The intelligent transmitter 244LD LevelStar is designed to perform continuous measurements for liquid level, interface or density of liquids in the process of all industrial applications. The measurement is based on the proven Archimedes buoyancy principle and thus extremely robust and durable. Measuring values can be transferred analog and digital. Digital communication facilitates complete operation and configuration via PC or control system. Despite extreme temperatures, high process pressure, and corrosive liquids, the 244LD measures with consistent reliability and high precision. It is approved for installations in contact with explosive atmospheres. The 244LD combines our abundant experience with most advanced digital technology.

FEATURES

- HART Communication, 4 to 20 mA, or Foundation Fieldbus
- Configuration via FDT-DTM
- Multilingual full text graphic LCD
- IR communication as a standard
- Easy adaptation to the measuring point without calibration at the workshop
- Linear or customized characteristic
- 32 points linearization for volumetric measurement
- Approved for SIL 2 applications (at HART)
- Back documentation of measuring point
- Continuous self diagnostics, Status, and diagnostic messages
- Configurable safety value
- Local display in %, mA, or physical units
- Process temperature from –196 °C to +500 °C
- Materials for use with aggressive media
- Micro sinter metal sensor technology

Equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising from the use of this material.
Supply via power supply unit with communication; Ex

Further supply circuits see Master Instruction document.

CONNECTIONS, OPERATIONAL ELEMENTS

- 22 Cover for terminal compartment
- 24 Security lock, for Ex d version
- 38 Cable gland (for cable Ø 6 to 12 mm)
- 39 Plug
- 50 Overvoltage protection (if present)

Direct supply with communication; not Ex

- 45 Terminal “+” wire cross-section up
- 46 Terminal “-“ section up
- 47 Ground Terminal to 2.5 mm²
- 48 External ground connection
- 22 Cover for terminal compartment

FDT-DTM: Configuration

Direct supply with communication; not Ex

Further supply circuits see Master Instruction document.

CONNECTIONS, OPERATIONAL ELEMENTS

- 22 Cover for terminal compartment
- 24 Security lock, for Ex d version
- 38 Cable gland (for cable Ø 6 to 12 mm)
- 39 Plug
- 50 Overvoltage protection (if present)
TECHNICAL DATA

Data refer to the sensor material Type 316L (1.4404)
Explosion protection certificates must be observed!

Input / Output

Measuring ranges ....... 50 mm to 50 m, upper and lower range value continuously adjustable
Standard lengths of
Displacer (204DE) ....... 350 to 3000 mm, 14 to 120 in; further lengths on request
Weight of displacer 1) .... max. 25 N
Measuring span ......... 2 to 20 N contin. adjustable (to 1 N on request)
Span ratio
Turn-down .......... 1:1 to 1:10 (1:20 on request)
Accuracy 2) ............ ± 0.2 % at Level, Density and Interface measurement. Increased accuracy with customized adjustment.
Transfer function ....... linear or customized with up to 32 set points

Configuration
- with FDT-DTM per HART protocol
- via 2-wire connection 4-20 mA
- via IR communication
- with multi-lingual, full graphic LCD display with %, mA, physical units and 2 from the outside-to-use buttons
Load .................. \( R_{\text{bmax}} = (U_s - 12 \text{ V}) / 23 \text{ mA} \)

Communication FOUNDATION Fieldbus H1
Connection ............... twisted and shielded two wire cable acc. to recommendation based on IEC 1158-2
Supply voltage \( U_s \) ........... 9 to 32 V DC 3), \( V_{pp} \leq 1 \%
Operating current ......... 10.5 mA ± 0.5 mA (base current)
Digital communication .... FF specification ITK Profile 6, Link-Master (LAS), function blocks 2AI, PID, IS, OS, AR
Signal amplitude ........ ± 8 mA
Fault current ............ ≤ 13 mA
Operating values .........according to IEC 1158-2
Bus connection ............Fieldbus interface based on IEC 1158-2
Power supply ............ Power supply is achieved dependent on the application by means of segment coupler
File ..................... The actual file can be downloaded from our homepage

Configuration
Software ................. National Instruments NI-FBUS Configurator
Hardware ................. FBUS interfaces from National Instruments (USB-FBUS and PCMCIA-FBUS)
Control systems .......... FOUNDATION Fieldbus H1 compatible

Failure handling
Substitute value ......... last value or safety value
Safety value .......... adjustable –110 to 110 % of out Reset substitute value ....... automatically or manual

