# SATRON VOD Turbidity and solids sensor for food and Biopharma

**The SATRON VOD analyzer allows savings to be obtained in process industries such as:**
- **Impurities monitoring of clean water**
- **Detection of yeast after the membrane in breweries**
- **Integrity monitoring of filters**
- **Whey turibity on seperator discharge**

**The transmitter uses fully flat front process side flushing and communicates via 4...20mA and digitally using the HART® protocol.**

**Pipe to be ordered seperately**

## TECHNICAL SPECIFICATIONS

**Measuring range**
0...1 500 NTU equivalent on 1,5" pipe
0...1 000 NTU equivalent on 2" pipe
0...200 NTU equivalent on 3" pipe
0...50 NTU equivalent on 4" pipe

**Calibration**
The transmitter is factory calibrated at 4mA = water, 20mA = full asorption. freely adjustable with pushbuttons or Hart® modem.

**Damping**
Time constant adjustable 0.01 to 60 s.

**Repeatability**
0.1% from maximum span.

**Response time**
0.1s (with less than 0.1s damping)

**Accuracy**

| | |
|---|---|
| 0...50 NTU | 0.2% |
| 0....1 500 NTU | 1% |

**Unit selection**
%, NTU, FNU, FTU, mg/L, g/dm3, PPM

**Temperature limits**
Ambient: -30 to +80 °C
Display operating range: 0 to +50 °C (Does not affect operation of the transmitter)

Process N type: -5 to +100 °C (120 °C for 10min)
Process H type: -5 to +140 °C (160 °C for 30 min)
Shipping and storage: -40 to +80 °C

**Output** 3-wire (3W), 4-20 mA

**Supply voltage**
Nominal 24 VDC, (21,6 - 27,6V) 200mA

**Humidity limits** 0-100 % RH

**Pressure class:**
- PN40
- Test pressure -1 to 30 bar (-14.5 to 435 PSI)

**EMC directive 2014/30/EC**
- EN 61326-1:2013

**CONSTRUCTION**
***Materials:***
Sensing element [1]: AISI316L, Duplex (EN. 1.4462), Hast. C276/C22, or Titanium Gr2.
Surface quality: Polished Ra <0,8µm
Lens: Sapphire or Spinel ceramic
Cable Material of slave probe: PE

**Housing with display** code **N:**
Housing: AISI303/316, Seals: Nitrile-rubber and Viton®,
Nameplates: Polyester

**Housing without display** code **H:**
Housing: AISI303/316, Seals: Viton® and NBR.
Nameplates: Polyester

**Connection hose between sensing element and housing** code **L:**
PVC signal cable or hose protected with PTFE/AISI316 braiding
Nameplates: Polyester

**Electrical connections**
Housing without display code **H:**
1x M12 plug connector

Housing with display, code **N**:
2x M12 plug connector

**I/O-connections**

| | |
|---|---|
| Current output1 | Turbidity active |
| Range (Namur NE 043) | 3.5...23 mA |
| Maximum load | 600 Ω |
| Factory setting | 4...20 mA |

Switch outputs (up to 3 available)

| | |
|---|---|
| Relay, grounding contact | |
| Maximum voltage | 35 V |
| Maximum current | 50 mA |
| Maximum leakage current | 10 µA |

Switch inputs (up to 3 available)

| | |
|---|---|
| NC (no connection) | OFF |
| 0...2 V | ON |
| Minimum values for switch in use | |
| Voltage | 16 V |
| Current | 4 mA |
| Leakage current | 1 mA |

Current output2
Internal power supply
Current output 2 has same ground as binary IO

| | |
|---|---|
| Maximum load | 400 Ω |
| Range | 3.5...23 mA |
| Factory setting | 4...20 mA |

External power supply
Current output 2 is galvanically isolated

| | |
|---|---|
| Maximum supply voltage | 35 VDC |
| Range | 3.5...23 mA |
| Factory setting | 4...20 mA |
| Maximum isolation voltage | 100 VDC |

**Process connections of the sensor**
- Tuchenhangen Type "N"

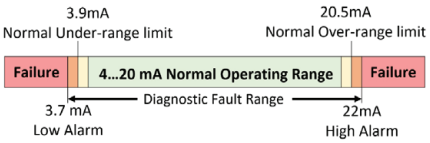
**Protection class:** IP66, IP67 See Selection chart.

