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Original Instruction Manual

CNC machining centre
HBZ CC 200/100

Version	11/2020-0
Serial no.	12000063 / 64

Information on how to use this Instruction Manual

Search: opens the "Search" menu ...

Text Opens a section

Printing this Instruction Manual

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General information

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Owner

Name		
Address		
Postcode		Town

Machine model

Type	HBZ CC
Serial no.	12000063

Trained operating staff

Name	
Name	
Name	

About this Instruction Manual

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Use of symbols

The instructions in this manual are preceded by safety warnings.

They indicate potential risks that can arise when working on the machine, and are classified as follows:

	SIGNAL WORD
	The type and source of potential danger is shown here! The possible consequences of ignoring the warning are shown here. ➢ The measures for mitigating the risk are shown here.

Symbols warning of possible injury are categorised in three degrees of severity with corresponding colour coding in the header.

Signal word	Explanation	Consequences if ignored
DANGER	indicates immediately pending danger	resulting in severe injury or death
WARNING	indicates potential danger	possibly resulting in severe injury or death
CAUTION	indicates a possibly dangerous situation	possibly resulting in minor injury

Property damage warnings are shown as follows:

	NOTE
	Note text! The possible consequences of ignoring the warning are shown here. ➢ The mitigation measures are shown here.

Signal word	Explanation	Consequences if ignored
NOTE	indicates possible property damage	Property damage

Further possible warnings:

↗ **Section ...**	**Warning** relating to another section.
Text	**Warning:** Laser beam
Text	**Warning:** Dangerous voltage
Text	**Warning:** Suspended load
Text	Risk of crushing
	Wear eye and head protection
	Wear protective clothing
	Wear safety gloves
	Wear safety shoes

Use of abbreviations

A	Direction of turntable rotation to X axis
WA	Working area
IM	Instruction Manual
HOP	Hand operating panel
C	Direction of turntable rotation to Z axis
CC	Chip conveyor
CNC	Computerised numerical control
CLU	Central lubricating unit
DP	Decentralised periphery
GUD	Global user data
HMC	Horizontal machining centre
HSC	High speed cutting
HTS	Hollow taper shank tooling
BSMS	Bavius spindle monitoring system
HT	Handheld terminal
CD	Cooling device
CL	Cooling lubricant
CLS	Cooling lubricant system
LED	Light emitting diode
MA	Maintenance area
MCHA	Material change
MCS	Machine coordinate system
MDA	Model driven architecture
MMS	Minimal quantity lubrication system
MT	Machine table
NC	Numerical control
OC	Oil central lubrication

PC discs	Polycarbonate discs
SP	Spindle
PLC	Programmable logic controller
TCH	Tool change system
TM	Tool magazine
TRGS	Technical rules for hazardous substances
UGUD	User global user data
WCS	Work piece coordinate system
T	Tool
TM	Tool magazine
TCS	Tool change system

- Actions requiring several **work steps** are numbered.
- **Lists** are marked with **bullet points** “•”.

Introduction to this Instruction Manual

The purpose of this Instruction Manual is to facilitate familiarisation with the machine/system and its proper intended use.

This Instruction Manual contains important information on how to operate the machine/system safely, properly and cost efficiently. Observing the warnings will help to avoid risks and raise the reliability and service life of the machine/system.

In addition to this Instruction Manual, instructions reflecting existing national laws on accident prevention and environmental protection must also be observed.

This Instruction Manual must always be kept available at the operating site of the machine/system.

Everyone and anyone who is charged with working with/on the machine/system, such as

- **operating tasks,** including fitting, troubleshooting during operation, disposing of production waste, cleaning, disposing of operating and auxiliary materials

- **maintenance tasks** (servicing, repairs)

must read and use this Instruction Manual.

Acknowledged technical work and safety rules must also be observed alongside this Instruction Manual and the accident prevention rules prevailing in the country of use and at the site of installation.

Suggestions and proposals for revision:

We welcome any tips and suggestions that would enable us to optimise this Instruction Manual. Please feel free to submit any suggestions or proposals for revision as follows:

1. Copy the relevant page(s) and note your comments or suggestions on it/them.

2. Send it/them, together with your name and address (incl. tel./fax numbers) to:

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General information 0–3
Manufacturer 0–3
Owner 0–3
Machine model 0–3
Trained operating staff 0–3
About this Instruction Manual . . . . . 0 – 5
Use of symbols . . . . . 0 – 6
Use of abbreviations . . . . . 0 – 8
Introduction to this Instruction Manual . . . . . 0 – 10
Suggestions and proposals for revision: . . . . . 0 – 11

1. Safety 1–1

1.1 Warnings and symbols 1-1
1.2 Safekeeping this Instruction Manual 1-1
1.3 Fundamental principle 1-1
1.4 Intended use 1-2
1.4.1 Improper use 1-2
1.4.2 Residual risk 1-3
1.5 Warranty and liability 1-3
1.6 Organisational measures 1-4
1.6.1 Staff selection and qualification; basic duties 1-5
1.6.2 Safety warnings during particular operating phases 1-6
1.6.3 Special works when using the machine/system and performing maintenance or troubleshooting during operation; disposal 1-7
1.6.4 Notes on special types of risk 1-8
1.7 Transportation 1-10
1.8 Fuse protecting the electrical system 1-12
1.9 Structural modifications 1-12
1.10 Machine/system setup, alignment 1-13
1.11 Initial commissioning 1-13
1.12 Working area, hazardous area for people 1-14
1.13 Safety equipment and safety regulations 1-16
1.13.1 Checking safety equipment, "safety check" 1-17
1.13.2 Checking for damages to movable and fixed guards. 1-17
1.13.3 Safety light curtain 1-18
1.14 Danger spots in the machine area 1-19
1.14.1 Working area 1-21

1.14.2 Machine table, (MT), pallet 1-23
1.14.3 Maintenance area (MA) 1-24
Overview maintenance area 1-26
1.14.4 Working in the tool magazine area 1-28
1.15 Collision 1-30
1.16 Service sockets 1-30
1.17 Compressed air 1-31
1.18 Dangers from electrical energy 1-31
1.19 Dangers from hydraulic energy 1-32
1.20 Maintenance units 1-32
1.21 Groundwater protection 1-33
1.22 Use of operating and auxiliary materials 1-33
1.23 Disposing of operating and auxiliary materials 1-34
1.24 Leakage of harmful gas or vapour 1-34
1.25 Materials for processing 1-34
1.26 Operators' conduct when operating/running the machine 1-35
1.27 Basic machining principles 1-35
1.28 Prior requirements for using tools 1-36
1.29 Cleaning 1-36
1.30 Maintenance works 1-37
1.31 Firefighting 1-38
1.32 Spare parts, accessories 1-38
1.33 Replacing inspection windows 1-39
1.34 Options 1-41
1.34.1 Cooling lubricant system [90] 1-41
1.34.2 Coolant circulation 1-41
1.34.3 Tool control [97] 1-43
1.34.4 Probe [23] 1-43
1.34.5 Vacuum system 1-43
1.34.6 Suction unit [12] 1-44
1.34.7 Protractor head 1-44
1.34.8 90° protractor head 1-45

2. Machine−specific safety . . . . . 2−1

2.1 Switching the machine on, ready for operation, and off 2-1
2.1.1 Switching the machine on 2-1
2.1.2 Machine is ready for operation 2-3

2.1.3 Switching the machine off 2-4
2.2 Reference axis 2-6
2.3 Checking safety equipment, "safety check" 2-8
2.3.1 Test stop special comments 2-8
2.3.2 Start the Teststop function on CH01 +CH02 2-9
2.3.3 Start the Test stop (break test) function on CH01 2-9
2.3.4 Start the Test stop (break test) function on CH02 2-10
2.3.5 Executing manual functions 2-11
2.4 What to look out for in setup operating mode 2-15
2.4.1 Checking the functional reliability of the Emergency OFF [30] switch 2-16
2.4.2 Checking the functional reliability of the door lock switches [61] 2-18
2.4.3 Checking the functional reliability of the door lock switches [61] at the maintenance door 2-19
2.4.4 Checking the function of the safety light curtain (31) in normal (automatic/production) operation 2-21

3. Logistics 3–1

3.1 Transportation, storage 3-1
3.1.1 Packaging 3-1
3.1.2 Dimensions, weights 3-1
3.1.3 Transportation 3-1
3.1.4 Storage 3-2
3.2 Initial commissioning 3-3
3.2.1 List of tasks to be performed 3-3
3.3 Decommissioning 3-5
3.3.1 Temporary decommissioning 3-5
3.3.2 Permanent decommissioning (scrapping) 3-5

4. Technical data 4–1

4.1 Rating plate 4-1
4.2 Type designation and machine number 4-2
4.3 Dimensions and weights 4-3
4.4 Scope of supply 4-3
4.5 Ratings 4-4
4.6 Permissible ambient conditions 4-4
4.7 Setup conditions 4-4
4.8 Noise emissions 4-4
4.9 Operating and auxiliary materials 4-5

4.10 Travel / Travel speeds 4-5
4.11 Load bearing ability of the table; work piece dimensions 4-6
4.12 Tool magazines 4-8
4.12.1 Assigning tools to slots 4-9

5. Controls 5–1

5.1 Overview of controls 5-1

6. CNC monitor control operation 6–1

6.1 Overview of the operating panel with machine control panel (option) 6-1
6.1.2 Overview of the axis selection keys [49] 6-7
6.1.3 Overview of the customer keys [45] 6-10
6.1.4 Machine control panel elements (44) 6-13
6.1.5 Overview of the special keys 6-15
6.2 Key switch authorisation 6-15
6.2.1 Overview of the key switches 6-16
6.2.2 Authorisation levels for mode of operation selector switch 6-16
6.2.3 Overview of SIEMENS key switches 6-18
6.3 Overview: Tool magazine controls 6-19
6.4 Overview of the signal column [91] 6-22
6.4.1 Explanation of the colours on the signal column 6-23
6.4.2 Acoustic alarm (91.1) 6-24
6.5 Using the mode of operation selector switch [53] 6-25
6.5.1 Set to 0 = Normal (automatic/production) operation 6-25
6.5.2 Set to I = Setup operation/Manual mode 6-27
6.5.3 Set to II = Mode of operation for checking programming with manual intervention (option) 6-29
6.6 Customer key operating procedures [45] 6-30
6.6.1 Using the keys to execute functions 6-30
6.6.2 Executing functions using the keys on the tool magazine 6-43
6.7 Manual functions 6-46
6.7.1 Executing manual functions 6-46
6.7.2 Executing service functions 6-49
6.7.3 Executing spindle functions 6-50
6.7.4 Executing manual pallet load function 6-56
6.7.5 Executing manual tool control function 6-59
6.7.6 Executing manual cooling lubricant function (option) 6-61
6.7.7 Executing manual temperature compensation linear function 6-64

6.7.8 Executing manual temperature compensation spindle function 6-65
6.7.9 Chip conveyor (option) 6-66
6.8 Diagnostics 6-69
6.8.1 Diagnosis: Pallet change 6-70
6.8.2 Diagnosis: Temperature compensation 6-72
6.8.3 Diagnosis: Temperature compensation Spindle 6-73
6.8.4 Diagnosis: Spindle 6-74
6.9 Executing Custom function 6-76
6.9.1 Executing transfer function (option) 6-78
6.10 Changing language 6-79
6.11 Automatic functions (option) 6-81

7. Work guidance 7–1

7.1 Daily, prior to starting work 7-1
7.2 While the machine is in operation 7-1
7.3 Machining different materials 7-2
7.4 Risk to people and the environment 7-2
7.4.1 Normal (automatic/production) operation 7-2
7.4.2 Setup operation / Manual mode and
Mode of operation for checking programming with manual intervention .....
7-3
7.4.3 What to do if accidents occur - First aid 7-3
7.5 Triggering the undervoltage release 7-4
7.6 Manual cleaning 7-5
7.6.1 Manual cleaning with blow gun 7-5
7.7 Vacuum unit malfunctions 7-8
7.7.1 Prior to NC START 7-8
7.7.2 Following NC START 7-9
7.8 Chip conveyor Stop (Option) 7-10
7.8.1 Normal process 7-11

8. CNC programming 8–1

8.1 Machine-specific M functions 8-1
8.2 User cycles 8-3
8.2.1 Load sub-program 8-3

9. Malfunctions 9–1

9.1 After activating Emergency OFF [30] 9-2
9.1.1 "Normal operation" 9-2

9.1.2 "Setup operation / Manual mode" 9-4
9.2 Referencing the axes 9-5
9.3 Error messages / Error codes 9-5
9.3.1 Error messages / Error codes with signal lamps 9-17

10. Cleaning and looking after the machine . . . . . 10−1

10.1 Daily, at the end of work 10-1
10.1.1 Preparing the machine 10-1
10.2 Cleaning the machine 10-4
10.2.1 Overview of the machine 10-5
10.2.2 Cleaning the machine 10-6
10.3 Cooling lubricant system (CLS) 10-8
10.4 Instructions for cleaning PC panes 10-9
10.5 After cleaning 10-10
10.5.1 On-off valve [8.5] 10-10

11. Maintenance and servicing . . . . . 11−1

11.1 Maintenance 11-1
Technical customer service 11-2
11.2 Overview: Maintenance instructions 11-3
11.2.1 Servicing at regular intervals 11-3
11.3 Lubrication and maintenance instructions 11-7
11.3.1 Explanation of symbols 11-8
11.4 Maintenance works 11-9
11.4.1 Preparing the machine 11-9
11.5 Performing the maintenance works 11-12
11.5.1 Wedge clamp HBZ 11-12
11.6 Performing the maintenance works 11-14
11.6.1 Executing the maintenance works 11-14
11.7 Checking levels and filters 11-23
11.8 Checking pressure settings and adjusting if necessary 11-33
11.8.1 Maintenance unit [8] for compressed air 11-35
11.8.2 Maintenance unit [8.1] for cleaning the measuring systems 11-41
11.8.3 Pressure control valve [8.8] for accelerator (ejector) 11-42
11.8.4 Pressure control valve [95] for cleaning the tool taper 11-43
11.8.5 Maintenance unit [97] for tool control 11-44

12. Technical appendix ..... 12−1

12.1 Accessories 12-1
12.1.1 Cooling unit [89] for switch cabinet 12-1
12.2 Further accessories (option) 12-1
12.2.1 Cooling lubricant system [90] 12-1
12.2.2 Tool control [97] 12-1
12.2.3 Chip conveyor [56] 12-1
12.2.4 Suction unit [12] 12-2
12.2.5 Probe [23] 12-2
12.2.6 Protractor head 90° 12-2
12.2.7 HAPA protractor head 12-3
12.2.8 Handheld terminal [64] 12-4
12.3 Circuit diagram 12-5
12.4 Equipment list 12-5

13. Lubricants and fluids ..... 13−1

13.1 Lubricants 13-2
13.1.1 Lubricants used for the first time 13-2
13.2 Fluids 13-3
13.2.1 Fluids used for the first time 13-3

14. Spare parts catalogue ..... 14−1

Preliminary remarks on the spare parts catalogue 14-1

15. Appendix ..... 15−1

15.1 List of part numbers 15-1
15.2 Machine details 15-4
1 Setup plan Page 1
1 Foundation plan Page 1
1 Transport dimensions Page 1-
2 Drive layout Page 1-
3 Fluid plan Page 1-
4 Instruction Manual: Main spindle external
5 Instruction Manual: Main spindle cooling unit external
6 Instruction Manual: Switch cabinet cooling unit external
7 Instruction Manual: Hydraulic unit external
Electrics diagram is not part of the Instruction Manual. Supplied separately.

Options: .

8 Instruction Manual: Chip conveyor		external
9 Instruction Manual: Cooling lubricant system	external	
10 Instruction Manual: Suction unit	external	
11 Instruction Manual: Probe, transmitter, receiver	external	
12 Instruction Manual: Tool control, hardware, software		external
13 Instruction Manual: Vacuum pump	external	
14 Instruction Manual: Smart Vision	external	
16 Instruction Manual: Briquette press	external	

1. Safety

1.1 Warnings and symbols

The warnings described in the "General information" section of this Instruction Manual are used to highlight particularly important notes in the appropriate places.

1.2 Safekeeping this Instruction Manual

	NOTE
	Duty to provide information! To avoid incorrect operation ➢ This Instruction Manual must be kept permanently within reach of the machine and must be accessible to everyone operating, servicing or repairing the machine.

1.3 Fundamental principle

- Although this machine has been built in accordance with best engineering practice and acknowledged safety regulations, its operation may still pose threats to life and limb of users or third parties and/or may impair the machine or other property. The machine may only be operated
  - for the proper intended purpose
  - in impeccably safe condition
- The machine may only be put into service if all safety equipment is properly installed and functioning correctly.

1.4 Intended use

- Wherever possible, the machine/system must be protected with fixed and/or locked moving guards.
- The machine/system is only intended for commercial use!
- The machine/system may not be used in explosive atmospheres.
- The machine/system is only designed to machine
  - Aluminium, aluminium profiles
  - Steel
  - Titanium
  - Plastic (only in conjunction with suitable peripheral equipment)
  - GRP and CFRP work pieces (only in conjunction with suitable peripheral equipment)
  - Wood and other materials, especially containing magnesium (only after consultation with, and written approval by, the manufacturer)

  Any other use or use above and beyond the aforementioned specifications is deemed improper.
  The manufacturer/supplier accepts no liability for any damage resulting from improper use. The owner bears sole risk.
- Intended use also includes reading the Instruction Manual and adhering to the maintenance and servicing instructions.
- Please make sure the suction unit is also used as intended.

1.4.1 Improper use

- The machine may only be operated for the intended purpose as described in the Instruction Manual.

1.4.2 Residual risk

	DANGER
	Hydraulic failure (e.g. power cut, hose burst; **machine turned off at master switch)** **The rocker can be put into rocking motion by human force.** Failure to observe this warning can result in severe accidents culminating in possible disability or death. ➢ Do not stand on the machine table. Use suitable equipment to lock the rocker and prevent it from moving when performing repairs or maintenance.

1.5 Warranty and liability

- The terms and conditions of sale and supply of bavius technologie gmbh apply and will be provided upon signature of the purchasing contract, at the latest. Warranty and liability claims relating to injury or property damage are excluded if due to one or more of the following causes:
  - Improper use of the machine
  - Improper fitting, commissioning, operating or servicing of the machine
  - Operating the machine despite defective safety equipment or with safety equipment and guards that have been improperly installed or are not functioning correctly
  - Failure to observe the Instruction Manual notes relating to transportation, storage, assembly, commissioning, operation, servicing or fitting the machine
  - Unauthorised modifications to the design of the machine
  - Any other unauthorised modifications
    (e.g. drive ratios: power and engine speed)
  - Inadequate monitoring of wearing machine parts
  - Improperly executed repairs
  - Emergencies caused by external influence or force majeure.

1.6 Organisational measures

	DANGER
	Risk of accidents while working! Owners are responsible for accidents occurring during work. ➢ All of the following measures must be observed.

- All generally applicable and local regulations governing accident prevention and environmental protection must be made available and observed, in addition to the Instruction Manual.
  Such regulations may also govern, for example, how to deal with hazardous substances, or the provision/wearing of personal protective equipment, or traffic regulations (e.g. safety data sheets).
- Everyone charged with working with/on the machine must have read and understood this Instruction Manual, and especially this Safety section, before commencing work. Once they have started work, it is too late. This is particularly true for staff who only occasionally work with/on the machine (e.g. fitting/maintenance tasks).
- At least occasionally check to make sure the staff are working in a safety- and risk-conscious manner, and observing this Instruction Manual.
- Wear personal protective equipment where necessary or stipulated by law.
- Observe all safety and danger warnings on the machine/system.
- Make sure all safety and danger warnings on the machine are legible at all times.
- Do not perform any alterations, additions or modifications to the machine that might adversely impact safety without the prior consent of the manufacturer. This applies equally when installing and adjusting safety equipment and valves, and when welding bearing parts.
- Spare parts must meet the technical requirements specified by the manufacturer. This is always the case if original spare parts are used.
- The control unit may only be operated by trained members of staff.
- Do not alter (PLC, software) the programmable control systems.

- Replace hydraulic hoses at the specified/reasonable intervals, even if they are not exhibiting obvious safety defects.
- Adhere to the intervals for recurring inspections/maintenance works as specified by law or indicated in the Instruction Manual.
- Make sure everyone knows where the fire extinguishers are located, and how to operate them.
- Make use of all fire warning and firefighting options.

1.6.1 Staff selection and qualification; basic duties

	DANGER
	Risk of accidents while working! bavius technologie gmbh accepts no liability for work accidents resulting from failure to observe the following. ➢ All of the following measures must be observed.

- Reliable members of staff only may work on/with the machine. Observe the legal minimum age.
- Only assign trained and instructed members of staff; clearly assign responsibility for operation, fitting, servicing and repairs. **Recommendation: Let the manufacturer train your staff!**
- Make sure any staff member working on the machine has been assigned to do so.
- Assign lead responsibility for the machine – including traffic regulations – and empower that person to refuse to follow any instructions issued by third parties that contravene safety rules.
- Staff members who are still awaiting training, instruction, induction or are still in general training may only work on/with the machine if supervised at all times by an experienced technician.
- Work on electrical equipment belonging to the machine/system may only be performed by electricians or trained technicians under the guidance and supervision of an electrician and must comply with electrotechnical regulations.
- Only technicians with special hydraulic training and experience may work on hydraulic equipment.

1.6.2 Safety warnings during particular operating phases

	DANGER
	Risk of accidents while working! Owners are responsible for accidents occurring during work. ➢ All of the following measures must be observed during the relevant operating phases.

1.6.2.1 Normal (automatic/production) operation

Operation of the machine using numerical control for programmed automatic operation with closed guards and/or functioning protective equipment that prevents access.

- Desist from working in such a way that may raise safety concerns, e.g. disenabling the safety function of the door lock switch [61] by inserting a loose actuator!
- Take steps to ensure that the machine/system is only operated when it is safe and fully functional.
  Only operate the machine when all of the protective equipment and safety-related fixtures, e.g. removable protective equipment, Emergency OFF features, sound insulation, suction units, are in place and fully functional.
- Check the machine/system for externally visible damages and defects at least once each shift. Report any changes (including in operating behaviour) immediately to the responsible entity/person. If necessary, shut the machine down immediately and safeguard it.
- Shut the machine/system down immediately if malfunctions occur, and safeguard it. Make sure malfunctions are rectified immediately.
- Follow the Instruction Manual when performing switch on/off procedures, study the control displays.
- Before switching on/starting the machine/system, make sure nobody is at risk from the ramping up procedure.
- The mode of operation selector switch [53] must be set to "Normal operation" and locked!
- Do not switch suction or ventilation equipment off or remove it while the machine is running.

1.6.2.2 Setup operation / Manual mode

Non-programmed operation of the machine.

1.6.2.3 Mode of operation for checking programming with manual intervention

Operation of the machine using numerical control for checking or optimising the NC program when the guards to the working area are open and the locks disenabled.

1.6.3 Special works when using the machine/system and performing maintenance or troubleshooting during operation; disposal

- Comply with the setting, servicing and maintenance tasks and intervals specified in the Instruction Manual, as well as the specifications governing the replacement of parts/partial equipment. These tasks must be performed by technicians.
- Notify the operations team prior to commencing any special or maintenance work. Designate a supervisor.
- Comply with the switch on/off procedures described in the Instruction Manual and observe the notes on maintenance when performing any work affecting the operation, adjustment to production, refitting or setting of the machine/system and its safety features, or when conducting maintenance, servicing and repairs.
- Safeguard a sufficiently wide radius around the maintenance area.
- Once the machine/system has been completely shut down for maintenance and repairs, make sure it cannot be restarted unexpectedly.
  - Turn off the master switch and safeguard against restarting
  - Hang a warning sign on the master switch.
- When repairing or replacing individual parts or larger assemblies, fasten them carefully to lifting gear and safeguard them appropriately to eliminate any risk. Only use suitable and technically flawless lifting gear and load bearing equipment of suitable dimensions. Do not stand or work beneath suspended loads.
- When assembling above body height, use the climbing aids and platforms provided or other similarly safe equipment. Do not use parts of the machine as climbing aids. Do not stand on the machine table or pallet – risk of slipping or falling. Wear fall protection when performing maintenance at height.
  Keep all handles, steps, handrails, platforms and ladders free of dirt, snow and ice.

- Remove any oil or conditioning agents from the machine, and especially its connections and threaded joints, before commencing maintenance/repairs. Do not use any aggressive cleaning agents. Use lint-free cloths.
- Always remember to tighten any threaded connections loosened for maintenance and repairs.
- If the fitting, servicing and repair works necessitate the disassembly of the safety equipment, it must be re-assembled and checked immediately after completion of the work.
- Ensure the safe and environmentally compatible disposal of all operating and auxiliary materials, as well as all replacement parts.

1.6.4 Notes on special types of risk

	DANGER
	Risk of accidents while working! Owners are responsible for accidents occurring during work. ➢ All of the following measures must be observed for the relevant types of risk.

1.6.4.1 Electrical energy

- Only use original fuses with the specified amperage. Shut the machine/system down immediately if the electrical energy supply system malfunctions.
- Work on electrical or operating equipment belonging to the machine/system may only be performed by electricians or trained technicians under the guidance and supervision of an electrician and must comply with electrotechnical regulations.
- When performing servicing, maintenance and repairs on machine and system parts, they must be de-energised and safeguarded against unexpected restarting if specified.
  - Turn off the master switch [15] and safeguard against restarting
  - and hang a warning sign on the master switch [15].
  Confirm the absence of voltage on the de-energised parts before grounding and short circuiting them, and isolating any adjacent live parts.

- The electrical features of the machine/system must be inspected/checked at regular intervals. Defects, such as loose connections or scorched cables, must be rectified immediately.
- If work must be performed on live parts, make sure a second person is present to activate Emergency OFF [30] or turn off the master switch [15] in the event of an emergency. Only use insulated tools.

1.6.4.2 Gas, dust, vapour, smoke

- Remove any dust and flammable substances from the machine/system and its surroundings before welding, e.g. with a stud welder, and ensure sufficient ventilation (risk of explosion).
- Comply with any pertinent national regulations when working in confined spaces.
- Smoking, naked flames and fire are forbidden. Avoid sparks.

1.6.4.3 Hydraulics, pneumatics

- Only technicians with special hydraulic training and experience may work on hydraulic equipment.
- Check all lines, hoses and threaded joints regularly for seal integrity and externally visible damage. Eliminate any damages immediately. Oil may spurt out, causing injuries and fires.
- Depressurise any system sections and pressure lines (hydraulics, compressed air) prior to commencing repairs.

1.6.4.4 Noise

- Sound insulation equipment on the machine/system must be in place and function during operation.
- Wear the specified personal ear protection.

1.6.4.5 Oil, grease and other chemicals

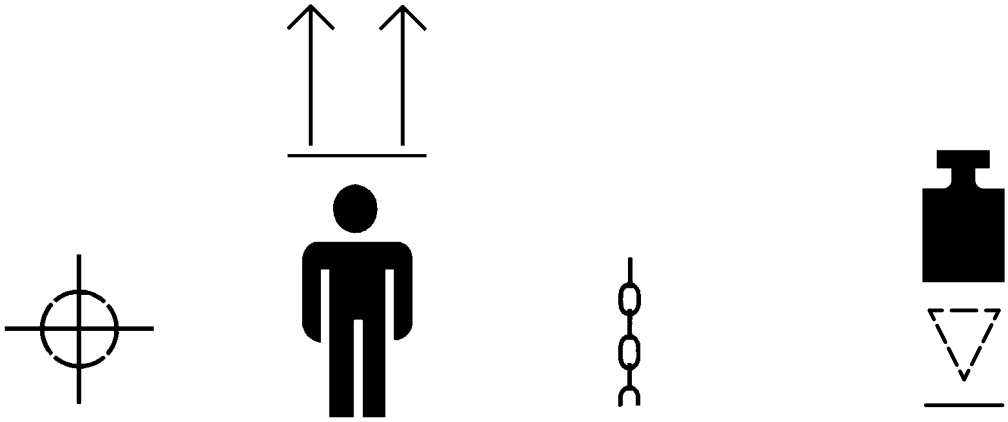
- When handling oil, grease and other chemicals, comply with the safety regulations applying to the product.
  Wear personal protective equipment.
- Handle hot operating and auxiliary materials with care (risk of burns and scalds).
- The machine does not contain any asbestos.

1.7 Transportation

	⚠ WARNING
	Risk of transport damage! bavius technologie gmbh accepts no liability for accidents occurring during transportation due to failure to observe the following. ➢ All of the following measures must be observed during transportation.

- Transportation of the machine/system only in compliance with instructions given by authorised and designated agents of bavius technologie gmbh (depending on means of despatch).
- Plug the ends of hydraulic lines to prevent any dirt getting into the hydraulic system.
- During transportation, make sure the machine and its hydraulic, pneumatic lines, cable ducts, and energy supply lines are not damaged, line with wood and wrap in rubber aprons to protect (e.g. against abrasion), if necessary.
- Safeguard the load securely. Use suitable attachment points.
- Assign trained experts to supervise lifting procedures.
- When loading, only use suitably capable lifting gear and load bearing equipment (weight).
- The design and use of all lifting gear must comply with applicable regulations.
- Only use suitable transportation vehicles with sufficient load bearing ability (weight).
- Only use lifting gear and load bearing equipment at the appropriately marked points.
  Raise the load slightly to make sure the weight is distributed evenly. Otherwise, transport safety may be compromised. Set down carefully.

- Observe the notes and symbols on the packaging:



Centre of gravity | **Top** | **Attach here** | **Position of feet** (only when the container is closed)

- Commissioning or re-commissioning by authorised and designated agents of bavius technologie gmbh only.

1.8 Fuse protecting the electrical system

	WARNING
	Danger from electrical voltage! Work on electrical or operating equipment belonging to the machine/system may only be performed by electricians or trained technicians under the guidance and supervision of an electrician and must comply with electrotechnical regulations. ➢ All of the following measures must be observed.

	NOTE
	Avoiding damage The scope of supply does not include fuse protection for the electrical system; it must be supplied on site, close to the machine. ➢ See the setup plan and circuit diagram for ratings.

1.9 Structural modifications

	NOTE
	Avoiding damage Alterations, additions or modifications to the machine are forbidden without the written consent of bavius technologie gmbh. ➢ Original spare parts and accessories from bavius technologie gmbh only may be used.

1.10 Machine/system setup, alignment

	NOTE
	Avoiding damage The scope of supply does not include fuse protection for the electrical system; it must be supplied on site, close to the machine. ➢ The site must be appropriate for the permissible setup and ambient conditions. ➢ Setup and alignment by authorised and designated agents of bavius technologie gmbh only.

1.11 Initial commissioning

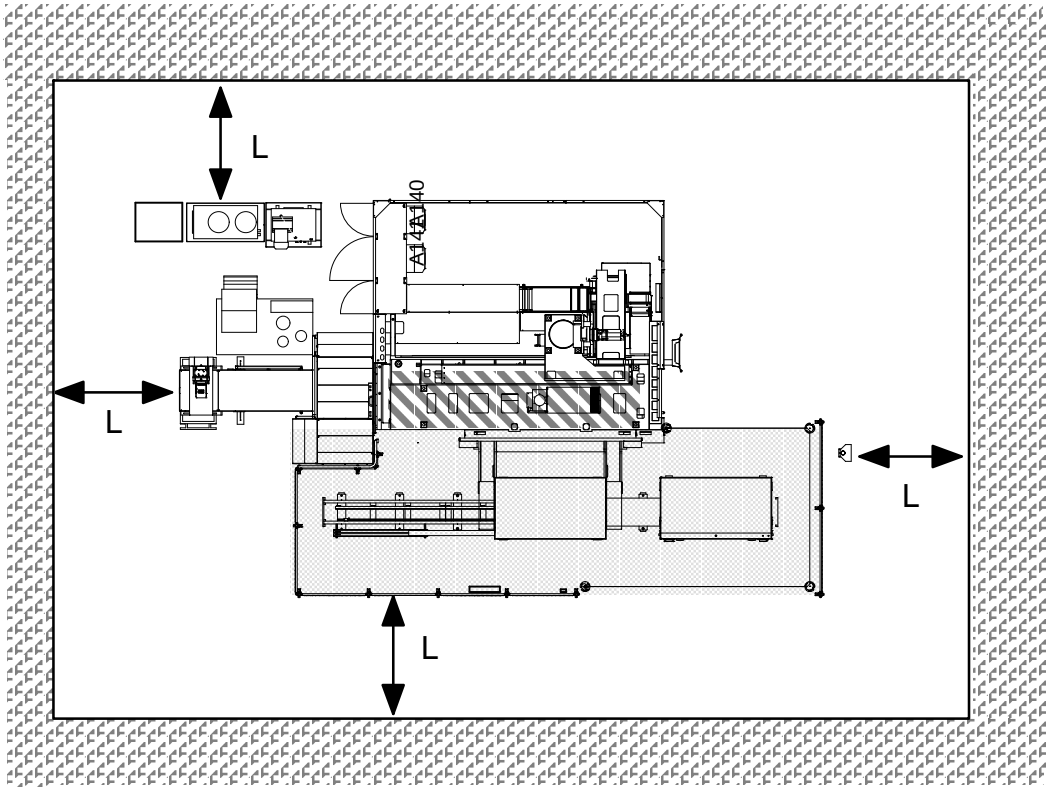
	NOTE
	Avoiding damage Incorrect operation causes damage. ➢ Initial commissioning of the machine/system following setup/assembly by authorised and designated agents of bavius technologie gmbh only.

1.12 Working area, hazardous area for people

	DANGER
	Risk of accidents while working! bavius technologie gmbh accepts no liability for work accidents resulting from failure to observe the following. ➢ All of the following measures must be observed.

- The owner of the machine/system has a duty to:
  keep all floor markings and danger warnings at/on the machine visible and legible (Setup plan).
- A hazardous area is any area in or around the machine where people are exposed to the risk of injury or damage to health.
- The working area is the space in which the machining process takes place.
- A freely accessible area of at least 600 mm (23.62 inches) must be kept clear on the operating side of the machine. This space is classified as a hazardous area. No objects may be placed in the hazardous area.
- The setup location must be sufficiently large (minimum size requirement) to allow smooth operation and maintenance access. The site may only be accessed by trained operators during operation.

A G



Key	No.	Explanation
A		Working area
G		Hazardous area
L		600 mm (23.62 inches)

1.13 Safety equipment and safety regulations

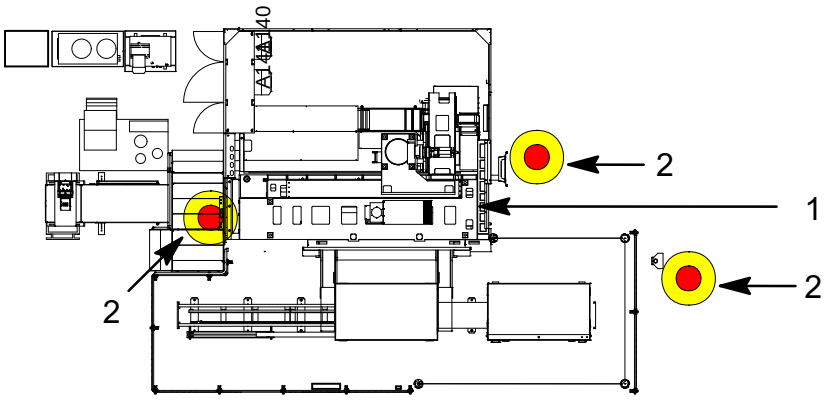
	DANGER
	Risk of accidents while working! bavius technologie gmbh accepts no liability for work accidents resulting from failure to observe the following. ➢ Safety equipment prevents danger; it must not be circumvented.

	NOTE
	General note. Prior to commencing work: ➢ Check safety equipment. During operation: ➢ Notify the supervisor immediately if a safety feature fails. Make sure a trained and designated technician rectifies any defects. Equally important: ➢ Comply with all applicable accident prevention and safety regulations and laws.

1.13.1 Checking safety equipment, "safety check"

	DANGER **Risk of accidents while working!** bavius technologie gmbh accepts no liability for work accidents resulting from failure to observe the following. ➢ Failure to observe the following points may result in severe accidents culminating in possible disability. ➢ Report any damages and defects to the responsible entity/person immediately. If necessary, shut the machine down immediately and safeguard it.

