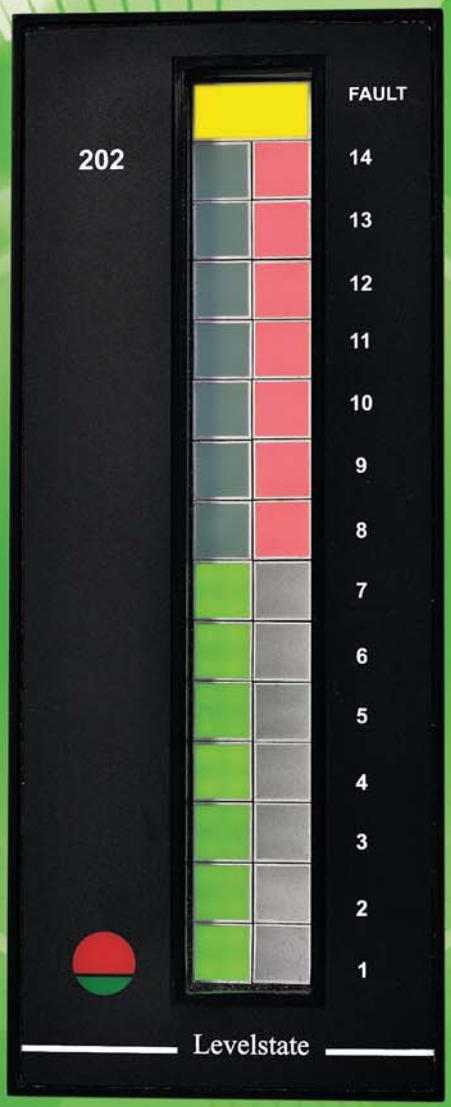


EDLI

Electronic Drum Level Indicator

Levelstate

Solution at all levels

THE LEADER

Reliable detection of boiler drum water level is essential for the safety of any steam raising plant. Very high level may result in erosive 'wet' steam causing damage to the superheater, reheater and other downstream equipments including turbine. Very low level may cause overheating, leading to tube failure and possible explosion. Advanced electronic level monitoring systems based on conductivity principle have therefore become the norm for level monitoring of all boiler installations.

Levelstate is one of the leading manufacturers of electronic water level monitoring systems.The product range includes Electronic Drum Level Indicator (EDLI) for monitoring water level including alarm and tripping at pre-set levels of steam generating plants.

Applications

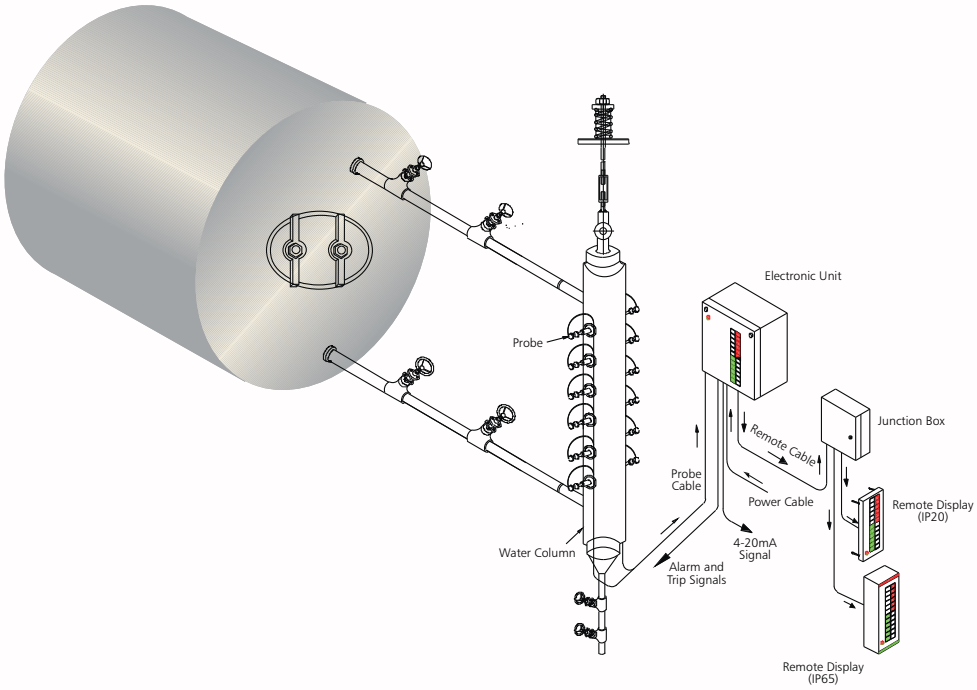
- Boiler drum
- Feedwater heater
- Deaerated feedwater storage tank
- Condenser hotwell
- HP turbine bypass drain sump
- Cold reheat drain sump

