



# Polarograph

## Model 4330/P

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## 1 General Description

**Model 4330/P** is the widely known heavy metal traces analyzer developed by AMEL. It combines both Dropping Mercury Electrode for polarographic measurements and Hanging Drop Mercury Electrode for voltammetric analysis. This unique feature developed by AMEL allows for widening of the possible measuring techniques range for both organic or inorganic compounds. The instrument is completely computer controlled, via Windows® based software that includes a fully automated analytical module.

## 2 Metrological Properties

### 2.1 Counter Electrode

Voltage Output	± 12V max
Current Output	± 12,5mA max
Slew Rate	1mV/s to 10V/s
Protection	Thermal, overload and short-circuit

### 2.2 Working Electrode

Current Measure	From 1nA to 10mA Full Scale in 8 ranges
Current Resolution	From 1pA at 1nA Full Scale to 1µA at 10mA Full Scale
Measuring Accuracy	± 0,2% & 0,1% (conversion at Full Scale)



## 2.3 Reference Electrode

Input Impedance	> 1T $\Omega$
Input Capacitance	< 20pF (1m cable)
Biasing Current	< 2pA at 25°C
Common Mode Rejection	> 50dB full frequency response
Voltage Range	$\pm$ 10V max

## 2.4 Polarization Capability

Voltage	$\pm$ 4V max
Current	$\pm$ 10mA max
Voltage Resolution	1mV
Current Resolution	1pA
Accuracy	$\pm$ 0,2% & 0,1% (conversion at Full Scale)

## 2.5 Response Time

Potentiostatic Rise Time	10 $\mu$ s resistive load (1000 $\Omega$ )
Galvanostatic Rise Time	25 $\mu$ s resistive load (1000 $\Omega$ )

## 2.6 Meters and Interfaces

A/D Converter	16 BIT
D/A Converter	16 BIT
Sampling Rate	200 $\mu$ s

## 2.7 Digital Interface

Connection	USB with full instrument control (baud rate 57600 – N – 8 – 1)
Memory	EEPROM 64kB – SRAM 32kB

## 2.8 Cell Connections

Working Electrode	Dropping Mercury Electrode (110 x $\varnothing$ 6mm capillary - $\varnothing$ 0,1mm) Hanging Drop Mercury Electrode (110 x $\varnothing$ 6mm capillary - $\varnothing$ 0,1mm)
Counter Electrode	Platinum wire $\varnothing$ 1x5mm
Reference Electrode	Ag/AgCl (saturated KCl electrolyte)
Stirrer	Magnetic (computer controlled)

## 2.9 Power Supply and Dimensions

Voltage Mains	115 or 230V AC $\pm$ 10% 50/60Hz
Power Consumption	40VA max
Dimensions (L x W x H)	250 x 270 x 350mm
Weight	12kg



## 3 Implemented Electrochemical Techniques

### 3.1 Detection

AD	Amperometric Detection
PD	Potentiometric Detection
DSA	Double Step Amperometry
DSV	Double Step Potentiometry
PAD	Pulsed Amperometric Detection

### 3.2 Voltammetric

LSV	Linear Scan Voltammetry
CYV	Cyclic Voltammetry
SWV	Square Wave Voltammetry
NPV	Normal Pulse Voltammetry
ACV	Alternating Current Voltammetry
DPV	Differential Pulse Voltammetry
DNV	Differential Normal Pulse Voltammetry
DAV	Differential Alternate Pulse Voltammetry

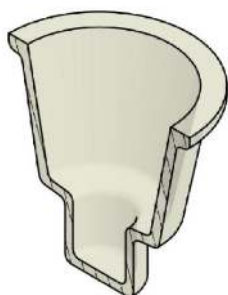
### 3.3 Stripping

LSS	Linear Scan Stripping
ACS	Alternate Current Stripping
SWS	Square Wave Stripping
DAS	Differential Stripping
DPS	Differential Pulse Stripping
DNS	Differential Normal Pulse Stripping
PSA	Potentiometric Stripping Analysis
CCSA	Constant Current Stripping Analysis

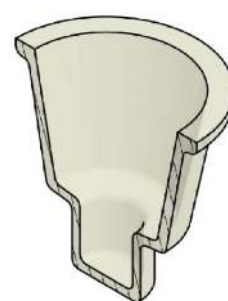
## 4 Accessories and Spare Parts

Each instrument comes with all the cables needed for installation along with two Pyrex cells (430/GC), two magnetic stirrer bars (430/SB), one extra glass capillary (430/C), one manual vacuum pump with mercury trap (430/PV & 430/GT), a complete set of 5 cables for cell connection (191/5BN2)m grid and USB cable (191/GPC & 191/USB).

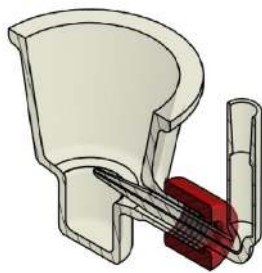
The following cells can be used with Model 430 Polarograph.



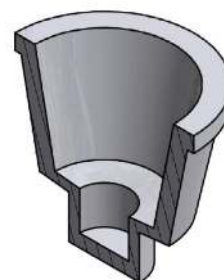
*Pyrex cell 430/GC*



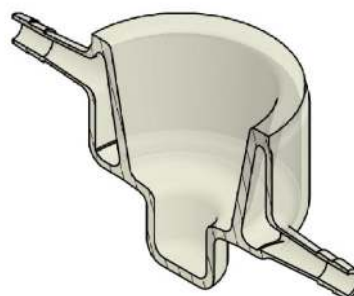
*Quartz cell 430/QZ*



*Pyrex cell with Liggins capillary 430/LC*



*PTFE cell 430/TE*



*Pyrex cell with thermostatic jacket 430/TJ  
(Ø9mm thermostat piping)*



*Microcell for small volumes (1-5mL) **430/MC***

The following spare parts and accessories are meant for everyday use and maintenance.

435/LF	Magnetic stirrer
430/SB	Magnetic stirrer bar
430/LU	Luggin capillary for 430/LC cell
430/CE	Glass tube for reference silver wire protection
430/PM	Glass tube with ceramic frit for reference electrodes
430/PT	Platinum tip counter electrode
430/MHS	PTFE cap for NS6 conical tapered fittings
9811	Saturated KCl solution 250mL
430/MV	Hangind Drop & Dropping Mercury Electrode
430/PV	Manual vacuum pump for Hanging Drop Mercury Electrode
430/GT	Mercury trap for 430/PV manual vacuum pump
430/C	Capillary for Models 4330 and 4330/P (Ø0,1mm)
191/5BN2	Set of WE, RE and CE cables
191/GPC	Grid power cable
191/USB	USB cable