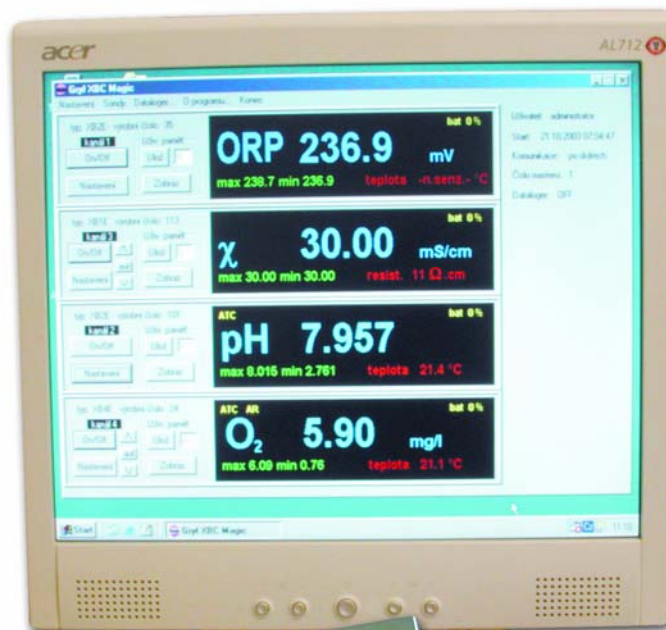


Gryf



Magic

Measuring system Magic

System Magic uses a smart probe connected to a PC or a notebook or a PDA. The most important part of the instrument is its software, which makes it different from all the other so far produced instruments. The main strategy while developing this system was to create an all-purpose measuring instrument which would be able to measure any value, so that the user would not have to buy several instruments (pH meter, conductivity-meter, etc.). An ordinary PC, which is nowadays a standard equipment of every workplace, can be used to work with this Magic system. The customer can also buy a set corresponding to his needs and add more values later. Thanks to this feature this instrument can replace not only simple, one-purpose measuring instruments but also very complicated combined instruments of the highest class. Construction of the system: a sensor (for example pH, ORP, ISE electrode, conductivity sensor, oxygen sensor, temperature sensor, etc.) is connected to the measuring head. This set is called a **smart probe**. Here the analogue signal from the sensor is changed into a digital one. The digital signal is then cable transferred via interface into a PC. The interface connection is possible via an RS 232 (COM) port or a USB. The system Magic XBM has the interface built-in directly into a PDA. The temperature can be measured together with every other measured value.

The Magic system enables:

- To measure on several channels at a time (XBC 4 channels, XBM 3 channels)
- More users working with a possibility to save their own user's configuration.
- To measure a larger amount of samples with a possibility to store and name the obtained values.
- To measure with a high level of comfort and accuracy.
- The user's setting of the digital filter and statistical calculations.
- The voltage controlling of titration.
- A warning when exceeding the preset values.
- A DATALOGGER function which allows collecting the measured values in an adjustable interval.
- To export the values into other formats (DBF, CSV, TXT).
- To store and print out the records of measuring and calibration.
- A maximal support of the SLP (GLP) report.
- Recording and storing all activities performed on the system.
- Upgrading to new probe types produced in the future.

This measuring system can be combined from below components:

Laboratory and stationary measuring system **Magic XBC**

Portable measuring system **Magic XBM**

Measuring head

XB2 - pH, ORP, ISE measuring

XB4 - oxygen measuring

XB1 - conductivity measuring

XB5 - unimeter (incoming voltage + current). The possibilities of Magic system are enlarged. A sensor for any kind of value (with a defined current or voltage output) can be connected.

Measuring system **Magic XBC**

Suitable especially for laboratories and clean operating. Its advantage is that any standard computer can be used. The system can be partially portable by using a notebook computer. Magic XBC enables the user to measure four values at a time (depending on the type of the smart probe) and gives a possibility to use laboratory or submersible probes). All types of smart probes are interchangeable and compatible. The PC interface connecting the probes with a PC includes outlets which can be allocated to any measuring channel. The outputs can be used for example for automatic titration control or for warning when exceeding the measured value.

