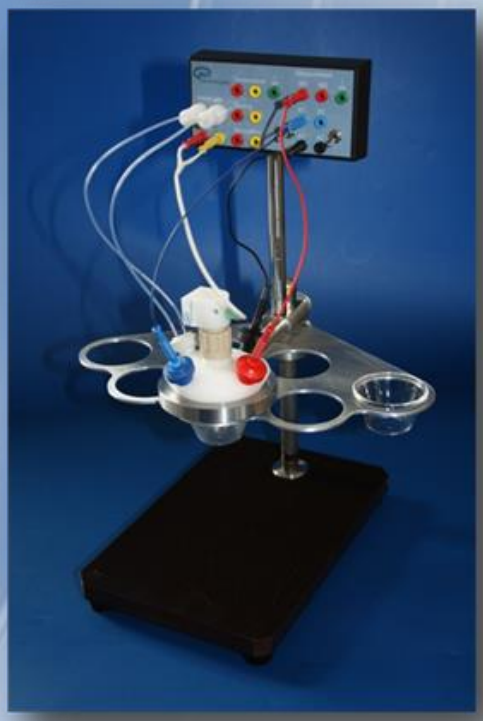
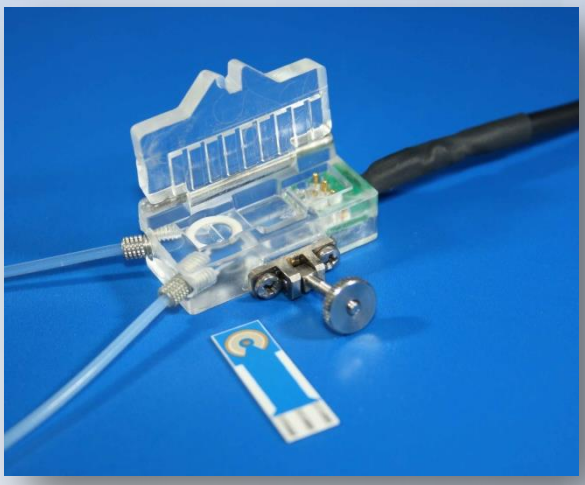
CATALOGUE 2019

BVT Technologies, a.s.





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BASIC ARRANGEMENTS

With classic electrodes

Measurements with:

- ✓ Stirrer
- ✓ Paste electrode
- ✓ Oxygen electrode
- ✓ Classic WE, RE and AUX
- ✓ Glass cell TC4 or termosted TC5

With screen printed electrodes

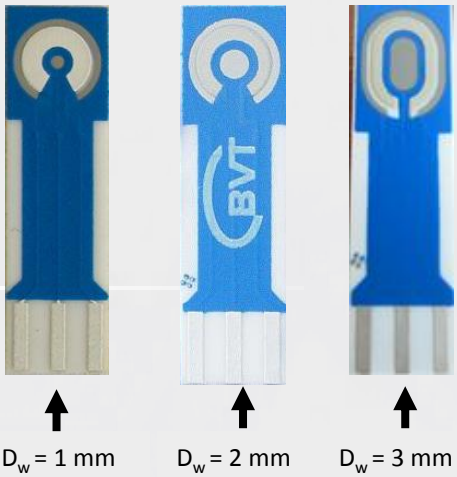
Measurements with:

- ✓ Stirrer
- ✓ KA1.C with sensor (AC1, AC2, CC1, CC2,…)
- ✓ Paste electrode
- ✓ Oxygen electrode
- ✓ Glass cell TC4 or TC5

SPE sensors

DIMENSIONS OF WE
We offer you basic sensors AC1 electrodes with the diameter of WE 1, 2 a 3 mm

US Patent: US7,811,431B2



MEASUREMENT OF SMALL VOLUMES
We offer you AC1 with integrated microreactor (MAC) for measurements of volumes of 20 µl in a closed system

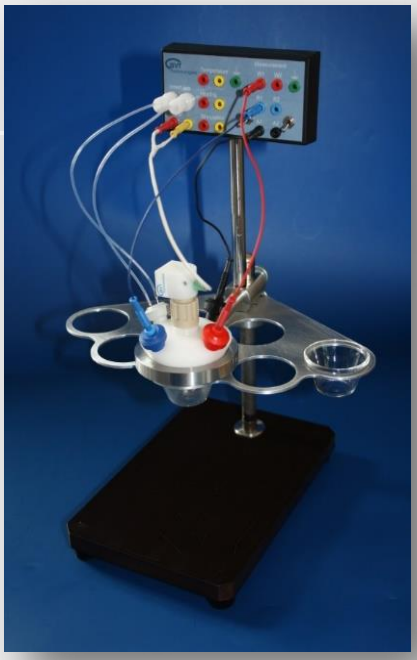
- SENSOR with microreactor (patent applications PV 2009-22)
- small volume and reactor size means that the diffusion can assure equilibrium of concentration in the solution
- there is minimum contamination risk when using toxic materials
- the volume is not changed during measurement by evaporation (the system can be closed)
- the content of the microreactor can be mixed by shaking

TEMPERATURE SENSING INTEGRATION
All sensors can be equipped with heating and temperature sensing element
Thermistor (must be calibrated) x **Pt 1000** (response in agreement of ČSN EN ISO/IEC 17025)

Type	Material of WE	Material of RE and dielectric layer
AC1.	WS: Au/Pt	RS RE from silver Ceramic protection layer with limited resistance to strong acids
	W1: Au	R1 RE from Ag/AgCl (60%:40%). Polymeric protection layer with limited resistance to organic solvents and sonification
	W2: Pt Fragile layer of Pt which can be destroyed by sonification, current over 10 mA and mechanical cleaning	
	W3: Ag	R2 RE from chlorinated silver. Polymeric protection layer with limited resistance to organic acids and sonification
	W4: C	

