

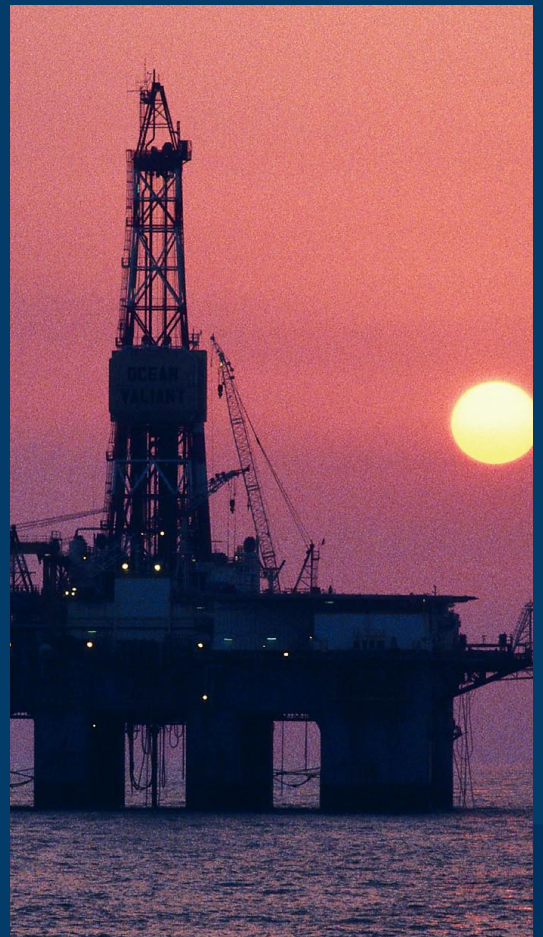


SCHROEDAHL

we protect your business

Oil and Gas

High-Class Pump Protection



SCHROEDAHL Worldwide

Profit from the experience, competence and know how of an international leading supplier of specialty valves.



Schroedahl is a worldwide orientated company with decades of experience in development and manufacturing of high-class specialty valves for Power Stations, Industrial Plants as well as for production, transport and refining systems in the Oil and Gas sector.

Thanks to the high reliability of the SCHROEDAHL products in combination with consequent customer orientation the company is now worldwide leader in the area of pump protection systems.

Since its founding in 1962 Schroedahl turns innovations into customer applications – an example is the invention of the Pump Protection Valve by one of the founders of the company, Mr. Wilhelm Odendahl.

With our competence and our know how in consulting, projects, delivery, assembly, commissioning, inspection, repair as well as modification we ensure a high availability of complete systems equipped with SCHROEDAHL Valves.



Specialist in the Oil and Gas segment

We offer you durable and reliable Pump Protection for your installations in the Oil and Gas production and or refinery.



Schroedahl develops and manufactures for the production (upstream) and refining (downstream) of Oil and Gas high-class Pump Protection Valves.

These are used on offshore platforms, FPSO (Floating Production Storage Offloading) or FSO (Floating Storage Offloading) ships as well as in refineries and chemical plants.

The SCHROEDAHL Pump Protection and Control Valves are to be combined with the most different pump types:

- Crude Oil Pumps
- LNG, LPG, Naphta, Ammonia pumps
(Pumps for fluid gas, fluid gas fuel, benzene, fluid ammonia)

- Process Liquid Pumps
- Booster Pumps
- Seewater-Injection Pumps
- Firefighting Pumps

As our products are used under the toughest conditions, we manufacture at the highest level of quality.

The complete Production and Processing is based on the important national and international regulations and standards (DIN, UVV, TUV, AD, TRD, ASME, ANSI as well as ISO 9001 / EN 29001).

On top of that we only use high quality materials, like in example Carbon Steel or Duplex, to ensure reliability by durable efficient functioning.

The SCHROEDAHL Pump Protection Valve

Schroedahl has invented the Pump Protection Valve (Automatic Recirculation Valve) and is worldleader in this segment.

Pump Protection Valves have the task to ensure the Minimum Flow through a pump. By doing so the pump is protected against overheating, cavitation resulting in damage. In case the process requires no flow or a small quantity of the pumped liquids, the Pump Protection Valve automatically returns the required Minimum Flow via a Bypass back to the pump.

The SCHROEDAHL Pump Protection Valves operate modulating. In case the requirement of the process increases, the via the Bypass returned flow is auto-

matically reduced – and the other way around. This increases the efficiency of the complete system and optimises at the same time the economy of operation during medium process requirements.