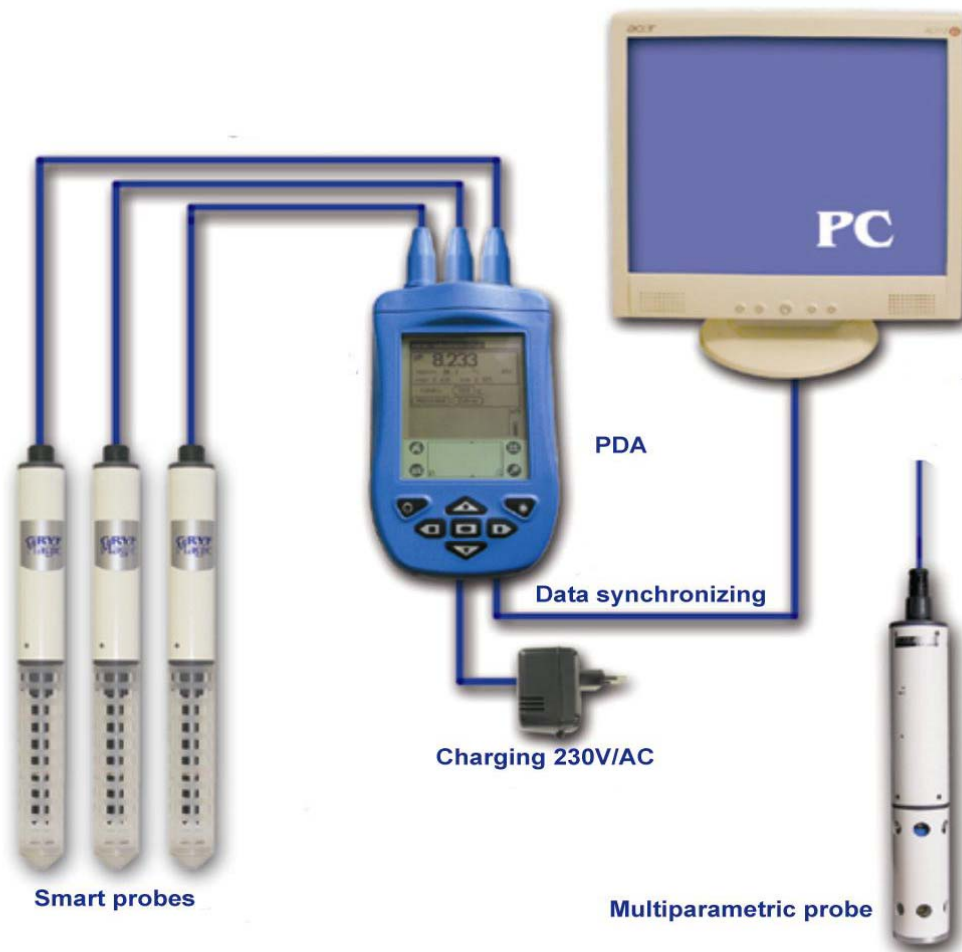
Running of the Magic XBC system does not block the PC for other operations. It can run also as the background.



Specifications

Probe connection	cable
Number of connected probes	1 ÷ 4.
Power supply of the probes	Via a connecting cable The probes are galvanic separated from the environment
SLP (GLP) report supporting	yes
PC connection	RS232 (COM port) or USB interface
User's data memory	100 values / channel
Circle data memory	200 values / channel
Measuring period	adjustable, 1 ÷ 60 sec.
Datalogger – memory capacity	Limited by the HD capacity
Datalogger - record period	1 sec. ÷ 24 hrs.
Power supply	External source 8 ÷ 15V DC/ 200mA, or from the USB
Electronic switches (logical outlets) 4x	28V, 100mA DC
Voltage output	0 ÷ 1V , max. 2mA
Working temperature range	0 °C ÷ 50 °C
Storage temperature range	-20 °C ÷ 80 °C
XBC Interface size	148 x 129 x 50 mm
Coverage	IP40
PC requirements	free port RS232 (COM) or USB, Pentium 75MHz, W95,W98,WME,W2000,WXP

