

# SIEMENS

## Product data sheet

**6ES7315-6TH13-0AB0**


SIMATIC S7-300, CPU 315T-2 DP,  
CENTRAL PROCESSING UNIT FOR PLC AND  
TECHNOLOGY 256 KBYTE WORKING MEMORY,  
1. INTERFACE MPI/DP 12MBIT/S 2. INTERFACE  
DP(DRIVE),  
INTEGRATED I/O FOR TECHNOLOGY FRONT  
CONNECTOR (1 X 40PIN) AND MICRO MEMORY  
CARD MIN. 8 MB NECESSARY

### General information

|                          |                                        |
|--------------------------|----------------------------------------|
| Hardware product version | 01                                     |
| Firmware version         | CPU:V2.7;integrated technology: V4.1.5 |

### Engineering with

|                     |                                                                        |
|---------------------|------------------------------------------------------------------------|
| Programming package | STEP 7 V5.4 + SP5 (and higher) and Optional package S7-Technology V4.2 |
|---------------------|------------------------------------------------------------------------|

### Supply voltage

|                                                        |          |
|--------------------------------------------------------|----------|
| 24 V DC                                                | Yes      |
| permissible range, lower limit (DC)                    | 20.4 V   |
| permissible range, upper limit (DC)                    | 28.8 V   |
| External protection for supply cables (recommendation) | 2 A min. |

### Load voltage L+

|                             |      |
|-----------------------------|------|
| Rated value (DC)            | 24 V |
| Reverse polarity protection | Yes  |

### Digital outputs

|                                                       |                                                                                               |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Load voltage L+                                       |                                                                                               |
| Rated value (DC)                                      | 24 V ; (2L+)                                                                                  |
| Reverse polarity protection                           | No ; (2L+)                                                                                    |
| Input current                                         |                                                                                               |
| Current consumption (in no-load operation), typ.      | 200 mA                                                                                        |
| Inrush current, typ.                                  | 2.5 A                                                                                         |
| I <sup>2</sup> t                                      | 1 A <sup>2</sup> ·s                                                                           |
| Power losses                                          |                                                                                               |
| Power loss, typ.                                      | 6 W                                                                                           |
| Memory                                                |                                                                                               |
| Work memory                                           |                                                                                               |
| integrated                                            | 256 kbyte                                                                                     |
| expandable                                            | No                                                                                            |
| Load memory                                           |                                                                                               |
| pluggable (MMC)                                       | Yes                                                                                           |
| pluggable (MMC), max.                                 | 8 Mbyte                                                                                       |
| Data management on MMC (after last programming), min. | 10 a                                                                                          |
| Backup                                                |                                                                                               |
| present                                               | Yes ; Guaranteed by MMC (maintenance-free)                                                    |
| without battery                                       | Yes ; Program and data                                                                        |
| CPU processing times                                  |                                                                                               |
| for bit operations, min.                              | 0.1 µs                                                                                        |
| for bit operations, max.                              | 0.1 µs                                                                                        |
| for word operations, min.                             | 0.2 µs                                                                                        |
| for fixed point arithmetic, min.                      | 2 µs                                                                                          |
| for floating point arithmetic, min.                   | 3 µs                                                                                          |
| CPU-blocks                                            |                                                                                               |
| Number of blocks (total)                              | 1024 ; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used. |
| DB                                                    |                                                                                               |
| Number, max.                                          | 1023 ; Number band: 1 to 1023                                                                 |
| Size, max.                                            | 64 kbyte                                                                                      |
| FB                                                    |                                                                                               |

