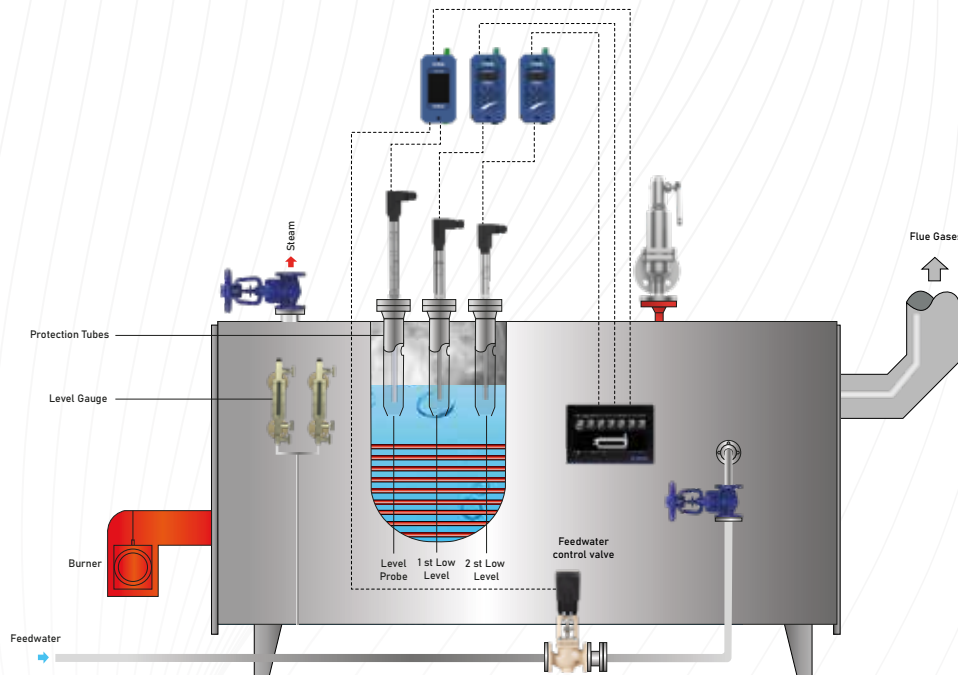


Boiler Level Control and Safety

In steam boilers, the water level decreases with the convert of the water into steam and the decreasing water is completed by the operation of the boiler feedwater pump. Depending on the amount of steam produced in the steam boiler, since the water temperature entering the boiler is lower than the boiler temperature and due to changes in steam pressure, a constant fluctuation in the water level occurs. For the efficient and safe operation of boilers, the water level must always be checked. This check may include a sound or light alarm, shutting down the feedwater supply, and shutting down the burner. It is also essential to provide an outside drum level indicator such as magnetic or reflex level gauges.



Note: Level probes can be both installed in a protection tube or a level tube. It is undesirable for the water to drop below the desired level in steam boilers. If it does, it can cause costly damage to the boilers and even fatal accidents. In case of low water level, check the following reasons.

Causes of Low Level

- Lack of feedwater
- Sudden load changes
- Feedwater pump failure
- Safety valve leaks
- Control valve malfunction
- Malfunction of boiler water level controller