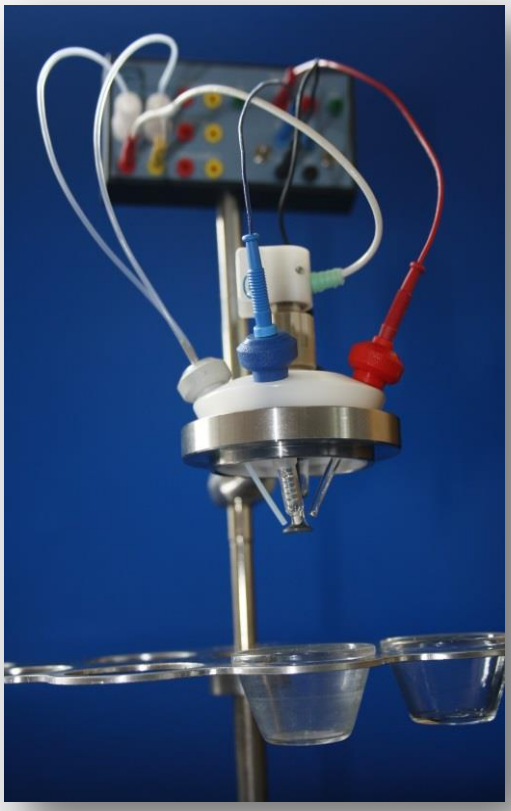
Electrochemical workstation

NEW!



MAIN ADVANTAGES

- ✓ **Simplified measurement set-up**
- ✓ **Colour distinction of electrodes**
- ✓ **Fast and easy change of measured solutions**
- ✓ **Up to 7 measurement positions**



- Electrochemical measuring workstation for glass cells TC6 and TC9 enables fixing a cell with all measurement accessories (classic electrodes, stirrer, holders, stoppers…) and connecting it into a single system. **Geometry of electrodes and stirrer does not change during measurement.**
- The stand can hold up to 7 prepared solutions, 5 of those solutions can be measured by a simple turn of the electrode rack.
- The switchbox reduces the number of outgoing cables to just two cables (one for measurement, and one for supply of measurement accessories).
- Moreover, dosing of gas either into the sample or above its surface can be programmed.

MINISTERSTVO PRŮMYSLU A OBCHODU

The creation of this propagation material was supported by the project **ACTIVE DOSAGE OF CYTOSTATIC** **CZ.01.1.02/0.0/0.0/15_018/0004617** co-financed by the European Union.

Electrochemical Workstation
Workstation electrodes

The electrochemical workstation facilitates the use of BVT electrodes in a simplified well-arranged setup.

BVT offers a new series of electrodes with **colour-coded casings** and connecting cables compatible with the workstation:

Working electrode - WCEc
Materials:
Pt, Ag, Au -Ø 0,01mm – 3mm
Glassy carbon Ø 1mm 2 mm 3mm

Reference electrode - RCEc
Materials: Ag/AgCl

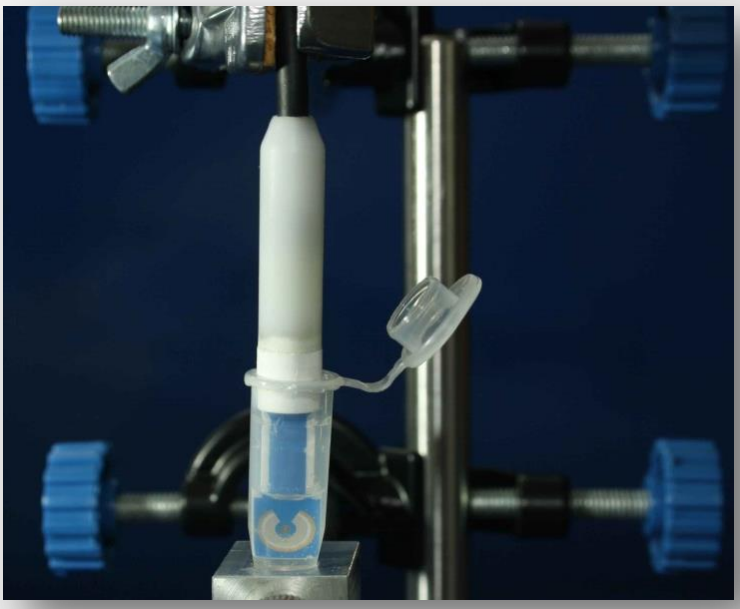
Auxiliary electrode - ACEc
Materials: Pt
Length 8 mm
Diameter 0,5 mm

See www.bvt.cz for more details.

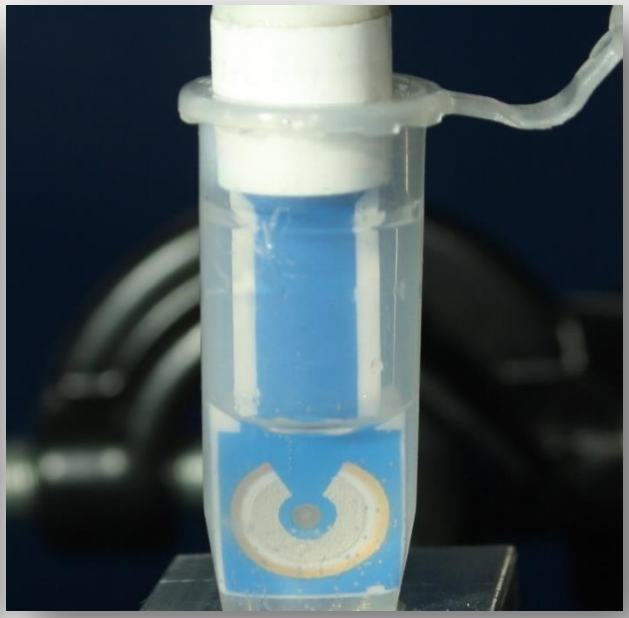
CONNECTORS

SIMPLE CONNECTOR FOR ELECTROCHEMICAL SENSORS
The connector **enables the use of the biosensor** based on the substrates AC1, AC2, AC4, AC11, AC13, CC1, CC2 and TS1 **in glass BVT vessels TC2, TC3, TC4, TC5 and TC6**.

