



## SUBMERSIBLE LEVEL TRANSMITTERS



### HYDROBAR

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

#### DESCRIPTION

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**.


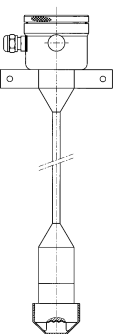
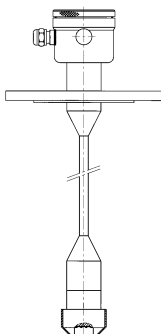
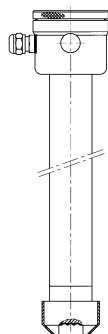
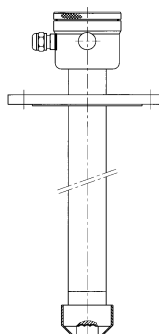
## SPECIFICATIONS

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)



Flush diaphragm

Specifications can change without notice

SERIES HYDROBAR						
	Type code:	Hydrobar-Cable-FR	Hydrobar-Cable	Hydrobar-Cable-F	Hydrobar-EXTD	Hydrobar-EXTD-F

Detailed drawings available on request

## ORDER INFORMATION

Order code cable extension:*			Hydrobar-cable (length) -					
Order code SS extension:*			Hydrobar-EXTD (length) -					
Measuring Ranges (bar)	Maximum overpressure (bar)	Adjustable span range (bar)						
0 - 0.1...0.4	6.4	0 - 0.1 / 0 - 0.4	B					
0 - 0.4...0.7	6.4	0 - 0.4 / 0 - 0.7	C					
0 - 0.7...1.5	10.5	0 - 0.7 / 0 - 1.5	D					
0 - 1 ... 4	16	0 - 1 / 0 - 4	E					
Fixed range: Specify calibrated range (only Hydrobar-cable)			FR					
- Mounting connection: Flange DIN or ANSI (specify size)				F				
- Special mounting connections: Example 1 1/2" or 2" BSP (specify)				X				
- Digital local indicator 3 1/2 digit, programmable					I			
- Intrinsically safe: EEx ia IIc T4						EX		
- SPECIALS: Other wetted parts (Hast.C or gold plated) or other cable material (Hytrel or PTFE) (specify)							G	

\* Always specify cable or SS extension length at order code

## 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.

## 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



## INTELLIGENT SUBMERSIBLE LEVEL TRANSMITTERS

**Remote Rangeable**

# HYDROBAR 'I'



- ▶ Free Programmable by PC or HHT
- ▶ Output 4-20mA and HART® Protocol
- ▶ Accuracy 0.1%
- ▶ Strong Diaphragms
- ▶ Perfect Long Term Stability (<0.1%/ 2 years)
- ▶ Temperature compensated
- ▶ Zero/Span adjustable
- ▶ Intrinsically Safe  
ATEX II 1G  
EEx ia IIC T4



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	: 40vDC : 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



Strong flush diaphragm

## Ordering Information

ORDERINGCODE		Hydrobar -I- cable (length) -					
Ranges (bar)	Maximum overpressure (bar)	Adjustable span range (bar) min. - max.		↑	↑	↑	↑
0 - 0.04...0.4	6.4	0 - 0.04 / 0 - 0.4	1				
0 - 0.12...1.2	10.5	0 - 0.12 / 0 - 1.2	2				
0 - 1 ... 10	30	0 - 1 / 0 - 10	3				
- Mounting connection: Flange DIN or ANSI (specify size)					F		
- Other top mounting connections: Example G2" thread (specify)					X		
<b>OPTIONS</b>							
- Intrinsically safe: ATEX II 1 G EEx ia IIC T4						Ex	
- Hasteloy C diaphragm							G7
- Hytrel cable							G10
- Gold plated diaphragm							G16
- Process connection 1/2" 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 (G1/2" and G1") for pressure measurement.

