



# ROBOT WORLD

## The World of Robots

Currently, the robot market is experiencing explosive growth, with significant potential in segmented sectors. As an emerging growth trend, humanoid robots entered their first year of mass-production in 2025. The Chinese market size reached approximately RMB 8.239 billion (accounting for 50% of the global total), and is projected to grow to RMB 86.1 billion by 2030, representing a compound annual growth rate exceeding 40%. This growth is driving the localization of industrial robots and promoting scenario-based innovation in robotics.

Industrial Robot **1052** Billion yuan  
(as of 2030)

Service Robot **1413** Billion yuan  
(As of 2030)

Special Robot **506** Billion yuan  
(as of 2030)

Humanoid Robot **860** Billion yuan  
(as of 2030)



# CONTENTS

## Introduction

About APQ	01
Honors&Qualifications	02

## Intelligent Robot Control Platform

Robot Product MAP	04
TER Embodied Intelligent Controller	06
TACBoxController	16
AKmagazine-style controller	24
ESeriesintelligent controller	40
robotssupportingtool chain	44

## APQ service and quality control

R&D Strengths	47
Production Strengths	48
Quality Strengths	49
Service Strengths	50

# ABOUT APQ



**2009**

Founded

**4**

Sales Center

**30+**

authorized service channels

**100+**

Industry Scenarios

**10000+**

Total Customers

**600000+**

Total Shipments

Founded in 2009 and headquartered in Suzhou, APQ is a high-tech enterprise with fully in-house capabilities spanning industrial AI computer design, R&D, manufacturing, marketing, sales, and delivery. The company provides a comprehensive range of IPC products, including traditional industrial PCs, industrial all-in-one PCs, industrial displays, industrial motherboards, and industry controllers. In addition, APQ has independently developed a suite of IPC+ toolchain software products, including IPC SmartMate, IPC SmartManager, and IPC SwitchLink, forming an industry-pioneering E-Smart IPC Industrial Intelligent Brain. These solutions are widely applied in machine vision, motion control, robotics, and industrial digitalization, and APQ has established unique technical advantages and extensive application cases in the field of embodied intelligent robotics. Currently, APQ operates a headquarters base in Suzhou, an R&D center in Chengdu, and four major sales centers covering East China, South China, West China, and North China, together with more than 30 contracted service partners. Its nationwide service network significantly enhances R&D strength and customer service responsiveness. To date, APQ has delivered customized solutions to over 100 industries and more than 10,000 customers, with cumulative product shipments exceeding 600,000 units.

With more than a decade of dedicated development, APQ remains committed to its corporate vision of “ becoming an outstanding specialized and innovative industrial enterprise, while helping employees and more people improve their happiness. ” The company actively practices its core values of Integrity, Pragmatism, Professionalism, Honesty, Innovation, and Responsibility, and upholds the spirit of “ More reliable, therefore more trustworthy. ” By providing reliable products and professional services, APQ has earned long-term trust and deep partnerships with its customers. The company has successively established Joint Laboratories for Intelligent Specialized Equipment, Machine Vision Joint Laboratories, and Graduate Joint Training Bases with institutions such as the University of Electronic Science and Technology of China, Chengdu University of Technology, Hohai University, and Jiangsu University. APQ also participates in drafting multiple national standards related to industrial intelligent controllers and industrial operation and maintenance. In recognition of its contributions, APQ has been awarded titles such as “ Annual Outstanding Supply Chain Enterprise in the Embodied Intelligence Field ” and “ Outstanding Enterprise in the Humanoid Robot Ecosystem. ” The company has also received honors including Jiangsu High-Tech Enterprise, Jiangsu Specialized, Refined, and Innovative SME, and Suzhou Gazelle Enterprise.

## Positioning

industrial intelligent entity service provider

## Assign

Make Industry More Reliable, Enrich Life

## Wish

Become an outstanding specialized and sophisticated SME in industry and help employees and more people enhance their well-being

## Value

integrity, pragmatism, professionalism, honesty, innovation, accountability

## Core Philosophy

self-reflection (awareness, cessation, insight), gratitude (things require), altruism (beneficial words and actions)

## Cornerstone

People-oriented, stay principled and make breakthroughs

# HONOR & AWARD

## Honors and Certifications

APQ focuses on the R&D and manufacturing of intelligent industrial computers. Committed to independent innovation, we possess full-chain R&D capabilities covering motherboard development, software development and structural processing. Over the years, we have built a sound technological ecosystem, earning more than 100 patents and over 40 software copyrights. Meanwhile, we have received more than 10 honors, including National High-Tech Enterprise, Jiangsu Private Technology Enterprise, Suzhou Gazelle Enterprise, and Jiangsu Provincial Specialized, Sophisticated, New and Unique Enterprise.

# 20+

## Corporate Honors



# 30+ Enterprise Qualifications



CCC certificate

FCC certificate

CE certificate

RoHS certificate

energy-saving certification certificate



ISO9001 quality management system

ISO14001 environmental management system

ISO/IEC27001 information security management system

SA8000 social responsibility management system







ISO45001 occupational health and safety management system

# 100+ Patents Applied 40+ Software Copyrights



# ROBOT PRODUCT MAP



		ARM	x86	Jetson	X86+Jetson	x86+GPU
 <b>Service Robots</b>	Residential/indoor		TER30R			
	Commercial Guidance		TER30R			
 <b>AGV/AMR</b>			TER30R	TAC-3000Pro		
	Outdoor Low-Speed		TAC-6000	TAC-3000Pro		
				TAC-7000		
 <b>Mobile Robots</b>	Outdoor High-Speed			AK4	TER40J	
	desktop/industrial		AK1 /AK5			
 <b>Industrial Robots</b>	six-axis/SCARA					AK6 AK7 E7Pro
	research/service		TER30R	TAC-3000Pro	AK4	
 <b>Humanoid Robots</b>	high-performance general-purpose			TER40J	TER30X+TER30J	
	firefighting/inspection				TAC-3000Pro	
 <b>Mutil-Legged Robots</b>						



High Cost-Performance



High Computing Power



High Real-Time



### Selection Recommendation

Service Robot: TER30R

Mobile Robot: TER30R, TER40J, TAC-6000, TAC-7000,  
TAC-3000Pro, AK4

Collaborative Robot: AK1, AK5

Industrial Robot: AK6, AK7, E7Pro

Humanoid Robot: TER30R/X/J, TER40J, TAC-3000Pro, AK4

Mutil-Legged Robots: TAC-3000Pro

### Interconnection Components

Camera: GMSL, USB

Radar: network

IMU: serial

Voice: network

Motion Control: EtherCAT, CAN

Display Touch Screen: HDMI+USB

# CORE" BIG BRAIN + SMALL BRAIN" ARCHITECTURE FOR EMBODIED ROBOTS Dual-Domain Fusion of Perception and Control

---

TER Embodied Intelligent Controller

TER30/TER40



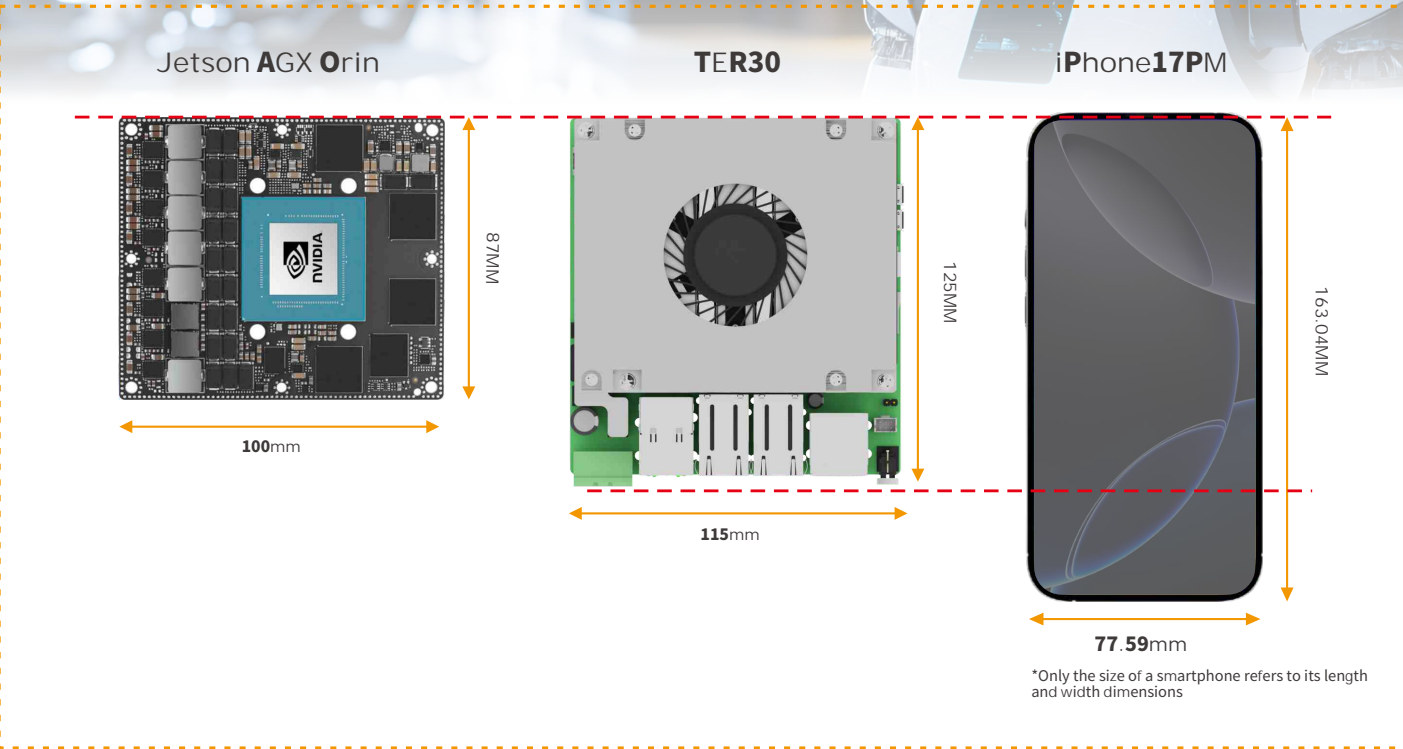
# EIGHT MAJOR CORE **ADVANTAGES**

## Make Embodied Intelligent Robots More **Reliable**

Embodied intelligent robots impose stringent requirements on core controllers, including small size, high computing power, excellent heat dissipation, strong scalability, high shock resistance, and low interference. The TER series meets these demands precisely with eight core advantages, enabling embodied intelligent robots to achieve better perception and decision-making, as well as more flexible motion control in complex environments.



Only the size of a smartphone  
High-performance controller designed specifically for compact spaces



### Diverse Combinations Compact and Flexible

#### Bare Board

Smaller Size, lighter weight



#### With Enclosure

Stronger structure,  
higher impact resistance



#### Flat Mount

Independent module,  
convenient maintenance



#### Stacking Mount

High integration,  
saving more space



# DUAL-BRAIN COLLABORATION UMLEASHES UNLIMITED POTENTIAL

Core "Big Brain + Small Brain" Architecture  
for Embodied Robots

## TER30

### Compact Size

118.2mm × 130mm × 57.6mm

### Light weight

≈ 1kg (weight with enclosed housing)



## Product Features

### TER30J(A5/B3/C3)

Jetson: Perception brain

- NVIDIA Jetson AGX Orin, delivering up to 275TOPS of computing power
- High-speed, low-latency Ethernet for seamless inter-brain communication
- Industrial-grade interfaces and reliable design with shock and impact resistance

### TER30X(A5/B3)

x86: motion-control cerebellum

- Supports 12<sup>th</sup> and 13<sup>th</sup> generation Intel Core processors
- High-real-time system enabling 1000Hz precision control
- Intelligent heat dissipation and wide voltage design, adaptable to harsh environments.

