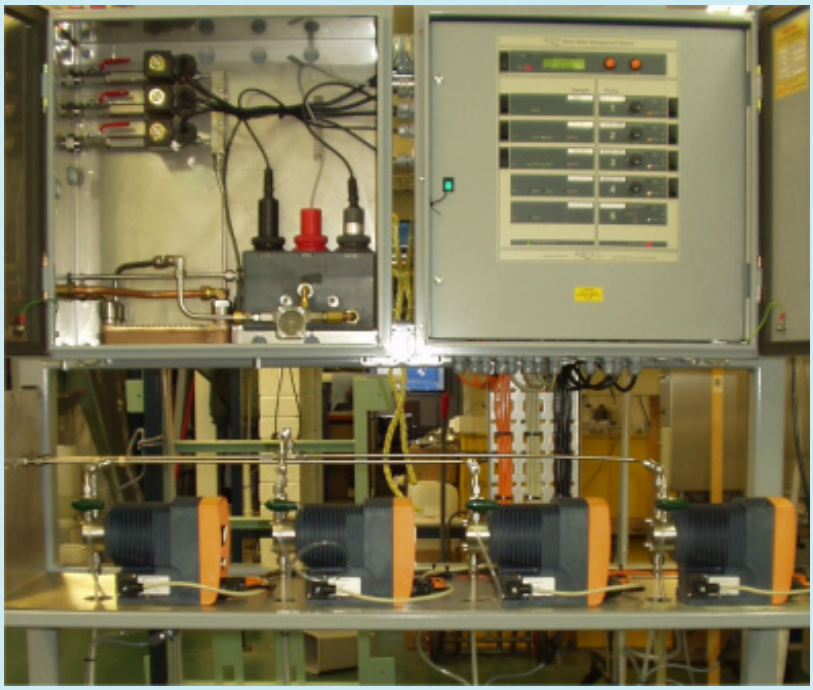
AQUANET International Ltd.

Specialist Instrumentation and Software Engineers for Automated Water Quality Control

Automated Feed water management for steam boilers.



Simple TDS controllers for steam boilers from 500 kg/hr.

Controls 4 Steam UK Limited
Suite 15, Blackburn Rovers Enterprise Centre,
Ewood Park, Blackburn, Lancashire, UK BB2 4JF
Tel: 01254 841769 Fax 01254 841799
E-mail: sales@controls4steam.co.uk
www.controls4steam.co.uk

AQUANET International Ltd., 8 The Galloway Centre,
Hambridge Lane, Newbury, Berkshire, UK RG14 5TL
www.aquanetint.com
Tel +44 (0)1635 580680
e-mail tech@aquanetint.com

ISO 9001
REGISTERED FIRM

The chemistry of Boiler Water can change dramatically as boiler load varies. Different boiler types have different profiles, but dosing parameters are rarely adjusted.

Traditionally, testing was undertaken once a day and the chemical dosed with little account taken of load variation. More often this results in over or under dosing.

Aquanet designs produces and manufactures Automation equipment for the automatic testing and treatment of the following water systems.

Steam boilers.
Our high pressure systems allow boilers of up to 100 bar to be monitored and controlled with the one system managing up to three boilers, five water sample points and five chemical injection options.

Medium-pressure boilers and exhaust gas generators.
Our standard medium pressure system allows boilers with working pressures up to 16 bar. The Aquanet system can monitor up to three boilers and control up to five chemical injection pumps.

Services offered
Aquanet systems are the result of continuous research and development, driven by the needs and demands of the industry.

Aquanet systems offer

- 24 Hour protection
- Systems are given protection at all times,under all load conditions.

Correct chemical treatment.
Aquanet systems are designed to follow the chemical treatment regime recommended by the chemical provider.

Aquanet Benefits
Correct Chemical Application.
Correctly dosed water treatment chemical not only makes sure systems are protected but also that expensive chemical over dosage is kept to a minimum. Aquanet systems can be reconfigured to suit all major chemical providers specified treatment regimes.

Constant System Performance Monitoring.
Engineers usually test boiler water conditions once or twice a day. Chemical dosing is then adjusted to suit that condition. Changes in boiler or plant load are rarely compensated for leading to constant under or over dosing.
Aquanet systems are on duty 24 hours a day 7 days a week constantly measuring and adjusting the boiler chemistry and conditions for optimum efficiency.

Automatic Corrective Actions.
Automatic blow down valves can keep boiler water conductivity levels within the boiler manufacturers optimum range at all times.

Economic use of Chemicals and Water
Aquanet systems are configured using the chemical treatment providers dosing data to give optimum chemical performance and economy.

Metered blow down rate keeps boiler water wastage to a minimum and avoids blow down operations at critical times.

Performance History
Aquanet systems give managers a complete historical overview of system performance. Essential maintenance and operational decisions can be made with confidence.

Safe Chemical Usage
Aquanet systems dosing pumps draw liquid chemical directly from the chemical providers drums and signals when the drum is empty;

- · No mixing or dilution.
- · No decanting.
- · No chemical spillage.

