

APA 6000™ Low-Range Hardness Analyzer



Accurate and Continuous Monitoring of Soluble Hardness

Hach's patented¹ APA 6000™ Low-Range Hardness Analyzer accurately and continuously measures up to three sample streams for low levels (50 µg/L to 10 mg/L) of soluble hardness. Using a precise colorimetric method, the instrument performs an analysis every four minutes. It delivers continuous, accurate, and dependable performance with minimal cost for operation and maintenance.

Designed specifically for reliable analysis at low concentrations, the APA 6000 Low-Range Hardness Analyzer lets you establish an automatic system for monitoring softener performance in industrial, ultrapure, and water treatment processes. The APA 6000 Analyzer makes continuous monitoring and trend analysis easier with menu-driven software, on-screen prompting, self-test diagnostics, security provisions, and flexible datalogging.

Applications – optimizing softener performance

Wherever accuracy is paramount, the APA 6000 Low-Range Hardness Analyzer is the instrument of choice. Designed specifically for situations where low levels of hardness must be monitored precisely and reliably on a continuous basis, Hach's analyzer is often found monitoring both influent and effluent for a wide range of industrial applications and water treatment processes, including: water softener effluent, demineralizer effluent, boiler feedwater, boiler water and process water. It is well-suited for monitoring hardness within the ultrapure processes required for the manufacture of pharmaceuticals, electronic chips, and cosmetics.

Automatic 3-stream analysis, grab-sample convenience

The Hach APA 6000 Low-Range Hardness Analyzer can optionally monitor up to three separate sample streams with additional sample sequencing kits.

The analyzer also allows you to take periodic grab samples without interrupting sample flow. An easily accessible port allows you to introduce grab samples with a minimum of effort. Using the same port, you can verify the accuracy of the APA 6000 with a known standard addition. The instrument manual also provides bench method procedures for grab-sample correlation using APA reagents.

Principle of operation

The APA 6000 Low-Range Hardness Analyzer utilizes the patented CSIA (Carrierless Sequential Injection Analysis) for fluid handling. This approach allows fast analysis with low consumption of both reagents and sample. By using the sample as the dispersion carrier, the instrument makes a separate carrier liquid unnecessary – and cuts the required sample volume to about 1% of that required by other analyzers.

The instrument consists of six primary components – an autoburette, multi-position valve, mixing chamber, colorimetric detector, AquaTrend® Interface, and external case.

In a typical measurement cycle, the autoburette dispenses accurate volumes of sample, standard, and reagent through the multi-position valve into the mixing chamber. From the mixing chamber, sample and reagent are dispensed to the colorimetric detector, which produces a precise reading of the sample's hardness concentration.

Simple menus (in English, French, German or Spanish) guide the user through each step of operation. An easy-to-use instruction manual is also included for installation, operation, calibration and troubleshooting.



The Hach APA 6000 Low-Range Hardness Analyzer

- Measures low-range hardness using USEPA-approved calmagite chemistry
- Accurately and continuously measures up to three sample streams
- Operates unattended for one month
- Virtually maintenance-free
- Makes your water softening system more efficient and less costly

THERE'S ONLY ONE WAY TO BE SURE

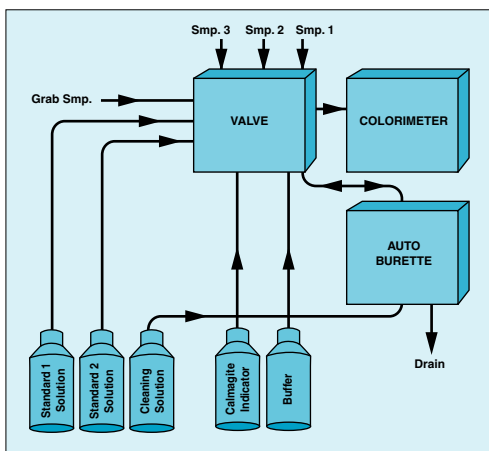
¹U.S. Patent 5849592



Separate, spill-containing compartments on each side of the instrument contain all chemical reagents and standards. This allows you to change solutions without opening the enclosure and influencing the internal temperature of the instrument.

