Electric screwdrivers, nutrunner motors and tightening automation solutions with torque/angle current control. Control unit with advanced programming.
eTensil. Fiam’s electrical revolution continues.

With eTensil, Fiam sets the benchmark in the world of industrial tightening. We have integrated our tried-and-tested air solutions with a range designed and manufactured to raise the level in manual and automatic tightening through electric tools with torque/angle current control.

Nowadays the components to be assembled include several variants which, besides different geometries, are designed for different types of screws and torque values. Therefore a complete production flexibility which involves the use of efficient, versatile and smart tools is needed.

eTensil new range meets these requirements thanks to its torque/angle control current system, which ensures a great productive versatility.

Electric, efficient and accurate, eTensil is the Italian made response to this modern industry’s demand for green, versatile and intelligent tools. We have designed them to be integrated in smart production: from precision mechanics to automotive, from electronics to household appliances assembly.

Design, power, manufacturing precision are the cornerstones making eTensil a proud Italian solution. A consistent project in which every detail has been taken into account aiming at top performance.
Control units with advanced programming

Manual tightening systems

Automatic tightening systems

Ergonomics and position monitoring devices
Control units.
Smart power.

The control units of this new range represent the real great innovation of the whole project. Thanks to their “smart core” the control units can program, control and manage all the tools functions. Designed and built entirely by Fiam, they represent a strategic choice providing one of the most advanced solutions in terms of efficiency and versatility for the industrial production.

1. Two control units with common features.
TPU-C1 and TPU-C3 models.

The two units are
- TPU-C1, basic model
- TPU-C3 advanced model
with a fast and intuitive programming, they offer essential functions to correctly and quickly manage a tightening process and make it reliable:

- AUTOMATICALLY AND IMMEDIATELY RECOGNIZING THE CONNECTED TOOL and setting the applicable parameters range for it.
- ALLOW IN-PROCESS TORQUE ADJUSTMENTS by modifying the relevant parameter on the operating panel.
- SCREW COUNTING this function turns the system into an effective Poka Yoke device.
- The tightening results are visualized on the unit display, highlighted by the leds.
- STORING the outcome of the last 99 tightening.
- CHECK TIGHTENING TIME to detect process anomalies like overtreading and already tightened screws.
- COMMUNICATION WITH MASTER PLC and others devices: 8 + 8 signals I/O freely programmable that offer several functionalities to be chosen from 9 + 11 signals (TPU-C1) and 21 + 21 signals (TPU-C3). Allow to communicate the phase and the system status and to remote control the tool.
- DISPLAYING OF TIGHTENING RESULTS the basic model displays the OK / NOK status (in addition to the tightening time) while the advanced model displays the torque value at the end of each cycle together with time and angle values.
- INTERFACING WITH WORKING STATIONS In presence of Jigs, workpieces locking devices can be activated/deactivated.
- “SMART THREAD” FUNCTION for processing of self-threading, self-tapping, self-drilling screws, or else where the final torque value is lower than thread forming torque.
- “SMART SPEED” FUNCTION useful for speeding up the production process. It is possible to create a “two-phase” tightening strategy: screwdrivers start with a high-speed rotation until reaching the set angle, then rotate at a pre-defined speed that allows to maintain the accuracy of the result.
eTensil is the unique screwdriver that allows changing the starting mode without modifying the mechanical configuration.

- **START UP MODES**
  - lever start
  - push to start
  - lever + push to start
  - “Latched lever” + push to start.

Other functions can be activated / deactivated acting directly on the control unit:
- **STARTING BLOCK** (in case of an anomaly)
- **FRONT ILLUMINATION LED**
- **UNTIGHTENING FUNCTION** (left rotation tool).

The main feature of these advanced units is the **possibility to set different control functions**:
- **the SOFT START FUNCTION**: the ramp speed acceleration is not fixed but it is possible to set the **time** acceleration to ease screw engagement
- **the TOOL SPEED**: can be set within the minimum / maximum range.

Functionality and aesthetics combine in the control unit design, allowing practical access to the operating panel. These features together with the **sturdiness** make this unit perfect for a vertical clamp.

Functionality and control manages inside the unit, which Fiam has designed and created so that **tightening can be managed in a synchronised and efficient way**. High-visibility front LEDs visualize and monitor the main parameters such as: **correct functioning, anomalies or emergency**. A guarantee for the constant increase of the efficiency in the production activities.
Performance and functions.

Advanced programming.

The advanced TPU-C3 control unit is equipped with all the features of the basic model. It guarantees the status control of the tool and of the assembly process with additional programming features.

The additional features of the advanced TPU-C3 model.

5. Programming.

Possibility to set up to 8 tightening programs with torque, angle and time control/monitoring. The programs can be managed in sequence and can also be selected remotely in single mode or with binary combination, which allow to set both the number of screws and the torque values.

For example: it is possible to sequence different programmes, each with different parameters within the same tightening process.

6. Displaying of torque value.

While TPU-C1 displays the OK / NOK status (in addition to the tightening time), the advanced TPU-C3 model displays the torque value at the end of each cycle together with time and angle values.

Another key difference comparing this unit with the basic version TPU-C1 is represented by this functionality. For example, it can work as poka-yoke system when tightening critical joints.

Should you have elastic gaskets, rubber elements or other materials, the control unit verifies that these are present or not during the process.

This is made by measuring the angle and comparing it with a range set by the operator during the programming phase.

7. Monitoring of the tightening angle.

Other additional settable features are:

• **PRE-SELF UNTIGHTENING**: it is possible to set the untightening angle and the pause between the untightening and the subsequent tightening.

  This strategy finds its application in the electrical / electronic field, for example when it is necessary to open and then close connectors to insert electrical wires.

• **POST-SELF UNTIGHTENING**: it is possible to set the untightening angle as the pause time between untightening and subsequent tightening.

• **STOP-BY-TIME TIGHTENING**

  When it is necessary to tighten threaded fasteners to a certain height and not to a defined torque. This is made by checking the tightening time.

8. “SMART PRO EVO” functions.
TPU-C3 control unit, advanced model.

The two control units compared

**TPU-C1**
- 1 program to control tightening process and sequence
- Automatic recognition of the tool and configuration
- Screw counter - Poka Yoke system
- OK / NOK: tightening result displayed
- "Smart Thread" function
- "Smart Speed" function
- Min / Max tightening time control - Poka Yoke system
- Settable untightening speed
- Tighten screws with left thread. Optional function
- 2 levels password:
  - to protect the set parameters or totally block the system
- Unit calibration
- Available measurement units Nm / Lb / In. / Kgf.cm
- Serial communication (RS232)
- Language selection (IT, EN, DE, FR, ES)
- Log of the last 99 tightenings
- Delayed jig release. Settable function
- 8 + 8 programmable I/O (9 + 11 signal types)

**SMART PRO EVO**
- 4 start-up modes selectable on the unit
- Soft Start - acceleration ramp
- Settable rotation speed

**TIGHTENING STRATEGIES**
- Torque control
- Torque control with tightening time monitoring

**TPU-C3**
- 8 programs to control the tightening process and sequence
- Automatic recognition of the tool and configuration
- Screw counter - Poka Yoke system
- OK/NOK torque value display in Nm or other unit of measurement
- "Smart Thread" function
- "Smart Speed" function
- Min / Max tightening time control - Poka Yoke system
- Settable untightening speed
- Tighten screws with left thread. Optional function
- 2 levels password:
  - to protect the set parameters or totally block the system
- Unit calibration
- Available measurement units Nm / Lb / In. / Kgf.cm
- Serial communication (RS232)
- Language selection (IT, EN, DE, FR, ES)
- Log of the last 99 tightenings
- Delayed jig release. Settable function
- 8 + 8 programmable I/O (21 + 21 signal types)
- Selection of programs from I/O (remotely)
- Min / Max tightening angle control - Poka Yoke system

**SMART PRO EVO**
- 4 start-up modes selectable on the unit
- Soft Start - acceleration ramp
- Settable rotation speed

**TIGHTENING STRATEGIES**
- Torque control
- Torque control with tightening time monitoring
- Torque control with tightening angle monitoring
- Angle control and torque monitoring
- Time control and torque monitoring (Stop-by-time tightening)

Additional features of TPU-C3 compared to the basic unit are highlighted in red on the chart above.
Production flexibility. Efficiency at hand.

