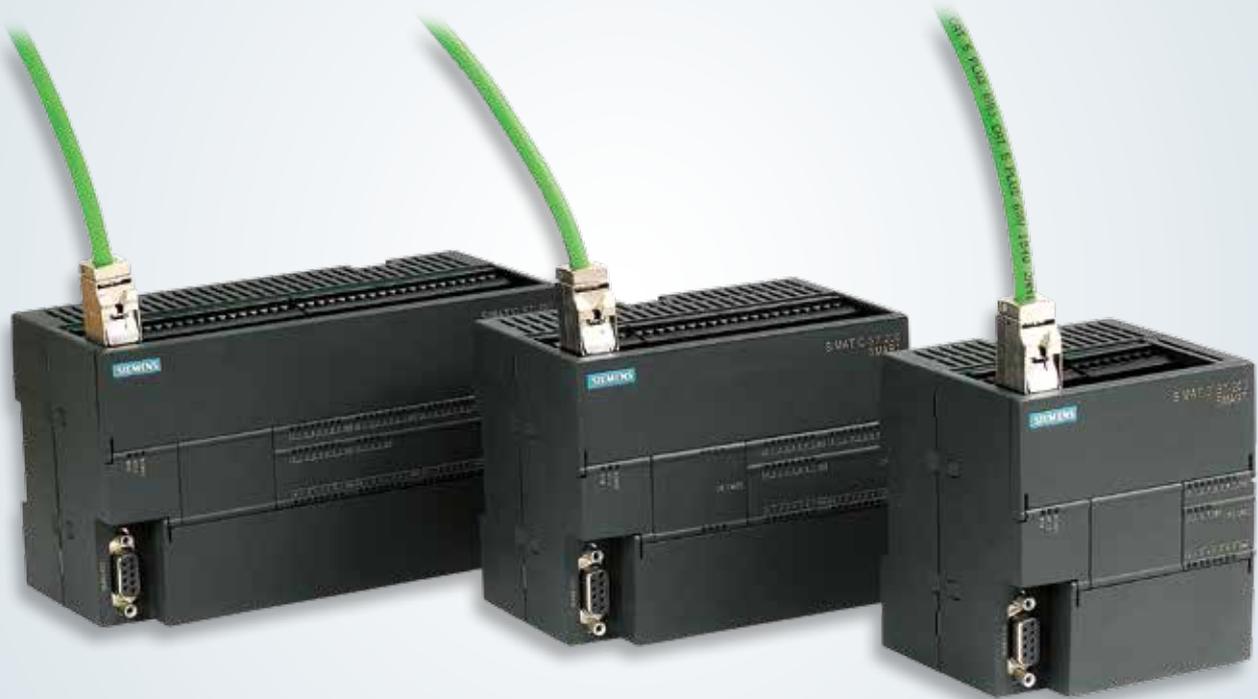# SIEMENS

SIMATIC S7-200 SMART

S7-200 SMART Programmable controller

Answers for industry.

Siemens is synonymous with innovation, especially in the domain of industrial automation. Committed to R&D, promotion and application of latest technologies, Siemens has been instrumental in enhancing our customers' competitiveness for over 140 years. Our state-of-the art automation products and solutions not only improve production efficiency but also reduce total cost of ownership.

One such innovation from the house of Siemens is the SIMATIC controller series. These Programmable Logic Controllers (PLC) from Siemens offer a wide range of selection options starting from the most basic logic controller 'LOGO!' to powerful SIMATIC S7 series, which are high performance programmable controllers. For specific applications with higher demands on data storage, faster communication with embedded applications including GUI, Siemens also offers the automation controller system based on PC. Irrespective of the requirements, one can flexibly combine one or more Simatic controllers and customize the solution optimally.
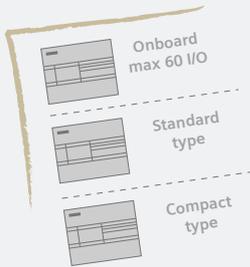
SIMATIC S7-200 SMART, our newly launched micro PLC product, is designed to suit the needs of developing markets that are under constant pressure due to prices and demands for continuous performance. Providing an excellent performance-to-price ratio, SIMATIC S7-200 SMART when combined with other SMART drive products from Siemens helps in building an extremely cost effective yet efficient automation solution.
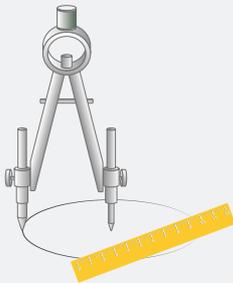
Contents

SIMATIC S7-200 SMART Product Highlights

More models, more choices

It provides CPU modules that have a large number of I/O points onboard (up to 60 points.) The CPU module has a standard type and compact type for the users to choose, which can meet the different needs of customers.

Extension options, accurate customization

The new signal boards are designed with scalable communication ports, digital or analog channels, that are closely fitting to the user's application requirements, and lower the user's costs for expansion.

High speed chip, excellent performance

It is equipped with Siemens dedicated processor chip, the basic instruction execution time is up to 0.15 μs, it has the leading performance compared to the micro PLC of the same level, it can easily deal with complex and fast processes.
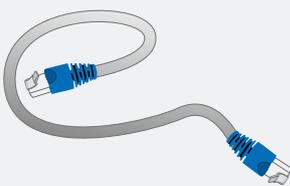
Ethernet interconnectivity, economic and convenient

All CPUs have integrated Ethernet interface to download the programs conveniently and quickly using the common cable. Through the Ethernet port, it can connect to other Simatic CPUs / HMIs to realize interconnection and set up the network.

Tri-axial pulse, freedom in motion

Provides powerful functions of speed and positioning control, the CPU module can maximally integrate three 100 kHz high speed pulse outputs, and support PWM/PTO.

Common SD card, fast update

This PLC integrates Micro SD card slot, supports common Micro SD card, can be used to update the program or device firmware, and can provide great convenience to the engineer who conducts the field service.
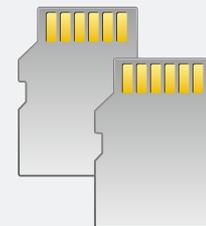
User-friendly software, programming efficiency

Based on the powerful functions inherited from the Siemens programming software, it has absorbed more humanized design which has enhanced the user friendliness of the software greatly. Improved the efficiency in developing the program.
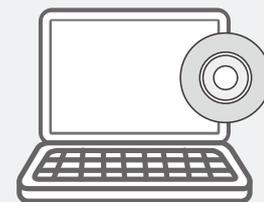
Perfect integration, seamless integration

The perfect integration of SIMATIC S7-200 SMART, Basic LINE HMI and SINAMICS V20/V90, forms the micro automation solutions that is cost-effective; meeting the OEM customer's full range of demand.
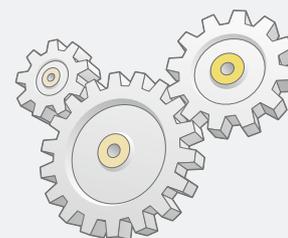
CPU module

The new S7-200 SMART has two different types of CPU modules, i.e. standard type and compact type. Standard type CPU is expandable with I/O expansion modules and signal boards. Compact type CPUs are non expandable with I/O expansion modules and signal boards.

Standard type CPU module
CPU SR20/SR30/SR40/SR60
CPU ST20/ST30/ST40/ST60

Compact type
CPU module
CPU CR40/CR60

Ethernet interface

I/O expansion module

RS485 serial port

Signal board expansion

Supporting Micro SD card

Real-time clock [1]

High speed counters

High speed pulse output [2]

[1] Only supports the standard type CPU module

[2] Only supports the standard type transistor output;
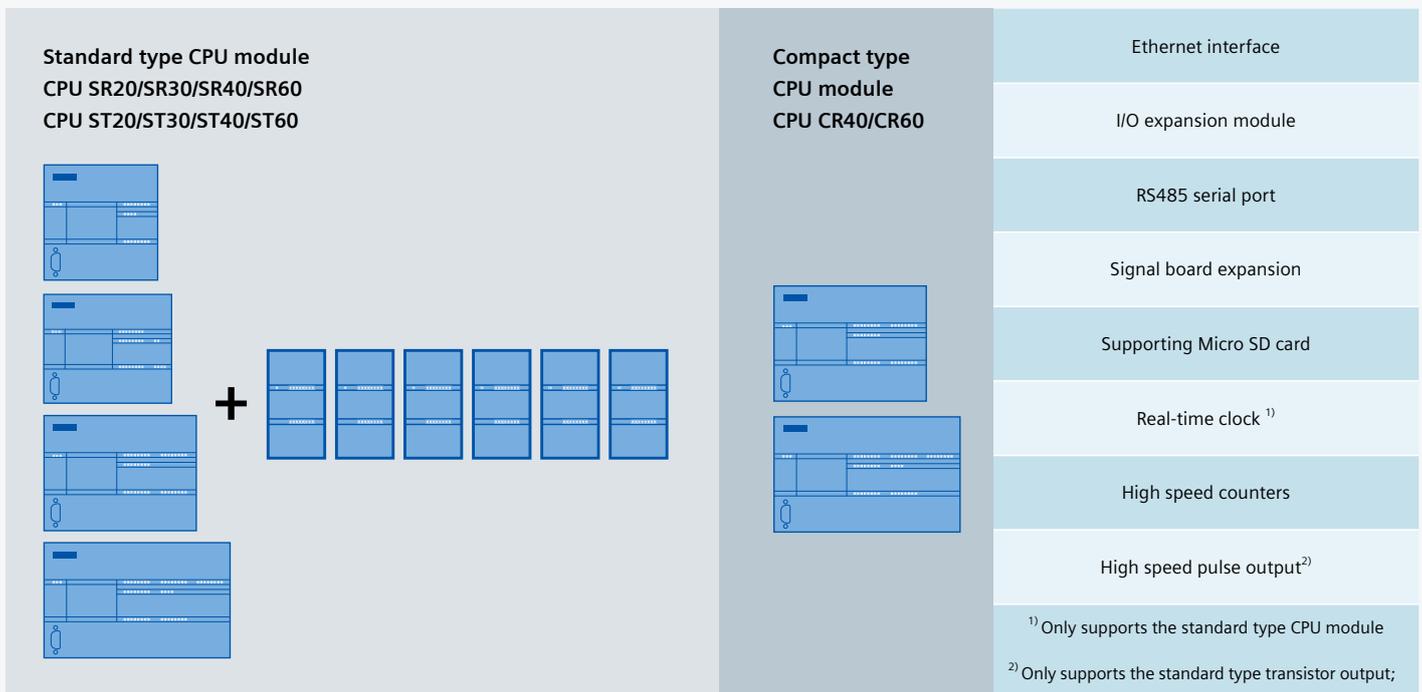
Type	CR40	CR60	SR20	SR30	SR40	SR60	ST20	ST30	ST40	ST60
High speed counter	4 at 100 kHz for single phase		4 at 200 kHz for single phase							
High speed pulse output	—						2 at 100 kHz	3 at 100 kHz		
Number of communication ports	2		2 ~ 3							
Number of Expansion modules	—		6							
Maximum I/O handling capacity [3]	40	60	212	222	232	252	212	222	232	252
Maximum analogue I/O [3]	—		36							

[3] The maximum I/O handling capacity is considering I/O expansion with Signal boards.

Communication and running state indicator, the PLC state can be seen easily.

Convenient installation, support rail type and screw type installation

The input and output terminals of all modules are removable.

Integrated Ethernet port that makes the downloading and networking equipment more convenient;
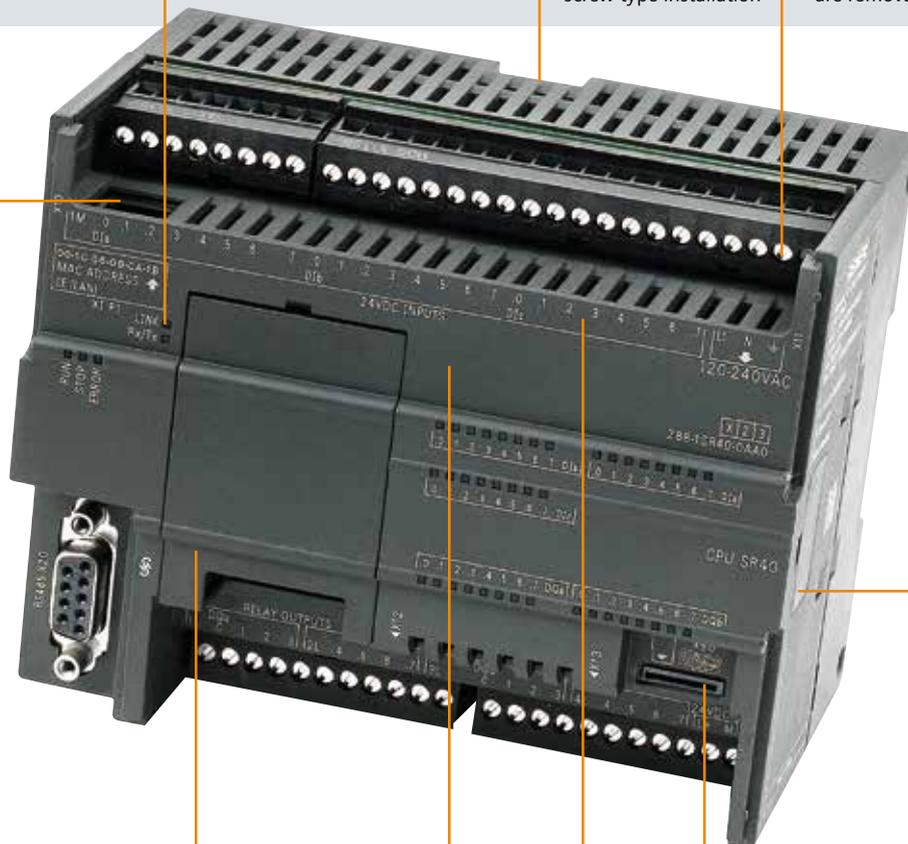
Pin plug connection, module can be connected more closely

Signal board extension achieves accurate configuration, without occupying space in the electric control cabinet.

Generic Micro SD card supports program downloading and PLC firmware updating

Siemens dedicated high speed chip is incorporated, with basic instruction execution time up to 0.15 μs;

It is equipped with super capacitor, when the power is down, it still can guarantee the normal work of the clock

Signal board

The signal board is mounted directly on the front of the CPU body; without occupying the cabinet space, its installation and disassembly are convenient and quick. For a small amount of I/O points extension and more demand for communication ports, the signal board with new design can provide more economical and flexible solutions.

Basic information of the signal board

Model	Specification	Description
SB DT04	2DI/2DO transistor output	It provides additional digital I/O extensions, and support 2 digital inputs and 2 digital transistor outputs.
SB AQ01	1AO	It provides additional analogue I/O extension, and support 1 analogue output, with a precision 12 bits.
SB CM01	RS232/RS485	It provides additional RS232 or RS485 serial communication interface, the conversion can be realized via simple configuration in the software.
SB BA01	Battery module	It supports the generic CR1025 cell (battery), which can drive the clock for about 1 year.
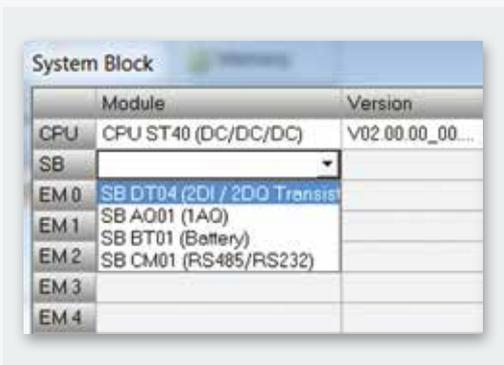
Signal board configuration

When the standard CPU module is selected in the system block, the aforementioned four signal boards will display the SB options:

- When SB DT04 is selected, the system can automatically distribute I7.0 and Q7.0 as the beginning of the I/O image area
- When SB AQ01 is selected, the system can automatically allocates AQW12 as the I/O image area
- When SB CM01is selected, it can be done via selecting the RS232 or RS485 in the port type setting box.
- When SB BA01 is selected, the low power consumption alarm can be initialized or the power consumption state can be monitored via I7.0.

Installation steps

Remove the cover board of terminal

Remove the cover board with Screw driver

No fastening screw is required, gently insert it;

The installation is complete

Network communication

All S7-200 SMART CPUs offer 1x Ethernet interface and the 1x RS485 interface onboard. Using Signal board CM01, one can add additional RS485/232 interface.
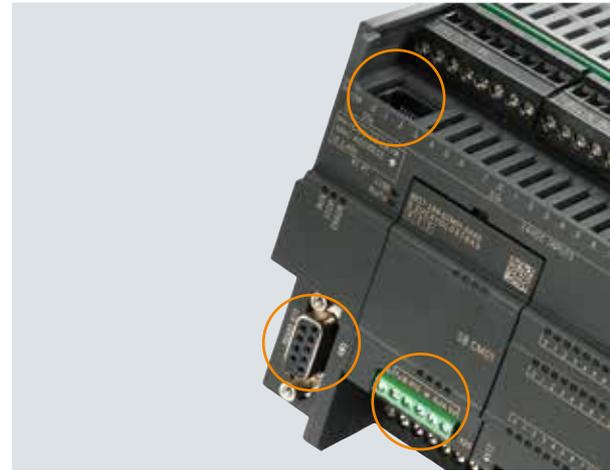
Ethernet communication

All the CPU modules are equipped with Ethernet interface, which supports Siemens S7 protocol, can support many terminal connections:

- Can be used as the programs downloading port (via general network cable)
- Communicate with Simatic Key/touch HMI with Profinet/Ethernet interface, maximally support 8 sets of equipment
- Communicate with multiple Ethernet equipment through the switch to achieve fast data communication.
- Supports up to 8 active GET/PUT connections and 8 passive GET/PUT connections.
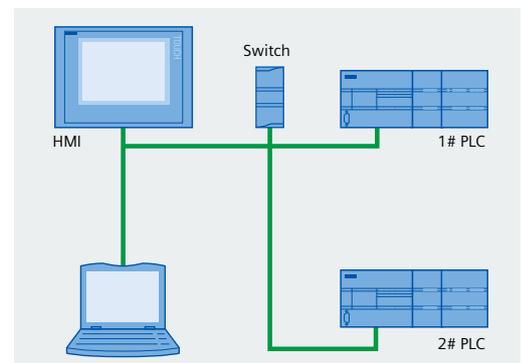
Serial communication

On board RS485 port as well as additional RS232/485 port using CM01 can communicate with the inverter and touch screen and so on third party equipments. Signal board offers configurable RS232/RS485 port, maximally supports for up to 4 devices.