Communication HART
Connection .................. Two-wire system
Supply voltage \( U_s \) 4) ....... > 12 V + \( R_b \)’0.025 A
- \( R_b \) is the total burden resistor for lines, HART measurement resistor and communication.
Current sink .............. max. 24 mA
Signal range ............. 4 to 20 mA
Operating range .......... 3.8 to 20.5 mA (acc. NE 43)
Critical error alarms in the
2-wire Communication .... < 3.6 mA and > 21 mA
HART Protocol
- 2-wire ............. 1200 Baud, HART compliant
- IR communication ....... 19200 Baud
Communication Hardware
- Hand terminal .......... HT 375/475
- PC Software .......... WIN xx and FDT/DTM

Operating conditions 5)
Process temperature ....... –196 °C to 500 °C
Pressure rating
acc. to DIN ............... PN 16, 40, 63, 100, 160, 250
acc. to ANSI ............... Class 150, 300, 600, 900, 1500
Ambient temperature 6) 7) ....... –40 °C to 80 °C
Relative humidity .......... up to 100 %
Condensation ............... permitted
Transportation-
storage temperature ...... –40 °C to 85 °C
Protection ............... IP 66 (acc. DIN 40 050)
The device can be operated at a class D2 location in accordance with DIN IEC 654, part 1.

Operation condition effects
Ambient temperature .......... –10 °C ... +70 °C
Zero ..................... < 0.1 % / 10 K 9)
Span ..................... < 0.07 % / 10 K
Total
\( 9) \) \( 1 \) \( \frac{\text{max. span}}{\text{adjusted span}} \pm 0.07 \) \( \frac{\text{Measured value}}{\text{adjusted span}} \) % / 10 K
(sp. = measuring span)
\(< –10 ^\circ \text{C} / > +70 ^\circ \text{C} \) ....... twice the value
Process temperature .......... < 0.1 % / 10 K 9)
Operating pressure .......... no influence (vacuum resistant)

Transitional behavior
Dynamic behavior
Damping (90 %-time) ........ 0 to 32 s
Switch-on time .............. 7 s
Step response (63 %-time)
with damping 9 s .......... 250 ms
Update rate ..................10 / s
Long term stability .......... < 0.2 % / 6 months at 20 °C 9)
Noise suppression
Common mode voltage ........ < AC 250 V e
Common mode rejection .... 120 dB
Series mode rejection .... 50 dB
Filter ..................... Smart Smoothing

1) For measurement of interface or density:
weight 25 N + buoyant force at lowest density
2) Accuracy acc. ANSI / ISA - 551.1 - 1979
3) With explosionproof device 9 to 24 V DC
4) \( U_s \) (max) with explosionproof device < 30 V, otherwise < 42 V
5) Not with all materials - see Table of Comparison of Materials page 6
6) Ambient temperature must not exceed 50 °C at measuring module housing, when process medium or heating of medium exceed 300 °C
7) –50 °C on request
8) Display not readable at T < –20 °C or T > 70 °C
9) For max. measuring span
Material, Pressure Rating & Contact Face, Mounting Direction
see Model Codes

Material Amplifier housing . . . . Aluminum
(Alloy No. GD-Al Si 12), Polyurethane coated, or Stainless Steel

For Sour Gas applications acc. to NACE Standard MR-0175 or MR-0103:
Wafer body . . . . . . . . . . . . 316L (1.4404)
Torque tube . . . . . . . . . . .  Hastelloy C276 or C4 or Inconel 600

The material of the seal at the Torque tube bearing corresponds to the material of the head piece.

Mounting
Mounting method . . . . . . . . . Sandwich mounted
acc. to DIN . . . . . . . . . . . .  DN 80, DN 100
acc. to ANSI . . . . . . . . . . .  3 inch, 4 inch

Note: Always follow the RH or LH version! See the picture below. The device can’t be used ‘upside down’! All internal parts are mounted and calibrated in inverse manner. The conversion can be performed only by the manufacturer or a contractual partner. Otherwise calibration and pressure test are invalid.

Weight
Transmitter . . . . . . . . see table page 7
Displacer . . . . . . . . . . . see table page 10

244LD LevelStar versions ...
... for Left Hand (LH) or Right Hand (RH) mounting

Electrical connection
Cable entry thread . . . . . . M20x1.5 or 1/2-14 NPT
Cable gland and screwed sealing plug have to be ordered separately under model code BUSG ...
For equipment in Ex d version, 1 screwed sealing plug made of stainless steel is included in delivery.
Screw terminals . . . . . . . . . wire cross-section up to 2.5 mm²
Test sockets . . . . . . . . . . . Ø 2 mm

Electromagnetic compatibility EMC
Operating conditions . . . . industrial environment
Immunity according to
EN 61326 (3/2002) . . . . fulfilled
Emission according to
EN 55011, May 2000,
Group 1, Class A . . . . . . fulfilled
EN 50081-2 . . . . . . fulfilled
NAMUR recommendation NE 21 Status Aug.1998 fulfilled

SAFETY REQUIREMENTS
CE Label
Electromagnetic compatibility . . . . . 2004/108/EC fulfilled
Explosion protection acc. to ATEX . . . 2014/34/EU

Safety
According to EN 61010-1
(resp. IEC 1010-1) . . . . . . safety class III
Internal fuses . . . . . . . . . . . none (or not replaceable by customer)
External fuses . . . . . . . . . . . Limitation of power supplies for fire protection have to be observed due to EN 61010-1, appendix F (resp. IEC 1010-1).
**Electrical classification ATEX**

With appropriate order only.
National requirements have to be observed.

