



Aufstellung und Installation
Setup and installation

VIDEO

<http://fg.am/fd21install>

FELDER®

User manual Multi Boring Machine FD 21 professional

Translation



Keep this manual handy and in good condition for continual reference!

**Note: Year of construction**

The machine number of this machine will be printed on the cover sheet of this operating manual. The final two digits of the machine number show the year of construction of this machine. e.g. XXX.XX.XXX.15 -> Year of manufacture 2015



Attention! Risk of material damage! The machine must be inspected immediately upon arrival. If the machine has been damaged during transport, or if any parts are missing, a written record of the problems must be submitted to the forwarding agent and a damage report compiled. Also be sure to notify your supplier immediately.



For the safety of all personnel, it is necessary to study this manual thoroughly before assembly and operation. This manual must be kept in good condition and should be considered as part of the machine. Furthermore, the manual must be kept to hand and within the vicinity of the machine so that it is accessible to operators when using, maintaining or repairing the machine.

**Important Notices!**

Please note, that depending on the model of the machine, not all described functions are present, or additional functions and buttons are available (e.g. machines with special functions).

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KR-Felder-Str. 1

A-6060 Hall in Tirol

Tel.: +43 (0) 5223 5850 0

Fax.: +43 (0) 5223 5613 0

E-Mail: info@felder.at

Internet: www.felder.at

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General

1 General

1.1 Symbol legend

Important technical safety instructions in this manual are marked with symbols. These instructions for work safety must be followed.

In all these particular cases, special attention must be paid in order to avoid accidents, injury to persons or material damage.



Warning! Risk of injury or death!

This symbol marks instructions that must be followed in order to avoid harm to one's health, injuries, permanent impairment or death!



Warning! Danger! Electric current!

This symbol warns of potentially dangerous situations relating to electric current. Not observing the safety instructions increases the risk of serious injury or death. All electrical repairs must be carried out by a qualified electrician!



Attention! Risk of material damage!

This symbol marks instructions which, if not observed, may lead to material damage, functional failures and/or machine breakdown!



Note:

This symbol marks tips and information which should be observed to ensure efficient and failure-free operation of the machine.

1.2 Information about the manual

This manual describes how to operate the machine properly and safely. Be sure to follow the safety tips and instructions stated here as well as any local accident prevention regulations and general safety regulations. Before beginning any work on the machine, ensure that the manual, in particular the chapter entitled "Safety" and the respective safety guidelines, has been read in its

entirety and fully understood. This manual is an integral part of the machine and must therefore be kept in the direct vicinity of the machine and be accessible at all times. If the machine is sold, rented, lent or otherwise transferred to another party, the manual must accompany the machine.

1.3 Copyright

This manual should be handled confidentially. It is designated solely for those persons who work on or with the machine. All descriptions, texts, drawings, photos and other depictions are protected by copyright and other commercial laws. Illegal use of the materials is punishable by law.

This manual, in its entirety or parts thereof, may not be transferred to third parties or copied in any way or form, and its contents may not be used or otherwise communicated without the express written consent of the manufacturer.

Infringement of these rights may lead to a demand for compensation or other applicable claims. We reserve all rights in exercising commercial protection laws.

General

1.4 Liability and warranty

The contents and instructions in this manual have been compiled in consideration of current regulations and state-of-the-art technology as well as based on our know-how and experience acquired over many years. This manual must be read carefully before commencing any work on or with this machine. The manufacturer shall not be liable for damage and/or faults resulting from the disregard of instructions in the manual. The text and images do not necessarily represent the delivery contents. The images and graphics are not depicted on a 1:1

scale. The actual delivery contents are dependent on custom-build specifications, add-on options or recent technical modifications and may therefore deviate from the descriptions, instructions and images contained in the manual. Should any questions arise, please contact the manufacturer. We reserve the right to make technical modifications to the product in order to further improve user-friendliness and develop its functionality.

1.5 Warranty notice

The guarantee period is in accordance with national guidelines. Details may be found on our website, www.felder-group.com

1.6 Spare parts



Attention! Risk of material damage!

Non genuine, counterfeit or faulty spare parts may result in damage, cause malfunction or complete breakdown of the machine.

If unauthorised spare parts are fitted into the machine, all warranty, service, compensation and liability claims against the manufacturer and their contractors, dealers and representatives shall be rejected.

Use only genuine spare parts supplied by the manufacturer.



Note: The original spare parts that have been authorised for use are listed in a separate spare parts catalogue, enclosed in the documentation package supplied with the machine.

1.7 Disposal



Attention! Used electrical materials, electronic components, lubricants and other auxiliary substances must be treated as hazardous waste and may only be disposed of by specialised, licensed firms.

If the machine is to be disposed of, separate the components into the various materials groups in order to allow them to be reused or selectively disposed of. The whole structure is made of steel and can therefore be dismantled without problem. This material is also easy to dispose of and does not pol-

lute the environment or jeopardise public health. International environmental regulations and local disposal laws must always be complied with.

Safety

2 Safety

At the time of its development and production, the machine was built in accordance with prevailing technological regulations and therefore conforms to industry safety standards.

However, hazards may arise should the machine be operated by untrained personnel, used improperly or employed for purposes other than those it was designed for. The chapter entitled "Safety" offers an overview of all the important safety considerations necessary to optimise

safety and ensure the safe and trouble-free operation of the machine.

To further minimise risks, the other chapters of this manual contain specific safety instructions, all marked with symbols. Besides the various instructions, there are a number of pictograms, signs and labels affixed to the machine that must also be heeded. These must be kept visible and must not be removed.

2.1 Intended use

The machine described in this manual is intended solely for processing wood and similar machinable materials. Machining materials other than wood is only permitted with the express written consent of the manufacturer. Operational safety is guaranteed only when the machine is used for the intended purposes. The term "proper use" also refers to correctly observing

the operating conditions as well as the specifications and instructions in this manual.

The machine may only be operated with parts and original accessories from the manufacturer.

Intended use:

- Drilling dowels at fixed distances
- For the drilling of holes in all types of woods, glued wood as well as MDF and plexiglass

See chapter entitled >Operation<



Attention! Any use outside of the machine's intended purpose shall be considered improper and is therefore not permitted. All claims regarding damage resulting from improper use that are made against the manufacturer and its authorised representatives shall be rejected. The operator shall be solely liable for any damage that results from improper use of the machine.

2.2 Manual contents

All those appointed to work on or with the machine must have fully read and understood the manual before commencing any work. This requirement must be met even if the appointed person is familiar with the operation of such a machine or a similar one, or has been trained by the manufacturer. Knowledge about the contents of this manual is a pre-

quisite for protecting personnel from hazards and avoiding mistakes so that the machine may be operated in a safe and trouble-free manner. It is recommended that the operator requests proof from the personnel that the contents of the manual have been read and understood.

Safety

2.3 Making changes and modifications to the machine

In order to minimise risks and to ensure optimal performance, it is strictly prohibited to alter, retrofit or modify the machine in any way without the express consent of the manufacturer.

All the pictograms, signs and labels affixed to the

machine must be kept visible, readable and may not be removed. Pictograms, signs and labels that have become damaged or unreadable must be replaced promptly.

2.6 Work safety

Following the safety advice and instructions given in this manual can prevent bodily injury and material damage while working on and with the machine. Failure to observe these instructions can lead to bodily injury and damage to or destruction of the machine. Disregard of the safety advice and instructions given in this manual

as well as the accident prevention regulations and general safety regulations applicable to the operative range of the machine shall release the manufacturer and their authorised representatives from any liability and from all compensation claims.

2.4 Responsibilities of the operator

This manual must be kept in the immediate vicinity of the machine and be accessible at all times to all persons working on or with the machine. The machine may only be operated if it is in proper working order and in safe condition. The general condition of the machine must be controlled and the machine must be inspected for visible defects every time before it is switched on. All instructions in this manual must be strictly followed without reservation.

Besides the safety advice and instructions stated in this manual, it is necessary to consider and observe local

accident prevention regulations, general safety regulations as well as current environmental stipulations that apply to the operational range of the machine. The operator and designated personnel are responsible for the trouble-free operation of the machine as well as for clearly establishing who is in charge of installing, servicing, maintaining and cleaning the machine. Machines, tools and accessories must be kept out of the reach of children.

2.5 Personnel requirements

Only authorised and trained personnel may work on and with the machine. Personnel must be briefed about all functions and potential dangers of the machine. "Specialist staff" is a term that refers to those who – due to their professional training, know-how, experience, and knowledge of relevant regulations – are in a position to assess delegated tasks and recognise potential risks. If the personnel lack the necessary knowledge for working on or with the machine, they must first be trained. Responsibility for working with the machine (installation, service, maintenance, overhaul) must be clearly defined and strictly observed. Only those persons who can be expected to carry out their work reliably may be given permission to work on or with the machine. Personnel

must refrain from working in ways that could harm others, the environment or the machine itself. It is absolutely forbidden for anyone who is under the influence of drugs, alcohol or reaction-impairing medication to work on or with the machine. When appointing personnel to work on the machine, it is necessary to observe all local regulations regarding age and professional status. The user is also responsible for ensuring that unauthorised persons remain at a safe distance from the machine. Personnel are obliged to immediately report any irregularities with the machine that might compromise safety to the operator.

Safety

2.7 Machine hazards

The machine has undergone a hazard analysis. The design and construction of the machine are based on the results of this analysis and correspond to state-of-the-art technology.

The machine is considered operationally safe when used properly. Nevertheless, there are some remaining risks that must be considered.
The machine runs at high electrical voltage.



Warning! Danger! Electric current!

Electrical energy can cause serious bodily injury. Damaged insulation materials or defective individual components can cause a life-threatening electrical shock.

- Before carrying out any maintenance, cleaning and repair work, switch off the machine and ensure that it can not be accidentally switched on again.
- When carrying out any work on the electrical equipment, ensure that the voltage supply is completely isolated.
- Do not remove any safety devices or alter them to prevent them from functioning correctly.



Warning! Risk of injury or death!

When working on or with the machine, the following must be strictly observed:



Persons with long hair who are not wearing a hairnet are not permitted to work on or with the machine!



It is prohibited to wear gloves while working on or with the machine.



It is strictly forbidden to climb onto the machine—danger of falling.

Safety

2.8 Personal protective equipment

When working on or with the machine, the following must always be worn by personnel:



Protective clothes

Sturdy, tight-fitting clothing (tear-resistant, no wide sleeves, no jewellery (rings, bracelets, necklaces, etc.)).



Protective footwear

To protect the feet from heavy falling objects and prevent sliding on slippery floors



Hearing protection

To protect against loss of hearing



Safety glasses

Excellent fit and eye protection are ensured during machining.

2.9 Other risks



Warning! Risk of injury!

Even if the safety measures are complied with, there are still certain associated risks that must be considered when working on the machine:

General safety rules:

- Be wary of sharp edges to avoid cutting yourself, in particular when changing the tooling.
- Risk of injury due to ejected work pieces and parts of work pieces (e.g. branches, chips).
- Risk of injury from workpiece kickback.
- Hearing damage as a result of high noise levels.
- Risk of damage to health from dust especially when working hard woods.
- Risk of injury through being crushed, cut, caught, wound up or sliced.

The following risks can occur with a drilling machine:

- There is a high risk of injury when coming into contact with revolving parts.
- The risk of injury is high when clamping work-pieces.
- Risk of injury from ejected tool pieces (e.g. cutting pieces).
- There is a high risk of injury when changing mortising parts.
- Risk of injury when drilling through the workpiece due to the drill bit emerging from the workpiece.
- The workpiece tipping due to insufficient workpiece support.
- Rotating tool coming in contact with parts of the machine.
(with horizontal drill)

Specifications

3 Technical specifications

3.1 Dimensions and weight

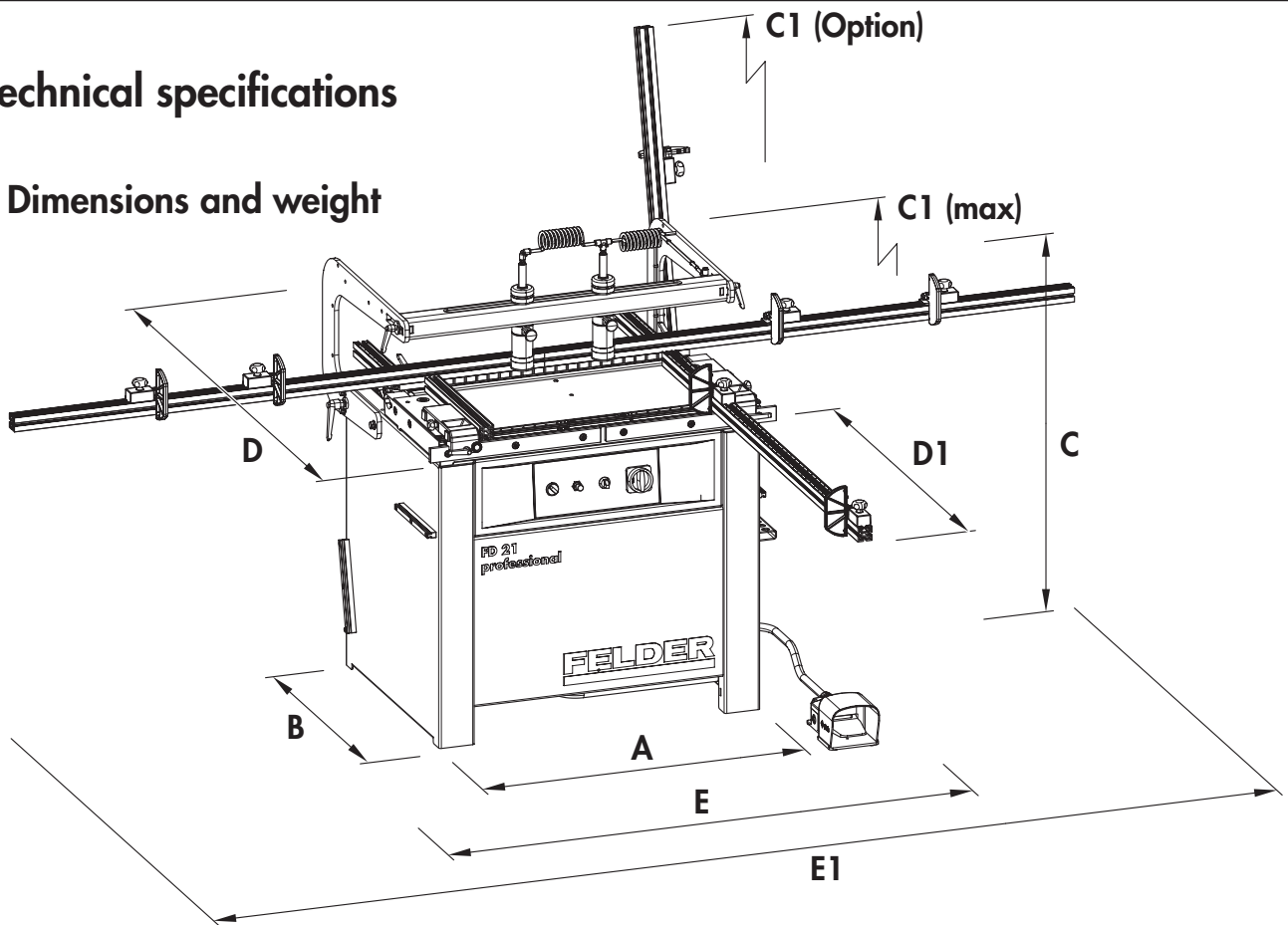


Fig. 3-1: Dimensions

Machine	FD 21 professional
Base dimensions A x B	910 x 720 mm
Total height C	1125 mm
Total height C1 (max. / Option)	1285 mm / 1595 mm
Overall width D (max.)	955 mm
Overall width D1 (Option)	1123 mm
total length E	1078 mm
total length E1 (Option)	3000 mm
Work bench F (Width x Depth)	900 x 380 mm
Net weight *)	340 kg
Operating/room temperature	+10° to +40°C

Machine including packaging	
Length x Width x Height	1200 x 1160 x 1400 mm
Transport width min.	850 (770**) mm
Weight (approx.)*	400 kg
Storage temperature	-10° to +50 °C

*) with average-sized equipment

**) Contact service technician

Specifications

3.2 Electrical connection/Drive motor

The actual values can be found on the data plate.