Measuring system **Magic XBM**

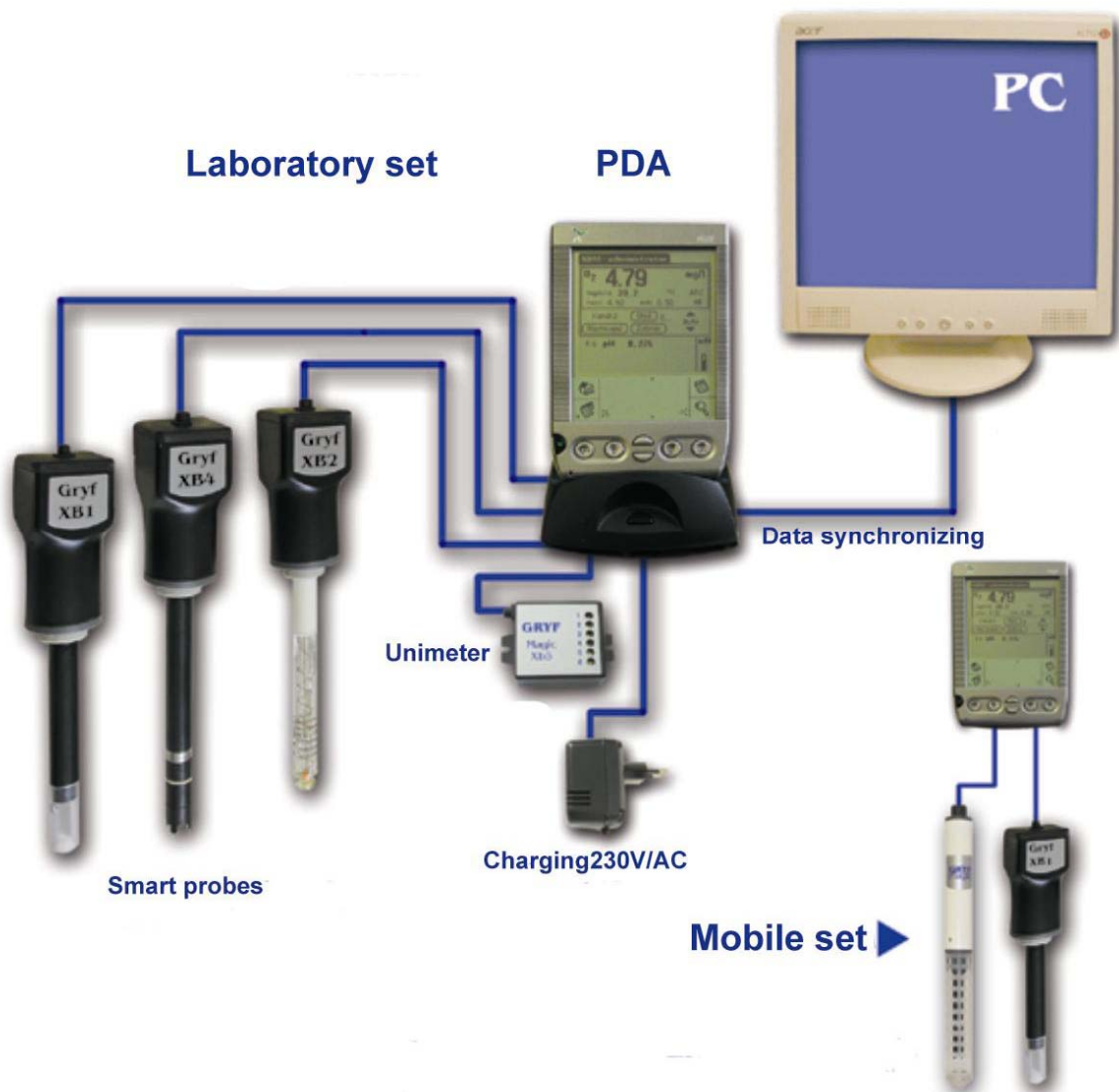


It's a portable measuring system with IP67 coverage. These features pre-determine Magic XBM to outdoor measuring and working in heavier climatic conditions. The system enables to measure three values at a time (depending on the type of the smart probe) and gives the possibility to use a submersible probe with IP 68 coverage. Laboratory probes can be connected as well. All types of smart probes are interchangeable and compatible. The linking interface is a part of the PDA.

The time of data recording during the DATALOGGER function

Example: When the record interval is 20 minutes, the outdoor XBM can work about 1 month on its own internal energy source. A reserve accumulator can be supplied for longer lasting or more frequent monitoring.

Another version of Magic XBM is a bench PDA, which can measure up to 4 values at a time. The PDA is placed in a voltage bolster from which up to 4 sensors can be supplied. Next to the bolster one sensor can be connected directly to the PDA. **When the PDA is not used for measuring, it can be used as a personal organiser.**



This version of Magic XBM is capable of precise laboratory measurements and can replace all types of bench and portable measuring instruments

