The SWITCH-MASTER® tapping attachment has been designed for use on CNC-controlled machines. Owing to the integrated reverse gear mechanism, the change of rotation of the machine spindle is no longer needed.

Normally the tapping attachments type SWITCH-MASTER® are made for the production of right-hand threads. However, on request the attachment can be produced also for left-hand threads. The turning direction of the machine spindle remains right-turning in both cases.

For the use of the tapping attachment, a stop block is needed for the following functions:

- Supporting the torque caused by the operation of the attachment.
- Correct definition of the position between machine spindle and stop block when using automatic tool changers.
- Supply of the auxiliary energy necessary for the change of the sense of rotation on the SWITCH-MASTER® = pressurized air (6.1 bar).

The stop block is normally fitted individually to the customer’s machine before shipping of the attachment.

The connection to the machine spindle is a cylinder shank Ø 25 acc. to DIN 1835 B+E; the use of the adapter shanks is a fast and economically efficient way of guaranteeing the compatibility with all the usual spindle adaptions. Producing range is M4 - M12. Maximum permissible speed: 3000 rpm

On the machine side, compressed air (6.1 bar) is needed as auxiliary energy for the change of direction of rotation.

Tool locking is executed via collets of size ER 16 acc. to DIN ISO 15488.

Owing to the better torque transmission, we recommend the use of collets with integrated square (type ER16-GB). The attachments are designed for the use with internal coolant-lubricant supply (IKZ) up to 50 bar (700psi) coolant-lubricant pressure.

The advantages of the SWITCH-MASTER® tapping attachment include:

- Smooth, low-wear running due to oil bath lubrication (SAE 75 W-90, 20 cm³).
- Safe sealing against the penetration of coolant-lubricant into the housing, by separating the axial and rotational movement of the clamping head.
- Reduced wear on the gear change elements thanks to extremely quick changes of the direction of rotation (35 msec).
- No axial jolts on the tap during gear changes.
- Minimised axial forces exerted on the thread flanks of the tap.
- Obtaining constant thread depths by exactly defined switching point.
- Reduced safety distance to 5 mm between workpiece and tool due to short gear change path. This yields an additional reduction of cycle times.
- Constant cutting speed ➔ Increased tool life.
- Protection of the machine spindle by constant right-hand running.
- As the tool spindle is not permanently accelerated or braked and the turning direction not changed, energy is saved due to almost constant power consumption.
The Function of SWITCH-MASTER®

During the complete thread producing cycle the machine spindle rotates right-hand. After reaching the programmed feed depth the Z-axis switches to reverse without dwell time. In the interaction between feed reverse of the Z-axis and the positive feed caused by the pitch of the rotating tool, the clamping head of the tool holder is axially pulled out of the tapping attachment. This pulling out brings about the reversing of the rotating direction (reverse). After the tool leaves the produced thread, the spring-loaded tool adaptation clamping head is pulled back into its initial position and the tool again changes the rotating direction. The auxiliary energy - “compressed air” - required for the switching procedure must be available permanently with 6 ± 0.5 bar at the tapping attachment during the whole machining process.

Maintenance Schedule

The maintenance of the tapping attachment may only be carried out at EMUGE and should be executed after 250,000 machined threads!

Following maintenance intervals are defined acc. to the result of the first maintenance.
### Machining conditions

