## SIEMENS

## Data sheet

## 6ES7515-2FM02-0AB0



\*\*\* 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

General information	
Product type designation	CPU 1515F-2 PN
HW functional status	FS01
Firmware version	V2.9
Product function	
I&M data	Yes; I&M0 to I&M3
Isochronous mode	Yes; Distributed and central; with minimum OB 6x cycle of 500 $\mu s$ (distributed) and 1 ms (central)
Engineering with	
STEP 7 TIA Portal configurable/integrated from version	V17 (FW V2.9) / V16 (FW V2.8) or higher; with older TIA Portal versions configurable as 6ES7515-2FM01-0AB0
Configuration control	
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	
<ul> <li>Mains/voltage failure stored energy time</li> </ul>	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
l²t	0.02 A <sup>2</sup> ·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

• integrated (for program)	750 khute			
<ul> <li>integrated (for program)</li> <li>integrated (for data)</li> </ul>	750 kbyte			
Integrated (for data)     Load memory	3 Mbyte			
Plug-in (SIMATIC Memory Card), max.	32 Gbyte			
Plug-In (SIMATIC Memory Card), max. Backup				
maintenance-free	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			
• Size, max.	3 Mbyte; For DBs with absolute addressing, the max. size is 64 KB			
FB				
Number range	0 65 535			
• Size, max.	500 kbyte			
FC				
Number range	0 65 535			
• Size, max.	500 kbyte			
OB	500 kbyte			
Size, max.	500 kbyte			
Number of free cycle OBs	100			
Number of time alarm OBs	20			
Number of delay alarm OBs     Number of evelia interrupt OBs	20 20: With minimum OR 3x cyclo of 500 up			
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	0.040			
Number	2 048			
Retentivity	N			
— adjustable	Yes			
IEC counter	Any (only limited by the main memory)			
Number     Detentivity	Any (only limited by the main memory)			
Retentivity	Vac			
— adjustable	Yes			
S7 times	2.049			
Number     Detentivity	2 048			
Retentivity	Vac			
— adjustable IEC timer	Yes			
Number	Any (only limited by the main memory)			
Retentivity				
— adjustable	Yes			
Data areas and their retentivity				
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.	3 Mbyte; When using PS 6 0W 24/48/60 V DC HF			
Flag				

• Size, max.	16 kbyte
<ul> <li>Number of clock memories</li> </ul>	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	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
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	
<ul> <li>Modules per rack, max.</li> </ul>	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	
• Туре	Hardware clock
Backup time	6 wk; At 40 °C ambient temperature, typically
Deviation per day, max.	
	10 s; Typ.: 2 s
Operating hours counter	40
• Number	16
Clock synchronization	
<ul> <li>supported</li> </ul>	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
	2
Number of ports	
integrated switch	Yes
Protocols	
IP protocol	Yes; IPv4
PROFINET IO Controller	Yes
PROFINET IO Device	Yes
SIMATIC communication	Yes
<ul> <li>Open IE communication</li> </ul>	Yes; Optionally also encrypted
	i co, optionally also chu ypteu

Web server	Yes			
Media redundancy	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0			
ROFINET IO Controller				
Services				
— PG/OP communication	Yes			
— Isochronous mode				
	Yes			
— Direct data exchange	Yes; Requirement: IRT and isochronous mode (MRPD optional)			
	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			
<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			
<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 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 $\mu s$ 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			
······································	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			
ROFINET IO Device				
Services				
— PG/OP communication	Yes			
— 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			
nterface				
terface types				
• RJ 45 (Ethernet)	Yes; X2			
Number of ports	1			
integrated switch	No			
rotocols				
IP protocol	Yes; IPv4			
PROFINET IO Controller	Yes			
<ul> <li>PROFINET IO Device</li> </ul>	Yes			
	Yes			
SIMATIC communication				
Open IE communication	Yes; Optionally also encrypted			
<ul><li>Open IE communication</li><li>Web server</li></ul>	Yes			
<ul><li>Open IE communication</li><li>Web server</li><li>Media redundancy</li></ul>				
Open IE communication     Web server     Media redundancy ROFINET IO Controller	Yes			
<ul><li>Open IE communication</li><li>Web server</li><li>Media redundancy</li></ul>	Yes			

