Chapter 1

Safety

1. For your safety

Regulations and guidelines

The machine meets the requirements of safety standard ANSI B11.3.

Chapter Safety

This chapter describes the safety concept. The chapter describes how potential dangers can be avoided. The overview of residual risks contains measures to be taken by the operator in order to reduce the residual risks.

Notes

- 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!
- USA and Canada: TRUMPF also recommends that the safety regulations for ANSI press brakes be observed.

Warnings and warning signs

Certain operations can be a source of danger during operation. The documentation contains warnings before the instructions for these activities. There are warning plates on the machine.

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

Signaling word	Description
DANGER	... refers to great dangers. If not avoided, it can result in death and serious injuries.
WARNING	Refers to a dangerous situation. It could lead to serious injuries, if it is not avoided.
CAUTION	... indicates a potentially dangerous situation. It could lead to injuries, if it is not avoided.
NOTICE	If such a situation is not observed, it can lead to damage to property.

Signaling words Tab. 1-1

Example of a warning:

⚠ DANGER

Risk of fatal injury due to falling load!

- ➢ Observe safety regulations for the handling of heavy loads.
- ➢ Never walk under a suspended load.
- ➢ Use certified tackle and means of transportation of sufficient size.
- ➢ Employ qualified technicians to transport the machine.
- ➢ Carry out transport in accordance with the transport regulations.

2. Operational safety

The machine can result in the following dangers if it is used inappropriately or for purposes other than those intended, or else if it is not safe to operate:

- Dangers to the safety of the operator.
- Damage to the machine and to other property of the operator.
- Negative effect on the effective functioning of the machine.

2.1 Intended use

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

Installation, operating and transport conditions defined by TRUMPF must be adhered to and maintenance work must be carried out in accordance with the Operator's manual. The user must observe the specifications of the country in which the machine is being operated as well as national and regional safety and accident prevention regulations.

The user may bend cold sheets using the machine.

The following is not permitted:

- Unauthorized alteration or conversion of the machine by the user or personnel.
- Any working procedure that impairs the safety.
- Processing of hot, splintering or brittle materials.
- Use of tools from other manufacturers without release by TRUMPF.
- The storage of tools no longer required on the press beam.

Disclaimer Any use going beyond this is considered to be unauthorized use. TRUMPF is not liable for any damage, especially personnel injuries and production failures resulting from this. The risk is borne solely by the operator. The warranty will be voided.

2.2 Authorized personnel

- Operation, setting and maintenance work may only be carried out by authorized, trained and instructed personnel.
- Qualified personnel may:
  - Transporting the machine to the installation site.
  - Carry out work at the hydraulic, pneumatic and electrical assemblies.
  - Disassemble the machine and its components.

3. Hazards

3.1 Dangers due to the open electrical cabinet

The electrical cabinet may be opened only by an electrician.

⚠ DANGER

Electrical voltage!

Electric shock!

- Keep the electrical cabinet closed.
- Before opening the electrical cabinet: turn off the MAIN SWITCH and secure it against being switched back on again. Wait for the discharging time (at least 5 minutes).

⚠ CAUTION

Hot components!

Burns!

- Keep electrical cabinet closed.
- Before opening the electrical cabinet: switch off the main switch and secure against being switched back on.
- Wait for the cooling phase (minimum 5 minutes).

3.2 Hazards due to laser radiation

Laser products are divided into laser classes as per the European standard EN 60825-1 (USA: ANSI Z136.1, ANSI B11.21). The laser class corresponds to the hazard level of the laser light emitted.

Assembly	Class	Description
BendGuard optoelectronic safety device	1	The accessible laser radiation is not dangerous under normal, foreseeable conditions.

Laser classes Tab. 1-2

⚠ WARNING

Risk of eye injuries due to laser radiation!

Laser radiation causes irreparable damage to the eyes.

- Do not look directly into the beam.

3.3 Dangers handling workpieces

Processing workpieces can be dangerous. These dangers and measures are different for every workpiece.

Sharp-edged workpieces

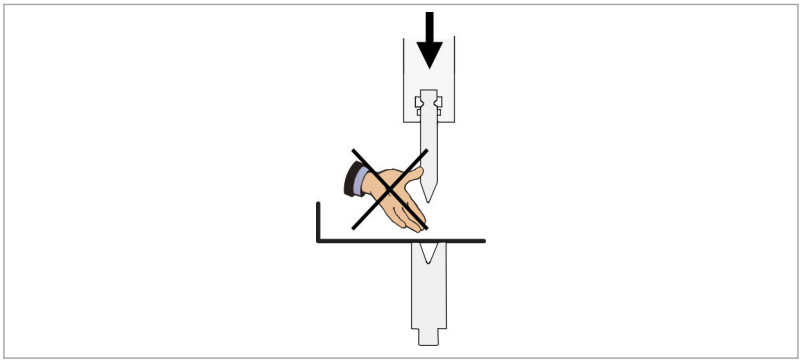
⚠ WARNING

Workpieces have sharp edges!

Risk of injury!

➢ Wear personal safety equipment.

Upper and lower tool



Upper and lower tool Fig. 25903

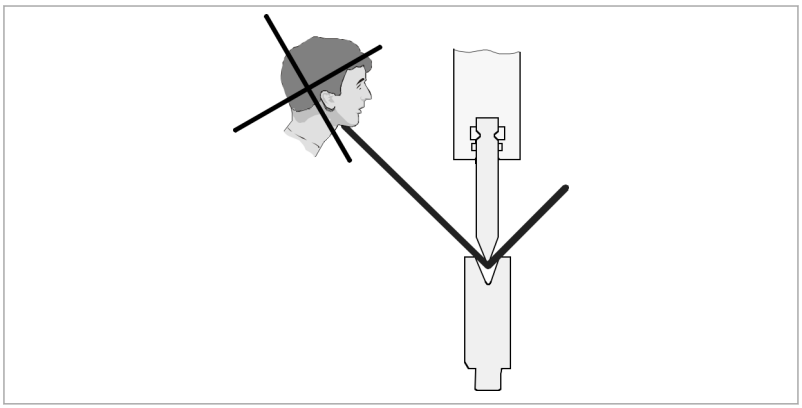
⚠ WARNING

Press beam moves downwards!

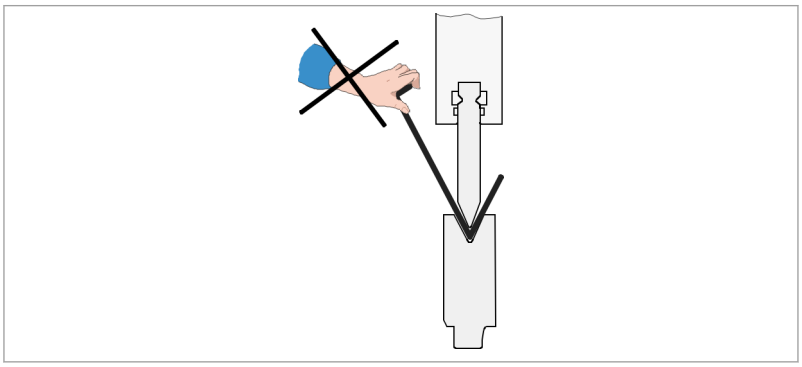
Body parts can be severed off!

➢ Do not insert hand between upper and lower tools.

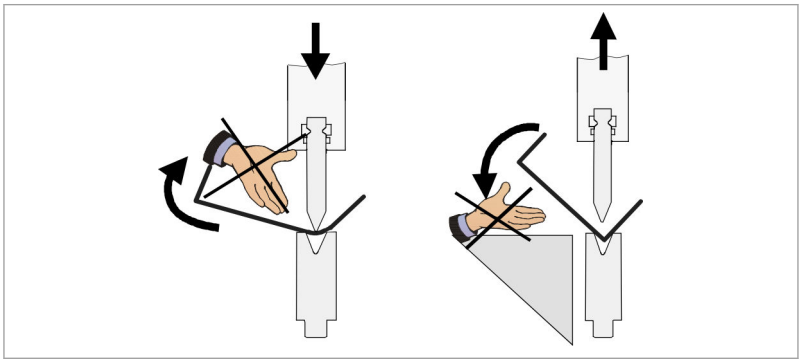
Flange of the workpiece



Side swivels far out Fig. 55869



Hand gets caught Fig. 55828



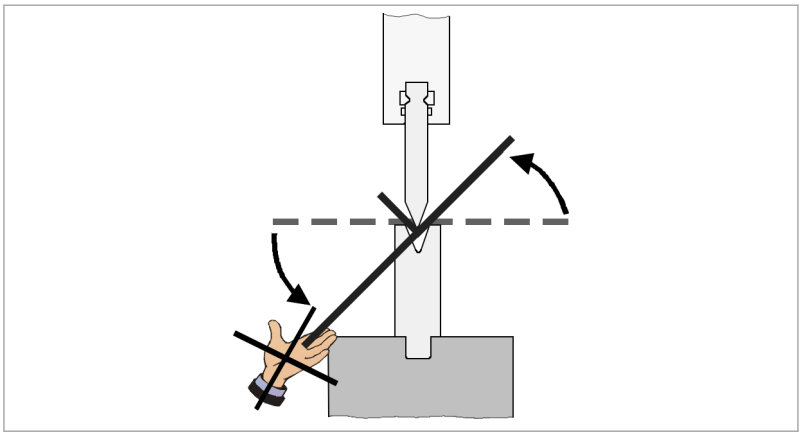
Hold workpiece from the side Fig. 53449

⚠ WARNING

The flanges of the workpiece swivel upwards or downwards during bending!

Risk of injury, crushing!

- Maintain sufficient distance to the workpiece.
- Hold the workpiece in such a way that hands and fingers do not get trapped.
- In the case of support brackets: hold the piece on the sides after bending.



Bend internal flanges Fig. 71123

⚠ WARNING

When bending tabs on the inside the workpiece swivels downwards!

Risk of injury, crushing!

- Maintain sufficient distance from the workpiece and from the lower tool clamp.
- Position the workpiece such that hands and fingers do not get clamped.

Positioning the workpiece

If the workpiece is incorrectly positioned, the workpiece and the gauge finger of the backgauge can collide.

⚠ WARNING

The backgauge can move unexpectedly and at high speeds!

Risk of injury!

- Position the workpiece only after the backgauge has moved to the next position.

Falling workpieces

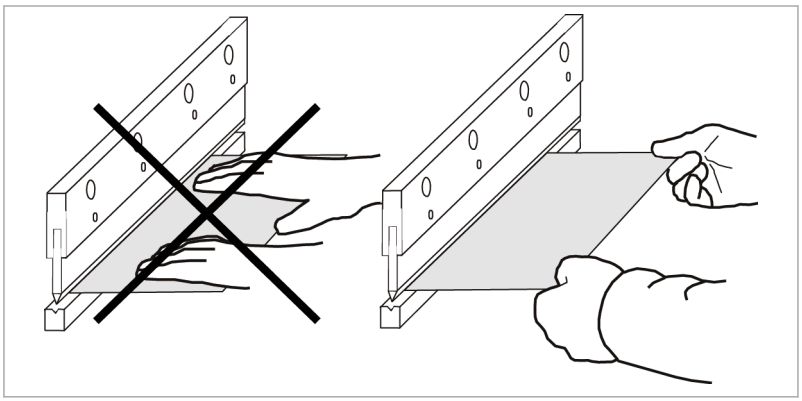
⚠ CAUTION

Falling workpieces!

Risk of injury!

- Wear safety shoes.

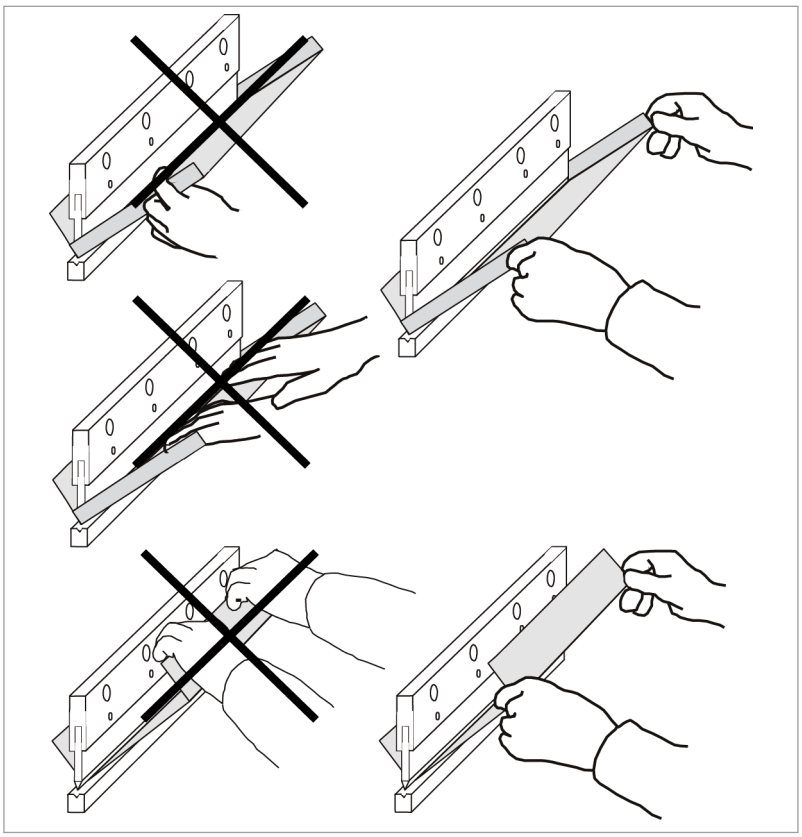
Improper handling of flat workpieces



Correctly bending flat workpiece Fig. 77538

- Hold onto the workpiece by the front corners:
  - Thumbs lie on the workpiece.
  - Palms of hand hold the workpiece from below.

