



Picture 1: Gantry OverHead M40

**Assembly Instruction for CNC base machinery
(partly completed machinery)**

**Operating Instruction for CNC machinery
(complete machinery)**

Type: Gantry OverHead M[®]

Models: 20, 30, 40, 50

About this manual

Used shortcuts

MD Machinery Directive 2006/42/EC
SCM Safety Circuit Module

Used symbols

You will find different symbols in this manual that signalizes important information/facts and danger.



Warning!

This symbol indicates dangers that cause damages for person's health, physical injury or death.



Warning! Dangerous voltage!

Warning of danger from electricity. Ignoring can lead to serious injury or death.



Attention!

This Symbol indicates important notes. Ignoring this symbol leads to damages and malfunctions of the machinery.



Information:

This symbol indicates important information and notes.

Observe the safety instructions



Before you put into operation the CNC machine / CNC base machine EuroMod, work with the machine or make additions or changes to/with the wiring of the machines electrical control cabinet / in the housing of the machine, make sure to read carefully:

- the safety instructions in this manual (Chapter 3) and
- the safety instructions for DC / AC Power amplifiers in the Operating manuals for Servo positioning modules with CANopen Interface /1.1/ resp. /1.2/

This Operating instruction has to be found near the CNC machine, so it has to be guaranteed that the user has always access to the information inside it.

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Despite all care, printing errors and mistakes cannot be excluded. For suggestions and information on errors, we are grateful.

CE mark for (complete) CNC machinery:

isel CNC machinery are CE compliant and marked accordingly. For this machinery the CE declaration of conformity is valid.

No CE mark for partly completed CNC machinery:

Partly completed machinery (definition from EC machinery directive 2006/42/EC) has no CE mark.

For partly completed machinery the declaration of incorporation (referred to in Annex II, part 1, section B) is valid.

For all other machinery parts and components, be applied to the CE safety directives, initial operation are prohibited until all appropriate requirements are met.

The company **isel Germany AG** assumes no responsibility or liability if you make any changes without the consent of the manufacturer of the machine that affect the CE-conformity of the machine.

The EMC test is valid only for the controller's original configuration ex works, i.e. the delivery state.

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1 Introduction

All **isel** CNC base machinery (corresponding MD 2006/42/EC **partly completed machinery**) respectively **isel** CNC machinery (corresponding MD 2006/42/EC **complete machinery**) of type Gantry OverHead M (even so machinery of type FlatCom, EuroMod and ModuStar) are proven CNC machinery. They provide the user a wide range of possibilities for 2D or 3D processing of work pieces.

Machinery are constructed in different sizes and accomplishments. The bases are exactly fitted and variable mountable standard profiles and drive units. Depending from the machinery demands according kinematics the units are mounted. The appearance of machine of one type is always the same. Applications of a concrete machine respectively the tool mounted on the Z axis are variously.

All CNC base machinery / CNC machinery of type **Gantry OverHead M** have a unique control and safety concept as well as a unique design of the mechanics. Each single machine becomes configured, measured and tested for many hours before delivery to the customer.

For every delivered CNC base machine / CNC machine a check protocol is archived under the special order number at the manufacturer isel Germany AG. The customer can request this protocol. All CNC base machinery / CNC machinery are surveyed with circle form tester QC20 from **Renishaw**[®] in all three interpolation planes resp. Laser interferometer.

As presupposition for your work you need basic knowledge's in CNC techniques and PC application. It would be good to know also the terminology of the current valid MD:

- **MD 2006/42/EU** since 29.12.2009 **obligingly by law**

Please note this manual that you

- install and do commissioning of CNC base machine / CNC machine correctly
- can work safety, fast and effectively
- keep away danger from persons and the equipment
- can fully profit from the capabilities of CNC base machine / CNC machine

The statements in this manual orientate to a standard complexity of deliver the CNC machine is ready for operation. Notes not related to the machine (e.g. accessory or software) you can skip when reading the manual the first time.

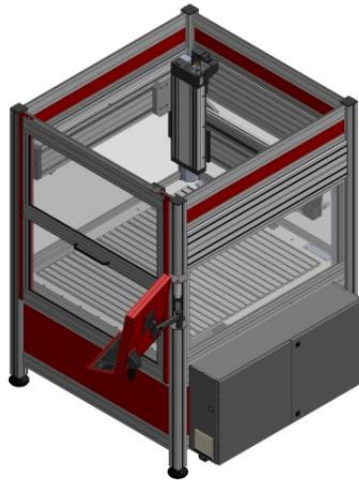
The statements in this manual are basing on the following configuration / technical state of the CNC machine control system:

- all motor amplifiers have **monitoring of standstill state**
- Operator software is: **ProNC /6/ or / Remote /7/ higher then version 1.46.2.1**

For installation and commissioning the software or accessory please note the supplemental manuals. They are composed in the bibliography of this manual.

Example CNC base machine Gantry OverHead M:

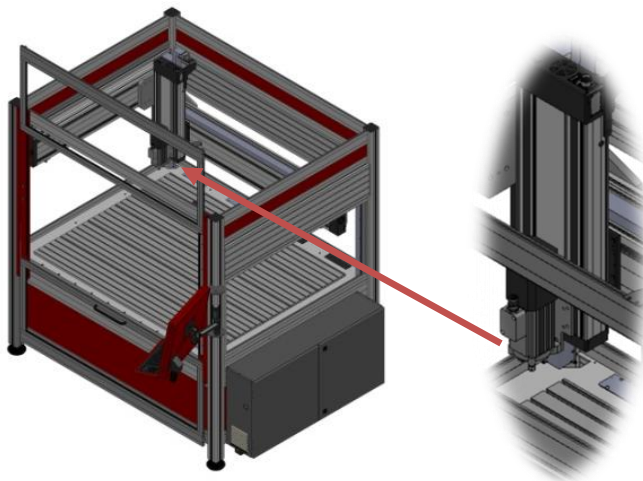
- **partly completed machine**
- equipped **without tool**, no clearly definition of application purpose
- this CNC base machine is delivered **without CE mark**
- for this CNC base machine the **Declaration of Incorporation** is valid



Picture 2: Gantry OverHead M30 base machine

Example CNC machine OverHead M:

- **complete machine**
- equipped **with tool** milling spindle, so applicable for milling or drilling
- this CNC machine is delivered **with CE mark**
- for this CNC machine the **Declaration of Conformity** is valid



Picture 3: Gantry OverHead M30 CNC machine

2 Intended use and reasonably foreseeable misuse

isel CNC machinery / *isel* CNC base machinery are CNC controlled machinery with more than one linear axis resp. one or two optional rotation axis. The motor power amplifiers will be driven via a PC based CAN-CNC-control (CANopen standard). All control and power electronics for the axis is mounted in a control cabinet.



Differences between CNC-machine and CNC-base-machine:

***isel* CNC machine:**

In the new, at 29.12.2009 legally binding machine directive 2006/42/EC, is the term “**machinery**” defined as follows (quote from EC directive, article 2, letter a):

„*machinery*“

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*.

Each *isel*-CNC-machine delivered **with a tool** (e.g. milling or engraving spindle, metering device, measuring device like CCD camera or triangulation laser, water jet nozzle, plasma burner), is for the purpose of the directive 2006/42/EC a machine, because she was manufactured for a specific purpose resp. *specific application and therewith a specific usage*.

The usage results from the kind of tool which is mounted on a moveable axis, e.g.:

tool = milling tool	→ usage for milling, drilling
tool = engraving tool	→ usage for engraving
tool = metering device	→ usage for metering
tool = water jet nozzle	→ usage for water jet cutting

The manufacturer *isel* Germany AG is able to effect a legal prescribed risk assessment for the CNC-machines. CNC-machines will be delivered with a machinery enclosure.

***isel* CNC base machine:**

In the new, at 29.12.2009 legally binding machine directive 2006/42/EC, is the term “**partly completed machinery**” defined as follows (quote from EC directive, article 2, letter g):

„*partly completed machinery*“

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

Each **isel-CNC-base-machine** delivered **without a tool** and therefore **not for a specific application** is for the purpose of the directive 2006/42/EC a **partly completed machine**.

- The CNC-machine / CNC-base-machine is used for work in dry rooms (workshops, laboratories) and industrial firms (max. ambient temperature: 40°C)
- **CNC-machine:**
 - The **CNC-machine (complete machine)** is according to the type mounted on the machine tool **appropriately** used. That is, the concrete tool of the CNC machine specifies the intended use of the machine within the meaning of the Machinery Directive (Annex I, Section 1.1.2). Under this premise, the CNC-machine is suitable for milling, drilling, cutting, engraving, metering, measuring or water jet cutting. The CNC-machine is not suitable for graphite machining.
 - Appropriate processing materials are light metals, plastics, wood, glass, platinum materials, etc.
 - Not permitted are materials which produces during processing harmful gases
 - The CNC-machine is prepared for an extraction unit device. This extraction unit is preferably suitable for dry dust (wood dust, fiberglass / fiberglass dust, platinum dust, etc.).
- The **CNC base machine** (partly completed machine) can be added by you as the buyer of the base-machine with a variety of appropriate processing tools to a CNC-machine (complete machine) in compliance with the requirements of the machinery directive. You are responsible for CE certification if you use the machine itself resp. sell (bring to market). The CE certification also includes the legally required identification of a safe machine by the CE mark.
- CNC-machinery for milling processes:
 - The CNC-milling-machines are designed for milling/drilling of the following materials: **aluminum, copper, brass, plastics (e.g. GRP / fiberglass), wood**
 - The processing of magnesium is prohibited because of fire.
 - During the processing of steel / stainless steel only engraving or a processing with low cutting forces is possible.
 - It shall not be used milling spindles with a toolholder greater than ISO 25 or HSK 25 (hollow shank taper). The speed of the spindle drive may not be higher than the corresponding processing speed for the material.
 - All machines are designed for milling spindles (spindle machining, induction motor) with a maximum of 3 kW drive power.
 - Cutters and drills may be used up to a maximum shaft diameter of 12 mm.
 - The tools form cutters and conical formers for timber industry may be used up to a maximum cutting diameter of 45mm and a shaft diameter of 12 mm.

- The rapid traverse velocity should not exceed the values of 150mm/sec till 200mm/sec depending on the machine size.
- The feed rate of the processing tool in the material must be determined technologically and should be smaller than the rapid traverse speed.
- For the secure clamping of the tools in the tool holder, the user is responsible.
- To the reasonably foreseeable misuse belongs the operation of the machine by two persons. It is prohibited that one person presses in test-mode (see also 7.1 Operation modes) the acknowledge button (ACK) and another person is touching into the machines workspace or do work in another way when the safety door is open and an axis movement is going on.
- There must be no manipulations on the locking of the safety door.

3 Safety guidelines



Read this section of the manual before connecting and commissioning of the machine carefully!

As is the case with all technological systems are also in this machine functioning and operational safety ensured only if the operation both the *general* safety precautions as well as the *special* safety instructions are observed.

3.1 Common safety guidelines

1. The installation and initial operation of the machine may only be carried out by authorized personnel with appropriate qualifications.
2. The machine may only be used in accordance with the provisions of this manual. For the damage caused by use of the machine for other applications then the machine has been developed, closes the manufacturer isel Germany AG from any liability.
3. The CNC machine may operate only as using ***suitable materials for processing*** as using ***proven accessories***. By the use of non-approved materials and accessories (e.g. tools for milling) can damage the machine or the work pieces that are created. In this case the manufacturer is excluded from any liability.
4. Before commissioning the machine, make sure that the mains voltage (that is specified on the name plate of the individual components) is in accordance with the existing mains voltage in your plant or working place. A wrong voltage can destroy the machine and its components.
5. To avoid electrical shock do not insert objects into the machine imports; except for the intended replacement of parts in accordance with this manual.
6. For the implementation of maintenance work always disconnect the machine from the AC power grid.
7. Before opening the switchboard (switch cabinet) the main power switch has to be **switched to OFF** and the power plug has to be **disconnected from the AC power grid**.
8. Important: components in the switchboard (switch cabinet) can have residual voltage.
9. Never operate the machine at locations where could be a risk that water or other liquids can penetrate in the control cabinet or the CNC-control panel.
10. The footprint of the machine must be sufficiently stable; please note the loading capacity of your used grounding.
11. The opening of the machine housing and repairs to the machine may only be carried out by authorized service technicians.
12. Please note that there is a risk of injury caused by the milling spindle with a clamped cutter or milling / drilling tool.
13. The milling machine may only be operated with original accessories or accessories according to the manufacturer released. Exchange of parts in accordance with the provisions of this manual only genuine parts may be used. For the damage caused by the use of non-shared accessories or foreign parts, no liability is assumed.
14. The milling machine must not be placed in potentially explosive atmospheres.
15. When laying out the mains cable be careful that you avoid tripping hazards and prevent damage to the electric main.

16. Any modification to the CNC-machine or its components without the written approval of the manufacturer causes that the EC-declaration of conformity becomes invalid.
17. When cleaning the machine avoid the inhalation of dust.
18. Clean the machine with a suitable cleaning agent only (household, non-abrasive cleaning agents).
19. Mobile phones in the vicinity of the machine should not be used. Interference in the CNC-control cannot be ruled out.

