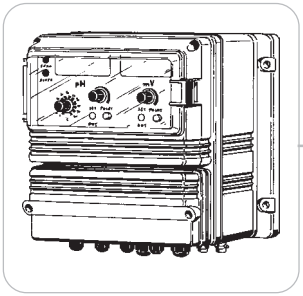
This manual contains important safety information about installation and use of this equipment. Ignoring this information could result in injuries or damages.

It is strictly forbidden to use this equipment with radioactive chemicals !



"LPHRHP" CONTROLLER OPERATING MANUAL

Read carefully!

CE

ENGLISH Version

R1-02-03

"LPHRHP" series instruments comply with the following European regulations:

EN60335-1 : 1995, EN55014, EN50081-1/2, EN50082-1/2, EN6055-2, EN60555,3

Based on directive CEE 73/23 c 93/68 (DBT Low voltage directive) and directive 89/336/CEE (EMC Electromagnetic Compatibility)

GENERAL SAFETY GUIDELINES

Danger! In emergencies the instrument should be switched off immediately! Disconnect the power cable from the power supply!

When using instrument with aggressive chemicals observe the regulations concerning the transport and storage of aggressive fluids!

When installing outside European Community, always observe national regulations!

Manufacturer is not liable for any unauthorized use or misuse of this product that can cause injury or damage to persons or materials!

Caution! Instrument must be accessible at all times for both operating and servicing. Access must not be obstructed in any way!

Feeder should be interlocked with a no-flow protection device.

Instrument and accessories must be serviced and repaired by qualified and authorized personnel only!

Always read chemical safety datasheet!

Always wear protective clothing when handling hazardous or unknown chemicals!

General description	page 4
Electrical connections	page 4
Temperature compensation	page 5
pH calibration	page 5
pH adjustment	page 6
Stand-by	page 6
Delay	page 7
Redox calibration	page 7
Redox adjustment	page 7
LPHRHP as a free chlorine meter: set up	page 8
Probes cleaning and storage	page 9
pH current output	page 9
Redox current output	page 9
Accessories	page 9
Technical features	page 10
Installation wiring diagrams	page 11

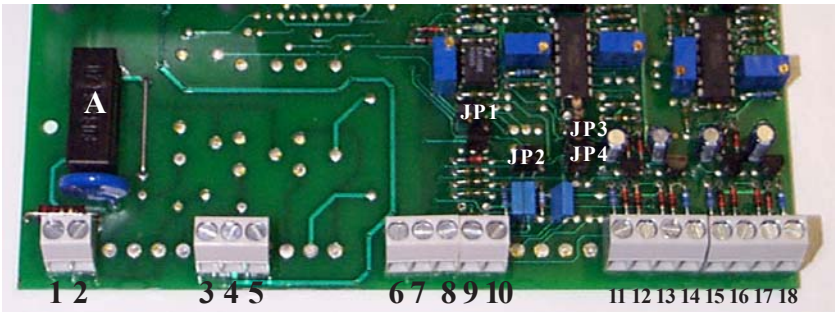
GENERAL DESCRIPTION

"LPHRHP" instrument measures and adjust pH and Redox (mV) parameters during industrial control process such as pH adjustment or free chlorine regulation in swimming pools. It is a proportional pH and Redox controller with dual digital display (from 0 to 14.00pH and from 0 to 1000mV). It has two analog and proportional set-points and two (0-20mA or 4-20mA) outputs proportional to read value. They are showed on two red units display (high clear display) for readings in high light environment. Instrument is housed into a plastic made case (ABS) for wall mounting with IP65 grade protection. Dimensions are: 215x205x130mm. Installing screws are the corner of a 195mmx141mm rectangle. Instrument adjustments and displays are protected by a transparent polycarbonate cover closed by two screws. A Stand-by function allows to deactivate metering pumps in case of water lack into swimming pool. This safety function starts during the pump's boot sequence and allows electrodes polarization.