The internal instrument temperature is pre-set at the factory. The design of the analyzer door and instrument panel provides a small insulated space ensuring precise temperature control for accurate analysis.

Within the enclosure, a module panel separates sensitive electrical components from wetted parts. All openings to the enclosure are gasketed to protect against leakage.



The multi-position valve directs the flow of samples, reagents, and standards through the instrument for hardness analysis every four minutes.

Method of Analysis

Precise proportions of the sample and a colorimetric calmagite indicator are introduced into the mixing chamber where an exact amount of monomagnesium ethylenediaminetetraacetate (Mg-EDTA) is added.

Mg-EDTA is a chelating agent which exchanges magnesium on an equivalent basis for any calcium or other divalent cations present in the sample. The mixture is directed to the colorimeter where color intensity is measured at a wavelength of 520 nm. The color intensity is directly proportional to the concentration of total calcium and magnesium in the sample. The instrument measures total soluble hardness as CaCO₃ through a range of 50 µg/L to 10 mg/L.

Rugged, spill-proof enclosure

The APA 6000 is housed in a NEMA 4X(indoor)/IP66-rated enclosure that protects components from contact with chemicals and maintains a constant temperature. Reagents are housed in a separate, spill-proof compartment that also provides UV protection.

Genuine Hach reagents, guaranteed accuracy

Hach's rigorous quality control program ensures that both reagents and standards used with the APA 6000 Low-Range Hardness Analyzer meet our standards for purity and stability, so they will deliver dependable results with every test.

The system is designed for both accuracy and economy. The analyzer consumes less than 1L of each reagent per month. Reagents are easily replenished without interrupting sample flow.

Automatic, reliable operation

Operating unattended for up to 30 days, the instrument auto-calibrates, auto-cleans and self-primers. A menu-driven interface allows you to set the frequency of these functions.

Calibration

Calibration cycles can be programmed for automatic or on-demand use. Automatic calibration takes less than 35 minutes. A calibration history can easily be displayed on the analyzer's LCD display.

Multi-function displays, data outputs and network integration

The AquaTrend Controller built into the APA 6000 Low-Range Hardness Analyzer displays all menu choices and measurement data for up to three sample streams.



A large, clearly visible LED display (graphic or numeric) reports hardness levels in units of mg/L, µg/L, ppm, ppb, degrees, German hardness, or gr/gal. Simple menus (in English, Spanish, French, or German) guide the user through each step of the operation.

The APA 6000 Analyzer includes two 4-20 mA outputs and two alarm relay outputs. The operator can program the outputs anywhere within the overall analyzer range.

With optional Signal Output and Power Supply Modules, this can be expanded to 14 4-20 mA outputs and 14 alarm relay outputs. The system can be configured for up to four PID control loops to monitor and control critical processes.

Flexible datalogging capabilities allow you to graph, trend and display measurement data for the last hour, last day, or last 30 days.

An optional RS-232 interface and SIO module can provide expanded datalogging and links to PCs. Using the LonWorks® protocol, the APA 6000 can easily be linked via Hach's AquaTrend Network to other Hach instruments. Using Hach's MOD I/O interface and fast set-up software, the network can also be linked to a PLC or SCADA system with a direct, all-digital connection.

The AquaTrend Interface automatically monitors key instrument and network functions. Supervisors can easily control access to network programming functions with a four-digit password.

APA 6000 Low Range Hardness Specifications*

Range

50 µg/L to 10.0 mg/L soluble hardness (calcium and magnesium ions) as CaCO₃

Accuracy

Better than ± 5% of reading or ± 50 µg/L, whichever is greater

Repeatability

Better than ± 3% of reading or ± 30 µg/L, whichever is greater

Cycle Time

Less than 4 minutes

Calibration Cycle (typical)

Normal 35 minutes

Sample Temperature Range

5 to 50 °C

Sample Flow

20 to 1000 mL/min. maximum at basic water conditioning filter; 6 mL/min. maximum, filtered to 22µ or less at sample inlet block

Inlet Pressure

2.5 to 100 psig at basic water conditioning filter; 0.5 to 30 psig at sample inlet block

Grab Sample

Temperature: 5 to 50 °C

Volume: 100 mL minimum; filtered to 22µ or better

Sample Filter Inlet

3/4" NPT male or female

Drain Fitting

3/4" NPT barbed hose fitting

Outputs

Two 4-20 mA outputs suitable for recorders or PID control. Output span programmable over any portion of the 0 to 10 mg/L range (130 VAC isolation from earth ground).