3.2 Special safety guidelines

- The CNC machine has an enclosure resp. sliding door around, but not above the working area. The clear panes (material: Polycarbonate) are fixed in the machine frame resp. sliding door. They guarantee the protection against moving parts and breaking parts of tool or work piece possibly ejected out of the working area inside. The CNC machine is open to top, so there is no complete protection against breaking parts (**Residual risk**). The enclosure reduces noise level and keeps slivers in milling or drilling operation. **During operation** the sliding door is **kept shut** (closed and locked) and so it can not be opened. This safety module (door interlocking, the so called **Schmersal**) must not be manipulated or removed.
Without complete, intact enclosure resp. sliding door including undamaged Polycarbonat panes a CNC machine delivered with CE mark must not be put into operation.
- The CNC base machine without enclosure resp. sliding door is a partly completed machine due to MD 2006/42/EU and is delivered without CE mark. The **Declaration of Incorporation** is valid.
As operator of the CNC base machine you are responsible for implementation of suitable protection actions as result of your risk assessment. Those actions have to comply with all safety requests of MD 2006/42/EU.
- Be always careful that work pieces are tightly clamped. The use of **safe and suitable** parts / devices for work piece clamping is one of the tasks of the operator. **Unsafe or not suitable** devices for work piece clamping can cause unfasten of work piece from device during operation. This can result in heavy damage and accidents with fatality or personal damages. In this case injury of tool, work piece, clamping device or other parts of the machine can occur.
- In emergency the EMERGENCY STOP (NOT HALT) switch is to be pushed. Pushing this switch results in disconnection of the power supply for power electronics in the motor amplifiers resp. the frequency converter for the working spindle by the main relay controlled by the safety module. Emergency stop complies with Stop category 1 due to EN 60204-1:2006 (controlled stop and subsequent switch off the power supply for motor amplifiers).
- The key switch on the CNC operator panel may be used only by knowledgeable and instructed persons, because in TEST mode there is an increased risk of damage. Please keep the replacement key switch under your personal check.
- The operator has guarantee sufficient ventilation according accrument of dust or gas, caused by the operation process of working pieces.
- If the sound pressure level near the machine should be higher then 70 dB(A) the operator has to wear an applicative ear protection.
- The work at and with the machine is only allowed for authorized, knowledgeable and instructed persons. Those persons have to be informed by a special instruction about possibly appearing endangerments (especially residual risk).



- Flowing water must not be used for cooling. For cooling purpose only special cooling equipment (refer to the chapter accessory) may be used. This cooling equipment has to generate water fog or an air flow for cooling effect. No drops of cooling medium may appear or flow under the clamping plate.
- **WARNING! High leakage current (earth leakage current, protective conductor current) !**
Before connecting the CNC machinery to the AC power supply it is essential to connect an additional protective conductor (cross section, laying and clamping point in the cabinet are described in section 5.5 *Connection to the AC power supply*).



**ATTENTION! HIGH LEAKAGE
CURRENT**

4 Scope of delivery / distribution state (QA)

4.1 Standard scope of delivery

The standard scope of delivery regarding CNC machine / CNC Base machine contains:

- Aluminium base frame with
 - enclosure (clear panes, material: Polycarbonate) and (perpendicularly moveable) single piece sliding door (for CNC machine only, not for CNC base machine)
 - machine table (mounted on the Y axis) with a T-Groove plate for clamping the work piece
- Drive axes X, Y, Z including mechanical or magnetic end switches and position feedback controlled Servo motors
- CNC control panel with TFT monitor (Touch screen) and operation elements
- Control cabinet including:
 - Mains power plug, mains line, net input filter
 - Main switch, lockable in OFF state due to EN 60204-1 (part 1)
 - Servo motor power amplifiers
 - PC based CNC Controller (CAN-PC or Industry-PC)
 - System module I (Safety module, CAN I/O module, 24 VDC power supply)
- Machinery documentation with the following parts:
 - This Assembly instruction for CNC base machinery / Operating instruction for CNC machinery
 - Operating instruction for system module SKME or iSM10, Servo motor power amplifiers iMD10 / iMD20 or iMD40, PC based CNC Controller iPC series and CNC control panel
 - wiring diagram with part lists



The control software ProNC /6/ or Remote /7/ including CAN CNC Motion Control Software is completely installed on the control PC. The CNC machine was tested factory-made using this software.

The declaration of conformity for CNC machinery is only valid if the CNC machine is used with this control software (ProNC version 1.45.6.1 or newer resp. Remote version 1.45.6.1 or newer).

For Back Up the control software ProNC / Remote is stored on CD-ROM or USB memory stick for the purpose of reinstallation (Setup).

The user is responsible for archiving all his application programs (ISO, PAL, CNC or NCP format) on USB memory stick.



The current scope of delivery of your CNC machine is defined in the packaging note.

4.2 Delivery status from the factory (quality management)

To verify the accuracy of the CNC machine the circular form measuring system Renishaw QC20 is used.

Using this system the accuracy of all axes of all produced CNC machinery / CNC base machinery becomes checked before delivery.

Circular form measuring system QC20

The assembly of the QC20 is possible at each machine, and takes only a few minutes to complete. The measuring is controlled via a simple, standard CNC program.

The data are obtained and evaluated in the diagnostic software and the errors with their size and the corresponding impact on the overall accuracy are shown in graphical / tabular form.

The form of recognized circles (in all three interpolation planes XY / XZ / YZ) provides guidance on any existing machine error:

- tracking error / position tolerance
- straightness error / perpendicularity
- measure error / backlash
- quadrant transitional / circular form tolerance

The measurements are made depending on the size of the measured axes with a radius of 50mm, 100mm, 150mm and 300mm. It is always the shortest axis considered.

The delivery of any CNC machine to the customer follows only when all parameters are within the prescribed limit. The results of the measurements are stored and archived according the current machine resp. order.

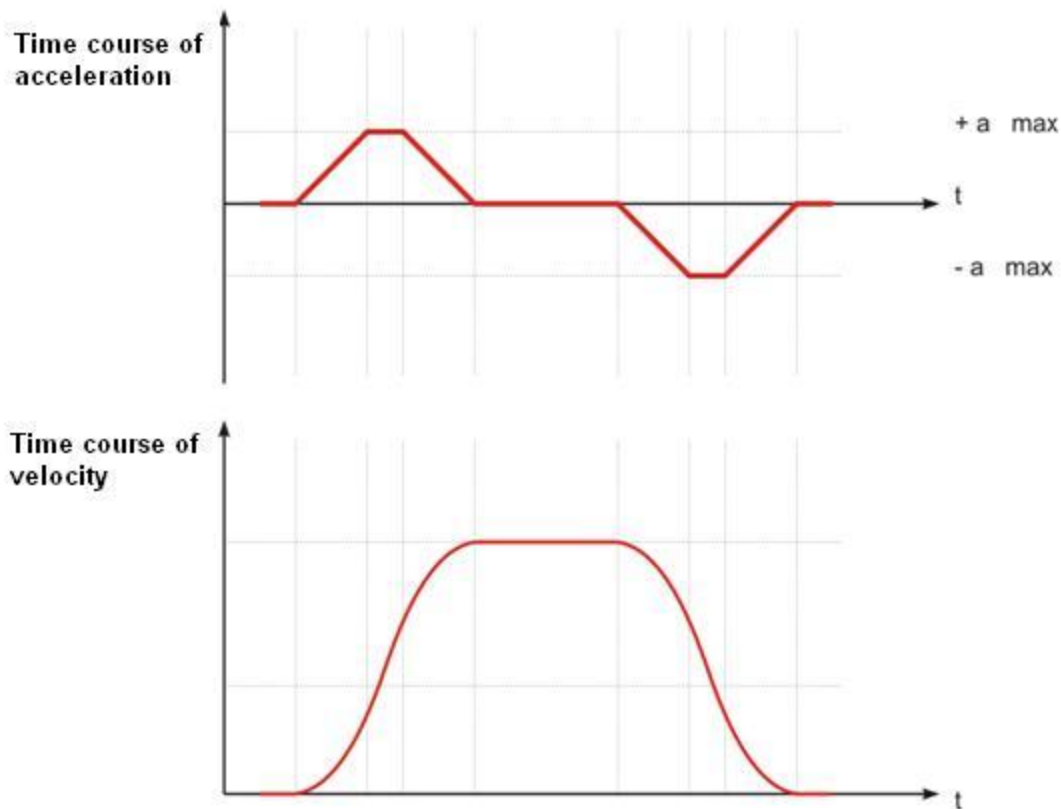


Picture 4: circular form measure with Renishaw QC20

To test the position accuracy the laser interferometer Renishaw XL80 is used.

The laser measuring system allows both the complete testing of complex machine tools and automation systems / special machines as well as simple positioning / motion axes.

With the available lenses extensive opportunities for static and dynamic tests are available, e.g. the identification of the real velocity profile $v = v(t)$ of a linear axis and thus the proof of the continuity of meaningful signal curve:



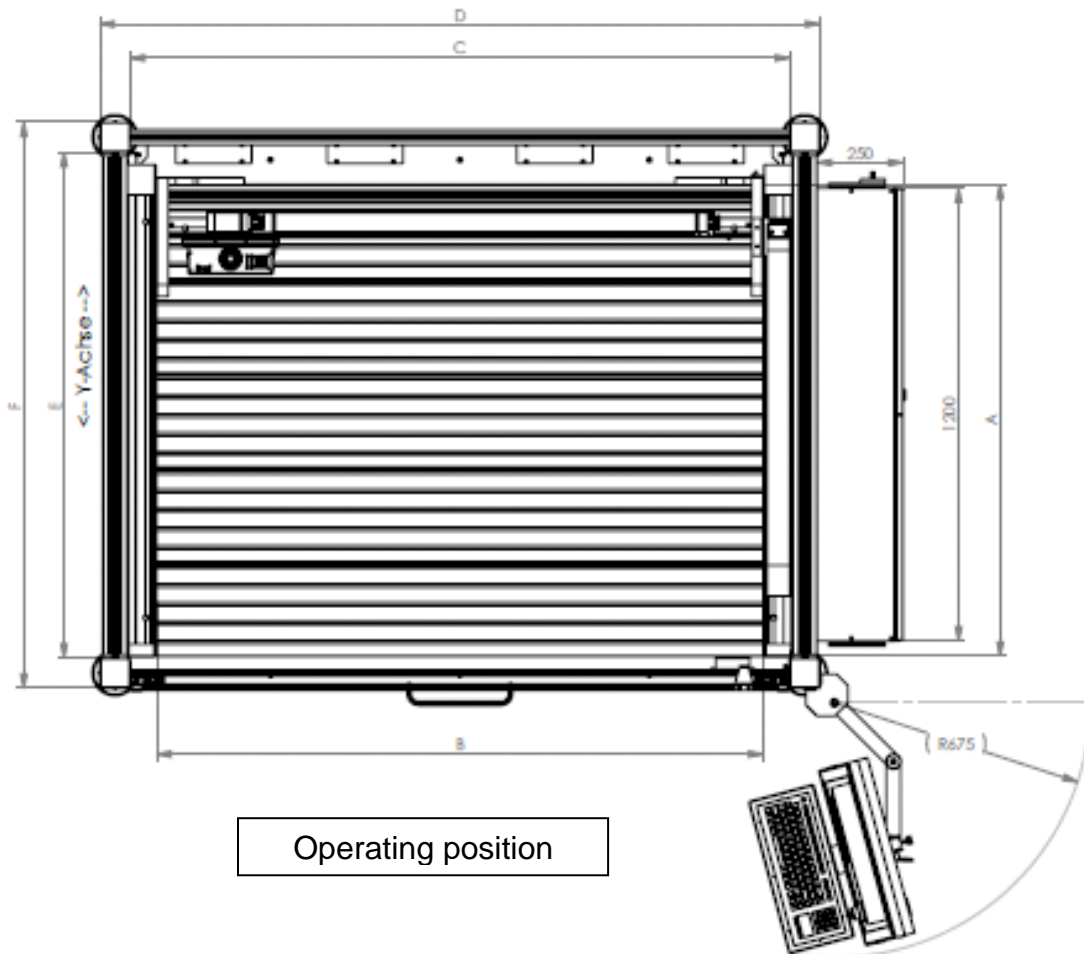
Picture 5: velocity profile of a linear axis with jerk limitation

The position measurement is the most commonly performed measurement on a machine. The laser measuring system measures the **positioning accuracy and repeatability** by comparing the displayed position of the machine with the laser measurement system measured the current position.

5 Installation and connection of the CNC machine

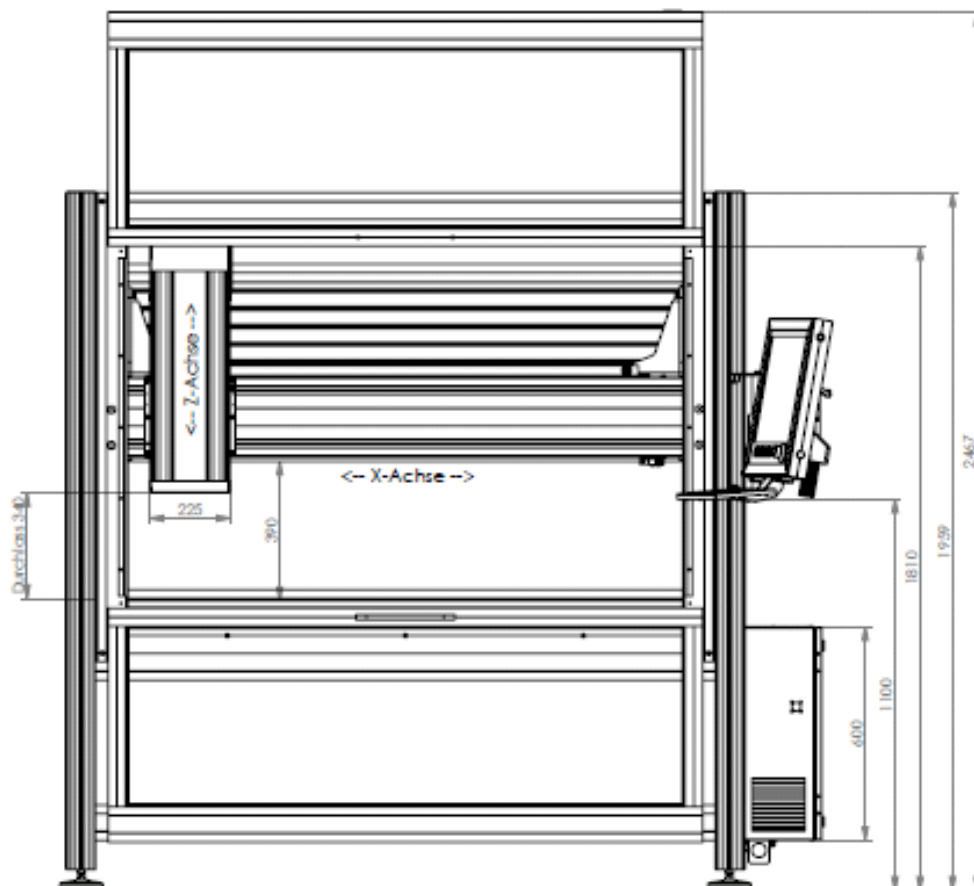
5.1 Space requirements

The required space for the machine is limited to the outer dimensions of the machine, the controller cabinet and the CNC control panel as well as enough space in front or side of the machine to operate it and to be able to set up. The sliding door of the machine hood opens downward so you need no additional space above the machine



