration with the existing equipment

The PPC-A55-070 Industrial Panel PC is based around the powerful RK3568 System on Chip (SoC), powered by the Rockchip RK3568 low-power processor which integrates a quad-core Cortex®-A55 processor.

The RK3568 supports multi-format video decoders and has a high-performance RAM (LPDDR4X) capable of sustaining demanding memory bandwidths. It also provides a complete set of peripheral interfaces.

# Ordering Options

Chipsee products can be customized during the ordering process. The product will be shipped with the pre-installed factory defaults if no extra requirements are specified. The table in the Hardware Features section provides information about the default options bundled with the product.

> ✏ **Note**
>
> You can order the PPC-A55-070 from the official **Chipsee Store** or from your nearest distributor.

## Operating System

This product comes with a pre-installed OS of your choice. Please see the list below for the supported OSes, which can also be obtained from the Software Documentation section, along with the detailed installation instructions.

• Debian 11

• Android 11

• Buildroot Linux Qt 5.15

> ⚠ **Warning**
>
> The Software Documentation section provides a detailed instruction on how to install different OSes on your own. However, bear in mind that Chipsee can't take the responsibility of inadequate installation procedure. If you "brick" your device, please contact Chipsee Technical Support at **support@chipsee.com** for further assistance

## Optional Features

The PPC-A55-070 Industrial Panel PC does not include 4G/LTE module by default. The module is optional and can be selected at the Chipsee store during the ordering process.

> ⚠ **Warning**
>
> Installation, repair, and maintenance tasks should be performed by trained personnel only. Chipsee does not bear any responsibility for damage caused by inadequate handling of the product.

## Hardware Features

The PPC-A55-070 Industrial Panel PC offers a broad range of performance and connectivity options for scalable integration, providing expandability according to future needs. Some of the key features are listed in the table below.

| PPC-A55-070 | |
|---|---|
| CPU | Rockchip RK3568, Quad-core Cortex-A55 (2.0GHz) |
| RAM | 2GB LPDDR4 |
| eMMC | 16GB |
| Storage | TF Card, Supports up to 128GB SDHC |
| Display | 7" LCD, 1024 x 600, High Brightness: 500 cd/m$^2$ |
| HDMI | 1 x HDMI-D |
| Touch | 5-point capacitive touch screen |
| USB | 1 x USB 2.0 HOST, 1 x USB 3.0 HOST, 1 x USB Type-C |
| LAN | 2 x RJ45, GbE |
| POE | Supported, Optional |
| Audio | 3.5mm Audio In/Out Connector, 2W Internal Speaker |
| Buzzer | Yes |
| RTC | Yes |
| RS232 | default 2 x RS232 (Optional 6 x RS232 at most, include 1 debug port)[1] |
| RS485 | default 3 x RS485 at most[1] |
| CAN | default 2 x CAN |
| GPIO | 8 Channels Isolated IO, 4 x Input and 4 x Output |
| WiFi/BT | Integrated WiFi/BT Module |
| 4G/LTE | Supported, Optional |
| Power Input | From 6V to 36V |
| Current at 12V | 550mA Max at 12V |

| PPC-A55-070 | |
|---|---|
| **Power Consumption** | 6.6W Max |
| **Working Temperature** | From 0°C to +60°C |
| **OS** | Android 11, Debian11, Buildroot Linux Qt |
| **Dimensions** | PPC-A55-070 (PN: CS10600-RK3568-070P): 188.05 x 123.11 x 33.20mm |
| **Weight** | PPC-A55-070 (PN: CS10600-RK3568-070P): null |
| **Mounting** | PPC-A55-070 (PN: CS10600-RK3568-070P): Panel |

Table 125 Key Features

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**1**(**1**,**2**)This product has 6 x UART channels in total. The default configuration is 2 x RS232 and 3 x RS485, include 1 debug port. UART can be swapped between RS232 and RS485 modes easily, so if you need different RS232/RS485 configuration, please get in touch with the Chipsee Technical Support at **support@chipsee.com**

