SIEMENS

Data sheet

6ES7146-6HF00-0BB0



SIMATIC ET 200eco PN, AI 6x U/I + AIQ 2x U/I, M12-L, 8x M12, 16-bit resolution, channel diagnostics for wire break and short-circuit, shared device with 2 controllers, prioritized startup, MSI, MSO, MRP, S2 redundancy, I&M0...3, multi-fieldbus, PN IO, Ethernet IP, Modbus TCP, degree of protection IP67 / IP69K

HW functional status FS02 Firmware version V5.1x • FW update possible Yes Vendori detuification (VendorID) 002AH Device ID according to ODVA (VendorID) 04E3H Device ID according to ODVA (PendorID) 04E3H Device ID according to ODVA (PendorID) 04E3H Device ID according to ODVA (Product code) 0FABH Product function 04E3H • I&M data Yes; I&M0 to I&M3 • Isothronous mode No • FROFINET from CSD version/CSD revision CSDML V2.4.x • Multi Fieldbus Configuration Tool (MFCT) V1.5 or higher Operating mode Yes • ISI Yes Stapply voltage power supply according to NEC Class 2 required No Laad voltage 11+ • Rated value (DC) 24 V • germissible range, upper limit (DC) 24 V • germissible range, upper limit (DC) 24.4 W • germissible range, upper limit (DC) 24.8 W • Reverse polarity protection Yes; against destruction Imput current 110 mA; without load form load voltage 21+, max. 12.A; Maximum value form load voltage 21+, max. 12.A; Maximum value form load voltage 21+, max. 12.A; Maximum value	General information	
Firmware version V5.1.x • FW update possible Yes Vendor identification (VendorID) 002AH Device identific (DeviceID) 0306H Manufacturer ID according to ODVA (VendorID) 04E3H Device identific (DeviceID) Yes Engineering with STEP 7 V18 or higher with HSP 0391 • STEP 7 T1A Portal configuration for (MFCT) V1.5 or higher Operating mode Yes • NKSI Yes Supply voltage Yes power supply according to NEC Class 2 required No Laad voltage 1L+ • Reverse polarity protection Yes; against destruction		FS02
• FW update possible Yes Vendor identification (VendorID) 002AH Device identifier (DeviceID) 0306H Manufacture ID according to ODVA (VendorID) 04E3H Device ID according to ODVA (Product code) 0FABH Product function 0 • I&M data Yes; I&M0 to I&M3 • Isochronous mode No • Firiofitized startup Yes Engineering with STEP 7 TIA Portal configurable/integrated from version • FROFINET from GSD version/GSD revision GSDML V2.4.x • Multi Fieldbus Configurable / Integrated from version STEP 7 V18 or higher with HSP 0391 Operating mode • • MSI Yes • MSI Yes • MSI Yes Supply voltage Yes power supply according to NEC Class 2 required No Load voltage 11.+ • • Rade value (DC) 24 V • permissible range, lower limit (DC) 28.8 V • errot consumption (rated value) 110 mA; without load from load voltage 11.+ (unswitched voltage) 12 A; Maximum value from load voltage 12.+, max. 12 A; Maximum value from load voltage 12.+, max. 12 A; Maximum value from load voltage 21.+, max. 8 <td< td=""><td></td><td></td></td<>		
Vendor identification (VendorID) 002AH Device identifier (DeviceID) 0306H Manufacturer ID according to ODVA (VendorID) 04E3H Device ID according to ODVA (Product code) 0FABH Product function • • I&M data Yes; I&M0 to I&M3 • isochronous mode No • Prioritized startup Yes Engineering with • • STEP 7 TIA Portal configurable/integrated from version STEP 7 V18 or higher with HSP 0391 • PROFINET from GSD version/GSD revision GSDML V2.4.x • Multi Fieldbus Configuration Tool (MFCT) V1.5 or higher Operating mode • • MSI Yes • MSI Yes • MSI Yes Supply voltage • power supply according to NEC Class 2 required No Load voltage 1.4* • • Rated value (DC) 24 V • permissible range, lower limit (DC) 20.4 V • permissible range, lower limit (DC) 28.8 V • permissible range, upper limit (DC) 28.8 V • Reter value) 110 mA; without load from load voltage		
