OPERATING INSTRUCTIONS
Extension of the machine

INDEX

Bar loading magazine

INDEX MBL22-8
INDEX MBL24-6
INDEX MBL32-6
INDEX MBL40-6
INDEX MBL40-8

INDEX Multi spindle turning machines

Control system INDEX C200-sl

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Note on applicability

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A word on copyright

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Safety information

Preliminary observations

- In section "Safety instructions", we have described the information which is required for safe operation of the INDEX MBL bar loading magazine.
- In addition, you must carefully read the document "Safety instructions for CNC turning machines" which is pertaining to the turning machine and observe all the instructions given there. In said document you will find further safety instructions which are also valid for the INDEX MBL bar loading magazine although they are not mentioned in the present document.
- In case you are not in possession of the document "Safety instructions for CNC turning machines", you may order same from INDEX.

Definitions

Environmental conditions

Refer to document "Safety instructions for CNC turning machines", please.

Use according to the regulations and warning notices concerning possible maloperation

Description of the machine

Machine:	Bar loading magazine for multi-spindle turning machine
Machine type series:	INDEX MBL22-8, MBL24-6, MBL24-8, MBL32-6, MBL40-6, MBL 40-8

Intended use

- Stockpiling and supply of bar material
- Loading of a multi-spindle turning machine
- Guidance of bar material
- Feed of bar material
- Disposal of remnants
- Spot-drilling of bar material

Use only after attachment and alignment at INDEX MS22-8, MBL24-6, MBL24-8, MS32-6, MS40, MS40-8 multi-spindle turning machine.

Related documentation

- Operating instructions / Alignment instructions / Instructions for transportation

Limits of use

	MBL22-8 MBL24-8	MBL24-6	MBL32-6	MBL40-6 MBL40-8
Minimum bar diameter	D7	D7	D7	D13
Maximum bar diameter	D22 / D24	D24	D32	D40
Bar length in case of type 3300 (mm)	1500...3300	1500...3300	1500...3300	1500...3300
Bar length in case of type 4300 (mm)	2000...4300	2000...4300	2000...4300	2000...4300
Maximum speed (1/min)	10 000	10 000	8 000	7000
	depending on the nature of the bar material			

Non-combustible metal bars

The bars must exhibit balanced mass.

Related documentation

- Document "Demands on material bars"
- Technical data

Spatial limits

Overall dimension of the loading magazine after assembly + 800 mm in all directions.

Related documentation

- Machine assembly plan

Time limits

Useful life: 10 years in three shift operation

Those parts subject to high stress exhibit a useful life of 20.000 hours.

Parts subject to wear and tear must be exchanged according to the maintenance plan.

Related documentation:

- Maintenance plan INDEX MBL

Forseeable non-intended use:

- use at other than the indicated machines
- use of too small or too large bar diameters
- use of too short or too long bars
- use of other than the indicated materials
- excessive loading
- use of wrong accessory parts
- use / operation / maintenance by more than one person (exception: loading of the rack loader unit)
- use without attachment respectively alignment at the multi-spindle turning machine MS40
- use without lubrication of the guidance channels
- use without carrying through the necessary adjustment work (refitting)
- use of inappropriate bar material (with respect to straightness, eccentricity)

Related documentation:

- Operating instructions

Field of use

Only intended for Industrial use. The indicated technical data and limits must be observed.

Like in case of the multi-spindle machine, basically, only one person may work at the bar loading magazine. In an exceptional case, the operator must designate a responsible.

User group

Expert staff:	Transport, assembly, initial operation, loading, operation, set-up, maintenance, dismantling
Qualification:	Expert staff (e.g. master craftsman, set-up man, industrial mechanic): instruction / training required.

Semi-skilled staff:	operation, loading
Qualification:	auxiliary force with operator training

Operator obligations

Refer to document "Safety instructions for CNC turning machines", please.

Personal safety equipment

Refer to document "Safety instructions for CNC turning machines", please.

Personnel qualification

Refer to document "Safety instructions for CNC turning machines", please.

General safety information

Machining of bar stock

Since the INDEX MBL bar loading magazine uses material bars, the following is valid as a matter of principle:

- The spindle guidance channel must be adapted at the diameter and profile of the bar stock (by means of half bearings, reducing tubes).
- The "Demands on material bars" apply (Document LY1002.10211).

Chucking pressure and chucking power

Refer to document "Safety instructions for CNC turning machines", please.

Changing tools

Spot-drilling unit

When tools are changed, there is a risk of injury from protruding and sharp-edged tools.

In general:

- Tool holders must be moved to an ergonomically convenient position.
- Suitable protective measures must be taken (e.g., cloth or protective sleeves) for protruding tools (e.g., boring bars).
- Suitable tools must be used.
- The required torque must be observed. The respective specifications can be found in the tool holder catalogue.

Safety functions and equipment

Refer to document "Safety instructions for CNC turning machines", please.

Work area enclosure and work area door

Refer to document "Safety instructions for CNC turning machines", please.

Pressure tanks

Refer to document "Safety instructions for CNC turning machines", please.

Electrical energy

Refer to document "Safety instructions for CNC turning machines", please.

Operating fluids and additives

Refer to document "Safety instructions for CNC turning machines", please.

Spot-drilling unit

Inadmissible emissions (of gases, powders, oil mists) may happen at the spot-drilling unit. For this reason, the spot-drilling unit must be connected to the exhaust equipment of the machine.

In so doing, you must use the connecting element for the defined interface of the exhaust equipment.

IT and data security

Refer to document "Safety instructions for CNC turning machines", please.

Specific safety instructions

As a matter of principle, you must wear and use your personal safety equipment.

The following specific dangers may occur at the spot-drilling unit:

- In case you use the confirmation key: Motions of the spot-drilling unit respectively of the lifting unit. In such case you are in danger of being crushed. The danger zones within the area of the Z axis traverse path as well as the area between cylinder and stopper of the lifting unit must be vacant.
- Only qualified staff and especially trained personnel may make use of the confirmation key.
- Before light curtain reset at the bundle respectively rack loader unit, you must check, whether the danger zone is vacant.
- Bundle loader unit: Caution when handling the bar bundle. Especially when you undo the cording, some of the bars may suddenly get out of place.
- In case of the rack loader respectively bundle loader unit, there is the danger of bars falling down. Before lowering the hoisting slings at the bundle loader unit, you may, if necessary, at first have to pull bars present at the stopper of the separating device back into the slings. Only thereafter, you may lower the slings.
- Before loading bars into the supply area, the hoisting sling must be lowered completely.
- In case of the rack loader unit, you must heed that the stoppers at the conveyor chains must be adjusted to the respective bar diameter.
- Danger may also be caused by remnants falling down into the remnant container. The danger zone is covered by the container. However, as soon as you remove the container, one can access the danger zone. Therefore, remnant container discharge must not happen simultaneously with bar change.
- On the loading side there is the danger of being crushed between the bars.
- In case of the rack loader unit, the bar ought to be deposited on the supply area. Thereafter, from there, the bar rolls over the incline into the direction of the conveyor chains.
  Don't get your fingers in between the bars.
- In case of the bundle loader unit, the bars of the bundle may get out of place. Therefore, special caution is advised, especially when cutting open the cording or when removing the hoisting equipment.
- At the spot-drilling unit, there is the danger of being cut by chips or by sharp tool edges.
- The weight of the chip respectively remnant container may exceed the limits stipulated in the regulations concerning lifting and load. You must set the respective counter in the control unit in such a way that the weight does not exceed the admissible limits. After reaching the pre-set number of bore holes respectively bar changes, an order "Discharge container" will appear.
- In case of the rack loader unit, you may have to call in a second person for the lifting of the bars.

- Part of the pneumatic or hydraulic circuit may still be under pressure after switching the bar loading magazine OFF. This applies especially for connections between non-return valves and actors.
  Before de-airing, the respective unit must be moved into a safe home position or must be secured against unintended movements.
  This applies especially for the cylinders of the lift and for the swivelling movements of the gripper unit.
- The electric motors may be getting very hot during operation. Therefore, there is danger of being burnt at the crank casing.
- At the channel interlock, levers have been preloaded by means of torsion springs. Such levers may only be moved via the respective movement command from the control unit. With manual unlocking, there is the danger that the levers abruptly swivel back into their "locked" position.
- The top parts of the guidance channels may be tilted up. Such tilting-up must always happen via the respective movement command from the control unit. Thereby, the channel is being opened respectively closed by means of a lever and retained in its position.
  When opening the channel in another way than the above mentioned, there is the danger of getting crushed between the fix and the movable part of the guidance channel.
- The shifting of the drum may only be carried out by qualified INDEX staff! Before shifting, the drum must be secured against torsions. Special caution is advised when shifting the drum. There is the danger of being crushed between drum and base frame.
- The connection point between the bar loading magazine and turning machine must be secured by an appropriate hood system. The correct installation of said hood system must be guaranteed.
  Without such hoods, there is the danger of being drawn-in and cut by rotating machine parts.

Please also observe the general and situational safety instructions as well as the intended use of the bar loading magazine.

The necessary set-up work is described in chapter "Set-up". No other set-ups or modifications than those mentioned in the "Set-up" chapter must be carried out at the bar loading magazine.

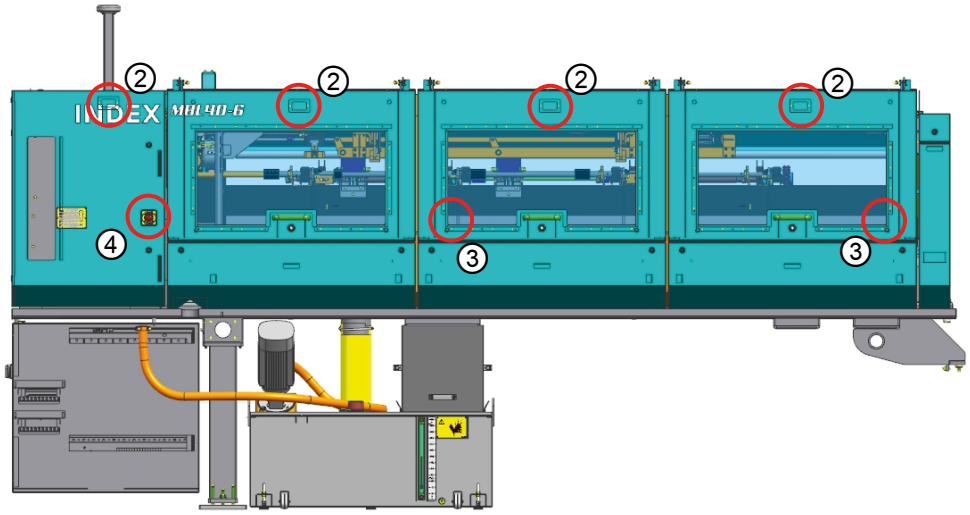
Specifications concerning media supply have been set out in "Technical Data" and must imperatively be observed.

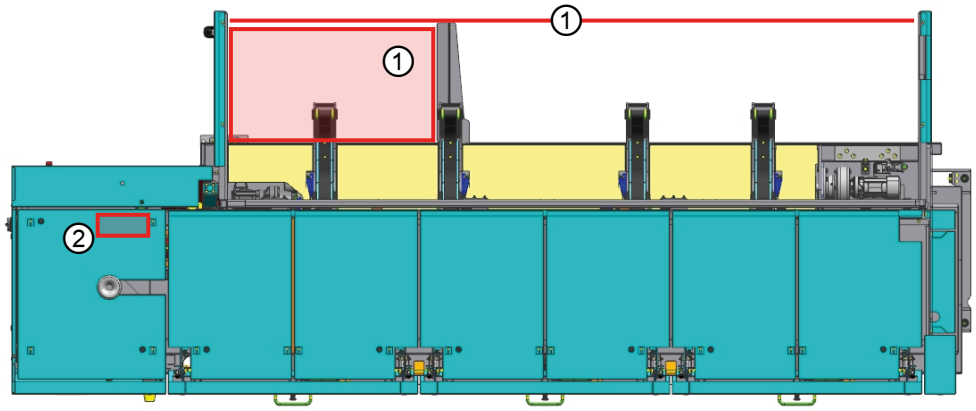
In spite of all safety precautions, there still is a remaining risk e.g. due to pressures existing in the pneumatic respectively hydraulic circuit or due to bars or remnants falling down.

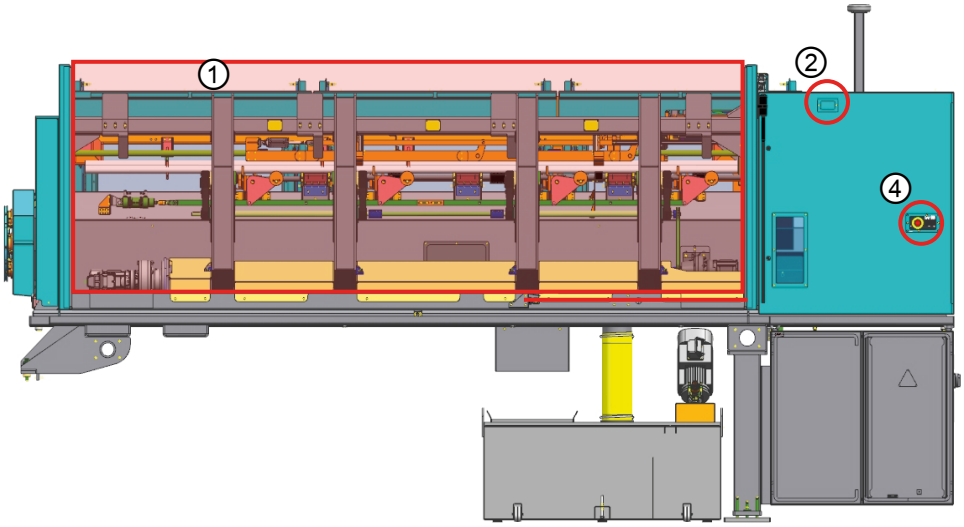
Therefore, special caution is advised, especially when carrying out maintenance or repair work.

Engineered safety features

The bar loading magazine is safeguarded by means of different safety components.







① Light curtains

The light curtain at the bundle respectively rack loader unit impedes movements within the reach of the lifting and the spot-drilling unit subsequent to interruption of the light curtain. The collet chuck of the spot-drilling unit can carry out a rapid retracting motion. The motions for bar guidance and bar feed can continue so that continued production is guaranteed.

② Mobile separating safety installations

These installations impede the access of the operator during ongoing motions. The mobile separating safety installations are equipped with a bolt keeper for the safeguarding of running-out movements.

③ Safety switches of the channel interlock

These safety switches serve the enquiry of the channel interlock. Before drum indexing or spindle rotation release, the channels must be locked.

④ Safety switches for channel aperture monitoring

These safety switches serve the monitoring of the channel aperture. Before drum indexing or spindle rotation release, the channels must be locked.

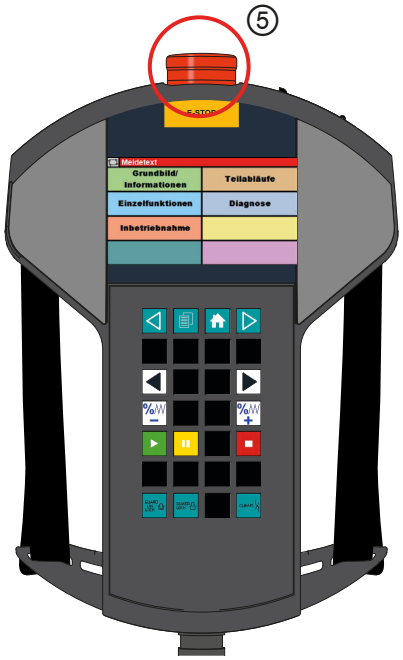
Drum stroke

For service purposes, the drum may be pushed backward. The linked position of the spindle is being enquired. If said position was not reached, any movements at the bar loading magazine will be impeded.

⑤ Emergency-OFF

There is an emergency-OFF switch at the front face on the left hand side of the operating room door and an emergency-OFF switch at the rear side on the left hand side at the spot-drilling unit. Moreover, there is an emergency-OFF switch at the portable operating panel.

The emergency-OFF switch stops any movement at the bar loading magazine and at the turning machine.



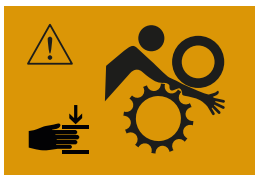
Plates

The attached plates warn against possible hazards

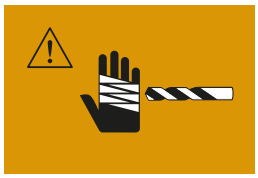
Danger due to remnants falling down

Danger during work at the hydraulic system

Danger with access during ongoing motions (at the bundle loader unit)



Crushing hazard
Entanglement hazard



Danger by running-out drill

Electric shock hazard

Main switch - heed information

Safety installations as well as warning notices must by no means be modified, dismantled or damaged.

Noise emission

Noise emissions of the bar loading magazine

The bar loading magazine is designed for operation at an INDEX turning machine. For this reason, noise emissions arise from the combination of the turning machine and the bar loading magazine during the machining of bars.

Noise emitted from the magazine is measured according to the applicable directives and regulations.

The actual noise emission at the magazine depends on the production process and the environmental conditions at the installation location.

The level of the noise emissions depends on the following parameters. The exacter said parameters are being taken into account, the smaller will be the extent of the noise emissions respectively of the vibrations.

- Exact alignment of the bar loading magazines and the machine to one another.
- Appropriate bottom attachment of the bar loading magazine for the safeguarding of the position, for example by anchoring the magazine to the floor. See KM915X.9006X.
- Adequate interchange parts for the respective bar diameter at the machine and in the bar loading magazine (collet chucks, fiber-cement tubes, half bearings, etc.)
- Bar material with a straightness smaller than 0.25 mm per metering point. For further information refer to "Requirements to the material bars" (LY1001.10211, please.)
- Adequate parameters for the machining of the material like for example cutting velocity and feed.
- Sufficient lubrication of the channels in the bar loading magazine by means of the predetermined lubricating oil.
- Installation and closing of all covers and doors.

In case polygon material is being machined, you must anticipate higher levels of the noise emissions.

Since the noise emissions may vary greatly depending on the production process and on the environmental conditions of the installation location, reference values are indicated for easier evaluation.

Reference measurement with turning machine and bar loading magazine according to the above mentioned predeterminations.

Bar length 3000 mm

Speed of all spindles at 6000 rpm (approx. 85% of the machine speed)

No chip removing process. Serial cleaning system.

Measurement in the style of DIN EN ISO 23125:2010-10

Uncertainty of measurement: 4 db(A) accuracy class 3

Maximum emission noise level: XX db(A)
YY db(C)

Situational safety information

Transport and packing

- The hydraulic system must be depressurized before transport.
  The oil reservoir must be evacuated before transport.
- The bar magazine must not be lifted at the cowling.
- Apart from that, the instructions in document "Safety instructions for CNC turning machines" shall apply.

Assembly and installation

Refer to document "Safety instructions for CNC turning machines", please.

Commissioning (set-up mode)

Spot-drilling unit

Set-up mode with the machining area door open allows movements at reduced speeds, which may pose a certain risk.

To reduce said risk, please heed the instructions in the respective section of document "Safety instructions for CNC turning machines".

Operation (production mode)

During the production process, the bar loading magazine needs not to be supervised. The non-supervised operation of the bar loading magazine, however, requires (normally prior to operation) detailed analysis and evaluation of the planned production process with respect to additional risks and dangers which may arise from the non-supervision of the magazine.

The specified speeds must be observed.
Depending on the properties of the material bars, it may however be necessary to reduce the speed.

Otherwise, the instructions of document "Safety instructions for CNC turning machines" shall apply.

Maintenance and repair

In general, maintenance and repair is to be carried out with the magazine turned off. The main switch must be locked out. In a few cases, maintenance and repair need to be performed with the magazine turned on (e.g., replacement of backup batteries). These activities must be carried out with special care.

Even when the main switch is switched off, parts of the magazine (e.g., the control cabinet light) may still carry electricity. These parts are labelled.

- Apart from that, the instructions in document "Safety instructions for CNC turning machines" must be observed.

Storage and decommissioning

Refer to document "Safety instructions for CNC turning machines", please.

Disposal

Refer to document "Safety instructions for CNC turning machines", please.

Product monitoring

Refer to document "Safety instructions for CNC turning machines", please.

Declarations of Conformity

Refer to document "Safety instructions for CNC turning machines", please.

Design and Functions

General description

The MBL bar loading magazines serves the supply, spot-drilling, guidance and feed of material bars as well as the disposal of remnants thereof at a multi-spindle turning machine.

By means of the bar loading magazine, you can process round and hexagonal material. The loading magazine possesses an individual control system and is being connected with the machine by means of a defined interface (UNIMAG).

Merely the function of the magazine's hydraulic system and sealing air supply are being guaranteed by the machine.

MBL40-6 loading magazine attached to an INDEX MS40-6 machine

Control of the machine

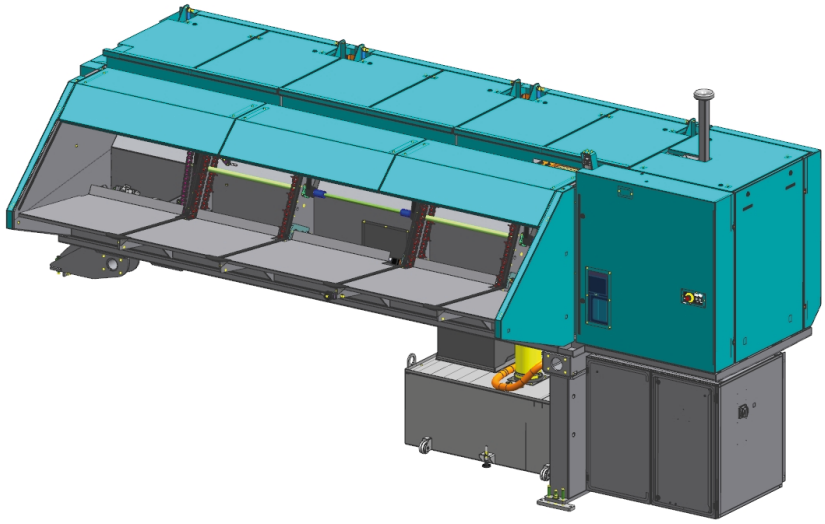
Control system INDEX C200-sl

The MBL bar loading magazines are predominantly attached to machines equipped with the INDEX C200-sl control system. This very configuration is being described in the present document.

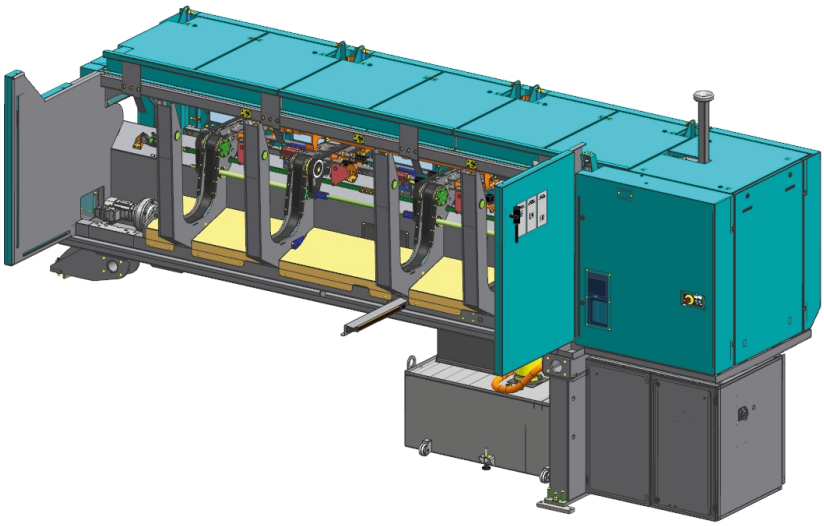
Control system INDEX C200-4D

However, the loading magazine MBL40-6 can also be attached to and be operated together with an INDEX MS-machine equipped with the INDEX C200-4D control system. For this case, please refer to document "INDEX MBL - Information concerning MS-machines with PowerLine control system“.

The bar loading magazine is available in different supply variants, that is to say as a bundle or as a rack loading magazine as well as a magazine for bar lengths of 3300 mm respectively 4300 mm. In addition, a 50 Hz and a 60 Hz magazine version is available.

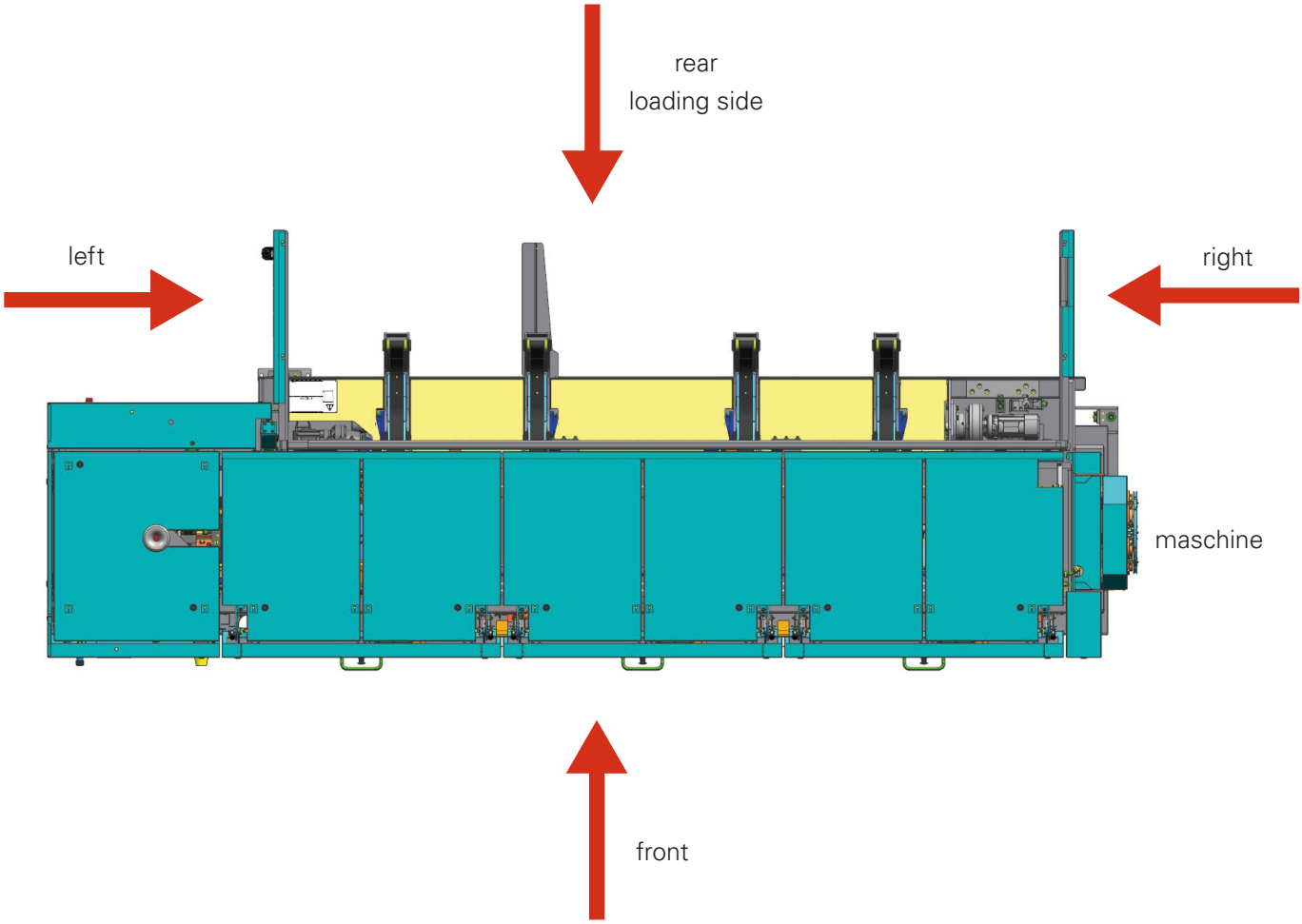


Rack loading magazine

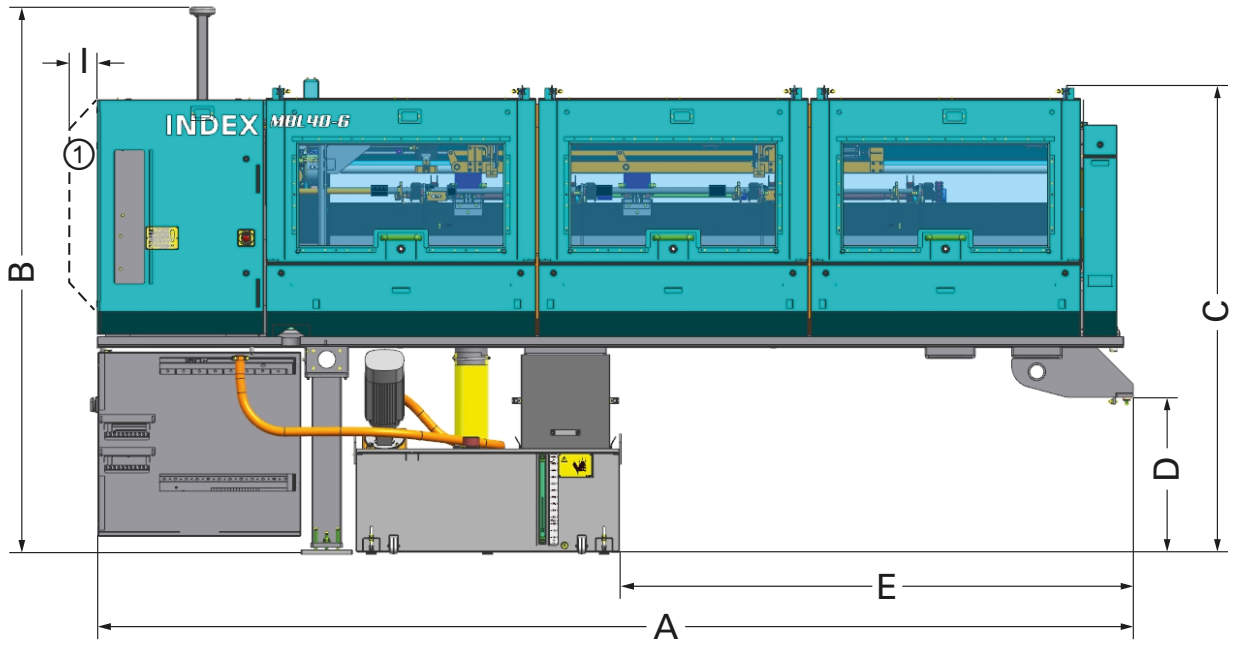


Bundle loading magazine

Top view



Dimensions



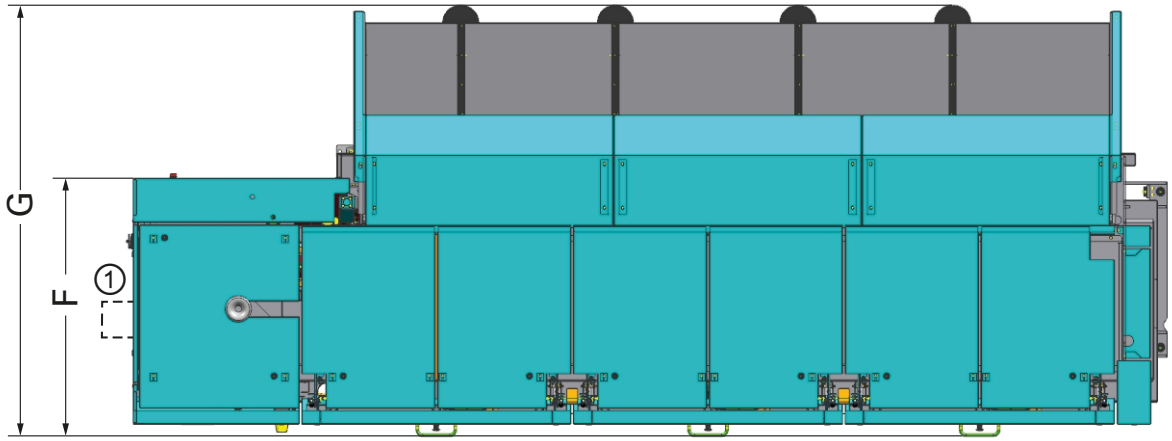
Loading magazine dimensioned. Type classification: 3300 and 4300. (table)

