Mark 93 Series

Sanitary Steam Traps

NEW! Horizontal connections available
(See lay-in dimension changes on pages 7-12)

The Mark 93 is a balanced port, thermostatic steam trap designed specifically for use in validated clean steam systems. The sanitary design follows ASME BPE guidelines including a 20Ra µin finish on all internal wetted parts, self-draining design, and all relevant materials, marking and documentation guidelines.

The MK93 has been specifically designed to provide higher flow rates at low pressures and low subcooling levels. **In lab testing, the MK93 consistently exhibited excellent flow rates at subcooling levels of less than 3°F or less (<1,7°C).** Note: Low subcooling operation insures that condensate won't back up and wet (cool) the upstream validated temperature sensor.

There are two base designs within the MK93 product range: the standard MK93 – good for differential pressures (P1) up to 50 psi (3,4 bar), and the MK93 Option "P" for differential pressures ranging from 45 – 90 psi (3,1 – 6,2 bar). Both designs are rated to 90 psi (6,2 bar) operating pressure but are recommended for use within the specified inlet pressure ratings.

During start-up, the bellows element is contracted and fully open to discharge all non-condensable gas and condensate. The heat of entering steam causes the element to expand, closing the valve. As condensate accumulates in the body, the element cools, causing the bellows/stem tip to retract allowing condensate to drain.

Features

- Fill fluid meets FDA/ICH Q3C/FDA Class 3 criteria designation
- Low subcooling operation reduces probability of temperature validation faults and resultant SIP delays
- CRN Registration Number available
- Thermostatic steam trap in 316L stainless steel that is designed for clean steam tracing, drip-leg and process applications
- All 316L stainless steel housing and internals
- Polished components – body interior and exterior are mechanically polished to 20Ra and 40Ra finish respectively
- Sanitary clamp ends standard, other ends (tube weld, threaded, ISO/DIN) available upon request
- Self draining when installed vertically (outlet side down)
- New design provides excellent flow rates with low subcoolingFDA and USP Class VI TFE-VIT gasket standard on clamped body, or FDA and USP Class o-ring on bolted option
- Option for electropolished body
- Warranties:
  - 5 year material and workmanship
  - 2 year low subcooling performance

Applications

- Typical applications are: sterilization drainage for fermenters, bioreactors, separation and filtration equipment, lyophilizers, autoclaves, process piping equipment and steam barriers
- Condensate drainage from process systems using clean steam – fermenters, bioreactors, SIP systems and sterilizers

