radman
Process Development (P.J.S.)

Safety Relief Valve
Control Valve
Actuator
Valve Automation Center (VAC)

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01. The Company Introduction

RADMAN Process Development Co. p.j.s. is a manufacturing company located in Tehran. It was established in 2011 and It is the first underlicensed Iranian company in the design and production of Safety Valves, Control Valves and Actuators used in Oil, Gas, Petrochemical and other industries. Our production is based on a technical knowledge transferred and high quality supervised contract with well-known British, Italian, German, Japanese and S.Korean Companies.

In 2015 RADMAN was nominated as a Technology -Based company by vice-presidency for science and technology and as a HIGH TECH company by ministry of industry, mine and trade.

Along with receiving engineering technologies, Radman's researchers in R&D Department commence to improve products to a higher level. Based on our modern factory and facilities, today, we have the capability to deliver complete valve solutions for major projects in the power generation, oil and gas exploration and general industrial sectors.

02. Safety Valves

The effects of exceeding safe pressure levels in an unprotected pressure vessel or system could be catastrophic both for plant and personnel. Safety Relief Valve is designed to protect any pressurized system from the effects of exceeding its design pressure limit. A safety relief valve is designed to automatically discharge gas, steam, vapor or liquid from any pressure containing system, preventing a predetermined safe pressure being exceeded, and protecting plant and personnel.

RADMAN has the detailed knowledge and modern technology for precisely producing the high quality Control valves. The company has developed different series of products to give the best response, in term of control, to the characteristics of different plants. our products provide vital risk protection to vast number of sectors and applications, including the oil and gas, petrochemical, chemical, water treatment, metallurgical, ship building and power generation industries. The Radman range of safety relief valves contains five distinct valve types:

a Series, m Series, r Series, d Series, n Series

a1 Series

a series is the name given by Radman to one of its full nozzle valves which have been designed for gas, steam, liquid and multi-phase fluid application, design criteria and application limits are in accordance with ASME Sec. VIII and ASME Sec. I standards, a series is devided to two categories: *a1 series and a2 series*.

a1 series: API 526 (ASME Sec. VIII)

a1 series has been designed in accordance with ASME Sec VIII and API 526 standard. It can be used for fluids in liquid, gaseous or multi-phase state, variety of types (conventional, bellows and balance piston) combined with the large choice of accessories and material makes it possible to meet any process and service condition in order to provide the best solution.

More details are listed in below table:

a1 series											
Valve Size (in)	Inlet	1	1-1/2	1-1/2	2	3	3	4	6	6	8
	outlet	2	2	3	3	4	6	6	8	10	10
Set Pressure Range	0.5 To 413 bar										
Temperature Range	-267 to 538 C										
Orifice	D to T										
Pressure Class Range	Up to 2500										
Variety Type	Conventional, Balanced bellows and Balanced piston										
End Connection	RF, RTJ										
Body Material	A216 WCB, A217 WC6, A351 CF8, A351 CF8 , SA 352 Gr. LCB , Super Duplex, Inconel and etc.										
disk and Nozzle Material	Stainless Steel 410, Stainless Steel 17/4 PH, Stainless Steel 316/316L, Stainless Steel 304/304L , Stainless Steel 304/304L+Stell., Stainless Steel 316/316L+Stell., Duplex, Inconel, Special										
Spring Material	Carbon steel, Stainless Steel 302, High Temp Alloy, Inconel X-750 and etc.										
Accessories	Bellows, Piston, Heating jacket, Plain Lever, Test gag, Packed lever, Bolted Cap and Soft Seat										

Features and Benefits

. Lighter and more compact construction:
Continuous design improvements have created smaller and lighter valves to support current industry design trends, especially space and weight saving.

. Interchangeable parts:
Valves can be modified from type to type, gas, liquid, conventional and bellows simply by changing only a few parts in a1 series.

. Simplified maintenance and service:
re-engineering has reduced the number of parts, making maintenance easier and more cost effective·

. Material Selection:
A wide range of materials are offered including non-ferrous for low temperature and oxygen service, as well as exotic alloys specifically for the chemical and process industries.

. High performance springs:
Safety relief valve springs are specially designed to guarantee set point repeatability.
Bellows back-up piston: in a1 series pressure safety relief valves, an optional auxiliary back-up piston for balanced bellows valves ensures fail-safe operation in the event of bellows failure.

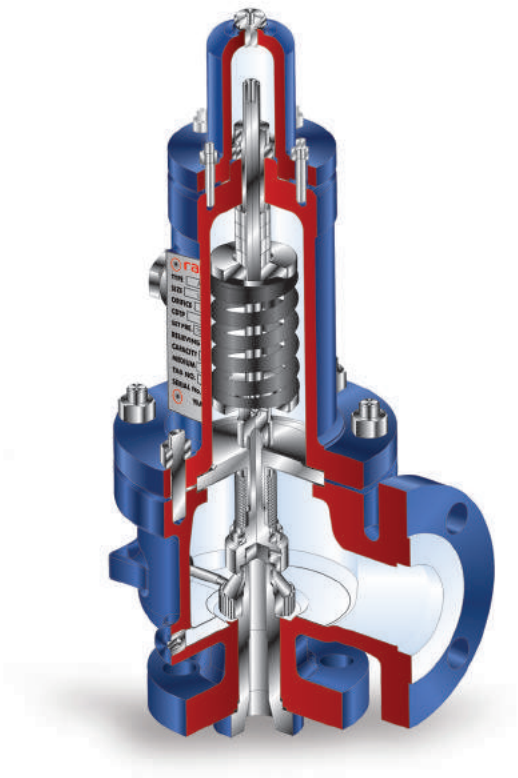
. Guiding surface:
The material selection of guiding components together with a self-aligning disc and spindle pivot point, ensure correct alignment and no galling of guiding surfaces required by relevant codes.

. Seat leakage integrity:
Choice of nozzle and disc materials (coupled with superior lapping techniques) provides seat tightness to a higher standard than that required by relevant codes.

. Adjustable blowdown:
The valve reseating pressure (blowdown) can be simply adjusted to suit special or specific performance requirements.

. Nozzle design:
the method and location of attachment to the body avoid transmission of pipe stresses to the nozzle/ disc mating surface.

. API 526 dimensions:
Standardised dimensions allows pipework layouts to be detailed confidently.



a2 Series

a2 Series: ASME Sec.I

a2 series is a full nozzle type safety valve designed according to ASME Sec. I standard for saturated and superheated steam service on drums, super heaters outlet, reheater inlets and outlets and economizer applications.

More details are listed in below table:

a2 Series													
Valve Size (in)	Inlet	1	1-1/2	1-1/2	2	2	2-1/2	3	3	4	6	6	8
	outlet	2	2	3	3	4	4	4	6	6	8	10	10
Set Pressure Range	1 To 413 bar												
Max. Temperature	1000 °F (538 °C)												
Orifice	0.307 to 11.045 in^2												
Pressure Class Range	ANSI Class 150 Up to 2500												
Codes	ASME Sec. I and Sec. VIII												
End Connection	RF, RTJ, Special												
Body Material	A216 WCB, A217 WC6 and etc.												
disk and Nozzle Material	Stainless Steel 17/4 PH, Stainless Steel 316/316L, Stainless Steel 316/316L+Stell. and etc.												
Spring Materila	Carbon steel, Stainless Steel, High Temp. Alloy and etc.												
Accessories	Test gag, Plain Lever, Packed Lever, Bolted Cap and Weather hood												

Features and Benefits

. Lighter and more compact construction:
Continuous design improvements have created smaller and lighter valves to support current industry design trends, especially space and weight saving.

. Simplified maintenance and service:
Re-engineering has reduced the number of parts, making maintenance easier and more cost effective.

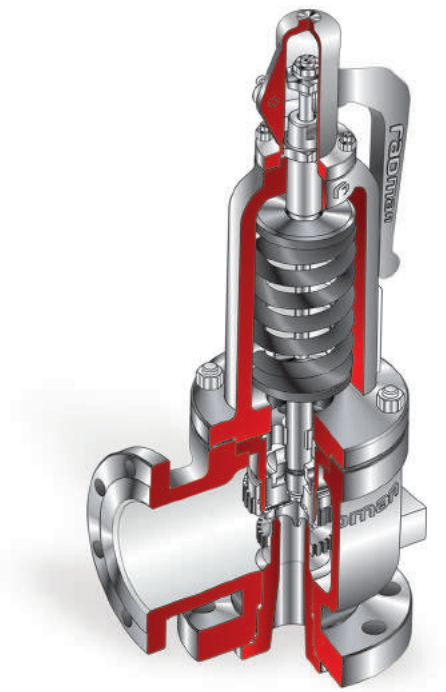
. High performance springs:
Safety relief valve springs are specially designed to guarantee set point repeatability.