**Weight**

| | |
|---|---|
| Housing without **(H)**: | 1 kg |
| Housing with Display **(N)**: | 1.3 kg |
| Remote Housing (**L**)**:** | 2.5 kg |

Min. load using HART®-communication 250 Ω

Output signal according to NAMUR NE043 Signal Level for the failure information of Digital Transmitters.




**UL 61010-1, 3rd Ed. Rev May 11. 2012**
**CAN/CSA C22.2 No. 61010-1-12, Ed. 3**
**EMC directive 2014/30/EC**
- EN 61326-1:2013

[1] Parts in contact with process medium compliant to FDA

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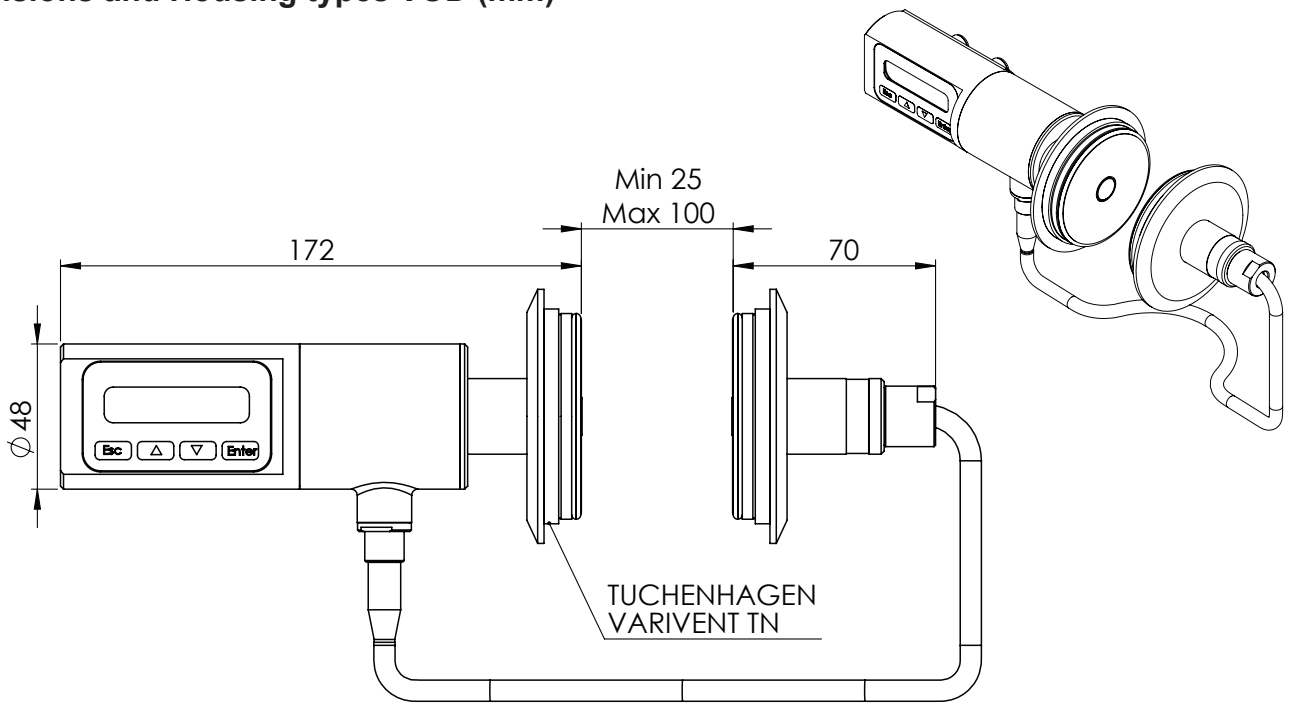
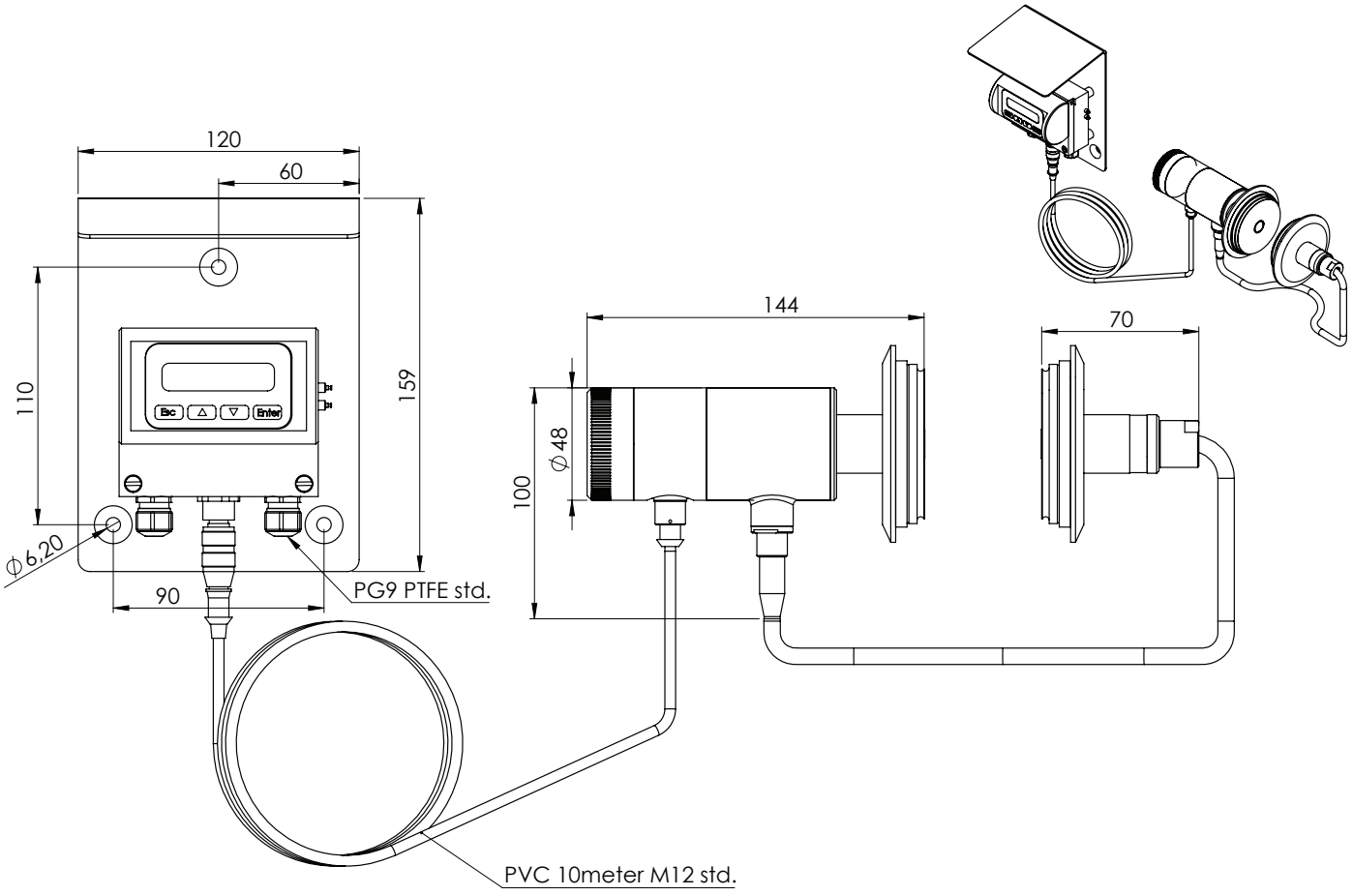
## Dimensions and Housing types VOD (mm)