|                                               |                                |
|-----------------------------------------------|--------------------------------|
| Number, max.                                  | 1024 ; Number range: 0 to 2047 |
| Size, max.                                    | 64 kbyte                       |
| <b>FC</b>                                     |                                |
| Number, max.                                  | 1024 ; Number range: 0 to 2047 |
| Size, max.                                    | 64 kbyte                       |
| <b>OB</b>                                     |                                |
| Description                                   | see instruction list           |
| Size, max.                                    | 64 kbyte                       |
| Number of free cycle OBs                      | 1 ; OB 1                       |
| Number of time alarm OBs                      | 1 ; OB 10                      |
| Number of delay alarm OBs                     | 1 ; OB 20                      |
| Number of time interrupt OBs                  | 1 ; OB 35                      |
| Number of process alarm OBs                   | 1 ; OB 40                      |
| Number of DPV1 alarm OBs                      | 3 ; OB 55, 56, 57              |
| Number isochronous mode OBs                   | 1 ; OB 61                      |
| Number of technology synchronous alarm OBs    | 1 ; OB 65                      |
| Number of startup OBs                         | 1 ; OB 100                     |
| Number of asynchronous error OBs              | 5 ; OB 80, 82, 85, 86, 87      |
| Number of synchronous error OBs               | 2 ; OB 121, 122                |
| <b>Nesting depth</b>                          |                                |
| per priority class                            | 8                              |
| additional within an error OB                 | 4                              |
| <b>Counters, timers and their retentivity</b> |                                |
| <b>S7 counter</b>                             |                                |
| Number                                        | 256 ; Number range: 0 to 255   |
| <b>Retentivity</b>                            |                                |
| adjustable                                    | Yes                            |
| preset                                        | 8                              |
| <b>Counting range</b>                         |                                |
| adjustable                                    | Yes                            |
| lower limit                                   | 0                              |
| upper limit                                   | 999                            |
| <b>IEC counter</b>                            |                                |

|                                    |                                          |
|------------------------------------|------------------------------------------|
| present                            | Yes                                      |
| Type                               | SFB                                      |
| Number                             | Unlimited (limited only by RAM capacity) |
| S7 timer                           |                                          |
| Number                             | 256 ; Number range: 0 to 255             |
| of which retentive without battery |                                          |
| adjustable                         | Yes ; From Z 0 to Z 7                    |
| Retentivity                        |                                          |
| adjustable                         | Yes                                      |
| preset                             | No retentivity                           |
| Time range                         |                                          |
| lower limit                        | 10 ms                                    |
| upper limit                        | 9990 s                                   |
| IEC timer                          |                                          |
| present                            | Yes                                      |
| Type                               | SFB                                      |
| Number                             | Unlimited (limited only by RAM capacity) |
| Data areas and their retentivity   |                                          |
| retentive data area, total         | All DBs, max. 128 KB                     |
| Flag                               |                                          |
| Number, max.                       | 2048 byte                                |
| Retentivity available              | Yes ; MB 0 to MB 2047                    |
| Retentivity preset                 | MB 0 to MB 15                            |
| Number of clock memories           | 8 ; 1 memory byte                        |
| Data blocks                        |                                          |
| Number, max.                       | 1023 ; From DB 1 to DB 1023              |
| Size, max.                         | 64 kbyte                                 |
| Retentivity adjustable             | Yes ; via non-retain property on DB      |
| Retentivity preset                 | Yes                                      |
| Local data                         |                                          |
| per priority class, max.           | 1024 byte                                |
| Address area                       |                                          |
| I/O address area                   |                                          |

|                                                                             |                           |
|-----------------------------------------------------------------------------|---------------------------|
| Inputs                                                                      | 2048 byte                 |
| Outputs                                                                     | 2048 byte                 |
| of which, distributed                                                       |                           |
| Inputs                                                                      | 2048 byte                 |
| Outputs                                                                     | 2048 byte                 |
| Process image                                                               |                           |
| Inputs, adjustable                                                          | 2048 byte                 |
| Outputs, adjustable                                                         | 2048 byte                 |
| Inputs, default                                                             | 128 byte                  |
| Outputs, default                                                            | 128 byte                  |
| Default addresses of the integrated channels                                |                           |
| Digital inputs                                                              | 66                        |
| Digital outputs                                                             | 66                        |
| Subprocess images                                                           |                           |
| Number of subprocess images, max.                                           | 1                         |
| Digital channels                                                            |                           |
| Inputs                                                                      | 16384                     |
| Outputs                                                                     | 16384                     |
| Inputs, of which central                                                    | 512                       |
| Outputs, of which central                                                   | 512                       |
| Analog channels                                                             |                           |
| Inputs                                                                      | 1024                      |
| Outputs                                                                     | 1024                      |
| Inputs, of which central                                                    | 64                        |
| Outputs, of which central                                                   | 64                        |
| Hardware configuration                                                      |                           |
| Racks, max.                                                                 | 1                         |
| Modules per rack, max.                                                      | 8                         |
| Expansion devices, max.                                                     | 0                         |
| Number of DP masters                                                        |                           |
| integrated                                                                  | 2 ; 1 DP and 1 DP (drive) |
| via CP                                                                      | 2 ; for DP                |
| Configuration / Number of FMs and CPs that can be operated (recommendation) |                           |

