



Universidad de Oviedo

Hojas de características del Trabajo Fin de Máster realizado por

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**Upgrade of the UNICOS Time Stamp Push Protocol
(TSPP) broker to include ultra-fast events**

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1. Introduction

1.1. Project identification

- Title: Upgrade of the UNICOS Time Stamp Push Protocol (TSPP) broker to include ultra-fast events
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- Date: June 2017
- Organization: CERN

1.2. Project overview

The current project objective is to solve the issue of the fast interlocks (or ultra-fast events) by improving the Time Stamp Push Protocol (TSPP) used to communicate the control and supervision layers. This protocol is used in the framework UNICOS, and this framework should also be modified as to support this new feature.

With this new feature, the organization will be able to fulfil the requirements of the internal clients who need this capability as to have a proper use of their equipment.

1.3. Document overview

This document contains the datasheets of the devices used as to test the different possibilities for the fast interlock feature implementation, as well as to test and validate an application created with this feature by means of the automatic code generation of UAB.

2. Datasheets

The datasheets of the devices used are included in this order:

1. SIMATIC S7-300 CPU 317-2 PN/DP: CPU of the PLC.
2. SIMATIC S7-300, DIGITAL INPUT SM 321: Digital input module with fast interlock capability. The module used is no longer available for purchase and so, its datasheet is not available for downloading. Its replacement datasheet is attached instead. The original module technical data can still be consulted in <https://support.industry.siemens.com/cs/pd/321062?pdtd=td&lc=en-US>
3. SIMATIC S7-300, DIGITAL OUTPUT SM 322: Digital output module.
4. SIMATIC S7-300, RAIL: Rack for the CPU and modules placement.
5. SIMATIC S7-300, FRONT CONNECTOR: 20 Pin connector for the digital input and output modules.
6. SIMATIC S7, MICRO MEMORY CARD: Memory card used in the CPU to store the program.

SIMATIC S7-300 CPU 317-2 PN/DP, CENTRAL PROCESSING UNIT WITH 1 MB WORKING MEMORY, 1. INTERFACE MPI/DP 12MBIT/S, 2. INTERFACE ETHERNET PROFINET, WITH 2 PORT SWITCH, MICRO MEMORY CARD NECESSARY



General information	
Hardware product version	01
Firmware version	V3.2
Engineering with	
• Programming package	STEP 7 V5.5 or higher
Supply voltage	
Rated value (DC)	
• 24 V DC	Yes
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
external protection for power supply lines (recommendation)	2 A min.
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
• Repeat rate, min.	1 s
Input current	
Current consumption (rated value)	750 mA
Current consumption (in no-load operation), typ.	150 mA

Inrush current, typ.	4 A
I^2t	1 A ² ·s
Power loss	
Power loss, typ.	4.65 W
Memory	
Work memory	
<ul style="list-style-type: none"> integrated 	1 024 kbyte
<ul style="list-style-type: none"> expandable 	No
<ul style="list-style-type: none"> Size of retentive memory for retentive data blocks 	256 kbyte
Load memory	
<ul style="list-style-type: none"> Plug-in (MMC) 	Yes
<ul style="list-style-type: none"> Plug-in (MMC), max. 	8 Mbyte
<ul style="list-style-type: none"> Data management on MMC (after last programming), min. 	10 y
Backup	
<ul style="list-style-type: none"> present 	Yes; Guaranteed by MMC (maintenance-free)
<ul style="list-style-type: none"> without battery 	Yes; Program and data
CPU processing times	
for bit operations, typ.	0.025 μs
for word operations, typ.	0.03 μs
for fixed point arithmetic, typ.	0.04 μs
for floating point arithmetic, typ.	0.16 μs
CPU-blocks	
Number of blocks (total)	2 048; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
DB	
<ul style="list-style-type: none"> Number, max. 	2 048; Number range: 1 to 16000
<ul style="list-style-type: none"> Size, max. 	64 kbyte
FB	
<ul style="list-style-type: none"> Number, max. 	2 048; Number range: 0 to 7999
<ul style="list-style-type: none"> Size, max. 	64 kbyte
FC	
<ul style="list-style-type: none"> Number, max. 	2 048; Number range: 0 to 7999
<ul style="list-style-type: none"> Size, max. 	64 kbyte
OB	
<ul style="list-style-type: none"> Size, max. 	64 kbyte
<ul style="list-style-type: none"> Number of free cycle OBs 	1; OB 1
<ul style="list-style-type: none"> Number of time alarm OBs 	1; OB 10
<ul style="list-style-type: none"> Number of delay alarm OBs 	2; OB 20, 21
<ul style="list-style-type: none"> Number of cyclic interrupt OBs 	4; OB 32, 33, 34, 35

