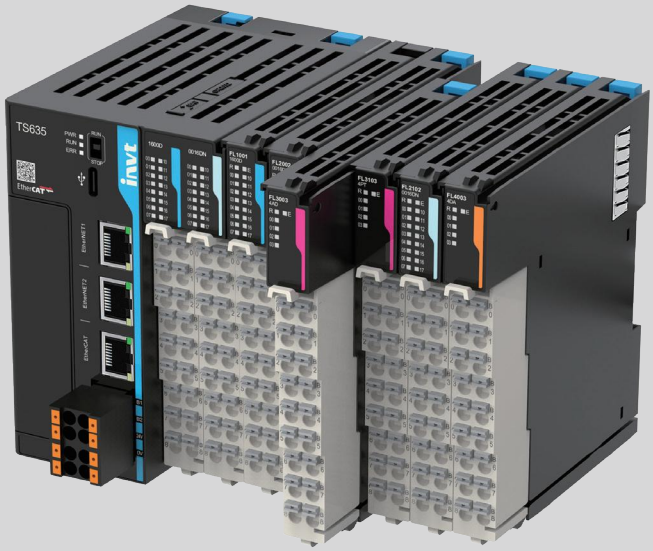
TS600 Series Intelligent PLC



About Us

INVT (Shenzhen INVT Electric Co., Ltd) has been concentrating on industry automation and energy power since its foundation in 2002 and is committed to "Providing the best product and service to allow customers more competitiveness". INVT goes public in 2010 and is the first A-share listed company (002334) in Shenzhen Stock Exchange in the industry. At present, INVT owns 15 subsidiaries and more than 4500 employees, over 40 branches, forming a sales network covering more than 100 overseas countries and regions.

INVT has been awarded as the Key High-tech Enterprise of National Torch Plan based on mastering of key technologies in power electronics, auto control and IT. With business covering industry automation, electric vehicle, network power and rail transit, INVT has established 10 R&D centers nationwide, boasts more than 1400 patents and owns the first lab in the industry awarded ACT qualification from TÜV SÜD, UL-WTDP and CNAS National Lab. The industrial parks in Shenzhen and Suzhou aim to provide customers with advanced integrated product development design management, comprehensive product R&D test and auto informational production. The worldwide INVT branches and warranty service centers are ready to offer customers all-around back-ups including professional solutions, technical trainings and service support.

In the next decade, INVT will continue to take " Sincere Virtuous, Professional Aspiring" as our business philosophy, enhance core business sectors including industrial automation, electric vehicle, network power and rail transit based on the three major technologies in industry automation and energy power fields, and strive to become a leading, responsible and harmonic international professional group armed with proper product structure, leading technologies, efficient management, robust profitability and superior competitiveness.