### Intrinsic safe:

<table>
<thead>
<tr>
<th>AID 421</th>
<th>II 1/2 G Ex d ib/ia IIC/IIB T4/T6</th>
<th>PTB 04 ATEX 2011X</th>
<th>Zone 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>AID 421</td>
<td>II 2 G Ex d ib/ia IIC/IIB T4/T6</td>
<td>PTB 04 ATEX 2011X</td>
<td>Zone 1</td>
</tr>
</tbody>
</table>

### Explosion proof:

<table>
<thead>
<tr>
<th>AD 432</th>
<th>II 1/2 G Ex da/db IIB/IIC T4/T6</th>
<th>PTB 02 ATEX 1025 X</th>
<th>Zone 0</th>
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</thead>
<tbody>
<tr>
<td>AD 432</td>
<td>II 2 G Ex da/db IIB/IIC T4/T6</td>
<td>PTB 02 ATEX 1025 X</td>
<td>Zone 1</td>
</tr>
</tbody>
</table>

**Zone 2:**

Manufacturer’s Declaration

**Further certificates** see also our website.

- FM
- CSA
- NEPSI
- Russia
- Kazakhstan

---

*Version with heating jacket; sandwich-mounted between displacer chamber 204DC and cover flange 204BCF, with displacer 204DE*
## Comparison of Material

<table>
<thead>
<tr>
<th>Code</th>
<th>MNr</th>
<th>DIN</th>
<th>Remarks</th>
<th>Equivalent to</th>
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<tbody>
<tr>
<td>P235G1TH</td>
<td>1.0305 1.0345</td>
<td>EN 10 216-2</td>
<td>VdTUV - Wbl. 457</td>
<td>ASTM A 106 A</td>
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<tr>
<td>P235GH</td>
<td>1.0460</td>
<td>EN 10 273</td>
<td>VdTUV - Wbl. 350/3</td>
<td>ASTM A 105</td>
</tr>
<tr>
<td>X6 CrNiMo17 12 2</td>
<td>1.4571</td>
<td>DIN EN 10088-3</td>
<td>VdTUV - Wbl. 411</td>
<td>AISI 316Ti</td>
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<tr>
<td>X2 CrNiMo 17 12 2</td>
<td>1.4404</td>
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<td>VdTUV - Wbl. 411</td>
<td>AISI 316L</td>
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<tr>
<td>X2 CrNiMo 18 14 3</td>
<td>1.4435</td>
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<tr>
<td>X3 CrNiMo 17 13 3</td>
<td>1.4436</td>
<td></td>
<td>VdTUV - Wbl. 411</td>
<td></td>
</tr>
<tr>
<td>NiMo 16 Cr 15 W</td>
<td>2.4819</td>
<td>17 744</td>
<td>equal to Hastelloy C276 VdTUV - Wbl. 400</td>
<td>UNS N10276</td>
</tr>
<tr>
<td>NiCr 15 Fe</td>
<td>2.4816</td>
<td>17 742</td>
<td>Inconel 600 VdTUV - Wbl. 305</td>
<td>UNS N06600</td>
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<tr>
<td>NiCr 22 Mo 9 Nb</td>
<td>2.4856</td>
<td>17 744</td>
<td>Inconel 625 VdTUV 499</td>
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<tr>
<td>NiCr 21 Mo</td>
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<td>X2 CrNiMoN 22 5 3</td>
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<tr>
<td>GD - AlSi 12</td>
<td>3.2582 06</td>
<td>17 007-4</td>
<td>Al – Die-casting</td>
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</table>

### Service Limits of wafer body PN 250 made of (material)

Max. operating pressure in bar at temperature in °C

#### 1.0460

<table>
<thead>
<tr>
<th>°C</th>
<th>-10 to 120</th>
<th>200</th>
<th>250</th>
<th>300</th>
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<td>200</td>
<td>175</td>
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<tr>
<td>bar</td>
<td>231</td>
<td>219</td>
<td>206</td>
<td>180</td>
<td>145</td>
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#### 1.4435 / 1.4571

