● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
System cycles					
PROFIBUS cycle	SIMOTION D: For integrated drives and drives on connected CX32-2: 0.5 ... 8 ms	C240/C240 PN: 1 ... 8 ms (in 0.25 ms steps)	P350-3 DP: 1 ... 8 ms (in 0.125 ms steps)	1 ... 8 ms (in 0.125 ms steps)	1 ... 8 ms (in 0.125 ms steps)
PROFINET cycle		C240 PN: 0.5 ... 4 ms (in 0.25 ms steps)	P320-3, P350-3 PN: 0.25 ... 4 ms (in 0.125 ms steps)	D410-2 DP/PN: 0.25 ... 4 ms (in 0.125 ms steps)	D4x5-2 DP/PN: 0.25 ... 4 ms (in 0.125 ms steps)
Position control and interpolation cycle					
• Minimum position control cycle	The position control cycle (SERVO) includes the position controller, the actual-value and setpoint system and the axis monitoring functions.	0.5 ms	0.25 ms	1/0.5 ms [3]	0.5/0.25 ms [1]
• Position control cycle to PROFIBUS cycle	The axis motion control functions are performed in the interpolation cycle. The position control cycle and the interpolation cycle are a multiple of the PROFIBUS/ PROFINET cycle. The transformation ratios are adjustable.	1:1, 2:1	1:1, 2:1	1:1 ... 8:1	1:1 ... 8:1
• Position control cycle to PROFINET cycle		1:1 ... 16:1	1:1 ... 16:1	1:1 ... 16:1	1:1 ... 16:1 (1:1) [2]
• Interpolation cycle 1 (IPO) to position control cycle		1:1 ... 6:1	1:1 ... 6:1	1:1 ... 6:1	1:1 ... 6:1 (1:1 ... 4:1) [2]
• Interpolation cycle 2 (IPO2) to interpolation cycle 1 (IPO1)		2:1 ... 64:1	2:1 ... 64:1	2:1 ... 64:1	2:1 ... 64:1
• Fast position control cycle ($SERVO_{Fast}$) to PROFINET cycle	Values with $SERVO_{Fast}$ and IPO_{Fast} activated for D435-2 DP/PN, D445-2 DP/PN and D455-2 DP/PN (for details, see SIMOTION D4x5-2 manuals)	–	–	–	1:1
• Fast interpolation cycle (IPO_{Fast}) to fast position control cycle ($SERVO_{Fast}$)		–	–	–	1:1 ... 4:1

Notes:

Communication via PROFIBUS and PROFINET

The availability of a PROFIBUS or PROFINET interface depends on the controller variant implemented.
The SIMOTION controllers are equipped with PROFIBUS and/or PROFINET as standard.
For SIMOTION P350-3 DP, PROFINET can be retrofitted with an optional communication module.
This must be taken into account with regard to the connection possibilities and functions over PROFIBUS and PROFINET.

SIZER for Siemens Drives engineering tool

The performance requirements for a SIMOTION application can be estimated using the engineering tool SIZER for Siemens Drives.
For more information about SIZER for Siemens Drives, refer to chapter System description – Dimensioning.

[1] 0.5 ms in combination with integrated SINAMICS S120 drives, 0.25 ms in combination with the runtime levels $SERVO_{Fast}$ and IPO_{Fast} (D435-2 DP/PN, D445-2 DP/PN and D455-2 DP/PN only).

[2] Values in brackets with $SERVO_{Fast}$ and IPO_{Fast} activated (for details, see SIMOTION D4x5-2 manuals)

[3] 1 ms when using the TO axis and the integrated drive control

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Dynamic Servo Control (DSC)					
• With Dynamic Servo Control (DSC), the control loop of the position controller is located in the drive (with cycles of 125 µs or higher).	With SINAMICS S120 and SIMODRIVE drives	●	●	●	●
Memory for system data					
• Memory media	MMC: Micro Memory Card CF: CompactFlash card HDD: Hard Disk Drive	MMC 64 MB	P320-3: CF 4 GB P350-3: HDD 40 GB	CF 1 GB	CF 1 GB
• Retentive memory (for retained user data/retain variables)	SIMOTION P: with UPS up to 256 KB	107 KB	15 KB	108 KB	D425-2/ D435-2: 364 KB D445-2/ D455-2: 512 KB
• Permanent memory (for user data/data storage on exchangeable memory medium)		50 MB	Any, dependent on memory configuration	300 MB	300 MB
• RAM disk (load memory for user data/ for downloading the configuration and programs)	Memory sizes can be configured with SIMOTION P	29 MB	18 MB	31 MB	D425-2: 31 MB D435-2: 41 MB D445-2: 56 MB D455-2: 76 MB
• RAM (user memory for code and data)	D410-2 and D4x5-2: additional 20 MB for Java applications	50 MB	37 MB Adjustable to a maximum of 200 MB	48 MB	D425-2: 48 MB D435-2: 64 MB D445-2: 128 MB D455-2: 256 MB
Address ranges					
• Logical I/O address space in KB		4	4	8	16
• Physical I/O address space in KB	When PROFIBUS and PROFINET are used, the total address space applies				
- PROFIBUS: max. per ext. subnet each for inputs and outputs		1	1	1	1
- PROFINET: max. for inputs and outputs (each)	D4x5-2 DP/PN: If CBE30-2 is used as a second PROFINET interface, 2 × 4 KB physical address space is available.	4	4	4	4
• Permanent process image for background task (I/O variables) in bytes		64	64	64	64
• Additional configurable process image for each cyclic task (I/O variables)		●	●	●	●
• Address space per PROFIBUS DP station in bytes		244	244	244	244
• Address space per PROFINET device in bytes		1400	1400	1400	1400