Drive motor	Three-phase current motor
Motor voltage	3x 400 V
motor frequency	50 Hz
System of protection	IP 55
Motor power S6-40 % *)	1,5 kW

*) S6 = operation under load and intermittent service; 40% = relative operating factor

Electrical connection	
mains voltage according to specification plate	±10%
Safeguarding	see circuit plan
Power supply cord (H07RN-F)	5x2,5 mm ²
Triggering characteristic	C

3.3 Compressed air supply

Hose connection Ø	10 mm / 3/8 "
Supply pressure min./max.	7-12 bar
Compressed air consumption approx.	
foot pedal boring cycle (1 x)	5,9 NI/min
Drill unit tilt (0° → 90° → 0°)	15,5 NI/min
Compressed air – quality:	
Free of oil, condensate and particles according to:	ISO 8573-1 5-4-3

3.4 Tooling / Mortising spindles



Note: We recommend that only original Felder tools are used (Felder catalogue).

Type of tool	Drill bits
Shaft diameter	10 mm
Tool diameter min./max.	4 mm/35 mm*)
Length of the drill max.	85 mm
Mortising spindles	
Number of drilling heads	21
Distance between axis of drills	32 mm
Speed 50/60 Hz	2800/3300 min-1
Max. drilling depth	70 mm
Max. drill height	55 mm

*) Take note of the assembling position! See chapter entitled >Making adjustments and preparations<

Specifications

3.5 Chip extraction

Dust extraction outlet, Ø	80 mm
Air speed	24 m/s
Vacuum min.	470 Pa
Volume flow min.	434 m ³ /h

3.6 Particle emission

The working areas of this machine comply to BGI 739-1 and are classed as dust reduced.

The maximum concentration level of 2 mg/m³ of inhalable dust in the air will not be exceeded.

This only applies if the conditions that are specified in the section >Extraction< are adhered to.

See chapter entitled >Setup and installation<

3.7 Noise emission

The specified values are emission values and therefore do not represent safe workplace values. Even though a relationship exists between particle emission and noise emission levels, an inference cannot be made about whether additional safety measures need to be implemented. Factors which can significantly affect the emission level that presently exists at the workplace include duration of the effect, characteristics of the workspace,

and other ambient influences. The permissible workplace values may also differ from country to country. Nevertheless, this information is provided to help the operator better assess hazards and risks. Depending on the location of the machine and other specific conditions, the actual noise emission values may deviate significantly from the specified values.



Note:

To keep the noise emission as low as possible, always use sharpened tools and operate the machine at the correct speed.

Ear protection must always be worn; however, such protection cannot be considered a substitute for properly sharpened tools.

All values in dB(A) and with a measurement uncertainty factor of 4 dB(A).

	Idle	Working
Sound power level (EN ISO 3746)	89	100
Workplace emissions values (EN ISO 11202)	85	90

Specifications

Transport, packaging and storage

4 Transport, packaging and storage

4.1 Safety instructions



Attention! Risk of material damage!

The machine can be damaged or destroyed if it is subjected to improper handling during transport.



Warning! Risk of injury!

There is a risk of injury as a result of falling parts while transporting, loading or unloading the machine.

For this reason the following safety instructions must be observed:

- Never lift loads over a person.
- Always move the machine with the utmost care and caution.
- Only use suitable lifting accessories and hoisting devices that have a sufficient load-carrying capacity.
- The machine should never be lifted by its protruding parts (e.g. working table).
- Consider the machine's centre of gravity when transporting it (minimise the risk of it tipping over).
- Take measures to prevent the machine from slipping sideways.
- Ropes, belts or other hoisting devices must be equipped with safety hooks.
- Do not use torn or worn ropes.
- Do not use knotted ropes or belts.
- Ensure that ropes and belts do not lie against sharp edges.
- Transport the machine as carefully as possible in order to prevent damage.
- Avoid subjecting the machine to shocks. When transporting the machine overseas, ensure that the packaging is airtight and that a desiccant is added to protect the metal parts against corrosion.

4.2 Transport inspection

Upon arrival, inspect the shipment to ensure that it is complete and has not suffered any damage. If any transport damage is visible, do not accept the delivery or only accept it with reservation. Record the scope of the damage on the transport documents/delivery note. Initiate the complaint process.

For all defects that are not discovered upon delivery, be sure to report them as soon as they are recognised as damage claims must be filed within a certain period, as granted by law.

4.3 Packaging

If no agreement has been made with the supplier to take back the packaging materials, help to protect the environment by reusing the materials or separating them according to type and size for recycling.



Attention! Dispose of the packaging materials in an environmentally friendly way and always in accordance with local waste disposal regulations. If applicable, contract a recycling firm to dispose of the packaging materials.



Note: Help preserve the environment!

Packaging materials are valuable raw materials and in many cases they can be used again or expediently reprocessed or recycled.

Transport, packaging and storage

4.4 Storage

Keep items sealed in their packaging until they are assembled/installed and be sure to observe the stacking and storage symbols on the outside of the packaging.

Store packed items only under the following conditions

- Do not store outdoors.
- Store in a dry and dust-free environment.
- Do not expose to aggressive substances.
- Protect from direct sunlight.
- Avoid subjecting the machine to shocks.
- Storage temperature: -10° to $+50^{\circ}$ C.
- Maximum humidity: 60 %.
- Avoid extreme temperature fluctuations (condensation build-up).
- Apply a coat of oil to all bare machine parts (corrosion protection).
- When storing for longer than 3 months, apply a coat of oil to all bare machine parts (corrosion protection). Regularly check the general condition of all parts and the packaging. If necessary, refresh or re-apply the coat of anti-corrosive agent.
- If the machine is to be stored in a damp environment, it must be sealed in air-tight packaging and protected against corrosion (desiccant).

4.5 Transport

! Attention! Risk of material damage!
Transport the machine according to the enclosed transport and assembly instructions!
Do not lift the machine by its work table, extension frames or handwheels.

i Note:
The transportation width is well under 1000 mm. This makes it possible to transport the machine through doorways.

4.5.1 Transport locking device

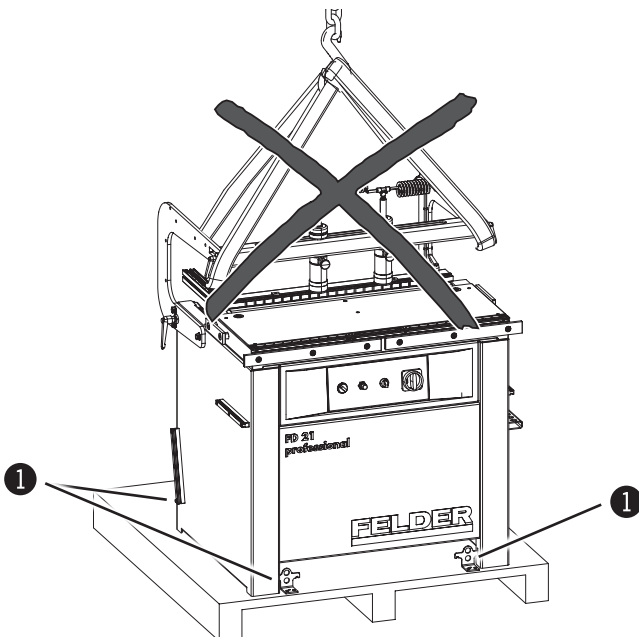


Fig. 4-1: Transport locking device

The machine is partly assembled when delivered on the pallet

The machine is mounted to the pallet with transport brackets.

Only remove the brackets once the machine is to be removed from the pallet.

Never lift the machine by its protruding parts.

The machine must only be moved using a forklift or a pallet truck.

1 Transport brackets

Transport, packaging and storage

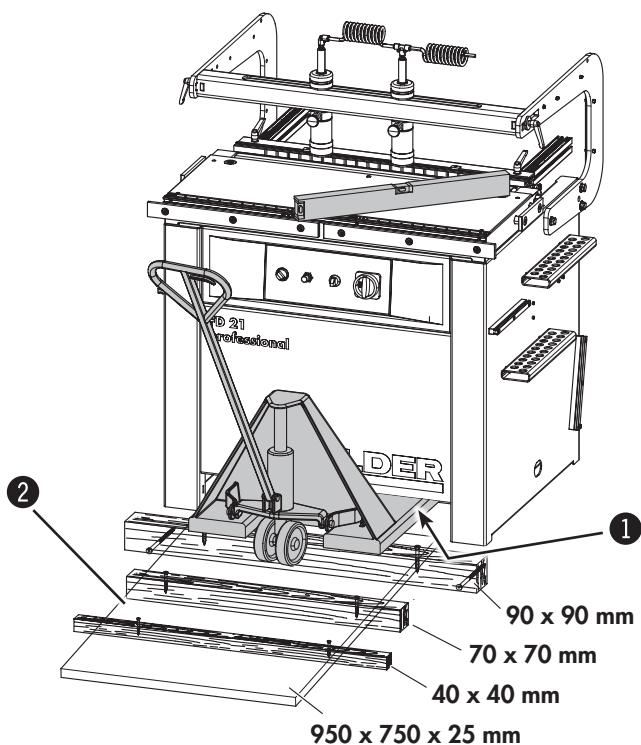
4.5.2 Lifting and transport



Attention! Heavy dead weights can easily cause an injury
Depending on the equipment, two or three additional helpers may be necessary when unloading.



Attention! Risk of material damage! / Danger of tipping
Consider the centre of gravity when hoisting the machine (danger of overturning).



Unloading with a fork carriage truck:

Use a loading platform similar to the one depicted in the picture opposite to unload from the pallet.

1. Push the forks under the gaps in the machine frame.
2. Consider the centre of gravity when hoisting the machine (danger of overturning).
3. Unload the machine from the pallet with the fork carriage truck.

① Cutout hole in the machine frame

② Unloading ramp

Transport with a forklift truck

1. Move the forks of the forklift truck so they fit into the pallets slots.
2. Transport the machine according to the enclosed transport and assembly instructions!

③ Slots in the pallet

Fig. 4-2: Unloading with a fork carriage truck

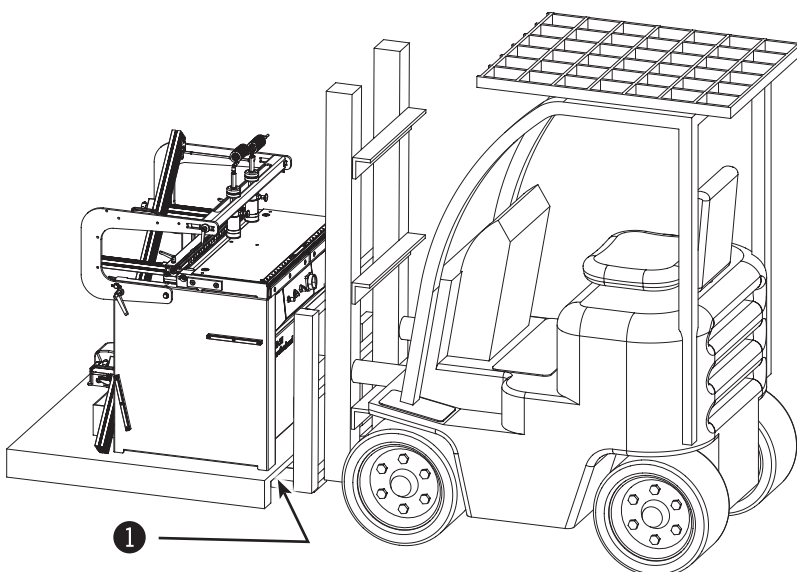


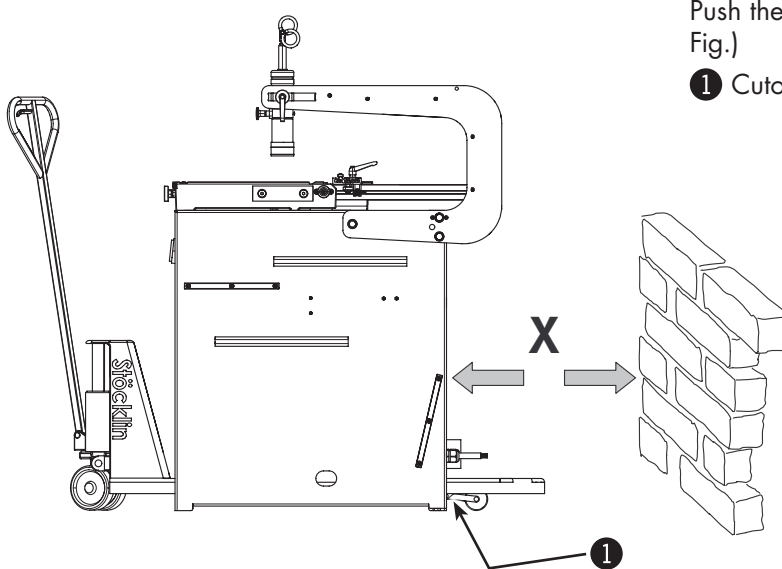
Fig. 4-3: Transport with a forklift truck

Transport, packaging and storage

4.5.3 Transport with a pallet jack



Attention! Heavy dead weights can easily cause an injury / Danger of tipping
Consider the centre of gravity when hoisting the machine (danger of overturning).