STERIFLOW
a division of Jordan Valve

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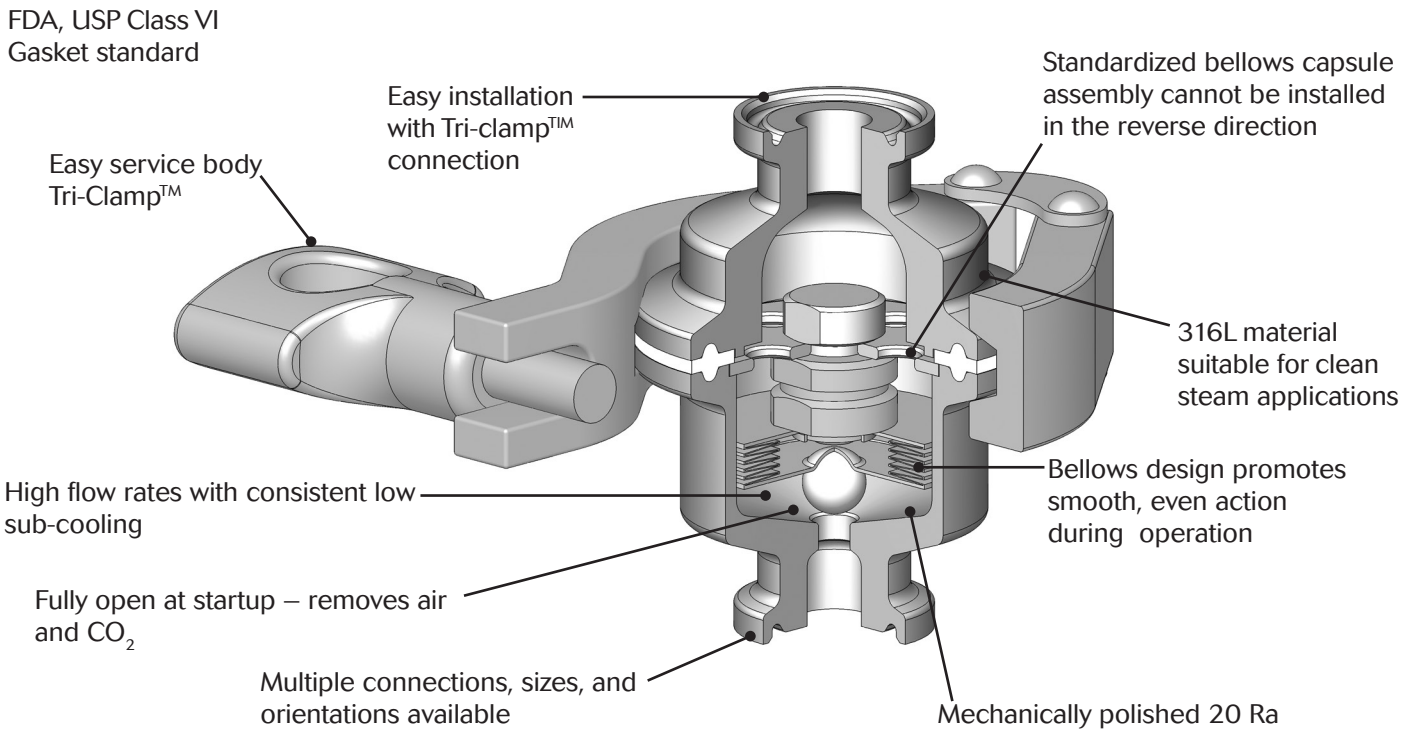
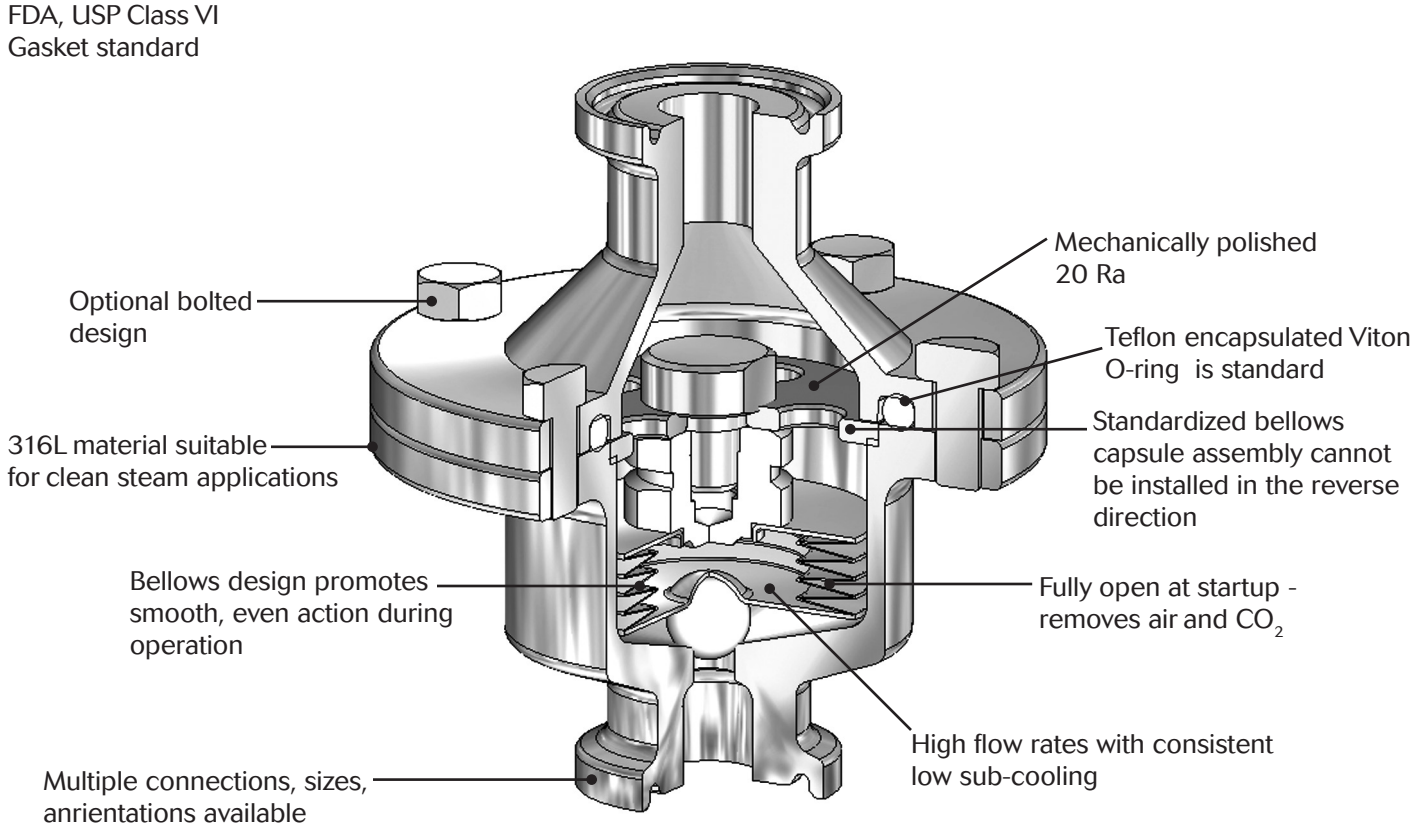
Features & Benefits – MK93 with Tri-Clamp Ends



Features & Benefits – MK93 with Bolted Body with Tri-Clamp Ends



Specifications

Sizes:

- 1/2", 3/4", 1", 1-1/2"
- DIN DN15, DIN DN20, DIN DN25, DIN DN40
- ISO DN15, ISO DN20, ISO DN25, ISO DN40

End Connections

- ASME, DIN/ISO Sanitary Tri-Clamp
- ASME/DIN/ISO Tube Ends

Material

- Body Inlet/Outlet: 316L Stainless Steel
- Thermal Element: 316L Stainless Steel
- Gaskets (Standard): PTFE/Viton - 350°F (177°C) Optional: PTFE/EPDM - 300°F (149°C), Tuf-Steel - 350°F (177°C), Silverback - 350°F (177°C) All gaskets are FDA and USP Class VI approved
- Tri-clamp: 304 SST

