6ES7151-8FB01-0AB0

Data sheet



*** spare part *** SIMATIC DP, IM151-8F PN/DP CPU for ET200S, 256 KB work memory, int. PROFINET interface (with three RJ45 ports) as IO Controller/I-device without battery, MMC required

General information	
HW functional status	01
Firmware version	V3.2
Product function	
• Isochronous mode	No
Engineering with	
Programming package	as of STEP 7 V5.5, Distributed Safety V5.4 SP4 or as of STEP 7 TIA Portal V11
Supply voltage	
Rated value (DC)	24 V
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes; against destruction
external protection for power supply lines (recommendation)	2 A min.
Mains buffering	
 Mains/voltage failure stored energy time 	5 ms
Input current	
Inrush current, typ.	1.8 A
I²t	0.13 A ² ·s
from supply voltage 1L+, max.	352 mA; 426 mA with DP master module
Output current	
for backplane bus (5 V DC), max.	700 mA
Power loss	
Power loss, typ.	5.5 W
Memory	
Work memory	
• integrated	256 kbyte; For program and data
• expandable	No
Load memory	
• Plug-in (MMC)	Yes
Plug-in (MMC), max.	8 Mbyte
 Data management on MMC (after last programming), min. 	10 a
Backup	
• present	Yes; Ensured by SIMATIC Micro Memory Card (maintenance-free)
CPU processing times	
for bit operations, typ.	0.06 µs
for word operations, typ.	0.12 µs
for fixed point arithmetic, typ.	0.16 µs

for floating point arithmetic, typ.	0.59 μs
CPU-blocks	
Number of blocks (total)	1 024; (DBs, FCs, FBs); the maximum number of loadable blocks can be reduced by the MMC used.
DB	
Number, max.	1 024; Number range: 1 to 16000
• Size, max.	64 kbyte
FB	
Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
FC	
Number, max.	1 024; Number range: 0 to 7999
• Size, max.	64 kbyte
OB	
Number, max.	See S7-300 operation list
• Size, max.	64 kbyte
Number of free cycle OBs	1; OB 1
Number of time alarm OBs	1; OB 10
Number of delay alarm OBs	2; OB 20, 21
 Number of cyclic interrupt OBs 	4; OB 32, 33, 34, 35
 Number of process alarm OBs 	1; OB 40
 Number of DPV1 alarm OBs 	3; OB 55, 56, 57
 Number of isochronous mode OBs 	1; OB 61; only for PROFINET
Number of startup OBs	1; OB 100
 Number of asynchronous error OBs 	6; OB 80, 82, 83, 85, 86, 87 (OB83 only for centralized I/O and PROFINET IO)
Number of synchronous error OBs	2; OB 121, 122
Nesting depth	
 per priority class 	16
additional within an error OB	4
Counters, timers and their retentivity	
S7 counter	
Number	256
Retentivity	
— adjustable	Yes
— preset	Z 0 to Z 7
Counting range	
— adjustable	Yes
— lower limit	0
— upper limit	999
IEC counter	
• present	Yes
• Type	SFB
Number	Unlimited (limited only by RAM capacity)
S7 times	
Number	256
Retentivity	
— adjustable	Yes
— adjustable — preset	
— adjustable — preset Time range	Yes No retentivity
adjustable preset Time range lower limit	Yes No retentivity 10 ms
adjustable preset Time range lower limit upper limit	Yes No retentivity
adjustable preset Time range lower limit upper limit IEC timer	Yes No retentivity 10 ms 9 990 s
 — adjustable — preset Time range — lower limit — upper limit IEC timer ◆ present 	Yes No retentivity 10 ms 9 990 s Yes
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- adjustable - preset Time range - lower limit - upper limit IEC timer • present • Type • Number	Yes No retentivity 10 ms 9 990 s Yes SFB
- adjustable - preset Time range - lower limit - upper limit IEC timer • present • Type • Number	Yes No retentivity 10 ms 9 990 s Yes SFB
- adjustable - preset Time range - lower limit - upper limit IEC timer • present • Type • Number Data areas and their retentivity	Yes No retentivity 10 ms 9 990 s Yes SFB Unlimited (limited only by RAM capacity)
- adjustable - preset Time range - lower limit - upper limit IEC timer • present • Type • Number Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max.	Yes No retentivity 10 ms 9 990 s Yes SFB Unlimited (limited only by RAM capacity)
- adjustable - preset Time range - lower limit - upper limit IEC timer • present • Type • Number Data areas and their retentivity Retentive data area (incl. timers, counters, flags), max. Flag	Yes No retentivity 10 ms 9 990 s Yes SFB Unlimited (limited only by RAM capacity) 64 kbyte