The user can manually programme various work processes on the tools themselves, without having to change the mechanical setup or having to deal with an external accessory. This strategic choice defines eTensil as one of the most advanced solutions in terms of efficiency and versatility.

9. Torque/angle current control system.

This technology offers the possibility of adjusting the torque during operation. This can be done simply by changing the specific parameter on the control unit, which is the “smart core” of this range of solutions.

In this system the torque is detected by measuring the current used by the motor. The angle is detected through specific hall sensors.

10. Signaling LEDs.

Three LEDs ensure precise and efficient signaling. It is a simple solution that ensures the screwdrivers’ settings and correct functioning are immediately apparent to the user. The blue LED near the reverse button remains lit to signal that the screwdriver is in “untighten” mode (leftwards rotation). The white LED in the same area shows the tool is ready for use. The LED at the front, next to the quick change chuck, lights up the area of work as well as indicating anomalous functioning at the end of a tightening cycle (in conjunction with the blue LED). Once the same LED flashes constantly it means that the programmed maintenance is required.

11. Reversibility.

The reverse command is encased within the screwdriver body to protect it from wear, collision or damage and accidental activation. A single press of the button when the screwdriver is not in action inverts the rotation (indicated by the blue LED). Holding the button for at least four seconds starts up the “SMART PRO” programming mode (indicated by the LED flashing).

12. Start up ergonomics.

The start up lever is another “smart” device in the system, designed to grant maximum freedom in terms of use. An analogic sensor with exceedingly sturdy mechanics/electronics that are not susceptible to wear mean it can be contactless. Pressed, it slots perfectly into the tool’s casing thus ergonomically supporting to the user’s hand.

In addition, the force required to start a tool at the beginning of its cycle is ergonomically irrelevant: work is less tiring thus productivity is at a maximum.
Reliability.
A long-term project.

eTensil components are built to guarantee the highest levels of reliability and safety throughout the life cycle of any operation. The engineering involved in the mechanics, the cleanliness in the design and performance tests passed, all arise from Fiam’s wide Know-how of knowledge and specialist patents within the industrial tightening industry.


Brushless motors are the avant-garde in efficient and consistent performance, due to their high-precision mechanics. eTensil has been designed in order to obtain endless electric lifespan, thanks to the implementation of low wearing components, to low motor inertia and to a lower heating of the assembly. Hall sensors allow the user to have full control of rotation and ironless systems make the motor so light.


Increased performance in output, duration and noise level are the principles that guide the latest designs in gear assembly - aims we have achieved through research focused on ensuring gear lifespan and efficiency as well as the careful sizing and the incorporation of treatment options into the manufacturing cycle. Such innovative ways of working mean the gear assembly remains practically unchanged even after thousands of operational hours, as our lab tests prove.

15. Modular structure.

Functionalties integrated into the circuit board, reduced and simplified electrical connections, its clean design, the modularity and the seamless integration of electronic components into the mechanics; all bases of the constructive strength, designed to last and guarantee safe and efficient servicing.


The cable is extremely flexible, with sturdy connectors, designed to last over time and made entirely in Italy upon Fiam’s specifications. Standard length is 3 metres, which can be increased by adding additional cables. Extremely resilient, flame resistant and halogen-free, designed to resist oils and to face extreme conditions of use in an industrial environment. The connection to the control unit is positioned at the back of the unit itself, allowing a better view to the display.
Ergonomic design.
Perfection in handling.

eTensil design takes care of both appearance and functionality. Ergonomics has always been the central point of Fiam design and key strength in provided solutions. In perfect Italian style, the design also adheres to the combination of form and matter, with linearity and refined layout.

17. Ergonomic grip.
The grip has been designed and manufactured with the clear goal to reduce any fatigue and optimize productivity. Materials, horizontal grip-shaping, and the casing layout provide a stable rest point for the hand. All such details reveal a research for functionality and aesthetics. The grip is made of innovative materials ensuring a better resistance against any form of collision or damage. It is placed close to the tightening area, making the centring easy and fast. Easy to handle, combining low weight and dimensions. Suitable for both left and righthanded users, as well as for the smaller and female hands.

18. Reduced-effort start up.
The pressure required to activate lever start up is much lower than others available on the market. Reducing the effort the user needs to sustain over the course of the working day, will result in increase of production efficiency.

19. Several models for different needs.
Angle screwdrivers are ideal solutions where tightening has to be done in tight and hard-to-reach areas. Their 30° or 90° heads - which are extremely compact to reach awkward tightening areas - have been designed and manufactured with innovative materials that make them wear resistant (and hence low maintenance), while delivering impressive tightening precision. Models available with start lever only.

Operating layouts change and the tightening points are located on vertical wall? Straight screwdrivers can be converted to pistol screwdrivers, making the tightening job 100% ergonomically sound. The pistol grip - available on request - results in an extremely balanced new grip that is also suitable where hanging systems are not an option.

eTensil ergonomic design also ensures low noise and comfort. All of the screwdrivers’ mechanical elements have been designed to be noiseless - motor, gears. The tool is equipped with quick change chuck: easy and safe to use, it allows the user to quickly change bits. The presence of a suspension device eliminates the need for the user to support the tools. All of these features are essential to eTensil’s unparalleled ergonomics.
Fiam has always considered as a priority the safety of the working tools, which play a vital role in the assembly process. The eTensil project has grown into its current strategical importance over a long certification process that has involved collaboration between Fiam and three external laboratories in a series of “pre-compliance” tests. Fiam guarantees that its range of electric screwdrivers fully complies with latest electrical safety, EMC and ESD directives.

21. Low environmental impact.

No sliding electrical contact in the brushless electric motors prevents carbon and blade dust emissions thus creating a safer working environment. All eTensil components are made of recyclable materials, making it easy to dispose of them. The entire system in every element of the eTensil screwdriver range has been designed with the Life Cycle Assessment in mind: from supply chain to finalisation, from production to product transport, from usage to disposal.

22. ESD certification.

Casing of eTensil range has been made using the latest technology in ESD dissipative plastic, thus avoiding the build up of electrostatic charge. Any electrical charges transferred by the user to the tool (and vice versa) are discharged to the ground without intruding upon the tightening area. In compliance with the latest European Directives, the eTensil range is immune to electromagnetic disturbances generated by cables or as a result of the interference of other devices. The tools do not influence other devices either. This is a huge advantage when assembling high-quality electrical components that must be protected from the build up of electrostatic charge.


The casing of eTensil is designed and manufactured to reduce as much as possible dust and other waste or substances infiltrations, that can compromise functionality of the tool. The most exposed parts of the screwdrivers are duly sealed. This greatly reduces potential functioning issues linked to external, damaging factors. In addition, all labels are enclosed within the casing to keep them protected from wearing and ensure traceability.

24. Maximum safety.

Operating at low-voltage (32 volts) means maximum safety. Special ergonomic grips guarantee perfect thermal isolation.
## Screwdrivers technical features.

