



Assembly instructions for CNC basic
machines (incomplete machines)

Operating instructions for CNC machines
(complete machines)

Type/Model: ICP 4030 iMC-P

On these operating instructions

Abbreviations

MRL Machinery Directive 2006/42/EC

Symbols used

In this manual, you will find various symbols to draw your attention to important information / facts and risks:

**Warning!**

Warning of hazards that may lead to adverse health effects, physical injury or death.

**Warning! Lethal voltage**

Warning of danger from electrical current. Ignoring this may lead to serious injury or death.

**Attention!**

This symbol highlights instructions, which if not followed may result in damage or malfunction.

**Information**

This symbol highlights important information and notices.

Safety notice



Before you start up the CNC machine ICP 4030, work with the machine or make additions or changes to the electrical installation of the machine / in the control cabinet /5/ of the machine, please read carefully:

- the safety notices in these operating instructions (Section 3) and
- the safety instructions for electrical drives and controls in the operating instructions manual Positioning module with CANopen interface /1.1/ or /1.2/

These operating instructions must be kept close to the machine and be accessible to the staff (operators, fitters, maintenance personnel) at all times.

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Despite the utmost care, printing errors and mistakes cannot be excluded. We would be grateful for any suggested improvements or references to errors.

CE marking for (complete) CNC machines:

isel-CNC machines are CE compliant and marked accordingly. The CE conformity declaration applies to these machines.

no CE marking for partly completed machinery:

Partly completed machinery (Definition as per Machinery Directive 2006/42/EC) have no CE marking.

The declaration of incorporation applies to party completed machinery.

For all other machine parts and components, to which CE safety guidelines apply, start-up is prohibited until all appropriate requirements are met.

The company **isel Germany AG** accepts no responsibility or liability if you make changes to the machine without the manufacturer's consent, which affect the CE conformity of the machine.

The EMC test is only valid for the original machine configuration delivered ex works. Manufacturer:

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1 Introduction

All **isel**-CNC basic machines (pursuant to the Machinery Directive 2006/42/EC **partly completed machinery or partial machines**) or **isel**-CNC machines (pursuant to the Machinery Directive 2006/42/EC **Machinery, i.e. complete machines**) of the type ICP 4030 are tried and tested CNC machines, which offer a wealth of possibilities for two or three-dimensional machining of components.

The basis is formed by precisely tailored and variably mountable standard profiles and drive units, which are fitted depending on the requirements of the machine type (the so-called machine kinematics). The external appearance of the machine of one type is always the same. The applications of the specific CNC machine in accordance with the tool mounted (on the Z axis) can be quite diverse.

A common feature of all CNC basic machines / CNC machines of the type **ICP 4030** is the control and safety concept and the basic structure of the mechanics. Each machine is configured before delivery, tested for many hours in depth, measured at the factory and run in.

For each basic machine / machine delivered, a measurement and test report with the customer's order number is kept at the manufacturer isel Germany AG, and can be requested by you as a buyer. All basic machines / machines are measured with circularity tester QC20 by **Renishaw**[®] in all three interpolation planes or laser interferometer.

As a prerequisite for your work, you need basic knowledge in CNC technology and PC application, and if possible, a basic knowledge of the terminology of the currently applicable Machinery Directive (**MRL**):

- **MRL 2006/42/EC** **since 29.12.2009** **legally binding**

Please follow these **operating instructions** so that you

- can work properly install / start up the CNC basic- / CNC machine
- and work it safely and effectively
- Keep hazards away from people and equipment
- and fully use the performance of the CNC machine.

The statements in these operating instructions are based on a standard scope of delivery, with which the machine is ready for operation. You can skip statements (e.g. regarding accessories and software), which do not affect your machine in your initial study of these **operating instructions**.

The statements in these operating instructions apply to the following equipment / technical level of the CNC machine control:

- all motor output stages are fitted with **Standstill monitoring** (from 01/07/2008)
- the operating software used is: **ProNC /6/ / Remote /7/ from software version V1.46.2.1**

To install and set up software or the accessories, please also consult the other manuals and instructions.

These are indicated in the source directory.

Example CNC basic machine ICP 4030:

- **(partly completed machine)**
- **without tool**, no clear definition of the intended purpose
- this CNC machine is delivered **without a CE mark**
- the declaration of incorporation applies to this CNC machine.

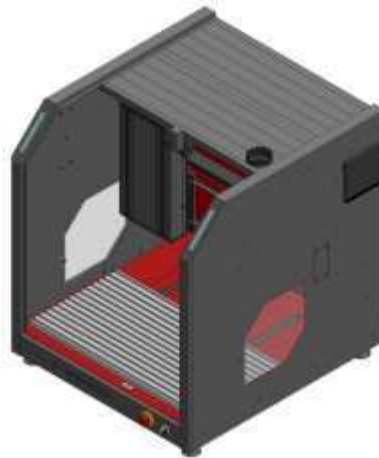


Fig 1: ICP 4030 EC CNC basic machine

Example CNC basic machine ICP 4030:

- **Complete machine**
- fitted **with the tool** cutter spindle, so suitable for drilling / cutting
- this CNC machine is delivered **with a CE mark**
- the declaration of conformity applies to this CNC machine.

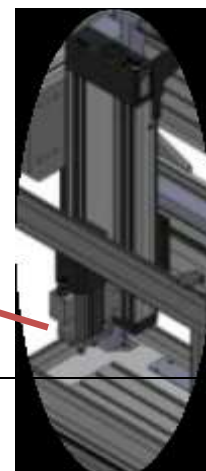
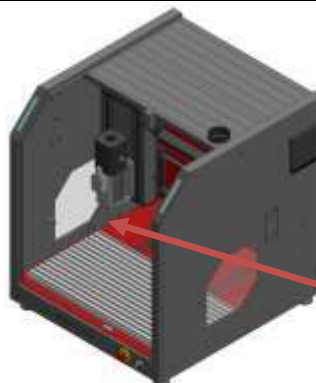


Fig 2: JCP 4030 EC CNC machine

2 Intended use, foreseeable misuse

isel-CNC machines / *isel*-CNC basic machines are CNC controlled machines with several linear axes or an optional rotating axis. The motor output stages are controlled via a control core either independently (CNC operation) or PC-based CNC control (DNC operation). The complete control and power electronics for all axes is housed behind the back wall of the machine.



Difference between a CNC machine and a CNC basic machine:

Machine:

In the Machinery Directive 2006/42/EG legally binding since 29.12.2009, the term “**Machine**” is defined as follows (quote from MD, Article 2, Letter a):

“Machine”

- *an assembly, fitted with or intended to be fitted with a drive system other than directly applied human or animal effort, consisting of linked parts or components, at least one of which moves, and which are joined together **for a specific application**;*

Every *isel*-CNC machine, delivered **with a tool** (e.g. cutter or engraving spindle, dosing unit, sensor like CCD camera or triangulation laser, water jet nozzle, plasma burner or equiv.), is a machine pursuant to the Machinery Directive 2006/42/EC, because it is manufactured and to be used for a specific purpose or **for a specific application and thus use**.

The use results from the type of the tool (fitted on a movable axis), for example:

Tool = machining spindle	Application for cutting, drilling
Tool = engraving spindle	Application for engraving
Tool = dispensing unit	Application for sticking, dispensing
Tool = water jet nozzle	Application for water jet cutting

etc.

As the manufacturer, isel Germany AG can carry out the statutory required risk assessment for CNC machines. CNC machines are supplied with housing.

isel-CNC basic machine:

In the new Machinery Directive 2006/42/EC legally binding since 29.12.2009, the term “**partly completed machines**” is defined as follows (quote from MD, Article 2, Letter g):

“partly completed machine”

- an assembly which is almost machinery but which cannot in itself perform a specific application. *A drive system represents a partly completed machine. Partly completed machinery is only intended incorporated into or assembled with other machinery or other partly completed machinery or equipment, thereby forming machinery to which this Directive applies;*

Every isel-CNC basic machine delivered **without a tool** and therefore not *for a specific application*, is **partly completed machinery** pursuant to the Machinery Directive 2006/42/EC.

- The **CNC machine / CNC basic machine** is designed for use in dry rooms (workshops, labs or similar rooms) and industrial companies (maximum ambient temperature: 40°C)
- **CNC machine:**
 - The **CNC machine (complete machine)** must be used accordingly based on the type of the tool fitted on the machine. This means, the concrete tool of the CNC machine determines the proper use of the machine in accordance with the Machinery Directive (Annex I, Section 1.1.2). Under this premise, the CNC machine is suitable for milling, drilling, cutting, engraving, dosing, measuring or water jet cutting. The CNC machine is not suitable for graphite machining.
 - Suitable processing materials are light metals, plastics, wood, glass, circuit board materials and the like.
 - Not permitted are materials that produce harmful gases when they are processed.
 - The CNC machine is prepared for an extraction device. This extraction is preferably suitable for dry dust (wood dust, fibreglass / fibreglass-platinum dust and similar).
- The **CNC basis machine (partly completed machine)** may be supplemented by you as the buyer of the basic machine with a wide range of suitable processing tools for the CNC machine (complete machine) in compliance with the requirements of the Machinery Directive. You are responsible for the CE certification if you deploy / use or sell (market) the machine. The CE certification also contains the statutory mandatory marking of the safe machine with the CE mark.

- CNC machines for milling:
 - The CNC cutting machines are designed for cutting / drilling the following materials: **Aluminium, copper, brass, plastics (e.g. GRP/fibre glass), wood**
 - Processing magnesium is **prohibited** due to the risk of fire.
 - In the processing of steel / stainless steel only engraving works or processing with low cutting forces is possible.
 - Cutters and drills may be used up to a maximum shaft diameter of 7 mm.
 - In the case of the tools form cutters and counter-bores for the wood sector, the cutting diameter shall not exceed 45mm and the shank diameter shall not exceed 7mm.
- The rapid traverse rates should, depending on the system size, not exceed the value of 150 mm / sec to a maximum of 200mm / sec.
- The feed speed of the tools in the material must be determined technologically and should always be less than the rapid traverse rate.
- The user is responsible for the secure clamping of the tools in the tool holder.

The (reasonably) foreseeable misuse includes the operation of the CNC machine by two persons. It is prohibited for a person in the test mode (see Section 7.1 Operating modes) to activate the acknowledgement button on the operating panel and the other person to reach into the working area of the machine with opened door or perform activities of any kind therein.

There must be no tampering with the lock of the protective cover (on the back).

3 Safety notices



Read this section of the Operating Instructions carefully before connecting and operating the machine! As with all technical systems, faultless function and operational safety can only be guaranteed with this machine if the general safety precautions and the special safety instructions are observed during operation.

3.1 General safety notices

1. The machine must only be installed and commissioned by authorised personnel with the appropriate qualifications.
2. The machine must only be used in accordance with these instructions. The manufacturer excludes any liability for damages arising from use of the machine for other applications.
3. The CNC machine may only be operated to process suitable materials using tried and tested components. The use of non-approved materials and accessories (e.g. cutters) may cause damage to the machine or components. In this case, the manufacturer excludes any liability.
4. Before starting the machine, check that mains voltage specified on the rating plate of the individual components mains voltage matches the mains voltage available. The wrong mains voltage can destroy the machine and its components.
5. To prevent electric shocks, do not put any objects into the machine; an exception to this is the proper replacement of parts in accordance with these operating instructions.
6. Always isolate the machine from the mains before carrying out any maintenance work.
7. Never operate the machine in locations where there is a risk of water or other liquids entering the control unit behind the rear cover or the front panel controls.
8. The floor space of the machine must be sufficiently stable; please note the permissible floor load.
9. The opening of the machine housing and repairs to the machine must only be performed by authorised service technicians.
10. Please note that there may be risk of injury from a cutter clamped in the cutting spindle.

11. The cutting machine may only be operated with original accessories, or accessories approved by the manufacturer. When replacing parts in accordance with these operating instructions, only original parts may be used. No liability shall be accepted for damages caused by the use of non-approved accessories or external parts.
12. The cutting machine must not be used potentially explosive areas.
13. When laying the mains line, make sure there are no risks of tripping or damage to the lines.
14. If, without the written consent of the manufacturer, a change to the CNC machine or its components is made, the EC declaration of conformity issued shall become invalid.
15. When cleaning the machine, avoid breathing in any dust created.
16. Clean the machine only with suitable cleaning agents (standard household, non-abrasive cleaning agents).
17. Mobile telephones should not be used in the vicinity of the machine. Interference with the CNC control cannot be ruled out.

3.2 Special safety notices

- The CNC machine is surrounded by a housing enclosing the working area or a protective cover.

The transparent panes fixed in the machine frame or the protective cover ensure the safety of operating personnel. The panes must not be removed. The material of these panes is:

- PETG = Polyethylene terephthalate with glycol or
- Polycarbonate, e.g. brand name Makrolon ®

The transparent panes ensure during the operation of the machine (during set up or processing of the component) protection against moving machine parts and any tool or component parts ejected from the working area due to a break in the material.

The housing reduces the noise level and holds back chips created in a chipping process. **During processing**, the protective hood is **locked (bolt)** and cannot be opened. This safety device (**door lock**, the **so-called Schmersal switch**) must not be removed or changed.

A CNC machine delivered with CE marking must not be started without a full, intact housing including undamaged PETG or polycarbonate panes.

- The **drill or cutting tools used on the CNC machine with processing spindle must, in the case of the tool holder SK11, have a maximum shaft diameter of 7 mm (standard)**. If you are unsure or have any queries about the choice of tool, please contact the application technology department at isel Germany AG.
- The CNC basic machine without a housing or protective hood is a complete machine under the Machinery Directive 2006/42/EG and is supplied without CE marking. The declaration of incorporation and assembly instructions applies. ***As the operator of the CNC basic machine, you are responsible, based on your risk assessment, for taking appropriate protective measures to meet the safety requirements on the machine under the Machinery Directive 2006/42/EC.***
- Always make sure the components are sitting tightly. The use of a suitable, i.e. safe component clamping device for the specific processing is the task of the operator of the CNC machine. Unsuitable, unsafe clamping devices can if the component comes loose from the clamping device during processing and lead to serious accidents resulting in death or personal injury or serious damage to the component, the tool, the clamping device and other machine parts.

- For emergencies, you will find an emergency stop switch at the front. This interrupts the power supply to the power electrics (motor output stages) and the frequency converter for the main spindle drive. The shut-down takes place according to stop category 1 (controlled stop and subsequent interruption of the power supply to the drives).
- Only skilled and trained persons should handle the key switch on the control elements because in test mode there is an increased risk of injury. Keep the spare key locked away.
- Provide adequate ventilation for dust or gas, caused by the processing of the materials.
- If the sound pressure level on the machine exceeds the value of 70dB(A), appropriate ear protection must be worn by the operators.
- Work on and with the machine must be carried out by authorised, trained and instructed staff. These staff must have received special training on possible risks (in particular residual risk).
- Before changing the tool, the machine must be switched off by operating the emergency stop switch.
- For cooling, no running water may be used, but only a cooling device (see accessories), in which a water mist or air causes the cooling effect. No drops must be allowed to form and flow under the clamping plate.



- **ATTENTION! High leakage current (earth leakage current, protective conductor current)!**
Before connecting to the AC supply network, it is essential to connect an additional protective conductor (cross-section, installation and terminal point in the control cabinet are described in section 5.5 Connection to the AC supply network).

4 Setting up and connecting the CNC machine

4.1 Scope of supply

The machine is delivered fully assembled on a pallet. In the scope of delivery of the ICP 4030, Art no.: 280270 XXX the following are contained:

- Machine housing including:
 - *three drive axes with ball screw spindle 16 x 10mm or 4mm, 2-phase stepper motors and two limit switches*
 - *Protective cover with solenoid interlock*
- Stepper motor control behind the machine rear wall included:
 - *Mains input filter with main switch and fuses*
 - *2-phase stepper motor output stages for 4 axes with max. 4 A rated current*
 - *Connection board with processor (core module)*
 - *Safety circuit module (SK module)*
 - *48V power supply unit and 24V power supply unit*
 - *Function keys and emergency stop on the front of the machine*
- Triangular key for unlocking the cover switch
- Mains supply line, communication line
- Remote as software (optional: ProNC:
- Operating instructions

4.2 Delivery status ex works (quality assurance)

The ball-bar measuring system QC10 Renishaw is used to demonstrate / check the machine accuracy of the CNC machines.

This system determines the precision of the axes of all CNC machines / CNC basic machines produced before the delivery.

Ball-bar measuring system QC10

The assembly of the QC10 is possible on each tool machine and only takes a few minutes. The ball-bar measurement is controlled via a simple, standardised CNC programme. The data is identified in the diagnostic software, evaluated and the faults displayed graphically/in a table with their size and the corresponding impact on the overall accuracy.

The form of the circuits detected (in all three interpolation levels XY/XZ/YZ) gives indications of possible machine faults:

- Tracking errors / position tolerance
- Straightness error / square
- Dimensional error / backlash
- Quadrant transition / circular deviation

The measurements are done based on the size of the axes to be measured with a radius of 50mm, 100mm, 150mm and 300mm. The shortest axis must always be taken into consideration.

Each CNC machine will not be delivered until all parameters are within the prescribed limits. The results of measurements are stored either as machine- or order-related and archived.



Figure: Circularity measurement with Renishaw's QC10 circular form measuring system

4.3 Space required

The machine's space requirement is limited to the external dimensions and sufficient space in front of the machine to be able to operate and set it up. At the back you need about 10 cm space for the connectors. The cover of the housing opens upwards.