Distinctive Features

- Choice of 8 to 48 channels for various levels of visibility and centre to centre distance depending on site
- Available for pressure ratings upto 207 bar (3000 psi)
- Dual power supply with 100% redundancy and power supply failure indication
- Self-diagnostic features to detect open-circuit/short circuit/contamination
- Fully validated trip logic eliminates spurious trips
- Fully configurable multiple DPCO relay outputs
- Adjustable time delay output
- Multiple remote display facility
- Opto-isolated dual 4-20 mA analogue output
- Explosion proof (optional)

Approvals

- Quality system accredited to ISO 9001
- Design approval of pressure parts, operational and field testing of the system
- Third party inspection, testing and certification by approved international agencies
- Certification of explosion proof to international standard for use in hazardous area



Levelstate EDLI Installation at Boiler Drum

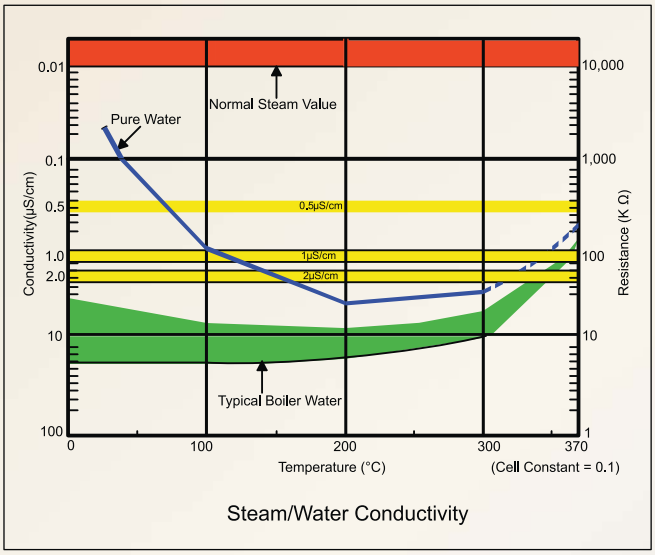
Levelstate

MAINTENANCE FREE EQUIPMENT

Operating Principle

Levelstate EDLI incorporates multiple Probes fitted to a Water Column, which is widely accepted as a reliable, convenient and maintenance free equipment. The technology uses the well established principle of resistivity discrimination between steam and water to provide a clear indication of water level in a boiler drum or any other vessel such as feedwater heater, deaerated feedwater storage tank, condenser hotwell, etc.

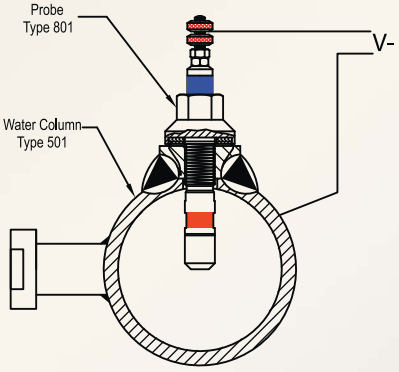
The discrimination between steam and water is based on the significant difference in resistivity between the two states over the saturation range. The sensing element is a Probe with an insulated tip inserted in a side-arm Water Column. On applying voltage to the tip, conduction occurs between the tip and the inside wall of the column. Each Probe is connected to its own sensing and indication circuit. A vertical display of multiple Red/Green high intensity LEDs give the level indication.

