Maintenance Instructions

TNX65/42 TX8i-s

TNX65/42 as from serial No. 7060436

TNX65/42 Value package

142969 - 10.2016
WTAL-en/Ru

Note on applicability

Illustrations in this publication may deviate from the product supplied. Errors and omissions due to technical progress expected.

A word on copyright

Symbols

This chapter describes the symbols used in the documentation for users to highlight risks and tips.

This symbol draws attention to imminent danger to life and health. Failure to observe this danger sign can result in serious damage to health, as well as potentially fatal injuries and even death.

This symbol draws attention to imminent danger due to electricity. Failure to observe this danger sign can result in serious damage to health, as well as potentially fatal injuries and even death.

This symbol draws attention to important information on correct operation of the machine. The machine or parts of the machine may be damaged or malfunction if these instructions are not observed.

Documentation safety instructions

The documentation for users and particularly the safety instructions must be observed.
The safety instructions are set out in a separate document forming part of the TRAUB documentation for users.

Risk of fire and explosion!
The machine must not operate unattended when using inflammable lubricoolants.

Danger due to electricity
Work on motors or other electrical assemblies may only be carried out by specially trained and instructed personnel!

Danger due to electricity
Even when the machine has been switched off, electricity may still be stored in the electric components. These components are identified by a corresponding sign and must not be touched until the specified discharge time has expired.

Depressurize hydraulic system
Before starting any maintenance or repair work, the entire hydraulic system must be depressurized via the accumulator drain valve.

Disconnect compressed air supply from the machine
Before starting any maintenance work on the machine, the compressed air supply must be disconnected from the machine by turning the manual knob on the air maintenance unit.

Health hazard!
Do not allow lubricoolants to come into contact with the skin. Appropriate skin care agents must be used.
Vapour extractors must be fitted to prevent inhalation of physiologically harmful substances.

Safety instructions
The safety instructions contained in this manual must be observed without fail!

Accumulator ≤ 1 l
Accumulators with a volume ≤ 1 l are not subject to mandatory testing in accordance with Pressure Equipment Directive (PED) 97/23/EC. CE marking and a declaration of conformity are not permitted for these accumulators.

Fuels

The information in the data sheets of the fluid manufacturers and in the document **Notes on Operating Materials** must be observed during all work involving fuels and fluids.

The filling quantities of the fuels and fluids are stated in the respective fluid schedules.

Locally applicable guidelines and regulations must be observed when disposing of auxiliaries, coolants and lubricants.

Visual inspection of all fluid lines and wiring

It is essential to examine all fluid lines and wiring at regular intervals, in accordance with the service time and use of the machine, as well as the different ambient conditions.
In this way, potential faults or problems can be identified and remedied at an early stage.

Risk of injury due to escaping fluid!
Fluids may escape from damaged fluid lines at high pressure. Personal protective equipment must therefore always be worn during visual inspections.

If such visual inspection reveals defects in fluid lines or wiring, the machine must be switched off and the defective lines or leads replaced without delay.

Fluid lines which have been replaced must be tightened down with the torque specified by the manufacturer.

Maintenance and repair work

Maintenance and repair work may only be carried out by specially trained and authorised personnel.
In this context, TRAUB recommends that the *daily visual inspection, maintenance after 200 hours and maintenance after 1000 hours of operation* be carried out by the user and that the manufacturer's service be called in for all other maintenance work.

The machine must normally be switched off before starting any maintenance work. The main switch must be secured so that it cannot be reactivated.
Even when the main switch is off, parts of the machine (e.g. control cabinet lamp) may still be live. These parts are identified by a warning sign.
In a small number of cases, the machine must be switched on for maintenance work (e.g. when replacing back-up batteries). Such maintenance must be undertaken with particular care.

Upon completing any maintenance or repair work, the machine's operator must check that the machine and its safety mechanisms are in perfect working order.

Maintenance intervals

In order to ensure the machine's correct functioning in the long term, it is essential to carry out the maintenance work at the specified intervals and to confirm this by signing and dating the corresponding columns.

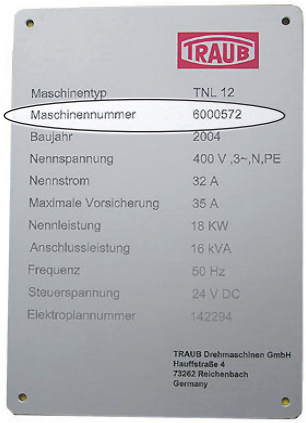
Only the reading on the mechanical operating hours counter to the left of the master switch applies when checking whether and which maintenance intervals have been observed.

Operating hours counter

The operating hours counter is located beside the master switch and exclusively counts the hours during which the machine is in operation after *"Drives ON"*, regardless of whether it is producing workpieces.
The operating hours counter has no effect on the maintenance intervals.

Maintenance kits and spare parts

The parts lists needed for maintenance and repair work can be ordered from the manufacturer's service quoting the 7-digit serial number on the rating plate.



The Article Nos. of the required spare parts can be found in the in the Spare Parts List.

Screen display

The message block "MAINTENANCE WORK REQUIRED" appears on the monitor upon expiry of each maintenance interval in order to make it easier for the user to comply with the specified intervals. The required maintenance interval can be read off in the line "Maintenance interval" (blue background) after pressing the keys: Monitor - Supplement - Piece counter.

For example: MAINTENANCE INTERVAL 2 000 hours

The work required in each instance is described in the Maintenance Instructions. The display can be cleared by pressing the keys: Delete maintenance - Input in the maintenance menu when the maintenance work is complete. The alarm on the monitor is cancelled at the same time.

Maintenance checklist

It is possible using the maintenance checklist on the following pages to tell quickly which maintenance work is due when.
The work required can be seen in chapters A to F.

Maintenance	A	A	A	A	AB	A	A	A	A	ABC
Operating hours	200	400	600	800	1000	1200	1400	1600	1800	2000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABCD
Operating hours	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABC
Operating hours	4200	4400	4600	4800	5000	5200	5400	5600	5800	6000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABCDE
Operating hours	6200	6400	6600	6800	7000	7200	7400	7600	7800	8000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABC
Operating hours	8200	8400	8600	8800	9000	9200	9400	9600	9800	10000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABCD
Operating hours	10200	10400	10600	10800	11000	11200	11400	11600	11800	12000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABC
Operating hours	12200	12400	12600	12800	13000	13200	13400	13600	13800	14000
Date: Name:										

Maintenance checklist

Maintenance	A	A	A	A	AB	A	A	A	A	ABCDE
Operating hours	14200	14400	14600	14800	15000	15200	15400	15600	15800	16000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABC
Operating hours	16200	16400	16600	16800	17000	17200	17400	17600	17800	18000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABCD
Operating hours	18200	18400	18600	18800	19000	19200	19400	19600	19800	20000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABC
Operating hours	20200	20400	20600	20800	21000	21200	21400	21600	21800	22000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABCDE
Operating hours	22200	22400	22600	22800	23000	23200	23400	23600	23800	24000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABC
Operating hours	24200	24400	24600	24800	25000	25200	25400	25600	25800	26000
Date: Name:										
Maintenance	A	A	A	A	AB	A	A	A	A	ABCD
Operating hours	26200	26400	26600	26800	27000	27200	27400	27600	27800	28000
Date: Name:										

Fire protection device

Testing / servicing the fire protection device

Note the manufacturer's documentation with regard to servicing the fire protection device.

It is advisable to conclude a maintenance agreement with the manufacturer of the fire protection device for its maintenance.

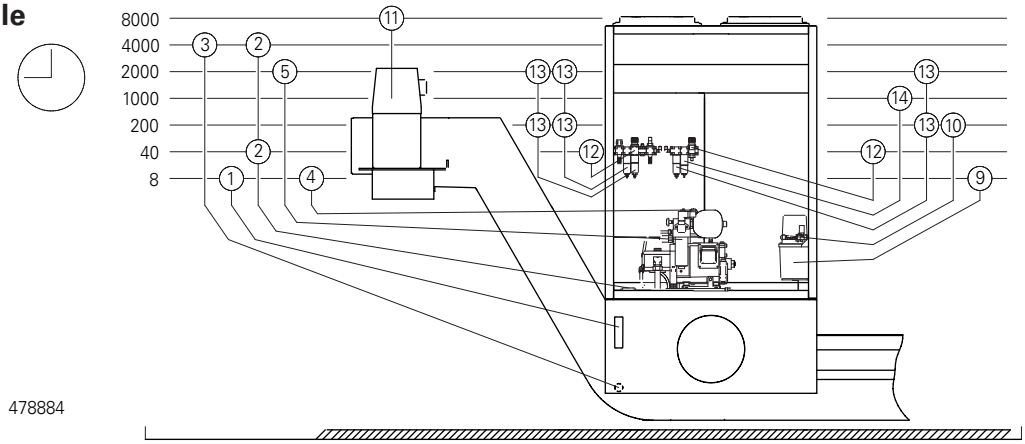
A function test must be performed once per year by an expert authorized by the manufacturer in writing.

On completion of maintenance work

Danger of being crushed by the control cabinet
During operation, the control cabinet must be moved right up to the machine to avoid the risk of being crushed.

Whenever maintenance work is complete, the owner or operator of the machine must check that the machine, including its guards and protective devices, is in safe operating condition.

