INVT Control Product Catalog

Programmable Controller / Human Machine Interface / Industrial Internet

Company profile

Shenzhen INVT Electric Co., Ltd. (INVT for short, stock code: 002334) was founded in 2002, focusing on the fields of industrial automation and energy power. It was listed on Shenzhen Stock Exchange (SZSE) and issued A shares in 2010. Adhering to the core values of "Achieve customers, performance orientation, open and win-win cooperation, struggle and innovation" and with the mission of making every effort to offer most valuable products and services to strengthen customer competitiveness, INVT provides differentiated and specialized industry solutions, customized technical services, global localization operations, and digital management models to global customers.

Core competitiveness

Company scale: In 2023, the total operating revenue was approximately RMB 4.59 billion, a year-on-year increase of 12.03%. The net profit was approximately 371 million Yuan, a year-on-year increase of 35.06%. The total assets reached 5.186 billion Yuan, a year-on-year increase of 6.13%. INVT has 4 large bases of production and research, 15 holding subsidiaries, and over 5000 employees.

R&D capability: INVT is a national key high-tech enterprise in China's Torch Program and a drafting unit for the national standard of low-voltage VFDs. It has established a strict quality management system and passed CNAS certification. The R&D testing laboratory has been awarded the Acceptance of Client Testing (ACT) accreditation by TUV-SUD in Germany, and the main products are CE-compliant. INVT has also been recognized as the National Enterprise Technology Center, and Guangdong Engineering Technology Research Center, and has undertaken a number of national, provincial and municipal science and technology projects. By the end of 2023, INVT has 1538 patents and 283 computer software copyrights.

Marketing and service network: INVT has set up dozens of branches and hundreds of joint warranty centers around the world, and has established strong cooperative relationships with many domestic and international channel partners. This comprehensive sales and service network enables INVT to respond quickly to global market demands and provide immediate technical support and quality after-sales service.

Business segments

Industrial automation: Offering VFDs, servo systems, motors, controllers, human-machine interfaces, sensors, elevator drive systems, industrial internet, and other products and integrated solutions, which are widely used in compressors, cranes, solar pumps, printing and packaging machinery, 3C electronics, lithium-ion battery equipment, semiconductor equipment, offshore equipment, iron and steel, petroleum, chemical industry, and other fields.

Network power: Offering micro module data centers, power supply and distribution products, intelligent temperature control products, intelligent monitoring products, and integrated solutions, which are widely used in cloud data centers, finance, communication, medical, energy, and other fields.

New energy vehicle: Offering comprehensive products such as main motor controllers, auxiliary motor controllers, vehicle controllers, and onboard power supplies, covering the full range of solutions for commercial vehicles and passenger cars.

PV energy storage: Offering grid-tie inverters, energy storage inverters, off-grid inverters, monitoring accessories, which have been applied in many scenarios at home and abroad.

CONTENT

INVT Automation networking

Information layer

Enterprise application system
- ERP
- PLM
- MES
- SCM
- CRM

Cloud platform
- INVT cloud
- Private platform
- APP customized
- PC customized

Data termina
- Standard
- Flagship
- Industry specific
- Expansion card supported

Control layer

HMI
- VS
- VA
- VK
- VT

Controller
- AX70 series
- TM700 series
- TP6000 series

Small PLC
- IVC1L
- TS600

I/O
- IVC1L extension modules
- AX-EM extension modules
- I/O series

Drive layer

VFD Servo
- VFD
- DA180
- DA200
- DA300

Small PLC

IVC series PLC features fast speed, stable performance, strong function and software usability.

IVC1L feature

IVC1L is a general-purpose PLC product with compact structure, complete functions, and flexible I/O configuration. It can be widely used in small-scale IO and simple positioning applications.

- 60 built-in I/O points, able to add on 7 modules and 128 I/O points
- 16K steps program capacity
- 1 RS232, 2 RS485, supporting the Modbus master/slave protocol
- Two 50K+four 10K high speed input ports
- Three 100K high speed output (transistor type) ports
- Support real time clock function and built-in battery
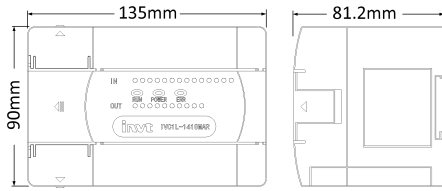- Support DC power supply and AC power supply modules
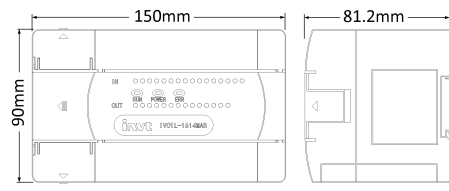
IVC1L technical specification

Model IVC1L-		0806MAT	1410MAT	1614MAT	1614MAT1	2416MAT	3624MAT	0806MAR	1410MAR	1614MAR	2416MAR	3624MAR
Power												
Input	Voltage	220VAC (85~264VAC)										
	Current	1.5A										
Output	5V/GND	900mA										
	24V/GND	300mA										
	24V/COM	600mA										
I/O configuration												
Built-in I/O	Total	14	24	30	30	40	60	14	24	30	40	60
	Input	8	14	16	16	24	36	8	14	16	24	36
	Output	6	10	14	14	16	24	6	10	14	16	24
	Input type	NPN/PNP						NPN/PNP				
	Output type	Transistor (NPN)						Relay				
Extension I/O	Extension module	7										
	Total	128										
Analog		—		2 AI, 1 AO				—				
High speed I/O												
High speed input		2×50KHz+4×10KHz, AB phase (1×30K, 1×5K)						2×50KHz+4×10KHz, AB phase (1×30K, 1×5K)				
High speed output		3×100KHz						—				
Communication												
Serial port	RS232	1										
	RS485	2										
	Protocol	Programming protocol; MODBUS master/slave; free port; N:N protocol										
Storage												
Program capacity		16K steps										
Data block		8000 D registers										
Interrupt												
External input interrupt		16										
High speed counter interrupt		6										
Internal time interrupt		3										
Serial port interrupt		12										
PTO output completion interrupt		3										
Power loss interrupt		1										
Programming												
Software		Auto Station										
Subprogram calling		Supported total 64 subprograms (6 levels), and it can supports the design of input and output interfaces										
Others												
Digital filtering function		X0~X7 adopts digital filering and other ports adopt hardware filtering										
Encryption		Upload/download password, monitor password, subprogram encryption, format disable, upload disable										
Real time clock		Support, built-in battery										
Data saving function at power failure		Supported										

Model	IVC1L-	0806MDT	1410MDT	1614MDT	2416MDT	3624MDT	0806MDR	1410MDR	1614MDR	2416MDR	3624MDR	1614MAR1	1616MAR6
Power													
Input	Voltage	24VDC (19~30VDC)										220VAC (85~264VAC)	
	Current	0.85A										15A	
Output	5V/GND	900mA											
	24V/GND	300mA											
	24V/COM	–										600mA	
I/O configuration													
Built-in I/O	Total	14	24	30	40	60	14	24	30	40	60	30	32
	Input	8	14	16	24	36	8	14	16	24	36	16	16
	Output	6	10	14	16	24	6	10	14	16	24	14	16
	Input type	NPN/PNP					NPN/PNP						
	Output type	Transistor (NPN)					Relay						
Extension I/O	Extension module	7											
	Total	128											
Analog		–										2 AI, 1 AO	2 thermal resistance
High speed I/O													
High speed input		2×50KHz+4×10KHz, AB phase (1×30K, 1×5K)					2×50KHz+4×10KHz, AB phase (1×30K, 1×5K)						
High speed output		3×100KHz					–						
Communication													
Serial port	RS232	1											
	RS485	2											
	Protocol	Programming protocol; MODBUS master/slave; free port; N:N protocol											
Storage													
Program capacity		16K steps											
Data block		8000 D registers											
Interrupt													
External input interrupt		16											
High speed counter interrupt		6											
Internal time interrupt		3											
Serial port interrupt		12											
PTO output completion interrupt		3											
Power loss interrupt		1											
Programming													
Software		Auto Station											
Subprogram calling		Supported total 64 subprograms (6 levels), and it can supports the design of input and output interfaces											
Others													
Digital filtering function		X0~X7 adopts digital filering and other ports adopt hardware filtering											
Encryption		Upload/download password, monitor password, subprogram encryption, format disable, upload disable											
Real time clock		Support, built-in battery											
Data saving function at power failure		Supported											

IVC1L	
Soft element	
Inputs	X element, 128
Outputs	Y element, 128
Auxiliary relays	M element, 2048
Local auxiliary relays	LM element, 64
Special auxiliary relays	SM element, 512
Status relays	S element, 1024
Data registers	D element, 8000
Local data registers	V element, 64
Indexing/addressing registers	Z element, 16
Special data registers	SD element, 512
Timer — Total	T element,256
Timer — 1ms	T252~T255
Timer — 10ms	T210~T251
Timer — 100ms	T0~T209
Counter — Total	C element, 256
Counter — 16bit up counter	C0~C199
Counter — 32bit up/down counter	C200~C235
Counter — 32bit high speed counter	C236~C255
Rising edge	1024
Falling edge	1024

Sidebar labels: Small PLC | Medium PLC | I/O System | HMI | Industrial Internet

IVC1L dimension

Model	Dimension
IVC1L-0806M** IVC1L-1410M**	135×90×81.2mm

Model	Dimension
IVC1L-1614M**	150×90×81.2mm
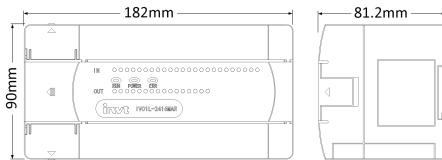
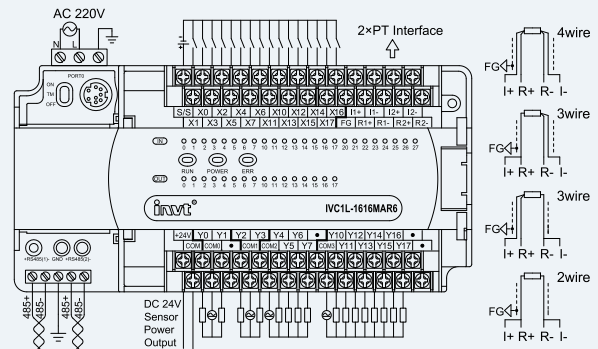| Model	Dimension
IVC1L-1614MAR1 IVC1L-1614MAT1 IVC1L-1616MAR6 IVC1L-2416M**	182×90×81.2mm
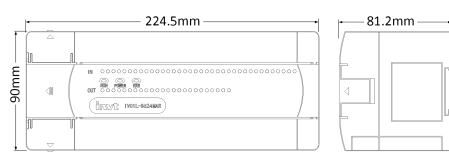
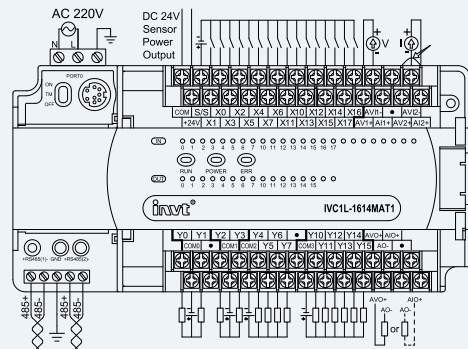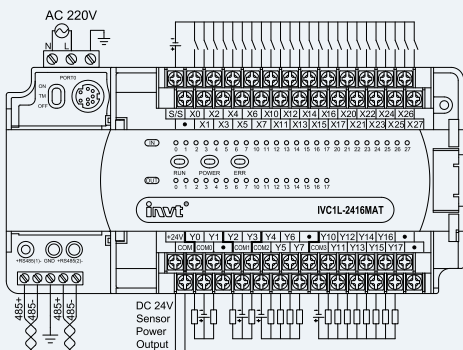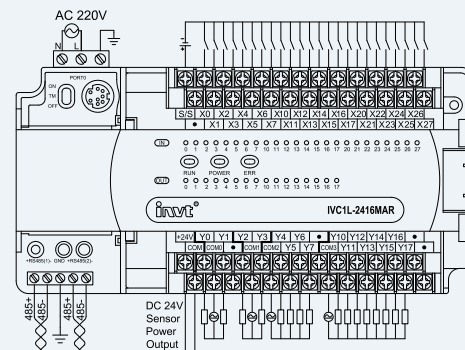| Model	Dimension
IVC1L-3624M**	224.5×90×81.2mm

IVC1L(AC) wiring diagram

IVC1L-0806MAR

IVC1L-0806MAT

IVC1L-1410MAR

IVC1L-1410MAT
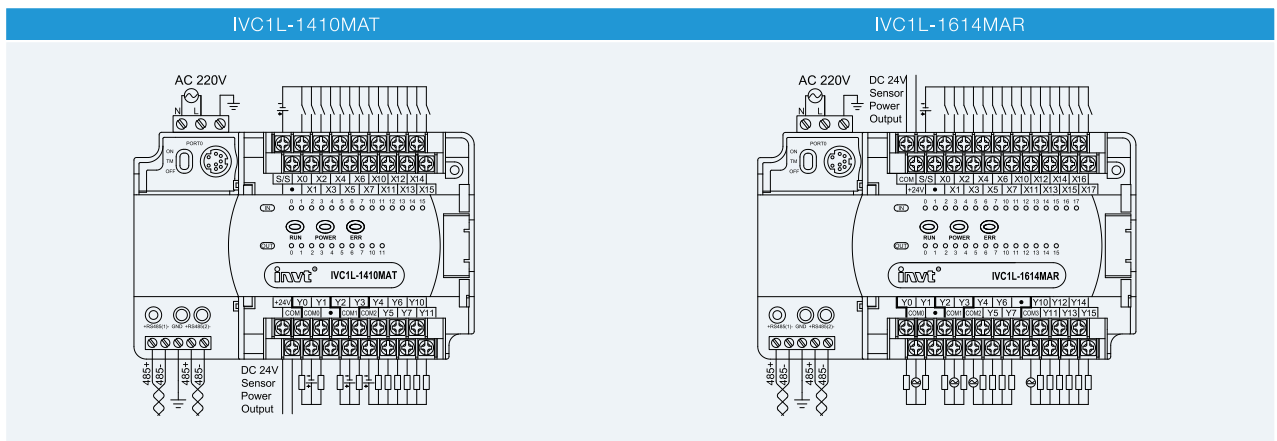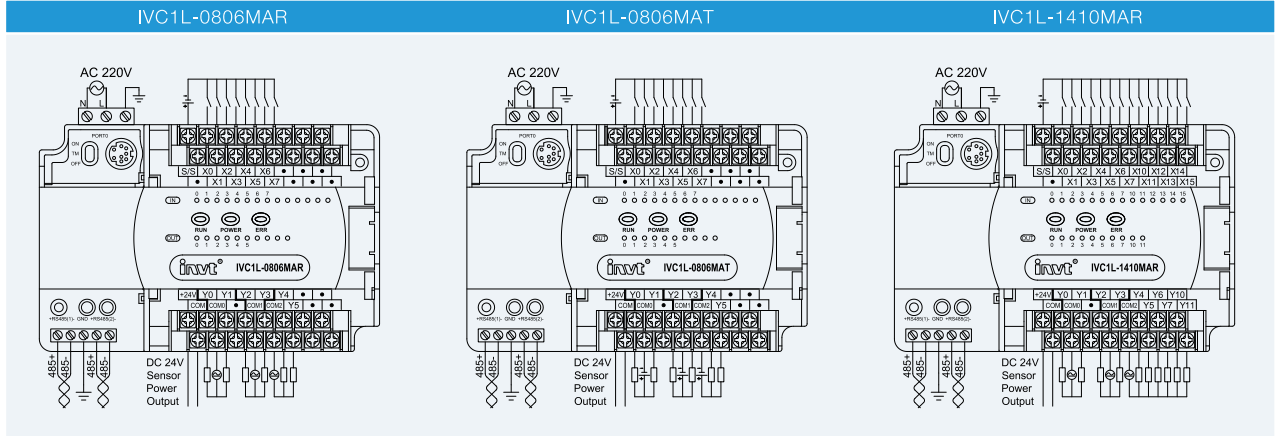
IVC1L-1614MAR
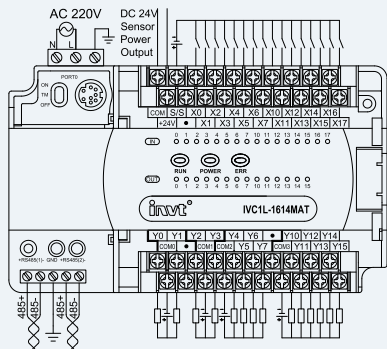
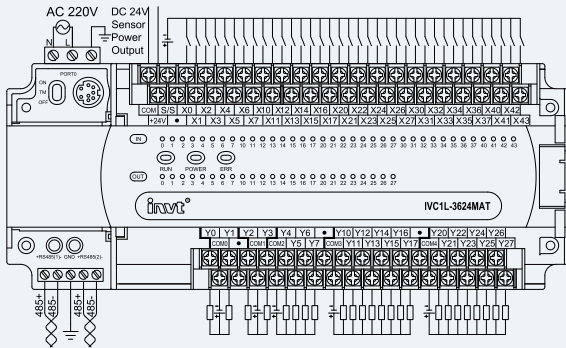IVC1L-1614MAT

IVC1L-1616MAR6
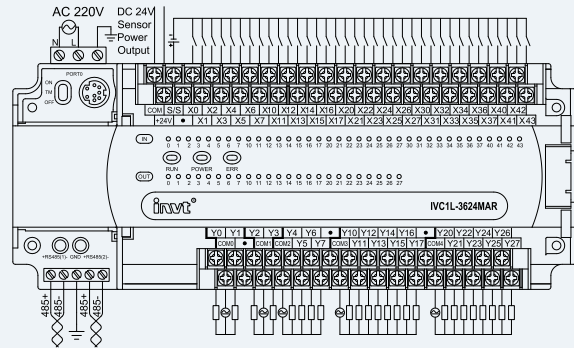

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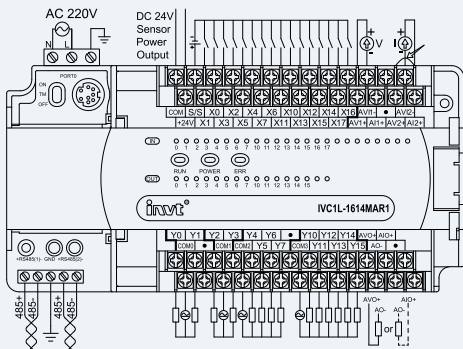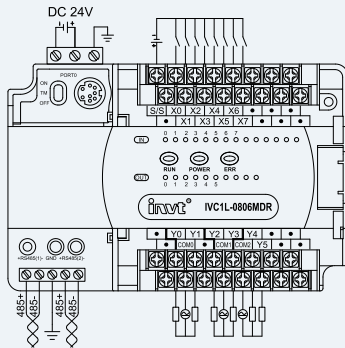

IVC1L-1614MAT1

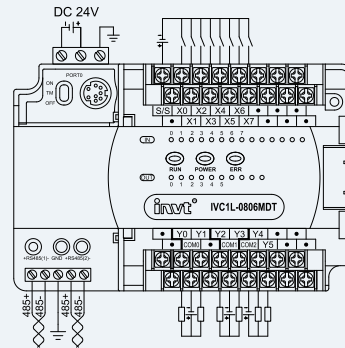IVC1L-2416MAT

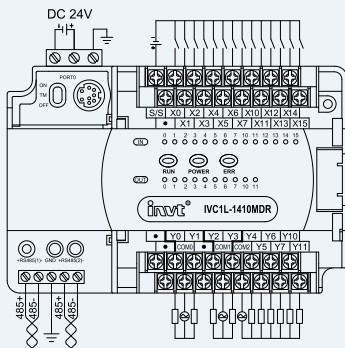IVC1L-2416MAR

IVC1L-3624MAT

IVC1L-3624MAR
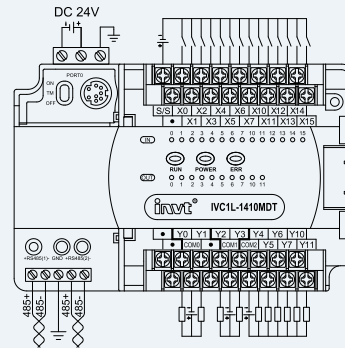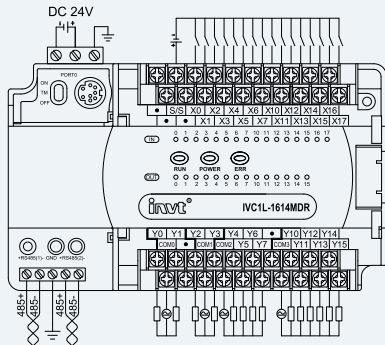
IVC1L(DC) wiring dragram
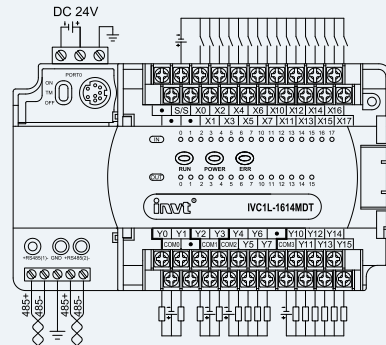

IVC1L-0806MDR

IVC1L-0806MDT

IVC1L-1410MDR

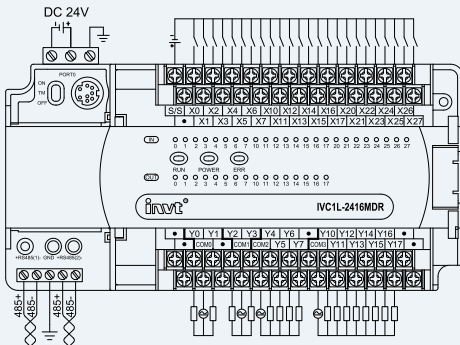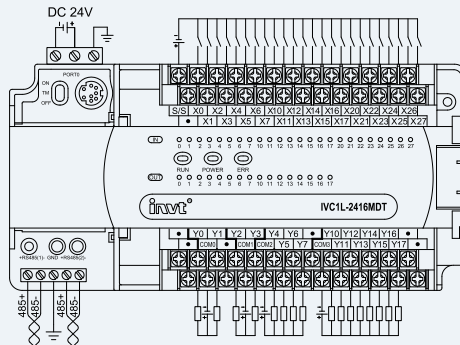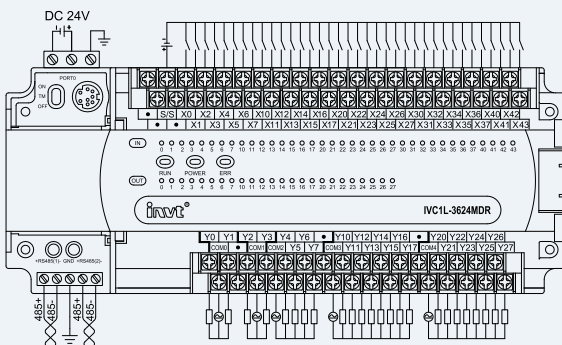IVC1L-1410MDT

IVC1L-1614MDR

IVC1L-1614MDT

IVC1L-2416MDR

IVC1L-2416MDT

IVC1L-3624MDR

IVC1L-3624MDT
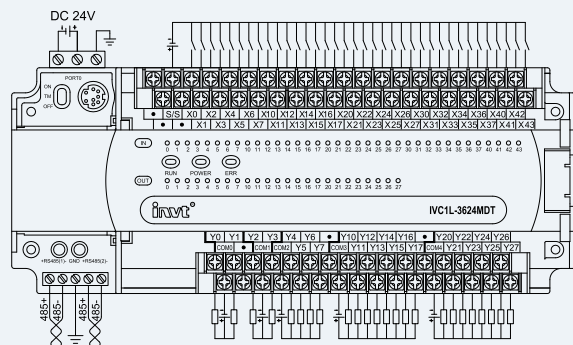
● Digital input module

Model	IVC1L-1600ENN
Product overview	16 digital inputs
General	
Dimension	61×90×81.2mm
Power 5V/GND	70mA
Power 24V/GND	—
Output specification	
Inputs	16
Input type	PNP/NPN (source type/sink type)
Input voltage	24VDC
Current	60mA (DC24V/COM)
Insulation	Optocoupler insulation
Action indication	LED is on when optocoupler is driven
Equivalent resistance	4.3kΩ/channel
Logic 1 signal	≥15VDC
Logic 0 signal	≤5VDC

● Digital output module

Model	IVC1L-0016ENT
Product overview	16 points transistor output
General	
Dimension	61×90×81.2mm
Power 5V/GND	170mA
Power 24V/GND	—
Output specification	
Outputs	16
Output type	Transistor
Voltage	24VDC
Insulation	Optocoupler insulation
Action indication	LED is on when optocoupler is driven
Minimum load	5mA (5~24VDC)
Max. output current Resistive load	Total current can be increased by 0.1A for every additional 1 point above 8 points
Max. output current Inductive load	24VDC, 7.2W
Max. output current Lamp load	24VDC, 1.5W
Response time OFF→ON	Max.0.5ms (100mA/24VDC)
Response time ON→OFF	Max.0.5ms (100mA/24VDC)
Contact life	—

Model	IVC1L-0016ENR
Product overview	16 points relay output
General	
Dimension	61×90×81.2mm
Power 5V/GND	70mA
Power 24V/GND	100mA
Output specification	
Outputs	16
Output type	Relay
Voltage	250VAC,below 30VDC
Insulation	Mechanical insulation of relay
Action indication	The LED light is on when relay output contact closed
Minimum load	2mA/5VDC
Max. output current Resistive load	2A/1point , The total current of 8 points of common COM terminal is less than 8A
Max. output current Inductive load	220VAC, 80VA
Max. output current Lamp load	220VAC, 100W
Response time OFF→ON	Max.20ms
Response time ON→OFF	Max.20ms
Contact life	200,000 time

● Digital input/output module

Model	IVC1L-0808ENT
Product overview	8 digital inputs, 8 points transistor output
General	
Dimension	61×90×81.2mm
Power 5V/GND	170mA
Power 24V/GND	‒
Input specification	
Inputs	8
Input type	PNP/NPN (source type/sink type)
Input voltage	24VDC
Current	50mA (DC24V/COM)
Insulation	Optocoupler insulation
Action indication	LED is on when optocoupler is driven
Equivalent resistance	4.3kΩ/channel
Logic 1 signal	≥15VDC
Logic 0 signal	≤5VDC
Output specification	
Outputs	8
Output type	Transistor
Voltage	5~24VDC
Insulation	Optocoupler insulation
Action indication	LED is on when optocoupler is driven
Minimum load	5mA (5~24VDC)
Max. output current — Resistive load	0.3A/1 point 0.8A/4points 1.6A/8points
Max. output current — Inductive load	24VDC, 7.2W
Max. output current — Lamp load	24VDC, 1.5W
Response time OFF→ON	Max.0.5ms (100mA/24VDC)
Response time ON→OFF	Max.0.5ms (100mA/24VDC)
Contact life	‒

Model	IVC1L-0808ENR
Product overview	8 digital inputs,8 points relay output
General	
Dimension	61×90×81.2mm
Power 5V/GND	70mA
Power 24V/GND	50mA
Input specification	
Inputs	8
Input type	PNP/NPN (source type/sink type)
Input voltage	24VDC
Current	50mA (DC24V/COM)
Insulation	Optocoupler insulation
Action indication	LED is on when optocoupler is driven
Equivalent resistance	4.3kΩ/channel
Logic 1 signal	≥15VDC
Logic 0 signal	≤5VDC
Output specification	
Outputs	8
Output type	Relay
Voltage	250VAC, below 30VDC
Insulation	Mechanical insulation of relay
Action indication	The LED light is on when relay output contact closed
Minimum load	2mA/5VDC
Max. output current — Resistive load	2A/1point , The total current of 8 points of common COM terminal is less than 8A
Max. output current — Inductive load	220VAC, 80VA
Max. output current — Lamp load	220VAC, 100W
Response time OFF→ON	Max.20ms
Response time ON→OFF	Max.20ms
Contact life	200,000 time

● Analog input module

Model	IVC1L-2AD	
Product overview	2 analog inputs	
General		
Dimension	61×90×81.2mm	
Power	5V/GND	70mA
	24V/GND	–
Input specification		
Coversion speed	15ms/channel (normal speed), 6ms/channel (high speed), settable	
Range	Voltage input	-10V~+10V -5V~+5V
	Current input	-20mA~+20mA
	Digital format	Default: -2000~+2000; Range: -10000~+10000
Resolution	12 bit	
Accuracy	±1%FS	
Isolation	The optocoupler isolates analog circuit from digital circuit. The analog circuit is internally isolated from the 24VDC power supply of the module. No isolation between analog channels.	