. Nozzle design:
The method and location of attachment to the body avoids transmission of pipe stresses to the nozzle/ disc mating surface

• Two-Ring Design:
Precise blowdown control is provided by the adjustable two-ring design. Blowdown may be conveniently adjusted while the valve is installed in the system.

. Shut Tight:
a2 Series valves shut off tight. Years of application engineering have resulted in special design which is recessed for pressure and temperature equalization ensuring a flat, tight seal that is capable of containing system pressure at 94+% of the valve's set pressure.

. Precise Popping Point:
Centering of the disc through the low friction guide ensures that RADMAN's a2 Series Safety Valves open at set pressure precisely, even after repeated cycling.



m Series

m series is a high efficiency Pilot operated safety valve with unique full and semi nozzle design and dimensions according to API 526. Pop action and modulating pilots are available for both liquid and gas duties.

RADMAN Pilot Operated Valves Types:

Pop Action: Controls the main valve in a rapid manner, it is either open or closed specifically for gas applications. Modulating: The main valve is opened in a controlled manner, the over pressure is constantly monitored and the opening of the main valve is proportionate to the overpressure.

More details are listed in below table:

m Series											
Valve Size (in)	Inlet	1	1-1/2	1-1/2	2	3	3	4	6	6	8
	outlet	2	2	3	3	4	6	6	8	10	10
Temperature range	-267 to 260 °C										
Orifice	D to T										
Pressure Class Range	Up to 2500 x 600										
Variety Type	Pilot-Operated Pop action, Pilot-Operated-Modulating										
End Connection	RF, RTJ, Special										
Body Material	SA 216 Gr. WCB, SA 217 Gr. WC6, SA 351 Gr. CF8M, SA 315 Gr. CF8, SA 352 Gr. LCB Super Duplex, Inconel and Special										
Disk and Nozzle Material	Stainless Steel 410, Stainless Steel 17/4 PH, Stainless Steel 316/316L, Stainless Steel 304/304L Stainless Steel 304/304L+Stell., Stainless Steel 316/316L+Stell., Super Duplex, Inconel and Special										
Spring Material	Carbon steel, Stainless Steel 302, High Temp.Alloy, Inconel X-750 and etc.										
Accessories	Remote Sensor, Packed Lever, Back Flow Preventer, Cooling/Heating Cap, External Filter, Test Gag, Liquid Duty, Field Test Connector, Remote Unloader										

Features and Benefits

- **Close system operating pressure:**

The system operating pressure can be much closer to the set pressure on a pilot operated valve than with a standard spring loaded safety relief valve. System pressures in the interval of 95 to 98% of set pressure are often accommodated.

- **Tolerates high inlet pressure loss:**

High inlet pressure losses due to difficult inlet piping systems can be accommodated by remote sensing the pilots, hence trouble free operation can be assured.

- **Close differential pressure setting:**

Pop acting pilot operated valves are quick acting and hence there is no delay between the pilot and the main valve opening pressures. Modulating valves inherently have a delay, which is nominally 2%. This ensures the pilot is not leaking when the system pressure is close to the set pressure.

- **Close blowdown and overpressure tolerance:**

Pop action safety valve pilots can be adjusted to give zero overpressure and a blowdown typically equal to 3% of set pressure.

- **Integral pilot filter:**

m series pilots operated safety valves are fitted with integral filters.

- **Full lift capability:**

Pilot operated safety valves will maintain full lift against high levels
of back pressure. Unlike spring loaded safety valves, which would need either differential setting or the addition of balanced bellows.

- **Soft seat:**

m series pilots and main valves are soft seated to give optimum leak tightness. Various materials are available for a wide range of duties. Maintenance is simplified as seat lapping is reduced.

- **Integral sensing:**

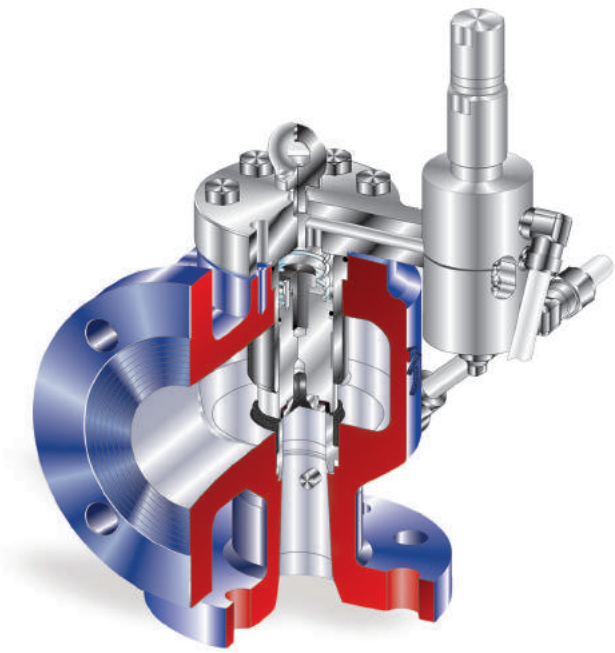
m series pilots are sensed from the nozzle, giving a compact design and accurate pressure sense from within the flow stream.
Remote sensing for difficult inlet piping systems is recommended.

- **Two part piston-disc assembly:**

This gives a reduced guiding geometry, keeping the size of the components within the body bowl to a minimum, thus increasing the effective discharge area through the valve outlet.

- **Wide range of accessories:**

Available accessories are Back flow preventer, External supply filter, Remote pressure sensing, Heating or cooling coils, Field test connector, Packed lift levers, Ferrules (government rings) and Test gag.




r1 Series

r1 Series

r1 Series safety valves, relieve thermal expansion of process fluids in vessels and long lengths of pipework, and are suitable for gas and liquid applications. Its compact design leads to simplified maintenance. Reliable performance and easy maintenance procedures are characteristics of this valve, when properly installed in suitable applications for its design.

More details are listed in below table:

r1 Series						
Valve Size (in)	Inlet	1/4	1/2	1/2	3/4	1
	outlet	1/2	1/2	1	1	1
Temperature range:	-267 to 538 C					
Orifice	0.03,0.07,0.11 and 0.169					
pressure range:	0.5 to 280 bar					
End Connection	NPT male/female Threaded, RF and special					
Body Material	SA 216 Gr. WCB, SA 217 Gr. Wc6, SA 351 Gr. CF8M, SA 351 Gr. CF3M, SA 352 Gr. LCB and Special					
disk and Nozzle Material	Stainless Steel 410, Stainless Steel 17/4 PH, Stainless Steel 316/316L, Stainless Steel 304/304L , Stainless Steel 304/304L+Stell.,Stainless and Special					
Spring Material	Carbon steel, Stainless Steel 302, High Temp.Alloy, Inconel X-750 and etc.					
Accessories	Test Gag, Open Lever, Packed Lever, Soft Seat. Bolted cap					

Features and Benefits

. Simplified maintenance:
For the flanged version, a slip on inlet flange makes it easier to realign into existing pipework after servicing.

. Interchangeable parts:
Valves can easily be modified from gas to liquid or liquid to gas with the minimum number of parts.

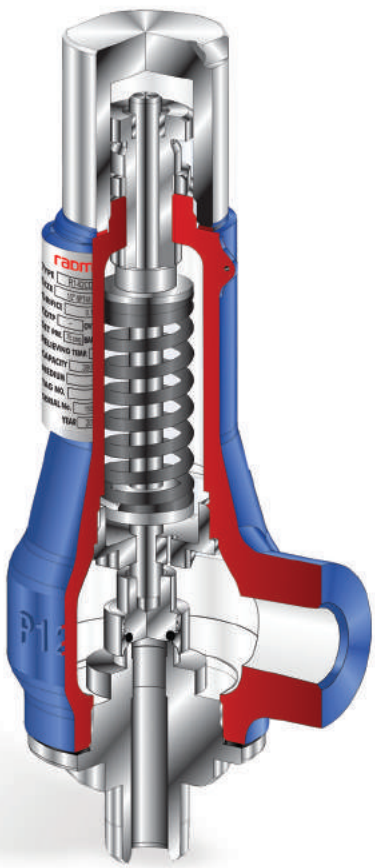
. Safe and reliable:
Proven dependability ensures safe and reliable performance.

