



fill level



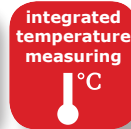
Type:  
**Sonicont® USP4S**

## Ultrasonic filling level transmitter for general applications

Technical information TI02.20

### In brief

Piktogramme:



### Application

- Non-contact level and volume measurement
- Flow measurement at open channels and measuring weirs
- Water and waste water sector
- Process industry
- Environmental technology
- Storage tanks, storage bunkers, silos

### Main features

- Measuring ranges up to 8m
- Connector plug M12 or extension cable version
- High protection class IP65 / IP67 resp. IP68
- Process temperature range  $-20^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$
- Electronic 4...20mA in 2-wire-technology
- High accuracy  $\leq 0,2\%$
- Operating interface Bluetooth® 5.0 LE
- Integrated overvoltage protection
- Envelope curve indication
- Temperature compensation and interference echo suppression



### Description

The device is an electronic ultrasonic filling level transmitter for monitoring, control and continuous measurement of filling levels in liquids, pastes and coarse bulk materials.

Due to its high accuracy and the digital adjustability by Bluetooth® 5.0 LE the device can be suited to a wide variety of applications.

The robust design and the high-quality workmanship turns the device into a very high quality product, which even the most adverse environmental conditions cannot affect, whether the lowest temperatures when used outdoors, extreme shock and vibration stress or aggressive media.

A captive laser marking of the type label ensures the identifiability throughout the entire lifetime of the device.

Obviously is the optional marking of a measurement point designation resp.

TAG, a customer label or of a neutral type label, of course also per laser marking.

A LABS- resp. silicone-free version and a customer specific configuration resp. preset is also optionally available like a factory certifications for drink water suitability.

Customer specific special versions can be realized short-term on request, e.g. special designs or other process materials.

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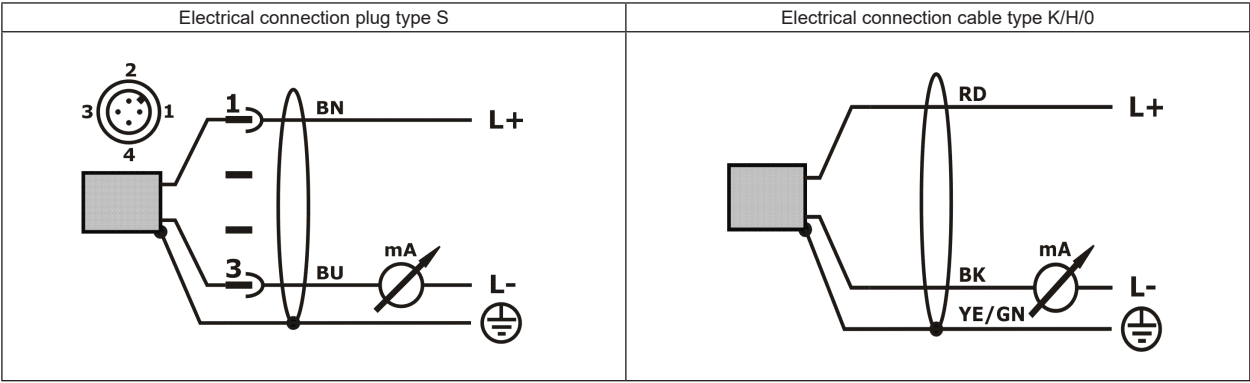


