# **SIEMENS**

## Data sheet

## 6ES7518-4FP00-3AB0



SIMATIC S7-1500F, CPU 1518F-4 PN/DP ODK, Central processing unit with ODK Runtime Interface, work memory 6 MB for program and 20 MB for data, 1st interface: PROFINET IRT with 2-port switch, 2nd interface: PROFINET RT, 3rd interface: Ethernet, 4th interface: PROFIBUS, 1 ns bit-performance, SIMATIC Memory Card required

General information	
Product type designation	CPU 1518F-4 PN/DP ODK
HW functional status	FS05
Firmware version	V2.6
Product function	
● I&M data	Yes; I&M0 to I&M3
Engineering with	
STEP 7 TIA Portal configurable/integrated as of	V15.1 (FW V2.6)/V14 (FW V2.0) or higher
version	
Configuration control	
via dataset	Yes
via dataset  Display	Yes
	Yes 6.1 cm
Display Screen diagonal [cm]	
Display Screen diagonal [cm] Control elements	6.1 cm
Display Screen diagonal [cm]	
Display Screen diagonal [cm] Control elements	6.1 cm
Display Screen diagonal [cm]  Control elements Number of keys	6.1 cm

Type of supply voltage permissible range, lower limit (DC) 19.2 V permissible range, upper limit (DC) 28.8 V Reverse polarity protection Yes Mains buffering • Mains-voltage failure stored energy time • Repeat rate, min. 1/s    Mains buffering   • Mains-voltage failure stored energy time • Repeat rate, min. 1/s    Input current   1/s   1.55 A		
permissible range, upper limit (DC) Reverse polarity protection  Mains buffering  Mains/voltage failure stored energy time Repeat rate, min.  Input current  Current consumption (rated value) Inrush current, max.  P  Ouz A*s  Power Infeed power to the backplane bus Infeed power to the backplane bus Infeed power to the backplane bus Infeed power to skylame Infeed value Infeed	Type of supply voltage	24 V DC
Reverse polarity protection  Mains buffering  Mains Voltage failure stored energy time Repeat rate, min.  Input current  Current consumption (rated value) Inush current, max.  Power Infleed power to the backplane bus It w Power consumption from the backplane bus (balanced)  Power loss.  Power loss, typ.  Z4 W  Memory  Memory  Integrated (for program) integrated (for program) integrated (for CPU function library of CPU Runtime)  Pulyain (SIMATIC Memory Card), max.  Backup Pulyain (SIMATIC Memory Card), max.  Backup Pilyain (SIMATIC Memory Card), max.  Backup For integrations, typ.  In sort of solds for Simatic Memory Card), max.  Backup For integrations, typ. In sort of solds for Simatic Memory Card), max.  Backup For integrations, typ. In sort over operations, typ. In sort op	permissible range, lower limit (DC)	19.2 V
Mains buffering  • Mains/voltage failure stored energy time • Repeat rate, min.  Input current  Current consumption (rated value)  Inrush current, max.  If 0.02 A*s  Power  Infeed power to the backplane bus Power consumption from the backplane bus (balanced)  Power loss  Power loss Power loss, typ.  Memory  Number of slots for SIMATIC memory card SIMATIC memory card required Yes  Work memory  • integrated (for program) • integrated (for CPU function library of CPU Runtime)  Load memory  • Plug-in (SIMATIC Memory Card), max.  Backup • maintenance-free  Yes  CPU processing times  for bit operations, typ.  for fixed point arithmetic, typ. for footing point arithmetic, typ. for footing point arithmetic, typ. for footing point arithmetic, typ. for floating point arithmetic, typ. for floating point arithmetic, typ.  • Number of elements (total)  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	permissible range, upper limit (DC)	28.8 V
Mains/voltage failure stored energy time Repeat rate, min.  Input current  Current consumption (rated value) Inrush current, max.  It	Reverse polarity protection	Yes
• Repeat rate, min.    Input current  Current consumption (rated value)   Inush current, max.   If	Mains buffering	
Input current Current consumption (rated value) Inrush current, max.  2.4 A; Rated value Pt 0.02 A*s  Power Infeed power to the backplane bus (balanced) Power consumption from the backplane bus (balanced) Power loss Power loss Power loss, typ. 24 W  Memory Number of slots for SIMATIC memory card SIMATIC memory card required Yes Work memory  integrated (for program) integrated (for program) integrated (for CPU function library of CPU Runtime)  Load memory  Plug-in (SIMATIC Memory Card), max.  Backup  maintenance-free Yes  CPU processing times For bit operations, typ. for fixed point arithmetic, typ. for fixed point arithmetic, typ. for floating point arithmetic, typ.  Plug-in (SIMATIC total) SIMATIC memory Simatic maximum and simatic max	Mains/voltage failure stored energy time	5 ms
Current consumption (rated value)  Inrush current, max.  Power  Infeed power to the backplane bus  Power consumption from the backplane bus (balanced)  Power loss  Power loss, typ.  24 W  Memory  Number of slots for SIMATIC memory card  SIMATIC memory card required  Yes  Work memory  • integrated (for program) • integrated (for CPU function library of CPU Runtime)  Load memory  • Plug-in (SIMATIC Memory Card), max.  Backup  • maintenance-free  Yes  CPU processing times  for bit operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.  CPU-blocks  Number of DBs created value  1.55 A  2.4 k; Rated value  12 W  Power loss  12 W  Memory  1	Repeat rate, min.	1/s
Inrush current, max.  If t 0,02 A² s  Power  Infeed power to the backplane bus 12 W  Power consumption from the backplane bus (balanced)  Power loss  Power loss, typ. 24 W  Memory  Integrated (for consumption from the backplane bus (balanced)  Power loss, typ. 24 W  Memory  Integrated (for program) 10	Input current	