1.13.2 Checking for damages to movable and fixed guards.



Key	No.	Explanation
1		Safety doors to working area, front, with inspection window
2	30	Emergency OFF

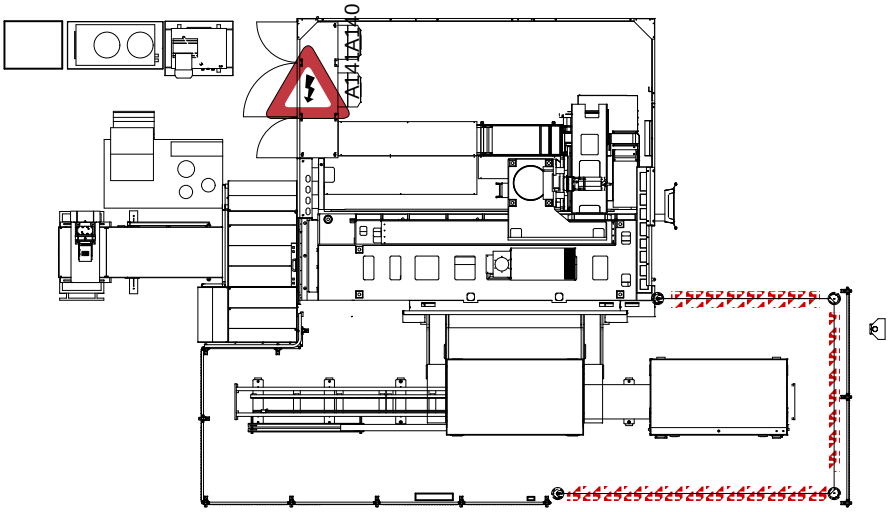
Prior requirement:

- Machine is switched off (↗ 1.13.3)
- Moving safety equipment (sliding door, protective doors) closed.

Procedure:

1. Visual inspection, practical checks, e.g.:
   - Chip protection
   - Inspection window (↗ 1.33 Replacement intervals)
   - Inspection window: signs of cracks forming or continuous cracks, has come loose from its frame, you can still see through it

1.13.3 Safety light curtain

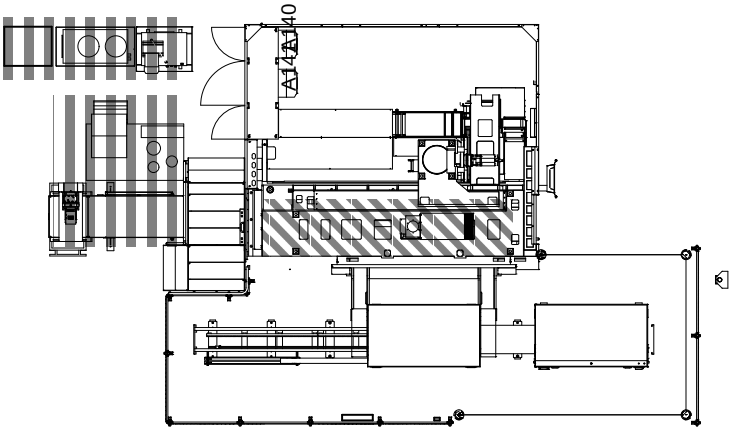


- The machine/system user is responsible for:
  - e. g. to maintain all marking on floor and all signs of danger at/on the machine completely in visible and readable condition
    ↗ Installation plan..
  - Safety light curtain [31]
    ↗ Product information annex 15.

1.14 Danger spots in the machine area

	WARNING **Danger spots in the machine area!** bavius technologie gmbh accepts no liability for work accidents resulting from failure to observe the following. ➢ All of the following measures must be observed.

- The working areas must be protected by fixed and/or locked, movable guards that are specifically designed to contain any processed materials, fluids and parts.
- Access to dangerous moving parts of the machine must be prevented by fixed, locked, movable guards.
- The movement of the machine spindle into this working area must be prevented during loading and unloading. This measure must not be solely dependent on the software.
- Failure to observe the danger spots may result in severe accidents culminating in possible disability (1.4).



A W

Key	No.	Explanation
A		Working area
G		Hazardous area

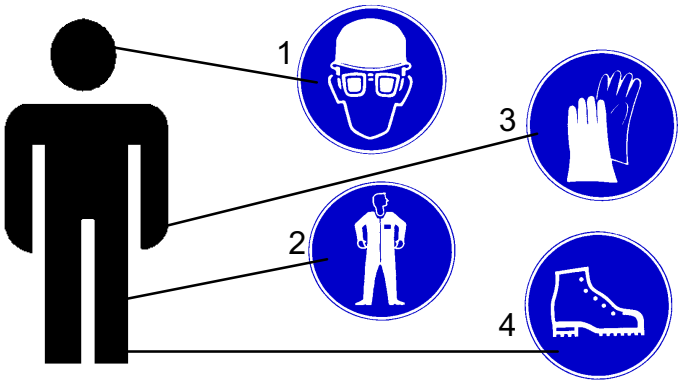
1.14.1 Working area

	DANGER
	Access to the working area! Risk of injury when working in the working area (e.g., inspection, maintenance, servicing, cleaning or setting works). ➢ Only operate the machine once you are sure that nobody is inside the working and/or maintenance area. ➢ Compliance with the following safety requirements prior to entering the working area is mandatory:

Prior requirement:

- Sufficient lighting in place.
- Good visibility at all times through the inspection window of any people or movements relating to the machining process.
- These people must have been specially trained to deal with hazards, such as:
  - Vapours
  - Stumbling, slipping, falling, jolting, pricking, cutting while accessing the machine.
  - Laser beams, not looking into the beam
    Do not intentionally point the laser beam at anyone.
  - Pricks, punctures or cuts by tools in the spindle
  - Movements of the axes and spindle

- Designated individuals must wear personal protective equipment when working, e.g.:

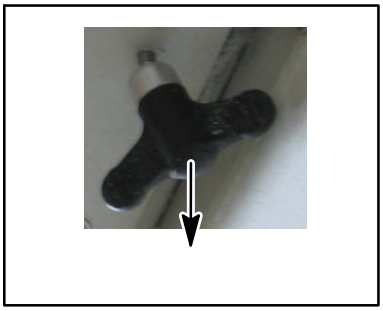


Key	No.	Explanation
1	-	Wear eye and head protection
2	–	Wear protective clothing
3	–	Wear safety gloves
4	–	Wear safety shoes

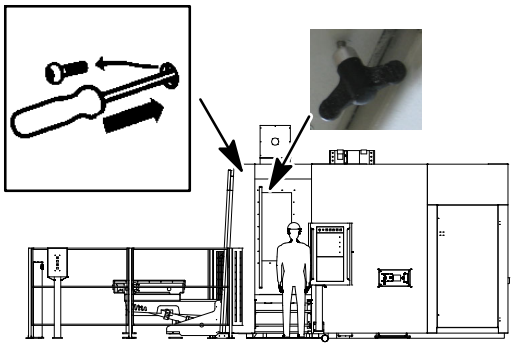
1.14.1.1 Emergency unlocking the doors to the working area

- The mechanical lock of the doors can be deactivated:

From inside:
Remove emergency unlocking key



From outside:
Manually unlock with Ø = 2.5 mm screwdriver, at least 150 mm long



Reset:
If the lock is released manually, it must be engaged again using the screwdriver.

1.14.2 Machine table, (MT), pallet

	DANGER
	Standing on the machine table or pallet Do not stand on the machine table or pallet – risk of slipping or falling.

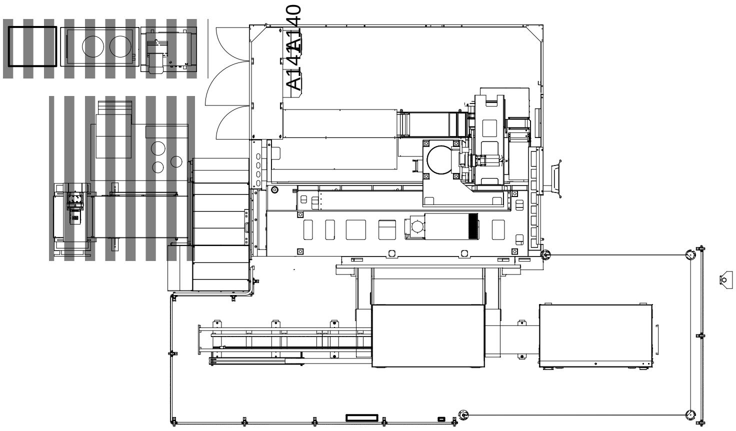
	DANGER
	Operator access to setup, loading and unloading positions. Designated individuals must wear personal protective equipment when working

- These people must have been specially trained to deal with hazards, such as:
  - Danger from suspended loads

- Risk of crushing
- Vapours
- Contact with metal chips, sharp-edged work pieces
- Risk of slipping caused by operating and auxiliary materials
- Laser beams, not looking into the beam
  Do not intentionally point the laser beam at anyone.

1.14.3 Maintenance area (MA)

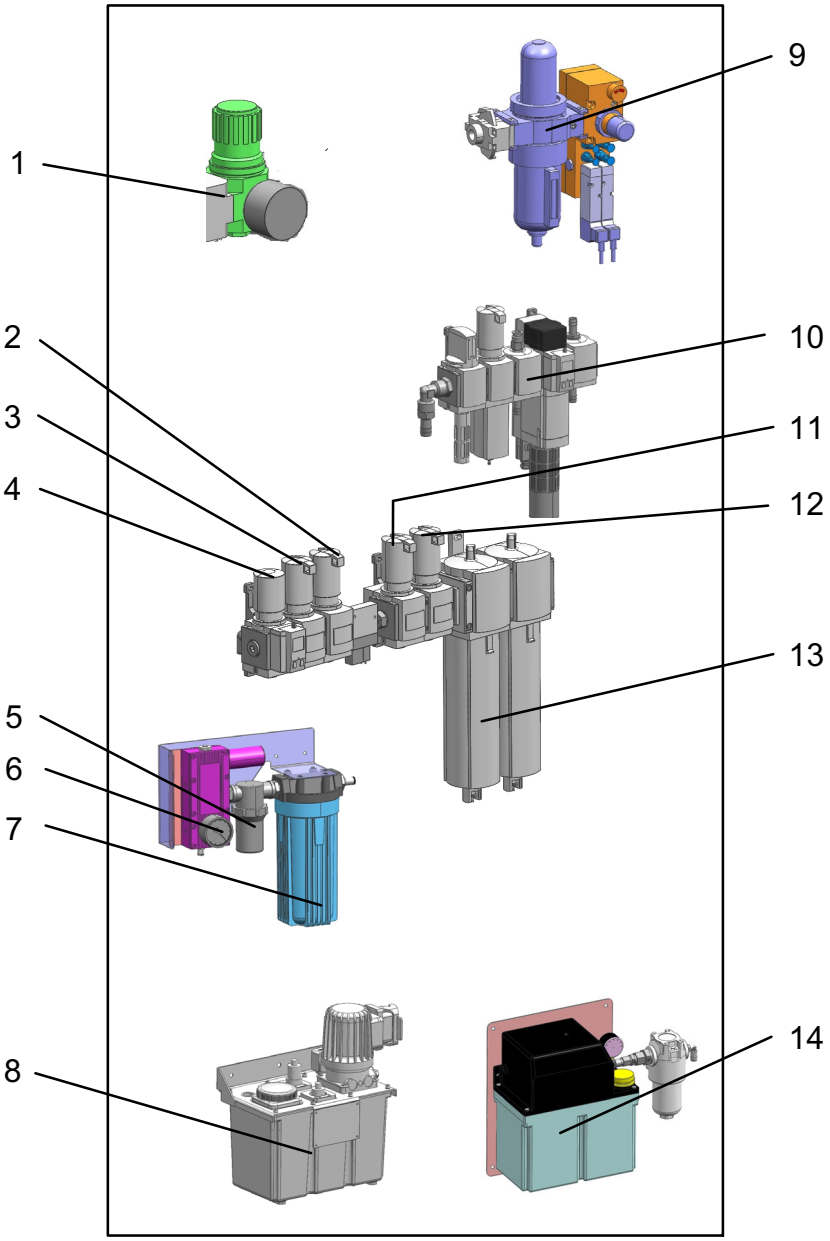
	DANGER **Access to the maintenance area!** Access to the maintenance area not closed. "Normal operation" is not possible if the door lock switch [61] is not locked. ➢ Only operate the machine once you are sure that nobody is inside the working and/or maintenance area.



W

Key	No.	Explanation
W		Maintenance area

Overview maintenance area

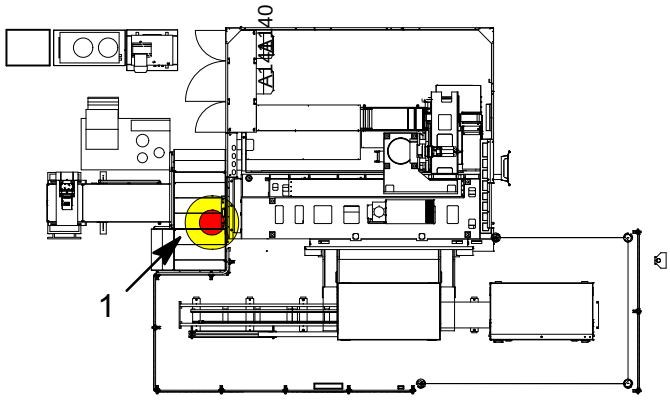


Key	No.	Explanation
1	18	Maintenance unit Cleaning measuring system
2	8.8	Maintenance unit: Vacuum accelerator
3	1.1.4	Maintenance unit: Oil extraction
4	1.2.2	Maintenance unit: Spindle lubrication, oil + air
5	1.1.2	Fine filter

Key	No.	Explanation
6	1.3	Vacuum display
7	1.1.1	Oil tank
8	4	Central lubrication, grease
9	97	Maintenance unit: Tool control
10	–	Wartungseinheit main valve
11	1.2.1	Maintenance unit: Spindle sealing air
12	95	Maintenance unit: Tool taper cleaning
13	8	Water separator
14		Central lubrication, oil

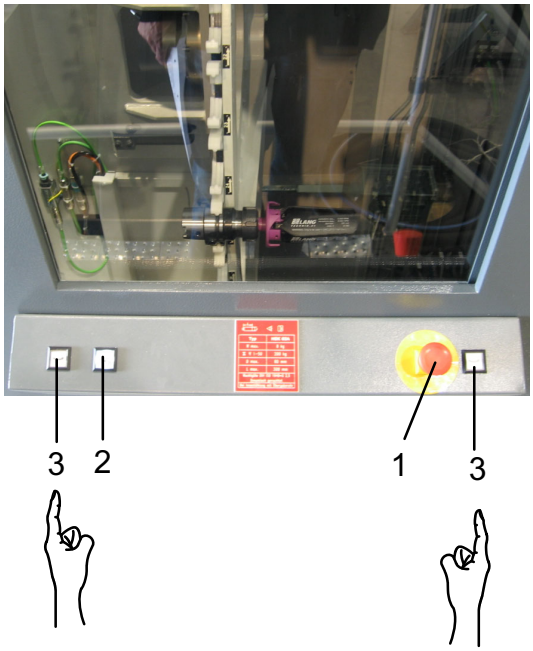
1.14.4 Working in the tool magazine area

	DANGER
	Working in the tool magazine area! Severe accidents resulting in possible disability can occur when working in the tool magazine area. ➢ Activate Emergency OFF.



Key	No.	Explanation
1	30	Emergency OFF on the tool magazine

- Activate " " [30] immediately in case of imminent danger.
- These people must have been specially trained to deal with hazards, such as:
  - Working on the tool magazines requires the greatest care and caution.

- 

Key	No.	Explanation
1	30	Emergency OFF on the tool magazine
2	61	Unlock/lock the door
3	66	Movement of the tool magazine: press both buttons

NOTE

Direction of rotation of the tool magazine.

Pressing the left button [66] briefly before the right button [66] makes the tool magazine on the side facing the operator move up in steps.

Pressing the right button [66] briefly before the left button [66] makes the tool magazine on the side facing the operator move down in steps.

- To stop movement, release one of the buttons.
- There is a risk of the tool magazines moving

- Tools may prick or puncture
- Compliance with the safety clearances between tool magazines and individual(s) is mandatory.
- Standing or laying down parts in the hazardous area of the tool magazines is forbidden.

1.15 Collision

	NOTE
	What to do in the event of a collision. Collisions can cause damage to the machine that is not necessarily visible at first glance. If the machine suffers a collision, bavius technologie gmbh must be notified under all circumstances. ➢ Following each collision, the machine must be measured and, if necessary, re-adjusted to avoid any further damage and ensure flawless operation.

1.16 Service sockets

	⚠ **WARNING**
	Danger from electrical energy! Although the master switch [15] is turned off, the service sockets [20] are still live. Carelessness can result in injury. ➢ The service sockets [20] must be kept clean and dry at all times. ➢ The protective covers must be in place when not in use.

- Use of the service sockets [20] (e.g. portable tools, test equipment).

1.17 Compressed air

	NOTE
	Insufficient compressed air supply. Functional impairment. ➢ A permanent supply of compressed air from the central network is mandatory for safety reasons. ➢ Make sure the supplied quantity of compressed air is sufficient, the supply line is appropriately dimensioned, and the operating pressure in the central network is adequate.

- Compressed air is supplied via plug-in connection (↗ Technical data).
- Check the operating pressure setting on the gauge of the compressed air maintenance unit [8]:

Set value (↗ Fluid plan)

Compressed air :	(↗ Fluid plan)
Network operating pressure:	(↗ Fluid plan)
Pressure sensor setting:	(↗ Fluid plan)

1.18 Dangers from electrical energy

	⚠ WARNING
	Danger from electrical energy! Carelessness can result in injury. ➢ Disconnect the machine from the mains by turning off the master switch [15] before commencing any cleaning or maintenance works. ➢ Work on electrical equipment belonging to the machine may only be performed by electricians.

1.19 Dangers from hydraulic energy

	WARNING
	Danger from hydraulic energy! A loss of pressure in the hydraulic system caused by leakage or insufficient oil triggers an error message. The machine stops. ➢ Only technicians with special hydraulic training and experience may work on hydraulic equipment. ➢ Depressurise any system sections and pressure lines prior to commencing repairs.

1.20 Maintenance units

	WARNING
	Working on maintenance units! A loss of pressure in the compressed air maintenance unit triggers an error message. The machine stops. ➢ If work must be performed on maintenance units, make sure a second person is present to activate Emergency OFF [30] or turn off the master switch [15] in the event of an emergency.

1.21 Groundwater protection

NOTE

Damage caused by operating and auxiliary materials.

Operating and auxiliary materials can get into the groundwater.

- Owners are responsible for ensuring that operating and auxiliary materials from the machine/system cannot leak into the groundwater.
- Suitable measures include oiltight hall floors, or oiltight collecting basins. The operating and auxiliary materials dripping off processed work pieces must also be taken into consideration.

1.22 Use of operating and auxiliary materials

WARNING

Risk of burns!

There is a risk of burns when draining hot fluids.

- Avoid spilling fluids in the machine surroundings to prevent the risk of slipping.
- Observe the manufacturers' safety data sheets when using operating and auxiliary materials.

1.23 Disposing of operating and auxiliary materials

	NOTE
	Damage caused by operating and auxiliary materials. Operating and auxiliary materials can get into the groundwater. ➢ Comply with legal regulations when disposing of used substances and materials. ➢ The same applies for production waste (e.g. chips) processed with the aid of such substances or materials.

1.24 Leakage of harmful gas or vapour

	⚠ **WARNING**
	Gas or vapour leakage! Harmful gas or vapour can escape when covers are opened. ➢ Ensure sufficient ventilation or suction.

1.25 Materials for processing

	⚠ **WARNING**
	Machining unsuitable materials! Risk of fire or explosion. ➢ Materials must not be flammable or explosive.

1.26 Operators' conduct when operating/running the machine

	⚠ WARNING
	Danger even if the machine is at a standstill! Even if the machine is not running, it still poses a threat to life and limb (e.g. following NC program stop). ➢ Perform all safety steps before accessing the machine working area. ➢ Operators must have been specially trained to deal with hazards (e.g. manual disengagement of the door lock switches [61] on the machine doors).

- Necessary safety measures (1.14.1)

1.27 Basic machining principles

	⚠ CAUTION
	Work pieces may be ejected. If work pieces are not securely tensioned/fastened, the rotating tool may cause them to be ejected from their fastening. ➢ Work pieces must be fastened absolutely securely and firmly to the machine table and/or tensioning device.

1.28 Prior requirements for using tools

	NOTE
	Using tools and tool mounts. Damage from damaged tools or tool mounts. ➢ Prior to commencing work, check the tools and tool mounts you are going to use. ➢ Damaged tool mounts must not be used.

- For restrictions when using tools, see (↗ Technical data).

1.29 Cleaning

- Daily, at the end of work, see (↗ 10.1).
- Cleaning procedure, see (↗ 10.2),
  I. Working area
  II. Maintenance area

1.30 Maintenance works

- Performing maintenance and servicing.
  I. Working area (1.14.1),
  II. Maintenance area

Disconnection from the mains:

- Disconnect the machine from the mains by turning off the master switch [15] and padlocking it:
  - before removing any covers from the machine
  - before performing any assembly work.

Electrics, electronics:

- Electricians must de-energise and confirm the absence of power prior to commencing work.

Stored energy:

- Wait 5 minutes before removing the trays (chip trays).

1.31 Firefighting

	NOTE
	Firefighting. Fire damage can occur. ➢ Fight fires with ABC powder extinguishers Do not use water extinguishers.

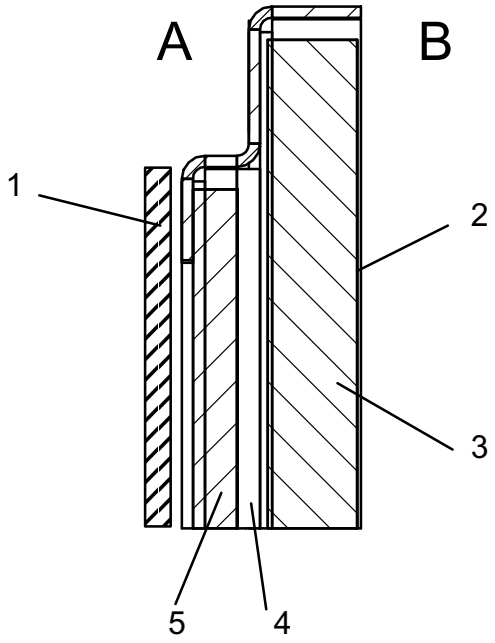
1.32 Spare parts, accessories

	NOTE
	Warranty and liability may lapse. bavius technologie gmbh accepts no warranty or liability whatsoever for damages caused by the use of non-original spare parts and accessories. ➢ Following repairs to safety-critical components, the functional, mechanical/electrical properties of the original part must be guaranteed again. We recommend the use of original bavius technologie gmbh spare parts only when replacing components. We have neither tested nor approved spare parts and accessories not supplied by ourselves. The installation and/or use of such products may adversely change the original properties of the machine.

1.33 Replacing inspection windows

	⚠ CAUTION
	Operational safety is jeopardised. Risk of injury from defective inspection window. ➢ In order to assure safety when operating the machines, the following intervals for replacing the polycarbonate safety windows have been agreed with the trade association: PC windows, protected on both sides, with sealed cut edges: 8 years ➢ As such, the polycarbonate safety windows are classified as wearing parts.

- The installation and assembly information provided by the companies supplying the inspection windows must be observed when replacing them.



Inspection windows:

Key	No.	Explanation
A		Working area: Machine inner side
B		Working area: Machine outer side
1		Glass viewing pane
2		Foil
3		Polycarbonate
4		Air space
5		Single-pane safety glass

1.34 Options

1.34.1 Cooling lubricant system [90]

	NOTE
	Damage to the cooling lubricant system. Incorrect handling may cause damage to the cooling lubricant system. ➢ Observe the manufacturer's specifications.

- See (15.2)

1.34.2 Coolant circulation

	NOTE
	Automatic operation. Start when machine is switched off. ➢ Every 4 hours, the cooling lubricant system and chip conveyor [56] run automatically for about 15 minutes. → The cooling lubricant is circulated.

Pressure vessel > 20 - 200 litres - System A:

	NOTE
	Pressure Vessel Ordinance. According to the German Pressure Vessel Ordinance, a vessel containing a product of more than 20 up to 200 of pressure and volume (bar x litre) of substances that are flammable pursuant to the German Chemicals Act (hazard class II or higher pursuant to the German Ordinance on Hazardous Agents), caustic or toxic must be approved by an expert from an authorised testing agency. ➢ With its capacity of 19.5 litres and maximum pressure of 1 bar, the vessel is not subject to this Ordinance. Approval has not been obtained. As such, the use of the aforementioned substances with this vessel is not permitted.

Pressure vessel > 200 litres - System B:

	NOTE
	Pressure Vessel Ordinance. According to the German Pressure Vessel Ordinance, a vessel containing a product of more than 200 of pressure and volume (bar x litre) of substances that are flammable pursuant to the German Chemicals Act (hazard class II or higher pursuant to the German Ordinance on Hazardous Agents), caustic or toxic must be approved by an expert from an authorised testing agency. ➢ With its capacity of 10/20 litres and maximum pressure of 7.0 bar, the vessel is not subject to this Ordinance. Approval has not been obtained. As such, the use of the aforementioned substances with this vessel is not permitted.

1.34.3 Tool control [97]

	NOTE
	Damage to tool control. Incorrect handling may cause damage. ➢ Observe the manufacturer's specifications.

- See (15.2)

1.34.4 Probe [23]

	NOTE
	Damage to the probe. Incorrect handling may cause damage. ➢ Observe the manufacturer's specifications.

- See (15.2)

1.34.5 Vacuum system

	NOTE
	Damage to the vacuum system. Incorrect handling may cause damage. ➢ Observe the manufacturer's specifications.

- See (15.2)

1.34.6 Suction unit [12]

	NOTE
	Damage to the suction unit. Incorrect handling may cause damage. ➢ Observe the manufacturer's specifications.

- See (15.2)

1.34.7 Protractor head

	NOTE
	Tool damage bavius technologie gmbh accepts no liability for work accidents resulting from failure to observe the following. ➢ A twist lock is essential when operating a protractor head. ➢ The twist lock is included by the manufacturer when the head is ordered. ➢ When retrofitting the head, the customer must supply the twist lock.

- Technical data, see (4.12).

1.34.8 90° protractor head

	NOTE **Tool damage** Incorrect operation causes tool damage. ➢ The protractor head is only designed for machining E5 (level 5). ➢ Anti-clockwise rotation of the spindle only when using the protractor head. ➢ Feed must be adjusted to match the lower spindle speed. ➢ The protractor head must be located in the specified position in the tool magazine. ➢ The tool number of the protractor head must be entered when programming the machining process.

- Technical data, see (4.12).

2. Machine-specific safety

2.1 Switching the machine on, ready for operation, and off

	WARNING
	Switching the machine on. Risk of injury and/or damage to the machine. ➢ Make sure nobody is inside the inner machine area (e.g. working area).

	NOTE
	Check spindle mount. Loaded tools in the spindle mount can cause damage. ➢ Make sure no tools are loaded in the spindle mount.

2.1.1 Switching the machine on

Prior requirement:

- [53] set to " 0 "

Procedure:

1. Turn [15] to " I "
   → Control unit starts

1. Press (40)

2. Press [42.2]

3. Press [41.2]

Correct outcome:

→ CNC control unit starts (automatically)

2.1.2 Machine is ready for operation

Prior requirement:

- Machine is switched on (2.1.1)
- Doors are closed, door lock switches [61] engaged
- Z axis not interfering.

Procedure:

1. Press
2. Press [42.2]
3. Press [41.2]
4. Change [42] to 100 %
5. Press
6. Press

The reference run is complete when the tool magazine flap closes again and the program status display changes from "Program running" to "Program aborted".

7. → all axes are referenced
   (see also User guide)
8. Press → Ref point de-selected
9. Check safety equipment, "safety check"

2.1.3 Switching the machine off

	WARNING **Circuit: F0.1, F0.2, F0.3 are not de-energised!** The machine lamp [60] and service sockets [20] remain live, even when the machine is switched off. ➢ Observe the safety regulations.

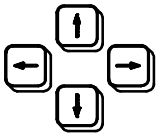
Procedure:

1. Press

1. Press

2. Horizontal soft keys
   Press Program

3. Horizontal soft keys
   Press Sub-program

4.  Position cursor in menu window ENDOFSHIFT program

5. Vertical soft keys
   Press Select

6. Press

7. Press

8. Press

9. → End of program
   → CNC axes close to reference point
   → No tool in spindle

10. Press (70)

    → Drives are switched off
    → Program content and data remain saved

11. Shut down any other PCs that might be switched on (e.g. PanelPC, Aradex computer).

	NOTE
	Misuse may cause PC errors. The PCs may not be able to ramp up properly and may switch to error mode. ➢ Shut down all additional PCs on the machine properly before turning off the master switch.

12. Turn [15] to " 0 "
    → Machine and control unit are voltage free

2.2 Reference axis

	WARNING
	X-Axis is over the 1. Limit position Risk of injury and/or damage to the machine. ➢ Set manually the X-axis under the 1. Limit position before start the reference drive

	WARNING
	If the vacuum was connected before Risk of injury and/or damage to the machine. ➢ The system will disconnect with signal powerOn the vacuum for release the teststop on the channel 02

	WARNING
	If the C-axis is are on the hardware nocks Risk of injury and/or damage to the machine. ➢ Set manually the right position before start the reference drive

Prior requirement:

- For reference the axis after machine restart or reset powerOn realice follow the steps

Procedure:

1. Press power ON bottom on the machine front panel

- After restart or NCK reset the machine is in JOG-REF

- Check if one pallet is on the load position and the other on work position, Normally the vaccum untit retract the vacuum suctions balgs by power ON.
- If the pallets are not in basic position need to realise a pallet basic position recovery action after the axis get synchronized
- The pneumatic unit are ready for work
- The hydraulic unit small ring are ready for work now
- A- and C-axis realize the pole position identification.
- Clamping on spindle are active.

2. Press quit light curtain bottom on the loading area panel

- The hydraulic unit are big ring ready for work now
- Gantry X-axis (CH1), SW-axis(CH2) and TA-Axis(CH2) are ready for synchronize the gantry unit if the override >0% and start feed ON

3. 1Press the button spindle start and feed start on the machine front panel

4. Set the override >0%

- Now the machine start the gantry sinchronisation
- All 3 gantry axis are synchronized

5. Set channel 01 in JOG

6. Press start NC

- Cycle SYNC start the reference drive
- The Z-Axis go in safety position
- The C-Axis look for the hardware nock in + direction (+180°)
- After found the nock go in – direction and search for the reference flag
- Set the position C0
- The A-Axis look for the hardware nock in + direction (+90°)
- After found the nock go in – direction and search for the reference flag
- Set the position A0
- Reference drive is finished
- The CH02 go in AUTO modus by PLC order

2.3 Checking safety equipment, "safety check"

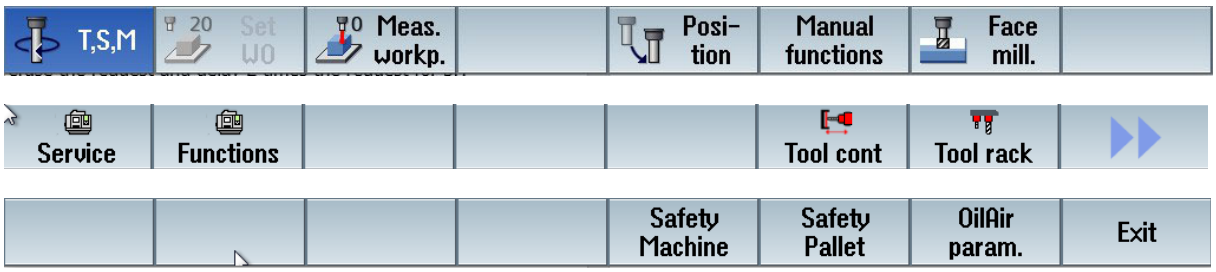
	⚠ WARNING **Check the safety equipment.** Failure to observe the following points may result in severe accidents culminating in possible disability. ➢ Observe safety equipment.

2.3.1 Test stop special comments

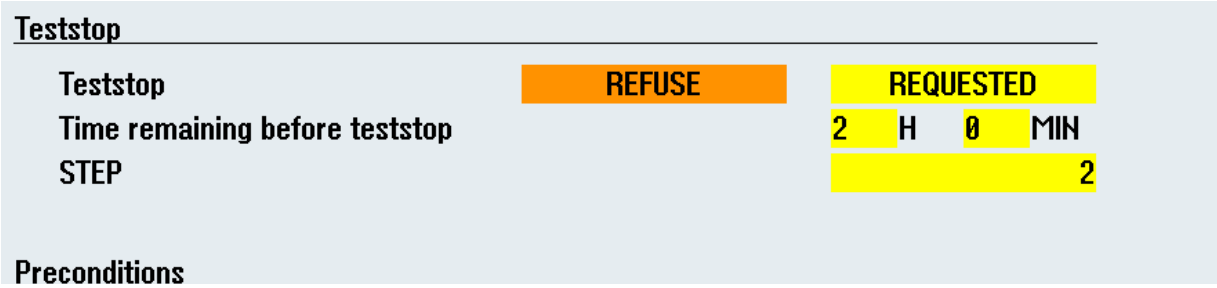
After 8 hours the test stop function set the messages:

701133	Safety Integrated: teststop ordered, 2x refusal possible (Rest 3H). Lock doors. Start with key T
701141	Safety Integrated PALCHG: teststop ordered, 2x refusal possible (Rest 3H). Lock doors. Start with key 'T

This mean the operator can refuse the request and delay 2 times the request for 3 hours.



press F1 button for refuse the request request



Or start the test stop function with the button

2.3.2 Start the Teststop function on CH01 +CH02

This function is standard after restart or NCK Reset and the test stop is requested in channel 01(701135) and channel 02 (701143).

701143	Safety Integrated PALCHG: teststop ordered, no refusal possible. Lock doors. Start with key 'T'
701135	Safety Integrated: teststop ordered, no refusal possible. Lock doors. Start with key T

Prior requirement:

- Machine is referenced already and in JOG mode
- Press button in small operator control station for acknowledge the safe light curtain after the light button lights up. (If the light curtain has been interrupted)
- Change override poti [42] to 100 %

Procedure:

1. Press

   test stop start on channel 02 (break test turn-axis)
   test stop start on channel 01
   → machine get power „Off“
   Test stop is performed
   Message: "Safety Integrated: Test stop is being performed"

2.3.3 Start the Test stop (break test) function on CH01

	⚠ WARNING **Check the safety equipment.** Failure to observe the following points may result in severe accidents culminating in possible disability. ➢ If the chanel 02 is not requested it is possible to start the test stop in channel 01.

Prior requirement:

- Machine is referenced already and in JOG mode
- Change override poti [42] to 100 %

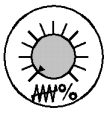
Procedure:

1. Press test stop simulate an emergency stop
   → machine get power „Off“"

2.3.4 Start the Test stop (break test) function on CH02

	WARNING **Check the safety equipment.** Failure to observe the following points may result in severe accidents culminating in possible disability. ➢ If the chanel 01 is not requested or a pallet change will start it is possible to start the test stop in channel 02.

Prior requirement:

- Machine is referenced already and in JOG mode
- Press button in small operator control station for acknowledge the safe light curtain after the light button lights up. (If the light curtain has been interrupted)
- Change override poti  [42] to 100 %

Procedure:

1. Press (40)

2. Press test stop start on channel 02 (break test turn-axis)
   → machine get power „Off“

2.3.5 Executing manual functions

Prior requirement:

- Machine is switched on
  or
  Machine is ready for operation.

