

SIMOTION Motion Control System

Overview of SIMOTION functions

| <ul style="list-style-type: none"> ● 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 | | | | | |
| <ul style="list-style-type: none"> ● 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 | 0.5 ms ³⁾ | 0.5/0.25 ms ¹⁾ |
| <ul style="list-style-type: none"> ● Position control cycle to PROFIBUS cycle ● Position control cycle to PROFINET cycle ● Interpolation cycle 1 (IPO) to position control 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 |
| | | 1:1 ... 16:1 | 1:1 ... 16:1 | 1:1 ... 16:1 | 1:1 ... 16:1 (1:1) ²⁾ |
| | | 1:1 ... 6:1 | 1:1 ... 6:1 | 1:1 ... 6:1 | 1:1 ... 6:1 (1:1 ... 4:1) ²⁾ |
| <ul style="list-style-type: none"> ● 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 |
| <ul style="list-style-type: none"> ● Fast position control cycle (SERVO_{Fast}) to PROFINET cycle ● Fast interpolation cycle (IPO_{Fast}) to fast position control cycle (SERVO_{Fast}) | 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 |
| | | – | – | – | 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 engineering tool

The performance requirements for a SIMOTION application can be estimated using the SIZER engineering tool.

For more information about SIZER, refer to chapter "System description – Dimensioning" in Catalog PM 21 · 2011.

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

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.

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|--|---|-----------------------|--|-----------------|--|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| Dynamic Servo Control (DSC) | | | | | |
| <ul style="list-style-type: none"> ● 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 drives SINAMICS S120 and SIMODRIVE | ● | ● | ● | ● |
| Memory for system data | | | | | |
| <ul style="list-style-type: none"> ● Exchangeable 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 |
| <ul style="list-style-type: none"> ● 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 |
| <ul style="list-style-type: none"> ● Permanent memory (for user data/data storage on exchangeable memory medium) | | 50 MB | Any, dependent on memory configuration | 300 MB | 300 MB |
| <ul style="list-style-type: none"> ● 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 |
| <ul style="list-style-type: none"> ● 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 | | | | | |
| <ul style="list-style-type: none"> ● Logical I/O address space in KB | | 4 | 4 | 8 | 16 |
| <ul style="list-style-type: none"> ● Physical I/O address space in KB <ul style="list-style-type: none"> - PROFIBUS: max. per ext. subnet each for inputs and outputs - PROFINET: max. each for inputs and outputs | When PROFIBUS and PROFINET are used, the total address space applies D4x5-2 DP/PN: If CBE30-2 is used as second PROFINET interface, 2 × 4 KB physical address space are available | 1 | 1 | 1 | 1 |
| <ul style="list-style-type: none"> ● Permanent process image for background task (I/O variables) in bytes | | 64 | 64 | 64 | 64 |
| <ul style="list-style-type: none"> ● Additional configurable process image for each cyclic task (I/O variables) | | ● | ● | ● | ● |
| <ul style="list-style-type: none"> ● Address space per PROFIBUS DP station in bytes | | 244 | 244 | 244 | 244 |
| <ul style="list-style-type: none"> ● Address space per PROFINET device in bytes | | 1400 | 1400 | 1400 | 1400 |

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|---|--|-----------------------|--|---|---|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| 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: | 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 U/f: 1 ... 12 | – | – | Servo: 1 Vector: 1 U/f: 1 (alternatively) | Servo: 1 ... 6 Vector: 1 ... 6 U/f: 1 ... 12 (alternatively) |
| Speed-controlled axis over PROFIBUS DP <ul style="list-style-type: none"> ● SINAMICS S/SINAMICS G (servo, vector control) ● SIMODRIVE 611 universal ● MICROMASTER/MICROMASTER Vector ● Drives with speed profile in accordance with standard message frames (PROFdrive 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 <ul style="list-style-type: none"> ● SIMODRIVE POSMO A | Standard functions available in SCOUT command library | ● | – (P320-3) ● (P350-3 DP) ○ (P350-3 PN) | ● | ● |

¹⁾ In principle, a fourth or a 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.