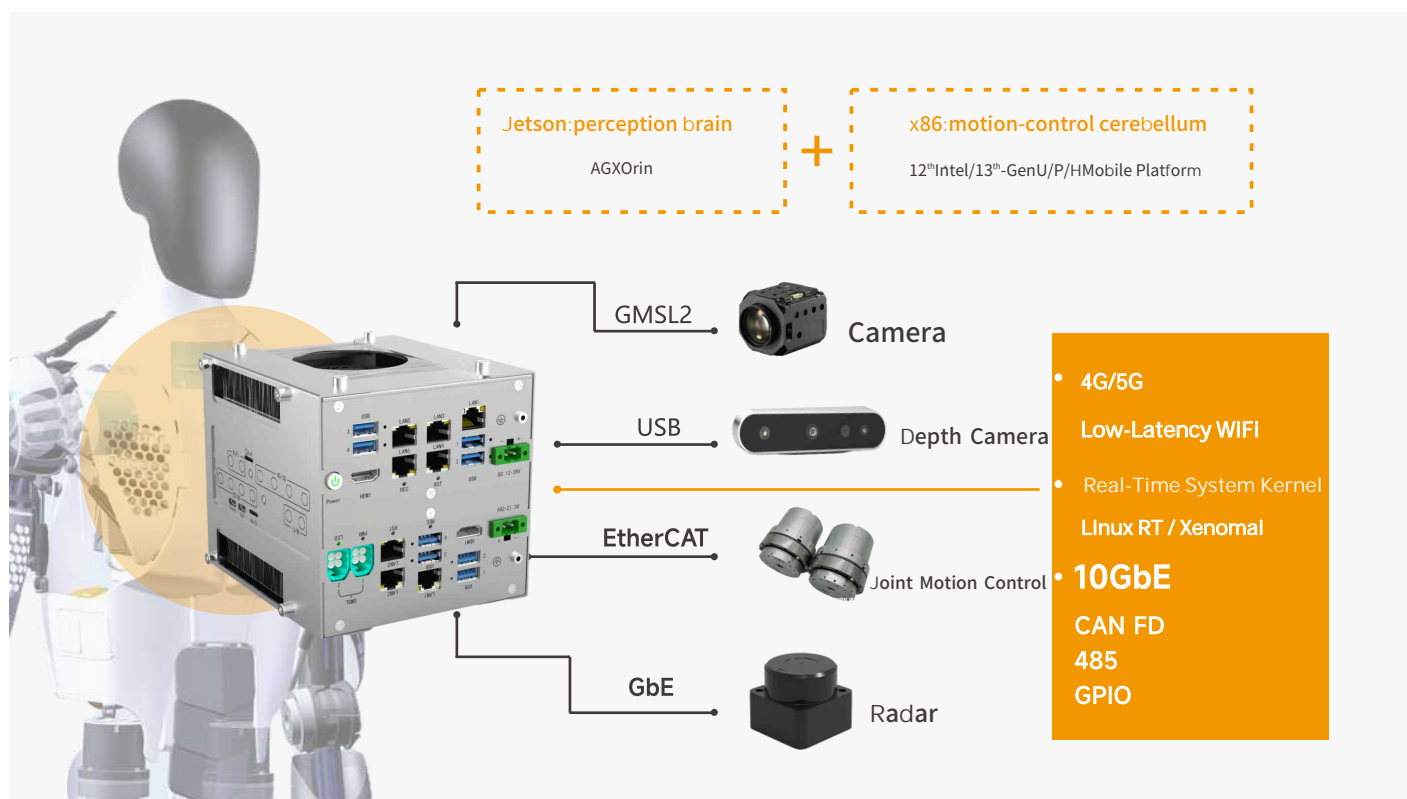
# TER30

## Application Case for Humanoid Robots

### Application Background

Embodied intelligent robot controllers face industry-wide challenges such as low integration, fragmented computing power, and response latency. To address these issues, APQ innovatively launched the "core big-brain/small-brain" product solution. This solution employs a dual-brain collaborative architecture—comprising a perception brain and motion control cerebellum—and combines edge computing with a real-time system to enable efficient multimodal data processing and millisecond-level precise control. It completes the closed-loop of "perception-decision-execution" within a compact footprint while simultaneously delivering high computing power and low power consumption. Its modular architecture significantly enhances system reliability and adaptability to complex scenarios.

### Application Solution



### Application Effect


#### Dual-Domain Fusion Architecture

- Dual-domain synergy between perception and motion control enables parallel execution of large-model inference and high-precision motion control significantly improving computing power allocation efficiency.
- The proprietary heat-pipe fin composite cooling system ensures stable operation in environments ranging from -20 ° C to 50 ° C, significantly enhancing the thermal dissipation efficiency.

#### Real-Time Performance and Reliability

- Equipped with IPC Assistant, Cloud Control Hand, and other IPC+ toolchains to monitor equipment parameters in real time, significantly improving system stability compared to traditional solutions
- Employs state self-awareness technology to support dynamic equipment health assessment, substantially reducing operational and maintenance costs.

# TER30

Platform	Jetson			X86	
Model	 TER30J-A5	 TER30J-B3	 TER30J-C3	 TER30X-A5	 TER30X-B3
Features	For <b>EtherCAT</b> motion control, Compact installation	For <b>USB camera applications</b> , compact installation	For <b>GMSL</b> camera applications Compact installation	For <b>EtherCAT</b> motion control compact installation	For high-bandwidth high-real-time, compact installation
CPU	Supports NVIDIA® Jetson AGX Orin series modules			Supports Intel® 12/13th-U/P/H mobile platform CPUs	
Computing	AI computing power up to 275 TOPS				
Memory	board memory up to 64GB DDR5			Supports one SO-DIMM DDR5 memory slot	
LAN	1 * 10GbE 4*GbE	1 * 10GbE 2*GbE	1 * 10 GbE 2 * 1 GbE	5 * 1 GbE	2 * 10GbE 1*GbE
USB	2 × USB 10Gbps 2 × USB 5Gbps	3 × USB 10Gbps 5 × USB 5Gbps	3 × USB 10Gbps 1 × USB 5Gbps	4 × USB 5Gbps	4 × USB 5Gbps
GMSL	Null	Null	8 × GMSL2	Null	Null
COM	2 * COM (RS232/RS485)			4 * COM (RS232/RS485)	
CAN	2 * CAN FD			---	---
GPIO	8*GPIO				
Expansion	Supports wireless mobile network expansion, including 4G/5G, WiFi, and Bluetooth				
Power Supply	DC 12~28V wide-voltage power supply				
Size	118.2mm × 130mm × 57.6mm				



Model		TER30J-A5	TER30J-B3	TER30J-C3
CPU	CPU	Supports Jetson AGX Orin Series; supports up to 75 W		
Ethernet	Wired Module	1 * Marvell® AQR113C, 10/100/1000/2500/5000 /10000 Mbps 1 * Marvell® 88E1512, 10/100/1000 Mbps 1 * Intel® i350-AM4, 10/100/1000 Mbps	1 * Marvell® AQR113C, 10/100/1000/2500/5000 /10000 Mbps 1 * Marvell® 88E1512, 10/100/1000 Mbps 2 * Intel® i226-V, 10/100/1000 Mbps	1 * Marvell® AQR113C, 10/100/1000/2500/5000 /10000 Mbps 3 * Intel® i210-AT, 10/100/1000 Mbps
	Storage	M.2	1 × M. Key-M slot (NVMe SSD)	
	TF	1 * TF Card Slot	/	
Expansion Slots	M.2	1 * M.2 Key-B Slot (USB 5 Gbps + USB 2.0, 3052, with 1 * Nano SIM Card Slot)		
		1 * M.2 Key-E Slot (PCIe x1 + USB 2.0)		
Front/O	Ethernet	1 * 10GbE ( RJ45) 4 * GbE ( RJ45)	1 * 10GbE (RJ45) 2 * GbE (RJ45)	1 × 10 GbE (RJ45) 2 × GbE (RJ45)
	USB	2 * USB 10Gbps (Type-A) 2 * USB 5Gbps (Type-A)	3 * USB 10Gbps (Type-A) 5 * USB 5Gbps (Type-A)	3 × USB 10 Gbps (Type-A) 1 × USB 5 Gbps (Type-A)
	Display	1 * HDMI: Resolution up to 4096*2304@30Hz (Type-A)		
	GMSL	/		8 * GMSL2 (FAKRA Mini Quad, Male)
	LED	1 * System Status LED		
	Button	1 * Power Button + Power LED 1 * System Reset Button 1 * System Recovery Button		
	PowerInput	1 * Power Input (2P, P=5.00/5.08, Terminal Block)		
Sidel/O	OTG	1 * USB 2.0 (Micro-B, flashing port)		
	Debug	1 * USB 2.0 (Micro-B, Debug port)		
	TF	1 * TF Card Slot	/	
	SIM	1 * Nano SIM Card Slot		
Power Supply	Type	AT/ATX		
	Power Input Voltage	12 ~ 28V DC		
	Connector	1 * Power Input Connector (2P, P=5.08mm, Terminal Block)		
	RTC Battery	CR2032 Coin Cell		
	Linux	Jetpack 6.2 (Ubuntu 22.04)		
OSSupport	Enclosure Material	Aluminum alloy		
Mechanical	Dimensions	118.2 mm (L) × 130 mm (W) × 57.6 mm (H)		
	Mounting	Bracket Mounting		
Environment	Heat Dissipation System	Active Fan Cooling		
	Operating Temperature	-20~50°C (Industrial SSD)		
	Storage Temperature	-40~80°C (Industrial SSD)		
	Relative Humidity	10 to 95% RH (non-condensing)		
	Vibration During Operation	3 Grms @ 5-500 Hz, random, 1 hr/axis		
	Shock During Operation	15G, half sine, 11ms, ±X/Y/Z, 3 shocks/axis		



Model		TER30X-A5	TER30X-B3
CPU	CPU	Supports Intel® 13th Gen Core i3/i5/i7-U/P/H processors; supports up to 45 W	Supports Intel® 13th Gen Core i3/i5/i7-U/P/H; supports up to 45 W
Memory	Socket	1 * Non-ECC SO-DIMM slot; up to DDR5 5200 MT/s	1 * Non-ECC SO-DIMM slot; up to DDR5 5200 MT/s
	Maximum Capacity	Up to 32 GB	Up to 32 GB
Graphics	Controller	Intel® Iris® Xe Graphics	Intel® Iris® Xe Graphics
Ethernet	Wired Module	1 * Intel® i219-V (10/100/1000 Mbps)	1 * Intel® i219-V (10/100/1000 Mbps)
		1 * Intel® i210-AT (10/100/1000 Mbps)	1 * Intel® i210-AT (10/100/1000 Mbps)
		1 * Intel® i350-AM4 (10/100/1000 Mbps)	1 * Intel® X710-AT 2 (100/1000/2500/10000 Mbps)
Storage	M.2	1 * M.2 Key-M Slot (NVMe SSD, 2280)	1 * M.2 Key-M Slot (NVMe SSD, 2280)
Expansion Slots	M.2	1 * M.2 Key-B Slot (USB 5 Gbps + USB 2.0, 3052, with 1 * Nano SIM Card Slot)	
Front I/O	Ethernet	5 * GbE (RJ45)	2 * 10GbE (RJ45) 1 * GbE (RJ45)
		USB	4 * USB 5Gbps (Type-A)
	Display	1 * HDMI: Resolution up to 4096*2304@30Hz (Type-A)	
	Button	1 * Power Button + Power LED	
		1 * System Reset Button	
		1 * System Recover Button	
Power Input	1 * Power Input (2P, P=5.00/5.08, Terminal Block)		
Side I/O	SIM	1 * Nano SIM Card Slots	
Power Supply	Type	AT/ATX	
	Power Input Voltage	12 ~ 28V DC	
	Connector	1 * Power Input Connector (2P, P=5.08 mm, Terminal Block)	
	RTC Battery	CR2032 Coin Cell	
OS Support	Linux	Ubuntu 22.04	
Mechanical	Enclosure Material	Aluminum alloy	
	Dimensions	118.2 mm (L) × 130 mm (W) × 57.6 mm (H)	
	Mounting	Bracket Mounting	
Environment	Heat Dissipation System	Active Fan Cooling	
	Operating Temperature	-20~50 °C with 0.7 m/s (Industrial SSD)	
	Storage Temperature	-40~80°C to (Industrial SSD)	
	Relative Humidity	10 to 95% RH (non-condensing)	
	Vibration During Operation	3 Grms @ 5-500 Hz, random, 1 hr/axis (Industrial SSD)	
	Shock During Operation	15G, half-sine, ms, 11 X/Y/Z, ± shocks/axis 3 (Industrial SSD)	

# INTEGRATED COMPUTING AND CONTROL UNIT

Suitable for high-performance humanoid robots and outdoor high-speed mobile robots

## TER40

### Size

168.5 mm × 130 mm × 58 mm



### Super Computing Power

NVIDIA® Jetson Thor, delivering up to 2070 TOPS of computing power



### Abundant Interfaces

8 × GMSL / 4 × USB / 4 × CAN FD / 2 × 10GbE / 4 × GbE



### Stable & Reliable

Vehicle-mounted connection terminals, hybrid cooling solution for long-term stable operation

Thor Platform  
Coming soon



## Product Overview

TER40J is equipped with an NVIDIA Jetson Thor core module delivering up to 2070 TOPS of computing power. Its rich set of interfaces and strong impact resistance make it specifically designed for high-performance humanoid robots and outdoor high-speed mobile robots, enabling plug-and-play operation and rapid integration.

# LOW POWER CONSUMPTION & COMPACT SIZE

Suitable for service robots/AGV/AMR/special-purpose robots

## TER30R

### Size

118.2 mm × 130 mm × 35 mm



#### ARM architecture

Uses the Rockchip ARM platform, offering low power consumption and high performance.