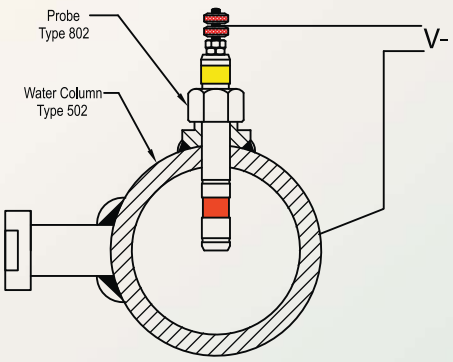


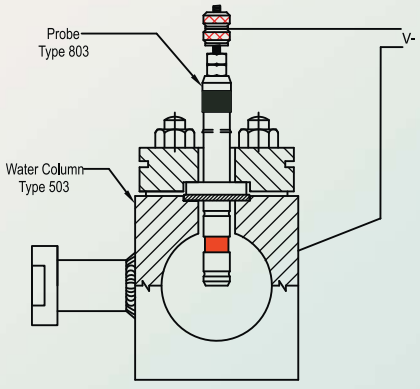
Steam/Water Conductivity

The dimensions are selected to provide a resistance typically less than 0.1 MΩ when the Probe is immersed in water. An electronic discrimination circuit senses whether the Probe resistance is less than 0.1 MΩ (representing water) or greater than 0.1 MΩ (representing steam).The detection level is dependent on water purity and boiler operating conditions.

The side-arm Water Column stimulates condensate flow and circulation. The flushing effect results in water inside the column being purer than the water in the drum. As pressure increases, the water resistivity increases and it is essential that the steam/water switching threshold lies above the side-arm water resistivity for the maximum boiler pressure encountered. On the other hand, it is advisable to use resistivity switching threshold as low as possible to render the system less susceptible to switching due to moisture and water droplets.







EDLI COMPONENTS

Water Column

Probe

Electronic Unit

Remote Display Unit

Probe Cable

INSTALLATION, COMMISSIONING AND MAINTENANCE TOOLS

Probe Insertion Tool

Probe insertion tool comprises of a torque wrench and a socket. It is used with a preset torque to avoid excessive tightening of the Probe.

Blanking Plugs

Blanking plugs are fitted in each Probe position to avoid damage to Probes during blowdown of the Water Column.

Programmer

The handheld programmer is used to program the Electronic Unit Type 202B to suit plant operating conditions.

Simulator

Simulator is a commissioning aid and is used for simulating steam/water status of the conductivity Probes.

Seat Cutting Tool

Manually operated seat cutting tool is available for reseating the Water Column.

ROBUST DESIGN
WATER COLUMN

Water Columns are designed to promote condensation of saturated steam with minimum drop in temperature. Circulating condensate in the Water Column flushes the vessel and Probes continuously. This prevents build up of sediment and eliminates the need for periodic blowdown.

The design and fabrication meets the requirement of ASME B31.1 Power Piping Code. Water Columns are hydro-tested at 1.5 times the rated pressure at ambient temperature.

For suspending the Water Column, a sling rod with variable load spring support is provided. Stainless steel guards are provided for Probe protection.

Type 501

Rating: 150 bar at 341°C
(2175 psi at 645°F)

Material: Carbon steel extruded section conforming to ASTM A105 or thick wall seamless carbon steel pipe conforming to ASTM A106

Probe installation: Screwed with gasket seal

No. of ports: 8 to 48

Minimum pitch: 25mm

Sight range: As per plant requirement

Steam/water connection:
25NB x Sch. 160
(custom size available on request)

Drain connection: 15NB x Sch. 80
(custom size available on request)

Type 502

Rating: 207 bar at 370°C
(3000 psi at 698°F)

Material: Thick wall seamless carbon steel pipe conforming to ASTM A106

Probe installation: Metal to metal compression fitting

No. of ports: 8 to 48

Minimum pitch: 25mm

Sight range: As per plant requirement

Steam/water connection:
25NB x Sch. 160
(custom size available on request)