① In case of MBL22-8, MBL24-8, MBL40-8 loading magazines

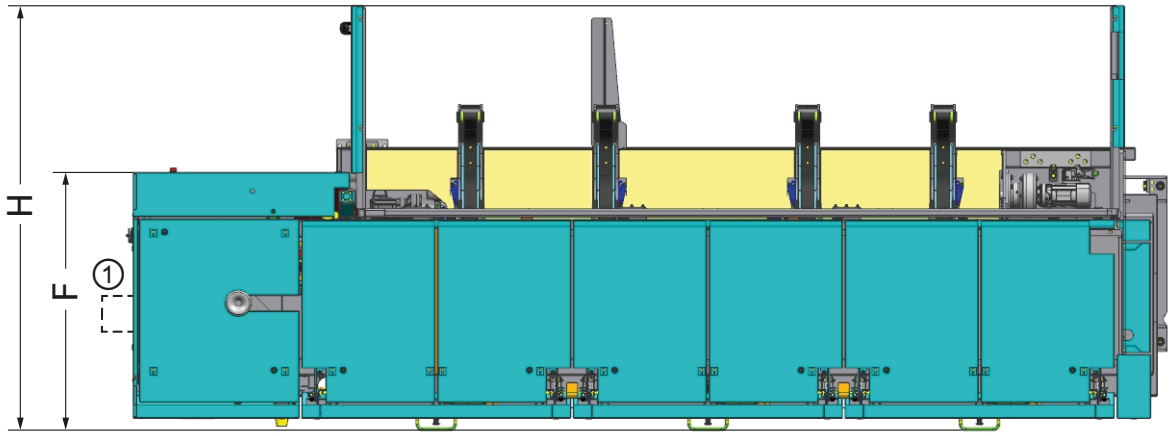
Dimensions of MBL loading magazines

Dimensions [mm]	MBL22-8 / MBL24-8		MBL24-6 / MBL32-6 / MBL40-6		MBL40-8	
	3300	4300	3300	4300	3300	4300
A	4720	-	4720	5720	4860	5860
B	2485	-	2490	2490	2600	2600
C	2130	-	2135	2135	2180	2180
D	700	-	700	700	710	710
E	2340	-	2340	3340	2330	3330
F	1175	-	1160	1160	1200	1200
G	1960	-	1945	1945	2015	2015
H	1930	-	1920	1920	1990	1990
I	150	-	-	-	150	150

For F, G and H refer to the following page, please.



Rack loader dimensioned



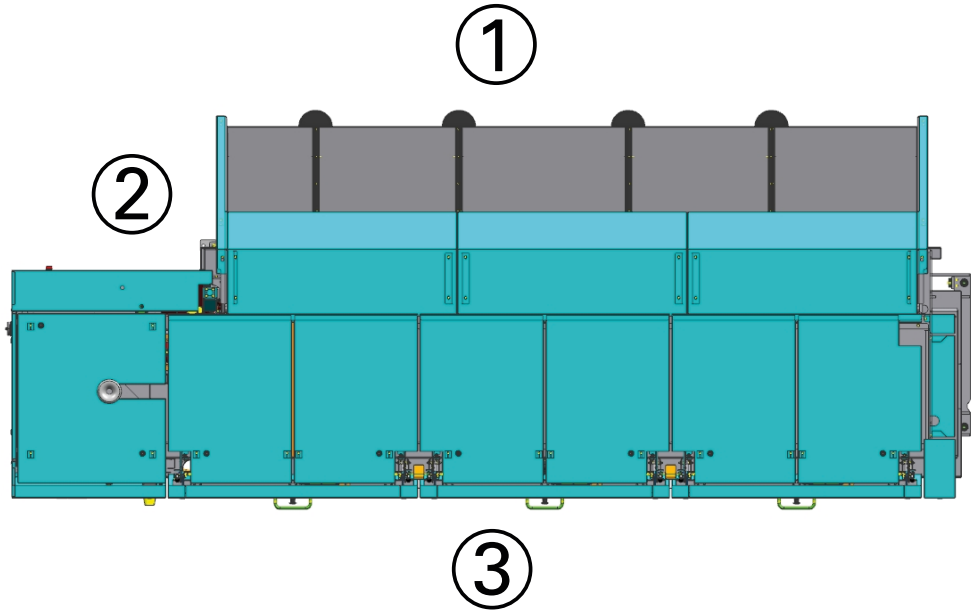
Bundle loader dimensioned

For operation of the bar loading magazine, you must allow for 800 mm in addition to the overall dimension.

① In case of MBL22-8, MBL24-8, MBL40-8 loading magazines

Work stations at the bar loading magazine

The following work stations are planned at the bar loading magazine:



Loading unit ①

Here, you load the bars. Depending on the version of the loading unit, the bars are being loaded manually or by means of a crane.

In case you use a rack loader unit, you also have to carry out adjustment work.

Spot-drilling unit ②

At the spot-drilling unit, you exchange drills and collet and you discharge the chip container. In addition, you have to carry out adjustments for adaptation of the unit to the bar diameter.

Drum ③

Here, you exchange the half bearings in the guidance channels as well as the sliders according to the bar diameter.

Bar lift ③

Adjustment work for the adaptation of the lift to the respective bar diameter

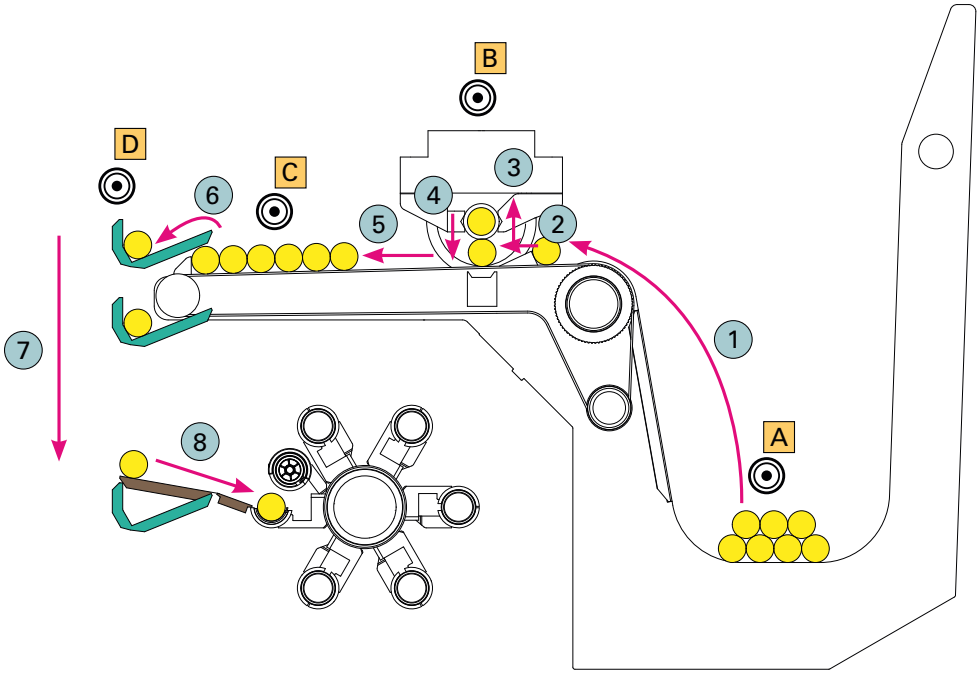
Remnant container ③

Discharging the remnant container

For detailed information, refer to the chapters "Operation, Loading and Set-up", please.

Schematic illustration of the loading magazine functions

Instead of a being supplied in a bundle loader unit, the bars may just as well be supplied in a rack loader unit.



A Bundle loader unit

B Spot-drilling unit

C Stockpiling of spot-drilled bars

D Lift

Process

1 Bar supply in the form of a bundle or on a rack.

2 Bar separating device

3 Lifting-up for spot-drilling

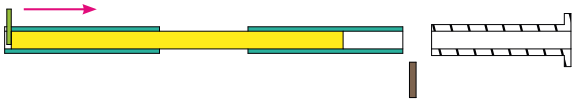
4 Depositing after pot-drilling

5 Supply of spot-drilled bars

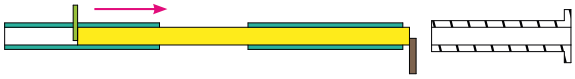
6 Bar separating device

7 8 Feed of the bars into the guidance channels

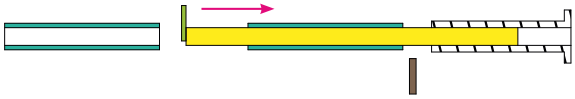
8 Bar in the guidance channel



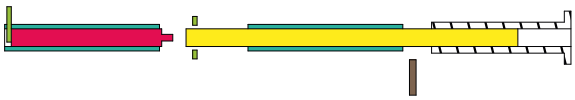
9 Metering of bar length



10 Feed position gripper unit

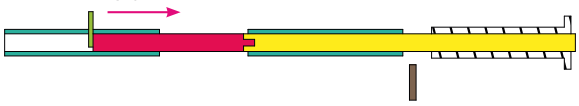


11 Grip bar

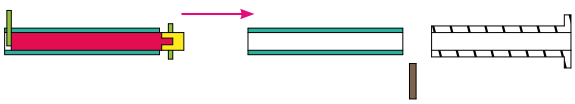


12 Slip bar over slider

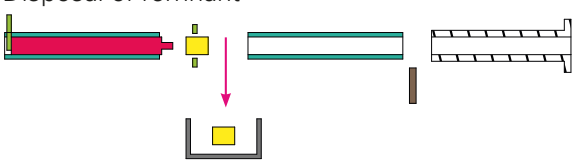
13 Machining position



14 Pull-off remnant



15 Disposal of remnant



Technical data

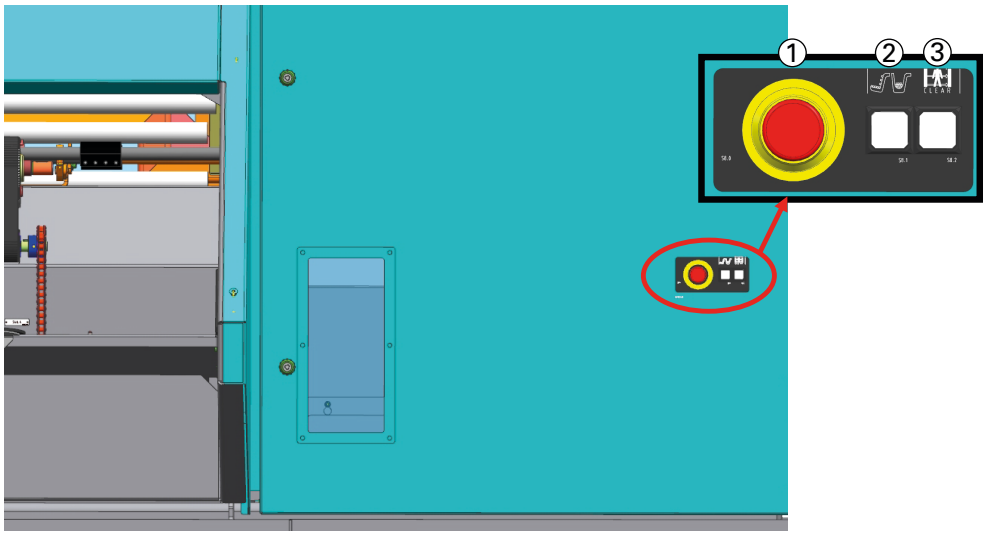
		MBL22-8 / MBL24-8	MBL24-6	MBL32-6	MBL40-6 / MBL40-8
Material bars					
round	Ø	7 – 22 (24) mm	7 – 24 mm	7 – 32 mm	13 – 40 mm
hexagonal	SW	6 – 19 (20) mm	6 – 20 mm	6 – 27 mm	12 – 34 mm
Speed		up to 10 000 1/min	up to 10 000 1/min	up to 8000 1/min	up to 7000 1/min
		(depending on the nature of the bar material)			
Bar supply					
Rack loader unit		Loading capacity 700 mm			
Bundle loader unit	Ø	300 mm bundle max. 2000 Kg			
Bar lengths					
Version 3300		1500 ... 3300 mm			
Version 4300		2000 ... 4300 mm			
Oil for channel lubrication		CLP 150 oil according to DIN51517-3; 325L viscosity 150 mm²/s (40°C) according to DIN ISO 3448			
Straightness of the bar		max. 0,5 mm/m (see document "Requirements to material bars")			
Electric parameters					
Rated voltage		400 V			
Control voltage		24V DC			
Rated power		3 kW			
Connection power		3,4 kVA			
Current		4,9 A			
Frequency		50 Hz / 60 Hz			
Response time light curtains		500 ms			
Compressed air supply		6…10 bar / max. 1200 L/min			

Dimensions	**MBL22-8 / MBL24-8**	**MBL24-6 / MBL32-6 / MBL40-6**	**MBL40-8**
Length Version 3300	4977 mm	4760 mm	4910 mm
Length Version 4300	5977 mm	5760 mm	5910 mm
Width	1955 mm	1940 mm	2010 mm
Height	2485 mm	2491 mm	2601 mm
Masses			
Bar loading magazine	3850 kg (version MBL40-6 / 3300 bundle loader)		
Lubricating oil unit	210 kg (without oil)		

Operating

Operating elements

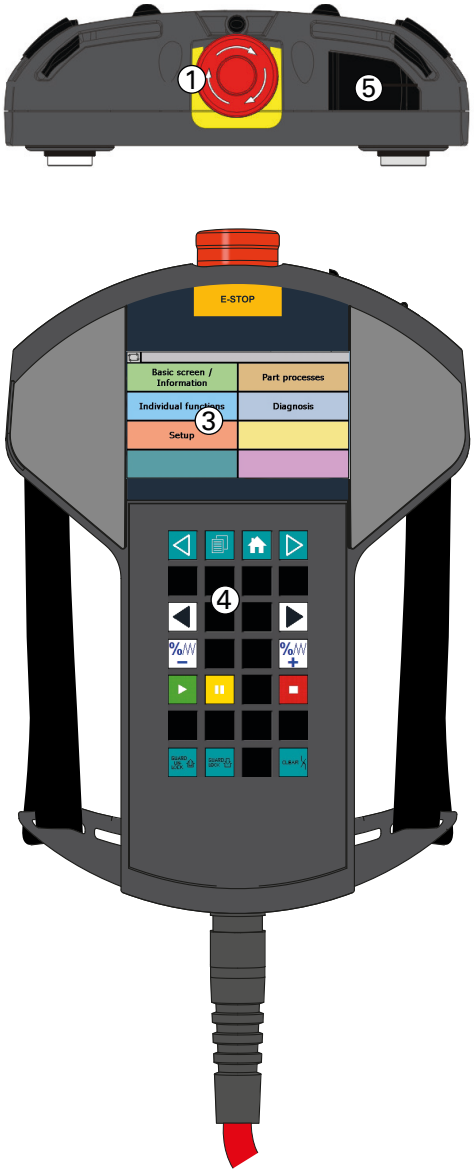
Operating panel at the rear side of the loading magazine



1 EMERGENCY OFF
2 REQUIRE LOADING
3 RESET LIGHT CURTAIN

Handheld Terminal Keba KeTop T20

Front view



1 Emergency OFF switch
2 -
3 Color display with touch screen
4 Matrix touch with 28 keys
5 Protection cover for USB host (USB memory sticks) or the MICRO-SD card

Rear view

1 Touch stylus (integrated in housing)
2 Enabling device
3 Adjustable hand straps

Cleaning the touch screen

CAUTION

Never clean the touch screen with solvents, scouring agent or scrubbing sponges. Otherwise the touch surface could be damaged!

For cleaning the device, use a soft cloth and a bit of water or a mild cleaning agent. The cleaning agent should be sprayed onto the cloth and not directly onto the surface.

Via **home screen → Setup → Display → Touch Clean** you can activate a mode, which disables the touchable display for 30 sec. In this time the display can be cleaned without triggering unintended activities via the touchable display.

Meaning and functions of the softkeys at the manual control unit

Basic keys - available in every screen

Home key - Return to basic screen

Page backward - one screen level back

One screen leftward - in screen levels with several screens: switch to the screen which is on the left-hand side of the current screen

One screen rightward - in screen levels with several screens: switch to the screen which is on the right-hand side of the current screen

Unlock hoods - Unlock hoods at the loading magazine in case unlocking is allowed

Lock hoods - Lock hoods at the loading magazine in case the hoods are closed

Delete error - Current errors are being deleted, in case they were corrected.

Override keys

Override minus - The override switch is put back to the next percentage level

Override plus - The override switch is put forward to the next percentage level

Operating sequences - Operation

Step backward - Switch backward to the previously carried out step of the operating sequence (switching is possible only, if a step backward is allowed.)

Step forward - Switch to the next step of the operating sequence

Start operating sequence - The current operating sequence is being started

Stop operating sequence - The current operating sequence is being stopped

Abort operating sequence - The current operating sequence is being aborted

Bundle loader unit

Lifting-up unit upward - The lifting-up unit at the bundle moves upward.

Lifting-up unit downward - The lifting-up unit at the bundle moves downward.

Hoisting sling upward - The hoisting sling moves upward

Hoisting sling downward - The hoisting sling moves downward

Stopper at bundle upward - The stopper at the bundle closes.

Stopper at bundle downward - The stopper at the bundle opens.

Stopper upward - The stopper at the lifting-up unit opens.

Stopper downward - The stopper at the lifting-up unit is closed.

Cross conveyor backward - The cross conveyor belt runs backward

Cross conveyor forward - The cross conveyor belt runs forward

Rack loader unit

Chain drive upward - The chain drive runs upward

Chain drive downward - The chain drive runs downward

Chain drive 1 tooth upward - The chain drive runs upward by on tooth.

Stopper upward - The stopper at the lifting-up unit opens

Stopper downward - The stopper at the lifting-up unit closes

Cross conveyor backward - The cross conveyor belt runs backward

Cross conveyor forward - The cross conveyor belt runs forward

Spot-drilling unit

Stopper upward - The stopper at the spot-drilling unit opens

Stopper downward - The stopper at the spot-drilling unit closes

Lifting-up unit upward - The lifting-up unit moves upward

Lifting-up unit downward - The lifting-up unit moves downward

Open gripper - The gripper at the spot-drilling unit opens

Close gripper - The gripper at the spot-drilling unit closes

Open collet - The collet of the spot-drilling unit opens

Close collet - The collet of the spot-drilling unit closes

Z axis of the spot-drilling unit

JOG Function mode JOG - The Z axis can be moved forward or backward via the Z+/Z- key

INC Function mode INC - The Z axis can be moved forward or backward in increments via the Z+/Z- key

POS Function mode POS - The Z axis can be positioned via the Z+/Z- key

Z– Key Z–: In the selected function mode, the Z axis can be moved leftward

Z+ Key Z+: In the selected function mode, the Z axis can be moved rightward

Spot-drilling unit drill

Drill: clockwise run - The drill of the spot-drilling unit rotates clockwise

Drill: counter-clockwise run - The drill of the spot-drilling unit rotates counter-clockwise

Stop drill - The drill of the spot-drilling unit stops

Drill lubrication system ON - The drill lubrication system is switched-ON

Drill lubrication system OFF - The drill lubrication system is switched-OFF

Bar lift - Bar insertion unit

Unlock lift - Lift interlock is unlocked

Lock lift - Lift interlock is locked

Initial stroke upward - The initial stroke moves upward

Initial stroke downward - The initial stroke moves downward

Main stroke upward - The main stroke moves upward

Main stroke downward - The main stroke moves downward

Swivel bar insertion unit out - The bar insertion unit is swivels out

Swivel bar insertion unit in - The bar insertion unit swivels in

Channel on the left/right, channel lubrication

Unlock channel on the right (on the left) - The channel interlock opens

Lock channel on the right (on the left)- The channel interlock closes

Open channel on the right (on the left) - The channel opens, if unlocked

Close channel on the right (on the left) - The channel closes, if gripper unit is swivelled out

Pulse cylinder forward - The pulse cylinder of the channel interlock moves forward.

Pulse cylinder backward - The pulse cylinder of the channel interlock moves backward.

Unlock both channels -The left- and the right-hand channel interlocks open.

Lock both channels - The left- and the right-hand channel interlocks close.

Open both channels - The left- and right-hand channel opens, if they are unlocked and if the slider is in 0 position.

Close both channels - The left- and right-hand channel opens if the gripper unit is swivelled-out.

Key Z0 - The slider moves to 0 position.

Info key - Blends-in the condition of the inputs

Channel lubrication ON - The channel lubrication system is switched-ON.

Channel lubrication OFF - The channel lubrication system is switched-OFF.

Slider

JOG	Function mode JOG - The slider can be moved forward or backward via the Z+/Z- keys
INC	Function mode INC - The slider can incrementally be moved forward or backward via the Z+/Z- keys
POS	Function mode POS - The slider can be positioned by means of the Z+/Z- keys
	Unlock slider - The slider arrest opens
	Lock slider - The slider arrest closes
	Swivel stopper out - The stopper meant for bar length measurement swivels out
	Swivel stopper in - The stopper meant for bar length measurement swivels in
Z–	Key Z–: Der Schieber kann in der angewählten Funktionsart nach links gefahren werden
Z+	Key Z+: Der Schieber kann in der angewählten Funktionsart nach rechts gefahren werden
	Channel lubrication ON - The channel lubrication system is switched-ON.
	Channel lubrication OFF - The channel lubrication system is switched-OFF.

Gripper unit

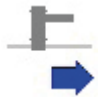
Open gripper - The gripper opens

Close gripper - The gripper closes

Swivel gripper unit out - The gripper unit swivels out

Swivel gripper unit in - The gripper unit swivels in

Gripper unit leftward - The gripper unit moves leftward



Gripper unit rightward - The gripper unit moves rightward

Ejector forward - The ejector moves forward

Ejector backward - The ejector moves backward

Key Z0 - The slider is moved to position 0

Unlock slider - The slider arrest opens

Lock slider - The slider arrest closes

Paging - alarm list/alarm protocol

Page up - You page up one page

Page down - You page down one page

Line up - You skip one line up

Line down - You skip one line down

Screen leftward - The screen is pushed leftward

Screen rightward - The screen is pushed rightward

Service functions

The following softkeys will only appear in the "Initial operation" screen → Service functions

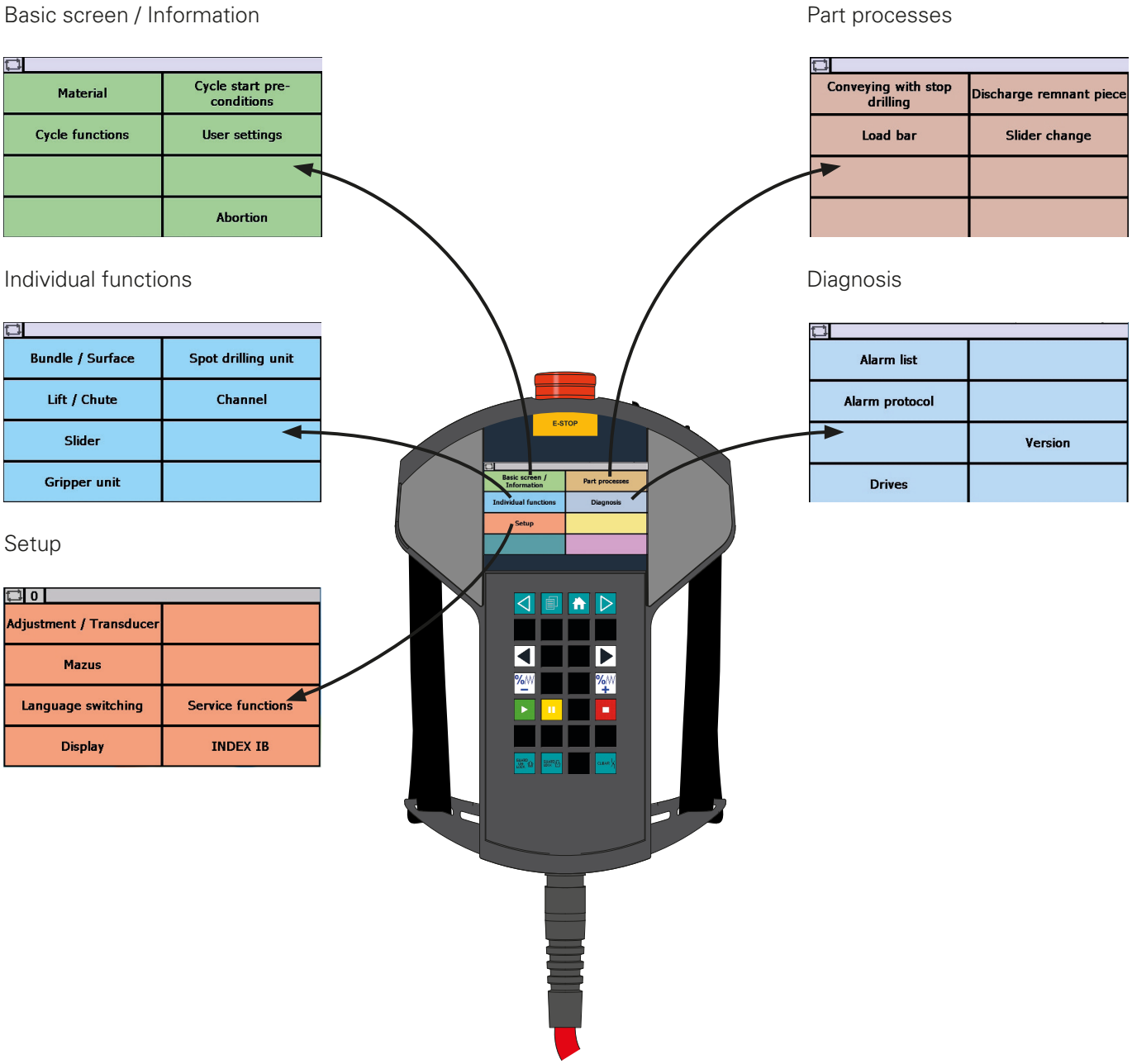
Air ON - compressed air is being switched ON

Air OFF - compressed air is being switched OFF

Operating philosophy

From the basic screen to the navigation screen

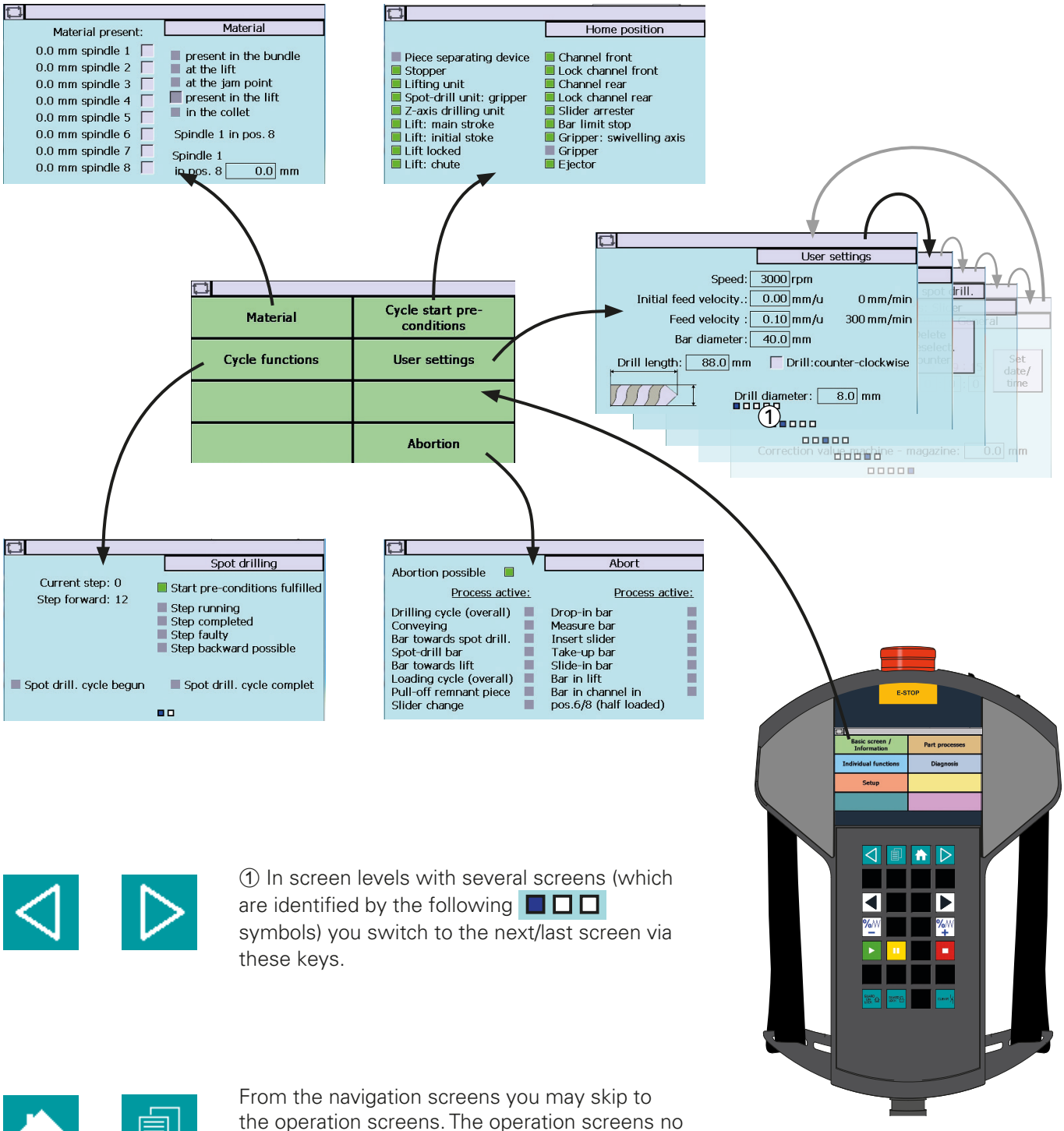
Screen navigation is structured strictly hierarchic. It consists of the superordinated basic screen ("Home-Screen") and of the subordinate navigation screens.



