## 6ES7515-2FM01-0AB0

**Data sheet** 



\*\*\* Spare part \*\*\* 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

Figure similar

Product type designation Product type designation Product type designation Product type designation Product function  • I&M data • Isochronous mode  • I&M data • Isochronous mode  Product function  • I&M data • Isochronous mode  Profuse function  • I&M data • Isochronous mode  Profuse function  V17 (FW V2.9) / V13 (FW V1.5) or higher  Configuration control  V18 (FW V2.9) / V13 (FW V1.5) or higher  Configuration control  V19 (FW V2.9) / V13 (FW V1.5) or higher  Control elements  Number of keys  6  Mode selector switch  1  Supply voltage  Rated value (DC)  permissible range, lower limit (DC)  permissible range, upper limit (DC)  permissible range, upper limit (DC)  Prover posary function  Wains buffering • Mains/voltage failure stored energy time • Repeat rate, min.  Input current  Current consumption (rated value)  Insub current, max.  Prover consumption (rated value)  Included power to the backplane bus (balanced)  Prover consumption from the backplane bus (balanced)  Prover consumption for Slots for SIMATIC memory card  I SIMATIC memory card required  Wick memory  • integrated (for program)  Production  Prover consumption  File (Free Prover)  File (Fr		
HW functional status FS03 Firmware version V2.9 Froduct 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)  • STEP 7 TIA Portal configurable/integrated from version V17 (FW V2.9) / V13 (FW V1.5) or higher  Configuration control via dataset Yes Display Screen diagonal [cm] 6.1 cm  Control elements  Number of keys 6 Mode selector switch 1 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 • Mainsvoltage failure stored energy time • Repeat rate, min. 1/s  Input current Current consumption (rated value) 0.8 A Inrush current, max. 2.4 A; Rated value Power Infeed power to the backplane bus (balanced) Power consumption from the backplane bus (balanced) Power consumption from the backplane bus (balanced) Power consumption from the backplane bus (balanced) Power loss Power loss, Vp. 6.3 W  Memory Number of slots for SIMATIC memory card 1 SIMATIC memory card quired Work memory	General information	
Firmware version V2.9 Product function  • I&M data • Isochronous mode  Engineering with • STEP 7 TIA Portal configurable/integrated from version  Configuration control via dataset Ves Display Screen diagonal [cm] Control elements Number of keys 6 Mode selector switch 1 Supply voltage Rated value (DC) permissible range, lower limit (DC) permissible range, upper limit (DC) permissible range, upper limit (DC) Reverse polarity protection • Repeat rate, min. Ins Input current Current consumption (rated value) Input current, max. Pt 0.02 A²-s Power loss, typ. Power loss, typ. Power loss, typ.  Power loss, typ.  Memory Number of slots for SIMATIC memory card SIMATIC memory card STEP 7 TIA Portal configurable/integrated from version Yes; (Mish to IRM) Yes (Mish to IRM) Yes; (Mish to IRM) Y	Product type designation	CPU 1515F-2 PN
Product function  • I&M data  • Isochronous mode  Engineering with  • STEP 7 TIA Portal configurable/integrated from version  Configuration control  via dataset  Yes  Distributed and central; with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central)  V17 (FW V2.9) / V13 (FW V1.5) or higher  Configuration control  via dataset  Yes  Display  Screen diagonal [cm]  Control elements  Number of keys  Mode selector switch  1  Supply voltage  Rated value (DC)  permissible range, upper limit (DC)  permissible range, upper limit (DC)  permissible range, upper limit (DC)  Reverse polarity protection  Wains buffering  • Mains/voltage failure stored energy time  • Rapeat rate, min.  Input current.  Current consumption (rated value)  In Use Current consumption (rated value)  In Use Current consumption from the backplane bus (balanced)  Power consumption from the backplane bus (balanced)  Power consumption from the backplane bus (balanced)  Power loss  Power loss, typ.  6.3 W  Memory  Number of slots for SIMATIC memory card  1  SIMATIC memory card required  Work memory	HW functional status	FS03
I I I I I I I I I I I I I I I I I I I	Firmware version	V2.9
