



# Automatic continuous desalting valve for steam boilers

Mod. 560-A | EN ASME/ANSI



EC-2



560-A

## Operation

The conductivity electrode EC-1, the desalting controller RD-1 and the continuous desalting valve with servomotor allow the automatic desalting process of boiler water which eliminates:

- Organic matter and mineral salts in solution. (Calcium, magnesium, sodium, potassium, iron, bicarbonate ions, chlorides, sulphates, nitrates, ...etc.).
- Solid materials in suspension. (Sand, clay, metal residues, rock residues, organic matter, ...etc.).

The continuous bleeding process prevents:

- Damage caused by erosion and perforation, entailing the following high costs:

- Direct: Replacement or repair of materials.
- Indirect: Stoppages, product losses, ...etc.

- Danger of boiler explosion.

And reduces:

- Incrustations and sediments caused by precipitation of calcium and magnesium salts, which obstruct thermic transmission and which cause unnecessary and excessive fuel consumption.
- Foam formation caused by excessive saline concentration, with its corresponding drag.

This combination of measuring, comparison and control ensures minimum water loss and thus gives considerate energy savings.

## Regulation

- PED 2014/68/UE
- UNE-EN 12516-2
- UNE-EN 1092-1
- UNE-EN 12266-1

## Valve specifications

### Size

- DN-15, 20 and 25

### Temperature range

- -10 to +250 °C

### Applications

- Liquids

### Materials

- Carbon steel

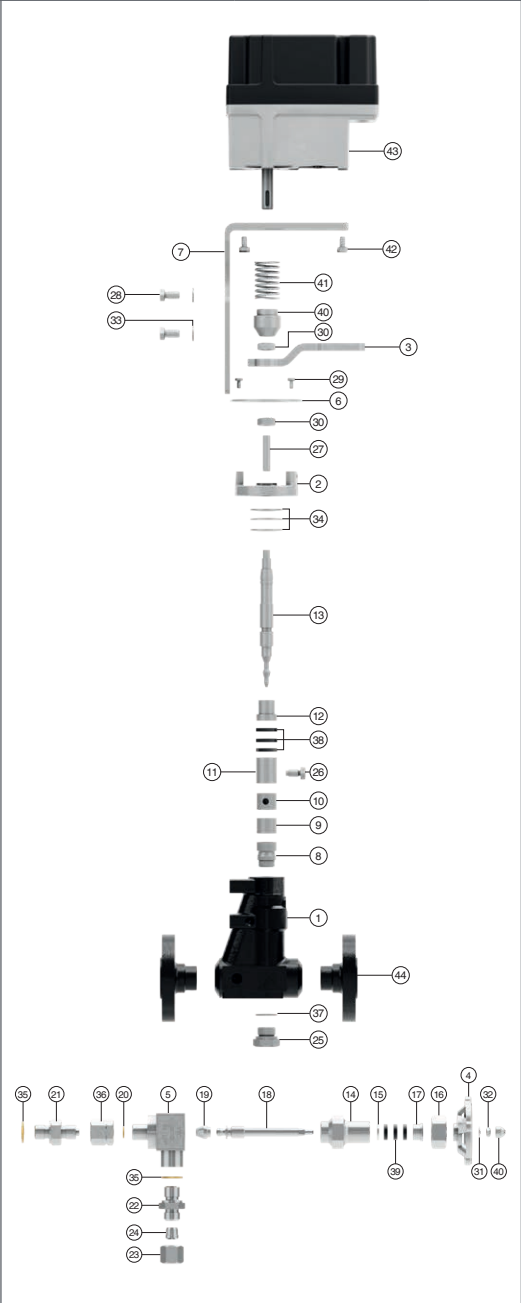
### Maximum pressure

- Up to 40 bar

## Certification



N° . PIECE	PIECE	MATERIAL				
1	Body	Carbon steel (EN-1.0619)				
2	Gland body	Carbon steel (EN-1.1191)				
3	Control lever	Cast iron (EN-1.0037)				
4	Flywheel	Aluminium (EN-AC-44200)				
5	Sample-taking faucet body	Stainless steel (EN-1.4008)				
6	Reader plate	Aluminium				
7	Lever lock	Carbon steel (EN-1.0037)				
8	Measuring nozzle seating	Stainless steel (EN-1.4028)				
9, 10	Measuring nozzle cap	Stainless steel (EN-1.4028)				
11	Measuring nozzle endless nut	Stainless steel (EN-1.4028)				
12, 17	Gland	Carbon steel (EN-1.1191)				
13	Measuring nozzle shaft	Stainless steel (EN-1.4028)				
14	Sample-taking faucet gland body	Carbon steel (EN-1.1191)				
15	Sample-taking faucet gland washer	Stainless steel (EN-1.4401)				
16	Gland nut	Carbon steel (EN-1.1191)				
18	Sample-taking faucet shaft	Stainless steel (EN-1.4401)				