INVT Guangming
Technology Building

INVT Shenzhen
Production Industry Park


INVT Suzhou Industry Park

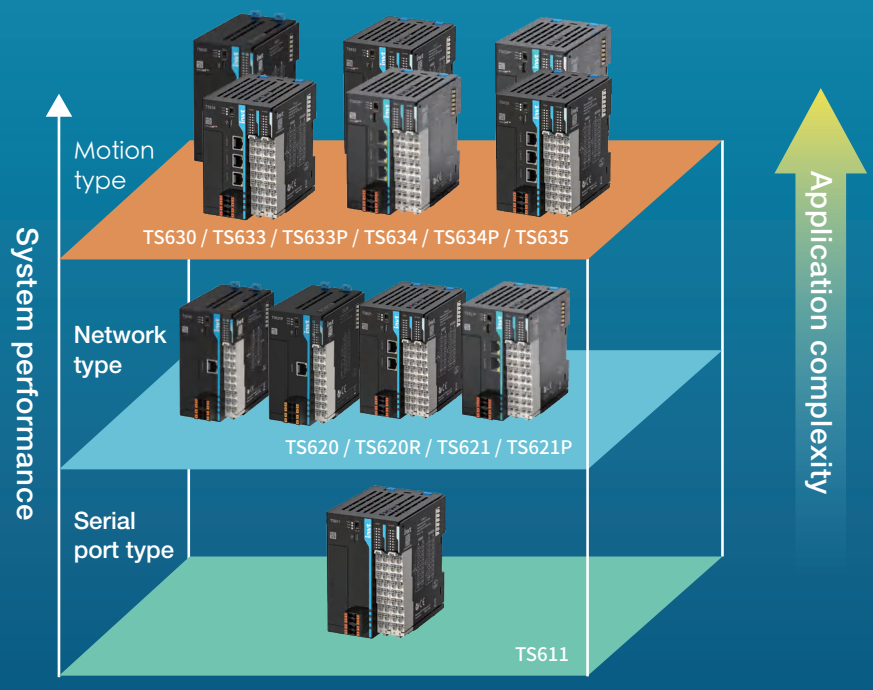

INVT Zhongshan
New Energy Industry Base

TS600 Series Intelligent PLC

Product overview

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

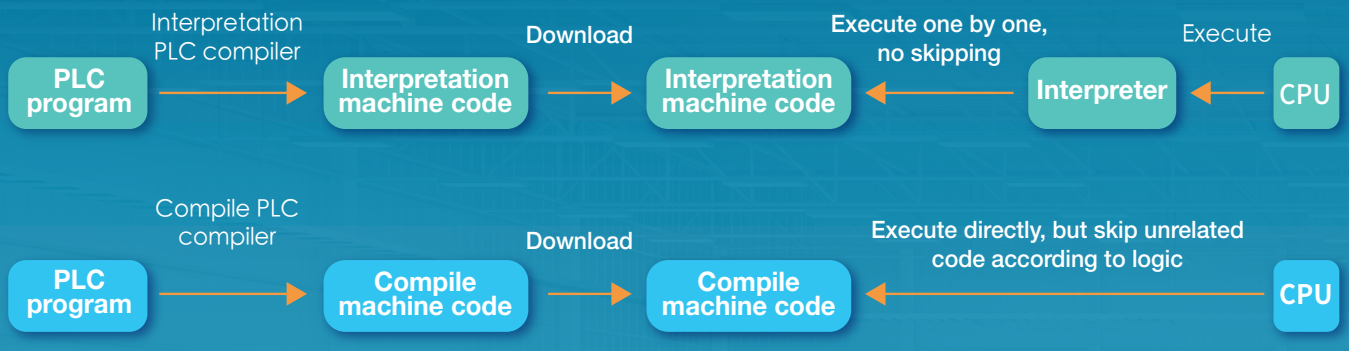


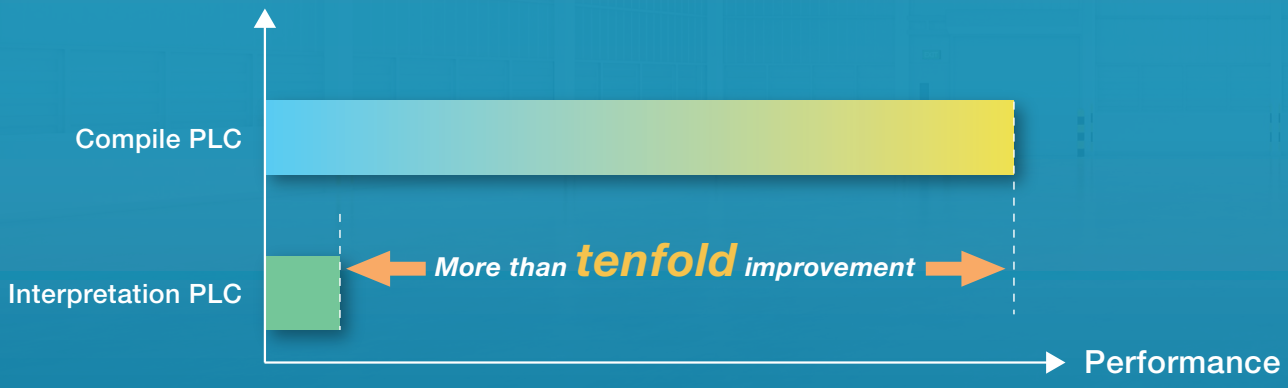

Strong motion control
High performance
Easy connection
6 highlights
Easy programming
Easy scalability
Cloud collaboration

