



## Replacement Guide from Hach 5000 to Hach 5500sc

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**1 Introduction**

Twenty years after launching the Silica analyzer model 5000, Hach has introduced to the market a new analyzer with innovative solutions. The aim of this guide is to help you make the transition from the Series 5000 Analyzer to the new 5500sc Silica Analyzer.

**2 Why switch from Hach 5000 to Hach 5500sc?**

There are several reasons to switch from the Series 5000 to the 5500sc. Even if you are continuing to use the same measurement operations and principles, the new generation provides benefits that will prove advantageous.

Series 5000 Silica	Hach 5500sc
	
2.9 liters reagents every 30 days 1 bottle/month @ 8.8 min cycle time	Extended reagent replacement intervals and low reagent consumption 1 bottle (2-liter) every 90 days @ 15 min or 60 days @ 9.5 min
Fixed measurement cycle	Configurable measurement cycle from continuous up to 240 mins (Interval Mode)
2.9 L PET bottles	2 L bottles with quick-connect, including pre-installed tubing and color coding - Reduces time maintaining the unit and reduced risk of contact with chemicals
No predictive diagnostic tool	Predictive diagnostics (PROGNOSYS™) and built-in help function. Reduces risk of unexpected failures and unit downtime
8-channel external sequencer	Optional built-in sequencer, up to 6-channels Lowers costs via sampling points and eliminates cost for an external sequencer (up to \$ 6,000)
Grab Sample In	Grab Sample In <u>and</u> Grab Sample Out Enables quick QC validation in addition to normal process monitoring
Pressurized reagent delivery system – NO PUMPS	Same principle with improved design. Built-in air compressor requires no external air supply
Colorimetric analysis method at 810 nm.	Same method
3 reagents and one standard	Same number, but different reagent concentrations



### 3 Specification differences between Hach 5000 and Hach 5500sc

SPECIFICATION	Hach 5000	Hach 5500sc
<b>MEASUREMENT SPECIFICATIONS</b>		
Measurement range:	0.00 to 5000 µg/L as SiO <sub>2</sub>	0–5000 µg/L as SiO <sub>2</sub>
Accuracy (typical):	0.00–500 µg/L: ± 1.0 µg/L or ± 5% of reading, (the larger value); 500–5000 µg/L: ± 7% of reading	0–500 µg/L: ±1% or ±1 µg/L (the larger value), 500–5000 µg/L: ±5%
Minimum Detection Limit:	0.5 µg/L	0.5 µg/L
Precision/Repeatability:	± 0.5 µg/L or ± 1.0% (the larger value)	±0.5 ppb or ±1% (the larger value)
Step Response Time (sample temperature dependent):	8.8 minutes for 30 to 50 °C, 15 minutes for 5 to 40 °C, (field adjustable)	Typical 9.5 minutes from 5 to 50 °C
Stabilization time	After initial startup or annual maintenance: 5 meas. cycles After standby: 1 meas. cycle After calibration: 0 meas. cycles	After initial startup or annual maintenance: 5 meas. cycles After standby: 1 meas. cycle After calibration: 0 meas. cycles
Calibration time	15 min Tcal<30°C, 8 min Tcal>30°C	Slope calibration: 10 minutes
Analyzer Sample Requirements A sample pressure control kit is provided	Regulated to 5 ± 3 psig (34.5 ± 20.7 kPa). Flow rate: 100 to 300 mL/minute. Temperature : 5 and 50 °C.	Accepted pressure:- 2–87 psi (0.14 - 6 bar) in the provided preset regulators, pre-set to 2.0 psi. Acceptable flow rate: 55–300 mL/min Temperature: 5 to 50 °C (41 to 122 °F)
No. of sample streams	1	1, 2, 4 or 6; programmable sequence
Grab sample in	yes	yes
Grab sample out	no	yes
<b>FUNCTIONS</b>		
Calculations	No	Yes, between Si concentration of sample lines or external parameters
<b>LIQUID CONNECTIONS</b>		
Sample line in	¼ inch push-to-connect fitting, ¼ inch only; rigid or semi rigid plastic tubing	¼ inch or 6 mm OD push-to-connect fitting for plastic tubing
Sample bypass drain	none	¼ inch or 6 mm OD push-to-connect fitting for plastic tubing
Analyzed sample out drain fitting	¾ inch hose barb fitting ¾-inch NPT PVC female	11 mm (7/16 in.) ID slip-on fitting for soft plastic tubing
Case drains	½ inch hose fitting	11 mm (7/16 in.) ID slip-on fitting for soft plastic tubing
<b>GAS CONNECTIONS</b>		
Air Purge inlet: instrument- quality air	15-scfh (std cubic feet per hour) ¼-inch OD stainless steel compression tubing fitting	15 scfh (0.425 m <sup>3</sup> /hour), 6 mm OD push-to-connect fitting for plastic tubing
Air Purge outlet	none	11 mm (7/16 in.) ID slip-on fitting for soft plastic tubing, same tubing as analyzed sample out drain
Reagent Pressure Inlet Fitting and Source	¼-inch OD stainless steel compression tubing fitting 20 to 60 psig regulated; nitrogen, instrument quality or compressed air.	none (internal source)
<b>ELECTRICAL CONNECTIONS</b>		
Power Requirements:	115 or 230 VAC, 50/60 Hz, switch selectable; 52 VA, 32 W maximum	100–240 VAC, 50/60 Hz universal power supply
Analog/Recorder Outputs:	One, selectable for 0–0.01/0.1/1 V, or 4–20 mA (500 Ω maximum).	4x; 4–20 mA outputs, Load impedance: 600 Ω max. Expandable to 8x or 12x with additional, 4-20ma SC1000 output module(s)
Serial I/O:	RS232 and 20 mA current loop	Optional modules for flow, ModBus,



