

AlphaCPU™ Central Processing Unit

The Central Processing Unit is a modular seabed hydrocarbon production system, which forms the heart and brain of an AlphaPRIME™ developed field. It utilises all-electric power and control for maximum efficiency and reliability. This ensures its suitability for all field developments including deepwater applications and those requiring long tie-backs.

The AlphaCPU™ consists of the following main building blocks:

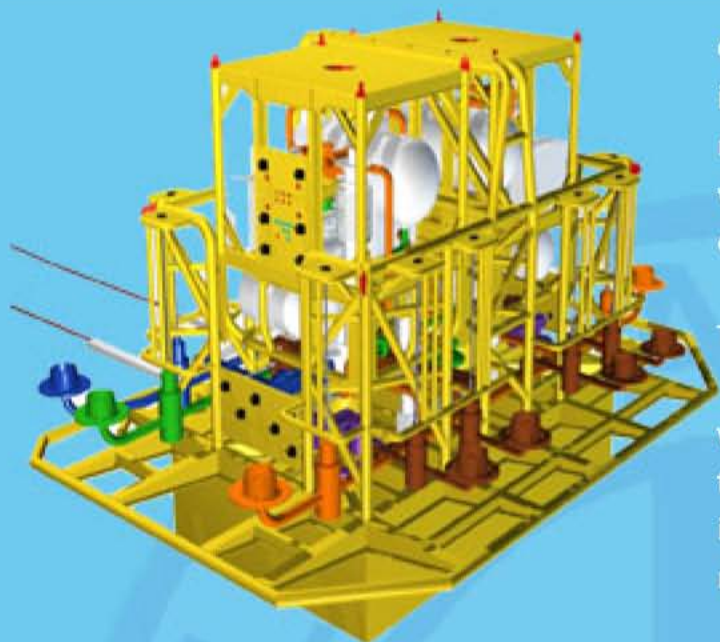
- **KeyMAN™**
- **System-Modules™**

The AlphaCPU™ incorporates two or more identical autonomous System-Modules™ that are installed into a KeyMAN™. The KeyMAN™ is attached to a field specific foundation system or base. A protection structure can be incorporated into the design if required.

Each System-Module™ includes its own power and control pod, allowing autonomous operation of the module. The System-Modules™, which are readily recoverable to the surface, ensure that Inspection, Maintenance and Repair (IMR) or re-configuration activities can be undertaken without well shut-in, thereby ensuring continuous production. This is achieved by replacing one of the System-Module(s)™ with a spare, whilst maintaining production through the remaining System-Module(s)™.



AlphaCPU™



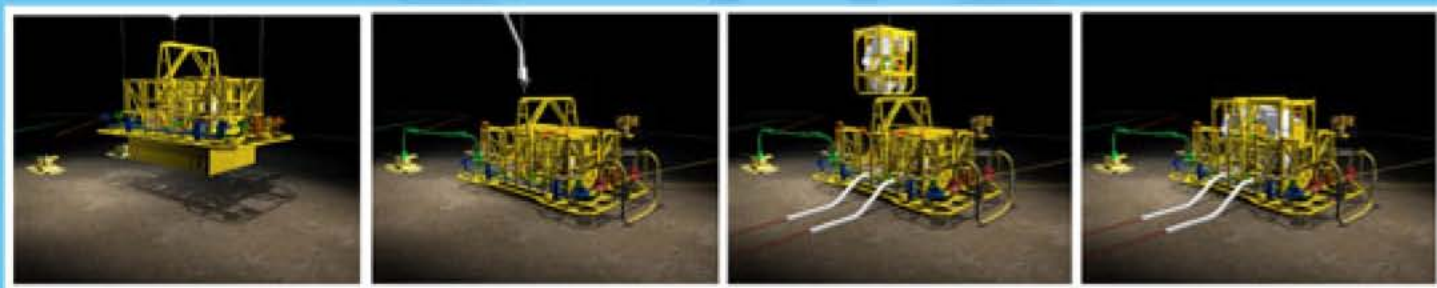
Connection of the System-Modules™ to the KeyMAN™ is achieved via the following wet-mateable connections: multibored well-head type, fluid connectors, high voltage electrical connectors, and control/chemical connectors.

The system does not use "insert" or "component" retrievable methods as these require additional wet-mateable connections, seals and isolation valves to be made up for each equipment item, thereby increasing weight and size and reducing system reliability and availability.

