

Instruction Manual for the Automatic Nut Tapping Machine **TOP-CUT 10 D**



Machine No. :

Year of Manufacture : 2015

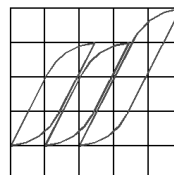
Streicher Maschinenbau GmbH

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First of all...

Messrs Streicher wish you every success with your new machine.

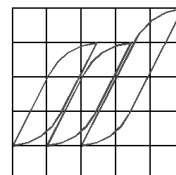
Our name has given you the confidence to buy one of our machines and you have every right to expect that it will work for as long as possible without malfunctioning and be as easy as possible to operate.

But we must ask you - for your own benefit:

Please do not put this Instruction Manual to one side without reading it. You will see that it contains a great deal of important information to make it easier for you to take proper control of your machine.

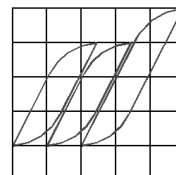
We wish you every success

Best regards, Messrs Streicher Maschinenbau GmbH



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1 General

1.1 The environment has to be right as well!

The machine you get from us has been developed and designed on the basis of our great experience and up-to-date knowledge of tapping and built with maximum care and attention to detail. The quality of the threads produced, the simplicity of the tools, and the great variety of possible applications mean that this machine will always work to your full satisfaction. The fast retooling time and the performance achieved are quite impressive.

To maintain constant levels of performance and economic efficiency, it is essential to always keep the highly-developed electronic and pneumatic systems operating at optimum levels.

Only employ suitably qualified and trained personnel to operate, service and maintain the machine. We advise taking an intensive familiarisation course at Messrs STREICHER. A small expense, but well worth it.

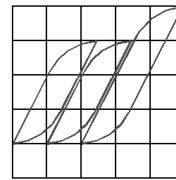
Monitor the regular cleaning, servicing and maintenance of the machine. Routinely check that the machine is operating perfectly.

To ensure trouble-free operation of the air cylinder, the compressed air supplied must be in perfect condition. It must not contain any moisture. Check that the air lines leading to the machine have effective water separators.

Regularly satisfy yourself that the parts to be cut are true to size and in a clean condition. Ensure that the tools are used with maximum care and precision.

Only use first-class taps. To solve particular problems when tapping, it is advisable to work together with an experienced tap manufacturer. Mechanical devices for re-grinding the taps and appropriate measuring instruments should be available.

It is very important for thread quality, for tool life, for output and for the service life of the machine that you use a first-class cutting oil, one that is best-suited for the job and that it is kept carefully and permanently clean.



Dirt and swarf should be regularly removed from the filtering system, if necessary, several times a day. The entire oil circulation system should be cleaned intensively at the given time and new oil provided.

If you have any questions or requests, if any problems arise, whatever their nature, just call us:

At Messrs Streicher, we are always here for you!

1.2 Accessories

Swarf conveyor

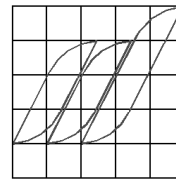
If the slivers are very long or not magnetic, either trough scrapers, slat-band chain conveyors or permanently magnetic slide conveyors are used instead of the magnetic cylinder.

Round nut - Carriage

For the tapping of round nuts or threaded sleeves, a round nut carriage is available. In addition to the axial clamping, this causes a radial clamping force which ensures a secure holding of the parts.

Effective power measuring device

This is used to determine the recorded effective power of the spindle and thus tap wear. As soon as a given value is exceeded, the machine shuts down.



2 Safety Regulations / Safety Equipment

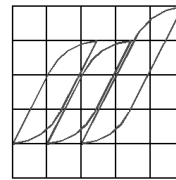
2.1 Safety regulations and precautionary measures

Our Top-Cut series machines are state-of-the art and are designed to operate safely and reliably. However, perfect and safe operation of this machine presupposes that it has been appropriately transported, expertly installed and commissioned and that it will be properly operated and serviced. The operator must therefore ensure that the information in this instruction manual is carefully followed.

- ⇒ The machine is potentially dangerous if untrained personnel operate or service it inexpertly or not in accordance with its intended purpose (see Section “3.1 Range of application of the machine”). This is why it is essential that only appropriately qualified and trained personnel work on or with this machine.
- ⇒ Before commencing work, operating personnel must be thoroughly familiar with all the warnings, notices and maintenance measures contained in this instruction manual.
- ⇒ No modifications or changes of any kind can be made to the machine.
- ⇒ Universally valid statutory provisions and other binding regulations regarding accident prevention and environmental protection should be observed in addition to this instruction manual.
- ⇒ Non-compliance with the following points may result in physical injury or damage to property. You must therefore ensure that they are read and observed by all operators.

2.1.1 Operation

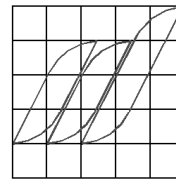
- Safety equipment such as doors, protective hoods and covers must be neither detached nor put out of commission. They must be closed before operation and must not be opened during operation.
- Changes to the machine that prejudice safety must be reported immediately to whoever is in charge.
- Before switching on the machine, check all levels.
- While the machine is in automatic mode, do not switch it off at the master switch.
- Should there be any danger to people or machine, press the mushroom-head EMERGENCY STOP pushbutton immediately.



- Warning! Risk of injury
Do not reach into the rotating sorting rings of the drum feed device!
- Warning! Electric shock, danger to life!
Only qualified and specially trained personnel should open the doors of the control cabinet.
- Take maximum care when fitting the tool devices; it is particular important that the layout is clean.
- Devote extreme care to the clamping process in the tool area.
- Ensure that the area round the machine and especially the work area in front of the machine is kept clean and tidy. Should oil drip onto the floor, wipe it up immediately (risk of slipping!).
- Do not throw scrap into the coolant.
- Operating personnel may operate the machine only when wearing personal protective equipment (close-fitting clothing, antiskid safety shoes, ear defenders, protective goggles, hair net etc.).
- In addition to the existing interior lighting of the machine sufficient lighting must also be provided on the exterior of the machine.

2.1.2 Maintenance and repair

- Maintenance, service and repair work must only be carried out by specially trained personnel.
- Before carrying out maintenance, service or repair work, press the EMERGENCY STOP button. This also applies when working on the feed device and on the control cabinet.
- If repairs are necessary to the electrical equipment, the machine must be turned off at the master switch and disconnected from the mains. Work should only be carried out by a skilled and specially authorised electrician. The relevant regulations must be observed (Association of German Electrotechnical Engineers VDE 0113 / EN 60204; Accident Prevention Regulations of the Professional Associations, e.g. for Germany, UVV 7.0, VBG 4).
- If the machine has to be operative for certain repair work to be carried out, particular care must be taken: Ensure that it is not possible for anyone to be injured.



- If the safety devices are removed for repair or maintenance, the machine must be shut down precisely as prescribed. As soon as the repair or maintenance work is completed, re-install the safety equipment.
- Only use lubricants and cooling lubricants as stated in the lubricant table (see Section "3.4.9 Selecting and pouring the tapping oil").
- Under no circumstances use wool or cleaning waste to clean the machine. Use only lint free cleaning materials (cloths or paper).
- Under no circumstances use compressed air to clean the machine: swarf may get into the spindle bearing.

2.1.3 Extinction of liability and warranty claims

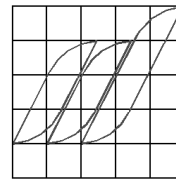
Messrs Streicher Maschinenbau GmbH assume neither liability nor guarantee,

- if the information in this instruction manual is not complied with;
- if the machine and any auxiliary equipment are not used in accordance with the intended purpose;
- if the machine and any auxiliary equipment are not operated in an appropriate manner;
- if the machine and any auxiliary equipment are not properly maintained and serviced;
- if the safety devices are not used or are disabled;
- if any technical or operational modifications are made that have not been approved by Messrs Streicher.

2.2 Safety devices

The standard of machine safety is extremely high, so that operating personnel are given the maximum protection against injury.

At both control sides of the machine, mushroom-head pushbuttons are located for emergency use. They are easy to reach and, when pressed, bring the machine to an EMERGENCY STOP.



The two protective doors, covering the work area of the machine, are each secured by a safety limit switch, and cannot be opened during automatic operation. Also, all motors can be activated only if the protective hoods are closed.

During setup operation, the machine functions can be executed maximally only with the protective door on the respective control side of the machine being open.

In the case of an open protective door, cylinder movements can only be executed by simultaneously pressing the required function key together with the pushbutton for two-handed engagement.

All headstock doors are also secured by safety limit switches. If these doors are opened, the machine comes to an EMERGENCY STOP immediately. All the motors are stopped immediately.

2.3 Mechanical safety devices

2.3.1 Control shaft drive unit

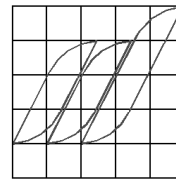
The two disk cams for controlling the left-hand and right-hand advance are driven, via a toothed belt and worm gear drive unit, by the main spindle. If, in rare cases, the control shaft should be blocked by a sticking advance unit, the drive train is protected by a safety clutch.

2.3.2 Controlling the Carriage

As soon as the carriage or pusher comes up against an obstruction in its forward movement, the control roller on the respective spindle side lifts off the advance cam. In this way, tool and machine are protected effectively against mechanical destruction.

2.3.3 Safety clutch – Feed device

To minimise damage while the nuts are being sorted and advanced in the feed device, a safety clutch is incorporated in the drive shaft. Via a slotted nut, the required disengagement moment can be preset.



2.4 Machine noise (Top-Cut 16D)

An M8 flanged nut was being cut from steel. The output quantity was approx. 140 pieces/min. The feed device was half full. The installation corresponded to operational use.

The Top-Cut 30D machines have the same design features as the measured type. It is therefore assumed that the noise emission is similar.

Noise was measured (in accordance with DIN 45635-01-KL3) under load, with the safety devices closed. The load placed on the machine depends on the type of blank and the material used. The machine was in the upper performance range during measurement.

The 1m measuring surface sound pressure level L_p as an energetic mean value from the corrected sound pressure levels

no-load operation 68.0 dB(AS)
load operation 69.6 dB(AS)

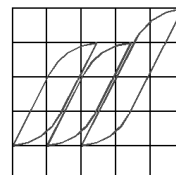
Sound power level LWA

no-load operation 84.6 dB(AS)
load operation 86.2 dB(AS)

Corrected sound pressure levels L_P on two measurement points in 1.6m above the ground left and right, each at a distance of 0.5m from the machine.

There is no fixed work area available at the machine. The operator is only here for setup and checking / control purposes.

No-load operation	Measurement point 1	70.1 dB(AS)
	Measurement point 2	69.9 dB(AS)
Load operation	Measurement point 1	72.2 dB(AS)
	Measurement point 2	71.0 dB(AS)



2.5 Declaration of Conformity

EC Declaration of Conformity within the meaning of the EC Machinery Directive 2006/42/EC, Appendix IIA

We,

**Streicher Maschinenbau GmbH
Argenstrasse 58/1**

88079 KRESSBRONN / GERMANY

hereby declare that the machine designated below corresponds to the relevant basic safety and health requirements of the EC directive based on its design and build and in the version marketed by us. Changes to the machine that are not coordinated with us shall render this machine invalid.

