

# Methane Sensor Type Laser

## INSTRUCTION MANUAL



***FRANATECH***

UNDERWATER SENSORS FOR DISSOLVED GASES

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## 1 Packing List

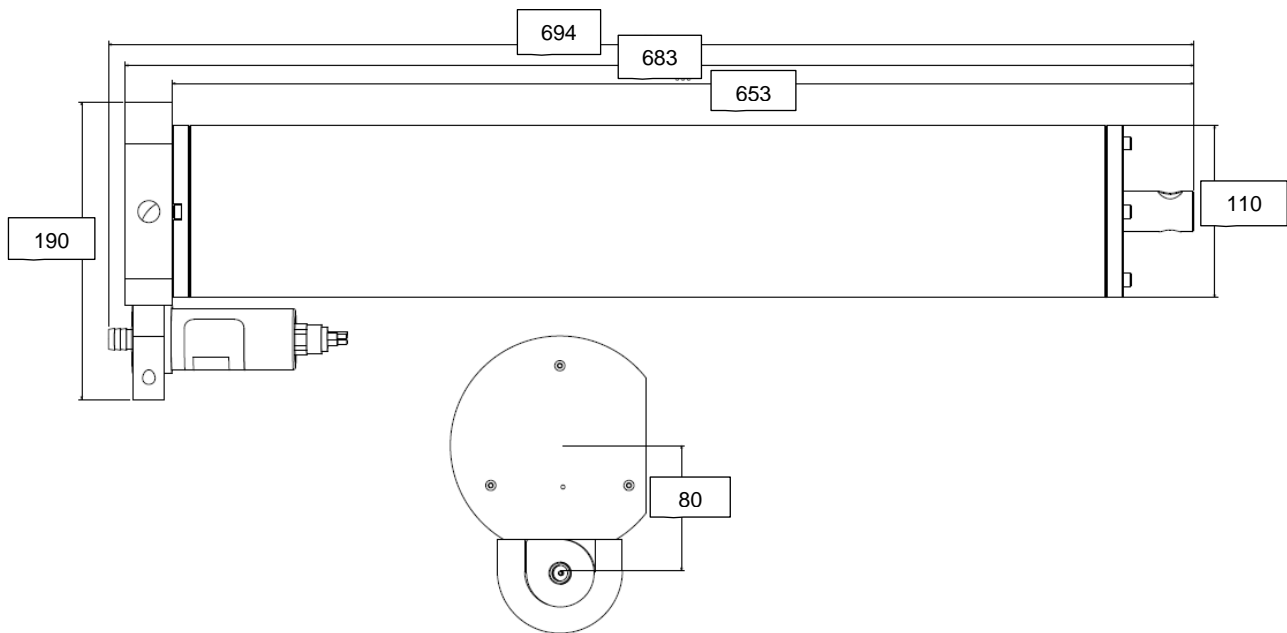
1. 1 Laser Methane Sensor Titan (Type: CH4 Laser CT)
2. 1 Cable for Pump UDP-M (connects pump to laser)
3. 1 Pump Seabird 5M Titan
4. 1 Pump flow chamber incl. fixing bracket
5. 1 Cable with power and data connectors LM8-232L
6. 1 RS232 serial to USB Converter
7. 1 Power supply 100-250V AC to 24 V with American plug
8. 1 Software CD (Live Data Acquisition, Data Logger Control + Offline Data Viewer)
9. 1 Software Manual
10. 1 Instruction Manual
11. 1 Pigtail MCIL8F 60cm

## 2 Specifications

### 2.1 Mechanical Specifications

Dimensions L x D	615 mm x 110 mm (660 with connectors)
Weight in air	14 kg
Water displacement	5.9 L
Weight in freshwater	8 kg

All dimensions in mm



### 2.2 Environmental Specifications

Depth rating	4000 m
Operating temperature	-3 °C - + 20 °C

### 2.3 Performance

Range	2 - 10000 ppmv
Accuracy	±2 ppmv (range <100 ppmv) ±2 % of reading (range >100 ppmv)
Warm-up time	60 - 120 s
Initialization time	5 min (after entering water and starting to measure)
Reaction time	5 s
T90 time	10 s
T99 time	120 s