Improper handling when bending boxes



Bending box correctly Fig. 77539

- Hold the workpiece at the right and left between your thumb and index finger.
- When holding, do not reach into the box with your hands. Due to the bending operation, fingers or your hand can be crushed or caught between the workpiece and upper tool.

3.4 Dangers due to unexpected movements

⚠ WARNING

The backgauge can move unexpectedly and at high speeds!

Risk of injury!

- ➢ Position the workpiece only after the backgauge has moved to the next position.
- ➢ Do not reach over the bending line.

3.5 Noise hazards

The A-weighted emission sound pressure at the work station of the personnel is at ≤70 dB(A).

4. Measures to be taken by the manufacturer

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

4.1 Danger zones and safeguarding device

1	Switch cabinet	4	Side safety doors	7	Backgauge
2	EMERGENCY STOP push-button	5	PRESS BEAM UP foot switch	8	BendGuard optoelectronic safety device
3	Main switch	6	PRESS BEAM DOWN foot switch with stop function	9	Rear safety door

Danger zone and safeguarding Fig. 102832

Side safety doors

These safety doors safeguard the area to the side of the ram and machine bed. When the doors are closed, it is not possible for persons to reach into the danger zone from the side.

The side safety doors are monitored.

If one or both of the side protection doors are opened during operation, the emergency stop triggers.

Rear protection door

The safety door secures the danger zone inside the machine.

The safety door is monitored.

If the safety door is opened during machining, EMERGENCY STOP will be triggered.

BendGuard optoelectronic safety device

The optoelectronic safety device monitors the area in front of, behind and below the upper tool during operation by means of a light field.

The press beam moves at a maximum speed between the upper dead point and the mute point.If the BendGuard is pushed up by an obstacle (e.g. trapped hand) or if the light field is interrupted, then the press beam will stop.

The press beam moves at reduced speed between the mute point and the lower dead point. The optoelectronic safety device is not active.

Main switch

The machine is switched on and off via the main switch. The main switch can be secured against being switched on again using a padlock.

The main switch has the following positions:

Position	Description
0	The machine is switched off and the voltage supply of the machine is interrupted.
I	The machine is switched on.

Tab. 1-3

EMERGENCY STOP push-button/EMERGENCY STOP function

EMERGENCY STOP has the following effect:

- Control stops.
- The press beam stops.
- Stop all axis motions of the backgauge.
- The PRESS BEAM UP foot switch is deactivated.
- All drives of the backgauge remain supplied, but cannot generate any power (STO: safe torque off).
- The hydraulic unit is switched off.

PRESS BEAM DOWN foot switch with stop function

The foot switch has the following positions:

Position	Description
The foot switch is not pressed.	The press beam is stationary or remains stationary.
The foot switch is pressed as far as the first pressure point (neutral position).	The press beam moves downwards.
The foot switch is pressed all the way down.	The stop function leads to the following: ▪ Control stops. ▪ The press beam stops. ▪ Stop all axis motions of the backgauge. ▪ The hydraulic unit is switched off.

Tab. 1-4

PRESS BEAM UP foot switch

The press beam can be moved upwards using the PRESS BEAM UP foot switch.

The foot switch has the following positions:

Position	Description
The foot switch is not pressed.	No effect on the press beam.
The foot switch is pressed.	Hydraulic system switches on. The press beam moves upwards.

Tab. 1-5

The PRESS BEAM UP foot switch is not active in the following cases:

- EMERGENCY STOP was triggered.
- One or both side protection doors were opened.
- The rear safety door was opened.

USA, Canada, Mexico, South America: Key switch for DEACTIVATE DOOR LOCK

There is a key switch for the maintenance work.

The key switch is located on the rear side of the machine.

The key switch has the following positions:

Position	Description
0	The power supply to the machine will be interrupted when the switching cabinet door is opened. The key must be removed and kept safely.
I	The power supply to the machine remains switched on when the electrical cabinet door is opened.

Tab. 1-6

Processing strategy of the backgauge

The backgauge can move to the next programmed position at different times.

Step change	Description
automatic	The backgauge automatically moves to the next index position at the end of the bending operation.
	The backgauge automatically moves to the next stop position when the press beam has moved upwards up to the mute point.
	Default setting. The backgauge automatically moves to the next stop position when the press beam has moved upwards up to the upper dead point.
Manually	the press beam moves to the upper dead point (UDT).The control stops. The backgauge moves to the next index position when START is pressed.
	the press beam moves to the upper dead point (UDT). The backgauge moves to the next index position when the PRESS BEAM DOWN foot switch is pressed.

Step change Tab. 1-7

4.2 Safety-relevant signs on the machine

Warning signs draw attention to dangers when operating the machine.

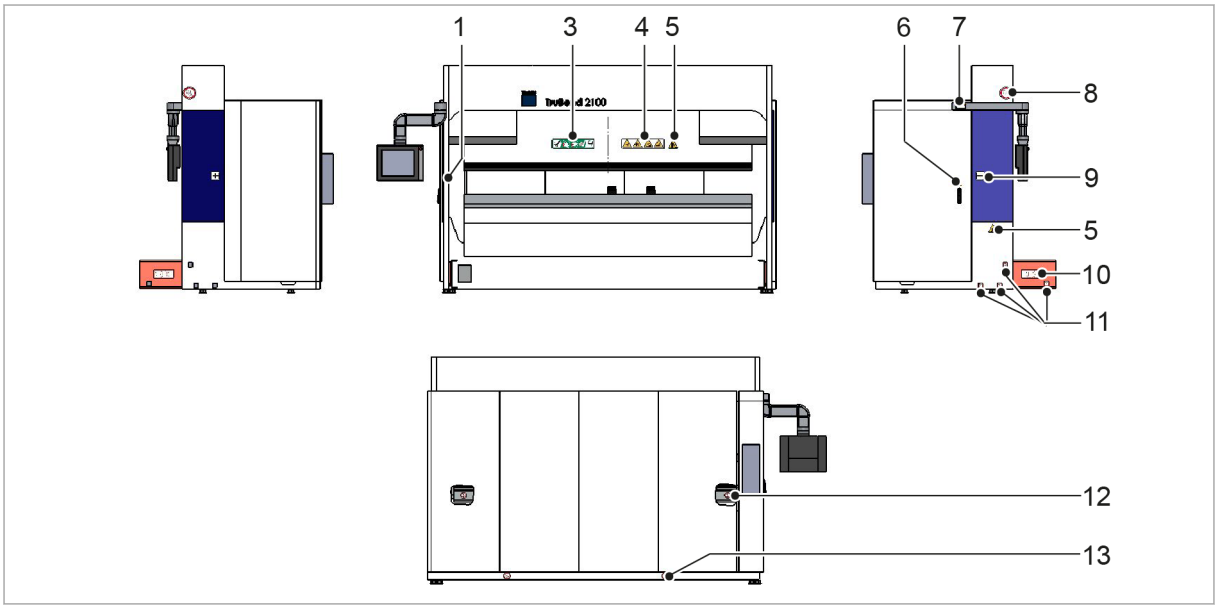
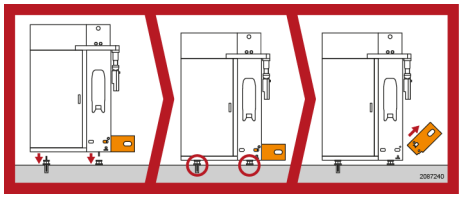


Fig. 102837

No.	Safety-relevant signs on the machine	Description
–		Warning of hot surface.
1		WARNING about laser beams.
3		Safety information for freeing trapped persons.
4		▪ 1: Risk of crushing between upper and lower tool. ▪ 2: Risk of crushing between workpiece that has moved up or down and machine parts in this area. ▪ 3: Risk of impact due to workpiece that has moved up or down. ▪ 4: Risk of crushing and impact due to backgauge.
5		Risk of tilting
6		Warning of electrical voltage.
7		Machine is top-heavy. Secure the machine from toppling over until it is anchored in the foundation.
8		Secure machine on the truck during transport.
9		Position of center of gravity.
10		Only remove the transport securing device when the machine is anchored.

No.	Safety-relevant signs on the machine	Description
11		Jacking point for hydraulic hoisting jack.
12		Climbing on prohibited.
13		Move the machine carefully and delicately and by hand only. Do not use a forklift truck or other motorized tractors as there is a risk of tilting due to abrupt acceleration.

Safety-relevant signs on the machine Tab. 1-8

4.3 Safety-relevant signs on the machine (USA and Canada)

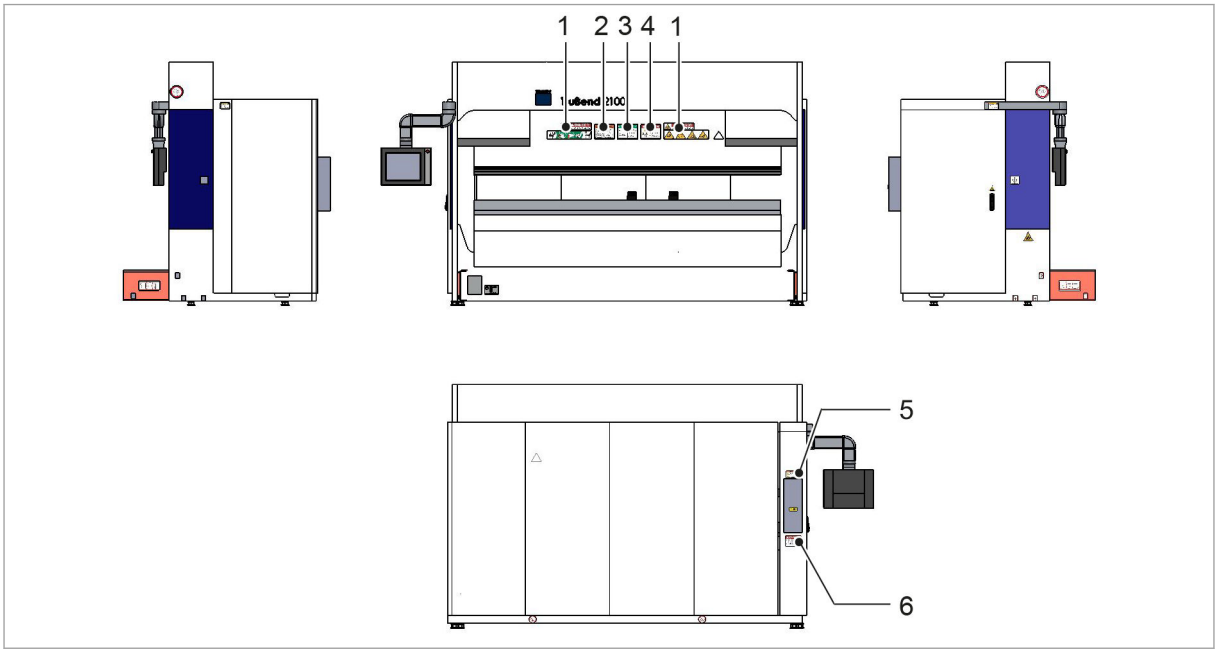
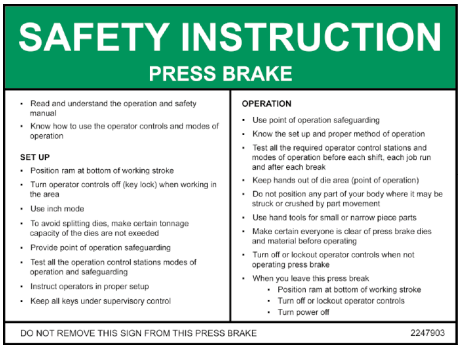
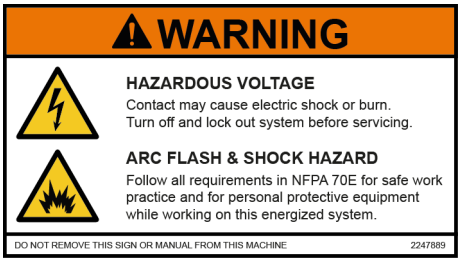


Fig. 102838

:

No.	Safety-relevant signs on the machine (USA and Canada)
1	
2	
3	
4	

No.	Safety-relevant signs on the machine (USA and Canada)
5	
6	

Safety-relevant signs on the machine (USA and Canada) Tab. 1-9

5. Organizational measures to be taken by the user

5.1 Observe warnings and warning signs

Certain operations can be a source of danger during operation. The documentation contains warnings before the instructions for these activities and warning signs are provided on the machine.

5.2 Training and instructing operators

Measures applicable worldwide

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

- Train personnel appropriately.
- Inform the personnel about the possible dangers and the safety measures. Chapter 1 "Safety" forms the basis.
- Keep personal safety equipment ready.
- As far as possible, ensure personnel wear protective gear (e.g. gloves, safety shoes, hearing protection, safety glasses...).
- Define responsibilities for safety, operation, maintenance, setting work and service.
- Demand that personnel read the technical documentation of the machine. Recommendation: obtain written confirmation from the personnel.

