## **Data sheet**

## 6ES7511-1AL03-0AB0

## Siemens EcoTech



SIMATIC S7-1500, CPU 1511-1 PN, central processing unit with work memory 300 KB for program and 1.5 MB for data, 1st interface: PROFINET IRT with 2-port switch, 25 ns bit performance, SIMATIC Memory Card required - - approvals and certificates according to entry 109815653 at support.industry.siemens.com to be considered! - -

Product type designation	CPU 1511-1 PN
HW functional status	FS03
Firmware version	V3.1
FW update possible	Yes
Product function	
• I&M data	Yes; I&M0 to I&M3
• Isochronous mode	Yes; Distributed and central; with minimum OB $6x$ cycle of 500 $\mu s$ (distributed and 1 ms (central)
<ul><li>SysLog</li></ul>	Yes
Engineering with	
STEP 7 TIA Portal configurable/integrated from version	V19 (FW V3.1) / V18 (FW V3.0) or higher; with older TIA Portal versions configurable as 6ES7511-1AK02-0AB0
onfiguration control	
via dataset	Yes
isplay	
Screen diagonal [cm]	3.45 cm
ontrol elements	
Number of keys	8
Mode buttons	2
upply 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
put current	
Current consumption (rated value)	0.56 A
Current consumption, max.	0.9 A
Inrush current, max.	1.15 A; Rated value
l²t	0.5 A <sup>2</sup> ·s
ower	
Infeed power to the backplane bus	10 W
Power consumption from the backplane bus (balanced)	5.5 W

Power loss, typ.	3.4 W
Memory	
Number of slots for SIMATIC memory card	1
SIMATIC memory card required	Yes
Work memory	
integrated (for program)	300 kbyte
• integrated (for data)	1.5 Mbyte
Load memory	
Plug-in (SIMATIC Memory Card), max.	32 Gbyte
Backup	
<ul> <li>maintenance-free</li> </ul>	Yes
CPU processing times	
for bit operations, typ.	25 ns
for word operations, typ.	32 ns
for fixed point arithmetic, typ.	42 ns
for floating point arithmetic, typ.	170 ns
CPU-blocks	
Number of elements (total)	4 000; Blocks (OB, FB, FC, DB) and UDTs
DB	
Number range	1 60 999; subdivided into: number range that can be used by the user: 1 59 999, and number range of DBs created via SFC 86: 60 000 60 999
• Size, max.	1.5 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	1.0 Moyte, 1 or DD3 with absolute addressing, the Illax. Size is 04 ND
Number range	0 65 535
• Size, max.	300 kbyte
FC	
Number range	0 65 535
• Size, max.	300 kbyte
ОВ	
• Size, max.	300 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 250 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
Number of asynchronous error OBs	4
Number of synchronous error OBs	2
Number of diagnostic alarm OBs	1
Nesting depth	24
• per priority class	24
Counters, timers and their retentivity	
S7 counter	2.048
Number  Petentivity	2 048
Retentivity — adjustable	Yes
— adjustable  IEC counter	100
Number	Any (only limited by the main memory)
Retentivity	Any tony minico by the main memory)
— adjustable	Yes
S7 times	
Number	2 048
Retentivity	
— adjustable	Yes
IEC timer	
Number	Any (only limited by the main memory)
Retentivity	
— adjustable	Yes

Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	256 kbyte; in total; available retentive memory for bit memories, timers,
	counters, DBs, and technology data (axes): 216 KB
Extended retentive data area (incl. timers, counters, flags), max.	1.5 Mbyte; When using PS 6 0W 24/48/60 V DC HF
Flag	
• Size, max.	16 kbyte
Number of clock memories	8; 8 clock memory bit, grouped into one clock memory byte
Data blocks	
<ul> <li>Retentivity adjustable</li> </ul>	Yes
Retentivity preset	No
Local data	
<ul> <li>per priority class, max.</li> </ul>	64 kbyte; max. 16 KB per block
Address area	
Number of IO modules	2 048; max. number of modules / submodules
I/O address area	
Inputs	32 kbyte; All inputs are in the process image
Outputs	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
per CM/CP	,
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
	o rayre
Subprocess images	32
Number of subprocess images, max.	32
Hardware configuration	
Number of distributed IO systems	32; A distributed I/O system is characterized not only by the integration of distributed I/O via PROFINET or PROFIBUS communication modules, but also by the connection of I/O via AS-i master modules or links (e.g. IE/PB-Link)
Number of DP masters	
• Via CM	4; A maximum of 4 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be
	inserted in total
Number of IO Controllers	
• integrated	1
• Via CM	4; A maximum of 4 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
Fime of day	
Clock	
• Type	Hardware clock
Backup time	6 wk; At 40 °C ambient temperature, typically
<ul> <li>Deviation per day, max.</li> </ul>	10 s; Typ.: 2 s
Operating hours counter	
Number	16
Clock synchronization	
• supported	Yes
• to DP, master	Yes; via PROFIBUS CM / CP
• on DP, device	Yes; via PROFIBUS CM / CP
