The “Hydrobar” series are submersible level transmitters with a cable or SS tube extension, to measure the level in waterworks, deep wells, underground tanks, concrete bunkers, etc. The “Hydrobar” transmitters are available as fixed range (type FR) units, or with adjustable zero and span. All transmitters are fully temperature compensated, and are equipped with strong flush mounted diaphragms who are laserwelded, this results in a perfect long term stability.

**DESCRIPTION**

**HYDROBAR**

- ACCURACY 0.2%
- STRONG DIAPHRAGMS
- PERFECT LONG TERM STABILITY (< 0.1%/year)
- TEMPERATURE COMPENSATED
- ZERO/SPAN ADJUSTABLE
- INTRINSICALLY SAFE
  
  EEx ia IIC T4

**SUBMERSIBLE LEVEL TRANSMITTERS**
**SPECIFICATIONS**

Measuring ranges: 0.1 bar to 10 bar  
Output signal: 4-20mA, 2-wire  
Adjustment: Zero and span internally (not for FR type)  
Overall accuracy: 0.2% of adjusted span  
Power supply: 13 to 40 vDC (Exi: 17-28 Vdc)  
Electrical connection: PG9, 1/2” NPT or M20 x1.5  
External load (max.): 550 Ohm/24 V to 1400 Ohm/40 vDC  
Protection grade: IP68 (cable/SS tube) IP66 (electr. housing)  
Process temperature: -10°C to +70°C  
Temperature sensitivity: +/- 0.015%/K  
Wetted parts: AISI 316L (standard)  
Material cable: Polyethylene (PE) (option: Hytrel or PTFE)  

**Electrical connection**

- PG9, 1/2” NPT or M20 x1.5  
- 4-20mA, 2-wire

**Adjustment**

- Zero and span internally (not for FR type)
- 0.2% of adjusted span

**Power Supply**

- 13 to 40 vDC (Exi: 17-28 Vdc)
- 13 to 40 vDC (Exi: 17-28 Vdc)

**Protection Grade**

- IP68 (cable/SS tube) IP66 (electr. housing)
- IP68 (cable/SS tube) IP66 (electr. housing)

**Process Temperature**

- -10°C to +70°C
- -10°C to +70°C

**Temperature Sensitivity**

- +/- 0.015%/K
- +/- 0.015%/K

**Wetted Parts**

- AISI 316L (standard)
- AISI 316L (standard)

**Material Cable**

- Polyethylene (PE) (option: Hytrel or PTFE)
- Polyethylene (PE) (option: Hytrel or PTFE)

Specifications can change without notice.

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**ORDER INFORMATION**

<table>
<thead>
<tr>
<th>Measuring Ranges (bar)</th>
<th>Maximum overpressure (bar)</th>
<th>Adjustable span range (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 0.1...0.4</td>
<td>6.4</td>
<td>0 – 0.1 / 0 – 0.4</td>
</tr>
<tr>
<td>0 – 0.4...0.7</td>
<td>6.4</td>
<td>0 – 0.4 / 0 – 0.7</td>
</tr>
<tr>
<td>0 – 0.7...1.5</td>
<td>10.5</td>
<td>0 – 0.7 / 0 – 1.5</td>
</tr>
<tr>
<td>0 - 1 ... 4</td>
<td>16</td>
<td>0 - 1 / 0 - 4</td>
</tr>
</tbody>
</table>

- Fixed range: Specify calibrated range (only Hydrobar-cable)
  
- Mounting connection: Flange DIN or ANSI (specify size)
  
- Special mounting connections: Example 1 1/2” or 2” BSP (specify)
  
- Digital local indicator 3 1/2 digit, programmable
  
- Intrinsically safe: EEx ia IIC T4
  
- SPECIALS: Other wetted parts (Hast.C or gold plated) or other cable material (Hytrel or PTFE) (specify)

* Always specify cable or SS extension length at order code

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**GENERAL INFORMATION**

Laser welded diaphragms: All Hydrobar level transmitters consist of a strong, flush mounted diaphragm, which are laser welded.

Temperature compensation:

All Hydrobar transmitters are fully temperature compensated.

EMC/CE: Klay Instruments manufactures all transmitters according to the new EMC/CE rules.