- Number of process alarm OBs 1; OB 40
- Number of DPV1 alarm OBs 3; OB 55, 56, 57
- Number of isochronous mode OBs 1; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
- Number of startup OBs 1; OB 100
- Number of asynchronous error OBs 6; OB 80, 82, 83, 85, 86, 87 (OB83 only for PROFINET IO)
- Number of synchronous error OBs 2; OB 121, 122

Nesting depth

- per priority class 16
- additional within an error OB 4

Counters, timers and their retentivity

S7 counter

- Number 512

Retentivity

- adjustable Yes
- lower limit 0
- upper limit 511
- preset Z 0 to Z 7

Counting range

- can be set Yes
- lower limit 0
- upper limit 999

IEC counter

- present Yes
- Type SFB
- Number Unlimited (limited only by RAM capacity)

S7 times

- Number 512

Retentivity

- adjustable Yes
- lower limit 0
- upper limit 511
- preset No retentivity

Time range

- lower limit 10 ms
- upper limit 9 990 s

IEC timer

- present Yes
- Type SFB
- Number Unlimited (limited only by RAM capacity)

Data areas and their retentivity

retentive data area in total	All, max. 256 KB
Flag	
• Number, max.	4 096 byte
• Retentivity available	Yes; From MB 0 to MB 4095
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8; 1 memory byte
Data blocks	
• Number, max.	2 048; Number range: 1 to 16000
• Size, max.	64 kbyte
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes
Local data	
• per priority class, max.	32 768 byte; Max. 2048 bytes per block
Address area	
I/O address area	
• Inputs	8 192 byte
• Outputs	8 192 byte
of which distributed	
— Inputs	8 192 byte
— Outputs	8 192 byte
Process image	
• Inputs	8 192 byte
• Outputs	8 192 byte
• Inputs, adjustable	8 192 byte
• Outputs, adjustable	8 192 byte
• Inputs, default	256 byte
• Outputs, default	256 byte
Subprocess images	
• Number of subprocess images, max.	1; With PROFINET IO, the length of the user data is limited to 1600 bytes
Digital channels	
• Inputs	65 536
— of which central	1 024
• Outputs	65 536
— of which central	1 024
Analog channels	
• Inputs	4 096
— of which central	256
• Outputs	4 096
— of which central	256
Hardware configuration	

Number of expansion units, max.	3
Number of DP masters	
• integrated	1
• via CP	4
Number of operable FMs and CPs (recommended)	
• FM	8
• CP, PtP	8
• CP, LAN	10
Rack	
• Racks, max.	4
• Modules per rack, max.	8
Time of day	
Clock	
• Hardware clock (real-time)	Yes
• retentive and synchronizable	Yes
• Backup time	6 wk; At 40 °C ambient temperature
• Deviation per day, max.	10 s; Typ.: 2 s
• Behavior of the clock following POWER-ON	Clock continues running after POWER OFF
• Behavior of the clock following expiry of backup period	Clock continues to run with the time at which the power failure occurred
Operating hours counter	
• Number	4
• Number/Number range	0 to 3
• Range of values	0 to 2 ³¹ 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; With DP slave only slave clock
• to DP, slave	Yes
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Yes; As client
Digital inputs	
Number of digital inputs	0
Digital outputs	
Number of digital outputs	0
Analog inputs	