<table>
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<th>-196 to 10</th>
<th>-10 to +50</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>DIN</th>
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</thead>
<tbody>
<tr>
<td>bar</td>
<td>250</td>
<td>250</td>
<td>230</td>
<td>200</td>
<td>177</td>
<td>162</td>
<td>148</td>
<td></td>
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<tr>
<td>bar</td>
<td>248</td>
<td>248</td>
<td>211</td>
<td>178</td>
<td>158</td>
<td>145</td>
<td>138</td>
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#### 1.4462

<table>
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<th>-10 to 50</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
<th>260</th>
<th>DIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>bar</td>
<td>250</td>
<td>225</td>
<td>209</td>
<td>194</td>
<td>184</td>
<td>178</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bar</td>
<td>260</td>
<td>234</td>
<td>218</td>
<td>201</td>
<td>191</td>
<td>185</td>
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<td>ANSI</td>
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#### Inconel 625

<table>
<thead>
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<th>°C</th>
<th>-196 to 50</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>450</th>
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<th>DIN</th>
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<td>250</td>
<td>230</td>
<td>210</td>
<td>197</td>
<td>184</td>
<td>177</td>
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<td>255</td>
<td>234</td>
<td>214</td>
<td>201</td>
<td>187</td>
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#### Inconel 825

<table>
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<th>-10 to 50</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>450</th>
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<th>DIN</th>
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<td>bar</td>
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<td>187</td>
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<td>171</td>
<td>165</td>
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#### Hastelloy C (2.4610 / 2.4819 / 2.4602)

<table>
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<th>50</th>
<th>100</th>
<th>200</th>
<th>300</th>
<th>400</th>
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<th>DIN</th>
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</thead>
<tbody>
<tr>
<td>bar</td>
<td>250</td>
<td>250</td>
<td>233</td>
<td>209</td>
<td>200</td>
<td>184</td>
<td></td>
<td></td>
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<tr>
<td>bar</td>
<td>260</td>
<td>260</td>
<td>243</td>
<td>217</td>
<td>209</td>
<td>192</td>
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<td>ANSI</td>
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</table>

### Table of weights

<table>
<thead>
<tr>
<th>Transmitter</th>
<th>Weight [kg]</th>
<th>DIN PN</th>
<th>ANSI Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 80 / 3 inch</td>
<td>12.5</td>
<td>150</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>12.5</td>
<td>300 / 600</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>12.5</td>
<td>900</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>150 RF</td>
<td>1500</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>150 RJF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 100 / 4 inch</td>
<td>13.5</td>
<td>150</td>
<td>13.5</td>
</tr>
<tr>
<td></td>
<td>13.5</td>
<td>300 / 600</td>
<td>13.5</td>
</tr>
<tr>
<td></td>
<td>13.5</td>
<td>900</td>
<td>13.5</td>
</tr>
<tr>
<td></td>
<td>150 RF</td>
<td>1500</td>
<td>18.5</td>
</tr>
<tr>
<td></td>
<td>150 RJF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Intelligent Buoyancy Transmitter 244LD with Torque Tube

**Wafer Body Material (Process wetted):**
- 1.0460 (~A 105 Carbon Steel), application from –10° C to 350° C .................. -K
- 1.4404 (316L) or 1.4435 if Pressure Rating codes H1 and H2 are selected, application from –60 °C to 400 °C ........................................ -S
- 1.4404 (316L) or 1.4435 if Pressure Rating codes H1 and H2 are selected, application from –196 °C to 400 °C ...................................... -U
- 1.4404 (316L) or 1.4435 if Pressure Rating codes H1 and H2 are selected, application from –60 °C to 500 °C (only with Option -4) ............................................................. -T
- 1.4541 (321), application from –60 °C to 400 °C ................................. -H
- 1.4541 (321), application from –196 °C to 400 °C .............................. -Q
- 1.4541 (321), application from –60 °C to 500 °C ............................... -J
- 1.4462 (Duplex), application from –10 °C to 280 °C (only with Option -4) ............................................................. -N
- 2.4856 (Inconel 625), application from –196 °C to 450°C (only with Option -4) ............................................................. -R
- 2.4858 (Inconel 625), application from –10 °C to 450°C (only with Option -4) (on request) .................................................. -I
- 2.4819 (Hastelloy C276), appl. from –196 °C to 400° C (only with Option -4) ............................................................. -C

**Torque Tube Material (Process wetted):**
- 1.4404 (316L) ................................................................. S
- Hastelloy C276 ........................................................................... X
- Hastelloy C4 (on request) ......................................................... Y
- 2.4816 (Inconel 600) .............................................................. I
- 2.4375 (Monel K500) ............................................................. M