Nominal Cv: 3.8

Design Pressure/Temperature Rating

- Maximum Allowable Pressure (PMA): 145 psig (10,0 bar)
- Maximum Allowable Temperature (TMA): 350°F (177°C)

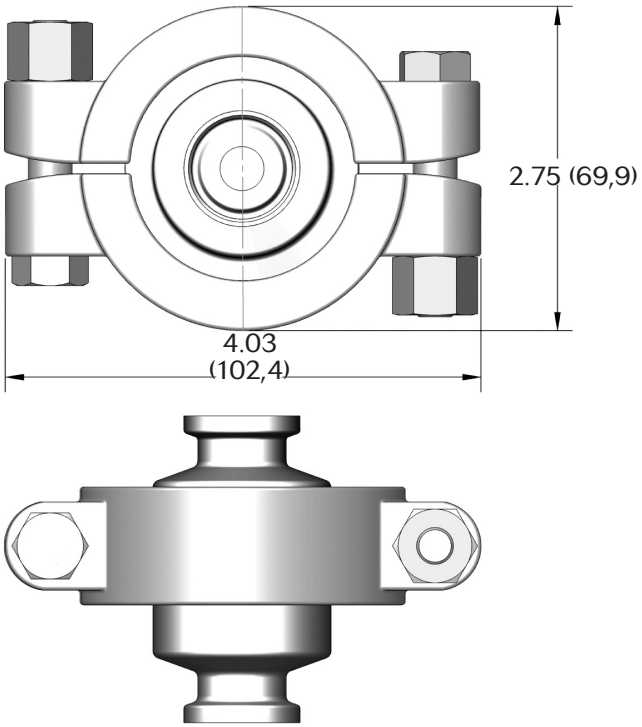
Maximum Recommended Differential Pressure

- MK93: 10 – 50 psi (0,7 – 3,4 bar)
- MK93 Option P: 45 – 90 psi (3,1 – 6,2 bar)

CRN Registration Number: OC12623.5

Dimensions - Vertical Connections

Bolted Tri-Clamp (1/2", 3/4", DN15, DN20)



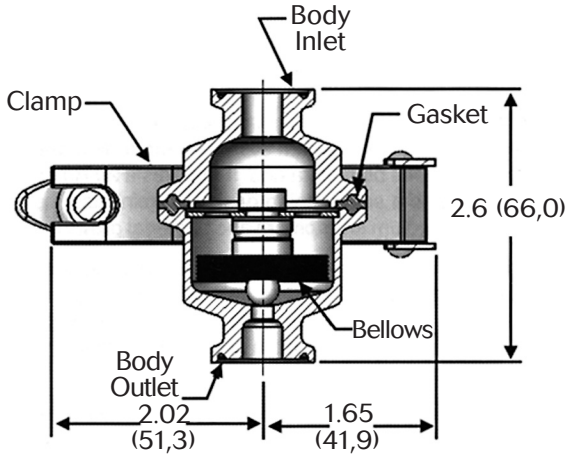
Weight: 1.4 lbs (0,64 kgs)

Flow Capacity Table

Condensate Temp Below Saturation (Subcooled Temp)	Capacity - lbs/hr (kg/hr) @ Differential Pressure - psi (bar)					
	10 (0,69)	20 (1,38)	30 (2,07)	50 (3,45)	75 (5,17)	90 (6,21)
5°F lbs/hr	195 (88,5)	373 (169)	549 (249)	870 (395)	1012 (459)	1165 (528)
10°F lbs/hr	490 (222)	813 (369)	1142 (518)	1715 (778)	2207 (1001)	2437 (1105)
20°F lbs/hr	1127 (511)	1697 (770)	2202 (999)	3074 (1394)	3932 (1784)	4139 (1877)
Cold Water lbs/hr	2580 (1170)	3648 (1655)	4468 (2027)	5768 (2616)	6944 (3150)	7504 (3404)

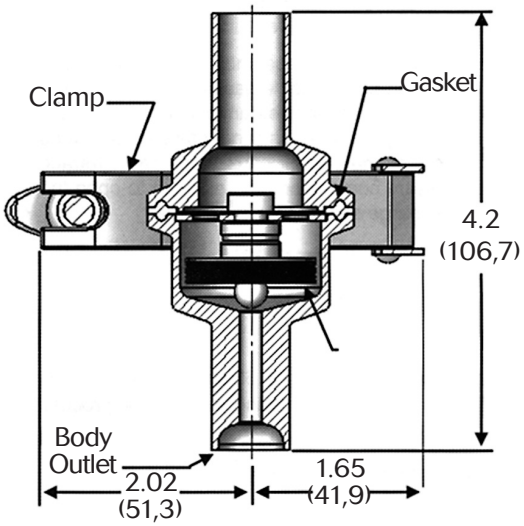
Dimensions - Vertical Connections

Tri-Clamp Ends (1/2", 3/4", DN15, DN20)



Weight: 1.3 lbs (0,59 kgs)

