1011734 RevB

HAYWARD®

AQR S3 Omni® Series

Pool Chlorinator and Automation Control

Installation Manual



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AQRS3400MNI
AQRS3250MNI

Hayward Industries
1415 Vantage Park Dr., Suite 400
Charlotte, NC 28203
Phone: (908) 355-7995
www.hayward.com

USE ONLY HAYWARD GENUINE REPLACEMENT PARTS

IMPORTANT SAFETY INSTRUCTIONS

When using this electrical equipment, basic safety precautions should always be followed, including the following:

READ AND FOLLOW ALL INSTRUCTIONS

- Use Copper Conductors Only
- Disconnect all AC power during installation.
- ⚠ **WARNING:** To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.
- Hayward salt systems are designed, tested and sold as systems and are certified by several agencies around the globe --- with each component of the systems meeting all required certifications and attendant legal requirements.
- Pursuant to the terms and conditions of any applicable Warranty, the use of a non-genuine Hayward replacement salt chlorination cell on any Hayward automation or chlorination product will void any Warranty.
- A green colored terminal is located inside the wiring compartment. To reduce the risk of electric shock, this terminal must be connected to the grounding means provided in the electric supply service panel with a continuous copper wire equivalent in size to the circuit conductors supplying the equipment.
- All field installed metal components such as rails, ladders, drains, or other similar hardware within 3 meters of the pool, spa or hot tub shall be bonded to the equipment grounding bus with copper conductors not smaller than 8 AWG US / 6 AWG Canada.
- NOTICE TO USERS: This control product is to be used only in accordance with the directions of this label. It is an offense under the Pest Control Products Act to use a control product under unsafe conditions.

⚠ WARNING

- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours.**
- **KEEP** new and used batteries **OUT OF REACH or CHILDREN.**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.



- ⚠ **WARNING:** Even used batteries may cause death or serious injury.
- ⚠ **WARNING:** Call a local poison control center for treatment information.
- ⚠ **WARNING:** Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.

- ⚠ **WARNING:** This product contains non-rechargeable batteries. Do NOT force discharge, recharge, disassemble, heat above 85°C, or incinerate. Doing so may result in injury due to venting, leakage, or explosion resulting in chemical burns.

- ⚠ **WARNING:** This product contains non-replaceable batteries. Do NOT under any circumstances attempt to remove or replace the factory-installed battery.

- ⚠ **WARNING:** Non-rechargeable batteries are not to be recharged.

NOTICE: This product contains a Panasonic BR1225 coin-type lithium battery.

NOTICE: The nominal voltage of the battery contained within this product is 3V.

Certificate of Conformity

Product:	AQRS3 & AQRS3 Omni Series
CPSC Regulation:	Safety Standard for Button Cell or Coin Batteries and Consumer Products Containing Such Batteries Underwriters Laboratories UL 4200A-2023
Manufacturer:	Hayward Industries 1415 Vantage Park Drive, Suite 400, Charlotte, NC 28203 Technical Service Phone: (908) 355-7995
Manufacture Location:	Hayward Industries, 61 Whitecap Drive, N. Kingstown, RI 02852
Date Manufactured:	The serial number consists of 14 characters Example serial number: 1A23045-1045631 The 3rd - 4th digits are the year The 5th - 7th digits are the # day of year Example above is the 45th day of 2023
Test Report By:	Hayward Industries One Hayward Industrial Drive, Clemmons, NC 27012 Phone: (908) 355-7995 Test Report: March 2024

I hereby certify that the finished product(s) covered by this certificate comply with the rules, bans, standards, and regulations stated herein, and that the information in this certificate is true and accurate to the best of my knowledge, information, and belief. I understand and acknowledge that it is a United States federal crime to knowingly and willfully make any materially false, fictitious, or fraudulent statement, representation, or omission on this certificate.

Works only with a genuine S3 Series Hayward salt cell

NSF

Certified to NSF/ANSI Standard 50

Omni not evaluated by NSF

SAVE THESE INSTRUCTIONS

FCC Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by Hayward could void the user's authority to operate this equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio / TV technician for help.

Industry Canada Statement

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
The term "IC" before the certification / registration number only signifies that the Industry Canada technical specifications were met.

FDAS Compliance

Certified to CEC T20 FDAS Pool Control Requirements.

Before You Begin

The AQR S3 Omni® is a web enabled pool automation control with a convenient touchscreen interface and chlorine generation features. Automatically and remotely control pumps, heaters, valve actuators, pool and yard lighting, pool chemistry equipment and more. The AQR S3 Omni offers the next generation of technology to manage pool/spa equipment, allowing communication to web connected computers, tablets and mobile devices. You can now conveniently monitor your pool/spa and change settings anytime, and from anywhere.

Using the chlorine generator feature requires a concentration of salt (sodium chloride) in the pool water. The AQR S3 Omni automatically sanitizes your pool by converting the salt into free chlorine which kills bacteria and algae in the pool. Chlorine will revert back to sodium chloride after killing bacteria. These reactions will continuously recycle virtually eliminating the need to add sanitizing chemicals to your pool. The only time you may need to add more salt to the pool is when water is replenished due to backwashing, draining, or splashing (not evaporation).

The AQR S3 Omni also provides control functions adding convenience to pool and spa management. Built in functions include variable speed filter pump control, single and two speed filter pump control, heater control, valve control, pool cover detection, and more.

The AQR S3 Omni is offered in two models with the AQRS3400MNI designed to handle the purification needs of most residential swimming pools up to 40,000 gallons (150,000 liters), or most commercial pools up to 25,000 gallons (95,000 liters). Check local codes for other restrictions. The actual amount of chlorination required to properly sanitize a pool varies due to bather load, rainfall, temperature, and the pool's cleanliness.

Use the proper AQR S3 Omni model for your pool (installation and mounting requirements are the same for all models):
AQRS3400MNI - for residential pools up to 40,000 gallons
AQRS3250MNI - for residential pools up to 25,000 gallons

What's Included

Before attempting to install the AQR S3 Omni system, check that the following components have been included in the package:

- AQR S3 Omni Electronics Unit
- AQR S3 Omni Controller
- Flow Switch
- Electrolytic Cell
- Temperature sensors (water and air)

What's NOT Included

Some of the additional items that you may need to complete an installation include:

- Wire/conduit for 115 VAC or 230 VAC connection from the main panel to AQR S3 Omni
- Wire/conduit for filter pump
- Wire for remote heater control
- Hayward Smart Relay - a single Smart Relay can be added for additional high voltage pool equipment
- Mounting hardware (screws, bolts, etc.) for mounting AQR S3 Omni
- Tools and PVC glue for installing the TurboCell and flow switch

NOTE: Hayward does not recommend using the AQR S3 Omni to generate bromine.