# Power Input

The PPC-A55-070 Industrial Panel PC can be powered by a wide range of input voltages: From 6V to 36V DC. The power input connector is a **3-pin, 3.81mm terminal**. The polarity and the pinout is clearly marked on the housing of the product as shown on the figure below. There is one power input connector which is a 2.1mm I.D x 5.5mm O.D x 9.5mm DC connector. For a proper DC power adapter, refer to the figure below.
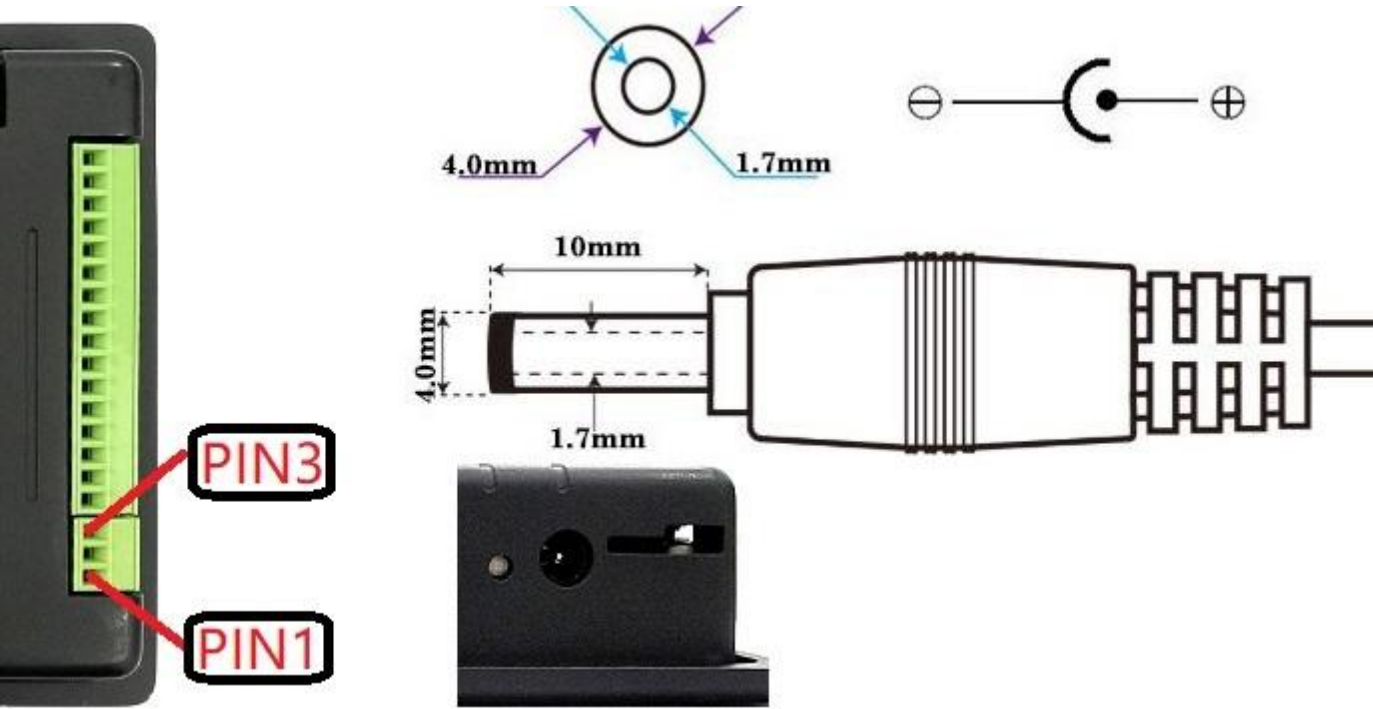


**Figure 574:** *Power Input*

Note that the "**+**" sign represents the positive power input, and it is printed both at the casing and as a silk-screen on a PCB of the embedded version. The "**-**" terminal is shorted to the ground.

| Power Input Definition | | |
|---|---|---|
| **Pin Number** | **Definition** | **Description** |
| Pin 1 | Positive Input | DC Power **Positive Terminal** |
| Pin 2 | Negative Input | DC Power **Negative Terminal** |
| Pin 3 | Ground | **Power System Ground** |

Table 126 Power Connector

> ✏️ **Note**
>
> The system ground "**G**" is connected to power negative "**-**" on board.

