HI6000 Series

Multiparameter Modular System

pH/ORP, pH/ORP/ISE, EC and DO

HANNA® instruments

World-leading specialists in laboratory electrochemistry for over 47 years

The Modular HI-6000

Within these pages you will find detailed information on the very latest addition to the Hanna range, our modular 6000 series. This revolutionary bench meter can be configured to simultaneously measure up to 3 parameters with plug-in modules allowing measurement of Conductivity, Dissolved Oxygen, Ion Selective Electrodes and pH.

Global Strength

Hanna Instruments has been a world leader in the development and manufacture of electrochemistry instrumentation since our foundation in 1978.

Every Hanna product is developed and manufactured in-house at our ISO9001 European production facility where we continually invest in manufacturing equipment and processes to consistently produce quality assured and accurate instrumentation.

Local advice, support and service

Whatever your requirements for testing, the experts at Hanna are here to help. Each member of our UK team has, on average, more than 20 years of experience in their areas of specialisation. As both the developers and manufacturers of our product range, we're well-versed in their versatile applications and the needs of our customers.

If you require accurate, reliable and repeatable measurement, we can provide an ideal solution to suit your needs. We provide both on-site and video call consultations alongside servicing and calibration from our local UK facility.

Our ISO 9001 service centre and UKAS accredited calibration laboratory supports our customers with annual calibration contracts and ongoing product support. We are proud of our excellent reputation within the instrumentation field, from the quality of work we deliver to the fast turnaround we provide to our customers - averaging 24 hours between receipt and reporting.

Multiparameter Modular System

pH/ORP, pH/ORP/ISE, EC and DO

HI6000 Series

The new **HI6000** Series modular multiparameter touchscreen laboratory system is designed for research and laboratory professionals who demand impeccable measurement quality.

HI6000 is a fully **flexible** laboratory measurement platform that can be customised according to the user's measurement and application needs.

Designed and developed using the latest generation technologies it gives users **complete control** over their measurements and **total confidence** in their results. Multi-point calibration (up to 5 points) guarantees the highest possible **accuracy**.

Modular by nature, **HI6000** allows simultaneous installation of three of the four modules offered by Hanna Instruments: pH/ORP, pH/ORP/ISE, Dissolved Oxygen and Conductivity.

Combined with the appropriate sensors, the device provides fast, reliable measurements displayed on the large touchscreen.

A context-sensitive help menu and **tutorial videos** support the user through all operations, for a very user-friendly experience.

Users can configure the instrument to suit their own needs. The instrument features numerous functions to simplify and optimise work routines, such as a wide choice of display modes, installation of **application profiles** for immediate access to recurring methods, and **versatile connectivity** for data storage and sharing.

Accurate & Reliable

Go Modular

Easily install and swap modules.

Any combination of 1 to 3 modules can be used.

- Multiparameter measurement flexibility
- Plug-and-play design
- Effortless installation