Derect data sechange     Profile largy     Profile largy     Profile largy     Profile largy     Profile largy     Profile largy     Derect data sechange     Derect d	— Isochronous mode	No		
-IRTNo-IRCPROPUYYes pruser program-IRCPROPUYYes hold ball up 61 000 distributed 10 devices can be connected via AS-1IRCPROPUS of connectable 10 Devices from RT, max.22-IRCPROPUS of the connectable 10 Devices from RT, max.22-IRCPROPUS of the connectable 10 Devices from RT, max.22-IRCPROPUS of the connectable 10 Devices from RT, max.21-IRCPROPUS of the connectable 10 Devices from RT, max.21-IRCPROPUS of the connectable 10 Devices from RT, max.21-IRCPROPUS of the connectable 10 Devices from RT.21-IRCPROPUS from multicable 10 Devices from RT.21-IRCPROPUS from MULTICABLE 10 on the multiple of Devices from RT.21-IRCPROPUS from MULTICABLE 10 on the multiple of Devices from RT.21-IRCPROPUS from MULTICABLE 10 on the multiple of Devices from RT.21-IRCPROPUS from MULTICABLE 10 on the multiple of Devices from RT.21-IRCPROPUS from RT.Yes from RTIRCPROPUS from RT.Yes f				
PROF lenergy     Yes: per user program      Number of connectable I/O Devices, max.     22./h total, up it 100 devices can be connected via AS-4.      Number of connectable I/O Devices for RT, max.     23      Number of I/O Devices below in the simultaneously     8.      Number of I/O Devices below in the simultaneously     8.      Number of I/O Devices below in the simultaneously     8.      Number of I/O Devices below in the simultaneously     8.      Number of I/O Devices below in the simultaneously     8.      Number of I/O Devices below in the simultaneously     8.      Number of I/O Devices below in the simultaneously     8.      Number of I/O Devices below in the simultaneously     8.      Number of I/O Devices per tool, max.     8.      Number of I/O Devices and on the quantity of configuration devices, and on the quantity of configuration devices.      Number of O/O Devices in the simultaneously     1.      Number of I/O Devices in the simultaneously     Yes: per user program      Number of I/O Devices in the simultaneously     Yes: per user program      Number of I/O Devices in the simultaneously	-			
<ul> <li>Frontized starbup</li> <li>No</li> <li>Number of connectable ID Devices, max.</li> <li>Winther of connectable ID Devices for RT, max.</li> <li>of which in ine, max.</li> <li>advaluable in Devices for RT, max.</li> <li>Sub total across all interfaces</li> <li>device for ID Devices that can be simultaneously</li> <li>is total across all interfaces</li> <li>device for ID Devices that can be simultaneously</li> <li>is total across all interfaces</li> <li>device for ID Device that can be simultaneously</li> <li>is total across all interfaces</li> <li>device for ID Device that can be simultaneously</li> <li>is total across all interfaces</li> <li>device for RT</li> <lidevice for="" li="" rt<=""> <li>de</li></lidevice></ul>				
<ul> <li>- Number of connectable I/D Bevices, max.</li> <li>22) In trait, up 1 in 100 distributed I/O devices can be connected via AS4; PROFINETIO Sor PROFINET</li> <li>- Number of I/D Devices that can be simultaneously addivatedivated view, max.</li> <li>- Number of I/D Devices per toot, max.</li> <li>- Number of I/D Devices per toot, max.</li> <li>- Updating times</li> <li>- PROFILE I/D Bevice</li> <li>- PROFILE I/D Bevice</li></ul>				
Auster of connectative ID Devices for RT, max. 2 - of which in time, max. 2 - of which in time, max. 8 - Watter of ID Devices that can be simultaneously and of the update time also depends on communication share advoctationary of ID Devices per tool, max. 8 - Updating times - Updating times - Updating times - For and type of 1 me - For and type of type		32; In total, up to 1 000 distributed I/O devices can be connected via AS-i,		
		32		
adivised/decinitions and a set of the set of the update time also depends on communication alare are the update time also depends on communication alare are the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also depends on communication alare are dependent on the update time also dependent on the u				