Machine designation : Automatic Two Spindle Tapping Machine **TOP-CUT 16D**
for tapping operation of female threads M5 – M10 (M12).

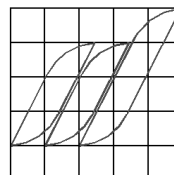
Serial No. :

Relevant EC directives

- Directive 2006/42/EC of the European parliament and the council from 17 May 2006 on machinery, and amending Directive 95/16/EC (recast)
- Directive 2014/30/EU of the European parliament and the council from 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast).
- Directive 2014/35/EU of the European parliament and the council from 26. February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (recast).

Applied harmonised standards

- DIN EN ISO 12100 – Safety of machinery General principles of design Risk assessment and risk reduction (ISO 12100:2010), March 2011
- Safety of machinery – Electrical equipment of machinery – Part 1: General requirements (IEC 44/709/CDV:2014), 02.12.2010
German Version FprEN 60204-1:2014
- DIN EN ISO 13850
Safety of machinery - Emergency stop function - Principles for design (ISO 13850:2006); German Version EN ISO 13850:2008

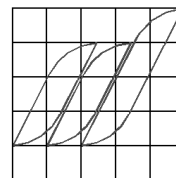


- DIN EN 61000-6-4:2011-09; VDE 0839-6-4:2011-09
Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments (IEC 61000-6-4:2006 + A1:2010); Sept. 2011.
German Version EN 61000-6-4:2007 + A1:2011 (emission standard for industrial environments)
- DIN EN 61000-6-3:2011-09; VDE 0839-6-3:2011-09
Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3:2006 + A1:2010); Sept. 2011.
German Version EN 61000-6-3:2007 + A1:2011 (Immunity for commercial and light-industrial environments).

Kressbronn June 25, 2015

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Michael Streicher
(Managing director)



2.6 Plant-related environmental water protection (environmental management)

Within the meaning of water protection legislation, automatic tapping machines are considered to be a "PTU" system (system for the production, treatment, and use of substances hazardous to water). It is not necessary for the Lower Water Authority to carry out a suitability assessment or type approval process.

2.6.1 Data for environmental management

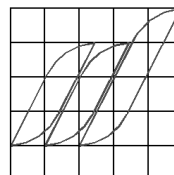
- | | |
|---|-----------------|
| • Cooling agent store in the machine stand
(→ volume contents >100 l -1,000 l) | see techn. data |
| • Machine hazard level: | |
| ○ when using cutting oil (as a rule WGK 2) | A |
| ○ when using emulsion (as a rule WGK 3) | C |
| • Pump pressure, cooling agent pump | < 1.5 bar |
| • Oil temperature (depending on load condition) | 20 -50 °C |

2.6.2 Machine properties

The machine corresponds to the basic requirements by VAWs*) as follows:

- Continuous and oiltight welding seams within the complete machine stand area;
- Secure and stable position due to the favourable length ratio of the main machine dimensions;
- Splash-proof encapsulation of the entire working area;
- Automatic shutdown of the cooling agent pump when the protective door is opened;
- When operated in accordance with specifications, capable of resistance against the mechanical, thermal, and chemical influences to be expected;
- Leakages are become quickly visible due to the smooth and painted machine walls;
- If requested by the customer, a collection tray without drain is available.

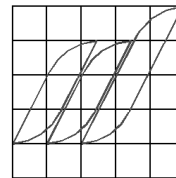
*) Regulation on plants for handling substances hazardous to water



2.6.3 Duties of the operator

The operator of the plant must ensure that the emissions at the exhaust of the flaring device are checked.

- Check whether the workshop floor is made from FD concrete or coated concrete. If this is not the case, suitable collection trays must be used. If necessary, the machine foundations or a cellar can also be used as a collection space.
- Prepare and adhere to operating instructions;
- Marking the plant;
- Affixing information sheets;
- Keeping a plant register;
- Monitoring the machine in respect of leaks;
- Repair, maintenance, and cleaning by instructed personnel;
- Competent disposal of any substances that have leaked out.



3 Commissioning

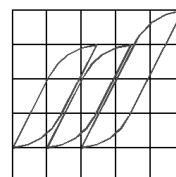
3.1 Range of application of the machine

The machines of the Top-Cut series are made exclusively for use as fully automatic tapping machines for nuts with tapped through-holes.

All types of standard nuts, flanged nuts, cone nuts, and collar nuts, as well as dodecagonal and special nuts can be processed. Using a round nut carriage, round nuts and sleeves are tapped. The thread length may be approximately twice as large as the diameter of the thread.

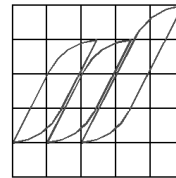
Nuts can be made from steel, aluminium, brass, copper or zinc and their alloys. A certain amount of machining of nuts made from stainless steel is also possible.

The nut blank can be forged, turned, pressed or cast, and can be tapped both in the soft and hardened condition, up to 32 HRC.

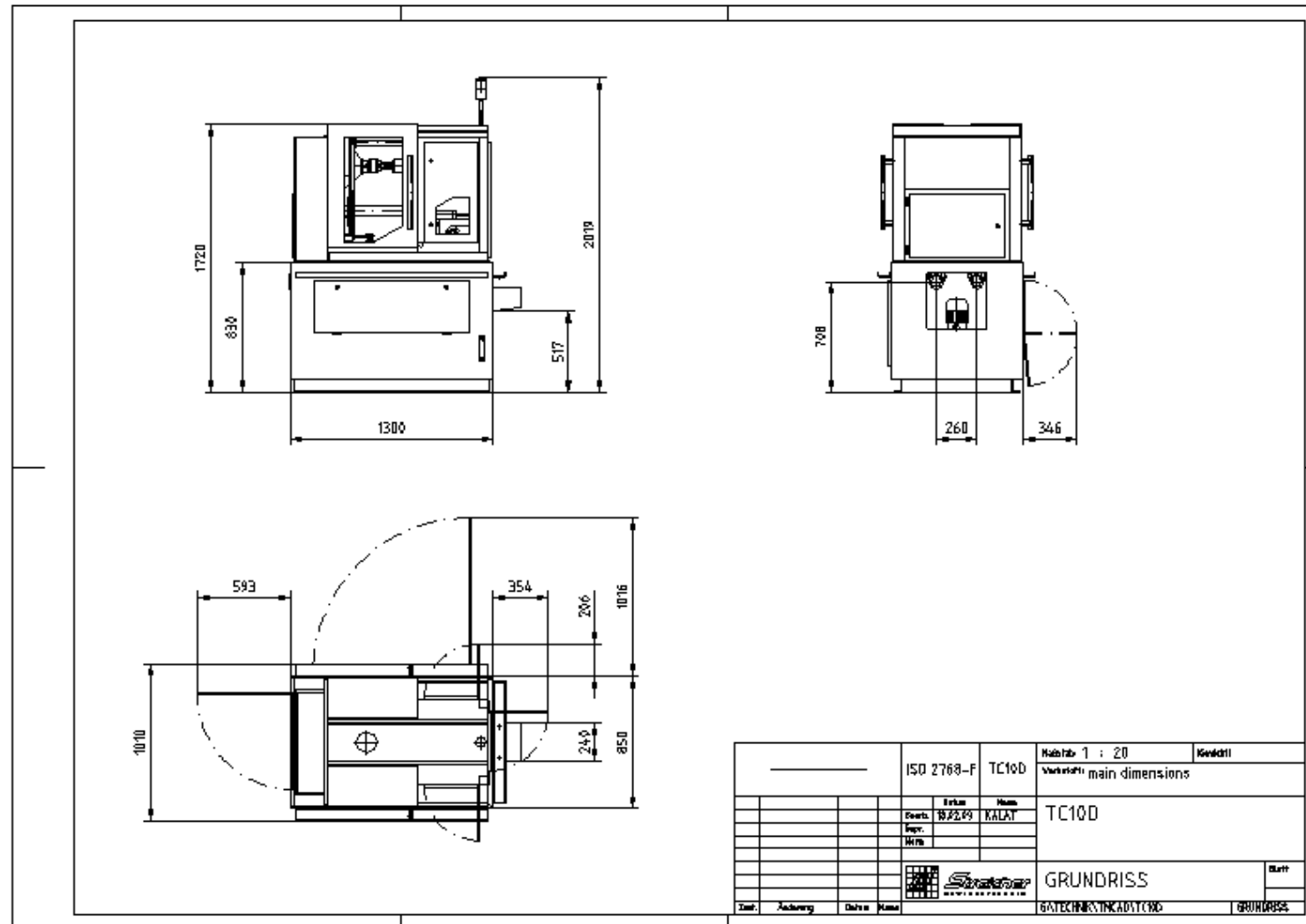


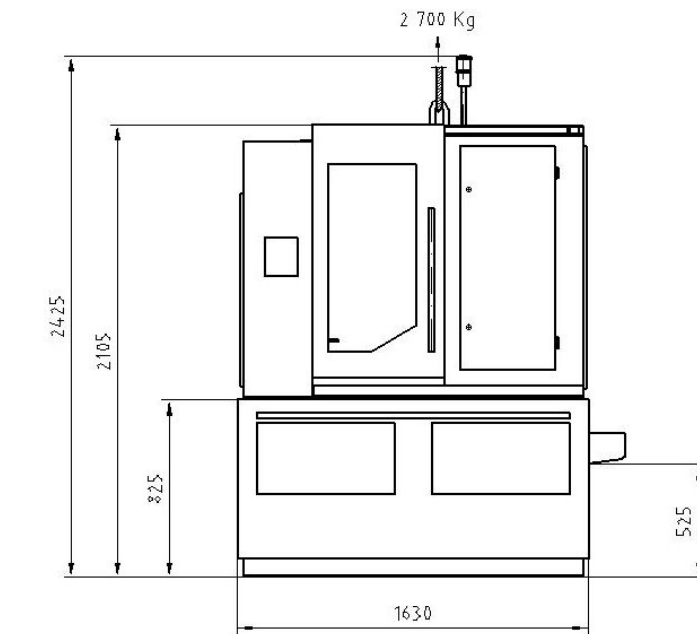
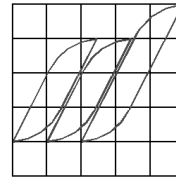
3.2 Technical specifications