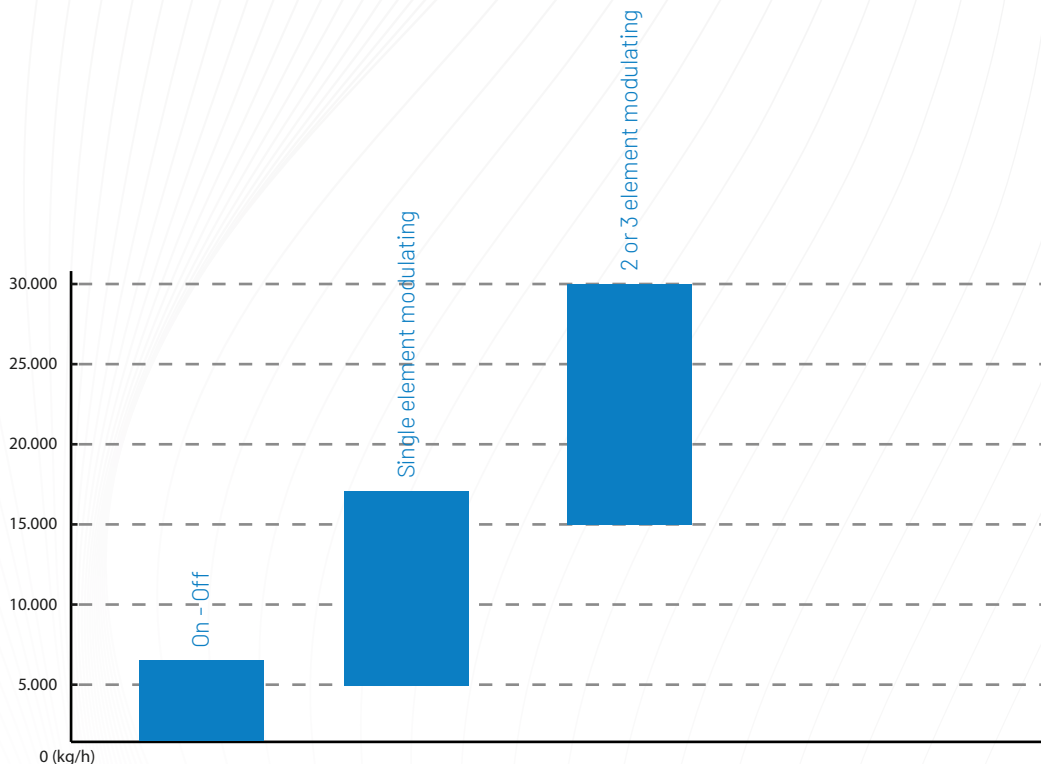
To ensure the safe operation of the boiler, all elements that affect the level control must be monitored and make sure they are working. In case of failure, the boiler operator must understand the cause of the problem and should take action most appropriately.

Boiler Water Level Control Systems

In steam boilers, feed water should be supplied to replace the water lost during steam production. Automatic level control systems are applied in steam boilers produced with modern technology. Automatic feedwater control systems have two different applications: On/Off Level control and modulating level control.

Depending on the boiler capacity; On-Off level control system should be used for the boilers with the capacity up to 5000 kg/h. for the boiler with the capacity up to 15.000 kg/h single element modulating control and higher capacity than 15.000 kg/h 2 or 3 element modulating level control systems should be used.

- **Single Element Modulating** : Modulating level control system only
- **2 Element Modulating** : Modulating level control system, steam production amount measurement with modulating level control system and steam flow meter
- **3 Element Modulating** : Modulating level control system, steam production amount measurement with steam flow meter and feed water amount measurement for the boiler with water flow meter



It is not sufficient to decide which level control system to use only by considering the boiler capacity. In practice, factors such as the steam consumption behavior of the plant, the variability of process loads, and the feedwater conditions are equally important. For example, an on-off level control system may not be adequate even in a low-capacity boiler if there are sudden or frequent load fluctuations. In such cases, modulating level control is preferred to ensure stable operation.

Another major reason to use a modulating level control system is energy efficiency. At higher flow rates, adding large amounts of cooler water instead of evaporated water can lead to both energy loss and thermal stress on the boiler. By adding water proportionally to the steam consumption, the boiler can operate more smoothly, reducing thermal shocks and improving fuel efficiency. Therefore, modulating control systems are often selected not only for larger capacity boilers but also for medium or even smaller boilers where load variations are significant or energy efficiency is a priority.

