

Monitors for Organic Pollution, Surrogate Color, THM Precursor Measurement and Coagulation Control

7320 Series

Industrial^{IT}
enabled™

- **Coagulation control cost saving**
 - savings on alum or ferric of £80,000 (US\$120000) per year have been achieved on potable water treatment plants
- **Reduced sludge disposal costs**
 - Less alum, less sludge, lower costs
- **Surrogate color measurement**
 - significant savings on operational costs through lower maintenance requirements
- **THM (trihalomethanes) precursor alert**
 - provides advanced warning of increased risk of THM development
- **Automatic compensation for turbidity**
 - reduces initial capital expenditure, minimizing operational costs
- **Reagentless operation**
 - significant savings in operational expenditure costs
- **Automatic on-line diagnostics maintain the intensity of the light source**
 - continuous on-line diagnostics reduces calibration frequency, thereby reducing maintenance costs



**A robust, easy-to-use continuous
on-line range of monitors**

ABB

7320 Series UV Monitors

The ABB 7320 Series of monitors are designed for Organic Pollution and Coagulation control on potable water treatment plants.

The **7320/1000 Dissolved Organic Monitor** (low range 0 to 20mg^l-¹C) has been designed for use on potable water treatment plants. In particular it can be used to monitor the quality of the water at the outlet from a carbon filter or on the final water as a THM precursor measurement. Long term field trials have shown that maintenance demands on these applications are minimal.

The **7320/2000 Dissolved Organic Monitor** (high range 0 to 100mg^l-¹C) is used for intake protection on potable water applications to detect the rise in DOC (dissolved organic carbon) from algal bloom toxins and industrial discharges.

The **7320/3000 Coagulation Monitor/Controller** has been designed specifically for use on potable water treatment plants to provide information on the incoming raw water for predictive control of the coagulant.

The optimized *profile scanning* of the surface area of each measurement is made every 6s. This has been demonstrated in extensive field trials to provide a superior performance, when compared with the traditional color measurement system.

The significant benefits of a straight-through system, without the need for expensive and maintenance intensive filter systems, or the need for consumable reagents, ensures the long term reliability, which is essential for on-line control.

Turbidity Compensation

In addition to the absorption measurement at 254nm, a second measurement at 400nm enables the monitor to compensate automatically for fluctuations in turbidity. This avoids the need for expensive and maintenance-prone filtration systems, which significantly reduces maintenance demands.

Reagentless Operation

The monitor uses no chemical reagents during operation, reducing cost of ownership to an absolute minimum. When compared to a color monitor, which has been traditionally used for coagulation control, the cost of ownership, together with the initial capital purchase cost, can be recovered in 3 years.

Maintenance

Minimal maintenance, due to the simplicity of the monitor, is a key feature. Apart from periodic validation of the calibration (this varies with user preference, typically at 3 month intervals) and annual replacement of the wiper blades, there should be no requirement for any further manual intervention.



Auto-cleaning Mechanism

Calibration

Calibration is carried out using high-quality demineralized water for zero setting and a suitable phthalate calibration standard to adjust the span. This is a simple procedure and, for user convenience, a funnel is supplied with the monitor.

Installation

A wall-mounting bracket is provided to enable the flow-through sensor to be mounted on a wall or back-plate.

Alarms

There are two set point alarms which can be configured as high or low programmable alarms. The facility to accept a signal from an external flow meter enables the instrument to fail-safe on loss of sample alarm.

Light Source

The Light Source is monitored continuously for correct operation and the inherent design of the system ensures a lamp life of up to 10 years, thus keeping operating costs to an absolute minimum.

Warranty

Warranty is 12 months, providing the system is operated in accordance with the operating instructions. It is not a condition of the warranty that a service contract is required.

Auto-Cleaning

Optical cleaning is a key feature, reducing maintenance levels and optimizing the performance. The cleaning frequency is programmable to accommodate varying sample conditions.

Applications

There are many applications where the 7320 Monitor can be used to improve on more traditional methods.

