Operator's manual

TruBend Series 7000

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TruBend Series 7000

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TRUMPF

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Chapter 1

Safety

Delivery versions

Machines with complete safety equipment according to the requirements of the EC Machinery Directive:

- These machines are supplied with CE marking as well as EC Declaration of Conformity.

Machines without complete safety equipment:

- These machines do not fulfill all requirements of the EC Machinery Directive. These are supplied with an EC Manufacturer's Declaration and without CE marking.
  - Machines without complete safety equipment do not have the optoelectronic safety device, operate with the maximum closing speed of the beam and the maximum positioning speed of the backgauge.
- The operator must take suitable measures for the operational safety of the machine in accordance with the statutory regulations of the country in which it is operated.
- Machines without complete safety equipment cannot be operated in the European Union and its associated countries.

Note
The machine with complete safety equipment is described in the operator's manual.

1. For your safety

EC Declaration of Conformity

With the CE marking and the EC Declaration of Conformity, TRUMPF confirms that the machine corresponds to the basic safety and health-related requirements of the EC Machinery Directive, ANSI and OSHA.

The CE marking is located on the nameplate of the machine. The EC Declaration of Conformity is delivered along with the machine.

Chapter Safety

This chapter describes the safety concept of the machine and indicate possible dangers and measures. The overview of residual risks contains measures to be taken by the operator in order to reduce the residual risks.

Note
The operator must adhere to the valid safety and accident prevention regulations of the respective country and the safety laws of the state and of the region!

Warnings and danger signs

Certain activities can be a source of danger during the operation. The documentation contains warnings before the instructions for these activities. Danger signs are attached on the machine (see "Measures to be taken by the manufacturer", pg. 1-10).

A warning contains signaling words that have been explained in the following table:

Signaling word	Description
Danger	Indicates a major danger. Could lead to death and serious injuries if not avoided.
Warning	Refers to a dangerous situation. Could lead to serious injuries if not avoided.
Caution	Refers to a dangerous situation. Could lead to injuries if not avoided.

Tab. 1-1

Example:

Danger

Suspended load!
Falling loads could lead to severe injuries or even death.
- ➢ Observe the safety regulations for the handling of heavy loads.
- ➢ Never walk under a suspended load.
- ➢ Use tested and appropriately sized tackle and means of transportation.
- ➢ Employ qualified technicians to transport the machine.
- ➢ Carry out the transport in accordance with the transport regulations.

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2. Operational safety

The machine can become a source of danger if it is used inappropriately or for purposes other than intended (see "Overview of residual risks", pg. 1-21):

- Dangers to the safety of the operator.
- Damage to the machine and to other objects of the operator.
- Impairment of the working efficiency of the machine.

2.1 Authorized use

Machine
The operator may only bend cold metal sheets using the machine.

The operator may use the machine only in the industrial sector.

The installation, operation and transport conditions for the machine prescribed by TRUMPF must be adhered to and the maintenance work must be performed. The installation of the machine and its operation must comply with the national regulations valid in the country where the machine is operated. The operator must adhere to the national regulations.

The following is impermissible:

- Unauthorized changes and retrofitting of the machine.
- Any working procedure that impairs the safety.
- Processing of hot or splintering materials.
- Unauthorized use of tools that are not allowed by TRUMPF.

Exemption from liability
Any use, service and maintenance going beyond this is not intended. TRUMPF does not accept liability for any damage to property or persons arising from these. The risk is borne solely by the operator. The machine guarantee will be voided.

2.2 Authorized personnel

Only authorized, trained and briefed personnel should operate, set and service the machine.

Only specially trained personnel should:

- work on the electrical modules.
- Transporting, installing, and disassembling the machine.
- Check safety elements.

3. Hazards

3.1 Overview of laser classes

Laser systems are divided into laser classes according to the European standard EN 60825-1. The laser class corresponds to the hazard level of the laser light emitted.

Laser class	Description
1	The accessible laser radiation is not dangerous under sensibly predictable conditions.
2M	The accessible laser radiation lies in the visible spectral range of 400 nm to 700 nm. It is not dangerous for eyes in the case of short exposure time (up to 0.25 s) as long as the beam is not observed through optical instruments (magnifying glass, lens, telescope).
	Eyes are normally protected from the laser light by turning away and closing the eyelids.

Overview of laser classes   Tab. 1-2

3.2 Hazards due to laser radiation

BendGuard with block laser

BendGuard with block laser is an optoelectronic safety device and corresponds to laser class 1.

Warning

Class 1 laser radiation!
Eye injury.
➢ Do not look directly into the laser beam.

Line laser

The line laser corresponds to the laser class 2M.

Warning

Class 2M laser radiation!
Long-term damage to eyes.
➢ Do not look directly into the laser beam.
➢ Do not look at the laser beam directly through optical instruments.

3.3 Hazards when dealing with workpieces

Handling of workpieces can be a source of danger. These dangers and the measures taken against them differ depending on the workpiece.

Upper and lower tool
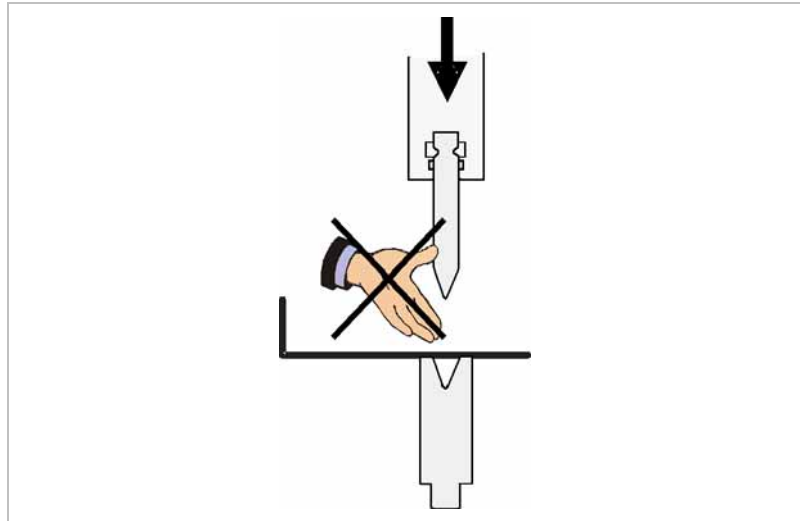
Fig. 25903

⚠️ **Warning**	**Beam moves downwards!** **Separation of body parts.** ➢ Never insert hands between upper and lower tools.

Workpieces

⚠️ **Warning**	**Workpieces have sharp edges!** **Risk of injury** ➢ Wear personal protective gear.

⚠️ **Warning**	**Workpieces falling due to sudden release of the beam!** **Risk of injury** ➢ Wear personal protective gear. ➢ Select a lower tool die width that is suitable for the material thickness of the workpiece and angle.

Side of the workpiece
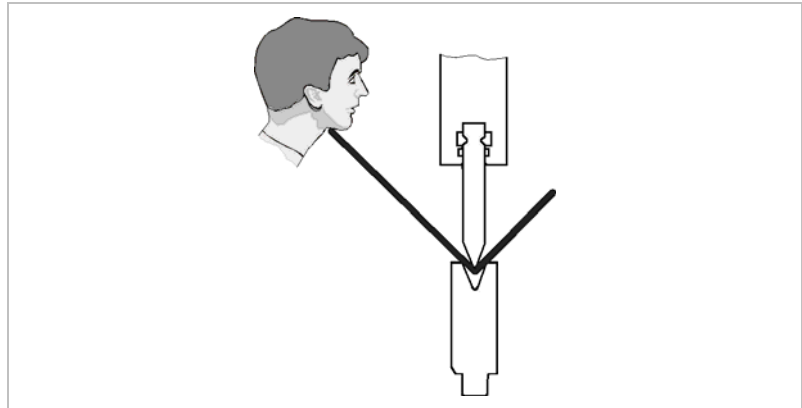
Fig. 25906
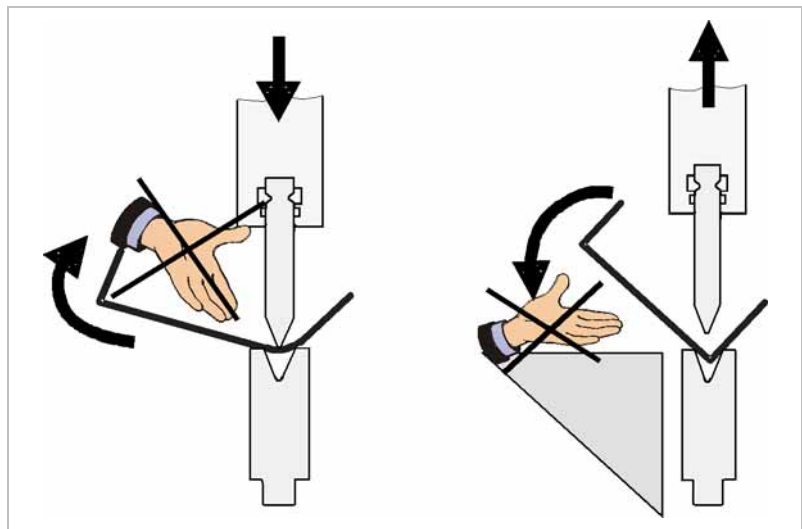
Fig. 53449

⚠️ **Warning**	**Side of the workpiece swings upwards during bending and then again downwards after bending!** **Risk of injury, crushing.** ➢ Maintain sufficient distance from the workpiece. ➢ Hold the workpiece from below. ➢ In the case of supporting aids: hold the piece from the side after bending.

Position the workpiece

The workpiece and the gauge fingers of the backgauge can collide if the workpiece is positioned incorrectly.

Depending on the processing strategy of the backgauge, the workpiece must be positioned such that it does not collide with the backgauge.

Warning

Backgauge moves unexpectedly!
Risk of injury
➢ Position the workpiece only after the backgauge has moved to the next position.

3.4   Dangers in the switch cabinet

Danger

Electrical voltage!
Electric shock.
➢ Keep the switch cabinet closed.
➢ Each time before opening the switch cabinet: set the MAIN SWITCH to 0 and wait for five minutes.

Caution

Hot surface!
Burns.
➢ Keep the switch cabinet closed.
➢ Each time before opening the switch cabinet: set the MAIN SWITCH to 0 and wait for the cooling phase.

3.5   Noise hazards

The A-rated equivalent continuous sound pressure level at the workstation of the operating personnel is ≤70 dB(A).

4. Measures to be taken by the manufacturer

The danger zone of the machine is safeguarded by safety devices. The machine may only be operated with these safety devices.

4.1 Safety devices and protection of danger zones

Danger zones of the machine are protected by safety devices.

1	Safety brake	6	Upper protective cover
2	Rear protective cover	7	Emergency stop impact button
3	Main switch and Service key switch	8	Beam down foot switch with stop function
4	Optoelectronic safety device (optional)	9	Emergency-up foot switch
5	Side safety doors		

Safety devices and danger zones   Fig. 53816

Emergency stop impact button

EMERGENCY STOP brings about the following:

- The power supply to the machine is disconnected (24 V control voltage is maintained).
- The axes motion stops.
- The safety brake is activated.
- EMERGENCY-UP is deactivated.

Beam down foot switch with stop function

The BEAM DOWN foot switch has three positions:

Position	Description	
0	Not pressed	The beam stands still or stops.
1	Pressed	The beam moves downwards.
2	Pushed through	The axes motion stops.
		The safety brake is activated.

Tab. 1-3

Emergency-up foot switch

The EMERGENCY-UP foot switch can be used to move the beam upwards. The EMERGENCY-UP foot switch is not active if EMERGENCY STOP was triggered. The EMERGENCY-UP foot switch has two positions:

Position	Description	
0	Not pressed	No effect on the beam.
1	Pressed	The beam moves upwards.
		The control system remains set to START.

Tab. 1-4

Optoelectronic safety device (optional)

The optoelectronic safety device monitors the area below the upper tool during a light field operation.

The beam moves at the maximum speed (up to 220 mm/s) between the upper dead point and the mute point The optoelectronic safety device monitors the area in front of and below the upper tool. If the light field is interrupted during operation, the beam stops moving.

The beam moves at a reduced speed between the mute point and the lower dead point. The optoelectronic safety device monitors the area below the tool tip of the upper tool. If the light field is interrupted during operation, the beam stops moving.

Side safety doors

The side safety doors secure the area to the side of the beam and the press table. When the safety doors are closed, the danger zone cannot be accessed from the side.

If **both** the side safety doors are opened during operation:

- The axes motion stops.
- The safety brake is activated.

If **one** of the side safety doors is opened during operation:

- The axes motion stops.
- The opening can be confirmed with the Beam down foot switch. All axes can again be moved. The beam moves only at a reduced speed.

Rear protective cover

The rear protective cover secures the danger zone inside the machine. The protective cover is firmly screwed.

The rear protective cover must be firmly screwed each time after being removed.

Upper protective cover

The upper protective cover secures the commuting area of the safety brake. The protective cover is firmly screwed.

The upper protective cover must be firmly screwed each time after being removed.

Safety brake

If the beam does not stop within the springback and the lag time, the safety brake stops the machine drive. The beam movement stops.

The safety brake locks the drive at standstill and prevents the beam from falling.

Main switch

The main switch is used to switch the machine on or off. The main switch can be prevented from being switched on again using a lock.

Key switch for service (only in USA and Canada)

There is a key switch for the maintenance work performed by trained personnel.

The key switch is located on the switch cabinet and has two positions.

0	The machine is switched off when the switch cabinet doors are opened.
1	The power supply of the machine is maintained when the switch cabinet doors are opened.

Tab. 1-5

Safety functions of the control system

The danger zones of the machine are additionally protected by the safety functions of the control system.

Safety control system

The machine is equipped with a safety control system that corresponds to the requirements of the EN 954-1 category 4.

This means: even if there is an error in the control system, all safety devices and safety measures continue working.

Monitoring the programmed working speed

Individual bends of a program can be programmed with an increased working speed (up to 25 mm/s).

The working speed of the beam is monitored and can be more than 10 mm/s only under the following prerequisites:

- A tool with a permissible die width is selected.
- The bending angle is 90°.
- The correction of the bending angle is smaller than or equal to 10°.
- BendGuard Mode 1, 2, 3 or 4 is selected.

Processing strategy of the backgauge

The backgauge can move upwards and downwards (R axis), forwards and backwards (X axis) and to right and left (Z axis) in a CNC-controlled manner. The axes are controlled through the machine control system.

In order to avoid collisions and crushing, the backgauge drive is run in the X direction with the force restricted to 150 N. If the gauge finger runs into an obstacle in the X direction, the backgauge stops. The axes can move freely.

Monitoring of the line laser

The line laser projects a line on the sheet in order to indicate the bending line.

During the bending process, the line laser is automatically switched off when the beam moves down from the clamping point. This prevents laser reflections during the bending process.

If the beam is at the upper dead point for longer than five minutes, the line laser is automatically switched off.

Monitoring of the BendGuard block laser

The BendGuard with block laser is installed such that it can be raised by 25 mm. If the BendGuard with block laser is raised due to an obstacle (e.g. trapped hand) during the bending process, the beam stops.

Monitoring of the centrally mechanical upper tool clamp (optional)

Bending tools are clamped by a central, mechanical tool clamp (optional). The tool clamping is opened and closed by a detachable lever. The beam cannot be moved as long as the lever of the upper tool clamp is attached.

4.2 Signs on the machine

Informative and danger signs indicate dangers when operating the machine.
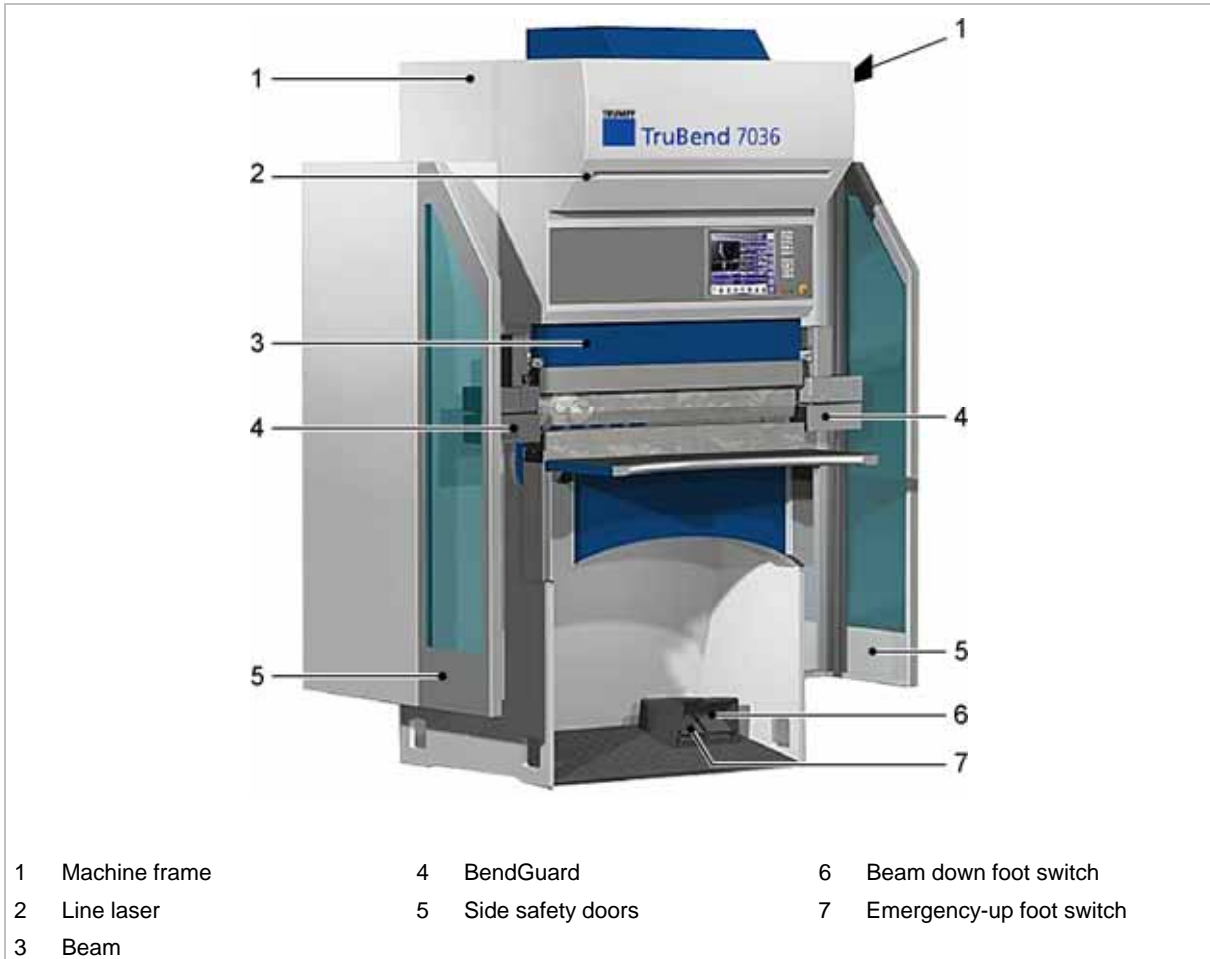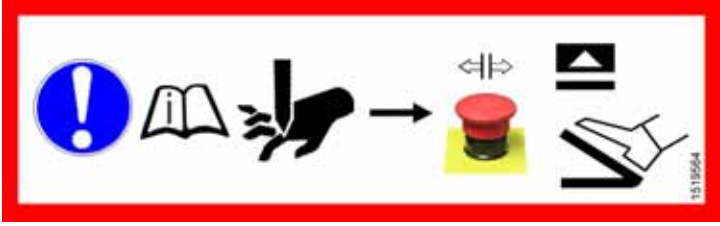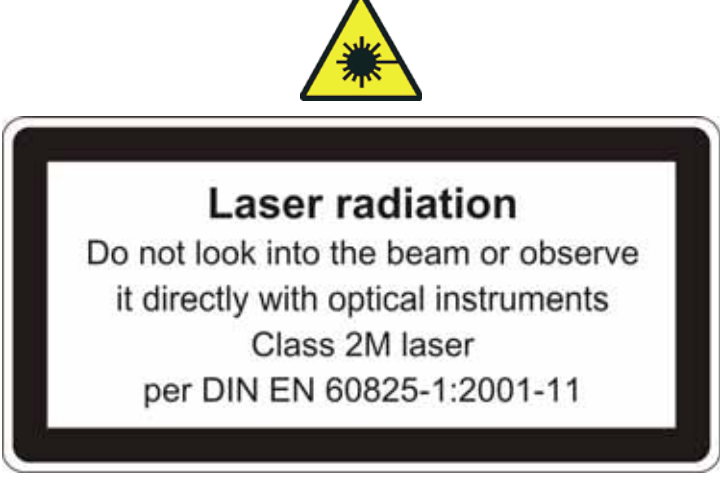
1	Machine frame	4	BendGuard	6	Beam down foot switch
2	Line laser	5	Side safety doors	7	Emergency-up foot switch
3	Beam				

Position of the signs   Fig. 54409

Sign no.	Informative and danger signs
3	 Risk of crushing between upper and lower tool

Sign no.	Informative and danger signs
3	Refer to the operator's manual. Safety information for the case of body parts getting trapped(see "Operation_Behavior in emergency").
1	Risk of crushing and risk of injury in the commuting area of the brake discs of the safety brake.
6	Marking for the beam down foot switch with stop function
7	Marking for the emergency-up foot switch
2, 4	**Laser radiation** Do not look into the beam or observe it directly with optical instruments Class 2M laser per DIN EN 60825-1:2001-11 Danger from class 2M laser radiation
Additional signage in the USA:	

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Sign no.	Informative and danger signs
5	Dangers when operating the machine
5	Marking for the danger zone
3	Risk of crushing between upper and lower tool

Sign no.	Informative and danger signs
5	 **CAUTION** THIS MACHINE IS HEAVY IN FRONT-GUARD AGAINST TIPPING UNTIL ANCHOR BOLTS ARE SECURED. COMPLETE INSTALLATION INSTRUCTIONS ARE IN "OPERATORS MANUAL" PACKED IN PLASTIC POUCH ON SIDE OF MACHINE. BEFORE STARTING - LEVEL, CLEAN, LUBRICATE AND CHECK RAM SLIDES FOR PROPER CLEARANCE AS DESCRIBED IN "OPERATORS MANUAL". DO NOT REMOVE THIS SIGN FROM THIS MACHINE 831166 Note: machine is top-heavy

5	
	SAFETY GUIDELINES
	ELECTROMECHANIC PRESS BRAKE
	• READ AND UNDERSTAND THE OPERATION AND SAFETY MANUAL.
	• KNOW HOW TO USE THE OPERATOR CONTROLS AND MODES OF OPERATION
	SET UP
	• POSITION RAM AT BOTTOM OF WORKING STROKE
	• TURN OPERATOR CONTROLS OFF (key lock) WHEN WORKING IN THE AREA.
	• USE INCH MODE AND TWO HAND CONTROL.
	• TO AVOID SPLITTING DIES, MAKE CERTAIN TONNAGE CAPACITY OF THE DIES ARE NOT EXEEDED
	• PROVIDE POINT OF OPERATION SAFEGUARDING
	• TEST ALL THE OPERATION CONTROL STATIONS MODES, OF OPERATION AND SAFEGUARDING.
	• INSTRUCT OPERATORS IN PROPER SETUP
	• KEEP ALL KEYS UNDER SUPERVISORY CONTROL
	OPERATION
	• USE POINT OF OPERATION SAFEGUARDING
	• KNOW THE SET UP AND PROPER METHOD OF OPERATION
	• TEST ALL THE REQUIRED OPERATOR CONTROL STATIONS AND MODES OF OPERATION BEFORE EACH SHIFT EACH JOB RUN AND AFTER EACH BREAK
	• KEEP HANDS OUT OF DIE AREA (point of operation)
	• DO NOT POSITION ANY PART OF YOUR BODY WHERE IT MAY BE STRUCK OR CRUSHED BY PART MOVEMENT
	• USE HAND TOOLS FOR SMALL OR NARROW PIECE PARTS
	• MAKE CERTAIN EVERYONE IS CLEAR OF PRESS BRAKE DIES AND MATERIAL BEFORE OPERATING
	• TURN OFF OR LOCKOUT OPERATOR CONTROLS WHEN NOT OPERATING PRESS BRAKE
	• WHEN YOU LEAVE THIS PRESS BRAKE
	    POSITION RAM AT BOTTOM OF WORKING STROKE
	    TURN OFF OR LOCKOUT OPERATOR CONTROLS
	    TURN POWER OFF
	DO NOT REMOVE THIS SIGN FROM THIS PRESS BRAKE
	
	Safety information

Sign no.	Informative and danger signs
5	**WARNING** **TO PREVENT SERIOUS BODILY INJURY** NEVER PLACE ANY PART OF YOUR BODY WITHIN THE DIE AREA. NEVER OPERATE THIS MACHINE WITHOUT ADEQUATE SAFEGUARDING. NEVER OPERATE, INSTALL DIES, OR MAINTAIN THIS MACHINE WITHOUT PROPER INSTRUCTION AND WITHOUT FIRST READING AND UNDERSTANDING THE OPERATORS OR MACHINE MANUAL. NEVER INSTALL PUNCHES OR DIES WITHOUT FOLLOWING TOOL MANUFACTURERS INSTRUCTIONS AND RECOMMENDED SETUP PROCEDURES. IT IS THE EMPLOYERS RESPONSIBILITY TO IMPLEMENT THE ABOVE AND ALSO TO PROVIDE PROPER DIES, DEVICES OR MEANS THAT MAY BE NECESSARY OR REQUIRED FOR ANY PARTICULAR USE, OPERATION, SETUP OR SERVICE. DO NOT REMOVE THIS SIGN OR MANUAL FROM THIS MACHINE Notes for avoiding injuries

Informative and danger signs on the machine   Tab. 1-6

5.   Measures to be taken by the operator

5.1   Observing warnings and danger signs

Certain activities can be a source of danger during the operation. The documentation contains warnings before the instructions for these activities and danger signs are provided on the machine(see "Measures to be taken by the manufacturer", pg. 1-10).

5.2   Instructing personnel

The operator must take the following measures before the personnel start working on the machine:

- Informing the personnel about potential dangers.
- If necessary, ensuring that the personnel wears personal protective gear.
- Defining responsibilties for safety, operation, maintenance, setting work and service.
- Ensuring that the personnel read the technical documentation of the machine. Recommendation: getting written confirmation for instructing the personnel.

Additional measures:

- Ensuring that nobody wears long and loose clothes.
- Reporting necessary repairs to the operator.

