Data sheet

6ES7515-2FM02-0AB0



SIMATIC S7-1500F, CPU 1515F-2 PN, central processing unit with work memory 750 KB for program and 3 MB for data, 1st interface: PROFINET IRT with 2-port switch, 2nd interface: PROFINET RT, 30 ns bit performance, SIMATIC Memory Card required

via dataset Yes Display Screen diagonal [cm] 6.1 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) 0.8 A Current consumption, max. 1.1 A Inrush current, max. 2.4 A; Rated value I²t 0.02 A² s Power Power to the backplane bus (balanced) 6.2 W Power loss, typ. 6.3 W	General information	
Firmware version Product function • I&M data • IsAM data • IsAM data • Isochronous mode Persional forms (central) Engineering with • STEP 7 TIA Portal configurable/integrated from version Configuration control via dataset Display Screen diagonal [cm] Control elements Number of keys Rated value (DC) permissible range, upper limit (DC) permissible range, upper limit (DC) permissible range, upper limit (DC) Alains/voltage failure stored energy time • Mains/voltage failure stored bus (balanced) Power consumption, max. In LA Inrush current, max. Power consumption from the backplane bus (balanced) Power consumption from the backplane bus (balanced) Power consumption for the backplane bus (balanced) Power consumption for lots of SIMATIC memory card required Ves Minam Duffor (SIMATIC memory card required Power Loss of SIMATIC memory card required Power Loss of SIMATIC memory card required Pose (SIMATIC memory card required) Ves Ves Ves Ves Ves Ves Ves Ve	Product type designation	CPU 1515F-2 PN
Product function 18M data Yes; 18M0 to 18M3 1 sockronous mode 2 ves; Distributed and central; with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central) 1 ves; Distributed and central; with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central) 1 ves provided of 1 ves provided 1 ves pr	HW functional status	FS01
• I8M data Yes; I8M0 to I8M3 Yes; Distributed and central; with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central) with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central) with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central) with central year of 1 ms (central) with Central Yes or Nigher; with older TIA Portal versions configurable as 6ES7515-2FM01-0AB0 **Control control*** **Ves** **Screen diagonal [cm]** **Corten diagonal [cm]** **Corten diagonal [cm]** **Excreen diagonal [cm]** **Corten diagonal [cm]** **Excreen diagonal [cm]**	Firmware version	V2.9
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Configuration control	Engineering with	
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Number of keys 8	Screen diagonal [cm]	6.1 cm
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) 0.8 A Current consumption, max. 1.1 A Inrush current, max. 2.4 A; Rated value Ift 0.02 A²-s Power Infeed power to the backplane bus (balanced) 6.2 W Power loss, typ. 6.3 W Memory Number of slots for SIMATIC memory card 1 SIMATIC memory card required	Control elements	
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Reverse polarity protection Mains buffering Mains/voltage failure stored energy time Repeat rate, min. Negret rate, min. Current consumption (rated value) Current consumption, max. Inrush current, max. 1.1 A Inrush current, max. 2.4 A; Rated value Power Infeed power to the backplane bus Power consumption from the backplane bus (balanced) Power loss Power loss, typ. 6.3 W Memory Number of slots for SIMATIC memory card SIMATIC memory card required Yes	permissible range, lower limit (DC)	19.2 V
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Repeat rate, min. Input current Current consumption (rated value) Current consumption, max. Inrush current, max. Irrush current, max. If t 0.02 A²-s Power Infeed power to the backplane bus Power consumption from the backplane bus (balanced) Power loss Power loss, typ. Memory Number of slots for SIMATIC memory card SIMATIC memory card required 1 1/s 0.8 A 0.8 A 0.8 A 0.8 A 1.1 A 1.1 A 1.1 A 1.2 W 0.02 A²-s 0.6.2 W 0.6.2 W 0.8 A 0.9	Mains buffering	
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Inrush current, max. Power Power to the backplane bus 12 W	Current consumption (rated value)	0.8 A
Power Infeed power to the backplane bus Power consumption from the backplane bus (balanced) Power loss Power loss, typ. 6.3 W Memory Number of slots for SIMATIC memory card SIMATIC memory card required 0.02 A²-s 12 W 6.2 W 6.3 W Memory Yes	Current consumption, max.	1.1 A
Infeed power to the backplane bus Power consumption from the backplane bus (balanced) 6.2 W Power loss Power loss, typ. 6.3 W Memory Number of slots for SIMATIC memory card SIMATIC memory card required Yes	Inrush current, max.	2.4 A; Rated value
Infeed power to the backplane bus Power consumption from the backplane bus (balanced) 6.2 W Power loss Power loss, typ. 6.3 W Memory Number of slots for SIMATIC memory card SIMATIC memory card required 12 W 6.2 W 6.3 W Memory Yes	l²t	0.02 A²·s
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Power loss, typ. 6.3 W Memory Number of slots for SIMATIC memory card 1 SIMATIC memory card required Yes	Power consumption from the backplane bus (balanced)	6.2 W
Number of slots for SIMATIC memory card 1 SIMATIC memory card required Yes	Power loss	
Number of slots for SIMATIC memory card 1 SIMATIC memory card required Yes	Power loss, typ.	6.3 W
SIMATIC memory card required Yes	Memory	
	Number of slots for SIMATIC memory card	1
Work memory	SIMATIC memory card required	Yes
	Work memory	

