

# *Continuous, On-Line Measurement of Total Residual Chlorine*



*Model Q45H/79*

**Total Residual Chlorine Monitor**

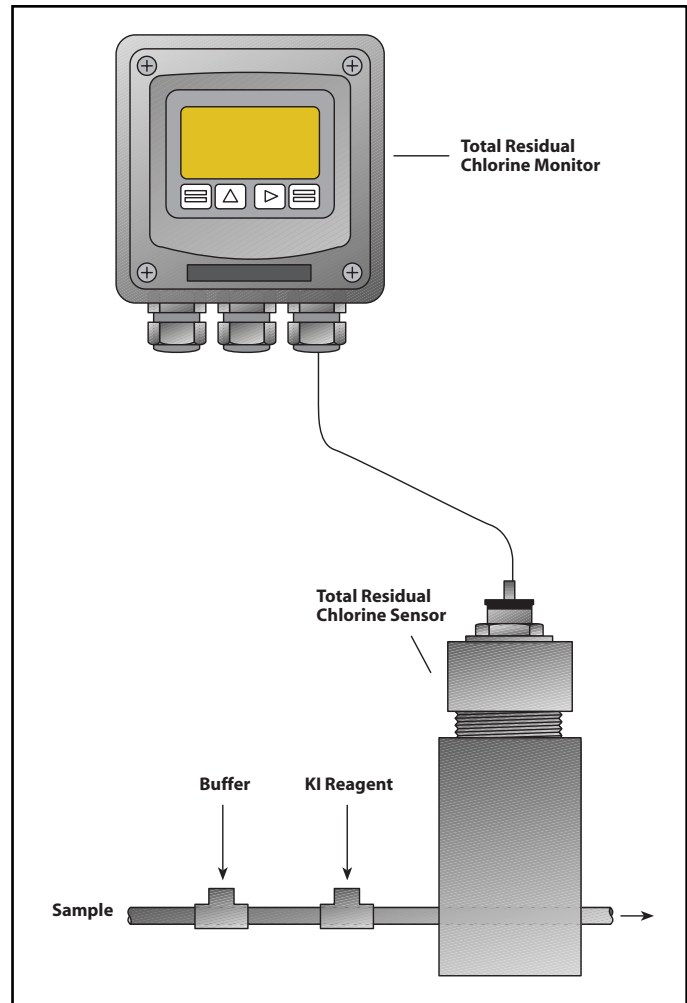


# High Sensitivity PPB Measurement

Chlorination of potable water, wastewater effluent and cooling water is widely used throughout the world to control biological activity in the water. Disinfection of potable water with chlorine ensures that the tap water is safe to drink once it has passed through the distribution system. Wastewater disinfection helps to ensure that receiving streams are safe for recreational use, and cooling water chlorination reduces biofouling that can degrade heat transfer efficiency. In addition to these common uses, there are many other applications where chlorine addition helps to reduce biological contamination. Since the Q45H/79 is capable of measuring down to 0.001 PPM, it is also ideal for use in dechlorination applications where chlorine discharge limits are often extremely low.

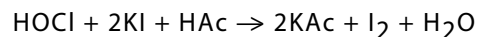
Residual chlorine is found in many chemical forms in water systems. Residuals in clean water are often predominantly free chlorine while wastewater, cooling water and chloraminated water can contain mixtures of free chlorine, combined chlorine and organochlorine species. Measurement of residual chlorine can be relatively difficult where a variety of chlorine forms exist, and a measurement of "Total Residual Chlorine" is often required in these applications. This total chlorine measurement is normally done by reacting the chlorine in a water sample with potassium iodide and buffered to pH 4. All of the various chlorine compounds react with the iodide to release an equivalent amount of iodine, and the released iodine is measured using various methods.

Many on-line monitors for total residual chlorine use the iodometric method for measurement, where current between two exposed electrodes determines the iodine concentration. ATI's Model Q45H/79 Total Residual Chlorine Monitor uses this same standard iodometric method, but with a membraned sensor for measuring the iodine in solution. The system takes the reacted sample containing iodine and uses a membraned amperometric sensor rather than exposed electrodes. The gas permeable membrane allows only iodine to react with the sensor. Sample contaminants are reduced from coming in contact with the sensor with a 40-60 micron filter located in the inlet flow block.



## Description

The Q45H/79 monitor is an on-line automated chemistry system that provides the components necessary to continuously perform total residual chlorine measurement. In operation, a small amount of the sample is pumped into the system and mixed with a pH 4 buffer and then with potassium iodide. At pH 4, chlorine components in solution react as follows (equation shown is for one chlorine compound only):



# Operation and Features



## Operation

The sample to be measured is pumped to the inlet flow block located in the side of the chemistry module, from which a small filtered sample is then taken and mixed with pH 4 buffer and potassium iodide. The reacted sample now moves to a special flowcell assembly where the iodine is measured with a membraned amperometric sensor. The signal from the sensor with temperature are then processed by the monitor and displayed on the monitor in parts per million total residual chlorine.