5.3   Adhering to the duty of care when handling the machine

Checking the danger zone and safety devices

The operator must always make sure that nobody is within the danger zone before starting up the machine.

The operator should operate the machine only with safety devices. Safety devices should not be disassembled or switched off except during maintenance or service work. After completing this work, the operator must install the safety devices and switch them on.

Additional safety measures must be taken in order to process special parts that cannot be processed using the available safety devices.

All safety devices must be regularly checked for proper function.

Ensure that the machine is in perfect working order

Operator:

- The operator or the persons appointed by him/her must operate the machine when it is in perfect working order.
- The operator must meet the conditions specified in the installation plan and the installation conditions.
- The operator must ensure that the work station is kept clean and tidy by issuing appropriate instructions and conducting inspections.

Operator:

- The operator must report the changes (including the operating performance) arising in the machine immediately to the owner. The machine must be checked for visible defects and damage at least once per shift.

Observance of shutdown procedures

The described shutdown procedures must be observed for all tasks.

5.4 Using spare parts, accessories and operating material

Using spare parts and accessories

Spare parts and accessories that are not approved by TRUMPF are not checked. Installing and using external parts and accessories can change design-related properties of the machine and weaken the safety.

Exemption from liability

TRUMPF does not accept liability for damage arising from the use of external parts and accessories or improper installation or replacement of original spare parts and accessories.

6. Overview of residual risks

The machine has residual risks in spite of its safety devices, conception and construction type .

The following overview of residual risks shows the main potential hazards to life and health posed by the machine.

The measures that can be taken by the machine operator to reduce the residual risks are specified in the overview.

Residual risk	Dangerous point	Type of danger	Measure to be taken by the operator
Mechanical elements			
Crushing and shearing	Entering into the danger zone Entering into the danger zone from the side	Risk of fatal injury	Operation by trained and instructed personnel. Wear personal protective gear. If body parts are trapped: press the EMERGENCY-UP foot switch.
Crushing and shearing	Defective safety brake	Risk of fatal injury	None
Gripping or retracting Crushing and shearing	Movement of the backgauge and the workpiece. Collision between the gauge fingers and the tool.	Risk of injury	Operation by trained and instructed personnel. Select appropriate processing strategy of the backgauge.
Gripping or retracting Crushing	Movement of the brake disc	Risk of injury	Specially trained personnel for maintenance, service and repairs. Screw the upper protective cover firmly.
Crushing	Lock rod of the tool clamp	Risk of injury	Operation by trained and instructed personnel.
Crushing	Between the workpiece and the beam	Risk of fatal injury	Operation by trained and instructed personnel.
Workpieces falling	Releasing of the workpiece after bending	Risk of injury	Operation by trained and instructed personnel. Wear personal protective gear.
Instability	Overturning of the machine	Risk of fatal injury	Use the provided lifting holes when transporting the machine.
Electrics			
Electrical contact	Direct contact with normally live parts.	Risk of fatal injury	Specially trained personnel for maintenance, service and repairs.
	Indirect contact with parts that are live due to an error.	Risk of fatal injury	Specially trained personnel for maintenance, service and repairs.
Thermal			
Burns	Hot surface of the brake	Risk of injury	Specially trained personnel for maintenance, service and repairs. Wait for the cooling phase

Residual risks   Tab. 1-7

Chapter 2

TruBend Series 7000 installation conditions

Material number	0383471

TRUMPF

Who does what?

2-3

Customer

Before the machine is delivered, you must make sure that all of the conditions described in this chapter have been fulfilled.

If this is not the case, the TRUMPF Service personnel will not be able to put the system into service.

Note
The MAIN SWITCH on the machine may only be switched on by TRUMPF Service personnel.

TRUMPF Service personnel

The machine is put into service by TRUMPF Service technicians.

This includes:
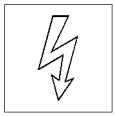
- Installing, aligning, leveling and fastening the machine.
- Connecting the machine to the supplies (with the exception of the electrical power supply).
- Performing a functional test.
- Instructing personnel.

1. Planning aid
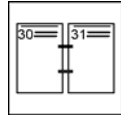
The planning aid provides an overview of the measures to be taken and preparations to be carried out.

For details, refer to the corresponding sections of these installation conditions.

Time before the de-livery of the ma-chine	Planning criterion	Measures	Done/Date
8 weeks	Operator and training	• Appoint a member of staff to be responsible for preparations for the delivery of the machine. • Select operating personnel, maintenance person-nel, and programmers. Set dates for training cour-ses.	
	Installation site	• Define the machine location. Consider the space requirements specified in the installation plan. • Check the floor requirements (floor quality, even-ness). Observe the weight and dimensions of the machine here. • Check the ambient conditions required (room tem-perature, exposure to sunlight, ambient air purity). • Check the transport route (gateway dimensions, header heights, cable rack heights, room to ma-neuver around corners etc.).	
	Electrical supply	• Install electrical connections at the installation site. • Conductor cross-sections and fuses protection according to legal requirements.	
	Telephone connection	Install an analog telephone connection.	
	Bending tools	Order the initial bending tool equipment. Support from relevant TRUMPF department.	
3 weeks but not later than week	Transport	Prepare necessary transport aids.	
2-3 weeks, but not later than week ...	Feedback	Feedback to the relevant TRUMPF department that the installation conditions have been fulfilled.	
During installation and start-up	Allocate qualified electricians	Connect the system to the electrical power supply.	

Tab. 2-1

2. Installation site

2.1 Arrangement and space requirements of the machines
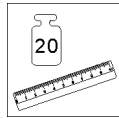
The arrangement of the machines and the space requirements for standard installation can be taken from the applicable installation plan:

- Arrangement of individual options.
- Space requirements for opening all doors.
- Outside dimensions of the protective cover and space requirements for the protective cover when it is opened.
- Electric power supply.
- Telephone socket.

2.2 Floor requirements

Note
If the requirements described below are not met, a structural analyst must carry out an evaluation.
Further data and information on floor requirements can be obtained from TRUMPF Maschinen Austria GmbH + Co. KG.

Evenness of the installation surface
- The floor should be as even as possible.
- An evenness deviation of 12 mm/10 meters (0.472 in/ 393.7 in) is required (DIN 18202) in the area of the machine installation location.

Installation surface
Quality of the entire installation surface for the machine with switch cabinet:
- Base plate throughout the area of the load-bearing points.
- The floor must be oil-proof.

Pay attention to variable loads in the immediate vicinity of the machines (e.g. forklifts, assembly and disassembly of machines directly beside the press brake, shuttle carts, etc.).

Flexible base plate
- Carrying capacity of the subsurface at least $ks = 5000$ kN/m^3.
- Minimum thickness: 200 mm/7.87 in.
- The reinforcement of the base plate should be at least equal to or better than that specified in the tables below.
- Concrete quality (corresponding to tensile strength C 25/30):

Note
The following tables for the reinforcement in the base plate are applicable for **new construction** of the floor.

		7018	7036
Top lengthwise (xsi)	cm^2/m	3.20	3.20
Top transverse (eta)	cm^2/m	3.20	3.20
Below lengthwise (xsi)	cm^2/m	3.20	3.20
Below transverse (eta)	cm^2/m	3.20	3.20

Reinforcement in the base plate   Tab. 2-2

Ceiling plate/free span base plate

If the machine is installed on a ceiling plate or a free span base plate, a structural analyst must carry out an evaluation, taking into account the specifications in the Weight Load (see "Weight load", pg. 2-6) section.

2.3   Weight load

Structural stress analysis

The load capacity of the floor area must be subjected to a structural stress analysis prior to installation.

Weights of the relevant machine parts and load on the support points:

		7018	7036
Total weight of the machine	kg / lb	2000 / 4414	2600 / 5518
Structural weight load per support point in the front	kN	35.85	48.77
Structural weight load per support point at the rear	kN	6.65	9.90
Weight support front/rear	mm^2/sq in	1875 / 2.91	1875 / 2.91

Tab. 2-3

2.4 Ambient conditions

Machine ambient temperature

Permissible ambient temperature for machine operation:

- +10°C/+50°F to +40°C/+104°F.
- According to NFPA 79, the maximum temperature in the USA and Canada is 40°C/104°F.

Ambient conditions for the control system

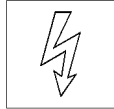Permissible temperature range for the control system during transport or when the machine is switched off:

- -20°C/-4°F to +70°C/+158°F.

Permissible humidity for the control system:

- 10 to 95 % relative humidity, but non-condensing.

TRUMPF

3.   Electrical supply

3.1   Power supply

Continuous undervoltage or overvoltage is not permitted. Greater voltage fluctuations endanger the problem-free operation of the machines and reduce their performance.

NEC conditions

Note
The NEC is applicable only for USA and Canada!

Grounding

The machine and the power distributor system must be equipped with a grounding line in accordance with NEC article 250, "Grounding".

For further details on grounding power distributor systems and industrial plants, refer to the NEC standards or consult an electrician or the power station.

Grounded power supply system with star connection

Power supply lines in ungrounded power supply systems with delta connection are not fail-safe by nature. Delta power supply systems tend to generate transient overvoltages to ground. Delta power supply systems can result in increased voltages being applied to the connected devices. The control system or the machine can no longer be reliably operated if a potential to ground develops in the system. For this reason, a grounded transformer **must** be installed in the star connection in delta power supply systems (see NEC article 450-5).

Isolating transformer

The following notes must be observed if the machine is equipped with an isolating transformer:

- The cable from the isolating transformer to the switch cabinet of the machine must be provided and laid by the customer.
- The isolating transformer is not indicated on the installation plan. The customer must define the location of the isolating transformer.
- The isolating transformer must be installed such that access via the front door (door with nameplate) remains free. The required safety distance is 800 mm according to IEC and 1100 mm according to NEC. A safety distance of 100 mm must be maintained behind and at the sides of the transformer.

| 1 | Isolating transformer | 3 | Lateral and rear safety distance |
| 2 | Front safety distance | | |
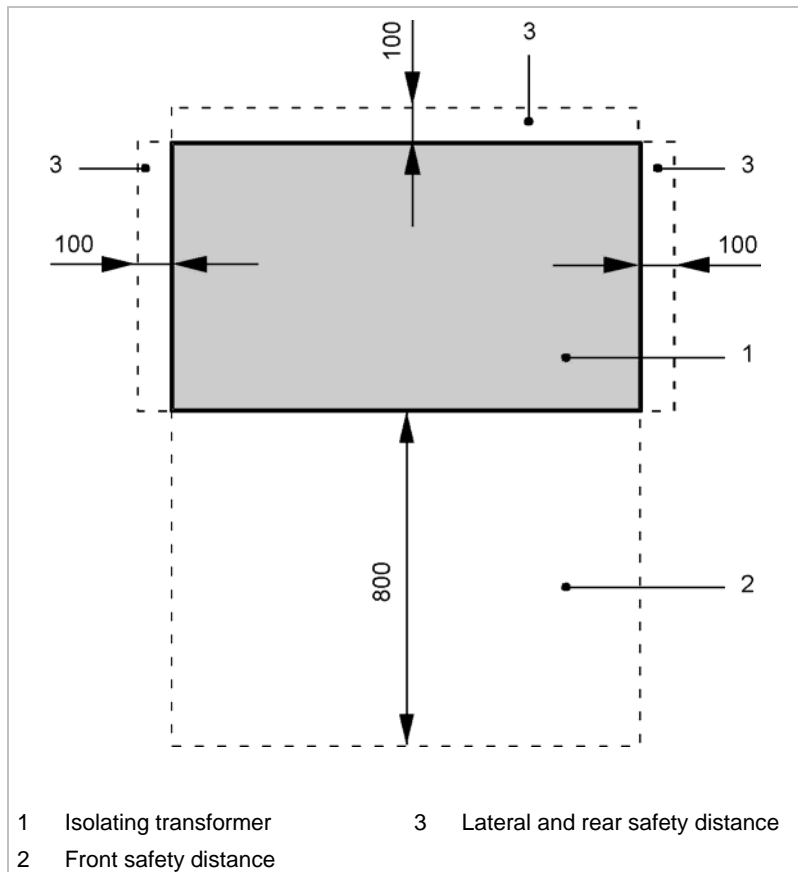
Fig. 53198

3.2 Connected loads, fuse protection, frequency

Machines should only be connected by qualified specialists.

Connected loads   Before shipping, the system is set to the power supply voltage and power frequency specified by the customer.

TruBend		7018	7036
Line voltage range	VAC	360 - 480	360 - 480
Frequency tolerance	-	±2 %	±2 %
Connected load	kVA	5	6
Fuse protection at 400 V or 460 V	A	3 x 35	3 x 35
Maximum interruption time	-	10 ms every 10 s	

Tab. 2-4

Connecting cables Regulation: Establish the electric power supply in accordance with DIN EN 60204-1/4.3.1:

Cable	Regulation • Four-pole copper cable (L1, L2, L3, PE). • Single strand or multi strand with wire end ferrules. • Connection must be protected against direct contact. • Clockwise phase rotation.
Cable cross-section	Design in accordance with: VDE 0100, Part 430 (IEC 364-4-47) At least 6 mm^2
Ground wire	Design in accordance with: VDE 0100, Part 540 (IEC 364-5-54) At least 6 mm^2
Fault current circuit breaker	Recommendation: ABB: F204 B63 / 0,3 or DOEBKE: 4B SK 63-4 / 0,3

Tab. 2-5

NEC conditions Note
The NEC applies only to Canada and the USA.

• A four-pole connection is required: L1, L2, L3 and PE.

• THHN copper or equivalent is recommended (2000 V maximum output) designed for a maximum temperature 90°C/194°F.

• No aluminum cables should be used to connect the machine.

• The conductor cross-section must correspond to NEC 670-4 (a), with a permissible amperage of at least 125 % of the operating current specified on the nameplate.

• To ensure the voltage stability and rating, the line should be larger than specified in the NEC table 310-16.

3.3   Remote diagnostics

A country-specific telephone interface is normally installed in the machine's switch cabinet for the installation of the Teleservice.

Note
The connection point is indicated on the installation plan using this symbol.

Telephone modem connection

The following tasks must be initiated at the customer location:

- Installation of a telephone socket for an analog modem at the machine switch cabinet by the customer's telephone company.
- It must be possible to access the modem with a direct dialing number. Otherwise, a separate exchange line is required.
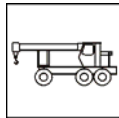
3.4 Network connection

TRUMPF provides the following interfaces for the network (e.g. a connection to a programming system) in the control cabinet of the machine:

- RJ 45 plugs for customers with shielded-twisted pair network cabling.

4. Transport

4.1 Preparations for transporting the machine to the installation site

The customer must make the necessary arrangements to transport the machines from the truck to the final installation site.

Clarify the transport route to the machine installation site in a timely manner before its delivery. Check the following when doing so:

• Gateway openings

• Header heights.

• Cable rack heights.

• And similar.

Dimensions and weight of the machines

Take into account the dimensions of the machine in accordance with the installation plan during transport.

TruBend		7018	7036
Weight	kg / lb	2000 / 4414	2600 / 5732
Width	mm/in	1290 / 51	1805 / 71
Depth max transport measurement T'	mm/in	1255 / 49.4	1255 / 49.4
Height	mm/in	2375 / 93.5	2375 / 93.5

Tab. 2-6

Preparing auxiliary tools

Means, Tools, Materials

• Crane truck for unloading the truck (carrying capacity corresponding to the weight of the machine).

• Fork lift for transporting the machine (carrying capacity min 3.5 t).

or

• Gantry crane for transporting the machine (carrying capacity corresponding to the weight of the machine).

➢ Prepare auxiliary transportation equipment three weeks prior to machine delivery.

The auxiliary transportation equipment must be available during the entire installation process.

4.2 Unloading machine and transporting it to installation site

Warning

The center of gravity of the machine is too far.
The machine can easily tip over.

➢ Use the lifting holes for the transport and installation of the machine.

Checking for damage in transit

1. Check all machine parts after delivery for damage caused during transit.
2. Record visible damage caused during transport on the cargo note and have the record countersigned by the truck driver.
3. Report any hidden damage caused during transport to the insurance company and to TRUMPF within 6 days.

Unloading and transporting the machine

Means, Tools, Materials

- When transporting the machine with a crane: type A shackle (DIN 82101).

When transporting the machine with a crane: use two type A shackles per machine (DIN 82101):
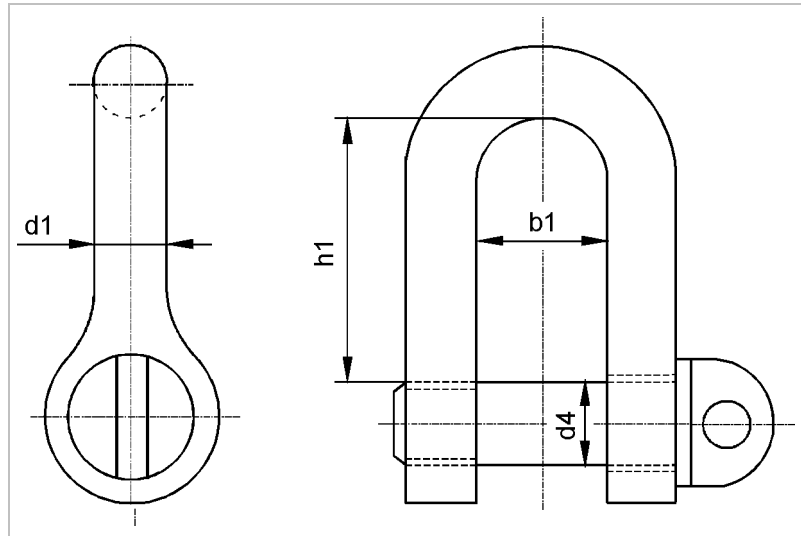
Fig. 52814

TruBend		7018 / 7036
Permissible loading kN		94
Bolt diameter		1 3/8"
Main dimensions mm/in	d1	30 / 1.181
	d4	36 / 1.417
	h1	111 / 4.370
	b1	47 / 1.850

Technical data for the shackles for different machine types   Tab. 2-7

1	Transport using crane	4	Transport using forklift	D	Diameter
2	Securing device for ship-ping-pallet	5	Transport of the machine without securing device for ship-ping-pallet	X	Distance between the upper edge of the machine and the center of the lifting holes
3	Securing device for shipping				
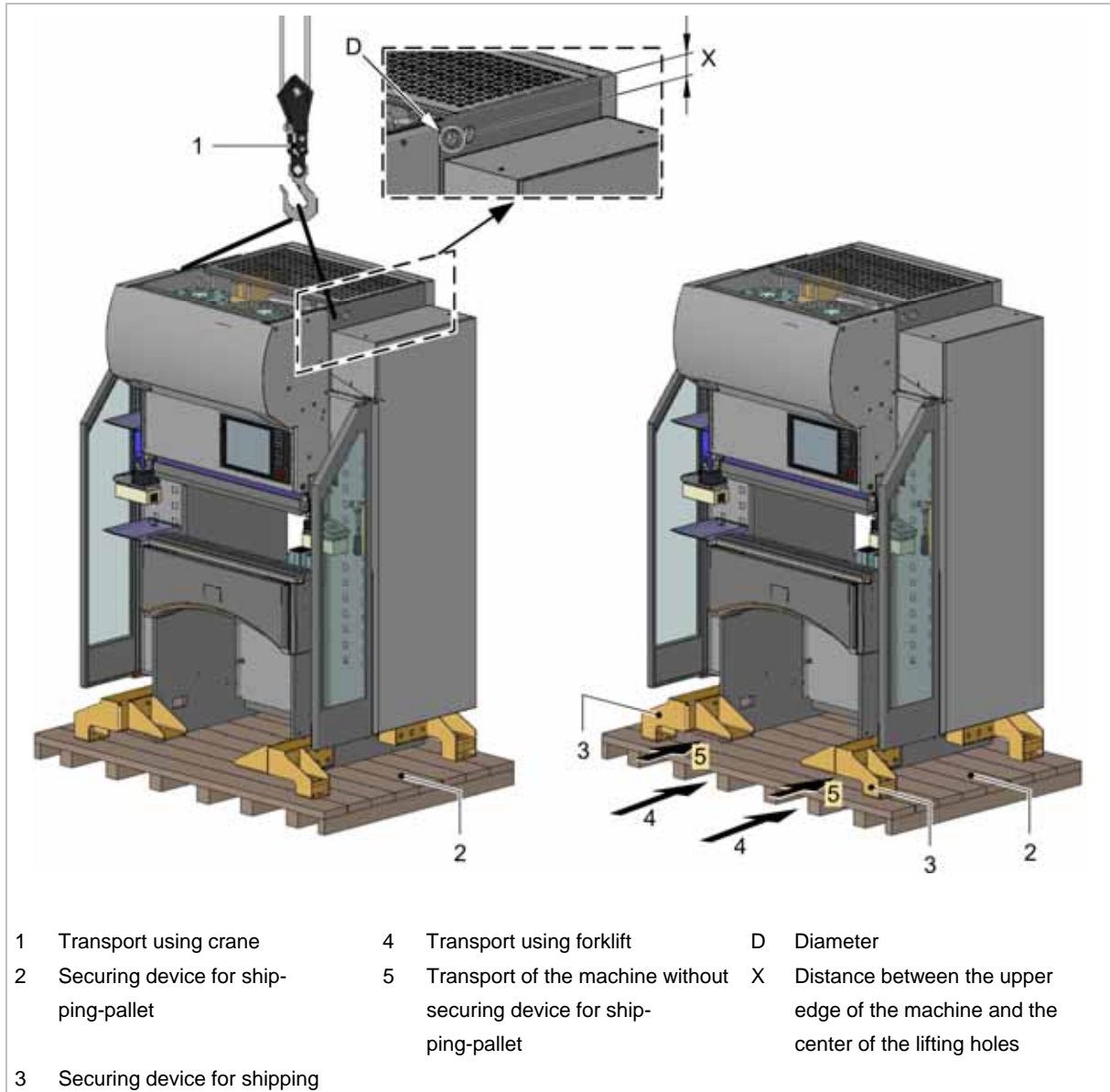
Transporting the machine   Fig. 54410

TruBend		7018	7036
Diameter D	mm/in	50 / 1.97	50 / 1.97
Distance between lifting holes	mm/in	455 / 17.9	965 / 38
Distance between the up-per edge and the center of the lifting holes X	mm/in	65 / 2.56	65 / 2.56
Thickness of the lifting hole	mm/in	25 / 0.98	25 / 0.98

Dimensions of the lifting holes for the transport with a   Tab. 2-8
crane

Unloading the machine

1. Remove machine packaging.
2. Unloading the machine
   - ➢ Fasten the shackle on the front lifting holes of the machine.
   - ➢ Unload machine using a crane (1).

   or

   - ➢ Unload machine using a forklift (4).

Transporting the machine to the installation site

Note

The securing devices for shipping should not be removed.

3. Transport machine using a crane with sufficient carrying capacity(1).

   or

   - ➢ Transport the machine using a forklift (carrying capacity min 3.5 t) (4).

Remove the securing device for shipping-pallet

4. Remove the securing device for shipping-pallet at the installation site:
   - ➢ Raise the machine using a crane(1).

   or

   - ➢ Raise the machine using a forklift on the securing device for shipping (3)(5).

5. Remove the securing device for shipping-pallet (2).
6. Shut off the machine.
7. Transport additionally packed accessories using a forklift directly from the truck to the machine installation site.

Chapter 3

Description

1. Machine concept

3-3

TruBend is a CNC-controlled press brake for bending of even metal sheets by forming.

The press brake is made up of the following components:

- Machine frame.
- Beam with tool holder for upper tools (punch).
- Press table with tool holder for lower tools (die).
- Beam drive.
- Backgauge system for positioning of the workpiece.

Fig. 54413

How does a press brake function?

In order to use a press brake for bending, a tool is required which is fastened on the beam or the press table. Typical tools used for this purpose are punches and dies. Punches are mostly fastened on the beam and dies on the press table.

The tool to be used depends on bending method, raw material, material thickness and angle.

The workpiece is manually inserted into the machine. The workpiece is placed on the lower tool. It is pushed into the machine until it fits closely against the backgauge.

The stroke is triggered using the foot switch. The beam moves downwards. The punch presses the workpiece into the die of the lower tool. The workpiece is bent.

After the bending process, the beam moves upwards again. The workpiece can be removed and positioned for the next bending operation.

2.   Technical data.   3-5

TruBend		7018	7036
Press force	kN	180	360
Length of bend	mm	510	1020
Installation height	mm	300	300
Width between columns	mm	422	932
Throat	mm	150	150
Working height	mm	1150	1150
Beam (Y axis) rapid traverse	mm/s	220	220
Beam (Y axis) work cycle (depends on the die width, freely programmable)	mm/s	0.1 - 25	0.1 - 25
Positioning accuracy of the beam (Y axis)	mm	±0.001	±0.001
Stroke of the beam (Y axis)	mm	120	120
Length	mm	1295	1805
Width	mm	1320	1330
Height	mm	2380	2380
Ground	kg	1800	2600
Electrical connection	kVA	5	6
Control system	-	TASC 6000 Windows XPe Pentium M 1.1 GHz 15" touchscreen	
Backgauge			
Withdrawal speed	mm/s	220	220
X axis speed	mm/s	1000	1000
R axis speed	mm/s	330	330
Z axis speed	mm/s	1000	1000
Positioning accuracy of the X axis	mm	0.04	0.04
Positioning accuracy of the R axis	mm	0.06	0.06
Traverse path of the X axis	mm	240	240
Maximum range before stop in the X direction	mm	500	500
Traverse path of the R axis	mm	80	80

Tab. 3-1

3. Machine axes

Machine axes   Fig. 54387

All axes are CNC-controlled and can be programmed through the control system.

Axis	Description
Y	Upward and downward movement of the beam.
R1 and R2	Upward and downward movement of the back-gauge.
X1 and X2	Forward and backward movement of the gauge fingers.
Z1 and Z2	Movement of the backgauge towards the right and left.

