



PETROLVALVES GROUP
enabling your energy flow

PRODUCT CATALOGUE

Control Valves
and related equipments



VSI CONTROLS
A PETROLVALVES COMPANY



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Product Catalogue

Control Valves and related equipments

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About Us

VSI Controls, a leading control valve company, part of PetrolValves Group, offers Customers an exciting alternative to procure general and severe service control valve systems that provide a best-fit solution for their processes.

The design, geometry and shapes of the products, together with the use of modern casting processes, advanced assembly and test technology differentiate VSI Controls in specialty and severe service markets.

VSI Controls provides the highest quality control systems and complements the product offering of PetrolValves manual & automated on-off valves and Mokveld axial control, check and choke valves.

“BEST-FIT
SOLUTIONS
FOR CUSTOMERS’
PROCESSES”

Our Mission

VSI Controls is fully committed to give its Customers the highest level of service and satisfaction while providing customized best-fit solutions at competitive prices and on time delivery.

“PRODUCT
QUALITY
THAT SURPASSES
MANUFACTURING
EXCELLENCE”





Worldwide Presence



PV AND VSI HQ / Milan (Italy)



Production capabilities



Service capabilities (including authorized shops)



Regional offices / Milan, Houston, Buenos Aires, London, Stavanger, Moscow (opening 2020), Abu Dhabi, Dammam, Aksai, Atyrau, Kuala Lumpur, Shanghai

WORLDWIDE PRECENCE THROUGH THE COMPANIES OF THE GROUP:

Italy - Uk - The Netherlands - Norway - Usa - Malaysia - Russia - Kazakhstan

VSI Controls is directly present in many countries with its own staff and facilities and leverages on the extensive PetrolValves infrastructure around the world.





Capability

Castellanza Plant - hub 1

Via Benedetto Croce

Area: 60.000 smq

Lifting capability: Cranes up to 120 tons

Machining: Vertical and Horizontal lathes, other machining equipments

X-ray bunker

Assembly: 14 dedicated areas for assembly from 1" to 56"; White Room for clean assembly Testing: Hydrotest and gas test of valves from 1/2" up to 36" and up to class ASME 4500

Castellanza Plant - hub 2

Via San Giovanni

Area: 3.000 smq

Lifting capability: Cranes up to 20 tons

Assembly: 14 dedicated areas for assembly from 1" to 36"

Testing: Hydrotest and gas test of valves from 1/2" up to 36" and up to class ASME 2500

Quality System & Certification

Quality is a key improvement driver for us and it is an integral part of our business. **VSI Controls** products are designed, manufactured and tested according to the highest available standards and we are committed to continuous improvement.

System Manual and Procedures in place are in compliance with ISO 9001 standard (Ed. 2008). VSI Controls is ISO 9001 certified and is in progress to obtain ISO 14001 and ISO 45001 Certifications.

To serve the global market, we reached the most important system certifications and product licenses operating in compliance with all the main applicable international industry standards.

ISO 9001 - PED - ATEX - CU TR 010 - CU TR 012 - CU TR 032 - CRN Canada.

VSIze Sizing and Selection Tool

VSI Controls has developed user-friendly software named VSIze for sizing and selecting valve solutions.

The software uses current industry standards and calculation methods, provides recommendations to the user, and automated error checking. The library includes the full standard production of **VSI Controls**, while special solutions are available upon request.

Our Customers have experienced a significant reduction of time to select and configure our products.

Resident Engineering

VSI Controls has implemented the Resident Engineering Program to support and facilitate our customers during technical evaluation at the tender stage and detailed engineering work during the execution phase.

The program provides high value engineering support at customer's premises, resulting in the reduction of costly changes that can appear later in the project cycle. Our engineers will reside with customer engineers to ensure design optimization and define requirements from the beginning of the project.

Project Management

Accuracy and reliability of project execution matters more than ever.

To ensure the highest level of order management, **VSI Controls** has implemented a Project Management Team structure which mirrors our customer organizations.

The team is headed by an experienced **Project Manager** supported by **Project Engineers, Quality Engineers, Production Engineers** and **Documentation Controllers**.

At **VSI Controls** we believe in customer satisfaction to build long term relationships. Successful project execution is the key to build our reputation.