NOTE: Before installing this product as part of a saline water purification system in a pool or spa using natural stone for coping or for immediately adjacent patios/decking, a qualified stone installation specialist should be consulted regarding the appropriate type, installation, sealant (if any) and maintenance of stone used around a saline pool with an electronic chlorine generator in your particular location and circumstances.

NOTE: The use of dry acid (sodium bisulfate) to adjust pool pH is discouraged especially in arid regions where pool water is subject to excessive evaporation and is not commonly diluted with fresh water. Dry acid can cause a buildup of by-products that can damage your chlorinator cell.

Overview

The functions and features described in this manual assume that the AQR S3 Omni is using the latest firmware version available from Hayward. For instructions on how to upgrade firmware, refer to AQR S3 Omni Operation manual.

Although the AQR S3 Omni is easy to use, it is important to completely read through this manual before attempting to install, configure and operate the unit.

Features

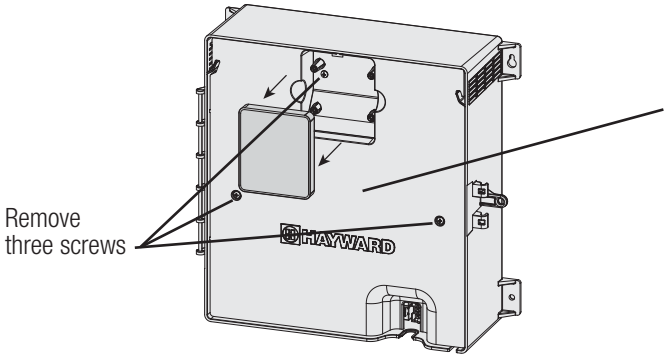
The AQR S3 Omni offers the following features:

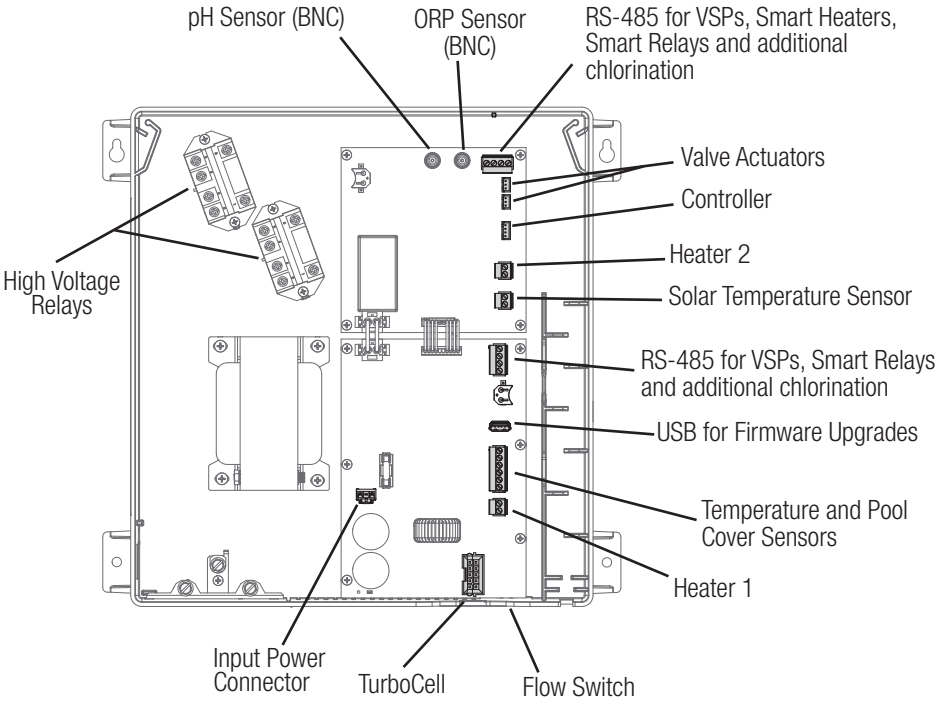
- can generate chlorine using a range of salt concentrations from between 2700 – 3400 PPM (Standard Salt mode) or 1200-1800 PPM (Low Salt mode).
- control and schedule a Hayward Variable Speed (VSP) pump using the internal RS-485 connection, a Pentair VSP using a Hayward HLPMPCONV converter (sold separately) or a single speed pump using an internal relay
- connection for pool cover detection (lowers chlorine production when the pool is covered)
- can be powered by either 115 or 230 VAC
- offers recirculation freeze control which turns on the filter pump automatically to prevent freezing
- offers 2 high voltage (120/240V) internal relays to control pumps, pool lights, yard lights, water features, chemical dispensers and more (an additional external Smart Relay can be added for up to 3 high voltage relays)
- control up to 2 automatic valve actuators including pool and spa valves, water feature valves, cleaner valves and more
- control up to 2 heaters or low voltage equipment including gas heaters, electric heat pumps, and solar heaters as well as various low voltage devices
- up to 4 external inputs; 3 for temperature sensing, 1 for pool cover detection
- built-in wireless and Ethernet port for connection to the home's router/access point allowing communication to devices on the home network or on the web
- input for flow switch for water flow detection
- BNC inputs for ORP and pH sensing
- control an optional AQR S3 chlorinator or a Hayward AquaRite salt chlorinator for additional chlorination (the AquaRite must have a HLAQRPCB communication board installed)