Lubrication schedule



	1	2	3	4	5	9	10	11	12	13	14
				bar					bar		
	8h			8h		8h			40h	200h	200h
		40h					200h				
		4000h	4000h					8000h			
					2000h					2000h	1000h
			180l				6.0l				

Assemblies

Hydraulic system | Central lubrication system | Chip conveyor gear mechanism | Air

Operating elements

Level indicator | Filler port | Drain | Pressure measuring device | Hydraulic fluid filter, air filter

Activities

Check filling level, pressure | Top up to required level | Fill with fresh fluid | Clean or replace filter

Further informations

Tank capacity

Fluids

The information in the data sheets of the fluid manufacturers and in the document **Notes on Operating Materials** must be observed during all work involving fuels and fluids.

The filling quantities of the fuels and fluids are stated in the respective fluid schedules.

A	Daily visual inspection		
No.	**Where**	**What**	**Comments**
01	**Complete machine**	• Check safety mechanisms • Check there are no accumulations of metal chips in the working area; any deposits found must be removed • Look for visible oil or lubricoolant leaks	
02	**Working area door**	• Examine the window pane and clean it if necessary	
03	**Chip conveyor**	• Check the pre-filter box for accumulations of metal chips and remove them if necessary	
04	**Hydraulic system**	• Check filling level and top up if necessary	

A01

Complete machine

Check safety mechanisms

Check that all safety mechanisms on the machine are complete (no missing covers, gratings, fences, …).

Check there are no accumulations of metal chips in the working area; any deposits found must be removed

Note personal protection.

Look for visible oil or lubricoolant leaks

A02

Working area door

Examine the window pane

A damaged window pane can cause accidents!
The window pane must be replaced immediately even if it shows only small cracks or minor damage or if it has become cloudy!

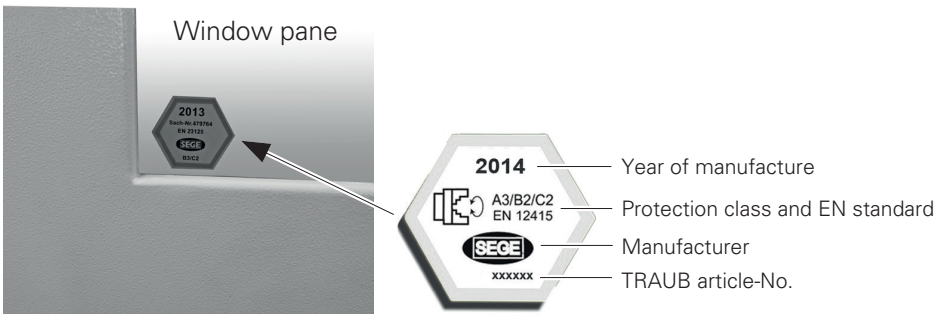
The window pane becomes less resilient with age and must therefore be replaced every 8 years.

- Examine the window pane in the working area door for cracks, cloudiness and other signs of damage.
- Replace the window pane if necessary.

	Article No. without Visiport	Article No. with Visiport
Mounting kit for window pane	480544	479920

A safety sticker with Article No., year of manufacture and the name of the manufacturer is affixed to the window pane.

Example: Safety sticker on window pane



Cleaning the window pane

The side of the window pane facing the operator is susceptible to scratching!
Sprays, abrasive cleaning agents or cloths must not be used.
Clean the window pane with a commercially available glass cleaning agent and wipe with a soft cloth or tissues.

The side of the window pane facing the working area is resistant to scratching. All standard commercial cleaning agents can be used here.

A03

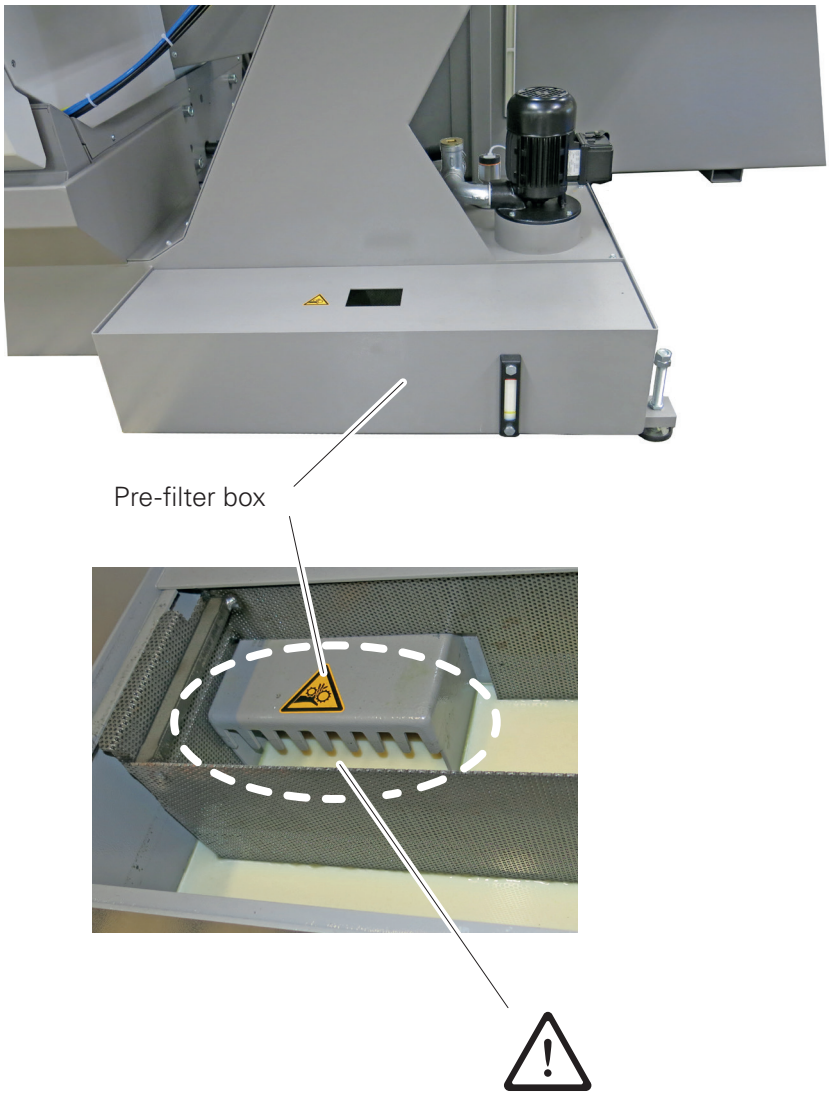
Chip conveyor

Avoid skin contact with the lubricoolant!
Suitable skin protection must be used!

Risk of injury
Suitable aids must be used to remove the metal chips.
Note personal protective equipment.

Check the pre-filter box on the chip conveyor for accumulations of metal chips and remove them if necessary

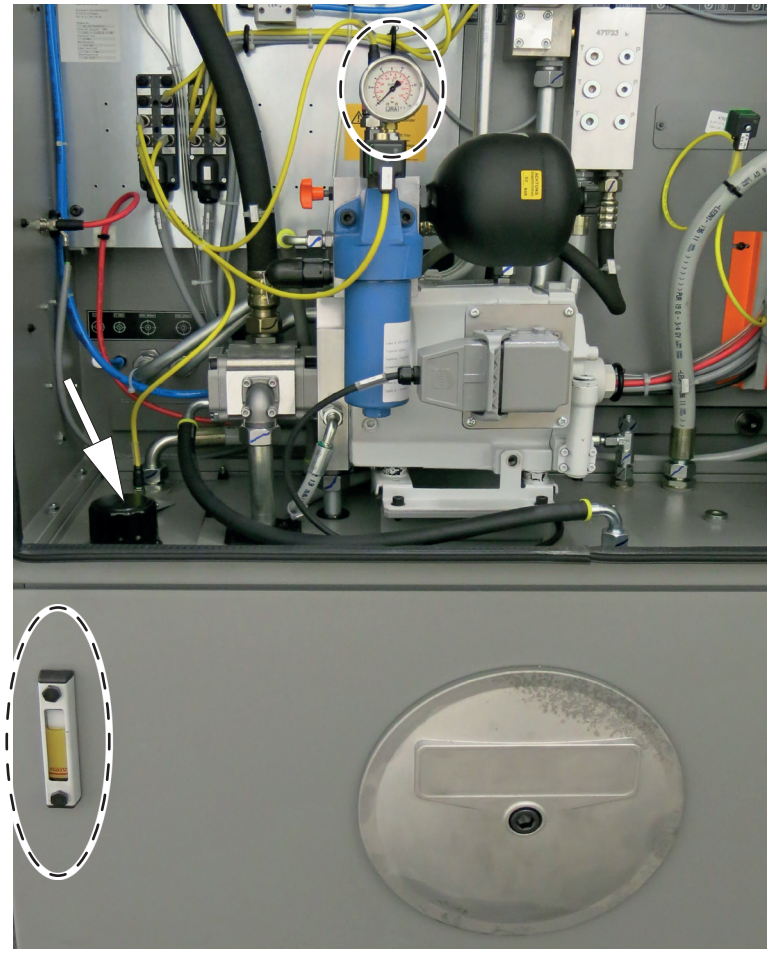
Risk of injury
Beware of injuries when reaching into the chain guide.
For this reason, the chip conveyor **must** be switched off before removing metal chips from the pre-filter box.
Suitable aids must be used to remove the metal chips.



