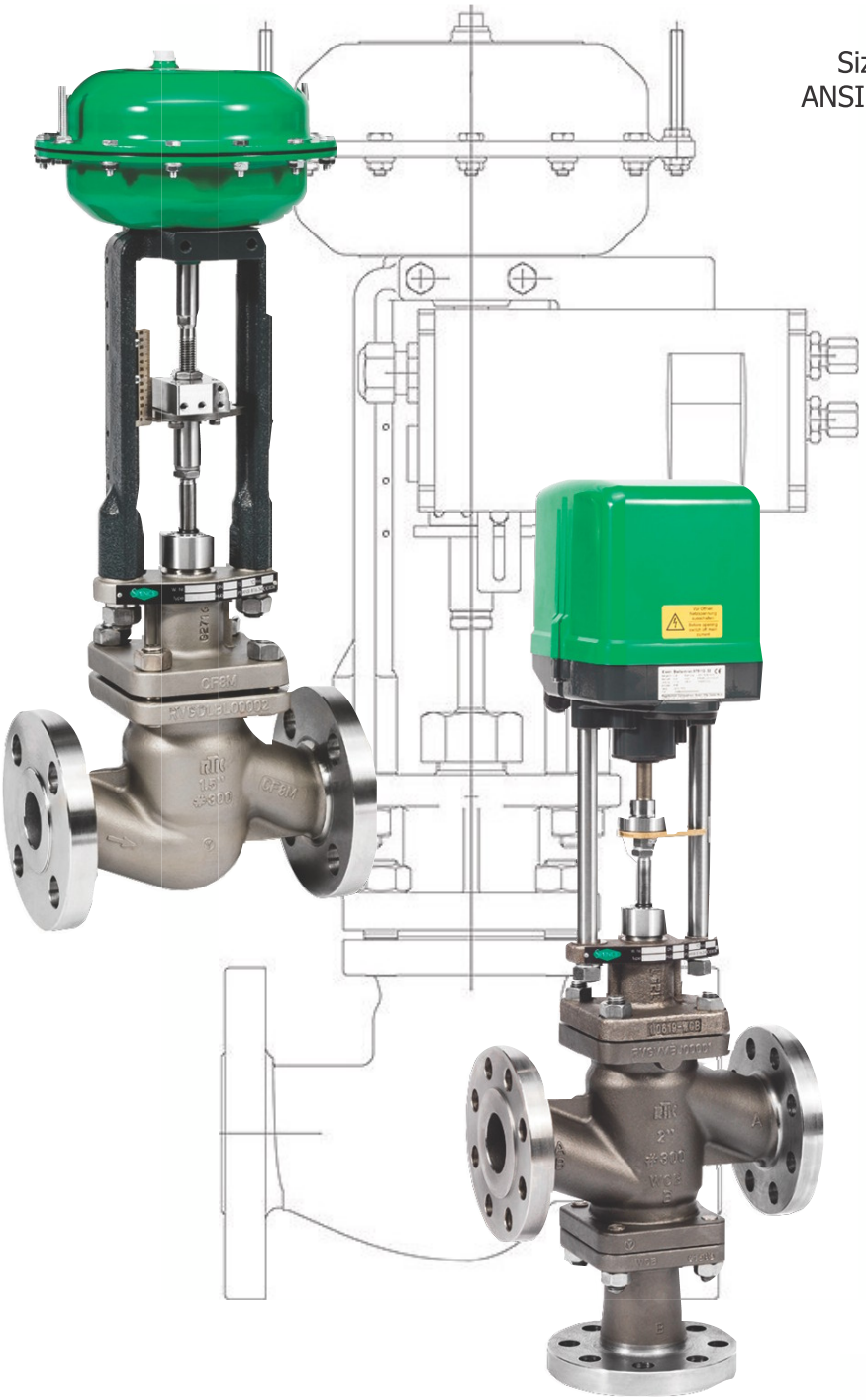
GENERAL
STEM-GUIDED
CONTROL VALVES

Sizes 1" - 12" (25mm - 300mm)
ANSI Class 150 - 900 (PN16 - 160)



REflex®

Control and Shut-Off Valves ● Variety of Trim Designs in Different Materials ● Electric and Pneumatic Actuators as Standard

CIRCOR POWER & PROCESS

SPENCE

Product Information

BROADEST RANGE IN THE INDUSTRY

The **REFLEX** line of two and three way valves offers more possibilities than any other valve family in the Industry. It is an all-purpose stem guided control valve, suitable for use in a wide range of Industries. Using a modular design, and with numerous trim styles and materials available, there is a valve for nearly every application. **All valves are available either as ANSI or DIN, ensuring that direct replacement is always possible.**

TRIM OPTIONS

Interchangeable plugs and seats offer maximum versatility in flow control applications.

