



SUBSEA ACTUATION

valves and actuators

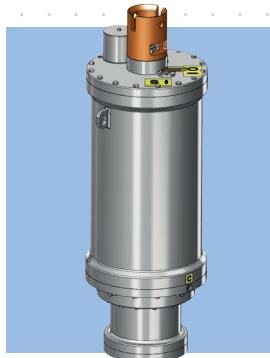
PETROLVALVES offers a complete single-source integrated solution for manual or actuated high integrity ball, check, slab gate, double expanding gate and axial flow valves, in both Subsea and Topsides environments.

Subsea actuators are suitable for installation at any water depth, in both deep and shallow water.

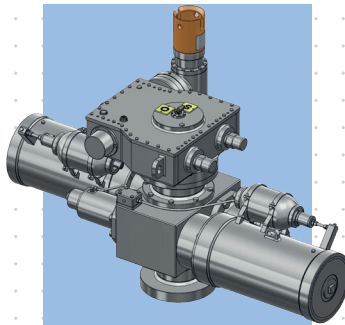
Topsides actuators are manufactured for special applications such as very reliable ESD & HIPPS Systems, quick-closing operations, high-torque requirements and compact platform installations. Both Subsea and Special Topsides actuated valves employ advanced technology to guarantee high performance, reliability, availability and safety over a long-term operational life.

visual index

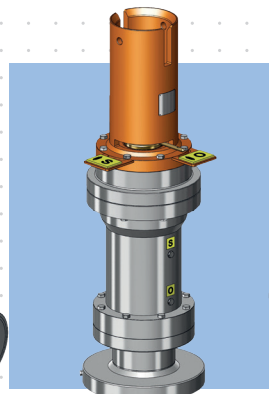
ball and check valves HYDRAULIC ACTUATORS



