

- **Automatic on-line monitoring of residual/total water hardness**
  - ideal for water softening and potable water plants
- **Menu-driven, programmable functions with clear LCD text display**
  - simple operation
- **Programmable hardness units**
  - °dH, °f, ppm CaCO<sub>3</sub> and mmol l<sup>-1</sup>
- **Configurable initiation of analysis**
  - automatic intervals (programmable 0 to 99 minutes)
  - from external flow signal (turbine meter)
  - external stop/start
- **Remote diagnostic alarm**
  - dirty measuring chamber
  - low reagent level
- **500ml (1 pint) reagent storage bottle**
  - extended operation period
- **Analog output 0 to 20mA and 4 to 20mA**
  - enables the use of process recorders for data recording
- **Two fully adjustable limit contacts**
  - enables separate ranges of hardness levels to be monitored



**A unique water hardness  
monitoring system with superior  
performance**

**General**

The AW100 has been developed as a simple device to monitor the quality of water from softeners. Applications include laundries, utility boiler plants, soft drinks factories, brewing, food processing and potable water plants. It provides an alarm for high hardness that starts an automatic regeneration of the ion exchange beds used most commonly in these applications.

The AW100 uses one of four reagents that changes from green to red at a predetermined water hardness level. The reagent is added to a known volume of sample via a small pump until a color change takes place. The volume of reagent required to bring about this reaction (monitored photo-electrically) indicates the level of hardness of the water sample. The AW100 also provides an analog signal, the range of which is determined by the choice of one of the four reagents available.

The digital display on the front of the monitor and the analog output show the value of the last analysis cycle.

Three alarm outputs are provided – two concentration alarms for control purposes and one alarm to drive an audible signal device. There are also inputs for a flow device and suspension of the flow cycle.

**Secure Operation Without Supervision  
– Low-level Reagent Alarm**

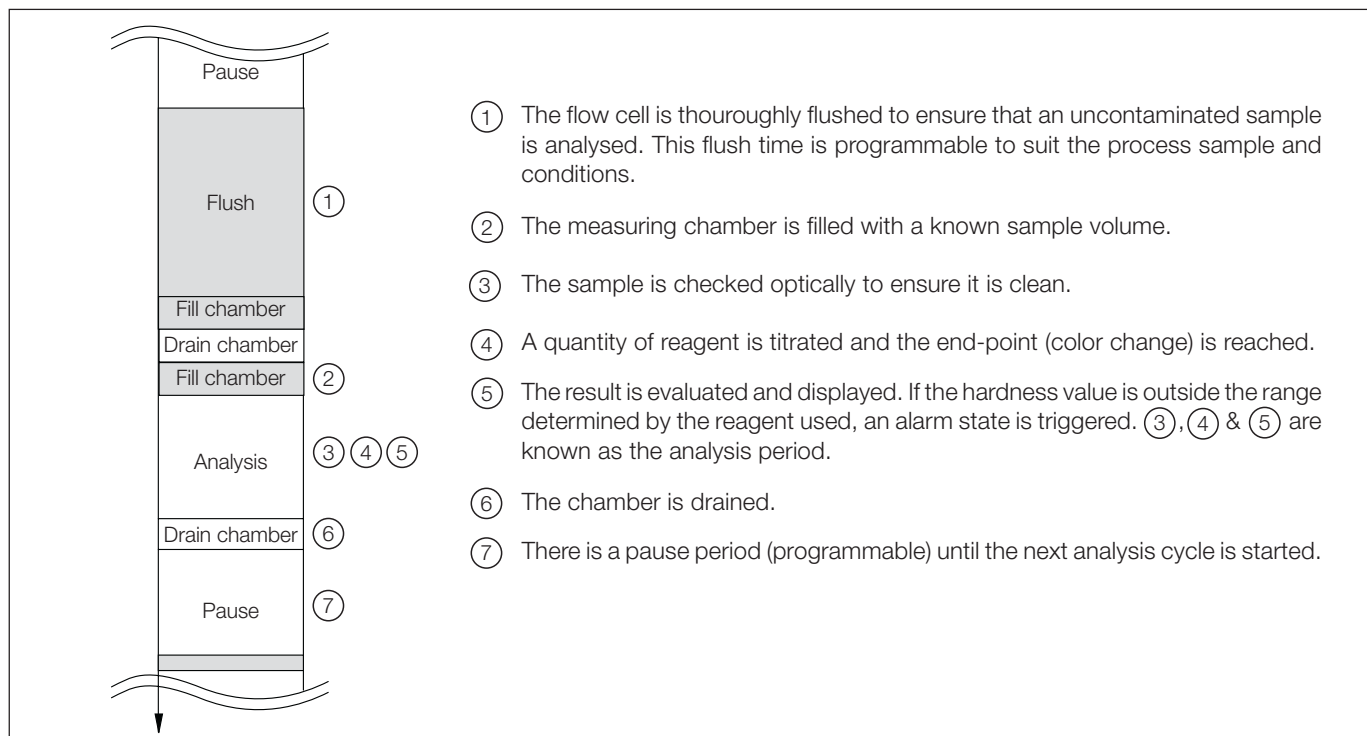
In certain steam boiler installations, the possibility of an unsupervised boiler operating with a depleted supply of reagent would have safety implications; allowing untested sample to flow through the boiler system. To overcome this problem, the AW101 employs a programmable low-level reagent alarm operation function. This monitors the reagent constantly and an alarm is triggered if the available reagent quantity falls below the quantity required for 72 hours usage.

