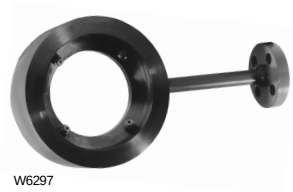
Fisher CON-TEK® Steam Conditioning Equipment Selection Guide

W7011



W6297

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- **CON-TEK steam conditioning valves accurately control steam temperature and pressure for high efficiency in power generation, industrial processing, space heating and auxiliary steam applications**
- **CON-TEK turbine bypass system that combines specifically designed valves to meet exact pressure and temperture needs, with rapid-responding electrohydraulic actuators and power unit**
- **CON-TEK desuperheaters efficiently reduce the temperature of superheated steam to the desired set point for the most efficient operation in a variety of steam applications**
- **Rugged, reliable double-acting piston, electrohydraulic, or electric actuators can be supplied with the steam conditioning valves. Spring-return pneumatic diaphragm actuators are supplied with the Design DVG/AF desuperheater, which includes an integral spraywater control valve**

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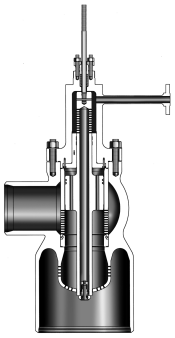
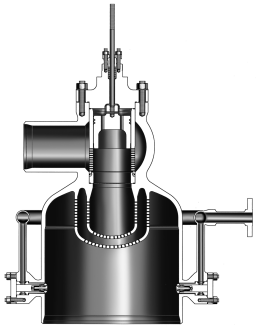
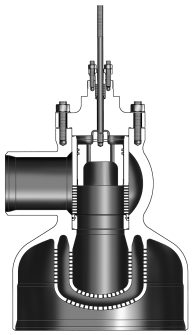
FISHER-ROSEMOUNT™ Managing The Process Better.™

Product Flier PF85.1:010

Steam Conditioning Valves

 W7013-1/IL **DESIGN CVX-AA**	 W7014-1/IL **DESIGN CVX-CA**	 W7015- /IL **DESIGN CVX-PA**
Style		
Angle steam conditioning valve with spraywater injected in the direction of steam flow immediately downstream of the seat where velocity and turbulence are high. High velocity and turbulence helps mix the water quickly and evenly throughout the steam flow. Design allows for intrinsic feedforward control due to the direct proportioning of water addition to steam flow. Also available in Y-pattern design.	Angle steam conditioning valve with multiple spray nozzles injecting water radially from an externally mounted manifold. Water is injected downstream of the seat where turbulence is high. High turbulence helps ensure quick and even mixing throughout the flow. Multiple nozzles allow for large water-flow addition. Also available in Z- or Y-pattern designs	Angle valve for steam pressure reduction only. Also available in Z- or Y-pattern designs.
Applications		
Process steam and other small to moderate water-flow applications	Turbine bypass, condenser dump, and other moderate to large water-flow applications	Any turbine bypass, condensor dump, or process steam application.
Sizes		
Steam: 1- through 20-inch inlet with 2- through 42-inch outlet **Spraywater:** 1, 1-1/2, or 2 inches	**Steam:** 1- through 24-inch inlet with 2- through 48-inch outlet **Spraywater:** 1 through 4 inches	**Steam:** 1- through 24-inch inlet with 2- through 48-inch outlet
End Connections and Ratings		
ANSI Socket Weld: 1- through 3 inches **ANSI Buttwelding and Raised-Face Flanged:** All sizes **Ratings:** PN25 to PN250 (ANSI Class 150 to 1500)	**ANSI Socket Weld:** 1 through 3 inches **ANSI Buttwelding and Raised-Face Flanged:** All sizes **Ratings:** PN25 to PN760 (ANSI Class 150 through 4500) (intermediate and special classes also available)	**ANSI Socket Weld:** 1 through 3 inches **ANSI Buttwelding and Raised-Face Flanged:** All sizes **Ratings:** PN25 to PN760 (ANSI Class 150 through 4500) (intermediate and special classes also available)
Flow Characteristic		
Linear, equal percentage, or special	Linear, equal percentage, or special	Linear, equal percentage, or special
Flow Coefficients		
Maximum C_V from 15 to 2000	Maximum C_V from 15 to 6400	Maximum C_V from 15 to 6400
Rangeability		
50 to 1	50 to 1	50 to 1
Shutoff Class (IEC 534-3 and ANSI/FCI 70-2-1991)		
Class IV	Class IV (standard) or V (optional)	Class IV (standard) or V (optional)
Body and Bonnet Material and Construction		
Forged and machined body made of SA105 carbon steel, F11 chrome moly steel , or F22 chrome moly steel (similar to C22.8, 13 Cr Mo44, and 10 Cr Mo910, respectively). Other materials available.		

