



spare part SIMATIC DP, CPU 1513pro F-2 PN for ET 200pro, central processing unit with work memory 450 KB for program and 1.5 MB for data, 1st interface: PROFINET IRT with 3-port switch, 2nd interface: PROFINET RT, 40 ns bit performance, degree of protection: IP65/67, SIMATIC Memory Card required connection module required

General information	
Product type designation	CPU 1513pro F-2 PN
HW functional status	FS01
Firmware version	V2.8
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	Yes; Via X1, with minimum OB 6x cycle of 500 µs
Engineering with	
• STEP 7 TIA Portal configurable/integrated from version	V16
Configuration control	
via dataset	Yes
Control elements	
Mode selector switch	1
Supply voltage	
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Mains buffering	
• Mains/voltage failure stored energy time	5 ms
Input current	
Current consumption (rated value)	0.31 A
Inrush current, max.	0.4 A; Rated value
I ² t	0.001 A ² ·s
from supply voltage 1L+, max.	0.35 A
Power	
Infeed power to the backplane bus	2.275 W
Power loss	
Power loss, typ.	5.3 W
Storage	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
• integrated (for program)	450 kbyte
• integrated (for data)	1.5 Mbyte
Load memory	
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
• maintenance-free	Yes

CPU processing times	
for bit operations, typ.	40 ns
for word operations, typ.	48 ns
for fixed point arithmetic, typ.	64 ns
for floating point arithmetic, typ.	256 ns
CPU-blocks	
Number of elements (total)	2 000; Blocks (OB, FB, FC, DB) and UDTs
DB	
• Number range	1 ... 60 999; subdivided into: number range that can be used by the user: 1 ... 59 999, and number range of DBs created via SFC 86: 60 000 ... 60 999
• Size, max.	1.5 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
• Number range	0 ... 65 535
• Size, max.	450 kbyte
FC	
• Number range	0 ... 65 535
• Size, max.	450 kbyte
OB	
• Size, max.	450 kbyte
• Number of free cycle OBs	100
• Number of time alarm OBs	20
• Number of delay alarm OBs	20
• Number of cyclic interrupt OBs	20; With minimum OB 3x cycle of 500 µs
• Number of process alarm OBs	50
• Number of DPV1 alarm OBs	3
• Number of isochronous mode OBs	1
• 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
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 timer	
• Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	
• Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	128 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 88 KB
Flag	
• Size, max.	16 kbyte
• Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
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	2 048; max. number of modules / submodules
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)	8 kbyte
— Outputs (volume)	8 kbyte
Hardware configuration	
Number of distributed IO systems	32; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)
Number of IO Controllers	
• integrated	2
• via CM	0
Rack	
• Modules per rack, max.	16; Expansion width max. 1.2 m
• Number of lines, max.	1
Time of day	
Clock	
• Backup time	6 wk; At 40 °C ambient temperature, typically
• Deviation per day, max.	10 s; Typ.: 2 s
Operating hours counter	
• Number	16
Clock synchronization	
• supported	Yes
• in AS, master	Yes
• in AS, device	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	2
Number of PROFIBUS interfaces	0
1. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X1 P3
• Number of ports	3; 2x M12 + 1x RJ45
• integrated switch	Yes
Protocols	
• IP protocol	Yes; IPv4
• PROFINET IO Controller	Yes
• PROFINET IO Device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes; Optionally also encrypted
• Web server	Yes
• Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— Isochronous mode	Yes
— Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)
— IRT	Yes
— PROFIenergy	Yes
— Prioritized startup	Yes; Max. 32 PROFINET devices
— Number of connectable IO Devices, max.	128; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
— Of which IO devices with IRT, max.	64
— Number of connectable IO Devices for RT, max.	128

