

# DCT 531P



## Industrial Pressure Transmitter with RS485 Modbus RTU

Process Connections with Flush Welded Stainless Steel Diaphragm

accuracy according to IEC 60770:  
 $\leq \pm 0.25 \% \text{ FSO}$

### Nominal pressure

- ▶ from 0 ... 100 mbar up to 0 ... 40 bar

### Output signal

- ▶ RS485 with Modbus RTU protocol

### Special characteristics

- ▶ hygienic version
- ▶ diaphragm with low surface roughness
- ▶ CIP / SIP-cleaning up to 150 °C
- ▶ ingress protection IP 67 / IP 69
- ▶ reset function

### Optional versions

- ▶ different process connections
- ▶ cooling element for media temperatures up to 300 °C

The pressure transmitter DCT 531P was designed for use in the food / beverage and pharmaceutical industry. The compact design with hygienic version guarantees an outstanding performance in terms of accuracy, thermal behaviour and long term stability.

The integrated RS485 interface is characterized by a robust and reliable data transmission that works failure-free even over long distances.

Additionally, the modular construction concept of the device allows to combine different electrical and mechanical connections, so it is easy to adapt the pressure transmitter to different conditions on-site.

### Preferred areas of use are



Food and beverage



Pharmaceutical industry

### Material and test certificates

- ▶ Inspection certificate 3.1 according to EN 10204
- ▶ Test report 2.2 according to EN 10204



Modbus®

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Technical Data

| Input pressure range <sup>1</sup> |       |   |      |      |      |      |      |     |     |
|-----------------------------------|-------|---|------|------|------|------|------|-----|-----|
| Nominal pressure gauge            | [bar] | -1...0  | 0.10 | 0.16 | 0.25 | 0.40 | 0.60 | 1   | 1.6 |
| Nominal pressure absolute         | [bar] | -   | -    | -    | -    | 0.40 | 0.60 | 1   | 1.6 |
| Overpressure                      | [bar] | 5   | 0.5  | 1    | 1    | 2    | 5    | 5   | 10  |
| Burst pressure ≥                  | [bar] | 7.5   | 1.5  | 1.5  | 1.5  | 3    | 7.5  | 7.5 | 15  |
|                                   |       |   |      |      |      |      |      |     |     |
| Nominal pressure gauge / absolute | [bar] | 2.5   | 4    | 6    | 10   | 16   | 25   | 40  |     |
| Overpressure                      | [bar] | 10  | 20   | 40   | 40   | 80   | 80   | 105 |     |
| Burst pressure ≥                  | [bar] | 15  | 25   | 50   | 50   | 120  | 120  | 210 |     |
| Vacuum resistance                 |       | p <sub>N</sub> > 1 bar: unlimited vacuum resistance<br>p <sub>N</sub> ≤ 1 bar: on request |      |      |      |      |      |     |     |

<sup>1</sup> consider the pressure resistance of fitting and clamps

| Output signal / Supply   |  |
|--|--|
| Standard   | RS485 with Modbus RTU protocol / V <sub>S</sub> = 9 ... 32 V <sub>DC</sub> |
| Performance  |  |
| Accuracy <sup>2</sup>  | ≤ ± 0.25 % FSO   |
| Long term stability  | ≤ ± 0.1 % FSO / year at reference conditions                               |
| Measuring rate   | 500 Hz   |
| Delay time   | 500 msec   |
| <sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)                                     |  |
| Thermal effects (offset and span) <sup>3</sup>   |  |
| Tolerance band   | ≤ ± 0.75 % FSO   |
| in compensated range <sup>4</sup>  | -20 ... 85 °C  |
| <sup>3</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions |  |
| <sup>4</sup> the minimum compensation temperature depends on the filling fluid used  |  |

| Permissible temperatures   |   |   |
|--|---|---|
| Filling fluid  | silicone oil  | food compatible oil   |
| Medium <sup>5</sup>  | -40 ... 125 °C  | -10 ... 125 °C  |
| Medium with cooling element <sup>6</sup>   | overpressure: -40 ... 300 °C<br>vacuum: -40 ... 150 °C <sup>7</sup> | overpressure: -10 ... 250 °C<br>vacuum: -10 ... 150 °C <sup>7</sup> |
| Electronics / environment  | -40 ... 85 °C   |   |
| Storage  | -40 ... 100 °C  |   |
| <sup>5</sup> max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C |   |   |
| <sup>6</sup> max. temperature depends on the used sealing material, type of seal and installation  |   |   |
| <sup>7</sup> also for p <sub>abs</sub> ≤ 1 bar   |   |   |