H404T01

Steam Conditioning Valve Options

Design CVX-T Steam Cooler
The steam cooler is similar to the outlet section of the CVX-C valve and is normally used where separation of the pressure reduction (CVX-P) and desuperheating functions is required. The steam cooler is equipped with a water supply manifold or mulitple manifolds, which provides cooling water to a number of spray nozzles in the pipe wall of the outlet section. The fine spray provides very efficient mixing and almost immediate vaporization. The steam cooler section can accommodate a silencer, which decreases steam pressure energy in a controlled-velocity expansion.

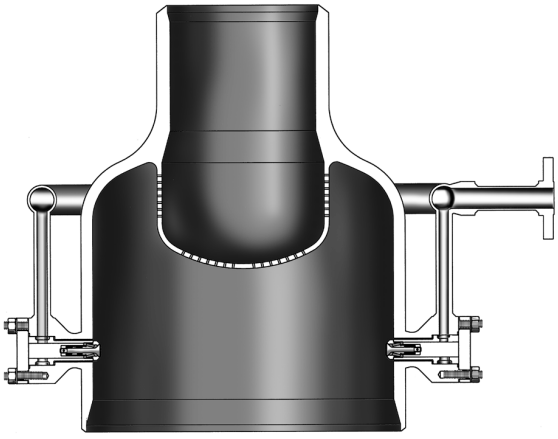
Design CVS-S Steam Sparger
The steam sparger is a diffuser used where further pressure reduction is needed downstream of a valve. It also can provide a constant back-pressure to the valve. The sparger is a fixed,multiple-orifice device that inserts into the piping.

Other Options

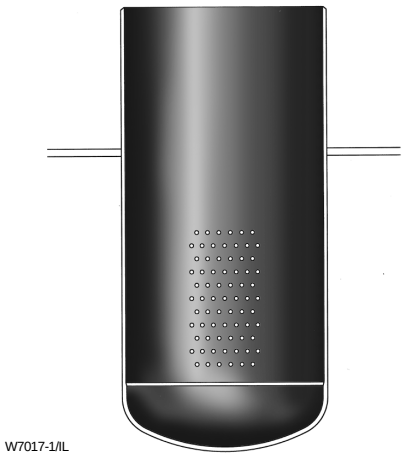
WhisperFlo™ Trim... Specialized noise attenuation trim for Design CVX-C and CVX-P valves.

Steam-Assisted Desuperheating Spraying... Uses the engergy of high-temperature and high-pressure steam to assist atomizing and mixing spray water in low-pressure outlet section. Useful for systems operating regularly at low flows.

Drain and Warm-Up Bypass Connections... Can be included for easier installation



Design CVX-T Steam Cooler



Design CVX-S Steam Sparger

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Turbine Bypass Systems

When a power plant experiences wide swings in demand, boilers and turbines cannot respond properly without a turbine bypass system. The CON-TEK system allows operation of the boiler independently of the turbine. It provides an alternate flow path for the steam, and it conditions the steam to the same pressure and temperature normally found at the turbine outlet. The system protects the turbine, boiler, and condenser from damage caused by swings in temperature and pressure. For quicker, more economical start-up, the system allows you to start and check the boiler separately from the turbine. After a shutdown, the system can match steam temperatures to that of the turbine so your plant can come back up quicker with less risk of damage.

The bypass control system includes control circuits and logic. This system enables the proper valve position for the pressure and temperature needed for startup, turbine trip, or cycling to low load.

W6872

Electrohydraulic Bypass Valve

Electrohydraulic System

The electrohydraulic system includes a control logic panel and the motors and pumps to provide hydraulic power for fast valve stroking and precise positioning. It also includes the hydraulic valve actuator with a high-performance proportional or servo valve and feedback transducer. An accumulator system allows fast response and emergency power in case of a hydraulic or electrical failure.

Bypass Valves

The high-pressure turbine bypass valve diverts main steam around the high-pressure turbine to the cold reheat line during start-up, turbine trips, and while operating at minimum load. The low-pressure bypass valves provide a steam path from the hot reheat section, around the intermediate and low-pressure turbine to the condenser. Available valve types include angle and Z-pattern forged designs. If isolating valves are needed, The Design FSV provides tight shutoff at high pressure drops.