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| <ul style="list-style-type: none"> ● 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 <ul style="list-style-type: none"> ● SINAMICS S110 (blocksize format) <ul style="list-style-type: none"> - Servo control ● SINAMICS S120 (blocksize, booksize and chassis formats) <ul style="list-style-type: none"> - Servo control - Vector control ● SIMODRIVE 611 universal ● MICROMASTER MM4 ● Certified servo/vector/stepper drives in acc. with standard message frames (PROFIdrive profile 1-6) | SIMOTION D: SINAMICS as the standard drive technology | <ul style="list-style-type: none"> ● (C240) ● (C240 PN) | <ul style="list-style-type: none"> – (P320-3) ● (P350-3 DP) ○ (P350-3 PN) | ● | ● |
| | Also linear motor ¹⁾ | | | | |
| | With external encoder (limited dynamic response) | | | | |
| | Also linear motor ¹⁾ | | | | |
| <ul style="list-style-type: none"> ● SIMODRIVE 611 universal ● MICROMASTER MM4 ● Certified servo/vector/stepper drives in acc. with standard message frames (PROFIdrive profile 1-6) | With external encoder (limited dynamic response) | | | | |
| Speed and position-controlled axis over PROFINET IO with IRT (PROFIdrive) <ul style="list-style-type: none"> ● SINAMICS S120 (blocksize, booksize and chassis formats) <ul style="list-style-type: none"> - Servo control - Vector control | Also linear motor ¹⁾ | <ul style="list-style-type: none"> – (C240) ● (C240 PN) | <ul style="list-style-type: none"> ● (P320-3) ○ (P350-3 DP) ● (P350-3 PN) | <ul style="list-style-type: none"> – D410-2 DP ● D410-2 DP/PN | <ul style="list-style-type: none"> – D4x5-2 DP ● D4x5-2 DP/PN |
| With external encoder (limited dynamic response) | | | | | |
| Drives with analog ±10 V setpoint interface <ul style="list-style-type: none"> ● Via onboard drive interface ● Via ADI 4 (Analog Drive Interface for 4 axes) ● Via IM 174 (Interface Module for 4 axes) | Configuration either as analog or stepper drive See SIMOTION I/O components in Catalog PM 21 · 2011. | <ul style="list-style-type: none"> 4 (C240) – (C240 PN) | – | – | – |
| | | ● | <ul style="list-style-type: none"> – (P320-3) ● (P350-3 DP) ○ (P350-3 PN) | ● | ● |
| | | ● | <ul style="list-style-type: none"> – (P320-3) ● (P350-3 DP) ○ (P350-3 PN) | ● | ● |
| Hydraulic drives over ±10 V setpoint interface <ul style="list-style-type: none"> ● Via onboard drive interface ● Via ADI 4 (Analog Drive Interface for 4 axes) ● Via IM 174 (Interface Module for 4 axes) ● Analog outputs through I/O ● Encoders through I/O | | <ul style="list-style-type: none"> 4 (C240) – (C240 PN) | – | – | – |
| | | ● | <ul style="list-style-type: none"> – (P320-3) ● (P350-3 DP) ○ (P350-3 PN) | ● | ● |
| | | ● | <ul style="list-style-type: none"> – (P320-3) ● (P350-3 DP) ○ (P350-3 PN) | ● | ● |
| | | ● | ● | ● | ● |
| | | ● | ● | ● | ● |

¹⁾ See chapter "Direct drives" in Catalog PM 21 · 2011.

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|--|---|--------------------------|--|-----------------------------------|-----------------------------------|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| Drives on SIMOTION (continued) | | | | | |
| Stepper drives <ul style="list-style-type: none"> ● Onboard pulse direction interface for stepper drives ● Via IM 174 (Interface Module for 4 axes) | Configuration either as analog or stepper drive | 4 (C240) – (C240 PN) | – | – | – |
| | | ● | – (P320-3) ● (P350-3 DP) ○ (P350-3 PN) | ● | ● |
| Encoders on SIMOTION | | | | | |
| Measuring systems that can be connected over the integrated interface <ul style="list-style-type: none"> ● Number ● Absolute encoder with SSI interface ● Incremental measuring systems | See Measuring systems in Catalog PM 21 · 2011 . | | | | |
| | SIMOTION D/ CX32-2: Encoder connection via DRIVE-CLiQ | 4 (C240) – (C240 PN) | – | 1 | – |
| | | ● (C240) – (C240 PN) | – | ● | – |
| | C240: TTL D410-2: TTL/HTL | ● (C240) – (C240 PN) | – | ● | – |
| Measuring systems that can be connected over the bus <ul style="list-style-type: none"> ● 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) <ul style="list-style-type: none"> ● Via onboard interfaces ● Via SINAMICS S110/S120 ● SIMODRIVE 611 universal over 2nd axis control (2-axis module) ● Isochronous PROFIBUS encoder ● PROFINET encoder with IRT ● Encoder on ADI 4 (Analog Drive Interface for 4 axes) ● Encoder on IM 174 (Interface Module for 4 Axes) | | | | | |
| | | ● (C240) – (C240 PN) | – | ● | – |
| | SIMOTION D/ CX32-2: Encoder connection via DRIVE-CLiQ | ● | ● | ● | ● |
| | Option for SIMODRIVE 611 universal | ● | ● | ● | ● |
| | See Measuring systems in Catalog PM 21 · 2011 . | ● | ● | ● | ● |
| | See Measuring systems in Catalog PM 21 · 2011 . | – (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 |
| | At least one electric or hydraulic axis must be configured on ADI 4/IM 174. | ● | – (P320-3) ● (P350-3 DP) ○ (P350-3 PN) | ● | ● |
| | | ● | – (P320-3) ● (P350-3 DP) ○ (P350-3 PN) | ● | ● |