• in AS, master	Yes
• in AS, device	Yes
on Ethernet via NTP	Yes
nterfaces	
Number of PROFINET interfaces	1
1. Interface	
Interface types	
• RJ 45 (Ethernet)	Yes; X1
<ul> <li>Number of ports</li> </ul>	2

update time of 500 µs of the isochronous OB is decisive  - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - with IRT and parameterization of "odd" send cycles  - for send cycle of 250 µs - for send cycle of 250 µs - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 500 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - RRT - PROFINET IO Device  Services - Isochronous mode - IRT - PROFienergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - PROFINET Security Class  RJ 45 (Ethemet)  • 100 Mbps • Authoropositian • Authoropositian • Authoropositian • Authoropositian • Authoropositian • Industrial Ethernet status LED  Protocols	• integrated switch	Yes
PROFINET IO Controller PROFINET (O Device Profinet (O Device) Profinet (O D	· ·	
PROFINET IC Device SIMATIC communication Open IE communication Yes Optionally also encrypted Yes Web server Yes Nedia redundancy Yes PROFINET IC Controller Services Inachronous mode Direct data exchange IRT PROFINET Gottaler Services IRT PROFINET Gottaler Services IRT PROFINET Gottaler Ves, Requirement: IRT and isochronous mode (MRPD optional) Yes Wes, per user program Yes, Max. 32 PROFINET Gevices 128, In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 128 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 128 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up to 512 distributed I/O devices can be connected via AS-1, PROFINET Gevices 129 In total up	• IP protocol	Yes; IPv4
SIMATIC communication Open IE communication Wes server Media returnatory Yes Media returnatory Yes Media returnatory Yes PROFINET IO Controller  Services  Inscriptorious mode Direct data exchange IRT PROFILER TS and isochronous mode (MRPD optional) Yes, Requirement: IRT and isochronous mode (MRPD optional) Yes Yes, Per user program Yes, Max. 32 PROFINET devices Yes, PROFILED To device so an be connected via AS-I, PROFILED To device so an be connected via AS-I, PROFILED To device so an be connected via AS-I, PROFILED To device so an be connected via AS-I, PROFILED To PROFINET  Of which Io Ille, max. In the profile of the profile The connected to Devices for RT, max. In the profile of the	PROFINET IO Controller	Yes
Open IE communication  Vesi berver  Nedia redundancy  PROFINET IO Controllet  Services  - Isochronous mode  Direct data exchange  - Isochronous mode  Direct data exchange  - IRT  - IRT  - PROFilenergy  Prioritized starup  - Number of connectable IO Devices, max.  - Of which IO devices with IRT, max.  - Number of connectable IO Devices for RT, max.  - of which II Gevices that can be simultaneously activated-deviced, rider, and the prioritized starup and the prioritized starup activated-deviced devices of RT with sector of IO Devices per tool, max.  - Number of IO Devices that can be simultaneously activated-deviced-deviated, max.  - Number of IO Devices per tool, max.  - Updating times  - PROFINET Security Class  1  Update time for IRT  - for send cycle of 250 µs  - for send cycle of 500 µs  - for send	PROFINET IO Device	Yes
Web server  Media redundancy  PROFINET IO Controller  Services  I sochronous mode  Direct data exchange  PROFINET of Controller  PROFilenergy  Promitzed startup  Number of connectable IO Devices, max.  Of which IO devices with IRT, max.  Number of connectable IO Devices for RT, max.  Web Services  Number of Connectable IO Devices for RT, max.  Web Services  Number of Connectable IO Devices for RT, max.  Web Services  Number of IO Devices Int can be simultaneously activated/deactivated, max.  Number of IO Devices per tool, max.  Number of IO Devices per tool, max.  Web Services  Number of IO Devices per tool, max.  PROFINET Security Class  I the minimum value of the update time also depends on communication shis set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data  I Update time for IRT  For send cycle of 250 µs  For send cycle of 270 µs  For send cycle of 300 µs  For send cycle of 4 ms  Web IRT and parameterization of "odd" send cycles  For send cycle of 250 µs  For send cycle of 250 µs  For send cycle of 100 µs  For send cycle of 250 µs  For send cycle of 100 µs  For send cycl	SIMATIC communication	Yes