High performance

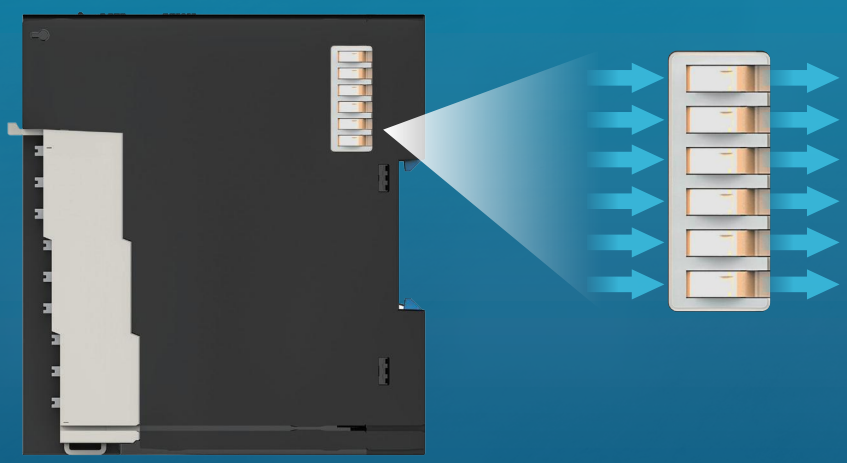
Running efficiently

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



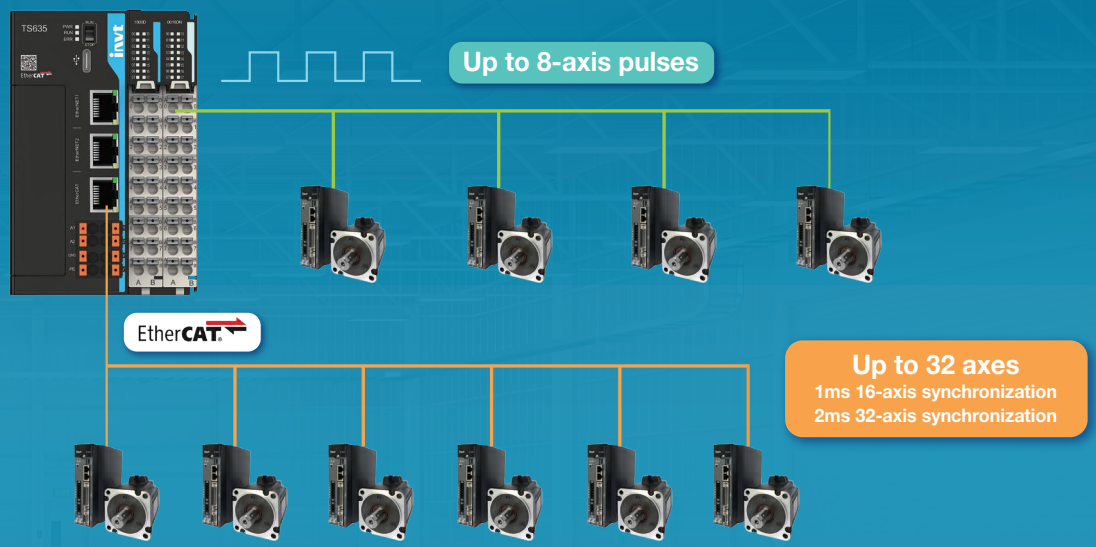


100Mbps backplane bus; 125μs IO refresh speed; plating process, reliable connection; saving data at power down, 1s power-down ride-through



Strong motion control

High-speed motion control, easily implementing complex processes



Single-axis control

speed and torque control

Position control

Homing

Multi-axis control

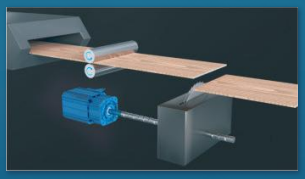
E-gear

E-CAM

Interpolation

Flying shear

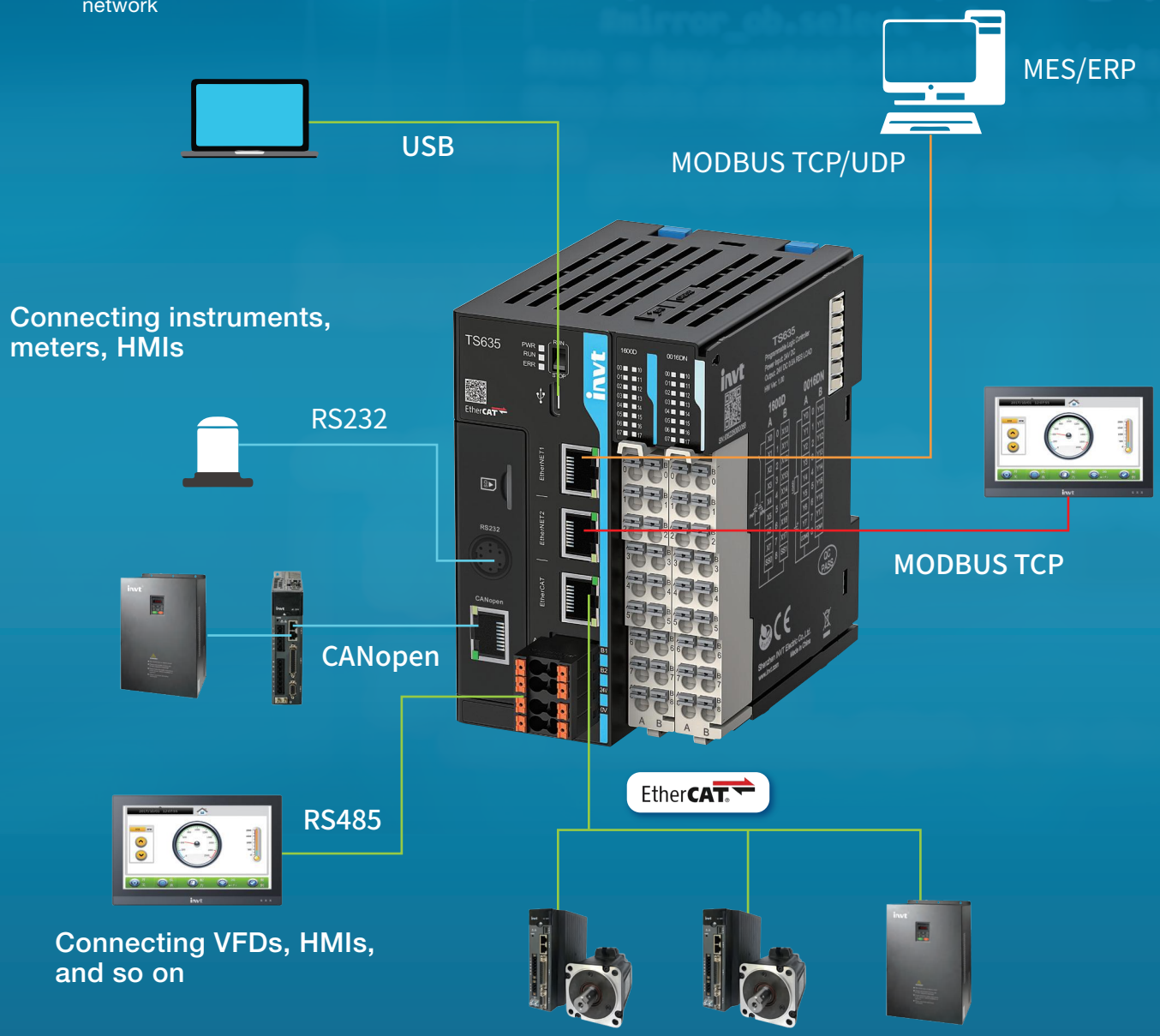
Chasing shear



Easy connection

Multi-protocol support facilitates interconnection

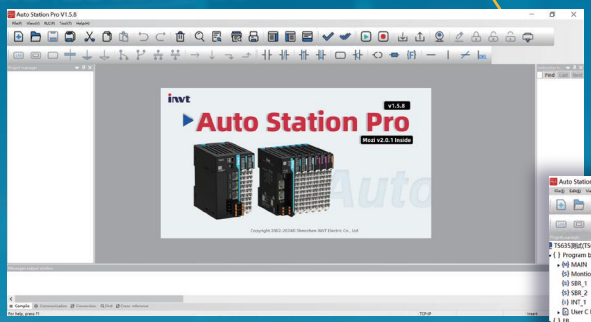
Dual-port design, makes cascading easy, and achieves the isolation between the internal network and external network