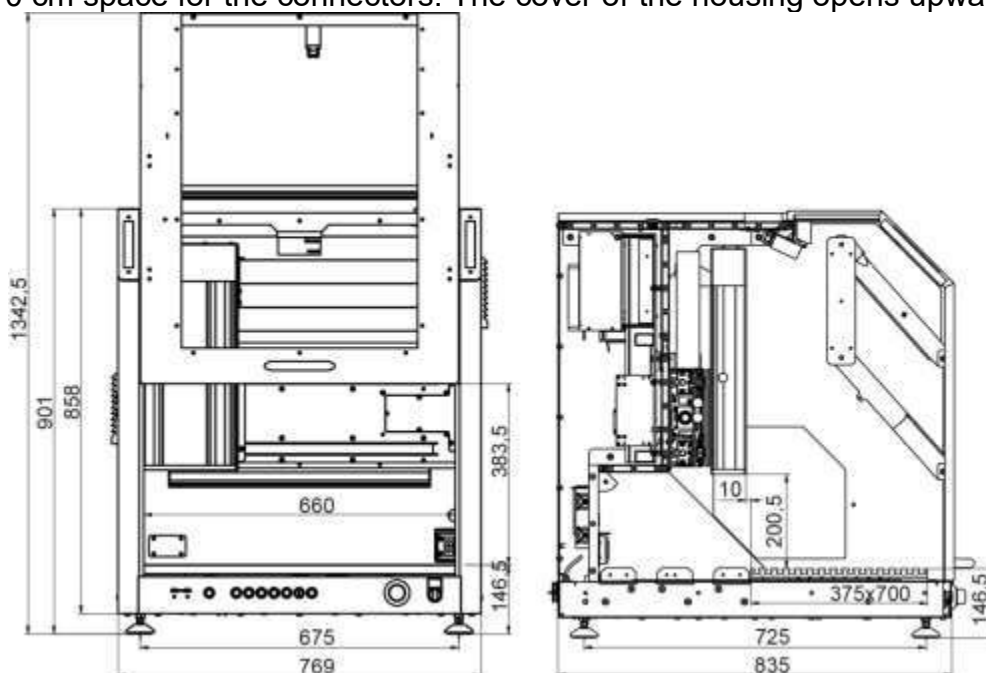


Figure: Dimensions and space required



Always keep the triangular wrench especially when transporting outside the machine.

When you set up your CNC machine, use only suitable,



, secure clamping tools (see

chapter Accessories).

Always make sure the components are sitting tightly.



When planning the installation space for the CNC machine, all-round access for trained personnel during a maintenance or service phase must be taken into account!

4.4 Transporting the CNC machine

Remove the transport locks. Use only appropriate lifting devices (forklifts, trucks). Only lift the machine from the bottom.

On subsequent transport, make sure that the mains and connection lines are not damaged.

Remove the mains plug before any transport



When transporting the machine, make sure it is not exposed to heavy vibrations. Always keep the triangular wrench for manually unlocking the door outside the machine.

4.5 Setting up the CNC machine

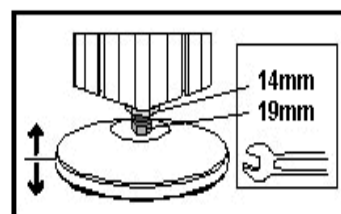
The clamping area / processing area of the CNC machine and all axes are factory set exactly perpendicularly.



Never loosen the fastenings of the axes or the mounting angle at which the transverse axis is mounted (X-axis). Otherwise the machine must be re-measured by a technician of the manufacturer isel Germany AG.

Set the machine up on a level and firm surface. You can compensate for any unevenness in the floor/table with the height-adjustable feet.

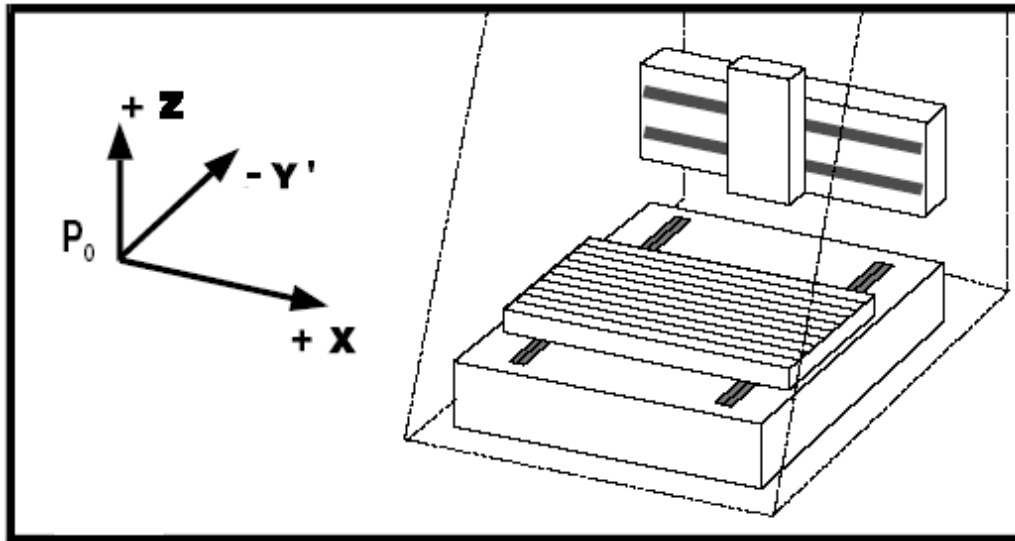
To accurately align the machine, you need a spirit level with accuracy of at least 0.1 mm/m. Secure the height of the machine feet with the locknut.



4.6 Coordinate system and reference point

The coordinate system of the machine is defined as shown in the illustration, whereby you can freely select (move) the component zero point P0 via the software.

The reference point of the machine (machine zero point) is set in front (Y) at the factory on the left (X) above (Z).



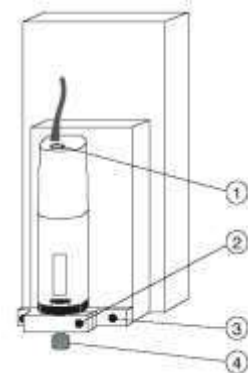
Stickers on the machine indicate the axes.

4.7 Processing machine

The standard machine tool (accessory, not included in the scope of delivery) can accept different tools with a maximum shaft diameter of 6.35 mm in the collet (4) (standard 3 mm, other Ø see accessories).

Use two open-end wrenches SW 22 to change the collet chuck. The power for the processing machine is released via the software.

The speed of the machine can be set manually with the wheel (1).



To disassemble the machine tool, turn off the main switch of the ICP, remove the power cable from the distributor box, loosen the clamping screw (2) and remove the machine tool from its bracket.

To disassemble the machine with the bracket, remove the power cable, loosen the two outer screws (3) (only loosen, do not unscrew completely) and remove the machine with the holder and T-slot nuts out downwards.



You can also mount many other tools, measuring devices (laser) or other suitable fixtures to the T-slot plate of the Z-axis with appropriate brackets.

For the electrical connection, please use the junction box on the Z-axis.

If you want to reassemble the machine tool or other tools, you must realign the bracket parallel to the XY plane.

The machine tool is directly wired and can be switched by the software. Also other optional switching outputs with which you can switch additional devices (see Technical data). The machine tool can only be switched on if the POWER button lights up, the hood is closed and locked, the rotary switch on the machine is set to ON and the software responds to the machine.

4.7.1 Protective cover with solenoid interlock



*In the CNC-compact machines of the type ICP, the housing is homogeneous, i.e. **not** removable.*

The transparent glass panes fixed in the machine frame or hood (material): polycarbonate or PETG ensure during the operation of the machine (during set up or processing of the component) protection against moving machine parts and any tool or parts of tools ejected from the working area.



A CNC machine delivered with CE marking must not be started without a full, intact housing including undamaged polycarbonate panes

5 Design and operation

On delivery:

- all operating elements are already connected to the safety circuit of the control unit.
- the main spindle drive is (not speed controlled 230V/500-750W or speed controlled 750W)
- additional actuators or sensors are connected according to

customer requirements.

5.1 Safety notices



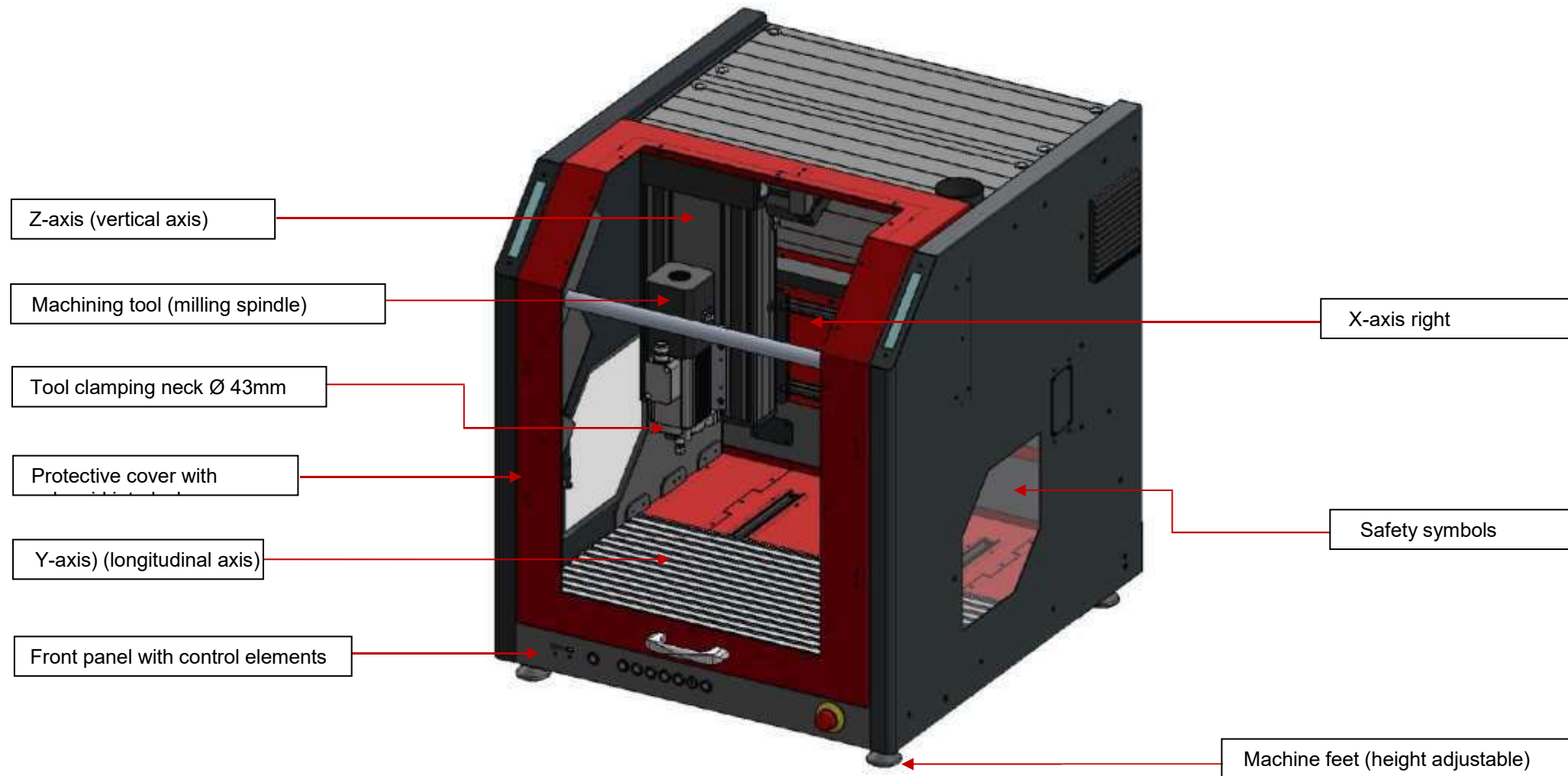
All work on the electrical installation must only be carried out by authorised and trained personnel. Any changes to the electrical installation will void the warranty and CE conformity.

When adding to the machine (e. g. working spindle, inverters, actuators, sensors, etc.), the operator is responsible for ensuring that all safety regulations in accordance with EN 60204-1 are complied with.



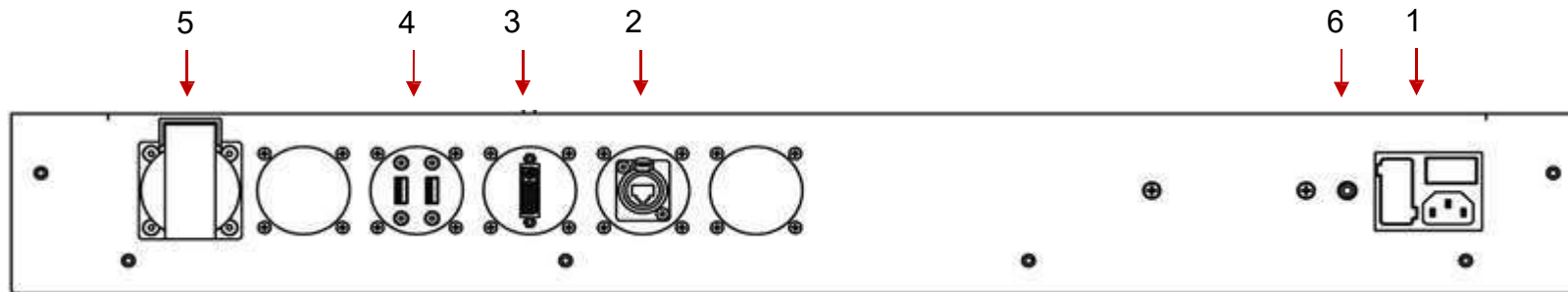
Observe the technical data of the machine and the pin assignments.


5.2 Overview



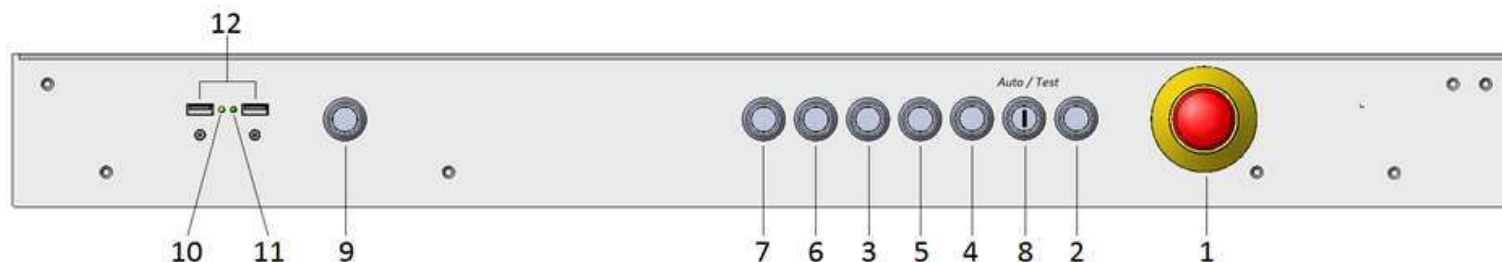
5.3 Connections

5.3.1 Connections on the back



Number	Description	Description
1	Mains connection socket filter with main switch and fuses	230V AC power supply unit connection with main switch and mains fuse 2 x 10A slow-blow: IEC 127 HBC  Replace defective fuses only with original spare parts!
2	LAN	Connection socket for LAN connection to the iPC 25
3	DVI connection	Connection socket 15-pole for DVI monitor
4	USB 3.0	USB 3.0 socket for external peripherals (mouse or keyboard)
	Recovery	USB 2.0 socket for recovery of the iPC 25 and external peripherals (mouse or keyboard)
5	Schuko socket (optional)	switched mains socket L/N/PE in accordance with IEC CEE7/3
5	Earthing bolts	Connecting bolt M4 for additional protective equipotential bonding

5.3.2 Front Panel Controls



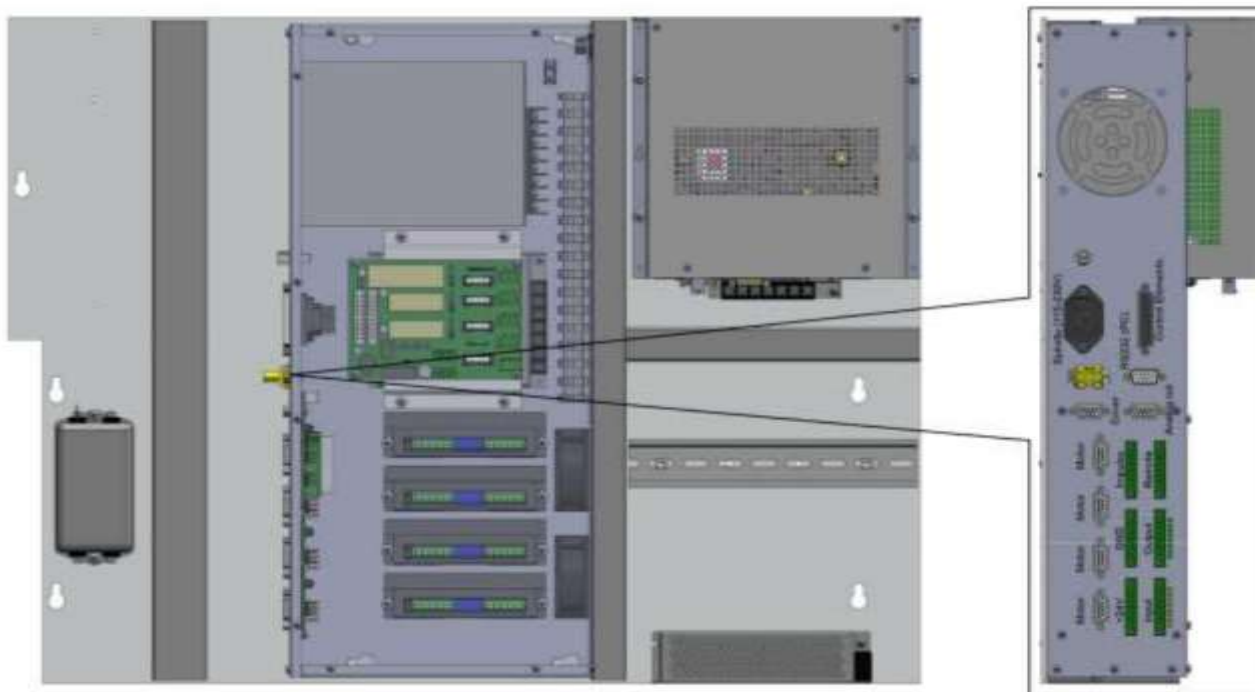
Operating elements for the machine controller

No.	Description	Description
1	Emergency stop button	Switching off the power supply of the motor output stages and the working spindle.
2	3 Power-On button	Power supply to the output stages is switched on.
3	Mode selector switch	This key switch switches between automatic and set-up mode. In automatic mode , the cover or door can only be opened if the axes do not move and the connected milling spindle is switched off . In set-up mode , the hood or door can only be opened when the working spindle is switched off . In this operating mode, the axes can also be moved when the hood is open .
4	START button	In CNC mode, pressing the button starts the programme stored in the controller's flash memory. The start button cannot be used in DNC mode.
5	STOP button	In CNC mode, pressing the STOP key interrupts a running user program / axis movement. The user programme /axis movement can be continued by pressing the START button.
6	FAULT display	The fault display indicates an error in the safety circuit.
7	COVER button	This button is used to open the cover (if there is one). The cover can only be opened if the conditions described under "Mode selector switch" are met. The release to open the cover is indicated by the white illumination of the button.
8	ACK (Acknowledge) button	This key has no function on this machine.

