SIMOTION C is the modular controller variant with the proven design of the SIMATIC S7-300 using its simple expansion options. SIMOTION C230-2 and C240 are a high-performance Motion Controllers for control functions and Motion Control tasks.

HMI devices can be connected directly to the on board PROFIBUS or Ethernet interface for operator control and monitoring. Functions such as remote maintenance, diagnostics and teleservice can also be used via these interfaces.

Benefits
- Can be flexibly used due to the SIMATIC S7 module range and thus optimal adaptation to automation task
- For universal use with digital and analog servo drives or stepper drives
- User-friendly handling and uncomplicated design without a fan
- Versatile networking due to on board PROFIBUS DP and Industrial Ethernet interfaces
- Powerful due to a range of integrated functions
- Simple engineering of open-loop control and Motion Control applications within the same program

Application
SIMOTION C can be used wherever
- Motion Control, technology and control functionalities are to be programmed, parameterized and executed as a unit
- A modular expandable device is to be placed near or in the machine
- Communication with other programmable controllers is necessary
SIMOTION C is universally applicable and meets the highest standards with respect to suitability for industrial use, due to high EMC compatibility and resistance against shock and vibration loads.

Main applications are:
- Packaging machinery
- Plastic and rubber processing machinery
- Presses, wire-drawing machinery
- Textile machinery
- Printing machinery
- Wood, glass, ceramic, and stone working machinery
- Retrofitting

Due to the increasing use of servo drives, such machinery requires integrated logic, Motion Control and technology functions.
General Information

Expansion using distributed I/Os
Distributed I/Os can be assembled with intelligent I/O system components:
- SIMATIC ET 200S
- SIMATIC ET 200M
- SIMATIC ET 200X
- SIMATIC ET 200pro
- SIMATIC ET 200eco

Function
SIMOTION C provides the following basic functionality for the various automation requirements:
- SIMOTION Runtime system
  - Freely programmable with several languages in accordance with IEC 61131
  - Various Runtime levels (cyclic, sequential, event-driven)
  - PLC and arithmetic functionality
  - Communications and management functions
  - Motion Control functions (Motion Control Basic)
- Test and diagnostic interfaces
  This basic functionality can be expanded, e.g. with loadable technology packages, if required.

Technology packages (TP)
A special feature of SIMOTION is that the operating system functionality can be expanded by loading technology packages, such as:
- Motion Control with the functions:
  - Positioning - POS
  - Synchronous operation/electronic gear - GEAR
  - Synchronous operation/electronic cam - CAM
- Temperature controller - TControl

No slot rules.

Expansion
Up to 8 slots can be used to the right of the Motion Controller in the main unit for SIMATIC S7-300 I/O Modules.

The IM 365 can be used to connect an expansion rack (two-tier design) to increase the number of slots available for I/O Modules from 8 to 16. Multitier configuration with IM 360/IM 361 is not supported by SIMOTION C.

Operator control and monitoring (HMI)
Communication utilities which support user-friendly data exchange with HMI devices are integrated in the basic functionality of the SIMOTION C230-2. Operator control and monitoring can be implemented using SIMATIC HMI devices, such as TPs (Touch Panels), OPs (Operator Panels) or MPs (Multi Panels).

These devices can be connected via PROFIBUS or Ethernet interfaces, and are configured using ProTool/Pro or WinCC flexible.

With the SIMATIC NET communication software, the open, standardized OPC interface is available for accessing SIMOTION from other Windows-based HMI systems.

Communication
Due to its integrated interfaces, SIMOTION C supports both - process and data communication. The SCOUT engineering system is provided for user-friendly communication configuration and diagnostics.

Further information
- on TOP connect can be found in Catalog KT 10.2 and in the Interactive Catalog under “Automation Systems”, “System Cables/Control Cabinets”, “SIMATIC TOP connect System Cables”.

SIMOTION C - Controller-based

Design (continued)

The following components comprise a SIMOTION C system:
- Motion Controller and Micro Memory Card
- If required, further system components such as:
  - Load power supplies (PS) for connecting SIMOTION C to a power supply of 120V/230 V AC
  - Central (not on board) and distributed I/O components
  - Servo drives with analog or digital setpoint interface or stepper drives

Design technology
The simple design technology makes SIMOTION C flexible and easy to service:
- Module mounting
  Simply attach the module to the standard mounting rail, swing it in and screw it tight.
- Integrated backplane bus
  The backplane bus is integrated in the Motion Controller. The Motion Controller is connected to the I/O Modules with bus connectors which are plugged into the rear of the housing.
  The front connector coding prevents front connectors from being plugged into the wrong module type.
- Screw-type or spring-loaded terminals for I/O Modules
- TOP connect
  This connection method provides pre-assembled wiring with 1 to 3-wire connection systems with screw-type or spring-loaded terminal as an alternative to wiring directly on the I/O module.
  This system uses a defined mounting depth since all connections and connectors are recessed in the module and are protected and covered by doors on the front.
- No slot rules.