|                                                      |                                                 |
|------------------------------------------------------|-------------------------------------------------|
| FM                                                   | 8                                               |
| CP, point-to-point                                   | 8                                               |
| CP, LAN                                              | 10                                              |
| Time of day                                          |                                                 |
| Clock                                                |                                                 |
| Hardware clock (real-time clock)                     | Yes                                             |
| battery-backed and synchronizable                    | Yes                                             |
| Deviation per day, max.                              | 10 s                                            |
| Backup time                                          | 6 wk ; At 40 °C ambient temperature             |
| Operating hours counter                              |                                                 |
| Number                                               | 1                                               |
| Number/Number range                                  | 0                                               |
| Range of values                                      | 0 to 2 <sup>31</sup> hours (when using SFC 101) |
| Granularity                                          | 1 hour                                          |
| retentive                                            | Yes ; Must be restarted at each restart         |
| Clock synchronization                                |                                                 |
| supported                                            | Yes                                             |
| to MPI, master                                       | Yes                                             |
| to MPI, slave                                        | Yes                                             |
| to DP, master                                        | Yes                                             |
| to DP, slave                                         | Yes                                             |
| in AS, master                                        | Yes                                             |
| in AS, slave                                         | Yes                                             |
| Digital inputs                                       |                                                 |
| Number/binary inputs                                 | 4                                               |
| of which, inputs usable for technological functions  | 4                                               |
| Input characteristic curve acc. to IEC 61131, Type 1 | Yes                                             |
| Number of simultaneously controllable inputs         |                                                 |
| horizontal installation                              |                                                 |
| up to 40 °C, max.                                    | 4                                               |
| up to 60 °C, max.                                    | 4                                               |
| vertical installation                                |                                                 |
| up to 40 °C, max.                                    | 4                                               |

|                                                       |                                                              |
|-------------------------------------------------------|--------------------------------------------------------------|
| Input voltage                                         |                                                              |
| Rated value, DC                                       | 24 V                                                         |
| for signal "0"                                        | -3 to +5 V                                                   |
| for signal "1"                                        | 15 to 30 V                                                   |
| Input current                                         |                                                              |
| for signal "1", typ.                                  | 7 mA                                                         |
| Input delay (for rated value of input voltage)        |                                                              |
| for counter/technological functions                   |                                                              |
| at "0" to "1", max.                                   | 10 $\mu$ s ; typ.                                            |
| at "1" to "0", max.                                   | 10 $\mu$ s ; typ.                                            |
| Cable length                                          |                                                              |
| Cable length, shielded, max.                          | 1000 m                                                       |
| Digital outputs                                       |                                                              |
| Number/binary outputs                                 | 8                                                            |
| of which high-speed outputs                           | 8                                                            |
| Functions                                             | For technology functions, e.g. high-speed cam switch signals |
| Functionality/short-circuit strength                  | Yes                                                          |
| Response threshold, typ.                              | 1.0 A                                                        |
| Limitation of inductive shutdown voltage to           | 48 V                                                         |
| Lamp load, max.                                       | 5 W                                                          |
| Controlling a digital input                           | No                                                           |
| Load resistance range                                 |                                                              |
| lower limit                                           | 48 $\Omega$                                                  |
| upper limit                                           | 4 k $\Omega$                                                 |
| Output voltage                                        |                                                              |
| for signal "0", max.                                  | 3 V ; (2L+)                                                  |
| for signal "1", min.                                  | Rated voltage -2.5 V                                         |
| Output current                                        |                                                              |
| for signal "1" rated value                            | 0.5 A                                                        |
| for signal "1" permissible range for 0 to 60 °C, min. | 5 mA                                                         |
| for signal "1" permissible range for 0 to 60 °C, max. | 0.6 A                                                        |
| for signal "0" residual current, max.                 | 0.3 mA                                                       |