5.3 Adhering to the duty of care when handling the machine

Checking the danger zone and safety devices

Safety devices must not be acknowledged when persons are in the danger zone. The personnel must always make sure that nobody is in the danger zone before acknowledging.

Personnel may only operate the machine with functional safety devices. Safety devices may not be removed or put out of operation.

Once per shift, preferably before starting the production:

- Check the safety devices for proper function.

Ensuring the perfect working order

User:

- The user must ensure that the machine is installed as per the installation plan and installation conditions.
- The user must ensure that only authorized personnel works at the machine.
- The user must ensure that damaged or missing warning signs on the machine are replaced.
- The user or the persons appointed by him/her must operate the machine when it is in perfect working order.
- The user must ensure that the work station is kept clean and tidy by issuing appropriate instructions and conducting inspections.
- The user must ensure that the working areas are supplied with sufficient fresh air.

Operator:

- The operator must immediately report changes (including the operating performance) occurring in the machine to the operator. The machine must be checked for externally visible defects and damage at least once per shift.
- The operator must ensure before every use that worn tools are not used.
- The operator must ensure that only those people who are absolutely required for operation may be in the immediate danger zone (up to one meter in front of the bending line over the entire length of the press table).
- The operator must ensure that tools and backgauges are correctly programmed and set up for the work to be done.

Lock the machine to prevent unauthorized use

If the operator leaves the machine for a short time or at the end of the shift, he must secure the axes from moving. By entering a code on the user interface, the machine can be locked to prevent unauthorized use.

Observing the shutdown procedure

The prescribed switch-off procedures must be adhered to during all work (e.g. setting and maintenance work).

5.4 Water protection

Water-pollutant substances should not enter the ground or into water bodies.

The Federal Republic of Germany

The principle of precaution is applicable for machines in the Federal Republic of Germany: water should not become contaminated when using water-pollutant substances (Federal Water Act WHG).

The plant decree and the administrative regulations of the Federal states explain how this principle of precaution should be adhered to.

Water-pollutant materials	▪ Hydraulic oil ▪ Lubricants
Water Hazard Class	1 or 2
Volume of water-pollutant materials	≤1000 l (≤264 gal)
Hazard level of the machine	A

Water protection specifications Tab. 1-10

Outside the Federal Republic of Germany

Outside the Federal Republic of Germany, the respective national regulations as regards water protection must be adhered to.

5.5 Spare parts, accessories, software, operating materials

Using spare parts, accessories and software

Spare parts and accessories that have not been released by TRUMPF (in the following: "External parts and accessories") are not checked. Installing and using external parts and accessories can change design-related properties of the machine and weaken the safety.

Only software that has been approved for installation by TRUMPF may be installed.

Liability disclaimer

TRUMPF is not liable for damage if external parts and accessories are used or if spare parts and accessories approved by TRUMPF are not installed or replaced properly.

TRUMPF cannot be held liable for damages resulting from the installation or operation of software which is not approved by TRUMPF.

Using permissible operating materials as per the regulations

The approved operating materials (especially lubricating and cleaning agents) must be used according to regulations. If a safety data sheet has been prescribed for the manufacturer of the operating material (European Directive 1907/2006 REACH), the instructions/notes in it must be followed/taken into consideration, such as:

- Chemical properties.
- Physical and safety-related specifications.
- Transport.
- Regulations.
- Safety measures, storage, and handling.
- Measures for in the event of accidents or fires.

- Specifications for toxicology and ecology.
- Waste code with prescribed disposal method for the operating material.

Note

The safety data sheet can be obtained from the manufacturer of the respective operating material.

5.6 Safety data sheet on hazardous materials

The safety data sheets e.g. for lubricants, cleaners or gases can be downloaded from the TRUMPF web page: http://www.trumpf.com/s/msds.

6. Overview of residual risks

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

The following overview of residual risks is a summary of the main potential threats to life and limb posed by the machine.

Any additional precautions that can be taken by the machine user to reduce residual risks are specified in the overview of residual risks.

For detailed descriptions of the measures: (see "Hazards", pg. 1-6).

Residual risks	Hazard area	Type of danger	Necessary action
Mechanical elements			
Squeezing, shearing off of body parts, cutting, impacts	▪ Vertical tool change. ▪ Stopping and positioning of the workpieces.	Risk of injury	Operation by trained and instructed personnel. Wear personal safety equipment. If body parts are trapped, press the PRESS BEAM UP foot switch.
Gripping or retracting Squeezing, shearing off of body parts	▪ 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. Position the workpiece only after the backgauge has moved to the next position. Do not reach over the bending line.
Crushing	▪ Between the workpiece and the press beam.	Risk of fatal injury	Operation by trained and instructed personnel.
Rubbing or abrading	▪ Movement of the press beam.	Risk of injury	Operation by trained and instructed personnel. Do not touch the press beam as long as it is moving.
Slipping, falling	▪ In case of a fault: larger oil leak from the hydraulics.	Risk of injury	Operation by trained and instructed personnel.
Injection	▪ In case of a fault: escape of high-pressure hydraulic oil.	Risk of injury	Specially trained personnel for maintenance, service and repairs. Observe the compulsory maintenance work requirements.

Residual risks	Hazard area	Type of danger	Necessary action
Falling workpieces	▪ Releasing the workpiece after bending.	Risk of injury	Operation by trained and instructed personnel. Wear personal safety equipment.
Falling tools	▪ Unintentional actuation of the Safety-Click.	Risk of injury	Operation by trained and instructed personnel. Wear personal safety equipment.
Instability	▪ Tipping over of the machine.	Risk of fatal injury	Use the intended securing points and permitted additional equipment to transport the machine. Anchor the machine to the floor.
Radiation			
Laser	BendGuard optoelectronic safety device	Risk of injury	Operation by trained and instructed personnel. Do not look directly into the beam.
Materials			
Contact with or by inhaling dust, aerosols and gases	Hydraulic oil or lubricants	Health hazard	Specially trained personnel for maintenance, service and repairs. Wear personal safety equipment. Note the safety data sheets.
Electrics			
Electric 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.

Residual risks Tab. 1-11

7. Disassembly and disposal

TRUMPF recommends that TRUMPF machine tools be disassembled and disposed of by Technical Service or a specialist disposal company. The following information is to be passed on to the specialist disposal company performing the disposal work, to guarantee fast, environmentally sound and safe disposal.

Preparing disassembly

- Contamination, in particular types of dust which can be stirred up or which be hazardous during disassembly are to be removed.
- Close off the disassembly and storage area over a wide area.
- Move down movable parts and suspended loads as far as possible. Secure or support suspended loads in the event of a defective machine.
- Have the machine disconnected from the power supply by a trained electrician.
- If present: Close the compressed air supply and separate it from the machine.
- Depressurize components under pressure (e.g. compressed air line).
- Wait at least an hour to allow any residual voltage in the machine to dissipate and hot components to cool down. All assemblies/components can then be touched.

Hazardous materials

Prior to disassembly, dispose of the following hazardous materials in accordance with national regulations:

Hazardous substance	Installed in assembly
Hydraulic oil	Hydraulic unit, hydraulic cylinder, hydraulic lines, hydraulic system hoses
Refrigerant	Air conditioning unit (electrical cabinet)
Batteries	Electrical cabinet, operating panel, ...

Hazardous materials Tab. 1-12

Assemblies with particular risk potential

The following assemblies will constitute a hazard if disassembled:

Assembly	Danger
Machine	Can tilt forwards if the brace is released.
Press Beam	Falls down if the hydraulic components are removed first.

Assemblies with particular risk potential during disassembly Tab. 1-13

Remove

- Poisonous vapors can result when thermally cutting painted components or components made out of composite materials.
  - Select a suitable cutting process.

    or
  - Wear a suitable protective mask and ensure there is a sufficient supply of fresh air.
- Secure top-heavy assemblies to prevent them from tipping over and carefully put them in a good transport position (center of gravity down).
- Moving assemblies may be unbraked after being disconnected from the power supply.
  - Fix movable assemblies prior to disassembly/transport, so that the center of gravity cannot move in an uncontrolled manner.
- Mechanical stresses can be released when undoing chains, ropes and steel constructions!
  - Wear suitable protective gear and close off the area over a wide area.
- On defective machines, parts of the hydraulic system and the compressed air system may still be under pressure!

Transporting assemblies

- Cordon off transport routes and storage positions extensively.
- Use suitable lifting gear. See installation conditions.
- Fasten assemblies above the center of gravity as far as possible.

Chapter 2

TruBend Series 2000 (B35) installation conditions

Who does what?

Customer

All the conditions described in this chapter must be fulfilled before the machine is delivered.

If this is not the case, Technical Service will not be able to put the machine into service.

Note

During start-up, the main switch on the machine may only be switched on by Technical Service.

Technical Service

The machine is put into service by Technical Service.

Start-up includes:

- Align, level and secure the machine.
- If required: fill oil.
- Connecting the machine to the power supply.
- Performing a functional test.

1. Planning aid

The planning aid provides an overview of the measures to be taken and preparations to be made.

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

Planning criterion	Required measures
Personnel and training	▪ Appoint a member of staff to be responsible for preparations for the delivery of the machine. ▪ Appoint operating and service personnel and programmers.
Installation site	▪ Determine the installation site of the machine, taking into account the space requirements according to the installation plan. ▪ Check floor requirements: – Floor quality. – Flatness. ▪ Take the weight and dimensions of the machine into account. ▪ Check the requirements for ambient conditions: – Room temperature. – Exposure to sunlight. – Purity of the ambient air. ▪ Check transport route, e.g.: – Gateway openings. – Doors. – Cable rack heights. – Shunting areas around corners.
Electrical system	▪ Install electrical connections at the installation site. ▪ Lay the conductor cross-section and fuse protection according to the legal requirements.
Bending tools	Order your initial set of bending tools after consulting with TRUMPF.
Transport	Provide auxiliary transport equipment.
Installation	Operations which must be performed by the service engineer prior to commissioning: ▪ Transport the machine to the installation site ▪ Position the machine correctly and prepare it for anchoring on the ground ▪ Position the adjustable legs under the machine ▪ Assemble the support bracket ▪ Connect the foot switch and network cable ▪ Have a qualified electrician connect the machine to the power supply system.

Planning aid Tab. 2-1

2. Installation site

What does the customer need to do?

Please consult a structural analyst for professional support, particularly in the context of the topic of floor requirements. Hand over the "Installation site" section and the installation plan to the structural analyst.

2.1 Space requirements

The following is documented in the TRUMPF installation:

- Space requirements for installation.
- Space requirements of the moving elements.

Hall height

TruBend	Height of the machine	Hall height
2100	max. 2437 mm (max. 96 in)	min. 3500 mm (min. 138 in)

Hall height Tab. 2-2

2.2 Floor requirements

The quality of the prepared parts can be guaranteed only when the floor conditions meet TRUMPF requirements.

Surface

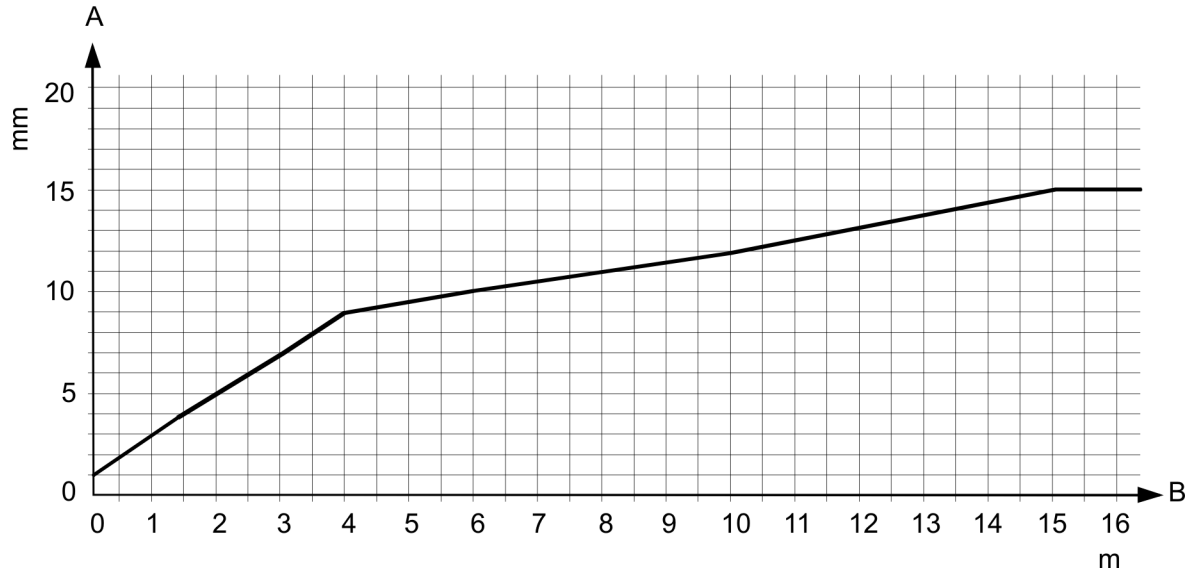
Flatness

The floor on which the machine stands must be even.