#### Abundant Interfaces

2×GbE / 3×EtherCAT / 4×CAN FD / 4×COM /  
5×USB 2.0 / 3×USB 5 Gbps



#### Wide Voltage Design

Supports 12~28 V DC wide-voltage power supply



## Product Overview

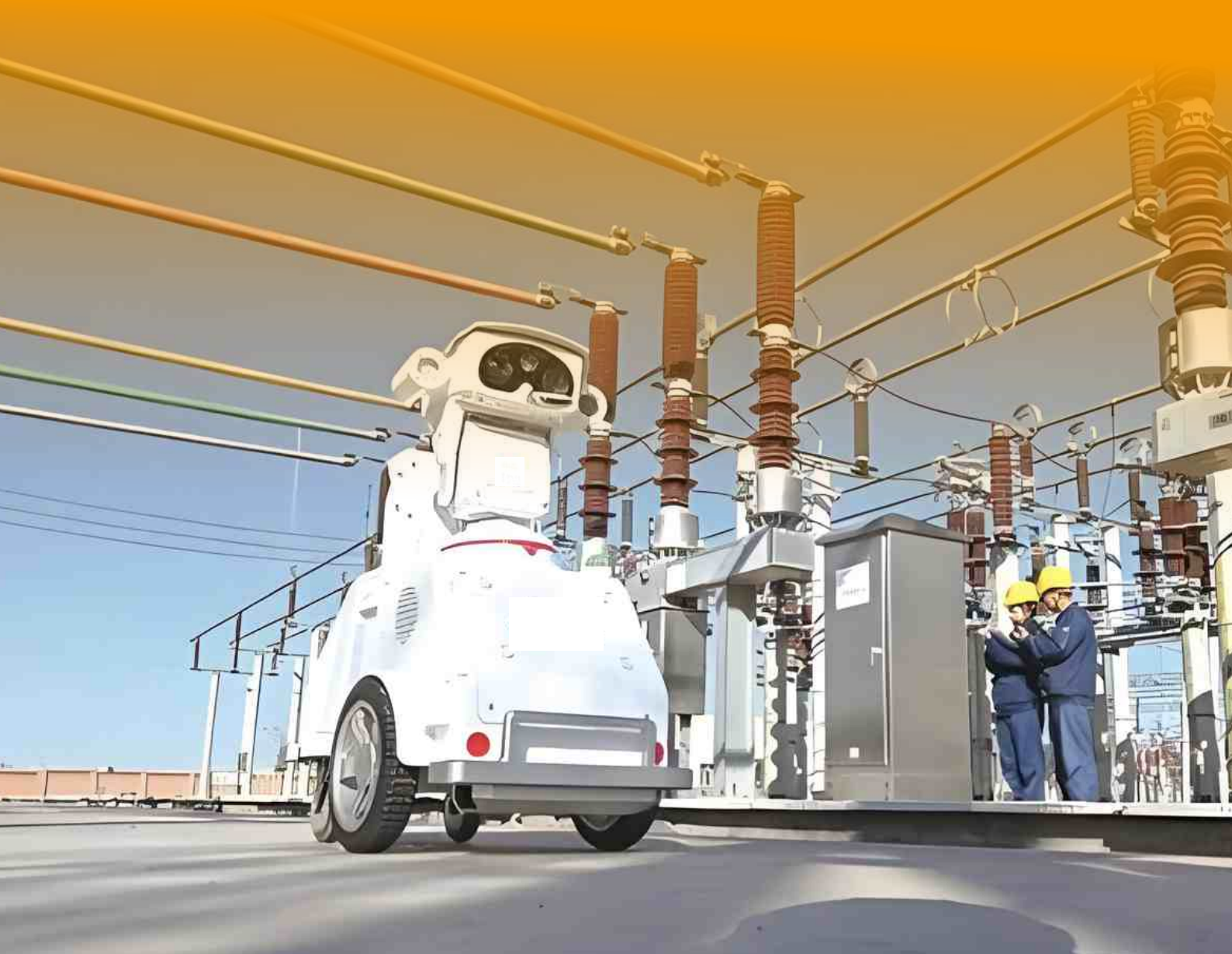
TER30R is a low-power, high-performance embodied intelligent robot control platform built on the Rockchip ARM architecture. Its compact size is specially tailored for lightweight robots. It withstands external impacts of up to 30G, easily handling uncertainties in complex environments, making it a reliable "mobile brain" for service robots, AGVs, and special-purpose robots.

# LOW-SPEED ROBOT INTELLIGENT BASE

---

TAC Box Controller

TAC-3000Pro, TAC-6000, TAC-7000



# INDUSTRIAL-GRADE INTELLIGENT BASE

## ALL-ROUND VERSATILE SOLUTION FOR DIVERSE SCENARIOS

Firefighting/inspection robot, service humanoid robot,  
outdoor low-speed mobile robot, AGV/AMR

### TAC-3000 Pro



#### 157TOPS computing power

Powered by NVIDIA® Jetson Orin NX/Nano

Core module series supporting Super mode



#### Rich interfaces for flexible expansion

3×GbE / 4×USB / 1×HDMI, supports 5G/4G/WiFi



#### Multiple mounting options for easier integration

Supports DIN, desktop, and wall-mounted installation



### Product Overview

TAC-3000 Pro is a reliable base for firefighting, inspection, and service robots, powered by Jetson Orin Nano/NX combining and supporting the Super mode. It features high computing power, multiple interfaces, and wide-temperature operation, enabling it to easily meet the requirements of various low-speed mobile robots.

# TAC-3000 Pro

## Substation Inspection Robot Application Case

### Application Challenges

- Compact form factor and high performance, delivering AI capabilities across diverse scenarios;
- Multiple cameras and sensors pose challenges for expandability;
- Highly reliable operation even in outdoor environments.

### Solutions

- Equipped with the Jetson Orin NX/Nano series core module, delivering up to 157 TOPS computing power, with a compact volume of only 45 × 150.7 × 114.5 mm, enabling easy installation;
- supports up to five LAN and four USB interfaces, among others, for sensor connectivity;
- operates on 12~28 V wide-voltage DC power and has an operating temperature range of -20 to 50 °C.

### Solution Advantages

- high computing power ensures high-precision navigation, obstacle avoidance, and monitoring;
- diversified interface design simplifies subsequent integration and effectively reduces costs;
- features a rugged enclosure design, enabling stable long-term operation across wide voltage and temperature ranges.



### System architecture diagram



# Product Specifications

Model		TAC-3000 Pro			
Core Modules	Processor System	Jetson Orin Nano 4GB, 34 TOPS	Jetson Orin Nano 8GB, 67 TOPS	Jetson Orin NX 8GB, 117 TOPS	Jetson Orin NX 16GB, 157 TOPS
Ethernet	Wired Module	1 * GbE (LAN signal from System-on-Module), 2 * Intel® i210-AT GbE			
Storage	M.2	1 * M.2 Key-M slot (PCIe Gen 4 x1, NVMe SSD, 2280)			
Expansion Slots	Mini PCIe	1 * Mini PCIe slot (PCIe x1+, USB 2.0, with 1 * Nano SIM card)			
	M.2	1 * M.2 Key-B slot (USB 5.5 Gbps, with 1 * Nano SIM card, 3052)			
		1 * M.2 Key-E slot (PCIe Gen 3+, USB 2.0, 2230)			
Front I/O	Ethernet	3 * GbE			
	USB	2 * USB 10Gbps (Type-A)			
		2 * USB 5Gbps (Type-A)			
	Display	1 * HDMI: max resolution up to 4096 * 2304@ 30 Hz			
	Button	1 * Power Button with LED			
	OS Rec	1 * OS Recovery Button			
	Reset	1 * System Reset Button			
Power Input	1 * Power Input Connector (12-28VDC)				
Side I/O	OTG	1 * USB 2.0 (Type-C)			
	Debug	1 * USB 2.0 (Type-C)			
	SIM	2 * Nano SIM Card Slots			
Power Supply	Type	AT/ATX			
	Power Input Voltage	12-28 V DC			
	Connector	1 * Power Input Connector (2P, P=5.08 mm, Terminal Block)			
	RTC Battery	CR 2032 Coin Cell			
OS Support	Linux	Jetpack 6.2 (Ubuntu 22.04)			
Mechanical	Enclosure Material	Radiator: Aluminum alloy, Box: SGCC			
	Dimensions	150.7 mm (L) * 114.5 mm (W) * 45 mm (H) (Mounting Hardware Not Included)			
	Mounting	Ear Mounting, DIN Rail Mounting (Shipping Option)			
Environment	Cooling System	Active Fan Cooling			
	Operating Temperature	-20~50°C (Industrial SSD)			
	Storage Temperature	-40~80°C (Industrial SSD)			
	Relative Humidity	10 to 95% RH (non-condensing)			
	Vibration	3 Grms @ 5-500 Hz, random, hr/axis			
	Shock	15G, half sine, 11 ms, ±X/Y/Z, 3 shocks/axis			

# LOW POWER CONSUMPTION + HIGH REAL-TIME Performance Long-Running Uninterrupted Operation

outdoor low-speed mobile robot

## TAC-6000



### Multiple processors

Equipped with Intel® 11~13th desktop CPU



### Abundant Interfaces

2×GbE / 6×USB / 1×HDMI / 4×COM



### Multiple Installations

Self-developed enclosure, supports DIN, desktop, and wall-mounted installation



## Product Overview

TAC-6000 Features Intel® 11/12th/13th generation high-efficiency processors and an intelligent cooling system, ensuring stable operating features even during extended operation. Its rich array of interfaces meets robots' requirements for multi-vision and multi-sensing capabilities, making it a dedicated motion control platform for outdoor low-speed mobile robots.

## Product Specifications

Model		TAC-6000	
CPU	CPU	Intel® 11th Gen Core™ i3/i5/i7 Mobile-U CPU, TDP=28 W	Intel® 12-13th Gen Core™ i3/i5/i7 Mobile -P/-H CPU, TDP=28/45W
	Chipset	SOC	SOC
BIOS	BIOS	AMI UEFI BIOS	AMI UEFI BIOS
Memory	Socket	1*SO-DIMM slot,DDR4 up to 3200MHz	1*SO-DIMM Slot,DDR5 up to 3200MHz
	Maximum Capacity	32GB	
Graphics	Controller	Intel® HD/UHD Graphics	
Ethernet	Controller	1 * Intel® i210-AT (10/100/1000 Mbps, RJ45)	
		1 * Intel® i219-V/LM (10/100/1000 Mbps, RJ45)	
Storage	M.2	1 * M.2 Key-M slot (PCIe x4 NVMe/SATA SSD, auto detect, 2280)	
Expansion Slots	M.2	1 * M.2 Key-B slot (PCIe x1+ USB 2.0, with SIM card slot, 2350)	
		1 * M.2 Key-E Slot (PCIe x1+USB 2.0, 2230)	
	Mini PCIe	1 * Mini PCIe Slot (SATA/PCIe+USB 2.0, with SIM card slot)	
Front I/O	USB	6 * USB0.0 (Type-A)	
	Ethernet	2 * RJ45	
	Display	1 * HDMI (Type-A): maximum resolution up to 3840×2160@24Hz	
	Serial	4 * RS232/485 (COM1/2/3/4, jumper controlled)	
	Switch	1 * AT/ATX Mode Switch (Enable/Disable automatic power-on)	
	Button	1 * Reset (Press and hold for 0.2 seconds to restart; 3 seconds to clear CMOS) 1 1 * OS Rec (System Recovery)	
Left I/O	SIM	2 * Nano SIM Card Slot	
Right I/O	Audio	1 * 3.5 mm Audio Jack (Line-Out / MIC, CTIA)	
	Power	1 * Power Button	
		1 * PS ON_	
		1 * DC Power Input	
Power Supply	Type	DC	
	Power Input Voltage	12-28VDC	
	Connector	1 * 4Pin Power Input Connector (P= 5.08mm)	
	RTC Battery	CR2032 Coin Cell	
OS Support	Windows	Windows 10/11	
	Linux	Linux	
Watchdog	Output	System Reset	
	Interval	Programmable 1 ~ 255 sec	
Mechanical	Enclosure Material	Radiator: Aluminum, Box: SGCC	
	Dimensions	165 mm (L) × 115 mm (W) × 64.9 mm (H)	
	Weight	Net: 1.4 kg, Total: 2.4 kg	
	Mounting	DIN, Wallmount, Desk mounting	
	Heat Dissipation System	PWM Air Cooling	
Environment	Operating Temperature	-20~60°C (Industrial SSD)	
	Storage Temperature	-40~80°C (Industrial SSD)	
	Relative Humidity	10 to 95% RH (non-condensing)	
	Vibration During Operation	3Grms@5-500Hz, random, 1 hr/axis	
	Shock During Operation	15G, half-sine, 11ms, ± X/Y/Z, 3shocks/axis	

# FULL-PERFORMANCE, ULTIMATE RELIABILITY

Outdoor low-speed mobile robot

## TAC-7000



### High-performance processor

Equipped with Intel® 6~9/12~14th desktop CPU



### Strong expansion capability

Supports 5G/4G/WiFi expansion



### Intelligent cooling system

Features a PWM-controlled active cooling fan, ensuring reliable operation even in high-temperature environments



## Product Overview

TAC-7000 As a high-performance control brain, it supports multiple Intel desktop-grade CPUs and is equipped with an intelligent PWM cooling system that ensures long-term stable operation even under high temperature conditions. It is undoubtedly the ideal computation platform for outdoor cleaning, inspection, and similar applications.