Serial port supports the following protocols:

- Modbus RTU
- PPI
- USS
- Free port communication (for interconnection with Bar code scanners, weighing scales, serial printers etc.)
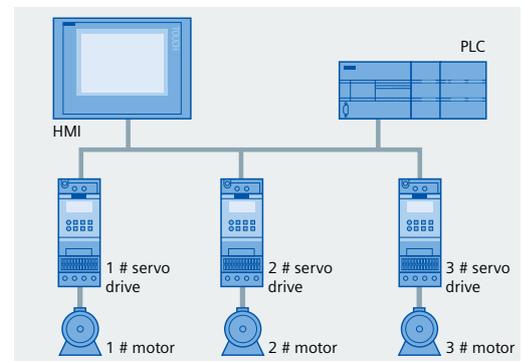
Communication with the host computer*

Using Siemens PC Access tool, it is possible to read the data from S7-200 SMART on to the host computer. This can be used for simple GUI requirements for data monitoring or data archiving.

(PC Access is an OPC server protocol specifically developed for S7-200 series PLC, an OPC software dedicatedly developed for interaction between the micro PLC and host computer)
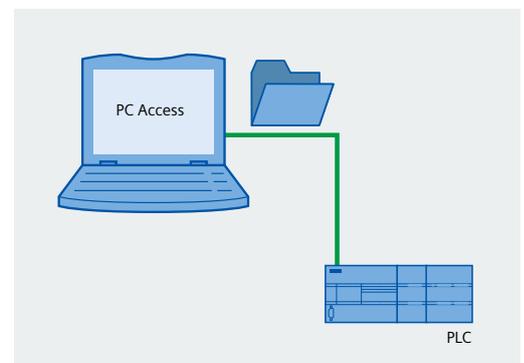
*) it will be released soon, please consult the Siemens offices and authorized distributors for the specific information.

Motion control

S7-200 SMART CPU provides maximum three 100KHz high speed pulse outputs, it can be configured for PWM output or motion control output through the powerful and flexible setup wizard, providing a unified solution for speed and position control of both the stepper motor or servo motor, satisfying the precise positioning requirements of the small mechanical equipment.
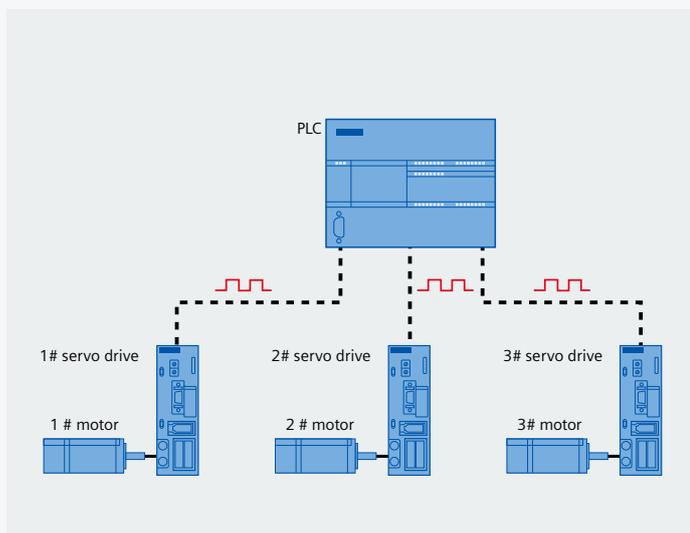
Basic functions of motion control

- Standard type transistor output module CPU, ST30/ST40/ST60 provides three 100 kHz high speed pulse output (ST20 provides two 100 kHz), supports PWM (pulse width modulation) and PTO (pulse train output).

- In PWM mode, the cycle of the output pulse is fixed, the pulse width and duty cycle are adjusted by the program, which can adjust the speed of the motor, the opening of valves etc.

- In PTO mode (motion control), the output pulse can be configured as multiple modes of operation, including automatically finding the original point, for realising the control of the stepper motor or servo motor, achieving the purpose of speed adjustment and positioning;

- The Q0.0, Q0.1 and Q0.3 on the CPU body can be configured as the PWM output or high speed pulse output, the above functions can be set up via the Wizard;
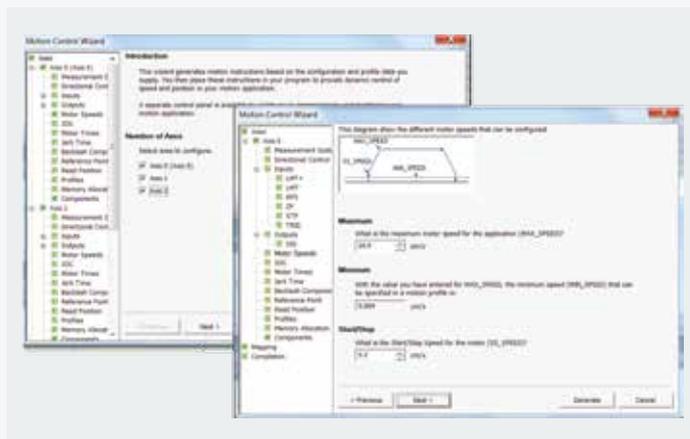
PWM and motion control wizard settings

In order to simplify the control functions in your application, the position control wizard provided by the STEP 7- Micro/WIN SMART can help you complete the PWM and the PTO configuration in a few minutes. The wizard can generate the position instructions, you can dynamically control the speed and position in your application with these instructions.

According to the user selected PWM pulse number, the PWM wizard can generate PWMx_RUN subroutine frame corresponding to editing.

Motion control wizards can maximally provide the settings for three pulse outputs, the pulse output speed is adjustable from 20 Hz to 100 kHz.

Labelling machine
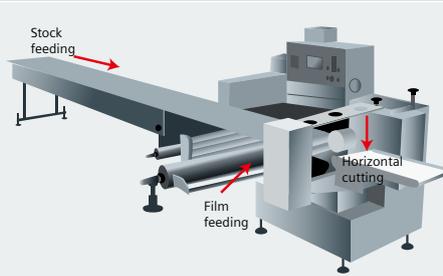
Pillow-type packaging machine
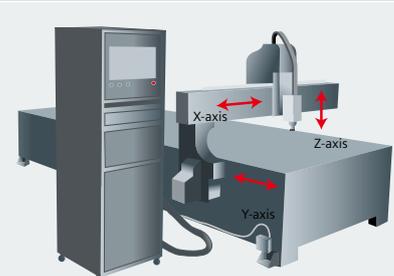
Woodworking machinery

Motion control features

- It provides configurable measurement system, it can use the engineering units (such as inches or centimetres) when inputting the data, and can also use the pulse number.

- it provides configurable backlash compensation;

- it supports the absolute, relative and manual control modes;

- it supports the continuous operation;

- it provides up to 32 groups of motion envelope, each envelope can set maximally 16 levels of speed;

- it provides 4 different reference point searching modes, each mode can select the initial direction search and the final approach direction.
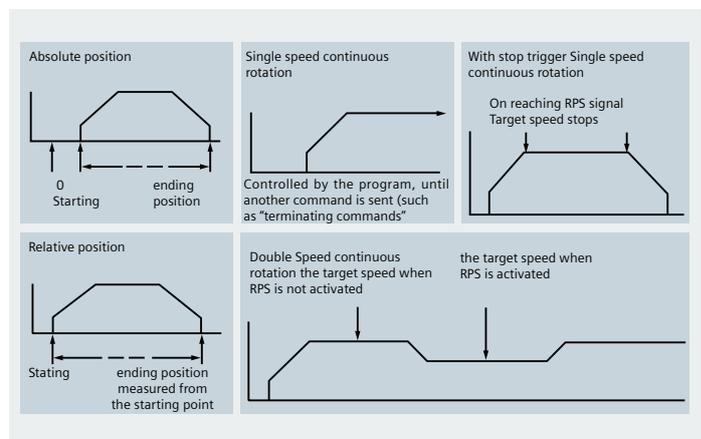
Monitoring of motion control

In order to help users develop motion control scheme, STEP 7- Micro/WIN SMART provides the motion control panel. The operation, configuration and envelope configuration settings let the users easily monitor, on the motion control function operation, the start and test phases in the development process.

- The use of the motion control panel can verify whether the motion control wiring is correct or not, you can adjust the configuration data and test each mobile envelope;

- Display the current speed, current position and direction of the bit control, as well as the input and output of LED (except pulse LED) status;

- View to modify the configuration settings of the bit control operation stored in the CPU module
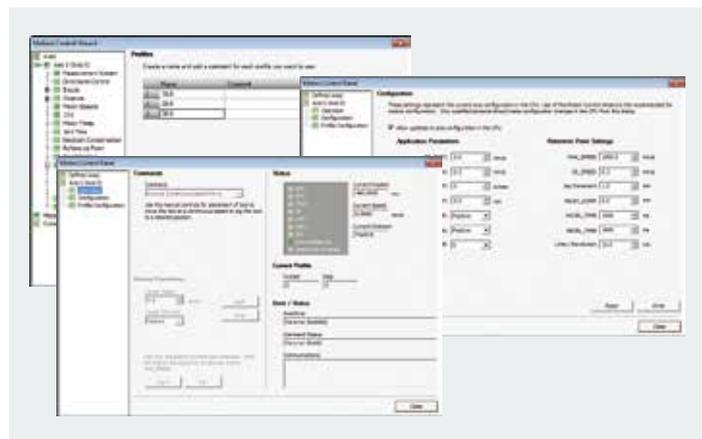
User-friendly software improves programming efficiency

STEP 7- Micro/WIN SMART is the programming software of the S7-200 SMART, it can run smoothly on the Windows XP SP3/Windows 7 Operating System. It supports LAD (ladder diagram), STL (Statement List), FBD (function block diagram) programming languages, freely converting between parts of language, the installation file is less than 100 MB. While inheriting the excellent programming idea of the STEP 7- Micro/WIN, the more user-friendly design makes programming easier and project development more efficient.

New menu design

It has no more traditional drop-down menu. It has adopted the band-type menu design, all menu options can be seen completely. The image of the icon display makes the operation more convenient.

By double clicking on the menu, it can be hidden so as to provide more space for a visual programming window.
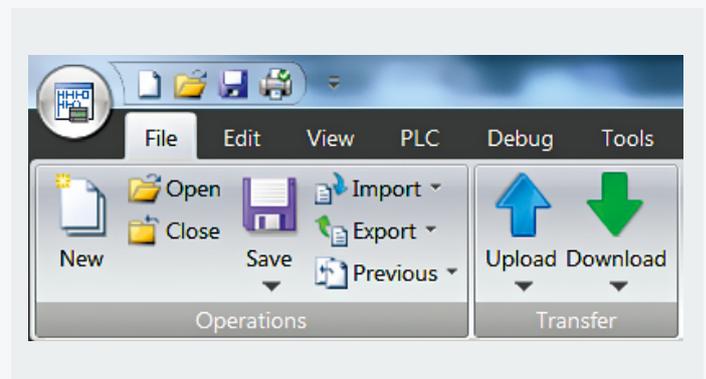
Fully movable window design

All windows in the software interface can move freely, and provide eight kinds of drag and drop methods.

The main window, the program editor, the output window, variable table, state diagram etc. windows can be combined according to the user's habits, maximally improve the programming efficiency.
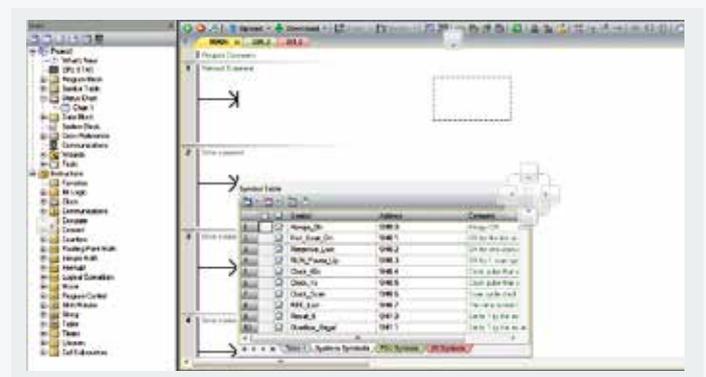
The definitions of variables and program notes

The users can define the variable name according to the process flow, and can call through the variable name directly, allowing users to fully enjoy the convenience of high-level programming language. A special function registers the address call, automatically naming the variable, which can now be called directly the next time.

Micro/WIN SMART provides a perfect function for annotation, can add annotations to program block, programming network and variables, with its readability greatly improved. When the mouse is moved to the instruction block, data types supported by each pin are automatically displayed.
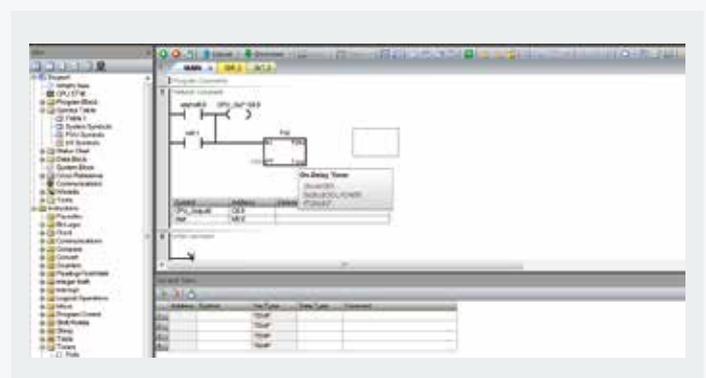
STEP 7-Micro/WIN SMART Software features:

1. **New menu design**
2. **Fully movable window design**
3. **Variable definitions and notes**
4. **Novel wizard setting**
5. **Status monitoring**
6. **Convenient command Library**
7. **Powerful password protection functions ....**

For detailed information about the software, consult the S7-200 SMART System Manual.

Setup wizard

Micro/WIN SMART integrates simple and quick wizard settings; you can just follow the wizard prompts to set up the parameters for each step of the complex function setting. The new guidance function allows the user to directly set up a step function, and without the need to reset every step, to modify the wizard settings.

The wizard setting supports the following functions:

- HSC (high speed counter)
- Motion control
- PID
- PWM (Pulse width Modulation)
- Text display
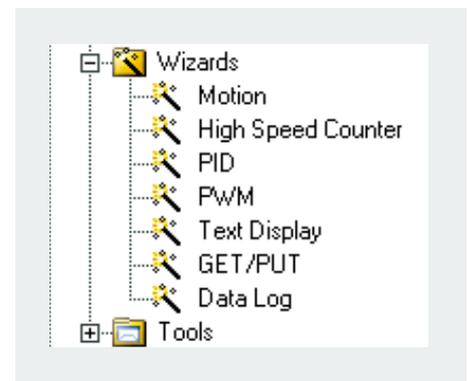
Status monitoring

In the Micro/WIN SMART status graph, it can monitor the current values of each input / output channel of PLC, at the same time, it can conduct the mandatory input operation to test the program logic for each channel.

Status monitoring value can be displayed in numerical form, and can also be directly displayed in the waveform, the aforementioned two can also be switched each other.

In addition, the Micro/WIN SMART system can monitor the PID and motion control operation, equipment operation status through the dedicate operation panel.

Convenient command Library

In PLC programming, the same tasks that are repetitively executed will be generally included in a subprogram, which can be directly used in the future. The use of subroutines can better organize the program structure, facilitate the debugging and reading.

Micro/WIN SMART provides the command library functions, converting the subroutine into a block of instructions, as a common block of instructions, which will be directly dragged and dropped into the programming interface to complete the call. The command library function provides password protection function, preventing the database files from being randomly reviewed or modified.

In addition, Siemens offers a large instruction library to complete a variety of functions, which can be easily added into the software.
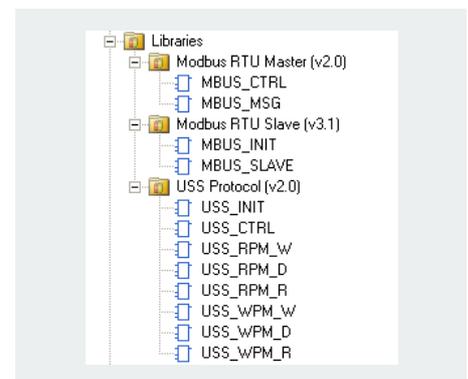
SMART micro automation solutions

The perfect combination of Siemens SIMATIC micro-automation products and SINAMICS drive products has created new micro automation solutions that are economical, reliable and easy to use. SIMATIC S7-200 SMART PLC, SIMATIC BASIC LINE touch/Key HMI, SINAMICS V20 inverter and SINAMICS V90 servo system, that are of high performance-to-price ratio helps users to improve the performance of machinery and equipment, reduce the development cost, significantly shorten the launching time of the machine and equipment, and effectively improve the market competitiveness of the user.

