

**OFFSPRING
INTERNATIONAL
LIMITED**



PLEM CONTROL SYSTEMS



Offspring International offers a range of **PipeLine End Manifold (PLEM)** control systems as part of its integrated CALM buoy and conventional buoy mooring and offloading systems.

Available under an exclusive agreement with valve actuator manufacturer, Paladon Systems, the PLEM valve control systems can be operated from the surface or subsea, and autonomously with the innovative Autonomous Shutdown Valve (ASV).



PLEM CONTROL SYSTEMS

Optimised PLEM Control

Offshore loading and unloading Single Point Mooring (SPM) and Conventional Buoy Mooring (CBM) systems feature a PLEM containing single and multiple valves to control flow to and from the terminal. Smooth operation of the valves is critical to maximising tanker movements and trouble-free scheduling.

Offspring International offers several PLEM control systems for SPM and CBM loading and offloading:

SPM – PLEM Control

The PLEM is connected to the SPM CALM buoy via flexible submarine hose(s), typically in either a “Chinese lantern” or “Lazy S” configuration, enabling oil to be transferred to and from the tanker via a floating hose. OIL offers the following PLEM control options:

Manually controlled valve – operated by diver. Ideal for shallow water where calm Sea States are the norm. These valves are normally left permanently open and only closed for a hose change out or in the event of an emergency.

Remote double-acting valve operation from the SPM buoy. The PLEM valve is controlled using a double-acting hydraulically operated actuator, powered open and closed by Hydraulic Power Unit (HPU) mounted on the CALM buoy and connected by a control umbilical.

Remote single-acting valve operation from the SPM buoy. The PLEM valve is controlled using a single-acting, hydraulically operated actuator, powered open by a HPU mounted on the CALM buoy and connected by umbilical. The valve is held open by hydraulic pressure and fails safe via the actuator’s spring when the hydraulic pressure to the actuator is lost.

Autonomous Shutdown Valve

With increasing demands for more efficient tanker scheduling and greater loading / offloading availability, Offspring International offers Paladon Systems’ patented Autonomous Shutdown Valve (ASV). Fully autonomous and self-contained, the ASV offers terminal operators fail-safe offloading operations, greater system availability, and emergency shutdown capability.

Suitable for CALM buoy and conventional buoy mooring systems, the ASV removes the restrictions on offloading operations typically imposed by manual valve operation that can require expensive diver interventions and are only possible during fair weather.

The ASV also replaces the extended chain of components needed with a hydraulically operated valve actuator, powered open by a CALM buoy mounted HPU; effectively removing reliance on a surface control umbilical.

It also eliminates the need for frequent maintenance visits to the buoy for checking and recharging of HPU system pressure.

CBM – PLEM Control

For CBM offloading operations, OIL offers a diver operated valve PLEM control option, as well as the Autonomous Shutdown Valve and its associated benefits.

Autonomous Shutdown PLEM Valve Operation

A self-contained subsea package, the ASV comprises of a PLEM valve, spring-return actuator and a long-life, battery controlled electric and hydraulic control system.

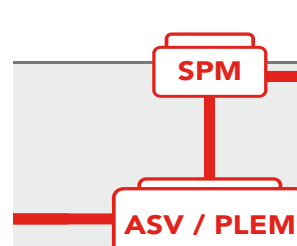
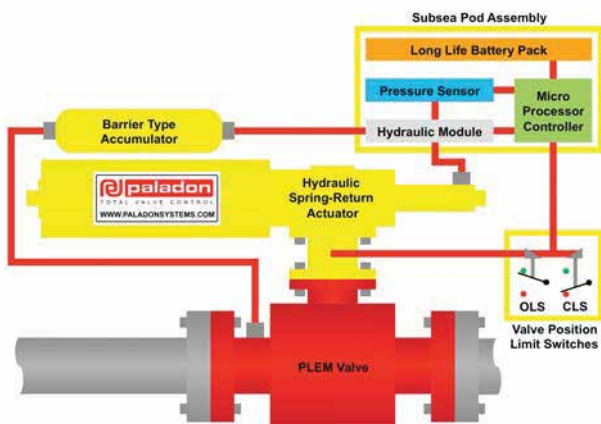
When in operation, pressure from the pipeline to the terminal, or pressure from the subsea hose linking the buoy to the PLEM, is converted to hydraulic control pressure which is used to open the PLEM valve. Once pumping operations are completed, the drop in the pipeline's pressure enables the actuator's spring to move the PLEM valve to the closed fail-safe position. The valve closure speed can be controlled to suit the terminal.

Key ASV Features

- Fully automatic fail-safe operation of PLEM valve to isolate the pipeline from the riser
- 24/7/360 system availability irrespective of weather conditions
- Significant OPEX reduction when compared to traditional systems
- Automatic linebreak detection and shutdown
- Risk of pollution, liability and loss of sealine inventory significantly reduced when compared to traditional systems
- Comprehensive communications suite providing remote status monitoring, override control and in-situ diagnostics
- Rugged design for the harshest conditions using proven technology across all system components
- Non pressure compensated designs suitable for depths down to 120 m (394 ft); pressure compensated designs for operation from 120 m (394 ft) to 200 m (656 ft).

ASV System Overview

- Pipeline pressure acts on barrier vessel, pipeline pressure on one side converts to hydraulic control pressure on the other
- Complete electro-hydraulic manifold system housed within an oil filled pressure compensated pod
- Valve actuator powered via a high flow pilot valve
- Internal watchdogs give 1:115 time ratio to conserve battery power
- Expected life 7/10 years, 5 years guaranteed based on 3 operations per week
- Batteries have a 20A/Hr capacity, rechargeable option available
- 8-Bit micro controller.