|                                                 |                               |
|-------------------------------------------------|-------------------------------|
| Parallel switching of 2 outputs                 |                               |
| for increased power                             | No                            |
| for redundant control of a load                 | No                            |
| Switching frequency                             |                               |
| with resistive load, max.                       | 100 Hz                        |
| with inductive load, max.                       | 0.2 Hz ; to IEC 947-5-1, DC13 |
| on lamp load, max.                              | 100 Hz                        |
| Aggregate current of outputs (per group)        |                               |
| horizontal installation                         |                               |
| up to 40 °C, max.                               | 4 A                           |
| up to 60 °C, max.                               | 3 A                           |
| all other mounting positions                    |                               |
| up to 40 °C, max.                               | 3 A                           |
| Cable length                                    |                               |
| Cable length, shielded, max.                    | 1000 m                        |
| Encoder                                         |                               |
| Connectable encoders                            |                               |
| 2-wire sensor                                   | No                            |
| 1st interface                                   |                               |
| Type of interface                               | Integrated RS 485 interface   |
| Physics                                         | RS 485                        |
| Isolated                                        | Yes                           |
| Power supply to interface (15 to 30 V DC), max. | 200 mA                        |
| Functionality                                   |                               |
| MPI                                             | Yes                           |
| DP master                                       | Yes                           |
| DP slave                                        | Yes                           |
| Point-to-point connection                       | No                            |
| MPI                                             |                               |
| Number of connections                           | 32                            |
| Services                                        |                               |
| PG/OP communication                             | Yes                           |
| Routing                                         | Yes                           |



|                                      |                                              |
|--------------------------------------|----------------------------------------------|
| Global data communication            | Yes                                          |
| S7 basic communication               | Yes                                          |
| S7 communication                     | Yes                                          |
| S7 communication, as client          | No ; but via CP and loadable FB              |
| S7 communication, as server          | Yes ; Connection configured on one side only |
| Transmission rate, max.              | 12 Mbit/s                                    |
| <b>DP master</b>                     |                                              |
| <b>Services</b>                      |                                              |
| PG/OP communication                  | Yes                                          |
| Routing                              | Yes                                          |
| Global data communication            | No                                           |
| S7 basic communication               | Yes ; I blocks only                          |
| S7 communication                     | Yes                                          |
| S7 communication, as client          | No ; but via CP and loadable FB              |
| S7 communication, as server          | Yes ; Connection configured on one side only |
| Equidistance mode support            | Yes                                          |
| Isochronous mode                     | Yes ; OB 61                                  |
| SYNC/FREEZE                          | Yes                                          |
| Activation/deactivation of DP slaves | Yes                                          |
| DPV1                                 | Yes                                          |
| Transmission rate, max.              | 12 Mbit/s                                    |
| Number of DP slaves, max.            | 124                                          |
| <b>Address area</b>                  |                                              |
| Inputs, max.                         | 2048 byte                                    |
| Outputs, max.                        | 2048 byte                                    |
| <b>User data per DP slave</b>        |                                              |
| Inputs, max.                         | 244 byte                                     |
| Outputs, max.                        | 244 byte                                     |
| <b>DP slave</b>                      |                                              |
| <b>Services</b>                      |                                              |
| PG/OP communication                  | Yes                                          |
| Routing                              | Yes ; Only with active interface             |
| Global data communication            | No                                           |