## 2.4 Electrical Specifications

Supply Voltage 11 - 30 V DC

Current drain upon powering

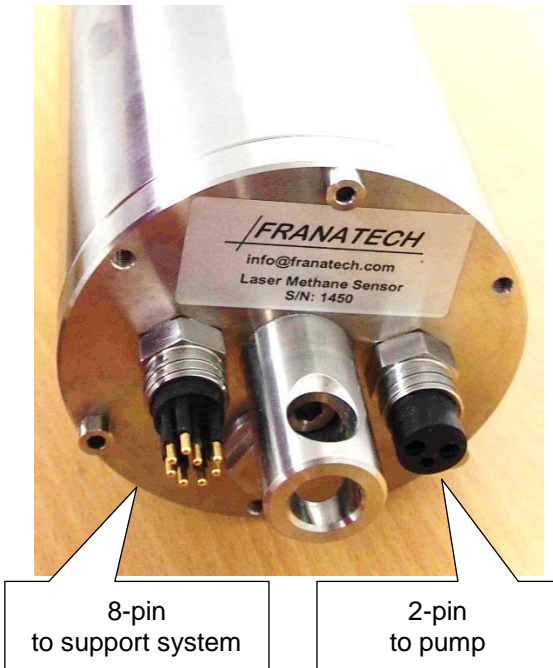
$U_{\text{supply}}$	$I_{\text{inrush}}$	$t_{\text{max}}$
11,0 V	3,57 A	80,00 $\mu\text{s}$
12,0 V	4,21 A	120,00 $\mu\text{s}$
16,0 V	5,24 A	300,00 $\mu\text{s}$
21,0 V	7,66 A	200,00 $\mu\text{s}$
24,0 V	8,07 A	180,00 $\mu\text{s}$
30,0 V	9,66 A	160,00 $\mu\text{s}$

$U_{\text{supply}}$  Voltage of power supply  
 $I_{\text{inrush}}$  Max. Inrush current  
 $t_{\text{max}}$  Duration of inrush current (peak width)

Power consumption

Water Temp	Power drain
20 °C	5.2 W
15 °C	4.8 W
10 °C	4.7 W
5 °C	4.7 W

### Connectors Pin-Out



Pin #	Configuration	Description
1	+11..30 V DC	<p>Male Face View</p>
2	GND	
3	NC	
4	NC	
5	NC	
6	RS232 GND	
7	RS232 RX	
8	RS232 TX	

1	GND	<p>Female Face View</p>
2	+12 V DC	

## 2.5 Communication Specifications

Settings serial port RS-232

Baud rate: 9600 baud  
 Stop bits: 1  
 Data bits: 8  
 Parity: none  
 Flow control: none

**Communication Protocol**

Command	Response	Example
gd_1\r	t.t_m.m_n.n_t.t_h.h\r	15.2 100.0 10.0 95.0 20.0 => 15.2°C and 100.0ppmv

\_ = Space (ASCII Character 32)

\r = Carriage Return (ASCII Character 13)

t.t = Temperature °C (range -10.0 to 50.0)

m.m = Methane ppmv (range 0.0 to 10000.0)

n.n = raw value for internal calculations (range 0.0 to 10000.0)

t.t = Internal use (if value is between 10.0 and 110.0, sensor status is OK).

h.h = Internal use (if value is below 40.0, sensor status is OK)

