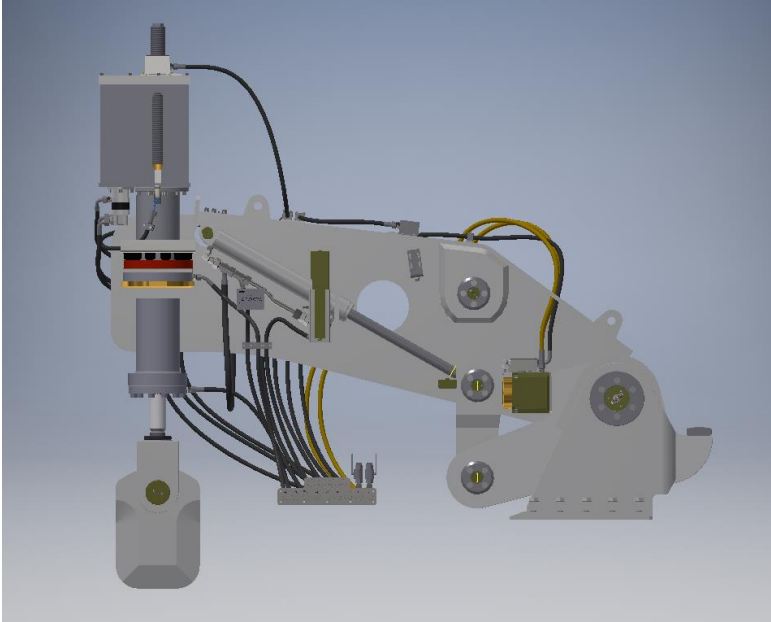


<p>Package Number</p>	<p>14</p>
<p>Package Name</p>	<p>LOCKING MECHANISM</p>
<p>Scope of Work (* To be confirmed)</p>	<p>The buoy locking mechanisms provide securing of the STP Buoy to its fixed position in the Mating Cone. The locking mechanisms consist of a number of hydraulically operated locking jacks distributed around the upper mating ring.</p> <p>The locking mechanisms are remotely operated by hydraulics. A mechanism is arranged so that the lifting tip of the mechanism first move in under the buoy locking recess ring before it is lifted upwards. After the locking mechanism engages hydraulically to the correct pretension value, a mechanical nut is manually engaged to lock the locking mechanism in a permanent fixed position. The hydraulic pressure is not removed until all the locking mechanisms are mechanically locked in pre-tensioned condition.</p>  <p>The FPSO is permanently connected to the buoy, but the locking mechanisms may be operated individually for maintenance purposes.</p> <p>RULES AND REGULATIONS</p> <p>The Manufacturer shall work in accordance with the requirements given in this specification, including, but not limited to, those listed below. Including the annexes and the applicable requirements given in the rules, regulations, codes and standards listed.</p> <p>The design, manufacture, workmanship and testing shall be in accordance with:</p> <ul style="list-style-type: none"> • ABS “Guide for building and classing floating production installation 2004”

- ABS “Rules for building and classing steel vessels 2006”
- ABS “Rules for building and classing Single Point Mooring 1996”
- ABS “Guide for building and classing facilities on offshore structures 2000”
- ABS “Guide for building and classing mobile offshore drilling units 2006”
- OCIMF “Recommendations for Equipment Employed in the Mooring of Ships at Single Point Moorings 1993”

It is the Manufacturer responsibility to request the current revision of the necessary rules, regulations, codes and standards.

The Supplier shall work in accordance with the requirements in this specification including the appendices and the applicable requirements of the referenced rules and standards listed above.

The referenced rules and standards shall apply where this specification states no requirements. In the event of conflict between documents, the most stringent rule shall apply.

The Supplier is responsible to have the latest edition of all the referenced rules or standards, and shall make them readily available to all inspection personnel involved in the work, and shall ensure that involved personnel are familiar with the relevant specifications.

CERTIFICATION

All relevant documentation shall be sent to ABS for review and approval. The Classification Society shall follow up the production and witness the tests as required by the rules.

The Manufacturer shall prepare a document list for documents and drawings that shall be submitted to ABS for review. The status of each drawing shall be reported in the monthly progress report.

The following ABS scope of work shall be included:

1. ABS approval of WPS, WPQ and NDE procedures
2. ABS approval of the proposed material list
3. Pre-production meeting
4. Fabrication surveys
5. Witness of final functional, pressure and load tests
6. Issue of certificates of conformity, certificate of inspection and design approval

Comments to engineering, fabrication or testing made by ABS or APL shall be implemented.

Product Certificate

The agreed scope of supply shall be delivered with the following certificates and

statement of compliance:

1. ABS Certificate of Inspection and Certificate of Conformity
2. Statement of Compliance issued by the Manufacturer, confirming that all work, services and supply of equipment meet the standards and requirements specified in the contract.

