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Data sheet 6ES7655-5PX41-1AX0

SIMATIC CFU CIO HART with aluminum enclosure, bundle consisting of: 1x SIMATIC CFU CIO HART (6ES7655-5PX41-1XX0), 1x aluminum enclosure with cable glands, shield busbar, shield terminals, preassembled and checked



General information	
Product type designation	CFU CIO HART with aluminum enclosure
HW functional status	FS01
Firmware version	V1.0
● FW update possible	Yes
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0319H
Number of channels	16
Product function	
● I&M data	Yes; I&M0 to I&M3
● Isochronous mode	No
● The user can configure digital channels as input/output as required	Yes
● Digital channels can be parameterized	Yes
Engineering with	
● STEP 7 TIA Portal configurable/integrated from version	V19 Update 2
● STEP 7 configurable/integrated from version	STEP 7 V5.7.1.4
● PCS 7 configurable/integrated from version	V9.1 SP2 UC7 (+PDM V9.3 Upd1)
● PROFIBUS from GSD version/GSD revision	- / -
● PROFINET from GSD version/GSD revision	GSDML V2.43 2024.03.04
Operating mode	
● DI	Yes
● Counter	Yes
● DQ	Yes
CiR - Configuration in RUN	
Reparameterization possible in RUN	Yes
Installation type/mounting	
Mounting	For horizontal and vertical mounting
Mounting position	Horizontal, vertical
Recommended mounting position	horizontal set up
Supply voltage	
Type of supply voltage	24 V DC
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Short-circuit protection	Yes
Redundant power supply	Yes
Mains buffering	

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● Mains/voltage failure stored energy time	1 ms; For communication
Input current	
Current consumption (rated value)	4.1 A; RJ45 BusAdapter, 8xDI, 4xAI, 2xAQ, 2xDQ with 2 A each
Current consumption, max.	9 A
Inrush current, max.	7 A
I^2t	0.5 $A^2 \cdot s$
Encoder supply	
Number of outputs	16
Output voltage, min.	12 V
Short-circuit protection	Yes; Electronic
Output current	
● up to 60 °C, max.	6 A; total current DQ + additional current for analog channels
Power loss	
Power loss, typ.	6.6 W; RJ45 BusAdapter, 8xDI, 4xAI, 2xAQ, 2xDQ with 12 ohms load each
Address area	
Address space per station	
● Address space per station, max.	1 440 byte; Dependent on configuration
Digital inputs	
Number of digital inputs	16
Digital inputs, parameterizable	Yes
Sourcing/sinking input	Yes
Input characteristic curve in accordance with IEC 61131, type 1	Yes
Input characteristic curve in accordance with IEC 61131, type 2	No
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Pulse extension	Yes; off, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s
Digital input functions, parameterizable	
● Gate start/stop	Yes; hardware gate, usable by multiple DI counters
● Freely usable digital input	Yes; Parameterizable input filter
● Counter	Yes
— Number, max.	16
— Counting frequency, max.	5 kHz; fast counter mode, sinking input; 1 kHz sourcing input, NAMUR
— Counting width	32 bit
— Counting direction up/down	Yes; Up
Input voltage	
● Rated value (DC)	24 V
● for signal "0"	-9 V to +5 V
● for signal "1"	+11 to +30V
● permissible voltage at input, min.	-9 V
● permissible voltage at input, max.	30 V
Input current	
● for signal "1", typ.	2.5 mA; max: 2.5 mA sourcing input; 2.3 mA sinking input; 10 mA fast counter; 6.5 mA NAMUR
Input delay (for rated value of input voltage)	
for standard inputs	
— parameterizable	Yes; none / 0.05 / 0.1 / 0.2 / 0.4 / 0.8 / 1.6 / 3.2 / 12.8 / 20 ms
Cable length	
● shielded, max.	1 000 m
● unshielded, max.	600 m
Digital outputs	
Type of digital output	Transistor
Number of digital outputs	16
Current-sinking	No
Current-sourcing	Yes
Short-circuit protection	Yes
● Response threshold, typ.	4.1 A
Open-circuit detection	Yes
Overload protection	Yes
Limitation of inductive shutdown voltage to	typ. L+ (-11 V)
Controlling a digital input	Yes

