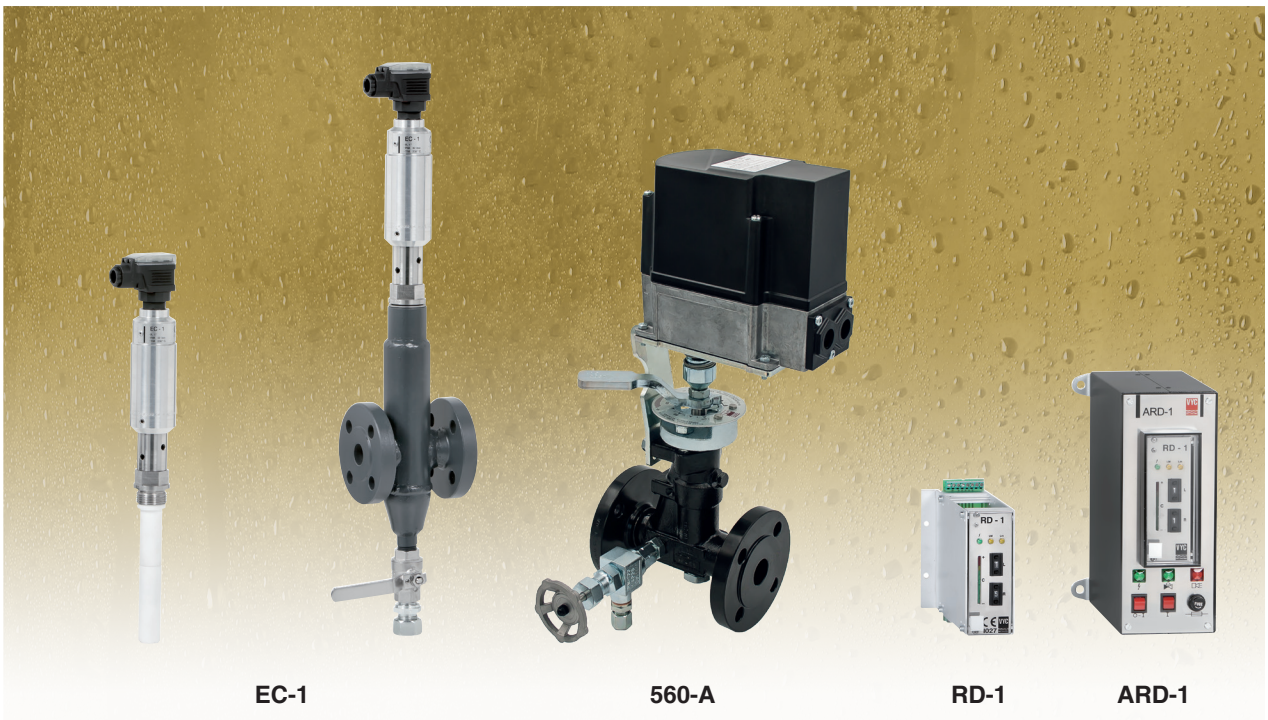
Automatic continuous desalting valve

For steam boilers **Model 560 - A**

EN ASME/ANSI



EC-1 **560-A** **RD-1** **ARD-1**

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 considerable energy savings

Conforms to the low voltage directive 73/23/CE version 93/68/CE.
According to the electromagnetic compatibility directive 89/336/CE version 93/68/CE.

Specifications

— The unit consists of a Continuous desalting valve with servomotor, a Conductivity electrode EC-1 and Desalting controller RD-1 with or without assembly cupboard.

A Continuous desalting valve with servomotor

1 Faucet for taking samples: Makes process of analysing the salt concentration of boiler water easier. Possibility of guided connection for pipes with a Ø of 6/8 mm.