Number of analog inputs	0
Analog outputs	
Number of analog outputs	0
Interfaces	
Number of industrial Ethernet interfaces	1; 2 ports (switch) RJ45
Number of RS 485 interfaces	1; Combined MPI / PROFIBUS DP
Number of RS 422 interfaces	0
1. Interface	
Interface type	Integrated RS 485 interface
Physics	RS 485
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	200 mA
Functionality	
• MPI	Yes
• PROFIBUS DP master	Yes
• PROFIBUS DP slave	Yes
• Point-to-point connection	No
MPI	
• Transmission rate, max.	12 Mbit/s
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
DP master	
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	124
Services	
— 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
— S7 communication, as server	Yes
— Equidistance	Yes
— Isochronous mode	Yes; OB 61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO

— SYNC/FREEZE	Yes
— Activation/deactivation of DP slaves	Yes
— Number of DP slaves that can be simultaneously activated/deactivated, max.	8
— Direct data exchange (slave-to-slave communication)	Yes; As subscriber
— DPV1	Yes
Address area	
— Inputs, max.	8 kbyte
— Outputs, max.	8 kbyte
User data per DP slave	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
DP slave	
• Transmission rate, max.	12 Mbit/s
• automatic baud rate search	Yes; only with passive interface
• Address area, max.	32
• User data per address area, max.	32 byte
Services	
— 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
— S7 communication, as server	Yes; Connection configured on one side only
— Direct data exchange (slave-to-slave communication)	Yes
— DPV1	No
Transfer memory	
— Inputs	244 byte
— Outputs	244 byte

2. Interface	
Interface type	PROFINET
Physics	Ethernet RJ45
Isolated	Yes
automatic detection of transmission rate	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Change of IP address at runtime, supported	Yes
Interface types	
• Number of ports	2

• integrated switch	Yes
Media redundancy	
• supported	Yes
• Switchover time on line break, typ.	200 ms; PROFINET MRP
• Number of stations in the ring, max.	50
Functionality	
• MPI	No
• PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality
• PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality
• PROFINET CBA	Yes
• PROFIBUS DP master	No
• PROFIBUS DP slave	No
• Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
• Web server	Yes
— Number of HTTP clients	5
PROFINET IO Controller	
• Transmission rate, max.	100 Mbit/s
Services	
— PG/OP communication	Yes
— Routing	Yes
— S7 communication	Yes; with loadable FBs, max. configurable connections: 16, max. number of instances: 32
— Isochronous mode	Yes; OB 61; isochronous mode can only be used alternatively on PROFIBUS DP or PROFINET IO
— Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
— IRT	Yes
— Shared device	Yes
— Prioritized startup	Yes
— Number of IO devices with prioritized startup, max.	32
— Number of connectable IO Devices, max.	128
— Of which IO devices with IRT, max.	64
— of which in line, max.	64
— Number of IO Devices with IRT and the option "high flexibility"	128
— of which in line, max.	61
— Number of connectable IO Devices for RT, max.	128
— of which in line, max.	128
— Activation/deactivation of IO Devices	Yes
— Number of IO Devices that can be simultaneously activated/deactivated, max.	8

— IO Devices changing during operation (partner ports), supported	Yes
— Number of IO Devices per tool, max.	8
— Device replacement without swap medium	Yes
— Send cycles	250 µs, 500 µs, 1 ms; 2 ms, 4 ms (not in the case of IRT with "high flexibility" option)
— Updating time	250 µs to 512 ms (depending on the operating mode, see Manual "S7-300 CPU 31xC and CPU 31x, Technical Data" for more details)
Address area	
— User data consistency, max.	1 024 byte
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— Routing	Yes
— S7 communication	Yes; with loadable FBs, max. configurable connections: 16, max. number of instances: 32
— Isochronous mode	No
— Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
— IRT	Yes
— PROFIenergy	Yes; With SFB 73 / 74 prepared for loadable PROFIenergy standard FB for I-Device
— Shared device	Yes
— Number of IO Controllers with shared device, max.	2
Transfer memory	
— Inputs, max.	1 440 byte; Per IO Controller with shared device
— Outputs, max.	1 440 byte; Per IO Controller with shared device
Submodules	
— Number, max.	64
— User data per submodule, max.	1 024 byte
PROFINET CBA	
• acyclic transmission	Yes
• cyclic transmission	Yes
Open IE communication	
• Number of connections, max.	16
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 443, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface