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Drives on SIMOTION					
Maximum number of axes	Higher number of axes possible using multiple synchronized devices	32 axes	128 axes	8 axes (typ. 2 to 3 axes)	D425-2: 16 axes D435-2: 32 axes D445-2: 64 axes D455-2: 128 axes
Integrated drive control The drive control integrated in SIMOTION D is based on SINAMICS S120 Control Units: • With SIMOTION D410-2 on the CU310-2 Control Unit, firmware version V4.x • With SIMOTION D4x5-2/CX32-2 on the CU320-2 Control Unit, firmware version V4.x The BOP20 Basic Operator Panel and the basic positioner EPos are not supported by the integrated drive control.	SIMOTION D4x5-2: CX32-2 Controller Extension can be used to provide additional drive controls: D425-2: max. 3 CX32-2 [1] D435-2: max. 5 CX32-2 [1] D445-2: max. 5 CX32-2 [1] D455-2: max. 5 CX32-2 [1] Per CX32-2: Servo: 1..6 Vector: 1..6 *V/f*: 1..12 (alternatively)	–	–	Servo: 1 Vector: 1 *V/f*: 1 (alternatively)	Servo: 1..6 Vector: 1..6 *V/f*: 1..12 (alternatively)
Speed-controlled axis over PROFIBUS DP • SINAMICS S/SINAMICS G (servo, vector control) • SIMODRIVE 611 universal • MICROMASTER/ MICROMASTER Vector • Drives with speed profile in accordance with standard message frames (PROFIdrive profile 1-6)	SIMOTION D: SINAMICS as the standard drive technology	●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●
Intelligent positioning motor over PROFIBUS DP • SIMODRIVE POSMO A	Standard functions available in SCOUT command library	●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●

[1] In principle, a fourth or sixth CX32-2 Controller Extension can also be connected, e.g. for implementing modular machine concepts. In this case, no drives/drive components can be connected any longer to the integrated drive control of the SIMOTION D4x5-2. All drives must then be operated via the Controller Extensions.

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Drives on SIMOTION (continued)					
Position-controlled axis over PROFIBUS DP with PROFIdrive	SIMOTION D: SINAMICS as the standard drive technology	● (C240) ● (C240 PN)	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●
• SINAMICS S110 (blocksize format)					
- Servo control					
• SINAMICS S120 (blocksize, booksize and chassis formats)					
- Servo control	Also linear motor [1]				
- Vector control	With external encoder (limited dynamic response)				
• SIMODRIVE 611 universal	Also linear motor [1]				
• MICROMASTER MM4	With external encoder (limited dynamic response)				
• Certified servo/vector/stepper drives in acc. with standard message frames (PROFIdrive profile 1-6)					
Speed and position-controlled axis over PROFINET IO with IRT (PROFIdrive)		– (C240) ● (C240 PN)	● (P320-3) ○ (P350-3 DP) ● (P350-3 PN)	– D410-2 DP ● D410-2 DP/PN	– D4x5-2 DP ● D4x5-2 DP/PN
• SINAMICS S110 (blocksize format)					
- Servo control					
• SINAMICS S120 (blocksize, booksize and chassis formats)					
- Servo control	Also linear motor [1]				
- Vector control	With external encoder (limited dynamic response)				
• Certified servo/vector/stepper drives in acc. with standard message frames (PROFIdrive profile 1-6)					
Analog interface with ±10 V setpoint interface					
• Via onboard drive interface	Configuration either as analog or stepper drive	4 (C240) – (C240 PN)	–	–	–
• Via ADI 4 (Analog Drive Interface for 4 axes)	See chapter SIMOTION I/O components.	●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●
• Via IM 174 (Interface Module for 4 axes)		●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●
Hydraulic drives over ±10 V setpoint interface					
• Via onboard drive interface		4 (C240) – (C240 PN)	–	–	–
• Via ADI 4 (Analog Drive Interface for 4 axes)		●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●
• Via IM 174 (Interface Module for 4 axes)		●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●
• Analog outputs through I/O		●	●	●	●
• Encoders through I/O		●	●	●	●

[1] See chapter SIMOTICS linear and torque motors.

