Naval field:
Sensor ring fastening on engine shaft.

Autofeed tightening unit to be installed on robot.

Fiam have designed and manufactured a self-feeding tightening solution for the automatic assembly of sensor rings on engine shafts in the marine sector, using 10 M6 oval head, hex socket screws and Loctite (thread-locking) treatment.

The tightening operation is carried out by an air shut-off nutrunner motor with built-in torque transducer; it is housed in a single-stroke fastening slide installed on the anthropomorphic robot arm of the customer.

It includes:

**SCREW FEEDING UNIT**

Following components are installed on the work bench:

- **Screw circular feeder**: it guarantees high feeding capacity
- **Special “over unloaded” sensor**: a device integrated in the feeder in order to signal when bowl is empty

“Over unloaded” sensor
• **‘Overload’ sensor** with photocell: it prevents screws getting stuck in the selection duct resulting into greater reliability and improved effectiveness in the working cycle.

• **Electronic controller**, it is a necessary tool for adjusting the amplitude of vibration produced by the feeder and therefore the screw feeding capacity.

• **1-way screw selector**: it is used to separate and send the screws singly from the feeder

• **Embedded screw passage sensor** for controlling the screw passage; this sensor is totally shielded and isn’t influenced by other sensors positioned nearby

• **Hard screw feed hoses**: they guarantee extreme speed to the screw passage

• **TOCS-TC computerised control unit**: it reads and memorises torque value, displays the cycle results (OK and NOT OK), monitors the tightening cycle through torque/time values, that can be easily stored.

• **FRL group**: filter, pressure regulator and lubricator with compressed air pressure gauge filters the air and maintains constant the machine feed guaranteeing suitable lubrication of the tool

• **Transparent protective cover**
TIGHTENING UNIT

The tightening operation is carried out by an air shut-off nutrunner motor with built-in torque transducer; it is housed in a single-stroke fastening slide installed on the anthropomorphic robot arm of the customer.

The tightening unit includes:

- **Single-stroke fastening slide**
  equipped with running on ball recirculating runners, magnetic cylinders, pneumatic decelerators and limit switch position sensors

- **Air nutrunner motor**
  MCSE10A - TC with automatic immediate air shut-off torque control system equipped with built-in torque transducer. The strain gauge torque transducer converts the torque applied into an electrical signal that is then processed by the TOCS-TC computerised unit

- **Screw head and inductive sensor** for controlling screw passage

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Advantages of this solution

**High efficiency of the production cycle**

- This solution can be integrated in the customer’s production line increasing production rate.

**Waste elimination**

- The assembly operations are fast and accurate reducing the non conforming products (waste): a decisive advantage for final quality.

**A solution guaranteed by Fiam**

- The solution has been designed and customized entirely by Fiam. It has been tested carefully to guarantee our customer a perfect functioning.
Would you like to see the video of these solution?