Control elements for the control computer

No.	Description	Description
9	Power button	Switching on the control unit
10	Power LED	Operating display of the control computer
11	HDD-LED	Hard disk access indicator
12	USB sockets	USB 2.0 sockets for USB devices (USB stick, WIBU etc.)

5.3.3 Structure of the stepper motor control



5.4 Connections on the stepper motor controller

5.4.1 Safety notices



All work on the electrical installation must only be carried out by authorised and trained personnel. Any changes to the electrical installation will void the warranty and CE conformity. When adding to the machine (e. g. working spindle, inverters, actuators, sensors, etc.), the operator is responsible for ensuring that all safety regulations in accordance with EN 60204-1 are complied with.

5.4.2 Access to the stepper motor controller and its components

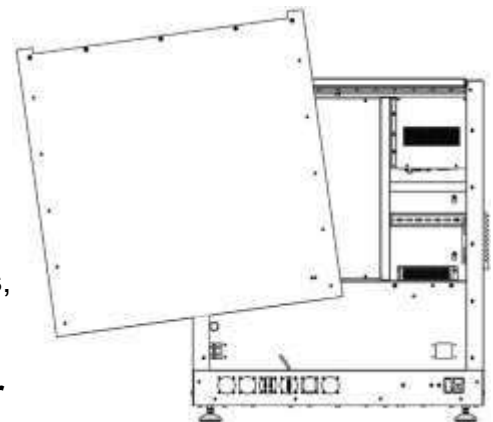
To access the connections of the stepper motor controller, please proceed as follows:



Disconnect the mains plug of the machine!

Remove the machine's cover plate by loosening the hexagonal screws and pulling the earth cable from the cover plate.

Now you can connect additional components (e. g. frequency inverters, solenoid valves, sensors, actuators, etc.) to the connections of the stepper motor controller.



Opening the housing of the stepper motor controller

As a rule, it is not necessary to access the built-in components inside the stepper motor controller. The opening of the housing cover may only be carried out by authorised and trained personnel.

After removing the rear panel of the machine, remove the housing of the stepper motor controller. Loosen the Phillips-head screws on the top of the housing cover and remove it. Components such as stepper motor power amplifiers, SK modules, switching power supplies, etc. can now be reached.

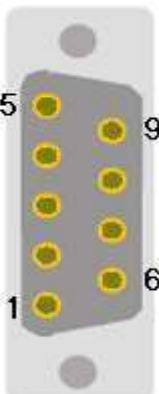
5.4.3 Connections

Motor - Motor connection X-, Y-, Z-, A-axis, Sub-D9-pole socket

The motor modules (CNC axis) are connected to these SubD-9 sockets.



This plug may only be connected or disconnected when the controller is switched off. Failure to do so may result in damage to the motor cable or the stepper motor output stage!

	Pin	Description
	1	Motor phase 1A
	2	Motor phase 1B
	3	Motor phase 2A
	4	Motor phase 2B
	5	+24VDC
	6	with Z-axis brake (+24VDC/1.8A output with reference potential GND)
	7	Limit switch 2 (input +24VDC, opener contact)
	8	GND
	9	Limit switch 1 (input +24VDC, opener contact)

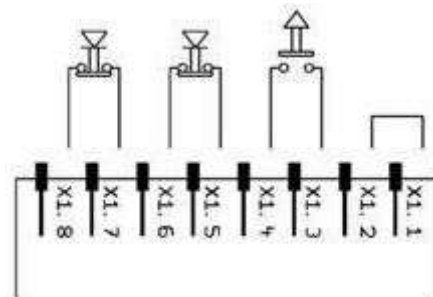


A stepper motor with brake can only be connected to the Z-axis socket. At this socket the switching signal (+24V at pin 6) is provided for the motor brake.

Remote - interface safety circuit, 8-pole socket

Via this interface, the controller can be integrated into a higher-level safety circuit system or, when the controller is installed in a control cabinet, this important functional interface can be used as a remote control. Note that the external power control input can only be used when the front power button is switched off. This is done by bridging pins 1 and 2.

Pin	Description
1	Power button selection
2	Power button selection
3	External power (closer)
4	External power (closer)
5	External emergency stop 1 (opener)
6	External emergency stop 1 (opener)
7	External emergency stop 2 (opener)
8	External emergency stop 2 (opener)





External emergency stop not used:

Pin 5 and 6 bridged

Pin 7 and 8 bridged

If an external emergency stop switch is used, the length of the connection cable is max. 5m.

Using an external power button:

Pin 1 and 2 bridged

Connecting the external power button (closer) to pin 3 and 4

Impulses - interface impulse controller, 8-pole socket

This interface makes it possible to trigger the functions of the front control buttons (start, stop) as a remote function from an external control panel or another device via I/O functions.

Pin	Description	
1	Input external start button	
2	+24VDC	
3	Input external stop button	
4	Input lamp start button	
5	-24VDC	
6	Input lamp stop button	
7	Input length measuring probe	
8	Input length measuring probe	



If no external stop button is used, pins 2 and 3 must be bridged.

Input - Digital inputs, 8-pole socket

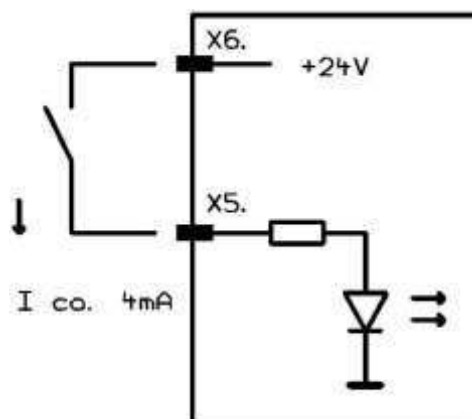
The controller has 8 digital inputs (Input 1... 8). External devices (sensors, switches, outputs of other devices) can be connected via these. The inputs are opto-decoupled. If an input is connected with +24VDC, a logical HIGH signals this. If it is not switched on (e. g. switch open) a logical LOW is signalled.



Never short-circuit the 24VDC reference potential of the controller to GND or housing.

The binary inputs (user inputs) Input 1 to Input 8 must be wired as shown on the right..

The load of the controller-internal 24VDC power supply is approx. 4 mA per input in the 1-active state (button closed)



Output - Digital outputs, 8-pole socket

The controller has 8 digital (Output 1... 8) transistor outputs (high-side switch, short-circuit-proof). This can be used to connect external devices (relays, inputs of other devices, etc.). The outputs can be loaded up to 24 VDC/300mA.



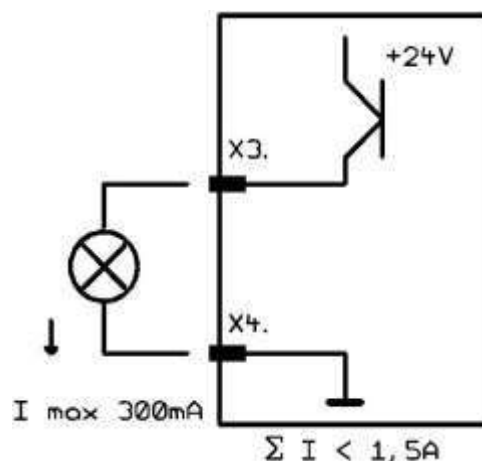
Never short-circuit the 24VDC reference potential of the controller to GND or housing.

When the emergency stop switch is pressed, the status of the binary outputs remains unchanged and are not reset!

The binary outputs (user outputs) Input 1 to Input 8 must be wired as shown on the right.

The transistor outputs Output 1 to Output 8 can be loaded with max. 300 mA per output.

When all 8 outputs are switched and set at the same time (1-active), the maximum power handling capacity of the controller-internal 24VDC/60W-1.5 A power supply unit (corresponds to approx. 180 mA per output)!



Analogue - Out - Sub-D9-pole socket

With this connector, an external frequency inverter and the associated working spindle can be connected via an analogue 0... 10V output can be controlled.

Pin	Description
1	+24VDC
2	n.c.
3	n.c.
4	Closer 1 (potential-free contact)
5	Analogue 0 ...10V
6	GND
7	n.c.
8	Closer 1 (potential-free contact)
9	GND

Cover - Sub-D9-pole socket

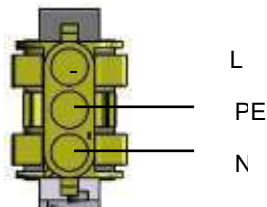
At this connection, the door interlock of the connected machine can be integrated into the safety circuit of the controller.

Pin	Description
1	+ coil opener contact
2	Switch 1.1 (bridge to Pin 3 if no cover is used)
3	Switch 1.2 (bridge to Pin 2 if no cover is used)
4	Switch 2.1 (bridge to Pin 5 if no cover is used)
5	Switch 2.2 (bridge to Pin 4 if no cover is used)
6	- coil opener contact
7 - 9	not used



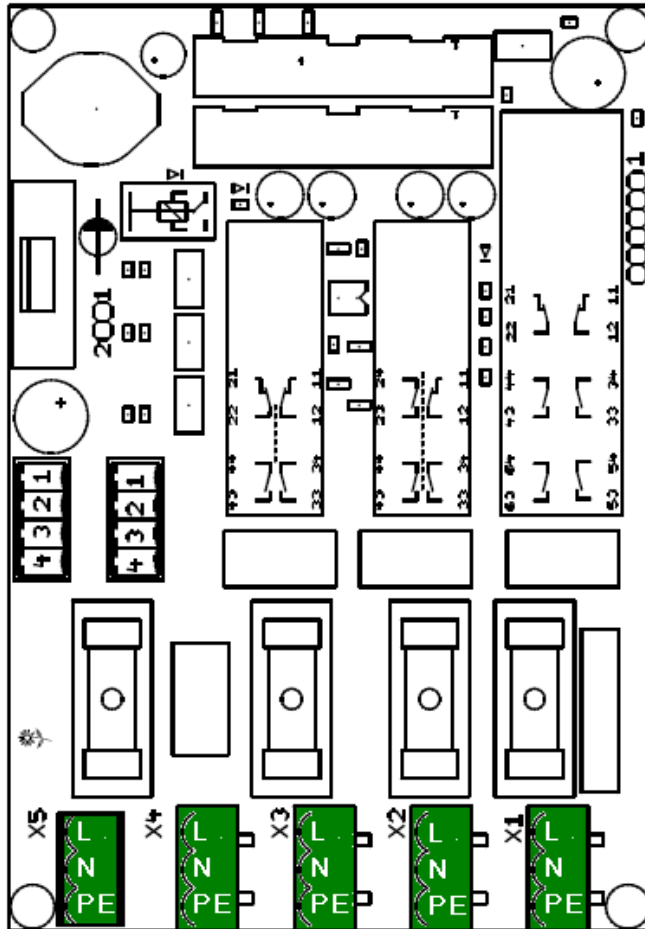
If no cover/safety door is used, pins 2 and 3 as well as pins 4 and 5 must be bridged.

Plug connector, 3-pole white 230 V/ 2 A - Work area lighting



Milling spindle - 100 - 230V, connection 3-pole

This output can be used to connect either a milling spindle without speed control or a frequency converter with associated main spindle drive (e.g. iSA 750) with speed control. Depending on the application, the power supply line of the milling spindle or the frequency inverter must be connected to the safety circuit module.



Remove the rear panel of the machine and the housing cover of the stepped motor control (see Chapter 5.4.2).

Connect the cable to the "Spindle 230V" socket with the appropriate connection to the safety circuit module.

If the machine is delivered without a milling spindle, the connection (X1) for a milling spindle without speed control is assigned at the factory.



Connection **X3** for frequency inverter, max. Switching capacity 100-230V / 6A

Connection **X3** for milling spindle, max. Switching capacity 100-230V / 6A

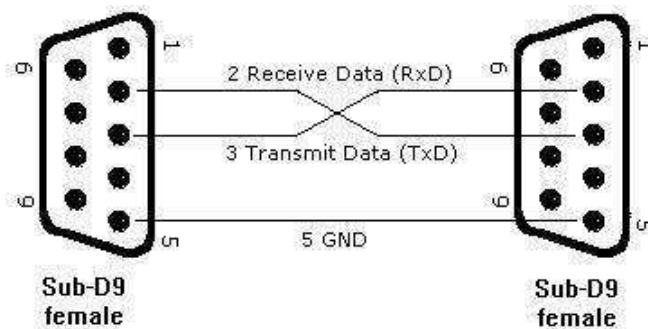
Control Elements - Connecting operating elements

At this connection, the front operating elements (switches, buttons) are connected to the machine control.

RS232 (PC) - Programming interface

A serial interface (RS232) is used for data transmission between the control of the machine ICP 3020 / 4030 and a control computer. The communication cable (zero modem cable) supplied should be used for the connection. A software protocol enables error-free transmission of ASCII characters. However, both systems must adhere to the specified transmission protocol.

- The connected control computer sends a command that ends with a line end character[CR, char (13)].
- The processor unit acknowledges the execution or storage of the command by the acknowledgement signal 0[char (48)] or reports an error with an ASCII character other than 0.

**Transfer parameters:**

- 19200 Baud
- 8 Data bits
- 1 Stop bit
- no parity

5.5 Setting the stepper motor output stages

The ICP 3020/4030 iMC-P CNC machine has four MD24 stepper motor power output stages. The setting for rated current, step resolution and current reduction is made via the DIP switches on the top of the output stage housing.

When delivered, all stepper motor output stages are set to the corresponding stepper motors of your machine. However, should it be necessary to change the settings of the stepper motor output stages (e. g. using a 4th. axis), please note the following pages



The controller should be configured before the controller is switched on for the first time, so that a connected motor cannot be damaged by an incorrect current setting.

Opening the housing

Remove the rear panel of the machine and the housing cover of the control unit (see Chapter 5.4.2). The stepper motor output stages are arranged next to each other. Configure the individual stepper motor output stages according to the following tables:

DIP Switch - MD24 in ICP 4030

	1	2	3	4	5	6	7	8
on	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 1: Current setting 1
- 2: Current setting 2
- 3: Current setting 3
- 4: Current reduction
- 5: Step resolution 1
- 6: Step resolution 2
- 7: Step resolution 3
- 8: Step resolution 4

Current setting (DIP-Switch 1, 2, 3,)

DIP switches 1,2,3 are used to set the motor current. Herewith the motor current can be adapted to the used motor. The following table shows the motor currents with corresponding switch positions.

Peak current[A]	Nominal	SW1	SW2	SW3
1.00	0.71	ON	ON	ON
1.46	1.04	OFF	ON	ON
1.91	1.36	ON	OFF	ON
2.37	1.69	OFF:	OFF:	ON
2.84	2.03	ON	ON	OFF:
3.31	2.36	OFF:	ON	OFF:
3.76	2.69	ON	OFF	OFF
4.20	3.00	OFF	OFF	OFF



The output stages for the X, Y and Z axes are set to a nominal current of 3.00 A at delivery.

The output stage for the 4th axis (A-axis) is set to a rated current of 2.03A.

Current reduction (DIP switch 4)

Since the holding torque of stepper motors is higher than the torque, a holding torque similar to that of the torque can be achieved by means of a reduced current. As a result, for example, with a current reduction of 25%, the power dissipation is reduced by 50%, as the power decreases square to the current. The automatic current reduction can be set when the motor is at standstill using DIP switch 4. If DIP switch 4 is in the ON position, the automatic current reduction is deactivated. In the OFF position, the current is reduced to 50% at standstill.