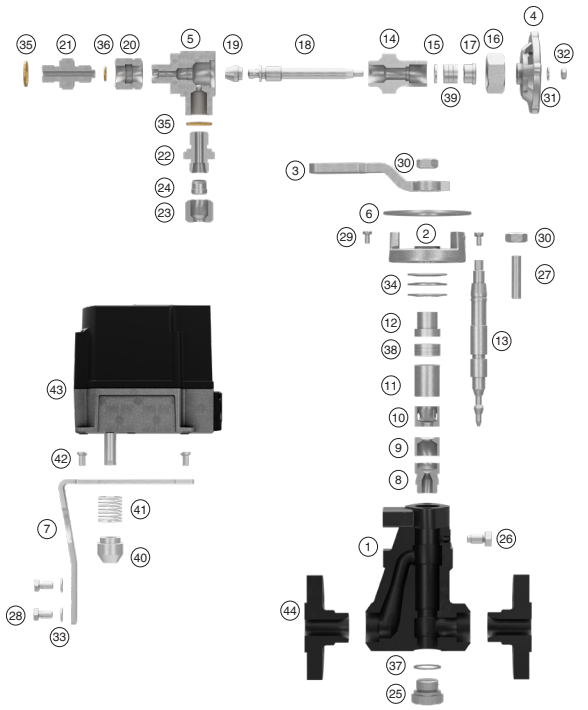
2 Reader plate: Allows bleeding positions to be seen clearly and concisely, even from some distance away.

3 Plug for draining the measuring nozzle.

4 Measuring nozzle: Acts as a valve, measuring and control organ. The water under pressure expands silently and gradually into it. Thus, dirt, incrustations and salt deposits are removed. Due to this gradual expansion, the system does not suffer erosion.

5 Servomotor mounted on the valve on an angle mounting. A synchronised reversable motor is used as a transmission element. Via gearing it adjusts the position of the regulation lever.

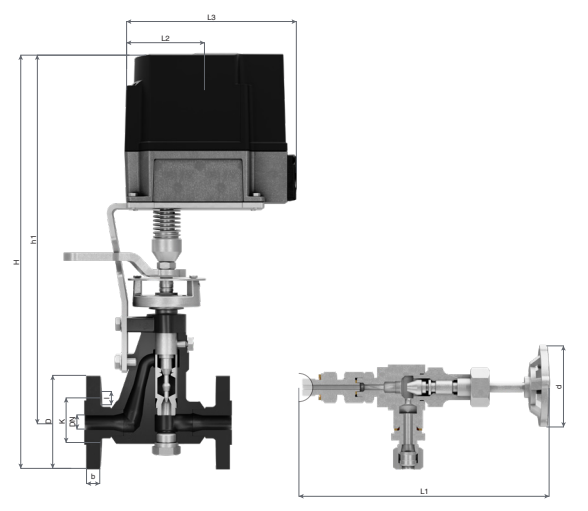
SECCIÓN DE CORTE A-A



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	PRESSURE IN bar	40	37,1	33,3	30,4
	MAXIMUM TEMPERATURE IN °C	RT	100	200	250
OPERATING CONDITIONS 150# ASME B16.5	PRESSURE IN bar	19,2	17,7	13,8	12,1
	MAXIMUM TEMPERATURE IN °C	50	100	200	250
OPERATING CONDITIONS 300# ASME B16.5	PRESSURE IN bar	40	37,4	33,6	30,7
	MAXIMUM TEMPERATURE IN °C	50	100	200	250

RT: Room teperature (-10°C to 50°C)



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	419	416	419	424	421	429	429	426	434
h1	371			371			371		
L	150			150			160		
L1	167			167			167		
L2	85			85			85		
L3	175			175			175		
d	60			60			60		
D	95	90	95	105	100	115	115	110	125
K	65,00	60,30	66,70	75,00	69,90	82,60	85,00	79,40	88,90
I	14,00	15,90	15,90	14,00	15,90	19,10	14,00	15,90	19,10
b	16,00	11,20	14,30	18,00	12,70	15,90	18,00	14,30	17,50
DRILLS N°.	4			4			4		
WEIGHT IN 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

If the accepted conductivity value previously selected is exceeded the desalting controller RD-1, via indication from the conductivity electrode EC-1, operates the servomotor and opens the continuous desalting valve to the **OPEN** position. When the conductivity decreases the adjustment mechanism returns to the **SERVICE** position giving continuous economical desalting. When the "valve closed" switch is on the adjustment mechanism automatically puts the valve in the **CLOSED** position. These positions are fixed by the micro limit 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.