SIMATIC Touch/Key HMI

Ethernet

SIMATIC S7-200 SMART

SINAMICS V20

USS / MODBUS RTU

SINAMICS V90

SIMOTICS S-1FL6

SIMOTICS GP 1LE0
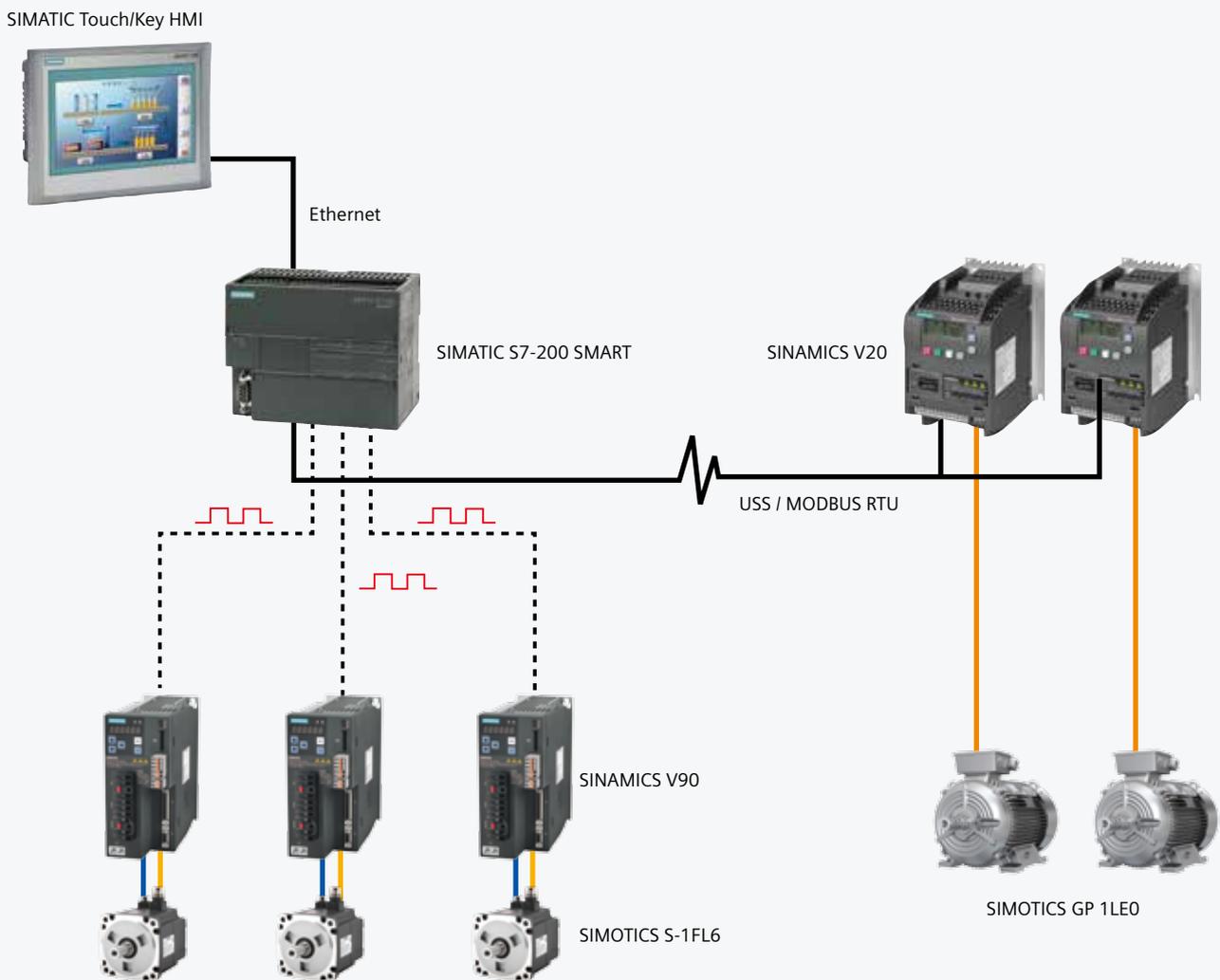
Recommendations for the use of S7-200 SMART:

- While programming and debugging, it is suggested to, using 1 set of ordinary switchboard, to connect the related equipment (including PLC, touch screen, computer) to the switch. After downloading the PLC or touch screen programs, they can be directly tested on the touch screen through touch. When testing the PLC working state, there is no need to use a cable to connect the PLC and touch screen.

- Through the use of Micro SD card the fast and batch downloading of the PLC program can be realized. The well-prepared source card can be delivered to the end user by courier, or, in the scenario of urgent demand, the source file stored in the card can be sent via Email directly to the user at the site, the source file will be copied to the SD card and can be used after receiving.

Common SD card – Fast Update!!

The S7-200 SMART CPUs support the use of a microSDHC card for:

- User program transfer.
- Reset CPU to factory default condition.
- Firmware update of the CPU and attached expansion modules as supported

You can use any standard, commercial microSDHC card with a capacity in the range 4GB to 16GB.For detailed information about the software, consult the S7-200 SMART System Manual.

Program Transfer

A memory card can be used to transfer user program content into the CPU's permanent memory, completely or partially replacing content already in the load memory.

For duplication of program from one CPU to other CPUs, you need not require software. Time & cost saving is also achieved.

Firmware upgrade

A memory card can be used to update the firmware in a CPU and any connected expansion modules.

No return to the factory for FW upgrade, it can be done with SD card.

Restore factory settings

A memory card can be used to erase all retained data, putting the CPU back into a factory default condition.

Technical specifications

Technical specification for CPU SR20/ST20

Model	CPU SR20 AC/DC/RLY	CPU ST20 DC/DC/DC
Order No.: **(MLFB)**	**6ES7 288-1SR20-0AA0**	**6ES7 288-1ST20-0AA0**
Standard		
Dimension W x H x D (mm)	90 x 100 x 81	
Weight	367.3 g	320 g
Power consumption	14 W	20W
Available current (EM bus)	Max. 740 mA (5 V DC)	Max. 1110 mA (5 V DC)
Available current (24 V DC)	Max. 300 mA (sensor power source)	
Digital input current consumption (24 V DC)	4mA for each input point used	
CPU features		
User memory	12 KB program memory /8 KB data memory /max. 10 KB retentive memory	
On board digital I/O	12 input points / 8 output points	
Process image size	256 bits input (I) / 256 bits output (Q)	
Analog image	56 words input (AI) / 56 words output (AQ)	
Bit memory (M)	256 bits	
Temporary (local) memory	The main program has 64 bytes, each subroutine and interrupt program has 64 bytes	
I/O module extension	6 extension modules	
Signal board extension	Max. 1 signal board	
High speed counters	4 in total	
	Single phase: 4 of 200 kHz	
	Quadrature phase: 2 of 100 kHz	
Pulse output	–	2 of 100 kHz
Pulse capture input	12	
Cycle interrupt	2 in total, resolution is of 1ms,	
Interrupt Edge	4 rising edges and 4 falling edges (when using optional signal board, there are 6 edges each)	
Memory	Micro SDHC card (optional)	
Precision of real-time clock	120 seconds/month	
Real-time clock hold time	In general 7 days, or min. 6 days when 25 °C (Maintenance free super capacitor)	
Performance/ Processing Time		
Boolean	0.15 μs/instruction	
Moving word operations	1.2 μs/instruction	
Real mathematical operations	3.6 μs/instruction	
The user's program elements supported by the S7-200 SMART		
POUs	type/quantity • main program: 1 • sub-program: 128 (0 to 127) • interrupt program: 128 (0 to 127) Nesting depth • from main program: 8 sub-program level • from interrupt program: 4 sub-program level	
Accumulators	4	
Timer	type/quantity • non-holding (or not retained) (TON, TOF) : 192 • holding (or retained) (TONR) : 64	
Counters	256	
Communications		
Number of ports	1 Ethernet port/ 1 serial (RS485) /1 additional serial (optional RS232/485 signal board) port	
HMI equipment	max. 4 connection on serial port max. 8 connections on ethernet port	
Programming equipment (PG)	Ethernet: 1	
Number of connections	Ethernet: • 8 for HMI • 1 for programming • 8 for CPU • 8 for active GET/PUT connection • 8 for passive GET/PUT connection serial (RS485) : • each port has 4 for HMI connections	
Data transmission rate	Ethernet: 10/100 Mb/s RS485 system protocol: 9600, 19200 and 187500 b/s RS485 free port: 1200 to 115200 b/s	
Isolation (external signal and PLC logic side)	Ethernet: Transformer isolation, 1500 V AC RS485: none	
Type of cable	Ethernet: CAT5e shielded cable RS485: PROFIBUS network cable	
Power source		
Voltage range	85 ~ 264 V AC	20.4 ~ 28.8 V DC
Power supply frequency	47 ~ 63 Hz	–

Model (continued)	CPU SR20 AC/DC/RLY	CPU ST20 DC/DC/DC
Input current	When the maximum load is reached, only CPU is included 210 mA when voltage is 120 V AC (with a 300 mA sensor power output) 90 mA when voltage is 120 V AC (without a 300 mA sensor power output) 120 mA when voltage is 240 V AC (with a 300 mA sensor power output) 60 mA when voltage is 240 V AC (without a 300 mA sensor power output) When the max load is reached, it CPU and all the scalable extensions are included 290 mA when voltage is 120 V AC 170 mA when voltage is 240 V AC	When the maximum load is reached, only CPU is included 160 mA when voltage is 24 V DC (without a 300 mA sensor power output) 430 mA when voltage is 24 V DC (with a 300 mA sensor power output) When the max load is reached, CPU and all the scalable extensions are included 720 mA when voltage is 24 V DC
Inrush current (max)	9.3 A when voltage is 264 V AC	11.7 A when voltage is 28.8 DC
Isolation (input power with the logic side)	1500 V AC	–
Leakage current, AC line for functional earthing	Max 0. 5 mA	–
Hold time (power off)	30 ms when voltage is 120 V AC 200 ms when voltage is 240 V AC	20 ms when voltage is 24 V DC
Internal fuse (cannot be replaced by the user)	3 A, 250 V, Slow-blow fuse	3 A, 250 V, Slow-blow fuse
Sensor power source		
Voltage range	20.4 ~ 28.8 V DC	
Rated output current (max)	300 mA (short circuit protection)	
Maximum ripple noise (<10 MHz)	<1 V peak-peak value	
Isolation (CPU logic side and sensor power source)	Not isolated	
Digital input		
Number of input points	12	
Type	The sinking / sourcing type (IEC type 1 sinking)	The sinking/sourcing type (IEC type 1 sinking excluding I0.0 to I0.3)
Rated voltage	It is 24V DC when the current is 4 mA, nominal value	
Allowable continuous voltage	Max 30 V DC	
Surge voltage	35 V DC, lasting 0.5 s	
Logic 1 signal (min)	It is 15 V DC when the current is 2.5 mA	The voltage is 4 V DC when it ranges from I0.0 to I0.3, I0.6 to I0.7: 8 mA Other input: 15 V DC when it is 2.5 mA
Logic 0 signal (min)	It is 5 V DC when the current is 1 mA	The voltage is 1 V DC when it ranges from I0.0 to I0.3, I0.6 to I0.7: 1 mA Other input: 5 V DC when it is 1 mA.
Isolation (field side and logic side)	500 V AC, lasting 1 min	
Isolation group	1	
Filter time	Each channel can be separately selected (point I0.0 to 11.3) : 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 µs 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms	
HSC clock input frequency (max) (Logic 1 battery = 15 ~ 26 V DC)	Single phase: 4 of 200 kHz Quadrature phase: 2 of 100 kHz	
Number of inputs that connect at the same time	12	
Cable length (max), its unit is meter	Shielded: 500m (normal input), 50m (HSC input) ; non shielded: 300m (normal input)	I0.0 to I0.3, shielded (only limited to this category) : 500 m (normal input), 50 m (HSC input) I0.6 to I0.7, shielded (only limited to this category) : 500 m (normal input), All other inputs: shielded: 500 m (normal input) ; non shielded: 300 m (normal input)
Digital output		
Number of output	8	
Type	Relay, dry contact	Solid state-MOSFET (source-type)
Voltage range	5 ~ 30 V DC or 5 ~ 250 V AC	20.4 ~ 28.8 V DC
Logic 1 signal when the current is max.	–	Min. 20 V DC
Logic 0 signal when the load is KG	–	Max. 0.1 V DC
Rated current at each point (max)	2.0 A	0.5 A
Rated current at each public end (max)	10.0 A	6 A
Lamp load	30 W DC/200 W AC	5 W
On state resistance	New equipment is 0.2 Ω maximally	Max. 0.6 Ω
Leakage current at each point	–	Max. 10 µ A
Surge current	It is 7A when the contact is closed	8 A, max. lasting 100 ms
Overload protection	none	
Isolation (field side and logic side)	1500 V AC, lasting 1 min (coil and contact) none, (coil and logic side)	500 V AC, lasting 1 min
Isolation resistance	New equipment is 100 MΩ minimally	–
Disconnect the insulation between the contacts	750 V AC, lasting 1 min	–
Isolated group	1	2
Inductive voltage clamp	Not recommended	L+ - 48 V DC, 1 W loss
Relay max. on/off frequency	Not recommended	
Switching delay (Qa.0-Qa.3)	Max. 10 ms	From the disconnection to connection max.1 µs from the connection to disconnection is 3 µs max.
Switching delay (Qa.0-Qa.7)	Max. 10 ms	From the disconnection to connection max. 50 µs from the connection to disconnection is 200 µs max.
Mechanical life (no load)	10,000,000 break/close cycles	–
Contact life under the rated load	100,000 break/close cycles	–
Output state under the STOP mode	Last value or replicable value (The default value is 0)	
Number of output that are connected at the same time	8	
Cable length	Shielded: 500 m; non shielded: 300 m	

Technical specification for CPU SR30/ST30

Model	CPU SR30 AC/DC/RLY	CPU ST30 DC/DC/DC
Order No.: **(MLFB)**	**6ES7 288-1SR30-0AA0**	**6ES7 288-1ST30-0AA0**
Standard		
Dimension W x H x D (mm)	110 x 100 x 81	
Weight	435 g	375 g
Power consumption	14 W	12W
Available current (EM bus)	Max. 740 mA (5 V DC)	
Available current (24 V DC)	Max. 300 mA (sensor power source)	
Digital input current consumption (24 V DC)	4mA for each input point used	
CPU features		
User memory	18 KB program memory /12 KB data memory /max. 10 KB retentive memory	
On board digital I/O	18 input points / 12 output points	
Process image size	256 bits input (I) / 256 bits output (Q)	
Analog image	56 words input (AI) / 56 words output (AQ)	
Bit memory (M)	256 bits	
Temporary (local) memory	The main program has 64 bytes, each subroutine and interrupt program has 64 bytes	
I/O module extension	6	
Signal board extension	Max. 1 signal board	
High speed counters	4 in total Single phase: 4 of 200 kHz Quadrature phase: 2 of 100 kHz	
Pulse output	–	3 of 100 kHz
Pulse capture input	12	
Cycle interrupt	2 in total, resolution is of 1ms,	
Interrupt Edge	4 rising edges and 4 falling edges (when using optional signal board, there are 6 edges each)	
Memory	Micro SDHC card (optional)	
Precision of real-time clock	120 seconds/month	
Real-time clock hold time	In general 7 days, or min. 6 days when 25 °C (Maintenance free super capacitor)	
Performance/ Processing Time		
Boolean	0.15 µs/instruction	
Moving word operations	1.2 µs/instruction	
Real mathematical operations	3.6 µs/instruction	
The user's program elements supported by the S7-200 SMART		
POUs	type/quantity • main program: 1 • sub-program: 128 (0 to 127) • interrupt program: 128 (0 to 127) Nesting depth • from main program: 8 sub-program level • from interrupt program: 4 sub-program level	
Accumulators	4	
Timer	type/quantity • non-holding (or not retained) (TON, TOF) : 192 • holding (or retained) (TONR) : 64	
Counters	256	
Communications		
Number of ports	1 Ethernet port/ 1 serial (RS485) /1 additional serial (optional RS232/485 signal board) port	
HMI equipment	max. 4 connection on serial port max. 8 connections on ethernet port	
Programming equipment (PG)	Ethernet: 1	
Number of connections	Ethernet: • 8 for HMI • 1 for programming • 8 for CPU • 8 for active GET/PUT connection • 8 for passive GET/PUT connection serial (RS485) : • each port has 4 for HMI connections	
Data transmission rate	Ethernet: 10/100 Mb/s RS485 system protocol: 9600, 19200 and 187500 b/s RS485 free port: 1200 to 115200 b/s	
Isolation (external signal and PLC logic side)	Ethernet: Transformer isolation, 1500 V AC RS485: none	
Type of cable	Ethernet: CAT5e shielded cable RS485: PROFIBUS network cable	
Power source		
Voltage range	85 ~ 264 V AC	20.4 ~ 28.8 V DC
Power supply frequency	47 ~ 63 Hz	–