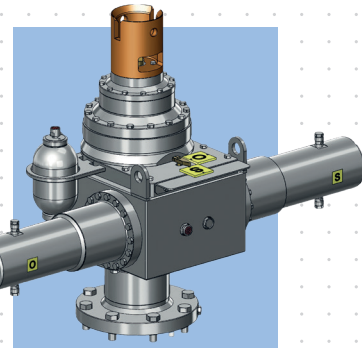
HELICAL SPLINE®
SPRING RETURN



RACK & PINION
SPRING RETURN

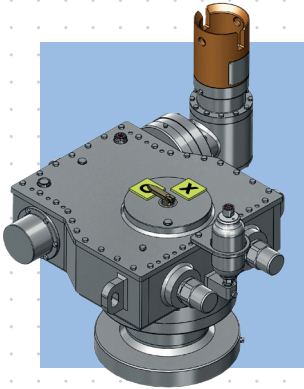


HELICAL SPLINE®
DOUBLE ACTING

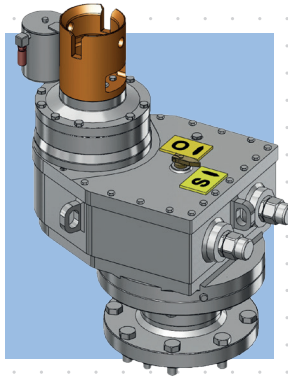


RACK & PINION
DOUBLE ACTING

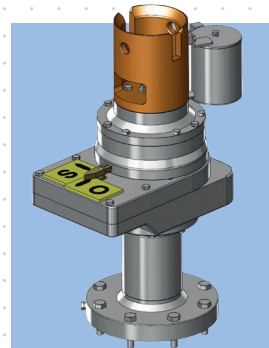
gearboxes



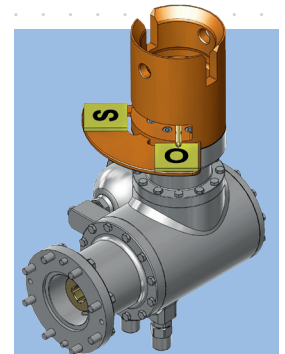
WORM
SCREW



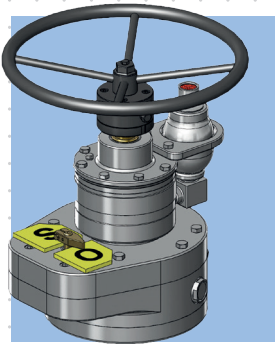
PARALLEL
AXIS



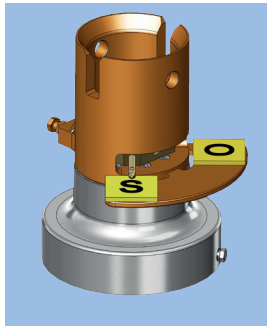
PLANETARY
GEAR



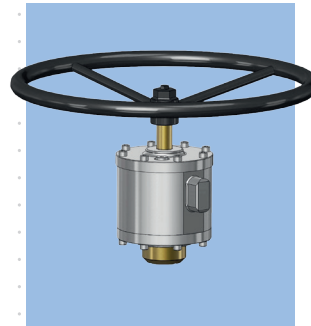
NORMAL
AXIS



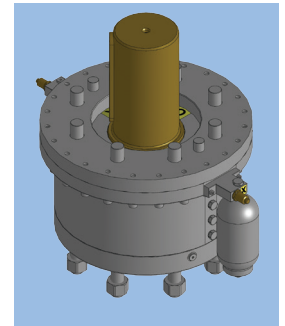
DIVER HAND
WHEEL INTERFACE



DIRECT ROV
INTERFACE

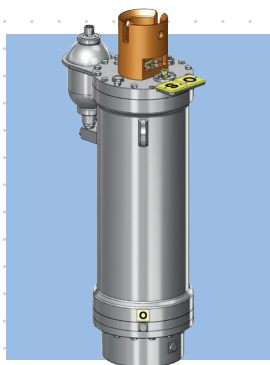


MANUAL TORQUE
TOOL

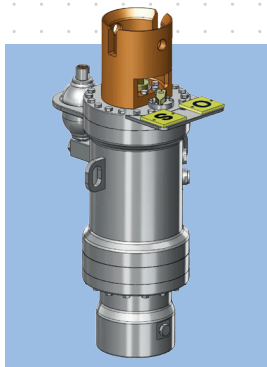


HYDRAULIC
DAMPER

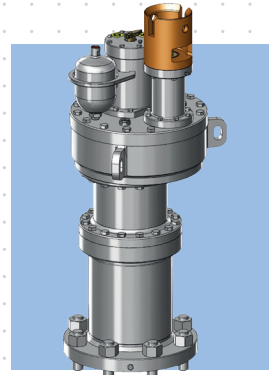
gate and axial FLOW VALVES



LINEAR HYDRAULIC
ACTUATOR
SPRING RETURN AND
DOUBLE ACTING



LINEAR
GEARBOX



WORM MULTITURN
GEARBOX

subsea actuators

GENERAL FEATURES

- ▶ Tailor made sizing according to customer requirements related to safety factors, operating pressures and operating curves.
- ▶ Fully customized material selection in accordance with Client requirements and applications.
- ▶ High strength materials for internals and torque transmitting parts.
- ▶ Seawater resistant materials for all exposed parts.
- ▶ Fully compensated design for installation at any water depth.
- ▶ Designed for extended operational life.
- ▶ Fail-safe or Fail-as-is solutions according to plant design.
- ▶ Redundant dynamic sealing on piston and external moving parts.
- ▶ Clearly visible local position indicator.
- ▶ Compact design available for PLEM and manifold installation.
- ▶ Special features to allow fast valve operation (less than 2 sec.).
- ▶ Fully designed and qualified according to API 6A, API 17D, API 6D, API 6DSS, ISO 13628, ISO 10423, ISO 14723.
- ▶ API 17D, ISO 13628-8 or tailor made diver/ROV interfaces.

subsea actuators

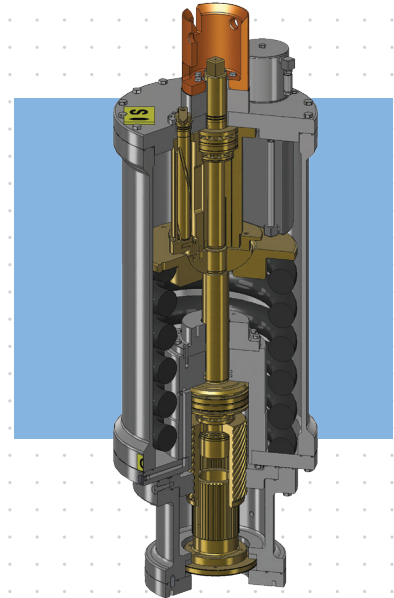
OPTIONAL FEATURES

- ▶ Hydraulic and electric connectors according to customer requirements.
- ▶ Umbilical system including SUTU and TUTU terminations and Hydraulic Power Units.
- ▶ Full diver/ROV retrievability of actuators and mechanical operators.
- ▶ Self-clutching system or diver/ROV retrievable actuators designed to match Client specifications.
- ▶ Guiding systems to ease subsea removal and installation operations of retrievable operators.
- ▶ Remote position indication to Control Room by means of limit switches or position transmitters.
- ▶ Stem and spool extensions to meet Client requirements in terms of distance from valve center line and field structure layout.
- ▶ Protection or pressure retaining caps engineered to protect valve stem and prevent any leakage to the environment after operator removal.
- ▶ Docking tools for removal and installation of operators and stem cap (ROV or diver operation).
- ▶ Tailor made position indicators according to Client requirements.

