

1. HYDRAULIC POWER UNIT

- Designed for rugged operation
- Customized hydraulic system for each application
- Serves multiple control valves
- 2 independent pressurizing pumps
- Self-contained filter system

1-1. APPLICATION

The hydraulic power unit supplies the necessary pressurized hydraulic fluid for the actuators. The HS-series unit is designed for small to medium hydraulic systems.

1-2. DESIGN

The hydraulic power unit is equipped with one accumulator to cover peak requirements. It is mounted to the sidewall of the hydraulic power unit.

1-3. MOTOR-PUMP UNITS

Because of the accumulator, the pump is designed for mean consumption only. However, there two motor-pump units (each with an accumulator charging valve), of which one is in operation while the other one is standby.

1-4. TANK

The tank has sufficient capacity to allow for complete drainage of the accumulator, pipes and actuators into the tank.

1-5. FILTER

An off-line filter unit with cooler is installed on top of the tank. It is self-contained and comprises of an pump with an electric motor, a cooler with a fan and a filter. The unit can also be used to fill and empty the tank by



Hydraulic Power Unit for HP Bypass Valve System

switching over a multi-way valve. Due to its self-contained design, the filter element can be changed during operation of the hydraulic power unit.

1-6. OIL HEATER

If required, the power unit can be fitted with a heater.

1-7. HYDRAULIC POWER UNIT CONTROLLER

A control box on the top of the power unit contains controller, power switches and display elements necessary for operation.

The power unit is ready for operation after the connection to the electric power supply.

1-8. FUNCTION

1-8-1. Hydraulic Power Unit

The internal gear pump draws the hydraulic fluid from the tank and pumps it into the accumulator. As soon as the pressure in the accumulator has risen to 24 MPa. the accumulator charging valve switches the pump over to circulation. i. e. the pump discharges back into the tank through the accumulator charging valve at practically no pressure.

A non-return valve prevents the hydraulic fluid from

flowing back out of the accumulator. If the pressure in the accumulator drops by 10%, the charging valve switches over and the accumulator are charged again. A pressure reducing valve, downstream of the accumulator, supplies oil to the actuators at a constant, controlled system pressure.

If a fast-stroking unit with accumulator is fitted, a connection is provided to charge the additional accumulator. The required supply pressure can be adjusted.

In case of excessive temperature rise a fan starts, and switches off as soon as the temperature decreased by approximately 5deg.C.

Should hydraulic fluid overheat or the hydraulic fluid level in the tank be too low, both motor-pump units are switched off.

If the power unit is equipped with a heating system, the control system switches the latter on or off, depending on the temperature of the hydraulic fluid.

If the pump fails to charge the accumulator the other pump automatically starts and switches off as soon as the pressure is normal.

If there is an abnormality, the system is automatically switched over to the other motor-pump unit and a corresponding alarm is given.

If the accumulator pressure drops too low, an alarm indicates hydraulic power unit failure. Accumulator and pump are protected by a pressure relief valve. A second pressure relief valve protects the system pressure.

1-8-2. Control System

The control system covers the following functions:

- switching of the accumulator charging valve
- starting of the stand-by pump
- change of the operating pump
- start of the cooling fan
- stop of the heater
- generating alarm and message signals

The customer has only to connect electric supply and I/O signals.

The regeneration unit used for Fyrquel is powered and fused through the control cabinet. The supply cable of the regeneration unit has to be connected to the control cabinet.

1-8-3. Signal

Operational conditions and malfunctions are displayed on the display elements in the cabinet door. Malfunction-messages occur, they are displayed on the cabinet door and the collective malfunction-signal is given. When the malfunction is cleared, the pumps and fan will start automatically. The malfunction message will be kept stored until the operator has checked the HPU locally and reset the malfunction message with the reset button.