| Electrical protection         |  |
|-------------------------------|--|
| Short-circuit protection      | permanent  |
| Reverse polarity protection   | on supply connection no damage, but also no function   |
| Electromagnetic compatibility | emission and immunity according to EN 61326  |
| Mechanical stability          |  |
| Vibration                     | according to DIN EN 60068-2-6      G 1/2": 20 g RMS (25...2000 Hz)<br>others: 10 g RMS (25...2000 Hz)  |
| Shock                         | according to DIN EN 60068-2-27      G 1/2": 500 g / 1 msec<br>others: 100 g / 1 msec   |
| Filling fluids                |  |
| Standard                      | silicone oil   |
| Option                        | food compatible oil according to 21CFR178.3570<br>(Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500)<br>others on request |

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Technical Data

| Materials                                 |   |  |
|---|---|--|
| Housing / electrical connection           | stainless steel 1.4404 (316 L)  |  |
| Pressure port                             | stainless steel 1.4435 (316 L)  |  |
| Diaphragm                                 | stainless steel 1.4435 (316 L)  |  |
| Seal                                      | standard: FKM (recommended for medium temperatures $\leq 200$ °C)<br>option: FFKM (recommended for medium temperatures $< 260$ °C)<br>Clamp, Varivent®: without<br>others on request                              |  |
| Media wetted parts                        | pressure port, seal, diaphragm  |  |
| Miscellaneous                             |   |  |
| EHEDG certificate Type EL Class I         | EHEDG conformity is only ensured in combination with an approved seal. This is e.g. for<br>- Clamp (C61, C62): T-ring-seal from Combifit International B.V.<br>- Varivent® (P41): EPDM-O-ring which is FDA-listed |  |
| Weight                                    | approx. 200 g   |  |
| Current consumption                       | max. 10 mA  |  |
| Surface roughness                         | pressure port $R_a < 0.8 \mu\text{m}$ (media wetted parts)<br>diaphragm $R_a < 0.15 \mu\text{m}$<br>weld seam $R_a < 0.8 \mu\text{m}$   |  |
| Operational life                          | 100 million load cycles   |  |
| Installation position                     | any (standard calibration in a vertical position with the pressure port connection down; differing installation position for $p_N \leq 2$ bar have to be specified in the order)                                  |  |
| CE-conformity                             | EMC Directive: 2014/30/EU   |  |
| Wiring diagram                            |   |  |
| RS 485 / Modbus RTU                       |   |  |
|   |   |  |
| Pin configuration / electrical connection |   |  |
| Electrical connection                     | M12x1 / metal (5-pin), IP 67  |  |
| Supply +                                  | 1   |  |
| Supply -                                  | 3   |  |
| A (+)                                     | 2   |  |
| B (-)                                     | 4   |  |
| Reset                                     | 5   |  |
| Shield                                    | plug housing  |  |

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Technical Data

**Dimensions / mechanical connection (mm / in)**

⇒ metric threads and other versions on request

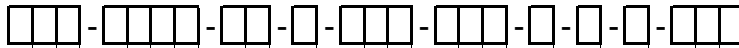
<sup>6</sup> max. temperature depends on the used sealing material and type of seal and installation

| Configuration Modbus RTU                          |     |   |   |   |   |
|---|-----|---|---|---|---|
| Standard configuration                            | 001 | - | 1 | - | 1 |
| <b>Address</b>                                    |     |   |   |   |   |
| Address   | 001 |   |   |   |   |
|   | ... |   |   |   |   |
|   | 247 |   |   |   |   |
| <b>Baud Rate</b>                                  |     |   |   |   |   |
| 4800 Bd   |     |   | 0 |   |   |
| 9600 Bd   |     |   | 1 |   |   |
| 19200 Bd  |     |   | 2 |   |   |
| 38400 Bd  |     |   | 3 |   |   |
| <b>Parity</b>                                     |     |   |   |   |   |
| None  |     |   |   |   | 0 |
| Odd   |     |   |   |   | 1 |
| Even  |     |   |   |   | 2 |
| <b>Configuration code (to specify with order)</b> |     |   |   |   |   |
|   |     | - |   | - |   |