actuators and gearboxes FOR QUARTER TURN VALVES

hydraulic spring return helical spline actuators MAIN FEATURES

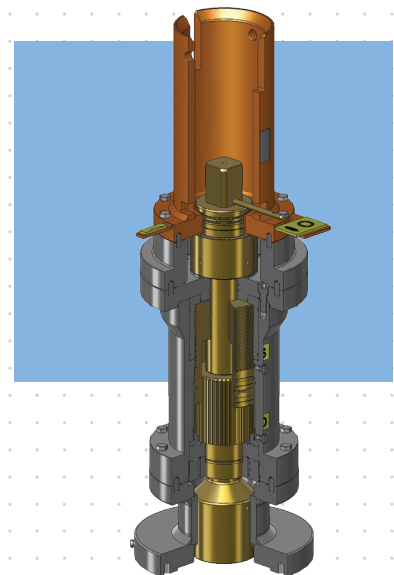
- ▶ Compact ergonomic design for manifold application.
- ▶ Piston with linear movement only instead of rotary to guarantee a linear output torque.
- ▶ High spline profile contact surface with low specific stress values preventing wear and deformation.
- ▶ Suitable and reliable for high number of strokes and fast operation.
- ▶ Factory set end stops for perfect valve stroke and alignment.



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hydraulic double acting helical spline actuators MAIN FEATURES

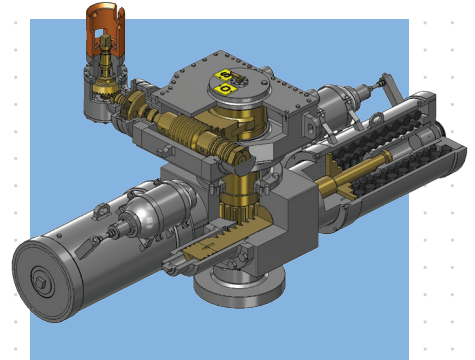
- ▶ Compact ergonomic design for side by side and manifold application.
- ▶ Piston with linear movement only instead of rotary to guarantee a linear output torque.
- ▶ High spline profile contact surface with low specific stress values preventing wear and deformation.
- ▶ Suitable and reliable for high number of strokes and fast operation.
- ▶ Factory set end stops for perfect valve stroke and alignment.



hydraulic spring return rack and pinion actuators

MAIN FEATURES

- ▶ Simple and reliable design for minimum vertical dimensions.
- ▶ Modular execution.
- ▶ Easily externally adjustable stops for perfect valve stroke and alignment.
- ▶ Weight balanced design.

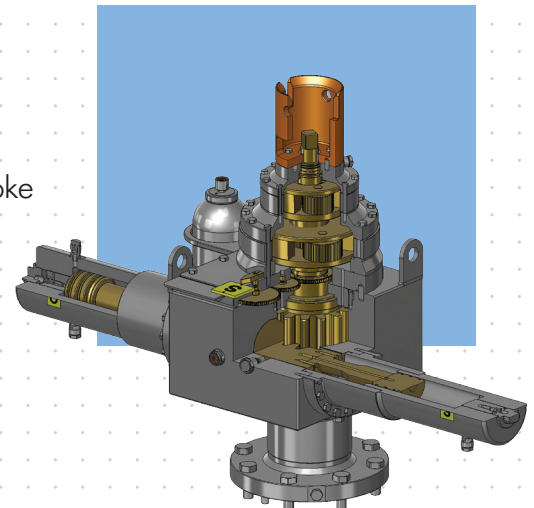


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hydraulic double acting rack and pinion actuators

MAIN FEATURES

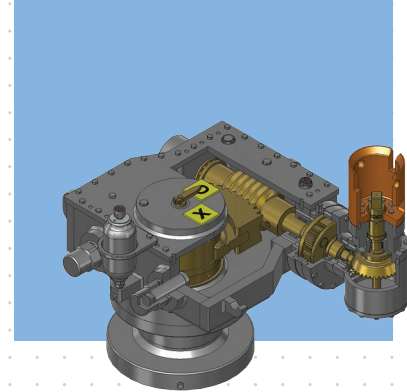
- ▶ Simple and reliable design for minimum vertical dimensions.
- ▶ Modular execution.
- ▶ Easily externally adjustable stops for perfect valve stroke and alignment.
- ▶ Weight balanced design.



worm screw gearboxes

MAIN FEATURES

- ▶ High output torque, suitable for any ball and check valve operation.
- ▶ Factory set end stops for perfect valve stroke and alignment.
- ▶ Non reversible mechanism to lock the valve in position during pigging operation.
- ▶ Horizontal or vertical diver/ROV interface as per customer requirements.
- ▶ Suitable for lifting the check valve clapper without in-line pressure.
- ▶ Designed to allow normal check valve functionality if not operated by diver/ROV.