Machine	TOP-CUT 10D	TOP-CUT 16D	TOP-CUT 33D
Thread dimension	M5 – M10 (hex nut up to M12) 3/16" – 3/8"	M5 - M16 3/16" - 5/8"	M10 – M33 3/8" – 1.1/8"
Max. outside diameter of parts	25 mm	32 mm	60 mm
Max. diameter across flats	22 mm	27 mm	50 mm
Power of spindle motor	4,0 kW	9,7 kW	13,2 kW
Speed range	400 – 5000 rpm	400 – 5000 rpm	200 – 1600 rpm
Max. output quantity (square / hex nuts)	19.700 pcs/h	17.520 pcs/h	5.640 pcs/h
Max. output quantity (flange nuts)	11.090 pcs/h	11.090 pcs/h	3.200 pcs/h
Max. output quantity (round nuts)	6.975 pcs/h	7.780 pcs/h	3.200 pcs/h
Coolant volume	160 l	270 l	330 l
Capacity of coolant pump	100 l/min 0,2 bar	100 l/min 0,2 bar	100 l/min 0,2 bar
Machine control system	mechanical / PLC	mechanical / PLC	mechanical / PLC
Control voltage	24V DC	24V DC	24V DC
Max. permissible air pressure	5 bar	5 bar	5 bar
Max. permissible ambient temperature	-10°C ... +40°C	-10°C ... +40°C	-10°C ... +40°C
Machine weight	1.700 kg	2.700 kg	4.550 kg
Machine dimensions L/W/H	1850 / 1010 / 2200 mm	1900 / 1350 / 2400 mm	2100 / 1450 / 2500 mm
Paint finish for the machine	pebble grey RAL 7032		
Paint finish for the protection doors	brilliant blue RAL 5007 mint turquoise RAL 6033 coral red RAL 3016		

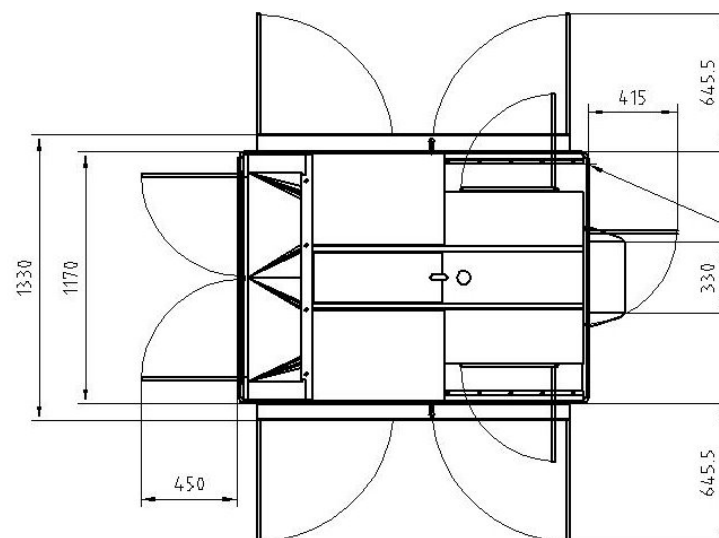
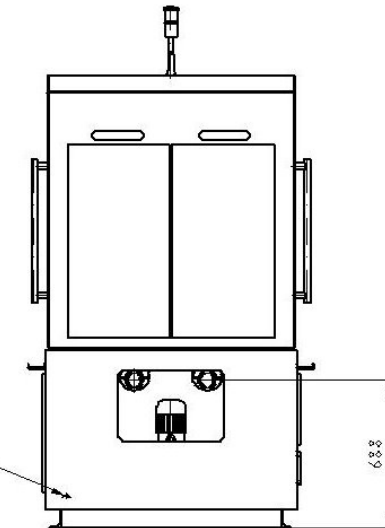


3.3 Overall dimensions / connection scheme



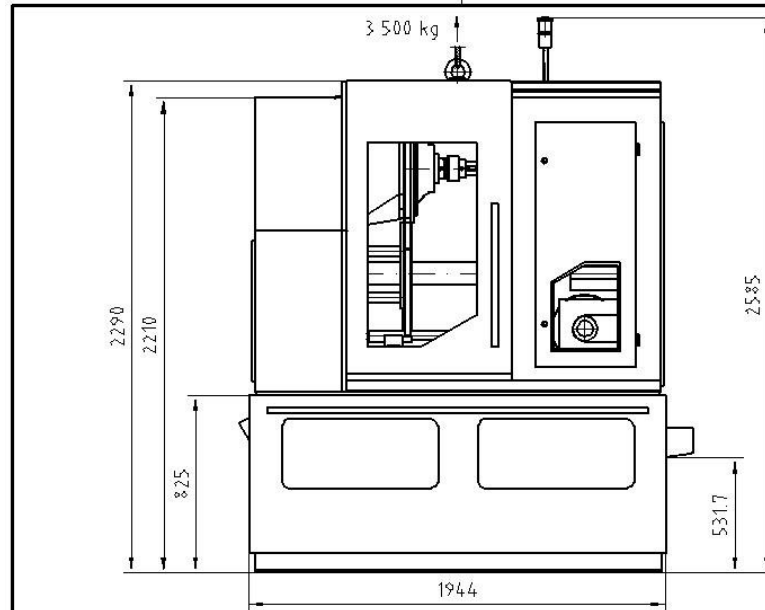
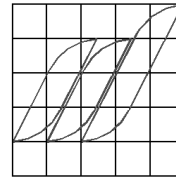


elektrischer Anschluss
electric supply

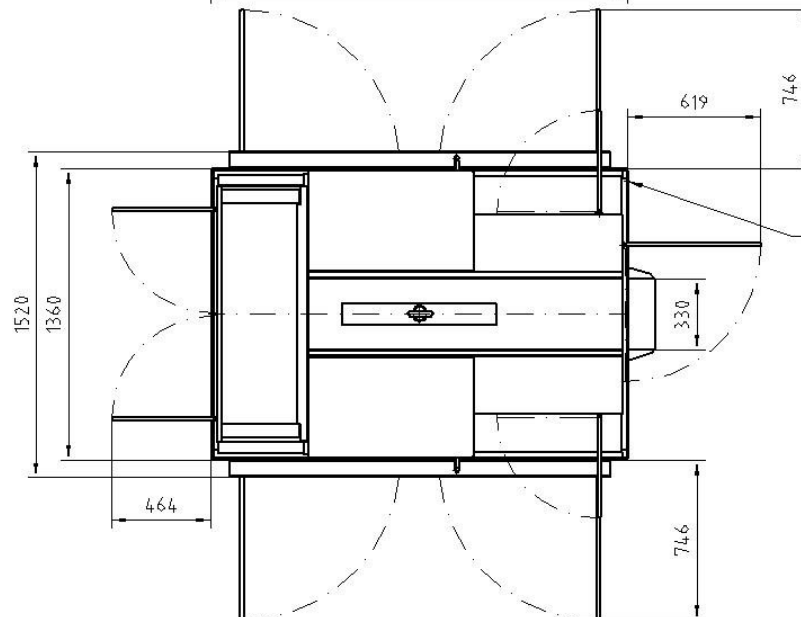
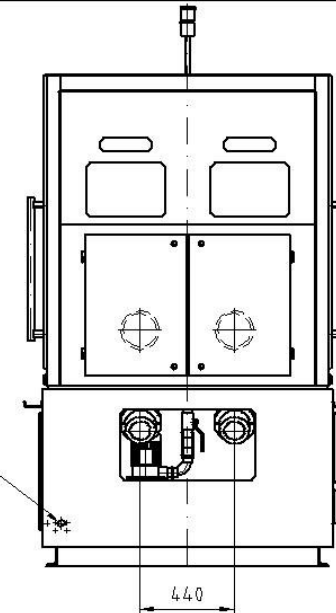


pneumatischer Anschluss
pneumatic supply G1/4"

				ISO 2768-f TC16D		Maßstab: 1 : 20		Kennzahl	
						Werkstoff: main dimensions			
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				Bearb. 02.10.14		ARNEGGGER			
				Gepr.					
				Norm					

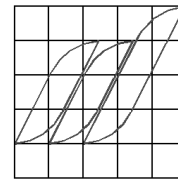


elektrischer Anschluss
electric supply



pneumatischer Anschluss
pneumatic supply G1/4"

		ISO 2768-f	TC33D	Maßstab: 1 : 20	Gewicht
				Werkstoff: main dimensions	
		Datum	Name	TC33D	
		Bearb.			
		Gepr.			
		Norm			
				GRUNDRISS	Blatt
Zust.	Änderung	Datum	Name	G:\TECHNIK\TMCAD\TC14D\GRUNDRISS	GRUNDRISS



3.4 Machine installation

3.4.1 Transporting the machine

The machine should be transported and loaded by crane only. To this purpose, a ring-shaped lug is screwed in at the top of the machine. Conditionally, it is also possible to use a suitable forklift truck. It must be ensured here that the machine is safely anchored on the fork so that it cannot slide off the fork during transportation.

Remove wooden box or lining and take off packaging film. In order to remove the wooden beams from underneath the machine, the machine may only be lifted up by a crane for reasons of safety. The ropes and fittings must be attached at the attachment points provided for this purpose (see Sect. "3.3 Overall dimensions / connection scheme")

3.4.2 Checking the scope of delivery

As soon as the machine is unpacked, check what has been delivered against the delivery note. Also, examine the machine and any auxiliary equipment to make sure that it has not suffered any damage during transportation. Messrs Streicher must be informed in writing immediately if any parts are missing, delivered in error or damaged.

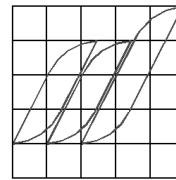
3.4.3 Removing transportation bracing

Effective in-transit protection against damage is provided for the machine and its accessories.

- Remove the transportation bracing that secures the protective doors against opening.
- Remove the packaging material and the gummed strips of tape.
- Any packaged tools and devices must be removed from the machine.

3.4.4 Assembling the machine

No foundation is needed to assemble the machine. We recommend that you use the commercially available machine feet. Screw these into the 4 location holes in the machine stand in such a way that the machine is secure and level. Under no circumstances must the machine be screwed to the floor by means of fixing bolts or pegs, as the machine could twist and this would impair the finishing accuracy.



The following points must also be taken into consideration during assembly:

- The necessary free space around the machine, required for operation and maintenance, must not be underrun (see Chap. „0“).
- Suitable measures must be taken to protect the machine's power lead against mechanical damage.
- All cables and hoses must be positioned so that there is no risk that the operating personnel could trip over them.
- Provide sufficient room for the finished part and swarf containers to be transported to and from the machine.

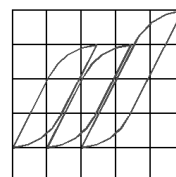
3.4.5 Connecting to the electrical power supply

The machine can be operated on both a 4 and 5-wire three-phase system.

When operating the machine on a 4-wire system, the live wires are connected to input terminals L1, L2 and L3 in the control cabinet. The PEN conductor is connected to the PE terminal. This is jumpered with terminal N.

When operating the machine on a 5-wire system, the wires are connected to the corresponding input terminals L1, L2, L3, N and PE in the control cabinet. Any jumper between N and PE must be removed.