Model	IVC1L-4AD	
Product overview	4 analog inputs	
General		
Dimension	61×90×81.2mm	
Power	5V/GND	70mA
	24V/GND	–
Input specification		
Coversion speed	15ms/channel (normal speed), 6ms/channel (high speed), settable	
Range	Voltage input	-10V~+10V -5V~+5V
	Current input	-20mA~+20mA
	Digital format	Default: -2000~+2000; Range: -10000~+10000
Resolution	12 bit	
Accuracy	±1%FS	
Isolation	The optocoupler isolates analog circuit from digital circuit. The analog circuit is internally isolated from the 24VDC power supply of the module. No isolation between analog channels.	

● Analog output module

Model	IVC1L-2DA	
Product overview	2 analog outputs	
General		
Dimension	61×90×81.2mm	
Power	5V/GND	72mA
	24V/GND	–
External power	24VDC (-15%~20%), Maximum allowable ripple voltage 5%,100mA	
Output specification		
Coversion speed	2ms/channel	
Range	Voltage output	-10V~+10V
	Current output	0~20mA 4~20mA
	Digital format	Default: -2000~+2000; Range: -10000~+10000
Resolution	12 bit	
Accuracy	±1%FS	
Isolation	The optocoupler isolates analog circuit from digital circuit. The analog circuit is internally isolated from the 24VDC power supply of the module. No isolation between analog channels.	

Model	IVC1L-4DA	
Product overview	4 analog outputs	
General		
Dimension	61×90×81.2mm	
Power	5V/GND	72mA
	24V/GND	–
External power	24VDC (-15%~20%), Maximum allowable ripple voltage 5%, 100mA	
Output specification		
Coversion speed	2ms/channel	
Range	Voltage output	-10V~+10V
	Current output	0~20mA 4~20mA
	Digital format	Default: -2000~+2000; Range: -10000~+10000
Resolution	12 bit	
Accuracy	±1%FS	
Isolation	The optocoupler isolates analog circuit from digital circuit. The analog circuit is internally isolated from the 24VDC power supply of the module. No isolation between analog channels.	

● Analog input/output module

Model	IVC1L-5AM	
Product overview	4 analog inputs, 1 analog output	
General		
Dimension	61×90×81.2mm	
Power	5V/GND	72mA
	24V/GND	–
Input specification		
Coversion speed	15ms/channel (normal speed), 8ms/channel (high speed), settable	
Range	Voltage input	-10V~+10V -5V~+5V
	Current input	-20mA~+20mA
	Digital format	Default: -2000~+2000; Range: -10000~+10000
Resolution	12 bit	
Accuracy	±1%FS	
Isolation	The optocoupler isolates analog circuit from digital circuit. The analog circuit is internally isolated from the 24VDC power supply of the module. No isolation between analog channels.	
Output specification		
Coversion speed	2ms/channel	
Range	Voltage output	-10V~+10V
	Current output	0~20mA 4~20mA
	Digital format	Default: -2000~+2000; Range: -10000~+10000
Resolution	12 bit	
Accuracy	±1%FS	
Isolation	The optocoupler isolates analog circuit from digital circuit. The analog circuit is internally isolated from the 24VDC power supply of the module. No isolation between analog channels.	

● Thermocouple module

Model	IVC1L-4TC	
Product overview	4 thermocouple	
General		
Dimension	61×90×81.2mm	
Power	5V/GND	72mA
	24V/GND	–
External power	24VDC (-15%~20%), Maximum allowable ripple voltage5%, 50mA	
Input specification		
Conversion speed	240ms/channel	
Input type	K/J/E/N/T/R/S type thermocouple	
Digital format	Celsius (0.1 °C)	K type: -1000~+12000 J type: -1000~+10000 E type: -1000~+10000 N type: -1000~+12000 T type: -2000~+4000 R type: 0~16000 S type: 0~16000
	Fahrenheit (0.1 °F)	K type: -1480~+21920 J type: -1480~+18320 E type: -1480~+18320 N type: -1480~+21920 T type: -3280~+7520 R type: 320~29120 S type: 320~29120
Resolution	0.5 °C/0.9 °F; 12bit	
Accuracy	±0.5%FS+1 °C	
Isolation	The optocoupler isolates analog circuit from digital circuit. The analog circuit is internally isolated from the 24VDC power supply of the module. No isolation between analog channels.	

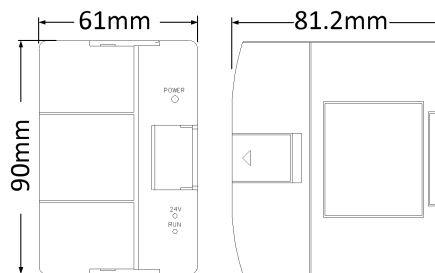| Model	IVC1L-2TC	
Product overview	2 thermocouple	
General		
Dimension	61×90×81.2mm	
Power	5V/GND	72mA
	24V/GND	–
External power	24VDC (-15%~20%), Maximum allowable ripple voltage5%, 50mA	
Input specification		
Conversion speed	240ms/channel	
Input type	K/J/E/N/T/R/S type thermocouple	
Digital format	Celsius (0.1 °C)	K type: -1000~+12000 J type: -1000~+10000 E type: -1000~+10000 N type: -1000~+12000 T type: -2000~+4000 R type: 0~16000 S type: 0~16000
	Fahrenheit (0.1° F)	K type: -1480~+21920 J type: -1480~+18320 E type: -1480~+18320 N type: -1480~+21920 T type: -3280~+7520 R type: 320~29120 S type: 320~29120
Resolution	0.5 °C/0.9 °F; 12bit	
Accuracy	±0.5%FS+1 °C	
Isolation	The optocoupler isolates analog circuit from digital circuit. The analog circuit is internally isolated from the 24VDC power supply of the module. No isolation between analog channels.	

● Termal resistance module

Model	IVC1L-2PT	
Product overview	2 thermal resistance	
General		
Dimension	61×90×81.2mm	
Power	5V/GND	72mA
	24V/GND	–
External power	24VDC (-15%~20%), Maximum allowable ripple voltage5%, 50mA	
Input specification		
Conversion speed	15ms/channel	
Input type	Pt100/Cu100/Cu50	
Digital format	Celsius (0.1°C)	Pt100: -1500~+6000 Cu100: -300~+1200 Cu50: -300~+1200
	Fahrenheit (0.1°F)	Pt100: -2380~+11120 Cu100: -220~+2480 Cu50: -220~+2480
Resolution	0.2°C/0.36°F; 12bit	
Accuracy	±1%FS	
Isolation	The optocoupler isolates analog circuit from digital circuit. The analog circuit is internally isolated from the 24VDC power supply of the module. No isolation between analog channels.	

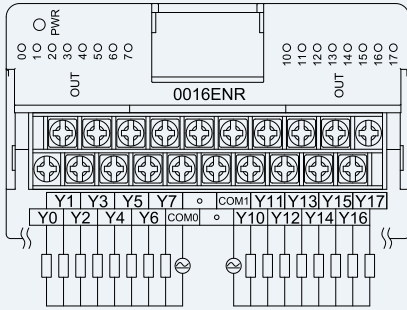| Model	IVC1L-4PT	
Product overview	4 thermal resistance	
General		
Dimension	61×90×81.2mm	
Power	5V/GND	72mA
	24V/GND	–
External power	24VDC (-15%~20%), Maximum allowable ripple voltage5%, 50mA	
Input specification		
Conversion speed	15ms/channel	
Input type	Pt100/Cu100/Cu50	
Digital format	Celsius (0.1°C)	Pt100: -1500~+6000 Cu100: -300~+1200 Cu50: -300~+1200
	Fahrenheit (0.1°F)	Pt100: -2380~+11120 Cu100: -220~+2480 Cu50: -220~+2480
Resolution	0.2°C/0.36°F; 12bit	
Accuracy	±1%FS	
Isolation	The optocoupler isolates analog circuit from digital circuit. The analog circuit is internally isolated from the 24VDC power supply of the module. No isolation between analog channels.	

IVC1L extension module dimension

61mm · 81.2mm · 90mm

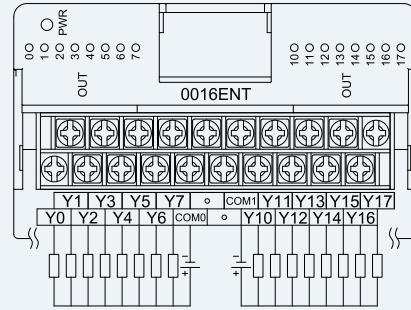| Model	Dimension
IVC1L extension module	61×90×81.2mm

IVC1L extension module wiring diagram
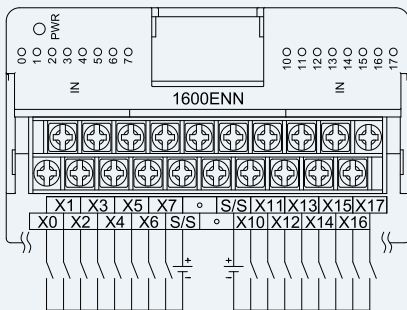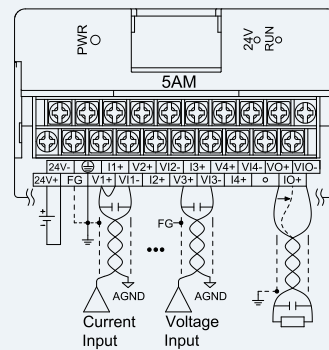
IVC1L-0016ENR

IVC1L-0016ENT

IVC1L-0808ENT
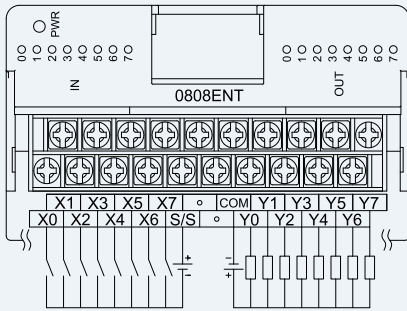
IVC1L-0808ENR

IVC1L-1600ENN

IVC1L-5AM

Current Input　　Voltage Input

Small PLC

Medium PLC

I/O System

HMI

Industrial Internet

IVC1L-2AD

Current Input   Voltage Input

IVC1L-4AD

Current Input   Voltage Input
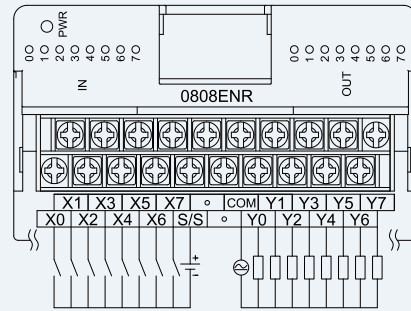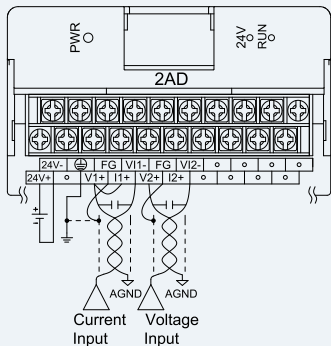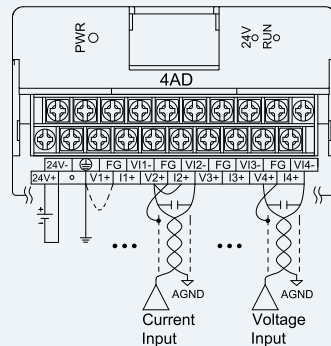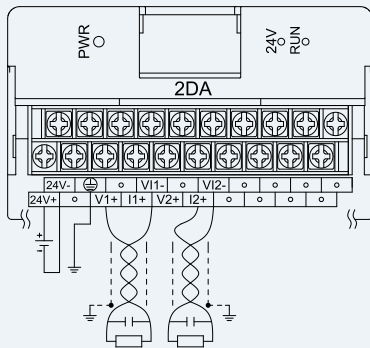
IVC1L-2DA

IVC1L-4DA

IVC1L-2PT/IVC1L-4PT

I+ R+ R- I-   FG   2wire

I+ R+ R- I-   FG   3wire

I+ R+ R- I-   FG   3wire

I+ R+ R- I-   FG   4wire
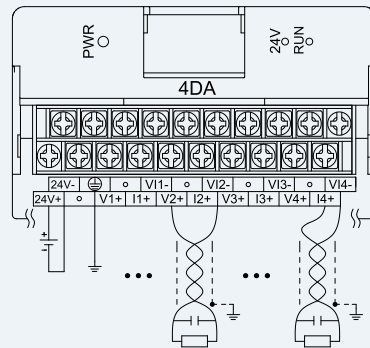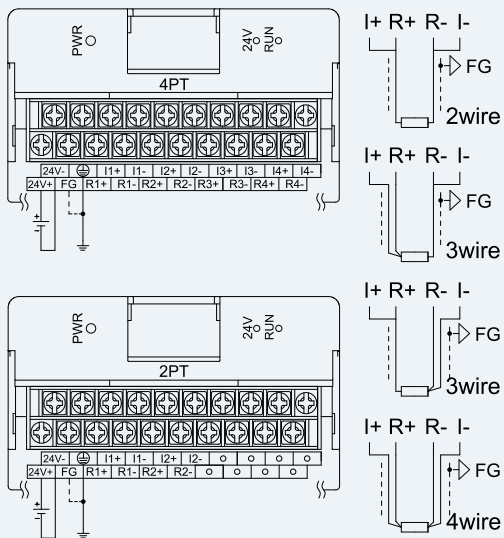
IVC1L-2TC/IVC1L-4TC

L+ L-   FG   TC
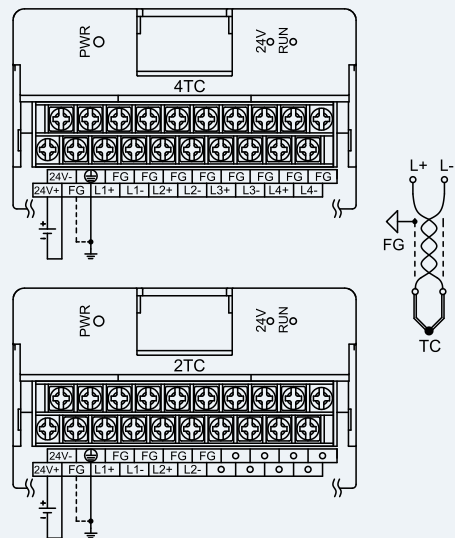
IVC PLC spare part

Product type	Description	Photo
IVC-SL1	PLC-VS HMI 232 communication cable(2m)	

Product type	Description	Photo
IVC-SL5	PLC-VT/VK/VA HMI 232 communication cable(7m)	

Product type	Description	Photo
IVC-SL2	PLC download cable, USB-RS232(Port0) (2m)	

Product type	Description	Photo
IVC-SL8	PLC-VS HMI 232 communication cable(7m)	

Product type	Description	Photo
IVC-SL3	PLC-VT/VK/VA HMI 232communication cable(3m)	

Product type	Description	Photo
IVC-SL9	IVC1L extension cable(1m)	

Product type	Description	Photo
IVC-SL4	HMI download cable, available for VT/VK/VA/VS series(2m)	

Small PLC

Medium PLC

I/O System

HMI

Industrial Internet

INVT TS600 series intelligent PLC integrates high-performance embedding technology, and it is based on a high-speed bus system architecture to integrate four types of automation control, namely, sequence, process, information, and motion control, into the same system. It achieves the real-time control and complex calculation through the highly reliable software and hardware real-time system, and provides open communication interfaces, IoT networks, and distributed module system architecture. The completely independent programming software provides customized services, making programming easy.

TS600 can work with INVT VFD, servo, HMI, IoT and other products to construct one-stop automation solutions to create value for customers.

Product positioning
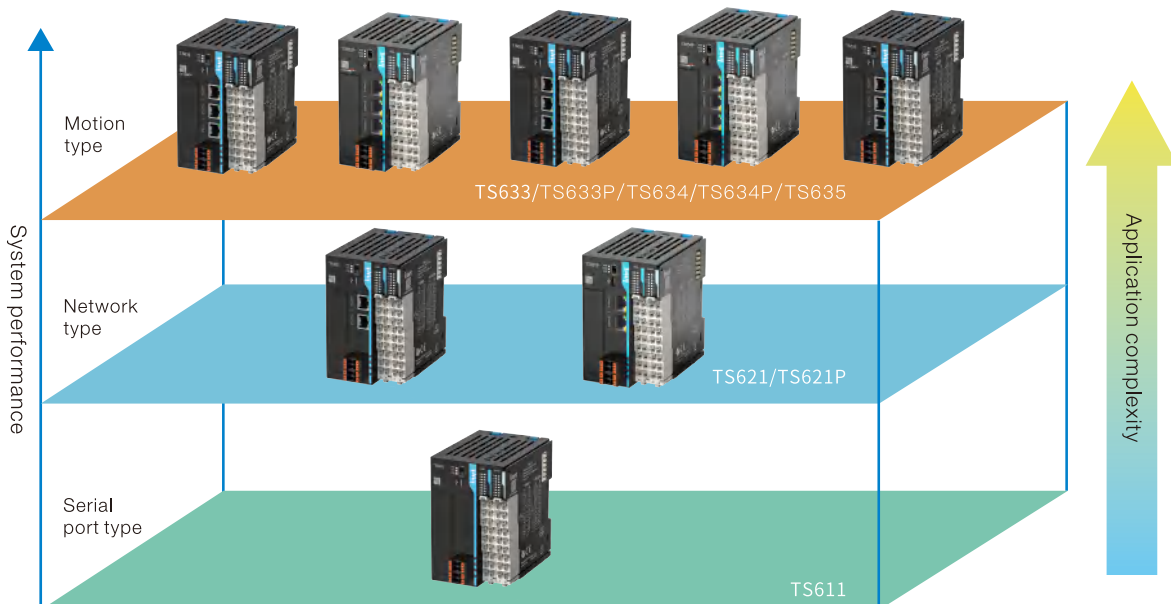
Product positioning

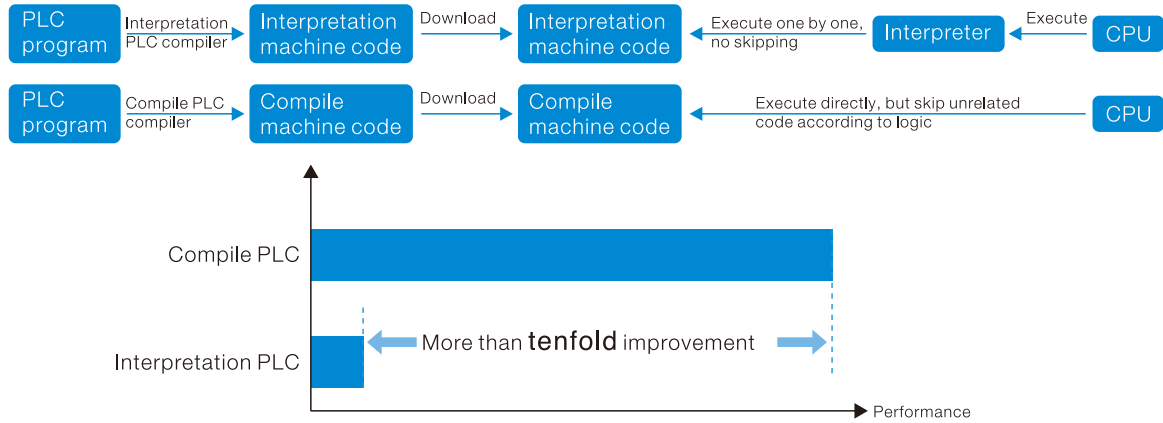### Running efciently

● 1G main frequency, compile command breakthrough, bit operation speeding up to 0.01μs

| PLC program | →Interpretation PLC compiler→ | Interpretation machine code | →Download→ | Interpretation machine code | ←Execute one by one, no skipping← | Interpreter | ←Execute← | CPU |

| PLC program | →Compile PLC compiler→ | Compile machine code | →Download→ | Compile machine code | ←Execute directly, but skip unrelated code according to logic← | | | CPU |

Compile PLC

Interpretation PLC

← More than **tenfold** improvement →

Performance

● 100Mbps backplane bus; 125μs IO refresh speed; plating process, reliable connection; saving data at power down, 1s power-down ride-through

Product positioning

High-speed motion control, easily implementing complex processes

up to 8-axis pulses

Up to 32 axes
1ms 16-axis synchronization
2ms 32-axis synchronization

EtherCAT
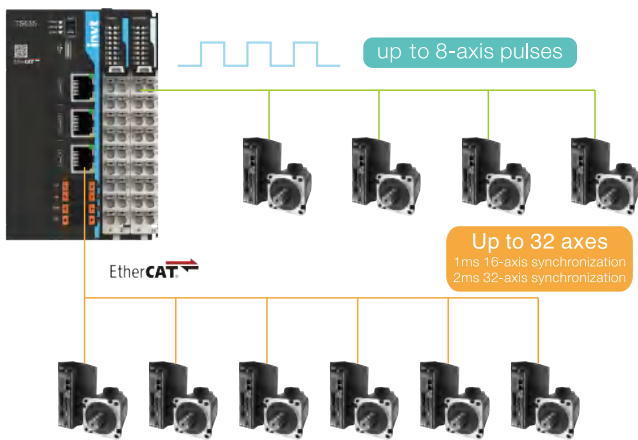
Single-axis control

Multi-axis control

Flying shear

speed and torque control

E-gear

Position control

E-CAM

Chasing shear

Homing

Interpolation

Multi-protocol support facilitates interconnection

● Dual-port design, makes cascading easy, and achieves the isolation between the internal network and external network

MODBUS TCP/UDP

USB

MES/ERP

RS232

Connecting instruments, meters, HMIs

MODBUS TCP

CANopen

RS485

EtherCAT

Connecting VFDs, HMIs, and so on

*Supports Ethernet/IP slave
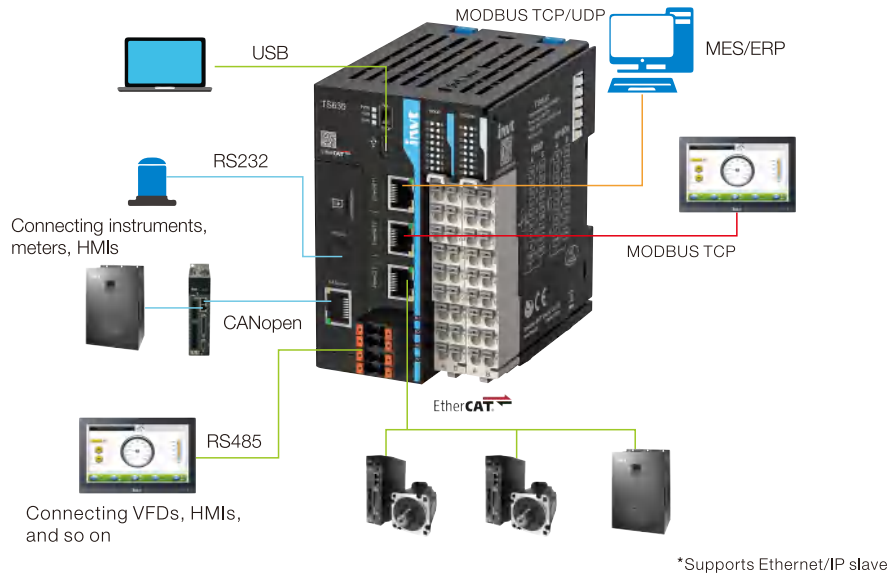
● Equipped with the brand new AutoStationPro
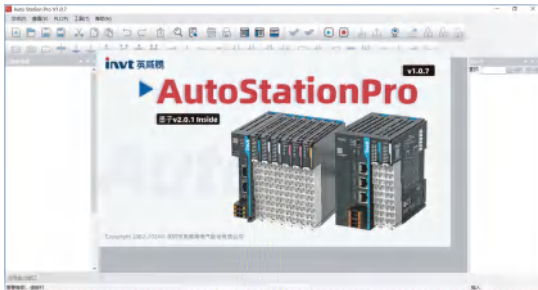
● Supporting user-defined variables

● Compliant with IEC61131 programming specifications, supporting the languages LD, SFC, IL, C, and ST (under development). The pulse and bus axes are compatible with a set of axis control commands.
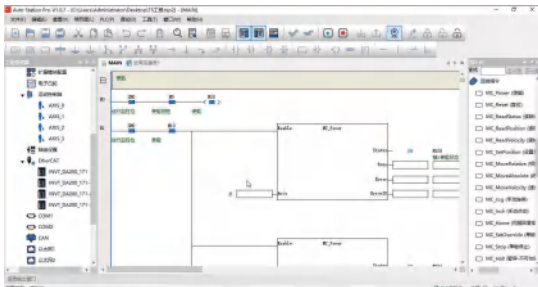
● Supporting graphic conguration through dragging, Easy parameter setup and automatic address allocation

- Trace function
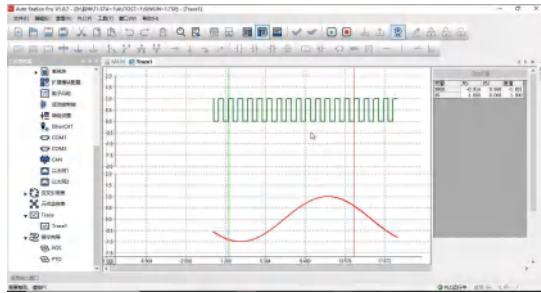
Easy scalability

Standard conguration of CPU
16 points of DI
8 200kHz high-speed inputs
16 points 0f DO
8/16 200KHz high speed outputs

Compatible with Flex series I/O modules for scaling
Up to 16 I/O modules can be expanded locally
Use of push-in terminals, facilitating wiring
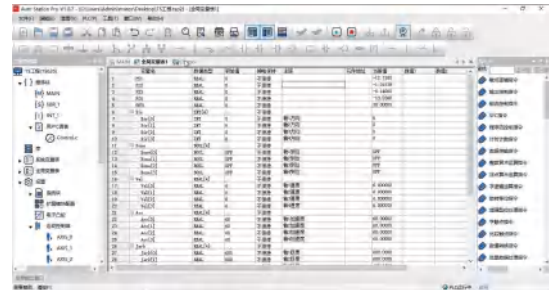Vertical plug-in assembly, with working time reduced by 80%
Mounting space reduced by more than 60%, compared with traditional modules
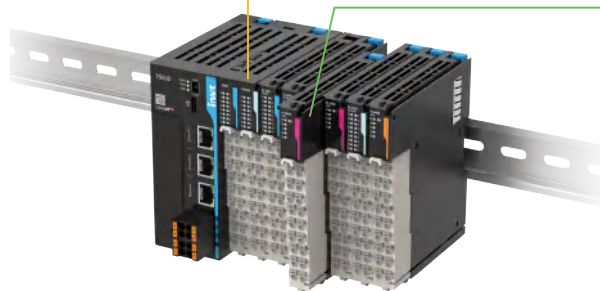
*TS611, TS621, TS621P supports 16 high-speed outputs of 200kHz

Supporting various expansion cards

RS232\CANopen

4G*

WIFI*

Supporting 72 EtherCAT slave nodes
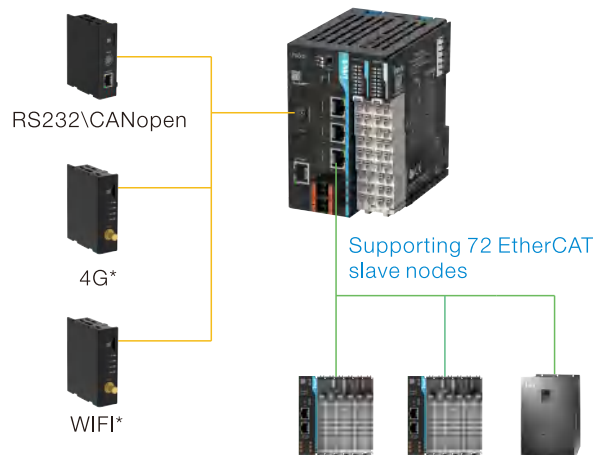
*4G and WIFI expansion card is under development