# Touch Screen

The PPC-A55-070 Industrial Panel PC uses a 5-point capacitive touch screen.



Figure 575: *Capacitive Touch Screen Connector*

> ⚠️ **Attention**
>
> A capacitive touch screen is susceptible to power noise and Electromagnetic Radiation (EMR). It may cause LCD ripples or even capacitive touch malfunction. If using a capacitive multi-touch test application, you might notice the touch points float erratically across the display. There are several solutions to this problem:
>
> 1. Use a high-quality Power Adapter Unit (PSU) with low EMR. You can also provide power from a battery.
> 2. Make sure that the PPC-A55-070 Power Input connector (pin 3) is properly connected to the Power System Ground to provide sufficient EMI shielding and eliminate the problem entirely.
> 3. Bad GND problems can also be confirmed by touching pin 3 of the Power Input connector with one hand while operating the capacitive touch screen with the other hand. In this case, the operator's body acts as the Power System Ground.

# Connectivity

There are many connectivity options available on the PPC-A55-070 industrial PC. It has 1 x USB 2.0 HOST, 1 x USB 3.0 HOST, 1 x USB Type-C, 2 x RJ45, GbE (RJ45) Ethernet connector supporting up to 1 Gbps, and 5 x UART terminals (RS232/RS485/CAN).

## RS232/RS485/CAN

The serial communication interfaces (RS485, RS232, and CAN) are routed to a **16-pin 3.81mm terminal**, as illustrated on the figure below.
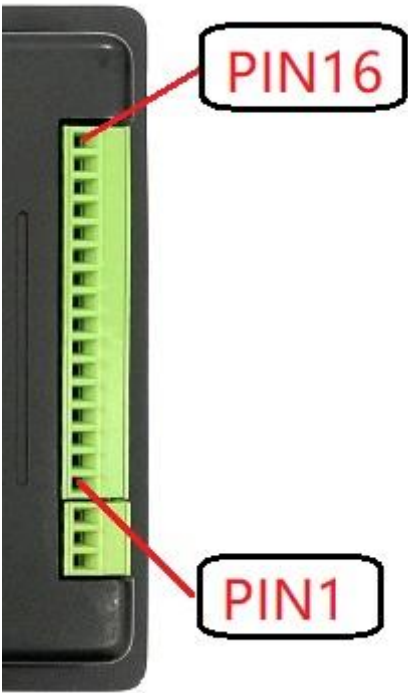


Figure 576: *Relation between serial pins on embedded vs. enclosed version of the* **PPC-A55-070** *Industrial PC*

The table below offers more detailed description of every pin and its definition:

| RS232 / RS485 / CAN Pin Definition: | | |
|---|---|---|
| **Pin Number** | **Definition** | **Description** |
| Pin 16 | CAN1_H | CAN H signal |
| Pin 15 | CAN1_L | CAN L signal |
| Pin 14 | CAN0_H | CAN H signal |
| Pin 13 | CAN0_L | CAN L signal |
| Pin 12 | RS485_5- | CPU UART5, RS485 –(B) signal |
| Pin 11 | RS485_5+ | CPU UART5, RS485 +(A) signal |
| Pin 10 | RS485_4- | CPU UART4, RS485 –(B) signal |