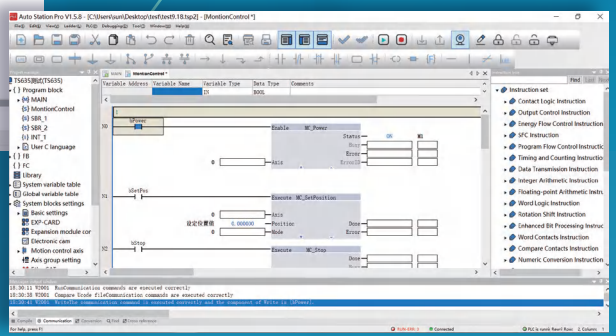
*Ethernet IP master/slave nodes supported

Easy programming

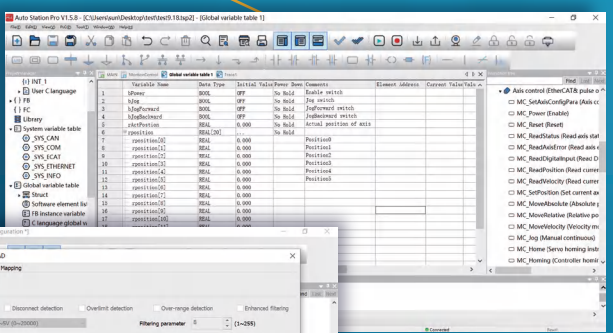
Equipped with the brand new AutoStationPro

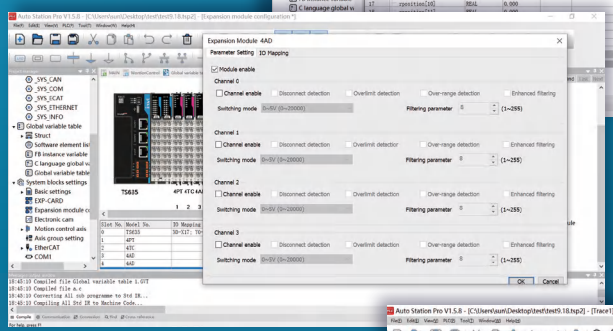


Compliant with IEC61131 programming specifications, supporting the languages LD, SFC, IL, C, and ST (under development). The **pulse** and **bus axes** are compatible with a set of axis control commands.

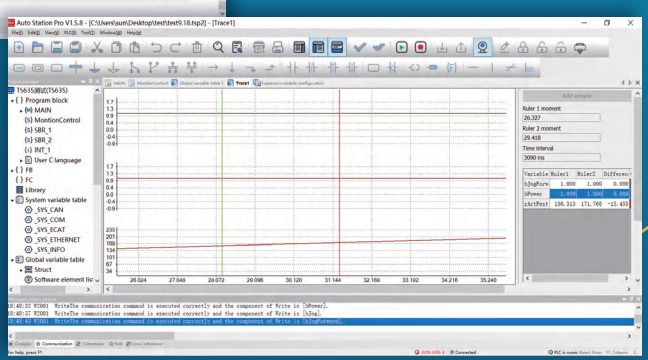


Supporting **user-defined variables**





Supporting **graphic configuration** through dragging , Easy parameter setup and automatic address allocation

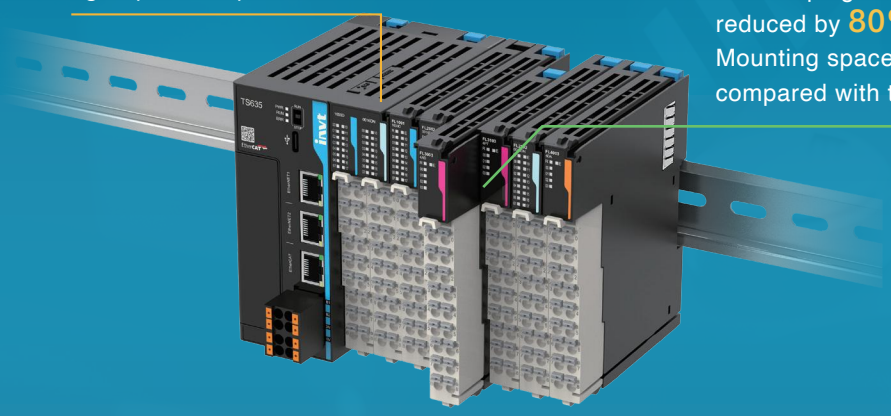


Trace function

Easy scalability

Standard configuration of CPU

8/16 points of DI
8 channels of 200kHz high-speed inputs
8/16 points 0f DO
Up to 16 channels of 200kHz
high-speed outputs