set for PROPINET IC, on the number of IO devices, and on the quantity of conjugad user data       Update time for RT       for send cycle of 1 ms     1 ms to 512 ms       PROENET IO Device       Services       ProOP communication     Yes       Isochronous mode     No       RPOP communication     Yes       PROP communication     Yes       PROP communication     Yes       PROP communication     Yes       PROP communication     Yes       ProOP communication     Yes       Number of IO Controllers with shared device, max.     4       activationididactivation of I-fervices     Yes       Asset management record     Yes       Number of IO Controllers with shared device, max.     4       Asset management record     Yes       Number of connections reserved for EXHMM     Yes       Iot Maps     Yes       Number of connections reserved for EXHMM/veb     10       Number of connections reserved for EXHMM/veb     10       Number of connections reserved for EXHMM/veb     10       Number of connections reserved for EXHMM/veb<	<ul> <li>Number of IO Devices per tool, max.</li> </ul>	8		
- for send cycle of 1 ms         1 ms to 512 ms           PROFINET IO Device         -           Services         -           - PGUP communication         Yes           - Isochronous mode         No           - Isochronous mode         No           - ROF Planergy         Yes; per user program           - PROFIshergy         Yes; per user program           - Prointized startup         No           - Shared device         Yes; per user program           - Asset management record         Yes; per user program           - Asset management record         Yes; per user program           Interface types         Yes           R4 (Ethernet)         Yes           • Asset functions in travel         Yes           • Asset functions in travel         Yes           • Autocrossing         Yes           • Industrial Ethernet status LED         Yes           • Number of connections reserved for ESHMI/web         10           • Number of connections	— Updating times	set for PROFINET IO, on the number of IO devices, and on the quantity of		
PROFINET to Device     Performanication       Services     - PG/OP communication       - Isochronous mode     No       - Isochronous mode     No       - RT     No       - PROFlenergy     Yes; per user program       - PROFlenergy     Yes       - Number of IO Controllers with shared device, max.     4       - activation/deactivation of Ledvices     Yes; per user program       - Asket management record     Yes; per user program       - Autoregotation     Yes       • 100 Mbps     Yes       • Autoregotation     Yes       • Industrial Ethernet)     Yes       • Number of connections, max.     192; via integrated interfaces of the CPU and connected CPs / CMs       • Number of connections, max.     192; via integrated interfaces of the CPU and connected CPs / CMs       • Number of connections, max.     192; via integrated interfaces of the CPU and connected CPs / CMs       • Number of connections, max.     192; via integrated interfaces of the CPU and connected CPs / CMs       • Number of connections, max.     192; via integrated interfaces of the CPU and connected CPs / CMs       • Number of connections, max.     192; via integrated interfaces of the CPU	Update time for RT			
Services     - PG/OP communication     Yes       PG/OP communication     No	— for send cycle of 1 ms	1 ms to 512 ms		
	PROFINET IO Device			
- INTNo- PROFlenergyYes; per user program- Prioritized startupNo- Shared deviceYes- Autheor of IO Controllers with shared device, max.4- activation/dectivation of I-devicesYes; per user program- Asset management recordYes; per user program- Asset management recordYes; per user programInterface typesVes- Nutheor of IO Controllers with shared device, max.4- Asset management recordYes; per user programInterface typesVes- Nutheor of prome status LEDYesProtecolsYesProtecolsProtecolsPROFleafeYes; V2.4 / V2.6Number of connections, max.192; via integrated interfaces of the CPU and connected CPs / CMsNumber of connections, via integrated interfaces108Number of connections, via integrated interfaces108Number of connections, via integrated interfaces108Number of sonnections, via integrated interfaces108Number of sonnections, reserved for ESI-IMII/web10Number of sonnections, subjectedYes- Media redundancyorly via 1st interface (X1)- MRPYes- MRPYes; NIPP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Cleant- MRPYes; NIPP Automanager according to IEC 62439-2 Edition 3.0- Number of stations in the ring, max.30- Number of stations in the ring, max.30- Number of stations in the ring, max.Yes- S				