The machine must be protected by a preliminary safety cutout. The ampere value of the preliminary safety cutout and the conductor cross-section of the supply line must be defined in accordance with local conditions and electrical engineering regulations. The following values should be used as a basis:



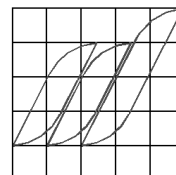
Machine	Nominal connection power	3x230 V	3x400 V	3x415 V	3x440 V	3x500 V
TOP-CUT 10D	14 kVA	32 A	20 A	19 A	18 A	17 A
	preliminary safety cutout	32 A	25 A	25 A	25 A	25 A
	conductor cross-section of the supply line	6 mm ²	4 mm ²	4 mm ²	4 mm ²	4 mm ²
TOP-CUT 16D	26 kVA	78 A	45 A	43 A	41 A	36 A
	preliminary safety cutout	100 A	63 A	63 A	63 A	50 A
	conductor cross-section of the supply line	25 mm ²	16 mm ²	16 mm ²	16 mm ²	10 mm ²
TOP-CUT 33D	36 kVA	108 A	62 A	59 A	56 A	49 A
	preliminary safety cutout	160 A	80 A	80 A	80 A	63 A
	conductor cross-section of the supply line	35 mm ²	16 mm ²	16 mm ²	16 mm ²	16 mm ²

The supply line must be selected in accordance with routing and operating conditions. It must be protected against any mechanical, thermal and chemical action as well as against the ingress of humidity via the line ends.

In particular in the case of forklift truck operation, the supply line must be routed vertically upwards inside a steel pipe or within a cable tray.

The conductors must not be exposed to any tensile or pressure forces. Means of attachment must not damage the supply line. In the case of infed points it must be ensured that the supply line becomes neither twisted nor kinked.

You are hereby informed expressly that the machine operator must carry out Check No. 2 pursuant to EN 60204 Chapter 18.2.2 ("Checking the impedance of the fault loop and the suitability of the assigned overcurrent protection device").



Warning:

Only a suitably qualified and authorised trained electrical engineer is allowed to open the doors to the control cabinet and connect the machine in accordance with the electrical engineering regulations.

3.4.6 Testing the 24 V direct current power supply

The direct voltage must be checked at the terminals "+" and "-" on the secondary side of the direct current supply. Only if the voltage is between 20.4, and 26.4 VDC, the machine may be operated.

If this should not be the case, then the existing supply voltage does not agree with the specified voltage for which the machine was delivered. The power supply must be removed and replaced by a suitable one.

3.4.7 Testing the phase sequence

Enable the master switch.

Operate function key "Feed device ON/OFF".

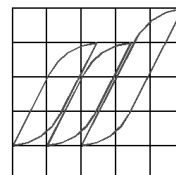
In the lower section, the two drums of the feed device must turn toward the centre. If this is not the case, switch off and disconnect from the mains and reverse the two phases at the power supply terminals.

3.4.8 Connecting to the pneumatic system

The pneumatic supply is to be connected to the G1/4" pneumatic connection provided for this purpose. Only supply the machine with dry air! The air pressure set for the maintenance unit at the factory is 6 bar. Small amounts of water in the compressed air supply are taken up by the water separator and automatically drained.

If the flange nut carriage is used, the air consumption of the machine per minute is as follows:

TOP-CUT 10/16D	45-50 ltr.
TOP-CUT 33D	50-55 ltr.



If the round nut carriage is used, the air consumption of the machine per minute is as follows:

TOP-CUT 10/16D	250-300 ltr.
TOP-CUT 33D	300-350 ltr.

3.4.9 Selecting and pouring the tapping oil

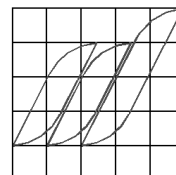
You must take care only to use special tapping oil with the relevant additives and a low viscosity.

Pump the oil onto the perforated plate upstream of the coolant pump. The filling levels are as follows:

TOP-CUT 10D	160 litres
TOP-CUT 16D	270 litres
TOP-CUT 33D	330 litres

Check these on the oil level indicator on the front of the machine.

To help you select a tapping oil, some of the brandname products are listed below. The sequence in which the products are listed does not rank them according to suitability and quality.



Manufacturer	Designation
Aral	Ropa FR 12 Sulnit UP, Sulnit UG, Sulnit UR
BP	Olex GES 4
ESSO	DN15 41108
Fina	Vulcite EPX 15, Vulcite EPX 30, Vulcite EPX 40
Fuchs	Ecocut 532 LE
Mobil	Mobilmet 20-series Mobilmet 443, 446, 447 Mobilmet 700-series
Oest	MEBA S 9017

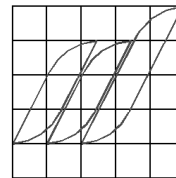
Warning:

Under no circumstances use cutting emulsion!
Take note of the manufacturer's safety specifications!

Differing demands are made on the oil depending on the material used for the blank, the cutting speed and the tap. You can only determine the most suitable oil for a particular application by field-testing, together with the manufacturer.

In making your selection, it is essential also to consider whether skin can tolerate it and other hazards for the operating personnel who come into physical contact with the oil. This includes making sure, in accordance with the "safety act governing the handling of cooling lubricants ZH 1/248", that,

- a) an official register of the cooling lubricants is set up;
- b) a competent expert determines and assesses the extent of the danger;
- c) measures are taken to protect the operating personnel;
- d) operating personnel are periodically examined by a suitable doctor;
- e) there are instructions available regarding the handling of cooling lubricant specific to the work area;
- f) the cooling lubricant is properly disposed of without harming the environment.



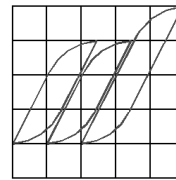
3.4.10 Selecting and pouring the tapping oil into the advance housing

The tapping oil also serves to lubricate the advance cams and the worm gear drive unit in the advance housing.

The oil must be filled into the advance housing until the oil level is visible at the upper point of both oil gauges.

3.4.11 Initial trial run

Before running the machine for the first time, check all the oil levels in accordance with Section "8 Maintenance / Customer Service"! For more information, refer to Section "6 Preparation for the automatic sequence".



4 Operation and Function

4.1 Protection by password assignment

All machine functions are protected by passwords, that can be defined and set up by the user. In accordance with the relevant degree of danger, each function or mode of operation to be executed has been assigned a password level. The higher the level is, the more functions are enabled by the control system.

The passwords assigned can be displayed on the operating control. However, only those passwords will be indicated that have the same level as the level currently selected, or a lower level.

If no function or input pushbutton is operated within a period of 10 minutes, the password must be entered again.

4.2 Modes of operation

There are two distinct modes on the machine, setup mode and automatic mode.

In setup mode and with the protective doors closed, all the function keys are operative. When the protective hood is open, setup functions can only be performed if the "two-handed engagement" pushbutton is pressed at the same time. The feed motor and the coolant pump cannot be enabled.

In automatic mode, only the function keys "Automatic ON/OFF", "Feed device ON/OFF", and the spindle motor speed adjustment are effective. As a rule, automatic mode is started and stopped by operating "Automatic On/Off".

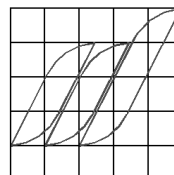
The mushroom-head pushbuttons for "Emergency Stop" are naturally operative in both modes.

4.3 Switch in the switch cabinet door

4.3.1 Master switch

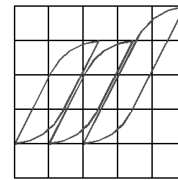
The master switch connects both the main circuit and the control circuit of the machine to the mains.

To avoid hazardous situations, the machine should always be shut down when it is not in operation. The master switch must not be used as an EMERGENCY STOP switch!



Warning:

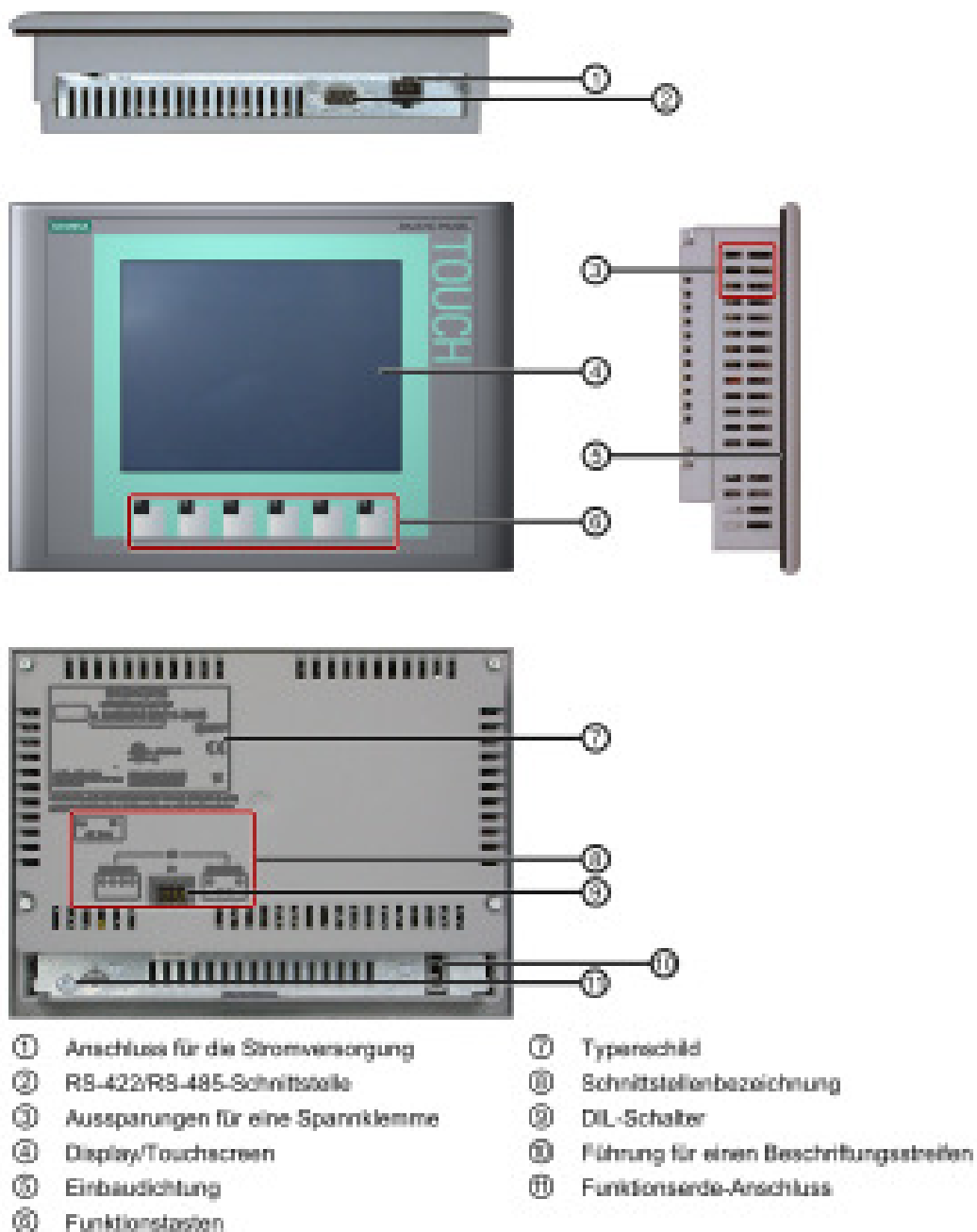
Only a suitably qualified and authorised trained electrical engineer is allowed to open the doors to the control cabinet and connect the machine in accordance with the electrical engineering regulations. When the electrical equipment is being worked on, the master switch must be OFF and the machine disconnected from the mains. As an additional safety precaution, the master switch should also be secured with a padlock. Refer to the electrical engineering regulations.