Alarms

Two SPDT relays with contacts rated for 5A resistive load at 230 VAC. Additional relays available with optional Signal Output Modules.

Network Connectivity

AquaTrend™ network, using the Lonworks® protocol

Certification

NRTL certified to UL and CSA standards and CE approved

Power Requirements

95-240 VAC, 50/60 Hz ± 2 Hz

Enclosure

NEMA-4X(indoor)/IEC 529 (IP66) with provision for air purge. Reagent enclosure is drip-proof.

Dimensions

21 x 25 x 21" (522 x 627 x 526 mm)

Weight

56 lbs (25.5 kg)

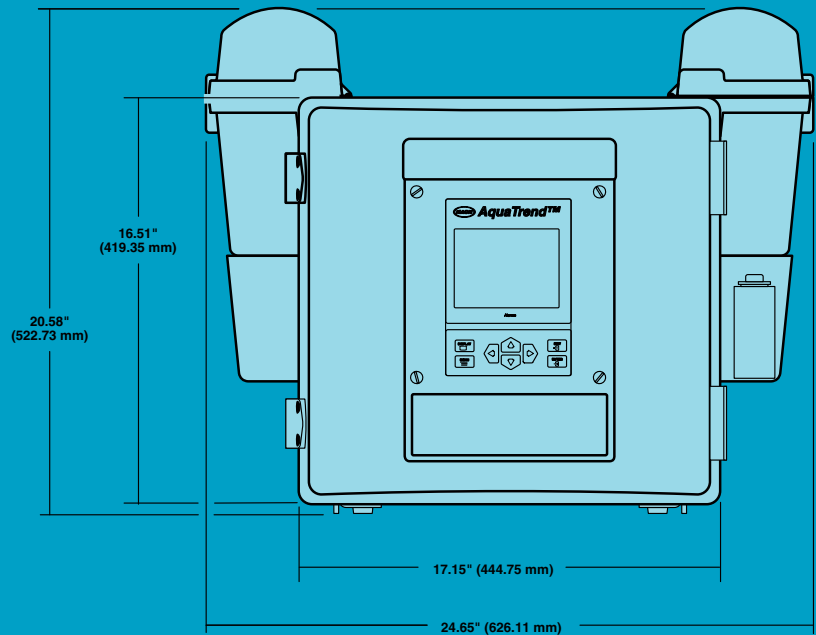
*Subject to change without notice.

APA 6000™ Low-Range Hardness Analyzer Installation

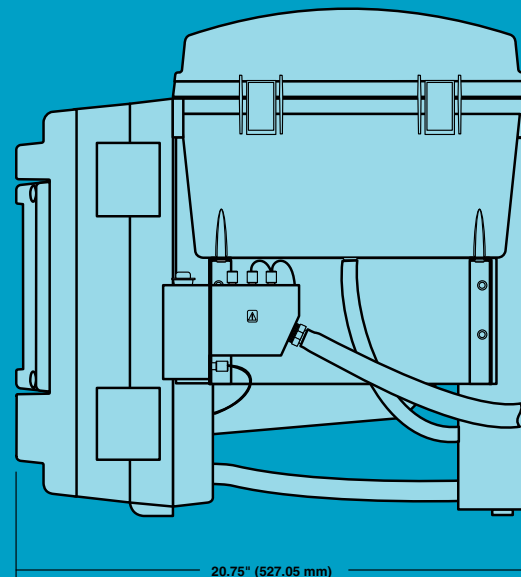
The analyzer can be bench-, wall- or panel-mounted in only a few minutes. All necessary mounting hardware is included.