**STOP Function**

The active analysis cycle can be interrupted by pressing the STOP/Standby key on the display pad. The cycle can be interrupted remotely/automatically using the STOP relay.

**Mode of Operation**

**Analysis Cycle**

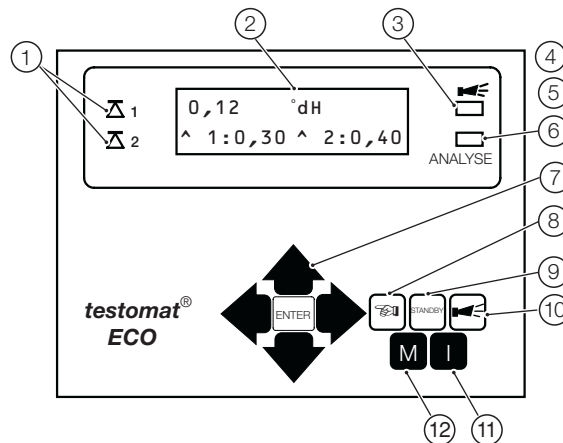


**Reagents Available for AW101**

		Parameter/Type of Reagent			
Units		Water Hardness AW101901	Water Hardness AW101902	Water Hardness AW101903	Water Hardness AW101904
Range	°dH German (10mg/CaO per 1000ml Water)	0.05 to 0.5 (0.1)	0.25 to 2.5 (0.05)	1.0 to 10.0 (0.2)	2.5 to 25.0 (0.2)
	°f French (10mg/ CaCO3 per 1000ml Water)	0.09 to 0.89 (0.02)	0.45 to 4.48 (0.1)	1.79 to 17.9 (0.4)	4.48 to 44.8 (0.4)
	ppm CaCO <sub>3</sub> North America and UK (1mg CaCO3 per 1000 ml Water)	0.89 to 8.93 (0.2)	4.47 to 44.7 (0.9)	17.9 to 179 (3.8)	44.7 to 447 (3.8)
	mmol/l Internationally recommended units (100mg CaCO <sub>3</sub> per 1000ml Water)	0.01 to 0.09 (0.01)	0.04 to 0.45 (0.01)	0.18 to 1.79 (0.04)	0.45 1 4.48 (0.04)

**Note.** Figures in brackets show measurement resolution

**Display**



**① Status of Limit Value Displays**

Displays the status of the limit values LV1 and LV2.

**② Text Display**

Displays the current analysis, all important status results and programming data in a 2-line LCD.

**③ Alarm**

Displays a function fault.

**④ Power Switch**

The On/Off switch is located on the right-hand side panel.

**⑤ Unit Fuse (inside the unit)**

Protects outputs against overload and short circuit.

**⑥ Analysis Message**

Displays current analysis.

**⑦ Programming Keys (Cursorblock with ENTER)**

These keys are used to enter all values and programming data.

**Function Keys**

⑧ 'Manual' – manual start of an analysis.

⑨ 'STANDBY' – manual analysis stop/standby.

⑩ 'Alarm' – cancels alarm message.

**⑪ I-Key**

Access all unit information.