ELECTRICAL CONNECTIONS

Electrical wirings are made on the terminal blocks placed beneath the lower frontal cover, remove screws and flip it up to open it. Before to proceed with wiring ***unplug power supply*** and strictly observe the followings :

- check and ensure ground system works as per your country normatives
- install a (0.03 A) differential breaker in case of inefficient grounding
- wire grounding before any other connection
- check and ensure power supply is correct



Connections:

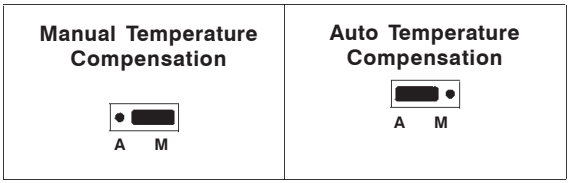
1-2 : 230Vac Power Supply
3-4-5 : Earth
6-7-8 : SEPR"* Probe +V(6) ; Signal(7); -V(GND8)
9-10 : Temperature Probe
11-12 : Proportional Current Out 11(+) ; 12(-) Redox (Chlorine Pump)
13-14 : Proportional Current Out 13(-) ; 14(+) pH (Acid/base Pump)
15-16 : Current out (mV) for chart recorder REG ; 15(+) ; 16 (-)
17-18 : Current out (pH)for chart recorder REG ; 17 (-) ; 18 (+)

JP1 Acid/Base configuration jumper
JP2 Auto/Manual temperature
JP3 + JP4 "Delay" Jumper
A : Fuse 0,315A T 5x20

* Remove jumper if probe is installed

TEMPERATURE COMPENSATION (AUTOMATIC OR MANUAL)

The instrument is capable of automatic temperature compensation using an ETE probe (NTC 10Kohm). See introduction for probe's electrical wiring. The instrument is configured to perform both automatic or manual temperature compensation. If not otherwise specified the instrument is configured for manual temperature compensation. Temperature compensation can be configured using the jumper JP3 located on the main board. JP3 jumper configuration can be:



pH CALIBRATION

It is necessary to proceed with the probe calibration once connected the pH probe to the BNC connector.

- Check and ensure power supply is within ±10% of tag value before supply power to the instrument.

- Connect the pH probe (the one with blue cable cap) to the BNC connector placed in the lower panel of the case.

- Set the buffer solution temperature, using the (°C) knob of the instrument, if working with manual temperature compensation. Dip otherwise, using the automatic temperature compensation, the temperature probe in the buffer solution while performing the probe calibration.

Rinse probe with water then dry it (do not wipe it) before dip it in the buffer solution This procedure will avoid buffer solution contaminations.

- Dip the pH probe in a pH 7.00 buffer solution (BSB), shake and wait one minute to stabilize reading. Use a screwdriver to adjust the ZERO regulation on the front panel to read on the instrument display the buffer solution value.

- Dip the pH probe in a pH 4.00 buffer solution (BSA), or pH 9.2 buffer solution (BSC), shake and wait one minute to stabilize reading. Use a screwdriver to adjust the SLOPE regulation on the front panel to read on the instrument display the buffer solution value.

- Set the system working temperature, using the (°C) knob, if using manual temperature compensation. Install otherwise, using automatic temperature compensation, the temperature probe (ETE) on the system to be monitored.

- Install the pH probe in the off line probe holder. Using a PED probe holder it is possible to install both temperature and pH probes in the same holder.

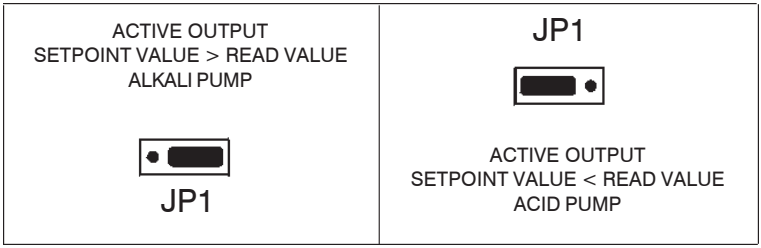
pH ADJUSTMENT

Keeping pressed “pH Setpoint” button, display shows the intervention point value. To change it keep pressed the button and begin to rotate the “pH Setpoint” knob. If the yellow led is on then the pH current out is active and there is a proportional current signal on blocks 13-14. Use this output to connect a metering pump (like “IC” or “EXT” pump). Proportional function is a 0.2pH difference between read value and instrument setpoint value.