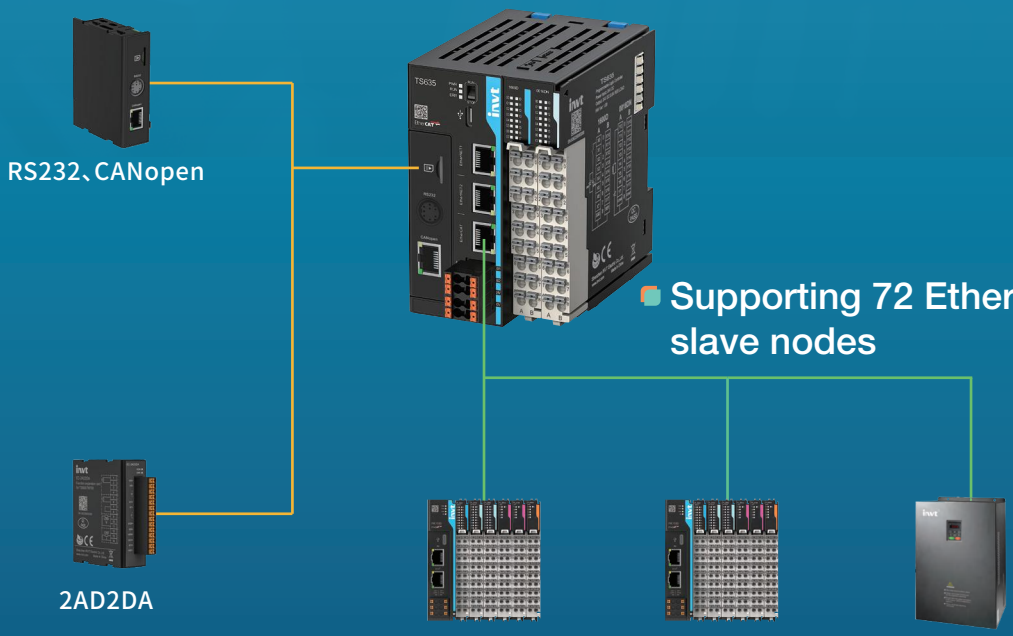


Compatible with Flex series I/O modules for scaling

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

*TS620 and TS630 equipped with 8 digital inputs and 8 digital outputs; TS611, TS621, and TS621P support 16 channels of 200kHz high-speed outputs

Supporting various expansion cards



Supporting 72 EtherCAT slave nodes

Cloud collaboration

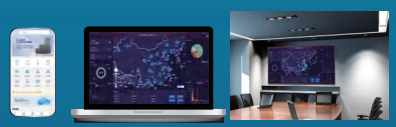
Efficient resource utilization in response to digitalization trends

Supporting the **4G**, **WiFi**, and **RJ45** transmission methods, remote upload and download through VPN, and cloud collaboration through MQTT and API

4G、WIFI、RJ45

IWOCloud IoT cloud platform

- Various data presenting means
- Mature IOT applications
- Remote O&M
- API data interface



Mobile phone | PC | Large screen

Real-time data monitoring

Remote O&M

Third-party IoT platform

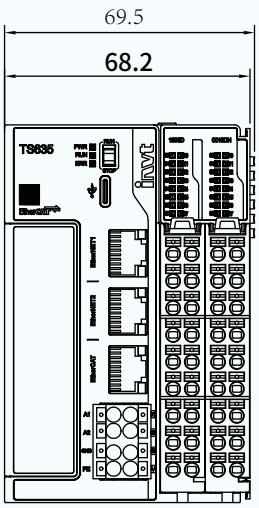
Product specifications

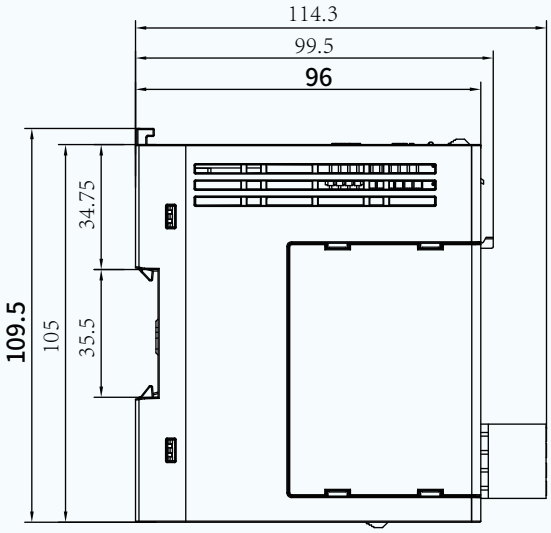
Model	TS635	TS634	TS634P	TS633	TS633P	TS630	TS621	TS621P	TS620	TS620R	TS611
General specifications											
EtherNet interface	2	2	2	2	2	1	2	2	1	1	-
EtherCAT interface	1	1	1	1	1	1	-	-	-	-	-
Max. number of axes (bus+pulse)	32 (bus) +4 (pulse)	16 (bus) +4 (pulse)	16 (bus) +4 (pulse)	8 (bus) +4 (pulse)	8 (bus) +4 (pulse)	8 (bus) +4 (pulse)	8 (pulse)	8 (pulse)	4 (pulse)	-	8 (pulse)
RS485 bus	2 channels, supporting Modbus RTU master/slave function										
EtherNet bus	Supporting Modbus TCP/UDP, program upload and download, and firmware upgrade										-
USB interface	1 channel, Type-C interface, supporting program upload and download, and firmware upgrade										
DI	16 inputs originally, including eight 200kHz high-speed inputs					8 inputs originally, including eight 200kHz high-speed inputs	16 inputs originally, including eight 200kHz high-speed inputs		8 inputs originally, including eight 200kHz high-speed inputs	8 inputs originally, including eight 200kHz high-speed inputs	16 inputs originally, including eight 200kHz high-speed inputs
DO	16 outputs originally, including eight 200kHz high-speed outputs					8 outputs originally, including eight 200kHz high-speed outputs	16 outputs originally, including sixteen 200kHz high-speed outputs		8 outputs originally, including eight 200kHz high-speed outputs	6 outputs originally, Relay outputs	16 outputs originally, including sixteen 200kHz high-speed outputs
Pulse axis	up to 4 axes						up to 8 axes		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 flash)										
Real-time clock	Supported (CR2032 battery is optional; the real-time clock works about four days without a battery)										
Local expansion modules	Expand Flex series I/O，Up to 16，disallowing hot swapping										
Local expansion card	1 expansion card, supporting SD card, CANopen card, RS232 card and so on										
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-defined 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 steps at 0.2ms										
Bit handling command	0.0127μs										
Word transmission command	0.0014μs										
Floating-point transmission command	0.0027μs										
Four operations of math	0.033μs										
Power specifications											
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										