Plug variations include:

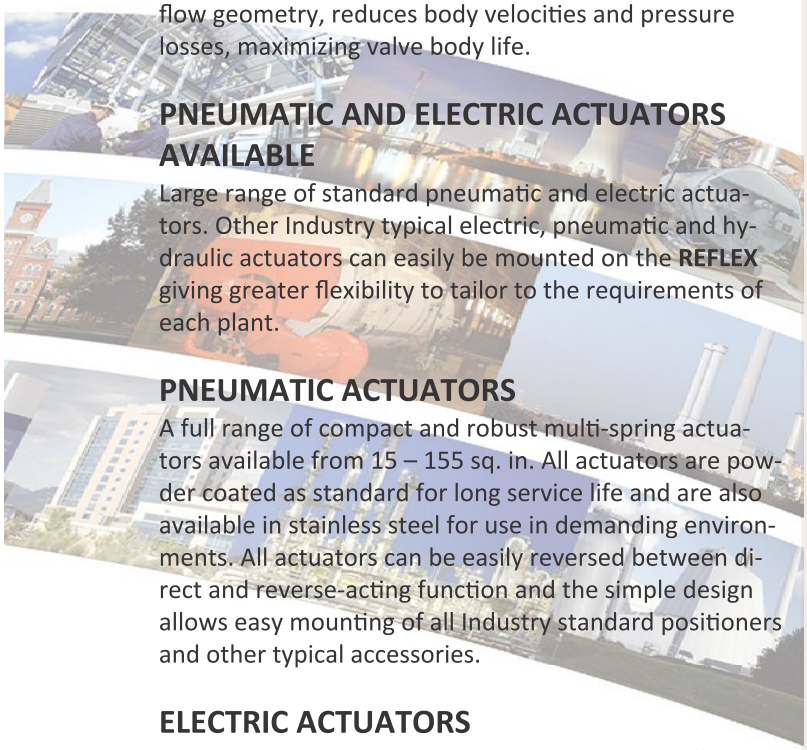
- **On/Off Plug** - Provides maximum flow with minimum pressure drop.
- **Parabolic Plug** - Covers all Cv ranges and is especially suitable for low differential pressures.
- **V Port Plug** – Shorter stroke allows smaller actuators to be used.
- **Perforated Plug** – Reduces noise and offers protection against cavitation.
- All of the above trims are available with Soft Seat option, increasing the shut off from standard Class IV to Class VI.

TRIM MATERIALS

Standard valve trim consists of series 400 stainless steel plugs with 316 stainless steel seats. In addition, 316 stainless steel plugs are available offering superior corrosion resistance. Seating surfaces (both plug and seat ring) can be armored with a nickel/cobalt overlay (Stellite®) which provides significantly longer service life. Complete trims (plug and seat) are also available in Ferro-Titanium offering a trim for the most demanding applications.

WIDE VARIETY OF STEM PACKINGS

Including: Maintenance free self-adjusting multilayer PTFE packing, pure graphite packing, Bellows Seal and Chlorophrene packing (for refrigeration). The **REFLEX** can be delivered with a stem packing for the given application. On top of the wide selection of different packings available, all valve stems are roller burnished preventing burrs that can damage the packing, thus extending the service life of the packing.



HIGH FLOW CAPACITIES

Widest Cv range in the industry, coupled with optimized flow geometry, reduces body velocities and pressure losses, maximizing valve body life.

PNEUMATIC AND ELECTRIC ACTUATORS AVAILABLE

Large range of standard pneumatic and electric actuators. Other Industry typical electric, pneumatic and hydraulic actuators can easily be mounted on the **REFLEX** giving greater flexibility to tailor to the requirements of each plant.

PNEUMATIC ACTUATORS

A full range of compact and robust multi-spring actuators available from 15 – 155 sq. in. All actuators are powder coated as standard for long service life and are also available in stainless steel for use in demanding environments. All actuators can be easily reversed between direct and reverse-acting function and the simple design allows easy mounting of all Industry standard positioners and other typical accessories.

