



WDT CNC Working Center



isel[®] www.isel.com

Operating and Maintenance Instruction

B.289002/2001.16/E

Place for type plate

On this Manual

Various symbols are used in this Manual to quickly provide you with brief information.

Danger



Caution



Reference



Example

Supplementary
information

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In spite of every care, printing errors and errors can not be excluded.
We welcome any suggestions and remarks on faults.



isel-machines and controllers are CE-conforming and adequately labeled.

Commissioning of all other machine components is not allowed until all corresponding demands, on which the CE-safety guidelines have to be applied, are fulfilled.



isel automation KG assumes no guarantee on machines that have been altered or modified.



The electromagnetic compatibility test only applies to the original configuration of the machine supplied ex works.

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Please, consider these short instructions to

- properly commission the equipment,
- fast, safely, and effectively work,
- avoid danger to personal,
- and thus exploit the full potential.

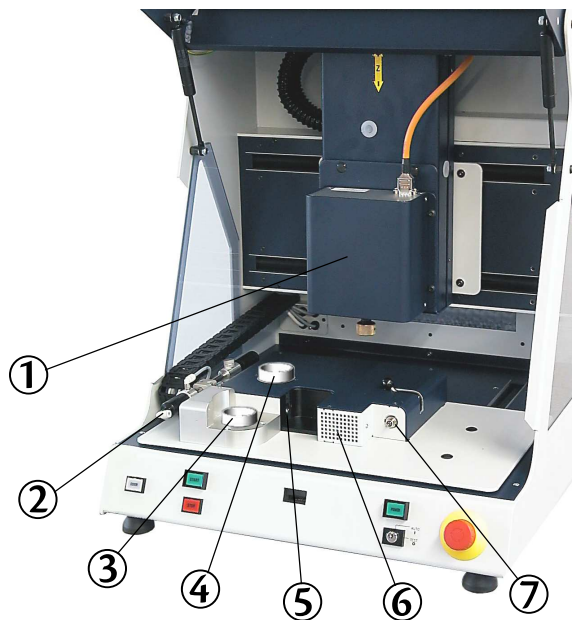
We wish you a lot of success. Enjoy your future working with the WDT CNC Working Center.

1 Introduction and intended purpose

This CNC working center is a tool machine with three linear axes and special additional devices which can be controlled electronically.

- The 4-axes machine consists of:

- ① Rotary axis
- ② Cooling rod
- ③ Liquid container (Agitator)
- ④ Degreasing agent container
- ⑤ Laser scanner
- ⑥ Heating blower
- ⑦ Milling spindle





WDT CNC Working Center

- The machine is planned for production of Wolceram®-caps using the laser CNC coating technic of WDT. It is guaranteed by the international patent protection.

The machine is permitted to be used only for this purpose.

To do this a prepared tooth stump is scanned by a laser, afterwards it is automatically dipped into a low viscosity suspension several times, it is dried and finally worked out to measure.

- It is designed for use in dry rooms, offices, living and training areas and in labs and small firms (maximal ambient temperature 40° C).

2 Notes on safety



- The machine should not be operated in a combustible environment.
- The machine is completely enclosed. The enclosure protects you against moving tools, decreases the operating noise level, and restrains the chips/dust.
- While operating, the hood is locked and can not be opened. You should neither remove nor modify this safety mechanism.
- For emergency situations, you find an Emergency-Off switch on the front-panel of the machine.
It interrupts the power supply to the power module and tooling machine.
However, the software - machine communication remains possible for fault tracing.
- Only experts and trained persons should operate the keyswitch since a higher risk exists in test mode.
Please, keep the alternative key in a secure place.
- All 230 V loads are only single-pole switched. You must assume that an interrupted load is not necessarily voltage-free.
- Clean the machine regularly and remove chips and dust deposits.
- While working please avoid any contact with moisture.
- Please pay attention to the technical operating rules of the additional devices such as laser, heating blower, milling spindle, agitator and cooling.

