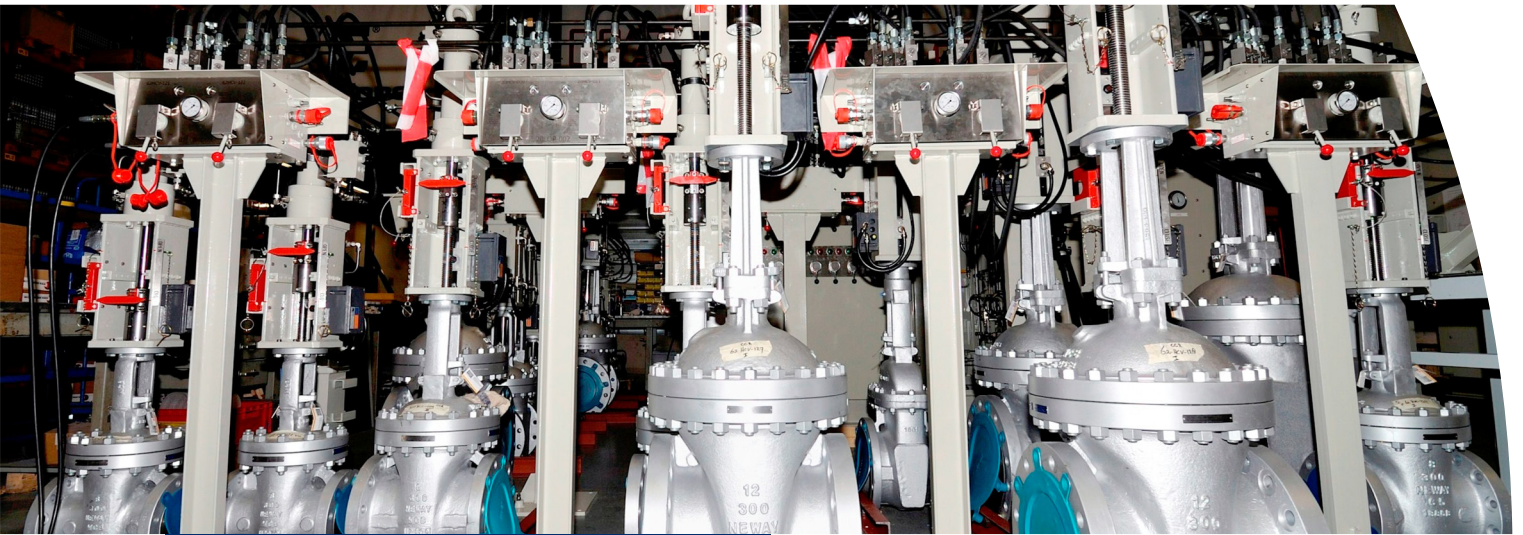


Emergency Shut Down Systems



DECADES OF EXPERIENCE GUARANTEED QUALITY

For remote operation of safety valves, hydraulic actuating systems are an essential part for the control and safety of industrial equipment. Doedijns is specialised in fully autonomous hydraulic ESD systems for the operation of on/off valves in protective functions.

Our hydraulic ESD systems, including electrical control cabinets and shut-off valves are in accordance with the highest safety standards used in the oil & gas industry and in complete accordance with Shell DEP/PTS specifications. Safety and reliability are very important aspects and a main consideration for the engineering and operation of flammable process installations in particular. The variety of our systems for on-off valves is as large as its range of applications: from actuators with flow and pressure controls operated by a simple electro-hydraulic unit or hand pump, up to fully autonomous systems including electric control cabinets and shut-off valves.

Strong characteristics

Hydraulic operated ESD valves or systems have several strong characteristics:

- Suitable for hazardous areas due to its Ex-proof classification SIL/ATEX
- A high level of reliability through the fail safe principle with continuous status monitoring
- Hydraulic energy is stored in a compact accumulator which ensures that hydraulic energy is available under all circumstances
- In case of electric power failure the valve can automatically move to its safe position
- Suitable for all valve sizes and types, from 2" and up: be it ball, gate, globe or butterfly valves
- Very high power to weight ratio due to the high operating pressure. Actuators can be compact, which is an advantage for fireproofing, installation and operation

At a guaranteed life span of 20 years, our valve actuating systems are all in all a cost effective solution.