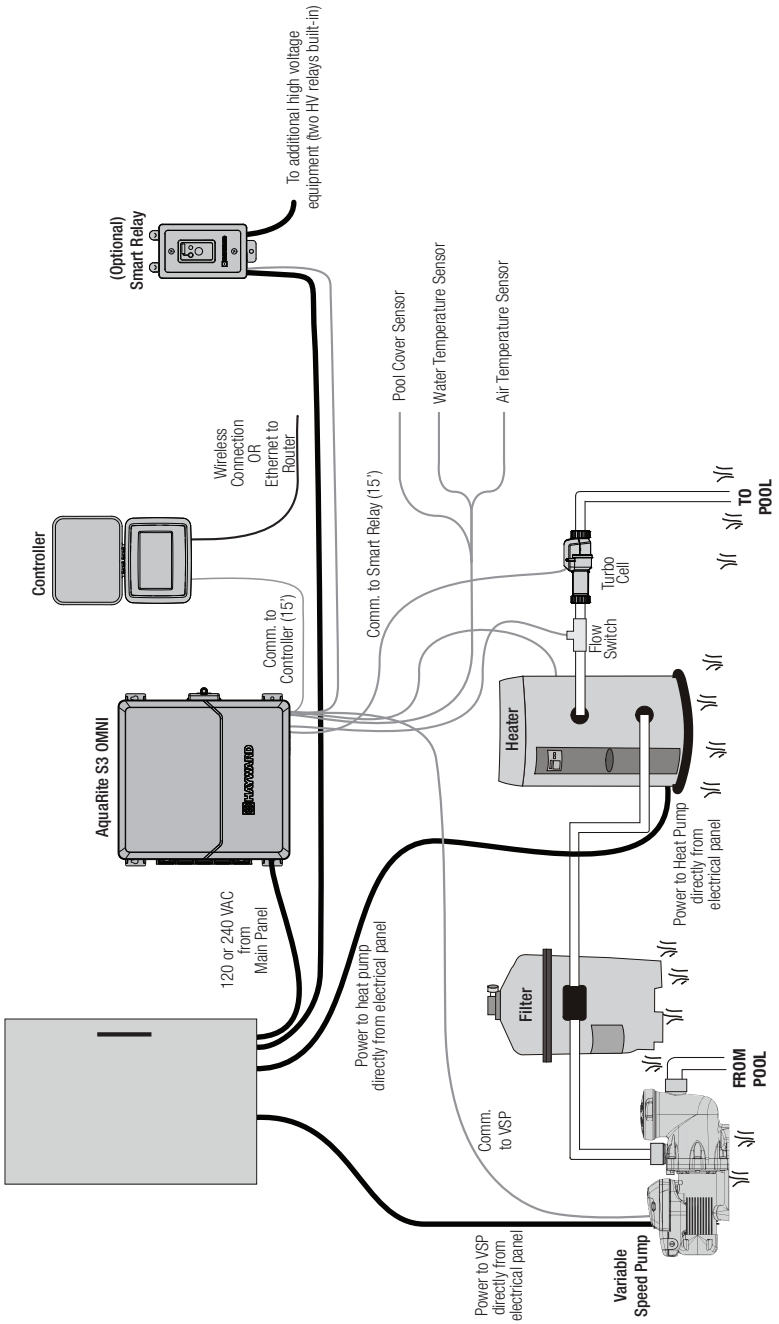
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Front Panel Removal

DANGER of Death, Injury or Property Damage if procedure not followed. Dead front removal is required for this installation. Power to the AquaRite S3 Omni panel MUST be shut off before the dead front is removed. This means a complete shutdown of power to the entire AquaRite S3 Omni panel.






To additional high voltage equipment (two HV relays built-in)
(Optional) Smart Relay
Wireless Connection OR Ethernet to Router
Controller
Comm. to Controller (15')
Comm. to Smart Relay (15')
Pool Cover Sensor
Water Temperature Sensor
Air Temperature Sensor
AquaRite S3 OMNI
120 or 240 VAC from Main Panel
Power to heat pump directly from electrical panel
Heater
Flow Switch
Turbo Cell
TO POOL
Power to Heat Pump directly from electrical panel
Filter
FROM POOL
Comm. to VSP
Power to VSP directly from electrical panel
Variable Speed Pump

Installation Steps

Details on each installation step are presented on the following pages:

1. Mounting the equipment (page 8)
   - AQR S3 Omni main unit and Controller
   - Temperature sensors

2. Plumbing (page 9)
   - TurboCell
   - Flow Switch

3. Electrical (page 10)
   - High Voltage (input power and HV relays)
   - Low voltage wiring (Smart Relay, VSP, heater, sensors, heater, flow switch and TurboCell)

4. Prepare the pool water (page 20)
   - General Water Chemistry
   - Salt

5. System Startup (page 22)
   - Configuration
   - Operation

Mounting the Equipment

AQR S3 Omni Enclosure

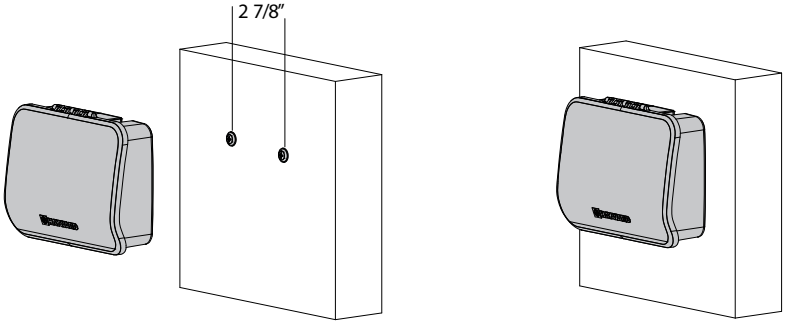
The AQR S3 Omni is contained in a rain-tight enclosure that is suitable for outdoor mounting. The control must be mounted a minimum of 6 ft (2 m) horizontal distance from the pool/spa (or more, if local codes require). The AQR S3 Omni is designed to mount vertically on a flat surface with the knockouts facing downward. Because the enclosure is vented (disperses heat from inside the box), it is important not to block the four sides of the control. Do not mount the AQR S3 Omni inside a panel or tightly enclosed area. Plugs are supplied to seal any unused knockouts.

When selecting a mounting location, note that the standard cables supplied with the included Controller, TurboCell, flow switch and temperature sensors are all 15 ft (4.6 m) long. Consider these connections when determining a mounting location. Select the proper mounting hardware given the size and weight of the unit. The AQR S3 Omni mounting brackets require a total of 4 mounting screws/bolts to fasten the AQR S3 Omni to the mounting surface.

AQR S3 Omni Controller

The Controller comes with a 15 ft (4.6 m) cord and plugs into the AQR S3 Omni. It should be mounted in a location that is convenient for the user to view and change pool/spa settings. When considering the mounting location, make sure there is enough clearance above the Controller so that the flip door will be able to be opened fully. Also be sure to allow enough clearance below the Controller to access the USB and Ethernet connectors. For best viewing results, position the Controller where it won't be subjected to direct sunlight.

The Controller has two keyhole cutouts on the back of its enclosure. A mounting template can be found on page 58. To mount, screw the two provided fasteners into the mounting surface at the desired location as shown on the following page.



Tighten until the bottom of the screw heads are 1/8" off the mounting surface. Position the Controller cutouts over the screw and slide the unit downward. You may have to tighten or loosen the screws slightly to fully engage the screw heads to get a snug fit.

Temperature Sensors

The AQR S3 Omni is packaged with two temperature sensors, one for water and one for air.

Water Sensor

This sensor measures the pool/spa temperature and is used for heating. It is installed in the filtration plumbing after the filter but before either the solar or conventionally fueled heaters.