# Product Specifications

Model		TAC-7000	
CPU	CPU	Intel® 10th Gen Core™ i3/i5/i7 Desktop CPU, TDP 65 W	Intel® 12-14th Gen Core™ i3/i5/i7 Desktop CPU, TDP ≤ 65W
	Chipset	Intel® Q170	Intel® Q670
BIOS	BIOS	AMI UEFI BIOS	AMI UEFI BIOS
Memory	Socket	2 * SO-DIMM slot, dual-channel DDR up to 4 MHz	2 * SO-DIMM slot, dual channel DDR5, up to 5600 MHz
	Maximum Capacity	64GB, single-Max 32G	
Graphics	Controller	Intel® HD/UHD Graphics	
Ethernet	Controller	1 * Intel® i210-AT (10/100/ Mbps, 1000 RJ45)	
		1 * Intel® i219-V/LM (10/100/ Mbps, 1000 RJ45)	
Storage	M.2	1 * M.2 Key-M Slot (PCIe x4 NVMe/SATA SSD, auto-detect, 2280)	
Expansion Slots	M.2	1 * M.2 Key-B Slot (PCIe x1+ USB 2.0, with SIM card slot, 2350)	
		1 * M.2 Key-E Slot (PCIe x1+ USB 2.0, 2230)	
	Mini PCIe	1 * Mini PCIe Slot (SATA/PCIe+ USB 2.0, with SIM card slot)	
Front I/O	USB	6 * USB 3.0 (Type-A)	
	Ethernet	2 * RJ45	
	Display	1 * HDMI (Type-A): max resolution up to 3840×2160@24Hz	
	Serial	4 * RS232/485 (COM1/2/3/4, jumper control)	
	Switch	1 * AT/ATX Mode Switch (Enable/Disable automatic power on)	
	Button	1 * Reset (Press and hold for 0.2 s 1 to restart; 3s to clear CMOS)	
		1 * OS Rec (system recovery)	
Left I/O	SIM	2 * Nano SIM Card Slot	
Right I/O	Audio	1 * 3.5mm Audio Jack (line-out + mic, CTIA)	
	Power	1 * Power Button	
		1 * PS ON_	
1 * DC Power Input			
Power Supply	Type	DC	
	Power Input Voltage	12-28VDC	
	Connector	1 * 4Pin Power Input Connector (P= 5.08mm)	
	RTC Battery	CR2032 Coin Cell	
OS Support	Windows	Windows 10/11	
	Linux	Linux	
Watchdog	Output	System Reset	
	Interval	Programmable 1 ~ 255 sec	
Mechanical	Enclosure Material	Radiator: Aluminum, Box: SGCC	
	Dimensions	165 mm (L) * 115 mm (W) * 64.9 mm (H)	
	Weight	Net: 1.4 kg, Total: 2.4 kg	
	Mounting	DIN, Wallmount, Desk mounting	
	Heat Dissipation System	PWM Air Cooling	
Environment	Operating Temperature	-20~60°C (Industrial SSD)	
	Storage Temperature	-40~80°C (Industrial SSD)	
	Relative Humidity	10 to 95% RH (non-condensing)	
	Vibration During Operation	3 Grms @ 5-500 Hz, random, 1 hr/axis	
	Shock During Operation	15G, half-sine, 11ms, ± X/Y/Z, 3shocks/axis	

# FOUNDATION OF INDUSTRIAL **ROBOT** PERFORMANCE

---

**AK1** Cartridge-style Controller  
AK1/AK4/AK5/AK6/AK7



# ULTRA-LOW POWER CONSUMPTION LONG-LASTING STANDBY

industrial/desktop collaborative robot

## AK1 Series



### CPU Platform

Intel®J1900/J6412/TDP 10W ultra-low power consumption



### Abundant Interfaces

3/4 × GbE/4 × USB/1 × HDMI/2 × COM, etc.



### Wide Voltage Design

Supports 12-28V DC wide-voltage power supply



## Product Overview

Its key feature is support for the Intel J1900/J6412 CPU, with an average power consumption of only 10W. Its design features multiple Ethernet ports and multiple USB ports, making it suitable for industrial and desktop-class collaborative robots, where it excels for portability and energy efficiency.

# AK1

## Collaborative Robot Application Cases

### Application Challenges

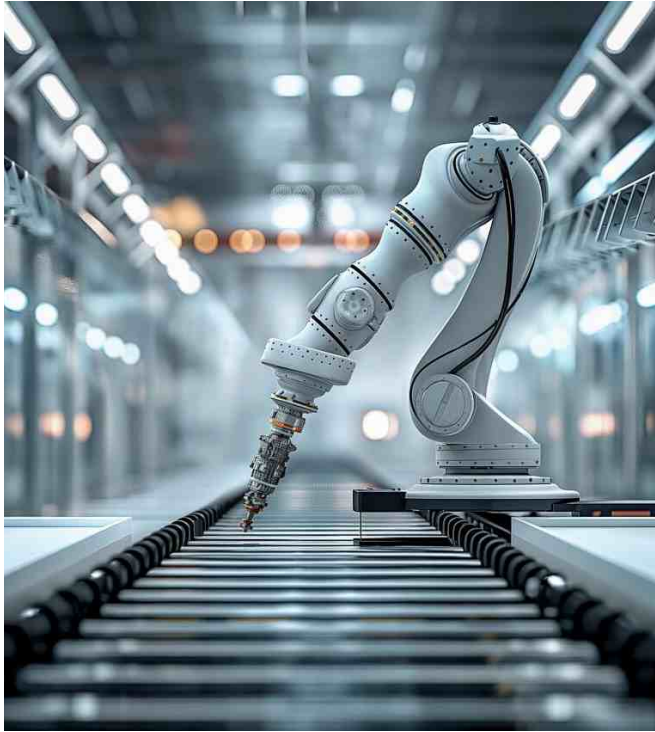
- Requires real-time analysis and real-time control;
- Communication connections between different devices and different I/O interfaces;
- Must operate stably in harsh environments, such as high temperature, high vibration, and high dust levels.

### Solutions

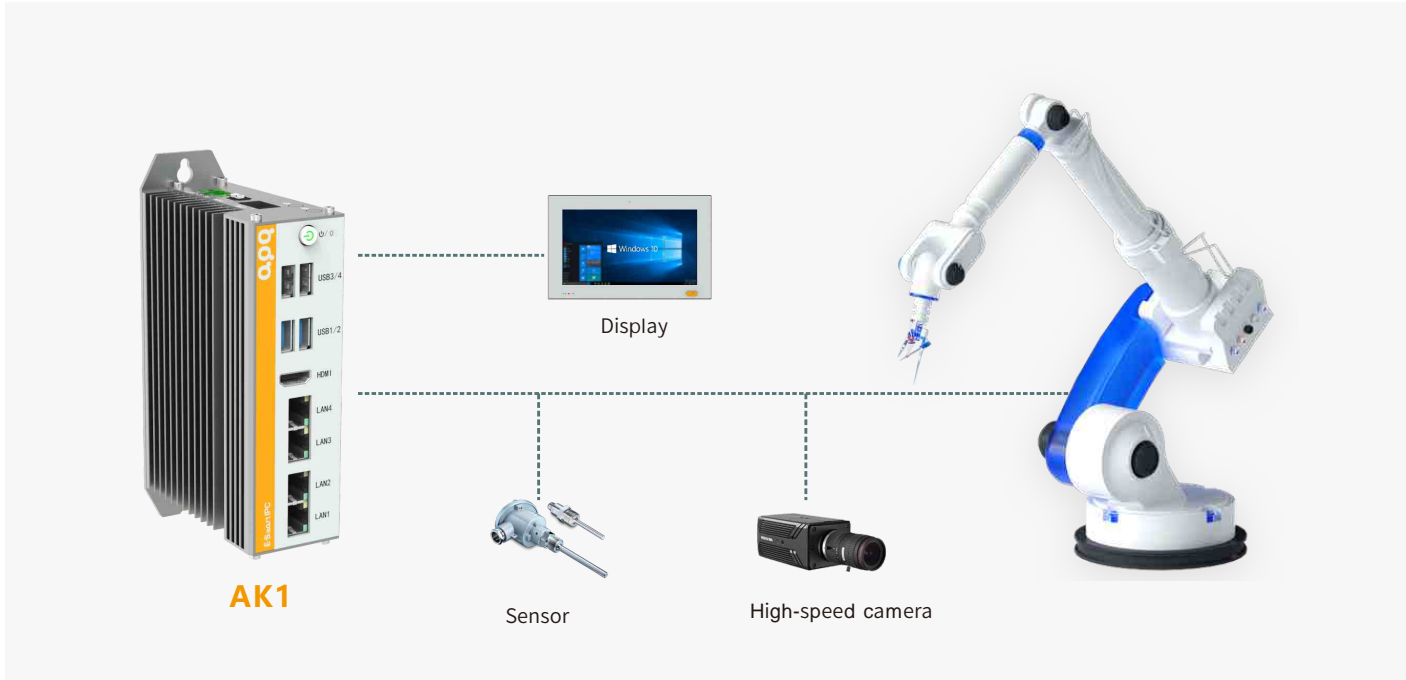
- Equipped with industrial-grade Intel J1900/J6412 processors to support simultaneous analysis and control processing;
- Rich interfaces and expansion redundancy enable data exchange among multiple devices;
- Wide-voltage DC power supply (12~28 V), operating temperature (-20~60°C), and authoritative certifications ensure reliability.

### Solution Advantages

- Supports multiple mounting methods—including DIN rail, desktop, and wall-mounted—enabling higher system integration.
- Supports 4G/WiFi expansion for remote data monitoring and early warning, reducing unplanned downtime risk.
- Self-developed IPC assistant, IPC housekeeper, and other collaborative software systems to reduce maintenance labor costs.



### System architecture diagram



## Product Specifications

Model		AK1A3	AK1A4
CPU	CPU	Intel® Celeron® Processor J1900	Intel® Celeron® Processor J6412
	Base Frequency	2.0 GHz	2.0GHz
	Max Turbo Frequency	2.4 GHz	2.6GHz
	Cache	2MB	4MB
	Total Cores/Threads	4/4	4/4
	Chipset	SOC	SOC
	BIOS	AMI UEFI BIOS	AMI UEFI BIOS
Memory	Socket	1 × Non-ECC SO-DIMM slot, DDR3L-1333MHz	* Non-ECC SO-DIMM Slot, DDR4-3200MHz
	Max Capacity	Max.8GB	Max.32GB
Graphics	Controller	Intel® UHD Graphics	Intel® UHD Graphics
Ethernet	Controller	3 × Intel® i210-AT GbE	4* Intel® i210-AT GbE
Storage	M.2	1 × M.2 Key-M (SATA 2.0, SATA SSD, 2280)	1* M.2 Key-M slot (SATA 3.0+ PCIe Gen 3 x1, NVMe/SATA SSD Auto Detect, 2280)
Expansion Slots	Mini PCIe	1* Mini PCIe (PCIe Gen 2+, USB 2.0, with SIM card slot)	1* Mini PCIe (PCIe Gen 2+, USB 2.0, with SIM card slot)
FrontI/O	USB	1* USB 5Gbps (Type-A)	2* USB 5 Gbps (Type-A)
		3* USB 2.0 (Type-A)	2* USB 2.0 (Type-A)
	Display	1* HDMI: max resolution up to 4096*2304 @ 24 Hz	1* HDMI: maximum resolution up to 4096 * 2304 @ 24 Hz
	Ethernet	3* RJ45	4* RJ45
	Switch	1* PS ON Connector	/
LeftI/O	Button	1* Power Button with LED	
	SIM	1* Nano SIM card slot	
	Switch	1* AT/ATX Mode Switch (Enable/Disable Automatic Power On)	
RightI/O	Button	1* OS Recover Button 1* System Reset Button	
	Power	1* Power Input Connector (12-28 VDC)	
	Serial Port	2* RS232/485 (COM1/2, Terminal Blocks, BIOS+ Switch Select)	
Mechanical	Dimensions	43 mm (L) * 95.5 mm (W) * 139 mm (H)	
	Heat Dissipation System	Passive Heat Dissipation	
	Operating Temperature	-20-60°C (Industrial SSD)	
	Storage Temperature	-40-80°C	
	Relative Humidity	10 to 90% RH (non-condensing)	
	Vibration During Operation	3 Grms @ 5-500 Hz, random, 1 hr/axis (Industrial SSD)	
	Shock During Operation	15 G, half sine, 11 ms, + X/Y/Z, 3 shocks/axis (Industrial SSD)	