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**ACCESSOIRES**

- Cable clamp for Hydrobar-cable
- Wall mounting bracket for SS tube extension
- Extra cable length (standard 3 m, max 200 m)
- Extra SS tube length (standard 2 m, max 4 m)
- Sliding sleeve (for SS tube extension)
- Junction box (IP66) including venting

---

**SERIES HYDROBAR**

<table>
<thead>
<tr>
<th>Type code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrobar-Cable-FR</td>
<td></td>
</tr>
<tr>
<td>Hydrobar-Cable</td>
<td></td>
</tr>
<tr>
<td>Hydrobar-Cable-F</td>
<td></td>
</tr>
<tr>
<td>Hydrobar-EXTD</td>
<td></td>
</tr>
<tr>
<td>Hydrobar-EXTD-F</td>
<td></td>
</tr>
</tbody>
</table>

Detailed drawings available on request.
The Hydrobar ‘I’ is an ‘Intelligent’, free adjustable, hydrostatic level transmitter with cable (IP68) for level measurement in water & wastewater, pulp, slurry, chemicals, etc.

Zero and span are adjustable by HART® Protocol and PC or HHT.

The Hydrobar ‘I’ has active temperature compensation and a strong (laserwelded) diaphragm which results in a perfect long term stability.

HART® is a registered trademark of the HART Communication Foundation

Programmable by PC or HHT
### Specifications

- **Measuring ranges**: 0.04 bar to 10 bar
- **Output signal**: 4-20mA / 2-wire + HART® Protocol
- **Adjustment**: Zero and span by PC or HHT
- **Accuracy**: 0.1% of adjusted span
- **Power supply**: 12 to 40 vDC
- **External load (max.)**: 550 Ohm/24vDC to 1400 Ohm
- **Protection grade**: IP68
- **Process temperature**: -10 °C to +70 °C
- **Temperature sensitivity**: +/- 0.01%/K
- **Wetted parts**: AISI 316L (standard)
- **Material cable**: Polyethylene (PE) (option: Hytrel or PTFE)

Specifications can change without notice.

### Ordering Information

<table>
<thead>
<tr>
<th>ORDERINGCODE</th>
<th>Hydrobar -I- cable (length) -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranges (bar)</td>
<td>Maximum overpressure (bar)</td>
</tr>
<tr>
<td>0 – 0.04...0.4</td>
<td>6.4</td>
</tr>
<tr>
<td>0 – 0.12...1.2</td>
<td>10.5</td>
</tr>
<tr>
<td>0 – 1...10</td>
<td>30</td>
</tr>
</tbody>
</table>

- Mounting connection: Flange DIN or ANSI (specify size) F
- Other top mounting connections: Example G2” thread (specify) X

### OPTIONS

- Intrinsically safe: ATEX II 1G EEx ia IIC T4 Ex
- Hasteloy C diaphragm G7
- Hytrel cable G10
- Gold plated diaphragm G16
- Process connection ½” BSP M. (By adapter) G21
- Process connection 1” BSP (flush diaphragm) G54

* Always specify cable length at orderingcode

### Applications

The Hydrobar “I” can be used for level and pressure measurement in all kind of fluids, like water & waste water, pulp, slurry, chemicals, etc. Typical applications are Level measurement in:

- Basins
- Deep wells
- Tanks/vessels
- Underground tanks
- Ballast tanks (Shipbuilding)

Also available with threaded connections (G½” and G1”) for pressure measurement.

### General Information

- **Laser welded diaphragms**
  All Hydrobar level transmitters have strong, flush mounted, diaphragms which are laser welded.
- **Active Temperature compensation**
  All Hydrobar transmitters are fully temperature compensated.
- **EMC/CE**
  Kløy Instruments manufactures all transmitters according to the European CE rules.

### Approvals

The following certificates are available:

- **HART® Protocol**
- **ATEX II 1G EEx ia IIC T4**
- **DNV, RINA, ABS Type Approvals**

### Accessories

- **Cable clamp**
- **Junction box (IP68) including venting**
- **Extra cable length**
Description

The Series “2000-Hydrobar” is a complete range of microprocessor based submersible level transmitters for top mounting, with a local display and adjustment by three push buttons. Zero and span can be calibrated very easy without test pressure.

The display which can indicate a number of chosen engineering units is also used during programming. Process temperatures can be indicated and damping times adjusted from 0 to 25 secs. A 4-20mA Current Simulation can be performed. Also a tanklinearisation can be done. The Intelligent Series 2000-Hydrobar are fully temperature compensated, and are equipped with strong flush diaphragms who are laser welded, this results in a perfect long term stability.

HART® is a registered trademark of the HART Communication Foundation
General information series 2000

Calibration

The standard Series 2000 Transmitter is always equipped with a display and 3 pushbuttons for easy calibration. Both the measured and the calibrated value can be read locally. A full calibration can be completed using the three pushbuttons or with the optional handheld terminal (HART®), or by PC with special software from Klay Instruments.

Zero and span can be calibrated very easy, without testpressure, also in vacuum ranges. Linearisation can be made for horizontal tanks (P111). For all other adjustable points see table right.

The series 2000 will as standard be delivered with 2 closed covers, so the 3 pushbuttons and the standard display are behind the cover.

