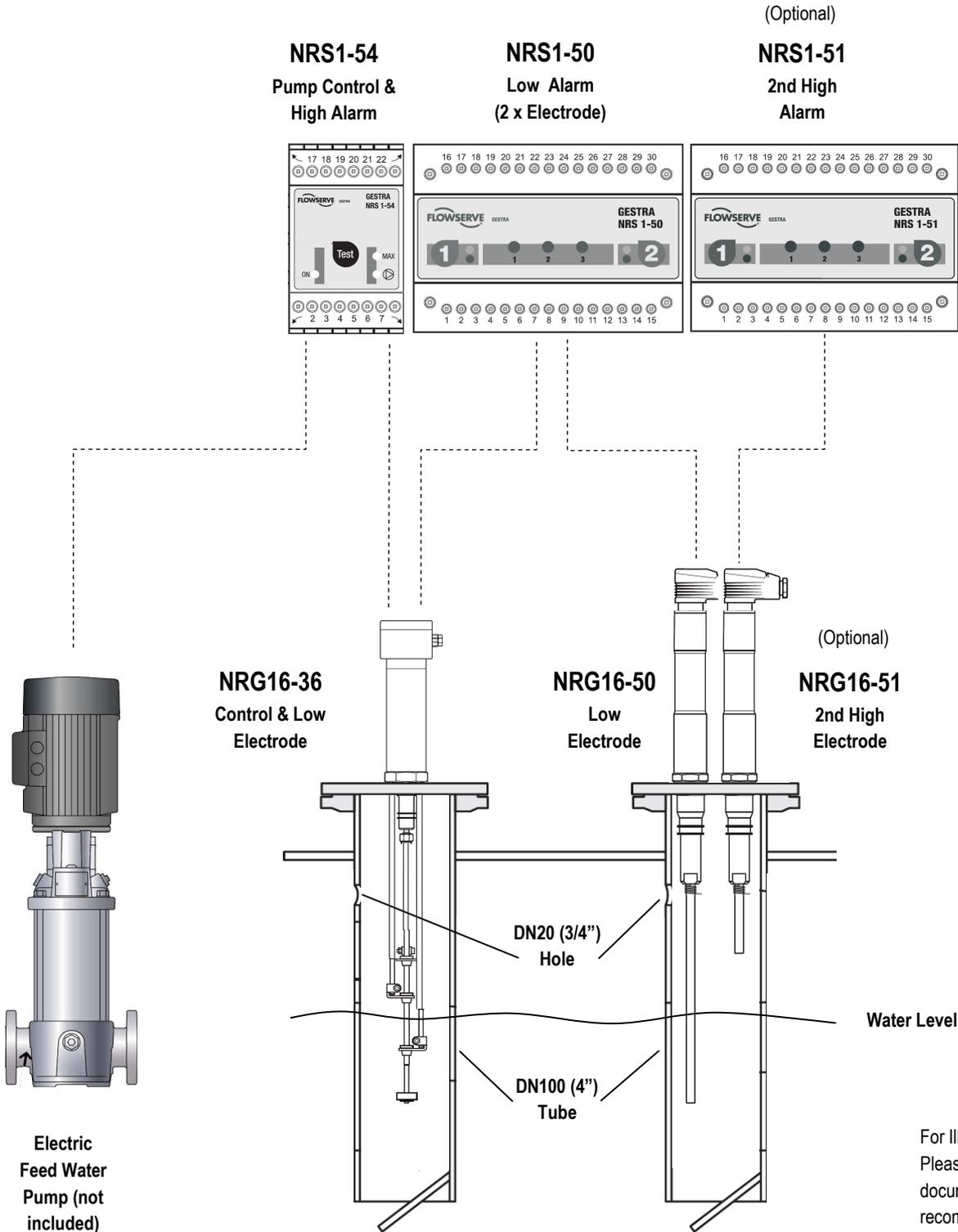


### SSP32-50LL - A New Generation of Advanced Boiler Water Level Control System for Pump On/Off Control

The *GESTRA* SpectorMODUL SSP32-50LL system incorporates the very latest in high integrity SIL3 class water level limiters which are Self-Monitoring with Automatic Routine Testing (SMART), to provide a boiler water level control system (exceeding the latest SAFed BG01 boiler operation guidelines issued in October 2011). The system is suitable for applications to a maximum of 32 bar g.



## SYSTEM CONCEPT

The SpectorMODUL level system uses two electrodes mounted directly into the boiler shell. These are protected from turbulence and foaming in the boiler by protection (or stilling) tubes. This arrangement precludes the need to have external chambers equipped with sequencing purge valves with interconnecting pipe work that is susceptible to blocking up or accidental isolation. As the high integrity electrodes have no moving parts, no daily testing is required when mounted directly in the boiler shell. Maintenance is therefore minimal.