Model	CPU SR30 AC/DC/RLY	CPU ST30 DC/DC/DC
Input current	When the maximum load is reached, only CPU is included 92 mA (including power source of the sensor) when the voltage is 120 V AC 40 mA (excluding power source of the sensor) when the voltage is 120 V AC 52 mA (including power source of the sensor) when the voltage is 240 V AC 27 mA (excluding power source of the sensor) when the voltage is 240 V AC When the max load is reached, it CPU and all the scalable extensions are included 136 mA when voltage is 120 V AC 72 mA when voltage is 240 V AC	When the maximum load is reached, only CPU is included 64 mA when voltage is 24 V DC (without a 300 mA sensor power output) 365 mA when voltage is 24 V DC (with a 300 mA sensor power output) When the max load is reached, CPU and all the scalable extensions are included 624 mA when voltage is 24 V DC
Inrush current (max)	8.9 A when voltage is 264 V AC	6 A when voltage is 28.8 V DC
Isolation (input power with the logic side)	1500 V AC	–
Leakage current, AC line for functional earthing	Max 0. 5 mA	–
Hold time (power off)	30 ms when voltage is 120 V AC 200 ms when voltage is 240 V AC	20 ms when voltage is 24 V DC
Internal fuse (cannot be replaced by the user)	3 A, 250 V, Slow-blow fuse	
Sensor power source		
Voltage range	20.4 ~ 28.8 V DC	
Rated output current (max)	300 mA (short circuit protection)	
Maximum ripple noise (<10 MHz)	<1 V peak-peak value	
Isolation (CPU logic side and sensor power source)	Not isolated	
Digital input		
Number of input points	18	
Type	The sinking / sourcing type (IEC type 1 sinking)	The sinking/sourcing type (IEC type 1 sinking excluding I0.0 to I0.3)
Rated voltage	It is 24 V DC when the current is 4 mA, rated value	
Allowable continuous voltage	Max 30 V DC	
Surge voltage	35 V DC, lasting 0.5 s	
Logic 1 signal (min)	It is 15 V DC when the current is 2.5 mA	The voltage is 4 V DC when it ranges from I0.0 to I0.3, I0.6 to I0.7: 8 mA Other input: 15 V DC when it is 2.5 mA
Logic 0 signal (min)	It is 5 V DC when the current is 1 mA	The voltage is 1 V DC when it ranges from I0.0 to I0.3, I0.6 to I0.7: 1 mA Other input: 5 V DC when it is 1 mA.
Isolation (field side and logic side)	500 V AC, lasting 1 min	
Isolation group	1	
Filter time	Each channel can be separately selected (point I0.0 to I1.5) : 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 µs 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms Each channel can be separately selected (I0.6) : 0, 6.4, 12.8 ms	
HSC clock input frequency (max) (Logic 1 battery = 15 ~ 26 V DC)	Single phase: 4 of 200 kHz Quadrature phase: 2 of 100 kHz	
Number of inputs that connect at the same time	18	
Cable length (max), its unit is meter	Shielding: 500m (normal input), 50m (HSC input) ; non shielding: 300m (normal input)	I0.0 to I0.3, shielding (only limited to this category) : 500 m (normal input), 50 m (HSC input) I0.6 to I0.7, shielding (only limited to this category) : 500 m (normal input), All other inputs: shielding: 500 m (normal input) ; non shielding: 300 m (normal input)
Digital output		
Number of output	12	
Type	Relay, dry contact	Solid state-MOSFET (source-type)
Voltage range	5 ~ 30 V DC or 5 ~ 250 V AC	20.4 ~ 28.8 V DC
Logic 1 signal when the current is max.	–	Min. 20 V DC
Logic 0 signal when the load is 10 K Ω	–	Max. 0.1 V DC
Rated current at each point (max)	2.0 A	0.5 A
Rated current at each public end (max)	10.0 A	6 A
Lamp load	30 W DC/200 W AC	5 W
On state resistance	New equipment is 0.2 Ω maximally	Max. 0.6 Ω
Leakage current at each point	–	Max. 10 µ A
Surge current	It is 7A when the contact is closed	8 A, max. lasting 100 ms
Overload protection	none	
Isolation (field side and logic side)	1500 V AC, lasting 1 min (coil and contact) none, (coil and logic side)	500 V AC, lasting 1 min
Isolation resistance	New equipment is 100 MΩ minimally	–
Disconnect the insulation between the contacts	750 V AC, lasting 1 min	–
Isolated group	1	
Inductive voltage clamp	Not recommended	L+ - 48 V DC, 1 W loss
Switching delay (Qa.0-Qa.3)	Max. 10 ms	From the disconnection to connection max.1 µs from the connection to disconnection is 3 µs max.
Switching delay (Qa.4-Qb.7)	Max. 10 ms	From the disconnection to connection max. 50 µs from the connection to disconnection is 200 µs max.
Mechanical life (no load)	10,000,000 break/close cycles	–
Contact life under the rated load	100,000 break/close cycles	–
Output state under the STOP mode	Last value or replicable value (The default value is 0)	
Number of output that are connected at the same time	12	
Cable length	Shielded: 500 m; non shielded: 150 m	

Technical specification for CPU SR40/ST40/CR40

Model	CPU SR40 AC/DC/RLY	CPU ST40 DC/DC/DC	CPU CR40 AC/DC/RLY
Order No.: **(MLFB)**	**6ES7 288-1SR40-0AA0**	**6ES7 288-1ST40-0AA0**	**6ES7 288-1CR40-0AA0**
Standard			
Dimension W x H x D (mm)	125 x 100 x 81		
Weight	441.3 g	410.3 g	440 g
Power consumption	23 W	18 W	18 W
Available current (EM bus)	Max. 740 mA (5 V DC)		–
Available current (24 V DC)	Max. 300 mA (sensor power source)		
Digital input current consumption (24 V DC)	4mA for each input point used		
CPU features			
User memory	24 KB program memory /16 KB data memory /max. 10 KB retentive memory		12 KB program memory /8 KB data memory /max. 10 KB retentive memory
On board digital I/O	24 input points / 16 output points		
Process image size	256 bits input (I) / 256 bits output (Q)		
Analog image	56 words input (AI) / 56 words output (AQ)		
Bit memory (M)	256 bits		
Temporary (local) memory	The main program has 64 bytes, each subroutine and interrupt program has 64 bytes		
I/O module extension	6 extension modules		–
Signal board extension	Max. 1 signal board		–
High speed counters	4 in total Single phase: 4 of 200 kHz Quadrature phase: 2 of 100 kHz		4 in total Single phase: 4 of 100 kHz Quadrature phase: 2 of 50 kHz
Pulse output	3, 100 kHz		–
Pulse capture input	14		
Cycle interrupt	2 in total, resolution is of 1ms,		
Interrupt Edge	4 rising edges and 4 falling edges (when using optional signal module, there are 6 edges each)		4 rising edges and 4 falling edges
Memory	Micro SDHC card (optional)		
Precision of real-time clock	120 seconds/month		–
Real-time clock hold time	In general 7 days, or min. 6 days when 25 °C (Maintenance free super capacitor)		–
Performance/ Processing Time			
Boolean	0.15 µs/instruction		
Moving word operations	1.2 µs/instruction		
Real mathematical operations	3.6 µs/instruction		
The user's program elements supported by the S7-200 SMART			
POUs	type/quantity • main program: 1 • sub-program: 128 (0 to 127) • interrupt program: 128 (0 to 127) Nesting depth • from main program: 8 sub-program level • from interrupt program: 4 sub-program level		
Accumulators	4		
Timer	type/quantity • non-holding (or not retained) (TON, TOF) : 192 • holding (or retained) (TONR) : 64		
Counters	256		
Communications			
Number of ports	1 Ethernet port/ 1 serial (RS485) /1 additional serial (RS232/485 signal board is selectable, only limited to SR40 and ST40)		
HMI equipment	max. 4 connection on serial port max. 4 connections on ethernet port		
Programming equipment (PG)	Ethernet: 1		
Number of connections	Ethernet: • 4 for HMI • 1 for programming • 8 for CPU • 8 for active GET/PUT connection • 8 for passive GET/PUT connection serial (RS485) : • each port has 4 for HMI connections		
Data transmission rate	Ethernet: 10/100 Mb/s RS485 system protocol: 9600, 19200 and 187500 b/s RS485 free port: 1200 to 115200 b/s		
Isolation (external signal and PLC logic side)	Ethernet: Transformer isolation, 1500 V AC RS485: none		
Type of cable	Ethernet: CAT5e shielded cable RS485: PROFIBUS network cable		
Power source			
Voltage range	85 ~ 264 V AC	20.4 ~ 28.8 V DC	85 ~ 264 V AC
Power supply frequency	47 ~ 63 Hz	–	47 ~ 63 Hz

Model		CPU SR40 AC/DC/RLY	CPU ST40 DC/DC/DC	CPU CR40 AC/DC/RLY
Input current	Only includes the CPU	130 mA when voltage is 120 V AC (without a 300 mA sensor power output) 250 mA when voltage is 120 V AC (with a 300 mA sensor power output) 80 mA when voltage is 240 V AC (without a 300 mA sensor power output) 150 mA when voltage is 240 V AC (with a 300 mA sensor power output)	190 mA when voltage is 24 V DC (without a 300 mA sensor power output) 470 mA when voltage is 24 V DC (with a 300 mA sensor power output)	130 mA when voltage is 120 V AC (without a 300 mA sensor power output) 250 mA when voltage is 120 V AC (with a 300 mA sensor power output) 80 mA when voltage is 240 V AC (without a 300 mA sensor power output) 150 mA when voltage is 240 V AC (with a 300 mA sensor power output)
	Includes CPU and all extension accessories	300 mA when voltage is 120 V AC 190 mA when voltage is 240 V AC	680 mA when voltage is 24 V DC	-
Inrush current (max)		16.3 A when voltage is 264 V AC	11.7 A when voltage is 28.8 V DC	7.3 A when voltage is 264 V AC
Isolation (input power with the logic side)		1500 V AC	–	1500 V AC
Leakage current, AC line for functional earthing		Max 0. 5 mA	–	Max 0. 5 mA
Hold time (power off)		30 ms when voltage is 120 V AC 200 ms when voltage is 240 V AC	20 ms when voltage is 24 V DC	50 ms when voltage is 120 V AC 400 ms when voltage is 240 V AC
Internal fuse (cannot be replaced by the user)		3 A, 250 V, Slow-blow fuse		
Sensor power source				
Voltage range		20.4 ~ 28.8 V DC		
Rated output current (max)		300 mA (short circuit protection)		
Maximum ripple noise (<10 MHz)		<1 V peak-peak value		
Isolation (CPU logic side and sensor power source)		Not isolated		
Digital input				
Number of input points		24		
Type		The sinking / sourcing type (IEC type 1 sinking)	The sinking/sourcing type (IEC type 1 sinking excluding I0.0 to I0.3)	The sinking / sourcing type (IEC type 1 sinking)
Rated voltage		It is 24 V DC when the current is 4 mA, nominal value		
Allowable continuous voltage		Max 30 V DC		
Surge voltage		35 V DC, lasting 0.5 s		
Logic 1 signal (min)		It is 15 V DC when the current is 2.5 mA, 10.0 to 10.4 V DC at 8 mA	The voltage is 4 V DC when it ranges from I0.0 to I0.3 : 8 mA Other input: 15 V DC when it is 2.5 mA	Other input: 15 V DC when it is 2.5 mA
Logic 0 signal (min)		It is 5 V DC when the current is 1 mA	The voltage is 1 V DC when it ranges from I0.0 to I0.3: 1 mA Other input: 5 V DC when it is 1 mA	Other input: 5 V DC when it is 1 mA
Isolation (field side and logic side)		500 V AC, lasting 1 min		
Isolation group		1		
Filter time		Each channel can be separately selected (only first 14 input loads on board, including the digital input of the signal board) 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 µs 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms		
HSC clock input frequency (max) (Logic 1 battery = 15 ~ 26 V DC)		Single phase: 4 of 200 kHz Quadrature phase: 2 of 100 kHz		Single phase: 4 of 100 kHz Quadrature phase: 2 of 50 kHz
Number of inputs that connect at the same time		24		
Cable length (max)		10.0 to 10.3: Shielding: 500m (normal input), 50m (HSC input) ; All other inputs: shielding 500m (normal input) ; non shielding: 300m (normal input)		
Digital output				
Number of output		16		
Type		Relay, dry contact	Solid state-MOSFET (source-type)	Relay, dry contact
Voltage range		5 ~ 30 V DC or 5 ~ 250 V AC	20.4 ~ 28.8 V DC	5 ~ 30 V DC or 5 ~ 250 V AC
Logic 1 signal when the current is max.		–	Min. 20 V DC	–
Logic 0 signal when the load is KG		–	Max. 0.1 V DC	–
Rated current at each point (max)		2.0 A	0.5 A	2.0 A
Lamp load		30 W DC/200 W AC	5 W	30 W DC/200 W AC
On state resistance		New equipment is 0.2 Ω maximally	Max. 0.6 Ω	New equipment is 0.2 Ω maximally
Leakage current at each point		–	Max. 10 µ A	–
Surge current		It is 7A when the contact is closed	8 A, max. lasting 100 ms	It is 7A when the contact is closed
Overload protection		none		
Isolation (field side and logic side)		1500 V AC, lasting 1 min (coil and contact) none, (coil and logic side)	500 V AC, lasting 1 min	1500 V AC, lasting 1 min (coil and contact) none, (coil and logic side)
Isolation resistance		New equipment is 100 MΩ minimally	–	New equipment is 100 MΩ minimally
Disconnect the insulation between the contacts		750 V AC, lasting 1 min	–	750 V AC, lasting 1 min
Isolated group		4	2	4
Inductive voltage clamp		Not recommended	L+ - 48 V DC, 1 W loss	–
Switching delay (Qa.0-Qa.3)		Max. 10 ms	From the disconnection to connection max.1 µs from the connection to disconnection is 3 µs max.	Max. 10 ms
Switching delay (Qa.4-Qb.7)		Max. 10 ms	From the disconnection to connection max. 50 µs from the connection to disconnection is 200 µs max.	Max. 10 ms
Mechanical life (no load)		10,000,000 break/close cycles	–	10,000,000 break/close cycles
Contact life under the rated load		100,000 break/close cycles	–	100,000 break/close cycles
Output state under the STOP mode		Last value or replicable value (The default value is 0)		
Number of output that are connected at the same time		16		
Cable length		Shielded: 500 m; non shielded: 150 m		

Technical specification for CPU SR60/ST60/CR60

Model	CPU SR60 AC/DC/RLY	CPU ST60 DC/DC/DC	CPU CR60 AC/DC/RLY
Order No.: **(MLFB)**	**6ES7 288-1SR60-0AA0**	**6ES7 288-1ST60-0AA0**	**6ES7 288-1CR60-0AA0**
Standard			
Dimension W x H x D (mm)	175 x 100 x 81		
Weight	611.5 g	528.2 g	620 g
Power consumption	25 W	20 W	
Available current (EM bus)	Max. 740 mA (5 V DC)		–
Available current (24 V DC)	Max. 300 mA (sensor power source)		
Digital input current consumption (24 V DC)	4 mA for each input point used		
CPU features			
User memory	30 KB program memory /20 KB data memory /max. 10 KB retentive memory		12 KB program memory / 8 KB data memory / max. 10 KB retentive memory
On board digital I/O	36 input points / 24 output points		
Process image size	256 bits input (I) / 256 bits output (Q)		
Analogue image	56 words input (AI) / 56 words output (AQ)		
Bit memory (M)	256 bits		
Temporary (local) memory (L)	The main program has 64 bytes, each subroutine and interrupt program has 64 bytes		
I/O module extension	6 extension modules		–
Signal board extension	Max. 1 signal board		–
High speed counters	4 in total Single phase: 4 of 200 kHz Quadrature phase: 2 of 100 kHz		4 in total Single phase: 4 of 100 kHz Quadrature phase: 2 of 50 kHz
Pulse output	3, 100 kHz		–
Pulse capture input	14		
Cycle interrupt	2 in total, resolution is of 1ms,		
Interrupt Edge	4 rising edges and 4 falling edges (when using optional signal module, there are 6 edges each)		4 rising edges and 4 falling edges
Memory	Micro SDHC card (optional)		
Precision of real-time clock	120 seconds/month		–
Real-time clock hold time	In general 7 days, or min. 6 days when 25 ℃ (Maintenance free super capacitor)		–
Performance/ Processing Time			
Boolean	0.15 μs/instruction		
Moving word operations	1.2 μs/instruction		
Real mathematical operations	3.6 μs/instruction		
The user's program elements supported by the S7-200 SMART			
POUs	type/quantity • main program: 1 • sub-program: 128 (0 to 127) • interrupt program: 128 (0 to 127) Nesting depth • from main program: 8 sub-program level • from interrupt program: 4 sub-program level		
Accumulators	4		
Timer	type/quantity • non-holding (or not retained) (TON, TOF) : 192 • holding (or retained) (TONR) : 64		
Counters	256		
Communications			
Number of ports	1 Ethernet port/ 1 serial (RS485) /1 additional serial (RS232/485 signal board is selectable)		
HMI equipment	max. 4 connection on serial port max. 8 connections on ethernet port		
Programming equipment PG)	Ethernet: 1		
Number of connections	Ethernet: • 8 for HMI • 1 for programming • 8 for CPU • 8 for active GET/PUT connection • 8 for passive GET/PUT connection serial (RS485) : • each port has 4 for HMI connections		
Data transmission rate	Ethernet: 10/100 Mb/s RS485 system protocol: 9600, 19200 and 187500 b/s RS485 free port: 1200 to 115200 b/s		
Isolation (external signal and PLC logic side)	Ethernet: Transformer isolation, 1500 V AC RS485: none		
Type of cable	Ethernet: CAT5e shielded cable RS485: PROFIBUS network cable		
Power source			
Voltage range	85 ~ 264 V AC	20.4 ~ 28.8 V DC	85 ~ 264 V AC
Power supply frequency	47 ~ 63 Hz	–	47 ~ 63 Hz