. Material selection:
A wide range of materials are offered, including non-ferrous for low temperature and oxygen service, and exotic alloys specified for the chemical and process industries.

. High performance springs:
Safety relief valve springs are specially designed to guarantee set point repeatability.

. Guiding surfaces:
The material selection of guiding components, together with self-aligning disc pivot points, ensures correct alignment and no galling of guiding surfaces.

. Trim:
r1 Series valves have been designed with metal trim to give optimum performance at higher pressures.



r2 Series

r2 Series is a full lift, full nozzle pressure safety valve with fixed and adjustable blowdown ring. These series provide simple and easy maintenance due to its new design that consist of three main part (separate cap and bonnet). This is owed to the bar material (forge) being of the design. These series are also designed to cover a wider range of pressure in comparison to r1 and comes with various accessories.

More details are listed in below table:

r2 Series							
Valve Size (in)	Inlet	1/2	1/2	3/4	11	1/2	2
	outlet	1/2	1	1	1	11/2	2
Orifice	0.099,0.206 and 0.374 sq.in						
End Connection	RF, NPT male/female and special						
Body Material	A105, SS 316, SS 304, A250 Gr. LF2, super Duplex, Inconel and special						
disk and Nozzle Material	Stainless Steel 410, Stainless Steel 17/4 PH, Stainless Steel 316L, Stainless Steel 304L, SS 304L + Stell., SS 316L + Stell., Super Duplex, Inconel, Special						
Spring Material	Carbon Steel, Stainless Steel 302, High Temp. Alloy, Inconel X-750 and Special						
Accessories	Packed Lever, Soft Seat, Test Gag, Nace Compliance, Heating Jacket and Special						

Features and Benefits

• **Simplified maintenance:**
separate parts in bar material (forged) design leads to an easy maintenance.

• **Interchangeable parts:**
Valves can easily be modified from gas to liquid or liquid to gas with the minimum number of parts.

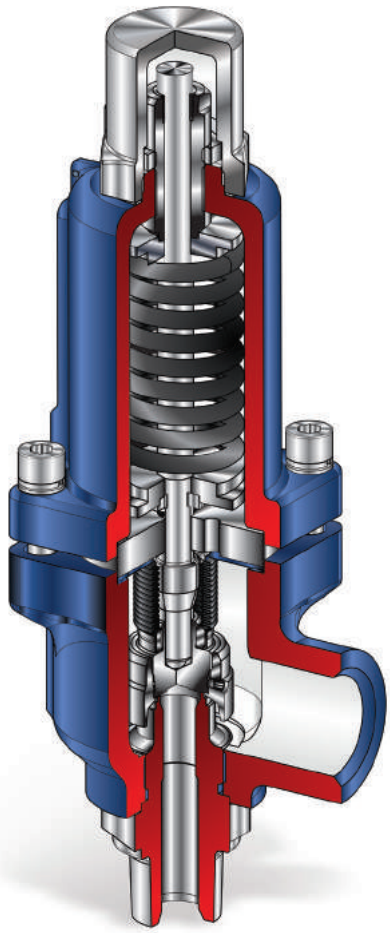
• **Wide pressure range:**
r2 series are specially designed to implement in high pressure (up to 350 bar) process conditions.

• **Material selection:**
A wide range of materials are offered, including non-ferrous for low temperature and oxygen service, and exotic alloys specified for the chemical and process industries.

• **High performance springs:**
Safety relief valve springs are specially designed to guarantee set point repeatability.

• **Guiding surfaces:**
The material selection of guiding components, together with self-aligning disc pivot points, ensures correct alignment and no galling of guiding surfaces.

• **Trim:**
r2 Series valves have been designed with PMSS (Primary Metal Secondary Soft) trim to give optimum performance in various process conditions.




d Series

d Series

d series Safety Relief Valves provide full overpressure protection for process systems at an affordable cost of ownership, thanks to the semi nozzle design. The d series Safety Relief Valve is available in both conventional and balanced bellows types. All accessories normally required are available. Variety of types combined with the large choice of material makes it possible to meet any process condition and medium in order to provide the best solution.

More details are listed in below table:

d Series									
Valve Size (in)	Inlet	1	1	1-1/4	1-1/2	2	2-1/2	3	4
	outlet	2	1-1/2	2	2-1/2	3	4	5	6
Set Pressure Range	0.35 to 40 bar								
Temperature Range	-40 to 150 Celsius								
Orifice	0.64, 1.02, 1.67, 2.48, 4.38, 6.67, 10.3								
Variety Type	Conventional and balanced bellows types								
End Connection	RF, FF								
Body Material	SA 216 Gr. WCB, SA 351 Gr.CF8M special								
Disk and Nozzle Material	SS 316L/ SS 316, SS304L/SS 304, special								
Spring Material	Carbon steel, Stainless Steel 302, special								
Accessories	Open Bonner, Blowdown Ring, Test Gas, Open Lever, Packed Lever, Soft Seat Bolted Cap, Special								

Features and Benefits

• **Wide range of service application:**
Are designed to function equally well on air, gas and steam or in liquid service.

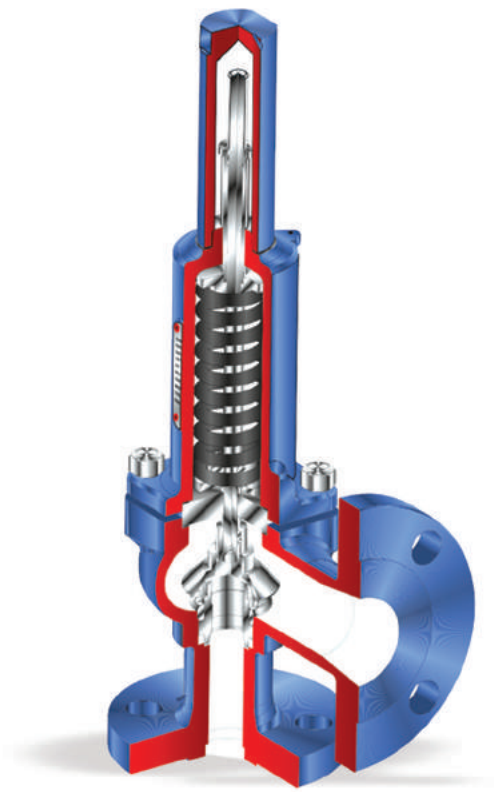
• **Full lift maximum discharge capability:**
The combination of top guiding, unobstructed seat bore and full lift capability ensures the highest possible discharge rate thus maximum plant protection.

• **Correct alignment:**
A freely pivoting disc, which ensures correct alignment with the nozzle. The combination of top guiding

• **Optional Connections:**
d series valves may be furnished with Optional flanged connections with unique face-to-face dimensions to match existing installations.
Additionally, oversized or expanded outlet sizes are available.

• **Precision lapped stainless steel trim:**
Superior lapping techniques provides seat tightness to a higher standard than that required by relevant codes.

• **Comprehensive range of accessories:**
Accessories are Bellows, Heating jacket, Plain Lever, Test gag, Packed lever, Bolted Cap, Screwed Cap and Soft Seat.



n Series

n Series Safety relief valves are the Radman non-API safety valves that
are designed and manufactured in accordance with API 520 and ASME Sec. VIII, however the orifice sizes, inlet outlet sizes and pressure ratings are not limited to the ones in API 526. These series of valves are provided in two body design, cast and forge. Each body type also is available in both conventional and balanced bellows type.