Device identifier (DeviceID) 0306H Manufacturer ID according to ODVA (VendorID) 04E3H Device ID according to ODVA (Product code) 0FABH Product function • • I&M data Yes; I&M0 to I&M3 • Isochronous mode No • Prioritized startup Yes Engineering with • • STEP 7 TIA Fortal configurable/integrated from version STEP 7 V18 or higher with HSP 0391 • MULT Fieldbus Configuration Tool (MFCT) V1.5 or higher Operating mode • • MSI Yes • MSO Yes CIR - Configuration in RUN Yes Calibration possible in RUN Yes Supply voltage • power supply according to NEC Class 2 required No Load voltage 11.4 • • Rated value (DC) 24 V • permissible range, uper limit (DC) 28.8 V • permissible range, uper limit (DC) 28.8 V • Reverse polarity protection Yes; against destruction Ipmut current • Current consumption (rated value) </td <td></td> <td></td>		
Manufacturer ID according to ODVA (VendorID) 04E3H Device ID according to ODVA (Product code) 0FABH Product function 0FABH • I&M data Yes; I&M0 to I&M3 • Isochronous mode No • Prioritized startup Yes Engineering with STEP 7 TIA Portal configurable/integrated from version • STEP 7 TIA Portal configurable/integrated from version STEP 7 V18 or higher with HSP 0391 • PROFINET from GSD version/GSD revision GSDML V2.4.x • Multi Fieldbus Configuration Tool (MFCT) V1.5 or higher Operating mode Yes • MSI Yes • MSO Yes Calibration possible in RUN Yes Supply voltage Power supply according to NEC Class 2 required No Load voltage 1L+ • Rated value (DC) 24 V • permissible range, lower limit (DC) 28.8 V • Reverse polarity protection Yes; against destruction Input current 110 mA; without load Current consumption (rated value) 110 mA; without load from load voltage 2L+, max. 12 A; Maximum value from load voltage 2L+, max. 8 </td <td></td> <td></td>		
Device ID according to ODVA (Product code) OFABH Product function • • I&M data Yes; I&M0 to I&M3 • Isochronous mode No • Prioritized startup Yes Engineering with • • STEP 7 TIA Portal configurable/integrated from version STEP 7 V18 or higher with HSP 0391 • STEP 7 TIA Portal configurable/integrated from version GSDML V2.4.x • Multi Fieldbus Configuration Tool (MFCT) V1.5 or higher Operating mode • • MSO Yes Calibration possible in RUN Yes Supply voltage • power supply according to NEC Class 2 required No Load voltage 1L+ • • Rated value (DC) 24 V • permissible range, lower limit (DC) 28.8 V • Reverse polarity protection Yes; against destruction Input current 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 1L+ (unswitched voltage) 12 A; Maximum value Reverse polarity protection Yes; against destruction Input current 110 mA; without load <		
Product function I&M data Yes; I&M0 to I&M3 Isochronous mode No Prioritized startup Yes Engineering with STEP 7 TIA Portal configurable/integrated from version STEP 7 TIA Portal configurable/integrated from version STEP 7 TIA Portal configuration Tool (MFCT) V18 or higher with HSP 0391 GSDML V2, 4, x Multi Fieldbus Configuration Tool (MFCT) V15 or higher Operating mode MSI Yes MSO Yes MSO Yes MSO Yes CIR - Configuration in RUN Calibration possible in RUN Supply voltage power supply according to NEC Class 2 required Load voltage 1L+ Rated value (DC) 24 V • permissible range, lower limit (DC) 28.8 V • Reverse polarity protection Yes; against destruction Input current Current consumption (rated value) 110 mA; without load from load voltage 1L+ (u		