19	Seal	Stainless steel (EN-1.4401)				
20	Sample-taking faucet connection nut	Carbon steel (EN-1.1191)				
21	Sample-taking faucet connection	Carbon steel (EN-1.1191)				
22	Adapter	Carbon steel (EN-1.0308)				
23	Adapter nut	Carbon steel (EN-1.0308)				
24	Cutting ring	Carbon steel (EN-1.0308)				
25	Draining plug	Carbon steel (EN-1.1191)				
26, 28, 42	Screw	Carbon steel (EN-1.1191)				
27	Stud	Carbon steel (EN-1.1181)				
29	Screw	Stainless steel (EN-1.4401)				
30	Nut	Carbon steel (EN-1.1141)				
31	Washer	Stainless steel (EN-1.4401)				
32	Nut	Stainless steel (EN-1.4401)				
33, 44	Washer	Carbon steel (EN-1.1141)				
34	Disc spring	Vanadium chrome steel (EN-1.8159)				
35, 36, 37	Joint	Copper				
38, 39	Seal	Graphite				
40	Coupling	Carbon steel (EN-1.1191)				
41	Spring	Stainless steel (EN-1.4310)				
43	Servomotor	—				
44	Flanges	Carbon steel (EN-1.0460)				
DN		15 to 25 (EN, ANSI)				
PN		40				
OPERATING CONDITIONS	PN-40 EN 1092-1	MAXIMUM TEMPERATURE [°C]	40	37,1	33,3	30,4
OPERATING CONDITIONS	150# ASME B16.5	MAXIMUM TEMPERATURE [°C]	RT	100	200	250
OPERATING CONDITIONS	300# ASME B16.5	MAXIMUM TEMPERATURE [°C]	19,2	17,7	13,8	12,1
OPERATING CONDITIONS	300# ASME B16.5	MAXIMUM TEMPERATURE [°C]	50	100	200	250
OPERATING CONDITIONS	300# ASME B16.5	MAXIMUM TEMPERATURE [°C]	40	37,4	33,6	30,7
OPERATING CONDITIONS	300# ASME B16.5	MAXIMUM TEMPERATURE [°C]	50	100	200	250



**Operation**

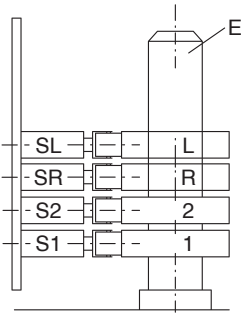
The EC-2 conductivity electrode with 4-20mA output has to be connected to a controller/PLC to control the salt purge valve. The control system shall operate: If the previously selected permissible conductivity value is exceeded, the control acts on the servo motor by opening the continuous purge valve to the OPEN position.

By decreasing the conductivity, the control acts up to the SERVICE position, achieving a continuous and economical desalination. If the conductivity continues to decrease, the valve will switch to the SHUT-OFF position. The positions of the servo motor are fixed by the end-of-stroke micro-switches.

#### Adjustment of micro limit switches

The micro limit switches come ready adjusted from the factory:

Using an screwdriver the positions of the micro switch can be readjusted. Turning the right to left decreases the purge position and turning it the left to right increases it.