- Laser

The laser uses sensitive sensor technology, and so it can use a low output beam to measure dark surfaces also. The human eye is able to see the laser beam because it has a wave length of 670 nm. The natural eye blinking reflex protects the eye from any harm.

Do not look directly into the laser beam or into reflected beams (e.g. from reflective surfaces or metals).

It is safe to look at the diffusive measuring point. According to EN 60825 the laser belongs to laser class 2, so there are no particular protectors required.

Aging of Safety Panes



Investigations, accomplished by the Association of German Machine Tool Factories (VDW) in connection with the responsible employer's liability insurance association have pointed out new aspects about the aging of polycarbonate as material for safety panes at machine tools. Although polycarbonate worked very good for this purpose, these panes sometimes substantially lose their ability to hold back flying around parts, especially under the influence of cooling lubricants. At longer term, polycarbonate panes that are double-sided protected against the effects of splinters, cooling lubricants, detergents, steams, etc. have hereby shown the highest resistance.

In order to set you in the position to carry out your care business, we would like to point out that safety panes made of polycarbonate are therefore to be examined regularly for their retaining abilities and to be changed if necessary. Additionally, such safety panes are to be classified as wearing parts in future. Beyond that, when you sale it, you are also obligated to inform the possible buyer of such a machine accordingly about that.

Even with consideration of these new realizations polycarbonate will be further used as material for safety panes in mechanical engineering due to its extremely high retaining ability. Spare panes ready to be installed can therefore be ordered from us at any time. In order to increase the necessary exchange intervals, we can also offer a retrofit kit for an additional protection on the operator side if desired.

3 Set up and connecting

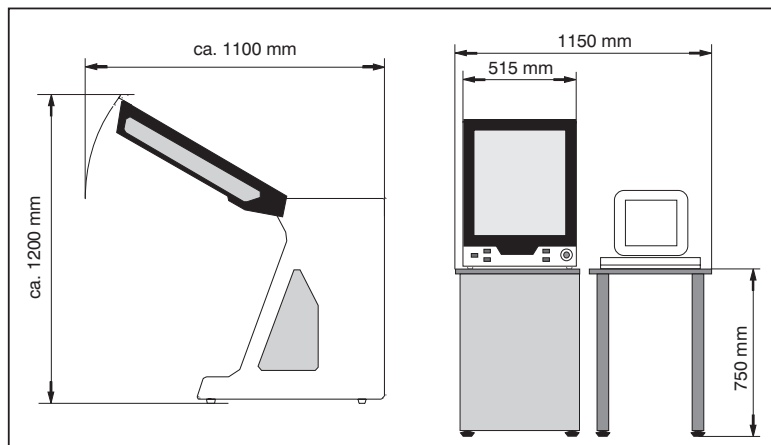
Scope of delivery

Machine and table (control box, monitor, etc.) are delivered on one palette. Contained in scope of delivery of the working center are:

- machine chassis with three linear axes included
 - complete control electronics
 - rotary axis
 - laser scanner and control device
 - heating blower
 - bracket for tooth caps including 6 mm split chuck and knurled screw
 - milling spindle including 3 mm split chuck
 - liquid container (with stirrer)
 - working area illumination
- triangular wrench for unlocking the hood switch
- machine table with control computer
- providing desk for assembling
- monitor and keyboard
- AC power cable,
interconnection PC <----> machine
- Driver software I5DRV for DOS including setup program, floppy disk, manual
- WDT processing program, floppy disk, manual
- as well as this service and maintenance instruction for the machine

Set up

The **space requirement** of the machine is limited to the external measurements and to sufficient room in front of the machine in order to operate and arrange the processing, plus approx. 10 cm behind the machine to allow for connectors. The hood opens upwards. Thus, the required total height is approx. 2 meters.



Dimensions and space requirement

Remove the sheet metal retaining hooks between the feet and the palette. Then, set up the work table onto a flat, level surface. Next set up the machine, monitor and keyboard acc. as seen above.

The table surface can be leveled by screwing the feet into or out of the table legs.

Transport

During transportation, please pay attention to the supply and connection cables (remove if needed) so that they are not damaged. Use only suitable lifting devices.