Following signals are available as contact

- HV ON (SPDT contact)
- Collective malfunction (SPDT contact)
- Pressure too low (Relay de-energizes if a malfunction occurs; 12normally-open contacts for blocking the connected hydraulic actuators)

TECHNICAL SPECIFICATION

Available system pressure	max. 160 bar
Hydraulic Fluid	Mineral oil DIN51525 Fire retardant fluid
Tank capacity	310 liter
Ambient temperature range	-10...50 °C Designed for outdoor installation, sun protection recommended
Sound pressure level	< 75dBA @ 1m
Pumps	
Discharge rate	8.4 l/min
Type	Internal gear pump
Motors	
Power supply	3x 380...420 V, 50 Hz or 3 x 440...480 V, 60 Hz (other voltages upon request)
Pump motors	2 x 4.0 kW / 50 Hz or 4.6 kW / 60 Hz
Filter motor	1 x 0.37 kW / 50 Hz or 0.42 kW / 60 Hz
Fan motor	1 x 0.18 kW / 50 Hz or 0.20 kW / 60 Hz
Design according to	IEC 34-1
Protection class	IP 55
Isolation class	F
Lubrication (motor)	For life, lithium based grease
Bearing	Ball bearing, pre-charged
Humidity protection	100% (Tropical)
Accumulator	
	Gas bladder type, locally mounted
Nominal capacity	50 liter
Max. permissible pressure	330 bar
Approval	CE (others upon request)
Gas	Nitrogen
Filter	
	Standard, self contained type (electric motor, pump, filter, clogging indicator)
	Filtration degree $\beta_{10} > 200\mu\text{m}$
	Air breathing filter on tank
Sensors	
	Level
	Pressure
	Temperature
Oil cooler	
	Standard
Control and Monitoring unit	
	SHV
Interference immunity	CE-conform
Protection level	IP65
Wiring	
	Completely Wired
	Power supply for regeneration unit (when operated with fire retardant oil)

Optional Scope of Supply

- Oil heater
- Oil drip tray
- Regeneration unit (when operated with Phosphate ester fluid)

1-9. DIMENSIONAL INFORMATION

Outline Dimension (unit/mm)

- A 950mm
- B 2020mm
- C 600mm
- D 1700mm
- E 2200mm

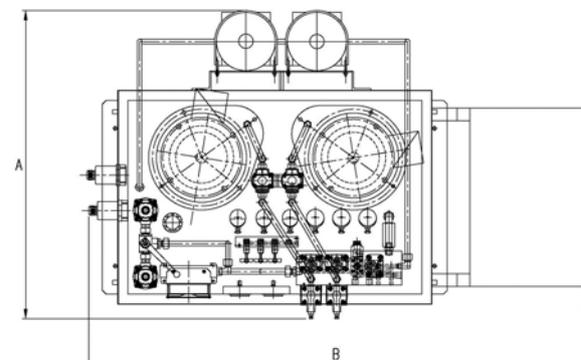
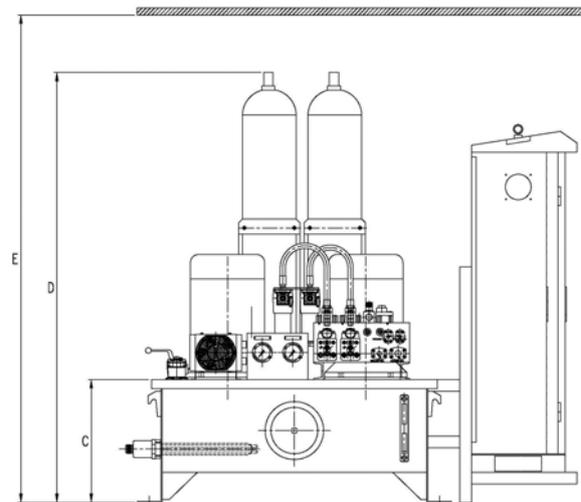
Weight

Approx 505kg



Hydraulic Power Unit

Outline Drawing



2. SELF CONTAINED ELECTRO-HYDRAULIC

ACTUATORS

BFS Self Contained Electro Hydraulic Actuators vest experience with supporting the power plant and oil, gas with valve automation solutions for the most critical applications in extreme operating environments has resulted in product designs that offer unsurpassed quality and reliability across all industries and applications.