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Drives on SIMOTION (continued)					
Stepper drives	Configuration either as analog or stepper drive				
• Onboard pulse direction interface for stepper drives		4 (C240) – (C240 PN)	–	–	–
• Via IM 174 (Interface Module for 4 axes)		●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●
Encoders on SIMOTION					
Measuring systems that can be connected over the integrated interface	See chapter Measuring systems.				
• Quantity	SIMOTION D/CX32-2: Encoder connection via DRIVE-CLiQ	4 (C240) – (C240 PN)	–	1	–
• Absolute encoder with SSI interface		● (C240) – (C240 PN)	–	●	–
• Incremental measuring systems	C240: TTL D410-2: TTL/HTL	● (C240) – (C240 PN)	–	●	–
Measuring systems that can be connected over the bus					
• Resolver, absolute encoder (SSI and EnDat), incremental encoder (TTL and sin/cos)	Connected through drive or ADI 4/IM 174 (ADI 4/IM 174 for SSI absolute encoder and TTL incremental encoder)	●	●	●	●
Connection options for 2nd encoder (external encoder)					
• Via onboard interfaces		● (C240) – (C240 PN)	–	●	–
• Via SINAMICS S110/S120	SIMOTION D/CX32-2: Encoder connection via DRIVE-CLiQ	●	●	●	●
• SIMODRIVE 611 universal over 2nd axis control (2-axis module)	Option for SIMODRIVE 611 universal	●	●	●	●
• Isochronous PROFIBUS encoder	See chapter Measuring systems.	●	●	●	●
• PROFINET encoder with IRT	See chapter Measuring systems.	– (C240) ● (C240 PN)	● (P320-3) ○ (P350-3 DP) ● (P350-3 PN)	– D410-2 DP ● D410-2 DP/PN	– D4x5-2 DP ● D4x5-2 DP/PN
• Encoder on ADI 4 (Analog Drive Interface for 4 axes)	At least one electric or hydraulic axis must be configured on ADI 4/IM 174.	●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●
• Encoder on IM 174 (Interface Module for 4 Axes)		●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Measuring inputs					
On-board measuring inputs					
• Quantity		C240: 2+4 C240 PN:4	–	8	16
• Reproducibility		6 µs	–	Typ. 5 µs	5 µs
Measuring inputs on the drives					
• SIMODRIVE 611 universal		1/axis	1/axis	1/axis	1/axis
• SINAMICS S110 (CU305)		2/closed-loop control	2/closed-loop control	2/closed-loop control	2/closed-loop control
• SINAMICS S120 (CU310-2)		8/closed-loop control	8/closed-loop control	8/closed-loop control	8/closed-loop control
• SINAMICS S120 (CU320-2)		8/closed-loop control	8/closed-loop control	8/closed-loop control	8/closed-loop control
• SIMOTION CX32-2	D425-2: max. 3 CX32-2 [1)] D435-2: max. 5 CX32-2 [1)] D445-2: max. 5 CX32-2 [1)] D455-2: max. 5 CX32-2 [1)]	–	–	–	4/closed-loop control
• Over TM15 Terminal Module on SINAMICS S120 or SIMOTION D/CX32-2	See chapter SIMOTION I/O components.				
- Number of measuring inputs per Terminal Module, max.		24	24	24	24
- Reproducibility		125 µs	125 µs	125 µs	125 µs
• Over TM17 Terminal Module High Feature on SINAMICS S120 or SIMOTION D/CX32-2					
- Number of measuring inputs per Terminal Module, max.		16	16	16	16
- Reproducibility		≤ 1 µs	≤ 1 µs	≤ 1 µs	≤ 1 µs
Output cams					
High-speed output cams (hardware-supported output cams with higher resolution)					
• On-board output cams		●	–	●	●
- Reproducibility		70 µs	–	Typ. 125 µs	10 µs
• Over TM15 Terminal Module on SINAMICS S120 or SIMOTION D/CX32-2	See chapter SIMOTION I/O components.				
- Reproducibility		125 µs	125 µs	125 µs	125 µs
• Over TM17 Terminal Module High Feature on SINAMICS S120 or SIMOTION D/CX32-2					
- Reproducibility		≤ 10 µs	≤ 10 µs	≤ 10 µs	≤ 10 µs

[1)] In principle, a fourth or sixth CX32-2 Controller Extension can also be connected, e.g. for implementing modular machine concepts. In this case, no drives/drive components can be connected any longer to the integrated drive control of the SIMOTION D4x5-2. All drives must then be operated via the Controller Extensions.