• Media redundancy PROFINET IO Controller  Services  - Isochronous mode - Direct date exchange - Direct date exchange - HRT - PROFilenergy - Prioritized startup - Number of connectable IO Devices, max Of which IO devices with IRT, max - Number of connectable IO Devices for RT, max Of which IO devices with IRT, max - Number of IO Devices that can be simultaneously activated of IO Devices that can be simultaneously activated of IO Devices that can be simultaneously activated/deachated, max Number of IO Devices per tool, max Number of IO Devices per tool, max - Updating times - PROFINET Security Class  Update time for IRT - for send cycle of 250 µs - for send cycle of 10 ps - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 3 ms - for send cycle of 500 µs - for	Open IE communication	Yes; Optionally also encrypted
PROFINET IO Controller  Services	Web server	Yes
Services	Media redundancy	Yes
- Isochronous mode - Direct data exchange - Direct data exchange - PROFIenergy - Profitzed startup - PROFIenergy - Profitzed startup - Number of connectable IO Devices, max Of which IO devices with IRT, max Number of connectable IO Devices for RT, max Number of connectable IO Devices for RT, max Number of connectable IO Devices for RT, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Updating times - Updating times - PROFINET Security Class  Update time for IRT - for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 1 ms - with IRT and place for IRT - for send cycle of 1 ms - with IRT and place for IRT - for send cycle of 500 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 250 µs - for send cycle of 1 ms - for send cycle of 250 µs - for send cycle of 1 ms - for send cycle of 250 µs - for send cycle of 1 ms - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of	PROFINET IO Controller	
- Direct data exchange - IRT - IRT - PROFlenergy - Prioritized startup - Number of connectable IO Devices, max Of which IO devices with IRT, max Of which IO devices with IRT, max Of which IO devices that can be simultaneously activated/deachvated, max Of which Io devices per tool, max Ik with the result of IO Devices per tool, max Ik with the result of IO Devices per tool, max Updating times - PROFINET Security Class - FROFINET Security Class - Frosend cycle of 250 us - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 2 ms -	Services	
- IRT - PROFienergy - Prioritized startup - Number of connectable IO Devices, max Of which In line, max Of which In line, max Of which In line, max It with In Internation of the prioritized discretization of the prioritized discretization of the prioritized startup - Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max PROFINET Security Class - PROFINET Security Class - PROFINET Security Class - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 1 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 µs - For send cycle of 1 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 4 ms - For send cycle of 2 ms - For send cycle of 500 µs - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 3 ms - For send cycle of 500 µs - For send cycle of 500 µs - For send cycle of 500 µs - For send cycle of 500 µ	<ul> <li>Isochronous mode</li> </ul>	Yes
PROFIlenergy Prioritzed startup Prioritzed startup Prioritzed startup Promitzed startup Promitzed startup Promote of connectable IO Devices, max. PROFINET I devices PROFINET Gevices PROFINET Severity Class PROFINET Security Class Prof send cycle of 250 µs For send cycle of 4 ms For send cycle of 150 µs For send cycle of 500 µs For send cycle of 150 µs For send cycle of	<ul> <li>Direct data exchange</li> </ul>	Yes; Requirement: IRT and isochronous mode (MRPD optional)
- Prioritized startup - Number of connectable IO Devices, max. 128; In total, up to 512 distributed I/O devices can be connected via AS-I, PROFINET 64  - Number of connectable IO Devices for RT, max. 128  - of which in line, max. 128  - Number of IO Devices per tool, max. 128  - Which in line, max. 128  - PROFINET Security Class 11  - PROFINET Security Class 11  - For send cycle of 250 µs 250 µs 10 4 ms; Note: in the case of IRT with isochronous mode, the minim update time of 500 µs of the isochronous OB is decisive 1200 µs of the isochronous	— IRT	Yes
- Number of connectable IO Devices, max Of which IO devices with IRT, max Of which IO devices with IRT, max Of which In line, max Of which In line, max Number of IO Devices that can be simultaneously activated/descrivated/max? - Number of IO Devices that can be simultaneously activated/descrivated/max Number of IO Devices per tool, max Number of IO Devices per tool, max Updating times - Updating times - PROFINET Security Class - PROFINET Security Class - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 µs - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 µs - For send cycle of 4 ms - For send cycle of 500 µs - For	— PROFlenergy	Yes; per user program