These documents are considered as a part of the scope of supply, and shall be supplied with the final delivery.

EX Certification

Electrical components shall be certified to not represent a fire or explosion risk in a Hazardous Area Zone 1, gas group IIC temperature class T1-T6.

Ingress Protection Rate

The STP Locking mechanisms will be submerged in seawater during FPSO hook up. i.e. all electrical components shall be IP 68-20m.

Design Loads

The system is designed to keep the buoy securely locked in the mating cone of the vessel, while sustaining all relevant loads

During operation condition the locking mechanism is transferring vertical loads from the buoy. The horizontal loads from the buoy are mainly transferred directly on the mating cone module by the upper mating ring.

The vertical load is caused by

- Mooring system
- Swivel stack
- Effective pre-tension on the jaw

Transverse and lateral loads is caused by

- Horizontal mooring reaction force
- Turret rotation stick slip torque

The ultimate design capacity per locking mechanism must be

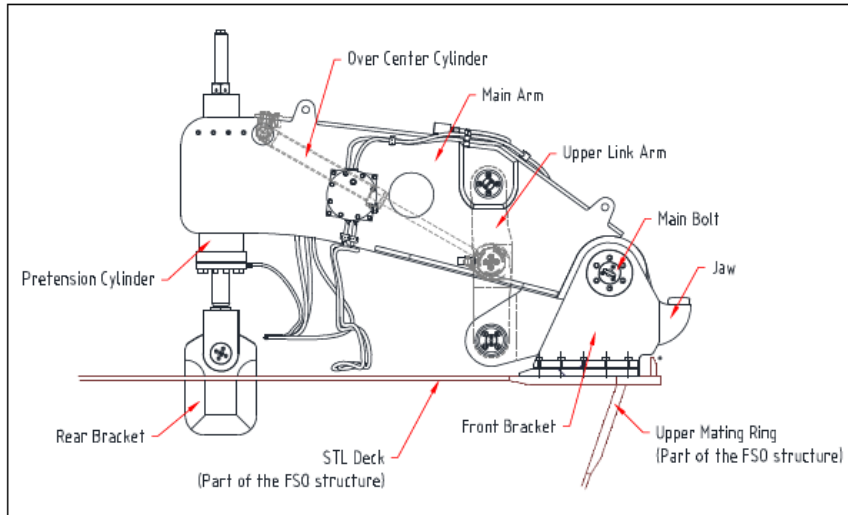
Vertical load, 7000 KN

Longitudinal load, 1000 KN

Transverse load, 1000 KN

Material Specification

The STP Locking mechanisms consists of several parts. Bellow is a description of the main parts with its function. Material grades are also defined



Jaw: A 300mm wide retractable latching piece. The buoy rests on its tip.

Upper/lower link arm: Mechanism to lift, lower and lock the jaw.

Front bracket: Supports the jaw and the main arm to the deck level.

Main arm: Moment arm to act as “housing” for the over centre mechanism.

Over centre cylinder: Operates the over centre mechanism. The over centre cylinder does not transfer any operational load.

Rear bracket: Transferring the loads from the pretension cylinder.

Pretension cylinder with locking function: Doing pretension of the buoy and lock it in place after pretension.

Structural part	Material grade
Jaw	NV-E36
Main Arm	NV-D36/E36
Upper Link Arm	NV-E36
Lower Link Arm	NV-E36
Front Bracket	NV-E36
Rear Bracket	NV-E36
Fork	NV-E36
Shafts/pin	EN 10088 1.4418 QT900
Cylinder Piston	EN 10088 1.4418 QT900
End Disks	EN 10088 1.4418 QT900
Bushings	Deva BM 397

SCOPE OF SUPPLY

The Supplier shall be responsible for fabrication, testing and delivery of the Scope of supply listed in bellow.

Qty.	Description	
14	Locking Mechanism Assembly	
28	Proximity switches and cables	
1 set	Relevant equipment for testing	
28	Transportation skid for locking mechanism	
1 set	Final documentation,	
1	Bolt tensioner complete with pump, hose etc.	
Spare parts consisting of:		
1	Spare Pretension Cylinder	
1	Spare Overcentre Cylinder	
1	Complete set of spare seals and gaskets	
1 set (4 off)	Spare flexible hoses	

All equipment shall be:

- Mechanically completed
- Tested
- Documented according to the requirements given in section 9 in this specification.
- Preserved for storage in warm, humid and salt laden atmosphere for minimum 12 months without need for further preservation.
- Packed and secured in a standard container (option).