• integrated (for program)	750 khuta
• integrated (for program)	750 kbyte
• integrated (for data)	3 Mbyte
Load memory	22 Chuta
Plug-in (SIMATIC Memory Card), max. Poelsus	32 Gbyte
Backup	Voc
maintenance-free CRU processing times	Yes
CPU processing times	00
for bit operations, typ.	30 ns
for word operations, typ.	36 ns
for fixed point arithmetic, typ.	48 ns
for floating point arithmetic, typ.	192 ns
CPU-blocks	
Number of elements (total)	8 000; 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.	3 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	5 Mbyte, 1 of 555 With absolute addressing, the max. 3/26 is 64 No.
Number range	0 65 535
Size, max.	500 kbyte
FC	ood ruyto
	0 65 535
Number rangeSize, max.	0 65 535 500 kbyte
	500 kbyte
OB Size may	500 khyta
Size, max. Number of free evelo OPa	500 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	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; 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	V
IEC timer	Yes
• Number	Yes
Retentivity	
	Any (only limited by the main memory)
·	Any (only limited by the main memory)
— adjustable	
— adjustable Data areas and their retentivity	Any (only limited by the main memory) Yes
— adjustable	Any (only limited by the main memory)
adjustable Data areas and their retentivity	Any (only limited by the main memory) Yes 512 kbyte; In total; available retentive memory for bit memories, timers,

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	of hoyte, max. To his per block
	0.400:
Number of IO modules	8 192; 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
	JL
Hardware configuration	
Number of distributed IO systems	64; 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	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
integrated	2
● 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
 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
	10
Clock synchronization	V
• supported	Yes
• in AS, master	Yes
• in AS, device	Yes
on Ethernet via NTP	Yes
Interfaces	
Number of PROFINET interfaces	2
1. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X1
Number of ports	2
*	
• integrated switch	Yes
Protocols	V 15 4
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
— PROFlenergy	Yes; per user program
 Prioritized startup 	Yes; Max. 32 PROFINET devices
 Number of connectable IO Devices, max. 	256; In total, up to 1 000 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. 	256
— of which in line, max.	256
 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	$250~\mu s$ 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	Vee
— PG/OP communication	Yes
— Isochronous mode	No You
— IRT	Yes
PROFlenergy Shared device	Yes; per user program
	Yes 4
 Number of IO Controllers with shared device, max. activation/deactivation of I-devices 	
— Asset management record	Yes; per user program Yes; per user program
Asset management record 2. Interface	rea, per user program
Interface types	
RJ 45 (Ethernet)	Yes; X2
Number of ports	1
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
— PROFlenergy	Yes; per user program No
— Prioritized startup	
Number of connectable IO Devices, max.	32; In total, up to 1 000 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	, and the second
— for send cycle of 1 ms	1 ms to 512 ms
PROFINET IO Device	
Services	
 PG/OP communication 	Yes
— Isochronous mode	No
— IRT	No
— PROFlenergy	Yes; per user program
— Prioritized startup	No
— 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
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. 	192; 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 	108
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	V
• S7 routing	Yes
 S7 communication, as server 	Yes
O.7	V
S7 communication, as client	Yes
User data per job, max.	Yes See online help (S7 communication, user data size)
User data per job, max. Open IE communication	See online help (S7 communication, user data size)
User data per job, max. Open IE communication TCP/IP	See online help (S7 communication, user data size) Yes
 User data per job, max. Open IE communication TCP/IP — Data length, max. 	See online help (S7 communication, user data size) Yes 64 kbyte
User data per job, max. Open IE communication TCP/IP — Data length, max. — several passive connections per port, supported	See online help (S7 communication, user data size) Yes 64 kbyte Yes
 User data per job, max. Open IE communication TCP/IP — Data length, max. 	See online help (S7 communication, user data size) Yes 64 kbyte