ELECTRIC ACTUATORS

The robust modular design covers a wide range of actuating forces from 675 – 3370 lbs. force. A wide range of actuating speeds and all standard voltages are available, giving the customer an actuator to suit their needs. Many options and accessories are available, including two extra limit switches (for the customer) as standard. These actuators are also available with a certified hydraulic fail close function and come with a hand wheel for manual operation as standard.

OPTIONS

Hydraulic Emergency Closing Unit. This unit gives valves with electric actuators a proven and reliable fail close option. The unit closes smoothly even at large differential pressures. The closing time can be adjusted to meet the system requirements. Automatic return to closed loop control is possible without any external components or wiring. This ensures that the valve resumes normal duties as soon as the plant returns to normal operations.

REFLEX SPECIFICATIONS

BODY ASSEMBLY: Single seated, top entry bolted bonnet, globe style; stem guided unbalanced plug

SIZE, RATINGS:
1" – 12" Class 150, 300, 600 and 900

BODY MATERIALS:
Carbon Steel ASTM A216 WCB (class 150 – 900)
Stainless Steel ASTM A351 CF8M (class 150 – 900)
Chrome Moly, ASTM A217 WC9 (class 600 & 900)

BONNET: Bolted Bonnet
Bonnet with cooling fins for high temperatures
Extended bonnet for bellows seal

END CONNECTIONS:
Flanges according to ANSI B16.5 RF (Raised Face)
Butt weld Ends according to ASME B16.25 - 2007
Dimensions (face-to-face) per ANSI/ISA-75.08 (DIN EN 558-1)

STEM PACKING:
PTFE/Graphite -76°F to 482°F [-60°C to 250°C]
Pure graphite -76°F to 986°F [-60°C to 530°C]
Bellows seal -76°F to 662°F [-60°C to 350°C]
Chloroprene -40°F to 212°F [-40°C to 100°C]

PLUG TYPES & FLOW CHARACTERISTICS:
On/Off Plug (Quick opening)
Parabolic Plug (Equal Percentage or Linear)
V Port Plug (Linear)
Perforated Plug (Equal Percentage or Linear)
Mixing Plug (Linear)
Diverting Plug (Linear)

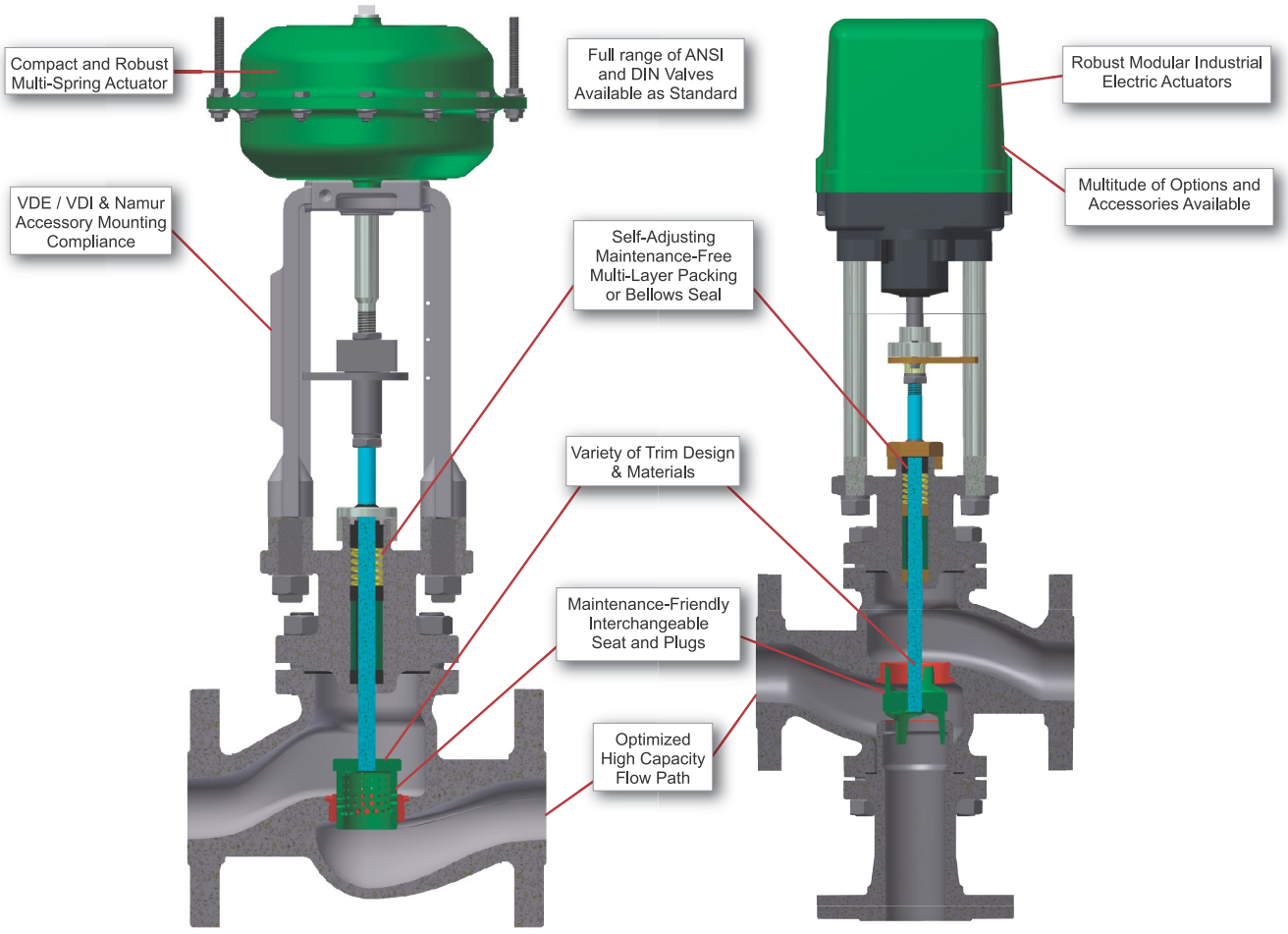
TRIM MATERIALS:
Plug 1.4122 (Martensitic)
Stem and Seat AISI 316 Ti
Optional
Plug AISI 316 Ti
Parabolic Plug stellited or hardened
Perforated Plug hardened