Picture 6: space requirement Gantry OverHead M20 to M50

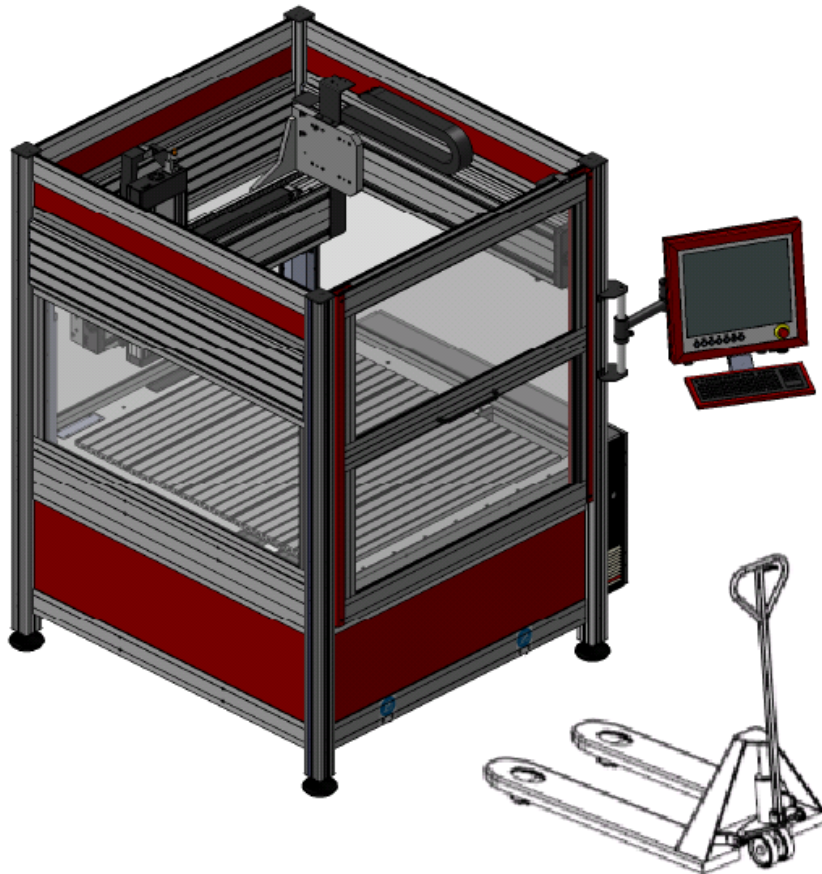
Gantry OverHead M Standard (permission to pass 340 mm)							
model	Item-no:	dimension [mm]					
		A	B	C	D	E	F
M20	275223 56165	1000	1100	1240	1400	1040	1200
M30	275233 56165	1250	1100	1240	1400	1340	1500
M40	275243 56165	1250	1600	1740	1900	1340	1500
M50	275253 56165	1750	1600	1740	1900	1840	2000



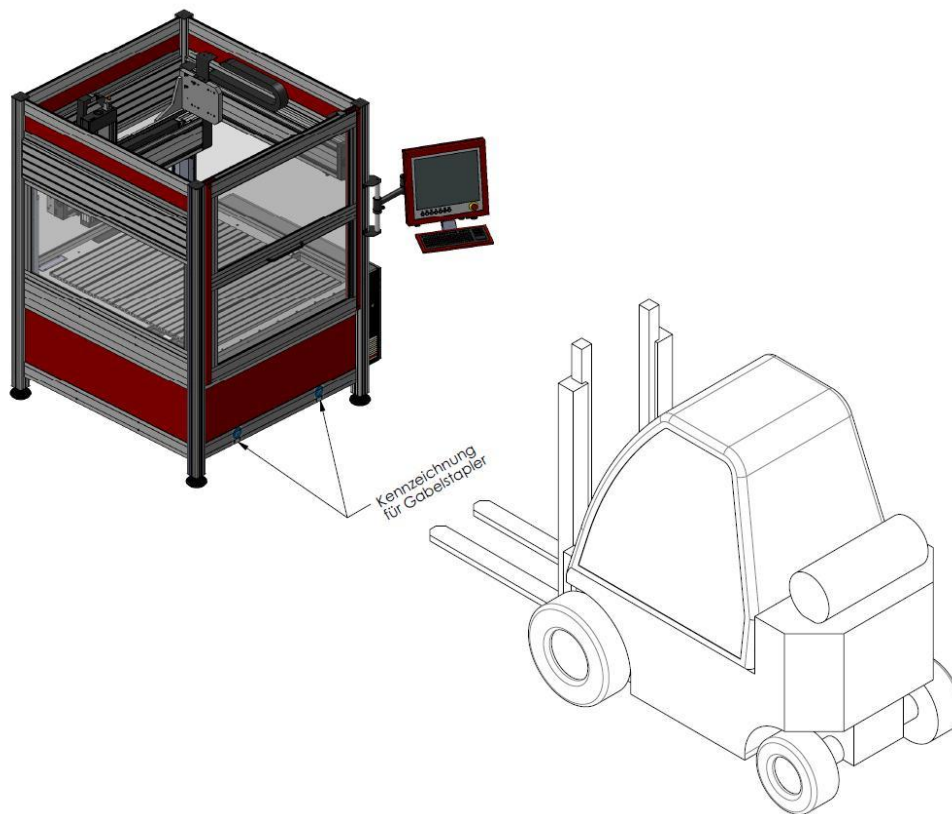
Picture 7: space requirement Gantry OverHead M20 to M50

5.2 Transport of the CNC machine

When transporting the machine pay attention according its weight and size. Remove the transport lock from the frame feeds. Use only appropriate lifting equipment (forklift, trucks, see the picture below). Lift the machine only from below and do not pull up on the cover. The contact points on the lower machine frame for transporting with a forklift are marked with a pictogram.



Picture 8: transport by trucks



Picture 9: transport by forklift

In case of a later transfer, please make sure that the net cable and connection cables are not damaged.



Unplug the power supply cable before each transport



Take care during transport that the machine is not suspended to heavy vibrations.



Keep the triangular key for manual unlock of the door outside the machine.



The contact points for the transport of the machine with a forklift are marked with this pictogram.

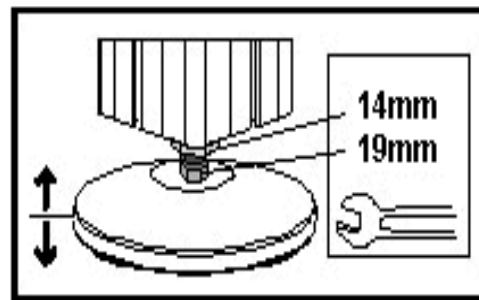
5.3 Put up the CNC machine

The clamping / processing area of the CNC machine and all axes are aligned precisely at right angles from the factory.



Never loosen the fastenings of the axles or the mounting bracket, in which the transverse axis (X-fitted axis). Otherwise, the machine must be re-measured by a technician from manufacturer isel Germany AG.

Place the machine on a plane and solid area. You can compensate the unevenness of the floor / table with the adjustable feet. For precise alignment of the machine you need a spirit level with an accuracy of at least 0.1 mm / m. Save the height of the machine feet with the lock nut.



For safe installation of your new CNC machine on site, we offer the following service:

CNC base machine / CNC machine measuring / calibration with laser interferometer at the customer / end-user site (article number: 991300 0001).



Picture 10: Laser measurement of an isel base machine in plant Dermbach in Thuringia

5.4 Enclosure

5.4.1 Enclosure with sliding door and safety interlock on CNC machinery

CNC machinery of type Gantry OverHead M have a homogeneous machine frame, e.g. the enclosure is not removable.

The transparent panes (material: polycarbonate) mounted in the machine frame resp. in the door ensure during operation of the machine (setup or working process) protection against moving machine parts as well as eventually thrown work piece fragments from the work area.



You are not allowed to put a CE marked CNC machine into operation if the enclosure is not complete, intact or the polycarbonate panes are damaged.

5.4.2 Mounting of suitable protective measures at CNC base machinery

The delivered CNC base machinery without safety door / hood resp. without in the machine frame fixed transparent panes are partly completed machinery for the purpose of the directive 2006/42/EC. They are delivered without a CE marking.

It applies the declaration of incorporation and the assembly instruction.

You are not allowed to put the delivered CNC base machine into operation if you have not mounted appropriate protective measures.



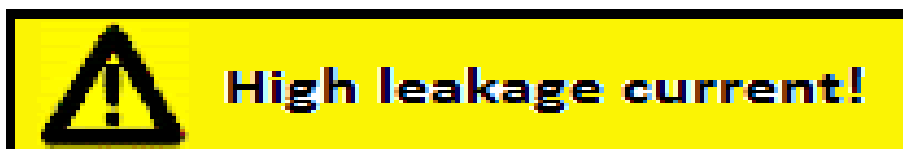
As the operator of the CNC base machine, you are responsible for taking appropriate protective measures based on your risk assessment to comply the requirements for the machine according to Machinery Directive 2006/42/EC.

5.5 Connection to AC power supply, cabling

The CNC machine is controlled by a control PC /3/ and a power electronics for the servo motors (motor drives /1.1/ /1.2/). The complete control – integrated in a control cabinet /5/ – is completely cabled with the axes and electrical components of the machine.

The wiring diagrams reflecting cabling of components are part of the machine documentation /5/.


The AC power cord of the control cabinet, connect only when the machine is ready for commissioning. The following guidelines must be observed:



WARNING! High leakage current !

Before connecting the CNC machinery to the AC power supply it is essential to connect an additional protective conductor (cross section: 2.5 mm² or 4 mm²).

Prior to the commissioning of the electrical machine an **additional protective conductor** of **2.5 mm² (protected installation)** or a protective conductor of **4 mm² (unprotected installation)** has to be installed between the following **2 points**:

- **Starting point:** The point marked by  on the terminal point of the protective conductor rail in the cabinet
- **End point:** The point where the protective conductor has a cross section of not less than 10 mm² of copper or 16 mm² of aluminum (for example, this **End point** could be the electric distribution of the plant or building).

Please entrust the implementation to an electrical installer.

Request to the AC power supply: TN-S system, i.e.

- Connection 1-phase: PHASE (P), NEUTRAL CONDUCTOR, PROTECTIVE CONDUCTOR
- Connection 3-phase: L1, L2, L3, NEUTRAL CONDUCTOR, PROTECTIVE CONDUCTOR
- Line fuse: P (L1, L2, L3) 16A - C



If you use residual current circuit breaker (FI) for line protection / fault current limiting: **A RCD with AC characteristics should not be used.** Through the use of frequency converters and chopped amplifiers inside the power units (inside the control cabinet) of our CNC machines can occur beside AC residual current also additionally superimposed fault currents with pulsating DC and DC. Please talk to your electrical installer.



The term **leakage current** is understood here as **earth leakage current**. This item is defined in the standard EN 60204-1:2007 section 8.2.8 - note 1. If the CNC machine could be established ideal isolated from Earth Reference Potential, the **earth leakage current** is equal to the **current in the protective conductor**.

**Information for compressed air connection of accessories:**

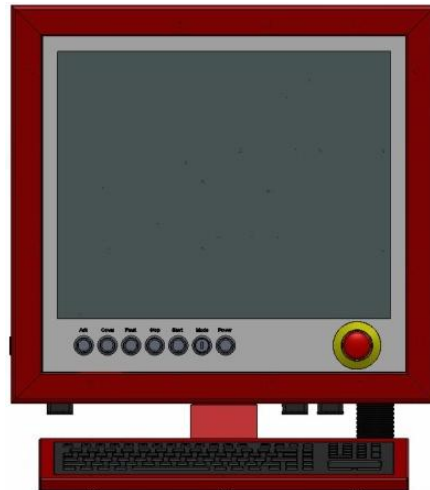
To use the optional vacuum clamping system or the tool changer and collets of the working spindle it's necessary that the location of the machine has a compressed air connection.

accessories	air pressure	air consumption
pneumatic vacuum pump	4 - 6 bar	100-150 l/min (1 nozzle)
cold air nozzle	3 - 10 bar	100-150 l/min
cover of the tool changer	3 - 6 bar	impulse
milling spindle with automatic tool change	> 7.5 bar	impulse
on the milling spindle mounted swivel unit for exhaust (specially for woodworking)	2 bar	impulse

6 Initial operation, terminology CNC technology

6.1 Operating elements

The following figure shows the operating elements on the CNC control panel. The use of each single element is explained in chapter 7.3.



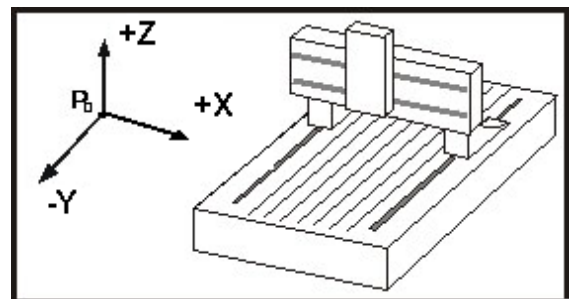
Picture 11. CNC control panel iOP-19-TFT

6.2 Coordinate system and work piece zero point

The coordinate system of the CNC machine is set as a right system as shown in the picture.

The **work piece zero point** P0 can be defined by the software (e.g. via teach in) or is freely programmed in the application program.

A **yellow** label on each axis marks both the axes (X, Y or Z as axis letter for linear axes, A, B or C as axis letter for rotation axis) as well as the positive / negative axis direction of linear axis resp. positive / negative rotation direction or rotation axis.



If you need to change the arrangement of the coordinates, please read the manuals for the motor power amplifiers IMD10 /1.1/, IMD20 or IMD40 /1.2/ or contact our technical support.