- Prioritized strup     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       Indeface types     Fermional Structure       Ruface types     Fermional Structure       Ruface types     Yes       - Autocrossing     Yes       - Autocrossing     Yes       - Autocrossing     Yes       - Autocrossing     Yes       - Mumber of connections, max.     192; via integrated interfaces of the CPU and connected CPs / CMs       - 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, max.     192; via integrated interfaces of the CPU and connected CPs / CMs       - Number of connections reserved for ES/HMI/web     10       - Number of connections, max.     192; via integrated interfaces       - Number of connections reserved for ES/HMI/web     10       - Number of connections, supported     Yes       - MRP     Yes       - MRP     Yes       - MRP     Yes, as MRP ring node according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client       - MRP     Yes; as MRP ring node according to IEC 62439-2 Ed				
- Shared device     Yes       - Number of IO Controllers with shared device, max.     4       - activation/deactivation of 1-devices     Yes, per user program       - Asset management record     Yes; per user program       Interface types     Test per user program       RL4 SE (Element)     Yes       - Autoorgotistion     Yes       - Mumber of connections, max.     192; viz 1/ V2.6       Number of connections via integrated interfaces of the CPU and connected CPs / CMs     10       - Number of connections via integrated interfaces     108       - Number of connections via integrated interfaces     108       - Number of connections via integrated interfaces     108       - Number of sonarctions via integrated interfaces     108       - Number of sonarctins wia integrated interfaces     108       - Number of sonarctins     Yes <td< td=""><td></td><td></td></td<>				
— Asset management record     Yes; per user program       Interacte types       RJ 45 (Ethernet)       • 100 Mbps     Yes       • Autoregotiation     Yes       • Autoregotiation     Yes       • Autoregotiation     Yes       • Industrial Ethernet status LED     Yes       PROFIsate     Yes; V2.4 / V2.6       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 reserved for ES/HMI/web     10       • Number of connections reserved for ES/HMI/web     10       • Number of connections us integrated interfaces     108       • Number of stronnections us via integrated interfaces     108       • Number of stronnections us via integrated interfaces     108       • Number of stronnections us via integrated interfaces     108       • Number of stronnections, supported     Yes       - MEP     MER       - MEP interconnection, supported     Yes; as MRP ring node according to IEC 62439-2 Edition 3.0       - MRPD     Yes; as MRP ring node according to IEC 62439-2 Edition 3.0       - MRPD     Yes; as MRP ring node according to IEC 62439-2 Edition 3.0       - MRPD     Yes; as onther program       - Strotnymication, as erver     Yes       • Strotnymication, as erver <td></td> <td></td>				
Interface types         RJ 45 (Ethernet)         • 100 Mbps       Yes         • Autoreoptiation       Yes         • Autorossing       Yes         • Industrial Ethemet status LED       Yes         Protocols       Protocols         PROFisafe       Yes; V2.4 / V2.6         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         MRP       Yes         Media redundancy       only via 1st interface (X1)         - MRP       Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client         - MRPD       Yes; as MRP ring node according to IEC 62439-2 Edition 3.0         - MRPD       Yes; as MRP ring node according to IEC 62439-2 Edition 3.0         - MRPD       Yes; as MRP ring node according to IEC 62439-2 Edition 3.0         - MRPD       Yes; as MRP ring node according to IEC 62439-2 Edition 3.0         - MRPD       Yes; as Communication 3.0         - Number of stations in the ring, max.       50				
RJ 45 (Ethernet)         • 100 Mbps       Yes         • Autonegotiation       Yes         • Autocrossing       Yes         • Industrial Ethernet status LED       Yes         Protocols       Processing         PROFisafe       Yes; V2.4 / V2.6         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 reserved for ES/HMI/web       10         • Number of connections is integrated interfaces       108         • Number of connections reserved for ES/HMI/web       10         • Number of connections via integrated interfaces       108         • Number of S7 routing paths       16         Redundancy mode	-	res, per user program		
