



Manual

HydroC™ CH₄ Sensor

for Hydrocarbons, Methane (CH₄)

© CONTROS Systems & Solutions GmbH



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Version History

Revision	Date	By	Comment
2.0	12.02.08	SWH	Update for 60mm sensor head, CH ₄ data sheet included
2.1-2.2	18.05.08	SWH, SJM	Membrane change procedure; Temperature stabilization
2.3	06.06.08	SWH	New case
2.4-2.6	18.07.08	SWH	Internal connector changed, updated specs for power etc., new FAQ, calibration and data signal differences explanation
2.7	13.08.08	DE, RB	General Review and update
2.8	09.09.08	SWH	Addition of internal connector picture according to CR standard
2.9	25.09.08	RB	General Review and update
2.10	11.10.08	SWH	Correct Data Protocol example and thermo stab. Graphic
2.11	15.10.08	SWH, CR	Correct pinout internal 8-pol connector
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3.2	28.05.09	SWH, PF	Picture of typ. POM sensor holder
3.3	18.08.09	SWH, CR	Updated data protocol, new TS1 format
3.4	14.09.09	SWH	Temp. from TS1 is used for external DS4 calibration
3.5	06.10.09	SWH, SJ	Installation procedure for Sintermetal / Sealing
3.6	12.11.09	SWH, AL	Format update
3.7	24.11.09	SM, RB	General Update
3.8	12.12.09	SWH	Minor corrections
3.9	27.01.2010	RB	General Update
3.10	25.06.2010	SK, RB	General Update

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In view of our continual improvement policy, the design and specifications of our products may vary from those illustrated in this brochure.



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1 Getting started

1.1 General information

This document should not be considered to be a replacement for formal training for the user or personnel. CONTROS cannot accept liability for any errors contained herein or consequences arising as a result of such errors. Feedback regarding any errors identified by the reader is appreciated so that immediate correction may be taken.

Corporate policy dictates that CONTROS products are continually evolving. Therefore the content of this document will likewise be updated from time to time without official announcements to that effect.

This manual should not be distributed to any third party without prior approval of CONTROS.

We encourage exchange of information and cooperation! If any queries or problems occur please contact us. To evaluate your concern, we do need as much detailed information as possible, for example:

- Hardware and software configuration of your PC or laptop
- Program version
- Description of problem(s)
- Data logs
- Can the equipment be returned to CONTROS or an authorized dealer if required?

1.1.1 Secondary Documents

All CONTROS™ manuals are available as PDF downloads from our server subject to a special username and password – allocated on application.

1.1.2 Limited Liability Statement

Extreme care should be taken when using or giving service to HydroC™ equipment. It should be used or maintained only by personnel with knowledge and training in the use and maintenance of oceanographic and sub-sea offshore electronic equipment.

CONTROS Systems & Solutions GmbH disclaims all product liability risks arising from the use or maintenance of this system. CONTROS has no way of control the use of this equipment or choosing the personnel to operate it and therefore cannot take actions to comply with laws pertaining to product liability, including laws which impose a duty to warn the user of any dangers involved in operating this equipment. Therefore, acceptance of this system by the customer shall be conclusively deemed to include a covenant by the customer to defend, indemnify, and hold CONTROS harmless from all product liability claims arising from these or servicing of the system.

1.1.3 Manufactures' Guarantee

CONTROS™ guarantees that this product complies with the quality and specifications stipulated. We undertake to repair any defect from faulty design, material or workmanship during one year after delivery of the equipment. This guarantee is not extended to underwater connecting cables supplied by CONTROS Systems & Solutions GmbH where breakage or malfunction occurs to the cable during installation or those caused by wear or other external forces, e.g. to the membranes.



1.2 About CONTROS and HydroC™ Sensor



Control Systems & Solutions GmbH ("CONTROS") develops produces and markets submersible measuring systems for the determination of hydrocarbons and carbon dioxide in water. These systems are offered in combination with data management systems for risk management applications within the offshore sector, water and waste treatment market and oceanographic research. CONTROS systems are used in many applications such as underwater hydrocarbon and gas measurements, greenhouse gas monitoring, air-sea gas exchange, ocean acidification, carbon capture and storage and also methane hydrate studies. Moreover CONTROS is involved in Subsea Oil & Gas Early Leak Detection, pipeline inspection as well as subsea Oil & Gas

installation monitoring systems. CONTROS systems have been successfully attached to a wide range of platforms like AUVs, ROVs, Floats, Landers, CTDs, Gliders and Buoys. Such systems can be further expanded via data management systems, data pre-processing, on-board data storage, and telemetry and data visualization/presentation to meet customer specific needs.

CONTROS also offers quality management, training courses and sessions, engineering services, ROV Pilots, Leak Detection Experts and international project management. With this system solution of measuring and data management techniques, CONTROS meets the special needs of the mentioned markets. The after sales service and technical support is a key feature of CONTROS corporate policy and has a significant positive impact on purchase decisions.



Image 1: HydroC™ Titanium Ultra-deep housing for 6000m, with the characteristic silicone membrane (left) and the optional biofouling protection (right).



1.2.1 Measuring Principle

CONTROS HydroC™ systems are optical, headspace-based underwater sensors for the measurement of the partial pressure of carbon dioxide, hydrocarbons and methane. Dissolved gas diffuses from the liquid through a patented thin film composite membrane into a detector chamber. The concentrations are measured by non-dispersive infrared spectrometry within a gas circuit.