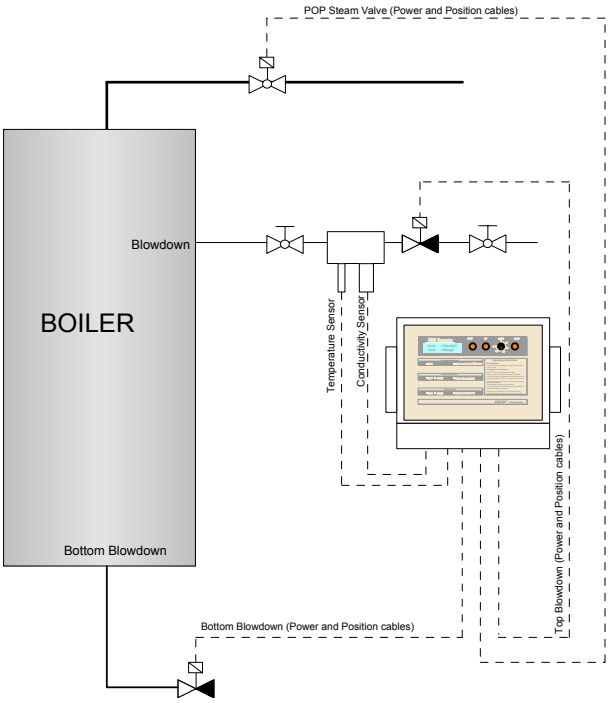
Extended System Life.
Aquanet systems were specifically developed to combat boiler service failures.

- · 70% of boiler failures are said to be water related.
- · Correct water conditions at all times can be shown to improve service life.

Free Choice of Chemical Provider.
Aquanet systems can be configured to use most water treatment chemicals.

- · Close adherence to recommendations of the providers is essential and at Aquanet we make sure that those chemicals are applied in the most effective way possible.
- · Should an Aquanet user decide to change chemical provider, then reconfiguration of the system is a simple and routine procedure.

AQTDS Dissolved Solids and Blowdown Controller



DESCRIPTION

At a pre-determined interval the controller pulses its scum line blowdown valve and measures the temperature and conductivity of the discharged boiler water.

If the conductivity is above the pre-set limit it will pulse the valve open and closed for a few seconds at a time until the conductivity (and hence TDS) falls to within limits, after which it waits for a predetermined time until the cycle starts again.

The CP10 conductivity and Pt100 temperature sensors are de-signed to withstand the temperatures and stresses involved and are extremely robust.

The system will accept 230/110 Vac input.

The primary functions are: -

- Surface blowdown control
- Optional timed bottom blowdown
- Pulsed output control for steam valve

The bottom blowdown valve and the steam header valve inputs have provision for micro-switch feedback which indicate to the controller the success or failure of the valve opening.
The front panel houses

- LCD display
- Status LED's
- Alarm / Fault LED's

When a valve fails the alarm LED is illuminated.

SPECIFICATIONS

Input power	110/220VAC 50/60 Hz
Power requirement	50 watts
Operational temperature	0 to 55°C
Storage temperature	-15 to 85°C
RH	0-95% non condensing
Alarm relay contacts	220 Vac @ 1 Amp
Terminals suitable for	2.5 mm

Cables

Probes	4 core screened 1 mm^2 max length 10 metres
Terminations	2.5 mm^2 screw terminals
Quiescent current	40mA (approx)

Probe

Probe energisation voltage	200 mV volts
Standard range	0-5000 uMhos (other ranges available)
Temperature compensation curve	2% per °C
Auto compensation of standard probes	0 to 200°C
Electronics temperature coefficient	0.18% per °C

Controls

Conductivity Set point
Surface blow down On Time in seconds
Surface blow down Off time in minutes
Bottom blow down Period (in minutes)
Bottom blow down On time (Max)
Steam header Valve POP ON time in seconds
Steam header Valve POP OFF time in seconds
Alarm band in uMhos
Temperature coefficient of conductivity as % per degrees C
Scale Factor (SF) conversion (conductivity to micro Siemens)

Alarm Outputs

SMS
Volt Free Relay contacts
LED
Software via Aquanet

Amplifier Enclosure

Material	GRP
Rating	IP 65 dimensions
Dimensions	300 x 200 x 190 mm
Cable entry	cable glands

Environmental

Operational temperature	0 to 55°C
Storage temperature	-15 to 85°C
RH	0-95% non condensing

Note: All specifications may be subject to change without notice

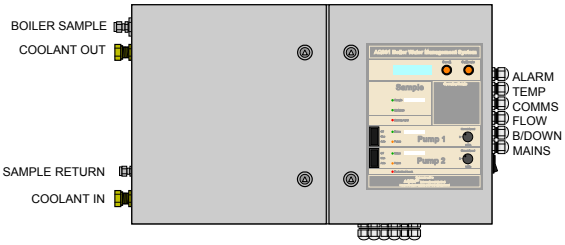
Controls 4 Steam UK Limited
Suite 15, Blackburn Rovers Enterprise Centre,
Ewood Park, Blackburn, Lancashire, UK BB2 4JF
Tel: 01254 841769 Fax 01254 841799
E-mail: sales@controls4steam.co.uk
www.controls4steam.co.uk