Power Infeed power to the backplane bus 12 W Power consumption from the backplane bus 30 W (balanced)  Power loss Power loss, typ. 24 W  Memory Number of slots for SIMATIC memory card 1 SIMATIC memory card required Yes Work memory  • integrated (for program) 4 Mbyte • integrated (for CPU function library of CPU Runtime) 50 Mbyte; Note: The "CPU function library of the CPU" are C/C++ blocks for the user program that were created using the SIMATIC ODK 1500S or Target 1500S.  Load memory  • Plug-in (SIMATIC Memory Card), max. 32 Gbyte  Backup • maintenance-free Yes  CPU processing times for bit operations, typ. 1 ns for word operations, typ. 2 ns for fixed point arithmetic, typ. 6 ns  CPU-blocks Number of elements (total) 12 000; Blocks (OB, FB, FC, DB) and UDTs  DB • Number range 1 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	Current consumption (rated value)	1.55 A
Infeed power to the backplane bus Power consumption from the backplane bus (balanced)  Power loss Power loss Power loss, typ.  24 W  Memory  Number of slots for SIMATIC memory card SIMATIC memory card required Yes  Work memory  • integrated (for program) • integrated (for CPU function library of CPU Runtime)  • integrated (for CPU function library of CPU Runtime)  Load memory  • Plug-in (SIMATIC Memory Card), max.  Backup • maintenance-free Yes  CPU processing times for bit operations, typ. for word operations, typ. for fixed point arithmetic, typ. for floating point arithmetic, typ. for floating point arithmetic, typ. for floating point arithmetic, typ.  1 2 000; 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	Inrush current, max.	2.4 A; Rated value
Infeed power to the backplane bus Power consumption from the backplane bus (balanced)  Power loss Power loss Power loss, typ.  24 W  Memory Number of slots for SIMATIC memory card SIMATIC memory card required Yes  Work memory • integrated (for program) • integrated (for CPU function library of CPU Runtime)  • integrated (for CPU function library of CPU Runtime)  Load memory • Plug-in (SIMATIC Memory Card), max.  Backup • maintenance-free  Yes  CPU processing times for bit operations, typ. for word operations, typ. for fixed point arithmetic, typ. for fixed point arithmetic, typ. for fixed point arithmetic, typ. for floating point arithmetic, typ.  Plug-blocks Number of elements (total)  Power loss 12 W  W  30 W  30 W  30 W  30 W  30 W  4 MW  4 W  4 W  4 W  4 W  4 W  4 W	l²t	0.02 A <sup>2</sup> ·s
Power consumption from the backplane bus (balanced)  Power loss Power loss, typ. 24 W  Memory Number of slots for SIMATIC memory card 1 SIMATIC memory card required Yes  Work memory  • integrated (for program) 4 Mbyte • integrated (for CPU function library of CPU Runtime) 50 Mbyte; Note: The "CPU function library of the CPU" are C/C++ blocks for the user program that were created using the SIMATIC ODK 1500S or Target 1500S.  Load memory • Plug-in (SIMATIC Memory Card), max. 32 Gbyte  Backup • maintenance-free Yes  CPU processing times for bit operations, typ. 1 ns for word operations, typ. 2 ns for fixed point arithmetic, typ. 2 ns for floating point arithmetic, typ. 6 ns  CPU-blocks  Number of elements (total) 12 000; Blocks (OB, FB, FC, DB) and UDTs  B • 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	Power	
Power loss   Power loss   Power loss   Power loss, typ.   24 W	Infeed power to the backplane bus	12 W
Power loss Power loss, typ.    All Memory	•	30 W
Power loss, typ.    Memory	(balanced)	
Number of slots for SIMATIC memory card  SIMATIC memory card required  Yes  Work memory  integrated (for program)  integrated (for data)  integrated (for CPU function library of CPU Runtime)  Plug-in (SIMATIC Memory Card), max.  Backup  maintenance-free  Yes  CPU processing times  for bit operations, typ.  for word operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.  The state of th	Power loss	
Number of slots for SIMATIC memory card  SIMATIC memory card required  Yes  Work memory  integrated (for program)  integrated (for program)  integrated (for CPU function library of CPU Runtime)  Solve the user program that were created using the SIMATIC ODK 1500S or Target 1500S.  Load memory  Plug-in (SIMATIC Memory Card), max.  Backup  maintenance-free  Yes  CPU processing times for bit operations, typ. for word operations, typ. for fixed point arithmetic, typ. for floating point arithmetic, typ.  for floating point arithmetic, typ.  DB  Number of elements (total)  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	Power loss, typ.	24 W
SIMATIC memory card required  Work memory  integrated (for program) integrated (for data) integrated (for CPU function library of CPU Runtime)  Ves  So Mbyte  integrated (for CPU function library of CPU Runtime)  Dok 1500S or Target 1500S.  Load memory Plug-in (SIMATIC Memory Card), max.  Backup  maintenance-free  Yes  CPU processing times  for bit operations, typ. for word operations, typ. for fixed point arithmetic, typ. for floating point arithmetic, typ. for floating point arithmetic, typ.  DB  Number of elements (total)  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	Memory	
Work memory  • integrated (for program) • integrated (for data) • integrated (for CPU function library of CPU Runtime)  • integrated (for CPU function library of CPU Buntime)  • integrated (for CPU function library of CPU So Mbyte; Note: The "CPU function library of the CPU" are C/C++ blocks for the user program that were created using the SIMATIC ODK 1500S or Target 1500S.  Load memory • Plug-in (SIMATIC Memory Card), max.  Backup • maintenance-free  Yes  CPU processing times  for bit operations, typ. 1 ns for word operations, typ. 2 ns for fixed point arithmetic, typ. 3 ns for floating point arithmetic, typ. 6 ns  CPU-blocks  Number of elements (total)  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	Number of slots for SIMATIC memory card	1
