New computerized monitoring system of the tightening cycle
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Tightening and monitoring: the intelligent simplicity

These new, effective Fiam tightening solutions represent a practical and inexpensive monitoring system of the tightening cycle. It is a poka-yoke system (anti-error system). They verify immediately the tightening cycle, guaranteeing the reliability of the tightening process regardless of the operator’s ability. The use of these systems accelerates the production cycles avoiding the need of post-process controls (for example to check the number of tightened screws) ensuring as a consequence the good quality of the assembled product.

They include:
- Lever or push button air shut-off screwdrivers equipped with pneumatic pick-up signal (ported)
- New computerized monitoring unit TOM-PM (Torque Operation Monitor - Pressure Monitoring): it allows the monitoring of the tightening cycle through the double-signal pressure coming from the screwdrivers, subsequently converted into electric signal.
Be demanding

Don't be satisfied with the maximum

Reliability

Components long lifetime thanks to careful design and quality of the manufacturing process which results in reduced maintenance and repair costs.

TOM-PM unit (Torque Operations Monitor – Pressure Monitoring) allows to discriminate during the tightening cycle the screws that have been tightened correctly according to pre-set cycle time and number of screws to be fastened.

The system can also identify possible assembly defects, comparing the time elapsing between start and finish of fastening (when the clutch shuts off) and the time-window considered appropriate for the same phase.

TOM-PM unit is equipped with dual pneumatic signal to monitor correctly the assembly cycle: a signal checks the screwdriver start, while the other checks when the clutch operates. These two signals guarantee system operation regardless of pressure variations: a considerable advantage in respect to other poka-yoke systems using only one pneumatic signal reading the pressure “gap” when the torque is reached. Programming of these one signal systems is time taking and not immediate. Moreover, such systems depend on the infeed pressure which is a critical feature in many production lines.

Fiam screwdrivers guarantee accurate tightenings thanks to their high and tested performances accepted by in different productive fields such as electronic, household appliance industries and car components. Fiam screwdrivers guarantee high torque repeatability on soft and hard joints.

Productivity

Considerable increase of the efficiency of the tightening cycle thanks to innovative systems.

The operator avoids to control tightening results piece by piece, because the unit signals the outcomes by means of acoustic and visual indicators.

- Status of the tightening operations is displayed to the operator through visible led-lights positioned on the unit front panel:
  - Single tightening end (OK-NOK outcome)
  - Tightening cycle end (OK outcome)

- The unit signals alarms optically (through the led-lights supplied) and acoustically when the tightening or the cycle are KO.

Practical functionalities make easier the operations during the assemblies:

- The operator can cancel last tightening count by pressing a button on the front panel: this feature is important in case the operator has to loose the screw (ex. required f.i. in cases where a component has mistakenly been forgotten within the tightening cycle).
- The operator can reset the program with the key and start a new tightening sequence
- PLC programming keypad: user friendly

Fiam screwdrivers are equipped with quick-change chuck: it favours easier and safer bit replacement; it is available upon request also for use of double insert bits.
Optimization of the tool performances concerning ergonomics and operator safety

The practical, immediate acoustic and visual alarm systems ease assembly operations for the operator.

TOM-PM unit is extremely compact allowing easy integration into the work station which will result practical and comfortable.

The unit is arranged for installation of a visual and acoustic tower light which guarantees an easier use for operator.

Screwdriver’s grip is ergonomic: designed according to modern biomechanics principles paying particular attention to the features of the female hand. The grip is manufactured with an ergonomic sheath made of anti-slip material, increasing the hand grip on screwdriver, improving the handling, thermal insulation and operator’s comfort.

Extremely reduced weight of the screwdriver; they are manufactured with light alloys.

Tools are designed to be hanged to suspension device (balancer) thus eliminating any effort to lift the tool.

Patented silencing system: these screwdrivers are extremely noiseless, air exhaust is also controlled.

Comfortable low effort reverse button: it reduces finger fatigue.

Innovative systems designed paying even more attention to environment safeguard.

The advanced technological design of the tool’s air motor permits considerable decrease of compressed air consumption, without affecting tool performances.

Thanks to the tool’s inner kinematic motions which optimize efficiency, available power is transmitted with minimum dispersions.

Fiam tool’s torque control systems operate fast reducing working time of the screwdriver and compressed air consumption.

OILFREE: Fiam screwdrivers work at maximum efficiency without need of lubrication thus eliminating oil exhaust into working environment.