• Isochronous mode  Yes: Distributed and central; with minimum OB 6x cycle of 500 µs (distributed) and 1 ms (central)  Engineering with  • STEP 7 TIA Portal configurable/integrated from version  V17 (FW V2.9) / V13 (FW V1.5) or higher  Configuration control  via dataset  Ves  Display  Screen diagonal [cm]  Control elements  Number of keys  6  Mode selector switch  1  Supply voltage  Rated value (DC)  permissible range, lower limit (DC)  permissible range, upper limit (DC)  permissible range, upper limit (DC)  Reverse polarity protection  Mains/voltage failure stored energy time  • Repeat rate, min.  1/s  Input current  Current consumption (rated value)  Inrush current, max.  Power  Infeed power to the backplane bus  Power consumption from the backplane bus (balanced)  Power consumption from the backplane bus (balanced)  Fower loss, typ.  Memory  Number of slots for SIMATIC memory card  SIMATIC memory card required  Yes  Work memory	Product function	
Engineering with  STEP 7 TIA Portal configurable/integrated from version  Configuration control  via dataset  Yes  Display  Screen diagonal [cm]  Control elements  Number of keys  Rated value (DC)  permissible range, lower limit (DC)  permissible range, lower limit (DC)  permissible range, upper limit (DC)  Reverse polarity protection  Mains buffering  Nabisvoltage failure stored energy time Repeat rate, min.  Input current  Current consumption (rated value)  Inrush current, max.  Power  Infeed power to the backplane bus  Power consumption from the backplane bus (balanced)  Power loss, typ.  Memory  Number of slots for SIMATIC memory card  Sirphy Ves  Work memory  V17 (FW V2.9) / V13 (FW V1.5) or higher  V18 (FW V2.9) / V13 (FW V1.5) or higher  Ves  Ves  Sirphy V13 (FW V1.5) or higher  Ves  Screen diagonal (Two V1.5) or higher  Ves  A character  Ves  Ves  Ves  Work memory  Ves  Ves  Vos  Vos  Vos  Vos  Vos  Vos	● I&M data	Yes; I&M0 to I&M3
STEP 7 TIA Portal configurable/integrated from version  Configuration control  via dataset  Yes  Display  Screen diagonal [cm]  Control elements  Number of keys  Rated value (DC) permissible range, lower limit (DC) permissible range, upper limit (DC) permissible range, upper limit (DC)  Reverse polarity protection  Mains buffering  Mains furfier  Mains/voltage failure stored energy time Repeat rate, min.  Input current  Current consumption (rated value) Inrush current, max.  In Que A's s  Power  Infeed power to the backplane bus Power loss, typ.  Memory  Number of slots for SIMATIC memory card Sissan and suspenses Ves  Ves  Ves  Ves  Ves  Ves  Ves	• Isochronous mode	
Configuration control  via dataset Yes  Display  Screen diagonal [cm] 6.1 cm  Control elements  Number of keys 6  Mode selector switch 1  Supply voitage  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 • S ms • Repeat rate, min. 1/s  Input current  Current consumption (rated value) 0.8 A  Inrush current, max. 2.4 A; Rated value  I't 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 Yes  Work memory	Engineering with	
via dataset Yes  Display  Screen diagonal [cm] 6.1 cm  Control elements  Number of keys 6 Mode selector switch 1  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 Inrush current, max. 2.4 A; Rated value Prower  Infeed power to the backplane bus (balanced) 6.2 W  Power loss Power loss Power loss Power of slots for SIMATIC memory card 1  SIMATIC memory card required Work memory	<ul> <li>STEP 7 TIA Portal configurable/integrated from version</li> </ul>	V17 (FW V2.9) / V13 (FW V1.5) or higher
Screen diagonal [cm]   6.1 cm	Configuration control	
Screen diagonal [cm] 6.1 cm  Control elements  Number of keys 6 Mode selector switch 1  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  • Mainsvoltage failure stored energy time 5 ms • Repeat rate, min. 1/s  Input current  Current consumption (rated value) 0.8 A Inrush current, max. 2.4 A; Rated value  It 0.02 A²-s  Power  Infeed power to the backplane bus (balanced) 6.2 W  Power loss  Power loss  Power loss, typ. 6.3 W  Memory  Number of slots for SIMATIC memory card 1  SIMATIC memory card required Yes  Work memory	via dataset	Yes
Number of keys  Mode selector switch  Supply voltage  Rated value (DC) permissible range, lower limit (DC) permissible range, upper limit (DC)  Reverse polarity protection Mains buffering  Mains/voltage failure stored energy time Repeat rate, min.  Input current  Current consumption (rated value) Inrush current, max.  In unit current  Infeed power to the backplane bus Power loss, typ.  Memory Number of slots for SIMATIC memory card SIMATIC memory  Va V  Power Mains Voltage failure stored energy time S ms	Display	
Number of keys  Mode selector switch  1  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  Inrush current, max. 2.4 A; Rated value  Pt 0.02 A²·s  Power  Infeed power to the backplane bus 12 W  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 1  SIMATIC memory card required Yes  Work memory	· · · · · · · · · · · · · · · · · · ·	6.1 cm