integrated (for program) integrated (for data) integrated (for CPU function library of CPU function library of CPU function library of CPU function library of the CPU" are C/C++ blocks for the user program that were created using the SIMATIC ODK 1500S or Target 1500S.  Load memory Plug-in (SIMATIC Memory Card), max.  32 Gbyte  Backup maintenance-free Yes  CPU processing times for bit operations, typ. for word operations, typ. for fixed point arithmetic, typ. for floating point arithmetic, typ. for floating point arithmetic, typ.  DB Number of elements (total)  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	SIMATIC memory card required	Yes
<ul> <li>integrated (for data)</li> <li>integrated (for CPU function library of CPU Runtime)</li> <li>50 Mbyte; Note: The "CPU function library of the CPU" are C/C++ blocks for the user program that were created using the SIMATIC ODK 1500S or Target 1500S.</li> <li>Load memory</li> <li>Plug-in (SIMATIC Memory Card), max.</li> <li>Backup</li> <li>maintenance-free</li> <li>Yes</li> <li>CPU processing times</li> <li>for bit operations, typ.</li> <li>for word operations, typ.</li> <li>2 ns</li> <li>for fixed point arithmetic, typ.</li> <li>6 ns</li> <li>CPU-blocks</li> <li>Number of elements (total)</li> <li>12 000; Blocks (OB, FB, FC, DB) and UDTs</li> <li>DB</li> <li>Number range</li> <li>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</li> </ul>	Work memory	
integrated (for CPU function library of CPU Runtime)      integrated (for CPU function library of CPU Buntime)      integrated (for CPU function library of the CPU" are C/C++ blocks for the user program that were created using the SIMATIC ODK 1500S or Target 1500S.  Load memory      Plug-in (SIMATIC Memory Card), max.      32 Gbyte  Backup      maintenance-free      Yes  CPU processing times for bit operations, typ.     1 ns for word operations, typ.     2 ns for fixed point arithmetic, typ.     6 ns  CPU-blocks  Number of elements (total)  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	<ul><li>integrated (for program)</li></ul>	4 Mbyte
Runtime)  blocks for the user program that were created using the SIMATIC ODK 1500S or Target 1500S.  Load memory  Plug-in (SIMATIC Memory Card), max.  32 Gbyte  Backup  maintenance-free  Yes  CPU processing times for bit operations, typ. 1 ns for word operations, typ. 2 ns for fixed point arithmetic, typ. 6 ns  CPU-blocks  Number of elements (total)  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	<ul><li>integrated (for data)</li></ul>	20 Mbyte
<ul> <li>◆ Plug-in (SIMATIC Memory Card), max.</li> <li>Backup</li> <li>◆ maintenance-free</li> <li>Yes</li> <li>CPU processing times</li> <li>for bit operations, typ.</li> <li>for word operations, typ.</li> <li>2 ns</li> <li>for fixed point arithmetic, typ.</li> <li>2 ns</li> <li>for floating point arithmetic, typ.</li> <li>6 ns</li> <li>CPU-blocks</li> <li>Number of elements (total)</li> <li>DB</li> <li>◆ Number range</li> <li>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</li> </ul>	·	blocks for the user program that were created using the SIMATIC
Backup	Load memory	
<ul> <li>● maintenance-free</li> <li>Yes</li> <li>CPU processing times</li> <li>for bit operations, typ.</li> <li>1 ns</li> <li>for word operations, typ.</li> <li>2 ns</li> <li>for fixed point arithmetic, typ.</li> <li>2 ns</li> <li>for floating point arithmetic, typ.</li> <li>6 ns</li> <li>CPU-blocks</li> <li>Number of elements (total)</li> <li>DB</li> <li>Number range</li> <li>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</li> </ul>	Plug-in (SIMATIC Memory Card), max.	32 Gbyte
for bit operations, typ.  for word operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.  CPU-blocks  Number of elements (total)  Number range  Number range  1 ns  2 ns  6 ns  CPU-blocks  Number of elements (total)  12 000; Blocks (OB, FB, FC, DB) and UDTs  DB  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	Backup	
for bit operations, typ.  for word operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.  CPU-blocks  Number of elements (total)  Number range  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	• maintenance-free	Yes
for word operations, typ.  for fixed point arithmetic, typ.  for floating point arithmetic, typ.  6 ns  CPU-blocks  Number of elements (total)  12 000; 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	CPU processing times	
for fixed point arithmetic, typ.  2 ns  for floating point arithmetic, typ.  6 ns  CPU-blocks  Number of elements (total)  12 000; 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	for bit operations, typ.	1 ns
for floating point arithmetic, typ.  CPU-blocks  Number of elements (total)  12 000; 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	for word operations, typ.	2 ns
CPU-blocks  Number of elements (total)  12 000; 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	for fixed point arithmetic, typ.	2 ns
Number of elements (total)  12 000; Blocks (OB, FB, FC, DB) and UDTs  • 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	for floating point arithmetic, typ.	6 ns
◆ 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	CPU-blocks	
• 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	Number of elements (total)	12 000; Blocks (OB, FB, FC, DB) and UDTs
the user: 1 59 999, and number range of DBs created via SFC	DB	
	Number range	the user: 1 59 999, and number range of DBs created via SFC