Surrogate Color Monitor

Extensive field trials have rapidly established that the 7320 Monitor performs as a surrogate color monitor providing many performance-enhancing benefits and providing significant operational cost savings such as:

- Reagentless operation
- Automatic cleaning
- Very low power consumption
- Long life lamp
- High stability
- No expensive filtration

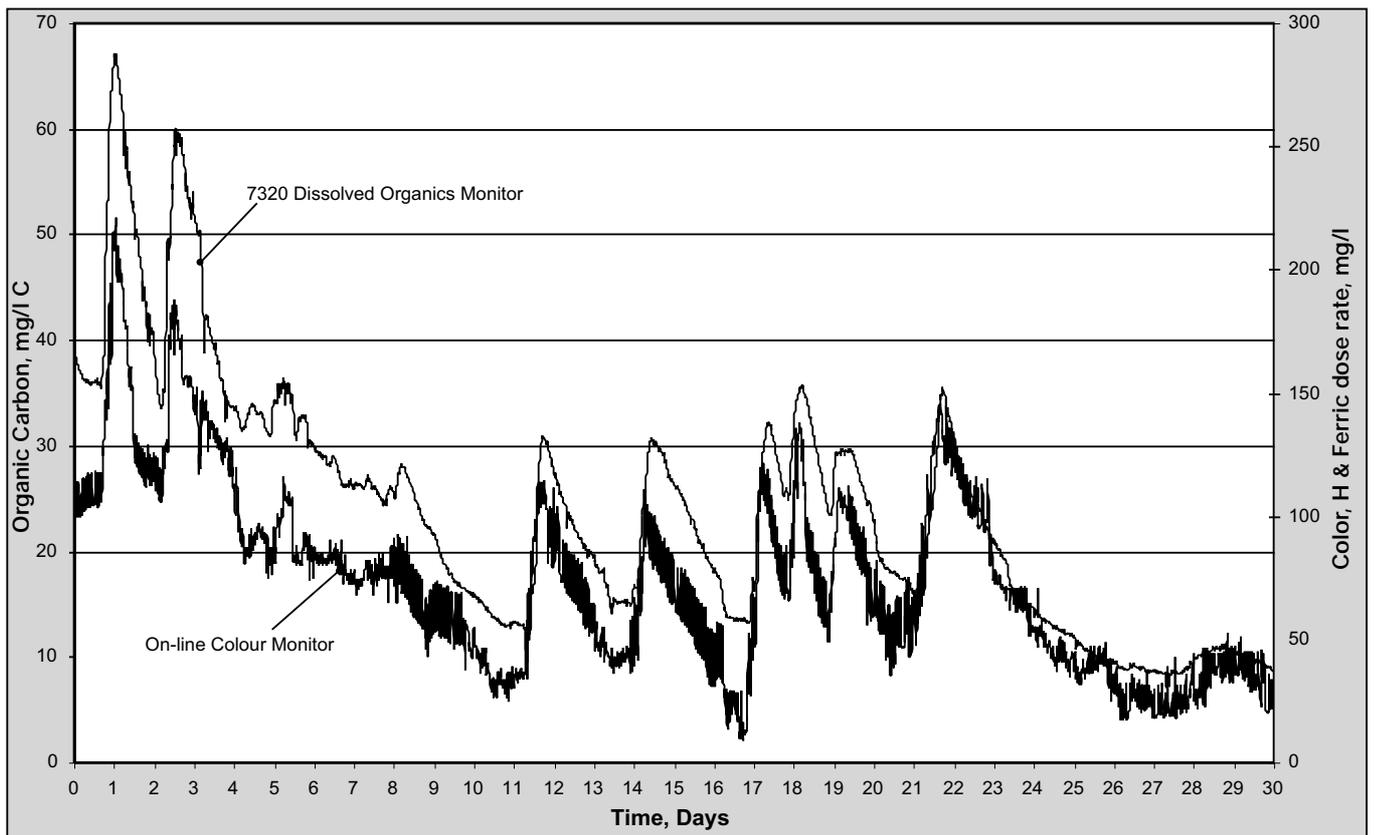
When compared directly with a conventional color monitor, which uses a filtration unit, significant savings can be made on initial capital expenditure and operational costs have shown that the entire cost of purchase can be recovered over a 10 year life span.

THM Precursor Measurement

Increasing concerns over THMs have resulted in the need for advance warning of unfavourable conditions which might encourage the development of THMs in drinking water.

When used on final chlorinated treated water, the analyzer provides advance warning of any increase in dissolved organic carbon, thereby enabling rapid corrective action to reduce the risk. Under such clean water conditions the maintenance becomes virtually zero.

Many of the low-range analyzers are now used for this increasingly critical application, often used in conjunction with turbidity measurement.



Direct Comparison of Color Measurement against UV Monitor

...Applications

Coagulation Control

The 7320 Monitor has demonstrated on many sites that a dramatic improvement to the water quality occurs when used as part of an automatic coagulation control system.

Savings of as much as £80,000 (US\$120000) per annum for chemical reagents have been demonstrated and are only a part of the improved efficiencies that have been realised.