**Wafer Body Flange Size (Nominal size):**
- DN 70 (available with Wafer Body Material S, U, T, and Torque Tube Material S and C) ......................................................... 0
- DN 80 ...................................................................................... 1
- DN 100 ..................................................................................... 2
- 3 inch ....................................................................................... 3
- 4 inch ....................................................................................... 4

(continued on next page)
**Wafer Body Pressure Rating & Contact Face**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Contact Face Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PN400 (PN16 to PN250)</td>
<td>L/L (Lens Face / Lens Face)</td>
<td>H2</td>
</tr>
<tr>
<td>PN500 (PN16 to PN250)</td>
<td>L/L (Lens Face / Lens Face)</td>
<td>H1</td>
</tr>
<tr>
<td>ANSI Class 150</td>
<td>RF/RF (Raised Face / Raised Face)</td>
<td>R2</td>
</tr>
<tr>
<td>ANSI Class 1500</td>
<td>RF/RF (Raised Face / Raised Face)</td>
<td>R3</td>
</tr>
<tr>
<td>ANSI Class 150</td>
<td>SF/SF (Smooth Finish / Smooth Finish)</td>
<td>S2</td>
</tr>
<tr>
<td>ANSI Class 1500</td>
<td>SF/SF (Smooth Finish / Smooth Finish)</td>
<td>S3</td>
</tr>
<tr>
<td>ANSI Class 150</td>
<td>RJF/RJF</td>
<td>J2</td>
</tr>
<tr>
<td>ANSI Class 1500</td>
<td>RJF/RJF</td>
<td>J3</td>
</tr>
<tr>
<td>ANSI Class 300</td>
<td>RF/LF (Large Female / Large Female)</td>
<td>LM</td>
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<tr>
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<td>RF/LG (Large Groove / Large Tongue)</td>
<td>LG</td>
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<td>SG/ST (Small Groove / Small Tongue)</td>
<td>ST</td>
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<td>SG/LG (Small Groove / Small Tongue)</td>
<td>LG</td>
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<td>SG/LG (Small Groove / Small Tongue)</td>
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</table>

**Wafer Body Mounting Direction: (Amplifier to body)**

<table>
<thead>
<tr>
<th>Mounting Direction</th>
<th>Code</th>
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<tbody>
<tr>
<td>Right Hand mounted</td>
<td>R1</td>
</tr>
<tr>
<td>Left Hand mounted</td>
<td>L1</td>
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</table>

*On top*
### MODEL CODES 244LD LevelStar (continued)

#### Version:
- Base VERSION - LEVELSTAR - (244LD) .......................................................... (f)(v) ...................... N
- Base (N) LEVELSTAR + Displacer (244LD + 204DE) ................................................. (f)(v) ...................... T
- Base (N) LEVELSTAR + Displacer + Displacer Chamber + Flange combination + Flange (244LD + 204DE + 204DC + 204FK + 204BCF) .................................. (f)(v)(h) .................... D

#### Cable Entry:
- M20x1.5 without cable gland ................................................................................................. M
- 1/2-14 NPT without cable gland ................................................................................................. N

#### Communication:
- HART................................................................................................................................................ H
- PROFIBUS-PA (on request) ........................................................................................................... P
- FOUNDATION Fieldbus H1 .......................................................................................... (aa) ................. B

#### Electrical Classification:
- ATEX intrinsic safe Zone 0, IIC T4 (HART) ................................................................. (d) .................. 0C4
- ATEX intrinsic safe Zone 0, IIC T6 (HART or FOUNDATION Fieldbus) .......... (d) .................. 0C6
- ATEX intrinsic safe Zone 1, IIC T4 (HART) ................................................................. 1C4
- ATEX intrinsic safe Zone 1, IIC T6 (HART or FOUNDATION Fieldbus) .......... 1C6
- ATEX intrinsic safe Zone 2, IIC T4(HART) ................................................................. 2C4
- ATEX intrinsic safe Zone 2, IIC T6 (FOUNDATION Fieldbus) Zone 2, IIC T6 (HART) VERSION N, T, D ........................................ (c) .................. 2C6
- ATEX explosionproof Zone 0, IIC T6................................................................................. (d) .................. D0C
- ATEX explosionproof Zone 1, IIC T6.................................................................................. D1C
- FM Explosionproof ............................................................................................................. FDZ
- CSA Explosionproof ............................................................................................................ CDZ
- FM Intrinsically Safe (HART) (FOUNDATION Fieldbus) .................................................. (c) .................. FAA
- EAC Intrinsically Safe Zone 0 - IIC T6.............................................................................. (x)(z) ................. GA0
- EAC Intrinsically Safe Zone 1 - IIC T6.............................................................................. (x) .................. GA1
- EAC Intrinsically Safe Zone 2 - IIC T6.............................................................................. (x) .................. GA2
- EAC Explosionproof Zone 0 - IIC T6................................................................................. (x)(z) ................. GD0
- EAC Explosionproof Zone 1 - IIC T6.................................................................................. (x) .................. GD1
- NEPSI Intrinsically Safe, Ex d ia IIB/IIC T4/T6 Ga/Gb or Ex d ia IIB/IIC T4/T6 Gb ............ NA6
- NEPSI Explosionproof, Ex d IIB/IIC T4/T6 Gb ..................................................................... NDZ
- BRAZIL Intrinsically Safe, Ex db/ia IIC T6/T4 Gb/Ga .................................................. BA6
- BRAZIL Explosionproof, Ex db/ia IIC T6/T4 Gb ............................................................... BDZ
- For General Purpose Areas; without certification ................................................................. ZZZ