**3 Before deployment**

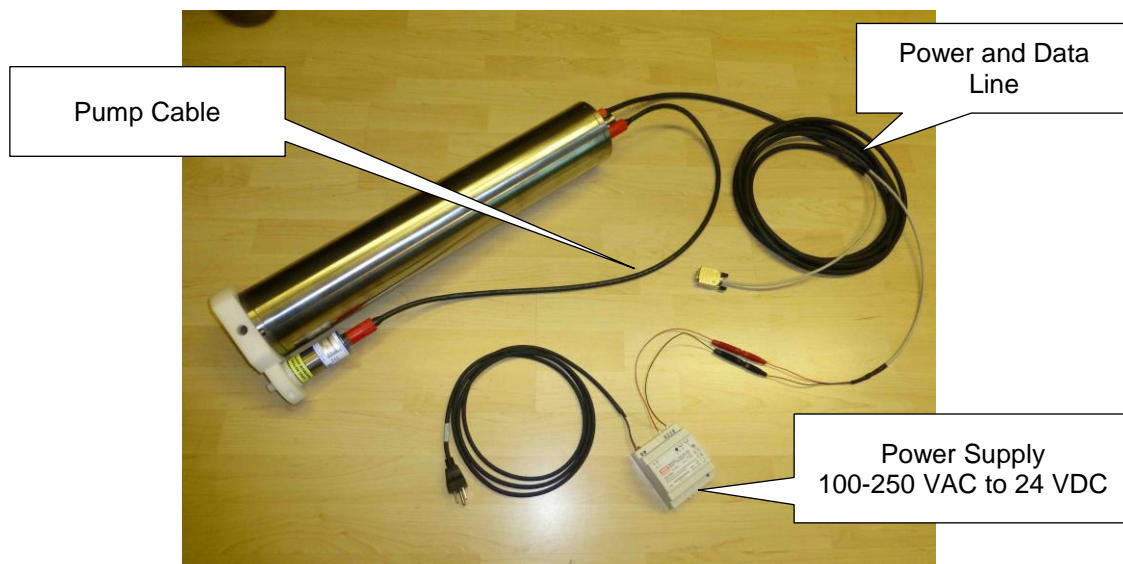
**3.1 Important Note on Connection**

As soon as the sensor is connected to power, the internal data logger starts to log.

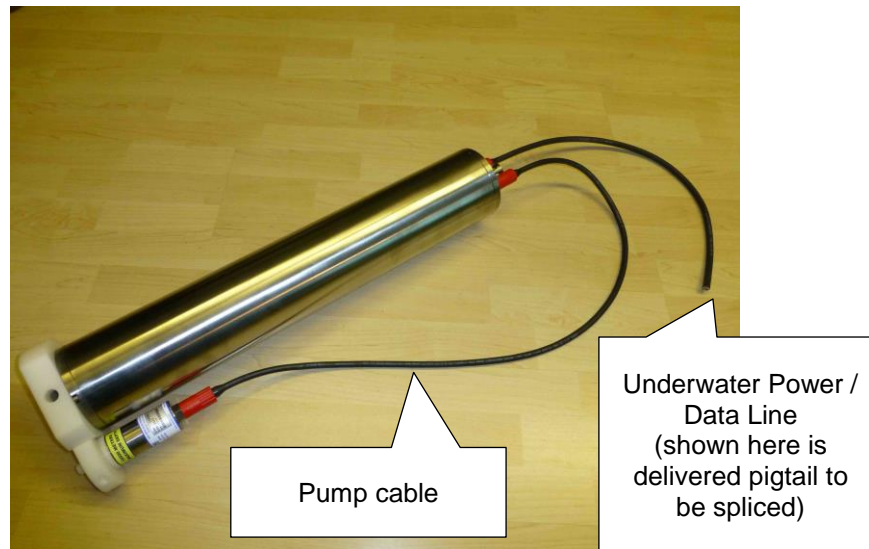
The pump is powered via the sensor. If the sensor is powered on, the pump will start as soon as it is connected to the sensor.

**3.2 Cabling configuration**

Laboratory Configuration



## Underwater Configuration



### 3.3 Water pump

The water pump and flow-through chamber always have to be mounted onto the sensor before the deployment. The sensor is configured to be operated in flow-through mode.

The pump uses water as lubricant; and should not run dry. It should be connected just before putting the sensor to water.

If it is wetted, the pump can be operated in air for a maximum of 30 min. This can be done by spraying water into the pump inlet.

### 3.4 Internal Data logger

The internal data logger has to be configured before deployment. Follow the instructions in the chapter “PREPARE INTERNAL DATA LOGGER FOR MEASUREMENT” of the software manual.

The Standard settings are sample rate of 1 sample/min and Central European Time (CET and CEST).

The data download is slow due to the 9600 baud rate. It is recommended therefore to erase the logger memory before each deployment.

The logging capacity is 37,600,000 data sets.