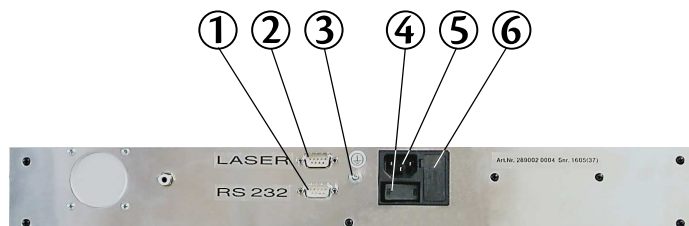


Above all, keep the triangular wrench always outside of the machine during transportation.

(see page 22)

Connections

Before putting into operation connect all cables to the machine. The cables are enclosed.



- ① Connection machine <---> computer
Important! The red plug must be connected at the PC
- ② Laser (shining 9-pin Sub D connector)
- ③ Additional ground kontakt
- ④ Machine power switch
- ⑤ Power supply 230 V
(connected via main switch at working table)
- ⑥ Fuse

Don't forget to connect the monitor, keyboard and mouse at the back of the computer.

All internal machine connections are existent. Please do not modify them in anyway.

Do not switch the machine on before it is ready for operation.

4 Comissioning

4.1 Preparations

It is provided that machine and computer is connected regular.

Milling machine

The milling machine accepts a rotary grinder with a shaft diameter of 3 mm. The current for the rotary grinder is controlled by the WDT-software.

Changing the rotary grinder:



Switch off the machine !

Never press the lockpin while milling machine is running!

1. Turn the clamping lever ① to the right
2. Pull out the milling grinder and exchange it.
3. For tightening the milling



grinder, turn the clamping lever ① counter-clockwise.

4. Re-adjust the tool position by using the WDT software (ref. WDT-software manual).

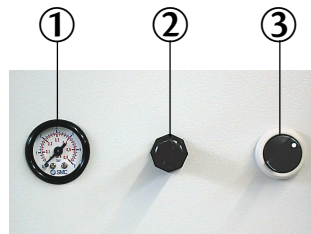
Heating blower

The heating blower is automatically controlled by the WDT-software.

Cooling

The cooling is manually controlled by the operator

- ① Manometer
- ② Air pressure regulator
- ③ On/Off switch



Laser

The laser is automatically controlled by the WDT-software.



Do not look directly into the laser beam ! This also applies for rays, which are reflected by shiny surfaces (e.g. bright metals).

The laser is factory adjusted. Only specialists are permitted to re-adjust the laser.

Agitator

The agitator is automatically controlled by the WDT software.

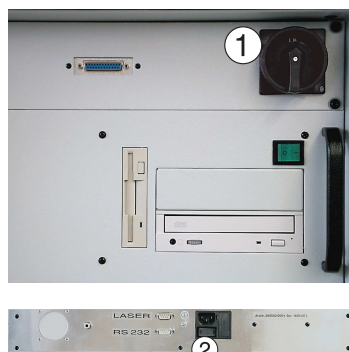
Coating suspension

Put the container with the coating suspension into the agitator on the base plate. As long as the WDT software is active, the coating suspension is cooled and kept in liquid condition here.

4.2 Important operationing instructions

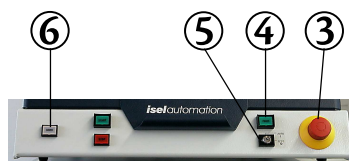
Push-buttons and switches

The mains switch of the working center is located at the front. The round mains switch ① disconnects the whole working center from power supply, including controller and computer. The smaller switch ② at the back side of the machine chassis serves only for the machine.



③ Emergency-Off

Abort of all functions; the error status remains testable using the software; the hood can be opened using the push-button ⑥. Releasing Emergency-Off by turning the red knob clockwise (cw).



④ POWER

You can turn the power stage on only, if Emergency-Off is released.

⑤ Keyswitch

Using the key, you can switch between test and automatic operation.