The Pump Protection is only operated via the internal valve technology. Independent of the pressure is measured which flow the processes requires – the via the Bypass returned flow is automatically adjusted accordingly.



Ensuring in the whole range

Modern technology, extreme durability and clear cost advantages – rely on the special class of SCHROEDAHL Pump Protection Valves.



Pump Protection Valves are in most cases superior to Conventional Control Valves. As they are flow dependent and only mechanically operated, they require in total fewer components.

Opposite to a Control Valve no actuator, flowmeter and control unit are needed, a valve only is required!

This makes the SCHROEDAHL high-tec Pump Protection Valves in total clearly less susceptible to problems and nearly maintenance free. Also the total weight is reduced, which is of significant importance for Offshore or FPSO applications.

A further distinguishing advantage:

SCHROEDAHL Pump Protection Valves are in all areas – Procurement, Commissioning, Maintenance, Wear – remarkable economic. The purchase price alone is around two third lower than a Control Valve!

With assembly the Pump Protection Valve is easily assembled to the outlet of the pump - ready! These are all advantages, which you should use for the total concept of your plant.

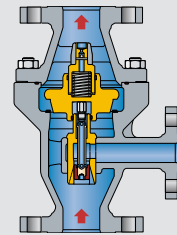
Summary advantages Pump Protection Valves:

- More economic to Purchase, Commission, Servicing and due to less wear
- High economy of operation due to modulating control of the bypass flow
- Strictly mechanical, flow operated, power independent operation
- Only one valve without additional components – due to this less susceptible to breakdowns and low wear
- Non return valve and Bypass connection are already integrated in the valve
- Nearly maintenance free

The SCHROEDAHL Pump Protection Valves

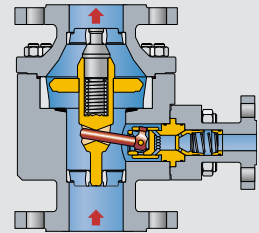
SUL

- Cost economic design with reliable operation for the low pressure range
- Casted housing in CS and SS material
- Pressure Class PN 16 to PN 64. Size DN 25 to DN 250
- High flows via the Bypass
- For differential pressures (ΔP Bypass) up to 40 Bar



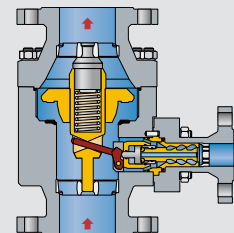
TDL

- Forged housings with large range of standard materials from CS, SS to Duplex materials, special materials upon request
- Pressure Class PN 16 to PN 100. Size DN 25 to DN 500
- Non return valve in Bypass
- For differential pressures (ΔP Bypass) up to 40 Bar
- Venturi-ring operated main non-return valve for difficult conditions



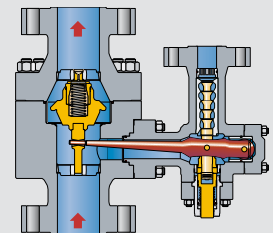
TDM

- High pressure design with multiple controlled bypass system
- Forged housing with large range of standard materials as with the TDL Valve, special materials upon request
- Pressure Class PN 64 to PN 250. Size DN 25 to DN 500
- Non return function in the Bypass
- For differential pressures (ΔP Bypass) up to 230 Bar



MRM

- Absolute high pressure design with multiple controlled Bypass system
- For differential pressures (ΔP Bypass) up to 500 Bar
- Forged housing with large range of standard materials as with the TD valves, special materials upon request
- Pressure Class PN 250 to PN 640. Size DN 25 to DN 500
- For Offshore and other high pressure applications



For detailed information please use the specific product catalogues.

Project example Pump Protection Valve



In the year 1997 Schroedahl received the order for the supply of two Pump Protection Valves for the **Northsea platform Visund** in Norway.

The project, operated by Norsk Hydro, is situated approximately 140 km West of Sogne Fjord in the Northsea and connects four oilreservoirs at a depth of 335 m.

Besides the Oil and Gas production systems there is one sea water injection system, since 2002 the two sea water injection pumps are protected by Schroedahl valves.



The two high pressure valves of type

MRM150UHHW-SD

have the size DN 8" (DN 200), the pressure class PN # 2500 lbs (PN 400) and are manufactured out of special Sea Water resistant 22% Chrome Duplex materials.