DIP 4	Current reduction
ON	0% reduction (deactivated)
OFF:	50% reduction



If the holding torque is sufficient, the activated automatic current reduction is recommended.

At delivery, the automatic current reduction is activated (DIP 4 = OFF).

Step resolution (DIP-Switch 5, 6, 7, 8)

The step resolution can be set with DIP switches 5,6,7 and 8. By setting a larger divider for the movement, smoother running is achieved. However, the maximum achievable speed decreases. The torque in micro-step operation is also reduced to approx. 75%. The following table shows the switch settings for the corresponding step resolution.

Micro-steps	Steps/ Rot. (1.8 ° Motor)	SW5	SW6	SW7	SW8
2	400	OFF:	ON	ON	ON
4	800	ON	OFF:	ON	ON
8	1600	OFF:	OFF:	ON	ON
16	3200	ON	ON	OFF:	ON
32	6400	OFF:	ON	OFF:	ON
64	12800	ON	OFF:	OFF:	ON
128	25600	OFF:	OFF:	OFF:	ON
5	1000	ON	ON	ON	OFF:
10	2000	OFF:	ON	ON	OFF:
20	4000	OFF:	OFF:	ON	OFF:
25	5000	OFF:	OFF:	ON	OFF:
40	8000	ON	ON	OFF:	OFF:
50	10000	OFF:	ON	OFF:	OFF:
100	20000	ON	OFF:	OFF:	OFF:
125	25000	OFF:	OFF:	OFF:	OFF:



At delivery, the step resolution is set to 800 steps/revolution of the motor.

6 Installation and commissioning

6.1 Safety notices



Observe the technical data of the machine and the pin assignment in Chapter 5.3.



Failure to observe the safety instructions may endanger persons and objects due to mechanical or electrical influences or failure of the device.



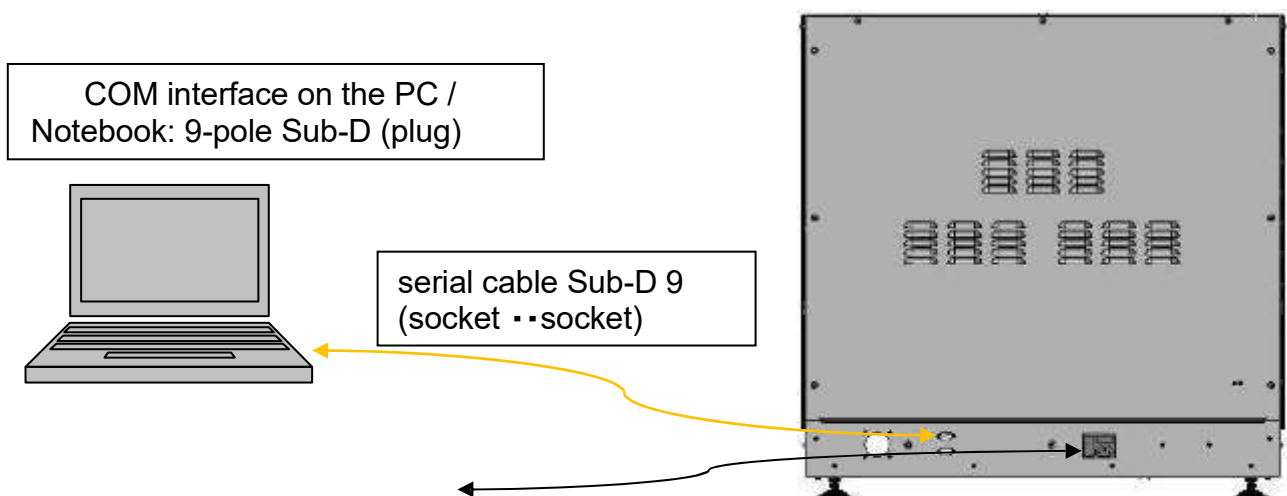
Failure to observe the safety regulations will result in the loss of all claims for damages.

6.2 Preparation

Before making the connections, make sure that:

- no mechanical defects (loose parts) are visible on the machine
- all cables described in the scope of delivery are present
- the machine has been placed according to the installation instructions.

6.3 Create connections



- Connect power cable
- Connect the display to DVI
- Connect mouse and keyboard to USB

Configuration (if not yet pre-set)

- Configure motor currents and step resolution of the power output stages via DIP switches. (see Chapter 5.5 Setting the motor output stages)

First start-up

You should carry out the following steps during the first start-up:

- Switch on the machine with the main power switch (rear side)
- Check that the emergency stop switch is pulled out / unlocked.
- To open the hood, press the COVER button. The cover can only be opened when this button is lit.
- Close the cover and switch on the end stage with the POWER button. The button must light up.

The machine is now ready for operation!

Choice of operating mode

- Use of the compact CNC machine ICP iMC-P in CNC or DNC operation

6.4 Software installation

You can choose between the CNC operating interfaces / CNC operating software

- operating and programming software **ProNC**
- operating and output software (Interpreter) **Remote**

The CNC software contained in the scope of delivery of your CNC machine

- **ProNC** including remote article-number: **Z11-333500** or
- **Remote** article number: **Z12-334500**

includes the relevant manuals

- **ProNC:** **Operating instructions and programming regulation**
- **Remote:** **Operating instructions**

stored in PDF format in the appropriately marked installation CD and the USB flash drive supplied.



Use the USB memory stick also for archiving your application programmes.

The CNC operating software ProNC or Remote (depending on the order / scope of delivery) is already completely installed in the delivered state of the CNC machine.

For questions regarding the installation (for example, a software update) of **ProNC** or configuring the software modules, please read the operating instructions ProNC Chapter 3.4.4 "Configuration dialogue" / 6 /.

For questions regarding the installation (for example, a software update) of **Remote** or configuring the software modules, please read the operating instructions REMOTE Chapter 2.8.3.1 "Configuration" /7/.

For more information on the CNC operating software, refer to the appropriate manuals or the ReadMe files on the installation CD.



Alternatively, you can also start the installation assistant. This assistant will take you through the installation.



To operate and program the control system in *CNC mode*, you need the programming software *PALPC* from version *2.01.04.0*.

To operate the machine in *DNC mode*, you need the control software *Remote (optional ProNC)* from version *1.45.6.2* with the control interface for IMC4-compatible machine controls.

Follow the instructions for installing the software. These are located on the supplied installation medium.

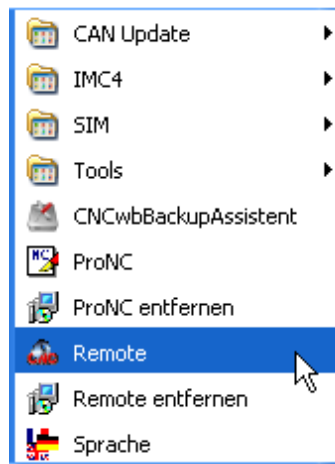
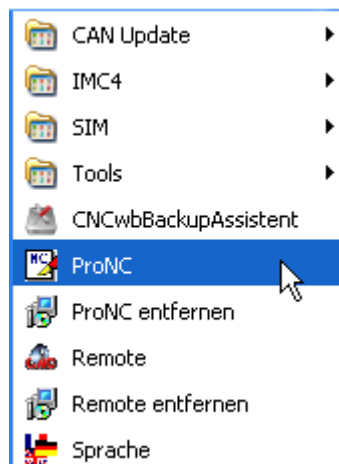
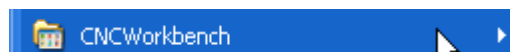
Start the CNC operating software **ProNC**



or **Remote**



- - with a click of the mouse on the icon on the desktop or in the task bar or
- - by clicking the mouse in the start menu file CNCWorkbench



6.5 Mode AUTOMatik – Production on the CNC machine

The following is the sequence for the manufacture of parts on a CNC machine:

- 1: Manufacture of operational readiness (pre-production)
- 2: Production: Processing / manufacturing one or several components
- 3: Ending the operational readiness (cleaning or service)

The following description is simplified (i.e. without manual or automatic tool change) and applies to the production of **one** cutting part with the CNC control software **Remote**.

6.5.1 Establishing operational readiness

Operating actions:

- 1: Start CNC operating software **Remote**, close hood of the CNC machine
- 2: Set mode selector switch to AUTO
- 3: Press Power-On button on the CNC operating panel

Result (the background image with isel-logo and text is the default single colour):



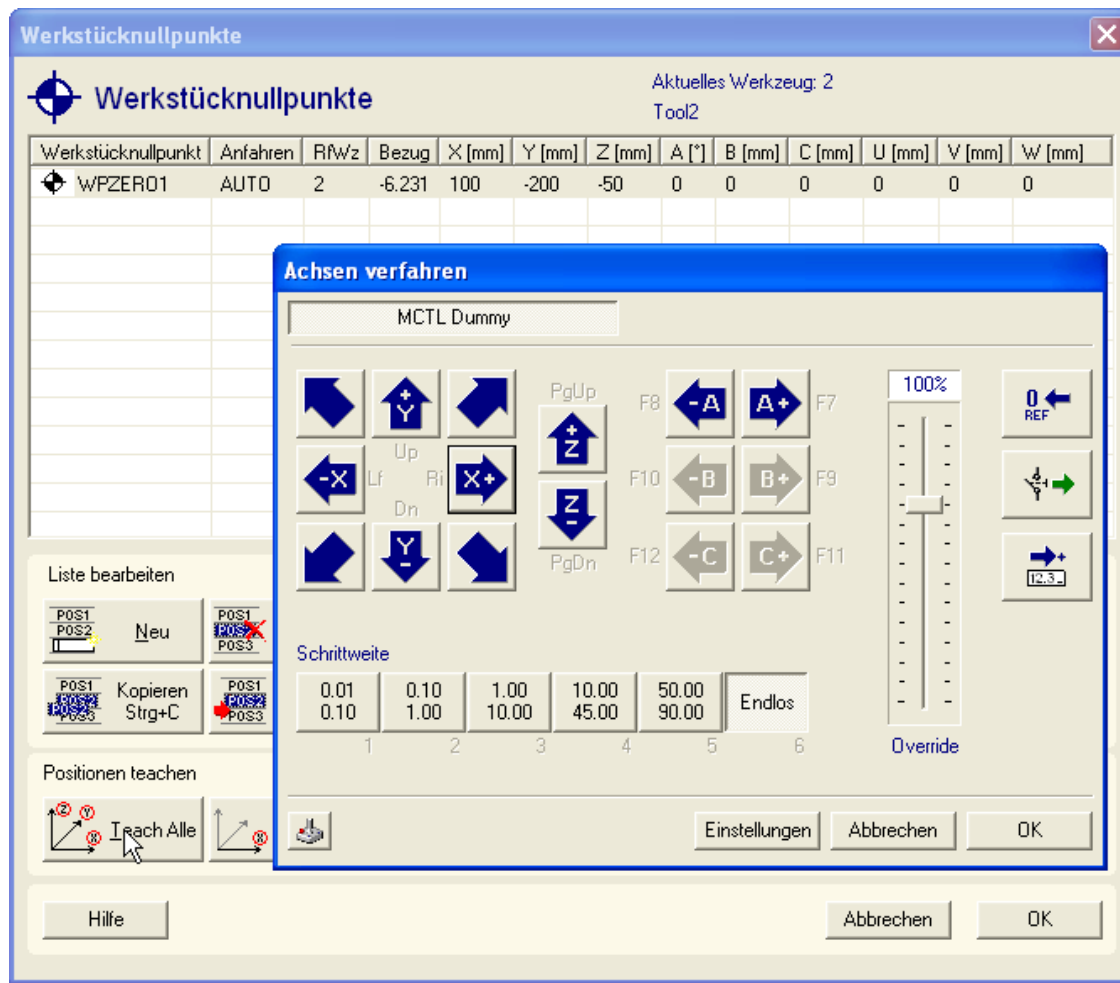
- 4: Reset the motion controller -> all drive units are initialised and their operational readiness established.



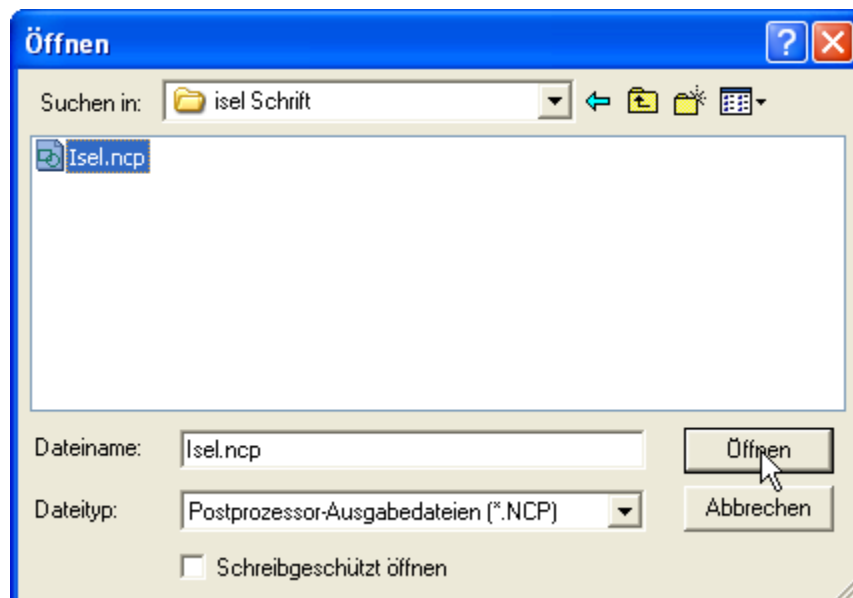
- 5: Do a reference run of all axes (standard setting: Z-axis is first referenced) -> after this control action the numerical axes can be moved manually



- 6: Move the axes manually to a position in which the tool can be clamped in the clamping device of the working spindle; open hood; clamp tool; clamp component blank on the working plane; close hood; determine component zero point, e. g. by teach-in:



7: Open processing programme (here: the NCP file **Isel.ncp**):



The screenshot displays a CNC control interface with a program editor and two function menus.