A04

Hydraulic system

Check filling level and top up if necessary



B	Maintenance work every 200 hours of operation		
No.	**Where**	**What**	**Comments**
01	**Hydraulic system**	• Check system pressure • Check oil level	
02	**Chip conveyor**	• Check the chip conveyor for fouling around the level switch and clean it if necessary	Note manufacturer's documentation
03	**Central lubrication unit**	• Check filling level	
04	**Pneumatic system**	• Check filter for fouling and replace if necessary • Check and correct the air pressure if necessary	
05	**Power clamping chuck**	• Clean and lubricate	Note manufacturer's documentation
06	**Parts conveyor**	• Check belt of parts conveyor	Note manufacturer's documentation
07	**Lighting**	• Check and clean/repair if necessary	
08	**Transition from working area to coolant / oil spray extractor**	• Clean	
09	**Covers in the working area**	• Check wiper / wiper lips	Switch on the machine
10	**Fluid cabinet**	• Clean the metal filter	
11	**Bar feeding magazine**	• Check oil level	Note manufacturer's documentation

B01

Hydraulic system

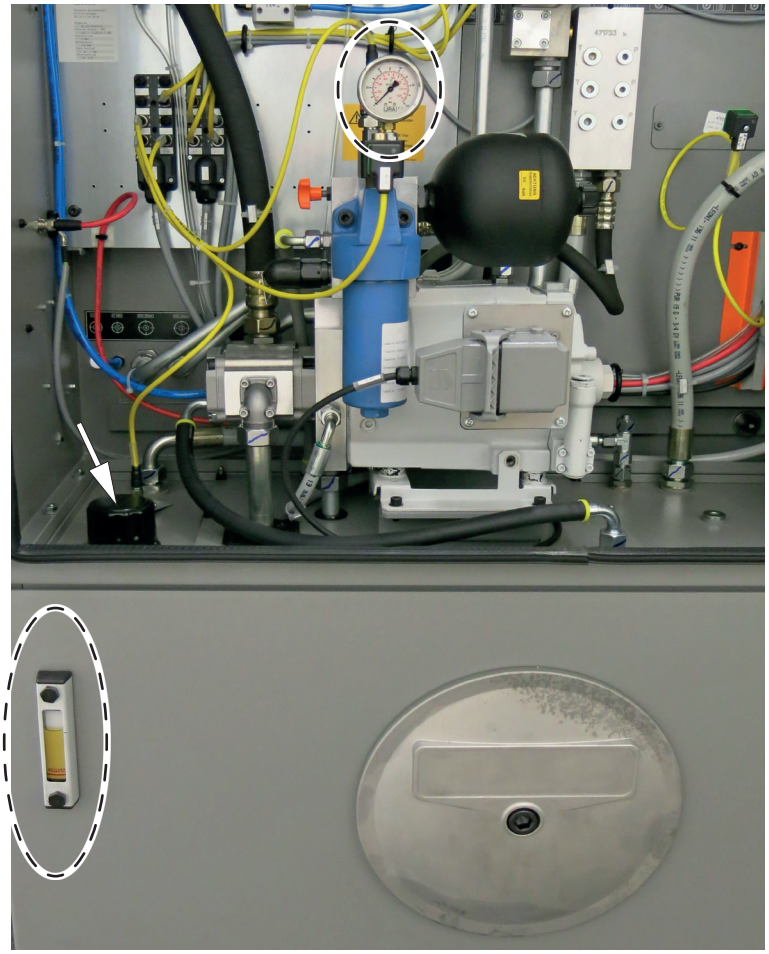
The information in the data sheets of the fluid manufacturers and in the document **Notes on Operating Materials** must be observed during all work involving fuels and fluids.

The filling quantities of the fuels and fluids are stated in the respective fluid schedules.

- Read off the system pressure on the pressure gauge (required pressure = 80 ± 3 bar)

The system pressure is checked when the machine is stationary, i.e. there are no machine movements.

- Check oil level and top up if necessary.



B02

Chip conveyor

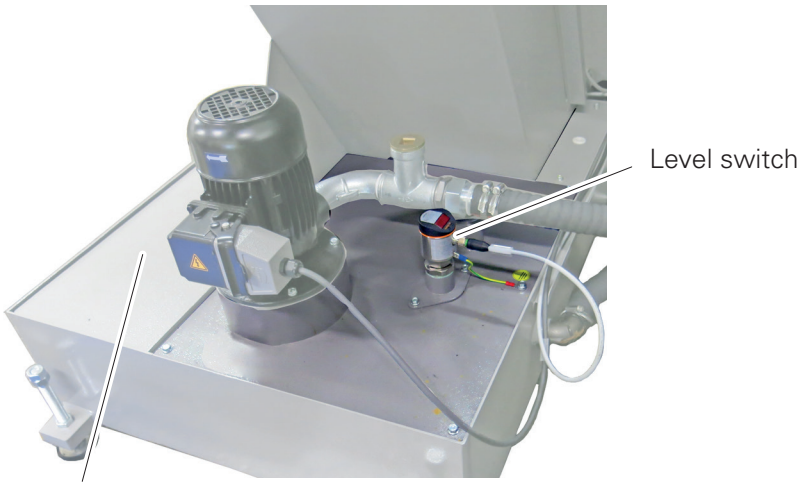
Avoid skin contact with the lubricoolant!
Use suitable skin care agents!

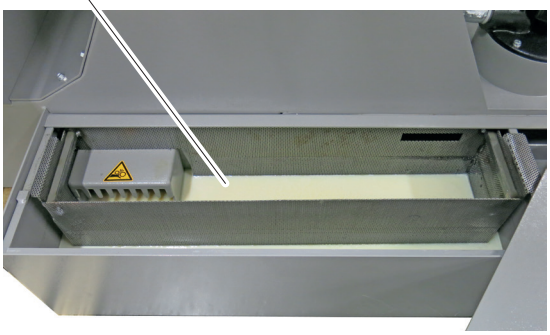
Check the chip conveyor for fouling around the level switch and clean it if necessary

Risk of injury
Beware of injuries when reaching into the chain guide.
For this reason, the chip conveyor **must** be switched off before removing metal chips/other dirt from the area behind the strainer basket.
Note personal protective equipment.
Suitable aids must be used to remove the metal chips.

Note the corresponding manufacturer's documentation.

- Check the area behind the strainer basket for fouling and clean it if necessary.





B03

Central lubrication unit

The information in the data sheets of the fluid manufacturers and in the document **Notes on Operating Materials** must be observed during all work involving fuels and fluids.

The filling quantities of the fuels and fluids are stated in the respective fluid schedules.

- Check filling level of central lubrication unit and top up if necessary.

B04

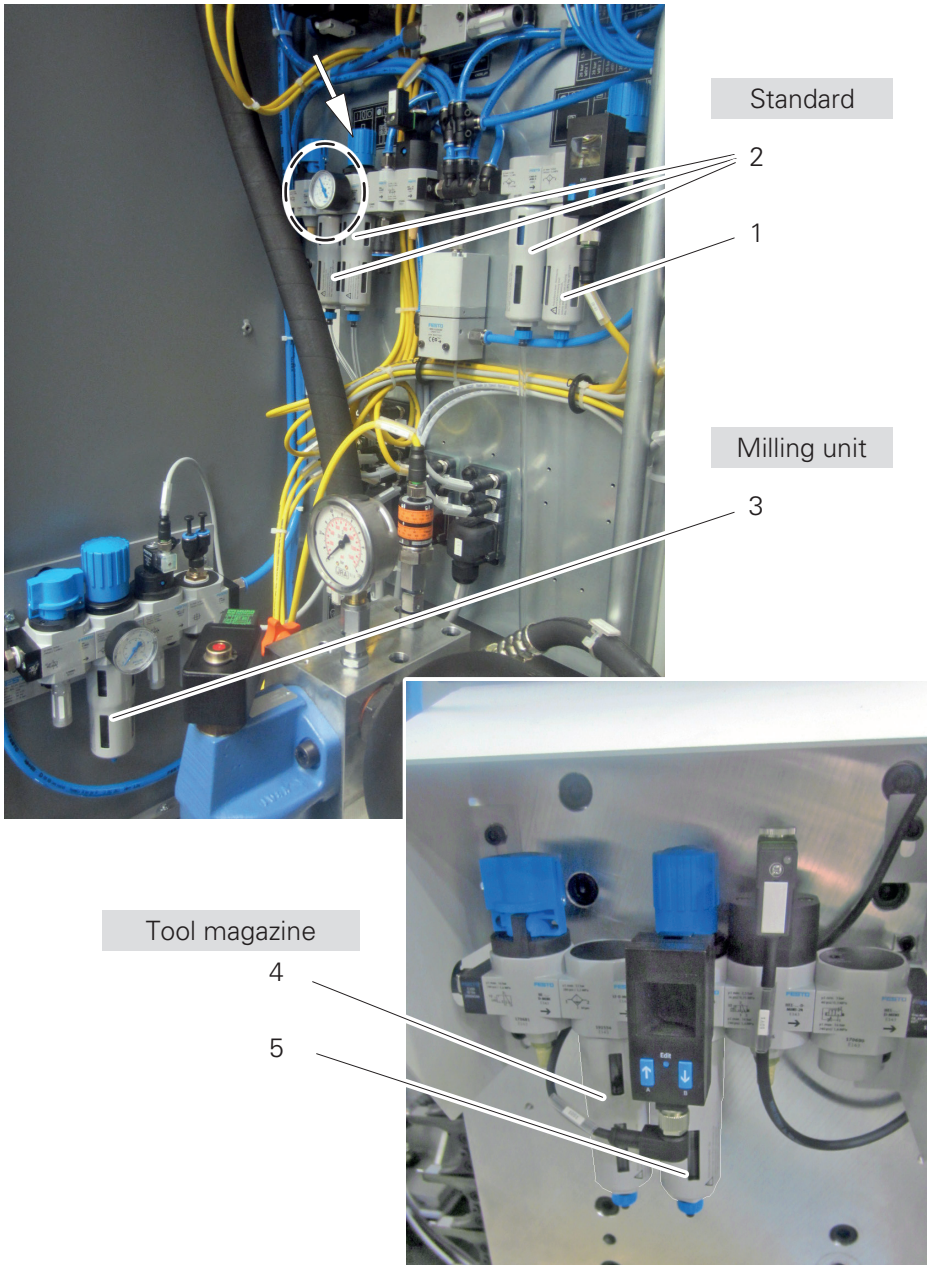
Pneumatic system

- Examine all filter in the maintenance unit for signs of fouling and replace if necessary.