The Home-Screen is reached from all navigation screens via the "Home" key or the "Page back" key.

From the Navigation screens to the Operation screens

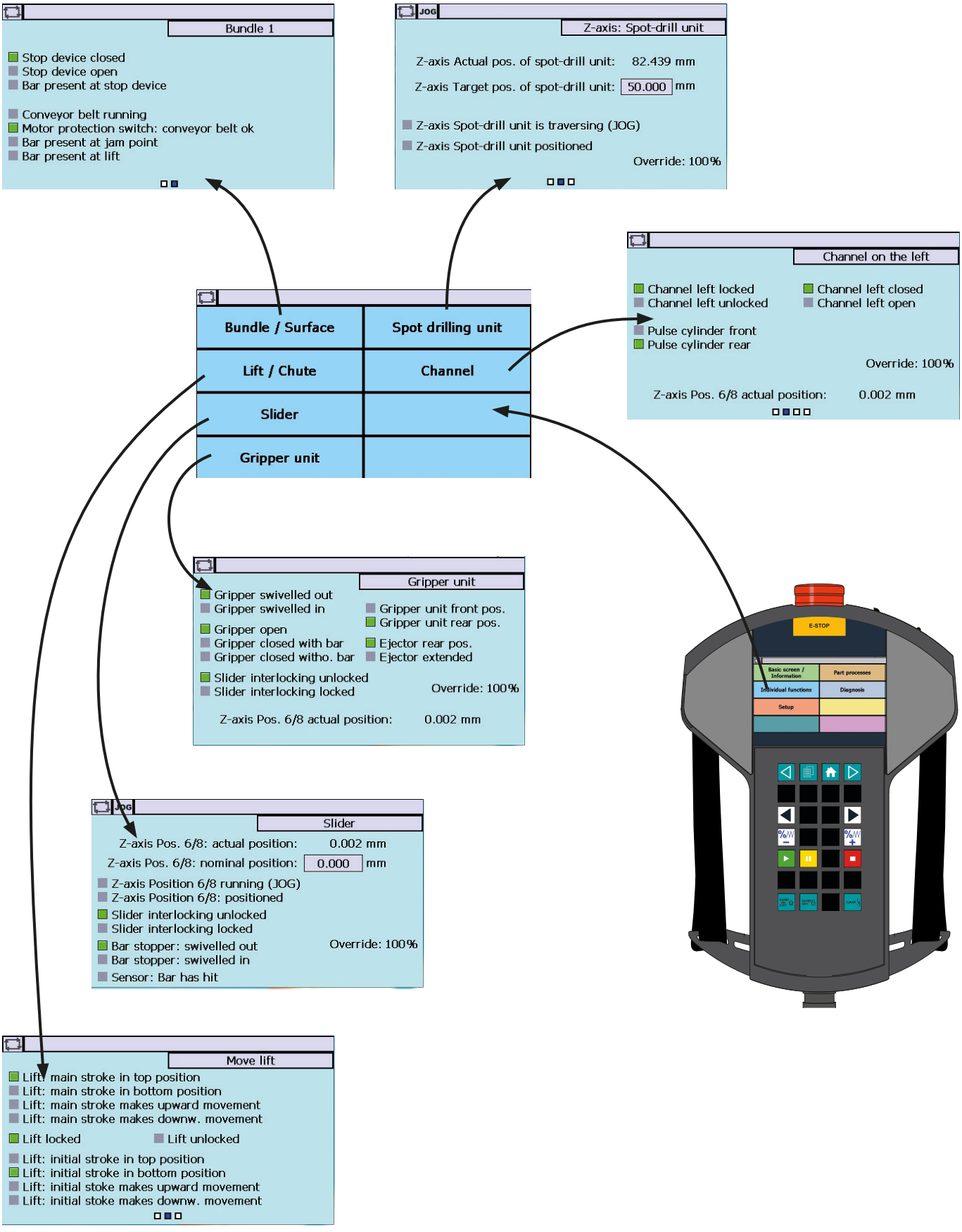
Navigation „Basic screen / Information“



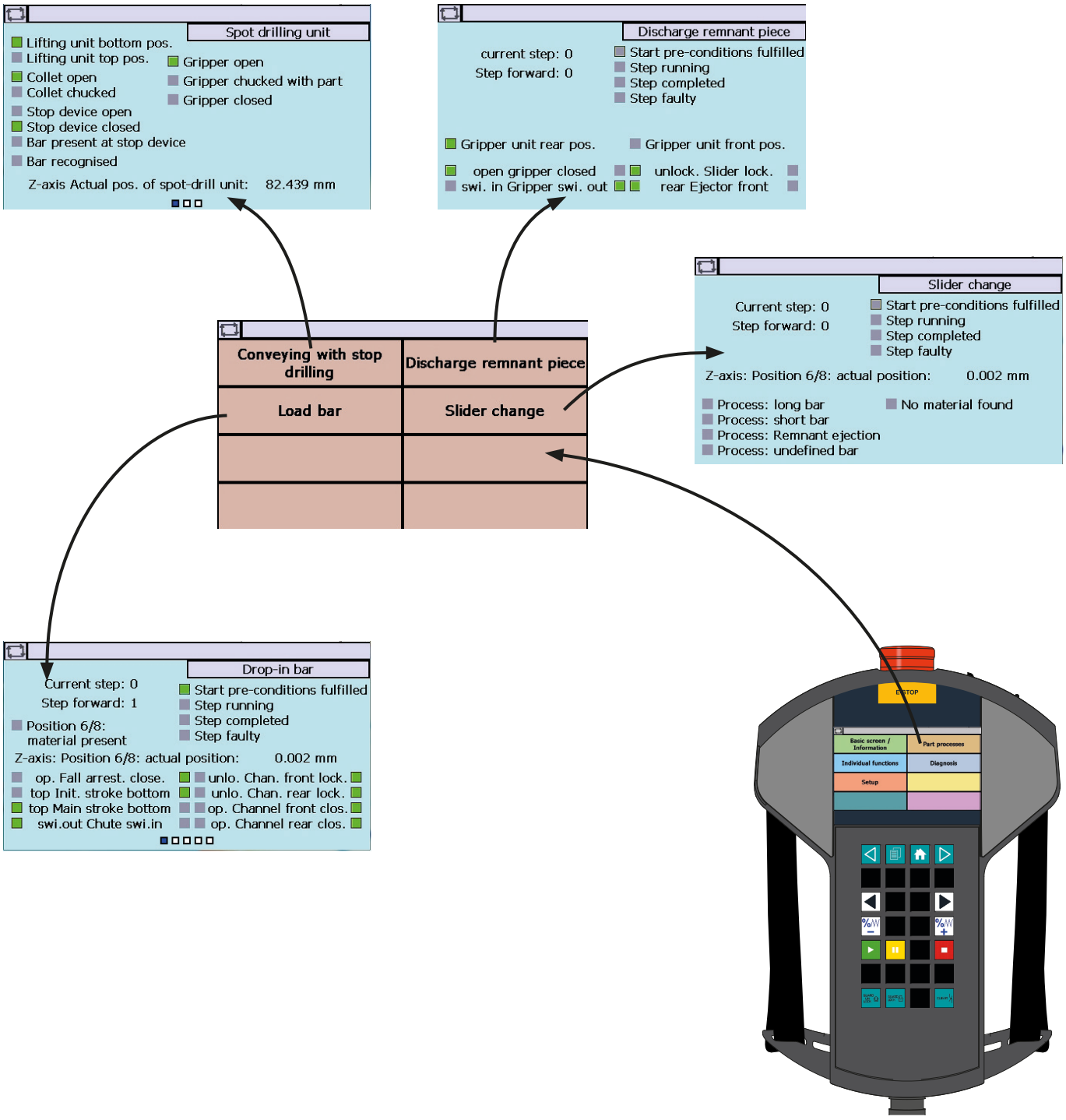
① In screen levels with several screens (which are identified by the following ■□□ symbols) you switch to the next/last screen via these keys.

From the navigation screens you may skip to the operation screens. The operation screens no longer contain any visible navigation features. In every operation screen you can call-up the associated navigation screen or skip to the Home-Screen via the "Home" key.

Navigation „Part processes“



Navigation „Individual functions“



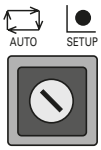
Operation mode types and function types

A difference is made between the operation mode and function types.

Operation modes

The switching of operation modes happens via the switching of the operation mode of the machine. I. e. via the key switch at the main operating panel of the machine. The operation mode may be switched at the magazine at any time, since a cycle which may be running at the same time will not be interrupted by switching the mode.

Operation mode dependent screens do not exist.



Automatic mode

In Automatic mode, all motions are allowed as long as the hoods are closed and locked.

- Cycle running
- Carry out partial processes step by step
- Manual carrying out of individual functions.

With unlocked hoods, no motion is allowed.

Set-up mode

Any actions which are allowed in the Automatic mode, are allowed in the Set-up mode, too.

- Individual functions with open hood require confirmation.

Function types

The magazine can be operated in two types of function.

Manual

The magazine does not carry out any automatic functions. The user may run sub-functions step-by-step or can operate individual functions.

Cycle

The magazine carries out the following functions:

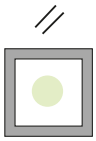
- Conveying of material bars (if required)
- Spot-drilling (if bars are present and the supply area is vacant)
- Unloading of the remnant piece (upon request of the machine)
- Loading of new bars (upon request of the machine)
- Feeding forward (part feed) (upon request of the machine)

The magazine enters Cycle as soon as the machine enters Cycle.

- Overall cycle
- Set-up or memory overwriting in position 6/8
- Operation of units - magazine (start loading, bar forward/backward, spot-drilling of bar...)

The magazine leaves Cycle as soon as the machine leaves Cycle. However: any "Spot-drilling" process which may still be running will be completed before that. Since the hydraulic system of the machine is required for this, it is not possible to switch off the hydraulic system of the machine during this.

If the machine is run channel-by-channel or position-by-position in the set-up mode, spot-drilling is not carried out as a matter of principle. Spot-drilling only happens manually in the respective magazine screen. This happens against the background that the magazine is not supposed to spot-drill asynchronously during set-up, since it is highly probable that the user is going to abort the process via RESET.



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RESET key at the machine control panel

The **RESET key at the machine control panel has direct effect on the magazine. By pressing said key, you abort any processes running in the m**agazine. This means the following:

- Short motions which are just being carried out can be completed.
- Long motions which are just being carried out will be interrupted, e.g. slider motions.
- Process step chains will NOT be reset.
  Reason: An error, e.g. in the loading cycle, will trigger a position stop at the machine. In such case, it is highly probable that the user is gong to press the RESET key, before trying to solve the problem in the magazine and to complete the run manually.
- In case continuation is impossible, abortion of the process step chain may happen via a key of the magazine operating panel.

Start pre-conditions

The fulfilment of the following "start pre-conditions" for sub-functions results in the overall start pre-conditions for "Magazine ready to start".

Magazine ready

Confirmation for "Magazine ON" in case basic functions like Hydraulic system and compressed air are ok and no crass alarms are active at the magazine.

Magazine: drum release

The units of the magazine are positioned in such a way that drum indexing can be carried out (e.g. gripper unit swivelled-out).

Magazine ready to start

The cycle for machine and magazine (see above) can be started.

In the ideal case, all units are in home position.

Sub-processes ready to start

An individual sub-process (e.g. pull remnant part off) is ready to start for manual operation from the magazine.

Individual functions ready to start

An individual function (e.g. swivel gripper unit in) is ready to start for manual operation from the magazine.

Loading of bars

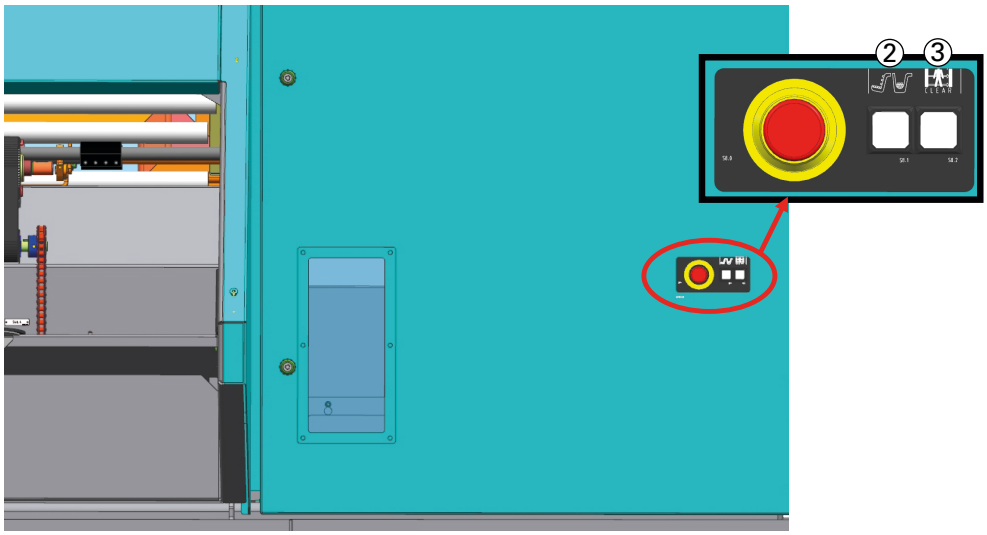
Bar loading is best from cycles "Operate magazine" and "Bar loading".

Loading the magazine by means of the rack loader unit

The user loads bars into the rack loader unit and stockpiles them there.

For the loading of the rack loader unit, loading must in the first instance be required.

- For this purpose press key ② "REQUEST LOADING" at the rear face of the loading magazine.



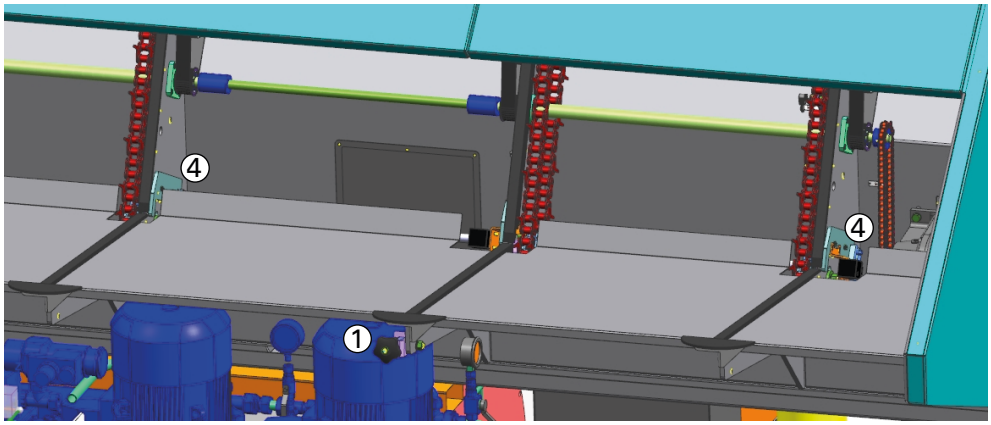
As soon as loading may happen, the key is glowing.

Attention:

If the key is flashing, the bar loading magazine is in a work cycle. If the light curtain is interrupted during said cycle, any motions will be stopped.

Depending on the position of the individual actors, you have to enable the units.

- Deposit the first bar on the loading area.
  As a result of interrupting the light curtain, key ③ "RESET LIGHT CURTAIN" will be glowing.
- After the first bar has been inserted, the stoppers ④ of the chain conveyors must be adjusted to the bar diameter. The chain conveyors may only convey one bar at a time..
- Adjustment happens via a hand wheel ① beneath the loading area.
  The stoppers are being jointly adjusted by means of a mechanism.



Two sensors check whether a bar is present at the chain conveyor and whether the bar is lying precisely. If this is not the case, an error message will appear. The user must then bring the bar into the correct position.

Heed safety instructions, please.

- After adjustment of the stoppers, further bars may be inserted into the loading unit, until said unit is full.

Depending on the weight of the bars which are supposed to be loaded, the user must call a person to assist him.

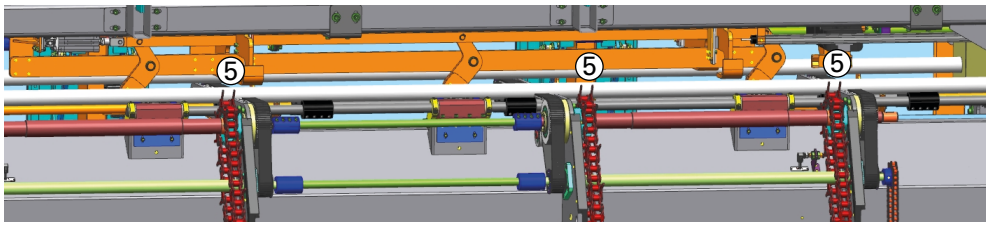
As soon as loading is completed and the light curtain is cleared again, the light curtain must be reset.

- For this purpose press key ③ "RESET LIGHT CURTAIN".

After successful reset of the light curtain, this key does not shine any longer.

Before light curtain reset make sure that the area of the rack loader unit is vacant.

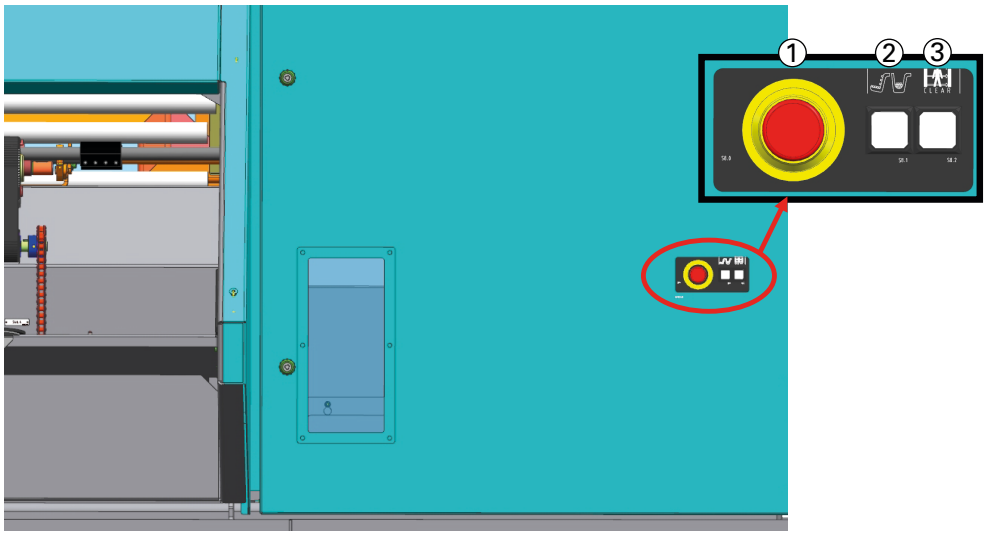
The stop point ⑤ of the lifting unit is located at the top end of the chain conveyor. A sensor recognises whether material is present there. If this is not the case, the rack loader unit will automatically convey bars to the top until the sensor recognises a bar.



Alternatively, you can trigger an immediate "raising movement" via key "REQUIRE LOADING". See section "Operation".

Loading bars in case of a magazine with rack loader unit

- Press key ② "Request loading". The key starts flashing.



1 EMERGENCY OFF
2 REQUEST LOADING
3 RESET LIGHT CURTAIN

- Completion of other sub-processes (spot drilling, loading cycle)
- Rear hood unlocked
- In case all other processes are completed, the lamp of key ② REQUEST LOADING will be steadily burning. This indicates that the light curtains may be interrupted for loading without affecting any other processes.
- Loading of the rack loader unit (see section "Loading"), automatic switch-OFF of the release circuits.
  After interruption of the light curtains, the lamp of key ③ RESET LIGHT CURTAIN is beaming.
- After completion of loading and regional release of the light curtain, press key ③ RESET LIGHT CURTAIN: Thereby, you re-activate the release circuits and the continuation of any other sub-processes.
- After closing the rear hood, it is being locked again.
- Maybe press key② REQUEST LOADING once again. The light will be extinguished, the step chain (maximum of 6 steps) will run up until a bar has approached the stopper.
- If you don't press the key a second time, the key continues beaming until the chain is being resumed again by the other process.[1)]

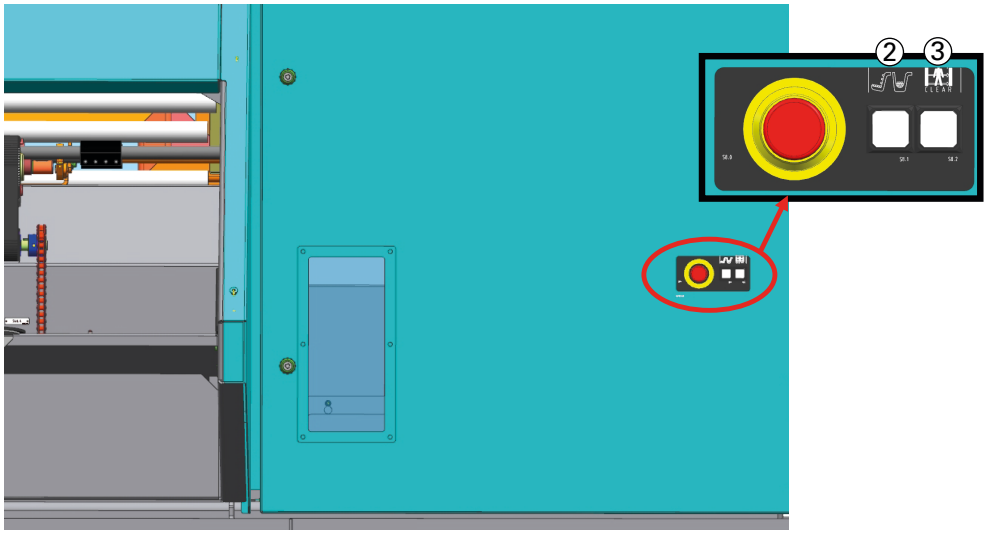
Loading by means of the bundle loader unit

Bars are being loaded into the bundle loader unit by means of a crane and stock piled there.

The bundle loader unit is protected by means of light curtains.

For loading the bundle loader unit, you must in first place require loading.

- For this purpose press key ② "REQUEST LOADING" at the rear face of the loading magazine.



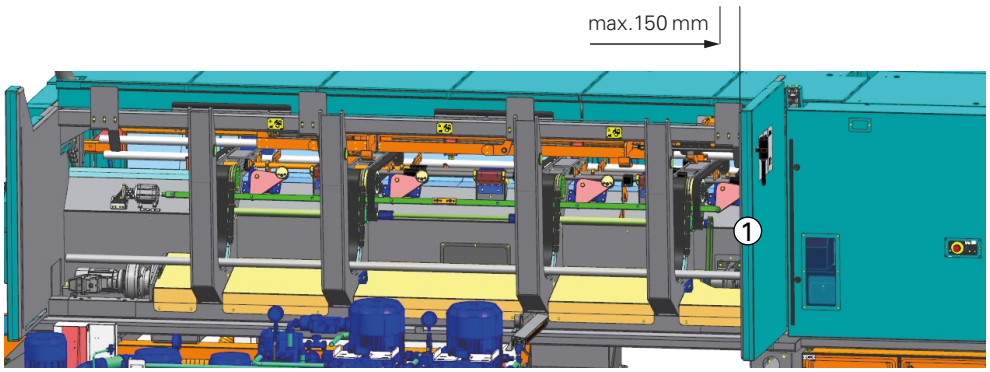
Thereby, the hoisting slings are being lowered.

As soon as loading may be carried out, the key will glow.

Attention:

If the key is flashing, the bar loading magazine is in a work cycle. If the light curtains are interrupted during said cycle, any motions will be stopped.

Depending on the position of the individual actuators, you must move the units free.



- Insert the bundle carefully into the bundle loader unit by means of a crane. The bars are supposed to show only small displacements within the bundle,
- Deposit the bundle as close as possible to the wall ① pointing to the magazine end.
- After inserting the bundle, you must check whether the position of the hoisting slings is correct. In order to prevent damages, the hoisting slings must not get out of place laterally.
- Thereafter and to begin with, you may release the bundle (sheet clamps). Subsequently, you may remove the hoisting devices. Thereby, the light curtains will be interrupted.

Please heed loading safety instructions.

As soon as the loading operation is completed and the light curtains are cleared, the light curtains must be reset.

- For this purpose press key ③ "RESET LIGHT CURTAIN".

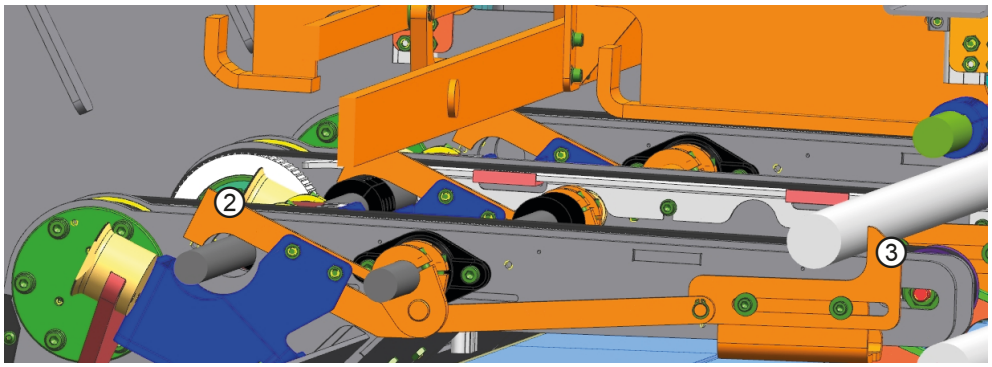
After successful reset of the light curtain, this key does not shine any longer.

Before light curtain reset make sure that the bundle loader unit area is vacant.

The bundle is being lifted as soon as a further bar is needed for spot-drilling. Lifting happens for so long a time until a bar lies at the stopper ② of the bundle loader unit.