KA1.S, KA2.S
Diameter 8,5 mm
The small diameter of this connector is its main advantage.
It can be inserted into test-tubes, Eppendorf tubes (volume 1,5 ml), or to small vessels for (easy) measurement of small volumes of liquid samples.



Example of fitting into a holder

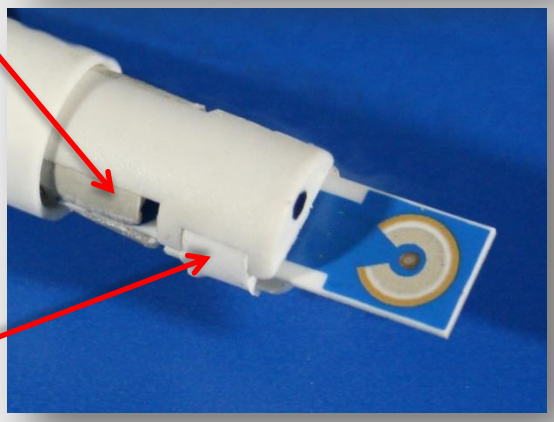


Connector KA1.S with a sensor inserted into Eppendorf tube (volume 1,5 ml)

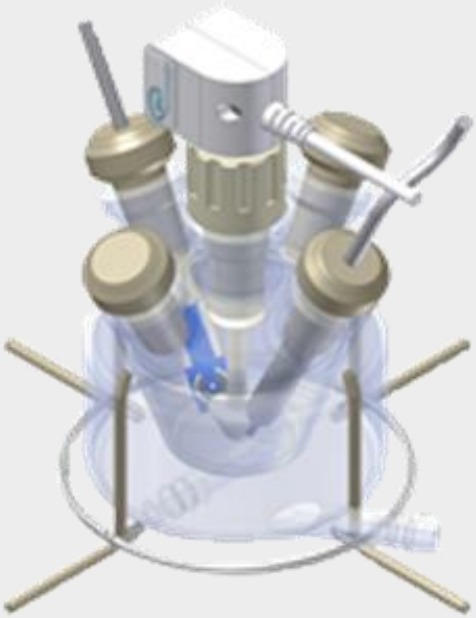
CONNECTORS

SIMPLE CONNECTOR FOR ELECTROCHEMICAL SENSORS
The connector **enables the use of the biosensor** based on the substrates AC1, AC2, AC4, AC11, AC13, CC1, CC2 and TS1 **in glass BVT vessels TC2, TC3, TC4, TC5 and TC6**.

KA1, KA2
Diameter 10,6 mm
The main advantages of KA1 and KA2 connectors are that the contacts are sealed and protected against humidity and their small diameter.
Connector KA1.C.* is recommended to be used with the TC2 and TC3 glass cells. It has standard NJ 8/10 cone which enables its exact positioning.



KA1.C, KA2.C
The cell TC4, TC5, TC6 is recommended for use with KA1.C.*.



KA1.C in TC5 cell together
With electrodes and stirrer ST1

FLOW CELLS

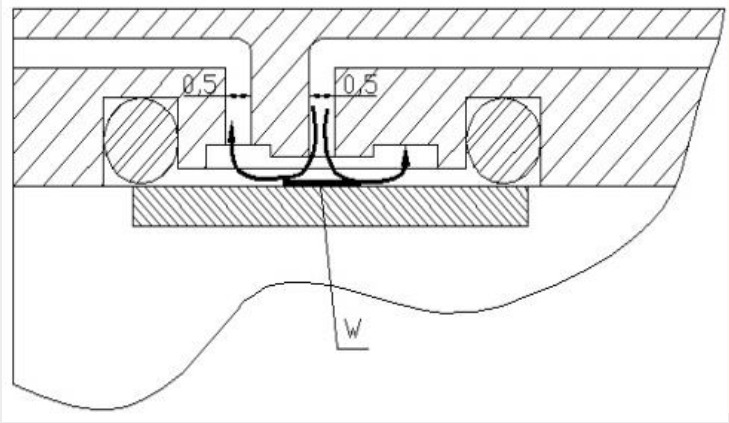
Flow cell FC 2

Cell Material: Polymetylmetacrylate

The sensor is inserted into the slit of cell and tightened by closing of the door. The cell ensures the flow around the working electrode. It is optimised to minimise air bubbles cumulate in the cell. The cell also contains the contact and output cable.

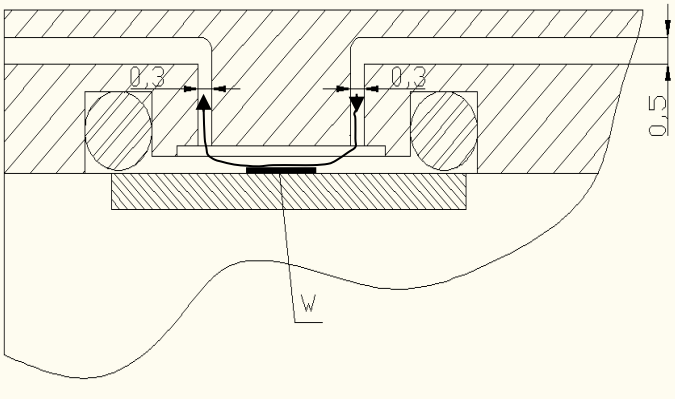
Flow Arrangement – Capilary gap cell „CG“

Original Matsuda solution is derived for jet to semi-infinite wall[1]. More precise description is capillary gap cell[2].



Flow Arrangement – Thin layer cell “TL”

The dependence of current on flow is in Matsuda[5]

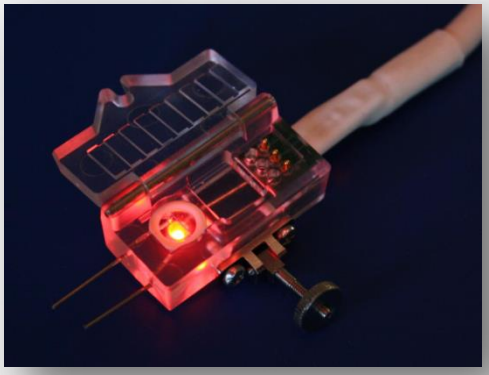


See www.bvt.cz for more details.