Mode selector switch  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/voltage failure stored energy time 5 ms  • Repeat rate, min. 1/s  Input current  Current consumption (rated value) 0.8 A  Inrush current, max. 2.4 A; Rated value  IPt 0.02 A²-s  Power  Infeed power to the backplane bus (balanced) 6.2 W  Power consumption from the backplane bus (balanced) 6.3 W  Memory  Number of slots for SIMATIC memory card 1  SIMATIC memory card required Yes  Work memory	Control elements	
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 • Repeat rate, min. 1/s  Input current  Current consumption (rated value) 0.8 A Inrush current, max. 2.4 A; Rated value  Pt 0.02 A²-s  Power  Infeed power to the backplane bus (balanced) 6.2 W  Power consumption from the backplane bus (balanced) 6.3 W  Memory  Number of slots for SIMATIC memory card 1  SIMATIC memory card required Yes Work memory	Number of keys	6
Rated value (DC)  permissible range, lower limit (DC)  permissible range, upper limit (DC)  Reverse polarity protection  Yes  Mains buffering  • Mains/voltage failure stored energy time • Repeat rate, min.  Input current  Current consumption (rated value)  Inrush current, max.  Pt  0.08 A  Inrush current, max.  1/8  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  Work memory	Mode selector switch	1
permissible range, lower limit (DC)  permissible range, upper limit (DC)  Reverse polarity protection  Yes  Mains buffering  • Mains/voltage failure stored energy time • Repeat rate, min.  Input current  Current consumption (rated value)  Inrush current, max.  1/2  Inrush current, max.  1/2  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  Work memory	Supply voltage	
permissible range, upper limit (DC)  Reverse polarity protection  Mains buffering  Mains/voltage failure stored energy time Repeat rate, min.  Input current  Current consumption (rated value)  Iret  O.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 Wess  Yes  Ves  Ves  Ves  Ves  Ves  Ves	Rated value (DC)	24 V
Reverse polarity protection  Mains buffering  Mains/voltage failure stored energy time Repeat rate, min.  Input current  Current consumption (rated value)  Inrush current, max.  Inrush current, max.  Infeed power to the backplane bus Infeed power to the backplane bus (balanced)  Power consumption from the backplane bus (balanced)  Power loss Power loss, typ.  Memory  Number of slots for SIMATIC memory card  SIMATIC memory card required  Work memory  Yes  5 ms  5 ms  5 ms  1/s  1/s  1/s  1/s  1/s  1/s  1/s  1	permissible range, lower limit (DC)	19.2 V
Mains buffering  Mains/voltage failure stored energy time Repeat rate, min.  1/s  Input current  Current consumption (rated value)  Inrush current, max.	permissible range, upper limit (DC)	28.8 V
Mains/voltage failure stored energy time Repeat rate, min.  Input current  Current consumption (rated value)  Inrush current, max.  Inrush current, max.  If a consumption (rated value)  If a consumption (rated value)  If a consumption (rated value)  If a consumption form the backplane bus  Power  Infeed power to the backplane bus (balanced)  Power loss  Power loss  Power loss, typ.  Memory  Number of slots for SIMATIC memory card  SIMATIC memory card required  Yes  Work memory  Work memory  Manual Simanus (some state of the state o	Reverse polarity protection	Yes
● Repeat rate, min.  Input current  Current consumption (rated value)  Inrush current, max.  Inrush current, max.  Infeed power to the backplane bus  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  Work memory  Ves  Work memory	Mains buffering	
Input current Current consumption (rated value) Inrush current, max. Inrush current, max.  If to 0.02 A²-s  Power Infeed power to the backplane bus Power consumption from the backplane bus (balanced) Power loss Power loss Power loss, typ.  Memory Number of slots for SIMATIC memory card SIMATIC memory card required Work memory  Ves  Work memory	<ul> <li>Mains/voltage failure stored energy time</li> </ul>	5 ms
Current consumption (rated value)  Inrush current, max.  If t	Repeat rate, min.	1/s
Inrush current, max.  If t 0.02 A²·s  Power  Infeed power to the backplane bus 12 W 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 1  SIMATIC memory card required Yes  Work memory	Input current	
Power   Description   Descri	Current consumption (rated value)	0.8 A