Micro switch position	Position of the lever on the indicator plate
SL (OPEN)	100°
SR (CLOSED)	0°
S1 (SERVICE)	8°

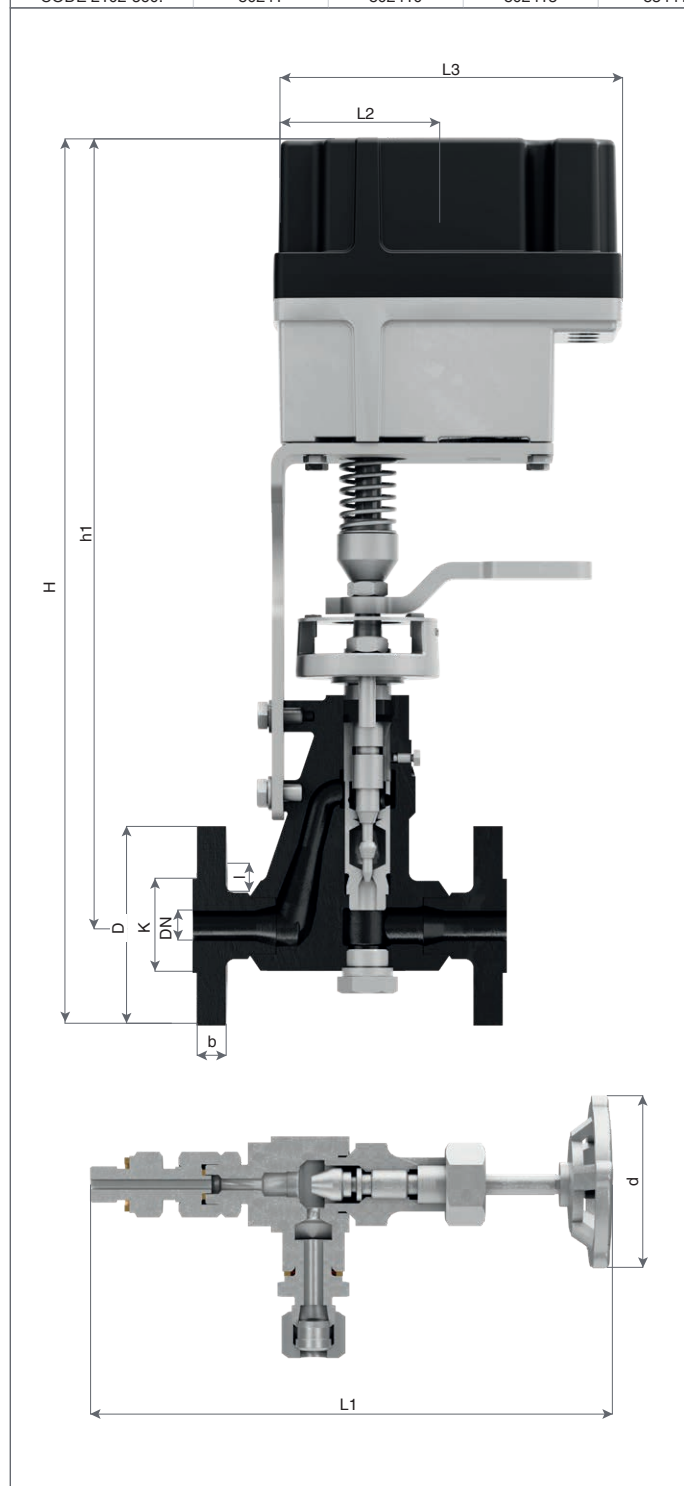
#### Manual or automatic operation

- To operate the valve manually:**
1. Disconnect the electrical current to the servo.
  2. Mechanically decouple the servo (42)

#### **B** Servomotor

Reversible synchronous motor, power consumption 7 VA.  
 Permanently lubricated gearing.  
 Voltage: 230 VAC ±10%, 50/60 H2 ±5%.  
 Switched limit microswitches: 6  
 Adjustment time: 60s / 90°.  
 Torque: Max. load: 15 Nm  
 Ambient temperature: 60 °C  
 Protection: IP65

DN	15			20			25		
CONNECTIONS	I- Flange PN-40 EN 1092-1								
	II- Flanges class 150 lbs ASME/ANSI B 16.5								
	III- Flanges class 300 lbs ASME/ANSI B 16.5								
	I	II	III	I	II	III	I	II	III
H [mm.]	419	416	419	424	421	429	429	426	434
h1 [mm.]	371			371			371		
L [mm.]	150			150			160		
L1 [mm.]	167			167			167		
L2 [mm.]	85			85			85		
L3 [mm.]	175			175			175		
d [mm.]	60			60			60		
D [mm.]	95	90	95	105	100	115	115	110	125
K [mm.]	65,00	60,30	66,70	75,00	69,90	82,60	85,00	79,40	88,90
I [mm.]	14,00	15,90	15,90	14,00	15,90	19,10	14,00	15,90	19,10
b [mm.]	16,00	11,20	14,30	18,00	12,70	15,90	18,00	14,30	17,50
DRILLS N°.	4			4			4		
WEIGHT [kgs.]	7,20	6,45	6,91	7,60	6,85	7,67	8,16	7,48	8,45
CODE 2102-560.	80241	802410	802413	83441	834410	834413	81041	810410	810413



## Operation, efficiency and emptying

To establish the boiler's salinity, the quantity of salts extracted per unit of time must be equal to that of the water supply in this same period.

