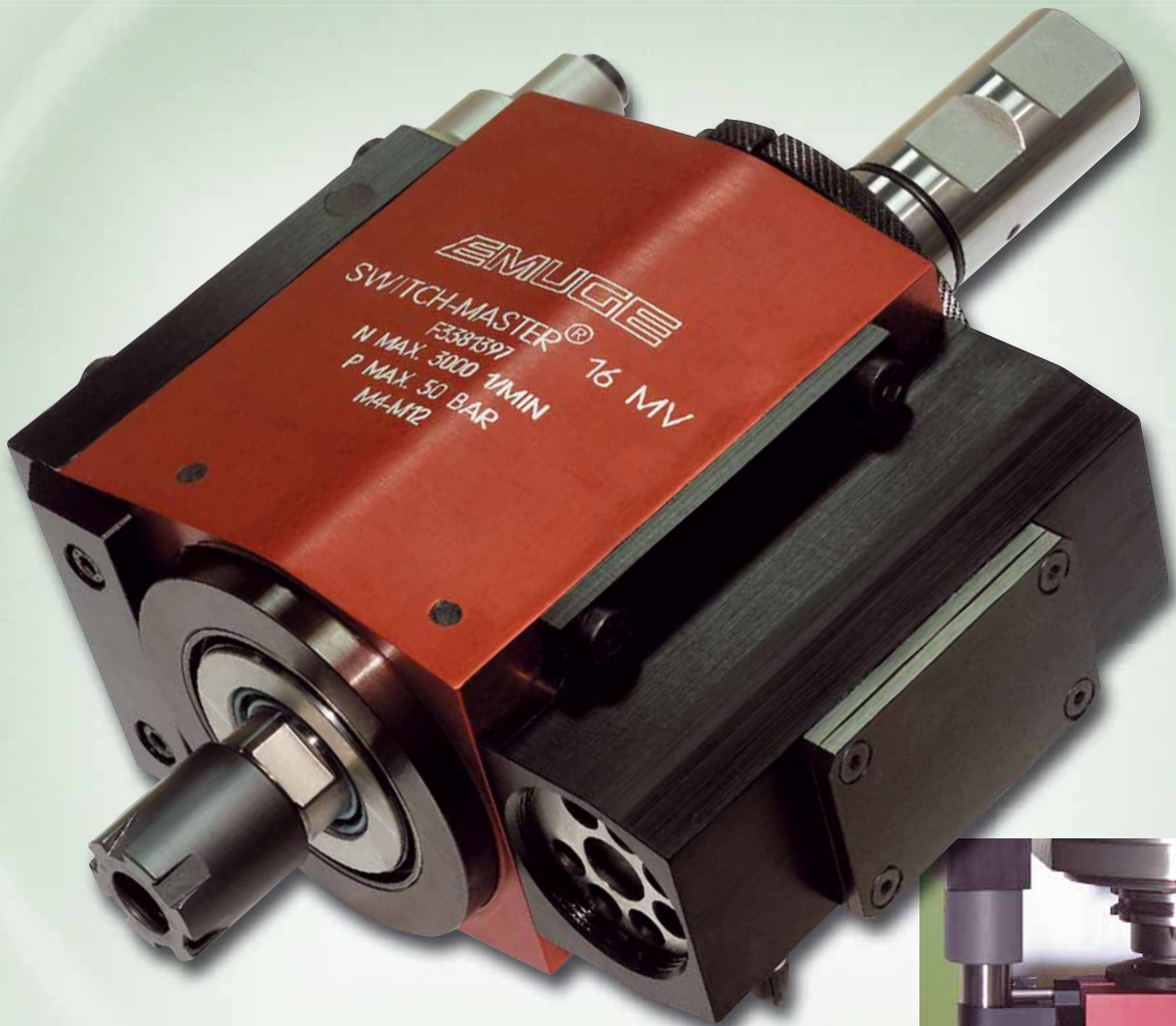


EMUGE

Clamping Technology



EMUGE Tapping Attachment
SWITCH-MASTER® 16 MV

Application Range and Characteristics

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 ($6^{+1}_{-0.5}$ 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 $\varnothing 25$ 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 adaptations. Producing range is M4 - M12. Maximum permissible speed: 3000 rpm
On the machine side, compressed air ($6^{+1}_{-0.5}$ 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.