The sensors measure in real time and store data to an internal data logger at different operating depths with a maximum of 6000 m. The standard measuring range is 100nmol/l – 50µmol/l (others available) for dissolved CH₄ (Methane). Every HydroC™ is calibrated individually and in situ within a special insulated water tank. Its titanium housing has a cylindrical shape with a diameter of 90 mm and a length of 526 mm. Due to its small size and weight (2.6 kg in water) an integration of the instrument into various static as well as moving platforms can be easily achieved. The comprehensive optimization process aims at the successful autonomous long-term deployment on e.g. surface buoys, underwater observatories and floats. In addition to many other features CONTROS has recently integrated a sleep mode function in respect of limited power. Energy consumption is one of the major challenges the company is capable to cope with. Moreover a flow head provided by an external pump attached to the sensor has decreased response time to less than 120s. All sensors are plug and play units which come with CONTROS designed software ready to use.

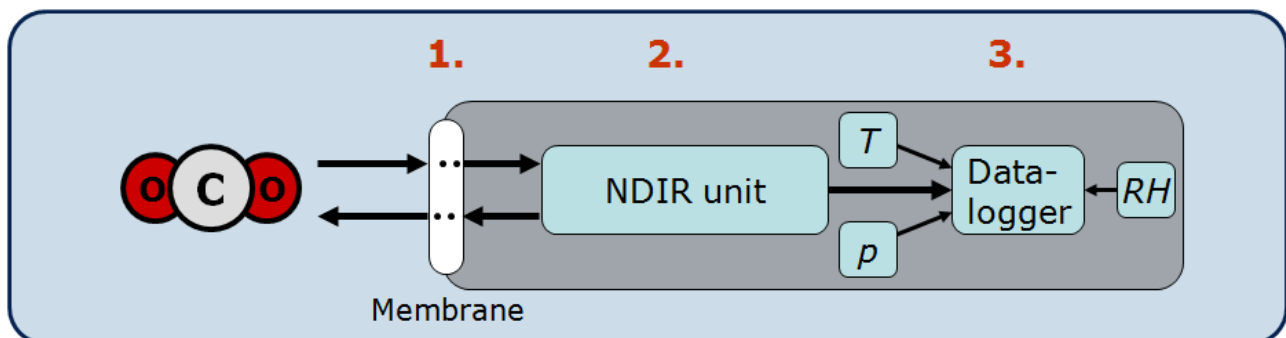


Image 2: HydroC™ function principle

- 1. Dissolved gasses and water vapor pass the hydrophobic membrane**
➤ Equilibration
- 2. Gas concentration measured by non-dispersive infrared spectrometry (NDIR) within a gas circuit**
- 3. Internal Datalogger saves CH₄ concentration along with T, p and RH; optionally the data is transmitted by cable**



1.3 Set Up

1.3.1 Unpack and Check: HydroC™ Standard



Image 3: Packing list HydroC™

List of Parts

1. 1 x HydroC™ sensor with transport protection for the sensor head (yellow cap) and a Subconn dummy connector
2. 3 x Spare membranes
3. 1 x pigtail (0.5m or 5m) with Subconn female plug
4. 1 x CD ROM with documentation and software
5. 1 x Calibration certificate and additional papers (see next page)
6. 1 x Lab-cable with (e.g. RS-232 SubD9) connector and 4mm power “banana” plugs
7. 1 x USB-RS232 Adapter with driver disk (see next page)
8. 1 x Power Source



Documents & Software



Manual & Certificates

This manual and certifications.

CONTROS™ Detect

Visualization of data stream sent by the PCS

USB-to-Serial-Adapter

To connect your PC via test cable.

1.3.2 Preparing the Sensor

1. Check the Membrane. There should be no scratches and it should be as clean as possible!!!
2. Install the cable connector and locking sleeve. Connect the other end to the computer/controller. Verify that the hardware and external fittings are secure and locked in place.
3. Connect the power source and apply power at least ½ hour (30 min.) before the measuring takes place. Use a power supply with enough voltage and current, e.g. 12V DC / 2A.

A simple reaction test can be made by using methane gas from a cigarette lighter. Let the gas flow against the membrane for a few seconds. The signal should increase sharply within 7 - 10 seconds. Be aware that too long exposures to such high gas concentrations (as those present in the lighter) will drive the detector into saturation, from which state it needs approx. 30 seconds to recover to background values.

- The sensor will only show true methane concentrations in water (not in air) due to the calibration ranges.

To obtain a valid measurement, immerse the sensor in water (i.e. bucket) for at least 30 min. before measuring. Note that it is recommended to plug the power source to the HydroC™ system at least 30 minutes before any deployment to enable it to stabilize.



- Opening the sensor (except to replace the membrane) without prior consultation and explicit authorization from CONTROS will invalidate the guarantee!

1.4 Important notices / How to handle

- Please support the Instrument with a sufficient power supply with 2A @ 12V, as the heater needs some power during warm-up.
- In case of failures / connection problems disconnect and reconnect your USB-RS232 adapter first. Then check if the USB driver is properly installed.
- You need a warm-up time of 2- 30 minutes depending on the environmental conditions.
- Please be extremely careful with the membrane, because a small hole or any kind damage to it, will flood the complete sensor!
- After cleaning there is no special handling for the storage required.