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Switching capacity of the outputs	
● with resistive load, max.	2 A
● on lamp load, max.	5 W
Load resistance range	
● lower limit	12 Ω
● upper limit	12 kΩ
Output voltage	
● Type of output voltage	DC
● for signal "1", min.	Ue minus 1 V
Output current	
● for signal "1" rated value	2 A
● for signal "0" residual current, max.	0.1 mA
Output delay with resistive load	
● "0" to "1", typ.	50 µs
● "0" to "1", max.	100 µs
● "1" to "0", typ.	50 µs
● "1" to "0", max.	100 µs
Parallel switching of two outputs	
● for uprating	No
● for redundant control of a load	No
Switching frequency	
● with resistive load, max.	100 Hz
● with inductive load, max.	1 Hz; at 2 A; 2 Hz at 0.5 A
● on lamp load, max.	10 Hz
Total current of the outputs	
● Current per channel, max.	2 A
horizontal installation	
— up to 60 °C, max.	6 A
vertical installation	
— up to 60 °C, max.	6 A
Cable length	
● shielded, max.	1 000 m
● unshielded, max.	600 m
Analog inputs	
Number of analog inputs	16
Input ranges	
● Current	Yes; 0 ... 20 mA, 4 ... 20 mA, 4 ... 20 mA HART
Input ranges (rated values), currents	
● 0 to 20 mA	Yes; 16 bit incl. sign
— Input resistance (0 to 20 mA)	233 Ω
● 4 mA to 20 mA	Yes; 16 bit incl. sign
— Input resistance (4 mA to 20 mA)	233 Ω
HART communication	
● Primary Master	Yes
● input resistance (with HART communication)	233 Ω
Cable length	
● shielded, max.	1 000 m
● unshielded, max.	600 m
Analog outputs	
Number of analog outputs	16; short-circuit proof with respect to ground
Current output, no-load voltage, max.	24 V
Output ranges, current	
● 0 to 20 mA	Yes; 15 bit
● -20 mA to +20 mA	No
● 4 mA to 20 mA	Yes; 16 bit incl. sign
Connection of actuators	
● for current output two-wire connection	Yes
Load impedance (in rated range of output)	
● for current outputs, min.	50 Ω

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● with current outputs, max.	750 Ω
● with current outputs, inductive load, max.	10 mH
Destruction limits against externally applied voltages and currents	
● Voltages at the outputs	36 V; Minus 0.3 V lower limit
Cable length	
● shielded, max.	1 000 m
● unshielded, max.	600 m
Analog value generation for the inputs	
Measurement principle	integrating (Sigma-Delta)
Integration and conversion time/resolution per channel	
● Resolution with overrange (bit including sign), max.	16 bit
● Integration time, parameterizable	Yes; channel by channel
Smoothing of measured values	
● parameterizable	Yes; none, weak, medium, strong, channel-by-channel
Analog value generation for the outputs	
Settling time	
● for resistive load	2 ms; 750 ohm
● for inductive load	1.2 ms
Encoder	
Connection of signal encoders	
● for current measurement as 2-wire transducer	Yes
Connectable encoders	
● NAMUR encoder/changeover contact according to EN 60947	Yes; no CO contact
● 2-wire sensor	Yes
— permissible quiescent current (2-wire sensor), max.	1.5 mA
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.05 %
Temperature error (relative to input range), (+/-)	0.005 %/K
Crosstalk between the inputs, min.	60 dB
Repeat accuracy in steady state at 25 °C (relative to input range), (+/-)	0.05 %
Linearity error (relative to output range), (+/-)	0.02 %
Temperature error (relative to output range), (+/-)	0.003 %/K
Crosstalk between the outputs, min.	70 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.02 %
Operational error limit in overall temperature range	
● Current, relative to input range, (+/-)	0.5 %
● Current, relative to output range, (+/-)	0.5 %; 0 ... 60 °C: 0.2 %
Basic error limit (operational limit at 25 °C)	
● Current, relative to input range, (+/-)	0.1 %
● Current, relative to output range, (+/-)	0.1 %
Interfaces	
Number of PROFINET interfaces	1
1. Interface	
Interface type	PROFINET
Isolated	Yes
Interface types	
● Number of ports	2; via BusAdapter
● integrated switch	Yes
● BusAdapter (PROFINET)	Yes
Protocols	
● PROFINET IO Device	Yes
● Media redundancy	Yes; as MRP client
Interface types	
RJ 45 (Ethernet)	
● 100 Mbps	Yes
● Autonegotiation	Yes