Description of the axes   Tab. 3-2

4. Modules of the machine 3-7

1	Drive with safety brake	6	Base plate	10	Control panel
2	Line laser	7	Press table	11	Tool clamp
3	Front iLED illumination	8	Nameplate and CE marking	12	Backgauge
4	Side safety doors	9	Foot switch	13	Foot support
5	Beam				

Fig. 54052

4.1 Nameplate and CE marking

TRUMPF Maschinen Austria
GmbH & Co KG
A - 4061 Pasching Industriepark 24 Tel.:+43(0)7221-603-0

Elektromechanische Abkantpresse
Type: **TruBend** 7036   CE

Masch. Nr.:	B0702A0005	Masse der Presse:	2500 kg
Fabr. Nr.:	F1011E	Spannung:	3x400 V
Typ:	B19	Nennstrom:	8,7 A
Presskraft	max: 360 kN	Frequenz:	50 Hz
Hub	max: 110 mm	Anschlussleistung:	6,0 kVA
Nachlaufzeit	max: 90 ms	Steuerspannung:	24 V=
Nachlaufweg bei 220mm/s	max: 12	Baujahr:	2008
Sicherheitsabstand	min: 180 mm	Dok. Nr.: 96030-5-2000-0/000/00	

Example: nameplate with CE marking   Fig. 53932de

The nameplate with CE marking is located on the side at the bottom left on the machine frame.

4.2 Machine frame

The machine frame is the basic structure of the machine.

The machine frame is a stable welding construction and comprises two side parts, the press table and a connection support. The springback during bending is minimum thanks to the C shape of the machine frame. The springback is monitored by a measurement system on the machine frame.

Due to the shape of the machine frame, the machine has a large bending space inside (throat).

4.3 Press table

The press table is a part of the machine frame.

The tool holder for lower tools is mounted on the press table. When bending, the beam moves downwards and presses the workpiece into the lower tool with a defined and calculated force.

The press table is designed such that it adjusts itself to the bowing of the beam. The beam pressure is thus equally distributed over the length of bend.

4.4 Beam

The beam is connected with the machine body through a guide and is moved using a drive. The drive is installed above the beam and moves it upwards and downwards.

The tool holder for upper tools is mounted on the beam. When bending, the beam moves downwards and presses the workpiece into the lower tool with a defined and calculated force. The position of the beam is controlled using the machine control system.

The beam has high bending rigidity. It is designed such that it does not bend at all or shows minimum bending in spite of the forces that act upon it during the bending process. The bending strength of the beam depends on the length of the bend of the machine and the position of the drives.

4.5 Electromechanical direct drive and safety brake

The beam is driven with an electromechanical direct drive and is secured by a safety brake.
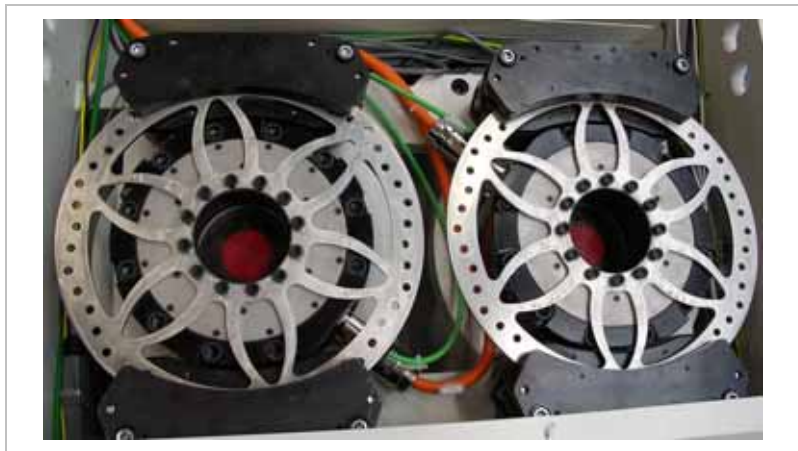
Fig. 54383

The electromechanical direct drive has one or two motors. The motor is connected directly to the beam and moves it upwards and downwards.

The downward movement of the beam must stop within a specific distance (springback) and a specific time (lag time). The spring-back and lag time values are specified on the nameplate.

If the beam does not stop within the springback and the lag time, the safety brake stops the machine drive. The beam movement stops.

The safety brake locks the drive at standstill and prevents the beam from falling.

The safety brake is installed above the motor. It consists of a brake disc and two brake callipers each.

4.6 Tool clamp

Tools are secured in a tool clamping. The tool clamping has one clamp for upper tools on the beam and one for lower tools on the press table.

The upper tool clamp is self-centering. This means that the tools are automatically aligned at the center above the press table during the clamping.

The lower tool clamp is installed on the press table.

Manual tool clamping

The manual tool clamping is divided into individual segments. Every segment is opened and closed individually using adjusting screws on the front side.

Centrally mechanical tool clamping (optional)

Fig. 54050

The centrally mechanical tool clamping clamps the tool using the clamp piston.

The tool clamping is opened and closed by a detachable lever. The beam cannot be moved as long as the lever of the upper tool clamp is attached.

4.7   Backgauge

The backgauge has three axes: R, X and Z axis.

The backgauge is used to define the position of the workpiece.

The workpiece is manually inserted into the machine. The workpiece is placed on the lower tool. It is pushed into the machine until it fits closely against the gauge finger of the backgauge.

Every backgauge has a gauge finger on which the workpiece is butted.

The backgauge can, depending on the mode, move to the next programmed position at different times. The time of the movement is called step change.

Incremental switching	Setting at the control system	Description
Manual (MSC)	*Down button.* *Upper dead point, stop.*	The backgauge moves to the next position when the BEAM DOWN foot switch is pressed.
Automatic	Only for Tru-Bend series 5000: *End decompression.*	The backgauge automatically moves to the next stop position at the end of the bending operation.
	Only for Tru-Bend series 5000: *Mute point.*	The backgauge automatically moves to the next stop position when the beam has moved upwards up to the mute point.
	Upper dead point.	The backgauge automatically moves to the next stop position when the beam has moved upwards up to the upper dead point.

Incremental switching   Tab. 3-3

3-axis backgauge
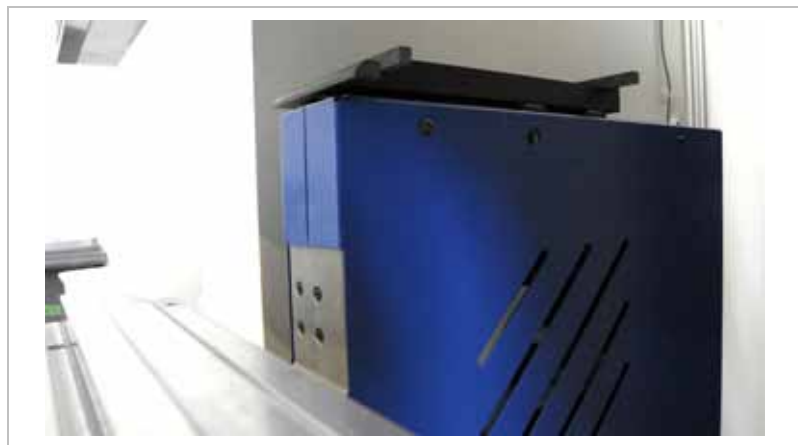
Fig. 54411

The backgauge can move upwards and downwards (R axis), forwards and backwards (X axis) and to right and left (Z axis) in a CNC-controlled manner. The axes are controlled through the machine control system.

In order to avoid collisions and crushing, the backgauge drive is run in the X direction with the force restricted to 150 N. If the gauge finger runs into an obstacle in the X direction, the backgauge stops. The axes can move freely.

6-axis backgauge (optional)
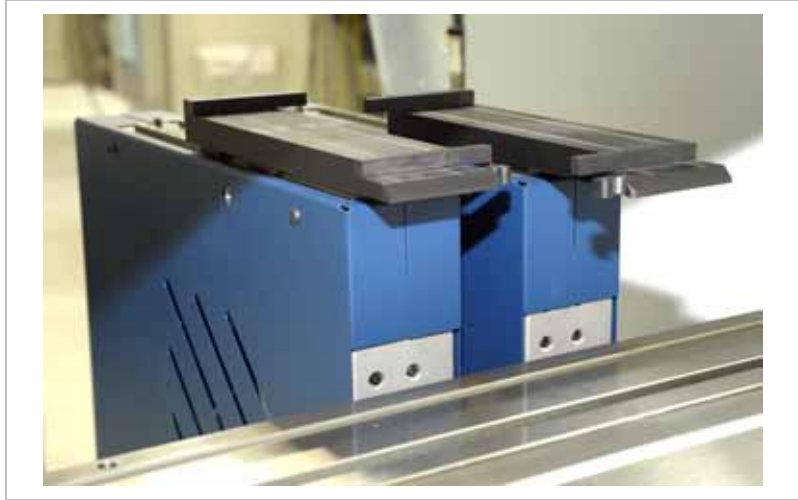
Fig. 54057

The 6-axis backgauge comprises two 3-axis backgauges which move independently from each other. All 6 axes are controlled through the machine control system.

4.8   Control system

The machine is operated using the TASC 6000 control system with touchscreen. The control system is network-compatible.

The control system can be used for numerical or graphical (2D profiles, optional) creation of programs. All CNC-controlled axes of the machine can be programmed using the control system.

Tools, materials and bend allowances are stored in the control system.

Graphical shopfloor programming (optional)

Using the graphics shopfloor programming (BendGraph), simple profiles can be programmed graphically (2D) at the machine.

Functions of the graphical shopfloor programming:

- Single bendings and round bendings can be programmed.
- The 2D profile can be processed (e.g. mirrored) and modified.
- The effective length of the bending part is displayed.

- The bending sequence is calculated automatically; it can however be modified.
- Tools are automatically allocated to every bend.
- A 3D simulation of the bending part, tools and gauge fingers is displayed in the production.

E-Shop

Tools
Tools can be ordered using the E-Shop on the control system if the control system has an Internet connection. The E-Shop on the control system contains all standard and special tools of the tool catalog.

Also in the E-Shop: the Information Service for Bending. The Information Service for Bending is a central platform with useful and interesting facts about the TruBend and bending tools.

Help at the control system

Online help and F1 help
The operator's manual is stored in the control system in the form of online help. The entire information about operation, maintenance, setting work etc. can be viewed using the online help.

Brief help texts for individual functions and input fields are displayed in the F1 help. The F1 help can be opened and closed using the <?> key.

TRUMPF

4.9 Control panel

1	Monitor with touchscreen	4	Changing to another window	7	EMERGENCY STOP impact button
2	Number pad	5	Help key	8	START
3	Cursor keys	6	Tab key	9	STOP
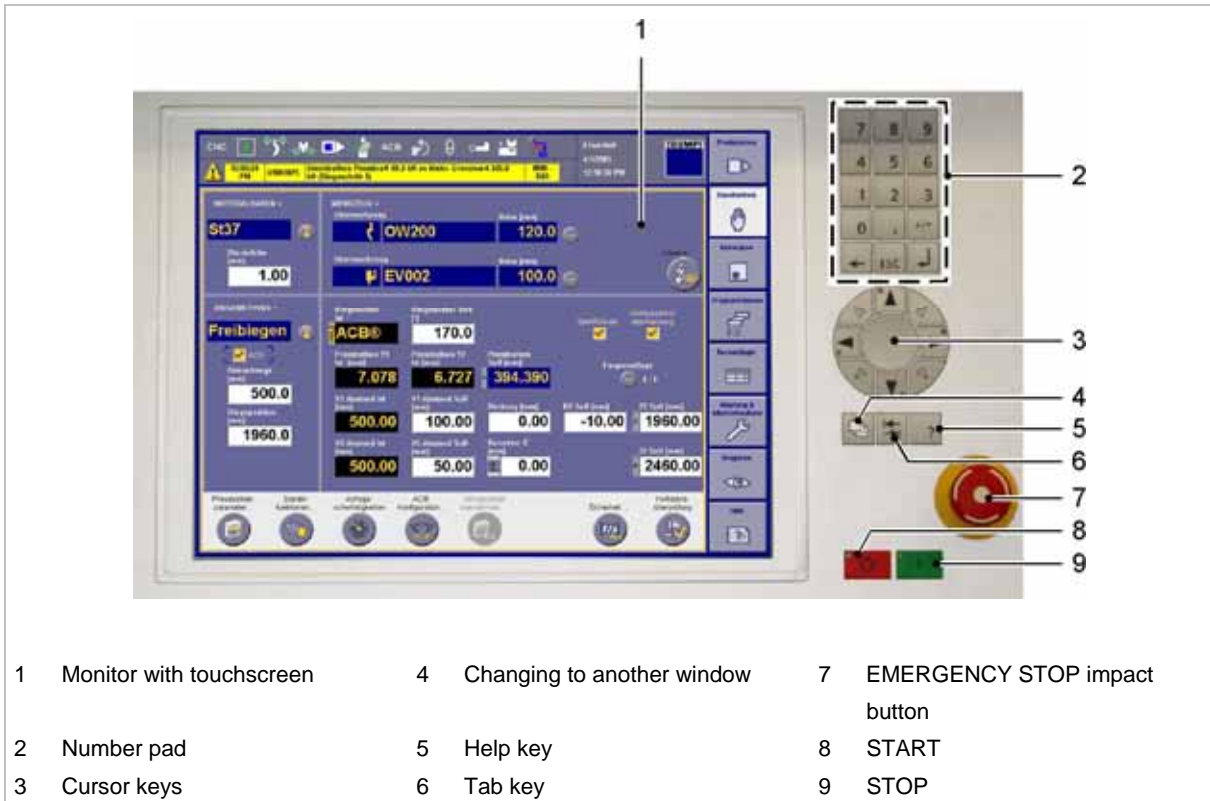
Fig. 53202

The machine is operated using the touchscreen. All functions and input fields can be selected by pressing on the screen .

Numbers are entered using the number pad. For entering letters, a keyboard is displayed on the control system.

Programs, tools, archive and data can be loaded and imported into the control system via the USB connection. The USB connection for the control system is located outside on the right near the control panel.

Slewable control panel (op-tional)

Fig. 54377

The slewable control panel can be bent towards the front. The an-gle of inclination can be set using the control system.

4.10 Foot switch

There are two foot switches: Beam down and Emergency-up.
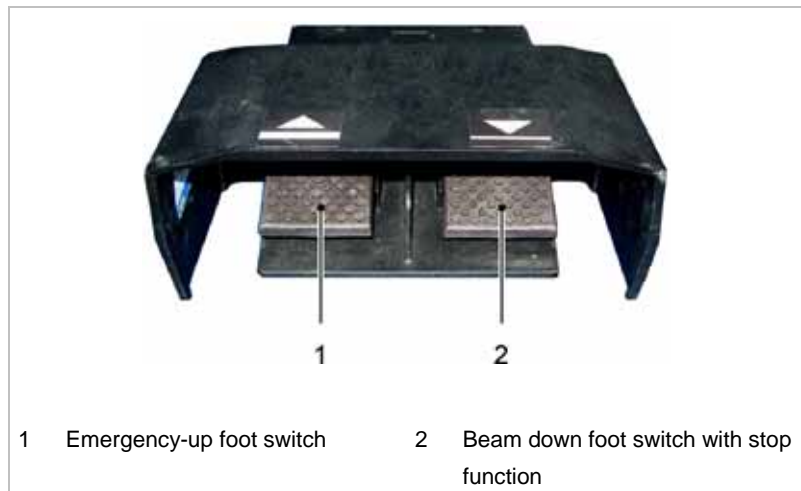
| 1 | Emergency-up foot switch | 2 | Beam down foot switch with stop function |

Fig. 54382

Beam down foot switch with stop function

The BEAM DOWN foot switch has three positions:

Position	Description	
0	Not pressed	The beam stands still or stops.

Position	Description	
1	Pressed	The beam moves downwards.
2	Pushed through	The axes motion stops.
		The safety brake is activated.

Tab. 3-4

Emergency-up foot switch The EMERGENCY-UP foot switch can be used to move the beam upwards. The EMERGENCY-UP foot switch is not active if EMERGENCY STOP was triggered. The EMERGENCY-UP foot switch has two positions:

Position	Description	
0	Not pressed	No effect on the beam.
1	Pressed	The beam moves upwards.
		The control system remains set to START.

Tab. 3-5

4.11 Safety device

Optoelectronic safety device: BendGuard with block laser

The optoelectronic safety device monitors the area below the upper tool during a light field operation.

The beam moves at the maximum speed (up to 220 mm/s) between the upper dead point and the mute point The optoelectronic safety device monitors the area in front of and below the upper tool. If the light field is interrupted during operation, the beam stops moving.

The beam moves at a reduced speed between the mute point and the lower dead point. The optoelectronic safety device monitors the area below the tool tip of the upper tool. If the light field is interrupted during operation, the beam stops moving.

How does the BendGuard with block laser function?

A   Viewing direction from the front
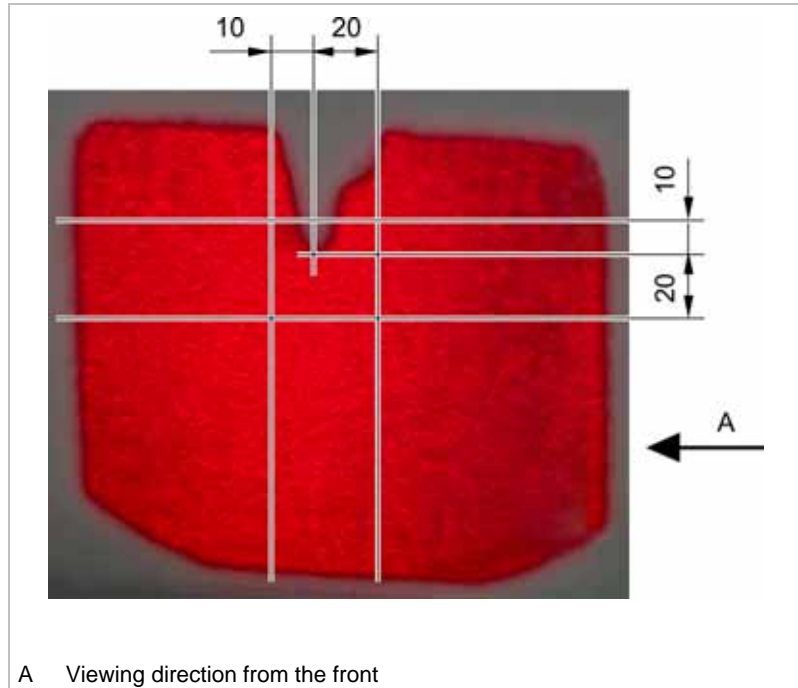
Light field of the BendGuard with block laser   Fig. 54381

The transmitter of the block laser projects a light field on the receiver. The light field consists of individual laser beams. The transmitter is installed to the left and the receiver to the right on the machine.

The light field covers the lower part of the upper tool. The area around the tool tip is monitored. The beam will stop if the light field is interrupted in this area.

Side safety doors

The side safety doors secure the area to the side of the beam and the press table. When the safety doors are closed, the danger zone cannot be accessed from the side.

If **both** the side safety doors are opened during operation:

- The axes motion stops.
- The safety brake is activated.

If **one** of the side safety doors is opened during operation:

- The axes motion stops.
- The opening can be confirmed with the Beam down foot switch. All axes can again be moved. The beam moves only at a reduced speed.

4.12 Ergonomics

Comfort base plate (optional)

Fig. 54384

The comfort base plate is installed in the front on the press table and supports the lower arms during sedentary operation. Its height can be adjusted (eight different positions) and it can be folded.

Standing and sitting aid (optional)

Fig. 54385

The machine can be operated in a sedentary position. The standing and sitting aid supports the operator for an ergonomically correct working position during sedentary operation.

Comfort foot support (optional)

During sedentary operation, the foot switch can be placed on a foot support. The operator can access the foot switch easily in the sitting position.

The height and the sloping position of the foot support can be adjusted in a stepless manner.

Front iLED illumination (optional)

The work area in front of the machine and the gauge fingers inside the machine are illuminated by means of iLEDs. iLEDs provide white, bright light that hardly generates any heat. The brightness can be set using the control system.

The illumination unit for the work area in front of the machine is installed in the front on the machine body.

Rear iLED illumination (optional)

The work area in front of the machine and the gauge fingers inside the machine are illuminated by means of iLEDs. iLEDs provide white, bright light that hardly generates any heat. The brightness can be set using the control system.

Illumination unit for the gauge finger is installed inside the machine. The iLEDs are swiveled by a motor such that the front edge of the gauge finger is always illuminated.

4.13 Line laser (optional).

Fig. 54378

The line laser projects a line on the sheet in order to indicate the bending line.

During the bending process, the line laser is automatically switched off when the beam moves down from the clamping point. This prevents laser reflections during the bending process.

If the beam is at the upper dead point for longer than five minutes, the line laser is automatically switched off.

5. Tools

5.1 Tools from TRUMPF

In order to use a press brake for bending, a tool is required which is fastened on the beam or the press table. Typical tools used for this purpose are punches and dies. Punches are mostly fastened on the beam and dies on the press table.

The tool to be used depends on bending method, raw material, material thickness and angle.

All tools from TRUMPF that can be used for the TruBend have already been stored in the control system. Data for special tools is delivered along with the special tools and must be imported.

Tools can be ordered using the E-Shop or the tool catalog.

1	Upper tool	5	Die width
2	Workpiece	6	Lower tool radius
3	Internal workpiece radius	7	Upper tool radius
4	External workpiece radius	8	Lower tool
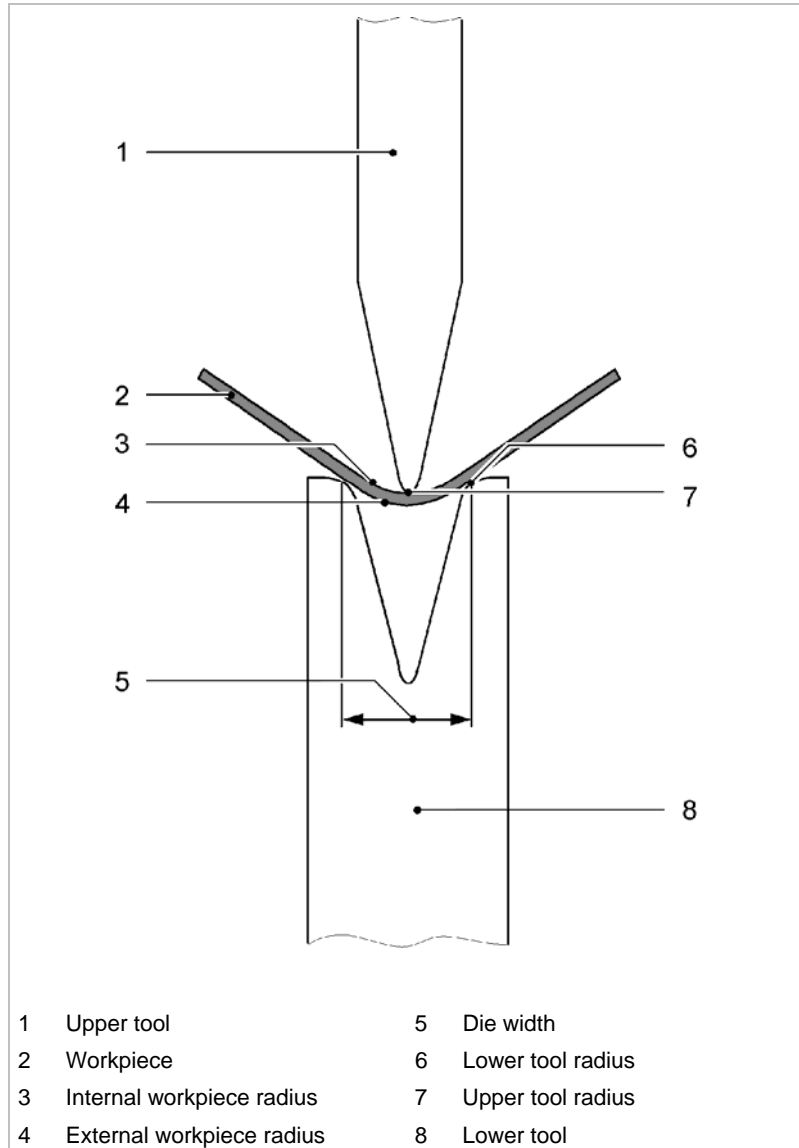
Tool and workpiece   Fig. 12763

Head-bearing and shoulder-bearing tools

Head-bearing and shoulder-bearing tools are available. Shoulder-bearing tools transfer the press force evenly onto the workpiece, even with large tool effective depths or lateral forces (e.g. with seams) that may appear.

Safety-Click safety element

Head-bearing upper tools up to 100 mm in length are equipped with Safety Click. This safety device prevents the tools from falling out of the tool clamping. The lock can be released by pushing a button:

- The upper tools can be changed quickly and safely in vertical position.

- Short tool set-up times, because there is no need of sliding out laterally from the upper tool clamp.

TRUMPF LASERdur bending tools

The work surfaces and radii of all tools and the support areas of the lower tool clamp are hardened. This has the following advantages:

- Long service life of the tools.

- High levels of machine accuracy maintained over a long time.

Tools of varying lengths

All tools exist in various divisions and lengths that can be combined with one another:

- Several tool stations can be used.

- Reduced tool costs.

- Time-efficient operation.

Can be used for folding over

TRUMPF upper tools can be inserted on both sides.

Self-centering

The upper tool clamp for TRUMPF tools is self-centering. The upper tools need not be aligned.

Chapter 4

Operation

1. Description of the operating elements

1.1 Foot switch

There are two foot switches: Beam down and Emergency-up.

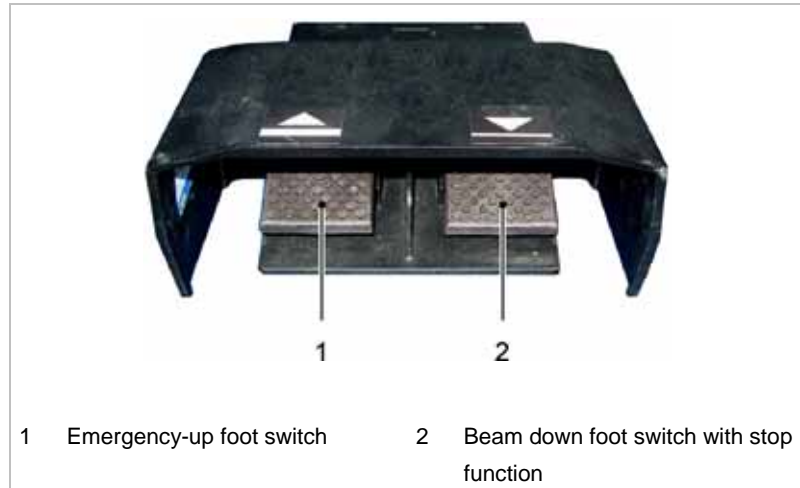|			
1	Emergency-up foot switch	2	Beam down foot switch with stop function

Fig. 54382

Beam down foot switch with stop function

The BEAM DOWN foot switch has three positions:

Position	Description	
0	Not pressed	The beam stands still or stops.
1	Pressed	The beam moves downwards.
2	Pushed through	The axes motion stops. The safety brake is activated.

