

Seatools Subsea Control HPU

Reliable subsea hydraulic power for PCS – 19-03-2017

Introduction

Main purpose technology

- Supply of low-pressure (LP) and high-pressure (HP) fluids to the Subsea Control Module (SCM) on the XMT to control the hydraulically operated valves on the XMT and the Down Hole Safety Valve (DHSV) and any down hole choke/sliding sleeve
- Key features
 - Designed according to highest quality standards
 - Designed to be permanently situated subsea (20+ years design lifetime)
 - Applicable to a wide range of fields and conditions
 - High level of redundancy
- Value creation
 - Reduction of costs associated with procurement, installation, and operation of umbilicals (through smaller-sized umbilicals)
 - Reduction of mean time to repair
 - Enabling for environmentally sensitive areas (through closed loop)
 - Enabling for additional tie-backs to existing host

Typical Applications

Brownfield applications

- Additional tie-backs to existing host where no or limited space on topside is available for additional HPU
- No or reduced capacity of LP or HP line in existing umbilical (damaged / fouled / corroded / plugged tubes). In this case, a local SHPU can act as a rescue solution
- Greenfield applications
 - New field in environmentally sensitive area where no discharge of control fluids is allowed. Redundant return line increases umbilical size significantly, which negatively influences CAPEX investment. Local SHPU for SCM in closed-loop configuration reduces required umbilical size
 - Smaller reservoirs at remote locations where high CAPEX investment related to infrastructure results in negative field ROI. SHPU allows for reducing umbilical CAPEX

Specifications

General	
Power rating	2 kW
Design MTTF	> 20 years
Depth rating	500 msw (3000 msw optional)
Operating temperature range (water)	-5°C – +40°C
Storage temperature range (air)	-18°C – +50°C
Outer dimensions	2230 x 850 x 1380 mm
Frame coating	NORSOK M-501

Hydraulic	
Supply pressure (LP)	207 bar (345 bar optional)
Supply pressure (HP)	345 bar (690 bar optional)
Return pressure (LP)	≥ 2 bar
LP output flow	3 l/min
HP output flow	0.5 l/min
Reservoir volume	100 liters
Hydraulic connections (HP, LP, LP	Single-line connectors (MQC optional)
return)	
Fluid compatibility ¹	MacDermid HW443 or Castroil HT/HT2

¹ SHPUs compatible with mineral oils can also be delivered

Electrical	
Power supply	400 VAC, 3-phase, 50 or 60 Hz
Control interface	SIIS 2, CAN open
Sensor class	ISO 13628-6 compliant



Fig. 1 Subsea HPU for Production Control System

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Options

- Alternative power supply The SHPU can be delivered with alternative power supply requirements such as 225 VAC, 500 VAC, or 400 VDC. Another alternative is a 24-VDC power supply from the SCM or Control system distribution side (SIIS 3 interface). This option comes with a battery, including charger circuit
- Alternative hydraulic circuit configuration In its basic configuration, the LP flow is fed back to the 100L reservoir and the HP flow is vented into the sea. However, in case the related hydraulic valves allow for this, a configuration in which the HP flow is fed back to the reservoir is possible as well.
- Hydraulic trickle charge fill In order to omit filling operations, the HPU can be executed with a trickle-charge filling provision. This can be executed with an overfill protection mechanism.
- Additional hydraulic reservoir As an alternative to trickle-charge filling, an additional large volume (e.g. 1000L) hydraulic reservoir can be delivered to prolong the time between refill operations.
- Removable control module In this setup, the control module is modular by means of ROV mate-able connectors and a ditto mechanical locking mechanism. This arrangement ensures that in case of failure of an electronic component, an ROV can remove and replace the entire module for maintenance without the need to remove the entire SHPU.
- Alternative control interface The default control interface is SIIS 2. Alternative interfaces such as SIIS 3 or fiber are possible as well.
- Gas separator Optionally, a gas separator can be installed in the return line in order to remove gas potentially present in the return flows.



Fig. 2 1000 liters subsea hydraulic reservoir

Complementary: Subsea Chemical Storage

- Costs associated with procurement, installation, and operation of umbilicals can be reduced further by subsea storage of production chemicals (e.g. inhibitors)
- Also, the other points of value creation as outlined on sheet 2 apply to subsea storage of chemicals as well
- Seatools has developed and qualified a subsea liquid storage system intended for longterm subsea storage of production chemicals
- Seatools is currently developing its storage system further by increasing storage capacity. This increased storage volume allows for further simplification and CAPEX and OPEX reductions
- Together with the SHPU, this could form a "rescue package" in case of umbilical damage whereby hydraulic transport is blocked



Fig. 3 Subsea Chemical Storage

Contact information

Johan Sol Business development M. +31651518734 E. jhs@seatools.com