<table>
<thead>
<tr>
<th>Type of screwdriver</th>
<th>Code</th>
<th>Type</th>
<th>Nm</th>
<th>in lb</th>
<th>c.p.m.</th>
<th>Starting system</th>
<th>Reversibility</th>
<th>Weight</th>
<th>Dimensions</th>
<th>Power consumption</th>
<th>Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBCC2A-2000</td>
<td>111712100</td>
<td>0,6 ± 2</td>
<td>5,3 ± 17,7</td>
<td>500 ± 2000</td>
<td>*</td>
<td>0,76</td>
<td>275x39</td>
<td>32</td>
<td>F1/4&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBCC3A-1200</td>
<td>111712101</td>
<td>0,7 ± 3</td>
<td>6,2 ± 26,5</td>
<td>300 ± 1200</td>
<td>*</td>
<td>0,76</td>
<td>275x39</td>
<td>32</td>
<td>F1/4&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBCC4A-900</td>
<td>111712102</td>
<td>0,7 ± 4</td>
<td>6,2 ± 35,4</td>
<td>225 ± 900</td>
<td>*</td>
<td>0,76</td>
<td>275x39</td>
<td>32</td>
<td>F1/4&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBCC5A-650</td>
<td>111712103</td>
<td>0,7 ± 5</td>
<td>6,2 ± 44,2</td>
<td>160 ± 650</td>
<td>*</td>
<td>0,76</td>
<td>275x39</td>
<td>32</td>
<td>F1/4&quot;</td>
<td></td>
<td></td>
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<tr>
<td>EBCC7A-350</td>
<td>111712104</td>
<td>0,8 ± 7</td>
<td>7 ± 61,9</td>
<td>90 ± 350</td>
<td>*</td>
<td>0,76</td>
<td>275x39</td>
<td>32</td>
<td>F1/4&quot;</td>
<td></td>
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</tr>
<tr>
<td>EBCC2A30-2000</td>
<td>111712135</td>
<td>30°</td>
<td>0,6 ± 2</td>
<td>5,3 ± 17,7</td>
<td>500 ± 2000</td>
<td>lever start</td>
<td>0,76</td>
<td>327x39</td>
<td>32</td>
<td>M1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>EBCC3A30-1200</td>
<td>111712136</td>
<td>30°</td>
<td>0,7 ± 3</td>
<td>6,2 ± 26,5</td>
<td>300 ± 1200</td>
<td>lever start</td>
<td>0,76</td>
<td>327x39</td>
<td>32</td>
<td>M1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>EBCC4A30-900</td>
<td>111712137</td>
<td>30°</td>
<td>0,7 ± 4</td>
<td>6,2 ± 35,4</td>
<td>225 ± 900</td>
<td>lever start</td>
<td>0,76</td>
<td>327x39</td>
<td>32</td>
<td>M1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>EBCC5A30-650</td>
<td>111712138</td>
<td>30°</td>
<td>0,7 ± 4,5</td>
<td>6,2 ± 39,8</td>
<td>160 ± 650</td>
<td>lever start</td>
<td>0,76</td>
<td>327x39</td>
<td>32</td>
<td>M1/4&quot;</td>
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<tr>
<td>EBCC2A90-2000</td>
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<td>90°</td>
<td>0,6 ± 2</td>
<td>5,3 ± 17,7</td>
<td>500 ± 2000</td>
<td>lever start</td>
<td>0,76</td>
<td>327x39</td>
<td>32</td>
<td>M1/4&quot;</td>
<td></td>
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<tr>
<td>EBCC3A90-1200</td>
<td>111712131</td>
<td>90°</td>
<td>0,7 ± 3</td>
<td>6,2 ± 26,5</td>
<td>300 ± 1200</td>
<td>lever start</td>
<td>0,76</td>
<td>327x39</td>
<td>32</td>
<td>M1/4&quot;</td>
<td></td>
</tr>
<tr>
<td>EBCC4A90-900</td>
<td>111712132</td>
<td>90°</td>
<td>0,7 ± 4</td>
<td>6,2 ± 35,4</td>
<td>225 ± 900</td>
<td>lever start</td>
<td>0,76</td>
<td>327x39</td>
<td>32</td>
<td>M1/4&quot;</td>
<td></td>
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<tr>
<td>EBCC5A90-650</td>
<td>111712133</td>
<td>90°</td>
<td>0,7 ± 4,57</td>
<td>6,2 ± 39,8</td>
<td>160 ± 650</td>
<td>lever start</td>
<td>0,76</td>
<td>327x39</td>
<td>32</td>
<td>M1/4&quot;</td>
<td></td>
</tr>
<tr>
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<td>90°</td>
<td>1 ± 8</td>
<td>8,8 ± 70,8</td>
<td>65 ± 250</td>
<td>lever start</td>
<td>0,93</td>
<td>334x39</td>
<td>32</td>
<td>M1/4&quot;</td>
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</tr>
</tbody>
</table>

### Legend
- **E** = Electric
- **B** = Power of motor in watt/10
- **C** = Screwdriver
- **A** = Torque control with automatic shut off
- **90** = 90° angle model
- **30** = 30° angle model
- **2000** = Speed
- **2** = Maximum tightening torque in Nm
- **I** = Test results of laboratory performing tests that comply with the standard

### Accessories
- Accessory drive: female hexagonal drive 1/4", 6,35 mm (ISO 1173). The code number must be used when ordering.

All screwdrivers are supplied with a working speed equal to 25% of the nominal one to guarantee tightening quality and precision. In order to obtain the nominal torque and speed range, it is necessary to set parameters following the instructions given in Use and Maintenance Manual. For any further information, contact the Fiam Technical Service.

### Starting system: 4 available modalities for all models
- Lever start
- Push to start
- Lever start + push to start
- Latched lever + push to start

The “latched lever” + push to start mode allows the screwdriver to work without need to keep the lever pressed. For safety, the screwdriver activates only when pushing on the bit. In this mode, the first pressure applied to the lever starts the screwdriver until clutch shuts off, whereas a second pressure can eventually stop it before the working cycle is completed.

### Standard equipment (supplied with the tool)
- Connection cable to power supply unit (code 686903834); length 3 mt and with error proof connection system
- Clutch adjustment key
- Hanging ring
- Eco-friendly packaging
- Use and maintenance manual.

### eTensil screwdrivers, nutrunner motors and TPU control units, are covered by an extended warranty of 24 months or 1.000.000 cycles (first goal achieved).
Control unit technical features.

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
<th>Speed</th>
<th>Nr. of connectable tools</th>
<th>Tool feed tension</th>
<th>Feed input</th>
<th>I/O</th>
<th>Led signaling</th>
<th>Weight kg</th>
<th>L x Width x H mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPU-C1</td>
<td>686200105</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>230 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0.8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C3</td>
<td>686200107</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>230 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0.8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C1-120V</td>
<td>686200106</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>120 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0.8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C3-120V</td>
<td>686200108</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>120 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0.8</td>
<td>180x147x105</td>
</tr>
</tbody>
</table>

SSU - Vacuum pump
Designed and produced by Fiam. Necessary for the suction of the screws, it works at 220 Volt-50 Hz with a use of power of only 45 Watts.

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSU - Vacuum pump for screw suction system</td>
<td>676000120</td>
</tr>
</tbody>
</table>

Pistol grip
code 681041029
To convert straight models into pistol models.

Auxiliary grip
code 681041030
When using straight screwdrivers at torques higher than 4 Nm, it is good practice to use the auxiliary grip, which reduces the reaction by distributing it over two hands rather than one.

90° right angle fitting
code 686910164
Useful when converting the screwdriver from straight to pistol and the power cable drops from above.

Connection cable
code 686903834
The 3m-long cable connecting the screwdriver and power supply unit comes with the screwdriver, though it can also be ordered separately and joined to the cable provided to achieve greater lengths. Please check with the Fiam Technical Advice Department for the maximum length that can be produced.
The eTensil range is available for integration with production cycle monitoring systems, such as TPM unit. Produced entirely by Fiam, these systems are equipped with a series of acoustic and visual alerts, allowing users to continuously monitor work processes, thus guiding them through the assembly stages. These systems eliminate post-process controls, they are easy to use and intuitive to set up.

25.
TPM.
Tightening Position Monitor.

TPM is an auxiliary system that increases the efficiency of tightening operation cycles by monitoring all the sequences concerned with tool positioning at the tightening point. This consists of a telescopic magnesium arm and a TPM monitoring unit that both guides users through the operations and ensures that the final product is assembled in line with the required specifications. The telescopic arms can be supplied with the TPM and come in two versions: one allows the device to perform angular movement detection, another angular and linear movement detection. Discover them on page 20.

