



## 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	
4	not assigned		
5			
6	blue-white		
7			
8	red		
9			
10	green-white		
11			
12	black		
13			
14	black	0V electronics for position sensor and optional motor cooler	A
15	yellow	Relay PIN 3	B
16	not assigned		
17			
18	blue		
19			
20	red-white		
21			
22	green		
23			
24	black-white		
25			

TYPE OF CONNECTION (EXTERN)				MOTOR	
UNIPOLAR	BIPOLAR			LEADS	WINDING
	1WINDING	SERIAL	PARALLEL		
A —	A —	A —	A —	BLK	A
COM —	A —	□	□	BLK/WHT	□
A\ —	B —	A\ —	A\ —	GRN/WHT	A\
B —	B —	B —	B —	GRN	B
COM —	B —	□	□	RED	□
B\ —	B\ —	B\ —	B\ —	RED/WHT	B\
				BLU/WHT	
				BLU	

TYPE OF CONNECTION (EXTERN)				MOTOR	
UNIPOLAR	BIPOLAR			LEADS	WINDING
	1WINDING	SERIAL	PARALLEL		
A —	A —	A —	A —	BLK	A
COM —	A —	□	□	BLK/WHT	□
A\ —	B —	A\ —	A\ —	GRN/WHT	A\
B —	B —	B —	B —	GRN	B
COM —	B —	□	□	RED	□
B\ —	B\ —	B\ —	B\ —	RED/WHT	B\
				BLU/WHT	
				BLU	

**The notes following on the next page must be observed carefully.**

## 4.1 Remarks to the connector assignment

Remark	Description
<b>A</b>	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>B</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"> <li>• Once the blade has reached the homing point during a reference run, there is contact between <b>PIN3</b> and <b>PIN15</b> of the Sub-D connector.</li> <li>• If the blade is located outside the reference position, there is contact between <b>PIN2</b> and <b>PIN15</b> of the Sub-D connector.</li> <li>• 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).</li> </ul>
<b>C</b>	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**

**Front view and mounting**  
 □ 56.4  
 □ 47.14±0.2  
 4.25

**Side view**  
 20.6±0.5  
 1.6  
 0.08 [A]  
 0.05  
 06.36  
 0.05  
 13.5±1  
 76Max.  
 19.05±0.1  
 2.1±0.25  
 □ 38.7  
 (only for type ST5518L2008-B Ready for encoder + driver mount)  
 UL1007 AWG 22 L=300±10mm  
 Connector Type: JST XHP-8 Contact: SXH-001T-P0.6

**Rear view**  
 □ 38.7  
 19.05±0.1  
 2.1±0.25

SPECIFICATION	CONNECTION		BIPOLAR		PERMISSIBLE RADIAL+AXIAL FORCE ROTOR SPRING-MOUNTED IN AXIAL DIRECTION
	UNIPOLAR OR BIPOLAR-1 WINDING	BIPOLAR SERIAL	PARALLEL		
VOLTAGE (VDC)	4.8				
AMPS/PHASE	2.0	1.41	2.82		
RESISTANCE/PHASE (Ohms)@25°C	2.4±10%	4.8±10%	1.2±10%		
INDUCTANCE/PHASE (mH) @1KHz	5.1±20%	20.4±20%	5.1±20%		
HOLDING TORQUE (Nm) [lb-in]	1.2 [10.62]	1.7 [15.02]	1.7 [15.02]		
DETTENT TORQUE (Nm) [lb-in]		0.068 [0.602]			
STEP ANGLE (°) ± ACCURACY		1.8±5% (NON-ACCUM)			
BACK-EMF (V) (300 U/min)		29.60			
ROTOR INERTIA (Kg-m²) [lb-in²]		4.8x10 <sup>-5</sup> [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 [14°F ~ 122°F]					
INSULATION RESISTANCE 100 MΩhm (UNDER NORMAL TEMPERATURE AND HUMIDITY)					
INSULATION CLASS B 130° [266°F]					
DIELECTRIC STRENGTH 500VAC FOR 1 MIN. (BETWEEN THE MOTOR COILS AND THE MOTOR CASE)					
AMBIENT HUMIDITY MAX. 85% (NO CONDENSATION)					
2 TECHNICAL DATE	09.04.08	J.W.			
1 PIN-Belegung	04.01.08	J.W.			
REV DESCRIPTION	DATE	APVD			

TYPE OF CONNECTION (EXTERNAL)		CONNECTOR PIN NO. Δ		MOTOR LEADS		WINDING	
UNIPOLAR	BIPOLAR	SERIAL	PARALLEL	1	2	3	4
A	A	A	A	BLK	GRN	BLK/WHI	A
B	B	A'	B	GRN	RED	GRN/WHI	A'
B'	B'	B	B'	RED	BLU	RED/WHI	B
		B'	B'	BLU	WHI	BLU/WHI	B'






**WIRING DIAGRAM**  
 (A) BLK BLK/WHI GRN/WHI (A) GRN  
 (B) RED RED/WHI BLU/WHI (B) BLU





**FULL STEP 2 PHASE-Ex.**  
 WHEN FACING MOUNTING END (X)  
 CCW CW  
 STEP A B A' B'  
 1 + + - -  
 2 - + + -  
 3 - - + +  
 4 + - - +

PERMISSIBLE RADIAL+AXIAL FORCE		AXIAL-FORCE Fo (N)		Fo=15	
DISTANCE a (mm)	RADIAL-FORCE Fr (N)	AXIAL	RADIAL	AXIAL	RADIAL
5	130	0.08	0.02	4.5	4.5
10	90				
15	70				
20	52				
AT LOAD MAX: (N)					

SCALE	FREE	APVD
X	±0.5	CHKD
1PL	±0.2	DRN
2PL	±0.1	SIGNATURE
ANGLE	±30'	

**5. Accessories**

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

260220	<p><b>B24</b> Creasing wheel for corrugated cardboard <b>type B (B flute)</b> D=24mm; equipped with 2 ball bearings</p>	
260230	<p><b>B26</b> Creasing wheel for corrugated cardboard <b>type C (C flute)</b> D=24mm; equipped with 2 ball bearings</p>	
260310	<p><b>B32</b> Creasing wheel for <b>polypropylene</b>; D=24mm; equipped with 2 ball bearings</p>	
230200	<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><b>ECOCAM EC4</b> Luftdurchlässige Dauer-Schneideunterlage Durable cutting mat - permeable to air</p>