• Size, max.	16 Mbyte; For DBs with absolute addressing, the max. size is 64 KB
FB	
Number range	0 65 535
• Size, max.	1 Mbyte
FC	
Number range	0 65 535
• Size, max.	1 Mbyte
ОВ	
● Size, max.	1 Mbyte
<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 100 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>	3
<ul> <li>Number of technology synchronous alarm OBs</li> </ul>	2
<ul> <li>Number of startup OBs</li> </ul>	100
<ul> <li>Number of asynchronous error OBs</li> </ul>	4
<ul> <li>Number of synchronous error OBs</li> </ul>	2
<ul> <li>Number of diagnostic alarm OBs</li> </ul>	1
Nesting depth	
• per priority class	24; Up to 8 possible for F-blocks
Counters, timers and their retentivity	
S7 counter	2.040
• Number	2 048
Retentivity	V
— adjustable	Yes
IEC counter	Any (only limited by the main memory)
• Number	Any (only limited by the main memory)
Retentivity	Yes
— adjustable	res
S7 times	2 048
• Number	2 040
Retentivity	Yes
— adjustable	165
IEC timer	Any (only limited by the main memory)
Number	Any (only limited by the main memory)
Retentivity	Vos
— adjustable	Yes

Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags),	768 kbyte; In total; available retentive memory for bit memories,
max.	timers, counters, DBs, and technology data (axes): 700 KB
Extended retentive data area (incl. timers, counters,	20 Mbyte; When using PS 6 0W 24/48/60 V DC HF
flags), max.	
Flag	
<ul><li>Number, max.</li></ul>	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	16 384; max. number of modules / submodules
I/O address area	
• Inputs	32 kbyte; All inputs are in the process image
<ul><li>Outputs</li></ul>	32 kbyte; All outputs are in the process image
per integrated IO subsystem	
— Inputs (volume)	16 kbyte; 16 KB via the integrated PROFINET IO interface X1, 8 KB via the integrated PROFINET IO interface X2 and via the integrated PROFIBUS DP interface
— Outputs (volume)	16 kbyte; 16 KB via the integrated PROFINET IO interface X1, 8 KB via the integrated PROFINET IO interface X2 and via the integrated PROFIBUS DP interface
per CM/CP	
— Inputs (volume)	8 kbyte
— Outputs (volume)	8 kbyte
Subprocess images	
<ul> <li>Number of subprocess images, max.</li> </ul>	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	
• integrated	1
● Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total
Number of IO Controllers	
• integrated	2
● Via CM	8; A maximum of 8 CMs/CPs (PROFIBUS, PROFINET, Ethernet) can be inserted in total