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| | Notes | SIMOTION C240/C240 PN | SIMOTION P320-3/P350-3 | SIMOTION D410-2 | SIMOTION D4x5-2 |
|---|--|--------------------------|---------------------------|-----------------------|-----------------------|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| Measuring inputs | | | | | |
| Integrated measuring inputs | | | | | |
| • Number | | 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 | – | |
| • 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 SIMOTION I/O components in Catalog PM 21 · 2011. | | | | |
| - Number of measuring inputs per Terminal Module, max. | | 24 | 24 | 24 | 24 |
| - Reproducibility | | 125 μs | 125 μs | 125 μs | 125 μs |
| • Over TM17 High Feature Terminal Module 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) | | | | | |
| • Integrated output cams | | ● | – | ● | ● |
| - Reproducibility | | 70 μs | – | typ. 125 μs | 10 μs |
| • Over TM15 Terminal Module on SINAMICS S120 or SIMOTION D/CX32-2 | See SIMOTION I/O components in Catalog PM 21 · 2011. | | | | |
| - Reproducibility | | 125 μs | 125 μs | 125 μs | 125 μs |
| • Over TM17 High Feature Terminal Module on SINAMICS S120 or SIMOTION D/CX32-2 | | | | | |
| - Reproducibility | | ≤ 10 μs | ≤ 10 μs | ≤ 10 μs | ≤ 10 μs |

¹⁾ In principle, a fourth or a 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.

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|---|--|---------------------------|--|-------------------------------|-------------------------------|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| Output cams (continued) | | | | | |
| Standard output cams (update in position controller or IPO cycle, reproducibility of the output cam depends on the implemented I/O) | | | | | |
| <ul style="list-style-type: none"> ● Integrated output cams | | ● | – | ● | ● |
| <ul style="list-style-type: none"> ● Over TM15/TM17 High Feature Terminal Module on SINAMICS S120 or SIMOTION D/CX32-2 | See SIMOTION I/O components in Catalog PM 21 · 2011. | ● | ● | ● | ● |
| <ul style="list-style-type: none"> ● Over S7-300 backplane bus of SIMOTION C | | ● | – | – | – |
| <ul style="list-style-type: none"> ● Over PROFIBUS DP | | ● | – (P320-3) ● (P350-3 DP) ○ (P350-3 PN) | ● | ● |
| <ul style="list-style-type: none"> ● 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 |
| <ul style="list-style-type: none"> ● Output to internal system variable | | ● | ● | ● | ● |
| Integrated I/O interfaces | | | | | |
| Programmable digital inputs/outputs (can be parameterized individually as either input or output) | | | | | |
| <ul style="list-style-type: none"> ● of which for output cam, max. ● of which as measuring inputs, max. | Further inputs/outputs can be implemented for output cam or measuring inputs via the TM15 or TM17 High Feature Terminal Modules. | – | – | 8 | 16 |
| | | – | – | 8 | 8 |
| | | – | – | 8 | 16 |
| Digital inputs (fixed inputs, cannot be parameterized) | | | | | |
| <ul style="list-style-type: none"> ● of which inputs with specific functions <ul style="list-style-type: none"> – Measuring inputs, max. – External zero mark signal for referencing, max. – Fail-safe digital inputs (F-DI) | D410-2: The 3 F-DI can also be used as 6 DI. | 18 | – | 5 + 6 (3 F-DI) | 12 |
| | | 2+4 (C240) 4 (C240 PN) | – | – | – |
| | | 4 (C240) | – | – | – |
| | | – | – | 3 | – |
| Digital outputs (fixed outputs, cannot be parameterized) | | | | | |
| <ul style="list-style-type: none"> ● of which outputs with specific functions <ul style="list-style-type: none"> – Fast output cams, max – Fail-safe digital outputs (F-DO) | D410-2: The F-DO can also be used as DO. | 8 | – | 1 (1 F-DO) | – |
| | | 8 | – | – | – |
| | | – | – | 1 | – |
| Relay outputs with specific functions | | | | | |
| <ul style="list-style-type: none"> ● Controller enable ● Ready | | 4 (C240) | – | – | – |
| | | 1 | – | – | – |
| Analog inputs | | | | | |
| SIMOTION D: D410-2: additional ones over TM31 D4x5-2: over TM31 or TB30 | See SIMOTION I/O components in Catalog PM 21 · 2011. | – | – | 1 (onboard) ○ (TM31) | ○ |
| 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 SIMOTION I/O components in Catalog PM 21 · 2011. | 4 (C240) | – | ○ | ○ |
| Pulse direction interface for stepper drives | | | | | |
| | SIMOTION C240: Configuration either as analog or stepper drive. | 4 (C240) | – | – | – |