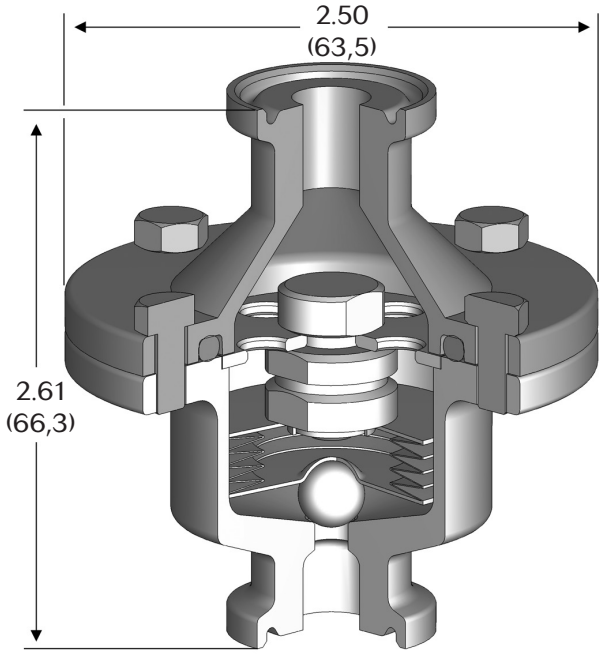
Tube Weld Ends (1/2", 3/4", DN15, DN20)



Weight: 1.5 lbs (0,68 kgs)

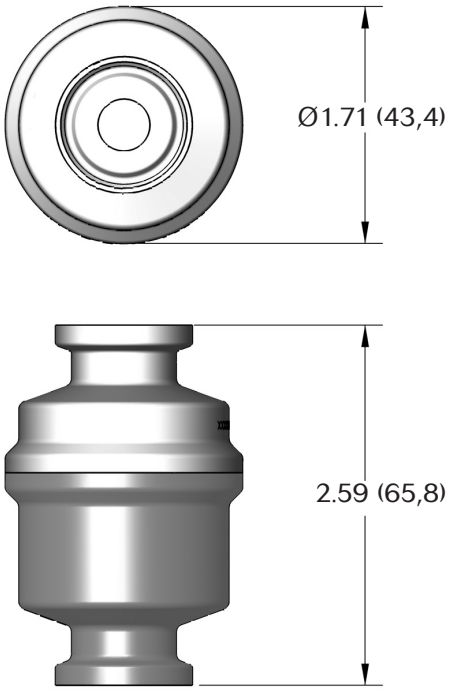
Dimensions - Vertical Connections

Bolted Body (93B) (1/2", 3/4", DN15, DN20)



Weight: 1.2 lbs (0,55 kgs)

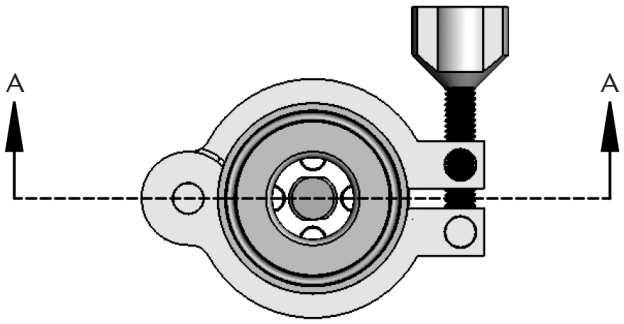
Welded Joint (93W) (1/2", 3/4", DN15, DN20)

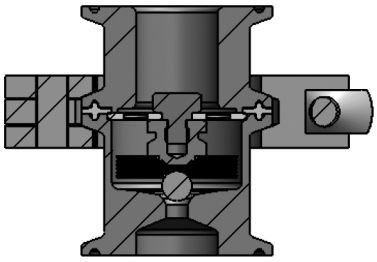


Weight: 1.0 lbs (0,45 kgs)