Politic books Referritivity adjustable Yes, via mon-retain property on DB	Number of clock memories	8; 1 memory byte
Retentivity adjustable Yes, was non-retain property on DB Yes Retentivity preset Yes Retentivity adjustable 2 048 byte Retentivity preset 2 048 byte Retentive preset 2 048 byte		o, i memory byte
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Outputs		
Imputs	•	
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Inputs, adjustable 2 048 byte		2 048 byte
Outputs, adjustable 2 0.48 byte	Process image	
Injusts, default 128 byte		
Outputs, default 128 byte		
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 in AS, master in AS, device on Ethernet via NTP Yes; As client 	Hardware clock (real-time) retentive and synchronizable Backup time Deviation per day, max. Behavior of the clock following POWER-ON Behavior of the clock following expiry of backup period Operating hours counter Number Number Number/Number range Range of values Granularity retentive Clock synchronization supported to MPI, master on MPI, device	Yes 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s Clock continues running after POWER OFF the clock continues at the time of day it had when power was switched off 1 0 0 to 2^31 hours (when using SFC 101) 1 h Yes; Must be restarted at each restart Yes No No
 in AS, device on Ethernet via NTP Yes; As client 	Hardware clock (real-time) retentive and synchronizable Backup time Deviation per day, max. Behavior of the clock following POWER-ON Behavior of the clock following expiry of backup period Operating hours counter Number Number Number range Range of values Granularity retentive Clock synchronization supported to MPI, master on MPI, device to DP, master	Yes 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s Clock continues running after POWER OFF the clock continues at the time of day it had when power was switched off 1 0 0 to 2^31 hours (when using SFC 101) 1 h Yes; Must be restarted at each restart Yes No No Yes; With DP master module
• on Ethernet via NTP Yes; As client	Hardware clock (real-time) retentive and synchronizable Backup time Deviation per day, max. Behavior of the clock following POWER-ON Behavior of the clock following expiry of backup period Operating hours counter Number Number Number/Number range Range of values Granularity retentive Clock synchronization supported to MPI, master on MPI, device to DP, master on DP, device	Yes 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s Clock continues running after POWER OFF the clock continues at the time of day it had when power was switched off 1 0 0 to 2^31 hours (when using SFC 101) 1 h Yes; Must be restarted at each restart Yes No No Yes; With DP master module Yes; With DP master module
	Hardware clock (real-time) retentive and synchronizable Backup time Deviation per day, max. Behavior of the clock following POWER-ON Behavior of the clock following expiry of backup period Operating hours counter Number Number Number range Range of values Granularity retentive Clock synchronization supported to MPI, master on MPI, device to DP, master on DP, device in AS, master	Yes 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s Clock continues running after POWER OFF the clock continues at the time of day it had when power was switched off 1 0 0 to 2^31 hours (when using SFC 101) 1 h Yes; Must be restarted at each restart Yes No No Yes; With DP master module Yes; With DP master module No
1. Interface	Hardware clock (real-time) retentive and synchronizable Backup time Deviation per day, max. Behavior of the clock following POWER-ON Behavior of the clock following expiry of backup period Operating hours counter Number Number Number range Range of values Granularity retentive Clock synchronization supported to MPI, master on MPI, device to DP, master on DP, device in AS, master in AS, device	Yes 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s Clock continues running after POWER OFF the clock continues at the time of day it had when power was switched off 1 0 0 to 2^31 hours (when using SFC 101) 1 h Yes; Must be restarted at each restart Yes No No Yes; With DP master module Yes; With DP master module No No
Interface type PROFINET	Hardware clock (real-time) retentive and synchronizable Backup time Deviation per day, max. Behavior of the clock following POWER-ON Behavior of the clock following expiry of backup period Operating hours counter Number Number Number range Range of values Granularity retentive Clock synchronization supported to MPI, master on MPI, device to DP, master on DP, device in AS, master in AS, device	Yes 6 wk; At 40 °C ambient temperature, typically 10 s; Typ.: 2 s Clock continues running after POWER OFF the clock continues at the time of day it had when power was switched off 1 0 0 to 2^31 hours (when using SFC 101) 1 h Yes; Must be restarted at each restart Yes No No Yes; With DP master module Yes; With DP master module No No