Tab. 4-1

Emergency-up foot switch

The EMERGENCY-UP foot switch can be used to move the beam upwards. The EMERGENCY-UP foot switch is not active if EMERGENCY STOP was triggered. The EMERGENCY-UP foot switch has two positions:

Position	Description	
0	Not pressed	No effect on the beam.
1	Pressed	The beam moves upwards. The control system remains set to START.

Tab. 4-2

1.2 Control panel

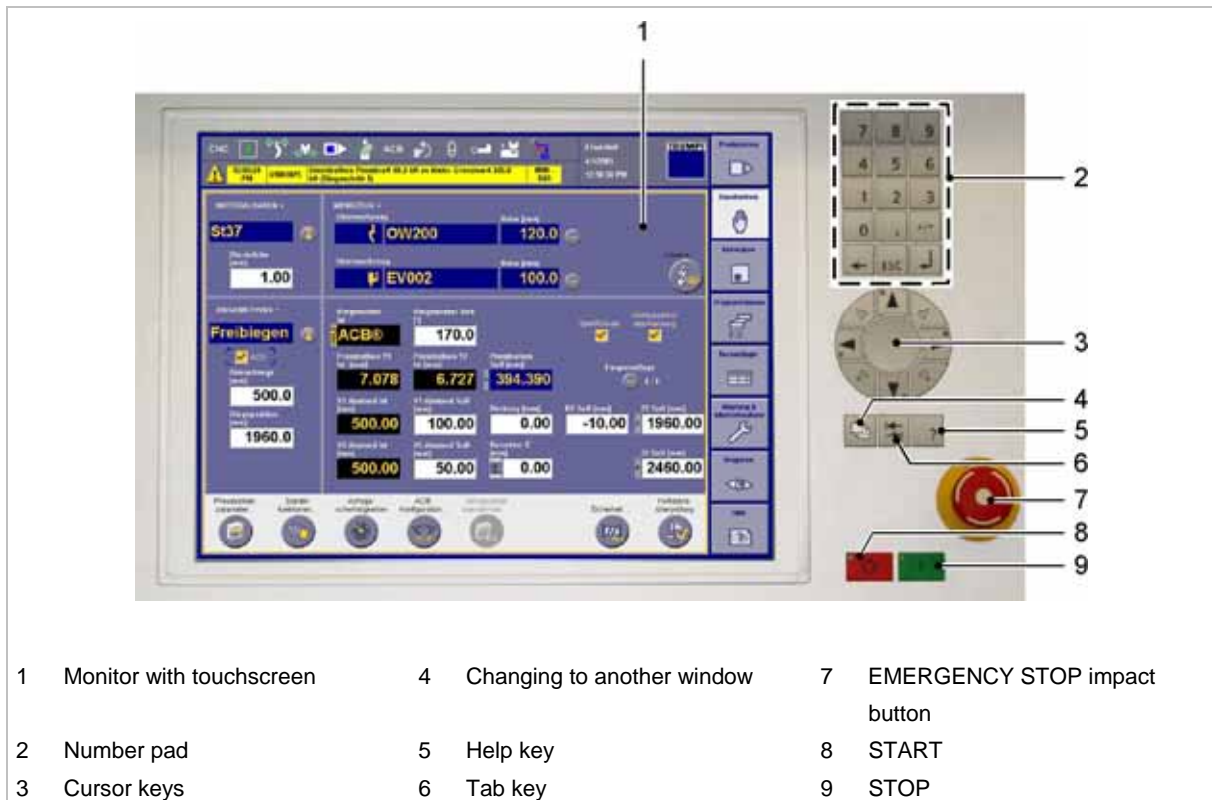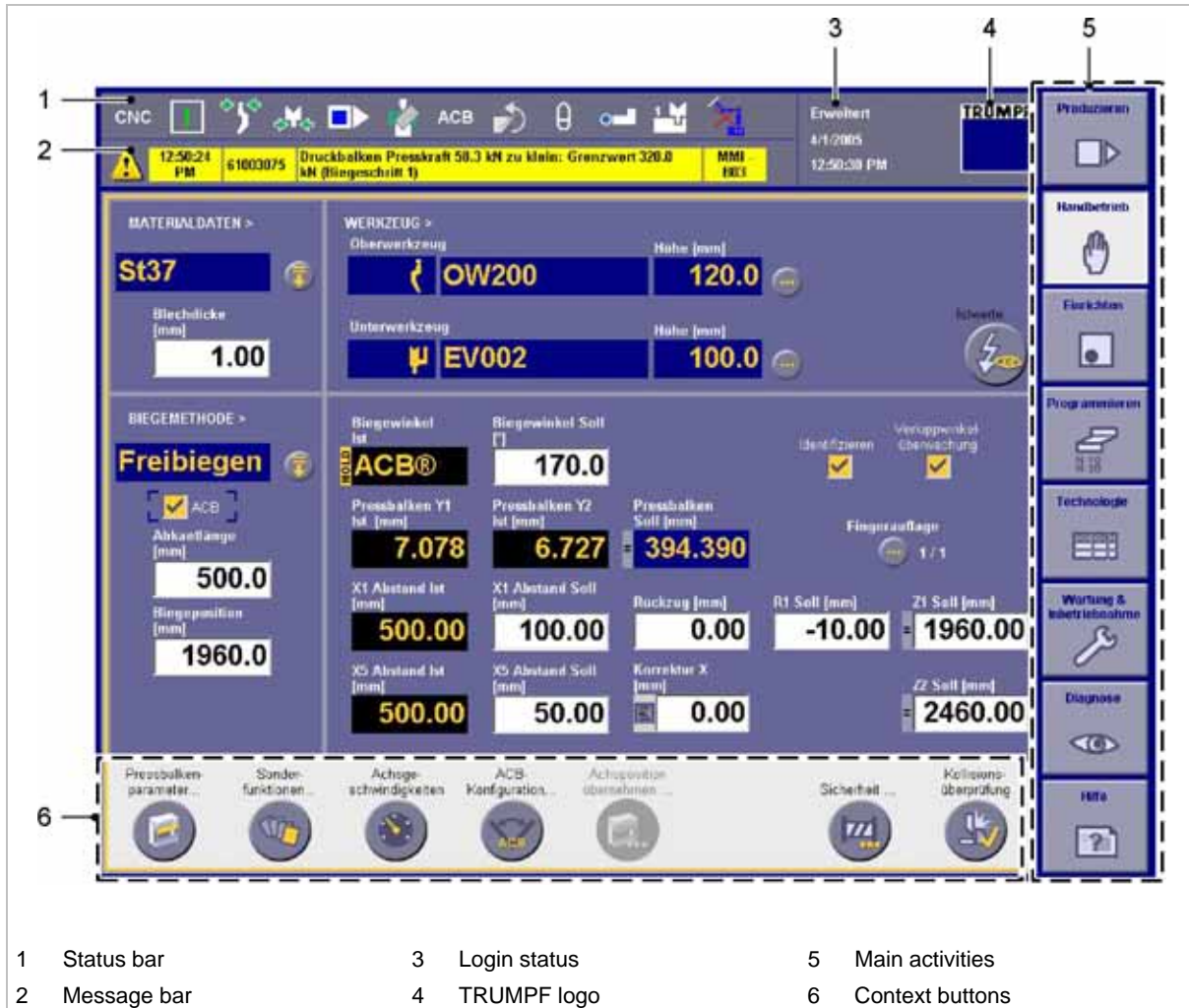|						
1	Monitor with touchscreen	4	Changing to another window	7	EMERGENCY STOP impact button
2	Number pad	5	Help key	8	START
3	Cursor keys	6	Tab key	9	STOP

Fig. 53202

Note
The beam has a USB connection outside on the right side.

1.3 User interface

User interface layout

| 1 | Status bar | 3 | Login status | 5 | Main activities |
| 2 | Message bar | 4 | TRUMPF logo | 6 | Context buttons |

User interface   Fig. 41631

Symbol in status bar		Description of the symbol
CNC	CNC	Connection to the machine control system is present or is not present.
		Tool clamp free/occupied.

Symbol in status bar		Description of the symbol
		Program status: • A program is being read. • Program disabled. • Pause. • Execute a program. • Stop. • Program undefined.
		Selected safety mode during the beam movement **with** block laser (four modes are possible).
		Selected safety mode during the beam movement **without** optoelectronic protective device (two modes are possible).
		Foot switch active or not active.
		Possible stop positions: • Stopping front. • Placing and stopping second stage. • Placing and stopping third stage.
		Remote diagnostics active.

Tab. 4-3

Message line The message bar is divided into 4 areas and is used to display information (gray), warnings (yellow) and error messages (red):

- The time at which the error occurred.
- The corresponding error number.
- A brief description of the error that occurred.
- Source of the error: control system or machine element that caused the error.

Note
Details about information text, notes and error messages are listed under *Diagnostics.*

Login status Three informative fields are displayed to the right, next to the status bar and the message line:

- Logged-on user.
- Current date.
- Current time.

Note

Language, unit of measure, and (your own) password can be changed by clicking on the information displayed in the log-on status.

TRUMPF logo   The following functions can be initiated by clicking the TRUMPF logo:

- Switch off machine.
- Change user.

Main activities

Main activity	Function in the main activity
Production	• Loading programs. • Displaying setup plan. • Producing programs. • Initiating program/global corrections.
Manual operation	• Programming and producing a single bend.
Program-ming	• Creating programs. • Modifying existing programs. • Selecting tools. • Making interventions in the processing sequence.
Technology	• Managing tools, materials and bend allowances. • Configuring ACB data. • E-Shop (ordering spare parts and tools). • Adjusting program parameters. • Adjusting the illumination on the machine.
Maintenance & Start-Up	• Maintenance overview. • Maintenance plan. • Machine configuration. • User management. • Screen functions. • Program backup.
Diagnostics	• Viewing error messages. • Sorting error messages. • ACB status display. • Diagnostics tools.
Help	Using Help (online operator's manual). Functions: • Search. • Index. • Bookmark.

Tab. 4-4

Input and position fields   A variety of input and position fields are available on the user interface that are marked in different colors in accordance with their functions:

- White: direct input of numbers or letters is possible.
- Black: actual values are displayed. No input possible.
- Blue: calculated nominal values or parameters selected from the lists or the tables are displayed. No direct input possible.

List selection   Clicking ⬇ opens a list from which parameters such as bending method can be selected.

Dialog box   Clicking ⬤ opens a dialog box from which, for instance, tools from a table can be selected. Filters can be set in the table in order to limit the selection.

The selection made in the dialog box can be saved with *Apply* or closed without saving with Cancel.

1.4   Operating elements at the switch cabinet

1	SERVICE key switch (only in USA and Canada)	3	CONTROL SYSTEM key switch
2	MAIN SWITCH with EMERGENCY SHUTDOWNfunction		
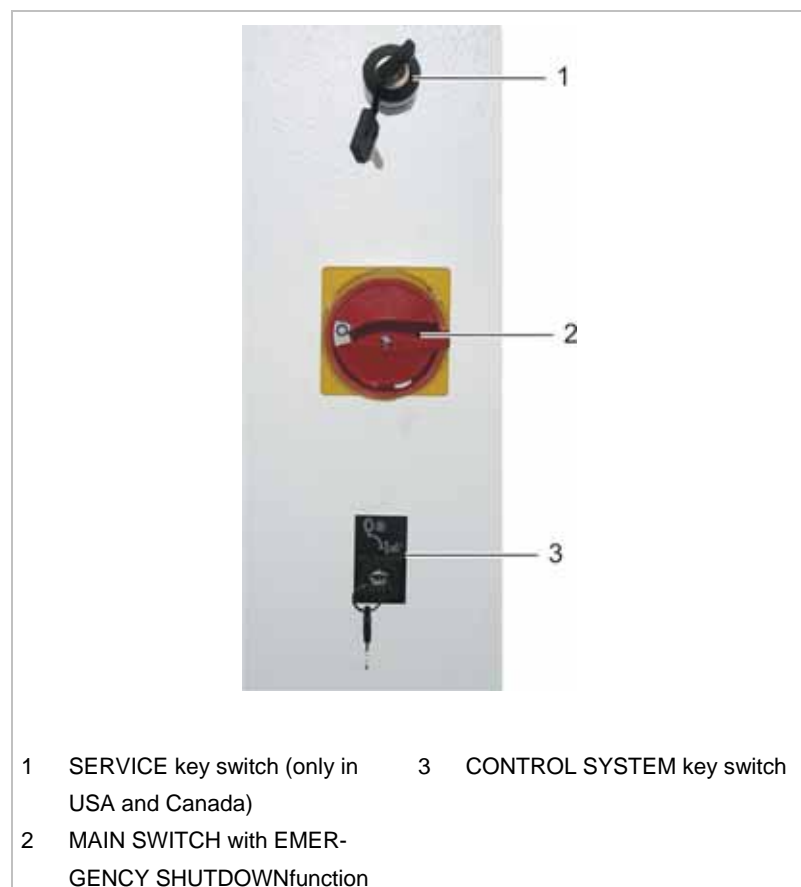
Operating elements on the rear side of the machine   Fig. 53203

2. Operating modes

Operating mode	Description	
Foot operation	• One operator. A foot switch is activated.	• Trigger the stroke with the BEAM DOWN foot switch.

Tab. 4-5

3. Switching on the machine

3.1 Releasing emergency stop/Emergency shutdown

The EMERGENCY STOP and EMERGENCY SHUTDOWN functions are located at the following points:

- EMERGENCY STOP impact button on the control panel.
- Main switch with EMERGENCY SHUTDOWN function.

Conditions

- The side safety doors of the machine are closed.
- The door of the switch cabinet is closed (USA and Canada).

➢ To release the EMERGENCY STOP-impact button, rotate the impact button to the right and pull it out.

or

➢ To release EMERGENCY SHUTDOWN on the MAIN SWITCH, turn the MAIN SWITCH to I.

3.2 Switching on the machine

Conditions

- EMERGENCY STOP released.
- The side safety doors of the machine are closed.
- The door of the switch cabinet is closed.

or

- The CONTROL SYSTEM key switch is set to 1.

<table>
<tr><td rowspan="4">⚠
Caution</td><td>**Backgauge fingers may collide with the loaded tools!**</td></tr>
<tr><td>➢ The axis positions of the X and R axes currently programmed in the manual mode must be suitable for the loaded tools, **or**</td></tr>
<tr><td>➢ Adjust the axis position of the X axis to >200 mm, **or**</td></tr>
<tr><td>➢ Remove the loaded tools.</td></tr>
</table>

1. Turn the MAIN SWITCH on the switch cabinet to I.

   The control system of the machine starts. This can take some time.

   A loud noise can be heard.

   The start page of the user interface appears.

   Keyboard is displayed.

Note

If the user does not log on within 20 s, the last logged-on user is automatically logged on (if no password has been stored).

2. To select "User": press 🔒 and select user.

   or

   ➤ Enter "User".

3. If required, enter "Password".

4. Close the displayed keyboard with <ESC>.

5. Press *Log-on*.

   The user interface will open.

   A loud noise can be heard.

Note

The position of the BendGuard must match with the tool height programmed in the manual operation.

6. Check the defined position of the BendGuard.

7. Press START.

   The beam moves upwards to the reference point.

   The backgauges are referenced. They move at a reduced speed.

   A loud noise can be heard.

8. Press the BEAM DOWN foot switch and keep it pressed.

   The beam moves downwards. The structural brake test is conducted. A loud noise can be heard.

The machine is ready for operation.

4. Switching off the machine

4.1 Switching off the machine in the case of malfunctions

➢ Press the EMERGENCY STOP impact button on the control panel.

4.2 Switching off the machine

1. Press the *TRUMPF logo*.

   The "Log off " screen appears.
2. Confirm with *Yes*.

   The start page of the user interface appears.
3. Select *Switch off machine*.

   The "Switch off machine" screen appears.
4. Confirm with *Yes*.

   The user interface is closed.
5. Wait until the message "It's now safe to turn off your computer" appears on the control panel.
6. Set the MAIN SWITCH to 0.

The machine is switched off.

5. Behavior in case of emergency and malfunctions

In case of emergencies and malfunctions that occur during the machine operation, the operator must distinguish between the following on the basis of his professional experience:

• EMERGENCY STOP: the beam stops.

• EMERGENCY-UP: the beam moves upwards.

• MAIN SWITCH: the machine is switched off.

When should emergency-up be pressed?

• If a person's body part gets trapped in the machine.

• When are body parts at the risk of getting trapped?.

When should emergency stop be pressed?

• In all other situations.

When should the main switch be set to 0?

• If the malfunction cannot be eliminated within a short time, e.g. in the case of maintenance work.

5.1 Rescuing trapped persons
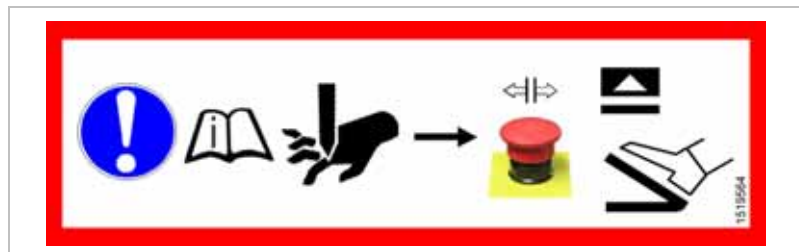
Information plate on the machine   Fig. 54408

1. If emergency stop was triggered: release EMERGENCY STOP.

2. Press the EMERGENCY-UP foot switch.

   The beam moves upwards. The control system switches to STOP.

6. Optoelectronic safety devices (optional)

Note
The downward movement of the beam at a rapid speed >10 mm/s is only permitted when an optoelectronic safety device on the machine is used.

6.1 Activating the optoelectronic safety device

1. *Maintenance & start-up*, select"Machine configuration".
2. Under "MACHINE OPTIONS >", activate"Block laser".

6.2 Avoiding dirt

Transmitter and receiver of the block laser must be kept free of dirt.

1. Keep the transmitter and receiver windows free of dust, dirt, and oil.
2. Avoid scratches on the window in the beam area.
3. Clean the window only with a soft, slightly damp cotton cloth.

6.3 Checking the function of the BendGuard

Before starting the work, it must be checked whether the Bend-Guard is working faultlessly. Do not trust the setting without first checking by yourself.

1. Interrupt the light field with an object during the closing movement at rapid speed.

   Downward movement of the beam stops.
2. Check the mute point.

6.4 Check the light field of the BendGuard using block laser

Correct alignment of the light field must be ensured after every tool change and at regular intervals.

Condition

- The desired tool is loaded.

1   Display

Fig. 54610

1. Press *Tool Align* on the receiver

   The camera in the receiver is automatically aligned with the tool tip.

2. Checking the LED display on the receiver.

   The light field alignment is correct if the middle LED lights up.

   The light field must be realigned if more or other LEDs light up.

6.5 Operating the machine without optoelectronic safety devices

The machine can be operated without an optoelectronic safety device. In this mode, the beam moves at a safe speed of max 10 mm/s.

1. When the user interface is started up: acknowledge the message with the EMERGENCY-UP foot switch.
2. **Either**
   - ➢ Press *Production >Safety*.
   - ➢ Press "BENDGUARD MODE >" 5 or 6.
   - ➢ *Apply*

   or
   - ➢ Press *Manual operation >Safety*.
   - ➢ Press "BENDGUARD MODE >" 5 or 6.
   - ➢ *Apply*

   or
   - ➢ Press *Program*, "Bendings", "Special functions".
   - ➢ Press "BENDGUARD MODE >" 5 or 6.

7. Manual operation

A single bend is programmed in the *Manual operation*. This bending operation can be processed immediately.

7.1 Defining the basic parameters

Selecting material data
1. Press *Manual operation*.
2. To select the material: under "MATERIAL DATA >, press" 🔽 and select the desired material.
3. Enter "Sheet thickness".

Select bending method
4. To select the bending method: under "BENDING METHOD >, press" 🔽 and select the desired bending method.
   – Air bending.
   – Seaming.
   – Flattening.
   – Embossed bending.
   – Swivel bending (if swivel bending tools are stored in tool management).
   – User (if user defined bending characteristics are stored).

Entering the length of bend and the bend position
5. Enter the "Length of bend".
   The bend position and the position of the gauge fingers (Z1 and Z2) are adjusted automatically.
6. Enter the "Bend position".

Selecting tools
7. To select the upper or lower tools, use ⚫⚫⚫ to open the tool selection.

   Note
   Only tools that have been created under *Technology*, "Tool Management" are displayed in the list. This also allows tool lists from TruTops Bend to be viewed.
   The selection of the list can be restricted using filters.

8. Select the desired tool from the list.
   The selected tool is displayed under "Preview>".

9. To select an adapter or a holder, use 🔽 to select the desired tool.
   The selected adapter or holder is displayed under "Preview>".

   The height of the selected adapter is displayed.

10. To install the tool or the adapter in the rotated position: activate "Tool rotated" or "Adapter rotated".

11. Press *Apply*.

Entering bending data
12. Enter geometry data for the bending. All the white fields can be modified.

7.2 Defining other parameters

Like a bending that has been created in *Program*(see "Operation_Program_Create program numerically"), beam parameters, special functions and axis speeds can be modified or selected.

Modifying beam parameters

Note
Only USA: Mute points 1 and 2 can be modified only by the "Customer administrator" user.

1. To modify beam parameters: press *Beam parameters...*.
2. Enter the beam parameters.
3. Press *Apply*.

Modifying axis speeds.
4. To modify axis speeds: press *Axis speeds*.
5. Enter the axis speeds.
6. Press *Apply*.

Modifying the safety mode
7. To modify the BendGuard mode: press *Safety...*.

Note
"BendGuard Mode" is only displayed if the corresponding option is activated under *Maintenance & start-up*, "Machine configuration".

8. Select "BendGuard mode".
9. For BendGuard modes 2 and 4: under "Nesting height", enter the height of the lateral link plate.
10. Press *Apply*.

Switching off backgauge collision check
11. To switch off collision check of the backgauge: press *Safety...*.
12. Deactivate "Collision check".
13. Press *Apply*.

7.3 Programming an increased working speed

Individual bends of a program can be programmed with an increased working speed (up to 25 mm/s).

The working speed of the beam is monitored and can be more than 10 mm/s only under the following prerequisites:

- Tool with a permissible die width is selected (from die width 10 onwards).
- The bending angle is 90°.
- The correction of the Bending angle is smaller than or equal to +10° (values between 0 and +10 are permissible).
- BendGuard Mode 1, 2, 3 or 4 is selected.

Note

If a user-specific bending characteristic is used, an increased working speed cannot be programmed.

1. Press *Program*, "Bendings",>"Joint speed".

   or

   ➢ Press *Manual operation*, *Joint speeds...* .

   Note

   The speed at which the beam moves downwards from the safe opening width (6 mm above the sheet) up to the clamping point.

2. Enter speed under "Y safe opening".

   – Possible values: 1 mm/s up to max 25 mm/s, depending on the programmed die width.

   Note

   Speed at which the beam moves downwards from the clamping point up to the lower dead point.

3. Enter speed under "Y press".

   – Possible values: 1 mm/s up to max 25 mm/s, depending on the programmed die width.

The beam moves from the safe opening width to the upper dead point at an increased speed.

7.4 Conducting collision check

The graphics collision check is a structural test that is carried out at the clamping point and at the lower dead point.

1. Press *Manual operation*.

2. Press *Collision check...* .

   The collision check is performed.

   If the backgauge collision check is switched off under *Safety...*, then no collision check is carried out for the backgauge.

   The detected collisions are displayed in the message line and can be viewed under *Diagnostics*, "Pending messages".

   All existing collision messages are deleted on during a tool change.

7.5 Producing individual bendings

1. Press START.
2. Place the workpiece between the upper and the lower tool and bring it against the backgauge.
3. To move the beam downwards: press the BEAM DOWN foot switch.

7.6 Using user defined bending characteristics

Bending characteristics (empirically determined) are stored in the control system for specific materials and tools. If a material or tool group is used for which no bending characteristics are stored, the lower dead point
of the beam is calculated using a geometric formula.

If this yields excessive deviations in the nominal angle (so that corrections have to be entered), user-specific bending characteristics can be created.

Condition

- A separate bending characteristic is created for the selected combination of tools, raw material, sheet thickness and opening angle(see "Operation_Technology_Create bending characteristic").

Note
The separate bending characteristic can be used only if a separate bending characteristic was stored for the combination of tools, raw material and sheet thickness.
Under "Bending method", the *User* method is then shown.

1. Press *Manual operation*.
2. Select"Bending method" >*User*.

The bending characteristic is used.

8. Programming

Programs can be programmed in the following ways:

- Numerically (all bends programmed individually).
- Graphically with graphics shopfloor programming (BendGraph, 2D profile drawing).
- Only TruBend series 5000: Graphically in the profile editor in TruTops Bend (optional).

8.1 Creating programs numerically

Creating a program

1. Press *Programming*, "Bending part".
2. Press *New Program*.

   The "New bending part" screen appears.
3. Enter the data for the "DESIGNATION >":
   - Enter"Description" (can be entered alphanumerically and is used for identifying the programs in the database).
   - Enter "Drawing number".
   - Use ⬇ to select classification name (classification name can be entered manually or can be selected from the list. The program is saved in a subfolder of the same name in the selected storage unit) (see "Operation_Maintenance & start-up_Criterion for management").
4. Select "MATERIAL DATA >":
   - Use ⬇ to select "Raw material".
   - Enter "Sheet thickness".
   - Enter "Quantity req.".
5. Deactivate "Create graphic 2D profile".

   or

   ➢ If TruTops Bend is activated: select"Program type" >*Numeric*.
6. Press *OK*.

   A new program is created. The entries from steps 3 and 4 appear on the user interface.
7. Fill in additional fields if desired.