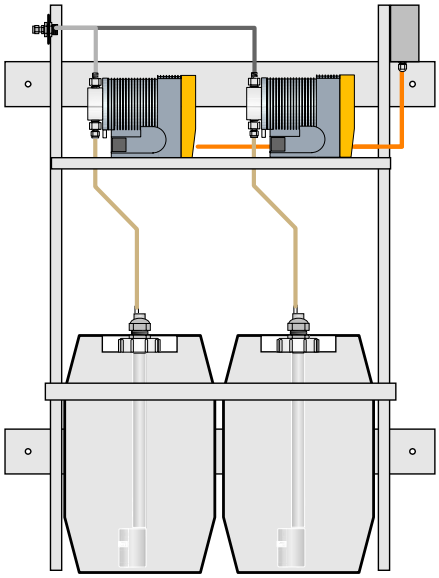
AQUANET International Ltd., 8 The Galloway Centre,
Hambridge Lane, Newbury, Berkshire, UK RG14 5TL
www.aquanetint.com
Tel +44 (0)1635 580680
e-mail tech@aquanetint.com

AQUANET International Ltd.

Specialist Instrumentation and Software Engineers for Automated Water Quality Control

AQ301 INDUSTRIAL Single Boiler Water Quality management System





This unit is specially designed to suit automated water quality management for industrial boilers up to 16 bar at an affordable price.

The AQ301 system can be manufactured for a single product chemical regime, with one injection pump, or for a 2 product regime with (max) two pumps.
The unit further comprises pH, conductivity, feed temperature probes and mechanical flow meter. It comes with a local LCD display and probe calibration can be conducted from the front panel.

The system can be configured for chemicals of a chosen supplier or for designated Aquanet products.
The probes are temperature fail-safe protected and a low product level alarm is provided for the chemical drums.

The unit is stand-alone but can be expanded to full remote monitoring, data logging and display with Aquanet software and PC.

NB. The unit accepts only a single boiler water sample. For dual boilers and/or a feed sample, an AQ300 unit is required!

Features and Benefits

- Keeps boilers scale and corrosion free = lower operating costs
- Ensures correct chemical levels at all times = no manual control
- Easily reconfigured for new chemical suppliers = free choice
- Unique Windows Software, written for networking = ease of use
- Can be used on an existing control room PC = lower capital cost
- Optional GSM interface allows selectable alarms to be sent to an engineer or control room telephone.

Specifications

Description
The equipment is supplied as a separate instrumentation cabinet and pump rack , both with mounting plates. The instrumentation cabinet is stainless steel with hinged lockable doors. The left hand section holds the integral sample cooler and probes. The right hand section houses the
electronics, manual controls and communication
interface.

Dimensions (W) x (H) x (D) mm
Cabinet –740 x 450 x 150
Drum Frame - 760 x 1000 x 340

Weight - 35 kg

Colour - RAL 7-001 (dark grey) Rating - IP66

Power requirements
220/240 Vac 50/60 Hz. 6A

Max. Operating Temperature
50°C max.

Humidity 0-95% RH non condensing

Probes
pH
Range 0 – 14pH
Sealed Reference cell
Resolution 0.5% FSD

Conductivty
Range 0-5000uMhos (other ranges available)
Automatic temperature compensation
Resolution 0.5% FSD

Dissolved Oxygen (OPTION)
Range 0 – 2.5 mg/litre
Automatic temperature compensation
Resolution 0.5% FSD

Feed Tank Temperature
Stainless steel pocketed probe
0-110°C scaled as 4-20 mA signal

Mechanical Flow Meters
Flanged DN25 to DN80 PN16
Maximum operating Temp 130°C

Ultrasonic Flow Meters (OPTION)
Non penetrating.
Clamps onto outside of existing pipe work.
Transducer max operating temperature 200°C

Blowdown Valves 0 to 32 bar max

Diaphragm Pulse Pumps
1 litre/hr 17 bar max, polypropylene head.
Teflon coated diaphragm.

GSM Interface (OPTION)
Allows selectable alarms to be sent to an engineers or control room telephone.