| RS232 / RS485 / CAN Pin Definition: | | |
|---|---|---|
| Pin 9 | RS485_4+ | CPU UART4, RS485 +(A) signal |
| Pin 8 | RS485_3- | CPU UART3, RS485 –(B) signal |
| Pin 7 | RS485_3+ | CPU UART3, RS485 +(A) signal |
| Pin 6 | RS232_0_RXD | CPU UART0, RS232 RXD signal |
| Pin 5 | RS232_0_TXD | CPU UART0, RS232 TXD signal |
| Pin 4 | RS232_2_RXD | CPU UART2, RS232 RXD signal, Debug Port |
| Pin 3 | RS232_2_TXD | CPU UART2, RS232 TXD signal Debug Port |
| Pin 2 | GND | System Ground |
| Pin 1 | +5V | System +5V Power Output, No more than 1A Current output |

Table 127 Connectivity Section

> ⚠ **Attention**
>
> 1. RS485_3,RS485_4 and RS485_5 can control the input and output direction automatically. There's no need to control it from within the software.
> 2. The 120Ω match resistor for the RS485 is mounted by default.
> 3. The 120Ω match resistor for the CAN bus is NOT mounted by default.

## USB Connectors

There are 2 x **USB HOST connectors** onboard which includes 1 x USB 2.0 HOST, 1 x USB 3.0 HOST, 1 x USB Type-C , as shown in the figures below.



Figure 577: *USB 2.0 and USB3.0 HOST Connectors (enclosed PC version)*



Figure 578: *USB Type-C Connector (enclosed PC version)*

> ⚠️ **Warning**
>
> Be careful not to touch surrounding electronic components accidentally while plugging in USB devices into the embedded IPC version.

## LAN Connectors

**LAN (RJ45) connector** provides 2 x Ethernet connectivity over standardized Ethernet cables as shown the figure below. The integrated Ethernet interface supports up to 1 Gbps data throughput. The right port also support POE function, not support default.



Figure 579: *RJ45 LAN Connector*

> ✏️ **Note**
>
> Use CAT5 or better cables to achieve full data throughput over maximum distance defined by the 1000BASE-T standard (100m).

## WiFi & BT Module

The PPC-A55-070 Industrial Panel PC is equipped with the popular **Realtek RTL8821CS WiFi/BT module** which supports BT/BLE 2.1/3.0/4.2, as well as 802.11ac/abgn 433Mbps 2.4/5.8 GHz Wireless LAN (WLAN).



Figure 580: *RTL8821CS WiFi/BT Module*

The PPC-A55-070 includes an SMA connector for an external WiFi/BT antenna, as illustrated in the figure below.

*WiFi+BT Antenna SMA*

## 4G/LTE Module

The PPC-A55-070 Industrial Panel PC is equipped with a **mini-PCIe connector** that can connect a 4G/LTE module. The customer will also need a SIM Card Holder and a 4G/LTE Antenna Connector to ensure 4G/LTE works on the PPC-A55-070. SIM card does **NOT** support hot plug. **Power off** before inserting or removing SIM card.