• 100 Mbps       Yes         • Autoregotiation       Yes         • Autorossing       Yes         • Industrial Ethemet status LED       Yes         Protocols       Protocols         Protocons       192; via integrated interfaces of the CPU and connected CPs / CMs         • Number of connections, max.       192; via integrated interfaces of the CPU and connected CPs / CMs         • Number of connections via integrated interfaces       108         • Number of S7 routing paths       16         Redundancy mode       -         • H-Sync forwarding       Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client         - MRP       Yes; Requirement: IRT         - MRPD       Yes; Requirement: IRT         - Switchover time on line break, typ.       200 ms; For MRP, bumpless for MRPD         - Number of stations in the ring, max.       52         SIMATIC communication, as server       Yes         • S7 routing       Yes         • S7 routing       Yes         • S7 communication, as server       Yes         • User data per job, max.       Se online help (S7 communication, user data size)         Open IE communication       Yes         • Data length, max.       Se online help (S7 communication, user data size) <t< td=""><td></td><td></td></t<>				
• AutonegotiationYes• AutocrossingYes• Industrial Ethemet status LEDYesProtocolsYesPROFisafeYes; V2.4 / V2.6Number of connections, max.192; via integrated interfaces of the CPU and connected CPs / CMs• Number of connections reserved for ES/HMI/web10• MRP• Site connections reserved for ES/HMI/web• MRP ClientYes; Resultement: IRT• Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD• Site connuncicationYes• Site communicat		Voc		
• Autocrossing       Yes         • Industrial Ethernet status LED       Yes         Protocols				
• Industrial Ethernet status LED       Yes         Protocols       PROFIsafe       Yes; V2.4 / V2.6         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 Sonnections via integrated interfaces       108         • Number of Sonnections via integrated interfaces       108         • Number of S7 routing paths       16         Redundancy mode       -         • H-Sync forwarding       Yes         Media redundancy       only via 1st interface (X1)         - MRP Interconnection, supported       Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client         - MRPD       Yes; mRP Automanager according to IEC 62439-2 Edition 3.0         - MRPD       Yes; mRP Automanager according to IEC 62439-2 Edition 3.0         - MRPD       Yes; mRP Client         - MRPD       Yes; row for MRPD         - Number of stations in the ring, max.       50         SIMATIC communication       See online help (S7 communication, user data size)         Open IE communication, as client       Yes         • User data per job, max.       See online help (S7 communication, user data size)         Open IE communication       Yes         - Data length, max.	-			
Protocols           PROFIsate         Yes; V2.4 / V2.6           Number of connections, max.         192; via integrated interfaces of the CPU and connected CPs / CMs           Number of connections reserved for ESI/HMI/web         10           Number of connections reserved for ESI/HMI/web         10           Number of connections via integrated interfaces         108           Number of S7 routing paths         16           Redundancy mode         -           H-Sync forwarding         Yes           Media redundancy         only via 1st interface (X1)           - MRP         Yes; as MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client           MRP Client         Yes; as MRP ring node according to IEC 62439-2 Edition 3.0           - MRP Interconnection, supported         Yes; as MRP ring node according to IEC 62439-2 Edition 3.0           - MRPD         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         Yes           • S7 communication, as server         Yes           • User data per job, max.         See online help (S7 communication, user data size)	C C			
PROFIsafe       Yes; V2.4 / V2.6         Number of connections       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       Yes         Media redundancy       only via 1st interface (X1)         - MRP       Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client         - MRP       Yes; as MRP ring node according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client         - MRPD       Yes; sea MRP ring node according to IEC 62439-2 Edition 3.0         - MRPD       Yes; For MRP, bumpless for MRPD         - Number of stations in the ring, max.       50         SIMATIC communication       Yes         • S7 conting       Yes         • S7 communication, as enver       Yes         • User data per job, max.       See online help (S7 communication, user data size)         Open IE communication       Yes         • TCP/IP       Yes         • Data length, max.       54 kbyte         • several passive connections per port, supported       Yes         • ISO-on-TCP (RFC1006)       Yes				