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Output cams (continued)					
Standard output cams (update in position controller or IPO cycle, reproducibility of the output cam depends on the implemented I/O)					
• On-board output cams		●	–	●	●
• Over TM15/TM17 Terminal Module High Feature on SINAMICS S120 or SIMOTION D/CX32-2	See chapter SIMOTION I/O components.	●	●	●	●
• Over S7-300 backplane bus of SIMOTION C		●	–	–	–
• Over PROFIBUS DP		●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●
• Over PROFINET IO		– (C240) ● (C240 PN)	●(P320-3) ○ (P350-3 DP) ● (P350-3 PN)	– D410-2 DP ● D410-2 DP/PN	– D4x5-2 DP ● D4x5-2 DP/PN
• Output to internal system variable		●	●	●	●
Integrated I/O interfaces					
Programmable digital inputs/ outputs (can be parameterized individually as either input or output)	Further inputs/outputs can be implemented for output cam or measuring inputs via the TM15 or TM17 High Feature Terminal Modules.	–	–	8	16
• of which for output cam, max.		–	–	8	8
• of which as measuring inputs, max.		–	–	8	16
Digital inputs (fixed inputs, cannot be parameterized)	D410-2: The 3 F-DI can also be used as 6 DI.	18	–	5 + 6 (3 F-DI)	12
• of which inputs with specific functions					
- Measuring inputs, max.		2+4 (C240) 4 (C240 PN)	–	–	–
- External zero mark signal for referencing, max.		4 (C240)	–	–	–
- Fail-safe digital inputs (F-DI)		–	–	3	–
Digital outputs (fixed outputs, cannot be parameterized)	D410-2: The F-DO can also used as DO.	8	–	1 (1 F-DO)	–
• of which for outputs with specific functions					
- High-speed outputs of output cams, max.		8	–	–	–
- Fail-safe digital outputs (F-DO)		–	–	1	–
Relay outputs with specific functions					
• Controller enable		4 (C240)	–	–	–
• Ready		1	–	–	–
Analog inputs SIMOTION D: D410-2: Also over TM31 D4x5-2: Over TM31 or TB30	See chapter SIMOTION I/O components.	–	–	1 (on-board) ○ (TM31)	○

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● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Integrated I/O interfaces (continued)					
Analog outputs SIMOTION C240: Can be used as drive interface or standard analog outputs. SIMOTION D: D410-2: Over TM31 D4x5-2: Over TM31 or TB30	See chapter SIMOTION I/O components.	4 (C240)	–	○	○
Pulse direction interface for stepper drives	SIMOTION C240: Configuration either as analog or stepper drive.	4 (C240)	–	–	–
SIMOTION C centralized I/O modules					
• Centralized I/O modules per system, max.		16	–	–	–
• Central/expansion rack, max.	SIMOTION C: max. two-tier configuration with IM 365 interface module	○	–	–	–
• Connectable central SIMATIC S7-300 I/Os	For suitable modules see chapter SIMOTION I/O components.	●	–	–	–
Connectable distributed I/O modules					
Distributed I/O (over PROFIBUS DP) • SIMATIC ET 200S • SIMATIC ET 200pro • SIMATIC ET 200M • SIMATIC ET 200eco • ADI 4 (Analog Drive Interface for 4 Axes) • IM 174 (Interface Module for 4 Axes) • All certified standard slaves (DP-V0, DP-V1, DP-V2)	For suitable modules see chapter SIMOTION I/O components. Isochronous: SIMATIC ET 200S SIMATIC ET 200M ADI 4 IM 174	●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●
Distributed I/O (over PROFINET IO) • SIMATIC ET 200S, ET 200SP • SIMATIC ET 200M • SIMATIC ET 200pro • SIMATIC ET 200eco PN • All certified PROFINET devices	Isochronous: SIMATIC ET 200S SIMATIC ET 200SP (available soon)	– (C240) ● (C240 PN)	● (P320-3) ○ (P350-3 DP) ● (P350-3 PN)	– D410-2 DP ● D410-2 DP/PN	– D4x5-2 DP ● D4x5-2 DP/PN
SINAMICS drive I/O (over DRIVE-CLiQ)					
• Via Terminal Modules TM15, TM17 High Feature, TM31, TM41, TM54F	For connection to SIMOTION C and P over SINAMICS S120	●	●	●	●
• Via TB30 Terminal Board	Plug-in card for SIMOTION D4x5-2 and SINAMICS CU320-2	●	●	–	●

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● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
SIMOTION HMI devices					
Connection over PROFIBUS DP (configured using WinCC flexible)		●	– (P320-3) ● (P350-3 DP) ○ (P350-3 PN)	●	●
• SIMATIC MP 177 DP Mobile Panel					
• SIMATIC MP 277 Mobile Panel					
• SIMATIC TP 177B and TP 277 Touch Panel					
• SIMATIC OP 177B and OP 277 Operator Panel					
• SIMATIC MP 277 and MP 377 Multi Panel					
• SIMATIC Panel PC 477, PC 677, PC 877					
Connection over Ethernet/PROFINET (when configured using WinCC flexible)		●	●	●	●
• SIMATIC MP 177 PN Mobile Panel [1]					
• SIMATIC MP 277 Mobile Panel [1]					
• SIMATIC TP 277 Touch Panel [1]					
• SIMATIC TP 177B Touch Panel Color [1]					
• SIMATIC OP 177B Operator Panel Color [1]					
• SIMATIC MP 177					
• SIMATIC OP 277 Operator Panel [1]					
• SIMATIC MP 277 [1] and MP 377 Multi Panel [1]					
• SIMATIC Panel PC 277, PC 477, PC 577, PC 677, PC 877					
HMI software for SIMOTION					
• WinCC flexible		○	○	○	○
• WinCC (SCADA system, Version V7.0 and higher)		○	○	○	○
Software for extended communication with SIMOTION					
• SIMATIC NET OPC server	See section SIMOTION runtime software.	○	● [2]	○	○
• SIMOTION IT OPC XML-DA (over Ethernet)		● [3]	● [3]	●	●
- Open communication over TCP/IP and SOAP standard protocols					
- Clients on any hardware with various operating systems (Windows, Linux, etc.)					
- According to OPC Foundation standard OPC XML-DA V1.01					