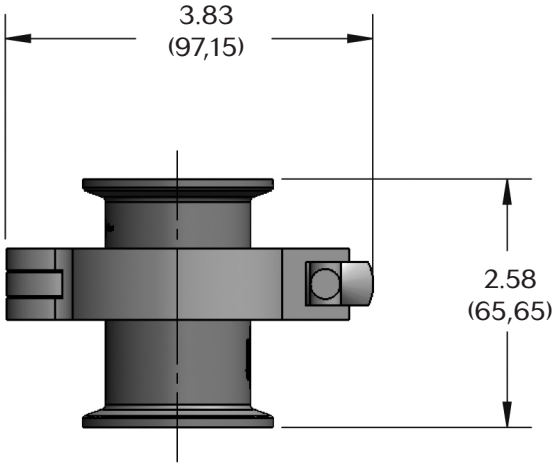
Dimensions - Vertical Connections

MK93C 1", DN25 Series



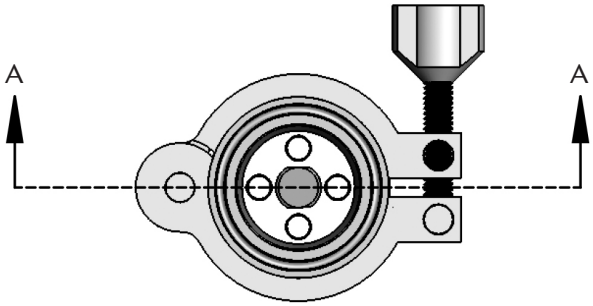


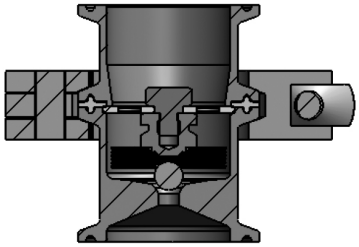
Section A-A



Dimensions - Vertical Connections

MK93C 1-1/2", DN40 Series





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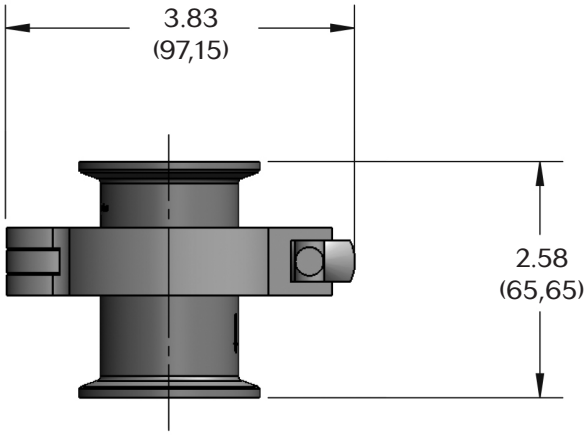
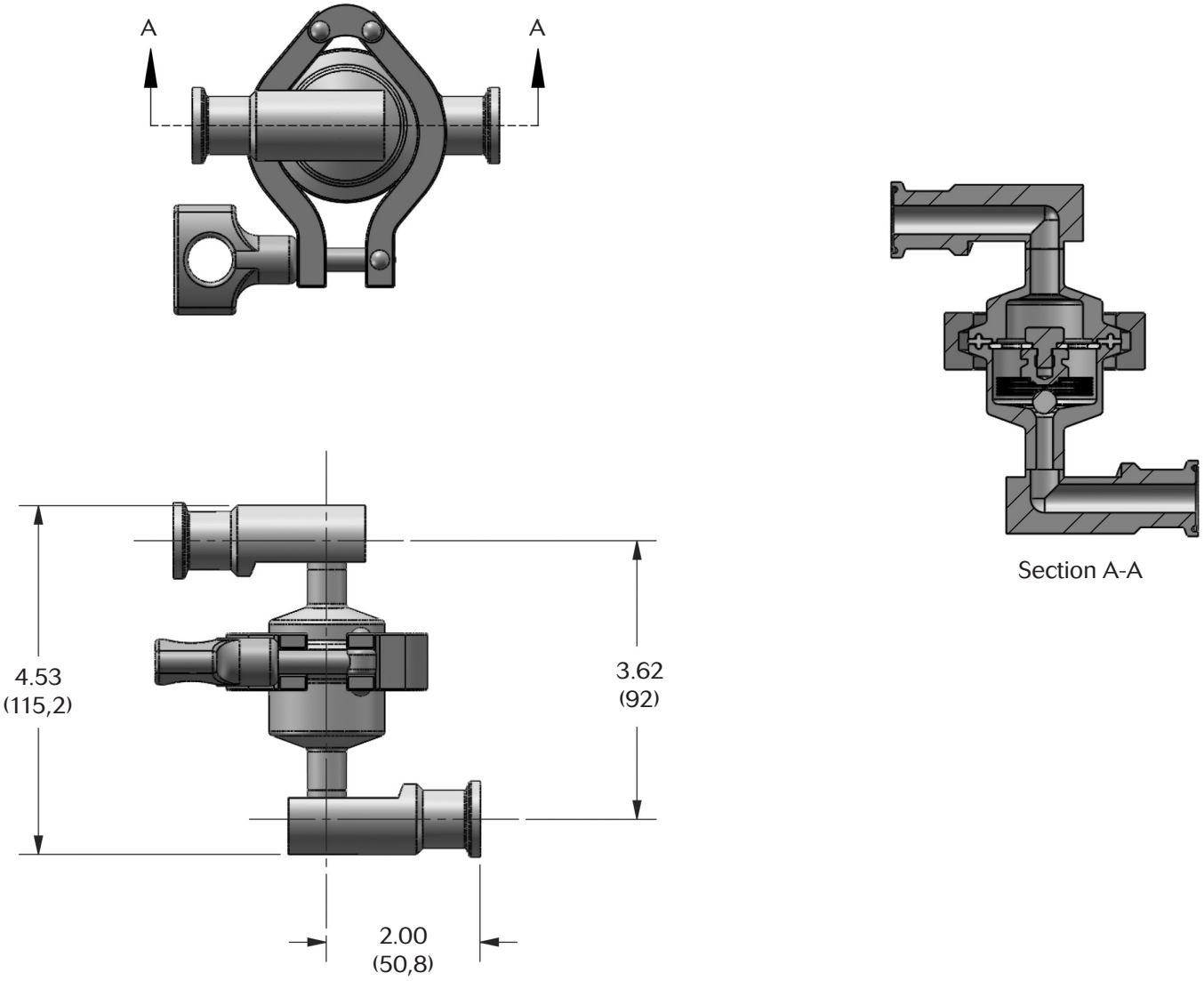


Dimensions - Horizontal Connections

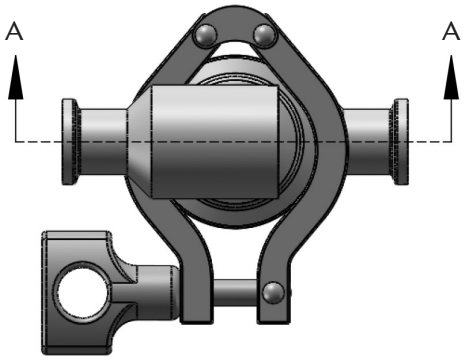
*MK93C 1/2", DN15 Horizontal Inlet/Outlet (CHCH, MHMH, PHPH)**