Model		CPU SR60 AC/DC/RLY	CPU ST60 DC/DC/DC	CPU CR60 AC/DC/RLY
Power input when max. load of the input current is reached	Only includes the CPU	160 mA when voltage is 120 V AC (without a 300 mA sensor power output) 280 mA when voltage is 120 V AC (with a 300 mA sensor power output) 90 mA when voltage is 240 V AC (without a 300 mA sensor power output) 160 mA when voltage is 240 V AC (with a 300 mA sensor power output)	220 mA when voltage is 24 V DC (without a 300 mA sensor power output) 500 mA when voltage is 24 V DC (with a 300 mA sensor power output)	160 mA when voltage is 120 V AC (without a 300 mA sensor power output) 280 mA when voltage is 120 V AC (with a 300 mA sensor power output) 90 mA when voltage is 240 V AC (without a 300 mA sensor power output) 160 mA when voltage is 240 V AC (with a 300 mA sensor power output)
	Includes CPU and all extension accessories	370 mA when voltage is 120 V AC 220 mA when voltage is 240 V AC	710 mA when voltage is 24 V DC	–
Inrush current (max)		16.3 A when voltage is 264 V AC	11.5 A when voltage is 28.8 V DC	7.3 A when voltage is 264 V AC
Isolation (input power with the logic side)		1500 V AC	none	1500 V AC
Leakage current, AC line for functional earthing		none		
Hold time (power off)		30 ms when voltage is 120 V AC 200 ms when voltage is 240 V AC	20 ms when voltage is 24 V DC	50 ms when voltage is 120 V AC 400 ms when voltage is 240 V AC
Internal fuse (cannot be replaced by the user)		3 A, 250 V, Slow-blow fuse		
Sensor power source				
Voltage range		20.4 ~ 28.8 V DC		
Rated output current (max)		300 mA (short circuit protection)		
Maximum ripple noise (<10 MHz)		<1 V peak-peak value		
Isolation (CPU logic side and sensor power source)		Not isolated		
Digital input				
Number of input points		36		
Type		The sinking / sourcing type (IEC type 1 sinking)	The sinking/sourcing type (IEC type 1 sinking excluding I0.0 to I0.3)	The sinking/ sourcing type (IEC type 1 sinking)
Rated voltage		It is 24 V DC when the current is 4 mA, rated value		
Allowable continuous voltage		Max 30 V DC		
Surge voltage		35 V DC, lasting 0.5 s		
Logic 1 signal (min)		IThe voltage is 4 V DC when it ranges from I0.0 to I0.3 : 8 mA Other input: 15 V DC when it is 2.5 mA		Other input: 15 V DC when it is 2.5 mA
Logic 0 signal (min)		It is 5 V DC when the current is 1 mA	The voltage is 1 V DC when it ranges from I0.0 to I0.3: 1 mA Other input: 5 V DC when it is 1 mA	Other input: 5 V DC when it is 1 mA
Isolation (field side and logic side)		500 V AC, lasting 1 min		
Isolation group		1		
Filter time		Each channel can be separately selected (I0.0 to I1.5) : 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 µs 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms Each channel can be separately selected (I0.6) : 0, 6.4, 12.8 ms		
HSC clock input frequency (max) (Logic 1 battery = 15 ~ 26 V DC)		Single phase: 4 of 200 kHz Quadrature phase: 2 of 100 kHz		Single phase: 4 of 100 kHz Quadrature phase: 2 of 50 kHz
Number of inputs that connect at the same time		36		
Cable length (max)		Shielded: 500m (normal input), 50m (HSC input) ; non shielded: 300m (normal input)	I0.0 to I0.3, shielded (only limited to this category) : 500 m (normal input), 50 m (HSC input) All other inputs: shielded: 500 m (normal input) ; non shielded: 300 m (normal input)	Shielded: 500m (normal input), 50m (HSC input) ; non shielded: 300m (normal input)
Digital output				
Number of output		24		
Type		Relay, dry contact	Solid state-MOSFET (source-type)	Relay, dry contact
Voltage range		5 ~ 30 V DC or 5 ~ 250 V AC	20.4 ~ 28.8 V DC	5 ~ 30 V DC or 5 ~ 250 V AC
Logic 1 signal when the current is max.		–	Min. 20 V DC	–
Logic 0 signal when the load is KG		–	Max. 0.1 V DC	–
Rated current at each point (max)		2.0 A	0.5 A	2.0 A
Lamp load		30 W DC/200 W AC	5 W	30 W DC/200 W AC
On state resistance		New equipment is 0.2 Ω maximally	Max. 0.6 Ω	New equipment is 0.2 Ω maximally
Leakage current at each point		–	Max. 10 µ A	–
Surge current		It is 7A when the contact is closed	8 A, max. lasting 100 ms	It is 7A when the contact is closed
Overload protection		none		
Isolation (field side and logic side)		1500 V AC, lasting 1 min (coil and contact) none, (coil and logic side)	500 V AC, lasting 1 min	1500 V AC, lasting 1 min (coil and contact) none, (coil and logic side)
Isolation resistance		New equipment is 100 MΩ minimally	–	New equipment is 100 MΩ minimally
Disconnect the insulation between the contacts		750 V AC, lasting 1 min	–	750 V AC, lasting 1 min
Isolated group		6	3	6
Inductive voltage clamp		Not recommended	L+ - 48 V DC, 1 W loss	–
Switching delay (Qa.0-Qa.3)		Max. 10 ms	From the disconnection to connection max.1 µs from the connection to disconnection is 3 µs max.	Max. 10 ms
Switching delay (Qa.4-Qb.7)		Max. 10 ms	From the disconnection to connection max. 50 µs from the connection to disconnection is 200 µs max.	Max. 10 ms
Mechanical life (no load)		10,000,000 break/close cycles	–	10,000,000 break/close cycles
Contact life under the rated load		100,000 break/close cycles	–	100,000 break/close cycles
Output state under the STOP mode		Last value or replicable value (The default value is 0)		
Number of output that are connected at the same time		16		
Cable length		Shielded: 500 m; non shielded: 150 m		

Technical specification for digital input modules

Model	EM DI08
Order No. (MLFB)	**6ES7 288-2DE08-0AA0**
Standard	
Dimension W x H x D (mm)	45 x 100 x 81
Weight	141.4 g
Power consumption	1.5 W
Current consumption (SM bus)	105 mA
Current consumption (24 V DC)	4 mA for each input point used
Digital input	
Number of input points	8
Type	The sinking / sourcing type (IEC type 1 sinking)
Rated voltage	It is 24 V DC when the current is 4 mA, nominal value

Model	EM DI08
Allowable continuous voltage	Max 30 V DC
Surge voltage	35 V DC, lasting 0.5 s
Logic 1 signal (min)	It is 15 V DC when the current is 2.5 mA
Logic 0 signal (max)	It is 5 V DC when the current is 1 mA
Isolation (field side and logic side)	500 V AC, lasting 1 min
Isolation group	2
Filter time	0.2, 0.4, 0.8, 1.6, 3.2, 6.4, 12.8 ms (optional 4 inputs form one group)
Number of inputs that connect at the same time	8
Cable length (max)	500m (Shielded), 300m (non shielded)

Technical specification for digital output modules

Model	EM DR08	EM DT08
Order No.: (MLFB)	**6ES7 288-2DR08-0AA0**	**6ES7 288-2DT08-0AA0**
Standard		
Dimension W x H x D (mm)	45 x 100 x 81	
Weight	166.3 g	147 g
Power consumption	4.5 W	1.5 W
Current consumption (SM bus)	120 mA	
Current consumption (24 V DC)	Each relay coil used is 11 mA	–
Digital output		
Number of outputs	8	
Type	Relay, dry contact	Solid state-MOSFET (source-type)
Voltage range	5 ~ 30 V DC or 5 ~ 250 V AC	20.4 ~ 28.8 V DC
Logic 1 signal when the current is max.	–	20 V
Logic 0 signal when the load is KG	–	0.1 V
Rated current at each point (max)	2.0 A	0.75 A
Lamp load	30 W DC/200 W AC	5 W DC
Resistance of the contact in the ON state	New equipment is 0.2 Ω maximally	0.6 Ω
Leakage current at each point	–	10 µ A
Surge current	It is 7A when the contact is closed	8 A, max. lasting 100 ms
Overload protection	none	
Isolation (field side and logic side)	1500 V AC, lasting 1 min (coil and contact) none, (coil and logic side)	500 V AC, lasting 1 min
Isolation resistance	New equipment is 100 MΩ minimally	–
Disconnect the insulation between the contacts	750 V AC, lasting 1 min	–
Isolated group	2	2
Current of each public end (max)	8 A	3 A
Inductive voltage clamp	–	- 48 V DC
Switching delay	Max. 10 ms	From the disconnection to connection max.50 µs from the connection to disconnection is 200 µs max.
Mechanical life (no load)	10,000,000 break/close cycles	–
Contact life under the rated load	100,000 break/close cycles	–
Output state under the STOP mode	Last value or replicable value (The default value is 0)	
Number of output that are connected at the same time	8	
Cable length	Shielded: 500 m; non shielded: 300 m	

Technical specification for digital input/output modules

Model	EM DR16	EM DT16	EM DR32	EM DT32
Order No.: **(MLFB)**	**6ES7 288-2DR16-0AA0**	**6ES7 288-2DT16-0AA0**	**6ES7 288-2DR32-0AA0**	**6ES7 288-2DT32-0AA0**
Dimension W x H x D (mm)	45 x 100 x 81		70 x 100 x 81	
Weight	201.9 g	179.7 g	295.4 g	257.3 g
Power consumption	5.5 W	2.5 W	10 W	4.5 W
Current consumption (SM bus)	145 mA	145 mA	180 mA	185 mA
Current consumption (24 V DC)	4 mA for each input point used			
	Each relay coil used is 11 mA	–	Each relay coil used is 11 mA	–
Digital input				
Number of input points	8		16	
Type	The sinking / sourcing type (IEC type 1 sinking)			
Rated voltage	It is 24V DC when the current is 4 mA, nominal value			
Allowable continuous voltage	Max 30 V DC			
Surge voltage	35 V DC, lasting 0.5 s			
Logic 1 signal (min)	15 V DC			
Logic 0 signal (min)	5 V DC			
Isolation (field side and logic side)	500 V AC, lasting 1 min			
Isolation group	2			
Filter time	0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 ms (optional, 4 form one group)			
Number of inputs that connect at the same time	8		16	
Cable length	500 m (Shielded), 150 m (non shielded)			
Digital output				
Number of output	8		16	
Type	Relay, dry contact	Solid state-MOSFET	Relay, dry contact	Solid state-MOSFET
Voltage range	5 ~ 30 V DC or 5 ~ 250 V AC	20.4 ~ 28.8 V DC	5 ~ 30 V DC or 5 ~ 250 V AC	20.4 ~ 28.8 V DC
Logic 1 signal when the current is max.	–	Min. 20 V DC	–	Min. 20 V DC
Logic 0 signal when the load is KG	–	Max. 0.1 V DC	–	Max. 0.1 V DC
Rated current at each point (max)	2 A	0.75 A	2 A	0.75 A
Lamp load	30 W DC/200 W AC	5 W	30 W DC/200 W AC	5 W
Resistance of the contact in the ON state	New equipment is 0.2 Ω maximally	Max. 0.6 Ω	New equipment is 0.2 Ω maximally	Max. 0.6 Ω
Leakage current at each point	–	Max. 10 µ A	–	Max. 10 µ A
Surge current	It is 7A when the contact is closed	8 A, max. lasting 100 ms	It is 7A when the contact is closed	8 A, max. lasting 100 ms
Overload protection	none			
Isolation (field side and logic side)	1500 V AC, lasting 1 min (coil and contact) none, (coil and logic side)	500 V AC, lasting 1 min	1500 V AC, lasting 1 min (coil and contact) none, (coil and logic side)	500 V AC, lasting 1 min
Isolation resistance	New equipment is 100 MΩ minimally	–	New equipment is 100 MΩ minimally	–
Disconnect the insulation between the contacts	750 V AC, lasting 1 min	–	750 V AC, lasting 1 min	–
Isolated group	2	2	4	3
Each end of the current public	8 A	3 A	8 A	6 A
Inductive voltage clamp	-	-48 V	–	-48 V
Switching delay	From the disconnection to connection max.1 µs from the connection to disconnection is 3 µs max.	Max. 10 ms	From the disconnection to connection max.1 µs from the connection to disconnection is 3 µs max.	Max. 10 ms
Mechanical life (no load)	10,000,000 break/close cycles	–	10,000,000 break/close cycles	–
Contact life under the rated load	100,000 break/close cycles	–	100,000 break/close cycles	–
Output state under the STOP mode	Last value or replicable value (The default value is 0)			
Number of output that are connected at the same time	8		16	
Cable length	Shielded: 500 m; non shielded: 300 m			

Technical specification for analogue input modules

Model	EM AI04
Order No.: (MLFB)	6ES7 288-3AE04-0AA0
Standard	
Dimension W x H x D (mm)	45 x 100 x 81
Weight	147 g
Power consumption	1.5 W (no load)
Current consumption (SM bus)	80 mA
Current consumption (24 V DC)	40 mA (no load)
Analogue input	
No. of Inputs	4
Type	Voltage or current (differential) : 2 can be selected as a group
Range	±10 V, ±5 V, ±2.5 V, or 0 ~ 20 mA
Full scale range (data word)	-27, 648 ~ 27, 648
Overshoot / undershoot range (data word)	Voltage: 27, 649 ~ 32, 511/-27, 649 ~ -32, 512 Current: 27, 649 ~ 32, 511/-4864 ~ 0
Overflow / underflow (data word)	Voltage: 32, 51 2 ~ 32, 767/-32, 51 3 ~ -32, 768 Current: 32, 512 ~ 32, 767/-4, 865 ~ -32, 768
Resolution	Voltage mode: 11 bits + signal bits Current mode: 11 bits
Maximum voltage / current resistance	±35 V/±40 mA
Smoothness	None, weak, medium or strong
Noise suppression	400, 60, 50 or 10 Hz
Input resistance	≥9 M Ω (voltage) / 250 Ω (current)
Isolation (field side and logic side)	none
Precision (25℃ / 0 ~ 55℃)	Voltage mode: full range ±0.1 %/±0.2 % Current mode: full range ±0.2 %/±0.3 %
Analogue to digital conversion time	625 μs (400 Hz inhibited)
Common mode rejection	40 dB, DC to 60 Hz
The working signal range	Signal plus common mode voltage must be less than +1 2 and greater than -12 V;
The cable length (maximum)	100 m, Shielded twisted pair
Diagnosis	
Overflow / underflow	✓
24 V DC low voltage	✓

Technical specification for analogue output modules

Model	EM AQ02
Order No.: (MLFB)	6ES7 288-3AQ02-0AA0
Standard	
Dimension W x H x D (mm)	45 x 100 x 81
Weight	147.1 g
Power consumption	1.5 W (no load)
Current consumption (SM bus)	80 mA
Current consumption (24 V DC)	50 mA (no load)
Analogue output	
No. of Inputs	2
Type	Voltage or current
Range	±10 V or 0 ~ 20 mA
Resolution	Voltage mode: 10 bits + signal bits Current mode: 10 bits
Full scale range (data word)	Voltage: -27, 648 ~ 27, 648 Current: 0 to 27, 648
Precision (25℃/0 ~ 55℃)	Full range ±0.5 %/ ±1.0 %
Stabilisation time (95% of the new value)	Voltage: 300 μs (R), 750 μs (R), 750 μs (1 μ F) Current: 600 μs (1 mH), 2 ms (10 mH)
Load resistance	Voltage: > 1000 Ω Current: < 500 Ω
Output state under the STOP mode	Last value or replicable value (The default value is 0)
Isolation (field side and logic side)	none
Cable length (max)	100 m, shielded twisted pair
Diagnosis	
Overflow / underflow	✓
Short circuit to ground (only for voltage mode)	✓
Circuit breaker (only for current mode)	✓
24 V DC low voltage	✓

Technical specification for analogue input/output modules

Model	EM AM06
Order No.: (MLFB)	6ES7 288-3AM06-0AA0
Standard	
Dimension W x H x D (mm)	45 x 100 x 81
Weight	173.4 g
Power consumption	2.0 W (no load)
Current consumption (SM bus)	80 mA
Current consumption (24 V DC)	60 mA (no load)
Analogue input	
No. of Inputs	4
Type	Voltage or current (differential) : 2 can be selected as a group
Range	±10 V, ±5 V, ±2.5 V, or 0 ~ 20 mA
Full scale range (data word)	-27, 648 ~ 27, 648
Overshoot / undershoot range (data word)	Voltage: 27, 649 ~ 32, 511/-27, 649 ~ -32, 512 Current: 27, 649 ~ 32, 511/-4864 ~ 0
Overflow / underflow (data word)	Voltage: 32, 51 2 ~ 32, 767/-32, 51 3 ~ -32, 768 Current: 32, 512 ~ 32, 767/-4, 865 ~ -32, 768
Resolution	Voltage mode: 11 bits + signal bits Current mode: 11 bits
Maximum voltage / current resistance	±35 V/±40 mA
Smoothness	None, weak, medium or strong
Noise suppression	400, 60, 50 or 10 Hz
Input resistance	≥9 M Ω (voltage) / 250 Ω (current)
Isolation (field side and logic side)	none
Precision (25℃ / 0 ~ 55℃)	Voltage mode: full range ±0.1 %/±0.2 % Current mode: full range ±0.2 %/±0.3 %

Model	EM AM06
Analogue to digital conversion time	625 μs (400 Hz inhibited)
Common mode rejection	40 dB, DC to 60 Hz
Working signal range	Signal plus common mode voltage must be less than the +1 2 V is greater than -12 V
The cable length (maximum)	100 m, Shielded twisted pair
Analogue output	
No. of Inputs	2
Type	Voltage or current
Range	±10 V or 0 ~ 20 mA
Resolution	Voltage mode: 10 bits + signal bits Current mode: 10 bits
Full scale range (data word)	Voltage: -27, 648 ~ 27, 648 Current : 0 ~ 27, 648
Precision (25℃/0 ~ 55℃)	Full range ±0.5 %/ ±1.0 %
Stabilisation time (95% of the new value)	Voltage: 300 μs (R), 750 μs (R), 750 μs (1 μ F) Current: 600 μs (1 mH), 2 ms (10 mH)
Load resistance	Voltage ≥ 1000 Ω Current ≤ 600 Ω
Output state under the STOP mode	Last value or replicable value (The default value is 0)
Isolation (field side and logic side)	None
Cable length (max)	100 m, shielded twisted pair
Diagnosis	
Overflow / underflow	✓
Short circuit to ground (only for voltage mode)	✓
Circuit breaker (only for current mode)	✓
24 V DC low voltage	✓

Technical specification for digital input / output signal board

Model	SB DT04
Order No.: (MLFB)	6ES7 288-5DT04-0AA0
Standard	
Dimension W x H x D (mm)	35 x 52.2 x 16
Weight	18.1 g
Power consumption	1.0 W
Current consumption (SM bus)	50 mA
Current consumption (24 V DC)	Each input used 4mA
Analogue input	
No. of Inputs	2
Type	Sinking type/sourcing type (IEC type 1 sinking)
Rated voltage	24 V DC, When the current is 4 mA, nominal value
Allowable continuous voltage	Max. 30 V DC
Surge voltage	35 V DC, lasting 0.5 s
Logic 1 signal (min)	15 V DC when the current is 2.5mA.
Logic 0 signal (max)	5 V DC when the current is 1 mA.
Isolation (field side and logic side)	500 V AC, lasting 1 min
Isolation group	1
Filter time	Each channel can be selected separately 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 µs 0.2, 0.4, 0.8, 1.6, 3.2, 6.4 and 12.8 µs
Number of inputs connected at the same time	2
Cable length	500 m (shielded), 300 m (non shielded)
Digital output	
Number of outputs	2
Type of output	Solid state -MOSFET
Voltage range	20.4 ~ 28.8 V DC
Logic 1 signal at max current	Min 20 V DC
Logic 0 signal at max current	Max 0.1 V DC
Rated current of each point (max)	0.5 A
Lamp load	5 W
Contact resistance in the ON status	Max 0.6 Ω
Current leakage at point	Max. 10 µA
Surge current	5 A, max lasting 100 ms
Overload protection	No
Isolation (field side and logic side)	500 V AC, lasting 1 min
Isolation group	1
Current of each public end	1 A
Inductive voltage clamp	L + - 48 V, 1 W loss
Switching delay	Disconnected to connected maximally 2 µs connected to disconnected maximally 10 µs
Output state under the STOP mode	Last value or replicable value (The default value is 0)
Number of inputs connected at the same time	2
Cable length (max)	500 m (shielded), 150 m (non shielded)