Expansion
Up to 8 slots can be used to the right of the Motion Controller in the main unit for SIMATIC S7-300 I/O Modules.

The IM 365 can be used to connect an expansion rack (two-tier design) to increase the number of slots available for I/O Modules from 8 to 16. Multitier configuration with IM 360/IM 361 is not supported by SIMOTION C.
Overview

SIMOTION C is an S7 300-design controller. In addition to the already integrated interfaces, the controller can also be expanded using I/O Modules from the SIMATIC S7 300 range.

The two controllers SIMOTION C230-2 and SIMOTION C240 differ in PLC- and Motion Control Performance.

Design

Interfaces
- Switches, LEDs ...
  - 1 x mode selector
  - 1 x LED strip for fault and status indicators
  - 1 x slot for SIMOTION Micro Memory Card
  - 1 x interface for Industrial Ethernet
  - 2 x interfaces for PROFIBUS DP
    (of which one interface is for MPI)
  - Power supply terminals

- Drive interfaces
  - 1 x interface for setpoint output for up to 4 axes
    (either analog or stepper drives)
  - 4 x encoder inputs for incremental or absolute value encoders

- Integrated I/Os
  - 18 digital inputs (of which 2 are for sensors and 4 for Bero)
  - 8 digital outputs

Data storage/data backup
The SIMOTION C Motion Controller has an integrated non-volatile data memory for storing process variables. The data is backed up on a SIMOTION Micro Memory Card (MMC).

Connectable periphery
The following periphery can be used:
- All certified PROFIBUS standard slaves (DP-V0, DP-V1, DP-V2)
- Isochronous I/O such as ET 200S or ET 200M
- Servo drives of the MASTERDRIVES, SIMODRIVE and INAMICS series over PROFIBUS DP interface with PROFIdrive
- MICROMASTER and COMBIMASTER frequency drives
- Stepper drives such as SIMOSTEP motors with FM STEPDRIVE power unit

Position-controlled Motion Control
The control and Motion Control functionality runs centrally on SIMOTION C. The functionality ranges from simple positioning up to complex Motion Control tasks using cams.

Setpoint output/actual value acquisition:
- Position control with analog setpoint output
  The SIMOTION C Motion Controller has one analog output for the speed setpoint and one encoder input for cyclic detection of the actual position value for each axis.
- Position control with pulse direction output for stepper drives
  The Motion Controller has one pulse output for the position setpoint for each axis. Stepper drives can either be operated without an encoder or be position-controlled with an encoder.
- Position control with digital setpoint output
  The PROFIBUS DP interface with PROFIdrive is available for this purpose. The actual position value is read in over PROFIBUS DP and the speed setpoint is output.
- Position control with mixed setpoint output
  The analog, stepper and PROFIBUS drives can be used in a mixed configuration. The channels of the 4 on board interfaces can be used for analog or stepper drives.
- Incremental position detection
  Incremental encoders supply counter pulses for the traversed path in accordance with their resolution. It is generally necessary to use reference point approach.
  The following can be used:
    - Rotary encoders
    - Translatory encoders (length dimensions)

- Absolute position detection
  Absolute value encoders with serial interfaces can be used (SSI absolute value encoders). It is not necessary to use reference point approach.

- Isochronous PROFIBUS encoder

Expansion using central I/Os
The central I/O is connected directly to the SIMOTION C Motion Controller.

The I/O installation comprises two tiers for central I/O (second tier with IM 365 interface) with up to 8 I/O Modules each and up to 4 Analog Modules.

I/O Modules from the SIMATIC S7 300 series can be used for a central design.