Push the forks under the gaps in the machine frame. (see Fig.)

① Cutout hole in the machine frame

Fig. 4-4: Transport with a pallet jack



Note: Ensure that there is sufficient space to work around the machine.

In order to maintain and operate the machine properly, it must be set up at least 500 mm away from the wall, parallel to the work direction (measurement X).

To operate and maintain the machine, leave a min. of 2000 mm space all around the machine.

Setup and installation

5 Setup and installation

5.1 Safety instructions

Warning! Risk of injury! Improper assembly and installation can lead to serious physical injury or equipment damage. For this reason, this work may only be carried out by authorised, trained personnel who are familiar with how to operate the machine and in strict observance of all safety instructions.

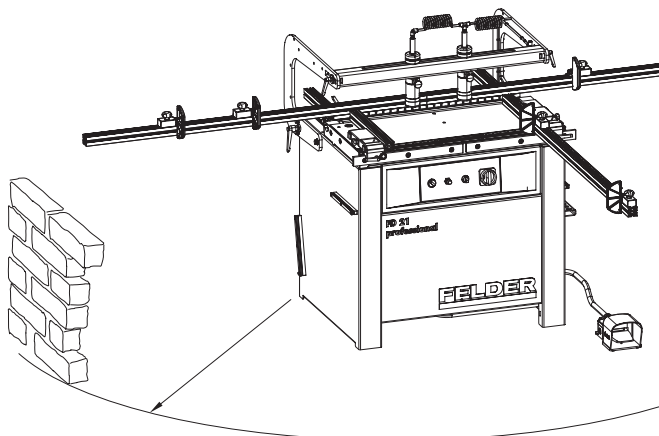
- Before assembling and installing the machine, check to make sure it is complete and in good condition.
- Keep the work area orderly and clean. Components and tools that are not put in their correct place or put away may be the cause of accidents!
- Ensure that there is sufficient space to work around the machine. Ensure there is ample distance between the machine and other solid constructions such as a walls or other machines.
- Install the safety equipment according to the instructions and check that it functions properly.

Warning! Risk of injury! An incomplete, faulty or damaged machine can lead to serious physical injury or equipment damage. Only assemble and install the machine if the machine and its parts are complete and intact.

Warning! Danger! Electric current!
Work on electrical fittings may only be carried out by qualified personnel and in strict observance of the safety instructions.

Attention! Risk of material damage!
Only operate the machine in ambient temperatures from +10°C to +40°C. If the instructions are not followed, damage may occur to bearings.

5.2 Floor space requirement



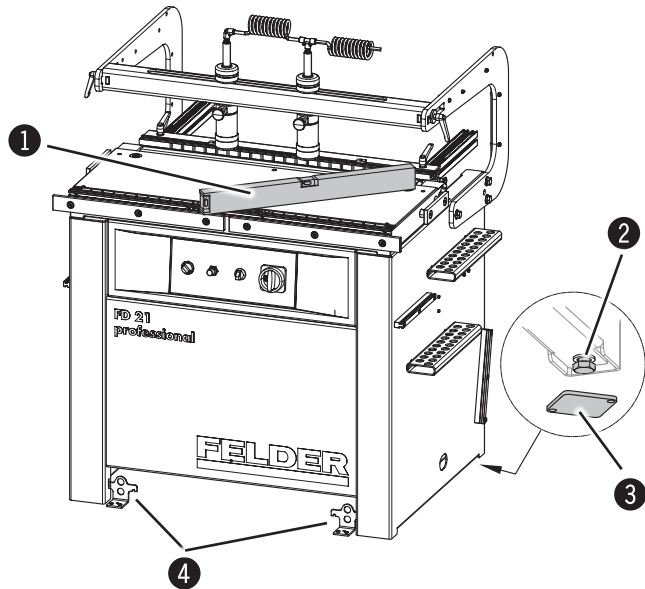
Installation site requirements:

- Operation/room temperature: +10° to +40° C
 - Ensure that the work surface is sufficiently stable and has the proper load-bearing capacity
 - Provide sufficient light at the workstation
 - Ensure there is sufficient clearance for or from neighbouring workstations
- To operate and maintain the machine, leave a min. of 2000 mm space all around the machine.

Fig. 5-1: Space requirements/Measurements

Setup and installation

5.3 Positioning and levelling the machine



1. Transport the machine to the installation site as instructed in the "Transport" chapter and the enclosed transport or installation instructions.
2. Position the machine with the aid of a spirit level to ensure that the machine functions precisely and operates smoothly.
Even out uneven floors by setting the adjusting screw or by bolsterring the machine.
3. If necessary, the machine can be bolted down to the floor with the transport brackets.
4. Remove the oxidation protective layer from all blank machine parts.

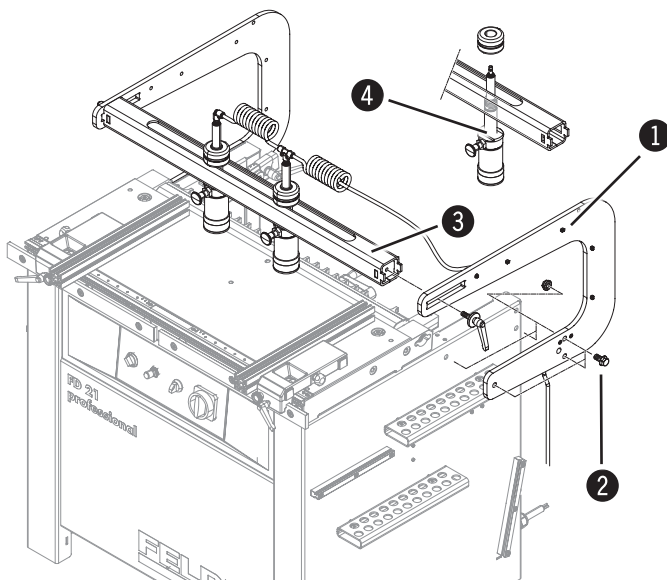
- ① Spirit levels
- ② Adjusting screw
- ③ Steel platen
- ④ Transport brackets

Fig. 5-2: Positioning the machine

5.4 Assembly

- i** Note: Some of the parts mentioned are only dismantled for overseas transport and might therefore already be assembled.

5.4.1 Pneumatic clamp frame / Workpiece clamp



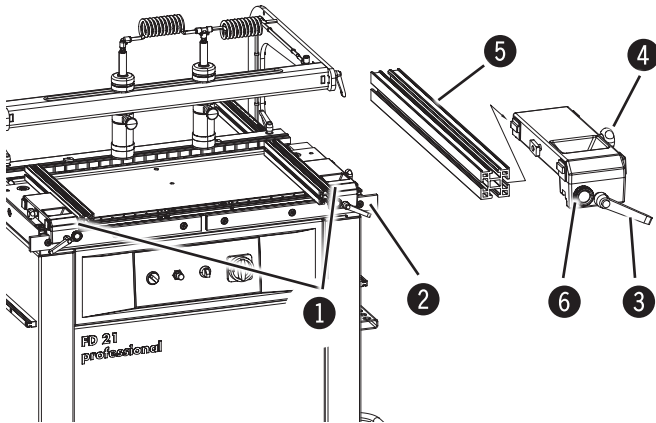
1. Lateral clamp support arms (on both sides)
Screw the outrigger arm using nuts and screws to the machine stands.
 2. Attach all clamps to the lateral support.
—> 2x Standard
—> possibly one clamp additional as an accessory)
 3. Pre-assembled lateral support incl. compressor rods attached using support arms
Affix with the clamping lever.
- ① Lateral clamp support arms
 - ② Socket head cap screw
 - ③ Pneumatic clamp frame
 - ④ Workpiece clamp

Fig. 5-3: Pneumatic clamp frame / Workpiece clamp

Setup and installation

5.4.2 Lateral stops

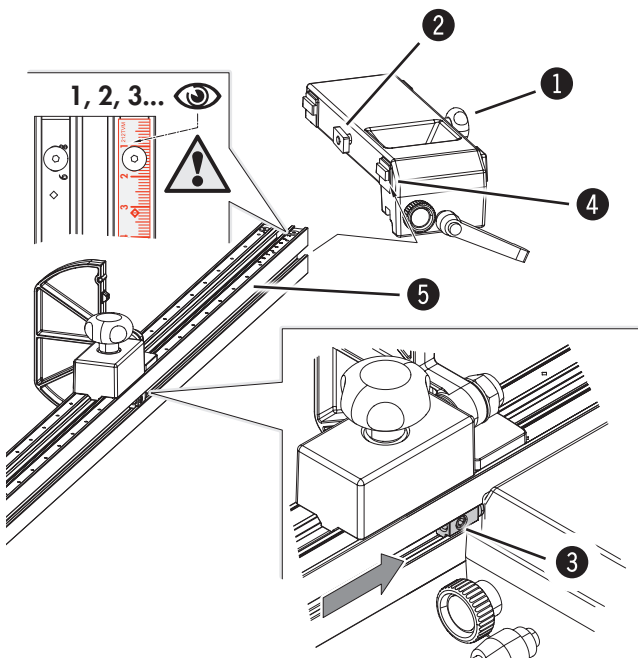
! Attention! Risk of material damage! locking (Option: quick adjustment)
Loosen the thumb screws from the locking.



1. Place lateral stops in their running groove
 2. Tighten the clamping lever
 3. Loosen the thumb screw.
 4. Assemble and clamp the fence guide.
- ① Lateral stops
 - ② Guide
 - ③ Clamping lever
 - ④ Thumb screw
 - ⑤ Fence guide
 - ⑥ locking (Option: quick adjustment)

Fig. 5-4: Lateral stops

5.4.3 Mounting the stop extension onto the lateral clamps



1. Loosen the thumb screw. Remove the fence guide. (see previous description)
 2. Mount lateral stop extension fence onto the lateral clamps
 3. Stop extension: should be inserted far enough to reach endstops.
 4. Screw the thumb screw in tightly, Tighten the clamping lever
- ① Thumb screw
 - ② U-clamp
 - ③ Positioning pin
 - ④ Guide
 - ⑤ Stop extension

Fig. 5-5: Stop extension

Setup and installation

5.4.4 Mounting the extension as depth stop

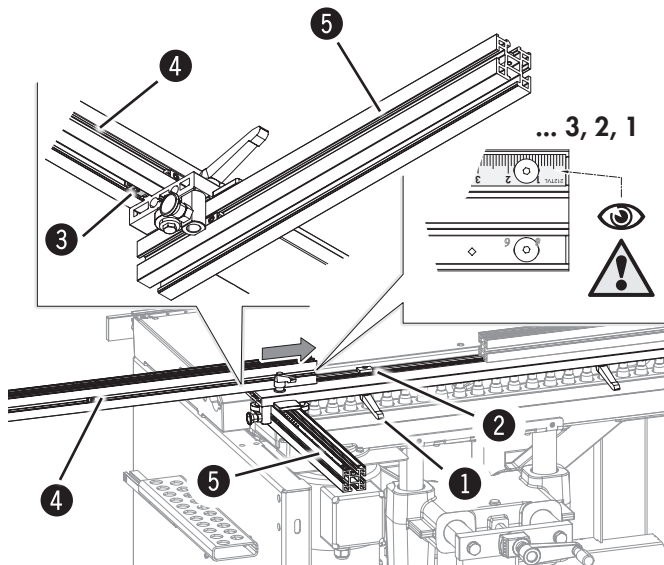


Fig. 5-6: Stop extension

Position the vertical borer

See chapter entitled

>Making adjustments and preparations< / > Drill unit tilt<

1. Release the clamping lever.
2. Mount lateral stop extension fence onto the lateral clamps
3. Stop extension: is pulled fully to the front (up to stop)
4. Tighten the clamping lever
5. The second stop extension should be mounted on the opposite side in the same way

- ① Single-hand clamping lever
- ② U-clamp
- ③ Fence screw
- ④ Stop extension
- ⑤ Depth stop profile

5.4.5 Lateral stops digital

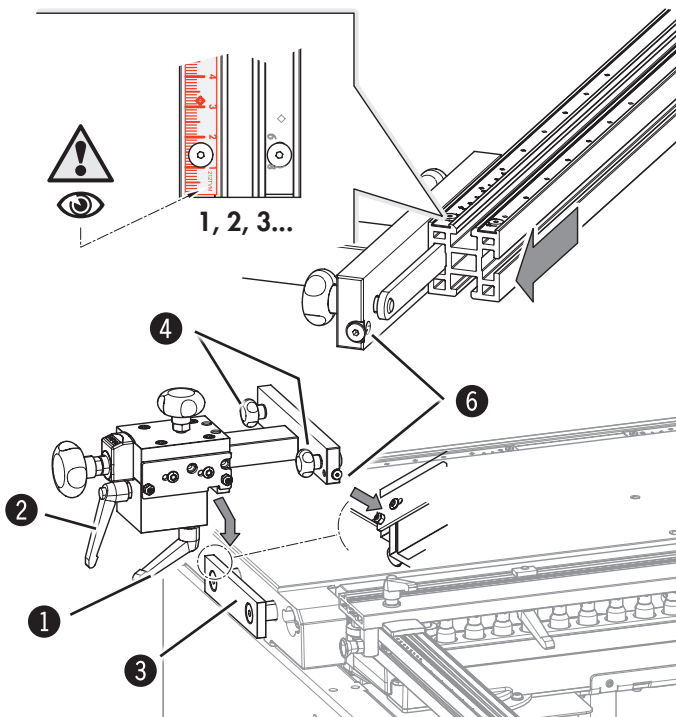


Fig. 5-7: Assembly instructions

1. Assembly of the coupler system:
See individual assembly instructions
2. Thread the side stop into the machine table.
is pulled fully to the front (up to stop)
3. Secure clamping levers 1 and 2.
4. Loosen the thumb screws.
5. Mount lateral stop extension fence onto the lateral clamps
6. Stop extension:
is pulled fully to the front (up to stop)
7. Tighten the thumb screws.

- ① ② Single-hand clamping lever
- ③ coupling system
- ④ Thumb screws
- ⑤ Stop extension
- ⑥ Fence screw

Setup and installation

5.5 Chip extraction

Warning! Risk of injury! The dust extraction hose must be non-flammable and must not conduct electricity! For this reason, only use genuine FELDER dust extraction hoses!

i Note: As a rule, all units must be vacuumed during use. A time delayed socket is available as an accessory.

