

FFU SEMINAR 25.01.2007

**ANGUILA SUBSEA
HIGH POWER SWITCH**

**BY
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WHY USING A SUBSEA INSTALLED SWITCH.

- EASY, FAST AND SECURE OPERATION DIRECT FROM THE CONTROL ROOM.
- NO MOBILIZATION OF ROV AND SUPPORT.

TYPICAL APPLICATION FOR A SUBSEA INSTALLED SWITCH.

- **BOOSTER PUMPS**
- **INJECTION PUMPS**
- **COMPRESSORS**
- **PIPE HEATING SYSTEMS**
- **OTHER MULTIPLE POWER CONSUMERS.**

BACKGROUND & HISTORY

OTTER SWITCH BOX

- **Designed and built 2000
initiated by Tronic UK**
- **Operation principle
2 sets hydraulic operated el-connectors**
- **Client: Total**
- **Customer: FMC/Centrilift**
- **Water depth approx. 100 metres**
- **To operate two downhole pumps**

Assembly of Carriage



Carriage ready to insert



Detail of ROV Marking

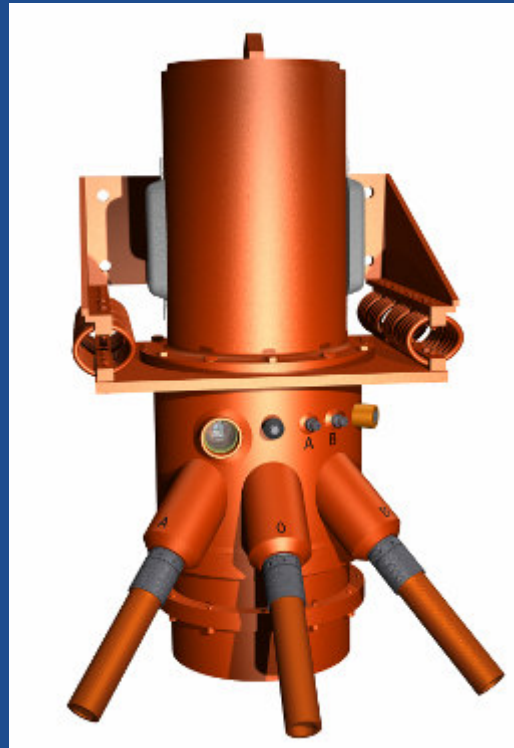


Installed on the Tree Cap



EXPERIENCE WITH THE OTTER SWITCH BOX

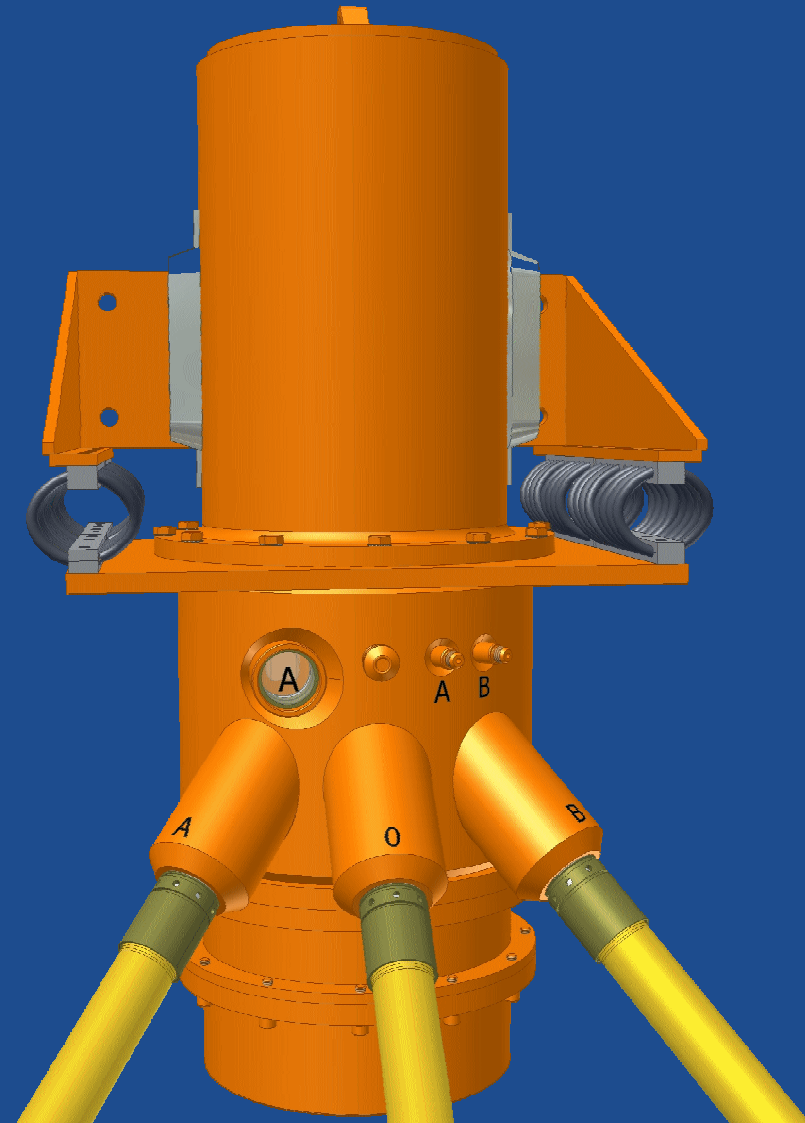
- On one well one of the down hole pumps exhibited a short circuit this adversely affected the switch. The switch has been by-passed and the single pump is still working.
- A re-fubishment of all of the switches was started in summer 2005.
- Failure has been linked to effecting a switch over whilst under power. This resulted in damage to the connectors.