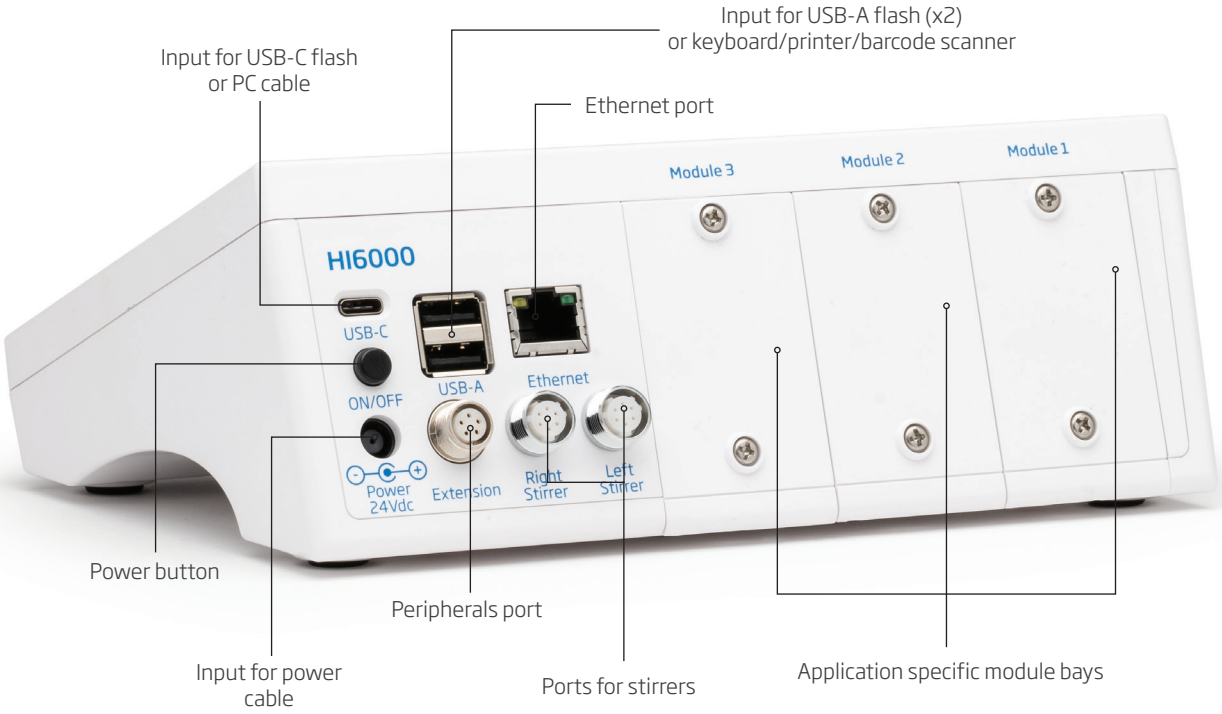
Flexibility and expandability

Module options

Up to three measurement modules can be easily installed into the **HI6000** housing.
You can choose any combination of the available modules.

Module	**HI6000-1**	**HI6000-2**	**HI6000-3**	**HI6000-4**
Sensor	pH/ORP	pH/ORP/ISE	EC	DO
Details	For ORP measurements a separate sensor is required.	Direct measurement of pH, ORP and ISE. Incremental ISE methods (Known Addition, Known Subtraction, Analyte Addition, and Analyte Subtraction) are also available.	Supports the measurement of high purity water used in the pharmaceutical industry. The application includes meter verification, cell validation applications and the module is programmed for the three stages of the USP <645> bulk water analysis. Once a stage is met a report can be generated and saved.	Supports dissolved oxygen applications for batch analysis of multiple samples: • Oxygen Uptake Rate (OUR) • Specific Oxygen Uptake Rate (SOUR) • Biological Oxygen Demand (BOD) Reports are available for analysis records.
Recommended Probes	**HI1131B** Recommended Refillable combination pH electrode **HI7662-TW** Recommended Stainless steel Temperature probe	**HI1131B** Recommended Refillable combination pH electrode **HI7662-TW** Recommended Stainless steel Temperature probe Hanna Ion Selective Electrodes	**HI7631233** Recommended EC and resistivity probe	**HI7641133** Recommended Optical DO probe **HI764833** Recommended Polarographic DO probe