SHUTOFF CLASS (ANSI /FCI 70-2):
Standard Trim Class IV (<0.01% Cv) metal seat
Standard Trim Class IV-S2 (<0.005% Cv) metal seat, lapped in
Soft Seat Class VI (tight closing) with PTFE max +392°F
Diverting Plug port B Class III (<0.1% Cv)

ACTUATORS:

Standard:	Pneumatic Spring & Diaphragm & Electric
Optional:	Customer specified actuators (Electric, Pneumatic and Hydraulic)

REFLEX Features & Benefits



Feature	Advantage	Benefit
Full Range Of ANSI & DIN Valves Available	Interchangeability With Control Valves From Other Manufacturers	Application Accessibility
Variety of Trim Designs and Materials	Longer Life and Greater Flexibilty	Reduced Operating and Maintenance Costs, Longer Service Life
Self-Adjusting, Maintenance-Free Multi-Layer Packing or Bellows Seal	Reduced Leakage Lower Fugitive Emissions	Improved Environmental Compliance No Adjustment Necessary
Interchangeable, Top-Entry Trim	Application Flexibility & Ease of Access	Reduces Spare Inventory Costs
Optimized High Capacity Flow Path	Per Size Cv Higher Than Most Valves In Its Class	Lower Initial Costs
Compact Multi-Spring Actuator	Reduced Height & Weight	Lower Installation Costs
Industry Standard Accessory Mounting	Accommodates Most Valve Automation Products	Lower Automation Costs
Modular Industrial Designed Electric Actuator	Covers Wide Array of Application Capabilities	Lower Inventory Costs
Multitude of Options and Accessories Available for Electric Actuator	Provides Product Modification Agility Necessary to Satisfy Market Requirements	Application Rangeability

REFLEX Trim Designs

Characteristic: **On/Off or Quick Opening**
Flow direction: **To open**
This plug provides maximum flow with minimum pressure drop and Is Ideal when large flows are required just after opening.

Characteristic: **Linear or Equal Percentage**
Flow direction: **To open**
This plug covers all Cv ranges and is especially suitable for low differential pressures. The equal percentage flow characteristic provides excellent low flow control.

Characteristic: **Linear**
Flow direction: **To open or to close**
This plug is ideally suited when actuator selection is critical, and the shorter stroke means smaller actuators can often be used.

Characteristic: **Linear or Equal Percentage**
Flow direction: **To open or to close**
The perforated plug is suitable for use where high differential pressures are present. It can also be used where noise is an issue, typically reducing the noise level by 10 dBA. The hardened version improves life expectancy in cavitation and/or flashing conditions.