We offer flow cells on demand of customers.

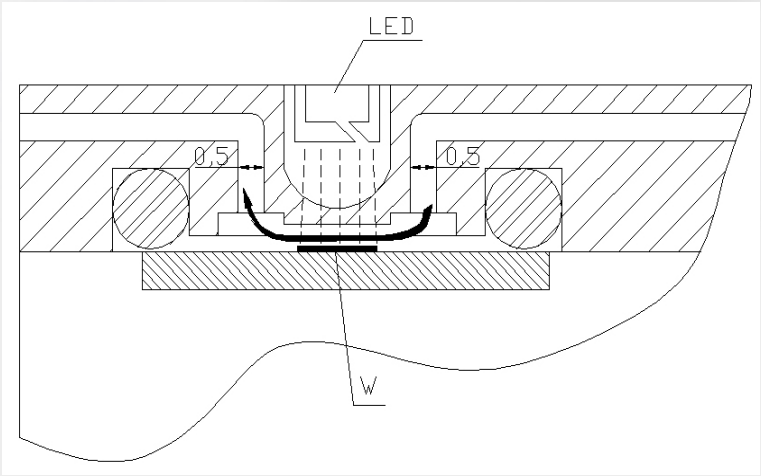
FLOW CELLS

Flow cell FC 3



Cell Material: Polymethylmethacrylate
Flow Arrangement: Thin layer cell "TL"

The flow cell enables the use of AC1, AC2, CC1, CC2 sensor in a flow through arrangement in opto-electrochemical measurements[1,2].



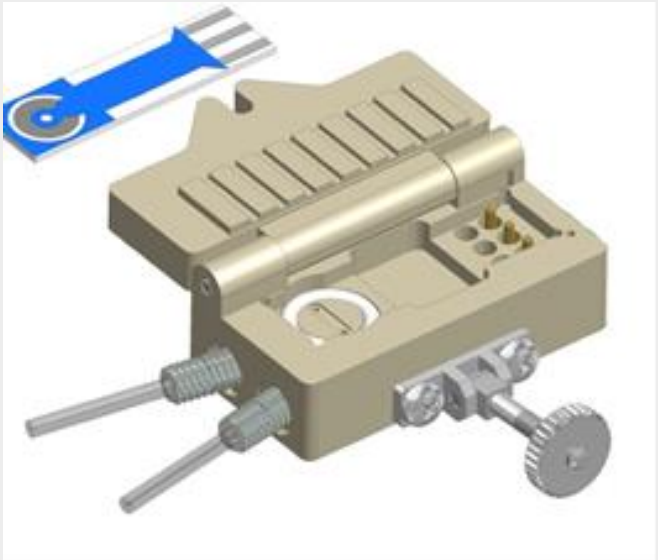
LED Specification

Diameter: 3 mm
Wave length: 350 - 2000 nm
(If special laser LED is used the band width and other parameters can be specified on demand)

Emitting angle: 27 deg

Flow cell FC 4

Cell Material: high quality chemically resistant Polyether ether ketone (PEEK)
Conection: micro fluidic connectors Ministac -permitting a fully compatible connection to chromatography tubing



Flow Arrangement – Thin layer cell "TL"

The sensor is inserted into the slit of cell and tightened by closing of the door. The cell ensures the flow around the working electrode. The cell contains also the contact and output cable.

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FLOW CELLS

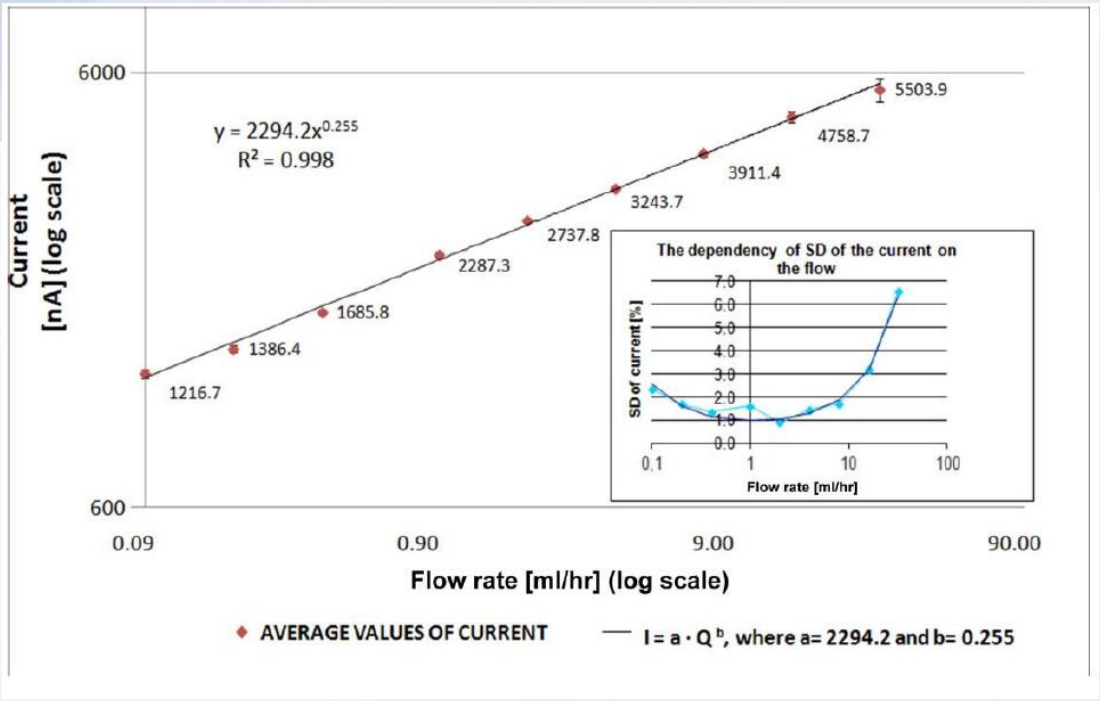


Figure 1. Dependency of cell current on flow rate (log-log scale axis, 10 mM $K_3Fe(CN)_6$).The dependence of SD of current on the flow rate is in inset. [1]