1. Drill a 3/8" (10 mm) diameter hole in the PVC piping and remove all chips and burrs.
2. Insert sensor until O-ring collar sits flush on the hole.
3. Position hose clamp over the sensor and gently tighten until O-ring makes an adequate seal. Do not overtighten.

Air Sensor

This sensor is used to provide recirculation freeze protection. Mount the air sensor outdoors in a space that is not in direct sunlight or subject to heating/cooling from other sources.

Solar Sensor

For solar applications, mount the sensor near the solar collector array so that it is exposed to the same sunlight as the collectors. Use additional cable (20 AWG) if necessary.

Plumbing

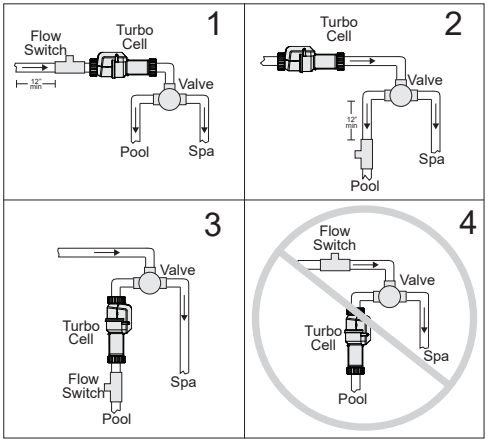
Ensure that the AQR S3 Omni installation does not constitute a cross connection with the local potable water supply. Consult local plumbing codes.

The AQR S3 Omni is packaged with a flow switch, TurboCell and cell unions.

The flow switch and cell should be plumbed in the return line to the pool/spa. The preferred installation is after (downstream) all the pool equipment (filter, heater, solar, etc.). The electrolytic cell and flow switch tee fitting are designed to be plumbed into 2" (51 mm) PVC pipe. Adapters (not included) can be used for systems with 1½" (38 mm) plumbing.

For proper plumbing, refer to the overview diagram on page 7 and the information below.

Flow Switch: IMPORTANT: There must be at least a 12" (25 cm) straight pipe run before (upstream) the flow switch. If the switch is plumbed after the cell, the cell can by counted as the 12" (25 cm) of straight pipe. To ensure proper operation, verify that the arrow on the flow switch (located on top of gray hex) points in the direction of water flow.



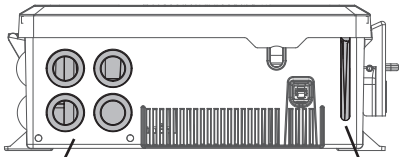
Electrolytic Cell: Install using the unions provided. Tighten unions BY HAND for a watertight seal. For pool/spa combination systems with spillover, use configurations #2 or #3 above to allow chlorination of both the pool and spa during spillover but preventing over-chlorination when operating the spa only.

Electrical

The AQR S3 Omni requires high and low voltage connections. A high voltage connection will be made to the AQR S3 Omni to power the unit as well as the high voltage relays (if they will be used). Low voltage connections will be made to sensors, VSP wiring, optional Smart Relay, heater wiring and more. Enclosure knockouts are provided for high voltage wiring. A low voltage channel inside the enclosure will ensure a separation of wiring and organize the low voltage wiring coming into the AQR S3 Omni enclosure. Always:

- Ensure that power is disconnected prior to performing any wiring
- Follow all local and NEC (CEC if applicable) codes
- Use copper conductors only
- Always remove power to the AQR S3 Omni before removing the front panel

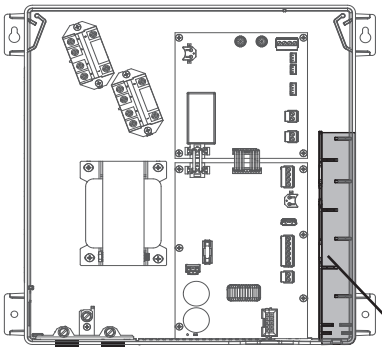
Bottom View



High Voltage knockouts

Low Voltage Wiring Channel

Inside View



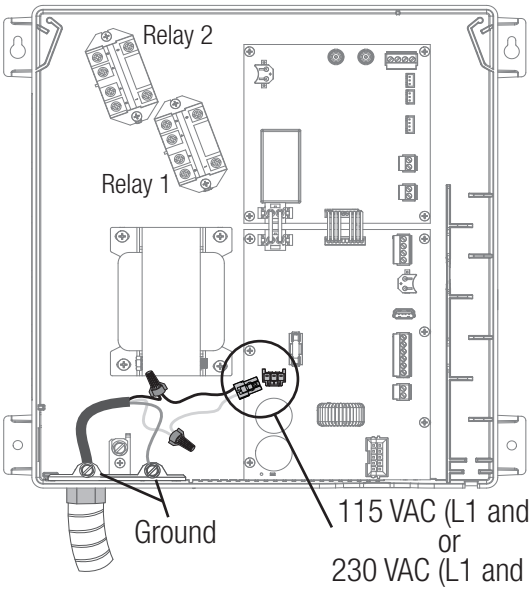
High Voltage knockouts

Low Voltage Wiring Channel

Input Power

The AQR S3 Omni is intended to be powered by either a 115 VAC (2A) or 230 (1A) VAC continuous supply. There is no need to manually select or use different input terminals, the AQR S3 Omni will automatically detect the input voltage. A wiring harness is included and will plug into the input power connector shown below. Wire nuts are supplied for connecting the harness to input power. Wire the harness according to the diagram. Connect the ground wire to one of the green ground screws as shown.

For Canadian installations, the AQR S3 Omni shall be connected to a circuit protected by a class A ground fault interrupter.



Connection Table

The AQR S3 Omni includes 2 high voltage relays (HVR1and HVR2), 2 low voltage/heater relays (LVR1and LVR2), 2 valve outputs (VLV1and VLV2) and 3 temperature sensor & 1 external input sensor (SENS1-SENS4). one additional Smart Relay (HVR3) can also be added. When wiring pool equipment to the AQR S3 Omni, keep a record of all connections. You'll need to record which input/output is used and what equipment is attached. To aid in this process, use the table shown. To identify the various inputs/outputs, refer to the diagram below the table. After attaching equipment to the AQR S3 Omni, fill in the appropriate information in the table. This information will be used to configure the AQR S3 Omni after installation is complete.