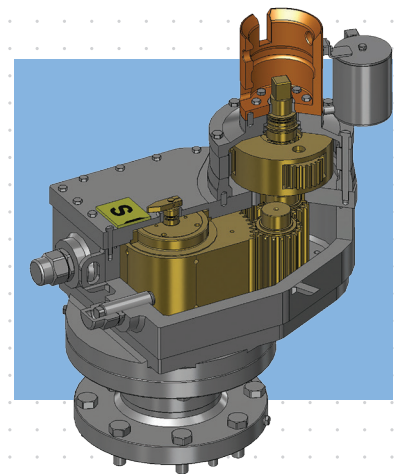


05

parallel axis gearboxes

MAIN FEATURES

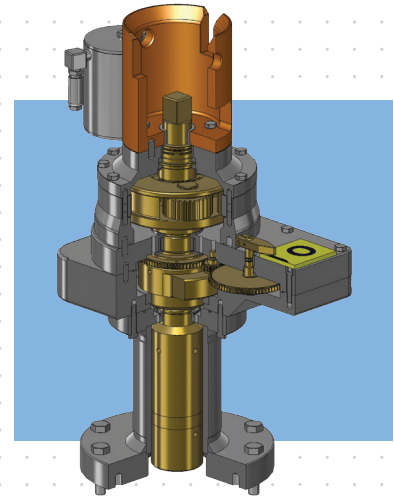
- ▶ Simple and compact design for minimum overall dimensions.
- ▶ Factory set end stops for perfect valve stroke and alignment.



planetary gearboxes

MAIN FEATURES

- ▶ Integrated valve and operator design, compact size and reduced weight.
- ▶ Long term reliable service life.
- ▶ Factory set end stops for perfect valve stroke and alignment.

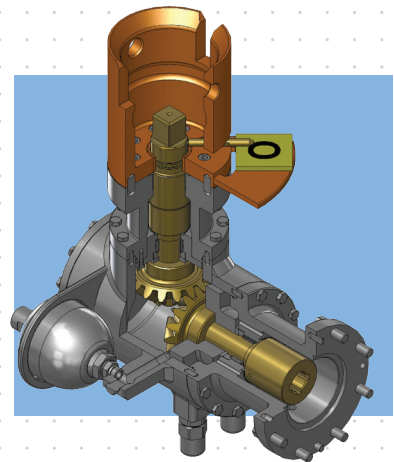


06

normal axis gearboxes

MAIN FEATURES

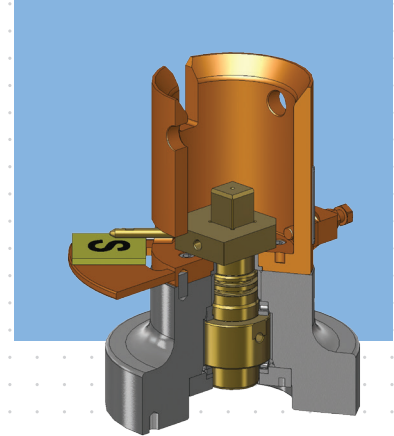
- ▶ Integrated valve and operator design, compact size and reduced weight.
- ▶ Long term reliable service life.
- ▶ Factory set end stops for perfect valve stroke and alignment.



direct rov interfaces

MAIN FEATURES

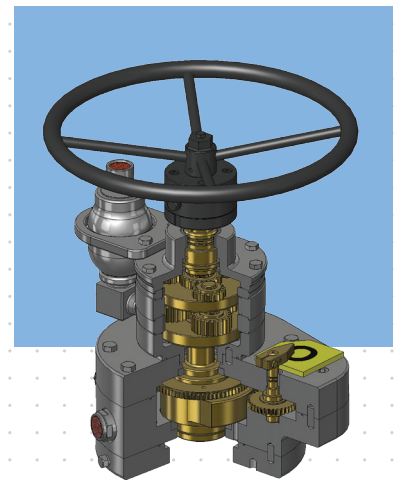
- ▶ Integrated valve and operator design, compact size and reduced weight.
- ▶ Long term reliable service life.
- ▶ Factory set end stops for perfect valve stroke and alignment.



diver handwheel interfaces

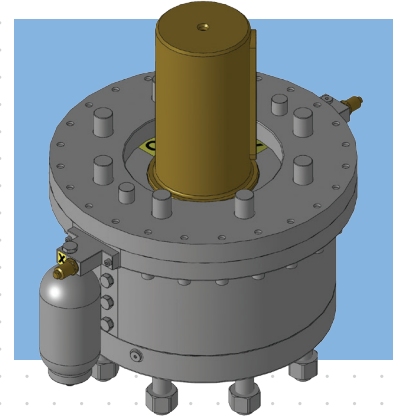
MAIN FEATURES

- ▶ Integrated valve and operator design, compact size and reduced weight.
- ▶ High torque multiplication for an easy diver operation (diver max torque 75 Nm).
- ▶ Handwheel diameter 500 mm (other diameters available upon request).
- ▶ Long term reliable service life.
- ▶ Factory set end stops for perfect valve stroke and alignment.



hydraulic dampers MAIN FEATURES

- ▶ Reduced impact of swing check valves closure member.
- ▶ Flow regulator to set operating time.