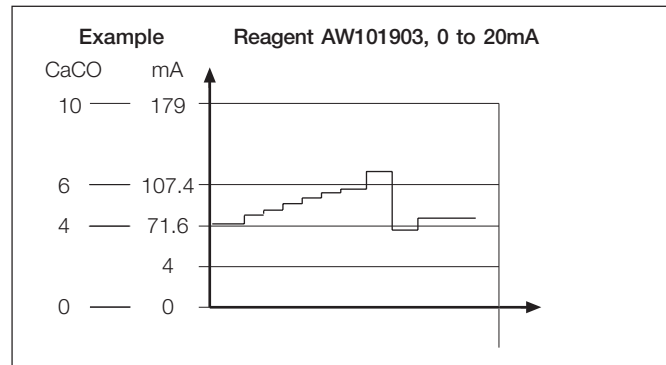
**⑫ M-key**

Access the programming menu.

**Analog Output**

Another possibility for monitoring the analysis is the connection to a process recorder or supervisory system. For this purpose the unit is equipped with a programmable current output.

Output values of 0 to 20mA and 4 to 20mA can be selected for retransmission of the measured value.



*Typical Recorder Output*

**Specification**

**Display**

**Ranges**

Determined by reagent (see table on page 3)

**Alarms**

Three relay outputs – limit values (LV1, LV2) and one fault alarm

Resistive load 4A

**Alarm displays**

The following faults are shown on the display and also activate the Alarm output:

- Low water pressure
- Function fault optics
- Measuring fault analysis
- Function fault dosing pump
- Function fault outlet to drain
- Reagent low level
- Measuring fault dirtiness
- Measuring fault turbine meter
- Measuring range exceeded

**Front panel indicators**

- Programme in operation
- Analysis stopped
- Lack of reagent
- Satisfactory result
- Unsatisfactory result
- Viewing window

**Outputs**

**Current output**

- 0 to 20mA or 4 to 20mA
- Max. load 500Ω

**EMC**

**Conformity**

EN50081-1, EN5008-2, EN61010-1

**Power Supply**

**Voltage**

115V, 230V or 24V AC ±10%, 50/60 Hz

**Power consumption**

30VA

**Unit Protection**

115V, 230V: T 0.1A

24V:T 1.0A

**Environmental Data**

**Sample Pressure**

0.1 to 3 bar (1.5 to 45.5 psi)

**Sample Temperature**

10 to 40°C (41 to 104°F) max.

**Ambient Temperature**

10 to 45°C (41 to 124°F)

**Mechanical Data**

**Ingress Protection**

IP65

**Dimensions**

380 x 459 x 280 mm (15 x 18.8 x 11 in.)