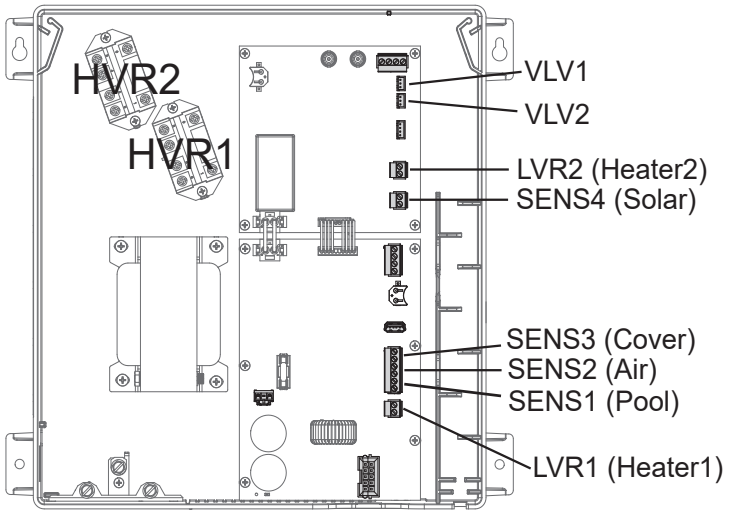
Connection	Pool Equipment	Description
High Voltage Relays		
HVR1		
HVR2		
Smart Relay		

Low Voltage Relays/Heaters		
LVR1		
LVR2		

Valve Acutators		
VLV1		
VLV2		

Temperature Sensors		
SENS1 POOL		
SENS2 AIR		
SENS3 COVER		
SENS4 SOLAR		

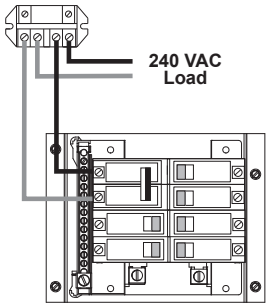
Optional Smart Relay Purchased Separately



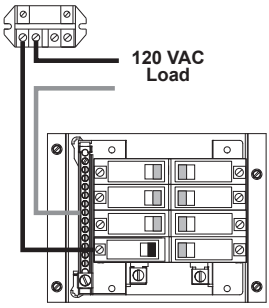
High Voltage Wiring

Single Speed Filter Pump and 120/240V Pool Equipment

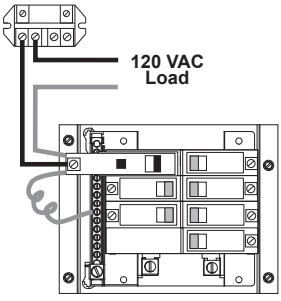
The two internal relays in the AQR S3 Omni are dry contact double pole (make/break both "legs" of 240V circuits) and are rated at 3HP/20A at 240V (1½HP/20A at 120V) using wire with a minimum insulation rating of 75º C. Each relay can be used to power high voltage pool equipment like a single speed filter pump, light, accessory pump, transformer, etc. The diagram below shows typical relay wiring from a standard power panel.



Wiring relay for 240 VAC Pool Equipment



Wiring relay for 120 VAC Pool Equipment



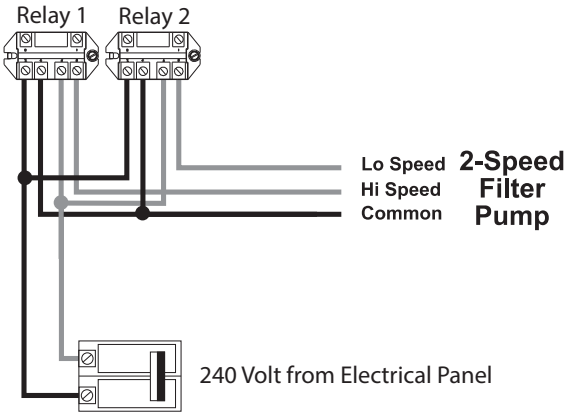
Wiring GFCB for 120 VAC Pool Equipment

⚠ **WARNING**: Do not use the AQR S3 Omni to control an automatic pool cover. Swimmers may become entrapped underneath the cover.

⚠ **WARNING**: Do not use the AQR S3 Omni to control fire pits or fire features.

Two Speed Filter Pump

The AQR S3 Omni can control a two speed filter pump using both internal relays. Refer to the wiring diagram below. For proper wiring, observe the relay markings. Relays are labeled "1" and "2" and are shown on the diagram on page 12.



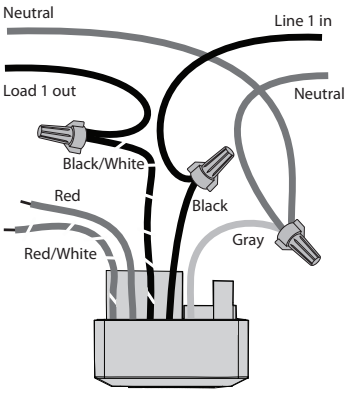
Variable Speed Filter Pump

Variable speed pumps don't require the use of the AQR S3 Omni's internal relays. Both the pump and the AQR S3 Omni are powered constantly from the electrical panel. The AQR S3 Omni controls the pump's function using low voltage communication wiring. This connection is shown on page 16.

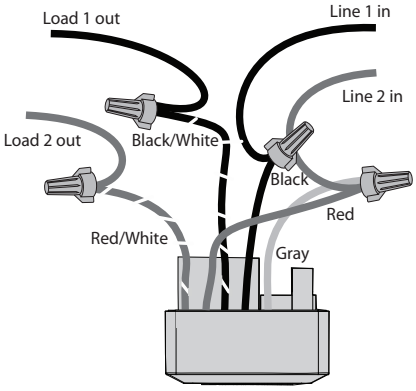
Smart Relay Load Wiring

In addition to the AQR S3 Omni's internal relays, a single Smart Relay can be used to control either 115 or 230 VAC pool equipment. Smart Relays are sold separately and include an electrical box and Wiring Whip. If not using the included box, install the Smart Relay (HLH485RELAY) into an electrical box with a minimum volume of 16.2 in^3. Use the included Wiring Whip if the electrical box will be mounted within 6 ft of the power source. Red, black and green conductors are included for 230 VAC wiring. A white conductor is supplied if using 115 VAC input power. Use the included wire nuts for wiring connections. Use proper threaded strain relief fittings when attaching conduit to knockouts. After wiring is complete, carefully insert the cover with connections into the box and secure.