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		Profibus, *Hart, *Ethernet (*future, not yet available)
Digital inputs	none	Six isolated inputs configurable as TTL or open-collector/relay
4-20 mA input	none	Optional SC1000 4x 4-20 ma input module (2 modules Max)
Alarms:	4x programmable relays, Functions: 2 x sample concentration alarms, analyzer system warning, analyzer system shutdown alarms	4x programmable relays; Functions: concentration alarm, scheduler, analyzer warning/error or event (measuring ch.x, zero cal, slope cal, shutdown, startup, grab sample or end of measuring cycle )
Dual monitor	none	Connection for a remote SC controller which becomes master
Smart probe	none	Connection for future external probe
Power out	none	2x max current, 250 VAC, AC:5A, DC:1.6A, always on
<b>REAGENTS</b>		
Reagents:	2.9 L Molybdate 3 (P/N 1995-03), 2.9 L Citric Acid/Surfactant(P/N 23470-03), 2.9 L Amino Acid F (P/N 23531-03),	2 L Molybdate 3, 6774802 2 L Citric Acid/Surfactant, 6774902 2 L Amino Acid F, L 6775102
Standard	2.9 L Silica Standard Solution, 500 µg/L (P/N. 21008-03) (250 mL required for standardization)	2 L Standard Silica, 500 µg/L , 67750022 (1 bottle) of standard for every 10 calibrations
Reagent consumption for a 15 minute cycle time	5.1 L (1.8 bottle) of each reagent every 90 days	2 L ( 1 bottle) of each reagent every 90 days (Measurement interval set to 15 min)
<b>GENERAL</b>		
Enclosure:	Rating: NEMA 4x/IP65 Molded ABS plastic cabinet with gasketed doors (for indoor use)	Rating: NEMA 4x/IP65 Material: PC/ABS case, PC door, PC hinges and latches, 316 SST hardware Indoor use only.
Mounting	Bench top or panel mounting only	Wall, panel or table
Dimensions	W x D x H mm: 564 x 419 x 857 inches : 22 x 17 x 34	W x D x H mm : 452 x 360 x 804 inches : 17.8 x 14.2 x 31.7 An adapter plate Model 6791000 is available to mount the Hach 5500sc on previous Hach 5000 panel location
Shipping Weight	36.7 kg (81 lb) without reagents and standards	20 kg (45 lb) without reagents and standards, 36.3 kg (80 lb) with reagents
Ambient Operating Conditions:	10 to 45 °C, 5 to 95% non-condensing humidity. Suitable for general purpose, clean, indoor environments (not suitable for outdoor use).	5 to 45 °C (41 to 113 °F) 5 to 95% non-condensing humidity Storage temperature: -20 to 60 °C (-4 to 140 °F) (Must not be in direct sunlight)
Screen	Alphanumeric LCD display, membrane keyboard	Display, LCD 5.7" color VGA (640x480), membrane keyboard



#### 4 Reference documents

Below are shown the documents required to perform a quick, safe and correct replacement of analyzers. Each document can be downloaded directly from the web by clicking the description.