Features and Benefits

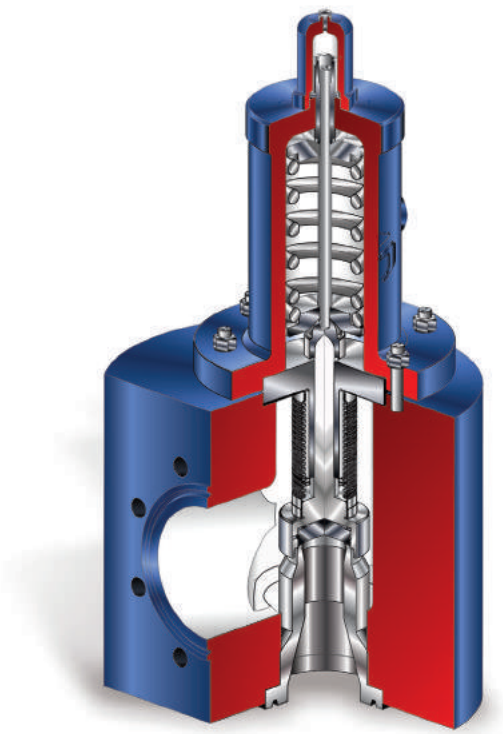
• **Material selection:**
Base /inlet body, body, bonnet and all internal parts can be produced in special materials exactly to meet customer specification requirements.

• **High performance springs:**
Safety relief valve springs are specially designed to guarantee set point repeatability.

• **Guiding surface:**
the material selection of guiding components together with a self-aligning disc and spindle pivot point, ensure correct alignment and no galling of guiding surfaces required by relevant codes.

• **Seat leakage integrity:**
choice of nozzle and disc materials (coupled with superior lapping techniques) provides seat tightness to a higher standard than that required by relevant codes.

• **Wide range of accessories:**
available accessories are Bellows, Piston, Heating Jacket, Plain Lever, Test Gag, Packed Lever, Bolted Cap, Screwed Cap and Soft Seat.



03. Control Valves

The control loops of a processing plants are designed to keep a process variable (i.e. pressure, flow, level, temperature, etc.) within a required operating range to ensure a quality end product is produced. The most common final control element in the process control industries is the control valve. The control valve manipulates a flowing fluid, such as gas, steam, water, or chemical compounds to compensate for the load disturbance and keep the regulated process variable as close as possible to the desired set point. The control valve is a critical part of the control loop.

RADMAN has the detailed knowledge and modern technology for precisely producing the high quality Control valves. The company has developed different series of products to give the best response, in term of control, to the characteristics of different plants.
our products provide vital risk protection to vast number of sectors and applications, including the oil and gas, petrochemical, chemical, water treatment, metallurgical, ship building and power generation industries.

Industries Served

OIL AND GAS INDUSTRY

RADMAN has been providing engineered severe service valves for the oil and gas industry. Our valves are installed and in operation in a wide range of the oil and gas industry's harsh applications. RADMAN holds major industry approvals, and served many of the world's major oil & gas companies.

products

- Globe/angle type control valves for general service and severe applications with high pressure drop, cavitation or flashing services.
- Triple offset butterfly valves for high pressure service.
- Trunnion-mounted ball valves for gas and liquid services.

POWER GENERATION

RADMAN provides comprehensive range of products for high temperature and high pressure drop severe service conditions in power generation industry. Complete range of high pressure class valves with welding connections are available.

products

- Two-way and three-way Control valves for general service and severe applications actuated by pneumatic, electric, or electro-hydraulic actuators.
- Triple offset butterfly valves for high pressure service.
- Steam conditioning valves, Desuperheaters.

Industries Served

CHEMICAL PROCESSING

RADMAN's wide range of valves are designed for long service life in corrosive and abrasive applications of chemical processing in sophisticated materials such as titanium, hastelloy, monel, and so on. Special material products are supplied for corrosive chemical control services. We offer bellows seal & specially designed ISO 15848-1 Class A sealings for toxic service valves.

products

- Control valves with higher rangeability trims, special materials, cryogenic, and bellows.
- High performance & triple offset butterfly valves.
- Quarter turn control and on-off valves.

GENERAL INDUSTRIES

RADMAN's compact & modular design products can achieve quick delivery, superior cost effectiveness. Vast range of automation products are available. RADMAN offers high flow capacity with smaller and more cost effective cost effective size of valves.

products

- Compact control valves for general service.
- High performance & triple offset butterfly valve.
- Quarter turn control and on-off valves.



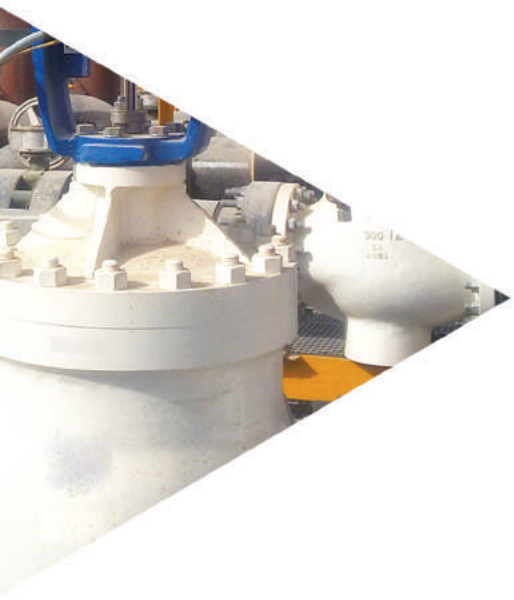









	Valve tape	Feature	Size	Max Press. Rating
1	Globe Valves	Precise control / Severe service	1/2" - 36"	ANSI 150 ~ 2500
2	Angle Valves	Viscosity, Resistance	3/4" - 24"	ANSI 150 ~ 2500
3	3-Way Globe Valves	Mixing & Diverting	3/4" - 16"	ANSI 150 ~ 600
4	Pressure Regulators	Direct / Pilot	1" - 16"	ANSI 150 ~ 2500
5	Ball Valves	Soft / Metal Seat	1/2"- 24"	ANSI 150 ~ 2500
6	V-notch Ball Valves	High Rangeability	1" - 16"	ANSI 150 ~ 600
7	Butterfly Vales	High-performance / Triple Offset	2" - 100"	ANSI 150 ~ 1500
8	Teflon Blocked Valves	Anti-corrosion	3/4" - 2"	ANSI 150
9	Discharge Valves	Tank Bottom	1" - 10"	ANSI 150 ~ 300
10	Desuperheaters	Venturi / Mechanical Nozzle / Variable Nozzle	All	All



Size	1/2" - 36"	Max Press. Rating	ANSI 150 ~ 2500

Globe Valves

RADMAN® Globe valves are the best solution for throttling service in oil, gas, petrochemical and other industrial purposes. It provides optimal solutions to control from general service fluids to corrosive, cryogenic, high temperatures fluids under severe service conditions containing erosion, corrosion and high pressure drops.

Performance

- High Cv to body size ratio, which allows for smaller. and more cost effective valve size selection.
- High Cv to valve weight ratio.
- Optimized streamlined flow.
- Excellent flow control rangeability.

Design Flexibility

- Modular construction design.
- All trim components are replaceable from the top for easy maintenance.
- Wide range of supplementary cavitation & noise control options
- Inherently characterized trim offered in equal percentage, linear, quick opening and modified parabolic. Multi trim sizes are available.
- Full range of body and trim material options.
- Full range of bonnet and packing designs to suit various process fluid characteristics.

Size	3/4" - 24"	Max Press. Rating	ANSI 150 ~ 2500

Angle Valves

RADMAN® angle valves are widely accepted for controlling fluids of high differential pressure, slurry, high viscosity, or adhesive. They are provided with a number of features such as low resistance of flow passage, anti-wear quality within the valve, and easy maintenance and inspection.

Performance

- High Cv to body size ratio.
- High Cv to valve weight ratio.
- Excellent flow control rangeability.

Design Flexibility

- Modular construction design available with a range of different connections and styles.
- All trim components removable from the top for easy
- maintenance.
  Wide range of supplementary noise control options. Inherently characterized trim offered in equal percentage, linear, quick opening and modifiedpara-
- bolic (options). Multi trim sizes available.
- Full range of body and trim material options.
- Full range of bonnet and packing designs to suit various temperatures and fluids.

Size	3/4" - 16"	Max Press. Rating	ANSI 150 ~ 600

Mixing / Divert 3-way Valves

RADMAN® three-way type control valves are used for controlling the fluids mutually to three directional pipings, i.e., mixing service or diverting service

Performance

- High Cv to body size ratio.
- High Cv to valve weight ratio.
- Excellent flow control rangeability.