The valves are layed out for a Bypass Flow of 122 m³/h at a pump head of 4000 m, and a main flow of 490 m³/h.

The SCHROEDAHL Control Valve

Profit from our experience and our know how – Schroedahl develops and manufactures Control Valves since 1962.

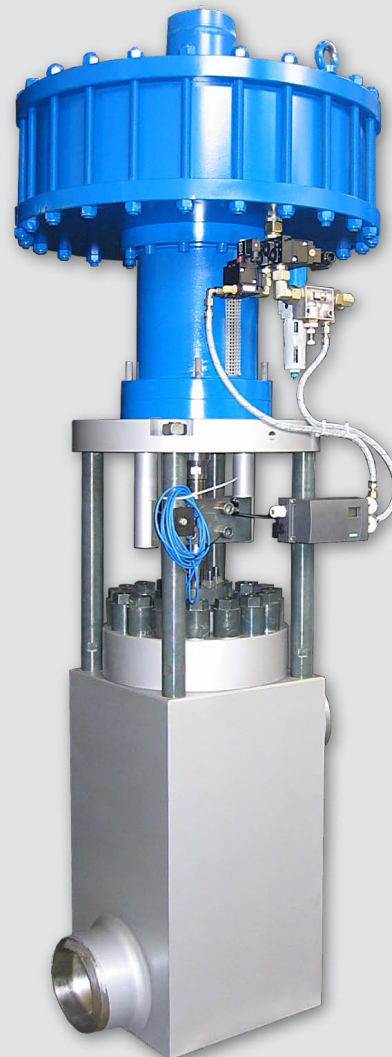
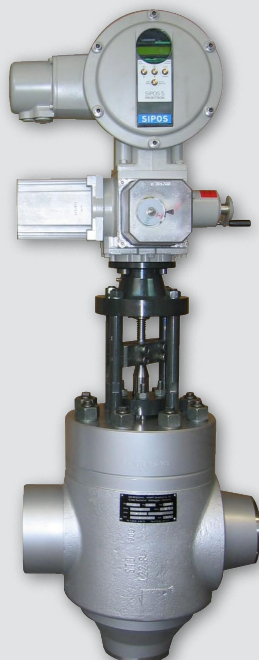
Control Valves are the conventional type of Pump Protection. The complete system consists of the actual Control Valve with mounted Actuator, a Flow-meter at the suction side of the pump as well as a Control Unit.

During pump operation the flow is continuously measured, the measured results are transferred to the control unit. In case the required Minimum Flow of the pump is lower than defined, the control unit opens the Control Valve and supplies to the pump the Minimum Flow medium (such as Oil, Gas, Sea Water, Chemicals). Damage of the pump due to cavitation or overheating is avoided.

Schroedahl offers fully developed and worldwide proven Control Valve Systems, optimal pre-set according to your conditions.

Our experienced technicians and engineers will be pleased to do the fine tuning and setting of the system and components during the commissioning on site.

Of course we're also there for you for future inspection and maintenance of the Control System (i.e. to check the settings).



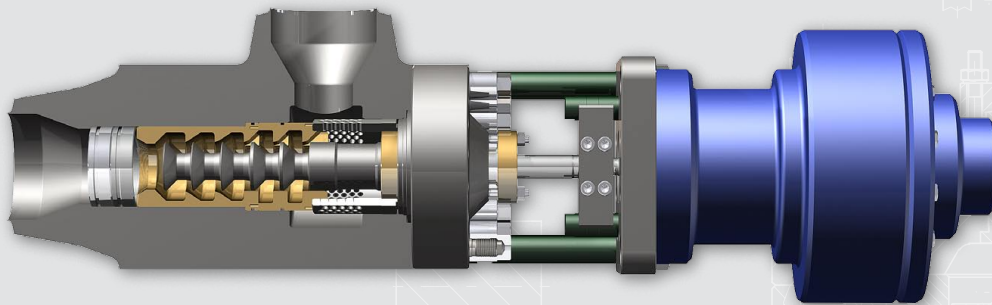
Well proven Top Quality

For special applications, not covered by the SCHROEDAHL Pump Protection Valves, we recommend our Control Valve Type ACA.

Schroedahl Control Valves are high quality products, of which the quality and functioning are also suitable for the use under tough conditions.