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|--|--|-------------------------|--|-------------------------------|-------------------------------|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| SIMOTION C centralized I/O modules | | | | | |
| <ul style="list-style-type: none"> • Centralized I/O modules per system, max. | | 16 | – | – | – |
| <ul style="list-style-type: none"> • Central/expansion rack, max. | SIMOTION C: max. two-tier configuration with IM 365 interface module | ○ | – | – | – |
| <ul style="list-style-type: none"> • Connectable central SIMATIC S7-300 I/Os | For suitable modules see SIMOTION I/O components in Catalog PM 21 · 2011. | ● | – | – | – |
| Connectable distributed I/O modules | | | | | |
| Distributed I/O (over PROFIBUS DP) <ul style="list-style-type: none"> • 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 SIMOTION I/O components in Catalog PM 21 · 2011. 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) <ul style="list-style-type: none"> • TMC1080 PN/TMC1180 PN • SIMATIC ET 200S • SIMATIC ET 200M • SIMATIC ET 200pro • SIMATIC ET 200eco PN • All certified PROFINET devices | Isochronous: SIMATIC ET 200S TMC1080 PN TMC1180 PN | – (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) <ul style="list-style-type: none"> • Via Terminal Modules TM15, TM17 High Feature, TM31, TM41, TM54F • Via TB30 Terminal Board | For connection to SIMOTION C and P over SINAMICS S120 Plug-in card for SIMOTION D4x5-2 and SINAMICS CU320-2 | ● | ● | ● | ● |
| | | ● | ● | – | ● |

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| | Notes | SIMOTION C240/C240 PN | SIMOTION P320-3/P350-3 | SIMOTION D410-2 | SIMOTION D4x5-2 |
|---|---|-----------------------|--|-----------------|-----------------|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| SIMOTION HMI devices | | | | | |
| Connection over PROFIBUS DP (configured using WinCC flexible) | | | | | |
| <ul style="list-style-type: none"> ● SIMATIC MP 170 Mobile Panel ● SIMATIC MP 177 DP Mobile Panel ● SIMATIC MP 277 Mobile Panel ● SIMATIC TP 170B and TP 270 Touch Panel ● SIMATIC TP 177B and TP 277 Touch Panel ● SIMATIC OP 170B and OP 270 Operator Panel ● SIMATIC OP 177B and OP 277 Operator Panel ● SIMATIC MP 270B and MP 370 Multi Panel ● SIMATIC MP 277 and MP 377 Multi Panel ● SIMATIC Panel PC 477, PC 670, PC 677, PC 877 | | ● | – (P320-3) ● (P350-3 DP) ○ (P350-3 PN) | ● | ● |
| Connection over Ethernet/PROFINET (configured using WinCC flexible) | | | | | |
| <ul style="list-style-type: none"> ● 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 TP 270 Touch Panel ● SIMATIC OP 270 Operator Panel ● SIMATIC OP 277 Operator Panel ¹⁾ ● SIMATIC MP 270B and MP 370 Multi Panel ● SIMATIC MP 277 ¹⁾ and MP 377 Multi Panel ¹⁾ ● SIMATIC Panel PC 477, PC 577, PC 670, PC 677, PC 877 | | ● | ● | ● | ● |
| HMI software for SIMOTION | | | | | |
| <ul style="list-style-type: none"> ● WinCC flexible ● WinCC (SCADA system, version V7.0 or higher) | | ○ | ○ | ○ | ○ |
| Software for extended communication with SIMOTION | | | | | |
| <ul style="list-style-type: none"> ● SIMATIC NET OPC server ● SIMOTION IT OPC XML-DA (over Ethernet) <ul style="list-style-type: none"> - 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 | See SIMOTION runtime software in Catalog PM 21 · 2011 . | ○ ● ³⁾ | ● ²⁾ ● ³⁾ | ○ | ○ |

¹⁾ PROFINET IO-capable.

²⁾ Subject to license.

³⁾ Subject to license for SIMOTION Kernel < V4.2.