8.2 Creating programs graphically (optional)

Using the graphics shopfloor programming (BendGraph), simple profiles can be programmed graphically (2D) at the machine.
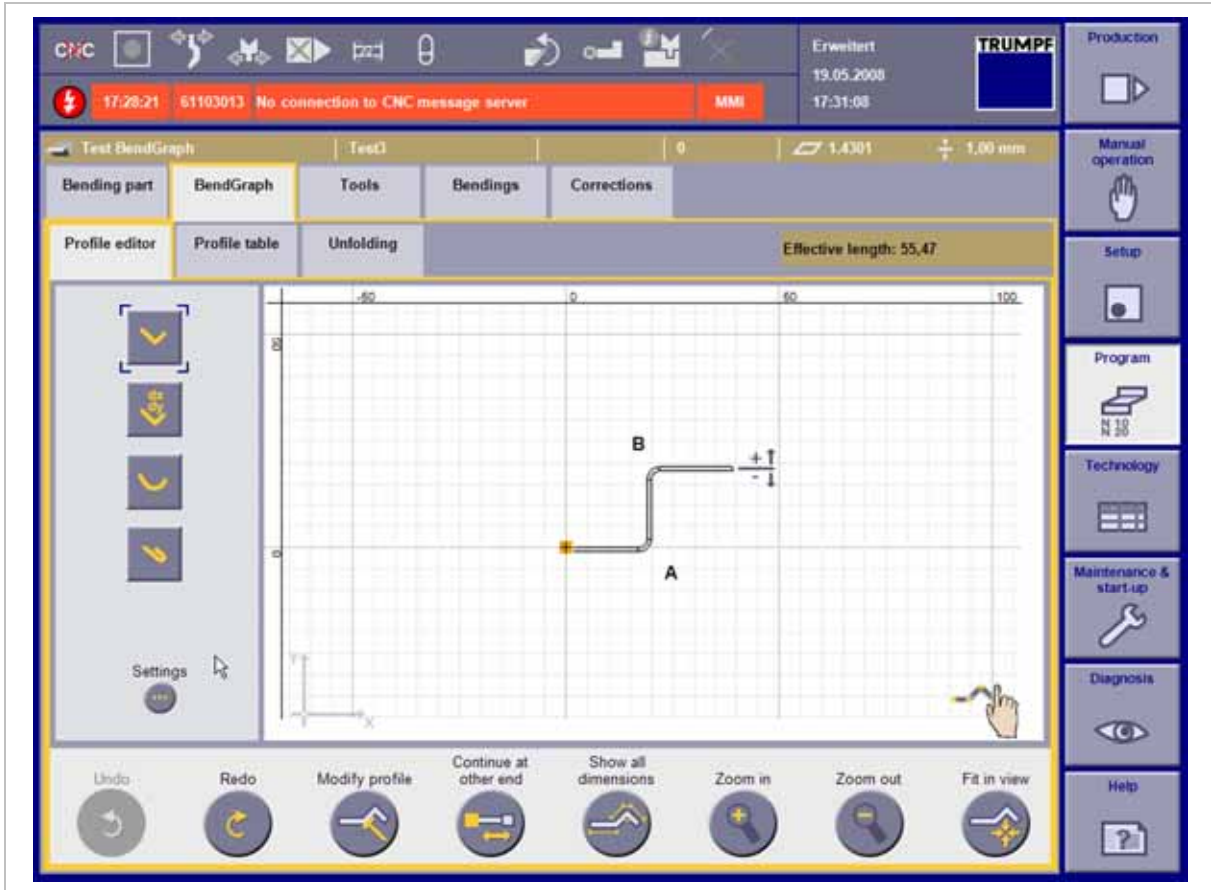
Fig. 53199en

Creating segments in the BendGraph

Segments can be created in various ways:

	Description
	Creating segment: • Enter "Angle". • Enter "Side length".
	Creating segment: • Enter "Angle" and "Dx". • or enter "Angle" and "Dy". • or enter "Dx" and "Dy".

	Description
	Creating segment with round bending: • Enter "Angle". • Enter "Side length". • Enter the "Radius" of the bend. • Enter "Number of segments". • The "Segment length" is calculated automatically.
	Only TruBend series 5000: Creating segment with a seam: • Enter "Distance". • Enter "Seam length". • Select "Folding direction". • Enter "Number of segments". • The "Segment length" is calculated automatically.
	Sketch mode: when this character appears in the drawing sheet, segments of the profile can be sketched directly in the drawing sheet. Sketching segment: • Tap on the drawing sheet. • Open "Details". • Make settings. • Press "Apply". • Enter values.

Tab. 4-6

Creating a program

1. Press *Programming*, "Bending part".
2. Press *New Program*.

   The "New bending part" screen appears.
3. Enter the data for the "DESIGNATION >":
   – Enter"Description" (can be entered alphanumerically
     and is used for identifying the programs in the database).
   – Enter "Drawing number".
   – Use 🔽 to select classification name (classification name
     can be entered manually or can be selected from the list.
     The program is saved in a subfolder of the same name in
     the selected storage unit) (see "Operation_Maintenance &
     start-up_Criterion for management").
4. Select "MATERIAL DATA >":
   – Use 🔽 to select "Raw material".
   – Enter "Sheet thickness".
   – Enter "Quantity req.".

5. Deactivate "Create graphic 2D profile".

   or

   ➢ If TruTops Bend is activated: select"Program type" >*Nu-meric.*

6. Press *OK.*

   A new program is created. The entries from steps 3 and 4 appear on the user interface.

7. Fill in additional fields if desired.

Creating profile

Condition

- Program (graphically, 2D) has already been created .

Defining settings

1. Press *Programming*, "BendGraph".
2. Press "Profile editor".
3. Use ⬤ to open "Settings".

   Note
   The settings are default settings. The selected values apply either to all segments or to all the following segments that are selected.

4. Defining Default settings.
5. Press *Apply*.

Drawing the first segment

6. **Either**

   ➢ Press ⌄.

   or

   ➢ Press ⬇.

   or

   ➢ To set the start point of the profile: tap on the drawing sheet.

   ➢ To draw a segment: tap on the drawing sheet once again.

7. Enter values.

   A preview of the segment is displayed.

8. Use ⬤ to open "Details...".
9. Select Settings.
10. Press *Apply*.
11. Press "OK" (✓).

    The segment is drawn.

12. To cancel the procedure: Press Cancel (✕).

    The segment is not drawn.

Drawing further segments

13. **Either**

    ➢ Press ⌄ .

    or

    ➢ Press ⚓ .

    or

    ➢ To draw a segment with round bending: press ✅ .

    or

    ➢ Only TruBend series 5000: To draw a segment with a seam: press 🔽 .

    or

    ➢ To draw a segment: tap on the drawing sheet.

14. Enter values.

    A preview of the segment is displayed.

15. Open ⋯ .

16. Select Settings.

17. Press *Apply*.

18. Press "OK" (✅).

    The segment is drawn.

19. To cancel the procedure: Press "Cancel" (❌).

    The segment is not drawn.

Modifying segment

Note
Segments can be modified directly in the profile editor or in the profile table.

20. **Either**

    ➢ Tap on the desired segment.

    ➢ Modify values.

    ➢ Press "OK" (✅).

    or

    ➢ Press "Profile table".

    ➢ Select the desired segment.

    ➢ Modify values.

    ➢ Press "OK" (✅).

    ➢ To return to the profile editor: press "Profile editor".

Deleting a segment

Note

Segments can be deleted directly in the profile editor or in the profile table. Only the first or the last segment of the profile can be deleted.

21. **Either**
   ➢ Tap on the desired segment.
   ➢ Press "Delete..." (🗑).
   ➢ Press *Yes.*
   or
   ➢ Press "Profile table".
   ➢ Select the desired segment.
   ➢ Press "Delete..." (🗑).
   ➢ Press *Yes.*
   ➢ To return to the profile editor: press "Profile editor".

Continuing the profile drawing on the other side

22. To add the next segment to the other end of the profile: press *Continue other side.*

Modifying profile

23. To flip, scale or rotate the entire profile: press *Modify profile.*
24. Make settings.
25. Press *Apply.*

The profile has been created.

Deleting profile

Deleting the entire profile.

Condition

- A profile is drawn.

1. Press *Programming*, "BendGraph".
2. Press "Profile table".
3. Press *Delete profile.*
4. Press *Yes.*

Modifying profile

To modify a program at a later time, all modifications that affect the profile must be made directly in the profile.

Condition

- A profile is drawn.

Note
If the profile is subsequently modified, development, tool stations and bending data will be recalculated.

1. Press *Programming*, "BendGraph".

Note
Segments can be modified directly in the profile editor or in the profile table.

2. **Either**
   - ➢ Press "Profile editor".
   - ➢ Mark the desired segment.
   - ➢ Modify values.
   - ➢ Press "OK" (✓).

   or
   - ➢ Press "Profile table".
   - ➢ Select the desired segment.
   - ➢ Modify values.
   - ➢ Press "OK" (✓).

The profile has been modified.

Creating development.

The drawn profile must be developed and the bending sequence must thereby be calculated. Tool stations and bendings are created and calculated automatically.

Creating development.

1. Press *Programming*, "BendGraph".
2. Press "Development".
   The development is created.

   Possible bending sequences are calculated.

   The effective length of the profile is displayed.

Using other calculated bending sequences

Note
All possible bending sequences are always calculated.

3. To display further calculated bending sequences: Press *Other bending sequence*.

Defining a bending sequence

4. To define the bending sequence: press *Define bending sequence...*.
5. Mark bendings according to the sequence.
   The bending sequence is defined.

Recalculating the bending sequence

6. To recalculate the bending sequence: press *Calculate sequence*.

Displaying the dimensioning

7. To display the dimensioning of the development: press *Show dimensions*.

Defining process data

8. Press *Process parameters*.
9. Perform settings.
10. Press *Apply*.

8.3 Defining tool stations

Programming tool stations

The tool stations can be graphically programmed directly on the control system of the machine.

Note
If the program was programmed with graphics shopfloor programming (BendGraph), the tool stations are created automatically.

Creating tool stations

1. Press *Programming*.
2. Press "Tools".

   Tool station 1 is already preset by the control system. It can however be modified.
3. Enter the "Length" of the station.
4. If desired, enter the "Position" of the station.
5. To fix the position of the station: activate "Position fixed".
6. To position all tool stations centrally on the press table: press *Centering set-up plan*.
7. To define segmentation automatically: activate "Automatic segmentation".

   Note
   The segmentations of the tools that are actually present must have been stored in the tool database.
8. To take into account the number of tools actually available during segmentation, activate "Consider tool storage position".
9. To create a new tool station: press *New station...*

   or

   ➢ Press *Copy station* to copy a station.

   An additional tool station is displayed.
10. Enter the data of the copied or the new tool station.
11. Press *Delete station* to delete a station.

Selecting tools

12. To select the tool station to be processed, use to select the desired station.

    or

    ➢ Click on the desired station.

    or

    ➢ Use (*Previous station*) or (*Next station*) to select the desired station.

    The selected station is marked in orange.

13. To select the upper or lower tools: use to open the tool selection.

    Note

    Only tools that have been created under *Technology*, "Tool management" are displayed in the list. This also allows tool lists from TruTops to be viewed.

    The selection of the list can be restricted using filters.

14. Select the desired tool from the list.

    The selected tool is displayed under "Preview>".

    Note

    Only TruBend series 5000: Only seaming tools that have been created under *Technology*, "Tool management" are displayed in the list.

15. Only TruBend series 5000: To use a seam strip: select the desired seaming tool under "Lock seam type".

16. To select an adapter or a holder: use to select the desired tool.

    The selected adapter or holder is displayed under "Preview>".

    The height of the selected adapter is displayed.

17. To install the tool or the adapter in the rotated position: activate "Tool rotated" or "Adapter rotated".

18. Press *Apply*.

Editing segmentation

19. Press *Edit segmentation....*

20. **Either**

    ➢ Use to select the tool station under "Group".

    – Beam tool.
    – Table tool center.
    – Table lock seam front.

    or

    ➢ Click on the desired tool station.

    The selected tool station is marked in orange.

21. Select the desired tool under "TOOLS>".

22. Use in "SEGMENTATION >" to apply tool.

23. If necessary, use to remove the selected tool from the segmentation.

24. If necessary, use or to move the selected tool.

25. Press *Apply*.

Displaying setup plan

26. Press *Set up plan....*

    The setup plan is displayed.

27. Close the setup plan with *Close*.

8.4 Displaying bending process (3D)

Note
If the program was created graphically (graphical shopfloor programming or TruTops Bend), a 3D simulation of the bends is displayed.

| 1 | Open navigator | 3 | 3D simulation |
| 2 | Select standard views | 4 | Configure display |
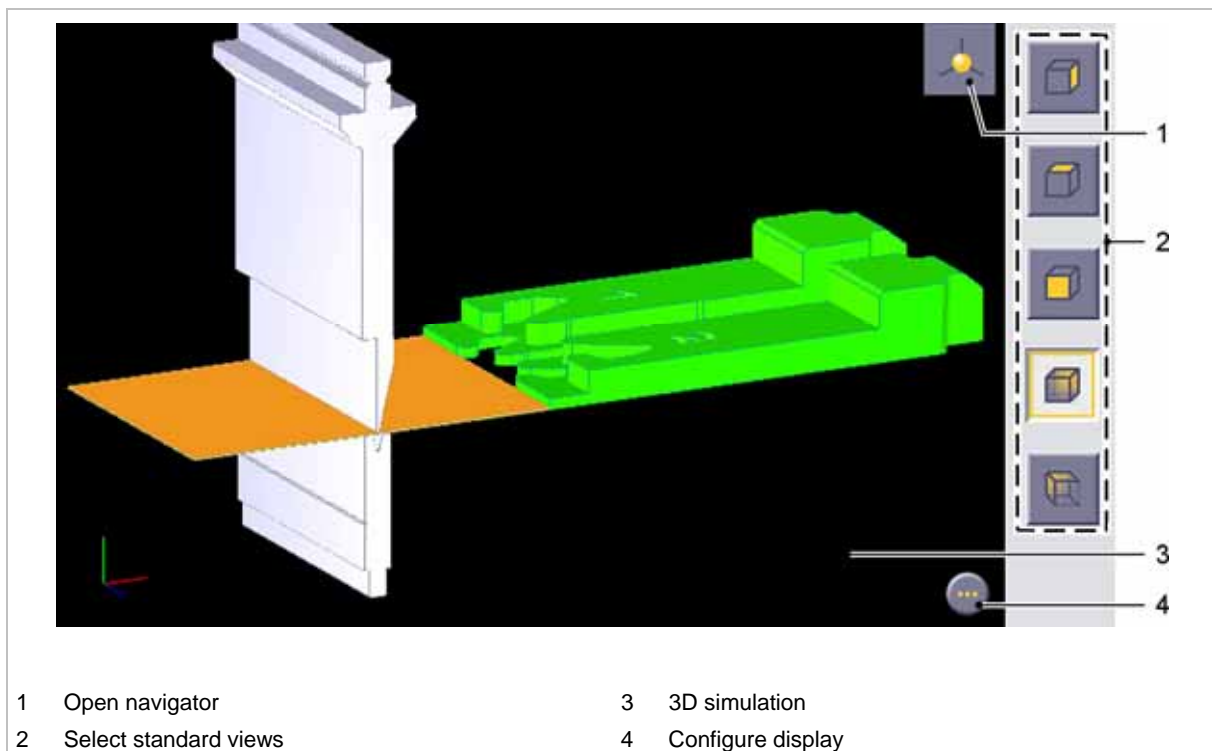
3D simulation   Fig. 53197

The 3D simulation can be rotated and swiveled in various directions using the navigator.

Moving 3D simulation on the touchscreen

1	Rotating around Y axis	5	Close
2	Move	6	Adjusting the graphic in window
3	Rotating around X axis	7	Zooming out/zooming in
4	Rotating around Z axis		
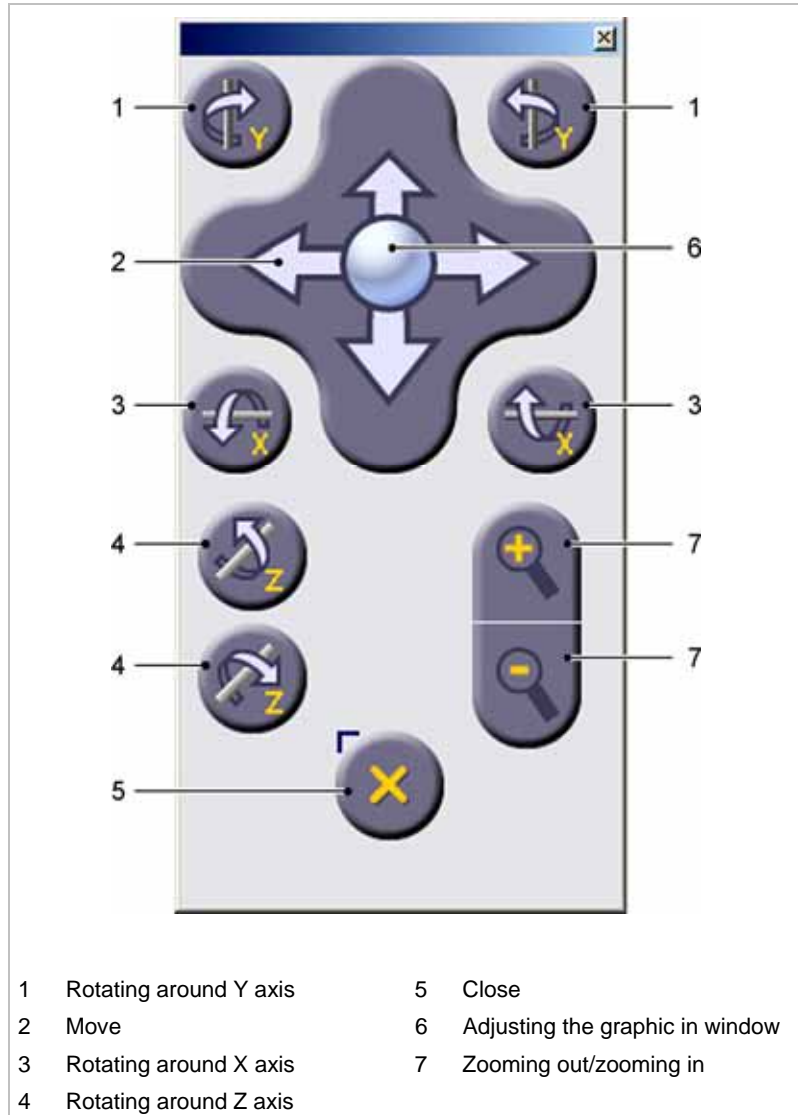
Navigator   Fig. 53196

Simulating bending process

1. Press *Programming*, "Bendings".
2. Press "Graphics".
3. To simulate individual bendings: press *Next bending process* or *Prev. bending sequence*.

Adjusting the bending process

To optimize the bending process, the following settings can be made:

- Rotate bending part.
- Position gauge fingers.
- Avoiding collisions through certain measures.

Note
Rotate bending part and avoid collisions are possible only if the program was created with the graphical shopfloor programming (BendGraph) on the machine.

Rotate bending part.
1. Press *Programming*, "Bendings".
2. Press "Graphics".
3. To rotate the bending part in the tool station: press *Rotate bending part*.
   The bending part is rotated.

   The position of the gauge fingers is adjusted automatically.

Changing the position of the gauge fingers
4. To change the position of the gauge fingers: press *Adjust finger....*
   The Adjust finger menu is opened.
5. Make the desired settings.
6. To close the menu: press .

Avoiding collisions
7. To avoid collisions: press *Avoid collisions....*
   The collision avoidance wizard is opened.
8. Select the desired strategy for collision avoidance.
9. Press *Next*.

Note
Modified settings are automatically saved.
10. Make settings.

Note
The settings made previously are automatically saved.
11. To select a different/further strategy for collision avoidance: press *Back*.

Note
If collisions occur because of the design of the bending parts, the only way to avoid these is by changing the design of the bending parts in "BendGraph" or in TruTops Bend.
12. Repeat steps 8 to 11 until no further collisions occur.
13. Press *Finish*.
   The collisions are eliminated.

8.5 Defining bendings

Programming bendings

Note
If the program was programmed with graphics shopfloor programming (BendGraph), the bendings are created automatically. Changes in the bendings should then be made only in BendGraph.
If bendings created in a graphically programmed program are modified, these modifications are not applied to the profile. When the bendings are regenerated, these modifications are overwritten.

Defining the data for the first bending operation

1. Press *Programming*.
2. Press "Bendings".
3. Press "Geometry".

    The new bending part initially consists of only one single bend. The number of the bend is displayed on the left-hand side. The current bend is outlined in yellow.

4. Enter geometry data for bend 1.

    Note
    Only USA: Mute points 1 and 2 can be modified only by the "Customer administrator" user.

5. Press"Beam parameters".
6. Enter beam parameters for bending 1.

    Note
    "BendGuard Mode" is only displayed if the corresponding option is activated under *Maintenance & start-up*, "Machine configuration".

    Only USA:"BendGuard mode" is set to mode 3 (with stop at the mute point).

7. If BendGuard is to be used for this bending operation: press"Special functions".
8. Select the desired special functions for bending 1.
9. For BendGuard modes 2 and 4: under "Nesting height", enter the height of the lateral link plate.
10. If the axis speeds are to be modified: Press"Axis speeds".
11. Modifying axis speeds.

Defining additional bendings

12. To create a new bend: Press*New bend....*

    or

    ➤ To copy a bend, press*Copy bending*.

    An additional bend is displayed on the left-hand side. The current bend is outlined in yellow.

13. Enter the data of the copied or the new bend as described in steps 2 to 8.

Deleting bending

14. Press *Delete bending*.

    The current bend is deleted. The remaining bends are renumbered.

Moving bendings

15. To move the sequence of the bendings, press *Move bending operation...*

Move bends opens.

16. Select the bend which is to be moved.

The selected bend is outlined in yellow.

17. Use 🔼 or 🔽 to move the bend up or down.

18. Press *OK*.

The bends are renumbered in accordance with the modified sequence.

Programming an increased working speed

Individual bends of a program can be programmed with an increased working speed (up to 25 mm/s).

The working speed of the beam is monitored and can be more than 10 mm/s only under the following prerequisites:

- Tool with a permissible die width is selected (from die width 10 onwards).
- The bending angle is 90°.
- The correction of the Bending angle is smaller than or equal to +10° (values between 0 and +10 are permissible).
- BendGuard Mode 1, 2, 3 or 4 is selected.

Note
If a user-specific bending characteristic is used, an increased working speed cannot be programmed.

1. Press *Program*, "Bendings",>"Joint speed".

   or

   ➢ Press *Manual operation*, *Joint speeds...* .

   Note
   The speed at which the beam moves downwards from the safe opening width (6 mm above the sheet) up to the clamping point.

2. Enter speed under "Y safe opening".
   - Possible values: 1 mm/s up to max 25 mm/s, depending on the programmed die width.

   Note
   Speed at which the beam moves downwards from the clamping point up to the lower dead point.

3. Enter speed under "Y press".
   - Possible values: 1 mm/s up to max 25 mm/s, depending on the programmed die width.

The beam moves from the safe opening width to the upper dead point at an increased speed.

8.6 Using user defined bending characteristics

Bending characteristics (empirically determined) are stored in the control system for specific materials and tools. If a material or a tool group for which no bending characteristics are stored is used, the lower dead point
of the beam is calculated using a geometric formula.

If this yields excessive deviations in the nominal angle (so that corrections have to be entered), user-specific bending characteristics can be created.

Using separate bending characteristics

Condition

- A separate bending characteristic is created for the selected combination of tools, raw material, sheet thickness and opening angle (see "Operation_Prgramming_Separate bending characteristics").

Note
The separate bending characteristic can be used only if a separate bending characteristic was stored for the combination of tools, raw material and sheet thickness.
Under "Bending method", the method *User* is then shown.

1. Press *Programming*.
2. Press "Bendings".
3. Press "Geometry".
4. Select the desired bend.
5. Select the "Bending method"*User*.

8.7 Check

Running program check

The program check is a general test of the bending program. It is run automatically when the bending program is loaded in Production.

1. Press *Programming*.
2. Press *Bending part*.

   Note
   Detected errors are displayed in "Program check xxx", and can be viewed under *Diagnostics*, "Pending messages " or "Message history".

3. Press *Check....*

   The program check is carried out.

   Only USA: If a bending operation was programmed with BendGuard mode without stopping at the mute point, a message is displayed.

   Only USA: If manual incremental switching ("Down button") was programmed, a message is displayed.

All existing collision messages are deleted during a tool change.

8.8 Loading a program

Loading a program

Note
Programs are always stored in subdirectories in the selected storage directory (depending on the classification, e.g. customer) (standard). The program storage unit can also be expanded in order to store programs in nested directories. All directories of the selected storage directory (e.g. C:\Programs) are displayed in the expanded program storage unit. More directories can be created.
Example of standard directories: 'C:\Programs\Kunde\test.bnc'
Example of nested directories:
'C:\Programs\Kunde\Jahr\Auftrags-Nr\test.bnc'
To activate the expanded program storage unit, contact TRUMPF Customer Service Department.

1. Press *Programming*, "Bending part".

   or

   ➢ Press *Production*.

2. Press *Load program....*

    The "Bending parts list" is opened.

3. Use 🔽 to select "Storage unit".

    All programs that are saved in this folder are displayed in the list.

    Note
    The list of programs can be restricted using filters or search functions.

4. To search for the designation, enter "Search string".

    All programs that contain the entered search string in the description/file name, drawing number or in the comment are displayed.

    Note
    Only the classification names for which programs exist in the storage unit are offered in the selection list(see " Operation_Maintenance & start-up_Criterion for management").

5. To search for programs of a special classification, use 🔽 to select the classification name.

    All programs for the selected classification are displayed in the list.

6. To display additional search options, click the magnifying glass.

    "Description", "File name" and "Material" are displayed.

7. Use 🔽 to select the "Material" to be searched for.

    All programs that use the selected material are displayed in the list.

8. To show descriptions or file names in the list, activate "Description" or "File name".

    Description or file name of the bending program are displayed in the list.

9. To sort the programs according to columns, click the column overview.

    – Description/File name.
    – Classification name.
    – Type.
    – Date.

10. To search for programs of a particular date, enter "Date from" and "to".

    All programs that were generated within the specified period are displayed in the list.

11. Select the program.

    The selected program is marked in yellow.

    To the right, "Details>", "Preview>" (in the case of graphic programs) and "Quantity>" of the selected program are displayed.

Note

A program check is carried out automatically when a program is loaded. Detected errors are displayed in "Program check xxx", and can be viewed under *Diagnostics*, "Pending messages " or "Message history".

12. Press *Apply*.

The program check is carried out.

Only USA: If a bending operation was programmed with block laser mode without stopping at the mute point, a message is displayed.

Only USA: If manual incremental switching ("Down button") was programmed, a message is displayed.

The program is loaded.

8.9 Managing programs

The programs are created as per certain classifications, e.g. sorted by customer.

Note

All programs that are stored in the selected directory are displayed in the bending parts list.
Programs are always stored in subdirectories in the selected storage directory (depending on the classification, e.g. customer) (standard). The program storage unit can also be expanded in order to store programs in nested directories. In the expanded program storage unit, all directories of the selected storage directory (e.g. C:\Programs) are displayed. More directories can be created.
Example of standard directories: 'C:\Programs\Kunde\test.bnc'
Example of nested directories:
'C:\Programs\Kunde\Jahr\Auftrags-Nr\test.bnc'
To activate the expanded program storage unit: contact TRUMPF Customer Service Department.