• 1&M data Yes; 1&M0 to 1&M3 • Isochronous mode No • Prioritized startup Yes Engineering with • STEP 7 TIA Portal configurable/integrated from version STEP 7 V18 or higher with HSP 0391 • PROFINET from GSD version/GSD revision GSDML V2.4.x • Multi Fieldbus Configuration Tool (MFCT) V1.5 or higher Operating mode • MSO Yes • MSO Yes CIR - Configuration in RUN Yes Calibration possible in RUN Yes Supply voltage power supply according to NEC Class 2 required No Load voltage 1.+ • Reverse polarity protection Yes is against destruction Input current 110 mA; without load Current consumption (rated value) 110 mA; without load from load voltage 1.+ (unswitched voltage) 12 A; Maximum value fmol load voltage 2.+, max. 12 A; Maximum value Encoder supply 8 24 V encoder supply • Short-circuit protection Yes; per channel, electronic	· · · · ·	
• Isochronous mode No • Prioritized startup Yes Engineering with STEP 7 V18 or higher with HSP 0391 • STEP 7 TIA Portal configurable/integrated from version STEP 7 V18 or higher with HSP 0391 • PROFINET from GSD version/GSD revision GSDML V2.4.x • Multi Fieldbus Configuration Tool (MFCT) V1.5 or higher Operating mode . • MSI Yes • MSO Yes CIR - Configuration in RUN Yes Calibration possible in RUN Yes Supply voltage . power supply according to NEC Class 2 required No Load voltage 1L+ . • Rated value (DC) 24 V • permissible range, lower limit (DC) 20.4 V • pervise pointly protection Yes; against destruction Input current . Current consumption (rated value) 110 mA; without load from load voltage 1L+ (maswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Encoder supply . Number of outputs 8 24 V encoder supply . • Short-circuit protection Yes; per channel, electronic		Yes: I&M0 to I&M3
• Prioritized startup Yes Engineering with STEP 7 TIA Portal configurable/integrated from version STEP 7 V18 or higher with HSP 0391 • STEP 7 TIA Portal configurable/integrated from version SSDML V2.4.x • Multi Fieldbus Configuration Tool (MFCT) V15 or higher Operating mode - • MSI Yes • MSO Yes CIR-Configuration in RUN Yes Calibration possible in RUN Yes Supply voltage - power supply according to NEC Class 2 required No Load voltage 1L+ - • Rated value (DC) 24 V • permissible range, lower limit (DC) 20.4 V • permissible range, lower limit (DC) 28.8 V • Reverse polarity protection Yes; sigainst destruction Input current - Current consumption (rated value) 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value from load voltage 2L+, max. 8 24 V encoder supply - • Short-circuit protection Yes; per channel, electronic <td></td> <td></td>		
Engineering with STEP 7 TIA Portal configurable/integrated from version STEP 7 V18 or higher with HSP 0391 • PROFINET from GSD version/GSD revision GSDML V2.4.x • Multi Fieldbus Configuration Tool (MFCT) V15 or higher Operating mode . • MSI Yes • MSO Yes • MSO Yes • Calibration possible in RUN Yes Supply voltage		
• STEP 7 TIA Portal configurable/integrated from version STEP 7 V18 or higher with HSP 0391 • PROFINET from GSD version/GSD revision GSDML V2.4.x • Multi Fieldbus Configuration Tool (MFCT) V1.5 or higher Operating mode Ves • MSO Yes CIR - Configuration in RUN Yes Calibration possible in RUN Yes Supply voltage No Load voltage 1L+ No • Rated value (DC) 24 V • permissible range, lower limit (DC) 20.4 V • Reverse polarity protection Yes; against destruction Input current 110 mA; without load from load voltage 2L+, max. 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value from load voltage 2L+, max. 8 24 V encoder supply 8	· · · · · · · · · · · · · · · · · · ·	
PROFINET from GSD version/GSD revision GSDML V2.4.x Multi Fieldbus Configuration Tool (MFCT) V1.5 or higher Operating mode MSI Ves MSO Yes CIR - Configuration in RUN Calibration possible in RUN Yes Supply voltage power supply according to NEC Class 2 required No Load voltage 1L+ Rated value (DC) 24 V permissible range, lower limit (DC) 20.4 V permissible range, upper limit (DC) 28.8 V requeres polarity protection Yes; against destruction Inut current Current consumption (rated value) from load voltage 1L+ (nad voltage 1L+		STEP 7 V18 or higher with HSP 0391