Design & Development

VSI Controls engineering are process supported by the most advanced design tools:

- Fully 3D design for assembly studio and CAD-CAM technology
- CFD simulations and FEM analysis performed to optimize design of fluid-dynamic performances, structural integrity and to optimize weights and shapes
- Valve modular design can be configured to meet and satisfy the most different operating conditions
- Valve sizing, as well as sound pressure level prediction, is performed according to the standard IEC 60534
- Trim and material selection is based on a careful analysis of processes and on the relevant installed base experience
- Particular attention is paid to the dynamic behavior during the control action, noise, cavitation, mechanical vibration, velocity, erosion and wear
- Advanced mechanical technology is used for: Overlays, Hard facings, Additive Manufacturing and Solid Tungsten Carbide
- Value engineering technique to fully meet Customers' expectations and requirements, continuously improving the performance of the products
- Advanced measuring and control systems

Additive Manufacturing

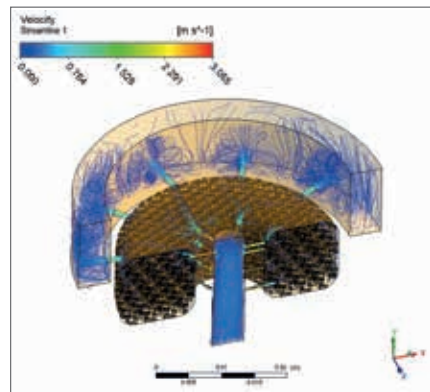
Additive Manufacturing, also known as 3D-metal printing allows the creation of 3D-metal components using special printing machines.

This outstanding technology can be used in Control Valve trim design, especially for severe service applications where high pressure drop, cavitation, flashing, high noise levels and erosive fluids are present.

Additive Manufacturing is a game changer when compared to traditional subtractive technologies (machining, laser cutting etc.) as it allows for:

- No theoretical limits on trim design in terms of geometry and fluid paths
- Easy customization to any process conditions and process fluid
- Reduced time to market (up to 10 times less when compared to traditional technologies)
- Reduced dimensions and weight
- Easy retrofit and reverse engineering applications
- High mechanical properties

Several materials can be metal printed such as Martensitic, Austenitic or Duplex Stainless steels, Inconel and Monel alloys, Titanium, etc.



VSI Controls has developed a wide range of additive manufactured trims, both for globe and rotary valves, these include:

- Multistage Multipath labyrinth trim for high pressure drop applications on gas and liquids
- Microflow multistage trims
- Multistage trims for Control ball valves (V-Shape and HXL series)

The technical solutions have been standardized and are available to all VSI Controls Customers.

For Severe Service applications the required valve may need to be individually designed in conjunction with plant designers, valve engineers and operating engineers: we find that these are the applications where Additive Manufacturing is able to show its incredible potential.



Our Approach

VSI Controls approach to Service focuses on avoiding issues and preventing failure before it occurs.



Caring about our customers' needs

Promptness, communication, solutions, trust, partnership and competitiveness through local support



Worldwide presence

Full coverage thanks to PV's manufacturing plants, JVs, authorized workshops and certified service centers



Experience

Over 40 years of group's manufacturing experience
Team +500 PV Experts



360° assistance

Support throughout the entire valves life cycle, including delivery, commissioning and testing phases



Specialized network

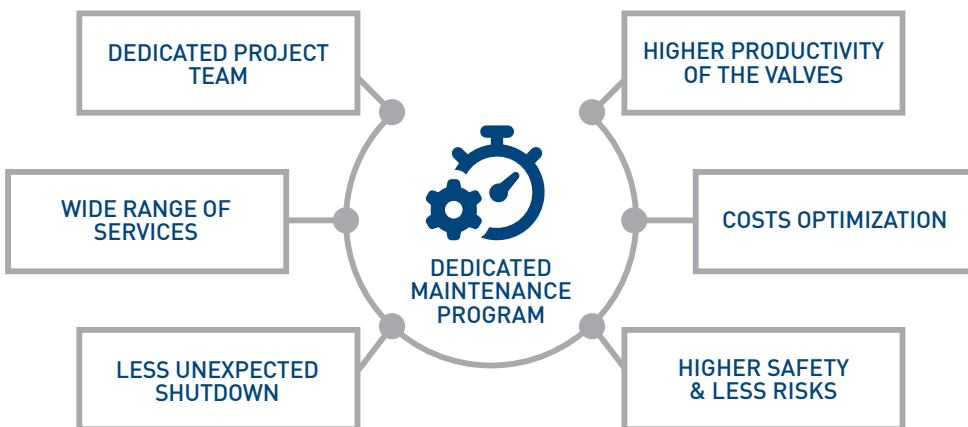
Quality standard and procedures applied in every intervention and repair center



Customer Benefits




VSI Controls, the perfect business partner for long lasting valve performance. Our valve management program suits to all types of valves. We systematically develop a customized maintenance program tailored to the specifications of your installed base after an accurate analysis of every single valve characteristic.