Others are:

- Improved water quality
- Reduced manpower
- Sludge disposal costs significantly reduced
- Reduced risk of THM development

This technique is particularly successful on upland waters where humic and fulvic acids are the main constituents of the color content.

The 7320 Monitor has demonstrated on many upland water sites that reliable and extremely cost effective on-line control can be achieved reliably.

The monitor is compact and very robust; installation is simple and easy with minimal cost.

Cost Savings Based on Plant Size

Chemical costs were reduced by £80,000 (US\$120000). Savings on chemical reagents were only a part of the overall total efficiency improvements.

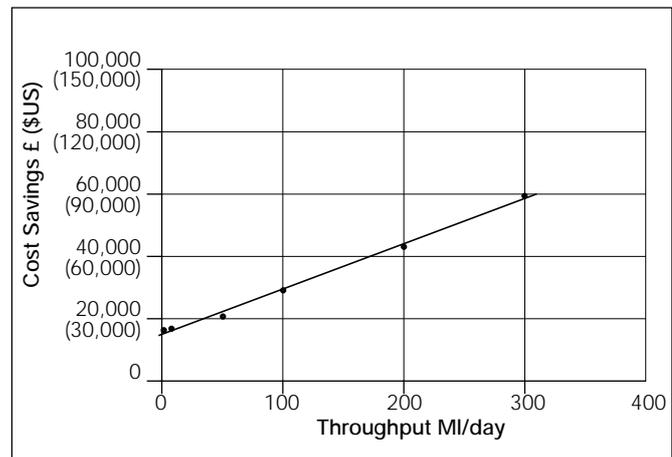
Other benefits are:

- Improved water quality
- Reduced manpower, based on a site producing 100MI/day = £7.20 (US\$10) per MI/day, or £720.00 (US\$1000) per day producing £262K (US\$390000) per annum
- Sludge disposal costs falling by £7k (US\$10500) per annum
- Reduced risk of cryptosporidium – better control of water quality
- Reduced requirement for more on-line analyzers at the back end of the installation – greater assurance of water quality
- THMs risks are reduced, more reliable control minimizing breakthrough of organics to the final chlorinated water

How was this achieved?

The reliability of the 7320 Monitor provided the confidence which enabled continuous on-line control to be trusted:

- More sensitive and reliable feed-forward control
- Virtually maintenance-free operation
- Reagentless operation leading to low operational costs
- Eliminates the need for expensive and maintenance-prone filtration



Typical Cost Savings v. Throughput

Specification

General

Sensor range

(Based on potassium hydrogen phthalate calibration standards)

7320/1000	Low range	0 to 20mg ^l - ¹ C
7320/2000	High range	0 to 100mg ^l - ¹ C
7320/3000	Coagulate dose	0 to 100mg ^l - ¹ C

Linearity

Low range	0.5mg ^l - ¹ C
High range	2mg ^l - ¹ C

Reproducibility

Low range	0.25mg ^l - ¹ C
High range	1mg ^l - ¹ C

Inferred units

Absorbance units/metre
Color °H
Coagulant dose mg^l-¹C
mg^l-¹C T.O.C.

Maximum current output scale expansion

Low range	0 to 2mg ^l - ¹ C
High range	0 to 20mg ^l - ¹ C

Lamp life

Rated by the manufacturer at 1.2 x 10⁹ flashes per min. (10 years continuous operation at the rate of one flash at 6s intervals [typical] equates to 5.2% of the rated lamp life)

Diagnostics

Out of sample
Lamp disabled
Loss of signal
Electronic failure

Internal wiper cleaning system

Programmable, operation frequency 15, 30, 45 and 60mins. 2, 4, 6, 12 and 24 hours.

Display

Resolution

Low range	0.01mg ^l - ¹ C
High range	0.1mg ^l - ¹ C

Measured value

4-digit, backlit LCD window

Information

2 x 16-character dot matrix, backlit LCD window

Reproducibility

±3% of reading

Response time

Normally three minutes for 90% step change depending on signal damping factor

Sample

Flow rate

0.5 to 5l/min (free of air bubbles). A higher minimum flow rate is required at high turbidity levels when using the high range sensor

Temperature

0 to 40°C (32 to 104°F)

Pressure

3bar max.

