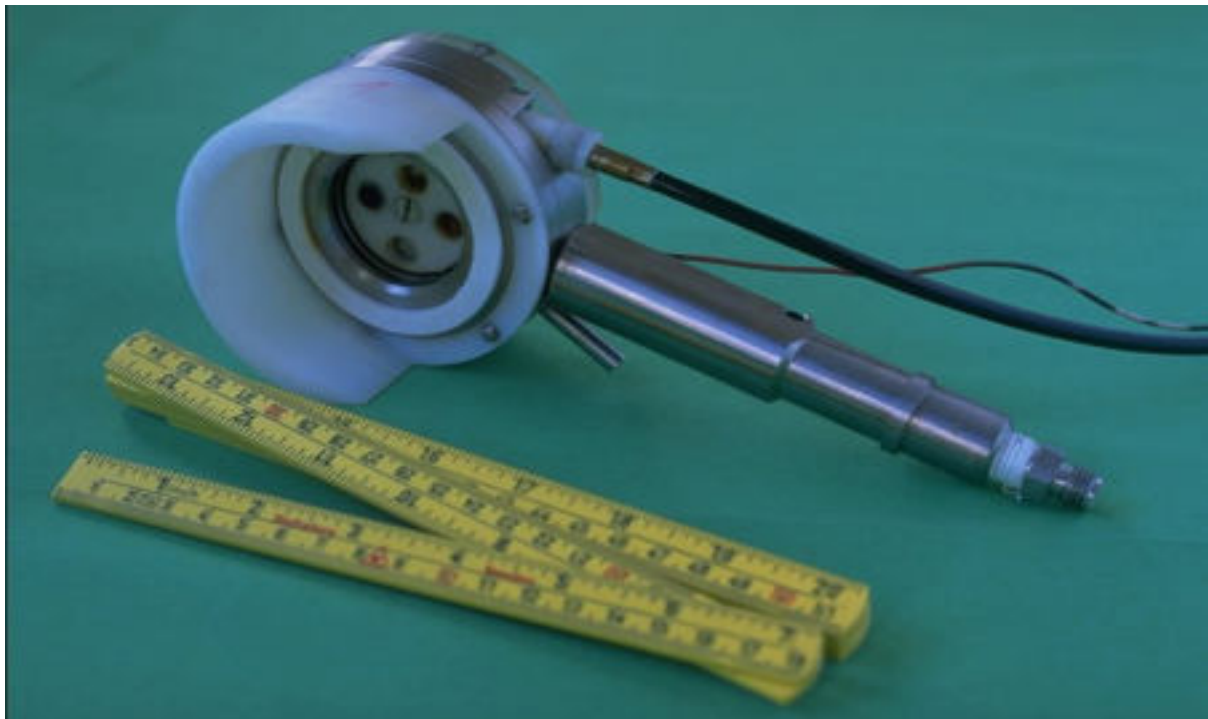


F-BOLT



The F-BOLT ultrasonic scanner inspection of subsea bolts

Features

The ROSCAN system; comprising of a real time computer that controls a digital NDT system marinised stepper motor which drives the scanning movement.

- Topside workstation for real-time control and evaluation
- A ROV tool that communicates through the ROV umbilical and is installed by the ROV on the bolt for inspection
- Low weight and small size. Subsea titanium computer-container: Ø190, L=500mm, weight is ~20kg/44lb in air
- Depth compensated marinised stepper motor
- Easily interfaced by any work class ROV or by a diver
- Communication through a twisted pair in the ROV umbilical current loop, RS232 or RS485
- Four integrated suction pads keep the scanner in position, allowing the ROV manipulator to let go after positioning
- All data is stored for post processing.