Long-term benefits of Valve Management approach:



Services Overview

Our expertise to support you in your daily activities with a full range of on-site and off-site services.

 <p>ON-SITE SERVICES</p> <ul style="list-style-type: none"> • Field Service Engineer • Mobile workshop • Diagnostic of valves in service • Fugitive emission campaign 	 <p>OFF-SITE LOCAL</p> <ul style="list-style-type: none"> • Proactive maintenance program • Valves and spare parts procurement • Engineering services and product upgrade • Stock management
 <p>GLOBAL SERVICES</p> <ul style="list-style-type: none"> • Product training • Maintenance training 	

Product
Portfolio





Product Portfolio

The control valve is the most important piece of equipment in modern process loops and control systems.

The operational conditions of fluid pressure, temperature and process dynamics require accuracy in the analysis of intrinsic characteristics and in the selection of control valves to obtain efficient performance in a process control system.

Portfolio at a Glance

We have assembled a range of products with the design, geometry and shapes that differentiate us in the specialty and severe service control valve market, in applications, such as: superheated steam, high differential pressures, volatile, corrosive, dirty and erosive fluids, as well as applications where flashing, cavitation or aerodynamic noise occur.

The shape and design characteristics, together with the use of noble materials, modern casting processes and advanced assembly and test technology, has allowed us to achieve an extraordinary level of capability and quality that is recognized by our Customers all over the world.

The control valve offering includes Reciprocating Globe, Angle, Three-Way, Rotary Eccentric Plug, Double and Triple Offset Butterfly, Segmented V-Ball, Specialty Ball, Desuperheaters and Regulators. They come equipped with Double-acting spring return actuators and advanced digital positioners and provide the thrust, speed, accuracy and response to handle the most demanding applications.



G-Stream

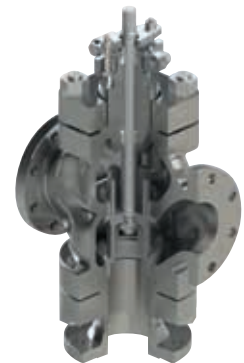
The G-Stream is the work-horse of the reciprocating valve offering. With a modern design that incorporates an advanced clamped-in seat ring and a double upper guide system. It is available in a wide range of configurations and suitable for a wide variety of applications in continuous process industries. Its double-acting spring-cylinder actuator ensures high actuation thrusts, pneumatic stiffness and excellent performance levels. The G-Stream is extremely versatile and can be supplied with several options to meet the specific needs of each application.



SIZES	1/2" to 36" (15 to 900 mm)
RATING CLASS	ANSI 150 to 4500
BODY MATERIALS	Carbon Steel, Chrome-Moly, Stainless Steel, Duplex, Hastelloy, Monel, Alu-Bronze, Titanium, Most other Alloys
END CONNECTIONS	Integral Flanges (ANSI, UNI-DIN), BW, SW, Hub
TRIM	Quick change seat, Stem guided or cage guided, Unbalanced or P/B design, Special trim
ACTUATOR	Double Acting cylinder with spring for failsafe action, Electric, Hydraulic options
FEATURES	Versatile configurations: single seat, cage, angle, 3-ways, steam-jacketed, cryogenic, micro flow, bellows seal, low noise and anticavitation, reduced trims. Double top-stem guiding designed out of stream and large stem diameter ensures shutoff and no galling or sticking, Simple to service and maintain

Three-Way

The Three-way G-Stream bodies are used in applications with converging flow (mixing action) or diverging flow (bypass action). Most of the components are common with the globe-style valve, thus minimizing spare parts required for the plant maintenance.