Figure 581: *mini-PCIe Connector & 4G Module*



Figure 582: *SIM Card Holder & 4G Antenna*
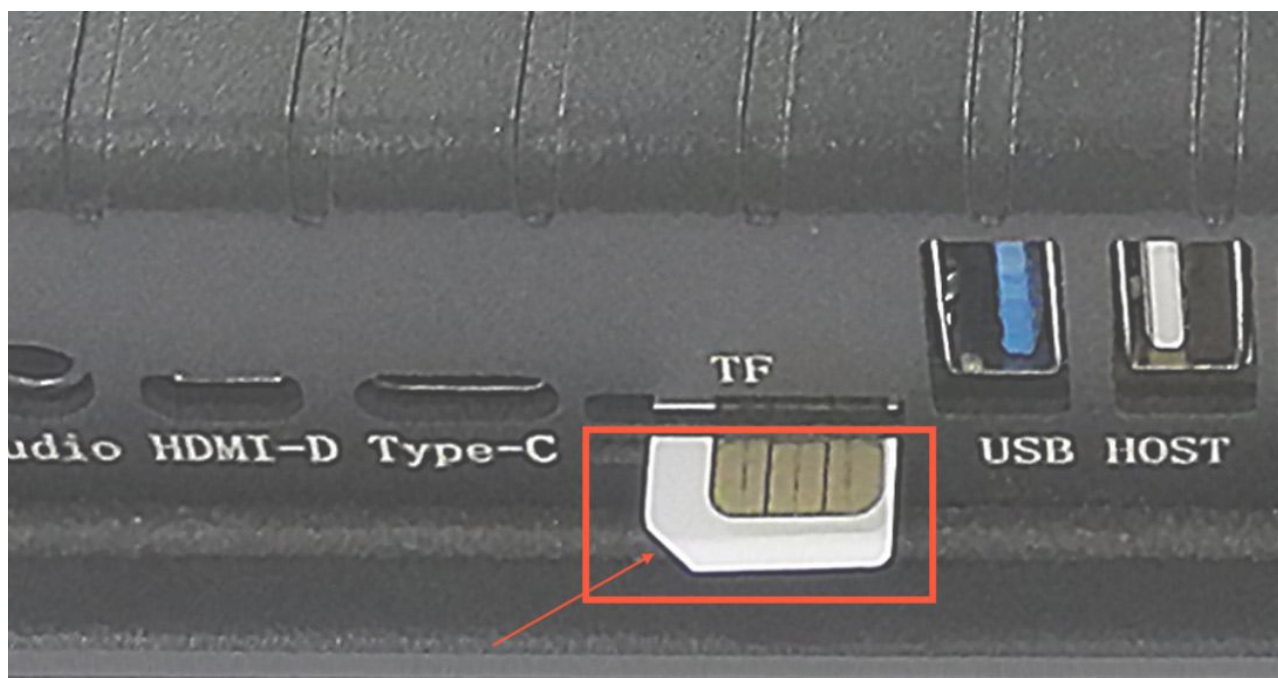
*SIM Card Direction*

> ⚠️ **Attention**
>
> The product does not come shipped with the 4G/LTE module by default. The customer can choose the 4G/LTE module option when placing an order, we will install all the necessary components.

## TF Card & SIM Card Slot

The PPC-A55-070 Industrial Panel PC features 1 x **TF Card (micro SD) slot** and 1 x **SIM Card slot**. TF Card can address up to 128GB of memory.



Figure 583: *TF (micro SD) Card & SIM Card Slot*

> ✏️ **Note**
>
> The product does not come shipped with the TF Card by default.

## Audio Connectors

The PPC-A55-070 Industrial Panel PC features some audio peripherals. It has 1 x **3.5mm audio output jack**.
Also, the PPC-A55-070 industrial PC has a miniature 2W internal speaker for audio reproduction, as well as a small buzzer for alarm/notification sounds.



Figure 584: *Audio Connector*

> ⚠️ **Attention**
>
> By plugging in the headphone cable, the internal speaker will be disabled automatically.

# HDMI Connector

The PPC-A55-070 Industrial Panel PC supports 1 x HDMI-D 2.0 interfaces.


Figure 585: *HDMI Connector*

# PROG Button

The PPC-A55-070 Industrial Panel PC has one button on the board marked as PROG, shown in the figure below.
When button is pressed before power, the PPC-A55-070 will enter MASKROM mode which can use Type-C port do upgrade system. You can use this function to download the OS software to the internal eMMC.
When button is released before power, the PPC-A55-070 will boot normally.

There is no need to press the button during regular operation. However, if you need to reinstall the OS, please refer to the detailed information on how to re-flash the OS.


Figure 586: *PROG Button*

# GPIO

The PPC-A55-070 Industrial Panel PC features a **10-pin 3.81 mm terminal** that provides 8 x opto-isolated GPIO pins, of which 4 x are output, and 4 x are input pins. The 10-pin terminal also includes an isolated PSU input in the range of 5 to 24 VDC. The exact pinout is given in follow table.

