

SIMATIC DP, HART ANALOG INPUT SM 331, 2 AI, 0/4 - 20mA  
HART, UP TO 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                                                                                |
| <b>Input ranges</b>                                                                                                             |                                                                                      |
| • Current                                                                                                                       | Yes                                                                                  |
| <b>Input ranges (rated values), currents</b>                                                                                    |                                                                                      |
| • 0 to 20 mA                                                                                                                    | Yes                                                                                  |
| • Input resistance (0 to 20 mA)                                                                                                 | 50 $\Omega$                                                                          |
| • 4 mA to 20 mA                                                                                                                 | Yes                                                                                  |
| • Input resistance (4 mA to 20 mA)                                                                                              | 50 $\Omega$                                                                          |
| <b>Cable length</b>                                                                                                             |                                                                                      |
| • shielded, max.                                                                                                                | 400 m                                                                                |
| <b>Analog value generation for the inputs</b>                                                                                   |                                                                                      |
| Measurement principle                                                                                                           | Sigma Delta                                                                          |
| <b>Integration and conversion time/resolution per channel</b>                                                                   |                                                                                      |
| • Resolution with overrange (bit including sign), max.                                                                          | 16 bit; 10 bit to 15 bit + 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                                                                |
| <b>Encoder</b>                                                                                                                  |                                                                                      |
| <b>Connection of signal encoders</b>                                                                                            |                                                                                      |
| • for current measurement as 2-wire transducer                                                                                  | Yes                                                                                  |
| • for current measurement as 4-wire transducer                                                                                  | Yes                                                                                  |
| <b>Errors/accuracies</b>                                                                                                        |                                                                                      |
| 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 range), (+/-)                                                       | 0.05 %                                                                               |
| <b>Operational error limit in overall temperature range</b>                                                                     |                                                                                      |
| • Current, relative to input range, (+/-)                                                                                       | 0.45 %; From 0/4 to 20 mA                                                            |
| <b>Basic error limit (operational limit at 25 °C)</b>                                                                           |                                                                                      |
| • Current, relative to input range, (+/-)                                                                                       | 0.1 %; From 0/4 to 20 mA                                                             |
| <b>Interference voltage suppression for <math>f = n \times (f_1 \pm 1 \%)</math>, <math>f_1</math> = interference frequency</b> |                                                                                      |
| • Series mode interference (peak value of interference < rated value of input range), min.                                      | 60 dB                                                                                |
| • Common mode interference, min.                                                                                                | 130 dB                                                                               |
| <b>Interrupts/diagnostics/status information</b>                                                                                |                                                                                      |
| Diagnostic functions                                                                                                            | Yes; can be set in parameters, red LED, alarm message                                |

|                                                       |                                        |
|-------------------------------------------------------|----------------------------------------|
| <b>Alarms</b>                                         |                                        |
| • Diagnostic alarm                                    | Yes; Parameterizable                   |
| • Limit value alarm                                   | Yes; Parameterizable, channels 0 and 1 |
| <b>Diagnostic messages</b>                            |                                        |
| • Diagnostic information readable                     | Yes                                    |
| • 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)                     |
| <b>Diagnostics indication LED</b>                     |                                        |
| • Group error SF (red)                                | Yes                                    |
| • Channel fault indicator F (red)                     | Yes                                    |
| <b>Ex(i) characteristics</b>                          |                                        |
| Module for Ex(i) protection                           | Yes                                    |
| <b>Maximum values of input circuits (per channel)</b> |                                        |
| • 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.          | 0.6 °C                                 |
| <b>Potential separation</b>                           |                                        |
| <b>Potential separation analog inputs</b>             |                                        |
| • between the channels                                | Yes                                    |
| • between the channels and backplane bus              | Yes                                    |
| <b>Permissible potential difference</b>               |                                        |
| between the inputs (UCM)                              | 60 V DC/30 V AC                        |
| <b>Isolation</b>                                      |                                        |
| <b>tested with</b>                                    |                                        |
| • Channels against backplane bus and load voltage L+  | 1500 V AC                              |
| • Channels among one another                          | 1500 V AC                              |
| • Load voltage L+ against backplane bus               | 500 V DC                               |
| <b>Standards, approvals, certificates</b>             |                                        |
| FM approval                                           | Available soon                         |
| <b>Use in hazardous areas</b>                         |                                        |
| • Type of protection acc. to EN 50020 (CENELEC)       | [Ex ib] IIC                            |

- Type of protection acc. to FM
- Type of protection acc. to KEMA
- Test number KEMA

Class I, Division 2, Group A, B, C, D T4; Class I, Zone 2, Group IIC T4  
 II3 (2) G Eex nA [ib] IIC T4  
 KEMA 97 ATEX 3039X

#### Ambient conditions

##### Ambient temperature during operation

- max. 60 °C

#### Dimensions

|        |        |
|--------|--------|
| Width  | 40 mm  |
| Height | 125 mm |
| Depth  | 120 mm |

#### Weights

|                 |       |
|-----------------|-------|
| Weight, approx. | 260 g |
|-----------------|-------|

**last modified:** 03/24/2017 