MAPAL
EPC – End Position Control
Actuating Tools for Machining Centres

NEW
In order to efficiently carry out difficult machining operations, such as clearance grooves or undercuts on components in large scale production, special tools with actuating features are used for the most part. These tools are mainly utilized on special machines which are, for example, equipped with drawbars. The general trend, however, is to move away from special machines towards modern and flexible machining centres. MAPAL is in a position to provide innovative tooling solutions, which can realise actuating functions without additional feed units. We are talking about coolant actuated, speed controlled centrifugal force tools or tools with contact stop.

The coolant actuated tools represent the largest potential. Coolant is available to all machining centres in different pressure ranges. A disadvantage of the systems used up to now was that there is no feedback signal whether the slide is in start or in end position. In order to get a higher safety, additional resting times were programmed. These increase the total machining time but do not provide a hundred per cent guarantee that the slide is in the correct position.

MAPAL now offers the new EPC End Position Control System for all slide tools.

Independent of the type of actuation, the particular end positions are transferred to the machine control via sensors. Thus, the next step of the machining programme can be started immediately without additional resting time.

The results are time savings of up to twenty seconds per machining cycle. The stator of the MAPAL Tooltronic® serves as connection between tool and machine. Due to the inductive data and power transfer this system is extraordinarily safe.

Internal power supplies (batteries) as used in radio systems are not required. The stator on the machine can be used very easily for operating a Tooltronic® axis, which allows to machine complete contours.

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**Advantages of the EPC System:**

- Maximum process reliability by reporting end positions
- Time savings (no resting times)
- Upgrades to Tooltronic® possible (contour machining)
Coolant Actuated Tools with EPC

For these tools the slides are actuated by using the coolant of the machining system. A pressure of 40 to 80 bars is required. This coolant pressure does not affect the moving parts directly but via a sealing membrane to an oil depot which simultaneously lubricates the moving parts. During pressure admission the oil actuates a piston which is connected with the drawbar/push bar. Sensors on both end positions of the piston report the positions directly to the machine control by inductive data transfer. The speed of the drawbar/push bar can be controlled by a restrictor valve. By the translative movement of the drawbar/push bar, for example, radial slides are moved to the outside via high precisely ground helical serrations in order to create clearance grooves or undercuts. The drawbar/push bar is retracted by a spring.

The Machining Cycle without and with EPC:

- **Actuating Movement and Machining**
- **Retraction of Slide**
- **Machining Time (t) per Component**

**Without EPC**
- **Coolant Pressure on**
- **Resting Time**
- **Coolant Pressure off**
- **Resting Time**
- **Retraction of Tool**
- **Next Component**

**With EPC**
- **Coolant Pressure on**
- **Coolant Pressure off**
- **Retraction of Tool**
- **Next Component**
MAPAL EPC End Position Control –
More Safety and Less Machining Time

Crank Shaft Thrust Bearing
Task: Finishing of crank shaft thrust bearings in cylinder crank cases

Your Advantages:
- Supported turning of the thrust bearing width on machining centres
- Time saving and quality improvement compared to milling

Cylinder Hole
Task: Finishing of cylinder holes with cutting edge compensation

Your Advantages:
- Reduced costs for cutting materials
- High tool life due to cutting edge compensation
- High process reliability due to machining without grooves during tool retraction

Brake Calliper Piston Hole
Task: Finishing of piston holes including clearance grooves for protection caps and seal ring slots

Your Advantages:
- Short machining time without tool change
- High accuracy of the clearance grooves to the basic hole due to machining in one setting

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