Go Digital



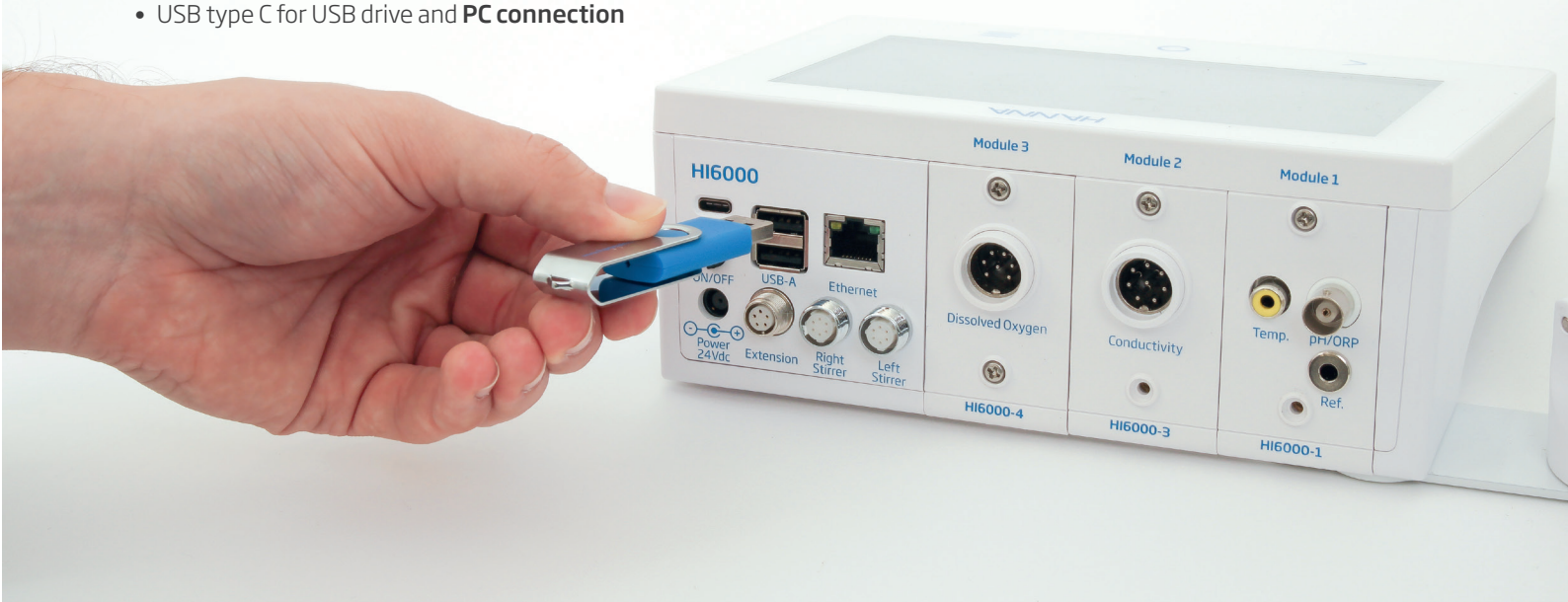
Thanks to Wi-Fi connection, forget about manual data transcripts

Connectivity features and services

- Transfer logged data to a USB flash drive
- Log files include **measurements** and **calibration data** (as .CSV file)
- FTP and email for log export via **Ethernet and Wi-Fi connection**
- Download logs using the meter's embedded web server
- USB type A for USB drive, **printer** (standard or thermal), and **keyboard**
- USB type C for USB drive and **PC connection**

Logging

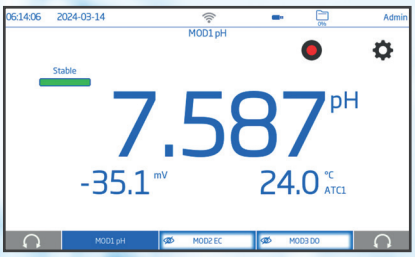
- **Active log** during measurement
- Data log collection of at most **1,000,000 data points**, with time and date stamp
- Logging types: manual, automatic, autohold
- Sample ID for manual and autohold data



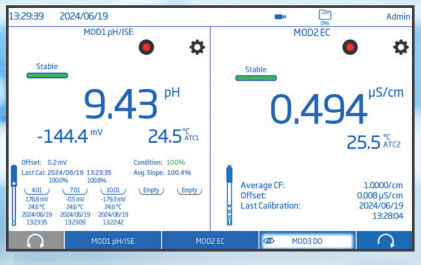
Seamless Simplicity

Multiple screen configurations

Up to 3 measurements can be shown on screen simultaneously. Views can be mixed and matched.