**Weight**

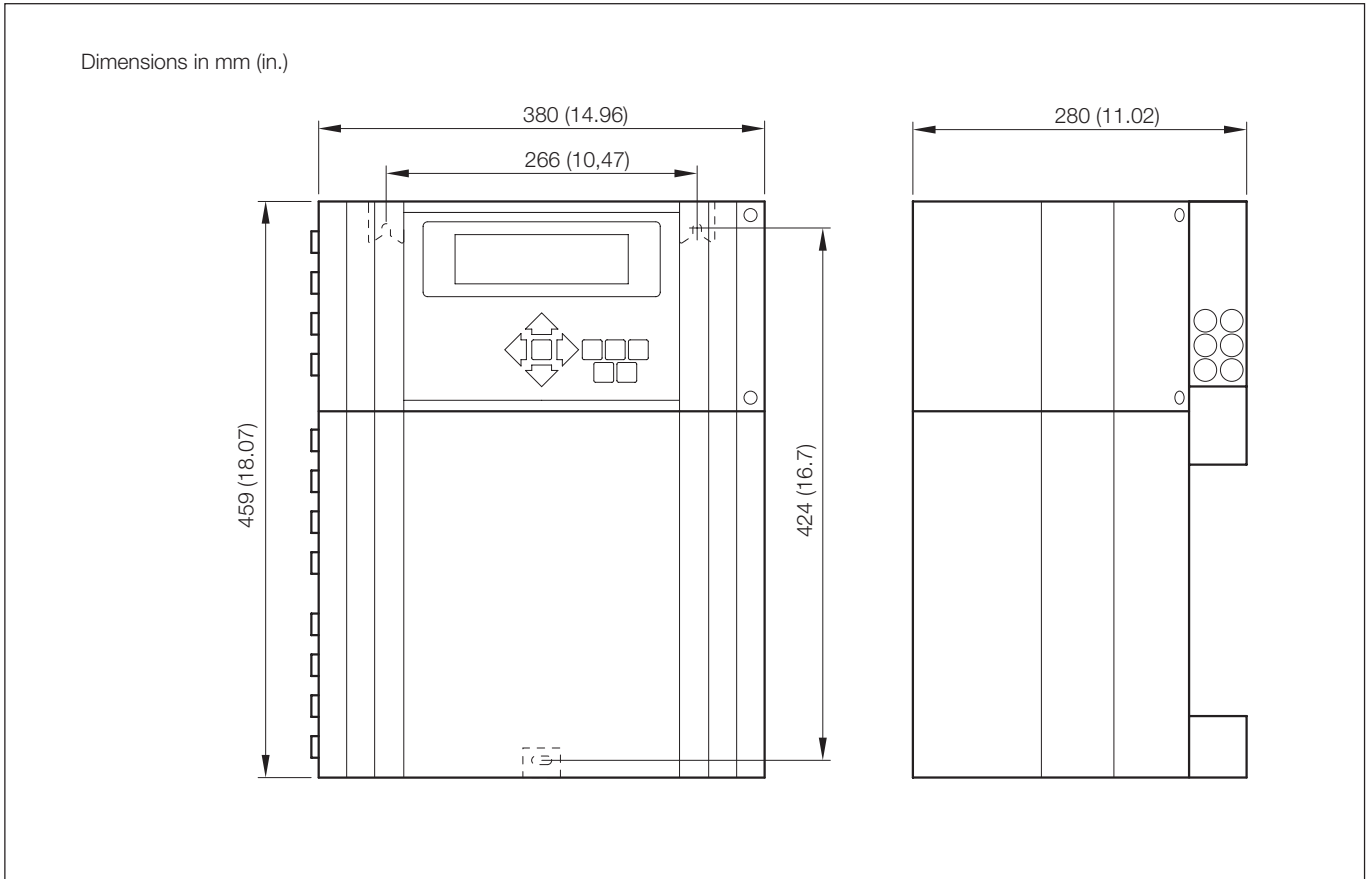
9 kg (19.8 lbs)