6.3 Assignment of the motion axes

The assignment of the motion axes depending from the operator position is:

- On **flatbed machinery**:
 X-axis = transverse axis (+X right; -X left)
 Y-axis = longitudinal axis **(+Y away from the operator; -Y to the operator)**
 Z-axis = lift axis (+Z up; -Z down)

The logical address letters are accordingly:

X - axis	= transverse axis	= X	= amplifier node address 1 (*)
Y - axis	= axis	= Y	= amplifier node address 2 (*)
			= amplifier node address 8 (**)
Z - axis	=stroke axis	= Z	= amplifier node address 3 (*)
A- axis	= axis of rotation	=A	= amplifier node address 4
(*) = CAN bus 1			
(**) = Gantry slave axis			

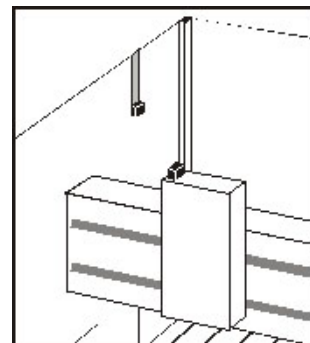
6.4 Reference point, machine zero point and home position

The **Reference point** of the machine (**identically to the machine zero point**) is ex factory at the following axes positions:

- At the back (Y-axis)
- left (X-axis)
- at the top (Z-axis)

The **reference point** is set by the hardware limit switches (factory set).

Former EuroMod machines had a **home position** sensor to signal this special position to the controller. This sensor was needed because the motor power amplifiers did not have the feature to supervise the standstill of the driven single axis / motor.



The Home position sensor is not needed for EuroMod machinery because of the feature of supervising standstill of axis in the motor power amplifiers.

6.5 Work piece mounting resp. clamping



When you set up your machine you have to use only suitable and safe clamping tools (see also chapter accessories).

Note that the work pieces are always solid fixed.

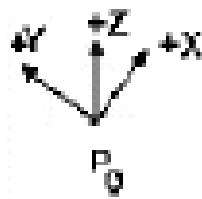
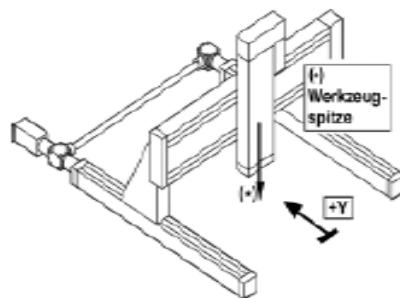
6.6 Machine kinematics

6.6.1 Flatbed machinery Gantry OverHead

A **flatbed machine** has the following characteristic:

The **clamping plate for the work piece** is mounted tightly on the machine frame. The work piece is not moved.

So a Y motion of the **tool** (that is the tools top) in positive Y direction (+Y) happens away from the operator.



Axis direction always is to be seen according the tool tip, so the coordinate system has to be a XYZ orthogonal system (remember the right hand rule).

7 Operation

7.1 Operation modes

- **Operation mode AUTO = AUTOMATIC = Processing mode**

In operation mode AUTO you can process a selected (i.e. opened) application program (ISO- / PAL- / NCP- or CNC file) on your CNC machine and so the work piece becomes processed. The door / cover is locked while processing is active, that is the axes of the machine are moving.

In operation mode AUTO you can open the door / cover of the CNC machine at first when all axes do not move (standstill monitoring) **and** the working spindle (e.g. the milling spindle of a CNC milling machine) does not rotate (speed = 0 Rpm), i.e. also is switched off.

For opening the door / cover the operator has to push the COVER button.

When the door / cover is closed again it will be locked automatically by the safety interlock.

- **Operation mode TEST = TEST = Setup mode**

For test and monitoring purposes the operation mode TEST can be used.

In order to change from operation mode AUTO to operation mode TEST turn the key in the key switch on the operator panel to right, i.e. to position TEST.

In operation mode TEST you can process a selected (i.e. opened) application program (ISO- / PAL- / NCP- or CNC file) on your CNC machine even when the door / cover is open, but with the following **two restrictions**:

1st restriction: When the door / cover is open, the application program is processed as long as the ACK-button (ACKnowledge button) keeps pushed by the operator.

2nd restriction: Operation mode TEST has no influence on the velocity (as normal motion as fast motion) of the axes, the current velocity keeps unchanged. But the working spindle will not turn because the frequency converter is disabled in this mode.

Releasing the **Acknowledge-button (ACK-Button)** when the door / cover is open causes an EMERGENCY STOP and therewith a switch off the power voltage supply for the motor power amplifiers and for the frequency converter(s) driving the working spindle(s). In TEST mode the switch on of the working spindle is scotched by the safety circuit module.



Attention! Risk of injury!

The key switch = mode selection switch may be used only by authorized and knowledgeable staff, because there is no protection against moving machinery axes when the door / cover is opened in TEST mode.

7.2 Cover interlock, Cover unlock, Standstill monitoring



The cover interlock is a basically safety relevant function.

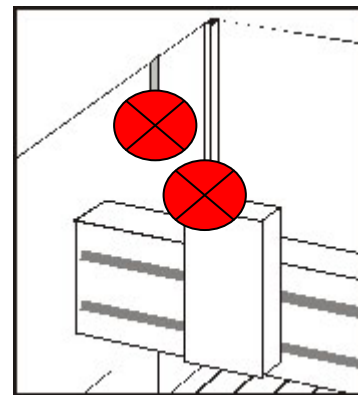
A special **Home position** is not watched by the CNC controller (i.e. safety circuit module). So **Home position** has **no influence on cover lock / cover unlock**.

Rather standstill monitoring (integrated in the motor power amplifiers) is relevant. This **standstill monitoring** is implemented redundantly in accordance with EN ISO 62061 (VDE 0113-50) (cross contact recognition). All motor power amplifiers (e.g. IMD10 /1.1/ or IMD20 /1.2/), integrated in the Control cabinet /5/ of the CNC machine, are switched in line according safety. They **feed forward the clock signals** (the 1st from the Safety Circuit Module, the last to the Safety Circuit Module) when the amplifier recognizes that the driven servo motor **is not outside a position feed back controlled limit**.

The Safety Circuit Module generates (i.e. transmits) two clock signals over two outputs and receives / monitors those two clock signals on two inputs. When standstill of all servo motors / machine axes in **AUTOMATIC mode** the cover is **unlocked**.



Home-Position-Sensor not available, rather standstill monitoring in all axes!



Basically: All linear axes (X, Y, and Z) of the CNC machine and all optional rotation axes (A, B, C) have to remain stationary in order to be able to open the door / cover in operation mode **AUTOMATIC** (i.e. the key switch is in position **AUTO**).



key switch = mode selection switch

In Setup mode (**key switch = mode selection switch** in position **TEST**) the cover can always be opened, independent of the current position or standstill of all linear axes (X, Y, Z) of the CNC machine and all optional rotation axes (A, B, C).

The cover control (as a part of SCM) monitors the sensor and controls the actuator (**safety interlock**) for cover lock / unlock:

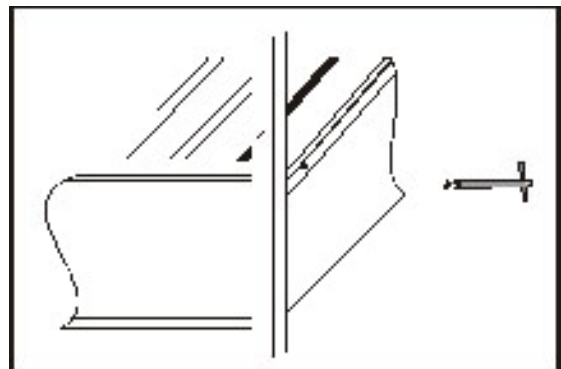
- Sensor function of **safety interlock**:
 1. Cover closed / open
 2. Cover locked / unlocked
- Actuator function of **safety interlock**:
Cover lock



How to do cover unlock manually?

For special cases (e.g. door lock defect or loss of power supply voltage of the machine) you can use the triangular key (enclosure of the CNC machine) to open the door / cover lock manually.

1. Switch off the machine.
2. Turn the triangular key – without using great force- a half turn to the left and open the door.



The servo motors of the machine are not powered.

3. Turn the triangular key back to the right.

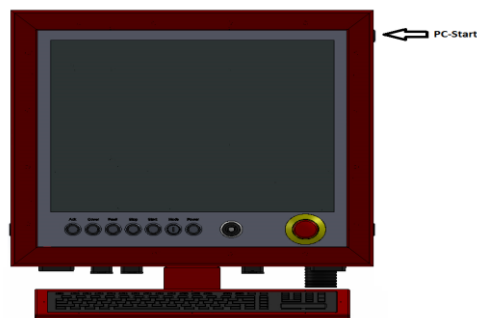


**In the state
safety interlock manually unlocked
you must not operate the machine.**

7.3 CNC operating panel

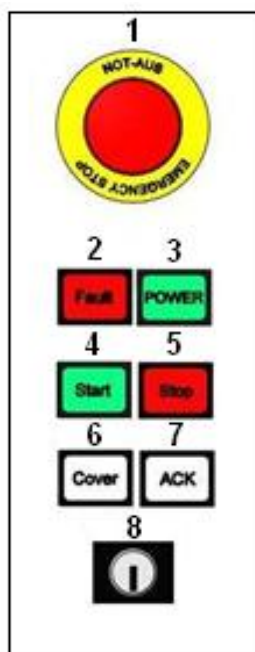
7.3.1 CNC operating panel – right side: button for PC boot / shut down

Having switched on the main switch on the control cabinet /5/ you can boot the Windows operating system of your Control-PC (inside the control cabinet). Push the button on the right side of CNC operating panel to boot or shut down.



7.3.2 CNC operating panel – front side: operating elements

The operation of the CNC machine takes place using the buttons on the external hand control unit or optionally via the buttons on the CNC operating panel /4/, the keyboard, the mouse/trackball or via touch screen.



External hand control unit



CNC operating panel



Picture 12: operating elements iOP-19

1- Emergency stop switch

When pushed: Turns off the power supply for the servo motor power amplifiers and the working spindle (**controlled stop 1 = STOP1 corresponding EN 60204-1**).

Push this switch in case of any danger. This means dangers for the user's health or machine safety. The safety circuit module (SCM) in the control cabinet is applicable till safety category 3 (DIN EN945-1). To unlock the switch turn it to right (clockwise).



If you push the EMERGENCY STOP switch the servo motor power supply will not be switched off immediately (EN 60204-1, stop category 1 = STOP1) so any axes motion can be stopped until standstill.

The main power supply voltage of 115/230VAC lies still inside the control cabinet, only the motor power supply voltage for the amplifiers is switched off.

2- Fault-lamp

The fault lamp indicates an error within the safety circuit module (SCM).

All servo motor power amplifiers and the frequency converter are disabled.

3- POWER button

Use this button to switch on motor power supply voltage for the servo motor power amplifiers.

Conditions for switch on:

- Main power switch on the control cabinet is switched on
- Emergency stop button is pulled out



Note /2/, there chapter 4.1.4 Dialog for Status request!

If power supply voltage is successfully switched on the power button is lighted green.

4- Start-button

If you press the start button the currently selected (opened) application program (ISO, PAL, CNC or NCP format) is started or a stopped motion of the machinery axes or the application program is continued, even from the point where it was stopped by pushing the stop button.

5- Stop-button

If you press the stop button the currently started application program (ISO, PAL, CNC or NCP format) and therewith any motion of the machinery axes is stopped.

The current line in the application program keeps marked /6/ /7/.

If the SCM recognizes standstill of all machinery axes and also standstill of the working spindle, the **cover button** is enabled. In this state the cover can be unlocked by pressing the cover button so the door / cover can be opened.

You can continue the execution of the user program by pressing the start button or you can abort program execution by pressing the ESC button on the keyboard.

6- Cover-button

Use this button to open the machines cover or safety door. This is only possible if the conditions from point “8 – mode selection switch“ are complied. An enable for opening of the cover or safety door is signaled by a white lighted cover button.

7- ACK-button (ACKnowledge-button)

In the operation mode **TEST** this button has to be pushed as long as the machinery axes are moving **and** the door / cover is open.

Releasing the **Acknowledge-button (ACK-Button)** when the door / cover is open causes an EMERGENCY STOP and therewith a switch off the power voltage supply for the motor power amplifiers and for the frequency converter(s) driving the working spindle(s).

8- Mode selection switch = key switch

Use this switch to change between **AUTO (processing mode)** and **TEST (setup mode)**.



In **AUTO** you can **open the cover or safety door** of the machine **only** if **no axis is in motion** and the mounted **working spindle** is **switched off** (means that spindle does not turn).

In **TEST** you can **open the cover or safety door** of the machine **only** if the mounted **working spindle** is **switched off** (means that spindle does not turn). You can just **move the axes at opened cover or safety door** if you **press the ACK button**.

Ensure that in setup-mode (key switch on TEST) only authorized personal operates on the machine.



In which operation mode the working spindle can be switched on?

- **Operation mode AUTO = AUTOMATIC = Processing mode**

Any switch on resp. turning on to target speed the working spindle **is possible if the door / cover is closed and locked**.

- **Operation mode TEST = TEST mode = Setup mode**

Any switch on resp. turning on to target speed the working spindle **is generally impossible**.



Operating mode alternation AUTO —► TEST :

Operating mode alternation AUTO —► TEST

While processing the work piece causes rev down the working spindle to 0 rpm (when frequency converter with enable input drives the working spindle) resp. the working spindle is switched off.



Operating mode alternation TEST —► AUTO:

Operating mode alternation TEST —► AUTO

Causes rev up the working spindle to previous target rpm resp. the working spindle is switched on.



Operating mode alternation is permitted only in STOP-state of the CNC machinery axes!

If operating mode alternates not in STOP-state of the CNC machinery axes this can damage the working spindle or the work piece.



Attention! Risk of injury!

The key switch = mode selection switch may be used only by authorized and knowledgeable staff, because there is no protection against moving machinery axes when the door / cover is opened in TEST mode.

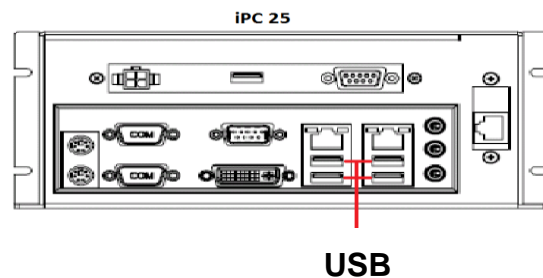
10- Potentiometer for override

With the potentiometer you can adjust the travel of the axes continuously.

7.3.3 CNC controller: USB connectors (female)

The USB connectors can be used to plug in USB devices like USB memory stick, the WIBU-USB-dongle for ProNC /6/ or an external CD/DVD drive.