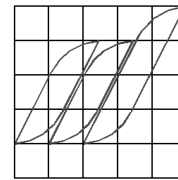


4.4 Operating control

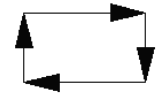
4.4.1 Operation and function of the operating control.

Aufbau des KTP600 Basic color DP





4.4.2 Function keys F1 – F4



4.4.2.1 Function key F1: "Compressed Air On/Off"

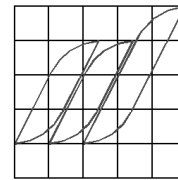
When this key is pressed, the entire pneumatic system is ventilated or vented. In the event of one protective door being open, respectively, this key will only have an effect if, within one second, the pushbutton "Two-handed engagement" is pressed simultaneously. This ensures that the person operating the machine cannot be injured by the movements of the machine.

The green LED of the pushbutton lights up, if the respective output of the control system is active.

If the machine is not in an automatic cycle, this function can be switched on and off as required. Before setup operation is started, the system must be ventilated. Otherwise no cylinder movements can be carried out.

If the machine is in automatic operating mode, then the system can now longer be ventilated. On completion of the automatic sequence, the pneumatic system is ventilated.

Following an activated emergency stop, the pneumatic system is ventilated by the machine. Only when the emergency stop function is no longer active, the pneumatic system can be ventilated again.



4.4.2.2 *Function key F2: "Feed device On/Off"*

4.4.2.3 *Function key F3: "Coolant pump On/Off"*

When these keys are operated the relevant motor is activated or deactivated. In the case of the coolant pump, the protective doors must be closed.

The green LED of the respective key lights up if the respective output of the control system is active.

Before the automatic cycle starts, the devices can be switched on. At the start and end of the sequence of work, the machine switches the motors on and off in each case. During the automatic sequence of work, the coolant pump cannot be switched off.

The infeed can be controlled in dependence of the delivery capacity. To do this, a light barrier each must be attached to the two feed chutes and connected at the corresponding PLC inputs. The feed device now runs until both light barriers are interrupted by the nut column. It subsequently stops until two parts / spindle have been tapped, and then starts up again.

If there is an EMERGENCY STOP, the devices are switched off. The motors can only be switched back on once the EMERGENCY STOP function has been cancelled.

4.4.2.4 *Function key F4: "Automatic On/Off"*

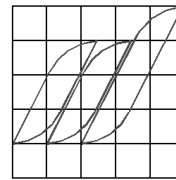
When this function key is pressed, the machine starts the automatic sequence of work. The coolant pump is switched on and after a few seconds, the other motors start to work (if they have not already been switched on).

The green LED of the pushbutton illuminates if the machine is in automatic mode.

The automatic cycle can only be started if the machine is in its starting position (operating message: "Starting positions"), and the emergency stop function is not active. In addition, the protective doors must be closed.

During the automatic work sequence, all keys can be operated (with the exception of the emergency stop command device), without there occurring a fault in the work sequence.

When the function key is operated again, the automatic run is terminated. The particular work cycle that has been started is completed after the pushbutton is pressed. When the machine has reached its starting position, the motors are switched off, the pneumatic system remains ventilated.



The automatic sequence of work is also terminated by malfunctions in the sequence of motions. Here, however, the cycle OFF signal comes from the machine itself and not from the person operating it. After shutdown, the flashing light comes on. The type of fault is displayed on the operating control.

4.4.3 Main menu

The main menu shows the totals counter and the current spindle speed. This totals counter counts the tapped nuts from both spindles. It can only be changed in the submenu Z10 via the two individual counters.

Simultaneously, the keys F1 – F4 can be used in the main menu to select the four submenus "Counter", "Performance", "Setup", and "Parameter".

4.4.4 Submenu "Counter"

4.4.4.1 Z10: Counter/Spindle

In automatic mode, the piece counters count the tapped nuts on a per spindle basis. These can be changed by entering a numeric value.

4.4.4.2 Z20: Output quantit /min

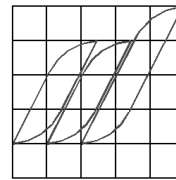
This parameter indicates the current capacity of the machine in pieces. The value comprises the output quantity from both spindles and is updated every minute.

4.4.4.3 Z21: Output quantity

Here, the current processing time for a single part is shown.

4.4.4.4 Z30: Shift counter

The shift counter counts the tapped nuts in automatic mode. The value can be keyed over freely or set to "0".



4.4.4.5 Z32: Cumulative counter (Lev.4)

This counter also counts the tapped nuts in automatic mode. The value can be keyed over freely or set to "0". In contrast to the shift counter, a password authorization is required here.

4.4.4.6 Z40: Piece preselection counter

With each cam stroke of both spindles, the input value of the piece preselection counter is decreased. The current value shows the current counter value. When the preset number of pieces is reached the machine switches off. Entering "0" deactivates the counter.

4.4.4.7 Z50: Event counter

This parameter can be used to control external additional devices (e.g. storage bunkers). In a similar fashion as for the piece preselection counter, the input value is decreased at each cam stroke of both spindles. The current value shows the current counter value.

When the preset number of pieces is reached, a corresponding SPC output switches to "1" for the duration of a single cycle and could activate a potential-free relay. The counter then starts to count again. Entering "0" deactivates the counter.

4.4.4.8 Z60: Hours counter (Lev.8)

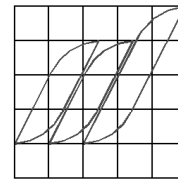
This parameter is used to show the machine run time in automatic mode. The value can be keyed over freely or set to "0". Then unit of the decimals after the point is 6 min.

4.4.5 Submenu "Performance"

4.4.5.1 M10 / M11: Spindle performance 1 / 2

Here, the effective performance of the spindle motor taken up during the forward movements of the carriages 1 or 2 is indicated. In order to compensate for minor performance variations caused by different material hardnesses, a mean value from three strokes shall always be formed.

For each individual spindle an upper performance limit can be entered in the second line. As soon as the value preset here is exceeded by the mean value, e.g. by a dulled tap, the machine shuts down.



4.4.5.2 M16: Spindle performance - lower limit

Here, the effective performance of the spindle motor taken up during each forward movement is compared to the effective performance of the preceding pre-stroke. The value of the current pre-stroke must therefore reach at least the value of the predecessor, corrected by the parameter to be input. If this value is not reached, the machine shuts down.

The standard value is 80%, that is, the effective power of the current pre-stroke may be 20% lower than that of the preceding one.

This measurement serves to detect a tap break, where immediately from one pre-stroke to another significantly less power is required from the engine.

4.4.5.3 M30: Adapt the spindle performance display

This parameter can be used to influence globally the effective performance display. This may be necessary if, when using certain taps, the effective performance is precisely known by means of other measurement methods, and this value is to be indicated also.

The standard value is 100%.

4.4.6 Submenu "Parameter"

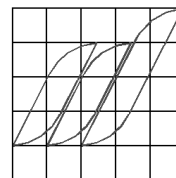
4.4.6.1 P10: Password processing

Users can log into the control system by pressing the key F2 and entering the password. In accordance with the relevant authorization level granted, the various individual submenus can then be selected and/or parameters modified.

The assignment between password and the user group with scope of authorization is effected by means of the "Edit" function key. Here, passwords and user groups can be administered.

General tips

- Passwords or users can only be set up and administered at the highest level 9, by a user "Admin" or "999". The password of these two users is only known to management or the production managers.
- Each user must be assigned a user group. The groups are numbered from 1,2,3 9, with this number – for the sake of simplicity - also corresponding to the level of authorization (e.g. Group 2 = Level 2, Group 6 = Level 6).



- Level "9" is only necessary for password administration, but not to operate the machine.
- The highest level necessary to set up the machine is "8". When the machine is delivered, a user "100" with password "100" is set up. This user should be deleted once the machine is accepted and set up with a new password.

Setting up a user

- Press F-key "Login" and enter user "999", press the Enter key, press the Tab key.
- Enter password, press the Enter key, press the Tab key for the ok query, press the Enter key
- Function key "Edit"
- Use the „Up/Down arrow key“ to select „new user“, Enter
- E.g. user „333“, Enter, Tab
- Enter password e.g. „333“, Enter, Tab, ok query, Enter
- 2xTab (select group), press Return and use the „Up/Down arrow key“ to select group, press Enter to confirm
- Tab (log off time), e.g. enter „20“, Enter, Tab, ok query, Enter

Deleting a user

- In the menu „Edit“, select a user and delete the username.

Logging a user off

- Press "Logout" key

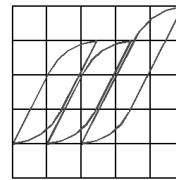
Logging on other users

- At "Login" enter the corresponding user with password.

4.4.6.2 P20: no automatic control OFF in the case of faults

If this value is set to "1", the machine does not shut down immediately when a fault occurs. Rather, the spindle side where there is the fault remains in its starting position, whilst the other spindle side still continues to produce. The flashing light flashes, and the type of fault is displayed on the operating control.

Due to the single spindle machine run in the case of faults, machine availability continues to be increased.



4.4.6.3 P30: Machine

This parameter adapts the control system to the machine type.

0 = TC16D

1 = TC33D

2 = TC10D

4.4.6.4 P80: Language

This parameter determines the appropriate language of the operating console.

4.4.7 Submenu "Setup"

In this menu E10 you were branched to the further machine setup menus.

4.4.7.1 D10 / D20: Running of spindle motor / Speed adjustment

Key "motor"

Press the key to activate the spindle motor, and release this key again to deactivate the spindle motor. The spindle motor runs only when the protective doors are closed.

Key +/-

Operate the key to adjust the spindle speed. Simultaneously, the spindle motor has to be activated.

For the quick setting of the correct speed, menu D10 shows the speed and, in relation to the thread size, also the cutting speed. However, first the thread diameter of the nut to be tapped must be defined in menu D20.

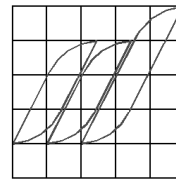
4.4.7.2 E4110 / E4210: Setup Spindle 1 / 2

Key brake

The parking brake of the spindle motor can be activated and deactivated by operating the key (Picture D20). This may become necessary, if the spindle needs to be turned by hand in setup mode.

