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Data sheet 6ES7154-8FB01-0AB0



SIMATIC DP, IM154-8F PN/DP CPU for ET 200pro, 512 KB work memory, internal PROFINET interface, internal PROFIBUS DP master/device interface degree of protection IP65/67, Micro Memory Card and connection module for delivery

General information	
Product type designation	IM 154-8F PN/DP CPU
HW functional status	01
Firmware version	V3.2
Product function	
● Isochronous mode	Yes; Via PROFIBUS DP or PROFINET interface
Engineering with	
● Programming package	STEP 7 V5.5 or higher, Distributed Safety V5.4 SP4
Supply voltage	
Rated value (DC)	24 V
external protection for power supply lines (recommendation)	MCB 24 V DC / 16 A with tripping characteristic Type B and C (see ET 200pro manual)
Load voltage L+	
● 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
Input current	
Current consumption, typ.	350 mA
Current consumption (in no-load operation), typ.	250 mA; Typical, current consumption for CPU in STOP state
Inrush current, typ.	2 A
I^2t	0.25 $A^2 \cdot s$; Typical
Power loss	
Power loss, typ.	8.5 W
Storage	
Work memory	
● integrated	512 kbyte
● expandable	No
Load memory	
● Plug-in (MMC), max.	8 Mbyte
● Data management on MMC (after last programming), min.	10 a
Backup	
● present	Yes; Guaranteed by MMC (maintenance-free)
● without battery	Yes; Program and data
CPU processing times	
for bit operations, typ.	0.05 µs
for word operations, typ.	0.09 µs
for fixed point arithmetic, typ.	0.12 µs

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for floating point arithmetic, typ.	0.45 µs
CPU-blocks	
Number of elements (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	
● 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
● 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	
— can be set	Yes
— lower limit	0
— upper limit	999
IEC counter	
● Type	SFB
● Number	Unlimited (limited only by RAM capacity)
S7 timer	
● Number	256
Retentivity	
— adjustable	Yes
— preset	No retentivity
Time range	
— lower limit	10 ms
— upper limit	9 990 s
IEC timer	
● Type	SFB
● Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Retentive data area (incl. timers, counters, flags), max.	128 kbyte
Flag	
● Size, max.	2 048 byte
● Retentivity available	Yes; MB 0 to MB 2 047
● Retentivity preset	MB 0 to MB 15
● Number of clock memories	8

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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	16 384
— of which central	128
● Outputs	16 384
— of which central	64
Analog channels	
● Inputs	1 024
— of which central	64
● Outputs	1 024
— of which central	64
Hardware configuration	
Number of DP masters	
● integrated	1
Rack	
● Racks, max.	1
● Modules per rack, max.	16; Expansion width max. 1 m
Time of day	
Clock	
● Hardware clock (real-time)	Yes
● retentive and synchronizable	Yes
● Backup time	6 wk; At 40 °C ambient temperature
● Deviation per day, max.	10 s; Typ.: 2 s
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	Yes
● on MPI, device	Yes
● to DP, master	Yes; With DP slave only slave clock
● on DP, device	Yes
● on Ethernet via NTP	Yes; As client
1. Interface	
Interface type	Integrated RS 485 interface
Isolated	Yes
Interface types	
● RS 485	Yes

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● Output current of the interface, max.	May only be used for external terminating resistor
● Design of the connection	2x M12 B-coded
Protocols	
● MPI	Yes
● PROFIBUS DP master	Yes
● PROFIBUS DP device	Yes
● Point-to-point connection	No
MPI	
● Transmission rate, max.	12 Mbit/s
Services	
— PG/OP communication	Yes
— Routing	Yes
— Global data communication	Yes
— S7 basic communication	Yes
— S7 communication	Yes
— S7 communication, as client	No
— S7 communication, as server	Yes
PROFIBUS DP master	
● Transmission rate, max.	12 Mbit/s
● max. number of DP devices	124
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; Connection configured on one side only
— Equidistance	Yes
— Isochronous mode	Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
— SYNC/FREEZE	Yes
— activation/deactivation of DP devices	Yes
— Direct data exchange (slave-to-slave communication)	Yes; as subscriber
— 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
PROFIBUS DP device	
● Transmission rate, max.	12 Mbit/s
● automatic baud rate search	Yes; only with passive interface
● Address area, max.	32
● User data per address area, max.	32 byte
Services	
— Routing	Yes; with interface active
— Global data communication	No
— S7 basic communication	No
— S7 communication	Yes
— S7 communication, as client	No
— S7 communication, as server	Yes; Connection configured on one side only
— Direct data exchange (slave-to-slave communication)	Yes
— DPV1	No
Transfer memory	
— Inputs	244 byte
— Outputs	244 byte

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2. Interface	
Interface type	PROFINET
Isolated	Yes; Galvanic isolation for P3 is implemented in IM154-8, for P1 and P2 in CM
automatic detection of transmission rate	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Change of IP address at runtime, supported	Yes
Interface types	
● Number of ports	3
● integrated switch	Yes
● Design of the connection	Ethernet (2x M12 D-coded; 1x RJ45)
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
● Media redundancy	Yes
PROFINET IO Controller	
● Transmission rate, max.	100 Mbit/s
Services	
— PG/OP communication	Yes
— Routing	Yes
— S7 communication	Yes; With loadable FBs, max. configurable connections: 14, max. number of instances: 32
— Isochronous mode	Yes; OB 61 - isochronous mode is possible either on DP or PROFINET IO (not simultaneously)
— IRT	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	250 µs to 512 ms (depending on the operating mode, see "IM 154-8 CPU Interface Module" operating instructions for more details)
Address area	
— Inputs, max.	2 048 byte
— Outputs, max.	2 048 byte
— User data consistency, max.	1 024 byte
PROFINET IO Device	
Services	
— PG/OP communication	Yes
— Routing	Yes
— S7 communication	Yes; With loadable FBs, max. configurable connections: 14, max. number of