Procedure:

1. Press [40]

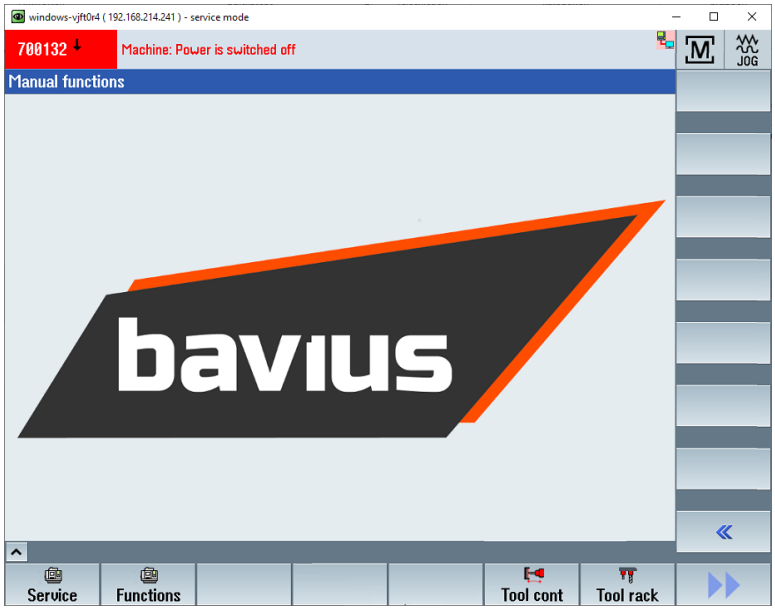
2. Press

3. Press

4. Horizontal
   soft keys
   Press Machine

5. Horizontal soft keys
   Press Manual functions

The screen [44] displays, e.g.:



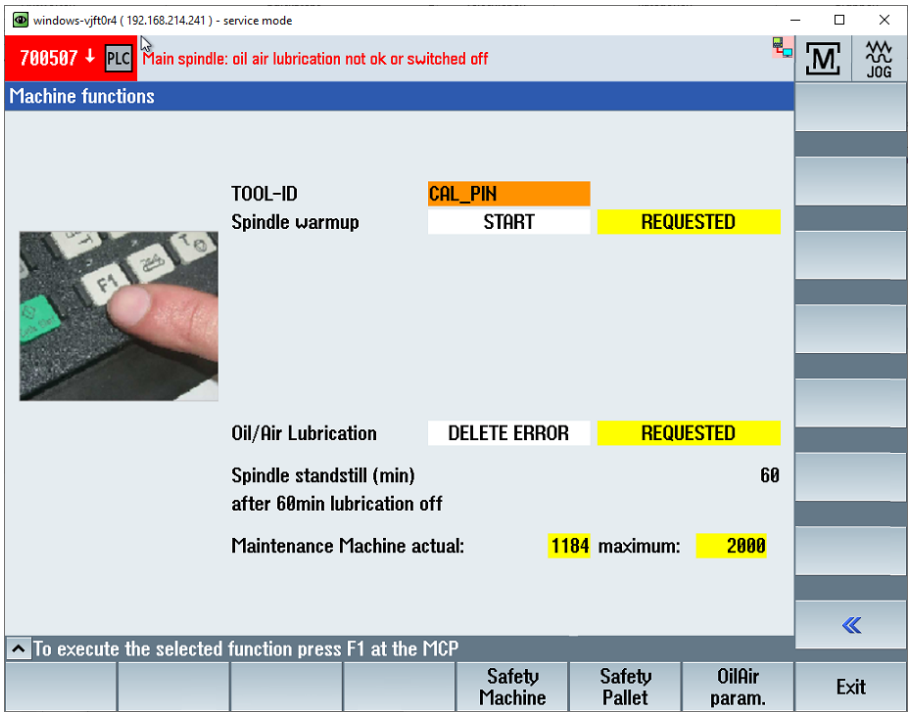
2.3.5.1 Executing machine functions

Prior requirement:

- See (↗ 2.3.5)

1. Horizontal soft keys
   Press Functions

The screen [44] displays, e.g.:



2.3.5.2 Warming the spindle

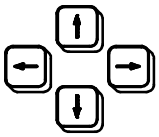
	NOTE
	Warming the spindle. Observe the following to avoid damaging the spindle: ➢ Only use finely balanced and suitable tools when warming the spindle.

- See (↗ Main spindle instruction manual)

Prior requirement:

- ↗ Main spindle user guide
  respectively
  Observe the alarm display on the screen [44]
- See (↗ 6.7.3)

Procedure:

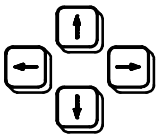
1. 

   Position cursor in
   menu window Tool ID n

2. Tool
   ID "n"

   Enter tool ID or tool slot number
   ↗ Sinumerik tool management instruction manual

3. Press

4. 

   Position cursor in menu window:

   Warming the spindle Start

5. Press

6. Press F1

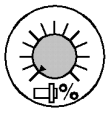
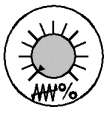
   → Function is executed

Correct outcome:

7. → Spindle warm-up program starts.

2.4 What to look out for in setup operating mode

	⚠ CAUTION **What to look out for in setup operating mode** Setup mode and the machining of the first work piece are particularly prone to accidents. ➢ This mode of operation therefore requires a particularly careful work approach. ➢ The fitter must be familiar with the machine, machining technology, tool cutting speeds, feed rates and work piece tensioning.

- The following functions are particularly important:
  - [30] Emergency OFF
  -  [41] Spindle override for rapid feed
  -  [42] Feed override
  - Single block (for the first sample work piece and to test the program)
  - [41.1] Stop spindle
  - [42.1) Stop feed
  - Stop NC

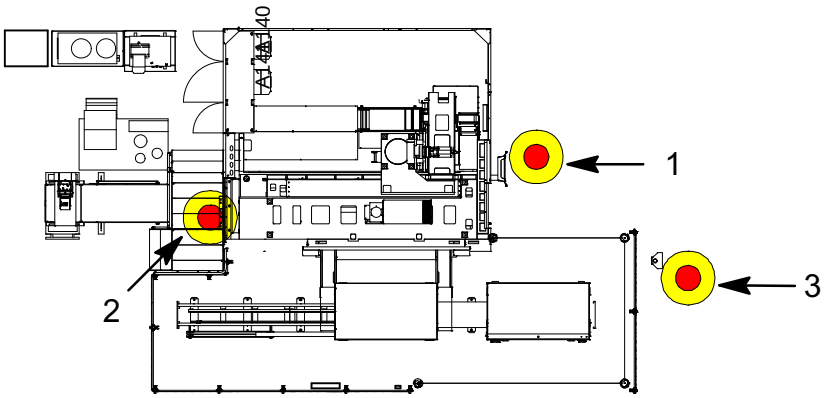
2.4.1 Checking the functional reliability of the Emergency OFF [30] switch

NOTE

Emergency OFF test

One Emergency OFF is located on the operating panel, the other on the tool magazine.

Briquette press option:
Emergency OFF on the briquette press encompasses the entire system



Key	No.	Explanation
1	30	On the operating panel
2	30	On the tool magazine
3	30	On the secondary control panel

Emergency OFF [30]

Pressing this button shuts down the entire machine.
(Evaluation in adjustment control).

Procedure:

1. Turn [15] to " I "
   → CNC control unit starts (automatically)

2. Press

[40]

3. Press [30]
   → The machine drives are switched off immediately
   → Lamp extinguishes
   → The screen [44] displays, e.g. 3000:
   Emergency OFF

4. Turn [30] in the direction of the arrow to unlock

5. Press

→ Error message confirmed

6. Press

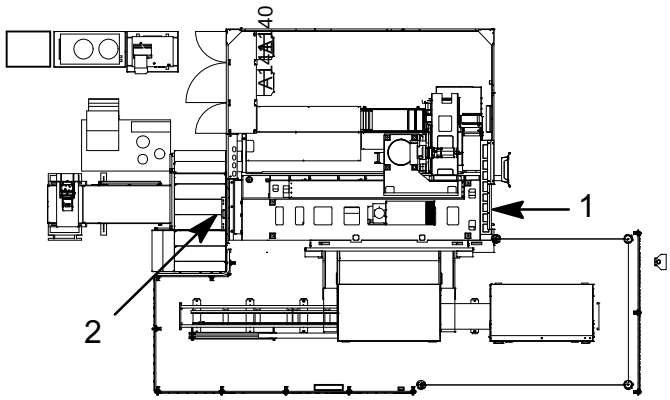
[40]

   → Lamp lights up

7. Repeat the test for each individual " " [30].

2.4.2 Checking the functional reliability of the door lock switches [61]

	WARNING **Function test: door lock switches** Risk of injury when manually unlocking the door lock switches [61] on the machine doors. ➢ Only operate the machine once you are sure that nobody is inside the working and/or maintenance area.



Key	No.	Explanation
1	61	Unlock/lock the sliding doors in the working area
2	61	Unlock/lock the tool magazine doors

Prior requirement:

- See (2.1.1)

Procedure:

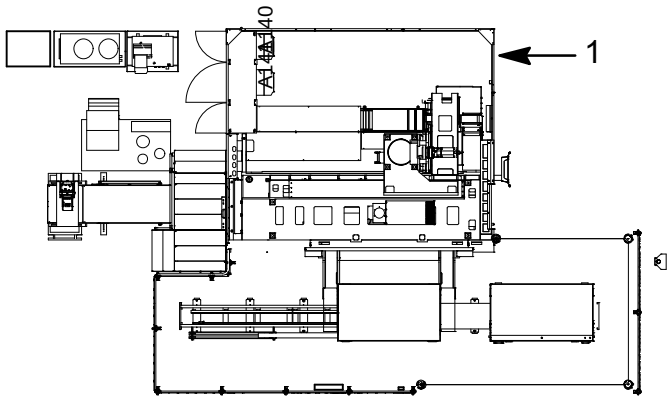
1. Press → LED flashes
   → Doors unlocked
2. Open doors
3. Close doors
4. Press → Doors locked

Correct outcome:

5. → Door lock switches [61] set to locked.
6. → Doors with door lock switches [61] cannot be opened.

2.4.3 Checking the functional reliability of the door lock switches [61] at the maintenance door

	WARNING
	Function test: door lock switches Risk of injury when manually unlocking the door lock switches [61] on the machine doors. ➢ Only operate the machine once you are sure that nobody is inside the working and/or maintenance area.



Key	No.	Explanation
1	61	Unlock/lock the doors in the maintenance area

Prior requirement:

- See (2.1.1)
- Light of the buttom is on

Procedure:

1. Press
   → Light of the buttom flashes
   → Door unlocked

2. Open door
   →Light of the buttom is out

3. Close door
   → Light of the buttom flashes

4. Press
   → Door locked
   → Light of the buttom is on

Correct outcome:

5. → Door lock switches [61] set to locked.

6. → Doors with door lock switches [61] cannot be opened.

2.4.4 Checking the function of the safety light curtain (31) in normal (automatic/production) operation

	NOTE
	Checking the safety light curtain [31] Machining centre with safety light curtain [31] and protective field for hazardous area, see Setup plan. Safety light curtain [31], see User guide, Section 15.

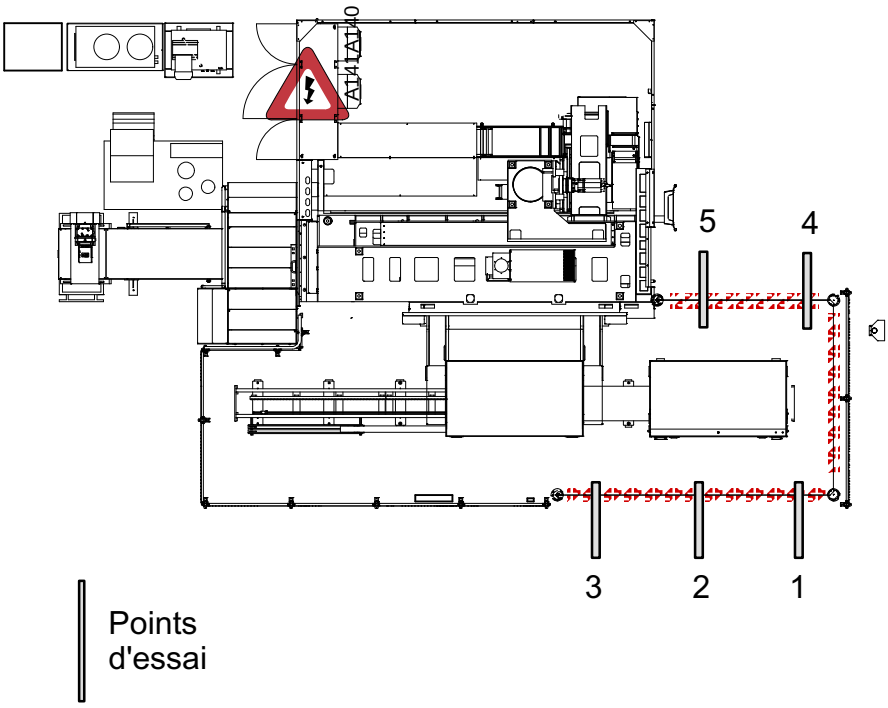
2.4.4.1 Checking the light path between transmitter and receiver

Prior requirement:

- The green LED on the light curtain is lit
- Non-permeable test specimen, 80 mm diameter

Procedure:

1. Move the test specimen along the entire length of the monitored area.
2. Pass the following areas:
   –Directly in front of the transmitter [1]
   –In the middle, between transmitter and receiver [2]
   –Directly in front of the receiver [3]



Correct outcome:

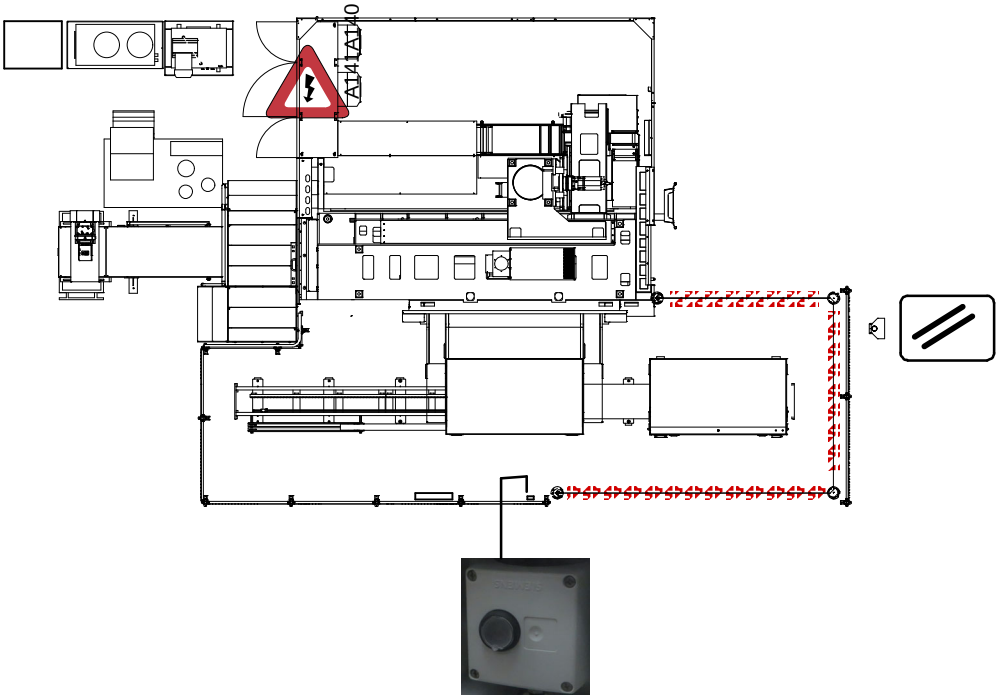
3. → Only the red LED on the receiver on each multi-beam safety light curtain must light up, **not** the green or yellow LEDs

4. → Inducing hazardous states must not be possible while the light beam is interrupted.

2.4.4.2 Checking the protective field

Prior requirement:

- ↗ 2.1.1
- Safety light curtain (31) is monitoring, e.g.:
  - Protective field



Procedure:

1. Interrupt
   → Machine stops hazardous movements,
   → the screen (44) displays, e.g.
   M 3134: Protective field accessed: no controller release!

2. Release

3. Press

4. Press

Correct outcome:

5. → The screen (44) displays: No message.

6. → active.

3. Logistics

3.1 Transportation, storage

3.1.1 Packaging

- Shipment by truck: The machine is shipped under tarpaulin.
  These tarpaulins remain our property and must be returned to bavius technologie gmbh
  carriage paid once the machine is installed.

3.1.2 Dimensions, weights

	NOTE
	Dimensions and weights Depending on means of despatch (see drawing). ➢ Observe the notes and symbols on the packaging.

3.1.3 Transportation

- Transportation of the machine/system only in compliance with instructions given by authorised and designated agents of bavius technologie gmbh.
- When loading, only use suitably capable lifting gear and load bearing equipment (weight ↗ 3.1.2)
- The design and use of all lifting gear must comply with applicable regulations.
- Only use suitable transportation vehicles with sufficient load bearing ability (weight ↗ 3.1.2)
- Only attach lifting gear and load bearing equipment at the appropriately marked points.

3.1.4 Storage

	NOTE
	Incorrect storage. Failure to comply with the following storage conditions may result in damage to the machine. Such damage is excluded from the warranty. ➢ All of the following measures must be observed.

- The storage location must be protected against direct climate influence (frost, moisture, direct sunlight)
- The storage location must be protected against condensation, acid, alkaline and other aggressive substances (vapours from these substances)
- Store in dust-free, closed spaces
- The storage area must be flat, hard and free of vibration
- Store in packaging
- Check the machine for transport and packaging damage
- Check the state of the machine and compliance with the storage conditions at regular intervals

3.2 Initial commissioning

	NOTE
	Initial commissioning! Setup/assembly and initial commissioning of the machine only by authorised technicians who are familiar with the machine. ➢ All of the following measures must be observed.

3.2.1 List of tasks to be performed

- Move, set up and align the machine.
- Connect the compressed air supply.
- Connect the UL/CSA version to the primary side of the matching transformers, observing the correct voltage: 400, 440, 460 or 480 V (factory set to 480 V!)
- Connect the machine to the power supply.
- Check the connection voltage.
- Check the rotating field (clockwise).
- Check the secondary and operating voltages.
- Check the direction of rotation of the drive motor.
- Check the operating materials and replenish if necessary.
- Check the safety equipment.
- Clean the machine.
- Train the customer.

	NOTE
	Training. Training recommendation. ➢ Enter the names of the people who have received training in the appropriate boxes in the "General information" section. Make sure each person who has received training signs off.

- Explain the structure of the Instruction Manual and the importance of the other documents.
- Explain the general safety information based on Section 1.
- Explain each work step for checking the safety equipment based on Section 1.
- Explain the key operating features of the machine based on Section 5.
- Explain the control unit for the machine based on the control unit user guide and Section 6.
- Explain how to work with the machine based on Section 7.
- Explain the use of accessories based on Section 12.
- Explain what problems and malfunctions might occur during machining and operation, and how to rectify them, based on Sections 7 and 9.
- Explain each work step for cleaning the machine based on Section 10.
- Explain how to service the machine based on Section 11.
- Make sure the customer signs the handover report.

3.3 Decommissioning

3.3.1 Temporary decommissioning

	⚠ CAUTION
	Temporary decommissioning. Failure to observe the following measures may result in damage to the machine from corrosion, bacteria, etc. Such damage is excluded from the warranty. ➢ All of the following measures must be observed.

- Thoroughly clean the machine, workspace and spindle.
- Grease the guide rails.
- Change the oil and oil filter if it is time for a service.
- Replace the entire contents of the cooling unit if it is time for a service.
- Cover the machine with foil.

3.3.2 Permanent decommissioning (scrapping)

	NOTE
	Permanent decommissioning. Failure to observe the following may cause damage to health and harm the environment, and incur severe legal penalties. ➢ All of the following measures must be observed.

- Drain and dispose of operating and auxiliary materials. Comply with legal regulations when disposing of operating and auxiliary materials.
- Dispose of the machine in compliance with applicable national laws and/or ordinances.

4. Technical data

4.1 Rating plate

- The rating plate is located on the door of the switch cabinet for the machine, and contains the following information:

Inscription	Explanation
Baujahr Year of construction année de fabrication	
Maschinentyp Type modéle machine	
Maschinen Nummer Machine number numéro de machine	
Anschlussspannung Connection voltage tension de raccordement	
Stromart / Frequenz Current type / frequency type de courant / frequence	
Nennstrom der Maschine Machine current rating courant nominal de la machine	
Sicherung in der Zuleitung Fuse protection in supply line fusible prot. le ciruit d'alimentation	
Größter Motor Largest motor moteur le plus grand	
Kurzschlußabschaltvermögen Short circuit breaking capacity puissance de coupure sur court−circuit	

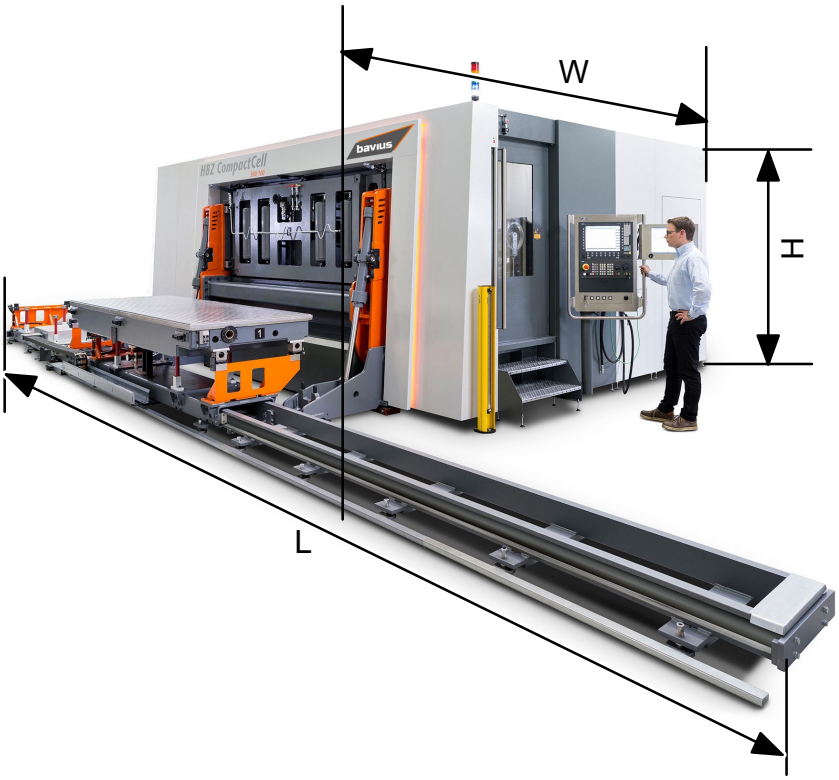
Inscription	Explanation
Stromlaufplan Nummer Circuit diagram number numéro du schéma électrique	
Luftverbrauch max. Max. air consumption consommation pneumatique max.	

4.2 Type designation and machine number

- Please always indicate the type and number of the machine when contacting our customer service by phone or mail.

4.3 Dimensions and weights

Type	L: Length mm	W: Width mm	H: Height mm	Weight kg
HBZ	**Layout**			



Requisite minimum dimensions (1.12).

4.4 Scope of supply

- CNC machining centre
- Circuit diagram
- Instruction Manual
- Accessories

4.5 Ratings

- HBZ CC

CNC machining centre	EU ratings	UL/CSA ratings
Power supply	3 x 400 V, N/PE, 50 Hz	3 x 480 V/PE, 60 Hz
Pneumatic supply	NG 13	G 1/2”
Operating pressure	> 6.5 bar	> 94 psi
Air consumption	approx. 2 500 normal l/min	approx. 2 500 normal l/min
Air quality	ISO 8573−1 class 4.4.4	ISO 8573−1 class 4.4.4

4.6 Permissible ambient conditions

- Ambient temperature: +15°C min. - +40°C max.
- Humidity: 30% - 95% max. for all operating equipment with climate classification 3K4 as per DIN IEC 721 part 3-3.
- Vibration: max. values for mech. class 3M1 as per DIN IEC 721 part 3-3.

4.7 Setup conditions

- Floor properties: Industrial floor, flatness within the footprint max. +/- 2 mm (0.07 inch).
- Foundation: Foundation plan
- Setup plan: Depending on type of machine/system

4.8 Noise emissions

- Workplace measurement of the noise produced a reference level of 75 dB(A)
- Depending on local conditions, the noise level may be higher, and may cause noise-induced hearing loss. In such cases, operators must be provided with appropriate protective equipment or otherwise protected.

4.9 Operating and auxiliary materials

- Lubricants (↗ Section on cooling lubricants)
- Coolants(↗ Section on cooling lubricants)
- Auxiliary materials (↗ Section on cooling lubricants)

4.10 Travel / Travel speeds

	NOTE
	Risk of collisions. Travel distance may be restricted, depending on the tool Ø and length. ➢ Perform visual checks while programming NC, machining, and performing geometric testing.

See (↗ 4.12).

	NOTE
	Travel speed. Travel speed is dependent on the control unit. ➢ The data are listed in the table below.

- HBZ CC

HBZ CC 200/100	X axis	Y axis	Z axis	A axis	C axis
Travel distance	2650 mm	1100 mm	550 mm	± 120°	± 200°
Max. travel speed	60 m/min	40 m/min	60 m/min	360°/s	360°/s
HBZ CC 300/100	X axis	Y axis	Z axis	A axis	C axis
Travel distance	3650 mm	1100 mm	550 mm	± 105°	± 200°
Max. travel speed	60 m/min	40 m/min	60 m/min	360°/s	360°/s
HBZ CC 400/100	X axis	Y axis	Z axis	A axis	C axis
Travel distance	4650 mm	1100 mm	550 mm	± 105°	± 200°
Max. travel speed	60 m/min	40 m/min	60 m/min	360°/s	360°/s

4.11 Load bearing ability of the table; work piece dimensions

NOTE

Load bearing ability and dimensions.

➢ The corresponding machining process dictates the maximum work piece dimensions.

- HBZ CC

HBZ CC 200/100			
Max. load bearing ability of table/pallet	Max. length of work piece	Max. width of work piece	Max. work piece height from top edge of table
1600 kg	2000 mm	1000 mm	300 mm
HBZ CC 300/100			

Max. load bearing ability of table/pallet	Max. length of work piece	Max. width of work piece	Max. work piece height from top edge of table
2000 kg	3000 mm	1000 mm	300 mm
HBZ CC 400/100			
Max. load bearing ability of table/pallet	Max. length of work piece	Max. width of work piece	Max. work piece height from top edge of table
2500 kg	4000 mm	1000 mm	300 mm

4.12 Tool magazines

	NOTE **Risk of collisions.** Travel distance may be restricted, depending on the tool Ø and length.

	NOTE **Risk of collisions.** Travel distance may be restricted, depending on the tool Ø and length. ➢ Tools may only be used if they have transfer pipes. ➢ Tools may only be used if they are dynamically balanced to DIN ISO 1940=G 2.5.

- When loading and unloading the tool magazine manually, see (↗ 1.15, 1.15.3 and 7.4).
- See (↗ 4.10.)
- See (↗ Spindle Instruction Manual).

4.12.1 Assigning tools to slots

NOTE

Risk of collisions.

Risk of collision from incorrect assignment.

➢ There is therefore only one possible tool assignment option.

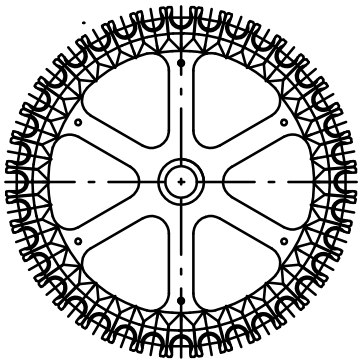
NOTE

Slot no. for probe [23].

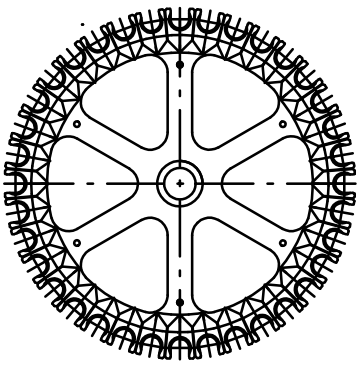
One slot no. is reserved for the probe [23].

➢ Identification with tool type "710".

2 x 50 tool slots (tool magasine 1 and 2)
Tool Ø up to 80 mm max. **Length: max. 300 mm** **Weight: max. 4.5 kg** **Total weight of all tools: max. 200 kg**
Slot no.: 1 – 50



Magasine 1



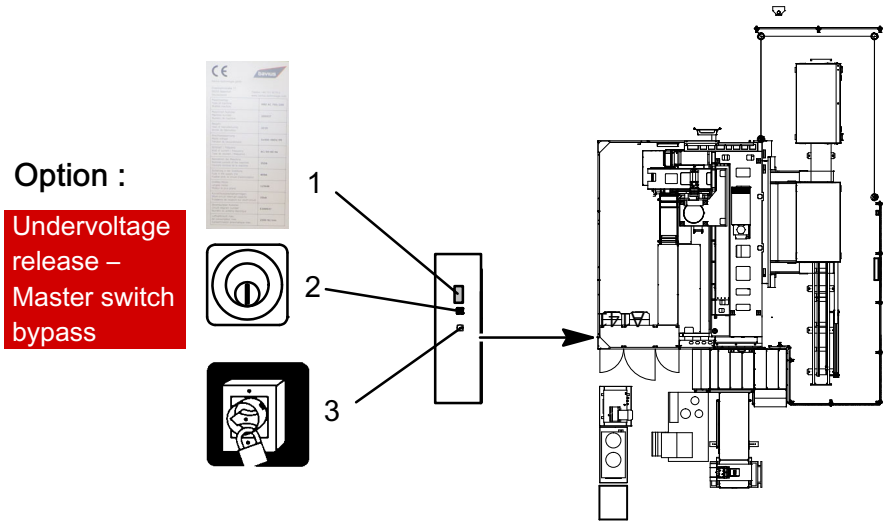
Magasine 2

3 tool slots (tool magasine 1 and 2) for angle head
Length: max. 300 mm **Weight: max. 8 kg**
Slot no.: 45, 47,49

5. Controls

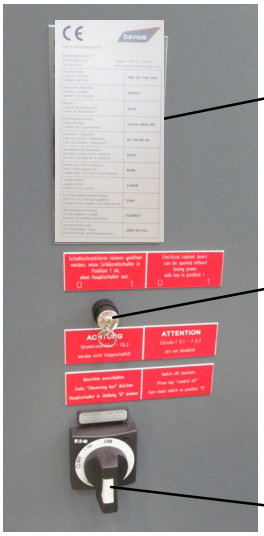
This section only describes the general controls.
For control functions that are dependent on the control unit, see (Section 6).

5.1 Overview of controls



Key	No.	Explanation
1		Type plate
2		Key for switch cabinet doors
3		Master switch

	WARNING
	Incorrect operation. Incorrect operation can result in injuries or property damage. ➢ These controls may only be operated by trained members of staff.



Type plate

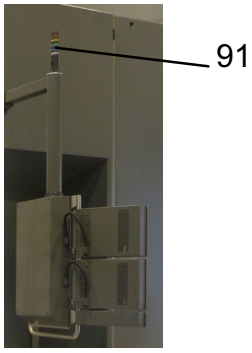
The type plate (1) is located on the switch cabinet door.

Key for switch cabinet door

This key (2) is needed to open the switch cabinet door when the machine is running.

Master switch [15]

The master switch is located on the left-hand switch cabinet door.
The master switch connects/disconnects the machine to/from the power supply.

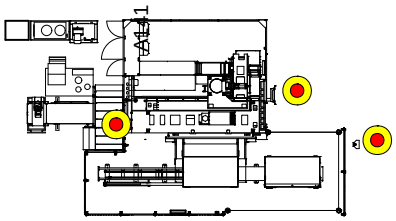


Signal column [91] (6.4)

The signal column [91] is located at the top of the operating panel.

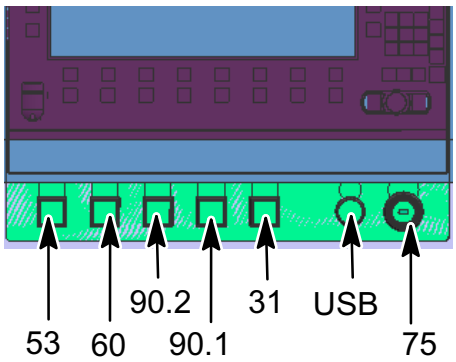
Acoustic alarm [91.1]

The acoustic alarm [91.1] is integrated in the signal column.



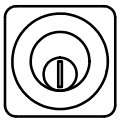
Emergency OFF [30]

One Emergency OFF is located on the operating panel, the other on the tool magazine.
Pressing this button shuts down the entire machine.
(Evaluation in adjustment control).



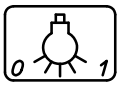
Controls beneath the screen:

Mode of operation selector switch [53]
Machine lamp [60]
Cooling lubricant system, manual rinse [90.1]
Pump for cleaning machine [90.2] (option)
Confirm the safety light curtain (31)
USB connection (USB) (option)
Enabling switch [75]



Mode of operation selector switch [53]

Authorisation, see (6.2)



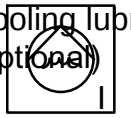
Machine lamp [60]

For switching the machine lamps in the working area on and off.
Is live, even when the master switch [15] is off.

Enabling switch [75]

The enabling switch [75] is located on the operating panel.

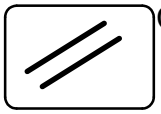
Cooling lubricant system, manual rinse [90.1] (optional)



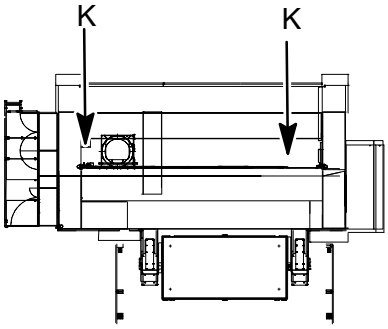
For switching on the pump for manually rinsing the cooling lubricant system (7.6)

Machine table cleaning pump [90.2] (optional)

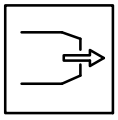
The switch turns the machine table cleaning pump on and off.



Confirm the safety light curtain [31]
Press this button to confirm pallet change release
→ Safety light curtain is active



Air shower camera (K)
(optional)
It is located on the operating panel. (alternative to 90.2)

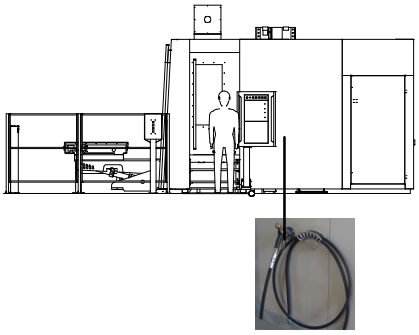


The switch turns on the air showers 1+2

NOTE

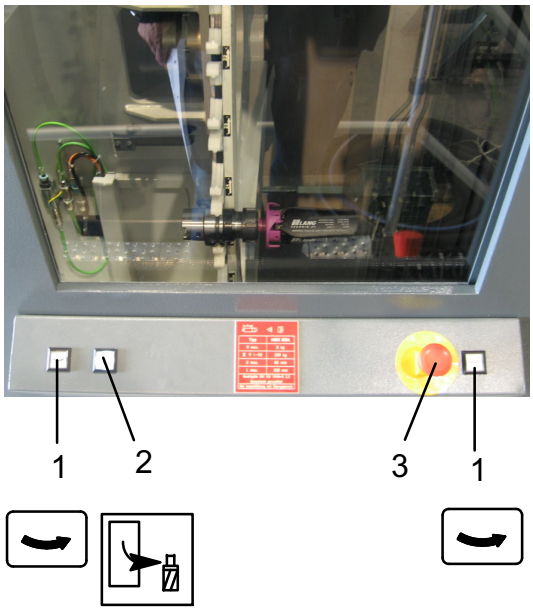
Pump for manual rinse.

This button switches the pump on.
The control unit switches it off again automatically.



Spray gun (W) for manually rinsing the cooling lubricant system [90.1] (option)
Located on the right, near the door to the working area.
For cleaning the machine table and/or working area 7.10.

Tool magazine operating device



Key	No.	Explanation
1	66	Rotate tool magazine
2	61	Unlock/lock the tool magazine doors
3	30	Emergency OFF

Press these buttons [66] to rotate the magazine.
They are located on the tool magazine.
Function, see (6.3.2).

Press both buttons [66] to rotate the tool magazine.

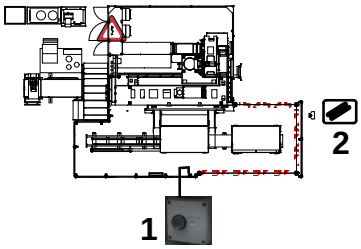
Emergency OFF [30] Pressing this button shuts down the entire machine.

NOTE

Direction of rotation of the tool magazine.

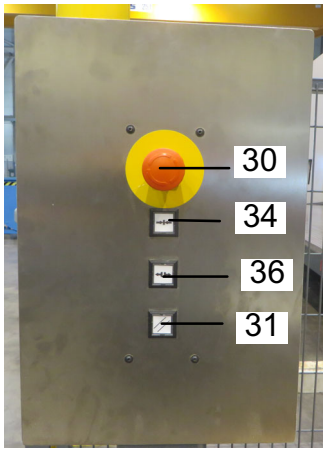
The direction of rotation is determined as follows:

- Pressing the left button [66] briefly before the right button [66] makes the tool magazine on the side facing the operator move down in steps.
- Pressing the right button [66] briefly before the left button [66] makes the tool magazine on the side facing the operator move up in steps.



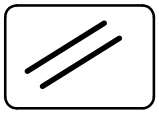
Operating panel for the safety light curtain:

Confirm the safety light curtain [31]
Press this button to confirm pallet change release
press 1 first and then press 2
→ Safety light curtain is active



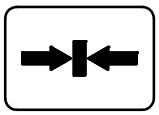
Device for operating the safety light curtain

Emergency OFF [30] Pressing this button shuts down the entire machine.



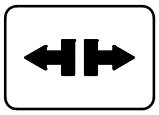
Confirm the safety light curtain [31]
Press this button to confirm pallet change release
→ Safety light curtain is active.

Acknowledge the safe photocell and acknowledge the signal workpiece ready for production



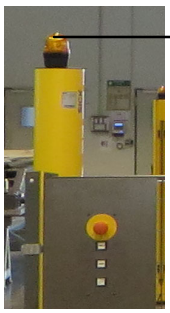
Tension work piece [34]
Press these buttons to activate work piece clamping.

Set the function vacuum connect if one or more zones are selected.
If the operator presses the bottom more as 2 seconds activate the confirmation for the workpiece ready for production
(End of prepare new workpiece)

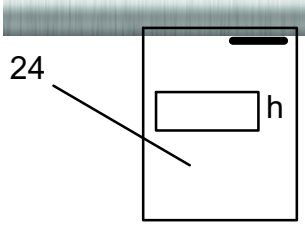


Disengage work piece [36]
Press this button to deactivate work piece clamping.