Model	TS635	TS634	TS634P	TS633	TS633P	TS621	TS621P	TS611
General specications								
EtherNet interface	2	2	2	2	2	2	2	−
EtherCAT interface	1	1	1	1	1	−	−	−
Max. number of axes (bus+pulse)	32 axes (bus) +4 axes (pulse)	16 axes (bus) +4 axes (pulse)	16 axes (bus) +4 axes (pulse)	8 axes (bus) +4 axes (pulse)	8 axes (bus) +4 axes (pulse)	8 axes (pulse)	8 axes (pulse)	8 axes (pulse)
RS485 BUS	2 channels, supporting Modbus RTU master/slave function							
EtherNet bus	Supporting Modbus TCP/UDP, program upload and download, and rmware upgrade							−
USB interface	1 channel, Type-C interface, supporting program upload and download, and rmware upgrade							
DI	16 inputs originally, including eight 200kHz high-speed inputs							
DO	Self-contained 16 inputs and 16 outputs, including 8 channels of 200kHz high-speed output					Self-contained 16 inputs and 16 outputs, including 16 channels of 200kHz high-speed output		
Pulse axis	Up to 4 axes					Up to 8 axes		
Input power	24V DC (-15% – +20%)/1A, supporting reversal protection							
Standalone power consumption	<3W							
Backplane bus power supply	5V/2.5A							
Power-down protection	Supported (retention by the internal ash)							
Real-time clock	Supported (CR2032 battery is optional; the real-time clock works about four days without a battery)							
Local expansion modules	Up to 16, disallowing hot swapping							
Local expansion card	1 expansion card, supporting SD card, CANopen card, RS232 card							
Program language	LD, SFC, IL, and C							
Program download	USB port, Ethernet port, SD card (expansion card), and remote download (expansion card)							
Program data capacity	200K steps of user program; 2MByte user-dened variables, in which 128KByte support power-down retention; About 150K soft elements, the soft elements numbered after 1000 support power-down retention							
Command speed (step)	20K step 0.2ms (logic command)							
Bit handling command	0.0127µs							
Word transmission command	0.0014µs							
Floating-point transmission command	0.0027µs							
Four operations of math	0.033µs							
Power specications								
Terminal input power rated voltage	24V DC							
Terminal input power rated current	1A							
24V input power protection	Protection against reverse connection and surges							
Hot swapping of module	Not supported							
Input specications								
Input type	DI							
Number of input channels	16							
Input mode	Source and sink							
Input voltage class	24V DC (-10% -+10%)							
Input current	Typical value for X0–X7: 13.5mA; Typical value for X10–X17: 4.2mA							
Max. input frequency	200kHz for X0–X7; 200Hz for X10–X17							
Input resistance	Typical value for X0–X7: 1.7kΩ; Typical value for X10–X17: 5.7kΩ							
ON voltage	≥15VDC							
OFF	≤5VDC							
Isolation method	Capacitive isolation							
Common terminal method	8 channels/group							
Input action display	When the input is in the driving state, the input indicator is on (software control)							

Model	TS635	TS634	TS634P	TS633	TS633P	TS621	TS621P	TS611
Output specications								
Output type	Transistor output							
Number of output channels	16							
Output mode	Sink type		Source type	Sink type	Source type	Sink type	Source type	Sink type
Output voltage class	24V DC (-10%-+10%)							
Output load (resistive)	0.5A/point, 2A/group							
output load (inductive)	7.2W/point, 24W/group							
Hardware response time	≤2μs							
Load current requirement	Load current ≥ 12mA when output frequency is greater than 10kHz							
Max. output frequency	200kHz for resistive load, 0.5Hz for inductive load, and 10Hz for lighting load							
Leakage current at OFF	Below 30μA (24V typical voltage)							
Max. residual voltage at ON	≤0.5VDC							
Isolation method	Capacitive isolation							
Common terminal method	8 channels/group							
Short-circuit protection function	Supported							
External inductive load requirement	Flyback diode needed for external inductive load connection							
Output action display	When the output is valid, the output indicator is on (software control)							
Output derating	The current at each common terminal group cannot exceed 1A at ambient temperature of 55℃							

Product dimensions
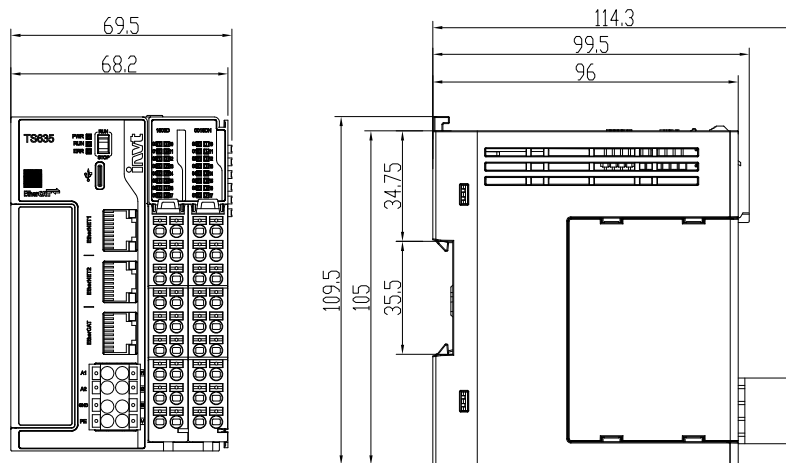
Expansion card specification

Model	TS-CAN-232
Product description	TS600 series expansion card, which supports. Micro SD cards, CANopen bus, and one channel of RS232 communication
IP rating	IP20
Working temperature	-20℃-55℃
Terminal resistor	Built-in terminal resistor, which can be selected through the dial switch
RS232	1
CAN communication baud rate	1Mbps: Distance<20m 500Kbps: Distance<80m 250Kbps: Distance<150m 125Kbps: Distance<300m 100Kbps: Distance<500m 50Kbps: Distance<1000m
SD card capacity	Up to 32GB
SD card specications	Micro SD
SD card communication interface	SDIO
Hot swapping	Supported by SD cards, but not supported by the expansion card

Small PLC

Medium PLC

I/O System

HMI

Industrial Internet

| Material code	Model	Description	Dimension
● IVC1L main module ●			
11060-00076	IVC1L-0806MAR	8 digital inputs, 6 relay outputs, AC220V power supply	135×90×81.2mm
11060-00077	IVC1L-0806MAT	8 digital inputs, 6 transistor outputs, AC220V power supply	135×90×81.2mm
11060-00070	IVC1L-1410MAR	14 digital inputs, 10 relay outputs, AC220V power supply	135×90×81.2mm
11060-00071	IVC1L-1410MAT	14 digital inputs, 10 transistor outputs, AC220V power supply	135×90×81.2mm
11060-00068	IVC1L-1614MAR	16 digital inputs, 14 relay outputs, AC220V power supply	150×90×81.2mm
11060-00069	IVC1L-1614MAT	16 digital inputs, 14 transistor outputs, AC220V power supply	150×90×81.2mm
11060-00066	IVC1L-1614MAR1	16 digital inputs, 14 relay outputs, integrated 2AI and 1AO, AC220V power supply	182×90×81.2mm
11060-00067	IVC1L-1614MAT1	16 digital inputs, 14 transistor outputs, integrated 2AI and 1AO, AC220V power supply	182×90×81.2mm
11060-00064	IVC1L-2416MAR	24 digital inputs, 16 relay outputs, AC220V power supply	182×90×81.2mm
11060-00065	IVC1L-2416MAT	24 digital inputs, 16 transistor outputs, AC220V power supply	182×90×81.2mm
11060-00062	IVC1L-3624MAR	36 digital inputs, 24 relay outputs, AC220V power supply	224.5×90×81.2mm
11060-00063	IVC1L-3624MAT	36 digital inputs, 24 transistor outputs, AC220V power supply	224.5×90×81.2mm
11060-00198	IVC1L-1616MAR6	24 digital inputs, 16 relay outputs, integrated 2 thermal resistor (PT), AC220V power supply	182×90×81.2mm
11060-00139	IVC1L-0806MDR	8 digital inputs, 6 relay outputs, DC24V power supply	135×90×81.2mm
11060-00138	IVC1L-0806MDT	8 digital inputs, 6 transistor outputs, DC24V power supply	135×90×81.2mm
11060-00143	IVC1L-1410MDR	14 digital inputs, 10 relay outputs, DC24V power supply	135×90×81.2mm
11060-00142	IVC1L-1410MDT	14 digital inputs, 10 transistor outputs, DC24V power supply	135×90×81.2mm
11060-00145	IVC1L-1614MDR	16 digital inputs, 14 relay outputs, DC24V power supply	150×90×81.2mm
11060-00144	IVC1L-1614MDT	16 digital inputs, 14 transistor outputs, DC24V power supply	150×90×81.2mm
11060-00147	IVC1L-2416MDR	24 digital inputs, 16 relay outputs, DC24V power supply	182×90×81.2mm
11060-00146	IVC1L-2416MDT	24 digital inputs, 16 transistor outputs, DC24V power supply	182×90×81.2mm
11060-00149	IVC1L-3624MDR	36 digital inputs, 24 relay outputs, DC24V power supply	224.5×90×81.2mm
11060-00148	IVC1L-3624MDT	36 digital inputs, 24 transistor outputs, DC24V power supply	224.5×90×81.2mm
● IVC1L extension module ●			
11060-00207	IVC1L-0808ENR	8 digital inputs, 8 relay outputs	61×90×81.2mm
11060-00204	IVC1L-0808ENT	8 digital inputs, 8 transistor outputs	61×90×81.2mm
11060-00205	IVC1L-1600ENN	16 digital inputs	61×90×81.2mm
11060-00217	IVC1L-0016ENT	16 transistor outputs	61×90×81.2mm
11060-00206	IVC1L-0016ENR	16 relay outputs	61×90×81.2mm
11060-00214	IVC1L-2AD	2 analog input	61×90×81.2mm
11060-00212	IVC1L-2DA	2 analog outputs	61×90×81.2mm
11060-00215	IVC1L-2TC	2 thermocouple	61×90×81.2mm
11060-00216	IVC1L-2PT	2 thermal resistance	61×90×81.2mm
11060-00209	IVC1L-4AD	4 analog inputs	61×90×81.2mm
11060-00208	IVC1L-4DA	4 analog outputs	61×90×81.2mm
11060-00210	IVC1L-4TC	4 thermocouple	61×90×81.2mm
11060-00213	IVC1L-4PT	4 thermal resistance	61×90×81.2mm
11060-00211	IVC1L-5AM	4 analog inputs, 1 analog output	61×90×81.2mm
● IVC PLC spare part ●			
67005-00004	IVC-SL1	PLC-VS HMI 232 communication cable (2m)	2m
67005-00001	IVC-SL2	PLC download cable, USB-RS232 (Port0)(2m)	2m
67005-00002	IVC-SL3	PLC-VT/VK/VA HMI 232 communication cable (3m)	3m
67005-00003	IVC-SL4	HMI download cable, available for VT/VK/VA/VS series (2m)	2m
67005-00259	IVC-SL5	PLC-VT/VK/VA HMI 232 communication cable (7m)	7m
67005-00391	IVC-SL8	PLC-VS HMI 232 communication cable (7m)	7m
67005-00392	IVC-SL9	IVC1L extension cable (1m)	1m
● TS600 main module ●			
11060-00315	TS611	16 inputs and 16 transistor outputs, 1×USB (TypeC), 2×RS485, 8 channels of 200K input, 16 channels of 200K output, up to 8 axes (pulse axes)	CE
11060-00318	TS621	16 inputs and 16 transistor outputs, 1×USB (Type-C), 2×RS485, 8 channels of 200K input, 16 channels of 200K output, 2×EtherNet, up to 8 axes (pulse axes)	CE
11060-00318	TS621P	16 inputs and 16 transistor (PNP) outputs, 1×USB (Type-C), 2×RS485, 8 channels of 200K input, 16 channels of 200K output, 2×EtherNet, up to 8 axes (pulse axes)	CE
11060-00317	TS633	16 inputs and 16 transistor outputs, 1×USB (Type-C), 2×RS485, 8 channels of 200K input, 8 channels of 200K output, 2×EtherNet, 1×EtherCAT, up to 12 axes (8 bus axes + 4 pulse axes)	CE
11060-00317	TS633P	16 inputs and 16 transistor (PNP) outputs, 1×USB (Type-C), 2×RS485, 8 channels of 200K input, 8 channels of 200K output, 2×EtherNet, 1×EtherCAT, up to 12 axes (8 bus axes + 4 pulse axes)	CE
11060-00316	TS634	16 inputs and 16 transistor outputs, 1×USB (Type-C), 2×RS485, 8 channels of 200K input, 8 channels of 200K output, 2×EtherNet, 1×EtherCAT, up to 20 axes (16 bus axes + 4 pulse axes)	CE
11060-00316	TS634P	16 inputs and 16 transistor (PNP) outputs, 1×USB (Type-C), 2×RS485, 8 channels of 200K input, 8 channels of 200K output, 2×EtherNet, 1×EtherCAT, up to 20 axes (16 bus axes + 4 pulse axes)	CE
11060-00312	TS635	16 inputs and 16 transistor outputs, 1×USB (Type-C), 2×RS485, 8 channels of 200K input, 8 channels of 200K output, 2×EtherNet, 1×EtherCAT, up to 36 axes (32 bus axes + 4 pulse axes)	CE
● TS600 series expansion card module ●			
11060-00313	TS-CAN-232	TS600 series expansion card TS-CAN-232, which supports Micro SD cards, CANopen bus, and one channel of RS232 communication	CE

Medium PLC

Industrial control technology based on the CODESYS platform
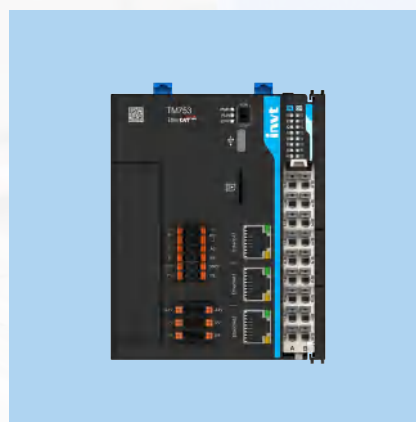
The AX series controller is a motion control programmable controller for multi-axis motion control and high-order motion control needs based on the CODESYS platform and EtherCAT bus technology. It adopts modular design, integrates rich communication interfaces and high-level motion control functions, and quickly builds an industrial control network.

- CPU module
- Power supply module
- Digital input/output module
- Analog input/output module
- Temperature detection module
- EtherCAT communication module
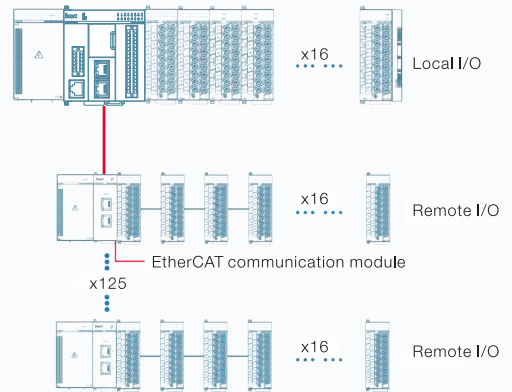
Advanced motion control

The AX series controller integrates rich motion control functions, and realizes high-level motion control such as electronic cam, electronic gear, and synchronous control through high-speed EtherCAT bus or pulse.
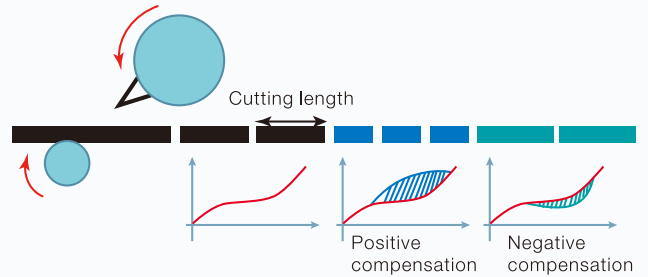
Quintic polynomial cam curve processing

- By specifying velocity, position, and acceleration boundary conditions, a continuous trajectory is obtained and the motion trajectory is smoother.
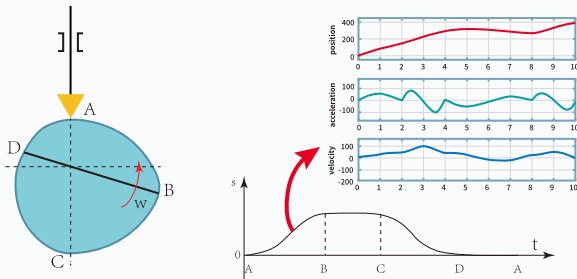
Modify the CAM curve online

- Position compensation is performed for deviations in the trajectory of the motion without the need to regenerate the cam curve.

Multi-axis linear interpolation

- The 2/3/4 axes move in a straight line at the same time, supporting relative/absolute position operation.
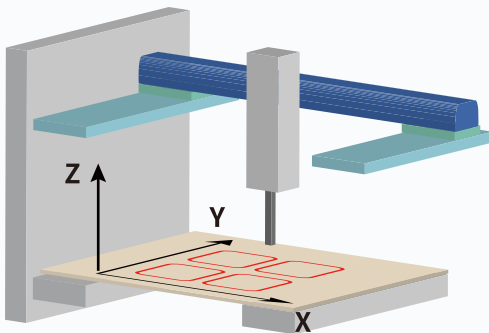
Arc interpolation

- Support plane XY/XZ/YZ any 2-axis arc interpolation, using trigonometric function interpolation, trajectory distortion control within 0.001mm.

Industry-specific process libraries

The extensive industry application experience helps us to understand customers at a deeper level, and then according to the characteristics of the industry, the common part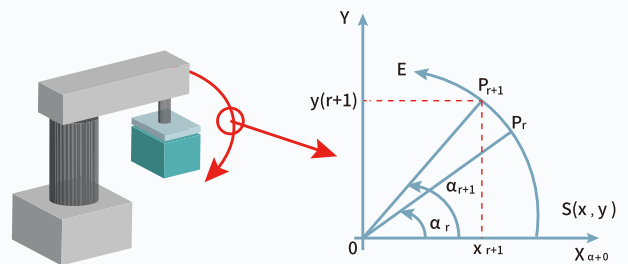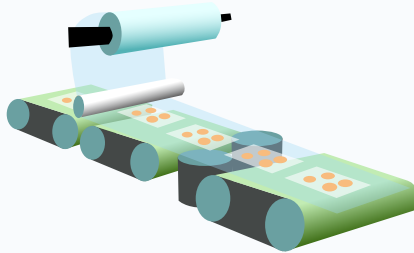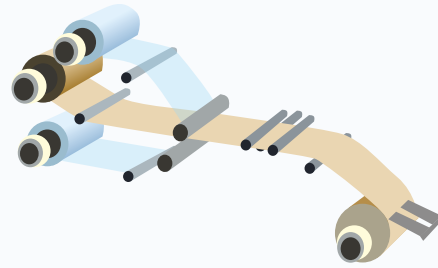s of the complex process are extracted and condensed, encapsulated internally, and users only need to simply configure the interface parameters to achieve complex control, effectively shorten the engineer's programming and debugging time, improve efficiency, and reduce costs.

Packaging industry process library

Retract and unwind process library

Multi-level open network

The CPU integrates standard common buses and interfaces such as EtherCAT, Ethernet, CANopen, RS485, etc., flexibly deploys communication networks, and creates a highly adaptable automation control system.

LAN network interface
- As a Modbus TCP slave, it can communicate with 16 masters
- As a ModbusTCP master, it can connect 63 slaves

RS485 serial interface
- 2-channel independent serial interface
- Support ModbusRTU master/slave
- As a ModbusRTU master, 31 slave devices can be connected

EtherCAT real-time networking
- CPU supports max. 32 EtherCAT axes
- Suuport 125 EtherCAT slave module
- Support servo axis and expansion rack expansion at the same time
- The bus communication rate is 100Mbps, and the maximum distance between the two nodes is 100m

PC   HMI   Modbus TCP master

Switch

31   Modbus
Modbus RTU

Ethernet

EtherCAT

63   CANopen

x16   Remote I/O

x125

x16   Remote I/O

Local high-speed I/O
- 4-channel differential input
- 12-channel 200kHz single-ended input
- 8-channel 200kHz single-ended output with 4-axis pulse motion control

CANopen interface
- As a CANopen master, 63 slave devices can be connected

- EtherCAT bus control on 8/16/32 axes
- High-order motion control such as electronic cams
- Industry-specific process libraries
- 6 standard programming language in IEC61131-3

Technical specification

Model		AX70-C-1608N	AX71-C-1608N	AX72-C-1608N
Rated working voltage		DC24V (-5%~+5%)		
Storage				
Program capacity	Size	10M Word		
	Quantity	POU definition:3000 POU instance:6000		
Data capacity		8M Word		
Power down maintains data capacity		512K Bytes		
Maximum capacity of the SD card		32G		
I/O				
High speed IO		16 channels high-speed input, 8 channels high-speed output		
The maximum number of local extension modules		16	16	16
Max. IO point	Local	256	256	256
	EtherCAT bus	32000	15872	7936
High speed input		4 differential input + 12 200kHz single-ended input, supports 8 single-phase or A/B phase high-speed counting (supports 1x and 4x)		
High speed output		8-channel 200kHz single-ended output with 4-axis pulse motion control		
IO interruption		8-channel high-speed interruption		
Communication networks and interfaces				
Ethernet		1×RJ45, 10BASE-T or 100BASE-TX, support PLC software download, ModbusTCP, TCP/IP protocol		
EtherCAT		1×RJ45, 100BASE-TX, the distance between the two slave stations is less than 100m		
CANopen		1×RJ45,100BASE-TX		
Serial communication (RS485)		In-line terminals with ModbusRTU master/slave support		
USB		1× Mini USB, PC communication, program download and debugging		
Memory card		1× Micro SD for field software system upgrades		
Connection between PLCs		Ethernet/ModbusRTU		
PC software connection		Ethernet/Modbus		
Modem connection		Support		
Instruction cycle				
Bit operation time		1ns		
Word operation time		4ns		
Fixed-point operation time		80ns		
Floating-point operation time		150ns		
Motion control				
Control axes	EtherCAT max. control axes	32	16	8
Point movement	Manual function	●	●	●
	Homing function	●	●	●
	Fixed-point function	●	●	●
	Speed control	●	●	●
	Variable speed function	●	●	●
	Emergency stop function	●	●	●
	Halt function	●	●	●
	Reset function	●	●	●
	Position overlay function	●	●	●
	Magnification change function	●	●	●
	Time position control	●	●	●
	Time speed control	●	●	●
Interpolation function (pulse)	Linear interpolation	4 axes, 200kHz,supporting three modes, pulse + sign, forward/reverse pulse train, and quadrature coded pulse		
	Planar arc interpolation	2 axes, 200kHz,supporting three modes, pulse + sign, forward/reverse pulse train, and quadrature coded pulse		

Model		AX70-C-1608N	AX71-C-1608N	AX72-C-1608N
Motion control				
Electronic cam	Max. quantity of cam table	64 tables		
	Max. points of total cam tables	4194240		
	Max. points of single cam table	65535		
Electronic gear		●		
Motion control cycle		The EtherCAT data communication cycle uses the same control cycle; the pulse communication cycle is 1ms		
Position unit		Pulse count, millimeters, inches		
The maximum number of axes for		4 axes, 200kHz, support pulse + sign, forward/reverse pulse train and quadrature coded pulse three		
Clock				
Internal clock		When the ambient temperature is 55 °C: the error is -3.5 ~ +0.5 minutes / month When the ambient temperature is 25 °C: the error is -1.5 ~ +1.5 minutes / month When the ambient temperature is 0 °C: the error is -3 ~ +1 minute / month		
Configuration programming				
Programming platform		Invtmatic Studio		
programming language		IL, ST, FBD, LD, CFC, SFC		
Basic specification				
Operating ambient temperature		-10~55°C		
Operating ambient humidity		10%~95% (No condensation)		
Storage ambient temperature		-40~70°C		
Storage ambient humidity		10%~100% (Non-condensing)		
IP rating		IP20		
Operating environment		No corrosive gases		
Altitude		2000 meters or less above sea level		
Installation location		Inside the control cabinet		
Degree of contamination		2 or less: Compliant with IEC61131-2		
Surges		2kV		
Anti-interference		Power cord 2kV (according to IEC61000-4-4 standard)		
Electrostatic rating		6kV CD or 8kV AD		
Vibration resistant		3.5mm amplitude within 5~8.5Hz; 10m/s^2 acceleration within 8.5~150Hz; X/Y/Z axis, 10 cycles		
Dimensions and weight				
Dimension (W×H×D)		80×90×95mm (excl. terminal) 80×90×113mm (incl. terminal)		
Weight		0.38kg		

Note: ● indicates support; ▬ indicates not support

● Power supply module

Model	AX-PWR
Input power	AC100~240V (-15%~+10%)
Input frequency	50/60Hz (-5%~+5%)
Output voltage	DC24V (-5%~+5%)
Output current	2A
Efficiency	>70%
Overcurrent protection	Support
Fuse	Built-in
Dimension (W×H×D)	50×90×95mm
Material code	11015-00002

● Digital input module

Model	AX-EM-1600D
Internal power supply	5VDC (-10%~10%)
Extend bus consumption	5V/50mA
Number of channels	16
Input type	NPN/PNP
Input voltage	DC24V
Input current	4.7mA
Port filtering time	10ms
Logic 1 signal	≥15V DC
Logic 0 signal	≤5V DC
Isolation mode	Photocoupler isolation
Dimension (W×H×D)	32×90×117mm
Material code	11015-00004

● Digital output module

Model	AX-EM-0016DP
External power supply	DC24V (-15%~+5%)
Internal power supply	5VDC (-10%~10%)
Extend bus consumption	5V/60mA
Number of channels	16
Output type	Transistor PNP output, active-high
Output voltage	12V~24V (-15%~+5%)
Max. load	0.5A/point; 2A/Common side (resistive load)
Leakage current at each point	<10uA
OFF→ON response time	Max. 0.5ms (100mA/24VDC)
ON→OFF response time	Max. 0.5ms (100mA/24VDC)
Isolation mode	Magnetic isolation
Short-circuit resistant output	Yes (Limit maximum current to 1.7A during protection)
Dimension (W×H×D)	32×90×117mm
Material code	11015-00005

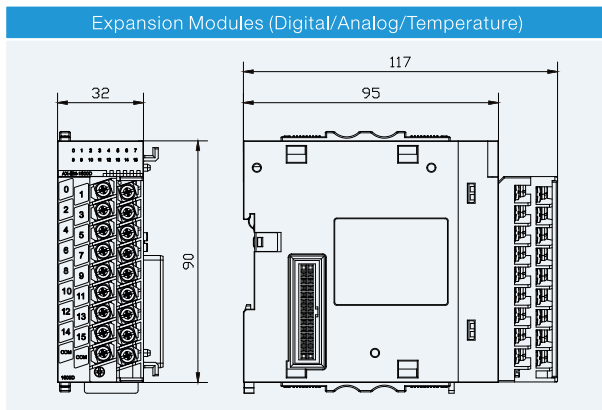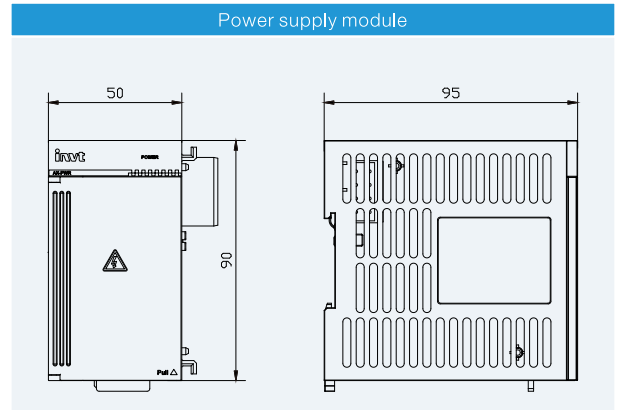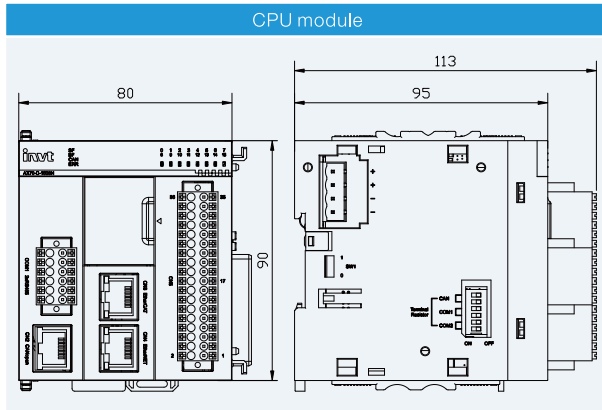| Model	AX-EM-0016DN
External power supply	DC24V (-15%~+5%)
Internal power supply	5VDC (-10%~10%)
Extend bus consumption	5V/60mA
Number of channels	16
Output type	Transistor NPN output, active low
Output voltage	12V~24V (-15%~+5%)
Max. load	0.5A/point; 2A/Common side (resistive load)
Leakage current at each point	<9uA
OFF→ON response time	Max. 0.5ms (100mA/24VDC)
ON→OFF response time	Max. 0.5ms (100mA/24VDC)
Isolation mode	Magnetic isolation
Short-circuit resistant output	Yes (Limit maximum current to 1.7A during protection)
Dimension (W×H×D)	32×90×117mm
Material code	11015-00006