Design Flexibility

- Modular construction design available with a range of different connections and styles.
- All trims components are removable from the top for easy maintenance.
- Wide range of supplementary noise control options.Inherently characterized trim offered in equal percentage, linear, quick opening and modified parabolic (options).
- Multiple trim sizes available.
- Full range of body and trim material options.
- Fully rationalized and interchangeable features.
- Full range of bonnet and packing designs to suit various temperatures and fluids.

Size	1" - 16"	Max Press. Rating	ANSI 150 ~ 2500

Self-Acting Pressure Regulator Valves

RADMAN® pressure regulating valves are designed for controlling pressure of liquids & gases in various industrial applications.

Performance

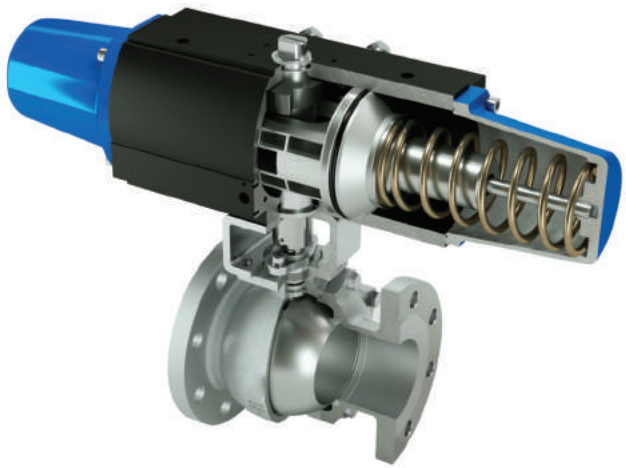
- Direct operated / Pilot operated.
- Easy setting / Fast action.
- Low cost maintenance.

Design Flexibility

- Wide spring selection range.
- Various types of pressure regulating valves for liquids & gases.

Specification

- Pressure reducing type (P2 control).
- Back pressure/Relief type (P1 control).
- Tank blanketing type.



Size	1/2"- 24"	Max Press. Rating	ANSI 150 ~ 2500

Ball Valves

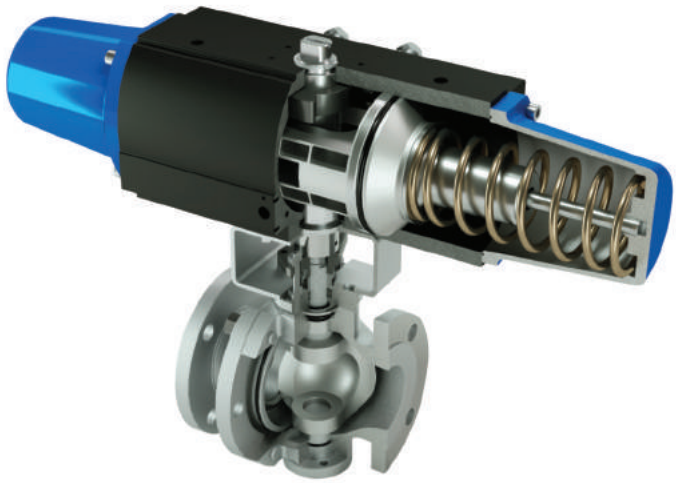
RADMAN® ball valves have been developed for wide range of process industry applications.
RADMAN® ball valves comply with API standard that incorporate many special features. This series of valves is designed for both pressure and vacuum service.

Standard Specifications

- Flanged end, 2-pcs split body construction, top entry available.
- Fields serviceable, wrench/gear/actuator mounted.
- Test Pressure: As per API 6D Std.
- Face to Face Dimension: as per API 6D Std.

End Connections

Flanged, conforming to ANSI B 16.5. The ball valves comply with one or more of the following standard specifications as to pressure, temperature ratings and dimensions: ANSI, API, BS, DIN, MSS.



Size	1" - 16"	Max Press. Rating	ANSI 150 ~ 600

V-Notch Ball Valves

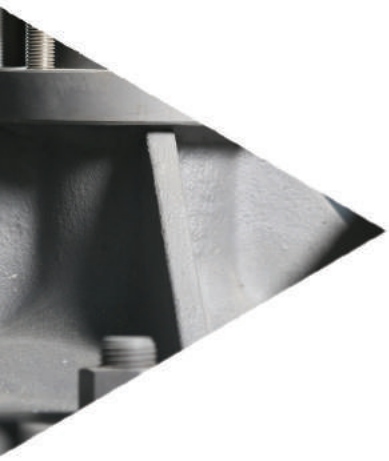
RADMAN® V-notch ball valves are Top Entry, Full Bore, Trunnion, and stem ball type, which are exclusively designed for excellent proportional control. RADMAN® has special shape of ball which is suitable for accurate throttling control and on-off service not only general fluids but also critical conditions in powders, slurry, gummy, fibrous material and other fluids with special characteristics.

Performance

- High Cv body size ratio (Full bore).
- Controls through 90° rotation.
- Excellent control range ability.
- Easy maintenance.
- ISO standard Mounting.

Design Flexibility

- Direct mounting actuator design flexibility .
- Control any fluids.
- Full range of body and vane material options with availability of hard facings.
- Seat changeability.
- Equal or Linear characteristics available.
- Self-cleaning and tight seating.
- Double-eccentric disc options.



Size	2" - 100"	Max Press. Rating	ANSI 150 ~ 1500

Butterfly Valves

RADMAN® butterfly valves have been developed for a large number of applications throughout process industries.
RADMAN® high performance butterfly valves are mainly used for isolation or on-off applications but also suitable for control, especially on high-flow, lowpressure applications. It offers additional advantages such as simple structure and low cost.

Features and Benefits

- High Cv to valve weight ratio compared to conventional control valves
- Throttling controls 60° rotation, on-off controls 90° rotation
- Excellent flow control range ability

Design Flexibility

- Triple-offset design
- Metal / Laminated / Soft seat available
- Actuator mounting flange dimensions in accordance with ISO 5211
- Swing through and tight shut-off seated trim design.
- Flange types are available
- Full range of bonnet and packing design to suit various temperatures and fluids
- Provides fire safe sealing, which combines a soft seal ring and metal seal ring.
- Full range of body and vane material options. Hard facing available