Single-parameter screen



Dual-parameter screen

Triple-parameter screen

Great user experience

User-friendly interface

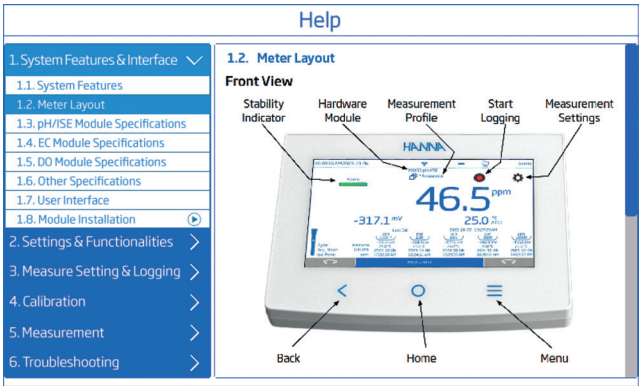
- 7" (17.8 cm) capacitive touchscreen with multi-touch support
- Capacitive touch keys for back, home and menu system buttons
- User-friendly icons and symbols enable easy navigation and interpretation of instrument functions
- Choice of five different display modes:
  - Standard
  - Simple GLP with calibration information
  - Full GLP with electrode status and calibration point details
  - Interactive graph updated in real time
  - Tabulated data with date, time and notes

10 User-Profiles

- For direct access to daily analyses, users can save their procedures in profiles grouping together all their method configuration data.

On-board help and video tutorial

- The HELP menu supports users with a brief overview of the system's main functionalities through text and video tutorials.



Stay Secure

Accuracy

Multi-point calibration for optimum results

- pH calibration up to 5 points with 8 stored standard buffers and 5 custom buffers
- ISE calibration up to 5 points with 5 stored standards and 5 custom buffers
- Conductivity calibration up to 5 points with 6 stored standards and 1 user standard

HI6000 automatically recognises the closest buffer to the pH value being measured from all available (standard and custom) buffers in the buffer group.

Certification

The calibration certificate specifies the corrections to be applied to your measurement results, making them more accurate.

For organisations involved in quality management systems, standardisation guidelines strongly recommend regular calibration and maintenance of measurement systems, validated by a calibration certificate which can be checked during an audit.

"Measuring equipment needs to be checked periodically. With Hanna Instruments calibration services, you can ensure the reliability and quality of your measuring equipment. You optimise their smooth operation and reduce your costs."

Support

Our technical team is here to help you

- Phone support
- Quick assistance
- Advice on choosing the right electrodes for your application
- Calibration services
- Repairs on our premises

pH/ORP and pH/ORP/ISE modules

HI6000-1 · HI6000-2

HI6000-1 (pH/ORP) module

HI6000-2 (pH/ORP/ISE) module

The **HI6000-1** module measures pH, ORP and temperature.

The **HI6000-2** module measures pH, ORP, specific ions and temperature.

Measurement

- Choice of Measurement Unit
  - pH (**HI6000-1**, **HI6000-2**) – pH, mV
  - ORP (**HI6000-1**, **HI6000-2**) – mV, Rel.mV
  - ISE (**HI6000-2** only) – ppt, ppm, ppb, g/L, mg/L, µg/L, mg/mL, µg/mL, M, mol/L, mmol/L, %w/v, user defined
- Reading modes:
  - Direct and direct/autohold
  - Known Addition, Known Subtraction, Analyte Addiiton, Analyte Subtration (**HI6000-2**)

Calibration

- pH calibration using
  - **Up to five** Hanna Instruments pH buffers (pH 1.68, 3.00, 4.01, 6.86, 7.01, 9.18, 10.01 and 12.45)
  - Up to five custom buffers
- mV calibration using a single point to calibrate offset.
- ISE calibration using **up to five** nominal standard values and/or up to five custom solutions (user supplied)

Recommended probes

For pH measurements, Hanna recommends the **HI1131B** double junction combination pH electrode, together with **HI7662-TW** temperature probe for use with these modules.

HI1131B is a glass body, double junction, refillable pH electrode with an indicating sensor made of high temperature (HT) glass. The double junction reference and HT glass design allow the electrode to be used in a wide variety of applications.

Probe connection to the unit is secured through a galvanically isolated BNC connection.

HI7662-TW stainless steel temperature probe allows the meter to automatically temperature compensate (ATC) pH measurements.