The GPIO **HIGH** output level corresponds to the voltage connected at the Isolated Power Input, while the GPIO **LOW** output level corresponds to the isolated Ground Input. Each GPIO output can drive loads up to 500mA, enough to drive various applications directly, such as relays or solenoid valves.
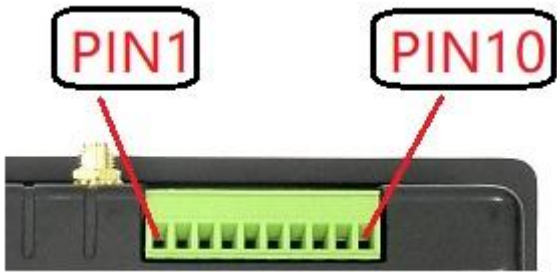
Figure 587: *GPIO Terminal (enclosed PC version)*

| GPIO Pin Definition: | |
| --- | --- |
| **Pin Number** | **Definition** |
| Pin 1 | Isolated Power Input2 |
| Pin 2 | Isolated Ground Input |
| Pin 3 | OUT1 |
| Pin 4 | OUT2 |
| Pin 5 | OUT3 |
| Pin 6 | OUT4 |
| Pin 7 | IN1 |
| Pin 8 | IN2 |
| Pin 9 | IN3 |
| Pin 10 | IN4 |

Table 128 GPIO Pinout

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**2**   If the isolation is not a requirement, it is possible to use a non-isolated PSU instead.
It is also possible to use the onboard 5V power supply: it can be re-routed to the *Isolated Power Input* pin by populating R251 and R247 PCB footprints with 0Ω resistors.
Note that in this case, the *Isolated Power Input* pin will become an output for the onboard 5V power supply.

# Mounting Procedure

The PPC-A55-070 Industrial Panel PC can be mounted with 4 x M4 screws, enabling simplified installation onto any standard mounting fixture.

## PPC-A55-070

You can mount PPC-A55-070 with the Vesa (75 x 75mm) and Panel mounting methods, as shown on the figure below.
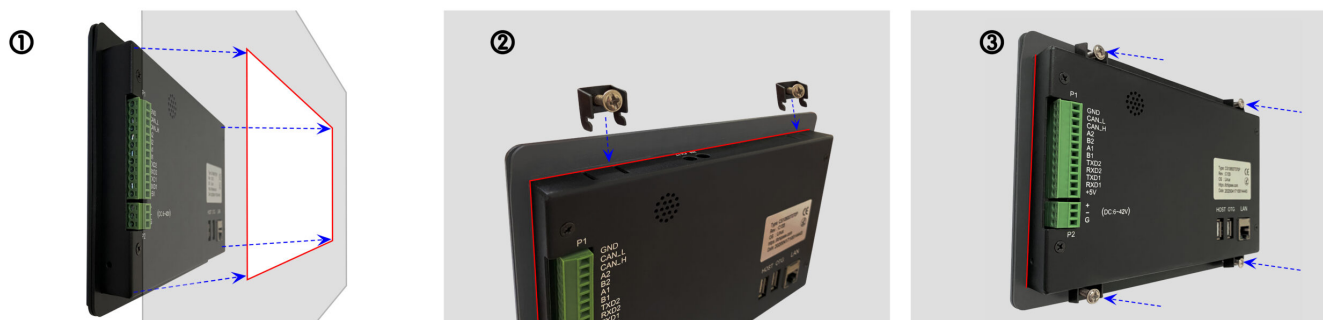
Figure 588: *Panel mounting*

> ⚠️ **Attention**
>
> Please make sure the display is not exposed to high pressure when mounting into an enclosure.

You can find detailed information about mounting in the Mount IPC Guide.