Key >>

Press key to inch forward the advance device 1 or 2. In this way, all carriages and clamping movements can be observed precisely and adjusted if necessary. To this end, the pneumatic system must have been ventilated and, with the protective door on the operator side being open, the pushbutton "Two-handed engagement" must be operated.



When this pushbutton has been pressed, the spindle and advance cams start running. As soon as the respective starting position of the control shaft has been reached, the cam roll of the advance device is pneumatically pressed onto the cam, the advance device moves forward.

When the starting position is reached, the roll lifts off again; the advance device remains in the rear position, and spindle and advance cam stop. In order to move the advance forward again, the key must be released and pressed again.

Key <<>>

In order to be able to adjust the tool exactly when cutting round nuts, the radial clamping can be opened and closed with the key. To this end also, the pneumatic system must have been ventilated and, with the protective door on the operator side being open, the pushbutton "Two-handed engagement" must be operated.

4.4.7.3 E15: Speed of feeder

This parameter is used to control the speed of the feeder drums. In this way, the infeed volume can be adapted optimally to the machine requirement.

- 0 = Slow speed
- 1 = Standard speed
- 2 = Fast speed

4.4.7.4 E17: Delayed activation supply device

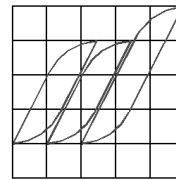
A light barrier in the supply channel controls the supply device. Once the nut column interrupts the light barrier, the supply device stops.

This parameter specifies by how many parts the nut column may slip down until the supply device starts running again.

4.4.7.5 E20: Nut type

This is used to enter the type of nut to be tapped on the machine.

- 0 = Hex nut
- 1 = Flange nut
- 2 = Round nut



4.4.7.6 *E21: Axial clamping cylinder pushes (round nut only)*

In accordance with the design of the nuts, this parameter is used to define whether the axial clamping cylinder is used to clamp the nut toward the rear against the contact pipe or toward the front against the forelock jaws.

- 0 = the nut is clamped toward the rear against the contact pipe
- 1 = the nut is pressed toward the front

4.4.7.7 *E22: Monitoring of axial clamping cylinders is active (round nut only)*

In rare cases, it may be necessary that even the short stroke of the axial clamping cylinder must be monitored by a proximity switch. If a nut is clamped in askew, the machine switches off.

For this purpose, the proximity switch must be fitted and wired up.

- 0 = the control system ignores the signal of the proximity switch
- 1 = the signal of the proximity switch is monitored

4.4.7.8 *E23: Number of interference removal attempts*

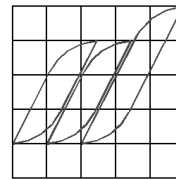
If the nut blanks drop into the clamp incompletely or slanted (see above), the running cart will remain in the rear position, the clamp will open and close and try clamping the part again correctly.

This parameter specifies how often this process is to repeat until the machine finally switches off.

4.4.7.9 *E25: Check: lack of nuts*

This parameter is used to define whether the proximity switches in the two feed chutes are to check for the existence of nuts or not. A deactivation of this check can be meaningful in particular when the machine is being run in.

- 0 = Check is active
- 1 = Check is not active



4.4.7.10 *E30: Activate spindle sides*

This parameter is used to determine whether, in automatic mode, the advance device is to be active from one spindle side only. This can be advantageous if the machine needs to be completely retooled, and the feed device on one side is not yet completely empty.

0 = the advance devices on both spindle sides are active

1 = only the advance device on spindle side 1 is active

2 = only the advance device on spindle side 2 is active

4.4.7.11 *E35: Left thread*

This parameter determines the rotation of the spindle motor.

4.4.8 Important operating messages

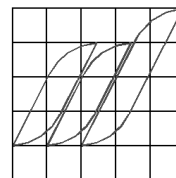
4.4.8.1 *Starting position*

The machine is in its starting position. The precondition for this is:

- LED 1.5 "Carriage 1 rear position " illuminates (switch on pneumatic cylinder in the advance device housing outputs signal).
- LED A12.0 "Valve, carriage 1 to front " does not illuminate (valve does not pick up).
- LED 1.7 "Carriage 2 rear position " illuminates (switch on pneumatic cylinder in the advance device housing outputs signal).
- LED A12.2 "Valve, carriage 2 to front " does not illuminate (valve does not pick up).

4.4.8.2 *Spindle 1/2: no starting position*

The advance device on spindle side 1 / 2 is not in its rear position (rear cylinder switch does not output signal).



4.4.9 Important fault messages

4.4.9.1 *Emergency Stop*

The machine is not ready for operation. The Emergency Stop device is activated (see Sect. "4.4.11 Mushroom head pushbutton "Emergency stop" (red) / .Emergency stop device").

4.4.9.2 *Control shaft is blocked*

The coupling between spindle and control shaft is slipping. There can be various reasons for this:

- A nut has become stuck between the carriage and the feed chute.
- The radial clamping has become stuck during opening after the tapping process; the carriage cannot return from the front position.
- The air pressure of the pneumatic system is too high; the advance device cannot be moved to the rear by the cam roll.

4.4.9.3 *Carriages 1 or 2 are stuck on the feed chute*

If a nut should not drop correctly into the clamping or the prism of the carriage, the carriage becomes stuck on the feed chute. In this case, the cam disk continues to rotate but the cam roll lifts off the down cam and the advance device is at a standstill. As soon as the cam rises again, the roll makes contact again, and the advance device is moved to its rear position.

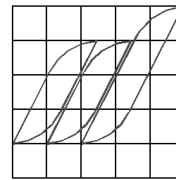
This small to and fro movement of the carriage frequently causes the nut to drop in correctly at the second pre-stroke.

If the carriage is still stuck on the chute during the third pre-stroke, the machine switches off.

When tapping round nuts, in addition to the to and fro movement of the carriage, the radial clamping is opened and closed again.

4.4.9.4 *Radial clamping spindle 1 / 2 not closed*

When tapping round nuts, the closing of the radial clamping is controlled by a proximity switch. This check is effected a short time after the valve has been activated and as long as the advance device is still in its rear position. If the switch does not output a signal, the cam roll is pulled backwards to ensure that the carriage remains in the rear position.



If the clamping does not close correctly three times in a row, the machine switches off (see paragraph above).

If this fault message should appear without any obvious reason, check the air pressure (6 bar) of the machine. If the air pressure is insufficient, the clamping device closes too slowly and the check by the proximity switch comes too early.

4.4.9.5 Carriages 1 / 2 have not reached the front position

In order to ensure that the nut is indeed fed via the tapping device by the necessary measure at each pre-stroke, the switch on the relevant advance cylinder must output a signal in the front position. If this is not done, the machine shuts down.

4.4.9.6 Carriages 1 / 2 have not reached the rear position

This message appears if the rear limit switches are not adjusted correctly. With every spindle stroke the switches have to be actuated.

When adjusting the limit switches move the switch slowly from the back to the front. When the LED comes on, push the switch about 1 mm further, for operational safety.

4.4.9.7 No more parts to tap – Spindle 1 / 2

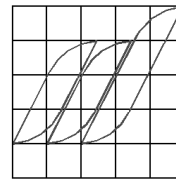
Check the two bottom proximity switches on the feed chutes in order to see whether the nut columns are moving. If, within a specified period of time, no Light/Dark change is found any more, the machine shuts down. The length of the time depends on the speed.

4.4.9.8 Preset number of pieces reached

The number of pieces set with the "piece presetting counter" has been reached.

4.4.9.9 The upper / lower performance limit for spindles 1 or 2 has been reached

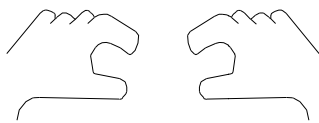
See Sect. "4.4.5 Submenu "Performance"



4.4.9.10 External automatic control OFF

The machine can be shut down by external devices. To do this, a 24VDC signal must be applied to the relevant PLC input. If this occurs, the relevant message is displayed, and the machine shuts down.

4.4.10 Pushbutton "Two-handed engagement"



This pushbutton is used to protect the person operating the machine during setup mode. The inching movement of the advance devices and the opening/closing of the radial clamping is only functional if the safety doors are open in conjunction with "two-handed engagement". As soon as the function key is released and pressed again, the pushbutton must also be pressed again.

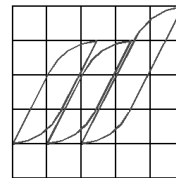
This ensures that the person operating the machine cannot be injured by the movements of the machine.

4.4.11 Mushroom head pushbutton "Emergency stop" (red) / .Emergency stop device

The EMERGENCY STOP device is activated in the following way:

- by operating personnel:
 - by operating the red mushroom head pushbutton "Emergency Stop";
 - by opening one of the spindle drive doors
- by the machine itself
 - by a response from the motor protection switch of the spindle motor, the coolant pump or the magnetic roller

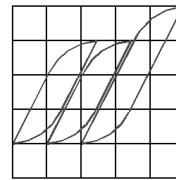
After activation, all the motors are brought to a standstill immediately, and the signal light is switched on. As long as the emergency stop device is active, no control functions can be executed.



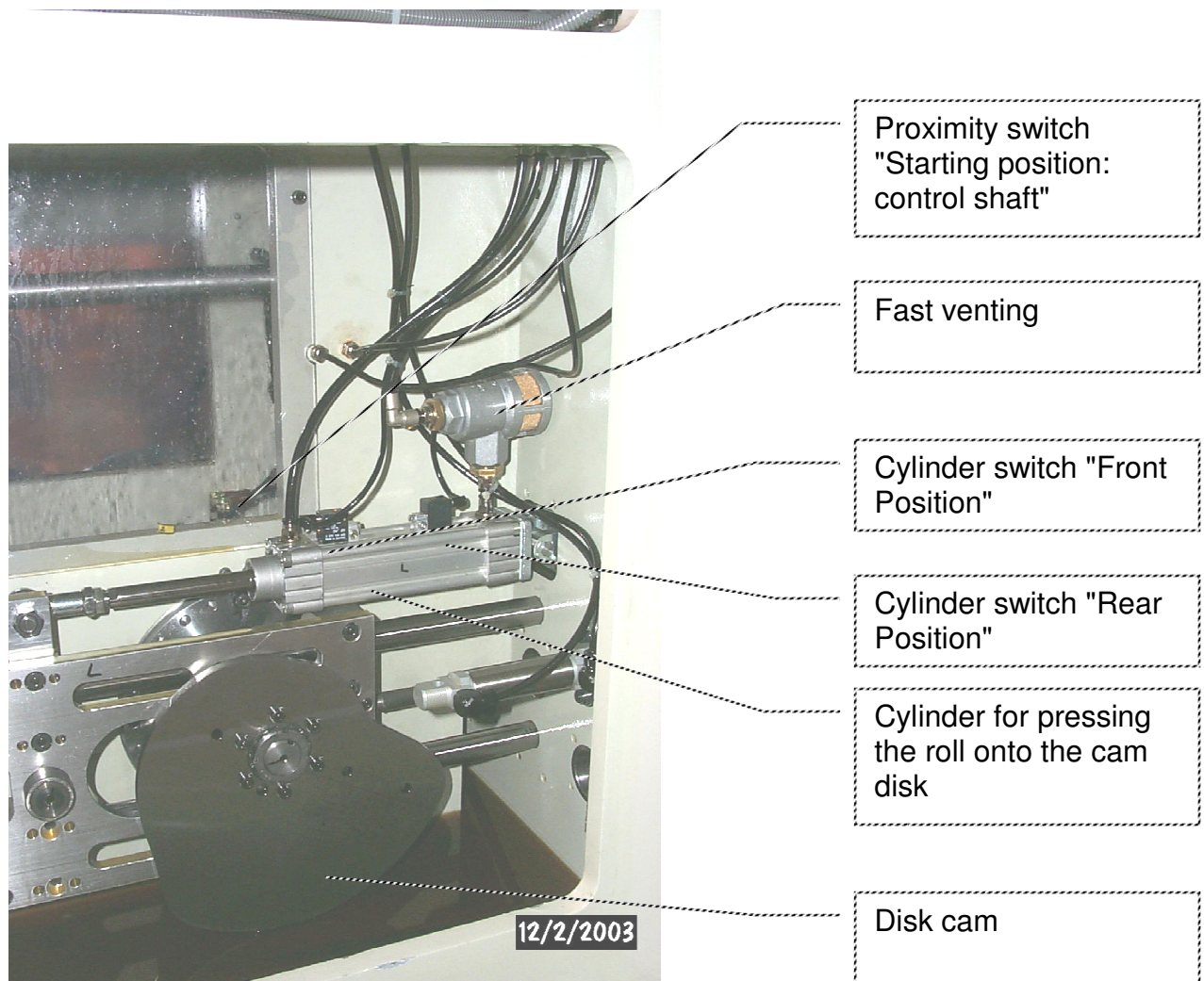
The mushroom-head pushbutton must not be used for an operational shutdown of the machine!