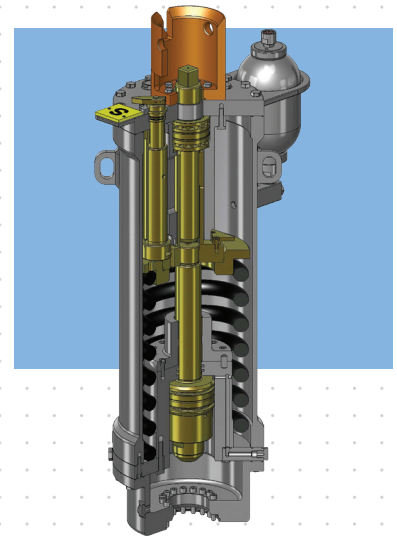


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actuators and gearboxes FOR LINEAR VALVES

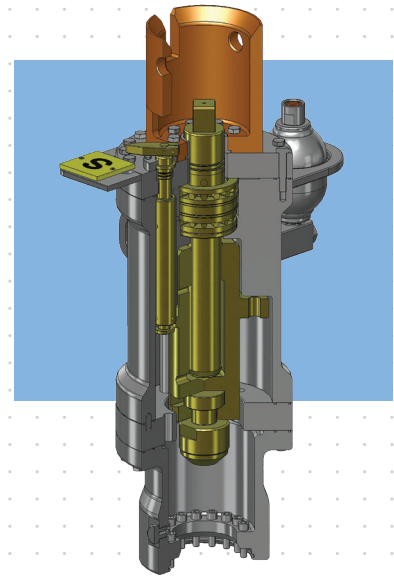
hydraulic spring return and double acting linear actuators MAIN FEATURES

- ▶ Spring Return and Double Acting execution available.
- ▶ Compact size and reduced weight.



linear gearboxes MAIN FEATURES

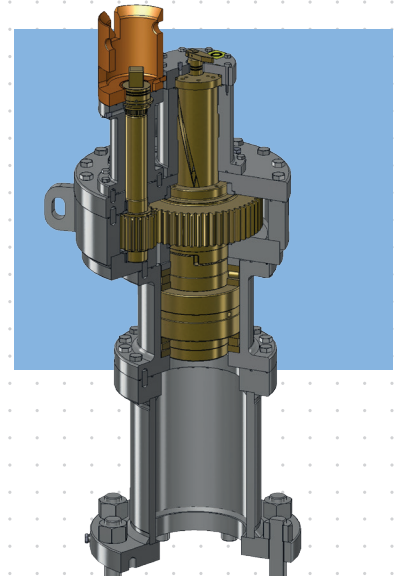
- ▶ Compact size and reduced weight.
- ▶ High output thrust.



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worm multiturn gearboxes MAIN FEATURES

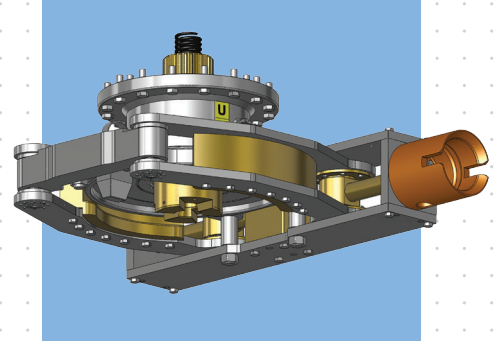
- ▶ High output torque, suitable for non-rising stem gate and axial flow valve operation.
- ▶ Compact size and reduced weight.



actuators and gearboxes REMOVAL SYSTEMS

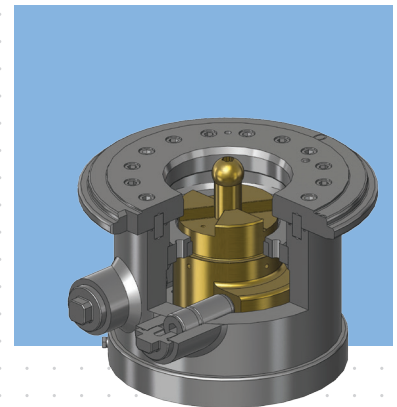
rov clamp retrieval system CLAMP MAIN FEATURES

- ▶ Coupling between spool piece and operator guaranteed by a clamp system.
- ▶ Clamp arms operated from unlocked to locked position and vice versa by ROV override.
- ▶ Misalignment prevention between operator and spool piece guaranteed by a reference key or clamp system.
- ▶ Automatic clutch for removal and reinstallation on the valve apart from valve position.
- ▶ Clutch spool equipped with relief valve acting as overpressure venting device and accumulator acting as pressure compensation device.
- ▶ Seawater resistant materials for all exposed parts.



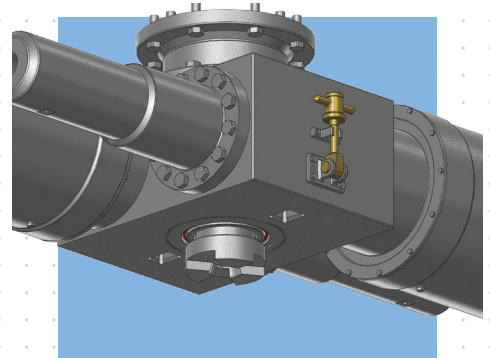
rov clamp retrieval system PERMANENT SPOOL MAIN FEATURES

- ▶ Easily externally adjustable stops for perfect valve bore alignment.
- ▶ Misalignment prevention guaranteed by reference groove.
- ▶ Centering pin for easy alignment with clamp clutch.
- ▶ Stem teeth design including lateral slope angle to ease smoothly the disengagement operation.
- ▶ Seawater resistant materials for all exposed parts.
- ▶ Additional port for spool cavity flushing and filling with compensation oil.