(3) Orange
(2) Blue
(1) Red

Micro switch Position	Position of the lever on the indicator plate
(1) OPEN	35°
(2) CLOSED	0°
(3) SERVICE	8°

Manual or automatic operation

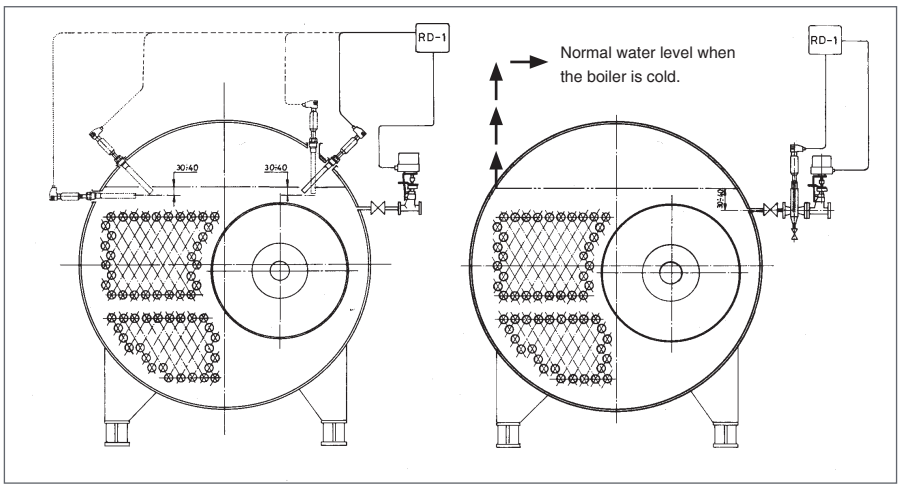
To operate the valve manually:
1.Disconnect the electrical current to the servo. Open the servomotor cover and remove the x1 connector.
2. Press coupling pin K1 (see page 3 Fig. 1 Mod. 560 Complementary technical instructions).
3. Move the adjustment lever to the desired position and release bolt K1.
4. Cover the cover.

Restoring automatic operation:
1. Place the regulating lever in the position between 0° and 35° on the nameplate of the valve using the bolt K1 (see page 3 Fig.1 Mod. 560 Complementary technical instructions).
2. Connect actuator connector X1.
3. Cover the cover.
4. Switch on power.

B Servomotor

Reversible Synchronous Motor, 10 VA Consumption.
Gearbox with permanent lubrication.
Voltage: 220 V CA -15% / +10%, 50…60 Hz ±6%
Communted micro limit switches: 6
Adjustment time: 65 s / 90°
Cell: Maximum load: 18 Nm
Ambient temperature: 60 °C
Protection: IP-66

Installation examples



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.

Lo que se puede expresar: $S \cdot A = C \cdot P$

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: $P = \frac{R \cdot S}{C - S}$

Using the calibrated scale, the lever allows exact adjustment of the measuring nozzle.
We shall set the lever at the position that allows us to remove a volume of water (P) at a differential pressure. Differential pressure = Working pressure - (Back pressure + Load losses).

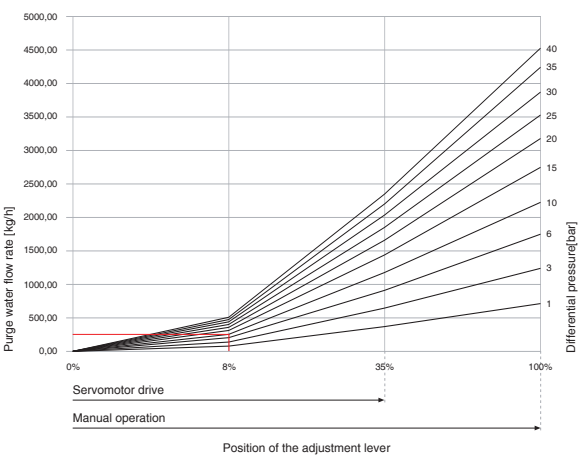
Automatic continuous purge (servo-driven) is achieved with setting values from 0 to 35.

Position 100, with manual actuation, corresponds to the fully open nozzle section and allows a complete purge in a short time. In this case, the flow rate is approximately twice as high as that of the 35% value on the scale.

Example:

Δp = 10 bar
R = 1850 kg/h
S = 800 µS/cm
C = 6200 µS/cm
P = 274 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.

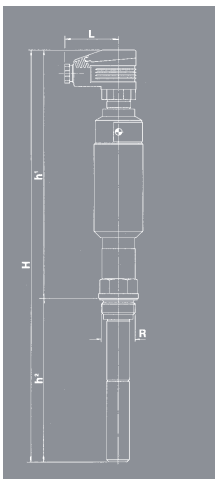


The combination of the Continuous desalting valve* and the Blowdown valve for bleeding dirt and sludge• is essential for optimizing the boiler's efficiency, and include its maximum security and availability. Neither of them can be replaced with others not designed for this specific application. Their moderate cost is depreciated in the short term.