# COMPACT AND CONVENIENT FLEXIBLE INTEGRATION

Research & service humanoid robot  
/outdoor high-speed mobile robot

## AK4 Series



### High Computing Power

Powered by Jetson AGX Orin, delivering up to 275 TOPS of computing power



### Compact Size

53 (L) × 186.4 (H) × 145 (W) mm; compact integration for limited spaces



### Multiple Installations

Supports DIN, desktop, and wall-mounted installation



# Product Specifications

Model		AK4100A6
Core Modules	Processor System	Jetson AGX Orin 32 GB, 200 TOPS Jetson AGX Orin 64 GB, 275 TOPS
Ethernet	Wired Module	1 * Marvell® AQR113C 10GbE 1 * Marvell® 88E1512 GbE 4 * Intel® i210-AT GbE
Storage	M.2	1 * M.2 Key-M Slot (PCIe Gen x4, NVMe SSD, 2280)
	TF	1 * TF Card Slot
Expansion Slots	Mini PCIe	1 * Mini PCIe Slot (PCIe Gen 3 + USB 2.0, with 1 * Nano SIM Card Slot)
	M.2	1 * M.2 Key-B Slot (USB 5Gbps, with 1 * Nano SIM Card Slot, 3052)
Front I/O	Ethernet	6 * RJ45
	USB	3 * USB 10Gbps (Type-A) 5 * USB 5Gbps (Type-A)
	Display	1 * HDMI: maximum resolution up to 4096*2304@30Hz
	Button	1 * Power Button with LED
	OS Rec	1 * OS Recovery Button
	Reset	1 * System Reset Button
	Power Input	1 * Power Input Connector (12-28VDC)
Side I/O	OTG	1 * USB 2.0 (Type-C)
	Debug	1 * USB 2.0 (Type-C)
	PS ON	1 * PS ON Connector_
	TF	1 * TF Card Slot
	SIM	2 * Nano SIM Card Slots
	Audio	1 * 3.5 mm Jack (mic + line-out)
	Serial	4 * RS232/485 (Terminal Blocks)
	CAN	2 * CAN FD (Terminal Blocks)
	GPIO	4 * DI (Isolated Digital Input, Range 3.3-24 VDC, NPN & PNP, Terminal Block)
		4 * DO (Isolated Digital Output, Range 3.3-24 VDC, Max 0.5 A per channel, Terminal Block)
	Sync	1 * SYNC_ IN (Isolated Digital Input, Terminal Block)
1 * SYNC_ OUT (Isolated Digital Output, Terminal Block)		
1 * PPS_SYNC (Isolated Digital Input, Terminal Block)		
Power Supply	Type	AT/ATX
	Power Input Voltage	12 ~ 28V DC
	Connector	1 * Power Input Connector (4P, P=5.08 mm, Terminal Block)
	RTC Battery	CR2032 Coin Cell
OS Support	Linux	Jetpack 6.2 (Ubuntu 22.04)
Mechanical	Enclosure Material	Aluminum alloy
	Dimensions	53 mm (L) × 145 mm (W) × 186.4 mm (H) (Installation hardware not included)
	Mounting	Ear mounting, DIN rail mounting (shipping option)
Environment	Cooling System	Active fan cooling
	Operating Temperature	-20-50°C with 0.7 m/s airflow
	Storage Temperature	-40-80°C
	Relative Humidity	10 to 95% RH (non-condensing)
	Vibration	3 Grms @ 5-500 Hz, random, 1 hr/axis
Shock	15G, half sine, 11 ms, ± X/Y/Z, 3 shocks/axis	

# WORRY-FREE EXPANSION POTENTIAL UNLIMITED

industrial/desktop collaborative robot

## AK5 Series



### CPU Platform

Intel®Alder LakeN97/i3-N305



### Powerful Expansion

Supports GbE/POE/PCIe/PCI/GPIO/serial port expansion



### Multiple Installations

Supports DIN,desktop,and wall-mounted installation

AK5A2

AK5B2



## Product Overview

The most prominent feature of the AK5 is its support for Intel J1900/J6412 CPUs, with an average power consumption of only 10W. Designed with multiple Ethernet ports and USB interfaces, it is suitable for industrial and desktop-class collaborative robots, delivering outstanding performance in long-term stable operation and energy efficiency.

## Product Specifications

Model	AK5A2		AK5B2		
CPU	CPU	Intel® Alder Lake N97	Intel® Alder Lake N305	Intel® Alder Lake N97	Intel® Alder Lake N305
	Base Frequency	2.0 GHz	1 GHz	2.0 GHz	1 GHz
	Max Turbo Frequency	3.60 GHz	3.8 GHz	3.60 GHz	3.8 GHz
	Cache	6MB	6MB	6MB	6MB
	Total Cores/Threads	4/4	8/8	4/4	8/8
	Chipset	SOC		SOC	
	BIOS	AMI UEFI BIOS		AMI UEFI BIOS	
Memory	Socket	1 * Non-ECC SO-DIMM Slot, DDR4-3200MHz		1 × Non-ECC SO-DIMM Slot, DDR4-3200MHz	
	Max Capacity	Max. 32 GB		Max. 32 GB	
Graphics	Controller	Intel® UHD Graphics		Intel® UHD Graphics	
Ethernet	Controller	2 * Intel® i210-AT GbE		2 × Intel® i210-AT GbE	
Storage	M.2	1 * M.2 Key-M slot (SATA 3.0, SATA SSD, 2280)		1 * M.2 Key-M slot (SATA 3.0 + PCIe Gen 3 x1, NVMe/SATA SSD Auto Detect, 2280)	
	SATA	/		1 * SATA 3.0 Connector	
Expansion Slots	Mini PCIe	1 * Mini PCIe (PCIe Gen 2 + USB 2.0, with SIM card slot)		1 * Mini PCIe (PCIe Gen 2 +, USB 2.0, with SIM card slot)	
Front I/O	USB	4 * USB 5Gbps (Type-A) 2 * USB 2.0 (Type-A)		4 * USB 5Gbps (Type-A)	
	Serial	2 * RS232/485 (COM1/2, DB9/M, Full lanes, BIOS switch)		2 * RS232/485 (COM1/2, DB9/M, Full lanes, BIOS+ Switch select)	
	Display	1 * HDMI: max resolution up to 4096 × 2304 @ 24 Hz		1 * HDMI: max resolution up to 4096 × 2304 @ 24Hz	
		1 * DP: max resolution up to 4096 × 2160 @ 60 Hz		1 * VGA: max resolution up to 1920 × 1200 @ 60Hz	
		1 * VGA: max resolution up to 1920 × 1200 @ 60 Hz			
	Ethernet	2 * RJ45			
	Switch	1 * PS _ON Connector			
	Power	1 * Power Input Connector (12-28 V DC)			
	SIM	1 * Nano SIM Card Slot			
	Button	1 * Power Button with LED			
Left I/O	SIM	/			
	Switch	1 * AT/ATX Mode Switch (Enable/Disable Automatic Power-On)			
	Button	1 * OS Recovery Button			
1 * System Reset Button					
Mechanical	Dimensions	53mm(L) × 145mm(W) × 186.4mm(H)			
	Heat Dissipation System	Passive Heat Dissipation			
	Operating Temperature	-20~60°C (Industrial SSD)			
	Storage Temperature	-40~80°C			
	Relative Humidity	10 to 90% RH (non-condensing)			
	Vibration During Operation	3 Grms @ 5-500 Hz, random, 1 hr/axis (Industrial SSD)			
	Shock During Operation	15G, half-sine, 11ms, +X/Y/Z, +3 shocks/axis (Industrial SSD)			

## Product Specifications

Model		AK5B4	
CPU	CPU	Intel® Alder Lake N97	Intel® Alder Lake N305
	Base Frequency	2.0 GHz	1 GHz
	Max Turbo Frequency	3.60 GHz	3.8GHz
	Cache	6MB	6MB
	Total Cores/Threads	4/4	8/8
	Chipset	SOC	
	BIOS	AMI UEFI BIOS	
Memory	Socket	1 × Non-ECC SO-DIMM slot, DDR4-3200MHz	
	Max Capacity	Up to 32 GB	
Graphics	Controller	Intel® UHD Graphics	
Ethernet	Controller	4 * Intel® i210-AT GbE	
Storage	M.2	1 * M.2 Key-M slot (SATA 3.0, SATA SSD, 2280)	
	SATA	1 * SATA 3.0 Connector	
Expansion Slots	Mini PCIe	1 * Mini PCIe (PCIe Gen 2 + USB 2.0, with SIM card slot)	
Front I/O	USB	2 * USB 5Gbps (Type-A)	
		2 * USB 2.0 (Type-A)	
	Serial	2 * RS232/485 (COM1/2, DB9/M, Full lanes, BIOS +Switch select)	
	Display	1 * HDMI: max resolution up to 4096*2304 @ 24Hz	
		1 * VGA: max resolution up to 1920*1200 @ 60Hz	
	Ethernet	4 * RJ45	
		2 * RJ45	
	Switch	1 * PS ON Connector_	
	Power	1 * Power Input Connector (12~28 VDC)	
	SIM	1 * Nano SIM Card Slot	
Button	1 * Power Button with LED		
Left I/O	SIM	1 * AT/ATX Mode Switch (Enable/Disable Automatic Power On)	
	Button	1 * OS Recovery Button	
		1 * System Reset Button	
Mechanical	Dimensions	53 mm (L) × × 145 mm (W) × × 186.4 mm (H)	
Environment	Heat Dissipation System	Passive Heat Dissipation	
	Operating Temperature	-20~60 °C (Industrial SSD)	
	Storage Temperature	-40~80 °C	
	Relative Humidity	10 to 90 % RH (non-condensing)	
	Vibration During Operation	3 Grms @ 5-500 Hz, random, 1 hr/axis (Industrial SSD)	
	Shock During Operation	15G, half sine, 11ms, +X/Y/Z, 3 shocks/axis (Industrial SSD)	

# INDUSTRIAL INTELLIGENT BRAIN

## MULTI-AXIS PRECISION CONTROL

industrial six-axis/SCARA robot

### AK6 Series



#### Processing Platform

Intel® 11th-U/12th/13th -P/H (28/45 W)



#### Abundant Interfaces

6\*GbE (up to)/6\*USB (up to)/2\*COM DB9, etc.



#### Multiple Sizes

53/72.9/97.7 × 186.4 × 145 mm (L × H × W)

AK6C6

AK6A2



### Product Overview

AK6 As an industrial robot smart brain, it delivers outstanding multi-tasking capability; its architecture makes it ideal for industrial six-axis robots. In multi-axis control, it performs with the same flexibility and precision as industrial six-axis robots.

# Product Specifications

Model		AK A2		
CPU	CPU	Intel® 11th Generation Core™ i3/i5/i7 Mobile-U Processor	Intel® 12/13th Generation Core™ i3/i5/i7 Mobile -U/P/H CPU	
	Chipset	SoC	SOC	
BIOS	BIOS	AMI UEFI BIOS	AMI UEFI BIOS	
Memory	Socket	* Non-ECC SO-DIMM Slot, DDR4-3200MHz	2 * Non-ECC SO-DIMM slot, dual-channel DDR5-4800 MT/s	
	Maximum Capacity	Max 32GB	64GB, Single Max 32G	
Graphics	Controller	Intel® UHD Graphics / Intel® Iris® Xe Graphics	Intel® Iris® Xe Graphics	
Ethernet	Controller	1 × Intel® i210-AT GbE	1 * Intel® i210-AT GbE	
		1 × Intel® i219-V/LM GbE	1 * Intel® i219-V/LM GbE	
Storage	M2	1 × M.2 Key-M (PCIe Gen 3 x4, NVMe SSD, 2280)	1 * M.2 Key-M (PCIe Gen 3 x4, NVMe SSD, 2280)	
Expansion Slots	Mini PCIe	1 × Mini PCIe (PCIe Gen 2+, USB 2.0, with SIM card slot)	1 * Mini PCIe (PCIe Gen 2+, USB 2.0, with SIM card slot)	
		1 * Mini PCIe (PCIe Gen 2 (Optional) + USB 2.0)	1 * Mini PCIe (PCIe Gen 2 (Opt.), USB + 2.0)	
	Primary Cabinet Support	1E:16*GPIO/4*CH	1A: 16 × GPIO / 2 × PoE / 4 × CH	1A: 16 × GPIO / 2 × PoE / 4 × CH
			1B: 16 × GPIO / 4 × PoE / 4 × CH	1B: 16 × GPIO / 4 × PoE / 4 × CH
Secondary Cabinet Support	1E:16*GPIO/4*CH	1C: 2 × PoE	1C: 2 × PoE	
		1D: 4 × PoE	1D: 4 × PoE	
Front I/O	USB	4 * USB 5Gbps (Type-A)	6 × USB 3.0 (Type-A)	
		2 * USB 2.0 (Type-A)		
	Serial	2 * RS232/485 (COM1/2, DB9/M)	2 * RS232/485 (COM1/2, DB9/M)	
	Display	1 * HDMI: max resolution up to 4096*2304 @ 24Hz	1 * HDMI: max resolution up to 4096*2304 @ 24Hz	
		1 * DisplayPort: max resolution up to 4096*2160 @ 60Hz	1 * DisplayPort: max resolution up to 4096*2160 @ 60Hz	
		1 * VGA: max resolution up to 1920*1200 @ 60Hz	1 * VGA: max resolution up to 1920*1200 @ 60Hz	
	LAN	2 * RJ45	2 * RJ45	
	Power	1 * Power Input Connector (12-28VDC)	1 * Power Input Connector (12-28 VDC)	
	SIM	1 * Nano SIM Card slot	1 * Nano SIM Card Slot	
	Button	1 * Power Button with LED	1 * Power Button with LED	
	Switch	1 * PS_ON Connector	1 * PS_ON Connector	
Left I/O	Switch	1 * AT/ATX Mode Switch (Enable/Disable Automatic Power-On)		
	Button	1 * OS Recovery Button		
		1 * System Reset Button		
Mechanical	Dimensions			
Environment	Heat Dissipation System	Passive Heat Dissipation		
	Operating Temperature	-20-60°C (Industrial SSD)		
	Storage Temperature	-40-80°C		
	Relative Humidity	10 to 90% RH (non-condensing)		
	Vibration During Operation	3 Grms @ 5-500 Hz, random, 1 hr/axis (Industrial SSD)		
	Shock During Operation	15G, half-sine, 11ms, +X/Y/Z, +3 shocks/axis (Industrial SSD)		

