



DA Series Variable Area Desuperheaters

Desuperheater overview

Spirax Sarco direct contact desuperheaters reduce the temperature of superheated steam to produce steam temperatures approaching saturation temperature. Spray water is injected directly into the steam, flashing into vapour by absorbing heat from the steam. The DA series desuperheater is designed to precisely and economically control the downstream steam temperature by injecting cooling water directly into the superheated steam flow. It consists of a single actuator and a spray control valve integrated into a single unit.

Typical applications:

- High turndown applications that are beyond the scope of fixed area desuperheaters.
- To safely reduce the steam temperature to allow the operation of downstream process equipment designed for lower temperatures, maintaining a constant temperature for processes precise temperature control
- To reduce the temperature of steam discharge from turbine by-pass systems on power plants for heat exchanges, dump stations etc.
- To improve heat transfer of indirect contact heat exchangers- shell and tube, plate type, reactor heating jackets, etc.

Features:

- Easy installation
- Low maintenance
- Robust design
- Wide Cv range
- Minimal steam pressure drop
- Rapid evaporation to minimise over spray
- Flexible design options

Standard and approvals

- Pressure rating and connections according to ASME B 16.34 and ASME B16.5.
- This product fully complies with the requirements of the Pressure Equipment Directive (PED) and carries the **CE** mark when so required.
- Welding is in accordance with ASME IX.
- Connections (ASME B16.5) are sized to suit the process conditions.
- Standard ASTM materials of construction include: carbon steel, stainless steel and chrome molybdenum steel. Special materials are available on request.

Documentation and certification:

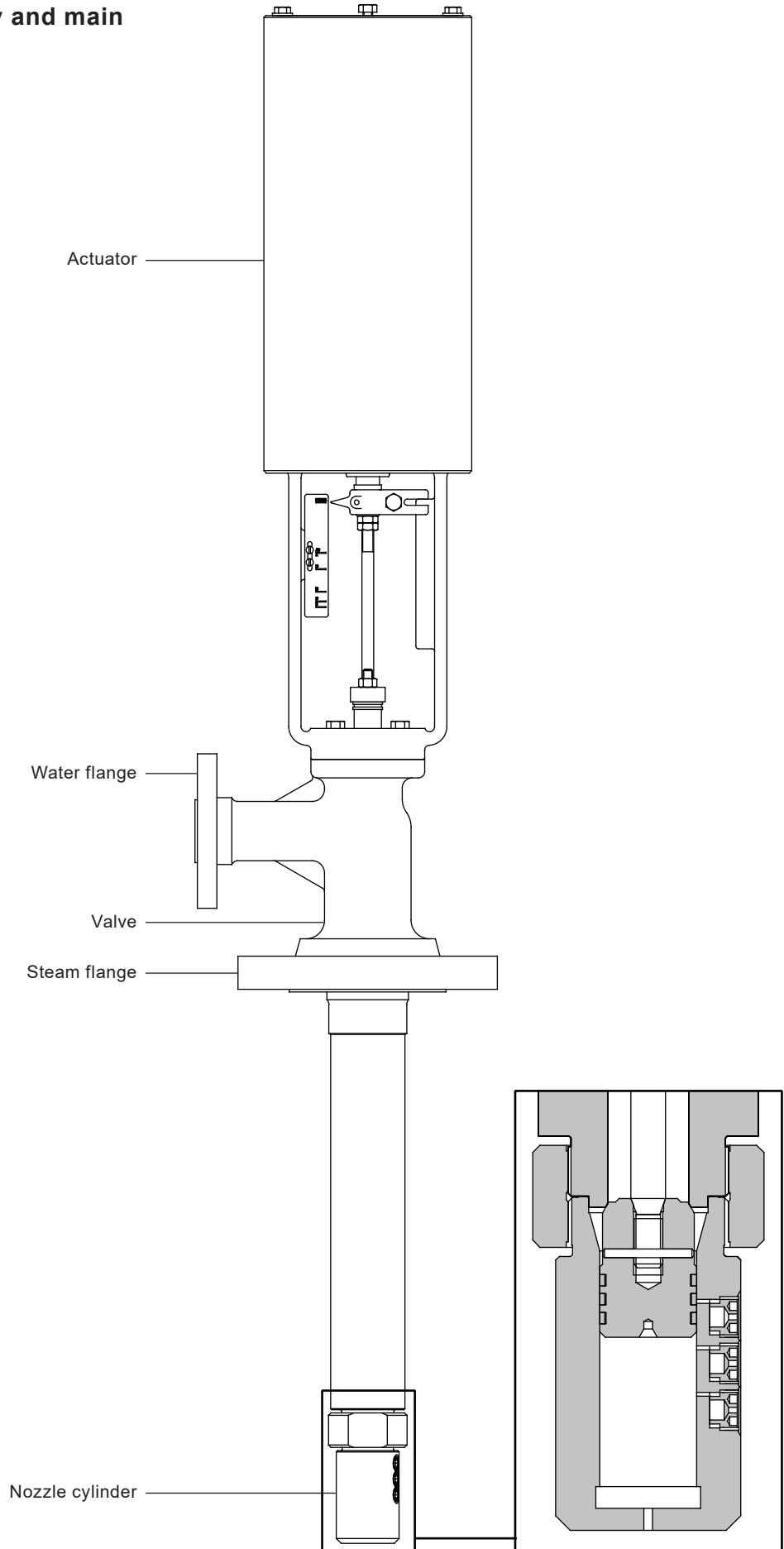
Each Spirax Sarco DA will be supplied with the following documentation & certification pack:

- Material traceability certificates to EN 10204 3.1 for body assembly, plug, stem, and nozzles
- Quality certificate indicating hydrostatic test and seat leakage test results
- Warranty terms & conditions

NDT reports are available on request



Standard scope of supply and main component identification

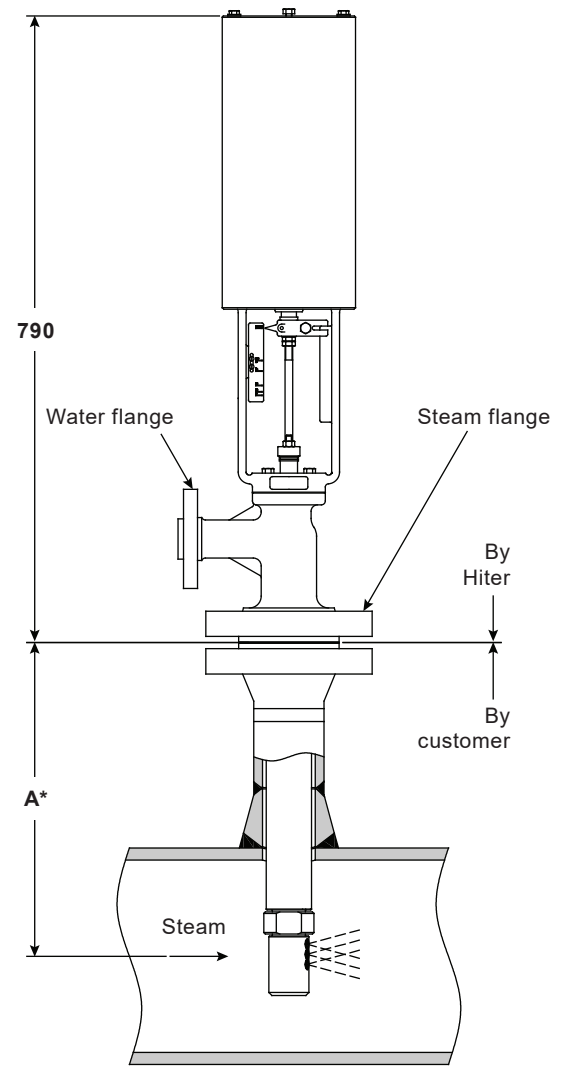
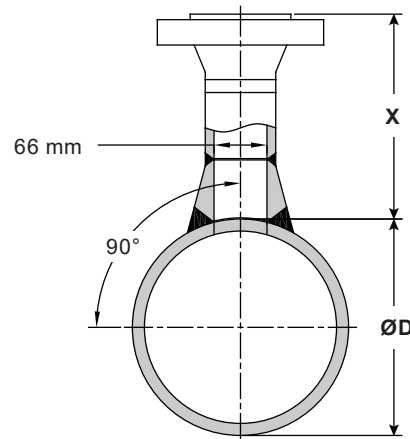