Power Infeed power to the backplane bus 12 W 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 1 SIMATIC memory card required Yes  Work memory	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 Work memory  Yes	l²t	0.02 A <sup>2</sup> ·s
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  Work memory	Power	
Power loss Power loss, typ. 6.3 W  Memory  Number of slots for SIMATIC memory card 1  SIMATIC memory card required Yes  Work memory	Infeed power to the backplane bus	12 W
Power loss, typ. 6.3 W  Memory  Number of slots for SIMATIC memory card 1  SIMATIC memory card required Yes  Work memory	Power consumption from the backplane bus (balanced)	6.2 W
Memory  Number of slots for SIMATIC memory card  SIMATIC memory card required  Yes  Work memory	Power loss	
Memory  Number of slots for SIMATIC memory card  SIMATIC memory card required  Yes  Work memory	Power loss, typ.	6.3 W
Number of slots for SIMATIC memory card 1 SIMATIC memory card required Yes Work memory	•	
SIMATIC memory card required  Yes  Work memory		1
Work memory		Yes
·		
	integrated (for program)	750 kbyte

• integrated (for data)	3 Mbyte
• integrated (for data)	3 Mbyte
Load memory	32 Gbyte
Plug-in (SIMATIC Memory Card), max.      Packers	32 Gbyte
Backup	Voc
maintenance-free  CPU processing times	Yes
CPU processing times	
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
a Cizo, may	3 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
• Size, max.	5 Wibyte, For DBS with absolute addressing, the max. Size is 64 KB
FB Number range	0 05 525
Number range     Size may	0 65 535
• Size, max.	500 kbyte
FC Number and an	0. 05 505
Number range	0 65 535
• Size, max.	500 kbyte
OB	
• Size, max.	500 kbyte
<ul> <li>Number of free cycle OBs</li> </ul>	100
<ul> <li>Number of time alarm OBs</li> </ul>	20
<ul> <li>Number of delay alarm OBs</li> </ul>	20
<ul> <li>Number of cyclic interrupt OBs</li> </ul>	20; With minimum OB 3x cycle of 500 μs
<ul> <li>Number of process alarm OBs</li> </ul>	50
<ul> <li>Number of DPV1 alarm OBs</li> </ul>	3
<ul> <li>Number of isochronous mode OBs</li> </ul>	2
<ul> <li>Number of technology synchronous alarm OBs</li> </ul>	2
<ul> <li>Number of startup OBs</li> </ul>	100
<ul> <li>Number of asynchronous error OBs</li> </ul>	4
<ul> <li>Number of synchronous error OBs</li> </ul>	2
<ul> <li>Number of diagnostic alarm OBs</li> </ul>	1
Nesting depth	
<ul> <li>per priority class</li> </ul>	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	7.11) (2.11) 11.11.11.22 2) 3.10 11.11.11.11.11.11.11.11
— adjustable	Yes
S7 times	
• Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	1.00
• Number	Any (only limited by the main memory)
	Any (only limited by the main memory)
Retentivity	Vac
— adjustable	Yes
Data areas and their retentivity	54011 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
Retentive data area (incl. timers, counters, flags), max.	512 kbyte; In total; available retentive memory for bit memories, timers, counters, DBs, and technology data (axes): 472 KB
Extended retentive data area (incl. timers, counters, flags), max. Flag	3 Mbyte; When using PS 6 0W 24/48/60 V DC HF
• Size, max.	16 kbyte

Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Number of clock memories  Data blocks	o, o clock memory bit, grouped into one clock memory byte
Retentivity adjustable	Yes
Retentivity adjustable     Retentivity preset	No
Retentivity preset  Local data	INU
per priority class, max.	64 kbyte; max. 16 KB per block
Address area	Or Naylo, max. To Na por blook
Number of IO modules	8 192; max. number of modules / submodules
I/O address area	o 192, max. number of modules / submodules
• Inputs	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	oz majte, i m odupate dio in dio processi intege
— 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	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
Clock synchronization	
• 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	
• 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	100, Milit Automanagor according to 120 of 100 f Edition 2.0
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
<ul> <li>Of which IO devices with IRT, max.</li> </ul>	64
<ul> <li>Number of connectable IO Devices for RT, max.</li> </ul>	256
— of which in line, max.	256
<ul> <li>Number of IO Devices that can be simultaneously activated/deactivated, max.</li> </ul>	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 $\mu s$	$250~\mu s$ to 4 ms; Note: In the case of IRT with isochronous mode, the minimum update time of $500~\mu s$ of the isochronous OB is decisive