Isolated	Yes
automatic detection of transmission rate	Yes
Autonegotiation	Yes
Autocrossing	Yes
Change of IP address at runtime, supported	Yes
Interface types	
• RJ 45 (Ethernet)	Yes
Number of ports	3; RJ45
integrated switch	Yes
Protocols	
• MPI	No
PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality
PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality
PROFINIO DR	Yes
PROFIBUS DP master PROFIBUS DP devices	No
PROFIBUS DP device	No
Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
Web server Point to point compaction	Yes
Point-to-point connection PROFINEL IO Controller	No
PROFINET IO Controller	400 Mbilder full dumlars
Transmission rate, max. Soprious	100 Mbit/s; full duplex
Services — PG/OP communication	Von
	Yes
— Routing	Yes; With DP master module
— S7 communication	Yes; with loadable FBs
— Isochronous mode — IRT	Yes; OB 61; only for PROFINET IO
	Yes
— Shared device	Yes
— Prioritized startup	Yes
Number of IO devices with prioritized startup, max.	32 128
— Number of connectable IO Devices, max.— Of which IO devices with IRT, max.	64
— of which in line, max.	64
Number of IO Devices with IRT and the option "high flexibility"	128
— of which in line. max.	61
Number of connectable IO Devices for RT, max.	128
— of which in line, max.	128
Activation/deactivation of IO Devices	Yes
Number of IO Devices that can be simultaneously activated/deactivated, max.	8
 IO Devices changing during operation (partner ports), supported 	Yes
Number of IO Devices per tool, max.	8
Device replacement without swap medium	Yes
— Send cycles	$250~\mu\text{s}, 500~\mu\text{s}, 1~\text{ms}; 2~\text{ms}, 4~\text{ms}$ (not in the case of IRT with "high flexibility" option)
— Updating time	Minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the number of configured user data items.
— Updating times	250 μs to 512 ms (depends on operating mode; for more details, refer to Operating Instructions, "Interface Module IM151-8 PN/DP CPU")
Address area	
— Inputs, max.	2 kbyte
— Outputs, max.	2 kbyte
— User data consistency, max.	1 024 byte; with PROFINET I/O
PROFINET IO Device	
Services	V
— PG/OP communication	Yes
— Routing	Yes
— S7 communication	Yes; with loadable FBs
 Isochronous mode 	No
— IRT	Yes

— PROFlenergy	Yes; With SFB 73 / 74 prepared for loadable PROFlenergy standard FB for I-
	Device
— Shared device	Yes
 Number of IO Controllers with shared device, max. 	2
Transfer memory	
— Inputs, max.	1 440 byte; Per IO Controller with shared device
— Outputs, max.	1 440 byte; Per IO Controller with shared device
Submodules	
 number of submodules / at the 1st interface / as PROFINET IO device / maximum 	64
 User data per submodule, max. 	1 024 byte
PROFINET CBA	
acyclic transmission	Yes
cyclic transmission	Yes
Open IE communication	
Number of connections, max.	8
 Local port numbers used at the system end 	0, 20, 21, 23, 25, 80, 102, 135, 161, 443, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
2. Interface	00000, 00004, 00000
	External interface via master readille CEC7400 411400 04D0
Interface type	External interface via master module 6ES7138-4HA00-0AB0
Isolated	Yes
Interface types	V
• RS 485	Yes
Output current of the interface, max.	No
Protocols	
• MPI	No
PROFINET IO Controller	No
PROFINET IO Device	No
PROFINET CBA	No
 PROFIBUS DP master 	Yes
 PROFIBUS DP device 	No
 Open IE communication 	No
Web server	No
PROFIBUS DP master	
 Transmission rate, max. 	12 Mbit/s
 max. number of DP devices 	32; Per station
Services	
— PG/OP communication	Yes
— Routing	Yes
Global data communication	No
 S7 basic communication 	Yes; I blocks only
— S7 communication	Yes
— S7 communication, as client	No
S7 communication, as server	Yes
— Equidistance	Yes
— Isochronous mode	No
— SYNC/FREEZE	Yes
activation/deactivation of DP devices	Yes
max. number of DP devices that can be	8
activated/deactivated at the same time	
Direct data exchange (slave-to-slave communication)	Yes
— DPV1	Yes
Address area	
— Inputs, max.	2 048 byte
— Outputs, max.	2 048 byte
User data per DP device	
— Inputs, max.	244 byte
— Outputs, max.	244 byte
Protocols	
Redundancy mode	
Media redundancy	