Characteristic: **Linear**
Flow direction: **A + B > AB**

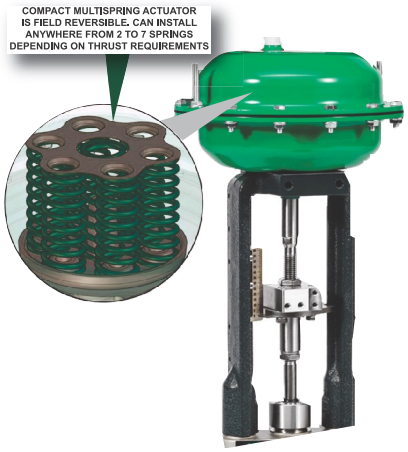
Characteristic: **Linear**
Flow direction: **AB > A , B**

All Plugs Available with Soft Seat, Offering Class VI Shut Off (Not Diverting)

REFLEX C_V Table

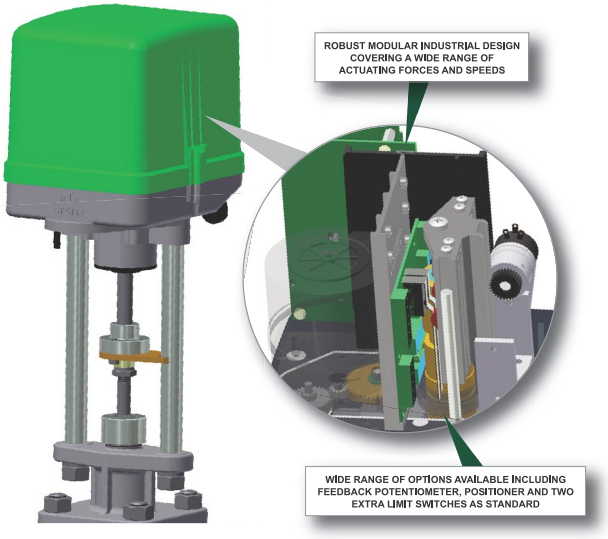
Valve Size (in)	DN	On/Off Plug Min	On/Off Plug Max	Parabolic Plug Min	Parabolic Plug Max	V-Port Plug Min	V-Port Plug Max	Perforated Plug Min	Perforated Plug Max	Mixing Plug	Diverting Plug
1	25	2	10.7	0.58	10.7	8.7	10.7	2	8.4	10.7	8.7
1½	40	7.9	28	0.58	28	13	28	2	22	28	22
2	50	14	43	1.2	43	21	43	2	34	43	35
2½	65	22	73	2	73	22	73	5.6	57	73	55
3	80	36	110	7.9	110	36	110	8.8	86	110	92
4	100	56	172	14	172	56	172	8.8	135	172	140
6	150	147	386	56	386	147	386	23	303	386	339
8	200	225	687	87	687	225	687	35	540	687	487
10	250	350	1074	147	1074	350	1074	60	842	1074	867
12	300	540	1546	225	1546	540	1546	91	1223	1546	1306

Standard Actuator Offerings



Spring & Diaphragm Actuator

The **REFLEX** is available with a multi-spring diaphragm actuator which delivers excellent control performance in a compact package. This actuator design is based on decades-proven and highly reliable diaphragm technology. The spring and diaphragm actuator provides for inherent fail safe operation and can be easily converted between direct and reverse acting functions. Standard positioners and a variety of accessories cleanly mount on this actuator.



Electric Actuator

All valves are available with an electrically-operated actuator. These actuators provide higher actuating forces than comparable pneumatic actuators. A wide range of operating voltages and actuating speeds are available for each actuator version, ensuring the actuator is tailor made for each application. Due to the inherent stiffness of the gear wheels and motors these actuators effectively buffer high fluid dynamic forces experienced in extreme flow conditions. A variety of accessories, including feedback potentiometers, positioners and an emergency closing unit are available for these actuators, providing the best range in industry.

Standard **REFLEX** Accessories

Pneumatic Actuators

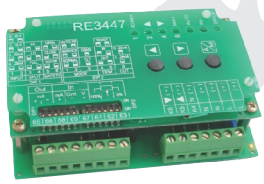
- Siemens PS2
- ABB TZIDC
- Electropneumatic Eckardt SRI 990 & SRI 986
- Pneumatic Eckardt SRP 981
- Air Filter/Regulator
- Solenoid Valves
- Limit/Proximity Switches
- Manual Override Handwheels

Electric Actuators

- Feedback Potentiometer
- Feedback Transducer
- Digital Valve Positioner
- CANopen/Profibus Systems
- Hydraulic emergency closing units

Noise Reduction Devices

- Integrated silencer on Valve Outlet
- Silencing Orifice



Specialty Valves

Feedwater Valve with Recirculation

Specially designed to Protect Feedwater Pumps against cavitation by combining boiler feedwater valve and By-Pass valve in one. Adjustable recirculation rate up to 10% of Cv value. Hardened recirculation plug and seat for low wear operation.