PROFIBUS of PROFINET 64  - Of which IO devices with IRT, max Number of connectable IO Devices for RT, max Of which in line, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Updating times - PROFINET Security Class - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 250 µs - For send cycle of 1 ms - For send cycle of 250 µs - For send cycle of 1 ms - For send cycle of 250 µs - For send cycle of 1 ms - For send cycle of 250 µs - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 1 ms - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle	<ul> <li>Prioritized startup</li> </ul>	Yes; Max. 32 PROFINET devices
Number of connectable IO Devices for RT, max of which in line, max Number of IO Devices that can be simultaneously activated/deactivated, max Number of IO Devices per tool, max Number of IO Devices per tool, max Number of IO Devices per tool, max Updating times Updating times PROFINET IO, on the number of IO devices, and on the quantity of configurated user data PROFINET Security Class For send cycle of 250 µs for send cycle of 250 µs for send cycle of 1 ms for send cycle of 1 ms for send cycle of 2 ms for send cycle of 2 ms for send cycle of 4 ms With IRT and parameterization of "odd" send cycles for send cycle of 250 µs for send cycle of 500 µs for send cycle of 1 ms for send cycle of 2 ms for send cycle of 4 ms	<ul> <li>Number of connectable IO Devices, max.</li> </ul>	
- of which in line, max Number of IO Devices that can be simultaneously activated/deactivated/max Number of IO Devices per tool, max Updating times - Updating times - PROFINET Security Class - PROFINET Security Class - PROFINET Security Class - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 500 µs - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 250 µs - For send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - For send cycle of 250 µs - For send cycle of 2		64
- Number of IO Devices that can be simultaneously activate/deactivated, max.  - Number of IO Devices sper tool, max.  - Updating times  - PROFINET Security Class  Update time for IRT  - for send cycle of 250 μs  - for send cycle of 500 μs  - for send cycle of 4 ms  - With IRT and parameterization of "odd" send cycles  - for send cycle of 500 μs  - for send cycle of 4 ms  - with IRT and parameterization of "odd" send cycles  - for send cycle of 500 μs  - for send cycle of 4 ms  - with IRT and parameterization of "odd" send cycles  - for send cycle of 500 μs  - for send cycle of 4 ms  - with IRT and parameterization of "odd" send cycles  - for send cycle of 500 μs  - for send cycle of 250 μs  - for send cycle of 500 μs  -	<ul> <li>Number of connectable IO Devices for RT, max.</li> </ul>	128
activated/deactivated, max.  — Number of IO Devices per tool, max.  — Updating times  — PROFINET Security Class  In eminimum value of the update time also depends on communication shis set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data  In the minimum value of the update time also depends on communication shis set for PROFINET Security Class  In the minimum value of the update time also depends on communication shis set for PROFINET Security Class  In the case of IRT with isochronous mode, the minimup date time of 500 µs of the isochronous OB is decisive  500 µs to 8 ms  For send cycle of 1 ms  For send cycle of 2 ms  For send cycle of 4 ms  With IRT and parameterization of "odd" send cycles  Update time for RT  For send cycle of 500 µs  For send cycle of 500 µs  For send cycle of 500 µs  For send cycle of 1 ms  For send cycle of 1 ms  For send cycle of 1 ms  For send cycle of 2 ms  For send cycle of 4 ms  For send cycle of 500 µs  For send cycle of 4 ms  For send cycle of 500 µs  For send	,	128
The minimum value of the update time also depends on communication share for PROFINET (0, on the number of 10 devices, and on the quantity of configured user data  - PROFINET Security Class  Update time for IRT  - for send cycle of 250 μs  - for send cycle of 500 μs  - for send cycle of 1 ms  - for send cycle of 2 ms  - for send cycle of 2 ms  - for send cycle of 4 ms  - With IRT and parameterization of "odd" send cycles  Update time of RT  - for send cycle of 250 μs  - for send cycle of 250 μs  - for send cycle of 4 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  - for send cycle of 1 ms  - for send cycle of 1 ms  - for send cycle of 2 ms  - for send cycle of 4 ms  - for send cycle of 2 ms  - for send cycle of 4 ms  - for send cycle of 2 ms  - for send cycle of 4 ms  - for send cycle of 4 ms  - for send cycle of 2 ms  - for		