This is the interface to transfer any NC data like NCP, ISO, PAL or CNC application programs or drawings from/for a CAD/CAM system from the users Desktop-PC to the Control-PC /3/.



If you want to execute an ISO or PAL application program with ProNC /6/ a so called WIBU-USB-dongle has to be plugged to one of the two USB connectors.

For the execution of ISO or NCP programs with Remote /7/ no WIBU-USB-dongle is needed.

7.4 CNC control software: Installation and starting

You can choose between the CNC control software:

- Process automation software **ProNC** /6/
- Control software **Remote** /7/

The CNC control software (part of scope of delivery of your CNC machine)

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

including the corresponding manuals

- **ProNC:** **Operating and programming instruction** /6/
- **Remote:** **Operating instruction** /7/

in PDF format is stored on the corresponding marked installation CD and the delivered USB memory stick.



Use the USB memory stick also to archive your application programs and initialisation files *.ini resp. configuration files *.cfg .

On delivery of CNC machine the CNC control software **ProNC** or **Remote** (depending on the order / delivery) already fully installed.

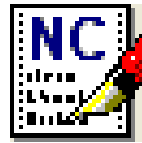
For installation of **ProNC** please read the operating instruction ProNC chapter 3.4.4 “configuration dialog“ /6/.

For installation of **Remote** please read the operating instruction REMOTE chapter 2.8.3.1 „configuration“ /7/.

Further information's about the CNC-Software can be found in the corresponding manuals resp. ReadMe files on the installations CD.

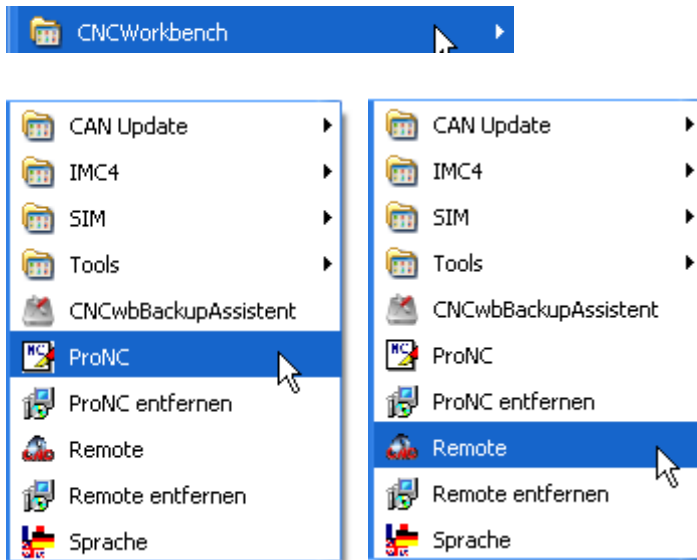


***Alternatively you can start the installation assistant.
This assistant will guide you through the setup process.***

or **Remote**

Start the CNC Operator software **ProNC**

- with a mouse click on the icon on the desktop or in the taskbar
- or
- with a mouse click in the Star menu folder CNCWorkbench



7.5 Operating mode AUTOMATIC – production with CNC machine

The production of parts on a CNC machine is accomplished in the following sequence:

- 1: Ensure the operational readiness (pre-production)
- 2: Production: processing / production of one or more work pieces
- 3: Complete operational readiness (cleaning and maintenance)

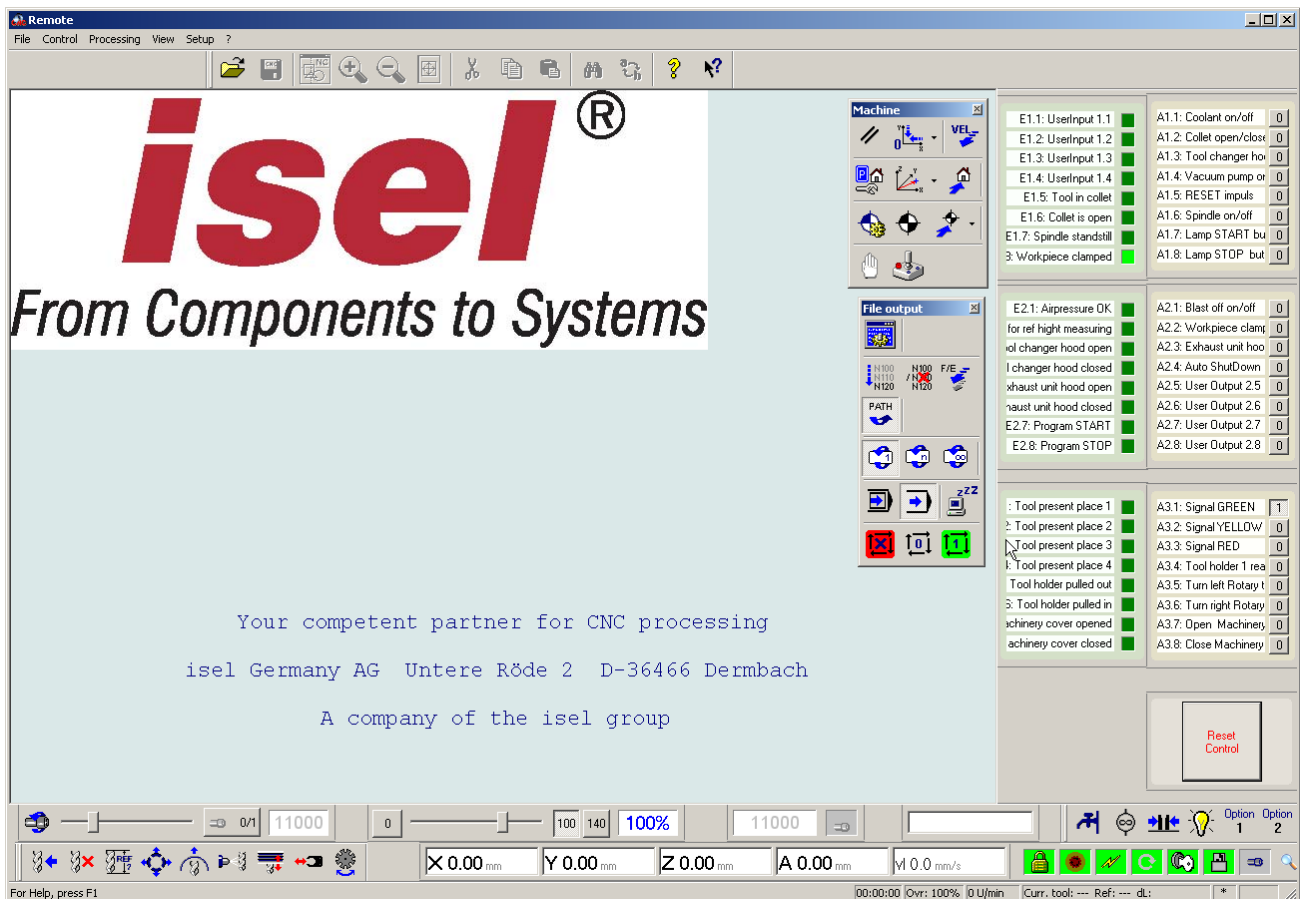
The following description is simplified (i.e., without manual or automatic tool change) and applies to the production of a milled part with CNC control software **Remote**.

7.5.1 Ensure the operational readiness

Operator actions:

- 1: Launch CNC control software remote, close hood of the CNC machine
- 2: Set the mode selector switch to AUTO
- 3: Press the Power On button on the CNC operator panel

Result (the background image with isel logo and text as default is unicoloured):



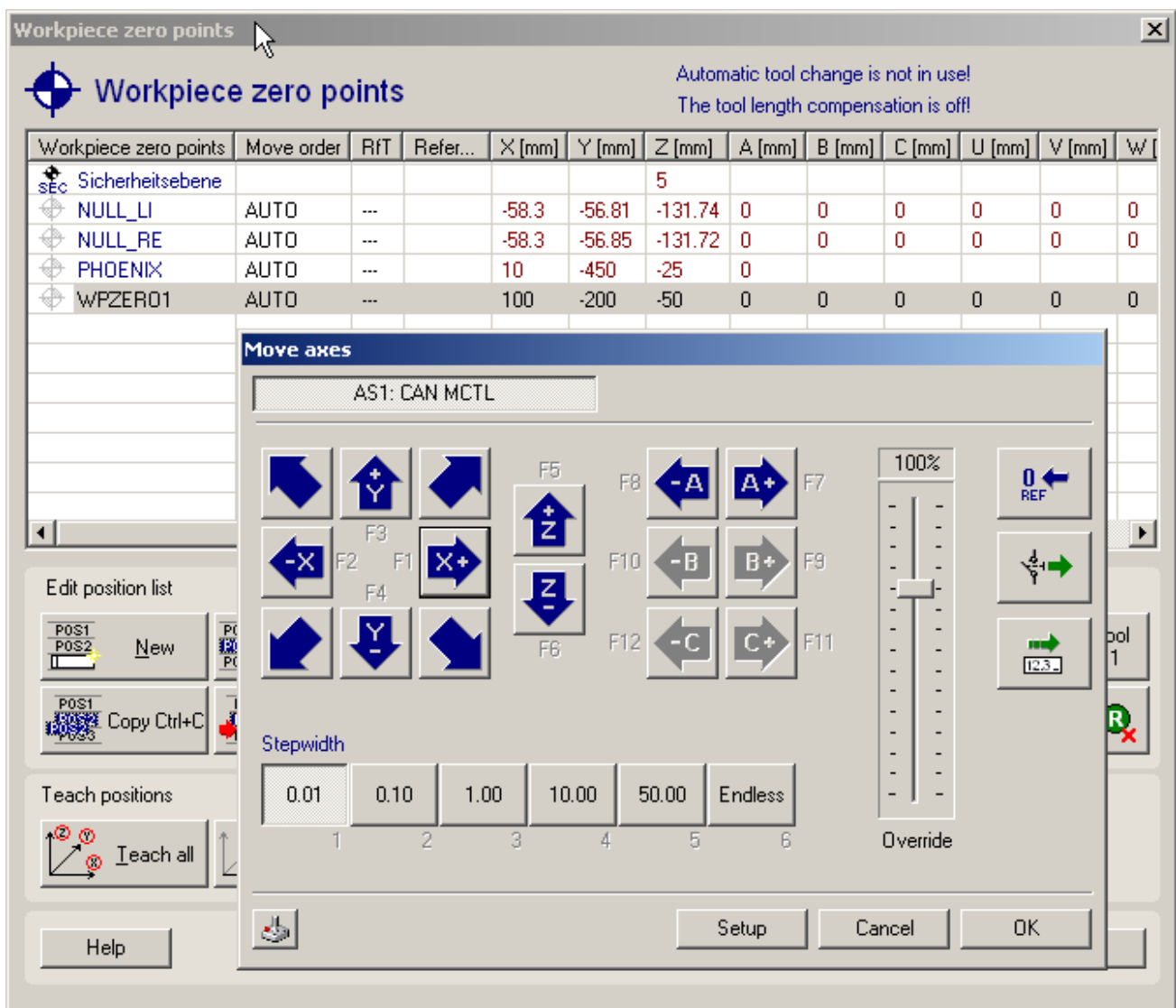
- 4: Reset the motion controller -> all drive units are initialized and put into operational state



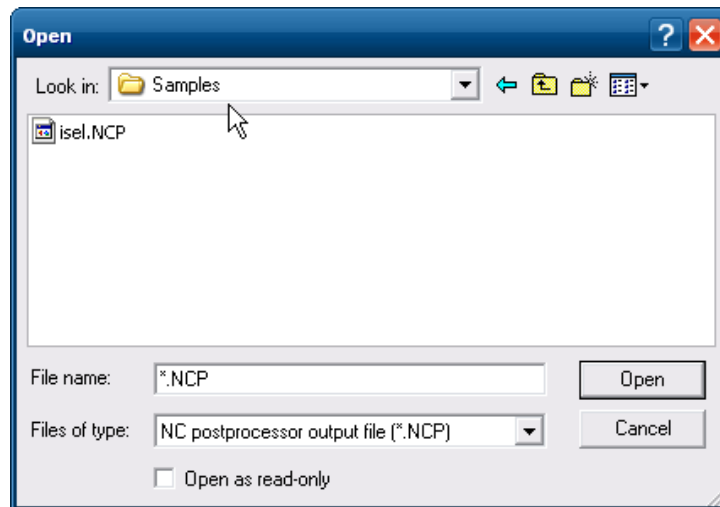
- 5: Homing of all axes (the default setting: Z axis is first referenced) -> after this action, the numerical control axes can be moved manually



- 6: Manually driving axes to a position in which the clamping device of the tool in the machining spindle can be tensioned;
Open the hood, clamp tool; span work piece blank on the working plane, close hood, work piece zero point as by teach-in to determine:



7: Open the application program, here: NCP file **isel.NCP**

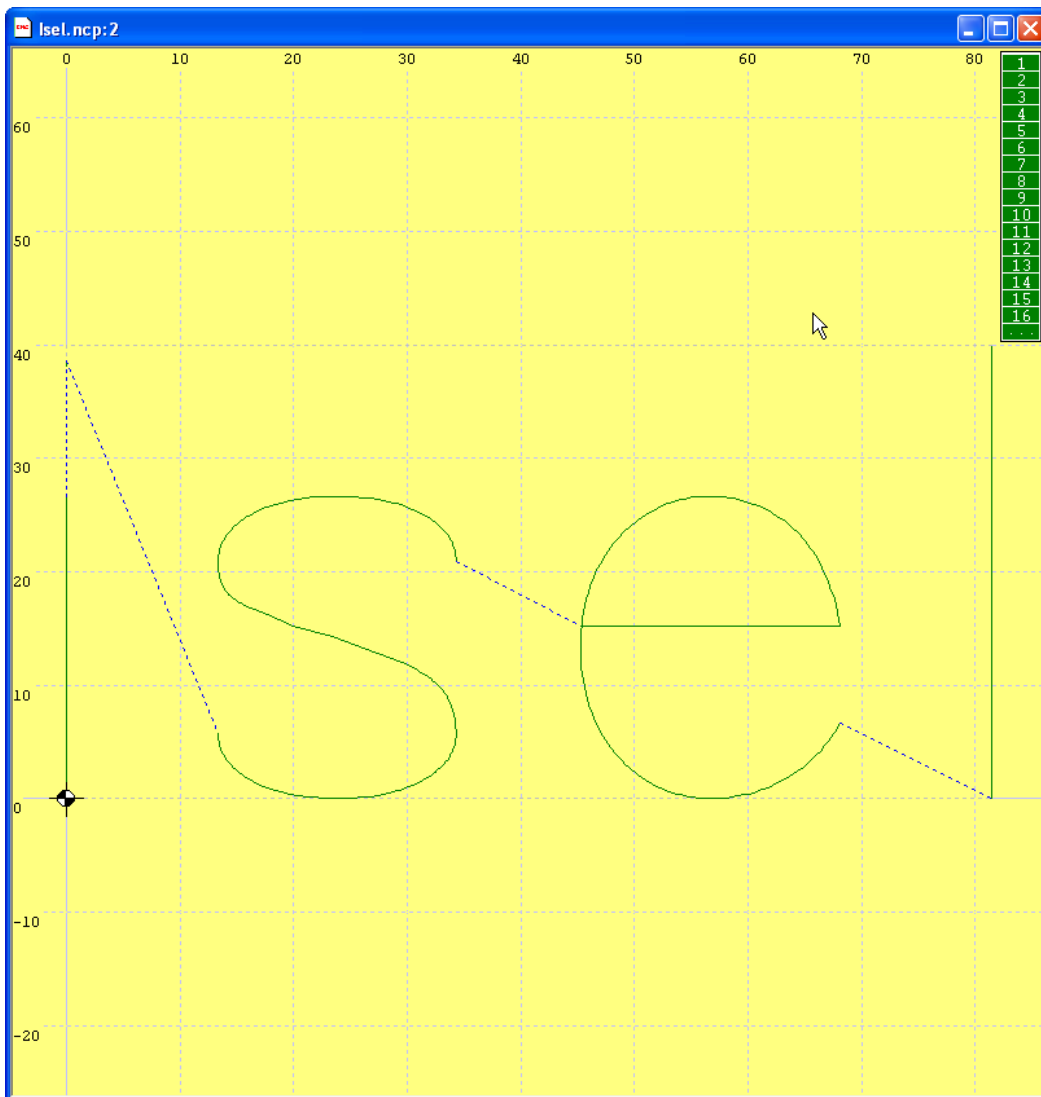


Result (text view):

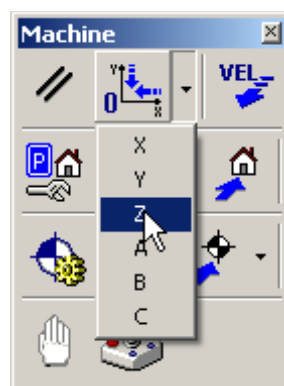
```
IMF_PBL_V1.0 - PICTURES BY PC
; T01 - D0.1 - S4 - HSS - SCHAFTFRAESER
; WPZERO ; Nullpunkt festlegen
; BLOCK 1
DISPLAY 1 1 "Text"
GETTOOL 1 ; D0.1 - HSS - SCHAFTFRAESER
SPINDLE CW RPM1
COOLANT ON ; Khlung ein
FASTABS X0 Y0 ; Positionieren
FASTABS Z2000 ; Sicherheitsabstand
VEL 5000
MOVEABS Z-1000
VEL 25000
MOVEABS Y26667
FASTABS Z3000 ; Rueckzugsebene
FASTABS Y38095 ; 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 I23810 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 X33648 Y8681
CCWABS I29033 J6310 X32682 Y9998
CCWABS I27524 J4785 X31823 Y10726
CCWABS I25381 J1824 X29492 Y12015
```



Result (graphical view):



8: For safety: Reference the Z axis:



7.5.2 Production: processing / production of one or more work pieces

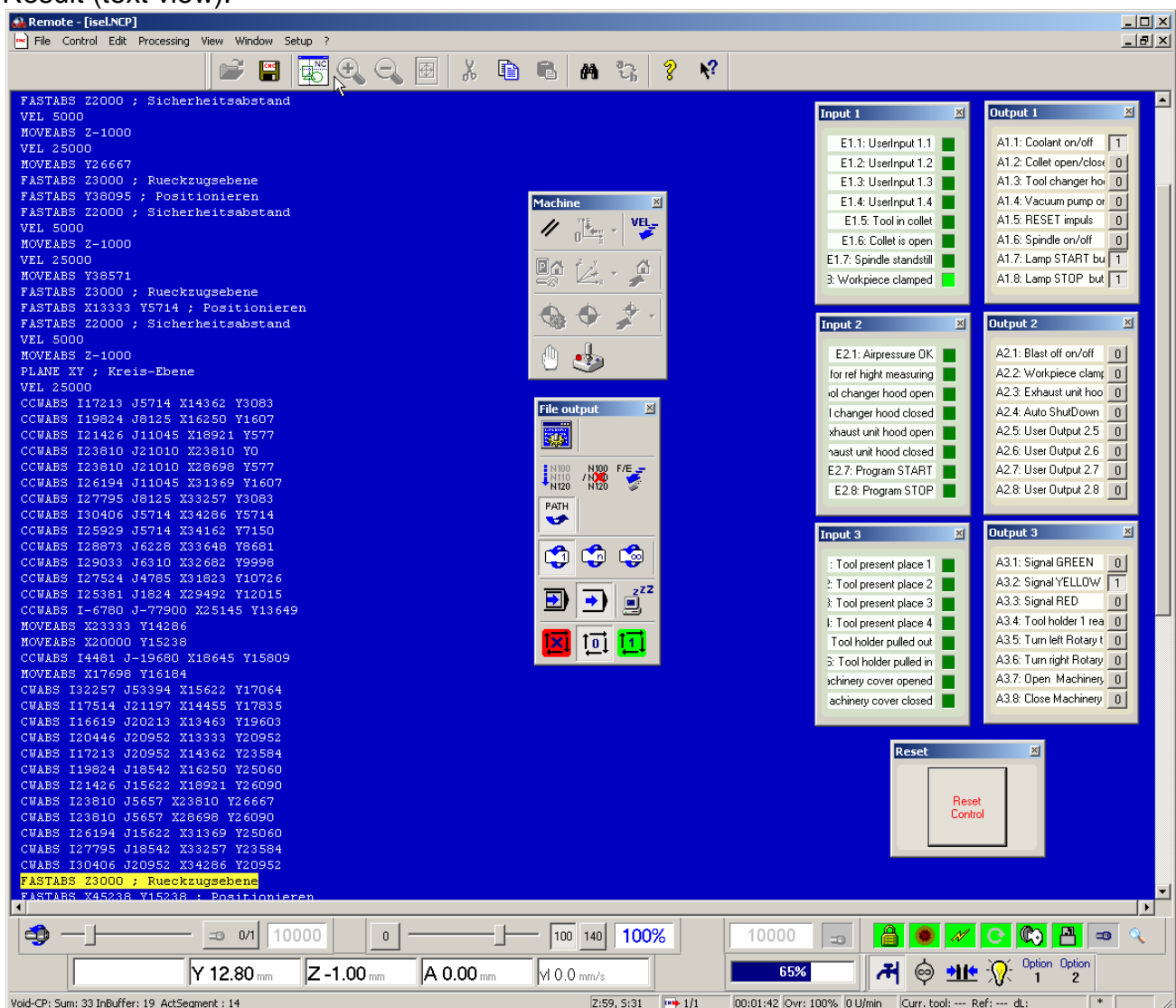
Operator actions:

1: Setting the execution mode to automatic mode:

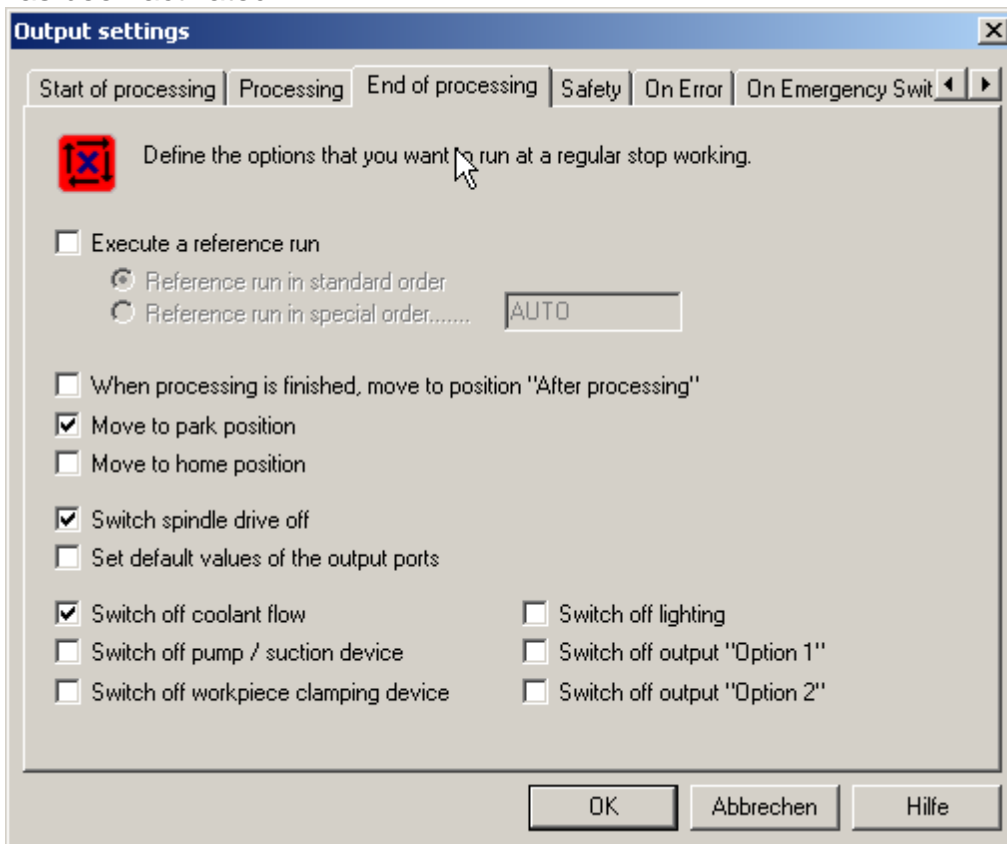


2: Press the START button on the CNC control panel -> Processing starts

Result (text view):



3: Wait for the end of processing; if the work piece has been completely processed, the axes of the CNC machine (Z axis first, then the X and Y axis) automatically go to the park position in the case that the following output settings (*Setup -> CNC/NCP file processing*) has been activated:



4: Open cover, unclamp, remove and check the ready processed work piece

7.5.3 Complete operational readiness

Operator actions::

- 1: For Safety: Press the EMERGENCY STOP pushbutton -> all drives are free of torque
- 2: If necessary, perform cleaning operations (see Section 9)
- 3: Exit the CNC control software **Remote** (*File -> Exit*)
- 4: On the CNC control panel click on Shutdown



- 5: or on the CNC operator panel - right side – press the toggle switch for PC on / off
Switching main power supply switch on control cabinet in the "OFF" position

8 Accessories

Matching for each CNC machine, you can order the following accessories:

- clamping set (clamp lever SH1,SH2, 2 stop rails, hexagon socket wrench)
- additional mounting material for T-groove panel
- bench vise 1, 2
- additional collet chucks for working spindle
- tool kit cutter, driller, graver
- three different tool changers (linear, direct or round changer) with high frequency main spindle drive, option: length measurement button
- rotation axis(axis)
- main spindle drive iSA 500, 750, 900
- working spindle UFM 500, UFM 1050
- vacuum clamping system **isel-Vakufit**
- pneumatics accessories
- cold air cooling **isel-CoolMin**: cooling unit with cold air nozzle (up to -20°C)
- exhaust unit
- industrial vacuum cleaner
- engraving spindle
- diamond engraving head
- spray-/cooling unit, cooling medium HL4
- **isel**-special grease for central lubrication
 - fat cartridge: article number: 299032 0002
 - greaser: article number: 299032 0003
- CAD/CAM software isyCAD/CAM 2.5, Galaad/Kay/Lancelot, ProNC /6/, Remote /7/



Information for compressed air connection of accessories:

To use the optional vacuum clamping system or the tool changer and collets of the working spindle it's necessary that the location of the machine has a compressed air connection.

accessories	air pressure	air consumption
pneumatic vacuum pump	4 - 6 bar	100-150 l/min (1 nozzle)
cold air nozzle	3 - 10 bar	100-151 l/min
cover of the tool changer	3 - 6 bar	impulse
milling spindle with automatic tool change	> 7.5 bar	impulse
on the milling spindle mounted swivel unit for exhaust (specially for woodworking)	2 bar	impulse



The necessary software for tool changing inclusive tool length measurement is a part of the control- and programming software Remote / ProNC.



Look at all accessories for a professional installation and note the applicable standards and safety regulations.

8.1 Dust extraction (optionally)

For integration the dust suction into your machine (in the case of retrofit) please use the **Assembly instruction** for this accessory.



8.2 Tool changer (standard accessory or optionally)

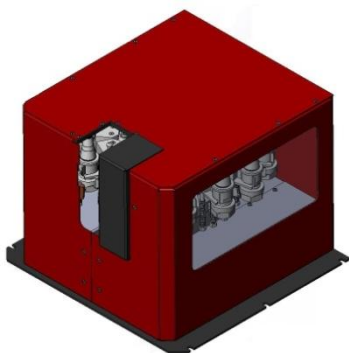
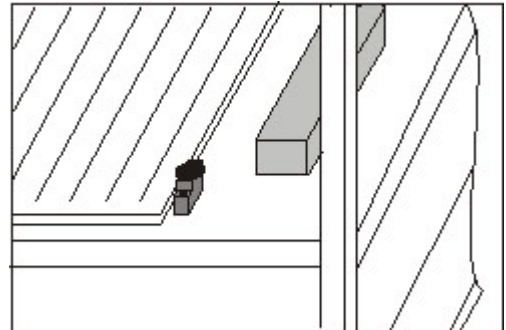
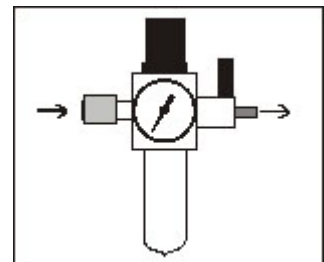
The tool changer (in case of standard accessory) is assembled and connected primed factory-made.