The following functions can be carried out in"Program management":

- Importing/exporting programs.
- Copying programs.
- Creating a new version of a program.
- Deleting a program.
- Renaming a program.
- Updating all programs of the selected storage unit.

Note

Selecting programs(see "Operation_Programming_Load program").

Importing/exporting program

1. Press *Programming*.
2. Press "Bending part".
3. Press *Program management...*.

   The "Bending parts list" is opened.
4. Use 🔽 to select "Storage unit".
5. Press *Import/Export...*

   "File transfer" is opened.

   On the left, under "Directory", the path selected in step 4 is displayed along with all bending programs that are stored there.
6. To the right, under "Directory", select a directory to
   – Import programs (select the directory where the programs that are to be imported are located).
   – Export programs (select the directory where programs are to be exported into).
7. **Either**
   ➢ Use 🔵 to import all displayed programs from the external directory.
   ➢ To import files created in TruTops, activate "Also copy TruTops files".

   or
   ➢ Select file from the external directory.
   ➢ Use 🔵 to import the selected program.

   Note
   If a program is exported that is loaded in *Programming*, it is automatically saved before export.
8. **Either**
   ➢ Use 🔵 to export all displayed programs from the internal directory.
   ➢ To export files created in TruTops, activate "Also copy TruTops files".

   or
   ➢ Select file in the internal directory.
   ➢ Use 🔵 to export the selected program.
9. Press *Close*.
10. Press *Close*.

Deleting a program

1. Press *Programming*.
2. Press "Bending part".
3. Press *Program management...*.

   The "Bending parts list" is opened.
4. Select the program.

   The selected program is marked in yellow.
5. Press *Delete...*.

   The "Delete bending part " screen is opened.

   Note

   If the bending program is deleted from the list, it is still stored in the storage unit, but is no longer displayed in the list. The program is displayed again the next time the storage unit is updated. If the bending program is deleted from the storage unit, it is deleted for good and cannot be recovered.

6. **Either**

   ➢ To delete the bending program from the list, press *No*.

   or

   ➢ To delete the bending program for good (from the bending part storage), press *Yes*.

Renaming a program

1. Press *Programming*.
2. Press "Bending part".
3. Press *Program management....*

   The "Bending parts list" is opened.
4. Select the program.

   The selected program is marked in yellow.
5. Press *Rename ....*

   "Rename bending part " is opened.

   Note
   The file name of the program does not change when the "Description" or Classification (e.g. "Customer") is modified.
6. Modify "Description", "Drawing number", or "Classification"
7. To modify the file name of the program or to move the program (in the storage unit selected under "Classification"), activate "Change physical file name".

   The file name is changed according to the designation.

   The (BNC) file is moved into a folder according to the entry under "Classification".
8. *OK*.

The program is renamed and displayed in the list with the modified "Designation".

9. Production

9.1 Loading a program

Note
Programs are always stored in subdirectories in the selected storage directory (depending on the classification, e.g. customer) (standard). The program storage unit can also be expanded in order to store programs in nested directories. All directories of the selected storage directory (e.g. C:\Programs) are displayed in the expanded program storage unit. More directories can be created.
Example of standard directories: 'C:\Programs\Kunde\test.bnc'
Example of nested directories:
'C:\Programs\Kunde\Jahr\Auftrags-Nr\test.bnc'
To activate the expanded program storage unit, contact TRUMPF Customer Service Department.

1. Press *Programming*, "Bending part".
   or
   ➢ Press *Production*.
2. Press *Load program....*
   The "Bending parts list" is opened.
3. Use 🔽 to select "Storage unit".
   All programs that are saved in this folder are displayed in the list.

   Note
   The list of programs can be restricted using filters or search functions.
4. To search for the designation, enter "Search string".
   All programs that contain the entered search string in the description/file name, drawing number or in the comment are displayed.

   Note
   Only the classification names for which programs exist in the storage unit are offered in the selection list (see " Operation_Maintenance & start-up_Criterion for management").
5. To search for programs of a special classification, use 🔽 to select the classification name.
   All programs for the selected classification are displayed in the list.
6. To display additional search options, click the magnifying glass.
   "Description", "File name" and "Material" are displayed.
7. Use 🔽 to select the "Material" to be searched for.
   All programs that use the selected material are displayed in the list.

8. To show descriptions or file names in the list, activate "Description" or "File name".

   Description or file name of the bending program are displayed in the list.

9. To sort the programs according to columns, click the column overview.

   – Description/File name.

   – Classification name.

   – Type.

   – Date.

10. To search for programs of a particular date, enter "Date from" and "to".

    All programs that were generated within the specified period are displayed in the list.

11. Select the program.

    The selected program is marked in yellow.

    To the right, "Details>", "Preview>" (in the case of graphic programs) and "Quantity>" of the selected program are displayed.

    Note
    A program check is carried out automatically when a program is loaded. Detected errors are displayed in "Program check xxx", and can be viewed under *Diagnostics*, "Pending messages " or "Message history".

12. Press *Apply*.

    The program check is carried out.

    Only USA: If a bending operation was programmed with block laser mode without stopping at the mute point, a message is displayed.

    Only USA: If manual incremental switching ("Down button") was programmed, a message is displayed.

    The program is loaded.

9.2 Creating a production plan

Creating a new production plan

1. Press *Production*.
2. Press *Production plan....*
   "Production plan" opens.
3. Press *Add production plan....*
   A new production plan is added.

   The production plan is marked in orange.
4. Enter "Name" and confirm with <ENTER>.
5. Enter "Piece" and confirm with <ENTER>.

The quantity can be entered to define how often the production plan should be executed.

6. If the production plan has already been executed, then enter the actual quantity "Act. pcs" and confirm with <ENTER>.

Adding program

7. Press *Add bending part....*

The "Bending parts list" is opened.

Note

The list of programs can be limited using a search string or one of the filters.

The list of the programs can be sorted by table headings.

8. Select the desired program.

The program is selected in orange.

9. Press *Apply*.

The program is added to the production plan.

10. To add more programs, repeat steps 7 to 9 as many times as necessary until all desired programs have been added.

Removing program

11. To delete programs, select the program and press *Remove bending part*.

Updating Production plan

12. Select the desired production plan.

13. Press *Update*.

The programs of the production plan are updated.

Deleting production plans

14. Select the desired production plan.

15. Press *Delete production plan*.

The production plan is deleted.

Loading production plan

16. Select the desired production plan.

17. Press *Load production plan*.

18. Press *Close*.

The production plan is loaded and can be processed.

9.3   Displaying setup plan

1. Press *Production*.

2. Press *Set up plan....*

The setup plan is displayed.

9.4   Defining corrections

Enter local corrections

1. Press *Production*.

2. Press *Corrections...*

Note

All the white fields can be modified.

3. Enter corrections.

   – Angle correction.

   – X correction.

   – LDP correction.

   – Parallelism

   – Only TruBend series 5000: V crowning.

Entering global corrections

4. Press *Global corrections...*.

"Global corrections..." opens.

Note

All the required bending angles programmed in the active program are displayed.

5. Activate "Req. angle with".

6. Use 🔽 to select "Req. angle with".

7. Enter "Correction".

8. Activate "Backgauge X".

Note

All the backgauges positioned in the active program are displayed.

9. Use 🔽 to select "Backgauge X".

10. Enter "Correction".

11. Activate "Clamping point correction".

12. Use 🔽 to select "Clamping point corr."

13. Enter "Correction".

14. To apply global corrections, even of already corrected values, activate "Relative to previous adjustment values (Delta correction)".

15. Press *OK*.

The corrections are entered.

9.5 Setting the safety mode

Setting the safety mode

1. Press *Production*.

2. Press *Safety...*.

Note

"BendGuard Mode" is only displayed if the corresponding option is activated under *Maintenance & start-up*, "Machine configuration".

3. Select "BendGuard mode".

Switching off the collision check between the backgauge and the die

4. Under "Backgauge>", activate "Collision check off"

5. Press *Close*.

9.6 Producing bending parts

Condition

• The desired program is loaded .

1. Press START.
2. Place workpiece between the upper and the lower tool and bring it against the backgauge.
3. To move the beam downwards: press the BEAM DOWN foot switch.

9.7 Display production data

The production data of all produced programs are summarized in an XML file, and can be displayed using the Internet browser.

Condition

• Network connection of the machine.

Note
The XML file for the production data can **not** be opened at the machine, but only at an external computer via a network connection to the machine.

➢ Open the 'Production.xml' file under '\\B050XAYYYY\Production' using the Internet browser.

10.   Technology

Tab	Description
"Tool manage-ment"	• Loading, creating, editing, copying and deleting tools. • Importing and exporting tools from a tool archive (e.g. TruTops Bend).
"Tool groups"	• Creating, editing and deleting tool groups. • Importing and exporting tool groups from a TruTops Bend database.
"Material mana-gement"	• Creating, editing and deleting material. • Creating, editing and deleting raw material.
"Bend allowan-ces"	• Creating, editing and deleting bend allowances. • Importing and exporting bend allowances from a Tru-Tops Bend database.
"E-Shop"	Ordering tools online.
"Program para-meters."	Making global settings.
Only Tru-Bend series 7000 :"Illumination"	• Setting brightness of the illumination. • Modifying sloping position of the control panel. • Switching on the line laser to display the bending line.
"PDF viewer"	Displaying PDF files.
"Bending curves"	Creating user-specific bending characteristics.

Tab. 4-7

10.1 Managing tools

The following tool types are managed separately:

• "Upper tools."
• "Lower tools."
• "Radius inserts" (radius inserts for upper tools).
• "Z bending tools".
• Only TruBend series 5000:"Seaming tools".
• "Holders"
• "Adapters".
• "Swivel bending tools" (Swivel bending tools).
• "Swivel bending die" (WingBend tools).

Creating a new tool

Create tool
1. Press *Technology*.
2. Press "Tool management".

3. **Either**

   ➢ To create a new tool: press *New*.

   or

   ➢ Select the desired tool.

   ➢ To copy an existing tool: press *New from template*.

   "Tool data" is opened.

Defining tool properties

4. Press "Properties".

5. Press "Main properties".

6. Select or enter properties.

   – DESCRIPTION >

   – GEOMETRY >

   – DEFINITION >

7. Press "Further properties".

8. Select or enter properties.

   – GENERAL TOOL DATA>

   – SPECIFIC TOOL DATA >

Customizing segmentation

9. Press "Segmentation".

10. To create a new tool width: press *New*.

    – Select "Tool type".

    – Enter "Tool length".

    – Enter "Quantity" of tools.

11. To copy an existing tool width: press *New from template*.

    – Select "Tool type".

    – Enter "Tool length".

    – Enter "Quantity" of tools.

12. To delete a tool width: select the desired tool, press *Delete tool type* and confirm with *OK*.

Inserting front view of the tool

Note

To create window tools or gooseneck tools for instance, a front view of the tool must be inserted. Only in this way, the tool can be displayed in correct graphics and the collision check can be performed correctly.

If two identical gooseneck tools (e.g. horn left, length 40 mm) are to be created, these must have minimal differences:

Example: create a right hand gooseneck tool, length = 40 mm and another right hand gooseneck tool, length = 40.0001 mm.

13. **Either**

   ➢ Enter "File name of drawing".

   or

   ➢ Use ⊕ to select a drawing.

   ➢ Use ⬇ to select the storage medium.

   ➢ Use ➕ or ➖ to select the path.

   If the selected folder contains DXF or WZG files, then these are displayed on the right.

   ➢ Use ⬆ to skip to the next level up on the path.

   ➢ Use ⬇ to select "File type".

   If DXF files (*.dxf) are selected as the file type, then only DXF files are displayed in the list.
   If GEO files (*.wzg) are selected as the file type, then only WZG files are displayed in the list.

   ➢ Select the desired file.

   ➢ Press *Apply*.

Inserting a tool drawing   14. Select "Drawing".

15. **Either**

   ➢ Enter "File name of drawing".

   or

   ➢ Use ⊕ to select a drawing.

   ➢ Use ⬇ to select the storage medium.

   ➢ Use ➕ or ➖ to select the path.

   If the selected folder contains DXF or WZG files, then these are displayed on the right.

   ➢ Use ⬆ to skip to the next level up on the path.

   ➢ Use ⬇ to select "File type".

   If DXF files (*.dxf) are selected as the file type, then only DXF files are displayed in the list.
   If GEO files (*.wzg) are selected as the file type, then only WZG files are displayed in the list.

   ➢ Select the desired file.

   ➢ Press *Apply*.

   or

   ➢ Press *Edit in TruTops CAD*.

   ➢ Draw or edit drawing with the tool wizard in TruTops CAD.

   ➢ Quit TruTops CAD.

16. Press *OK.*

The tool is created.

Editing a tool

Editing a tool
1. Press *Technology*.
2. Press "Tool management".
3. Press *Edit tool*.
   "Tool data" is opened.

Modifying tool properties
4. Press "Properties".
5. Press "Main properties".
6. Select or modify properties.
   – GEOMETRY >
   – DEFINITION >
7. Press "Further properties".
8. Select or modify properties.
   – GENERAL TOOL DATA>
   – SPECIFIC TOOL DATA >

Customizing segmentation
9. Press "Segmentation".
10. To create a new tool width: press *New*.
    – Select "Tool type".
    – Enter "Tool length".
    – Enter "Quantity" of tools.
11. To copy an existing tool width: press *New from template*.
    – Select "Tool type".
    – Enter "Tool length".
    – Enter "Quantity" of tools.
12. To delete a tool width: select the desired tool, press *Delete tool type* and confirm
    with *OK*.

Inserting front view of the tool

Note
To create window tools or gooseneck tools, a front view of the tool must be inserted. Only in this way, the tool can be displayed in correct graphics and the collision check can be performed correctly.

13. **Either**
    ➢ Enter "File name of drawing".
    or
    ➢ Use 🔵 to select a drawing.
    ➢ Use 🔽 to select the storage medium.
    ➢ Use **+** or **−** to select the path.
      If the selected folder contains DXF or WZG files, then these are displayed on the right.
    ➢ Use 🔼 to skip to the next level up on the path.
    ➢ Use 🔽 to select "File type".
      If DXF files (*.dxf) are selected as the file type, then only DXF files are displayed in the list.
      If GEO files (*.wzg) are selected as the file type, then only WZG files are displayed in the list.

> ➢ Select the desired file.
> ➢ Press *Apply*.

or

> ➢ Press *Edit in TruTops CAD*.
> ➢ Draw or edit the drawing with the tool wizard in TruTops CAD.
> ➢ Quit TruTops CAD.

Inserting a tool drawing

14. Select "Drawing".

15. **Either**

> ➢ Enter "File name of drawing".

or

> ➢ Use 🔵 to select a drawing.
> ➢ Use 🔽 to select the storage medium.
> ➢ Use **+** or **−** to select the path.
>
> If the selected folder contains DXF or WZG files, then these are displayed on the right.
>
> ➢ Use ⬆ to skip to the next level up on the path.
> ➢ Use 🔽 to select "File type".
>
> If DXF files (*.dxf) are selected as the file type, then only DXF files are displayed in the list.
> If GEO files (*.wzg) are selected as the file type, then only WZG files are displayed in the list.
>
> ➢ Select the desired file.
> ➢ Press *Apply*.

or

> ➢ Press *Edit in TruTops CAD*.
> ➢ Draw or edit the drawing with the tool wizard in TruTops CAD.
> ➢ Quit TruTops CAD.

16. Press *OK*.

The tool is modified.

Importing a tool

Archive files (*.arv) of tools (e.g. from TruTops Bend) can be imported.

1. Press *Technology*.
2. Press "Tool management".
3. Press *Import data record*.

   "Open file" is opened.
4. Use 🔽 to select the storage medium.
5. Use **+** or **−** to select the path.

If the selected folder contains ARV files, these will be displayed on the right.

6. Use to skip to the next level up on the path.

7. Select the desired file.

8. Press *Apply*.

Exporting a tool

Tools can be exported as archive files (*.arv).

1. Press *Technology*.

2. Press "Tool management".

3. Select the desired tool.

4. Press *Export data record*.

   "Save as" is opened.

5. Use to select the storage medium.

6. Use ➕ or ➖ to select the path.

   If the selected folder contains ARV files, these will be displayed on the right.

7. Use to skip to the next level up on the path.

8. To create a new folder in the selected directory: press *New folder*, enter the "Name of the new folder" and press *OK*.

   The new folder is created and can be selected.

9. Enter the "File name".

10. Press *Apply*.

The tool drawing is saved as an ARV file and can be loaded in TruTops Bend when adding a tool.

Deleting a tool

Deleted tools are deleted from the database.

1. Press *Technology*.

2. Press "Tool management".

3. Select the desired tool.

4. Press *Delete tool*.

   "Delete tool" is opened.

5. Press *OK*.

The tool is deleted from the database.

Managing tool groups

Tool groups are created so as to group together tools with similar properties (e.g. upper tools with the same tool radius). A reference tool is specified for every tool group.

Bend allowances, materials or bending characteristics are assigned to tool groups. These are thus applicable for the tools of this tool group(see " Operation_Technology_Bend allowances")(see "Operation_Technology_Material and raw materials")(see " Operation_Technology_Create bending characteristic").

The following tool groups are differentiated:

- "Upper tool groups".
- "Die groups" (lower tool groups).

Creating a tool group
1. Press *Technology*.
2. Press "Tool groups".
3. Press *New group*.
4. Select or enter values.
5. Press *Apply*.
   The tool group is created.

Editing a tool group
6. Select the desired tool group.
7. Press *Edit group*.
8. Select or enter values.
9. Press *Apply*.
   The tool group is edited.

Deleting a tool group
10. Select the desired tool group.
11. Press *Delete group*.
12. Press *OK*.
   The tool group is deleted.

10.2 Managing materials and raw materials

Materials and raw materials are differentiated:

- Raw material: is defined in terms of properties such as tensile strength, modulus of elasticity, specific weight etc.
- Material: is a raw material in a specific form (e.g. sheet with a specific sheet thickness).

Creating raw materials

When a raw material is created, a relevant material (standard material) is automatically created. The material is created in the desired sheet thickness and with assignment to tool groups.

1. Press *Technology*.
2. Press "'Materials management".
3. Press "'Raw materials".
4. Press *Create raw material*.

   "Raw material management" is opened.
5. Press "Raw material data".

   Note
   The "Raw material name" can be freely assigned. The "DIN description" must be unique, and may be used only once, since it is used for internal calculations.
6. Select or enter values under "DESCRIPTION >" and "SPECIFICATION>".
7. Press "Standard sheets".
8. For the desired sheet thickness in which a material of this raw material is to be created, activate "Create".
9. For the desired sheet thickness in which a material of this raw material is to be created, select "UT group" and "LT group".
10. Press *OK*.

    The raw material is created.

    The respective material in the desired sheet thicknesses is created with the desired tool groups.

Editing raw materials

Only the raw material properties can be modified.

1. Press *Technology*.
2. Press "'Materials management".
3. Press "'Raw materials".
4. Select the desired raw material.
5. Press *Edit raw material*.

   "Raw material management" is opened.
6. Press "Raw material data".
7. Modify the values under "DESCRIPTION >" or "SPECIFICATION>".
8. Press *OK*.

   The raw material is modified.

Deleting raw materials

Raw material and the relevant material are deleted from the database if the raw material is deleted.

1. Press *Technology*.
2. Press "'Materials management".
3. Press "'Raw materials".
4. Select the desired raw material.
5. Press *Delete raw material*.
6. Press *OK*.

   Raw material and material are deleted.

Creating material

When a raw material is created, a relevant material (standard material) is automatically created. The material is created in the desired sheet thickness and with assignment to tool groups.

Further sheet thicknesses of the material can be created.

1. Press *Technology*.
2. Press "'Materials management".
3. Press "'Materials".
4. Use to select the desired raw material.
5. Press *Create material*.

   "Materials management" is opened.
6. Enter "Sheet thickness".
7. Select the desired tool groups under "SPECIFIC MATERIAL DATA >".
8. Press *OK*.

   The material is created.

Editing material

Materials are allocated to tool groups. This assignment can be modified.

1. Press *Technology*.
2. Press "'Materials management".
3. Press "'Materials".

4. Use to select the desired raw material.

5. Select the desired material.

6. Press *Edit material*.

   "Materials management" is opened.

7. Select the desired tool groups under "SPECIFIC MATERIAL DATA >".

8. Press *OK*.

   The tool group allocated to the material is modified.

Deleting material

Individual materials (of a specific sheet thickness) can be deleted.

1. Press *Technology*.

2. Press "'Materials management".

3. Press "'Materials".

4. Use to select the desired raw material.

5. Select the desired material.

6. Press *Delete material*.

7. Press *OK*.

   Material is deleted.

10.3 Managing bend allowances

Bend allowances depend on the following factors:
- Raw material, material.
- Sheet thickness.
- Opening angle.
- Bending method
- Tool (tool group).

Creating bend allowance

Bend allowances can be created for every material and every sheet thickness as per the opening angle and the bending method.

The bend allowance is calculated for all opening angles that lie between the opening angles already created for a material.

New bend allowances should be created if:

- Bend allowances for special opening angles are required for an existing material and sheet thickness.
- New tool groups have been created.
- The material has been created in a new sheet thickness.
- New raw materials have been created.

1. Press *Technology*.
2. Press "Bend allowances".
3. Press *Create factor*.
4. Enter or select the values.
5. Press *OK*.

The bend allowance is created.

Editing bend allowance

1. Press *Technology*.
2. Press "Bend allowances".
3. Select the desired entry.
4. Press *Edit factor*.
5. Modify values.
6. Press *OK*.

The bend allowance is modified.

Deleting bend allowance

1. Press *Technology*.
2. Press "Bend allowances".
3. Select the desired entry.
4. Press *Delete factor*.
5. Press *OK*.

The bend allowance is deleted.

Importing bend allowances

Archive files (*.arv) of bend allowances (e.g. from TruTops Bend) can be imported.

1. Press *Technology*.
2. Press "Bend allowances".
3. Press *Import data record.*
   "Open file" is opened.
4. Use 🔽 to select the storage medium.
5. Use ➕ or ➖ to select the path.
   If the selected folder contains ARV files, these will be displayed on the right.
6. Use 🔼 to skip to the next level up on the path.
7. Select the desired file.
8. Press *Apply*.

Exporting bend allowances

Bend allowances can be exported as archive files (*.arv).

1. Press *Technology*.
2. Press "Bend allowances".
3. Select the desired entry.
4. Press *Export data record.*
   "Save as" is opened.
5. Use 🔽 to select the storage medium.
6. Use ➕ or ➖ to select the path.
7. Use 🔼 to skip to the next level up on the path.
8. To create a new folder in the selected directory: press *New folder*, enter the "Name of the new folder" and press *OK.*
   The new folder is created and can be selected.
9. Enter the "File name".
10. Press *Apply*.

The tool drawing is saved as an ARV file and can be loaded in TruTops Bend when adding a tool.

10.4 Creating user defined bending characteristic

Bending characteristics (empirically determined) are stored in the control system for specific materials and tools. If a material or a tool group is used for which no bending characteristics are stored, the lower dead point
of the beam is calculated using a geometric formula.

If this yields excessive deviations in the nominal angle (so that corrections have to be entered), user-specific bending characteristics can be created.

The bending characteristics depend on the:
* Tool.
* Raw material.
* Sheet thickness.
* Opening angle.

Using separate bending characteristic

The separate bending characteristic can be used only if a separate bending characteristic was stored for the combination of tools, raw material and sheet thickness.

Under "Bending method", in the *Manual operation*(see "Operarion_Manual operation_Bending characteristic") and *Programming*(see "Operation_Programming_Separate bending characteristic")*User* can be selected.

Creating a separate bending characteristic

Separate bending characteristics should be created if materials or tools are used for which no bending characteristics are stored in the database.

The separate bending characteristics should be created for a special angle range.

Example: A new material is used, with which mainly 90° bending are performed. In this case, three "Measuring points" should be defined for the bending characteristic: e.g. for 80, 90 and 100°. The values for all opening angles within this range will be calculated.

Condition
* The desired tool is loaded.

Means, Tools, Materials
* Sheet of the desired material and sheet thickness.
* Desired tool.
* Goniometer.

Note
The tools must be loaded centrally in the machine.

Creating measuring point

1. Press *Technology*.
2. Use ▶ to display further file cards.
3. Press "Bending characteristic".
4. Use ⚫⚫⚫ to select tools and press *Apply*.

Note
Under "Raw material", the DIN description of the raw material is displayed and not the raw material name (see "Operation_Technology_Create raw material").

5. Select or enter "MATERIAL DATA >".
6. Enter the "Bending angle, req.".
7. Press START on the control system.

Note
The bend should be performed centrally on the machine.

8. Perform the bend.
   Enter the lower dead point of the beam (Y axis) under "Penetration depth".
9. Measuring the opening angle.
10. Enter the measured angle under "Actual angle".
11. Press *Save*.
    The measuring point is entered.

Creating further measuring points

12. Repeat steps 6 to 12 until all the desired measuring points have been created.
    A bending characteristic will be created. The bending characteristic applies to the range between the measuring points with the smallest and the largest nominal angles.

Updating measuring points

13. Select the desired measuring point in the list.
14. Press *Update measuring point*.
    The measuring point is outlined in orange. The values are entered under "MEASURING POINT >".
15. Repeat steps 6 to 11 .
16. Press *Save*.
    The measuring point is overwritten.

Deleting measuring point

17. Select the desired measuring point in the list.
18. Press *Remove measuring point*.
    The measuring point is deleted.

Displaying an overview of the measuring points

19. Press *Overview*.
    An overview of material and tool combinations for which at least one measuring point has been created is displayed.

10.5 E-Shop

Procuring bending tools and spare parts online

Bending tools and spare parts can be ordered online directly from the control system via the E-Shop.

Condition

- Internet connection (via modem, ISDN connection or network).

To make orders, the customer must be registered at TRUMPF.

Starting E-Shop
1. Press "E-Shop".
2. Select the desired catalog and press *Login*.

First-time registration
Note
Steps 3 to 5 are relevant only for the customers who are not yet registered.
3. Press *Registration*.
   The registration screen appears.
4. Enter the data.
5. Press *Send*.
   After registering, TRUMPF assigns you a password. This allows only registered customers to access E-Shop, thus protecting data.

Logging in to E-Shop
6. Enter the user name and password.
7. Press *Start*.