Number of connections       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       only via 1st interface (X1)         - MRP       Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager, MRP Client         - MRP       Yes; as MRP ring node according to IEC 62439-2 Edition 3.0         - MRPD       Yes; as MRP ring node according to IEC 62439-2 Edition 3.0         - MRPD       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       Yes         • S7 conting       Yes         • S7 communication, as server       Yes         • User data per job, max.       See online help (S7 communication, user data size)         Open IE communication       Yes         - Data length, max.       64 kbyte         - several passive connections per port, supported       Yes		Yes: V2.4 / V2.6		
• Number of connections reserved for ES/HMI/web10• Number of connections via integrated interfaces108• Number of S7 routing paths16Redundancy mode• H-Sync forwardingYes• Media redundancyonly via 1st interface (X1)- Media redundancyonly via 1st interface (X1)- MRPYes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client- MRP Interconnection, supportedYes; as MRP ring node according to IEC 62439-2 Edition 3.0- MRPDYes; Requirement: IRT- Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD- Number of stations in the ring, max.50SIMATIC communicationYes• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• Diser data per job, max.See online help (S7 communication, user data size)• DEP IE communicationYes• TCP/IPYes• Data length, max,64 kbyte• ISO-on-TCP (RFC1006)Yes	Number of connections			
Number of connections via integrated interfaces108Number of S7 routing paths16Redundancy modeYesImage: Image: Image	<ul> <li>Number of connections, max.</li> </ul>	192; via integrated interfaces of the CPU and connected CPs / CMs		
Number of S7 routing paths16Redundancy mode• H-Sync forwardingYesMedia redundancyonly via 1st interface (X1)- Media redundancyonly via 1st interface (X1)- MRPYes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client- MRPDYes; as MRP ring node according to IEC 62439-2 Edition 3.0- MRPDYes; Requirement: IRT- Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD- Number of stations in the ring, max.50SIMATIC communicationYes• S7 routingYes• S7 routingYes• S7 routing according to IEC 62439-2 Edition 2.0, MRP• S7 routingYes• ST routingYes• S7 routingYes• S7 routingYes• S7 routingYes• S7 routingYes• Dene IE communication, as clientYes• TCP/IPYes- Data length, max.64 kbyte- Data length, max.64 kbyte- Sto-on-TCP (RFC1006)Yes	<ul> <li>Number of connections reserved for ES/HMI/web</li> </ul>	10		
Redundancy mode       Yes         Media redundancy       only via 1st interface (X1)         - MRP       Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client         - MRP       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       Yes         • S7 routing       Yes         • S7 communication, as client       Yes         • User data per job, max.       See online help (S7 communication, user data size)         Open IE communication       Yes         • Data length, max.       64 kbyte         - several passive connections per port, supported       Yes         • ISO-on-TCP (RFC1006)       Yes	<ul> <li>Number of connections via integrated interfaces</li> </ul>	108		
• H-Sync forwardingYesMedia redundancyonly via 1st interface (X1)- Media redundancyonly via 1st interface (X1)- MRPYes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client- MRP interconnection, supportedYes; as MRP ring node according to IEC 62439-2 Edition 3.0- MRPDYes; Requirement: IRT- Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD- Number of stations in the ring, max.50SIMATIC communicationYes\$7 routingYes\$7 communication, as serverYes\$7 communication, as clientYesUser data per job, max.See online help (S7 communication, user data size)Open IE communicationYes- TCP/IPYes- Data length, max.64 kbyte- several passive connections per port, supportedYes+ ISO-on-TCP (RFC1006)Yes	Number of S7 routing paths	16		
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       Yes         • S7 communication, as server       Yes         • User data per job, max.       See online help (S7 communication, user data size)         Open IE communication       Yes         • TCP/IP       Yes         - Data length, max.       64 kbyte         - several passive connections per port, supported       Yes         • ISO-on-TCP (RFC1006)       Yes	Redundancy mode			