Communication functions

PG/OP communication	Yes
Data record routing	Yes
Global data communication	
<ul style="list-style-type: none"> • supported 	Yes
<ul style="list-style-type: none"> • Number of GD loops, max. 	8
<ul style="list-style-type: none"> • Number of GD packets, max. 	8
<ul style="list-style-type: none"> • Number of GD packets, transmitter, max. 	8
<ul style="list-style-type: none"> • Number of GD packets, receiver, max. 	8
<ul style="list-style-type: none"> • Size of GD packets, max. 	22 byte
<ul style="list-style-type: none"> • Size of GD packet (of which consistent), max. 	22 byte
S7 basic communication	
<ul style="list-style-type: none"> • supported 	Yes
<ul style="list-style-type: none"> • User data per job, max. 	76 byte
<ul style="list-style-type: none"> • User data per job (of which consistent), max. 	76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)
S7 communication	
<ul style="list-style-type: none"> • supported 	Yes
<ul style="list-style-type: none"> • as server 	Yes
<ul style="list-style-type: none"> • as client 	Yes; via integrated PROFINET interface and loadable FB or via CP and loadable FB
<ul style="list-style-type: none"> • 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)
S5 compatible communication	
<ul style="list-style-type: none"> • supported 	Yes; via CP and loadable FC
Open IE communication	
<ul style="list-style-type: none"> • TCP/IP <ul style="list-style-type: none"> — Number of connections, max. — Data length for connection type 01H, max. — Data length for connection type 11H, max. — several passive connections per port, supported 	Yes; via integrated PROFINET interface and loadable FBs 16 1 460 byte 32 768 byte Yes
<ul style="list-style-type: none"> • ISO-on-TCP (RFC1006) <ul style="list-style-type: none"> — Number of connections, max. — Data length, max. 	Yes; via integrated PROFINET interface and loadable FBs 16 32 768 byte
<ul style="list-style-type: none"> • UDP <ul style="list-style-type: none"> — Number of connections, max. — Data length, max. 	Yes; via integrated PROFINET interface and loadable FBs 16 1 472 byte
Web server	
<ul style="list-style-type: none"> • supported 	Yes
<ul style="list-style-type: none"> • Number of HTTP clients 	5
<ul style="list-style-type: none"> • User-defined websites 	Yes

PROFINET CBA (at set setpoint communication load)	
• Setpoint for the CPU communication load	50 %
• Number of remote interconnection partners	32
• Number of functions, master/slave	30
• Total of all master/slave connections	1 000
• Data length of all incoming connections master/slave, max.	4 000 byte
• Data length of all outgoing connections master/slave, max.	4 000 byte
• Number of device-internal and PROFIBUS interconnections	500
• Data length of device-internal und PROFIBUS interconnections, max.	4 000 byte
• Data length per connection, max.	1 400 byte
Remote interconnections with acyclic transmission	
— Sampling frequency: Sampling time, min.	500 ms
— Number of incoming interconnections	100
— Number of outgoing interconnections	100
— Data length of all incoming interconnections, max.	2 000 byte
— Data length of all outgoing interconnections, max.	2 000 byte
— Data length per connection, max.	1 400 byte
Remote interconnections with cyclic transmission	
— Transmission frequency: Transmission interval, min.	10 ms
— Number of incoming interconnections	200
— Number of outgoing interconnections	200
— Data length of all incoming interconnections, max.	2 000 byte
— Data length of all outgoing interconnections, max.	2 000 byte
— Data length per connection, max.	450 byte
HMI variables via PROFINET (acyclic)	
— Number of stations that can log on for HMI variables (PN OPC/iMap)	3; 2x PN OPC/1x iMap
— HMI variable updating	500 ms
— Number of HMI variables	200
— Data length of all HMI variables, max.	2 000 byte
PROFIBUS proxy functionality	
— supported	Yes
— Number of linked PROFIBUS devices	16
— Data length per connection, max.	240 byte; Slave-dependent

Number of connections	
• overall	32
• usable for PG communication	31
— reserved for PG communication	1
— adjustable for PG communication, min.	1
— adjustable for PG communication, max.	31
• usable for OP communication	31
— reserved for OP communication	1
— adjustable for OP communication, min.	1
— adjustable for OP communication, max.	31
• usable for S7 basic communication	30
— reserved for S7 basic communication	0
— adjustable for S7 basic communication, min.	0
— adjustable for S7 basic communication, max.	30
• usable for S7 communication	16
— reserved for S7 communication	0
— adjustable for S7 communication, min.	0
— adjustable for S7 communication, max.	16
• total number of instances, max.	32
• usable for routing	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: 24 max.