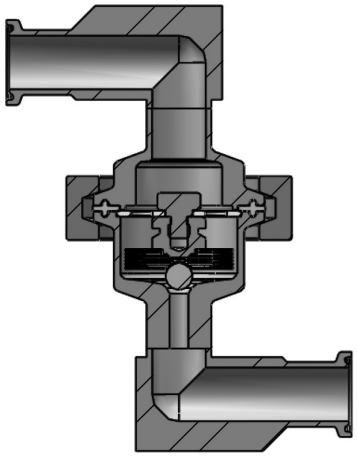


*** Note: Installation lay-in dimension were changed on this model in 2014.**

Dimensions - Horizontal Connections

*MK93C 3/4", DN20 Horizontal Inlet/Outlet (CHCH, MHMH, PHPH)**





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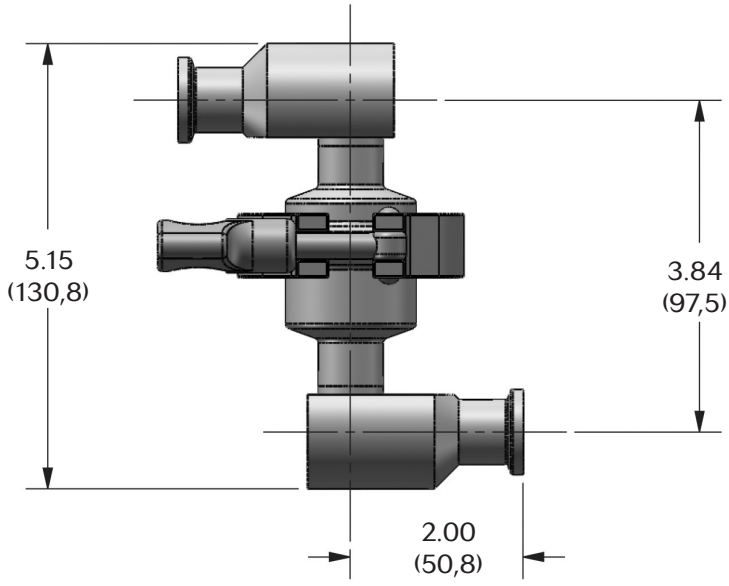
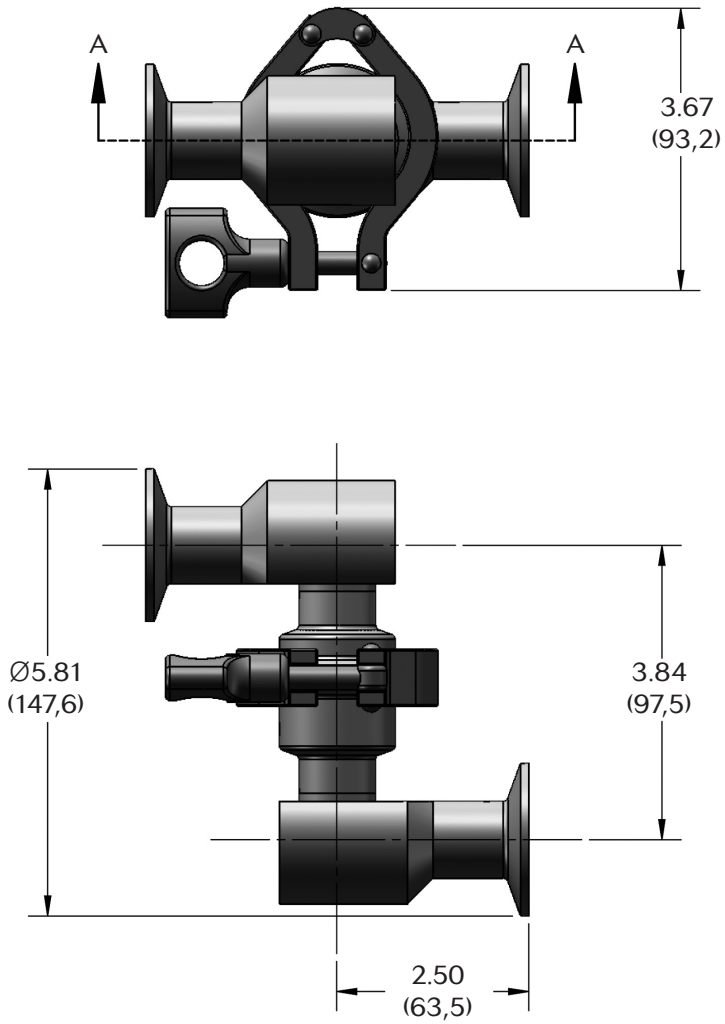
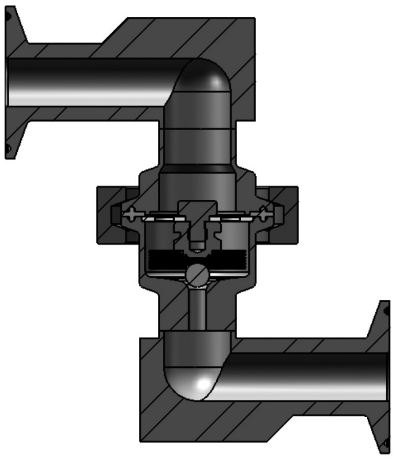


