

Automatic tightening of plastic baby-seats: a new Fiam solution

For this new solution designed by Fiam only 36 seconds are required to demonstrate its **absolute accuracy, top quality and very high productivity**. Made to satisfy the need to automatically tighten **12 self-threading screws on the backrests of plastic seats**. In presence of self-threading screws, an adequate axial thrust is required to form the thread inside the component. Fiam has therefore designed and built an auto-fed one spindle tightening unit.



► The unit in detail

Made with a bearing structure complete with jig support and accident prevention protective systems in polycarbonate, the unit comprises:

Workpiece jig

The jig is **designed according to the dimensions of the work piece to be assembled**. It is extremely lightweight and placed on a working area that allows the operator to position and remove the work piece easily. The jig template **moves electrically along the Y axis**, positioning itself on the pre-set coordinates.

Screw feeding unit, position on dedicated support plate

This includes a circular feeder and one way high speed screw selection unit. An **“overflow” control device**, using optical fibre, enables to improve the constancy of screw feeding, thereby avoiding screw jamming and machine shutdown.

“Light” fastening slide

Installed on the linear X axis, it runs on ball recirculating runners complete with magnetic cylinders limit switch position sensors and hydraulic decelerators. The slide comes complete with **screw-retaining head**.

The slide houses an **MCZ type air nutrunner motor** for tightening operations with **Jointech Plus torque control system** with automatic air shut-off.

Pneumatic installation with Festo components

Electrical installation with PLC SIEMENS S7- 200

The many diagnostic options include:

- Green indicator light (piece OK)
- Red indicator light (piece NOT OK)
- Yellow indicator light (malfunction)
- Buttons for emergency, head cleaning, screw loading



The machine is also fitted with a **LCD keypad** for managing pre-set working times as well as to display malfunctions



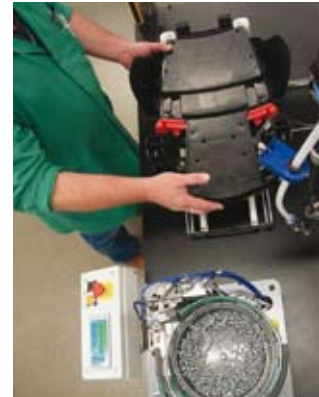
► Working cycle

- 1 . The operator positions the work piece by hand on the assembly jig
- 2 . Upon detecting the presence of the work piece, the machine receives the START from the operator and the tightening cycle then starts automatically
- 3 . The assembly jig travels along the Y axis while the slide travels along the X axis, covering a work area of approx. 500 x 500 mm. The slide descends vertically long the Z axis to carry out tightening operations at various points on the component
- 4 . The machine indicates the results of the tightening operations through the indicator lights; malfunctions, indicated by the yellow light, are specified on the keypad LCD display
- 5 . L'operatore estrae il pezzo e ne riposiziona uno per un nuovo ciclo di avvitatura

► The advantages offered by this Fiam solution

High production rate

The whole working cycle, from start to stop, is accomplished in 36 seconds giving an immediate return on the investment



Complete automation of the tightening operation

Almost all the work by the operator is eliminated, reducing fatigue to a minimum. The machine is fitted with polycarbonate safety guards and photoelectric barriers for operator safety throughout the working cycle.



Very high tightening accuracy and repeatability

The system ensures constant and continuous control of all assembly operations: the result is therefore a reliable and correctly tightened product; in other words a product of certified quality.

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