Media redundancyonly via 1st interface (X1) MRPYes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client MRP interconnection, supportedYes; as MRP ring node according to IEC 62439-2 Edition 3.0 MRPDYes; Requirement: IRT Switchover time on line break, typ. Number of stations in the ring, max.200 ms; For MRP, bumpless for MRPD Number of stations in the ring, max.50SIMATIC communicationYes•- S7 routingYes•- S7 communication, as serverYes•- S7 communication, as clientYes•- User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes Data length, max. several passive connections per port, supportedYes Data length, max. several passive connections per port, supportedYes NUPYes Soveral passive connections per port, supportedYes+- ISO-on-TCP (RFC1006)Yes	H-Sync forwarding	Yes		
MRPYes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager; MRP Client MRP interconnection, supportedYes; as MRP ring node according to IEC 62439-2 Edition 3.0 MRPDYes; Requirement: IRT Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD Number of stations in the ring, max.50SIMATIC communicationYes• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes- Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes	Media redundancy			
MRP Client- MRP interconnection, supportedYes; as MRP ring node according to IEC 62439-2 Edition 3.0- MRPDYes; Requirement: IRT- Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD- Number of stations in the ring, max.50SIMATIC communicationYes• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes• TCP/IPYes• Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes	— Media redundancy	only via 1st interface (X1)		
MRPDYes; Requirement: IRT Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD Number of stations in the ring, max.50SIMATIC communication50SToutingYes• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes- Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes	— MRP			
- Switchover time on line break, typ.200 ms; For MRP, bumpless for MRPD- Number of stations in the ring, max.50SIMATIC communicationYes• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes• TCP/IPYes• Data length, max.64 kbyte- Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes				
Number of stations in the ring, max.50SIMATIC communicationSimatic communication• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)• TCP/IPYes• TCP/IPYes- Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes				
• S7 routingYes• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes• TCP/IPYes• Data length, max.64 kbyte- pata length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes	- Number of stations in the ring, max.	50		
• S7 communication, as serverYes• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communicationYes• TCP/IPYes• Data length, max.64 kbyte- pata length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes				
• S7 communication, as clientYes• User data per job, max.See online help (S7 communication, user data size)Open IE communication• TCP/IPYes• Data length, max.64 kbyte- several passive connections per port, supportedYes• ISO-on-TCP (RFC1006)Yes	S7 routing	Yes		
• User data per job, max.     See online help (S7 communication, user data size)       Open IE communication     Yes       • TCP/IP     Yes       • Data length, max.     64 kbyte       - several passive connections per port, supported     Yes       • ISO-on-TCP (RFC1006)     Yes	• S7 communication, as server	Yes		
Open IE communication         • TCP/IP       Yes         - Data length, max.       64 kbyte         - several passive connections per port, supported       Yes         • ISO-on-TCP (RFC1006)       Yes	<ul> <li>S7 communication, as client</li> </ul>	Yes		
TCP/IP Yes     Data length, max. 64 kbyte     - several passive connections per port, supported Yes     ISO-on-TCP (RFC1006) Yes	• User data per job, max.	See online help (S7 communication, user data size)		
- Data length, max.     64 kbyte       - several passive connections per port, supported     Yes       • ISO-on-TCP (RFC1006)     Yes	Open IE communication			
<ul> <li>several passive connections per port, supported</li> <li>ISO-on-TCP (RFC1006)</li> <li>Yes</li> </ul>	• TCP/IP	Yes		
• ISO-on-TCP (RFC1006) Yes	— Data length, max.	64 kbyte		
	- several passive connections per port, supported	Yes		
- Data length, max. 64 kbyte	ISO-on-TCP (RFC1006)	Yes		
	— Data length, max.	64 kbyte		