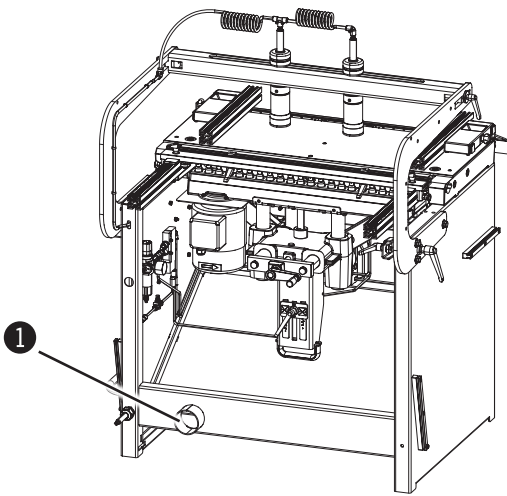


Fig. 5-8: Extractor port

① Extractor port diameter: 80 mm

- In addition, the vacuum performance must be sufficient to achieve the required negative pressures and an air speed of 20 m/s at the connector. (see "Technical data")
- Check the air speed before putting the machine into operation for the first time and after essential changes.
- The dust extractor setup must be controlled before the machine is put into operation for the first time. Check for obvious defects on a daily basis and the efficiency on a monthly basis.
- The dust extractor must be connected to the machine in such a manner that it runs in unison with the machine.
- The dust extraction hoses must be electrically conductive and grounded to prevent electrostatic build up.
- Use dust extractors with reduced dust emission to clean dust from the machine.

5.6 Compressed air supply connection

! Attention! Risk of material damage!
Only use connection socket DN 7,2 to connect the machine to the air supply
The factory-specified operation pressure must only be altered on the instructions of the service department!

Warning! Risk of injury! Check switch position–Drill unit tilt: 90°
See chapter entitled >7.6 Drill unit tilt<

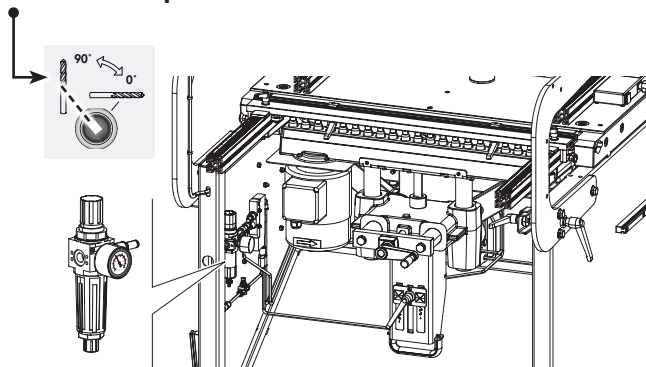


Fig. 5-9: Compressed air supply connection

The connection between the machine and the air pressure system is on the rear using a fast connection with a DN 7.2 type connector. The pressurised air supply is equipped with a regulator, filter and a water separator unit. Set the pressure to 6 bar on the filter pressure controller. (= Manufacturer's settings)

Setup and installation

5.7 Electrical connection



Warning! Danger! Electric current!

Work on electrical fittings may only be carried out by qualified personnel and in strict observance of the safety instructions.

Checking the loop impedance and the suitability of the overcurrent protective device must take place at the location where the machine is to be commissioned!



Attention! Risk of material damage!

Before hooking up the machine to the power supply, compare the specifications on the data plate with those of the electrical network. Only hook up the machine if the two sets of data correspond to each other. The electrical outlet must have the appropriate socket (for a three-phase alternating current motor, CEE).



Note: The machine's circuit box may only be opened with the express consent of the FELDER service team. Violating this stipulation shall render the right to make claims under the warranty null and void.



Attention! Risk of material damage!

The machine must be secured with an automatic fuse.

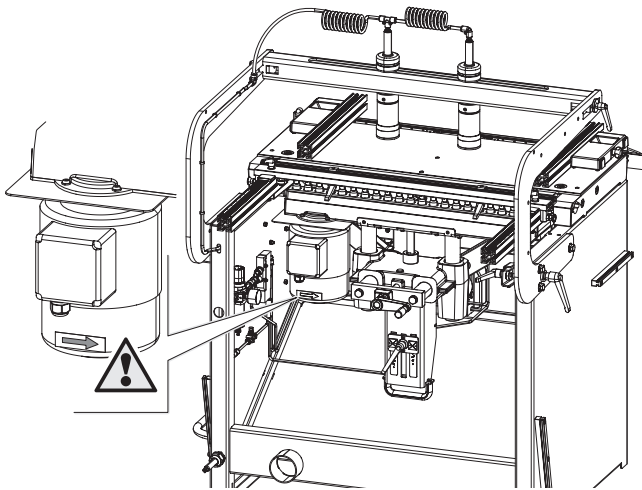


Fig. 5-10: Direction of the Motor rotation

1. Connect the plug to the power supply.
2. Switch on and let the machine run briefly.
See chapter entitled: >Operation<
3. While the motor is running, check its direction of rotation.
4. Should a change in the direction of rotation be necessary, switch the two phases on the power cable.

Electrical connection requirements

- The machine must be earthed with electrical conductors.
- The voltage fluctuations in the mains supply may not exceed $\pm 10\%$.
- The switch cabinet must be fitted with a circuit breaker (DIN VDE 0641).
Number of terminals: 3 (three phase current motors)
- The unit must only be used in TN-Systems (neutral connected to earth)! (only 3x400V)
- Power supply cable H07RN-F at least 5x 2,5 (rotary-current motor) or 3x 2,5 (alternating-current motor).
- Safeguarding/Power supply cord:
see "Technical data"
- The power supply cable must be protected against damage (e.g. armoured conduit).
- The power supply cable must be laid in such a way so it does not overbend or chafe and there is no risk of tripping over it.



Note: The machine's power cable is delivered with an open cable end, i.e. without a plug.

The operator is responsible for fitting the machine's power cable with a suitable plug in accordance with any country's specific regulations.

Assembly

6 Assembly

6.1 Overview

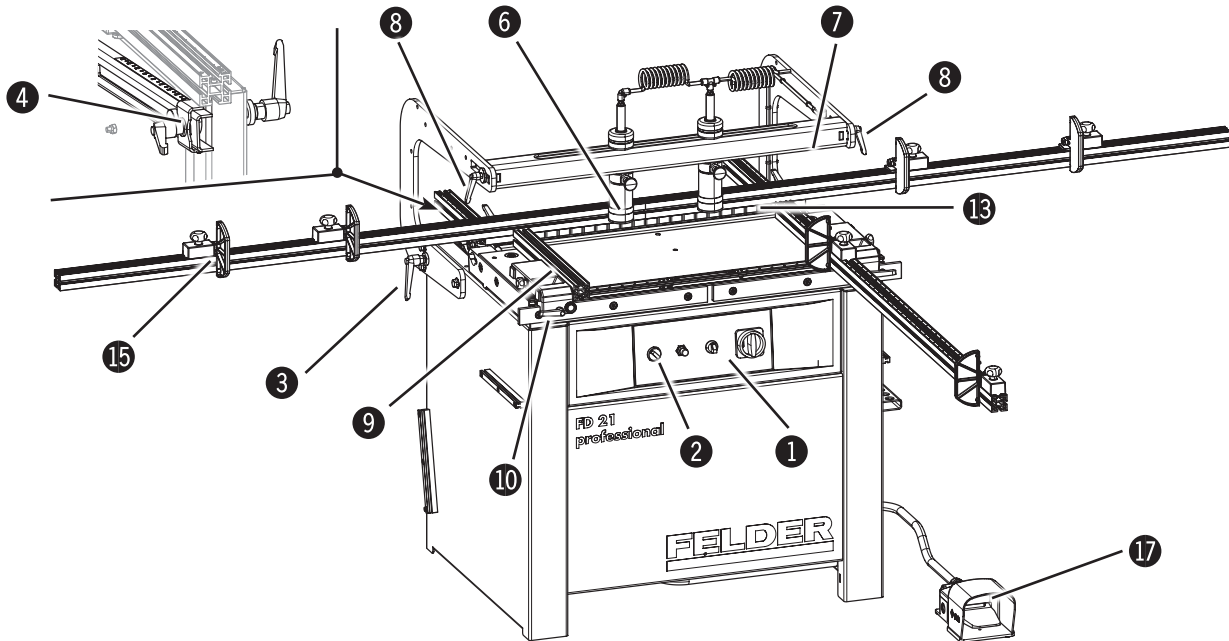
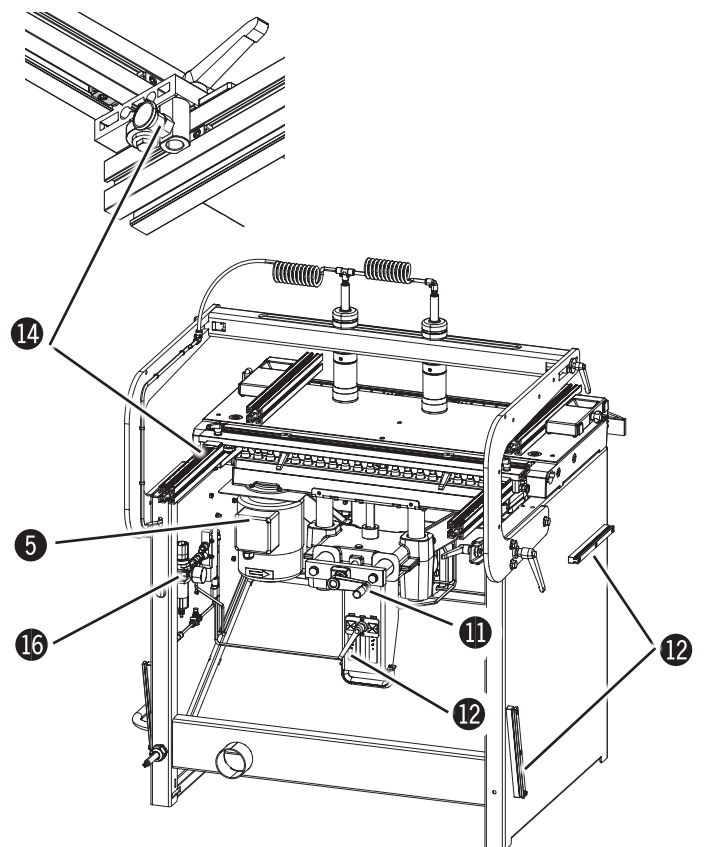


Fig. 6-1: Operation and display elements

- ① Control panel
- ② Switch: Drill unit tilt
- ③ Single-hand clamping lever: Drill unit tilt
- ④ Tilt stop (0°–90°)
- ⑤ Drill head (incl. Motor)
- ⑥ Workpiece clamp
- ⑦ Lateral clamp support
- ⑧ Single-hand clamping lever: Lateral clamp support
- ⑨ Lateral stops
- ⑩ Single-hand clamping lever: Lateral stops
- ⑪ Hand wheel: Mortising height adjustment (incl. display)
- ⑫ Mortising depth adjustment (incl. display)
- ⑬ Depth stop
- ⑭ Depth stop (e.g.: for 37mm line boring)
- ⑮ Fence extensions (incl. two crosscut stops)
- ⑯ Pressure connection point including regulator, filter and water blocker
- ⑰ Foot pedal for drill cycle
- ⑱ Fence sockets



Assembly

6.2 Data plate

A-6060 HALL in Tirol, KR-Felder-Straße 1, Tirol, Austria, Tel. +43 (0) 5223 58500, 43 (0) 5223 56130, info@felder.at www.felder.at		FELDER	
TYPE : XXXXXXXX		①	
NR.: XXX-XXX/XX-XX		②	
③ V: 400	PH: 3	HZ: 50	A: X.X
④ KW: X.X S1	XXXXXXXXXX		
Baujahr / year of construction / ANNEE DE CON			⑤ 20xx

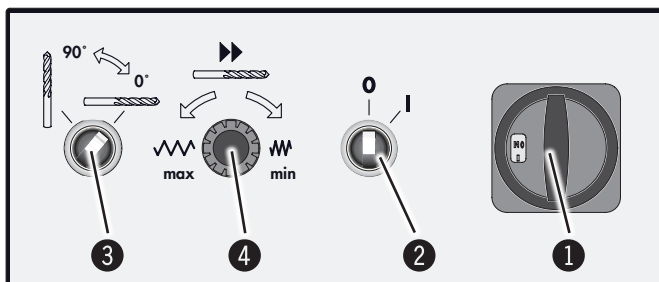
The data plate can be found on the right-hand side of the machine as illustrated.

The data plate displays the following specifications:

- ① Series number / Model designation
- ② Machine number
- ③ Voltage / Phases / Frequency
- ④ Power / Power supply
- ⑤ Year of construction
- ⑥ Manufacturer information

Fig. 6-2: Data plate

6.3 Operation and display elements



- ① Main switch
- Mains voltage off
- I Mains voltage on
- ② Mode switch – Spindle motor
- Spindle does not turn
- I Spindle motor: engages (Foot pedal for drill cycle)
- ③ Switch: Drill unit tilt
- ④ Regulating operating speed of drill unit

Fig. 6-3: Operation and display elements

i Note: The drill cycle is ended by releasing the foot pedal
See chapter entitled >Operation< / > Mortising work sequence<

Assembly

6.4 Accessories



Fig. 6-4: Quick-change chucks

i **Note: Further information**
See chapter entitled >Making adjustments and preparations< and >Operation<
See assembly instructions

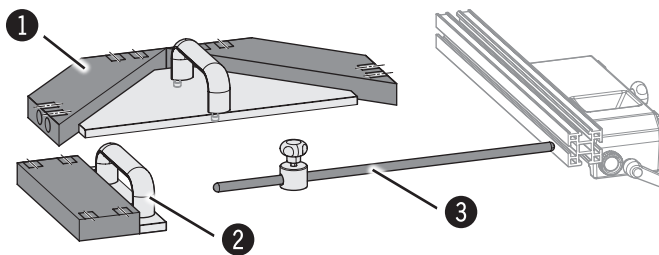


Fig. 6-5: mitre fence / Middle strip

Quick-change chucks
(Order no. 15.0.310)

Supplied with 5 standard pieces

mitre fence / Middle strip
(Order no. 432-311)

Adjustment gauge
(Order no. 432-317)

Lateral stops digital
(Order no. 432-315)

- ① mitre fence
- ② Middle strip
- ③ Adjustment gauge
- ④ Lateral stop digital

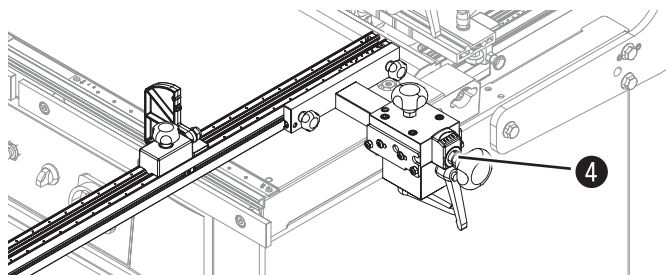


Fig. 6-6: Lateral stops digital

6.4.1 Additional pneumatic clamp

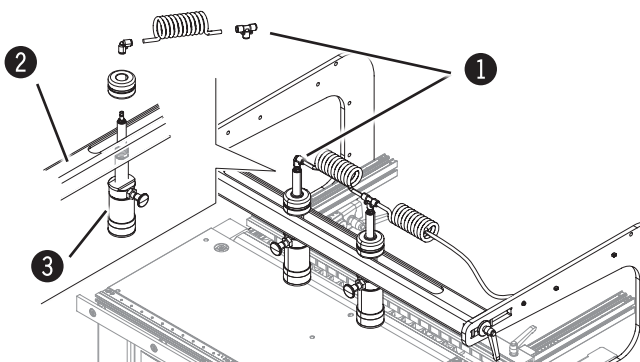


Fig. 6-7: Additional pneumatic clamp

Additional pneumatic clamp
(Order no. 432-310).