Feed pump on/off control is performed by the well proven NRG16-36 conductivity electrode in conjunction with a compact controller NRS1-54. The electrode tips are cut on site to suit the switching levels required. Two tips are used for the on/off switching levels of the pump and a third tip provides a high water alarm indication.

Low level alarm is provided by a further dedicated electrode tip on the NRG16-36 and NRG16-50 self-monitoring level electrodes. These are used in conjunction with the NRS1-50 dual-channel level switch which has redundancy and periodic self-checking circuitry to monitor the electrode, cable, safety output relay and internal components against malfunction. This arrangement provides an extremely reliable and fail-safe limiting Type B sub system compliant with SIL3 requirements (exceeding the minimum SIL2 rating outlined in BG01).

**NOTE:** This system does not provide independent 1st and 2nd Low alarm switch points. Both low alarm electrodes are cut to the same length to initiate a single output to the burner lockout safety circuit in accordance with EN12953-6.

The robust NRG16-36 and NRG16-50 electrodes do not have any electronic circuitry on or within the electrode body and are therefore completely unaffected by heat or vibration from the boiler. The self-monitoring feature detects and gives an alarm if any scale

or dirt builds up on the tip, or if the seals of the electrode are not pressure tight.

## OPERATION

During normal operation the boiler water level is maintained between the two pump control tips of the NRG16-36 electrode.

As the water level falls due to evaporation, the 'Pump On' tip becomes exposed and the controller signals the feed pump to switch on. The pump continues to run until the water level has recovered sufficiently to immerse the 'Pump Off' tip. The controller then signals the pump to switch off.

This method gives good control during varying steam demand.

Should the water level fall below the desired operational level, the NRG16-36 and NRG16-50 low alarm tips are exposed and the associated NRS1-50 controller signals an alarm condition to shut the boiler down well before the danger level is reached. The burner shutdown is endorsed by interruption of the burner circuit causing the boiler to 'Lockout'. Manual intervention is required to reset and re-fire the burner after restoration of water level.

In addition to constantly monitoring the boiler water level, the NRS1-50 switch also tests the integrity of the control circuit by the use of electronic logic every 40 seconds, without interrupting the burner circuit. These tests check the integrity of the connecting cable, short circuits, internal power supply and earth connections. For the first time in such a system, the NRS1-50 also self-checks the output relay for the burner safety circuit and also incorporates three self-diagnostic LEDs to assist in fault finding. The initiation of the periodic test is also monitored by a second built-in electronic device to ensure against malfunction of the self-checking circuitry.

In the event of low level electrode, switch failure or damage to the

interconnecting cable the limiter system will signal an alarm and shut down the boiler and a diagnostic LED will illuminate to indicate a possible reason for the fault.

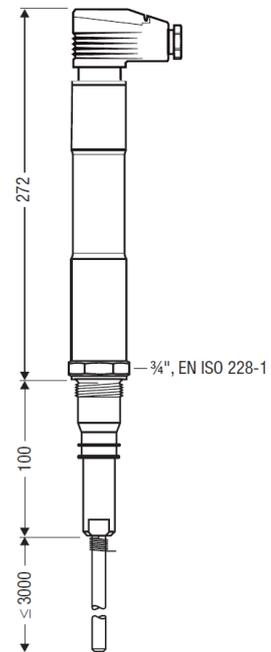
To avoid a boiler shutdown due to transient water level fluctuations, the low alarms operate after a delay of 3 seconds.

## EQUIPMENT SPECIFICATION

SSP32-50LL comprises of:

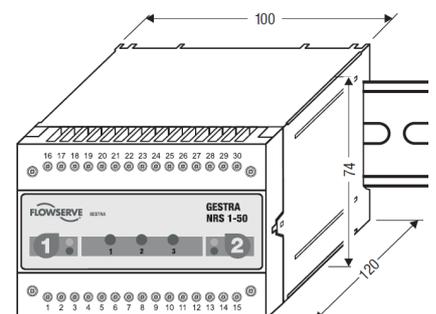
### 1 x Low Level Electrode, NRG16-50

Self-monitoring conductivity electrode with a rigid single stainless steel 7mm diameter tip for low level alarm. Tip is cut to length on site to suit the alarm level required. Lengths available: 500, 1000, 1500, 2000, 2500 or 3000mm.



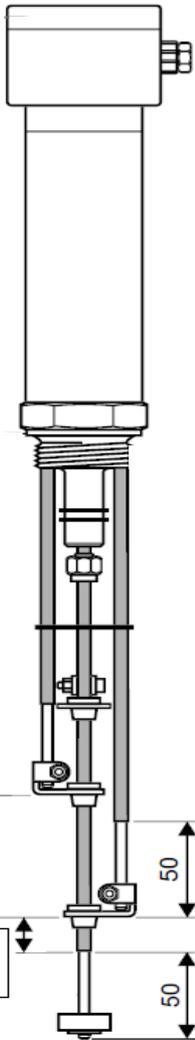
### 1 x Low Level Switch, NRS1-50

Fail-safe two channel level switch with periodic self-checking circuitry for use with NRG16-36 and NRG16-50 electrodes. Test button to simulate low water level. Available as a DIN rail mounted design only.