Can be expressed as:  $S \cdot A = C \cdot P$

R = Real steam production of the boiler (kg/h)

A = Feed water (kg/h)

P = Amount of water extracted in the bleeding process (kg/h)

S = Conductivity of the water supply (μS/cm)

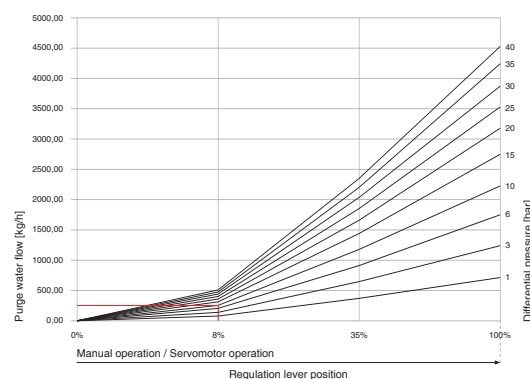
C = Desired conductivity inside the boiler (μS/cm)

The effect is achieved when the salts are removed continuously and without movement in order to prevent uncontrolled water losses from the boiler.

The amount of water extracted in the bleeding process:  $P = \frac{R \cdot S}{C \cdot S}$

By means of the graduated scale, the lever allows the exact adjustment of the dosing nozzle. The lever is set to the position that allows a flow rate (P) to be discharged at a differential pressure. Differential pressure = Working pressure - (Back pressure + Pressure drop).

Automatic continuous blowdown (servo driven) is achieved with setting values from 0 to 100. Position 100, with manual and automatic actuation, corresponds to the fully open nozzle section and enables a complete blowdown in a short time.

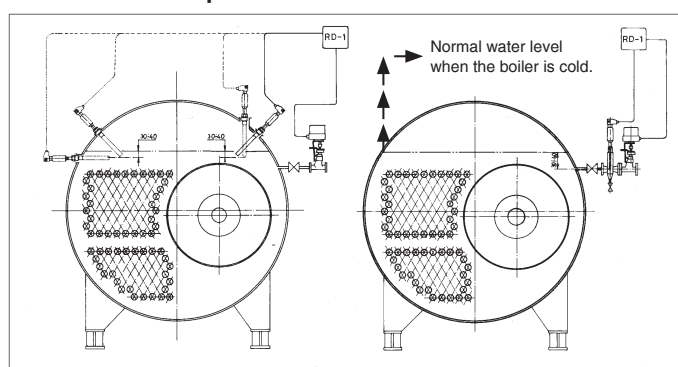


Example:

$$\Delta p = 10 \text{ bar} \cdot R = 1850 \text{ kg/h} \cdot S = 800 \text{ μS/cm} \cdot C = 6200 \text{ μS/cm} \cdot P = 274 \text{ kg/h}$$

Of which approximately 10% by means of sludge and sludge purge (Mod. 660, 660-A or 460) and the rest by means of salt purge (Mod 560 or 560-A). Water to be evacuated through the valve continuous salt drain valve ~ 250 kg/h.

## Installation examples



The combination of the Continuous desalting valve\* and the Blowdown valve for bleeding dirt and sludge\* is essential for optimizing the boiler's efficiency, and include its maximum security and availability. Neither of them can be replaced with others not designed for this specific application. Their moderate cost is depreciated in the short term.  
\* (See brochure Model 560-A). \* (See brochure Model 660, 660-A, and 460).



# Conductivity electrode. EC-2



Connection: Whitworth gas tight cylindrical male thread ISO 228/1 (DIN-259) 1".  
NPT thread ANSI-B2.1 by adapter .1" H-GAS at 1" or 1 1/4" M-NPT.  
Maximum service temperature: 238°C.  
Maximum service pressure: 32 bar.  
Protection: IP-65.