Operating mode MSI Yes • MS0 Yes • MSO Yes CiR - Configuration in RUN Yes Calibration possible in RUN Yes Supply voltage Yes power supply according to NEC Class 2 required No Load voltage 1L+ No • 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 Input current Current consumption (rated value) 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Innote of outputs 8 24 V encoder supply • Short-circuit protection Ves; per channel, electronic Yes; per channel, electronic		-
Operating mode Yes • MSI Yes • MSO Yes Cil- Configuration in RUN Yes Calibration possible in RUN Yes Supply voltage Yes power supply according to NEC Class 2 required No Load voltage 1L+ No • 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 Input current Current consumption (rated value) from load voltage 1L+ (unswitched voltage) 110 mA; without load from load voltage 2L+, max. 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Involution of outputs 8 24 V encoder supply • Short-circuit protection Ves; per channel, electronic Yes; per channel, electronic	 Multi Fieldbus Configuration Tool (MFCT) 	V1.5 or higher
• MSI Yes • MSO Yes CIR - Configuration in RUN Yes Calibration possible in RUN Yes Supply voltage No Jower supply according to NEC Class 2 required No Load voltage 1L+ • • 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 Input current Current consumption (rated value) from load voltage 1L+ (unswitched voltage) 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value from load voltage 2L+, max. 8 24 V encoder supply 8 24 V encoder supply • Short-circuit protection	· · · · · ·	
CiR - Configuration in RUN Yes Calibration possible in RUN Yes Supply voltage No Load voltage 1L+ No • 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 Input current 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Encoder supply 8 24 V encoder supply 8 24 V encoder supply Yes; per channel, electronic	· ·	Yes
Calibration possible in RUN Yes Supply voltage No power supply according to NEC Class 2 required No Load voltage 1L+ • 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 Input current 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value fnom load voltage 2L+, max. 12 A; Maximum value Encoder supply 8 24 V encoder supply § • Short-circuit protection Yes; per channel, electronic	• MSO	Yes
Supply voltage power supply according to NEC Class 2 required No Load voltage 1L+ • 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 Input current Current consumption (rated value) 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Encoder supply Number of outputs 8 24 V encoder supply • Short-circuit protection Yes; per channel, electronic	CiR - Configuration in RUN	
power supply according to NEC Class 2 required No Load voltage 1L+ • 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 Input current 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Encoder supply 8 24 V encoder supply • Short-circuit protection	Calibration possible in RUN	Yes
Load voltage 1L+ • 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 Input current Current consumption (rated value) from load voltage 1L+ (unswitched voltage) 110 mA; without load from load voltage 2L+, max. 12 A; Maximum value Encoder supply 8 V encoder supply 8 24 V encoder supply Yes; per channel, electronic	Supply voltage	
 Rated value (DC) permissible range, lower limit (DC) permissible range, upper limit (DC) permissible range, upper limit (DC) Reverse polarity protection Yes; against destruction Input current Current consumption (rated value) 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Encoder supply 8 24 V encoder supply 9 • Short-circuit protection Yes; per channel, electronic	power supply according to NEC Class 2 required	No