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# Ordering code DCT 531P

DCT 531P



|                              |  |   |   |   |   |   |   |   |         |
|------------------------------|--|---|---|---|---|---|---|---|---------|
| <b>Pressure</b>              |  |   |   |   |   |   |   |   |         |
|                              | absolute                                   | 5 | 0 | 1 |   |   |   |   |         |
|                              | gauge                                      | 5 | 0 | 2 |   |   |   |   |         |
| <b>Input</b>                 |  |   |   |   |   |   |   |   |         |
|                              | [bar]                                      |   |   |   |   |   |   |   |         |
|                              | 0.10                                       | 1 |   |   | 1 | 0 | 0 | 0 |         |
|                              | 0.16                                       | 1 |   |   | 1 | 6 | 0 | 0 |         |
|                              | 0.25                                       | 1 |   |   | 2 | 5 | 0 | 0 |         |
|                              | 0.40                                       |   |   |   | 4 | 0 | 0 | 0 |         |
|                              | 0.60                                       |   |   |   | 6 | 0 | 0 | 0 |         |
|                              | 1.0  |   |   |   | 1 | 0 | 0 | 1 |         |
|                              | 1.6  |   |   |   | 1 | 6 | 0 | 1 |         |
|                              | 2.5  |   |   |   | 2 | 5 | 0 | 1 |         |
|                              | 4.0  |   |   |   | 4 | 0 | 0 | 1 |         |
|                              | 6.0  |   |   |   | 6 | 0 | 0 | 1 |         |
|                              | 10   |   |   |   | 1 | 0 | 0 | 2 |         |
|                              | 16   |   |   |   | 1 | 6 | 0 | 2 |         |
|                              | 25   |   |   |   | 2 | 5 | 0 | 2 |         |
|                              | 40   |   |   |   | 4 | 0 | 0 | 2 |         |
|                              | -1 ... 0                                   |   |   |   | X | 1 | 0 | 2 |         |
|                              | customer                                   |   |   |   | 9 | 9 | 9 | 9 | consult |
| <b>Output</b>                |  |   |   |   |   |   |   |   |         |
|                              | RS485 Modbus RTU                           |   |   |   | L | 5 |   |   |         |
| <b>Accuracy</b>              |  |   |   |   |   |   |   |   |         |
|                              | 0.25 % FSO                                 |   |   |   |   |   |   | 2 |         |
|                              | customer                                   |   |   |   |   |   |   | 9 | consult |
| <b>Electrical connection</b> |  |   |   |   |   |   |   |   |         |
|                              | male plug M12x1 (5-pin) / metal            |   |   |   |   |   |   | N | 1       |
|                              | customer                                   |   |   |   |   |   |   | 9 | 9       |
| <b>Mechanical connection</b> |  |   |   |   |   |   |   |   |         |
|                              | G1/2" DIN 3852 flush ( $p_N \geq 1$ bar)   |   |   |   |   |   |   | Z | 0       |
|                              | G1" DIN 3852 flush                         |   |   |   |   |   |   | Z | S       |
|                              | G 1" cone                                  |   |   |   |   |   |   | K | S       |
|                              | Clamp DN 25 DIN 32676 ( $p_N \leq 16$ bar) |   |   |   |   |   |   | C | 6       |
|                              | Clamp DN 32 DIN 32676 ( $p_N \leq 16$ bar) |   |   |   |   |   |   | C | 6       |
|                              | Varivent® DN 40/50 ( $p_N \leq 25$ bar)    |   |   |   |   |   |   | P | 4       |
|                              | customer                                   |   |   |   |   |   |   | 9 | 9       |
| <b>Diaphragm</b>             |  |   |   |   |   |   |   |   |         |
|                              | stainless steel 1.4435 (316L)              |   |   |   |   |   |   | 1 |         |
|                              | customer                                   |   |   |   |   |   |   | 9 | consult |
| <b>Seal</b>                  |  |   |   |   |   |   |   |   |         |
|                              | for clamp, Varivent®:                      |   |   |   |   |   |   | 0 |         |
|                              | for inch thread - standard:                |   |   |   |   |   |   | 1 |         |
|                              | for inch thread - option:                  |   |   |   |   |   |   | 7 |         |
|                              | customer                                   |   |   |   |   |   |   | 9 | consult |
| <b>Filling fluid</b>         |  |   |   |   |   |   |   |   |         |
|                              | silicone oil                               |   |   |   |   |   |   | 1 |         |
|                              | food compatible oil (FDA)                  |   |   |   |   |   |   | 2 |         |
|                              | customer                                   |   |   |   |   |   |   | 9 | consult |
| <b>Special version</b>       |  |   |   |   |   |   |   |   |         |
|                              | standard                                   |   |   |   |   |   |   | 0 | 3       |
|                              | with cooling element up to 300°C           |   |   |   |   |   |   | 2 | 3       |
|                              | customer                                   |   |   |   |   |   |   | 9 | 9       |

<sup>1</sup> absolute pressure possible from 0.4 bar

Varivent® is a brand name of GEA Tuchenhagen GmbH