Technical specification for battery signal board

Model	SB BA01
Order No.: (MLFB)	6ES7 288-5BA01-0AA0
Standard	
Dimension W x H x D (mm)	35 x 52.2 x 16
Weight	20 g
Power consumption	0.6 W
Current consumption (SM bus)	18 mA
Current consumption (24 V DC)	None
Battery (need to be bought by the user)	
Hold duration	About 1 year
Type of battery	CR1025cell battery
Nominal voltage	3 V
Nominal capacity	30 mAH
Diagnosis	
Critical cell voltage	<2.5 V
Battery diagnosis	Low voltage lamp: Low battery voltage will cause the BA01 panel of the LED display in red state Diagnosis alarm / or low power digital output status available
Battery status	The battery status provided 0 =battery normal 1= Low battery
Battery status update	Battery status will be updated in the boot, then the CPU in RUN mode

Technical specification for analogue output signal board

Model	SB AQ01
Order No.: (MLFB)	6ES7 288-5AQ01-0AA0
Standard	
Dimension W x H x D (mm)	35 x 52.2 x 16
Weight	17.4 g
Power consumption	1.5 W
Current consumption (SM bus)	15 mA
Current consumption (24 V DC)	40 mA (no load)
Analogue output	
No. of Inputs	1
Type	Voltage or current
Range	±10 V or 0 ~ 20 mA
Resolution	Voltage mode: 11 bits + signal bits Current mode: 11 bits
Full scale range (data word)	-27, 648 ~ 27, 648 (-10V ~ 10 V) 0 ~ 27, 648 (0 ~ 20 mA)
Precision (25℃/0 ~ 55℃)	±0.5 %/ ±1.0 %
Stabilisation time (95% of the new value)	Voltage: 300 µs (R), 750 µs (R), 750 µs (1 µ F) Current: 600 µs (1 mH), 2 ms (10 mH)
Load resistance	Voltage ≥ 1000 Ω Current ≤ 600 Ω
Output state under the STOP mode	Last value or replicable value
Isolation (field side and logic side)	none
Cable length (max)	10 m, shielded twisted pair
Diagnosis	
Overflow / underflow	✓
Short circuit to ground (only for voltage mode)	✓
Circuit breaker (only for current mode)	✓

Technical specification for RS485/232 signal board

Model	1 SB CM01
Order No	6ES7 288-5CM01-0AA0
Standard	
Dimension W x H x D (mm)	35 x 52.2 x 16
Weight	18.2 g
Power consumption	0.5 W
Current consumption (5 V DC)	50 mA
Current consumption (24 V DC)	Not applicable
Transmitter and receiver (RS485)	
common-mode voltage range ;	-7 V ~ +12 V, 1 s, 3 VRMS continuous
Transmitter differential output voltage	min 2 V when RL = 100 Ω min 1.5 V when RL = 54 Ω
Termination and bias	On TXD 4.7 KΩ for +5 V On RXD 4.7 KΩ for GND
Receiver input impedance	Min 12 KΩ
The receiver threshold / sensitivity	Minimum +/-0.2 V, the typical lag 60 mV
Isolation The RS485 signal and the shell grounding RS485 signal and CPU logic common end	None
Length of cable, shielded cable	Isolation repeaters: 1000 m, baud rate up to 187.5 K No isolation repeaters: 50 m
Transmitter and receiver (RS232)	
Transmitter output voltage	Minimum +/-5V, when RL two 3 K
Output voltage sent	MAX. +/-1 5 V DC
Receiver input resistance	Min 3 KΩ
Receiver threshold / sensitivity	Lower limit 0.8 V, top limit 2.4 V typical lag 0.5 V
Receiver input voltage	Max +/- 30 V DC
Isolation The RS232 signal and the shell grounding RS232 signal and CPU logic common end	None
Length of cable, shielded cable	Max. 10 m

Technical specification for RTD module

Model	EM AR02
Order No.: **(MLFB)**	6ES7 288-3AR02-0AA0
Standard	
Dimension W x H x D (mm)	45 x 100 x 81
Weight	148.7 g
Power consumption	1.5 W
Current consumption (SM bus)	80 mA
Current consumption (24 V DC)	40 mA
Analogue input	
No. of Inputs	2
Type	RTD and resistance value of module reference ground
Range Nominal range (data word) overshoot / undershoot range (data word) Overflow / underflow (data word)	Please refer to RTD sensor selection table in the S7-200 SMART System Manual
Resolution	
Temperature	0.1℃ / 0.1°F
Resistance	15 position + sign
Maximum voltage hold	±35 V
Noise suppression	85 dB, 10 Hz/50 Hz/60 Hz/400 Hz
Common mode rejection	> 120 dB
Resistance	> 10 M Ω
isolation	500 V AC
Field side and logic side	500 V AC
Field side and 24 V DC side	500 V AC
24 V DC side and logic side	
Channel to channel isolation	0
Precision	Please refer to RTD sensor selection table
Repeatability	±0.05 % FS
Maximum power consumption of the sensor	0.5 m W
Measuring principle	Sigma-Delta
Module update time	Please refer to the noise reduction selection table
Cable length (maximum)	The maximum length to the sensor is 100 m
Cable resistance	Max.20 Ω, for Cu10, max. is 2.7 Ω
Diagnosis	
Overflow / underflow	✓
Circuit breaker (only current mode)	✓
24 V DC low voltage	✓

Technical specification of thermocouple module

Model	EM AT04
Order No.: **(MLFB)**	6ES7 288-3AT04-0AA0
Standard	
Dimension W x H x D (mm)	45 x 100 x 81
Weight	125 g
Power consumption	1.5 W
Current consumption (SM bus)	80 mA
Current consumption (24 V DC)	40 mA
Analogue input	
No. of Inputs	4
Range Nominal range (data word) overshoot / undershoot range (data word) Overflow / underflow (data word)	Please refer to RTD sensor selection table in the S7-200 SMART System Manual
Resolution	
Temperature	0.1℃ / 0.1°F
Resistance	15 position + sign
Maximum voltage hold	±35 V
Noise suppression	For the selected filter settings (10 Hz, 50 Hz, 60 Hz or 400 Hz) is 85 dB
Common mode rejection	120 V AC of, > 120 dB
Resistance	≥ 10 M Ω
isolation	
Field side and logic side	500 V AC
Field side and 24 V DC side	500 V AC
24 V DC side and logic side	500 V AC
Channel to channel isolation	-
Precision	Please refer to RTD sensor selection table
Repeatability	±0.05 % FS
Maximum power consumption of the sensor	Integral type
Module update time	Please refer to the noise reduction selection table
The cold end temperature error	± 1.5 ℃
Cable length (maximum)	The maximum length to the sensor is 100 m
Cable resistance	Max. 100 Ω
Diagnosis	
Overflow / underflow	✓
Circuit breaker (only current mode)	✓

General technical specifications

Electromagnetic compatibility - immunity with EN61000-6-2	
EN 61000-4-2 electrostatic discharge	8 kV, the air discharge to all surfaces; ±4 kV, conductive contact discharge on the exposed surface
EN 61000-4-3 Radiation, radio frequency, electromagnetic field immunity test	When 80 ~ 1000 MHz, 10 V/m, 1 kHz, 80 % AM When 1.4 ~ 2.0 GHz, 3 V/m, 1 kHz, 80 % AM When 2.0 ~ 2.7 GHz, 1 V/m, 1 kHz, 80 % AM
EN 61000-4-4 fast transient Bursts	2 kV, 5 kHz, - a coupled network of AC and DC power supply systems ; 2 kV, 5 kHz, I/O coupling clamp
EN 61000-4-5 Surge immunity	AC system — 2 kV Common mode, 1 kV Differential mode DC system — 2 kV Common mode, 1 kV Differential mode For the DC system (I/O signal, DC power supply system), need the external protection
EN61000-4-6 Conducted interference	When 150 kHz ~ 80 MHz, 10 V RMS, 1 kHz, 80 % AM
EN61000-4-11 Voltage dip	Communication systems; 60 Hz, 0% for 1 cycles, 40% for 12 cycles and 70% for 30 cycles
Electromagnetic compatibility of a conduction and radiation in accordance with EN 61000-6-4	
Transmission of EN55001, class A, group 1	0.15 MHz ~ 0.5 MHz < 79 dB (μV) Quasi peak ; < 66 dB (μV) Average value 0.5 MHz ~ 5 MHz < 73 dB (μV) Quasi peak ; < 60 dB (μV) Average value 5 MHz ~ 30 MHz < 73 dB (μV) Quasi peak ; < 60 dB (μV) Average value
Radiation EN55001, Class A, Group 1	30 MHz ~ 230 MHz < 40 dB (μV/m) Quasi peak ; Measured distances is 10m 230 MHz ~ 1 GHz < 47 dB (μV/m) Quasi peak ; Measured distances is 10m
Environmental conditions -transport and storage	
EN60068-2-2, Bb test, EN60068-2-1 test Ab, hot and cold	-40_oC~70_oC
EN60068-2-30, Db test, damp heat	25℃ ~ 55℃ / humidity 95 %
EN60068-2-14 Na test, a temperature change	-40~ 70℃, residence time 3hrs, 2 cycles
EN60068-2-32, free fall	0.3 m, 5times, product package
Atmospheric pressure	1080 ~ 660 hPa (equivalent to altitude -1000 ~ 3500 m)
Environment conditions -running	
Ambient temperature range (25 mm height space under the equipment for the wind coming in)	0℃ ~ 55℃, horizontal installation 0℃ ~ 45℃, vertical installation Humidity 95 %, No condensation
Atmospheric pressure	1080 ~ 795 hPa (equivalent to altitude 1000 ~ 2000 m)
Pollutant concentration	SO2: < 0.5 ppm ; H2S : < 0.1 ppm ; RH < 60 %, No condensation
EN 60068-2-14, Nb test, temperature change	5℃ ~ 55℃, 3℃/min
EN 60068-2-27 mechanical shock	15 G, 11 ms pulse, 3 axes upwards 6 impacts
EN 60068-2-6 Sinusoidal vibration	When DIN guide rail mounting : 5 ~ 9 Hz, 3.5 mm, when 9 ~ 150 Hz, 1 G Panel installation : when 5 ~ 9 Hz, 7.0 mm, when 9 ~ 150 Hz, 2 G Each axis swings 10 times, each divided into 1 octave
High voltage insulation test	
24 V/5 V nominal circuit	520 V DC (optical isolation boundary type test)
115/230 V Ground circuit	1500 V AC routine test/1950 V DC type test
11 5/230 V circuit for a 115/230 V circuit	1500 V AC routine test /1950 V DC type test
11 5/230 V circuit for a 24 V/5 V circuit	1500 V AC routine test /3250 V DC type test
Ethernet port on 24 V/5 V circuit and ground	1500 V AC (only the type testing)

Mounting dimensions

① Side view ② Horizontal mounting ③ Vertical mounting ④ Gap area

Be sure to bear in mind the following guidelines, when planning the installation:

- The equipment shall be isolated from the thermal radiation, high voltage and electrical noise.
- Leave enough space for cooling and wiring. A 25mm height space above or under the equipment must be left so as to allow free air circulation.

Please refer to "S7-200 SMART System Manual" for the specific requirements of installation and guidelines.

Input and output wiring diagram

24V DC input
As sinking type input

24V DC input
As sourcing type input

24V DC output
(sourcing type)

Relay output

Order number description

| 6 | E | S | 7 | — | 2 | 8 | 8 | — | | | | | | — | 0 | A | A | 0 |

Siemens S7 series PLC

S7-200 SMART

1: CPU
2: Digital expansion module
3: Analog expansion module
5: Signal board

C/S stands for CPU type

C stands for economic type, S stands for standard type

D/A represents the extension module type

D represents a digital expansion module, A represents an analog expansion module

E/Q represents input/output

R/T represents the digital expansion module relay output / transistor output

M represent the mixed input /output expansion module

* AR represents the RTD expansion module, AT represents the thermocouple module

XX represents the number input/output ports

0A: Reserved

A0: version No.