 permissible range, lower limit (DC) permissible range, upper limit (DC) permissible range, upper limit (DC) Reverse polarity protection Yes; against destruction Input current Current consumption (rated value) 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Encoder supply 8 24 V encoder supply 8 eschort-circuit protection Yes; per channel, electronic	Load voltage 1L+	
 permissible range, upper limit (DC) Reverse polarity protection Yes; against destruction Input current Current consumption (rated value) 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Encoder supply 8 24 V encoder supply 8 • Short-circuit protection Yes; per channel, electronic	Rated value (DC)	24 V
• Reverse polarity protection Yes; against destruction Input current Input current Current consumption (rated value) 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Encoder supply 8 24 V encoder supply 9 • Short-circuit protection Yes; per channel, electronic	 permissible range, lower limit (DC) 	20.4 V
Input current Current consumption (rated value) 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Encoder supply 12 A; Maximum value Number of outputs 8 24 V encoder supply • Short-circuit protection Yes; per channel, electronic	 permissible range, upper limit (DC) 	28.8 V
Current consumption (rated value) 110 mA; without load from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Encoder supply 12 A; Maximum value Vencoder supply 8 24 V encoder supply 9 • Short-circuit protection Yes; per channel, electronic	 Reverse polarity protection 	Yes; against destruction
from load voltage 1L+ (unswitched voltage) 12 A; Maximum value from load voltage 2L+, max. 12 A; Maximum value Encoder supply 12 A; Maximum value Number of outputs 8 24 V encoder supply • Short-circuit protection Yes; per channel, electronic Yes; per channel, electronic	Input current	
from load voltage 2L+, max. 12 A; Maximum value Encoder supply 8 Number of outputs 8 24 V encoder supply • Short-circuit protection Yes; per channel, electronic Yes; per channel, electronic	Current consumption (rated value)	110 mA; without load
Encoder supply Number of outputs 8 24 V encoder supply • Short-circuit protection Yes; per channel, electronic	from load voltage 1L+ (unswitched voltage)	12 A; Maximum value
Number of outputs 8 24 V encoder supply • Short-circuit protection Yes; per channel, electronic	from load voltage 2L+, max.	12 A; Maximum value
24 V encoder supply • Short-circuit protection Yes; per channel, electronic	Encoder supply	
Short-circuit protection Yes; per channel, electronic	Number of outputs	8
	24 V encoder supply	
	Short-circuit protection	Yes; per channel, electronic
Output current, max. O.5 A; total current for encoder and actuator supply: 2 A	Output current, max.	0.5 A; total current for encoder and actuator supply: 2 A
Actuator supply	Actuator supply	
Number of outputs 2	Number of outputs	2
Short-circuit protection Yes; per channel, electronic	Short-circuit protection	Yes; per channel, electronic

Subject to change without notice © Copyright Siemens

Output current		
Rated value	0.5 A; total current for encoder and actuator supply: 2 A	
Power loss		
Power loss, typ.	6.9 W	
Address area		
Address space per module		
Inputs	16 byte; + 2 bytes for QI information	
Outputs	4 byte	
Hardware configuration		
Submodules		
 Number of configurable submodules, max. 	2	
Analog inputs		
Number of analog inputs	8; 6 AI fixed, 2 AIQ can be parameterized	
For current measurement	8	
 For voltage measurement 	8	
permissible input voltage for voltage input (destruction limit),	30 V	
max.		