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● Autocrossing	Yes
Protocols	
Supports protocol for PROFINET IO	Yes
HART protocol	Yes
● Protocol version	up to Revision 7
Redundancy mode	
● PROFINET system redundancy (S2)	Yes
Media redundancy	
— MRP	Yes
Open IE communication	
● LLDP	Yes
Interrupts/diagnostics/status information	
Status indicator	Yes
Alarms	Yes
Diagnostics function	Yes
Substitute values connectable	Yes
Alarms	
● Diagnostic alarm	Yes
● Maintenance interrupt	Yes
● Limit value alarm	Yes
● Hardware interrupt	Yes
Diagnoses	
● Monitoring the supply voltage	Yes
● Wire break	Yes; channel by channel
● Short-circuit	Yes; channel by channel
● Group error	Yes
● Overflow/Underflow	Yes; channel by channel
Diagnostics indication LED	
● RUN LED	Yes; green LED
● ERROR LED	Yes; red LED
● MAINT LED	Yes; Yellow LED
● Monitoring of the supply voltage (PWR-LED)	Yes; green/red LED
● Channel status display	Yes; green/red LED
● Status indicator digital input (green)	Yes
● Status indicator digital output (green)	Yes
● Connection display LINK TX/RX	Yes; 2x green link LEDs on BusAdapter
Integrated Functions	
Frequency measurement	Yes
● Number of frequency meters	16
Counting functions	
● Continuous counting	Yes
● Counter response parameterizable	Yes
● Hardware gate via digital input	Yes
● Software gate	Yes
Measuring functions	
● Dynamic measurement period adjustment	Yes
Measuring range	
— Frequency measurement, min.	0.1 Hz
— Frequency measurement, max.	25 kHz; fast counter mode, sinking input; 1 kHz sourcing input, NAMUR
Accuracy	
— Frequency measurement	100 ppm; depending on measuring interval and signal evaluation
Potential separation	
Potential separation digital inputs	
● between the channels	No
● between the channels and the power supply of the electronics	No
Potential separation digital outputs	
● between the channels	No
● between the channels and the power supply of the	No

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electronics	
Isolation	
Isolation tested with	1 500 V AC between PROFINET and other electronics
Degree and class of protection	
IP degree of protection	IP66
Ambient conditions	
Ambient temperature during operation	
● horizontal installation, min.	-40 °C
● horizontal installation, max.	60 °C; Observe derating
● vertical installation, min.	-40 °C
● vertical installation, max.	60 °C; Observe derating
Ambient temperature during storage/transportation	
● min.	-40 °C
● max.	70 °C
Relative humidity	
● Operation, max.	95 %
Connection method	
Design of electrical connection	Connection plug
Dimensions	
Width	414 mm
Height	266 mm
Depth	111 mm
Weights	
Weight, approx.	5.5 kg

Classifications

	Version	Classification
eClass	16	27-24-26-90
eClass	14	27-24-26-90
eClass	12	27-24-26-90
eClass	9.1	27-24-26-90
eClass	9	27-24-26-90
eClass	8	27-24-92-90
eClass	7.1	27-24-92-90
eClass	6	27-24-92-90
ETIM	10	EC002584
ETIM	9	EC002584
ETIM	8	EC002584
ETIM	7	EC002584

Approvals / Certificates

General Product Approval				EMV	For use in hazardous locations
UKCA	CE EG-Konf.	KC	Manufacturer Declaration	KC	Ex ATEX

For use in hazardous locations			Environment
Type Examination Certificate	IECEx	CCC	EPD

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