Model	TS635	TS634	TS634P	TS633	TS633P	TS630	TS621	TS621P	TS620	TS620R	TS611
Input specifications											
Input type	digital input										
Number of input channels	16					8	16		8		16
Input mode	Source and sink										
Input voltage class	24VDC(-10%~+10%)										
Input current	Typical value for X0–X7: 13.5mA; Typical value for X10–X17: 4.2mA					Typical value for X0–X7: 17.5mA	Typical value for X0–X7: 13.5mA; Typical value for X10–X17: 4.2mA		Typical value for X0–X7: 17.5mA		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					200kHz for X0–X7	200kHz for X0–X7; 200Hz for X10–X17		200kHz for X0–X7		200kHz for X0–X7; 200Hz for X10–X17
Input resistance	Typical value for X0–X7: 1.7kΩ; Typical value for X10–X17: 5.7kΩ					Typical value for X0–X7: 1.3kΩ	Typical value for X0–X7: 1.7kΩ; Typical value for X10–X17: 5.7kΩ		Typical value for X0–X7: 1.3kΩ		Typical value for X0–X7: 1.7kΩ; Typical value for X10–X17: 5.7kΩ
ON voltage	⩾ 15VDC										
OFF voltage	⩽ 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)										
Output specifications											
Output type	Transistor output										
Number of output channels	16					8	16		8	-	16
Output mode	sink	Source	sink	Source		sink	sink	Source	sink	-	sink
Output voltage class	24VDC(-10%~+10%)										
Output load (resistive)	0.5A/point, 2A/group										
output load (inductive)	7.2W/point, 24W/group										
Hardware response time	<2us										
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	Optocoupler 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°C										
TS620R Output specifications											
Output type	Relay output										
Output mode	Dry node										
Number of output channels	6										
Output voltage class	250VAC/30VDC										
Maximum switching voltage	250VAC/125VDC（@0.3A）										
Output load（resistive load）	3A/point，8A/module										
Output load（Inductive load）	1A/point，4A/module										
Output load（lamp load）	30W/point，120W/module										
contact resistance	<100mΩ（1A 6VDC）										
Minimum load	5VDC 10mA										
Mechanical life	20,000,000 times										
Electrical life	100,000 times										
Isolation method	High voltage/Low voltage isolation										

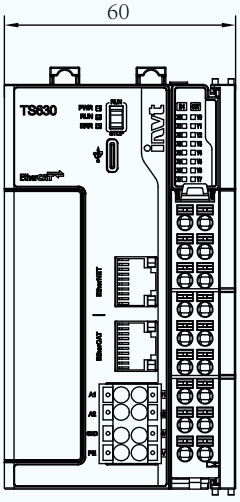
Dimension drawings

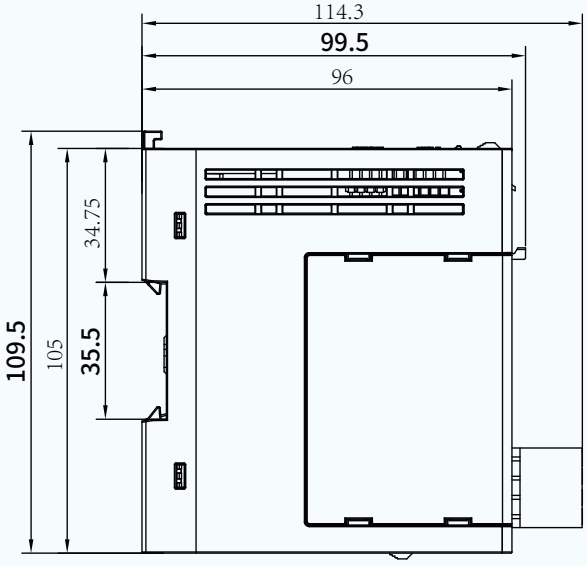
TS635、TS634、TS634P、TS633、TS633P、TS621、TS621P、TS611