Program Editor: The main window shows a CNC program with the following content:

```

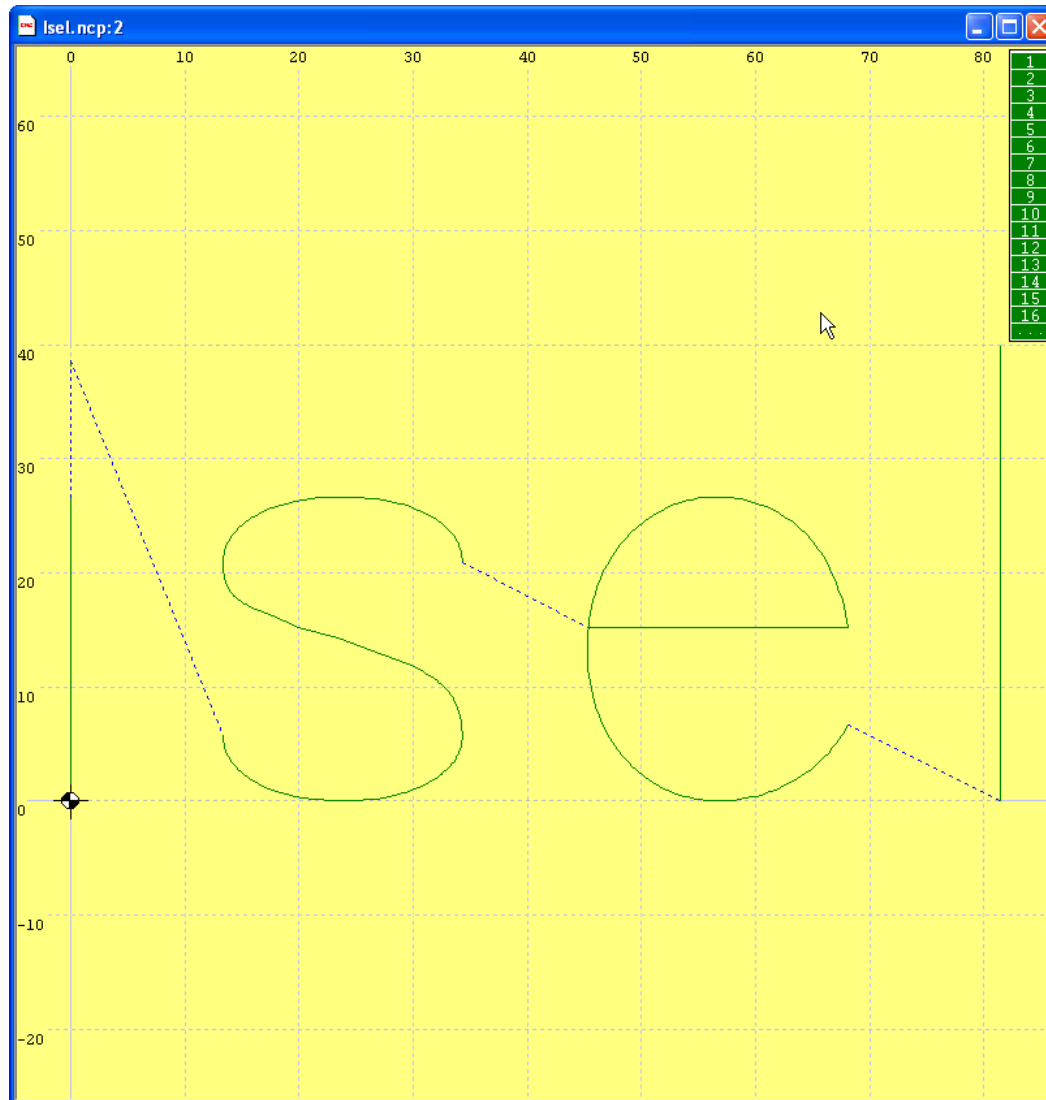
INF PBL V1.0 - PICTURES BY PC
; TO1 - DO.1 - S4 - HSS - SCHAFTFRAESER
; WPZERO ; Nullpunkt festlegen
; BLOCK 1
FASTABS Z3000 ; Werkzeugwechselpos.
GETTOOL 2 ; DO.1 - HSS - SCHAFTFRAESER
SPINDLE CW RPM1
COOLANT ON ; Khlung ein
FASTABS X0 Y0 ; Positionieren
FASTABS Z2000 ; Sicherheitsabstand
VEL 5000
MOVEABS Z-1000
VEL 25000
MOVEABS Y26667
FASTABS Z3000 ; Rueckzugsebene
FASTABS Y30095 ; Positionieren
FASTABS Z2000 ; Sicherheitsabstand
VEL 5000
MOVEABS Z-1000
VEL 25000
MOVEABS Y38571
FASTABS Z3000 ; Rueckzugsebene
FASTABS X13333 Y5714 ; Positionieren
FASTABS Z2000 ; Sicherheitsabstand
VEL 5000
MOVEABS Z-1000
PLANE XY ; Kreis-Ebene
VEL 25000
CCWABS I17213 J5714 X14362 Y3083
CCWABS I19824 J8125 X16250 Y1607
CCWABS I21426 J11045 X18921 Y577
CCWABS I23810 J21010 X23810 Y0
CCWABS I23910 J21010 X28698 Y577
CCWABS I26194 J11045 X31369 Y1607
CCWABS I27795 J8125 X33257 Y3083
CCWABS I30406 J5714 X34286 Y5714
CCWABS I25929 J5714 X34162 Y7150
CCWABS I28873 J6228 X3648 Y8681
CCWABS I29033 J6310 X32682 Y9998
CCWABS I27524 J4785 X31823 Y10726
CCWABS I25381 J1824 X29492 Y12015
CCWABS I-6780 J-77900 X25145 Y13649
MOVEABS X23333 Y14286
MOVEABS X20000 Y15238
CCWABS I4481 J-19680 X18645 Y15809
MOVEABS X17698 Y16184
CWABS I32257 J53394 X15622 Y17064
CWABS I17514 J21197 X14455 Y17835
CWABS I16619 J20213 X13463 Y19603
CWABS I38866 J20253 X13463 Y20253

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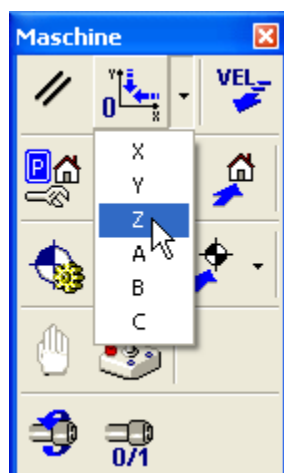
Dateiausgabe: A menu titled "Dateiausgabe" (Date Output) with various icons for file operations, including a folder, a document, and a printer.

Maschine: A menu titled "Maschine" (Machine) with various icons for machine operations, including a tool, a coordinate system, and a machine status icon.

Result (graphic view)



8: for safety sake, reference Z-axis:



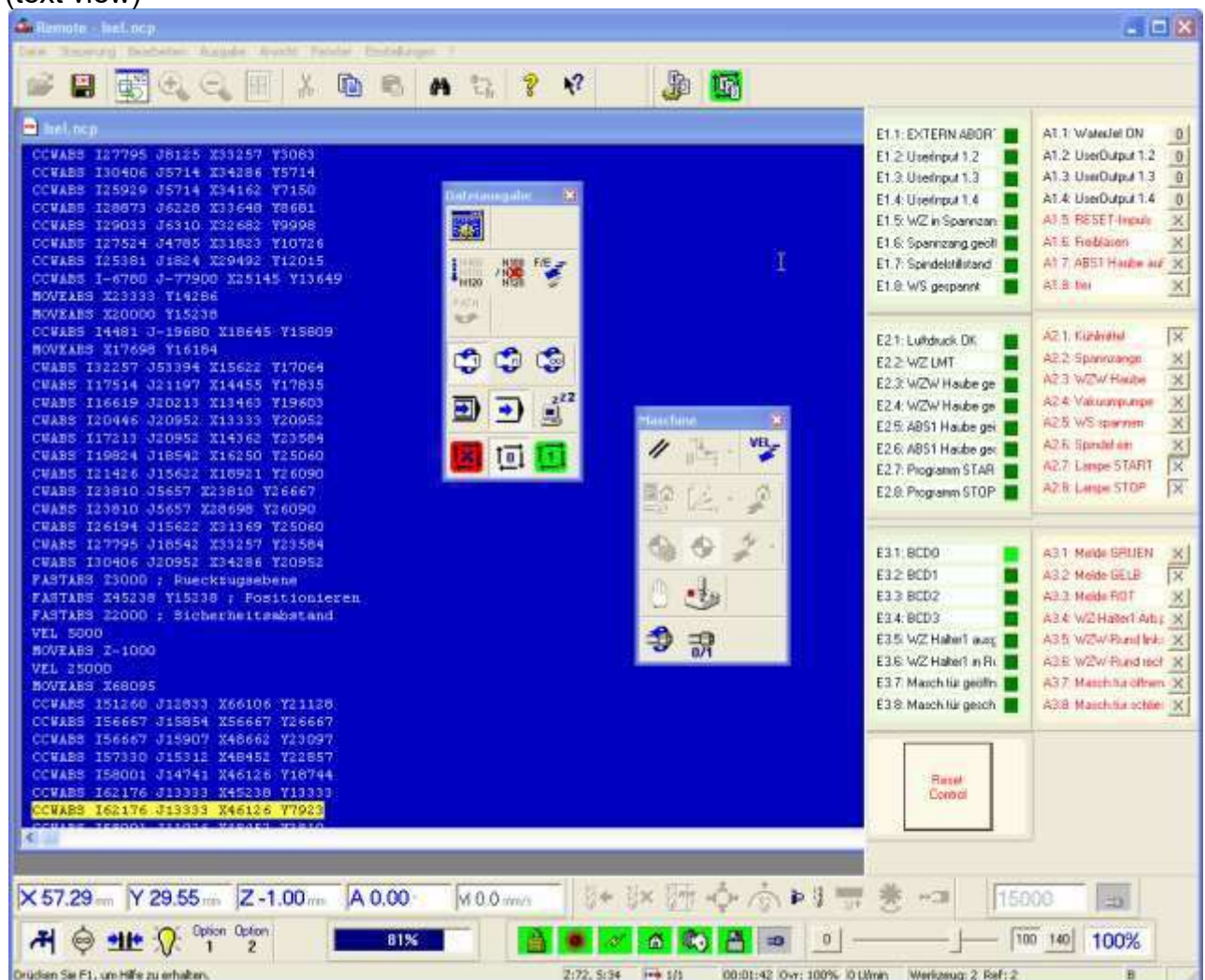
6.5. 2 Production: Processing / manufacturing a component /operations

- 1: Set processing mode to automatic operation:

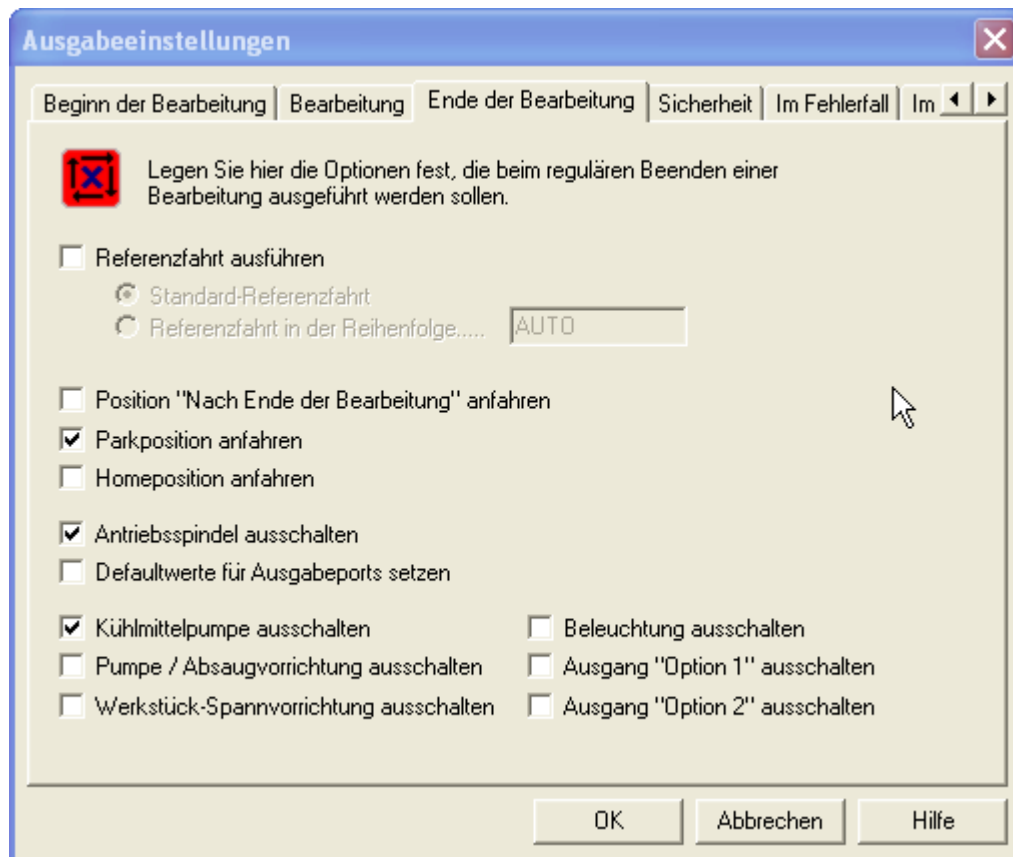


- 2: Press START button on the CNC operating panel -> processing starts

(text view)



3: Wait for end of processing; if the component has been completely processed, the axes of the CNC machine (Z axis first, followed by the X and Y axes) automatically go to the park position when the following output settings (*Settings* -> *output of the CNC-file*) has been activated:



4: Open hood, unclamp finished component, remove and examine:

6.5.3 Establishing operational readiness

Operating actions:

- 1: to be on the safe side, activate EMERG-STOP button -> all drives become de-energised
- 2: if necessary, carry out cleaning works (see Section 9)
- 3: End CNC operating software **Remote** (file -> end)
- 4: on the CNC operating panel Click on *run down*



or on the CNC operating panel – right side – activate the button for PC on / off

5: Switch main switch on the control cabinet to the position "OFF"

6.6 Operating modes

The operating system (firmware of the processor core) supports both the:

- CNC mode of the controller:
 - Control of the ICP processes the stored user programme independently without PC coupling
 - Use of the programming software PALPC for user programming and download of the user programme into the flash memory of the control unit.

and also the

- DNC mode of the controller:
 - PC/laptop is permanently connected to the control of the ICP via the serial interface.
 - Using the control surface Remote (ProNC) to control the machine

6.6.1 Use of the ICP 4030 in CNC operation

The CNC operating mode (automatic mode = CNC mode) represents the programme-controlled operation of the ICP 3020 / 4030 iMC-P.

The user programme stored in the memory (flash memory) of the stepper motor controller is processed until the end of the programme.

During automatic operation (CNC mode), the programme sequence can be stopped by pressing the STOP button on the front of the controller or by the external stop input. Pressing the START button on the front of the controller or activating the start input will continue automatic operation.



For information on operating and programming the CNC compact machine ICP in CNC mode, please refer to the PALPC operating instructions /2/ and the programming instruction /4/.

6.6.2 Use of the ICP 4030 in DNC operation

In DNC mode (DNC mode), the stepper motor control of the machine is connected to an operating PC (desktop PC or notebook) via the RS-232 serial interface.

In DNC mode, the loaded user programme is not executed in the flash memory, i.e. ignored. The pre-setting of actions (e. g. homing, axis movements or output actions) is triggered by the operator on the PC with the control software Remote / ProNC.



For information on operating and programming the CNC compact machine in DNC mode, please refer to the Remote operating instructions /3/.

Use of digital inputs and outputs and signalling in Remote/ProNC

The machines of the type ICP 3020 / ICP 4030 iMC-P each have 8 digital inputs and outputs, which can be used by the user.

Important notices!!!



During an axis movement, no digital input can be read, since the control must first send an acknowledgement signal as feedback signal.

During an axis movement, no digital output can be read, since the control must first send an acknowledgement signal as feedback signal.

The signalling (menu: Settings Signalling) in the operator interface Remote (optional: ProNC) is used with other *isel*-controllers for connection to higher-level controllers.

Important notice!!!



The configurable inputs and outputs for signalling cannot be used in DNC mode! This means that operation/control via external signals from a higher-level control (e. g. PLC) is not possible.

7 Cleaning, lubrication and maintenance



Turn off the main power switch before cleaning and maintenance and unplug the power plug (s) to prevent any accidental start-up.

7.1 Cleaning

- Clean the machine regularly with a broom or vacuum cleaner (no compressed air) to remove any chips. This protects the mechanics from premature wear.
- The sealing lips include a Teflon component and require no special maintenance.
- The plastic discs can be cleaned with a non-abrasive plastic cleaner.

7.2 Lubrication

- The guide rails and drive shafts are given a long-term central lubrication in the factory. Depending on the load, you should re-lubricate the guides and drive shafts at intervals of about 500-1000 hours of operation. For this, use the grease gun available as an accessory for central lubrication and the associated special grease.
- Do not lubricate too much at once, the shafts and steel rails should not be swimming in grease.
- If you want to lubricate, first do a reference run, then open the door and only now switch off the machine.

7.2.1 Basic lubrication

The drive components are lubricated at the factory with isel special grease. They can be started right away.

The EC safety data sheet as per Directive 93/112/EEC and ISO 11014-1 can be requested from the factory.

7.2.2 Re-lubrication

To re-lubricate the linear bearings with shafts, only the isel special grease should be used.

The grease required can be ordered using the following article numbers:

- 299032 0002 grease cartridge
- 299032 0003 grease gun

Depending on the application, we recommend re-lubrication every 500 to 1000 operating hours.

To lubricate the X axis, slide the carriage to the left*, remove the plastic plug on the left side of the machine and lubricate through the greasing nipple, which is now visible. The guide rails can be accessed through the sealing lips.

Grease characteristics:

The isel special grease has the following characteristics:

- huge reduction in wear
- considerably less consumption
- can be mixed with lithium and calcium greases
- water-repellent
- highly resistant to cold-, hot- and salt water and solvents
- Temperature range: -25°C to 200°C
- emergency mode >300°C
- up to 6 times longer service life
- extremely good adhesion to metal surfaces

The classification and marking as per the EU-Directives 67/548/EEC and 88/379/EEC - Water hazard class 1.

7.2.3 Lubrication points of the linear axes X, Y and Z

To **lubricate the Y-axis**, push the T-slot plate completely forward* and then unscrew it from the Y-axis (six screws).

Remove the plastic plug from underneath and lubricate through the now visible grease nipple. The guide rails can be accessed through the sealing lips.

To remove the cover plate of the y-axis, loosen the fastening screws all around.

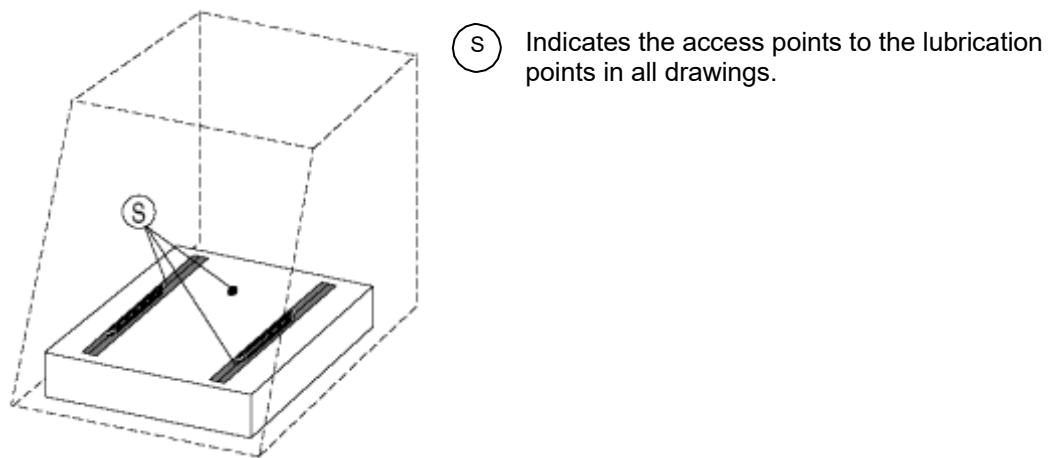
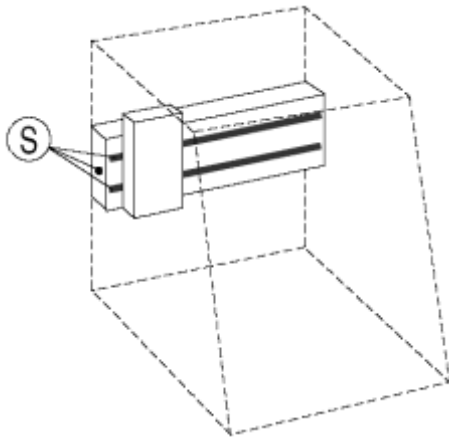


Fig 3: Lubrication points of the linear axes X, Y and Z

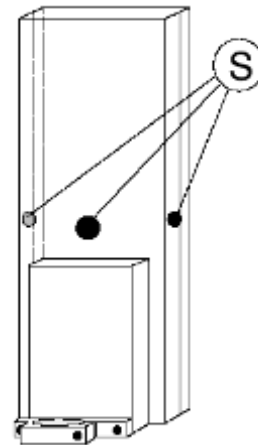


To **lubricate the X-axis**, slide the carriage to the left*, remove the plastic plug on the left side of the machine and lubricate through the greasing nipple, which is now visible. The guide rails can be accessed through the sealing lips.

At the **Z-axis**, you must first remove the machine tool from its holder, remove the three plugs and push the slide all the way down. *



Through the two side holes you can put some oil on the guide rails. The grease nipple for the drive is now located behind the front opening.

**If the machine is switched off, you can move the slides by hand.*



7.3 Maintenance intervals according to operating hours counter

The software operating hours counter integrated in the isel control software ProNC /6/ or Remote /7/ informs the operating personnel about the expiry of the current maintenance interval:

 <div> <div>Bearbeitung 82:11</div> <div>Mechanik 44:15</div> <div>Spindel 27:01</div> <div>00:05:48</div> </div>	 <div> <div>Bearbeitung 82:12</div> <div>Mechanik 44:15</div> <div>Spindel 27:40</div> <div>00:57:46</div> </div>