SIMOTION Motion Control System

Overview of SIMOTION functions

| | Notes | SIMOTION C240/C240 PN | SIMOTION P320-3/P350-3 | SIMOTION D410-2 | SIMOTION D4x5-2 |
|---|---|--------------------------|---|-------------------------------------|---|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| Software for extended communication with SIMOTION (continued) | | | | | |
| <ul style="list-style-type: none"> ● SIMOTION MIIF: Multipurpose Information Interface <ul style="list-style-type: none"> - Symbolic access to SIMOTION data via Ethernet - SIMOTION as server, e.g. operator panels as clients | | ○ | ○ | ○ | ○ |
| Communication | | | | | |
| Ethernet interfaces | | | | | |
| <ul style="list-style-type: none"> ● 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 | | | | | |
| <ul style="list-style-type: none"> ● Integrated/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 |
| <ul style="list-style-type: none"> ● Integrated CP5611 | For PG/PC and HMI | – | P350-3: 1 | – | – |
| <ul style="list-style-type: none"> ● 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 |
| <ul style="list-style-type: none"> ● Number of PROFIBUS DP slaves | Per PROFIBUS DP subnet | 64 | 64 | 64 | 64 |
| PROFINET interfaces | | | | | |
| <ul style="list-style-type: none"> ● Integrated 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 |
| <ul style="list-style-type: none"> ● Number of PROFINET devices (provided that PROFINET interface is onboard or optionally retrofitted) | D4x5-2: CBE30-2 can be used as second PROFINET interface in D4x5-2 DP/PN. Per PROFINET interface | 64 | 64 | 64 | 64 |
| <ul style="list-style-type: none"> ● Media redundancy (MRP and MRPD) | | ● | P320-3: ● P350-3: – | ● | ● |
| Further communication interfaces | | | | | |
| <ul style="list-style-type: none"> ● Serial interfaces | | – | 1 | – | – |
| <ul style="list-style-type: none"> ● USB interfaces | P350-3: e.g. for mouse and keyboard D4x5-2: for upgrading D4x5-2 Control Units using a USB memory stick | – | P320-3: 4 × USB 2.0 P350-3: 4 × USB 2.0 | – | 2 |
| <ul style="list-style-type: none"> ● DRIVE-CLiQ interfaces | | – | – | 1 | D425-2: 4 D435-2: 6 D445-2: 6 D455-2: 6 |

SIMOTION Motion Control System

Overview of SIMOTION functions

| | Notes | SIMOTION C240/C240 PN | SIMOTION P320-3/P350-3 | SIMOTION D410-2 | SIMOTION D4x5-2 |
|---|---|---------------------------|---|------------------------------------|-------------------------------------|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| Communication (continued) | | | | | |
| Connections over PROFIBUS DP and Ethernet/PROFINET <ul style="list-style-type: none"> ● PROFIBUS DP ● Ethernet/PROFINET | SIMOTION C: PROFINET with C240 PN only The connection resources can be assigned as required, over PROFIBUS DP or Ethernet. | C240: ● C240 PN: ● | P320-3: – P350-3 DP: ● P350-3 PN: – | ● | ● |
| | | 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 |
| <ul style="list-style-type: none"> ● SIMOTION SCOUT engineering system (SCOUT occupies up to 3 online connections) | | 2 | 2 | 2 | 2 |
| <ul style="list-style-type: none"> ● HMI | | 5 | 5 | 5 | 5 |
| <ul style="list-style-type: none"> ● OPC | | ● | ● | ● | ● |
| <ul style="list-style-type: none"> ● Basic communication Xsend/Xreceive (not via Ethernet) | | 5 | 5 | 5 | 5 |
| <ul style="list-style-type: none"> ● Standard TCP/IP connections | | 45 | 75 | 45 | 75 |
| <ul style="list-style-type: none"> ● SIMOTION IT | | ● | ● | ● | ● |
| Communication functions over PROFIBUS between: <ul style="list-style-type: none"> ● SIMOTION – SIMATIC HMI/WinCC flexible <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - Distributed I/O mechanisms Process image, e.g. (% I1.3) I/O variables (symbolic) - XSND/XRCV, max. 200 bytes ● SIMOTION – SIMATIC S7 <ul style="list-style-type: none"> - 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 with regard to SIMOTION | ● | ● | ● | ● |