Permissible flatness deviation (flatness tolerance):

- Footprint range: max. 12 mm (½ in) per 10 m (33 ft).
- Load-bearing points range: max. 2 mm (0.08 in) per 0.5 m (1.64 ft).

The flatness tolerance can be determined for different measuring point distances from the following diagram.



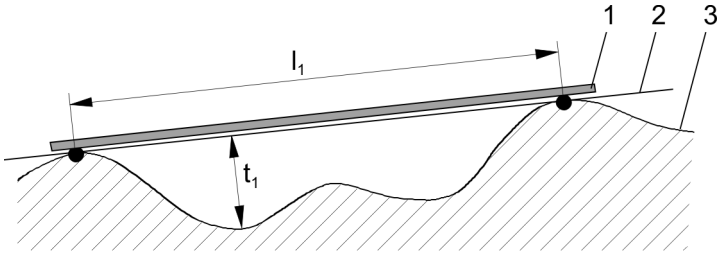
A Flatness tolerance B Measuring point distance

Flatness tolerance depending on the measuring point distance Fig. 65278

Measuring point distance	Flatness tolerance	Area
0.5 m (1.64 ft)	2 mm (0.08 in)	Load-bearing points.
10 m (33 ft)	12 mm (½ in)	Installation surface.

Examples Tab. 2-3

Measuring procedure:
The straight edge is placed on the high points of the surface and determines the depth gauge at the lowest point. For the selected measuring point distance the depth gauge may not be greater than the flatness tolerance.



1 Straightedge
2 Vanishing line of the straightedge
3 Surface
l1 Measuring point distance
t1 Depth gauge

Measuring procedure for determination of the depth gauge Fig. 65581

Expansion joints

- The entire installation surface must not have any expansion joints.
- No joint of any kind may be located in the load-bearing point range of the machine or within at least 275 mm (11 in) of it.
- The distance of the plug bore holes to the edge of the base plate must be at least 200 mm (8 in).

Floor quality

Note

The floor must be oil-proof.

Elastically cushioned base plate

- Carrying capacity of the subsurface at least ks = 5000 kN/m^3.
- Minimum thickness: 200 mm (7.87 in).
- Crosswise reinforcement 3.7 cm^2/m, double-layered.
  - US specification: 2 layers of #5 rebar, spaced 12 in on center, on both the top and bottom faces and oriented in both the longitudinal and transverse directions.
- Concrete quality (equivalent to strength class C 25/30).

When is a structural analyst generally required?

A structural analyst must be consulted under the following conditions:

- The previously mentioned requirements for an elastically embedded base plate are not met.
- The system is to be set up on a ceiling plate/free-span base plate.
- The system is to be set up on fiber-reinforced concrete or roller-compacted concrete.
- The system is to be installed on a floor other than the one named above.

Vibration damping

The machine must be damped against oscillations if other sensitive machines are located directly next to the machine or if the machine is located on a free-span surface which cannot tolerate these oscillations.

Vibration damping can be implemented by the following measures:

- Use Sylomer mats to isolate the machine; thickness 12 mm (0.47 in), quality SR 1200, violet color, foundation plate to the subsurface and on the side.
- Structure of the floor (from the bottom to the top):
  - A layer of construction mat.
  - At least 300 mm (11.8 in) gravel layer with compaction.
  - 120 mm (4.72 in) underbody C12/15 reinforced with 1 mild steel grid layer (steel cross-section lengthwise/crosswise 1.96 cm²/m, mesh width lengthwise/crosswise 100 mm, wire thickness lengthwise/crosswise 5 mm).

2.3 Weight load

Structural analysis

- Perform a structural stress analysis of the load-bearing capacity of the floor surface prior to installation.
- Take into account the weights of the relevant components and the load on the support points.

Note

If the concrete floor has the minimum thickness and quality, it will not have to be subject to a structural check.

TruBend	2100
Weight of machine	7500 kg (16534 lb)
Static load on each support point, front	32.8 kN
Dynamic load per front support point	40.9 kN
Static load on each support point, rear	5.7 kN
Dynamic load per rear support point	6.2 kN
Weight support at the front per base on a surface area of ...	80 x 80 mm (3.2 x 3.2 in)
Weight support at the rear per base on a surface area of ...	80 x 80 mm (3.2 x 3.2 in)

Weight load: (X) = enlarged open height Tab. 2-4

2.4 Stress due to vibration

In the immediate area around the system, external influences can lead to vibration loads. Vibration stress can effect the quality of workpieces.

External influences are e.g.:

- Fork lifts, industrial trucks, etc.
- Installation or removal of other machines in the immediate vicinity of the system.
- Machines which generate vibrations during operation, such as punching presses etc.

2.5 Ambient conditions

Machine ambient conditions

Note

When installing the machine, ensure that optoelectronic safety device BendGuard is protected against strong drafts and temperature fluctuations. Drafts between the transmitter and receiver can sporadically result in error messages from the BendGuard, thereby influencing productivity.

Machine status	Temperature
Operation	+10 °C ... +40 °C (+50°F ... +104°F)

Machine ambient conditions Tab. 2-5

Ambient conditions for the control system

Control status	Temperature	Humidity
Transport or switched-off machine	–20 °C ... +70 °C (–4°F ... +158°F)	20 to 75 % relative humidity 90 % temporarily, but non-condensing

Ambient conditions for the control system Tab. 2-6

3. Electrics

Target group The requirements specified in the "Electrical" section must be met by a company which specializes in electrical installations.

IEC/NEC conditions The IEC conditions apply worldwide, the NEC conditions apply only for Canada and the USA.

3.1 Power supply

Note

The central connection point is on the electrical cabinet and is shown on the installation plan with the illustrated symbol.

Connected loads

Notes

- Impermissible voltage fluctuations endanger the faultless operation of the machines and reduce their performance. A voltage stabilizer is necessary.
- The tolerance range applies to brief fluctuations. Measures to stabilize the mains must be taken in the event of continually non-permitted fluctuations. These measures must be coordinated with the energy supplier.

Rated power:	Frequency
400 V ±10%[1]	50 Hz ± 1%
460 V +10%/–5%[2]	60 Hz ± 1%

Nominal voltage and Frequency Tab. 2-7

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

TruBend	2100
Connected load (IEC)	20 kVA
Connected load (NEC)	24 kVA

1 The tolerance of the line must be determined if the nominal voltage is 380 V or 415 V at 50 Hz. No isolating transformer is required if the tolerance is between 360 V and 440 V.

2 Specification complies with the American National Standard (ANSI), C84.1 table 1, "Voltage range A".

TruBend	2100
Fuse protection	3 x 50 A
Maximum interruption time	10 ms/10 s

Connected loads Tab. 2-8

NEC conditions for fuses The use of slow-blow fuses is preferred. If these fuses are also used for branch circuits, an ETI type fuse must be used to protect the machine from current peaks when switching the machine on.

SCCR value The SCCR value is 35 kA.

Connecting cables

NEC	
Electrical line	▪ Copper line, four-core (L1, L2, L3, PE). ▪ THHN copper or equivalent is recommended (2000 V test voltage) designed for a maximum temperature of +90° C (+194° F). ▪ No aluminum lines may be used for the machine connection.
Conductor cross-section	▪ The conductor cross-section must meet NEC 670-4 (a). The conductor cross-section must be designed for at least 125 % of the nominal current. The nominal current is specified on the nameplate. ▪ To ensure voltage stability and rating, the line dimension should be larger than specified in the NEC table 310-16. ▪ Max. AWG 2

Requirements for the connecting cable Tab. 2-9

3.2 Power supply

Uninterruptible Power Supply (UPS)

The following applies in the event that it is necessary to connect the system to an uninterruptible power supply (UPS):

- When working out the dimensions of the UPS, the short-circuit and overload responses of the UPS system are to be taken into account alongside the continuous power and the electrical connected loads.
- As a rule: overload capacity of the UPS ≥200 % for 0.5 s.

Note

The dimensioning of the uninterruptible power supply must be established without fail by the manufacturer of the UPS plant!

Residual current device (RCD)

Notes

- Whether a fault current circuit breaker has to be used depends upon the local electricity company.
- On the line side, only residual current circuit breakers of type B (sensitive to all types of fault current, EN 50178/5.2.11.2; VDE 0160) are approved.

A fault current circuit breaker provides protection from fault currents due to directly or indirectly touching live parts.

Fault current circuit breaker for direct contact

If a fault current circuit breaker is used to provide protection from direct contact, an isolating transformer must be used (EN 50178 section 5.2.11.1, VDE 0160). This is because the leakage current resulting from the design is >30 mA.

Fault current circuit breaker for indirect contact

If a fault current circuit breaker is to be used to provide protection from indirect contact, this must be selected depending on the machine's fault current.

Note

In rare cases, customer-side voltage fluctuations on the machine's power input filter may lead to higher leakage currents than the typical value specified. The main power supply and the machine must then be separated by an isolating transformer. Typical leakage currents are 300 mA.

If a fault current circuit breaker is used, observe the following requirements:

Property	Requirement
Back-up fuse	(see "Tab. 2-8", pg. 2-12)
Fault current circuit breaker	63 A / 300 mA
Min. permissible cross-section	10 mm²

Tab. 2-10

TRUMPF recommends the following fault current circuit breaker:

- Doepke: DFS 4B SKS 63-4 / 0.3

Power supply configurations

A TN system with grounded star point is the standard power supply configuration for the connection.

When connecting the machine to a power supply with a grounded outer conductor, an isolating transformer must be used.

For IT and TT networks, as well as for asymmetrical mains supplies (one phase grounded, corner-grounded delta network), the machine must be connected via an isolating transformer by the customer

NEC conditions

Power supply configuration:

- A mains supply in star connection and with a grounded star point (Solidly Grounded Wye) is required.
- If the existing mains supply is in delta connection (Corner Grounded Delta), the customer must install a grounded isolating transformer in star connection (with grounded star point) (see NEC item 450-5).

Grounding:

- The machine and power distributor system must be equipped with a grounding line in accordance with NEC article 250, "Grounding".
- For details on grounding power distributor systems and industrial plants, refer to the NEC standards or consult an electrician or the power station.

IT system

A surge diverter is required if the machine is connected to an IT system.

TRUMPF recommends surge diverters from the following manufacturers:

- Phoenix Contact GmbH & Co. KG, Flachsmarktstrasse 8, 32825 Blomberg, Germany e-mail: info@phoenixcontact.com.
- Dehn+Söhne, PO Box No. 1640, D-92306 Neumarkt, E-mail: info@dehn.de.

Isolating transformer

Depending on the machine and on the power supply at the installation site, the voltages can be adjusted in the electrical cabinet at the 3-phase power supply (= EP.EM +CB1 –T2) for 3x 360 V, 3x 380 V, 3x 400 V, 3x 420 V, 3x 440 V, 3x 460 V, 3x 480 V, 3x 500 V and 3x 520 V.

For the special case of 3x230 V, an external isolating transformer which transforms the voltage to 3x400 V is provided.

3.3 Network link

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

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

Providing power supply

- Worldwide (outside the USA and Canada): 230 V with grounded socket or in accordance with the receptive national standard. The grounded coupling is delivered with the machine.
- USA and Canada: 115 V with plug socket according to USA standard.

4. Operating materials

4.1 Hydraulic oil

Notes

- On delivery, the hydraulic oil tank is filled with the maximum quantity of hydraulic oil permitted.

  Exceptions:
  Due to the dangerous goods regulations, the machine must be delivered without filling in some countries. This exception regulation is referred to at the conclusion of the contract.
  For air freight, the hydraulic oil will be delivered separately.
  If the machine is delivered with an unfilled hydraulic oil tank, Technical Service will provide an oil pump.
- Only filtered oil may be filled in the hydraulic oil tank. The filter used for this must have a filter fineness of 10 µm.

For initial filling, the following hydraulic oil is used:

- TruBend Fluid (mat. no. 1555678).
-

Notes

- Hydraulic oil from other manufacturers can also be used if it is certified as having equivalent properties (specification in accordance with DIN 51524-3).
- TRUMPF recommends the use of TruBend Fluid. When other hydraulic oils are used, this can lead to noise development or impairment in the running behavior.

Hydraulic oil volume

TruBend	Hydraulic oil volume
2100	110 l (29 gal)

Hydraulic oil volume: (X) = enlarged open height Tab. 2-11

5. Preparation for commissioning

The customer must make the following arrangements before the machine is commissioned by the TRUMPF service engineer:

- Transport the machine to the installation site (see Chapter 6, Transport).
- Position the machine and drill holes for the anchor bolt (see Chapter 7, Installation).
- Position the adjustable legs provided for the purpose beneath the machine (see Chapter 8, Set-up).
- Assemble the support brackets provided (see Chapter 9, Support bracket).
- Connect the foot switch and network cable (see Chapter 10, Foot switch and network cable).
- Have the machine connected to the power supply by an electrician (see Chapter 11, Electrical connection).

The work steps for this are described in the following Chapters.