— MRP	Yes
Switchover time on line break, typ.	200 ms; PROFINET MRP
Number of stations in the ring, max.	50
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
Number of connections, max.	8
Data length for connection type 01H, max.	1 460 byte
Data length for connection type 011, max.	
3.	32 768 byte Yes
 several passive connections per port, supported ISO-on-TCP (RFC1006) 	
Number of connections, max.	Yes; via integrated PROFINET interface and loadable FBs
— Data length, max.	32 768 byte
• UDP	Yes; via integrated PROFINET interface and loadable FBs 8
Number of connections, max. Data length, max.	
— Data length, max.	1 472 byte
Web server	V
• supported	Yes
User-defined websites Number of UTTP places.	Yes
Number of HTTP clients	5
communication functions / header	V
PG/OP communication	Yes
Data record routing	Yes; With DP master module
Global data communication	N.
• supported	No
S7 basic communication	
• supported	Yes; I blocks
 User data per job, max. 	76 byte
User data per job (of which consistent), max.	76 byte
S7 communication	
• supported	Yes
• as server	Yes
• as client	Yes; via integrated PROFINET interface and loadable FBs
 User data per job, max. 	See online help of STEP 7 (shared parameters of the SFBs/FBs and of the SFCs/FCs of S7 Communication)
communication functions / PROFINET CBA (with set target commu	·
Setpoint for the CPU communication load	50 %
Number of remote interconnection partners	32
number of remote interconnection partners number of master/device functions	30
total of all master/device connections	1 000
data length of all incoming master/device connections,	4 000 byte
max.	4 000 byte
 data length of all outgoing master/device connections, max. 	4 000 byte
 Number of device-internal and PROFIBUS interconnections 	500
 Data length of device-internal und PROFIBUS interconnections, max. 	4 000 byte
Data length per connection, max.	1 400 byte
performance data / PROFINET CBA / remote interconnection	/ with acyclic transfer / header
— Sampling interval, min.	500 ms
 Number of incoming interconnections 	
~	100
Number of outgoing interconnections	100
— Number of outgoing interconnections	100
 Number of outgoing interconnections Data length of all incoming interconnections, max. Data length of all outgoing interconnections, max. data volume / as user data for remote interconnections / in the case of acyclic transmission / 	100 2 000 byte
 Number of outgoing interconnections Data length of all incoming interconnections, max. Data length of all outgoing interconnections, max. data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum 	100 2 000 byte 2 000 byte 1 400 byte
— Number of outgoing interconnections — Data length of all incoming interconnections, max. — Data length of all outgoing interconnections, max. — data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum performance data / PROFINET CBA / remote interconnection.	100 2 000 byte 2 000 byte 1 400 byte / with cyclic transfer / header
— Number of outgoing interconnections — Data length of all incoming interconnections, max. — Data length of all outgoing interconnections, max. — data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum performance data / PROFINET CBA / remote interconnection — Transmission frequency: Transmission interval, min.	100 2 000 byte 2 000 byte 1 400 byte / with cyclic transfer / header 1 ms
— Number of outgoing interconnections — Data length of all incoming interconnections, max. — Data length of all outgoing interconnections, max. — data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum performance data / PROFINET CBA / remote interconnection — Transmission frequency: Transmission interval, min. — Number of incoming interconnections	100 2 000 byte 2 000 byte 1 400 byte / with cyclic transfer / header 1 ms 200
- Number of outgoing interconnections - Data length of all incoming interconnections, max. - Data length of all outgoing interconnections, max. - data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum performance data / PROFINET CBA / remote interconnection - Transmission frequency: Transmission interval, min. - Number of incoming interconnections - Number of outgoing interconnections	100 2 000 byte 2 000 byte 1 400 byte / with cyclic transfer / header 1 ms 200 200
— Number of outgoing interconnections — Data length of all incoming interconnections, max. — Data length of all outgoing interconnections, max. — data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum performance data / PROFINET CBA / remote interconnection — Transmission frequency: Transmission interval, min. — Number of incoming interconnections	100 2 000 byte 2 000 byte 1 400 byte / with cyclic transfer / header 1 ms 200