Model	AX-EM-4AD
Internal power supply	5VDC (-10%~10%)
Extend bus consumption	5V/138mA
Number of channels	4
Voltage range	-10V~+10V, -5V~+5V, 0~5V, 0~10V
Current range	-20mA~+20mA, 0~20mA, 4~20mA
Resolution	24bit
Normal temperature accuracy (25℃)	Voltage±0.1%FS, current±0.1%FS
Conversion speed	1ms/channel
Limit voltage	±12V
Limit current	±24mA
Max. common-mode voltage between channels	30VDC
Isolation mode	Between I/O ports and power supplies: Isolated channels: Not isolated
Dimension (W×H×D)	32×90×117mm
Material code	11015-00007

● Analog output module

Model	AX-EM-4DA
External power supply	24VDC (-15%~+20%)
Internal power supply	5VDC (-10%~+10%)
Extend bus consumption	5V/100mA
Number of channels	4
Voltage range	-10V~+10V, -5V~+5V, 0~5V, 0~10V
Current range	0~20mA, 4~20mA
Resolution	16bit
Normal temperature accuracy (25℃)	Voltage±0.1%FS, current±0.1%FS
Conversion speed	1ms/channel
Voltage output load	10kΩ~1MΩ
Current output load	0Ω~1kΩ
Isolation mode	Between I/O ports and power supplies: Isolated channels: Not isolated
Dimension (W×H×D)	32×90×117mm
Material code	11015-00010

● Temperature detection module

Model	AX-EM-4PTC
Internal power supply	5VDC (-10%~+10%)
Extend bus consumption	5V/150mA
Number of channels	4
Wiring method	2/3/4 wirings
Thermal resistance	Pt100, Pt500, Pt1000, CU100
Thermocouple	B, E, J, K, N, R, S, T
Resolution	24bit
Sensitivity	0.1˚C/˚F
Sampling period	1.5s/chanenl
Normal temperature accuracy (25℃)	Thermal resistance: ±0.3%FSThermocouple: ±0.1%FS±1˚C
Operating temperature accuracy	Thermal resistance: ±1%FSThermocouple: ±0.3%FS±1˚C
Cold junction compensation	Inside/Outside
Isolation mode	Between I/O ports and power supplies: Isolated channels: Not isolated
Dimension (W×H×D)	32×90×117mm
Material code	11015-00009

● Communication module

| Model	AX-EM-RCM-ET
Power supply	24VDC (-15%~+20%)
Communication protocols	EtherCAT
Synchronization mode	I/O uses input-output synchronization
Physical layer	100Base-TX
Transmission rate	100Mbps
Transmission distance	Maximum 100m between two nodes
Number of slaves	1~125, The internal address is automatically arranged by the network bus connection sequence
Duplex mode	Full duplex
Topology	Linear
Process data	A single Ethernet frame can be up to 1486 bytes in size
Refresh time	1000 switching inputs and outputs are approximately 30us
Dimension (W×H×D)	32×90×95mm
Material code	11015-00008

AX series product dimension

CPU module

Power supply module

Expansion Modules (Digital/Analog/Temperature)

Communication module

Tail plate
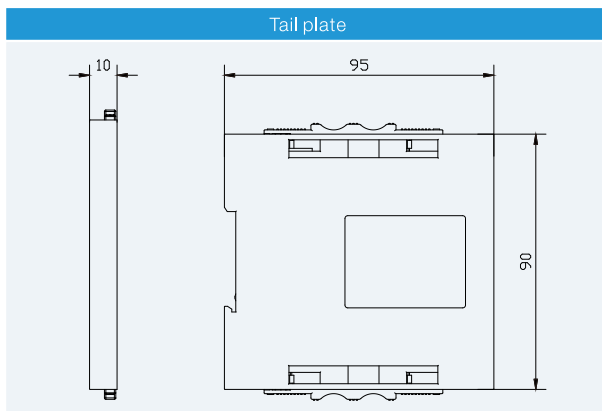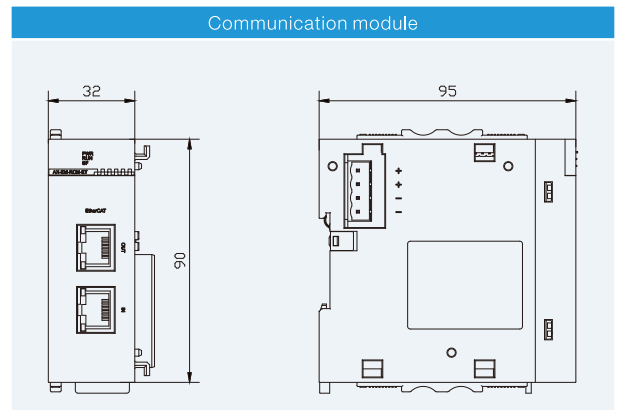
Medium PLC prodcut list

Material code	Model	Description	Dimension
11015-00014	AX70-C-1608N	CPU module; EtherCAT(32axes)/CANopen/Ethernet, Rs485×2, NPN output; RoHS	80×90×113mm
11015-00013	AX71-C-1608N	CPU module; EtherCAT(16axes)/CANopen/Ethernet, Rs485×2, NPN output; RoHS	80×90×113mm
11015-00015	AX72-C-1608N	CPU module; EtherCAT(8axes)/CANopen/Ethernet, RS485×2, NPN output; RoHS	80×90×113mm
11015-00002	AX-PWR	Power supply module; Input:100~240VAC50Hz/60Hz, output:2A, 24VDC; RoHS	32×90×95mm
11015-00004	AX-EM-1600D	Digital input module; 16-point input, 24VDC, NPN/PNP; RoHS	32×90×117mm
11015-00005	AX-EM-0016DP	Digital output module; 16-point PNP output, 500mA, 24VDC; RoHS	32×90×117mm
11015-00006	AX-EM-0016DN	Digital output module; 16-point NPN output, 500mA, 24VDC; RoHS	32×90×117mm
11015-00007	AX-EM-4AD	Analog input module; 4 channels, 24bit resolution, accuracy±0.1%; RoHS	32×90×117mm
11015-00010	AX-EM-4DA	Analog output module; 4 channels,16bit resolution, accuracy±0.1%; RoHS	32×90×117mm
11015-00008	AX-EM-RCM-ET	Communication module; EtherCAT slave module, support 16I/O modules; RoHS	32×90×95mm
11015-00009	AX-EM-4PTC	Temperature detection module; 4 channels, 24bit resolution, 0.1˚C/˚F; RoHS	32×90×117mm

TM700 series

The TM700 series high-performance programmable controller is mainly designed for scenarios with high motion control requirements and complex control networks. It has significant improvements in control performance, communication capabilities, and programming efficiency, allowing you to build control networks flexibly. Through OPCUA, the data interaction with the information layer is more convenient, further improving device takt time, shortening development cycles, and bringing an enhanced experience.
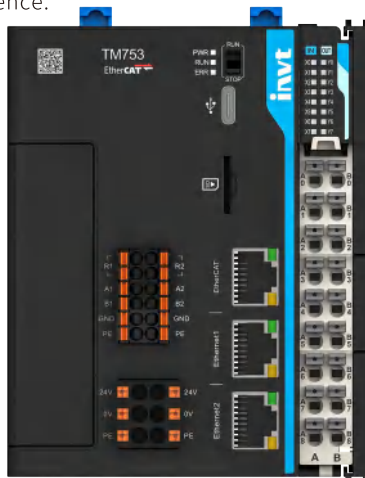
Powerful motion control

EtherCAT bus control is available, with standard PLCOpen motion control function, supported by industry process packages, enabling rapid development of motion control programs.

Informationization

The module supports multiple international standard communication networks, flexible construction of multi-level open communication networks, and seamless integration with upper level systems such as MES/ERP through OPC UA.

Cloud collaboration

With Extcard for functional extensions such as 4G and Wi-Fi, remote operation and maintenance and digital management of devices are available through the IWoCloud cloud platform and IWoScience IoT business system.

Easy programming

Multiple programming languages are supported, including LD, IL, SFC, CFC, FBD, and ST, and servo and VFD debugging can be conducted through Invtmatic Studio, significantly enhancing programming efficiency.

Powerful motion control

- 1ms@16 axes EtherCAT bus motion control, achieving multi-axis collaboration, significantly shortening the takt time
- 8 high-speed inputs and 8 high-speed outputs integrated, supporting functions such as encoder input, hardware latch, high-speed comparison output, and pulse axis. It has precise position control and is widely used in labeling, flying trigger and other scenarios
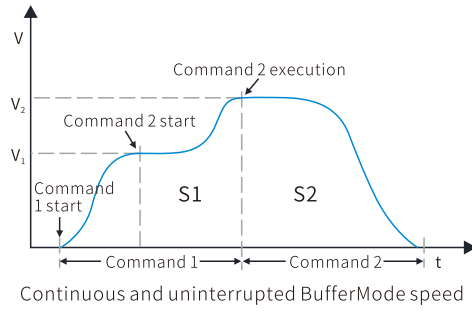

A0–A7: 8 high-speed inputs

· Four high-speed counters
· Probe, reset, preset value input

B0–B7: 8 high-speed outputs

· 4 groups of pulse axis
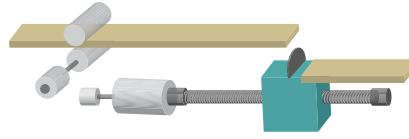· 4 groups of PWM output
· 4 high-speed comparison outputs

● Supporting BufferMode function for smooth motion, reducing impact on machinery and improving productivity

Continuous and uninterrupted BufferMode speed

● Supporting high-order motion control of electronic cams and gears
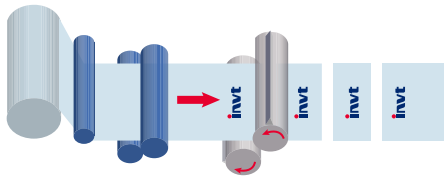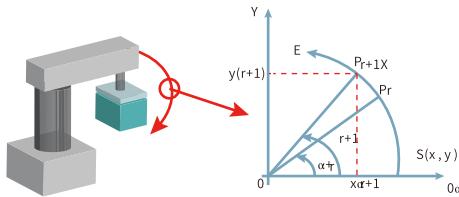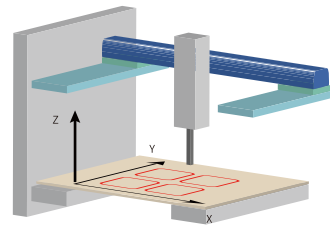

Flying shear

Linear flying shear

● Supporting multiple interpolation functions, such as linear interpolation, arc interpolation, and spiral interpolation
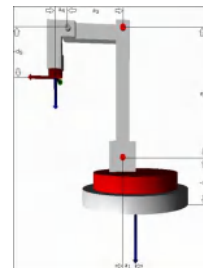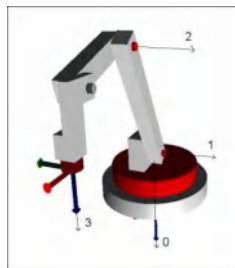

Arc interpolation

Multi-axis linear interpolation

● Supporting axis group function, with kinematic models integrating with multiple standards, easily achieving control of various types of robotic arms

● Industry-specific process libraries, integrated with a wealth of industry-specific process instructions, reducing the difficulty of process development and shortening the solution development cycle
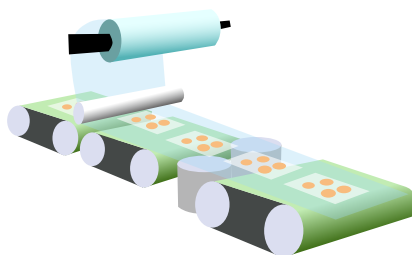
Process library for packaging industry

Winding and unwinding process library

Efficient network
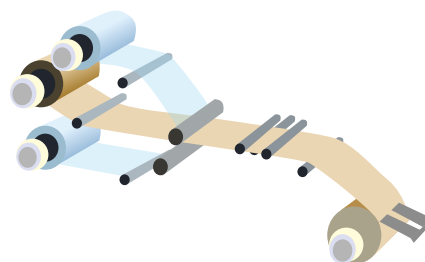
● Supporting rich network interfaces and protocols, EtherCAT, ModbusTCP, TCP/IP, UDP, EtherNet/IP*, Modbus RTU, and CANopen, enabling a multi-level network structure and flexible construction of control network
● OPC UA, tag communication, allowing efficient information exchange with simple configuration

Digitalization

● With the help of INVT IWoScence IoT business system, remote management, maintenance, analysis, and monitoring of equipment can be achieved. It has a friendly interface, simple operation, and complete functions, solving the problems of inconvenient management, maintenance, and monitoring in the application industry due to the complex environment where the equipment is located, making the work smarter and more efficient

Remote O&M

● The Extcard can be used to extend functions such as CANopen, 4G, Wi-Fi, etc. It can also achieve remote PLC debugging, program updates, firmware updates, and other functions with just one click through INVT WoCloud cloud platform
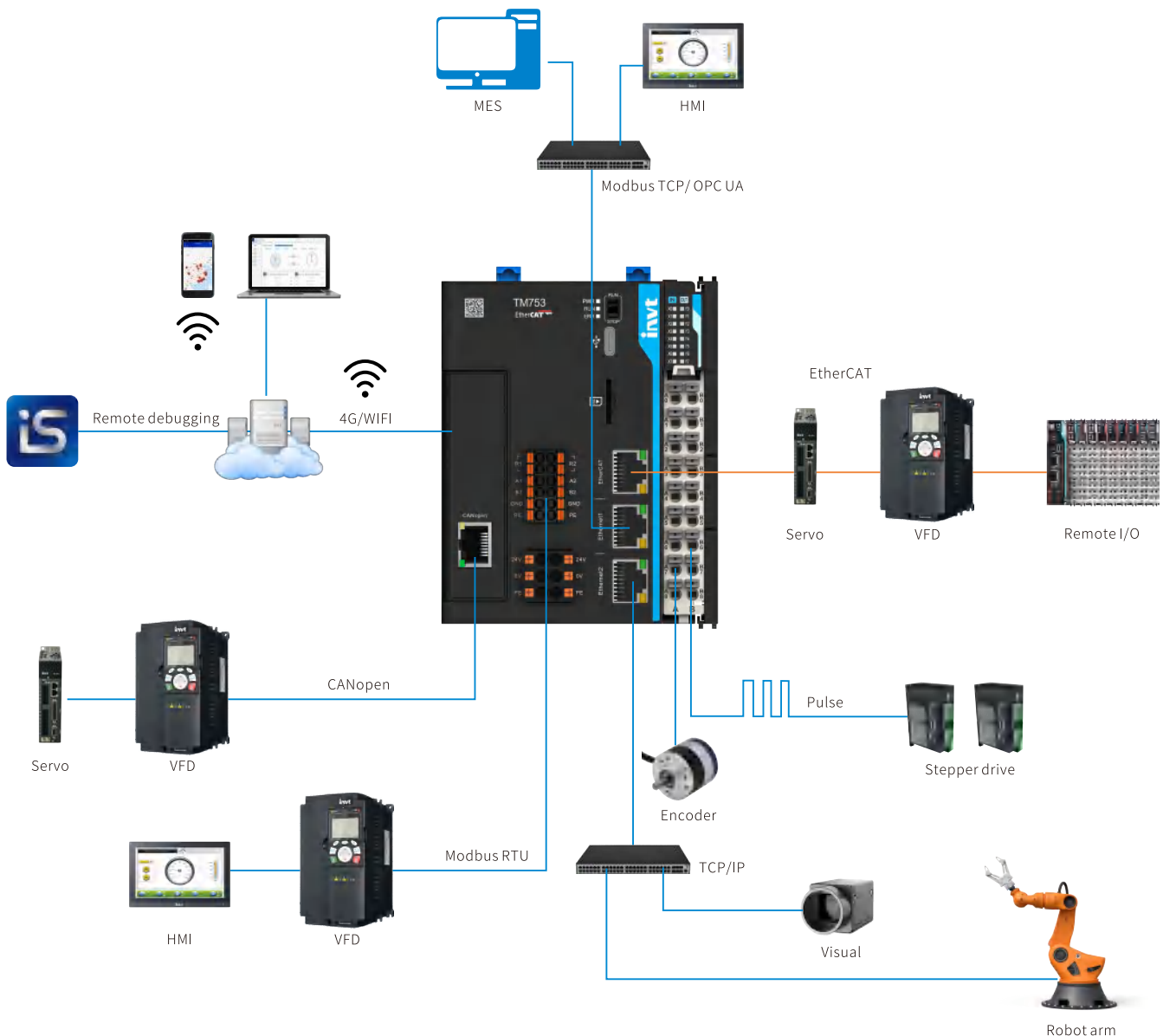
* EtherNet/IP is expected to be implemented in Q3

- Visibility of variable usage helps with program optimization and troubleshooting
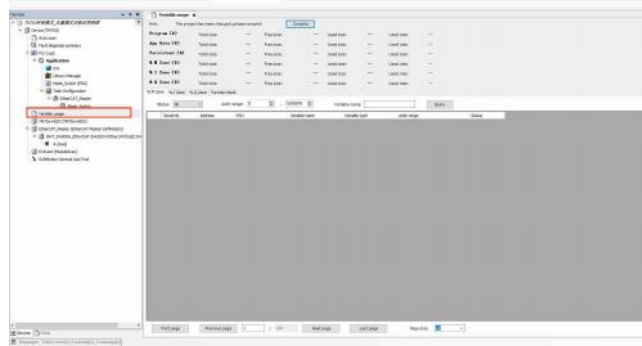
- Host controller reads and writes servo function codes and VFD function codes, making it easy to debug

- Axis unit conversions, clear and concise

- Homing method, easy to understand

Technical specifications

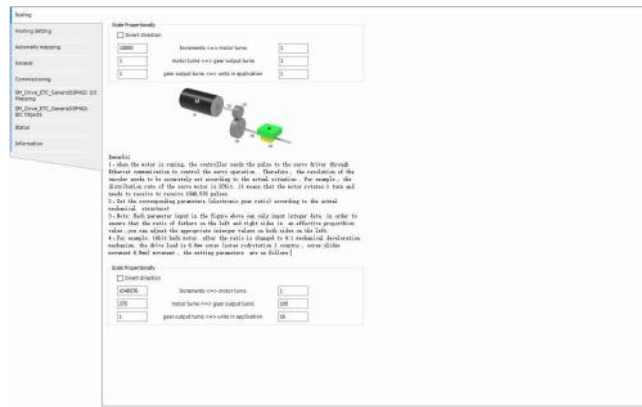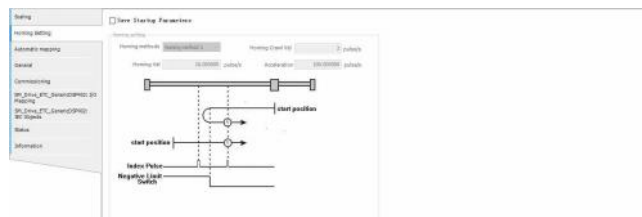| Model	TM750	TM751	TM752	TM753
Rated working voltage	DC24V(-15%~+20%)			
Memory				
Program capacity	20MB			
Data capacity	64MB			
Capacity of data saved at power failure	1MB			
Max. capacity of SD card	32G			
I/O				
High-speed I/O	8 high-speed inputs and 8 high-speed outputs			
Max. number of local expansion modules	16			
Max. number of I/O points — Local	512			
Max. number of I/O points — EtherCAT bus	32000			
High-speed input	4 channels of high-speed counter, supporting 1PH, A/B phase, CW/CCW, and pulse+direction, in which A/B phase supports frequency multiplication by 1, 2, and 4			
High-speed output	8 channels of 200kHz high-speed output, supporting 4-axis pulse motion control			
Support for I/O interruption	8 channels of high-speed interrupt input			
PWM output	4 channels of PWM output			
Communication network and interface				
Ethernet	×2, RJ45, 100Base-TX, supporting PLC software download, ModbusTCP, TCP/IP, and OPC UA protocols			
EtherCAT	1×RJ45, 100Base-TX, with the distance between two slave nodes less than 100m			
Serial communication (RS485)	×2, Modbus RTU primary and secondary nodes, in-line terminal			
USB	×1, Type-C, for PC communication, program download and debugging			
Storage card	1×Micro SD, for firmware upgrade, application and file transmission			
Communication expansion	CANopen/4G/WIFI			
Motion control				
Max. number of control axes	4	8	16	32
Motion control function	Point-to-point (PTP) motion, interpolation motion (linear, arc), electronic gear, electronic cam (flying shear, linear flying shear), and so on			
Configuration programming				
Programming platform	Invtmatic Studio 1.3.5 and above			
Programming languages	IL、ST、FBD、LD、CFC、SFC			
Basic specifications				
Running environment temperature	-10~55℃			
Running environment humidity	10%~95% (no condensation)			
Storage temperature	-40~70℃			
Storage humidity	10%~100% (no condensation)			
IP RATING	IP20			
Application environment	No corrosive gas			
Altitude	2000m or lower			
Installation manner	In control cabinet			
Pollution degree	Degree 2 or lower, compliant with IEC 61131-2			
Surge	2kV			
Anti-interference	2kV voltage-withstand power cable (compliant with IEC61000-4-4)			
ESD class	6kV CD or 8kV AD			
Vibration resistant	5~8.5Hz, vibration amplitude of 3.5mm; 8.5~150Hz, acceleration of $10m/s^2$; X/Y/Z axis, 10cycles			
Dimensions and weight				
Dimensions (W×H×D)	80.5×105×96mm (without terminal) 80.5×105×114.2mm (with terminal)			
Weight (kg)	0.39			

Small PLC / Medium PLC / I/O System / HMI / Industrial Internet

80.5mm

105mm

96mm

52.5mm

DIN rail
Installation
position centered
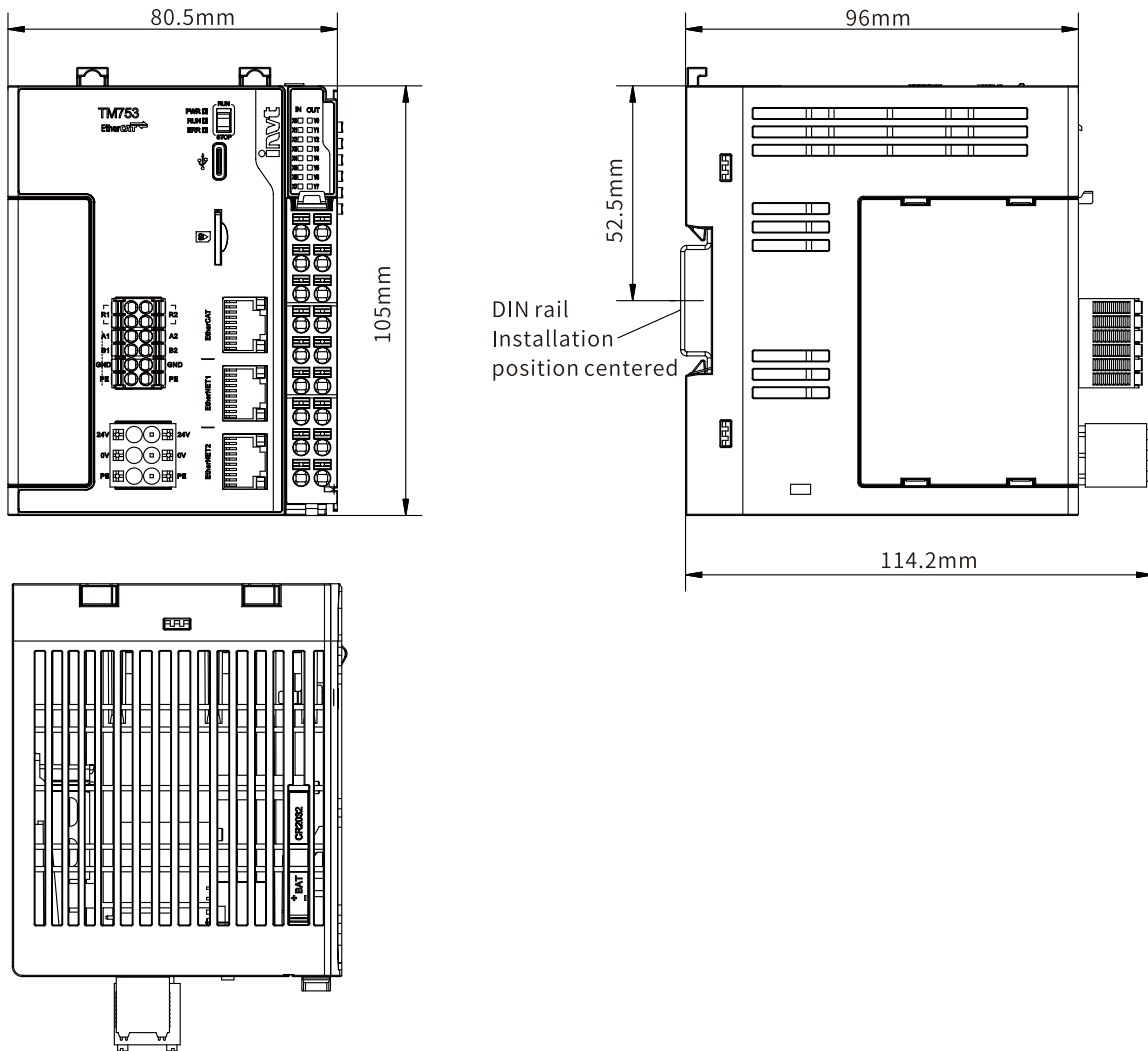
114.2mm

Ordering code	Model	Description	Dimension
11015-00024	TM750	CPU,4-axis,1×EtherCAT,2×Ethernet,2×RS485,8-in and 8-out high-speed I/O,24VDC;ROHS	80.5×105×114.2mm
11015-00025	TM751	CPU,8-axis,1×EtherCAT,2×Ethernet,2×RS485,8-in and 8-out high-speed I/O,24VDC;ROHS	80.5×105×114.2mm
11015-00026	TM752	CPU,16-axis,1×EtherCAT,2×Ethernet,2×RS485,8-in and 8-out high-speed I/O,24VDC;ROHS	80.5×105×114.2mm
11015-00023	TM753	CPU,32-axis,1×EtherCAT,2×Ethernet,2×RS485,8-in and 8-out high-speed I/O,24VDC;ROHS	80.5×105×114.2mm

I/O system

Flexible, reliable, and high-efficiency I/O system

Flex series new generation distributed I/O system

INVT Flex series I/O system is a exible, reliable, and efcient signal transmission system. The system is able to access to multiple standard communication networks, and equipped with rich signal modules to facilitate the deployment of personalized solutions while saving cabinet space, helping you develop more competitive personalized solutions.

Flexible
Rich communication couplers and I/O modules enable the exible design of control systems.

Efficient
Fully upgraded F-BUS bus with a 100-megabit communication rate creates a high real-time communication system.

Reliable
Tight connection using the gold plating process ensures stable and reliable signal transmission.

Compact
Ultra-thin design signicantly saves cabinet space and helps the equipment layout miniaturization.

Flexible

● The open Flex series I/O system adopts a modular design, supporting various bus network, and is equipped with rich signal modules to create personalized solutions. By importing the device description le to a third-party host controller, the module conguration can be achieved without specialized software conguration.

N   +   X

EtherCAT
Profinet
Ethernet/IP
......