[1] PROFINET IO-capable.
[2] Subject to license.
[3] Subject to license for SIMOTION Kernel < V4.2.

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Software for extended communication with SIMOTION (continued)					
• SIMOTION MIIF: Multipurpose Information Interface - Symbolic access to SIMOTION data via Ethernet - SIMOTION as server, e.g. operator panels as clients		○	○	○	○
Communication					
Ethernet interfaces					
• Number and transmission rates		1 × 10/100 Mbit/s	P320-3: 1 × 10/100/1000 Mbit/s P350-3: 2 × 10/100 Mbit/s	1 × 10/100 Mbit/s	D4x5-2 DP: 3 × 10/100/1000 Mbit/s D4x5-2 DP/PN: 2 × 10/100/1000 Mbit/s
PROFIBUS DP interfaces					
• On-board/support isochronous communication	One interface can be used as an MPI. SIMOTION P350-3: The PROFIBUS version can be optionally retrofitted with PROFINET.	2/2	P320-3: –/– P350-3 DP: 2/2 P350-3 PN: –/–	D410-2 DP: 2/2 D410-2 DP/PN: 1/1	2/2
• On-board CP5621	For PG/PC and HMI	–	P350-3: 1	–	–
• Transmission rates in Mbit/s		1.5 / 3 / 6 /12	1.5 / 3 / 6 /12	1.5 / 3 / 6 /12	1.5 / 3 / 6 /12
• Number of PROFIBUS DP slaves	Per PROFIBUS DP subnet	64	64	64	64
PROFINET interfaces					
• On-board ports	SIMOTION P350-3 DP: PROFINET can be optionally retrofitted by means of MCI-PN Communication Board	C240: – C240 PN: 3	P320-3: 3 P350-3 DP: 4, ○ P350-3 PN: 4	D410-2 DP: – D410-2 DP/PN: 2	D4x5-2 DP: – D4x5-2 DP/PN: 3
• Number of PROFINET devices (provided that PROFINET interface is onboard or optionally retrofitted)	D4x5-2: CBE30-2 can be implemented as second PROFINET interface for D4x5-2 DP/PN. Per PROFINET interface	64	64	64	64
• Media redundancy (MRP and MRPD)		●	P320-3: ● P350-3: –	–	●
Further communication interfaces					
• Serial interfaces		–	1	–	–
• USB interfaces	D4x5-2: for upgrading from D4x5-2 Control Units using a USB memory stick	–	P320-3: 4 × USB 2.0 P350-3: 4 × USB 2.0	–	2
• DRIVE-CLiQ interfaces		–	–	1	D425-2: 4 D435-2: 6 D445-2: 6 D455-2: 6

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Communication (continued)					
Connections over PROFIBUS DP and Ethernet/PROFINET	SIMOTION C: PROFINET with C240 PN only				
• PROFIBUS DP	The connection resources can be assigned as required, over PROFIBUS DP or Ethernet.	C240: ● C240 PN: ●	P320-3: – P350-3 DP: ● P350-3 PN: –	●	●
• Ethernet/PROFINET		C240: ●/– C240 PN: ●/●	P320-3: ●/● P350-3 DP: ●/○ P350-3 PN: ●/●	D410-2 DP: ●/– D410-2 DP/PN: ●/●	D4x5-2 DP: ●/– D4x5-2 DP/PN: ●/●
Online connections, max.		16	16	16	16
• SIMOTION SCOUT engineering system (SCOUT occupies up to 3 online connections)		2	2	2	2
• HMI		5	5	5	5
• OPC		●	●	●	●
• Basic communication Xsend / Xreceive (not via Ethernet)		5	5	5	5
• Standard TCP/IP connections		45	75	45	75
• SIMOTION IT		●	●	●	●
Communication functions over PROFIBUS between:	Basic version with regard to SIMOTION	●	●	●	●
• SIMOTION – SIMATIC HMI/ WinCC flexible					
- HMI data exchange: Support from the SIMOTION operating system					
- Plant-wide access to process data and displays					
- Interrupt mechanism: Alarms are event-driven					
• SIMOTION – SIMOTION					
- Distributed I/O mechanisms Process image, e.g. (% I1.3) I/O variables (symbolic)					
- XSND/XRCV, max. 200 bytes					
• SIMOTION – SIMATIC S7					
- Distributed I/O mechanisms Process image, e.g. (% I1.3) I/O variables					
- XSND/XRCV, max. 76 bytes					
• SIMOTION – SIMATIC NET OPC					
• SIMOTION – PG/PCs with STEP 7 and SCOUT					
• PROFIBUS DP slave-to-slave communication					