permissible input current for current input (destruction limit), max.	protective shutoff as of 32 mA (typical)	
Cycle time (all channels), min.	sum of the basic conversion times	
Input ranges (rated values), voltages		
• 0 to +10 V	Yes	
— Input resistance (0 to 10 V)	100 kΩ	
• 1 V to 5 V	Yes	
— Input resistance (1 V to 5 V)	100 kΩ	
• -10 V to +10 V	Yes	
— Input resistance (-10 V to +10 V)	100 kΩ	
Input ranges (rated values), currents		
• 0 to 20 mA	Yes; 17 V for 2-wire transformers	
— Input resistance (0 to 20 mA)	75 Ω	
• -20 mA to +20 mA	Yes; 17 V for 2-wire transformers	
 Input resistance (-20 mA to +20 mA) 	75 Ω	
• 4 mA to 20 mA	Yes; 17 V for 2-wire transformers	
— Input resistance (4 mA to 20 mA)	75 Ω	
Cable length		
 shielded, max. 	30 m	
Analog outputs		
Number of analog outputs	2; AIQ can be parameterized	
Voltage output, short-circuit protection	Yes	
Voltage output, short-circuit current, max.	40 mA	
Current output, no-load voltage, max.	19 V	
Cycle time (all channels) max.	1 ms	
Output ranges, voltage		
• 0 to 10 V	Yes	
• 1 V to 5 V	Yes	
• -10 V to +10 V	Yes	
Output ranges, current		
• 0 to 20 mA	Yes	
• -20 mA to +20 mA	Yes	
• 4 mA to 20 mA	Yes	
Connection of actuators		
 for voltage output two-wire connection 	Yes	
 for voltage output four-wire connection 	Yes	
 for current output two-wire connection 	Yes	
 for current output four-wire connection 	Yes	
Load impedance (in rated range of output)		
 with voltage outputs, min. 	1 κΩ	
 with voltage outputs, capacitive load, max. 	1 µF	
 with current outputs, max. 	600 Ω	
 with current outputs, inductive load, max. 	1 mH	
Destruction limits against externally applied voltages and currents	3	

 Voltages at the outputs towards MANA 	30 V; to reference potential 1M
Cable length	
• shielded, max.	30 m
Analog value generation for the inputs	
Analog value display	SIMATIC S7 format
Measurement principle	integrating
Integration and conversion time/resolution per channel	
 Resolution with overrange (bit including sign), max. 	16 bit
Integration time, parameterizable	Yes; channel by channel
Integration time (ms)	0.84 / 16.7 (50) / 20 (60) / 60 (180)
Basic conversion time, including integration time (ms)	4.50 / 21.5 (54) / 24 (64) / 64 (184)
 Interference voltage suppression for interference 	none / 60 / 50 / 16.7
frequency f1 in Hz	
Smoothing of measured values	
• parameterizable	Yes
• Step: None	Yes; 1x cycle time
• Step: low	Yes; 4x cycle time
• Step: Medium	Yes; 16x cycle time
Step: High	Yes; 32x cycle time
Analog value generation for the outputs	
Integration and conversion time/resolution per channel	16 bit
Resolution with overrange (bit including sign), max. Settling time	
for resistive load	1 ms
for capacitive load	1 ms
for inductive load	1 ms
Encoder	
Connection of signal encoders	
for voltage measurement	Yes
 for current measurement as 2-wire transducer 	Yes
 for current measurement as 4-wire transducer 	Yes
Errors/accuracies	
Linearity error (relative to input range), (+/-)	0.01 %
Temperature error (relative to input range), (+/-)	0.006 %/K
Crosstalk between the inputs, max.	-70 dB
	-70 dB 0.008 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input	
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-)	0.008 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max.	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 % 0.2 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Voltage, relative to output range, (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 % 0.2 % 0.1 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 % 0.2 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) Basic error limit (operational limit at 25 °C)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 % 0.2 % 0.1 % 0.15 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to output range, (+/-) • Voltage, relative to input range, (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 % 0.15 % 0.15 