Example.: Dosing Acid / ***Dosing base***

SP Value	Shown value	mA Output
7pH / ***7pH***	7.2pH / ***6.8pH***	20mA
7pH / ***7pH***	7.1pH / ***6.9pH***	10mA
7pH / ***7ph***	7.0pH / ***7pH***	0mA

The Setpoint “OUT” led is on when shown pH value is bigger or smaller than set one. To use this function, JP1 (internal jumper) must be set. Open the instrument, locate the jumper and set it as shown in the following picture:



STAND-BY

On demand, is available an input signal (Stand-by) on “SEPR” blocks. Using this input (connecting the proxy probe using the three wires brown, blue, black) is possible to disable the SETPOINT outputs leaving the reading activated. This procedure can be useful during filters cleaning or a situation in which the swimming pool recycle is halted. When there is not enough liquid for dosing the “Stand-by” led is on. Once there is enough liquid for dosing the “Stand-by” led will begin to blink. This phase is called “Delay”. Using jumpers JP3 and JP4 is possible to set-up how many seconds this phase will be long. Remember that when the “SEPR” led is off the “SP1” and “SP2” outputs are not active. “Stand-by” can be activated using a N.C. contact on block n.6-7. The “Stand-by” contact can be connected to the supplementary switch contact of a recycle swimming pool pump. “Stand-by” led is on when the input is active.

DELAY

Delay is active when instrument is switched on. During this time all outputs are not active. This safety function allows electrodes polarization. Time may be set using JP3 and JP4 internal jumpers as shown in the following scheme:

	JP3	C	C	O	O
	JP4	C	O	C	O
Time of Delay		10"	15'	30'	60'

C(closed) A(Open)

REDOX CALIBRATION

It is necessary to proceed with the probe calibration once connected the Redox probe to the BNC connector.

- Check and ensure power supply is within ±10% of tag value before supply power to the instrument.

- Connect Redox probe (the one with yellow cable cap) to the BNC connector placed in the lower panel of the case.

Rinse probe with water then dry it (do not wipe it) before dip it in the buffer solution This procedure will avoid buffer solution contaminations.

- Dip probe in a 650 mV buffer solution (BSD), shake and wait one minute to stabilize reading. Use a screwdriver to adjust the ZERO regulation on the front panel to read on the instrument display the buffer solution value.

- Install probe in the off line probe holder (PED) or directly on the system pipings using a PEA probe holder.

- Install a filter (100 micron) before the probe holder in horder to reduce probes maintenance.

REDOX ADJUSTMENT

Keeping pressed “mV Setpoint” button, display shows the intervention point value. To change it keep pressed the button and begin to rotate the “mV Setpoint” knob. To change this value, keep pressed this button and set the new value using the knob. When the “Setpoint” yellow LED is ON there is proportional current signal (0÷20 mA or 4÷20 mA) on blocks 11 and 12. to drive a metering pump as “IC” or “EXT”. Proportional function is a 26mV difference between read value and instrument setpoint value.