The stoppers of the bundle loader unit and of the bar lift ③ are being jointly adjusted (see section "Bar lift"). A sensor recognises the position of the bundle loader stopper.

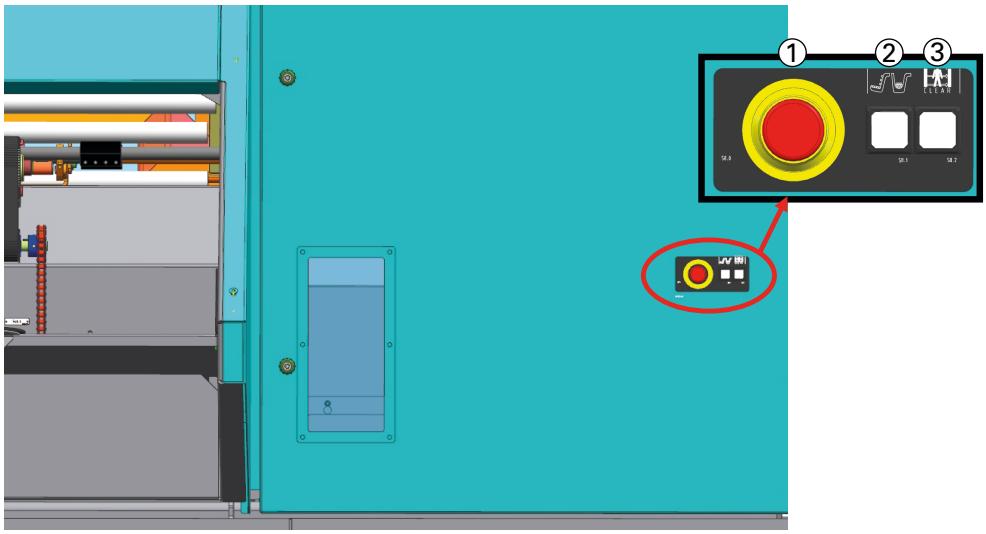
By means of the hoisting slings, the bundle is lowered a bit and the separating device lifts a bar out of the bundle. Said bar rolls on to the stopper of the lifter where the bar is lifted up by the lifting unit (see section "Lifting unit")



Alternatively, you can trigger an immediate "raising movement" of the bundle via double-pressing of key "REQUEST LOADING". See section "Operation"

Loading bars in case of a magazine with bundle loading unit

- Press key ② "REQUEST LOADING". The key starts flashing.



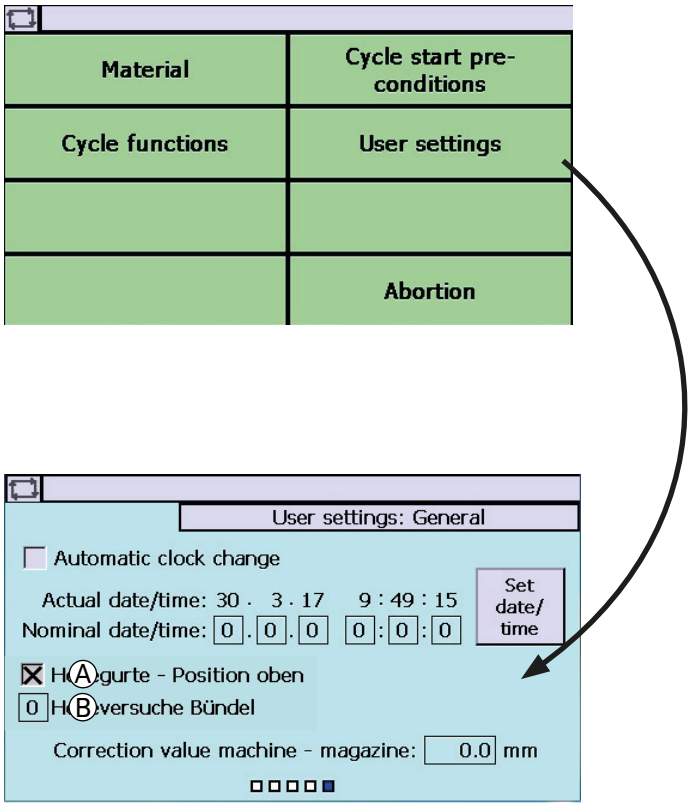
1 EMERGENCY OFF
2 REQUEST LOADING
3 RESET LIGHT CURTAIN

- Maybe complete sub-process "Convey bar", thereafter, start "Hoisting sling downward".
- Complete other sub-processes (spot-drilling, loading cycle)
- If the hoisting sling is in the very bottom position and if all other sub-processes are completed, the light of key ② "REQUEST LOADING" will be steadily burning. This indicates, that the light curtains may be interrupted for loading purposes without affecting any other processes.
- Loading of the bar bundle into the bundle loading unit (see section "Loading"), automatic switch-OFF of the release circuits.
  After interruption of the light curtains, the lamp of key ③ RESET LIGHT CURTAIN is beaming.
- After completion of loading and regional release of the light curtain, press key ③ RESET LIGHT CURTAIN: Thereby, you re-activate the release circuits and the continuation of any other sub-processes.
- Maybe press key② REQUEST LOADING a second time. The light extinguishes, the bundle is lifted up, until a bar approaches the separating unit.
- In case you do not press the key a second time, it continues beaming until the bundle is being re-assumed by the other process.

Hoisting belt settings

(only relevant in case of bundle loading units)

Navigation: Basic screen/information → User settings→ Horizontal sub-screen "General user settings"



☒ Hoisting belts - top position Ⓐ

Usually, the hoisting belts are mounted at the bottom position ① of the bundle arms which is intended for the attachment. Round bars will roll into the direction of the separating unit during the lifting procedure. Multi-sided bars, however, will not roll, they have to slide. However, sometimes, the bars will not slide due to the fact that the inclination of the belts are not steep enough for said sliding purpose.

In such cases, the belts must therefore be attached at the top position ② of the arms in order to achieve a steeper inclination of the belts in lifted-up condition.

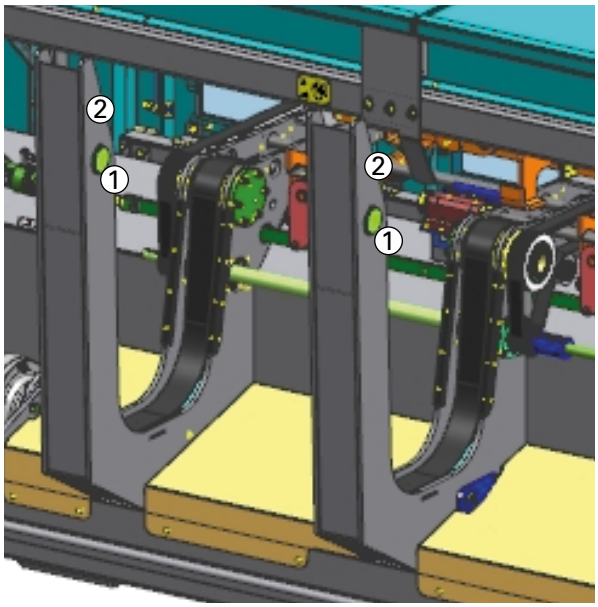
In case of new machines, INDEX attaches the belts at the top position right away during the INDEX assembly process.

☐ Bundle lifting attempts Ⓑ

Normally, the MBL-control system will state "no material present" in case no bar rolls into the direction of the separating unit any longer during the lifting procedure and will automatically have the belts move downwards for loading right away.

However, in case of thin bars, the operation range of the hold-down devices must be tighter in order to prevent that several bars are being separated simultaneously. In such case, it may happen that the bars do not roll under the holding-down devices at the first attempt, sometimes, the bars will lie crisscross in the bundle.

Before the control system states "no material present" in such case, lower the bundle a bit and only pick it up again in order to sort the bars. Via input "Bundle lifting attempts", you determine how often this procedure is supposed to be repeated. In case of "0" or "1" there will be no repetitions.



① Standard hoisting belt mounting position

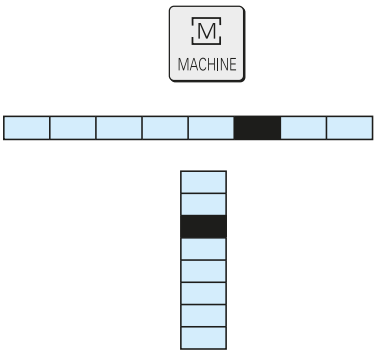
② Top position

Carrying out operating functions via the control system of the machine

User settings

To be able to operate the loading magazine via the control system of the machine, the user settings for the **Side loader INDEX MBL** (operating branch → **Parameters** → **User settings**→ **Material flow**) must have been activated..

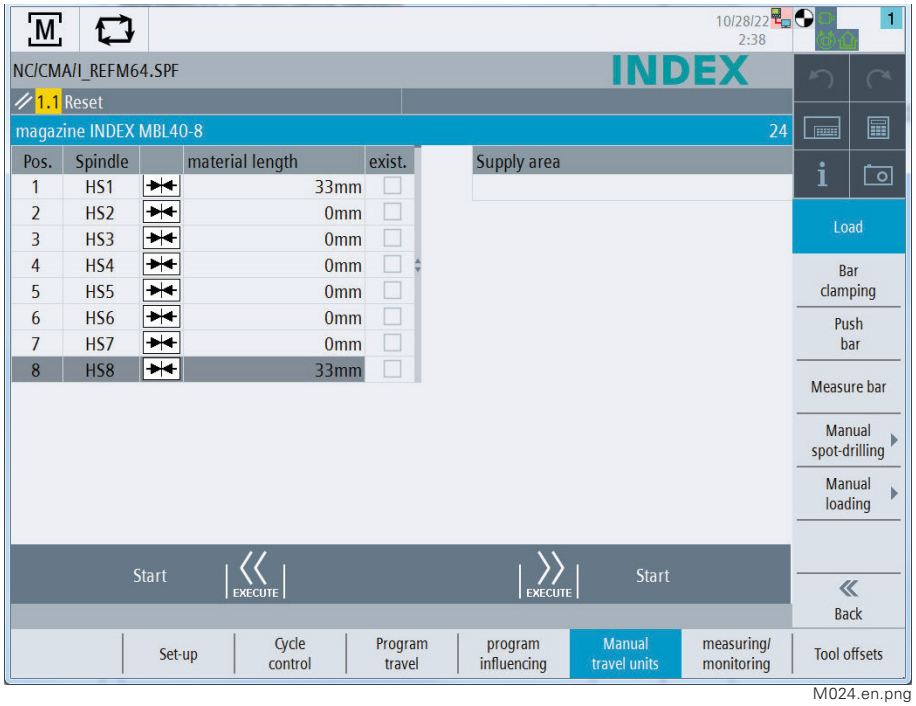
Operate units



Select OPERATION AREA OF THE MACHINE

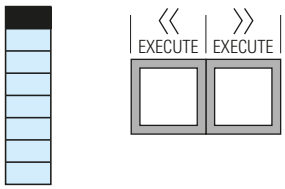
Press softkey →**Magazine** in screen "Operate units".

Thereafter, the following screen will be displayed:



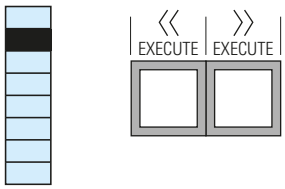
M024.en.png

In this screen you may carry out a series of important functions.



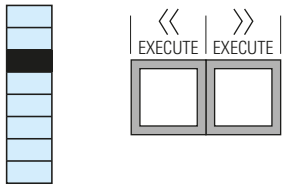
Start bar loading cycle

Via "**Load"** and "CARRY OUT FUNCTION", you start the loading cycle of the machine.



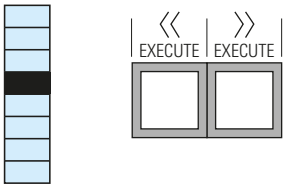
Clamp / unclamp material

Via **"Material chuck"** and "CARRY OUT FUNCTION", you close respectively open the selected material chuck.



Push material bars forward / backward

Via **"Push bar"** and "CARRY OUT FUNCTION", you may push the material bar forward respectively backward.



Measure material bar

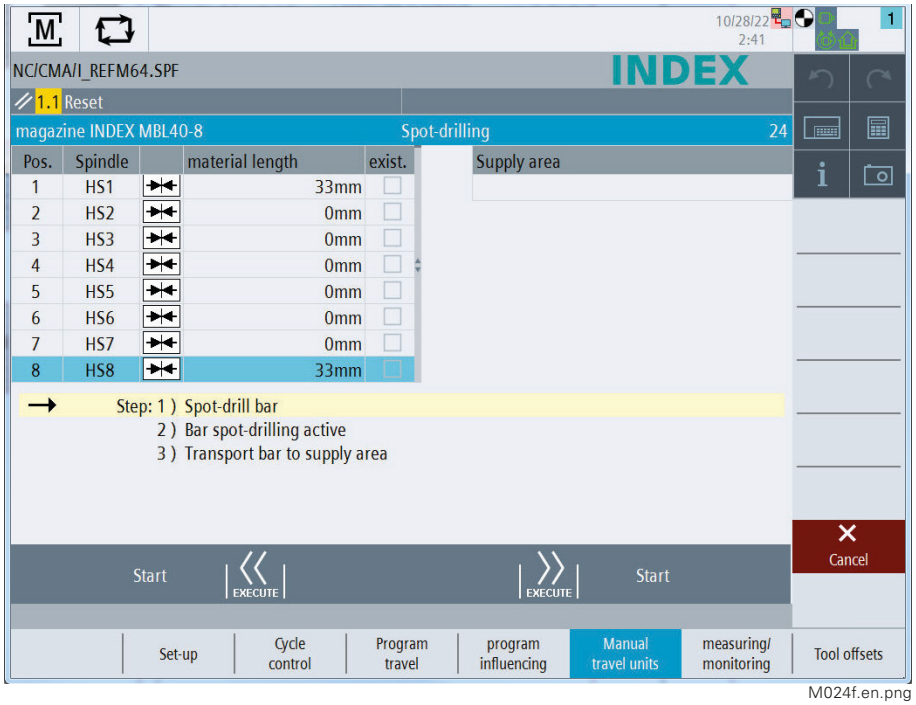
Via "**Measure bar"** and "CARRY OUT FUNCTION", you can measure the length of the material bar.

Manual spot-drilling of bars

By means of this function you may spot-drill material bars manually.

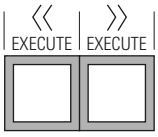
Press softkey **"Manual spot-drilling"**.

Thereafter, the following screen will be displayed:



M024f.en.png

The current step of the spot-drilling procedure will be displayed in the bottom area of the monitor.



Confirm every single step of the operating sequence via **"Start"**.

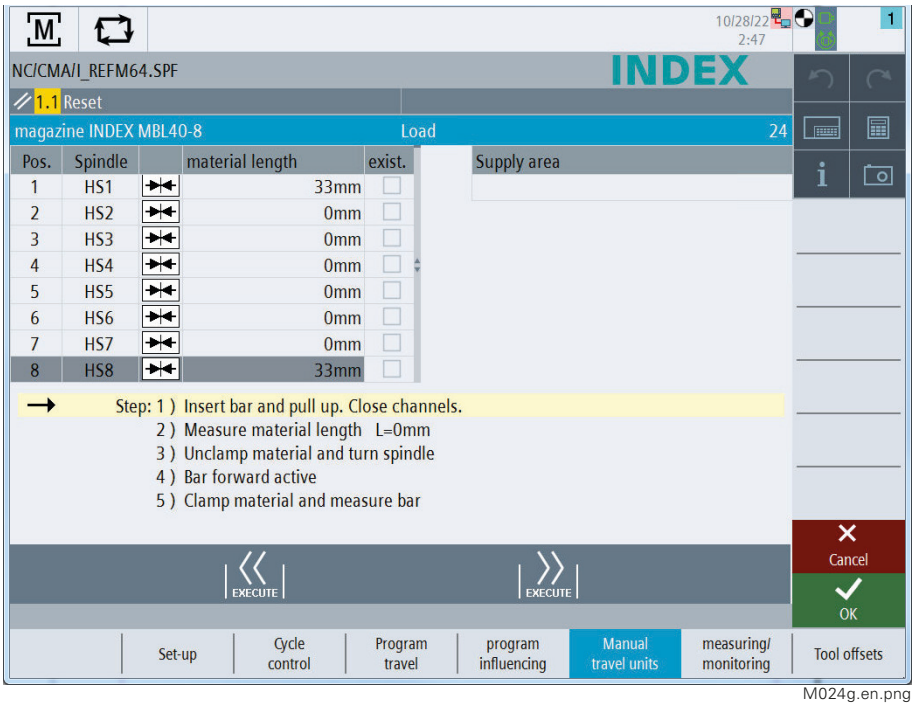
Manual bar loading

By means of this function,

1. you may insert and clamp short material bars manually,
2. long bars which have been loaded into the channel of the magazine beforehand, can be slid-in and clamped.

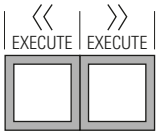
Press softkey **"Manual loading"**.

Thereafter, the following screen will be displayed:



M024g.en.png

The current step of the cycle will be displayed in the bottom area of the monitor.



Confirm every single step of the operating sequence via **"CARRY OUT FUNCTION"**.

Concerning step 2: This step is being skipped, in case the actual length has already been entered into field "L" during the previous loading attempt.

Set-up

Spot-drilling unit

The spot-drilling unit serves the spot drilling of material bars which are intended for the internal clamping sleeve of the slider.

Adjustment of the lifting stroke height

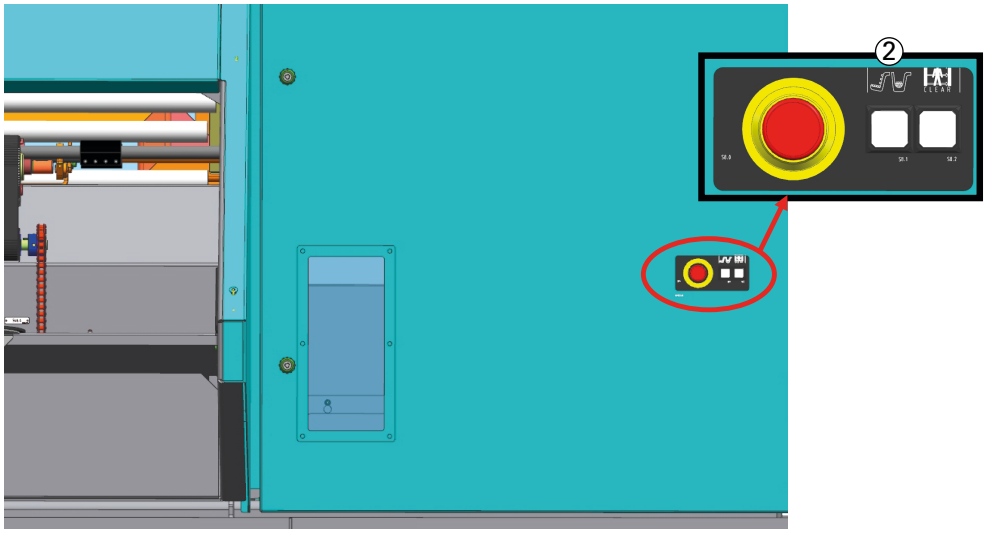
In case a bar is present at the stopper of the lifting unit, said bar is lifted up at this position by the spot-drilling unit. Depending on the diameter of the bar, the lifting stroke height must be adjusted in such a way that the bar can always be positioned centrically with reference to the lifting unit.

- For the adjustment of the lifting stroke height, open the rear door giving access to the spot-drilling unit. For this purpose, like with loading request, press key ② "REQUEST LOADING"

As soon as door can be opened, the above key will be glowing.

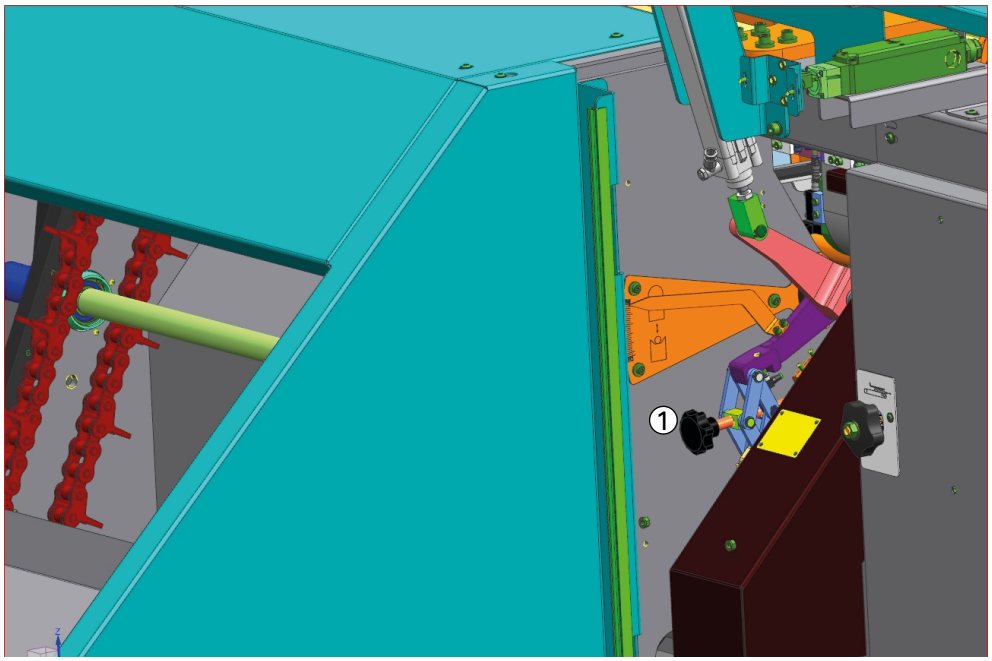
Attention:

In case the key is flashing, the loading magazine is in a spot-drilling cycle. In this case, the door remains locked until the cycle is completed



When the door is open, you will find a hand wheel ① as well as a scale on the left-hand side.

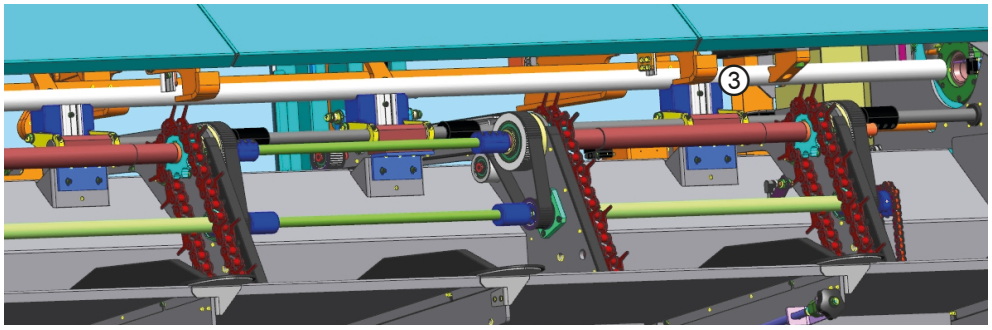
- Rotation of the hand wheel will shift the lifting stroke height.
  For adjustment, the lifting unit is supposed to be in bottom position.



After adjustment, the bar ought to be lifted for check purposes.

- For this, close the door and move lifting unit ③ into top position via the individual functions.

- After you have brought the bar into top position by means of the lifting unit, close the gripper of the spot-drilling unit via the individual functions.
- Please heed that the bar is not pushed upward or downward by closing the gripper. If this were the case, you must open the gripper and to lower the lifting unit. Thereafter you can correct and check the lifting stroke height.



3 Lifting unit

- Alternatively, you may also press the confirmation key at the operating panel of the loading magazine. With open door, you can thereby also move the lifting unit respectively the gripper via individual functions. At this, the light curtain must not be interrupted.

Attention:

For operation via the confirmation key, the key switch of the machine operating panel must be in "Set-up" position.
When working with the confirmation key, the operator must be especially careful. There is danger to get crushed between the pneumatic cylinder and the limit stop of the lifting unit.

The confirmation key may only be used by qualified and especially trained personnel.

Please heed the safety instructions.

- After completion of the adjustment of the lifting stroke height, please open the gripper and move the lifting unit into bottom position (home position).

Drill: cutting data

The technical data indicated by the manufacturer concerning feed and speed of the drill are valid as reference values. The parameters are mostly indicated in the form of ranges. It is recommended to select values from the low range.

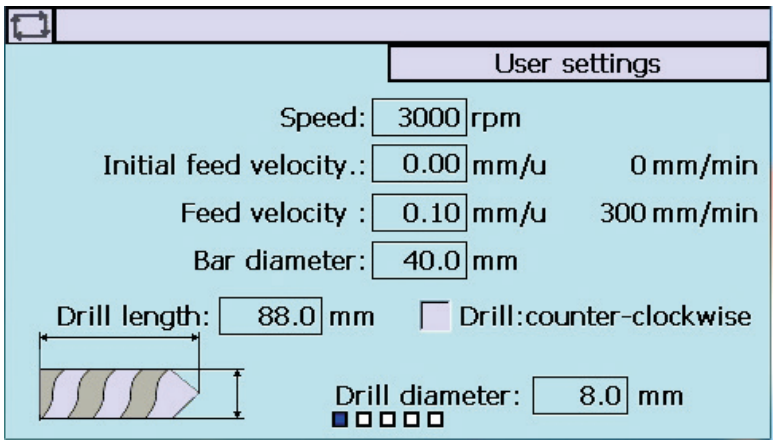
If necessary, you may select a lower initial feed velocity for the first millimeters of the boring. The rest of the boring is finished at the selected feed velocity. In case no deviating value or 0.00 mm/r has been entered, the complete boring is being done at the set feed velocity.

For optimisation, you may modify the values. However, this requires test borings with the respective bar material.

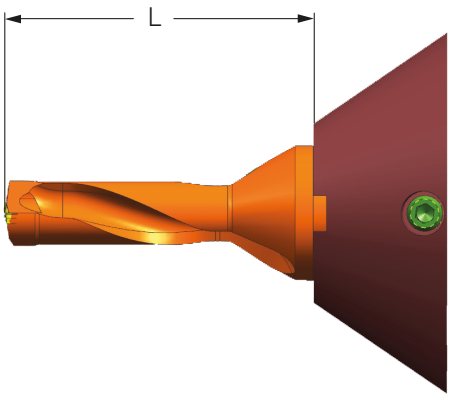
In case of material change, you must adjust and test the parameters anew.

You enter the drilling parameters under menu item "User settings" at the handheld operating device.

Navigation: Basic screen/information → User settings→ 1st horizontal sub-screen "User settings"

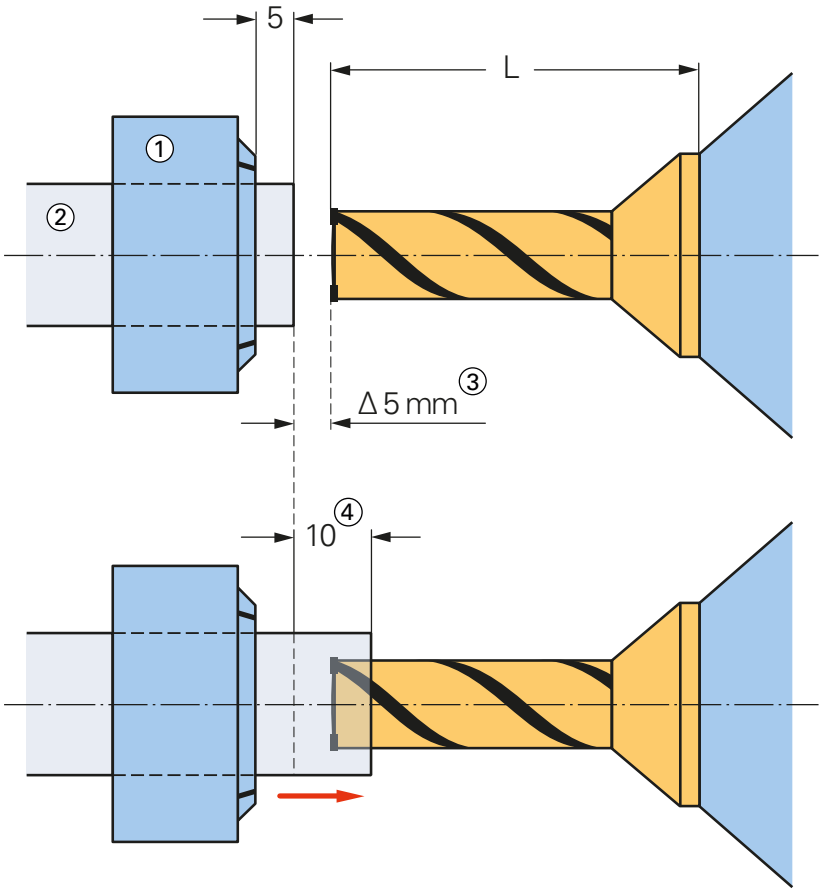


In this screen, the drill length is being displayed in a very simplified form for lack of space. The total drill length L which you have to enter here, comprises cutting edge, shaft and taper.



Drilling process

1. After capturing and gripping the material bar, the Z axis plus bar will travel at rapid velocity until they stop approx. 5 mm in front of the drill ③. This relatively great allowance is required since both the capturing of the bar end by means of the light barrier and the bar end itself are tolerance prone. By this allowance, the bar is prevented from hitting the drill in rapid motion.