2 Technical Data

2.1 Specifications

Applications	In-situ measurement of dissolved CH ₄ motivated by: Global Warming, Methane Hydrate Exploration & Research; Environmental Monitoring; Offshore Risk Management; Pipeline Inspection and Leak detection
Detector	High-precision optical analysing NDIR system • Maintenance free
Principle	Dissolved CH ₄ molecules diffuse through a silicone membrane into the patented detector chamber, where their number is determined by means of IR absorption spectrometry. Concentration dependent IR light intensities are converted into output signals.
Dimension/ Weight	90 d x 526 mm corrosion-free titanium/ 5,9 kg (2,6kg in water)
Operation depth	2000, 4000, 6000 m version available
Temperature range	-4 ... +30°C
Measuring range	100 nmol – 50µmol/l (other ranges available)
Equilibration time	first signal after 5s, T63 < 2min (with external pump)
Resolution	5 nmol
Accuracy	±3% reading (as the total sum of all the errors)
Calibration	Calibration unit is µmol/l • signal is derived considering internal sensors for pressure, temperature and humidity • Recalibration recommended every 12 months
Drift correction / Features	Dual channel NDIR unit • In situ response-time test
Connector	Connector SUBCONN® MCBH8-M Titanium 8-pin • Others on request
Power supply/ Consumption (@12 VDC)	Typ. 12 VDC (11 - 24 VDC) • warm- up phase 2- 30min/ Appr. 400mA (700mA during warm- up) + 350mA during zeroing + max. 150mA small external pump (option) + max. 700mA big external pump (option)
Data Interface	RS-232C • Data format ASCII NMEA-0183
Software	Windows® Software DETECT™ included (real time data visualization, setting of sensor parameters, download data from internal data logger) • Adaption to user-software
Options	RS-485 • Analogue Output: 0 – 5/10 V (Range / Full-scale can be user-configured) • Internal or external data logger (µSD card/ CF card) • external Battery Pack (e.g. 36 Ah Alkaline) • Build-in water temperature probe for concentration calculation • Ultra Sleep energy saving for long-term monitoring • ROV and AUV adaption packages • Profiling and mooring frames • HydroC™/CO ₂ (and/or CH ₄) FT system for underway (FerryBox) and lab applications • biofouling protection • external mounted pump with flow head for faster response time



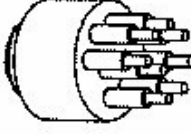
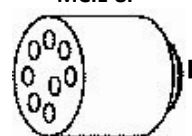
Notes:

1. **Housing and protection:** Titanium is used as a standard and strongly recommended for all environmental conditions. A protection cap is provided for critical applications, where the membrane could be damaged. An anti-fouling cap can be used for shallow water deployments.
2. **Operational temperatures:** Temperatures below approx. +4°C requires a special thermo stabilization unit with approx. 4W (warm-up: 10W) extra power consumption.
3. **Detection limit:** Is shown as twice the signal-to-noise ratio (SNR) defined by DIN/EN. The SNR is max. 100 nmol/l. **Resolution:** Is a fundamental electronic and measurement system value which is not connected by any ways to an (any) accuracy value. The resolution is not an indicator for the detection range.
4. **Accuracy:** Is the total sum of all the errors and better defined as a relative value.
5. **Response time:** All values are valid only for moderate concentrations (app. < 10 µmol/l), where the detection limit is higher, because molecules leave the sensor faster as the detection unit can measure them. The specified response time needs a water flow of approx. 20 cm/s.
6. **Calibration:** Is NOT required after changing the membranes or leaving the sensor in a case for a longer time. A calibration or service is recommended after 12 months of usage.
7. **Power supply:** A thermal stabilization is used as a standard in order to get optimized results in case that the surrounding temperature changes. For deep temperatures below +4°C a special thermo stabilization unit is required, which needs approx. 4W of extra power consumption (10W during warming up). When warmed-up, the power consumption decreases to 4W. External Power-Modules can be used for autonomous applications.
8. **Connector:** Any type upon prior request. Additional connectors are supported for more inputs with the optional datalogger or for the Power-Module unit to provide power to the sensor.
9. **Analogue output:** The output range can be factory adjusted to fit the user requirements upon request, e.g. to compensate electronically offsets from the wiring or external devices.
10. **Digital outputs:** NMEA-0183 standard ASCII output.
11. **Datalogger:** Possibility to be configured with extra analogue inputs and can be delivered with any digital configuration / baud rates and ASCII or NMEA-0183 data protocols. Included micro-SD card 2 GB.
12. **Fittings:** Any engineering tools are supported. Please ask CONTROS or any authorized dealer for special adaptations for your application. Standard fittings are supported for ROV / AUV operations, CTD fittings, pipeline fittings or flow-through systems.



2.2 Connection

2.2.1 UW Plug Connector

HydroC™ Connector		Interface Cable			Lab Connector	
Subconn MCBH-8M		MCIL-8F			Sub-D9 F + 4mm Banana	
						
Function	Pin	Code			Pin	Function
Power 0V	1	Black			A	Power 0V
Power 12V (10-30V)	2	White			5	SubD9 Ground
RS232 Tx → Rx PC	3	Red			B	Power +12V (10-30V, 2A)
RS232 Rx ← Tx PC	4	Green			2	SubD9 Rx PC
Auxiliary Signal	5	Orange			3	SubD9 Tx PC
Auxiliary Ground	6	Blue			-	
CH ₄ Signal 0-5V	7	White/Black	optional	Yellow	-	
CH ₄ Signal Ground	8	Red/Black	optional	Blue	Sig+	Banana 4mm Analogue +
					Sig-	Banana 4mm Analogue -

Notes:

Power

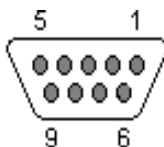
The power consumption of a HydroC™ sensor is:
 max. 2A peak during switch- on
 typ. 700 mA @ 12 VDC (8W) during warm-up (2 – 30min)
 typ. < 400 mA (4W) during operation (temperature- dependant)

Grounding

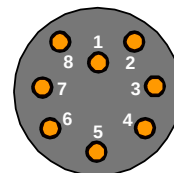
All grounds are connected together inside the sensor
 No isolation for any input/ output

RS-232

Connect the RS-232 cable direct 1:1 to the host / PC.