Set the function vacuum disconnects if one or more zones are selected. this bottom will cancel the confirmation workpiece ready fpr production. (Start of prepare new Workpiece)

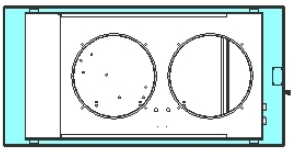


Flashing alarm [85]
lights up when the swivel axes are in motion



Hour counter [24]

The hour counter shows the number of hours the machine has been operating so far. It is located in the switch cabinet.



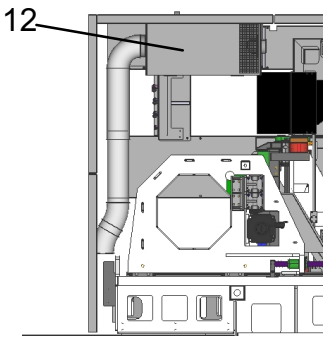
Spindle cooling unit [5]

Operating panel with master switch
Function (↗ Cooling unit instruction manual)

Tool control [97] (option)

Observe the manufacturer's specifications.
See (↗ Appendix).

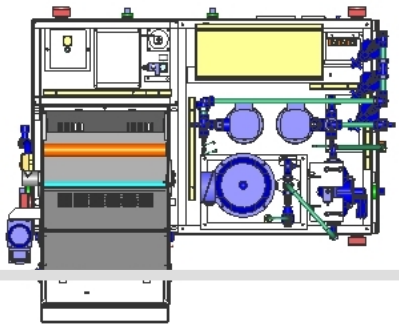
Tool control is located near the tool change system in the working area.



Suction unit [12] (option)

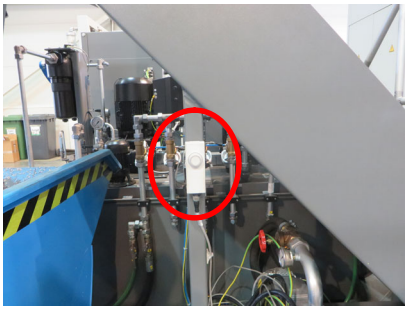
The suction unit is located at the rear of the machine, behind the flap.

Function (↗ Suction unit instruction manual)



CLS cooling lubricant system [90] (option)

Operating panel with master switch
Function (↗ CLS instruction manual)

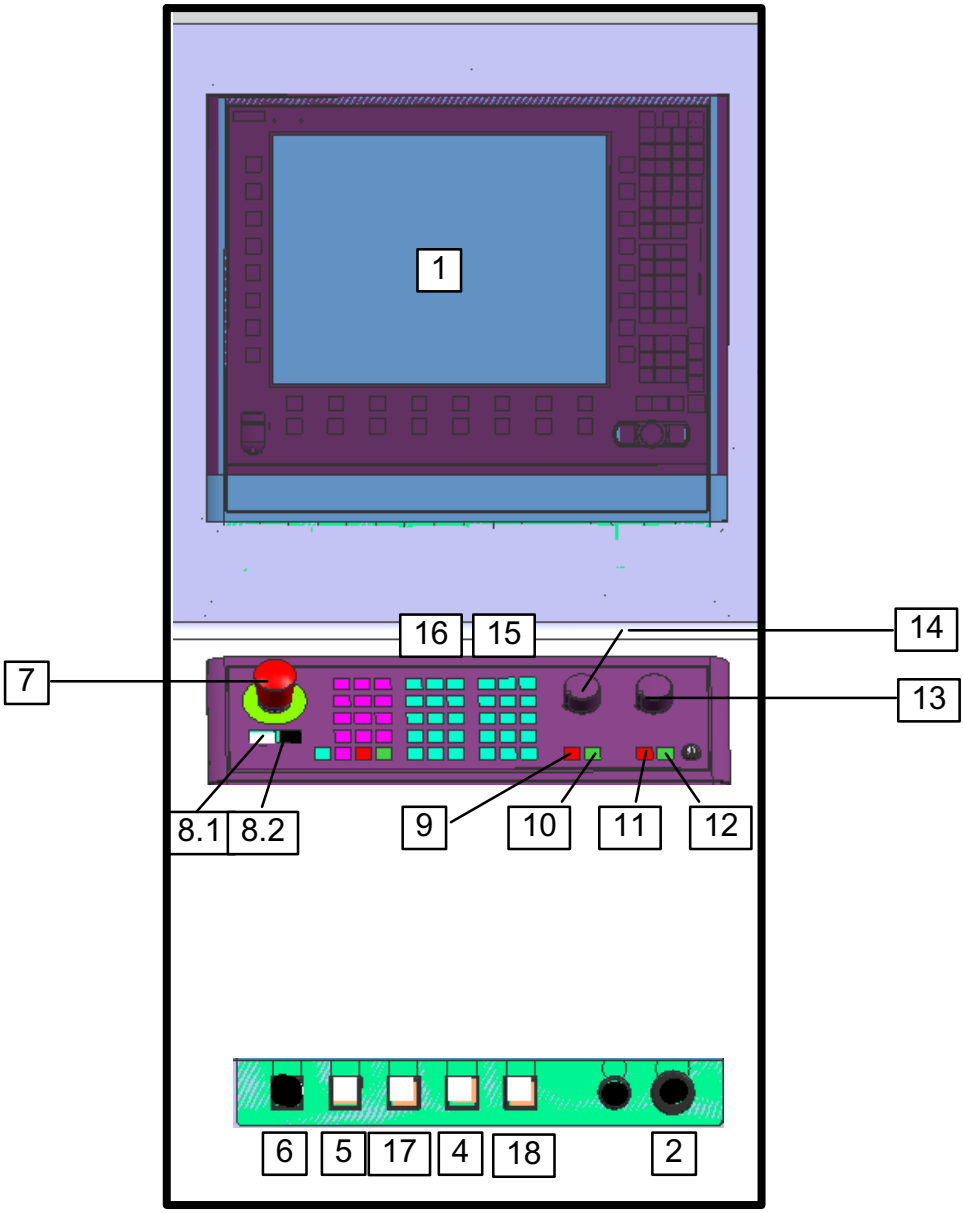


Light button to stop the chip conveyor

6. CNC monitor control operation

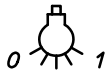
6.1 Overview of the operating panel with machine control panel (option)

	NOTE
	Pointed objects can damage the operating components. Do not use any pointed objects as they might damage the operating components. ➢ Use fingers only to operate the components.

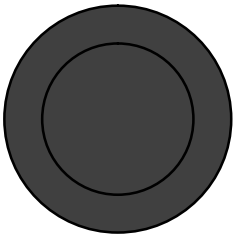

1
16
15
14
7
13
8.1
8.2
9
10
11
12
6
5
17
4
18
2

Key	No.	Explanation
1	44	Screen for displaying, e.g. - Data - Settings - Alarms, error messages
2	75	Enabling switch
3	-	USB connection (Option)
4	90.1	Cooling lubricant system, manual rinse
5	60	Machine lamp on/off
6	53	Mode of operation selector switch
7	30	Emergency OFF
8.1	40	Turn on power
8.2	70	Turn off power
9	41.1	Stop spindle
10	41.2	Start spindle
11	42.1	Stop feed
12	42.2	Start feed
13	42	Feed override
14	41	Rapid feed override
15	49	Axis selection keys
16	45	Customer keys
17	90.2	Spray nozzle pump
18	31	Confirm the safety light curtain [31]

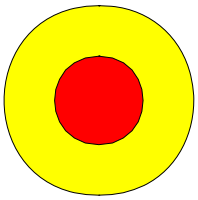
6.1.1 Operating components on the control panel

Symbol	Explanation
	(60) Machine lamp on / off
	(90.1) Pump for cooling lubricant system, manual rinse, on
	Spray nozzle pump ON / OFF (option)

6.1.1.1 Description of the enabling switch [75]

Switch	Explanation
	Enabling switch [75] A security feature to keep the operator at their post during **setup operation / manual operation**. The 3-stage enabling switch performs the following functional sequence: Stage 1: **Off** (control device not activated) Stage 2: **Enable** (control device activated to centre position) Stage 3: **Off with forced disconnect** (control device fully activated beyond centre position).

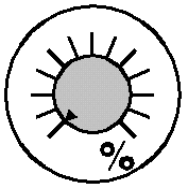
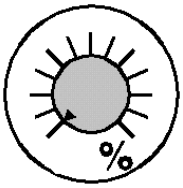
6.1.1.2 Machine control panel elements

Button	Explanation
I	Turn on power [40] This button switches the drives and power units on.
0	Turn off power [70] This button switches the drives and power units off.
	Emergency OFF [30] Press the red button in emergencies: 1. if lives are threatened, 2. if the machine or work piece is at risk of damage. As a rule, Emergency OFF shuts down all drives at the fastest possible braking torque.

6.1.1.3 Spindle control elements

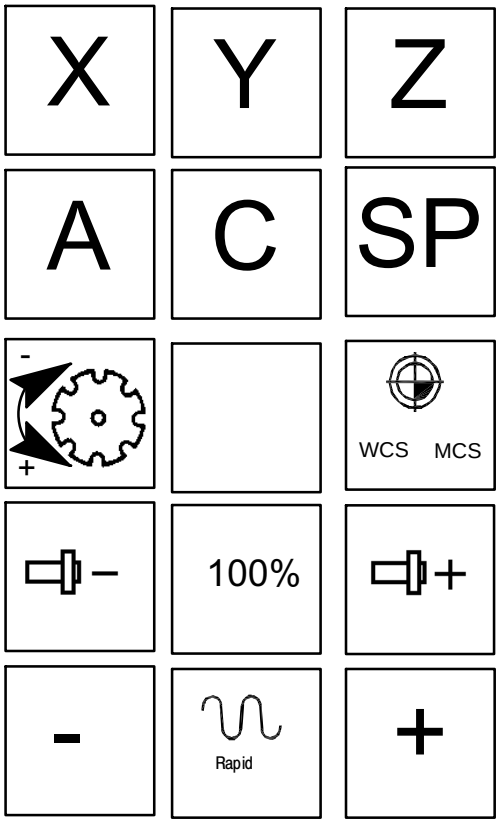
Spindle control	Explanation
	Start spindle [41.1]
	Stop spindle [41.2]

6.1.1.4 Feed control elements

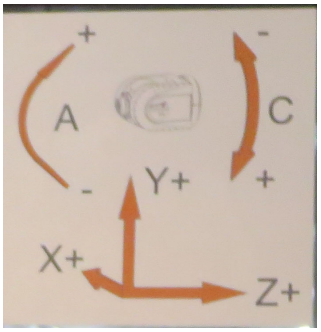
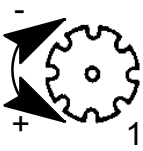
Feed control	Explanation
	Rapid feed override [41] Scale of 0 - 100 %. The 100% value is not exceeded during rapid feed operation. (↗ SINUMERIK 840D-SL).
	Feed override [42] Control range: 0 % - 120 % of the programmed values (↗ SINUMERIK 840D-SL).
	Start feed [42.1]
	Stop feed [42.2]

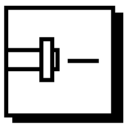
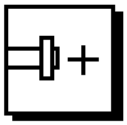
6.1.2 Overview of the axis selection keys [49]

	NOTE
	Detailed description. List of operating components ➢ A description of the operating components can be found in the user guide.



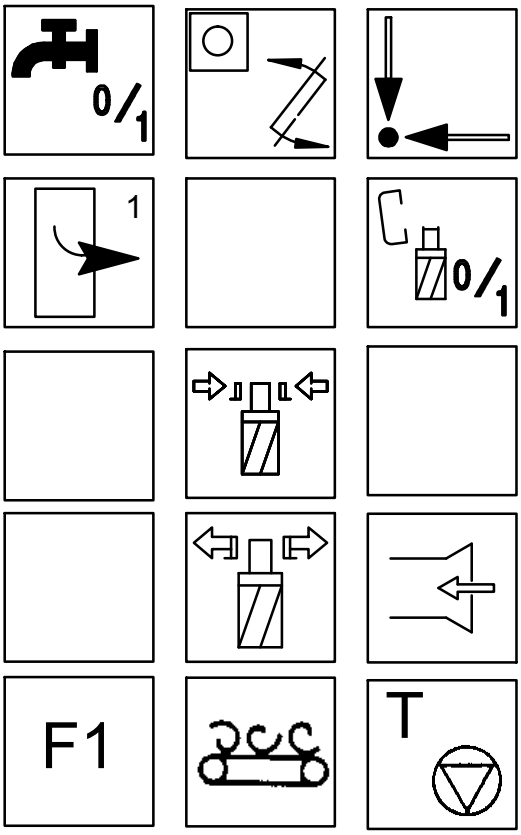
6.1.2.1 Description of the axis selection keys [49]

Symbol	Explanation
X,Y,Z A,C SP	(↗ 6.1) Axis keys: X, Y, Z: A, C: SP: Spindle 
 	Tool magazine 1 Press the button briefly to move one slot backwards by pressing "-" or forwards by pressing "+". Holding one of the buttons for more than 1 second keeps the axis moving until the button is released.
+ respectively -	forwards by holding "+" or backwards by holding "-"
WCS MCS	Use the WCS/MCS soft key in the machine menu or the button on the machine control panel to toggle between machine and tool coordinate system.
Rapid	Rapid feed override Press this button, together with "+" or "-" to move the axis quickly backwards or forwards

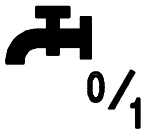
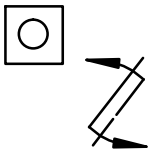
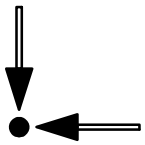
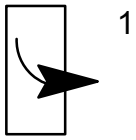
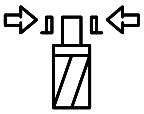
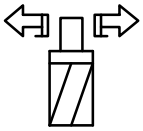
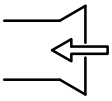
Spindle control	Explanation
	Spindle speed is reduced in 5% increments
	100% of the programmed spindle speed
	Spindle speed is increased in 5% increments

6.1.3 Overview of the customer keys [45]

	NOTE
	Detailed description. List of operating components ➢ A description of the operating components can be found in the user guide.

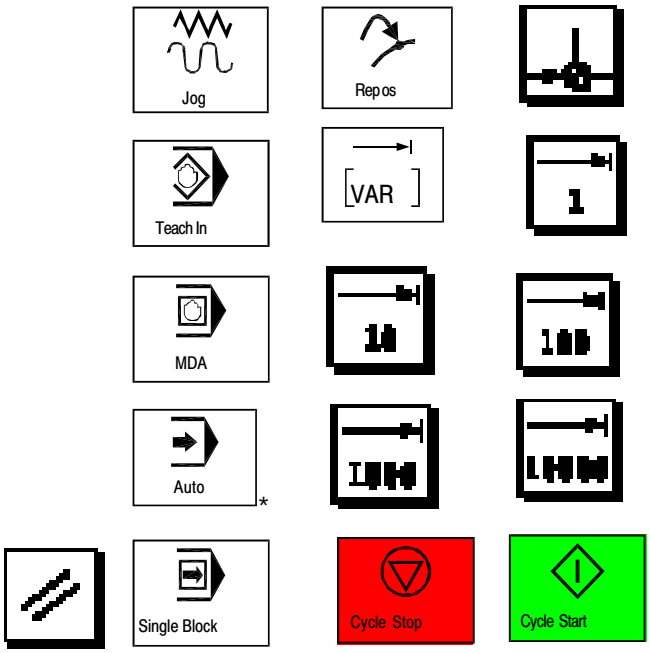


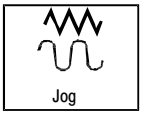
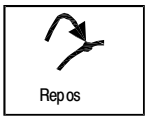
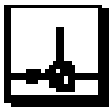
6.1.3.1 Description of the customer keys [45]

Symbol	Explanation
	Coolant off/on
	Material change
	Return to home Move axes to defined position
	Door 1 Unlock/lock the safety doors in the working area, front (sliding doors)
	Tool magazine flap close/open
	Tension tool Tool mount is loaded into the machining spindle
	Disengage tool Pressing this button disengages the tool, and it drops out of the spindle taper. Pressing this button disengages the tool mount from the machining spindle.
	Suction unit on/off

Symbol	Explanation
F1	Pressing this button executes the selected manual function.
	Chip conveyor off/on
T	Test stop When the screen displays the alarm [44] **"Safety Integrated: Test stop requested"** this button can be pressed to trigger a controlled test stop. The Start NC button is locked until the test has been successfully completed.

6.1.4 Machine control panel elements (44)



Button	Explanation
	JOG (Jogging) Conventional movement of the axes by: pressing the direction keys to continuously move the axes, pressing the direction keys to move the axes in steps, the hand wheel.
	REPOS Reposition Return to contour in ”Jog” mode
	REF POINT Move to reference point

Button	Explanation
Teach In	TEACH IN Create programs in dialogue with the machine in ”MDA” mode
VAR	VAR (Incremental Feed Variable): Move in increments Automatic function with variable incremental speed.
MDA	MDA (Manual Data Automatic): Machine control via processing a block or series of blocks. The blocks are entered on the operating panel.
Auto *	AUTO (Automatic): Machine control via automatic processing of a program.
1 10 100 1000 10000	Move in increments at a pre-defined incremental speed of 1, 10,100, 1000, 10000 (1=0.00001 inch 10=0.0001 inch 100=0.001 inch 1000=0.1 inch 10000=1 inch)
	Reset - Aborts the processing of the current program - Deletes monitoring messages (except for POWER-ON warnings). - Sets the channel to "Reset", i.e. the control unit is in starting position and ready for a new program sequence.
Single Block	SINGLE BLOCK: - can be activated in “Automatic” or “MDA” mode - permits processing of a part program block by block - press again to de-select

Button	Explanation
Cycle Stop	CYCLE STOP (Stop NC): Stops the processing of the current part program; the appropriate LED lights up. Processing can then re-commence by pressing Start NC.
Cycle Start	CYCLE START (Start NC): Starts the selected program (program name displayed in header) with the current block.

6.1.5 Overview of the special keys

Symbol	Explanation
	Bypass Emergency OFF (located on the secondary control panel)

6.2 Key switch authorisation

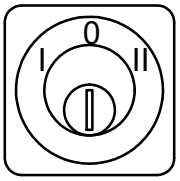
NOTE

Key switch access.

Avoiding damage.

➢ The appropriately authorised individuals are responsible for safekeeping and using the key switches.

6.2.1 Overview of the key switches

Switch	Explanation
	Mode of operation selector switch [53] 0 = Normal (automatic/production) operation I = Setup operation/Manual mode II = Mode of operation for checking programming with manual intervention ● (↗ 6.5).

6.2.2 Authorisation levels for mode of operation selector switch

	NOTE
	Key switch access. Avoiding damage. ➢ The appropriately authorised individuals are responsible for safekeeping and using the key switches.

Setting: 0	Mode of operation 1: Limited operation scope (Normal (automatic/production) operation) Useful for operators with little or no involvement in setting up or programming the CNC machining centre.
Setting: I	Mode of operation 2: Full operation scope (Setup operation/Manual mode). Useful for operators closely involved in setting up or programming the CNC machining centre.
Setting: II	Mode of operation 3: Full operation scope (Mode of operation for checking programming with manual intervention) For use by the manufacturer's service technicians. Useful for user's staff with appropriate authorisation and training to set access to programs, data and functions using the machine data operating panel.

6.2.3 Overview of SIEMENS key switches

NOTE

Overview of SIEMENS key switches.

Access rights to key switches.

➢ See also the user guide.

- See (↗ SINUMERIK 840D-SL)

Setting	Explanation	
0	0 key Protection level: 7	↑
1	1 key ***black*** Protection level: 6	Users can freely assign access rights
2	1 key ***green*** Protection level: 5	↓
3	1 key ***red*** Protection level: 4	
	Protection level: 3	Password

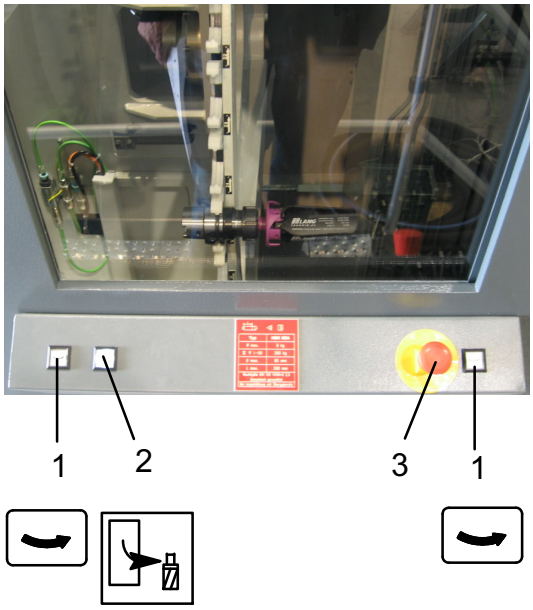
6.3 Overview: Tool magazine controls

NOTE

Pointed objects can damage the operating components.

Do not use any pointed objects as they might damage the operating components.

➢ Use fingers only to operate the components.



Key	No.	Explanation
1	66	Rotate tool magazine
2	61	Unlock/lock the tool magazine doors
3	30	Emergency OFF [30]

- Press buttons [66] to rotate the magazine.
  They are located on the tool magazine.
  Function, see (6.3.2).

- Press both buttons [66]
  to rotate the tool magazine.

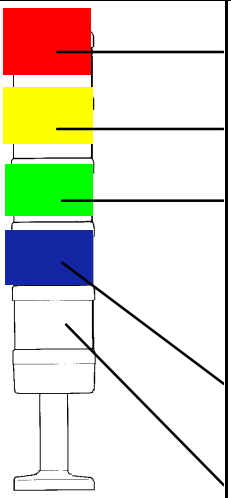
  Emergency OFF [30] Pressing this button shuts down the entire machine.

	NOTE
	Direction of rotation of the tool magazine. The direction of rotation is determined as follows: ➢ Pressing the left button [66] briefly before the right button [66] makes the tool magazine on the side facing the operator move down in steps. ➢ Pressing the right button [66] briefly before the left button [66] makes the tool magazine on the side facing the operator move up in steps.

See User guide: SINUMERIK

- The tool magazine and tool management system can be operated from the B 2 panel on the tool magazine.

6.4 Overview of the signal column [91]

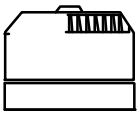
Signal column	Explanation
	Red lamp = Emergency (Malfunctions) Yellow lamp = Abnormal (Malfunctions) Green lamp = Normal lit as long as the NC program (with 100% feed) is being processed Blue lamp = Operator intervention urgently needed Clear lamp = Neutral Machine is ready for operation Alarm = The acoustic alarm [91.1] is integrated in the signal column. Sounds when warnings or error messages are triggered.

6.4.1 Explanation of the colours on the signal column

Lamp colour	
Red signal lamp = Malfunction/alarm	The red lamp is continuously lit if NC has started up and NC warning has been triggered Or for 3 seconds on 1st OB1 run (once master switch has been turned on or NCReset activated) The red lamp flashes if - at a speed of 400ms NC has not started up - at a speed of 200ms Alarm 701208 CLS: Chip conveyor, overflow level reached or Alarm 700730 Spindle: Vibration warning limit exceeded or Alarm 700731 Spindle: Vibration alarm limit exceeded
Yellow signal lamp = Warning	The lamp is continuously lit for specific error messages
Green signal lamp	The green lamp is continuously lit if Automatic mode is selected and Feed override is set to 100% and No stop feed has been activated Or for 3 seconds on 1st OB1 run (once master switch has been turned on or NCReset activated)
Blue signal lamp = Operator intervention urgently needed	The lamp is continuously lit if Light barrier is busy The lamp flashes at a speed of 500ms if: Pallet change is active and light barrier is interrupted or Light barrier is interrupted Or for 3 seconds on 1st OB1 run (once master switch has been turned on or NCReset activated)

White/clear signal lamp	The lamp is continuously lit if Power is turned on and The machine has not triggered an NC alarm and All axes requiring referencing have been synchronised/referenced Or for 3 seconds on 1st OB1 run (once master switch has been turned on or NCReset activated)

6.4.2 Acoustic alarm (91.1)

Alarm	Explanation
	Alarm = ↗ Screen display (44) e.g.: Alarms, error messages

- The acoustic alarm is integrated in the signal column.

6.5 Using the mode of operation selector switch [53]

	NOTE
	Key switch access. Avoiding damage. ➢ The appropriately authorised individuals are responsible for safekeeping and using the key switches.

- See (Safety section)

6.5.1 Set to 0 = Normal (automatic/production) operation

Prior requirement:

- Machine is ready for operation
- [53] set to " 0 "
- has been pressed
  → LED is lit
  → Program starts.

1. Doors with door lock switches [61] cannot be opened.
2. Press
   → LED is lit
   → Program stops
3. Press
   → LED flashes
4. → Doors in working area can be opened.
5. Doors to working area closed

6. Press

7. Press

   → LED is lit
   → Program starts.

Correct outcome:

8. Doors with door lock switches [61] cannot be opened.

6.5.2 Set to I = Setup operation/Manual mode

Prior requirement:

- Machine is ready for operation
- Siemens key switch set to " 0 "
- [53] set to " 0 "

Procedure:

	WARNING **Setting 1.** Risk of injury and/or damage to the machine. ➢ Make sure nobody is inside the inner machine area (e.g. working area).

1. [53] set to " I "
2. Siemens key switch set to " 3 "
3. Press
4. e.g.: Press
5. Press F1 max. 5 seconds after step 4.
6. Doors with door lock switches [61] cannot be opened.

7. Press → Doors to working area unlocked.

8. Open the doors to the working area.

	NOTE
	Axis movements and spindle rotations. Axis movements of max. 2m/min (78.7 inch/min) can only be triggered by toggle switchin conjunction with an enabling switch [75]. Spindle rotations of max. 500 1/min can only be triggered by toggle switch in conjunction with an enabling switch [75].

9. The positioning unit of the tool change system (TCS) cannot be moved.

	⚠ WARNING
	Setting 1. Risk of injury and/or damage to the machine. ➢ Make sure nobody is inside the inner machine area (e.g. working area).

10. Close doors

11. Press → Doors to working area locked.

Correct outcome:

12. Doors with door lock switches [61] cannot be opened.

Procedure:

13.

[53] set to " 0 " and key removed

14. Setup operation/manual mode completed.

6.5.3 Set to II = Mode of operation for checking programming with manual intervention (option)

- No function

6.6 Customer key operating procedures [45]

	NOTE
	Customer key operating procedures The functions described in this section can be selected in various modes. ➢ Observe the visual alarms, e.g. signal column [91]. ➢ The message with the highest priority is always displayed. ➢ If error messages are shown, the malfunctions must first be remedied before using the respective function keys to start machine functions.

- Observe (↗ 6.2)

6.6.1 Using the keys to execute functions

6.6.1.1 e.g. Function:

Prior requirement:

- Machine is switched on
  or
  Machine is ready for operation.
- Type of cooling selected in GUD

Procedure:

1. Press → Cooling ON
2. Press → Cooling OFF

Correct outcome:

3. Cooling OFF

6.6.1.2 e.g. Function: Material Change MCHA

Prior requirement:

- Machine is ready for operation.
- One palett is in in working station, one in loading station

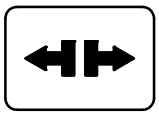
Procedure:

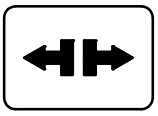
1. Press → LED is lit

2. Press

max. 5 seconds after 1.
→ Program MCHA starts

3. Procedure MCHA starts and run a step sequence for automatically loading and unloading pallet A and B.

4. Material Change ends

Button flash

5. Press 

Correct outcome:

6. → Workpiece ready to change

6.6.1.3 e.g. Function:

Prior requirement:

- Machine is ready for operation
- Doors are closed, door lock switches [61] engaged
- Spindle with tool positioned outside interference contour.

Procedure:

1. Press
2. Press → LED is lit
3. Press F1 max. 5 seconds after 2.
   → Program starts
   → Axes move to defined positions.

Correct outcome:

4. → LED above goes off
5. → Axes are in defined positions (home).

6.6.1.4 e.g. Function:

	NOTE **Test Stop is requested or running.** It is not possible to unlock or open the door to working area

Prior requirement:

- Machine is switched on
  or
  Machine is ready for operation.
- Doors are closed, door lock switches [61] engaged

Procedure:

1. Press
   → LED flashes
   → Door lock switches [61] for doors in working area in Unlock position
2. → Doors in working area can be opened.
3. Doors to working area closed
4. Press

Correct outcome:

5. → LED above lights up
6. → Door lock switches [61] for doors in working area in Lock position
7. → Doors in working area cannot be opened.

6.6.1.5 e.g. Function:

Prior requirement:

- Machine is ready for operation

Procedure:

1. Press
   → LED goes off
   → Tool magazine flap is open

	NOTE
	Risk of collisions. Avoiding damage. ➢ Beware of extended tool magazine.

2. Press
   → LED is lit
   → Tool magazine flap is closed

Correct outcome:

3. → Tool magazine flap is closed.

6.6.1.6 e.g. Function: or

Prior requirement:

- ➚ Machine is switched on and [I] [40] has been pressed

Procedure:

1. Press
2. [53] set to " 1 "

	NOTE **Disengage tool.** The tool can drop out of the spindle mount and be damaged. ➢ Make sure the tool cannot drop out of the spindle mount.

3. Press → release tool
4. Press → clamp tool
5. [53] set to " 0 " and key removed

6.6.1.7 e.g. Function: (without secure cover)

Prior requirement:

- Machine is switched on
- Doors are closed, door lock switches [61] engaged

Procedure:

1. Press → Chip conveyor starts
2. Press → LED flashes
3. → Doors in working area can be opened.

Correct outcome:

4. → Chip conveyor stops
5. → LED above goes off

Procedure:

6. Doors to working area closed
7. Press
8. Press → LED is lit
   → Chip conveyor starts
9. Press → LED goes off
   → Chip conveyor stops

6.6.1.8 e.g. Function: (option)

Prior requirement:

- ↗ 2.1.1 and [I] [40] have been pressed
- Doors are closed, door lock switches [61] engaged

Procedure:

1. Press
   → LED is lit
   → Chip conveyor runs at normal speed

	NOTE
	Chip conveyor speed. Press the key again to make the chip conveyor run at higher speed for about 5 minutes. It then automatically reverts to normal speed. Consequences of higher speed operation: ➢ Faster wear ➢ Too much cooling lubricant is ejected out of the machine

2. Press
   → LED is lit
   → Chip conveyor runs at higher speed for about 5 minutes

3. Press
   → LED is lit
   → Chip conveyor stops

6.6.1.9 e.g. Function: (option)

Prior requirement:

- Machine is switched on
  or
  Machine is ready for operation.
- Suction master switch ON

Procedure:

1. Press

   → Suction ON

2. Press

   → Suction OFF

Correct outcome:

3. Suction OFF

6.6.1.10 e.g. Function:

Prior requirement:

- Main Switch is OFF
- MCP is OFF

Procedure:

1. Press
   → Button is lit
   → Lamps in working area ON

2. Press
   → Button light has gone off
   → Lamps in working area OFF

Correct outcome:

3. → Button light has gone off

4. → Lamps in working area OFF

6.6.1.11 e.g. Function:

Prior requirement:

- Machine is switched on
- Door working area is unlocked and open

Procedure:

1. Press
   → Button is lit
   → Pump for CLS manual rinse ON

	NOTE
	Pump for manual rinse. The pump switches off automatically after a certain period. ➢ Turn it on as needed.

2. Press
   → Button light goes off
   → Pump for CLS manual rinse OFF

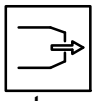
6.6.1.12 e.g. Function: (option)

Prior requirement:

- Machine is switched on

Procedure:

1. Press
   → Button is lit
   → Pump for spray nozzles starts
2. Press
   → Button light goes off
   → Pump for spray nozzles stops

6.6.1.13 e.g. Function:  (option)

Prior requirement:

- Machine is switched on

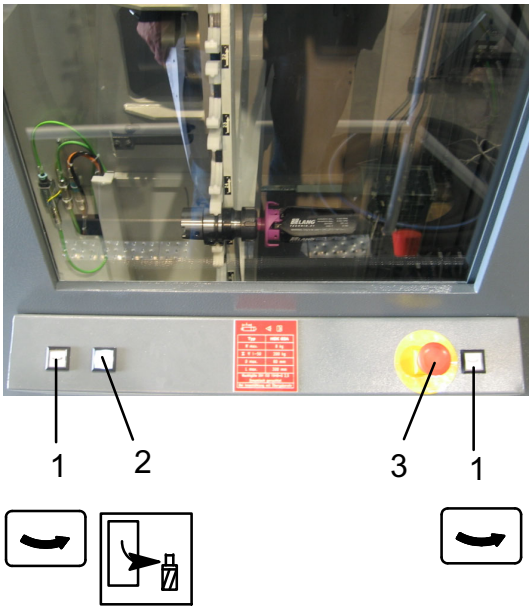
Procedure:

1. Press
   → Button is lit
   → Air shower ON

	NOTE
	Air shower. The pump switches off automatically after a certain period. ➢ Turn it on as needed.

2. Press
   → Button light goes off
   → Air shower OFF

6.6.2 Executing functions using the keys on the tool magazine



Key	No.	Explanation
1	66	Rotate tool magazine
2	61	Unlock/lock the tool magazine doors
3	30	Emergency OFF [30]

6.6.2.1 e.g. Function:

	NOTE
	Door lock switch. Button flashes fast. ➢ Automatic tool change starts. ➢ Doors to tool magazine in Lock position. ➢ Doors to tool magazine cannot be opened.

Prior requirement:

- Machine is switched on
  or
  Machine is ready for operation.
- No automatic tool change requested.
- Doors are closed, door lock switches [61] engaged
  → Button is lit

Procedure:

1. Press → Button flashes slowly
   → Door lock switches [61] for doors to tool magazine in Unlock position

2. Open tool magazine doors
   → Button light goes off

3. Close tool magazine doors
   → Button flashes slowly

4. Press → Button is lit
   → Door lock switches [61] for doors to tool magazine in Lock position

Correct outcome:

5. → Door to tool magazine cannot be opened.

6.6.2.2 e.g. Function:

Prior requirement:

- Machine is ready for operation.
- No automatic tool change requested.
- Tool magazine doors are open
  See (6.6.2.1)

Procedure:

Direction of rotation of the tool magazine

- Pressing the left button [66] briefly before the right button [66] makes the tool magazine on the side facing the operator move down in steps.
- Pressing the right button [66] briefly before the left button [66] makes the tool magazine on the side facing the operator move up in steps.

1. Press buttons [66] to rotate the tool magazine to the required slot.
   Then release [66].

2. Close and lock the tool magazine doors
   See (6.6.2.1)

Correct outcome:

3. → Button is lit

4. → Door lock switches [61] for doors to tool magazine
   in Lock position

5. → Doors to tool magazine cannot be opened.

6.7 Manual functions

	WARNING **Incorrect operation.** Incorrect operation can result in injuries or property damage. ➢ These controls may only be operated by trained members of staff.

- See (Safety section)

6.7.1 Executing manual functions

Prior requirement:

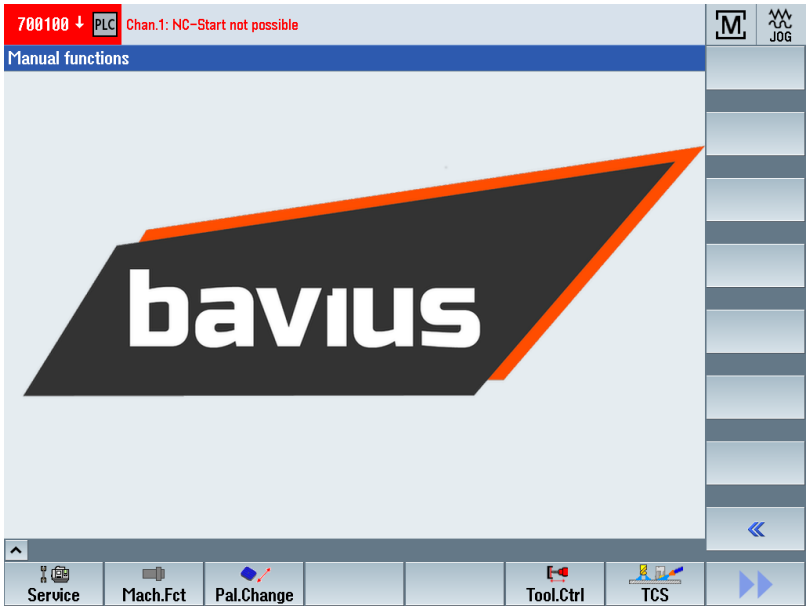
- Machine is switched on
  or
  Machine is ready for operation.