— for send cycle of 500 $\mu s$	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 $\mu s,625$ $\mu s$ 3 875 $\mu s)$
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	
— PG/OP communication	Yes
— Isochronous mode	No
— IRT	Yes
— PROFlenergy	Yes; per user program
— Shared device	Yes
<ul> <li>Number of IO Controllers with shared device, max.</li> </ul>	4
<ul> <li>activation/deactivation of I-devices</li> </ul>	Yes; per user program
Asset management record	Yes; per user program
2. Interface	
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	
<ul> <li>PG/OP communication</li> </ul>	Yes
— Isochronous mode	No

— Direct data exchange	No
— Direct data exchange — IRT	No No
— IKI — PROFlenergy	
0.	Yes; per user program
— Prioritized startup	No
<ul> <li>Number of connectable IO Devices, max.</li> </ul>	32; In total, up to 1 000 distributed I/O devices can be connected via AS-i, PROFIBUS or PROFINET
<ul> <li>Number of connectable IO Devices for RT, max.</li> </ul>	32
— of which in line, max.	32
<ul> <li>Number of IO Devices that can be simultaneously activated/deactivated, max.</li> </ul>	8; in total across all interfaces
<ul> <li>Number of IO Devices per tool, max.</li> </ul>	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	ooningarod door data
— 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)	Ver
• 100 Mbps	Yes
Autonegotiation	Yes
Autocrossing	Yes
Industrial Ethernet status LED	Yes
Protocols	V V0 4 (V0 0
PROFIsafe	Yes; V2.4 / V2.6
Number of connections	400 1 1 4 4 1 4 4 4 4 4 4 4 4 4 4 4 4 4
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 — MRP	only via 1st interface (X1)  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
Switchover time on line break, typ.      Number of stations in the ring, max.	50
SIMATIC communication	
S7 routing	Yes
S7 routing     S7 communication, as server	Yes
	Yes
S7 communication, as client      User data per job, may	
User data per job, max.  Open IF communication	See online help (S7 communication, user data size)
Open IE communication	Voc
• TCP/IP	Yes
— Data length, max.	64 kbyte
— several passive connections per port, supported	Yes
	Yes
• ISO-on-TCP (RFC1006)	
ISO-on-TCP (RFC1006)      Data length, max.      UDP	64 kbyte 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
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
Runtime license required	Yes
OPC UA Client	Yes
<ul> <li>Application authentication</li> </ul>	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
<ul> <li>User authentication</li> </ul>	"anonymous" or by user name & password
<ul> <li>Number of connections, max.</li> </ul>	10
<ul> <li>Number of nodes of the client interfaces, recommended max.</li> </ul>	2 000
<ul> <li>Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_I max.</li> </ul>	300
<ul> <li>Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max.</li> </ul>	20
<ul> <li>Number of elements for one call of OPC_UA_MethodGetHandleList, max.</li> </ul>	100
<ul> <li>Number of simultaneous calls of the client instructions for session management, per connection, max.</li> </ul>	1
<ul> <li>Number of simultaneous calls of the client instructions for data access, per connection, max.</li> </ul>	5
<ul> <li>Number of registerable nodes, max.</li> </ul>	5 000
<ul> <li>Number of registerable method calls of OPC_UA_MethodCall, max.</li> </ul>	100
<ul> <li>Number of inputs/outputs when calling OPC_UA_MethodCall, max.</li> </ul>	20
OPC UA Server	Yes; Data access (read, write, subscribe), method call, custom address space
<ul> <li>Application authentication</li> </ul>	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
<ul> <li>User authentication</li> </ul>	"anonymous" or by user name & password
<ul><li>Number of sessions, max.</li></ul>	48
<ul> <li>Number of accessible variables, max.</li> </ul>	100 000
<ul> <li>Number of registerable nodes, max.</li> </ul>	20 000
<ul> <li>Number of subscriptions per session, max.</li> </ul>	20
<ul><li>— Sampling interval, min.</li></ul>	100 ms
<ul><li>— Publishing interval, min.</li></ul>	200 ms
<ul> <li>Number of server methods, max.</li> </ul>	50
<ul> <li>Number of inputs/outputs per server method, max.</li> </ul>	20
<ul> <li>Number of monitored items, recommended max.</li> </ul>	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"
<ul> <li>Number of nodes for user-defined server interfaces, max.</li> </ul>	5 000
Further protocols	
• MODBUS	Yes; MODBUS TCP
Isochronous mode	
Equidistance	Yes
S7 message functions	
Number of login stations for message functions, max.	64