Application	Valve Type	Sizes	Ratings
High-pressure steam bypass	CVX-C	to 18-inch inlet with up to 24-inch outlet	PN250 to 760 or ANSI Class1500 to 4500
Low-pressure steam bypass	CVX-C	to 30-inch inlet with up to 60-inch outlets	PN100 to250 or ANSI Class 600 to 1500
High-pressure bypass control and isolation water vavles	HPS HPT	to 6 inches	to PN450 or to ANSI Class 2500
Low-pressure bypass water valves	ET	to 6 inches	PN25 to 100 or ANSI Class 150 to 600
Bypass stop valve (optional)	FSV	to 30 inches	PN100 to 760 or ANSI Class 600 to 4500

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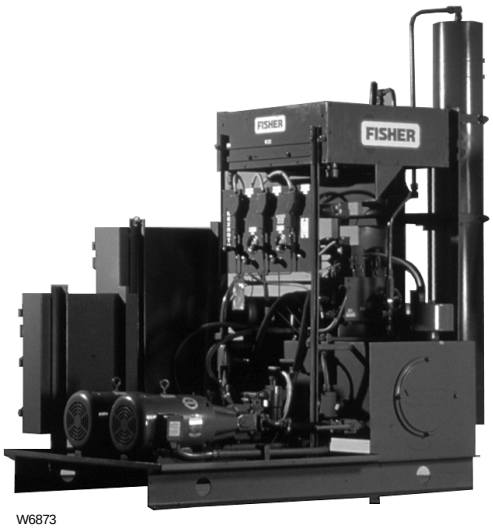
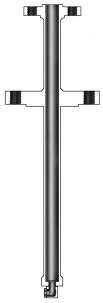
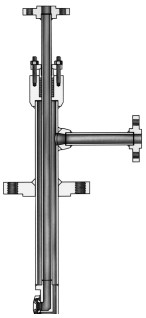


W6873

Electrohydraulic Power System

Desuperheaters

 W7102-1 **DESIGN DMA**	 W6310-1 **DESIGN DMA/AF**	 W6311-2 **DESIGN DSA**
Style		
Mechanically atomized desuperheater with single or multiple fixed-geometry spray nozzles Inserted through a flanged connection into an 8-inch or larger pipe	Mechanically atomized desuperheater with one, two, or three spray nozzles. Variable-geometry spray nozzles are activated by back pressure Inserted through a flanged connection into an 8-inch or larger pipe	Single fixed geometry nozzle Uses high-pressure steam for rapid atomization of spraywater Inserted through a flanged connection into an 8-inch or larger pipe
Applications		
Typical appliaction is process steam Constant load Inherent rangeability up to 5:1 (ratio of maximum C_v to minimum controllable C_v)	Typical applications are process steam, turbine extraction, and boiler superheaters and reheaters Moderate load fluctuations Inherent rangeability up to 20:1 (ratio of maximum C_v to minimum controllable C_v)	Typical applications are process steam and turbine extraction Large load fluctuations Inherent rangeability up to 50:1 (ratio of maximum C_v to minimum controllable C_v) Low-velocity steam lines
End Connection Sizes, Types, and Ratings		
Steam: 3, 4, or 6 inches **Spraywater:** 1, 1-1/2, or 2 inches **Steam and Spraywater Line Connection Type and Rating:** PN25 to 250 (ANSI Class 150, 300, 600, 900, or 1500) raised-face flanges	**Steam:** 3, 4, 6, or 8 inches **Spraywater:** 1, 1-1/2, 2, 2-1/2, or 3 inches **Steam and Spraywater Line Connection Type and Rating:** PN25 to 400 (ANSI Class 150, 300, 600, 900, or 2500) raised-face flanges	**Steam:** 3, 4, or 6 inches **Spraywater:** 1, 1-1/2, or 2 inches **Atomizing steam:** 1, 1-1/2, or 2 inches **Steam, Spraywater, and Atomizing Steam Line Connection Type and Rating:** PN25 to 250 (ANSI Class 150, 300, 600, 900, or 1500) raised-face flanges
Minimum Steam Velocity (See CON-TEK Sizing Sheet for Detailed Information)		
6 m/s	6 m/s	2 m/s
Maximum Unit C_v (for Spraywater Flow)		
3.8	15.0	9.97
Minimum Recommended Outlet Temperature (See CON-TEK Sizing Sheet for Detailed Information		
6°C above saturation temperature	6°C above saturation temperature	6°C above saturation temperature