The operation air pressure is > 7.5 bar.

The tool length measuring sensor (in case of standard accessory) for automatically tool length measurement before or behind the tool change is mounted on the right front side of the clamping plane.

For setup the tool changer system including tool length measurement please pay attention to the operating instruction manuals for ProNC / Remote.

Those manuals are stored in PDF format on the installations CD resp. the delivered USB memory stick.



Picture 13: tool changer SK20 round

9 Technical support and sale

If you need engineering support resp. sale information's please contact:

Technical support and sale:

Jürgen Balzer	+49 (0) 6659 / 981-774	juergen.balzer@isel.com
Steffan Gärrh	+49 (0) 6659 / 981-773	steffan.gaerth@isel.com
Jonas Röder	+49 (0) 6659 / 981-779	jonas.roeder@isel.com
Stefan Koch	+49 (0) 36964 / 84-526	stefan.koch@isel.com
Katja Henkel	+49 (0) 6659 / 981-744	katja.henkel@isel.com
Fax.:	+49 (0) 6659 / 981-776	

Engineering support:

Frank Hecht	+49 (0) 6659 / 981-763	frank.hecht@isel.com
Frank Jansen	+49 (0) 6659 / 981-765	frank.jansen@isel.com



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In our plant in Dermbach (Thuringia) a steady exhibition gives you the chance to get to know our products. Here our customers have the chance to see practical demonstrations. Furthermore we present our product palette at the important fairs worldwide (please consult our homepage to find more information's).



10 Cleaning, lubrication and maintenance



Switch off the main switch and unplug the mains plug before every cleaning or maintenance to avoid an accidental switching on.

10.1 Cleaning

- Clean the machine regularly with a hand brush or vacuum cleaner (no compressed air) from all chips. This protects the mechanics from premature wear.
- The seal lips include a Teflon component and require no special maintenance.
- Clean the polycarbonate panes with a not scouring plastic cleaner.

10.2 Lubrication and maintenance

- The guide rails and drive shafts are fitted from the factory with a long-term central lubrication. Depending on the strain, you should regrease the guides and drive shafts in an interval of about 500-1000 hours of operation. Please use the grease gun available as accessories for centralized and the associated specialty grease.
- If you use oil, please lubricate in an interval of about 100-200 hours of operation.
- Lubricate not too much at once, the wave rails and steel rails must not swim in the grease.

10.2.1 Basic lubrication

The drive components are lubricated at the factory with *isel* special grease. You can immediately drive the axis.

The EC-Safety data sheet according directive 93/112/EU and ISO 11014-1 can be sent to you on demand.

10.2.2 Later lubrication

For the lubrication of linear bearings with waves is only the *isel* special grease used.

Under the following article numbers the grease can be ordered:

- 299031 grease cartridge
- 931170 grease gun

Depending on the application is recommended that every 500 to 1000 operating hours you have to lubricate the axles.



Unplug the power supply cable of the machine before each lubrication process.

Grease properties:

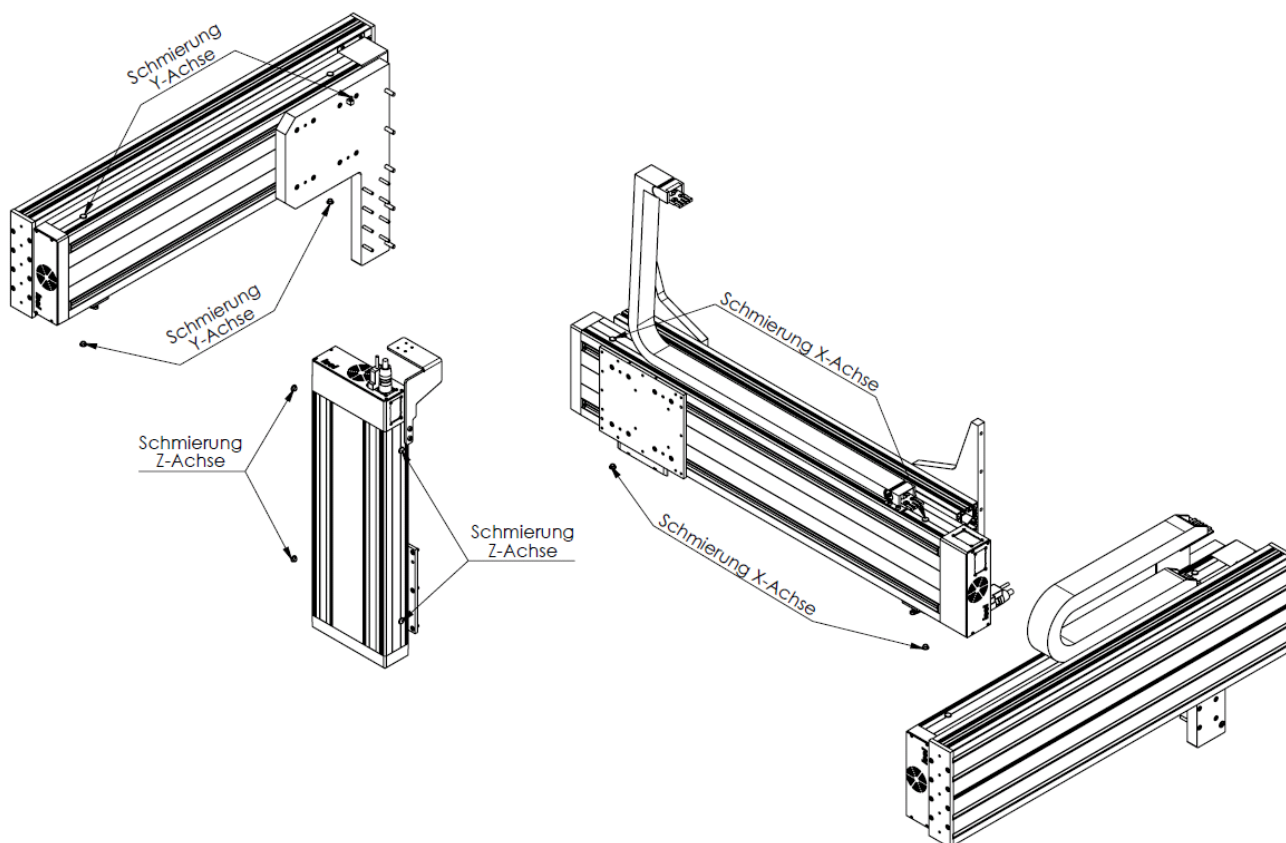
The *isel* special grease has the following properties:

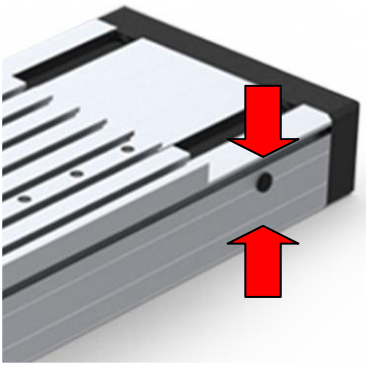
- Enormously wear out reduction
- less grease consumption
- mixable with lithium and calcium greases
- water resistant
- highly resistant against cold- hot- and salt-water as well as solvent
- temperature range: -25°C till 200°C
- fail safe $>300^{\circ}\text{C}$
- up to six fold service life extension
- extremely good adhesion to metal surfaces

Classification and marking complies with the EC directives 67/548/ EC and 88/379/ EC – water hazard class 1.

Before you start up lubrication of the axis

- 1.) Move the X-axis and Y-axis to the centre of the traversing area and the Z-Axis up to their reference position.
- 2.) Open the safety door / cover of the machine and switch off the main switch of the control.
- 3.) Unplug the main power supply cable of the machine from AC net.

10.2.3 Lubrication of the X, Y, Z-axis



There are black or white plastic plugs for an easy lubrication.













Under it there lies the lubrication nipple for the lubrication of the axes.


Pull this plug out. Process the axis slow, until the grease nipple is visible. Turn off the machine and lubricate through applying the grease gun on the now visible and accessible grease nipples.

After completion of the lubrication press the plastic plug back into its original position.

10.3 Maintenance intervals according to operating hours counter

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

  Bearbeitung 82:11 Mechanik 44:15 Spindel 27:01    00:05:48	  Bearbeitung 82:12 Mechanik 44:15 Spindel 27:40    00:57:46
Green bar: Minimum maintenance interval elapsed	Red bar: Maintenance interval elapsed; maintenance work is due

Clicking on the  icon provides further information:

 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



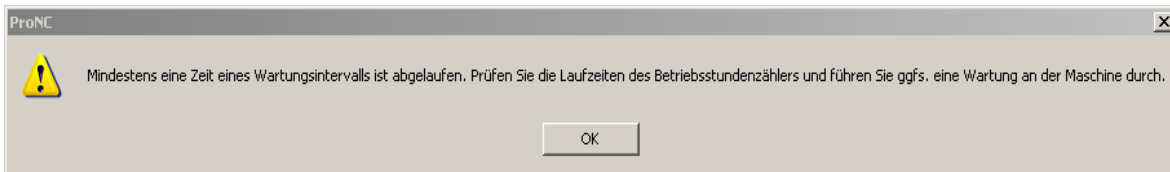
isel Germany AG
Ein Unternehmen der isel-Gruppe

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 **machining hours**.

If, when starting up the isel control software ProNC or Remote, the notice



that maintenance is required is displayed, the following maintenance tasks must be carried out.

10.4 Maintenance tasks

The following tasks must be performed after the laps of a maintenance interval:

- Visual inspection lubrication film on the **ball screw spindle and steel shaft guide** through the sealing lips of linear axes X, Y, and Z
- Re-lubrication, if necessary (see section 'Lubrication points')
- Visual inspection **chips and dirt within the linear axes** through the sealing lips, vacuum and clean as necessary
- Visual inspection **chips and dirt within the tool changing unit** through the loading opening, vacuum and clean as necessary

Further maintenance tasks include:

as necessary: Cleaning dirt out of the interior

Acoustic check for development of unusual noises

2 months: Visual inspection of linear units - wear

Visual inspection of toothed belt deflections in the Z-axis for tension and wear

1 year: Replacement of toothed belts in the Z-axis

Check for freedom from play of the linear guides and ball-type linear drives (circularity test on all levels with Renishaw measurement)



Toothed belts in the Z-axis:

refer to the parts list of the linear units in chapter *17.1 Axis layout*

11 Faults

<i>fault</i>	<i>reason</i>	<i>solution</i>
machine will not turn on	net input plug not connected	check net input cable connection
	main switch not switched on	switch on main switch
	fuse defect	remove net input plug, renew fuse
power supply voltage cannot switch on by POWER button	at least one motor power amplifier in the control cabinet signalizes FAULT by blinking LEDs	diagnose the cause of the fault and eliminate it /1.1/ and /1.2/
	hood / door is not closed	close hood / door
	Note /2/, there chapter 4.1.4 Dialog for Status request!	Note /2/, there chapter 4.1.4 Dialog for Status request!
	Emergency stop switch is unlocked	unlock Emergency stop switch
software works not correctly	main switch not switched on	switch on main switch
	power supply for the power amplifiers not switched on	power amplifiers by pressing POWER-button
	CAN bus connection between the CAN nodes not correctly	check CAN bus cables, plug ins and CAN node addresses resp. terminating resistor at the last CAN node
Servo motor of an axis fails	No power supply for the motor power amplifier	check fuses inside the control cabinet /5/ resp. the motor power amplifier /1.1/ or /1.2/
	temperature protection inside the motor power amplifier is active	- check fan inside the control cabinet - clean the filter in the ventilator device inside the control cabinet
	motor power amplifier defect	change motor power amplifier

<i>fault</i>	<i>reason</i>	<i>solution</i>
working spindle can not be switched on	note chapter 6.2 in this manual	note chapter 6.2 in this manual
	no spindle enable from SCM	check spindle enable from SCM
	Note /2/, there chapter 4.1.4 Dialog for Status request!	Note /2/, there chapter 4.1.4 Dialog for Status request!
	Frequency converter for working spindle defect	Check Frequency converter for working spindle defect
	wrong signaling parameters (Spindle-Start) selected	Check and modify signaling parameters (Spindle-Start)
	mode selection switch in position TEST	switch mode selection switch to position AUTO
	door / cover open	Close door / cover
red LED at the frequency converter is blinking	Fault in the frequency converter	Check parameters in the frequency converter
	Over current / low voltage	Check parameters in the frequency converter according AC motor data (note motor data identification plate)

12 Return electrical and electronic equipment for disposal

Collection

Users of electrical and electronic equipment in accordance with country-specific regulations are obliged to collect devices (that are not in use any longer) separately. Electrical and electronic equipment must not be disposed of with unsorted municipal waste.

Separate collection is the precondition for recycling and recovery, thereby saving resources of the environment is achieved.

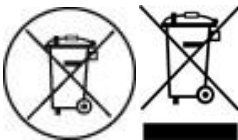
Return and collection systems

In the case of disposal of your CNC machine Gantry OverHead M, especially their electronic components, these must not be disposed of with household waste.

The local waste disposers have created disposal facilities for this purpose.

Meaning of symbols

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



13 Customers information

No person is authorized to provide any information other than those described in this manual.

Warranty

The manufacturer isel Germany AG warrants that this product is free from defects in material and workmanship. **isel Germany AG** MAKES NO OTHER WARRANTIES INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The user is responsible for the use and intended use of the product. If damage occurs during the warranty period of the product, your exclusive remedy and the entire liability of isel Germany AG is the repair or replacement of the product.

Limitation of Liability

If a disclaimer is not prohibited by law, the manufacturer isel Germany AG assumes no liability for any loss or damage caused by this product.

This applies regardless of whether it is direct, indirect, special, incidental or consequential, regardless of the legal basis, including warranty, contract, negligence or strict liability.

Apply the General Terms and Conditions (**GTC**) of isel Germany AG.

14 Remote diagnosis

For remote diagnosis using the World Wide Web (Internet) please contact our service department:

Frank Hecht	+49 (0) 6659 / 981-763	frank.hecht@isel.com
Frank Jansen	+49 (0) 6659 / 981-765	frank.jansen@isel.com

For remote diagnosis the Windows[®] program **NetViewer OneToOne (NV o2o)** in the current version becomes applicated as communication tool:



The supposition for Remote diagnosis via Internet is:
Connect the Control-PCs /3/ inside the Control cabinet /5/ of your CNC machine / CNC base machine to the Internet. For this purpose every Control-PC is equipped with an Ethernet-Interface.