### Application:

The VYC electrode mod.EC2 measures the conductivity of the water, where it allows the operation for a permanent measurement and monitoring control, applicable:

- For a regulation in steam boilers by means of a salt purge valve and valve actuation controller.
- Control in hot water boilers.
- Condensate return control.
- Conductivity control applications for high temperatures and pressures.

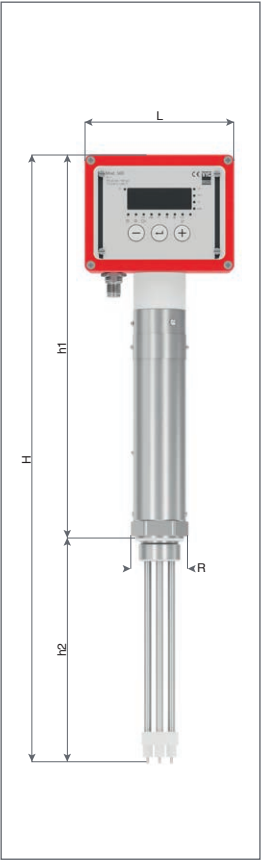
With improved functional performance, the EC-2 electrodes have been manufactured with the highest quality materials for very demanding applications. Each electrode has been tested to determine its unique functionality. The transmitter measures the conductivity of the water using four electrodes and a temperature probe, displaying the temperature-compensated water conductivity value, and transforms the information into a proportional 4/20mA output signal with RS-485 communication.

For correct operation, water quality requirements must be met, in accordance with EN boiler standards and TRD technical regulations.

Its operation must be within the operating limits of conductivity, pressure and temperature, according to the technical specifications of the equipment.

### Electrode connection collector

Nominal pressure: PN-40.  
Permissible pressures and temperatures according to DIN-2401.  
Sheet 2.  
Flange connection: DN-15, 20 and 25 (EN-1092-1).  
Electrode connection: Female thread Gas Whitworth cylindrical ISO 228/1 (DIN-259) 1".

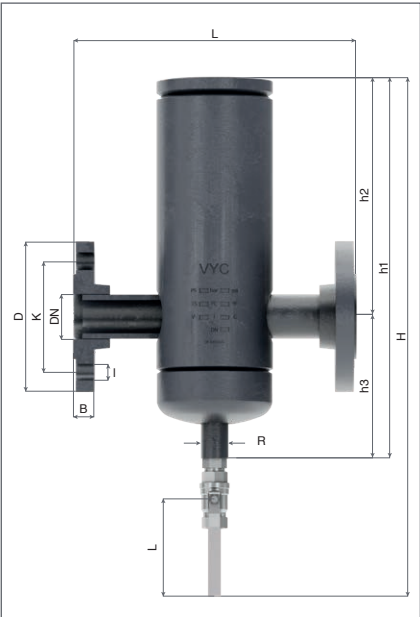


R	1"	1"	1"	1"	1"	1"	1"
h2	180*	300	380	500	600	800	1000
h1	307	307	307	307	307	307	307
H	487	607	687	807	907	1107	1307
L	120	120	120	120	120	120	120
WEIGHT [kg.]	2,00	2,10	2,20	2,30	2,40	2,50	2,60
CODE 2102-560.	7103	7104	7105	7106	7107	7108	7109



## Collector

Only EC-2 of h2 = 180 mm can be applied.



DN	15			20			25		
CONNECTIONS	I - Flanges PN-40 EN-1092-1 II - Flanges class 150 lbs ASME/ANSI B.16.5 III - Flanges class 300 lbs ASME/ANSI B.16.5								
	I	II	III	I	II	III	I	II	III
H	407			407			407		
h1	279			279			279		
h2	180			180			180		
h3	99			99			99		
L	165			190			216		
R1	1/2"			1/2"			1/2"		
L1	100			100			100		
D	95			105			115		
K	65			75			85		
I	14			14			14		
B	18			18			18		
DRILLS N°	4			4			4		
WEIGHT [kg.]	4,16			4,50			4,78		
CODE 2102-560.	802421	802422	802423	834421	834422	834423	810421	810422	810423

We recommend adding a blowoff valve to the equipment, Mod. 999, 1/2" joined to the waste pipe for periodic release of sludge. As a minimum a 2 ÷ 3 second release must be performed every 8 hours.