Angle-Style Body

The "Angle-Body Style" G-Stream has the same components of the standard G-Stream globe-style valve, so it is fully interchangeable except for the body itself. Depending on the application for which the valve is intended, the G-Stream valve with angle-style body may be supplied with an extended seat ring (venturi seat), that provides additional protection against the erosive action of the fluid.



Alpha & Beta

Alfa trim is a cage trim suitable for cavitating applications: the drilling scheme in the cage is designed in order to increase valve F_L coefficient, to reduce cavitation bubble creation in the vena contracta. Beta trim is suitable for noise reduction: the micro-drilled cage increases the noise production frequencies, in order to maximize the transmission loss (piping noise absorption). Both Alfa and Beta trim are made with hardened material, in order to prevent galling phenomena between the plug and cage, and to maximize the life cycle of the valve. Alfa and Beta trim are available in the double cage configuration, for intermediate cavitation and noise reduction.



Epsilon & Delta

This type of trim is specific for extreme cavitation, severe flashing and noise reduction. They are designed with the concept of the multi-stage - multi-path: fluid flow is divided in several independent channels where the pressure drop is split in multiple stages. The number of stages, size and expansion ratio of the channels are designed for each specific application. Delta trim is manufactured by means of a disc stack, while Epsilon trim is an additive manufactured trim, and it guarantees a shortened lead time to market. Both Epsilon and Delta trim are available in variable resistance configurations. For example less stages from bottom to top of the stack, resulting in an increase of the incremental C_v along the travel.



Gamma

Multistage cascade trim for high pressure, dirt, cavitating and erosive liquid flow. The trim is constituted by several plug sections working in cascade with increasing passage areas to guarantee excellent anti-cavitation performances.

Main features are:

- Variable number of stages with different area ratios to cover different process conditions.
- Large passage sections allow processes including liquids with large particles to pass without damaging and plugging.
- Shutoff performances are highly reliable due to the plug overlap in regulating sections.
- Reduced clearances between plug and guide improve stability and minimize vibrations.



Ex-Plug

High Cv capacity, non-crossover shaft, anti blow-out stem, class IV and VI shut-off, noise attenuator or anti-cav. disc available.



SIZES	1" to 12" (25 to 300 mm)
RATING CLASS	ANSI 150 to 600
BODY MATERIALS	Carbon Steel, Chrome Moly, Stainless Steel, Duplex, Hastelloy, Monel, Alu-Bronze, Titanium, Most other Alloys
END CONNECTIONS	Integral flanges (ANSI, UNI-DIN)
TRIM	Eccentric plug, reduced ports, non crossover shaft, anti cav. and low noise option
ACTUATOR	Double Acting cylinder with spring for failsafe action, Electric, Hydraulic options

V-Shape

V-notch Ball, high rangeability, bidirectional seat, non-crossover shaft, class IV and VI shut-off.



SIZES	1" to 16" (25 to 400 mm)
RATING CLASS	ANSI 150 to 600
BODY MATERIALS	Carbon Steel, Chrome Moly, Stainless Steel, Most other Alloys
END CONNECTIONS	Integral flanges (ANSI, UNI-DIN)
TRIM	V-ball, non crossover shaft, anti cav. and low noise option
ACTUATOR	Double Acting cylinder with spring for failsafe action, Electric, Hydraulic options

B-Disc

Double offset configuration, leakage class IV, V and VI, bi-metallic seal ring for bidirectional flow, cryogenic design, drilled wings design for anti cavitation or noise reduction available.



SIZES	2" to 72" (50 to 1800 mm)
RATING CLASS	ANSI 150 to 600
BODY MATERIALS	Carbon Steel, Chrome Moly / Stainless Steel, Duplex, Most other Alloys
END CONNECTIONS	Integral flanges (ANSI, UNI-DIN), Flangeless (wafer style), LUG type
TRIM	Double offset disc, high capacity, anti cav. and low noise option
ACTUATOR	Double Acting cylinder with spring for failsafe action, Electric, Hydraulic options

HXL

Side entry split body, trunnion design, high flow capacity, high rangeability, accurate control capability, class V and VI sealing capability, noise reduction on gas, anti cavitation on liquid, suitable for dirty fluids.



SIZES	2" to 48" (50 to 1200 mm)
RATING CLASS	ANSI 150 to 2500
BODY MATERIALS	Carbon Steel, Chrome Moly, Stainless Steel, Duplex, Most other Alloys
END CONNECTIONS	Integral flanges (ANSI, UNI-DIN), BW
TRIM	V-port, drilled disc, multistage
ACTUATOR	Double Acting cylinder with spring for failsafe action, Pneumatic Scotch Yoke, Electric, Hydraulic options

L-Act

Spring piston actuator.