Additional Features of the SIMOTION C240
Compared to the SIMOTION C230-2 the Motion Controller SIMOTION C240 has the following additional functionality:
- Increased performance, approximately 2.5x faster (depending on application)
- Increased user memory
- Increased memory for non-volatile process variables
- Analog drive interface can be used as standard outputs (analog and digital outputs)
- Encoder inputs can be used as counters
- Bero inputs can be used for global measuring
- Filter time of the analog outputs can be turned off
- Improved repeatability of output cams (Jitter)

For the operation of the SIMOTION C240 the SIMOTION Version V4.0 HF2 is required.
The maximum permissible cable lengths should be taken into account when planning the cable layout. Malfunctions may occur if longer lengths are used. The permissible length of PROFIBUS DP cables depends on the configuration.
### Technical data (continued)

<table>
<thead>
<tr>
<th>Integrated digital inputs</th>
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</tr>
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<tr>
<td>with special functions for:</td>
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<tr>
<td>• Measuring input (sensor)</td>
<td>2</td>
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<tr>
<td>• Bero connection</td>
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<tr>
<td>(all inputs can be used as standard inputs)</td>
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<tr>
<td>Input voltage</td>
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</tr>
<tr>
<td>• Rated value</td>
<td>24 V DC</td>
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<tr>
<td>• For signal &quot;1&quot;</td>
<td>11 V to 30 V</td>
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<tr>
<td>• For signal &quot;0&quot;</td>
<td>-3 V to +5 V</td>
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<tr>
<td>Isolation</td>
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<tr>
<td>• Inputs in groups of</td>
<td>18</td>
</tr>
<tr>
<td>Input current</td>
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</tr>
<tr>
<td>• For signal &quot;1&quot;, min./typ.</td>
<td>6 mA/8 mA</td>
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<tr>
<td>Input delay (at rated value of input voltage)</td>
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<tr>
<td>• 0 → 1, typ./max.</td>
<td>6 µs/15 µs</td>
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<tr>
<td>• 1 → 0, typ./max.</td>
<td>40 µs/150 µs</td>
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<tr>
<td>Connection of 2-wire Bero</td>
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<tr>
<td>• Permissible quiescent current</td>
<td>2 mA</td>
</tr>
<tr>
<td>Integrated digital outputs</td>
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<tr>
<td>Rated load voltage</td>
<td>24 V DC</td>
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<tr>
<td>Permissible range</td>
<td>20.4 V to 28.8 V</td>
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<tr>
<td>Isolation in groups of</td>
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<tr>
<td>Output current</td>
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</tr>
<tr>
<td>• For signal &quot;1&quot;</td>
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</tr>
<tr>
<td>• Minimum current per channel</td>
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<tr>
<td>• For signal &quot;0&quot;, max.</td>
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<td>Residual current, max.</td>
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<td>Derated loading</td>
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<tr>
<td>• at 40 °C (104 °F)</td>
<td>4 A</td>
</tr>
<tr>
<td>• at 55 °C (131 °F)</td>
<td>2 A</td>
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<td>Switching frequency of the outputs</td>
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<td>• With ohmic load</td>
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<tr>
<td>• With inductive load</td>
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<tr>
<td>Lamp load</td>
<td>5 W</td>
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<td>Purge energy/channel</td>
<td>400 mJ (not simultaneous)</td>
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<td>Output delay, typ.</td>
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<td>Short-circuit protection</td>
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<td>cULus-approval</td>
<td>Yes</td>
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</table>

### Selection and ordering data

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<thead>
<tr>
<th>Order No.</th>
<th>Motion Controller</th>
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<tbody>
<tr>
<td>6AU1 230-2AA01-0AA0</td>
<td>SIMOTION C230-2</td>
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<tr>
<td>6AU1 230-2AA01-0CA0</td>
<td>SIMOTION C230-2 Multi Axes Bundle</td>
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<tr>
<td>6AU1 700-0AA02-0AA0</td>
<td>SIMOTION Micro Memory Card (MMC) 32 MB for SIMOTION C230-2</td>
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<tr>
<td>6AU1 700-0AA02-0AA0-Z M24</td>
<td>SIMOTION Micro Memory Card (MMC) 32 MB for SIMOTION C230-2 with License Multi Axes Package for SIMOTION C</td>
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<tr>
<td>6AU1 240-1AA00-0AA0</td>
<td>SIMOTION C240</td>
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<tr>
<td>6AU1 720-1JA00-0AA0</td>
<td>SIMOTION Micro Memory Card (MMC) 32 MB for SIMOTION C240</td>
</tr>
<tr>
<td>6AU1 720-1JA00-0AA0-Z M24</td>
<td>SIMOTION Micro Memory Card (MMC) 32 MB for SIMOTION C240 with License Multi Axes Package for SIMOTION C</td>
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</tbody>
</table>

### Further information

- on PROFIBUS DP and Industrial Ethernet can be found under "Communication" as well as in Catalog IK PI or in the Interactive Catalog under "Automation Systems/SIMATIC NET Communication Systems".

1) Requires SIMOTION V4.0 HF2
The information provided in this catalog contains descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the product. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract. Availability and technical specifications are subject to change without notice.