Base module
(Digital/analog/temperature module)
Encoder module
Pulse module
Weighing module
......
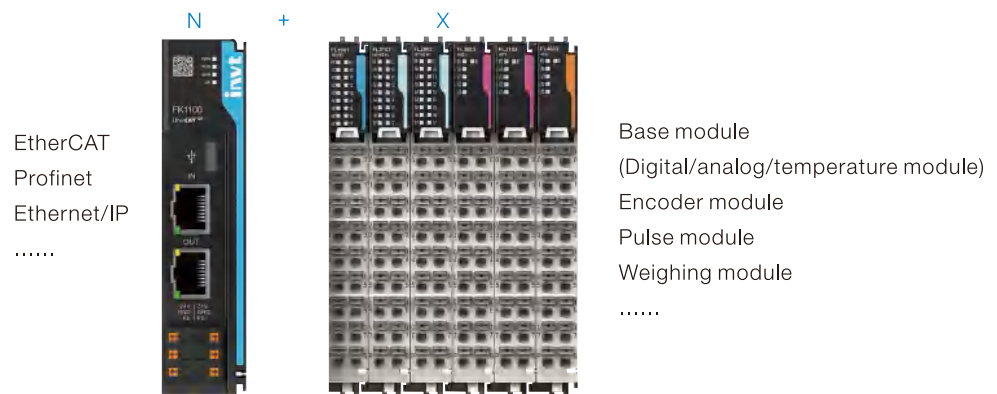
Efcient

● The system is equipped with a 100Mbps F-BUS backplane bus, with a response of I/O refresh in microseconds, achieving high-speed information exchange.

100Mbps
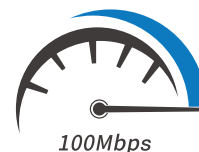
Product positioning

● Spring-loaded connection technology and 5u" gold plating process keep the connectors away from various types of corrosion and ensure a long service life of connectors.

Gold-plated connector

● The entire series adopts three-resistance coating to prevent dust, moisture, and salt spray, meeting a wider range of operating conditions and extending service life.

Three-resistance coating
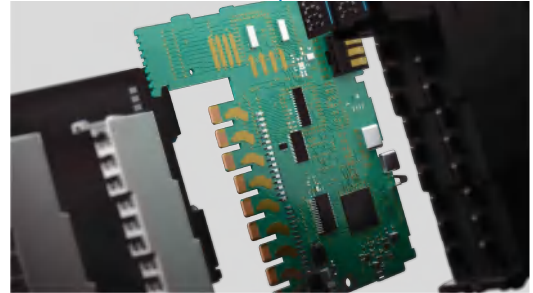
● Reliable grounding, further enhancing anti-interference capability.
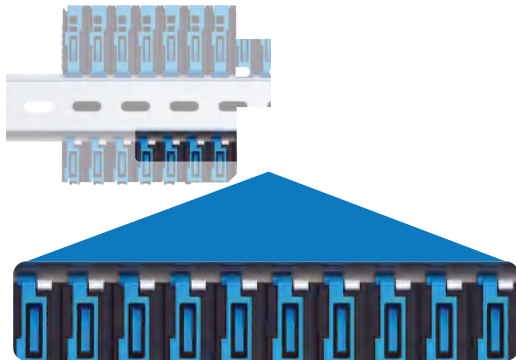
● Capable of operating in -25~55℃ and at an altitude of 3000m, fearless of freezing weather.

Compact

● 12mm ultra-thin design, saving 64% of the cabinet space, achieving miniaturization of the cabinet.
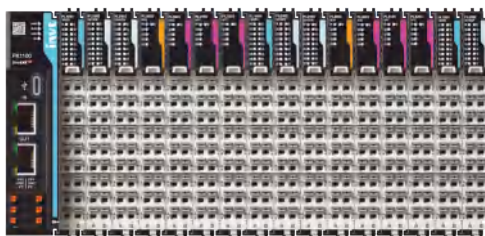
64%
space saving

Easy installation

- The wiring diagram is printed on the module so the wiring can be completed without referencing a user manual. By scanning the QR code on the front, you can obtain an electronic version of the user manual for more information.

E-manual

Wiring diagram

E-manual

Model, module type
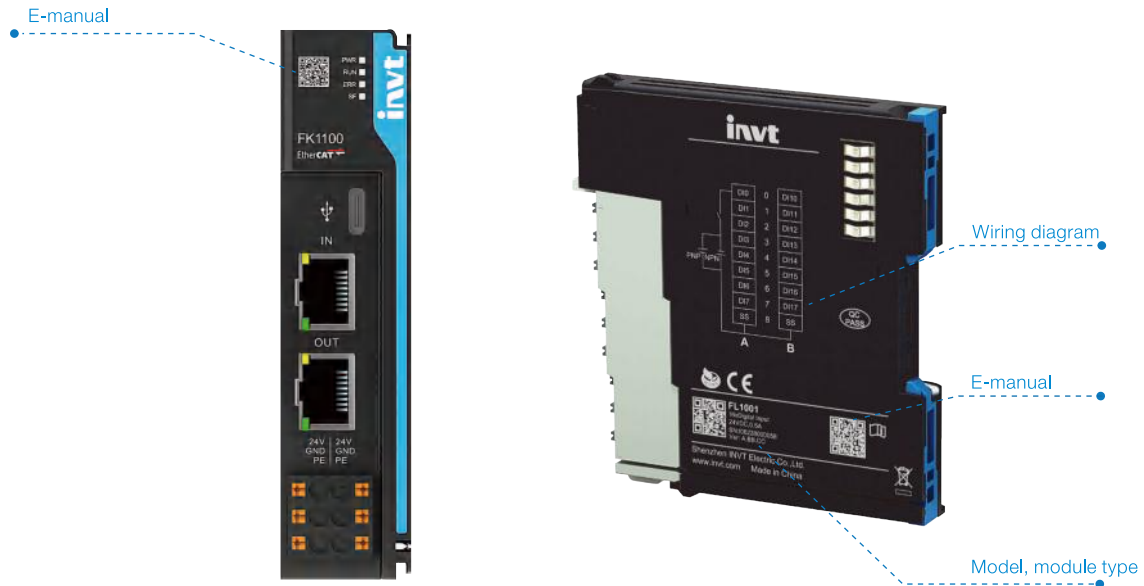
Tool-free quick connection

- PUSH IN connection technology enables easy installation without any tools, with a 70% improvement in wiring efciency compared to screw terminals, effectively reducing installation time while ensuring good reliability.

Direct plug-in connection, effectively reducing installation time
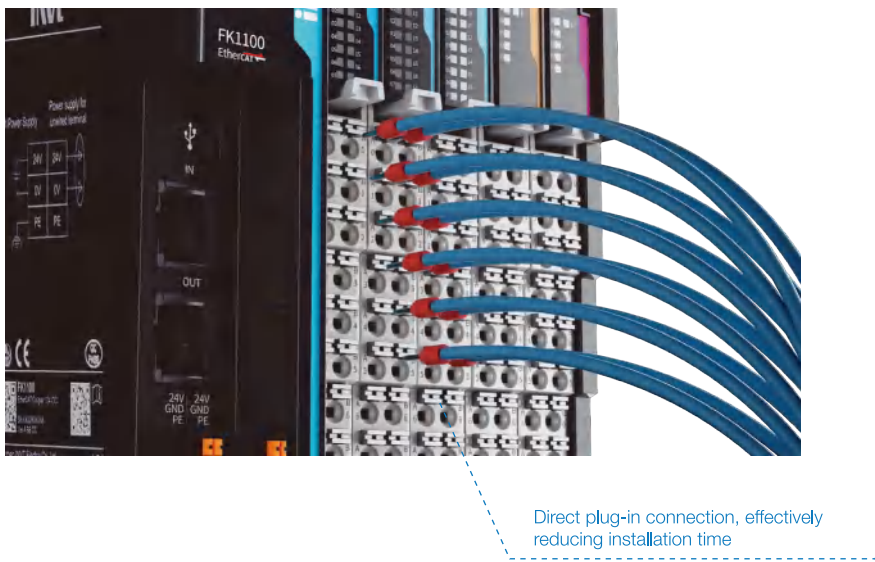
Clear identication

● Different modules are distinguished by color blocks and auxiliary codes, making identification and positioning more accurate and convenient.

Model
Auxiliary silk screen
Color block identication

Digital input	Digital output	analog input	analog output
FL1001	FL2002	FL3003	FL4003
FL1002	FL2003	FL3103	
	FL2102	FL3203	
	FL2103		
	FL2201		
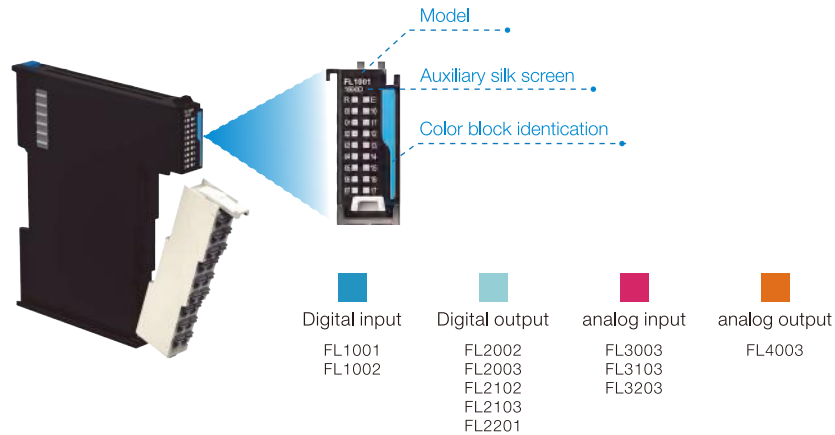
Channel-level diagnosis

● Each channel has a status indicator light, and each module can independently display its working status.
The operating status and fault information are clear at a glance.

Status indicator
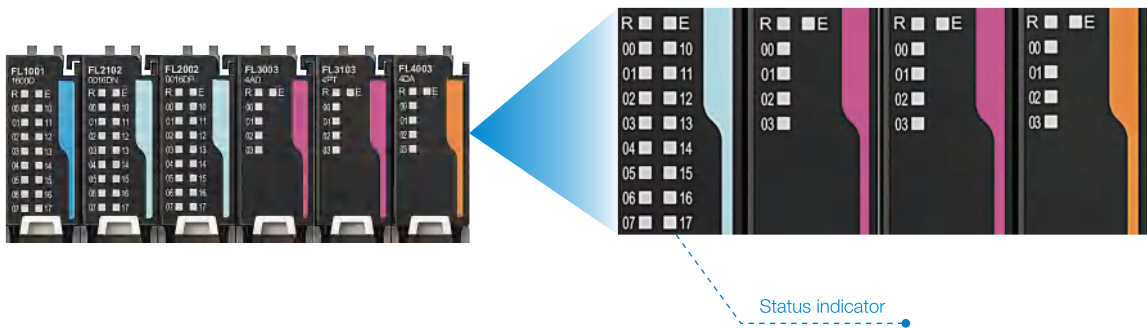
Easy to maintain

● Longitudinal sliding connection allows terminal assembly and disassembly without moving the left and right modules.
Adopting a two-section modular design, the wiring terminals can be disassembled separately without repeated wiring.

Longitudinal sliding connection

Detachable separately

● Communication coupler (EtherCAT)

Item	Specifications		
Ordering code	11016-00005		
Model	FK1100		
Product type	EtherCAT communication coupler		
Power supply	Rated voltage	24VDC (-15%~ +20%)	
	Power consumption of module	<10W	
	Isolation	No isolation	
	Power supply protection	Protection against reverse connection, overcurrent, and surges	
Interface	USB2.0	×1, for module upgrade	
	RJ45	×2, EtherCAT IN&OUT	
	EtherCAT slave	Synchronization method	Distributed clocks or input and output synchronization
		Physical layer	100BASE-TX
		Baud rate	100Mbit/s
		Output distance	Less than 100m between two nodes
		Transmission mode	Full duplex
		Topology structure	Linear, star-shape, tree-shape
		Slave address range	Assigned by the system
		Quantity of input PDO	Up to 768 bytes
		Quantity of output PDO	Up to 768 bytes
		Input mailbox size	Up to 128 bytes
		Output mailbox size	Up to 128 bytes
	Expansion bus	Number of I/O expansions	16, internal bus. The coupler can automatically identify the I/O type and quantity on the backplane
		Output power supply	5V/2.5A
Certication	CE, RoHS		
Environment	IP rating	IP20	
	Working temperature	-20℃–55℃	
	Working humidity	10%–95%RH (no condensation)	
	Air	No corrosive gas	
	Storage temperature	-40℃–70℃ (RH<90%RH, no condensation)	
	Altitude	Lower than 3000m	
	Pollution degree	Degree 2, compliant with IEC61131-2	
	Anti-interference	2kV power cable compliant with IEC61000-4-4	
	EMC antiinterference level	Zone B,IEC61131-2 (General industrial environment)	
	Vibration resistant	IEC60068-2-6 5Hz–8.4Hz, vibration amplitude of 3.5mm, 8.4Hz–150Hz, acceleration 9.8m/s2, 100 minutes for each in X, Y, and Z directions (10 times, 10 minutes each time, a total of 100 minutes)	
	Impact resistance	IEC60068-2-27, 9.8m/s2, 11ms, X/Y/Z, 3 times for each of 3 axes and 6 directions	
Installation method	35mm standard rail		
Weight	Net: 0.25(Kg) Gross: 0.28(Kg)		
Dimensions W×H×D	Product dimension: 25×105×96(mm) Package dimension: 29×109×100(mm)		

● Communication coupler (Profinet)

Item		Specications	
Ordering code		11016-00012	
Model		FK1200	
Product type		PROFINET communication coupler	
Power supply	Rated voltage	24VDC (-15% – +20%)	
	Power consumption of module	<10W	
	Power supply protection	Protection against reverse connection, overcurrent, and surges	
	Isolation	No isolation	
interface	USB2.0	×1, for module upgrade	
	RJ45	×2, Profinet P1&P2	
	Pronet slave	Physical layer	100BASE-TX
		Baud rate	100Mbit/s
		Output distance	Less than 100m between two nodes
		Transmission mode	Full duplex
		Topology structure	Linear, star-shape, tree-shape
		Communication protocol	Profinet IO Device
		Communication mode	RT
		Communication period	Min. 1ms
		Process data zone	Input max. 1440 bytes, output max. 1440bytes; IM0–IM3
		Pronet switch function	Supports networking function
		Ethernet service	Supports TCP/IP, SNMP, LLDP, ping, arp
		Port diagnosis	Supported
		Port disabling	Supported
		Factory settings reset	Supported
	Expansion bus	Number of I/O expansions	16, internal bus. The coupler can automatically identify the I/O type and quantity on the backplane
		Output power supply	5V/2.5A
Certication		CE, RoHS	
Environment	IP rating	IP20	
	Working temperature	-25℃–55℃	
	Working humidity	10%–95%RH (no condensation)	
	Air	No corrosive gas	
	Storage temperature	-40℃–70℃ (RH<90%RH, no condensation)	
	Altitude	Lower than 3000m	
	Pollution degree	Degree 2, compliant with IEC61131-2	
	Anti-interference	2kV power cable compliant with IEC61000-4-4	
	EMC antiinterference level	Zone B,IEC61131-2 (General industrial environment)	
	Vibration resistant	IEC60068-2-6 5Hz–8.4Hz, vibration amplitude of 3.5mm, 8.4Hz–150Hz, acceleration 9.8m/s2, 100 minutes for each in X, Y, and Z directions (10 times, 10 minutes each time, a total of 100 minutes)	
	Impact resistance	IEC60068-2-27, 9.8m/s2, 11ms, X/Y/Z, 3 times for each of 3 axes and 6 directions	
Installation method		35mm standard rail	
Weight		Net: 0.25(Kg) Gross: 0.28(Kg)	
Dimensions W×H×D		Product dimension: 25×105×96(mm) Package dimension: 29×109×100(mm)	

Communication coupler (EtherNet/IP)

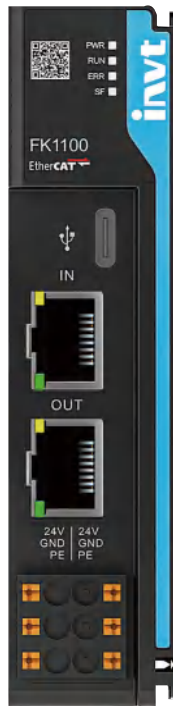| Item		Specications	
Ordering code	11016-00018		
Model	FK1300		
Product type	EtherNet/IP communication coupler		
Power supply	Rated voltage	24VDC (-15%~ +20%)	
	Power consumption of module	<10W	
	Isolation	No isolation	
	Power supply protection	Protection against reverse connection, overcurrent, and surges	
Interface	USB2.0	×1, used for module upgrade	
	RJ45	×2, EtherNet/IP P1&P2	
	EtherCAT slave	Physical layer	100BASE-TX
		Baud rate	100Mbit/s
		Output distance	Less than 100m between two nodes
		Transmission mode	Full duplex
		Topology structure	Linear, star, or tree
		Communication protocol	EtherNet/IP
		Max input length	504 bytes
		Max output length	504 bytes
		Max number of explicit message connections	6
		Max number of implicit message connections	3
		Max number of CIP connections	6
		Min. request packet interval (RPI)	1ms
		Alarm/Diagnosis status information	Supporting the upload of function codes from the local to the PLC
	Expansion bus	Number of I/O expansions	Up to 16, which depends on the actual power consumption calculation
		Output power supply	5V/2.5A
Certication	CE, RoHS		
Environment	IP rating	IP20	
	Working temperature	-20℃–55℃	
	Working humidity	10%–95%RH (no condensation)	
	Air	No corrosive gas	
	Storage temperature	-40℃–70℃ (RH<90%RH, no condensation)	
	Altitude	Lower than 3000m	
	Pollution degree	Degree 2, compliant with IEC61131-2	
	Anti-interference	2kV power cable compliant with IEC61000-4-4	
	EMC antiinterference level	Zone B,IEC61131-2 (General industrial environment)	
	Vibration resistant	IEC60068-2-6 5Hz–8.4Hz, vibration amplitude of 3.5mm, 8.4Hz–150Hz, acceleration 9.8m/s2, 100 minutes for each in X, Y, and Z directions (10 times, 10 minutes each time, a total of 100 minutes)	
	Impact resistance	IEC60068-2-27, 9.8m/s2, 11ms, X/Y/Z, 3 times for each of 3 axes and 6 directions	
Installation method	35mm standard rail		
Weight	Net: 0.25(Kg) Gross: 0.28(Kg)		
Dimensions W×H×D	Product dimension: 25×105×96(mm) Package dimension: 29×109×100(mm)		

● Digital input

Model	FL1001
Ordering code	11016-00004
Product type	Digital input, supporting source type/sink type
Power loss, typ	0.71W
Number of channels	16
Input type	Source/sink
Input voltage	DC24V±10%
Input current,typ	7mA
Max. input frequency	500Hz (duty ratio: 40%–60%)
Port filter time	Setting range: 1–65535 (default 1000), unit: 10μs; 1000 indicates 10ms. Able to set two groups of lter parameter. Every eight channels use a group of lter parameter
Signal of logic 1	≥15V DC
Signal of logic 0	≤5V DC
OFF-ON response time	100μs
ON-OFF response time	100μs
Isolation method	Optocoupler
Input frequency decrease	Derate by 75% when operating at 55℃ (with no more than 12 input points that are on at the same time), or by 10℃ when all input points are on
Weight	Net: 0.15(Kg) Gross: 0.18(Kg)
Dimensions (W×H×D)	Product dimension: 12.5×105×96mm Package dimension: 17.5×109×100mm

Model	FL1002
Ordering code	11016-00016
Product type	Digital input, supporting source type/sink type
Power loss,typ	0.73W
Number of channels	32
Input type	Source/sink
Input voltage	DC24V±10%
Input current,typ	7mA
Max. input frequency	500Hz (duty ratio: 40%–60%)
Port filter time	Setting range: 1–65535 (default 1000), unit: 10μs; 1000 indicates 10ms. Able to set two groups of lter parameter. Every eight channels use a group of lter parameter.
Signal of logic 1	≥15V DC
Signal of logic 0	≤5V DC
OFF-ON response time	100μs
ON-OFF response time	100μs
Isolation method	Optocoupler
Input frequency decrease	Derate by 75% when operating at 55℃ (with no more than 12 input points that are on at the same time), or by 10℃ when all input points are on
Weight	Net: 0.30(Kg) Gross: 0.33(Kg)
Dimensions (W×H×D)	Product dimension: 25×105×96mm Package dimension: 29×109×100mm

Digital output (source type)

Model	FL2002
Ordering code	11016-00006
Product type	Digital output, transistor source type output, active high
Power loss, typ	0.77W
Number of channels	16
External power	DC24V (-15%~+20%)
Output voltage	24V±10%
Max. output frequency	1kHz
Max. load	Resistive load: 0.5A/point, 2A/module Inductive load: 7.2W/point, 12W/module Illumination load: 5W/point, 18W/module
Leakage current/point	<10uA
OFF-ON response time	100µs
ON-OFF response time	100µs
Protection against overheat/overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Magnetic
Short-circuit protection output	Yes
Weight	Net: 0.15(Kg) Gross: 0.18(Kg)
Dimensions (W×H×D)	Product dimension: 12.5×105×96mm Package dimension: 17.5×109×100mm

Model	FL2003
Ordering code	11016-00013
Product type	Digital output, transistor source type output, active high
Power loss, typ	0.78W
Number of channels	32
External power	DC24V (-15%~+20%)
Output voltage	24V±10%
Max. output frequency	1kHz
Max. load	Resistive load: 0.5A/point, 2A/module Inductive load: 7.2W/point, 12W/module Illumination load: 5W/point, 18W/module
Leakage current/point	<10uA
OFF-ON response time	100µs
ON-OFF response time	100µs
Protection against overheat/overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Optocoupler isolation
Short-circuit protection output	Yes
Weight	Net: 0.30(Kg) Gross: 0.33(Kg)
Dimensions (W×H×D)	Product dimension: 25×105×96mm Package dimension: 29×109×100mm

Digital output (sink type)
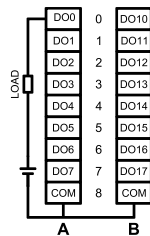
Model	FL2102
Ordering code	11016-00003
Product type	Digital output, transistor sink type output, active low
Power loss, typ	1.04W
Number of channels	16
External power	DC24V (-15%~+20%)
Output voltage	24V±10%
Max. output frequency	1kHz (duty ratio: 40%–60%)
Max. load	Resistive load: 0.5A/point, 4A/module Inductive load: 7.2W/point, 24W/module Illumination load: 5W/point, 18W/module
Leakage current/point	<10uA
OFF-ON response time	100µs
ON-OFF response time	100µs
Protection against overheat/overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Magnetic
Short-circuit protection output	Yes
Weight	Net: 0.15(Kg) Gross: 0.18(Kg)
Dimensions (W×H×D)	Product dimension: 12.5×105×96mm Package dimension: 17.5×109×100mm

● Digital output (sink type)
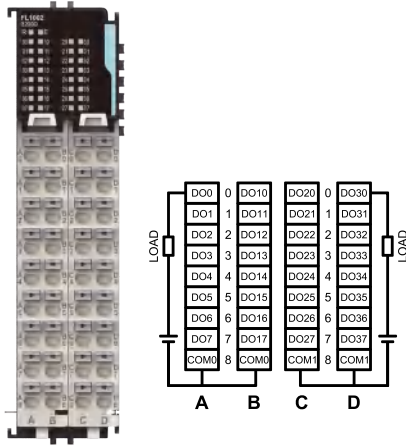
Model	FL2103
Ordering code	11016-00017
Product type	Digital output, transistor sink type output, active low
Power loss, typ	1.46W
Number of channels	32
External power	DC24V (-15%～+20%)
Output voltage	DC24V±10%
Max. output frequency	1kHz (duty ratio: 40%–60%)
Max. load	Resistive load: 0.5A/point, 4A/module Inductive load: 7.2W/point, 24W/module Illumination load: 5W/point, 18W/module
Leakage current/point	<10uA
OFF-ON response time	100μs
ON-OFF response time	100μs
Protection against overheat/overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Magnetic
Short-circuit protection output	Yes
Weight	Net: 0.15(Kg)　Gross: 0.18(Kg)
Dimensions (W×H×D)	Product dimension: 25×105×96mm Package dimension: 29×109×100mm

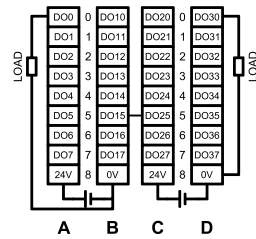## ● Digital input & output (source type)

| Model	FL5005
Ordering code	11016-00015
Product type	Digital input and output
Power loss, typ	0.68W
Number of channels	16
Input type	Source/sink
Input voltage	DC24V±10%
Input current, typ	7mA
Max. input frequency	500Hz (duty ratio: 40%–60%)
Port filter time	Setting range: 1–65535 (default 1000), unit: 10μs; 1000 indicates 10ms. Able to set two groups of Iter parameter. Every eight channels use a group of Iter parameter.
Signal of logic 1	≥15V DC
Signal of logic 0	≤5V DC
OFF-ON response time	100μs
ON-OFF response time	100μs
Isolation method	Optocoupler
Input frequency decrease	Derate by 75% when operating at 55°C (with no more than 12 input points that are on at the same time), or by 10°C when all input points are on
Number of output channels	16
Output type	Source, active high
External power	DC24V (-15%–+20%)
Output voltage	24V±10%
Max. output frequency	1kHz
Max. load	Resistive load: 0.5A/point; 2A/module
	Inductive load: 7.2W/point; 12W/module
	Illumination load: 5W/point; 18W/module
Leakage current/point	<10uA
Protection against overheat/overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Magnetic
Short-circuit protection output	Yes
OFF-ON	100μs
ON-OFF	100μs
Weight	Net: 0.30(Kg)　Gross: 0.33(Kg)
Dimensions (W×H×D)	Product dimension: 25×105×96mm Package dimension: 29×109×100mm

● Digital input & output (sink type)

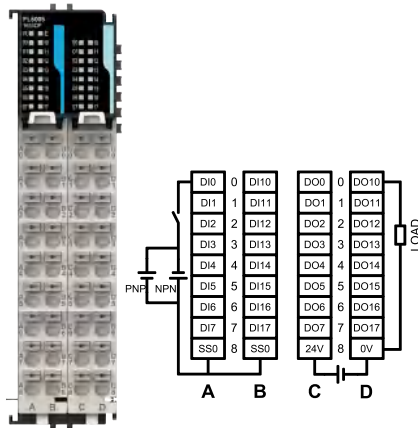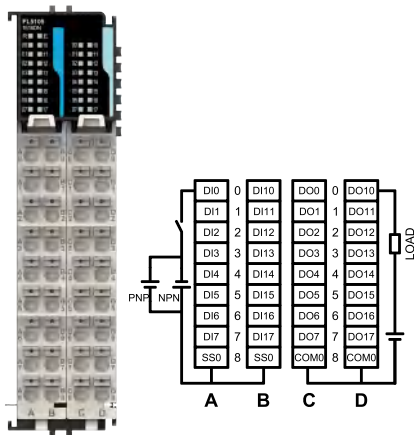| Model	FL5105
Ordering code	11016-00014
Product type	Digital input and output
Power loss,typ	1.05W
Number of channels	16
Input type	Source/sink
Input voltage	DC24V±10%
Input current,typ	7mA
Max. input frequency	500Hz (duty ratio: 40%–60%)
Port filter time	Setting range: 1–65535 (default 1000), unit: 10µs; 1000 indicates 10ms. Able to set two groups of Iter parameter. Every eight channels use a group of Iter parameter.
Signal of logic 1	≥15V DC
Signal of logic 0	≤5V DC
OFF-ON response time	100µs
ON-OFF response time	100µs
Isolation method	Optocoupler
Input frequency decrease	Derate by 75% when operating at 55℃ (with no more than 12 input points that are on at the same time), or by 10℃ when all input points are on
Number of output channels	16
Output type	sink, active low
External power	DC24V (-15%–+20%)
Output voltage	24V±10%
Max. output frequency	1kHz
Max. load	Resistive load: 0.5A/point; 4A/module
	Inductive load: 7.2W/point; 24W/module
	Illumination load: 5W/point; 18W/module
Leakage current/point	<10uA
Protection against overheat/ overcurrent/overvoltage	Supported
Exception check of external power	Supported
Isolation method	Magnetic
Short-circuit protection output	Yes
OFF-ON	100µs
ON-OFF	100µs
Weight	Net: 0.30(Kg) Gross: 0.33(Kg)
Dimensions (W×H×D)	Product dimension: 25×105×96mm Package dimension: 29×109×100mm

● Digital output (relay)

Model	FL2201
Ordering code	11016-00009
Product type	Digital output, relay output
Power loss, typ	1.56W
Number of channels	8
Contact type	N.O. contact
Contact load (resistive)	3A 250VAC/30VDC
Max. switching voltage	250VAC/125VDC@0.3A
Max. switching current	5A
Service life of relay	Electrical: 100,000 times Mechanical: 20,000,000 times
OFF-ON response time	≤15ms
ON-OFF response time	≤10ms
Weight	Net: 0.30(Kg) Gross: 0.33(Kg)
Dimensions (W×H×D)	Product dimension: 25×105×96mm Package dimension: 29×109×100mm