S7 message functions	
Number of login stations for message functions, max.	32; Depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes
simultaneously active Alarm-S blocks, max.	300

Test commissioning functions	
Status block	Yes; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4

Status/control	
• 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

Forcing	
• Forcing	Yes
• Forcing, variables	Inputs, outputs
• Number of variables, max.	10

Diagnostic buffer	
• present	Yes
• Number of entries, max.	500
— adjustable	No
— of which powerfail-proof	100; Only the last 100 entries are retained
• Number of entries readable in RUN, max.	499
— can be set	Yes; From 10 to 499
— preset	10
Service data	
• can be read out	Yes
Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Configuration	
Configuration software	
• STEP 7	Yes; V5.5 or higher
Programming	
• Command set	see instruction list
• Nesting levels	8
• System functions (SFC)	see instruction list
• System function blocks (SFB)	see instruction list
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	Yes
— GRAPH	Yes
— HiGraph®	Yes
Know-how protection	
• User program protection/password protection	Yes
• Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	40 mm
Height	125 mm
Depth	130 mm
Weights	
Weight, approx.	340 g

last modified:

01/17/2017

SIMATIC S7-300, DIGITAL INPUT SM 321, GALVANICALLY ISOLATED, 16 DI, DC 24V, 1 X 20 PIN, PROCESS INTERRUPT, DIAGNOSTICS, FIT FOR ISOCHRONONE MODE



Figure similar

Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Input current	
from load voltage L+ (without load), max.	90 mA
from backplane bus 5 V DC, max.	130 mA
Power loss	
Power loss, typ.	4 W
Digital inputs	
Number of digital inputs	16
Input characteristic curve in accordance with IEC 61131, type 2	Yes
Number of simultaneously controllable inputs	
horizontal installation	

— up to 40 °C, max.	16
— up to 60 °C, max.	16
vertical installation	
— up to 40 °C, max.	16
Input voltage	
• Type of input voltage	DC
• Rated value (DC)	24 V
• for signal "0"	-30 to +5V
• for signal "1"	13 to 30V
Input current	
• for signal "1", typ.	7 mA
Input delay (for rated value of input voltage)	
for standard inputs	
— parameterizable	Yes; 0.1 / 0.5 / 3 / 15 / 20 ms
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Encoder	
Connectable encoders	
• 2-wire sensor	Yes
— permissible quiescent current (2-wire sensor), max.	2 mA
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Interrupts/diagnostics/status information	
Diagnostic functions	Yes; Parameterizable
Alarms	
• Diagnostic alarm	Yes; Parameterizable
• Hardware interrupt	Yes; Parameterizable
Diagnostic messages	
• Wire-break	Yes; to I < 1 mA
Diagnostics indication LED	
• Group error SF (red)	Yes
• Status indicator digital input (green)	Yes
Potential separation	
Potential separation digital inputs	
• between the channels	No
• between the channels, in groups of	16
• between the channels and backplane bus	Yes; Optocoupler

Isolation

Isolation tested with	500 V DC
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Connection method

required front connector	20-pin
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Dimensions

Width	40 mm
-------	-------

Height	125 mm
--------	--------

Depth	120 mm
-------	--------

Weights

Weight, approx.	200 g
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last modified:	01/17/2017
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SIMATIC S7-300, DIGITAL OUTPUT SM 322, OPTICALLY ISOLATED, 8 DO, 24V DC, 2A, 1 X 20 PIN



Figure similar

Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Input current	
from load voltage L+ (without load), max.	60 mA
from backplane bus 5 V DC, max.	40 mA
Power loss	
Power loss, typ.	6.8 W
Digital outputs	
Number of digital outputs	8
Limitation of inductive shutdown voltage to	L+ (-48 V)
Switching capacity of the outputs	
• on lamp load, max.	10 W
Load resistance range	