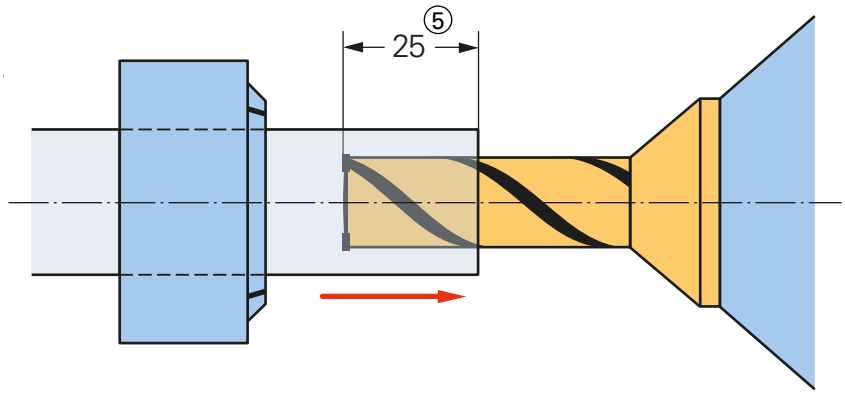


① collet chuck

② material bar

2. In case you are working with a smaller initial feed rate, the first 10 mm of the drilling path ④ will be travelled at such low feed rate. Subsequently, there will be a cut-free time of approx. 150 ms.

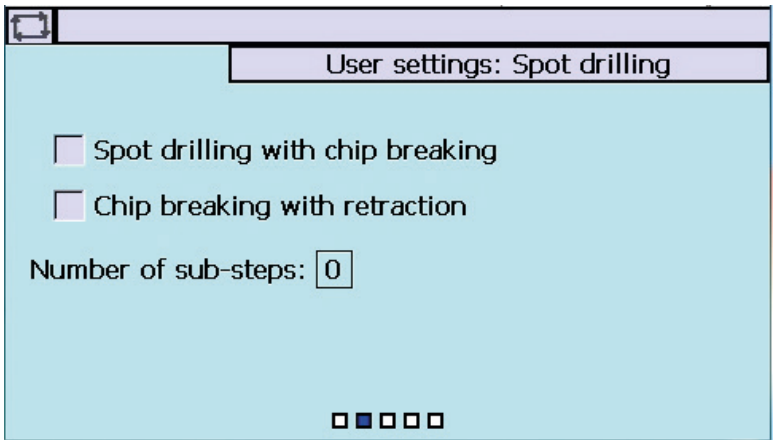
3. The remaining drilling process will be completed at the entered feed rate. The nominal drilling depth in the bar is 25 mm ⑤. Of this, 20 mm must be guaranteed for the internal clamping sleeve. The remaining 5 mm represent an allowance for reason of the capturing of the bar end mentioned in step 1 and for reason of a potentially existing drill bit.



User settings for spot-drilling

In addition, it is possible to subdivide the boring into several steps (maximum 8) with and without retraction of the drill out of the boring.

Navigation: Basic screen/information → User settings → Horizontal sub-screen "User settings for spot-drilling"

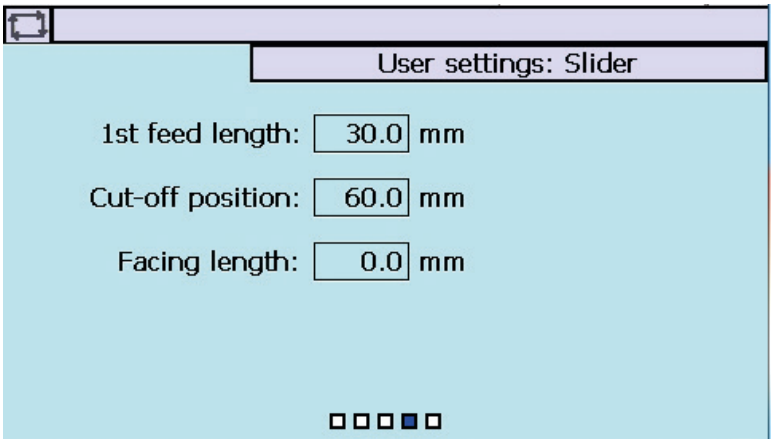


☒ In case merely fiield "Spot-drilling plus chip breaking" has been selected, there will be a short cut-free break of approx. 150 ms between the single drilling phases.

☒ In case both fields have been selected, the drill will be retracted to the start position between the single drilling phases.

Pre-selection counter for spot-drilling

Navigation: Basic screen/information → User settings → Horizontal sub-screen "Pre-selection counter for spot-drilling



In case it is known how many spot-drilling procedures can be carried out safely by one drill, you may enter a nominal number of spot-drillings for the pre-selection in this screen. For every spot-drilling procedure, the actual number of borings is incremented by 1.

When the nominal number is reached, a message will be issued which will be displayed both at the handheld MBL operating device and on the machine screen. Said message will not produce a stop and you also may remove the display via key DELETE FAILURE INDICATION. However, said error message will be repeated as a reminder every 10 minutes.

The actual number of spot-drillings can only be deleted via the "Clear pre-selection counter" button. By this, the operator confirms that he has exchanged the drill (only possible in case of "CYCLE OFF: Drill exchange". See respective section).

In case the above mentioned message is being ignored, the MBL will still spot-drill one further bar and subsequently the spot-drilling will be stopped. This will be displayed in this very screen. Thereafter, the production will continue until all loaded and spot-drilled bars will be used up.

Further options for the use of the pre-selection counter:

- as a reminder to discharge the small chip container in the spot-drilling station

The above is especially recommended in cases where the drill is already being monitored by the motor current based spot-drilling monitoring system of the MBL (refer to the respective section, please).

Drilling tools

For drillings with a diameter of 15 mm, it is standard to use a throwaway tip drill KUB Trigon (INDEX article number 904990.1061) with the respective throwaway tips (INDEX article number 904990.1081).

The length of the drill is 70 mm and must be entered in the user settings.

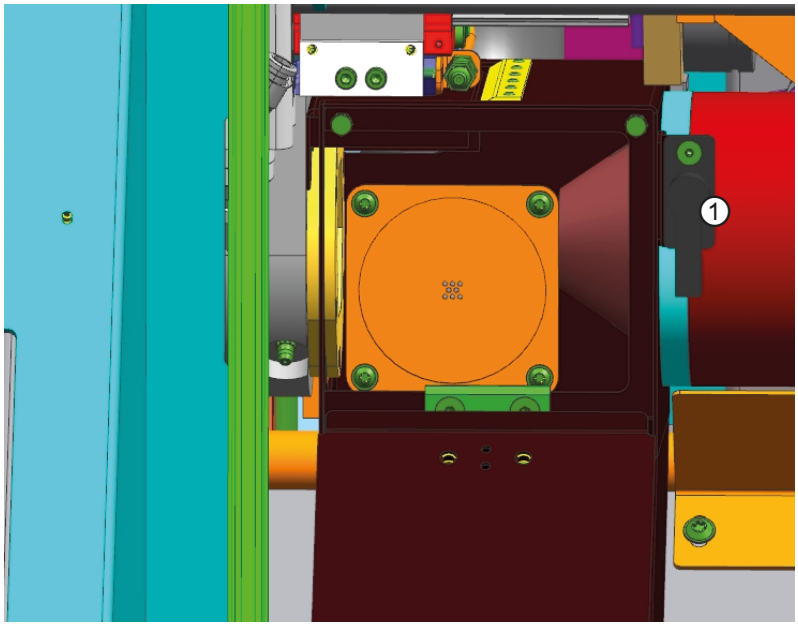
For drillings with a diameter of 8 mm, it is provided to use a solid carbide drill Titex (INDEX article number 904990.1071). The length of the drill is approx. 55 mm and must be entered in the user settings.

For varying tools, please contact INDEX and clarify.

Change drill

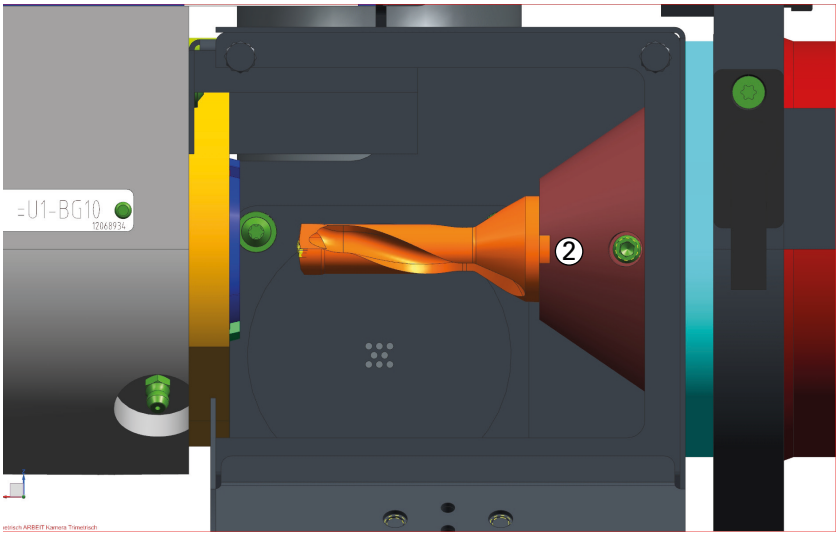
Z– Z+

- If you want to change the drill of the spot-drilling unit, first of all move Z axis away from the drill. A position at a distance of 145 mms is sufficient.
- Thereafter, open the door. Concerning this, please refer to "Adjustment of the lifting stroke height" further above in the present document.
- By rotating the locking bar ①, you may open the flap at the chip chute whereby the area for drill change is exposed.



Radially at the spindle of the spot-drilling unit, there is a boring in which a grub screw has been mounted. By means of said grub screw, the drill is clamped in the spindle.

- In order to change the drill, loosen the grub screw.
- Thereafter, you can axially withdraw the drill. A channel at spindle ② facilitates the disassembly of the drill. If necessary, you can pry the drill.



When dismantling the drill, you must wear your personal protective equipment. Please heed the safety instruction.

- The mounting of a new drill happens in reverse order.
- In case you wish to use the smaller drill ø8, you must use an adapter sleeve.
- The tools which are required for the drill change, may be stored in the holder next to the chip container.
- The locked-torque is 10 Nm.
- After exchange of the drilling bit, have the drill run counter-clockwise or clockwise and switch-ON the drill lubrication system for approx. 1 minute. After this, switch-OFF the lubrication system first and thereafter stop the drill. By this procedure, sufficient lubrication is guaranteed even with the first drilling after the exchange of the drilling bit.

  Navigation: Individual functions→ Spot-drilling unit

Change of the collet at the gripper unit of the spot-drilling unit

Z– Z+

- Traverse Z axis to position 145 mm via a key of the operating panel.
  With open door, additionally press the confirmation key.

Attention:

For operation via the confirmation key, the key switch of the machine operating panel must be in "Set-up" position.
When working with the confirmation key, the operator must be especially careful. There is danger to get crushed between the pneumatic cylinder and the limit stop of the lifting unit.

Functions which require the confirmation key may only be used by qualified and especially trained personnel.

Please heed the safety instructions.!

- In this position, you may use the mounting tools for the dismantling respectively mounting of the collet.
- After the mounting, close the flap at the chip chute and move the Z axis into its home position.

Clamping pressure of the chucking cylinder

If necessary, you may adjust the clamping pressure of the chucking cylinder. Thereby, you must heed, that a sufficiently high clamping pressure is available in order to be in a position to safely clamp the bar during the drilling process. For this reason, select the clamping pressure as high as possible.

For details concerning the clamping force, please see user documentation of the machine, sheet KM9852.90141 (MBL40-6 and MBL40-8) and KM9152.90121 (MBL22-8).

Special feature MBL22-8: Installation of a one-part collet for diameters 22 to 24 mm

The MBL22-8 loading magazines have a special feature on the drilling unit:

Up to a bar diameter of 22 mm, the standard clamping heads are used. From bar diameters of 22 mm to 24 mm, a one-part collet is used.

To be able to install this one-part collet, the base body must be removed from the clamping piston. This is done similarly to the machine.

Procedure

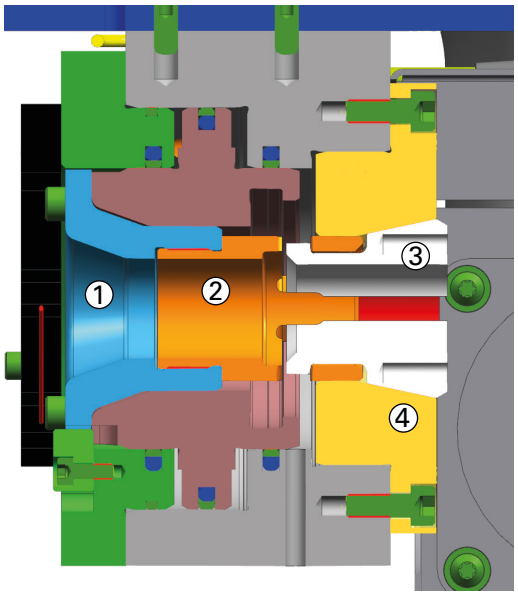
1. Remove the drill and collet.
2. Turn back the cross pin on the clamping element holder. It provides serves as an anti-twist lock for the base body.
3. Unscrew the base body from the clamping piston using the installation tool (SAP No. 10181964).
4. Screw the one-part collet fully into the clamping piston using the wrench insert (SAP No. 10251038) and turn it back until the cross pin of the clamping element holder engages in the groove of the collet. This ensures the anti-twist lock of the collet.
5. Screw in the cross pin on the clamping element holder and secure it.

For removal, follow the steps in reverse order.

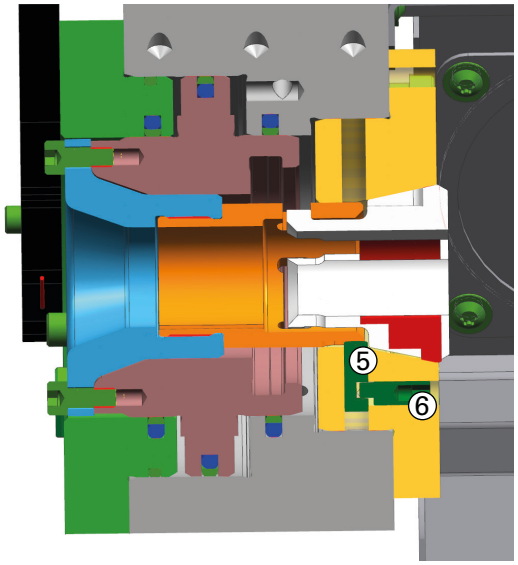
Pay attention to cleanliness!

Clean and grease the collet chuck and clamping element holder.

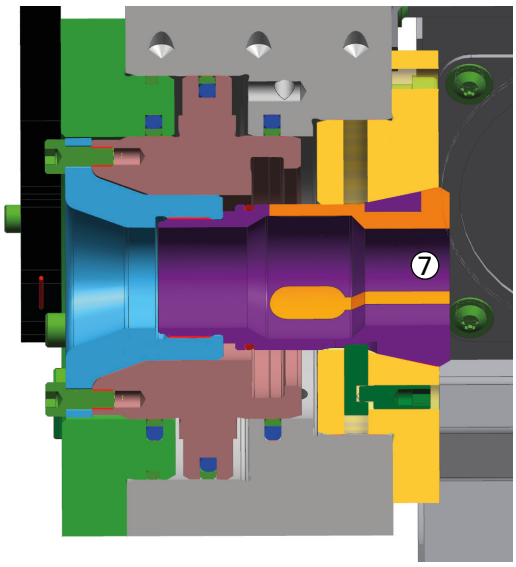
There are different adapted collets for each clamping diameter.



1 Clamping piston
2 Base body
3 Standard clamping head
4 Clamping element holder



5 Cross pin for anti-twist lock
6 Movement of the cross pin via this screw



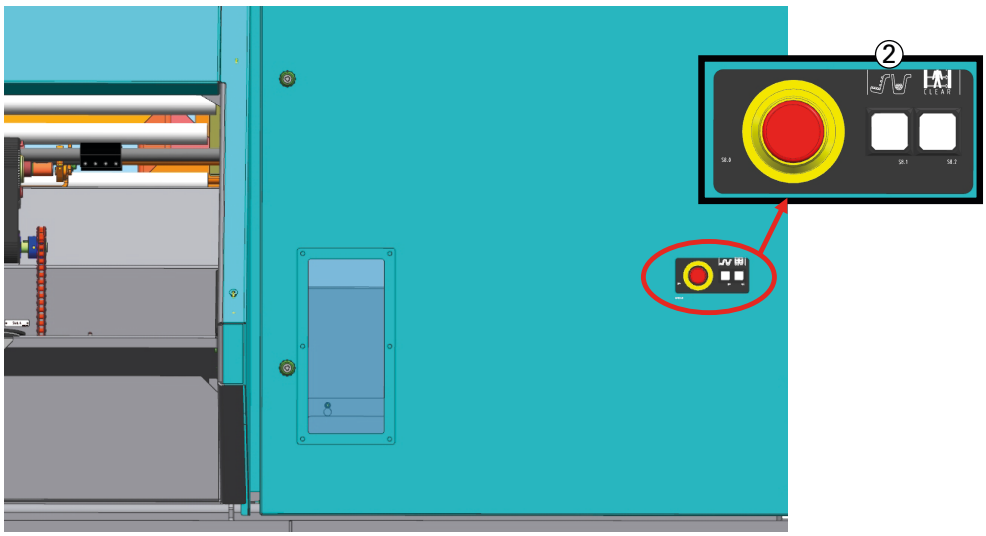
7 One-part collet for ø22 ... ø24

Discharging of the chip container

- For discharging of the chip container open the rear door which gives access to the spot-drilling unit.
- In additions, like with request of loading, press key ② "REQUIRE LOADING".
- As soon as the key is glowing, the door may be opened.

Attention:

In case the key is flashing, the bar loading magazine is in a spot drilling cycle. In such case, the door remains locked until the cycle is completed.



- Now, you can withdraw and discharge the chip container.
  While the door is open, no further spot-drilling cycle can be started.
- After discharging of the chip container, re-position it beneath the chip chute.

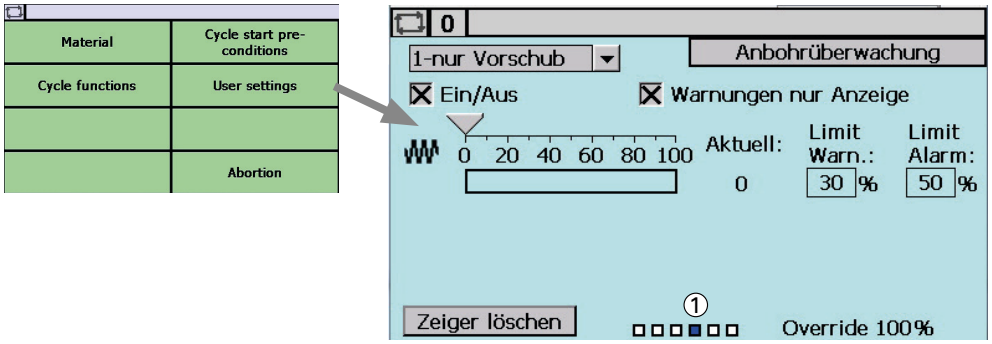
When discharging the chip container, you must use your personal safety equipment. Refer to safety instructions, please.

You ought to select a counter setting with reference to the anticipated weight of the chip container with chips in it.

Spot-drill monitoring

(the above function will be available from software version P01.12 on)

Navigation: → Basic screen/information → User settings→ Horizontal sub-screen "Spot-drill monitoring"①



Mode of operation

Spot-drill monitoring is based on the motor currents of the feed drive Z9 and of the rotary drive C9 of the drill. Said currents will be displayed in % of the maximum possible current while a spot-drill cycle is active. Thus, the display represents the degree of capacity utilisation of the respective drive. In the "spot-drilling" screen, the user may switch the monitoring function ON and OFF.

Before activation, a monitoring mode (1,2,3,4) must be selected. Hereby, it is determined which motor (1,2) is being monitored and in which way the motors (3,4) are supposed to be monitored.

During spot-drilling, the maximum reached value is displayed for the user by a so-called trailing pointer which may be reset at any time. Said trailing pointer serves the determination of the limits.

Two limits may be manually adjusted by the user: an alert limit and an alarm limit. Both limits entail different reactions. While monitoring is active, the actual value will be displayed for the user. In addition, there will also be a graphic display of said actual value.

Reactions in case of limit value excess

Alert limit exceeded with active "Merely display" setting

➞ At the operating device and at the machine, only one display is being activated.

Alert limit exceeded with de-activated "Merely display" setting

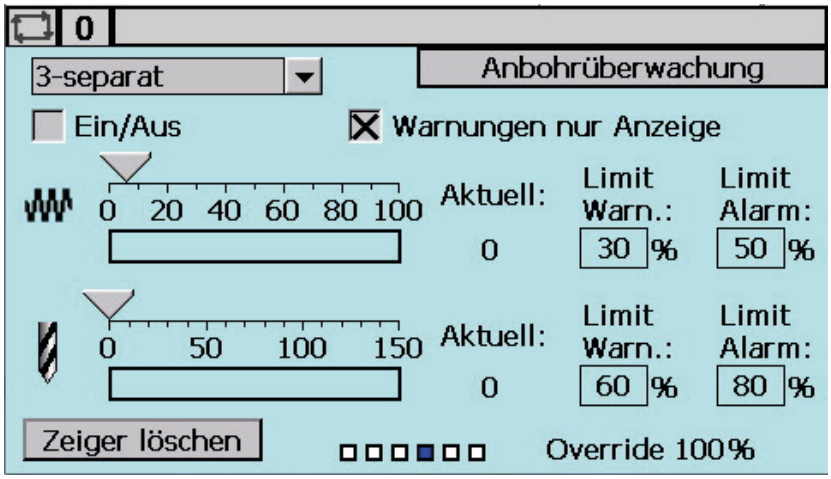
➞ At the operating device and at the machine, one display is being activated.
In addition, the next spot-drilling operation will be blocked.

Alarm limit exceeded

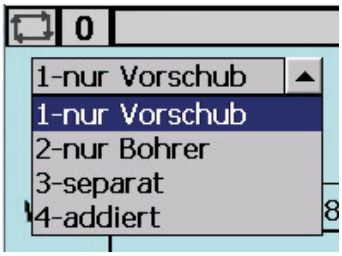
➞ The spot-drilling operation is immediately aborted and the drill is being moved to the drill position in front of the bar (free travel).

Subsequently, a user intervention is required.

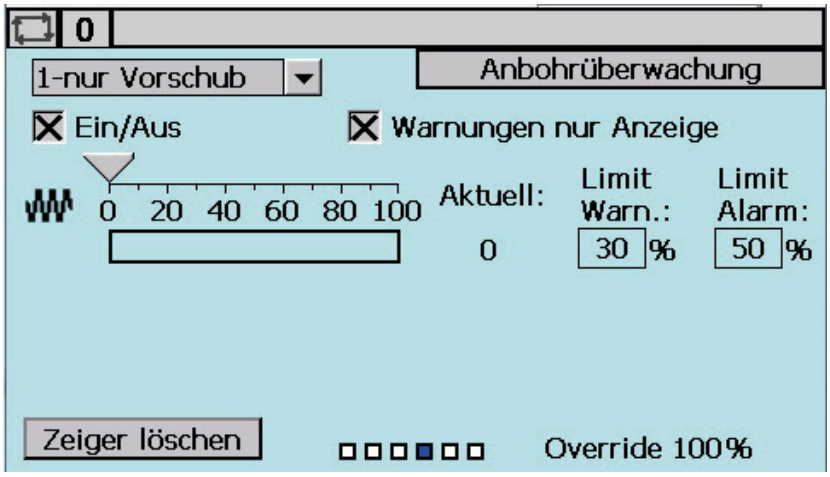
Set-up screen



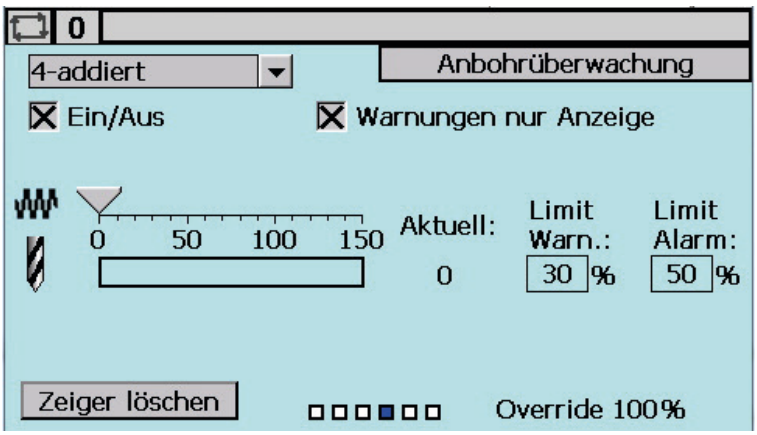
Display elements of the set-up screen

Selection box 	Selection of the monitoring modes: 1 – monitor feed drive (Z9) only 2 – monitor drill drive (C9) only 3 – monitor both drives separately 4 – monitor both drives together
ON/OFF	Switch-ON and OFF of the function
Mere display of warnings	☒ Active – In case the set alert limit is exceeded, this event is supposed to be displayed at the handheld operating device and at the machine ☐ De-activated – In addition to the display, the next spot-drilling operation will be blocked.
	Trailing pointer for the maximum reachable value.
	Line for feed drive Z9
	Line for drill drive C9
Current value:	Current value of the respective drive in % . In case of active monitoring, the displayed text will be highlighted in GREEN colour.
Alert limit::	This alert limit (pre-alarm) may be set by the user. This alert limit may e.g. serve as a hint to make a new drill available and to exchange it right now. In case this limit is reached, the text will be highlighted in ORANGE colour. Typically, this value ought to be smaller than the set alarm limit value..
Alarm limit:	This alarm limit may be set by the user. Since an alarm will always entail immediate stop with free travel, an alarm limit ought to be reached only in case of emergency, for instance in case the warning display was neglected. In case this limit is reached, the text will be highlighted in RED colour. Typically, this value ought to be smaller than the set alarm limit value..
Delete Pointer	By means of this, the maximum reached value displayed by the trailing pointer may be reset at any time. By so doing, the maximum value detection may happen anew.
Override 100%	Displayed value of the previously set override value. This value always ought to be 100%.

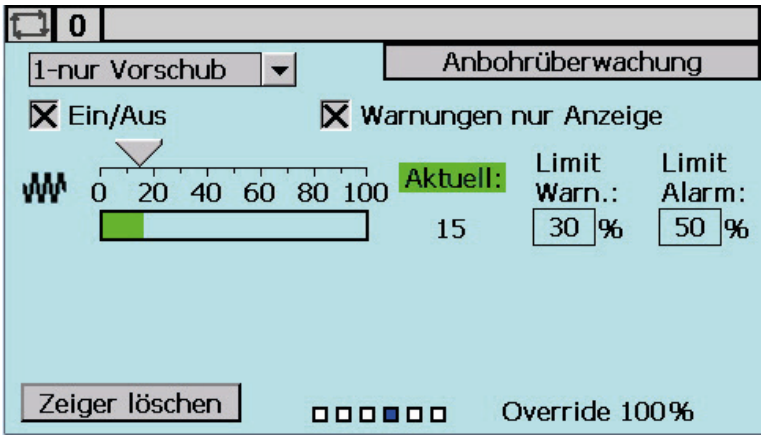
Example for the display



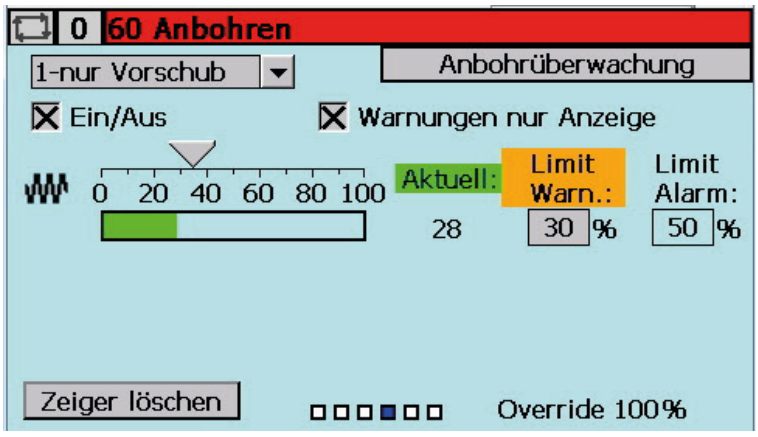
- Display for monitoring mode 1 (monitor feed only).
- Monitoring is switched-ON.
- Warnings will only be indicated in the form of a display.
- Alert limit has been set to 30% and alarm limit to 50%.
- Status: No active monitoring. Override = 100%.
- Trailing pointer was reset/deleted. (0%).