SIMOTION Motion Control System

Overview of SIMOTION functions

| <ul style="list-style-type: none"> ● 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 | | | |
| <ul style="list-style-type: none"> ● SIMOTION – SIMOTION <ul style="list-style-type: none"> - 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 | ● | ● | ● | ● |
| <ul style="list-style-type: none"> ● SIMOTION – SIMATIC S7 <ul style="list-style-type: none"> - Distributed I/O mechanisms Process image, e.g. (% I1.3) I/O variables <ul style="list-style-type: none"> - For SIMATIC – SIMOTION: SIMOTION as I-Device - For SIMOTION – SIMATIC: over SIMATIC CP | On P350-3 DP optionally by means of PROFINET board. | ● | ● | ● | ● |
| <ul style="list-style-type: none"> ● Slave-to-slave communication between SIMOTION controllers | | ● | ● | ● | ● |
| Communication functions over Ethernet/PROFINET between: | | | | | |
| <ul style="list-style-type: none"> ● SIMOTION – SIMATIC HMI/WinCC flexible <ul style="list-style-type: none"> - HMI data exchange: Support from the SIMOTION operating system - Plant-wide access to process data and displays - Interrupt mechanism: Alarms are event-driven | | ● | ● | ● | ● |
| <ul style="list-style-type: none"> ● SIMOTION – SIMATIC NET OPC | | ● | ● | ● | ● |
| <ul style="list-style-type: none"> ● SIMOTION IT OPC XML-DA (over Ethernet) <ul style="list-style-type: none"> - 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⁾ | ● | ● |
| <ul style="list-style-type: none"> ● SIMOTION MIIF: Multipurpose Information Interface <ul style="list-style-type: none"> - Symbolic access to SIMOTION data via Ethernet - SIMOTION as server, e.g. operator panels as clients | | ○ | ○ | ○ | ○ |
| <ul style="list-style-type: none"> ● SIMOTION – PG/PCs with STEP 7 and SCOUT | | ● | ● | ● | ● |
| <ul style="list-style-type: none"> ● Ethernet/PROFIBUS DP routing | | ● | ● | ● | ● |

¹⁾ Subject to license for SIMOTION Kernel < V4.2.

SIMOTION Motion Control System

Overview of SIMOTION functions

| <ul style="list-style-type: none"> ● 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: <ul style="list-style-type: none"> ● SIMOTION – SIMOTION ● SIMOTION – SIMATIC ● SIMOTION – PC | Not for D410 DP | ● | ● | ● | ● |
| Serial communication via a point-to-point connection <ul style="list-style-type: none"> ● CP 340 and CP 341 communication modules ● 1SI communication module (connected over ET 200S) | Basic version with regard to SIMOTION | ● | ● | ● | ● |
| Communication via AS-Interface <ul style="list-style-type: none"> ● CP 343-2 P communication module ● DP/AS-Interface Link 20E/Link Advanced ● IE/AS-Interface Link PN IO | Basic version with regard to SIMOTION | ● | ● | ● | ● |
| Connectable network couplers <ul style="list-style-type: none"> ● DP/DP coupler for connecting two PROFIBUS DP networks ● PN/PN coupler for connecting two PROFINET IO networks | Basic version with regard to SIMOTION | ● | ● | ● | ● |
| PROFIsafe drives on SIMOTION | | | | | |
| Max. number of PROFIsafe drives on SIMOTION with SINAMICS S120 drive system: <ul style="list-style-type: none"> ● over PROFIBUS with PROFIsafe <ul style="list-style-type: none"> - with 1 × PROFIBUS interface - with 2 × PROFIBUS interface ● over PROFINET with PROFIsafe | SIMOTION as I-Slave on SIMATIC F-CPU over PROFIBUS 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. | 16 32 | P320-3: – P350-3 DP: 16 P350-3 PN: – P320-3: – P350-3 DP: 32 P350-3 PN: – P320-3: 64 P350-3 DP: – P350-3 PN: 64 | 8 8 D410-2 DP: – D410-2 DP/PN: 8 | 16 32 64 |

¹⁾ For SIMOTION D410, routing through is only possible to integrated drive.

SIMOTION Motion Control System

Overview of SIMOTION functions

| | Notes | SIMOTION C240/C240 PN | SIMOTION P320-3/P350-3 | SIMOTION D410-2 | SIMOTION D4x5-2 |
|--|--|---|------------------------|-----------------|--|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| SIMOTION Kernel | | | | | |
| Execution system | | | | | |
| <ul style="list-style-type: none"> ● System tasks for motion control <ul style="list-style-type: none"> - SERVO (position control cycle) - IPO (interpolation cycle) - SERVO_{Fast} - IPO_{Fast} - MotionTasks (sequential) - ServoSynchronousTask (cyclic, synchronous with the position control cycle) | 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. | ● | ● | ● | ● |
| | | <ul style="list-style-type: none"> - Task structure/program execution <ul style="list-style-type: none"> - BackgroundTask (cyclic) - TimerInterruptTasks (time-controlled down to 1 ms) - IPoSynchronousTask (cyclic, synchronous with the interpolation cycle) - InterruptTasks (for user) (event-driven) - TControlTasks (temperature control) - StartupTask (for transition from STOP to RUN) - ShutdownTask (for transition from RUN to STOP) ● Task structure/error processing (SystemInterruptTasks) <ul style="list-style-type: none"> - ExecutionFaultTask (starts in the event of an error when executing a program) - TechnologicalFaultTask (starts in the event of an error on a technology object) - PeripheralFaultTask (starts in the event of an error on the I/O) - TimeFaultTask (starts in the event of a Timer-InterruptTask timeout) - TimeFaultBackgroundTask (starts in the event of a BackgroundTask timeout) | – | – | – |
| | | 20 | 32 | 32 | 32 |
| | | 1 | 1 | 1 | D425-2 DP: 1 D425-2 DP/ PN: 1 D435-2 DP: 1 D435-2 DP/ PN: 2 D445-2 DP/ PN: 2 D455-2 DP/ PN: 2 |
| | Adjustable monitoring time | 1 | 1 | 1 | 1 |
| | | 5 | 5 | 5 | 5 |
| | | 2 | 2 | 2 | 3 |
| | | 2 | 2 | 2 | 2 |
| | | 5 | 5 | 5 | 5 |
| | | 1 | 1 | 1 | 1 |
| | | 1 | 1 | 1 | 1 |
| | Central trouble-shooting is possible | | | | |
| | | 1 | 1 | 1 | 1 |
| | | 1 | 1 | 1 | 1 |
| | | 1 | 1 | 1 | 1 |
| | | 1 | 1 | 1 | 1 |
| | | 1 | 1 | 1 | 1 |