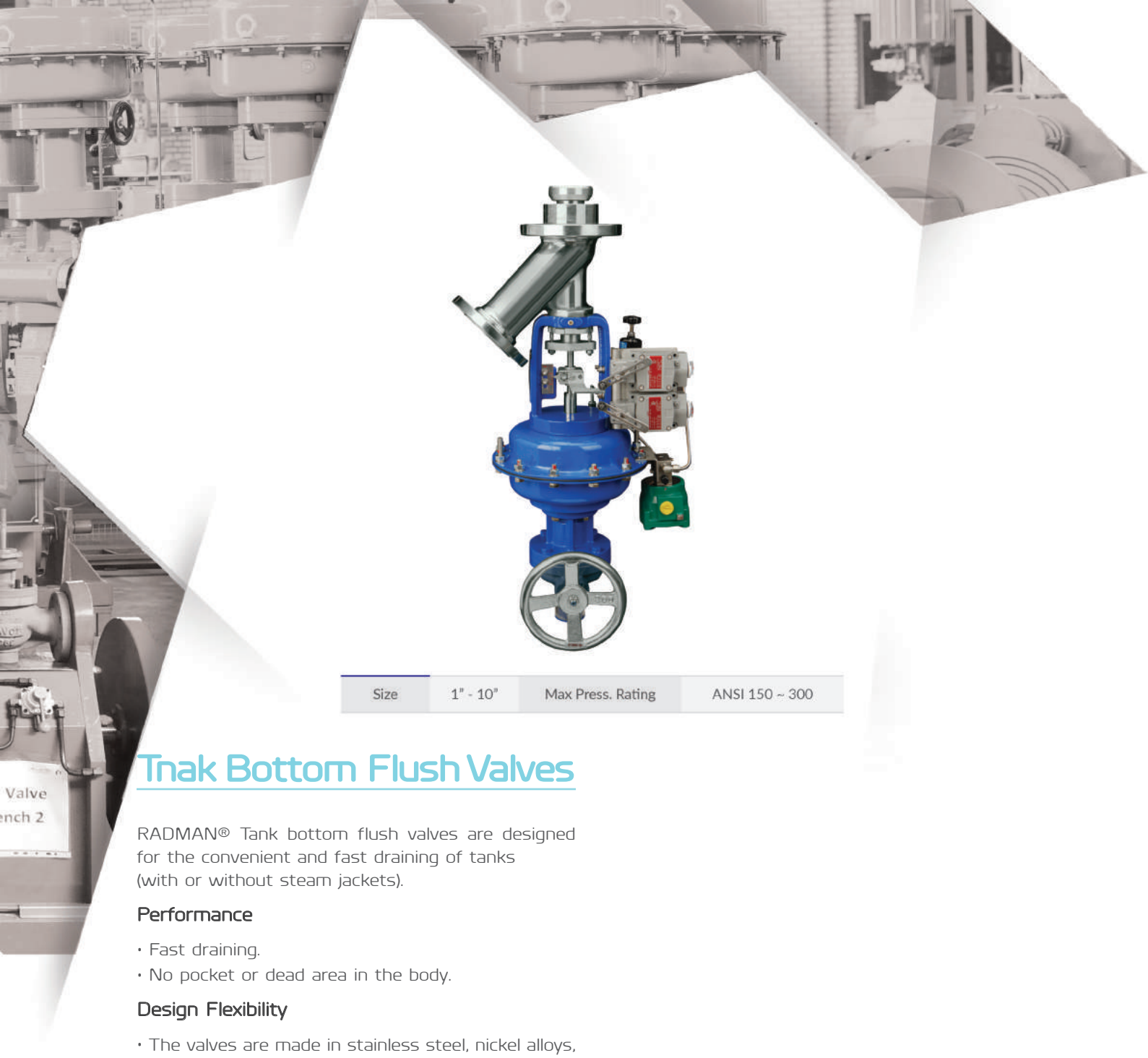
Size	3/4" - 2"	Max Press. Rating	ANSI 150

Teflon Block Valves

RADMAN® Teflon block valves are designed to be used for chemical injection service and acid or alkaline fluid service.
This valve has very compact design assembled with multi-spring diaphragm actuator.

Performance

- Integral body construction – All the wetted parts of the valve body are made of PTFE and realized
- superior anti-corrosive valve for acid or alkaline service.
- Main body is covered with stainless steel case providing high durability and long life.
- Compact design.
- Wide Cv range and controllability.



Size	1" - 10"	Max Press. Rating	ANSI 150 ~ 300

Tnak Bottom Flush Valves

RADMAN® Tank bottom flush valves are designed for the convenient and fast draining of tanks (with or without steam jackets).

Performance

- Fast draining.
- No pocket or dead area in the body.

Design Flexibility

- The valves are made in stainless steel, nickel alloys, carbon steel, etc.
- The valve can be fabricated with steam jackets.
- Cleaning connection and plug are available (option).
- Quick-opening disc (standard) equal percentage or linear (option).

Design Integrity

- Valve size are determined by outlet flange.
- The outlet connection line is at approximately 45° to the center line of the valve.
- Large stem diameter.

Desuperheaters

RADMAN® desuperheaters are designed to control steam temperature precisely and economically. KOMOTO's desuperheaters can optimize steam temperature, which can save fuel and in turn save investment cost.

Maintenance

- Venture style, fixed nozzle type, variable multiple nozzle type, steam conditioning type are available.
- Easy Installation & compact design.
- Excellent spray quality.
- Large control range.
- Long life.

Design Flexibility

- Tailor made design for each process. (No restriction for water or steam side flange)
- Carbon steel, Stainless Steel, Alloy steel materials are available

04. Actuators & accessories

Diaphragm Actuators

RADMAN® linear actuators are designed to control the flow, level and the pressure of fluid to respond to demand for fine process control and various plant systems. The 3600 actuators will satisfy customer's needs with its high reliability, durability and performance.

Specifications

- Maximum strength and reliable performance
- Compact design
- Multiple spring design

Piston Actuators

RADMAN® linear piston actuators are compact and provide long stroke and high thrust.

Specifications

- Long stroke (max. 600mm)
- High thrust
- Good Reliability
- Low hysteresis
- Light weight
- Easy maintenance
- Double acting and spring return
- Wide selection of accessories are available

Cylinder Actuators

RADMAN® Rotary cylinder actuators are designed to operate rotary valves such as ball valves, butterfly valves and plug valves for throttling or on-off service. RADMAN® Rotary cylinder actuators have unique canted scotch-yoke mechanism

Specifications

Ideal high torque

- Light weight
- Double acting and spring return
- Wide selection of optional accessories available
- Low hysteresis
- Mounting flange dimensions in accordance with ISO 5211
- Solenoid valve pad in accordance with "NAMUR"

rack & piston type

RADMAN® linear piston actuators are designed to operate sliding-stem valves, such as globe, gate, angel, three-way, etc. when diaphragm actuator can not secure the required thrust for valve operation.

Features and Benefits

· Stroke: up to 600 mm
· Thrust: up to 6238 kgf
· Minimum Air Supply: 5.0 (kgf/cm2G)
· Spring Range: 3.0~2.0 (kgf/cm2G)
· MAX. Working Pressure: 8 (kgf/cm2G)
· Action: Spring Acting (Opposite or Return) and Double Acting

Gas-over-Oil and Direct Gas Systems

They are typically used for on/off valve control in gas transmission pipelines.These systems use the pressure in the pipeline to provide the motive power for the valve actuators to operate rotary and linear valves.

- Compact and highly reliable manifolded control systems
- Modular control system manifolds to allow for quick, simple and inexpensive control system on-site functionality changes or servicing.
- Fully enclosed controls with lockable cover to provide excellent environmental protection and protection from unauthorised operation.
- PED or ASME approved gas-over-oil and power gas storage tanks for safe containment of power gas

Gas-over-Oil and Direct Gas Systems

They are available in all common configurations including multi-turn, part-turn, linear and lever and are able to operate practically all valve types and mechanisms.

- Torque outputs up to 675,000 Nm (5,973,750 lb in)
- Suitable for hazardous and non-hazardous areas.
- Modular design for exible operation and easy upgrades.

Subsea Systems

They are suitable for the operation of either rotary or linear subsea valves and are available in either double-acting or spring-return configurations.

- Non-pressure compensated designs. suitable for operation down to 150m
- Pressure compensated designs suitable for operation down to 1,000 m.
- All common ROV and diver override interface standards available.

Rotary Scotch-Yoke Valve Actuators

They are designed to operate any quarter-turn valve or mechanism.
Available in pneumatic, hydraulic, double-acting and spring-return configurations.

- Torque outputs up to 680,000
- Fabricated all steel construction as standard for excellent corrosion resistance and lightweight designs.
- Stainless steel designs also available
  3rd party approved for use in SIL3 certified systems
- Hydraulic valve actuators Lloyds certified for operation down to -65°C.

Linear Piston Valve Actuators

They are designed to operate any linear valve or mechanism and are available in pneumatic, hydraulic, double-acting and spring-return configurations.

- Thrust outputs up to 289,134 N (65,000 lbf)
- Pedestal and close-coupled valve mounting options
- Scragged springs to ensure optimum and stable performance
- 3 rd party approved for use in SIL3 certified systems

Self-Contained Electro-Hydraulic Systems

They provide on/off or positional control of linear and rotary valves.
Completely self-contained, these systems give operators the low installation costs offered by electric actuator systems, but with the power and fail-safe capabilities which have traditionally only been available from pneumatic or hydraulic systems.

- Low power requirements down to 100 W
- System designs available that generate no carbon footprint during operation
- System designs using biodegradable uid available
- Fail-close and fail-last designs available
- Partial valve stroke testing function with comprehensive diagnostics package available to permit the implementation of cost effective preventive maintenance programs
- All common communication protocols supported including HART and Foundation Fieldbus

Autonomous Shutdown Valves (ASV)

They are designed primarily for the operation of subsea PLEM valves used in CALM Buoy and similar tanker loading and of oading terminals. The ASV can also be employed in land based applications where external power is limited or unavailable.