— of which in line, max.	128
— Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces
— Number of IO Devices per tool, max.	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
Update time for IRT	
— for send cycle of 250 µs	250 µs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of 500 µs of the isochronous OB is decisive
— 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
— With IRT and parameterization of "odd" send cycles	Update time = set "odd" send clock (any multiple of 125 µs: 375 µs, 625 µs ... 3 875 µs)
Update time for 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
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— Isochronous mode	No
— IRT	Yes
— PROFIenergy	Yes; per user program
— Prioritized startup	No
— Shared device	Yes
— Number of IO Controllers with shared device, max.	4
— Asset management record	Yes; per user program
2. Interface	
Interface types	
• RJ 45 (Ethernet)	No
• Number of ports	1; 1x M12
• integrated switch	No
Protocols	
• IP protocol	Yes; IPv4
• PROFINET IO Controller	Yes
• PROFINET IO device	Yes
• SIMATIC communication	Yes
• Open IE communication	Yes; Optionally also encrypted
• Web server	Yes
• Media redundancy	No
PROFINET IO Controller	
Services	
— PG/OP communication	Yes
— Isochronous mode	No
— Direct data exchange	No
— IRT	No
— PROFIenergy	Yes
— Prioritized startup	No
— Number of connectable IO Devices, max.	32; In total, up to 512 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
— Number of connectable IO Devices for RT, max.	32
— of which in line, max.	32
— Number of IO Devices that can be simultaneously activated/deactivated, max.	8; in total across all interfaces
— Number of IO Devices per tool, max.	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
Update time for RT		
— for send cycle of 1 ms		1 ms to 512 ms
PROFINET IO Device		
Services		
— PG/OP communication		Yes
— Isochronous mode		No
— IRT		No
— PROFINergy		Yes; per user program
— Prioritized startup		No
— Shared device		Yes
— Number of IO Controllers with shared device, max.		4
— Asset management record		Yes; per user program
Interface types		
RJ 45 (Ethernet)		
• 100 Mbps		Yes
• Autonegotiation		Yes
• Autocrossing		Yes
• Industrial Ethernet status LED		Yes
Protocols		
PROFIsafe		Yes
Number of connections		
• Number of connections, max.		128; Via integrated interfaces of the CPU
• Number of connections reserved for ES/HMI/web		10
• Number of connections via integrated interfaces		128
• Number of S7 routing paths		16
Redundancy mode		
Media redundancy		
— MRP		Yes; as MRP redundancy manager and/or MRP client
— MRPD		Yes; Requirement: IRT
— Switchover time on line break, typ.		200 ms; For MRP, bumpless for MRPD
— Number of stations in the ring, max.		50
SIMATIC communication		
• S7 routing		Yes
• 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.		2 kbyte; 1 472 bytes for UDP broadcast
— UDP multicast		Yes; Max. 5 multicast circuits
• DHCP		No
• SNMP		Yes
• DCP		Yes
• LLDP		Yes
Web server		
• HTTP		Yes; Standard and user pages
• HTTPS		Yes; Standard and user pages
OPC UA		
• Runtime license required		Yes; "Small" license required
• OPC UA Client		Yes
— Application authentication		Yes
— Security policies		Available security policies: None, Basic128Rsa15, Basic256Rsa15,

<ul style="list-style-type: none"> — User authentication — Number of connections, max. — Number of nodes of the client interfaces, recommended max. — Number of elements for one call of OPC-UA_NodeGetHandleList/OPC-UA_ReadList/OPC-UA_WriteList, max. — Number of elements for one call of OPC-UA_NameSpaceGetIndexList, max. — Number of elements for one call of OPC-UA_MethodGetHandleList, max. — Number of simultaneous calls of the client instructions for session management, per connection, max. — Number of simultaneous calls of the client instructions for data access, per connection, max. — Number of registerable nodes, max. — Number of registerable method calls of OPC-UA_MethodCall, max. — Number of inputs/outputs when calling OPC-UA_MethodCall, max. 	Basic256Sha256 "anonymous" or by user name & password 4 1 000 300 20 100 1 5 5 000 100 20
<ul style="list-style-type: none"> • OPC UA Server <ul style="list-style-type: none"> — Application authentication — Security policies — User authentication — Number of sessions, max. — Number of accessible variables, max. — Number of registerable nodes, max. — Number of subscriptions per session, max. — Sampling interval, min. — Publishing interval, min. — Number of server methods, max. — Number of inputs/outputs per server method, max. — Number of monitored items, recommended max. — Number of server interfaces, max. — Number of nodes for user-defined server interfaces, max. 	Yes; Data access (read, write, subscribe), method call, custom address space Yes Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256 "anonymous" or by user name & password 32 50 000 10 000 20 100 ms 500 ms 20 20 1 000; for 1 s sampling interval and 1 s send interval 10 1 000
Further protocols	
<ul style="list-style-type: none"> • MODBUS 	Yes; MODBUS TCP
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	2 500
Number of simultaneously active program alarms <ul style="list-style-type: none"> • Number of program alarms • Number of alarms for system diagnostics • Number of alarms for motion technology objects 	600 100 80
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 5 engineering systems
Status block	Yes; Up to 8 simultaneously (in total across all ES clients)
Single step	No
Number of breakpoints	8
Status/control	
<ul style="list-style-type: none"> • Status/control variable • Variables • Number of variables, max. <ul style="list-style-type: none"> — of which status variables, max. — of which control variables, max. 	Yes; without fail-safe Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job 200; per job
Forcing	