Rack  Modules per rack, max.  Number of lines, max.  Number of PtP CM  Number of PtP CMs  Time of day  Clock  Type Backup time Deviation per day, max.  Deviation per day, max.  To be supported To DP, master To DP, master To DP, master To DP, master To DP, salve To DP, master To DP
Number of lines, max.  PIP CM  Number of PtP CMs  Ithe number of connectable PtP CMs is only limited by the number of available slots  Ime of day  Clock  Type Backup time Deviation per day, max.  Operating hours counter  Number  Number  Ithe Clock synchronization  Supported On DP, master On Ethernet via NTP  Yes  On Ethernet via NTP  Number of PROFIBUS interfaces  Number of PROFIBUS interfaces  Number of ports
PtP CM  Number of PtP CMs  the number of connectable PtP CMs is only limited by the number of available slots  Time of day  Clock  Type Backup time Backup time Deviation per day, max.  Operating hours counter  Number  Tolock synchronization  Supported Deviation Per Agy, max.  Pes Deviation Per Agy, max.  Per Agy, ma
the number of connectable PtP CMs is only limited by the number of available slots  ime of day  Clock  Type Backup time Deviation per day, max.  Operating hours counter  Number  Number  To DP, master Din AS, master Din AS, slave Done Ethernet via NTP  Terfaces  Number of PROFIBUS interfaces  Number of PROFIBUS interfaces  Number of ports  Number of ports Deviation by the number of available slots  the number of connectable PtP CMs is only limited by the number of available slots  Hardware clock  6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s  16  Clock synchronization  Yes  Yes  Yes  On Ethernet via NTP  Terfaces  Number of PROFINET interfaces  1  Interface  Interface types  Number of ports Yes  Interface switch  Yes
Clock         • Type         Hardware clock           • Backup time         6 wk; At 40 °C ambient temperature, typically           • Deviation per day, max.         10 s; Typ.: 2 s           Operating hours counter         16           • Number         16           Clock synchronization         Yes           • to DP, master         Yes           • to DP, master         Yes           • in AS, master         Yes           • in AS, slave         Yes           • on Ethernet via NTP         Yes           Interfaces         3           Number of PROFINET interfaces         3           Number of PROFIBUS interfaces         1           Interface types         • Number of ports         2           • integrated switch         Yes
Clock         • Type         Hardware clock           • Backup time         6 wk; At 40 °C ambient temperature, typically           • Deviation per day, max.         10 s; Typ.: 2 s           Operating hours counter         16           • Number         16           Clock synchronization         Yes           • to DP, master         Yes           • to DP, master         Yes           • in AS, master         Yes           • in AS, slave         Yes           • on Ethernet via NTP         Yes           Interfaces         3           Number of PROFINET interfaces         3           Number of PROFIBUS interfaces         1           Interface types         • Number of ports         2           • integrated switch         Yes
Backup time  Backup time  Deviation per day, max.  Operating hours counter  Number  Number  16  Clock synchronization  supported  to DP, master  in AS, master  in AS, slave  on Ethernet via NTP  Test  PROFIBUS interfaces  Number of PROFIBUS interfaces  Number of ports
Deviation per day, max.  Operating hours counter  Number  Number  16  Clock synchronization  supported  to DP, master  in AS, master  in AS, slave  on Ethernet via NTP  Test  Proof PROFIBUS interfaces  Interface types  Number of ports  Integrated switch  Yes  10  16  Clock synchronization  Yes  Yes  Yes  Yes  Yes  16  Yes  Yes  Yes  Yes  17  Integrated switch  Yes
Operating hours counter  Number  Number  16  Clock synchronization  supported to DP, master in AS, master in AS, slave on Ethernet via NTP  Yes  Number of PROFINET interfaces  Number of PROFIBUS interfaces  Interface  Interface types  Number of ports integrated switch  Yes
<ul> <li>Number</li> <li>Supported</li> <li>supported</li> <li>to DP, master</li> <li>in AS, master</li> <li>in AS, slave</li> <li>on Ethernet via NTP</li> <li>Number of PROFINET interfaces</li> <li>Number of PROFIBUS interfaces</li> <li>Interface</li> <li>Interface types</li> <li>Number of ports</li> <li>integrated switch</li> <li>Yes</li> <li>16</li> <li>Yes</li> <li>Yes</li> <li>16</li> <li>Yes</li> <li>16</li> <li>Yes</li> <li>16</li> <li>Yes</li> <li>17</li> <li>18</li> <li>19</li> <li>10</li> <li>1</li></ul>
Clock synchronization  • supported • to DP, master • in AS, master • in AS, slave • on Ethernet via NTP  **Test of PROFINET interfaces  Number of PROFIBUS interfaces  Interface types • Number of ports • Number of ports • integrated switch  **Test of PROFIBUS interfaces  2 • integrated switch  Yes
<ul> <li>supported</li> <li>to DP, master</li> <li>in AS, master</li> <li>in AS, slave</li> <li>on Ethernet via NTP</li> <li>Number of PROFINET interfaces</li> <li>Number of PROFIBUS interfaces</li> <li>Interface</li> <li>Interface</li> <li>Interface</li> <li>Interface types</li> <li>Number of ports</li> <li>integrated switch</li> </ul>
to DP, master     in AS, master     in AS, slave     in AS, slave     on Ethernet via NTP      Yes  Number of PROFINET interfaces Number of PROFIBUS interfaces  Interface  Interface  Interface types  Number of ports     integrated switch  Yes
in AS, master     in AS, slave     in AS, slave     on Ethernet via NTP      Terfaces  Number of PROFINET interfaces Number of PROFIBUS interfaces  Interface  Interface  Interface types      Number of ports     integrated switch  Yes  Yes  Yes  Yes  1  Yes
in AS, slave on Ethernet via NTP  Yes  Number of PROFINET interfaces  Number of PROFIBUS interfaces  Interface  Interface  Interface types on Number of ports on the integrated switch  Yes  Yes  Yes  Yes  Yes  Yes  Yes  Ye
on Ethernet via NTP      Number of PROFINET interfaces     Number of PROFIBUS interfaces     Interface  Interface  Interface types      Number of ports     integrated switch  Yes  Yes
Number of PROFINET interfaces  Number of PROFIBUS interfaces  1  Interface  Interface types  • Number of ports  • integrated switch  2  Yes
Number of PROFINET interfaces  Number of PROFIBUS interfaces  Interface  Interface types  Number of ports  integrated switch  Number of ports  Yes
Number of PROFIBUS interfaces  Interface  Interface types  Number of ports  integrated switch  1
. Interface Interface types  • Number of ports • integrated switch  2  Yes
Interface types  • Number of ports • integrated switch  2  Yes
<ul><li>Number of ports</li><li>integrated switch</li><li>Yes</li></ul>
• integrated switch Yes
D 1 4 5 ( T 1 )
• RJ 45 (Ethernet) Yes; X1
Protocols
• IP protocol Yes; IPv4
PROFINET IO Controller  Yes
PROFINET IO Device     Yes
SIMATIC communication  Yes
Open IE communication     Yes
• Web server Yes
<ul> <li>Web server</li> <li>Media redundancy</li> <li>Yes</li> <li>Yes; MRP Automanager according to IEC 62439-2 Edition 2.0</li> </ul>
Media redundancy     Yes; MRP Automanager according to IEC 62439-2 Edition 2.0
Media redundancy     Yes; MRP Automanager according to IEC 62439-2 Edition 2.0  PROFINET IO Controller
Media redundancy     Yes; MRP Automanager according to IEC 62439-2 Edition 2.0  PROFINET IO Controller  Services
<ul> <li>Media redundancy</li> <li>Yes; MRP Automanager according to IEC 62439-2 Edition 2.0</li> <li>PROFINET IO Controller</li> <li>Services</li> <li>— PG/OP communication</li> <li>Yes</li> </ul>

— IRT Yes

— MRP
Yes; As MRP redundancy manager and/or MRP client; max.

number of devices in the ring: 50

— MRPD Yes; Requirement: IRT

— PROFlenergy Yes

— Prioritized startup
Yes; Max. 32 PROFINET devices

— Number of connectable IO Devices, max. 512; In total, up to 1 000 distributed I/O devices can be connected

via AS-i, PROFIBUS or PROFINET

— Of which IO devices with IRT, max. 64

— Number of connectable IO Devices for RT, 512

max.