# Product Specifications

Model		AK6 C6	
CPU	CPU	Intel® 11th Generation Core™ i3/i5/i7 Mobile-U Processor	Intel® 12 / 13th Generation Core™ i3/i5/i7 Mobile-U/P/H CPU
	Chipset	SoC	SOC
BIOS	BIOS	AMI UEFI BIOS	AMI UEFI BIOS
Memory	Socket	* Non-ECC SO-DIMM Slot, DDR4-3200MHz	2 × Non-ECC SO-DIMM slot, dual-channel DDR5-4800 MT/s
	Maximum Capacity	Max. 32GB	64GB, Single Max 32GB
Graphics	Controller	Intel® UHD Graphics / Intel® Iris® Xe Graphics	Intel® Iris® Xe Graphics
Ethernet	Controller	* Intel® i210-AT GbE	* Intel® i210-AT GbE
		* Intel® i219-V/LM GbE	* Intel® i219-V/LM GbE
		* Intel® i350-AM GbE	* Intel® i350-AM GbE
Storage	M2	* M. Key-M (PCIe Gen x4, NVMe SSD)	* M. Key-M (PCIe Gen x4, NVMe SSD)
Expansion Slots	Mini PCIe	* Mini PCIe (PCIe Gen, USB 3.0, with SIM card slot)	* Mini PCIe (PCIe Gen, USB 3.0, with SIM card slot)
	Primary Cabinet Support	9D: 16*GPIO/4*CH	8A: 16 × GPIO / 4 × CH / 2 × DisplayPort +2 × HDMI / MXM 3.0 Type-A/B  (Secondary Cabinet not supported)  9A: 16 × GPIO / 4 × CH / 4 × LAN  9D: 16 × GPIO / 4 × CH  9M: 16 × GPIO / 4 × CH / 4 × POE  9G: 4 × LAN  9Q: 4 * POE
	Secondary Cabinet Support	9D: 16*GPIO/4*CH	9D: 16 * GPIO / 4 * CH
Front I/O	USB	4 * USB 3.0 (Type-A)	4 * USB 3.0 (Type-A)
	Serial	2 * RS232/422/485 (COM1/2, DB9/M)	2 * RS232 / 422 / 485 (COM1/2, DB9/M)
	Display	1 * HDMI: max resolution up to 4096*2304 @ 24 Hz	1 * HDMI: max resolution up to 4096 * 2304 @ 24 Hz
		1 * VGA: max resolution up to 1920*1200 @ 60 Hz	1 * VGA: max resolution up to 1920 * 1200 @ 60 Hz
	LAN	2 * RJ45	2 * RJ45
	POE	4 * PoE interface, supports IEEE 802.3af protocol (Opt. 4 * LAN)	4 * PoE interface, supports IEEE 802.3af protocol (Opt. 4 * LAN)
	Power	1 * Power Input Connector (12-28VDC)	1 * Power Input Connector (12-28VDC)
	Button	1 * Power Button with LED	1 * Power Button with LED
Switch	1 * PS_ON Connector	1 * PS_ON Connector	
Left I/O	Switch	1 * AT/ATX Mode Switch (Enable/Disable automatic power on)	
	Button	1 * OS Recover Button	
		1 * System Reset Button	
Mechanical	Dimensions		
Environment	Heat Dissipation System	Passive Heat Dissipation	
	Operating Temperature	-20~60°C (Industrial SSD)	
	Storage Temperature	-40~80°C	
	Relative Humidity	10 to 90% RH (non-condensing)	
	Vibration During Operation	3 Grms @ 5-500 Hz, random, 1 hr/axis (Industrial SSD)	
	Shock During Operation	15G, half-sine, 11ms, +X/Y/Z, +3 shocks/axis (Industrial SSD)	

# AK7 Series

## INDUSTRIAL-GRADE PERFORMANCE PLATFORM

### Empowering the Smart Manufacturing Future

Industrial six-axis/SCARA robot/handling robot

AK7C6

AK7A2



#### Processing Platform

Intel® 6-9th/ th 12-14th desktop CPU (65W)



#### Powerful Expansion

Supports AR module/aDoor module/GbE/POE/PCIe/PCI/  
GPIO/light source/serial port,  
and other expansion options



#### Wide Voltage Design

Supports 12~28 V DC wide-voltage  
power supply



## Product Overview

AK7 is an industrial-grade, high-performance motion control platform that supports Intel 6-9th, 12-14th generation processors and is widely deployed in applications such as six-axis robots, SCARA robots, material handling robots, and its versatile robustness and reliability make it the smart cornerstone of industrial automation control.

# AK7

## Application case for autonomous

### Application Challenges

- Extremely stringent requirements on volume and mounting method for tight spaces;
- Real-time processing of multi-channel data;no frequency reduction under high load;
- Long-term stable operation in high-temperature and high-vibration environments.

### Solutions

- Compact design with support for multiple mounting methods, including VESA,DIN,and wall mounting;
- Equipped with a high-performance CPU and MXM expansion for communication with multi-channel LiDAR;
- Operating temperature(-20~60 ° C),compliant with the IEC60068-2-27/64 shock and impact resistance standard.

### Solution Advantages

- Powerful computing power ensures navigation,obstacle avoid ance, and millimeter-level accuracy in material handling;
- Significantly enhanced stable operation capability under harsh operating conditions;
- High reliability reduces maintenance,lowering laborand operational costs.



### System architecture diagram



## Product Specifications

Model		AK7 A2	
CPU	CPU	Intel® 6-9th Generation Core™ Desktop Processor	
	TDP	65W	
	Socket	LGA1151	
Chipset	Chipset	Intel® Q170/H110	
	BIOS	AMI UEFI BIOS	
BIOS	Socket	2 * Non-ECC SO-DIMM slot, dual-channel DDR4-2666 MHz	
Memory	Maximum Capacity	64 GB, single maximum 32GB	
Graphics	Controller	Intel® HD Graphics / Intel® UHD Graphics	
Ethernet	Controller	1 * Intel® i210-AT GbE	
		1 * Intel® i219-V/LM GbE	
Storage	M.2	1 * M.2 Key-M (PCIe Gen 3 x4; H110 not supported; + SATA 3 3.0; NVMe/SATA SSD auto detection 2280)	
	Mini PCIe	1 * Mini PCIe (PCIe Gen 3+, USB 2.0, H110 not supported)	
		1 * Mini PCIe (PCIe Gen 3+, USB 2.0, with SIM card slot)	
Expansion Front I/O Bottom I/O	Primary Cabinet Support	1A: 16 × GPIO / 2 × PoE / 4 × CH	
		1B: 16 × GPIO / 4 × PoE / 4 × CH	
1C: 2 × PoE			
1D: 4 × PoE			
1E: 16 × GPIO / 4 × CH (H110 supports only)			
2A: 1 × PCIe x4 slot			
3A: 1 × PCI slot			
Secondary Cabinet Support		1E: 16 × GPIO / 4 × CH	
Mechanical		USB	4 × USB 5 Gbps (Type-A)
			2 × USB 5 Gbps (Type-A) (H110: 2 × USB 2.0)
	Serial	2 * RS232/485 (COM1/2, DB9/M)	
	Display	1 * HDMI: max resolution up to 4096*2304 @ 24Hz	
		1 * DisplayPort: max resolution up to 4096*2160 @ 60Hz	
		1 * VGA: max resolution up to 1920*1200 @ 60Hz	
	LAN	2 * RJ45	
	Power	1 × Power Input Connector (12-28 VDC)	
	SIM	1 * Nano SIM Card Slot	
	Button	1 * Power Button with LED	
Switch	1 * PS ON Connector		
Environment	Switch	1 * AT/ATX Mode Switch (Enable/Disable Automatic Power On)	
	Button	1 * OS Recovery Button	
		1 * System Reset Button	
Mechanical	Dimensions	53 mm (L) × 145 mm (W) × 1864 mm (H)	
Environment	Heat Dissipation System	Passive Heat Dissipation	
	Operating Temperature	-20-60 °C (Industrial SSD)	
	Storage Temperature	-40-80 °C	
	Relative Humidity	10 to 90 % RH (non-condensing)	
	Vibration During Operation	3 Grms @ 5-500 Hz, random, 1 hr/axis (Industrial SSD)	
Shock During Operation	15G, half sine, 11ms, +X/Y/Z, 3 shocks/axis (Industrial SSD)		

## Product Specifications

Model		AK7 C2	
CPU	CPU	Intel® 10th Generation Core™ Desktop Processor	Intel® 12-14th Generation Core™ Desktop Processor
	TDP	65W	65W
	Socket	LGA1151	LGA1700
Chipset	Chipset	Intel® Q170/H110	Intel® Q670/H610
	BIOS	AMI UEFI BIOS	AMI UEFI BIOS
BIOS	Socket	* Non-ECC SO-DIMM slot, Dual Channel DDR4-2666 MHz	2 * Non-ECC SO-DIMM Slot, Dual Channel DDR5-4800 MT/s
Memory	Max Capacity	64GB, Single Max. GB	64GB, Single Max. 32GB
Graphics	Controller	Intel® HD Graphics/Intel® UHD Graphics	Intel® UHD Graphics
Ethernet	Controller	* Intel® i210-AT GbE	
		1 * Intel® i219-V/LM GbE	
		1 * Intel® i350-AM4 GbE	
Storage	M2	1 * M.2 Key-M (PCIe Gen 3 x4(H110/H610 not supported) + SATA 3.0, NVMe/SATA SSD Auto Detect, 2280)	
	Mini PCIe	1 * Mini PCIe (PCIe Gen 3 + USB 2.0, with SIM card slot)	
Expansion	Primary Cabinet Support	8A: 16*GPIO/4*CH/2*DP+2*HDMI/MXM 3.0 Type-A/B (Secondary Cabinet not supported)	
		9A: 16*GPIO/4*CH/4*LAN	
		9D: 16*GPIO/4*CH	
Expansion	Secondary Cabinet Support	9M: 16*GPIO/4*CH/4*POE	
		9G: 4*LAN	
		9Q: 4*POE	
Front I/O	USB	4 * USB 5Gbps (Type-A)	
	Serial	2 * RS232/422/485 (COM1/2, DB9/M)	
	Display	1 * HDMI: max resolution up to 4096*2304 @ 24Hz 1 * VGA: max resolution up to 1920*1200 @ 60Hz	
	LAN	2 * RJ45	
	PoE	4 * PoE interface, supports IEEE 802.3af standard (Optional: 4 * LAN)	
	Power	1x Power Input Connector (12-28VDC)	
	Button	1 * Power Button with LED	
	Switch	1 * PS ON Connector	
Bottom I/O	Switch	1 * AT/ATX Mode Switch (Enable/Disable automatically power on)	
	Button	1 * OS Recover Button 1 * System Reset Button	
Mechanical	Dimensions	53 mm (L) * 145 mm (W) * 186.4 mm (H)	
Environment	Heat Dissipation System	Passive Heat Dissipation	
	Operating Temperature	-20-60°C (Industrial SSD)	
	Storage Temperature	-40-80°C	
	Relative Humidity	10 to 90% RH (non-condensing)	
	Vibration During Operation	3Grms @ 5-500 Hz, random, hr/axis (Industrial SSD)	
Shock During Operation	15G, half-sine, 11ms, ±X/Y/Z, 3 shocks/axis (Industrial SSD)		