Technical specification

Diameters	1"	Water connection										
	3"	Steam connection										
End connections	FR	Raised face										
	RTJ	Ring Type Seal (RTJ end flanges option available only for 600 class at additional cost)										
Pressure rating/temperature	ASME B16.34 – Class 150, 300, 600											
Steam pipe diameter	6" to 24"											
Maximum turndown	15:1											
Leakage classification	Class IV											
Differential pressure between water and steam	3.5 bar (50.76 psi) (minimum)											
	75 bar (1087.78 psi) (maximum)											
Maximum allow water pressure	95 bar (1377.86 psi)											
Minimum recommended water temperature	50 °C (122 °F)											
Maximum recommended water temperature	180 °C (356 °F)											
	Up to 232 °C (449.6 °F) without the need of steam thermal sleeve											
Differential temperature between water and steam	Above 232 °C (449.6 °F) we recommend the use of steam thermal sleeve ¹											
	¹ Optional, upon request.											
Body materials	Material	Maximum temperature	ASME Class rating	Maximum allowable pressure								
				WCB	425 °C (797.0 °F)	CL150	19.6 bar g (284.27 psi g)					
						CL300	51.1 bar g (741.14 psi g)					
	CL600	102.1 bar g (1480.83 psi g)										
	WC9	538 °C (1000.4 °F)	CL150	19.8 bar g (287.17 psi g)								
			CL300	51.7 bar g (749.84 psi g)								
			CL600	103.4 bar g (1499.69 psi g)								
	CF8M	538 °C (1000.4 °F)	CL150	19 bar g (275.57 psi g)								
			CL300	49.6 bar g (719.38 psi g)								
CL600			99.3 bar g (1440.22 psi g)									
Trim materials³	Plug	Seat	Gasket	Cylinder (Nozzles)	Nozzles	Temperature						
	Inox 410	Stellite	Inconel	Inox 410	Inox 416	538 °C (1000.4 °F)						
³ Special materials upon request.												
Flow coefficient - Cv	Nozzle	6A	6A1	9A1	6B	9B	6C	6D	3C6D	6E	3C6E	9E
	Cv	0.19	0.30	0.45	0.80	1.20	2.10	3.18	4.00	5.40	6.2	8.10
Actuator	Supplied as standard with a pneumatic spring return actuator that closes the water supply in the event of pneumatic of control signal failure. An optional hand wheel (mechanical override) actuator is available upon request. Electric actuators can also be supplied upon request.											
Actuator temperature range	-10 °C to +80 °C (14 °F to 176 °F)											
Actuator maximum pressure	6.21 bar (90 psi)											
Actuator spring range	2.07 bar to 3.45 bar (30 psi to 50 psi)											

Sizes (mm)

Nozzle	A (Central line insertion distance)	Total insertion distance
6A	395	445
6A1		
9A1		
6B	402	457
9B		
6C	411	477
6D	415	485
3C6D		
6E	417	489
3C6E		
9E		