Guided positioning.
The system locates the screwdriver’s position in a tightening process and stores this in its memory. It also stores the sequence of actions and the number of screws used. Storing this information is part of the system’s “self-learning” process.

How the system works.
The screwdriver activates when it finds the first position stored in its memory: POS-OK appears on the TPM display and the POS-OK LED on the telescopic arm lights up. For every screw tightened, the REMAIN display indicates how many screws are left to tighten, allowing the system to proceed to the next one. The END signal lights up once the memorised cycle is complete and permits users to proceed to a new working cycle.
Up to 35 positions/screws per programme, up to 8 programmes.

When programming the sequence and positions, users can set a precision tolerance depending on the extension distance: e.g. ± 10% for a length of approx. 1 mm; 0.1 degrees for an angle (maximum tolerance).

The large graphic display guides users step-by-step towards the tightening point. Once reached, all the green LEDs light up to signal that the user may proceed with the tightening process; the small display instead shows the number of screws left to tighten.
BT-MG magnesium telescopic arms
Telescopic arms in magnesium alloy, designed and produced by Fiam, extremely resistant to mechanical stress thus guaranteeing reliability and long life span, thanks to accurate manufacturing process and applied innovative materials. Designed with different telescoping extension elements (3 for all models and 2 for BT-MG 10...), they are conform for working areas according to various productive needs. Double terminal coupling guarantees great handiness and maximum freedom of action also for inclined tightening operations. They can be easily installed using a simple plate with reduced dimensions.

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
<th>Max torque (Nm)</th>
<th>Max work range (mm)</th>
<th>Min work range (mm)</th>
<th>Ø max tool (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT-MG 10 800</td>
<td>692071420</td>
<td>10</td>
<td>88.50</td>
<td>470</td>
<td>26.5-50</td>
</tr>
<tr>
<td>BT-MG 10 1000</td>
<td>692071421</td>
<td>10</td>
<td>88.50</td>
<td>540</td>
<td>26.5-50</td>
</tr>
<tr>
<td>BT-MG 15 800</td>
<td>692071409</td>
<td>15</td>
<td>132.70</td>
<td>505</td>
<td>26.5-50</td>
</tr>
<tr>
<td>BT-MG 15 1000</td>
<td>692071401</td>
<td>15</td>
<td>132.70</td>
<td>575</td>
<td>26.5-50</td>
</tr>
<tr>
<td>BT-MG 15 1500</td>
<td>692071404</td>
<td>15</td>
<td>132.70</td>
<td>745</td>
<td>26.5-50</td>
</tr>
</tbody>
</table>

Tool holder accessory (1)
Code 692079180
Only for eTensil straight models. To install the screwdriver on BT-MG reaction arm. It allows 9 rotation positions of the screwdriver on its own axis.

BC and BCA Cartesian arms
Cartesian arms fundamental solutions for ergonomics workplace, designed and manufactured by Fiam, can be used with any type of tool with a diameter up to 50 mm and weight up to 11 kg.

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
<th>Max torque (Nm)</th>
<th>Max work range R1 (mm)</th>
<th>Min work range R2 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC5 Cartesian arm</td>
<td>692031030</td>
<td>5</td>
<td>44.2</td>
<td>600-760</td>
</tr>
<tr>
<td>BC12 Cartesian arm</td>
<td>692031031</td>
<td>12</td>
<td>106.8</td>
<td>600-760</td>
</tr>
<tr>
<td>BCA5 Articulated Cartesian arm</td>
<td>692031034</td>
<td>5</td>
<td>44.2</td>
<td>610-730</td>
</tr>
<tr>
<td>BCA12 Articulated Cartesian arm</td>
<td>692031035</td>
<td>12</td>
<td>106.8</td>
<td>610-730</td>
</tr>
</tbody>
</table>

Tool holder accessories
Code 692039108 (2)
In order to install the straight screwdrivers to the Cartesian arm without damaging it or compromising its operation. Complete with assembly screws.

Code 681041034 (3)
An accessory for anchoring the top of the straight screwdriver to the Cartesian arm for a better view of the tightening point. Complete with assembly screws.
Arms with position monitoring device

All Fiam arms can be fitted with a position monitoring device and, combined with the TPM monitoring unit, help make tightening systems very suitable for “Poka-Yoke” processes, while increasing the efficiency and speed of the production cycle.

There are two types:
- B...TMP1 arms, models with single angle movement detection
- B...TMP2 arms, which also measure the linear movement of the arm in addition to its angular movement.

The arms must be integrated with the TPM monitoring unit code 692078019.

The guided positioning system operates as follows:
- It works through “self-learning”: it locates the screwdriver position at the various tightening points and stores them together with the sequence of actions and the number of screws (up to 35 positions/program and up to 8 programs).
- The TPM unit display offers a graphical system to guide operators progressively as they approach the tightening point.
- The screwdriver is enabled when it is at the first stored position (the TPM display shows POS-OK and the POS-OK LED on the telescopic arm lights).
- Each time a screw is tightened, the REMAIN display shows how many screws are left, indicating that it is ready to pass on to the next screw.
- The END signal comes on when the stored cycle is complete, and gives the OK to proceed with the next work cycle.
- During the memorization process, a precision tolerance can be programmed within the range: for example, for a length of 1 mm ± 10% approximately; for the angle 0.1 degrees (maximum tolerances).

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
<th>Max torque Nm</th>
<th>Max work range (mm)</th>
<th>Min work range (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models with SINGLE ANGLE movement detection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BT-MG 15 800 - TPM1</td>
<td>692071425</td>
<td>15</td>
<td>132,70</td>
<td>985</td>
</tr>
<tr>
<td>BT-MG 15 1000 - TPM1</td>
<td>692071426</td>
<td>15</td>
<td>132,70</td>
<td>1195</td>
</tr>
<tr>
<td>BT-MG 15 1500 - TPM1</td>
<td>692071427</td>
<td>15</td>
<td>132,70</td>
<td>1705</td>
</tr>
<tr>
<td>BC5 -TPM1</td>
<td>692031046</td>
<td>5</td>
<td>44,20</td>
<td>285-445</td>
</tr>
<tr>
<td>BC12-TPM1</td>
<td>692031047</td>
<td>12</td>
<td>106,80</td>
<td>285-445</td>
</tr>
<tr>
<td>Models with ANGLE and LINEAR movement detection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BT-MG 15 800 - TPM2</td>
<td>692071422</td>
<td>15</td>
<td>132,70</td>
<td>985</td>
</tr>
<tr>
<td>BT-MG 15 1000 - TPM2</td>
<td>692071412</td>
<td>15</td>
<td>132,70</td>
<td>1195</td>
</tr>
<tr>
<td>BT-MG 15 1500 - TPM2</td>
<td>692071415</td>
<td>15</td>
<td>132,70</td>
<td>1705</td>
</tr>
<tr>
<td>BC5 -TPM2</td>
<td>692031042</td>
<td>5</td>
<td>44,20</td>
<td>285-445</td>
</tr>
<tr>
<td>BCA5 -TPM2</td>
<td>692031050</td>
<td>5</td>
<td>44,20</td>
<td>110-260</td>
</tr>
<tr>
<td>BCA12-TPM2</td>
<td>692031051</td>
<td>12</td>
<td>106,80</td>
<td>110-260</td>
</tr>
</tbody>
</table>

The BCA Cartesian arms are arranged only with the TPM2 device being configured in addition to the angular and linear positions.

TPM – Tightening Position Monitor

Tightening position monitoring unit, to be used in combination with the selected arm, along with the TPU-C1 or TPU-C3 or TPU-C3 control unit and connection cable (code 692079192).

Length accuracy (mm): 1 ± 10%
Angle accuracy (degrees): 0,1°
Maximum number of screws per program: 35
Number of programs: 8
Total number of screws: 280 (35 per program, 8 programs).

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
<th>Dimensions (mm)</th>
<th>Electric feed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPM - Monitoring Unit</td>
<td>692078019</td>
<td>208 x 128 x 42</td>
<td>24 V, 110/230V - 50/60 Hz</td>
</tr>
</tbody>
</table>
Tightening automation. Innovating production.