AUTO = processing mode

In the automatic mode, the machine works stand-alone via the connected control computer.

TEST = test mode

- In this operating mode, you can open the hood at any time if the milling machine is switched off.
- You can continue to process the program. However, the milling machine is switched off if the hood is opened and can not be switched on again. The sledge remains freely moveable also with manual traversing (teaching).



**Take care of the mobile sledge:
Danger of bruising!**

⑥ COVER

The hood can only be opened if the button is lit. You can open the hood by pressing this button and pulling simultaneously on the grip!).

Keyswitch

You can nevertheless open the hood during operation for

debugging a program if you turn the keyswitch to TEST (test operation). In this case, the milling machine must be switched off but the work program is continued.



This key may only be used by expert and authorized personnel since there is no protection against moving machine parts anymore after opening the hood.

Bracket for tooth caps

The bracket for tooth caps can be fixed by turning the knurled head screw clockwise (cw). The cap is fixed in the bracket with wax.



Always make sure that all work pieces are firmly fixed.



4.3 First commissioning

Before commissioning the machine for the first time, please check that the WDT is set up and connected correctly:

- Before opening the hood for the first time, connect the power cable and turn on the mains switch. The COVER button ⑥ should light up allowing the hood to be opened.
- Emergency-Off must be released for all of the following functions.
- Close the hood and turn on the power stage using the POWER push-button ④; the push-button should light up.
- You can now execute the software. However, an error

message is displayed if the machine is not operational (power stage not turned on).

- The hood is locked while operating. You can only open the hood after the axes are standing still, the milling machine is off, and the software enables the opening of the hood (the COVER button lights up).
- You must press the COVER button for opening the hood. The hood is automatically locked after closing.



Please, refer to the corresponding software manual for all further information on working with the WDT-software.

5 Cleaning / maintenance



Open the hood before switching off the mains switch. After this, it is no longer possible to open the hood.



Switch off the mains switch before any cleaning or maintenance. Also, pull the power plug in order to prevent an inadvertent starting.

Clean the machine regularly with a brush or vacuum cleaner of all chips (no compressed air). This protects against early wear of mechanical parts.

- The sealing lips are made of a Teflon component and require no special maintenance.
- Clean the perspex windows with a non-abrasive fluid cleaner.
- The shaft guides and drive shafts are provided with a long-term lubrication ex works. Depending on the load, you should grease the shaft guides and drive shafts approx. every 500-1000 operating hours. Use usual roller bearing grease for that purpose. The shafts and shaft guides are factory lubricated using GP00/000F-20 sodium soap grease according to DIN 51 502. Please, re-lubricate every 100-200 operating hours if you use oil. First, make a reference movement for lubricating the driving axis. Next, open the hood and only now switch off the machine.

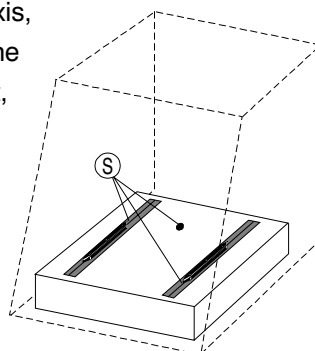


Ⓢ in all drawings is used to characterize access to the various greasing points.

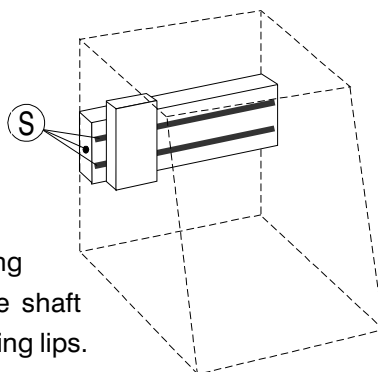
In order to lubricate the Y-axis, you must completely push* the base plate to the back. Next, unscrew it from the Y-axis (six screws).

Remove the plastic plug located underneath it and lubricate through the now visible lubricating nipple.