SIMOTION Motion Control System

Overview of SIMOTION functions

| | Notes | SIMOTION C240/C240 PN | SIMOTION P320-3/P350-3 | SIMOTION D410-2 | SIMOTION D4x5-2 |
|--|-------|--------------------------|---------------------------|--------------------|--------------------|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| SIMOTION Kernel (continued) | | | | | |
| Execution system (continued) | | | | | |
| <ul style="list-style-type: none"> ● Program organization <ul style="list-style-type: none"> - 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 | | ● | ● | ● | ● |
| <ul style="list-style-type: none"> ● 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] | | ● | ● | ● | ● |

SIMOTION Motion Control System

Overview of SIMOTION functions

| <ul style="list-style-type: none"> ● 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 | | | | | |
| <ul style="list-style-type: none"> • Motion Control Basic • POS – Positioning • GEAR – Synchronous operation • CAM – Cam • PATH – Path interpolation <p>The technology package functions are accessed via language commands, system variables and through function blocks in accordance with PLCopen.</p> | <p>No license required</p> <p>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)</p> | ● | ● | ● | ● |
| | | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ |
| | | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ |
| | | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ |
| | | ● ¹⁾ | ● ¹⁾ | – | ● ¹⁾ |
| Axis types | | | | | |
| <ul style="list-style-type: none"> • Electrical/hydraulic/stepper motor axes • Speed-controlled axis • Positioning axes <ul style="list-style-type: none"> - Rotary axis - Linear axis - Modulo for linear and rotary axes - Force/pressure-controlled axis - Force/pressure-limited axis • Synchronous axis • Path axis • Cam axis • Virtual axis • Simulation axis | <p>Included with POS license or higher</p> <p>Included with GEAR license or higher</p> <p>Included with GEAR license or higher</p> <p>Included with CAM license or higher</p> | ● | ● | ● | ● |
| | | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ |
| | | ● ¹⁾ | ● ¹⁾ | – | ● ¹⁾ |
| | | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ |
| | | ● | ● | ● | ● |
| | | ● | ● | ● | ● |
| Systems of units | | | | | |
| <ul style="list-style-type: none"> • Metric (mm, m, Nm, Pa, ...) • US (inch, feet, PSI, lb, ...) | | ● | ● | ● | ● |
| | | ● | ● | ● | ● |
| Axis monitoring functions | | | | | |
| <p>The activated monitoring functions are executed cyclically.</p> <ul style="list-style-type: none"> • 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 precisely one axis.

SIMOTION Motion Control System

Overview of SIMOTION functions

| | Notes | SIMOTION C240/C240 PN | SIMOTION P320-3/P350-3 | SIMOTION D410-2 | SIMOTION D4x5-2 |
|---|---|-----------------------|------------------------|-----------------|-----------------|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| Other technology packages | | | | | |
| Control technology package <ul style="list-style-type: none"> • With technology functions for temperature control | Technology package integrated in SCOUT | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ | ● ¹⁾ |
| Technology package Drive Control Chart (DCC) <ul style="list-style-type: none"> • With technology functions for Drive Control Chart | Technology package integrated in SCOUT | ● | ● | ● | ● |
| Technology package for Direct Product Motion (DPM) <ul style="list-style-type: none"> • With technology functions for intelligent, contact-free product synchronization | Technology package can be purchased via your SIEMENS contact | ○ ¹⁾ | ○ ¹⁾ | ○ ¹⁾ | ○ ¹⁾ |
| Technology package Multipurpose Information Interface (MIIF) <ul style="list-style-type: none"> • With multi-functional communication functions | Technology package can be purchased via your SIEMENS contact | ○ ¹⁾ | ○ ¹⁾ | ○ ¹⁾ | ○ ¹⁾ |
| SIMOTION IT | | | | | |
| SIMOTION IT DIAG <p>Integrated web server on the SIMOTION controller</p> <ul style="list-style-type: none"> • Service and diagnostic functions provided via Internet browser with extensive information functions (hardware/software version display, processor 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 | Licensed through the SIMOTION IT DIAG license or SIMOTION IT Virtual Machine combined license | ● ²⁾ | ● ²⁾ | ● | ● |

¹⁾ Use of the functions during runtime is subject to license.