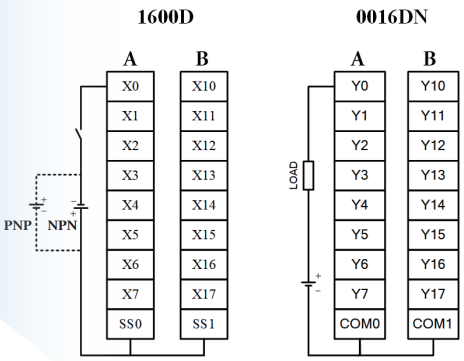
TS630、TS620、TS620R



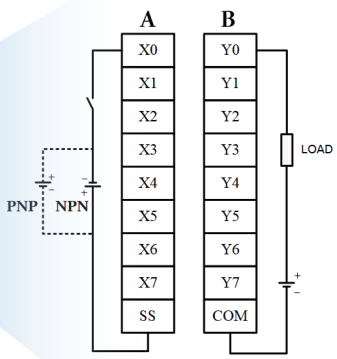


wiring diagrams

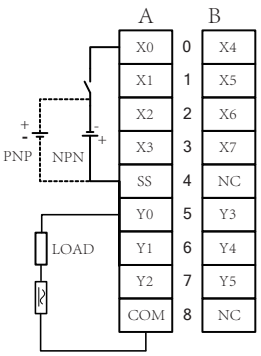
TS611、TS621、TS633、TS634、TS635



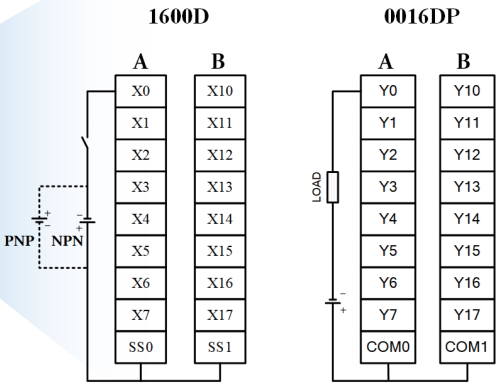
TS620、TS630



TS620R



TS621P、TS633P、TS634P



Expansion card specifications

Model	TS-CAN-232
Product picture	
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°C~55°C
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 specifications	Micro SD
SD card communi-cation interface	SDIO
Hot swapping	Supported by SD cards, but not supported by the expansion card

Model	EC-CAN
Product picture	
Product description	TS/TM series expansion card, 2*RJ45, 1*MicroSD card (SD card only supports TS series)
IP rating	IP20
Working temperature	-20°C~55°C
Terminal resistor	Built-in terminal resistor, which can be selected through the dial switch
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 specifications	Micro SD
SD card communi-cation interface	SDIO
Hot swapping	Supported by SD cards, but not supported by the expansion card

Model	EC-2AD2DA
Product picture	
Product description	TS/TM series analog expansion card, 2-channel analog input, 2-channel analog output
Hot swapping	Not supported
Number of input channels	2 channels
Voltage input range	0~10V, 0~5V, 1~5V
Current input range	0~20mA，4~20mA
Input accuracy (normal temperature 25°C)	Voltage ±1%, Current ±1%
Input accuracy (full temperature range)	Voltage ±3%, Current ±3%
Input resolution	12bit
Digital input	0~20000
Number of output channels	2 channels
Voltage output range	0~10V, 0~5V, 1~5V
Current output range	0~20mA，4~20mA
Output accuracy (normal temperature 25°C)	±1%
Output accuracy (full temperature range)	±5%
Output resolution	12bit
Digital output	0~20000

Ordering catalog

Material code	Model	Specifications	Certification
11060-00315	TS611	16 inputs and 16 transistor（NPN）outputs, 1×USB (Type-C), 2×RS485, eight 200K inputs, sixteen200K outputs, up to 8 axes（pulse）	CE
11060-00328	TS620	8 inputs and 8 transistor（NPN）outputs, 1×USB (Type-C), 2×RS485, eight 200K inputs, eight 200K outputs, 1xEtherNet, up to 4 axes（pulse）	CE
11060-00331	TS620R	8 inputs and 6 relay outputs, 1×USB (Type-C) , 2×RS485, eight 200K inputs, 1×EtherNet	CE
11060-00323	TS621P	16 inputs and 16 transistor（PNP）outputs, 1×USB (Type-C), 2×RS485, eight 200K inputs, sixteen 200K outputs, 2xEtherNet, up to 8 axes（pulse）	CE
11060-00318	TS621	16 inputs and 16 transistor（NPN）outputs, 1×USB (Type-C), 2×RS485, eight 200K inputs, sixteen200K outputs, 2xEtherNet, up to 8 axes（pulse）	CE
11060-00329	TS630	8 inputs and 8 transistor（NPN）outputs, 1×USB (Type-C), 2×RS485, eight 200K inputs, eight 200K outputs, 1xEtherNet,1xEtherCAT, up to 12 axes（8 bus axes +4pulse axes）	CE
11060-00324	TS633P	16 inputs and 16 transistor（PNP）outputs, 1×USB (Type-C), 2×RS485, eight 200K inputs, eight 200K outputs, 2xEtherNet,1xEtherCAT,up to 12 axes（8 bus axes +4pulse axes）	CE
11060-00317	TS633	16 inputs and 16 transistor（NPN）outputs, 1×USB (Type-C), 2×RS485, eight 200K inputs, eight 200K outputs, 2xEtherNet,1xEtherCAT,up to 12 axes（8 bus axes +4pulse axes）	CE
11060-00325	TS634P	16 inputs and 16 transistor（PNP）outputs, 1×USB (Type-C), 2×RS485, eight 200K inputs, eight 200K outputs, 2xEtherNet,1xEtherCAT,up to 20 axes（16 bus axes +4pulse axes）	CE
11060-00316	TS634	16 inputs and 16 transistor（NPN）outputs, 1×USB (Type-C), 2×RS485, eight 200K inputs, eight 200K outputs, 2xEtherNet,1xEtherCAT,up to 20 axes（16 bus axes +4pulse axes）	CE
11060-00312	TS635	16 inputs and 16 transistor（NPN）outputs, 1×USB (Type-C), 2×RS485, eight 200K inputs, eight 200K outputs, 2xEtherNet,1xEtherCAT,up to 36 axes（32 bus axes +4pulse axes）	CE
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
11060-00332	EC-CAN	TS/TM series expansion card, 2*RJ45, 1*MicroSD card (SD card only supports TS series)	CE
11060-00333	EC-2AD2DA	TS/TM series analog expansion card, 2-channel analog input, 2-channel analog output	CE