Specifications		HI6000 with HI6000-1 pH/ORP Module	HI6000 with HI6000-2 pH/ORP/ISE Module
pH	Range*	-2,0 to 20,0 pH; -2,00 to 20,00 pH; -2,000 to 20,000 pH	
	Resolution	0,1 pH; 0,01 pH; 0,001 pH	
	Accuracy	±0,1 pH; ±0,01 pH; ±0,002 pH (±1 last significant digit)	
	Temperature compensation	Automatic or manual	
	Calibration points	Up to 5	
	Type	Automatic; Semiautomatic; Manual	
	Standard buffers	Hanna and NIST pH 1,68, 3,00, 4,01, 6,86, 7,01, 9,18, 10,01, 12,45	
	Custom buffers	Up to 5	
	Custom group	Up to 5	
	1st calibration point	Offset or point (user setting)	
	Isopotential point	-2,000 to 20,000 pH	
mV	Range	-2000,0 mV to 2000,0 mV	
	Resolution	1 mV; 0,1 mV	
	Accuracy	±0,2 mV ±1 last significant digit	
	Calibration	Single point offset, ±2000,0 mV	
ISE (HI6000-2 module only)	Range	–	$1,0\times10^{-5}$ to 300,0 ppt (g/L or mg/mL) $5,0\times10^{-3}$ to $1,0\times10^{5}$ ppm (mg/L or µg/mL) 1,0 to $5,0\times10^{7}$ ppb (µg/L) $1,0\times10^{-7}$ to 10,0 M (mol/L) $1,0\times10^{-4}$ to $1,0\times10^{4}$ mmol/L $1,0\times10^{-6}$ to 60,0 % w/v $5,0\times10^{-7}$ to $5,0\times10^{7}$ user
	Resolution	–	1, 2, 3 significant digits
	Accuracy	–	±0,5% (monovalent ions) ±1% (divalent ions)
	Calibration points	–	Up to 5
	Calibration type	–	All standards Standard group
	Standards	–	7 standard solutions available for each concentration unit
	Custom standards	–	Up to 5
	Custom group	–	Up to 5
Temperature	Range*	-20,0 to 120,0 °C; -4,0 to 248,0 °F; 253,2 to 393,2 K	
	Resolution	0,1 °C; 0,1 °F ; 0,1 K	
	Accuracy	±0,2 °C; ±0,4 °F; ±0,2 K	
	Calibration	Single point, adjustable	

* The range may be limited by the probe's limits.

Did you know?

Hanna Instruments also offers a wide range of high quality pH electrodes for many applications.

Contact us to find the right electrode for your needs.

Conductivity module

HI6000-3

The **HI6000-3** module measures conductivity over an extended range from 0.001 µS/cm to 1 S/cm, TDS, resistivity, salinity and temperature.

The **HI6000-3** module also supports the measurement of high purity water used in the pharmaceutical industry. The application includes meter verification, cell validation applications and the **HI6000-3** module is programmed for the three stages of the USP <645> bulk water analysis. The meter guides you through the measurement steps and notifies you when a measurement is out of specification. Reports can be generated and saved.

Measurement

- Choice of Measurement Unit
  - Conductivity – µS/cm, mS/cm
  - Resistivity – Ω·cm, kΩ·cm, MΩ·cm
  - TDS – ppm, ppt
  - Salinity – ppt, PSU, %

Calibration

- Conductivity Calibration **up to five points**, using:
  - Offset: 0 µS/cm (in air)
  - Slope: 84 µS/cm, 1413 µS/cm, 5000 µS/cm, 12880 µS/cm, 80000 µS/cm, and 111800 µS/cm, or custom standards
- Salinity (%) calibration using 100% salinity standard