SubD9 – Female at the cable end, front view



male face view
 (view on sensor)
 SUBCONN® MC BH-8M

The sensor will only show valid results in sea water (not in air) due to the calibration and measurement principle. Valuable results can only be produced if the system is connected in the right way.



3 Maintenance

3.1 Maintenance and Calibration by CONTROS

Whenever a sensor is sent in for calibration to CONTROS, a full check of all components is carried out as well. Specially, components which are subject to a mechanical wear (i.e. pumps) which usually have a reduced life expectancy will be checked in greater detail.

A standard maintenance procedure consists of the following steps:

- Change of O-Rings
- Change of micro-pumps
- Change of membranes
- Cleaning, if needed, replacement of conducting analytical system
- Cleaning, if needed, replacement of optical system
- Test-run of „burn in“ with certificate
- Calibration with certificate
- Pressure Test with certificate, if desired by the user

3.2 Maintenance by the User

It is not necessary to clean the membrane. Although the membrane surface is quite robust, please be extreme careful to not scratch its surface; it is advised to rinse it and eventually use a soft tip swab; compressed air may be used.

To replace the membrane, unscrew the screws to remove the flange. Be careful because behind the membrane is a sintered metal plate and could fell out. *Note: bolts and threads use the metric system.*

Handle the membrane with care by holding it only by the edge. The membrane should be placed with the smooth surface looking toward the water.

In case of any apparent damage (scratches, puncture) replace the membrane immediately. Gouges left by the seal rings are normal, but it is advised to replace the membrane and seal-ring after every time the sensor head is dismounted.

After replacing the membrane, screw the flange crosswise. For better handling, place the sensor upright; to ease the centering of the membrane and preventing the metallic support plate to fall out.



3.2.1 Assembling the Sensor Head

The HydroC™ has at least one sensor head. For maintenance purposes O-Rings and membranes can be replaced.

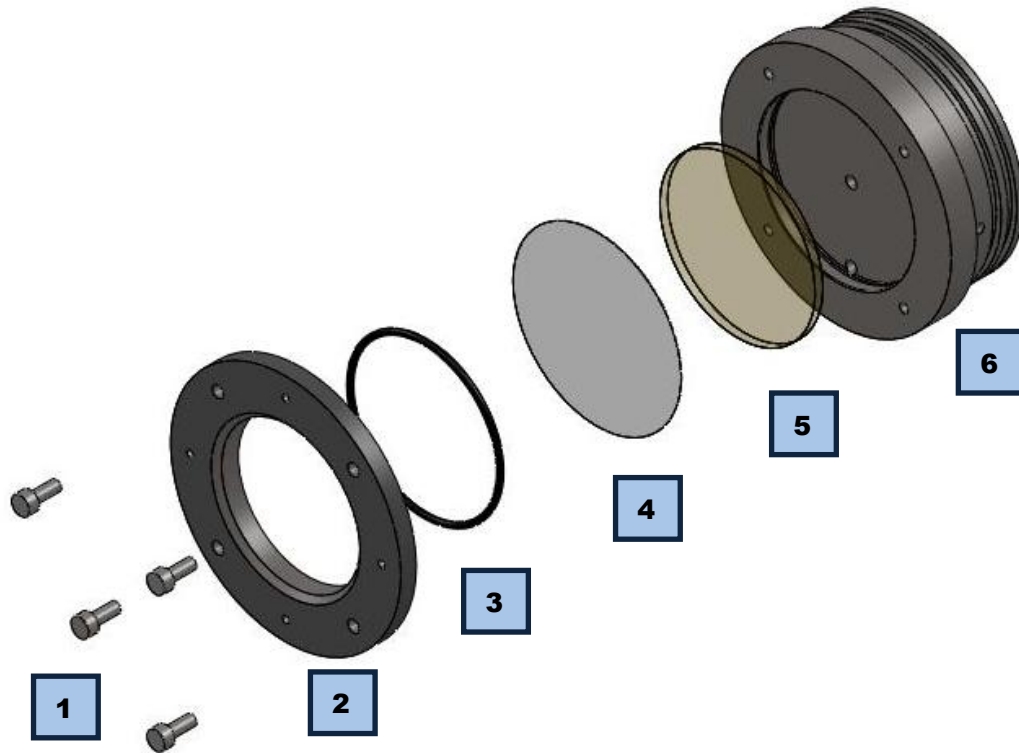


Image 4: Schematic construction of a HydroC™ sensor head

- 1 Screws
- 2 Sensor head clamping ring
- 3 O-Ring
- 4 Membrane
- 5 Sinter metal plate
- 6 Sensor head housing

- Try not to touch the membrane- handle it by holding it only at the edge!
- Do NOT use any (silicone) grease or oil for lubrication purposes on the O-rings! The silicon absorbs methane and distorts the results of measurements being taken.
- It is recommended to replace the membrane after deployment when the sensor is going to be stored unused for several weeks or months. The sensor is delivered with a set of 3 spare membranes; this amount should be enough for one year of use.
- When replacing the membrane, avoid direct exposure of the detector inlets to dust, humidity or particles.
- **Any damage to the membrane or the sensor head can lead to a leak - this may cause a total failure of the HydroC™ system.**



3.2.2 Procedure of membrane change



Image 5: The sensor with a new membrane and the 4mm Allen key.

The protection cap is already removed in the picture above.



Image 6: Remove the retainer flange and O-ring sealing.



Image 7: Place the new membrane on the sinter metal.