# Mechanical Specifications

## PPC-A55-070

The outer mechanical dimensions of PPC-A55-070 are 188.05 x 123.11 x 33.20mm (W x L x H). Please refer to the technical drawing in the figure below for details related to the specific product measurements.
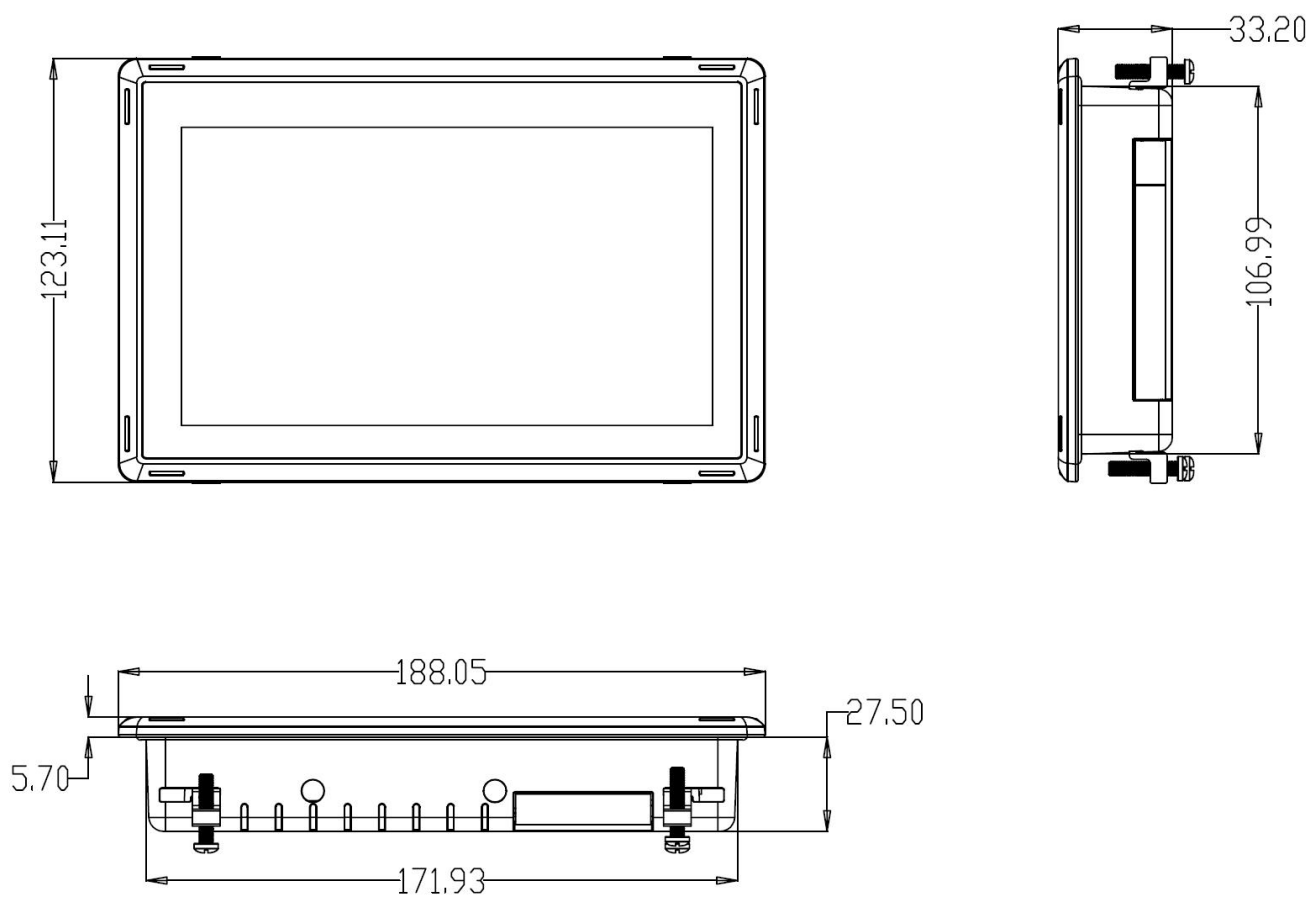
Figure 589: PPC-A55-070 *Technical Drawing*

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