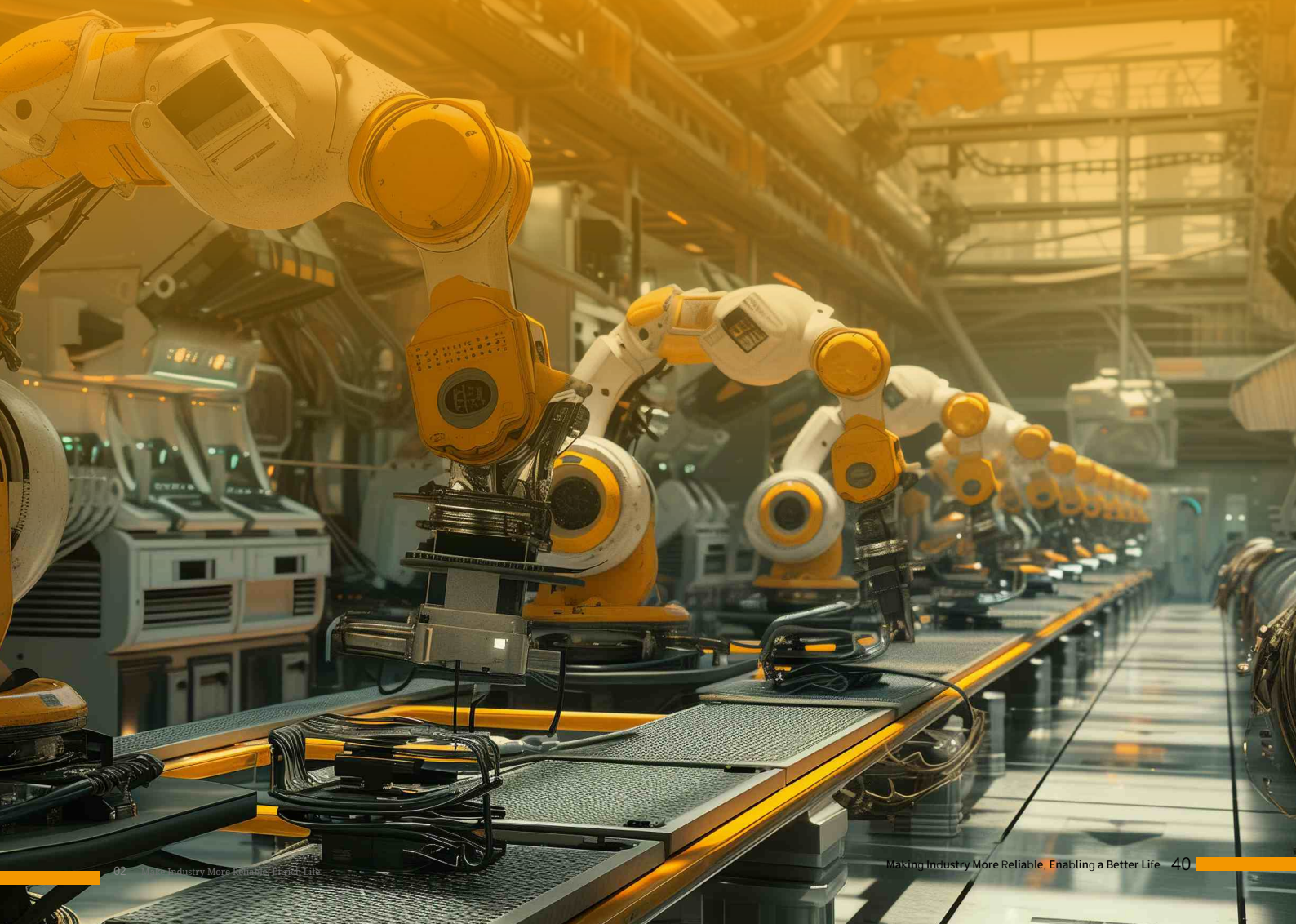


# VISION & CONTROL BRAIN FOR INDUSTRIAL ROBOTS

---

E Series Intelligent Controller

E7Pro



# E7 Pro

## MULTI-AXIS HIGH-PRECISION CONTROL For More Accurate and Stable Robot Performance

Industrial six-axis/SCARA robot

---



### CPU Platform

Intel® 12~14th Core platform +Q670 chipset



### Abundant Interfaces

2×GbE / 4×COM / 6×USB / 1×HDMI / 1×DP, etc.



### Optional Power Supply

Supports 18~60 V DC or 180~295 V AC



## Product Overview



E7 Pro is a high-performance device supporting multiple power supply options, designed for high-precision high-efficiency advanced robots to achieve intelligent coordination in visual perception and motion control.

# Product Specifications

Model		E7 Pro
CPU	CPU	Intel® 12th-14th Gen Core/Pentium/Celeron Desktop CPU
	TDP	65W
	Socket	LGA1700
	Chipset	Q670
	BIOS	AMI UEFI BIOS
Memory	Socket	2 * Non-ECC SO-DIMM slot, dual-channel DDR4-3200MHz
	Maximum Capacity	64GB, Single Max 32GB
Graphics	Controller	Intel® UHD Graphics
Ethernet	Controller	1 * Intel i219-V/LM GbE 1 * Intel i225/i226-V/LM 2 2.5GbE
Storage	SATA	3 * SATA 3.0, quick-release 2.5" 2 hard disk bays (7mm), supports RAID 0,1,5
	M2	1 * M.2 Key-M Slot (PCIe Gen 3 * 4+, SATA 3.0, NVMe/SATA SSD Auto Detect, 2280)
Expansion Slots	PCIe Slot	1: 2 * PCIe × 16 (×8/×8 Gen 3), +2 * PCI 2: 1 * PCIe × 16 (×16 Gen 4), +1 * PCIe × (×4 Gen 4) 3: 2 * PCIe × 16 (×16/NA or ×8/×8 Gen 3), +1 * PCIe × (×4 Gen 3) PS: Choose one from 1, 2, 3; Expansion card length < 320 mm; TDP < 450 W
	aDoor/MXM	1 * aDoor Bus (Optional: 4 * LAN / 4 * POE / 16 * GPIO expansion card) 1 * aDoor Expansion Slot
	Mini PCIe	2 * Mini PCIe Slot (PCIe Gen 3+, USB 2.0, with SIM Card)
	M2	/
Front I/O	Ethernet	2 * RJ45
	USB	2 * USB 10 Gbps (Type-A) 6 * USB 5 Gbps (Type-A)
	Display	1 * HDMI: max resolution up to 4096 × 2160 @ 30 Hz 1 * DisplayPort: maximum resolution up to 4096*2160 @ 60Hz
	Audio	2 * 3.5 mm jack (line-out + mic)
	Serial	2 * RS232/485/422 (COM1/2, DB9/M, Full Lanes, BIOS Switch) 2 * RS232 (COM3/4, DB9/M, Full Lanes)
	Button	1 * Power Button with LED 1 * System reset button 1 * OS Recovery Button
	Switch	1 * AT/ATX Mode Switch (Enable/Disable Automatic Power On)
	Power	1 * Power Input Connector (18-60VDC/220 VAC)
Mechanical	Dimensions	363 mm (L) * 270 mm (W) * 169 mm (H)
Environment	Heat Dissipation System	Fanless Passive Cooling (CPU) + PWM FAN (Internal)
	Operating Temperature	-20~60°C (Industrial SSD)
	Storage Temperature	-40~80°C
	Relative Humidity	10 to 90% RH (non-condensing)
	Vibration During Operation	3 Grms @ 5-500 Hz, random, 1 hr/axis (industry SSD)
	Shock During Operation	15G, half sine, 11 ms, ±X/Y/Z, 3 shocks/axis (industry SSD)

# FOUR MAJOR SERIE SIX KEY SCENARIOS

Making robots smarter, more reliable, and more efficient

Robot Category Product Series	  	 Humanoid Robots	 Service Robots	 Mobile Robots	 Multi-Task Robots	 Industrial Robot	 Multi-Legged Robots
<b>TER30R</b>	ARM		recommend	recommend			
<b>TER30J/X</b>	Jetson+x86	recommend					
<b>TER40J</b>	Jetson	recommend		recommend			
<b>TAC-3000Pro</b>	Jetson	recommend	recommend				recommend
<b>TAC-6000</b>	x86			recommend			
<b>TAC-7000</b>	x86			recommend			
<b>AK1</b>	x86				recommend		
<b>AK4</b>	Jetson	recommend		recommend			
<b>AK5</b>	x86				recommend		
<b>AK6</b>	x86+GPU					recommend	
<b>AK7</b>	x86+GPU					recommend	
<b>E7Pro</b>	x86+GPU					recommend	



# SOFTWARE SUPPORT

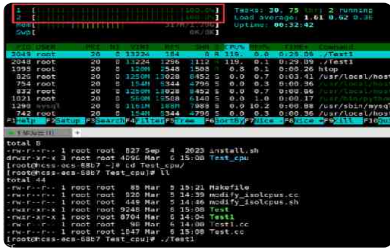
Apq has innovatively introduced the "core big brain + small brain" solution for embodied intelligence robot controllers. By enabling collaboration between perception & decision-making and motion control, and combining edge computing with real-time systems, it addresses challenges such as low integration, fragmented computing power, and high latency, achieving multimodal fused perception and decision-making with millisecond-level precision control.

The compact design delivers both high compute density and low power consumption, while modular combinations enhance system reliability. The accompanying intelligent software suite overcomes challenges in compatibility, stability, communication, and real-time switching. Apq's self-developed IPC SmartMate enables full device awareness and closed-loop data processing, and has been validated in real-world scenarios to significantly improve the stability and adaptability of embodied intelligent robots.

## Operating System Adaptation

Jetson& X86

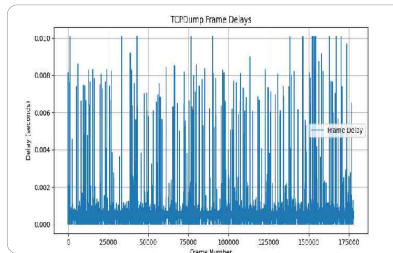
Supported software/patches+Ubuntu



## Real-Time Motion Control Optimization Package

Maximum network jitter of 35  $\mu$ s

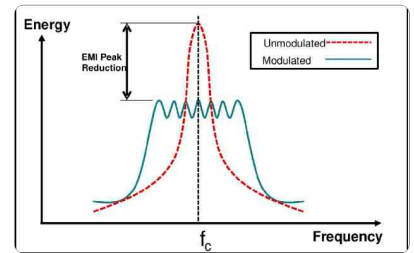
Achieves real-time control accuracy up to 1000Hz



## Enhanced BIOS firmware

Signal stability

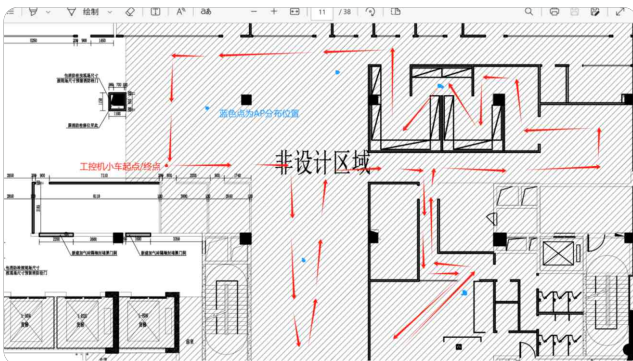
Interference intensity reduced by 20dB



## Mobile Signal Monitoring and Optimization Tool

Simulated mobility testing across AP hot spots

AP handover latency reduced by up to 80%



## Health Monitoring and Maintenance Suite

Self-awareness of 86 operational status indicators across more than 10 categories

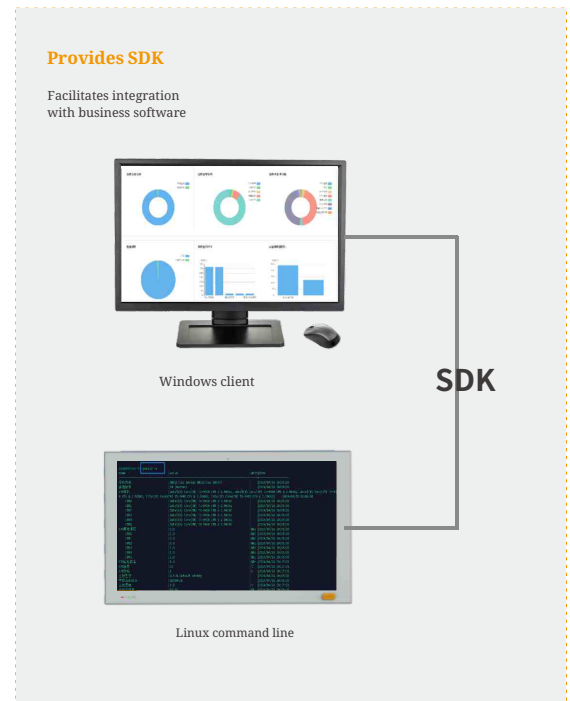
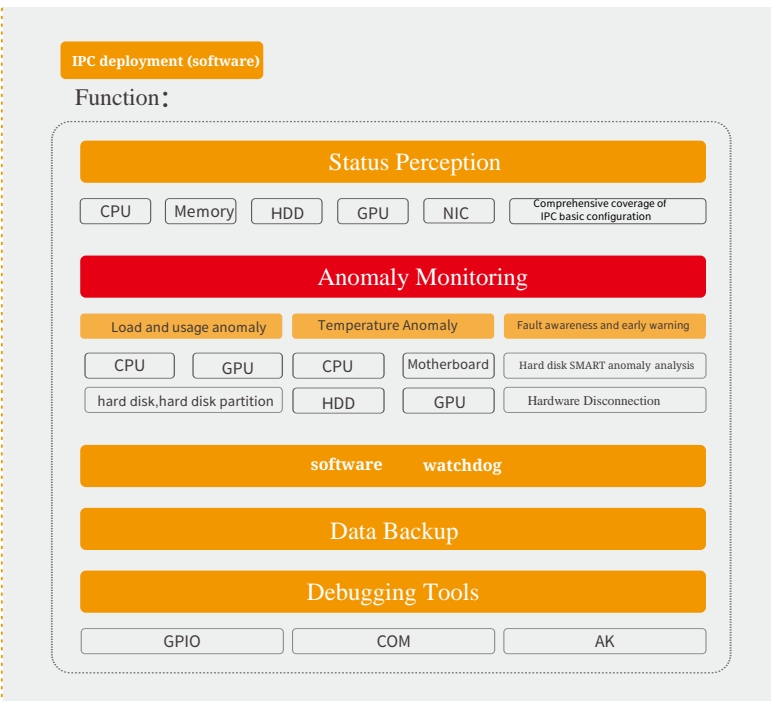
Self-monitoring of 53 types of abnormal events across 8 categories



# HEALTH OPERATIONS SUITE

APQ's KiWiBot Series, AK Series and TAC Series have been gradually applied to humanoid robots, industrial robots, service robots, robotic arms and other scenarios. With a modular architecture and a health operation and maintenance suite (Assistant SDK), they significantly reduce customers' integration and maintenance costs.