A* = Approximate distance to steam pipe centre

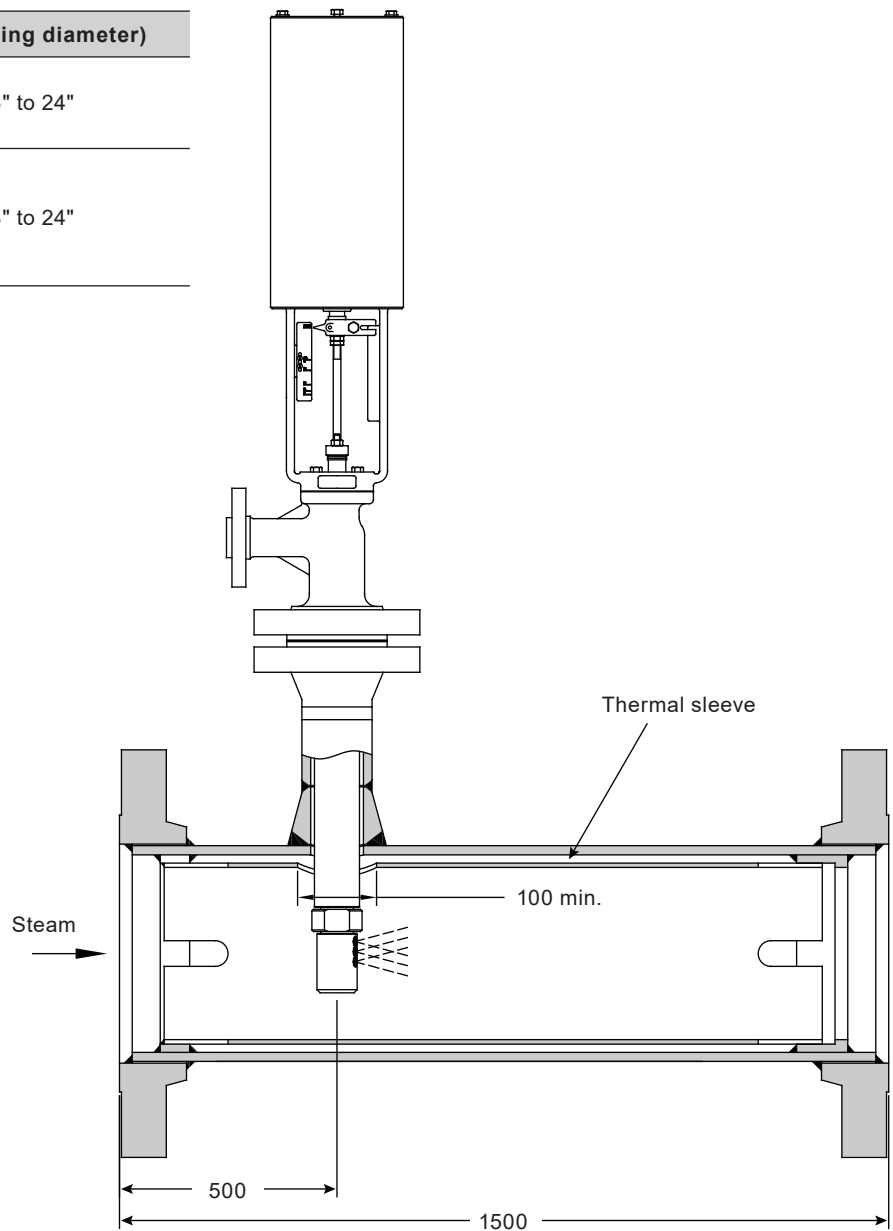
Branch height X calculation

$$X = A - \frac{\text{ØD}^*}{2}$$

*Note: For pipes over 24". X = 83 mm (3 ¼ ")

Typical installation (mm)

Nozzle	ØD (Piping diameter)
6A/6A1/9A1	6" to 24"
6B/9B	
6C	8" to 24"
6D/3C6D	
6E/3C6E/9E	



Pneumatic supply

The maximum allowable pressure of the actuator is 6.21 bar g (90 psi g). Higher pressures must be regulated in accordance with this limitation. The DA position should be controlled by a positioner. In the event of a pneumatic or signal failure, the actuator will fail to a position that closes the water supply to the steam.