● Analog input

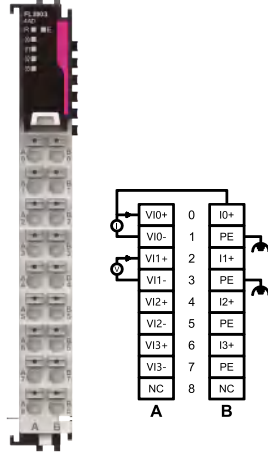| Model	FL3003
Ordering code	11016-00011
Product type	4 channels of analog input
Power loss, typ	0.83W
Number of channels	4
Voltage range	±5V, ±10V, +5V, +10V
Current range	0-20mA, 4-20mA, ±20mA
Accuracy in room temperature (of 25℃)	Voltage±0.1%FS, current±0.1%FS
Converting speed	320μs/channel
Max. common-mode voltage between channels	30VDC
Disconnection detection	Support (only voltage)
Isolation method	Between I/O port and power supply: isolated Between channels: not isolated
Resolution	16 bits
Weight	Net: 0.15(Kg) Gross: 0.18(Kg)
Dimensions (W×H×D)	Product dimension: 12.5×105×96mm Package dimension: 17.5×109×100mm

● Analog output
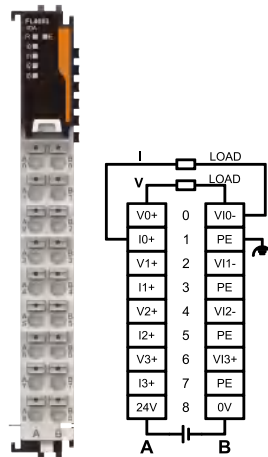
Model	FL4003
Ordering code	11016-00008
Product type	4 channels of analog output
External power	24VDC (-15%~+20%)
Power loss, typ	0.68W
Number of channels	4
Voltage range	±5V, ±10V, 0-5V, 0-10V
Current range	0-20mA, 4-20mA
Accuracy in room temperature (of 25℃)	Voltage±0.1%FS, current±0.1%FS
Converting speed	40μs/channel
Min. load resistance during voltage output	1kΩ
Max. load resistance during current output	600Ω
Disconnection detection	Support (only current)
Isolation method	Between I/O port and power supply: isolated Between channels: not isolated
Resolution	16 bits
Weight	Net: 0.15(Kg) Gross: 0.18(Kg)
Dimensions (W×H×D)	Product dimension: 12.5×105×96mm Package dimension: 17.5×109×100mm

● Temperature measuring (thermistor)
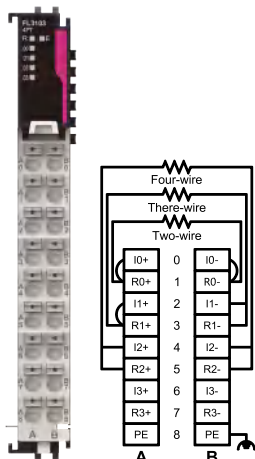
Model	FL3103
Ordering code	11016-00007
Product type	4 channels of thermistor input
Power loss, typ	0.88W
Number of channels	4
Wiring method	Two-, three-, or four-wire
Supported thermal resistors	PT100, PT500, PT1000, CU100
Sensitivity	0.0625℃/0.0625°F
SamplePeriod	240ms/channel (typical value)
Accuracy in room temperature (of 25℃)	±0.1%FS
Accuracy in working temperature	±1%FS
Filter time	Adjustable
Accuracy in working temperature	±0.3%FS
Isolation method	Between I/O port and power supply: isolated Between channels: not isolated
Weight	Net: 0.15(Kg) Gross: 0.18(Kg)
Dimensions (W×H×D)	Product dimension: 12.5×105×96mm Package dimension: 17.5×109×100mm

● Temperature measuring (thermocouple)
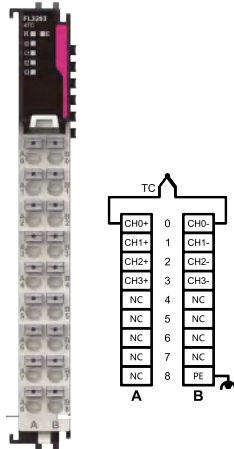
Model	FL3203
Ordering code	11016-00010
Product type	4 channels of thermocouple input
Power loss, typ	0.78W
Number of channels	4
Supported thermocouples	Types B, E, J, K, N, R, S, and T
Sensitivity	0.0625℃/0.0625°F
SamplePeriod	360ms/channel
Accuracy in room temperature (of 25℃)	±0.1%FS+cold junction compensation error
Accuracy in working temperature	±0.3%FS+cold junction compensation error
Cold junction compensation method	Internal
Disconnection detection	Supported
Isolation method	Between I/O port and power supply: isolated Between channels: not isolated
Weight	Net: 0.15(Kg) Gross: 0.18(Kg)
Dimensions (W×H×D)	Product dimension: 12.5×105×96mm Package dimension: 17.5×109×100mm

● Counting and position measurement
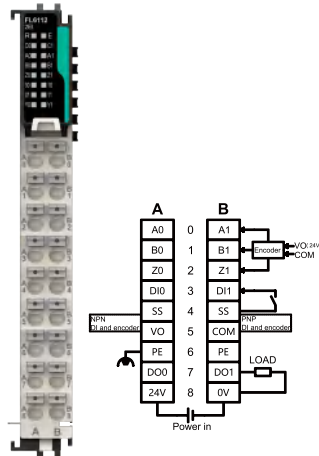
| Model	FL6112
Ordering code	11016-00019
Product category	Incremental encoder module
Power consumption	0.68W
Number of channels	2
Encoder voltage	24VDC±15%
Counting range	−2147483648~2147483647
Pulse mode	AB-phase quadrature pulse/Pulse + direction
Pulse frequency	200KHz
Frequency multiplication mode	X1/X2/X4
Resolution	1-65535 ppr (number of pulses per revolution)
Counter preset	Software preset
Z-pulse calibration	Supported by default for Z signa
Counter filter	0.1~65535*0.1μs per channel
Number of DIs	1 per channel
DI voltage	24VDC
DI edge selection	Rising edge/Falling edge/Rising or falling edge
DI type	Source or sink
DI filter time setting	0.1~65535*0.1μs per channel
DI function	Latch and reset
Latched value	Total latched values and latch completion flags
ON/OFF response time	μs level
Number of DOs	1 per channel
DO voltage	24V
DO type	Sink type, max. current 0.16A
DO function	High−speed comparison output
Measurement variable	Frequency/Speed
Update time of the measurement function	20/100/500/1000ms
Gating function	Software gate
Weight	Net: 0.15(Kg) Gross: 0.18(Kg)
Dimensions (W×H×D)	Product dimension: 12.5×105×96mm Package dimension: 17.5×109×100mm

● Counting and position measurement

Model	FL6121
Ordering code	11016-00021
Product category	Incremental encoder module
Power consumption	0.68W
Number of channels	2
Encoder voltage	5VDC
Encoder signal type	RS422 electrical level standards, differential input
Counting range	−2147483648~2147483647
Pulse mode	ABZ-phase quadrature pulse/Pulse + direction
Pulse frequency	100Hz~2MHz
Frequency multiplication mode	X1/X2/X4
Resolution	1-65535ppr
Counter preset	Software preset
Z-pulse calibration	Supported by default for Z signa
Counter filter	(0~65535)*10ns
Number of DIs	3
DI voltage	24VDC±10%
DI edge selection	Rising edge/Falling edge/Rising or falling edge
DI type	Source or sink
DI filter time	0~65535*10ns per channel
DI function	2XLatch, 1XReset
Latched value	Latched value 0, latched value 1, and latch completion flags
Hardware reset	Rising edge reset
Number of DOs	2
DO voltage	24VDC
DO type	Source type, rated output current 0.16A
DO function	High−speed comparison output
Measurement variable	Frequency/Speed
Update time of the measurement function	20/100/500/1000ms
Gating function	Software gate
Weight	Net: 0.15(Kg)　　Gross: 0.18(Kg)
Dimensions (W×H×D)	Product dimension: 12.5×105×96mm Package dimension: 17.5×109×100mm

● Counting and position measurement

Model	FL6002
Ordering code	11016-00022
Product category	SSI absolute encoder module
Power consumption	0.69W
Number of channels	2
Encoder voltage	24VDC
Encoder signal type	RS422 electrical level standards, differential input
SSI frame length	10~40 (Default: 13)
SSI clock frequency	125K/250K/500K/1M/1.5M/2MHz
Signal type	Gray code (default) / Binary
SSI interval time	(1~65536)*100us
Number of DIs	1 per channel
DI voltage	24VDC
DI edge selection	Rising edge/Falling edge/Rising or falling edge
DI type	Source or sink
DI filter time	(1~65536) *0.1us
DI function	Latch
Latched value	Latched values and latch completion flags
Number of DOs	1 per channel
DO voltage	24V
DO type	Source type, rated output current 0.16A
DO function	High−speed comparison output
Measurement variable	Frequency/Speed
Update time of the measurement function	20/100/500/1000ms
Gating function	Software gate
Weight	Net: 0.15(Kg)　　Gross: 0.18(Kg)
Dimensions (W×H×D)	Product dimension: 12.5×105×96mm Package dimension: 17.5×109×100mm

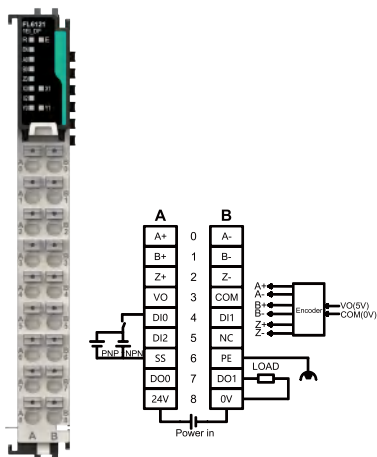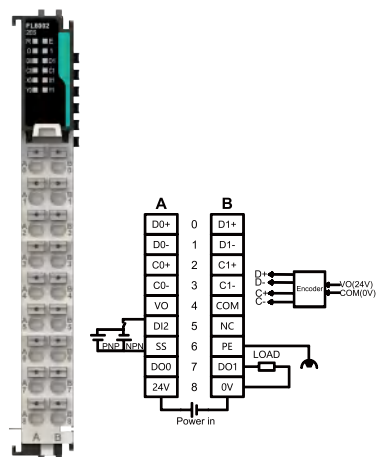| Ordering code	Model	Product type	Specications
11016-00005	FK1100	Coupler (EtherCAT)	EtherCAT coupler, 24VDC; RoHS
11016-00012	FK1200	Coupler (Pronet)	Pronet coupler, 24VDC; RoHS
11016-00018	FK1300	Coupler (EtherNet / IP)	EtherNet/IP coupler, 24VDC; RoHS
11016-00004	FL1001	Digital input	16×digital input, 24VDC, 0.5A; RoHS
11016-00016	FL1002	Digital input	32×digital input, 24VDC, 0.5A; RoHS
11016-00006	FL2002	Digital output(source type)	16×digital output (PNP), 24VDC, 0.5A; RoHS
11016-00013	FL2003	Digital output (source type)	32×digital output (PNP), 24VDC, 0.5A; RoHS
11016-00003	FL2102	Digital output (sink type)	16×digital output (NPN), 24VDC, 0.5A; RoHS
11016-00017	FL2103	Digital output (sink type)	32×digital output (NPN), 24VDC, 0.5A; RoHS
11016-00015	FL5005	Digital input & output (source type)	16 digital input and 16 digital output (PNP), 24VDC, 0.5A; RoHS
11016-00014	FL5105	Digital input & output (sink type)	16 digital input and 16 digital output (NPN), 24VDC, 0.5A; RoHS
11016-00009	FL2201	Digital output (relay)	8×relay output, AC:250V 3A / DC:30V 3A; RoHS
11016-00011	FL3003	Analog input	4 analog input, voltage & current 24bit; RoHS
11016-00008	FL4003	Analog output	4 analog output, voltage & current 16bit; RoHS
11016-00007	FL3103	Analog input (thermistor)	4 analog input, temperature, RTD 24bit; RoHS
11016-00010	FL3203	Analog input (thermocouple)	4 analog input, thermocouple (mV), TC 24bit; RoHS
11016-00021	FL6121	Counting and position measurement module	1 channel of incremental type, 5VDC differential, 2MHz; RoHS
11016-00019	FL6112	Counting and position measurement module	2 channels of incremental type, 24VDC single ended, 200kHz; RoHS
11016-00022	FL6002	Counting and position measurement module	2 channels of SSI type, 24VDC, 2MHz; RoHS

HMI

Friendly human-machine interaction experience
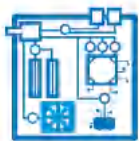
Powerful CPU

- Stable, efficient, safe, and reliable run in Linux.
- Industrial-grade high-performance processor.
- Cortex A7 CPU, with the main frequency up to 1.2GHz.

Diversified communication

- Multi-serial communication (RS232/422/485).
- Ethernet communication.
- Allowing one screen or multi-screen for one machine, or multi-screen for multi-machine.
- Optional IoT module, supporting remote monitoring, and remote program uploading and downloading.

Convenient configuration

- Multi-set recipes, multi-window function.
- Data acquisition, data alarm function.
- Macros are supported.
- Support for custom vector graphics.
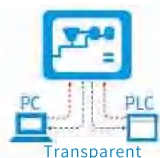
Featured function

- PC can communicate directly with the PLC via the HMI.
- Online simulation function, PC can be directly connected to the PLC simulation configuration project.
- USB, Ethernet, U disk three ways to update the configuration of the project.

IoT operation and maintenance

- Supporting WiFi networking method.
- Supporting remote upload and download, firmware update HMI/PLC.
- Supporting cloud platform data monitoring, historical data storage, and alarm push.
- Supporting cloud configuration, GIS mapping, and monitoring via the mobile app.

Safe and reliable

- Industrial-grade design, stable operation.
- High-capacity FLASH supports permanent storage of large capacity data without loss of power.
- Support USB flash drive data storage.
- New password mechanism, more secure and reliable to use.

VS–Q series

- 4.3/7.0/10.2/15.6"
- 16.77 million colors of true color display
- C language macros

Technical specification

Model	VS-043QE	VS-043QS	VS-070QE	VS-070QS	VS-070QS-G	VS-102QS-G	VS-102QS	VS-156QS
Display								
Display size	4.3"	4.3"	7"	7"	7"	10.2"	10.2"	15.6"
Resolution	480×272	480×272	800×480	800×480	1024×600	1024×600	1024×600	1920×1080
Screen material	ITO							
Color depth	24 bits							
Brightness (cd/m²)	400			450				300
Backlight type	LED							
Backlight life (hr)	20000							15000
Touch panel type	4-wire high accuracy touch panel							
CPU and memory								
CPU	Cortex-A7 1GHz (dual core)							Cortex-A7 1.2GHz
Memory	128M DDR3							256M DDR3
Flash	128M Flash							4G (EMMC)
Communication interface								
USB	USB Client ×1, USB Host ×1							USB Host ×1
Serial interface * COM1	RS232	RS485	RS232	RS232	RS232	RS232	RS232	RS232
COM2	RS485/422	–	RS485/422	RS485/422	RS485/422	RS485/422	RS485/422	RS485/422
COM3	–	–	RS485	RS485	RS485	RS485	RS485	RS485
Ethernet	–	Support	–	Support	Support	Support	Support	Support
SD card slot	–							
WIFI	–				Support		–	
Power supply								
Rated voltage	12-24VDC (±15%)							
Rated power	3W		4W			7W		10W
Environment								
Work temperature	-20~55 °C							
Work humidity	5~95%RH (No condensation)							
Protection level	IP65 (front panel)							
Certification								
CE	En55032, EN55035							
FCC compatibility	FCC, Class A							
Dimensions and weight								
Physical dimension W*H*D (mm)	139×86×31	139×86×31	203×145×35	203×145×35	203×145×35	273×211×40	273×211×40	395×257×31
Hole dimension A*B (mm)	132×80	132×80	192×138	192×138	192×138	259×201	259×201	383×246
Weight (Kg)	0.2	0.2	0.7	0.7	0.7	1.05	1.05	2.45
configuration								
Configuration software	HMITOOL							

Note: ● Indicates Support   – Indicates not supported   * In the serial interface, DB9 is a male socket

Dimension

VS-043

139mm
86mm
130mm
31mm
132mm
80mm

VS-070

203mm
145mm
190mm
35mm
192mm
138mm

VS-102

273mm
211mm
40mm
259mm
201mm

VS-156QS

395mm
257mm
40mm
383mm
32mm
246mm
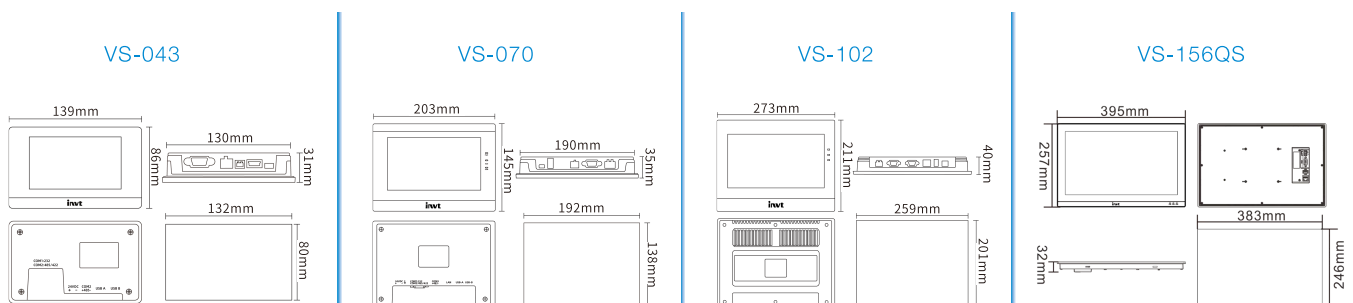
- 7.0/10.1"
- 3 serial ports
- Backlight life 20,000hrs
- Up to 30 screens, 100 macros

Technical specification

Model	VA2070-N0CXR	VA2100-N0CXR
Display		
Display size	7"	10.1"
Resolution	800×480	1024×600
Screen material	TFT	
Color depth	16 bits	
Brightness (cd/m²)	350	250
Backlight type	LED	
Backlight life (hr)	20000	
Touch panel type	4-wire resistive screen	
CPU and memory		
CPU	RISC ARM9 32Bit 300MHz	
Memory	64MB DDR3	
Flash	128MB Flash	
Number of screens	30 pages	
Interface		
USB	Host: USB2.0×1 / Client: USB2.0×1	
Serial interface * — COM1	RS232 (DB9)	RS232 (DB9)
Serial interface * — COM2	RS485/422 (DB9)	RS485/422 (DB9)
Serial interface * — COM3	RS485 (DB9)	RS485 (DB9)
Ethernet interface	-	-
Micro SD card slot	-	
Power supply		
Rated voltage	24VDC (±10%)(Isolation)	
Rated power	10W	20W
Environment		
Work temperature	-10~50°C	
Work humidity	10~90%RH (No condensation)	
Protection level	IP54 (Front board)	
Certification		
CE	EN61000-6-2, EN61000-6-4	
FCC compatibility	FCC, Class A	
RoHS	●	●
Dimensions and wight		
Physical dimension W*H*D (mm)	203.5×148.5×31.5	270.8×212.8×42.5
Hole dimension A*B (mm)	191.5×138	259×201
Weight (Kg)	0.55	1.1
Configuration		
Configuration software	VT Designer	

Note: ● Indicates Support   - Indicates not supported   * In the serial interface, DB9 is a female socket

Dimension

VA2070

203.5mm   148.5mm   31.5mm   191.5mm   138.0mm   CUT OUT

VA2100

270.8mm   212.8mm   42.5mm   259mm   201mm   CUT OUT
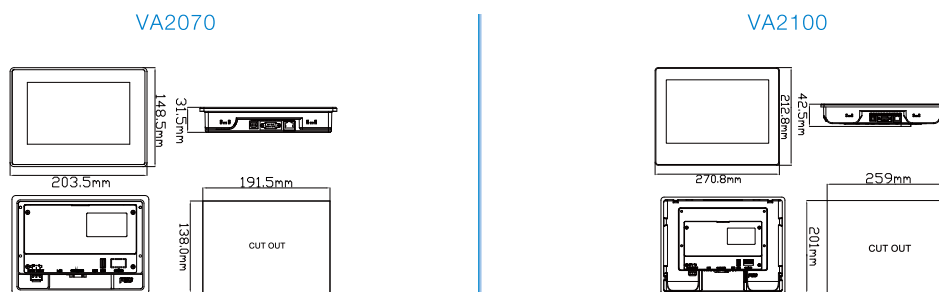
VK series

- 4.3/7.0/10.1"
- 3 serial ports
- Backlight life 20,000hrs
- Support macros

Technical specification

Model	VK2043-N0CXN	VK2043-N0CXR	VK2043-N0EXR	VK2070-N0EXR	VK2070-N0CXR	VK2100-N0CXR	VK2100-N0EXR
Display							
Display size	4.3"	4.3"	4.3"	7"	7"	10.1"	10.1"
Resolution	480×272	480×272	480×272	800×480	800×480	1024×600	1024×600
Screen material	TFT						
Color depth	16 bits						
Brightness (cd/m²)	400	400	400	400	400	350	350
Backlight type	LED						
Backlight life (hr)	20000						
Touch panel type	4-wire resistive screen						
CPU and memory							
CPU	RISC ARM9 32Bit 300MHz						
Memory	64MB DDR3						
Flash	128MB Flash						
Number of screens	7999 pages						
Interface							
USB	USB Host: USB2.0×1 / USB Client: USB2.0×1						
Serial interface * — COM1	−	RS232 (5-PIN terminal connector)			RS232 (DB9)		
COM2	−	RS422/485 (5-pin terminal connector)			RS422/485 (DB9)		
COM3	Rs485 (5-pin terminal connector)				RS485 (DB9)		
Ethernet interface	−	−	10M/100M BASE-T×1	10M/100M BASE-T×1	−	−	10M/100M BASE-T×1
Micro SD card slot	−						
Power supply							
Rated voltage	24VDC (±10%)(Isolation)						
Rated power	10W	10W	10W	20W	20W	20W	20W
Environment							
Work temperature	-10~60° C						
Work humidity	10~90%RH (No condensation)						
Protection level	IP65 (Front board)						
Certification							
CE	EN61000-6-2, EN61000-6-4						
FCC compatibility	FCC, Class A						
RoHS	●	●	●	●	●	●	●
Dimensions and wight							
Physical dimension W*H*D (mm)	129×103×33	129×103×33	129×103×33	203.5×148.5×37	203.5×148.5×37	270.8×212.8×42.5	270.8×212.8×42.5
Hole dimension A*B (mm)	118.5×92.5	118.5×92.5	118.5×92.5	191.5×138	191.5×138	259×201	259×201
Weight (Kg)	0.23	0.23	0.23	0.55	0.55	1.1	1.1
Configuration							
Configuration software	VT Designer						

Note: ● Indicates Support   − Indicates not supported   * In the serial interface, DB9 is a female socket

Dimension

VK2043

103mm
129mm
118.5mm
92.5mm
CUT OUT

VK2070

148.5mm
37mm
203.5mm
191.5mm
138.0mm
CUT OUT

VK2100

212.8mm
42.5mm
270.8mm
259mm
201mm
CUT OUT
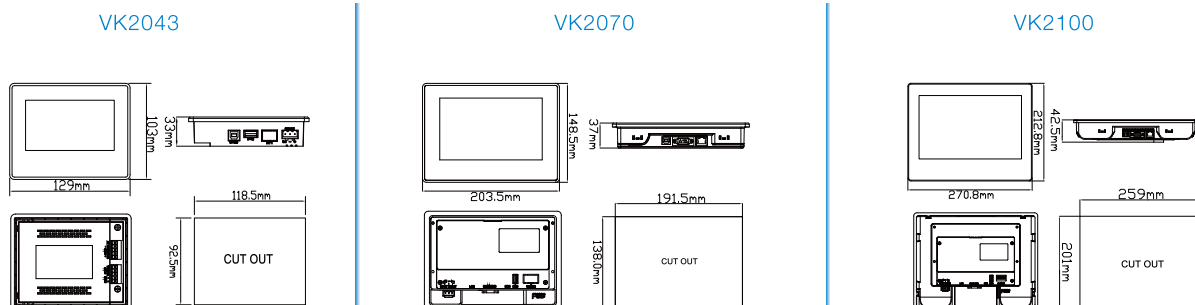
- 7.0/10.4"
- Up to 5 serial ports
- Isolation design
- Backlight life 20,000hrs
- Support macros

Technical specification

Model	VT2070-N0CTR-24	VT2070-H1ETR-31	VT2104-H0ETR-51
Display			
Display size	7"	7"	10.4"
Resolution	800×480	800×480	800×600
Screen material	TFT		
Color depth	16 bits		
Brightness (cd/m²)	400		
Backlight type	LED		
Backlight life (hr)	20000		
Touch panel type	4-wire resistive screen		
CPU and memory			
CPU	RISC ARM9 32Bit 300MHz		
Memory	64MB DDR3		
Flash	128MB Flash		
Number of screens	7999 pages		
Interface			
USB	USB Host: USB2.0×1 / USB Client: USB2.0×1		
Serial interface * COM1	RS232 (DB9)	RS232/422/485 (DB9)	RS232 (DB9)
COM2	RS422/485 (DB9)	RS485 (5-PIN terminal)	RS422/485 (DB9)
COM3	-	RS485 (DB9)	RS485 (DB9)
COM4	-	-	RS485 (5-pin terminal)
COM5	-	-	RS485 (5-pin terminal)
Ethernet interface	-	10/100M BASE-T×1	10/100M BASE-T×1
Micro SD card slot	-	Micro SD	-
Power supply			
Rated voltage	24VDC (±10%)(Isolation)		
Rated power	20W	20W	20W
Environment			
Work temperature	-10~60°C		
Work humidity	10~90%RH (No condensation)		
Protection level	IP66 (Front board)		
Certification			
CE	EN61000-6-2, EN61000-6-4		
FCC compatibility	FCC, Class A		
RoHS	●	●	●
Dimensions and wight			
Physical dimension W*H*D (mm)	188×143.3×40	188×143.3×40	270.8×212.8×42.5
Hole dimension A*B (mm)	174.5×132.5	174.5×132.5	259×201
Weight (Kg)	0.55	0.55	1.1
Configuration			
Configuration software	VT Designer		

Note: ● Indicates Support   - Indicates not supported   * In the serial interface, DB9 is a female socket

Dimension

VT2070

VT2104
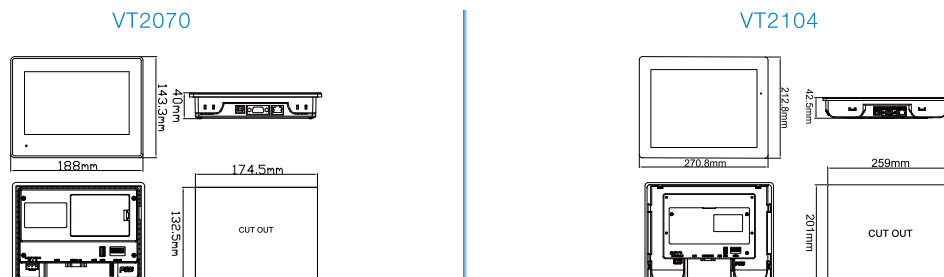
VS Series Intergrated Machine

- Size of 7.0 inches
- HMI-PLC AIO
- Diverse communication methods
- Easy configuration

Technical specification

Model		VS070QS-1618MDM1
Display		
Display size		7"
Resolution		800×480
Screen material		TFT
Color depth		24 bits
Brightness (cd/m²)		450
Backlight type		LED
Backlight life (hr)		20000
Touch panel type		4-wire resistive
Processor and memory		
Processor		Cortex-A7 1GHz
Memory		128MB DDR3
Flash memory		128MB Flash
Interface		
USB		USB Host×1 / USB Client×1
Serial * interface	COM1	RS485
	COM2	RS232
Ethernet		Supported
SD card socket		−
Power supply		
Rated voltage		24VDC (±15%)
Rated power		7W
Input		
Digital		16
Analog		2 channels
Output		
Digital		18
Analog		1 channel
Environment		
Working temperature		-20~55°C
Working humidity		5~95%RH (no condensation)
IP rating		IP65 (front panel)
Certification		
CE		En55032, En55035
FCC compatibility		FCC, Class A
RoHS		●
Dimensions and wight		
Physical dimension W*H*D (mm)		203×145×56
Hole dimension A*B (mm)		192×138
Weight (Kg)		0.8
Configuration		
Configuration software		HMI TOOL + Auto Station