SIZES 15, 25, 50, 100, 200

ACTION TYPE Single acting air to open, Single acting air to close, Double acting with spring to open, Double acting with spring to close, Double acting

CYLINDER MATERIAL Cast anodized aluminium alloy (Carbon Steel option available)

AIR SUPPLY Up to 150 psi (10,3 bar)

OPERATING TEMPERATURE -40°C to 175°C

OPTIONS Declutchable handwheel, limit stops

R-Act

Spring piston rotary actuator.



SIZES 25, 50, 100, 200

ACTION TYPE Single acting air to open, Single acting air to close, Double acting with spring to open, Double acting with spring to close, Double acting

CYLINDER MATERIAL Cast anodized aluminium alloy (Carbon Steel option available)

AIR SUPPLY Up to 150 psi (10,3 bar)

OPERATING TEMPERATURE -40°C to 175°C

OPTIONS Side mounted handwheel, limit stops

L-HD

Heavy Duty spring piston actuator.



SIZES 235, 335, 360, 435

ACTION TYPE Single acting air to open, Single acting air to close, Double acting with spring to open, Double acting with spring to close, Double acting

CYLINDER MATERIAL Carbon steel

AIR SUPPLY Up to 150 psi (10,3 bar)

OPERATING TEMPERATURE -40°C to 175°C

OPTIONS Limit stops, hydraulic manual operator. Ultra High Cycle design

SAR Self Actuated - Pressure Reducing

Direct operated pressure reducing valve, high rangeability, several membrane materials available, cryogenic design.



SIZES	1/2" to 2"
RATING CLASS	ANSI 150 to 1500
BODY MATERIALS	Carbon Steel, Chrome - Moly, Stainless Steel, Most other Alloys
END CONNECTIONS	Integral flanges, NPT, GAS/BS
TRIM	Stainless Steel, Most other Alloys
FEATURES	Direct operated pressure reducing valve, high rangeability, several membrane materials available, cryogenic design

SAP Pilot Operated

Pilot operated regulators, low minimum regulating pressure, several membrane materials available, single or double seat design.



SIZES	1/2" to 10"
RATING CLASS	ANSI 150 to 1500
BODY MATERIALS	Carbon Steel, Chrome - Moly, Stainless Steel, Most other Alloys
END CONNECTIONS	Integral flanges
TRIM	Stainless Steel, Most other Alloys
FEATURES	Pilot operated regulators, low minimum regulating pressure, several membrane materials available, single or double seat design

PETROLVALVES' range of production includes valves from ½" to 110" with pressure ratio of ANSI 150 to 4,500 and API 2,000 to 20,000. A wide range of Subsea and Topsides actuators is available to be matched to all kind of valves included in Petrolvalves' portfolio.

Triple Offset Valves AJ

Triple Offset "AJ Series" Valve, a torque-seated valve, with a metal-to-metal sealing and a conical design of seat and seal ring for bidirectional Zero Leakage tightness.

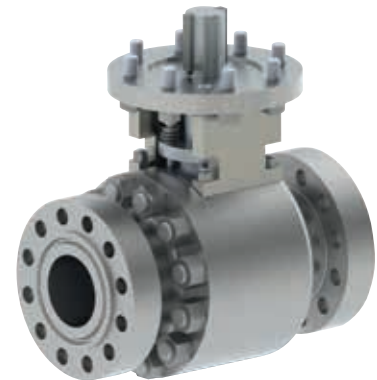


SIZES	3" to 80" (80 mm to 2000 mm)
RATING CLASS	ANSI 150 to 2500
BODY MATERIALS	Carbon Steel, Chrome Moly / Stainless Steel, Duplex, Most other Alloys
END CONNECTIONS	Integral flanges (ANSI, UNI-DIN), Flangeless (wafer style), LUG type
TRIM	Triple offset disc
ACTUATOR	Double Acting cylinder with spring for failsafe action, Electric, Hydraulic options

Ball Valves

Ball valves are the most common quarter-turn type valve used within Oil&Gas Industry due to their durability, reliability and capability to operate at ultra-high pressures.