Schematic diagram of the module and the signal board wiring

CPU ST20
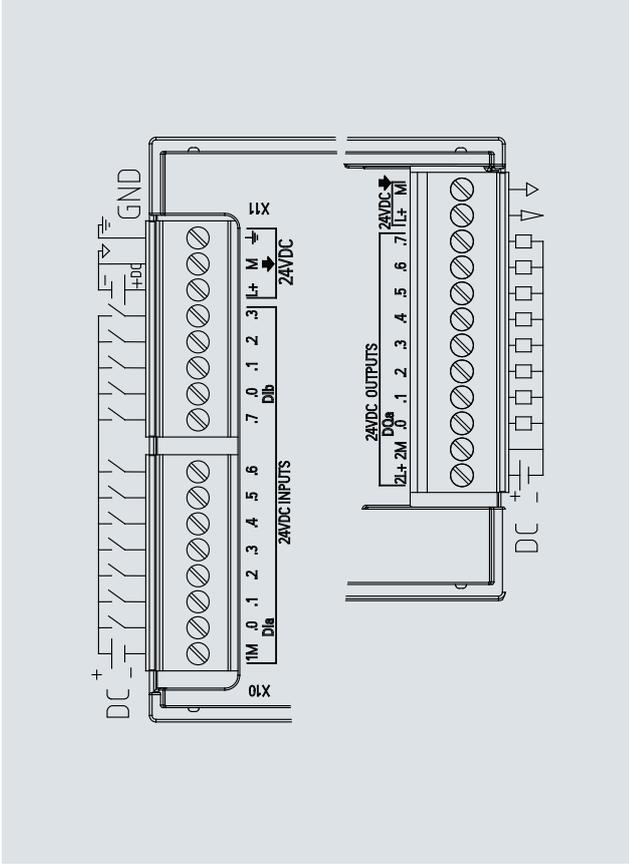
CPU ST30
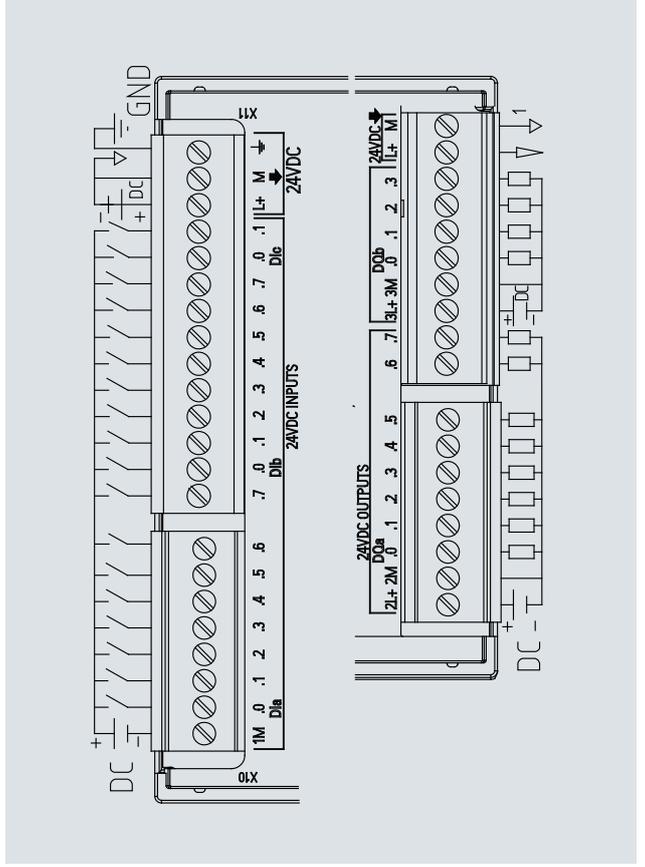
CPU ST40
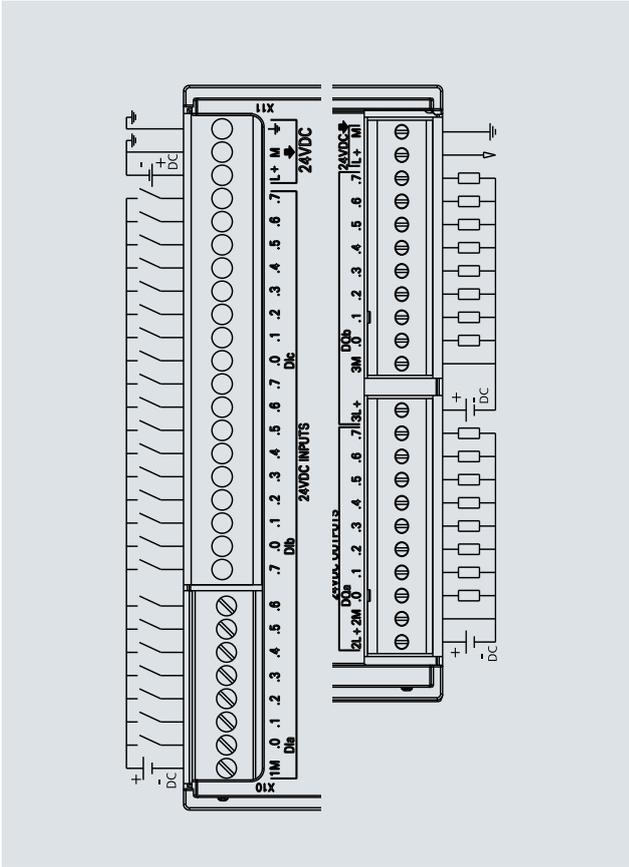
CPU SR20
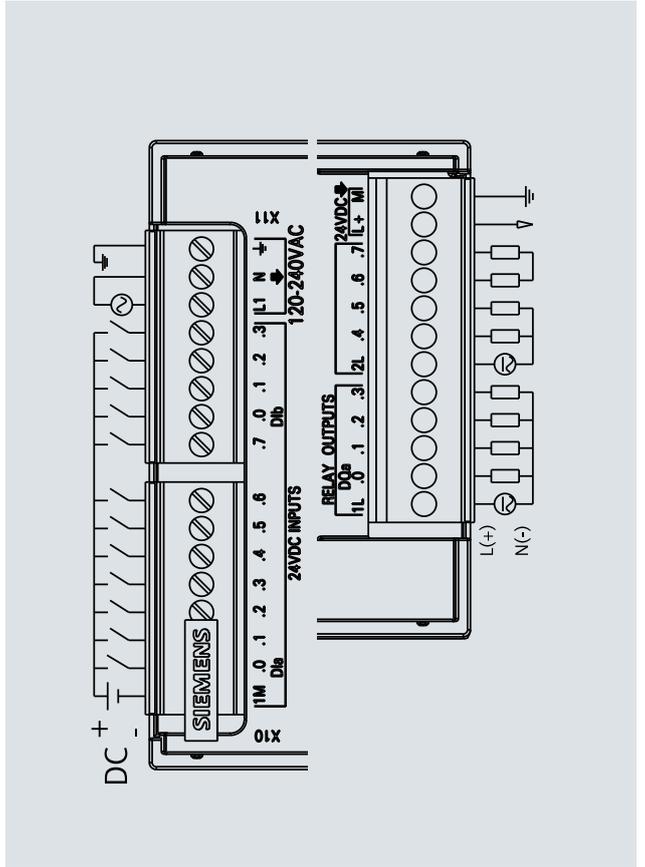
CPU SR30
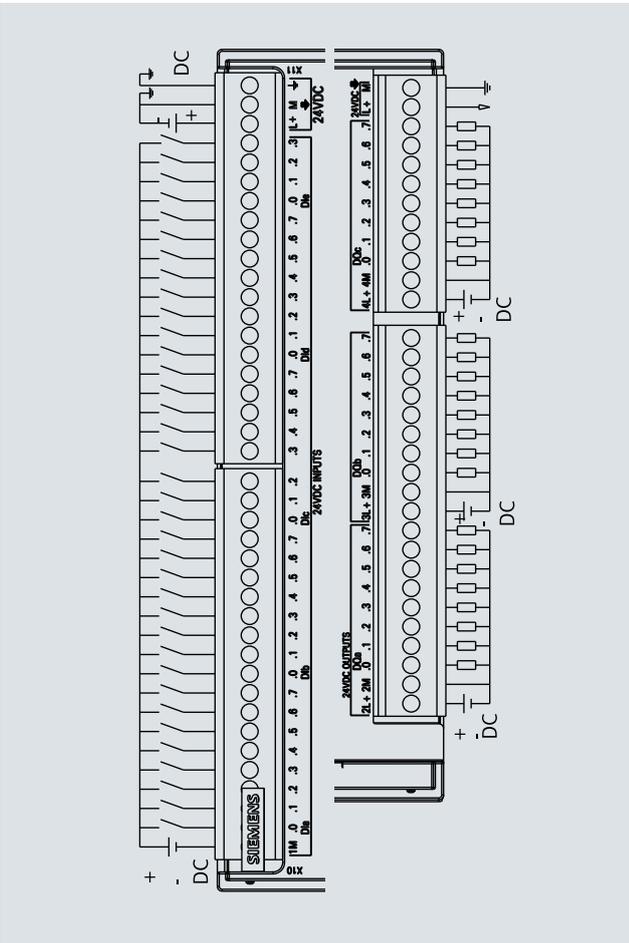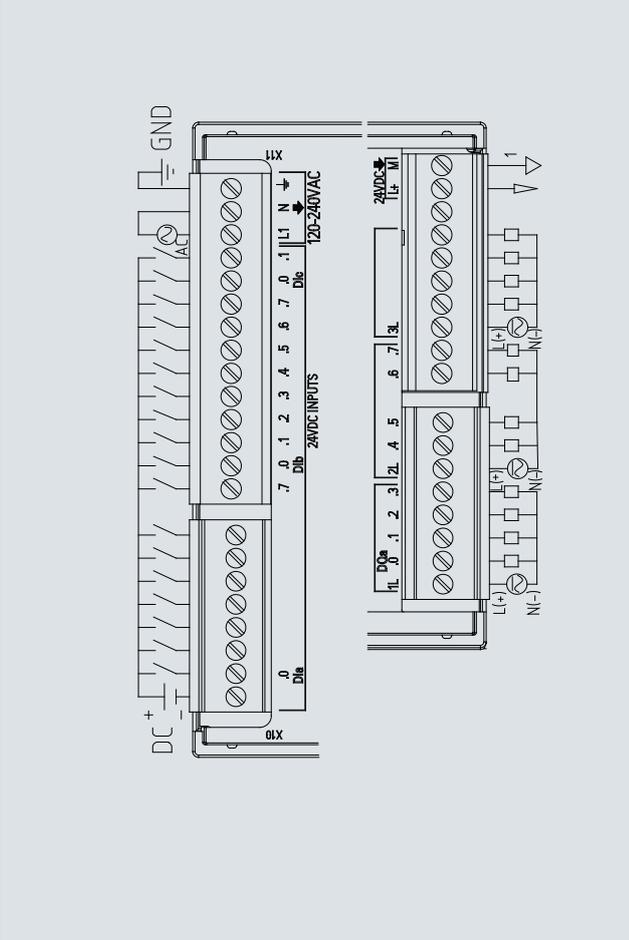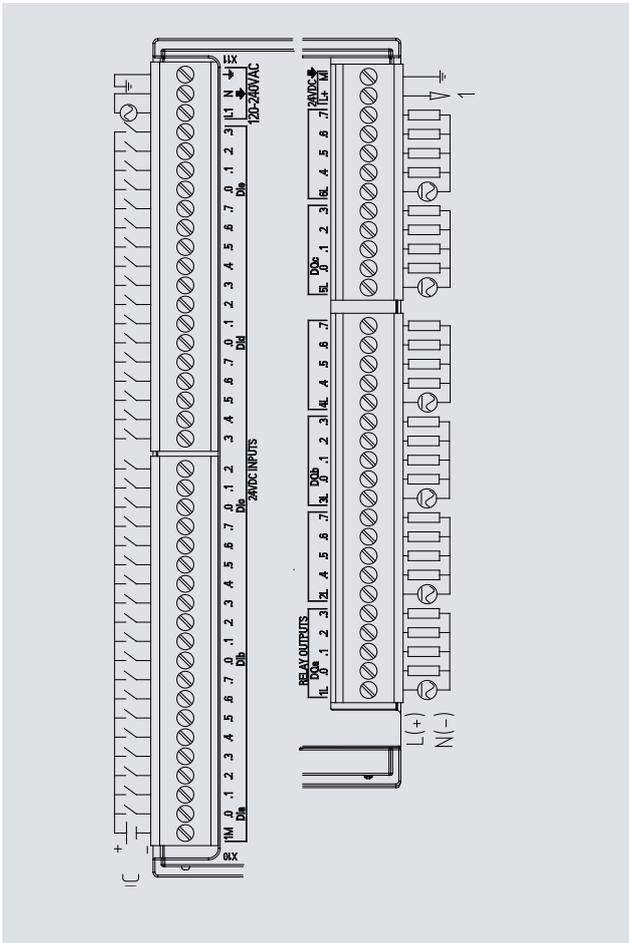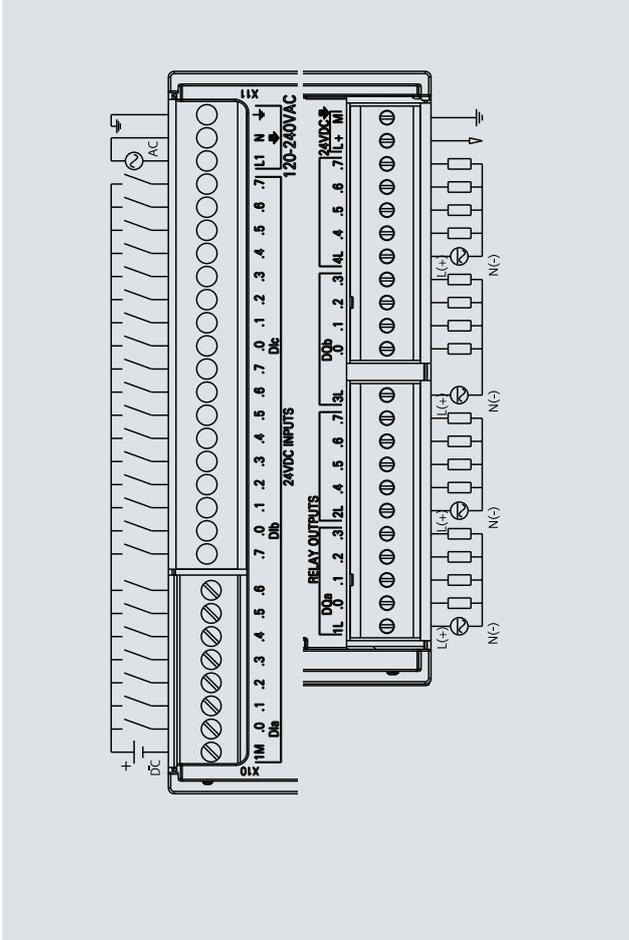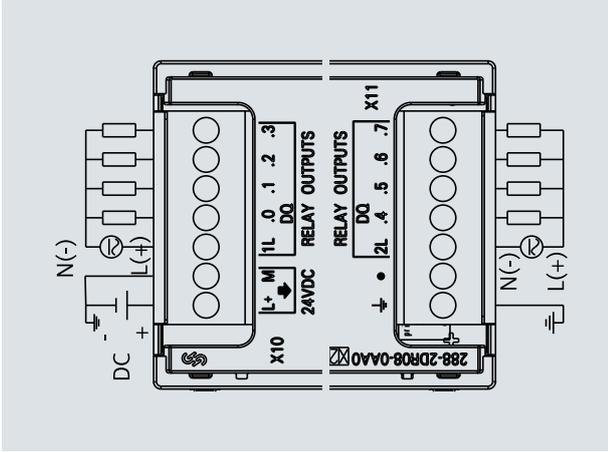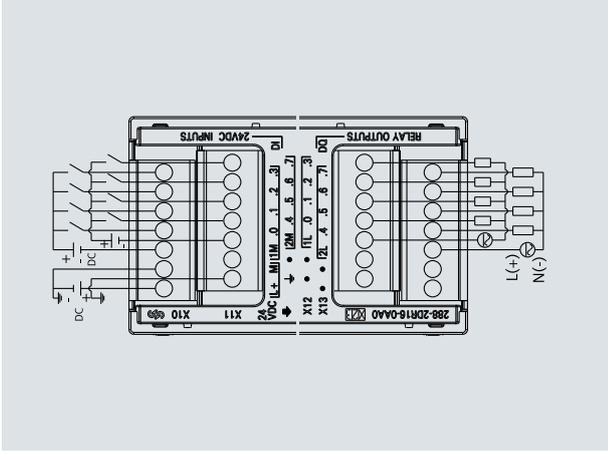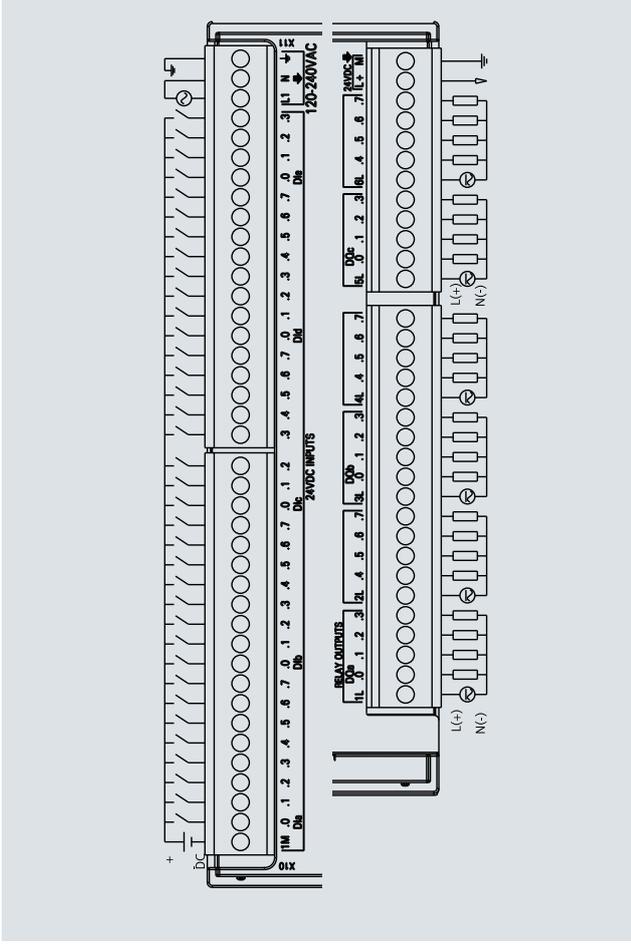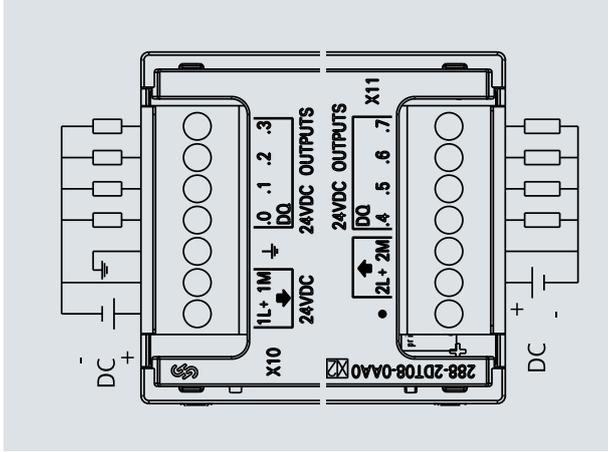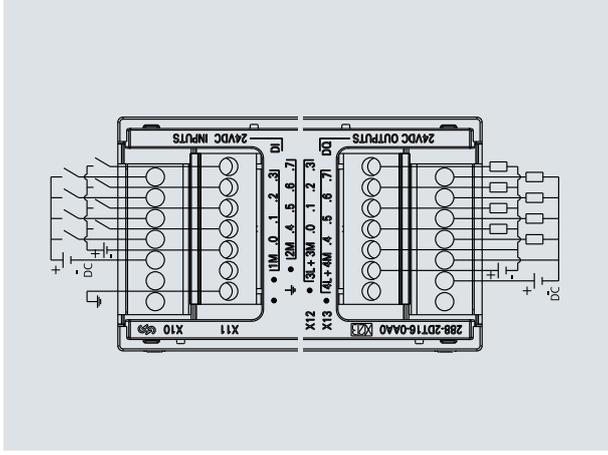
CPU SR40