<table>
<thead>
<tr>
<th></th>
<th>Tapping with synchronous spindle</th>
<th>Tapping with conventional tapping attachment</th>
<th>Tapping with SWITCH-MASTER®</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Machine type</strong></td>
<td>Chiron FZ 12</td>
<td>Chiron FZ 12</td>
<td>Chiron FZ 12</td>
</tr>
<tr>
<td><strong>Tap hole shape</strong></td>
<td>Blind hole</td>
<td>Blind hole</td>
<td>Blind hole</td>
</tr>
<tr>
<td><strong>Thread depth</strong></td>
<td>1.5 x D</td>
<td>1.5 x D</td>
<td>1.5 x D</td>
</tr>
<tr>
<td><strong>Dimension</strong></td>
<td>M8-6HX</td>
<td>M8-6HX</td>
<td>M8-6HX</td>
</tr>
<tr>
<td><strong>Tap</strong></td>
<td>Rekord 1A-H-TiCN</td>
<td>Rekord 1A-H-TiCN</td>
<td>Rekord 1A-H-TiCN</td>
</tr>
<tr>
<td><strong>Number of threads</strong></td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>GG30</td>
<td>GG30</td>
<td>GG30</td>
</tr>
<tr>
<td><strong>Machining level</strong></td>
<td>vertical</td>
<td>vertical</td>
<td>vertical</td>
</tr>
<tr>
<td><strong>Tap holder type</strong></td>
<td>KSN-HD</td>
<td>GRN-NC</td>
<td>SWITCH-MASTER®</td>
</tr>
<tr>
<td><strong>Programmed rpm</strong></td>
<td>2500</td>
<td>2500</td>
<td>2500</td>
</tr>
</tbody>
</table>

### Time and costs

<table>
<thead>
<tr>
<th></th>
<th>Tapping with synchronous spindle</th>
<th>Tapping with conventional tapping attachment</th>
<th>Tapping with SWITCH-MASTER®</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Machining time</strong> (for 40 thread bores)</td>
<td>112 sec.</td>
<td>61 sec.</td>
<td>38 sec.</td>
</tr>
<tr>
<td><strong>Machining costs</strong> (for 40 thread bores)</td>
<td>3.11 €</td>
<td>1.69 €</td>
<td>1.05 €</td>
</tr>
<tr>
<td><strong>Tap holder costs</strong></td>
<td>appr. 650 €</td>
<td>appr. 2400 €</td>
<td>appr. 4000 €</td>
</tr>
</tbody>
</table>

### Calculation of Economy

- **Synchronous spindle**: 112 sec. = 3.11 €
- **Conventional tapping attachment**: 61 sec. = 1.69 €
- **SWITCH-MASTER®**: 38 sec. = 1.05 €

### Calculation of the “break even point”

- **BEP = 1630**
- **BEP = 2500**

**Potential cost savings by use of SWITCH-MASTER®**
**Model 90°**

- Compressed air 6 bar
- Stop block for assembly on the machine
- Stop fixture

**Model 180°**

- Compressed air 6 bar
- Stop block for assembly on the machine
- Stop fixture

### Technical Data

<table>
<thead>
<tr>
<th>Type</th>
<th>Article number</th>
<th>Cutting range</th>
<th>Collet size</th>
<th>max. rpm</th>
<th>(D_1) DIN 1835 B+E</th>
<th>T</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWITCH-MASTER 16 MV 90°</td>
<td>F3381392</td>
<td>M4 - M12 (No.8 - 3/8)</td>
<td>ER 16 (GB)</td>
<td>3000</td>
<td>25</td>
<td>9</td>
<td>3.7</td>
</tr>
<tr>
<td>SWITCH-MASTER 16 MV 180°</td>
<td>F3381397</td>
<td>M4 - M12 (No.8 - 3/8)</td>
<td>ER 16 (GB)</td>
<td>3000</td>
<td>25</td>
<td>9</td>
<td>3.7</td>
</tr>
</tbody>
</table>

**Note:**

- The tapping attachment requires auxiliary energy = compressed air (6 +1 -0.5 bar) for reversing.
- Adaptor shank, collets, sealing disks and stop block are not part of the delivery, please order separately.
- The transfer of compressed air is executed via a special stop block mounted on the machine and into which the stop fixture engages.
<table>
<thead>
<tr>
<th>Country</th>
<th>Address</th>
<th>Phone Information</th>
</tr>
</thead>
</table>
| AUSTRIA      | EMUGE Präzisionswerkzeuge GmbH  
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