

SIMATIC DP, HART ANALOG INPUT SM 331, 2 AI, 0/4 - 20mA
HART, FROM HART REV. 5.0, FOR ET200M WITH IM153-2, 1 X 20
PIN

Supply voltage	
Load voltage L+	
• Rated value (DC)	24 V
• Reverse polarity protection	Yes
Input current	
from load voltage L+ (without load), max.	180 mA
from backplane bus 5 V DC, max.	100 mA
Output voltage	
Power supply to the transmitters	
• present	Yes
• Rated value (DC)	15 V; at 22 mA
• short-circuit proof	Yes; approx. 30 mA
• No-load voltage (DC)	29.6 V
Power loss	
Power loss, typ.	4.5 W
Analog inputs	
Number of analog inputs	2
permissible input current for current input (destruction limit), max.	40 mA
Input ranges	
• Current	Yes
Input ranges (rated values), currents	
• 0 to 20 mA	Yes
• Input resistance (0 to 20 mA)	50 Ω
• 4 mA to 20 mA	Yes
• Input resistance (4 mA to 20 mA)	50 Ω
Cable length	
• shielded, max.	400 m
Analog value generation for the inputs	
Measurement principle	Sigma Delta
Integration and conversion time/resolution per channel	
• Resolution with overrange (bit including sign), max.	16 bit; 10 to 15 bits + sign

• Integration time, parameterizable	Yes
• Integration time (ms)	2,5 / 16,67 / 20 / 100 ms
• Basic conversion time, including integration time (ms)	2.5 / 16.67 / 20 / 100 (1 channel enabled); 7.5 / 50 / 60 / 300 (2 channels enabled)
• Interference voltage suppression for interference frequency f1 in Hz	10 / 50 / 60 / 400 Hz

Encoder

Connection of signal encoders

• 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), (+/-)	0.01 %/K
Crosstalk between the inputs, min.	130 dB
Repeat accuracy in steady state at 25 °C (relative to input area), (+/-)	0.05 %

Operational error limit in overall temperature range

• Current, relative to input area, (+/-)	0.45 %; From 0/4 to 20 mA
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Basic error limit (operational limit at 25 °C)

• Current, relative to input area, (+/-)	0.1 %; From 0/4 to 20 mA
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Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, f_1 = interference frequency

• Series mode interference (peak value of interference < rated value of input range), min.	60 dB
• Common mode interference, min.	130 dB

Interrupts/diagnostics/status information

Alarms

• Diagnostic alarm	Yes; Parameterizable
• Limit value alarm	Yes; Parameterizable, channels 0 and 1

Diagnostic messages

• Diagnostic functions	Yes; Parameterizable
• Diagnostic information readable	Yes; possible
• Overrange	Yes; Red LED, signal
• Wire-break in signal transmitter cable	Yes; Red LED, signal
• Short-circuit of the signal encoder cable	Yes; Red LED, signal
• HART communication active	Yes; green LED (H)

Diagnostics indication LED

• Group error SF (red)	Yes
• Channel fault indicator F (red)	Yes

Ex(i) characteristics

Module for Ex(i) protection	Yes
Maximum values of input circuits (per channel)	

• Co (permissible external capacity), max.	62 nF
• Io (short-circuit current), max.	96.1 mA
• Lo (permissible external inductivity), max.	3 mH
• Po (power of load), max.	511 mW
• Uo (output no-load voltage), max.	26 V
• Um (fault voltage), max.	250 V; DC
• Ta (permissible ambient temperature), max.	60 °C

Potential separation

Potential separation analog inputs

• between the channels	Yes
• between the channels and backplane bus	Yes

Permissible potential difference

between the inputs (UCM)	60 V DC/30 V AC permitted potential difference (Viso) of signals from hazardous areas
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Isolation

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

Standards, approvals, certificates

CE mark	Yes
UL approval	Yes
FM approval	Yes
RCM (formerly C-TICK)	Yes
KC approval	Yes
EAC (formerly Gost-R)	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
• Test number KEMA	DEKRA 14 ATEX 0052X
• Type of protection acc. to KEMA	II 3 G (2) GD Ex nA [ib Gb] [ib IIC Db] IIC T4 Gc

Ambient conditions

Ambient temperature during operation

• min.	0 °C
• max.	60 °C

Connection method

required front connector	1x 20-pin
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Dimensions

Width	40 mm
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Height	125 mm
Depth	120 mm
Weights	
Weight, approx.	260 g
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