— data volume / as user data for remote	450 byte
interconnections / with cyclical transfer / with PROFINET CBA / per connection / maximum	
performance data / PROFINET CBA / HMI variables via PROI	FINET / acyclic / header
Number of stations that can log on for HMI variables	3; 2x PN OPC/1x iMap
(PN OPC/iMap)	3, 2x 1 N O1 0/1x IIVIap
HMI variable updating	500 ms
Number of HMI variables	200
 Data length of all HMI variables, max. 	2 000 byte
performance data / PROFINET CBA / PROFIBUS proxy funct	·
— supported	Yes
Number of linked PROFIBUS devices	16
 Data length per connection, max. 	240 byte; Slave-dependent
iPAR server	
• supported	Yes
Number of connections	
• overall	12
usable for PG communication	11
reserved for PG communication	1
adjustable for PG communication, min.	1
adjustable for PG communication, max.	11
usable for OP communication	11
- reserved for OP communication	1
adjustable for OP communication, min.	1
adjustable for OP communication, min. — adjustable for OP communication, max.	11
adjustable for OP communication, max. usable for S7 basic communication	10
usable for S7 basic communication — reserved for S7 basic communication	0
— adjustable for S7 basic communication, min.	0
— adjustable for S7 basic communication, max.	10
• usable for S7 communication	10; with loadable FBs
— adjustable for S7 communication, max.	10
• total number of instances, max.	32
usable for routing	4; max.
S7 message functions	
Number of login stations for message functions, max.	12; Depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes; ALARM_S, ALARM_SC, ALARM_SQ, ALARM_D, ALARM_DQ
simultaneously active Alarm-S blocks, max.	300
Test commissioning functions	
Status block	Yes; Up to 2 simultaneously
	·
Single step Number of breakpoints	Yes 4
Number of breakpoints Status/control	7
	Voc
Status/control variable Variables	Yes
Variables Number of variables, may	Inputs, outputs, memory bits, DB, times, counters
Number of variables, max. of which status variables, max.	30
— of which status variables, max.	30
— of which control variables, max.	14
Forcing	Ver
• Forcing	Yes
Forcing, variables	I/O
Number of variables, max. Plantage of the first state of the fir	10
Diagnostic buffer	
• present	Yes
Number of entries, max.	500
— adjustable	No
— of which powerfail-proof	100; Only the last 100 entries are retained
Interrupts/diagnostics/status information	
Alarms	Yes
Diagnostics function	Yes
Diagnostics indication LED	
for maintenance	Yes; MT

Bus fault BF (red)	Yes; BF-PN
Group error SF (red)	Yes
Monitoring 24 V voltage supply ON (green)	Yes
Bus activity PROFINET (green)	Yes; P1-/P2-/P3-Link
Potential separation	163, 1 171 271 3-Link
between PROFIBUS DP and all other circuit components	Yes
Isolation	165
Isolation tested with	500 V DC
Degree and class of protection	300 V DC
IP degree of protection	IP20
configuration / header	11 20
Configuration software	
• STEP 7	Yes; V5.5 or higher
configuration / programming / header	165, ¥6.6 61 Higher
Command set	see instruction list
Nesting levels	8
System functions (SFC)	see instruction list
System function blocks (SFB)	see instruction list
Programming language	
— LAD	Yes
— FBD	Yes
— STL	Yes
— SCL	Yes; Optional
— CFC	Yes; Optional
— GRAPH	Yes; Optional
— HiGraph®	Yes; Optional
Know-how protection	
 User program protection/password protection 	Yes
Block encryption	Yes; With S7 block Privacy
programming / cycle time monitoring / header	
• lower limit	1 ms
• upper limit	6 000 ms
adjustable	Yes
• preset	150 ms
Dimensions	
Width	120 mm; DP master module: 35 mm
Height	119.5 mm
Depth	75 mm
Weights	
Weight, approx.	320 g; DP master module: Approx. 100 g

last modified:

8/21/2024