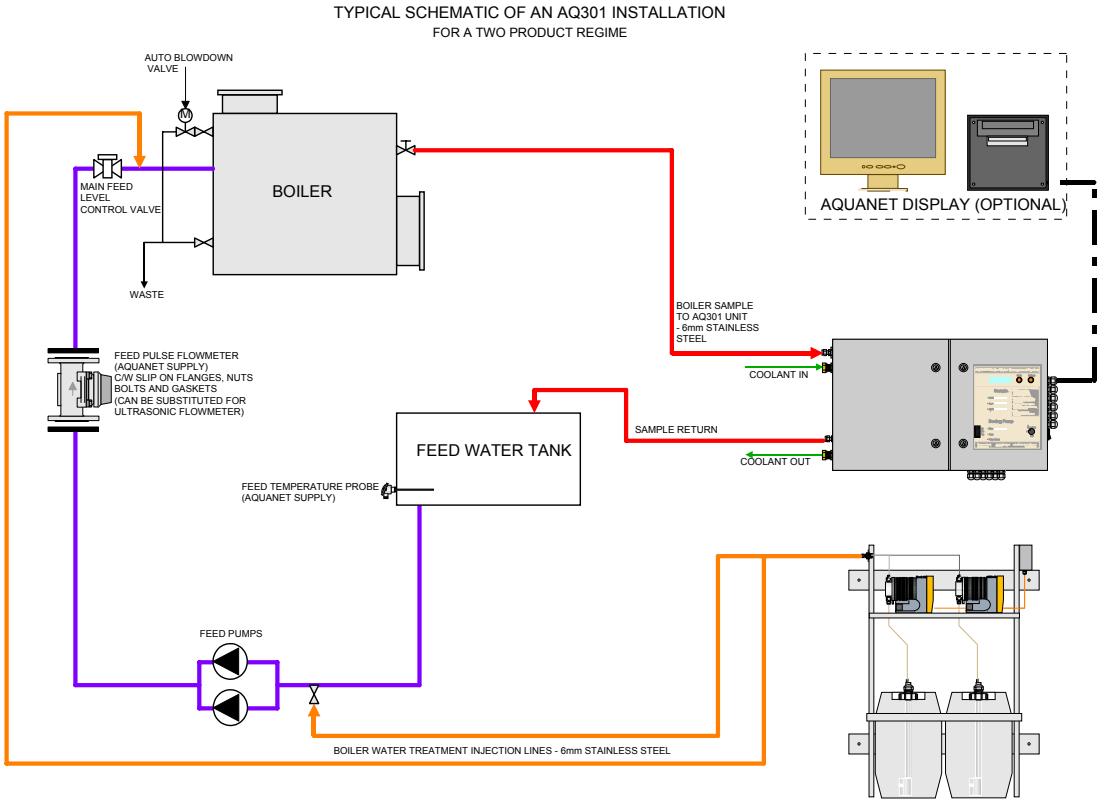
Communications and Monitoring (OPTION)
PC & comm. Box with AQUANET software compatibility for monitoring, logging and display. RS422 differential line drivers CRC protected

Links to other **AQUANET** units

Controls 4 Steam UK Limited
Suite 15, Blackburn Rovers Enterprise Centre,
Ewood Park, Blackburn, Lancashire, UK BB2 4JF
Tel: 01254 841769 Fax 01254 841799
E-mail: sales@controls4steam.co.uk
www.controls4steam.co.uk

AQUANET International Ltd., 8 The Galloway Centre,
Hambridge Lane, Newbury, Berkshire, UK RG14 5TL
www.aquanetint.com
Tel +44 (0)1635 580680
e-mail tech@aquanetint.com

ISO 9001 REGISTERED FIRM



Description of Operation
The boiler sample and cooling water supply are activated for 5 minutes at a pre-programmed periodicity of 10 minutes to 42 hours. The sample is analysed and the information processed by the electronics, followed by a small upward or downward adjustment of the relevant chemical pumps. The boiler water conductivity controls the optional auto surface blow down valve, maintaining the conductivity to pre-programmed levels. This accurately maintains the water at the ideal density for maximum chemical performance with minimum chemical and water wastage.

Flow Management
The system provides a manual scrolling display of the boiler water and temperature readings. When used in conjunction with a PC, the Aquamain software provides the following functions: Continuous display of pH and conductivity readings Optional dissolved oxygen readings, Feed temperature, Dosing pump strokes per minute, Chemical consumption, Chemical low level alarm, Fuse failure alarm, Main feed flow , Optional auto blow down operation.

User Guide
The AQUANET Software comes complete with a comprehensive user guide, which contains on-line copies of the operating, maintenance and fault finding manuals. It includes system drawings both mechanical and electrical and educational text de-scribing water treatment practice. Event Alarms Fault and limit alarms are both displayed on the screen and logged. Log Reports Pre-formatted management reports provide a summary of average monthly readings. All reports and data can be

Special Features
Probe calibration easy and quick at unit.
Probe construction designed for easy mounting and removal.
Extra pump speed control facility at unit.
Water sample temperature display, with probe protection cut-out.
Fuse failure alarms.
Pumps have special venting arrangements, returning the vented chemical to the

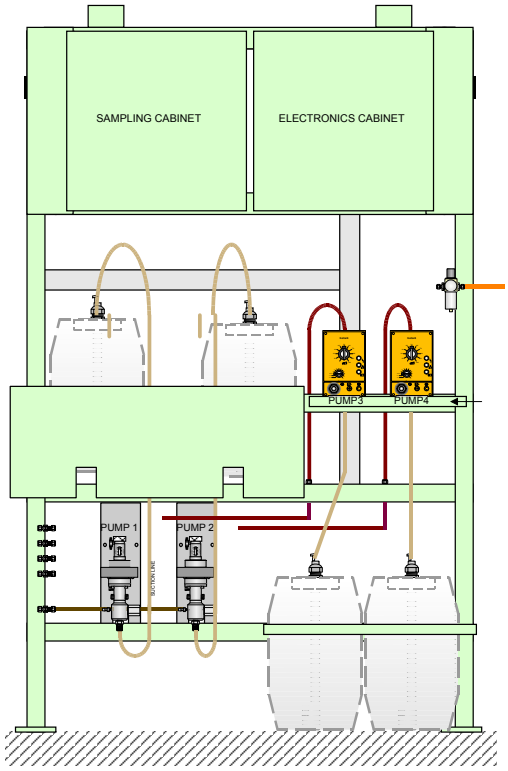
Controls 4 Steam UK Limited
Suite 15, Blackburn Rovers Enterprise Centre,
Ewood Park, Blackburn, Lancashire, UK BB2 4JF
Tel: 01254 841769 Fax 01254 841799
E-mail: sales@controls4steam.co.uk
www.controls4steam.co.uk

AQUANET International Ltd., 8 The Galloway Centre,
Hambridge Lane, Newbury, Berkshire, UK RG14 5TL
www.aquanetint.com
Tel +44 (0)1635 580680
e-mail tech@aquanetint.com

AQUANET International Ltd.