|                                                     |                                              |
|-----------------------------------------------------|----------------------------------------------|
| S7 basic communication                              | No                                           |
| S7 communication                                    | Yes                                          |
| S7 communication, as client                         | No ; but via CP and loadable FB              |
| S7 communication, as server                         | Yes ; Connection configured on one side only |
| Direct data exchange (slave-to-slave communication) | Yes                                          |
| DPV1                                                | No                                           |
| Transmission rate, max.                             | 12 Mbit/s                                    |
| Automatic baud rate search                          | No                                           |
| <b>Transfer memory</b>                              |                                              |
| Inputs                                              | 244 byte                                     |
| Outputs                                             | 244 byte                                     |
| Address area, max.                                  | 32                                           |
| User data per address area, max.                    | 32 byte                                      |
| <b>2nd interface</b>                                |                                              |
| Type of interface                                   | Integrated RS 485 interface                  |
| Physics                                             | RS 485                                       |
| Isolated                                            | Yes                                          |
| Power supply to interface (15 to 30 V DC), max.     | 200 mA                                       |
| <b>Functionality</b>                                |                                              |
| MPI                                                 | No                                           |
| DP master                                           | Yes ; DP(DRIVE)-Master                       |
| DP slave                                            | No                                           |
| Local Operating Network                             | No                                           |
| <b>DP master</b>                                    |                                              |
| <b>Services</b>                                     |                                              |
| PG/OP communication                                 | No                                           |
| Routing                                             | No                                           |
| Global data communication                           | No                                           |
| S7 basic communication                              | No                                           |
| S7 communication                                    | No                                           |
| Equidistance mode support                           | Yes                                          |
| Isochronous mode                                    | Yes                                          |
| SYNC/FREEZE                                         | No                                           |

|                                               |                                                                                                         |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Activation/deactivation of DP slaves          | Yes                                                                                                     |
| DPV1                                          | No                                                                                                      |
| Transmission rate, max.                       | 12 Mbit/s                                                                                               |
| Number of DP slaves, max.                     | 64                                                                                                      |
| <b>Address area</b>                           |                                                                                                         |
| Inputs, max.                                  | 1024 byte                                                                                               |
| Outputs, max.                                 | 1024 byte                                                                                               |
| <b>User data per DP slave</b>                 |                                                                                                         |
| Inputs, max.                                  | 244 byte                                                                                                |
| Outputs, max.                                 | 244 byte                                                                                                |
| <b>DP slave</b>                               |                                                                                                         |
| <b>Services</b>                               |                                                                                                         |
| GSD file                                      | <a href="http://www.ad.siemens.de/support">http://www.ad.siemens.de/support</a> in Product Support area |
| Transmission rate, max.                       | 12 Mbit/s                                                                                               |
| <b>Communication functions</b>                |                                                                                                         |
| PG/OP communication                           | Yes                                                                                                     |
| <b>Global data communication</b>              |                                                                                                         |
| supported                                     | Yes                                                                                                     |
| Number of GD loops, max.                      | 8                                                                                                       |
| Number of GD packets, max.                    | 8                                                                                                       |
| Number of GD packets, transmitter, max.       | 8                                                                                                       |
| Number of GD packets, receiver, max.          | 8                                                                                                       |
| Size of GD packets, max.                      | 22 byte                                                                                                 |
| Size of GD packet (of which consistent), max. | 22 byte                                                                                                 |
| <b>S7 basic communication</b>                 |                                                                                                         |
| supported                                     | Yes                                                                                                     |
| User data per job, max.                       | 76 byte                                                                                                 |
| User data per job (of which consistent), max. | 76 byte ; 76 bytes (with X_SEND or X_RCV), 76 bytes (with X_PUT or X_GET as server)                     |
| <b>S7 communication</b>                       |                                                                                                         |
| supported                                     | Yes                                                                                                     |
| as server                                     | Yes                                                                                                     |
| as client                                     | Yes ; Via CP and loadable FB                                                                            |