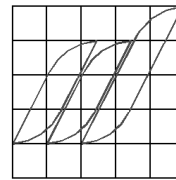
The effectiveness of the EMERGENCY STOP device is cancelled by one or more of the following actions:

- Dis-engagement of the red mushroom-head buttons
- Pressing the I button to re-activate the corresponding motor protection switch.
- Pressing the yellow ACK button on the operator control for resetting the EMERGENCY STOP device. Both protective doors must be opened.



4.5 Arrangement of proximity switches in advance device housing





5 Tool Change / Resetting the Machine TC-16D (TC-33D)

5.1 Remove feed tool

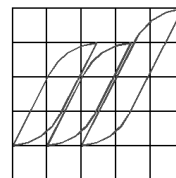
1. Move the feed drum to the rear. To this end, undo 2xM16 (2xM20) threaded pins in the drum shaft.
2. Remove sorting ring, intermediate layers, and spikes.
3. Unscrew the proximity switch holder in order to check the parts in the feed channel.
4. Undo the four M8 socket head screws to remove the chute.

5.2 Remove hex nut tool

1. Unscrew the four M8 socket head screws to remove the prisms.
2. Remove tap guide pipe: Remove M6 socket head screw and withdraw pipe to the rear from the spindle.
3. Depending on the type of nut, if necessary, remove the ejector head; to this end, the four M8-(8xM10) socket head screws must be unscrewed.
4. Unscrew the six M6-(M10) socket head screws to remove the advance cam.

5.3 Remove hex nut advance device

1. Undo M16/SW24-(M24/SW36) nut on the control rod of the advance device.
2. On the 2-edged (6-edged) unit, unscrew the control rod of the carriage toward the front.
3. Undo two M10-(M12) socket head screws respectively on the left and right of the transverse yoke.
4. Undo twice M10 threaded pins in the column flange on the advance device housing. (Unscrew 32xM8 at the clamping half-bearings)
Move the guide columns to the rear by approximately 20 cms.
5. Now lift the complete advance device from the machine.

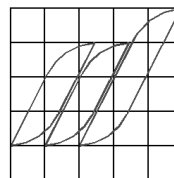


5.4 Fit round nut carriage

1. Screw holding device with ring-shaped lug onto the carriage. To this end, unscrew the respective internal M5 socket head screw of the two round guides for the advance wedges.
Warning: The two external M5 socket head screws must not be undone, as otherwise the guides become disadjusted and the wedges later block during any advance run!
2. Use crane to lift carriage into the machine. Note the number on the carriage.
3. Then push the internal guide column through the carriage toward the front to such an extent that the tightening surface of the column becomes visible on the column flange. Then, push the column by approximately 10 mms to the rear again for the sake of safety.
4. Tighten the M10 threaded pin within the internal column flange. Whilst tightening, always turn the column slightly to the left and right in order to ensure that the screw sits flat on the tightening surface.
5. Align carriage and fit external column according to the same pattern.
6. Remove holding device with ring-shaped lug and fully retighten round guides.
7. Insert 6-pin connector.
8. Connect air hoses:
Connection advance device housing top/inside <--> Connection carriage top
Connection advance device housing bottom/inside <--> Connection carriage bottom
6. Screw control rod with M16 thread onto the advance device rod, do not yet tighten M16/SW24 nut.

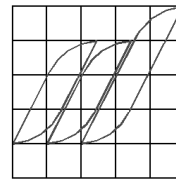
5.5 Adapt advance device for cutting round nuts

1. Fit advance cam in accordance with the direction of rotation arrow on the cam. When it is at the top of the cam, the arrow must point to the rear (spindle side 1 clockwise, spindle side 2 anti-clockwise).
2. Fit the ejector with four M8 socket head screws. Depending on the type of nut to be tapped, it may be necessary to screw a stop plate into the head.
3. Push tap guide pipe into the spindle and use M6 socket head screw to tighten.
4. Fit contact pipe and clamping jaws with tightening rods into the carriage.

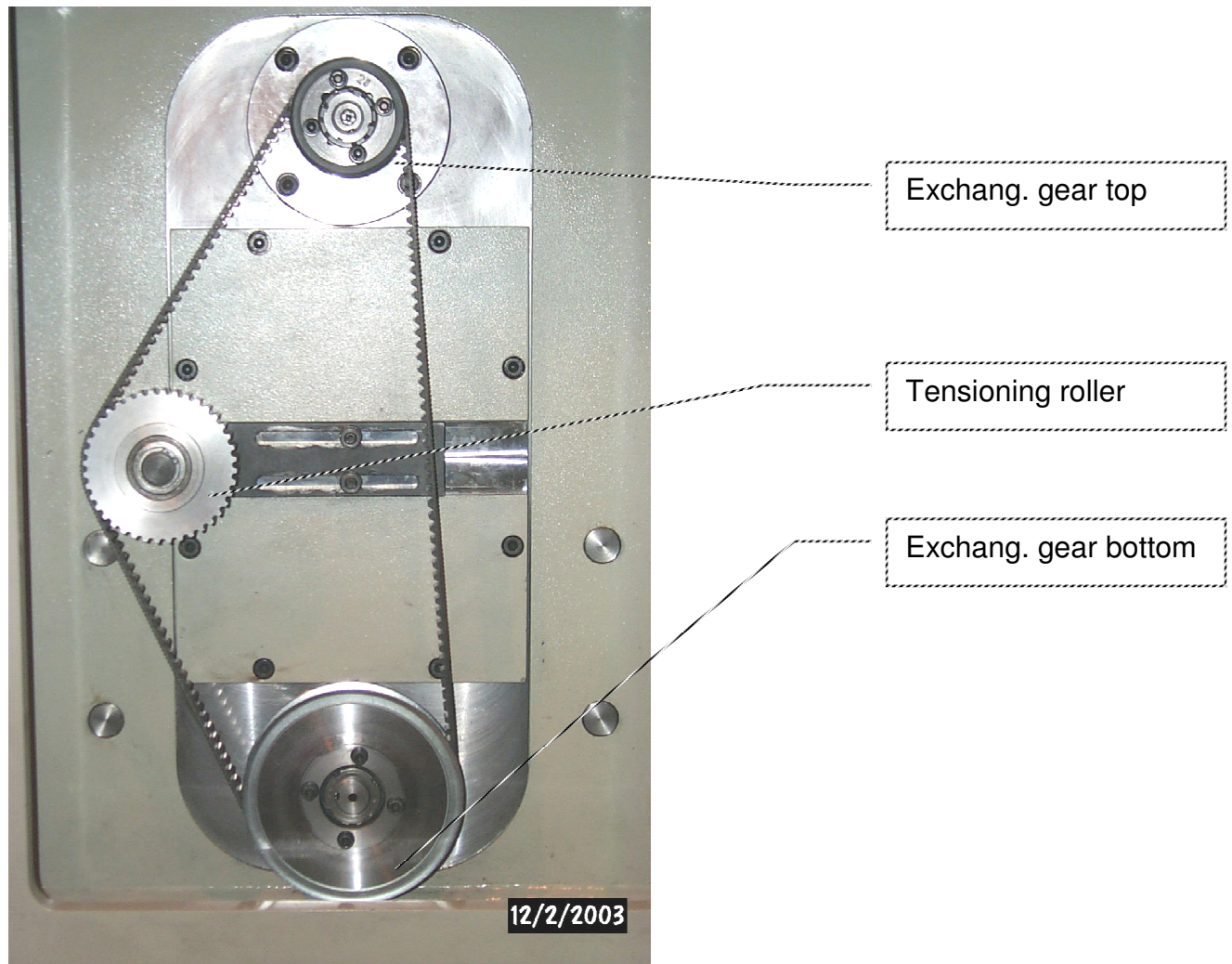


5.6 Fit feed tool

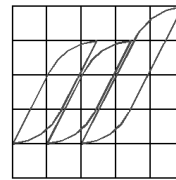
1. Bolt on the chute with four M8 socket head screws.
2. Fit the proximity switch holder for checking the parts in the feed chute.
3. Fit sorting ring, intermediate layers, and spikes.
4. Push the feed drum toward the front to such an extent that the sorting ring is in contact with the wear plate. Then tighten the rear M16-(M20) threaded pin in the drum shaft.
5. By turning the knurled nut, position the feed drum by 0.5 mm to the rear again, so that the sorting ring is no longer in contact with the wear plate. Then tighten the front M16 threaded pin in the drum shaft.



5.7 Fit exchangeable gears for adapting the gear ratio

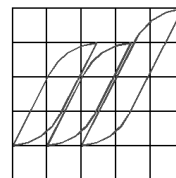


1. Undo the four M6-(M8) socket head screws of the top and bottom exchangeable gear.
2. Undo both 2xM8-(4xM8) nuts of the belt tensioner, push tensioner to one side and remove toothed belt.
3. No replace exchangeable gears. The exchangeable gears with the correct number of teeth suitable for the advance cam are noted on the advance cam.
4. Fit toothed belt and tension with belt tensioner.
5. Firmly tighten the screws of the exchangeable gears.