HP CHANGEOVER SWITCH 2006

HP CHANGEOVER SWITCH FEATURES

- Electrical (RMS values)
 - Power system: 3 phase 35-70 Hz
 - Principal voltage: 5,8 kV
 - Rated voltage: 7,2 kV
 - Rated current: 300 A
 - Short circuit current: 4000 A/1s
- Hydraulics
 - Supply pressure: 135 - 207 bar
(2000 - 3000 psi)
 - Hydraulic hoses: 6 mm / 700 bar
- Enviromental conditions
 - Design life: 25 years
 - Rated depth: 0 - 3000 m
 - Operating temp.: -5 to +25°C
 - Storage temp.: -40 to +60°C



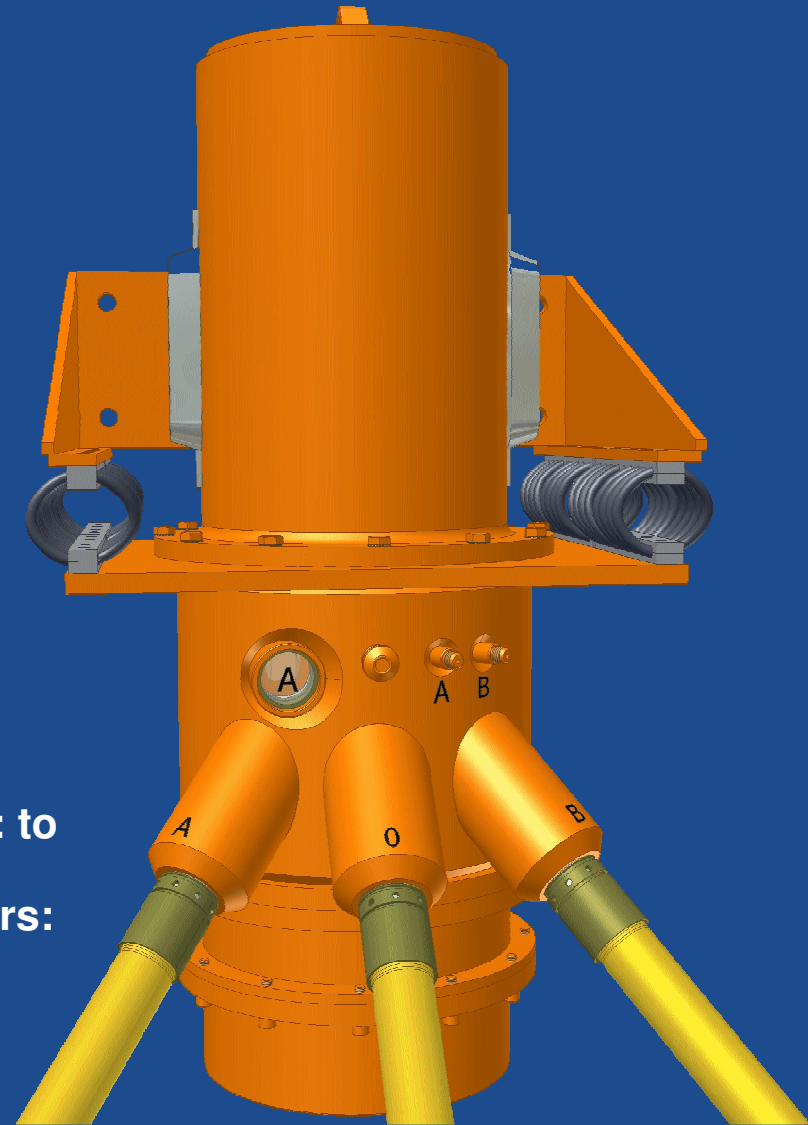
HP CHANGEOVER SWITCH FEATURES

– DIMENSIONS

- Total height: 1100 mm
- Total width: 500 mm
- El. Hose dim.: 51 mm
- Weight in air: Approx. 300 kg
- Weight water: Approx. 250 kg

– OPTIONS

- Vibration absorber arrangement
- Electrical position indication
- Optical position indication
- Length of electrical and hydraulic jumpers: to be specified by client
- High power bulkhead – and ROV Connectors: to be specified by client