|                                                      |                                                                                                       |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| User data per job, max.                              | See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication) |
| <b>S5-compatible communication</b>                   |                                                                                                       |
| supported                                            | Yes ; via CP and loadable FC                                                                          |
| <b>Number of connections</b>                         |                                                                                                       |
| overall                                              | 16                                                                                                    |
| usable for PG communication                          | 15                                                                                                    |
| reserved for PG communication                        | 1                                                                                                     |
| Adjustable for PG communication, min.                | 1                                                                                                     |
| Adjustable for PG communication, max.                | 15                                                                                                    |
| usable for OP communication                          | 15                                                                                                    |
| reserved for OP communication                        | 1                                                                                                     |
| adjustable for OP communication, min.                | 1                                                                                                     |
| adjustable for OP communication, max.                | 15                                                                                                    |
| usable for S7 basic communication                    | 12                                                                                                    |
| Reserved for S7 basic communication                  | 0                                                                                                     |
| adjustable for S7 basic communication, min.          | 0                                                                                                     |
| adjustable for S7 basic communication, max.          | 12                                                                                                    |
| usable for routing                                   | 8 ; additional                                                                                        |
| <b>S7 message functions</b>                          |                                                                                                       |
| Number of login stations for message functions, max. | 16 ; Depending on the configured connections for PG/OP and S7 basic communication                     |
| Process diagnostic messages                          | Yes                                                                                                   |
| simultaneously active Alarm-S blocks, max.           | 40                                                                                                    |
| <b>Test commissioning functions</b>                  |                                                                                                       |
| <b>Status/control</b>                                |                                                                                                       |
| Status/control variable                              | Yes                                                                                                   |
| Variables                                            | Inputs, outputs, memory bits, DB, times, counters                                                     |
| Number of variables, max.                            | 30                                                                                                    |
| of which status variables, max.                      | 30                                                                                                    |
| of which control variables, max.                     | 14                                                                                                    |
| <b>Forcing</b>                                       |                                                                                                       |
| Forcing                                              | Yes                                                                                                   |
| Force, variables                                     | Inputs, outputs                                                                                       |

|                                            |                                                           |
|--------------------------------------------|-----------------------------------------------------------|
| Number of variables, max.                  | 10                                                        |
| Status block                               | Yes                                                       |
| Single step                                | Yes                                                       |
| Number of breakpoints                      | 2                                                         |
| Diagnostic buffer                          |                                                           |
| present                                    | Yes                                                       |
| Number of entries, max.                    | 100                                                       |
| adjustable                                 | No                                                        |
| Interrupts/diagnostics/status information  |                                                           |
| Alarms                                     |                                                           |
| Alarms                                     | No                                                        |
| Diagnostic messages                        |                                                           |
| Diagnostic functions                       | No                                                        |
| Diagnostics indication LED                 |                                                           |
| Status indicator digital output (green)    | Yes                                                       |
| Status indicator digital input (green)     | Yes                                                       |
| Galvanic isolation                         |                                                           |
| Galvanic isolation digital inputs          |                                                           |
| between the channels and the backplane bus | Yes                                                       |
| Galvanic isolation digital outputs         |                                                           |
| between the channels and the backplane bus | Yes                                                       |
| Permissible potential difference           |                                                           |
| between different circuits                 | 75 VDC / 60 VAC                                           |
| Isolation                                  |                                                           |
| Isolation checked with                     | 500 V DC                                                  |
| Ambient conditions                         |                                                           |
| Operating temperature                      |                                                           |
| Min.                                       | 0 °C                                                      |
| max.                                       | 60 °C                                                     |
| Configuration                              |                                                           |
| Configuration software                     |                                                           |
| STEP 7                                     | Yes ; V5.2 SP1 or higher and S7 Technology option package |
| programming                                |                                                           |

|                                             |                      |
|---------------------------------------------|----------------------|
| Programming language                        |                      |
| LAD                                         | Yes                  |
| FBD                                         | Yes                  |
| STL                                         | Yes                  |
| SCL                                         | Yes                  |
| CFC                                         | Yes                  |
| GRAPH                                       | Yes                  |
| HiGraph®                                    | Yes                  |
| Command set                                 | see instruction list |
| Nesting levels                              | 8                    |
| Software libraries                          |                      |
| System functions (SFC)                      | see instruction list |
| System function blocks (SFB)                | see instruction list |
| Know-how protection                         |                      |
| User program protection/password protection | Yes                  |
| Cycle time monitoring                       |                      |
| lower limit                                 | 1 ms                 |
| upper limit                                 | 6000 ms              |
| adjustable                                  | Yes                  |
| preset                                      | 150 ms               |
| Dimensions                                  |                      |
| Width                                       | 160 mm               |
| Height                                      | 125 mm               |
| Depth                                       | 130 mm               |
| Weight                                      |                      |
| Weight, approx.                             | 750 g                |
| Status                                      | Jul 13, 2012         |