2-1. INTRODUCTION

BFS Self Contained Electro Hydraulic Actuator provide a rugged and reliable valve automation solution. Typically used in applications in which external pneumatic or hydraulic power source are unavailable, unreliable or uneconomic, these fully customizable systems provide:

- The same simplicity and low cost installation as provides by electric actuators.
- Fail safe or fail last operation.
- The power, precision and compact size of hydraulic actuators.
- Industry leading control options and system diagnostics.

2-2. APPLICATIONS

Fully customizable systems are available for practically any application and environment;

however, common ones include:

- Partial valve stroking.
- Onshore and offshore ESDV valves.
- Bypass Valve System for Power Plant.
- Globe control Valves.
- Ballast systems for FPSO's
- Wellhead choke Valves.
- Gas pipeline line-break shut-off systems.
- Severe service application systems.



*Self Contained Electro-Hydraulic Actuator
Application Globe Control Valve. / Linear Motion*

2-3. SYSTEM OVERVIEW

BFS Self contained electro hydraulic actuators are integrally mounted to the actuator, and typically consist following basic system components.

- Non-Pressurized Hydraulic Reservoir.
- Electric Pumps
- Hydraulic Accumulators
- Electro-Hydraulic Control System
- Hydraulic Valve Actuators

2-4. KEY FEATURES & OPTIONS

- On-off and modulating Valve operation.
- Partial valve stroke testing supported.
- Compatible with biodegradable fluids.
- Compact and rugged designs.
- Low power systems
- Direct acting zero leakage solenoid valve for proportional control with accuracy and fast response.
- Manifold construction to eliminate pipework and increase system reliability and ruggedness.
- Precise valve positioning capabilities using BFS smart hydraulic system.
- Manual overrides.

- Hydraulic accumulators to provide valve operation and back-up valve control loss of primary power supply source.

PERFORMANCE DATA

- Electric Power Source

; DC 24V.

; AC 115/225V 50/60Hz. Single Phase

; AC 380/420V 50/60Hz. Three Phase.

- Hazardous Area

; ATEX Zones 1 and 2.

; Explosion Protection Desigend.

- Hydraulic Pressure Output

; 210-barG to 350-barG.

- Ambient Operating Temperature

; -60°C to +60°C

- Valve Actuator Output / Force(Thrust/kgf)

; Reciprocating (Linear) - 289,134N. (65,000LBf)

; Quarter Turn (Rotary) - 680000N. (6,018,000LBf.in)

2-5. POSITIONING

The BFS's Hydraulic valve positioning system is designed specifically to provide precise positional control of hydraulic actuators with On-off or proportional valves. The hydraulic valve positioning system can accept positional feedback from a three wire potentiometer or position transmitter with a current output, key features include;

2-6. BASIC SYSTEM

- Selectable sinking or sourcing actual position 4 to 20mA output.

- Local remote configuration enable input and open drain status output.

- Selectable default operation on command signal

feedback signal break.

- ESDV solenoid output DC 24V open drain.

- Fault output DC24V open drain.

- Hydraulic pump drive controlled by demand or external pressure sensors

- Low power : normal operation less than 2W plus solenoids

2-7. ENHANCED SYSTEMS

- HART communication channel on re-transmitted actual position signal.

- Foundation Fieldbus interface.

- 3-analogue inputs for hydraulic system mounting and condition monitoring

- Performance logging with USD download.

- Partial stroke valve testing with logging



**Control Panel for Self Contained
Electro-Hydraulic Actuator**



**Gas Hydraulic Cylinder Actuator
Application Globe Control Valve**