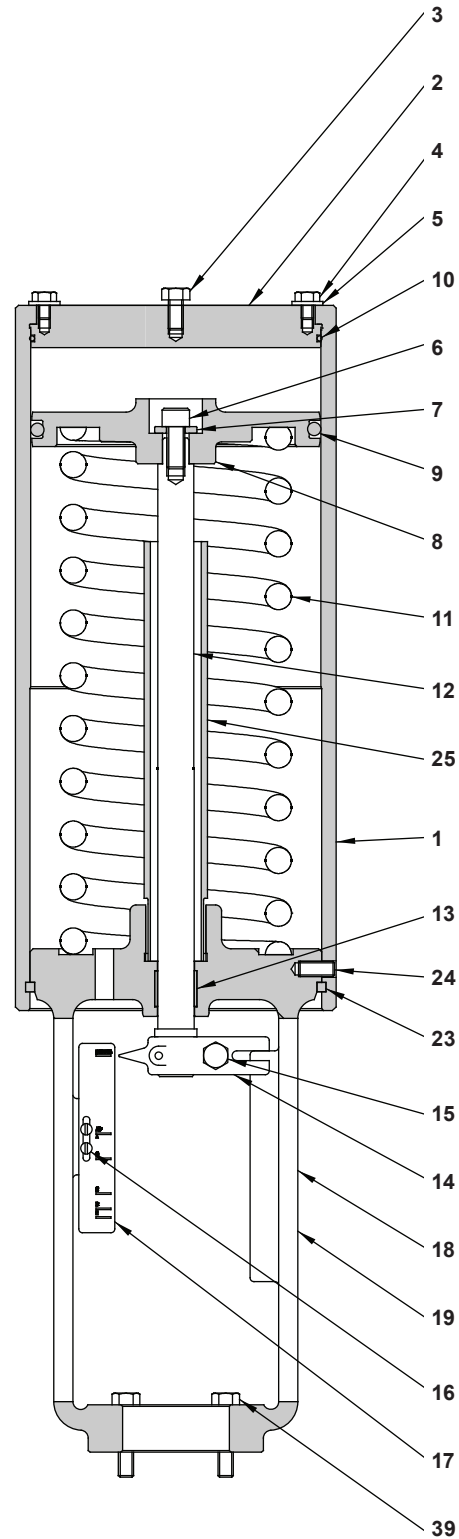
Positioners

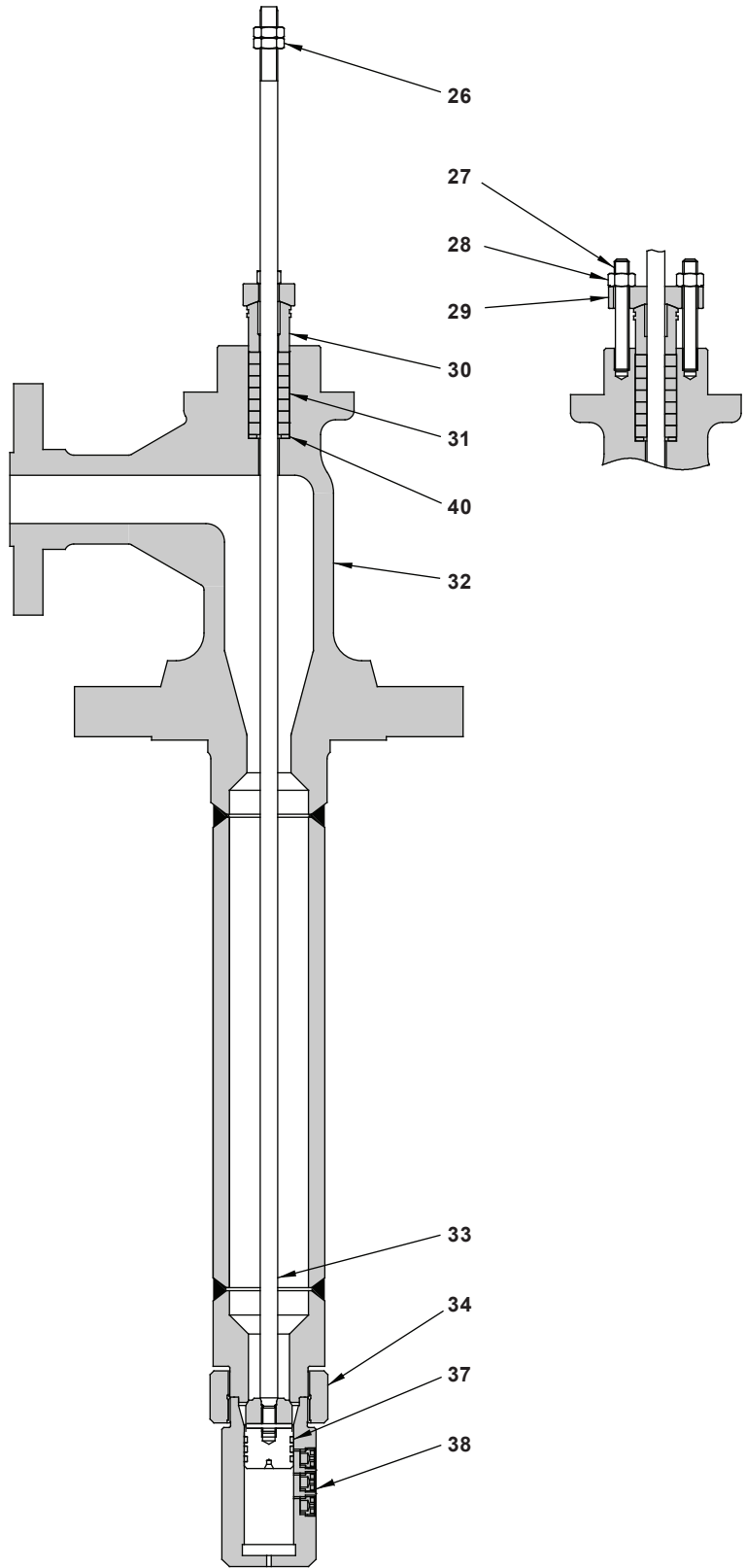
Positioners are available upon request.

Actuator parts list

Item	Description
1	Cylinder
2	Cover
3	Blanking bolt (Thread 5/16/18 UNC)
4	Bolt (cover)
5	Washer (cover)
6	Bolt (piston)
7	Washer (piston)
8	Piston
9*	'O' ring (piston)
10*	'O' ring (cover)
11	Spring
12	Stem
13	Bushing guide
14	Stroke indicator
15	Bolt (stroke indicator)
16	Screw (stroke nameplate)
17	Stroke nameplate
18	Nameplate
19	Yoke
23*	Split ring
24	Screw lock (cylinder)
25	Stroke limiter
39	Bolt (yoke)

* Recommended spare parts (see page 9)





Valve parts list

Item	Description
26	Nut (stem)
27	Bolt (packing)
28	Nut (packing)
29	Packing flange
30	Packing follower
31*	Packing
32	Body assembly
33*	Plug/stem assembly
34	Sleeve
37*	Sealing ring
38	Cylinder/nozzle assembly
40	Retainer ring

* Recommended spare parts (see page 9)