Alpha Thames works with the major processing equipment manufacturers; this enables the Company to utilise the latest cutting-edge processing technology and to provide state-of-the-art separation equipment within the System-Modules™.

The System-Modules™ are configured to suit the processing requirement of early field life. They can be readily retrieved and re-configured to suit the changing reservoir characteristics at any time during field life, or to include the latest technology when it becomes available. All System-Module™ change-outs are carried out without stopping production.

The pipelines to/from the host facility and the flowlines to/from the wells are attached to the KeyMAN™. The KeyMAN™ has been designed to accept most proprietary diverless pipeline connection systems. The AlphaCPU™ utilises conventional, field-proven technology combined with fully developed and tested electric power distribution and control equipment. The KeyMAN™, which is connected to the foundation system, contains only pipework and ROV operated field proven isolation valves, whilst the controls, electrical systems and actuators are located in the readily retrievable System-Modules™.





System-Modules™

The System-Modules™ are state of the art, all-electric, autonomous modules for use in the Central Processing Unit (AlphaCPU™). Each module is a completely integrated system that can be configured to incorporate processing/separation systems, booster pumps, HIPPS or any other requirements. The System-Modules™ can be re-configured and optimised to suit changing reservoir characteristics, as required throughout field life, whilst production is maintained. When configured with separation equipment, the System-Modules™ allow single-well flow test measurement of the separated fluid streams to be undertaken.

The System-Modules™ utilise standard, multibored, wellhead-type connectors to provide single-datum fluid connections. These connectors allow the rapid connection/disconnection and retrieval of the System-Modules™ to the surface for reconfiguration, maintenance or repair. Once recovered, accurate faultfinding, reliable component integration, and full system testing can be carried out under factory conditions, before redeployment.

The System-Modules™ incorporate key Alpha Thames technology, which makes them capable of allelectric operation at almost unlimited water depths and step-out distances. Installation, operation and retrieval can all be achieved without diver intervention.

KeyMAN™ Manifold

The KeyMAN™ houses the lower halves of the multibored connectors that provide the fluid and mechanical connection of each System-Module™. It also provides location for the installation of the umbilicals. The KeyMAN™ contains the necessary piping and ROV-operated valves to route the well fluids etc. to/from the flowlines/pipelines to the System-Modules™. No actuated valves or controls equipment are required in the KeyMAN™.

Each multibored connector provides a single-datum connection for each System-Module™. Once the multibored connection has been completed, accurate alignment of the electrical, control and chemical connectors are ensured, thus providing reliable connection of the services to the System-Module™.

The KeyMAN™ header pipes conveniently allows for pigging activities. A pig loop can be incorporated or it can facilitate daisy-chaining of other systems. It contains the necessary manifold piping to enable single-well flow testing to be undertaken in the System-Modules™.

Any proprietary pipeline/flowline connector system can be incorporated into the KeyMAN™ design.



Features

- Continuous production during System-Module™ replacement.
- All-electric power and control.
- Processing and boosting subsea.
- Constant-speed pumping, avoiding the need for heavy and costly speed-control equipment.
- 'Real-time' monitoring / control.
- Sand handling.
- Integrated local well-testing.
- Integrated power distribution.
- 1st stage separation on seabed.
- Removes unnecessary fluids/solids.
- Built-in system reliability .
- System flexibility .
- Conventional field-proven technology for all crucial interfaces, particularly for the KeyMAN™.
- Minimum wet-mateable connections.
- All serviceable equipment is contained in readily retrievable System-Modules™.

Benefits

- Facilitates early production.
- Maximises hydrocarbon extraction by reducing the effective reservoir depth; increases reservoir depletion and rate of production.
- Reduces production costs by \$2/\$3 per barrel.
- Field development on a 'Just-in-Time' basis.
- Overcomes topside bottleneck problems, capacity and weight restrictions.
- New technologies can be incorporated, as they become available, into the retrievable System-Modules™.
- Can incorporate multiphase pumping and overcome need for ESPs.
- Increases step-out distances by tying fields back to distant / shallow water host facility.
- Reduces or removes the need for offshore surface facilities/support.
- Provides complete flow assurance.
- Extends the life of existing platforms/infrastructure.
- Reduces chemical injection requirements.
- Savings on pipeline costs.