

IonAmp
Ion Sensitive / Ion Selective / pH
Amplifier

Ver.3 series

User Manual

SUPERTECH Instruments

General Description

IonAmp amplifier is a high precision amplifier construction to record any electrochemical potential. Every amplifier channel processes two signals from two independent electrodes and the difference of the two signals is composed as output. The two input signals are named as Reference and Ion Sensitive / Ion Selective / pH (it is abbreviated as IS) signal. IonAmp has got DC recording capability (cutoff frequency is 0 Hz) for both input signals. IonAmp amplifier can be configured 1 to several channels modularly.

IonAmp can record signals arisen from the following sources:

- Electrochemical sensor
- Ion-selective electrode
- Ion-sensitive electrode
- Ion-sensitive sensor
- pH electrode

Parts of the System

Every IonAmp amplifier is divided into two parts. They are the Main Amplifier and the Headstage. The Main Amplifier is table top or rack-mounted equipment. Both styles are available. The mechanical construction style of the Main Amplifier depends on the number of the channels and the preference of the user. The Headstage is a small dual-channel preamplifier. The Headstage is built into separated tiny equipment case, because it should be located close to the target, usually in shielded environment. The enclosure of the Headstage is always made of metal to provide a good shielding of the sensitive input circuitry.

Accessories

Headstage in the same channel number as the Main Amplifier.

Input shortcut wires for the Headstage.

Mains cable for the Main Amplifier.

Supertech Instruments does not offer electrodes, but upon request we provide customized input cables to connect your preferred 3rd-party electrodes to the Headstage.

Security Rules

Both inputs are extremely sensitive about static electricity (ESD sensitive). Even a small electric discharge will destroy the input. You must wear an ESD protector bracelet continuously to keep your body on ground potential when you do anything with the Headstage. We provide shortcut wires to keep the inputs always connected to the GND. You should remove these shortcuts just before connecting the electrodes. After disconnecting the electrodes please replace the shortcut wires immediately to the inputs.

The IonAmp amplifier must not be used in human experiments, because it has no European permission for human applications.

Specifications / Technical Data

Ion Sensitive / Ion Selective / pH Input

Monopolar (single-ended)

Input Resistance: > 1000 GOhms

Input Capacitance: 100 fF

Voltage Noise (1 MHz): 4.3 nV / sqrt(Hz)

Current Noise (100 kHz): 5.5 fA / sqrt(Hz)

Offset voltage correction range: +/- 900 mV

Offset control method: 10-turn helical potentiometer

Lower cutoff frequency: 0 Hz

Low Pass Filter setting selection:

100 Hz

1 kHz

10 kHz

Gain setting selection:

10

100

Reference Input

Monopolar (single-ended)

Input Resistance: 1000 GOhms

Input Capacitance: 3.5 pF

Voltage Noise (1 kHz): 7 nV / sqrt(Hz)

Current Noise: 0.56 fA / sqrt(Hz)

Offset voltage correction range: +/- 900 mV

Offset control method: 10-turn helical potentiometer

Lower cutoff frequency: 0 Hz

Low Pass Filter setting selection:

100 Hz

1 kHz

Gain setting selection:

10

100

The default values of the filter and gain settings of the two signal pathways are listed above. The actual values, what should be realized during the manufacturing process can be ordered with the default parameters, but they can be requested with custom values, to meet any special requirements, as well.

Mains voltage: 100-120V or 220-230V (chosen by an internal selector switch, fixed in the factory)

Power consumption: 30 VA / channel

First Time Installation and Setup

In switched off state of the Main Amplifier please connect all the cables: the power cord, the output cables to the data recording system and the Output GND cable to the central ground point of the setup. Please connect the Main Amplifier and the Headstage together. Please remove the shortcut wires from the input jacks of the Headstage and connect the wires from the recording electrodes to the appropriate inputs of the Headstage. Switch on the Main Amplifier and the system is ready to use.

Front Panel Controls

Reference Electrode input offset voltage correction helical potentiometer

IS Electrode input offset voltage correction helical potentiometer

Reference LP filter selector switch

IS LP filter selector switch

Mains switch

Connectors and Controls on the Back Side

Dedicated input socket to connect the Headstage

10 x Reference Voltage (corrected by the offset potentiometer) analog output BNC connector

100 x Reference Voltage (corrected by the offset potentiometer) analog output BNC connector

10 x IS Voltage (corrected by the offset potentiometer) analog output BNC connector

100 x Differential Output Voltage analog output BNC connector

The mathematical function, what is realized by the internal circuitry to calculate this output voltage is: $U_{diffout} = 10 \times (10 \times IS \text{ Voltage} - 10 \times \text{Reference Voltage})$

Output GND banana jack

Mains socket

The following two signals are available internally. Upon user request, before the manufacturing process, you can order to establish BNC output connectors on the back side to have these signals available to measure.

1.11 x Reference Offset Voltage

1.11 x IS Offset Voltage

Calibration

Every IonAmp amplifier is calibrated by the factory. You can check its calibration easily by involving a high precision function generator and a calibrated digital storage oscilloscope.

Warranty

Supertech Instruments gives you 5 years of full warranty for electronic products and 3 years of full warranty for mechanical products by default. Longer warranty periods can also be defined and agreed (the actual conditions should be discussed before placing the order).

Supertech Instruments gives you full warranty for its products against defects in materials or workmanship as long as the equipment has been subjected to normal and proper use. During the warranty period, faulty products will be repaired or replaced free of charge provided they are returned to our workshop. Postage of the warranty repair actions is paid by the Customer. The exceptions are the Vibration Isolation Tables. There are special conditions introduced for repairing of Vibration Isolation Tables (see the appropriate User Manual).

Supertech Instruments will undertake the servicing and calibration after the expiration of the warranty period for a nominal fee.

The warranty does not cover the faults made by the user.

The measuring equipments manufactured by Supertech Instruments are for experimental and/or lab animal purposes only and are not intended for human use.

Electrical safety measurements of proper operation of the 115 / 230 V AC mains electric system (from the equipments have been supplied) is the sole responsibility of the user.

You can find the general commercial and warranty conditions in the beginning of the Price List page of our website.

Further Information Sources

As the first step for further technical information please visit our website (www.superte.ch). On the website of Supertech Instruments you can find related products and further information.

On the Download page of our website you can find many more useful documents, technical descriptions and application leaflets to support our products. Please check the list of the available documents.

Technical hotline via email (all of them work):

office@supertechinstruments.co.uk (Supertech Instruments UK Ltd.)

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office@super-tech.eu (European Branch Office)

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In the past Supertech Instruments used several websites with similar contents for the different affiliates. For the sake of stability and continuity we keep working all the previously used domain names forever, but now they are automatically redirected to this one website presenting our measuring equipments:

www.superte.ch

Specifically for the STable (©) Vibration Isolation Tables you can find a dedicated website:

www.opticaltable.eu