* (See brochure Model 560-A).
• (See brochure Model 660, 660-A, and 460).

Conductivity electrode. EC-1

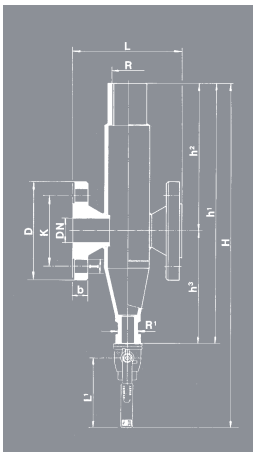
Connection: Whitworth gas-tight cylindrical male thread ISO 228/1 (DIN-259) 1".
NPT thread ANSI-B2.1 via adapter. 1" F-GAS to 1" or 11/4" M-NPT.
Maximum operating temperature: 238°C.
Maximum operating pressure: 32 bar.
Protection: IP-65.



R	1"
H	419
h1	252
h2	167
L	53
WEIGHT IN kgs.	0,97
CODE	2102-560.7102

Electrode connection collector
Nominal pressure: PN-40.
Allowable pressures and temperatures according to DIN-2401. Sheet 2.
Flange connection: DN-20 (EN-1092-1).
Electrode connection: Whitworth gas-tight cylindrical female thread ISO 228/1 (DIN-259) 1".

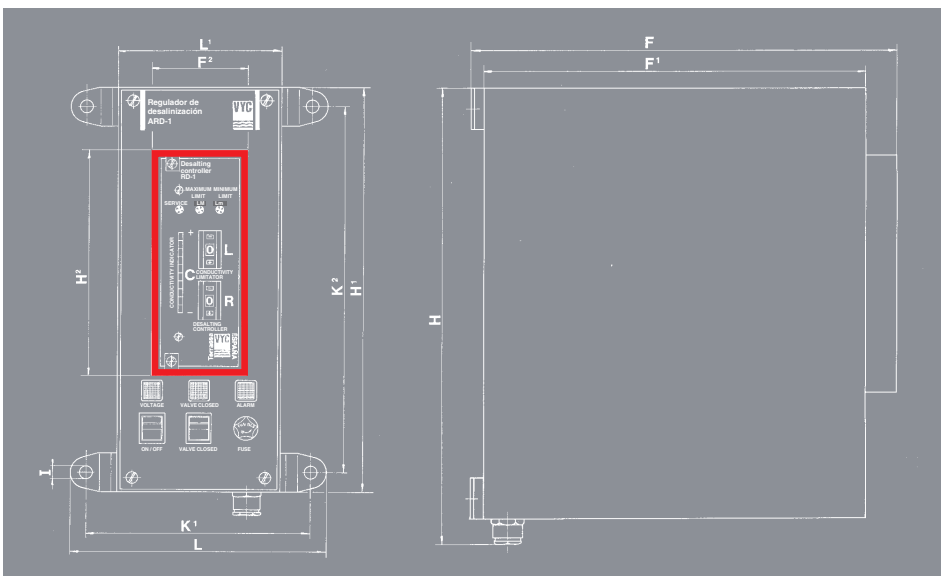
DN	20
R	1"
H	390
h1	267
h2	157
h3	110
L	115
R1	1/2"
L1	100
D	105
K	75
l	14
b	18
DRILLS N°.	4
WEIGHT IN kgs.	3,33
CODE	2102-560.83442



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.

Desalting controller. ARD-1. RD-1

Voltage: 220 V.A.C. ± 10% 50/60 Hz.
Electric consumption: Approximately 4,5 VA.
Relay contact: 250 V/4 A 750 VA.
Safety contact: Maximum 2A-Mitteltraeg.
Ambient temperature: -20 to + 70°C.
Regulator protection: IP - 00.
Regulator protection in assembly cupboard: IP - 50.
Regulation index: 2,5 to 20 mS.
Limit index: 40 to 75 mS.
▭ Desalting controller with assembly cupboard ARD-1.
— Desalting controller without assembly cupboard RD-1.



MODEL	ARD-1	RD-1
H	265	—
H^1	250	—
H^2	—	137
F	245	—
F^1	220	—
F^2	—	57
L	158	—
L^1	100	—
K^1	138	—
K^2	226	—
I	7,5	—
WEIGHT IN kgs.	2,50	0,93
CODE 2102-560.	0001	0002

The desalting controller without assembly cupboard RD-1 is supplied in a 19" sub-rack according to DIN-41494.

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