How to order

Product	DA					DA	
Nominal diameter	3					3	
Nozzle and stroke (mm)	Code	Nozzle		Stroke (mm)		6A1	
	6A	² Cv = 0.19		40.90			
	6A1	² Cv = 0.30		40.90			
	9A1	² Cv = 0.45		40.90			
	6B	² Cv = 0.80		54.10			
	9B	² Cv = 1.20		54.10			
	6C	³ Cv = 2.10		72.40			
	6D	³ Cv = 3.18		80.30			
	3C6D	³ Cv = 4.00		80.30			
	6E	³ Cv = 5.40		84.80			
	3C6E	³ Cv = 6.20		84.80			
	9E	³ Cv = 8.10		84.80			
Class (Steam and Water) and Standard	Code	Class (Steam and Water)		Standard		150	
	150	150		ASME B16.5			
	300	300		ASME B16.5			
	600	600		ASME B16.5			
Steam connection	Code	Steam end flange		Standard		FR	
	FR	Raised face		ASME B16.5			
	¹ RTJ	Ring joint face		ASME B16.5			
Water connection	Code	Water end flange		Standard		FR	
	FR	Raised face		ASME B16.5			
	¹ RTJ	Ring joint face		ASME B16.5			
Body material	Code	Body material				WC9	
	WCB	ASME SA-216 Gr. WCB					
	WC9	ASME SA-217 Gr. WC9					
	CF8M	ASME SA-351 Gr. CF8M					
Flange	SOL		Integral			SOL	
Trim material and temperature	Code	Trim material			Temperature		1
		Stem	Plug	Seal Ring	Min.	Max.	
	1	SS 316	SS 410	Inconel	0 °C (32 °F)	538 °C (1000.4 °F)	
Actuator	Code	Actuator				0	
	0	Pneumatic actuator with spring return					
	3	Pneumatic actuator with spring return and handwheel (available on request)					
Spring range and differential pressure	Code	Spring range		Maximum differential pressure		C	
	C	2.07 bar to 3.45 bar (30 psi to 50 psi)		75 bar (1087.78 psi)			

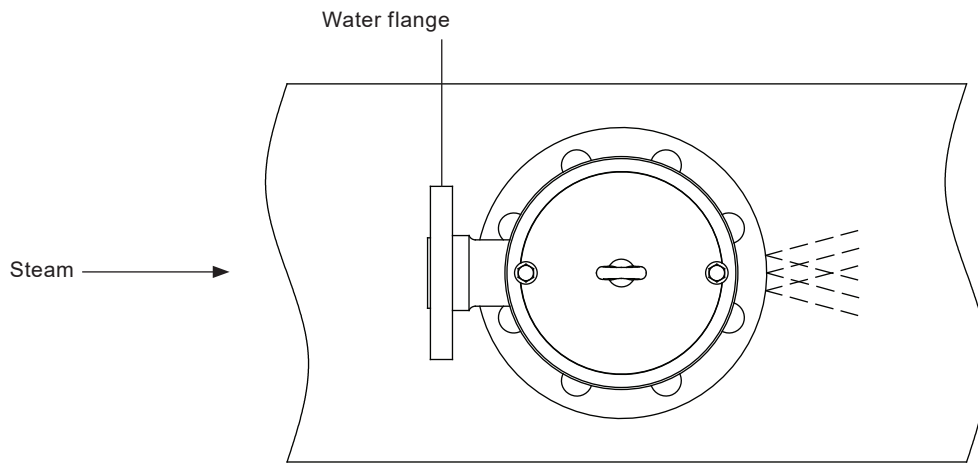
Notes:

¹ RTJ end flanges available on request, only for 600 class

² Steam pipe: 6" (minimum) / 24" (maximum)

³ Steam Pipe: 8" (minimum) / 24" (maximum)

Water connection



Standard assembly position

Ordering example:	DA	3	6A1	150	FR	FR	WC9	SOL	1	0	C
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Desuperheater DA 3 inch nominal diameter with a Cv = 0.30, Stroke = 40.9 mm, Steam and water class of 150, flanged connections - steam and water, body material ASME SA-217 Gr. WC9, integral flange, standard trim material, pneumatic spring return actuator with standard spring range.

Safety, installation and maintenance Information please refer to the Installation and Maintenance Instructions that are supplied with the product.

Spare parts

Item	Description
9	'O' ring (piston)
10	'O' ring (cover)
13	Bushing guide
23	Split ring
31	Packing
33	Plug/stem assembly
37	Sealing ring