The eTensil series nutrunner motors. Innovation in automatic production processes draws on over 70 years’ specialist knowledge of the ins and outs of the industrial tightening process in its every form. A solid, exclusive foundation on which Fiam has built the new eTensil electric nutrunner motors. In addition to the eTensil motors, we also design and manufacture all our industrial automation components entirely in-house. The embodiment of our strict design standards and manufacturing excellence. Electric solutions for taking the efficiency of tightening process automation to the next level: eTensil was devised as a proudly Italian response to the industry 4.0 demand for green work tools, offering high levels of performance and reliability, smart tools designed to fit seamlessly into any smart manufacturing operation.

1. Torque/angle current control system.
This technology offers the possibility of adjusting the torque during operation. This can be done simply by changing the specific parameter on the control unit, which is the “smart core” of this range of solutions.

2. On board electronics.
In this system the torque is detected by measuring the current used by the motor. The angle is detected through specific hall sensors.

3. Latest generation brushless motor.
FIAM has designed and created an innovative on board electronics. As a result the system is easier to use, workplace layout is tidier, and data exchange between the nutrunner motor and the power unit is faster.

Brushless motors are the avant-garde in efficient and consistent performance, due to their high-precision mechanics. eTensil has been designed in order to obtain endless electric lifespan, thanks to the implementation of low wearing components, to low motor inertia and to a lower heating of the assembly. Hall sensors allow the user to have full control of rotation and ironless systems make the motor so light.
Increased performance in output, duration and noise level are the principles that guide the latest designs in gear assembly - aims we have achieved through research focused on ensuring gear lifespan and efficiency as well as the careful sizing and the incorporation of treatment options into the manufacturing cycle. Such innovative ways of working mean the gear assembly remains practically unchanged even after thousands of operational hours, as our lab tests prove.

Functionalities integrated into the circuit board, reduced and simplified electrical connections, its clean design, the modularity and the seamless integration of electronic components into the mechanics; all bases of the constructive strength, designed to last and guarantee safe and efficient servicing.

The cable is extremely flexible, with sturdy connectors, designed to last over time and made entirely in Italy upon Fiam’s specifications. Standard length is 3 metres, which can be increased by adding additional cables. Extremely resilient, flame resistant and halogen-free, designed to resist oils and to face extreme conditions of use in an industrial environment.

eTensil electric nutrunner motors are not just regular screwdrivers adapted to be installed on a machine: instead, they are solutions specifically designed to be used in the industrial automation areas. They have features that make them ideal for automation:

- **Strong thrust bearings:** to withstand the thrust of the sort of slides found in automated production cycles that move in rapid, non-stop strokes
- **Ideal external geometries:** to make machine mounting practical along the full length of the aluminium outer body
- **Centring system** designed to achieve unbeatable reliability along both the vertical and horizontal axis.
Automatic screwdrivers. Productivity is within your reach.

The eTensil nutrunner motors have been designed for use also on manually operated automatic tightening systems too. Essential **when tackling tightening jobs with medium and large runs of identical screws**, they are great for speeding up the production cycle with their continuous supply of **screws that are automatically sent to the tightening point**. **Using systems like these does away with the manual stages** of picking up the screw and positioning it on the bit or on the part, with a 30%-plus reduction in cycle times. Available in various versions, providing the best possible solution for each production scenario.

8. **EasyDriver** screw feeding systems.

9. **Auto-advance device.**

10. **Telescopic device.**

11. **Tightening heads.**

**Latest generation feeding systems.** They manage the entire working cycle with great flexibility because they manage the tightening sequences quickly and easily, customizing them to the specific applications. The **INTEGRATED PLC** manages all machine parameters according to the tightening needs. The screw feeding systems are available in several versions:

- to feed large screws
- in the event of high production rates to allow the system to run unaided for longer, even when working with small screws
- models with dual circular bowls to process 2 **geometrically similar** screws, for example differing in length or made from different materials.

The eTensil nutrunner motor can be used in conjunction with the auto-advance device designed and manufactured by Fiam that allows the **bit to advance automatically** during the tightening stage, thus reducing operator fatigue, at the same time ensuring the screw is visible at all times and not allowing the bit to pull back. In addition, the screwdriver’s head does not rest on the surfaces, protecting them from any potentially damaging contact. Consequently, the auto-advance device is recommended for **effortless tightening in very right spaces, up against walls or inside small or very deep holes.**

The **telescopic device** allows you to reach tightening points up against walls, in awkward spaces or inside holes. The various telescopic stroke options are: 40, 60 and 100 mm. The device’s mechanical design includes two sensors:

- **call screw sensor:** monitoring the head’s stroke, it does not allow the screw to be called while tightening is still in progress. This benefits productivity as it stops screws jamming. The cycle stops when the set tightening torque is reached.
- **stroke detection sensor:** by measuring the tightening stroke, it allows the cycle to be stopped once screw height reaches the preset height above the surface the screw-retaining head is resting on.

The screw-retaining heads used hold the screw from the feeder and guide it correctly and safely to allow the bit to descend to the screw and tighten it onto the component. Since they are essential for reliable tightening, they are full customized by Fiam, based on the know-how gained over the years. **Their benefits:**

- excellent screw holding
- perfect screw driving at the tightening point
- any depth can be reached
- thanks to customized design, heads can process various screws sizes, even in embedded spots
- quick and easy assembly and disassembly.

For further information refer to the catalogue No. 89.
MCA tightening modules. They can be integrated anywhere.

MCA tightening modules with eTensil nutrunner motors are packed with innovation ready to make any production process even faster and more reliable. Solutions that are ready and tested for integration into existent production systems to increase their capacity, as well the quality of the tightening process and therefore of the end product.

12. All the benefits of MCA modules.

MCA modules comprise:
- eTensil nutrunner motors
- fastening slide
- screw-retaining head
- screw feeding system.

With MCA modules:
- screws are sent continuously and quickly from the bowl feeder to the screw-retaining device
- the approach and subsequent tightening of the screw on the component is automatic and accurate
- the whole tightening cycle is controlled and monitored by an integrated PLC that interfaces with the automated production systems (Industry 4.0).

- the resulting tightening cycles are complete and autonomous, with a simple external start
- the fastening slides ensure a precise approach stroke of the nutrunner motor/screw-retaining head to the component, guaranteeing high reliability of the assembled product since all screws are tightened with great precision. Light and compact (only 40 mm in width) they can be used on manipulators, electric axes or robots. They can also withstand substantial axial thrust (e.g. assembly with self-drilling screws).
- the EasyDriver screw feeding systems manage the entire working cycle with great flexibility: they control the tightening sequences quickly and easily, customizing them to the specific applications. The INTEGRATED PLC manages all machine parameters according to the tightening needs. Several models are available to meet every production need.

13. Versatile anywhere.

Ideal for:
- assembly lines
- turntables
- manipulators
- electric cartesian axes x,y,z: in order to tighten at different working heights
- robots
- cobots.

For further information refer to the catalogue No. 73.
Tighten with Cobots.
Humans take a leading role.

There will be a growing use of “smart machines”, or collaborative robots, in production systems. These solutions are not destined to replace humans, but to collaborate with them and free them from the heavier and more dangerous tasks, allowing them to provide the real added value in their work. Operators, or humans, become the ideal means for carrying out complex operations, and their skills are extended through a process of “job enlargement”, in which they are asked to perform the more critical tasks so that their daily work is more motivating and their jobs are more highly qualified.

14. The MCA module for Cobots.

These tightening modules pair perfectly with all collaborative robots on the market. There is a growing use of smaller cobots on assembly lines as they are ideal for:
- automating repetitive operations and making the best use of the operators’ skills
- carrying out most tightening jobs automatically
- being quickly reprogrammed and used for different applications.
Ease of programming and very fast setup.