Specifications		HI6000 with HI6000-3 EC Module	
Conductivity	Range*	0,000 to 9,999 µS/cm 10,00 to 99,99 µS/cm 100,0 to 999,9 µS/cm	1,000 to 9,999 mS/cm 10,00 to 99,99 mS/cm 100,0 to 1000,0 mS/cm
	Resolution	0,001 µS/cm 0,01 µS/cm 0,1 µS/cm	0,001 mS/cm 0,01 mS/cm 0,1 mS/cm
	Accuracy	±1 % of reading or ±0,010 µS/cm, whichever is greater	
	Cell Constant	0,0500 to 200,0000 /cm	
	Calibration Type	Automatic or manual	
	Calibration Points	Single; Up to 5	
	Calibration Solutions	84,00 µS/cm; 1,413 mS/cm; 5,000 mS/cm; 12,88 mS/cm; 80,00 mS/cm; 111,8 mS/cm	
	Temperature Compensation	Linear; Natural; Standard; Disabled	
	Reference Temperature	5,0 to 30,0 °C (41,0 to 86,0 °F, 278,2 to 303,2 K)	
	Temperature Coefficient	0,00 to 10,00 %/°C	
Resistivity	Range	1,0 to 99,9 Ω·cm; 100 to 999 Ω·cm; 1,00 to 9,99 KΩ·cm; 10,0 to 99,9 KΩ·cm; 100 to 999 KΩ·cm; 1,00 to 9,99 MΩ·cm; 10,0 to 100,0 MΩ·cm	
	Resolution	0,1 Ω·cm; 1 Ω·cm; 0,01 KΩ·cm; 0,1 KΩ·cm; 1 KΩ·cm; 0,01 MΩ·cm; 0,1 MΩ·cm	
	Accuracy	±1 % of reading or ±1 Ω·cm, whichever is greater	
Total Dissolved Solids (TDS)	Range	0,000 to 9,999 ppm 10,00 to 99,99 ppm 100,0 to 999,9 ppm	1,000 to 9,999 ppt 10,00 to 99,99 ppt 100,0 to 400,0 ppt actual TDS (with 1.00 factor)
	Resolution	0,001 ppm 0,01 ppm 0,1 ppm	0,001 ppt 0,01 ppt 0,1 ppt
	Accuracy	±1 % of reading or ±0,01 ppm, whichever is greater	
Salinity	Range	0.00 to 42.00 PSU (Practical Salinity Scale) 0.00 to 80.00 ppt (Natural Sea Water) 0.0 to 400.0 % (Percent Scale)	
	Resolution	0.01 PSU 0.01 ppt 0.1 %	
	Accuracy	±1 % of reading	
	Calibration	1 point, using 100 % salinity calibration solution (% scale only)	
Temperature	Range*	-20,0 to 120,0 °C / -4,0 to 248,0 °F / 253,2 to 393,2 K	
	Resolution	0,1 °C; 0,1 °F; 0,1 K	
	Accuracy	±0,2 °C; ±0,4 °F; ±0,2 K	
	Calilbration	Single point, adjustable	

* The range may be limited by the probe's limits.

Required probe

Hanna recommends the **HI7631233** platinum four-ring probe for use with this module.

Recommended for a wide range of industrial process water applications, **HI7631233** provides stable measurements over a wide measurement range and does not require frequent calibrations. A built-in temperature sensor measures the process temperature and adjusts the measured conductivity to a reference temperature by applying specialized compensation algorithms:

- Linear: appropriate when it is assumed that the temperature coefficient of variation has the same value for all measurement temperatures.
- Standard: appropriate for high-purity water measurements and documented in ASTM Standard D5391-14. This setting should be used for >1Mohm.cm resistivity measurements.
- Natural: appropriate for natural ground, well, or surface water (or water with similar composition) in accordance with ISO7888 standard.

The result is reliable electrolytic conductivity.

Dissolved Oxygen module

HI6000-4

HI6000-4 Dissolved Oxygen module is designed to be used with the **HI6000** Multiparameter Modular System for fresh and saltwater measurements of dissolved oxygen when used with the **HI7641133** optical dissolved oxygen (opdo®) probe or the **HI764833** polarographic dissolved oxygen probe.

The Oxygen Uptake Rate (OUR), Specific Oxygen Uptake Rate (SOUR), Oxygen Demand (BOD) methods guide the user through the procedures adhering to the standard method guidelines.

Concentration measurements are automatically compensated for barometric pressure, temperature, and salinity.

- OUR measurements determine the biological activity of a system in terms of oxygen consumption or respiration rate.
- SOUR measurements determine the oxygen consumption of a system.
- BOD measurements determine the oxygen uptake rate by microorganisms in a water sample over a period time.