**1 off Combination Level Electrode, NRG16-36**

Conductivity electrode with 4 tips. The central tip provides self-monitoring low alarm, two tips are for pump on/off control and the remaining tip provides a high alarm. The tips can be cut to length on site to suit the switching levels required. Lengths available: 500, 1000, 1500mm.



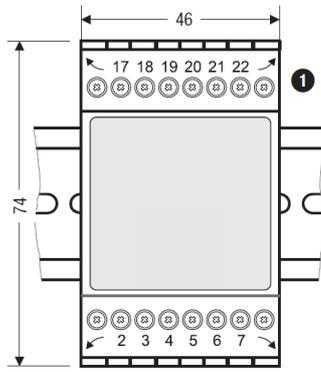
**NRG16-36**

NOTE: The NRG16-36 is supplied as standard with metal surface extension clamps for use with water with conductivities down to 0.5 microS/cm.

These must be removed for fluids of conductivity greater than 10microS/cm.

**1 off Pump Control & Alarm Switch, NRS1-54**

Conductive level switch for pump on/off and high alarm function to use with NRG16-36 electrode. Available as a DIN rail mounted design only.



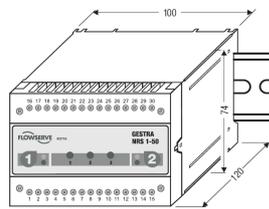
**NRS1-54**

**OPTIONAL EQUIPMENT**

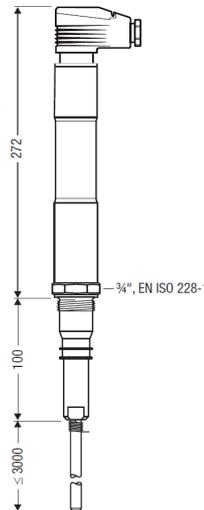
**SMART High Level Alarm System**

System comprises of NRG16-51 level electrode and NRS1-51 level switch to provide a fail-safe independent high level alarm with self-monitoring and automatic checking circuitry to SIL3 standard.

Applications for the high integrity High Alarm system include the operation of a 'slam-shut' valve in the feed water line to ensure fail-safe protection of steam plant and processes from 'carry-over' into the steam mains pipe work.



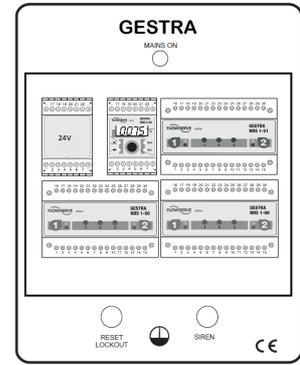
**NRS1-51**



**NRG16-51**

**Enclosure for Level Switches**

We can provide a glass fronted metal enclosure for wall mounting. The controllers and switches are ready installed and pre-wired to a terminal strip complete with power isolator, breakers, & relays. Just connect electrodes, power and alarm/safety circuits. Our engineers will be pleased to quote for specific requirements you may have.



**Typical Pre-Wired Enclosure**

**Remote Alarm & Shutdown Panel**

In accordance with SAFed BG01 boiler operation guidelines, this panel is an emergency device located remotely from the boiler house to shut off and isolate the burners rendering the boiler to a safe condition.

**Electrode Mounting Flanges & Protection Tubes**

GESTRA have been manufacturing and installing self-monitoring boiler water level controls for more than thirty years and can provide a wide range of flanges and protection tubes either from stock or engineered to your specific requirements.

**Information required when ordering**

- 1) Boiler maximum working pressure;
- 2) Boiler evaporation rate;
- 3) Electrode lengths required;
- 4) Feed pump pressures (maximum and operational);
- 5) Control system voltage: (24VDC, 115Vac or 230Vac). **NOTE:** GESTRA controllers and switches require a 24VDC supply. Depending on your requirements, a voltage transformer can be supplied to reduce the 115/230Vac incoming supply accordingly.

**Installation & Service**

GESTRA can provide full product support, installation, commissioning and servicing nationwide. Please refer to our Service Brochure for further details.

Think **GESTRA** for your steam, condensate and boiler house products

**Boiler Level Controls & TDS Blowdown Systems**

**Feed Water Tanks & Systems**

**Heat Recovery Systems**

**Pressurised Deaerator Systems**

**Condensate Pump Sets**

**Steam Traps**

**Manifolds**

**Trap Testing & Monitoring Systems**

**Non-Return Valves**

**Control Valves, Actuators & Controls**

**Pressure Reducing Stations**

**Separators**

**Stop Valves**

**Strainers**

**Safety Valves**

**Pressure & Temperature Gauges**

**Sight Glasses**

**Contamination Detection Systems**

**Flowmetering**