Outputs

Current output

0 to 10, 0 to 20 and 4 to 20mA

Max. load resistance

750Ω

Accuracy

±0.25% of FSD or ±0.5% of reading

...Specification

Set Points and Relays

No. of set points

Two, programmable over the instrument range

Diagnostic relay

Out of service, single-pole/single-contact

Relay contacts

Single-pole changeover

Rating

250V AC, 5A max. non-inductive

Power Supply

Voltage

100 to 130V AC and 200 to 260V AC, 50 to 60Hz

Power consumption

Less than 15W

Environmental Data

Operating temperature

0 to 40°C (32 to 104°F)

Storage temperature

0 to 55°C (32 to 131°F)

Protection

IP65 (NEMA4X)

Operating humidity

Up to 95% non-condensing

Max. distance between monitor and sensor

200 to 750mm

Overall dimensions

Monitor 252mm wide x 453mm high x 133mm deep

Sensors **Low range**
327mm wide x 410mm high x 160mm deep

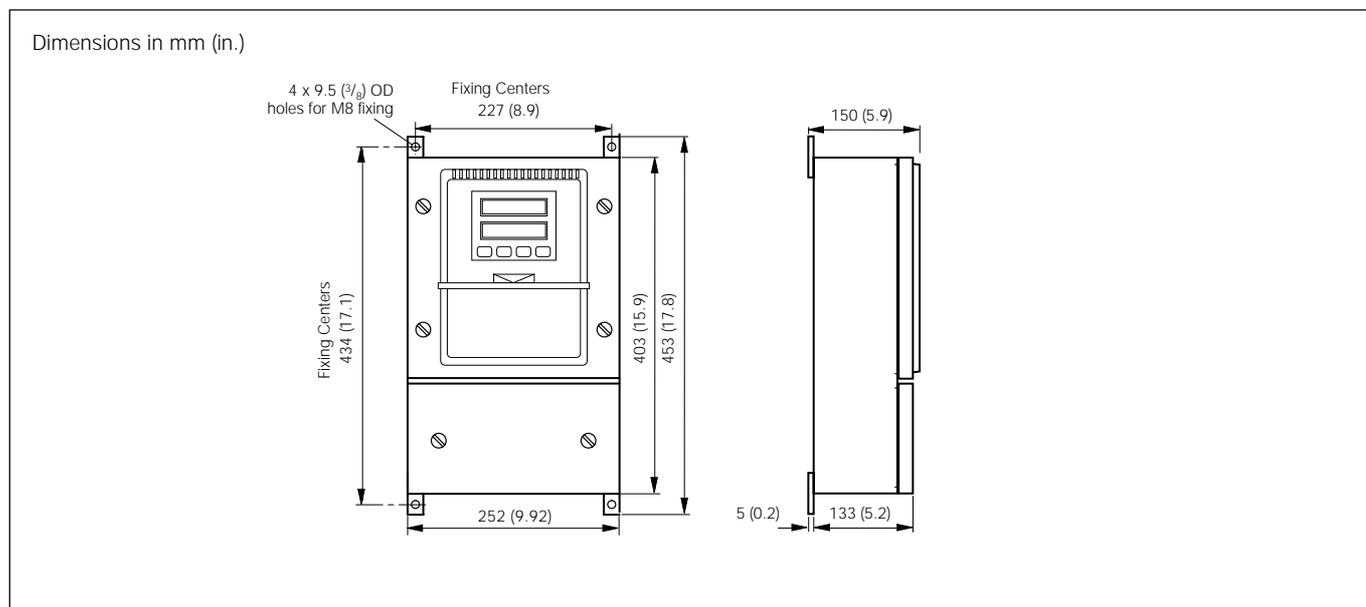
High range
408mm wide x 373mm high x 191mm deep

Weight

Monitor 11kg (24.2 lb)