Drain connection: 15NB x Sch. 80
(custom size available on request)

Type 503

Rating: 207 bar at 370°C
(3000 psi at 698°F)

Material: Carbon steel extruded section conforming to ASTM A105

Probe installation: Clamp plate mounting with metaflex gasket seal

No. of ports: 8 to 48

Minimum pitch: 35mm

Sight range: As per plant requirement

Steam/water connection:
25NB x Sch. 160
(custom size available on request)

Drain connection: 15NB x Sch. 80
(custom size available on request)

Optional: Water Column for super-critical applications available on request

THE HEART OF EDLI PROBES

As the primary element in sensing level signals, conductivity Probe is the heart of electronic level indicating systems. Probes are made of stainless steel with high purity zirconia/alumina ceramic insulator exhibiting a high degree of chemical inertness at elevated temperature. Pressure sealing is achieved through ceramic to metal vacuum brazing.

Insulation resistance: Greater than 5 MΩ at 500V

Hydrostatically tested: At twice the rated pressure

Type 801

Rating: 150 bar at 341°C (2175 psi at 645°F)

Connection: Screwed type probe with M16 x 1.5 mm thread and metaflex gasket seal

Optional: Probe Type 811 with non-wetting PTFE insulator available for pressure upto 23 bar at 220°C (334 psi at 428°F)

Type 802

Rating: 207 bar at 370°C (3000 psi at 698°F)

Connection: Swagelok type compression fitting with metal to metal seal

Type 803

Rating: 207 bar at 370°C (3000 psi at 698°F)

Connection: Clamp plate design with metaflex gasket seal

Optional: Probe for super-critical applications available on request

Probe Cable - Type 20128/20228/202B28

Levelstate provides high temperature resistant PTFE insulated multi-core Probe Cable. These are available in 10 meters length as standard. Custom lengths can be supplied maximum upto 30 meters.

Levelstate

STATE OF THE ART
ELECTRONIC UNIT

Type 201

Enclosure: Wall mounted FRP enclosure with IP65/NEMA 4X protection; Size (mm): 320H x 200W x 120D

Rating: -10°C to 70°C; Relative humidity: Upto 100%

No. of channels: Upto 12

Power supply: Single power supply - 85-264V AC, 47-63 Hz / 120-370V DC

Discrimination threshold: 0.5, 1 or 2 μS/cm (optional: 0.1 μS/cm)

Display: Green LED for water and Red LED for steam

Process fault (Alarm/Trip): 4 nos. SPDT relays; relays are configurable for normally energized/de-energized with time delay action. 2 out of 3 voting logic to ensure positive trip on process fault or to inhibit spurious trip.

Process fault discrimination: Channel LED flashing

System fault: Not available

Relay contact rating: SPDT-5 Amps; 230V AC / 24V DC

Switching power(max.): 1250VA / 120W

4-20 mA signal: Opto-isolated dual 4-20 mA DC stepped analog output; load impedance: 300 Ohms

Type 202

Enclosure: Wall mounted FRP enclosure with IP65/NEMA 4X protection; Size (mm): 320H x 200W x 120D

Rating: -10°C to 70°C; Relative humidity: Upto 100%

No. of channels: Upto 14

Power supply: Dual power supply with 100% redundancy- 85-264V AC, 47-63 Hz / 120-370V DC

Discrimination threshold: 0.5, 1 or 2 μS/cm (optional: 0.1 μS/cm)

Display: Green LED for water, Red LED for steam and Yellow LED for system fault

Process fault (Alarm/Trip): 4 nos. SPDT relays; relays are configurable for normally energized/de-energized with time delay action. 2 out of 4 voting logic to ensure positive trip on process fault or to inhibit spurious trip.