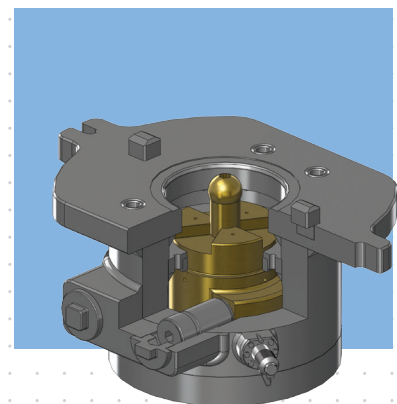
fast bolting diver retrieval system CLAMP MAIN FEATURES

- ▶ Coupling between spool piece and operator guaranteed by diver operated fast bolts.
- ▶ Actuator locked and kept in position on the valve by easily rotating two levers placed on valve/actuator interface.
- ▶ Fast bolting operated from unlocked to locked position and vice versa by diver.
- ▶ Misalignment prevention between operator and spool piece guaranteed by a system of asymmetric dowels and anti-rotation pins.
- ▶ Automatic clutch for removal and reinstallation on the valve independently from valve position.
- ▶ Seawater resistant materials for all exposed parts.



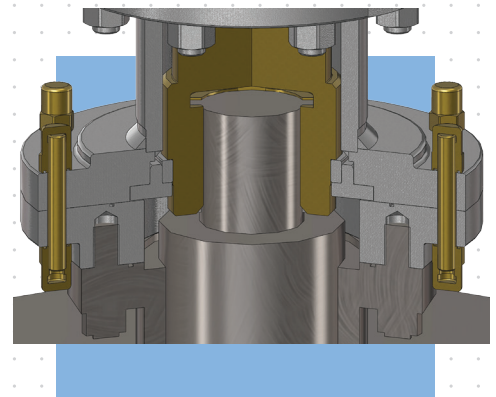
fast bolting diver retrieval system PERMANENT SPOOL MAIN FEATURES

- ▶ Easily externally adjustable stops for perfect valve bore alignment.
- ▶ Centering pin for easy alignment with operator clutch.
- ▶ Stem teeth design including lateral slope angle to ease smoothly the disengagement operation.
- ▶ Equipped with relief valve acting as overpressure venting device and accumulator acting as pressure compensation design.
- ▶ Seawater resistant materials for all exposed parts.
- ▶ Additional port for spool cavity flushing and filling with compensation oil.



enclosed nuts diver removable system CLAMP MAIN FEATURES

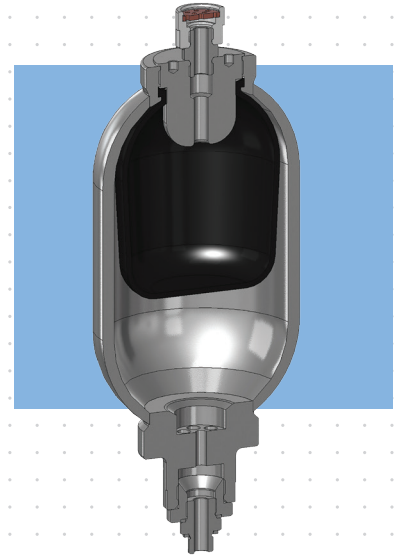
- ▶ Engagement/disengagement between operator and intermediate spool performed by means of diver removable enclosed nuts.
- ▶ Design limiting bolt and nut threads corrosion, permitting an easy unscrewing activity after long subsea installation periods.
- ▶ Separation of actuator and spool cavity by means of additional seals on actuator stem.
- ▶ Additional bearing on output stem to avoid any possible damage due to eventual impacts during installation.
- ▶ Additional adapter flange on valve top mounting to increase the diameter of location of the bolting.
- ▶ Additional port for spool cavity filling, outlet and inlet safety valves for seawater draining after installation.
- ▶ Seawater resistant material for exposed enclosed nuts.



actuators and gearboxes ACCESSORIES

closed type COMPENSATION SYSTEM

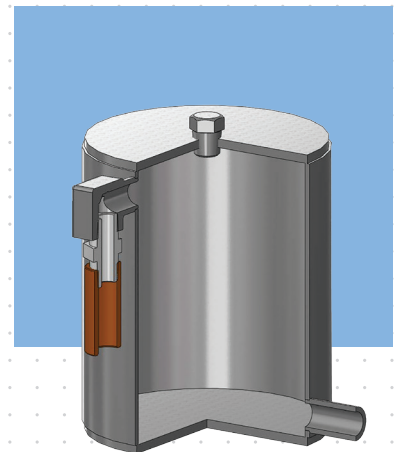
- ▶ Independent pressure balancing device connected to the operator main casing in order to avoid any spring chamber/casing over pressurization.
- ▶ Internal rubber diaphragm to avoid seawater and compensation oil direct contact.
- ▶ Safety relief to avoid pressurization of compensated cavity in case of stem leakage.
- ▶ Copper washer to avoid marine growth.
- ▶ PTFE nipple to protect copper pipe from cathodic corrosion protection system.