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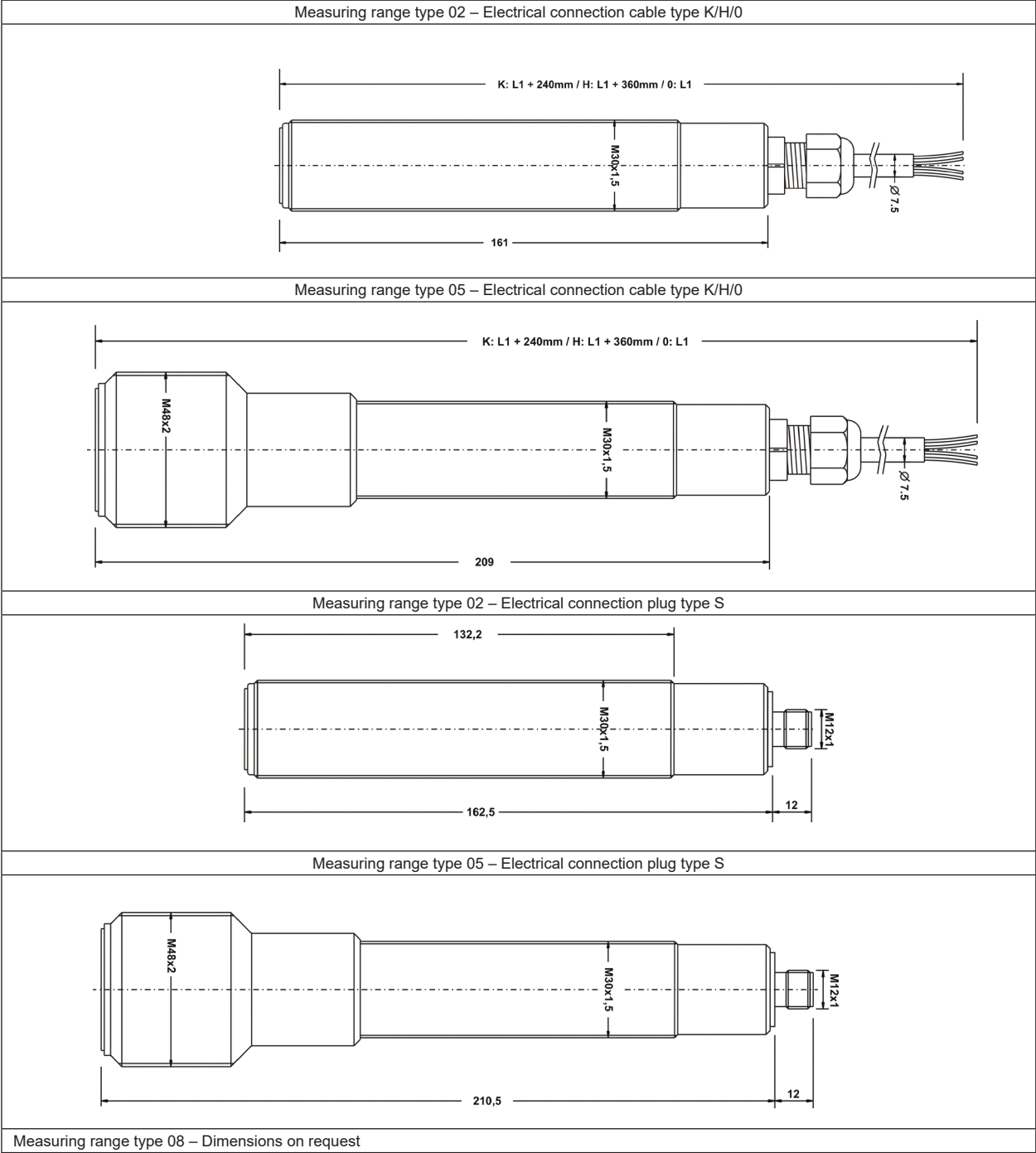
# Technical Data