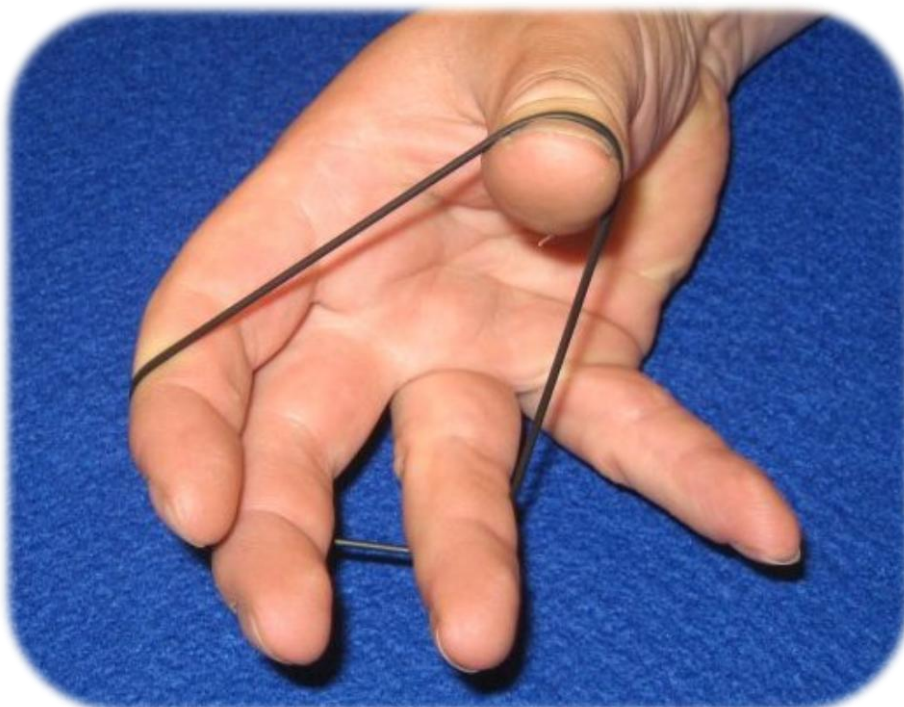


Image 8: To install a new O-ring 56x2 stretch it first.

The O-ring must be stretched first. The no-stretched O-ring it is too small to hold the membrane until all parts are fixed by the retainer flange. Do not use grease to install it!



Image 9: The now stretched O-ring sealing can be pushed on the membrane to fix it. Do not press on the membrane surface; do not rub over the surface of the membrane. Be sure that the membrane has no folds on it.



Image 10: Place the retainer flange on its place above the membrane pressed by the O-ring sealing, be sure that everything is on its place; a constant pressure above the retainer flange is needed; be careful to not scratch the membrane surface with any tool/finger. Tighten the screws clockwise and make a final inspection to check if all screws are fixed.

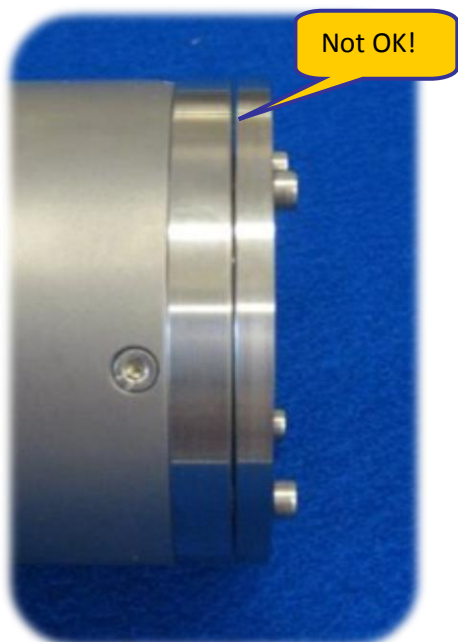


Image 11: A small gap shows the non-constant pressure on the O-ring sealing. Check the O-ring to be well fitted and try again. Tighten the screws clockwise until they are completely fixed.

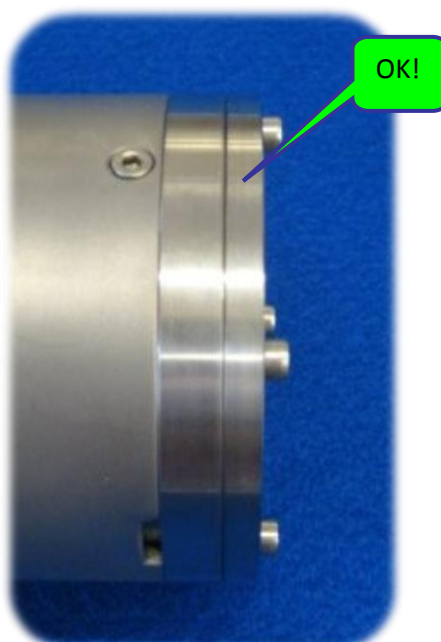


Image 12: Everything seems ok.

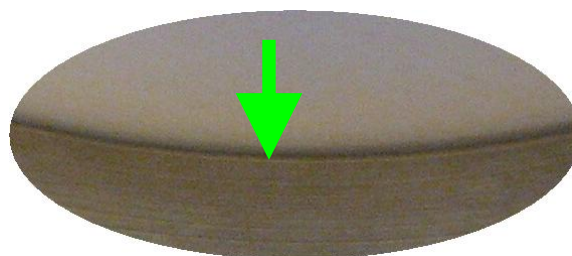
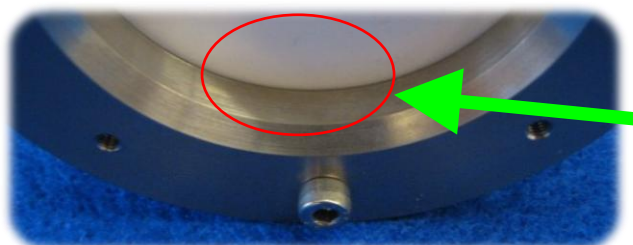


Image 13: Make a final inspection at the front face to check if the O-ring or membrane is not over-pressed or damaged. There should be always a small gap of ~0.2 mm between the retainer flange and the membrane.