**Consumables**

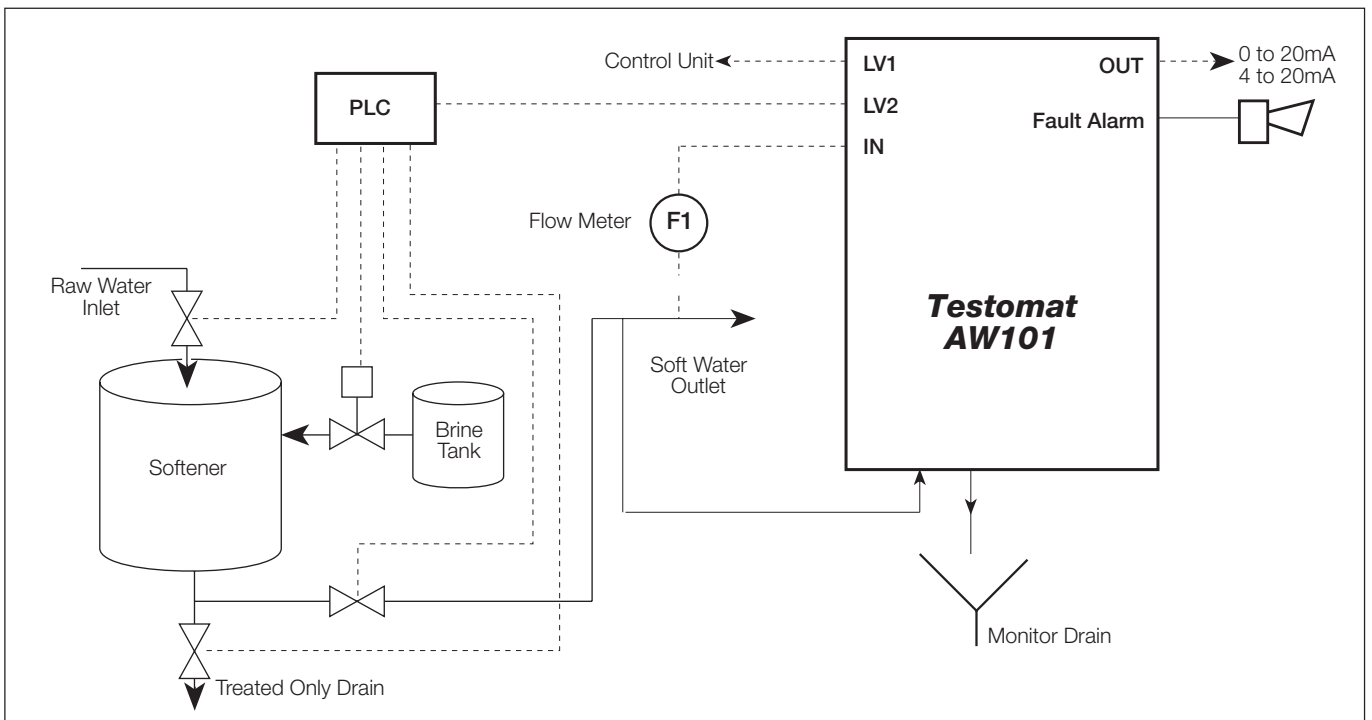
**Reagent consumption**

0.07ml (0.000123 pint) per test

**Overall Dimensions**

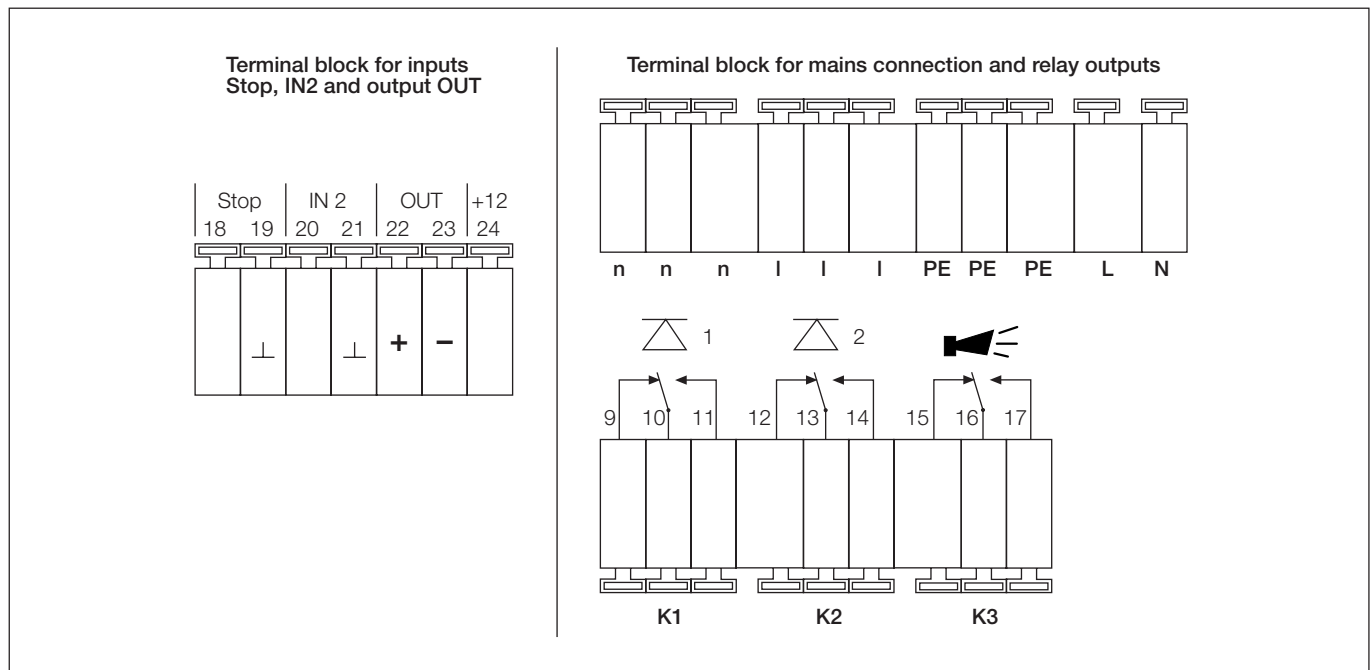


**Typical Installation Diagram**



## Terminal Block Identification

No.	Terminal	Type	Function	Note
-	PE	IN	Mains – Protective earth (5x)	Earth/Ground
1 2	L N	IN	Mains, L = Live Mains, N = Neutral	Mains input 115V, 230V or 24V AC
3 to 5 6 to 8	n l	OUT	Neutral, switched (8x) Live, switched (8x)	Mains voltage, max. 4A
9 10 11	LV1	OUT	Limit value output 1 – Normally closed Limit value output 1 – Common Limit value output 1 – Normally open	Volt-free relay output, max. load 240V AC, 4A
12 13 14	LV2	OUT	Limit value output 2 – Normally closed Limit value output 2 – Common Limit value output 2 – Normally open	Volt-free relay output, max. load 240V AC, 4A
15 16 17	Alarm	OUT	Fault message – Normally closed Fault message – Common Fault message – Normally open	Volt-free relay output, max. load 240V AC, 4A
18 19	Stop 2	IN	External analysis stop Common earth for inputs	Only for volt-free normally open/normally closed contact
20 21	IN 2	IN	Water meter input Common earth for inputs	Only for volt-free normally open/normally closed contact Note technical data of turbine
22 23	OUT + OUT -	OUT	0 or 4 to 20mA	Current output 22 + (0 or 4 to 20mA) 23 -
24	+	OUT	+12V for Hall-Sensor (turbine)	Note technical data of turbine Max. power input of sensor must not exceed 20mA



Terminal Block Labels

**Ordering Information**

<b>Testomat Water Hardness Monitor</b>	<b>AW101/</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>Version AW101</b>				
Water hardness		1		
<b>Mains Supply</b>				
115V AC 50/60Hz			1	
230V AC 50/60Hz			2	
24V AC 50/60Hz			3	
<b>Menu Language</b>				
English				1
German				2
French				3

**Spares**

**Pressure Regulator**

- AW101601 Regulator/filter housing
- AW101602 Regulator plug T2000, kpl
- AW101603 Flow regulator valve
- AW101604 Retaining pin for regulator plug
- AW101605 Inlet filter