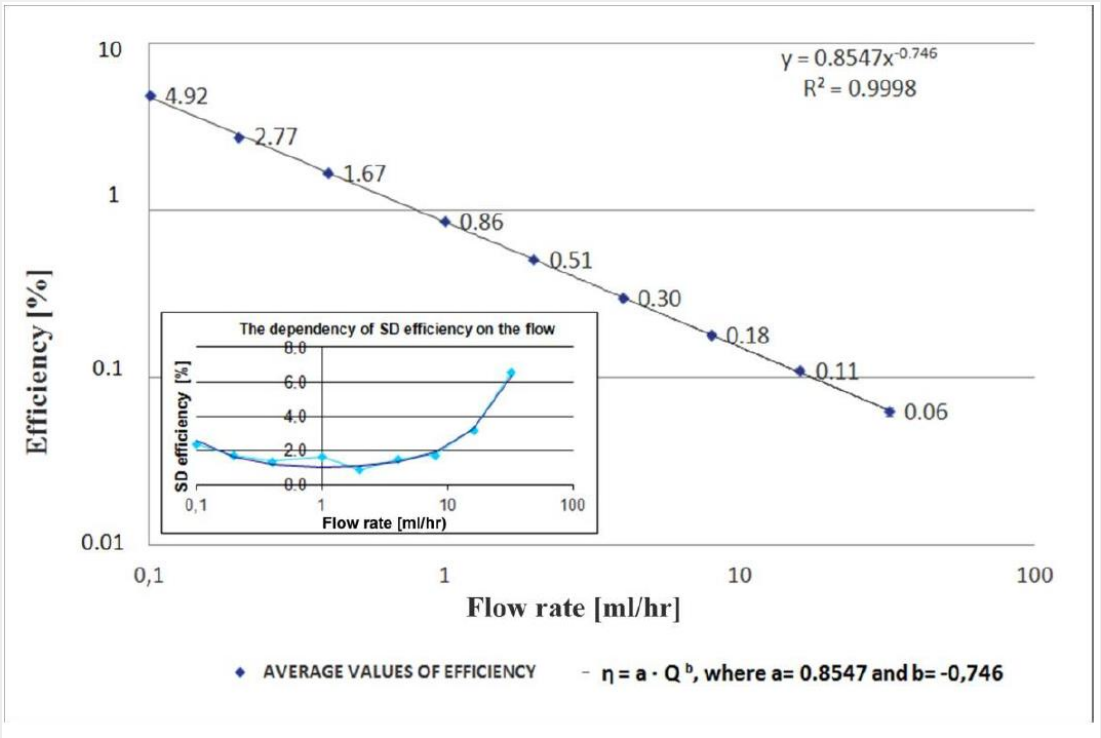


Figure 2. The dependence of the efficiency of electrochemical conversion on the flow rate (log-log scale). [1]

Literature:

1. *Jan Krejčí1, Iva Ventrubová1, Lucie Ježová1, Jan Fischer2, Jiří Barek2,*#*
   Testing of Electrochemical Efficiency of Wall-Jet Cell FC2 as a Tool for Detection of Electrochemically
. **Oxidisable Biomarkers**
   Int. J. Electrochem. Sci., 10 **(2015)** 4922 - 4927

LINEAR AND PERISTALTIC PUMPS

The linear pump LP.* is designed for extremely **small applications**. It can be used in hand-held devices. The main advantages are **flow with no pulsation** and **easy connection** with syringe piston. The pump can supply liquid in flow cells FC2/FC3.

- ✓ Portable device
- ✓ Hand-held usage
- ✓ Pulse free flow
- ✓ Low power application
- ✓ Flow rate: 0,1 - 250 µl/min
- ✓ USB serial port for computer control
- ✓ Possibility to start / stop pump
- ✓ Programmable via PC, the program can be later started independently manually on PC
- ✓ Accuracy 2,5 %

Peristaltic pumps PP10, PP13 – one or two channels

- ➢ Designed for extremely small applications such as medical or military applications
- ➢ Hand-held device
- ➢ The pulsation is minimized for flow cell FC2, FC4
- ➢ Tubing with required diameter should be specified by customer: 0,127 mm, 0,254 mm, 0,504 mm, 0,750 mm or 1,016 mm

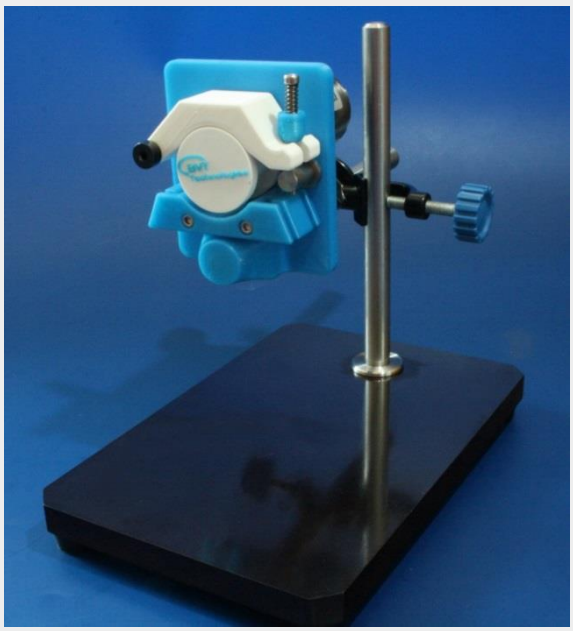
- ➢ Consumption: typical 100 mA
- ➢ USB serial port for computer control
- ➢ Possibility to start / stop pump manually independent of PC connection
- ➢ Supply: Low power application - USB or battery operation

DUAL CHANNEL PERISTALTIC PUMP

NEW!

