SIEMENS

Data sheet

6ES7513-1FM03-0AB0

SIMATIC S7-1500F, CPU 1513F-1 PN, central processing unit with work memory 900 KB for program and 2.5 MB for data, 1st interface: PROFINET IRT with 2-port switch, 25 ns bit performance, SIMATIC Memory Card required - - approvals and certificates according to entry 109815653 at support.industry.siemens.com to be considered! - -

General information		
Product type designation	CPU 1513F-1 PN	
HW functional status	FS04	
Firmware version	V4.0	
FW update possible	Yes	
Product function		
• I&M data	Yes; I&M0 to I&M3	
• Isochronous mode	Yes; Distributed and central; with minimum OB 6x cycle of 500 μs (distributed) and 1 ms (central)	
SysLog	Yes	
Engineering with		
STEP 7 TIA Portal configurable/integrated from version	V20 (FW V4.0) / V18 (FW V3.0) or higher; configurable with older TIA Portal versions as 6ES7 513-1FL02-0AB0	
Configuration control		
via dataset	Yes	
Display		
Screen diagonal [cm]	3.45 cm	
Control elements		
Number of keys	8	
Mode buttons	2	
Supply voltage		
Rated value (DC)	24 V	
permissible range, lower limit (DC)	19.2 V	
permissible range, upper limit (DC)	28.8 V	
Reverse polarity protection	Yes	
Mains buffering		
 Mains/voltage failure stored energy time 	5 ms	
Repeat rate, min.	1/s	
Input current		
Current consumption (rated value)	0.56 A	
Current consumption, max.	0.9 A	
Inrush current, max.	1.15 A; Rated value	
l²t	0.6 A²·s	
Power		
Infeed power to the backplane bus	10 W	
Power consumption from the backplane bus (balanced)	5.5 W	
Power loss		
Power loss, typ.	3.4 W	
Memory		
Number of slots for SIMATIC memory card	1	
SIMATIC memory card required	Yes	
Work memory		
• integrated (for program)	900 kbyte	
integrated (for data)	2.5 Mbyte	
Load memory		
Plug-in (SIMATIC Memory Card), max.	32 Gbyte	
Backup		
maintenance-free	Yes	
CPU processing times		

for bit operations, typ.	6 ns
for word operations, typ.	7 ns
for fixed point arithmetic, typ.	9 ns
for floating point arithmetic, typ.	37 ns
CPU-blocks	
Number of elements (total)	4 000; 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
- Cima may	59 999, and number range of DBs created via SFC 86: 60 000 60 999
• Size, max.	2.5 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB . Number range	0 05 505
Number range Gize may	0 65 535
• Size, max.	900 kbyte
FC Number range	0 05 505
Number range Ciao may	0 65 535
• Size, max.	900 kbyte
OB O:	000 11 4
Size, max. Number of free guele ORs.	900 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 250 μs
Number of process alarm OBs	50
 Number of DPV1 alarm OBs 	3
 Number of isochronous mode 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; Up to 8 possible for F-blocks
Counters, timers and their retentivity	
S7 counter	
Number	2 048
Retentivity	
— adjustable	Yes
IEC counter	
Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes
S7 times	
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.	256 kbyte; in total; available retentive memory for bit memories, timers,
	counters, DBs, and technology data (axes): 216 KB
Extended retentive data area (incl. timers, counters, flags), max.	2.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Flag	
Size, max.	16 kbyte
0.00	
Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
	8; 8 clock memory bit, grouped into one clock memory byte
Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte Yes
Number of clock memories Data blocks	
Number of clock memoriesData blocksRetentivity adjustable	Yes
 Number of clock memories Data blocks Retentivity adjustable Retentivity preset 	Yes

Number of IO modules	0.040.	
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	
per CM/CP		
— Inputs (volume)	8 kbyte	
— Outputs (volume)	8 kbyte	
Subprocess images		
Number of subprocess images, max.	32	
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 DP masters		
• Via CM	6; A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total	
Number of IO Controllers		
• integrated	1	
• Via CM	6; A maximum of 6 CMs (PROFINET + PROFIBUS) can be inserted in total	
Rack		
Modules per rack, max.	32; CPU + 31 modules	
Number of lines, 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	
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	
● to DP, master	Yes; via PROFIBUS CM / CP	
• on DP, device	Yes; via PROFIBUS CM / CP	
• in AS, master	Yes	
• in AS, device	Yes	
on Ethernet via NTP	Yes	
Interfaces		
Number of PROFINET interfaces	1	
1. Interface		
Interface types		
• RJ 45 (Ethernet)	Yes; X1	
Number of ports	2	
• integrated switch	Yes	
Protocols		
IP protocol	Yes; IPv4	
PROFINET IO Controller	Yes	
PROFINET IO Device	Yes	
SIMATIC communication		
Open IE communication	Yes: Ontionally also encrypted	
Web server	Yes; Optionally also encrypted	
Web server Media redundancy	Yes	
PROFINET IO Controller	Yes	
Services	Von	
— Isochronous mode	Yes	
— Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)	
— IRT	Yes	