|                                              |                                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                        |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Input Distance                               |                                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                        |
| Measuring range                              | MB-02: 0...≤ 2m                                                                                                                                                                                                                                   | MB-05: 0...≤ 5m                                                                                                        | MB-08: 0...≤ 8m                                                                                                        |
| Blocking distance BD                         | ≤ 0,10m (typ. 0,06m)                                                                                                                                                                                                                              | ≤ 0,15m (typ. 0,10m)                                                                                                   | ≤ 0,30m (typ. 0,19m)                                                                                                   |
| Operating frequency                          | 125kHz                                                                                                                                                                                                                                            | 75kHz                                                                                                                  | 50kHz                                                                                                                  |
| Emitting angle α                             | 10° ±2° (-3dB)                                                                                                                                                                                                                                    | 14° ±2° (-3dB)                                                                                                         | 10° ±2° (-3dB)                                                                                                         |
| Detection radius rx<br>rx = tan (α / 2) * Lx | r <sub>x</sub> = 0,087m (L <sub>x</sub> = 1,0m / α = 10°)<br>r <sub>x</sub> = 0,175m (L <sub>x</sub> = 2,0m / α = 10°)                                                                                                                            | r <sub>x</sub> = 0,307m (L <sub>x</sub> = 2,5m / α = 14°)<br>r <sub>x</sub> = 0,614m (L <sub>x</sub> = 5,0m / α = 14°) | r <sub>x</sub> = 0,491m (L <sub>x</sub> = 4,0m / α = 10°)<br>r <sub>x</sub> = 0,700m (L <sub>x</sub> = 8,0m / α = 10°) |
| Pulse rate tp (meas. cycle time)             | ≤ 10Hz / ≥ 100ms                                                                                                                                                                                                                                  | ≤ 4Hz / ≥ 250ms                                                                                                        | ≤ 2Hz / ≥ 500ms                                                                                                        |
| Reference conditions                         | EN/IEC 60770-1: Characteristic deviation – Limit value adjustment<br>15..25°C / 860..1060kPa / 45..75%r.F. / ton240s / 24VDC±0,1V / vertical, Process connection bottom, Ideal reflective surface, No interference reflections within signal beam |                                                                                                                        |                                                                                                                        |
|                                              | Characteristic deviation = Nonlinearity + Hysteresis + Reproducibility<br>FSO = Full Scale Output = Nominal measuring range<br>Tk = Temperature coefficient<br>Higher deviations possible for special adjustment                                  |                                                                                                                        |                                                                                                                        |
| Characteristic deviation                     | ≤ ±2mm or ±0,2%FSO                                                                                                                                                                                                                                |                                                                                                                        |                                                                                                                        |
| Influence of auxiliary power                 | ≤ ±0,002%FSO/V                                                                                                                                                                                                                                    |                                                                                                                        |                                                                                                                        |
| Long term drift                              | ≤ ±0,2%FSO/year                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                        |
| Temperature deviation                        | Tk Zero (mean value) ≤ ±0,006%FSO/K                                                                                                                                                                                                               |                                                                                                                        |                                                                                                                        |
| Output current 4...20mA Bluetooth® 5.0 LE    |                                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                        |
| Analogue output 4...20mA                     | 3,8...20,5mA / ≥ 3,6mA / ≤ 22mA / dI ≤ 1µA                                                                                                                                                                                                        |                                                                                                                        |                                                                                                                        |
| Permitted load                               | RL ≤ (Us - 11V) / 22mA                                                                                                                                                                                                                            |                                                                                                                        |                                                                                                                        |
| Time behavior                                | T90 ≤ Pulsrate t <sub>p</sub> (t <sub>y</sub> = 0s) / ton ≤ 3s (t <sub>y</sub> = 0s)                                                                                                                                                              |                                                                                                                        |                                                                                                                        |
|                                              |                                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                        |
| Interface                                    | Bluetooth 5.0 LE (2Mbit/s)                                                                                                                                                                                                                        |                                                                                                                        |                                                                                                                        |
| Transmit power                               | ≤ 0,1W                                                                                                                                                                                                                                            |                                                                                                                        |                                                                                                                        |
| Range                                        | Outdoor max. 200m / Indoor max. 40m                                                                                                                                                                                                               |                                                                                                                        |                                                                                                                        |
| Auxiliary power                              |                                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                        |
| Supply voltage Us<br>polarity protected      | 11...35VDC                                                                                                                                                                                                                                        |                                                                                                                        |                                                                                                                        |
| Residual ripple voltage                      | ≤ 2Vpp                                                                                                                                                                                                                                            |                                                                                                                        |                                                                                                                        |
| Supply current                               | ≤ 22mA                                                                                                                                                                                                                                            |                                                                                                                        |                                                                                                                        |
| Overvoltage protection                       |                                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                        |
| Coarse protection                            | EL-K/H/O: 75V / 10kA – wave 8/20µs / +L/-L to cable shield<br>EL-S: 150V / 10kA – wave 8/20µs / +L to -L                                                                                                                                          |                                                                                                                        |                                                                                                                        |
| Fine protection                              | 36V / all lines to -L                                                                                                                                                                                                                             |                                                                                                                        |                                                                                                                        |
| Process conditions                           |                                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                        |
| Process temperature                          | -20°C...+70°C                                                                                                                                                                                                                                     |                                                                                                                        |                                                                                                                        |
| Process pressure                             | -0,3...2 bar                                                                                                                                                                                                                                      |                                                                                                                        |                                                                                                                        |
| Environmental conditions                     |                                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                        |
| Environmental temperature                    | -20°C...+70°C                                                                                                                                                                                                                                     |                                                                                                                        |                                                                                                                        |
| Protection level                             | EL-K/H/O: IP68 [≤3m/≤0,3bar] (EN/IEC 60529)<br>EL-S: IP65/IP67 (EN/IEC 60529)                                                                                                                                                                     |                                                                                                                        |                                                                                                                        |
| Climatic classification                      | 4K4H (EN/IEC 60721-3-4)                                                                                                                                                                                                                           |                                                                                                                        |                                                                                                                        |
| Shock classification                         | 50g [11ms] (EN/IEC 60068-2-27)                                                                                                                                                                                                                    |                                                                                                                        |                                                                                                                        |
| Vibration classification                     | 20g [10...2000 Hz] (EN/IEC 60068-2-6)                                                                                                                                                                                                             |                                                                                                                        |                                                                                                                        |
| EM compatibility                             | Operation device class B / Industrial range (EN/IEC 61326)                                                                                                                                                                                        |                                                                                                                        |                                                                                                                        |
| MTTF                                         | 388 years                                                                                                                                                                                                                                         |                                                                                                                        |                                                                                                                        |
| Tightening torque                            | ≤ 20Nm                                                                                                                                                                                                                                            |                                                                                                                        |                                                                                                                        |
| Weight                                       | EL-K/H/O:<br>MB-02: 0,2kg + (L1 x 0,068kg/m)<br>MB-05: 0,3kg + (L1 x 0,068kg/m)<br>MB-05: 0,5kg + (L1 x 0,068kg/m)                                                                                                                                | EL-S:<br>MB-02: 0,2kg<br>MB-05: 0,3kg<br>MB-05: 0,5kg                                                                  |                                                                                                                        |
| Materials                                    |                                                                                                                                                                                                                                                   |                                                                                                                        |                                                                                                                        |
| Process wetted                               | PVDF, POM, PA, NBR, FPM, PE, PUR                                                                                                                                                                                                                  |                                                                                                                        |                                                                                                                        |
| Cable                                        | Breaking force > 900N<br>Bending radius > 120mm<br>Cross-section 0,22mm²<br>Resistance 90Ohm/km                                                                                                                                                   |                                                                                                                        |                                                                                                                        |