Maintenance unit	Spare filter cartridge	Article No.	Item
Standard	Activated carbon mini Set	476138.8251 476138.8181	1 2
Milling unit	40 µm	476138.8301	3
Tool magazine	40 µm 5 µm	476138.8141 476138.8151	4 5

The required air pressure must be set to 6 bar.

- Check and correct the air pressure if necessary.



B05

Power clamping chuck

Beware of being crushed by the power clamping chuck

Clean and lubricate as specified by the manufacturer

Due to the respective manufacturers' different requirements and/or specifications, the manufacturer's documentation must be observed without fail.

Depending on the materials to be machined (e.g. brass) and the extent to which machine capacity is utilized, the chucks may have to be cleaned more frequently.

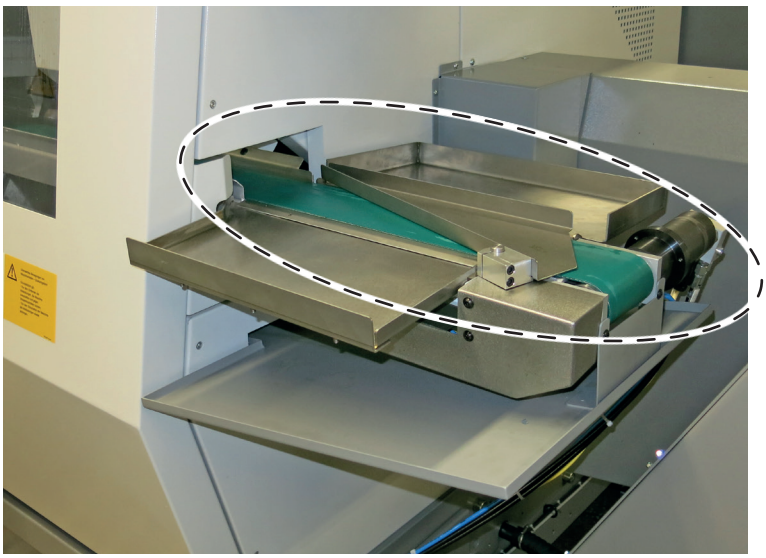
Illustrations exemplary

B06

Parts conveyor

- Check the tension of the conveyor belt and retension or replace the belt if necessary.

Note the corresponding manufacturer's documentation.



B07

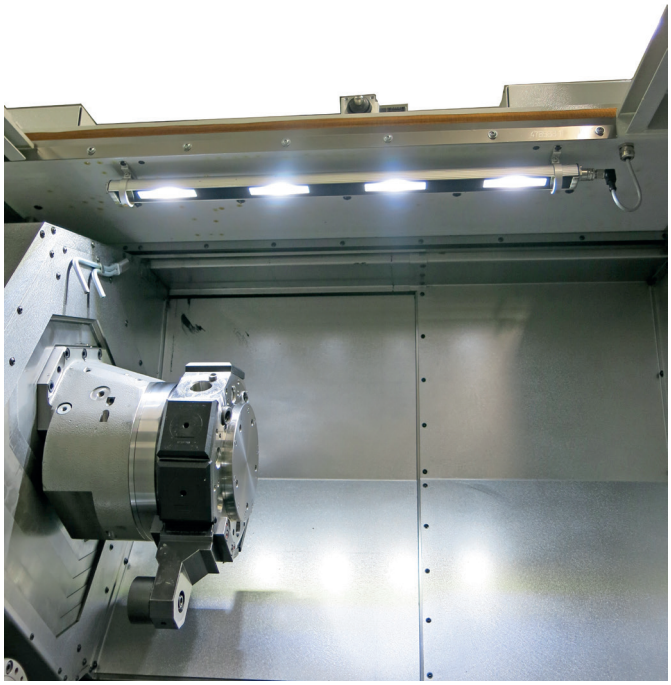
Lighting in the working area

Danger due to electric power.
Work on electrical assemblies may only be carried out by specially trained and instructed personnel!

- Check all lights/lamps in the working area for signs of damage.
  Damaged lights/lamps must be replaced immediately.

  Note the corresponding manufacturer's documentation.

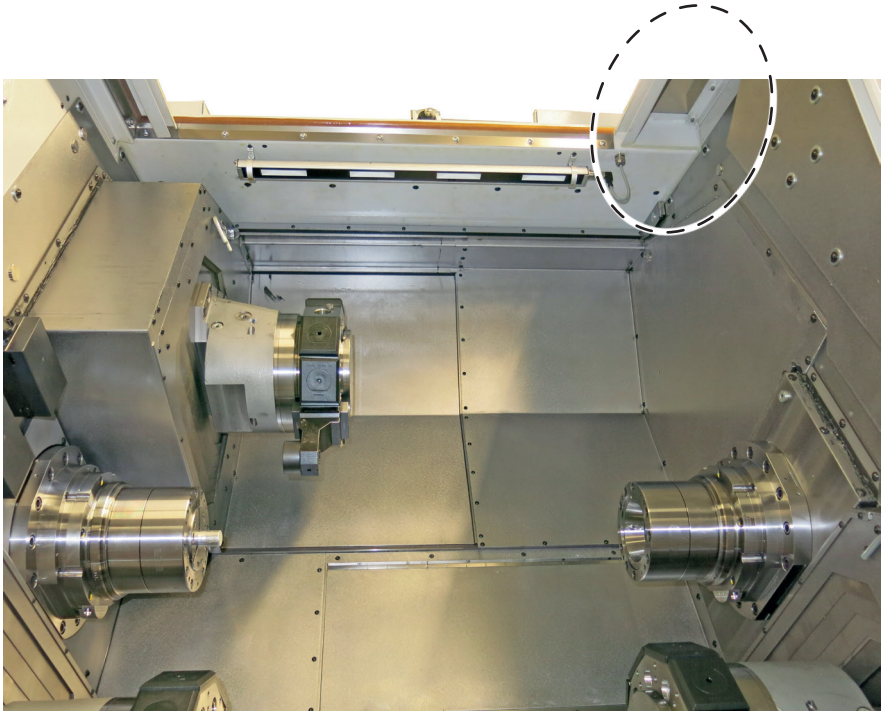
- Clean lights/lamps if necessary.



B08

Transition from working area to coolant / oil spray extractor

- Clean intake opening and/or metal filter.
  Replace metal filter if necessary.

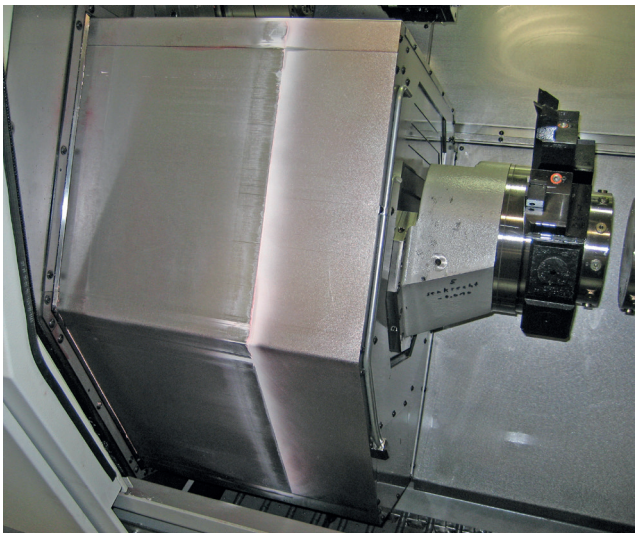


B09

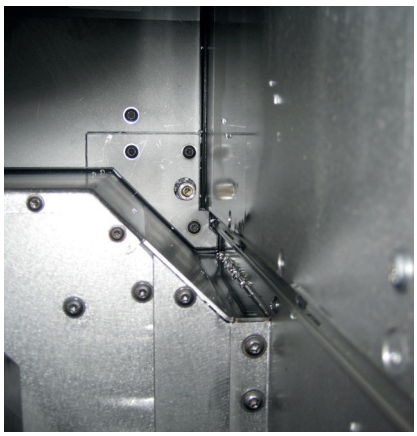
Cover in the working area

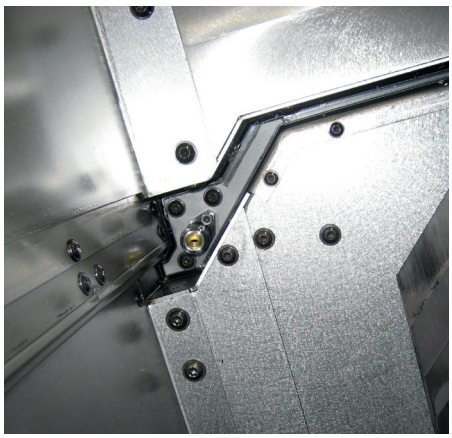
This maintenance work can only be carried out when the machine is switched on.

- Examine all wipers / wiper lips.