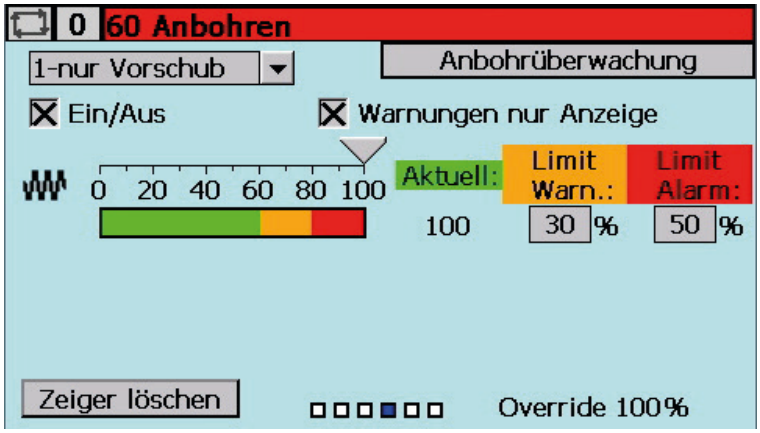
- Display for monitoring mode 4 (watch feed and drill drives together).
- Monitoring is switched-ON.
- Warnings will be indicated only in the form of a display.
- Alert limit has been set to 30% and alarm limit to 50%.
- Status: No active monitoring. Override = 100%.
- Trailing pointer was reset/deleted. (0%).



- Display for monitoring mode 1 (monitor feed only).
- Monitoring is switched-ON.
- Warnings will only be indicated in the form of a display.
- Alert limit has been set to 30% and alarm limit to 50%.
- Status: Active monitoring. Override = 100%.
- Current value = 15%.
- Trailing pointer 15%.
- No limit reached.



- Display for monitoring mode 1 (monitor feed only).
- Monitoring is switched-ON.
- Warnings will only be indicated in the form of a display.
- Alert limit has been set to 30% and alarm limit to 50%.
- Status: Active monitoring. Override = 100%.
- Current value = 28%
- The trailing pointer has registered 35%. Therefore, the set Alert limit of 30% was reached (text highlighted in orange colour).
- Error text "60 Spot-drilling" is being displayed in the headline.
- At the machine, error 779603 "Warning from spot-drilling monitoring" is being displayed.



- Display for monitoring mode 1 (monitor feed only).
- Monitoring is switched-ON.
- Warnings will only be indicated in the form of a display.
- Alert limit has been set to 30% and alarm limit to 50%.
- Status: Active monitoring. Override = 100%.
- Current value = 100% (or more)
- The trailing pointer has registered 100%. Therefore, the set Alarm limit of 50% was reached (text highlighted in red colour).
- Error text "60 Spot-drilling" is being displayed in the headline.
- At the machine, error 779601 "Alarm from spot-drilling monitoring" is being displayed.
- Spot-drilling was aborted and the drill was moved free.

Additional information

- Feed drive Z9:
  Only motor currents into drill direction are being taken in account..
- Drill drive C9:
  Consideration of the clockwise drill direction only.
- In case drilling is interrupted, a retraction movement will not be added for monitoring purposes.
- With start of monitoring, the initial current (initial current peaks) will be filtered out.
- Rapid current fluctuations (current peaks) will be filtered out or will be averaged by means of an average value.

Important notes

- You ought to avoid drillings with "new" drill exceeding a maximum value of 80% .
- Solely the user himself is responsible for the way in which he sets the limit values.
  Drill breakage or destruction of the drill can therefore not be prevented by the function itself.
- In case of drilling into difficult to machine materials, it may be necessary to de-activate this spot-drilling monitoring function.
- In case of drilling with special drills, it may be necessary to de-activate this spot-drilling monitoring function.
- In monitoring mode 3 (separate monitoring), the colour change cannot be assigned to a definite drive. It cannot be determined whether the drill drive or the feed drive has reached the limit which is now indicated. There is only one joint indication for both drills together.
  However, via a comparison of size between the registered trailing pointer value and the set alert/alarm limit, you may recognise which one of the drives has exceeded the limit.
- In mode 4 (joint, overlaying monitoring), you cannot determine whether the drill drive or the feed drive has reached the limit which is being signalled right now. It is therefore possible, that one drive alone or both drives together has/have exceeded the limit.

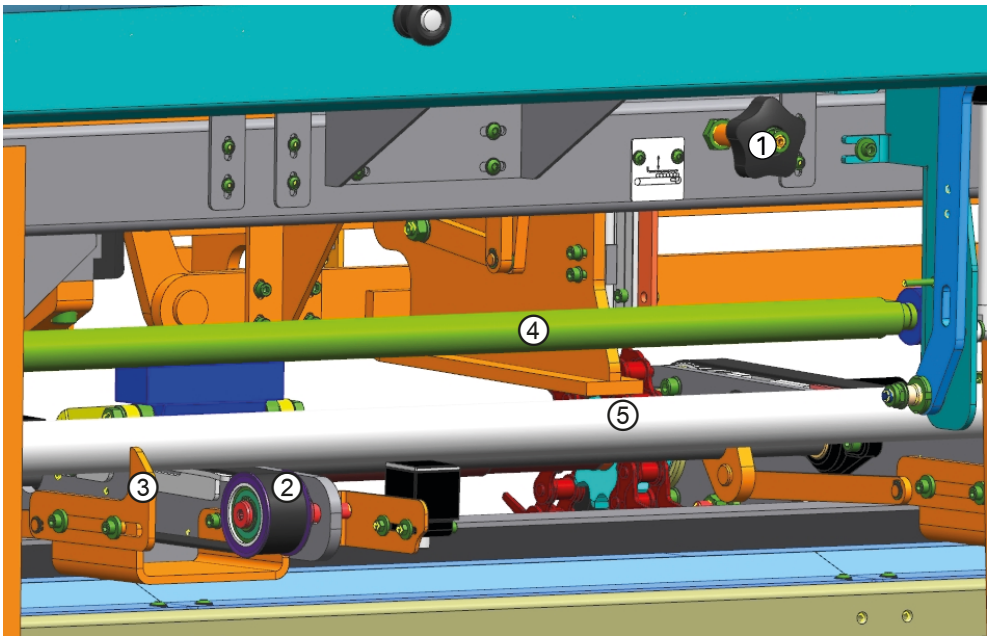
Bar lift

After spot-drilling, the bars are being transported via the cross conveyor belt ② to the stopper ③ at the bar lift. In this area, there are holding-down devices ④ which prevent the bars from piling up.

Depending on the bar diameter, the holding-down devices may have to be re-adjusted.

Re-adjustment of the holding-down devices at the bar lift

- Bring one bar into the stockpiling area.
- Open front door of the bar loading magazine.
- Lower the holding-down devices till the bar by rotating the hand wheels ① .
- Thereafter, set holding-down devices back a bit, so that there is some play between bar and holding-down devices.



1 Adjustment wheel
2 Cross conveyor belt
3 Stop position
4 Holding-down device
5 Bar

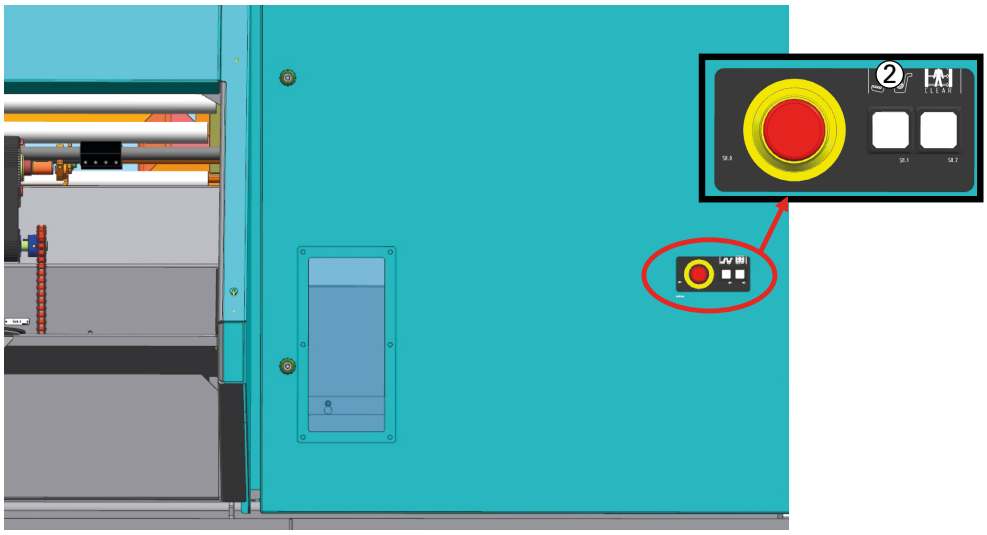
Adjustment of the stoppers to the bar diameter

The stoppers ③ of the bar lift must also be adjusted to the bar diameter, in order that the lift is lifting only one bar at a time.

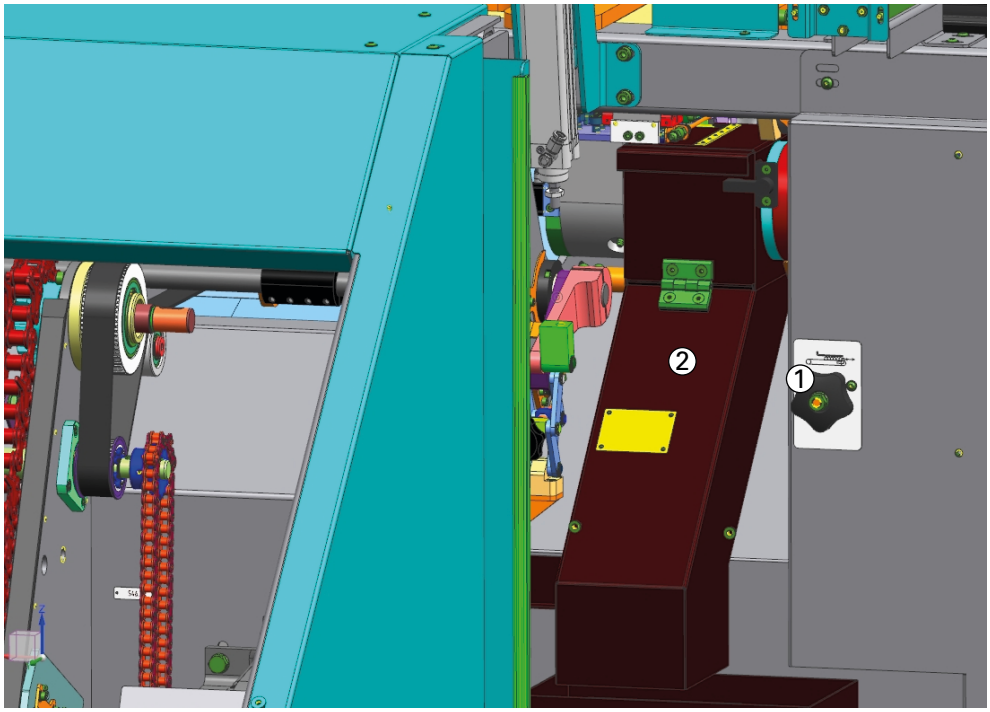
- For this purpose, open the rear door giving way to the spot-drilling unit.
- Press key ② "REQUIRE LOADING".
- As soon as the key is beaming, you may open the door.

Attention:

In case the key is flashing, the bar loading magazine is in a spot drilling cycle. In such case, the door remains locked until the cycle is completed.



- To the right of the chip shute ② there is an adjustment wheel ①.by means of which you may jointly adjust the sop positions of the bar lift. The scale helps with the adjustment.



Checking the lifting of the bar

In cases where there are already several bars in the stockpiling area, you have to check the lifting of the bars.

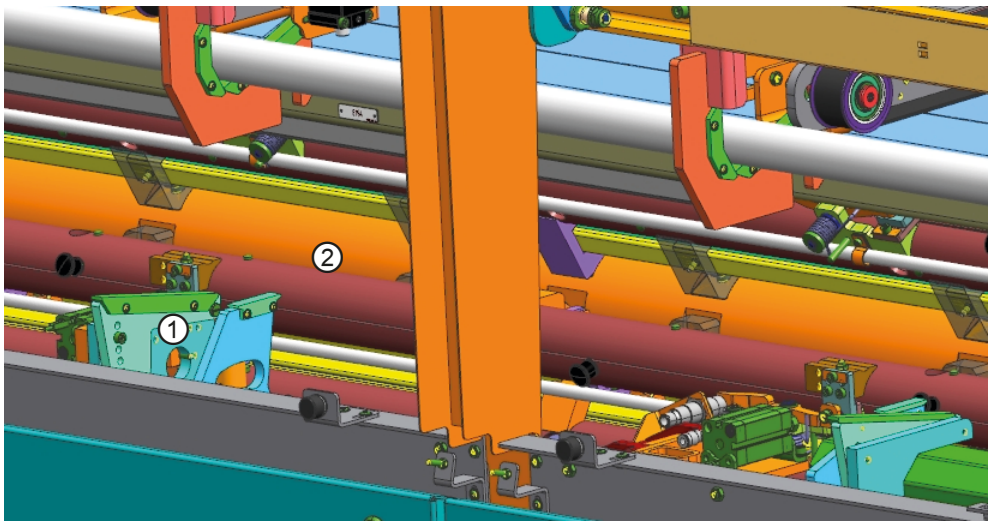
- Close all doors.
- If necessary, adjust the stop positions in such a way that only one bar is being lifted.

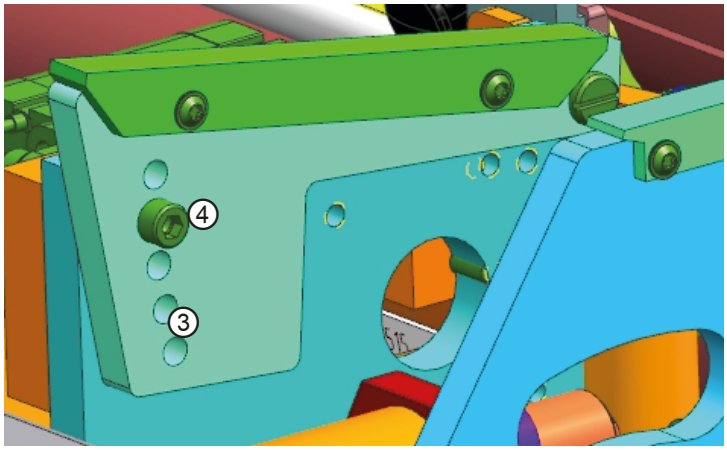
Adjust angle of the bar insertion guiding devices

After lifting up the bar, the bar lift moves downward and deposits the bar on a bar insertion guiding device ①. From there, the bars slide into the open channels ②.

Depending on the weight and on the dimensions of the bar, it is necessary to adjust the angle of the bar insertion guiding devices. For small respectively light bars or for polygon bars as well, you need a steeper angle than for heavy, round bars.

- The angle is adjusted by means of a grid ③. For adequate adjustment, you must dismantle the screw ④ and re-mount them after adjustment is completed.
- Set the angle in such a way that the bar is lying completely in the guidance channel.
- Set all bar insertion guiding devices to the same angle.





Channels

The channels serve the guidance of the bar material during machining.

- In order to be able to guide the bars in an optimum way, the guidance diameter of the channels must be adapted to the bar material. For the guidance diameter of the channel you select 1 mm more than the bar diameter.
- The adaptation happens by using different half bearings and reducing tubes which are being mounted in the channel.

Opening the channels

Z0

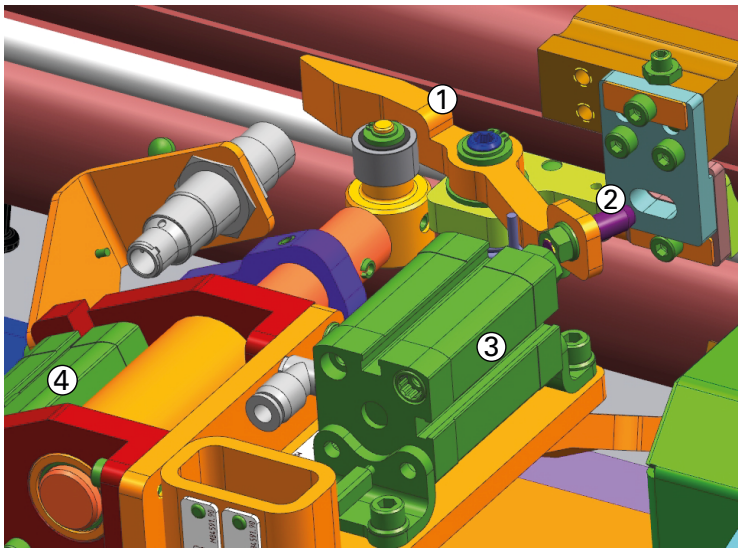
- To open the left channel, the slider carriage must be in zero position. Thereby, you prevent the slider from being damaged when opening the channel.

  If the slider is not in zero position, the command "open channel" is not carried out.

  In case of the right channels, there are no limitations.

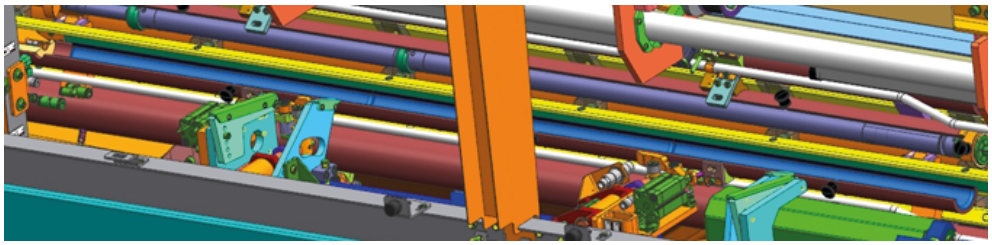
- Thereafter you must open the locks of the channels. At this, per lock a pneumatic cylinder moves out and presses against a lever. At said lever, a locking bolt is mounted, which connects the upper mobile part with the lower stiff part of the channel.

  Per channel side there are two locks which are moved simultaneously.



1 Lever
2 Locking bolt
3 Pulse cylinder
4 Cylinder

- After unlocking the channel, the channel may be opened. At this, a cylinder swivels in the opening lever which moves into a crank mechanism at the end of the channel. Thereby, the upper part of the channel folds open.

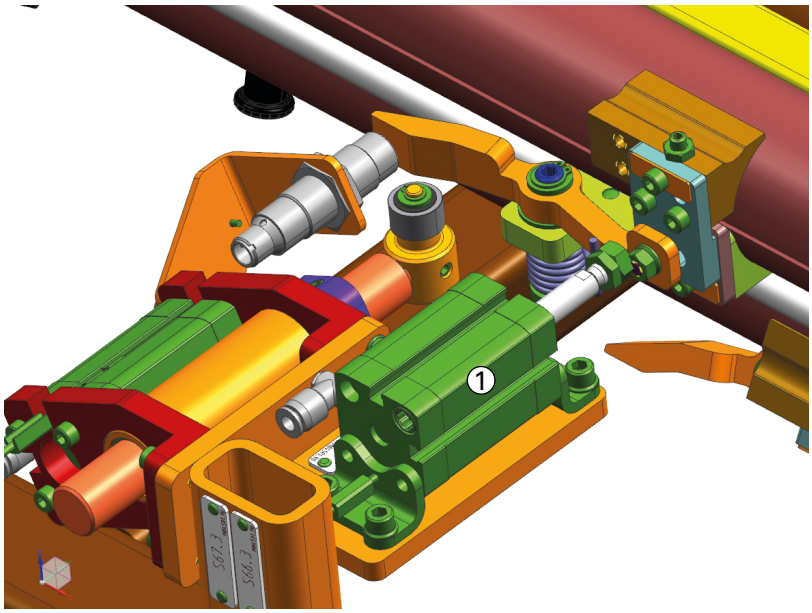


- As soon as the right and the left channel are open, the bar insertion guiding devices may be swivelled-in and the bar forwarded into the channel.

Attention: In case a bar is connected with the slider, the left channel must not be opened, since there is the danger of damaging the channel respectively the slider. Before opening the channel, the situation is enquired at the operating panel.

Closing the channels

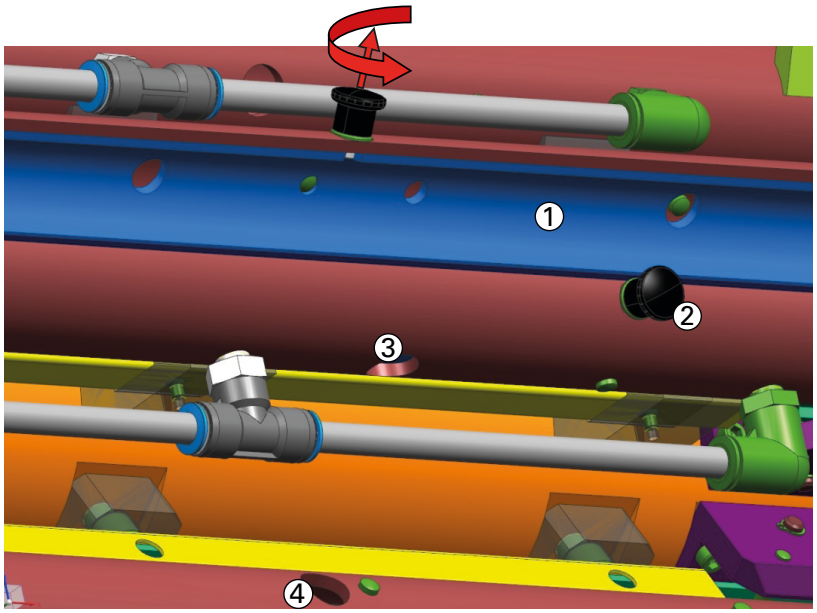
- The closing of the channels happens in reverse order of the opening procedure.
- After closing and locking the channel, the pulse cylinders move out to make sure that the locks are locked correctly.
- Moreover the "Locked" condition is enquired by means of sensors.



1 Pulse cylinder

Refitting the material diameter

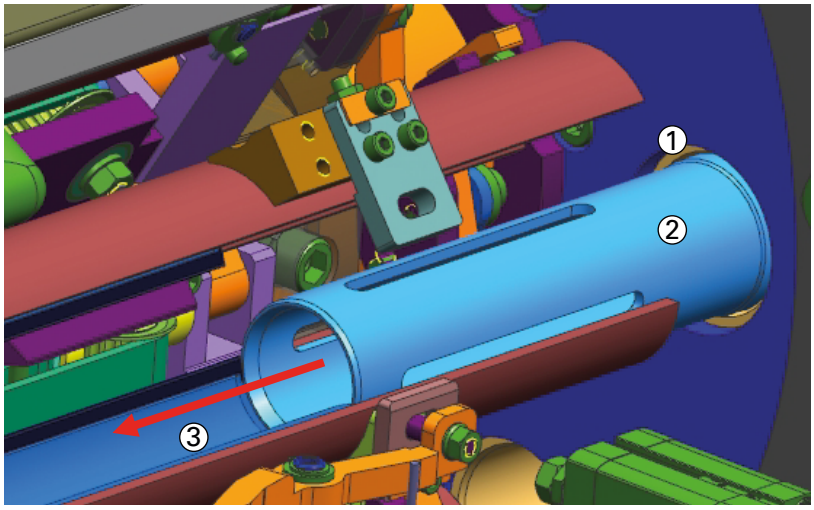
- With open channel, you may exchange the half bearings and reducing tubes. For this purpose, you must first of all dismount the slider, if present.
- For the exchange of the half bearings, pull out the locking pins and rotate them by approximately 30 degrees. By this, the locking pins will remain in this position.
- Now, you can dismount the half bearings into the direction of the channel center.
- The half bearings can be pushed out of the channel from outside. For this purpose, bore holes have been provided in the channels.



1 Half bearings
2 Locking pin
3 Dismantling bore hole
4 Dismantling bore hole

- The mounting of the half bearings happens in reverse order of the dismounting procedure. As an alternative to arresting the locking bolts, they can also remain in locked position.
- When inserting the new halve bearings, apply them in a slightly oblique position, so that the locking bolts can lock in the notch of the half bearing.

- After dismantling the half bearings, pull the reducing tubes axially out of the bush and remove them.
- With mounting in reverse order, please heed that the pin in the channel arrests in one of the elongated holes of the reducing bush.



1 Bush
2 Reducing tube
3 Half bearing

Attention: Please heed the correct fit of all parts in the channel and their arrest.

Damaged or deformed parts must be exchanged.

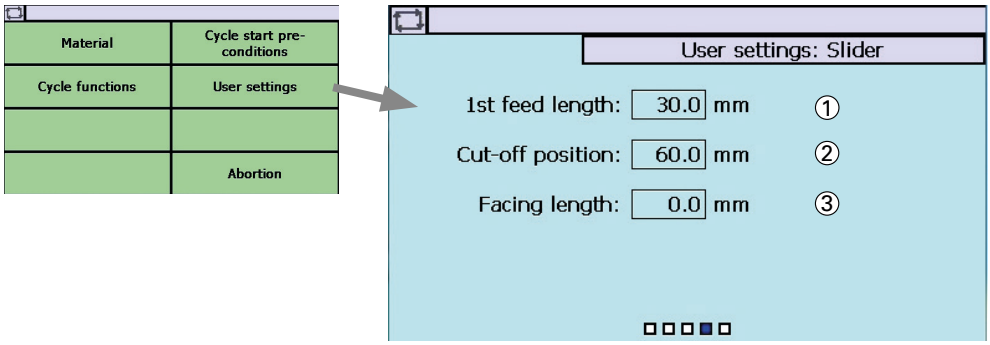
Slider

The bar feed is taken over by the slider. Each slider is connected with a slider carriage which is driven via a linear belt by a NC-motor.

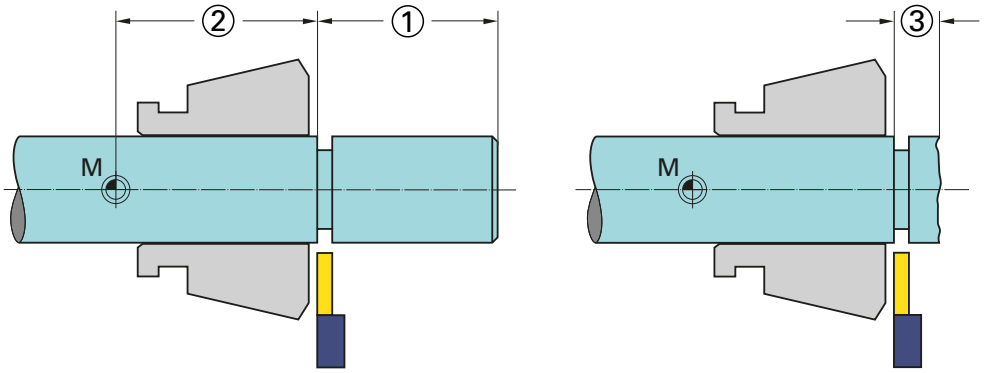
- The slider is adapted to the bar diameter. The reducing bushes are selected in such a way that the external diameter is identical to the bar diameter. Thereby, the slider is operated in the channel.
- With opening of the left channel, the slider is lifted up by the upper part of the channel. Such slaving happens by means of a bush at the right-hand end of the channel which must be adapted to the diameter of the external stoppers and by means of a fix bush at the left-hand end of the channel.

User settings for the slider

Navigation: → Basic screen/Information → User settings→ User settings for the slider

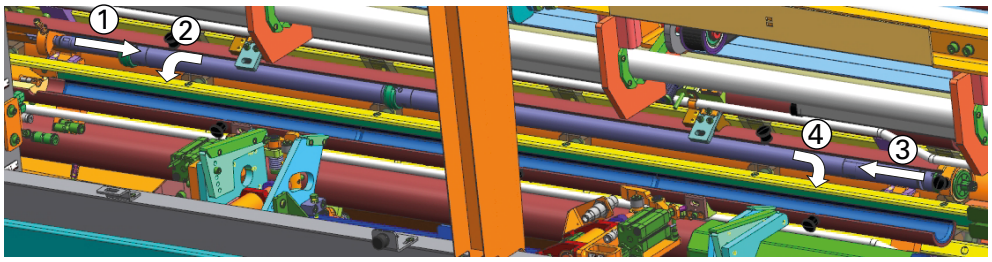


In this screen you enter the values for the bar feed setting (1st and 2nd feed length, cut-off position and face turning length):



①	Bar feed length	Length of the workpiece + allowance for the breadth of the cut-off tool
	1st and 2nd feed length	In case of workpieces which are quite long compared with their diameter, the feed may be carried out in two steps. In this way, machining can happen closer at the material chuck. Together, the 1st and the 2nd feed length result in the length which is relevant for capturing the bar end.
	2nd feed length > 0	MBL feeds forward twice. M187 Feed of 1st length M287 Feed of 2nd length.
	2nd feed length = 0	By means of M187, the material bar will be fed forward by the length of 1 workpiece all at once.
②	Cut-off position	Distance between the cut-off face and the zero point of the machine
③	Face turning length	Length required for the face turning of a new bar (with loading)

Dismantling of the slider

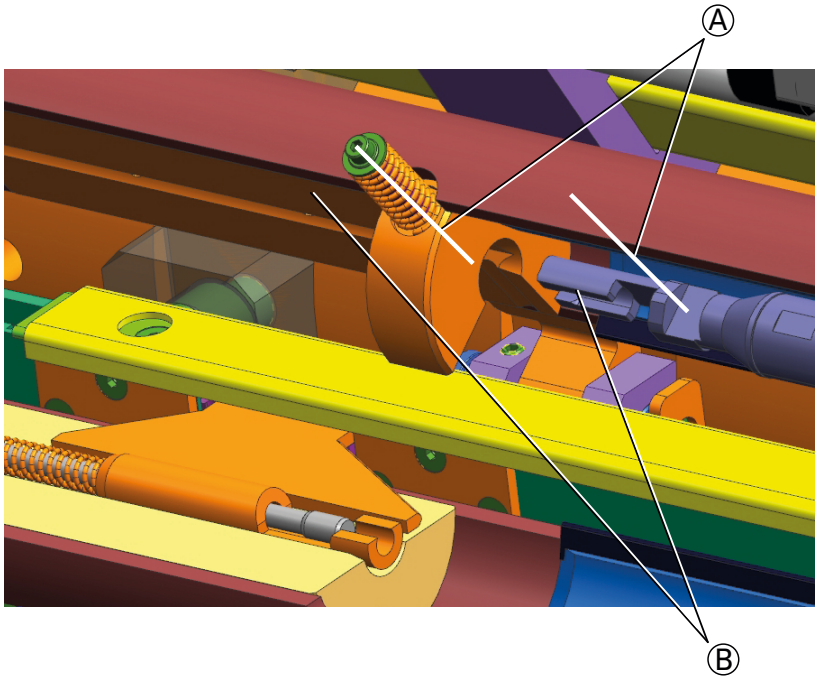


1. With open left channel, pull the slider rightwards out of the slaving device.
2. Tilt the left end outwards.
3. Pull the slider leftwards out of the bush at the right-hand end of the channel.
4. As soon as the right-hand part of the slider is free, the slider can be swivelled out of the channel and be removed.