4 Operating

4.1 Data logging with CONTROS™ Detect Software

With the CONTROS DETECT Software (for Windows®) all the HydroC™ sensors can be directly connected over RS-232 or RS-485 (or via USB). As an online viewer, all data's are logged and can be processed later with standard tools.

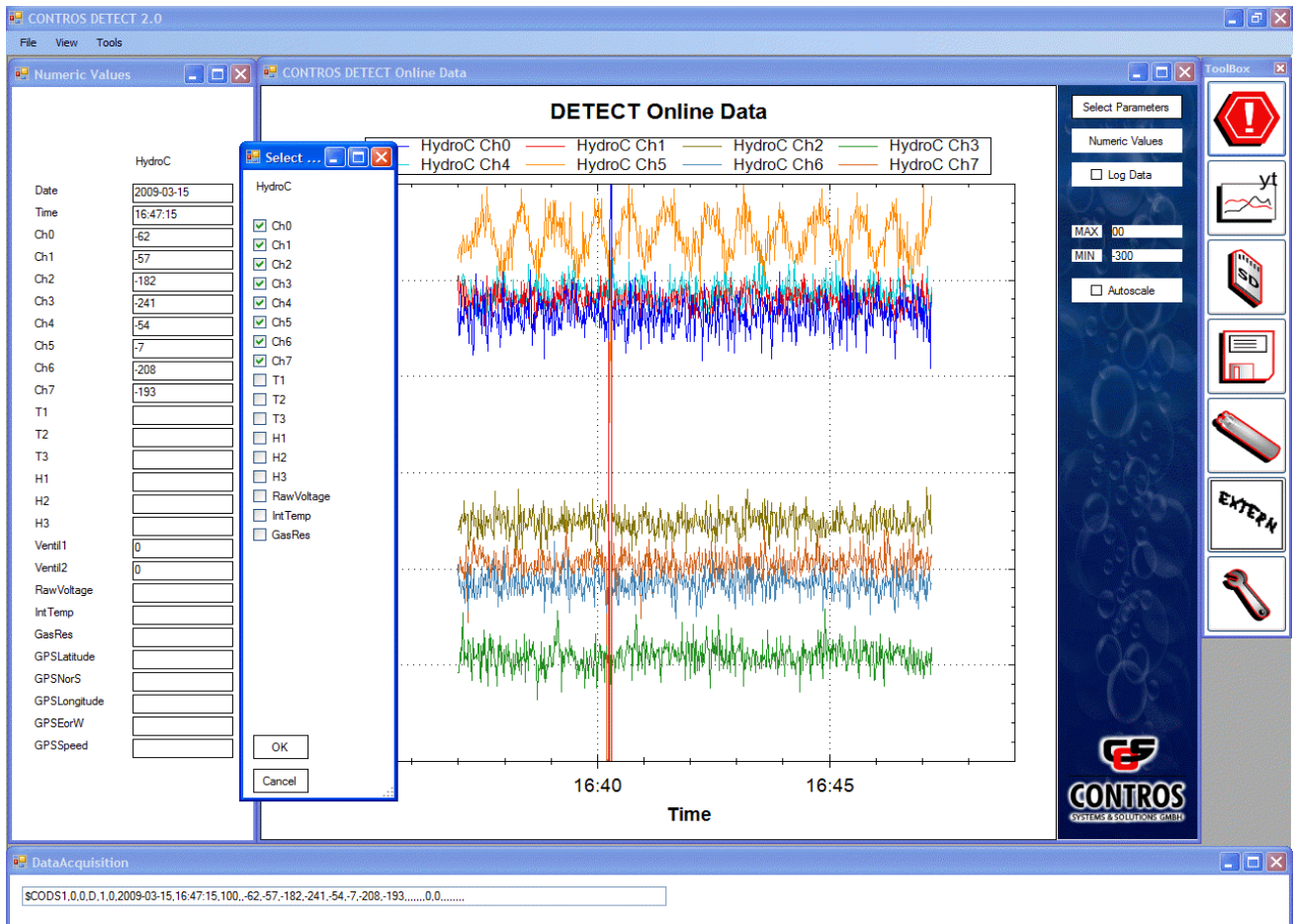


Image 14: Methane signal on the MS-Windows® CONTROS™ DETECT software package.

The CONTROS™ DETECT package supports USB – RS232 converter and virtual COM-ports from COM1 to COM256.

You don't have to set the configuration for the COM-port; the program will configure everything automatically.



4.2 NMEA Data Protocol

4.2.1 Introduction

The „CONTROS™ NMEA Data Transmission Protocol“ is a bi-directional data protocol for communication between different devices. It is suited for standardized communication, like commands and data transmission and complies with the NMEA-0183 specifications.

Features

- NMEA-0183 compatible protocol
- Length of data string up to 255 Bytes
- All data and parameters separated by points
- Checksum marked by star *, may be omitted
- Bi-directional: data and commandos in both directions
- Information is separated into address, format und data

4.2.2 Online Data Transmission

Live measurement data are auto-transmitted in a certain interval in NMEA-1083 format. See below for an explanation of the sample string.

- HydroC™ probes auto transmit measured data in a definable interval (≥ 1 sec).
- Transmission is according to EIA-232 standard (EIA-485 on demand) with 115200 bps,8,N,1.
- Baudrate is user-selectable.
- Auto transmission can be deactivated for command-driven data request.
- Data are transmitted as NMEA-compliant readable ASCII string.