Specifications

Probe connection	Cable
Number of connected probes	1 ÷ 3 (bench version 1÷4)
Power supply of the probes	Via a connecting cable Probes galvan.separated from the environment
Supporting of the SLP (GLP) report	yes
PC connection	PDA with interface or USB2
Minimal PC requirements	free port RS232 (COM) or USB, Pentium 100MHz, W98,WME,W2000,WXP
User data memory	Shared and separated record
Circle data memory	100 values / channel
Measuring period	adjustable, 1 ÷ 60 sec.
Dataloger – memory capacity	Limited by the PDA memory (16MB) 1MB...approx. 30000 values
Dataloger – record period	2 sec. ÷ 24 hours
Power supply	Internal accumulator, loading-external source 230VAC/12V DC
Working temperature range	0 °C ÷ 50 °C
Storage temperature range	-10 °C ÷ 60 °C
Coverage	IP67 (not the bench version)
PDA requirements	Palm OS 3.5 or higher
Data storage	Inner PDA memory Transfer of the data into the PC

Measuring head XB2 - pH, ORP, ISE



This measuring head enables the user to measure several values with various types of sensors. The connector to connect the sensors is built-in inside the head. After the sensor is connected the system recognises the type of the measured value so that the user does not need to set the system or calibrate it. Sensors at service are:

- **pH incl. temperature**
- **ORP** – oxidation-reduction potential
- **ISE** – measuring with ion-selective electrodes



Specifications Measuring head XB2

Power supply of the probe	Cable via XBC Interface
Coverage	IP40, submersible version IP 68
Temperature measuring range	-20 °C ÷ 120 °C
Temperature measuring accuracy	+/- 0,2 °C; +/- 1dig.
pH ; mV measuring range	-1.000 ÷ 15.000 pH; -1200.0 ÷ 1200.0mV
pH ; mV measuring accuracy	+/-0,004; +/-0,01 %; +/- 1dig.
Temperature compensation	Automatic, manual -10 ÷ 110 °C

The choice of preset substances for measuring ISE

Value indication	Conversion 1 mol/l = x g/l	Valency (charge)
NO ₃ ⁻	62	-1
K ⁺	39	1
S ²⁻	32.1	-2
Ag ⁺	108	1
Na ⁺	23	1
SCN ⁻	58	-1
Ba ²⁺	137	2
Li ⁺	6.9	1
ClO ₄ ⁻	99.5	-1
CO ₂	44	*
Cl ⁻	35.5	-1
Cu ²⁺	63.5	2
CN ⁻	26	-1
F ⁻	19	-1
BF ₄ ⁻	87	-1
J ⁻	127	-1
Pb ²⁺	207	2
NH ₄ ⁺	18	1
NH ₃	17	*
Br ⁻	80	-1
Cd ²⁺	112	2
Ca ²⁺	40.8	2

* They are not typical ISE electrodes (do not measure ions), but gas electrodes



Measuring head XB1 – conductivity

Conductivity measurements are carried out by a 4- or 2-electrode system. The 4-electrode method is used on the upper three measurement ranges, which guarantees high accuracy in high values of conductivity. The other two ranges (200,0 $\mu\text{S}/\text{cm}$ and 20,00 $\mu\text{S}/\text{cm}$) are measured by a 2-electrode method. However everything is performed via one sensor only.



Specifications Measuring head XB1

Power supply of the probe	Cable via XBC Interface
Coverage	IP40, submersible version IP 68
Conductivity measuring range *	0,00 ÷ 20,00 (50,00) $\mu\text{S}/\text{cm}$ 0,0 ÷ 200,0 (500,0) $\mu\text{S}/\text{cm}$ 0 ÷ 2000 (5000) $\mu\text{S}/\text{cm}$, 0,00 ÷ 20,00 (50,00) mS/cm 0,0 ÷ 200,0 (500,0) mS/cm
Conductivity measuring accuracy	0,5 %; +/- 1dig.
Temperature correction constant	infinitely adjustable 0÷3% / K, according to the standard EN 27 888
Relative temperature	20°C / 25°C
Resistance measuring	5,0 Ω ÷ 2000 $\text{k}\Omega\cdot\text{cm}$, in 5 ranges
Concentration measuring range	0 ÷ 200 g/l (up to 300 mS/cm) in 3 ranges
Conductivity-concentration conversion constant	infinitely adjustable 0,20 ÷ 2,00
Fixed value for NaCl ,KCl, NaOH	0 ÷ 200 g/l, 0 ÷ 20% (up to 300 mS/cm) in 3 ranges
Temperature compensation **	Automatic -5 ÷ 110 °C
Temperature measuring range	-20,0 ÷ 120,0 °C
Temperature measuring accuracy	+/- 0,2 °C; +/- 1dig.

* The range depends on the preset temperature compensation scope (see „Temperature compensation“)

** The currently used conductivity sensor has the maximum usable temperature 60°C

Measuring head XB4 – oxygen concentration



This measuring head offers the user measurements in two scopes. They can be changed-over manually or automatically. The oxygen concentration measurements use automatic temperature compensation (ATC) and manual atmospheric pressure compensation.



