Overview

SIMATIC S7-400:
The powerful controller for system solutions in the manufacturing and process industries

Within the controller family, the SIMATIC S7-400 is designed for system solutions in the manufacturing and process automation industry.

- The S7-400 is especially suitable for data-intensive tasks in the process industry. High processing speeds and deterministic response times guarantee short machine cycle times on high-speed machines in the manufacturing industry. The high-speed backplane bus of S7-400 ensures efficient linking of central I/O modules.
- The S7-400 is used preferably to coordinate complete plants and to control lower-level devices/stations; this is guaranteed by the high communication power and the integral interfaces.
- The performance is scalable thanks to a graded range of CPUs; the I/O capacity is almost unlimited.
- The power reserves of the CPUs enable new functions to be integrated without further hardware investment, e.g. processing of quality data, user-friendly diagnostics, integration into higher-level MES solutions or high-speed communication via bus systems.

SIMATIC S7-400, CPU	412-1 / 412-2	412-2 PN[4]	414-2 / 414-3	414-3 PN/DP[4]	416-2 / 416-3[4]	416-3 PN/DP[4]	417-4[4]
Work memory	512KB/ 1[1] MB	1 MB	2/4[2] MB	4 MB	8/16[3] MB	16 MB	32 MB
Processing times (ns)							
Bit/word/ fixed point/floating point	31.25/31.25/ 31.25/62.5	31.25/31.25/ 31.25/62.5	18.75/18.75/ 18.75/37.5	18.75/18.75/ 18.75/37.5	12.5/12.5/ 12.5/25	12.5/12.5/ 12.5/25	7.5/7.5/ 7.5/15
Timers/counters	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048
Address range							
Digital inputs/outputs	32768 each	32768 each	65536 each	65536 each	131072 each	131072 each	131072 each
Analog inputs/outputs	2048 each	2048 each	4096 each	4096 each	8192 each	8192 each	8192 each
DP interfaces							
Number of MPI/DP interfaces	1	1	1	1	1	1	1
Number of DP interfaces	— / 1[1]	—	1	—	1	1	1
Number of DP slaves per MPI/DP	32	32	32	32	32	32	32
Number of DP slaves per DP	64	—	96 each	125 each	125 each	125 each	125 each
Plug-in interface modules	—	—	— / 1 x DP[2]	1 x DP	— / 1 x DP[3]	1 x DP	2 x DP
Data set gateway	●	●	●	●	●	●	●
PN interfaces							
Number of PN interfaces	—	1 (2 ports)	—	1 (2 ports)	—	1 (2 ports)	—
PROFINET IO	—	●	—	●	—	●	—
PROFINET with IRT	—	●	—	●	—	●	—
PROFINET CBA	—	●	—	●	—	●	—
TCP/IP	—	●	—	●	—	●	—
UDP	—	●	—	●	—	●	—
Web server	—	●	—	●	—	●	—
ISO-on-TCP (RFC 1006)	—	●	—	●	—	●	—
Mounting dimensions W x H x D (mm)	25 x 290 x 219	25 x 290 x 219	25 x 290 x 219 50 x 290 x 219[2]	50 x 290 x 219	25 x 290 x 219 50 x 290 x 219[3]	50 x 290 x 219	50 x 290 x 219

— = cannot be used/not available
● = can be used/available

[1] CPU 412-2
[2] CPU 414-3
[3] CPU 416-3
[4] also as SIPLUS extreme component for corrosive atmosphere/condensation

Overview (continued)

- The S7-400 can be structured in a modular way without any slot rules; there is a wide range of modules available both for centralized configurations and distributed structures.
- The configuration of the distributed I/O of the S7-400 can be modified during operation. In addition signal modules can be removed and inserted while live (hot swapping). This makes it very easy to expand the system or replace modules in the event of a fault.
- Storage of the entire project data, including symbols and comments, on the CPU simplifies service and maintenance calls.
- Safety engineering and standard automation can be integrated into a single S7-400; plant availability can be increased through the redundant structure of the S7-400.
- Many S7-400 components are also available in a SIPLUS extreme version for extreme environmental conditions, e.g. for use where there is a corrosive atmosphere/condensation. For more detailed information, visit www.siemens.com/siplus-extreme