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Communication (continued)					
Communication functions over PROFINET IO between:	Basic version with regard to SIMOTION				
• SIMOTION – SIMOTION - Distributed I/O mechanisms Process image, e.g. (% I1.3) I/O variables (symbolic)	PROFINET standard feature on C240 PN, P320-3, P350-3 PN, D410-2 DP/PN and D4x5-2 DP/PN	●	●	●	●
• SIMOTION – SIMATIC S7 - Distributed I/O mechanisms Process image, e.g. (% I1.3) I/O variables - For SIMATIC – SIMOTION: SIMOTION as I-Device - For SIMOTION – SIMATIC: over SIMATIC CP	On P350-3 DP optionally by means of PROFINET board.	●	●	●	●
• Slave-to-slave communication between SIMOTION controllers		●	●	●	●
Communication functions over Ethernet/PROFINET between:					
• SIMOTION – SIMATIC HMI/ WinCC flexible - HMI data exchange: Support from the SIMOTION operating system - Plant-wide access to process data and displays - Interrupt mechanism: Alarms are event-driven		●	●	●	●
• SIMOTION – SIMATIC NET OPC		●	●	●	●
• SIMOTION IT OPC XML-DA (over Ethernet) - Open communication over TCP/IP and SOAP standard protocols - Clients on any hardware with various operating systems (Windows, Linux, etc.) - According to OPC Foundation standard OPC XML-DA V1.01		● [1]	● [1]	●	●
• SIMOTION MIIF: Multipurpose Information Interface - Symbolic access to SIMOTION data via Ethernet - SIMOTION as server, e.g. operator panels as clients		○	○	○	○
• SIMOTION – PG/PCs with STEP 7 and SCOUT		●	●	●	●
• S7 routing Ethernet/PROFIBUS DP		●	●	●	●

[1] Subject to license for SIMOTION Kernel < V4.2.

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Communication (continued)					
UDP and TCP/IP communication functions over Ethernet/PROFINET between: • SIMOTION – SIMOTION • SIMOTION – SIMATIC • SIMOTION – PC		●	●	●	●
Serial communication via a point-to-point connection	Basic version with regard to SIMOTION				
• CP 340 and CP 341 communication modules		●	●	●	●
• 1SI communication module (connected over ET 200S)		●	●	●	●
Communication via AS-Interface	Basic version with regard to SIMOTION				
• CP 343-2 P communication module		●	●	●	●
• DP/AS-Interface Link 20E/ Link Advanced		●	●	●	●
• IE/AS-Interface link PN IO		●	●	●	●
Connectable network couplers	Basic version with regard to SIMOTION				
• DP/DP coupler for connecting two PROFIBUS DP networks		●	●	●	●
• PN/PN coupler for connecting two PROFINET IO networks		●	●	●	●
PROFIsafe drives on SIMOTION					
Max. number of PROFIsafe drives on SIMOTION with SINAMICS S120 drive system:					
• via PROFIBUS with PROFIsafe					
- with 1 × PROFIBUS interface	SIMOTION as I-Slave on SIMATIC F-CPU over PROFIBUS	16	P320-3: – P350-3 DP: 16 P350-3 PN: –	8	16
- with 2 × PROFIBUS interface		32	P320-3: – P350-3 DP: 32 P350-3 PN: –	8	32
• via PROFINET with PROFIsafe	SIMOTION as I-Device on SIMATIC F-CPU over PROFINET Configuration: A higher-level SIMATIC F-CPU controls the safety functions of the SINAMICS S120 drives that are assigned to SIMOTION via the I-Slave/ I-Device interface of the SIMOTION controller. SIMOTION routes the safety telegrams through to the drives.	32	P320-3: 64 P350-3 DP: – P350-3 PN: 64	D410-2 DP: – D410-2: DP/PN: 8	64