Program alarms	Yes
Number of configurable program messages, max.	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	000
Number of program alarms	800
Number of alarms for system diagnostics	200
Number of alarms for motion technology objects	160
Test commissioning functions	Vasi Parallal antina access passible for up to 0 engineering quaterns
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) No
Single step	8
Number of breakpoints Status/control	0
Status/control variable	Yes; without fail-safe
Variables	inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times,
Validates	counters
<ul> <li>Number of variables, max.</li> </ul>	
— of which status variables, max.	200; per job
— of which control variables, max.	200; per job
Forcing	
• Forcing	Yes; without fail-safe
<ul> <li>Forcing, variables</li> </ul>	peripheral inputs/outputs (without fail-safe)
Number of variables, max.	200
Diagnostic buffer	
• present	Yes
<ul> <li>Number of entries, max.</li> </ul>	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
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 program; selection guide via the TIA Selection Tool
<ul> <li>Number of available Motion Control resources for</li> </ul>	2 400
technology objects	
<ul> <li>Required Motion Control resources</li> </ul>	
— 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	
<ul> <li>Number of positioning axes at motion control cycle of 4 ms (typical value)</li> </ul>	7
<ul> <li>Number of positioning axes at motion control cycle of 8 ms (typical value)</li> </ul>	14
	14
of 8 ms (typical value)	Yes; Universal PID controller with integrated optimization
of 8 ms (typical value)  Controller	
of 8 ms (typical value)  Controller  • PID_Compact	Yes; Universal PID controller with integrated optimization
of 8 ms (typical value)  Controller  PID_Compact  PID_3Step	Yes; Universal PID controller with integrated optimization Yes; PID controller with integrated optimization for valves
of 8 ms (typical value)  Controller  • PID_Compact  • PID_3Step  • PID-Temp	Yes; Universal PID controller with integrated optimization Yes; PID controller with integrated optimization for valves
of 8 ms (typical value)  Controller  PID_Compact  PID_3Step  PID-Temp  Counting and measuring	Yes; Universal PID controller with integrated optimization Yes; PID controller with integrated optimization for valves Yes; PID controller with integrated optimization for temperature
of 8 ms (typical value)  Controller  PID_Compact PID_3Step PID-Temp  Counting and measuring High-speed counter	Yes; Universal PID controller with integrated optimization Yes; PID controller with integrated optimization for valves Yes; PID controller with integrated optimization for temperature
of 8 ms (typical value)  Controller  PID_Compact PID_3Step PID-Temp  Counting and measuring High-speed counter  Standards, approvals, certificates	Yes; Universal PID controller with integrated optimization Yes; PID controller with integrated optimization for valves Yes; PID controller with integrated optimization for temperature
of 8 ms (typical value)  Controller  PID_Compact PID_3Step PID-Temp  Counting and measuring High-speed counter  Standards, approvals, certificates  Highest safety class achievable in safety mode	Yes; Universal PID controller with integrated optimization Yes; PID controller with integrated optimization for valves Yes; PID controller with integrated optimization for temperature  Yes  PLe SIL 3

<ul> <li>Low demand mode: PFDavg in accordance with SIL3</li> </ul>	< 2.00E-05
<ul> <li>High demand/continuous mode: PFH in accordance with SIL3</li> </ul>	< 1.00E-09
Ambient conditions	
Ambient temperature during operation	
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
<ul> <li>vertical installation, min.</li> </ul>	0 °C
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	
<ul> <li>Installation altitude above sea level, max.</li> </ul>	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	
<ul> <li>User program protection/password protection</li> </ul>	Yes
Copy protection	Yes
Block protection	Yes
Access protection	
<ul> <li>Password for display</li> </ul>	Yes
<ul> <li>Protection level: Write protection</li> </ul>	Yes; Specific write protection both for Standard and for Failsafe
<ul> <li>Protection level: Read/write protection</li> </ul>	Yes
Protection level: Complete protection	Yes
programming / cycle time monitoring / header	
<ul> <li>lower limit</li> </ul>	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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