115 VAC	Smart Relay Wire Colors	230 VAC
Line in	Black	Line 1 in
Load out	Black/White	Load 1 out
Neutral	Gray	Connect Gray & Red to Line 2 in
No Connection	Red	
No Connection	Red/White	Load 2 out



115 VAC



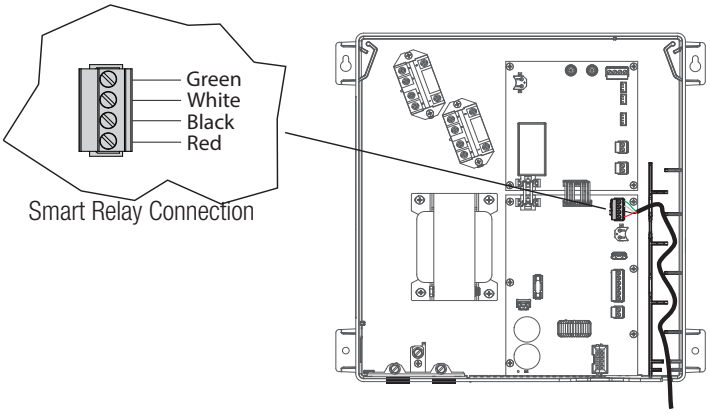
230 VAC

Low Voltage Wiring

NOTE: There is a low voltage channel on the right side of the AQR S3 Omni enclosure shown on page 11. All low voltage wiring that enters/exits the enclosure must run through this channel. There is a foam gasket included with the AQR S3 Omni that should be used to seal the channels's exit after wiring is complete. Do not run low voltage wiring through a knockout or with any high voltage wiring.

Smart Relay Wiring

Smart Relays rely on communication from the AQR S3 Omni. A Smart Relay comes with a 15 ft (4.6 m) 4 conductor cable and is wired to one of the two RS-485 connectors shown on page 6. Wire the cable as shown in the diagram. To ease wiring, the connector can be lifted off the onboard pins. Connect the Smart Relay communication wires to their proper screw terminals, then push the connector back onto the pins. For best results, strip back leads 1/8" before inserting into the screw terminals. After connecting the wires to the connector, run the communication cable through the low voltage wiring channel as shown.

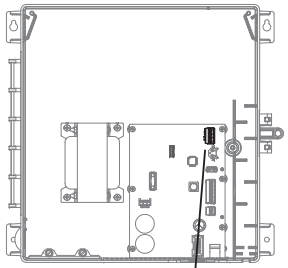


Smart Relay Connection

Hayward Variable Speed Pump (VSP) Wiring

The Hayward TriStar 950, TriStar 900, Super Pump 700 and MaxFlo 500 pumps wire directly to one of the RS-485 connectors and will be fully controlled by the AQR S3 Omni (schedules and speeds). Refer to the VSP Communication Wiring table and diagrams on the following page for VSP communication wiring instructions. For Pentair VSP models, use a Hayward HLPMPCONV converter (sold separately). Refer to the HLPMPCONV instructions for wiring information.

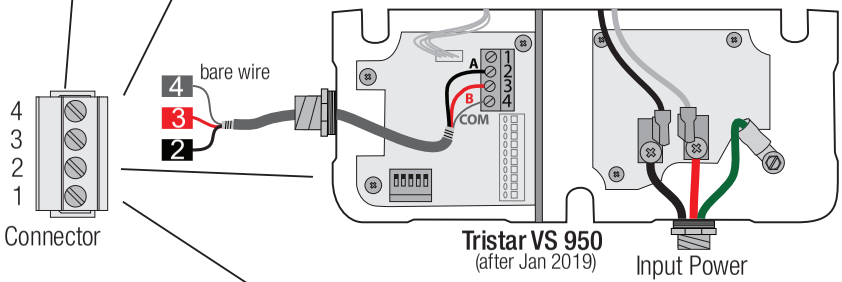
To ease wiring, the connector can be lifted off the onboard pins. Connect the VSP communication wires to their proper screw terminals, then push the connector back onto the pins. For best results, strip back leads 1/8" before inserting into the screw terminals. After wiring, run the communication cable through the low voltage Wiring Channel (same as Smart Relay above).

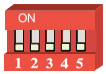


VSP Communication Wiring Table

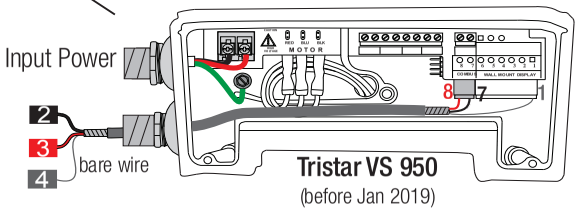
Pump Model	S3 Conn.	Pump Conn.
TriStar VS 950 (before Jan 2019)	2	7
	3	8
	4	1
*TriStar VS 950 (after Jan 2019)	2	A or 2
*TriStar VS 900	3	B or 3
*Super Pump VS 700 *MaxFlo VS 500	4	COM or 4

* Disconnect onboard display and set all dip switches to OFF position.



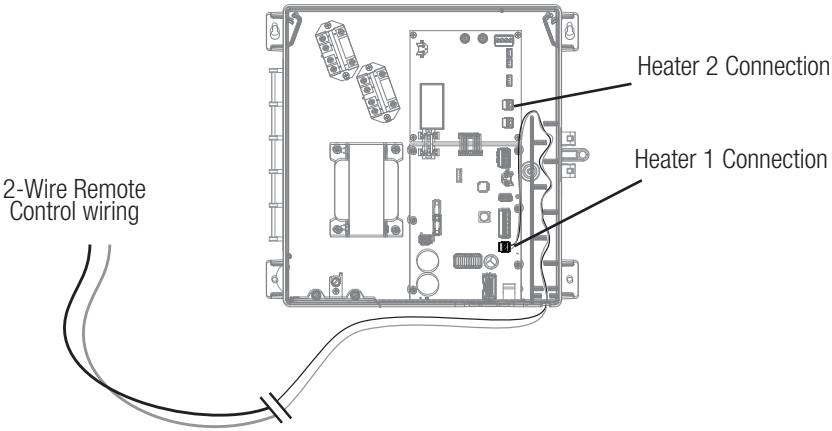


For pump models with dip switches, set all switches to OFF position (as shown). Remove the display cable. Use the spare connector taped to the display cable for the communication cable connection.



Heaters

The AQR S3 Omni provides a set of low voltage dry contacts that can be connected to most gas heaters or heat pumps with 24V control circuits. Manuals supplied with most heaters include specific wiring instructions for connecting the heater to an external control (usually identified as “2-wire” remote control). For millivolt or line voltage heaters, contact Hayward Technical support.