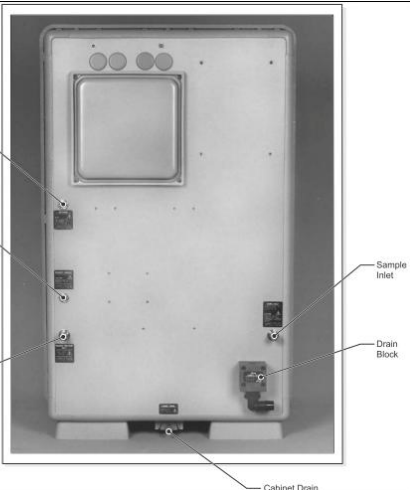

Code	Description and link	
Catalog 60000-18	<a href="#">Series 5000 Silica Analyzer, Instrument Manual</a>	old
DOC013.99.80240	<a href="#">5500sc SiO<sub>2</sub> Analyzer Unpacking Guide Illustrated</a>	new
DOC273.99.80258	<a href="#">Illustrated user instructions to mount the analyzer on a wall, on panel or on table.</a>	new
DOC273.99.80259	<a href="#">Adapter Plate User Instructions for Polymetron Analyzer.</a>	new
DOC023.97.80240	<a href="#">Installation Manual 5500sc SiO<sub>2</sub></a>	new
DOC023.97.80267	<a href="#">Operations 5500sc SiO<sub>2</sub></a>	new

#### 5 Step 1- Removing the Hach 5000 analyzer

#	PICTURE	ACTION
5.1	<p>ALARM 1 = 0.0 µg/l (LOW)  ALARM 2 = 19.0 µg/l (HIGH)  REC MAX = 50.0 µg/l  REC MIN = 0.0 µg/l  STANDARD VALUE = 30.0 µg/l  AUTO CALIB DISABLED  REAGENT BLANK = 0.0 µg/l  KEYBOARD UNLOCKED  01/01/94 SUNDAY 00:00  µg/l DATE-TIME ALARMS  -----  A 17.5 01/01-00:00 POWER FAIL  17.5 01/01-00:21  B 18.5 01/01-00:32  18.6 01/01-00:43  C 16.4 01/01-00:54  16.0 01/01-00:05  D 22.2 01/01-00:16 HALM2 19.0 µg/l  17.6 01/01-00:27  19.9 01/01-00:38 HALM2 19.0 µg/l  17.7 01/01-00:49  E 30.4 08/17-08:20 *CALIBRATION*  29.2 08/17-08:31 *GRAB SAMPLE*  G 10.9 08/17-08:42 USER CALIB</p>	<p><b>Save the analyzer setup</b></p> <ul style="list-style-type: none"> <li>Perform an analyzer printout</li> <li>(SETUP/PRINT SETUP/ENTER)</li> <li>Back up your Hach 5000 analyzer setup</li> <li>High/Low Alarm values</li> <li>Alarm relay identification</li> <li>Recorder max concentration</li> <li>4-20mA output ranges</li> <li>Digital com settings</li> <li>Disconnect the analyzer from its power source</li> </ul>
5.2		<p><b>Remove bottles</b></p> <ul style="list-style-type: none"> <li>Remove the 3 reagent bottles</li> <li>Follow regulations in place for the reagents' elimination/destruction</li> <li>Remove the silica standard solution</li> <li>You can keep the solution, but discard the bottle—the 5500 has different bottle types</li> </ul>
5.3		<p><b>Remove all electrical connections</b></p> <ul style="list-style-type: none"> <li>115/230 VAC power line</li> <li>High voltage relays</li> <li>Low voltage relays</li> <li>Recorder output</li> <li>RS 232 connection</li> </ul>

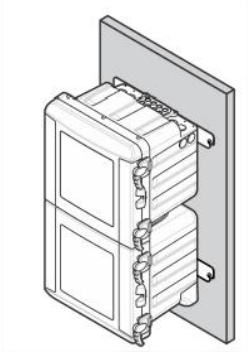
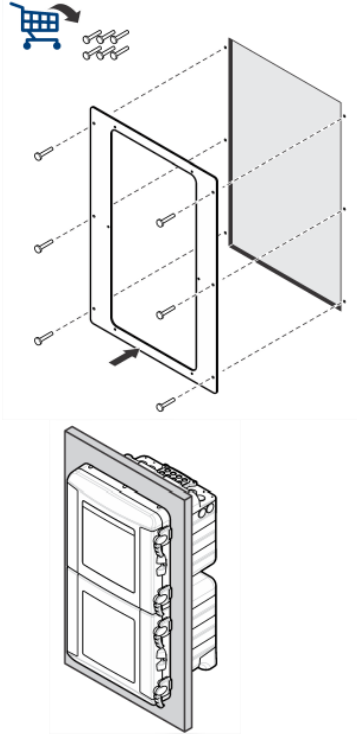
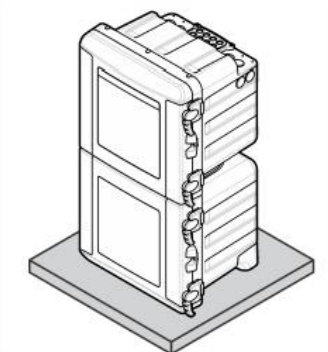