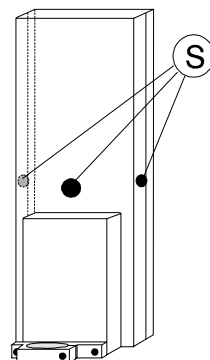
You can access the shaft guides through the sealing lips.



To lubricate the X-axis, move the sledge to the left*. Remove the plastic plug on the left side of the machine and lubricate through the now visible lubricating nipple. You access the shaft guides through the sealing lips.



At the Z-axis, you must remove the three plugs and push the sledge completely down*. You can apply some oil onto the shaft guides through the two side holes. The lubricating nipple for the drive is now visible through the front opening.



** You can move the sledge per hand if the machine is off.*

6 Troubleshooting

Fault	Cause	Remedy
Equipment can not be turned on	No mains power is available	check the mains circuit, power plug, multiple socket outlet
	Mains switch is not turned on	turn on the mains switch
	Fuse is defective	Pull the power plug replace the fuse (see below)
POWER button does not function	Hood not closed	close the hood
	Emergency-Off not released	release Emergency-Off
	Fuse is defective	Pull the power plug replace the fuse (see below)
Software does not work correctly	Equipment not turned on	turn on the equipment (mains switch in the back)
	Power stage not turned on	activate power stage (POWER button)
	Driver not loaded	install the driver
	Connection is not correct	check the cable connectors
Tooling machine (spindle) or heating fan does not function	Not released by the software	reset the equipment and perform a reference movement
	devices are switched off tooling machine is off	turn on the switches
	Fuse is defective	Pull the power plug replace the fuse (see below)
Laser is not working	Faulty cable	check connection
	Are the indicator lights luminated? (at the laser controller)	check laser controller or send in for service

Fuse replacement

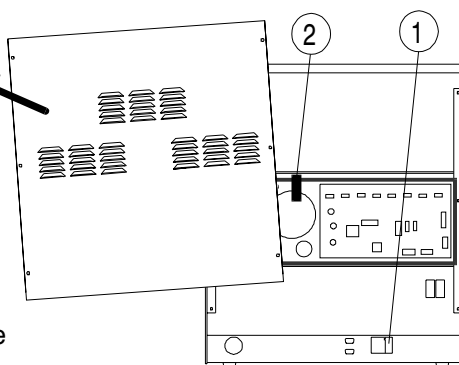


Disconnect the power cord before changing any fuse!

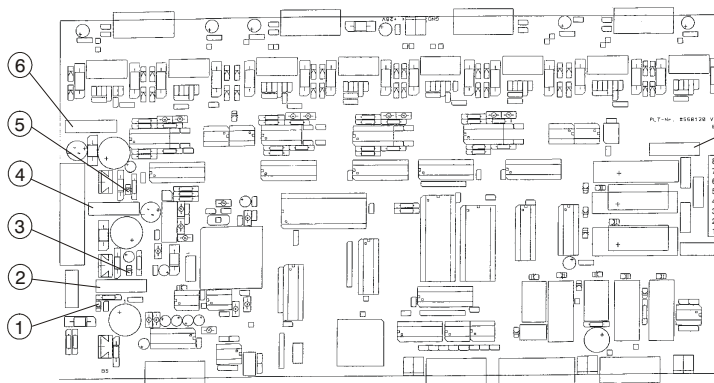
The main fuses of the machine ① are amenable from the outside. They are located directly beside the power plug.

Remove the large rear-panel for changing the other fuses. You find the main fuse for the motor voltage ② in front of the transformer in the black plastic holder (① + ②: 6.3 A each).

The remaining fuses are located on the controller printed circuit board.



Please refer to the following drawing for the positions of fuses (②, ④, ⑥, ⑦, ⑨) and LED's (①, ③, ⑤).