6. Transport

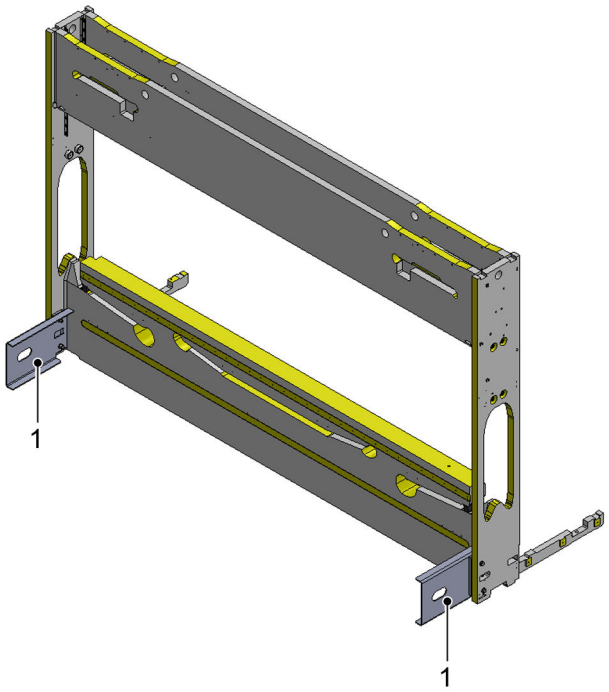
Transport of the system from the truck to its final installation site must be prepared and carried out by the customer.

6.1 Preparing transport

Before the machine is delivered, check the following:

- Is there sufficient space for transport to the installation site?
- Can the floor can be crossed with armored rollers, etc.?
- Are the gateway openings, header heights and cable rack heights sufficient?

Transport dimensions



1 Support tab

Fig. 78168

TruBend	2100
Weight	7500 kg (16534lb)
Length	3607 mm (139 in)
Width (including support tab)	2094 mm (82 in)
Height	2370 mm (93.3 in)

Transport dimensions: (X) = enlarged open height Tab. 2-12

6.2 Permitted auxiliary tools

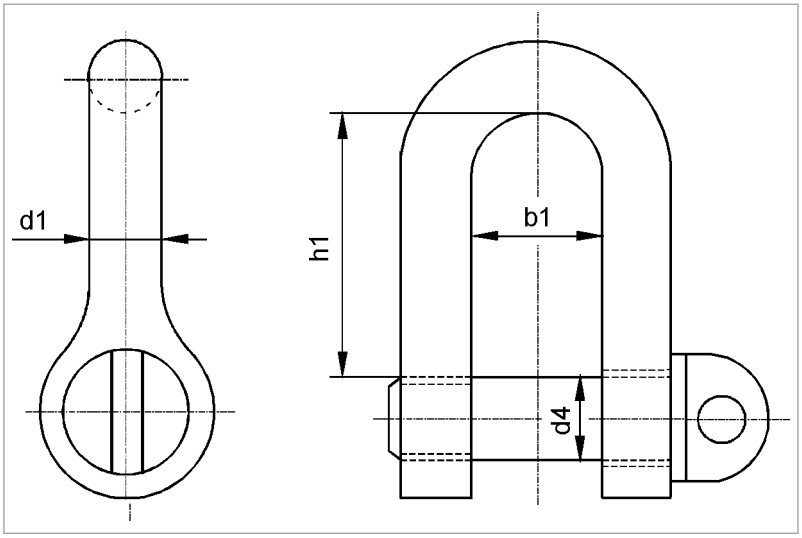
Note

The carrying capacity of the authorized auxiliary equipment must be selected in such a way that the maximum load can be transported safely.

Authorized additional equipment	Carrying capacity
Crane truck for unloading the truck	According to the machine weight
Gantry crane for transporting the machine **or** Armored rollers: 1 steerable, 2 fixed	According to the machine weight **or** At least 10 t (22047 lb) each
At least two hydraulic hoisting jacks	At least 8 t (17637 lb) each
Hoisting iron with extension. Length: 1 m (3.28 ft)	–
When transporting with a crane: two type A shackles (DIN 82101)	According to the machine weight
Adjustable crane chain	According to the machine weight
Lifting belt	According to the machine weight

Permitted auxiliary tools Tab. 2-13

Shackles When transporting the machine with a crane: use two type A shackles (DIN 82101):



Type A shackle Fig. 52814

TruBend	2100
Permissible loading	120 kN
Bolt diameter	2"
d1	47 mm (1.85 in)
d4	52 mm (2.05 in)
h1	158 mm (6.22 in)
b1	73 mm (2.87 in)

Shackle dimensions, form A Tab. 2-14

6.3 Checking, unloading and transporting the machine

On delivery: check the machine

1. Examine all components for any transport damage.
2. Record visible damage caused during transport on the cargo note and have the record countersigned by the truck driver.
3. Report any hidden transport damage to the insurance company and TRUMPF within six days.

Unloading and transporting the machine

Means, Tools, Materials

- For transport with armored rollers:
  - 4 wooden blocks 140 x 80 x 500 mm (included in the scope of delivery of the machine).
  - 4 screws (included in the scope of delivery of the machine).

DANGER

Suspended load!

Falling loads could lead to severe bodily injury or even death.

- ➢ Observe 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 transport in accordance with the transport regulations.

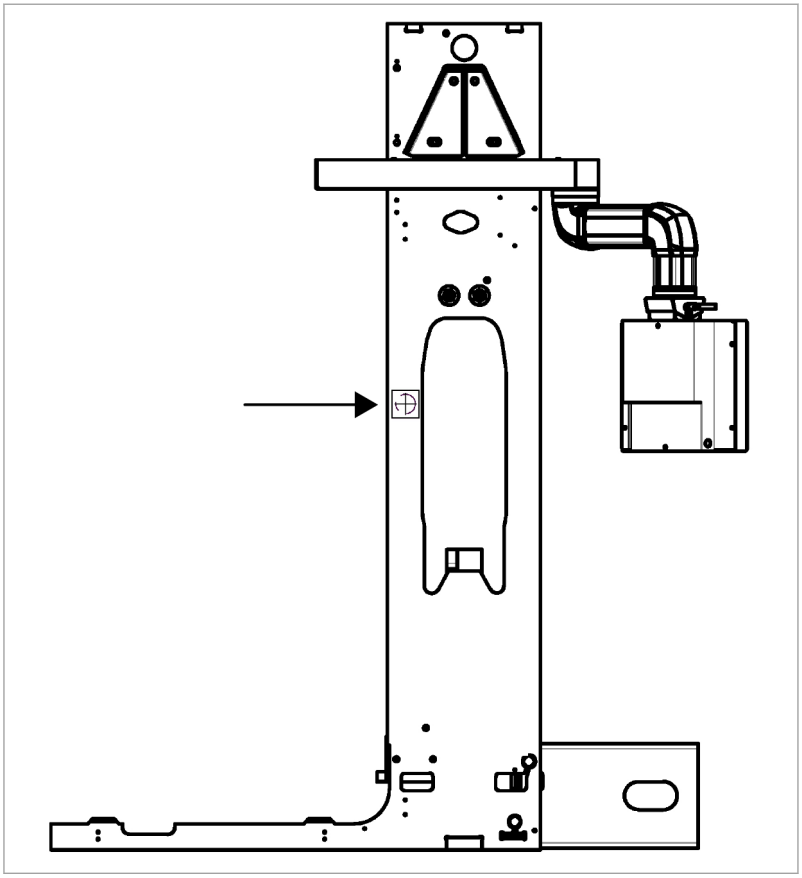
DANGER

The machine tilts forward!

Risk of fatal injury!

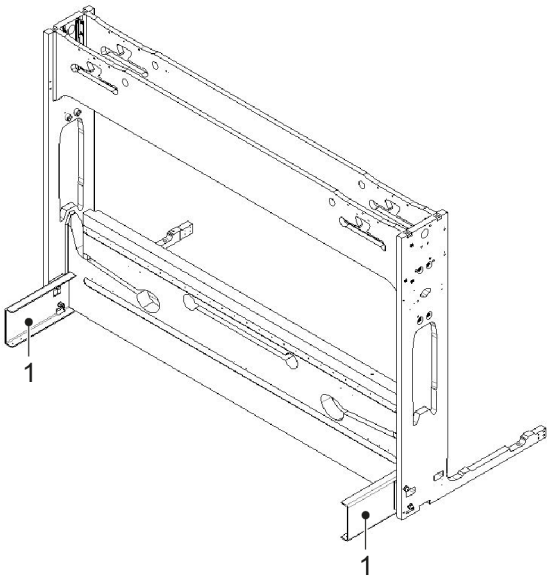
- ➢ There must be no one in the danger zone during transport.
- ➢ The machine may only be transported with the transport securing devices mounted.
- ➢ The machine may be operated only if it is anchored firmly in the foundation.

Observe the position of the center of gravity when transporting the machine:



Position of center of gravity Fig. 82046

The following transport securing devices may only be removed when the machine is anchored in the foundation:

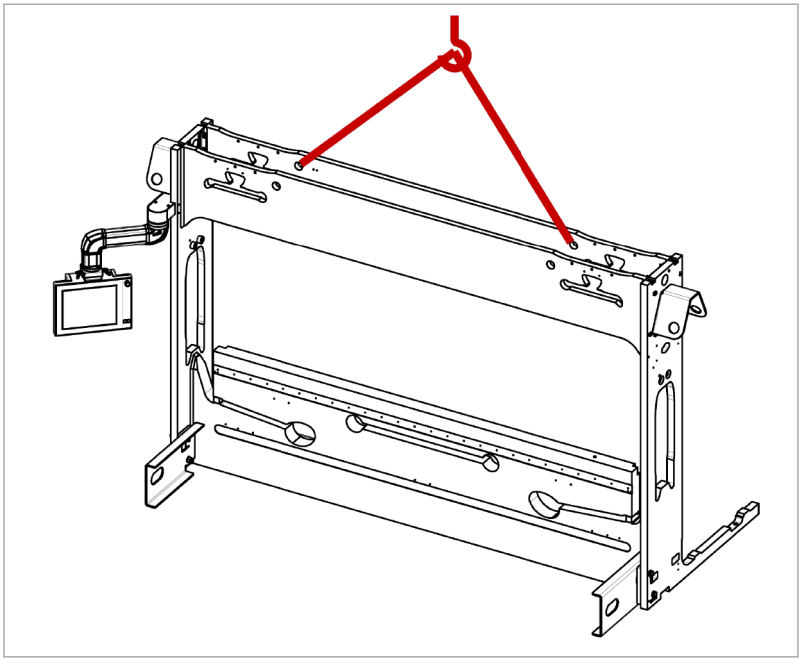


1 Support plate

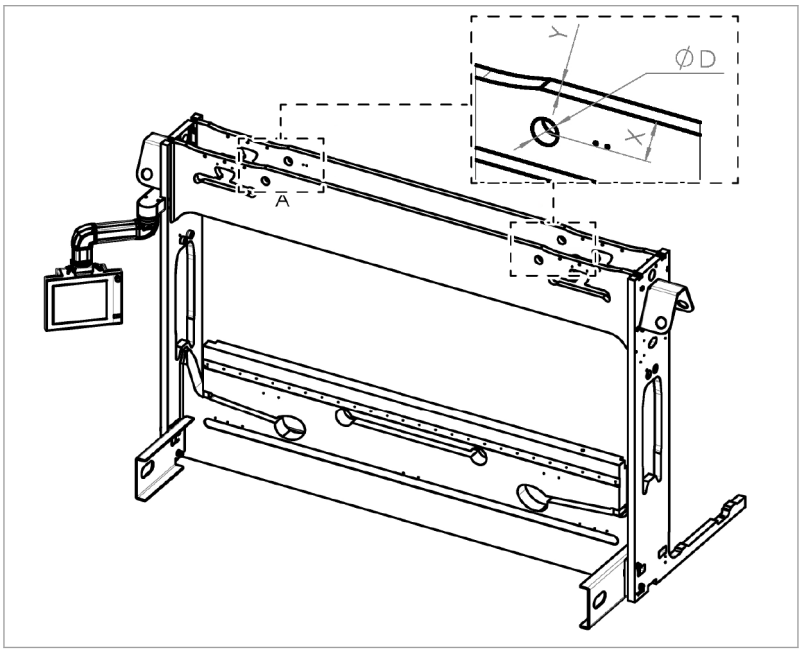
Fig. 102831

All transport securing devices must be stored in a safe place. The transport securing devices must be reattached if the machine is moved or converted at a later point in time.

The machine can be lifted and transported using the suspension holes:



Transport using crane Fig. 82048

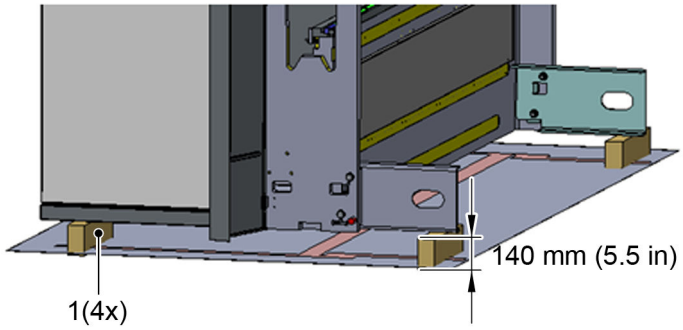


Suspension holes Fig. 82049

TruBend	2100
Diameter D	55 mm (2.2 in)
Distance X to upper edge of machine	90 mm (3.6 in)
Thickness Y of the bridge plate	40 mm (1.6 in)

Dimensions of the suspension holes Tab. 2-15

When transporting the machine further with armored rollers: Position the machine on wooden blocks.