The Q45H/79 is available either with the monitor mounted on the chemistry module or the monitor can be separated up to 100 ft. (25' standard) from the chemistry unit if required.

Sample tubing is connected to the inlet flow block assembly using 1/4" I.D. flexible tube. Recommended sample flow rate is 3-15 gallons per hour (0.2-1 LPM). While the chemistry unit uses only a small fraction of this sample, the higher flow keeps sample delivery times to a minimum. A 1/2" I.D. hose barb is provided for connection of the drain tubing.

## Features

### Sensing:

Measurement is made with a direct reading membraned amperometric iodine sensor.

### Standard Method:

Total chlorine is measured using EPA recommended method for reaction of sample with buffer and potassium iodide, and measurement of iodine released in the reaction.

### High Accuracy, High Sensitivity:

Measures from 0.001 PPM to 20.00 PPM

### Large Alphanumeric LCD Display:

Provides total residual chlorine display, alarm status and all configuration information.

### Control Relays:

Two 6-amp relays programmable for control or alarm function.

### Isolated Outputs:

Two assignable 4-20 mA outputs configured to track residual chlorine, temperature or assigned to PID control.

### Selectable PID Controller:

PID includes manual operation feature and diagnostic feature for relay notification of control problems.



# Model Q45H/79 Total Residual Chlorine Specifications

## Electronic Monitor

Display Range:	0-200 PPB or 0-2.000, 0-20.00 PPM
Accuracy:	± 0.01 PPM or 0.5% of F.S.
Repeatability:	± 0.01 PPM or 0.5% of F.S.
Linearity:	0.1% of F.S.
Zero Drift:	< 0.01 PPM per month
Display:	Large 4 digit LCD main display, 0.75" characters, 12 digit alpha-numeric second line display
Power:	115/230 VAC, 50/60 Hz., 10 VA
Control Relays:	Two SPDT relays, 6A @ 250 VAC 5A @ 24 VDC, resistive
Relay Mode:	Programmable for control or alarm function
Analog Outputs:	Two Isolated 4-20 mA, 550 Ohms max. load, Assignable
Operating Conditions:	-20-60°C, 0-95% R.H. non-condensing (does not apply to chemistry module)
Enclosure:	NEMA 4X (IP-66) wall or panel mount

## Chemistry Module

Sensor:	Membraned I <sub>2</sub> Sensor
Sensor Cable:	(for separated chemistry module only) 25 feet standard, 100 feet max.
Response Time:	90% in 60 seconds
Sample Pump:	Internal Tubing Pump, 15 cc/min.
Buffer and KI Pump:	Internal Tubing Pump, 0.06 cc/min.
Sample Flow Block:	PVC with internal 40-60 micron sample filter
Temperature Limits:	0-50°C
Sample Flow Rates:	3-15 GPH (.2-1 LPM) at sample flow block
Sample Flow Block Inlet:	1/4" I.D. Hose Barb
Sample Flow Block Drain:	1/2" I.D. Hose Barb

## Ordering Information:

### Q45H/79-A-B

Suffix A – System Style

- 1 – Integrated Single Enclosure System
- 2 – Separate Monitor and Chemistry Module (25 ft. cable standard)

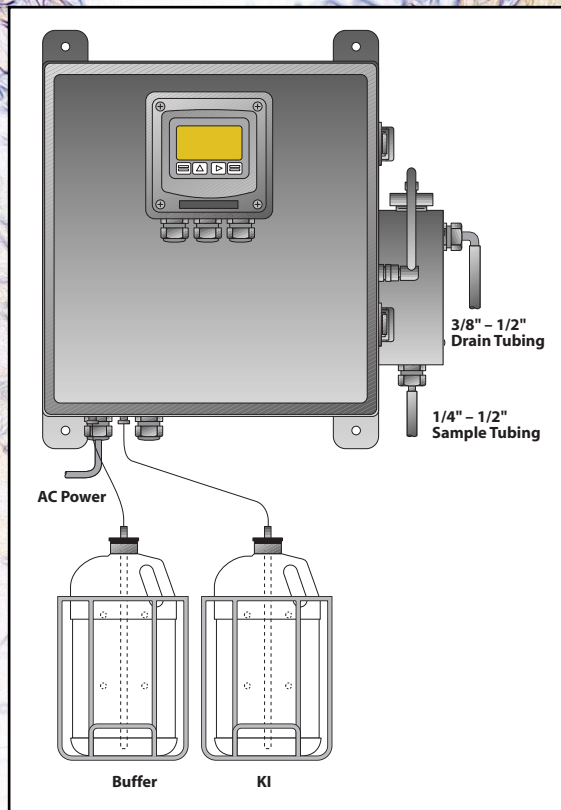
Suffix B – Power

- 1- 120 VAC, 50/60 Hz.
- 2- 220 VAC, 50/60 Hz.

## Accessories:

07-0100	Junction Box
30-0001	5-Conductor Cable
05-0068	Panel Mount Kit
47-0005	U-Bolt

## Typical System:



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