(continued on next page)
# OPTIONS:

- Housing Complete Stainless Steel: (H)
- External Push buttons for Maintenance: (M)
- Stainless Steel Label Fixed with Wire: (L)

### Certificates

- EN 10204-2.1, Certificate of Compliance: (1)
- EN 10204-2.2, Specific Test Report (Calibration): (2)
- EN 10204-3.1, Inspection Certificate of Process Wetted Material: (3)
- PED 97/23/EC additional unit verification, acc. to module F/G: (4)
- Comply with NACE Standard MR-0175, not with Wafer Material K (carbon steel): (6)
- SIL 2 Certificate: (Q)

### Material Test

- X-Ray or Isotope Test for Weldings: (7)
- Dye Penetration Test: (8)
- PMI-Test: (5)

### Subassemblies

- TRANSSTAR-housing with LEVELSTAR-electronic for selected code (244LD-*********-N): (af)
- Torque Tube for selected code (244LD-*********-W): (ab)
- Amplifier for selected code (244LD-*********-X): (ac)
- Complete Sensor for selected code (244LD-*********-Y): (ad)
- Wafer body for selected code (244LD-*********-Z): (p)

(a) Available with Wafer Body Flange Size 1 or 2
(b) Available with Wafer Body Flange Size 3 or 4
(c) Pending
(d) Not available with Wafer Body Pressure Rating & Contact Face codes L1, J1, J2, J3, H1, H2, and DD
(e) Not available with Electrical Classification FDZ, CDZ, 0C6, D0C, D1C, GDZ, NDZ or Optional Features -H
(f) Only with Communication H (HART) and electrical Classification 0C6, 1C6, 0C6, D1C, 2C6
(g) Pending
(h) Pending, order separately at this time
(i) Available with Wafer Body Flange Size 0
(j) Available with Wafer Body Flange Size 1
(k) Available with Wafer Body Flange Size 1
(l) Wafer Body Flange Size code 3 available only with Wafer Body Pressure Rating code R2, S2, J2
(m) Wafer Body Flange Size code 4 available only with Wafer Body Pressure Rating code R1, S1, J1, GT, GG
(n) Available with Wafer Body Material codes S, U, T, or Torque Tube Material codes S, C
(o) Available with Wafer Body Material codes S, U, T
(p) On request
(q) Only available with HART communication
(r) D at top
(s) F at top
(u) Not applicable with Version N, T, D
(v) Pending Electrical Classification FDZ, CDZ, GA6, GDZ, NA6, NDZ, BA6, BDZ
(w) Version N, T, D with external Pushbuttons
(x) Available with version N, T, D
(y) Not with Options -H and Version B, S or C
(z) Not with Pressure Rating H1 or H2
(aa) Levelstar with Electrical Classification D1C, D0C, 1C6, 0C6, 2C6, ZZZ
(ab) Not with (Optional feature H, R, B, L, F, V, 9, K, A, G, 2, 4, Q, X, Y, or Z)
(ac) Not with (Optional feature H, R, B, V, 9, K, A, G, 2, 3, 4, 6, Q, 7, 8, 5, W, Y, or Z)
(ad) Not with (Optional feature H, R, B, L, F, V, 9, K, A, G, 2, 3, 4, 6, Q, 7, 8, 5, W, X, X, or Z)
(ae) PED required for Wafer Body Pressure Rating & Contact Face H1, H2
(ped) PED required for Wafer Body Material A, H, J, Q, R, T, C, N
(ped) PED not available for Optional Feature X, Y, W
(afi) Not with (Optional features: M, R, B, V, 9, K, A, G, 2, 3, 4, 6, Q, 7, 8, 5, W, X, Y, or Z)
(agi) Not with FF communication
(ah) Only with Option N and Version N, T, D
**DISPLACER 204DE**