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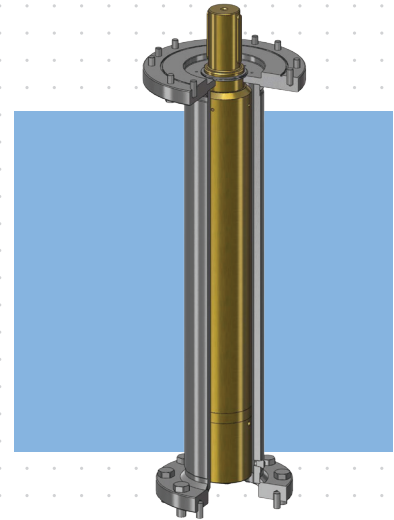
open type COMPENSATION SYSTEM

- ▶ Independent pressure balancing device connected to the operator main casing in order to avoid any spring chamber/casing over pressurization.
- ▶ Compensation fluid is heavier than seawater and immiscible with it, both for actuators and gearboxes.
- ▶ Super Duplex tank in order to prevent any compensation system corrosion.
- ▶ Copper pipe to avoid marine growth.
- ▶ PTFE nipple to protect copper pipe from cathodic corrosion protection system.



self supporting spool EXTENSIONS

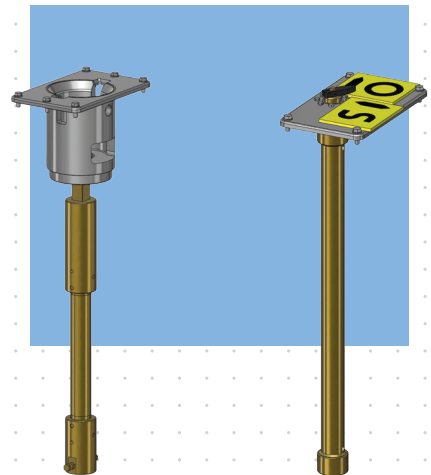
- ▶ Self supporting intermediate spool extensions.
- ▶ Capable of being installed between valves' bonnet and operator housing or below override interface in order to extend operating interfaces to the required height.
- ▶ Fixing to an external structure not needed.



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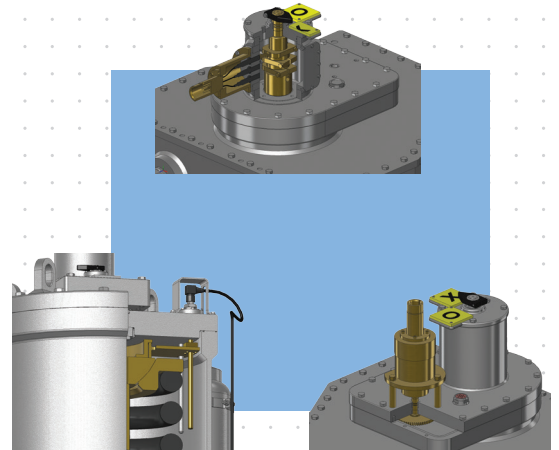
non self supporting EXTENSIONS

- ▶ Telescopic extensions available for both ROV interface and local position indicator.
- ▶ Adjustable final length of +/- 100 mm. Tailor made design for increase of adjustability.
- ▶ Available with universal joint to allow lateral misalignment of the ROV bucket.
- ▶ Seawater resistant material.



remote position INDICATORS AND TRANSMITTERS

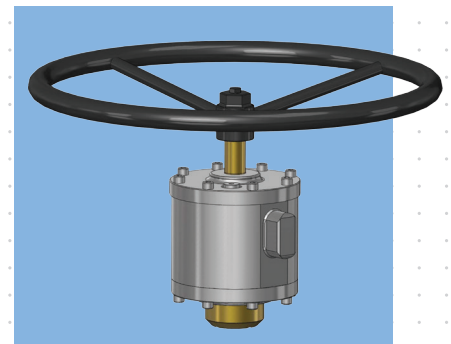
- ▶ Proximity switches for open, close and intermediate remote position indicator.
- ▶ 4-20 mA position transducer for continuous remote position indication; other communication protocol available upon request to meet Client requirements.
- ▶ Available up to triple redundant configuration.
- ▶ Both for linear and rotary equipment.
- ▶ Optional multiple pins subsea electric connectors, complete with protection caps.
- ▶ Optional diver removable limit switches and position transmitter assembly.