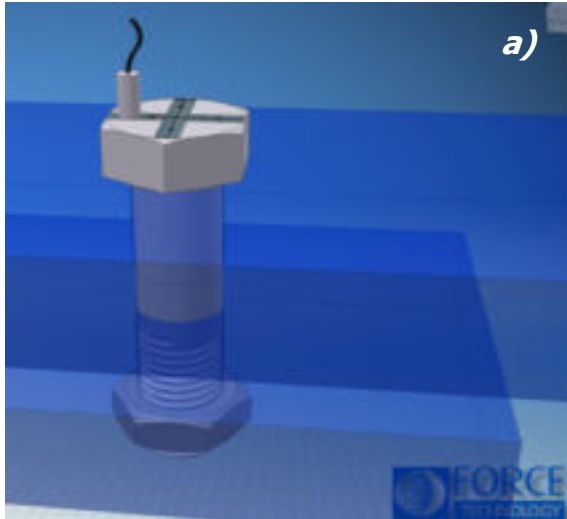
Operation

Pre-dive preparations

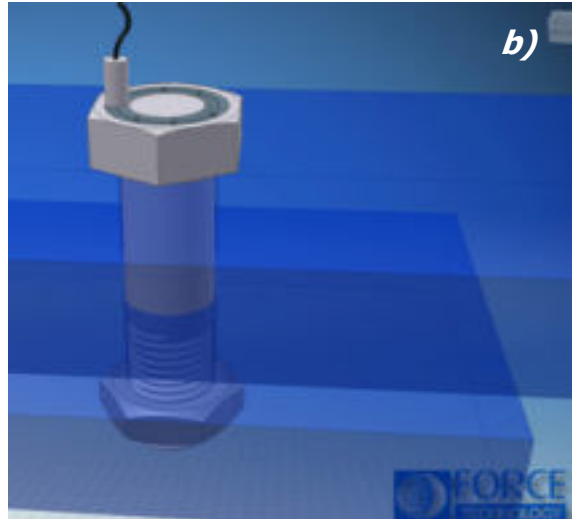
- Testing of scanner operation and establishing communication through the ROV umbilical top-side
- Calibration and establishing of reference level according to customer specifications for reporting all detected indications.

Diving

- The scanner is placed in position by the diver/ROV manipulator
- The diver/ROV has to clean the bolt head, geometry variations on the bolt head can make false in the test. To avoid this, a sample of the bolt should be pre-tested in our lab
- The operator starts the automated scan. The motors drive the probe exactly on the bolt head as shown on the next page
- All scanners are designed to operate down to 3000 m water depths.



Scanner movements for inspection of: a) remaining bolt body



b) crack detection

Mechanical design

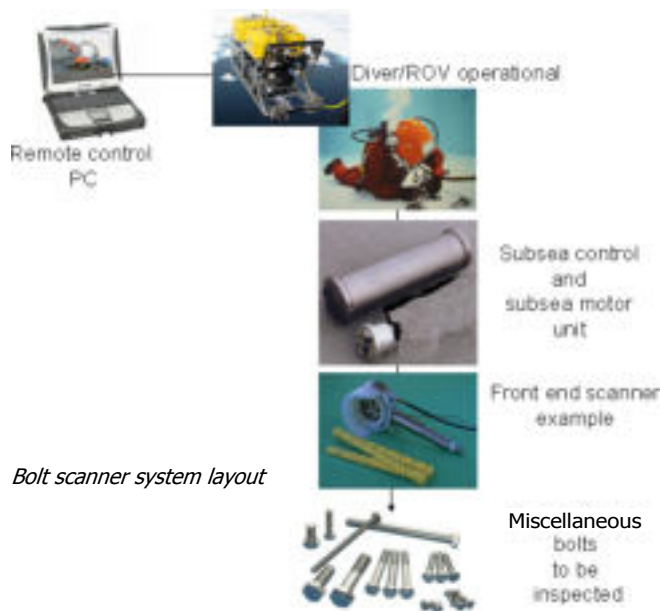
Most applications for a subsea bolt inspection programme requires a tailor-made design of the tool to inspect the bolt dimension, accessibility and quality of material used in the bolts. FORCE Technology prefers to receive a sample of the bolt for pre-testing the tool on the bolt in our lab facilities before the inspection.

FORCE Technology has off-the-shelf three versions of the bolt scanners available.

1. Crack inspection of the bolt
2. Inspect loss of bolt body dimension
3. Hardness inspection of bolts (Note: this using eddy current probes).

ROV/diver interface

- The front end scanner is to be operated by a ROV handle. Prior to inspection the diver/ROV locate the front end scanner on the bolt, and let go of the tool
- Weight in air is approximately 1 kg
- Requires 220 VAC power to the subsea control unit
- When each scan is complete, a quick assessment of the recorded scanning data is performed, allowing re-scanning of interesting areas to verify any erosion/crack detection
- When scanning and analyzing is completed, the scanner can quickly be moved to the next inspection area.



Bolt scanner system layout



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Subject to changes without notice

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