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5.4		<p><b>Remove all hydraulic connections</b></p> <ul style="list-style-type: none"><li>▪ Sample in/out</li><li>▪ Cabinet/Sample Drain</li><li>▪ Air purge</li><li>▪ The sample heater, Model 48500, can be removed as long as the sample temperature is above 5°C (41° F)</li><li>▪ The installed sample pressure conditioning kit (Model 45983-00) can be removed—the 5500 uses a different kit</li></ul>
5.5		<p><b>Remove the Hach 5000</b></p> <ul style="list-style-type: none"><li>▪ Remove the six screws</li><li>▪ Remove the analyzer, being careful of its weight: 37kg (81 lb)</li></ul>

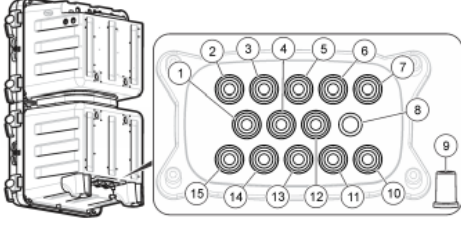
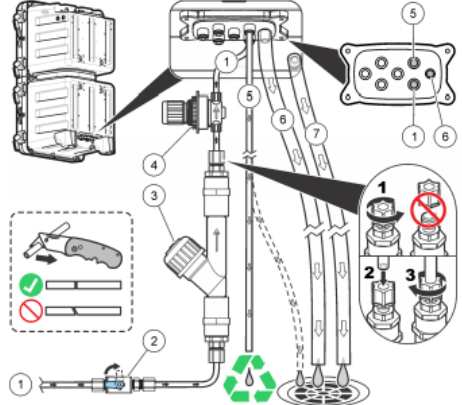
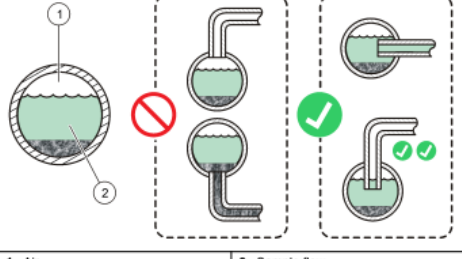
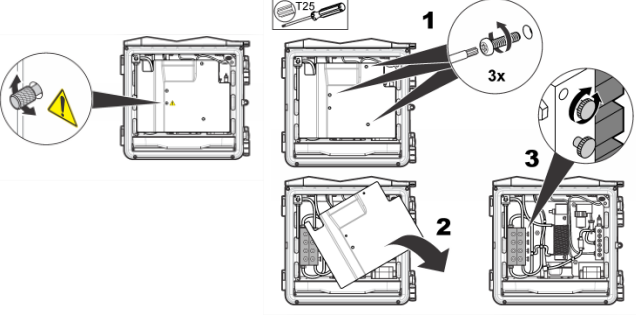


## 6 Step 2 - Installing the Hach 5500sc

6.1		<p><b>Wall mount installation</b></p> <p>Follow instructions 1B to 4B on document: <a href="#">Illustrated user instructions to mount the analyzer on a wall, on panel or on table.</a></p>
6.2		<p><b>Panel mount installation</b></p> <ul style="list-style-type: none"><li>▪ Install the <u>optional</u> adapter plate Model 6791000 with the six screws provided</li><li>▪ Follow instructions on document: <a href="#">Adapter Plate User Instructions for Polymetron Analyzer.</a></li></ul> <p>Follow instructions 1C to 4C on document: <a href="#">Illustrated user instructions to mount the analyzer on a wall, on panel or on table.</a></p>
6.3		<p><b>Panel mount</b></p> <p>Follow instructions 1A on document: <a href="#">Illustrated user instructions to mount the analyzer on a wall, on panel or on table.</a></p>