Example: Dosing Chlorine

SP Value	Shown Value	mA Output
700mV	674mV	20mA
700mV	687mV	10mA
700mV	700mV	0mA

“LPHRHP” AS A FREE CHLORINE METER : SET UP

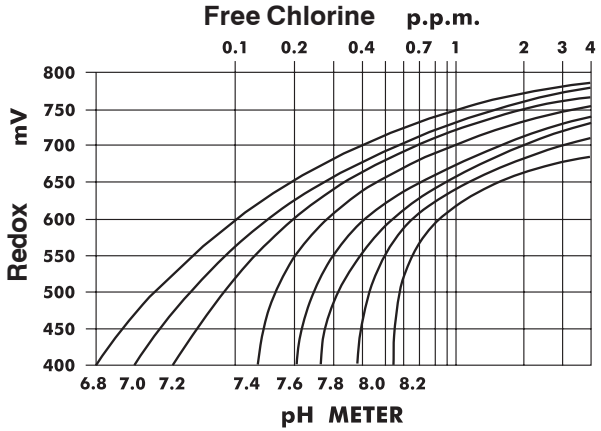
It is necessary to proceed with the probe calibration once connected the ORP probe (the one with yellow cable cap) to the BNC connector. Check and ensure power supply is within ±10% of tag value before supply power to the instrument.

Abundantly rinse with water the probe and dry it shaking it (do not wipe it) before dip it in the buffer solution in order to avoid buffer solution contaminations.

- Use the water to be treated to prepare a chlorine solution in similar percentage of the desired system working value using a DPD1.

- Measure pH of the water sample. This measure will be required to convert the ORP (mV) reading in free chlorine p.p.m.

- Dip the ORP probe in the prepared solution , shake and wait untill the reading is stabilized. Use a screwdriver to adjust the ZERO regulation on the front panel to read on the instrument display the ORP potential referred in the following table to the free chlorine p.p.m. solution prepared at the previously measured pH.



- Install the pH probe in the off line probe holder (PED) or directly on the system pipings using a PEA probe holder.

- Install a filter (100 micron) before the probe holder in order to reduce probes maintenance.

Only use water to be treated to prepare the free chlorine solution. Using different samples of water the reading may change up to ±50mV.

PROBES CLEANING AND STORAGE

To ensure a correct functioning probes must be cleaned once per month. Dip probes in HCl for 5 minutes then rinse with fresh water. A good functioning is ensured leaving probes always wet. Shipping bottle solution is an ideal environment for long time storages so do not remove it until installation. If shipping solution is no more available, it is possible to use a KCl 3M solution. For short time storage it is possbile to use also fresh water only. However probes should be always replaced in case of slow / wrong response during reading.

Do not use distilled water for probes storage. Do not wipe probes terminals. Probes are not covered by warranty.

pH CURRENT OUTPUT

A *0÷20mA* current signal (*4÷20mA on demand*) proportional to the instrument reading is available on blocks 17-18.

0÷14pH = 0÷20mA (4÷20mA)
Max load : 330 Ohm

Output current range (0÷20mA or 4÷20mA) is printed on the instrument label.
Output current signal without galvanic isolation, galvanic isolation is available on demand.

REDOX CURRENT OUTPUT

A *0÷20mA* current signal (*4÷20mA on demand*) proportional to the instrument reading is available on blocks 15-16

