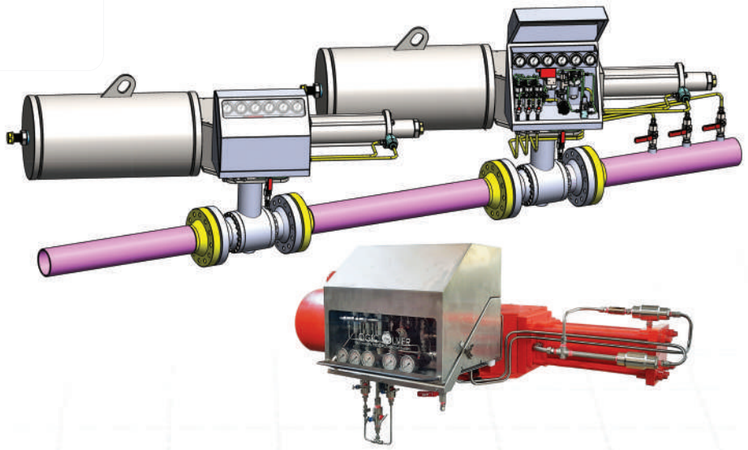
High-Integrity Pressure Protection System (HIPPS) Emergency Shut Down Valves (ESDV)

When operating in high-pressure environments and production fields, an overpressure event can cause damage to the environment, infrastructure, and personnel. Mitigating that risk on production wells and flowlines is a challenge that can be met with a HIPPS.
A system that closes the source of overpressure within the required timeframe and incorporates redundancy within the initiators (pressure sensors), logic solver, and final elements (shutdown valves) with at least the same reliability as a safety relief valve is usually identified as a HIPPS.
The hydraulic (mechanical) HIPPS provides a self-contained, independent protection system operated on demand with one-out-of-two (1oo2) or two-out-of-three (2oo3) (voting) pressure sensor inputs, a hydraulic logic solver, and two spring-return hydraulically actuated safety valves. The unit is typically self-powered and can be provided with additional real-time controls via a hydraulic power unit (HPU). This pressurizes the system and opens the safety shutdown valves.
The system remains open (armed) until an abnormal condition is detected. If an abnormal condition is detected, then the system closes the two actuated final element valves, protecting the downstream production or facility.

Applications

- Wellhead flowline
- Pipeline and compressor stations
- Flaring systems
- Separation and processing facilities
- Gas plants
- Gas storage
- Floating production storage and offloading (FPSO) vessels
- Offshore platforms
- Onshore operations



Key Features & Standards

- High-integrity, flexible mechanical and electronic design
- Pneumatic and hydraulic actuator options (conventional or compact)
- Self-contained hydraulic system
- Partial- or full-stroke testing
- Size 6 inches to 36 inches
- requirements for the specification, design, installation, operation and maintenance of a safety instrumented system (SIS) according to IEC 61511-1: standard
- SIL 3 certified design according to IEC 61508 standard
- Specifies requirements for the attachment of part-turn actuators according to ISO 5211 standard
- Mechanical integrity and sizing of actuators and mounting kits for pipeline valves according to API STD 6DX/ ISO 12490 standard
- Material used in H2S environment according to NACE MR0175 standard

Hydraulic Power Unit (HPU) & Power Handwheel

Valves are installed at regular intervals alongside the pipelines, which are installed to close or open the path. These valves are sliding type, which are called Gate Valves. These valves are industrial valves that are used to open and close the fluid flow path. Gate valves types are Wedge Gate Valve, Conduit Gate Valve Through, and Knife Gate Valve. The Through Conduit Gate Valve type, which is called pipeline gate transfer valves, is the most in use type. To open these valves manually, a lot of torque is required, and also rotating the wheel by operator is a time and energy consuming activity. Kardanan Shargh company has solved this problem by designing and manufacturing power Handwheel and Portable Hydraulic Unit, which is a mechanical hydraulic equipment, and by creating the right force torque in the shortest possible time.

Main Components:

1) Power Handwheel:
This equipment consists of several gearboxes and a hydraulic engine. The power handwheel is fixed on the Bevel Gear and has two mechanisms:
a) The first mechanism is manual and the operator can open or close the valve by turning the lever to the manual position and turning the Handwheel. The difference between this mode and the original manual mode (Bevel Gear Operator) is that with the designed gearboxes, the amount of power torque has been reduced by 80%, and this has helped the operator to turn the Handwheel and open or close the valve with much less force.
b) The second mechanism is automatic and uses hydraulic power. The operator can easily use the automatic mode of the device by turning the gear lever to the automatic mode and connecting the hoses of the hydraulic unit to the power Handwheel, which are of the quick coupling type. In this case, it is enough to open the gate valve. Turn on the engine and put the HPU valve in Open mode. It is worth mentioning that with the designed gearboxes, the torque in this case is 97% reduced.

2) Portable HPU:
This device consists of a stainless steel frame and an oil tank. A hydraulic pump driven by a gasoline engine is placed on this frame. The hydraulic pressure created by this pump is transferred to the power Handwheel by flexible hoses with quick coupling. This unit is easily portable by the handle and wheels that are considered for it, and there is no need to prepare it for each valve gate, and one hydraulic unit can be used for several valves.