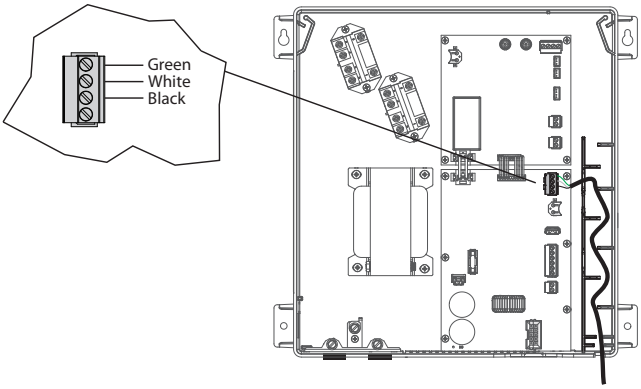


1. Wire heater to 120/240V power source per the instructions in the heater manual. The AQR S3 Omni does NOT control the power going to the heater.
2. Wire one of the two AQR S3 Omni heater outputs (shown above) to the heater’s remote control connection (refer to heater manufacturer’s manual). Many internal parts of the heater can get very hot--see the heater manufacturer’s recommendations on the minimum temperature rating for wires. If no guidance is given, use 105°C rated wire.
3. Refer to the heater manual but it’s very likely that the heater’s ON/OFF switch must be set to ON and the thermostat set to the maximum (hottest) setting.

Smart Heater Control

Smart Heaters are programmed with a Hayward Unique Address (HUA) which allows it to be fully controlled by a Hayward Omni pool automation control. Similar to other Smart Devices such as select Hayward variable speed pumps, you will be able to remotely create schedules and setpoints for both heating and cooling while displaying real time heater status and diagnostics for the Smart Heater. The Omni family of products provide a 3 wire cable connection used to communicate with the Smart Heater and requires firmware revision R4.3.0 or later.

Disconnect power to both the Smart Heater and the Omni control before removing their panels. Use a proper outdoor rated 3 conductor 22 AWG cable (20 AWG for runs over 30 ft) for the connection from the Omni control to the Smart Heater. Route the cable through appropriate knockouts making sure they are not shared with high voltage wiring. Refer to the diagram on the following page showing a Hayward OmniLogic control wired to the Smart Heater. Note that the position of each colored conductor is the same at both ends of the communication cable. Refer to your Smart Heater manual for specific wiring instructions. After the communication cable is fastened and secure, refasten the panels.



Sensors

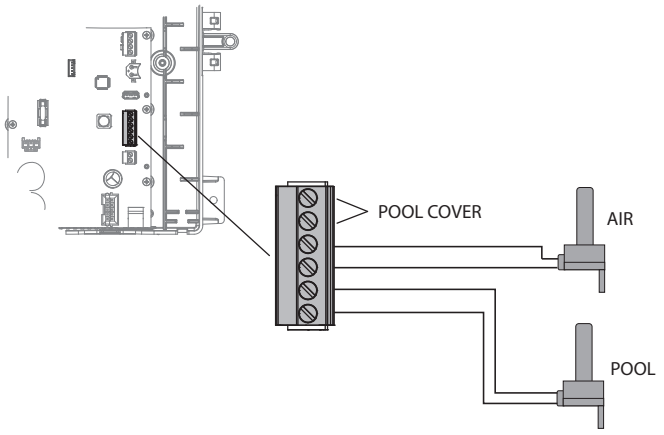
Temperature Sensors

The AQR S3 Omni utilizes Hayward 10K ohm thermistor type sensors for measurement of pool and air temperature. The sensors come with a 15 ft (4.6 m) cable. If a longer cable is required, contact the Hayward Technical support for information on suitable cable types and splices.

Temperature sensors are wired to the 6 position connector shown on page 6 and on the following page. To ease wiring, the connector can be lifted off the onboard pins. Connect the temperature sensors to their proper screw terminals, then push the connector back onto the pins. For best results, strip back leads 1/8" before inserting into the screw terminals.

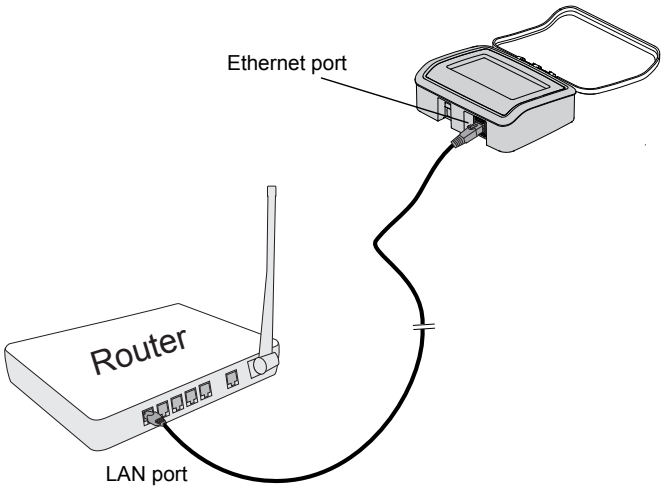
Pool Cover Sensor

If the pool has a motorized cover, the AQR S3 Omni can automatically scale back operational limits (both chlorination setpoint and pump speed) to ensure over-chlorination doesn't occur. The pool cover sensor must use a normally open switch that connects to the pool cover terminals shown on page 18. Refer to the pool cover manufacturer's literature to determine compatibility.



Home Router

If web enabled devices such as PCs, laptops, tablets or phones will be used to access the AQR S3 Omni, an Ethernet or wireless connection must be made to the home router. For wireless connections, a 2.4GHz connection to the router is required. For Ethernet connections, use outdoor rated Cat5e or Cat6 Ethernet cable. Connect one end to the Controller and the other to an available LAN port (not WAN) on the home router or access point.



Valve Actuators

The AQR S3 Omni can control up to two automatic valve actuators. Two of the valve outputs are normally used for the pool/spa suction and return valves or for general purpose use (solar, water feature, in-floor cleaner, etc.).

For installations with solar heating, Hayward offers the AQ-SOL-KIT-xx solar kit that contains a valve, actuator, and extra temperature sensor. The "xx" indicates the valve type from the 2 choices below:

-1P 1.5" Positive Seal
-2P 2" Positive Seal

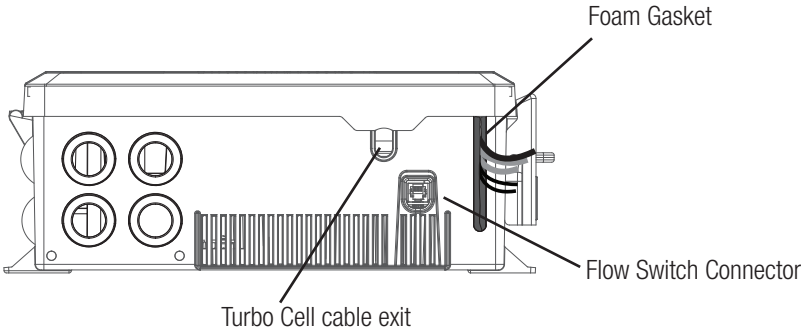
The AQR S3 Omni is compatible with standard valve actuators manufactured by Hayward, Pentair/ Compool, and Jandy. Refer to the diagram on page 6 for the location of the AQR S3 Omni's valve (VLV) connectors. Record all connections in the Connection Table on page 12.