green bar: Minimum maintenance interval expired	red bar: Maintenance interval expired, maintenance work must be carried out

A mouse click on the icon  brings further information:

Übersicht Service und Wartung

 5.12.2013 - 10:19:23

	insgesamt	seit der letzten Wartung	nächste Wartung in
Bearbeitungszeiten in Remote	15:04	00:00	
Bearbeitungszeiten in ProNC	82:12	00:00	
....insgesamt	97:16	00:00	600:00
Achslaufzeiten (mindestens 1 Achse)	44:15	00:00	200:00
Laufzeit der Frässpindel 1	27:40	00:00	500:00



isel Germany AG

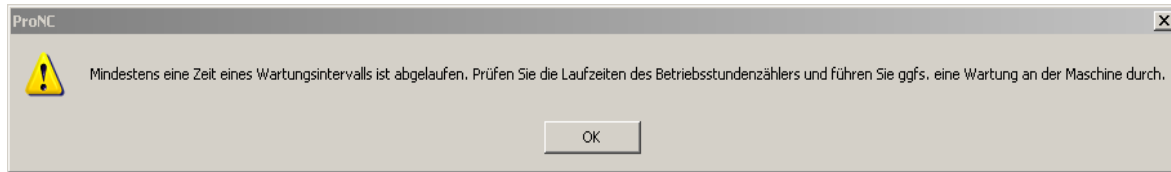
Ein Unternehmen der isel-Gruppe

isel Germany AG
Bürgermeister-Ebert-Straße 40
D-36124 Eichenzell
Tel: +49 (0) 66 59 / 981 - 0
E-Mail: automation@isel.com

OK

The maintenance interval is pre-set at the factory to a value of 300 **processing hours**.

If, when starting the isel control software ProNC or Remote, the message



indicates that maintenance is required, perform the following maintenance activities

7.4 Maintenance activities

The following tasks must be carried out at the end of a maintenance interval:

- Visual inspection of the lubricating film on the **ball screw and steel shaft guide** through the sealing lips of the linear axes X, Y and Z
- if necessary, re-lubrication (see section Lubrication points)
- Visual inspection of **chips and impurities within the linear axes** through the sealing lips, suction and cleaning if necessary
- Visual inspection of **impurities and chips within the tool changer unit** through assembly opening, suction and cleaning if necessary

Further maintenance work is:

when required: Cleaning of the interior from impurities acoustic control of unusual noise development

- | | |
|----------|--|
| 2 months | Visual inspection of linear units - wear and tear
Visual inspection of toothed belt reversals in the Z-axis for pre-tensioning and abrasion |
| 1 year | Toothed belt replacement in the Z-axis
Check that the linear guides and ball screws are free of play (circularity test in all planes by Renishaw measurement) |



Toothed belt in the Z axis:
see parts list of the linear units in Chapter *17.1 Axis structure*

8 Returning used electrical and electronic equipment for disposal

Collection

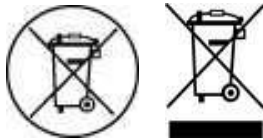
Users of electrical and electronic equipment are required to collect waste separately in accordance with the country-specific regulations. Used electrical and electronic equipment may not be disposed of with unsorted household waste. Separate collection is a precondition for the recycling and recovery, thereby conserving the resources of the environment.

Return and collection systems

In the case of the disposal of your CNC machine, specifically its electronic components, these may not be disposed of with household waste. The local disposal companies have established waste disposal options for this purpose.

Meaning of the symbols

All electrical and electronic equipment marked with these symbols should not be disposed of with household waste according to EU Directive.



9 Remote diagnosis

For remote diagnosis via the World Wide Web (Internet), please get in touch with our service department:

E-mail: support@isel.com

Tel. +49(6659)981800

The latest version of TeamViewer[®] is used as a communication tool for remote diagnosis.



A prerequisite for the remote diagnosis via the Internet is the connection of the control PCs / 3 / in the control cabinet of your CNC machine / CNC basic machine to the Internet. To this end, each control PC is equipped with an Ethernet port.

The connection is established via the internet in three steps:

1. **Step** You contact by phone or email our support team and ask for a consultation. The operator on the CNC machine becomes the **subscriber**, the **isel**-service technician acts as an **adviser**.
2. The subscriber starts the Windows programme on the control PC. **"TeamViewerQS_de.exe"**.
You will find this service programme under:
C:\CNCWorkbench\Tools\TeamViewer
The programme responds as follows:



3. Tell the **consultant** the **ID** and **password** by telephone.
After a successful connection set-up, remote diagnosis can begin.

10 Accessories

Based on the ICP 3020 / 4030 , you can order the following accessories:

- Clamping set (release lever SH1 and SH2, 2 stop rails, Allen wrench)
- additional fasteners for the T-grooved panel
- Bench vice, 1, 2,
- additional collets for each cutting spindle
- Set of tools milling cutter, drill bit, burin
- Linear tool changer with high frequency spindle, optional: Length measuring probe
- Rotating axis (4 Axis)
- Main spindle drives iSA 500,750,900
- Machining spindle UFM 500, UFM 1050
- Vacuum clamping system **isel-Vakufit**
- Cold air cooling **isel-CoolMin**: Cooling device with cold air nozzle (up to -20°C)
- Extraction device
- Spray-/cooling device, cooling agent HL4
- Workroom lighting
- Control software ProNC, PaIPC
- CAD/CAM software isyCAD/CAM 2.5



Note on the compressed air connection of accessories:
In order to be able to use the optional vacuum clamping system, cold air nozzle or tool changer and collet chuck of the machining spindle, a compressed air connection must be available at the machine installation site.

Accessories	Air pressure	Air consumption
Pneumatic vacuum pump	4 - 6 bar	100-150 l/min (1 nozzle)
Cold air jet	3 - 10 bar	100-150 l/min
Cover tool changer	3 - 6 bar	Impulse
Cutting spindle with automatic tool change	> 7.5 bar	Impulse
swivel unit fitted on the cutting spindle for extraction (especially when processing wood)	2 bar	Impulse

The necessary software for tool change including tool length measurement is part of the operating and programming software Remote / ProNC.



Make sure all the accessories are professionally installed and observe the applicable standards and safety regulations.

11 Technical data

11.1 Dimensions and weight

Data		
Dimensions (W x H x D):	[mm]	76
Travel ranges	X-axis	[mm]
	Y-axis	[mm]
	Z-axis	[mm]
Speed (X/Y/Z at 10mm pitch)		0/100/80 mm/s

11.2 Electrical Data

Mains connection

Mains connection:	100 - 230VAC	0 Hz
Fuse:	Mains input 2 x 6,3A / 250V sluggish	
Earthing:	corresponds to protection class 1	
Fault current:	1.2 mA (with UFM 500) 4.3 mA (with iSA750 + inverter)	

Safety

safety characteristics:	EN ISO 13849-1:200	8 Category 2, PL c
-------------------------	--------------------	--------------------

Stepper motor power stages

Max. peak current / rated current per output stage:	4.2 A / 3.5 A
Supply voltage output stage:	48 VDC
Automatic current reduction:	to 50%

Electrical connections

digital inputs	8 x 15 inputs
digital outputs: 8 x 15 transistor outputs 1 x Relay output 2	ge 24VDC/300 mA 30V/6A
Analogue outputs: 1 x analogue output 0 Set-point value output for F	...10V to the speed frequency converter
Motor brake Z-axis	Yes

Step motors

Holding torque	[Nm]	1.13
Voltage per phase	[A/A]	4.2
Voltage per winding parallel	[V]	2.1
Step angle / angle error	[° / %]	1.8° / ± 5
Connection lines		8

12 Malfunctions

<i>Fault</i>	<i>Cause</i>	<i>Solution</i>
System will not switch on	No mains connection	Check circuit power supply plug, power strip
	Main switch not switched on	Switch main switch on
	Fuse faulty	Disconnect mains plug Replace fuse
POWER button not working	Cover not closed	Close cover
	EMERG-STOP not unlocked	Unlock EMERG-STOP
	Fuse faulty	Disconnect mains plug Replace fuse
Software not working properly	System not switched on	Switch on system (main switch)
	Output stage not switched on	Switch on output stage (POWER
	Connection not correct	Check cable connections
No communication via serial interface	Wrong COM port selected	Setting the COM Port
	Wrong baud rate selected	Setting the baud rate (19200)
Processing machine (spindle) does not work	Incorrect setting in the spindle module dll (only DNC mode)	Check and, if necessary, change settings
	Rotary switch on the machine tool off	Switch on the machine tool
Traversing widths of the axes not correct	Spindle pitch does not correspond to software setting	Change the spindle pitch in the software /3/
	Step resolution does not correspond to the setting in the software (PALPC, Remote)	Change the step resolution in the software /3/
Axis referencing is not executed correctly	The reference direction and the corresponding limit switch are not correct.	Swap limit switch (remote, @-command)
	Referencing is performed on a deactivated limit switch	Activate limit switch and change limit switch (remote, @-command) if

13 Declaration of conformity or declaration of incorporation

In the Machinery Directive 2006/42/EG legally binding since 29.12.2009, the term **"Machine"** is defined as follows (quote from MD, 2006/42/EC Article 2, Letter a):

"Machine"

- *an assembly, fitted with or intended to be fitted with a drive system other than directly applied human or animal effort, consisting of linked parts or components, at least one of which moves, and which are joined together **for a specific application**;*

All isel CNC basic machines, supplied with a tool (e.g. processing or engraving spindle, dosing unit, sensor like CCD camera or triangulation laser, water jet nozzle, plasma burner or equiv.), are covered by the declaration of conformity contained in these operating instructions.

These CNC machines are (task-related) are to be used **for a specific application**, which results from the type of the tool (fitted on a moving axis):

Tool = Machining spindle -> Application for milling, drilling

Tool = Engraving spindle -> Application for engraving

Tool = Dosing device -> Application for gluing, dosing etc.

In the Machinery Directive 98/37/EC, which is valid until 28 December 2009, the term "partly completed machine / incomplete machine" or in the new Machinery Directive 2006/42/EC, which is legally binding as of 29 December 2009, the term "incomplete machine" is defined as follows (citation MRL 2006/42/EC, Article 2, letter g):

"partly completed machine"