Specifications Measuring head XB4

Power supply of the probe	Cable via XBC Interface
Coverage	IP40, submersible version IP 68
Oxygen measuring range	0,00 ÷ 10,00 mg/l, 0,0 ÷ 200,0 % 0,0 ÷ 80,0 mg/l, 0 ÷ 800%
Oxygen measuring accuracy	0,5 %; +/- 1dig.
Temperature measuring range	-10 ÷ 50 °C
Temperature measuring accuracy	+/- 0,2 °C; +/- 1dig.
Temperature compensation	Automatic 0 ÷ 50 °C

Measuring head XB5 – unimeter-thermometer

Measuring head XB5-un2 - 2-canal unimeter

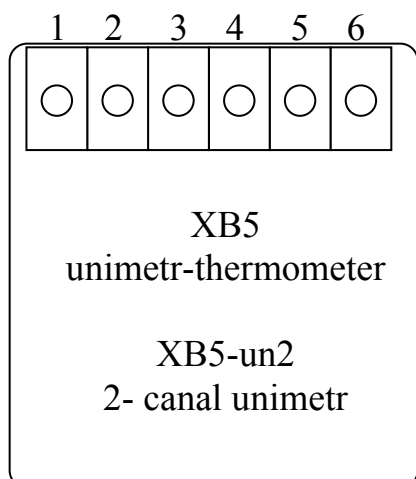


Measuring head XB5 creates a multi-purpose measuring instrument, which can display the values of the input voltage and currents and adjoin other values to them. This value can be given a value name and unit according to a real measured case. Measuring head XB5-un2 measures on 2 independent channels.

Specifications of the measuring heads

	XB 5	XB 5-un2
Power supply of the probe	Cable via interface Magic XBC	
Coverage	IP40, in submersible version	IP 68
Number of cannels	1 + temperature	2
Ranges of unimeter measurements	$\pm 10,000 \text{ V}$; $\pm 5,000 \text{ V}$; $\pm 1,0000 \text{ V}$ $\pm 500,0 \text{ mV}$; $\pm 100,00 \text{ mV}$ $\pm 20,00 \text{ mA}$; $\pm 5,000 \text{ mA}$	
Input resistance of the voltage inputs	$>1 \text{ M}\Omega$	
Input resistance of the current input	50Ω	
Unimeter accuracy	$\pm 0,01 \%$; $\pm 1 \text{ dig.}$	
Temperature measurement range *	$-50,0 \div 200,0 \text{ }^\circ\text{C}$	
Temperature accuracy	$\pm 0,2 \text{ }^\circ\text{C}$; $\pm 1 \text{ dig.}$	
Temperature sensor	Ni 1000, 6180 ppm	

* the range depends also on the type (resistance) of the temperature sensor.



XB5	XB5-un2
input	canal input
1. temperature	A 1V, 5V, 10V,
2. temperature	A 20mA, 5mA
3. 10V, 5V	A shared clamp
4. 1V, 500mV, 100mV	B 1V, 5V, 10V,
5. 20mA, 5mA	B 20mA, 5mA
6. shared clamp	B shared clamp

Multipurpose probe XBQ4



It is a submersible combined probe connected to the MAGIC XBM measuring system. This system enables to measure four different values at the same time. The probe is produced in a submersible version which makes it suitable especially for outdoor monitoring and measuring. The diameter of 60 mm enables the probe to be used for multimetric measurements in wells. A single connection cable makes the manipulation easy.

A unique, portable and very efficient monitoring system can be created by connecting this multipurpose probe with the XBM outdoor system with IP67 coverage.

The production letting: it is possible to select the measured values and their number before production. The probe is produced in two basic versions.

A Standard set includes: temperature sensor and modules to measure pH, ORP(ISE), conductivity and oxygen (up to four measured values, however all four are not a condition, the customer decides).

A set with a pressure sensor includes temperature and tensometric sensors to measure the depth of immersion. Other three different values can be added upon the customer's request.

Specification Multipurpose probes

The probe type	XBQ4	XBQp4
Power supply of the probe	Cable from MEZ 1000	
Coverage	IP 68 submersion max. 25 m	
Temperature measuring range	-10 ÷ 50 °C	
Temperature measuring accuracy	± 0,2 °C; ± 1dig.	
Level measuring range	0 ÷ 25m	
Level measuring accuracy	0,4 % of the range	

Other values depend on used modules, measured values (according to the parameters of mentioned measuring heads)

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