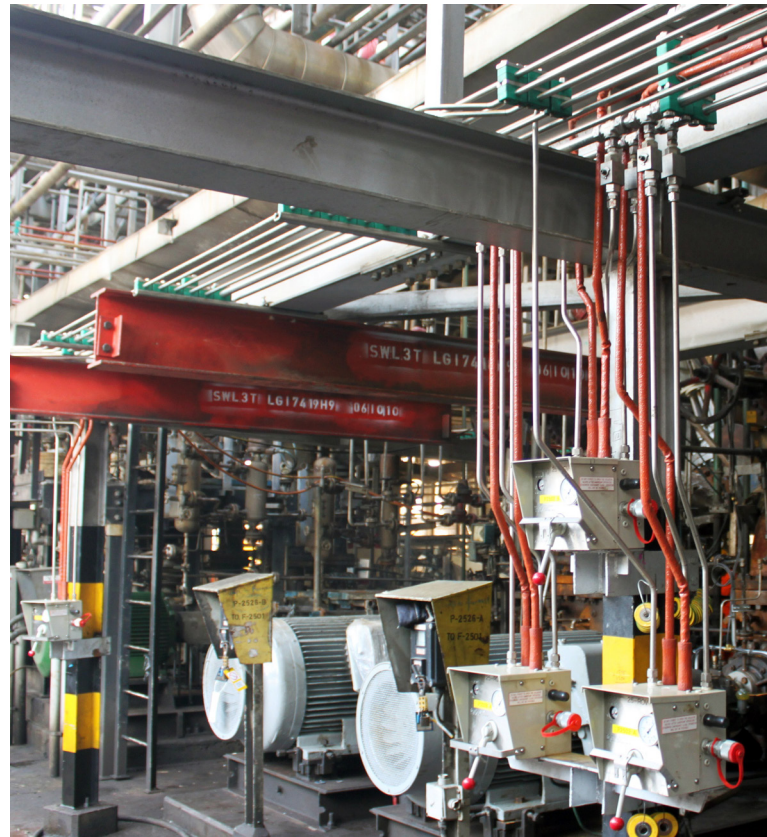
CONFIGURATION

Emergency operation of our hydraulic ESD systems is guaranteed after power failure, because hydraulic oil is stored under pressure in the accumulator. In this configuration the valve can go automatically to its safe position and is then still able to make two more strokes. Monitoring equipment makes it possible to guard the system's condition, allowing timely maintenance or repair. We can supply complete electric control cabinets for monitoring the status and performance of the hydraulic system.

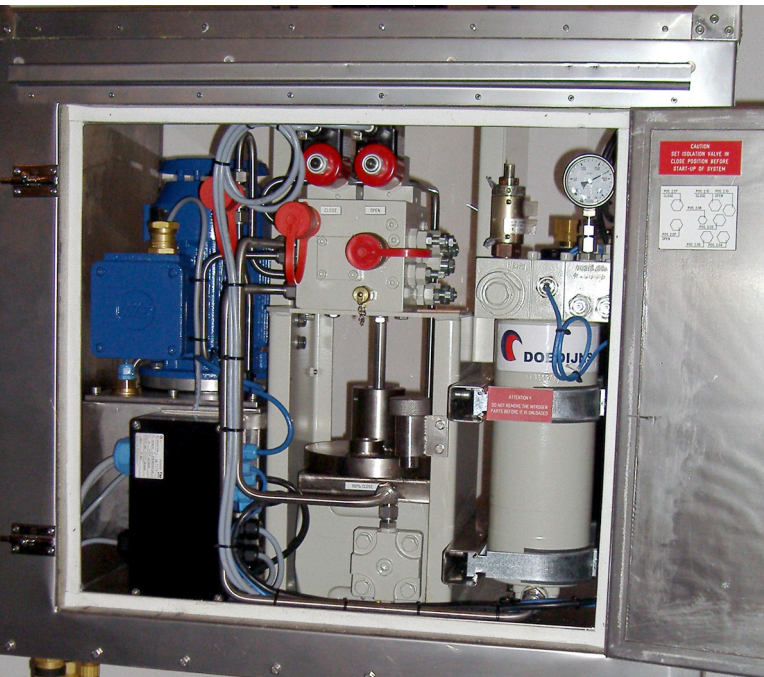
Our systems are available in the two following basic configurations: actuators with a centralised power pack and self-contained units.

ACTUATORS WITH A CENTRALISED POWER PACK

These custom built systems consist of a centralised power pack placed in a safe area. It keeps hydraulic oil stored under pressure for operation of connected valves in hazardous areas. Our power packs can be designed with a built-in accumulator/nitrogen system and a control cabinet. With one power pack various valves throughout the process installation can be operated. Our actuators are available for both rotary and linear actuated valves.



Local operating panels for operation actuators



SELF-CONTAINED UNITS IN SPECIAL FIREPROOF HOUSING

Self-contained units are actuators with an integrated compact power pack. They are an ideal solution for particular valves on remote locations, since they avoid the need for interconnection tubing. The units only require electric or air power for the pump motor, the solenoid valves and instrumentation. There is no external hydraulic tubing required. The complete units are built in a special fireproof housing that is tested and certified according UL 1709. The self-contained units are available for both rotary and linear actuated valves.