Features and Advantages

- 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®

Function

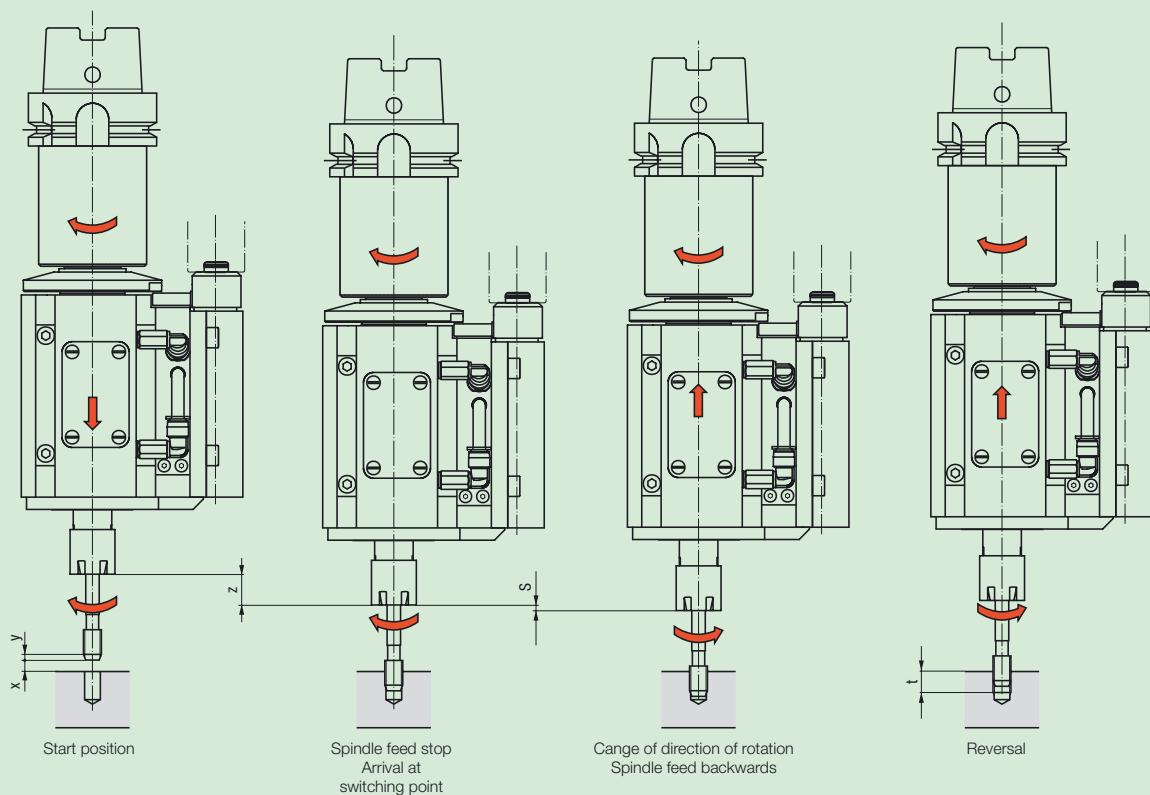
During the complete thread producing cycle the machine spindle rotates right-hand.

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 $6^{+1}_{-0,5}$ 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

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

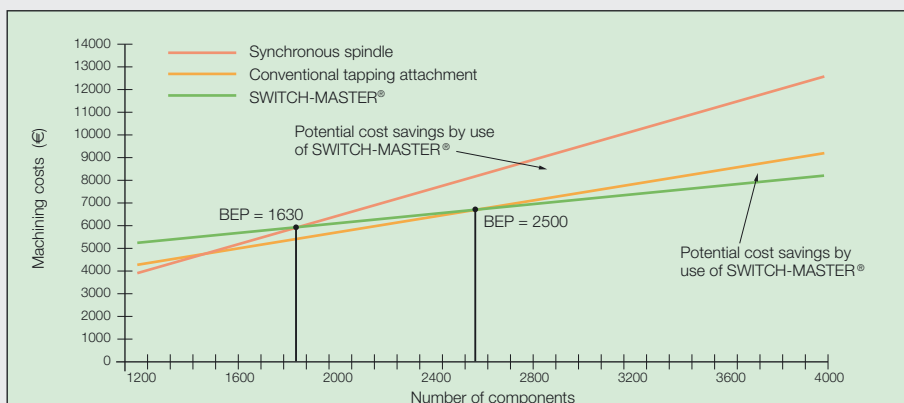
Time and costs

	Tapping with synchronous spindle	Tapping with conventional tapping attachment	Tapping with SWITCH-MASTER®
Machining time (for 40 thread bores)	112 sec.	61 sec.	38 sec.
Machining costs (for 40 thread bores) Machine pay per hour: 100 €/hour	3.11 €	1.69 €	1.05 €
Tap holder costs	appr. 650 €	appr. 2400 €	appr. 4000 €