15. Smart feeder.

The module for cobot involves a special screw feeding system with Modbus TCP/IP communication protocol, that enables broader and faster communication - via Ethernet connection - of all work-cycle-related information and digital Input and Output signals exchanged with and sent to the Cobot. It enables the Cobot to change the feeder’s operating parameters. Moreover, specific sensors check whether the screw has dropped into the hose properly and ready it for subsequent shooting: this avoids screws jamming and building up in the screw shooting hose and ensures uninterrupted work.


Designed to be fixed to the cobot’s wrist, this device allows the bit to advance to the tightening point automatically and not allows it to withdraw. During the tightening stage, the screwdriver’s head does not rest on the surfaces, protecting them from any potentially damaging contact. The device houses an eTensil nutrunner motor.

17. Safe.

Since the auto-advance device requires hardly any thrust for tightening, this system is perfectly in line with safety requirements. In addition, the screw is always held inside jaws and it is only shot out once the screwdriver head is positioned by the cobot over the tightening point: this means that the tip of the screw is never exposed during handling and hence cannot hit the operator.
Nutrunner motors technical features.

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
<th>Type</th>
<th>Tightening torque on soft joint Min. / Max.</th>
<th>Idle speed Min. / Max.</th>
<th>Reversibility</th>
<th>Weight</th>
<th>Accessories</th>
<th>Dimensions L x Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBMCC2A-2000</td>
<td>111712710</td>
<td></td>
<td>0,6 ÷ 2</td>
<td>5,3 ÷ 17,7</td>
<td>500 ÷ 2000</td>
<td>0,68</td>
<td>F1/4”</td>
<td>233x36</td>
</tr>
<tr>
<td>EBMCC3A-1200</td>
<td>111712711</td>
<td></td>
<td>0,7 ÷ 3</td>
<td>6,2 ÷ 26,5</td>
<td>300 ÷ 1200</td>
<td>0,68</td>
<td>F1/4”</td>
<td>233x36</td>
</tr>
<tr>
<td>EBMCC4A-900</td>
<td>111712712</td>
<td></td>
<td>0,7 ÷ 4</td>
<td>6,2 ÷ 35,4</td>
<td>225 ÷ 900</td>
<td>0,68</td>
<td>F1/4”</td>
<td>233x36</td>
</tr>
<tr>
<td>EBMCC5A-650</td>
<td>111712713</td>
<td></td>
<td>0,7 ÷ 5</td>
<td>6,2 ÷ 44,2</td>
<td>160 ÷ 650</td>
<td>0,68</td>
<td>F1/4”</td>
<td>233x36</td>
</tr>
<tr>
<td>EBMCC7A-350</td>
<td>111712714</td>
<td></td>
<td>0,8 ÷ 7</td>
<td>7 ÷ 61,9</td>
<td>90 ÷ 350</td>
<td>0,68</td>
<td>F1/4”</td>
<td>233x36</td>
</tr>
</tbody>
</table>

Legend

- EBMCC3A-2000 = Electric nutrunner motor with torque/angle current control system
- E = Electric
- MC = Nutrunner motor
- C = Torque/angle current control system
- 8 = Power of motor in watt/10
- A = Torque control with automatic shut off
- 2000 = Speed
- 111712710 = Code

All nutrunner motors are supplied with a working speed equal to 25% of the nominal one to guarantee tightening quality and precision. In order to obtain the nominal torque and speed range, it is necessary to set parameters following the instructions given in Use and Maintenance Manual. For any further information, contact the Fiam Technical Service.

Standard equipment (supplied with the nutrunner motor)
- Connection cable to control unit (code 686903834); lenght 3 mt and with error proof connection system
- Clutch adjustment key
- Eco-friendly packaging
- Use and maintenance manual

Models available upon request
- Motors with off-set device (for narrow distances between the axis)
- Motors with modified flange and / or with customized body design
- Motors with angled head
- Motors with axial compensator

Control unit technical features.

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
<th>Speed</th>
<th>Nr. of connectable tools</th>
<th>Tool feed tension</th>
<th>Feed input</th>
<th>I/O</th>
<th>Led signaling</th>
<th>Weight</th>
<th>L x Width x H</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPU-C1</td>
<td>686200105</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>230 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C3</td>
<td>686200107</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>230 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C1-120V</td>
<td>686200106</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>120 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C3-120V</td>
<td>686200108</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>120 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
</tbody>
</table>

Standard equipment
- Power supply fitted with cable and European plug
- I/O Connector
- Use and maintenance manual
- Eco-friendly packaging
- The unit is equipped with adjustable tilt foot

Accessories available upon request
- Led Indicator with 3 types of brigh for TPU 2 power supply unit, equipped with cable, can be fixed to the workbench - code 686990034
- Led Indicator with 3 types of brigh for TPU-M1 monitoring unit, equipped with cable, can be fixed to the workbench - code 686990039
- 3 colour and sound tower-light for TPU-M1 monitoring unit, equipped with cable, can be fixed to the workbench - code 686990040
- Fixing plate to position the power supply unit on any surface. It is supplied complete with screws, and can be anchored vertically or on a horizontal support (code 692080000)
- TPU-C1-120V model fitted with cable and American plug (code 686200106)
- TPU-C3-120V model fitted with cable and American plug (code 686200108)

Tightening results: the RS 232 port supplied by standard, sends strings with the process result of each tightening. In order to convert the data from the RS 232 port to a USB stick or to a PC, it is available the Fiam FIAM HYPERTERMINAL KIT cod. 696200913.

24 months warranty of 24 months or 1.000.000 cycles (first goal achieved).
Fastening slides SL 15.

Are completely designed by Fiam who also takes care of their construction. They are equipped with:
- Shielded screw transit sensor even monitors very small screws and it is not influenced by other sensors
- Practical and rational hose that includes cables between slide and feeder
- Pneumatic cylinders equipped with built-in air decelerators.

Slides for eternal nutrunner motors can be with:
- Single stroke: this fastening slide stands out for the single stroke performed by its motor to reach the tightening point and then tighten. Considering compact dimensions and weight, single stroke fastening slides are particularly suitable in situations where the approach movement is made by a robot arm or a manipulator with Z axis.
- Dual stroke: in addition to the stroke performed by the motor for the purpose of tightening, they feature an additional approach stroke to bring the head down to the component.
- Dual stroke with off-set device: in addition to the stroke performed by the motor for the purpose of tightening, these slides feature an additional approach stroke to bring the head down to the component, as well as the offset device, which enables you to reach tightening points with very short centre-to-centre distances.
- Triple stroke: these single- or dual-stroke slides are equipped with an additional anti-overturning device which handles screws having a total length/head diameter ratio from 1.1 to 1.5 (1.1 < H/D <1.5).

For more information about the features refer to the catalogue No. 73: Automatic tightening modules.