For more information, refer to:

www.siemens.com/simatic-s7-400

Detailed information on SIMATIC S7-400, see ***Catalog ST 400*** in the Siemens Industry Online Support:

www.siemens.com/industry-catalogs

SIMATIC S7-400, CPU	412-5H[4)]	414-5H[4)]	416-5H[4)]	417-5H[4)]	414F-3 PN/DP	416F-2	416F-3 PN/DP
Work memory	1 MB	4 MB	16 MB	32 MB	4 MB	8 MB	16 MB
Processing times (ns)							
Bit/word/ fixed point/floating point	31.25/31.25/ 31.25/62.5	18.75/18.75/ 18.75/37.5	12.5/12.5/ 12.5/25	7.5/7.5/ 7.5/15	18.75/18.75/ 18.75/37.5	12.5/12.5/ 12.5/25	12.5/12.5/ 12.5/25
Timers/counters	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048	2048/2048
Address ranges							
Digital inputs/outputs	65536 each	65536 each	131072 each	131072 each	65536 each	131072 each	131072 each
Analog inputs/outputs	4096 each	4096 each	8192 each	8192 each	4096 each	8192 each	8192 each
DP interfaces							
Number of MPI/DP interfaces	1	1	1	1	1	1	1
Number of DP interfaces	1	1	1	1	1	1	1
Number of DP slaves per MPI/DP	32	32	32	32	32	32	32
Number of DP slaves per DP	64	96	125	125	125 each	125	125 each
Plug-in interface modules	—	—	—	—	1 x DP	—	1 x DP
Data set gateway	●	●	●	●	●	●	●
PN interfaces							
Number of PN interfaces	1 (2 ports)	1 (2 ports)	1 (2 ports)	1 (2 ports)	1 (2 ports)	—	1 (2 ports)
PROFINET IO	●	●	●	●	●	—	●
PROFINET with IRT	—	—	—	—	●	—	●
PROFINET CBA	—	—	—	—	●	—	●
TCP/IP	●	●	●	●	●	—	●
UDP	●	●	●	●	●	—	●
Web server	—	—	—	—	●	—	●
ISO-on-TCP (RFC 1006)	●	●	●	●	●	—	●
Mounting dimensions W x H x D (mm)	50 x 290 x 219	50 x 290 x 219	50 x 290 x 219	50 x 290 x 219	50 x 290 x 219	25 x 290 x 219	50 x 290 x 219

— = cannot be used/not available
● = can be used/available

[4)] also as SIPLUS extreme component for corrosive atmosphere/condensation

I/O modules

Overview

Digital modules

SM 421 digital input module

- Digital inputs for the SIMATIC S7-400
- For connecting switches and 2-wire proximity switches (BEROs)

Detailed information on SIMATIC S7-400, see **Catalog ST 400** in Siemens Industry Online Support:
www.siemens.com/industry-catalogs

	Article No.
16 inputs, 24 V DC, with hardware/ diagnostics interrupt	**6ES7421-7BH01-0AB0**
32 inputs, 24 V DC	**6ES7421-1BL01-0AA0**
32 inputs, 120 V UC	**6ES7421-1EL00-0AA0**
16 inputs, 120/230 V UC, inputs according to IEC 1131-2 Type 2	**6ES7421-1FH20-0AA0**
16 inputs, 24 to 60 V UC, with hardware/ diagnostics interrupt	**6ES7421-7DH00-0AB0**

SM 422 digital output module

- Digital outputs for the SIMATIC S7-400
- For connecting solenoid valves, contactors, small-power motors, lamps and motor starters

Detailed information on SIMATIC S7-400, see **Catalog ST 400** in Siemens Industry Online Support:
www.siemens.com/industry-catalogs

	Article No.
16 outputs, 120/230 V AC, 2 A	**6ES7422-1FH00-0AA0**
6 outputs, relay contacts	**6ES7422-1HH00-0AA0**
16 outputs, 24 V DC, 2 A	**6ES7422-1BH11-0AA0**
32 outputs, 24 V DC, 0.5 A	**6ES7422-1BL00-0AA0**
32 outputs; 24 V DC, 0.5 A; with diagnostics	**6ES7422-7BL00-0AB0**

Analog modules

SM 431 analog input module

- Analog inputs for the SIMATIC S7-400
- For connecting voltage sensors and current sensors, thermocouples, resistors and resistance thermometers
- Resolution 13 to 16 bit