CPU ST60

CPU CR60

CPU SR60

CPU CR40

EM DR16

EM DT16

EM DR08

EM DT08

EM DI08

6ES7 288-2DE08-0AA0

24VDC INPUTS
DI · 1M .0 .1 .2 .3
X10

24VDC INPUTS
DI · 2M .4 .5 .6 .7
X11

DC + −

SB CM01

6ES7 288-5CM01-0AA0

SB CM01

Tx/B RTS M Rx/A 5V
X20

SB DT04

DI 2x24VDC / DQ 2x24VDC 0.5A
6ES7 288-5DT04-0AA0

SB DT04

DIf
.0 .1

DQf
.0 .1

DIf
.0 .1 L+ M
DQf
.0 .1
24V
DC
X19

DC + −

EM AM06

288-3AM06-0AA0

ANALOG INPUTS
AI
0+ 0− 1+ 1−
M 24VDC L+
X10   X11

ANALOG OUTPUTS
AO
0M 0 1M 1
X12

V or I

DC + −

EM AQ02

288-3AQ02-0AA0

L+ M
24VDC
X10

ANALOG OUTPUTS
AO
0M 0 1M 1
X11

DC − +

EM AI04

288-3AE04-0AA0

ANALOG INPUTS
AI
0+ 0− 1+ 1−
M 24VDC L+
X10

ANALOG INPUTS
AI
2+ 2− 3+ 3−
X11

V or I

DC − +

SB AQ01

EM AT04

EM DR32

EM DT32

EM AR02

EM AR02

34
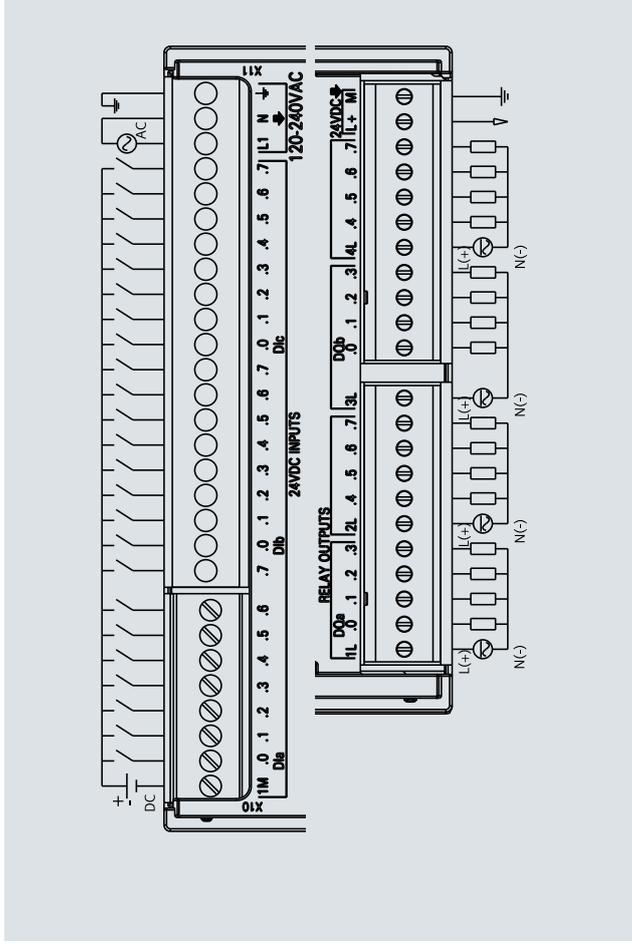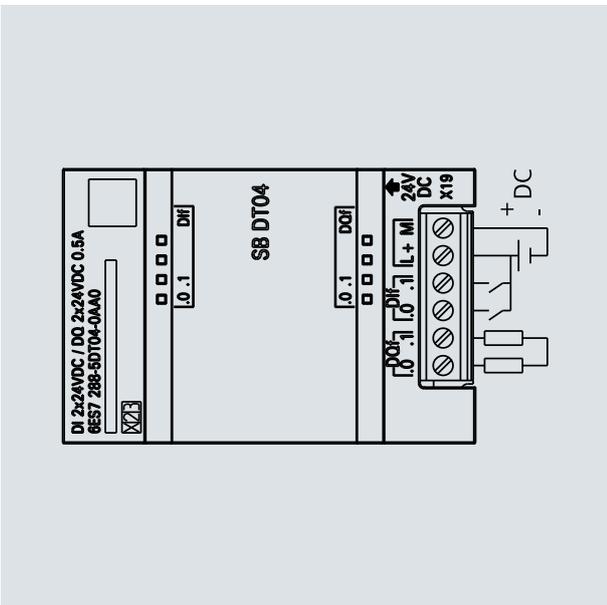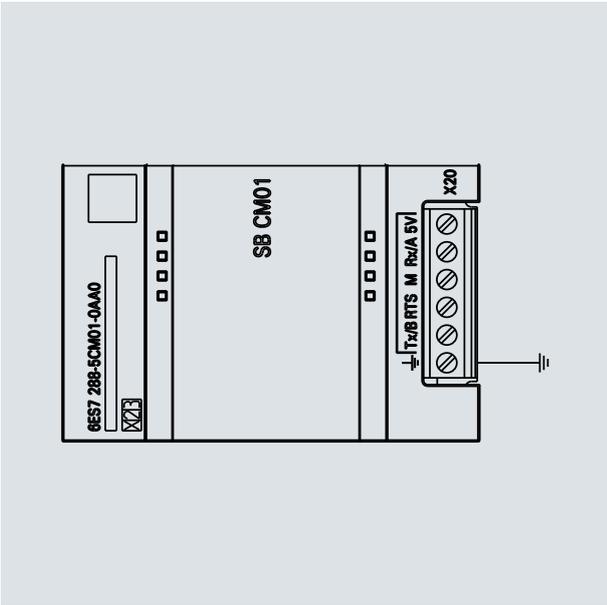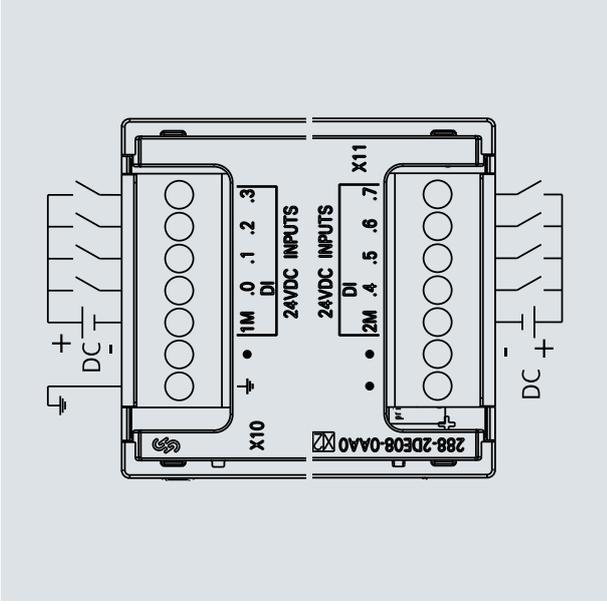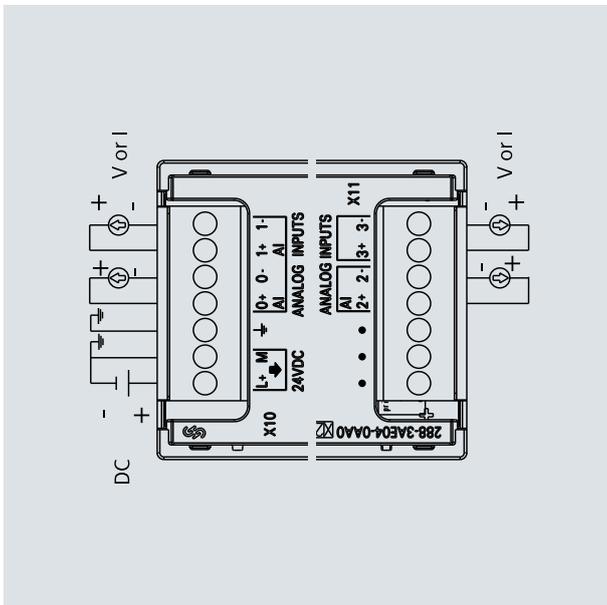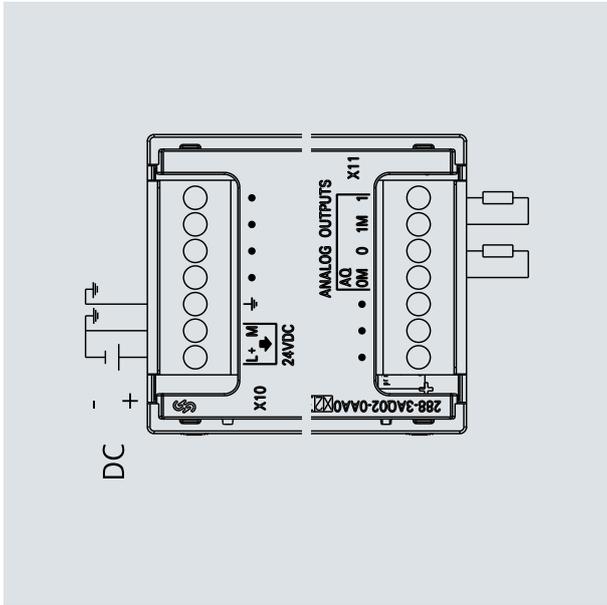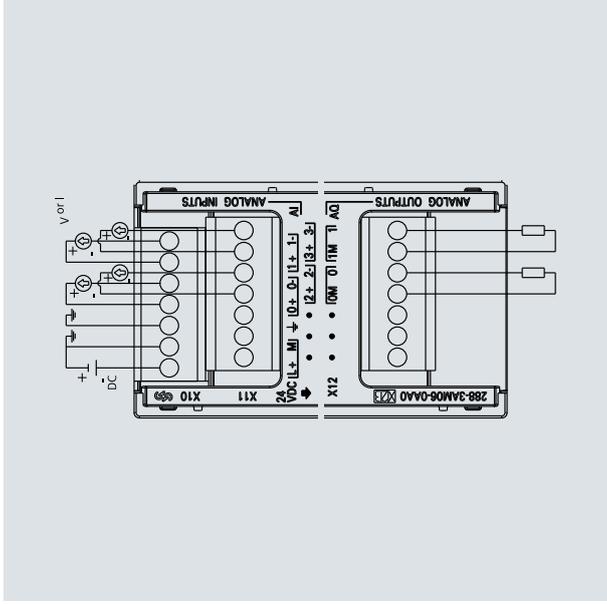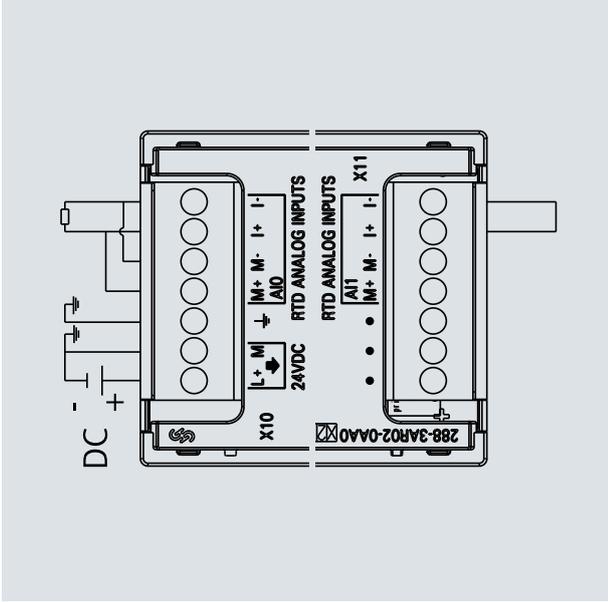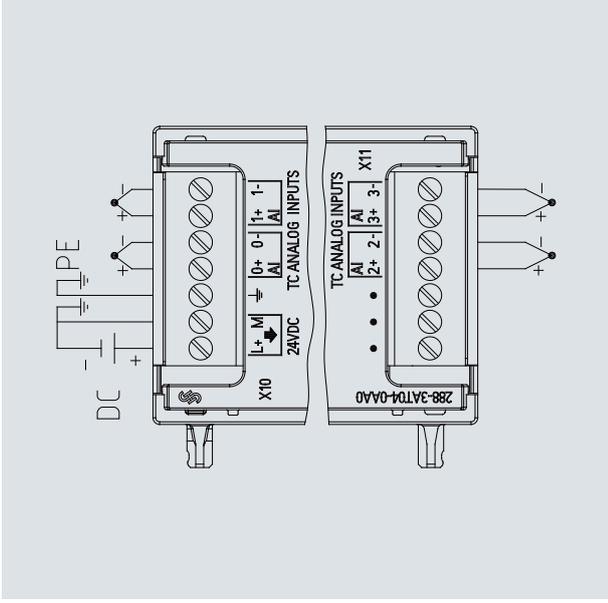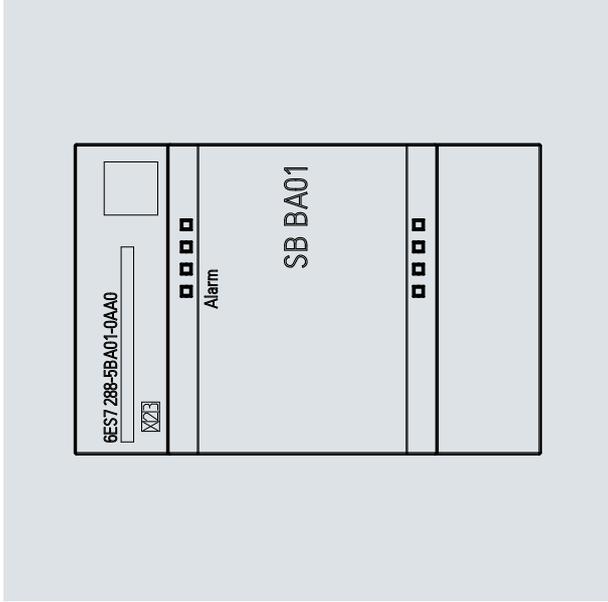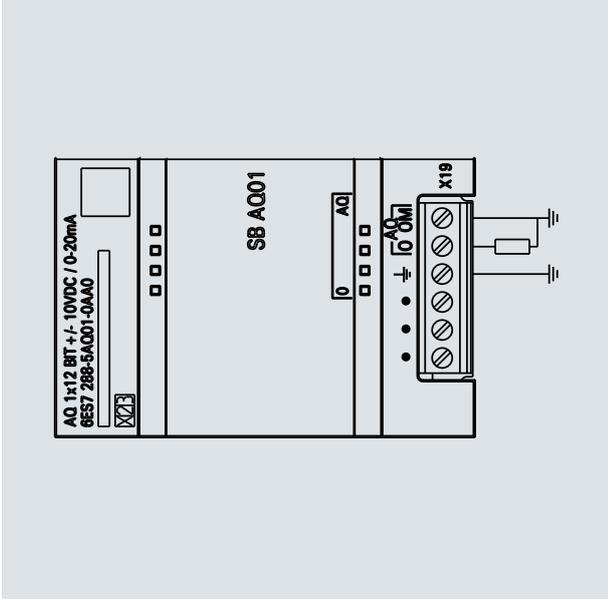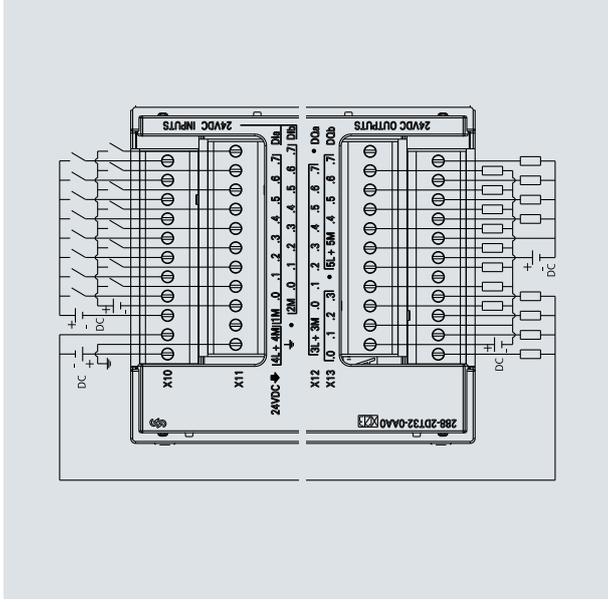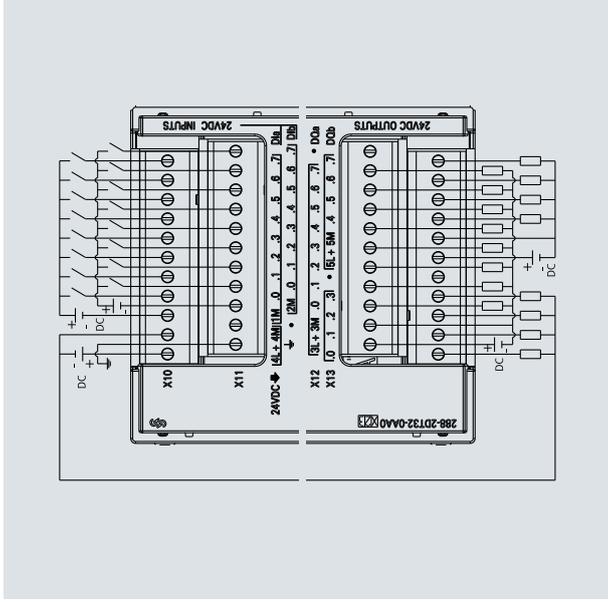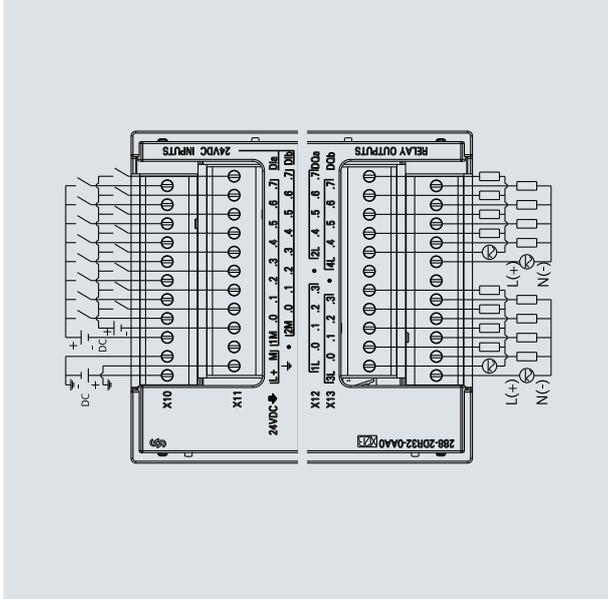
Order data

SIMATIC S7-200 SMART order data

Central processing unit (CPU)		Order No.
CPU SR20	Standard type CPU module, relay output, 220 V AC power supply, 12 inputs / 8 outputs	6ES7 288-1SR20-0AA0
CPU ST20	Standard type CPU module, transistor output, 24V AC power supply, 12 inputs / 8 outputs	6ES7 288-1ST20-0AA0
CPU SR30	Standard type CPU module, relay output, 220 V AC power supply, 18 inputs /12 outputs	6ES7 288-1SR30-0AA0
CPU ST30	Standard type CPU module, transistor output, 24V AC power supply, 18 inputs / 12 outputs	6ES7 288-1ST30-0AA0
CPU SR40	Standard type CPU module, relay output, 220 V AC power supply, 24 inputs / 16 outputs	6ES7 288-1SR40-0AA0
CPU ST40	Standard type CPU module, transistor output, 24V AC power supply, 24 inputs / 16 outputs	6ES7 288-1ST40-0AA0
CPU SR60	Standard type CPU module, relay output, 220 V AC power supply, 36 inputs / 24 outputs	6ES7 288-1SR60-0AA0
CPU ST60	Standard type CPU module, transistor output, 24V AC power supply, 36 inputs / 24 outputs	6ES7 288-1ST60-0AA0
CPU CR40	Economy type CPU module, relay output, 220 V AC power supply, 24 input / 16 output	6ES7 288-1CR40-0AA0
CPU CR60	Economy type CPU module, relay output, 220VAC power supply, 36 input / 24 output	6ES7 288-1CR60-0AA0
Extension module (EM)		**Order No.**
EM DI08	Digital input module, 8 x 24 V DC inputs	6ES7 288-2DE08-0AA0
EM DR08	Digital output module, 8x relay outputs	6ES7 288-2DR08-0AA0
EM DT08	Digital output module, 8 x 24 V DC outputs	6ES7 288-2DT08-0AA0
EM DR16	Digital input / output module, 8 x 24 V DC inputs / 8 x relay outputs	6ES7 288-2DR16-0AA0
EM DR32	Digital input / output module, 16 x 24 V DC inputs / 16 x relay outputs	6ES7 288-2DR32-0AA0
EM DT16	Digital input / output module, 8 x 24 V DC inputs / 8 x 24 V DC outputs	6ES7 288-2DT16-0AA0
EM DT32	Digital input / output module, 16 x 24 V DC inputs / 16 x 24 V DC outputs	6ES7 288-2DT32-0AA0
EM AI04	Analog input module, 4 inputs	6ES7 288-3AE04-0AA0
EM AQ02	Analog output module, 2 outputs	6ES7 288-3AQ02-0AA0
EM AM06	Analog input / output module, 4 inputs and 2 outputs	6ES7 288-3AM06-0AA0
EM AR02	RTD input module, 2 channels	6ES7 288-3AR02-0AA0
EM AT04	Thermo couple input module, 4 channels	6ES7 288-3AT04-0AA0
Signal board (SB)		**Order No.**
SB CM01	Communication SB, RS485 / RS232	6ES7 288-5CM01-0AA0
SB DT04	Digital expansion signal board, 2 x 24 V DC input / 2 x 24 V DC outputs	6ES7 288-5DT04-0AA0
SBAQ01	Analog expansion signal board, 1 x 12 bit analog output	6ES7 288-5AQ01-0AA0
SB BA01	Cell signal board, supports CR1025 button batteries	6ES7 288-5BA01-0AA0
Engineering Software		**Order No.**
Step7 Micro/win smart	Engineering software for S7-200 SMART series PLCs	6ES7 288-8SW01-0AA0

I-IA-ASFA-343

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