Typical Dimensions and Weights for Density Ranges $\Delta \rho^{(1)}$

<table>
<thead>
<tr>
<th>Material</th>
<th>316L (1.4404 / 1.4435)</th>
<th>PTFE</th>
<th>PTFE with 25 % C</th>
<th>Hastelloy C276</th>
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<tr>
<td>Code</td>
<td>-S (PN 100)</td>
<td>-T (PN 40 / 63)</td>
<td>-S (PN 250)</td>
<td>-S (PN 500)</td>
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<tr>
<td></td>
<td>$\Delta \rho$</td>
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<tr>
<td>Density range</td>
<td>$\rho_{\text{min}}$</td>
<td>$\rho$</td>
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<tr>
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<td>300 to 600 kg/m³</td>
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<td>300 to 1500 kg/m³</td>
<td>mm</td>
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<td>870</td>
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<td>46</td>
<td>63</td>
<td>595</td>
<td>17.2</td>
<td>710</td>
<td>24</td>
</tr>
</tbody>
</table>

1) $\Delta \rho = \rho_1 - \rho_2$

- $\rho_1$ = density of lower medium
- $\rho_2$ = density of upper medium

2) Using displacer material 1.4571 can cause small deviations in diameter, volume and weight.

3) For measurement of interface or density, the max. density of the lower medium is 1350 kg/m³.

4) Min. density of the lower medium

If a Displacer Chamber is used, the difference between the diameter of the Displacer and the inside diameter of the Displacer Chamber must be at least 10 mm.

Lengths < 350 mm and > 3000 mm, and density ranges < 300 kg/m³ and > 2000 kg/m³ on request.

**Accessories**

For Displacer Chamber 204DC, Flange combination 204FK and Cover Flange Kit 204BCF see PSS EML0901, 204xx

---

1) $\Delta \rho = \rho_1 - \rho_2$

- $\rho_1$ = density of lower medium
- $\rho_2$ = density of upper medium

2) Using displacer material 1.4571 can cause small deviations in diameter, volume and weight.

3) For measurement of interface or density, the max. density of the lower medium is 1350 kg/m³.

4) Min. density of the lower medium

If a Displacer Chamber is used, the difference between the diameter of the Displacer and the inside diameter of the Displacer Chamber must be at least 10 mm.

Lengths < 350 mm and > 3000 mm, and density ranges < 300 kg/m³ and > 2000 kg/m³ on request.
**MODEL CODES 204DE**

**Displacer for Buoyancy Transmitters from 2 N buoyancy up to 20 N 204DE**

**RANGE OF APPLICATION:** (a)

<table>
<thead>
<tr>
<th>Liquid Level - Media: Liquid / Gas or Air</th>
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</thead>
<tbody>
<tr>
<td>(Density difference = 250 kg/m³ to 2000 kg/m³)</td>
</tr>
<tr>
<td>............................................................</td>
</tr>
<tr>
<td>Interface Level / Density - Media: Liquid 1 / Liquid 2</td>
</tr>
<tr>
<td>(Density difference = 300 kg/m³ to 600 kg/m³)</td>
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<tr>
<td>............................................................</td>
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**DISPLACER MATERIAL:**

<table>
<thead>
<tr>
<th>Material</th>
<th>Suspension Length</th>
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</thead>
<tbody>
<tr>
<td>1.4404 (316L)</td>
<td>Customized ........</td>
</tr>
<tr>
<td>1.4541 (321)</td>
<td>Customized ........</td>
</tr>
<tr>
<td>PTFE (not for applications in Zone 0)</td>
<td>Standard ........</td>
</tr>
<tr>
<td>PTFE with 25% Carbon, for Zone 0</td>
<td>Standard ........</td>
</tr>
<tr>
<td>Hastelloy C276</td>
<td>Customized ........</td>
</tr>
<tr>
<td>2.4856 (Inconel 625)</td>
<td>Standard ........</td>
</tr>
<tr>
<td>2.4360 (Monel 400)</td>
<td>Standard ........</td>
</tr>
<tr>
<td>3.7035 (Titan)</td>
<td>Standard ........</td>
</tr>
</tbody>
</table>

**PRESSURE RATING:**

- Up to PN 100 / Class 600 ................................................................. D
- Up to PN 160 / Class 900 ................................................................. E
- Up to PN 250 / Class 150 ................................................................. F
- Up to PN 500 / Class 2500 ................................................................. G

**SUITABLE FOR FLANGE SIZE:** (at top of vessel / chamber)

<table>
<thead>
<tr>
<th>Flange Size</th>
<th>Suitable for Flange Size</th>
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</thead>
<tbody>
<tr>
<td>DN 50</td>
<td>.......................................................... 0</td>
</tr>
<tr>
<td>DN 70</td>
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<tr>
<td>DN 80</td>
<td>.......................................................... 2</td>
</tr>
<tr>
<td>DN 100</td>
<td>.......................................................... 3</td>
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<tr>
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<td>4 inch</td>
<td>.......................................................... 7</td>
</tr>
<tr>
<td>6 inch</td>
<td>.......................................................... 8</td>
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</table>