## 7 Connecting the Hach 5500sc hydraulics

<p>7.1</p>	 <table border="1" data-bbox="295 600 758 784"> <tr> <td>1 Sample 6 bypass drain</td> <td>6 Sample 2 bypass drain</td> <td>11 Sample 2 inlet</td> </tr> <tr> <td>2 Sample 5 bypass drain</td> <td>7 Sample 1 bypass drain</td> <td>12 Air purge inlet (optional)</td> </tr> <tr> <td>3 Sample 4 bypass drain</td> <td>8 Chemical drain</td> <td>13 Sample 3 inlet</td> </tr> <tr> <td>4 Sample 6 inlet</td> <td>9 Case drain for spills or leaks</td> <td>14 Sample 4 inlet</td> </tr> <tr> <td>5 Sample 3 bypass drain</td> <td>10 Sample 1 inlet</td> <td>15 Sample 5 inlet</td> </tr> </table>	1 Sample 6 bypass drain	6 Sample 2 bypass drain	11 Sample 2 inlet	2 Sample 5 bypass drain	7 Sample 1 bypass drain	12 Air purge inlet (optional)	3 Sample 4 bypass drain	8 Chemical drain	13 Sample 3 inlet	4 Sample 6 inlet	9 Case drain for spills or leaks	14 Sample 4 inlet	5 Sample 3 bypass drain	10 Sample 1 inlet	15 Sample 5 inlet	<p>Identify the hydraulic inlet/outlet connections for one to six sample streams</p>
1 Sample 6 bypass drain	6 Sample 2 bypass drain	11 Sample 2 inlet															
2 Sample 5 bypass drain	7 Sample 1 bypass drain	12 Air purge inlet (optional)															
3 Sample 4 bypass drain	8 Chemical drain	13 Sample 3 inlet															
4 Sample 6 inlet	9 Case drain for spills or leaks	14 Sample 4 inlet															
5 Sample 3 bypass drain	10 Sample 1 inlet	15 Sample 5 inlet															
<p>7.2</p>	 <table border="1" data-bbox="279 1254 742 1366"> <tr> <td>1 Sample in (single-stream)</td> <td>4 Non-adjustable pressure regulator (set at 4 psi to protect analyzer)</td> <td>7 Case drain</td> </tr> <tr> <td>2 Shut-off valve</td> <td>5 Sample bypass drain</td> <td></td> </tr> <tr> <td>3 Y-strainer with filter</td> <td>6 Chemical drain</td> <td></td> </tr> </table>	1 Sample in (single-stream)	4 Non-adjustable pressure regulator (set at 4 psi to protect analyzer)	7 Case drain	2 Shut-off valve	5 Sample bypass drain		3 Y-strainer with filter	6 Chemical drain		<p><b>Connect samples and drain lines</b></p> <ul style="list-style-type: none"> <li>Use the supplied tubing (6 mm), Y-strainer with filter and pressure regulator to plumb the drain and the sample to the analyzer</li> <li>The sample line tubing that goes into the plumbing access ports must be 6 mm</li> <li>Tubing of 1/4 in. may be used for the sample line up to the valve and y-strainer, but not into the analyzer's plumbing access ports</li> <li>See DOC023.97.80240 for more information</li> </ul>						
1 Sample in (single-stream)	4 Non-adjustable pressure regulator (set at 4 psi to protect analyzer)	7 Case drain															
2 Shut-off valve	5 Sample bypass drain																
3 Y-strainer with filter	6 Chemical drain																
<p>7.3</p>	 <p>1 Air      2 Sample flow</p>	<p>Connect the sample stream. Install each sample line into the center of a larger process pipe to minimize interference from air bubbles or bottom sediment. See figure on left.</p>															
<p>7.4</p>		<p>Set the bypass flow rate</p> <ul style="list-style-type: none"> <li>The bypass flow can be adjusted when the analyzer is in shutdown mode. Adjust the flow rate of the sample bypass line with the flow valve as shown at left.</li> <li>Use an external meter to measure the flowrate of the sample bypass line</li> <li>For faster response to changes in the process stream, increase the sample bypass line flow rate when the process stream is far from the analyzer</li> </ul>															





**8 Connecting the Hach 5500sc electrical connections**

Follow procedure on pages 11-17 of the operation manual

**9 Installing analyzer bottles and stir bar on the Hach 5500sc**

Follow procedure on pages 18-19 of the operation manual

**10 Training operators and supervisors on the new Hach 5500sc**

The following table shows the topics to be presented to train the plant operators and supervisors

<b>Plant operators – Standard use of the analyzer</b>		<b>Operation Manual Page</b>
	User interface and navigation	5
	Grab sample measurement	9
	Getting a grab sample from the analyzer	9
	View data	14
	View instrument information	16
	Using SD card's	16
<b>Instrumentation supervisor – startup and configuration</b>		
	Reagent preparation	7
	Analyzer setup	8, 10
	Sequencer configuration	8
	Reagents and standards setup	9
	Calculation setup	11
	4 – 20 mA setup	11
	PID setup (optional)	12
	Relay setup	12
	Relay activation options	13
	Updating the firmware	16
	Analyzer calibration	17