### 3.5 Data acquisition with Windows PC

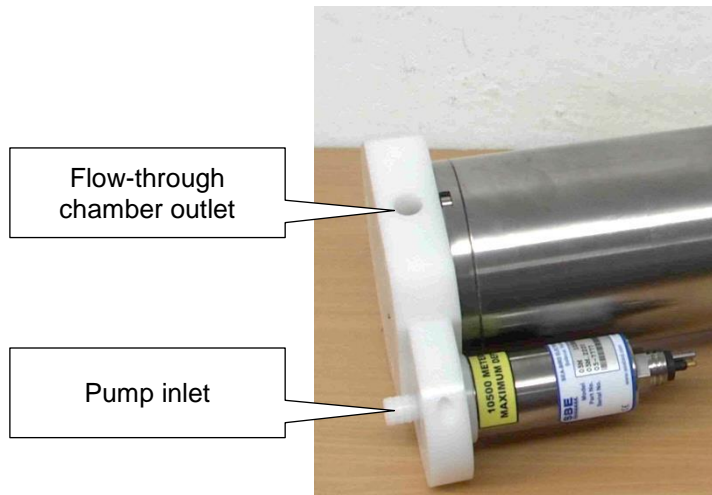
The sensor can be operated directly connected to a Windows PC.

In that case please follow the instructions in chapter “GRAPHICAL LIVE DATA ACQUISITION” of the software manual.

## 4 Deployment

### 4.1 Sensor orientation

The water outlet of the flow-through chamber should point upwards. This ensures that gas bubbles do not stay trapped within the chamber and are flushed by the water flow.



If gas bubbles come in contact with the membrane repeatedly or stick to it for a while (> 5 min), their high inside gas pressure will be transferred through the membrane into the detector circuit. This can lead to damage to the optical components.

## 4.2 Power cycling and interruption

Power cycling is possible. The minimum cycle is: > 5min ON / > 1min OFF

Power interruptions below 1 min are tolerated if they are not too frequent.

## 5 After deployment

Disconnect the water pump as soon as possible. It can run for maximum 30 min after the sensor has been pulled out of water.

To download the data from the internal data logger follow the instructions of chapter "DATA DOWNLOAD FROM INTERNAL DATA LOGGER" in the software manual.

## 6 Storage

### 6.1 Cleaning

If the sensor is not used for some weeks or for long time storage it is recommended to rinse it with clear water.

To rinse out any salt deposits or other residues in the flow-through chamber place the head of the sensor into a recipient of freshwater, and run the water pump for 10 min. The sensor has to be powered during this operation.

Alternatively, inject freshwater into the pump inlet and in the flow-through chamber outlet for rinsing.

### 6.2 Drying

To dry out sensor after rinsing remove the sensor from water, disconnect the water pump and keep the sensor running 2 hours in a dry environment.

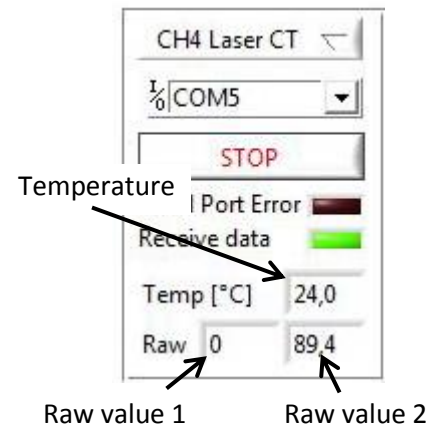


## 7 Troubleshooting

The included Software “Live Data Acquisition” can be used to check the sensor.

The displayed temperature is the internal temperature and not the water temperature.

- Sensor is constantly showing 0 ppmv, even in presence of methane
  - Raw value 1 >> 4  
=> run the sensor in a dry and methane free environment until the raw value is  $\leq 4$
  - Raw value 2 is > 110  
and/or Temperature  $\geq 30^{\circ}\text{C}$   
=> Move the sensor from hot environments like sun-flooded areas to cooler areas below  $25^{\circ}\text{C}$  and switch power off to let it cool down. The sensor should recover after 1-2 hours
  - Raw value 2 is < 10  
=> Remove the sensor from water, disconnect the water pump and keep the sensor running 2 hours in a dry environment



Note that when operated in air, the internal temperature must be kept below  $30^{\circ}\text{C}$ .

Otherwise an automatic shut-off will be triggered and the sensor will not measure until the temperature has decreased.

If possible, immerse the sensor head in cold water, for instance in a sink under a trickle of water, or immersed in a water recipient with a cooling circuit.

If above measures do not succeed, please contact Franatech.