— of which in line, max. 512

Number of IO Devices that can be
 8; in total across all interfaces

— Number of IO Devices per tool, max.

simultaneously activated/deactivated, max.

— 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 125  $\mu$ s 125  $\mu$ s

— for send cycle of 187.5  $\mu$ s 187.5  $\mu$ s

— for send cycle of 250 μs 250 μs to 4 ms

— for send cycle of 500  $\mu s$  500  $\mu s$  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" Update time = set "odd" send clock (any multiple of 125 μs: 375

Update time for RT

— for send cycle of 250  $\mu s$  250  $\mu s$  to 128 ms

- for send cycle of 500 μs 500 μs to 256 ms - for send cycle of 1 ms 1 ms to 512 ms

— for send cycle of 2 ms 2 ms to 512 ms

— for send cycle of 4 ms 4 ms to 512 ms

**PROFINET IO Device** 

Services

— PG/OP communication Yes

— S7 routing Yes

— Isochronous mode
No

— Open IE communication Yes

— IRT Yes

— MRP Yes; As MRP redundancy manager and/or MRP client; max.

number of devices in the ring: 50

— MRPD	Yes; Requirement: IRT
— PROFlenergy	Yes
— Shared device	Yes
<ul> <li>Number of IO Controllers with shared device, max.</li> </ul>	4
Asset management record	Yes; Per user program

### 2. Interface Interface types 1 Number of ports No • integrated switch • RJ 45 (Ethernet) Yes; X2 Protocols Yes; IPv4 • IP protocol Yes • PROFINET IO Controller Yes • PROFINET IO Device • SIMATIC communication Yes Yes • Open IE communication Yes • Web server No Media redundancy **PROFINET IO Controller** Services Yes - PG/OP communication Yes - S7 routing No - Isochronous mode Yes — Open IE communication - IRT No No - MRP - MRPD No Yes - PROFlenergy - Prioritized startup No 128; In total, up to 1 000 distributed I/O devices can be connected — Number of connectable IO Devices, max. via AS-i, PROFIBUS or PROFINET 128 - Number of connectable IO Devices for RT. max. 128 - of which in line, max. 8; in total across all interfaces - Number of IO Devices that can be simultaneously activated/deactivated, max. - Number of IO Devices per tool, max. The minimum value of the update time also depends on - Updating times communication share set for PROFINET IO, on the number of IO devices, and on the quantity of configured user data Update time for RT

— for send cycle of 1 ms	1 ms to 512 ms	
PROFINET IO Device		
Services		
— PG/OP communication	Yes	
— S7 routing	Yes	
<ul> <li>Isochronous mode</li> </ul>	No	
<ul> <li>Open IE communication</li> </ul>	Yes	
— IRT	No	
— MRP	No	
— MRPD	No	
— PROFlenergy	Yes	
— Prioritized startup	No	
— Shared device	Yes	
<ul> <li>Number of IO Controllers with shared</li> </ul>	4	
device, max.		
<ul> <li>Asset management record</li> </ul>	Yes; Per user program	
3. Interface		
Interface types		
<ul><li>Number of ports</li></ul>	1	
<ul><li>integrated switch</li></ul>	No	
• RJ 45 (Ethernet)	Yes; X3	
Protocols		
• IP protocol	Yes; IPv4	
<ul> <li>PROFINET IO Controller</li> </ul>	No	
PROFINET IO Device	No	
<ul> <li>SIMATIC communication</li> </ul>	Yes	
Open IE communication	Yes	
Web server	Yes	
4. Interface		
Interface types		
<ul><li>Number of ports</li></ul>	1	
• RS 485	Yes; X4	
Protocols		
PROFIBUS DP master	Yes	
PROFIBUS DP slave	No	
SIMATIC communication	Yes	
Interface types		
RJ 45 (Ethernet)		
• 100 Mbps	Yes	
• 1000 Mbps	Yes; Only possible at the X3 interface of the CPU 1518	

<ul> <li>Autonegotiation</li> </ul>	Yes
<ul> <li>Autocrossing</li> </ul>	Yes
<ul> <li>Industrial Ethernet status LED</li> </ul>	Yes
RS 485	
Transmission rate, max.	12 Mbit/s

Transmission rate, max.	12 Mbit/s
Protocols	
Number of connections	
Number of connections, max.	384; 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>	192
<ul> <li>Number of S7 routing paths</li> </ul>	64; in total, only 16 S7-Routing connections are supported via PROFIBUS
Redundancy mode	
H-Sync forwarding	Yes
SIMATIC communication	
<ul> <li>S7 communication, as server</li> </ul>	Yes
<ul> <li>S7 communication, as client</li> </ul>	Yes
<ul><li>User data per job, max.</li></ul>	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
— UDP multicast	Yes; Max. 5 multicast circuits
• DHCP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
Web server	
• HTTP	Yes; Standard and user pages
• HTTPS	Yes; Standard and user pages
PROFIBUS DP master	
Number of connections, max.	48; for the integrated PROFIBUS DP interface
Services	
— PG/OP communication	Yes