*** Note: Installation lay-in dimension were changed on this model in 2014.**

Dimensions - Horizontal Connections

*MK93C 1", DN25 Horizontal Inlet/Outlet (CHCH, MHMH, PHPH)**



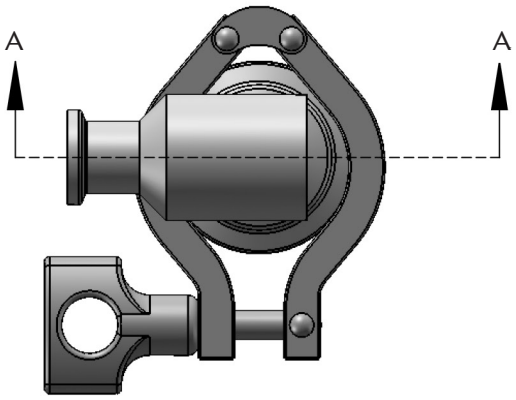


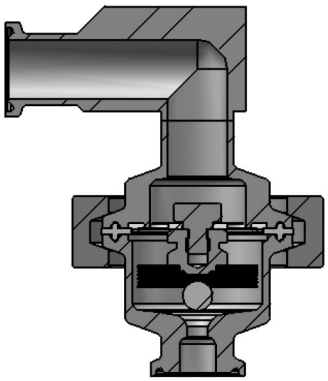
Section A-A

*** Note: Installation lay-in dimension were changed on this model in 2014.**

Dimensions - Horizontal Connections

*MK93C 3/4", DN20 Horizontal Inlet/Vertical Outlet (CHCV, MHMV, PHPV)**





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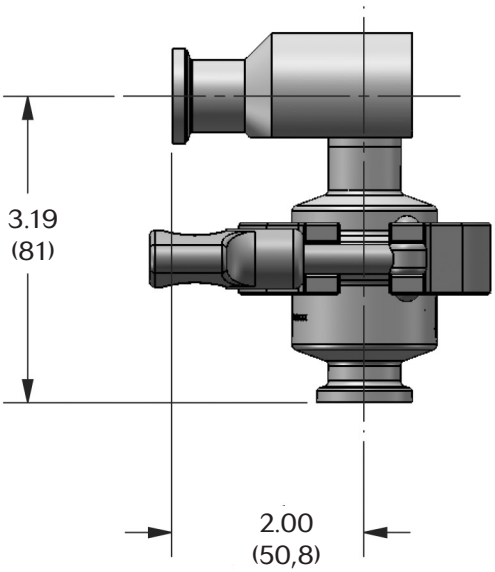
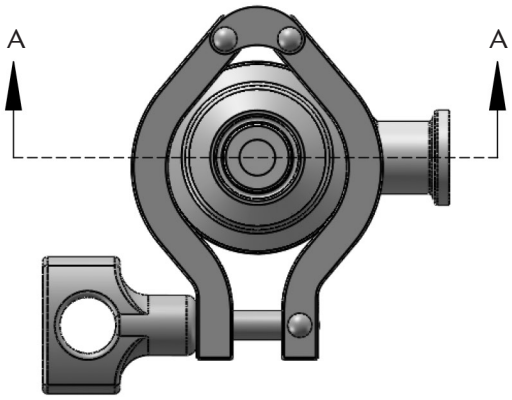
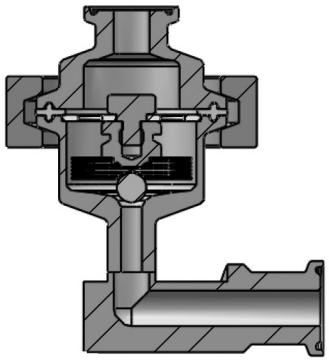