Note: ● Indicates Support   − Indicates not supported   * In the serial interface, DB9 is a female socket

Dimension

VS070QS-1618MDM1

203mm   145mm   56.45mm   192mm   138mm
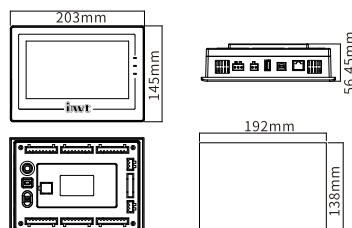
HMI-VS-Q series wireless module

Modules can be mounted to the HMI interface with fasteners, plug and play

IWOcloud IoT cloud platform free application

Product model	VS-Q-WIFI
Networking method	WIFI
Network frequency band	IEEE 802.11b
	IEEE 802.11g
	IEEE 802.11n
Network reconnection	Supported
Offline transmission resuming	Supported
API interface	Supported
VNC function	Supported
Data monitoring	Support up to 280 data points
Historical data	Supports up to 20,000 data items
Alarm push	Support client push and WeChat public account push

HMI product list

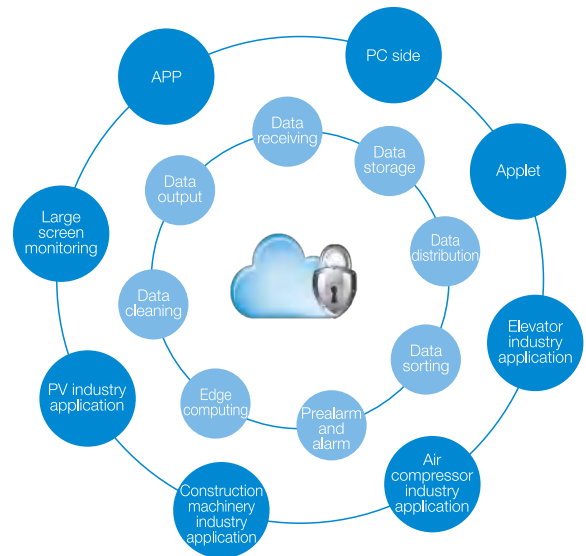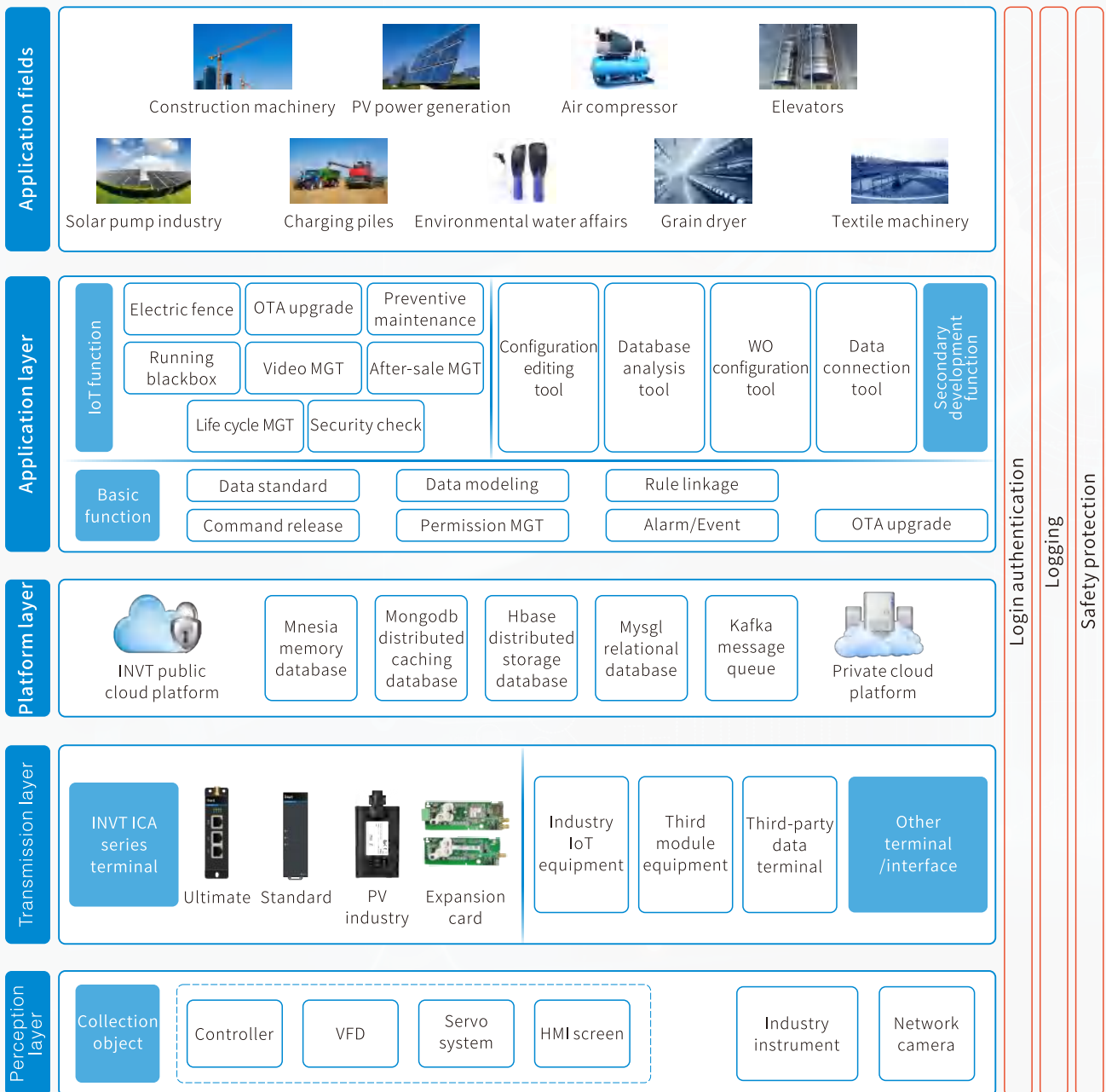| Product	Material code	Model	Description	Cut-out size
VS-Q series	11026-00025	VS-043QE	4.3'', 480×272, 24bit color, 2 serial port, RoHS	132×84mm
	11026-00025	VS-043QS	4.3'', 480×272, 24bit color, 2 serial port, 1 Ethernet port, RoHS	132×84mm
	11026-00022	VS-070QE	7.0'', 800×480, 24bit color, 3 serial port, RoHS	192×138mm
	11026-00023	VS-070QS	7.0'', 800×480, 24bit color, 3 serial ports,1 Ethernet port, RoHS	192×138mm
	11026-00029	VS-070QS-G	7.0'', 800×480, 24bit color, 3 serial ports,1 Ethernet port, support the expansion of the IoT,RoHS	192×138mm
	11026-00024	VS-102QS	10.2'', 1024×600, 24bit color, 3 serial port, 1 Ethernet port, RoHS	259×201mm
	11026-00028	VS-102QS-G	10.2'', 1024×600, 24bit color, 3 serial port, 1 Ethernet port, support the expansion of the IoT,RoHS	259×201mm
	11026-00026	VS-156QS	15.6'', 1920×1080, 24bit color, 3 serial port, 1 Ethernet port, RoHS	383×246mm
	11095-00023	VS-Q-WIFI	Wi-Fi module, supporting network frequency segments IEEE802.11b, IEEE802.11g, IEEE802.11n, need to be used with the IoT screen	–
	11060-00235	VS070-1614MDR1	7.0'' Inch AIO, with built-in 16 channels of digital input, 18 channels of digital output, 2 channels of analog input,1 channel of analog output	192×138mm
VA series	11060-00156	VA2070-N0CXR	7.0'', 800×480, 16bit color, 3 serial ports, no Ethernet port	191.5×138mm
	11060-00157	VA2100-N0CXR	10.1'', 1024×600, 16bit color, 3 serial ports, no Ethernet port	259×201mm
VK series	11060-00172	VK2043-N0CXN	4.3'', 480×272, 16bit color, 2 serial ports, no Ethernet port	118.5×92.5mm
	11060-00272	VK2043-N0CXR	4.3'', 480×272, 16bit color, 3 serial ports, no Ethernet port	118.5×92.5mm
	11060-00173	VK2043-N0EXR	4.3'', 480×272, 16bit color, 3 serial ports, 1 Ethernet port	118.5×92.5mm
	11060-00169	VK2070-N0EXR	7.0'', 800×480, 16bit color, 3 serial ports, 1 Ethernet port	191.5×138mm
	11060-00171	VK2070-N0CXR	7.0'', 800×480, 16bit color, 3 serial ports, no Ethernet port	191.5×138mm
	11060-00168	VK2100-N0CXR	10.1'', 1024×600, 16bit color, 3 serial ports, no Ethernet port	259×201mm
	11060-00167	VK2100-N0EXR	10.1'', 1024×600, 16bit color, 3 serial ports, 1 Ethernet port	259×201mm
VT series	11026-00017	VT2070-H1ETR-31	7.0'', 800×480, 16bit color, 3 serial ports, 1 Ethernet port	174.5×132.5mm
	11026-00018	VT2070-N0CTR-24	7.0'', 800×480, 16bit color, 32 serial ports, no Ethernet port,1MB (backup)	174.5×132.5mm
	11026-00016	VT2104-H0ETR-51	10.4'', 800×600, 16bit color, 5 serial ports,1 Ethernet port	259×201mm

Industrial Internet

Cloud platform | Application system | Cloud platform | Cloud services

INVT independently develops and owns four industrial Internet products, namely, IWOCloud industrial Internet cloud platform, WOScene application system, IWOLink data terminal products, and ICS industrial cloud service. In combination with INVT industrial automation products, we provide end-to-end integrated solutions for industry customers, helping them to move towards a new journey of digital transformation!

Application fields

Construction machinery PV power generation Air compressor Elevators

Solar pump industry Charging piles Environmental water affairs Grain dryer Textile machinery

Application layer

IoT function

Electric fence	OTA upgrade	Preventive maintenance	Configuration editing tool	Database analysis tool	WO configuration tool	Data connection tool	Secondary development function
Running blackbox	Video MGT	After-sale MGT					
Life cycle MGT	Security check						

Basic function

| Data standard | Data modeling | Rule linkage | |
| Command release | Permission MGT | Alarm/Event | OTA upgrade |

Platform layer

INVT public cloud platform | Mnesia memory database | Mongodb distributed caching database | Hbase distributed storage database | Mysgl relational database | Kafka message queue | Private cloud platform

Transmission layer

INVT ICA series terminal | Ultimate | Standard | PV industry | Expansion card | Industry IoT equipment | Third module equipment | Third-party data terminal | Other terminal /interface

Perception layer

Collection object | Controller | VFD | Servo system | HMI screen | Industry instrument | Network camera

Login authentication Logging Safety protection

IWOScene-SCADA: acquisition and monitoring system

Integrate equipment monitoring functions in various dimensions to meet the needs for equipment monitoring, including real-time monitoring of the safe operation, operation efficiency and effectiveness of the equipment in the form of large screens.

● **Data cockpit**

Management without leaving home

Through web pages in a mobile or a computer, large screen monitoring and other forms, you can quickly grasp the APP real-time status of the equipment, and carry out video monitoring, remote start/stop, and modification of parameters, and so on.
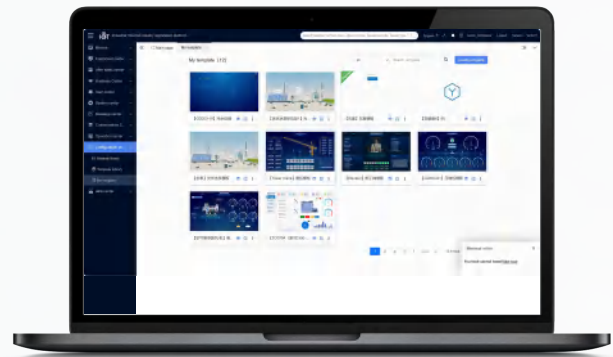
● **Free configuration monitoring**

Manage affairs without leaving home

The platform has built-in configuration editing tools, allowing users to configure their own configuration monitoring pages.

● **Historical data**

Integrates the functions for system operation and daily platform management to meet the needs for system management, including system settings, operation records, user data statistics, enterprise dynamic management, etc.

● Historical data query

Multidimensional application of data

You can customize the type of the focused parameter, address, type, chart, and fault.
You can also customize data charts for display, and export historical data to the local server in various types of files.

Small PLC

Medium PLC

I/O System

HMI

Industrial Internet

65
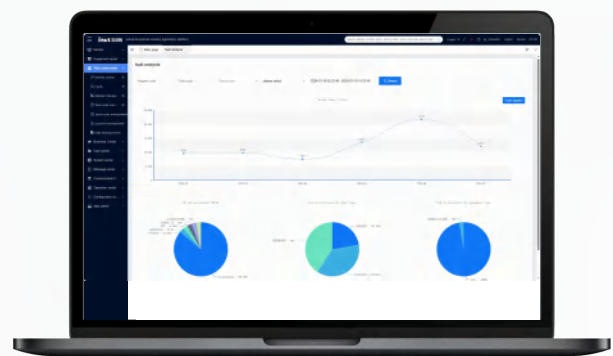
● Data analysis and statistics

Objective data support for fault analysis

For historical data, various statistical reports can be customized and generated, facilitating multi-dimensional data analysis applications. Based on different user needs, statistical analysis includes the assessment and statistical analysis of various equipment parameters, providing objective data support for decision-making in various departments such as research and development, after-sales, and sales.
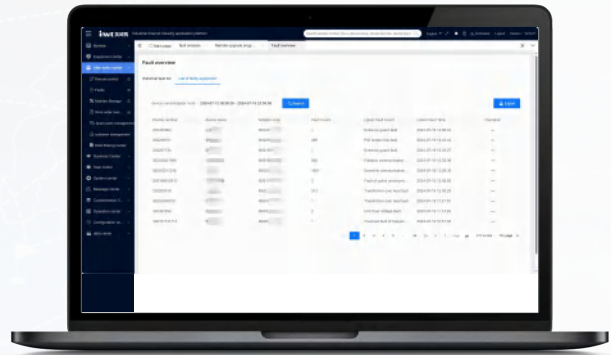
IWOScene-OMS: Operation and maintenance system

● Remote assistance

● Remote upgrade of equipment

Remote upgrade without leaving home

You can remotely upload, download, and monitor device equipment programs, including PLC, VFD, data terminal modules, etc.
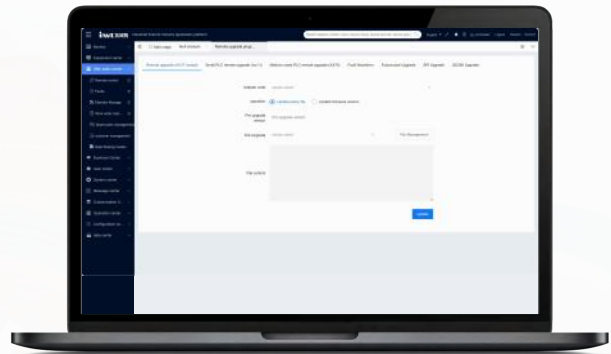
● Fault management

● Fault pre-alarm/alarm

Electronic sentry, real-time guarding of equipment

The system provides timely feedback on alarm information and push them through APP SMS, e-mail and other forms. For the key parameters of the key equipment, pre-alarm values can be set to detect faults before they occur.

Integrates functions for after-sales maintenance, improving the efficiency of after-sales maintenance of user equipment, including: fault management, maintenance management, work order management, spare parts management, etc.

● Preventive maintenance

Passive after-sales service becomes proactive service

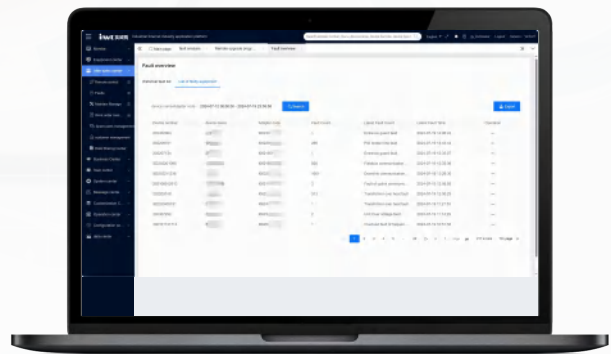This includes prediction of equipment service life, preventive cleaning of key components, life cycle management of maintenance parts, equipment exception pre-alarm, etc.
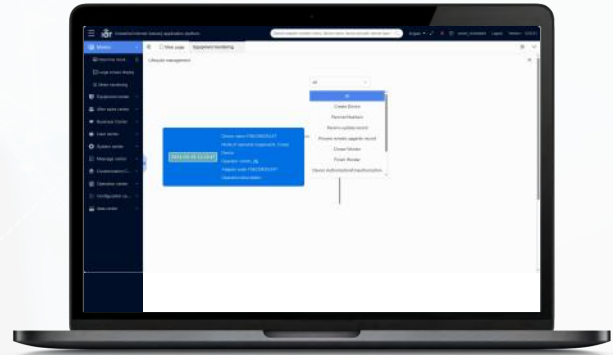
● **Maintenance management**

"Digital housekeeper" of equipment

The system can set the maintenance cycle for the monitoring equipment as a whole or components, and the maintenance logic can be customized, including countdown and event triggering.
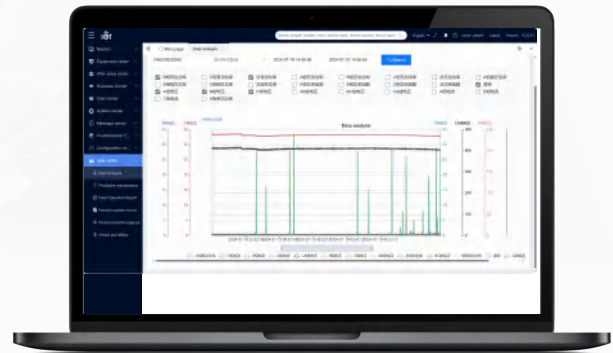
● **Work order management**

● After-sale WO management

Online processing of after-sale business

You can circulate a series of after-sales work orders such as faults, installation, and repair, and monitor the entire process of handling the results, improving the efficiency of after-sales maintenance work, enhancing user experience and corporate image.
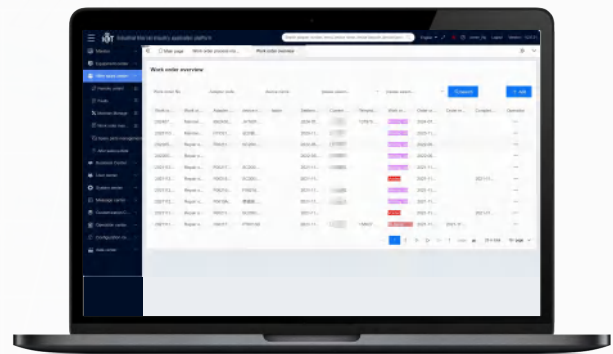
INVT provides industrial enterprises with complete, reliable, flexible, and quick-deliverable solutions.

Pan-access

Supporting various VFDs, servo, PLC, and HMI screens.

Multiple presenting

Supporting PC and mobile app (on Android and iOS)

Privatization deployment

The system cloud platform supports privatization deployment

Safe and stable

Supporting the pushing by means of mobile app, email, and SMS message

Multimedia access

Supporting onsite video, image, and interface access, and AI recognition of face.

Quick start

Easy to operate and user friendly interface

Personalized customization

Application system functions can be customized

Data analysis

Historic data, condition collection, and data reports

Alarm pushing

Data is encrypted before transmission, and servers are managed in distributed mode

Data interface

The platform provides the API, eliminating data silos

Multiple login methods

Go to the login interface through https://iot.invt.com/ with a PC

Login through the INVT APP with a mobile
Download methods: iOS: App Store > Search "INVTIOT" > Download
Android: App Store > Search "Invt cloud"

Large-screen application

Customized large-screen display can be applied to system data, which can be planned as follows:

· Macro data: Device distribution map, online/fault/alarm device distribution

· System key statistics: Device status statistics and work order quantity display

IWOLink data terminal product

To flexibly adapt to the data acquisition needs of various industrial equipment and different network scenarios, INVT has launched a series of data acquisition products to provide fast, easy, and secure IoT data connection solutions.

ICA417 series
Excellent performance
Edge computing, VPN transparent transmission, and remote OTA makes you feel like you are there!

4G Ultimate

TBox series
Super applicability
One device supports multiple scene applications! (Serial to 4G, Serial to Network port, Network port to 4G)
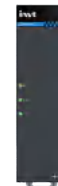
4G Standard

ICA400-06 series
With Wi-Fi
Dedicated to the PV industry, worry free network connection!

PV industry

| EC-IC series |
| --- |
| **Perfect match** |
| With a built-in card, traditional devices are perfectly upgraded with IoT functions! |

Expansion card

Data terminal product	ICA417-02-CN	EC-IC502-2-CN	ICA400-06N-5CN	ICA100-06N-5
Ordering code	11095-00019	11095-00009	11095-00025	11095-00025
Product orientation	**4G Ultimate**	**4G expansion card**	**PV industry 4G**	**PV industry Wi-Fi**
Communication parameters				
Upstream networking	4G/Network port	4G		WiFi
Upstream network speed	50Mbps	10Mbps		
Downstream communication	RS485/ RS232/Network port	RS485/232		
Downstream network speed	100Mbps	50Mbps		54Kbps
Hardware category				
IP rating	IP20	IP00	IP65	
Supply voltage	DC 10~24V		DC 5~12V	
Entire machine power dissipation	3W		3.5W	1.5W
Indicator	Power indicator, network status indicator, running status indicator			
Installation method	Standard rail installation	Screw	Aviation interface	
Working temperature	-25~65℃			
International version	CN/EU/LA version		CN/EU version	General
Antenna	External		Built-in	
Housing material	Sheet metal	-		Engineering plastic
Software functions				
Real-time data monitoring	Supported			
Edge computing	Supported			
OTA remote upgrade	Supporting VFD upgrade (Special-purpose products based on GD270/GD350 platform)		Supporting inverter upgrade	
Serial port transparent transmission	Supported		Unavailable	
VPN transparent transmission through network port	Supported	Unavailable		

Data terminal product	TBox	TBox-EU	TBox-4G
Ordering code	11095-00035	11095-00036	11095-00034
Product orientation	**Standard**	**Standard Europe**	**Lite**
Communication parameters			
Upstream networking	4G/Network port/Wi-Fi		4G/Network port
Upstream network speed	50Mbps		
Downstream communication	RS485/ RS232/Network port		
Downstream network speed	100Mbps		
Hardware category			
IP rating	IP20		
Supply voltage	DC 10~24V		
Entire machine power dissipation	3W		
Indicator	Power indicator, network status indicator, running status indicator		
Installation method	Standard rail installation		
Working temperature	-25~65℃		
International version	CN version		
Antenna	External		
Housing material	Engineering plastic		
Software functions			
Real-time data monitoring	Supported		
Edge computing	Supported		
OTA remote upgrade	Supporting inverter upgrade		
Serial port transparent transmission	Supported		
VPN transparent transmission through network port	Supported		

Structure size

Small PLC

Medium PLC

I/O System

HMI

Industrial Internet

Standard
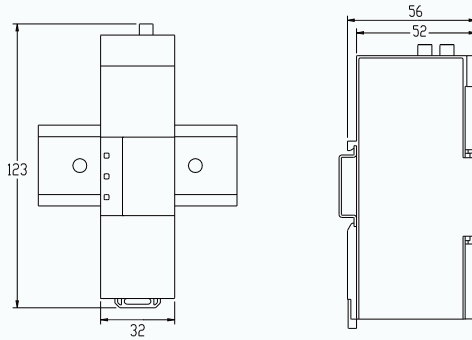
Model	Dimensions (W×H×D) (including rail clips)	Weight (excluding antenna)
TBox series	32×123×56mm	55g

Positioning: 3-in-1 version (RS485 to 4G/RS485 to network port/network port to 4G)
Features: RTU performance at the price of a DTU
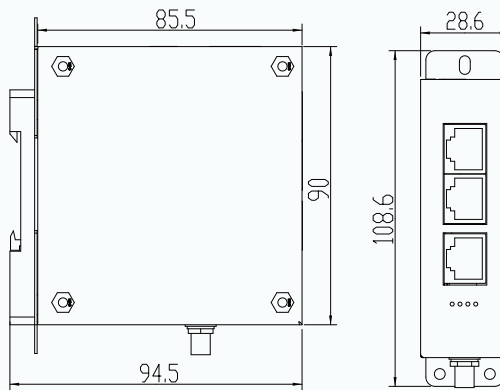
Model	Dimensions (W×H×D) (including rail clips)	Weight (excluding antenna)
ICA417 series	28.6×108.6×94.5mm	153g

Positioning: 4G Ultimate version (high-speed 4G cat 4 version)
Features: VPN transparent transmission, perfect support for remote debugging
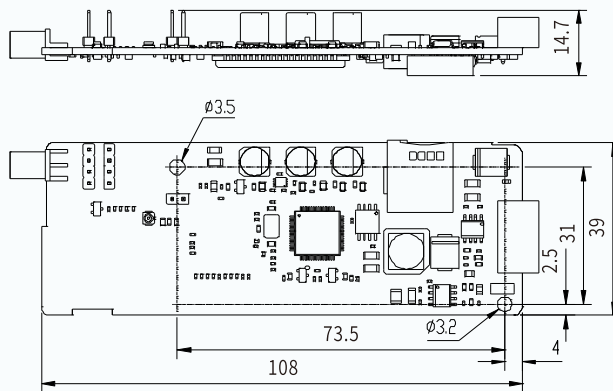
Model	Dimensions (W×H×D) (including rail clips)	Weight (excluding antenna)
EC-IC series	108×39×15.5mm	25g

IWOCloud industrial cloud platform

INVT develops the industrial IoT data processing platform to provide a stable, safe, and high-efficiency base for various IoT industries and application scenarios. As the IoT "brain", the platform provides large-scale data terminal node access and high concurrent terminal access capability to accept, clean, arrange, distribute, and save data uploaded from various devices. In addition, it provides standard database interfaces in unified data format externally, meeting enterprise informationization development needs.
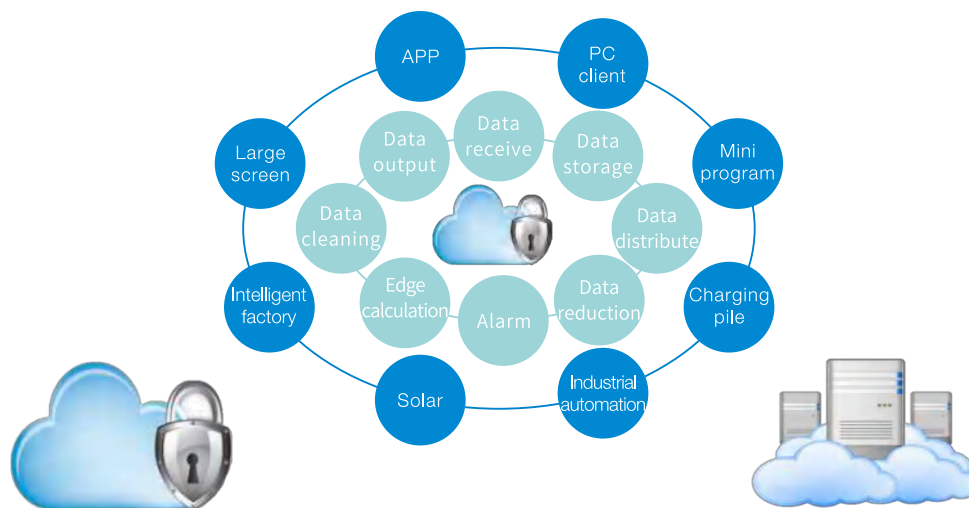
INVT public cloud platform

Customers upload device acquired data to INVT cloud platform (IWoCloud)
· System running: safe and stable
· Maintenance: at low cost

Privatized IoT platform

Customers can deploy industrial cloud platform with private permissions on specified servers, and upload device acquired data to the platform.
· Data privatization
· Maintenance: at high cost for the need of specialist for system stablity maintenance

Industrial cloud service

| Policy file maintenance service | Data flow card service | Cloud data storage service | Cloud platform use and maintenance |

| ICS-SW | ICS-SIM- | ICS-DS- | ICS-PF |

ICS-SW
Data acquiring policy
File maintenance service

ICS-SIM-
· Standard card:
30MB per month
· Large data flow card:
100MB per month
· Users can recharge their
cards before the 12-month
service life expires.