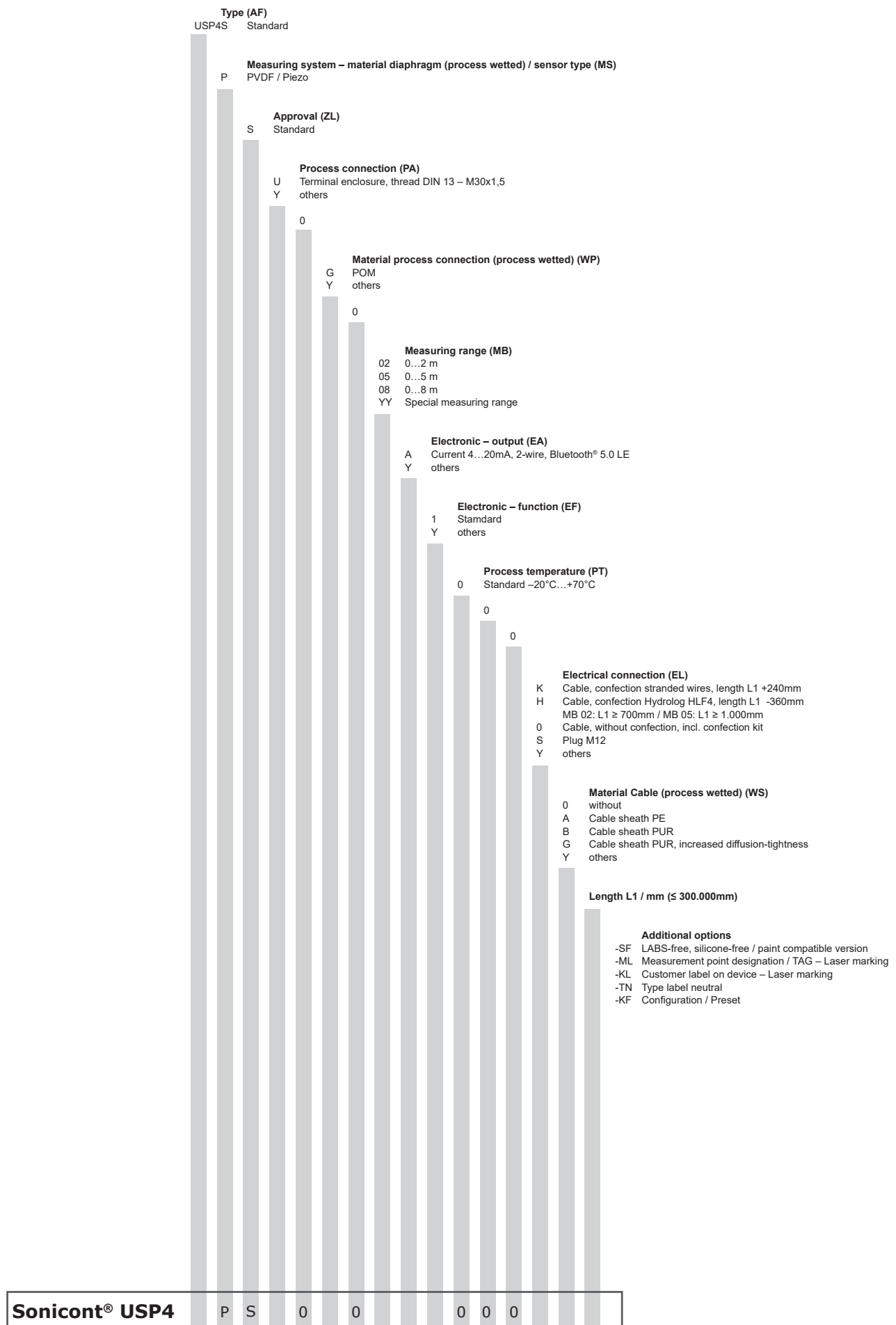
# Electrical connection



# Dimensions (mm)



## Order code







fill level



water level



pressure



temperature



flow



visualization



signal converter



sensoric



IoT-Solutions



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