Moulded wiper



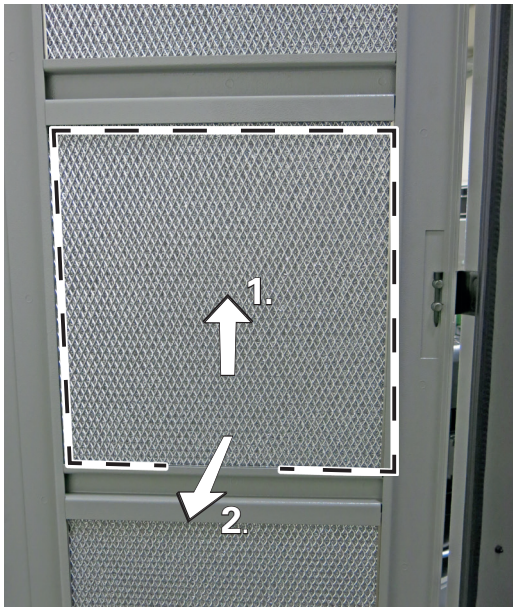


B10

Fluid cabinet

Clean the metal filter on the fluid cabinet:

- Remove all metal filters
- Wash or blow air through the metal filters
- Dry and refit the metal filters



B11

Bar feeding magazine

Check oil level

Check the oil level on the level indicator of the bar feeding magazine.
Top up with oil if necessary until the level indicator reaches maximum.

The values may vary depending on the bar feeding magazine installed.
Note the corresponding manufacturer's documentation.

C	Maintenance work every 1 000 hours of operation		
No.	**Where**	**What**	**Comments**
01	**see A, B**	• Carry out all the maintenance work listed under A and B	
02	**Pneumatic system**	• Replace active-carbon filter cartridge	

C01

Maintenance work every 200 and 1 000 operating hours

Carry out all the maintenance work listed under A and B.

C02

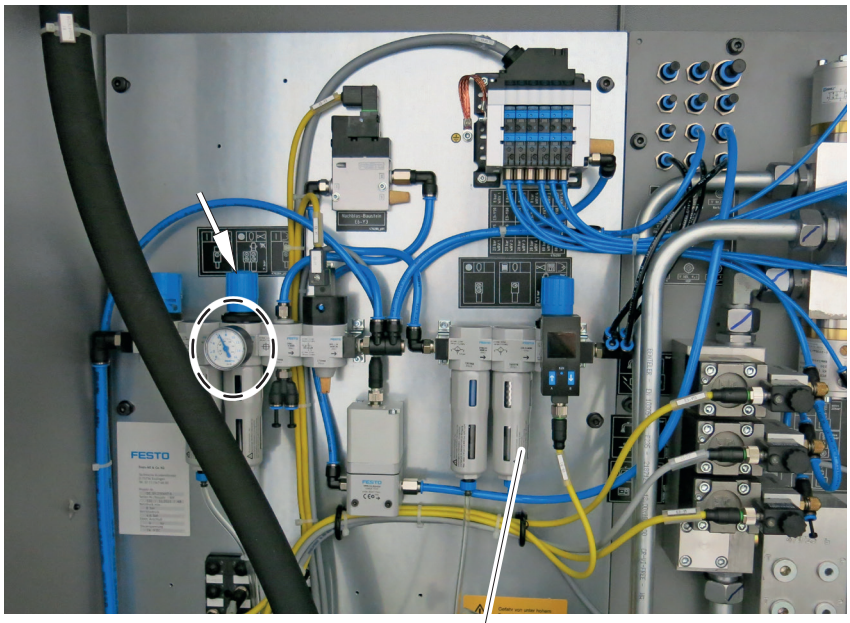
Pneumatic system

Replace active-carbon filter cartridge

Replacement filter for active-carbon filter cartridge	Article No. 476138.8251

The required air pressure must be set to 6 bar.

- Check and correct the air pressure if necessary.



Active-carbon filter cartridge

D	Maintenance work every 2 000 hours of operation		
No.	**Where**	**What**	**Comments**
01	**see A, B, C**	• Carry out all the maintenance work listed under A, B and C	
02	**Hydraulic system**	• Replace filter cartridge in the pressure filter	
03	**Axes**	• Check grid intervals and reference points	
04	**Hollow clamping cylinder, main spindle / opposed spindle if applicable**	• Clean lubricoolant collecting pan	
05	**Ball screw transmission, axes**	• Determine the reversing backlash	Switch on the machine
06	**Cover in the working area**	• Check wipers on cover panels of main and opposed spindles, replace if necessary	Switch on the machine

D01

Maintenance work every 200 and 1 000 operating hours

Carry out all the maintenance work listed under A, B and C.

D02

Hydraulic system

Risk of injury due to escaping hydraulic fluid!
The entire hydraulic system must be depressurized by manually actuating the accumulator drain valve in the fluid cabinet before starting any maintenance and repair work.

Further information can be found in chapter *"Hydraulic system"* in the User Manual.

Depending on service conditions, the hose lines should not remain in use for more than four years.

The information in the data sheets of the fluid manufacturers and in the document **Notes on Operating Materials** must be observed during all work involving fuels and fluids.

The filling quantities of the fuels and fluids are stated in the respective fluid schedules.

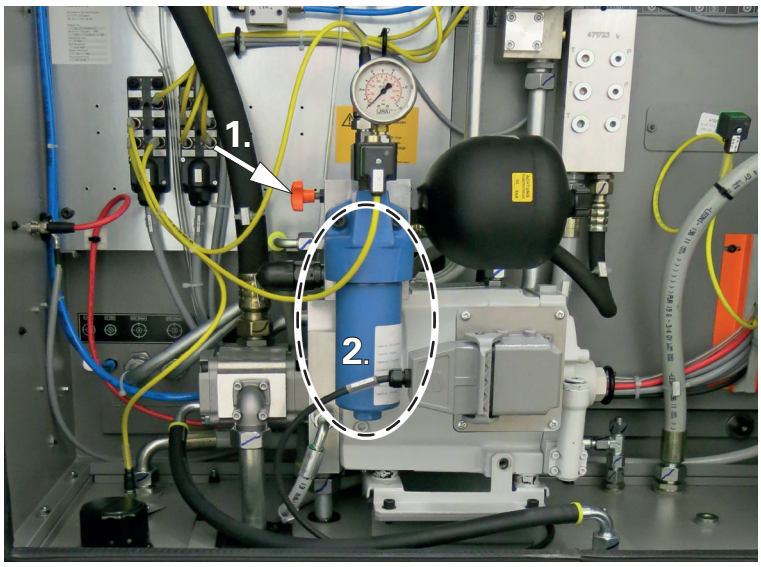
Replace filter cartridge in the pressure filter

Filter cartridge	Article No. 324567

- Unscrew the filter cover and dispose of the hydraulic oil from the filter cover.

  The used hydraulic oil must be disposed of in accordance with statutory regulations!

- Insert a new filter cartridge.
- Refit the filter cover and screw down tightly.



D03

Axes

- Have the grid spacing of all axes checked by the machine manufacturer's service.
- Have the reference points of axes X, Y and Z checked by the machine manufacturer's service.
- The deviation from setpoint must not exceed 0.03 mm.
  Larger deviations must be corrected!

D04

Hollow clamping cylinder, main spindle / opposed spindle if applicable

Clean lubricoolant collecting pan

Metal chips may be entrained into the lubricoolant collecting pan of the hollow clamping cylinder by the lubricoolant and clog the outlet strainer.
Parts and/or units must be removed if necessary in order to clean the lubricoolant collecting pan.

D05

Ball screw transmission, X-axis, Z-axis, V-axis and Y-axis

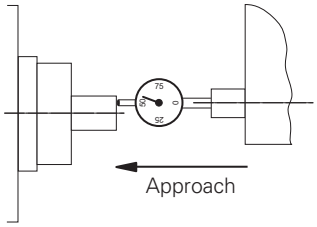
Determine the reversing backlash

This maintenance work can only be carried out when the machine is switched on.

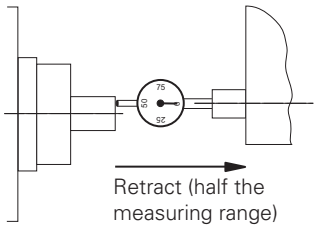
The machine must have run up for at least three hours (displace all axes) before checking the reversing backlash!

The distances traversed in order to measure the reversing backlash must be specified by a CNC program, not via the handwheel!

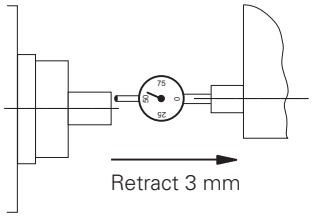
Moreover, the Z-axis should be set near the machining position, since the reversing backlash does not remain constant over the entire Z-axis!



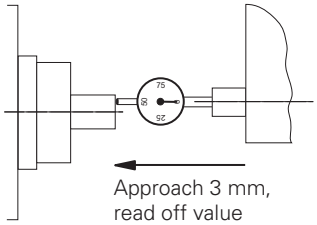
- Clamp a faced round part in the collet or jaw chuck.
- Secure a dial gauge with a resolution of 1/1000 on the tool carrier.
- Approach the clamped turned part until the tracer pin is just short of the fixed stop (feed rate f = 200 mm/min.).



- Retract the carriage until the dial gauge pointer is within the indicating range (f = 150 mm/min.).
- Set the dial gauge pointer to "0".



- Retract the carriage by 3 mm (dial gauge cleared) (f = 150 mm/min).



- Advance the carriage 3 mm to the zero position (f = 150 mm/min.).
- Read off and note the value on the dial gauge (every value other than "0" equals the reversing backlash).

- Repeat this measurement five times and form a mean value.
- This mean value must be doubled and entered in the control system as a backlash compensation value.
- Check the measurement.

If the values for the reversing play of the X, Z, V and Y axes are greater than 0.01 mm, they must be corrected by the machine manufacturer's service.