Assembly:

- Disconnect the machine from the mains power supply
- Remove the machine from the compressed air supply system and vent the remaining compressed air.
- Compressed air supply connection: remove left clamp
- Mount standard T piece
- Pneumatic hose mount connector
- Workpiece clamp: fix on the cross bar
- Pneumatic hose mount new clamp

- ① T-Piece
- ② Pneumatic clamp frame
- ③ Workpiece clamp

Assembly

6.4.2 Tool holder + Fence sockets

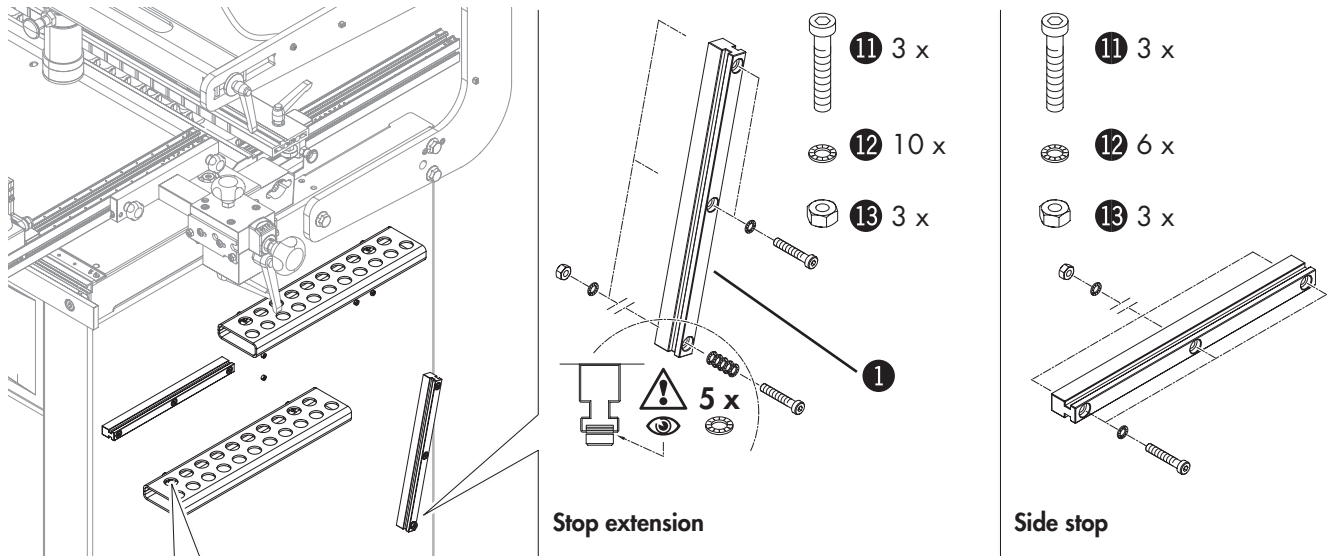


Fig. 6-9: Fence sockets

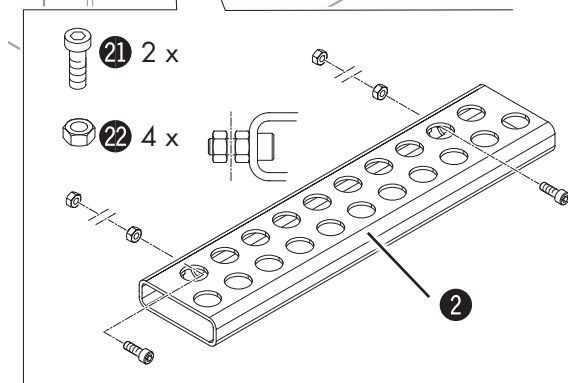


Fig. 6-8: Tool holder

Tool holder + Fence sockets
(Order no. 432-316)

Assembly:

Required tools:

- Allen key 3 + 5 mm
- Spanner SW 7 + 10 mm

1 Fence sockets

- 11 Allen screws M4 x 35 mm
- 12 Shims (6 x)
- 13 Hexagon nut M4 (3 x)

2 Tool holder

- 21 Allen screws M6 x 16 mm
- 22 Hexagon nut M6 (4 x)

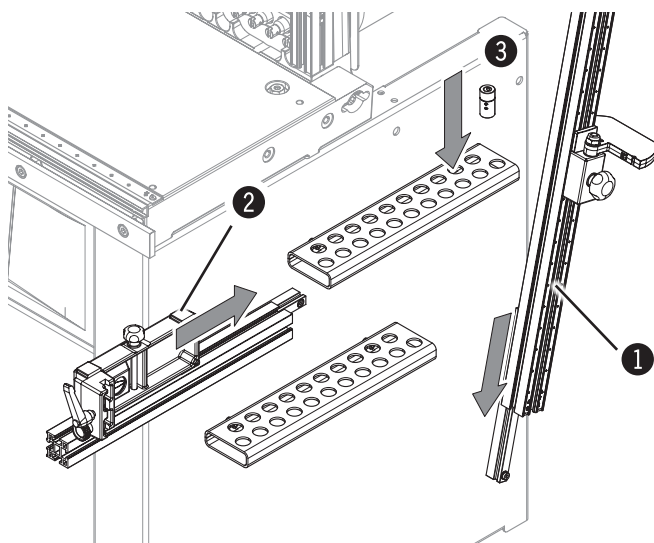


Fig. 6-10: Applications

Applications

- 1 Stop extension
- 2 Side stop
- 3 Quick-change chucks

Making adjustments and preparations

7 Making adjustments and preparations

7.1 Safety instructions

Warning! Risk of injury! Improper adjustment and setup work can lead to serious physical injury or material damage. For this reason, this work may only be carried out by authorised, trained personnel who are familiar with how to operate the machine and in strict observance of all safety instructions.

- Before beginning any maintenance work on the machine, switch it off and secure it against accidentally being switched on again.
- Before commencing any work with the machine, inspect it to ensure that it is complete and in technically good condition.
- Ensure that there is sufficient space to work around the machine.
- Keep the work area orderly and clean. Components and tools that are not put in their correct place or put away may be the cause of accidents!
- Install the safety equipment according to the instructions and check that it functions properly.

Warning! Danger! Electric current! Work on electrical fittings may only be carried out by qualified personnel and in strict observance of the safety instructions.

7.2 Clamping tools in the quick-change chuck

i Note: Standard right-hand side cutting borers have a black main body, left-hand side cutting borers have a red main body

i Note: We recommend that only original Felder tools are used (Felder catalogue). allowed boring tools: See technical data

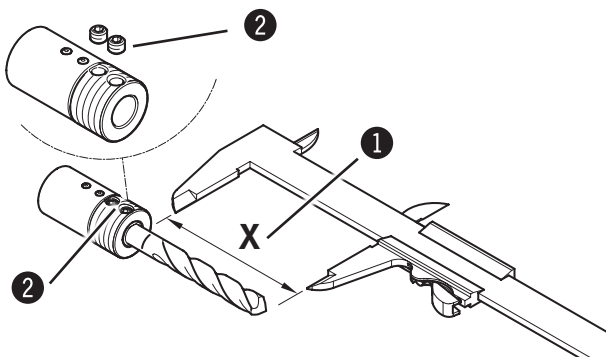


Fig. 7-1: clamp the boring tools

- ① Mortising depth
- ② Clamping screws

Before securing the drill bit, the following must be taken into account:

- Drill bits should be in good condition
- Pay close attention to the minimum and maximum drill bit diameters
- Switch the machine off and ensure that it cannot be switched on again
- Loosen the clamping screws
- Insert tool for desired drilling size
- Tighten the clamping screws

Making adjustments and preparations

7.3 Clamping the quick-change chuck with tools to the spindle

i Note: Standard right-hand side cutting borers have a black main body, left-hand side cutting borers have a red main body.

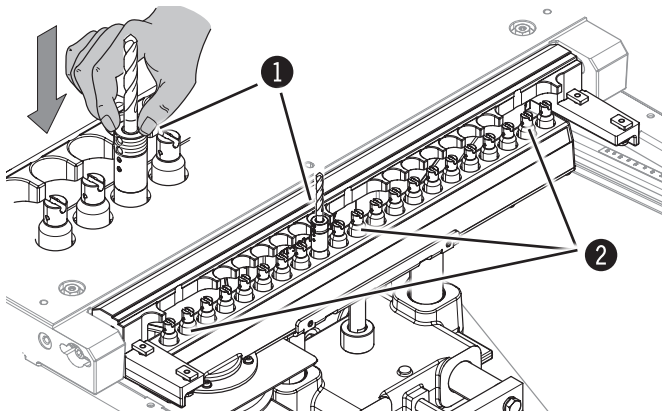


Fig. 7-2: Quick-change chucks

Before attaching the drill to the spindle, the rotation direction must be taken into account. Clamp the rightside with only R marked pieces and clamp the leftside with only L marked pieces.

- Quick-change chucks: incl. pre-assembled drill bit to be mounted onto the spindle
- Ensure that the chuck engages and snaps in completely

- ① Quick-change chucks
- ② Cabinet hinges drill (Option)

⚠ Warning! Risk of injury! / Risk of material damage!
Remove all the unused drill bits!

7.4 Mortising height adjustment / Mortising depth adjustment

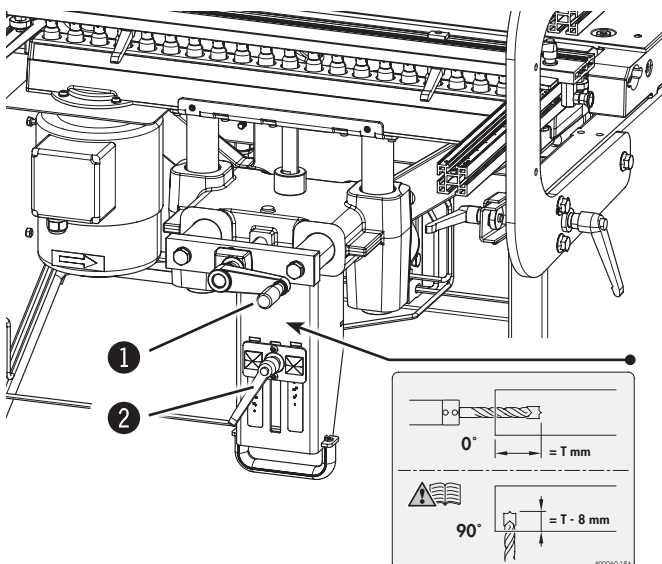


Fig. 7-3: Mortising height adjustment

- Switch off the machine.
- Note: In order to balance the nuts, always carry out height adjustments from the bottom to the top!**

Mortising height adjustment

- Height adjustment: perform with hand lever at the spindle head.
- read the desired height from the mechanical counter.

Mortising depth adjustment

- Release the clamping lever.
- control the adjustment with the reading magnifier.
- Clamp the clamping lever.

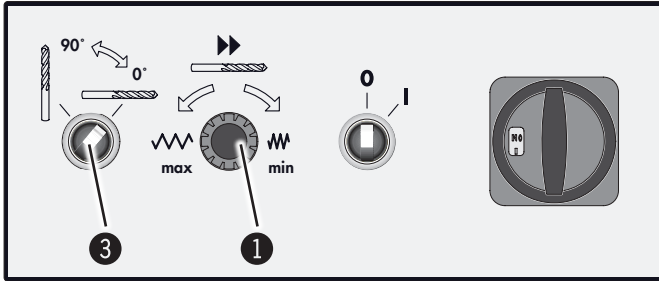
- ① Hand wheel: Mortising height adjustment
- ② Single-hand clamping lever

i Note: Because of different tool lengths, read the different bore lengths from the different scales

horizontal boring:	scale value = mortising depth
vertical boring:	scale value = mortising depth minus 8 mm

Making adjustments and preparations

7.5 Setting the feed rate



1. Switch off the machine.
2. Remove tools and stops from the work bench.
3. Switch machine on.
4. During forward movement adjust the rotary switch to the desired feed rate
the feed rate is independent of the tool diameter, number of tools and the material

① Turn switch for feed rate

Fig. 7-4: Setting the feed rate

7.6 Drill unit tilt

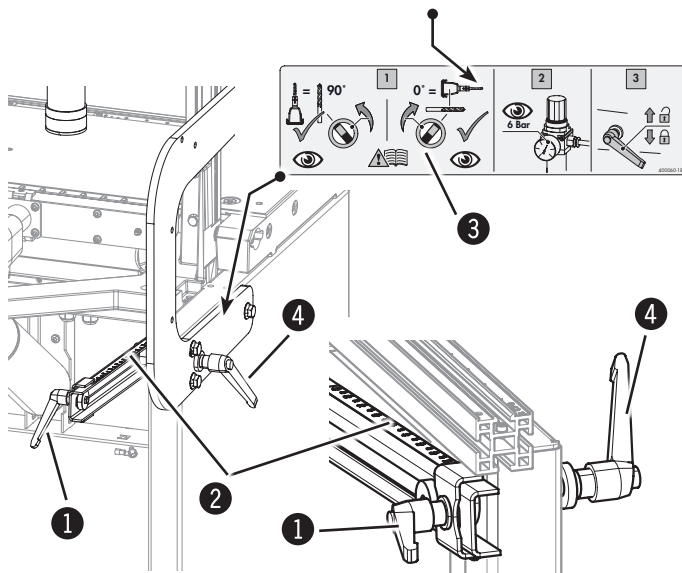


Warning! danger of trapping / Risk of injury!

Keep hands away from the boring unit during tilting

Beware of any possible collisions with stops and work pieces!

Prior tilting: Check switch position (see sticker)
with horizontal drill: 0° | with vertical drill: 90°



Adjusting the angle:

1. Switch off the machine.
2. Set the angle between 90° and 0° on the scale.
3. Single-hand clamp levers tighten drill unit tilt.

Drill unit tilt:

Execute the following instructions exactly (sequence)!