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to input range, (+/-) • Current, relative to input range, (+/-) • Voltage, relative to input range, (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 % 0.15 % 0.1 % 0.1 % 0.1 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to input range, (+/-) • Current, relative to input range, (+/-) • Voltage, relative to output range, (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 % 0.15 % 0.1 % 0.15 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Current, relative to output range, (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 % 0.15 % 0.15 % 0.1 % 0.1 % 0.1 % 0.1 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to input range, (+/-) • Current, relative to input range, (+/-) • Voltage, relative to output range, (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 % 0.15 % 0.15 % 0.1 % 0.1 % 0.1 % 0.1 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Voltage, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Current, relative to output range, (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 % 0.15 % 0.15 % 0.15 % 0.1 % 0.15 % ference frequency
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to output range, (+/-) • Current, relative to input range, (+/-) • Current, relative to input range, (+/-) • Current, relative to input range, (+/-) • Current, relative to output range, (+/-)	0.008 % 0.02 % 0.02 % 0.002 %/K -70 dB 0.008 % 0.15 % 0.15 % 0.15 % 0.15 % 0.1 % 0.15 % ference frequency
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-)	0.008 % 0.02 % 0.02 % 0.02 %/K -70 dB 0.008 % 0.15 % 0.15 % 0.15 % 0.15 % 0.1 % 0.15 % 0.1 % 0.1 % 0.18 % 0.18 % 0.18 % 0.08 % 0.11 % 0.08 % 0.11 % 0.08 %
Crosstalk between the inputs, max. Repeat accuracy in steady state at 25 °C (relative to input range), (+/-) Output ripple (relative to output range, bandwidth 0 to 50 kHz), (+/-) Linearity error (relative to output range), (+/-) Temperature error (relative to output range), (+/-) Crosstalk between the outputs, max. Repeat accuracy in steady state at 25 °C (relative to output range), (+/-) Operational error limit in overall temperature range • Voltage, relative to input range, (+/-) • Current, relative to output range, (+/-) • Voltage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to input range, (+/-) • Voltage, relative to input range, (+/-) • Current, relative to input range, (+/-) • Current, relative to output range, (+/-) • Notage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Current, relative to output range, (+/-) • Notage, relative to output range, (+/-) • Current, relative to output range, (+/-) • Notage, relative to output range, (+/-)	0.008 % 0.02 % 0.02 % 0.02 %/K -70 dB 0.008 % 0.15 % 0.15 % 0.15 % 0.15 % 0.1 % 0.15 % 0.1 % 0.1 % 0.18 % 0.18 % 0.18 % 0.08 % 0.11 % 0.08 % 0.11 % 0.08 %

M12 port	Yes; 2x M12, 4-pin, D-coded
Number of ports	2
integrated switch	Yes
Protocols	
PROFINET IO Device	Yes
Open IE communication	Yes
Interface types	
M12 port	
Autonegotiation	Yes
Autocrossing	Yes
• Transmission rate, max.	100 Mbit/s
Protocols	
Supports protocol for PROFINET IO	Yes
PROFIsafe	No
EtherNet/IP	Yes
Modbus TCP	Yes
PROFINET IO Device	
Services	
— IRT	Yes; 250 µs to 4 ms in 125 µs frame
— Prioritized startup	Yes
— Shared device	Yes
- Number of IO Controllers with shared device, max.	2
Redundancy mode	
 PROFINET system redundancy (S2) 	Yes
— on S7-1500R/H	Yes
— on S7-400H	Yes
 PROFINET system redundancy (R1) 	No
H-Sync forwarding	Yes
Media redundancy	
— MRP	Yes
EtherNet/IP	
Services	
— CIP Implicit Messaging	Yes
— CIP Explicit Messaging	Yes
— CIP Safety	No
— Shared device	Yes; 2x EtherNet/IP Scanner
 — Number of scanners with shared device, max. 	2
Updating times — Requested Packet Interval (RPI)	2 ma
	2 ms
Redundancy mode — DLR (Device Level Ring)	No
Address area	No
Address space per module, max.	48 byte; of which 44 bytes for inputs and 4 bytes for outputs