Specialist Instrumentation and Software Engineers for Automated Water Quality Control

AQ300 Steam Boiler Water Quality management System



Designed for industrial and marine steam boiler installations up to 100 bar, the AQ300 accurately monitors the boiler and feed water conditions. It injects exactly the required amount of chemicals and provides auto surface blow down control. It keeps the entire plant within the desired chemical limits, 24 hours a day, regardless of load.

The units can be fitted with a mixture of pumps of pumps and programmed for different pressure boilers and water treatment chemicals.

The system includes pH, conductivity, dissolved oxygen, temperature probes, data comm.-unit with software, feed flow meters, auto blow down valves, test kit and dosing pumps c/w suction assemblies with low level alarm.

The software provides for continuous display of all important readings and pre-formatted 'Management Reports' provide a summary of average readings for any period requested. The unit can be linked to other AQUANET systems and all
readings are displayed on one monitor. The system is pre-configured for each installation and a choice of coolers, pumps, flow meters and blow down valves are available depending on vessel requirements.
Installation can be carried out by the owners staff, shipyard or sub-contractor

Features and Benefits

- Keeps boilers scale and corrosion free = lower operating costs
- Ensures correct chemical levels at all times = no manual control
- Easily reconfigured for new chemical suppliers = free choice
- Unique Windows Software, written for networking = ease of use
- Can be used on an existing control room PC = lower capital cost

Specifications

Description
The equipment is supplied pre-wired on a steel frame.
The instrumentation is housed in a split steel cabinet with hinged lockable doors, the left hand section constructed of stainless steel, houses the sampling system and probes, the right hand section houses signal conditioning, control and the communications interface.
Accommodates up to 5 samples and 5 dosing pumps

Dimensions (W) x (H) x (D) mm
Cabinets 500x 500 x 250
Frame 1240 x 2100 x 460
(assembled c/w chemical drums)

Colour – Customer specification

Rating - IP66

Power requirements
220/240 Vac 50/60 Hz. 6A Max.

Operating Temperature 50°C max.

Humidity 0-95% RH non condensing

Probes
pH
Range 0 – 14pH
Automatic temperature compensation
Sealed Reference cell
Resolution 0.5% FSD

Conductivty
Range 0-400uMhos
(other ranges available)
Automatic temperature compensation
Resolution 0.5% FSD

Dissolved Oxygen
Range 0 – 2.5 mg/litre
Automatic temperature compensation
Resolution 0.5% FSD

Feed Temperature
Stainless steel pocketed probe
0-160°C scaled as 4-20 mA signal

Communications
RS422 differential line drivers
CRC protected

Links to other AQUA[NET] units
Optional interface to MODBUS

Flowmeters
Ultrasonic Flow Meters (Non penetrating).
Or Mechanical to suit pipe work

Clamps onto outside of existing pipe work.
Transducer maximum operating temperature 200°C

Blowdown Valves
Mecvhanically operated 32 bar
Or Pneumatic, with remote position indication.
Rated 100 bar to suit application
.
Chemical dosing pumps
Air operated 2.1 litre/hr max 500 bar (max) stainless steel
Electrically operated diaphragm pump1 litre/hr into 16 bar (max)

