

# Subsea Pressure Intensifier

Maximize the working pressure of subsea mounted accumulators

## APPLICATIONS

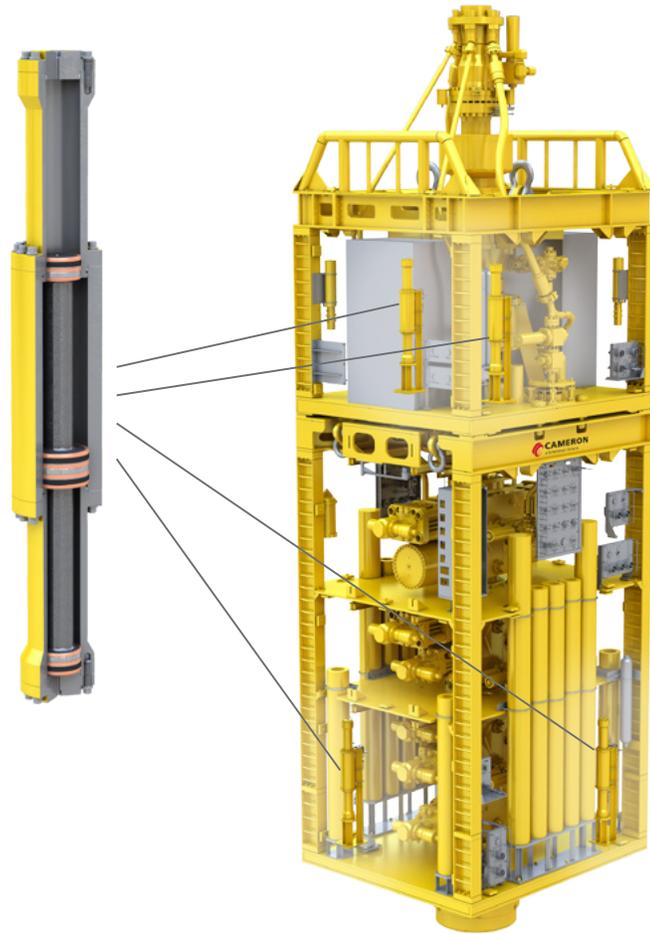
Offshore, deepwater, and ultradeepwater drilling and production operations

## BENEFITS

- Improved cost efficiency compared with existing subsea BOP controls
- Enhanced operational reliability with field-proven, streamlined subsea equipment
- Simplified operations through use of existing stack-mounted accumulators
- Decreased rig time with the ability to charge accumulators while running BOP stack down
- Minimized rig footprint through not requiring extra topside equipment to charge accumulators
- Increased certainty by improving shearing ability and enabling moving into greater water depths
- Reduced leakage risk through the use of nitrogen gas charge instead of helium gas

## FEATURES

- Exterior constructed of durable, maintenance-free, NACE MR0175-compliant 17-4 PH® Condition H1150D stainless steel
- Piston constructed of NACE MR0175-compliant 4130-grade steel with aluminum bronze overlay
- Approximately 30- to 60-min charge time to 7,500 psi [51.7 MPa] (stack dependent)
- Integral 5,000-psi [34.5-MPa] control valve
- Unit service life of 20 years with seal replacement per 10,000 strokes
- Pressure-balanced design rated to water depths greater than 15,000 ft [4,572 m]



*The system requires two subsea pressure intensifiers to be installed on the stack (shown with additional mounting locations option on lower marine riser package).*

The ability to drill in deeper waters is an ever-increasing advantage in today's market. One of the most important variables to determining drilling depth capabilities is the amount of usable fluid subsea for activating controls from surface.

The Cameron subsea pressure intensifier (SPI) enables increasing the useable control fluid stored in subsea mounted accumulators by boosting the working pressure from a conventional 5,000 psi [34.5 MPa] to the full rated pressure of 7,500 psi [51.7 MPa]. Available for new-build rigs or as a retrofit, the SPI is a space-saving, economical solution that enables you to

- improve shearing capability
- extend your operating work area into greater water depths
- use nitrogen gas instead of costly helium gas (stack dependent)
- minimize the weight increase on existing BOP stacks
- increase your capacity to comply with Bureau of Safety and Environmental Enforcement (BSEE) Well Control Rule and American Petroleum Institute (API) Specification 16D.

# Subsea Pressure Intensifier

---

## Simplified operation

Using technology similar to a BOP bonnet piston, the SPI strokes lower-pressure fluid through a large-diameter chamber into a small-diameter chamber to output a higher fluid pressure. This is accomplished by running the topside-supplied fluid into a 5,000-psi-rated control valve mounted onto the SPI. The control valve is operated by solenoids located inside the subsea control point of distribution (POD). For redundant units, an ROV panel is mounted near the units to isolate and select the unit to be activated. Each SPI has a corresponding ROV panel mounted on the lower stack with redundant regulators to step down the 7,500-psi output to 5,000-psi working pressure of the emergency systems.

## Real-time actuation and monitoring

Software control logic monitors redundant pressure transducers (PTs) mounted at the bank of subsea accumulators. These PTs are connected into the control circuit via new subsea electrical cables with a T-junction to replace the existing mini-POD cables. When the pressure drops below a threshold, the control logic activates the SPI. This begins cycling a double-stroking two-stage piston, which outputs 7,500-psi fluid into the accumulator bank.

When the desired working pressure limit of the accumulators is reached, the control logic deactivates the SPI. Relief valve protection is also provided to prevent excessive accumulator pressure. The remote digital or touch control panel (DCP or TCP) is updated with a readout indicating the surface supply pressure at the SPI and accumulator bank pressure. Intensifier operating fluid is exhausted into the subsea atmosphere.

## Versatile mounting options

The SPI can be mounted on either the lower marine riser package (LMRP) or below on the lower stack. Lower-stack-mounted systems can use the 5,000-psi charge supply line of the multiplex (MUX) PODs. LMRP-mounted systems can use the 5,000-psi supply from conduit valve modules and are inherently retrievable. The LMRP option requires a high-pressure stab to transfer fluid to the lower-stack-mounted accumulators. Single SPI units are available, but redundant SPI units are recommended. The subsea stack requires only two SPI assemblies. Cameron recommends installing the SPIs on the lower stack, but an option is available for installation on the LMRP.

[cameron.slb.com/SPI](http://cameron.slb.com/SPI)