A translucent cover can be delivered as an option. In that case you can use the display as a local indicator.

Adjustable points

<table>
<thead>
<tr>
<th>P101</th>
<th>Zero adjustment (4mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P102</td>
<td>Span adjustment (20mA)</td>
</tr>
<tr>
<td>P103</td>
<td>Cancel mounting position effect</td>
</tr>
<tr>
<td>P104</td>
<td>Adjustment pressure unit (see conversion table)</td>
</tr>
<tr>
<td>P105</td>
<td>4 - 20mA *</td>
</tr>
<tr>
<td></td>
<td>20 - 4mA (reverse output)</td>
</tr>
<tr>
<td>P106</td>
<td>Damping adjustment (0 to 25 sec)</td>
</tr>
<tr>
<td>P107</td>
<td>Indication of process temperature (read out on display)</td>
</tr>
<tr>
<td>P108</td>
<td>0 = CELC °C *</td>
</tr>
<tr>
<td></td>
<td>1 = FAHR °F</td>
</tr>
<tr>
<td>P109</td>
<td>Read on display:</td>
</tr>
<tr>
<td></td>
<td>0 = current (4 - 20mA) *</td>
</tr>
<tr>
<td></td>
<td>1 = pressure unit</td>
</tr>
<tr>
<td></td>
<td>2 = percent %</td>
</tr>
<tr>
<td>P110</td>
<td>Current simulation (4 - 20mA)</td>
</tr>
<tr>
<td>P111</td>
<td>Linearisation (Various tankshapes)</td>
</tr>
</tbody>
</table>

* = factory setting

Temperature compensation

All “2000-Hydrobar” leveltransmitters from Klay Instruments are fully temperature compensated. A temperature sensor, which monitors the process temperature, is mounted directly behind the diaphragm. The output of this sensor is used to compensate the transmitter for temperature variations.

RFI/EMC/CE

Klay Instruments manufactures all pressure- and leveltransmitters according to the new RFI/EMC and CE rules. All transmitters are equipped with RFI filters as standard.

Intrinsic safe certificate

The Hydrobar series are available with the Intrinsic safe certificate acc. to ATEX II 1G, EEx ia IIC T4

HART® Protocol and Profibus PA

The complete “2000-Hydrobar” series is available with HART® Protocol or PROFIBUS-PA output (option).
Level measurement in concrete basins

Accessories

- Cable clamp for Hydrobar-cable
- Wall mounting bracket for SS tube extension
- Extra cable length (standard 3m, max 100m)
- Extra SS tube length (standard 2m, max 4m)
- Other cable material (Hytrell or PTFE) (specify)
- Other diaphragm materials (specify)

Specifications

- Accuracy: 0.1% of adjusted span
- Measuring ranges: 0.04 bar to 0-4 bar
- Output signal: 4 - 20mA / 2-wire (HART protocol (option))
- Adjustment: by 3 pushbuttons or H.H.T. (HART®)
- Power supply: 12 - 40vDC
- Electrical connection: PG9, 1/2” NPT or M20
- External load: 600 Ohm/24v to 1400 Ohm/40vDC
- Protection grade: IP68 (cable/SS tube)
- Process temperature: -10°C to +70°C
- Temperature sensitivity: ±0.015% / K
- Electronic housing: AISI 304
- Wetted parts: AISI 316 (standard)
- Material cable: Polyethylene (option: Hytrell or PTFE)

Accessories can change without notice

Applications

The 2000-Hydrobar level transmitters can be used in fluids, like: water, waste water, pulp, mud, chemicals etc. For the following industries: water and waste water industry, marine / shipbuilding, pulp and paper, others. For other level and pressure transmitters, see page 4 of this brochure.

Order Information

* Always specify cable or SS extension length at order code

Order code cable extension: " 2000 - Hydrobar-cable (length) - "
Order code SS extension: " 2000 - Hydrobar-EXTD (length) - "

<table>
<thead>
<tr>
<th>Ranges (bar)</th>
<th>Maximum overpressure (bar)</th>
<th>Adjustable span range (bar)</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>0 – 0.12…1.2</td>
<td>10.5</td>
<td>0 – 0.12 to 0 – 1.2</td>
</tr>
<tr>
<td>0 – 1…4</td>
<td>30</td>
<td>0 – 1 to 0 – 4</td>
</tr>
</tbody>
</table>

- Mounting connection: Flange DIN or ANSI (specify size)
- Special mounting connections: Example 2” BSP (specify)

OPTIONS

- Transparant cover, display functions as local indicator
- Intrinsically safe: ATEX, II1G, EEx ia IIC T4
- HART® Protocol
- PROFIBUS-PA output (not available in Ex)
- SPECIALS: Other wetted parts or other cable material (specify)
Klay Instruments b.v. is an ISO 9001-2000 certified company who develops and manufactures a wide range of electronic Pressure and Level transmitters, “Intelligent” transmitters with HART® protocol or Profibus PA and pressure and level switches. All instruments are designed and manufactured in our factory in Dwingeloo, The Netherlands. Klay Instruments has a world wide service and sales distribution network.