— LargeForwardOpen (Class3)	No
Modbus TCP	
Services	
— read coils (code=1)	Yes
— read discrete inputs (code=2)	Yes
— Read Holding Registers (Code=3)	Yes
— write single coil (code=5)	Yes
— write multiple coils (code=15)	Yes
	Yes
 — Write Multiple Registers (Code=16) 	165
— Write Multiple Registers (Code=16) — Parameter change by master	No
— Parameter change by master	No
 Parameter change by master Modbus TCP Security Protocol 	No
 Parameter change by master Modbus TCP Security Protocol Address space per station 	No No
 Parameter change by master Modbus TCP Security Protocol Address space per station Address space per station, max. 	No No 48 byte; of which 44 bytes for inputs and 4 bytes for outputs
 Parameter change by master Modbus TCP Security Protocol Address space per station Address space per station, max. Access-consistent address space 	No No 48 byte; of which 44 bytes for inputs and 4 bytes for outputs
 Parameter change by master Modbus TCP Security Protocol Address space per station Address space per station, max. Access-consistent address space Updating time 	No No 48 byte; of which 44 bytes for inputs and 4 bytes for outputs 2 byte

Open IE communication		
• TCP/IP	Yes; (only EtherNet/IP or Modbus TCP)	
• SNMP	Yes	
• LLDP	Yes	
• ARP	Yes	
Interrupts/diagnostics/status information		
Substitute values connectable	Yes; channel by channel, parameterizable	
Alarms		
Diagnostic alarm	Yes; Parameterizable	
Maintenance interrupt	Yes; Parameterizable	
Limit value alarm	Yes; two upper and two lower limit values in each case	
Diagnoses		
Diagnostic information readable	Yes	
 Monitoring the supply voltage 	Yes	
— parameterizable	Yes	
Wire-break	Yes; at 4 mA to 20 mA and 1 V to 5 V	
Short-circuit	Yes; encoder and actuator supply module to ground, for output type voltage;	
	channel by channel	
Overflow/underflow	Yes	
Diagnostics indication LED		
• RUN LED	Yes; green LED	
• ERROR LED	Yes; red LED	
MAINT LED	Yes; Yellow LED	
• NS LED	Yes; green/red LED	
• MS LED	Yes; green/red LED	
• IO LED	Yes; red/green/yellow LEDs	
Channel status display	Yes; green LED	
for channel diagnostics	Yes; red LED	
Connection display LINK TX/RX	Yes; green LED, only link	
Potential separation		
	Yes	
between the load voltages		
between Ethernet and electronics	Yes	
Potential separation channels		
between the channels	No	
 between the channels and the power supply of the electronics 	No	
Permissible potential difference		
Between the inputs and MANA (UCM)	AC 10 Vpp to reference potential 1M	
Isolation		
tested with		
• 24 V DC circuits	707 V DC (type test)	
 Test voltage for interface, rms value [Vrms] 	1 500 V; According to IEEE 802.3	
Degree and class of protection		
IP degree of protection	IP65/67/69K	
Standards, approvals, certificates		
Suitable for safety-related tripping of standard modules	Yes; From FS01	
Highest safety class achievable for safety-related tripping of stand	dard modules	
Performance level according to ISO 13849-1	PL d	
 Category according to ISO 13849-1 	Cat. 3	
• SIL acc. to IEC 62061	SIL 2	
 remark on safety-oriented shutdown 	https://support.industry.siemens.com/cs/de/en/view/39198632	
Use in hazardous areas		
Explosion protection category for gas	ATEX, UKEX, IECEx, CCCEx for Zone 2	
Explosion protection category for dust	ATEX, UKEX, IECEX, CCCEx for Zone 22	
Ambient conditions		
Ambient temperature during operation	40 °C	
• min.	-40 °C	
• max.	60 °C	
Altitude during operation relating to sea level		
Ambient air temperature-barometric pressure-altitude connection method	Up to max. 5 000 m, at installation height > 2 000 m additional restrictions	

Design of electrical connection	4/5-pin M12 circular connectors
Design of electrical connection for the inputs and outputs	M12, 5-pin, A-coded
Design of electrical connection for supply voltage	M12, 4-pin, L-coded
Dimensions	
Width	45 mm
Height	200 mm
Depth	48 mm
Weights	
Weight, approx.	795 g

last modified:

11/29/2023 🖸