## General Information

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

## Approvals

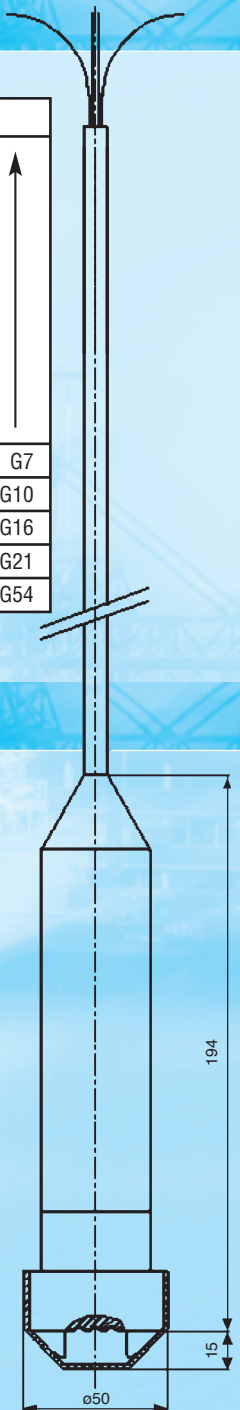
The following certificates are available:

- 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





## 'INTELLIGENT' LEVEL TRANSMITTERS

# Hydrobar 'S'



- MICROPROCESSOR BASED
- EASY CALIBRATION WITHOUT TEST PRESSURE BY 3 PUSH BUTTONS
- ACCURACY 0,1%
- 4-20 mA AND HART® PROTOCOL
- "ALL STAINLESS" DESIGN
- WIDE RANGEABILITY
- LOCAL DISPLAY
- ADJUSTABLE DAMPING



*Easy calibration  
without test pressure  
by 3 pushbuttons  
and display (standard)*

### Description

The Series "2000-Hydrobar" is a complete range of micro-processor 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 push-buttons 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 transparent cover can be delivered as an option. In that case you can use the display as a local indicator.

*Easy Programmable*

*Display with 3 pushbuttons  
(Standard)*



## Adjustable points

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

\* = 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 (Hytrel or PTFE) (specify)
- Other diaphragm materials (specify)

## 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.

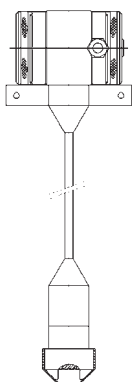
## Specifications

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) IP66 (electr. housing)
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: Hytrel or PTFE)

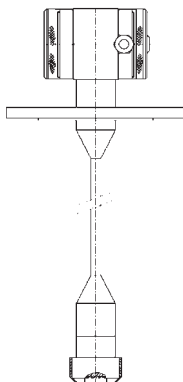
Specifications can change without notice

### Series 2000 'Hydrobar'

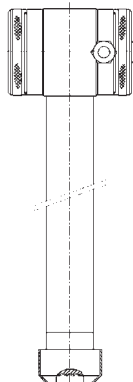
Hydrobar-Cable



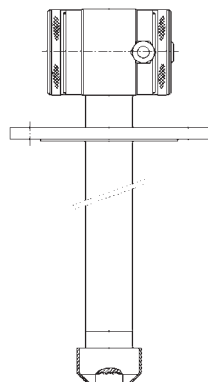
Hydrobar-Cable-F



Hydrobar-EXTD



Hydrobar-EXTD-F



## 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) -							
Ranges (bar)	Maximum overpressure (bar)	Adjustable span range (bar)		↑	↑	↑	↑	↑	↑
0 - 0.04...0.4	6.4	0 - 0.04 to 0 - 0.4	1						
0 - 0.12...1.2	10.5	0 - 0.12 to 0 - 1.2	2						
0 - 1...4	30	0 - 1 to 0 - 4	3						
- Mounting connection: Flange DIN or ANSI (specify size)					F				
- Special mounting connections: Example 2" BSP (specify)					X				
<b>OPTIONS</b>									
- Transparant cover, display functions as <b>local indicator</b>						I			
- Intrinsically safe: ATEX  II1G, EEx ia IIc T4							EX		
- HART® Protocol								H	
- PROFIBUS-PA output (not available in Ex)								P	
- SPECIALS: Other wetted parts or other cable material (specify)									G

## Klay Instruments b.v.

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.