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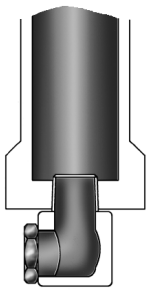
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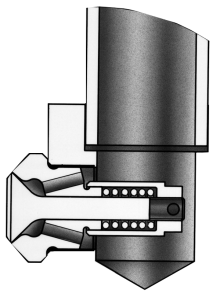
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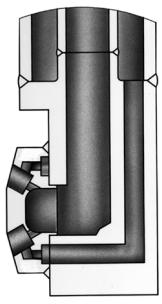
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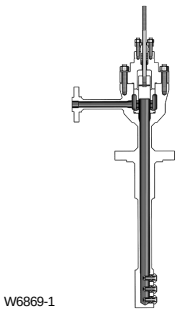
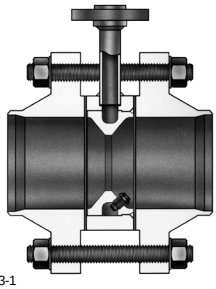
Desuperheater Nozzles

Desuperheaters (Continued)

 W6869-1 **DESIGN DVG/AF**	 W6313-1 **DESIGN DVI**
Style	
Mechanically atomized desuperheater with one to three spray nozzles Integrated spray water control valve Variable-geometry spray nozzles Controlled by a pnuematic actuator Flanged into the side of an 8-inch or larger pipe	Mechanically atomized desuperheater with multiple, fixed-geometry spray nozzles. Injects spraywater into the venturi section of the desuperheater Installed between flanges in 1- through 24-inch pipelines
Applications	
Typical applications are process steam, turbine extraction, and boiler superheaters and reheaters Moderate to large load fluctuations Inherent rangeability up to 25:1 (ratio of maximum C_v to minimum controllable C_v)	Typical application is process steam Moderate load fluctuations Inherent rangeability up to 10:1 (ratio of maximum C_v to minimum controllable C_v)
End Connection Sizes, Types, and Ratings	
Steam: 4 or 6 inches **Spraywater:** 1, 1-1/2, or 2 inches **Steam and Spraywater Line Connection Type and Ratings:** PN25 to PN400 (ANSI Class 150, 300, 600, 900, or 2500) raised-face flanges	**Steam:** 1 through 24 inches **Spraywater:** 1/2, 3/4, 1, or 2 inches **Steam and Spraywater Line Connection Type and Rating:** PN25 to PN250 (ANSI Class 150, 300, 600, 900, or 1500) raised-face flanges
Minimum Steam Velocity (See CON-TEK Sizing Sheet for Detailed Information)	
6 m/s	6 m/s
Maximum Unit C_v (for Spraywater Flow)	
8.5	9.48
Minimum Recommended Outlet Temperature (See CON-TEK Sizing Sheet for Detailed Information)	
6°C above saturation temperature	6°C above saturation temperature

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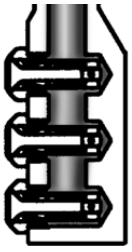

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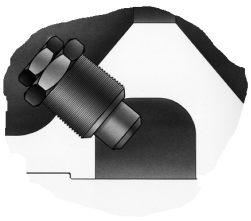