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
SIMOTION Kernel					
Execution system					
• System tasks for motion control		●	●	●	●
- SERVO (position control cycle)					
- IPO (interpolation cycle)					
- $SERVO_{Fast}$	$SERVO_{Fast}$ and IPO_{Fast} allow axes with differing dynamic responses to be assigned to a slow bus system and a fast bus system, as well as especially fast I/O processing. High-speed PROFINET I/O modules are used for this purpose.	–	–	–	D425-2 DP: – D425-2 DP/PN: – D435-2 DP: – D435-2 DP/PN: ● D445-2 DP/PN: ● D455-2 DP/PN: ●
- IPO_{Fast}					
- MotionTasks (sequential)		20	32	32	32
- ServoSynchronousTask (cyclic, synchronous with the position control cycle)		1	1	1	1 (2) [1]
• Task structure/program execution					
- BackgroundTask (cyclic)	Adjustable monitoring time	1	1	1	1
- TimerInterruptTasks (time-controlled down to 1 ms)		5	5	5	5
- IPOSynchronousTask (cyclic, synchronous with the interpolation cycle)		2	2	2	2 (3) [1]
- InterruptTasks (for user) (event-driven)		2	2	2	2
- TControlTasks (temperature control)		5	5	5	5
- StartupTask (for transition from STOP to RUN)		1	1	1	1
- ShutdownTask (for transition from RUN to STOP)		1	1	1	1
• Task structure / error processing (SystemInterruptTasks)	Central troubleshooting is possible				
- ExecutionFaultTask (starts in the event of an error when executing a program)		1	1	1	1
- TechnologicalFaultTask (starts in the event of an error on a technology object)		1	1	1	1
- PeripheralFaultTask (starts in the event of an error on the I/O)		1	1	1	1
- TimeFaultTask (starts in the event of a TimerInterruptTask timeout)		1	1	1	1
- TimeFaultBackgroundTask (starts in the event of a BackgroundTask timeout)		1	1	1	1

[1] Values in brackets with $SERVO_{Fast}$ and IPO_{Fast} activated for D435-2 DP/PN, D445-2 DP/PN and D455-2 DP/PN.

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
SIMOTION Kernel (continued)					
Execution system (continued)					
• Program organization - Units (source program) - Programs - Function blocks (FBs) - Functions (FCs) - System functions (SFs) - Libraries		●	●	●	●
PLC command set (according to IEC 61131-3; optionally expandable by technology functions)		●	●	●	●
System functions, e.g. for • Interrupt and error handling • Copying data • Clock functions • Diagnostic functions • Module parameterization • Operating mode transitions, Run/Stop • Reading and writing of data blocks from the user program to an exchangeable memory medium • DPV1 communication to DP slaves • Read/write drive parameters • DP slaves/PROFINET devices can be connected to and disconnected from application • DP slave and IP address can be set in user program • DP station diagnostics • Activate/deactivate technology objects • Counter (IEC commands) • Timer (IEC commands) • Real-time clock, format [DATE_AND_TIME]		●	●	●	●

Overview of SIMOTION functions

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Motion Control technology package					
Technology functions					
• Motion Control Basic	No license required	●	●	●	●
• POS – Positioning	Use of the functions during runtime is subject to license. SIMOTION D410-2 already contains the technology functions for precisely one axis. (D410-2 no PATH)	● 1)	● 1)	● 1)	● 1)
• GEAR – Synchronous operation		● 1)	● 1)	● 1)	● 1)
• CAM – Cam		● 1)	● 1)	● 1)	● 1)
• PATH – Path interpolation		● 1)	● 1)	–	● 1)
The technology package functions are accessed via language commands, system variables and through function blocks in accordance with PLCopen.					
Axis types					
• Electrical/hydraulic/ stepper motor axes		●	●	●	●
• Speed-controlled axis		●	●	●	●
• Positioning axes - Rotary axis - Linear axis - Modulo for linear and rotary axes - Force/pressure-controlled axis - Force/pressure-limited axis	Included with POS license or higher	● 1)	● 1)	● 1)	● 1)
• Synchronous axis	Included with GEAR license or higher	● 1)	● 1)	● 1)	● 1)
• Path axis	Included with GEAR license or higher	● 1)	● 1)	–	● 1)
• Cam axis	Included with CAM license or higher	● 1)	● 1)	● 1)	● 1)
• Virtual axis		●	●	●	●
• Simulation axis		●	●	●	●
Systems of units					
• Metric (mm, m, Nm, Pa, ...)		●	●	●	●
• US (inch, feet, PSI, lb, ...)		●	●	●	●
Axis monitoring functions					
The activated monitoring functions are executed cyclically. • Watchdog • Hardware and software limit switches • Position/zero-speed monitoring • Dynamic following error monitoring • Encoder monitoring, cable break • Force/pressure monitoring • Setpoint • Plausibility in data exchange		●	●	●	●

1) Use of the functions during runtime is subject to license. Exception: SIMOTION D410-2 already contains the Motion Control technology functions for just one axis.

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Other technology packages					
TControl technology package • With technology functions for temperature control	Technology package integrated in SCOUT	● 1)	● 1)	● 1)	● 1)
Technology package Drive Control Chart (DCC) • With technology functions for Drive Control Chart	Technology package integrated in SCOUT	●	●	●	●
Technology package Multipurpose Information Interface (MIIF) • With multi-functional communication functions	Technology package can be purchased via your Siemens contact	○ 1)	○ 1)	○ 1)	○ 1)
SIMOTION IT					
SIMOTION IT DIAG Integrated web server on the SIMOTION controller • Service and diagnostic functions provided via Internet browser with extensive information functions (hardware/software version display, process utilization, memory usage, diagnostic buffer, task runtimes, user logbook, operating state, time of day, etc.) • Access to all variables on the control system using variable browser functions • Watch tables (control variable diagnostics in status and control tables that can be permanently saved) • Trace (control variable tracing for one controller or several synchronously) • Generation of diagnostic data (diagnostic buffer, alarms, states of variables, ...) • Project update • Firmware update • Password-protected access • Remote access to SIMOTION file system • User-defined service and diagnostic pages		● 2)	● 2)	●	●

1) Use of the functions during runtime is subject to license.
2) Subject to license for SIMOTION Kernel < V4.2.