Procedure:

1. Press [40]
2. Press
3. Press
4. Horizontal
   soft keys
   Press Machine

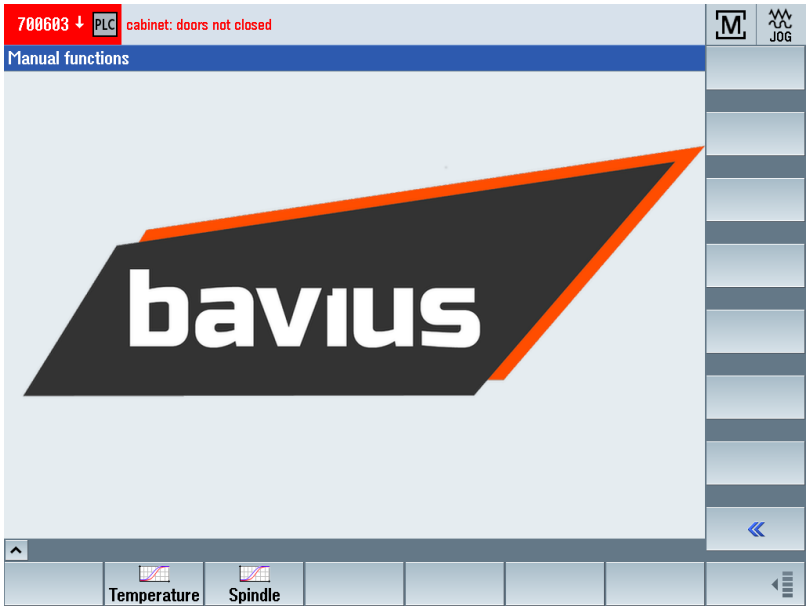
5. Horizontal
   soft keys
   Press Manual functions

The screen [44] displays, e.g.:



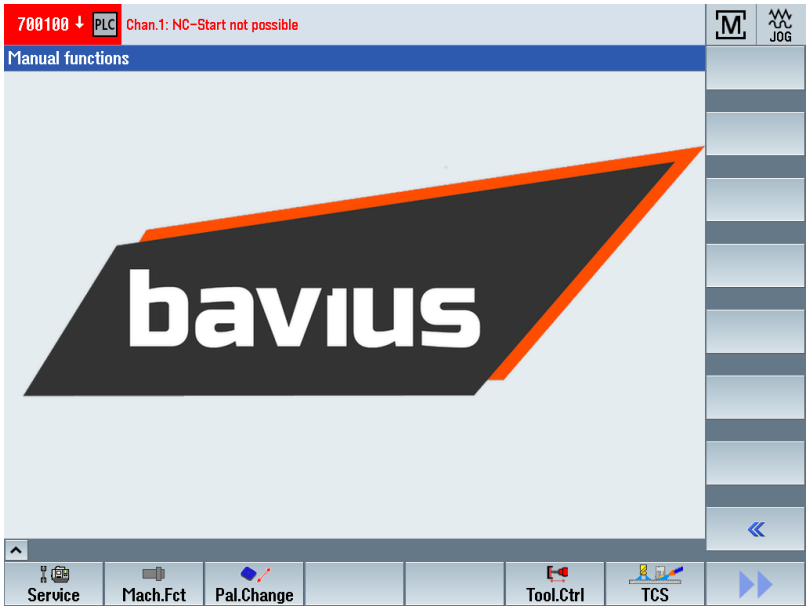
6. Horizontal
   soft keys
   Press > >

The screen [44] displays, e.g.:



7. Horizontal
   soft keys
   Press < <

The screen [44] displays, e.g.:



6.7.2 Executing service functions

Prior requirement:

- See (↗ 6.7.1)

1. Horizontal soft keys
   Press

- This function is only for users with password.

6.7.3 Executing spindle functions

6.7.3.1 Warming the spindle

	NOTE
	Warming the spindle. Observe the following to avoid damaging the spindle: ➢ Only use finely balanced and suitable tools when warming the spindle.

- See (↗ Main spindle instruction manual)

Prior requirement:

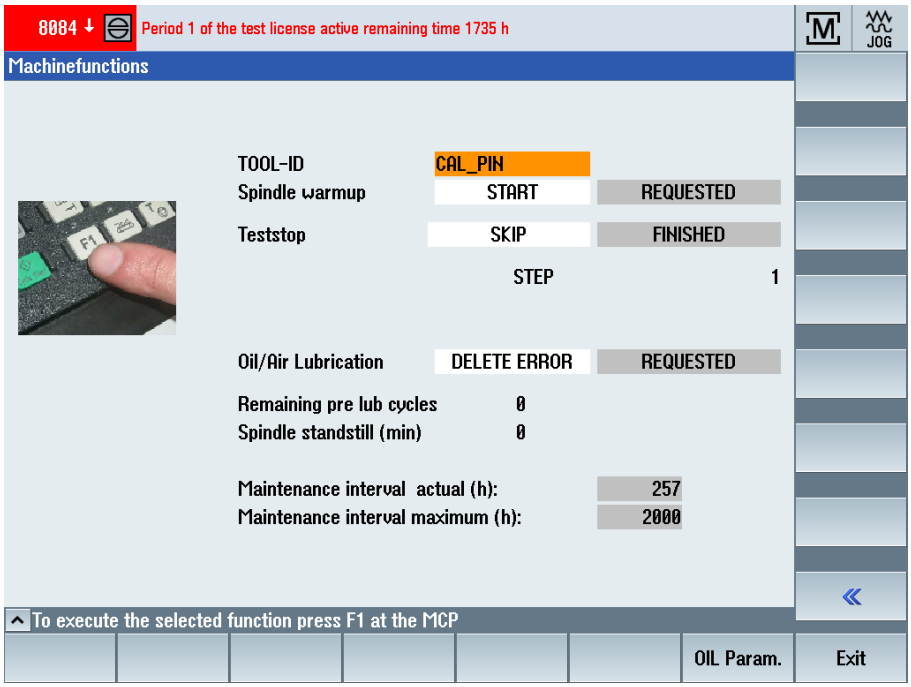
- ↗ Main spindle user guide
  and/or
  Observe the alarm display on the screen [44]
- See ↗ 6.7.1

Procedure:

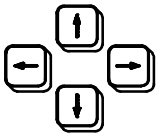
1. Horizontal softkeys
   Machine

   press

The screen [44] displays, e.g.:

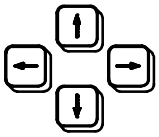


- T-ID
  Enter the number or name of the tool you want to use for Spindle Warmup. Please make sure that the selected tool is balanced and can be run with the maximum spindle rpm. For this operation the CAL_PIN is recommended. If the tool is not in the spindle, it will be picked up automatically by starting spindle warmup.
  Spindle warmup
  Highlight the field and press F1 to start. Make sure spindle override is 100%.

2.  Position cursor in menu window: Tool T-ID n

3. Tool ID "n" Enter tool ID or tool slot number
   ↗ Sinumerik tool management instruction manual

4. Press

5.  Position cursor in menu window:

start Spindle warm-up

6. Press

7. Press F1 → Function is executed

Correct outcome:

8. → Spindle warm-up program starts

6.7.3.2 Teststop

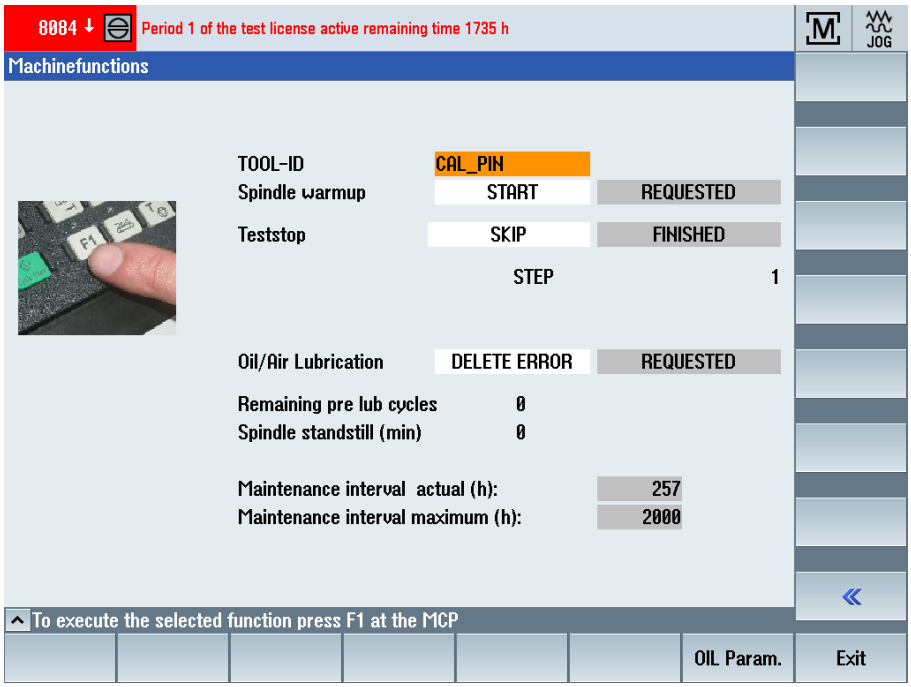
Prior requirement:

- See 6.7.1

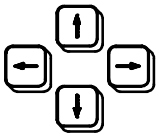
Procedure:

1. Horizontal softkeys
   Machine function press

The screen [44] displays, e.g.:



- Teststop
  To allow a trouble-free shift for the operator, it is possible to trigger the Teststop during the change of shift. To request a Teststop, highlight the field and select Request using the Select button. Press F1 to activate. The message „Safety Integrated: Teststop Required“ will be shown. Execute the Teststop from the MCP.
  It is also possible to skip the Teststop. The next Teststop will be requested in 2h. After that you are allowed to skip it one more time for exactly 1h. After skipping 2 times or after Main Switch on, the Teststop must be executed!

2.  Position cursor in menu window:
   Request test stop

3. Press F1 → Function is executed

4. The alarm display on the screen [44] shows:
   "Test stop requested"

5. Press ,
→ Test stop is performed
→ The alarm display on the screen [44] shows:
" Safety Integrated: Test stop in progress"

Correct outcome:

6. 0 [70] → has been switched off
→ Lamp goes off

7. The alarm display on the screen [44] shows:
Power is turned off

6.7.3.2.1 Oil/air lubrication

Prior requirement:

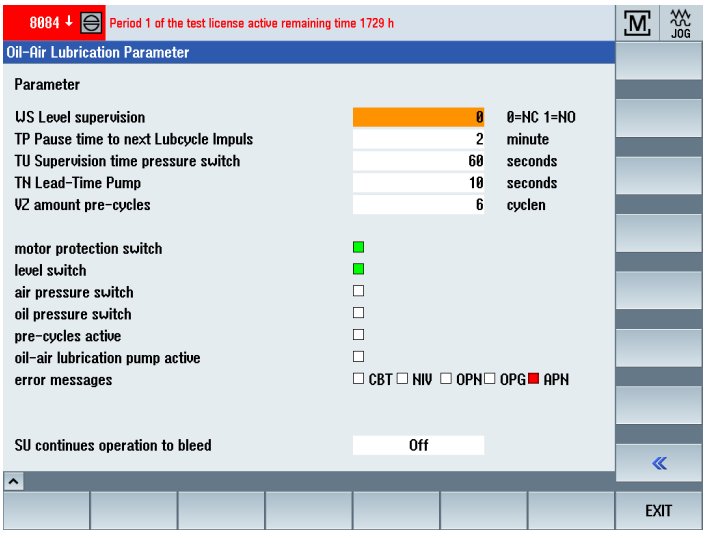
- Observe the alarm display on the screen [44]
- See (6.7.3.1)

Procedure:

1. Horizontal softkeys

   OIL Param press

The screen [44] displays, e.g.:



6.7.4 Executing manual pallet load function

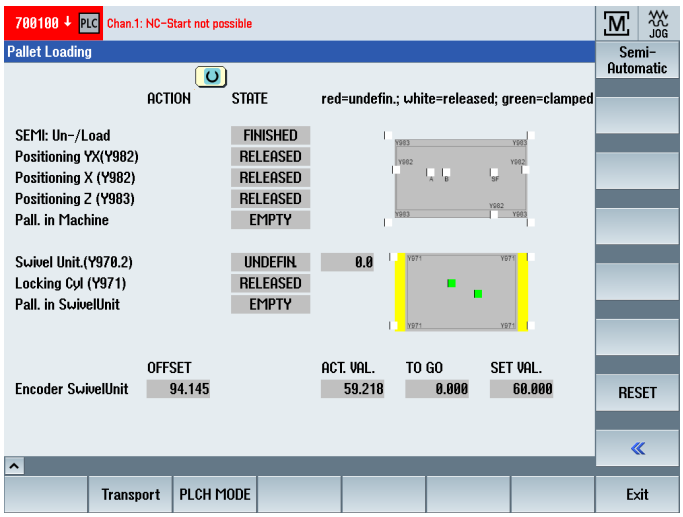
Prior requirement:

- See (↗ 6.7.1)

Procedure:

1. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



6.7.4.1 Executing manual transport function

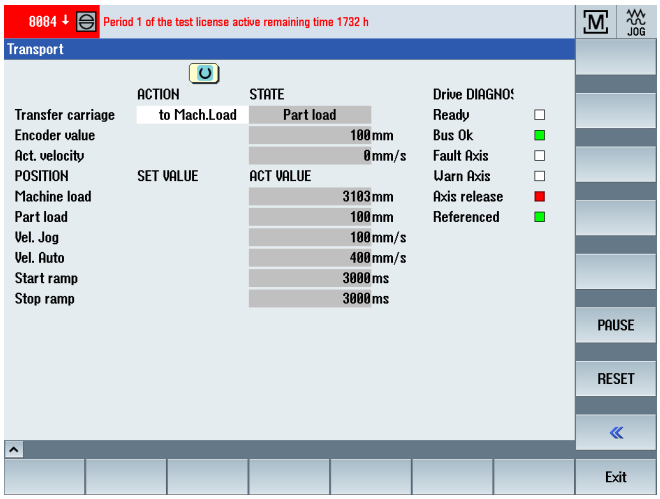
Prior requirement:

- See (↗ 6.7.4)

Procedure:

1. Horizontal soft keys
   Press Transport

The screen [44] displays, e.g.:



6.7.4.2 Executing manual PLCH mode

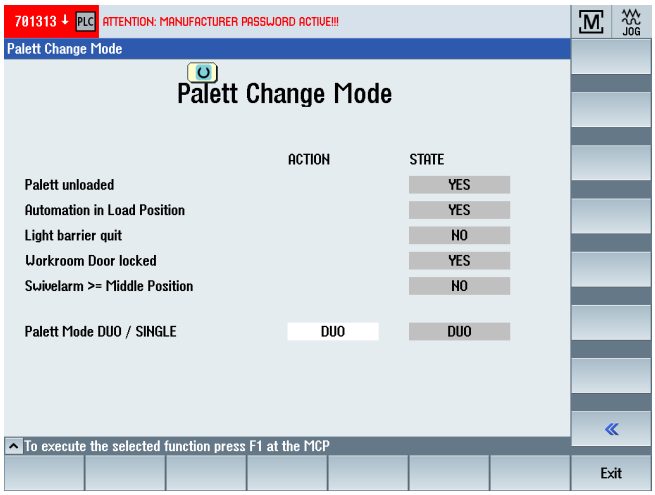
Prior requirement:

- See (↗ 6.7.4)

Procedure:

1. Horizontal soft keys
   Press PLCH MODE

The screen [44] displays, e.g.:



6.7.5 Executing manual tool control function

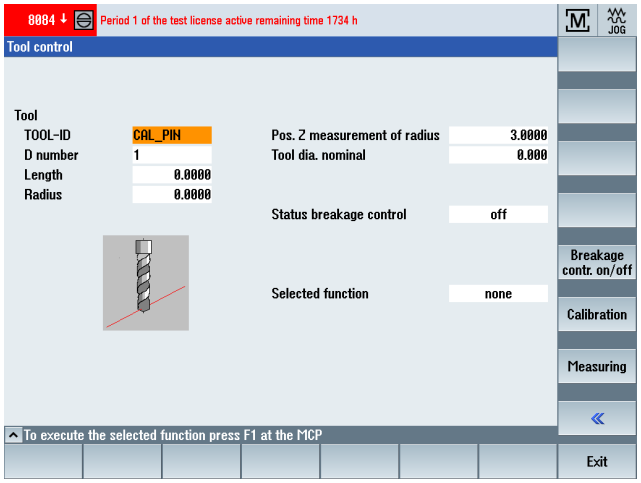
Prior requirement:

- See (↗ 6.7.1)

Procedure:

1. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



- This is where you measure tools and calibrate the tool measuring laser (Blum system).
- T number
  Enter the number or name of the tool you want to use in the TOOL-ID field. Select which function you wish to perform (Measuring or Calibration). Calibration is done with CAL_PIN. If the tool is not in the spindle, it will be picked up automatically. Start the selected function with F1
- D number
  In the field D-number enter the number of the cutting edge you want to be measured or calibrated and press input. D-number 1 is generally used.
- Length
  Displays the actual length of the tool (read only)

- Radius
  Displays the actual radius of the tool (read only)
  Pos. Z measurement of radius
  This value specifies the point from the tip of the tool where the radius is measured. If you have a mill with a radius on the tip, this value must be larger than the radius. Enter desired value and press input.
- Status breakage control
  This shows whether the breakage control is on or off. If the breakage control is on, the tool length will be checked when the command is read in the part program. This function can also be activated from a program with the command TOOL_BREAKAGE_CONTROL_ENABLE=1. (Read only)
- Selected function
  Displays the actual selected function (read only)
- Breakage control on / off
  With this softkey toggle the breakage control on and off. When the tool is broken, the machine will stop and display an error message.
- Calibration
  Use this softkey to activate the function Calibration. You should calibrate the laser daily before measuring tools. For calibration, use the special calibration pin.
- Measuring
  Use this softkey to activate the function measuring. Start the chosen function by pressing the key F1. The measuring cycle will pick up the selected tool and measure the tool length and tool radius. The results will be stored in Tool Management and displayed on this mask under length and radius.
- Back
  Go one level back to the Manual Functions screen
- Exit
  Return to the Main Screen

6.7.6 Executing manual cooling lubricant function (option)

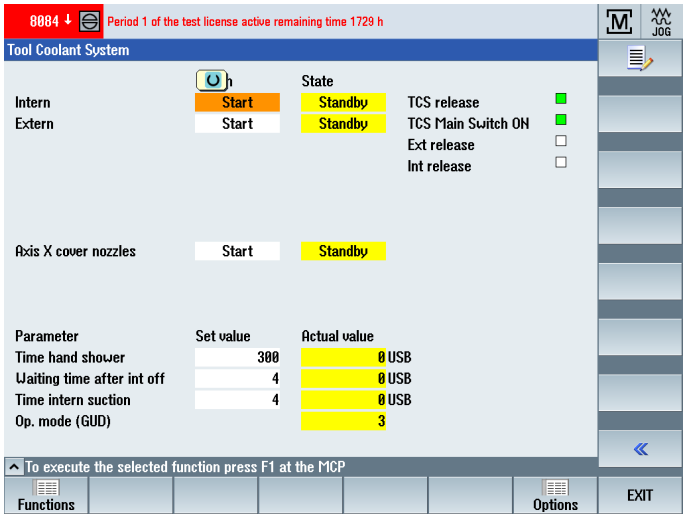
Prior requirement:

- See (↗ 6.7.1)

Procedure:

1. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



6.7.6.1 Executing manual cooling lubricant function: functions

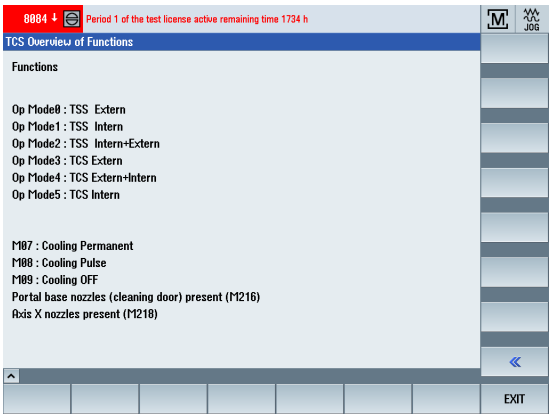
Prior requirement:

- See (↗ 6.7.6)

Procedure:

1. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



6.7.6.2 Executing manual cooling lubricant function: options

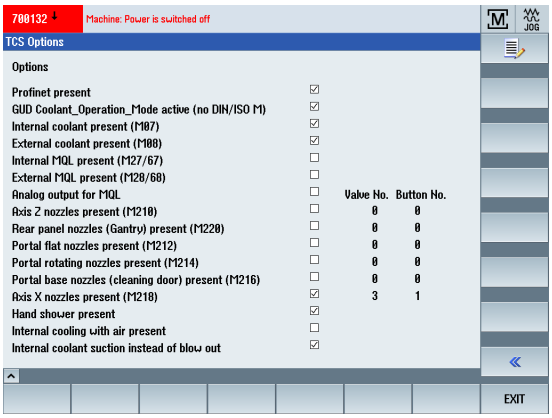
Prior requirement:

- See (↗ 6.7.6)

Procedure:

1. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



6.7.7 Executing manual temperature compensation linear function

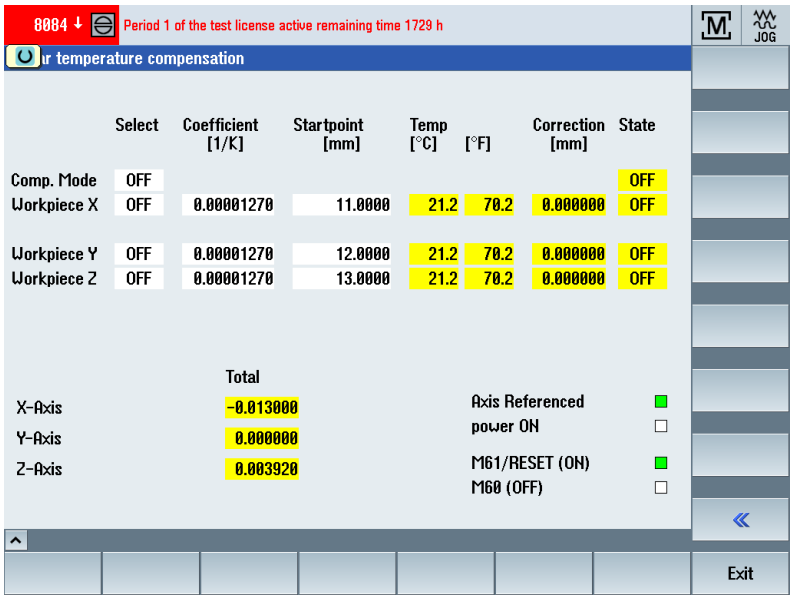
Prior requirement:

- See (↗ 6.7.1)

Procedure:

1. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



6.7.8 Executing manual temperature compensation spindle function

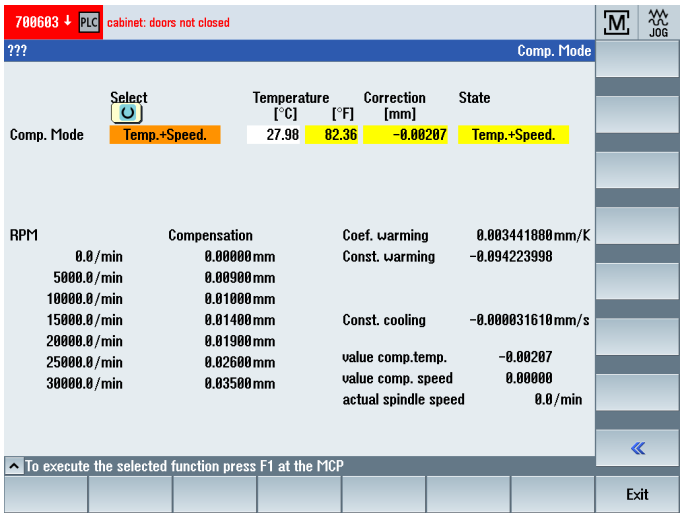
Prior requirement:

- See (↗ 6.7.1)

Procedure:

1. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



6.7.9 Chip conveyor (option)

Prior requirement:

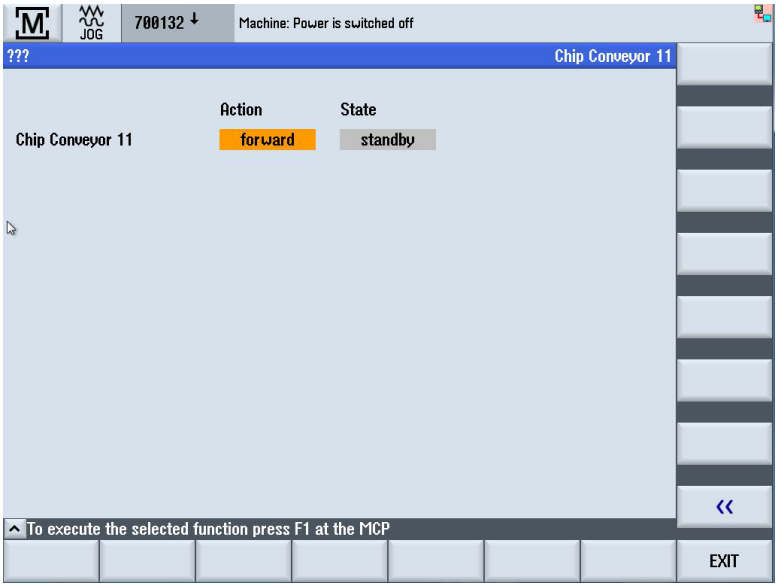
- See (6.7.1)

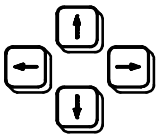
- [53] set to " 1 "

Procedure:

1. Horizontal soft keys
   Press Chip Conveyo

The screen [44] displays, e.g.:



2. 

Position cursor in menu window
Chip conveyor "n" or
Transverse chip conveyor

3. Press

→ Screen display [44]:
"Forward"

4. Press

Correct outcome:

5. → Selected chip conveyor moves forward

Procedure:

6. Press

→ Screen display [44]:
"Back"

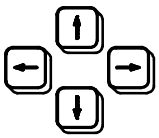
7. Press

As long as backward movement is needed

Correct outcome:

8. → Selected chip conveyor moves back

Procedure:

9. 

Position cursor in menu window
All chip conveyors

10.

Selection on each chip conveyor: "Forward"
→ Screen display [44]:
"Forward"

11. Press → All chip conveyors start: "Forward"

Correct outcome:

12. → All chip conveyors move forward.

13. Press → All chip conveyors stop

6.8 Diagnostics

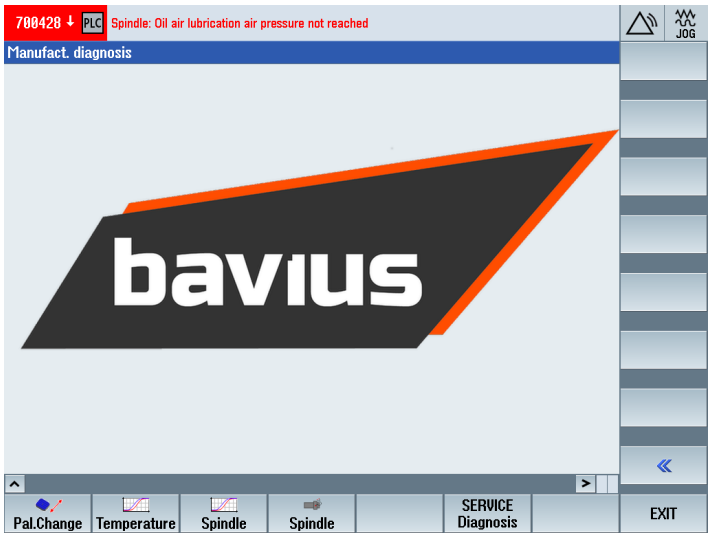
Prior requirement:

- Machine is switched on
  or
  Machine is ready for operation.

Procedure:

1. Press
2. Horizontal soft keys
   Press Diagnostics
3. Horizontal soft keys
   Press Manufacturer Diagnostics

The screen [44] displays, e.g.:



6.8.1 Diagnosis: Pallet change

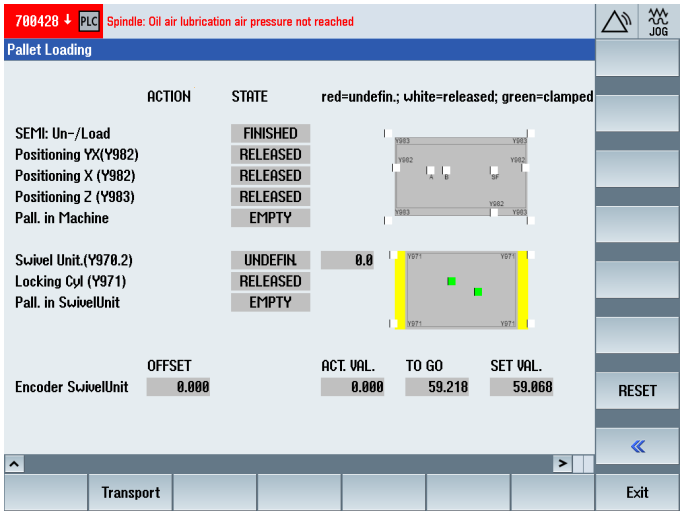
Prior requirement:

- See (↗ 6.8)

Procedure:

1. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



6.8.1.1 Diagnosis: Pallet change: Transport

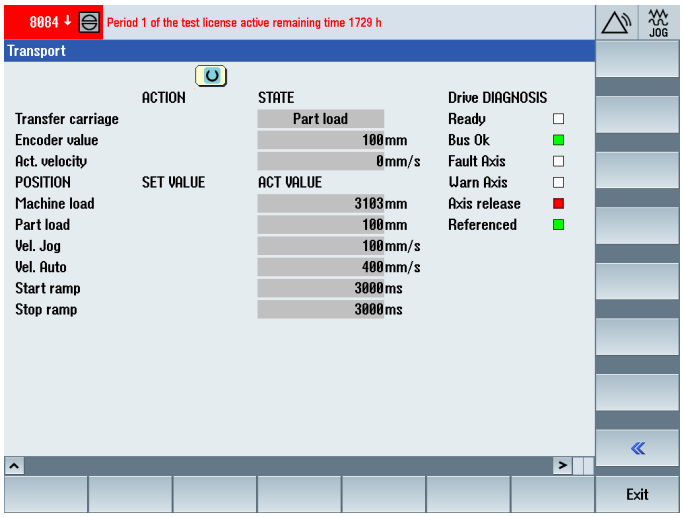
Prior requirement:

- See (↗ 6.8.1)

Procedure:

1. Horizontal soft keys
   Press **Transport**

The screen [44] displays, e.g.:

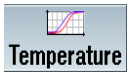


6.8.2 Diagnosis: Temperature compensation

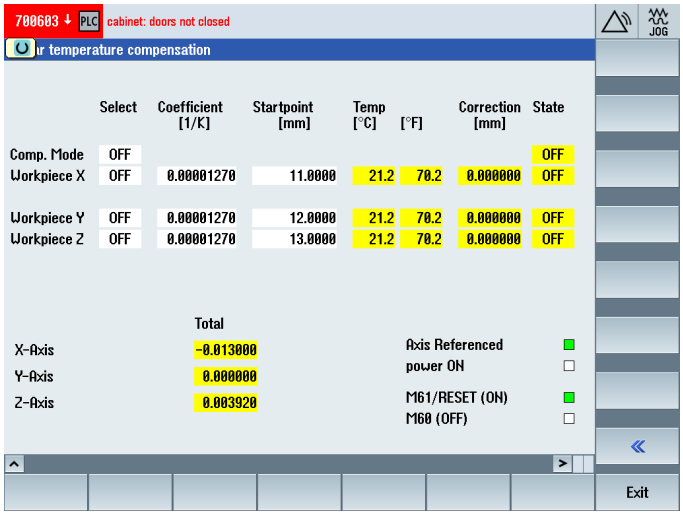
Prior requirement:

- See (6.8)

Procedure:

1. Horizontal soft keys
   Press 

The screen [44] displays, e.g.:



6.8.3 Diagnosis: Temperature compensation Spindle

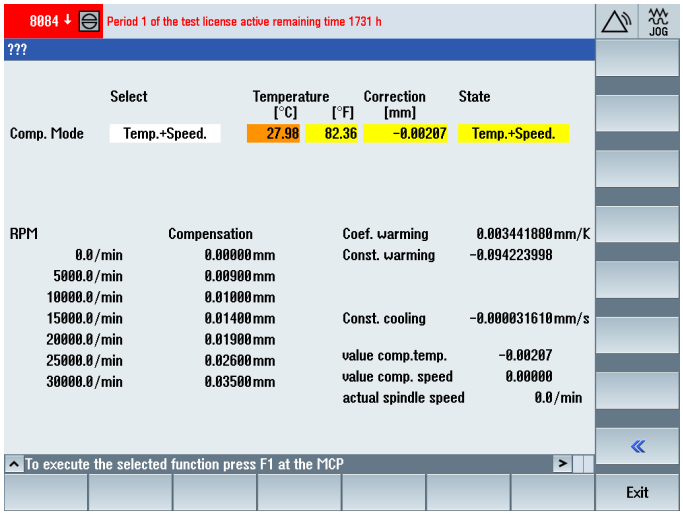
Prior requirement:

- See (6.8)

Procedure:

1. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



6.8.4 Diagnosis: Spindle

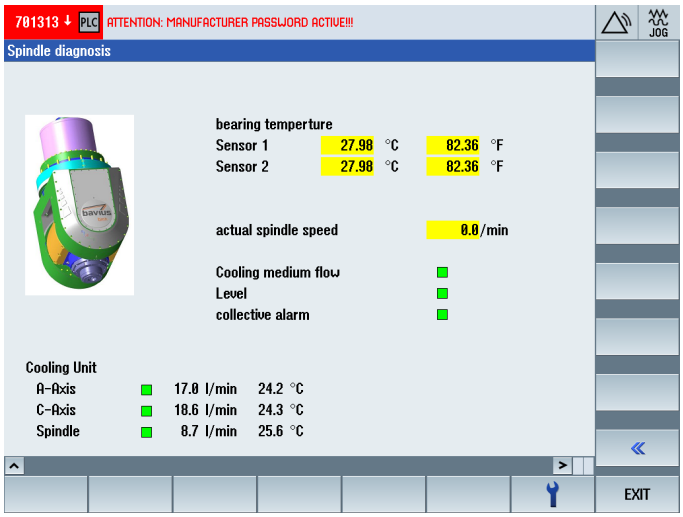
Prior requirement:

- See (6.8)

Procedure:

1. Horizontal soft keys
   Press Spindle

The screen [44] displays, e.g.:



6.8.4.1 Diagnosis: Spindle

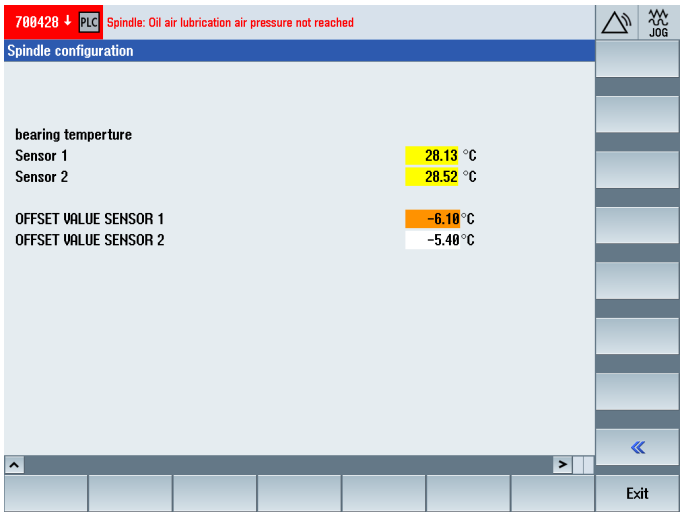
Prior requirement:

- See (↗ 6.8.4)

Procedure:

1. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



6.9 Executing Custom function

Prior requirement:

- Machine turned on)
  or
  Machine is ready for operation.