<table>
<thead>
<tr>
<th>Single-stroke fastening slide</th>
<th>Size (rail track size)</th>
<th>Tightening and approach strokes</th>
<th>Cylinder Ø (bore)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>SL 15D20 050-00 36</td>
<td>15</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>SL 15D20 080-00 36</td>
<td>15</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>SL 15D25 050-00 36</td>
<td>15</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>SL 15D25 080-00 36</td>
<td>15</td>
<td>80</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dual-stroke fastening slide</th>
<th>Size (rail track size)</th>
<th>Tightening and approach strokes</th>
<th>Cylinder Ø (bore)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>SL 15D20 050-50 36</td>
<td>15</td>
<td>50-50</td>
<td>20</td>
</tr>
<tr>
<td>SL 15D20 050-80 36</td>
<td>15</td>
<td>50-80</td>
<td>20</td>
</tr>
<tr>
<td>SL 15D20 080-50 36</td>
<td>15</td>
<td>80-50</td>
<td>20</td>
</tr>
<tr>
<td>SL 15D20 080-80 36</td>
<td>15</td>
<td>80-80</td>
<td>20</td>
</tr>
<tr>
<td>SL 15D25 050-50 36</td>
<td>15</td>
<td>50-50</td>
<td>25</td>
</tr>
<tr>
<td>SL 15D25 050-80 36</td>
<td>15</td>
<td>50-80</td>
<td>25</td>
</tr>
<tr>
<td>SL 15D25 080-50 36</td>
<td>15</td>
<td>80-50</td>
<td>25</td>
</tr>
<tr>
<td>SL 15D25 080-80 36</td>
<td>15</td>
<td>80-80</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fastening slides with anti-overturning device</th>
<th>Size (rail track size)</th>
<th>Tightening and approach strokes</th>
<th>Cylinder Ø (bore)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>SL 15 D20 100-50 36 AR</td>
<td>15</td>
<td>100 - 50</td>
<td>20</td>
</tr>
<tr>
<td>SL 15 D25 100-50 36 AR</td>
<td>15</td>
<td>100 - 50</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How to read model names</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SL 15 D20 050 36 AR</td>
<td>Anti-overturning device</td>
</tr>
<tr>
<td>SL 15 D25 050 36 AR</td>
<td>Clamping bracket Ø in mm</td>
</tr>
<tr>
<td>SL 15 D20 080 36 AR</td>
<td>Approach stroke in mm</td>
</tr>
<tr>
<td>SL 15 D25 080 36 AR</td>
<td>Tightening stroke in mm</td>
</tr>
<tr>
<td>SL 15 D20 100 36 AR</td>
<td>Cylinder Ø (bore) in mm</td>
</tr>
<tr>
<td>SL 15 D25 100 36 AR</td>
<td>Fastening slide</td>
</tr>
</tbody>
</table>
## Auto feed screwdrivers technical features.

<table>
<thead>
<tr>
<th>Type of screwdriver</th>
<th>Grip</th>
<th>Tightening torque of eTensil screwdriver Min. / Max.</th>
<th>Idle speed Min. / Max.</th>
<th>Starting system</th>
<th>Reversibility</th>
<th>Control unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Type</td>
<td>Nm</td>
<td>in lb</td>
<td>r.p.m.</td>
<td>Type</td>
<td>Type</td>
</tr>
<tr>
<td>CA-EBCC...-A</td>
<td>♦</td>
<td>0.6 ÷ 7</td>
<td>5.3 ÷ 61.9</td>
<td>90 ÷ 2000</td>
<td>Lever start</td>
<td>TPU-C1 / TPU-C3</td>
</tr>
<tr>
<td>CA-EBCC...-A-PA</td>
<td>♦</td>
<td>0.6 ÷ 7</td>
<td>5.3 ÷ 61.9</td>
<td>90 ÷ 2000</td>
<td>Push button</td>
<td>TPU-C1 / TPU-C3</td>
</tr>
<tr>
<td>CA-EBCC...-TE</td>
<td>♦</td>
<td>0.6 ÷ 7</td>
<td>5.3 ÷ 61.9</td>
<td>90 ÷ 2000</td>
<td>Push start</td>
<td>TPU-C1 / TPU-C3</td>
</tr>
<tr>
<td>CA-EBCC...-TE-PA</td>
<td>♦</td>
<td>0.6 ÷ 7</td>
<td>5.3 ÷ 61.9</td>
<td>90 ÷ 2000</td>
<td>Push start</td>
<td>TPU-C1 / TPU-C3</td>
</tr>
</tbody>
</table>

### Legend
- **Non-reversible screwdriver** (only tightening)
- The telescopic model provides also tightening on screws with left thread.

### Starting system
- Lever start
- Push start
- Push button

### Control unit technical features.

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
<th>Speed</th>
<th>Nr. of connectable tools</th>
<th>Tool feed tension</th>
<th>Feed input</th>
<th>I/O</th>
<th>Led signaling</th>
<th>Weight</th>
<th>L x Width x H</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPU-C1</td>
<td>686200105</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>230 Vac ± 10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C3</td>
<td>686200107</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>230 Vac ± 10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C1-120V</td>
<td>686200106</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>120 Vac ± 10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C3-120V</td>
<td>686200108</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>120 Vac ± 10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
</tbody>
</table>

### Standard equipment (supplied with the screwdriver)
The CA tightening system comprise: auto-feed electric screwdriver with corresponding control unit and a 3 m connection cable, screw feeder system and customized screw-retaining head.

- 4 bits
- Clutch adjustment key
- Keys for screw feeder’s use and maintenance
- Hanging ring
- Use and maintenance manual
- Eco-friendly packaging in paperboard (weight kg. 3) and dimensions: mm L600x450xh520

### Accessories available upon request
- Led Indicator with 3 types of brigh for TPU 2 power supply unit, equipped with cable, can be fixed to the workbench - code 686990034
- Led Indicator with 3 types of brigh for TPU-M1 monitoring unit, equipped with cable, can be fixed to the workbench - code 686990039
- 3 colour and sound tower-light for TPU-M1 monitoring unit, equipped with cable, can be fixed to the workbench - code 686990040
- Fixing plate to position the power supply unit on any surface. It is supplied complete with screws, and can be anchored vertically or on a horizontal support (code 692080000).
- The unit is equipped with adjustable tilt foot

### Control results:
The RS 232 port supplied by standard, sends strings with the process result of each tightening. In order to convert the data from the RS 232 port to a USB stick or to a PC, it is available the Fiam FIAM HYPERTERMINAL KIT cod. 696200913.

### eTensil technical specifications
- eTensil screwdrivers, nutrunner motors and TPU control units, are covered by an extended warranty of 24 months or 1.000.000 cycles (first goal achieved).
EasyDriver feeders.

Feeder types and their features:

**EasyDriver Standard** (1 x 240mm Ø bowl feeds 1 screwdriver)
- Feeds screws optimally and without jamming.
- For screws between 10 and 35 mm in length.

**EasyDriver MAXI 1|1** (MAXI 1|1 = 420mm Ø bowl feeds 1 screwdriver)
- Used when the job involves large screws and also in the event of high production rates to allow the system to run unaided for longer, even when working with small screws.
- For screws between 35 and 60 mm in length.

**EasyDriver 2|1** (2|1 = 2 240mm Ø bowls feed 1 screwdriver)
- With its dual circular bowls, it can process 2 geometrically similar screws, for example differing in length or made from different materials (e.g. stainless steel / browned steel) to feed a slide (one way).
- Screw choice is managed by the feeder's PLC through a selector or by an external signal.
- For screws between 10 and 35 mm in length.

For more information about the features refer to the catalogue No. 73: Automatic tightening modules.

### Screw-retaining heads (nose piece).

They are completely customized to the customer’s needs. Available with:
- With anti-overturning device for screws with length/head diameter ratio between 1.1 (approx.) and 1.5. To prevent screw jamming
- With friction jaws holding the screw on the head and not on the stem: jaws do not open, allowing screw insertion into holes
- For big screws to tighten screws up to 45 mm length
- With hose to reach embedded tightening points or inside holes
- With support or protective spacer/special materials to ease the positioning on the components and to avoid damaging them during assembly
- With elastic hose and mechanical screw gripping. Ensures the screw is held perfectly every time.

For more information about the features refer to the catalogue No. 73: Automatic tightening modules.

### BC40LK cartesian arm.

Also with pneumatic locking device.

The BC40 (code 692031033) and BCA40 (code 692031037) Cartesian arms can be used with auto-feeding screwdrivers. The BC40LK model is specifically for use with auto-feeding screwdrivers with auto-advance, which provide an automatic pushing force on the workpiece to aid operators so that they do not have to apply force while tightening.

With this Cartesian arm, in addition to all the benefits offered by Fiam Cartesian arms (see page 22), operators can also profit from a special device that counters the “recoil” caused by the tool bit during tightening and redirects this force to the mechanical arm rather than that of the operator.

When there is no power supply, the system stops automatically to prevent the pneumatic device from slipping and avoid any risk of crushing and/or accidental movement.