— PROFlenergy	Yes; per user program	
— 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	
— PROFINET Security Class	1	
Update time for IRT		
— for send cycle of 250 μs	$250~\mu s$ 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 $\mu s:375~\mu s,625~\mu s3875~\mu s)$	
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		
— Isochronous mode	No	
— IRT	Yes	
— PROFlenergy	Yes; per user program	
— Shared device	Yes	
 Number of IO Controllers with shared device, max. 	4	
 activation/deactivation of I-devices 	Yes; per user program	
 Asset management record 	Yes; per user program	
— PROFINET Security Class	SNMP Configuration and DCP Read Only	
Interface types		
RJ 45 (Ethernet)		
• 100 Mbps	Yes	
 Autonegotiation 	Yes	
 Autocrossing 	Yes	
Industrial Ethernet status LED	Yes	
Protocols		
PROFIsafe	Yes; V2.4 / V2.6	
Number of connections		
Number of connections, max.	128; 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 	88	
Number of S7 routing paths	16	
Redundancy mode		
H-Sync forwarding	Yes	
Media redundancy		
— Media redundancy	only via 1st interface (X1)	
— MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client	
 MRP interconnection, supported 	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0	
— 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		
Chin/110 Communication		

PG/OP communication	Yes; encryption with TLS V1.3 pre-selected	
• S7 routing	Yes	
Data record 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. 78 multicast circuits	
• DHCP	Yes	
• DNS	Yes	
• SNMP	Yes	
• DCP	Yes	
• LLDP	Yes	
Encryption	Yes; Optional	
Web server		
• HTTP	Yes; Standard and user pages	
• HTTPS	Yes; Standard and user pages	
• web API		
Number of sessions, max.	50	
 number of simultaneous HTTP calls, max. 	4	
— HTTP request body, max.	131 072 byte	
OPC UA		
Runtime license required	Yes; "Small" license required	
OPC UA Client	Yes; Data Access (registered Read/Write), Method Call	
 Application authentication 	Yes	
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256	
 User authentication 	"anonymous" or by user name & password	
 Number of connections, max. 	4	
 Number of nodes of the client interfaces, recommended max. 	1 000	
 Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_I max. 	300 _l	
 Number of elements for one call of 	20	
OPC_UA_NameSpaceGetIndexList, max. — Number of elements for one call of	100	
OPC_UA_MethodGetHandleList, max.	1	
 Number of simultaneous calls of the client instructions for session management, per connection, max. 	1	
 Number of simultaneous calls of the client instructions for data access, per connection, max. 	5	
— Number of registerable nodes, max.	5 000	
 Number of registerable method calls of OPC_UA_MethodCall, max. 	100	
 Number of inputs/outputs when calling OPC_UA_MethodCall, max. 	20	
OPC UA Server	Yes; data access (read, write, subscribe), method call, alarms & condition (A&C), custom address space, role-based access control	
 Application authentication 	Yes	
— Security policies	available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss	
— User authentication	"anonymous" or by user name & password	
 — GDS support (certificate management) 	Yes	
— Number of sessions, max.	32	
 Number of accessible variables, max. 	50 000	
 Number of registerable nodes, max. 	10 000	

- Number of program anomalous protections and the second material of the second program anomalous and the second program anomalous an	Number of subscriptions are series	50	
- Publishing interval, min Number of server methods, max Number of propositopty parameter method, max Number of impusivolatory per server method, max Number of monitored items, recommended max Number of redever interfaces, max Number of program aliams - Number of redever interfaces, max 200 - Number of redever interfaces, max Of which control variables, max Of whi	Number of subscriptions per session, max.	50	
- Number of server methods, max Number of inputs outputs per server method, max Number of inputs outputs per server method, max Number of server interfaces, max Number of server interfaces, max Number of nonders for user-defined server interfaces, max Number of program atams - Number of program atams - Number of program atams - Number of salarms for system diagnostics - Number of subcorptions, max 250 - Number of subcorptions, max 250 - Number of salarms for system diagnostics - Number of orinflurable program messages in RUN, max 5000, Program alarms - Number of orinflurable program messages in RUN, max 5000, Program alarms - Number of otalarms for solar diagnostics - Number of alarms for moint encology objects - Number of alarms for moint encology objects - Number of alarms for moint encology objects - Number of salarms for solar diagnostics - Number of comparal atams - Number of program alarms - Number of alarms for moint encology objects - Number of salarms for solar diagnostics - Number of variables, max of which status information Number of configura			
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- Number of server interfaces, max Number of notes for user defined server interfaces, max. - Alarms and Conditions - Number of program alarms - Number of program alarms - MoDBUS - Number of alarms for system diagnostics - MODBUS - Number of program alarms - MODBUS - M		20	
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### Author of congam alarms - Number of organ alarms - Number of starms for system diagnostics * MODEUS * MODEUS * MODEUS * MODEUS * Yes; MODBUS TCP * MODEUS * Modeus * Modeus * Number of login stations for message functions, max. * program alarms - Number of login stations for message functions, max. * program alarms - Number of configurable program messages, max. * Number of rogram alarms * Number of program alarms * Number of program alarms * Number of program alarms * Number of alarms for system diagnostics * Number of alarms for residue technology objects * Yes; Up to 8 simultaneously (in total across all ES clients) * Single step * No * Number of treat-points * Profiting * Yes * Status/control variables, max. - of which status variables, max. - of which status variables, max. - of which status variables, max. - of which control variables max. - of	 Number of server interfaces, max. 		
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- Number of alarms for system diagnostics #MODBUS Yes; MODBUS TCP ### A	 Alarms and Conditions 	Yes	
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Supported technology objects Motion Control Yes; Note: The number of technology objects affects the cycle time of the PLC		Yes	
Motion Control Yes; Note: The number of technology objects affects the cycle time of the PLC	· ·	Yes	
	Supported technology objects		
	Motion Control		

