



Tangential creasing tool

TCT-1

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1. General remarks

The TCT-1 is a processing unit for CNC-machines that is generally designed to crease cardboard, corrugated cardboard and thin polypropylene material. Nevertheless it's finally up to the user to test the machinability of respective materials. It's not possible to assure the processability of certain materials because of the wide variety of applications.

The TCT-1 is a processing unit that is designed for the operation on a CNC machine with a closed and safety controlled working space. The manual usage of the unit is not allowed.

Important security advise !



The TCM-3 is intended to be used as a single component within a complete machining system. It is delivered as an incomplete unit that is not able to operate without a specified stepper or servo motor driver. It is strictly forbidden to operate the unit without implementing all necessary safety regulations.

The combination of the cutting unit and the machining system has to be done by an expert only. It is not allowed to put the unit in operation before all necessary and required country-specific safety regulations have been observed and checked carefully.

Only the operator of the facility (i.e. machining system) is responsible for observing all relevant safety regulations.

2. Operation and maintenance

2.1 Fixation of the material to be processed

The TCT-1 can be used for creasing various materials. It is necessary to fix the material on the processing board. In most cases it is essential to use a vacuum table in combination with a special air-permeable mat (Art.-No. 230200).

2.2 Mounting the processing unit

The processing unit can be installed to the machining system similar to a conventional milling motor because of its 43mm clamp collar. It is strictly required to observe the machine builders mounting instructions to prevent the unit from loosening or turning out of position.

2.3 Mounting the tool holder and the creasing wheel

The tool holder has to be mounted to the 16mm axis carefully. A headless screw fixes it on the Weldon-surface. The creasing wheel itself is inserted in the slot of the tool holder fixed by a cylinder head screw.

The processing unit is designed for using specialized creasing wheels. Any other or additional employment is not according to the intended use.



Important security advise !

The blades may only be replaced if it is ensured that no actuator or drive motor of the processing system or the machining system can move. Therefore it is necessary to shut off the machining system or to remove the processing unit mechanically and electrically. It is strongly advised to observe the safety regulations of the respective machine manufacturer.

There is a high risk of injury to hands and fingers.

2.4 Reference run and alignment of the creasing wheel

Before using the tool it is required to perform a reference run of the machining system to ensure that the wheel is adjusted to the creasing direction. In most cases it is necessary to parameterize an offset.

This is a function of the respective machine control. For example, proceed as follows:

1. Do a reference run to the internal switch of the processing unit.
2. Check the wheel's position.
3. If the creasing wheel is not yet adjusted to the correct direction, it is necessary to parameterize an offset for the rotating axis of the processing unit.

Warning !

If the creasing wheel is not adjusted correctly by an offset value several components could be damaged seriously (e.g. the work piece, the cutting mat, the creasing wheel, the machining system or the processing unit).

2.5 Maintenance

The processing unit has to be checked and cleaned periodically. Blunt wheels have to be replaced immediately, since they negatively affect the processing results, increase the load on the kinematics and shorten the lifetime of wear parts.

Warning !



Before carrying out any maintenance work it is necessary to ensure that no actuator or drive motor of the processing system or the machining system can move. Therefore it is essential to shut off the machining system or to remove the processing unit mechanically and electrically. It is strongly advised to observe the safety regulations of the respective machine manufacturer. There is a high risk of injury because of moving parts and sharp creasing wheels.

3. Technical specifications

	Tangential creasing tool TCT-1	
	stepper motor	servomotor
Height approx.	192 mm	219 mm
Width approx.	58 mm	
Depth approx.	86 mm	
Distance from center clamp collar to back side of body appr.	29 mm	
Weight (approx.)	2.500g	
Diameter of clamp collar	43 mm	
Tool holder	16 mm-h7	
Tool orientation	by Weldon clamping surface	
Turning range	360 degrees, turning range not arrested, possibility of continuous circular operation	
Connector	Sub-D 25 pins	Sub-D 25 pins + connector for power supply of servomotor
Power supply for electronics	12V-DC	
Control of actuator	external stepper driver (not included in delivery)	external servo driver (not included in delivery)

4. Connector assignment

The following table 1 shows the assignment of the integrated 25-pin D-Sub connector.