• lower limit	12 Ω
• upper limit	4 kΩ
Output voltage	
• for signal "1", min.	L+ (-0.8 V)
Output current	
• for signal "1" rated value	2 A
• for signal "1" minimum load current	5 mA
• for signal "0" residual current, max.	0.5 mA
Switching frequency	
• with resistive load, max.	100 Hz
• with inductive load, max.	0.5 Hz
• on lamp load, max.	10 Hz
Total current of the outputs (per group)	
horizontal installation	
— up to 40 °C, max.	4 A
— up to 60 °C, max.	4 A
vertical installation	
— up to 40 °C, max.	4 A
Cable length	
• shielded, max.	1 000 m
• unshielded, max.	600 m
Interrupts/diagnostics/status information	
Diagnostic functions	No
Alarms	
• Diagnostic alarm	No
Diagnostic messages	
• Wire-break	No
• Short-circuit	No
• Fuse blown	No
• missing load voltage	No
Diagnostics indication LED	
• Rated load voltage PWR (green)	No
• Fuse OK FSG (green)	No
• Status indicator digital output (green)	Yes; per channel
Potential separation	
Potential separation digital outputs	
• between the channels	Yes
• between the channels, in groups of	4
• between the channels and backplane bus	Yes; Optocoupler
Isolation	
Isolation tested with	500 V DC

Connection method	
required front connector	20-pin
Dimensions	
Width	40 mm
Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	190 g
last modified:	01/17/2017

SIMATIC S7-300, RAIL L=480MM



Figure similar

Accessories	
belongs to product	S7-300
Dimensions	
Width	482.6 mm
Height	122 mm
Weights	
Weight, approx.	647 g
last modified:	01/16/2017

SIMATIC S7-300, FRONT CONNECTOR FOR SIGNAL MODULES WITH SCREW CONTACTS, 20-PIN



Ambient conditions	
Ambient temperature during operation	
• min.	0 °C
• max.	60 °C
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C
Accessories	
belongs to product	S7-300
Connection method	
Connection I/O signals	
• Connection method	Screw terminals
• Number of lines per connection	1; or combination of 2 conductors of up to 1.5 mm ² (total) in a shared ferrule
Conductor cross-section in mm ²	
— Connectable cable cross-sections for massive cables, min.	0.25 mm ²

— Connectable cable cross-sections for massive cables, min.	1.5 mm ²
— Connectable cable cross-sections for flexible cables without end sleeve, min.	0.25 mm ²
— Connectable cable cross-sections for flexible cables without end sleeve, max.	1.5 mm ²
— Connectable cable cross-sections for flexible cables with end sleeve, min.	0.25 mm ²
— Connectable cable cross-sections for flexible cables with end sleeve, max.	1.5 mm ²
Conductor cross-section acc. to AWG	
— Connectable cable cross-sections for massive cables, min.	24
— Connectable cable cross-sections for massive cables, min.	16
— Connectable cable cross-sections for flexible cables without end sleeve, min.	24
— Connectable cable cross-sections for flexible cables without end sleeve, max.	16
— Connectable cable cross-sections for flexible cables with end sleeve, min.	24
— Connectable cable cross-sections for flexible cables with end sleeve, max.	16
Wire end processing	
— Stripped length of cables, min.	6 mm
— Stripped length of cables, max.	6 mm
Mounting	
— Tool	Screwdriver, conical design, 3 mm to 3.5 mm
— Tightening torque, min.	0.4 N·m
— Tightening torque, max.	0.7 N·m
Dimensions	
Width	23 mm
Height	131 mm
Depth	36 mm
Weights	
Weight, approx.	70 g
last modified:	01/17/2017

SIMATIC S7, MICRO MEMORY CARD P. S7-300/C7/ET 200, 3.3 V
NFLASH, 2 MBYTES



Figure similar

Memory	
Type of memory	Flash-EPROM
Memory size	2 Mbyte
Number of write/delete operations, min.	100 000
Data retention (after final programming action), min.	10 y

Accessories	
belongs to product	S7-300 / ET200

Dimensions	
Width	24 mm
Height	32 mm
Depth	1.4 mm

Weights	
Weight, approx.	2 g

last modified: 01/17/2017