## Deployment method

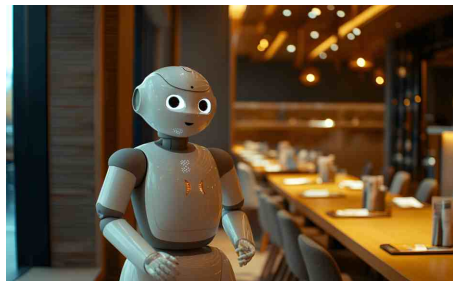


## Application Background

Fixed-Base Robots



Wheeled Robots



Legged Robots



# IPC SMARTMATE

## In-band monitoring

### Application Background

IPC Assistant serves as a monitoring and management tool for IPC devices. It runs directly on the IPC and, when used in standalone mode, is capable of collecting and recording multiple types of device data while providing visualized analysis.



#### Status Data Collection

Supports collection of 86 data items across more than 10 categories for comprehensive device status acquisition

设备监测 > CPU温度

时间选择: 近15分钟 | 近1小时 | 当日 | 近24小时 | 近7天

趋势:

2025-03-11 13:38:00    2025-03-11 13:43:00    2025-03-11 13:48:02

#### Health Assessment

Quantitative device scoring to quickly identify potential abnormal devices and issues

当前设备综合健康度: **96分**

设备当前运行正常。

基于近24小时数据统计, 更新时间13:47:52

[查看详情](#)

#### Anomaly Monitoring

Supports monitoring of 53 types of abnormal events across 8 categories for timely anomaly detection

健康评估 | 实时状态 | **异常事件**

序号	事件名称	异常值/说明	事件触发时间
1	风扇停转且CPU温度高	CPU温度=100 °C; CPU风扇转速=0 RPM	2025-03-11 13:53
2	风扇停转	[boardFan(CPU), boardFan1, boardFan2] 风扇停转!	2025-03-11 13:53
3	CPU温度超阈值	100.0 °C	2025-03-11 13:53
4	风扇停转	[boardFan(CPU), boardFan1, boardFan2] 风扇停转!	2025-03-11 13:53

#### Device Management

Supports multi-dimensional device management from hardware, software, and ports, providing a one-stop system management solution

##### 设备变更

USB:  10 秒

**i** 开启USB设备断开、连接检测

显示:  10 秒

**i** 开启显示设备断开、连接检测

Sata:  10 秒

**i** 开启sata硬盘断开、连接检测

- Debugging Tools
- Deployment Software
- Data Backup
- Data Management
- O&M Tasks
- Health Scoring

# Why Choose APQ?

## R&D Advantages

APQ self-developed cooling system (fan+heat pipe+fins) combined with the three-proof coating process reduces the volume of the robot controller by 40% at equivalent performance levels, enabling operation across a wide temperature range of -20°C~60°C, achieving an optimal balance between high performance and low power consumption while withstanding industrial-grade harsh environment challenges such as dust, vibration, and electromagnetic interference.



### Brain

Computing power requirements:

Large-model inference, multi-modal, point-cloud computing, video analytics, audio recognition

Optimal choices:

Jetson AGX Orin, Thor

### Cerebellum

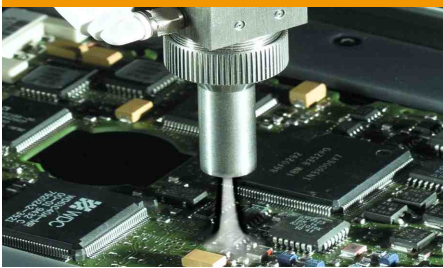
Computing power requirements:

70-axis motion control, 1000Hz motion-control cycle, 40us motion-control jitter

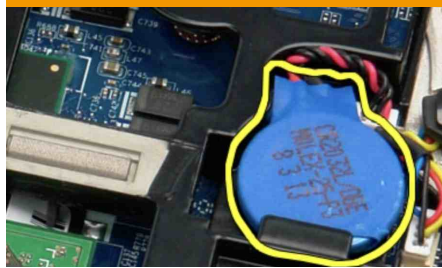
Best choice:

Mobile-P/-Hseries, RK3588

Motherboard three-proofing(outdoor operation)



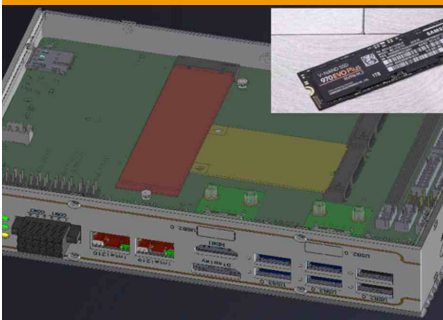
Package protection(corrosion)



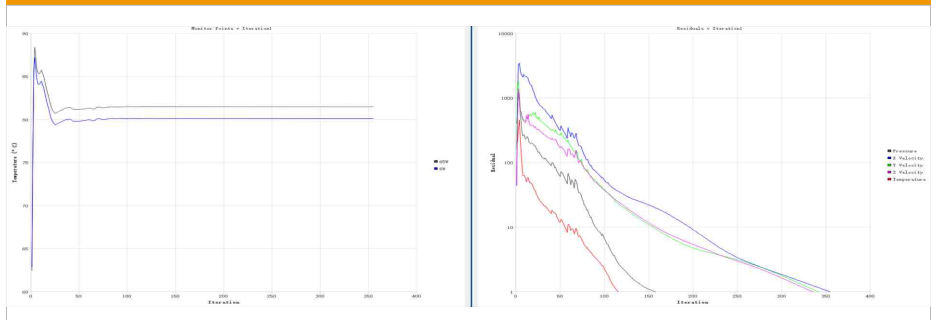
High-speed interface fastening(vibration)



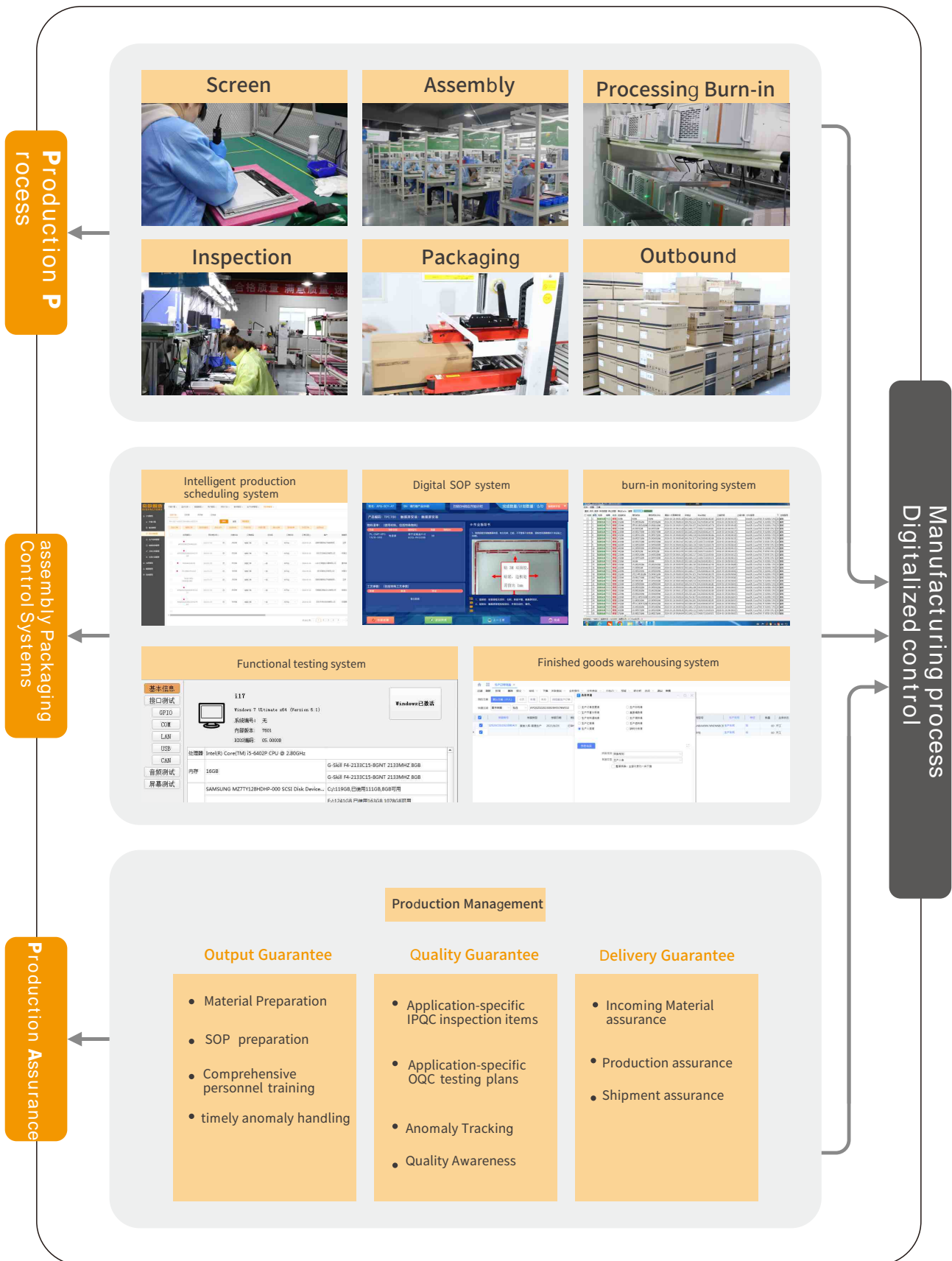
SSD design (power-loss protection)



Same cooling capacity, with 20% reduction in noise and volume



# End-to-end digitalization enabling rapid delivery



## Strict Product Control Stable Quality



## Service Advantages

# Three Service System

### Service Standards



#### 30-minute rapid response

Convenient communication channels  
Establish new industry standards  
Enhance customer collaboration experience



#### 3-day fast delivery

Flexible configuration and on-demand combinations  
Flexible manufacturing with rapid delivery  
Digitalized production and delivery process



#### 3-year extended warranty

Verified product design  
Tested product quality  
Guaranteed after-sales service

The "3-3-3" service primarily applies to APQ modular standard products; non-standard products are subject to the actual contract terms

### Service Basis



#### Intelligent customer service

Intelligent services: pre-sales consultation / after-sales repair requests  
Value-added services: configuration assistance / industry consultation  
Customer engagement: requirement collection / satisfaction surveys



#### Online Ordering System

Technical support: product documentation / application cases  
Online ordering: quick configuration / easy ordering  
Order tracking: contract management / delivery schedule tracking



#### Digital Factory

Flexible manufacturing: digital production management  
Quality control testing: standard testing / in-house quality inspection  
New product R&D: requirement research / performance validation



#### IPC SwitchLink / IPC SmartMate / IPC SmartManager

IPC SwitchLink: remote power on/off / remote system reboot / remote system reboot / power status monitoring  
IPC SmartMate: status data collection / health assessment / anomaly monitoring / device management  
IPC SmartManager: device monitoring / anomaly handling / daily operations and maintenance



#### 100+ Service Locations

One-click service request: rapid response / on-site service  
Remote operations and maintenance: remote diagnosis / anomaly localization / fault troubleshooting  
Technical validation: preventive maintenance / comprehensive servicing

### Service Window



#### National official hotline

+86-400-702-7002



#### Official Website

www.apuqi.net



#### Official account

Robin Chen



#### Official inquiry email

apqglobal@apuqi.com

# THANK YOU

**APQ** Full-Series **R**obot Controller

Empowering **R**obots: Faster  
Computation, **P**recise Control



Website: [www.apuqi.net](http://www.apuqi.net)  
E-mail: [apqglobal@apuqi.com](mailto:apqglobal@apuqi.com)  
Tel: +86-400-702-7002