**VOD with display and pushbuttons (N housing)**




**VOD with remote electronics housing with display (L housing)**

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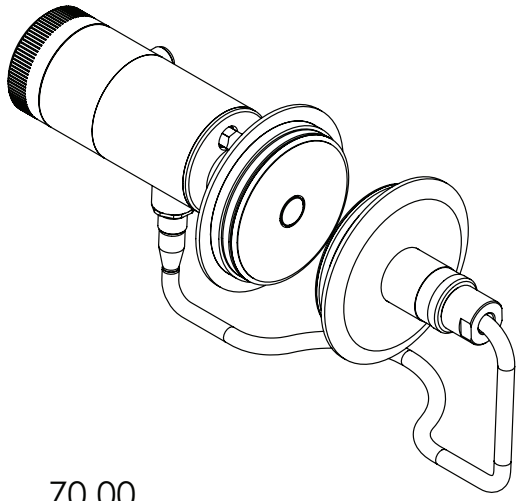

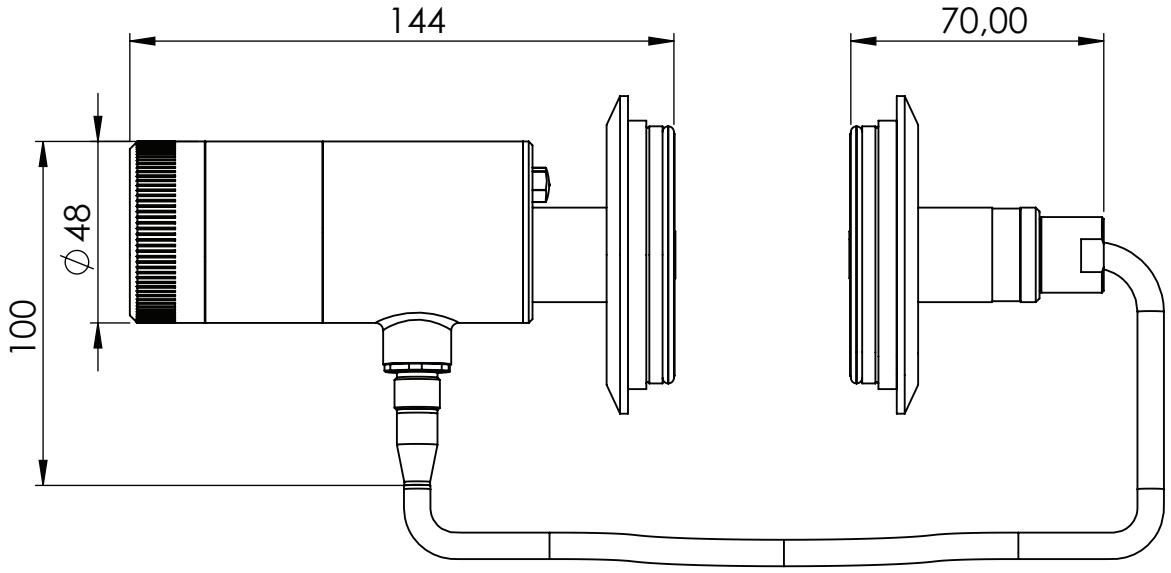


**VOD with no display (H-housing)**

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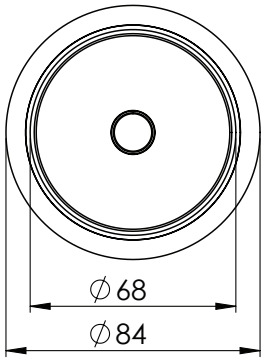
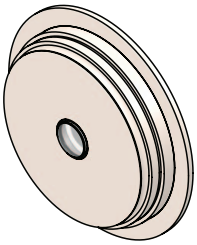
## Process connection details

The Satron VOD is equiped with a VARLININE process connection TYPE N.

Several pipe diameters are commersially available. Change of pipe will require a recalibration of the sensor.

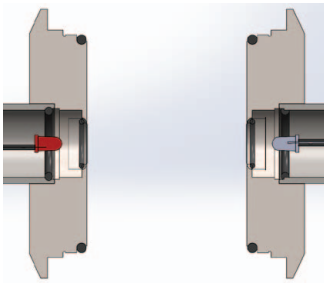


**TN**

## VOD measurement principle:

Turbidity measurment according absorption with selectable wavelenth LED lightsources (see selection chart). The LED (in red) sends light through the process and is received by the photodectector (in grey). Depending on the turbidity the amount of light received by the photodectector will change.The lifetime for the optical LED and photodetectors is 20 years minimum.



