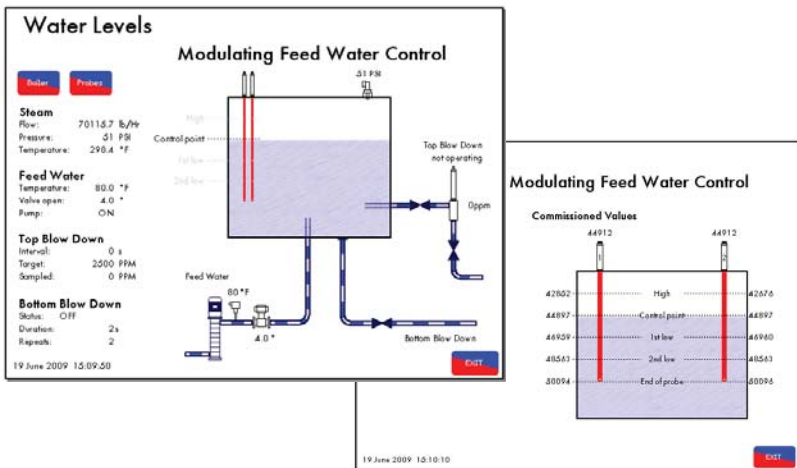
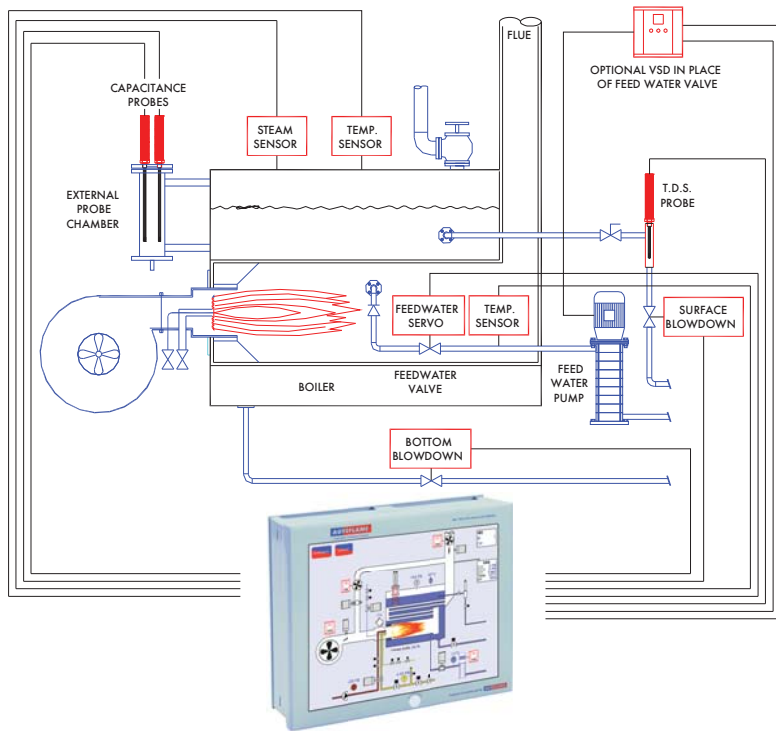


Combustion Management Systems



Feed Water Valve

- Valve sizes: 1/2" to 2"
- Carbon steel valve, stainless steel ball & stem
- Servo Torque: 37ft.lb & 42ft.lb
- NEMA 4 rated
- Position feed back potentiometer
- Flange spec: ANSI 300lb
- Maximum pressure: 300psi
- Maximum volume: 11,000gal/hr

Capacitance Probes

- Probe connection: 1/2"
- Probe length: 20" - 60"
- Stainless Steel
- PTFE coated



Main Features and Benefits

- Intelligent Water Level Control including:
 - High water warning alarm
 - 1st Low warning alarm
- First Out Annunciation
- Steam/Heat/Hot Water Flow Metering
- Surface and Bottom Blowdown Control

Intelligent Water Level Control

- 3-Element Control: Feedwater flow is controlled in response to:
 - Water level (capacitance/frequency reading)
 - Boiler pressure
 - Firing rate
- The flow is controlled by a fully modulating feedwater valve/ VSD or using an on/off signal for a feedwater pump
- 2 capacitance probes control 7 operational levels including:
 - 'high high' level
 - 'high' level and pre-high level warning alarm
 - 'control point' OR 'pump on' and 'pump off' level
 - '1st low' level and pre-1st low level warning alarm
 - '2nd low' level
- Safety: Capacitance readings are constantly checked between both probes, the commissioned values and an internal hardware reference capacitor (long term drift and temperature variations). Both probes self-check for mechanical and electrical integrity
- Accuracy: Repeatability to +/- 2mm (1/10")
- Movement Detection of Water: Ensures that no static value can be accepted, i.e. the probes are in turbulent water
- Swell Management: Prevents intermittent shutdowns from 1st low being switched due to increased steam requirements. The Autoflame MM unit knows the firing rate and boiler pressure and accommodates for this transient condition by increasing the 'control point' level
- Commissioning: The procedure is extremely rapid and easy to follow and can be performed at operating pressure