The peristaltic pump 2PP.T* is simple device for routine laboratory use. The pump has **two channels**. The flow is in one direction. The lifetime of tubing is optimized to maximal value. The pulsation is minimized for flow cell FC2.
The integrated shaft enables fastening by standard laboratory clamps. The pump is supplied by max 12V. The rotation speed is controlled by voltage. The control unit is delivered with pump.
The force on the tubing is adjusted by screw a spring. The pulsation damper can be ordered separately.

Technical Parameters
Double channel
4 rollers
Voltage: 3V-12V
Consumption: 150 mA – 220 mA – 600 mA (min – typical – max)
Starting current: 1000 mA (10 ms)
Flow in range: 100 – 3000µl/min



Model	Dimensions			
	Length	**Height**	**Width**	**Weight**
2PP.M10	201 mm	80 mm	70 mm	450 gms

- ✓ Calibration curve
- ✓ Long term stability
- ✓ Minimized pulsation
- ✓ (pulsation damper)
- ✓ The pump is provided with 2 spare tubing. Required diameter should be specified by customer: 0,127 mm, 0,254 mm, 0,504 mm, 0,750 mm or 1,016 mm.

STIRRER

ST1

- Simple motor
- consists of TC4, TC5, TC6 glass cell,
- revolutions range: 120 - 12000 rpm
- BVT pwm control
- Simple and low cost solution

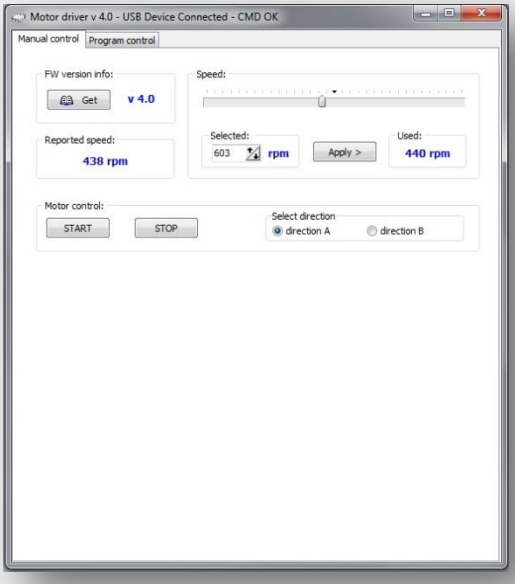
ST1 BVT pwm control unit

- The universal BVT control for stirrer ST1.
- The input voltage 5 V and 0,5A
- Connector USB enable to use it as USB device (PC, Power bank, Mobile charger.
- The output voltage 0-5V 2mm banana plugs

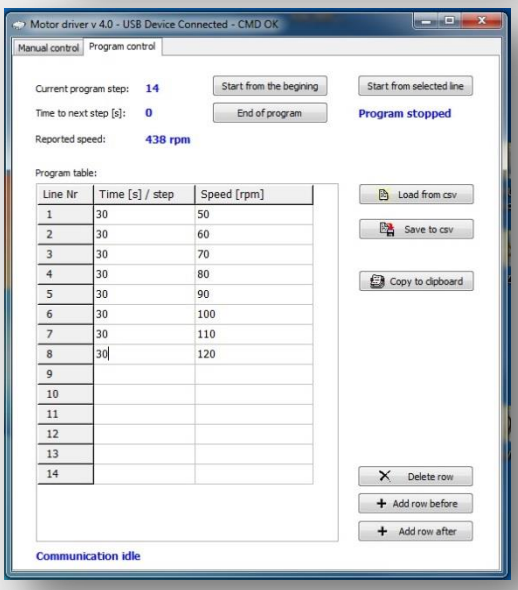
ST3

- Precision Maxon motor with gearbox and encoder optimum mass transport
- minimum hydrodynamic noise
- consists of TC4, TC5, TC6 glass cell, control electronics and SW
- can be used as USB device
- revolutions range: 10 - 1300 rpm
- The revolutions are programable

ST3 CONTROL RPM



Manual control



Program control

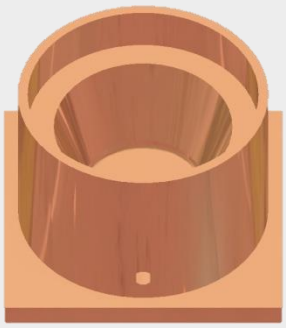
MINITHERMOSTAT

Technical parameters

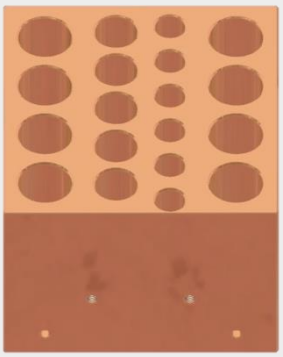
- Minithermostat device is designed for temperature control of analyte solution in electrochemical measurements. The temperature is stabilized and controlled by the Peltier thermal element, which allows to cool or warm the measured electrolytic samples.
- allows temperature control in range: -9,9°C and max. temperature: 49,9 °C
- supply: 12V
- for TC4, TC6,TC9