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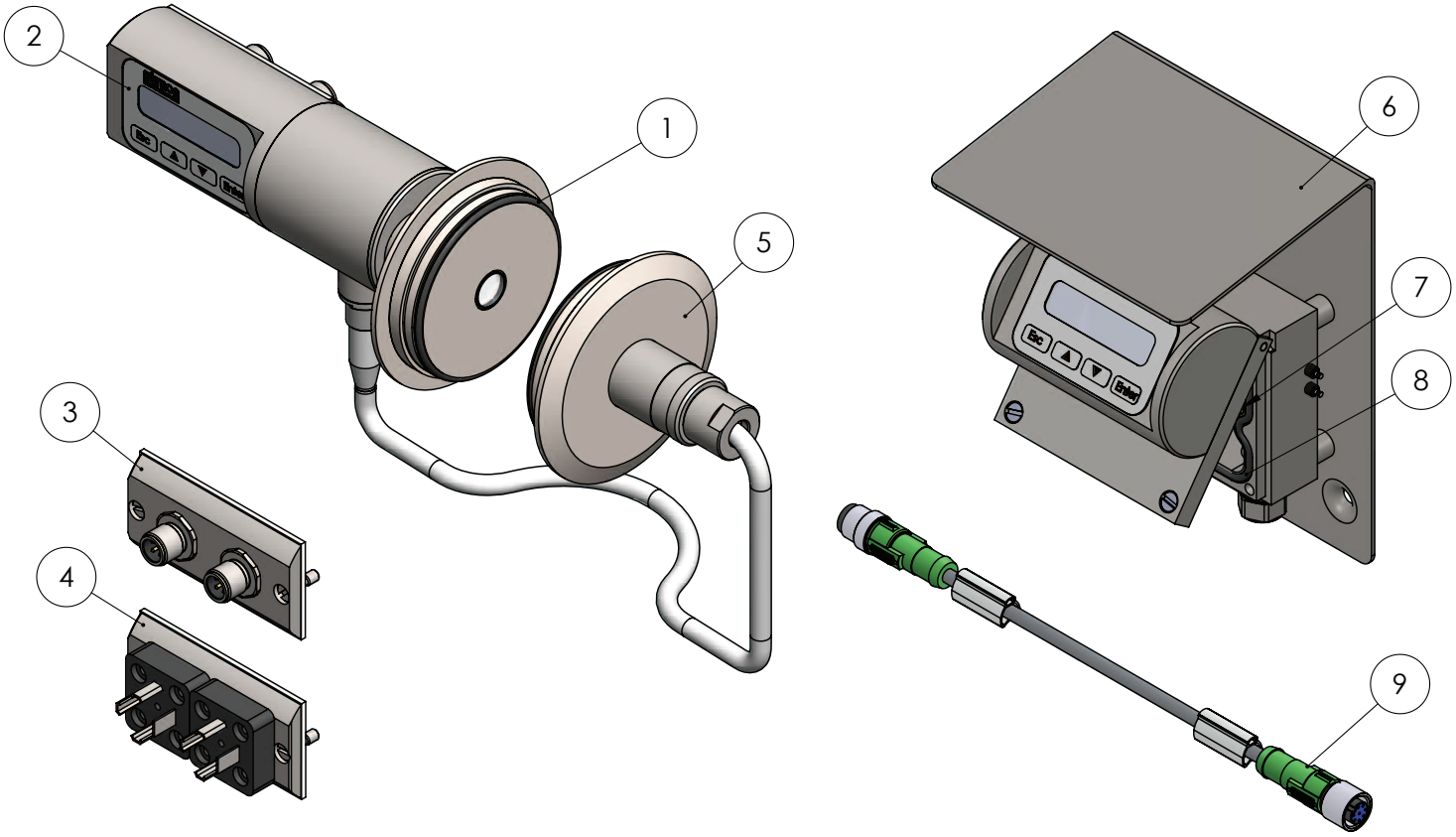
## Spare-parts VOD