I/O system product list

Ordering code	Model	Product type	Specications
11016-00005	FK1100	Communication coupler (EtherCAT)	Coupler, EtherCAT, 24VDC; RoHS
11016-00012	FK1200	Communication coupler (Profinet)	Coupler, Profinet, 24VDC; RoHS
11016-00018	FK1300	Communication Coupler (EtherNet/IP)	Coupler, EtherNet/IP, 24VDC; RoHS
11016-00029	FK1400	Communication coupler (Modbus TCP)	Coupler, Modbus TCP, 24VDC; RoHS
11016-00004	FL1001	Digital input	Digital input module, 16 channels, supporting the source and sink types, 500mA@ 24 VDC inputs; RoHS
11016-00016	FL1002	Digital input	Digital input module, 32 channels, supporting the source and sink types, 500mA@ 24 VDC inputs; RoHS
11016-00006	FL2002	Digital output (source type)	Digital output module, with 16 channels of PNP transistor output, 500mA @ 24 VDC; RoHS
11016-00013	FL2003	Digital output (source type)	Digital output module, with 32 channels of PNP transistor output, 500mA @ 24 VDC; RoHS
11016-00003	FL2102	Digital output (sink type)	Digital output module, with 16 channels of NPN transistor output, 500mA @ 24 VDC; RoHS
11016-00017	FL2103	Digital output (sink type)	Digital output module, with 32 channels of NPN transistor output, 500mA @ 24 VDC; RoHS
11016-00015	FL5005	Digital input/output (source type)	Digital input/output, 16 channels of input, 16 channels of PNP transistor output; RoHS
11016-00014	FL5105	Digital input/output (sink type)	Digital input/output, 16 channels of input, 16 channels of NPN transistor output; RoHS
11016-00009	FL2201	Digital output (relay)	Digital output, 8 relay outputs, dry contacts,3A@30VDC/250VAC;RoHS
11016-00011	FL3003	Analog input	Analog input, 4 channels, 16-bit resolution, room-temperature accuracy of±0.1%FS; RoHS
11016-00026	FL3404	Analog input	Analog input; 8 channels; voltage signals; 16-bit resolution; accuracy ±0.15%FS at room temperature
11016-00027	FL3504	Analog input	Analog input; 8 channels; current signal; 16-bit resolution; accuracy ±0.15%FS at room temperature
11016-00008	FL4003	Analog output	Analog output module, 4 channels, 16-bit resolution, room-temperature accuracy of ±0.1% FS; RoHS
11016-00007	FL3103	Temperature measurement (thermal resistor)	Thermal resistor detection, 4 channels, 24-bit resolution, sensitivity of 0.1°C / °F ; RoHS
11016-00010	FL3203	Temperature measurement (thermocouple)	Thermocouple detection, 4 channels, 24-bit resolution, sensitivity of 0.1°C / °F ; RoHS
11016-00019	FL6112	Counting module	Incremental encoder input, 2 channels, 24V single-ended, 200kHz; RoHS
11016-00021	FL6121	Counting module	Incremental encoder input, 1 channel, 5VDC differential, 2MHz; RoHS
11016-00022	FL6002	Counting module	SSI absolute input encoder module, 2 channels, 24VDC, 2MHz; RoHS
11016-00030	FL3321	Resistance bridge measurement	4-wire/6-wire resistor bridge sensor input, 1 channel, 24-bit, 5VDC, RoHS
11016-00031	FL3322	Resistance bridge measurement	4-wire/6-wire resistor bridge sensor input, 2 channel, 24-bit, 5VDC, RoHS
11016-00025	FL7102	Pulse module	Pulse output, 2 channels, 200kHz; RoHS
11016-00028	FL7200	Power feed module	Power feed; input: 24VDC, output: 5VDC 2.5A; RoHS
11016-00020	FC1160	EtherCAT branch device	Network component, EtherCAT, 6 ports, 100Mbit/s, 24VDC; RoHS
11016-00024	FS1005	Relay module	16 channels of input, supporting source/sink type, 16 channels of relay output, 5A@250VAC/30VDC

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