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	instances: 32
— Isochronous mode	No
— IRT	Yes
— 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, max.	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
● Keep-alive function, supported	Yes
Protocols	
Redundancy mode	
Media redundancy	
— Switchover time on line break, typ.	200 ms; PROFINET MRP
— Number of stations in the ring, max.	50
SIMATIC communication	
● S7 routing	Yes
Open IE communication	
● TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
— Number of connections, max.	8
— Data length, max.	32 768 byte; 1 460 bytes with connection type 01H; 32 768 bytes with connection type 11H
— several passive connections per port, supported	Yes
● ISO-on-TCP (RFC1006)	Yes
— Number of connections, max.	8
— Data length, max.	32 768 byte
● UDP	Yes
— 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	
PG/OP communication	Yes
Global data communication	
● supported	Yes
● Number of GD loops, max.	8
● Number of GD packets, max.	8
● Number of GD packets, transmitter, max.	8
● Number of GD packets, receiver, max.	8
● Size of GD packets, max.	22 byte
● Size of GD packet (of which consistent), max.	22 byte
S7 basic communication	
● supported	Yes
● User data per job, max.	76 byte
● User data per job (of which consistent), max.	76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)
S7 communication	

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● 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)
PROFINET CBA (at set setpoint communication load)	
● 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
Remote interconnections with cyclic transmission	
— 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
— Data length per connection, max.	450 byte
HMI variables via PROFINET (acyclic)	
— 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
PROFIBUS proxy functionality	
— supported	Yes
— Number of linked PROFIBUS devices	16
— Data length per connection, max.	240 byte; Slave-dependent
Number of connections	
● overall	16
● usable for PG communication	15
— reserved for PG communication	1
— adjustable for PG communication, min.	1
— adjustable for PG communication, max.	15
● usable for OP communication	15
— reserved for OP communication	1
— adjustable for OP communication, min.	1
— adjustable for OP communication, max.	15
● usable for S7 basic communication	14
— reserved for S7 basic communication	0
— adjustable for S7 basic communication, min.	0
— adjustable for S7 basic communication, max.	14
● usable for routing	X1 as MPI: max. 10; X1 as DP master: max. 24; X1 as DP slave (active): max. 14; X2 as PROFINET: 24 max.
S7 message functions	
Number of login stations for message functions, max.	16; Depending on the configured connections for PG/OP and S7 basic communication
Process diagnostic messages	Yes
simultaneously active Alarm_S blocks, max.	300
Test commissioning functions	
Status block	Yes; Up to 2 simultaneously
Single step	Yes
Number of breakpoints	4

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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; Only the last 100 entries are retentive at power on/off		
— can be set	No		
— preset	10		
Potential separation			
between backplane bus and electronics	No		
between backplane bus and all other circuit components	Yes		
between supply and all other circuits	Yes		
Isolation			
Isolation tested with	In general, 707 V DC (type test), Ethernet interface 1 500 V AC (for P1 and P2 on CM, for P3 on IM)		
Standards, approvals, certificates			
CE mark	Yes		
CSA approval	No		
cULus	Yes		
FM approval	No		
RCM (formerly C-TICK)	Yes		
Highest safety class achievable in safety mode			
● Performance level according to ISO 13849-1	PLe		
● SIL acc. to IEC 61508	SIL 3		
Configuration			
Configuration software			
● STEP 7	Yes; V5.5 or higher		
Programming			
● 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		
— CFC	Yes		
— GRAPH	Yes		
— HiGraph®	Yes		
Know-how protection			
● User program protection/password protection	Yes		
● Block encryption	Yes; With S7 block Privacy		
Dimensions			
Width	135 mm		
Height	130 mm		
Depth	65 mm; 60 mm without cover for RJ45 socket; 65 mm with cover for RJ45 socket		
Weights			
Weight, approx.	720 g		
Classifications			
		Version	**Classification**

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eClass	16	27-24-26-07
eClass	14	27-24-26-07
eClass	12	27-24-26-07
eClass	9.1	27-24-26-07
eClass	9	27-24-26-07
eClass	8	27-24-26-07
eClass	7.1	27-24-26-07
eClass	6	27-24-26-07
ETIM	10	EC001603
ETIM	9	EC001603
ETIM	8	EC001603
ETIM	7	EC001603
IDEA	4	3565
UNSPSC	15	32-15-17-05

Approvals / Certificates

General Product Approval

Miscellaneous







Miscellaneous



General Product Approval





China RoHS

Functional Saftey

TUEV

Type Examination Certificate

TUEV

Maritime application









NK / Nippon Kaiji Kyokai



Maritime application

CCS (China Classification Society)

KR (Korean Register of Shipping)

other

PROFINET



Miscellaneous

Industrial Communication



Industrial Communication

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