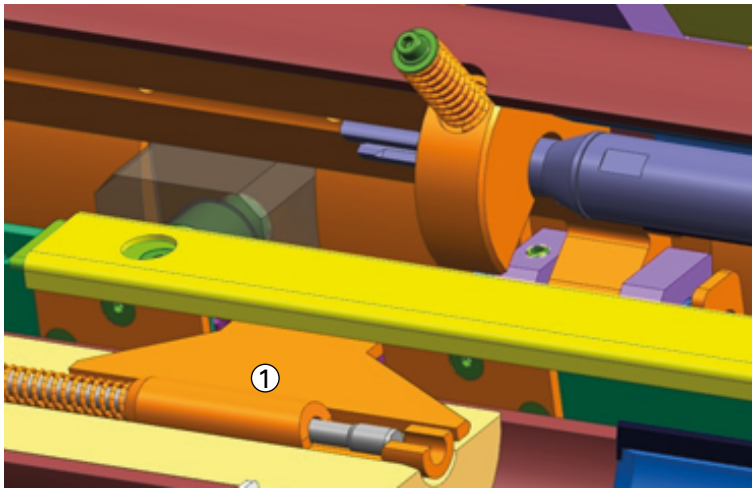
Mounting of the slider

- The mounting of the slider happens in the reverse order of the slider dismantling procedure.

When introducing the slider into the left bush, please heed the correct rotation position of the slider with reference to the bush. A non-observance of this may lead to a channel deadlock respectively to a faulty arrest of the slider and as a consequence thereof to damages of the loading magazine.



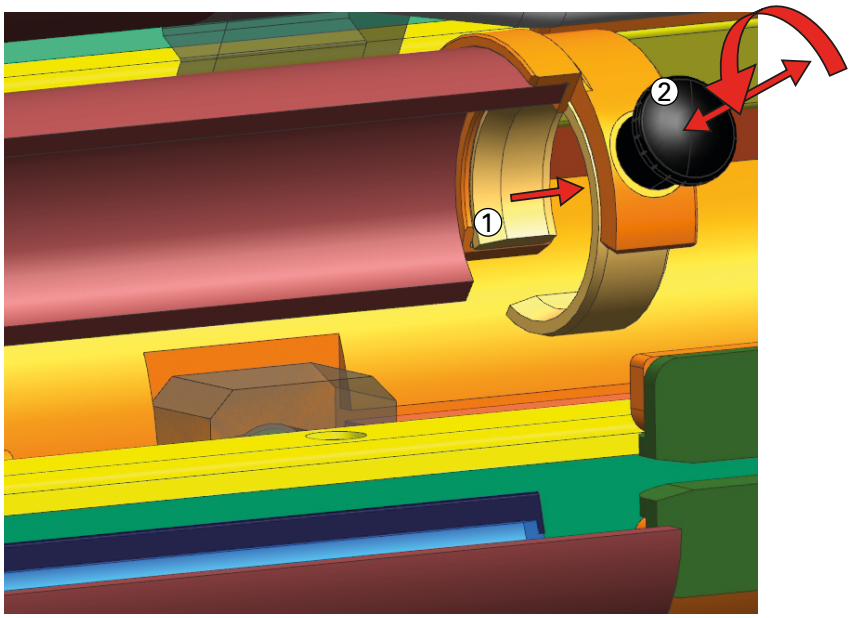
A Orientation for the slider arrest
B The faces must be parallel to one another



1 slider carriage

Exchange of slider-slaving bush

- After removal of the slider, you may exchange the slider-slaving bush at the right-hand end of the channel.



1 The greater chamfer points into the direction of the inner surface of the channel.
2 Locking bolt

- Pull the locking bolt ② out and rotate it by 30 degrees. By this, the locking bolt remains in its external position.
- Thereafter, slide the adapter bush rightward out of the holding fixture at the channel.

- Mounting happens in the reverse order of the dismantling procedure.

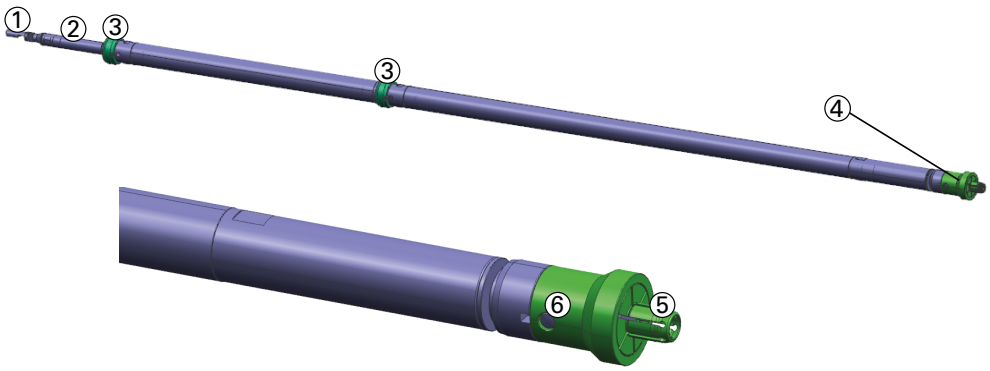
Attention: when mounting the bush, heed the correct mounting position and the correct fit of the bush in the holding fixture.

Refitting the slider

Depending on the bar diameter, you use different sizes of sliders. For the respective subdivision refer to the overview table, please. The slider itself must be adapted to the bar diameter.

At the right-hand end of the slider there are the internal clamping sleeve and the external stopper. Per slider there is one internal clamping sleeve and per material diameter an adequate external stopper.

In the middle and at the left-hand end of the slider there are reducing bushes. Said bushes must have the same external diameter as the bar material in order to be able to guide the slider well in the channel.



1 Coupling
2 Rotating sleeve
3 Reducing bushes
4 External stopper
5 Internal clamping sleeve
6 Transverse pin

- For dismantling, press out the adapter parts.
- Thereafter, pull-off the respective parts axially and then slide on the new parts.

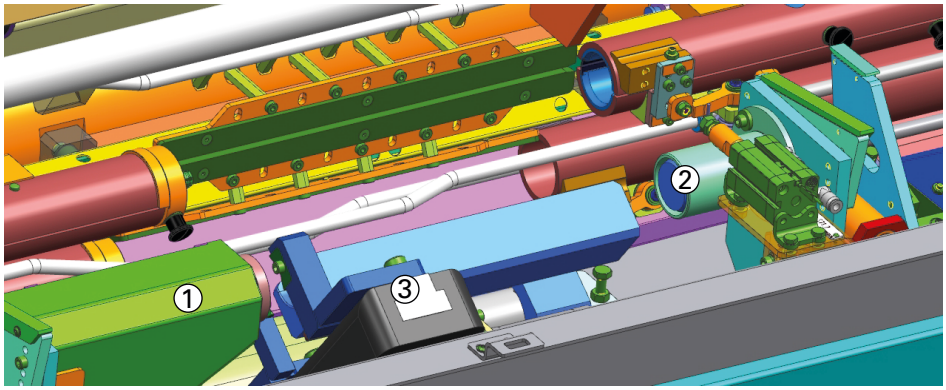
The connection to the slider carriage happens by means of a rotating sleeve and a coupling. See overview table.

- In case you change the size of the slider, you must also adequately exchange the above mentioned parts.

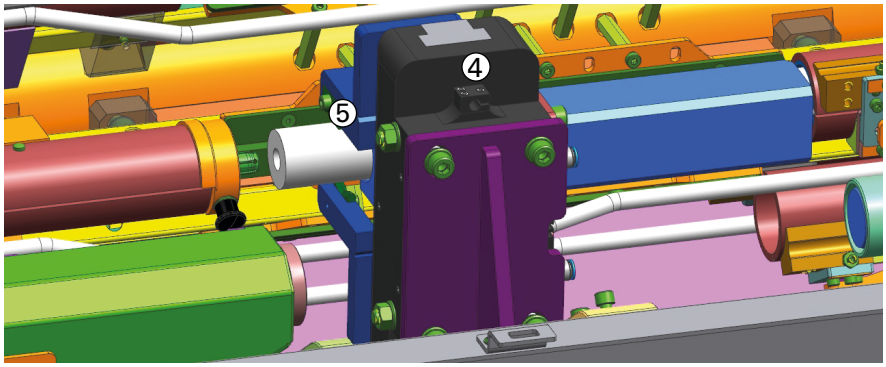
Gripper unit

The gripper unit's assignment is to slip the spot-drilled bar over the internal clamping sleeve of the slider respectively to pull-off the remnant from the slider. For this purpose, the gripper unit is swivelled-in. The gripper unit is equipped with a gripper for fixing the material and can carry out an axial stroke as well.

In swivelled-in condition, a cylinder pushes the remnant into the remnant chute. From there, the remnants reach the remnant container.



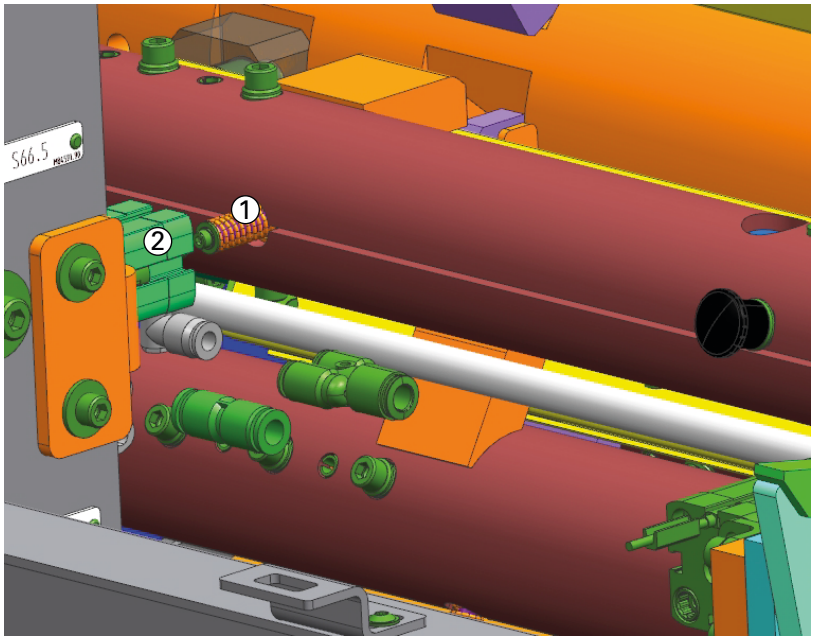
1 Remnant chute
2 Ejector
3 Gripper unit swivelled-out



4 Gripper unit swivelled-in
5 Gripper

Arresting the slider

- Before slipping the bar over the internal clamping sleeve of the slider, the slider must be arrested in the left channel in order to prevent the drive belt from being damaged.
- For this purpose, the slider is arrested in zero position by means of a pneumatic cylinder. The cylinder presses a spring-loaded bolt into an opening at the slider and arrests the slider.

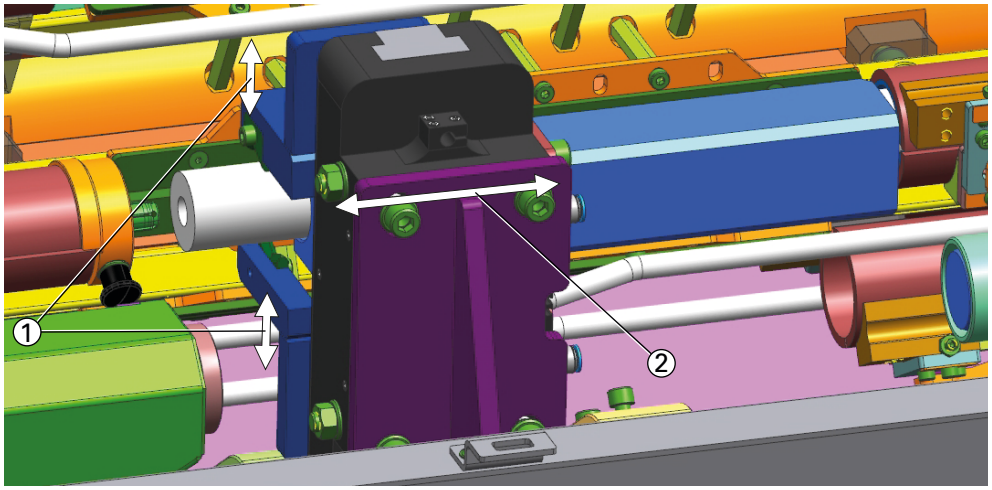


1 Spring-loaded bolt
2 Cylinder

With release, the cylinder moves backward and the spring presses the bolt into the unlocked position.

Slipping the bar over the slider

- After arresting the slider in the left channel, the gripper of the gripper unit is opened and moved into the right-hand end position.
- Thereafter, the gripper is swivelled-in. The gripper clamps the bar and traverses axially until the internal clamping sleeve extends into the bore hole of the bar. With this movement, the gripper unit must reach its axial end position. If this is not the case, the bar has not been spot-drilled and an error message will appear.
- The gripper opens and traverses rightward again. There, the bar is gripped once again and is being axially shifted leftward once again. With this motion, the gripper unit must not reach its axial end position. Otherwise, the bar is not completely slipped over the internal clamping sleeve of the slider and an error message will appear.
- After slipping the bar over the slider, the gripper opens, swivels out and moves back into its home position. The slider arrest is being released.



1 Open / close gripper
2 Axial stroke

Pulling-off the remnant

- After cutting-off the last workpiece, the main spindle collet chuck opens and the slider plus workpiece move leftward to its zero position.
- The slider is being arrested, the gripper opens and the gripper unit swivels in. The gripper unit is in its left-hand end position
- Thereafter, the gripper is closed and the gripper unit traverses rightward. By this, the remnant is being pulled off the internal clamping sleeve of the slider.
- Gripper unit plus remnant swivels out and moves into its left-hand end position. Thereby, the left-hand end of the workpiece is already located in the remnant chute.
- The gripper opens and the remnant lies in the half shell which is attached to the gripper.
- Subsequently, the ejector moves out and pushes the remnant into the chute.
- From there, the remnant reaches the remnant container. Depending on its weight and on the size of the remnants, said container must be evacuated at regular intervals.

Programming

Programming

Assignments and machine data

If the MBL bar loading magazine is supposed to be able to communicate with the machine, it must have been selected via MAZU102 before.

M-commands - principle of the cycle

M187	;feed of material bar
M69	;material chuck open
M87	;waiting for feedback "Feed complete" from magazine
M68 M177	;collet closed. workpiece present

Programming example: for "Push material bar forward"

```
N05 IF I_NOSPI1 GOTOF MANOSP
N10 G0 X2 Z.5 T122 D1 M5 M187     ; limit stop position, M5=SPI(ndle) Stop,
                                    M187=feed ON
N20 G4 F.2
N30 MSG("Material is being pushed forward")
;
;without stop check
N40 M69                           ;open chuck
N50 M87                           ; reader stop H until MBL-magazine signals
                                    that push forward was carried out
N60 M68 M177                      ; close chuck. Feed OFF - workpiece present
                                    on A side
N70 G4 F.2
```

Programming example for Push material bar forward until the bar strikes against the stop

```
;; #12MP
;Programme name: ?
;MS22C-6 /MNr: 270x9 9
;Customer: ?
;Part: ?
;Rev:  ?
;Person in charge:?
;Date: xx.xx.2018

;PUSH BAR FORWARD UNTIL IT STRIKES AGAINST THE STOP
……..
……..
;Cyclical machining by user
N240 G59 Z=ZMW_1
N245 IF I_NOSPI1 GOTOF MANOSP
/2N250 MA12_MPF                ;call of sub-programme: STRIKE AGAINST
                                STOP/PUSH FORWARD
N260 G64 G602 G0 Z2 X25 T121 D1
……
……
```

Sub-programme MA12.MPF – without stop check

```
;; #12MA
;Programme name: ?
;MS22C-6 /MNr: 270x99
;Customer: ?
;Part: ?
;Rev:  ?
;Person in charge:?
;Date: xx.xx.2018

;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Strike material against stop and push forward
;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

N05 IF I_NOSPI1 GOTOF MANOSP
N10 G0 X2 Z.5 T122 D1 M5 M187     ;Position where material strikes against stop,
                                   M5=SPI stop, M187=feed ON
N20 G4 F.2
N30 MSG("Material is being pushed forward")
;
;with stop check
N40 M69                           ;Open material chuck
N50 M87                           ;Reader stop until MBL magazine  signals
                                   that material bar was pushed forward.
N60 M68 M177                      ;Close material chuck. Feed OFF - work-
                                   piece present at A side
N70 G4 F.2
;
N80 Z1
N90 G0 X6.6 T122 D1
N100 MSG()
N110 MANOSP: M17
```

Sub-programme MA12.MPF – with stop check

```
;; #12MA
;Programme name: ?
;MS22C-6 /MNr: 270x99
;Customer: ?
;Part: ?
;Rev:  ?
;Person in charge:?
;Date: xx.xx.2018

;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
;Strike material against stop and push forward
;XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

N05 IF I_NOSPI1 GOTOF MANOSP
N10 G0 X2 Z.5 T122 D1 M5 M187      ;Position where material strikes against stop,
                                    M5=SPI stop, M187=feed ON
N20 G4 F.2
N30 MSG("Material is being pushed forward")
;
;with stop check
N40 I_M186                         ;Material stop check via cycle; there, M69/
                                    M87/ M68/ M177 is being carried out.
;
N80 Z1
N90 G0 X6.6 T122 D1
N100 MSG()
N110 MANOSP: M17
```

Transport, Installation, Commissioning

Safety Instructions

Instructions for shipment, installation, commissioning

Shipping brackets are identified by their red color.

Improper shipment, installation or commissioning often leads to accidents, damage or malfunction of the magazine which **INDEX** will accept no liability for and which will not be covered by the warranty.

Before the delivery, you should carefully plan the shipment to the installation site, the unloading, the installation and the commissioning of the magazine. Please pay attention to the following instructions in this document.

General sources of danger during in-house transportation

Magazines may be shipped only by authorized and qualified personnel.

Act consciously during shipping. Please omit hazardous and risky actions. Consider the consequences before acting.

Slopes and pitches can be particularly dangerous (e.g. ramps etc.). If passage is unavoidable extra precautions must be taken.

Make sure that the load will not slide off and that vehicle's traction and brake force are sufficient. Provide the load with additional securing devices, if necessary.

Dimensions and masses

For the mass of the bar loading magazine, please refer to the specifications in chapter "Technical Data" of this document.

Shipping- and lifting equipment

For lifting and moving individual units use only lifting and moving equipment with adequate load bearing capacity and loading area.

Preparations

This chapter is addressed to all personnel in charge of the installation.

On the basis of the following instructions, the installation site can be prepared for immediate installation and commissioning of the magazine.

Make sure that the delivery, the unloading and the placement of the magazine from the unloading location to the installation site are planned carefully.

Take into account the size (dimensions) and the masses of the individual units.

Suitable transport and lifting equipment must be provided on delivery of the magazine.

Remove potential obstacles along the way from the unloading location to the installation site.

Inspect the route for load bearing capacity, evenness, damage to surface, ridges, gradients and slopes etc.

Is there sufficient clearance through gates and door ways?

Do elevators have sufficient load bearing capacity?

Good preparation pays off!

Suitable transport- and lifting equipment

crane
truck-mounted crane
transport trolley
transport rollers

It is not allowed to lift up the bar loading magazine by means of a forklift.

Space requirements

Make sure to provide for the following:

Sufficient clear space around the magazine.
Sufficient moving space for the operator.
Sufficient space for maintenance and repair works.
It must be possible to open all magazine doors completely.
Storage space for bar material.

See the machine installation diagram in the chapter "Working Data" of the machine for determining the space requirements.

Foundations

Special foundations are not necessary as long as the floor quality complies with the usual building regulations according to the weight of the magazine.

Within the magazine standing area there must not be expansion joints.

After alignment at the machine, the bar loading magazine must be anchored to the floor. (Concerning this, please refer to sheet KM9152.9006x in chapter "Procedure documentation").

Environmental Conditions

If the data at the installation site deviate from the values above, please, contact INDEX or an INDEX agency.

Permissible ambient temperature	+10° C to +40° C
Max. relative air humidity	75%
Max. height above sea level	1000 m above MSL

Power supply

The bar loading magazine is connected with the machine and is powered by the machine.

For details concerning this, please refer to the respective electric wiring diagram.

Compressed Air Supply

Be aware of the max. permissible pressure for the magazine. See pneumatic diagram "Air supply of the loading magazine" in the chapter "Working Data".

For operating pressure and capacity for compressed air supply, please refer to section "Technical data".

Compressed air supply at the bar loading magazine at the front side to the left (loading side).

Pressure accumulator

When the magazine has been transported as airfreight the pressure accumulator fitted will be depressurised.

Before commissioning the pressure accumulator must be filled with nitrogen (N_2) by a specialist. Please stick to the recommended pressures.

For recommended pressures see the hydraulic diagram "Oil supply of the loading magazine".

Media to be provided

Lubricating oil

For required lubricating oil sort and filling capacity, please refer to section "Technical data".

Pumps and Tanks

Change of lubricating oil is part of regular maintenance.

For filling the hydraulic oil tank of the magazine a pump with a 10 µm-microfilter (absolute) is required. The pump may be used only for this purpose.

For emptying the lubricating oil tank an ordinary pump is sufficient. The same pump can be used for filling the lubricating oil tank, however, it has to be flushed with clean lubricating oil beforehand.

The drained-off liquids are best collected in stable containers with adequate capacity. Best suitable are metal barrels which can be sealed and should be labelled.

Chip disposal / remnant disposal

The chips accrued with spot-drilling, are being collected in a container provided for this purpose. The operator is responsible for regular discharge of said container as well as for the expert disposal of the chips.

The same applies for the discharged remnants.

Disposal of used media

Please ensure in time how used media such as lubricating oil can be disposed of in compliance with environment pollution regulations.

Compliance with water balance regulations

The magazine contains water polluting liquids, such as lubricating oil. These can leak out of the magazine accidentally. Therefore the magazine must be installed in a manner that no detrimental effects are possible to waters or ground water by these media.

Possible precautions:

Placing the magazine into a steel tray.
Sealing the workshop floor.

The locally valid guide lines and regulations must be taken into consideration

Delivery

Magazine

The magazine is delivered by truck it is either on planks or packed in a box standing on a transportation platform.

Magazine state on delivery:

– Oil pan in base frame is empty
– Lubricating oil tank is empty.
– Certain moving parts of the magazine e.g. the drum is secured by appropriate brackets.
– Overhanging parts of the bar loading magazine which might hamper transport, are dismantled.
– A rack installed under the right short foot guarantees stability
– All doors are closed and locked.
– All bright parts of the magazine are coated with a rust preventive.

Other separate units

The lubricating oil unit plus the remnant container are packed seperately.

Loose parts, such as spanners, small tools and interchange parts, etc. are included separately.

Transportation equipment

The transportation equipment is either packed separately or enclosed with other units.

The transportation equipment is generally charged for. When returning it to INDEX after installation, a refund will be paid.

Appliances and plates with lashing loops fixed at the bar loading magazine as well as transport rollers with the respectively corresponding racks are also part of the transportation equipment.

First check the magazine, the enclosed accessories and the lubricating oil unit for external damage and completeness (Bill of lading, delivery note).

Missing goods or damages can confirmed on the note of delivery by the shipping company.

In case of damage it is recommended to take photographs for easier proof.

Please notify **INDEX** or **INDEX** agency.

INDEX MBL

Transport notes

This magazine is not suitable for transport by means of fork lift!

Weight of the magazine
MBL40-6 (4300)

approx. 3850 kg

Transport by crane

The traverse and slinging ropes and the operating panel transportation safety device required for appropriate transport of the magazine will generally be supplied at extra cost and may be returned to the INDEX factory after setting up the magazine. In case of a new transport of the magazine, the above mentioned transporting tackle can be acquired liable to costs from the INDEX factory.

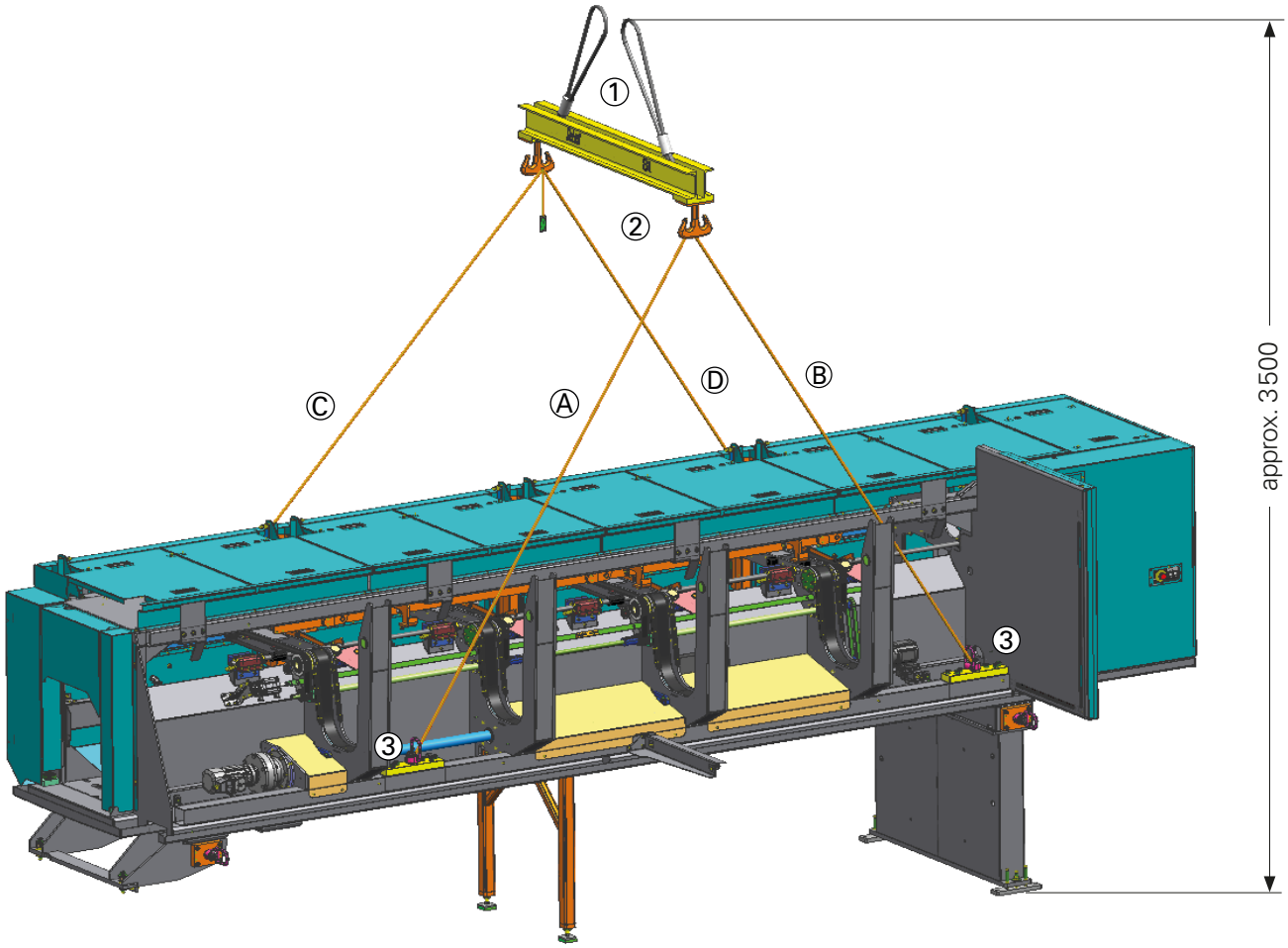
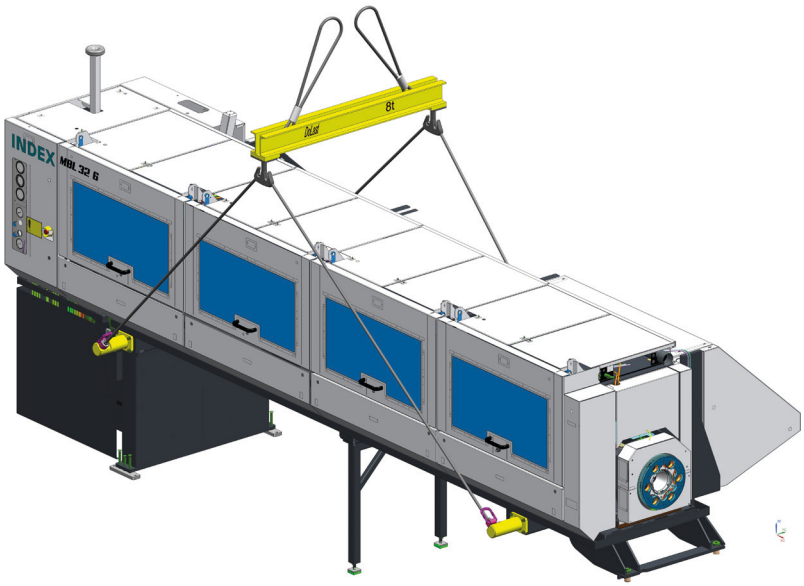