Procedure:

1. Press [40]

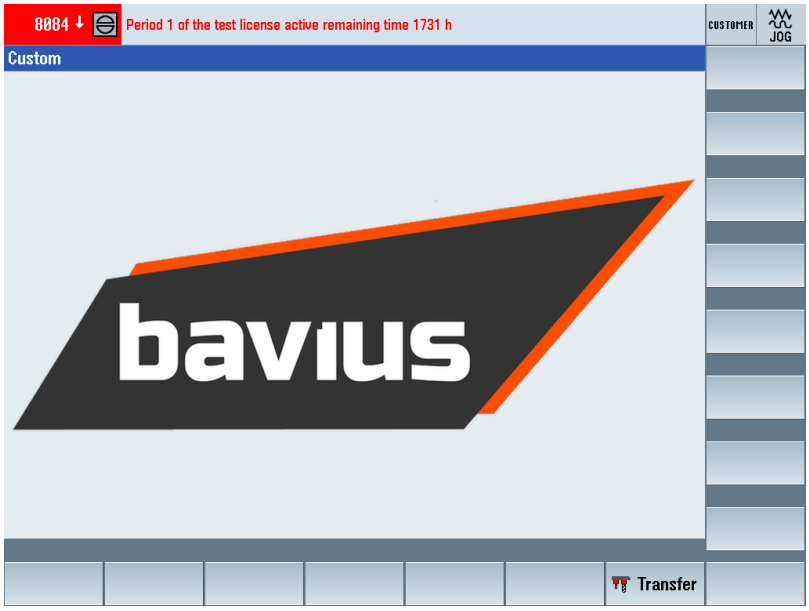
2. Press

3. Press

The screen [44] displays, e.g.:

4. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



6.9.1 Executing transfer function (option)

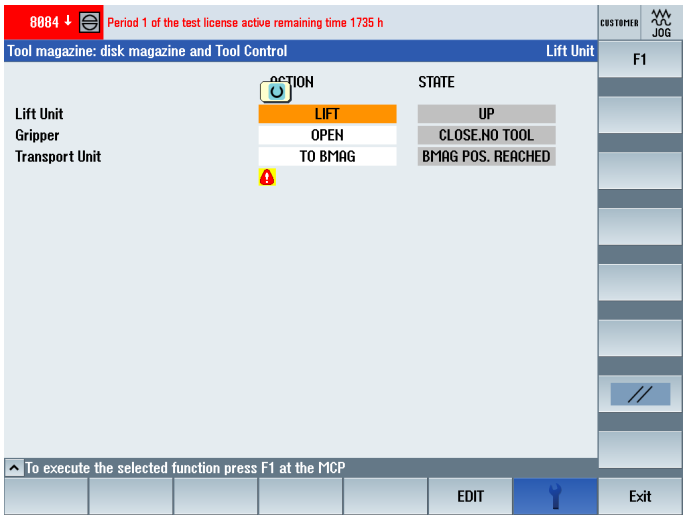
Prior requirement:

- See (↗ 6.9)

Procedure:

1. Horizontal soft keys
   Press

The screen [44] displays, e.g.:



6.10 Changing language

Prior requirement:

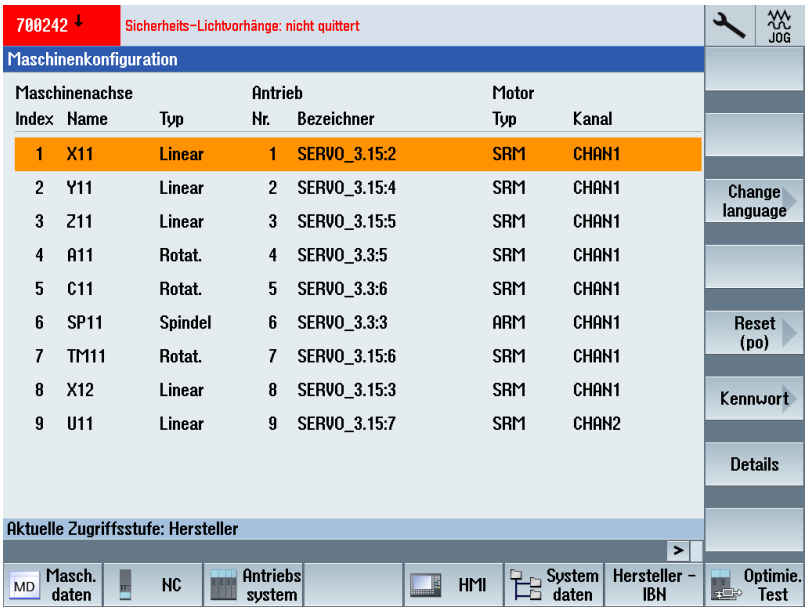
- See (↗ 2.1.1)
  or
  Machine is ready for operation.

Procedure:

1. Press

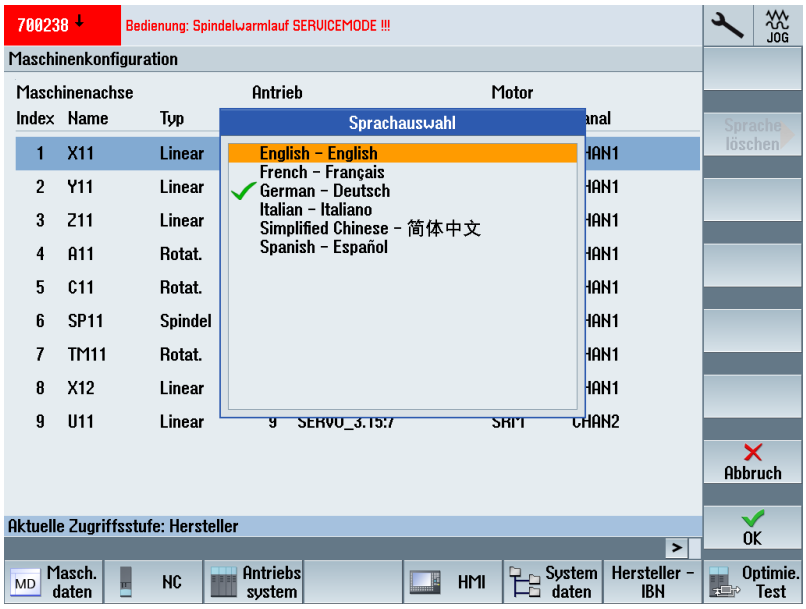
2. Horizontal soft keys
   Press Machine

The screen [44] displays, e.g.:



3. Horizontal soft keys
   Press Change language

The screen [44] displays, e.g.:


700238
Bedienung: Spindelwarmlauf SERVICEMODE !!!
JOG
Maschinenkonfiguration
Maschinenachse
Antrieb
Motor
Index
Name
Typ
Sprachauswahl
English - English
French - Français
German - Deutsch
Italian - Italiano
Simplified Chinese - 简体中文
Spanish - Español
1 X11 Linear
2 Y11 Linear
3 Z11 Linear
4 A11 Rotat.
5 C11 Rotat.
6 SP11 Spindel
7 TM11 Rotat.
8 X12 Linear
9 U11 Linear
Sprache löschen
Abbruch
OK
Aktuelle Zugriffsstufe: Hersteller
MD
Masch. daten
NC
Antriebs system
HMI
System daten
Hersteller - IBN
Optimie. Test

6.11 Automatic functions (option)

6.11.1 Program name

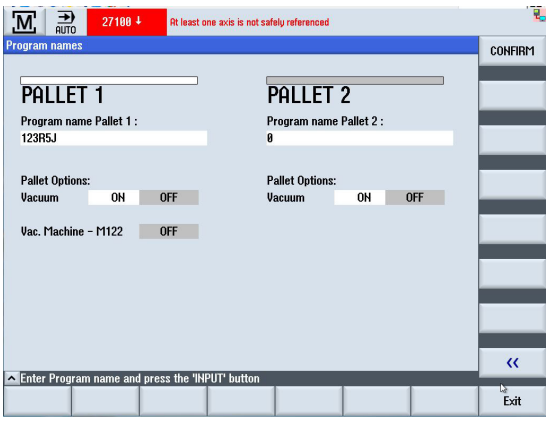
Prior requirement:

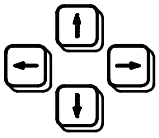
- Automatic operation

Procedure:

1. Press

The screen [44] displays, e.g.:



2.  Position cursor in menu window
   Vacuum pump ON

3. Press ; on screen: ON

4. Press F1 → Function is executed

Correct outcome:

5. → The vacuum pump starts.

7. Work guidance

	NOTE **Execute work guidance.** Failure to observe the safety regulations may result in damage to the machine. ➢ Observe the safety regulations.

- Observe (↗ Safety section) for all work guidance.

7.1 Daily, prior to starting work

1. Check the safety equipment as described in the Safety section.

	NOTE **Ambient temperature is too low.** If the ambient temperature is less than +15 °C, let the machine warm up. ➢ In ambient temperatures of less than +15 °C, turn on the machine (master switch ON and control unit turned on) and leave to warm up for about 15 minutes.

2. Maintenance works must be performed at fixed intervals.
3. Prepare the tool

7.2 While the machine is in operation

1. Maintenance works must be performed at fixed intervals.
2. Prepare the tool

7.3 Machining different materials

	NOTE
	Using auxiliary materials. Failure to observe the safety regulations may result in damage to the machine. ➢ Observe the manufacturers' safety data sheets when using auxiliary materials.

7.4 Risk to people and the environment

	⚠ WARNING
	Risk to people and the environment! Risk of injury to people or damage to the environment. ➢ Observe the visual alarms (e.g. signal column). ➢ Activate Emergency OFF.

- Always activate Emergency OFF [30] immediately in case of imminent danger.

7.4.1 Normal (automatic/production) operation

- The following risks only exist while setting up the machine/handling the work pieces:
  - Danger from suspended loads
  - Risk of injury (e.g. foot) from falling work pieces
  - Risk of cuts from sharp-edged work pieces
  - Risk of skin irritation from materials wetted with auxiliary materials

7.4.2 Setup operation / Manual mode and Mode of operation for checking programming with manual intervention

- Things may get caught in the rotating main spindle/tools (e.g. fingers, hands, loose hair, clothing).
- Risk of crushing and shearing from force-driven machine parts (e.g. axes, tensioning devices for work pieces, pallets)
- Risk of parts being ejected (e.g. if tool breaks or the work piece tensioning device fails)
- Risk of skin irritation and respiratory illness from auxiliary materials
- Risk of eye injuries from flying chips and auxiliary materials
- Danger from heavy work pieces (e.g. risk of foot injuries if work pieces are dropped during handling)
- Risk of cuts from sharp-edged work pieces
- Danger from suspended loads

7.4.3 What to do if accidents occur - First aid

- Secure the accident area
- Notify first aiders and supervisors
- Attend to the injured

7.5 Triggering the undervoltage release

Prior requirement:

- Undervoltage release has been activated.
- Master switch [15] set to "+trip"
  → Machine and operating panel disconnected

Procedure:

1. Turn master switch to "OFF"

2. Turn master switch to "Reset"
   and hold briefly.

3. Master switch automatically returns to "OFF".

Correct outcome:

4. → Machine has stopped

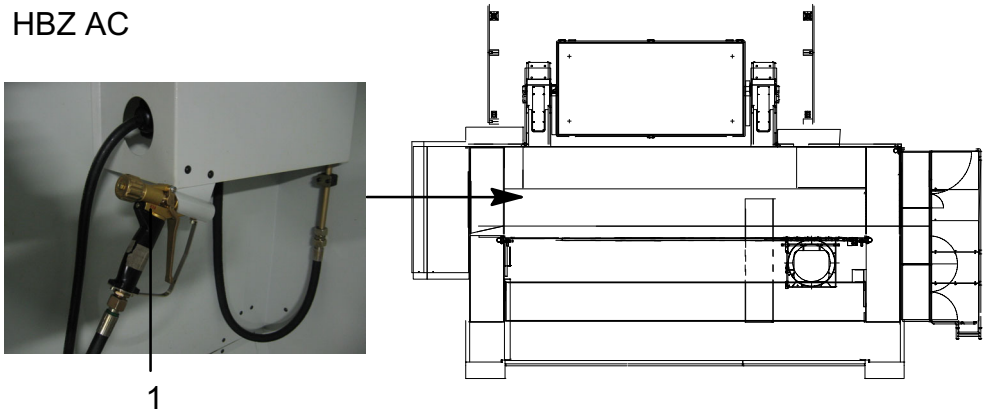
Procedure:

5. Undervoltage release key set to "0"

6. Turn on the machine.

7.6 Manual cleaning

HBZ AC



Key	No.	Explanation
1	90-1	Blow gun

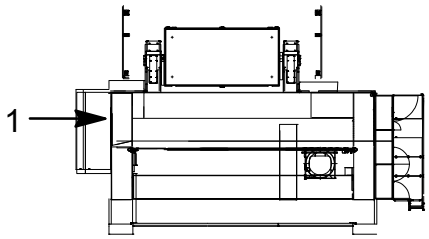
7.6.1 Manual cleaning with blow gun

	⚠ CAUTION
	Manual cleaning with blow gun. Risk of injury from cooling lubricant jets. ➢ Do not look into the blow gun of the cooling lubricant system when cleaning manually. ➢ Do not intentionally point the jet of cooling lubricant at anyone.

Prior requirement:

- Machine is switched on
  or
  Machine is ready for operation.

Procedure:



Key	No.	Explanation
1		Safety doors with inspection window

1. Press
   → LED flashes
   → Door lock switches [61] for doors in working area in Unlock position

2. Open the doors to the working area.

3. Press
   → Pump starts
   → Button is lit

4. Activate the blow gun for as long as cooling lubricant is needed for cleaning purposes.

Correct outcome:

5. → Button is lit
   → Cooling lubricant sprays out

Procedure:

6. Pump switches off after specified time
   → Button light goes off

7. Replace the blow gun in its designated holder

	WARNING
	Manual cleaning with blow gun. Risk of injury and/or damage to the machine. ➢ Make sure nobody is inside the inner machine area (e.g. working area).

8. Close the doors to the working area.

9. Press → Door lock switches [61] for doors in working area in Lock position

Correct outcome:

10. → LED above lights up

11. → Door lock switches [61] for doors in working area in Lock position

12. → Doors in working area cannot be opened.

7.7 Vacuum unit malfunctions

7.7.1 Prior to NC START

Prior requirement:

- See (↗ 2.1.2)
- Observe the alarm display on the screen [44]
- No NC START possible

Procedure:

	⚠ WARNING
⚠	**Troubleshooting the cause of malfunction.** Risk of injury and/or damage to the machine. ➢ Make sure nobody is inside the inner machine area (e.g. working area).

1. Confirm the error message on the screen [44]
   (↗ SINUMERIK 840D-SL user guide)

Correct outcome:

2. The alarm display on the screen [44] shows:
   No message

3. NC START is possible

7.7.2 Following NC START

Prior requirement:

- See (↗ 2.1.2)
- has been pressed
  → Program starts
- Program and machine stop
- → Observe the alarm display on the screen [44]

Procedure:

	⚠ WARNING **Troubleshooting the cause of malfunction.** Risk of injury and/or damage to the machine. ➢ Make sure nobody is inside the inner machine area (e.g. working area).

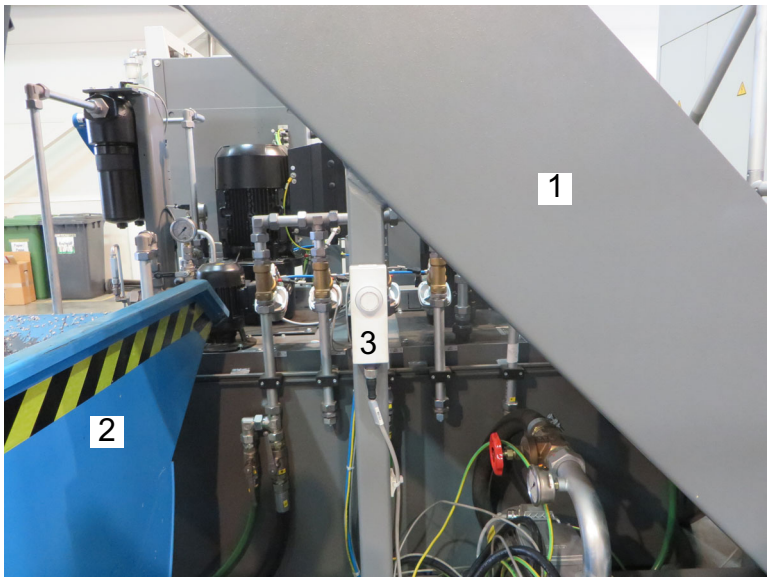
4. Confirm the error message on the screen [44]
   See (↗ User guide: SINUMERIK 840D-SL).

Correct outcome:

5. → The alarm display on the screen shows:
   No message

6. Start program again from the start
   or
   Continue NC program

7.8 Chip conveyor Stop (Option)



Pos.	No.	Explanation
1		Chip conveyor
2		Swarf bucket
2		Light button

WARNING

Incorrect operation.

Incorrect operation can result in injuries or property damage.

- These controls may only be operated by trained members of staff.
- Reaching into the opening is prohibited.

	NOTE **After pressing the light button, the chip conveyor automatically starts again automatically after 2 minutes.** Chips and lubricate can fall on the hall floor. ➢ Supply of the bucket and work uninterruptible.

7.8.1 Normal process

Prior requirement:

- Chip conveyor is running
- Light botton steady light
- Necessary to empty or exchange the swarf bucket

Procedure:

1. Press the illuminated pushbutton
   → Chip conveyor stops
   → Light botton flashes
   → A pop-up message appears at the main control panel for information
   → LED of the chip conveyor button on the main control panel flashes

2. Exchange the swarf bucket

3. Press the light button
   → Chip conveyor starts
   → Light button steady light
   → The pop-up message disappears at the main control panel

8. CNC programming

8.1 Machine-specific M functions

- See ↗ User guide: SINUMERIK 840D-SL.

Active	Function	Description
x	M3	Spindle clockwise
x	M5	Spindle anti-clockwise
x	M6	Stop spindle
x	M7	Coolant intern ON (permanently)
x	M8	Coolant extern ON (permanently)
x	M9	Coolants OFF
x	M10	Axis locking ON
x	M11	Axis locking OFF
x	M13	Spindle clockwise and coolant on
x	M14	Spindle counterclockwise and coolant on
x	M15	Spindle stop and coolant off
x	M17	Sub-program end
x	M30	Program end
x	M52	Clamp tool
x	M53	Unclamp tool
x	M60	Lock temperature compensation (e.g. for TCH)
x	M61	Re-release temperature compensation
x	M80	Suction 1 ON
x	M81	Suction 1 OFF
x	M82	Tool control ON
x	M83	Tool control OFF
x	M86	Chip conveyor ON, forward
x	M87	Chip conveyor OFF
x	M91	Tool movement magazin to spindle
x	M92	Tool movement spindle to magazin

Active	Function	Description
x	M101	Probe measurement ON (enable monitoring)
x	M102	Probe measurement OFF (disable monitoring)
x	M106	Chip conveyor high speed ON (HBZ)
x	M107	Chip conveyor high speed OFF (HBZ)
x	M122	Vacuum 1 ON
x	M123	Vacuum 1 OFF
x	M124	Vacuum 2 ON
x	M125	Vacuum 2 OFF
x	M126	Vacuum 3 ON
x	M127	Vacuum 3 OFF
x	M128	Vacuum 4 ON
x	M129	Vacuum 4 OFF
x	M130	Vacuum 5 ON
x	M131	Vacuum 5 OFF
x	M132	Vacuum 6 ON
x	M133	Vacuum 6 OFF
x	M134	Vacuum pallet connect loading position and start
x	M135	Vacuum pallet stop loading position and disconnect
x	M136	Vacuum pallet connect working position and start
x	M137	Vacuum pallet stop working position and disconnect
x	M157	Request start log file analyzer spindle - Aradex
x	M163	Lock temperature compensation (TCH)
x	M164	Reactivate temperature compensation
	M210	Water surge, rinsing point Z axis ON
	M211	Water surge, rinsing point Z axis OFF

8.2 User cycles

8.2.1 Load sub-program

- TCH

  e.g.: T = "n" TCH M30
  → Tool change loading

- HOME

	NOTE
	Authorise access rights. e.g.: HOME → Loading return to home ➢ Positions in “HOME.SPF” program can be altered.

9. Malfunctions

	WARNING
	Malfunctions on the CNC machining centre Troubleshooting malfunctions. ➢ If malfunctions occur on the CNC machining centre that are not described here or that cannot be remedied, please contact technical customer service.

- See (Safety section)

	NOTE
	Display of error messages / error codes. Error messages / error codes are displayed on the screen [44]. ➢ Technical customer service must be requested if errors cannot be remedied.

- See (User guide: SINUMERIK 840D-SL).

9.1 After activating Emergency OFF [30]

9.1.1 "Normal operation"

Procedure:

	⚠ CAUTION
	Dangerous states. Dangerous states, beware of e.g. vapours, sharp-edged tools or work pieces. ➢ Take protective measures immediately.

1. Check, e.g.

Possible cause	Remedy
Collision run	**Request technical customer service**
[30] activated	Only operate the machine when it is safe and functioning correctly. Continue with 2.

2. Turn [30] in the direction of the arrow to unlock

3. Press

→ Error message confirmed

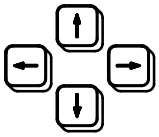
4. Press

(40)
→ Error message confirmed

	NOTE
	Error message confirmed. Once the error messages have been confirmed, the program starts again from the beginning.

5. Press

6. Horizontal soft keys
   Press Program

7.  Position cursor in menu window Program xxxxx

8. Vertical soft keys
   Press Execute

9. Press

10. Press

9.1.2 "Setup operation / Manual mode"

Procedure:

	⚠ CAUTION
	Dangerous states. Dangerous states, beware of e.g. vapours, sharp-edged tools or work pieces. ➢ Take protective measures immediately.

1. Check, e.g.

Possible cause	Remedy
Collision run	**Request technical customer service**
[30] activated	Only operate the machine when it is safe and functioning correctly. Continue with 2.

2. Turn [30] in the direction of the arrow to unlock.

3. Press

→ Error message confirmed.

4. Press

(40)
→ Error message confirmed.

9.2 Referencing the axes

NOTE

Check spindle mount.

Loaded tools in the spindle mount can cause damage.

➢ Make sure no tools are loaded in the spindle mount.

Prior requirement:

- Machine is switched on

Procedure:

- Section 2

9.3 Error messages / Error codes

- For example:

700100	Channel1: NC START not possible
700101	Initialisation failed: ASUP is missing or not enabled
700102	Channel1: NC-STOP triggered, check reports
700103	Reference run blocked: Axis X11 in magazine collision area
700104	Channel 2: NC START not possible
700105	Channel 2: NC-STOP triggered, check reports
700106	X11 axis: Collision position
700107	Error on ASUP start
700108	X11 axis: Movement not permitted
700109	Y11 axis: Movement not permitted
700110	Z11 axis: Movement not permitted
700111	A11 axis: Movement not permitted
700112	C11 axis: Movement not permitted
700113	SP1 axis (main spindle): Movement not permitted
700114	TM1 axis: Movement not permitted
700115	SP1 axis (main spindle): Feed lock through spindle controller

700116	C11 axis: Collision position	
700117	Y11 axis: Collision position	
700118	Machine: Both end position switches are actuated	
700119	Machine: For test stop close protective hood and doors	
700120	Main spindle: STOP	Yellow
700121	Machine: Compressed air supply 1 not OK	Yellow
700122	Machine: Compressed air supply 2 not OK	
700123	Main spindle: EMERGENCY STOP	
700124	Work area: Work area: Doors are open or unlocked	
700125	Work area: Gantry loader door is open or unlocked	
700126	Tool magazine: Door is open or unlocked	
700127	Tool magazine:	
700128	Work area: Doors interlock fault	
700129	Work area:	
700130	Tool magazine: Door interlock fault	
700131	Tool magazine:	
700132	Machine: Power is turned off	
700133	Machine: Power is not switched off	
700134	Machine: Vice position not registered or encoder not synchronised	
700135	Machine: Spindle not referenced	
700136	Machine: Not referenced	
700137	Machine: No spindle speed programmed	
700138	DB02.dbx192.6	
700139	CONTROL IS STARTING UP! PLEASE WAIT!	
700140	Axes: Feed stop by machine control panel	
700141	Main spindle: Stop by machine control panel	
700142	Channel1: Work piece clamped. Please setup or acknowledge for start	
700143	Channel1: Work piece detached. Please setup and clamp	
700144	Channel 2: Work piece clamped. Please setup or acknowledge for start	
700145	Channel 2: Work piece detached. Please setup and clamp	
700146	DB02.dbx193.6	
700147	Main spindle: Speed drop, feed stop axes	
700148	Axes: Feed start only if main spindle speed in target range	
700149	Main spindle: Stop with feed hold or program stop/reset	
700150	Machine: Move to home position with F1 button	
700151	Machine: Switch to JOG operating mode to move to home position	
700152	Machine: Test stop requested, override switch is not at 100%	
700153	Machine: Move to material change position with F1 button	
700154	Machine: Compressed air accumulation active after power ON	
700155	X axis: Feed stop because driver not pulled in	
700156	Machine: Press confirmation button or close safety equipment	
700159	Machine control panel: Caution, key switch in position I	
700160	Machine control panel: Key switch not in position 0	
700161	Channel1: Function can only be executed with key switch in position I	
700162	Channel 2: Function can only be executed with key switch in position I	
700163	Main spindle: Time for preventive maintenance	
700200	Global user data: Reading aborted	
700201	No main spindle type 1 or wrong main spindle type 1 selected	
700202	Axis drives: Not ready for operation	

700203	Profibus: At least one DP slave faulty	
700204	Drive input for operation missing	
700205	Drive input not ready for operation	
700208	Commissioning function activated: Handtmann Service only!!!"	
700209	HOP activated: Operation only possible on the hand-held unit	
700210	Axis A11: Disengage time monitoring when clamping	
700211	Axis C11: Disengage time monitoring when clamping	
700212	Axis Y11: Error axis brake not opened (LinClamp)	
700214	C11 axis set to hardware end switch -	
700215	C11 axis set to hardware end switch +	
700216	Pneumatic: Measuring system cleaning pressure not OK	Yellow
700217	Pneumatic: X21 measuring system cleaning pressure not OK	
700218	Pneumatic: Y/Z measuring system cleaning pressure not OK	
700224	Machine: Emergency OFF activated	
700225	Machine: MSST: Emergency OFF activated	
700226	Machine: LG: Emergency OFF activated	
700227	Machine: Safety light curtain: Emergency OFF activated	
700228	Machine: Tool change system: Emergency OFF activated	
700229	Machine: Gantry loader control panel: Emergency OFF	
700230	Machine: Gantry loader 1: Emergency OFF	
700231	Machine: Gantry loader 2: Emergency OFF	
700232	Main spindle: Tool not clamped	
700233	Axis A11: Clamp release	
700234	Axis C11: Clamp release	
700235	Axis A11: Clamp not clamped	
700236	Axis C11: Clamp not clamped	
700237	Operation: Oil/air lubrication SERVICE MODE (statically off) !!!	
700238	Operation: Spindle warm-up SERVICE MODE !!!	
700239	Operation: Spindle warm-up required	
700240	Safety light curtains: soiled	
700241	Safety light curtains: busy	
700242	Safety light curtains: not acknowledged	
700243	Operator safeguard: Loading area not OK (safety light curtain)	
700244	Protective cover not closed, NC start not possible	
700245	Handheld operator: Emergency OFF interface bypassed	
700246	Loading area: No release acknowledgement for loading + light barrier	
700247	Assembly guard rail in place	
700248	Tool magazine: Execute requested function with F1	
700249	Tool magazine1: Execute requested function with F1	
700250	Tool magazine2: Execute requested function with F1	
700252	Machine: Time for preventive maintenance	
700254	Cycle stop after TCH: Tool coolant level, pre-warning, not OK (ALARM CANCEL)	
700255	Cycle stop: Tool coolant, minimum level not OK (ALARM CANCEL)	
700256	Smart Vision II(FISCHER): Vibration Alarm A	
700257	Smart Vision II(FISCHER): Vibration Alarm B	
700258	Smart Vision II(FISCHER): Vibration Alarm C	
700259	Smart Vision II(FISCHER): Warning	
700260	Smart Vision II(FISCHER): Alarm	
700261	Smart Vision II(FISCHER): Emergency Stop	

700300	Main spindle: Error when tensioning/disengaging the tool	Yellow
700301	Main spindle: Error signal 'Tool tensioned'	
700302	Main spindle: Error signal 'Tensioned without tool'	
700303	Main spindle: Error signal 'Disengaged'	
700308	Tool change: Magazine 1 not in home position	
700309	Tool change: Tool control not in home position	
700316	TCS: Cover not opened	
700317	TCS: Cover not opened or magazine not in change position	
700318	TCS: Cover not opened or magazine not in change position or magazine slot occupied	
700319	TCS: Cover not opened or magazine not in change position or magazine slot empty	
700320	TCS: Cover not closed	
700321	TCS: Magazine not in home position	
700322	TCS: Magazine not in home position or cover not closed	
700323	TCS: Magazine slot occupied	
700324	TCS: Magazine slot not occupied	
700325	TCS: Fault for - Tension spindle with tool	
700326	TCS: Fault for - Tension spindle without tool	
700327	TCS: Fault for - Disengage spindle tool	
700330	TCS: Magazine not initialised	
700331	TCS: Magazine initialised	
700332	Tool change: Magazine door not opened	
700338	Tool change: Magazine loading. TCH waiting	
700339	Tool change: Magazine loading, door not locked	
700340	Tool change: Axis A moving to position	
700341	Tool change: Axis C moving to position	
700342	Tool change: Axis Y moving to position	
700343	Tool change: Axis Z moving to position	
700344	Tool change: Axes Y/Z moving to position	
700345	Tool change: Disengage tool clamp / Magazine to change position	
700346	Tool change: Disengage tool clamp	
700347	Tool change: Tension tool clamp	
700348	Tool change: Magazine to home position	
700349	Tool change: Magazine to change position	
700356	Tool change: Plausibility tool mgmt. spindle sig.<->Management diff."	
700357	Tool change: Error reading magazine slot data	
700358	Tool in spindle: Error reading tool type	
700400	Automation: Error loading step sequence	
700401	Automation: Error unloading step sequence	
700402	Automation: Detection: Zero-point clamp nozzles clogged	
700403	Automation: Detection: Check pallet position	
700404	Automation lock: Protective cover not open	
700405	Automation lock: Table position not plausible	
700406	Automation lock: Table already occupied	
700407	Automation lock: No response from gantry loader	
700408	Top cover: Initiator closed missing	
700409	Top cover: End switch error driver left	
700410	Top cover: End switch error driver right	
700411	Top cover: Feedback driver extended left/right missing	

700412	Top cover: Feedback driver pulled in left/right missing	
700413	Top cover: Error during ASUP initialisation	
700414	Top cover: Error during ASUP start	
700415	Top cover: Error writing DPR	
700416	Automation lock: No response from machine	
700417	Automation lock: Pallet not disengaged	
700418	Automation lock: No program number	
700419	Automation lock: Zero-point clamp flush	
700420	Automation lock: Pallet not tensioned	
700421	Automation: Collision monitoring test failed	
700423	No pallet	
700424	Switch cabinet: 480 VAC motor protection triggered	
700425	Switch cabinet: Control transformer motor protection and circuit breaker triggered upstream of MS	Yellow
700426	Switch cabinet: Control transformer motor protection and circuit breaker upstream of MS triggered remotely	
700427	Switch cabinet: Motor protection machine illumination triggered	
700430	X axis: Gantry loader not released	
700431	Protective cover lock: Gantry loader not at top	
700432	Work piece tensioning system: Tensioning error	
700433	Work piece tensioning system: Disengaging error	
700436	Detection: Error circuit 1	
700437	Detection: Error circuit 2	
700438	Detection: Error circuit 3	
700439	Detection: Error circuit 4	
700440	Automation: Gantry loader not ready for operation	
700441	Automation: Machine not ready for operation	
700500	Main spindle: Excess temperature Yellow	Yellow
700501	Main spindle: Cooling unit flow monitor fault	Yellow
700502	Main spindle: Cooling unit collective fault	Yellow
700503	Main spindle: Cooling unit, minimum level not OK	Yellow
700504	Main spindle: Cooling unit air filter not OK	Yellow
700505	Main spindle: Cooling unit water filter not OK	
700506	Main spindle: Cooling unit, minimum level, pre-warning	Yellow
700507	Main spindle: Oil-air lubrication faulty or switched off	Yellow
700508	Drives: X11 axis motor temperature warning	Yellow
700509	Drives: Y11 axis motor temperature warning	Yellow
700510	Drives: Z11 axis motor temperature warning	Yellow
700511	Drives: A11 axis motor temperature warning	Yellow
700512	Drives: C11 axis motor temperature warning	Yellow
700513	Drives: SP1 axis motor temperature warning	Yellow
700514	Drives: TM11 axis motor temperature warning	Yellow
700515	Drives: X12 axis motor temperature warning	Yellow
700516	Drives: X13 axis motor temperature warning	
700517	Drives: X14 axis motor temperature warning	
700518	Drives: Y21 axis motor temperature warning	
700519	Drives: Axis motor temperature warning	
700520	Drives: Axis motor temperature warning	
700521	Drives: Axis motor temperature warning	

700522	Drives: Axis motor temperature warning	
700523	Drives: Axis motor temperature warning	
700524	Drives: A11 motor, flow monitor 1 fault	
700525	Drives: A11 motor, flow monitor 2 fault	
700526	Drives: C11 motor, flow monitor 1 fault	
700527	Drives: C11 motor, flow monitor 2 fault	
700528	Drives: SP1 motor (spindle), flow monitor fault	
700529	Drives: Z11 motor, flow monitor fault	
700530	Drives: A axis motor excess temperature (PTC)	
700531	Drives: C axis motor excess temperature (PTC)	
700532	Machine X11 axis: Lubrication active	
700533	Machine X11 axis: Lubricant cartridge empty	
700534	Machine X11 axis: Lubrication system fault	
700535	Machine X12 axis: Lubrication active	
700536	Machine X12 axis: Lubricant cartridge empty	
700537	Machine X12 axis: Lubrication system fault	
700538	Machine Y11 axis: Lubrication active	
700539	Machine Y11 axis: Lubricant cartridge empty	
700540	Machine Y11 axis: Lubrication system fault	
700541	Machine Z11 axis: Lubrication active	
700542	Machine Z11 axis: Lubricant cartridge empty	
700543	Machine Z11 axis: Lubrication system fault	
700545	Main spindle: Oil-air lubrication switched off	
700546	Main spindle: Oil-air lubrication RESET active	
700547	Main spindle: Oil-air lubrication faulty	
700548	Outer tool spray unit: Medium level empty	
700549	Outer tool spray unit: Medium level pre-warning	
700550	Inner tool spray unit: Medium level empty	
700551	Inner tool spray unit: Medium level pre-warning	
700552	Inner tool spray unit: Compressed air fault	
700553	Inner tool spray unit: Medium FLOW fault	
700554	Inner tool spray unit: Medium level MIN	
700555	Inner tool spray unit: Air flow tool fault	
700556	Central lubrication: Lubricant pressure fault	Yellow
700557	Central grease lubrication: Minimum level	Yellow
700558	Central grease lubrication: Level pre-warning	
700559	Central grease lubrication: Pressure not reached	
700560	Central grease lubrication: Pressure not low before start	
700561	Central oil lubrication: Minimum level	
700562	Central oil lubrication: Pressure not reached	
700563	Central oil lubrication: Pressure not low before start	
700600	Switch cabinet: Switch cabinet cooling units fault	Yellow
700601	Switch cabinet: Switch cabinet cooling unit 2 fault	
700602	Switch cabinet: Cooling unit operating panel fault	
700603	Switch cabinet: Doors not closed	Yellow
700604	Switch cabinet: CSM module supply circuit breaker triggered	Yellow
700605	Switch cabinet: Coupling/output supply circuit breaker triggered	Yellow
700606	Switch cabinet: PC1/PC2 supply circuit breaker (Smart Vision)	Yellow
700607	Switch cabinet: Spindle speed monitoring circuit breaker triggered	

700608	Switch cabinet: Circuit breaker before master switch triggered	Yellow
700609	Switch cabinet: 230V supply circuit breaker triggered	Yellow
700610	Switch cabinet: Spindle cooling unit circuit breaker triggered	
700611	Switch cabinet: Input supply circuit breaker triggered	Yellow
700612	Switch cabinet: Profibus input supply circuit breaker triggered	
700613	Switch cabinet: Output supply circuit breaker triggered	
700614	Switch cabinet: (Delayed) Output supply circuit breaker triggered	Yellow
700615	Switch cabinet: Output coupling circuit breaker triggered"	Yellow
700616	Switch cabinet: Control transformer motor protection/circuit breaker triggered	
700617	Switch cabinet: Motor protection machine illumination triggered	
700618	Switch cabinet: Service socket motor protection/circuit breaker triggered	
700619	Switch cabinet: Hydraulic unit motor protection triggered	Yellow
700620	Switch cabinet: Central lubrication unit motor protection triggered	Yellow
700621	Switch cabinet: Chip conveyor motor protection triggered	Yellow
700622	Switch cabinet: Vacuum unit supply circuit breaker triggered	Yellow
700623	Switch cabinet: E/R fan or spindle module motor protection triggered	
700624	Switch cabinet: Spindle oil lubrication system motor protection/circuit breaker triggered	Yellow
700625	Switch cabinet: Cooling unit operating panel motor protection/circuit breaker triggered	
700626	Switch cabinet: E/R module circuit breaker triggered	Yellow
700627	Switch cabinet: Safety input/output supply circuit breaker triggered	
700628	Switch cabinet: Fischer controller supply circuit breaker triggered	
700629	Switch cabinet: Fischer computer supply circuit breaker triggered	
700630	Switch cabinet: Tool arena circuit breaker triggered	
700631	Switch cabinet: Process monitoring circuit breaker triggered	
700632	Hydraulic oil level too low	Yellow
700633	Hydraulic oil level pre-warning	Yellow
700634	Hydraulic oil temperature not OK	Yellow
700635	Hydraulic oil filter, feed, contaminated	
700636	Hydraulic oil filter, return, contaminated	
700637	Hydraulic pressure, high not reached	
700638	Hydraulic pressure, low not reached	
700639	Hydraulic pressure, high/low not reached	
700640	Chip conveyor monitoring block triggered	
700641	Options: Function not incorporated	
700642	Probe: Battery not OK	Yellow
700643	Probe: Not ready for operation	Yellow
700644	X axis cover not at top when hood closed	
700645	X axis cover not at bottom when hood open	
700646	Protective cover sliding seal not open	
700647	Protective cover sliding seal not closed	
700648	Switch cabinet: Spray extraction unit motor protection triggered	
700649	Machine: Spray extraction unit not ready for operation	
700650	Machine: Spray extraction unit 1, filter level, not OK	
700651	Machine: Spray extraction unit 2, filter level, not OK	
700652	Machine: Feedback from extraction unit 1, cover missing	
700653	Machine: Feedback from extraction unit 2, cover missing	
700700	Main spindle controller: Excess temperature	
700701	Main spindle controller: Cooling unit flow monitor fault	