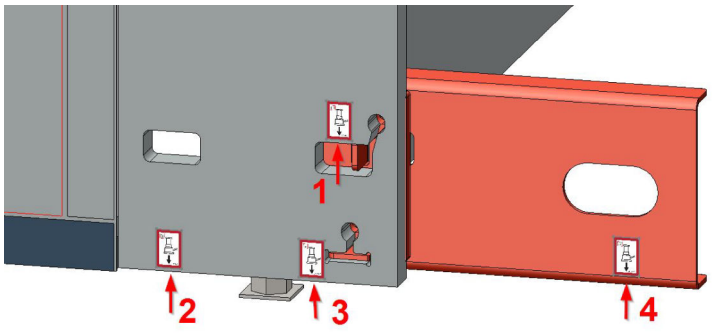


1 Wooden block

Position the machine on wooden blocks Fig. 86615

If the machine needs to be lifted from the ground, observe the procedure as described in section "Lift the machine and position on wooden blocks", page 2-32.

Due to a danger of tilting, **only** raise the machine using hydraulic hoisting jacks at the points marked (max. 150 mm (5.9 in)):



1/3 Position the machine on rear fixed armored roller or on the steerable armored roller

2 Position the machine on wooden blocks

4 Position the machine on front fixed armored roller

Attachment points for the hydraulic hoisting jack Fig. 89239

Unloading the machine

1. Remove machine packaging.
2. Secure the shackles to the suspension holes of the machine.
3. Unload the machine using a crane. Further transport with armored rollers: Position the machine on wooden blocks.
4. Transport the accompanying accessories box and any accessory parts that may be separately packaged directly from the truck to the installation site with a forklift truck.

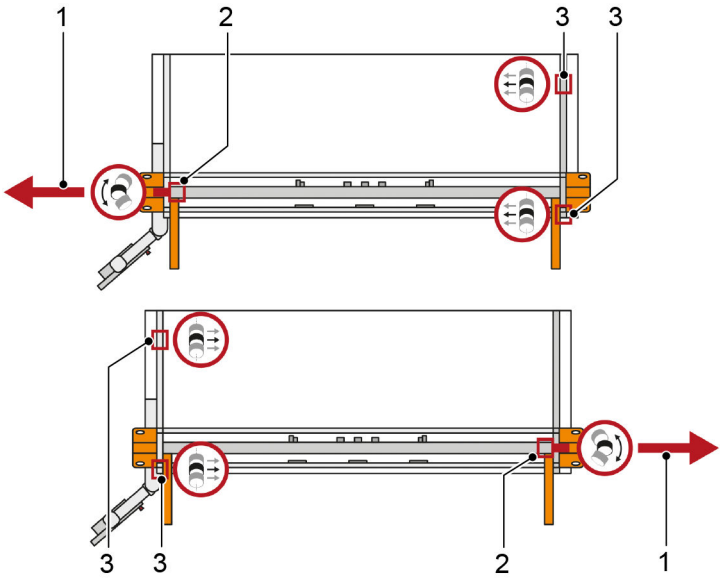
Transporting the machine using an indoor crane

5. Transport the machine to the installation site using an indoor crane with sufficient carrying capacity.

Transporting the machine using armored rollers

Notes

- The support areas of the armored rollers must be located centrally below the respective support points of the machine.
- Move the machine carefully and delicately and by hand only. Do not use a forklift truck or other motorized tractors as there is a risk of tilting due to abrupt acceleration.



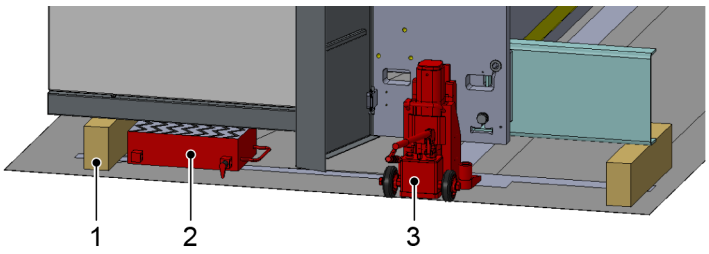
1 Transport direction
2 Position of steerable armored roller
3 Position of fixed armored roller

Transport with armored rollers Fig. 82050

6. Define transport direction.

Note

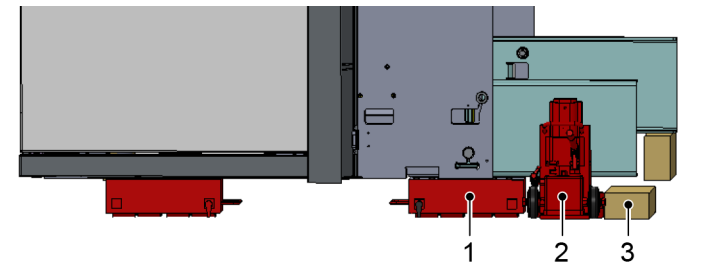
The following figures on the right show the procedure for transport direction as an example.



1 Wooden block
2 Rear fixed armored roller
3 Hydraulic hoisting jack

Position the rear fixed armored roller Fig. 89241

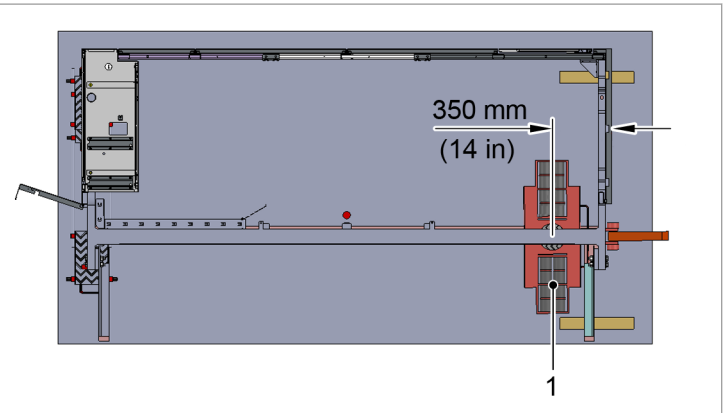
7. Apply the hydraulic hoisting jacks and lift the machine.
8. Position the rear armored roller.
9. Remove the rear wooden block.
10. Lower the machine.



1 Front fixed armored roller
2 Hydraulic hoisting jack
3 Wooden block

Position the front fixed armored roller Fig. 89242

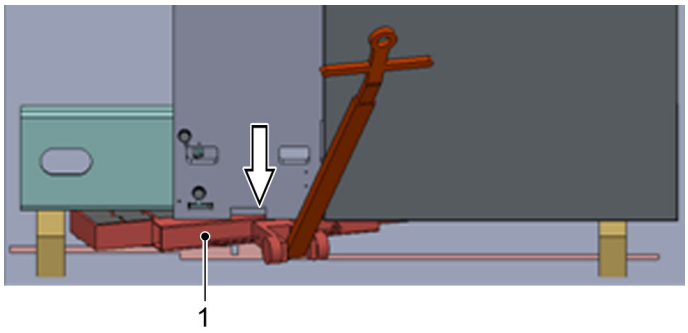
11. Apply the hydraulic hoisting jacks and lift the machine.
12. Position the front armored roller.
13. Rotate the front wooden block to a height of 80 mm (3.2 in).
14. Lower the machine.
15. Secure the armored rollers against rolling away with the sheet metal strip.



1 Steerable armored roller

Position the steerable armored roller Fig. 86877

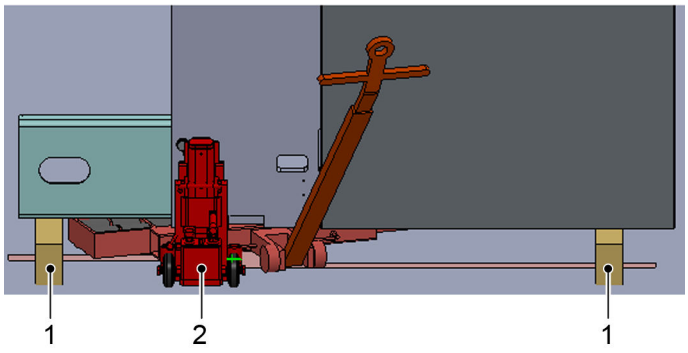
16. Position the steerable armored roller.



1 Steerable armored roller

Fig. 86617

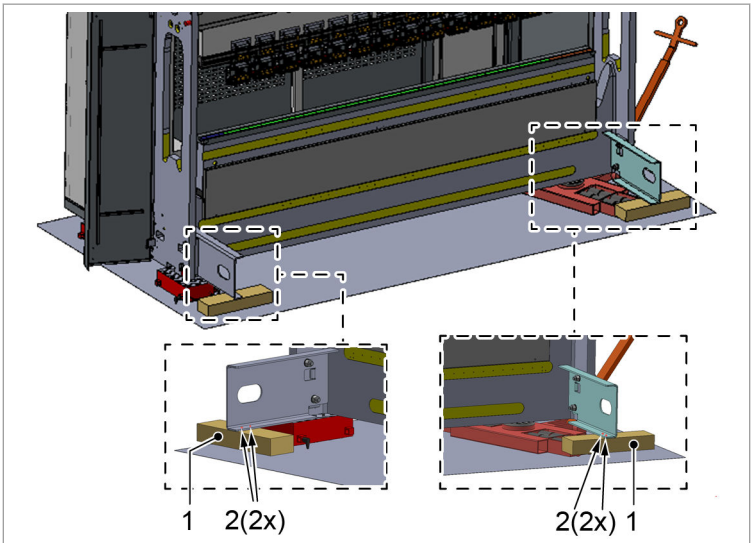
17. Rotate the armored roller until the roller of the armored roller and the edge of the recess are flush on the machine frame (see arrow).



1 Wooden block 2 Hydraulic hoisting jack

Fig. 86878

18. Apply the hydraulic hoisting jacks and lift the machine.
19. Remove the rear wooden block.
20. Rotate the front wooden block to a height of 80 mm (3.2 in).
21. Lower the machine.



1 Wooden block 2 Screw

Fig. 86880

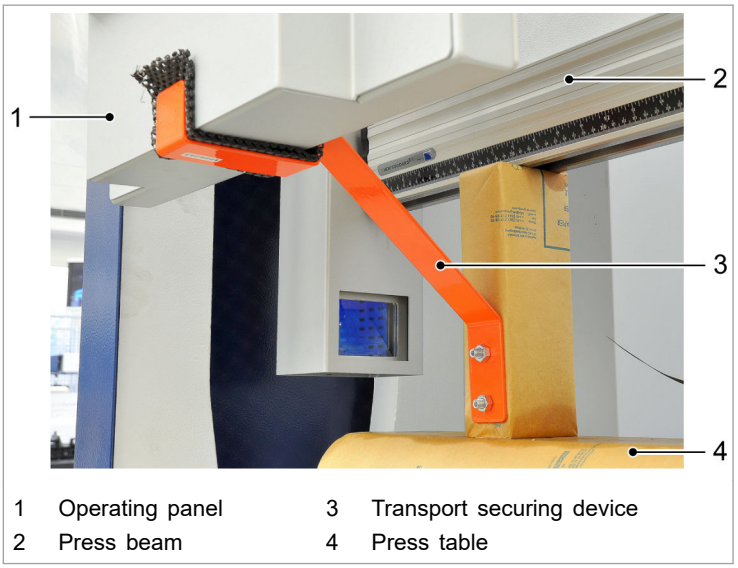
22. Fasten the wooden blocks with 2 screws each to increase transport safety.
23. Align the steerable armored roller in the direction of travel.
24. Transporting the machine to the installation site. Ensure the armored rollers stay in place.

6.4 Relocating the machine

Mounting the transport securing devices

Means, Tools, Materials

- Transport securing devices
  - TruBend 2100 (mat. no. 2345378)
- Open-end wrench, size 13.
- Size 6 Allen key.
- Size 14 Allen key.
- Torque wrench with size 30 plug-in hex socket head.

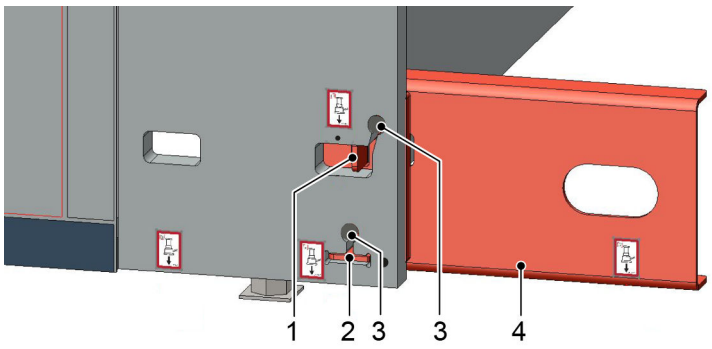


1	Operating panel	3	Transport securing device
2	Press beam	4	Press table

Fig. 70376

1. Mount transport securing device.

   Open-end wrench, size 13.