First Out Annunciation

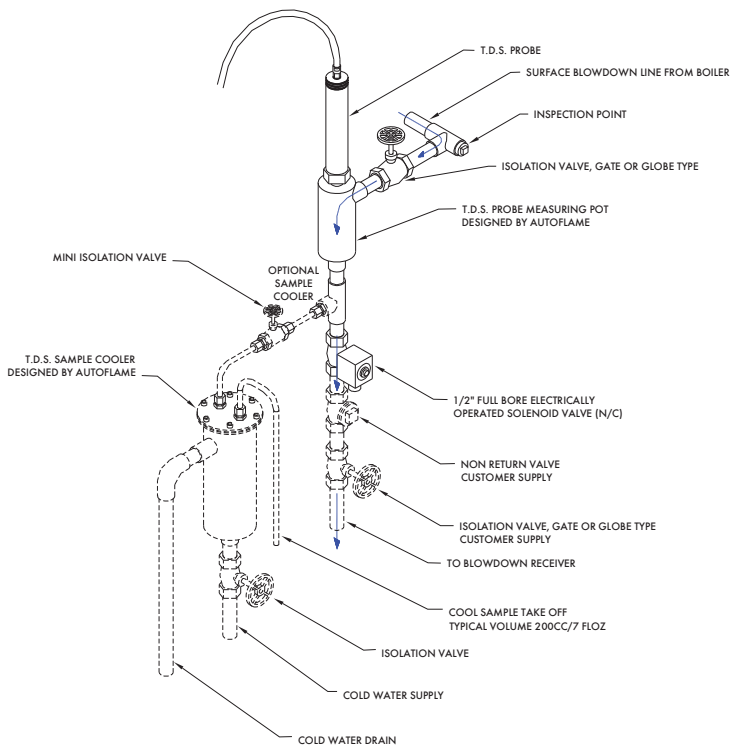
- 15 First Out Annunciation line voltage inputs.
- All inputs can be for display or burner lockout.
- User definable labels can be uploaded into the MM unit.
- First Out alarms can be set for low/high to trigger alarm.
- All data is accessible through the DTI.

Steam Flow Metering

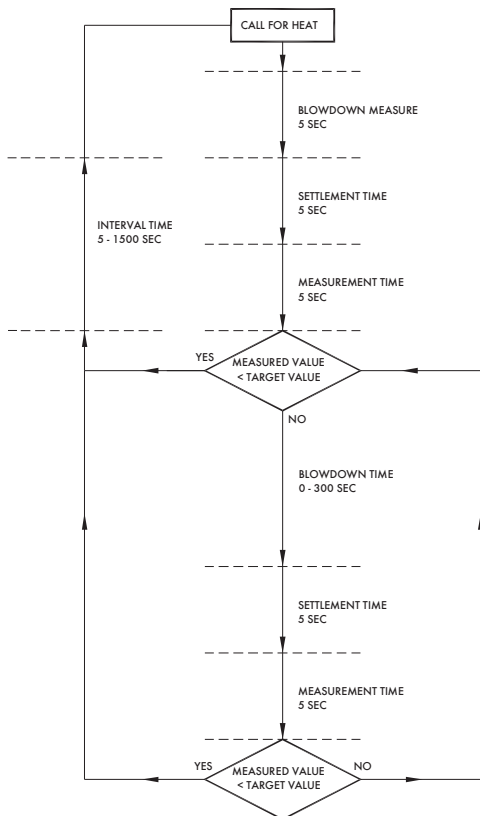
- Calculated and displayed in lbs/hr or kgs/hr.
- Steam flow temperature/Feedwater temperature.
- Gross/Net heat flow in the boiler calculated and displayed.
- Online analysis including instantaneous/totalised values, data logging and graphical display on the MM unit and DTI.

Combustion Management Systems

SURFACE BLOWDOWN PROBE, POT, ASSEMBLY AND SOLENOID VALVE



SURFACE BLOWDOWN TIMING DIAGRAM



Main Features and Benefits

- Surface Blowdown (T.D.S.) Management
- Automatic bottom/column blowdown control
- User-Defineable Timings and Set-Points

Surface Blowdown (T.D.S.- Total Dissolved Solids)

What affects the T.D.S. and how does the Autoflame controller correct for this?

- The T.D.S. is directly proportional to the conductivity of the water providing the temperature remains constant. Temperature effects the conductivity by 2% per °C
Steam temperature sensors measure the temperature and constantly correct the conductivity value accordingly
- Polarization of the water sample occurs when the electrical energy from the probe builds up an offset above/below the earth/ground value (0 volt)
The probe measures any build up of voltage potential above/below ground and the conductivity calculation is modified
- Scale build up on the probe electrode can effect the T.D.S. calculation
By design the water sampling container has been arranged so that the turbulence created during surface blowdown will ensure the probe remains free from scale

T.D.S. Calibration

- User-calibration method
- Automatic internal calibration method

T.D.S. Operation

- The surface blowdown valve will be opened on an intelligently timed basis such that the measured value of T.D.S. is maintained at or just below the 'target' value
- User-defineable adjustments include:
 - 'Target' value
 - Surface blowdown time
 - Time between surface blowdowns
 - Steam pressure threshold, outside which no surface blowdown occurs

Bottom/Column Blowdown

- All of the bottom/column blowdown settings are user-defineable
- Time-clock activated
- Up to 4 blowdowns can be accomodated in a 24 hour period
- Duration of each blowdown is from 0-60 seconds
- Each blowdown can be repeated up to 10 times- this allows a pulsed effect to be implemented for maximum sludge evacuation
- Communication links to all other boilers ensures that not more than 1 boiler can bottom blowdown at any one time

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