1122	N .
• 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
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
OPC UA	
<ul> <li>Runtime license required</li> </ul>	Yes
OPC UA Client	Yes
<ul> <li>Application authentication</li> </ul>	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
— User authentication	"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
— Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_L max.	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
— Number of registerable nodes, max.	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
— User authentication	"anonymous" or by user name & password
— Number of sessions, max.	48
- Number of accessible variables, max.	100 000
- Number of registerable nodes, max.	20 000
<ul> <li>Number of subscriptions per session, max.</li> </ul>	20
— Sampling interval, min.	100 ms
— Publishing interval, min.	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,

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	ProDiag or GRAPH
Number of loadable program messages in RUN, max.	5 000
Number of simultaneously active program alarms	3 000
	200
Number of program alarms	800
Number of alarms for system diagnostics	200
<ul> <li>Number of alarms for motion technology objects</li> </ul>	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	
<ul> <li>Status/control variable</li> </ul>	Yes; without fail-safe
Variables	inputs/outputs, bit memories, DBs, peripheral I/Os (without fail-safe), times, 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
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 program; selection guide via the TIA Selection Tool
Number of available Motion Control resources for technology objects	2 400
Required Motion Control resources	40
— 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
<ul> <li>Positioning axis</li> </ul>	
<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
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	PLo
<ul> <li>Performance level according to ISO 13849-1</li> </ul>	PLe

• SIL acc. to IEC 61508	SIL 3			
Probability of failure (for service life of 20 years and repair time	e of 100 hours)			
<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				
<ul> <li>horizontal installation, min.</li> </ul>	-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			
<ul> <li>vertical installation, min.</li> </ul>	-25 °C; No condensation			
• vertical installation, max.	40 $^\circ\text{C};$ Display: 40 $^\circ\text{C},$ at an operating temperature of typically 40 $^\circ\text{C},$ 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				
Password for display	Yes			
Protection level: Write protection	Yes; Specific write protection both for Standard and for Failsafe			
<ul> <li>Protection level: Read/write protection</li> </ul>	Yes			
<ul> <li>Protection level: Write protection for Failsafe</li> </ul>	Yes			
<ul> <li>Protection level: Complete protection</li> </ul>	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			
Classifications				

	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					
General Product App	roval				
<u>Manufacturer Declara-</u> tion	CE EG-Konf.	UK CA	Miscellaneous		<u>Miscellaneous</u>
General Product Approval	EMV	For use in hazardo	us locations		
RCM	RCM		EM	<u>CCC-Ex</u>	KEX ATEX
For use in hazardous	locations		Functional Saftey		Maritime application
<u>Type Examination Cer-</u> <u>tificate</u>	IECE×	<u>Miscellaneous</u>	<u>Type Examination Cer-</u> <u>tificate</u>	TUV	ABS
Maritime application					
BUREAU VERITAS		Lloyds Register uis	<u>NK / Nippon Kaiji Ky-</u> <u>okai</u>	RINA	<u>CCS (China Classifica-</u> tion Society)
Maritime application	other	Industrial Commun	ication		
	<u>PROFINET</u>	PROFINET			

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