²⁾ Subject to license for SIMOTION Kernel < V4.2.

SIMOTION Motion Control System

Overview of SIMOTION functions

| <ul style="list-style-type: none"> ● 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 <ul style="list-style-type: none"> • Read/write variables • Browse variables • Trace interface via SOAP • Password-protected access | Licensing through the SIMOTION IT OPC XML-DA license or SIMOTION IT Virtual Machine combined license | ● ¹⁾ | ● ¹⁾ | ● | ● |
| SIMOTION IT Virtual Machine (integrated Java runtime environment on the SIMOTION controller) <ul style="list-style-type: none"> • 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. | ● ²⁾ | ● ²⁾ | ● ²⁾ | ● ²⁾ |
| SIMOTION SCOUT engineering system | | | | | |
| SIMOTION SCOUT basic functions <ul style="list-style-type: none"> • 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) <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> • CamTool (graphical cam editor) • DCC editor (graphical editor for Drive Control Chart) | | ○ | ○ | ○ | ○ |

¹⁾ Subject to license for SIMOTION Kernel < V4.2.

²⁾ Use of the functions during runtime is subject to license.

SIMOTION Motion Control System

Overview of SIMOTION functions

| <ul style="list-style-type: none"> ● 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 <ul style="list-style-type: none"> • Hardware/software version • Processor utilization • Memory utilization • Diagnostic buffer • Task runtimes • User logbook • Operating status • Time | | ● | ● | ● | ● |
| Comparison functions for projects <ul style="list-style-type: none"> • Comparison of objects in projects: <ul style="list-style-type: none"> - Between offline projects - Between online and offline projects • Detailed comparison: Shows differences between objects in detail • Matching: Projects and objects can be matched | | ● | ● | ● | ● |
| Program test functions <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 | | ● | ● | ● | ● |

SIMOTION Motion Control System

Overview of SIMOTION functions

| | Notes | SIMOTION C240/C240 PN | SIMOTION P320-3/P350-3 | SIMOTION D410-2 | SIMOTION D4x5-2 |
|--|---|--------------------------|---------------------------|--------------------|--------------------|
| <ul style="list-style-type: none"> ● Basic version (function or license is purchased with the device or SCOUT) ○ Option (must be acquired as software/hardware) – Not possible | | | | | |
| Testing and diagnostics with SIMOTION SCOUT (continued) | | | | | |
| Further diagnostic functions | | | | | |
| <ul style="list-style-type: none"> ● Module diagnostics <ul style="list-style-type: none"> - Centralized - Distributed (e.g. ET 200M) ● PROFIBUS DP station diagnostics ● PROFINET station diagnostics | | ● | ● | ● | ● |
| | PROFINET standard feature on C240 PN, P320-3, P350-3 PN, D410-2 DP/PN, D4x5-2 DP/PN. Optional on P350-3 DP by means of PROFINET board | ● | ● | ● | ● |
| <ul style="list-style-type: none"> ● Diagnostic buffer <ul style="list-style-type: none"> - No. of entries, max. ● Process fault diagnostics (Alarm_S) <ul style="list-style-type: none"> - Messages from user program - No. of entries, max. | On SIMOTION D, one diagnostic buffer is provided for SIMOTION and another for the integrated SINAMICS drive. | 200 | 200 | 2 × 100 | 2 × 200 |
| | | ● | ● | ● | ● |
| | | 40 | 40 | 40 | 40 |
| Engineering drives | | | | | |
| STARTER (integrated in SCOUT) | | | | | |
| Drive/commissioning software for: | | | | | |
| <ul style="list-style-type: none"> ● SINAMICS S/SINAMICS G ● MICROMASTER 410/420/430/440 | | | | | |
| Drive ES BASIC | | | | | |
| Engineering tools and integrated data storage in SIMATIC S7/SIMOTION projects for: | | | | | |
| <ul style="list-style-type: none"> ● SINAMICS S/SINAMICS G (STARTER) ● MICROMASTER 410/420/430/440 (STARTER) ● SIMODRIVE (SimoCom U/SimoCom A) | | | | | |
| | Drive ES BASIC is included complete with license in the SIMOTION SCOUT software package. | ● | ● | ● | ● |