Important security advise !



The mechanical and electrical combination of the cutting unit and the machining system has to be done by an expert only. It is not allowed to put the unit in operation before all necessary and required country-specific safety regulations have been observed and checked carefully. Only the operator of the facility (i.e. machining system) is responsible for observing all relevant safety regulations.

Table 1: Connector assignment

PIN	Cable colour	Function / description	Remark																																																															
1	red	+12V electronics for position sensor and optional motor cooler	A																																																															
2	brown	Relay PIN 4	B																																																															
3	blue	Relay PIN 5																																																																
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6	blue-white	<table border="1"> <thead> <tr> <th colspan="4">TYPE OF CONNECTION (EXTERN)</th> <th colspan="2">MOTOR</th> </tr> <tr> <th rowspan="2">UNIPOLAR</th> <th colspan="2">BIPOLAR</th> <th rowspan="2">PARALLEL</th> <th rowspan="2">LEADS</th> <th rowspan="2">WINDING</th> </tr> <tr> <th>1WINDING</th> <th>SERIAL</th> </tr> </thead> <tbody> <tr> <td>A —</td> <td>A —</td> <td>A —</td> <td>A —</td> <td>BLK</td> <td>A</td> </tr> <tr> <td>COM —</td> <td>A —</td> <td>—</td> <td>—</td> <td>BLK/WHT</td> <td>A\</td> </tr> <tr> <td>A\ —</td> <td>—</td> <td>A\ —</td> <td>A\ —</td> <td>GRN/WHT</td> <td>—</td> </tr> <tr> <td>B —</td> <td>B —</td> <td>B —</td> <td>B —</td> <td>GRN</td> <td>B</td> </tr> <tr> <td>COM —</td> <td>B —</td> <td>—</td> <td>—</td> <td>RED</td> <td>B\</td> </tr> <tr> <td>B\ —</td> <td>—</td> <td>B\ —</td> <td>B\ —</td> <td>RED/WHT</td> <td>—</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>BLU/WHT</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>BLU</td> <td></td> </tr> </tbody> </table>		TYPE OF CONNECTION (EXTERN)				MOTOR		UNIPOLAR	BIPOLAR		PARALLEL	LEADS	WINDING	1WINDING	SERIAL	A —	A —	A —	A —	BLK	A	COM —	A —	—	—	BLK/WHT	A\	A\ —	—	A\ —	A\ —	GRN/WHT	—	B —	B —	B —	B —	GRN	B	COM —	B —	—	—	RED	B\	B\ —	—	B\ —	B\ —	RED/WHT	—					BLU/WHT						BLU		C
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The notes following on the next page must be observed carefully.

4.1 Remarks to the connector assignment

Remark	Description
A	The electronic system for the position sensor has to be supplied with a direct current of 12V (DC). The polarity must be respected carefully because otherwise electronics and/or fan may be damaged.
B	<p>The position sensor controls an integrated relay that can be used by the supervising CNC controller as a limit or reference switch:</p> <ul style="list-style-type: none"> • Once the blade has reached the homing point during a reference run, there is contact between PIN3 and PIN15 of the Sub-D connector. • If the blade is located outside the reference position, there is contact between PIN2 and PIN15 of the Sub-D connector. • Depending on the applied CNC controller, the integrated relay can be used as a normally closed switch (NC) or as a normally open switch (NO).
C	The connection of the stepper motor depends on the driver used. The following documentation has to be observed carefully.

Warning !



The electrical and mechanical connection of the processing unit has to be done with utmost accuracy by an expert only. It is not allowed to put the unit in operation before all necessary and required country-specific safety regulations have been observed and checked carefully. Only the operator of the facility (i.e. machining system) is responsible for observing all relevant safety regulations.