- AW101606 Spring for inlet filter
- AW101607 Inlet connector
- AW101608 Plug-in connector

**Measuring Chamber**

- AW101611 Sight-glass window 30 x 3 with seal
- AW101612 Sight-glass window 30 x 3
- AW101613 Sight-glass retaining disc
- AW101614 Screw spindle M3 x 40
- AW101615 Latch fastener TL 800-7-1
- AW101616 Plastic plug
- AW101617 Measuring chamber T2000

**Holding block for measuring chamber**

- AW101622 Magnetic stirrer
- AW101623 Plug-in connector – G<sup>3</sup>/<sub>8</sub> in.
- AW101624 Solenoid valve 2/2-way
- AW101625 Rear guide bar for measuring chamber

**Dosing Pump DOSIClip**

- AW101631 Jet pump complete
- AW101632 Suction capillary
- AW101633 Pressure capillary complete
- AW101634 Base circuit board T1 complete
- AW101635 Magnet (24V DC)

**Bottle connection/Suction tube**

- AW101641 Screwed cap with bottle insert T2000
- AW101642 Screwed cap GL32 only
- AW101643 Bottle insert for screwed cap with push-fit suction

**Electrical Components**

- AW101651 Fuse M4A
- AW101656 Cable sleeve 7 – 10
- AW101657 Mains on/off switch
- AW101658 Cover for Mains on/off switch
- AW101659 Multi-pin strap cable 10 pole  
With EMI filter clamp
- AW101660 Multi-pin strap cable 26 pole  
With EMI filter clamp
- AW101661 Cable loom 2V complete (for valves)
- AW101663 Cable loom for Mains on/off switch complete
- AW101664 Fuse T0.16A
- AW101665 Fuse T1.0A

**Spare Parts for 2-3 years operation**

- AW101611 2 x Sight-glass window 30 x 3 with seal
- AW101605 1 x Inlet filter (optional)
- AW101701 Gasket set T2000  
Number required subject to maintenance regime (see manual)
- AW101664 1 x fuse T0.16A
- AW101665 1 x fuse T1.0A

**Reagents**

- AW101901 TH2005 Water Hardness  
0.89 to 8.93 ppm CaCO<sub>3</sub>
- AW101902 TH2025 Water Hardness  
4.47 to 44.7 ppm CaCO<sub>3</sub>
- AW101903 TH2100 Water Hardness  
17.9 to 179 ppm CaCO<sub>3</sub>
- AW101904 TH2250 Water Hardness  
0.45 to 4.48 ppm CaCO<sub>3</sub>

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