D06

Covers in the working area

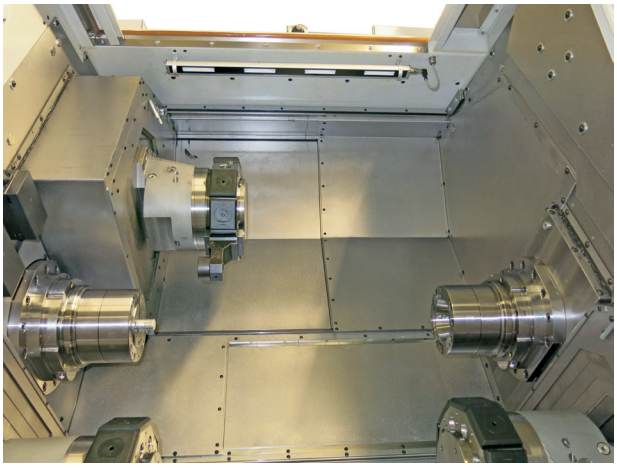
Check wiper (wiper lips and moulded wiper) on cover plates of main and opposed spindle and replace if necessary.

This maintenance work can only be carried out when the machine is switched on.

Damaged wipers must be replaced without delay.

Check wipers

- Apply a thin film of oil approx. 50 mm wide to the areas to be wiped.
- Wipe off the oil film by moving the slide approx. 30 mm.
- The wipers are OK if they wipe off the oil over the entire area.



If not, the worn wipers must be replaced.

The Article Nos. of the required wipers can be found in the in the Spare Parts List.

Replace wipers

- Set master switch to position "0" and lock it in position.
- Remove wipers.
- Remove any chips or impurities under the wiper and clean the guideways.
- Fit new wipers, pressing them firmly into place against the guideways.
- Set master switch to position "1".
- Check wipers again.

E Maintenance work every 4 000 hours of operation

No.	Where	What	Comments
01	**see A, B, C, D**	• Carry out all the maintenance work listed under A, B, C and D	
02	**Hydraulic system**	• Replace hydraulic fluid	
03	**Power clamping mechanism**	• Check concentricity of clamping cylinder	
04	**Top turrets**	• Clean drain opening	
05	**Control cabinet**	• Clean the interior of the control cabinet • Check and retighten connections	

E01

Maintenance work every 200, 1 000 and 2 000 operating hours

Carry out all the maintenance work listed under A, B, C and D.

E02

Hydraulic system

Risk of injury due to escaping hydraulic fluid!
The entire hydraulic system must be depressurized by manually actuating the accumulator drain valve in the fluid cabinet before starting any maintenance and repair work.

Further information can be found in chapter *"Hydraulic system"* of the User Manual.

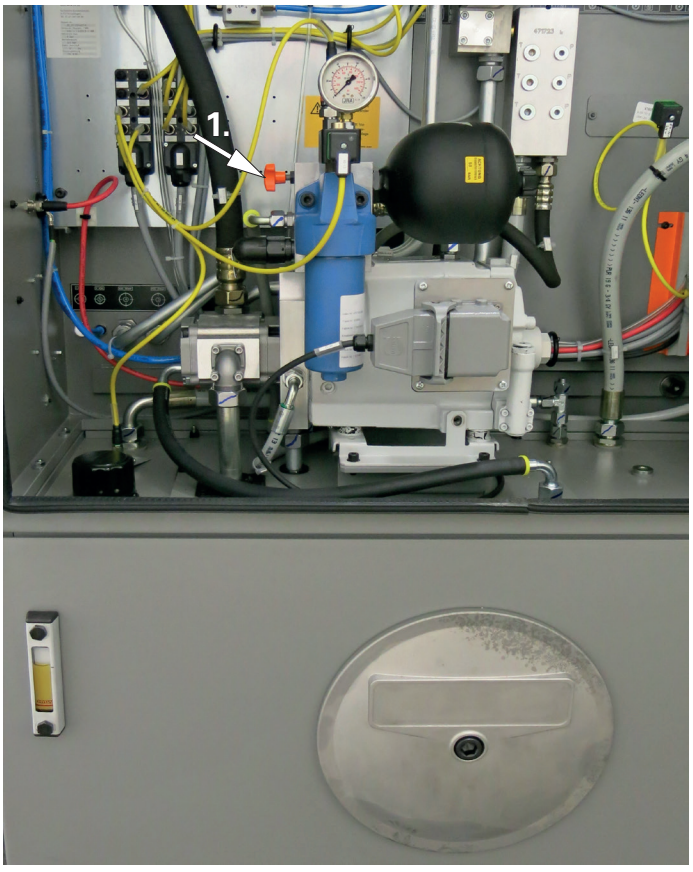
Depending on service conditions, the hose lines should not remain in use for more than four years.

The information in the data sheets of the fluid manufacturers and in the document **Notes on Operating Materials** must be observed during all work involving fuels and fluids.

The filling quantities of the fuels and fluids are stated in the respective fluid schedules.

Replace hydraulic fluid

- Switch off the hydraulic system
- Depressurise the hydraulic system
- Empty the hydraulic tank (drain or pump off the oil)
- Clean the tank
- Fill with fresh hydraulic fluid
- Check oil level in oil view glass



E03

Power clamping mechanism

Check concentricity with a dial gauge on rear part of cylinder.
Max. deviation = 0.03 mm

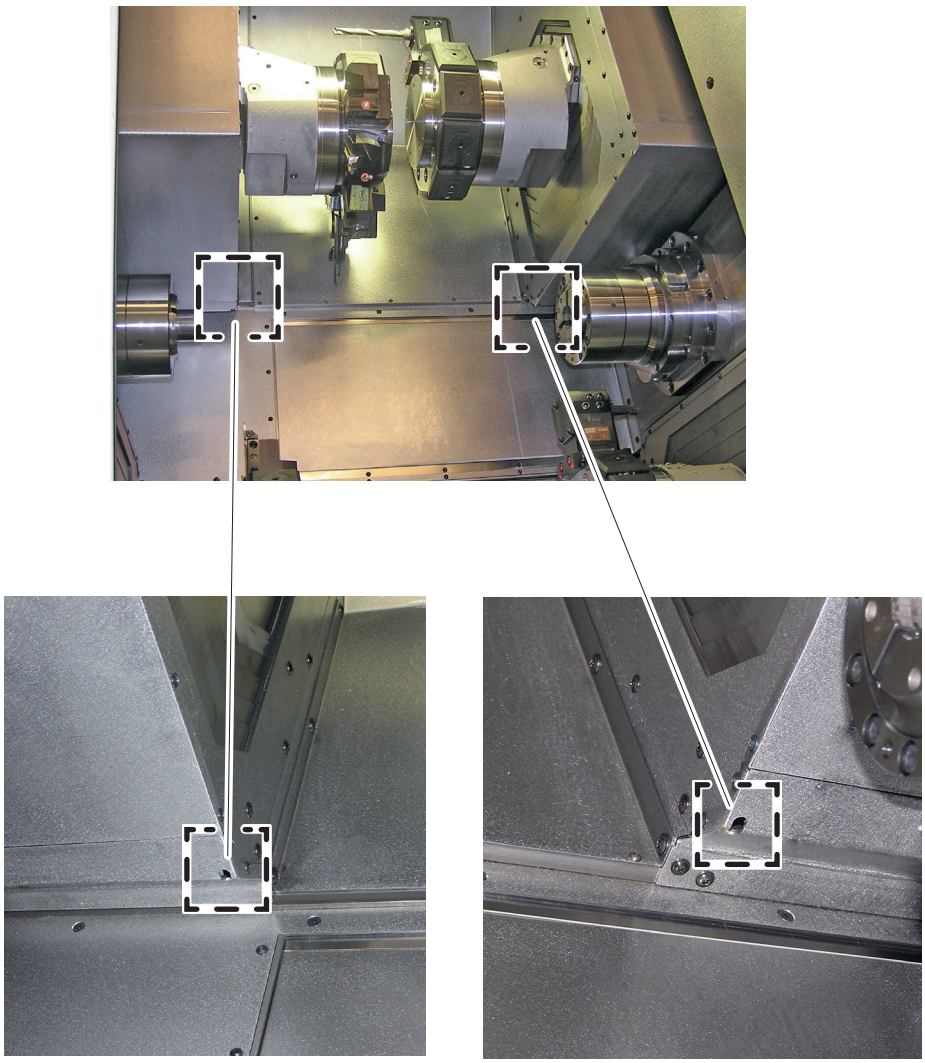
E04

Top turrets

Each of the top turrets has a drain opening which must always remain open.

Check and clean the drain opening if necessary.

Illustration exemplary



E05

Control cabinet

Danger due to electric power
Work on motors or other electrical assemblies may only be carried out by specially trained and instructed personnel!

Electrical components may still be energized even when the machine has been switched off. These components are marked accordingly and must not be touched before expiry of the specified discharge time.

Clean the interior of the control cabinet

- Set main switch to position "0" and secure it so it cannot be reactivated.
- Clean the interior of the control cabinet.

Check and retighten connections

- Check all connections in the control cabinet.
- Retighten any loose connections.
- Remove the covers from the busbars on the amplifiers and retighten all connections. Then refit the covers.

F	Maintenance work every 8 000 hours of operation		
No.	**Where**	**What**	**Comments**
01	**see A, B, C, D, E**	• Carry out all the maintenance work listed under A, B, C, D and E	
02	**Chip conveyor**	• Change transmission oil	Note manufacturer's documentation
03	**Machine**	• Check fan in spindle servo amplifier	
04	**O-rings**	• Check O-rings and replace if necessary	Switch on the machine

F01

Maintenance work every 200, 1 000, 2 000 and 4 000 operating hours

- Carry out all the maintenance work listed under A, B, C, D and E.