| No. | Part name | Order code | Note | |
|---|---|---|---|---|
| 1 | O-ring EPDM | 80036203 | 3A 18-03 Class **II** | (Do not exceed above 8% fat content). |
| 1 | O-ring FPM | 80016203 | 3A 18-03 Class **I** | |
| 1 | O-ring FFPM(Kalrez®) | 80046203 | 3A 18-03 Class **I** | |
| 2 | Sticker | T1325215 | | |
| 3 | Plug cover M12 | T1325031 | | |
| 4 | Plug cover DIN43650 | T1325003-K48 | | |
| 5 | Slave probe | T1325012-xxx-TN | Contact satron | |
| 6 | Remote Display Unit RDU | T13250016 | | |
| 7 | FUSE for L-Housing | 74212000 | | |
| 8 | Seal for L-Housing display | 80017226 | | |
| 9 | L-Housing data cable 10m PVC | 70000450 | | |
| 9 | L-Housing data cable 15m PUR | 70000440 | | |

# SATRON VOD Turbidity and solids sensor for food and Biopharma

## Selection Chart

| Adjustability | Span, min | Span, max |
|---|---|---|
| VOD with a 1,5" pipe | 0...200 NTU | 0...1 500 NTU |
| VOD with a 2" pipe | 0...50 NTU | 0...500 NTU |
| VOD with a 3" pipe | 0...30 NTU | 0...200 NTU |
| VOD with a 4" pipe | 0...10 NTU | 0...50 NTU |

**Process temperature limits**
- **N** Normal version -5...+100 °C continuous (120 °C for 10 minutes)
- **H**(**) High temperature -5...+140 °C continuous (160 °C for 30 minutes)

**Output**
- **S** 4-20mA DC/HART® for 50Hz (Europe)
- **J** 4-20mA DC/HART® for 60Hz (USA / Japan)

**Material of wetted parts**

| Body | | Lens | | Seal | | 3A 18-03 |
|---|---|---|---|---|---|---|
| **2** | AISI316L | **2** | Sapphire | **1**(***) | EPDM | Class **II** |
| **3** | Hast. C 276 | **4** | Spinel | **2** | FPM (Viton®) | Class **I** |
| **6** | Titanium Gr2 | | | **3** | FFPM (Kalrez®) | Class **I** |
| **8** | Duplex (EN 1.4462) | | | **4** (*) | PTFE (Teflon) | |
| **9** | Peek | | | | | |

**Housing type**
- **N** Housing with display and pushbuttons
- **H** Housing with, no display, (only one mA output)
- **L** Remote electronics housing with display

**Probe type**
- **0** No remote probe

**Connection type**
- **T** M12, IP67
- **V** PG9 (always with L housing), IP66

**Cable Material**
- **2**(*) AISI316L braided PTFE hose.
- **3** Steel reinforced PUR hose.
- **4** PE / PVC cable (std.)

**Cable length (L HOUSING)**
- **0** No L option selected
- **1** 5 M.
- **2** 10 M. (PVC std.)
- **3** 15 M.
- **4** 20 M.

**Light source**
- **2** 265nm
- **3** 590nm
- **6** 640nm
- **7** 880nm
- **8** 950nm
- **9** IR+

**Sensor process connections**
- **TN** Tuchenhagen "N" type DN50

| | | | | | | | | | | | / | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Documentation**

**Calibration certificate** **AE** English

**Installation and operating instructions** **IE** English **IF** Finnish **FR** French

**Material certificates**
- **0** No material certificate
- **MC1** Raw material certificate without appendices, in accordance with SFS-EN 10204-2.1 (DIN 50049-2.1) standard
- **MC2** Raw material certificate for wetted parts, in accordance with SFS-EN 10204-2.2 (DIN 50049-2.2) standard
- **MC3** Raw material certificate for wetted parts, in accordance with SFS-EN 10204-3.1 B (DIN 50049-3.1 B) standard

* Not EHEDG certified & Not within the 3A approval
** Only in combination with Quartz, Sapphire lens and Kalrez Seals. And only 880nm
*** Do not exceed above 8% fat content.

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*We reserve the right for technical modifications without prior notice.*



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