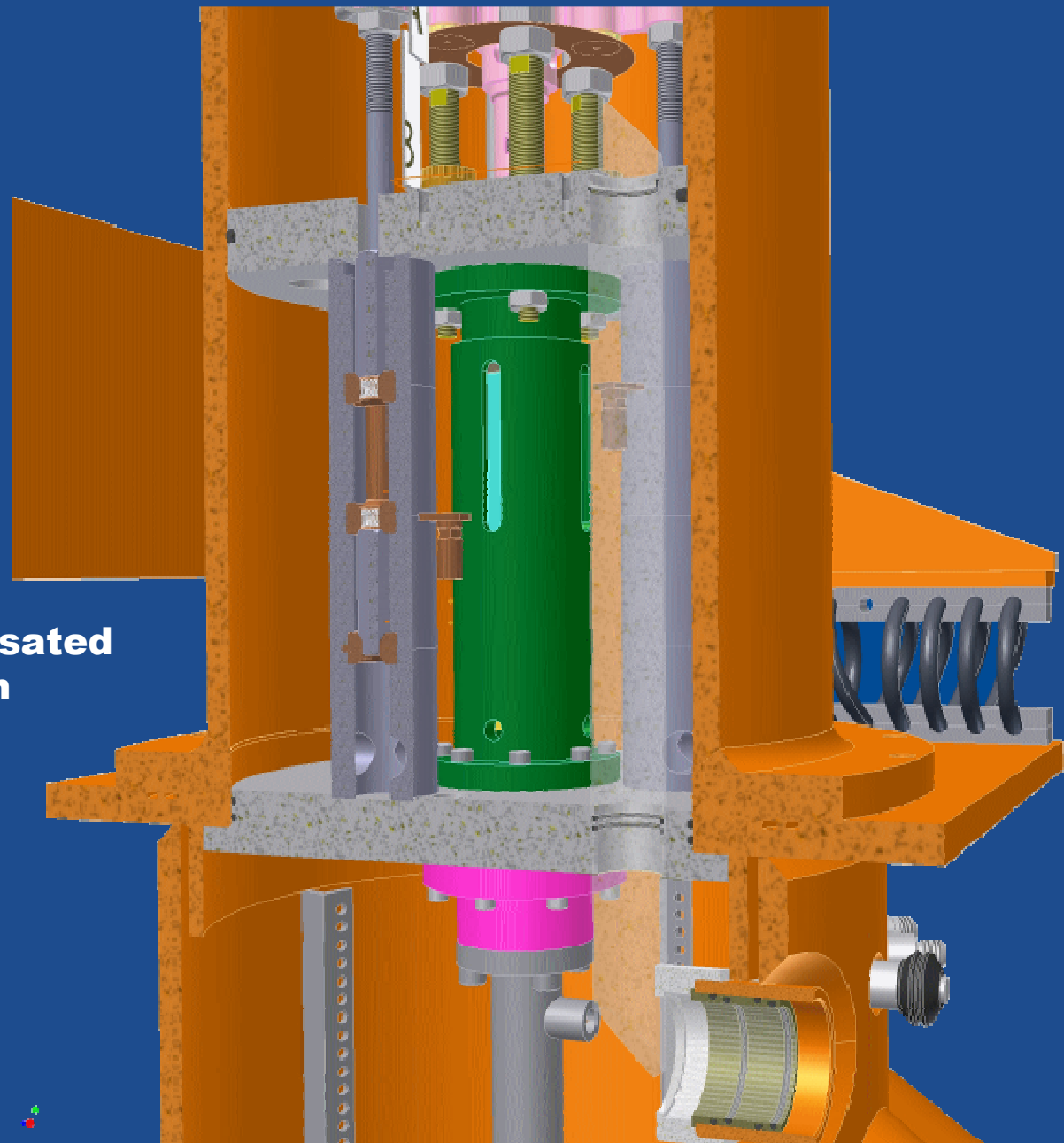


**Hydraulically charged
and released bistable
spring mechanism for