DS4 (Data)

\$	CODS4,	Dest,	Source,	D,	Format,LDN,...	(*Checksum)	CR LF
1	2	3	4	5...33 (comma separated)			

This Data Format DS4 Format 0 is used by all CONTROS HydroC™ Sensors.

Parameter:

1 Identifier	“CODS4”	
2 Destination	“0”, not used	
3 Source	“0”, not used	
4 Data	“D”	
5 Format	Not used yet	0 = this data format
6 LDN	Logical Device Nummer	0 = only one device
7 Date	Date YYYY-MM-DD	
8 Time	Time HH:MM:SS	specified in ISO8601:2000
9 MSec	Millisecond, 0..999	resolution of 10ms or 100ms
10	-	
11 Analog 0	-	
12 Analog 1	internal signal (µV)	Internal NDIR h/g #1 inverted
13 p_NDIR	Gas pressure in the NDIR cell	(mbar x 100)



14 p_in	Gas pressure behind the membrane	(mbar x 100)
15 Analog 4	-	
16 Analog 5	-	
17 Analog 6	-	
18 Analog 7	-	
19 State 1	-	
20 State 2	-	
21	reserved, always empty field	
22	reserved, always empty field	
23	reserved, always empty field	
24	reserved, always empty field	
25	reserved, always empty field	
26	reserved, always empty field	
27 Signal_raw	Raw detector signal	(digits)
28 Signal_ref	Raw reference signal	(digits)
29 T_sensor	Temperature of the NDIR unit	(digits)
30 Signal_proc	Sensor Signal	(digits)
31 Conc_estimate	Fraction of CH ₄ (estimate)	(digits · 10000)
32 Concentration	Concentration of CH ₄ in water	(nmol / l)
33	-	

4.2.3 Commands

Command: CODPV,0,0,R\r\n

Answer: CODPV,0,0,D,0,BOARD-ID,SOFTWARE-ID,HARDWARE-ID,DEVICE-SERIAL\r\n

BOARD-ID: Unique ID-Number of the data collection board

SOFTWARE-ID: Firmware version running on the data collection board

HARDWARE-ID: Hardware version of the data collection board

DEVICE-SERIAL: Unique Serial Number of the device package



5 Trouble shooting

This chapter is made with the support of our clients and partners – your feedback is highly appreciated!

5.1 Communication

5.1.1 No data / communication failure

Problem:

A measurement was started and nothing happens: no curves are displayed; no actual values appear in the signal-legend windows.

The system reports a communication failure with the sensor

Solution:

- Disconnect and connect again an USB-RS232 adapter.
- Check the function of the USB or RS232 Comport in the Windows® "Device Manager"
- Data transmission problem through the RS485/RS232-USB converter: the red LED should flash when the transmission runs. If no transmission happens, the LED is glowing continuously and the sensor gives a signal (Voltage output measured at the connector), check for loose connections. Pull out the energy supply cable and connect it after a few seconds. This will reset the Sensor.
- Check your baud rate and change the sensors baud rate (it is pre-configured with 115200):
 1. Use DETECT terminal window to change the baud rate:
To activate the DETECT terminal window, please go to -->"view" --> "show/hide communication" and type in the line below the string:
COMXX:\$COSCP,0,0,W,19200
(where XX is the com-port number you are currently using)
 2. Use DETECT in another computer.
 3. If not, please try to use another terminal program (f.e. Hercules™) that you can download and type in the following string:
\$\$COSCP,0,0,W,19200<CR><LF>

5.1.2 Peaks in the data

Possible Problem:

Wrong or loose connector

Solution:

- Try to disconnect and connect again at every connector.
- For internal adapters, please contact CONTROS.



6 Attachments

6.1 Spare Parts

6.1.1 Connector

Connector:	SUBCONN® MCBH-8M	male
Cable jack:	SUBCONN® MCIL-8F	female pigtail

6.1.2 Sealing Material

O-Ring Membrane:	56 x 2.0 mm	NBR 50
O-Ring Housing lid:	72 x 2,5 mm	NBR 70

6.1.3 Screws

Screw housing	M6 x 6 mm	DIN 912 Ti Gr. 2
Screw Sensor head	M4 x 6 mm	DIN 912 Ti Gr. 2
Protection cap:	M4 x 15 mm	DIN 912 Ti Gr. 2

6.1.4 Membranes

Standard Applications

CONTROS silicone membranes for fast- shallow-water applications up to 100 m
 CONTROS silicone membranes for standard applications up to 2000 m
 CONTROS silicone membranes HD for rough / standard applications up to 4000 m
 CONTROS silicone membranes extended HD for rough / deep water applications up to 6000 m

Anti-fouling / long term monitoring Applications

CONTROS AF silicone membranes 50 µm for deep water applications up to 6000 m
 Note: longer response time



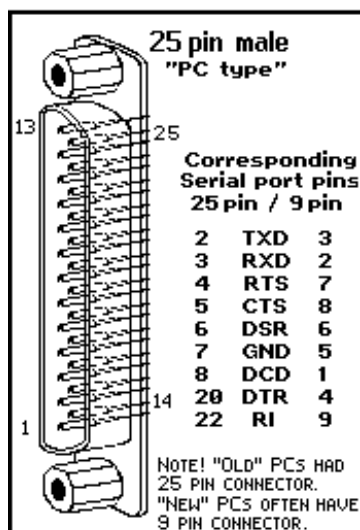
- The Antifouling membrane is only available in 50µm.
- Please keep in mind that the response time increases with thicker membranes.