Measurement

- Choice of Measurement Unit
  - DO – %Sat, mg/L, ppm
  - BOD – ppm, mg/L
  - OUR – ppm, mg/L
  - SOUR – ppm, mg/L
  - Pressure – mmHg, mbar, kPa, inHg, psi, atm
- Reading modes: direct and direct/autohold; BOD, OUR, SOUR

Calibration

- **One or two points** automatic calibration at 100.0 % (8.26 mg/L) and 0.0 % (0.00 mg/L)
- One point manual calibration using a valued entered by the user

Specifications		HI6000 with HI6000-4 DO Module	
DO	Range*	0,0 to 500,0 % saturation 0,00 to 90,00 mg/L (ppm) concentration	
	Resolution	0,1 % saturation 0,01 mg/L (ppm)	
	Accuracy	Refer to probe used	
	Calibration points	One or two points at 100,0 % (8.26 mg/L) and 0.0 % (0.00 mg/L)	
	Calibration type	Automatic Manual (user entered value in % saturation, mg/L, or ppm)	
Barometric pressure	Range	450,0 to 850,0 mmHg 600,0 to 1133,2 mbar 60,00 to 113,32 kPa	17,72 to 33,46 inHg 8,702 to 16,436 psi 0,5921 to 1,1184 atm
	Resolution	0,1 mmHg 0,1 mBar 0,01 kPa	0,01 inHg 0,001 psi 0,0001 atm
	Accuracy	±3 mmHg within ±15 % from calibration point ±3 mmHg ±1 least significant digit	
	Compensation	Automatic (meter-integrated barometer) Manual	
Temperature	Range*	-20,0 to 120,0 °C -4,0 to 248,0 °F 253,2 to 393,2 K	
	Resolution	0,1 °C 0,1 °F 0,1 K	
	Accuracy	Refer to probe used	
	Compensation	Automatic Manual	
	Calibration	Single point, adjustable	
Salinity compensation		Manual 0,00 to 45,00 PSU or g/L (ppt) 0,0 to 130,0 %	

* The range may be limited by the probe's limits.

Recommended probes

Hanna recommends a choice of 2 dissolved oxygen probes for use with this module: **HI7641133** optical dissolved oxygen probe (opdo®) and **HI764833** polarographic probe.

HI7641133 opdo probe (with **HI764113-1** Smart Cap) provides accurate dissolved oxygen measurements over long periods of time reducing the need for frequent calibration. The Cap, pre-loaded with calibration coefficients, includes the immobilised O_2 sensitive luminophore with a rugged, insoluble black oxygen permeable protective layer.

The principle of operation is based on the principle of fluorescence quenching and features an immobilised Pt-based luminophore that is excited by the light of a blue LED and emits a red light. Dissolved oxygen quenches this excitation. When there is no oxygen present, the lifetime of the signal is the greatest; as oxygen hits the sensing surface, the lifetime becomes shorter.

The intensity and lifetime are inversely proportional to the amount of oxygen present; as oxygen interacts with the luminophore it reduces the intensity and lifetime of the luminescence. The lifetime of the luminescence is measured by a photodetector, and is used to calculate the dissolved oxygen concentration. This is, in turn, reported by the meter as % saturation or mg/L of dissolved oxygen.

HI764833 Clark-Type polarographic probe features a platinum cathode and Ag/AgCl anode assembly and a built-in temperature sensor. The temperature measurement is used in computations for dissolved oxygen measurements.

The probe has a thin, 12 mm (0.47"), design that allows for convenient measurement in narrow vessels such as test tubes, wine bottles, standard BOD bottles.

The probe is fitted with a PTFE screw cap membrane that separates the probe's cathode and anode from the sample being measured. Oxygen diffuses across the membrane and interacts with the polarographic system to produce a current proportional to oxygen concentration. The cap is filled with **HI7041** electrolyte and screwed on to the probe. Screw-on caps with pretensioned membranes provide quick maintenance.

HI7641133
Optical DO Probe

HI764833
Polarographic DO Probe

Save space on your workbench

Probe holder

HI764060

- Probe holder with flexible arm supplied for up to 3 probes + 1 temperature sensor
- Can be securely fixed to either side of the instrument.