- Fully automated fail-safe operation of subsea PLEM valve includings automatic linebreak detection and valve shutdown
- Remote status monitoring, override control and in-situ diagnostics
- Significantly reduced risk of pollution and loss of sealine inventory when compared to all competing system designs
- Fully self-contained subsea system able to operate 5 to 7 years before requiring battery replacement

Accessories

Volume Booster

Specifications and Features

- Flow Capacity (Cv): exhaust; 1.32, 2.08, 5.24 – output; 1.19, 2.72, 4.91
- Material: Aluminum die-casting, Stainless steel
  Connection: PT, NPT

Lockup valve

Features and Benefits

- Material: Aluminum die-casting, Stainless steel
- Type: Mechanical (SPDT & DPDT), Proximity, ...
- Explosion proof type: ExiaIICT6, ExdIICT6/T5, etc.
- Enclosure: IP67

In-line Pipeline Strainers

They protect downstream in gas pipelines from damage from pipeline debris such as scale, rust, jointing compound and weld metal.

- Gap size from 0.25 to 3mm
- Suitable for pipelines up to 36"
- Low Blocking/Blinding
- Low Pressure Drops
- High Strength
- Simple Installation
- Reduced Maintenance
- Enhanced Equipment Protection

Air Filter Regulator

Available specifications

- Material: Aluminum diecasting, Stainless steel
- High ambient temperature option (100°C) available.
- Connection: PT, NPT
- RADMAN® (MR series) or other global brands

Solenoid Valve

Specifications and Features

- Type: 3way, 4way
- Power Source: AC 110V, AC 220V, DC 240V
- Connection: PT, NPT
- Pressure: 0~ 0.4 MPa, 0~0.7 MPa, 0.1 ~1MPa
- Explosion proof type: ExiaIICT6, ExdIICT6/T5, etc.

Positioner

Available specifications

- Type: E/P, P/P, Smart
- Actuator type: Linear, Rotary
- Communication: 4-20mA, Hart, Fieldbus, Profibus
- Explosion proof type: ExiaIICT6, ExdIICT6/T5, etc.
- Enclosure: IP66
- Material: Aluminum die-casting, Stainless steel
- RADMAN® (MH series) or other global brands

The TVC Positioners

They are designed to provide precise positional control of rotary or linear hydraulically or pneumatically actuated valve systems.

- Comprehensive diagnostics package to facilitate the implementation of cost effective preventive maintenance programs
- All common communication protocols supported
- Low power – normal operation less than 2W plus solenoids
- Large graphics LCD with comprehensive status and data display
- Selectable solenoid drive sense for failsafe operation
- Selectable default operation on command signal / feedback signal break
- Zone 2 / 1 Infrared communication interface using an Exia keypad

The PST Controller

They are designed to provide manual an automatic partial valve stroke testing of any pneumatic or hydraulic rotary or linear actuated valve system.

- All common communication protocols supported
- Valve travel confirmation by a position transmitter to allow for automatic documentation of test results
- Full diagnostics Package included
- Safety function ensures any emergency command will override a active partial valve stroke test
- Partial valve stroke testing can be initiated by a handheld infrared controller, an analogue signal or a digital signal
- ATEX certified

SOLUTION TO SEVERE SERVICE

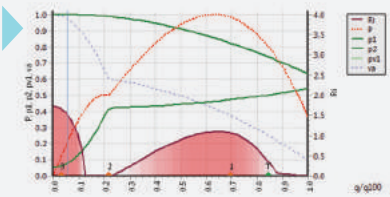
Comprehensive portfolio of severe service solution

RADMAN severe service products are engineered for customer's specific severe service conditions.
Our wide range of severe service product portfolio provides the most optimized solutions to cavitation, flashing, and noise in various pressure, temperature, even fluid with particles.

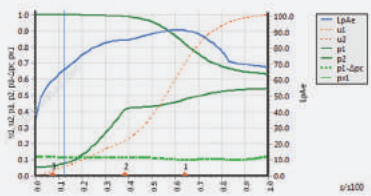
Accurate prediction & designing technologies

RADMAN® utilizes cutting edge technologies for prediction of cavitation, flashing, and noise in severe service conditions.
By having various types of multi stage trims, RADMAN can offer most optimized solutions for each service condition.

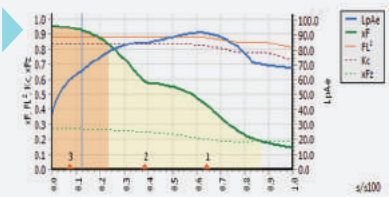
Plant Characteristics Calculation



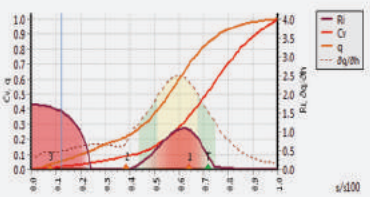
Pressure Characteristics Calculation



Valve Modifiers Sound Data Calculation

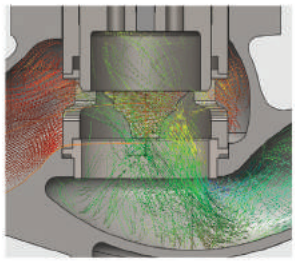


Flow Characteristics Calculation

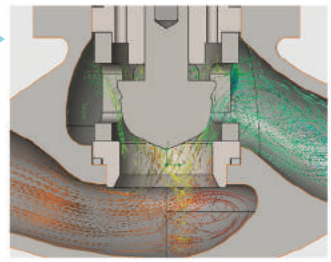


Standard Service Trims

balanced contoured cage
cage balanced (C-B TYPE)

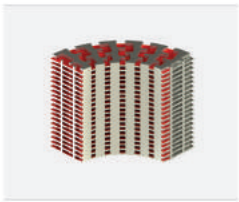


Unbalanced Contoured
Single Port (S-P TYPE)



Severe Service Trims

H Series Trim (Anti-Cavitation)



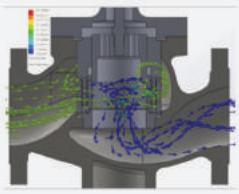
M Series Trim

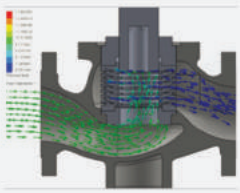
T Series Trim

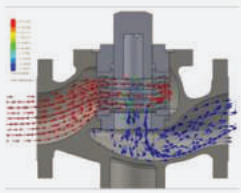
C Series Trim

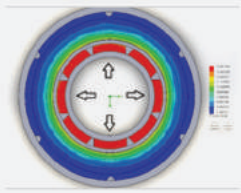
S Series Trim

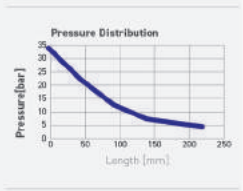
T Series trim Flow Simulation



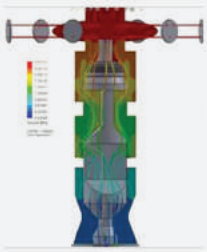


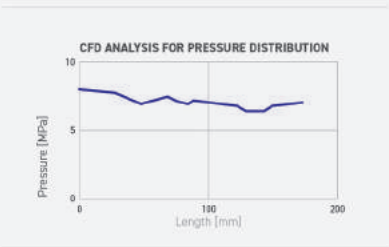


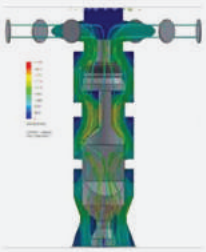


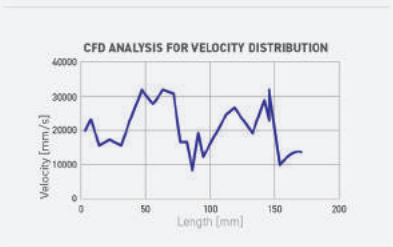


S Series trim









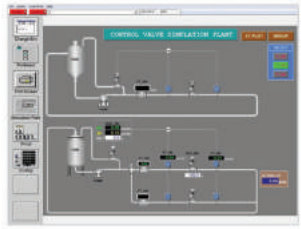
Verified design based on empirical evidence

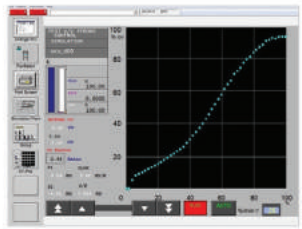
RADMAN® has been carrying out continuous tests on its several fully automated pilot plants for valve and self-acting pressure regulators to verify flow capacity, flow characteristic, rangeabilities, pressure loss, flow coefficients, valve performance and so on. Numerous verification processes between computerized prediction and collected empirical data have been made for superior accuracy of all products.