By continuous development based on years of experience as well as extensive technical competence the SCHROEDAHL Control Systems are well proven and optimised in detail. A high reliability during a long lifetime especially pays off, when the more modern Pump Protection Valves in special cases are not an alternative.

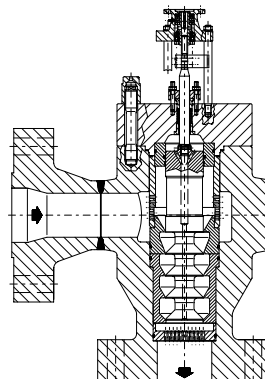
For the Pump Protection in the Oil and Gas sector we offer our Control Valve ACA, which can be laid out for the simple On/Off as well as the Modulating operation. Advantages of the type ACA are the low noise operation as well as the minimal wear by consequently using high grade materials. The easy assembly especially makes this Control Valve inspection and service-friendly.



Technical Data of the Control Valve

Type ACA

- Forged housings
- Pressure Class PN 150 lbs to PN 4500 lbs. Standard Size DN 1" to DN 8"
- Combined with most common actuators
- Angle and Z Type Body



Control Valve Project Example



In the year 2004 Schroedahl received the order for the supply of six Control Valves for Pump Protection on the **P-52 Platform** in Brazil.

The project is operated by Petrobras/Brazil and is located in the Campos Basin at the Roncador oilreservoir at a depth of 1900 m. The planning is to supply in 2006 daily approx. 180.000 barrels of oil and approx. nine million cubic meters of gas. The supplied Valves are for the protection of the Crude Oil pumps.

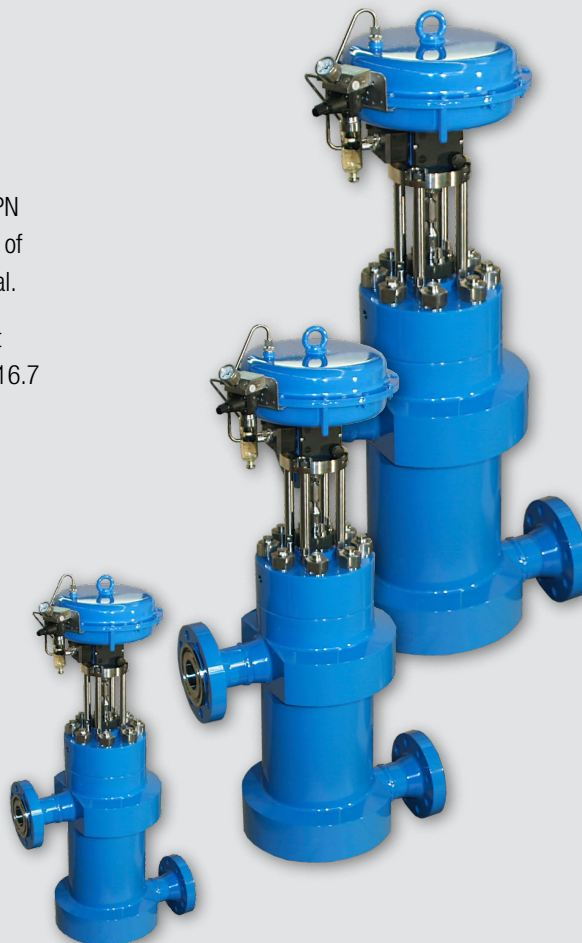
The pneumatic operated Control Valves of type

ACAP 1053 ZU2

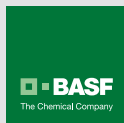
ACAP 1075 ZU2

are of nominal size DN 3" (DN 80), the pressure class PN # 300 lbs (PN 64) and PN # 900 lbs (PN 160). The multiple stage internals are made out of the especially seawater resistant Duplex material.

The Valves are layed out for a pump pressure at Minimum Flow operation of 35.7 respectively 116.7 Bar and a Minimum Flow of 113 m³/h.



Our Customers



SCHROEDAHL

we protect your business

SCHROEDAHL-ARAPP

Spezialarmaturen GmbH & Co. KG

Schoenenbacher Str. 4

51580 Reichshof-Mittelagger

GERMANY

Phone +49 2265 9927-0

Fax +49 2265 9927-947

www.schroedahl.de

info@schroedahl.de

Schroedahl International Corporation

2400 Augusta Dr. Suite 285

Houston, Texas 77057

United States of America

Phone +1 713 9758351

Fax +1 713 7800421

sic@schroedahl.com