Creating customer data
Note
The customer data must only be filled in once. It contains data such as contact person, delivery and invoicing address, etc.
8. Press *Your data*.
9. Enter the data.

10.6 Program parameters

Modifying default values

1. Press *Technology*.
2. Press "Program Parameters".
3. Modify the default values under "Press force".
4. To save the settings, select *Save settings*.

Switching the functions on and off

1. Press *Technology*.
2. Press "Program Parameters".
3. To **Switch on** the functions, activate the box.
4. To **Switch off** the functions, deactivate the box.
5. To save the settings, select *Save settings*.

Switching off collision check

1. Press *Technology*.
2. Press "Program Parameters".
3. To switch off the graphics collision check completely, deacti-vate "Graphics collision check".

10.7 PDF viewer

PDF files can be displayed using the PDF viewer.

The PDF viewer enables the viewing of TruTops setup plans, tool setup plans etc. for instance

Displaying files using the PDF viewer

Note
The opened file is closed when the main activity is changed.

Loading file
1. Press *Technology*, "PDF viewer".
2. Press *Open file*.
    "Open file" is displayed.
3. Under "Storage medium selection", select the directory in which the desired file is stored.
4. Under "Path", select the desired directory using + or -.
    The files stored in the selected directory are displayed on the right in the list.
5. Select the desired file.
    The file is marked in orange.
6. *Apply*

The selected file is opened. This can take some time depending on the file size.

Viewing file   7.   Use the following functions to view the file:

- *First page*.
- *Page back*.
- *Page forward*.
- *Last page*.
- *Adapt to window*.
- *Page in window width*.
- *Page in original size*.

Loading another file   8.   To load another file, press *Open file*.

The already loaded file will be closed.

"Open file" is displayed.

9.   Proceed as described in steps 1 to 6.

11.   Maintenance & start-up

Tab	Description
"Maintenance overview"	No function
"Machine configuration"	• Select the default language and unit of the user interface. • Activating options (e.g. block laser).
"Machine options"	Isolating and activating options (e.g. ACB, bar code reader...).
"MMI configuration."	• Managing and selecting users and user groups. • Modifying user rights. • Defining storage location for bending programs. • Modifying the 3D simulation display.
"Screen"	• Setting the screen brightness. • Modifying the touch-click behavior of the touchscreen.

Tab. 4-8

11.1 Isolating options

1. Press *Maintenance & start-up.*
2. Press "Machine options".
3. Press *Enter option code....*
4. Enter option code.
5. Press *OK.*

The option is isolated.

11.2 Activating options

To operate different options of the machine, they must be connected to the machine and activated at the user interface.

1. Press *Maintenance & start-up.*
2. Press "Machine configuration".
3. Activate options.
4. To save the settings, press *Save configuration* and confirm with *OK.*

11.3 User management

Defining a user

Creating a user group

Note
If the user has logged on as *Customer administrator* (password: trumpf), the rights of the user group can be *extended* as well as modified.

1. Press *Maintenance & start-up*.
2. Select "MMI configuration". Modify
3. Select "Group management".
4. Press *New group*.

   A new group is created.
5. Enter "Group name" and confirm with <Enter>.

   Note
   The newly created group can be based on all the groups created, including the group to which the active user is allocated. The rights of the selected basic group are adopted.
6. Use 🔽 to select "Basic group".
7. Use 🔽 to select the "Language"
   applicable to this group.
8. Use 🔽 to select the "Unit"
   applicable to this group.
9. The number of allocated users is displayed under "Members".

Creating a user

10. Select "User management".
11. Press *New user*.

    A new user is created.
12. Enter "User name" and confirm with <Enter>.

    Note
    The user can only be allocated to the groups defined under "Group management".
13. Use 🔽 to select the "User group" to which the user is to be allocated.
14. Use 🔽 to select the "Language" applicable to this user.
15. Use 🔽 to select the "Unit" applicable to this user.
16. Select the desired user.

Assigning/changing a password

Note
Only the passwords of the subordinate users can be assigned or changed. Your own password cannot be changed at this point.

17. Press *Change password*.
18. Enter "New password".
19. Enter the password again under "Confirm password".
20. Press *Apply*.

    The password is assigned or changed.

| Assigning rights | 21. Select "User rights". |
| | |

Note
The groups created under "Group management" can be selected.

22. Use 🔽 to select.
23. Select "Activity".

The selected activity is marked in orange.

Note
Rights of the same or a lower level can only be assigned. The logged-on user cannot assign any rights that are superordinate to his/her own position.

If the user has logged on as *Customer administrator* (password: trumpf), the rights of the user group can be *extended* as well as modified.

24. Select "STATUS".
   – Normal.
   – Write-protected.
   – Blocked.
   – Invisible.

The status is modified for the selected activity and for all lower level activities.

11.4 Managing bending programs

Defining directories for bending programs

Adding a new directory

1. Press *Maintenance & start-up*.
2. Select "MMI configuration". Modify
3. Select"Store program". Store
4. Use 🔽 to "Select user".

The default directory and all further directories that have been added are displayed under "Directories for bending programs".

Note
If "User-specific setting" is deactivated, the user-specific folder paths of the currently selected user are deleted. Therefore, first define the folder paths that apply to all users and then create the user-specific folder paths.

5. If the added directory should apply to all users, do not activate "User-specific setting".

   or

   ➢ If the added directory should apply only to the selected user, activate "User-specific setting".

6. Press*Add directory...*.

"Select folder" opens.

7. Use under "Storage medium selection" to select storage medium.

8. To create a new folder, press *New folder*, enter the "Name of the new folder" and confirm with *OK*.

9. Select the directory.

    The selected directory is marked in orange.

10. Press *Apply*.

    The new directory is displayed under "Directories for bending programs".

Deleting a directory

Note
The default directory cannot be deleted.

11. Select the directory.

    The selected directory is marked in orange.

12. Press *Remove*.

    The directory is deleted.

Deleting all directories

Note
The default directory cannot be deleted.

13. Deactivate "User-specific setting".

    All directories of the selected user created in addition to the default directory are deleted.

Defining the criterion for the management of bending programs (classification)

The classification defines the criteria for storing the bending programs in the selected storage unit. If *Customer* is entered as classification, a customer name can be entered when creating a new program. A subfolder is then created for the bending program in the storage unit that is named after the customer who was entered during programming. All bending programs, for which the same customer name was entered, are stored in this folder in the selected storage unit. The classification can be selected freely.

The definition of a classification establishes the desired order in the program storage unit.

Defining a classification

1. Press *Maintenance & start-up*.

2. Select "MMI configuration". Modify

3. Select"Bending program folder". Modify

4. Enter the desired classification criterion under "Inscription for classification".

    The classification is defined.

12. Diagnostics

Tab	Description
"Pending messages"	Displaying all current messages.
"Message history"	Displaying all messages.
"CNC diagnostics"	Starting the dynamic brake test and displaying the status of the CNC axes.
Only TruBend series 5000 :"ACB"	ACB diagnostics, ACB modules and ACB sensor values are displayed.
"Software versions"	Information about the software version in use is displayed.
"Remote diagnostics"	Switching remote diagnostics on and off

Tab. 4-9

12.1 Displaying current messages

1. Press *Diagnostics*.
2. Press "Pending messages".

   All current messages are displayed. Different types of messages can be filtered out from these messages.
3. Press "Info", "Warning" or "Error".

   Only the message types with a check mark are displayed.
4. To display the details of a message: select the desired message and press *Details*.

   The "Message details" screen appears.
5. Press "Cause", "Effect", "Measure" or "Error location".
6. Press *Close*.

12.2 Displaying all messages

1. Press *Diagnostics*.
2. Press "Message history".

   All messages are displayed. Messages can be filtered out from these messages according to the types of messages and the period of the message.
3. To filter out certain types of message types: press "Info", "Warning" or "Error".

   Only the message types with a check mark are displayed.

4. To filter messages by period: press and select the desired period.

5. To display the details of a message: select the desired message and press *Details*.

   The "Message details" screen appears.

6. Press "Cause", "Effect", "Measure" or "Error location".

7. Press *Close*.

13. Help

Help contains the entire operator's manual.

You have the following options in *Help*:

- Search.
- Index.
- Bookmark.
- Start page.
- Forward (displays the next page that has already been vie-wed).
- Back (displays the page last viewed).

Chapter 5

Setting work

1. Tools

1.1 Loading tools with manual tool clamping

1. Open the beam with the EMERGENCY-UP foot switch until tools can be positioned comfortably.
2. If BendGuard is equipped with block laser: move the BendGuard backwards on the guide rail.
3. Loosen the hexagonal socket screws on the tool clamp.
4. Load the tool
   - ➢ Push the lower tool in from the side and position it.
   - ➢ Push in the upper tool from the side without Safety-Click and position it.

   or

   - ➢ Push the lower tool in from the side and position it.
   - ➢ Insert the upper tool vertically with Safety-Click and position it.
5. Tighten the hexagonal socket screws and fasten the tools in place.

   Note
   The upper tool clamp for TRUMPF tools is self-centering.
6. Upper tools that are not self-centering must be aligned by means of an idle stroke before the first bending.

1.2 Loading tools with centrally mechanical tool clamping

1. Open the beam with the EMERGENCY-UP foot switch until tools can be positioned comfortably.
2. If BendGuard is equipped with block laser: move the BendGuard backwards on the guide rail.
3. Open the tool clamp with the lever.
4. Load the tool
   - ➢ Push the lower tool in from the side and position it.
   - ➢ Push in the upper tool from the side without Safety-Click and position it.

   or

   - ➢ Push the lower tool in from the side and position it.
   - ➢ Insert the upper tool vertically with Safety-Click and position it.

Note

The beam cannot be moved as long as the lever is attached.

5. Close the tool clamp with the lever and pull the lever out.

Note

The upper tool clamp for TRUMPF tools is self-centering.

6. Upper tools that are not self-centering must be aligned by means of an idle stroke before the first bending.

2. Mute point

2.1 Defining the mute point

The mute point is defined automatically by the machine.

The mute point must be defined manually for the following material-tool combination:

• Sheet thickness <1 mm.

• Die width ≥40 mm.

1. Attach the magnetic plate to the side of the lower tool to cover the die width.

   Note
   The magnetic plate can be moved upwards for the processing of corrugated sheets by the anticipated corrugation height. This prevents time-consuming stroke interruptions.

2. Slide the magnetic plate upwards by the amount of the sheet thickness.

3. Press the BEAM DOWN foot switch.

   The beam moves downwards.

   The mute point is defined automatically: the indicator lamp on the BendGuard glows continuously underneath the mute point.

4. If the indicator lamp also flashes underneath the mute point: check the programmed sheet thicknesses and tools and define the mute point once again.

3. Optoelectronic safety device

3.1 BendGuard with block laser

Aligning the light field

Means, Tools, Materials

- Allen key SW 2 mm
- Allen key SW 10 mm

1	Folding bar	3	Display
2	Screw		
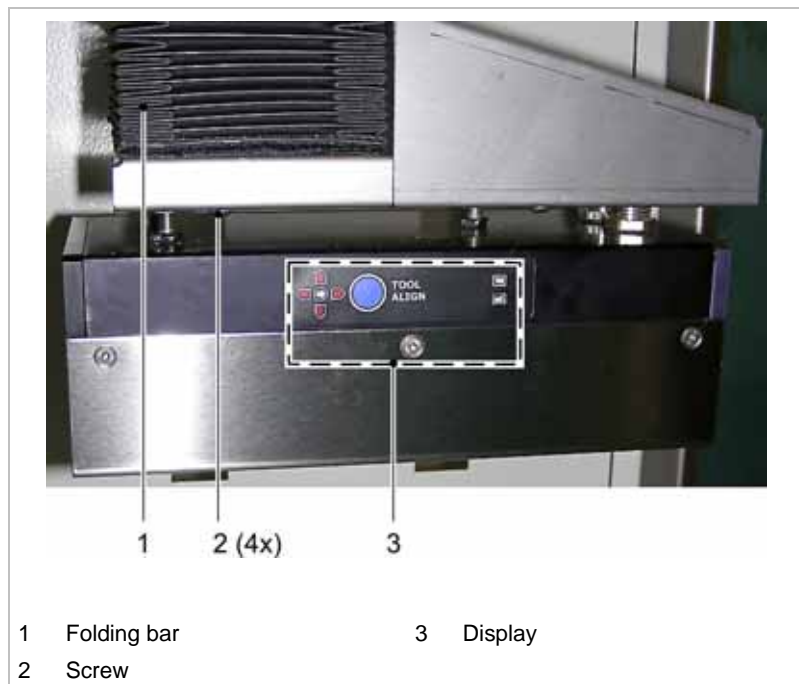
Fig. 54608

Note

The receiver is fastened to the right on the beam.

1. Release the Velcro fastener of the folding bar (1) on the receiver and push the folding bar upwards.
2. Loosen screws (2) and remove the cover.

| 1 | Nut | 2 | Lock nut |
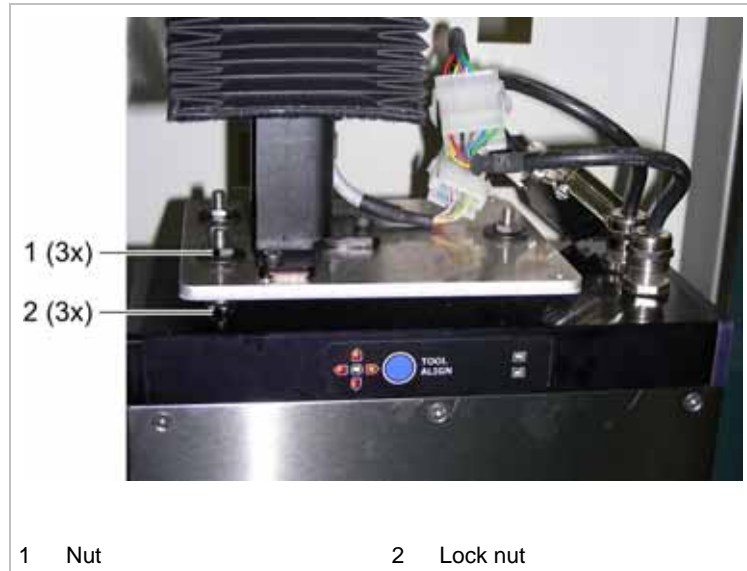
Fig. 54609

3. Slightly loosen the nuts (1) and lock nuts (2) on the Bend-Guard.

   Note
   The BendGuard may only be moved minimally.

4. Align the receiver until the middle LED lights up.

LED display	Explanation
	Move the receiver upwards until the middle LED lights up.
	Move the receiver forwards until the middle LED lights up.
	Move the receiver downwards until the middle LED lights up.
	Move the receiver backwards until the middle LED lights up.
	The receiver is outside the reception range. Move the receiver until the middle LED lights up.
	The light field alignment is correct if the middle LED lights up.

Tab. 5-1

   The light field alignment is correct if the middle LED lights up.

5. Tighten the nuts and lock nuts on the BendGuard carefully.

6. Place the cover and tighten the screws.

7. Move the folding bar downwards and fasten it using Velcro fastener.

Chapter 6

Maintenance

1. General guidelines

Appropriate maintenance is a prerequisite for maintaining the quality of the machine. It prevents operational malfunctions and their consequences.

Danger

Risk of fatal injury during maintenance work when the machine is switched on!

➢ If not explicitly stated otherwise: set the MAIN SWITCH to 0, lock the MAIN SWITCH, pull out the key.

➢ Strictly observe the safety regulations.

Notes on cleaning

- Clean the entire machine at regular intervals.
- Brush off large particles of dirt or remove them using an industrial vacuum cleaner.

Notes on lubrication

Refer to the lubrication chart and maintenance instructions for the lubrication of the machine. The following points should also be observed:

- Use only lint-free cleaning cloths and a thin-bodied spindle oil ("scavenge oil") to clean lubricating points. Do not use cleaning wool, kerosene or benzole.
- Do not mix synthetic lubricating oils with mineral oils or synthetic oils from other manufacturers, even if the synthetic oil in question has equivalent properties.
- Dispose of waste oil appropriately.

2. Maintenance Overview

Inter-val/operating hours	Maintenance point	Maintenance work	Page
40	Switch cabinet	Checking air conditioning unit for contamina-tion	6-14
40	Tool clamp	Cleaning the tool clamp	6-22
500	Backgauge	Lubricating the Z axis guide carriage	6-7
500	Backgauge	Lubricating the racks (X and Z axis)	6-7
500	Y axis on the beam	Lubricating the Y axis guide carriage	6-9
500	Beam drive	Lubricate the beam drive	6-10
500	Slewable control panel (optional)	Lubricating the spindle	6-12
500	Optoelectronic safety device	Cleaning the guide for the BendGuard with block laser	6-18
500	Optoelectronic safety device	Check the back stop for the BendGuard with block laser	6-19
500	Foot support	Cleaning the guide	6-21
500	Safety doors	Check the function of the safety switch on side safety doors	6-24
500	BendGuard with block laser	Check proper functioning.	6-26
1000	Energy supply chain on the backgauge	Check electrical supply lines	6-24
2000	Safety brake	Conduct dynamic brake test	6-19
As needed	Switch cabinet	Cleaning the air conditioning unit	6-15
As needed	Illumination	Cleaning the lamp	6-17
As needed	Optoelectronic safety device	Cleaning the transmitter and receiver	6-19

For single shift operation the following relations hold:

40 operating hours	weekly
500 operating hours	every 3 months
1000 operating hours	every 6 months
2000 operating hours	annually

3. Lubrication

6-5

3.1 Overview

| 1 | Spindle of slewable control panel | 3 | Rack for X and Z axis backgauge | 5 | Guide for Z axis backgauge |
| 2 | Guide carriage, Y axis | 4 | Beam drive | | |
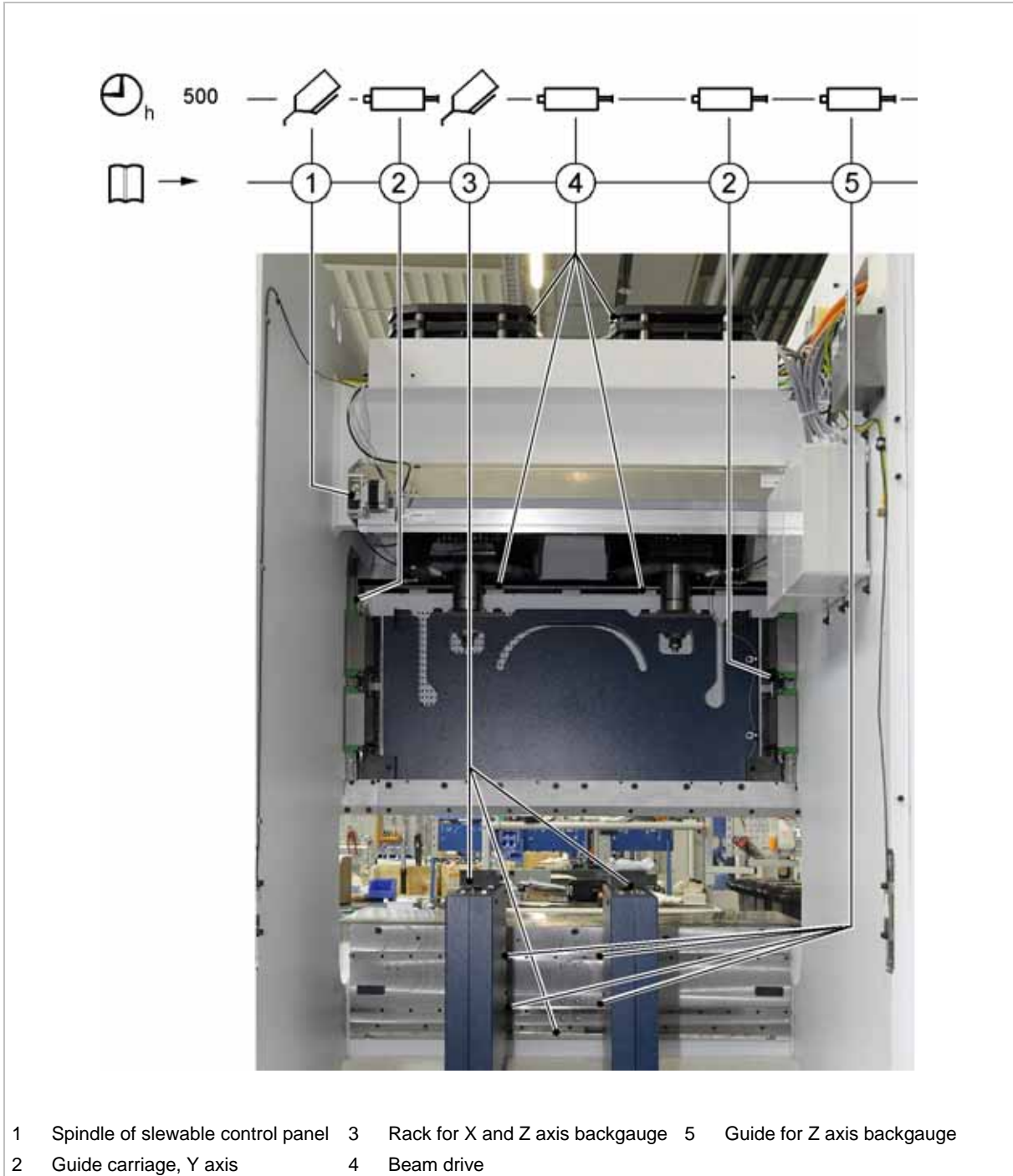
Lubrication chart   Fig. 54416

Symbol	Explanation	Symbol	Explanation
⊕h	Indication of lubrication intervals in hours	⊏⊐	Lubrication with a grease gun
⊓→	Read the maintenance instructions	⟋	Lubricate with an oil can or spray can

Tab. 6-1

Lubrication point	Recommended lubricants	Identification	Viscosity
Spindle of slewable control panel Rack for X and Z axis backgauge	ARAL Degol BG 220 ARAL Deganit BG 221 BP Energol GR-XP 220 BP Maccurat 220 D CASTROL Alpha SP 220 CASTROL Magnaglide D220 ELF Reductelf SP 220 ELF Moglia 220 ESSO Spartan EP 220 ESSO Febis K 220 FUCHS Renolin CLP 220 FUCHS Renep 220 K MOBIL Mobilgear 630 MOBIL Vactra oil No. 4 SHELL Omala oil 220 SHELL Tonna oil 220	CG, CLP, CGLP	ISO VG 220
Guide carriage, Y axis Guide for Z axis backgauge	SHELL Alvania EP2 MOBIL Mobilux EP2 Klüber HEL 46-450	KP2K-20	NLGI 2
Beam drive	Klüberplex BEM 41-132	KPHC2N-30L	NLGI 2

Tab. 6-2

3.2 Maintenance Instructions

Backgauge

(see "Overview", pg. 6-5)

100624:
Lubricating the Z axis guide carriage

Maintenance intervall: 500 operating hours

Means, Tools, Materials

- Phillips screwdriver.

1   Grease nipple

Fig. 54388

1. Switch off the machine properly, set the main switch to 0 and prevent the machine from being switched on again.
2. Loosen the screws on the rear protective cover slightly.
3. Pull the rear protective cover downwards and remove it.
4. Lubricate the guide carriage using a grease nipple.
5. Move the backgauge manually to left and right.
6. Repeat steps 4 and 5 three times.
7. Place the rear protective cover and screw it on.

100625:
Lubricating the racks (X and Z axis)

Maintenance intervall: 500 operating hours

Means, Tools, Materials

- Phillips screwdriver.
- Brush.
- Kerosene.

1   Rack

Rack, X axis   Fig. 54389
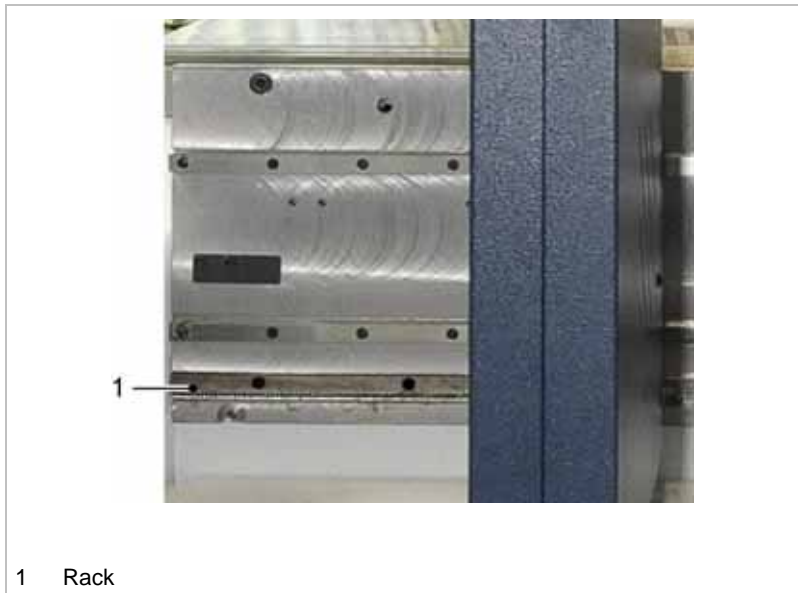
1   Rack

Rack, Z axis   Fig. 54398

1. Move the gauge finger completely to the front.
2. Switch off the machine properly, set the main switch to 0 and prevent the machine from being switched on again.
3. Loosen the screws on the rear protective cover slightly.
4. Pull the rear protective cover downwards and remove it.
5. Clean contaminated racks and pinions with a brush and kerosene.