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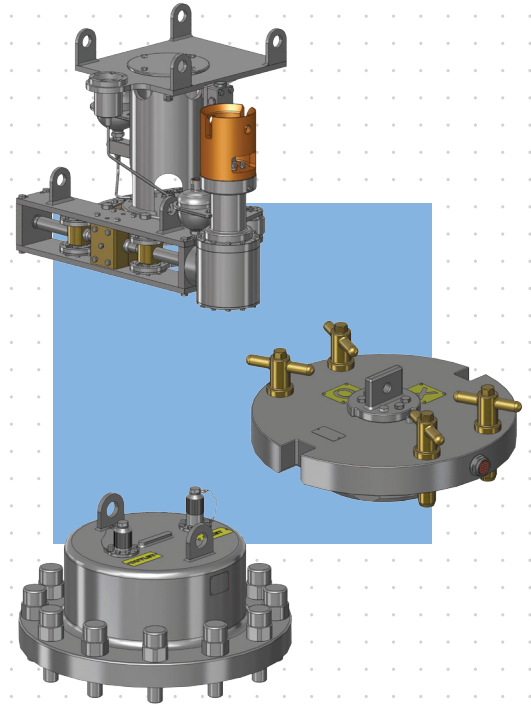
torque tool MULTIPLIER

- ▶ Light portable tool for diver intervention.
- ▶ Suitable for ISO 13628-8 ROV buckets or other types of buckets upon request.
- ▶ Diver torque multiplier up to 20 times.
- ▶ Max diver torque 75 Nm or 100 Nm.
- ▶ Handwheel diameter 500 mm (other diameters available upon request).



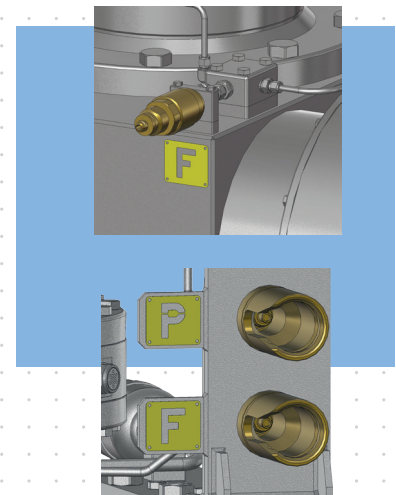
protection and pressure CAPS

- ▶ Caps to protect valve stem after actuator removal.
- ▶ Clamp, fast bolting or enclosed nuts removal and installation system.
- ▶ Pressure containing design to contain any potential valve stem leakage.
- ▶ Relief valves for cap integrity protection in case of non pressure containing design.
- ▶ Valves and tools to enable flushing after installation.
- ▶ Tailor made caps to meet Client and field requirements .



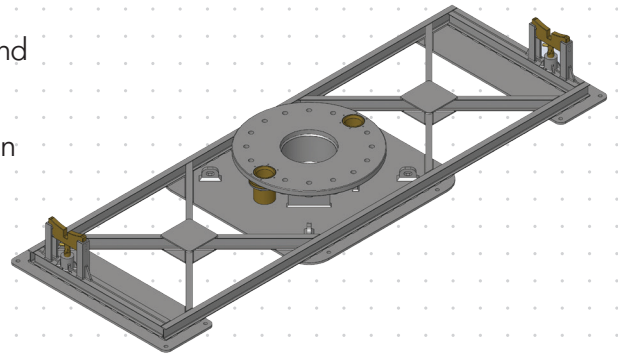
hydraulic CONNECTORS

- ▶ Female thread port on actuators' cylinders as standard connection; tailor made hydraulic connections provided upon request.
- ▶ Anti-vibration fittings feature.
- ▶ Hot stabs complete with protection caps.
- ▶ Both for ROV and diver intervention.



storage and transportation STRUCTURES

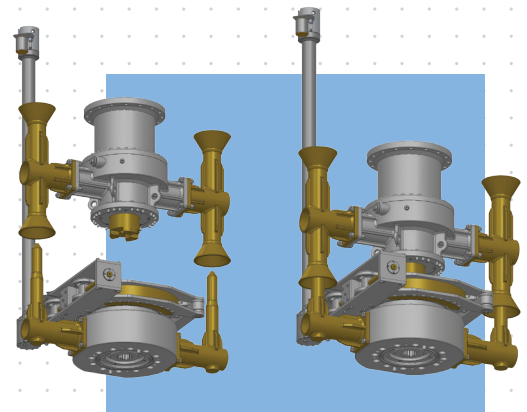
- ▶ High strength materials.
- ▶ Tailor made structures on purchased actuators and gearboxes equipped with removal system.
- ▶ Suitable for operators' parking and transportation activities.



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guiding SYSTEM

- ▶ High strength pins to ease subsea removal and reinstallation activities by ART tool.
- ▶ Available for all type of removal systems.
- ▶ Tailor made in accordance with Client and field requirements.





MANUFACTURING PLANT

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