Detailed information on SIMATIC S7-400, see **Catalog ST 400** in Siemens Industry Online Support:
www.siemens.com/industry-catalogs

	Article No.
16 inputs, non-floating, 13 bit	**6ES7431-0HH00-0AB0**
8 inputs, floating, 14 bit	**6ES7431-1KF20-0AB0**
8 inputs, floating, 13 bit	**6ES7431-1KF00-0AB0**
8 inputs, floating, 14 bit, with linearization	**6ES7431-1KF10-0AB0**
16 inputs, floating, 16 bit, hardware interrupt capability	**6ES7431-7QH00-0AB0**
8 inputs, floating, 16 bit, hardware interrupt capability, for thermocouples (I, U)	**6ES7431-7KF00-0AB0**
8 inputs, floating, 16 bit, hardware interrupt capability, for thermal resistors	**6ES7431-7KF10-0AB0**

SM 432 analog output module

- Analog outputs for the SIMATIC S7-400
- For connecting analog actuators

Detailed information on SIMATIC S7-400, see **Catalog ST 400** in Siemens Industry Online Support:
www.siemens.com/industry-catalogs

	Article No.
8 outputs, floating, 13 bit	**6ES7432-1HF00-0AB0**

Overview (continued)

Function modules

FM 450-1 counter module			Article No.
	• Two-channel, intelligent counter module for simple counting tasks • For direct connection of incremental encoders • Comparison function with 2 definable comparison values • Integrated digital outputs for outputting the reaction on reaching the comparison values Detailed information on SIMATIC S7-400, see **Catalog ST 400** in Siemens Industry Online Support: www.siemens.com/industry-catalogs	With 2 channels, max. 500 kHz; for incremental encoders	**6ES7450-1AP01-0AE0**

FM 451 positioning module			Article No.
	The three-channel FM 451 positioning module takes over the adjustment of mechanical axes for rapid traverse/creep speed drives. The module is designed for positioning adjusting and tooling axes, preferably with standard motors, controlled via contactors or frequency converters. • Three-channel positioning module for rapid traverse/creep speed drives • 4 digital outputs per channel for motor control • Incremental or synchronous-serial position feedback Detailed information on SIMATIC S7-400, see **Catalog ST 400** in Siemens Industry Online Support: www.siemens.com/industry-catalogs	For rapid traverse and creep speed drives	**6ES7451-3AL00-0AE0**

FM 452 cam controller			Article No.
	• Very high-speed electronic cam controller • Low-cost alternative to mechanical cam controllers • 32 cam tracks, 16 onboard digital outputs for direct output of actions • Incremental or synchronous-serial position feedback Detailed information on SIMATIC S7-400, see **Catalog ST 400** in Siemens Industry Online Support: www.siemens.com/industry-catalogs		**6ES7452-1AH00-0AE0**

FM 453 positioning module			Article No.
	The FM 453 is an intelligent, three-channel module designed for a wide range of positioning tasks using servo and/or stepper motors. • It can be used for simple point-to-point positioning tasks as well as for complex traverse profiles with the most stringent demands for dynamic response, accuracy, and velocity. • It is the ideal solution for positioning tasks in machines with high clock rates and for multi-axis machines. • Up to 3 independent motors can be controlled Detailed information on SIMATIC S7-400, see **Catalog ST 400** in Siemens Industry Online Support: www.siemens.com/industry-catalogs	with 3 channels/axes	**6ES7453-3AH00-0AE0**

Overview (continued)

Function modules			
FM 455 controller module			Article No.
	The FM 455 controller module is the intelligent 16-channel controller module for universal control tasks. It can be used, for example, for temperature control, pressure control, flow control or level control. • Convenient online self-optimization for temperature controls • Ready-to-use controller structures • 2 control algorithms • 2 versions: - FM 455 C as continuous controller - FM 455 S as step or pulse controller • With 16 analog outputs (FM 455 C) or 32 digital outputs (FM 455 S) for actuators Detailed information on SIMATIC S7-400, see **Catalog ST 400** in Siemens Industry Online Support: www.siemens.com/industry-catalogs	With 16 analog outputs for 16 continuous controllers	**6ES7455-0VS00-0AE0**
		With 32 digital outputs for 16 step or pulse controllers	**6ES7455-1VS00-0AE0**