*Factory Klay Instruments B.V. in Dwingeloo, The Netherlands*

## Other Klay pressure- and level transmitters

### 'Intelligent' pressure- and level transmitters

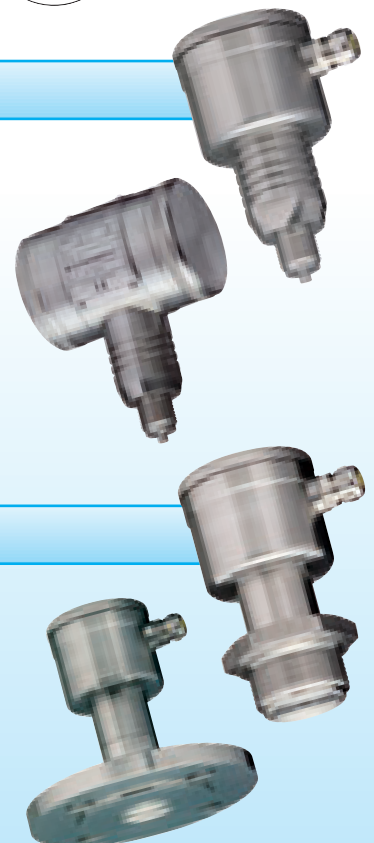
The Klay series 2000 is a complete range of microprocessor based pressure- and level transmitters with local display and adjustment by three pushbuttons. Zero and span can be adjusted without testpressure. The display can be used during programming to assist the operation. An engineering unit can be 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 G $\frac{1}{2}$ " (½" BSP) or ½" 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.



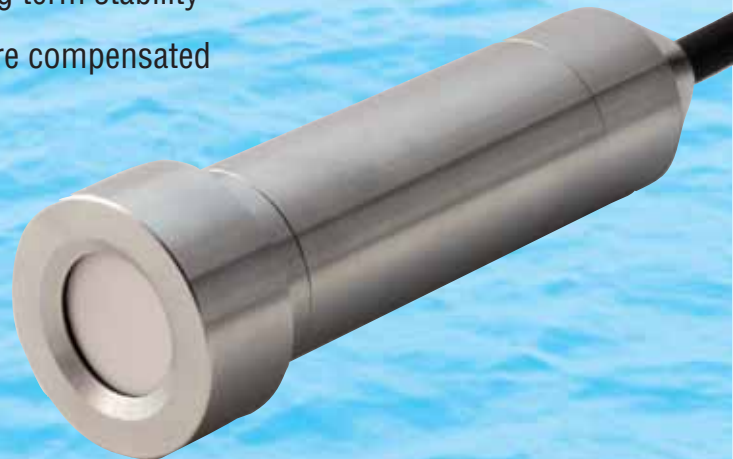


## SUBMERSIBLE LEVEL TRANSMITTERS

With **Capacitive Ceramic sensor**

# HYDROCER

- ▶ Accuracy 0.2% (Hydrocer 'I': 0.1%)
- ▶ Capacitive Ceramic Sensor
- ▶ Perfect long term stability
- ▶ Temperature compensated



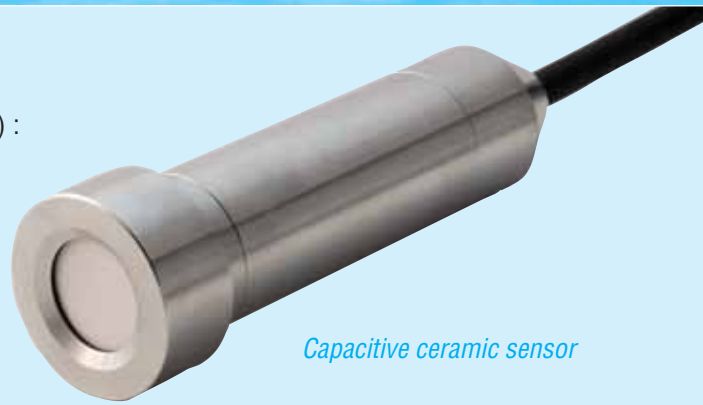
The "Hydrocer" is a hydrostatic submersible level transmitter with cable (IP 68) for level measurement in water & waste water, pulp, slurry, chemicals, etc.

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: Hytel or PTFE)



Capacitive ceramic sensor

## 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)			F	
- Other top mountingconnections. Example: G2" thread (specify)			X	
OPTIONS				
- SPECIALS: For example: other cable material (specify)				G

\* Always specify cable length and calibration at ordercode

## Application

The Hydrocer can be used for levelmeasurement 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)

## 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