700702	Main spindle controller: Cooling unit collective fault	
700703	Main spindle controller: Cooling unit, min. level not OK	
700704	Main spindle controller: Cooling unit air filter not OK	
700705	Main spindle controller: Cooling unit water filter not OK	
700706	Main spindle controller: Cooling unit level too high	
700730	Spindle: Vibration warning limit exceeded	red_ flashing_ 20 0ms
700731	Spindle: Vibration alarm limit exceeded	red_ flashing_ 20 0ms
700732	X axis temp. comp.: Input temp. coefficient not in permissible range: (0-0.00003)	
700733	X axis temp. comp.: Impermissible sudden changes in sensor temperature	
700734	X axis temp. comp.: Sensor temperature not in plausible range:	
700735	X axis temp. comp.: Error FB3	
700736	X axis temp. comp.: Dynamic monitoring while writing FB3	
700737	Y axis temp. comp.: Input temp. coefficient not in permissible range: (0-0.00003)	
700738	Y axis temp. comp.: Impermissible sudden changes in sensor temperature	
700739	Y axis temp. comp.: Sensor temperature not in plausible range	
700740	Y axis temp. comp.: Error FB3	
700741	Y axis temp. comp.: Dynamic monitoring while writing FB3	
700742	Z axis temp. comp.: Input temp. coefficient not in permissible range: (0-0.00003)	
700743	Z axis temp. comp.: Impermissible sudden changes in sensor temperature	
700744	Z axis temp. comp.: Sensor temperature not in plausible range	
700745	Z axis temp. comp.: Error FB3	
700746	Z axis temp. comp.: Dynamic monitoring while writing FB3	
700748	Vacuum in the machine: Vacuum not OK	Yellow
700749	Vacuum system: Pre-filter vacuum pump max. level reached	
700750	Vacuum in the machine: Time monitoring, vacuum not reached	
700751	Vacuum in the machine: Pressure build up!	
700752	Vacuum system: Pump not switched on	
700753	Vacuum unit in the machine: Vacuum selected but work piece not tensioned	
700800	Fischer drive: Request feed stop	
700801	Fischer drive: Power unit I2T - limitation	
700802	Fischer drive: Livebit monitoring error	
700803	Fischer drive: Motor temperature pre-warning	
700804	Fischer drive: IGBT temperature error	
700805	Fischer drive: Motor temperature error	
700806	Fischer drive: Collective warning	
700807	Fischer drive: Zero point monitoring error	
700808	Fischer drive: Collective error axis amplifier	
700809	Fischer drive: IGBT temperature error	
700810	Fischer drive: Bearing temperature 1 error	
700811	Fischer drive: Bearing temperature 2 error	
700812	Fischer drive: Bearing temperature 3 error	
700813	Fischer drive: Bearing temperature 4 error	
700814	Fischer drive: Bearing temperature 5 error	
700815	Fischer drive: Bearing temperature 6 error	
700816	Fischer drive: Motor temperature error	

700817	Fischer drive: Analog in Fast 0 Error
700818	Fischer drive: Analog in Fast 2 Error
700819	Fischer drive: Analog In Fast 3-IBIS Vibration
700820	Fischer drive: Analog In Slow 0 error
700821	Fischer drive: Analog In Slow 1 error
700822	Fischer drive: Analog In Slow 2 error
700823	Fischer drive: Emergency OFF chain open
700824	Fischer drive: DC link error
700825	Fischer drive: Avr Watchdog error
700826	Fischer drive: Vbus Watchdog error
700827	Fischer drive: OC Check error
700828	Fischer drive: SC Check error
700829	Fischer drive: DAC-Low-Limit error current limit
700830	Fischer drive: Power Limit error
700831	Fischer drive: Speed Limit error
700832	Fischer drive: Tool change positioning is running
700833	Fischer drive: Active Infeed module: Not ready for operation
700834	Fischer drive: Collective warning
700835	Fischer drive: Motor temperature pre-warning
700836	Fischer drive: Not ready for operation
700837	Fischer drive: Pulses not approved
700840	Fischer drive: Collective warning axis amplifier
700841	Fischer drive: IGBT temperature warning
700842	Fischer drive: Bearing temperature 1 warning
700843	Fischer drive: Bearing temperature 2 warning
700844	Fischer drive: Bearing temperature 3 warning
700845	Fischer drive: Bearing temperature 4 warning
700846	Fischer drive: Bearing temperature 5 warning
700847	Fischer drive: Bearing temperature 6 warning
700848	Fischer drive: Motor temperature warning
700849	Fischer drive: Analog in Fast 0 warning
700850	Fischer drive: Analog in Fast 2 warning
700851	Fischer drive: Analog In Fast 3-IBIS warning
700852	Fischer drive: Analog In Slow 0 warning
700853	Fischer drive: Analog In Slow 1 warning
700854	Fischer drive: Analog In Slow 2 warning
700855	Fischer drive: BM3 DB2.DBX250.7
700856	Fischer drive: Fan 0 warning
700857	Fischer drive: Fan 1 warning
700858	Fischer drive: BM4 DB2.DBX251.2
700859	Fischer drive: BM4 DB2.DBX251.3
700860	Fischer drive: BM4 DB2.DBX251.4
700861	Fischer drive: BM4 DB2.DBX251.5
700862	Fischer drive: BM4 DB2.DBX251.6
700863	Fischer drive: System start-up active
700900	TCS CT: Starting position for referencing missing
700901	TCS CT: Undefined position of horizontal positioning unit
700902	TCS CT: Load/unload completed with error
700903	WZW CT: Be-/entladen mit Fehler beendet

700904	TCS CT: Magazine movement blocked, loading door open
700905	TCS CT: Tool clamp in undefined position
700906	TCS CT: Tool in read cage
700907	TCS CT: NO tool in read cage
700908	TCS CT: Magazine loading slot occupied!
700909	TCS CT: Magazine loading slot empty!
700910	TCS CT: Scanner not in home position
700911	TCS CT: Scanner empty!
700912	TCS CT: Scanner occupied!
700913	TCS CT: CT read error
700914	TCS CT: CT write error
700915	TCS CT: Function not possible!
700932	TCS CT: Function stopped: Override 0%
700933	TCS CT: Function stopped: No feed
700934	TCS CT: Load/unload not possible, TCH active
700935	TCS CT: Request: open tool loading station door
700936	TCS CT: Request: close tool loading station door
700937	TCS CT: Step sequence, time monitoring expired
700938	TCS CT: Load/unload function active
700939	TCS CT: Function stopped: Control voltage OFF
700940	TCS CT: Request: Disengage clamp
700941	TCS CT: Request: Tension clamp
700942	TCS CT: Tool search finished, no result
700943	TCS CT: Tool search successfully completed
700956	Tool change: Prepare mode active
700957	Tool change: Change mode active
700958	Tool change: Load mode active
700959	Tool change: Unload mode active
701000	Pallet ch.: Change mode active, NC start not possible
701001	Pallet ch.: No starting position, MCHA start not possible
701002	Pallet ch.: Transport carriage position undefined
701003	Pallet ch.: Interface vacuum not in starting position
701005	Pallet ch.: Work piece in danger of collision with machine
701006	Pallet ch.: Start conditions not met
701007	Pallet ch.: Actual setting of encoder swivel arm not plausible
701008	Pallet ch.: Swivel arm position undefined
701009	Pallet ch.: Z axis in danger of collision
701010	Pallet ch.: MAC8 battery error
701011	Pallet ch.: MAC8 hardware error
701012	Pallet ch.: MAC8 Profibus error
701013	Pallet ch.: Swivel arm encoder error or encoder supply short circuit
701014	Pallet ch.: Swivel arm encoder error, parameter fault
701015	Pallet ch.: Encoder error rotary drive left
701016	Pallet ch.: Signal sensors pallet on carriage defective
701017	Pallet ch.: Swivel arm blocked, cylinder vacuum not retracted
701018	Pallet ch.: End point monitoring not reached, swivel arm locked
701019	Pallet ch.: End point monitoring not reached, centring cylinder Y
701020	Pallet ch.: End point monitoring not reached, centring cylinder X
701021	Pallet ch.: End point monitoring not reached, Z wedge gate valve

701022	Pallet ch.: Pallet monitoring signals in swivel arm not plausible
701023	Pallet ch.: Cylinder locking signals in swivel arm not plausible
701024	Pallet ch.: Cylinder lock position in swivel arm undefined
701025	Pallet ch.: Centring cylinder position undefined
701026	Pallet ch.: Centring cylinder position undefined
701027	Pallet ch.: Z wedge gate valve position undefined
701028	Pallet ch.: Pallet detection undefined
701029	Pallet ch.: Centring cylinder sensor signals Y not plausible
701030	Pallet ch.: Centring cylinder sensor signals X not plausible
701031	Pallet ch.: Z wedge gate valve sensor signals not plausible
701032	Pallet ch.: Service mode active
701033	Pallet ch.: Movement/action locked > Condition not met
701035	Pallet ch.: Button (PAUSE) Pallet change activated
701036	Pallet ch.: NC pallet load request halted
701037	Pallet ch.: NC pallet unload request halted
701038	Pallet ch.: NC load pallet request active
701039	Pallet ch.: NC unload pallet request active
701040	Pallet ch.: NC automatic pallet change request active
701041	Pallet ch.: Pallet B successfully loaded in the system
701042	Pallet ch.: Carriage drive malfunction
701043	Pallet ch.: Carriage end position activated
701044	Pallet ch.: New pallet processing not acknowledged
701045	Pallet ch.: New pallet ready for change
701046	Pallet ch.: Pallet changer not in operating mode NC_AUTO
701100	Safety Integrated: Error during forced dynamic sampling. Contactors not de-energised (RM E0.1)
701101	Safety Integrated: CAUTION: SERVICE key switch inserted!
701102	Safety Integrated: Chip conveyor contactors are not de-energising!
701103	Safety Integrated: Pneumatic contactors are not de-energising!
701104	Safety Integrated: Y axis contactors are not de-energising!
701105	Safety Integrated: Hydraulic contactors are not de-energising!
701132	Safety Integrated: Close doors and protective cover for test stop
701133	Safety Integrated: Test stop requested, 2x rejection possible (rest 3H). Doors locked. Actuate with 'T' button
701134	Safety Integrated: Test stop requested, 1x rejection possible (rest 1H). Doors locked. Actuate with 'T' button
701135	Safety Integrated: Test stop requested, no rejection possible. Doors locked. Actuate with 'T' button
701136	Safety Integrated: Test stop in progress
701137	Safety Integrated: Test stop not approved. Transformation selected. Key in position 1
701138	Safety Integrated: Override switch is not at 100 %, acknowledge safety light curtains/ fence, close doors, deselect REF.
701201	CLS: Lift pump 1 fault
701202	CLS: Lift pump 2 fault
701203	CLS: Lift pump 3 fault
701204	CLS: Lift pump 4 fault
701205	CLS: Waste tank overflow level reached
701206	CLS: Clean tank minimum level reached
701207	CLS: Clean tank maximum level reached

701208	CLS: Chip conveyor transverse, overflow level reached	red_ flashing_ 200ms
701209	CLS: Rinsing pump fault	
701210	CLS: External cooling pump fault	
701211	CLS: Internal cooling pump fault	
701212	CLS: Zero-point clamp pump fault	
701213	CLS: Z axis rinsing point pump fault	
701214	CLS: Portal nozzle pump fault	
701215	CLS: Hand spray/circulation pump fault	
701216	CLS: Deep bed filter drive fault	
701217	CLS: Input circuit protection triggered	
701218	CLS: Output circuit protection triggered	
701219	CLS: Valves circuit protection triggered	
701220	CLS: No response to external cooling request	
701221	CLS: No response to internal cooling request	
701222	CLS: No response to hand spray request	
701223	CLS: No response to Z axis rinsing point request	
701224	CLS: No response to flat spray nozzle portal request	
701225	CLS: No response to rotation nozzle portal request	
701226	CLS: No response to portal stand nozzle request	
701227	CLS: No response to X axis cover nozzle request	
701228	CLS: No response to zero-point clamp rinsing request	
701229	CLS: Master switch not on or CPU not ready for operation	
701231	CLS: Spindle rotary feedthrough is leaking!!	
701233	CLS: Clean tank minimum level	
701234	CLS: External cooling filter contaminated	
701235	CLS: Internal cooling filter contaminated	
701236	CLS: Paper transport fault	
701237	CLS: Out of paper fault	
701238	CLS: Switch on not possible! No tool for internal cooling in spindle	
701240	CLS, CC6: ConSep overflow level reached (Alarm Cancel)	
701244	CLS: Chip conveyor transverse, overflow level reached (Alarm Cancel)	
701300	CLS: Master switch OFF	
701301	CLS: Pump motor protection triggered	
701302	Chip conveyor long CC1 fault	
701303	Chip conveyor long CC2 fault	
701304	CC1: Chip conveyor motor protection triggered	
701305	CC1: Chip conveyor overload	
701306	CC6: Strap hinge conveyor, motor protection triggered	
701307	CC6: Strap hinge conveyor, lift pump motor protection triggered	
701308	CC6: Strap hinge conveyor, ultrasound sensor error	
701309	Chip conveyor long CC1 fault - not running	
701310	Chip conveyor long CC2 fault - not running	
701332	CLS: External cooling filter not OK	
701333	CLS: Internal cooling filter not OK	
701334	CLS: Tile drive fault	
701335	CLS: Tile end reached	
701336	CLS: Clean water tank flooded	

701337	CLS: Insufficient coolant, clean water tank
701338	CLS: KF filter flooded
701339	CLS: Insufficient coolant pre-warning
701342	CC3: Chip conveyor transverse, flood level in work area
701348	CC6: Strap hinge conveyor, contactor switch error
701349	CC6: Strap hinge conveyor, overload (Alarm Cancel)
701350	CC6: Strap hinge conveyor, flood level

9.3.1 Error messages / Error codes with signal lamps

No.	Description	Signal lamp
700120	Main spindle: STOP	Yellow
700121	Machine: Compressed air supply 1 not OK	Yellow
700216	Pneumatic: Measuring system cleaning pressure not OK	Yellow
700300	Main spindle: Error when tensioning/disengaging the tool	Yellow
700425	Switch cabinet: Control transformer motor protection and circuit breaker triggered upstream of MS	Yellow
700500	Main spindle: Excess temperature	Yellow
700501	Main spindle: Cooling unit flow monitor fault	Yellow
700502	Main spindle: Cooling unit collective fault	Yellow
700503	Main spindle: Cooling unit, minimum level not OK	Yellow
700504	Main spindle: Cooling unit air filter not OK	Yellow
700506	Main spindle: Cooling unit, minimum level, pre-warning	Yellow
700507	Main spindle: Oil-air lubrication faulty or switched off	Yellow
700508	Drives: X11 axis motor temperature warning	Yellow
700509	Drives: Y11 axis motor temperature warning	Yellow
700510	Drives: Z11 axis motor temperature warning	Yellow
700511	Drives: A11 axis motor temperature warning	Yellow
700512	Drives: C11 axis motor temperature warning	Yellow
700513	Drives: SP1 axis motor temperature warning	Yellow
700514	Drives: TM11 axis motor temperature warning	Yellow
700515	Drives: X12 axis motor temperature warning	Yellow
700556	Central lubrication: Lubricant pressure fault	Yellow
700557	Central grease lubrication: Minimum level	Yellow
700600	Switch cabinet: Switch cabinet cooling units fault	Yellow
700603	Switch cabinet: Doors not closed	Yellow
700604	Switch cabinet: CSM module supply circuit breaker triggered	Yellow
700605	Switch cabinet: Coupling/output supply circuit breaker triggered	Yellow
700606	Switch cabinet: PC1/PC2 supply circuit breaker (Smart Vision)	Yellow
700608	Switch cabinet: Circuit breaker before master switch triggered	Yellow
700609	Switch cabinet: 230V supply circuit breaker triggered	Yellow
700611	Switch cabinet: Input supply circuit breaker triggered	Yellow
700614	Switch cabinet: (Delayed) Output supply circuit breaker triggered	Yellow
700615	Switch cabinet: Output coupling circuit breaker triggered"	Yellow
700619	Switch cabinet: Hydraulic unit motor protection triggered	Yellow

700620	Switch cabinet: Central lubrication unit motor protection triggered	Yellow
700621	Switch cabinet: Chip conveyor motor protection triggered	Yellow
700622	Switch cabinet: Vacuum unit supply circuit breaker triggered	Yellow
700624	Switch cabinet: Spindle oil lubrication system motor protection/circuit breaker triggered	Yellow
700626	Switch cabinet: E/R module circuit breaker triggered	Yellow
700632	Hydraulic oil level too low	Yellow
700633	Hydraulic oil level pre-warning	Yellow
700634	Hydraulic oil temperature not OK	Yellow
700642	Probe: Battery not OK	Yellow
700643	Probe: Not ready for operation	Yellow
700730	Spindle: Vibration warning limit exceeded	red_flashing_200ms
700731	Spindle: Vibration alarm limit exceeded	red_flashing_200ms
700748	Vacuum in the machine: Vacuum not OK	Yellow
701208	CLS: Chip conveyor transverse, overflow level reached	red_flashing_200ms

10. Cleaning and looking after the machine

	⚠ CAUTION **Cleaning and looking after the machine!** Failure to observe the following measures may result in injuries and/or damage to the machine. ➢ Wear personal protective equipment to prevent injury. ➢ Observe the safety measures to avoid damaging the machine.

- See (Safety section)

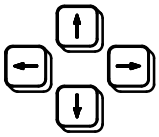
10.1 Daily, at the end of work

10.1.1 Preparing the machine

Prior requirement:

- [53] set to " 0 "
- Program end

Procedure:

1. Press
2. Horizontal soft keys
   Press Program
3.  Position cursor in menu window Program ENDOFSHIFT

4. Vertical
   soft keys
   Press Execute

5. Press

6. Press

Correct outcome:

7. → Program end
   → Spindle without tool.
   → CNC axes in cleaning position

8. Press → Safety equipment unlocked

9. Press → Tool magazine doors unlocked

10. Press [70]

    → Drives are switched off
    → Program content and data remain saved

	NOTE
	Misuse may cause PC errors. The PCs may not be able to ramp up properly and may switch to error mode. ➢ Shut down all additional PCs on the machine properly before turning off the master switch.

11. Turn [15] to " 0 " and padlock
→ Machine and control unit are voltage free

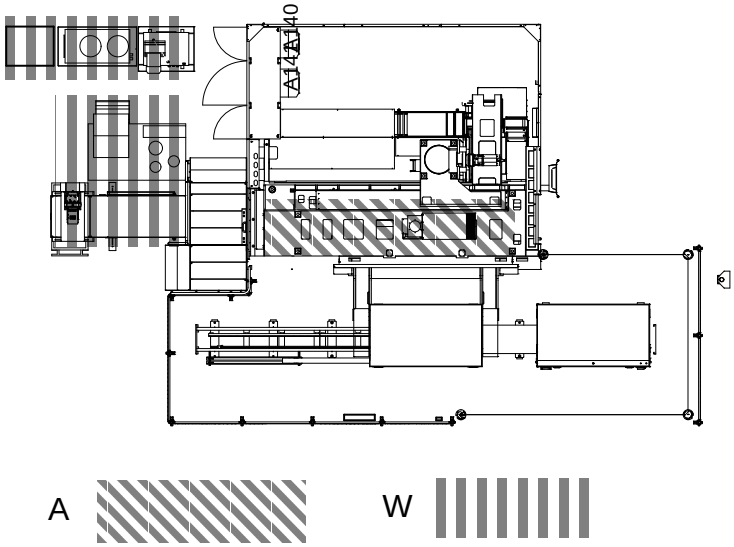
12. Turn off master switches on all peripherals and padlock.

10.2 Cleaning the machine

	⚠ CAUTION
	Cleaning the machine. Failure to observe the following measures may result in injuries. ➢ Wear personal protective equipment.

	NOTE
	Cleaning the machine. Failure to observe the following measures may result in damage to the machine. ➢ Do not used compressed air to clean the machine. ➢ Do not used compressed air to clean the spindle. ➢ Remove any product residue. ➢ Roughly clean with brush, paintbrush. ➢ Then use an industrial vacuum cleaner. ➢ Inspect the machine/system to make sure it looks clean. ➢ Observe the individual notes; check critical points and problem areas. ➢ Keep solvents away from seals and bearings. ➢ Only use lint−free cleaning materials, e.g. cotton waste. ➢ Observe any notes and product data sheets of cleaning agent manufacturers when using the cleaning agents, and make sure the cleaning agents are properly disposed of.

10.2.1 Overview of the machine



Key	No.	Explanation
A		Working area
W		Maintenance area

10.2.2 Cleaning the machine

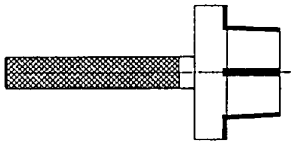
10.2.2.1 Working area

	NOTE
	Cleaning the tool control. The use of sharp objects when cleaning may damage the tool control. ➢ Do not use sharp objects when cleaning.

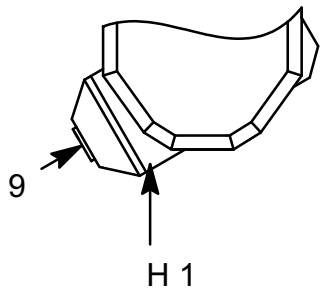
Procedure:

1. Clean the machine.

2. Main spindle cone (9)



Clean with cone wiper.



3. Maintenance works
   on the main spindle (H 1)
   (User guide, Section 15)

10.2.2.2 Maintenance area

	NOTE
	Cleaning the collecting basins. ➢ Make sure disposal of the content of the collecting basins (e.g. chips) is safe and environmentally compatible. **Cleaning the chip conveyor.** ➢ Observe the manufacturer's specifications. **Cleaning in the area behind of the working area** ➢ Check if it is necessary to clean. When needed clean. Attention: Reinstall the protective device correctly .

Procedure:

1. Clean the machine.
2. Ensure safe and environmentally compatible disposal of the drip trays.

10.3 Cooling lubricant system (CLS)

	NOTE
	Cooling lubricant system. The chip conveyor [56] is connected to the master switch for the cooling lubricant system.

- Observe the manufacturer's specifications. (Appendix).

Procedure:

1. Turn the master switch for the cooling lubricant system to "0" and padlock (User guide, Section 15)

10.4 Instructions for cleaning PC panes

The foils are surface treated and therefore easy to clean. Nevertheless, the following must be observed:

NOTE

When cleaning.

Please observe the following points when cleaning the foil-coated surfaces to ensure good visibility through the windows at all times.

- Once the foil has been attached, it must **not** be **touched** for the first two or three days.
- Visual impairment may occur during the first one or two months. This impairment takes the form of opaque areas that quickly disappear as the remaining gas diffuses out through the foil.
- Virtually any standard cleaning agent or alcohol solution can be added to water to clean the foil. Do not, however, **under any circumstances** use abrasive cleaners or agents containing ammonium.
  We recommend Hebro special cleaning agent, type 91-127
- Also use clean paper towels to clean and wipe the foil.
- You can then dry the window with a rubber wiper, as usual. **Please always make sure that the cleaned surface is still wet before wiping with a wiper.** Please be particularly careful when cleaning the foil edges and joints. If using a lambskin wiper, make sure it is clean. If using a rubber wiper, make sure it has **no sharp edges** protruding and the lip is flawless.
- We advise against advertising stickers or self-adhesive foils.

10.5 After cleaning

Procedure:

1. Maintenance works to be performed by owners.
   See (↗ Section 11)

2. Close door, engage door lock switches [61]

10.5.1 On-off valve [8.5]

	NOTE
	Insufficient operating pressure. Make sure the operating pressure from the central network is adequate. ➢ Monitor operating pressure.

- See (↗ 1.17)

Procedure:

1. Block / connect compressed air (8D).

11. Maintenance and servicing

11.1 Maintenance

	⚠ CAUTION
	Maintenance of the machine! Failure to observe the following measures may result in injuries and/or damage to the machine. ➢ Wear personal protective equipment to prevent injury. ➢ Observe the safety measures to avoid damaging the machine.

	NOTE
	Maintenance. Entitlement to warranty performance is subject to performance and written records of all maintenance works and services. The following maintenance works may only be performed by technical customer service. ➢ Changing hydraulic oil and filter; venting hydraulic system. ➢ Central grease lubrication; changing dosage. ➢ Leaking tool spray unit. ➢ Changing coolant. ➢ Leaking spindle cooling unit, switch cabinet cooling unit or cooling system.

	NOTE
	Cleaning the machine. Failure to observe the following measures may result in damage to the machine. ➢ Do not used compressed air to clean the machine. ➢ Do not used compressed air to clean the spindle. ➢ Remove any product residue. ➢ Roughly clean with brush, paintbrush. ➢ Then use an industrial vacuum cleaner. ➢ Inspect the machine/system to make sure it looks clean. ➢ Observe the individual notes; check critical points and problem areas. ➢ Keep solvents away from seals and bearings. ➢ Only use lint−free cleaning materials, e.g. cotton waste. ➢ Observe any notes and product data sheets of cleaning agent manufacturers when using the cleaning agents, and make sure the cleaning agents are properly disposed of.

Technical customer service

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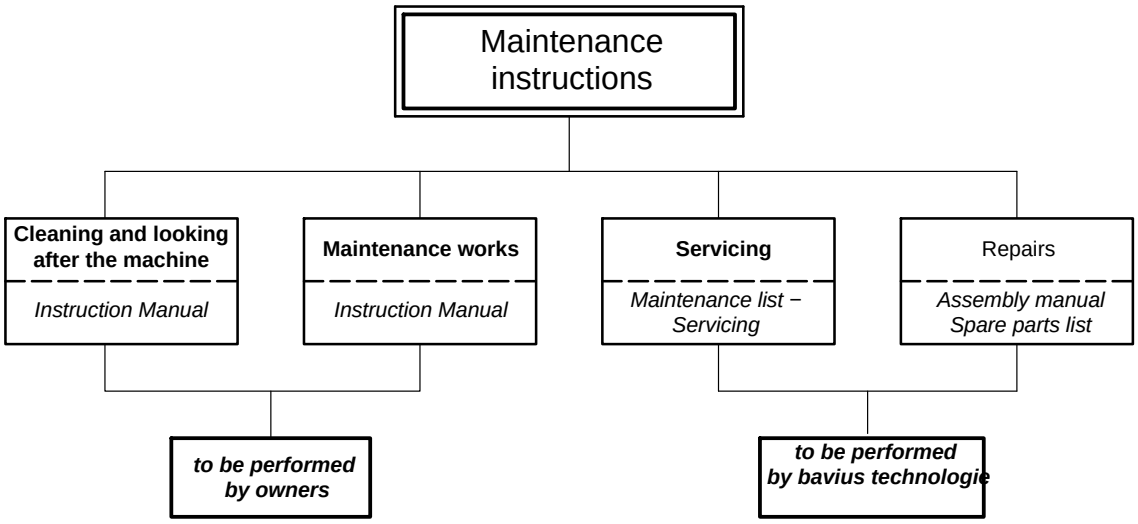
11.2 Overview: Maintenance instructions



11.2.1 Servicing at regular intervals

(every 8 hours of operation)

Designation	Tasks
Central oil lubrication, spindle [1.1]	Check level in tank, replenish if necessary (↗ 11.3 Lubrication and maintenance instructions).
Lubricating system, oil + air [1] Oil tank [1.1.1]	(↗ 11.3 Lubrication and maintenance instructions). Check level in tank, drain if necessary (↗ 11.7.1.1.1).
Spindle cone [9]	Clean (↗ Lubrication and maintenance instructions).
Vacuum pumps [10]	Check level in tank, replenish if necessary (↗ 11.3 Lubrication and maintenance instructions).

Designation	Tasks
Cooling lubricant system [90]	Check level in tank, replenish if necessary (Lubrication and maintenance instructions).
Spindle	Thru-coolant unit: Visual inspection of leckage
Chip conveyor [56]	Check level in tank, drain if necessary

(every 40 hours of operation)

Designation	Tasks
Vacuum	Check the level of the droplet separa-tor and drain if necessary.
Suction unit [12]	Control the filter elements. If neces-sary clean or change.
Cooling unit for spindle [5]	Check level in tank, replenish if necessary

(every 160 hours of operation)

Designation	Tasks
Guide rail and carriage	Clean from grease
Vacuum	Clean the prefilter Clean the inspection glass for the droplet separator, the fine filter and the evacuation inspection glass.

(every 400 hours of operation)

Designation	Tasks
Lubricating system, oil + air [1] Oil filter element [1.1.5]	(↗ 11.3 Lubrication and maintenance instructions). Check filters
Hydraulic unit [2]	Check level in tank, replenish if necessary (↗ 11.3 Lubrication and maintenance instructions).
Central lubrication, oil or grease [4]	Check level in tank, replenish if necessary (↗ 11.3 Lubrication and maintenance instructions).
Cooling unit for spindle [5]	Check level in tank, replenish if necessary (↗ 11.3 Lubrication and maintenance instructions).
Chip conveyor [56]	Visual inspection (↗ Lubrication and maintenance instructions).
Switch cabinet cooling unit [89]	Check (↗ Lubrication and maintenance instructions).
Maintenance units Check settings	Check pressure on control valve, adjust if necessary (↗ Lubrication and maintenance instructions).
Tool control[97]	Clean shutter Check pressure on control valve, adjust if necessary Check filter, change if necessary (↗ Lubrication and maintenance instructions).
Vacuum	Overall system test run
Cooling lubricant system[90]	Remove level sensors and clean

(every 2000 hours of operation, or once a year)

Designation	Tasks
Vacuum pumps [10]	Change oil and filter (↗ 11.3 Lubrication and maintenance instructions).
Positioning unit [76] for tool magazine Positioning unit [76.2] (option) for tool magazine	Grease lubricating point until lubricant emerges (↗ 11.3 Lubrication and maintenance instructions).
Cooling lubricant system [90]	Change coolant (↗ 11.3 Lubrication and maintenance instructions).
Energy supply chains	Visual inspection (↗ 11.3 Lubrication and maintenance instructions).
Chip conveyor [56]	Check of leakproof, damage and corrosion.
Spindle cooling unit [5]	Change coolant (↗ 11.3 Lubrication and maintenance instructions).

(once a year)

Designation	Tasks
Hydraulic unit [2]	Change hydraulic oil (↗ 11.3 Lubrication and maintenance instructions).

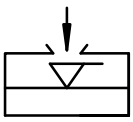
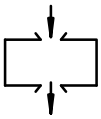
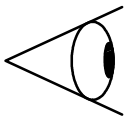
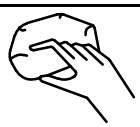
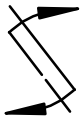
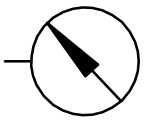
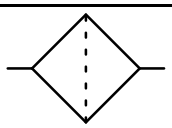
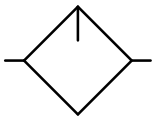
(every 4000 hours of operation)

Designation	Tasks
Lubricating system, oil + air [1]	(↗ 11.3 Lubrication and maintenance instructions).
Fine filter [1.1.2]	Check fine filter, replace if necessary (↗ 11.7.1.1.2)

11.3 Lubrication and maintenance instructions

Explanation of symbols (see 11.3.1).

11.3.1 Explanation of symbols

Symbol	Explanation
	Replenish
	Replace contents
	Visual inspection
	Clean
	Replace
	Pressure gauge (pressure measurement))
	Filter
	Oiler
	Information (IM)
	Can
	Grease press

Symbol	Explanation
	Oil can
	Drain

11.4 Maintenance works

	NOTE
	Maintenance works. Maintenance works keep the machine functioning flawlessly. ➢ Maintenance works must be performed at fixed intervals.

- See (↗ Safety section) and (↗ 11.3).

11.4.1 Preparing the machine

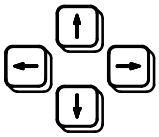
Prior requirement:

- [53] set to " 0 "
- Program end

Procedure:

1. Press

2. Horizontal soft keys
   Press Program

3. 
   Position cursor in menu window Program ENDOFSHIFT

4. Vertical soft keys
   Press Select

5. Press

6. Press

7. → Program end
   → Spindle without tool.
   → CNC axes in cleaning position

8. Press

   (70)
   → Drives are switched off
   → Program content and data remain saved

9. Press

10. → Doors in working area can be opened
    → LED above the button flashes

11. Open doors to working area

12. Press

13. → Doors to tool magazine can be opened
    → LED above the button flashes

14. Open doors to working area

	NOTE
	Misuse may cause PC errors. The PCs may not be able to ramp up properly and may switch to error mode. ➢ Shut down all additional PCs on the machine properly before turning off the master switch.

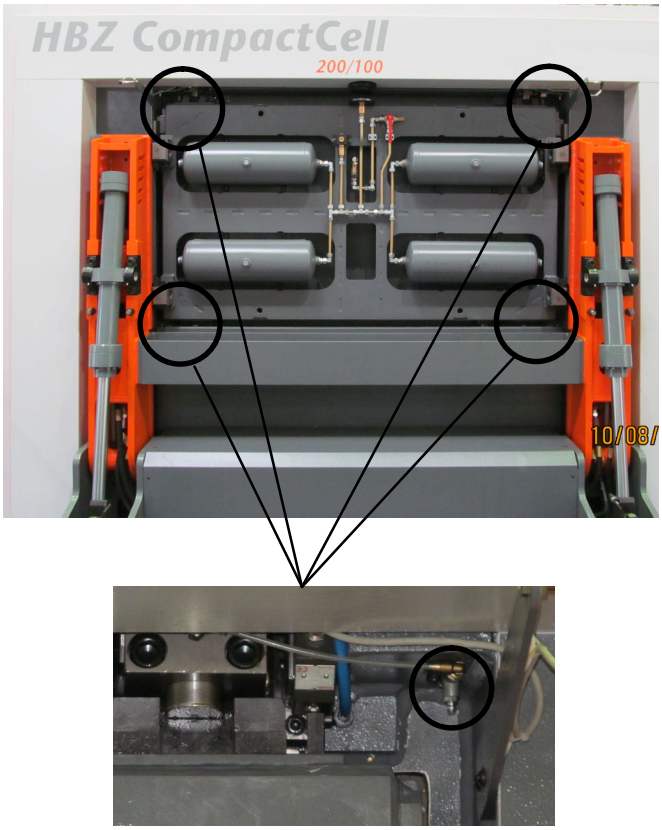
15. Turn [15] to " 0 " and padlock
    → Machine and control unit are voltage free

16. Turn off master switches on all peripherals and padlock.

11.5 Performing the maintenance works

	NOTE
	Cleanliness is key! Avoiding damage. ➢ The oil or grease you use must be free of dirt or particles. ➢ Ensure absolute ➢ Adhere to the specified sequence.cleanliness when filling.

11.5.1 Wedge clamp HBZ



Key	No.	Explanation
1		Wedge clamp
2		Lubrication nipple

11.5.1.1 Materials to use

Key	No.	Explanation
1		Greas press
2		Grease based on mineral oil Example: Renolit LZR 2H
3		Cleaning supplies

11.5.1.2 Carrying out the work

Prior requirement:

- No pallet in working position

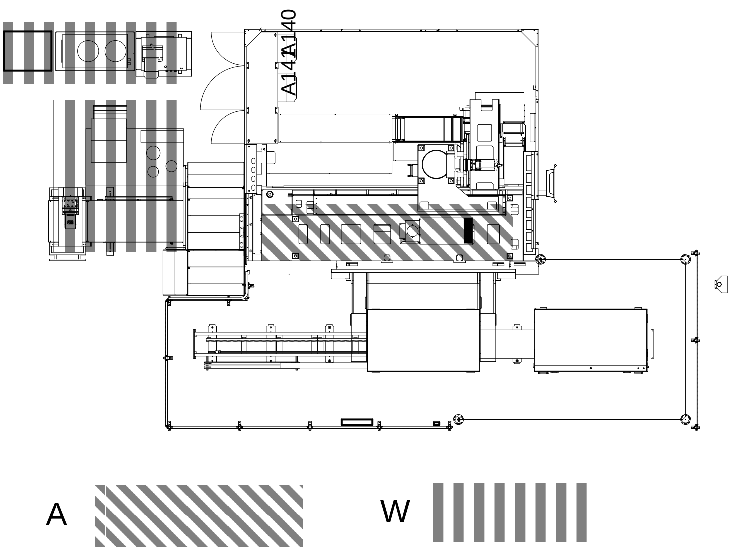
Procedure:

1. Connect grease press with the lubrication nipple
2. Move the grease press
3. Check until grease comes out of the lubrication nipple.
4. Disconnect grease press with the lubrication nipple
5. Repeat at all lubrication nipple

11.6 Performing the maintenance works

	NOTE
!	**Cleanliness is key!** Avoiding damage. ➢ The oil or grease you use must be free of dirt or particles. ➢ Ensure absolute ➢ Adhere to the specified sequence.cleanliness when filling.

