

Press-Release

L-MAX - a new and unique way to machine multiple layer & composite materials



Portable L-MAX drilling unit made for the aircraft industry.



Mobile control system IDM

For best results in the machining of multiple material layers, cutting parameters must be applied for each different material. The new L-MAX, a portable drilling unit from SOMEX (a member of the SUHNER group of companies) can perform all of these functions in automatic mode.

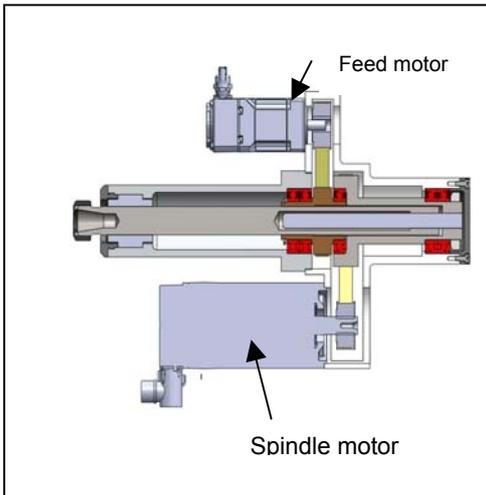
Multiple material layers, also referred as „Stacks“, can be composed from completely different materials, stacked up in layers of, for example: Titanium, Carbon or Aluminum. In order to achieve optimal machining results, each material layer must be programmed with its own cutting parameters- ideally for each layer automatically. The spindle speed and feed rate must be adapted for each material transition to the next.

In the past, aluminum was the primary choice of materials used in the aircraft industry and portable, hand held pneumatic driven drilling units were used as a common tool in this industry.

The application of these conventional pneumatic drilling units in today's modern and innovative aircraft industry necessitate extreme compromises. In addition to large air consumption combined with high noise emissions, pneumatic driven drilling units can not perform feed and speed variations as required for different stack materials.

Consequently only a portable, hand-held NC-programmable drill unit is capable to deliver optimal results and high efficiency since the aircraft industry imposes rigid quality standards including:

- Concentricity / position between holes $\leq 40 \mu\text{m}$
- Surface quality between Ra 1.6 und Ra 3.2
- Circularity / Hole quality for rivets $\leq \text{H8}$
- Other requirements, for example. Avoid of delamination



Working principle for a portable, hand-held NC-programmable L-MAX drilling unit

An L-MAX concept integrates 2 servo motors: The larger motor drives the spindle and the smaller servo regulates the feed. The feed rate is determined by the speed difference between ball screw and ball screw nut or in other words:

- If the speed (rpm) of the feed servo motor is higher than the spindle motor speed (rpm), then the L-MAX spindle will advance.
- If the speed (rpm) of the feed servo motor is lower than the spindle motor speed (rpm), then the L-MAX spindle will retract.

Both servo motors are controlled by the control system IDM. It allows to regulate spindle speed and feed at any position of the total travel.

Furthermore, an „adaptive drilling mode“ can be selected to help improve and optimize a drilling cycle. In this mode, the drill unit recognizes the transition from one layer to the next automatically. Irregular material thickness of layers at any position are being detected and matched with correct cutting parameters. This way, cycle times can be minimized and machining quality and results optimized.

The control system includes a „Minimum Quantity Lubrication“ (MQL) system which is directly mounted to the mobile platform.

Performance data drilling unit L-MAX :

- Programmable spindle speed and spindle feed
- Work cycles such as chip brake cycle and peck feed cycle
Spindle speed range from 3,000rpm up to 5,000rpm
- Drilling capacity from 4.76 mm (3/16") up to 11.11 mm (7/16")
- Integrated „Minimum Quantity Lubrication“ MQL
- Light weight depending on drilling capacity from 5,5 kg (12lbs)
- Quiet operation up to 65 dBA
- Option: „Adaptive drilling mode“

Further information

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