6. Apply rack grease on the racks and pinions on the X and Z axis using a brush.

7. Move the backgauge manually to left and right.

8. Move the gauge finger manually forwards and backwards.

9. Repeat steps 6, 7 and 8 three times.

10. Place the rear protective cover and screw it on.

Y axis on the beam

(see "Overview", pg. 6-5)

100626:
Lubricating the Y axis guide
carriage

Maintenance intervall: 500 operating hours

Means, Tools, Materials

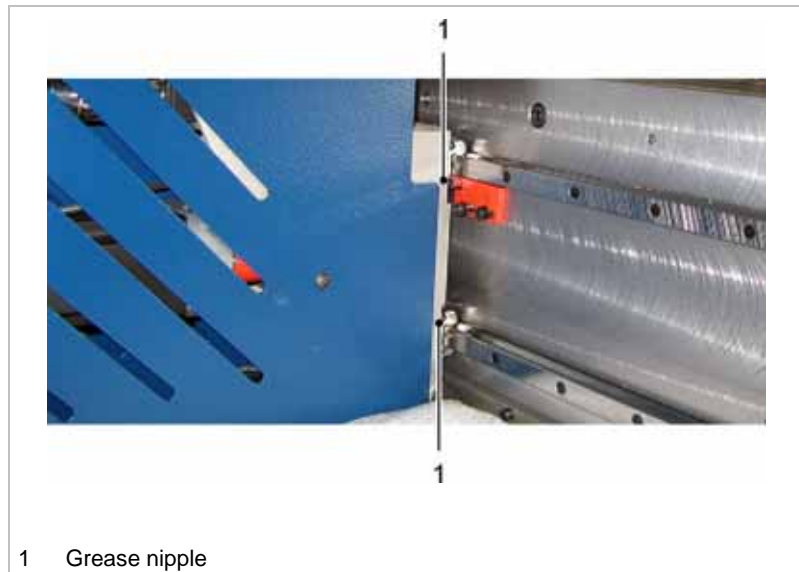• Phillips screwdriver.
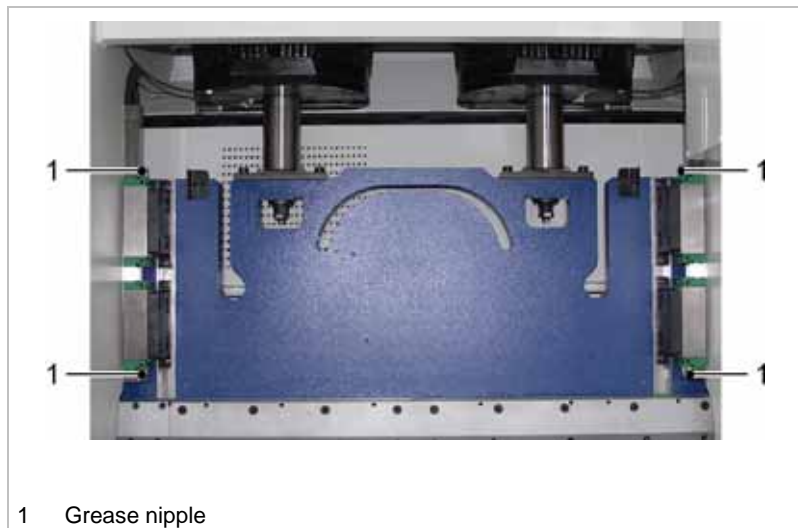
| 1 | Grease nipple |

Fig. 54392

1. Switch off the machine properly, set the main switch to 0 and prevent the machine from being switched on again.

2. Loosen the screws on the rear protective cover slightly.

3. Pull the rear protective cover downwards and remove it.

4. Lubricate the guide carriage using a grease gun until the old grease comes out on the guide rail.

5. Remove the old lubricant using a slightly oiled cloth.

6. Place the rear protective cover and screw it on.

7. Switch on the machine and move the beam upwards and downwards.

8. Repeat all the steps twice.

Beam drive

(see "Overview", pg. 6-5)

100643:
Lubricate the beam drive

Maintenance intervall: 500 operating hours

Means, Tools, Materials
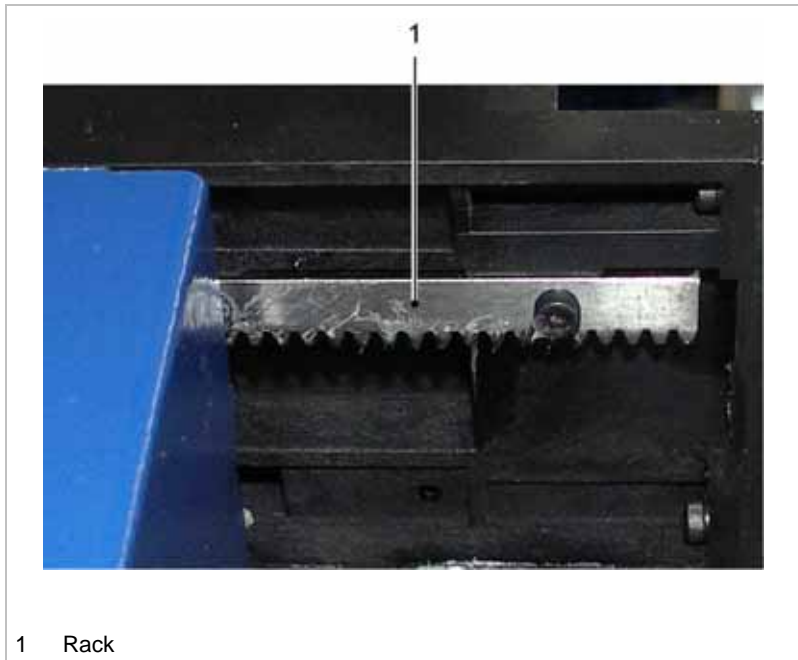- Phillips screwdriver.
- Conductor.

1. Switch off the machine properly, set the main switch to 0 and prevent the machine from being switched on again.
2. Loosen the screws on the rear protective cover slightly.
3. Pull the rear protective cover downwards and remove it.
4. Loosen the screws on the upper protective cover.

Warning

Hot brakes and brake discs!
Risk of burns.
- ➢ Do not touch the brakes and brake discs.
- ➢ Wait until the brakes and brake discs cool down.

Warning

Mobile brake discs!
Risk of injury
- ➢ Never put your hands between the radii of the brake discs.
- ➢ Do not put your hands to the right or left of the machine frame near the brake discs.

5. Remove the upper protective cover.

Note
For TruBend 7036, lubricate both the drives.
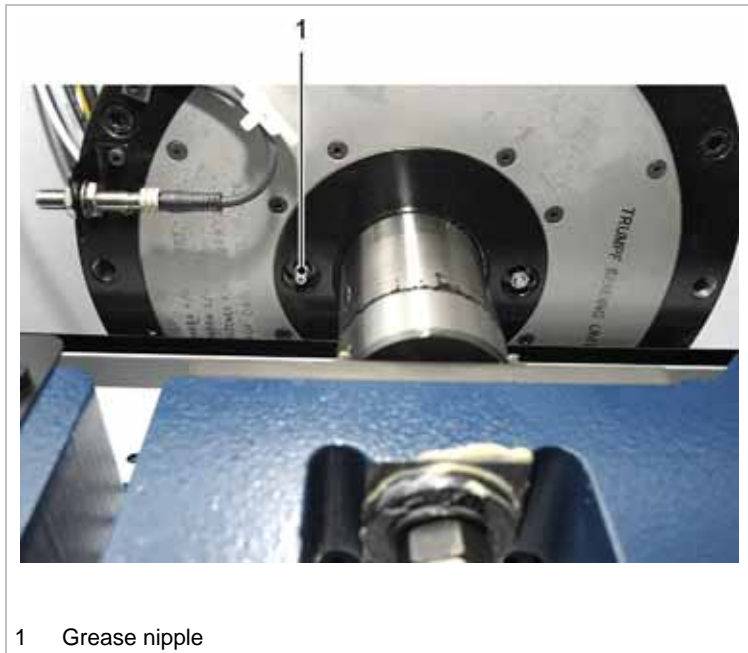
1   Grease nipple

Beam drive from below   Fig. 54414

6.   Lubricate the lower drive using a grease gun.

Note
For TruBend 7036, lubricate both the drives.

1   Grease nipple

Beam drive from above   Fig. 54415

7.   Lubricate the upper drive using a grease gun.

8.   Place the upper protective cover and screw it on.

9.   Place the rear protective cover and screw it on.

Slewable control panel (optional)

(see "Overview", pg. 6-5)

100627:
Lubricating the spindle

Maintenance intervall: 500 operating hours

Means, Tools, Materials

- Phillips screwdriver.
- Brush.
- Kerosene.

1   Spindle
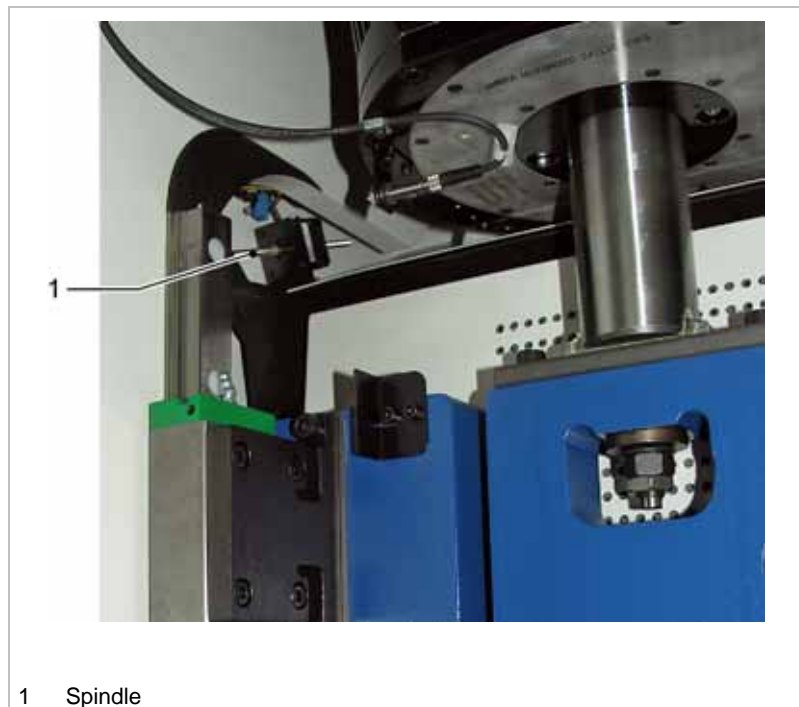
Fig. 54395

1. Switch off the machine properly, set the main switch to 0 and prevent the machine from being switched on again.
2. Loosen the screws on the rear protective cover slightly.
3. Pull the rear protective cover downwards and remove it.
4. Clean contaminated spindle with a brush and kerosene.
5. Apply rack grease on the spindle using a brush.
6. Place the rear protective cover and screw it on.

4. Mechanical elements

4.1 Overview

1	Safety brake	3	Tool clamp	5	Foot support
2	Illumination	4	Switch cabinet		

Fig. 54391

4.2   Maintenance Instructions

Switch cabinet

(see "Overview", pg. 6-13)

100007:
Checking air conditioning
unit for contamination

Maintenance intervall: 40 operating hours

Condition

- The main switch on the switch cabinet is switched off and is secured against being switched on again.

1 Fins	2 Covering	3 Fan wheels
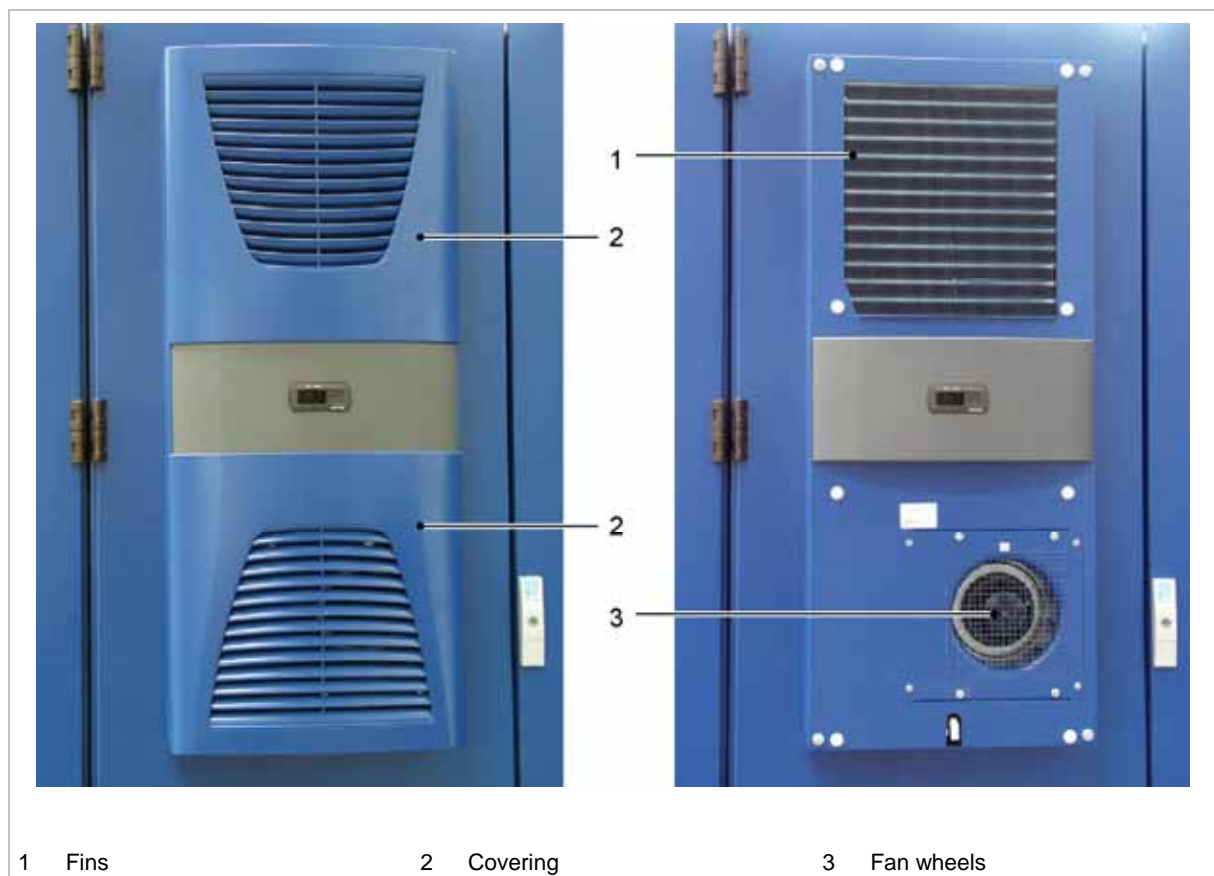
Air conditioning unit   Fig. 51914

Note
No filter mats should be used in the air conditioning units, because these reduce the effectiveness of the air conditioning unit.

1. Pull off the covering.
2. Check fins and fan wheel for contamination.
3. Mount covering.

100007:
Cleaning the air conditioning unit

Maintenance intervall: As needed

Clean the fins and the fan wheels in case of severe contamination.

Condition

• The main switch on the switch cabinet is switched off and is secured against being switched on again.
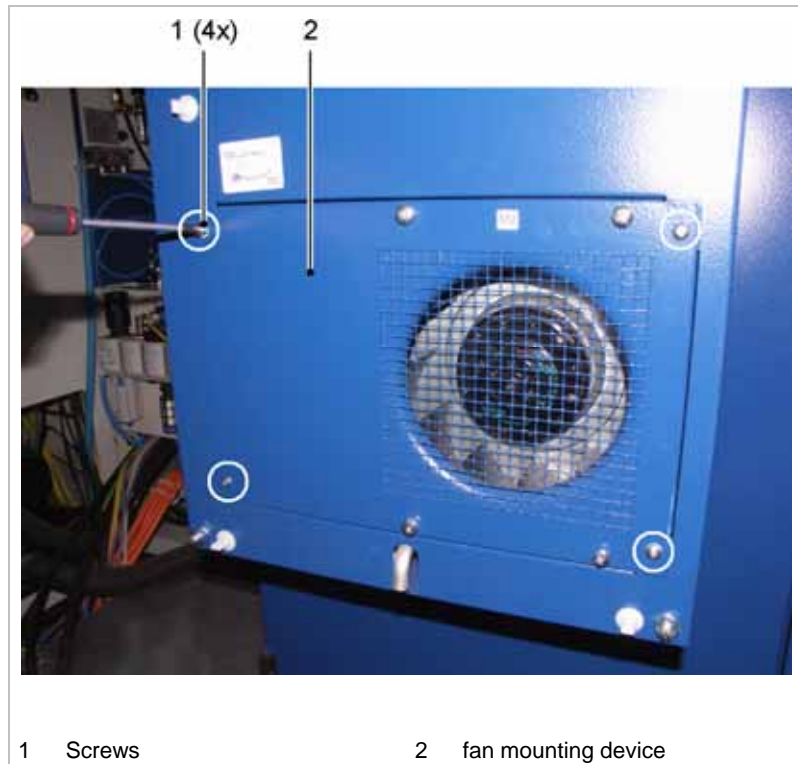
1	Screws	2	fan mounting device

fan mounting device   Fig. 51915

1. Remove the covering.
2. Loosen the screws (1) of the fan mounting device.

| 1 | Plug | 2 | Ground wire |
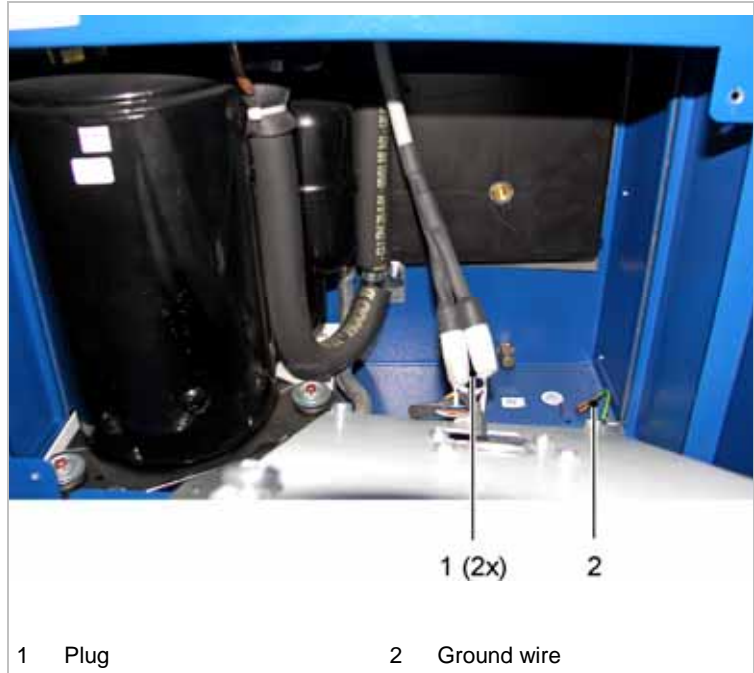
Connection cable of the fan mounting device   Fig. 51916

3. Fold the fan mounting device (2) to the front.

4. Loosen the plug and the earth cable of the fan mounting device.

   The fan mounting device can now be removed completely.

⚠ **Caution**

Effect on the eyes and lungs due to whirling dust and dirt!

➢ Wear suitable protective gear when blowing the air conditioning unit (safety glasses, dust protection glass).

5. Blow out the fan wheel with compressed air.

Carton in the opening of the fan mounting device   Fig. 51679

6. Insert a suitable carton into the opening of the fan mounting device in order to protect the lower housing part for dirt.

7. Blow off fins from the front and from below through the opening of the fan mounting device with compressed air.

8. Remove the box.

9. Plug in the fan mounting device again and mount the plug and the earthing cable again.

10. Tighten the screws of the fan mounting device.

11. Insert the covering.

Illumination

(see "Overview", pg. 6-13)

100631:
Cleaning the lamp

Maintenance intervall: As needed

Means, Tools, Materials

• Soft, clean cloth.

• Window-cleaning agent.

Note
Do not use any abrasive or aggressive agents for cleaning.

1. Switch off the machine properly, set the main switch to 0 and prevent the machine from being switched on again.

2. Clean the lamp with window-cleaning agent.

Note
Do not polish the lamp.

3. Dry the lamp.

Optoelectronic safety device

(see "Overview", pg. 6-13)

100629:
Cleaning the guide for the
BendGuard with block laser

Maintenance intervall: 500 operating hours

Means, Tools, Materials

• Phillips screwdriver.

• Slightly oiled cloth.

1   Guide

Fig. 54393

1. Switch off the machine properly, set the main switch to 0 and prevent the machine from being switched on again.

2. Open a side safety door.

3. Clean contaminated guide using a slightly oiled cloth.

4. Move the BendGuard back and forth on the guide a few times

5. Close the side safety doors.

100632:
Cleaning the transmitter and receiver

Maintenance intervall: As needed

Means, Tools, Materials

- Soft, clean cloth.
- Window-cleaning agent.

Note
Do not use any abrasive or aggressive agents for cleaning.

1. Switch off the machine properly, set the main switch to 0 and prevent the machine from being switched on again.
2. Clean the panes of the transmitter and receiver with window-cleaning agent.

Note
Do not polish the panes.

3. Dry the panes.

100634:
Check the back stop for the BendGuard with block laser

Maintenance intervall: 500 operating hours

The BendGuard with block laser functions only if it is engaged in the front on the guide.

Note
Do not switch off the machine.

1. Open a side safety door.
2. Push the BendGuard backwards on the guide.
   An error message is displayed.

Safety brake

(see "Overview", pg. 6-13)

100635:
Conduct dynamic brake test

Maintenance intervall: 2000 operating hours

The dynamic brake test is always automatically requested by the control system one year after the last valid brake test. The dynamic brake test can be also started any time independent from the maintenance interval.

Conditions

- The machine is switched on.

- A program with beam aperture of minimum 50 mm is loaded in the production.

- A program with joint speed Y rapid down = 220 mm/s is loaded in the production.

- BendGuard Mode 1, 2, 3 or 4 is selected.

1. Move the beam upwards up to the upper dead point using the EMERGENCY-UP foot switch.

2. Press *Diagnostics*, "CNC diagnostics", "PCSS brake test" >.

3. Press "Dynamic brake test".

4. Press *Production*.

5. Press START.

   Structural brake test is conducted. A loud noise can be heard.

   A message is displayed if the structural brake test was successful. The control unit switches to STOP and then again to START.

6. Press *Close*.

7. Press the BEAM DOWN foot switch and keep it pressed.

   The dynamic brake test is conducted. The beam moves downwards and stops suddenly. A loud noise can be heard.

   A message is displayed if the brake test was successful.

Foot support

(see "Overview", pg. 6-13)

100636:
Cleaning the guide

Maintenance intervall: 500 operating hours

Means, Tools, Materials
- Slightly oiled cloth.

1   Guide

Fig. 54394

1. Switch off the machine properly, set the main switch to 0 and prevent the machine from being switched on again.
2. Always clean the right and left guides with a slightly oiled cloth.

TRUMPF

Tool clamp

(see "Overview", pg. 6-13)

100639:
Cleaning the tool clamp

Maintenance intervall: 40 operating hours

Means, Tools, Materials

• Slightly oiled cloth.

1. Switch off the machine properly, set the main switch to 0 and prevent the machine from being switched on again.
2. Clean the upper and lower tool clamp with a slightly oiled cloth.

5. Electrics

5.1 Overview

| 1 | Backgauge power cables | 2 | BendGuard with block laser | 3 | Side safety doors |

Fig. 54607

5.2 Maintenance Instructions

Safety doors

(see "Overview", pg. 6-23)

100640:
**Check the function of the sa-
fety switch on side safety
doors**

Maintenance intervall: 500 operating hours

Note
Do not switch off the machine.

1. Open one of the side safety doors.
   The beam stops.
2. Confirm the error message with the BEAM DOWN foot switch.
   The beam can be moved.
3. Move the beam upwards or downwards.
4. Open both the side safety doors.
   The beam stops. EMERGENCY STOP is triggered.

   The beam cannot be moved as long as the two safety doors
   are open.

Energy supply chain on the backgauge

(see "Overview", pg. 6-23)

100641:
Check electrical supply lines

Maintenance intervall: 1000 operating hours

Means, Tools, Materials
• Phillips screwdriver.
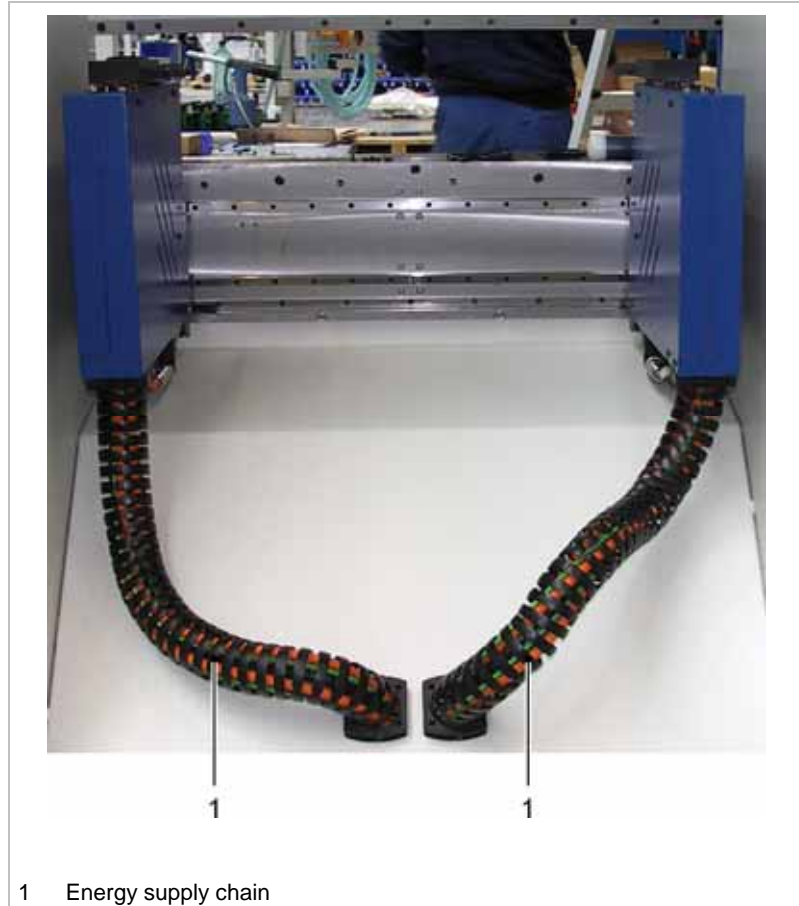
| 1 | Energy supply chain |

Fig. 54396

1. Switch off the machine properly, set the main switch to 0 and prevent the machine from being switched on again.

2. Loosen the screws on the rear protective cover slightly.

3. Pull the rear protective cover downwards and remove it.

4. Check the electrical supply lines for defects. Possible defects:
    –   Damaged or brittle insulation.
    –   Deformed supply lines (e.g. kinks, crushed supply lines).
    –   Improperly laid supply lines.

5. Check whether all electrical supply lines are laid within the energy supply chain.

6. Place the rear protective cover and screw it on.

BendGuard with block laser

(see "Overview", pg. 6-23)

100633:
Check proper functioning.

Maintenance intervall: 500 operating hours

Condition

• Optoelectronic safety device is activated.

Means, Tools, Materials

• Object for the interruption of the light field.

Note
Do not switch off the machine.

1. Trigger stroke and interrupt using an object during the rapid traverse.
   The beam stops. The control system switches to STOP.
2. Confirm the error message with the BEAM DOWN foot switch.
   The stroke can be resumed.
3. Resume stroke.

TRUMPF

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