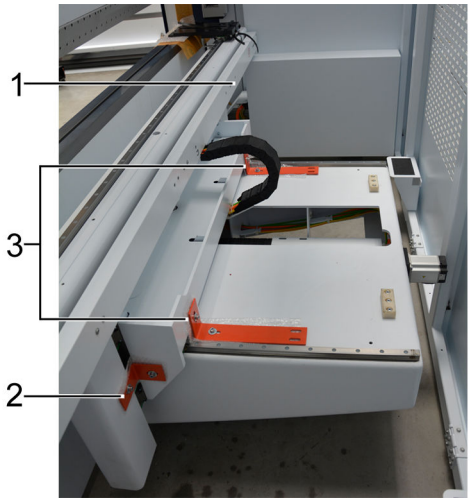


1	Upper flange	3	Screw M20x120 with plain washer and nut
2	Lower flange	4	Support tab

Fig. 86883

2. Apply support tab. When doing this, observe the vertical alignment to the machine and mounting position of the tabs.
3. Insert screws with plain washer and nut.
4. Tighten the screws to 390 Nm.

   Torque wrench with size 30 plug-in hex socket head.



1	Backgauge	3	X axis transport securing device
2	R axis transport securing device		

Fig. 72278

5. Mount the transport securing devices with 2 M8 screws each.

   Size 6 Allen key.

Transporting the machine using an indoor crane

Conditions

- The machine was separated from the energy source by qualified personnel.
- The transport securing devices are installed.
- Anchoring has been detached.

➢ Procedure for indoor cranes: (see "Unloading and transporting the machine", pg. 2-21)

Lifting the machine from the ground and transport with armored rollers

Conditions

- The machine was separated from the energy source by qualified personnel.
- The transport securing devices are installed.
- Anchoring has been detached.

Means, Tools, Materials

- 4 wooden blocks 140 x 80 x 500 mm (included in the scope of delivery of the machine).
- 4 screws (included in the scope of delivery of the machine).

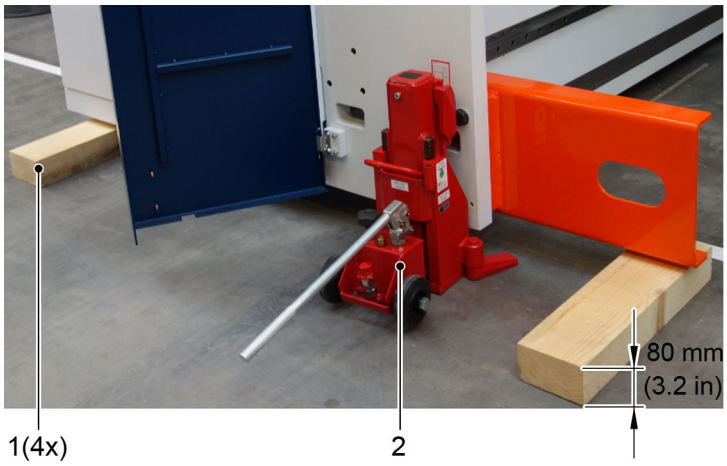
DANGER

The machine tilts forward!

Risk of fatal injury!

- ➢ There must be no one in the danger zone during transport.
- ➢ The machine may only be transported with the transport securing devices mounted.
- ➢ The machine may be operated only if it is anchored firmly in the foundation.

Lift the machine and position on wooden blocks



1 Wooden block 2 Hydraulic hoisting jack

Fig. 86885

1. Apply the hydraulic hoisting jacks and raise the machine by 100 mm (3.9 in).
2. Place the wooden block at a height of 80 mm (3.2 in).
3. Raise the machine to 150 mm (5.9 in).
4. Rotate the wooden blocks to a height of 140 mm (5.5 in).
5. Lower the machine.

6. Place wooden blocks on the opposite side in the same way.

Transporting the machine using armored rollers

7. For procedure, see section "Transporting the machine using armored rollers", 2-26.

Measures at the installation site

8. Anchor the machine to the ground.
9. Safely store transport securing devices.

7. Installation

7.1 Positioning the machine and drilling holes

Note

The adjustable legs are set up later at the installation points following drilling.

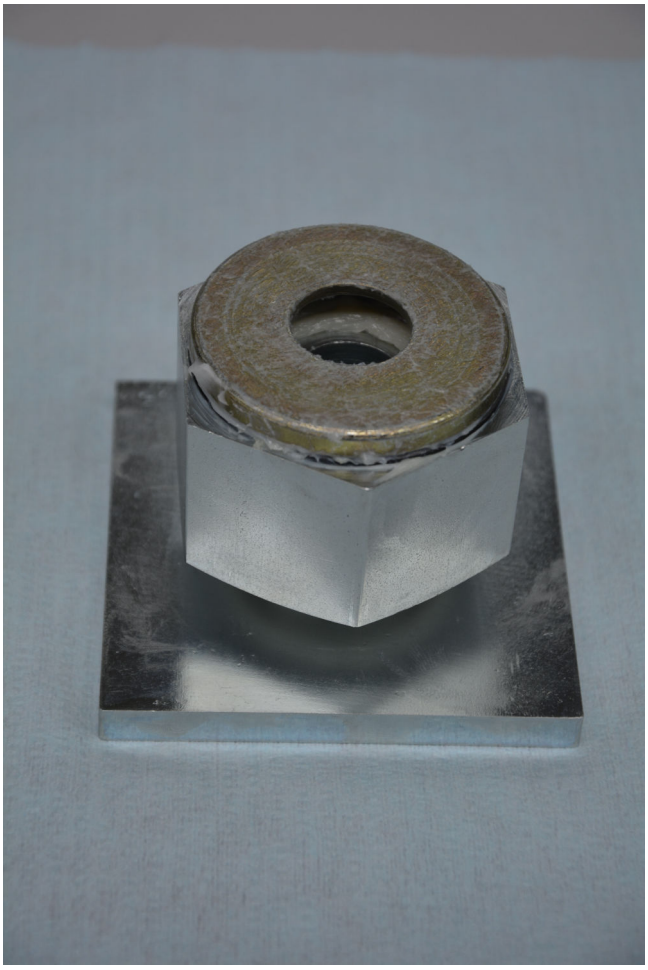
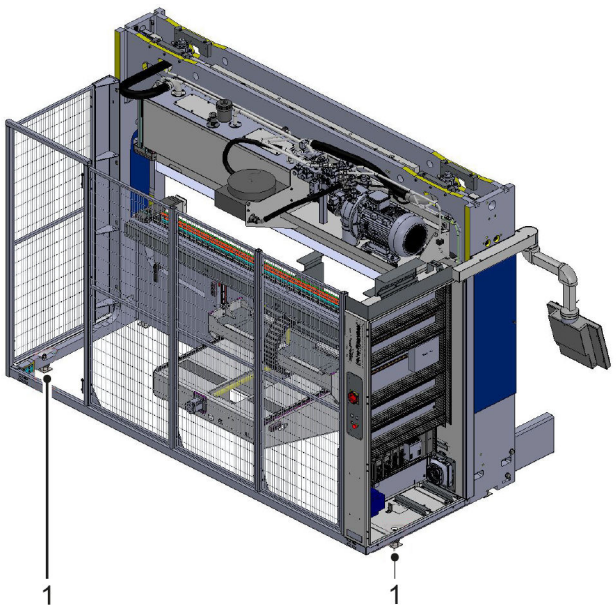


Fig. 72275

1. Using an indoor crane or forklift truck, position the machine at the installation site in accordance with the installation plan and align it.



1 Drilled hole positions

Fig. 102833

2. Open the electrical cabinet door and service door to access the drilled holes.

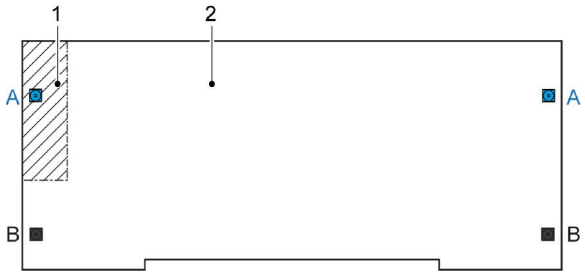
Note

The machine is bolted to the factory floor only at the rear, once on the left and once on the right.

Drill holes are drilled through the machine.

The holes must be drilled vertically and accurately.

The adjustable legs must stay free from dust to prevent the thread 'rubbing'. This is why they are only positioned at the installation points following drilling.



A Rear installation points (bolted)
B Front installation points (not bolted)
1 Switch cabinet
2 Machine body

Fig. 70361

3. Drill the holes of the rear installation points through the machine.

Drill diameter in mm	16 mm
Drilling depth	85 mm

Tab. 2-16

4. Clean the drilled holes.

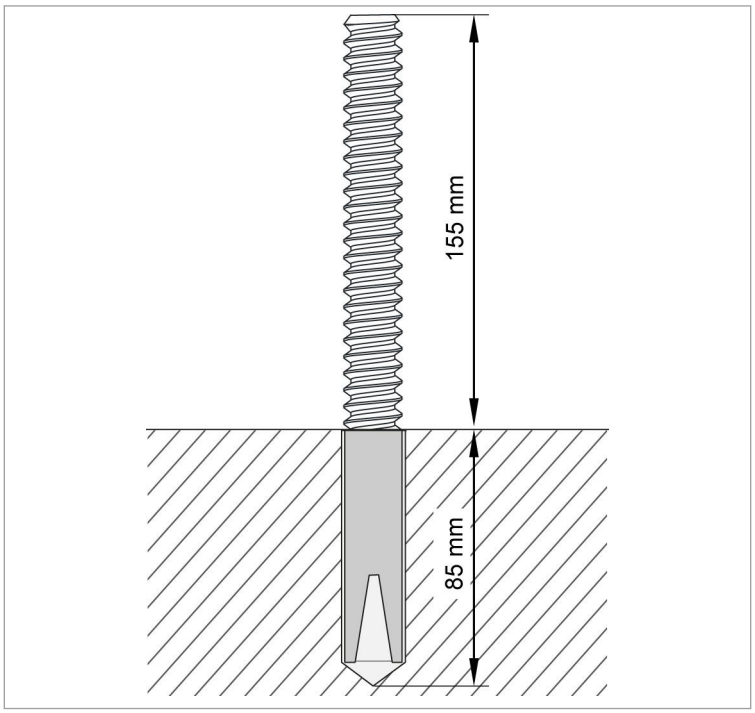


Fig. 68701

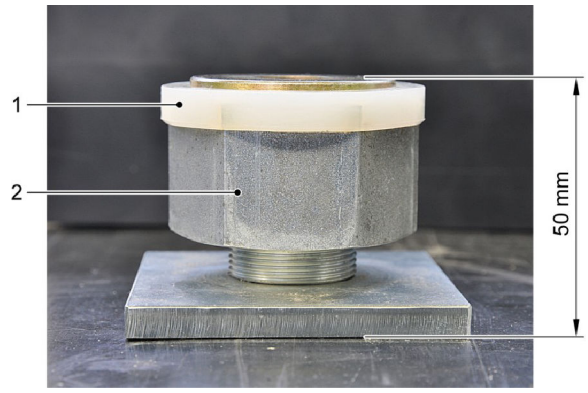
5. Drive the drop-in anchors of the rear installation points into the holes.

   ► The anchors must project out of the floor by about 155 mm.

8. Set-up and positioning

8.1 Preparing adjustable legs, positioning the machine

Preparing adjustable legs



1 Transport securing devices 2 Adjustment leg centered

Fig. 69525

1. Adjust the adjustable legs of the machine so that a distance of 50 mm is achieved between the support surface and the bottom of the base plate.

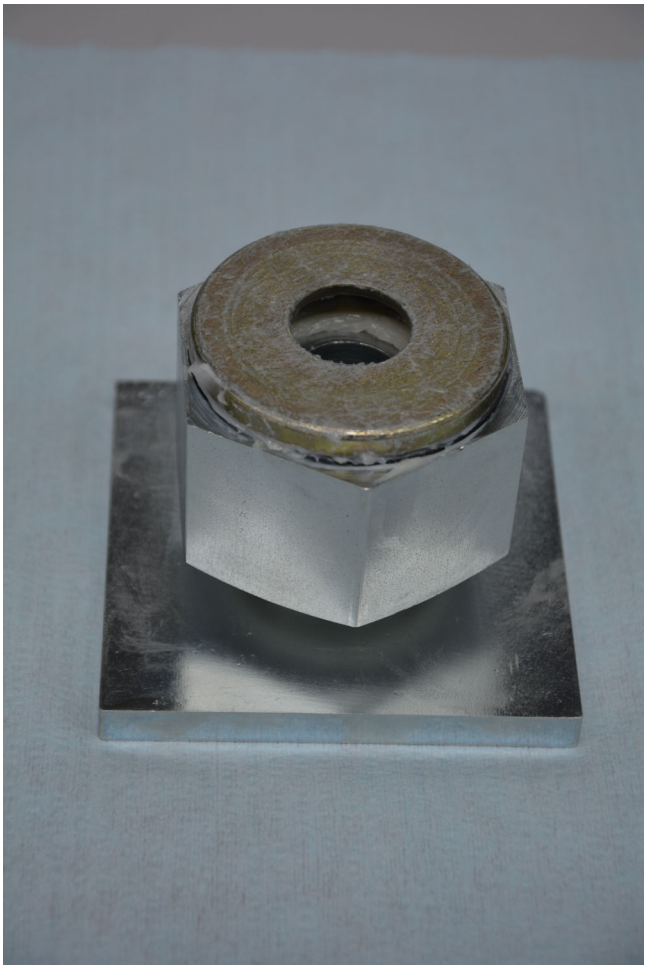


Fig. 72275

2. Remove the transport securing devices of the adjustable legs.

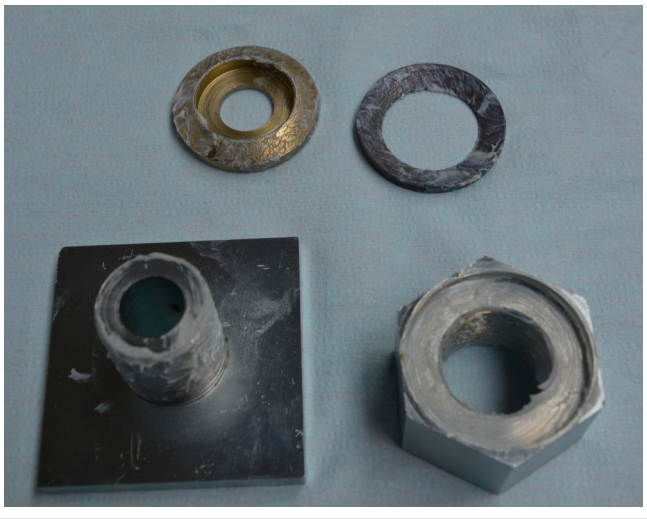


Fig. 72274

3. Lightly grease ball cups and spherical washer on both sides and the thread, if required.

Positioning the machine

⚠ CAUTION

Crush injuries due to machine falling down/tipping over!