Process fault discrimination: Channel LED flashing

System fault: System fault yellow LED is activated through one SPDT sealed relay for following abnormalities:

- Any power supply/internal power pack failure
- Probe channel malfunction by validation between adjacent channels

Relay contact rating: SPDT-5 Amps; 230V AC / 24V DC

Switching power(max.): 1250VA / 120W

4-20 mA signal: One no. 4-20 mA. DC stepped analog output; load impedance: 300 Ohms

STATE OF THE ART
ELECTRONIC UNIT

Type 202B

Enclosure: Wall mounted FRP enclosure with IP65/NEMA 4X protection; Size (mm): 500H x 400W x 200D

Rating: -10°C to 70°C; Relative humidity: Upto 100%

No. of channels: 8 to 48

Power supply: Dual power supply with 100% redundancy - 85-264V AC, 47-63 Hz / 120-370V DC

Discrimination threshold: 0.5, 1 or 2 μS/cm

Display: Green LED for water, Red LED for steam and Yellow LED for system fault

Process fault (Alarm/Trip): Upto 7 nos. DPCO relays; relays are configurable for normally energized or de-energized with time delay action for 1-20 seconds. 2 out of 4 voting logic to ensure positive trip on process fault or to inhibit spurious trip.

Process fault discrimination: Respective channel flashing at 1 Hz

System fault: System fault is activated through one DPCO sealed relay for the following abnormalities:

- Any power supply/internal power pack failure
- Short circuit/open circuit
- Probe contamination

System fault discrimination: Respective channel and yellow LED flashing at 2 Hz

Relay contact rating: DPCO - 8 Amps; 250V AC / 30V DC

Switching power (max.): 2000VA / 240W

4-20mA signal: Opto-isolated dual 4-20 mA DC stepped analog output; load impedance: 300 Ohms

Levelstate

ENJOY THE CONVENIENCE
REMOTE DISPLAY UNIT

The Remote Display Unit repeats the display of the Electronic Unit. The IP20 Remote Display Unit is intended for control room location. The IP65 Remote Display Unit can be located in the field like fireman's floor, feedwater control station, etc.

Two Remote Display Units can be powered by the Electronic Unit upto 500 meters. Additional Remote Display Unit with length exceeding 500 meters also available on request.

Type 20151

Display: Duplication of Electronic Unit Type 201
Protection class: IP20
Dimensions (mm): 144H x 72W x 30D

Type 20251

Display: Duplication of Electronic Unit Type 202
Protection class: IP20
Dimensions (mm): 180H x 72W x 30D

Type 202B51

Display: Duplication of Electronic Unit Type 202B
Protection class: IP20
Dimension (mm): 238H x 96W X 30D

Type 20153

Display: Duplication of Electronic Unit Type 201
Protection class: IP65
Dimensions (mm): 240H x 80W x 60D