*** Note: Installation lay-in dimension were changed on this model in 2014.**

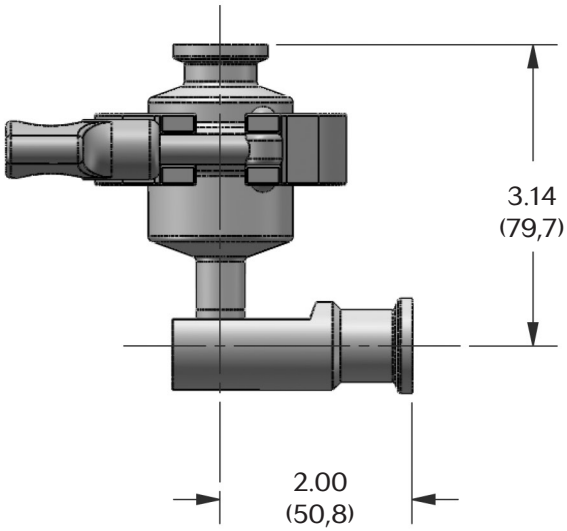
Dimensions - Horizontal Connections

*MK93C 1/2", DN15 Vertical Inlet/Horizontal Outlet (CVCH, MVMH, PVPH)**





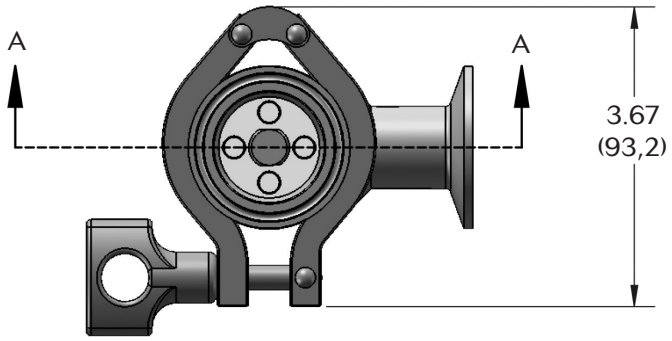
Section A-A

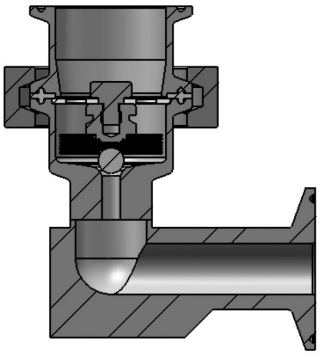


*** Note: Installation lay-in dimension were changed on this model in 2014.**

Dimensions - Horizontal Connections

*MK93C 1", DN25 Vertical Inlet/Horizontal Outlet (CVCH, MVMH, PVPH)**





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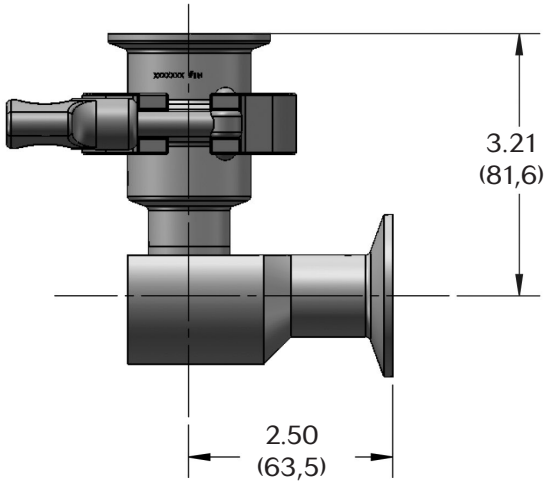

*** Note: Installation lay-in dimension were changed on this model in 2014.**

Ordering Schematic

NOTE: If ordering a 1/2" or 3/4" MK93 with horizontal connections to replace a previous purchase, or ordering an identical model for a new process, PLEASE NOTE THAT THE LAY-IN DIMENSIONS CHANGED IN 2014. Call Steriflow, or your Steriflow representative if you have questions.

Model	Body	–	Size	–	End Connections	–	Special Options
93	C		050		C		P

1	Model/Body Joint
93C	Tri-Clamp Body/Wingnut Clamp
93B	Bolted Body
93K	Tri-Clamp Body/Bolted Clamp
93W	Compact, Welded Body

2	Size	
050	1/2"	DN15
075	3/4"	DN20
100*	1"	DN25
150*	1-1/2"	DN40

* Note: 1" and 1-1/2" (DN25, DN50) tubing size is generally used in higher condensate load applications. Make sure you check the capacity chart on page 3 to ensure the MK93 can handle your condensate load. If not, the MK94 or MK934 may be a more appropriate model choice.

4	Options
B	20 Ra Ext. - Body Only
E	TFE/EPDM, FDA USP Class VI
G	Tuf-Steel, TFE/SST Body Gasket, FDA USP Class VI
S	Silverback Gasket TFE/SST Body Gasket, USP Class VI
P[1]	High Pressure Bellows
L	Electropolish MK93C or K Body
R	Electropolish, MK93B Bolted Body
F7*	TFE/Viton FDA, USP Class VI @ 250°F (121°C)

1 For applications with inlet pressure > 45 psi (3 bar)

* Document Part #25384 required when ordering

Note: if no gasket is specifically requested, a TFE/Viton gasket is provided

3	End Connections		
Inlet		Outlet	
C			Inch Tri-Clamp Vertical Inlet/Outlet
S*V			ISO Tri-Clamp Vertical Inlet/Outlet
D****			DIN Tri-Clamp Vertical Inlet/Outlet
N			NPT Threaded Inlet/Outlet
B			BSPT Threaded Inlet/Outlet
T			Inch Tube Vertical Inlet/Outlet
M**			DIN Tube Vertical Inlet/Outlet
P***			ISO Tube Vertical Inlet/Outlet
Z			Non-Standard
C	H	C	H	Inch Tri-Clamp Horizontal Inlet/Outlet*
C	H	C	V	Inch Tri-Clamp Horizontal Inlet/Vertical Outlet*
C	V	C	H	Inch Tri-Clamp Vertical Inlet/Horizontal Outlet*
M	H	M	H	Din Tri-Clamp Horizontal Inlet/Outlet
M	H	M	V	Din Tri-Clamp Horizontal Inlet/Vertical Outlet
M	V	M	H	Din Tri-Clamp Vertical Inlet/Horizontal Outlet
P	H	P	H	ISO Tri-Clamp Horizontal Inlet/Outlet
P	H	P	V	ISO Tri-Clamp Horizontal Inlet/Vertical Outlet
P	V	P	H	ISO Tri-Clamp Vertical Inlet/Horizontal Outlet

* Not available on 93W compact welded body
** According to DIN 11866
*** According to ISO DIN 11866 line B, ISO 1127
**** According to DIN 32676 Row A
*V According to DIN 32676 Row B

Note: Horizontal connection: trap lay-in dimension changed in 2014

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