operation in both
directions**

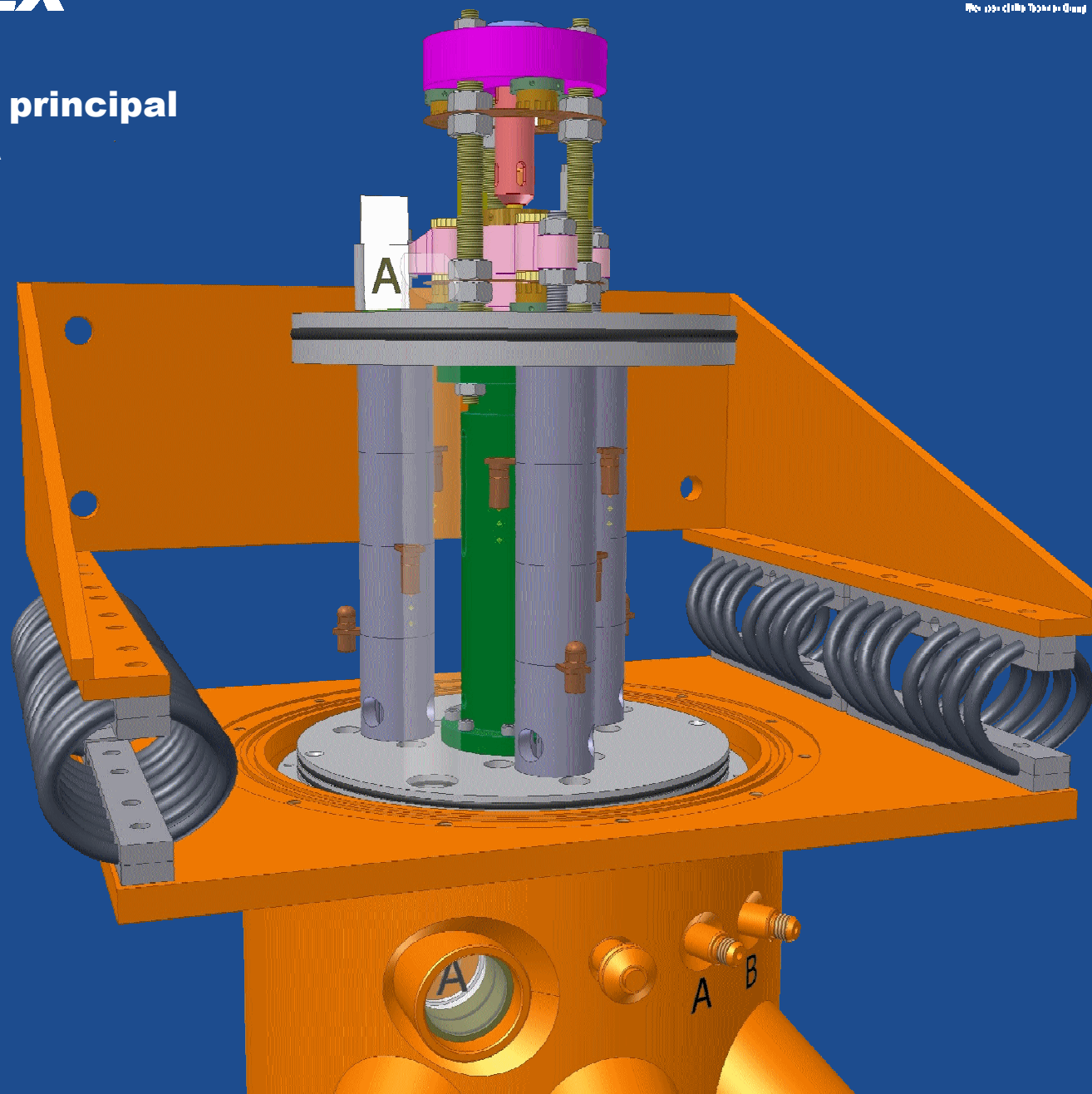
**STAY AS IS when failure
in hydraulic pressure**