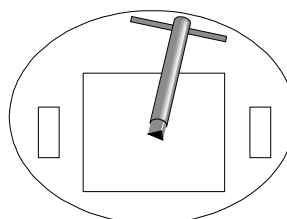


Controller printed circuit board behind the rear-panel

- | | |
|------------------------|--|
| ① Controller LED | Processor supply voltage 10 V/5 V |
| ② Input fuse | 1.25 Amp, slow-blow |
| ③ Controller LED | 24 V I/O voltage |
| ④ Input fuse | 1.25 Amp, slow-blow |
| ⑤ Controller LED | 24 V safety circuit voltage |
| ⑥ Input fuse | 1.25 Amp, slow-blow |
| ⑦ Heating blower | 230 V, 1.25 A, slow-blow HBD,
fuse (out3) |
| ⑧ Output connector | 230 V (tooling machine) |
| ⑨ Milling machine fuse | 230 V, 5 A, slow-blow HBD |
| ⑩ Laser connector | 15 mA max. |

For special cases (if a switch is defective or in case of power failure etc.), you can manually open the hood interlock using the triangular wrench.

1. Switch off the machine and lift the machine.
2. Remove the four screws and the shield in the bottom plate.
3. Insert the triangular wrench into the interlock from below and turn it half a turn to counter clockwise without applying excessive force.



Hole to the keyswitch
(from below)



You may not operate the machine in this state.

The milling machine remains de-energized.



7 Technical data / contact

	WDT CNC Working Center
Measurements w x d x h	515 x 580 x 615 mm
Movement areas X/Y/Z	200/175/90 mm
maximum axis speeds	20 mm/s (max., all axes, without a load)
Pass-through height	90 mm
Clamping table	250 x 425 mm
T-slot raster	25 mm
Approx. weight	74 kg
Sound pressure level	< 70 decibel (A)
Mains rating	230 V, 50 Hz, 16 Amp
Max. power consumption	1150 W
Fusing	power input 2 x 6.3 Amps, slow-blow HBD
Earthing	corresponds to protection class I.
Electric connections	2 x 24 V, switchable, 20 mA via optical isolator 1 x 230 V, switchable for heating fan 1 x 230 V, switchable for the tooling machine
Milling machine	100 W, 5.000-20.000 r.p.m., firmly wired
Heating fan	200 W, firmly wired
EMC test according to	EN 55011-B and EN 50082-1

In order to improve our products, we reserve the right to make engineering changes.

For further information and/or questions, please turn to

WDT Wolz-Dental-Technik GmbH



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8 Appendix Declaration of conformity

We, company **isel automation KG**
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declare in only responsibility, that the following machines

article designation: **WDT CNC Working Center**
article numbers: **289002 0001** (German)
289002 0002 (French)

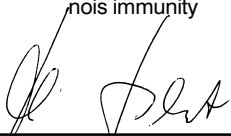
to which this declaration refers, have been developed, designed, and manufactured in agreement with

EC guideline 89/392/EWG ~ 93/68/EWG
EC guideline 73/23/EWG ~ 93/68/EWG
EC guideline 89/336/EWG ~ 93/68/EWG.

The following harmonized standards are applied:

- | | |
|---|---|
| <p>1. EN 292 parts 1 and 2
Safety of machines, basic terms,
general construction guiding principles</p> <p>2. EN 294
Safety distances against accessing
dangerous locations using the upper
limbs</p> <p>3. EN 349
Safety of machines: Minimum distances to
the avoidance of bruising of parts of the
body</p> <p>4. EN 418
Safety of machines: Emergency-Off equipment,
functional aspects, construction guiding
principles</p> <p>5. prEN 953
General requirements on construction and
design of separating protective devices</p> | <p>6. prEN 954-1
Safety-related parts of controllers</p> <p>7. EN 60 204 part 1
Electric outfit of industrial machines
General requirements</p> <p>8. EN 55011 (VDE 0875)
Limit values and methods of measurement
RF noise suppression of industrial,
scientific and medical radio-frequency
devices (Limit class B)</p> <p>9. EN 50082-1
Electro-magnetic compatibility
fundamental standard radiated inter-
ference
Part 1: Living areas, business and trade-
areas and small firms</p> <p>10. IEC 1000-4 (part 2-5)
Testing and method of measurement of
noise immunity</p> |
|---|---|

Eiterfeld, 12.4.2001


Hugo Isert, Manager