There are five general body styles of ball valves: single body, three-piece body, split body, top entry, and welded. In addition, there are two designs related to ball sealing mechanism: Trunnion mounted and Floating.



SIZES	2" to 48" (50 to 1200 mm)
RATING CLASS	ANSI 150 to 2500
BODY MATERIALS	Carbon Steel, Chrome Moly, Stainless Steel, Duplex, Most other Alloys
END CONNECTIONS	Integral flanges (ANSI, UNI-DIN), BW
TRIM	Stainless Steel, Duplex Most other Alloys
ACTUATOR	Double Acting cylinder with spring for failsafe action, Rack of Pinion or Scotch Yoke, Electric, Hydraulic options

Solutions for power industry

1. POWER INDUSTRY

VSI Controls has developed a full product range for the Power industry: fossil fuels power stations, combined cycle plants, ORC plants (geothermal and biomass), thermal solar plants, nuclear power plants.



Among the others **VSI Controls** can provide:

- PRDS systems (Pressure Reducing & Desuperheating station)
- Boiler feedwater valves
- Continuous blowdown valves
- Bypass turbine stop e control valves
- Steam vent valves
- Gas turbine feed valves

Main features:

- High temperature applications (up to 650°C)
- High pressure applications (up to 270 bar)
- Metal balanced or piloted plug
- Multicage or outlet silencer
- Cr-Mo or high Cr steel
- Body bonnet pressure seal connection

2. DESUPERHEATERS

a) DVP - Variable Area

SIZES	1" to 3" water side - 3" to 4" steam side
RATING CLASS	ANSI 150 to 2500
BODY MATERIALS	Carbon Steel, Chrome Moly, Stainless Steel
END CONNECTIONS	Flanged ANSI 150-2500
TRIM	Stainless Steel, Most other Alloys
ACTUATOR	Double Acting cylinder with spring for failsafe action
FEATURES	High rangeability, good water atomization also at minimum flow, variety of size of spray nozzle sizes, accurate control capability, minimum dimension thanks to built-in control system, available for cryogenic application, high differential pressure allowed, with multistage trim design





b) DSP - Spring Assisted Probe

SIZES 1/2" to 3" water side - 2" to 8" steam side

RATING CLASS 150 to 2500

BODY MATERIALS Carbon Steel, Chrome Moly, Stainless Steel

END CONNECTIONS Flanged ANSI 150-2500

TRIM Stainless Steel, Most other Alloys

FEATURES Easy and versatile design, no practical limitations in flow rate and operating conditions, no upper limitations in pipe size, with multiple nozzle layout. Available as standalone probe, or equipped with desuperheating chamber.

c) DSE - Spring Assisted External Mounting



SIZES 1/2" to 2" water side - 2" to 40" steam side

RATING CLASS 150 to 2500

BODY MATERIALS Carbon Steel, Chrome Moly, Stainless Steel

END CONNECTIONS Integral flanges, Flangeless (water-style assembly), BW

TRIM Stainless Steel, Most other Alloys

ACTUATOR Double Acting cylinder with spring for failsafe action

FEATURES A variety of nozzle dimensions available, no practical limitations in flow rate and operating conditions, no upper limitations in pipe size, with multiple nozzle layout, internal protection linear available, water distribution piping designed with free expanding design

d) DVT - Venutry Type



SIZES 1/2" to 2" water side - 2" to 10" steam side

RATING CLASS 150 to 2500

BODY MATERIALS Carbon Steel, Chrome Moly, Stainless Steel

END CONNECTIONS Integral flanges, Flangeless (water-style assembly), BW

TRIM Stainless Steel, Most other Alloys

FEATURES Good atomization even with very low steam velocity, suitable for very low flow rates



Leading Applications

POWER

OIL & GAS ONSHORE PLANTS

REFINERIES AND STORAGE TANKS

LNG - LIQUEFACTION, REGASIFICATION, TERMINALS

OFFSHORE PLATFORMS

FPSO, FLNG, FSRU

PETROCHEMICAL & CHEMICAL

PROCESS

DESALINATION

WATERWORKS





PETROLVALVES GROUP
enabling your energy flow

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Visit our website www.vsicontrols.com to get the latest revision.

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WorldWide presence:

**Italy - UK - The Netherlands - Norway - Usa - Malaysia
Russia - Kazakhstan**