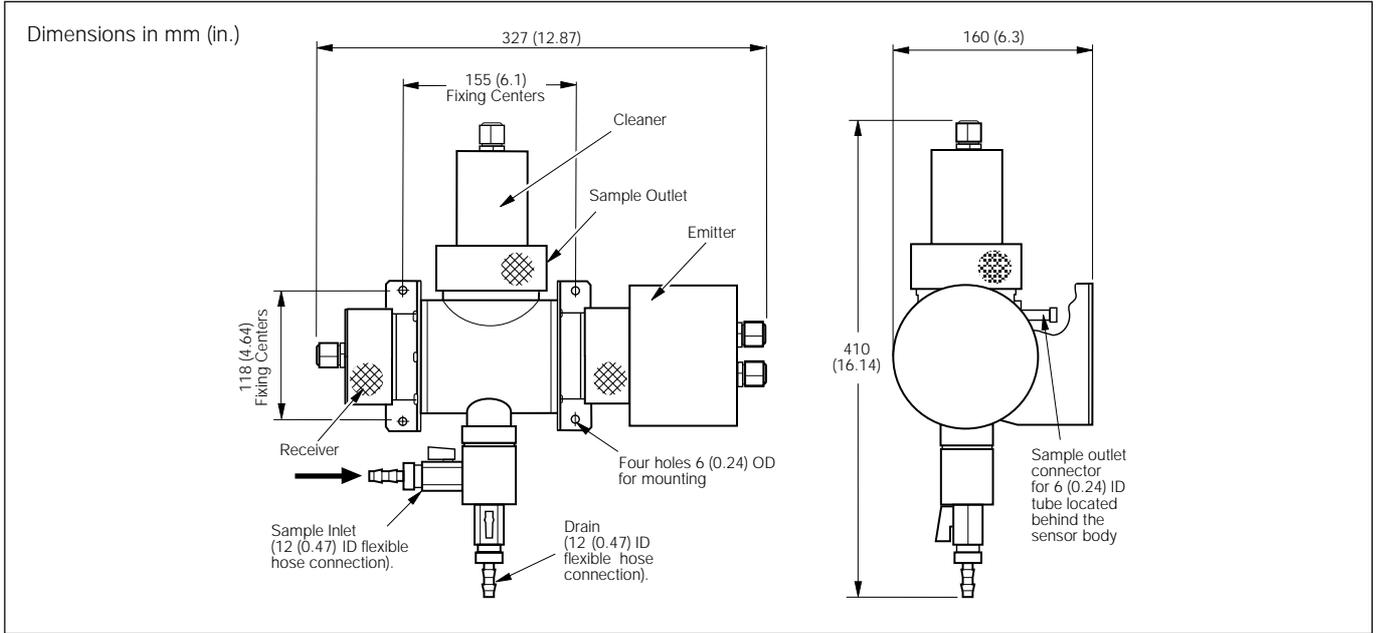
Sensor 6kg (13.2 lb)

Overall Dimensions

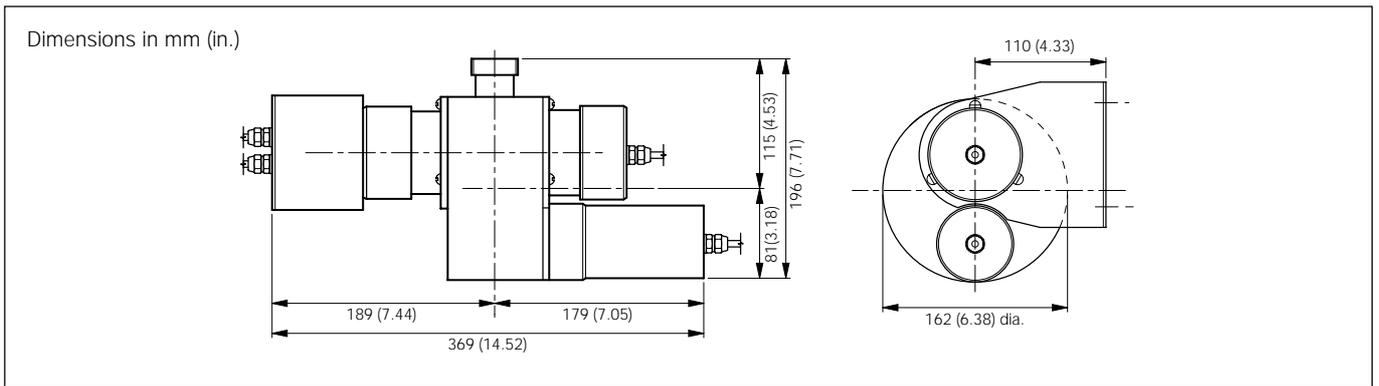


Monitor

...Overall Dimensions



Low Range Sensor



High Range Sensor

Ordering Information

7320 Series Monitor for Organic Pollution, Surrogate Color and Coagulation Control	Model 7320/	X	0 0 0
Low Range Organic Monitor Maximum range 0 to 10mg ^l - ¹ C with programmable high and low alarms Isolated 0 to 10mA, 0 to 20mA or 4 to 20mA programmable current output Power supply 110V/240V AC		1	
High Range Absorption Monitor Maximum range 0 to 100mg ^l - ¹ C with programmable set points configurable as high or low alarms Isolated 0 to 10mA, 0 to 20mA or 4 to 20mA programmable current output Power supply 110V/240V AC		2	
Coagulation Monitor Maximum range 0 to 100mg ^l - ¹ C with programmable alarms Isolated 0 to 10mA, 0 to 20mA or 4 to 20mA programmable current output Power supply 110V/240V AC		3	

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