Steam Converting Valve

Combined Pressure Reducing and Desuperheating in one valve. Optimized control characteristics with specially adapted Trim for Low Wear operation.

Continuous Blowdown Valve

Parabolic Plug with linear characteristic for precise control of blowdown rate. Hardened trim for low wear operation. Available with or without manual sample valve.

Valve with Silencer

Used to Reduce Noise for steam and gases. Also used to supress cavitation and reduce noise for liquids. Available with two to four throttle plates Included in pipe expansion.

Bottom Blowdown Valve

Available in either pneumatic or manual design. Hardened trim for low wear operation. Protection of stem packing by back sealing when the valve is opened.

Applications | Endless Possibilities

Industrial Boilers
STEAM
WATER TREATMENT
Boiler Feedwater Control
Continuous Blowdown
Temperature Control
Gases
Automotive Industry
PRDS
Wood Industry
Textile Industry
Water
Liquids
Steel Mills
Level Control
Power Industry
Thermal Oil
Oil & Gas Industry
Bottom Blowdown
Industrial Refrigeration
Mining
Marine
Pressure Control
Chemical Industry
Flow Control
Food & Beverage Industry
District Heating



CIRCOR POWER & PROCESS

CIRCOR Power & Process is a global provider of highly-engineered steam, water and gas solutions that strategically collaborates with customers to turn their most difficult applications challenges into opportunities to improve efficiencies and performance, and maintain operational excellence.

SPENCE

Spence Engineering Company is the industry leader in the steam equipment regulation field and is an ISO 9001 certified custom manufacturer of steam specialty and fluid control devices. Since its earliest days, Spence has continued its "History of Innovation" with new product development and improvements to the Spence "quality first" manufacturing philosophy. This commitment to quality has enabled Spence to develop and manufacture quality steam specialty and fluid controls products that meet the changing needs of today's HVAC and industrial marketplaces.

RTK REGELTECHNIK KORNWESTHEIM

A subsidiary of CIRCOR International, Inc.

Regeltechnik Kornwestheim (RTK) has more than 35 years experience in the manufacture and sales of control valves and is a leading European manufacturer of industrial valves. With highly motivated employees, a state-of-the-art production environment and a strong commitment to continuous improvement, RTK delivers innovative products and services that improve thermal efficiency and system safety. RTK has engineering expertise in control valves, electric and pneumatic actuators, sensors and controllers.

LESLIE CONTROLS, INC.

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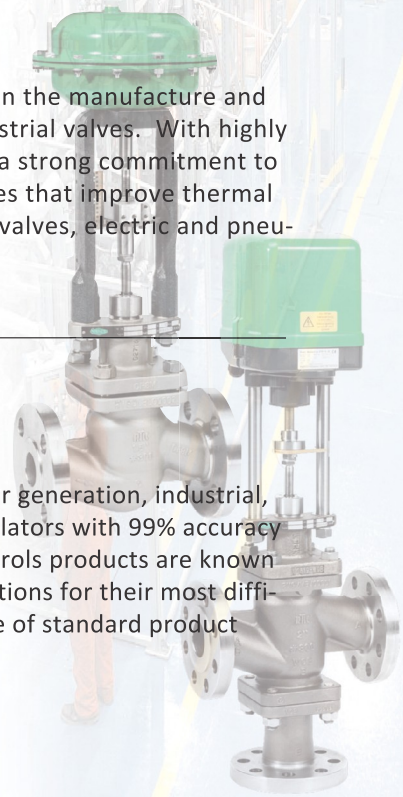
Leslie Controls, Inc. has designed and manufactured valves for the power generation, industrial, marine, and oil & gas markets for over a century. From high quality regulators with 99% accuracy to severe service control valves that provide **ZERO LEAKAGE**, Leslie Controls products are known throughout the world. Customers also rely on Leslie for engineered solutions for their most difficult applications. Leslie's Quick Delivery program provides a broad range of standard product within **five** days.



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