ASV System Communications

ASV Communication can be provided via RS232 (RS485 available for longer distances) link to the surface buoy; however, wireless and acoustic links are also available. Standard communication and data includes:

- Remote status indication
- Manual override function
- In-situ diagnostics and configuration
- Pipeline pressure
- Valve position
- Solenoid valve status
- Number of completed valve operation cycles
- Pressure sensor, solenoid valve and battery health.



OIL's Integrated Approach

The ASV can be readily integrated within the Offshore Ops Terminal Management System allowing oil terminals to maximise terminal availability and efficiency, increase safety, reduce operating costs and reduce environmental incidents.

Offshore Ops, working in partnership with Offspring International (OIL), offers industry leading software and technologies for mooring and offloading operations. Offshore Ops' fully OCIMF SMOG 2015 compliant Integrated Terminal Management System has been systematically developed over 12 years to provide 'live' data on a wide range of operational and environmental factors, as well as effective operations management.

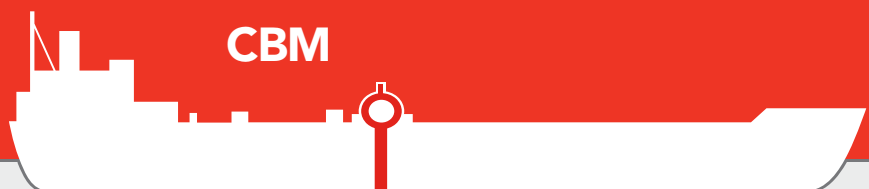
Offshore Ops – Enhanced Terminal Management

Offshore Ops' Integrated Terminal Management System comprises an array of sensors on the offloading buoy, together with a portable monitoring unit used by the mooring master on the tanker, providing 'live' data on all aspects of offloading operations.

Data can be monitored from multiple locations within the terminal, the tanker and even the world, using a secure internet connection. The Autonomous Shutdown Valve can be monitored within Offshore Ops.

In addition to the mooring and environmental advantages of using the Integrated Terminal Management System, the operational benefits include:

- Consignment scheduling
- Asset register
- Planned maintenance
- Policy and Procedural adherence.



ASV / PLEM

Offspring International

Offspring International specialises in equipment for mooring, offloading and control systems to optimise terminal operations both offshore and quayside. We offer a fully integrated supply of equipment for SPM and CBM buoy mooring, hoses, breakaway couplings, PLEM control systems, together with a comprehensive Offshore Ops terminal monitoring and management system. Using experience and expertise gained over 25 years, OIL is able to support other mooring applications including renewables, chain ferries, port operations, aquaculture etc.

Based in Dudley near Birmingham, UK, and with a subsidiary office in Laguna Niguel, California, Offspring International (OIL) supplies a range of SPM and tandem offtake mooring systems following the OCIMF 2018 "Guidelines for Offshore Tanker Operations", including single or dual hawser configuration, single leg-type mooring hawser and grommet-type mooring hawser manufactured and supplied in strict accordance with the OCIMF 2000 "Guidelines for the Purchasing and Testing of SPM Hawsers".

Integrated SPM & CBM Supply

All OIL offloading systems and products offer outstanding operational performance, reliability and safety, and include chafe chains, mooring hawsers, pick-up and messenger ropes, support buoys, shackles, associated fittings and load-monitoring equipment. Additionally, OIL is able to

supply single and double carcass floating marine and submarine hoses, dock hoses and long length conduit hoses in accordance with GMPHOM 2009.

OIL is also the exclusive worldwide agent for Lankhorst Euronete Portugal for SPM systems and Paladon Systems' Pipeline End Manifold Control Systems, international agent for Manuli Hydraulics - Oil & Marine division floating marine and submarine offloading hoses, MIB's MIBreak and Flip Flap marine breakaway couplings and primary agent for Techflow Marine's Quay Reel® flexible loading and unloading system.

Offspring International -Strength and Depth

OIL has a worldwide customer base together with a comprehensive international network of agents. OIL values long-term, customer relationships and so a commitment to excellence in customer service is one of our key strengths. We go beyond the normal pre-sales technical advice and project management expected when delivering mooring and offloading systems on-time and within budget. Our service also includes post-installation reviews and through-life support.





Paladon Systems

For over 35 years Paladon Systems has been supplying valve actuators and control systems on a global basis. Paladon Systems' experience supporting the Oil and Gas industry with valve automation solutions for the most critical applications in extreme operating environments has resulted in product designs that offer high quality and reliability.

Established in 1981, Paladon Systems has continuously developed its design, engineering, organisational, quality and management capabilities. This sustained innovation has led to Paladon Systems designing and manufacturing many industry-leading valve automation technologies in terms of cost efficiency, operational performance and environmental responsibility.

Paladon Systems' philosophy is to provide comprehensive, fit for purpose and cost effective valve automation solutions to its clients, and the industry sectors they serve. By building close working relationships with its customers, Paladon Systems is able to fully understand their operational requirements and subsequently design and develop valve automation solutions that met or exceed their customer's specifications.

Holding the ISO 9001 certification for over 20 years, today Paladon Systems holds accreditation and approvals from almost all major institutes, engineering companies and end users.

Headquartered in England, Paladon Systems has offices and facilities in Italy, Malaysia, the Russian Federation and the United States. With a comprehensive suite of valve automation solutions backed by a team of field service engineers. Paladon Systems' dedicated team of customer support engineers specialise in all aspects of site-work; from installation, through to commissioning, training and after-sales support.



Offspring International Limited is a leading supplier of high quality Single Point and Conventional Buoy Mooring and offloading systems, Quay Reel® loading and unloading system, hoses, breakaway couplings, PLEM control systems, pressure surge protection and navigational buoy moorings.



For more information on Offspring International Mooring and Offloading Systems
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