Magnetic Mini-Stirrer

HI6000180

Stirring speed and direction are adjustable via the **HI6000**'s interface or the front speed knob.

- Easy to handle, this lightweight and compact stirrer needs little room and is quickly recognisable on busy benches
- Chemical resistant housing
- Adjustment of stirring speed using the cursors on the HI6000 display
- Select the desired rotation: clockwise, counter clockwise, or alternating (15, 30, or 45 seconds)

Specifications	HI6000180
Stirring Capacity	1 liter
Speed Range	100 to 1500 rpm
Power Supply	Powered by the meter
Cover Material	ABS plastic
Environment	0 to 50 °C; RH max 95%
Dimensions / Weight	Ø 137 mm x 61 mm / 640 g

Thermal Printer

SP6000-PRN02

- Compact housing ideal for tight spaces
- Fast, stable network tethering
- Versatile connectivity: USB-A, USB-B, USB-C and Ethernet

Specifications	SP6000-PRN02
Print Method	Thermal
Print Speed	Up to 300 mm/s
Print Resolution	203 dpi
Print Direction	Vertical and horizontal
Dimensions / Weight	127mm x 128mm x 129mm / 1.3 kg

Choose your kit

Each preconfigured kit is supplied with electrode holder, calibration solutions starter kit, power adapter and accessories.

pH/ORP/ISE kit

HI6222-02 is supplied with:

- **HI6000** housing unit
- **HI6000-2** pH/ISE module (2 x) + **HI1131B** pH electrode + **HI7662-TW** temperature probe
- Calibration solution starter kit for pH

pH/ORP/ISE + EC kit

HI6522-02 is supplied with:

- **HI6000** housing unit
- **HI6000-2** pH/ISE module + **HI1131B** pH electrode + **HI7662-TW** temperature probe
- **HI6000-3** EC module + **HI7631233** EC and resistivity probe
- Calibration solution starter kit for pH and EC

pH/ORP/ISE +optical (opdo®) DO kit

HI6542-02 is supplied with:

- **HI6000** housing unit
- **HI6000-2** pH/ISE module + **HI1131B** pH electrode + **HI7662-TW** temperature probe
- **HI6000-4** DO module + **HI7641133** optical DO probe (opdo®) + **HI764113-1** Smart Cap™
- Calibration solution starter kit for pH and DO

pH/ORP/ISE + polarographic DO kit

HI6542P-02 is supplied with:

- **HI6000** housing unit
- 1 x **HI6000-2** pH/ISE module + **HI1131B** pH electrode + **HI7662-TW** temperature probe
- 1 x **HI6000-4** DO module + **HI764833** polarographic DO probe
- Calibration solution starter kit for pH and DO

pH/ORP/ISE + EC+optical (opdo®) DO kit

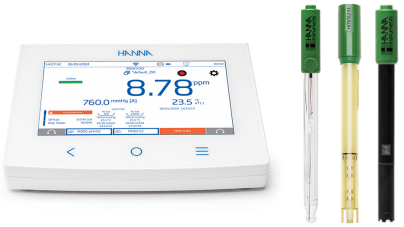
HI6553-02 is supplied with:

- **HI6000** housing unit
- **HI6000-2** pH/ORP/ISE module (installed) + **HI1131B** pH electrode + **HI7662-TW** temperature probe
- **HI6000-3** EC module + **HI7631233** EC & resistivity probe
- **HI6000-4** DO module+ **HI7641133** optical DO probe (opdo®)
- Calibration solution starter kit for pH and DO, EC and DO

pH/ORP/ISE + EC + polarographic DO kit

HI6553P-02 is supplied with:

- **HI6000** housing unit
- **HI6000-2** pH/ORP/ISE module (installed) + **HI1131B** pH electrode + **HI7662-TW** temperature probe
- **HI6000-3** EC module + **HI7631233** EC & resistivity probe
- **HI6000-4** DO module + **HI764833** polarographic DO probe
- Calibration solution starter kit for pH and DO, EC and DO



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