5.8 Adjust round nut carriage

1. Set low spindle motor speed.
2. Operate the relevant function key in the submenu "Setup Spindle 1 / 2" on the operating control such that the cam roll of the carriage is pressed against the advance cam but the carriage still remains in its rear position.
3. Operate the function key "Open clamping".
4. Turn the control rod to shift the position of the carriage. The control rod must now be turned manually such that the surface of the contact pipe is in alignment with the inside of the chute cover strips. Now add approximately 0.3mm for drop-in tolerance.
5. Lock M16/SW24 nut on the advance device rod with control rod.
6. Check opening path of the radial clamping by multiple operation of "Open clamping". The opening path can be determined via an M8 adjuster screw located centrally in the carriage. It should be preset such that the tapped nut is not touched when the carriage moves backward.



6 Preparation for the automatic sequence

Enable the master switch.

As soon as the flashing light flashes, the control system is ready for operation. Now any existing fault messages should be acknowledged by pressing the yellow ACK key.

Tip:

When the ACK key is pressed longer, the fault messages on both spindle sides are acknowledged.

Open both protective doors and reset the emergency stop device. The flashing light and the red LED of the operating control extinguish.

Close protective doors and use function key "Compressed air On/Off" to ventilate the pneumatic system. If necessary, check air pressure.

On the operator console, the operating message "Starting position " must appear.

Start the spindle motor via the submenus "Setup" – "Speed". Whilst the motor is running, adjust the spindle speed until the required cutting speed has been reached.

When using special tapping oil, cutting speed values for nuts that have not been heat-treated should be between 60 and 100 m/min. For heat-treated nuts with hardnesses of 26 - 32 HRC, cutting speeds should be between 40 and 60 m/min.

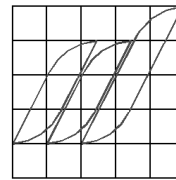
In order to avoid nuts being thrown off the tap, speed adjustment should be effected quickly.

Subsequently, stop the spindle motor.

Press the function key "Feeder On/Off" to check the troublefree infeed of the nuts. If necessary, set the rotation speed of the feed drums in the submenu "Feeder speed". The feeder device can optionally be operated in dependence of the infeed capacity. For this purpose, proximity switches must be fitted to both feed chutes (see Sect. 4.4.2 Function keys F1 – F4").

Direct the coolant output nozzle onto the tap point and, following the closure of the protective door, operate the function key "Coolant pump On/Off" and check the flow of coolant. If required, the quantity of oil can be regulated on the shutoff slide of the pump.

Next, press function key "Automatic On/Off" to start automatic operation. The pump starts up immediately, the spindle motor and the feed device start up a few seconds later. Automatic operation begins.



Sorted by the feed device, the blanks arrive via the two feed chutes in the drop-in position. If the carriage is in the rear position, the bottom part drops into the open clamping or, in the case of hex nuts, into the prism.

As soon as the carriage moves forward, the clamping closes and holds the dropped-in blank radially and axially. When a flange nut carriage is used, springs are used for clamping; in the case of a round nut carriage a pneumatic cylinder provides additional radial clamping force.

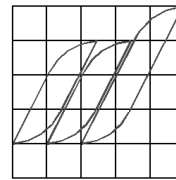
Hex nuts are not clamped in at all but secured in a prism against turning out of position.

When tapping has been completed, the clamping opens, the carriage moves backward and the next blank drops in. The tapped nut remains on the tap shaft and, with each newly tapped nut, is moved further along the shaft until it is finally thrown off at the rear of the shaft, via the bent end of the same.

When the function key "Automatic On/Off" is pressed again, the machine shuts down in its starting position. All the motors stop.

During the automatic machine run, the operating personnel only have a monitoring function, as if there is a malfunction, the machine will shut down and this will be indicated by the flashing indicator.

To ensure that the machine operates without malfunctioning, the automatic swarf and part conveyors from the machine should occasionally be checked. With high swarf volumes in particular, it is necessary from time to time to pull the swarf from the discharge slide by hand.



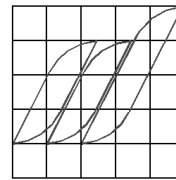
7 Adjusting the machine / machine faults

7.1 Machine malfunctions in the sequence of motions

The front and rear positions of the advance devices are monitored by cylinder switches. In the case of faults, the machine shuts down automatically; the flashing indicator starts to flash.

Resuming the automatic sequence of work:

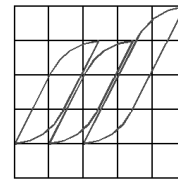
- Release the mushroom-head pushbutton if it has been pressed, and reset the emergency stop device.
- If necessary, place the advance devices in starting position via the submenu „Setup Spindle 1 / 2“.
- If the cam disks do not move, the clutch of the control shaft is slipping. Ventilate the pneumatic system via the operating control and attempt to remove the blockage with the spindle motor by operating the F2 key in inching mode in the submenu “Speed”.
- Otherwise open the rear door of the advance housing and ventilate the brake of the spindle motor via the operating control. Use an Allen key to rotate the top exchangeable gear slightly forward and backward, and attempt in this way to free up any existing blockage.
- Remove tools in carriage and / or feed chute.
- Eliminate the cause of the fault.
- If necessary, check the motor protecting switch.
- Ventilate the pneumatic system via the operating control.
- Then, in accordance with the "Preparation for the automatic sequence" paragraph, restart the machine.



7.2 Reject threads

According to DIN, the reject peg of the thread limit plug gauge is allowed to screw into the nut tap for a maximum of 1.5 revolutions. If the reject peg screws further in, the thread flank diameter is too great. There can be various reasons for this. The following points should be taken into consideration:

- Check the thread root diameter of the blanks. The thread root diameter must conform to DIN 336.
As a rule of thumb: The approximate size of the thread root diameter should be about the same as the diameter of the thread less the pitch.
- When the taps are new, there can still be grinding burrs on the cutting edges, so tap approx. 50 nuts and then check again.
- Modify the cutting speed by stepping it up or down.
- Choose the next smallest or next biggest tolerance zone position for the tap.
- It is essential that the swarf builds up and clears perfectly. It may be necessary to use a tap with a different cutting geometry.
- Check the taps for cutting edge welding or cutting edge breakouts. If necessary, use surface-treated taps.
- Reduce the cutting angle of the tap by regrinding or test a different tap.
- Use a different tapping oil.
- Check tap shaft diameter. The play between the thread core diameter and the tap shaft diameter should be between 0.3 – 0.4 mm for the Top-Cut 16 D machine, and between 0.4 – 0.55 mm for the Top-Cut 33 D machine.
- Check the shaft of the tap to make sure that it is running sufficiently true. It must be absolutely straight and concentric to the thread part of the cutter.
- The tap must not wobble excessively within the guide tube. The play between the nut outside contour and the tap guide should be between 0.3 – 0.4 mm for the Top-Cut 16 D machine, and between 0.4 -0.5 mm for the Top-Cut 33 D machine.



7.3 Excessive wobble (thread not at a right angle to the contact surface)

Normally, it is possible to achieve an extremely low wobble with the machines in the Top-Cut series. With an appropriately good nut quality and carefully maintained clamping device, it is less than 0.08 mm.

Warning!

Gauged threads are an absolute prerequisite for checking the wobble. Eject threads always falsify the measurement result.

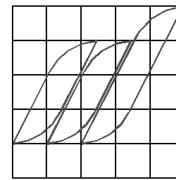
Off-centre bores by more than 0.2 mm significantly increase wobble. This is caused by an excessive deviation of the core bore from the centre in relation to the outside contour, an outside contour that is formed such that it is too small, so that the nut drops too deeply into clamping or is able to evade the clamping to one side, or worn clamping jaws.

If necessary, this can be checked by a dial gauge placed onto the spindle. It must be ensured that the dial gauge mounting is permanently connected to the spindle. Magnetic mountings should be avoided due to their insufficient stability.

Nuts clamped in an askew position have serious influence on the actual wobble. In order to check the same, 10 - 20 marked nuts are filled into the feed chute and tapped. It is best if the marking is in top position. Next, wobble is checked. If the wobble values relative to one another, as well as their angle positions, are almost identical, then the front contact surface of the contact pipe is not positioned at a right angle to the tap axis. Therefore the contact pipe must be reground.

To this end, the contact pipe is removed and screwed vertically onto a plate ground on both sides and featuring the approximate dimensions 200 x 200 x 18. On a surface grinding machine, the nut contact surface of the contact pipe is ground until clean.

Subsequently, 10 – 20 marked nuts are again tapped and checked. The individual wobble values must now be correspondingly low and the angle positions vary.



8 Maintenance / Customer Service

8.1 Daily maintenance

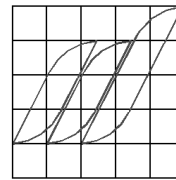
- Check the oil level for the tapping oil on the oil-level gauge on the front of the machine and if necessary replenish oil.
- Check the magnetic drum to see if swarf or nuts have become jammed and if so, remove them.
- Get rid of any swarf in the working area.
- De-grease the swarf, clean it and dispose of it in an eco-friendly way, in accordance with the regulations.
- Check the machine for obvious damage and defects. Notify the competent office of any changes that have occurred. If necessary, bring the machine to a standstill immediately and secure it.

8.2 Weekly maintenance

- Check the oil level in the advance device housing and, if necessary, replenish with tapping oil until the disk cams plunge approximately 1-2 cm into the oil with their highest points.

8.3 Monthly maintenance

- Clean all the polished surfaces of the machine with a cleaning cloth, if they are heavily soiled, use a domestic cleaner as well.
- Blow out all the filters in the doors of the control cabinet, or, if they are heavily soiled, replace them (refer to the manufacturer's Instruction Manual for this).



8.4 Six-monthly maintenance

- TOP-CUT 16D and TOP-CUT 33D only
Use a feeler gauge to check the vent path of the spindle motor brake according to the Lenze operating instructions, and adjust if necessary. To this end, the venting hood of the motor must be removed. The nominal venting path of the fitted brake BFK458-14 is 0.3mm (see Lenze Operating Instructions, Sect. 6 "Maintenance/Repair" – Page 35, Sect. 4.3 – Page 23 and the table in Sect. 3.3 "Characteristic data" – Page 16).
- Clean the entire tapping oil reservoir. To this end, remove the magnetic roller and pump off the oil. Dispose of the old oil and sludge properly and in an eco-friendly way!
- Clean the working area, and all surfaces sliding on one another. Remove even the smallest slivers.
- Check the machine's electrical equipment. Defects, such as loose connections, singed cables or oily operating means must be eliminated immediately.

8.5 Annual maintenance

- Switch off the master switch. Check spindle motor for contamination. If necessary, clean fan impeller and cooling ribs.

8.6 Customer service

For the process to be guaranteed, it is most important that the machine is available and reliable. To maintain the proven technical performance level of the machine, it is advisable to periodically allow the machine to be serviced by Messrs Streicher. This will ensure that weak points are detected in good time. This will also reduce machine downtime to a minimum.