— S7 routing	Yes
Data record routing	Yes
Isochronous mode	Yes
— Equidistance	Yes
Number of DP slaves	125; In total, up to 1 000 distributed I/O devices can be connected
realities of Dr. Slaves	via AS-i, PROFIBUS or PROFINET
<ul> <li>Activation/deactivation of DP slaves</li> </ul>	Yes
OPC UA	
Runtime license required	Yes
OPC UA client	Yes
<ul> <li>Application authentication</li> </ul>	Yes
— Security policies	Available security policies: None, Basic128Rsa15, Basic256Rsa15, Basic256Sha256
<ul><li>User authentication</li></ul>	"anonymous" or by user name & password
<ul><li>Number of connections, max.</li></ul>	40
<ul> <li>Number of nodes of the client interfaces,</li> </ul>	5 000
max.	
— Number of elements for one call of	300
OPC_UA_NodeGetHandleList/OPC_UA_Rea dList/OPC_UA_WriteList, max.	
Number of elements for one call of	20
OPC_UA_NameSpaceGetIndexList, max.	
<ul> <li>Number of elements for one call of OPC_UA_MethodGetHandleList, max.</li> </ul>	100
Number of simultaneous calls of the client	1
instructions per connection (except	
OPC_UA_ReadList,OPC_UA_WriteList,OPC_	
UA_MethodCall), max.	
Number of simultaneous calls of the client	5
instructions OPC_UA_ReadList,OPC_UA_WriteList and	
OPC_UA_MethodCall, max.	
— Number of registerable nodes, max.	5 000
— Number of registerable method calls of	100
OPC_UA_MethodCall, max.	
<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.	64
<ul> <li>Number of accessible variables, max.</li> </ul>	200 000

<ul> <li>Number of registerable nodes, max.</li> </ul>	50 000
<ul> <li>Number of subscriptions per session, max.</li> </ul>	20
<ul><li>— Sampling time, min.</li></ul>	10 ms
— Send time, min.	10 ms
<ul> <li>Number of server methods, max.</li> </ul>	100
<ul> <li>Number of inputs/outputs per server</li> </ul>	20
method, max.	
<ul> <li>Number of monitored items, max.</li> </ul>	10 000; For 1 s sampling interval and 1 s send interval
<ul> <li>Number of server interfaces, max.</li> </ul>	10
<ul> <li>Number of nodes for user-defined server interfaces, max.</li> </ul>	30 000
Further protocols	
• MODBUS	Yes; MODBUS TCP
Media redundancy	
Switchover time on line break, typ.	200 ms; For MRP, bumpless for MRPD
<ul> <li>Number of stations in the ring, max.</li> </ul>	50
Isochronous mode	
Isochronous operation (application synchronized up	Yes; Distributed and central; with minimum OB 6x cycle of 125 µs
to terminal)	(distributed) and 1 ms (central)
Equidistance	Yes
S7 message functions	
Number of login stations for message functions, max.	32
Program alarms	Yes
Number of configurable program messages, max.	10 000; Program messages are generated by the
	"Program_Alarm" block, ProDiag or GRAPH
Number of loadable program messages in RUN, max.	5 000
Number of simultaneously active program alarms	
<ul> <li>Number of program alarms</li> </ul>	1 000
<ul> <li>Number of alarms for system diagnostics</li> </ul>	200
<ul> <li>Number of alarms for motion technology</li> </ul>	160
objects	
Test commissioning functions	
Joint commission (Team Engineering)	Yes; Parallel online access possible for up to 10 engineering systems
Status block	Yes; Up to 16 simultaneously (in total across all ES clients)
Single step	No
Number of breakpoints	20
Status/control	
Status/control variable	Yes
Variables	Inputs/outputs, memory bits, DBs, distributed I/Os, timers, counters
	Counters

<ul> <li>Number of variables, max.</li> </ul>	
<ul><li>of which status variables, max.</li></ul>	200; per job
<ul><li>of which control variables, max.</li></ul>	200; per job
Forcing	
Forcing, variables	Peripheral inputs/outputs
<ul><li>Number of variables, max.</li></ul>	200
Diagnostic buffer	
• present	Yes
<ul> <li>Number of entries, max.</li> </ul>	3 200
<ul><li>of which powerfail-proof</li></ul>	1 000
Traces	
Number of configurable Traces	8; Up to 512 KB of data per trace are possible
Interrupts/diagnostics/status information	
Diagnostics indication LED	
RUN/STOP LED	Yes
• ERROR LED	Yes

Yes Yes

### Supported technology objects Motion Control Yes; Note: The number of axes affects the cycle time of the PLC program; selection guide via the TIA Selection Tool or SIZER 10 240 • Number of available Motion Control resources for technology objects (except cam disks) • Required Motion Control resources - per speed-controlled axis 40 80 - per positioning axis 160 - per synchronous axis 80 - per external encoder 20 - per output cam 160 - per cam track 40 - per probe Positioning axis 128 - Number of positioning axes at motion control cycle of 4 ms (typical value) 128 - Number of positioning axes at motion control cycle of 8 ms (typical value) Controller Yes; Universal PID controller with integrated optimization • PID\_Compact Yes; PID controller with integrated optimization for valves PID\_3Step Yes; PID controller with integrated optimization for temperature • PID-Temp Counting and measuring

MAINT LED

Connection display LINK TX/RX

High-speed counter	Yes

Standards, approvals, certificates		
Highest safety class achievable in safety mode		
<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 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	
horizontal installation, min.	0 °C
<ul> <li>horizontal installation, max.</li> </ul>	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
<ul> <li>vertical installation, min.</li> </ul>	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Ambient temperature during storage/transportation	
• min.	-40 °C
• max.	70 °C