F02

Chip conveyor

Change transmission oil

Note the corresponding manufacturer's documentation.

F03

Machine

- Check heat sinks and fans of the axis and spindle drives for contamination and clean them if necessary.
- Check correct functioning of fans.

F04

O-rings

Check and if necessary replace O-rings

This maintenance work can only be carried out when the machine is switched on.

Installed location	Article No.
Chuck element	479105.2201
Lubricoolant bush	479103.0071
Workholding fixture hollow clamping cylinder	319 378
Rinsing device hollow clamping cylinder	316 463 323 480
Workholding fixture solid clamping cylinder	316 463
Rinsing device solid clamping cylinder	316 684 311 769 321 138
Ejector and rinsing device	479103.0141 479103.0202 479103.0232 322 575 321 056 323 480
Discharge through the opposed spindle	479103.0642 300 843
Threaded bush/attachments for chuck	318 494 319 307 319 378 328 115 300 843 319 817

G	Safety-related maintenance every year		
No.	**Where**	**What**	**Comments**
01	**Emergency OFF button**	• Check Emergency OFF function	Switch on the machine
02	**Automatic working area door**	• Check mechanical switch strip	Switch on the machine
03	**Repeat blowing unit**	• Check storage batteries and replace them if necessary	Switch on the machine
	Maintenance required every 2 years for safety reasons		
04	**Repeat blowing unit**	• Replace storage batteries	
05	**Uninterruptible power supply**	• Replace storage batteries	(optional)
	Maintenance required every 4 years for safety reasons		
06	**Control cabinet / control console**	• Replace PC buffer batteries if necessary • Replace NC buffer batteries if necessary	Switch on the machine
07	**Control cabinet**	• Check buffer batteries and replace if necessary	
	Maintenance required every 8 years for safety reasons		
08	**Working area door**	• Replace window pane	

G01

Annual check of Emergency OFF function

This maintenance work can only be carried out when the machine is switched on.

Correct operation of the Emergency OFF buttons in the machine must be checked annually.
At least one axis must be driven for this purpose.
This check should not be performed during a machining operation, otherwise the machine may be damaged.

Press Emergency OFF button

Drives are stopped instantly

The following message must appear on the screen:
Emergency OFF machine

G02

Annual maintenance of the automatic working area door

Check mechanical rail of automatic working area door

This maintenance work can only be carried out when the machine is switched on.

The mechanical rail of the automatic working area door is a safety element and subject to mandatory annual inspection by an expert (safety regulation BGR 232 of the employers' liability insurance association).

Inspection of the automatic working area door to ensure its safe condition must be recorded in a written test log.

Faults and damage to the mechanical rail of the automatic working area door must be remedied immediately.

G03

Annual check of the repeat blowing unit

Check storage batteries and replace them if necessary

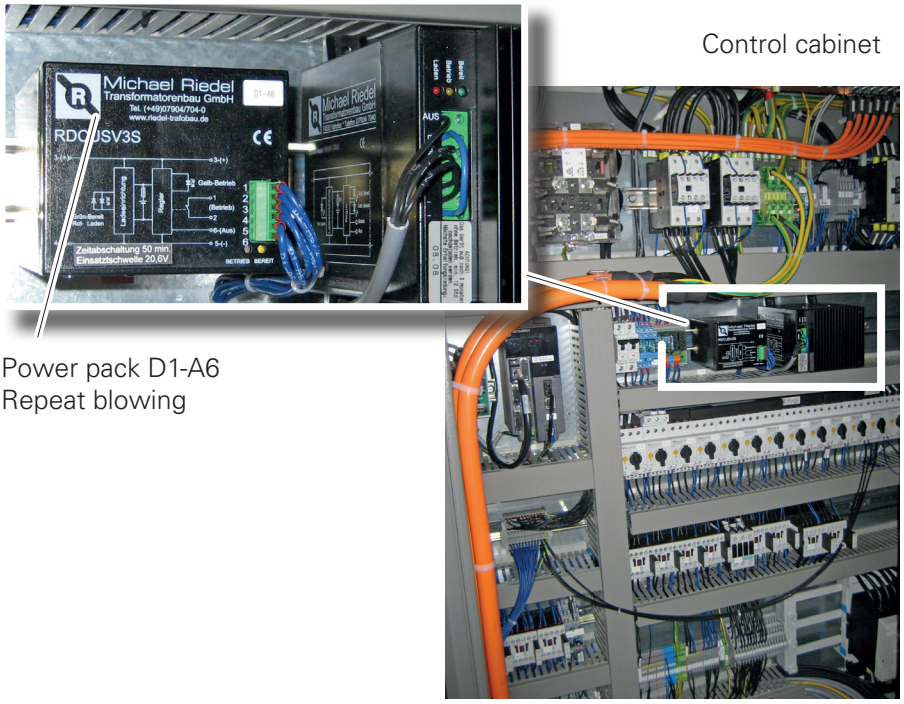
The storage batteries for the repeat blowing unit must be checked at least once per year. They are located in the control cabinet, in power pack D1-A6.
The momentary condition of the storage batteries is indicated by LEDs on the repeat blowing unit.
The control system and drives must be switched on for this check.

LED indicator on repeat blowing unit, power pack D1-A6

LED colour	Storage battery status	Note
green	Device is operational	
yellow	Storage battery delivers power	For a period of 50 min (after switching control system and main switch off).
red	Storage battery voltage low	Storage battery not recharged correctly/faulty

Replace the storage batteries (2x) if necessary

Storage battery 12V 0.5Ah	Article No. 221490 (1x)



Power pack D1-A6
Repeat blowing

Control cabinet

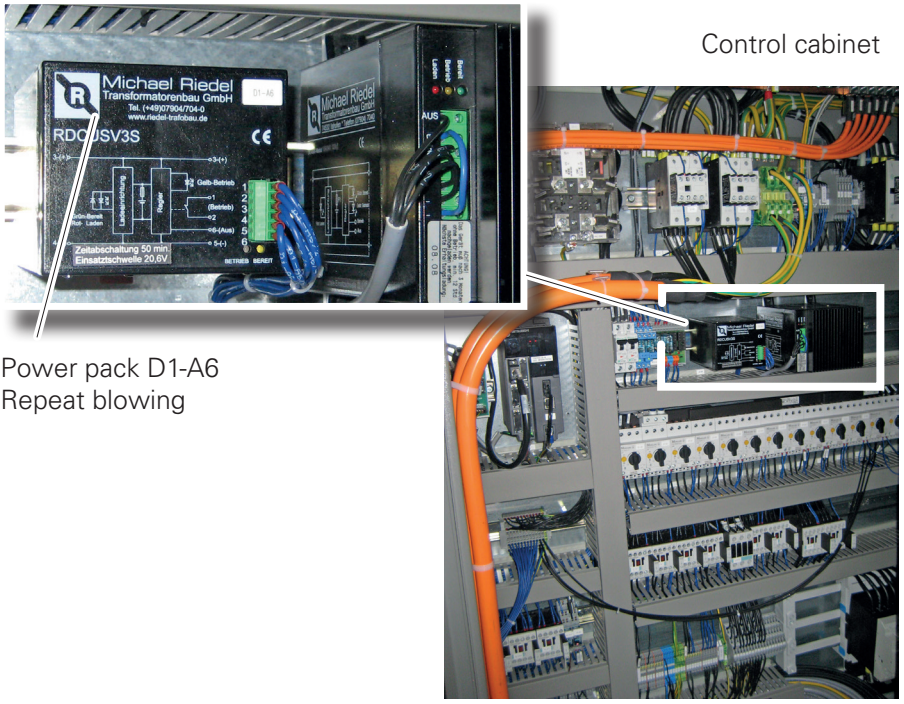
G04

Maintenance of the repeat blowing unit every 2 years

Replace storage batteries

The storage batteries for the repeat blowing unit are located in the control cabinet in power pack D1-A6. Two storage batteries are required.

Storage battery 12V, 0.5Ah	Article No. 221490 (1x)



Power pack D1-A6
Repeat blowing

Control cabinet

G05

Maintenance of the uninterruptible power supply every 2 years (optional)

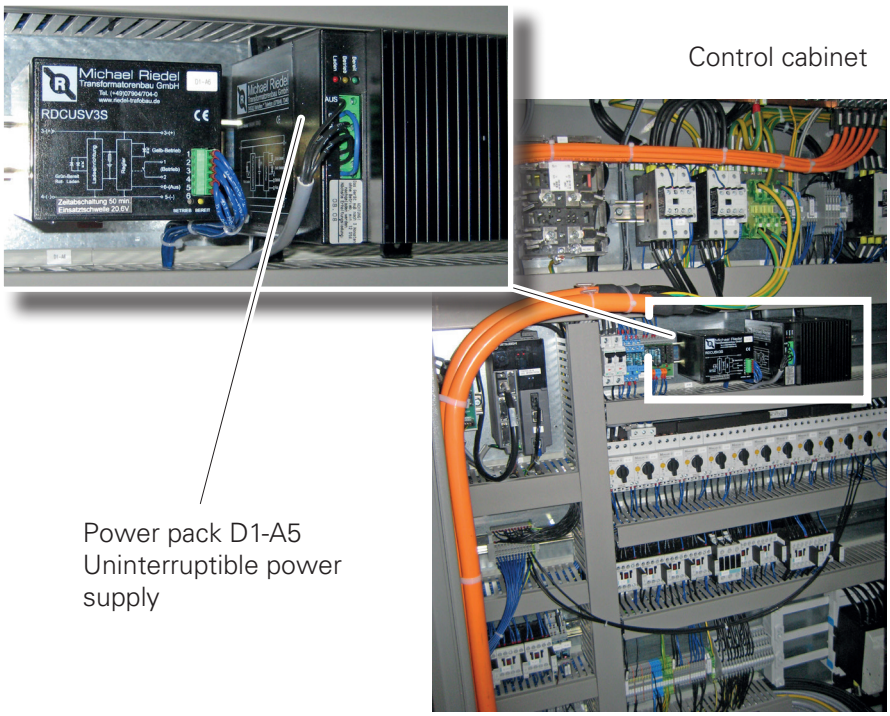
Replace storage batteries

The storage batteries for the uninterruptible power supply of the PC are located in the control cabinet in power pack D1-A5.
Two storage batteries are required.