- Supports must be placed beneath the machine when working with the machine in raised position.

⚠ DANGER

The machine is tilting forwards!

Risk of fatal injury!

- There must be no one in the danger zone during transport.
- The machine may only be transported with the transport securing devices mounted.
- The machine may be operated only if it is anchored firmly in the foundation.

1	Machine in raised position	3	Adjustable leg
2	Wooden beam	4	Set screw on the front of the machine

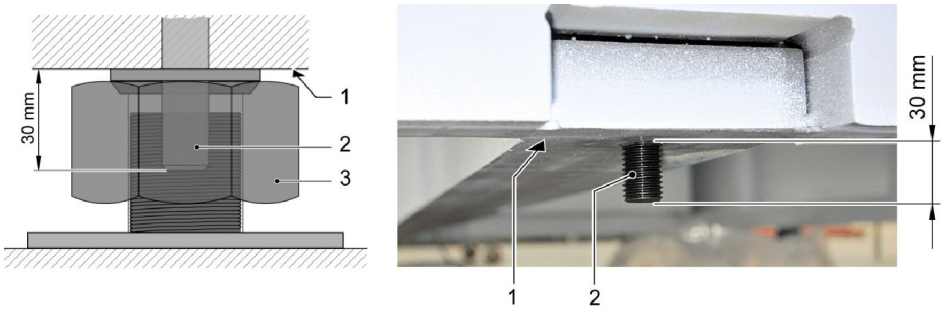
Fig. 69527

4. Using the indoor crane or hydraulic jack, raise the machine about 300 mm and place wooden beams beneath it to prevent it from falling/tipping over.

Note

The machine is not anchored to the factory floor at the front!

The set screws ensure that the adjustment legs do not slip out of place.



1 Underside of machine frame 2 Set screw 3 Adjustable leg

Fig. 69528

5. At the front of the machine, fully unscrew the set screws of the adjustable legs about 30mm out of the machine body and glue with Loctite.

   ► Allen key, AF 8

6. At the front of the machine, position the adjustable legs under the set screws.
7. At the rear of the machine, guide the adjustable legs into the drop-in anchors and align them.
8. Remove the wooden beams and carefully lower the machine onto the adjustable legs.
9. Screw the nuts (2 x M16) and plain washer loosely onto the rear anchor.

   ► Do not tighten because the machine must first be set up and aligned by a TRUMPF service engineer.

   ► Tightening nuts on the rear anchors is performed by a TRUMPF service engineer.

10. Align the base plates of the adjustable legs parallel to the machine body.

    ► Do not remove any transport devices!

    ► Transport devices are painted orange and will be removed by the TRUMPF service engineer.

9. Support bracket

9.1 Assemble the support bracket

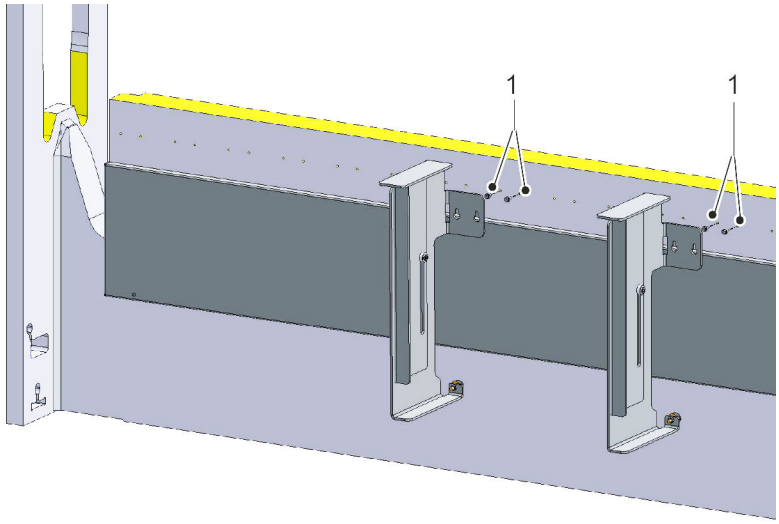
Note

Two support brackets are provided with the machine.

These only have to be fastened on the machine frame.

The support brackets are screwed directly to the machine frame.

Positioning across the entire table length is possible in 160 mm steps.



1 DIN EN1665 M6x16 screw

Fig. 102834

1. Screw the screws provided for fastening (DIN EN1665 M6x16) onto the desired position on the machine table.
2. Suspend the support brackets over the keyholes and screw on.

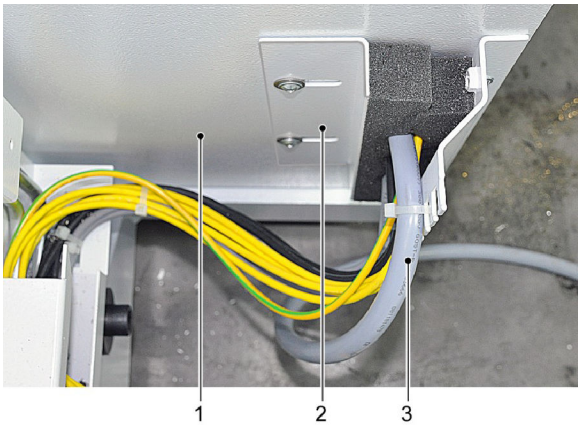
10. Foot switch and network cable

10.1 Connect the foot switch and network cable

Preparations

1. Open the electrical cabinet and service doors
2. Remove the cover of the cable entry at the bottom of the electrical cabinet inside the machine (2xM6).

   ► Allen key AF 4



1 Switch cabinet
2 Sealing strip
3 Foot switch connection cable

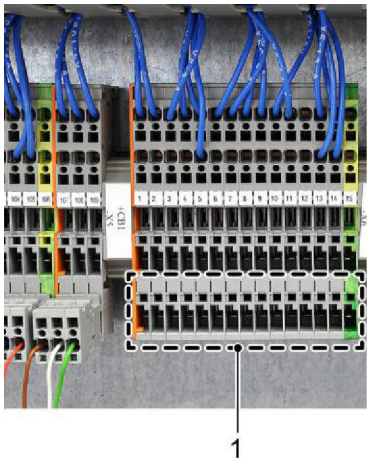
Fig. 69533

3. Loosen the left sealing strip of the cable entry (2xM6) and slide it towards the outside.

   ► Allen key AF 4

Connecting the foot switch

4. Route the connection cable of the foot switch into the electrical cabinet through the cable entry.



1 Interface for foot switch (X5)

Fig. 70843

5. Plug the connection cable of the foot switch in at interface X5.

Connecting the network cable

6. Route the network cable into the electrical cabinet through the lower cable entry.

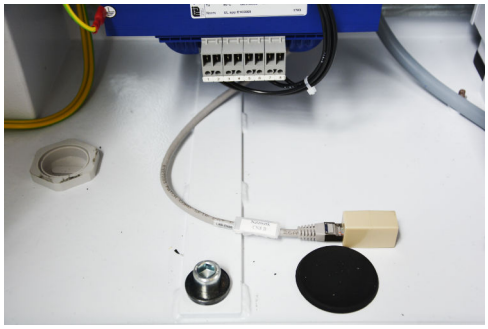


Fig. 84106

7. Connect the network cable to the RJ45 coupling.

Reworking

8. Route the network cable and connection cable tightly in the cable ducts of the electrical cabinet and pull the excess out through the cable entry.
9. Mount the sealing strip and cover in reverse order (see 2-42).

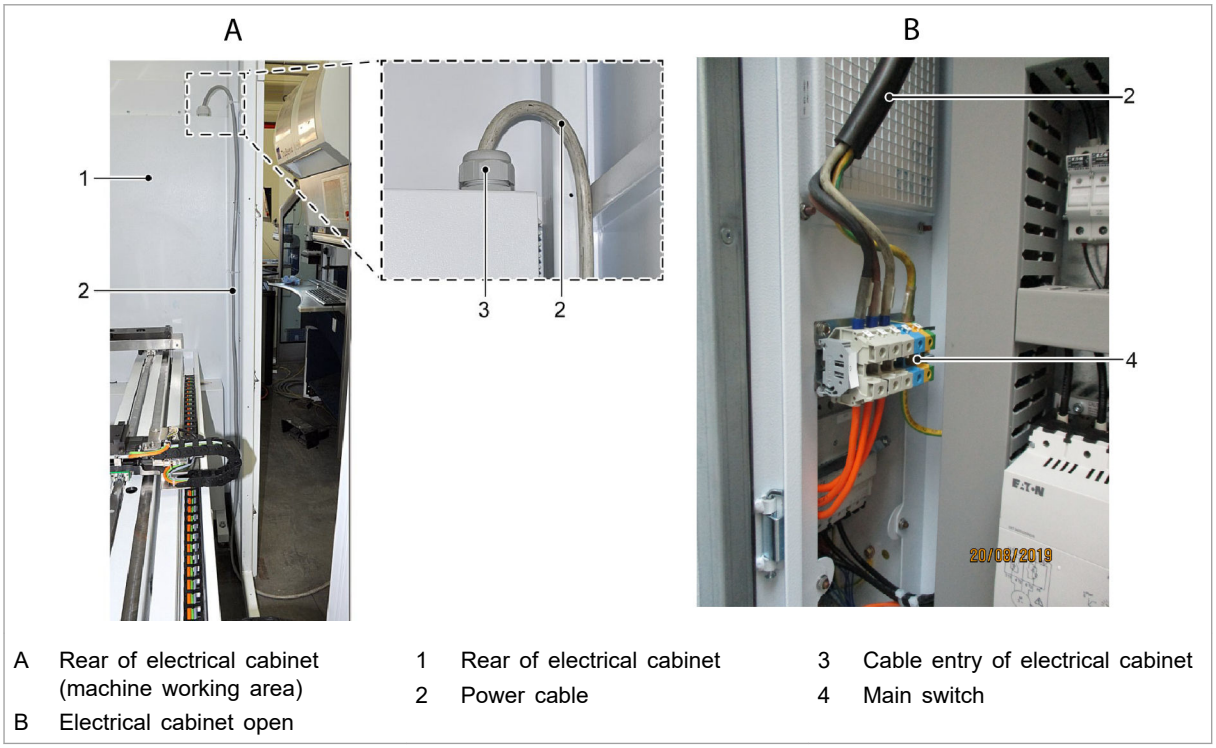
11. Electrical connection

11.1 Connecting the power cable

DANGER

Risk of fatal injury due to electric shock!

- The machine's electrical connection and work on the electrical cabinet may only be performed by qualified personnel (electricians)!
- The machine must be switched off when working on the electrical cabinet and secured against being switched back on.



A Rear of electrical cabinet (machine working area)
B Electrical cabinet open
1 Rear of electrical cabinet
2 Power cable
3 Cable entry of electrical cabinet
4 Main switch

Fig. 102835

1. At the rear of the machine, pull the power cable into the machine's work area from below and route it up along the electrical cabinet to the cable entry.
2. Guide the power cable in at the upper cable entry of the electrical cabinet.
3. Open the cable ducts in the electrical cabinet.

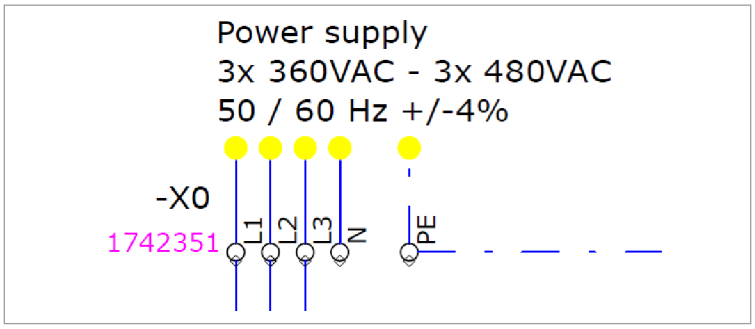


Fig. 102836

4. Have a qualified electrician connect the machine to the power supply.
5. Place the power cable in the cable ducts and route it tightly towards the outside.
6. Close the cable ducts in the electrical cabinet.
7. Using cable ties, stow the power cable safely in the machine work area.