FABRICATION

1.6 Welding

All welding shall be carried out by welders qualified by ABS and in accordance with welding procedures qualified and approved by ABS.

1.7 Non Destructive Testing

NDE operators shall be qualified by ABS. The extent and acceptance criteria of NDE shall be in accordance with ABS requirements. All performed examinations and results shall be recorded in a systematic way for full traceability.

1.8 Surface Preparation and Protective Coating

Surface treatment of carbon steel shall be in accordance with Norsok M501 System 7.

	<p>Final colour of the coated items is RAL1004</p> <p>TESTING</p> <p>1.9 Quality Control</p> <p>The inspection and tests necessary to confirm that the products meet the requirements of the standards, specifications and of the Purchase Order and this specification shall be carried out in the Supplier’s plant by competent personnel.</p> <p>Supplier shall issue an Inspection and test plan (ITP) with all test and verification activities.</p> <p>The Supplier is responsible to provide all necessary equipment needed to conduct the testing activities.</p> <p>1.10 General</p> <p>All Locking Mechanisms shall be subject to:</p> <ul style="list-style-type: none"> • Flushing and pressure testing of all tubing, cylinders and hoses installed by Supplier.. • Leak testing of the entire Hydraulic System for each LM. • Functional testing of all LMs. All cylinders, motors and sensors to be tested. <p>Detailed requirements for testing of the Locking Mechanisms will be given in Locking Mechanism - FAT Procedure. To be issued to Supplier at a later stage.</p> <p>Test frame for testing of free drop system will be provided by NOV APL. Supplier is responsible to provide all additional necessary equipment needed to conduct the testing activities, including HPU, load cell, pressure transmitters, etc.</p> <p>1.11 Pressure Tests</p> <p>All Hydraulic Components and flexible hoses in the hydraulic system shall be pressure tested, according to FAT and requirements from Classification Society. This also include Spare Hydraulic Hoses (if any).</p> <p>Pressure test reports to be issued for all pressure tested items. Pressure test reports to be named with reference to project, drawing number, Item number and item name.</p> <p>Hydraulic components to be pressure tested to 1,5 x design pressure. Ref. FAT for further requirements.</p> <p>Hydraulic Cylinders and Accumulators will be Pressure tested at maker’s plant before assembly into main arm.</p> <p>Supplier to prepare a pressure test report which includes a graph for pressure, temperature and time. The graph to be started before pressure build-up and stop after pressure test is completed at 0 bar.</p>
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	<p>1.12 Leakage Test</p> <p>The Hydraulic system shall undergo a leakage test to 1.1 x design pressure for each Locking Mechanism. Hold time 5 minutes. To be repeated 1 x 2 min</p> <p>1.13 Flushing</p> <p>The cleanliness level shall be to ISO 4406-15/12 (NAS 1638 class 6) or better. A flushing certificate shall be included.</p> <p>Supplier shall present detailed procedure on how to flush, equipment to be used and equipment to determine cleanliness level. Flushing results shall be documented with calibrated particle counter reports and loop number.</p> <p>1.14 Factory Acceptance Test Procedure & Report</p> <p>Test procedures and report will be made and issued by NOV APL.</p> <p>1.15 Test Failure, Re-Work, Re-Test</p> <p>In case a test fails, the Supplier is permitted to re-submit the same component believed responsible for the failure only once, and only after it has been properly re-worked and the reasons for failure thoroughly examined and explained by the Supplier to NOV APL (who must report them). Should the earlier mentioned component fail to pass a test for the second time, it shall be rejected and replaced by a new one.</p> <p>1.16 Mechanical Completion</p> <p>MC of equipment shall be in accordance with Supplier’s Standard. Relevant MC check sheets shall be completed and reviewed by APL prior to commencing any FAT or acceptance testing.</p> <p><u>Schedule:</u> Estimated package Sub-Contract Award Q3 2021 Estimated Package Delivery Time: 9 months FCA factory</p>
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<p>Project Registration</p> <p>Santos is committed to ensuring Australian Industry the opportunity to participate in the Barossa Project. Expressions of Interest are invited from contractors and suppliers with the relevant capability and capacity to undertake the scope of work.</p> <p>This is a request for specific expressions of interest. Contractors and suppliers will be considered for prequalification and tender if suitably qualified against this package.</p> <p>Note that an important part of the project registration process is to register an Expression of Interest at the correct Scope level.</p> <p><u>Scope level definition:</u></p>
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Full scope: Able to produce / supply all the package.

Partial scope: Able to produce / supply one or more of the sub-packages.

All registrations are to be completed via ICN Gateway BarossaOffshore.icn.org.au. Please contact the ICNNT if registration assistance is required. Contact details: (08) 8922 9422 or resources@icnnt.org.au.

Project Website: Santos Australia