Illustration: Transport by crane MBL40-6 (4300) bundle loader

	Pos.	No. of	Description	Order number
Transporting tackle	①	1	Spreader (transverse), complete - 8t	10511105
Slinging ropes MBL40-6 (4300) Bundle loader	②	(4) 1 1 1 1	Slinging ropes steel - ø16 (Carrying capacity minimum t) Pos. Ⓐ 2070/2080 mm (transport condition[1]/mounted condition[2]) Pos. Ⓑ 1570/1570 mm (transport condition[1]/mounted condition[2]) Pos. Ⓒ 2200/2270 mm (transport condition[1]/mounted condition[2]) Pos. Ⓓ 1840/1850 mm (transport condition[1]/mounted condition[2])	
Appliance	③		Appliance (standard) (prototypes 1 through 6)	10171626 10290701
Other transporting material		1	Plastic cover	
		1	Anti-slip mat	10078426

[1] transport condition = with transport foots; drum in rear position
[2] mounted condition = without transport foots; drum in front position

Transport by crane



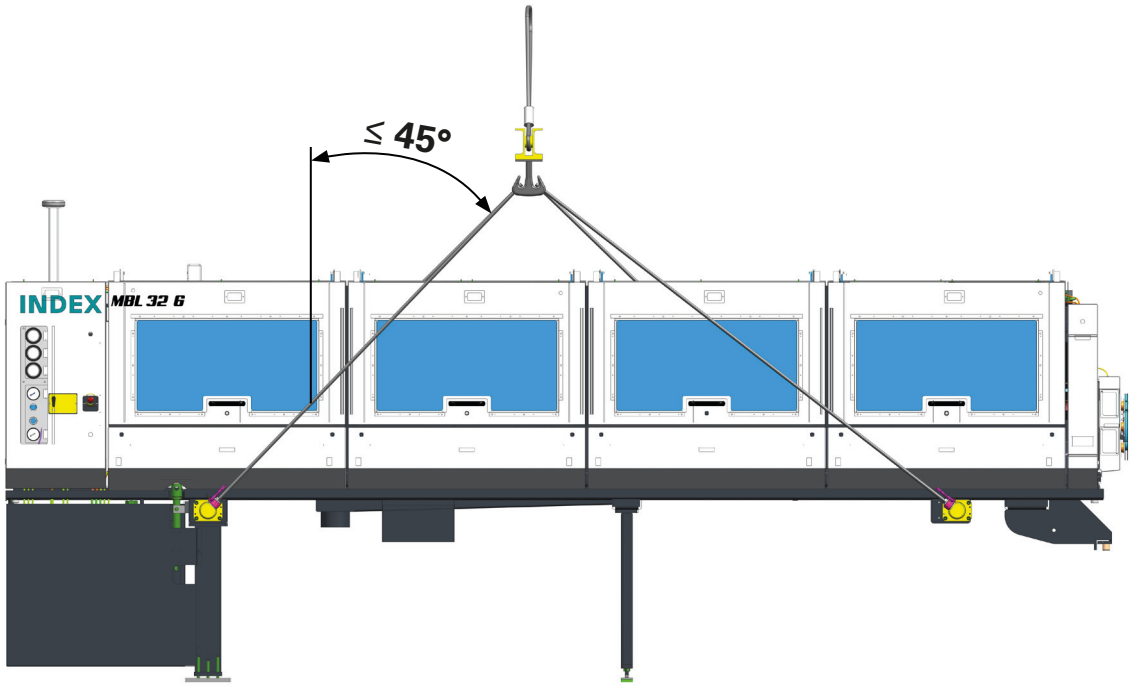


Illustration: transport by crane- rear side MBL32-6 (4300) Rack loader unit

Only transport the bar loading magazine in a horizontal position.

The cheese head screws are meant for one-time use only.
The tightening torque of the screws can be seen from the respective screw standard.

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www.index-werke.de

Unloading the Magazine by means of a Crane or a Mobile Crane

Use a crane with sufficient load bearing capacity.

Unload the magazine as near as possible the place of installation. Short transport distances reduce the hazards.

Lift the magazine only using the appropriate lifting tackle.

Height of crane hook above ground level:

Height of the unit (e.g. Magazine) ..... refer to picture
+ Lifting tackle or length of slings above the unit ..... refer to picture
+ Floor height of truck ..... approx 1,3 m
+ hoisting ..... 0,2 m

Remove all securing members for the transport on the truck.

Remove top and sides of crate.

Attach the supplied lifting tackle (refer to section "Attaching the transportation tackle to the magazine"").

Lift crane hook to equally tighten the slings.

Attention must be paid that the ropes do not touch the magazine.

Never stand under the suspended magazine.

Lift magazine slowly and carefully.

Take care that the magazine is kept horizontal. The centre of gravity is not exactly in the middle of the magazine.

If necessary lower the magazine and correct the slant by altering the rope lengths (e.g. shorter rope at heavier end) or by moving the hooks on the girder.

Lift magazine off the truck or more truck from under the suspended magazine.

Positioning of the transport means under the magazine.

Ensure that the chosen transport means has sufficient load bearing capacity. It must be at least equal to the magazine mass.

When using a trolley the load bearing area must be larger than the magazine area (floor area).

Lower magazine slowly and carefully onto the transport means, remove the lifting tackle and move the magazine to the place of installation.

When the magazine is unloaded with a crane at its place of installation the suspension tubes may be left in the magazine on its way there.

Lowering the Magazine in the Place of Installation

When the definite place of installation has been determined on and accordingly prepared (refer to chapter „Planning before Installation) the magazine can be directed there carefully and lowered.

Lowering the Magazine with a crane or a mobile crane

Lift the magazine with the crane until it is suspended observing the instructions in the chapter „Unloading the Magazine with a Crane or a Mobile Crane“.

When you have moved the magazine to the place of installation on a trolley or on a castor trolley pull these out from under the magazine.

Transport by means of Castor Trolleys

Use a castor trolley when there is no suitable crane or a mobile crane.

The advantage of castor trolleys is the low loading height.

The trolleys may be adjusted via the threaded spindles.

Castor trolleys require a firm, plane floor with the respective load bearing capacity and very slow and smooth motions.

The transport rollers are mounted at the bar loading magazine by means of racks.

Procedure with transport

– Bring transport rollers plus their racks into top position.
– Mount transport rollers plus corresponding racks at the left-hand foot respectively at the flange location near the right-hand foot.
– Rotate transport rollers downward equally and slowly by means of the threaded spindles until the bar loading magazine lifts off the floor.

Mount the transport rollers only at those points which have been provided for such purpose at the bar loading magazine. A different arrangement will entail severe damages to the bar loading magazine.

Heed possible floor unevenesses, pedestals, slopes, etc.

The bar loading magazine may only be moved very slowly and smoothly..

Unloading and Transport of Separate Units

For small separate units there are no special transport instructions.

These units are either on a pallet or they are packed together with other units.

Use for unloading and transport suitable slings or straps.

Attach the slings or straps in such a manner that they cannot slide off and the unit is safety suspended.

If eye bolts are provided attach the rapes or straps to these.

Never stand beneath suspended units.

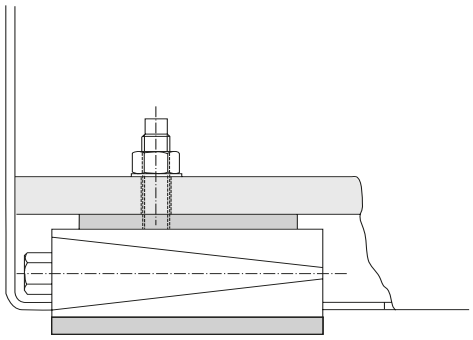
Unpacking the Accessories and checking them for Completeness

The accessories must be checked against the delivery note for completeness after unloading and unpacking (Compare with bill of lading or delivery note).

In case of discrepancy please contact your INDEX agency.

Installation of the magazine

1. Transport the magazine to the location.
2. In case you cannot use a crane at the installation site, the bar loading magazine must be moved to said site by means of castor trolleys
3. Lower the magazine onto the floor.
4. Push the loading magazine drum backward and secure.
   In this state, nothing except for the chip conveyor must be mounted, the cleaning plant tank must not be mounted.
5. Align the right-hand short foot centrally to the thread holes at the base by means of the adjusting screw.
6. Bring the left-hand part plus the long foot in alignment with the turning machine.
7. Align the loading magazine into longitudinal and cross direction by means of the adjusting screws



Adjustable machine foot (wedge-type pads)

8. Push drum forward carefully and secure.
9. Dismantle transport rack.

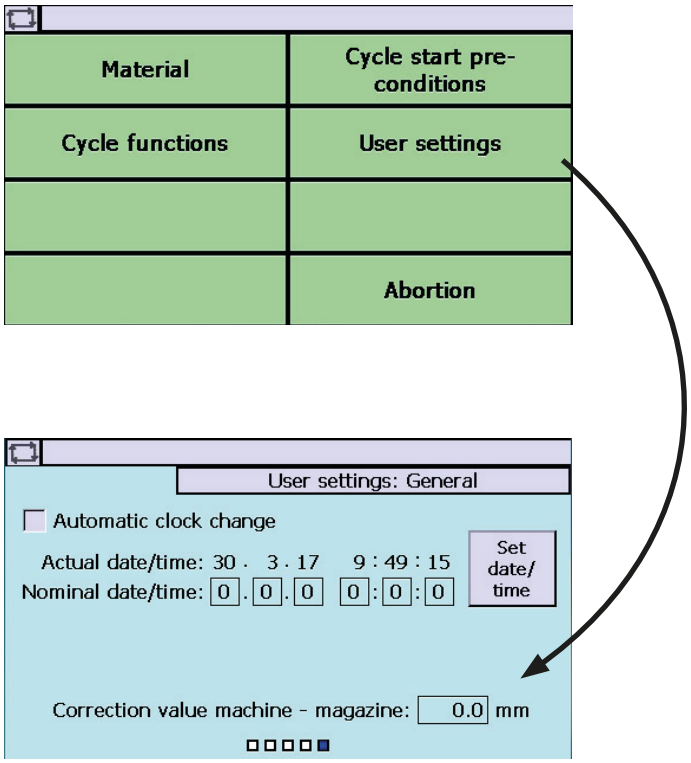
In case the bar loading magazine is attached to the machine by means of a crane, the transport racks are removed after lifting-up the bar loading magazine.

Alignment of the bar loading magazine

The precise alignment of the bar loading magazine with the turning machine may only be carried out by INDEX staff.

Entry of correction value between machine and loading magazine

Navigation: → Basic screen/information → User settings → General user settings



The correction value between machine and loading magazine is entered her.

You always have to enter said correction value once, after machine and loading magazine have been aligned to each other.

Securing means for the transport

Movable parts of the magazine are secured with painted red securing means for the transport.

Before commissioning of the magazine: Remove all securing means for the transport. Save the securing means for transport for a later transport of the magazine.

Removing the transportation safety devices

Before setting the bar loading magazine into operation for the first time, you must remove the following transporting safety devices.

- Operating panel safety device
- Drum distortion lock: remove rig pin.
- Drum axial stroke unit: remove M16 screw.
- Lubricating oil connection: dismantle screws and transportation safety device.
- Remove hood above cable for attachment to the machine.
- On the lubricating unit: Seal the lubricating oil connection between the bar loading magazine and the lubricating oil unit
- Oil drain
- Remnant drop unit

Commissioning

All the following tasks have to be carried out chronologically before commissioning.

After these have been carried out the magazine will be ready for commissioning.

Cleaning the Magazine

All bright magazine parts are coated with a rust preventing agent. Normally, said coating will be removed by the lubricating oil during the operation of the bar loading magazine.

When cleaning the magazine some of the solvent might splash into the eyes. Protect your eyes by wearing suitable safety goggles.
Protect your hands and arms by wearing long sleeve clothing and gloves when cleaning the magazine.
Risk of bodily injury by sharp edged magazine parts and tools!

The rust preventing agent must be washed of manually when the magazine is put into operation after a longer period and when the rust agent has become very tough.

For this purpose only agents that do not attack the magazine paint may be used.

Suitable are turpentine, paraffin (kerosene) or benzine.

Checking supplies and restocking

Lubricating oil unit: fill with oil

For notes on the quality of media lubricating oil, as well as on capacity of tanks and charging holes, see chapter "Maintenance instructions".

Pressure accumulator

For notes, please refer to section "Preparations".

Water cooling system

Functioning

The water cooling system serves the cooling of the switch cabinet, of the hydraulic oil and of the cooling lubricant.

The system is composed of a magazine-side cooling circuit and optionally either of

1. a water recirculation cooling unit besides the magazine

   or

2. an external cooling water circuit which has been made available by the operating company.

For any and all information concerning coolant, water quality and water treatment please refer to document "Notes on Operating Materials".

In case of use of a water recirculation cooling unit refer to the information of the manufacturer, please.

For cooling of the switch cabinet, cooling water feed and return lines are connected to the turning machine.

Electrical connection

Caution! Danger of death!

All work on the electrical equipment must be carried out exclusively by properly trained qualified personnel.

The control voltage is to be connected, according to EN 60204-1, one sided with PE. Please read the notes in the wiring diagram.
The switchgear cabinet may be opened only after the main switch have been set to the OFF position, and it must be secured according to the valid safety standards.

Switching-ON the Magazine

Always charge the lubricating oil tank before switching on the lubricating oil pump.

A dry running lubricating oil pump will get damaged.

After switching the turning machine and the bar loading magazine ON via the main switch, the bar loading magazine's control system runs-up automatically.

For "Automatic mode", all doors must be closed and all air grids must be vacant and confirmed.

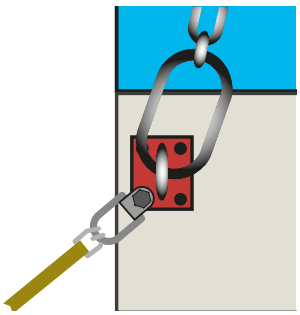
All units must be in their respective home position.

Preparation for repeated transport

1. Move all units into home position.
2. Discharge remnant container and chip container.
3. Disconnect pneumatic, hydraulic and electric supply.
4. Disconnect plug connection between loading magazine and machine.
   (Please refer to the respective section of this document)
5. Remove lubricating oil from the magazine.
6. Discharge lubricating oil unit and dismantle. Seal all apertures.
7. Protect oil sight glass against damages.
8. Attach all transportation safety devices. (Please refer to the respective section of this document)
   The drum must be in right-hand front position.
9. Close all doors.
10. Carry out transport only by means of admissible and appropriate means of transportation.

Pressure accumulator

For shipping as airfreight all charged pressure accumulators on the magazine have to be de-pressurised by a specialist.
Set main switch to OFF and secure against switching on.
De-pressurise the hydraulic system by opening the pressure accumulator valves.



Lashing the magazine on the truck

For this purpose, use the plates with lashing loops.
Place the loading magazine on the provided transportation pedestal..
Lash at the lashing loops provided for this purpose.

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Interchange parts

INDEX MBL22-8
INDEX MBL24-6
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INDEX Multi-spindle lathes

DIM 132 EN - 2023-05-24

0324 ec 20263803 Bar loading magazine MBL22-8, MBL24-6, MBL32-6, MBL40-6, MBL40-8

Overview and quantities

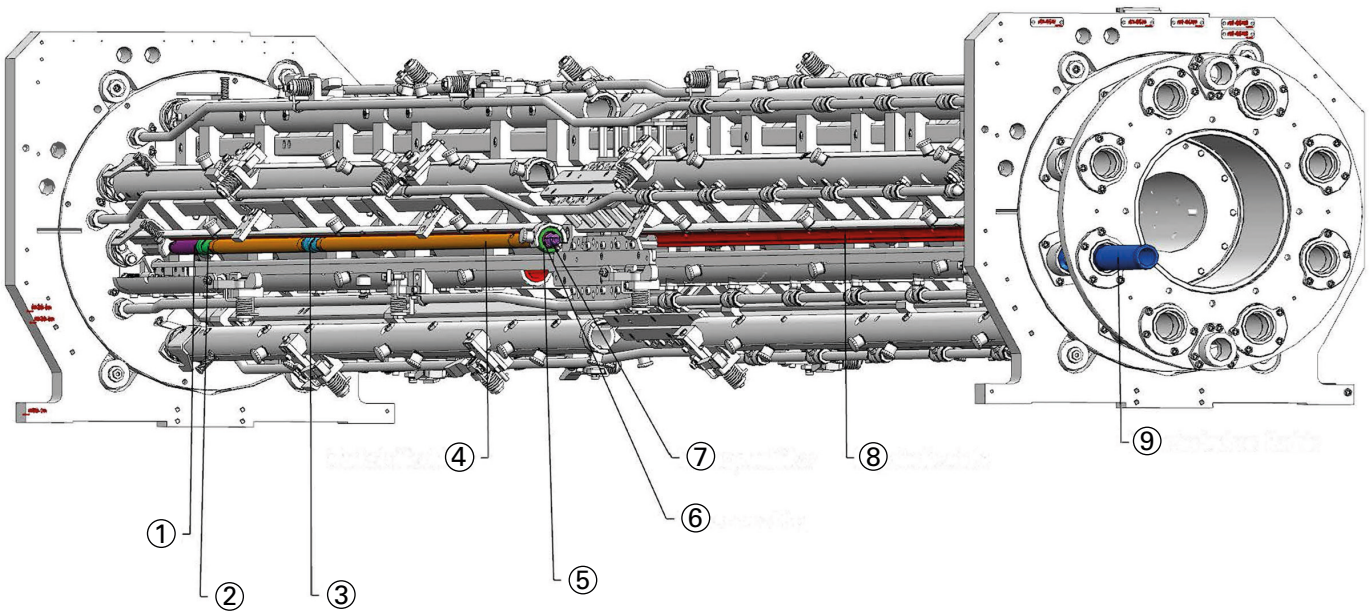
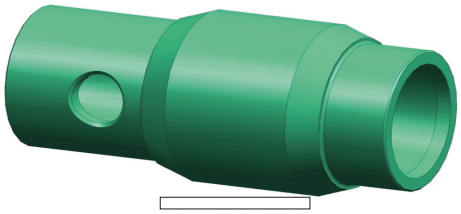
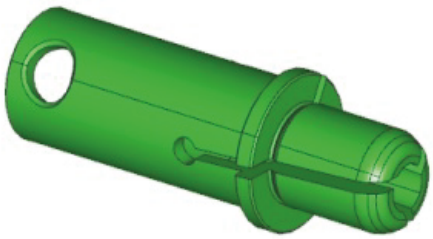
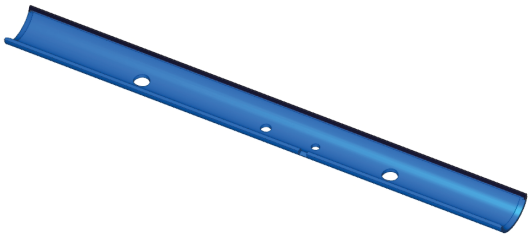
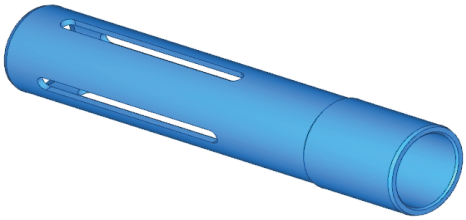


Figure: MBL22-8 - 3300 (sample picture of the arrangement of the interchange parts)

No.	Picture	Name	Quantity per set
1		Pusher carriage coupling	6 (six-spindle machines) 8 (eight-spindle machines)
2		Reduction bushing, left	6 (six-spindle machines) 8 (eight-spindle machines)
3		Reduction bushing, center	6 (six-spindle machines) 8 (eight-spindle machines)
4		Bar stock pusher	6 (six-spindle machines) 8 (eight-spindle machines)

No.	Picture	Name	Quantity per set
5		Adapter bushing	6 (six-spindle machines) 8 (eight-spindle machines)
6		External stop	6 (six-spindle machines) 8 (eight-spindle machines)
7		Internal clamping sleeve	6 (six-spindle machines) 8 (eight-spindle machines)
8		Bearing half shell	**Version 3300** 72 (six-spindle machines) 96 (eight-spindle machines) **Version 4300** 96 (six-spindle machines) 128 (eight-spindle machines)
9		Reduction bushing, right MBL22-24	6 (six-spindle machines) 8 (eight-spindle machines)
		Reduction bushing, right MBL32-40	6 (six-spindle machines) 8 (eight-spindle machines)

Change parts per workpiece diameter

MBL40-6 / MBL40-8

Material diameter	Half bearings	Reducing bushes	Adapter sleeves	Material feeder	Adapter sleeves for feeder (center)	Adapter sleeves for feeder (left)	External stopper	Internal clamping sleeve	Coupling of feeder carriage	Fiber-cement tubes
13	D14	D14	D13,5		D13	D13	D13			D14
14	D15	D15	D14,5		D14	D14	D14			D15
15	D16	D16	D15,5	D12	D15	D15	D15	Feeder D12 / Clamping diameter D8	Coupling D12	D16
16	D17	D17	D16,5		D16	D16	D16			D17
17	D18	D18	D17,5		D17	D17	D17			D18
18	D19	D19	D18,5		D18	D18	D18			D19
19	D20	D20	D19,5		D19	D19	D19			D20
20	D21	D21	D20,5		D20	D20	D20	Feeder D18 / Clamping diameter D15	Coupling D18	D21
21	D22	D22	D21,5	D18	D21	D21	D21			D22
22	D23	D23	D22,5		D22	D22	D22			D23
23	D24	D24	D23,5		D23	D23	D23			D24
24	D25	D25	D24,5		D24	D24	D24			D25
25	D26	D26	D25,5		D25	D25	D25			D26
26	D27	D27	D26,5		D26	D26	D26			D27
27	D28	D28	D27,5		D27	D27	D27	Feeder D23 / Clamping diameter D15	Coupling D23	D28
28	D29	D29	D28,5	D23	D28	D28	D28			D29
29	D30	D30	D29,5		D29	D29	D29			D30
30	D31	D31	D30,5		D30	D30	D30			D31
31	D32	D32	D31,5		D31	D31	D31			D32
32	D33	D33	D32,5		D32	D32	D32			D33
33	D34	D34	D33,5		D33	D33	D33			D34
34	D35	D35	D34,5		D34	D34	D34			D35
35	D36	D36	D35,5		D35	D35	D35			D36
36	D37	D37	D36,5	D32	D36	D36	D36	Feeder D32 / Clamping diameter D15	Coupling D32	D37
37	D38	D38	D37,5		D37	D37	D37			D38
38	D39	D39	D38,5		D38	D38	D38			No f-c tube fiber-ce-ment tube
39	D40	D40	D39,5		D39	D39	D39			
40	D41	D41	D40,5		D40	D40	D40			

The diameter of the guidance channel must be selected 1 mm wider in diameter than the bar diameter.

MBL32-6 with spot-drilling unit

Material diameter	Half bearings	Reducing bushes	Adapter sleeves	Material feeder	Adapter sleeves for feeder (center)	Adapter sleeves for feeder (left)	External stopper	Internal clamping sleeve	Coupling of feeder carriage	Fiber-cement tubes
13	D14	D14	D13,5	D12	D13	D13	D13	Feeder D12 / Clamping diameter D8	Coupling D12	D14
14	D15	D15	D14,5		D14	D14	D14			D15
15	D16	D16	D15,5		D15	D15	D15			D16
16	D17	D17	D16,5		D16	D16	D16			D17
17	D18	D18	D17,5		D17	D17	D17			D18
18	D19	D19	D18,5		D18	D18	D18			D19
19	D20	D20	D19,5	D18	D19	D19	D19	Feeder D18 / Clamping diameter D15	Coupling D18	D20
20	D21	D21	D20,5		D20	D20	D20			D21
21	D22	D22	D21,5		D21	D21	D21			D22
22	D23	D23	D22,5		D22	D22	D22			D23
23	D24	D24	D23,5		D23	D23	D23			D24
24	D25	D25	D24,5	D23	D24	D24	D24	Feeder D23 / Clamping diameter D15	Coupling D23	D25
25	D26	D26	D25,5		D25	D25	D25			D26
26	D27	D27	D26,5		D26	D26	D26			D27
27	D28	D28	D27,5		D27	D27	D27			D28
28	D29	D29	D28,5		D28	D28	D28			D29
29	D30	D30	D29,5		D29	D29	D29			D30
30	D31	D31	D30,5		D30	D30	D30			No f-c tube fiber-cement tube
31	D32	D32	D31,5		D31	D31	D31			
32	D33	D33	D32,5		D32	D32	D32			

The diameter of the guidance channel must be selected 1 mm wider in diameter than the bar diameter.

MBL32-6 without spot-drilling unit

Material diameter	Half bearings	Reducing sleeves (1+2)	Adapter sleeves	Material feeder	Adapter sleeves for feeder (center)	Adapter sleeves for feeder (links)	External clamping sleeve	Coupling for feeder carriage	Fiber-cement tubes
5	D14	D14	D13,5	D12	D13	D13	Schlenker 212E	Coupling D12	D14
6									
7									
8									
9									
10									
11	D19	D19	D18,5	D18	D18	D18	Schlenker 218E	Coupling D18	D19
12									

The diameter of the guidance channel must be selected 1 mm wider in diameter than the bar diameter.

Merely the feeder will be guided in the loading magazine if the magazine is operated without the spot-drilling unit. The gap between channel and material bar resulting from this will be filled with oil, however, the guidance quality may be somewhat limited.

MBL24-6, MBL24-6 with spot-drilling unit

Material diameter	Half bearings	Reducing sleeves	Adapter sleeves	Material feeder	Adapter sleeves for feeder (center)	Adapter sleeves for feeder (left)	External stopper	Internal clamping sleeve	Coupling of feeder carriage	Fiber-cement tubes
13	D14	D14	D13,5	D12	D13	D13	D13	Feeder D12 / Clamping diameter D8	Coupling D12	D14
14	D15	D15	D14,5		D14	D14	D14			D15
15	D16	D16	D15,5		D15	D15	D15			D16
16	D17	D17	D16,5		D16	D16	D16			D17
17	D18	D18	D17,5		D17	D17	D17			D18
18	D19	D19	D18,5		D18	D18	D18			D19
19	D20	D20	D19,5	D18	D19	D19	D19	Feeder D18 / Clamping diameter D15	Coupling D18	D20
20	D21	D21	D20,5		D20	D20	D20			D21
21	D22	D22	D21,5		D21	D21	D21			D22
22	D23	D23	D22,5		D22	D22	D22			D23
23	D24	D24	D23,5		D23	D23	D23			No f-c tube
24	D25	D25	D24,5		D24	D24	D24			

The diameter of the guidance channel must be selected 1 mm wider in diameter than the bar diameter.

For material diameter D23 and D24, special collets are required at the main spindle and at the spot-drilling unit.

MBL22-8 without spot-drilling unit

Material diameter	Half bearings	Reducing sleeves (1+2)	Adapter sleeves	Material feeder	Adapter sleeves for feeder (center)	Adapter sleeves for feeder (links)	External clamping sleeve	Coupling for feeder carriage	Fiber-cement tubes
5	D14	D14	D13,5	D12	D13	D13	Schlenker 212E	Coupling D12	D14
6									
7									
8									
9									
10									
11	D19	D19	D18,5	D18	D18	D18	Schlenker 218E	Coupling D18	D19
12									
13									
14									
15									
16									
17	D24	D24	D23,5	D23	D23	D23	Schlenker SHK23	Coupling D23	No f-c tube
18									
19									
20									
21									
22									

The diameter of the guidance channel must be selected 1 mm wider in diameter than the bar diameter.

Merely the feeder will be guided in the loading magazine if the magazine is operated without the spot-drilling unit. The gap between channel and material bar resulting from this will be filled with oil, however, the guidance quality may be somewhat limited.

MS24-6 without spot-drilling unit

Material diameter	Half bearings	Reducing sleeves (1+2)	Adapter sleeves	Material feeder	Adapter sleeves for feeder (center)	Adapter sleeves for feeder (links)	External clamping sleeve	Coupling for feeder carriage	Fiber-cement tubes
5	D14	D14	D13,5	D12	D13	D13	Schlenker 212E	Coupling D12	D14
6									
7									
8									
9									
10									
11	D19	D19	D18,5	D18	D18	D18	Schlenker 218E	Coupling D18	D19
12									

The diameter of the guidance channel must be selected 1 mm wider in diameter than the bar diameter.

Merely the feeder will be guided in the loading magazine if the magazine is operated without the spot-drilling unit. The gap between channel and material bar resulting from this will be filled with oil, however, the guidance quality may be somewhat limited.

From D13 on, work must be done with spot-drilling unit.

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