**Other Klay pressure- and level transmitters**

**‘Intelligent’ pressure- and level transmitters**

The Klay series 2000 is a complete range of microprocessor based pressure- and level transmitters with local display and adjustment by three pushbuttons. Zero and span can be adjusted without testpressure. The display can be used during programming to assist the operation. An engineering unit can be chosen and also the process temperature can be shown on the display. Also a damping (0-25 sec) and a current simulation (4-20 mA) can be performed. Over 40 different process connections are available including many flush diaphragm designs. The series 2000 are also available with HART® Protocol or Profibus PA. Detailed brochure available.

**Pressure transmitter ‘Peramic’**

The "Peramic" is an "All Stainless" pressure transmitter based on a ceramic pressure cell which can withstand high overpressures. The “Peramic” can be used for all gauge- and absolute pressure measurements on steam, liquids, gases and vapours. The available process connections are G1/2” (1/2” BSP) or 1/2” NPT. Zero and span are internally adjustable over wide ranges. Ranges are available from 0 - 0.2 bar to 0 - 350 bar. The Peramic is also available in an “Intelligent” version, Peramic “S” (series CER-2000) including the HART® protocol. Detailed brochures of both versions are available.

**Pressure- and level transmitters**

Klay Instruments manufactures a wide range of electronic level and pressure transmitters with strong flush mounted diaphragms and various process connections. These "All Stainless" transmitters series 8000-SAN, are fully temperature compensated. Ranges are available from 0,1 bar till 60 bar. Zero and span are internally adjustable over wide ranges. The series 8000-SAN is also available in an "Intelligent" version, Series 2000-SAN. From both series a detailed brochure is available.
The “Hydrocer” is a hydrostatic submersible level transmitter with cable (IP 68) for level measurement in water & waste water, pulp, slurry, chemicals, etc.

The “Hydrocer” is based on a Capacitive Ceramic sensor / diaphragm and has a Fixed Range (Type FR) and an adjustable version by HART® Protocol, type Hydrocer ‘I’ (accuracy 0.1%) The instrument has active temperature compensation and a perfect long term stability.

Our representative in your area is:
### Specifications

**Ranges**: from 0.1 bar to 2 bar  
**Output signal**: 4-20mA / 2-wire (option: HART® Protocol)  
**Accuracy**: 0.2% from adjusted span (Hydrobar ‘I’:0.1%)  
**Power supply**: 9 - 36vDC  
**Protection**: IP68  
**Process temperature**: -10° to +70°C  
**Sensor material**: Ceramic Al2O3  
**Sensor sealing**: Viton o-ring (standard)  
**Other wetted parts**: AISI 316  
**Material cable**: PE Polyethylene (Option: Hytrel or PTFE)

### Ordering Information

**ORDERING CODE**  
**FIXED RANGE**: HYDROCER-FR-CABLE (…m) Calibration*  
**ADJUSTABLE RANGE (by HART®)**: HYDROCER-I-CABLE (…m)-RANGE*-H

**RANGES HYDROCER ‘I’**:  
1: 0 - 0.5 ... 1.5 mWC  
2: 0 - 1 ... 4 mWC  
3: 0 - 3 ... 9 mWC  
4: 0-10 ... 20 mWC

**MOUNTING OPTIONS**  
- Mounting connection: Flange DIN or ANSI (specify size)  
- Other top mounting connections. Example: G2” thread (specify)  

**OPTIONS**  
- SPECIALS: For example: other cable material (specify)

* Always specify cable length and calibration at ordercode

### Application

The Hydrocer can be used for level measurement in all kinds of fluids, like water & waste water, pulp, slurry, chemicals, etc.  
Typical applications are Level measurement in:  
- Basins  
- Deep wells  
- Tanks / vessels  
- Underground tanks  
- Ballast tanks (shipbuilding)

### General Information

- **Active Temperature compensation**  
  All “Hydrocer” level transmitters are fully temperature compensated

- **EMC / CE**  
  Klay Instruments manufactures all Transmitters according to the European CE rules.

- **Diaphragm protection**  
  All “Hydrocer” transmitters will be delivered with a diaphragm protection cap as standard.

### Accessoires

- **Cable clamp**  
- **Junction box (IP 68) including venting**  
- **Extra cable length**