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  - for send cycle of 500 µs  - for send cycle of 1 ms  - for send cycle of 2 ms  - for send cycle of 4 ms  - for send cycle of 4 ms  - with IRT and parameterization of "odd" send cycles  - for send cycle of 500 µs  - for send cycle of 500 µs  - for send cycle of 2 ms  - for send cycle of 4 ms  - with IRT and parameterization of "odd" send cycles  Update time for RT  - for send cycle of 500 µs  - for send cycle of 1 ms  - for send cycle of 1 ms  - for send cycle of 2 ms  - for send cycle of 4 ms  - for send cycle of 4 ms  - for send cycle of 500 µs  - for send cycle of 1 ms  - for send cycle of 2 ms  - for send cycle of 500 µs  - for se	·	
Update time for IRT  — for send cycle of 250 µs — for send cycle of 500 µs — for send cycle of 1 ms — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 2 ms — for send cycle of 4 ms — with IRT and parameterization of "odd" send cycles  Update time for RT — for send cycle of 2 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 500 µs — for send cycle of 500 µs — for send cycle of 500 µs — for send cycle of 1 ms — for send cycle of 1 ms — for send cycle of 4 ms — that to 512 ms — for send cycle of 4 ms — RT — PROFINET IO Device  Services — Isochronous mode — IRT — PROF lenergy — Shared device — Number of IO Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record — PROFILET Security Class  PROFILET Security Class  RJ 45 (Ethemet)  • 100 Mbps • Autocrossing • Industrial Ethernet status LED  Protocols	— Updating times	set for PROFINET IO, on the number of IO devices, and on the quantity of
Update time for IRT  — for send cycle of 250 µs — for send cycle of 500 µs — for send cycle of 1 ms — for send cycle of 1 ms — for send cycle of 1 ms — for send cycle of 4 ms — for send cycle of 4 ms — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles  — With IRT and parameterization of "odd" send cycles  Update time for RT — for send cycle of 250 µs — for send cycle of 500 µs — for send cycle of 1 ms — for send cycle of 1 ms — for send cycle of 4 ms — when the foreign and foreign and the fore	— PROFINET Security Class	•
update time of 500 µs of the isochronous OB is decisive  — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms — for send cycle of 4 ms — With IRT and parameterization of "odd" send cycles — With IRT and parameterization of "odd" send cycles — With IRT and parameterization of "odd" send cycles — With IRT and parameterization of "odd" send cycles — For send cycle of 500 µs — for send cycle of 500 µs — for send cycle of 500 µs — for send cycle of 1 ms — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 4 ms — prosend cycle of 4 ms — for send cycle of 4 ms — for send cycle of 500 µs — for send cycle of 9 ms — hor send cycle of 9 ms — prosend cycle of 4 ms — yes — lsochronous mode — IRT — PROFINET IO Device  Services — Isochronous mode — IRT — PROFInergy — Shared device — Number of IO Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record — PROFINET Security Class — Asset management record — PROFINET Security Class  Interface types  RJ 45 (Ethernet)  • 100 Mbps • Autocrossing • Autocrossing • Autocrossing • Autocrossing • Industrial Ethernet status LED  Protocols	Update time for IRT	
- for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles - With IRT and parameterization of "odd" send cycles - With IRT and parameterization of "odd" send cycles - With IRT and parameterization of "odd" send cycles - For send cycle of 250 μs - For send cycle of 250 μs - For send cycle of 250 μs - For send cycle of 2 ms - For send cycle of 1 ms - For send cycle of 2 ms - For send cycle of 4 ms - For send cycle of 500 μs - For send cycle	— for send cycle of 250 μs	250 μs to 4 ms; Note: In the case of IRT with isochronous mode, the minimum
- for send cycle of 2 ms - for send cycle of 4 ms - with IRT and parameterization of "odd" send cycles - 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 - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - FROFINET IO Device  Services - Isochronous mode - IRT - PROFlenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - PROFINET Security Class - SNMP Configuration and DCP Read Only  Interface types  RJ 45 (Ethernet) - Autocrossing - Industrial Ethernet status LED - Protocols	— for send cycle of 500 μs	
- for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles  Update time for RT - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 250 μs - fo		
- for send cycle of 4 ms - With IRT and parameterization of "odd" send cycles  Update time for RT - for send cycle of 250 μs - for send cycle of 500 μs - for send cycle of 500 μs - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 500 μs - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 250 μs - fo	•	2 ms to 32 ms