Type of copper blocks MT1

MT-1.1 For BVT vessels TC4, TC6, TC9



MT-1.4 for Eppendorf microvials
8 x 1,5 ml 5 x 0,5 ml 6 x 0,2 ml



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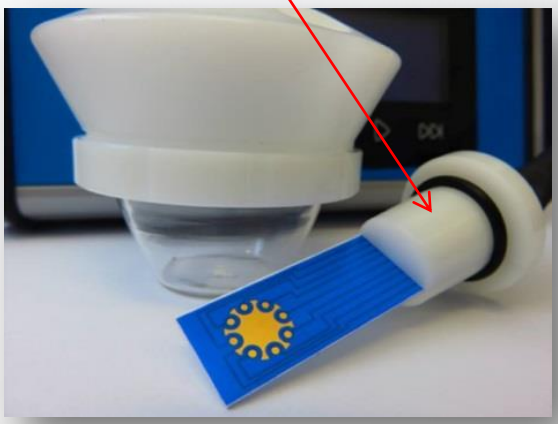
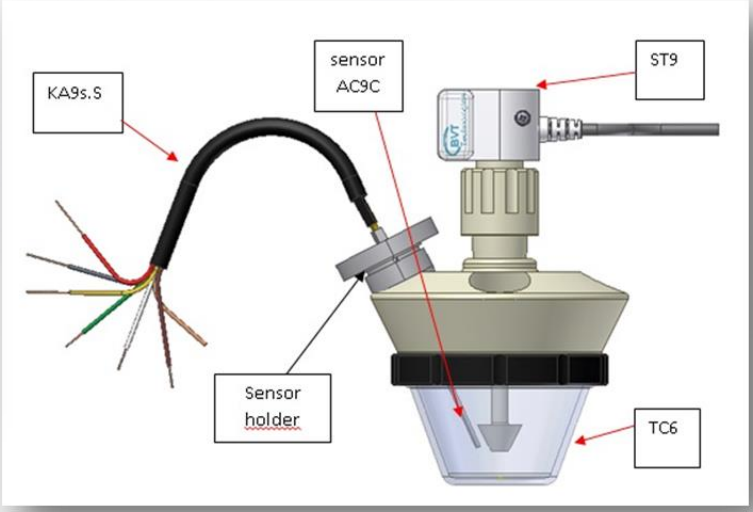
NEW PRODUCTS

Arrangement for measurement with multiarray electrode

AC9C **electrochemical sensor** with an array of **8 working electrodes and 1 common reference electrode**. It is used as a biosensor substrate **for multi-analyte detection**. An integrated connector is at the end of sensor. **Different enzymes can be put on the working electrodes** of the sensor. The electrodes can be made of **variety of materials (Au/Pt, Au, Pt, Ag, C). Materials are applied by screen printing or sputtering.**

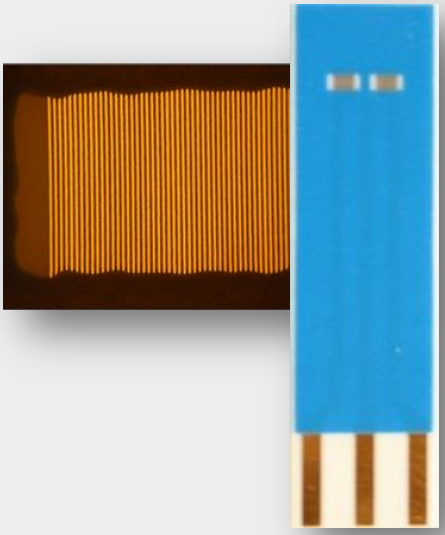
Sensor holder





The construction of stirrer assures **the optimum mass transport with minimum hydrodynamic noise in revolution range 100 - 1000 rpm**. Stirrer is produced from **high quality PEEK material which is chemically resistant**.

Universal stand for TC6, TC9



Detail of interdigitated structure of CC3.W1 sensor applied by sputtering

Reference:
Tomas Bertok, Erika Dosekova, Stefan Belicky, Alena Holazova, Lenka Lorencova, 5 Danica Mislovicova, Darina Paprckova, Alica Vikartovska, Robert Plicka, Jan Krejci, Marketa Ilcikova, Peter Kasak, Jan Tkac. Mixed Zwitterion-Based Self-Assembled Monolayer Interface for 2 Impedimetric Glycomic Analyses of Human IgG Samples in an Array 3 Format, Langmur, 2015

NEW!

DISTRIBUTION
PalmSens 2019

EmStat Go™

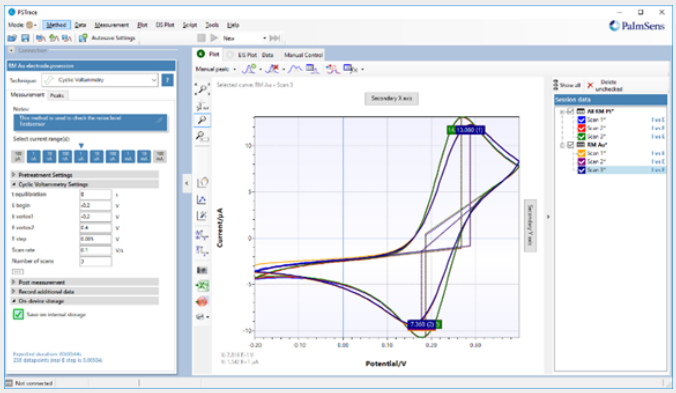
Tailored potentiostat for sensor applications

EmStat Go potentiostat
The EmStat Go is a battery powered*, handheld potentiostat which consists of a standard base unit and a customer-specific Sensor Extension module. The extension module can be equipped with one or more sensor connectors, temperature sensor, or other interface units you require for your sensor application.

Drop Detection
The EmStat Go can be equipped with automatic drop detection to have a PC or mobile app start the measurement automatically as soon as the droplet is present.

The EmStat Go allows you to go to market as soon as your electrochemical sensor is ready for it.

Supported techniques
The following techniques are supported by the EmStat Go:



Voltammetric techniques
- ✓ Linear Sweep Voltammetry LSV
- ✓ Differential Pulse Voltammetry DPV
- ✓ Square Wave Voltammetry SWV
- ✓ Normal Pulse Voltammetry NPV
- ✓ Cyclic Voltammetry CV

The above-mentioned techniques can also be used for stripping voltammetry.

Techniques as a function of time
- ✓ Amperometric Detection / AD
- ✓ Chronoamperometry CA
- ✓ Chronocoulometry CC
- ✓ Pulsed Amperometric Detection PAD
- ✓ Multiple Pulse Amperometric Detection MPAD
- ✓ Open Circuit Potentiometry OCP
- ✓ Multistep Amperometry MA

Where possible, the electrochemical techniques can be applied using auto ranging which means that the instrument automatically sets the optimal current range. The user can specify a highest and lowest current range in which the most appropriate range is selected automatically.