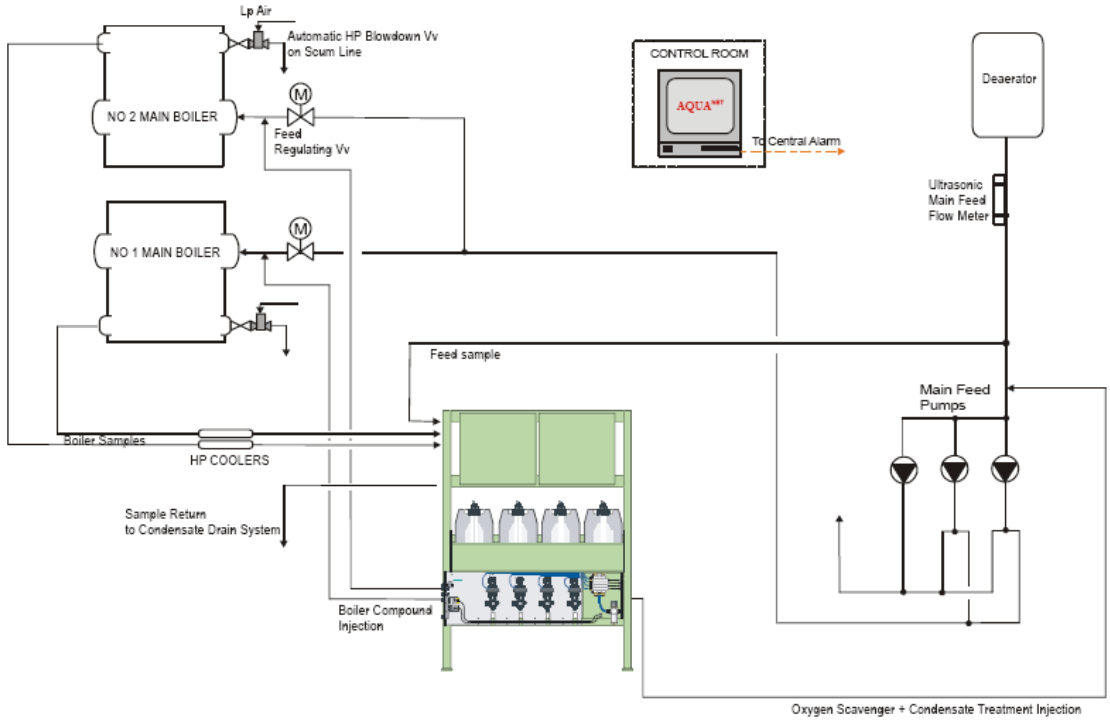
Additional standard features
Flushing water system with flow monitoring.
Dosing pump manual speed control
Dosing pump vent system, returns chemical to drum (No spillage)
Fuse failure alarms
Auto probe calibration on the unit

Controls 4 Steam UK Limited
Suite 15, Blackburn Rovers Enterprise Centre,
Ewood Park, Blackburn, Lancashire, UK BB2 4JF
Tel: 01254 841769 Fax 01254 841799
E-mail: sales@controls4steam.co.uk
www.controls4steam.co.uk

AQUANET International Ltd., 8 The Galloway Centre,
Hambridge Lane, Newbury, Berkshire, UK RG14 5TL
www.aquanetint.com
Tel +44 (0)1635 580680
e-mail tech@aquanetint.com

ISO 9001 REGISTERED FIRM

General Layout for **AQUANET** AQ300 Boiler and Feed Water Quality Monitoring and Management Equipment



Description of Operation
A sample from the feed system and each boiler is selected by each controller on a continuous cycle. The samples are cooled, pressure reduced and then passed through the probe block. The samples are analysed and the information is processed by the program, followed by an adjustment of the relevant injection pumps. The boiler water conductivity automatically controls the modulation of the surface blowdown valves, giving timed blowdown periods via a built in orifice. This accurately maintains the water at the ideal density for maximum chemical performance with minimum waste.

Flow Management
The system provides a continuous display for all boilers, feed water, condensate and total main feed. The display can be cumulative, average rate per minute and hour.
This data not only assists in the control of the water chemistry but also provides information indicating the source of feed losses and steam production. A useful maintenance tool.

Chemical consumption
An indication of the chemical consumption. Is also displayed

User Guide
The **AQUANET** PC comes complete with a comprehensive user guide, which contains on-line copies of the operating, maintenance and fault finding manuals. It includes system drawings both mechanical and electrical and educational text describing water treatment practice.

Event Alarms
Fault and limit alarms are both displayed on the screen and logged. They have a unique feature of a warning box appearing on the screen, which provides practical advice and instructions on corrective action.

Log Reports
Pre-formatted management reports provide a summary of average monthly readings, with comments on those which are persistently out of range. All reports and data can be viewed and printed for any period requested and are also available in various graphic formats. All data is archived for many years.

Auto-Calibrate
All probes are easily calibrated with the test kit provided and via easy to follow, on-screen, step-by-step instructions. It takes only minutes to carry out accurately, preventing the use of incorrect parameters

Controls 4 Steam UK Limited
Suite 15, Blackburn Rovers Enterprise Centre,
Ewood Park, Blackburn, Lancashire, UK BB2 4JF
Tel: 01254 841769 Fax 01254 841799
E-mail: sales@controls4steam.co.uk

AQUANET International Ltd., 8 The Galloway Centre,
Hambridge Lane, Newbury, Berkshire, UK RG14 5TL
www.aquanetint.com
Tel +44 (0)1635 580680
e-mail tech@aquanetint.com

AQUANET

Specialist Instrumentation & Software Engineers for Automated Water Quality Control

AQUANET-PRO SOFTWARE FOR WINDOWS

AQUANET software for windows is the next generation of specialty software and has been written to meet with the current demands of utility water management. The program can be used on a suitable existing PC or network.

The software can display and manage multiple **AQUANET** systems, such as boilers, cooling water, salinometers etc.

A typical **AQUANET** screen is a mimic drawing of the installations component parts e.g. Feed tank, boiler, blowdown valves, flow meters, etc. The software displays the current values being measured typically water pH, conductivity and dissolved oxygen, flow rates, input and output status.