ICS-DS-
· 6M: The data storage
rolling period is 6 months.
· 12M: The data storage
rolling period is 12 months.

ICS-PF
INVT cloud platform
use and maintenance

Data flow card service
· Standard card: 30MB per month

· Large data flow card: 100MB per month. Users can recharge their cards before the 12-month service life expires

API service
· CS-API: A third-party system can obtain device real-time data, facilitating remote device control and remote program upgrade.
· Standard version: The service application system provides data interfaces, for third-party systems to invoke data.
· Customized version: Data interfaces can be customized based on third-party system requirements.

Policy file maintenance service
· ICS-SW: Data acquiring policy file maintenance service, implementing the upgrade or update on different data points of monitored devices
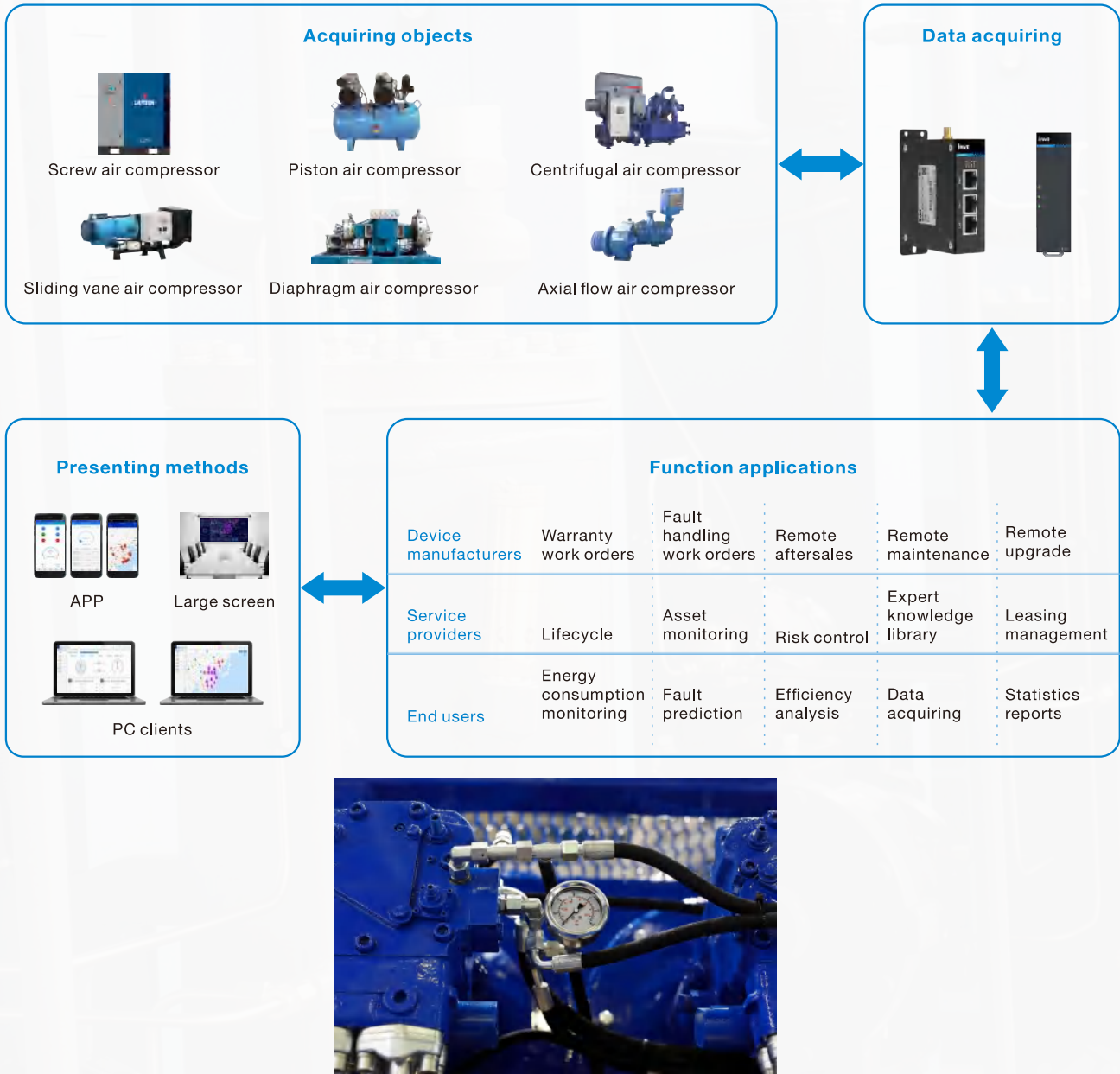
Cloud platform use and maintenance
· INVT cloud platform use and maintenance

Cloud data storage service
· 6M: The data storage rolling period is 6 months

· 12M: The data storage rolling period is 12 months

Air compressor IoT comprehensive service management platform

Acquiring objects

Screw air compressor

Piston air compressor

Centrifugal air compressor

Sliding vane air compressor

Diaphragm air compressor

Axial flow air compressor

Data acquiring

Presenting methods

APP

Large screen

PC clients

Function applications

Device manufacturers	Warranty work orders	Fault handling work orders	Remote aftersales	Remote maintenance	Remote upgrade
Service providers	Lifecycle	Asset monitoring	Risk control	Expert knowledge library	Leasing management
End users	Energy consumption monitoring	Fault prediction	Efficiency analysis	Data acquiring	Statistics reports

● **Solutions**

1. Saving aftersales costs: Remote aftersales can improve overall aftersales efficiency and reduce aftersales costs.

2. Device status monitoring and operation analysis: The best economic efficiency of replacing vulnerable and consumableparts can be achieved by real-time detection and intelligent analysis of these parts of air compressor.

3. IoT supervision and online leasing business: The ownership of leased device is separated from operational services, improving efficiency and reducing risks.

4. Refined energy consumption management: Through the IoT management, an enterprise can achieve a reduction of approximately 10% in energy consumption under the same operating conditions, saving at least RMB 700,000 in energy consumption costs annually.

Textile IoT smart management platform

Data acquiring

IoT system platform

Network version:
2G/4G/WiFi/Network port

INVT CLOUD
supporting privatized
deployment

Interface:
RS485/232
Ethernet

Protocol:
Modbus
supporting standard common
protocols

Textile machinery

Service application system

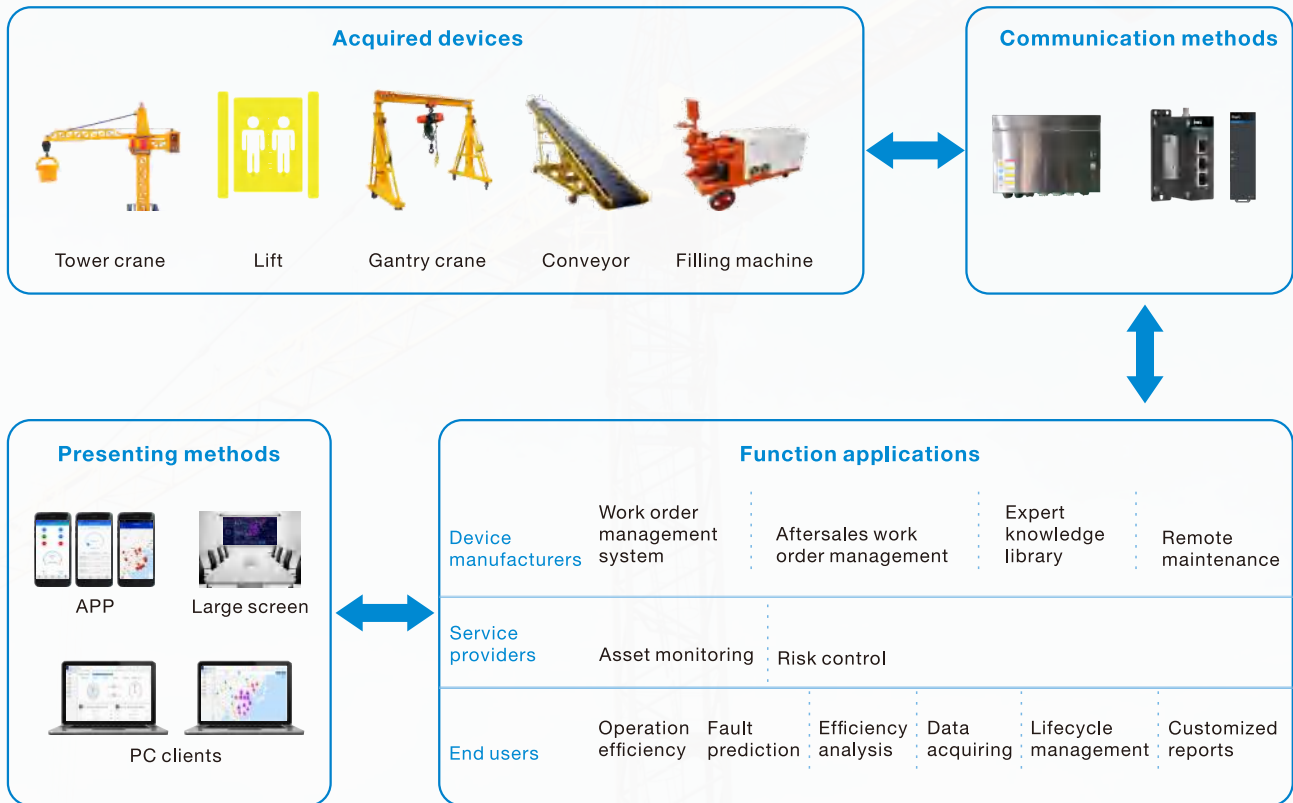| Real-time monitoring	Fault prediction	Data analysis	Capacity optimization	Centralized monitoring
Leasing management	Automatic piece counting	Lifecycle	Production reports	Performance improvement
Remote maintenance	Work order dispatching	Parameter distribution	Remote diagnosis	Remote upgrade

APP   PC clients   Large screen

Textile process production line

● Solution

1. It realizes remote monitoring of textile production line device, batch parameter distribution, real-time monitoring of device status, improving production efficiency.

2. It realizes remote fault prediction, reducing downtime of textile production line device, ensuring system stability, and reminding of periodic device maintenance.

3. It realizes the integration of IoT platform with enterprise ERP, PLM, CRM, SCM and other management information systems, helping enterprises in efficient resource flow and integration from product design to production, and ensuring the stability and efficiency of production.

Construction machinery IoT smart management platform

Acquired devices

Tower crane | Lift | Gantry crane | Conveyor | Filling machine

Communication methods

Presenting methods

APP | Large screen

PC clients

Function applications

Device manufacturers	Work order management system	Aftersales work order management	Expert knowledge library	Remote maintenance
Service providers	Asset monitoring	Risk control		

| End users | Operation efficiency | Fault prediction | Efficiency analysis | Data acquiring | Lifecycle management | Customized reports |

● Solution

Device manufactuers

1. Fault work order management: can handle faults timely and accurately, improving user experience.

2. Aftersales and maintenance work order management: can rigger maintenance tasks actively through remote aftersales and remote control, enhancing customer stickiness, and driving accessory sales.

3. Expert knowledge library management: precise fault handling suggestions pushing to assist in efficient management.
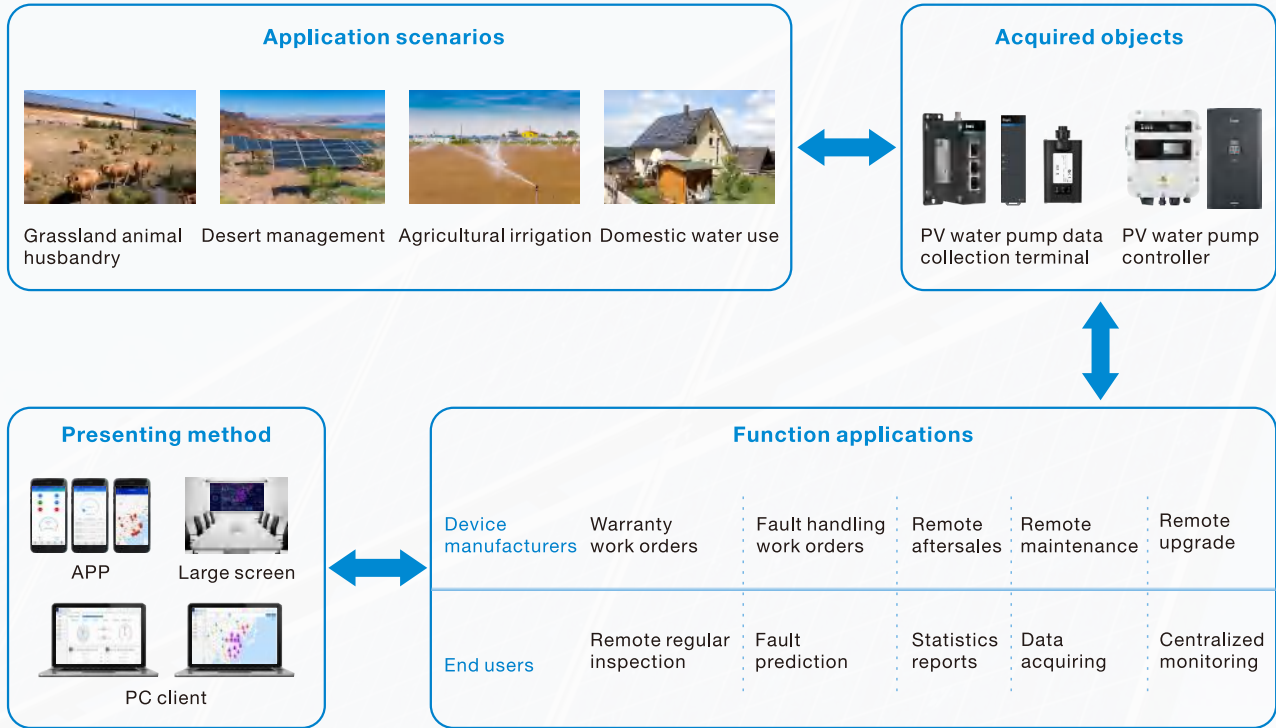
Service providers

1. Risk control: By combining IoT technology to achieve online leasing business, separating ownership of leased device from operational services, improving efficiency and controlling risks.

2. Timely reminder of payment: For device service providers' leasing business, a reminder of lease expiration can be provided to reduce repayment risks.

End users

1. Device monitoring: Real time monitoring of device status and implementation of over limit alarm mechanism for key parameters to ensure onsite safety production.

2. With the help of IoT terminal devices on construction sites, onsite inspectors can track device conditions and respond promptly to emergency situations.

3. Data report management: can generate health data for devices, facilitating maintenance operations, preventing faults, and timely notifying manufacturers for repairs.

4. Full lifecycle management of construction machinery: all device data is fully recorded for engineers to access.

PV water pumpt IoT smart management platform

Application scenarios

Grassland animal husbandry

Desert management

Agricultural irrigation

Domestic water use

Acquired objects

PV water pump data collection terminal

PV water pump controller

Presenting method

APP

Large screen

PC client

Function applications

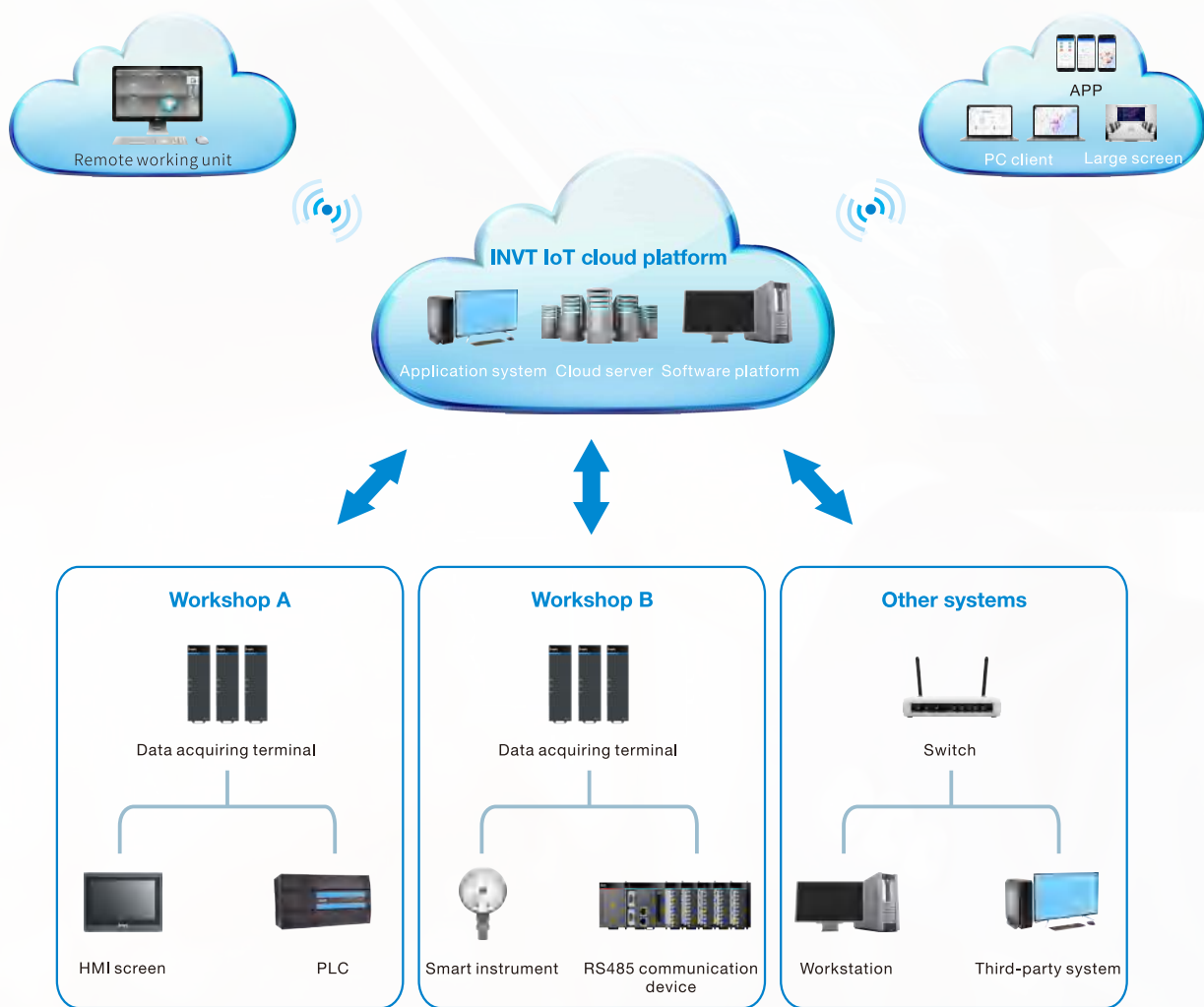|					
Device manufacturers	Warranty work orders	Fault handling work orders	Remote aftersales	Remote maintenance	Remote upgrade
End users	Remote regular inspection	Fault prediction	Statistics reports	Data acquiring	Centralized monitoring

PV water pump IoT platform

● Solution

1. Smart regular inspection and efficient O&M: can realize remote monitoring and analysis of PV water pump faults and exceptions, effectively solving practical problems such as difficult monitoring and control of PV water pumps, inspection difficulty, and low O&M effectiveness. Ultimately, the annual cost of O&M and inspection can be reduced by 30%.

2. Panoramic monitoring: can acqure operational data information such as voltage, current, and power of PV water pumps in real time, comprehensively monitor the operation of PV devices, and make intelligent analysis to achieve maximum operational efficiency of the entire PV water pump system.

3. PV water pump devices can be remotely controlled through computers and mobile phones, and key parameters of the devices can be remotely regulated.

The smart factory solution is a full lifecycle management system for a digital factory or product from requirements to design, production, operation, and maintenance. The purpose is to summarize and integrate the manufacturing data, operation data, maintenance data, and then analyze and process the data through big data analysis systems and artificial intelligence systems, ultimately completing the optimization, production capacity improvement, efficient operation, remote pre-maintenance.

Remote working unit

APP

PC client   Large screen

INVT IoT cloud platform

Application system Cloud server Software platform

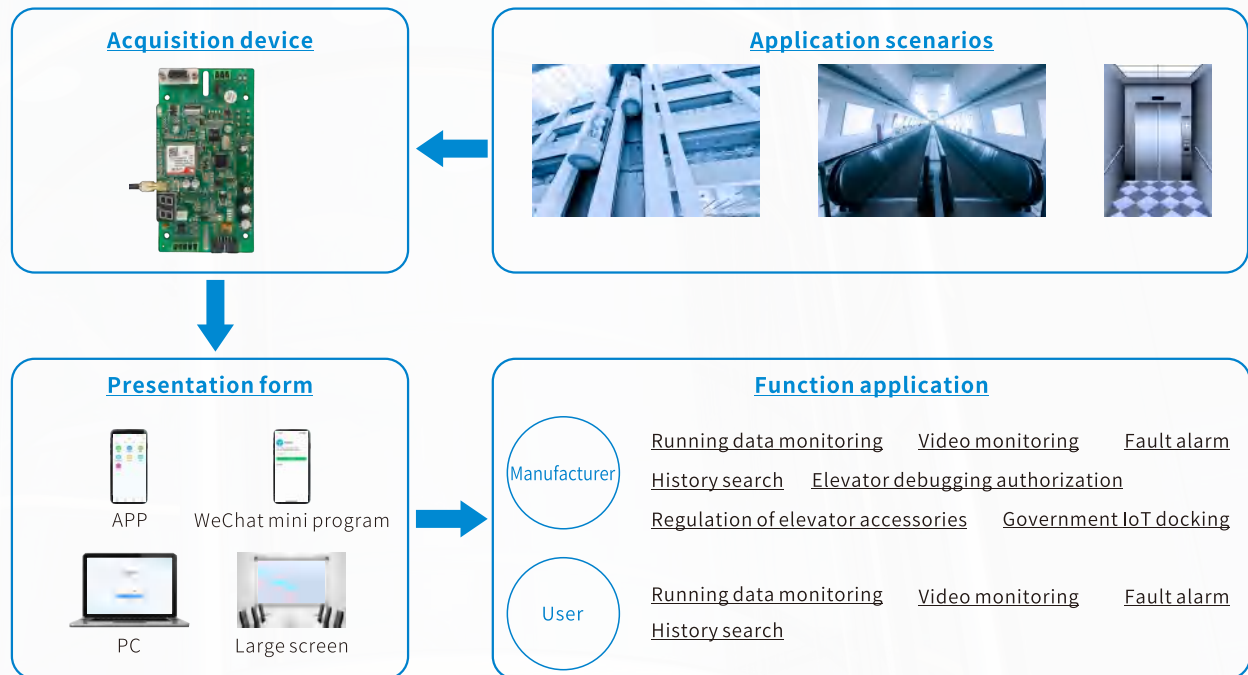| **Workshop A**	**Workshop B**	**Other systems**
Data acquiring terminal	Data acquiring terminal	Switch
HMI screen PLC	Smart instrument RS485 communication device	Workstation Third-party system

INVT IoT solution gradually achieves the goal of energy saving, emission reduction, and production increase and efficiency enhancement in smart factories in three stages:

1. To realize the interconnection and intercommunication of various industrial device data in the factory.

2. To manage factory device energy consumption and faults.

3. To establish a mathematical model for device energy saving, emission reduction, and production increase and efficiency enhancement by means of data analyisis.

IESM - Elevator IoT monitoring and management platform

Acquisition device

Application scenarios

Presentation form

APP   WeChat mini program

PC   Large screen

Function application

Manufacturer

Running data monitoring   Video monitoring   Fault alarm

History search   Elevator debugging authorization

Regulation of elevator accessories   Government IoT docking

User

Running data monitoring   Video monitoring   Fault alarm

History search

● **Solution**

1. Elevator debugging tools: The elevator main control and other auxiliary boards can be debugged through the APP, and the debugging permissions of the elevator can be supervised, so that only authorized personnel can perform elevator debugging.

2. "Digital housekeeper" of elevators: The accessories of elevators are supervised to ensure that only authorized elevator components can be installed for normal use, and avoid the use of illegal components that may affect the safety of elevator operation.

3. Real-time monitoring of operation status: Maintenance personnel can understand the health of the elevator at the first time, and take targeted measures.

4. Automatic push of faults and alarms: When a fault occurs, maintenance personnel will be notified in a timely manner through SMS. When a critical fault occurs (people trapped), the platform can automatically call the maintenance phone to timely appease the trapped personnel.

5. Data docking with government platforms: Currently, the docking work has been achieved in Shanghai, Hangzhou, Jiaxing, Jinhua, Ningbo, Shenyang, Fuzhou, Liaoning, Huzhou, Lishui and other places.

INVT Marketing service network

Distributor
Service Center
INVT Branch
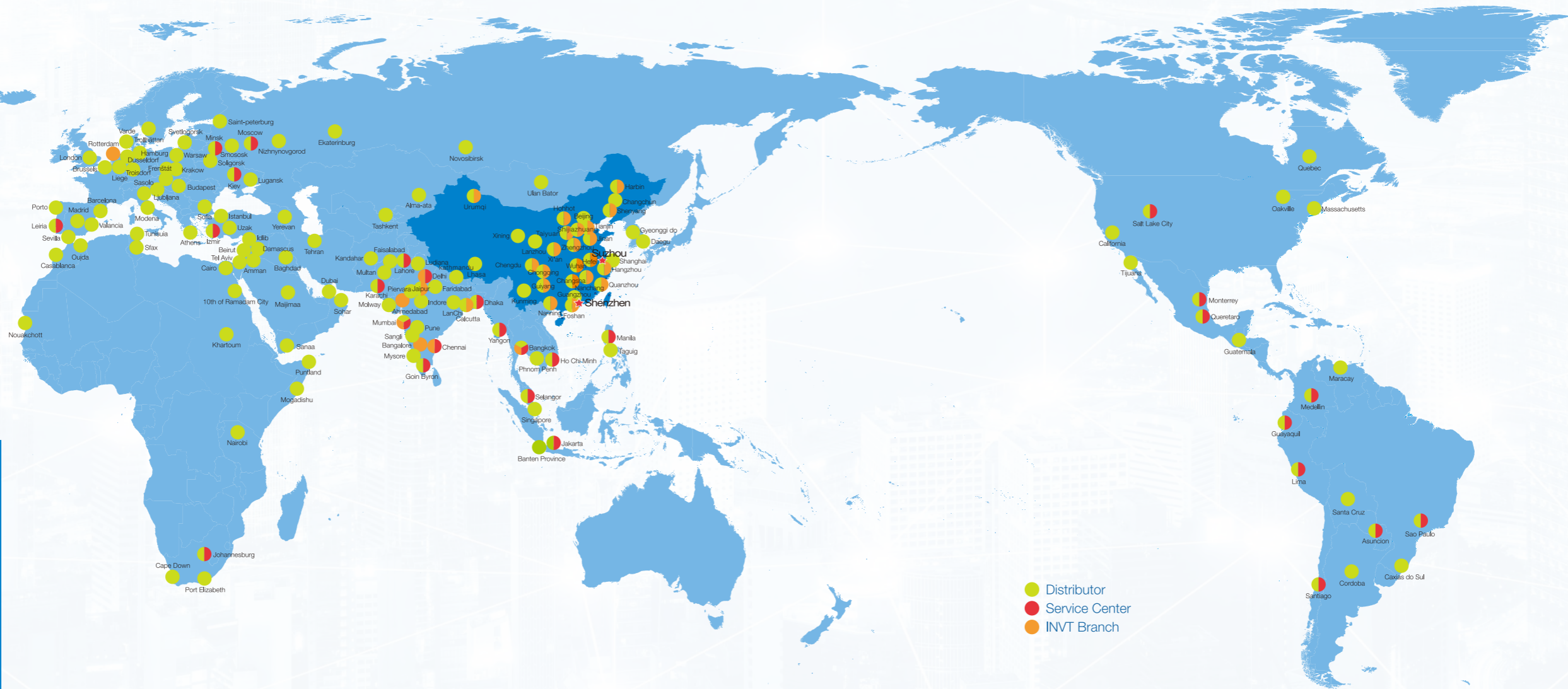
Factories * **3**

Headquarter in Shenzhen

Overseas Subsidiaries and offices * **8**

More than **100** Overseas Partners

Your Trusted Industry Automation Solution Provider