1. Prior tilting: Check switch position (Drill unit tilt)
2. Ensure that air pressure amounting to 6 bar is present in the machine.
3. Loosen the clamping lever.
4. Turn the switch on the control panel
5. The unit tilts up to the mechanical positive stop.
6. Clamp the clamping lever.

The position of the boring unit can be read from the tilt scale

Fig. 7-5: Drill unit tilt

- ① Clamping lever–Drill unit tilt
- ② Scale
- ③ Switch–Drill unit tilt
- ④ Clamping lever



Note:

When positioning the unit for vertical mortising, use the scale value from the mortising depth scale minus 8 mm. See chapter entitled >Mortising height adjustment / Mortising depth adjustment<

Making adjustments and preparations

7.7 Lateral stops

i Note:
every marked mortising position on the scale corresponds to its mortising centre.

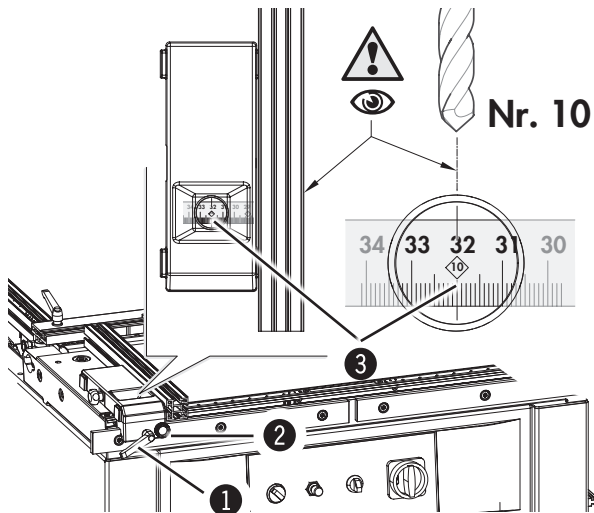


Fig. 7-6: Lateral stops

1. Switch off the machine.
2. Loosen the thumb screws from the locking.
3. Open cam lever and move fence.
4. Side measurement: is read from the magnifying lens.
5. Tighten side stop single-hand clamp lever.

① Single-hand clamping lever

② Thumb screw

③ Scale / Lens

Option: quick adjustment

Preparations:

1. Loosen the clamping screw.
2. Lock pins: Move to the desired position
3. Tighten the clamping screw.
4. Fine adjustment: Correct the misadjustment with the setting screw

Calibrate the fence:

5. Loosen the thumb screws from the locking.
6. Open cam lever and move fence.
 - Push to the front over the fence
 - Push in thumb screw 2.
 - Push to the left until it stops/until it reached the fence...
7. Tighten side stop single-hand clamp lever.

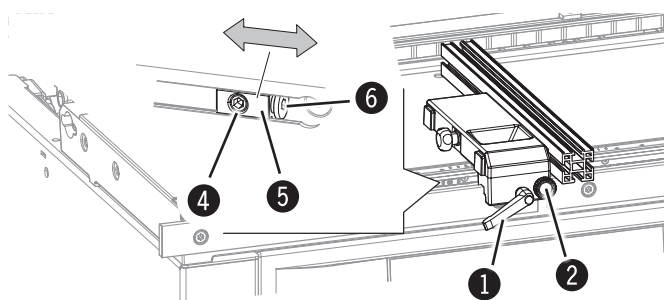


Fig. 7-7: Option: quick adjustment

④ Clamping screw

⑤ Lock pins

⑥ Adjusting screw

7.8 Depth stop (with horizontal drill)

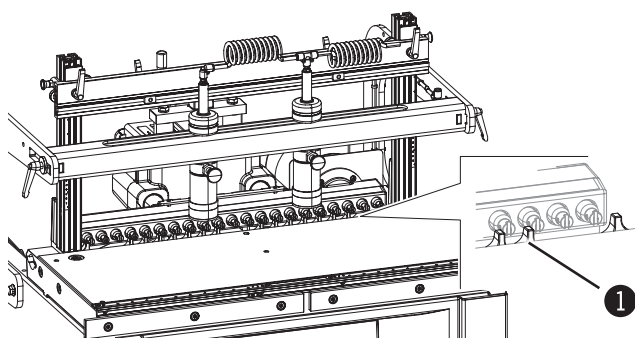


Fig. 7-8: Depth stop (Horizontal drilling)

Fix the workpiece against the lower stop.

① Depth stop

Making adjustments and preparations

7.9 Depth stop (with vertical drill)

i Note: with vertical drill: Mortising height adjustment = 0 mm
See chapter entitled >Mortising height adjustment / Mortising depth adjustment<

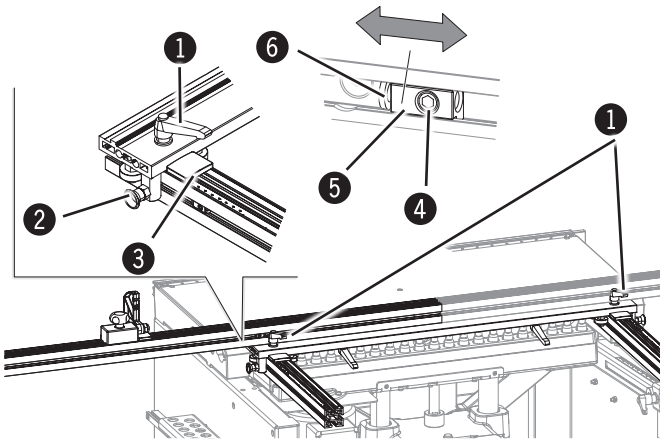


Fig. 7-9: Depth stop (Vertical drilling)

- ① Single-hand clamping lever
- ② Thumb screw
- ③ Scale / Lens
- ④ Setscrew
- ⑤ Lock pins
- ⑥ Adjusting screw

1. Switch off the machine.
2. Release the clamping lever (on both sides)
3. Loosen the thumb screws from the locking.
4. Depth stop: is positioned to the required amount (is read from the magnifying lens)
5. Tighten the clamping lever (on both sides)

quick adjustment

1. Loosen the setscrews (on both sides!).
2. Depth stop + Lock pins:
Move to the desired position
3. Pull both threaded pins tight (on both sides!).
4. Fine adjustment: Correct the misadjustment with the setting screw

7.10 Crosscut stop (on the stop extension)

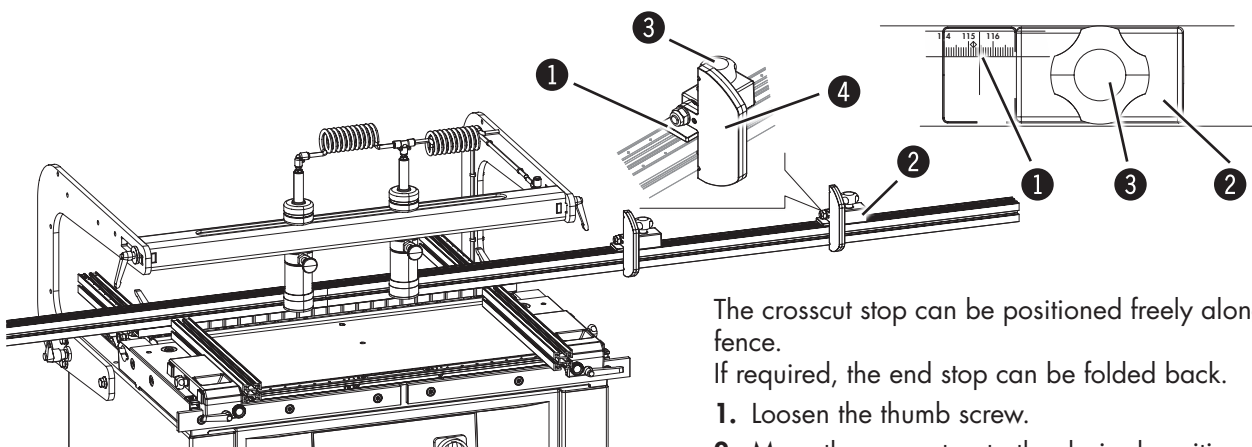


Fig. 7-10: Crosscut stop (Stop extension)

- ① Scale / Lens
- ② Crosscut stop
- ③ Thumb screw
- ④ End stop

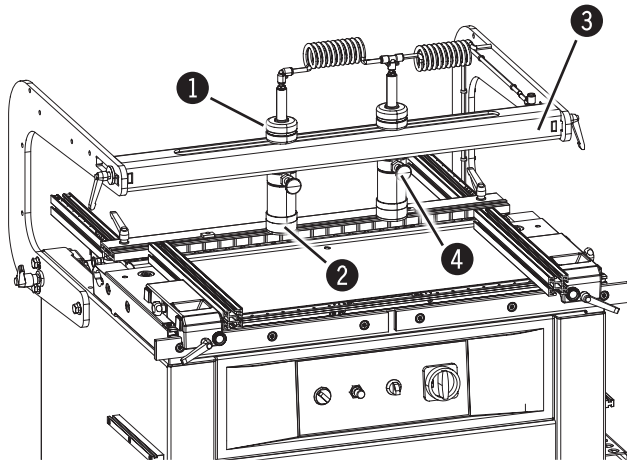
The crosscut stop can be positioned freely along the fence.

If required, the end stop can be folded back.

1. Loosen the thumb screw.
2. Move the cross stop to the desired position. The measurement (rip capacity) is read from the magnifying lens.
3. Tighten the thumb screw.

Making adjustments and preparations

7.11 Workpiece clamp

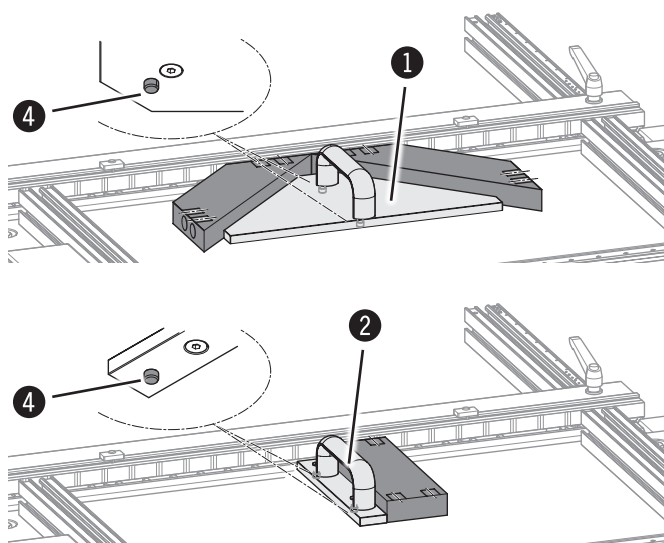


1. Switch off the machine.
2. attach the tool to the required stop.
3. Loosen clamping bolt.
4. Workpiece clamp: is brought sideways on the pneumatic clamp into the desired position.
5. Tighten clamping bolt.
6. By pulling the knob up to the height clamp, the clamp support automatically moves downwards to the tool.

- ① Clamping bolt
- ② Workpiece clamp
- ③ Pneumatic clamp frame Workpiece clamp
- ④ Height adjustment lever

Fig. 7-11: Workpiece clamp

7.12 Accessories (mitre fence / Middle strip / Adjustment gauge)



mitre fence / Middle strip

The 90° fence and the 45° mitre fence offer comfort and precision with every application.

Adjustment gauge

Gauge for the transferring of the distance of the side fences for simple, symmetrical adjustment.

- Switch off the machine.
- Remove lateral stops.
- Accessories: inserted into positioning holes on cast iron table.

- ① mitre fence
- ② Middle strip
- ③ Adjustment gauge
- ④ Positioning pin

Fig. 7-12: mitre fence / Middle strip

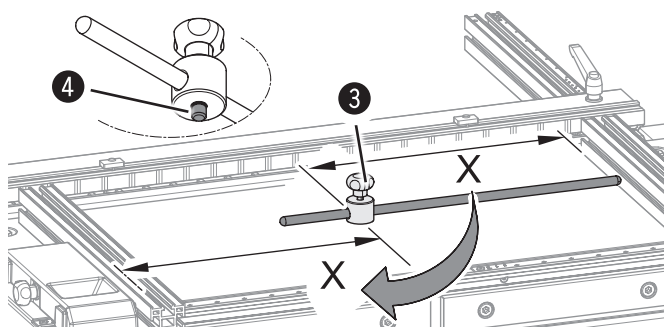


Fig. 7-13: Adjustment gauge

Operation

8 Operation

8.1 Safety instructions



Warning! Risk of injury! Improper operation may lead to severe physical injury or material damage. For this reason, this work may only be carried out by authorised, trained personnel who are familiar with how to operate the machine and in strict observance of all safety instructions.

Before starting work:

- Before commencing any work with the machine, inspect it to ensure that it is complete and in technically good condition.
- Ensure that there is sufficient space to work around the machine.
- Keep the work area orderly and clean. Components and tools that are not put in their correct place or put away may be the cause of accidents!
- Ensure all compressor rods are correctly positioned in order to securely clamp the workpiece.
- Check that all borers are sharp.
- Install the dust extraction system according to the instructions and test its function.
- Only process work pieces that can be securely positioned.
- Carefully inspect workpieces for foreign matter (nails, screws) which might impair processing.
- Support any work pieces that are longer than the machine table, (e.g. rolling trestles).
- Check that the whole tool is mounted correctly.
- Ensure that the tool turns freely.
- Heed the correct turn direction of the borer motor.
- Before switching on the machine, always check to make sure that there are no other persons in the immediate vicinity of the machine.

During operation:

- Never place your hands on the workpiece. Keep hands away from the individual borer screws and tools.
- When changing to another workpiece or if a malfunction occurs, first switch off the machine and then secure it against being switched on again accidentally.
- Do not switch off, circumvent or decommission protective and safety devices during operation.
- Risk of injury due to ejected work pieces and parts of work pieces (e.g. branches, chips).

When working on or with the machine, the following must be strictly observed:

- Persons with long hair who are not wearing a hairnet are not permitted to work on or with the machine!
- It is prohibited to wear gloves while working on or with the machine.

When working on or with the machine, the following must always be worn by personnel:

- Sturdy, tight-fitting clothing (tear-resistant, no wide sleeves, no jewellery (rings, bracelets, necklaces, etc.)).
- Protective footwear—To protect the feet from heavy falling objects and prevent sliding on slippery floors
- Hearing protection—To protect against loss of hearing



Note: Accessories:

Support long workpieces with additional surface equipment. (e.g. Table extensions, roll supports)



Attention! Risk of material damage!

Only operate the machine in ambient temperatures from +10°C to +40°C. If the instructions are not followed, damage may occur to bearings.

Operation

8.2 Drilling—Authorised and prohibited work techniques

i Note: A workpiece lying on the mortising table is held in place by an eccentric clamp and can only be machined on the front side.