Storage battery 12V, 2Ah	Article No. 221488 (1x)

LED indicator on power pack D1-A5 for the uninterruptible power supply (from 2.2010 onwards)

LED colour	Storage battery status	
blue	Ready	Device is operational
red	Bat. Lo	Storage battery capacity below 25%
green	Bat. full	Storage battery capacity over 75%
yellow	UPS	Power failure, UPS active
red flashing	Bat. Def	Storage battery faulty



G06

Maintenance of control console / control cabinet every 4 years

Replace PC/NC buffer batteries

This maintenance work can only be carried out when the machine is switched on.

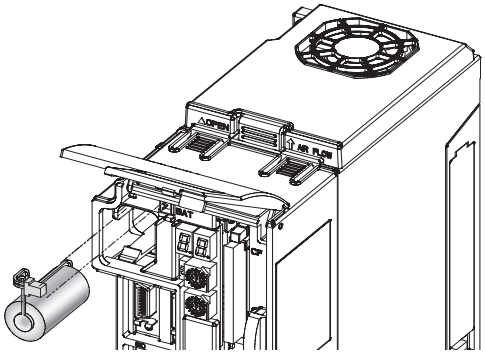
The PC buffer battery (in the control console) and the NC buffer battery (in the control cabinet) must be replaced after four years at the latest.

PC/NC buffer battery 3 V, type Q6 BAT	Article No. 223139

The buffer battery must be re-placed within 15 minutes (buffer duration of the built-in capacitors).

- Press *NC Off*
- Open cover on battery compartment
- Pull out battery with connections
- Insert new battery and engage connection
- Close cove

Example:
Replace NC buffer battery
(control cabinet)



Replace PC and NC buffer batteries
Regular replacement every 4 years

Buffer battery	Date	Signature

G07

Maintenance of control cabinet every 4 years

Danger due to electric power
Work on motors or other electrical assemblies may only be carried out by specially trained and instructed personnel!

Electrical components may still be energized even when the machine has been switched off. These components are marked accordingly and must not be touched before expiry of the specified discharge time.

Check buffer batteries

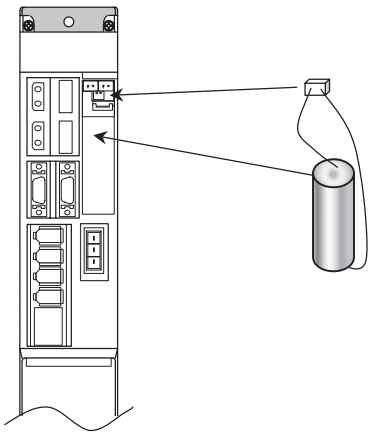
A servo buffer battery ER6V-C119B is installed in each axis amplifier.
The battery must be replaced after four years at the latest!

Servo buffer battery, type ER6V-C119B	Article No. 223093

(5 - 9 batteries, depending on machine configuration)

Replace buffer batteries

- Open front panel of axis amplifier
- Unplug and take out battery
- Connect and insert new battery
- Close front panel of axis amplifier



Servo butter battery

Replace servo buffer batteries
Regular replacement every 4 years

Axis amplifier	Date	Signature

G08

Maintenance of the working area door every 8 years

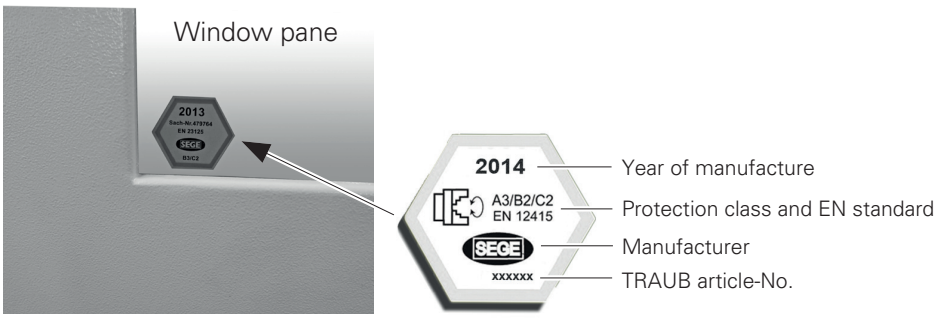
Replace window pane (polycarbonate)

Risk of accidents due to ageing of the window pane
The window pane becomes less resilient with age and must therefore be replaced every 8 years (see chapter F).

The window pane must be replaced for the first time 8 years after the date of manufacture.

A safety sticker with Article No., year of manufacture and the name of the manufacturer is affixed to the window pane.

Example: Safety sticker on window pane



	Article No. without Visiport	Article No. with Visiport
Mounting kit for window pane	480544	479920

The window pane must be installed in accordance with the instructions in drawing No. 479840 (Spare Parts List).
Ensure that the pane is installed correctly, the transparent sticker must be legible from the outside.

Replacement of the window pane
Regular replacement every 8 years

Date	Signature

A	Daily visual inspection		
No.	**Where**	**What**	**Comments**
01	**Complete machine**	• Check safety mechanisms • Check there are no accumulations of metal chips in the working area; any deposits found must be removed • Look for visible oil or lubricoolant leaks	
02	**Working area door**	• Examine the window pane and clean it if necessary	
03	**Chip conveyor**	• Check the pre-filter box for accumulations of metal chips and remove them if necessary	
04	**Hydraulic system**	• Check filling level and top up if necessary	

B	Maintenance work every 200 hours of operation		
No.	**Where**	**What**	**Comments**
01	**Hydraulic system**	• Check system pressure • Check oil level	
02	**Chip conveyor**	• Check the chip conveyor for fouling around the level switch and clean it if necessary	Note manufacturer's documentation
03	**Central lubrication unit**	• Check filling level	
04	**Pneumatic system**	• Check filter for fouling and replace if necessary • Check and correct the air pressure if necessary	
05	**Power clamping chuck**	• Clean and lubricate	Note manufacturer's documentation
06	**Parts conveyor**	• Check belt of parts conveyor	Note manufacturer's documentation
07	**Lighting**	• Check and clean/repair if necessary	
08	**Transition from working area to coolant / oil spray extractor**	• Clean	
09	**Covers in the working area**	• Check wiper / wiper lips	Switch on the machine
10	**Fluid cabinet**	• Clean the metal filter	
11	**Bar feeding magazine**	• Check oil level	Note manufacturer's documentation

C Maintenance work every 1 000 hours of operation

No.	Where	What	Comments
01	**see A, B**	• Carry out all the maintenance work listed under A and B	
02	**Pneumatic system**	• Replace active-carbon filter cartridge	

D Maintenance work every 2 000 hours of operation

No.	Where	What	Comments
01	**see A, B, C**	• Carry out all the maintenance work listed under A, B and C	
02	**Hydraulic system**	• Replace filter cartridge in the pressure filter	
03	**Axes**	• Check grid intervals and reference points	
04	**Hollow clamping cylinder, main spindle / opposed spindle if applicable**	• Clean lubricoolant collecting pan	
05	**Ball screw transmission, axes**	• Determine the reversing backlash	Switch on the machine
06	**Cover in the working area**	• Check wipers on cover panels of main and opposed spindles, replace if necessary	Switch on the machine

E Maintenance work every 4 000 hours of operation

No.	Where	What	Comments
01	**see A, B, C, D**	• Carry out all the maintenance work listed under A, B, C and D	
02	**Hydraulic system**	• Replace hydraulic fluid	
03	**Power clamping mechanism**	• Check concentricity of clamping cylinder	
04	**Top turrets**	• Clean drain opening	
05	**Control cabinet**	• Clean the interior of the control cabinet • Check and retighten connections	

F Maintenance work every 8 000 hours of operation

No.	Where	What	Comments
01	**see A, B, C, D, E**	• Carry out all the maintenance work listed under A, B, C, D and E	
02	**Chip conveyor**	• Change transmission oil	Note manufacturer's documentation
03	**Machine**	• Check fan in spindle servo amplifier	
04	**O-rings**	• Check O-rings and replace if necessary	Switch on the machine

G	Safety-related maintenance every year		
No.	**Where**	**What**	**Comments**
01	**Emergency OFF button**	• Check Emergency OFF function	Switch on the machine
02	**Automatic working area door**	• Check mechanical switch strip	Switch on the machine
03	**Repeat blowing unit**	• Check storage batteries and replace them if necessary	Switch on the machine
	Maintenance required every 2 years for safety reasons		
04	**Repeat blowing unit**	• Replace storage batteries	
05	**Uninterruptible power supply**	• Replace storage batteries	(optional)
	Maintenance required every 4 years for safety reasons		
06	**Control cabinet / control console**	• Replace PC buffer batteries if necessary • Replace NC buffer batteries if necessary	Switch on the machine
07	**Control cabinet**	• Check buffer batteries and replace if necessary	
	Maintenance required every 8 years for safety reasons		
08	**Working area door**	• Replace window pane	

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