Machining time and costs per component for 40 thread bores



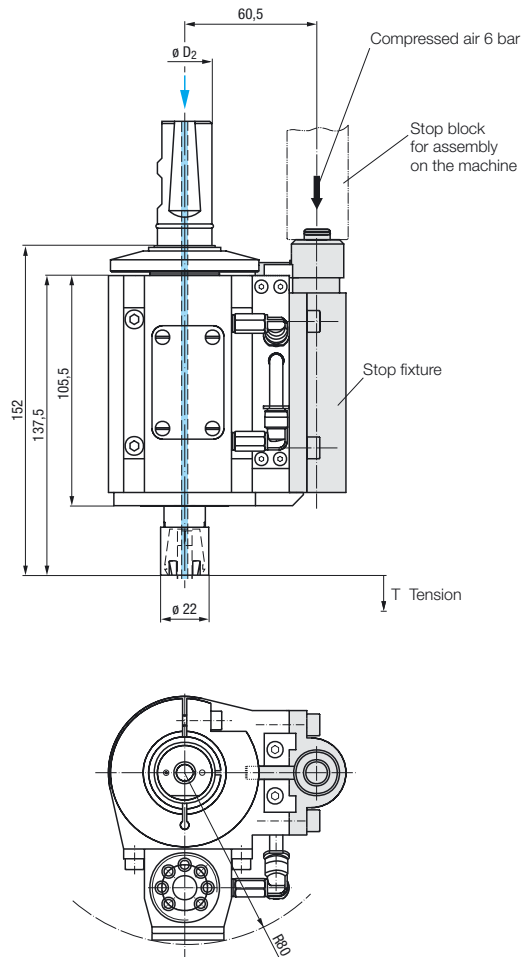
Calculation of the "break even point"



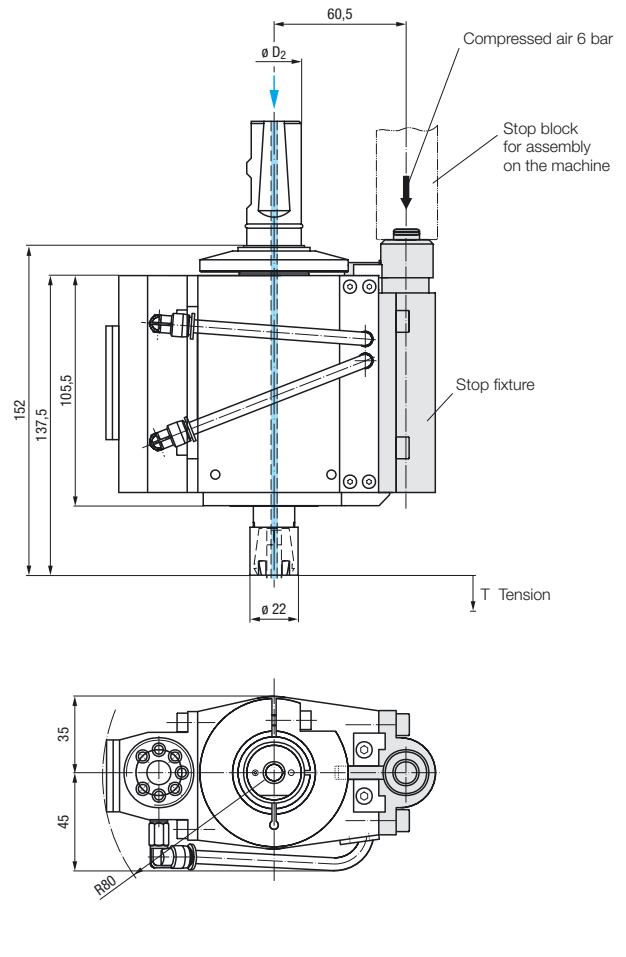
Calculation of Economy

Technical Data

Model 90°



Model 180°



Ordering example: SWITCH-MASTER 16 MV 180° - D 25 - DIN 1835 B+E
Article number: F3381397

Type	Article number	Cutting range	Collet size	max. rpm	D ₂ DIN 1835 B+E	T	Weight (kg)
SWITCH-MASTER 16 MV 90°	F3381392	M4 - M12 (No.8 - 3/8)	ER 16 (GB)	3000	25	9	3.7
SWITCH-MASTER 16 MV 180°	F3381397	M4 - M12 (No.8 - 3/8)	ER 16 (GB)	3000	25	9	3.7

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.



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