Eco-contribution WEEE accomplished: Fiam fulfils its manufacturer obligations respect to the environment and without costs for the customer.
Monitoring unit TOM-PM

**TECHNICAL FEATURES**

- Electric feed: 110/220VAC, 50/60Hz
- Extremely compact: 230x200x130 mm
- Weight: 2.0 Kg.
- The unit can be connected to lever or push button air screwdrivers featuring pneumatic double signal (START and TORQUE ACHIEVEMENT)
- It can't be used with push to start air shut off screwdrivers

<table>
<thead>
<tr>
<th>Standard equipment (supplied with tool)</th>
<th>Accessories available upon request</th>
<th>Models available upon request</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kit of pressure switches (cod. 68501058) with pneumatic hoses and electric cable length to 3,0 mt.</td>
<td>3 colors tower-light providing the same display light signals of the unit’s led-lights (supplied with 3,0 mt long cable): cod. 688000606</td>
<td>Customized models available. For example: models provided with tightening/un tightening/cycle end features, suitable for use with autofed tightening unit NCA (see cat.) or providing tightening sequence monitoring for more screwdrivers used by only one operator. For further information please contact Fiam Technical Consultancy Service</td>
</tr>
<tr>
<td>Power cord</td>
<td></td>
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<tr>
<td>IN connector for unit operation</td>
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<tr>
<td>Use and maintenance manual</td>
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<tr>
<td>Eco-friendly packaging</td>
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</tbody>
</table>

**OPERATION**

<table>
<thead>
<tr>
<th>Operation</th>
<th>LED-LIGHTS ON THE TOM-PM FRONT PANEL</th>
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</thead>
<tbody>
<tr>
<td>Tightening OK</td>
<td>TIGHTENING OK: green led-light</td>
</tr>
<tr>
<td>Tightening sequence set</td>
<td>CYCLE END: yellow led-light - TIGHTENING OK: green led_light</td>
</tr>
<tr>
<td>Fastening a screw already tightened</td>
<td>TIGHTENING KO: red led-light</td>
</tr>
<tr>
<td>Number of tightened screws</td>
<td>Counter on display</td>
</tr>
<tr>
<td>Number of tightenings KO</td>
<td>Counter on display</td>
</tr>
<tr>
<td>Screw stripping</td>
<td>TIGHTENING KO: red led_light, increase on counter KO and signal on display “T&gt;T_MAX”</td>
</tr>
<tr>
<td>Releasing the lever before the tightening is completed</td>
<td>Neither signal nor increase on the screw counter</td>
</tr>
<tr>
<td>Screw getting stuck; partial thread; presence of different joint among foreseen joint types (clutch operated before minimum time set)</td>
<td>TIGHTENING KO: red led-light, increase on counter KO and signal on display “T&lt;T_MIN”</td>
</tr>
<tr>
<td>Presence of different joint among foreseen joint types (Clutch operated after maximum time set)</td>
<td>TIGHTENING KO: red led-light, increase on counter KO and signal on display “T&gt;T_MAX”</td>
</tr>
</tbody>
</table>

**Monitoring unit TOM-PM**

**Model**
- Monitoring unit

**Code**
- 685001067

**Reliability**

**Productivity**

**Ergonomics**

**Ecology**
Reversibility: all models are suitable for tightening and untightening operations.

The data given in the table are indicative and can be changed without prior notice. The torque values are purely indicative and may be influenced by the softness of the type of joint, by the type and length of the screw, by the pressure and quantity of air supply, and by the type of accessory used. The values indicated for noise and vibration levels were obtained in the laboratory, performing tests that comply with the standards stated, but alone are not sufficient for calculating risks. Values measured in the single work places may be higher than those stated.

The values of actual exposure and consequent risks are specific and depend on the operator’s method of work, the type of work piece and the work place, as well as the operator’s time of exposure and his physical conditions. Fiam cannot be held responsible for any consequences deriving from the use of the information in the table when evaluating risks in the work place over which Fiam has no control. For all further details, please apply to the Fiam Technical Consultancy Service.

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**Legend**

- Figures shown are measured at a pressure of 6.3 bar operating pressure recommended by ISO 2787.
- Tightening torque values have been measured in accordance with ISO 5393 standard.
- Noise level has been measured in accordance with ISO 3744 and ISO 15744 standards. Additional factor: 3 dBA spread in method and production (ISO 15744).
- Vibrations level have been measured in accordance with ISO 8662-1 and ISO 8662-7 standards.
- Accessory drive: male square drive (ISO 1174); female hexagonal drive 1/4", 6.35 mm (ISO 1173).
- The code number must be used when ordering.

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**Standard equipment (supplied with the tool)**

- Clutch adjustment key
- Additional clutch spring (except angle models and 26C 8-10-12 models)
- Hanging ring
- Use and maintenance manual
- Eco-friendly packaging

**Accessories available upon request**

- Bits, sockets, etc., balancers, exhaust silencers and other compressed air system accessories: (see Accessories catalogue)

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