Optional Sense and Dispense

The AQR S3 Omni can be used with the Hayward HL-CHEM Sense and Dispense Kit. Using the HL-CHEM, the AQR S3 Omni will continuously monitor the pool's pH/ORP levels and automatically dispense chemicals to correct pH or add chlorine when needed. The HL-CHEM connects in the same manner as a Smart Relay using the on-board connector shown on page 15. High voltage chemical dispensing pumps are connected directly to a Smart Relay. Refer to the HL-CHEM manual for installation instructions.

Final Steps

With the previous wiring completed, locate the precut removable foam gasket that can be used to seal the low voltage exit. Wrap it around the low voltage wiring at the exit of the enclosure (shown below). Work the gasket into the exit slot until it is fully sealed then re-install the panel and display.



Flow Switch

The flow switch cable plugs into the flow switch connector shown above and on page 6. Ensure that the connector latch "snaps" into place.

TurboCell

The TurboCell should be plugged in AFTER the AQR S3 Omni deadfront panel is installed. Refer to page 6 for the location of the chlorinator cell connector. The cell cable will exit the enclosure as shown in the diagram above.

Preparing Pool/Spa Water

Salt Chlorination

The AQR S3 Omni automatically converts salt into free chlorine which kills bacteria and algae in the pool/spa. Chlorine will revert back to sodium chloride after killing bacteria. These reactions will continuously recycle, virtually eliminating the need to add sanitizing chemicals to your pool/spa. The only time you may need to add more salt to the pool/spa is when water is replenished due to backwashing, draining, or splashing (not evaporation). The actual amount of chlorination required to properly sanitize a pool varies due to bather load, rainfall, temperature, and the pool's cleanliness.

Water Chemistry

The table on the following page summarizes the levels that are recommended by the Association of Pool and Spa Professionals (APSP). The salt level listed below is a recommendation which allows for effective chlorine generation but generally stays below the level of human taste. If running higher levels, note that swimmers may taste the presence of salt.

CHEMICAL	IDEAL LEVELS
Salt	2700 to 3400 ppm
Free Chlorine	1.0 to 3.0 ppm
pH	7.2 to 7.8
Cyanuric Acid (Stabilizer)	30 to 50 ppm
Total Alkalinity	80 to 120 ppm
Calcium Hardness	200 to 400 ppm
Metals	0 ppm
Saturation Index	-.2 to .2 (0 best)

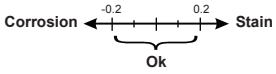
Saturation index

The saturation index (Si) relates to the calcium and alkalinity in the water and is an indicator of the pool water "balance". Your water is properly balanced if the Si is 0 ± 0.2. If the Si is below -0.2, the water is corrosive and plaster pool walls will be dissolved into the water. If the Si is above +0.2, scaling and staining will occur. Use the chart below to determine the saturation index.

Si = pH + Ti + Ci + Ai - TDS

°C	°F	Ti	Hardness Calcium	Ci	Total alkalinity	Ai	Total Dissolved Solids	TDS
12	53	0.3	75	1.5	75	1.9	0-1000	12.10
16	60	0.4	100	1.6	100	2.0	1001-2000	12.29
19	66	0.5	125	1.7	125	2.1	2001-3000	12.35
24	76	0.6	150	1.8	150	2.2	3001-4000	12.41
29	84	0.7	200	1.9	200	2.3	4001-5000	12.44
34	94	0.8	250	2.0	250	2.4		
39	102	0.9	300	2.1	300	2.5		
			400	2.2	400	2.6		
			600	2.4	600	2.8		
			800	2.5	800	2.9		

Use: Measure the pH of the pool water, the temperature, water hardness, total alkalinity, and total dissolved solids. Use the table above to determine Ti, Ci, Ai, and TDS in the formula shown above. If the Si is equal to 0.2 or more, stains may appear. If the Si is equal to -0.2 or less, corrosion or deterioration may occur.



The pool's chemistry must be balanced BEFORE activating the AQR S3 Omni. NOTE: If the pool does not have new water, add metal remover and non-copper based algaecide to the pool, per manufacturer's instructions. This ensures a quick, trouble-free transfer to the AQR S3 Omni system.

USE ONLY HAYWARD GENUINE REPLACEMENT PARTS

Salt

Use the chart on the following page to determine how much salt in pounds or (Kgs) should be added to reach the recommended levels. Use the Pool Sizing Formula below (measurements are in feet/ gallons and meters/liters) if pool size is unknown.

	Gallons (pool size in feet)	**Liters** (pool size in meters)
Rectangular	Length x Width x Average Depth x 7.5	Length x Width x Average Depth x 1000
Round	Diameter x Diameter x Average Depth x 5.9	Diameter x Diameter x Average Depth x 785
Oval	Length x Width x Average Depth x 6.7	Length x Width x Average Depth x 893

The operating salt level is between 2700 – 3400 PPM when in Standard Salt mode or 1200-1800 PPM when in Low Salt mode (see page 34). Before adding any salt, first test the pool's salt level. Chlorine added to a pool over time can produce salt so this is especially important for retrofit installation to older pools. If the level is low, determine the number of gallons in the pool and add salt according to the chart below. The salt in your pool/spa is constantly recycled and the loss of salt throughout the swimming season should be minimal. This loss is due primarily to the addition of water because of splashing, backwashing, or draining (because of rain). Salt is not lost due to evaporation.

Type of Salt to Use

It is important to use only sodium chloride (NaCl) salt that is greater than 99.0% pure. This can be found at most pool stores in 40-80 lb. bags labeled "for use in swimming pools". Alternatively, use common food quality or water softener salt that is at least 99.0% pure. It is also acceptable to use water conditioning salt pellets, however, it will take longer for them to dissolve. Do not use rock salt, or salt with more than 1% of yellow prussiate of soda, salt with anti-caking additives, or iodized salt.

How to Add Salt

For new plaster pools, wait 10-14 days before adding salt to allow the plaster to cure. Turn the circulating pump on and add salt directly into the pool. Brush the salt around to speed up the dissolving process—do not allow salt to pile up on the bottom of the pool. Run the filter pump for 24 hours with the suction coming from the main drain (use pool vacuum if there is no main drain) to allow the salt to evenly disperse throughout the pool. The salt display may take 24 hours to respond to the change in salt concentration.

Always check stabilizer (cyanuric acid), when checking salt. These levels will most likely decline together. Use the chart on the following page to determine how much stabilizer must be added to raise the level to 40 ppm.