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
<th>Max torque (Nm)</th>
<th>Max charge (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC40LK</td>
<td>692031055</td>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>BC40</td>
<td>692031033</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>BCA40</td>
<td>692031037</td>
<td>40</td>
<td>2</td>
</tr>
</tbody>
</table>

### Supporting structures and hoppers.

 Entirely designed and manufactured by Fiam, they serve to support EasyDriver feeders and their hoppers when used to meet the need for fast production rhythms. They ensure greater cleanliness and functionality of the operational layout, thanks to:
- An aluminium base plate complete with holes for fastening to the feeder
- Hollow aluminium profiles that allow cables and tube bundles to pass under the supporting surface
- Supporting feet with adjustable height and the option of anchoring to the floor simply with the brackets provided.

For more information about the features refer to the catalogue No. 73: Automatic tightening modules.

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### Technical specifications for MCA auto feed tightening modules.

<table>
<thead>
<tr>
<th>Type of nutrunner model</th>
<th>Torque range of nutrunner motor eTensil Min. / Max.</th>
<th>Idle speed r.p.m.</th>
<th>Type of fastening slide to use</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCA -E8MCC ...</td>
<td>0,6 ÷ 7</td>
<td>90 ÷ 2000</td>
<td>SL 15 single, dual, triple</td>
</tr>
<tr>
<td>MCA -E8MCC ... -AC</td>
<td>0,6 ÷ 7</td>
<td>90 ÷ 2000</td>
<td>Cobot device bit ejection 25-50</td>
</tr>
</tbody>
</table>

### Reversibility:

**Non-reversible nutrunner motor**
*only tightening*

- Speed range: Min. / Max. 0,6 ÷ 7 in lb 5.3 ÷ 61.9
- Idle speed: r.p.m. 90 ÷ 2000
- Type of fastening slide to use: SL 15 single, dual, triple

**Cobot device**

- Forward bit stroke device
- Bit ejection 25-50

### Standard equipment:

- **EasyDriver feeder**
- **Electric nutrunner motor**
- **Selected control unit and connection cable**
- **4 tightening bits** (1 fitted + 3 spares)
- **Fastening slide** complete with pneumatic fittings and supporting bracket
- **Screw-retaining head** customized for the screw, completed with bush
- **Screw shooting hose**
- **Shielded screw transit sensor**
- **Operation and maintenance manual**
- **Eco-friendly cardboard packaging** (weight kg 3)
- and dimensions: mm L 600 x 450 x h 520

### Standard equipment (supplied with MCA module for COBOT)

- **Special EasyDriver feeder for Cobot**
- **Electric nutrunner motor with forward bit stroke device**
- **Selected control unit and connection cable**
- **4 tightening bits** (1 fitted + 3 spares)
- **Two shielded screw transit sensors**
- **Screw-retaining head customized** for the screw, completed with bush
- **Screw shooting hose**
- **Operation and maintenance manual**
- **Eco-friendly cardboard packaging** (weight kg 3)
- and dimensions: mm L 600 x 450 x h 520

### Control unit technical features.

<table>
<thead>
<tr>
<th>Model</th>
<th>Code</th>
<th>Speed</th>
<th>Nr. of connectable tools</th>
<th>Tool feed tension</th>
<th>Feed input</th>
<th>I/O</th>
<th>Led signaling</th>
<th>Weight kg</th>
<th>L x Width x H mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPU-C1</td>
<td>686200105</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>230 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C3</td>
<td>686200107</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>230 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C1-120V</td>
<td>686200106</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>120 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
<tr>
<td>TPU-C3-120V</td>
<td>686200108</td>
<td>Min./Max.</td>
<td>1</td>
<td>32 VDC</td>
<td>120 Vac ±10% 50-60 Hz</td>
<td>8 inputs 8 outputs</td>
<td>yes</td>
<td>0,8</td>
<td>180x147x105</td>
</tr>
</tbody>
</table>

### Standard equipment

- **Power supply fitted with cable and European plug**
- **I/O Connector**
- **Use and maintenance manual**
- **Eco-friendly packaging**
- **The unit is equipped with adjustable tilt foot**

### Accessories available upon request

- **Led Indicator** with 3 types of brigh for TPU-M1 monitoring unit
- **Fixing plate to position** the power supply unit on any surface

### Tightening results:

- The RS 232 port supplied by standard, sends strings with the process result of each tightening.
- In order to convert the data from the RS 232 port to a USB stick or to a PC, it is available the Fiam FIAM HYPERTERMINAL KIT cod. 696200913.

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**eTensil screwdrivers, nutrunner motors and TPU control units, are covered by an extended warranty of 24 months or 1.000.000 cycles (first goal achieved).**
EasyDriver feeders.

Feeders that can be used with MCA modules are of different types:

**EasyDriver Standard** (1 x 240mm Ø bowl feeds 1 slide/spindle)
- Feeds the screws optimally and without jamming.
- For screws between 10 and 35 mm in length.

**EasyDriver MAXI 1|1** (MAXI 1|1 = 420mm Ø bowl feeds 1 slide/spindle)
- Used when the job involves large screws and also in the event of high production rates to allow the system to run unaided for longer, even when working with small screws.
- For screws between 35 and 60 mm in length.

**EasyDriver 2|1** (2|1 = 2 240mm Ø bowls feed 1 slide/spindle)
- With its dual circular bowls, it can process 2 geometrically similar screws, for example differing in length or made from different materials (e.g., stainless steel / browned steel) to feed a slide (one way).
- Screw choice is managed by the feeder’s PLC through a selector or by an external signal.
- For screws between 10 and 35 mm in length.

**EasyDriver for COBOT** (1 x 240mm Ø bowl feeds Cobot device)
- Enables communication with Cobot via Ethernet connection and with the Modbus TCP/IP communication protocol: this fieldbus enables broader and faster communication of all work-cycle-related information and digital.
- Input and Output signals exchanged with and sent to the Cobot. It enables the Cobot to change the feeder’s operating parameters.

For more information about the features refer to the catalogue No. 73: Automatic tightening modules.

Fastening slides SL 15.

Are completely designed by Fiam who also takes care of their construction. Slides for eTensil nutrunner motors can be:

- **Single stroke:** this fastening slide stands out for the single stroke performed by its motor to reach the tightening point and then tighten. Considering compact dimensions and weight, singlestroke fastening slides are particularly suitable in situations where the approach movement is made by a robot arm or a manipulator with Z axis.
- **Dual stroke:** in addition to the stroke performed by the motor for the purpose of tightening, they feature an additional approach stroke to bring the head down to the component.
- **Dual stroke with off-set device:** in addition to the stroke performed by the motor for the purpose of tightening, these slides feature an additional approach stroke to bring the head down to the component, as well as the offset device, which enables you to reach tightening points with very short centre-to-centre distances.
- **Triple stroke:** these single- or dual-stroke slides are equipped with an additional anti-overturning device which handles screws having a total length/head diameter ratio from 1.1 to 1.5 (1.1 < H/D <1.5).

For more information about the features refer to the catalogue No. 73: Automatic tightening modules.

Screw-retaining heads (nose piece).

They are completely customized to the customer’s needs. Available with:

- **With anti-overturning device** for screws with length/head diameter ratio between 1.1 (approx.) and 1.5, To prevent screw jamming.
- **With friction jaws** holding the screw on the head and not on the stem: jaws do not open, allowing screw insertion into holes.
- **For big screws** to tighten screws up to 45 mm length.
- **With hose** to reach embedded tightening points or inside holes.
- **With support or protective spacer/special materials** to ease the positioning on the components and to avoid damaging them during assembly.
- **With elastic hose and mechanical screw gripping.** Ensures the screw is held perfectly every time.

For more information about the features refer to the catalogue No. 73: Automatic tightening modules.

Supporting structures and hoppers.

Entirely designed and manufactured by Fiam, they serve to support EasyDriver feeders and their hoppers when used to meet the need for fast production rhythms. They ensure greater cleanliness and functionality of the operational layout, thanks to:

- **An aluminum base plate complete with holes** for fastening to the feeder.
- **Hollow aluminium profiles that allow cables and tube bundles to pass** under the supporting surface.
- **Supporting feet with adjustable height** and the option of anchoring to the floor simply with the brackets provided.

For more information about the features refer to the catalogue No. 73: Automatic tightening modules.

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