This software accesses the serial com ports COM1 and COM2 of the PC to communicate with standard **AQUANET** water management units such as:

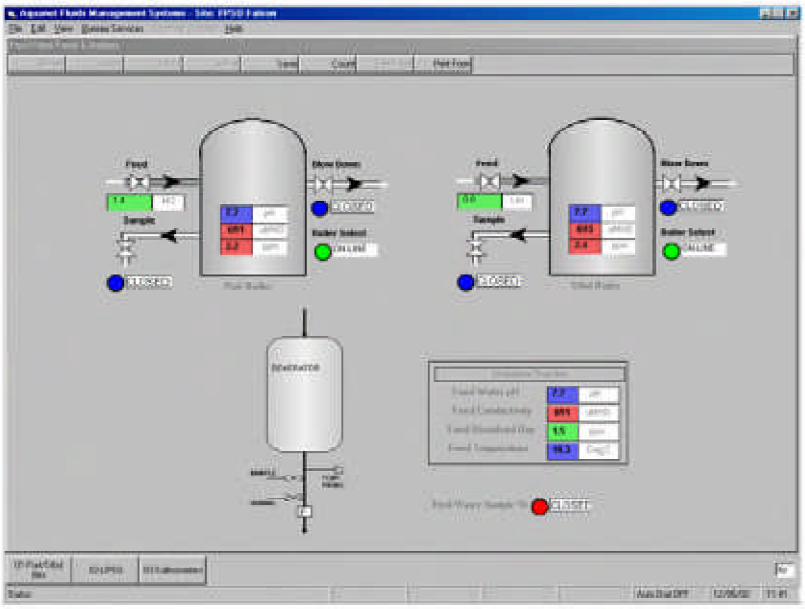
- Boiler Water Management Systems such as AQ300
- Cooling Water Management Systems such as AQ655
- Salinometer systems such AQ500
- Chlorination and pH control systems such as AQ100

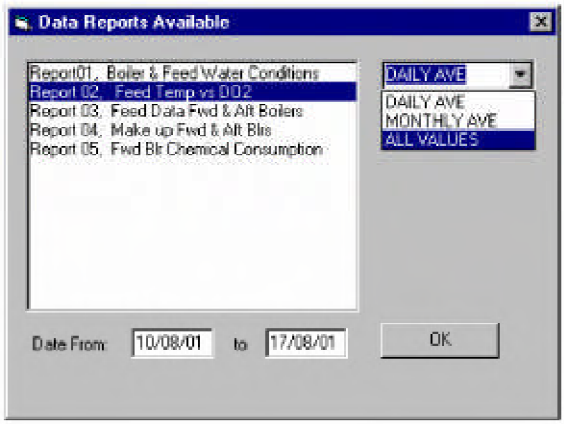
AQUANET is a standard Windows application and uses a Microsoft Access Database for the configuration and storage of logged data.

AQUANET provides optional support for Profibus by providing a PC plug in card which makes the PC running **AQUANET** software appear as a Profibus DP slave to a Profibus System Master.

Hardware requirements:
The minimum hardware requirements, for which this software is designed, are IBM compatible PC, comprising:

- 1.8 GHz processor speed,
- 512 Mbytes Ram,
- 100 Gigabyte Hard disk,
- CD Rewriter,
- Floppy disk drive
- USB ports , Local Serial ports Com1: and Com2:,
- Keyboard and mouse.
- Monitor resolution 1024 x 768
- Windows XP Operating system with service pack 2 or greater.





Features

- Communicates with **AQUANET** local control units, across a LAN or telephone network.
- Displays current values limits, status and alarms.
- Saves values to an Access Database.
- Detects alarm conditions.
- Automatically logs data and produces graphs and reports.
- Allows engineering configurations, even on remote sites.

GENERAL DESCRIPTION

Central to AQUANET is a data base, comprising a list of sites. Each site contains a list of units and each unit has a list of channels.

The following channels are allowed.