With IRT and parameterization of "odd" send cycles 875 μs)  Update time for RT  — for send cycle of 250 μs — for send cycle of 500 μs — for send cycle of 1 ms — for send cycle of 2 ms — for send cycle of 2 ms — for send cycle of 4 ms — for send cycle of 500 μs — for send cycle of 2 ms — for send cycle of 2 ms — for send cycle of 4 ms — for send cycle of 4 ms — for send cycle of 4 ms — FROFINET IO Device  Services — Isochronous mode — IRT — PROFIenergy — Shared device — Number of IO Controllers with shared device, max. — activation/deactivation of I-devices — Asset management record — PROFINET Security Class  RJ 45 (Ethernet) — 100 Mbps — Autocrossing — Ves — Industrial Ethernet status LED  Protocols	•	4 ms to 64 ms
- for send cycle of 250 µs - for send cycle of 500 µs - for send cycle of 500 µs - for send cycle of 1 ms - for send cycle of 2 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 2 ms - for send cycle of 8 ms - for send cycle of 2 ms - for send cycle of 4 ms - for send cycle of 5 ms - for send cycle of 4 ms - for send cycle of 5 ms - for send cycl	•	Update time = set "odd" send clock (any multiple of 125 $\mu s: 375~\mu s, 625~\mu s \dots 3~875~\mu s)$
- for send cycle of 500 µs 500 µs to 256 ms 1 ms to 512 ms 2 ms to 512 ms 2 ms to 512 ms 4 ms to 512 ms 4 ms to 512 ms 5 ms 4 ms to 512 ms 5 ms	Update time for RT	
for send cycle of 1 ms for send cycle of 2 ms for send cycle of 2 ms for send cycle of 4 ms for send cycle of 2 ms for send cycle of 4	— for send cycle of 250 μs	250 μs to 128 ms
for send cycle of 2 ms	— for send cycle of 500 μs	500 μs to 256 ms
- for send cycle of 4 ms 4 ms to 512 ms  PROFINET IO Device  Services  - Isochronous mode No - IRT Yes - PROFlenergy Yes; per user program - Shared device Yes - Number of IO Controllers with shared device, max activation/deactivation of I-devices Yes; per user program - Asset management record Yes; per user program - PROFINET Security Class SNMP Configuration and DCP Read Only  Interface types  RJ 45 (Ethernet)  • 100 Mbps • Autonegotiation • Autocrossing • Autocrossing • Industrial Ethernet status LED  Protocols	— for send cycle of 1 ms	1 ms to 512 ms
PROFINET IO Device  Services  - Isochronous mode	— for send cycle of 2 ms	2 ms to 512 ms
Services  - Isochronous mode	— for send cycle of 4 ms	4 ms to 512 ms
- Isochronous mode - IRT - PROFlenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - PROFINET Security Class  RJ 45 (Ethernet)  • 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED  Protocols	PROFINET IO Device	
- IRT - PROFlenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - PROFINET Security Class  RJ 45 (Ethernet)  100 Mbps - Autonegotiation - Autocrossing - Autocrossing - Industrial Ethernet status LED  Protocols		
- PROFlenergy - Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - PROFINET Security Class  Interface types  RJ 45 (Ethernet)  • 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED  Protocols		
- Shared device - Number of IO Controllers with shared device, max activation/deactivation of I-devices - Asset management record - PROFINET Security Class  Interface types  RJ 45 (Ethernet)  • 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED  Protocols		
<ul> <li>Number of IO Controllers with shared device, max.</li> <li>— activation/deactivation of I-devices</li> <li>— Asset management record</li> <li>— PROFINET Security Class</li> <li>Interface types</li> <li>RJ 45 (Ethernet)</li> <li>• 100 Mbps</li> <li>• Autonegotiation</li> <li>• Autocrossing</li> <li>• Industrial Ethernet status LED</li> <li>Protocols</li> </ul>	0,	
<ul> <li>— activation/deactivation of I-devices</li> <li>— Asset management record</li> <li>— PROFINET Security Class</li> <li>Interface types</li> <li>RJ 45 (Ethernet)</li> <li>• 100 Mbps</li> <li>• Autonegotiation</li> <li>• Autocrossing</li> <li>• Industrial Ethernet status LED</li> <li>Protocols</li> </ul> Yes; per user program Yes; per user program Yes Yes • Autoprossing <ul> <li>• Industrial Ethernet status LED</li> </ul> Protocools Yes		
- Asset management record - PROFINET Security Class  SNMP Configuration and DCP Read Only  Interface types  RJ 45 (Ethernet)  • 100 Mbps • Autonegotiation • Autocrossing • Industrial Ethernet status LED  Protocols		
— PROFINET Security Class  Interface types  RJ 45 (Ethernet)  • 100 Mbps  • Autonegotiation  • Autocrossing  • Industrial Ethernet status LED  Protocols  SNMP Configuration and DCP Read Only  Yes  Yes  Yes  Yes  Yes  Yes		
Interface types  RJ 45 (Ethernet)  • 100 Mbps  • Autonegotiation  • Autocrossing  • Industrial Ethernet status LED  Protocols	-	
RJ 45 (Ethernet)  • 100 Mbps  • Autonegotiation  • Autocrossing  • Industrial Ethernet status LED  Protocols  Protocols	·	SNMP Configuration and DCP Read Only