Pilot Plant for Control Valves

Characteristics

- Schneider Electric DCS System
- Flow Simulation
- Actual Cv<Max> test
- Inherent Flow Characteristic Curve test
- Pressure Loss test
- Valve Travel & Actual Cv test





Pilot Plant for Pressure Regulator

Characteristics

- Schneider Electric DCS System
- Flow Simulation
- Actual Cv<Max> test
- Inherent Flow Characteristic Curve test
- Droop & Lock up test

05. Valve Automation Center

Overview

Although valve actuators obviously form a significant part of any valve automation package, at Radman® we never forget that they are fully dependent on their associated control systems for reliable and effective valve control.

By building close working relationships with our customers, we fully understand their operational requirements and concerns, and provide robust and reliable bespoke control systems to satisfy them using the latest proven and cost effective technologies.

We provide control systems to meet any operational requirements with common ones including:

- On/off production and process control
- Emergency Shutdown (ESD)
- ESD risers
- High Integrity Process Protection (HIPPS)
- Partial valve stroke testing
- Positional and proportional control
- Linebreak detection

06. Valve Repair Renter

We offer offsite and onsite engineering, modification, calibration, repair, maintenance and test for Safety Relief Valves, Control Valves and Actuators. Anyone can sell you a new valve, but it takes a service organization to tell you when new isn't necessary. Repairing a valve to like-new condition costs roughly half of purchasing a new valve. Let us save you money. Before you purchase replacement valves give us a call. Our special process certificate allows us to perform machining on valve parts. This allows us to rework slightly damaged parts when possible to stay within Original Equipment Manufacturer (OEM) specifications.

Facilities

Engineering

Our skilled valve technicians will evaluate the condition of your valves, make the proper recommendations and work diligently to get your equipment tested, repaired and set to the correct specifications and back in-line as quickly as possible in order to minimize interruption of your daily operations.

Modification

If your valves aren't working properly, we can put in a modified trim package to improve valve performance. Moreover, when you need to recalibrate your devices in order to meet your new requirement, we can provide it for you.

Repair

We can manufacture new replacement parts through utilizing our extensive drawing library or by reverse engineering, while meeting all OEM standards. We are capable of repairing damaged plant equipment and in most cases, we can design upgrades for existing parts to extend the service life of your equipment.

Maintenance

We can work independently or with your reliability engineers to establish a database of Valves throughout your plant. You can count on our experience and knowledge to establish a recommended maintenance policy.

Test

Our certified testing capabilities are ready to meet customer requirements for all types of valves and actuators. Besides, we have the ability to produce computerized test reports to provide documentation of valve performance when tested.

Features and Benefits

Commissioning: Startup assistance to help ensure that equipment is performing to expected specifications.

- *Techanical Inspection:* Providing detailed reports of mechanical conditions.
- *Valve Repair:* Returning your valves to "like new" condition.
- *Shut Down Planning:* Helping to reduce outage or turnaround times.
- *Onsite Repairs:* Bringing resources and equipment to the site.
- *Troubleshooting:* Identifying root causes and providing solutions.
- *Spare Parts:* Producing manufacturer parts that meet the highest standards.
- *Predictive Maintenance:* Offering tools and expertise to monitor the health of an asset and identify potential problems in advance.
- *Site Surveys:* Gathering data throughout your plant for asset management.

Test and repair equipment

RADMAN's valve shop is recognized as an accredited facility, equipped with the latest European test and repair equipment including:

- Digital – Full automated safety relief valve test bench
- Digital tank protection and vacuum breathing valve test unit
- Full automated lapping machine with pneumatic load device and cooling system for working wheel
- Full automated polishing machine with pneumatic loaddeviceand cooling system for working wheel
- Portable driven grinding and lapping machine for safety and globe valve
- Valve Doctor Inspection sets with exible fixture for digital camera
- Manual lapping and polishing device with complete range of agent material
- All necessary vertical and horizontal CNC milling and turning machines along with all necessary manual equipment

Control Valve Repair:

RADMAN Control valve repair department equipped withrequired equipment like control valve test benches, loop communicators and high pressure compressor, providing necessary pressure for gas and liquid up to 700bar, calibrates and conducts hydro and functional tests for control valves up to 36".

Taking the advantage of these test units, our OEM trained technicians can carry out high pressure testing, stroking of the valve and its controls, seat leakage classification and total performance testing on control valves in accordance with international standards.

Trained actuator technicians carry out the repair and testing operations of different makes and types of actuators on electric, hydraulic, pneumatic and gas over oil type under the license of a well know European manufacturers.

The simulation and Lifecycle testing of actuators is a lsocarried out in a well-equipped cell with electrical panels.

Safty Relife Valve Repair:

RADMAN's digital – full automated safety relief valve test bench, equipped with CRS system (to provide all the required computer test reports), lift measuring unit and Acoustic leakage measuring unit enables our OEM trained relief valve technicians to carry out testing, calibrating and (re)adjusting the set pressure, seat tightness and full lift of all types of safety and breather valves.

With our complete range of test units and high pressure compressors, we can repair and test all kind of pilot operated and spring loaded safety relief valves ranging from ½ " to 12" for pressures up to 700 brag in gas and liquid services along with all kinds of tank protection and breathing valves from ½" to 20".

AFTER SALES SERVICE

Complete range of products for fluid control system

RADMAN® provides total life cycle management support of all products with full range of training, engineering, field services.

By utilizing modular design and quick change trim package, hundreds of standardized modular parts are ready for quick service to deliver a lower total cost of ownership.

Moudular Design

Quick Change Trim Package

07. Valve Training Courses for Valve Professionals

Valve Training Courses for Valve Professionals

Training center of RADMAN was formed to meet customers demands for specialist training in the oil and gas and energy sectors concentrating on assessing and verifying skills, enhancing performance and assuring clients of a safe workforce. Extensive field experience has made RADMAN familiar with the questions and problems customers face when using Safety and control Valve in their own applications.
We offer our courses in 3 general levels based on your job role and experience as follows:

For Valve Users

Basic, introductory training courses for valve users who have limited knowledge of valves and wish to gain a broader perspective about their use and application. This is a 'must' for people new to process controls, valve repairers and supervisory personnel.

For Maintenance Technicians

Multidiscipline training for maintenance / service engineers with a basic knowledge of valve technology. The goal is to learn to recognize and solve problems to restore the performance and integrity of the reconditioned valve in order to enhance process reliability and reduce downtime.

For Valve Engineers

Multidiscipline training intended for supervisory personnel or process engineers seeking advanced training in specific subjects. These courses require a basic knowldge of valve technology or needs to be preceded by a 'user' qualification.
Alternatively, customers can define their own training program based on their needs. Where variations of the standard training courses do not meet customer requirements a bespoke training plan can be devised to more closely reflect specific topics and customer needs.
Finally, when you buy RADMAN Process Development Co. p.j.s. safety and control valves, our experts can come to your facility and train your workshop staff while doing a job for one of your customers, and thereby provide your engineers with live training.

Certificates

Company's strengths reside in its willingness to respond efficiently to queries for product customization regarding design and performance, the expertise and experience of its staff, the quality of both organization and product and, above all, the commitment to satisfy every related requirement of the customers.

Since its foundation, in an attempt to standardize the above goals, RADMAN has put effort into keeping with integrated management system (IMS) requirements, in this regard RADMAN has got certified to ISO 9001: 2015 – ISO/TS 29001: 2010 – BS OHSAS 18001: 2007– ISO 14001:2015 – ISO 10004: 2012 – ISO 10002: 2004 For design, manufacturing, testing and maintenance of all kinds of Control Valves, Actuators and Safety Valves.

In addition to management system certifications, RADMAN has obtained required product certificates and type tests approvals according to applicable international codes and standards. RADMAN products have been assessed by MOODY international and has been certified in accordance with ASME Sec. VIII – ASME Sec.I – API 520 – API 6D – and PED 2014/68/EU.

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