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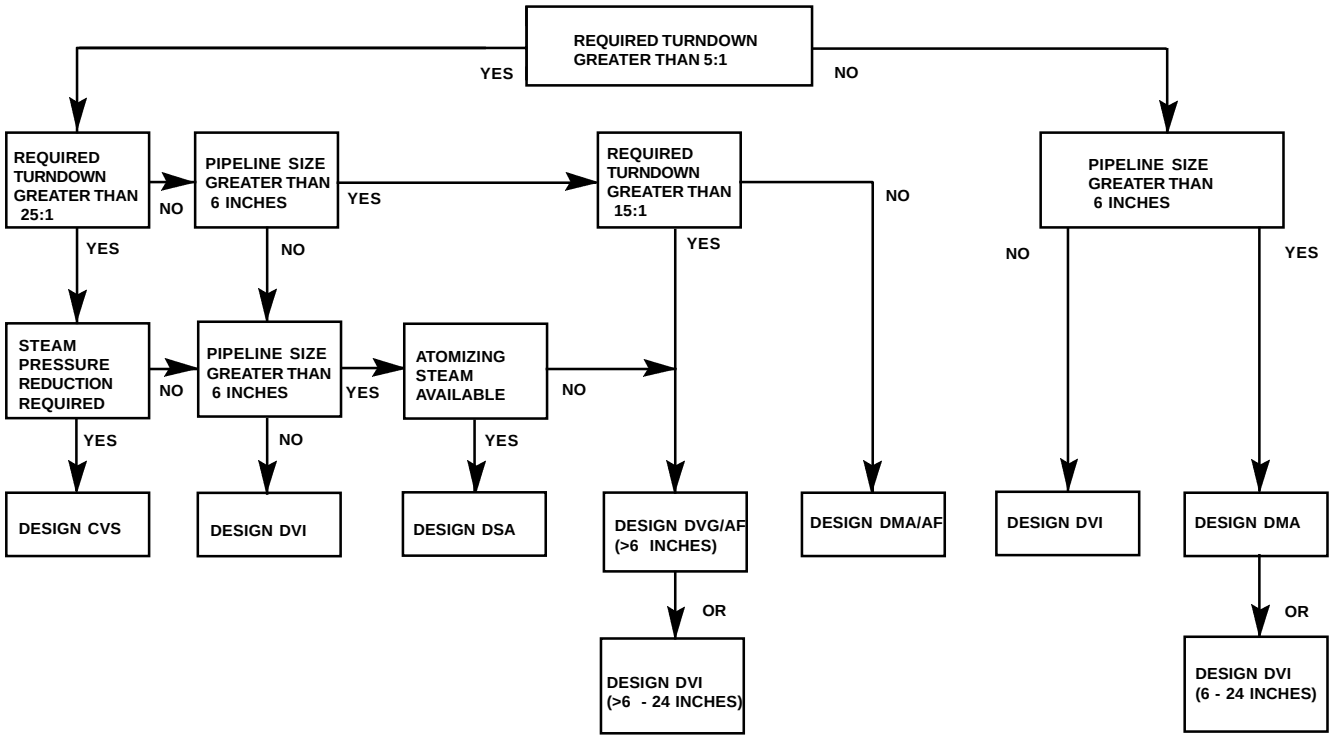
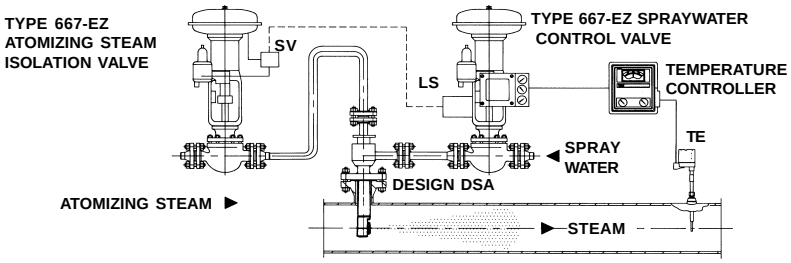
Desuperheater Nozzles