**Double pressure compensated
oil barriers for the switch
chamber**

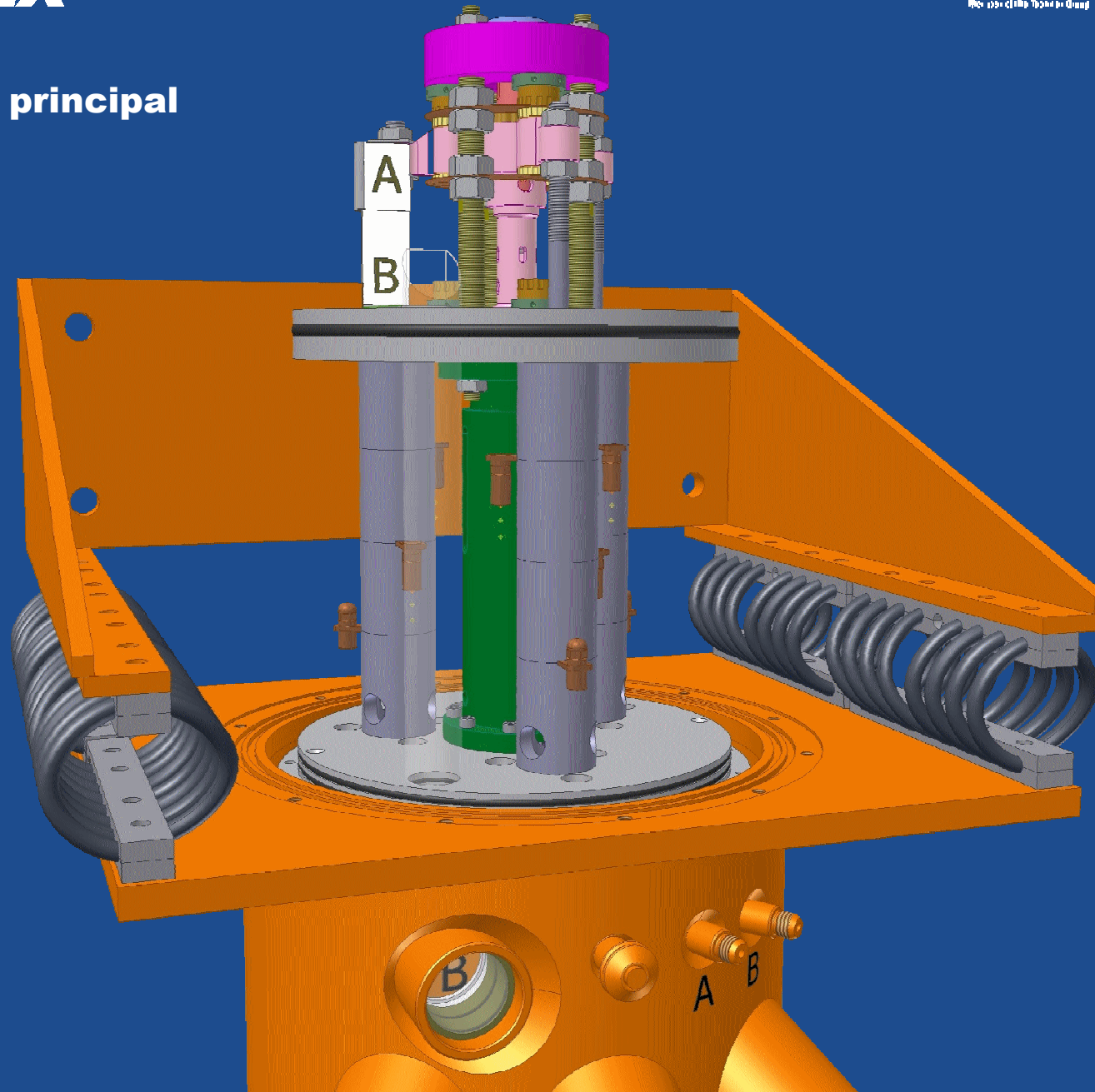
**Mirror covered
periscope prisma for
indication of contact
position by ROV**