0÷1000mV = 0÷20mA (4÷20mA)
Max load : 330 Ohm

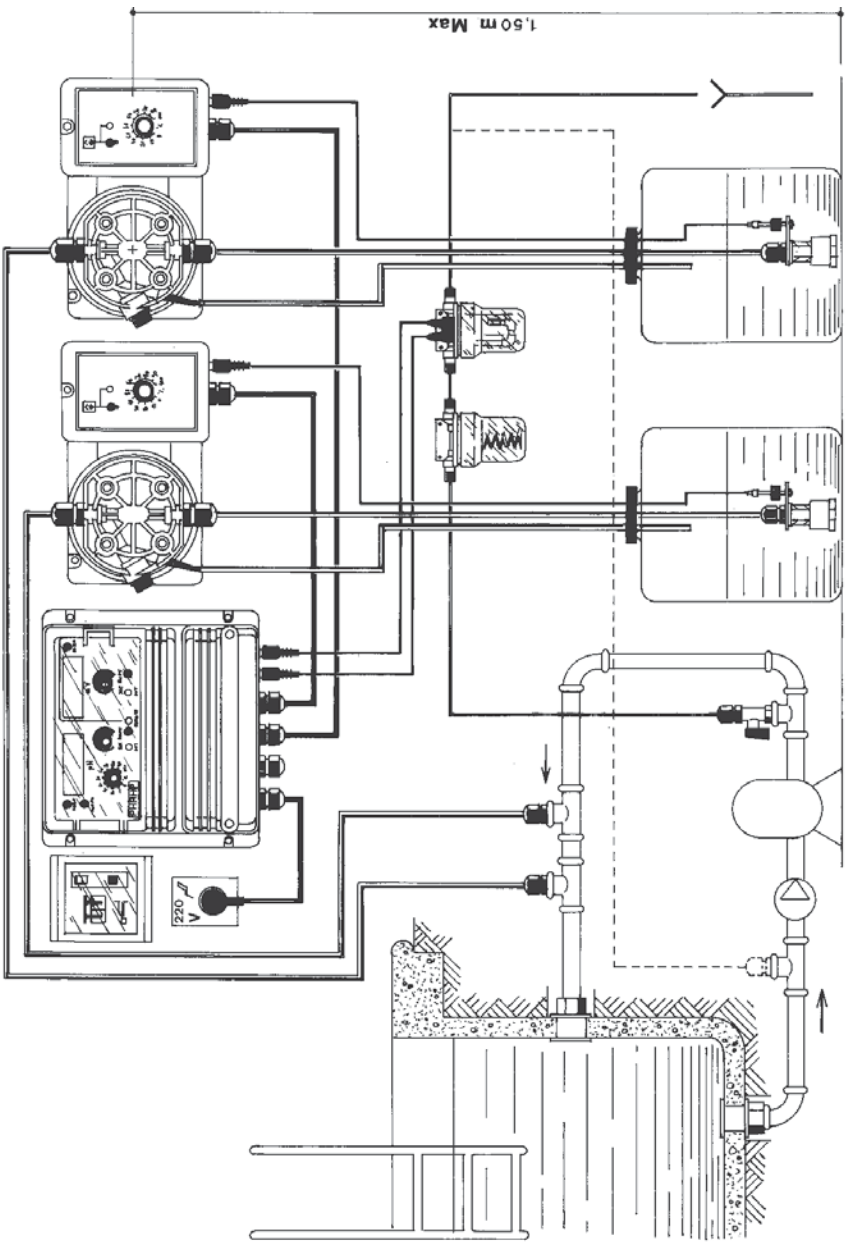
Output current range (0÷20mA or 4÷20mA) is printed on the instrument label.
Output current signal without galvanic isolation, galvanic isolation is available on demand.

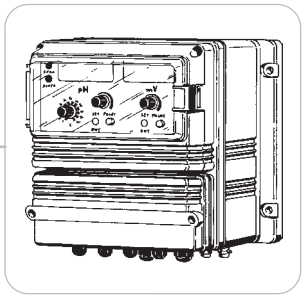
ACCESSORIES

N. 4 Dibbles ø6
N. 4 Screws 4.5x40
N. 2-3 Fuse (see next chapter for details)
N. 1 Instruction manual

TECHNICAL FEATURES

Power supply : 230 Vac ± 10%
Power consumption : 12 Watt
Reading range : 0 ÷1000 mV ; 0 ÷14 pH
Resolution : ± 1mV ; ± 0,01pH
Input current : 20 femptoamps
Asymmetric potential compensation (Zero) : ± 100mV ; ± 2pH
Hysteresis set-point : ± 10mV ; ± 0,1pH
Slope : ± 20%
Weight : 2,5 Kg
Case : IP65
Manual temperature range : 0÷ 80°C
Working temperature environment : 0÷ 50°C
Instrument fuse: 0,315A


1,50 m Max
220 V



When dismantling an instrument please separate material types and send them according to local recycling disposal requirements.
We appreciate your efforts in supporting your local Recycle Environmental Program.
Working together we'll form an active union to assure the world's invaluable resources are conserved.