Programming  Programming language  — LAD Yes; incl. failsafe — FBD Yes; incl. failsafe — STL Yes — SCL Yes — GRAPH Yes  Know-how protection  • User program protection/password protection Yes • Copy protection • Block protection • Block protection  • Password for display Yes • Protection level: Write protection • Protection level: Read/write protection • Protection level: Complete protection	Configuration		
LAD Yes; incl. failsafe FBD Yes; incl. failsafe STL Yes SCL Yes GRAPH Yes  Know-how protection  User program protection/password protection Copy protection Block protection Block protection Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection	Programming		
- FBD Yes; incl. failsafe - STL Yes - SCL Yes - GRAPH Yes  Know-how protection  • User program protection/password protection Yes • Copy protection Yes • Block protection Yes  Access protection • Password for display Yes • Protection level: Write protection Yes • Protection level: Read/write protection Yes • Protection level: Complete protection Yes • Isomorphic Implication Implicati	Programming language		
STL Yes SCL Yes GRAPH Yes  Know-how protection  • User program protection/password protection Yes • Copy protection Yes • Block protection Yes  Access protection  • Password for display Yes • Protection level: Write protection Yes • Protection level: Read/write protection Yes • Protection level: Complete protection Yes	— LAD	Yes; incl. failsafe	
- SCL - GRAPH Yes  Know-how protection  User program protection/password protection Copy protection Block protection  Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection	— FBD	Yes; incl. failsafe	
— GRAPH Yes  Know-how protection  • User program protection/password protection  • Copy protection Yes  • Block protection Yes  Access protection  • Password for display Yes  • Protection level: Write protection Yes  • Protection level: Read/write protection Yes  • Protection level: Complete protection Yes  • Protection level: Complete protection Yes  Cycle time monitoring  • lower limit adjustable minimum cycle time	— STL	Yes	
Know-how protection  User program protection/password protection Copy protection Block protection Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection Protection level: Complete protection Protection level: Complete protection Protection level: Manual Protection Protection level: Acad/write protection Protection level: Complete protection Protection level: Complete protection  Section 1	— SCL	Yes	
<ul> <li>User program protection/password protection</li> <li>Copy protection</li> <li>Block protection</li> <li>Yes</li> </ul> Access protection <ul> <li>Password for display</li> <li>Protection level: Write protection</li> <li>Protection level: Read/write protection</li> <li>Protection level: Complete protection</li> <li>Protection level: Complete protection</li> </ul> Cycle time monitoring <ul> <li>lower limit</li> <li>adjustable minimum cycle time</li> </ul>	— GRAPH	Yes	
Copy protection  Block protection  Password for display  Protection level: Write protection  Protection level: Read/write protection  Protection level: Complete protection  Protection level: Complete protection  Protection level: Complete protection  Access protection  Yes  Protection level: Write protection  Yes  Protection level: Complete protection  Yes  Cycle time monitoring  I lower limit  Adjustable minimum cycle time	Know-how protection		
Block protection  Yes  Access protection  Password for display Protection level: Write protection  Protection level: Read/write protection Protection level: Complete protection Protection level: Complete protection  Yes  Cycle time monitoring I lower limit  Access protection  Yes  Yes  Yes  Access protection  Yes  Yes  Access protection  Yes  Yes  Access protection  Access protection  Access protection  Access protection  Yes  Access protection  Access protection  Access protection  Access protection  Yes  Access protection  Acces	<ul> <li>User program protection/password protection</li> </ul>	Yes	
Access protection  Password for display Protection level: Write protection Protection level: Read/write protection Protection level: Complete protection Adjustable minimum cycle time  adjustable minimum cycle time	Copy protection	Yes	
<ul> <li>Password for display</li> <li>Protection level: Write protection</li> <li>Protection level: Read/write protection</li> <li>Protection level: Complete protection</li> <li>Protection level: Complete protection</li> <li>Cycle time monitoring</li> <li>lower limit</li> <li>Adjustable minimum cycle time</li> </ul>	Block protection	Yes	
<ul> <li>Protection level: Write protection</li> <li>Protection level: Read/write protection</li> <li>Protection level: Complete protection</li> <li>Protection level: Complete protection</li> <li>Cycle time monitoring</li> <li>lower limit</li> <li>Adjustable minimum cycle time</li> </ul>	Access protection		
<ul> <li>Protection level: Read/write protection</li> <li>Protection level: Complete protection</li> <li>Cycle time monitoring</li> <li>lower limit</li> <li>Yes</li> <li>Yes</li> <li>Adjustable minimum cycle time</li> </ul>	Password for display	Yes	
<ul> <li>Protection level: Complete protection</li> <li>Cycle time monitoring</li> <li>lower limit</li> <li>Adjustable minimum cycle time</li> </ul>	<ul> <li>Protection level: Write protection</li> </ul>	Yes	
Cycle time monitoring  • lower limit adjustable minimum cycle time	<ul> <li>Protection level: Read/write protection</li> </ul>	Yes	
• lower limit adjustable minimum cycle time	<ul> <li>Protection level: Complete protection</li> </ul>	Yes	
	Cycle time monitoring		
	• lower limit	adjustable minimum cycle time	
• upper limit adjustable maximum cycle time	• upper limit	adjustable maximum cycle time	

Open Development interfaces	
Size of ODK SO file, max.	9.8 Mbyte
Dimensions	
Width	175 mm
Height	147 mm
Depth	129 mm
Weights	
Weight, approx.	1 988 g
last modified:	10/19/2018