CUSTOMER SUPPORT

TRAINING – usage of sensors, training of work with our instruments and apparatus

- ✓ Glucose sensors, their use and measurement
- ✓ AChE sensors, their use and measurement
- ✓ Activity of enzymes measurement
- ✓ Inhibition of enzymes measurement
- ✓ Detection of organophosphorus and carbamate pesticides
- ✓ Biosensors based on interaction between algae and analyte
- ✓ Detection of herbicides
- ✓ Measurement of bioavailable toxic compounds
- ✓ The application of biosensor on demand of customer (If necessary the cost of preparation and special sensors or chemicals is added to the standard price.)

ORGANIZATION of workshops, project meetings

The training activities can be connected with workshop or summer school with interesting social program.

CURRENT PROJECTS

BVT Technologies was granted projects for:

ACTIVE DOSAGE OF CYTOSTATIC - CZ.01.1.02/0.0/0.0/15_018/0004617, co-financed by the European Union.
The aim of the project is the R&D of a prototype of device enabling continuous monitoring of cytostatic concentration in venous blood, which enables optimal dosage of cytostatic and maintaining its optimal effective concentration.
The device will be the basis for a system for enabling a controlled dosage of drugs with feedback. The device will detect Doxorubicin and its analogues. The project will produce two prototypes of the device. Prototypes will serve for following research leading to production of instruments for scientific clinical workplaces. The financial resources obtained from the sale of instruments to scientific workplaces will be used to complete clinical trials and obtain a permit to sell the equipment as a standard medical device or licence the device.

MODULAR TECHNOLOGICAL UNIT FOR THE PROCESS CONTROL IN THE BREWING PRODUCTION - Project TRIO: FV30332
The aims of the project are:

1. Research, development and implementation of a functional sample instrument for quick determining the concentration of maltose, which will be used in brewery conditions.
2. The unit for sample pretreatment allowing the connection of additional sensors - analyzers (E.g. sensor for diacetyl, alcohol, spectrometric measurements ...)
3. Laboratory instrument will consist of autonomous units of the analyzer and sample preparation. The sample preparation may be used alone.

AUTONOMOUSLY MOVING PLATFORM FOR MONITORING POST-MINING PIT LAKES AS EARLY DETECTION OF CATASTROPHES - 7D19007, co-financed by the Ministry of Education, Youth and Sports of the Czech Republic
The aim of the project is to develop an autonomous floating platform with a self-contained navigation system which will be usable for everyday measurements and evaluation of detected parameters in order to determine water quality in lakes created by recultivation of former industrial sites, as well as in shallower water reservoirs in general. The platform will also enable official authorities and persons responsible for the maintenance of the water reservoirs to perform basic maintenance works. From the commercial point of view, this system for monitoring and evaluation of acquired data presents a worldwide innovation.

BVT assures the technical and scientific support for project

THE VIBRATION TABLES OF THE NEW GENERATION - CZ.01.1.02/0.0/0.0/17_107/0012337, co-financed by the European Union
The aim of the project is to implement a new generation of vibration tables used for compacting of concrete and ceramic mixtures, as well as other loose materials, into manufacturing practice. The new vibration tables enable to set the vibration frequency independently on the excitation force. The project will result in 2 functional samples of vibration tables with the option to set the kinetic moment of the excentres to several predefined values and 2 functional samples of vibration tables with a fluently adjustable kinetic moment of the excentres, the value of which can be adjusted during the process of compacting.

INTERNATIONAL REPRESENTATIVES

C-Tech Innovations (https://www.ctechinnovation.com)
In 2019, BVT became a distributor of C-Tech Innovation's C-Flow product range.
C-Flow is a range of electrochemical cells and systems produced by C-Tech Innovation, a specialist in electrochemical technology based in the UK. With 50 years' experience in providing technology solutions and equipment, C-Tech has a deep institutional understanding of electrochemistry and the needs of re-searchers, engineers and technicians working in the field. Dissatisfied with the solutions currently on the market, C-Tech has poured those years of expertise into creating the equipment they wanted to use – the most versatile and easy-to-use electrochemical cells and systems in the world.

BASI (http://www.basinc.com)
BASi provides drug developers with superior scientific research and innovative analytical instrumentation, which saves time, saves money, and saves lives, to bring revolutionary new drugs to market quickly and safely.

Better Data Driving Better Decisions

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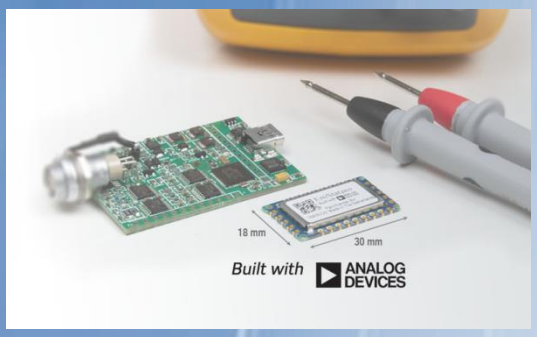
INTERNATIONAL REPRESENTATIVES

PalmSens
Compact Electrochemical Interfaces



PalmSens (http://www.palmsens.com)
The aim of PalmSens is:
To provide developers and producers of electrochemical sensors with portable, battery powered or low-cost and fully programmable electronic devices. These devices can be modified according to specifications given by users.
To promote the use of electrochemical sensors outside dedicated laboratories, by supplying handheld instruments as well as specific electrochemical sensors.
To provide researchers with electrochemical instruments at reasonable costs.

eDAQ (http://www.edaq.com/)
eDAQ manufactures e-corder and PowerChrom data recording systems for electrochemistry, chromatography, flow analysis, contactless conductivity, sensor recording, HiRes EIS, teaching and research.

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QRINS (http://www.qrins.com)

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