

SIMATIC S7-1500F, CPU 1517F-3 PN/DP, CENTRAL PROCESSING UNIT WITH WORKING MEMORY 3 MB FOR PROGRAM AND 8 MB FOR DATA, 1. INTERFACE, PROFINET IRT WITH 2 PORT SWITCH, 2. INTERFACE, ETHERNET, 3. INTERFACE, PROFIBUS, 2 NS BIT-PERFORMANCE, SIMATIC MEMORY CARD NECESSARY



Product type designation

General information

Hardware product version	FS01
Firmware version	V1.6
Engineering with	
<ul style="list-style-type: none"> STEP 7 TIA Portal can be configured/integrated as of version 	V13 Update 3

Display

Screen diagonal (cm)	6.1 cm
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Control elements

Number of keys	6
Mode selector switch	1

Supply voltage

Type of supply voltage	24 V DC
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes

Input current

Inrush current, max.	2.4 A; Rated value
Power	
Power consumption from the backplane bus (balanced)	30 W
Infeed power to the backplane bus	12 W
Power losses	
Power loss, typ.	24 W
Memory	
SIMATIC Memory Card required	Yes
Work memory	
• integrated (for program)	3 Mbyte
• integrated (for data)	8 Mbyte
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
• maintenance-free	Yes
CPU processing times	
for bit operations, typ.	2 ns
for word operations, typ.	3 ns
for fixed point arithmetic, typ.	3 ns
for floating point arithmetic, typ.	12 ns
CPU-blocks	
Number of blocks (total)	10 000
DB	
• Number, max.	10 000; Number range: 1 to 65535
• Size, max.	8 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
• Number, max.	9 998; Number range: 1 to 65535
• Size, max.	512 kbyte
FC	
• Number, max.	9 999; Number range: 1 to 65535
• Size, max.	512 kbyte
OB	
• Size, max.	512 kbyte
• Number of free cycle OBs	100
• Number of time alarm OBs	20
• Number of delay alarm OBs	20
• Number of time interrupt OBs	20
• Number of process alarm OBs	50
• Number of DPV1 alarm OBs	3
• Number isochronous mode OBs	2

• Number of technology synchronous alarm OBs	2
• Number of startup OBs	100
• Number of asynchronous error OBs	4
• Number of synchronous error OBs	2
• Number of diagnostic alarm OBs	1
Nesting depth	
• per priority class	24; only 8 for F-blocks
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
Retentivity	
— can be set	Yes
IEC counter	
• Number	Any (only limited by the main memory)
Retentivity	
— can be set	Yes
S7 times	
• Number	2 048
Retentivity	
— can be set	Yes
IEC timer	
• Number	Any (only limited by the main memory)
Retentivity	
— can be set	Yes
Data areas and their retentivity	
retentive data area in total (incl. times, counters, flags), max.	768 kbyte; Available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 700 KB
Flag	
• Number, max.	16 kbyte
• Number of clock memories	8
Data blocks	
• Retentivity adjustable	Yes
• Retentivity preset	No
Local data	
• per priority class, max.	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	8 192
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
— Inputs (volume)	16 kbyte; 16 KB via the integrated PROFINET IO interface, 8 KB via the integrated DP interface

— Outputs (volume)	16 kbyte; 16 KB via the integrated PROFINET IO interface, 8 KB via the integrated DP interface
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
• Number of subprocess images, max.	32
Address space per module	
• Number of IO subsystems	10
Hardware configuration	
Number of DP masters	
• Integrated	1
• via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
• Integrated	1
• via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Rack	
• Modules per rack, max.	32; CPU + 31 modules
• Rack, number of rows, max.	1
PtP CM	
• Number of PtP CMs	the number of connectable PtP CMs is only limited by the number of available slots
Time of day	
Clock	
• Type	Hardware clock
• Deviation per day, max.	10 s; Typ.: 2 s
• Backup time	6 wk; At 40 °C ambient temperature
Operating hours counter	
• Number	16
Clock synchronization	
• supported	Yes
• to DP, master	Yes
• in AS, master	Yes
• in AS, slave	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	2
Number of PROFIBUS interfaces	1
1st interface	
Interface types	
— Number of ports	2

— Integrated switch	Yes
— RJ 45 (Ethernet)	Yes
Protocols	
— PROFINET IO Controller	Yes
— PROFINET IO Device	Yes
— SIMATIC communication	Yes
— Open IE communication	Yes
— Web server	Yes
— Media redundancy	Yes
2nd interface	
Interface types	
— Number of ports	1
— Integrated switch	No
— RJ 45 (Ethernet)	Yes
Protocols	
— PROFINET IO Controller	No
— PROFINET IO Device	No
— SIMATIC communication	Yes
— Open IE communication	Yes
— Web server	Yes
3rd interface	
Interface types	
— Number of ports	1
— RS 485	Yes
Protocols	
— SIMATIC communication	Yes
Interface types	
RJ 45 (Ethernet)	
• 100 Mbps	Yes
• Autonegotiation	Yes
• Autocrossing	Yes
• Industrial Ethernet status LED	Yes
RS 485	
• Transmission rate, max.	12 Mbit/s
Protocols	
Number of connections	
• Number of connections, max.	320; via integrated interfaces of the CPU and connected CPs / CMs
• Number of connections reserved for ES/HMI/web	10
• Number of connections via integrated interfaces	160
• Number of S7 routing paths	64

PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	Yes
— Open IE communication	Yes
— IRT	Yes
— MRP	Yes; As MRP redundancy manager and/or MRP client; max. number of devices in the ring: 50
— PROFINergy	Yes
— Prioritized startup	Yes; Max. 32 PROFINET devices
— Number of connectable IO devices, max.	512; In total, up to 1000 distributed I/O devices can be connected via PROFIBUS or PROFINET
— Max. number of connectable IO devices for RT	512
— of which in line, max.	512
— Number of IO Devices with IRT and the option "high performance", max.	64
— Maximum number of IO devices that can be activated/deactivated at the same time.	8
— Max. number of IO devices per tool	8
— Updating times	The minimum value of the update time also depends on communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data
with RT	
— for send cycle of 250 µs	250 µs to 128 ms
— for send cycle of 500 µs	500 µs to 256 ms
— for send cycle of 1 ms	1 ms to 512 ms
— for send cycle of 2 ms	2 ms to 512 ms
— for send cycle of 4 ms	4 ms to 512 ms
for IRT with the "high performance" option	
— for send cycle of 250 µs	250 µs to 4 ms
— for send cycle of 500 µs	500 µs to 8 ms
— for send cycle of 1 ms	1 ms to 16 ms
— for send cycle of 2 ms	2 ms to 32 ms
— for send cycle of 4 ms	4 ms to 64 ms
— For IRT with the "high performance" option and parameter assignment for so-called "odd-numbered" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3.875 µs)
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Isochronous mode	No
— Open IE communication	Yes

— IRT, supported	Yes
— MRP, supported	Yes
— PROFinergy	Yes
— Shared device	Yes
— Number of IO controllers with shared device, max.	4
SIMATIC communication	
• S7 communication, as server	Yes
• S7 communication, as client	Yes
• User data per job, max.	See online help (S7 communication, user data size)
Open IE communication	
• TCP/IP	Yes
— Data length, max.	64 kbyte
— several passive connections per port, supported	Yes
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	1 472 byte
• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Standard and user-defined pages
• HTTPS	Yes; Standard and user-defined pages
PROFIBUS	
Services	
— PG/OP communication	Yes
— S7 routing	Yes
— Data record routing	Yes
— Isochronous mode	Yes
— equidistance	Yes
— Number of DP slaves	125; In total, up to 1000 distributed I/O devices can be connected via PROFIBUS or PROFINET
— Activation/deactivation of DP slaves	Yes
PROFIBUS DP master	
• Number of connections, max.	48; for the integrated PROFIBUS DP interface
Further protocols	
• MODBUS	Yes; MODBUS TCP
Media redundancy	
• Switchover time on line break, typically	200 ms
• Number of stations in the ring, max.	50

Isochronous mode

Isochronous operation (application synchronized up to terminal)	Yes
equidistance	Yes

S7 message functions

Number of login stations for message functions, max.	32
Block related messages	Yes
Number of configurable alarms, max.	10 000
Number of simultaneously active alarms in alarm pool	1 000
• Number of reserved user alarms	1 000
• Number of reserved alarms for system diagnostics	200
• Number of reserved alarms for motion technology objects	160

Test commissioning functions

Joint commission (Team Engineering)	Yes
• Maximum number of parallel ES clients	5
Status block	Yes; Up to 16 simultaneously (in total across all ES clients)
Single step	No

Status/control

• Status/control variable	Yes
• Variables	Inputs, outputs, memory bits, DB, times, counters
• of which status variables, max.	200; per job
• of which control variables, max.	200; per job

Forcing

• Force, variables	Inputs, outputs
• Number of variables, max.	200

Diagnostic buffer

• present	Yes
• Number of entries, max.	3 200
— Of which powerfail-proof	1 000

Traces

• Number of configurable Traces	8; 512 KB per trace are reserved in the CPU memory
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Interrupts/diagnostics/status information

Diagnostics indication LED

• RUN/STOP LED	Yes
• ERROR LED	Yes
• MAINT LED	Yes
• Connection display LINK TX/RX	Yes

supported technology objects

Motion	Yes
• Speed-controlled axis	

— Number of speed-controlled axes, max.	96; Max. number of speed-controlled axes (requirement: there must be no other motion technology objects created)
• Positioning axis	
— Number of positioning axes, max.	96; Max. number of positioning axes (requirement: there must be no other motion technology objects created)
• Synchronized axes (relative gear synchronization)	
— Number of axes, max.	48; Max. number of synchronous axes (requirement: there must be no other motion technology objects created)
• External encoders	
— Number of external encoders, max.	96; Max. number of external encoders (requirement: there must be no other motion technology objects created)
Controller	
• PID_Compact	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves
Counting and measuring	
• High-speed counter	Yes

Standards, approvals, certificates

Highest safety class achievable in safety mode

• Low demand (PFD) acc. to SIL3	< 2.00E-05
• High demand (PFH) acc. to SIL3	< 1.00E-09 1/h

Ambient conditions

Operating temperature

• horizontal installation, min.	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off

Configuration

programming

Programming language

— LAD	Yes; incl. failsafe
— FBD	Yes; incl. failsafe
— STL	Yes
— SCL	Yes
— GRAPH	Yes

Know-how protection

• User program protection	Yes
• Copy protection	Yes
• Block protection	Yes

Access protection

• Password for display	Yes
• Protection level: Write protection	Yes

• Protection level: Read/write protection	Yes
• Protection level: Complete protection	Yes
Cycle time monitoring	
• lower limit	500 µs; adjustable minimum cycle time
• upper limit	15 s; adjustable maximum cycle time
Dimensions	
Width	175 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	1 978 g
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