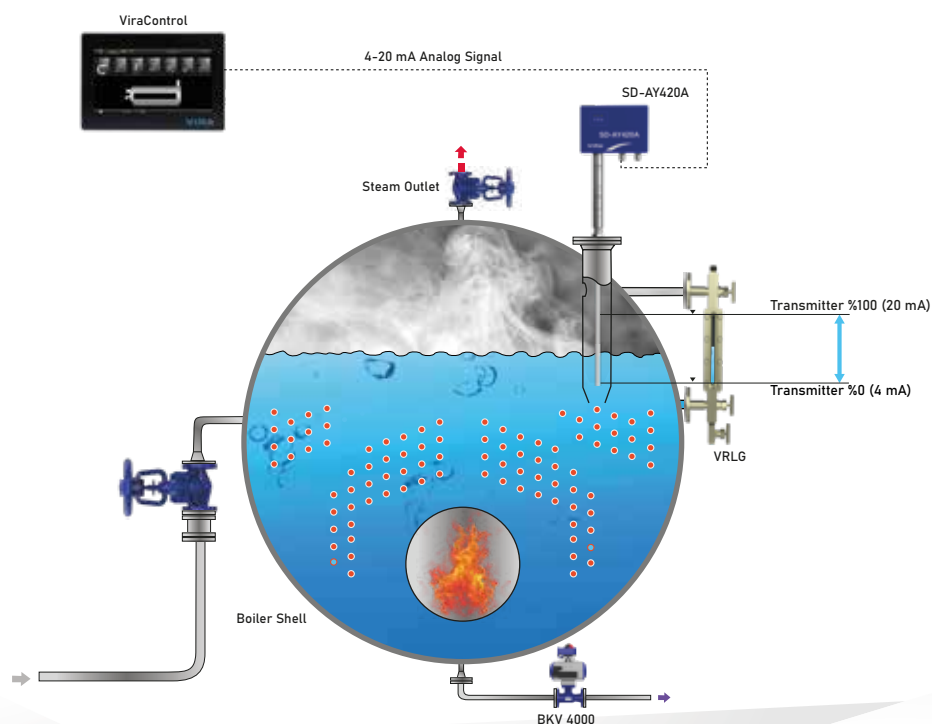
SD-AY 420A Capacitive Level Transmitter



SD-AY 420A Capacitive Level Transmitter

Type	: SD-AY 420A
Supply Voltage	: 24 VDC (Optional 230 VAC)
Functions	: Minimum & Maximum Level Set
Outputs	: 4–20 mA Analog Level Signal / Active (Optional Passive)
Nominal Pressure	: PN 40
Max. Operat. Temp.	: 239 °C
Max. Operat. Press.	: 32 Bar g
Connection	: G 1/2" BSPT (Optional NPT)
Length	: 300 -1500 mm
Max. Ambient Temp.	: 75 °C
Compliance	: CE (EMC 2014/30/EU, LVD 2014/35/EU, PED 2014/68/EU), EN 12952 & EN 12953, Type Approval (Module B + D)

