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Technical specifications (continued)

Article number	**6ES7332-8TF01-0AB0** SM332, 8AO, 0/4 - 20MA HART	**6ES7332-5TB10-0AB0** SIMATIC DP, HART ANALOG OUTPUT
Supply voltage		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• Reverse polarity protection	Yes	Yes
Input current		
from load voltage L+ (without load), max.	350 mA	150 mA
from backplane bus 5 V DC, max.	110 mA	100 mA
Power loss		
Power loss, typ.	6 W	3.5 W
Analog outputs		
Number of analog outputs	8	2
Current output, no-load voltage, max.	24 V	19 V
Cycle time (all channels) max.		5 ms
Output ranges, current		
• 0 to 20 mA	Yes	Yes
• -20 mA to +20 mA	No	No
• 4 mA to 20 mA	Yes	Yes
Connection of actuators		
• for current output two-wire connection	Yes	Yes
Load impedance (in rated range of output)		
• with current outputs, max.	750 Ω	650 Ω
• with current outputs, inductive load, max.	10 mH	7.5 mH
Destruction limits against externally applied voltages and currents		
• Voltages at the outputs towards MANA	+60/-0.5 V	max. 17 V / -0.5 V
• Current, max.		60 mA / -1 A
Cable length		
• shielded, max.	800 m	400 m
Analog value generation for the outputs		
Integration and conversion time/ resolution per channel		
• Resolution with overrange (bit including sign), max.	16 bit	12 bit; + sign
• Conversion time (per channel)		40 ms
Settling time		
• for resistive load	0.1 ms	2.5 ms
• for capacitive load		4 ms
• for inductive load	0.5 ms	2.5 ms
Errors/accuracies		
Output ripple (relative to output range, bandwidth 0 to 50 kHz), (±)	0.02 %	0.02 %
Linearity error (relative to output range), (±)	0.01 %	0.03 %
Temperature error (relative to output range), (±)	0.002 %/K	0.01 %/K
Crosstalk between the outputs, min.	70 dB	130 dB
Repeat accuracy in steady state at 25 °C (relative to output range), (±)	0.05 %	0.005 %
Operational error limit in overall temperature range		
• Current, relative to output range, (±)	0.2 %	0.55 %
Basic error limit (operational limit at 25 °C)		
• Current, relative to output range, (±)	0.1 %	0.15 %

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Technical specifications (continued)

Article number	**6ES7332-8TF01-0AB0** SM332, 8AO, 0/4 - 20MA HART	**6ES7332-5TB10-0AB0** SIMATIC DP, HART ANALOG OUTPUT
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	No	
Interrupts/diagnostics/ status information		
Diagnostic functions	Yes	Yes; Parameterizable
Substitute values connectable	Yes	Yes; Parameterizable
Alarms		
• Diagnostic alarm	Yes	Yes; Parameterizable
Diagnostic messages		
• Diagnostic information readable	Yes	Yes; possible
• Overrange		Yes
• Wire-break		Yes; as of output value > 0.5 mA
• HART communication active		Yes; green LED (H)
Diagnostics indication LED		
• Group error SF (red)	Yes	Yes; Red LED
• Channel fault indicator F (red)		Yes; per channel
Ex(i) characteristics		
Module for Ex(i) protection		Yes
Maximum values of output circuits (per channel)		
• Co (permissible external capacity), max.		230 nF
• Io (short-circuit current), max.		66 mA
• Lo (permissible external inductivity), max.		7.5 mH
• Po (power of load), max.		506 mW
• Uo (output no-load voltage), max.		19 V
• Um (fault voltage), max.		60 V; DC
• Ta (permissible ambient temperature), max.		60 °C
Potential separation		
Potential separation analog outputs		
• between the channels	No	Yes
• between the channels and backplane bus	Yes	Yes
• Between the channels and load voltage L+	Yes	Yes
Permissible potential difference		
between the outputs (UCM)		60 V DC/30 V AC permitted potential difference (Viso) of signals from hazardous areas
Isolation		
Isolation tested with	500 V DC	
tested with		
• Channels against backplane bus and load voltage L+		2500 V DC
• Channels among one another		2500 V DC
• Load voltage L+ against backplane bus		500 V DC

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Technical specifications (continued)

Article number	**6ES7332-8TF01-0AB0**	**6ES7332-5TB10-0AB0**
	SM332, 8AO, 0/4 - 20MA HART	SIMATIC DP, HART ANALOG OUTPUT
Standards, approvals, certificates		
FM approval		Yes
Use in hazardous areas		
• Type of protection acc. to FM		Class I, Division 2, Group A, B, C, D T4; Class I, Zone 2, Group IIC T4
• Type of protection acc. to KEMA		II 3 G (2) GD Ex nA [ib Gb] [ib IIIC Db] IIC T4 Gc
• Test number KEMA		DEKRA 14 ATEX 0053X
Connection method		
required front connector	20-pin	20-pin
Dimensions		
Width	40 mm	40 mm
Height	125 mm	125 mm
Depth	117 mm	120 mm
Weights		
Weight, approx.	220 g	290 g

Ordering data

	Article No.
Analog input module SM 331 HART Redundancy optional (channel-granular redundancy) 8 inputs, 0/4 … 20 mA or ±20 mA • Resolution: 15 bit + sign • Connection of 2-wire or 4-wire transmitters possible • HART (2-wire or 4-wire) • Wire break monitoring • Short-circuit-proof • Front connector required: 20-pin	**6ES7331-7TF01-0AB0**
Analog output module SM 332 HART Redundancy optional (channel-granular redundancy) 8 outputs, 0/4 … 20 mA • Resolution: 15 bit + sign • For 2-wire actuators • HART (2-wire) • Wire break monitoring • Front connector required: 20-pin	**6ES7332-8TF01-0AB0**
SM 331 HART Ex analog input module [EEx ib] 2 inputs, 0/4 … 20 mA in 2 channel groups, as of HART revision 5.0 • Individual electrically isolated channels • Resolution: 15 bit + sign • Connection of 2-wire or 4-wire transmitters possible • Wire break monitoring • Short-circuit-proof • HART (2-wire or 4-wire) • Front connector required: 20-pin	**6ES7331-7TB10-0AB0**
SM 332 HART Ex analog output module [EEx ib] 2 outputs, 0/4 … 20 mA in 2 channel groups, as of HART revision 5.0 • Individual electrically isolated channels • Resolution: 12 bit + sign • For 2-wire actuators • Wire break monitoring • HART • Front connector required: 20-pin	**6ES7332-5TB10-0AB0**
SM 336 F-AI HART safety-related analog input module Redundancy optional (channel-granular redundancy) 6 inputs, 0/4 … 20 mA	For detailed Ordering data , see the section "F digital/analog modules"