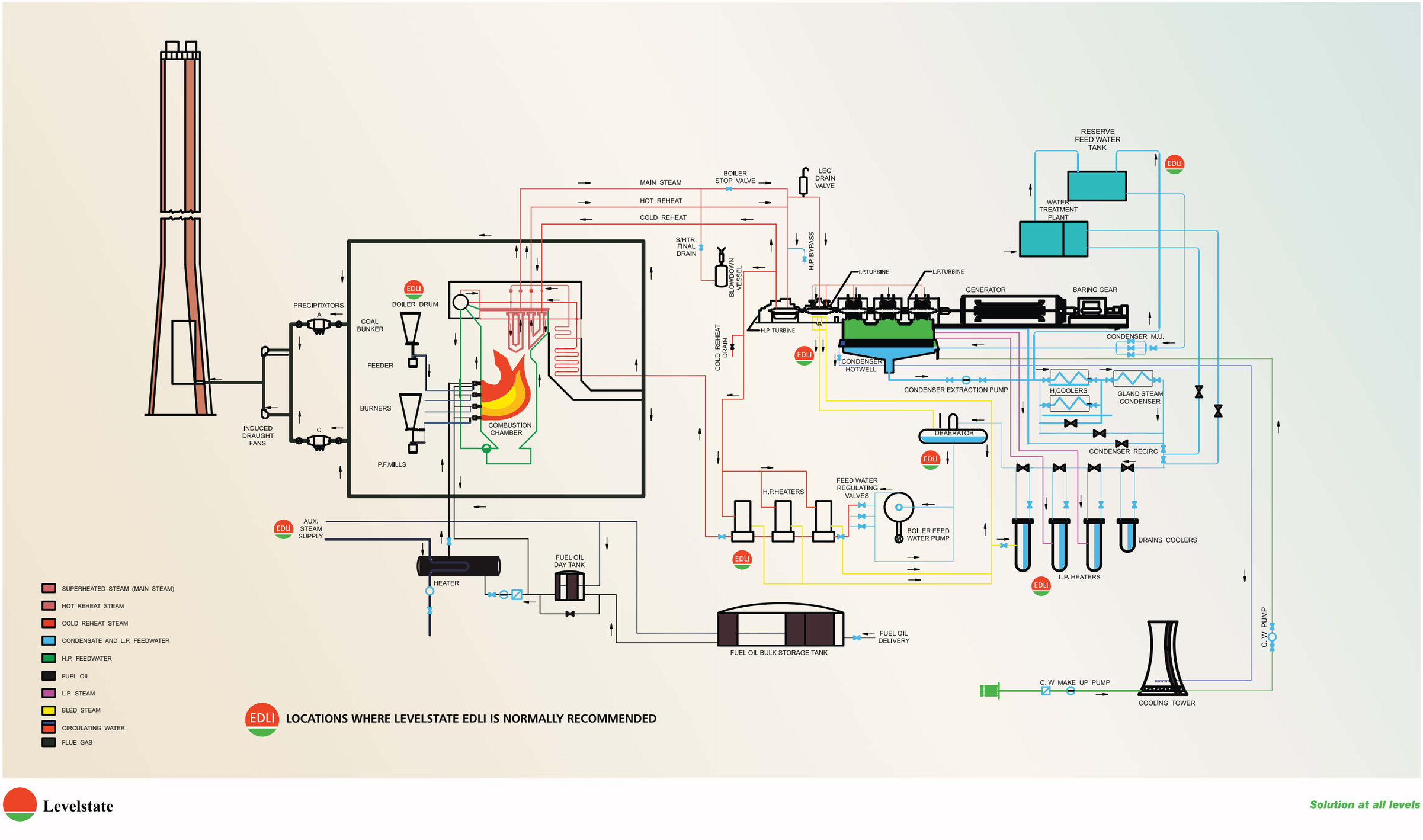
Type 20253

Display: Duplication of Electronic Unit Type 202
Protection class: IP65
Dimensions (mm): 240H x 80W x 60D

Type 202B53

Display: Duplication of Electronic Unit Type 202B
Protection class: IP65
Dimensions (mm): 320H x 200W x 120D

TYPICAL FOSSIL FUEL FIRED GENERATING UNIT



STEAM GENERATING PLANT
LEVEL MONITORING SOLUTION

Levelstate provides SOLUTION AT ALL LEVELS for steam generating plants. Products manufactured are Colour Port Type Direct Water Level Gauge (DWLG), Electronic Drum Level Indicator (EDLI) and Electronic Level Switch (ELS).

The guiding philosophy of reliability and user friendly design has made Levelstate a successful business entity. The user base includes power, petrochemicals, refinery, fertiliser, sugar, paper, cement, metallurgical and chemical industries throughout the world.

Various international agencies have approved Levelstate products. The quality system has been accredited ISO 9001. All Levelstate products are also available with the CE mark.

With professional marketing efficiency and on-time service delivery, Levelstate assures its customers value for money. Factory trained engineers are available on call to provide diagnostic assistance, pre-engineering support, installation and commissioning services.

ISO 9001
REGISTERED FIRM

Direct Level Gauge, Drum Level Indicator and Level Switch

HP Direct Water Level Gauge

MP Direct Water Level Gauge

Electronic Drum Level Indicator

Electronic Level Switch

Levelstate pursues a policy of continuous technical innovation and product development.
The information given in this document may change without notice.

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Levelstate

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