SD-AY 420A Typical Installation



TECHNICAL SPECIFICATION

SD-AY 420A Capacitive Level Transmitter

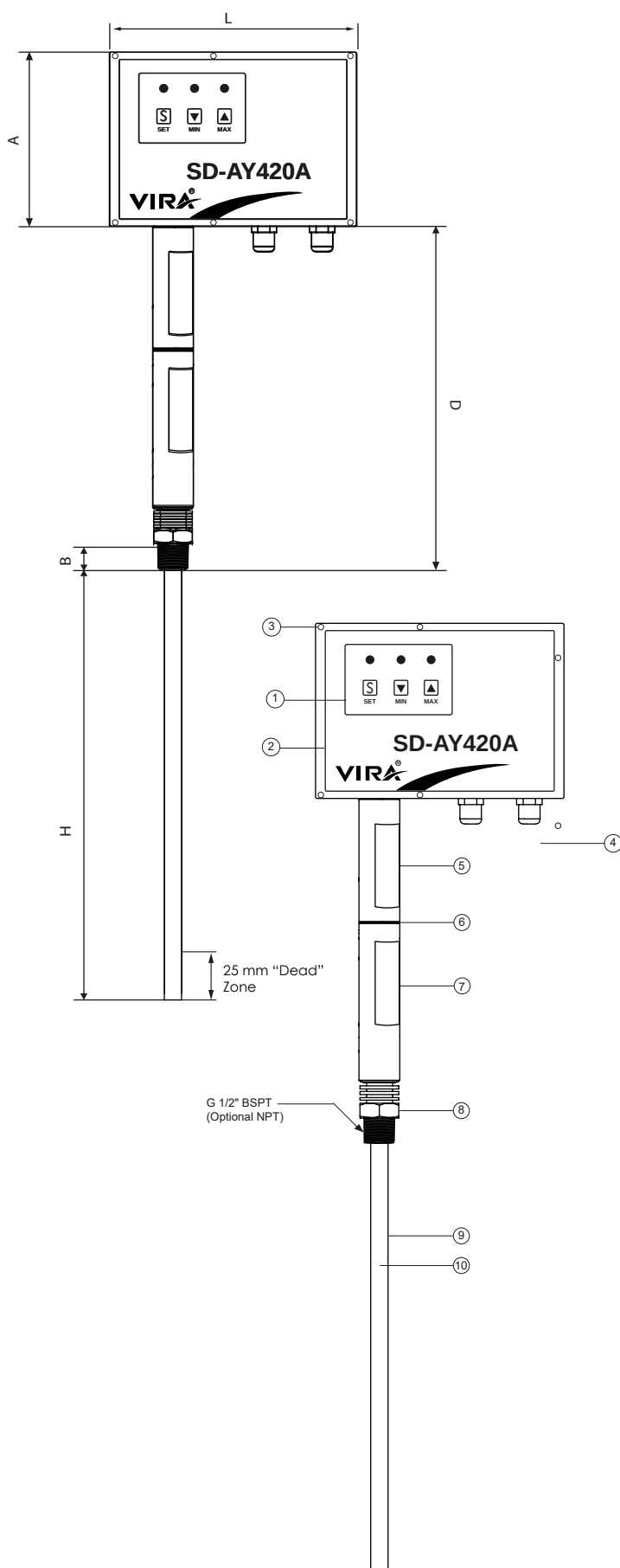
Technical Data

Type	SD-AY 420A
Supply Voltage	24VDC (Optional 230VAC)
Functions	Min Level Set, Max Level Set
Inputs	Level Probe Input
Outputs	4–20 mA Analog Level Signal
Display	Led
Max. Ambient Temp.	75 °C
Enclosure	Aluminum
Label	Lexan
Control	3 Buttons
Installation Type	Boiler top mounted
Protection Class	IP 65
Nominal Pressure	PN 40
Max. Operating Temp.	239 °C
Max. Operating Pres.	32 Bar g
Connection	G 1/2" BSPT (Optional NPT)
Length	300–1500 mm

Dimensions

H (mm)	L (mm)	A (mm)	B (mm)	C (mm)	D (mm)
300–1500	170	121	23,5	60	241

No	Part	Material
1	Display	Leds
2	Label	Lexan
3	Housing Screws M4	Austenitic Stainless Steel 304
4	PG7 Cable Gland	Brass (Nickel Coated)
5	Preamplifier Body	Austenitic Stainless Steel 304
6	Preamplifier Connector	Austenitic Stainless Steel 316L
7	Cover Assembly	Austenitic Stainless Steel 304
8	Probe Body	Austenitic Stainless Steel 316L
9	Probe Sheathing	Polytetrafluoroethylene (PTFE)
10	Probe (Sheated)	Austenitic Stainless Steel 316L



Note: The capacitive level probe is manufactured to the specified length and cannot be shortened afterwards. The required probe length must be clearly stated at the time of order.