- *An assembly that is almost machinery, **but which in itself cannot perform a specific application**. A drive system represents a **partly completed machine**. Partly completed machinery is only **intended incorporated into or assembled with other machinery** or other partly completed **machinery or equipment**, thereby forming machinery to which this Directive applies;*

All isel **CNC basic machines**, supplied **without a tool** (e.g. processing or engraving spindle, dosing unit, sensor like CCD camera or triangulation laser, water jet nozzle, plasma burner or equiv.), and therefore not to be used **for a specific application** are covered by the declaration of incorporation contained in these operating instructions.

13.1 Declaration of Conformity for (complete) machine

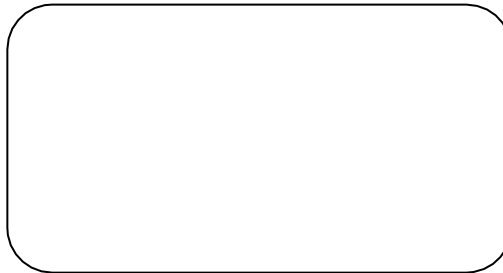
EC Declaration of Conformity as per Machinery Directive 2006/42/EC, appendix II A

The manufacturer

isel Germany AG
Bürgermeister-Ebert-Str. 40,
D-36124 Eichenzell

hereby declares that the following product Product description
isel-CNC-Machine ICP 4030

Types: **ICP 4030 iMC-P** Art.-No.: **280270 xxxx**
Rating plate:



satisfies the provisions of the above-mentioned Directive including any amendments valid at the time this declaration was given.

The following harmonised standards were applied:

EN ISO 12100:2010	Safety of Machinery – General Principles of Design – Risk assessment and risk reduction
EN ISO 13857:2008	Safety of machinery - safety distances to prevent hazard zones being reached by upper and lower limbs
EN 349:1993+A1:2008	Safety of machinery - Minimum gaps to avoid crushing of parts of the human body
EN ISO 14120:2015	Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards
EN ISO 13850:2015	Safety of machinery - Emergency-stop design principles
EN 60204-1/A1:2014	Safety of machinery - Electrical equipment of machines - Part 1 General requirements

The following additional EU Directives relevant to this product were used:

EMC directive	2014/30/EC
Low voltage directive	2014/35/EC

The **technical documentation** for this machine was drafted according to Annex VII Section A. The manufacturer undertakes to transmit these technical documents electronically to national authorities.

Authorised representative for the compilation of the technical documentation is: **Mr Werner Kister**

Place, Date: **Dernbach, 25 January 2012**



Werner Kister, Executive Board

13.2 Declaration of incorporation for (partly completed) basic machines

Declaration of incorporation as per Machinery Directive 2006/42/EC, appendix II B

The manufacturer **isel Germany AG**
Bürgermeister-Ebert-Str. 40,
D-36124 Eichenzell

hereby declares that the following product

Product description: **isel-Basis-Machine ICP 4030**
Types: **ICP 4030 iMC-P** Art.-No.: **280270 xxxx**
Rating plate:



fulfils the basic health and safety requirements of the **EC Machinery Directive 2006/42/EG Annex I**.
The following additional EU Directives relevant to this product were used:

EMC directive 2014/30/EU Low-voltage
directive 2014/35/EU

The following harmonised standards were applied:

- | | |
|---------------------|---|
| EN ISO 12100:2010 | Safety of Machinery – General Principles of Design – Risk assessment and risk reduction |
| EN ISO 13857:2008 | Safety of machinery - safety distances to prevent hazard zones being reached by upper and lower limbs |
| EN 349:1993+A1:2008 | Safety of machinery - Minimum gaps to avoid crushing of parts of the human body |
| EN ISO 14120:2015 | Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards |
| EN ISO 13850:2015 | Safety of machinery - Emergency-stop design principles |
| EN 60204-1/A1:2014 | Safety of machinery - Electrical equipment of machines - Part 1. General requirements |

The **technical documentation** for this partly completed machine was drafted according to Annex VII Section B. The manufacturer undertakes to transmit these technical documents electronically to national authorities.

Authorised representative for the compilation of the technical documentation is: **Mr Werner Kister**

The product (partly completed machine) is intended to be incorporated into a machine or assembled with other partly completed machinery to form a machine under the **MD 2006/42/EC**, Article 1, Section (1), Letter a.

Commissioning of the partly completed machine (product) is prohibited until the machinery into which this product has been incorporated or of which it is a component, fulfil the provisions of all relevant directives (especially MD2006/42 / EC) and this (completed) machine has a CE marking.

Place, Date: Dermbach, 25 January 2012

Werner Kister, Executive Board

14 Exploded views / spare parts lists

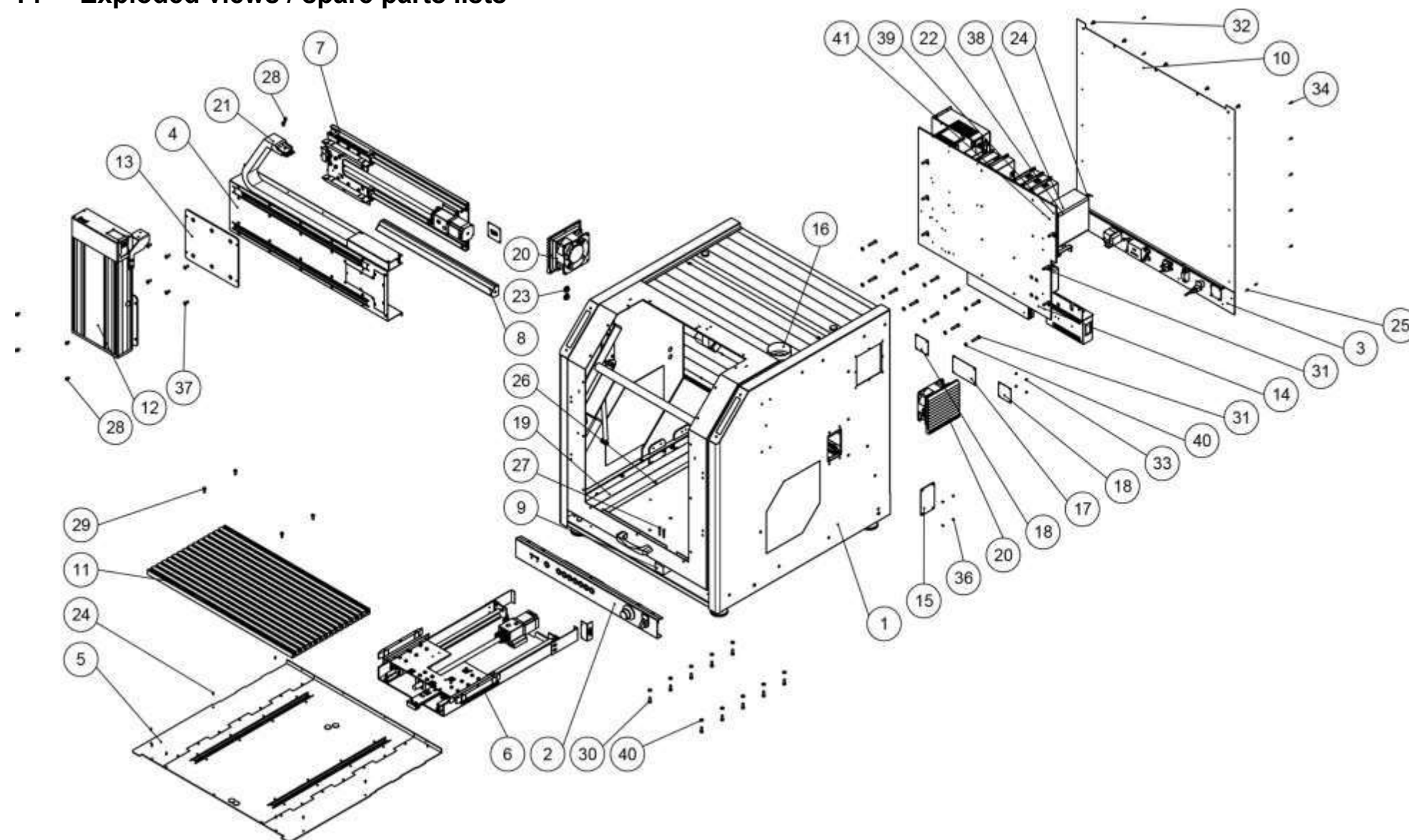


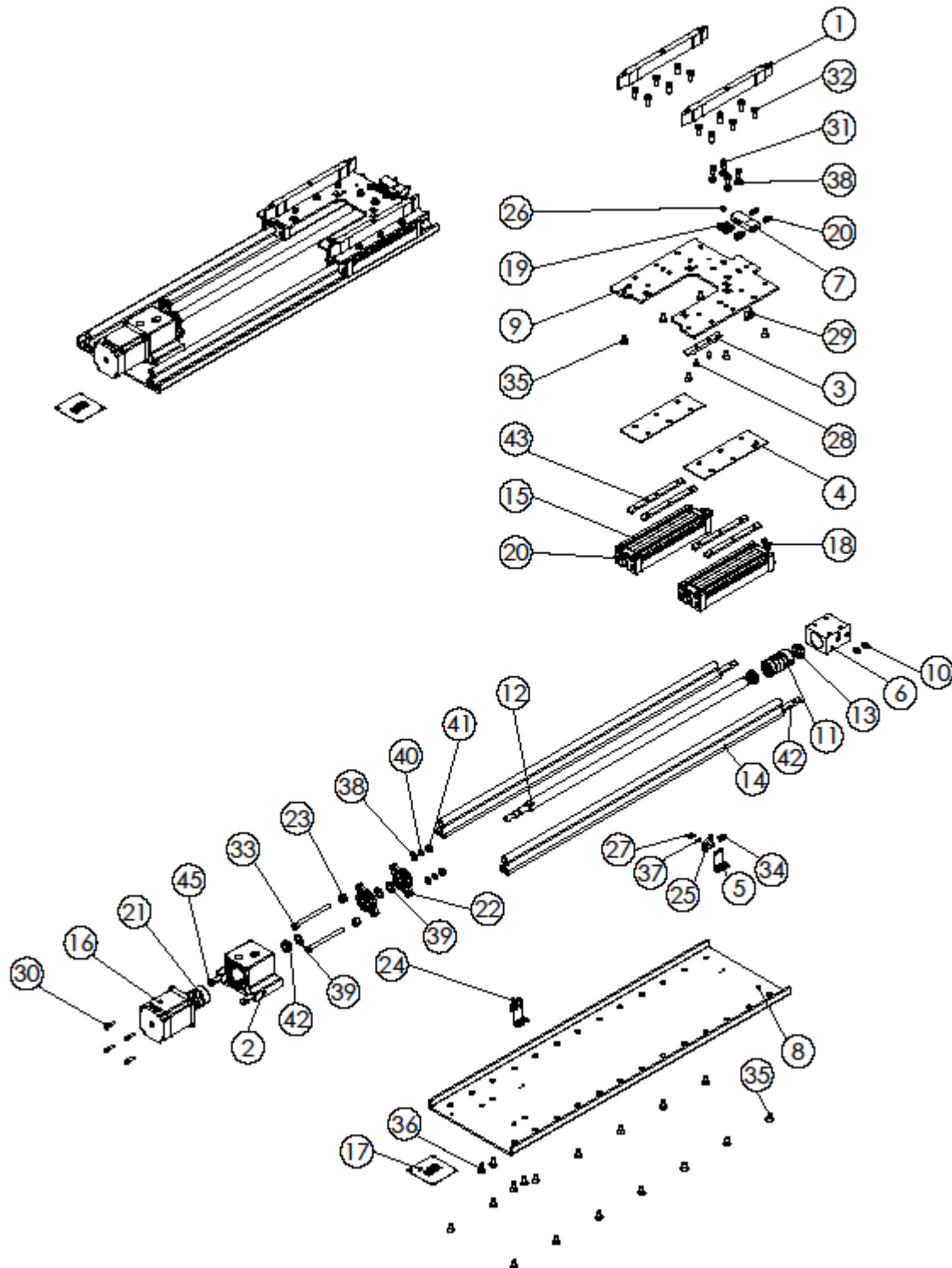
Fig 4: Exploded view ICP 4030, DU8000

Parts list ICP 4030

Item No.	Item No.	Quantity	Description	Drawing No.
1	680670 8001	1	DZ8001 - Chassis ICV 4030 - EC - RAL 7016 - RAL 3003	DZ8001
2	680670 8024	1	DZ8024 - Front panel with controls ICV 40-30 - EC	DZ8024
3	680670 8051	1	DZ8051 - Connection panel ICV-ICP 4030 - with blind panel	DZ8051
4	680670 8025	1	DZ8025 - X-Axis - Cover - ICV 4030 - EC - RAL 3003	DZ8025
5	680670 8034	1	DZ8034 - Y-Axis - Cover - Sheet metal machine - RAL 3003	DZ8034
6	680630 1002	1	DZ8035 - Y-Axis Sheet metal machine ICP-ICV 4030 - EC	DZ8035
7	680620 1002	1	DZ8036 - X-Axis Sheet metal machine ICP-ICV 4030 - EC	DZ8036
8	675012 6559	1	DZ6559 - LED - Machine lighting - PW45 - for ICV	DZ6559
9	680670 8044	1	DZ8044 - Back pressure central lubrication	DZ8044
10	680670 8053	1	DZ8053 - Cover Back wall ICV-EC	DZ8053
11	680670 8054	1	DZ8054 - Table top PT 25 ICV-EC	DZ8054
12	680640 1003	1	DZ8060 - Z-Axis Sheet metal machine ICV 4030 - EC	DZ8060
13	680670 8063	1	DZ8063 - Connector plate - X-Axis ICV	DZ8063
14	680650 8004	1	DU8004 - Control - Fitting - ICP 4030 - S	DU8004
15	680670 8289	1	DZ8289 - Service panel - Y-Axis - ICV 4030 - EC - RAL 7016	DZ8289
16	639112 29775	1	DZ2977 - Double flange ø80-ø50-2	DZ2977
17	680670 9144	1	DZ9144 - Cover sheet Motor - ICV 4030 - EC	DZ9144
18	680670 9145	2	DZ9145 - Blind sheet - ICV 4030 - EC	DZ9145
19	680670 9146	2	DZ9146 - Cable cover - ICV 4030 - EC	DZ9146
20	564029 1000	2	Aubomatcon - Filterlüfter ZL 803 - 120x120 - mit Lüfter	
21	219200 1000/219201	1	Energy chain 1 - ICV-EV	
22	559071	1	Plug-in switch 4-fold (6,3mm) - Art No 559071	
23	610019 0002	8	Blind plug d=16	
24	891201 0081	13	Raised countersunk headscrew DIN 966 4.8 VZ M 3 x 8	
25	891201 0101	6	Raised countersunk headscrew DIN 966 4.8 VZ M 3 x 10	
26	891122 0061	17	Cylinder bolt DIN 6912 8.8 M 4 x 6	
27	891122 0301	2	Cylinder bolt DIN 6912 8.8 M 4 x 30	
28	891124 0081	9	Cylinder bolt DIN 6912 8.8 M 6 x 8	
29	891124 0141	4	Cylinder bolt DIN 6912 8.8 M 6 x 14	
30	891124 0161	10	Cylinder bolt DIN 6912 8.8 M 6 x 16	
31	891124 0301	18	Cylinder bolt DIN 6912 8.8 M 6 x 30	
32	891594 0102	5	Pan head screw DIN 7380 M 6 x 10	
33	891181 0041	12	Oval head screw DIN 7985 4.8 VZ M 3 x 4	
34	891181 0101	19	Oval head screw DIN 7985 4.8 VZ M 3 x 10	
35	891592 0082	4	Pan head screw DIN 7380 M 4 x 8	
36	891131 0061	4	Countersunk bolt DIN 7991, M 3 x 6	
37	891134 0161	6	Countersunk bolt DIN 7991, M 6 x 16	
38	893160 0001	2	Toothed washer DIN 6797 Ø3,2	
39	893050 0001	2	Washer DIN 125 ST 3,2	
40	893054 0001	22	Washer DIN 125 ST 6,4	
41	892022 0001	2	Hexagonal nut DIN 934 8 M 3	

14.1 Structure axis systems

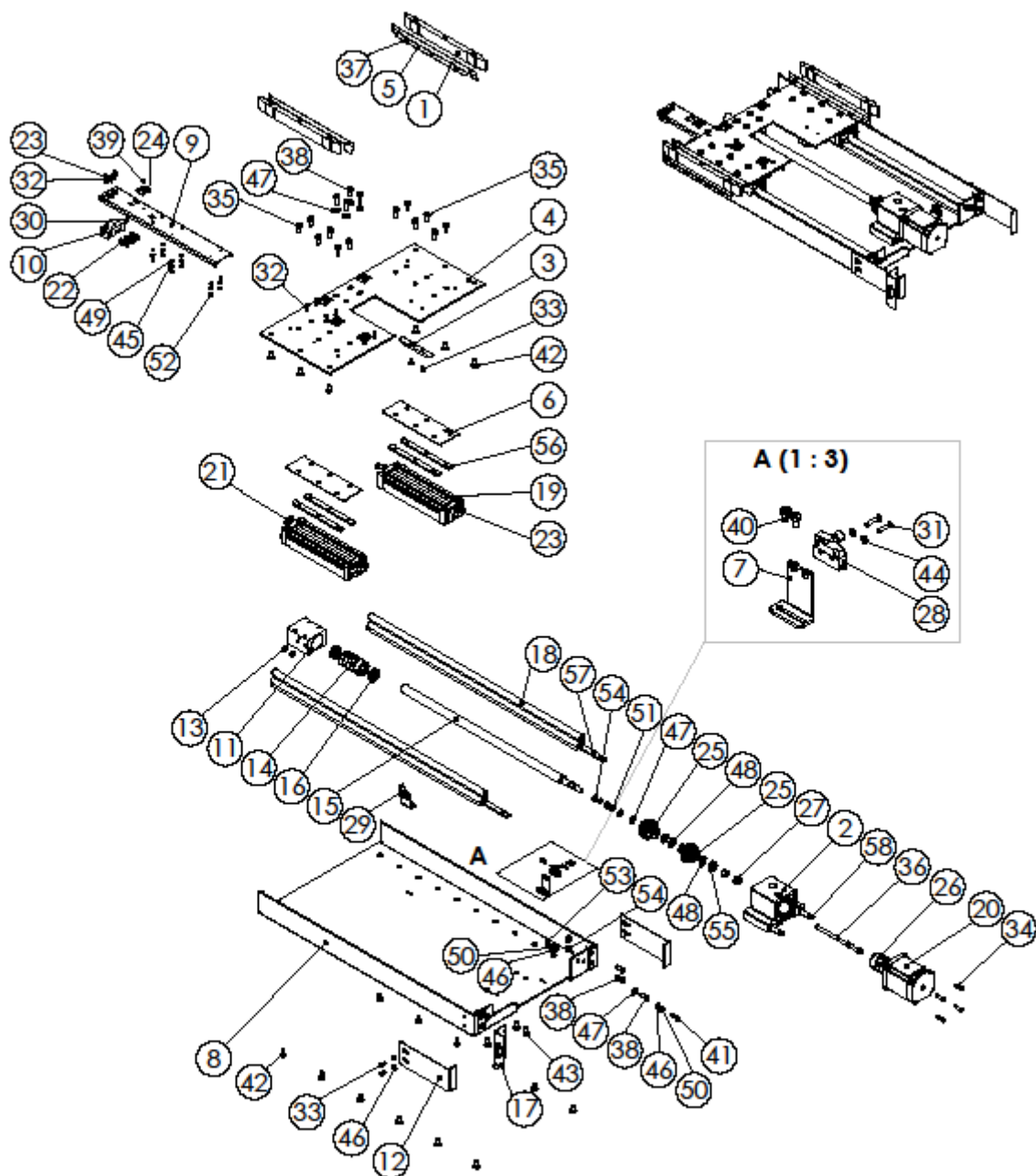
X-Axis



Parts list X-Axis

Item No.	Article number	Quantity	Description	Drawing No.
1	680524 1250	2	DZ1250 - Shuttle H22,5 ICP 20-15,30-20,40-30	DZ1250
2	680524 1328	1	DZ1328 - Bearing block X-Axis ICP	DZ1328
3	675012 7255	1	DZ7255 - Shuttle for travel limit switch GOH - Z-Axis	DZ7255
4	680670 8039	2	DZ8039 - X-Y-Axis - Slide base - ICV 4030 - EC	DZ8039
5	680670 8040	2	DZ8040 - X-Y-Axis - Limit switch bracket - ICV 4030 - EC	DZ8040
6	680670 8046	1	DZ8046 - X-Y-Axis - Clamping block Round nut - ICV 4030 - EC	DZ8046
7	680670 8048	1	DZ8048 - X-Axis - Lubricant distributor - ICV 4030 - EC	DZ8048
8	680670 8049	1	DZ8049 - X-Axis - Mounting plate - ICV 4030 - EC	DZ8049
9	680670 8050	1	DZ8050 - X-Axis - Slide plate - ICV 4030 - EC	DZ8050
10	622002 0001	2	TE1409 - Stud screw M8x0,75x10mm mit Kegel	TE1409
11	613110 0001	1	TE2456 - Ball screw nut - 16x10mm	TE2456
12	211135 10562	1	TE2859 - Ball screw spindle - 16x10mm - L=562	TE2859
13	613502	1	TP0104 - Scraper KG-Mutter	TP0104
14	680000 0647	2	ELF 1 with front bore - L=648	
15	623071 0151	2	Linear guide WS6 - L=150	
16	396058 60191	1	Motor module X-Axis - MS200	
17	680015 8001	1	DU8001 - Connector plate Motor module Y-Axis	DU8001
18	840003 0028	3	Plug-in fitting - 90degrees -M6-4	
19	840003 0027	3	Plug-in fitting straight QSM-M6-4	
20	623080 0001	4	Lubrication nipple for slide	
21	398931 080080	1	Shaft coupling WK 30-40	
22	420010	2	Flange bearing for KG-spindle	
23	642523	2	Spacer bushing flange bearing combination D12d6,75	
24	397011 1012	1	Limit switch with roller lever - 2pol. - L=550	
25	397015 1012	1	Limit switch with roller lever - 2pol. - L=950	
26	891374 0060	1	Threaded pin DIN 913 M 6 x 6	
27	891168 0101	4	Countersunk bolt DIN 963 4.8 VG M 2 x 10	
28	891122 0081	2	Cylinder bolt DIN 6912 8.8 M 4 x 8	
29	891122 0121	6	Cylinder bolt DIN 6912 8.8 M 4 x 12	
30	891122 0161	4	Cylinder bolt DIN 6912 8.8 M 4 x 16	
31	891124 0101	4	Cylinder bolt DIN 6912 8.8 M 6 x 10	
32	891124 0141	12	Cylinder bolt DIN 6912 8.8 M 6 x 14	
33	891124 0801	2	Cylinder bolt DIN 6912 8.8 M 6 x 80	
34	891181 0061	4	Oval head screw DIN 7985 4.8 VZ M 3 x 6	
35	891134 0121	20	Countersunk bolt DIN 7991, M 6 x 12	
36	891134 0141	4	Countersunk bolt DIN 7991, M 6 x 14	
37	893050 1000	4	Washer DIN 125 ST 2,2	
38	893054 0001	6	Washer DIN 125 ST 6,4	
39	893089 4000	3	Spring washer DIN 137 ø10,5	
40	893164 0001	2	Toothed washer DIN 6797 Ø6,4	
41	892025 0001	2	Hexagonal nut DIN 934 8 M 6	