• 100 Mbps     • Autonegotiation     • Autocrossing     • Industrial Ethernet status LED  Protocols  Yes  Yes  Yes  Yes  Yes  Yes		
<ul> <li>Autonegotiation</li> <li>Autocrossing</li> <li>Industrial Ethernet status LED</li> <li>Protocols</li> </ul> Yes Yes		
◆ Autocrossing     ◆ Industrial Ethernet status LED     Yes  Protocols	·	
Industrial Ethernet status LED     Yes  Protocols	-	
Protocols	-	
		Yes
	PROFIsafe	No
Number of connections	Number of connections	

<ul> <li>Number of connections, max.</li> </ul>	128; via integrated interfaces of the CPU and connected CPs / CMs
<ul> <li>Number of connections reserved for ES/HMI/web</li> </ul>	10
<ul> <li>Number of connections via integrated interfaces</li> </ul>	88
Number of S7 routing paths	16
Redundancy mode	
H-Sync forwarding	Yes
Media redundancy	
— Media redundancy	only via 1st interface (X1)
— MRP	Yes; MRP Automanager according to IEC 62439-2 Edition 2.0, MRP Manager;
	MRP Client
MRP interconnection, supported	Yes; as MRP ring node according to IEC 62439-2 Edition 3.0
— MRPD	Yes; Requirement: IRT
<ul> <li>Switchover time on line break, typ.</li> </ul>	200 ms; For MRP, bumpless for MRPD
Number of stations in the ring, max.	50
SIMATIC communication	
<ul> <li>PG/OP communication</li> </ul>	Yes; encryption with TLS V1.3 pre-selected
• S7 routing	Yes
Data record routing	Yes
<ul> <li>S7 communication, as server</li> </ul>	Yes
<ul> <li>S7 communication, as client</li> </ul>	Yes
User data per job, max.	See online help (S7 communication, user data size)
Open IE communication	
• TCP/IP	Yes
— Data length, max.	64 kbyte
<ul> <li>several passive connections per port, supported</li> </ul>	Yes
• ISO-on-TCP (RFC1006)	Yes
— Data length, max.	64 kbyte
• UDP	Yes
— Data length, max.	2 kbyte; 1 472 bytes for UDP broadcast
<ul> <li>UDP multicast</li> </ul>	Yes; max. 78 multicast circuits
• DHCP	Yes
• DNS	Yes
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• Encryption	Yes; Optional
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
• web API	
— Number of sessions, max.	50
<ul> <li>number of simultaneous HTTP calls, max.</li> </ul>	4
— HTTP request body, max.	131 072 byte
OPC UA	
Runtime license required	Yes; "Small" license required
OPC UA Client	Yes; Data Access (registered Read/Write), Method Call
Application authentication	Yes
Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15,
<del>V. F. 1999</del>	Basic256Sha256
<ul> <li>User authentication</li> </ul>	"anonymous" or by user name & password
<ul><li>Number of connections, max.</li></ul>	4
<ul> <li>Number of nodes of the client interfaces, recommended max.</li> </ul>	1 000
<ul> <li>Number of elements for one call of OPC_UA_NodeGetHandleList/OPC_UA_ReadList/OPC_ max.</li> </ul>	300
<ul> <li>Number of elements for one call of OPC_UA_NameSpaceGetIndexList, max.</li> </ul>	20
Number of elements for one call of OPC_UA_MethodGetHandleList, max.	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
— Number of registerable method calls of OPC_UA_MethodCall, max.	100
Number of inputs/outputs when calling OPC_UA_MethodCall, max.	20
OPC UA Server	Yes; Data Access (Read, Write, Subscribe), Method Call, Alarms & Condition (A&C), Custom Address Space
<ul> <li>Application authentication</li> </ul>	Yes
— Security policies	available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256, Aes128Sha256RsaOaep, Aes256Sha256RsaPss
— User authentication	"anonymous" or by user name & password
GDS support (certificate management)	Yes
— Number of sessions, max.	32
<ul> <li>Number of accessible variables, max.</li> </ul>	50 000
<ul> <li>Number of registerable nodes, max.</li> </ul>	10 000
Number of subscriptions per session, max.	50
— Sampling interval, min.	100 ms
— Publishing interval, min.	200 ms
Number of server methods, max.	20
Number of inputs/outputs per server method, max.	20
Number of impuls/outputs per server method, max.      Number of monitored items, recommended max.	4 000; for 1 s sampling interval and 1 s send interval
Number of monitored items, recommended max.      Number of server interfaces, max.	10 of each "Server interfaces" / "Companion specification" type and 20 of the
— Number of server interfaces, max.	type "Reference namespace"
<ul> <li>Number of nodes for user-defined server interfaces, max.</li> </ul>	15 000
<ul> <li>Alarms and Conditions</li> </ul>	Yes
— Number of program alarms	100
Number of alarms for system diagnostics	50
Further protocols	
• MODBUS	Yes; MODBUS TCP
87 message functions	
	32
Number of login stations for message functions, max.	32 250
Number of login stations for message functions, max. number of subscriptions, max.	250
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.	