• UDP	Yes
— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
UDP multicast	Yes; Max. 5 multicast circuits
• DHCP	Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• Encryption	Yes; Optional
Veb server	res, optional
• HTTP	Yes; Standard and user pages
• HTTPS	
	Yes; Standard and user pages
DPC UA	W.
Runtime license required	Yes
OPC UA Client	Yes
 Application authentication 	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
 User authentication 	"anonymous" or by user name & password
 Number of connections, max. 	10
 Number of nodes of the client interfaces, recommended max. 	2 000
 Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_L max. 	300
 Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max. 	20
 Number of elements for one call of OPC_UA_MethodGetHandleList, max. 	100
 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, custom address space
 Application authentication 	Yes
Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
— User authentication	"anonymous" or by user name & password
Number of sessions, max.	48
Number of sessions, max. Number of accessible variables, max.	100 000
•	
Number of registerable nodes, max.	20 000
 Number of subscriptions per session, max. 	20
— Sampling interval, min.	100 ms
— Publishing interval, min.	200 ms
 Number of server methods, max. 	50
 Number of inputs/outputs per server method, max. 	20
 Number of monitored items, recommended max. 	2 000; for 1 s sampling interval and 1 s send interval
— Number of server interfaces, max.	10 of each "Server interfaces" / "Companion specification" type and 20 of the type "Reference namespace"
 Number of nodes for user-defined server interfaces, max. 	5 000
Further protocols	
• MODBUS	Yes; MODBUS TCP
ochronous mode	
Equidistance	Yes
·	160
message functions	
	64
lumber of login stations for message functions, max.	V
Program alarms Jumber of configurable program messages, max.	Yes 10 000; Program messages are generated by the "Program_Alarm" block,

	ProDiag or GRAPH
Number of loadable program messages in RUN, max.	5 000
Number of simultaneously active program alarms	
 Number of program alarms 	800
 Number of alarms for system diagnostics 	200
Number of alarms for motion technology objects	160
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 8 engineering systems
Status block	Yes; Up to 8 simultaneously (in total across all ES clients)
Single step	No
Number of breakpoints	8
Status/control	
 Status/control variable 	Yes; without fail-safe
Variables	inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, counters
 Number of variables, max. 	
of which status variables, max.	200; per job
of which control variables, max.	200; per job
Forcing	
• Forcing	Yes; without fail-safe
• Forcing, variables	peripheral inputs/outputs (without fail-safe)
 Number of variables, max. 	200
Diagnostic buffer	
• present	Yes
Number of entries, max.	3 200
— of which powerfail-proof	500
Traces	
Number of configurable Traces	4; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
STOP ACTIVE LED	Yes
Connection display LINK TX/RX	Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC
Number of available Motion Control resources for	program; selection guide via the TIA Selection Tool 2 400
technology objects	
 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
— per cam track	160
— per probe	40
Positioning axis	
 Number of positioning axes at motion control cycle of 4 ms (typical value) 	7
 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	
High-speed counter	Yes
Standards, approvals, certificates	
Highest safety class achievable in safety mode	
Performance level according to ISO 13849-1	PLe
3	

SIL acc. to IEC 61508	SIL 3
Probability of failure (for service life of 20 years and repair time	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
Ambient conditions	
Ambient temperature during operation	
horizontal installation, min.	-25 °C; No condensation
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	-25 °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	
• min.	-40 °C
• 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
— GRAPH	Yes
Know-how protection	
 User program protection/password protection 	Yes
Copy protection	Yes
Block protection	Yes
Access protection	
Password for display	Yes
Protection level: Write protection	Yes; Specific write protection both for Standard and for Failsafe
 Protection level: Read/write protection 	Yes
 Protection level: Write protection for Failsafe 	Yes
Protection level: Complete protection	Yes
programming / cycle time monitoring / header	
• lower limit	adjustable minimum cycle time
upper limit	adjustable maximum cycle time
Dimensions	
Width	70 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	830 g

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