Only the following working techniques are permitted on the drilling unit:

- Boring on the narrow side of the workpiece
- Boring on the surface of the workpiece
- Drilling dowels at fixed distances

It is absolutely forbidden to perform the following working techniques on the drilling unit:

- Using abrasive wheels of any kind
- Moulding with moulding tools

8.3 Workpiece dimensions

Width	min. 60 mm
	over 800 mm: only with a roller unit or second person
Depth	min. 60 mm
Thickness	min. 8 mm, max. 65 mm

8.4 Switching on the machine / Switching off the machine / Emergency-stop



Warning! Risk of injury due to insufficient preparation!

It is only permitted to switch on the machine if, for the work at hand, the required preconditions are fulfilled and any preliminary work is completed. Therefore, the adjusting, fitting and operating instructions (see the corresponding chapters) must be read before switching on the machine.

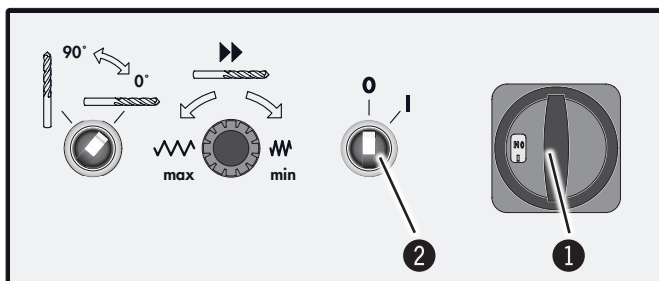


Fig. 8-1: Control panel

- ① Main switch
- ② Mode switch

Switching on the machine

1. Connect the machine to the main power supply.
2. Release the main switch safety mechanism and switch on (Position "I", "ON").
3. Set the mode switch to the „Mortising“ Setting. (Position "I")

Switching off the machine:

1. The drill cycle is ended by releasing the foot pedal
2. Switch off the main switch (Position "0", "OFF") and secure.
3. Disconnect the machine from the main power supply.

Emergency-stop:

Foot pedal for drill cycle: return
The machine is stopped automatically.

Operation

8.5 Mortising work sequence



Warning! Risk of injury due to insufficient preparation!

It is only permitted to switch on the machine if, for the work at hand, the required preconditions are fulfilled and any preliminary work is completed. Therefore, the adjusting, fitting and operating instructions (see the corresponding chapters) must be read before switching on the machine.



Warning! Risk of injury! / Risk of material damage!

Remove all the unused drill bits!

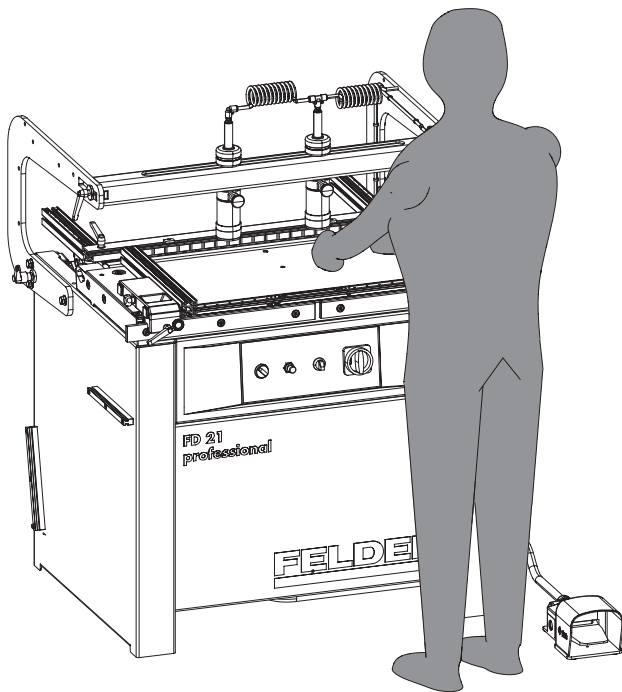


Fig. 8-4: Working position

Mortising preparation

1. Switch the machine off and ensure that it cannot be switched on again.
2. Extraction system must be connected.
3. Prepare the machine to operate
See chapter entitled >Making adjustments and preparations<
4. Ensure all compressor rods are correctly positioned as well as the work piece.
5. Take up work position (See Fig.)

Mortising work sequence

1. Release the main switch safety mechanism and switch on (Position "I", "ON").
2. Set the mode switch to the „Mortising“ setting.
3. Foot pedal for drill cycle: engaged.
 - Spindle motor: engages.
 - Workpiece clamp: is engaged.
 - bore feeder: engages
the borers bore to the depth specified.
4. Foot pedal for drill cycle: return.
 - bore feeder: turns off
the borers leave the work piece.
 - Spindle motor: turns off.
 - Workpiece clamp: dissolve.
5. If you are not going to continue working, switch off the machine and secure it against being turned on again accidentally.

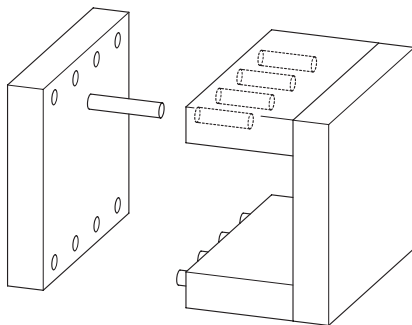
8.6 Examples of usage for work piece and stop positioning



Warning! Risk of injury!

Adjustments to the machine or tool replacement may only be conducted once the machine has stopped.
See chapter entitled >Making adjustments and preparations<

8.6.1 Corpus 90 degree dowel connection



Process step 7 (Vertical drilling)

Set drilling height to 0, swivel unit to vertical position

Process step 8

Setting the depth stop for vertical drilling

For flush cabinet, set depth stop on $\frac{1}{2}$ workpiece thickness

Process step 9

Clamp positioning

Process step 10

set the boring speed

Process step 11

carry out vertical boring

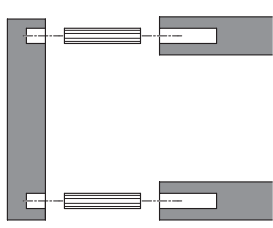


Fig. 8-5: Corpus 90 degree dowel connection

Process step 1

Attach the boring tool and position the side stops

- Drilling tool- \varnothing = Dowel- \varnothing
- Number of mortising tools = user-defined
- clamp the boring tools
- Mirror the lateral stops on both sides

Process step 2

adjust mortising height (Horizontal drilling)

- Drilling height = $\frac{1}{2}$ material thickness

Process step 3

Adjusting the boring depth

- Mortising depth = $\frac{2}{3}$ of the dowel length ($\frac{1}{3}$ of the remaining length must be smaller than the material thickness!) The mortising depth compensation is 8 mm.

Example: mortising depth horizontal 20 mm)
= mortising depth vertical 12 mm)

Process step 4

Clamp positioning

Process step 5

set the boring speed

Process step 6

carry out horizontal boring

Operation

8.6.2 Fixed 90° dowel joint

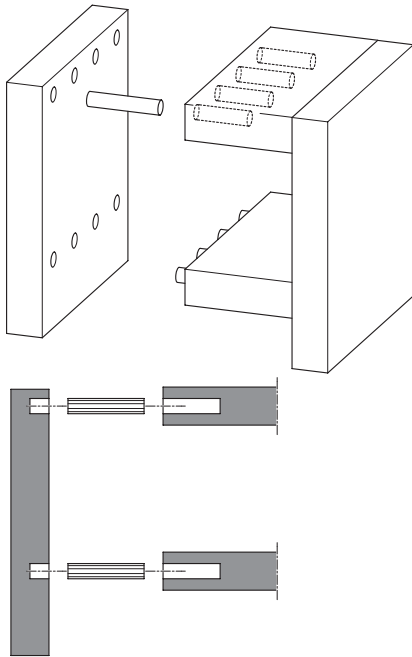


Fig. 8-6: Fixed 90° dowel joint

Alternative procedure to that in:

—> **Corpus 90 degree dowel connection**

Process step 1

Mounting the stop extension onto the lateral clamps

Process step 2

position the attachments required

Process step 3

vertical bore to fixed intermediate stop

8.6.3 45° dowel joint

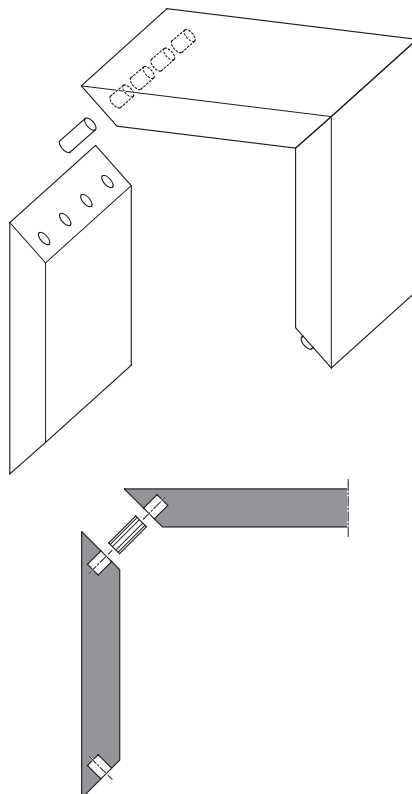


Fig. 8-7: 45° dowel joint

Alternative procedure to that in:

—> **Corpus 90 degree dowel connection**

Process step 1

pivot the boring head to 45 degrees

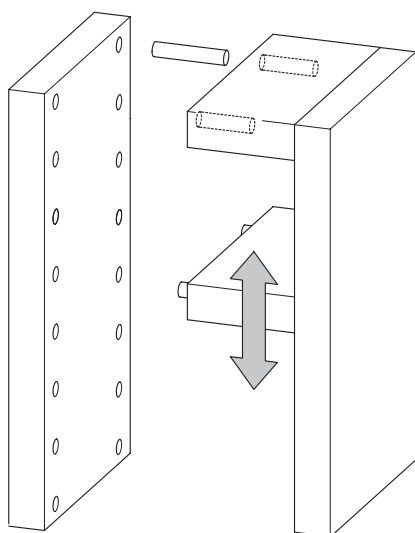
Process step 2

Check depth required

- Adjust as necessary

8.6.4 In-line hole boring

i Note: with vertical drill: Mortising height adjustment = 0 mm
See chapter entitled >Depth stop (with vertical drill)<



Alternative procedure to that in:

—> **Corpus 90 degree dowel connection**

Process step 1

clamp the boring tools

- for shelves support \varnothing 5 mm or \varnothing 3 mm)
- Determine the number of boring tools

Process step 2

Mount the required longitudinal stop

- Fix stop at 37 mm
- Correctly zero the boring head
- Check depth required
- Adjust the inline hole stop depth against the scale as required

Process step 3

- undertake boring

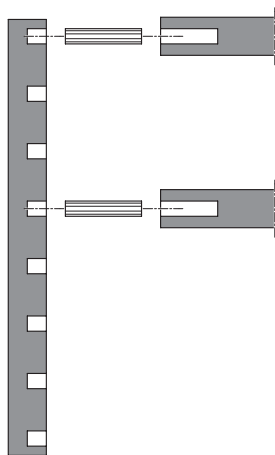


Fig. 8-8: In-line hole boring

Operation

8.6.5 Frame of 90° dowel joint

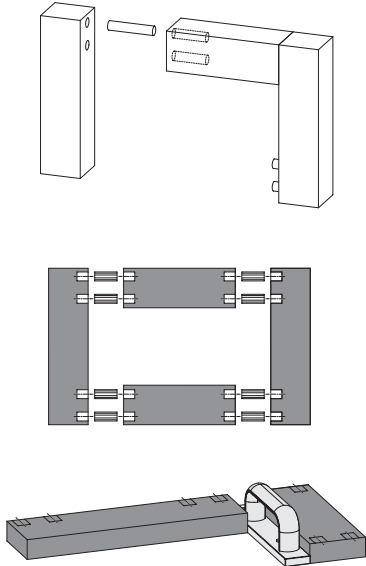


Fig. 8-9: Frame of 90° dowel joint

Alternative procedure to that in:

—> **Corpus 90 degree dowel connection**

Process step 1

set up to 90 degrees

Process step 2

adapt boring depth to correct length of dowels

8.6.6 Frame of 45° dowel joint

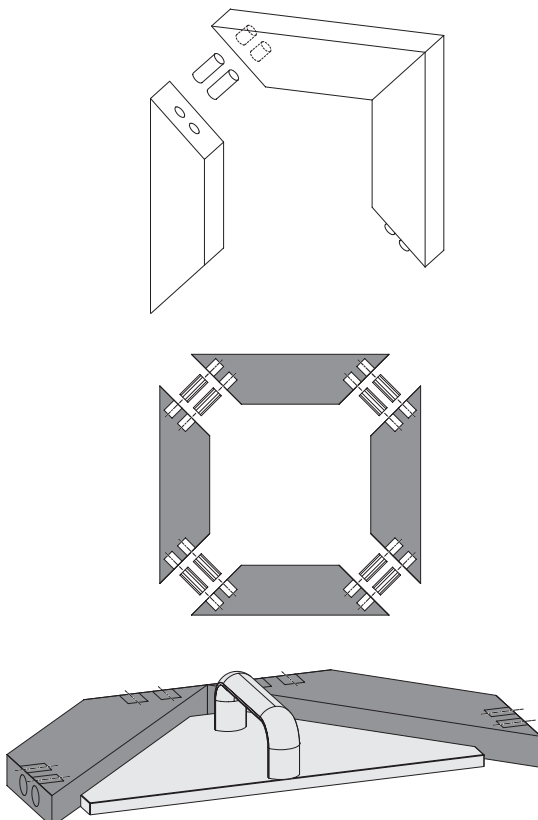


Fig. 8-10: Frame of 45° dowel joint

Alternative procedure to that in:

—> **Corpus 90 degree dowel connection**

Process step 1

structure of dowels and joints at 45 degrees

Process step 2

adapt boring depth to correct length of dowels

Service

9 Service

9.1 Safety instructions



Warning! Risk of injury!

Improper maintenance can cause serious injury or damage.

For this reason, this work may only be carried out by authorised, trained personnel who are familiar with how to operate the machine and in strict observance of all safety instructions.

- Before beginning any maintenance work on the machine, switch it off and secure it against accidentally being switched on again.
- Keep the work area orderly and clean. Components and tools that are not put in their correct place or put away may be the cause of accidents!
- Ensure that there is sufficient space to work around the machine.
- Following the maintenance work, reinstall the guards and check that they are functioning properly.



Warning! Danger! Electric current!

Work on electrical fittings may only be carried out by qualified personnel and in strict observance of the safety instructions.