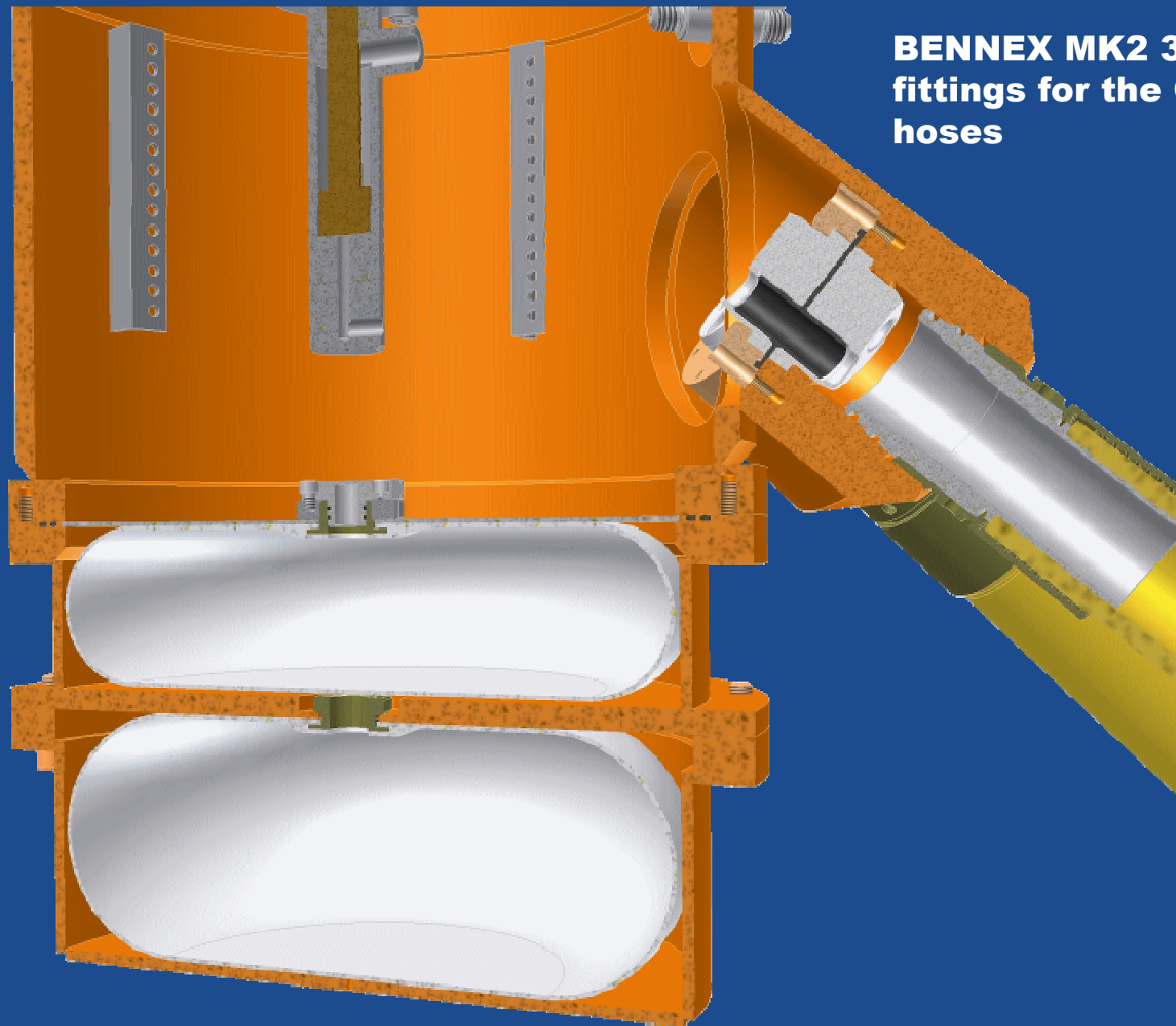


Operation principal position A



Operation principal position B





**BENNEX MK2 38 M58x2
fittings for the Gorilla
hoses**

BENNEX



FIRST OF 5 SWITCHES SUPPLIED TO THE CNR LYELL PROJECT



BENNEX

DETAIL CNR LYELL PROJECT



FUTURE DEVELOPMENT

- **Switch to be real circuit breaker**
- **Higher Voltage 11 – 22 Kv**
- **Electric operation**
- **Dry-mate connection of jumpers**