4.2 Stepper motor specifications

SPECIFICATION	UNIPOLAR OR BIPOLEAR		PERMISSIBLE RADIAL+AXIAL FORCE ROTOR SPRING-MOUNTED IN AXIAL DIRECTION
	UNIPOLAR-1 WINDING	BIPOLEAR SERIAL PARALLEL	
VOLTAGE (VDC)	4.8		
AMPS/PHASE	2.0		
RESISTANCE/PHASE (Ohms) @25°C	2.4±10%	1.41	2.82
INDUCTANCE/PHASE (mH) @1KHz	5.1±20%	4.8±10%	1.2±10%
HOLDING TORQUE (Nm) [lb-in]	1.2 [10.62]	20.4±20%	5.1±20%
DETEAT TORQUE (Nm) [lb-in]	0.068 [0.602]	1.7 [15.02]	1.7 [15.02]
STEP ANGLE (°) ± ACCURACY	1.8±5% (NON-ACCUM)		
BACK-EMF (V) (300 U/min)		29.60	
ROTOR INERTIA (Kg-m²) [lb-in²]		4.8x10 ⁻⁵ [0.164]	
WEIGHT (kg) [lb]		1.0 [2.2]	
TEMPERATURE RISE: MAX.80°C (MOTOR STANDSTILL; FOR 2 PHASE ENERGIZED)			
AMBIENT TEMPERATURE -10~ 50°C [14F ~ 122F]			
INSULATION RESISTANCE 100 MOhm (UNDER NORMAL TEMPERATURE AND HUMIDITY)			
INSULATION CLASS B 130° [266F]			
DIELECTRIC STRENGTH 500VAC FOR 1 MIN. (BETWEEN THE MOTOR COILS AND THE MOTOR CASE)			
AMBIENT HUMIDITY MAX. 85% (NO CONDENSATION)			

TYPE OF CONNECTION (EXTERN)		CONNECTOR PIN NO./A		LEADS		WINDING	
UNIPOLAR	BIPOLEAR	TWININGS	SERIAL	PARALLEL	A	B	A
A	A	A	A	A	1	2	BLK
B	B	A	A'	A'	3	3	BLK/WHI
A'	A'	B	B	B	4	4	GRN/WHI
B'	B'	B	B'	B'	5	5	GRN
COM	COM				6	6	RED/WHI
					7	7	RED
					8	8	BLU/WHI
							BLU

WIRING DIAGRAM

FULL STEP 2 PHASE-Ex. WHEN FACING MOUNTING END (X)

STEP	A	B	A'	B'	CW	CCW
1	+	+	-	-		
2	-	+	+	-		
3	-	-	+	+		
4	+	-	-	+		

PERMISSIBLE RADIAL+AXIAL FORCE		AXIAL-FORCE Fo (N)	
ROTOR SPRING-MOUNTED IN AXIAL DIRECTION	BEARING	AXIAL	RADIAL
At load max: (N)		0.08	0.02
		4.5	4.5

SCALE FREE		APVD	
X	1PL	CHKD	DRN
±0.5	±0.2		
±0.1	±0.1		
ANGLE ±30°			

REV	DESCRIPTION	DATE	APVD	SIGNATURE	DWG.NO
2	TECHNICAL DATE	09.04.08	J.W.		
1	PIN-Belegung	04.01.08	J.W.		

5. Accessories

Article No.	Description	
260010	Tool holder type KR for creasing wheels with ball bearings (image includes creasing wheel)	
260110	B12 Creasing wheel for cardboard 2pt D=24mm; equipped with 2 ball bearings	
260120	B14 Creasing wheel for cardboard 3pt D=24mm; equipped with 2 ball bearings	
260130	B16 Creasing wheel for cardboard 4pt D=24mm; equipped with 2 ball bearings	
260210	B22 Creasing wheel for corrugated cardboard type E / type F (E/F flute) D=24mm; equipped with 2 ball bearings	

<p>260220</p>	<p>B24 Creasing wheel for corrugated cardboard type B (B flute) D=24mm; equipped with 2 ball bearings</p>	
<p>260230</p>	<p>B26 Creasing wheel for corrugated cardboard type C (C flute) D=24mm; equipped with 2 ball bearings</p>	
<p>260310</p>	<p>B32 Creasing wheel for polypropylene; D=24mm; equipped with 2 ball bearings</p>	
<p>230200</p>	<p>Long life cutting mat EC-4; intended to be used on vacuum tables; useable on both sides</p> <p>Material Thickness : 4mm Roll width : 2000 mm Colour : grey</p>	 <p>ECOCAM EC4 Luftdurchlässige Dauer-Schneideunterlage Durable cutting mat - permeable to air</p>