Number of login stations for message functions, max. number of subscriptions, max.	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block,
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.	250 2 000 Yes
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000 600 100
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000 600 100 160
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems
Number of login stations for message functions, max. number of subscriptions, max. number of tags/attributes for subscriptions, max. Program alarms Number of configurable program messages, max.  Number of loadable program messages in RUN, max. Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  rest commissioning functions  Joint commission (Team Engineering)  Status block	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients)
Number of login stations for message functions, max. number of subscriptions, max. number of tags/attributes for subscriptions, max.  Program alarms Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block Single step	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  Number of program alarms  Number of alarms for system diagnostics  Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8
Number of login stations for message functions, max. number of subscriptions, max. number of tags/attributes for subscriptions, max.  Program alarms Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No
Number of login stations for message functions, max. number of subscriptions, max. number of tags/attributes for subscriptions, max.  Program alarms Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  rest commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control  • Status/control variable	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  rest commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control  • Status/control variable  • Variables	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control  • Status/control variable  • Variables  • Number of variables, max.	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes  Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control  • Status/control  • Status/control variable  • Variables  • Number of variables, max.  — of which status variables, max.	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000 600 100 160 Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters 200; per job
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control  • Status/control  • Status/control variable  • Variables  • Number of variables, max.  — of which status variables, max.  — of which control variables, max.	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes  Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control  • Status/control variable  • Variables  • Number of variables, max.  — of which status variables, max.  — of which control variables, max.  Forcing	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes  Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters  200; per job 200; per job
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control  • Status/control variable  • Variables  • Number of variables, max.  — of which status variables, max.  — of which control variables, max.  Forcing  • Forcing	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes  Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters  200; per job 200; per job
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  rest commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control  • Status/control variable  • Variables  • Number of variables, max.  — of which status variables, max.  — of which control variables, max.  Forcing  • Forcing  • Forcing  • Forcing, variables	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters  200; per job 200; per job Yes Peripheral inputs/outputs
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control  • Status/control variable  • Variables  • Number of variables, max.  — of which status variables, max.  — of which control variables, max.  Forcing  • Forcing  • Forcing, variables  • Number of variables, max.	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes  Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters  200; per job 200; per job
Number of login stations for message functions, max. number of subscriptions, max. number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control  • Status/control variable  • Variables  • Number of variables, max.  — of which status variables, max.  — of which control variables, max.  Forcing  • Forcing  • Forcing, variables  • Number of variables, max.  Diagnostic buffer	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters  200; per job 200; per job Yes Peripheral inputs/outputs 200
Number of login stations for message functions, max.  number of subscriptions, max.  number of tags/attributes for subscriptions, max.  Program alarms  Number of configurable program messages, max.  Number of loadable program messages in RUN, max.  Number of simultaneously active program alarms  • Number of program alarms  • Number of alarms for system diagnostics  • Number of alarms for motion technology objects  est commissioning functions  Joint commission (Team Engineering)  Status block  Single step  Number of breakpoints  Profiling  Status/control  • Status/control variable  • Variables  • Number of variables, max.  — of which status variables, max.  — of which control variables, max.  Forcing  • Forcing  • Forcing, variables  • Number of variables, max.	250 2 000 Yes 5 000; Program messages are generated by the "Program_Alarm" block, ProDiag or GRAPH 5 000  600 100 160  Yes; Parallel online access possible for up to 5 engineering systems Yes; Up to 8 simultaneously (in total across all ES clients) No 8 Yes Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters  200; per job 200; per job Yes Peripheral inputs/outputs

— of which powerfail-proof	500
Traces	
Number of configurable Traces	4
Memory size per trace, max.	512 kbyte
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes
MAINT LED	Yes
STOP ACTIVE LED	Yes
<ul> <li>Connection display LINK TX/RX</li> </ul>	Yes
Supported technology objects	
Motion Control	Yes; Note: The number of technology objects affects the cycle time of the PLC
<ul> <li>Number of available Motion Control resources for technology objects</li> </ul>	program; selection guide via the TIA Selection Tool 1 120
Required Motion Control resources	
— per speed-controlled axis	40
— per positioning axis	80
— per synchronous axis	160
— per external encoder	80
— per output cam	20
— 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>	11
<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	v.
High-speed counter	Yes
Standards, approvals, certificates	
Ecological footprint	Voc
environmental product declaration	Yes
Global warming potential  — global warming potential, (total) [CO2 eq]	90.1 kg
— global warming potential, (during production) [CO2 eq]  eq]	80.1 kg 23.8 kg
<ul><li>— global warming potential, (during operation) [CO2 eq]</li></ul>	57.4 kg
<ul><li>— global warming potential, (after end of life cycle)</li><li>[CO2 eq]</li></ul>	-1.29 kg
Ambient conditions	
Ambient temperature during operation	
<ul> <li>horizontal installation, min.</li> </ul>	-30 °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.	-30 °C; No condensation
vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during storage/transportation	
• 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	V
— LAD	Yes

— FBD	Yes
— STL	Yes
— SCL	Yes
— CFC	Yes
— GRAPH	Yes
Know-how protection	
<ul> <li>User program protection/password protection</li> </ul>	Yes
<ul> <li>Copy protection</li> </ul>	Yes
Block protection	Yes
Access protection	
<ul> <li>protection of confidential configuration data</li> </ul>	Yes
<ul> <li>Password for display</li> </ul>	Yes
<ul> <li>Protection level: Write protection</li> </ul>	Yes
<ul> <li>Protection level: Read/write protection</li> </ul>	Yes
<ul> <li>Protection level: Write protection for Failsafe</li> </ul>	No
<ul> <li>Protection level: Complete protection</li> </ul>	Yes
User administration	Yes; device-wide
programming / cycle time monitoring / header	
<ul> <li>lower limit</li> </ul>	adjustable minimum cycle time
• upper limit	adjustable maximum cycle time
Dimensions	
Width	35 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	336 g

last modified:

10/9/2024