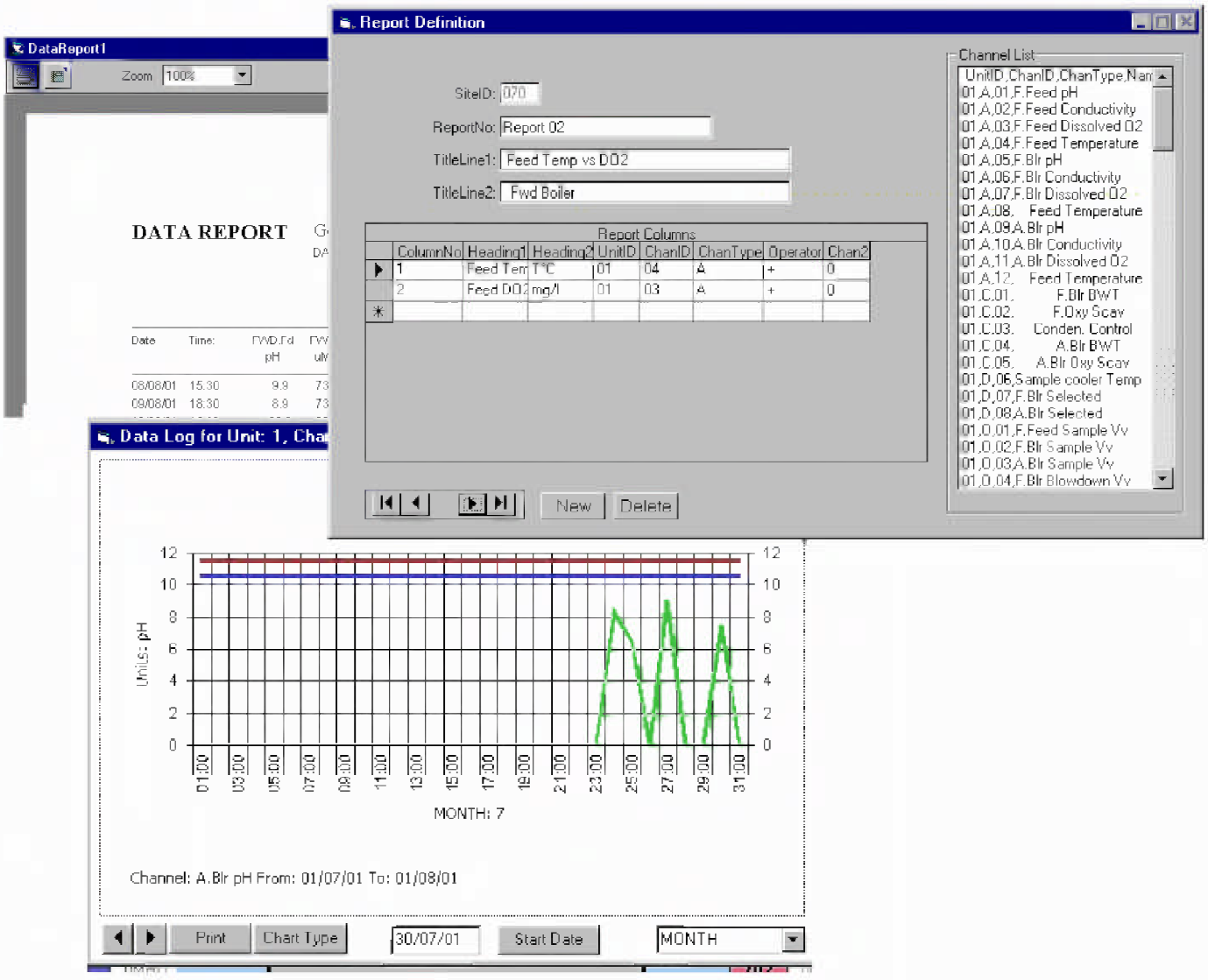
- Analogue Channel: varying voltages from probes such as pH, Conductivity, DO2 etc.
- Count channels: Pulses, from Flow meters etc.
- Discrete Channels: Low level switches, contact closure etc.
- Outputs: Relay activation, pulse trains to dosing pumps etc.

AQUANET software is a "poll – response" each outstation card has a unique site address, the software sends an interrogation query to a particular address, the receiving card recognises its address and responds with the current data. All communications are in ASCII and each message has a CRC checksum attached.

AQUANET units are sited on a local communications loop or on a modem over the telephone network.

When AQUANET requires communications with a unit it will either poll on the local Comm port or dial up the unit on the telephone network.

In the event of a communications break the local AQUANET unit will continue to perform its programmed task without reference to the communications loop and AQUANET software.



AQUANET

Specialist Instrumentation & Software Engineers for Automated Water Quality Control

Customer List 2012 **(In excess of 250 systems installed world wide)**

AQ300 System for Feed and 2 boiler samples controlling 4 chemical dosing pumps:
Pump for Oxygen Scavenger
Pump for Condensate conditioner
Pump for Boiler Product for each boiler

AQ TDS System for accurate TDS control of single boilers

Industrial Customers

Authentic Food Company
InterBrew
Dowty Cheltenham
Der Heel Hospital Amsterdam
Glaxo Smith Kline UK.
Intervet UK
Macau Central Power Station

Marine Customers

A P Moller
Barber Ship Management.
Bergesen Ship Management
British Gas Group
British Petroleum
Carnival Cruises
Celebrity Cruises
Cunard (QM2, Elizabeth & Victoria)
Ch' de L'Atlantique
Disney Cruises
Dynacom
Daewoo Shipping & Mechanical Eng.
Fincantieri SB.
Hapag Lloyd
Holland America Line
Hyundai Heavy Industries
Maersk Shipping
Maran Gas
Mitsubishi Heavy Industries
Mitsui Overseas Line
Norfolk Line
Petrobras
Petronas
Phillips China
P & O
Princess Cruises.
Samsung Heavy Industries
Single Buoy Moorings
STASCO (Shell)
Woodside Petroleum

Controls 4 Steam UK Limited
Suite 15, Blackburn Rovers Enterprise Centre,
Ewood Park, Blackburn, Lancashire, UK BB2 4JF
Tel: 01254 841769 Fax 01254 841799
E-mail: sales@controls4steam.co.uk
www.controls4steam.co.uk

AQUANET International Ltd., 8 The Galloway Centre,
Hambridge Lane, Newbury, Berkshire, UK RG14 5TL
www.aquanetint.com
Tel +44 (0)1635 580680
e-mail tech@aquanetint.com

ISO 9001 REGISTERED FIRM