11.6.1 Executing the maintenance works



Pos.	No.	
A		Working area
W		Maintenance area

11.6.1.1 Tool control [97]

	NOTE
	Damage to front glass. The front glass may be damaged if not cleaned properly. ➢ Do not use sharp objects to clean the front glass.

- Observe the manufacturer's specifications. (↗ Appendix).

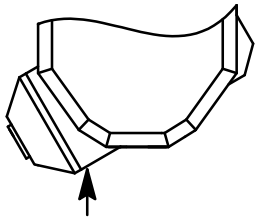
Service intervals	Tasks
400 h	Clean the shutters
400 h	Check pressure control valve settings, adjust if necessary
400 h	Check filter, replace if necessary

11.6.1.2 Maintenance works on the main spindles

- Observe the manufacturer's specifications. (Appendix).

Procedure:

1. Maintenance works
   on the main spindle (H 1)
   (H1 user guide, Section 15)



Service intervals	Tasks
Daily	Check rotation, visually inspect for leakages
Weekly	Check lip seal on clamping cone, replace if necessary Visually inspect the collet chuck
Monthly	Check "E.M." setting Check tensioning and pull-in force
Every three months	Replace the lip seal

11.6.1.3 Checking the energy supply chains

	⚠ CAUTION
	Checking the energy supply chains. Risk of injury. ➢ Be careful and watchful.

1. Visual inspection of all energy supply chains.

Service intervals	Tasks
2000 h or Once a year	Visual inspection

2. If you notice anything unusual, take a photo and send it for analysis to:

Technical customer service

Bavius technologie gmbh
Eisenbahnstrasse 17
88255 Baienfurt
Deutschland
Telephone: + 49 (0) 751 5079-926
Fax: + 49 (0) 751 5079-845
service@bavius-technologie.com

11.6.1.4 Chip conveyor [56]

	WARNING
	Risk of crushing! There is a risk of crushing when working on the chip conveyor. ➢ Do not reach into the chip conveyor.

	CAUTION
	Risk of crushing or cuts! There is a risk of cuts when working on the chip conveyor. ➢ Wear protective gloves.

- Observe the manufacturer's specifications. (Appendix).

Service intervals	Tasks
Daily	Empty the collecting tray
Every three months	Check the conveyor chain tension, grease if necessary Check the conveyor chain for damage Drive chain: Check tension Check the slotted filter, slotted sieve, lath brushes for dirt and damage Dismantle and clean the floating switch level regulator, sensors
Every six months	Motor circuit breaker: Functional test Electric cables: Check for breakage and damage
Once a year	Check containers for leakages, damage and corrosion

11.6.1.5 Vacuum unit

- Observe the manufacturer's specifications. (see Appendix).

Service intervals	Tasks
Weekly	Check drip separator level via inspection window, drain if necessary
Monthly	Clean prefilter Clean inspection window, drip separator, fine filter and draining inspection window
Every three months	Test run the entire system
Once a year	Check fine filter, replace if necessary

11.6.1.6 Suction unit [12]

- Observe the manufacturer's specifications. (see Appendix).

Service intervals	Tasks
Weekly	Check the filter elements, clean or replace if necessary

11.6.1.7 Cooling lubricant system [90]

- Observe the manufacturer's specifications. (see Appendix).

Service intervals	Tasks
Monthly	Check belt tension at fleece filter and tensioning shaft
Every three months	Dismantle and clean level sensors
Every six months	Dismantle and clean sensors, floating switches Clean fleece sensor Electric cables: Check for breakage and damage Motor circuit breaker: Functional test
Once a year	Discharge scoops, wipers, O ring wipers: Check for wear and damage Coolant tank: Clean, check for leakages, damage and corrosion

11.6.1.8 Spindle cooling unit [5]: Check display and flow monitor

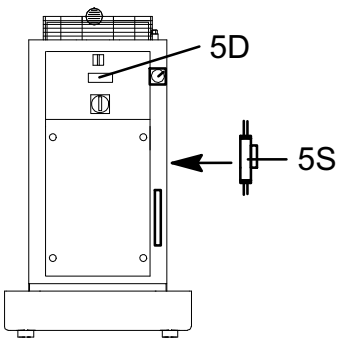
Procedure:

1. Visual inspection
   Display [5D]

   Set value (see Fluid plan)!

2. Visual inspection
   Flow monitor [5S]

   Set value (see Fluid plan)!



	WARNING
	Error messages may occur. Rectify notified errors. ➢ Contact technical customer service if error messages occur repeatedly.

- See (Safety section)

	NOTE
	Condensation. Condensation may form on lines and connections in certain climate conditions.

- Observe the manufacturer's specifications. (see Appendix).

Service intervals	Tasks
Weekly	Coolant level
Monthly	Filter mat (optional) Coolant: Check coolant circuit for dirt and possible solids (chips, etc.) Externally and visually check tank, components and all connections (piping, valves, hoses) in the consumer circuit for leakages
Every three months	Clean the condenser (air cooled reverse cooling unit) and fins with compressed air or brush
Every six months	Check the noise level of the condenser fan (air cooled reverse cooling unit)
Once a year	Replace coolant Check condenser (water cooled reverse cooling unit) for sufficient flow

11.6.1.9 Switch cabinet cooling unit [89]

	NOTE
	Malfunctions. All malfunctions of the switch cabinet cooling unit are recorded. ➢ Possible malfunctions are listed as errors.

- Troubleshooting (see Appendix, manufacturer's specifications)
- Observe the manufacturer's specifications. (see Appendix).

Service intervals	Tasks
2000 h	- Check level of soiling - Is the filter dirty? Replace the filter if necessary. - Are the cooling fins dirty? Clean if necessary. - Activate test mode; is the cooling function working properly? - Check noise levels of the compressor and ventilators.

11.7 Checking levels and filters

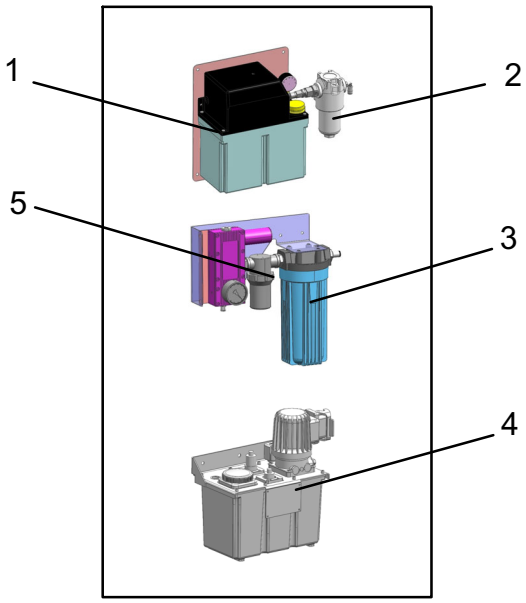
11.7.1 Lubricating system, oil + air [1]

WARNING

The lubricating system is a hazardous area.

Risk of injury from oil/air pressure.

➢ System pressure must be released before working on the oil/air lubricating system.

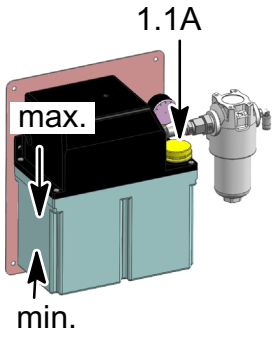


Key	No.	Explanation
1	1.1	Lubricating unit, oil + air
2	1.1.5	Oil filter element
3	1.1.1	Oil tank
4	4	Central lubrication, oil + grease
5	1.1.2	Fine filter

11.7.1.1 Lubricating unit, oil + air [1.1]

Procedure:

1. Check level in tank,
   replenish if necessary
2. Open the cap [1.1A].
3. Fill oil to max. level
   (see Overview of lubricants).
4. Close the cap [1.1A].

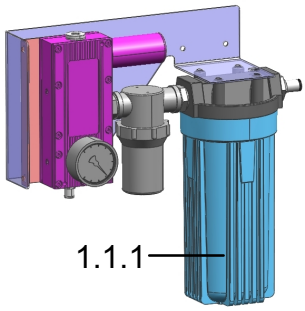


	NOTE
	Changes in dosage. May only be performed by authorised technicians. ➢ Request technical customer service

11.7.1.1.1 Oil tank [1.1.1]

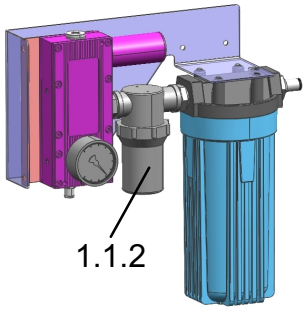
Procedure:

1. Check level in oil tank [1.1.1],
   drain if necessary.
2. Switch off or interrupt air supply [8D]
   (see 11.8.1).
3. Unscrew oil tank [1.1.1] clockwise.
4. Drain and dispose of oil.
5. Screw oil tank [1.1.1] back on anti-clockwise.
6. Reconnect air supply [8D]
   (see 11.8.1).



11.7.1.1.2 Fine filter [1.1.2]

Procedure:



1. Check fine filter [1.1.2],
   replace if necessary.

2. Switch off or interrupt air supply [8D]
   (see ↗ 11.8.1).

3. Unscrew fine filter [1.1.2] clockwise.

4. Drain and dispose of fine filter [1.1.2].

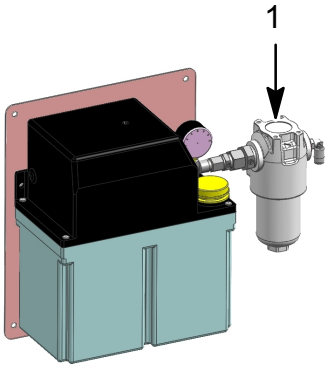
5. Insert new fine filter [1.1.2].

6. Screw fine filter [1.1.2] back on anti-clockwise.

7. Reconnect air supply [8D]
   (see ↗ 11.8.1).

11.7.1.1.3 Oil filter element [1.1.5]

Procedure:



1. Check display (1).
   • green = Filter ok
   • red = Replace filter
   (see ↗ Spindle IM 6.3.1)

11.7.1.2 Hydraulic unit [2]

WARNING

The lubricating system is a hazardous area.

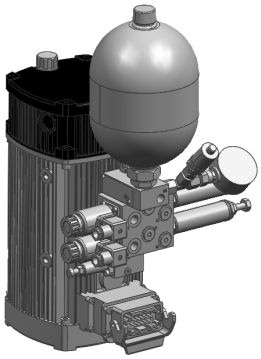
Risk of injury from oil/air pressure.

➢ System pressure must be released before working on the hydraulic unit.

Procedure:

1. Check level in inspection window, replenish if necessary

2. Unscrew cap (2A) anti-clockwise



NOTE

Fill oil.

Use funnel.

➢ We recommend using a funnel with a sieve mesh of 0.4 mm.

3. Fill oil to max. level
   (see Overview of lubricants).

4. Screw cap (2A) back on clockwise

	NOTE
	If the hydraulic unit or system is leaking: Request technical customer service. ➢ Replace the hydraulic oil and filter, and vent the hydraulic system at fixed intervals.

- (see ➚ 11.3 Lubrication and maintenance instructions).

11.7.1.3 Central lubrication, grease [4]

NOTE

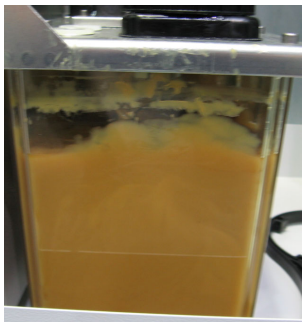
Avoiding damage

The lubricant can segregate (Oil separates from the fat) and have air pockets (Foto No 1)
Control if there is a seperation

➢ Before filling the lubricant in the tank segregate the lubricant by stirring (p. e. with a flexible plastic rod)

1

1



2

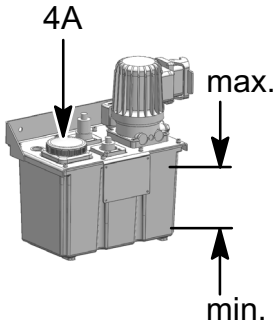
3

Key	No.	Explanation
1		Situation previously, Oil separates from the fat
1		Situation previously, air pocket

Key	No.	Explanation
2		Situation afterwards, fat mixed well
3		Segregate the lubricant by stirring with a flexible plastic rod.

Procedure Refilling:

1. Check level in tank, replenish if necessary
2. Unscrew cap (4A) anti-clockwise
3. Fill grease to max. level (see Overview of lubricants)
4. Screw cap (4A) back on clockwise



NOTE

Changes in dosage.

May only be performed by authorised technicians.

➢ Request technical customer service

11.7.1.4 Spindle cooling unit [5]

	⚠ CAUTION
	Type and source of danger. Possible consequences ➢ Use a red-white safety chain to cordon off the working area, and hang a warning sign. ➢ Wear protective goggles and gloves. ➢ Do not inhale freon vapour. ➢ Avoid skin contact with liquid coolant. ➢ Observe the safety data sheets for the fluids. ➢ Cleanliness is key.

Procedure:

1. Check level in inspection window,
   replenish if necessary

2. Unscrew cap (5B)
   anti-clockwise
   (see ➚ 15 Appendix).

3. Connect funnel with hose
   to filling port (5B)

4. Fill coolant to max. level
   (see ➚ Overview of cooling lubricants).

5. Screw cap (5B) back on clockwise

	NOTE
	If the cooling unit or cooling system is leaking: Request technical customer service. ➢ Check and replace coolant at fixed intervals.

- See (Lubrication and maintenance instructions)

11.8 Checking pressure settings and adjusting if necessary

NOTE

Checking/adjusting maintenance units.

These tasks may only be performed by two specially trained and instructed technicians.

These people must have been specially trained to deal with hazards.

➢ Activate Emergency OFF [symbol] [30] immediately in case of imminent danger.

Prior requirement:

- [53] set to " 0 "

Procedure:

1. Turn [15] to " I "
   → CNC control unit starts (automatically)
2. Turn [30] in the direction of the arrow to unlock
3. Press I [40]
4. Press
   → Doors to tool magazine can be opened.

	NOTE
	2nd person as a safeguard! For safety reasons, the 1st person stays at the control panel until the work is completed. ➢ The 1st person can then intervene quickly.

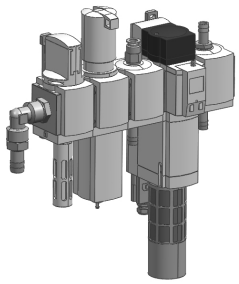
11.8.1 Maintenance unit [8] for compressed air

	NOTE
	Compressed air supply. Make sure the operating pressure from the central network is adequate. ➢ Check the set pressure.

Procedure:

1. Check the set pressure on the gauge:

   Set value (↗ > 6.5 bar)



- Adjust pressure:

2. Switch off or interrupt the air supply.

3. Before adjusting the air pressure, raise the catch, turn the adjusting screw (8A) anti-clockwise until the spring tension is released.

4. Connect the air supply and turn the adjusting screw clockwise until the gauge shows the correct pressure.

5. Then push the catch down to fix the setting.

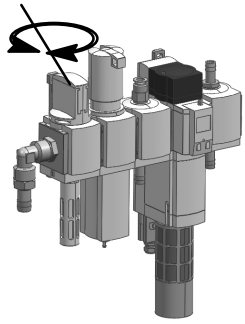
11.8.1.1 On-off valve [8.5]

	NOTE
	Compressed air supply. Make sure the operating pressure from the central network is adequate. ➢ Check the set pressure.

Procedure:

1. Block / connect compressed air (8D).

8.5D



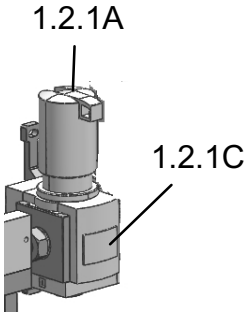
11.8.1.2 Pressure control valve [1.2.1] for sealing air

	NOTE
	Compressed air supply. Make sure the operating pressure from the central network is adequate. ➢ Check the set pressure.

Procedure:

1. Check the set pressure on the gauge [1.2.1C]:

   Set value (see Fluid plan).



- Adjust pressure:

2. Before adjusting the air pressure, raise the adjusting screw [1.2.1A] and turn anti-clockwise until the spring tension is released.

3. Turn the adjusting screw [1.2.1A] clockwise until the gauge [1.2.1C] shows the correct pressure.

4. Then push the adjusting screw [1.2.1A] down to fix the setting.

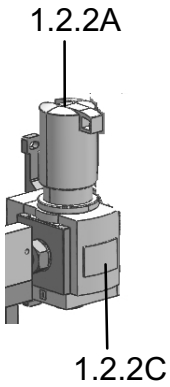
11.8.1.3 Pressure control valve [1.2.2] for oil/air lubricating system

	NOTE
	Compressed air supply. Make sure the operating pressure from the central network is adequate. ➢ Check the set pressure.

Procedure:

1. Check the set pressure on the gauge [1.2.2C]:

   Set value (see Fluid plan).



- Adjust pressure:

2. Before adjusting the air pressure, raise the adjusting screw [1.2.2A] and turn anti-clockwise until the spring tension is released.

3. Turn the adjusting screw [1.2.2A] clockwise until the gauge [1.2.2C] shows the correct pressure.

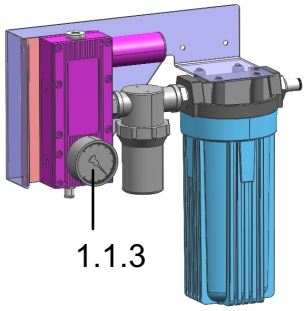
4. Then push the adjusting screw [1.2.2A] down to fix the setting.

11.8.1.4 Pressure gauge [1.1.3] for vacuum pump [10]

Procedure:

1. Check the set pressure on the gauge [1.1.3]:

   Set value (see Fluid plan).



11.8.1.5 Pressure control valve [1.1.4] for vacuum pump [10]

NOTE

Compressed air supply.

Make sure the operating pressure from the central network is adequate.

➢ Check the set pressure.

Procedure:

1. Check the set pressure on the gauge [1.1.4C]:

   Set value (see Fluid plan).

- Adjust pressure:

2. Before adjusting the air pressure, raise the adjusting screw [1.1.4A] and turn anti-clockwise until the spring tension is released.

3. Turn the adjusting screw [1.1.4A] clockwise until the gauge [1.1.4C] shows the correct pressure.

4. Then push the adjusting screw [1.1.4A] down to fix the setting.

11.8.2 Maintenance unit [8.1] for cleaning the measuring systems

NOTE

Compressed air supply.

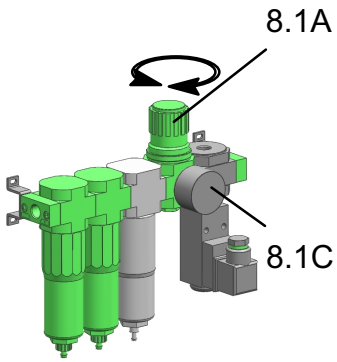
Make sure the operating pressure from the central network is adequate.

➢ Check the set pressure.

Procedure:

1. Check the set pressure on the gauge [8.1C]:

   Set value (see Fluid plan).



- Adjust pressure:

2. Before adjusting the air pressure, raise the adjusting screw (8.1A) and turn anti-clockwise until the spring tension is released.

3. Turn the adjusting screw [8.1A] clockwise until the gauge [8.1C] shows the correct pressure.

4. Then push the adjusting screw [8.1A] down to fix the setting.

11.8.3 Pressure control valve [8.8] for accelerator (ejector)

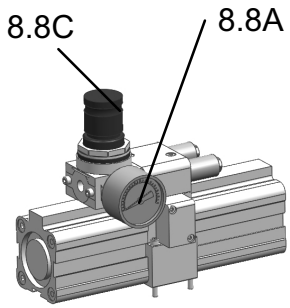
NOTE

Compressed air supply.

Make sure the operating pressure from the central network is adequate.

➢ Check the set pressure.

Procedure:



1. Check the set pressure on the gauge [8.8C]:

   Set value (see Fluid plan)!

- Adjust pressure:

2. Before adjusting the air pressure, raise the adjusting screw (8.8A) and turn anti-clockwise until the spring tension is released.

3. Turn the adjusting screw [8.8A] clockwise until the gauge [8.8C] shows the correct pressure.

4. Then push the adjusting screw [8.8A] down to fix the setting.

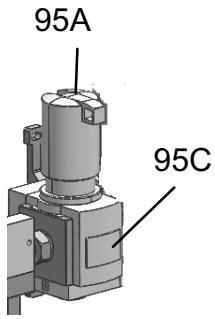
11.8.4 Pressure control valve [95] for cleaning the tool taper

	NOTE
	Compressed air supply. Make sure the operating pressure from the central network is adequate. ➢ Check the set pressure.

Procedure:

1. Check the set pressure on the gauge [95C]:

   Set value (see Fluid plan)!



- Adjust pressure:

2. Before adjusting the air pressure,
   raise the adjusting screw (95A) and turn
   anti-clockwise until the spring tension is released.

3. Turn the adjusting screw [95A] clockwise
   until the gauge [95C] shows the correct pressure.

4. Then push the adjusting screw [95A] down to fix the setting.

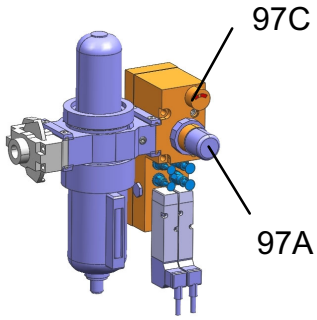
11.8.5 Maintenance unit [97] for tool control

	NOTE
	Compressed air supply. Make sure the operating pressure from the central network is adequate. ➢ Check the set pressure.

Procedure:

1. Check the set pressure on the gauge [97C]:

   Set value (see Fluid plan)!



- Adjust pressure:

2. Before adjusting the air pressure, raise the adjusting screw (97A) and turn anti-clockwise until the spring tension is released.

3. Turn the adjusting screw [97A] clockwise until the gauge [97C] shows the correct pressure.

4. Then push the adjusting screw [97A] down to fix the setting.

12. Technical appendix

12.1 Accessories

NOTE

Accessories.

When using accessories, please note:

➢ Only use original bavius technologie accessories.

Number	Designation
1	Cone wiper for cleaning the spindle cone
1	Key (double bit) for switch cabinet
1	Set of hexagon key wrenches 1.5 - 10 mm
1	Triangular key for spindle cooling unit
1	Hand grease press

12.1.1 Cooling unit [89] for switch cabinet

- Product information (Appendix).

12.2 Further accessories (option)

12.2.1 Cooling lubricant system [90]

- Product information (Appendix).

12.2.2 Tool control [97]

- Product information (Appendix).

12.2.3 Chip conveyor [56]

- Product information (Appendix).

12.2.4 Suction unit [12]

- Product information (Appendix).

12.2.5 Probe [23]

- Product information (Appendix).

12.2.6 Protractor head 90°

	NOTE
	Protractor head 90°. Machining processes at levels 1 - 5 only with this protractor head. The protractor head must be positioned in the appropriate slot on the tool magazine and the tool number of the protractor head entered in the machining program. Max. spindle speed is (depending on type) rpm anti-clockwise. Feed must be adjusted to match the lower spindle speed.

Technical data
Drawing no. 40 300 14 098

- Milling and drilling only are possible with the protractor head.

12.2.7 HAPA protractor head

	NOTE
	bavius protractor head. Machining processes at level 6 only with this protractor head. The protractor head must be positioned in the appropriate slot on the tool magazine and the tool number of the protractor head and level 6 must be entered in the machining program. Max. spindle speed is (depending on type) rpm anti-clockwise. Feed must be adjusted to match the lower spindle speed.

Technical data
Drawing no. 50 100 99 003

- Milling and drilling only are possible with the protractor head.

12.2.8 Handheld terminal [64]

Please see operating manual for this ↗ SINUMERIK 840D.

12.3 Circuit diagram

	NOTE
	Circuit diagram. The circuit diagram for the machine is located in the pocket inside the switch cabinet.

12.4 Equipment list

	NOTE
	Equipment list. The equipment list for the machine is located in the pocket inside the switch cabinet, together with the circuit diagram.

13. Lubricants and fluids

	NOTE
	Use of fluids, lubricants Observe the following measures to avoid causing damage: ➢ Do not mix fluids, lubricants. ➢ When changing fluids, thoroughly clean the lubricant container and the entire system (e.g. lines, spray nozzles). ➢ Extract from the overview of bavius technologie gmbh products (recommendation). ➢ The manufacturer's list does not constitute an evaluation. ➢ Nor does it claim to be exhaustive. ➢ The corresponding safety data sheets must be observed.

13.1 Lubricants

13.1.1 Lubricants used for the first time

Unit	Manufacturer	Name of product
Positioning unit [76] for TCS magazine	FUCHS MINERALOELWERKE GMBH	RENOLIT LZR 2 H Grease code as per DIN 51502 KP 2 N-30 and/ or ISO 6743-9 ISO-L-X-CDIB 2 Water hazard class 1 VwVwS annex 4
HTS tensioning block	Techno Service GmbH	Metaflux Moly−Spray Water hazard class 1 VwVwS annex 4 Metaflux Gleit−Metall Paste Water hazard class 1 VwVwS annex 4

13.2 Fluids

13.2.1 Fluids used for the first time

Unit	Manufacturer	Name of product
Grease central lubrication [4]	FUCHS MINERALOELWERKE GMBH	Renolit SF 7−041
Spindle lubrication [1]	Bucher AG CH-4900 Langenthal	Spindle Lube ISO VG 68 HyperClean 13/10 Water hazard class 2 VwVwS annex 4
Hydraulic unit [2]	FUCHS MINERALOELWERKE GMBH	RENOLIN D 15 VG 46 Water hazard class 1 VwVwS annex 4
Vacuum pump	FUCHS MINERALOELWERKE GMBH	Divinol Spezial 2000 HD 30 Water hazard class 2 VwVwS annex 4
Spindle cooling unit [5]	Bucher AG, CH-Langenthal	Coolelf Supra Water hazard class 1 VwVwS annex 4
Cooling lubricant system [90]	Deutsche Castrol Industrieoel GmbH	Castrol Alusol MF−X 10 % with waterr Water hazard class 1 VwVwS annex 4
Gear oil	BP Europa Mönchengladbach	Alpha SP 150 Water hazard class 1 VwVwS annex 4

Cooling lubricants:
for cooling lubricant cleaning systems only
(not minimal quantity lubrication system)

Specifications

Care must be taken to ensure that only lubricants with clear indication in respect of the following parameters, i.e. with specific test results are used:

- Specifications regarding concentration
- Information about corrosion protection
- Information about paint compatibility
- Information about non-ferrous metal compatibility
- Information about microbiological stability

Requirements

- Must comply with the requirements of the Technical rules for hazardous substances (TRGS) 611.
- Water soluble chlorine-free cooling lubricant containing mineral oil.
- Low foaming at recommended concentration.
  If cooling lubricant foams, use necessarily adequate defoamer.
- Free of aggressive or harmful additives.
- Good skin tolerance thanks to use of selected raw materials.

Technical data

• Mineral oil content Vol.%	>25 %	Tested to DIN 51 417-2
• pH value	min. 8.6 max. 9.6	Tested to DIN 51 369
• Corrosion protection	Grade 0 must be achieved at concentration of max. 15 % Tested to DIN 51 360/2	

- Recommended concentration: 5 - 10 %
- Mixing water (must be equivalent drinking quality):
  1. Total hardness (calcium, magnesium) 8 - 15 °dH
  2. pH value 6,0 - 8,0

Checking

	NOTE
	Checking of the cooling lubricants: To avoid damage, the following measures must be observed: ➢Checking the cooling lubricants according to TRGS 611. Summary of TRGS 611 Edition May 2007: 5.9 pH: The pH of the used water-mixed cooling lubricant must be checked weekly , 5.3 **Monitoring the nitrite content** (1) As a matter of principle, nitrite must be measured on a weekly basis in the used water-mixed cooling lubricant. 2) If regular checking of the used emulsion or solution and corresponding documentation of the measured values are ensured, in the case of continued low nitrite values (three times in succession under 10 mg nitrite/l), a longer measurement interval (maximum 4 weeks) can be laid down for the measurement of nitrite. In the case of values above 10 mg nitrite/l, it is necessary to revert to the weekly measurement interval. Attention is drawn to the recommendations for tests to check used water-mixed cooling lubricants that are provided in Rule 143 of the German Statutory Accident Insurance Institutions [22]. (3) If a value of 20 mg nitrite/l is exceeded, the water-mixed cooling lubricant must be changed in full or in part … Setpoints for weekly control with test strips: Nitrite < 20 mg Nitrite / l total hardness 0 - 15 °dH pH 8,6 - 9,6

Use

	NOTE **Use of cooling lubricants.** Observe the following measures to avoid causing damage: ➢ Read the tecnical information and safety data sheet for the cooling lubricant. ➢ Observe the specifications and regulations issued by the manufacturers of the cooling lubricants. ➢ Perform weekly inspections as per TRGS 611, BGR/GUV-R143. . ➢ Mix as specified by the manufacturers of the cooling lubricants. The mixing water must be equivalent to the quality specified above. Adhere to the specified temperatures when mixing. Concentrate and mixing water: minimum temperature +10 °C; maximum temperature +30 °C ➢ Only pour pre-mixed emulsion into the cooling lubricant tank to avoid the risk of corrosion. Never pour or replenish with plain water. ➢ Synthetic cooling lubricants generally do not offer optimum corrosion protection. If using synthetic cooling lubricants, make sure they offer good corrosion protection in order to avoid damaging the machine. ➢ Instruct the staff how to handle cooling lubricants, e.g. see trade association regulation BGR/GUV-R143.

Cleaning the cooling lubricant tank

	NOTE **Cleaning the cooling lubricant tank.** Observe the following measures to avoid causing damage: ➢ Since cleaning intervals are strongly dependent on the type of machining, material, type of cooling lubricant and number of operating hours, a generally valid specification is not possible. Cleaning intervals of 12 months are recommended as a guideline for one-shift operation (8 hours per day). ➢ Prior to re-filling the machine, fill it with diluted cooling lubricant (approx.1%) and flush for at least one hour. Then suction off the emulsion used for flushing and fill with the concentration required for operation. ➢ Remove any last trace of used cooling lubricant from the system and dispose of it properly. ➢ We recommend the use of special cleaning agents supplied by the manufacturers of the cooling lubricants.

Environmental protection, water protection:

	NOTE **Environmental protection, water protection.** Failure to observe may result in environmental or water pollution. ➢ When operating, shutting down or dismantling the system or parts of the system ensure compliance with local regulations governing the handling of substances that are hazardous to water.

General regulations

	NOTE
	Note on failure to observe. Failure to observe the specifications governing the use of lubricants may cause machine malfunctions or premature wear of machine parts. ➢ Do not mix different compositions of lubricants as this may lead to chemical reactions and adversely impair lubricant performance. ➢ Do not use cooling lubricants containing more than 15 Vol % flammable liquid as this would raise the potential risk of explosion or fire. The manufacturer of the machine cannot be held liable for damages (especially corrosion and leakages) to the machine or impaired performance caused during machining by the owner, especially ➢ If unsuitable cooling lubricants are used ➢ If the cooling lubricant is poorly or incorrectly serviced ➢ If unsuitable mixing water is used ➢ If the cooling lubricant is incorrectly replenished or filled ➢ If the system is incorrectly cleaned

Cooling lubricants recommended by bavius technologie gmbh

- See Instruction Manual, Section 13.

14. Spare parts catalogue

Preliminary remarks on the spare parts catalogue

The purpose of this spare parts catalogue is to assist when ordering spare parts; it is not suitable for use when assembling or dismantling the machine.

In order to identify the locations of spare parts, articles with item numbers may be listed that are not part of the spare parts consignment.

This spare parts catalogue contains the various assemblies comprising the machine. The installation data featured on the plate or list are needed for unambiguous order processing, and must be observed.

If products have been subsequently modified, the actual build status of the machine is decisive.

Computerised processing has necessitated the assignment of numbers to all parts, including non-drawing parts.
It makes sense to us to use these part numbers as identifying and order numbers for spare and wearing parts.
This spare parts catalogue contains the directly assigned part number.

We require the following information to enable rapid and reliable processing of your orders:

1. Machine type and number
2. Part number
3. Designation and dimensions
4. Quantity

Spare part service

Our spare part service is here to help you.
Please do not hesitate to call us Mondays through Thursdays
from 8:00 - 11:45 h and
from 13:30 - 16:00 h
Fridays
from 8:00 - 11:45 h and
from 13:30 - 15:00 h

Telephone:	+49 (0) 751 5079-926
Fax:	+49 (0) 751 5079-845
E-mail:	service@bavius-technologie.com

15. Appendix

15.1 List of part numbers

No.	Explanation
1 1.1 1.1.1 1.1.2 1.1.3 1.1.4 1.1.5 1.2 1.2.1 1.2.2 1.3	Lubricating system, oil + air Lubricating unit, oil + air Oil tank Fine suction filter Gauge for vacuum pump Maintenance unit: Oil suction (vacuum pump) Oil filter element Air recycling unit Maintenance unit: Spindle sealing air Maintenance unit: Spindle lubrication, oil + air Gauge for vacuum pump
2	Hydraulic unit
4 4.1	Central lubrication, oil + grease Lubricating unit for milling head
5	Cooling unit for spindle
7	Outlet filter
8 8.1 8.2 8.3 8.4 8.5 8.6 8.7 8.8 8.10	Maintenance unit for compressed air Maintenance unit: Measuring systems cleaning Maintenance unit: Main spindles sealing air Pressure control valve for sealing air, A axis Maintenance unit: C axis sealing air On-off valve Maintenance unit: A/C axis clamp Pressure control valve for water separator Maintenance unit for vacuum accelerator (ejector) Weight equalisation booster
9	Spindle cone
10	Vacuum pump
12	Suction unit
15 15.1	Master switch Master switch for tool magazine
19	Interface connector
20	Service socket

No.	Explanation
23	Probe
24	Hour counter
30	Emergency OFF
31	Safety light curtain
33	Cartridge for X/Y axis drive
34	Handheld operator: Tension work piece
35	Handheld operator: Close protective cover
36	Handheld operator: Disengage work piece
39	Work piece stop
40	Turn on power
41 41.1 41.2	Spindle override Stop spindle Start spindle
42 42.1 42.2	Feed override Stop feed Start feed
44	Screen
45	Customer keys (T1 - T15)
48	Operating modes
49	Axis selection (R1 - R15)
50	Manual and automatic function
51	Interface connector for HOP
53	Mode of operation selector switch
55	Machine table mode of operation, manual/automatic operation
56	Chip conveyor
57	Energy supply chains
60	Machine lamp
61	Door lock switch
64	Handheld operator (HOP)
65.1	Disengage tool
65.2	Tension tool
66	Rotate tool magazine

No.	Explanation
67	Clean X axis
68	X axis slide guide
69	Vice
75	Enabling switch
76 76.1	Positioning unit for TCS magazine Positioning unit for saw blade station
78	Delete error message
80	Interface connector NC program input and output
89 89.1 89.2	Switch cabinet cooling unit Error display Cooling unit operating device
90	Cooling lubricant system
90.1 90.2	Cooling lubricant system, manual rinse Pump for cleaning machine table
91 91.1	Signal column Acoustic alarm
95	Pressure control valve for cleaning tool tapers
96	Work piece height probe
97	Maintenance unit for tool control

15.2 Machine details

1 Setup plan	Page 1
1 Foundation plan	Page 1
1 Transport dimensions	Page 1-
2 Drive layout	Page 1-
3 Fluid plan	Page 1-
4 Instruction Manual: Main spindle	external
5 Instruction Manual: Main spindle cooling unit	external
6 Instruction Manual: Switch cabinet cooling unit	external
7 Instruction Manual: Hydraulic unit	external

Electrics diagram is not part of the Instruction Manual. Supplied separately.

Options:

8 Instruction Manual: Chip conveyor	external
9 Instruction Manual: Cooling lubricant system	external
10 Instruction Manual: Suction unit	external
11 Instruction Manual: Probe, transmitter, receiver	external
12 Instruction Manual: Tool control, hardware, software	external
13 Instruction Manual: Vacuum pump	external
14 Instruction Manual: Smart Vision	external
16 Instruction Manual: Briquette press	external