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Data sheet 6ES7151-8FB01-0AB0

Figure similar

*** 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
I^2t	0.13 $A^2 \cdot s$
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

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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
— preset	No retentivity
Time range	
— lower limit	10 ms
— upper limit	9 990 s
IEC timer	
● present	Yes
● Type	SFB
● Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	64 kbyte
Flag	
● Size, max.	256 byte
● Retentivity available	Yes
● Retentivity preset	MB 0 to MB 15

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● Number of clock memories	8; 1 memory byte
Data blocks	
● Retentivity adjustable	Yes; via non-retain property on DB
● Retentivity preset	Yes
Local data	
● per priority class, max.	32 768 byte; Max. 2048 bytes per block
Address area	
I/O address area	
● Inputs	2 048 byte
● Outputs	2 048 byte
of which distributed	
— Inputs	2 048 byte
— Outputs	2 048 byte
Process image	
● Inputs, adjustable	2 048 byte
● Outputs, adjustable	2 048 byte
● Inputs, default	128 byte
● Outputs, default	128 byte
Subprocess images	
● Number of subprocess images, max.	1; With PROFINET IO, the length of the user data is limited to 1600 bytes
Digital channels	
● Inputs	16 336
— of which central	496
● Outputs	16 336
— of which central	496
Analog channels	
● Inputs	1 021
— of which central	124
● Outputs	1 021
— of which central	124
Hardware configuration	
Number of modules per system, max.	63; Centralized
Mounting rail	
● Number of mounting rails that can be used	1
● Length of mounting rail, max.	Station width: ≤ 1 m or < 2 m
Time of day	
Clock	
● Hardware clock (real-time)	Yes
● retentive and synchronizable	Yes
● Backup time	6 wk; At 40 °C ambient temperature, typically
● Deviation per day, max.	10 s; Typ.: 2 s
● Behavior of the clock following POWER-ON	Clock continues running after POWER OFF
● Behavior of the clock following expiry of backup period	the clock continues at the time of day it had when power was switched off
Operating hours counter	
● Number	1
● Number/Number range	0
● Range of values	0 to 2^31 hours (when using SFC 101)
● Granularity	1 h
● retentive	Yes; Must be restarted at each restart
Clock synchronization	
● supported	Yes
● to MPI, master	No
● on MPI, device	No
● to DP, master	Yes; With DP master module
● on DP, device	Yes; With DP master module
● in AS, master	No
● in AS, device	No
● on Ethernet via NTP	Yes; As client
1. Interface	
Interface type	PROFINET

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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
● PROFINET CBA	Yes
● PROFIBUS DP master	No
● PROFIBUS DP device	No
● Open IE communication	Yes; Via TCP/IP, ISO on TCP, and UDP
● Web server	Yes
● Point-to-point connection	No
PROFINET IO Controller	
● Transmission rate, max.	100 Mbit/s; full duplex
Services	
— PG/OP communication	Yes
— Routing	Yes; With DP master module
— S7 communication	Yes; with loadable FBs
— Isochronous mode	Yes; OB 61; only for PROFINET IO
— IRT	Yes
— Shared device	Yes
— Prioritized startup	Yes
— Number of IO devices with prioritized startup, max.	32
— Number of connectable IO Devices, max.	128
— 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 µs, 500 µs,1 ms; 2 ms, 4 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	
— PG/OP communication	Yes
— Routing	Yes
— S7 communication	Yes; with loadable FBs
— Isochronous mode	No
— IRT	Yes

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— PROFIenergy	Yes; With SFB 73 / 74 prepared for loadable PROFIenergy 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	
Interface type	External interface via master module 6ES7138-4HA00-0AB0
Isolated	Yes
Interface types	
● 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 activated/deactivated at the same time	8
— 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	

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— 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 11H, max.	32 768 byte
— several passive connections per port, supported	Yes
● ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	8
— Data length, max.	32 768 byte
● UDP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	8
— Data length, max.	1 472 byte
Web server	
● supported	Yes
● User-defined websites	Yes
● Number of HTTP clients	5
communication functions / header	
PG/OP communication	Yes
Data record routing	Yes; With DP master module
Global data communication	
● 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 communication load) / header	
● Setpoint for the CPU communication load	50 %
● Number of remote interconnection partners	32
● number of master/device functions	30
● total of all master/device connections	1 000
● data length of all incoming master/device connections, 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
— Data length of all incoming interconnections, max.	2 000 byte
— Data length of all outgoing interconnections, max.	2 000 byte
— data volume / as user data for remote interconnections / in the case of acyclic transmission / with PROFINET CBA / per connection / maximum	1 400 byte
performance data / PROFINET CBA / remote interconnection / with cyclic transfer / header	
— Transmission frequency: Transmission interval, min.	1 ms
— Number of incoming interconnections	200
— Number of outgoing interconnections	200
— Data length of all incoming interconnections, max.	2 000 byte
— Data length of all outgoing interconnections, max.	2 000 byte

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— data volume / as user data for remote interconnections / with cyclical transfer / with PROFINET CBA / per connection / maximum	450 byte
performance data / PROFINET CBA / HMI variables via PROFINET / acyclic / header	
— Number of stations that can log on for HMI variables (PN OPC/iMap)	3; 2x PN OPC/1x iMap
— 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 functionality / header	
— 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, max.	11
● usable for S7 basic communication	10
— 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	Yes
Number of breakpoints	4
Status/control	
● Status/control variable	Yes
● Variables	Inputs, outputs, memory bits, DB, times, counters
● Number of variables, max.	30
— of which status variables, max.	30
— of which control variables, max.	14
Forcing	
● Forcing	Yes
● Forcing, variables	I/O
● Number of variables, max.	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

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● 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	
between PROFIBUS DP and all other circuit components	Yes
Isolation	
Isolation tested with	500 V DC
Degree and class of protection	
IP degree of protection	IP20
configuration / header	
Configuration software	
● STEP 7	Yes; V5.5 or higher
configuration / programming / header	
● 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

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