<ul style="list-style-type: none"> • Forcing • Forcing, variables • Number of variables, max. 	Yes; without fail-safe Peripheral inputs/outputs 200
Diagnostic buffer	
<ul style="list-style-type: none"> • present • Number of entries, max. — of which powerfail-proof 	Yes 1 000 500
Traces	
<ul style="list-style-type: none"> • Number of configurable Traces 	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
Diagnostics indication LED	
<ul style="list-style-type: none"> • RUN/STOP LED • ERROR LED • MAINT LED • Monitoring of the supply voltage (PWR-LED) • Connection display LINK TX/RX 	Yes Yes Yes Yes; green "24 V DC" LED Yes
Supported technology objects	
Motion Control <ul style="list-style-type: none"> • Number of available Motion Control resources for technology objects • Required Motion Control resources <ul style="list-style-type: none"> — per speed-controlled axis — per positioning axis — per synchronous axis — per external encoder — per output cam — per cam track — per probe • Positioning axis <ul style="list-style-type: none"> — Number of positioning axes at motion control cycle of 4 ms (typical value) — Number of positioning axes at motion control cycle of 8 ms (typical value) 	Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 800 40 80 160 80 20 160 40 5 10
Controller <ul style="list-style-type: none"> • PID_Compact • PID_3Step • PID-Temp 	Yes; Universal PID controller with integrated optimization Yes; PID controller with integrated optimization for valves Yes; PID controller with integrated optimization for temperature
Counting and measuring <ul style="list-style-type: none"> • High-speed counter 	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
<ul style="list-style-type: none"> • Performance level according to ISO 13849-1 • SIL acc. to IEC 61508 	PLe SIL 3
Probability of failure (for service life of 20 years and repair time of 100 hours)	
<ul style="list-style-type: none"> — Low demand mode: PFDavg in accordance with SIL3 — High demand/continuous mode: PFH in accordance with SIL3 	< 2.00E-05 < 1.00E-09
Ambient conditions	
Ambient temperature during operation	
<ul style="list-style-type: none"> • horizontal installation, min. • horizontal installation, max. • vertical installation, min. • vertical installation, max. 	-25 °C 55 °C -25 °C 55 °C
Ambient temperature during storage/transportation	
<ul style="list-style-type: none"> • min. • max. 	-40 °C 70 °C
Altitude during operation relating to sea level	
<ul style="list-style-type: none"> • Installation altitude above sea level, max. 	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual

Configuration			
Programming			
Programming language			
— LAD	Yes; incl. failsafe		
— FBD	Yes; incl. failsafe		
— STL	Yes		
— SCL	Yes		
— GRAPH	Yes		
Know-how protection			
• User program protection/password protection	Yes		
• Copy protection	Yes		
• Block protection	Yes		
Access protection			
• Protection level: Write protection	Yes		
• Protection level: Read/write protection	Yes		
• Protection level: Complete protection	Yes		
Cycle time monitoring			
• lower limit	adjustable minimum cycle time		
• upper limit	adjustable maximum cycle time		
Dimensions			
Width	135 mm		
Height	130 mm		
Depth	65 mm		
Weights			
Weight, approx.	614 g		
Classifications			
		Version	Classification
	eClass	16	27-24-26-07
	eClass	14	27-24-26-07
	eClass	12	27-24-26-07
	eClass	9.1	27-24-26-07
	eClass	9	27-24-26-07
	eClass	8	27-24-26-07
	eClass	7.1	27-24-26-07
	eClass	6	27-24-26-07
	ETIM	10	EC001603
	ETIM	9	EC001603
	ETIM	8	EC001603
	ETIM	7	EC001603
	IDEA	4	3565
	UNSPSC	15	32-15-17-05

Approvals / Certificates			
General Product Approval			

[Miscellaneous](#)



[Miscellaneous](#)



General Product Approval	Functional Safety
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[China RoHS](#)

[Type Examination Certificate](#)

[TUEV](#)

[Type Examination Certificate](#)

Maritime application



[NK / Nippon Kaiji Kyokai](#)



Maritime application	other	Industrial Communication
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[CCS \(China Classification Society\)](#)

[KR \(Korean Register of Shipping\)](#)

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