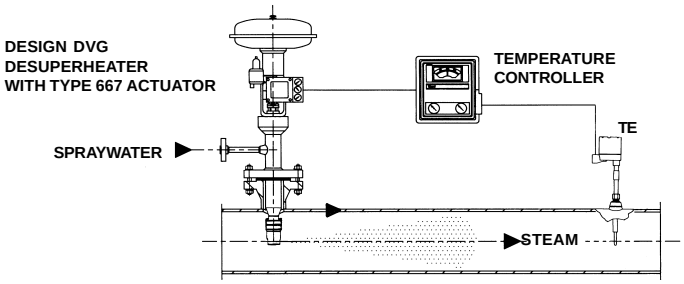
Desuperheater Selection



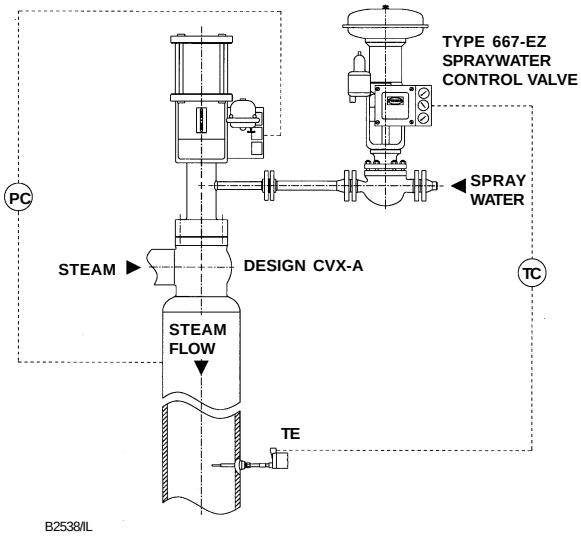
Typical Installations



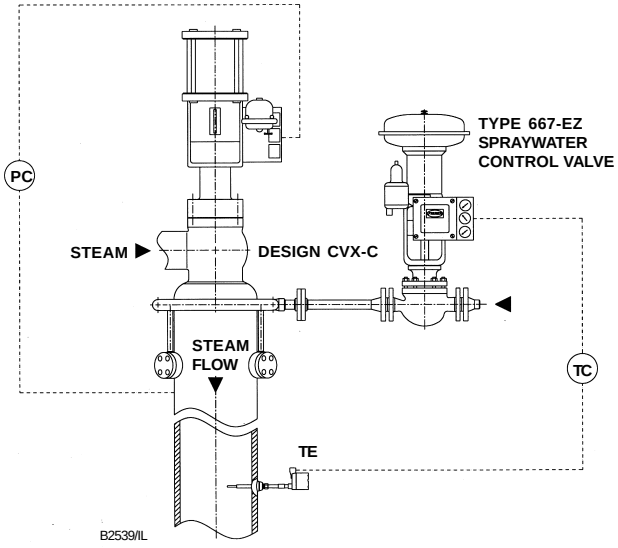
Design DSA Desuperheater



Design DVG Desuperheater

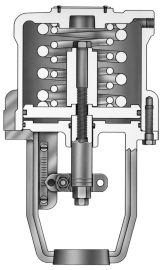
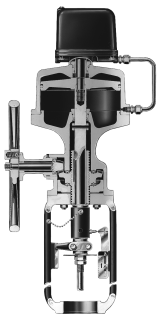


Design CVX-A Valve



Design CVX-C Valve

Actuators for Steam Conditioning Valves and Design DVG/AF Desuperheater

 W6507 **SYSTEM 9000 FloVue™ FINAL CONTROL SYSTEM**	 W0363-1 **TYPES 657 AND 667**	 W6304-1 **TYPE 585C, 585CR, 585, AND 585R**	 W0341-1/IL **TYPE 470 and 490**
Features			
Compact actuator with integral FIELDVUE® digital valve controller. Digital two-way communication. Advanced diagnostics available. Maximum of 6.9 bar supply pressure; for Design DVG/AF only.	Actuators for a maximum of 4 bar supply pressure; for Design DVG/AF only.	Heavy-duty actuators for a maximum of 10 bar supply pressure; for steam-conditioning valves.	Heavy-duty actuators for high force and long travel. Maximum of 8.6 bar supply pressure; for steam-conditioning valves.
Style			
High-pressure, spring-return actuator with integrated controller and accessories	Spring-return pneumatic diaphragm	Double-acting piston or spring-bias piston	Double-acting piston
Application, Typical Maximum Thrust, and Travel			
Application: Design DVG/AF **Thrust:** 12 000 N **Travel:** 50 mm	**Application:** Design DVG/AF **Thrust:** 5000 N **Travel:** 50 mm	**Application:** Design CVX **Thrust:** 70 300 N **Travel:** 100 mm	**Application:** Design CVX **Thrust:** 100 000 N **Travel:** 400 mm
Accessories			
Integrated limit switches, position transmitter, and exhaust valve; supply pressure filter-regulator	Pneumatic or electro-pneumatic valve positioners, FIELDVUE® digital valve controller, limit switches, position transmitters, handwheels, travel stops, and supply pressure filter-regulator	Pneumatic or electro-pneumatic valve positioners, FIELDVUE® digital valve controller, limit switches, position transmitters, handwheels, travel stops, and supply pressure filter-regulator	Pneumatic valve positioners, limit switches, position transmitters, handwheels, travel stops, and supply pressure filter-regulator

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W5500


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- **Select from a complete line of accessories for these actuators...valve positioners, position transmitter, and switches**
- **FIELDVUE digital valve controllers are communicating, microprocessor-based controllers that convert a current signal to a pressure signal to operate the actuator. Through the HART® communications protocol, the controller gives easy access to critical actuator-valve information.**
- **Electronic accessories are available with the CE Mark to EMC directive and with hazardous-area certifications**

Product Flier PF85.1:010

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