 Number of available Motion Control resources for technology objects 	1 120		
 Required Motion Control resources 			
— per speed-controlled axis	40		
— per positioning axis	80		
— per synchronous axis	160		
— per external encoder	80		
— per output cam	20		
	160		
— per cam track			
— per probe	40		
 Positioning axis — Number of positioning axes at motion control cycle of 4 ms (typical value) 	11		
— Number of positioning axes at motion control cycle of 8 ms (typical value)	14		
Controller			
PID_Compact	Yes; Universal PID controller with integrated optimization		
• PID_3Step	Yes; PID controller with integrated optimization for valves		
• PID-Temp	Yes; PID controller with integrated optimization for temperature		
Counting and measuring	1 55, 1 15 controller with integrated optimization for temperature		
	Voc		
High-speed counter Characteristics Characteristics	Yes		
Standards, approvals, certificates			
Highest safety class achievable in safety mode			
 Performance level according to ISO 13849-1 	PLe		
SIL acc. to IEC 61508	SIL 3		
Probability of failure (for service life of 20 years and repair time	e of 100 hours)		
— Low demand mode: PFDavg in accordance with SIL3	< 2.00E-05		
High demand/continuous mode: PFH in accordance with SIL3	< 1.00E-09		
product functions / security / header			
PROFINET Security Class	1		
signed firmware update	Yes		
Secure Boot	Yes		
safely removing data	Yes		
Ambient conditions			
Ambient temperature during operation			
·	-30 °C; No condensation		
horizontal installation, min.			
horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off		
vertical installation, min.	-30 °C; No condensation		
 vertical installation, max. 	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off		
Ambient temperature during storage/transportation	and planty to difficulties on		
	-40 °C		
• min.			
• max.	70 °C		
Altitude during operation relating to sea level			
Installation altitude above sea level, max.	5 000 m; Restrictions for installation altitudes > 2 000 m, see manual		
configuration / header			
configuration / programming / header			
Programming language			
— LAD	Yes; incl. failsafe		
— FBD	Yes; incl. failsafe		
— STL	Yes		
— SCL	Yes		
— CFC	Yes; either CFC or failsafe functionality		
— GRAPH	Yes		
	160		
Know-how protection	V		
User program protection/password protection	Yes		
 Copy protection 	Yes		
Block protection	Yes		
Access protection			
protection of confidential configuration data	Yes		

 Password for display 	Yes
 Protection level: Write protection 	Yes
 Protection level: Read/write protection 	Yes
 Protection level: Write protection for Failsafe 	Yes
 Protection level: Complete protection 	Yes
 User administration 	Yes; device-wide and centralized
 Number of users 	100
 Number of groups 	100
Number of roles	50
programming / cycle time monitoring / header	
• lower limit	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	336 g

	Version	Classification
eClass	14	27-24-22-07
eClass	12	27-24-22-07
eClass	9.1	27-24-22-07
eClass	9	27-24-22-07
eClass	8	27-24-22-07
eClass	7.1	27-24-22-07
eClass	6	27-24-22-07
ETIM	9	EC000236
ETIM	8	EC000236
ETIM	7	EC000236
IDEA	4	3565
UNSPSC	15	32-15-17-05

Approvals / Certificates

Classifications

General Product Approval

Manufacturer Declaration





<u>Miscellaneous</u>



General Product Approval

For use in hazardous locations

<u>KC</u>



<u>FM</u>



<u>FM</u>

Miscellaneous

For use in hazardous locations

Functional Saftey

Marine / Shipping



Type Examination Certificate



Type Examination Certificate





Marine / Shipping





NK / Nippon Kaiji Kyokai



CCS (China Classification Society)



other

Environment

PROFINET





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12/8/2024