6.3 Serial Interface

JALKANEN ALBUM - PC TEEREF
SERIAL PORT
COM1, COM2
THIS PAGE WAS CREATED USING ALBUM & QUICKPAGE.
ASK FOR THEM, WHEN YOU NEED
PERFECT ELECTRONIC CATALOGUES.
EMAIL: ALBUM@PRESSE.FI

Signal Ground..... GND --- 5
Ring Indicator..... RI IN --- 9
Data Terminal Ready..... DTR OUT --- 4
Clear To Send..... CTS IN --- 8
Transmit Data..... TXD OUT --- 3
Request To Send..... RTS OUT --- 7
Receive Data..... RXD IN --- 2
Data Set Ready..... DSR IN --- 6
Carrier Detect..... DCD IN --- 1

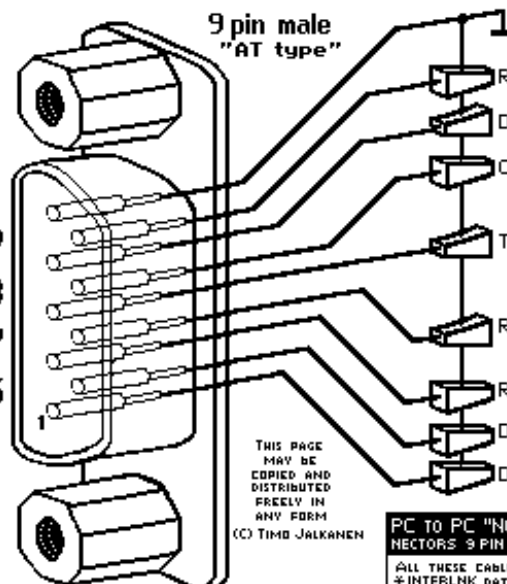


MODEM TO PC "STRAIGHT-THROUGH" CABLES					
25 PIN MALE	2-2	25 PIN FEMALE	2-3	9 PIN FEMALE	3-2
FOR PC	3-3	FOR PC	3-2	FOR PC	4-7
MODEM CON-NECTION	4-4	MODEM CON-NECTION	4-7	MODEM CON-NECTION	5-8
5-5		5-5		5-8	
6-6		6-6		6-6	
7-7 (DTE)		7-7 (DTE)		7-5	
8-8		8-8		8-1	
20-20		20-20		20-4	
22-22		22-22		22-9	

DTE = DATA TERMINAL (OR TERMINATING) EQUIPMENT
DCE = DATA COMMUNICATION (OR CIRCUIT TERMINATING) ED.

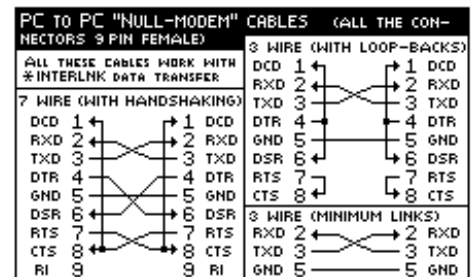
NOTE! IN MODEMS YOU ALWAYS HAVE A 25 PIN FEMALE CONNECTOR, COMPATIBLE TO "STRAIGHT-THROUGH" CABLES ABOVE.

COM1:
I/O ADDRESS 3F8H-3FFH
INTERRUPT IRQ4
COM2:
I/O ADDRESS 2F8H-2FFH
INTERRUPT IRQ3

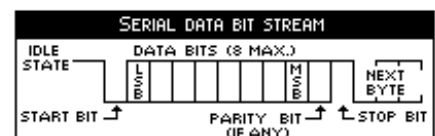


PRACTICAL SIGNAL DESCRIPTION

- ▶ "RING INDICATOR" INDICATES THAT MODEM DETECTED RINGING SIGNAL
- ◀ "DATA TERMINAL READY" TELLS TO MODEM THAT PC IS "READY"
- ▶ "CLEAR TO SEND" INDICATES THAT MODEM IS READY TO RECEIVE DATA FROM PC
- ◀ "TRANSMIT DATA" IS SERIAL BIT STREAM TO MODEM
- ◀ "REQUEST TO SEND" TELLS TO MODEM THAT PC WANTS TO SEND DATA (OR THAT PC IS "READY")
- ▶ "RECEIVE DATA" IS SERIAL BIT STREAM FROM MODEM
- ▶ "DATA SET READY" INDICATES THAT MODEM IS "READY"
- ▶ "DATA CARRIER DETECT" INDICATES THAT MODEM HAS PROPER REMOTE CONNECTION



*INTERLINK/INTERBUS IS PC TO PC DATA TRANSFER FEATURE OF MICROSOFT DOS 6.0 OR GREATER.



From: www.tec.sci.fi/tecref



6.4 CE Certificate



Konformitätserklärung Declaration of Conformity



gemäß DIN 45014 und ISO/IEC Leitfaden 22
in accordance with DIN 45014 and ISO/IEC guide 22

Die Firma: **CONTROS Systems & Solutions GmbH**
The company: **Wischhofstr. 1-3 Bld.: 2**
D-24148 Kiel

Erklärt, dass das Produkt: **HydroC™ / CH₄**
declares that the product: **HydroC™ / CH₄**

Verwendungszweck: **Methan Sonde für Seewasser und Offshore**
Product description: **Methane probe for seawater and offshore**

den folgenden Richtlinien der Europäischen Union entspricht
complies with the following EC guidelines

73/23 EWG Niederspannungsrichtlinie
73/23 EEC Low voltage directive

89/336 EWG EMV-Richtlinie
89/336 EEC EMC directive

Das Gerät erfüllt im Einzelnen die folgenden Normen
The instrument meets the requirements of the following norms

DIN EN 55022
DIN EN 55024

Kiel, 25.06.2010

Peer Fietzek, Technical Director