**DISPLACER LENGTH "L":** (inches are approx.)

- for Displacer Material codes P, and O:
  - 300 mm (12 inch) to 2000 mm (79 inch), with partition > 1000 mm ........................................... A
  - 2001 mm (79 inch) to 4000 mm (157 inch), with partition points ................................................. B
  - 4001 mm (157 inch) to 6000 mm (236 inch), with partition points ................................................. C
  - 6001 mm (236 inch) to 8000 mm (315 inch), with partition points ................................................. D
  - 8001 mm (315 inch) to 10000 mm (394 inch), with partition points ............................................. E
  - 10001 mm (394 in) to 12000 mm (472 in), with partition points .................................................. F
- for Displacer Material codes S, H, C, R, M, and T:
  - 300 mm (12 inch) to 3000 mm (118 inch) without partitioning .................................................... K
  - 3001 mm (118 inch) to 6000 mm (236 inch) One partition point ................................................... L
  - 6001 mm (236 inch) to 9000 mm (354 inch) Two partition points ............................................... M
  - 9001 mm (354 inch) to 12000 mm (472 inch) Three partition points ........................................... N
  - 12001 mm (472 in) to 15000 mm (591 in) Four partition points ................................................. O

**MATERIAL AND LENGTH OF THE SUSPENSION:** (Length "b") (d)

<table>
<thead>
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<th>Material</th>
<th>Suspension Length</th>
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<td>Standard Length</td>
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<td>1.4404 (316L)</td>
<td>Customized Length</td>
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<tr>
<td>1.4541 (321)</td>
<td>Standard Length</td>
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<td>1.4541 (321)</td>
<td>Customized Length</td>
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<td>Standard Length</td>
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<td>Hastelloy C</td>
<td>Customized Length</td>
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<td>Customized Length</td>
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<tr>
<td>2.4360 (Monel 400)</td>
<td>Standard Length</td>
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<td>2.4360 (Monel 400)</td>
<td>Customized Length</td>
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<tr>
<td>3.7035 (Titan)</td>
<td>Standard Length</td>
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<tr>
<td>3.7035 (Titan)</td>
<td>Customized Length</td>
</tr>
</tbody>
</table>

(continued on next page)
OPTIONS:
For application in Zone 0 (Additional grounding rope) (not available with Displacer Material: P) ....................................... -E
Damping Spring (Mat. 1.4310, max. 250 °C (482 °F)) ................................................................................................ -D
Damping Spring (Mat. HC, max 350 °C (662 °F)) ................................................................................................. -C
Tag No. Labeling – Stainless Steel Label Fixed with Wire (Text required) ......................................................... -L
Density difference > 200 kg/m$^3$; < 300 kg/m$^3$ .................................................................................................. -Y
Density difference < 200 kg/m$^3$ ......................................................................................................................... -Z

Certificates
EN 10204-2.1 Certificate of Compliance .................................................................................................................. -1
EN 10204-3.1 Inspection Certificate of Process Wetted Metallic Material (not available with Displacer Material: P and O) ........................................................................................................... -3
PMI - Test (not available with Displacer Material: P and O) .................................................................................. -5

(a) Upper and Lower Medium Density required (at operating temperature)
(b) Only in connection with Model code 204DC
(c) Exact length required (Contact face of flange to upper end of displacer)
(d) +/- 8 mm (+/- 0.3 inch)
(e) On ECEP request
(f) Required for 244LD with Option -G
(g) Consult factory if pressure rating is F or G
<table>
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<th>Version</th>
<th>Form of Sealings</th>
<th>DN 80 / 3 inch</th>
<th>DN 100 / 4 inch</th>
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<td>RJF Ring Joint Face</td>
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RF Raised Face
RJF Ring Joint Face
LF Large Female
LM Large Male
LG Large Groove
LT Large Tongue
SG Small Groove
ST Small Tongue
DIMENSIONS
244LD up to PN 250 / Class 1500

2 Name plate
3 Data label
20 Amplifier housing
22 Connection compartment
128 Heat sink
131 Wafer body
132 Lifting hook
142 Protective tube for displacer
150 Displacer
193 Lock screw

LH Left Hand = mounting amplifier to wafer body “Left hand mounted” (Model Code L)
RH Right Hand = mounting amplifier to wafer body “Right hand mounted” (Model Code R), see page 4

The above mentioned RH dimensions are also for LH. Dimensions c, d and g see previous page.