9.2 Maintenance schedule



Attention! Risk of material damage!

The following maintenance has to be carried out according to the instructed time intervals!



Note: Cleaning and care products are available as accessories (see: Tools and Accessories catalogue)

Interval	Component	Task to accomplish
Daily	Machine	Remove dust and shavings
	Table surfaces	Remove dust and shavings
	Fences	Remove dust and shavings
	Dust extractor	Check for defects
Monthly	Dust extractor	Check efficiency
	Guides (boring head)	Clean
	Compressed air supply connection	Check water separator
Poor boring	Tools	Check, and if applicable:
		Sharpen or replace

To guarantee an extended working life for the machine oil all bare machine surfaces with anti corrosion preservative.

Service

9.3 General maintenance instructions

- ! **Attention! Risk of material damage!**
Only high quality machine grease order nr. 10.2.002 may be used!
Spray oils such as graphite and Mos2 oils may damage the guide tracks!

- ! **Attention! Risk of material damage!**
Never use caustic or abrasive detergents.

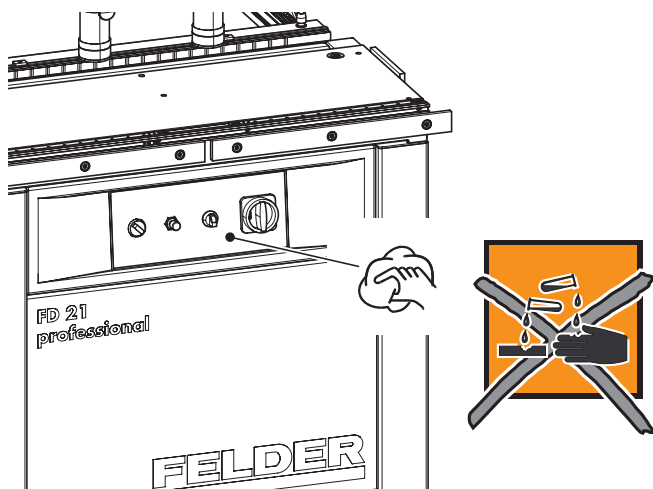


Fig. 9-1: Cleaning agents

We recommend that dust and chips are cleaned off the machine on a daily basis, especially from the table surfaces.

Clean the operating foil with a damp cloth.

Never use caustic or abrasive detergents.

These could damage the foil keyboard and may affect operation.

9.4 Cleaning and lubrication

- Switch the machine off and ensure that it cannot be switched on again.
- Pivot boring head to the horizontal position (See chapter entitled >Making adjustments and preparations<)

① Cylinder shafts

Clean and remove dust from cylinder shafts. Lubricate.

② Height adjustment spindle

Clean the spindles and lubricate with regular machine grease.

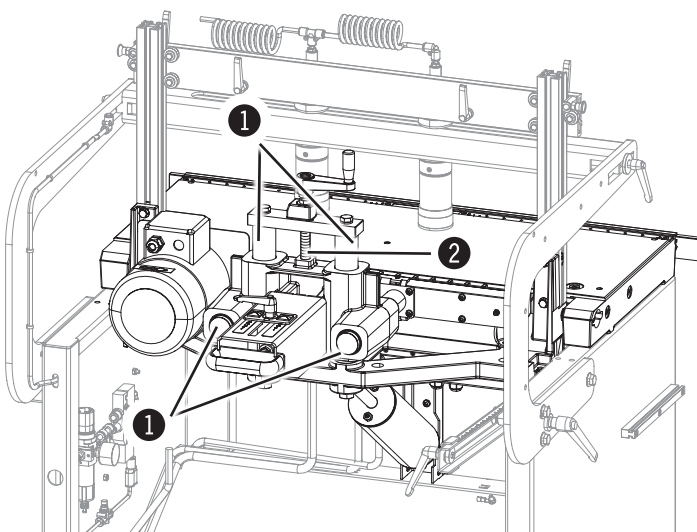


Fig. 9-2: Maintenance work

Service

Faults

10 Faults

10.1 Safety instructions

**Warning! Risk of injury!**

Repairing faults incorrectly can result in personal injury or damage to the machine.

For this reason, this work may only be carried out by authorised, trained personnel who are familiar with how to operate the machine and in strict observance of all safety instructions.

**Warning! Danger! Electric current!**

Work on electrical fittings may only be carried out by qualified personnel and in strict observance of the safety instructions.

10.2 What to do if a fault develops

In most cases:

- In the event of a breakdown which creates danger for either personnel or equipment, or occupational safety, immediately use the main switch to switch off the machine
- Also disconnect the machine from the mains and ensure it can not be switched on again.
- Inform those responsible for machine faults immediately.
- Type and extent of fault should be determined by an authorised professional, as well as the cause and repair.

10.3 What to do after rectifying the fault

**Warning! Risk of injury!****Before switching the machine back on:**

- The fault and its cause are professionally repaired.
- All safety equipment has been assembled according to regulations and is working correctly.
- Individuals are not located within the danger area of the machine.

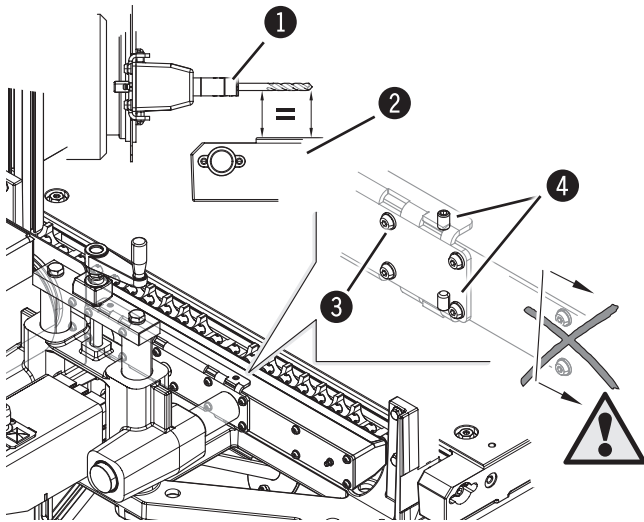
Faults

10.4 Faults, causes and repairs

Fault	Cause	Repair
Machine does not start (Spindle does not turn)	Power supply Main switch at setting „0“ Emergency stop switch engaged	Check the power supply Check switch position EMERGENCY STOP button: release
Boring head doesn't proceed (Spindle turn)	Compressed Air not present Air supply pressure too low	Check pressurized supply Check display pressure
Burn marks from drilling	Incorrect boring direction	Check motor direction Check right left drill mount
	Workpiece slipping	Check pneumatic arm clamp
Hold down doesn't clamp workpiece	Vertical adjustment of clamp	Check height of clamp
	Compressed Air not present Air supply pressure too low	Check pressurized supply Check display pressure
Boring head doesn't pivot completely	Head still clamped	Check hand clamp levers
	Compressed Air not present Air supply pressure too low	Check pressurized supply Check display pressure
Boring head doesn't pivot completely (until the stop is reached)	Air supply pressure too low	Check display pressure
	Tilt stop 45° Position	Tilt Stop 45°: release
Incorrect boring	Incorrect depth	Check depth stop screw

Faults

10.4.1 Altering the head of the spindle holder



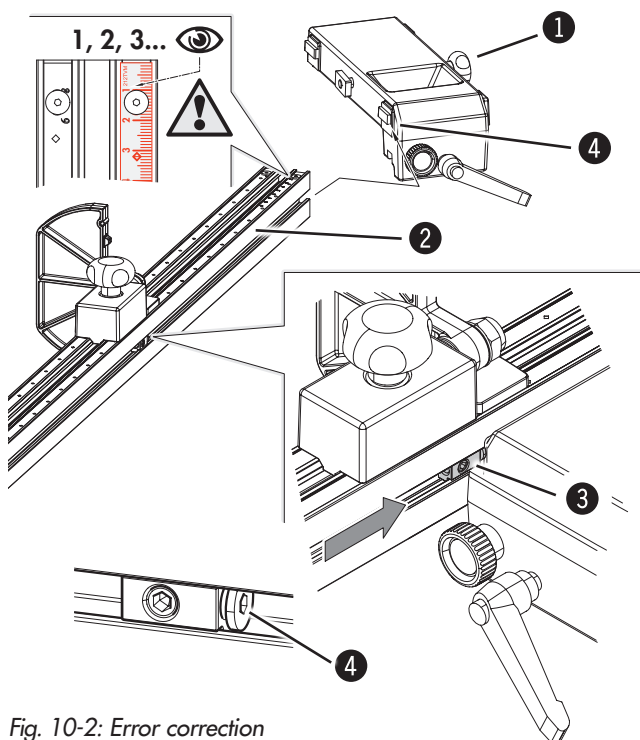
To set the head of the spindle head (1) parallel to the workbench (2):

1. Switch the machine off and ensure that it cannot be switched on again.
2. Loosen the clamping screws (10 x 3)
3. Correct the misadjustment with the setting screw (4 on top and bottom)
4. Tighten the clamping screws (10 x 3)
5. Check by boring
6. Test the adjustment and if required, readjust.
7. **Attention! Digital display-Drilling height**
Check the setting
See chapter entitled:
>Error correction-Digital display<

Fig. 10-1: Altering the head of the spindle holder

- 3 Clamping screws
- 4 Adjusting screw (Setscrew)
- 4 Digital display-Drilling height

10.4.2 Adjusting the dimensions stop (when using the extension as a lateral stop)



- Check if the attachment nuts are correctly engaged in the channels
- Check by boring
- Switch the machine off and ensure that it cannot be switched on again.

1. Loosen the thumb screw. Remove the fence guide.
2. Turn the adjustment screw with the socket head cap key
3. Check by boring
4. Test the adjustment and if required, readjust.

- 1 Thumb screw
- 2 Stop extension
- 3 Positioning pin
- 4 Adjusting screw

Fig. 10-2: Error correction

Faults

10.4.3 Error correction–Digital display

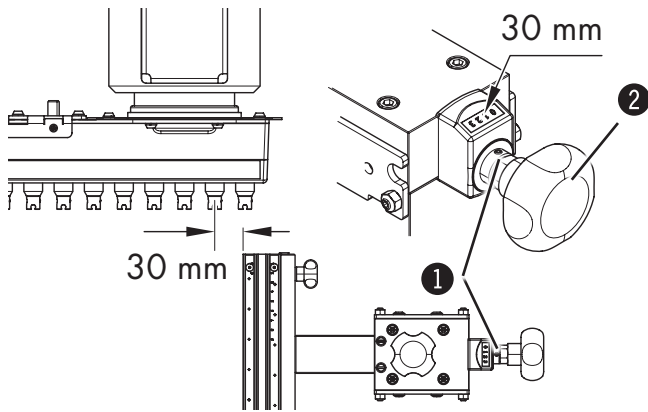


Fig. 10-3: Side stop

- Switch the machine off and ensure that it cannot be switched on again.
- Use the system handwheel to set the desired measurement (e.g. 30 mm)
Check by boring.
- Loosen the clamping screw.
- Error correction (with the handwheel)
Side stop or
Mortising height adjustment
- Tighten the clamping screw.
(Do not overtighten)
- Machine a sample workpiece again. Repeat the adjustment process if required.

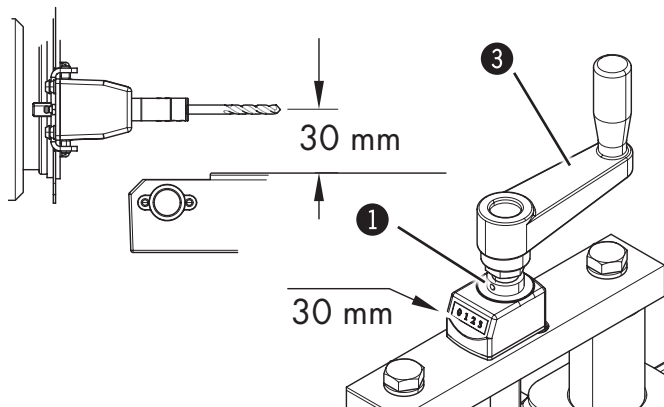


Fig. 10-4: Mortising height adjustment

- ① Clamping screw
- ② Handwheel–Side stop
- ③ Handwheel–Mortising height adjustment

10.4.4 90°-angle adjustment (Lateral stops digital)

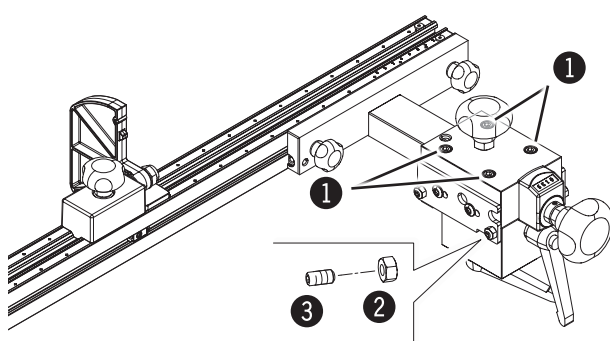


Fig. 10-5: 90°-angle adjustment

- ① Clamping screws
- ② Nut
- ③ Setscrew

- Check by boring.
- Switch the machine off and ensure that it cannot be switched on again.
- 1. Loosen the clamping screws (4x)
- 2. Loosen the nut and correct the angle with the setscrew
(on both sides, Always the same rotations on both sides.)
- 3. Tighten the clamping screws (4x)
- 4. Tighten the nut (2x, on both sides)
- 5. Machine a sample workpiece again. Repeat the adjustment process if required.

Declaration of Conformity

11 Annex–Declaration of Conformity



EG-Declaration of Conformity
According to Machine Guidelines 2006/42/EG

We hereby declare that the machine indicated below, which corresponds to the design and construction of the model we placed on the market, conforms with the health and safety requirements as stated by the EC.

Manufacturer:	Felder KG
	KR-FELDER-STR.1
	A-6060 Hall in Tirol
Product designation:	Multi Boring Machine
Make:	FELDER
Model designation:	FD 21 professional
The following EC guidelines were applied:	2006/42/EG
	2014/30/EU
The following harmonised norms were applied:	EN 12100-1
	EN 12100-2
	EN 60204-1

This EC Declaration of Conformity is valid only if the CE label has been affixed to the machine. Modifying or altering the machine without the express written agreement of the manufacturer shall render the warranty null and void.

The signatory of this statement is the appointed agent for the compilation of the technical information.



Johann Felder, Managing Director FELDER KG
KR-FELDER-STR.1 • A-6060 Hall in Tirol

Hall in Tirol, 1.2.2016

FELDER[®]

FELDER KG

KR-Felder-Straße 1

A-6060 Hall in Tirol

Tel.: +43 (0) 5223 / 58 50 0

Fax: +43 (0) 5223 / 56 13 0

Email: info@felder.at

Internet www.felder.at