TECHNICAL DESCRIPTION

A brief summary of the main components of our Valve Actuating systems:

Hydraulic actuator

The actuator consists of a double acting hydraulic cylinder (rotary or linear), a hydraulic manifold for all operation controls of the actuator, a valve mounting assembly and an adjustable coupling. The actuator is equipped with a facility for mechanically limiting the valve stroke to a 20% closed position (for partial stroke testing during operation) and for locking the valve in 100% closed position (to prevent the valve from opening).

Power pack

Consists of an oil reservoir with two motor-pump sets. The function of the pumps is to keep the accumulator fully charged with hydraulic oil. It can either be driven by an electrical or air operated motor (using plant instrument air), depending on the client's

requirements. The oil reservoir is equipped with all required instrumentation to monitor the status of the hydraulic system, such as level, pressure and temperature switches or transmitters. Through a well-chosen filter arrangement, normally suction, pressure and return filters are all used in conjunction, guaranteeing absolute cleanliness of the hydraulic oil.

Accumulator system

Generally consists of a piston type accumulator and a nitrogen rack. It is designed to store hydraulic oil under pressure to guarantee flawless valve operation even in case of power or air supply failure to the pump motor. The accumulator is sized for the operation of all connected valves. It allows fast stroking times for closing and opening the valves. The system is controlled based on the accumulator volume by means of proximity switches. There is also constant

monitoring of the nitrogen pressure level. These signals are used for starting and stopping the pumps and for sending alarms to a DCS.

Electric control module

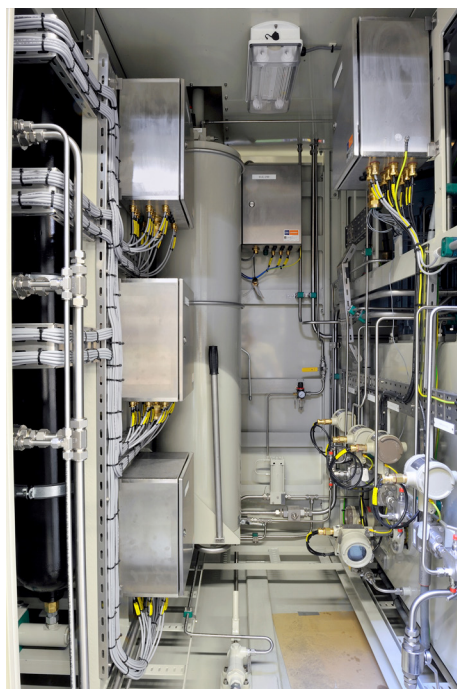
We designed a special control module for control of the hydraulic pumps and continuous diagnostics of the working system. As soon as a hydraulic system error is detected, an alarm is generated and sent to a DCS and, if preferred, all connected valves can be closed automatically.

SIL/ATEX

Our products are suitable for use in SIL applications. Failure rates obtained by an independent safety consultant are available for our products. We are also capable of designing and delivering ATEX certified systems.



Hydraulic Actuators with gate valves



Hydraulic Power Pack inside



Local operating panel with actuator

OVERVIEW OF MAIN APPLICATIONS

We can provide hydraulic operated systems for a broad range of applications (such as processing, transmission and production applications) in the oil and gas industry.

Process installation safety

In refineries, (petro)chemical installations and LNG plants a high standard of safety is required. Due to the complex nature of the construction of these plants (and presence of highly flammable and often toxic products), sections where a calamity occurred need to be sealed off rapidly to prevent fire spreading through the facility or leakage to continue. Hydraulic systems provide the required reliability and speed. Due to the remote control, hazardous areas don't have to be entered during a calamity.

Jetty operation safety

The application not only includes jetty protection, but also fast and reliable standard operation for opening and closing jetties during loading or storage. They always require easy and swift operation, automated or operated from a remote control panel. Hydraulic systems are well suited for those tasks.

COMPETENCE AND EXPERIENCE

We have the competence and experience to design and supply complete systems including hydraulic power packs, double acting actuators, valves and controls. All testing is carried out in our in-house facilities. Our experience dates back many decades and in those years we have executed and developed hundreds of valve actuating projects worldwide, installing thousands of remote operated valves. You will find our systems in a.o.: Brunei, Curacao, Dominican Republic, France, Malaysia, the Netherlands, Nigeria, Oman, Philippines, Qatar, Singapore, South-Africa, Switzerland, Thailand and the United Kingdom.



Hydraulic power pack



Jetty operation



Beach valve operation