42	890257 0011	1	Groove nut DIN 981 M10x0,75	
43	609011 0125	4	Threaded insert M6 10x4 125 long	
44	609011 0625	2	Threaded insert M6 1cx4 625 long	
45	890315 0002	2	Slide nut 2xM6 - L45xB10xH3,5mm	

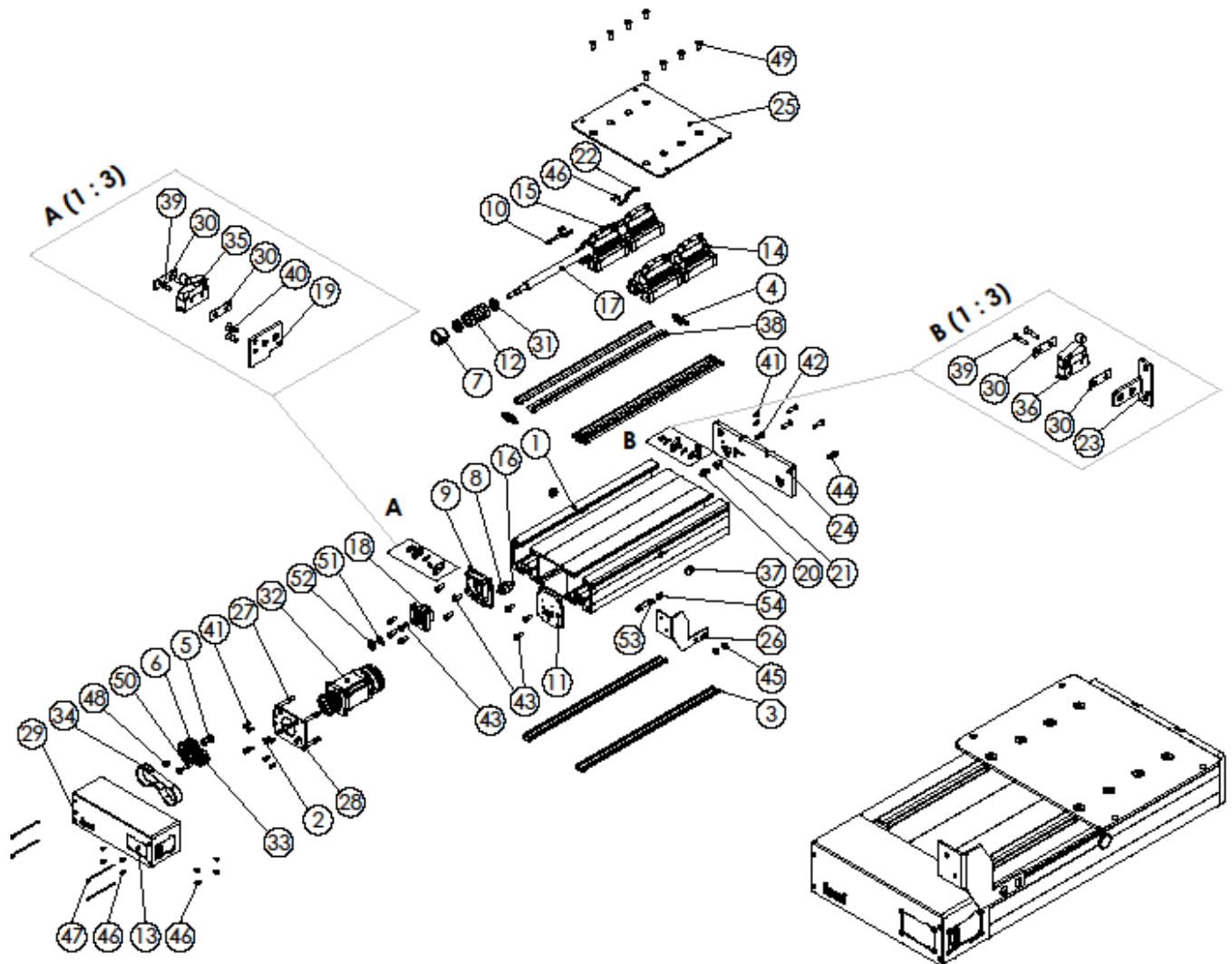
Y-axis



Parts list Y-axis

Item No.	Article number	Quantity	Description	Drawing No.
1	680534 1244	2	DZ1244 - Shuttle H22,5 ICP 30-20	DZ1244
2	680524 1328	1	DZ1328 - Bearing block X-Axis ICP	DZ1328
3	675012 7255	1	DZ7255 - Shuttle for travel limit switch GOH - Z-Axis	DZ7255
4	680670 8037	1	DZ8037 - Y-Axis - Slide plate - ICV 4030 - EC	DZ8037
5	680670 8038	2	DZ8038 - Y-Axis - Chip sheet - ICV 4030 - EC	DZ8038
6	680670 8039	2	DZ8039 - X-Y-Axis - Slide base - ICV 4030 - EC	DZ8039
7	680670 8040	2	DZ8040 - X-Y-Axis - Limit switch bracket - ICV 4030 - EC	DZ8040
8	680670 8041	1	DZ8041 - Y-Axis - Mounting plate - ICV 4030 - EC	DZ8041
9	680670 8042	1	DZ8042 - Y-Axis - Lubricant distributor sheet - ICV 4030 - EC	DZ8042
10	680670 8043	1	DZ8043 - Y-Axis - Lubricant distributor - ICV 4030 - EC	DZ8043
11	680670 8046	1	DZ8046 - X-Y-Axis - Clamping block Round nut - ICV 4030 - EC	DZ8046
12	680670 8047	2	DZ8047 - Y-Axis - Chip protection - ICV 4030 - EC	DZ8047
13	622002 0001	2	TE1409 - Stud screw M8x0,75x10mm with cone (replaces TP0150-4)	TE1409
14	613110 0001	1	TE2456 - Ball screw nut - 16x10mm	TE2456
15	211135 10462	1	TE2859 - Ball screw spindle - 16x10mm - L=462	TE2859
16	613502	1	TP0104 - Scraper KG-nut	TP0104
17	680015 8002	1	DU8002 - Mounting bracket - Connector plate - Y-Axis - ICP 4030 - S	DU8002
18	680060 0826	2	Guide LFS-12-11 L=542	
19	623071 0151	2	Linear guide WS6 - L=150	
20	396058 60190	1	Motor module Y-Axis - MS200	
21	840003 0028	2	Plug-in fitting - 90degree - M6-4	
22	840003 0027	3	Plug-in fitting straight QSM-M6-4	
23	623080 0001	4	Lubrication nipple for slide	
24	582009	5	Holder for cable tie	
25	420010	2	Flange bearing für KG-spindle	
26	398931 080080	1	Shaft coupling WK 30-40 D 8 - 8	
27	642523	2	Spacer bushing flange bearing combination D12d6,75	
28	397011 1012	1	Limit switch with roller lever - 2pol. - L=550	
29	397015 1012	1	Limit switch with roller lever - 2pol. - L=950	
30	891374 0060	1	Threaded pin DIN 913 M 6 x 6	
31	891168 0101	4	Countersunk bolt DIN 963 4.8 VG M 2 x 10	
32	891191 0080	8	Countersunk bolt DIN 965 4.8 VZ M 3 x 8	
33	891122 0081	6	Cylinder bolt DIN 6912 8.8 M 4 x 8	
34	891122 0161	4	Cylinder bolt DIN 6912 8.8 M 4 x 16	
35	891124 0141	12	Cylinder bolt DIN 6912 8.8 M 6 x 14	
36	891124 0801	2	Cylinder bolt DIN 6912 8.8 M 6 x 80	
37	891592 0052	6	Pan head screw DIN 7380 M 4 x 5	
38	891594 0161	10	Pan head screw DIN 7380 M 6 x 16	
39	891181 0050	5	Oval head screw DIN 7985 4.8 VZ M 3 x 5	
40	891181 0061	6	Oval head screw DIN 7985 4.8 VZ M 3 x 6	
41	891182 0160	1	Oval head screw DIN 7985 4.8 VZ M 4 x 16	
42	891134 0121	18	Countersunk bolt DIN 7991, M 6 x 12	
43	891134 0141	4	Countersunk bolt DIN 7991, M 6 x 14	
44	893050 1000	4	Washer DIN 125 ST 2,2	
45	893050 0001	6	Washer DIN 125 ST 3,2	
46	893051 0001	6	Washer DIN 125 ST 4,3	
47	893054 0001	6	Washer DIN 125 ST 6,4	
48	893089 4000	1	Spring washer DIN 137 ø10,5	
49	893160 0001	6	Toothed washer DIN 6797 Ø3,2	
50	893163 0001	2	Toothed washer DIN 6797 Ø5,3	
51	893164 0001	2	Toothed washer DIN 6797 Ø6,4	
52	892022 0001	6	Hexagonal nut DIN 934 8 M 3	
53	892023 0002	1	Hexagonal nut DIN 934 8 M 4	
54	892025 0001	4	Hexagonal nut DIN 934 8 M 6	
55	890257 0011	1	Groove nut DIN 981 M10x0,75	
56	609011 0125	4	Threaded insert M6 10x4 125 long	
57	609011 0525	2	Threaded insert M6 10x4 525 long	
58	890315 0002	2	Slide nut 2xM6 - L45xB10xH3,5mm	

Z-Axis



Parts list Z-Axis

Item No.	Article number	Quantity	Description	Drawing No.
1	635500 0039V02	1	Linear guide LFS-12-5 - L=390 - Lubrication hole in the middle	DZ2521
2	890133 0121	4	TE0174 - Countersunk bolt with Torx 20 M5x12	TE0174
3	632505	2	TE0275 - Cover profile SK593 P10_4	TE0275
4	693001	4	TE0398 - End trim for Sealer lip	TE0398
5	635001	2	TE0561 - Collet 8mm	TE0561
6	616002	2	TE0562 - Toothed belt wheel Z25 AT5 for collet D=8mm	TE0562
7	623065 0001	1	TE1972 - Lock nut for KG nut ø16	TE1972
8	674500 017312	1	TE2056 - Extension parabolic spring - L 12	TE2056
9	623051 2000	1	TE2342 - Direct drive end plate and counter bearing side (LF4 5 6) left	TE2342
10	635014	1	TE2328 - Crossing plate for limit switch for LF4; -5 and -6 L=62.5	TE2328
11	623052 1000	1	TE2435 - Cover sheet 72x72x5 for LF 4-6	TE2435
12	613110 0001	1	TE2457 - Ball screw nut - 16x10mm	TE2457
13	610110 2471	1	TE2471 - Blind plate for cover hood 225x75x80	TE2471
14	623072 0013	3	TE2796 - Linear guide WS5 - L=70 without KG nut	TE2796
15	623072 0014	1	TE2797 - Linear guide WS5 for KG - nut	TE2797
16	632126 2816	1	TE2816 - Rubber-bonded metal Parabolic spring - Art No632126 2816	TE2816

Item No.	Article number	Quantity	Description	Drawing No.
17	211135 10372	1	TE2859 - Ball screw spindle 16x10 - L=372mm	TE2859
18	623065 0102	1	TE2935 - Flange for belt drive (LF4-6)	TE2935
19	623056 1002	1	TE5925 - IGP 2520 - LES4 Belt drive - End plate - Limit switch plate	TE5925
20	632126 2374	1	DZ2374 - Rubber-bonded metal parabolic spring d12	DZ2374
21	674500 25130	1	DZ2513 - Spacer bushing parabolic spring	DZ2513
22	635014 2518	1	DZ2518 - Limit switch plate	DZ2518
23	674501 2519	1	DZ2519 - Limit switch bracket - LES 5 - special	DZ2519
24	680670 8061	1	DZ8061 - Z-Axis - Cover for LES5 - ICP 4030 - EC	DZ8061
25	680670 8062	1	DZ8062 - Z-Axis - Connector plate - ICP 4030 - EC	DZ8062
26	680670 8429	1	DZ8429 - E-Chain retaining plate Z-Axis -ICP 4030 - EC	DZ8429
27	634500 9012	4	SZ0789 - Spacer	SZ0789
28	674501 07902	1	SZ0790 - Motor adapter plate	SZ0790
29	623058 2418	1	SZ2418 - Cover cap Panasonic-Motor	SZ2418
30	610110 3745	4	SZ3745 - Mounting plate micro switch	SZ3745
31	613502	1	TP0104 - Scraper KG-Mutter	TP0104
32	396058 1315	1	Stepped motor module MS200	
33	616400	1	Tension pulley for toothed belt LF4-LF5	
34	616503 0280	1	Toothed belt 16 AT 5 – 280*	
35	397030 1012	1	Limit switch L=400mm	
36	397015 1012	1	Limit switch L=950mm	
37	610016	4	Kapsto-cover GPN 300 F-Type 300 F4_9_2 14 6_5	
38	630900	4	Sealer lip L - 380	
39	891168 0101	4	Countersunk bolt DIN 963 4.8 VG M 2 x 10	
40	891190 0060	2	Countersunk bolt DIN 965 4.8 VZ M 2,5 x 6	
41	891122 0101	6	Cylinder bolt DIN 6912 8.8 M 4 x 10	
42	891124 0121	1	Cylinder bolt DIN 6912 8.8 M 6 x 12	
43	891124 0161	10	Cylinder bolt DIN 6912 8.8 M 6 x 16	
44	891124 0201	4	Cylinder bolt DIN 6912 8.8 M 6 x 20	
45	891594 0101	2	Pan head screw DIN 7380 M 6 x 10	
46	891181 0061	12	Oval head screw DIN 7985 4.8 VZ M 3 x 6	
47	891181 0751	4	Oval head screw DIN 7985 4.8 VZ M 3 x 75	
48	891134 0121	2	Countersunk bolt DIN 7991, M 6 x 12	
49	891134 0161	8	Countersunk bolt DIN 7991, M 6 x 16	
50	891134 0351	1	Countersunk bolt DIN 7991, M 6 x 35	
51	893307 0000	1	Shim ring DIN 988 ST 10 x 16 x 1,0mm	
52	890257 0011	1	Groove nut DIN 981 M10x0,75	
53	890315 0002	1	Slide nut 2xM6 - L45xB10xH3,5mm	
54	890303 0002	1	4kt nut M4 - Company standard 10x10x3	

*) Wearing part, annual replacement recommended

15 Source directory:

- /1/ MD24 / MD28 Stepper motor drive module operating instructions, Version 03/2009
- /2/ PAL-PC Programming Instructions, Version 06/2004
- /3/ iMC-M / iMC-MP Programming Instructions, Version 03/2012
- /4/ Operating instructions *isel* control computer iPC-25: Manual for the control computer (control PC) iPC-25; isel Germany AG, 06/2014
- /5/ Remote: Operating and output programme for ISO-, NCP- and CNC files: Manual on the operating interface Remote; isel-automation 06/2005
- /6/ EC Directive Machinery 2006/42/EG (legally binding from 29.12.2009)

Operating instructions and manuals for download under:

<https://www.isel.com/de/service/anleitungen.html>

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17 Annex

17.1 Service card

Sender:

Company _____
Customer No. _____
Contact/Department _____
Telephone _____ Fax _____
Address _____
Return to _____

Quantity	Art. Number	Description	Invoice-No. Delivery note number (please enclose copy)	Serial number

Cause of complaint

a) Commercial complaint

☐ Incorrect delivery ☐ Quantity variance

☐ _____

b) Technical complaint

Error description:

When does the error occur?

☐ ongoing ☐ temperature-based

☐ sporadically ☐ after _____ minutes
runtime

Was the article already in use?

☐ Not yet in use

☐ Defect during commissioning

☐ _____ Months of operation

Date _____ Signature _____

Please note when returning the goods!

1. Proof of performance

A copy of the purchase invoice or delivery note is required to verify your warranty claim. If this proof is missing, we will return the goods unprocessed against a fee.

2. Fault description

In the case of products that arrive at our premises without a detailed description of the defect (defective or insufficient for repair), we have the right to choose between carrying out a chargeable fault diagnosis or the un-repaired return carriage forward against a handling fee.

3. Unjustified complaints

In the event of unjustified complaints (no defects can be ascertained, probably operating errors), the goods will be returned freight collect for a handling fee.

4. Packaging

We can only accept returned goods in *isel* original packaging or equivalent packaging. In the absence of original or improper packaging, the warranty claim is at risk. Resulting transport damage will void the warranty claim.

5. External products

Products that have not been purchased from us will be returned freight prepaid and un-repaired against a handling fee.

6. Transport costs

Transport costs for return deliveries from warranty claims will be borne by the customer. *isel Germany AG* All other transport costs are borne by the sender. Goods delivered carriage forward to us cannot be accepted for organisational reasons.

7. Terms and conditions of sale, delivery and payment

In all other respects, the sales, delivery and payment conditions of *isel Germany AG* apply