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
SIMOTION IT (continued)					
SIMOTION IT OPC XML-DA Integrated OPC XML-DA server on the SIMOTION controller • Read/write variables • Browse variables • Trace interface via SOAP • Password-protected access		● [1]	● [1]	●	●
SIMOTION IT Virtual Machine (integrated Java runtime environment on the SIMOTION controller) • Read and write access to the SIMOTION variables • Read and write access to the non-volatile memory (NVRAM) • Use of system functions (functions of the technology objects) • Use of standard Java classes in the device (file access, network functions, string functions, etc.) • Creation of servlets, for the purpose of enhancing the display of menu interfaces in HTML pages	Licensing through SIMOTION IT Virtual Machine Note: For SIMOTION Kernel < V4.2, can be used as combined license for SIMOTION IT DIAG, OPC XML-DA and Virtual Machine.	●	●	●	●
SIMOTION SCOUT engineering system					
SIMOTION SCOUT basic functions • SCOUT Workbench • STARTER Drive commissioning/parameterization • Hardware and network configuration • Diagnostics for testing and commissioning • Axis control panel • Program editors/programming languages (command set in accordance with IEC 61131-3) - Structured Text (ST) - Ladder Logic (LAD) - Function Block Diagram (FBD) - Motion Control Chart (MCC) • Creation of cams (basic) • Creation of technology objects • Technology tools (function generator) • Operator interface, online help and documentation in English, French, German and Italian		●	●	●	●
SIMOTION SCOUT optional packages • CamTool (graphical cam editor)		○	○	○	○
• DCC editor (graphical editor for Drive Control Chart)		○	○	○	○

[1] Subject to license for SIMOTION Kernel < V4.2.

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Testing and diagnostics with SIMOTION SCOUT					
Information functions		●	●	●	●
• Hardware/software version					
• Processor utilization					
• Memory utilization					
• Diagnostic buffer					
• Task runtimes					
• User logbook					
• Operating status					
• Time					
Comparison functions for projects		●	●	●	●
• Comparison of objects in projects: - between offline projects - between online and offline projects					
• Detailed comparison: Shows differences between objects in detail					
• Matching: Projects and objects can be merged					
Program test functions		●	●	●	●
• Control/status variables					
• Watch tables					
• Status program/FB/FC (with specification of the call point)					
• Single-step MCC					
• Breakpoints in all languages (ST, MCC, LAD/FBD)					
• Tracer for MCC (for fast program sequences)					
• Trace technology object (recording of all technology object commands)					
Trace		●	●	●	●
• Recording of I/O, system and program variables (on one controller as well as over several synchronously)					
• Recording from position control cycle onwards (n × position control cycle)					
• Trigger: Instantaneous, rising/falling edge, at code point system variable					
• Measuring functions for optimizing the speed/position controller (step response, ramp, frequency curve)					
• Automatic setting of the speed controller/position controller					
• Bode diagram, FFT analysis, function generator, mathematical functions					
• Endless trace					
• Recording over defined measuring period					

● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible	Notes	SIMOTION C240/C240 PN	SIMOTION P320-3/P350-3	SIMOTION D410-2	SIMOTION D4x5-2
Testing and diagnostics with SIMOTION SCOUT (continued)					
Further diagnostic functions					
• Module diagnostics		●	●	●	●
- Centralized					
- Distributed (e.g. ET 200M)					
• PROFIBUS DP station diagnostics	PROFINET standard feature on C240 PN, P320-3, P350-3 PN, D410-2 DP/PN and D4x5-2 DP/PN. Optional on P350-3 DP by means of PROFINET board.	●	●	●	●
• PROFINET station diagnostics		●	●	●	●
• Diagnostic buffer	On SIMOTION D, one diagnostic buffer is provided for SIMOTION and another for the integrated SINAMICS drive.				
- No. of entries, max.		200	200	2 × 100	2 × 200
• Process fault diagnostics (Alarm_S)					
- Messages from user program		●	●	●	●
- No. of entries, max.		40	40	40	40
Engineering drives					
STARTER (integrated in SCOUT) Drive/commissioning software for:		●	●	●	●
• SINAMICS S / SINAMICS G					
• MICROMASTER 410/420/430/440					
Drive ES BASIC Engineering tools and integrated data storage in SIMATIC S7/SIMOTION projects for:	Drive ES BASIC is included complete with license in the SIMOTION SCOUT software package.	●	●	●	●
• SINAMICS S/SINAMICS G (STARTER)					
• MICROMASTER 410/420/430/440 (STARTER)					
• SIMODRIVE (SimoCom U/SimoCom A)					