The APA 6000 Low-Range Hardness Analyzer should be installed as close as possible to the sampling point. A short distance between the analyzer and the sample stream allows the instrument to respond faster to changes in sample concentration.

An optional Remote AquaTrend Interface enables you to control the APA 6000 Low-Range Hardness Analyzer from a remote location. The interface can be positioned as far away as 1,320 feet (400 m) from the analyzer.



FRONT VIEW



SIDE VIEW

How to Order

The APA 6000 Low-Range Hardness Analyzer is supplied with an Installation Kit, Maintenance Kit, Basic Sample Conditioning Kit, Manual, Quick Reference Card, and a 1-month supply of reagents.

51002-10 APA 6000 Low Range Hardness Analyzer with integral AquaTrend Interface and Reagents, 50 to 10,000 µg/L

Reagents

26958-53 Reagent 1, Hardness Indicator Solution, 1L
26957-53 Reagent 2, Hardness Buffer Solution, 1 L
26962-53 Standard 1, Hardness Standard Solution, 0 mg/L, 1L
26963-53 Standard 2, Hardness Standard Solution, 5 mg/L, 1L
26964-53 Cleaning Solution, APA 6000, 1L

Optional Accessories

46306-00 Power Cord, 120 VAC
46308-00 Power Cord, 240 VAC
51045-00 Sample Sequencing Kit (for optional 3-stream operation order one kit per additional stream)

51068-00 Automatic Air Backflush Kit (120 VAC)
51068-01 Automatic Air Backflush Kit (230 VAC)
52074-00 Serial I/O Module
51250-00 Signal Output Module
52400-00 Digital Display Module
51200-00 Remote AquaTrend
52010-00 PS1201 Power Supply

Cables

52157-00 22-gauge, 2-conductor cable, communication only, by the foot (also available in 100' to 1,000' lengths)
52158-00 20-gauge, 4-conductor cable, by the foot (also available in 100' to 1,000' lengths)



For current price information, technical support and ordering assistance, contact the Hach office or distributor serving your area.

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Sample Specifications: Low-Range Hardness Analysis

The hardness analyzer shall be a continuous-reading analyzer that utilizes calmagite and Mg-EDTA for colorimetric measurement of hardness at a wavelength of 520 nm. The measurement range shall be 50 to 10,000 µg/L (parts per billion) total soluble hardness as CaCO₃. The analyzer accuracy shall be ± 5% of reading or ± 50 µg/L, whichever is greater; precision shall be ± 3% of reading or ± 30 µg/L, whichever is greater. The analyzer shall display data in a numeric or graphical format. The hardness analyzer shall be capable of automatic calibration, cleaning and self-priming.

The analyzer shall provide for continuous purge for sample to drain to assure fresh sample to the analyzer and reduce analysis lag time. The analyzer shall be capable of grab-sample analysis without interrupting continuous sample flow to the analyzer.

Fourteen user-defined internal recorders, four of which can be used for PID control, shall be provided. Two user-selectable recorder/controller outputs of 4-20 mA, with expansion capability up to 14, shall be provided. Recorder output span shall be user-adjustable over the entire span of the analyzer. Fourteen user-defined alarms shall be provided. Alarms may be programmed for sample concentration alarms, analyzer system warning and analyzer system shutdown. Two unpowered SPDT relays, also with expansion capability up to 14, shall be provided for internal alarms. Two relay contacts shall be rated for 5A resistive load at 230 VAC.

The analyzer components shall be housed in a NEMA-4X(indoor)/IEC 529 (IP66) plastic enclosure designed for bench, wall or panel mounting. Standards and reagents shall be isolated from analyzer electronics in separate plastic containers. Power requirement shall be 95-240 VAC, 50/60 Hz. The analyzer shall be warranted for one full year against defects in materials and workmanship and shall include a 30-day supply of standards and reagents.

The analyzer shall be designed to meet UL 3101-1, CSA C22.2 No. 1010.1 and EN61010-1 (IEC 1010-1) safety standards. The analyzer shall also comply with Class A limits for radio and noise emission as specified by the FCC and EN55011 (CISPR11).