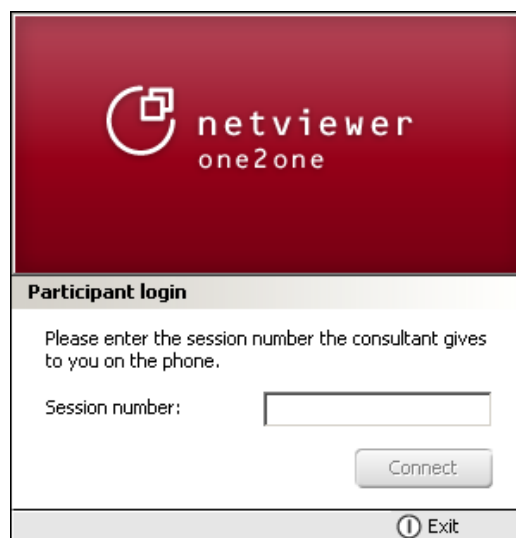
The connection establishment via Internet is done in three steps:

1st Step:

You get in touch with our service department by telephone or email to demand a consultation / remote diagnosis. The operator (working with the CNC machine) becomes **participant**, the service technician from *isel* Germany acts as **consultant**.

2nd Step:

The **consultant** will send per email the Windows program „NV_o2o_Participant_EN.exe“ to the **participant**. The participant starts this program on the Control-PC inside the control cabinet of his CNC machine / CNC base machine. Once started the program will show the following dialog:



3rd Step:

Now the **consultant** will start the Windows program „NV_o2o_Consultant_EN.exe“ on his Desktop-PC. When the connection to the Control-PC of the **participant** via Internet was established, the **consultant** gives the session number to the **participant** by phone. Now the **participant** can enter this session number into the edit field, click on the button “Connect” and the Remote diagnosis can start.

15 Technical Data of CNC Machine / CNC Base machine

15.1 Clamping area and traversing range

Modell	Breite in mm	Tiefe in mm	Höhe in mm	Aufspannfläche (B x T) in mm	Verfahrwege X / Y / Z in mm	Z-Durch- lass in mm
Gantry OverHead M 20	1400	1200	1960	1100 x 1000	710/ 610 /310	340
Gantry OverHead M 30	1400	1500	1960	1100 x 1300	710/ 910 /310	340
Gantry OverHead M 40	1900	1500	1960	1600 x 1300	1210/ 910 /310	340
Gantry OverHead M 50	1900	2000	1960	1600 x 1800	1210/ 1410 /310	340



All machines of type Gantry OverHead M, as CNC base machinery (partly completed machinery) as CNC machinery (completed machinery) have model specific the same dimensions.

EuroMod base machinery (according to MD 2006/42/EC these are „partly completed machinery“) are offered in two variants:

- **open** variant: **without** sliding door / cover and **without** clear panes
- **closed** variant: **with** sliding door / cover and **with** clear panes
(material: Polycarbonate)

A **Gantry OverHead M base machine** is always delivered without a tool. In concordance with MD 2006/42/EC this is the reason why there is no clearly definition of application purpose of this base machine.

So **Gantry OverHead M base machine** is always delivered **without** CE mark.

For this CNC base machine the **Declaration of Incorporation** is valid.

A **Gantry OverHead M machine** is always delivered as **closed** variant **with** sliding door / cover **and with** clear panes (material: Polycarbonate) **and with** a tool (e.g. a milling spindle).

In concordance with MD 2006/42/EC this **Gantry OverHead M machine** is useable for a clearly defined application purpose.

The intended (e.g. appropriate) use of **gantry OverHead M machine** must be **safely**.

The manufacturer isel Germany AG is responsible for this safety.

So **Gantry OverHead M machine** is always delivered **with** CE mark.

For this CNC machine the **Declaration of Conformity** is valid.

15.2 Mechanical values / electrical values

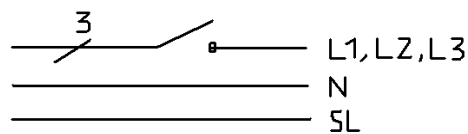
Weight: Gantry OverHead M: app. 450 kg

Control cabinet /5.1/ with AC net input (1-phase):

230VAC, 50...60 Hz, 1-phase input P/N/PE,
Cutout (main fuse) C16 in the control cabinet
P phase and neutral conductor N are switched

Control cabinet /5.2/ with AC net input (3-phase):

400VAC, 50...60 Hz, 3-phase input L1/L2/L3/N/PE,
Cutout (main fuse) C16 in the control cabinet
conductors L1/L2/L3 are switched, **conductor N is not switched**



The cabinet with 3-phase power supply is switched off in 3 pole way.

WARNING: The neutral conductor N is not disconnected!

If in your country the switching of the neutral conductor should be prescribed or required by law, then it has to be used a 4-pole circuit breaker.

Please contact your electrician before connecting the CNC machine to the AC mains supply.

Contact termination: not fixed installation according to EN 60204-1, section 5.1 „*Net input connectors*“

15.3 Sound pressure level

The sound pressure level varies by application and toolkit.

Sound pressure level without working spindle: **< 75 dB (A)**



Technical changes reserved!

15.4 isel machines: IO assignment (analog inputs / outputs)

Nb.	name / description / found in machinery module	Input signal (sensor) / = Analog Input Channel	I/O assignment
1	Velocity Override Potentiometer (Operator panel iOP-19: Standard)	Velocity Override	E1
2	Reserved for actual speed monitoring of working spindle 1 or available for the user or new machinery functionality	UserAnalogInput 2	E2
3	Available for the user or new machinery functionality	UserAnalogInput 3	E3
4	Available for the user or new machinery functionality	UserAnalogInput 4	E4

Mapping for machine-related input signals = Analog Input Channels

Nb.	name / description / found in machinery module	Output signal (actuator) / = Analog Output Channel	I/O assignment
1	Inverter for working spindle 1	Speed setpoint	A1

Mapping for machine-related output signals = Analog Output Channels

15.5 isel machines: IO assignment (binary inputs / outputs)

Nb.	name / description / found in machinery module	Input signal (Sensor) / = signal to be tested	I/O assignment
	1 to 8: CAN-I/O 16/16		
1	Reserved for user specific sensor	UserInput 1.1	E1.1
2	Reserved for user specific sensor	UserInput 1.2	E1.2
3	Reserved for user specific sensor	UserInput 1.3	E1.3
4	Reserved for user specific sensor	UserInput 1.4	E1.4
5	HSD-Spindle or other	Tool in collet	E1.5
6	Reserved	Collet is open	E1.6
7	Reserved	Spindle standstill	E1.7
8	Reserved	WP clamped	E1.8
	9 to 16: CAN-I/O 16/16		
9	Pressure monitoring module	Air pressure OK	E2.1
10	Tool length WZ-Längenmesstaster	Calliper for reference high measuring	E2.2
11	TCH	TCH hood open	E2.3
12	TCH	TCH hood closed	E2.4
13	Dust extraction (with pneumatic opening) on the working spindle 1	Exhaust unit hood open	E2.5
14	Dust extraction (with pneumatic opening) on the working spindle 1	Exhaust unit hood closed	E2.6
15	START button on Operator panel	Program START	E2.7
16	STOP button on Operator panel	Program STOP	E2.8
	17 to 24: CAN-I/O 8/12-4/1		
17	Tool present in Linear TCH or State of Rotary TCH	Tool present place 1	E3.1
18	Tool present in Linear TCH or State of Rotary TCH	Tool present place 2	E3.2
19	Tool present in Linear TCH or State of Rotary TCH	Tool present place 3	E3.3
20	Tool present in Linear TCH or State of Rotary TCH	Tool present place 4	E3.4
21	Tool holder or Dust extraction (with pneumatic opening) on the working spindle 2	Tool holder pulled out	E3.5
22	Tool holder or Dust extraction (with pneumatic opening) on the working spindle 2	Tool holder pulled in	E3.6
23	Cover open automatically or Cover open manually	Machinery cover opened	E3.7
24	Cover open automatically or Cover open manually	Machinery cover closed	E3.8

Mapping for machine-related input signals = Binary Input Signals



Shortcuts: WP = Work_piece
TCH = Tool_changer

Nb.	name / description / found in machinery module	Output signal (Actuator) = signal to be set or reset	I/O assignment
	1 to 8: CAN-I/O 16/16		
1	Coolant	Coolant on / off	A1.1
2	Tool collet	Tool collet open / close	A1.2
3	TCH hood	TCH hood open / close	A1.3
4	Vacuum pump for WP clamping module	Pump on / off	A1.4
5	RESET Error from Safety module	RESET impuls	A1.5
6	START working spindle 1 = cooling air on working spindle 1	Spindle 1 on / off	A1.6
7	START button on Operator panel	Lamp START button (green)	A1.7
8	STOP button on Operator panel	Lamp STOP button (red)	A1.8
	9 to 16: CAN-I/O 16/16		
9	Blast off (any shavings from the tool shaft)	Blast off on / off	A2.1
10	WP clamping device	WP clamp on / off	A2.2
11	Dust extraction (with pneumatic opening) on the working spindle 1	Exhaust unit hood open/close	A2.3
12	Auto-ShutDown or future extension	Auto-ShutDown	A2.4
13	Reserved for user specific actuator	UserOutput 2.5	A2.5
14	Reserved for user specific actuator	UserOutput 2.6	A2.6
15	Reserved for user specific actuator	UserOutput 2.7	A2.7
16	Reserved for user specific actuator	UserOutput 2.8	A2.8
	17 to 24: CAN-I/O 8/12-4/1		
17	Signal lamp green	Ready for operation, machine in base state	A3.1
18	Signal lamp yellow	Processing, machine is working	A3.2
19	Signal lamp red	Alarm, machine is in fault state	A3.3
20	Tool holder 1	Tool holder 1 ready	A3.4
21	Rotary TCH, control output to turn left	Turn left Rotary TCH	A3.5
22	Rotary TCH, control output to turn right	Turn right Rotary TCH	A3.6
23	Automatic door / cover opening	Open Machinery cover	A3.7
24	Automatic door / cover opening	Close Machinery cover	A3.8
	25 to 28: CAN-I/O 8/12-4/1		
25	Reserved for user specific actuator	UserOutput 4.1	A4.1
26	Reserved for user specific actuator	UserOutput 4.2	A4.2
27	Reserved for user specific actuator	UserOutput 4.3	A4.3
28	Reserved for user specific actuator	User Output4.4	A4.4

Mapping for machine-related output signals = Binary Output Signals



Shortcuts: WP = Work piece
TCH = Tool changer

16 Declaration of Conformity or Declaration of Incorporation?

In the new legally binding Machinery Directive 2006/42/EC effective as of 29/12/2009, the term '**machine**' is defined as follows (excerpt from Machinery Directive 2006/42/EC Article 2 a):

'Machine'

- *an assembly of linked parts or components, at least one of which moves through some type of actuator, with associated power and control circuits, joined together for a specific purpose in the processing, treatment;*

For all isel CNC machines which are delivered with a tool (e.g. milling or engraving spindle, dosing device, sensor element, such as a CCD camera or triangulation laser, water jet nozzle, plasma torch, etc.), the Declaration of Conformity in this operating manual applies.

These CNC machines are to be used *for the purpose of the intended application* based on the type of tool (mounted on the moving axis):

Tool = machining spindle	-> used for milling, drilling
Tool = engraving spindle	-> used for engraving
Tool = dosing unit	-> used for adhering, dosing

etc.

In the Machinery Directive 98/37/EC valid as of 28/12/2009, the term '**partial machine / partly completed machine**' and/or the term '**partly completed machine**' in the new Machinery Directive 2006/42/EC, which is legally binding as of 29/12/2009, is defined as follows (excerpt from Machinery Directive 2006/42/EC, Article 2, g):

'partly completed machine'

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

The Declaration of Incorporation in this operating manual applies for all isel **CNC base machines** which are delivered **without a tool** (e.g. milling or engraving spindle, dosing device, sensor element, such as a CCD camera or triangulation laser, water jet nozzle, plasma torch, etc.), and therefore not *for an intended use*.

16.1 Declaration of Conformity for (complete) machine

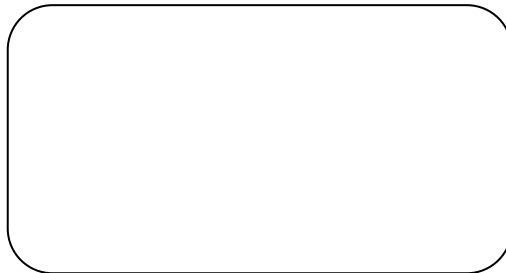
Declaration of Conformity in accordance with EC Machinery Directive 2006/42/EC, Annex II A

The manufacturer **isel** Germany AG
Bürgermeister-Ebert-Straße 40
D-36124 Eichenzell

hereby declares that the following product:

Product designation: **CNC-Machine Gantry OverHead M**
Types: **Gantry OverHead M20** Item-no: 275223 56165
Gantry OverHead M30 Item-no: 275233 56165
Gantry OverHead M40 Item-no: 275243 56165
Gantry OverHead M50 Item-no: 275253 56165

type label:
- designation
- part number.
- serial number
- date of construction



conforms to the requirements of the Directive identified above, including the applicable amendments at the time of the declaration.

The following harmonised standards have been applied:

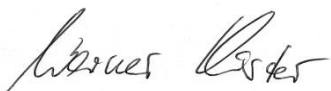
EN ISO 12100:2010	Safety of Machinery - Safety of machinery -- General principles for design -- Risk assessment and risk reduction
EN ISO 13857:2008	Safety of machinery -- Safety distances to prevent hazard zones being reached by upper and lower limbs
EN 349:1993+A1:2008	Safety of machinery. Minimum 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 -- Principles for design
EN 60204-1:2006	Safety of machinery. Electrical equipment of machines - Part 1: General requirements

The following additional EU Directives which are relevant for this product were applied:

EMC Directive	2014/30/EC
Low Voltage Directive	2014/35/EC

The **technical documentation** for this machine has been compiled in accordance with Annex VII, Part A. The manufacturer is obligated to electronic submission of this technical documentation to the national competent authorities upon request. **Person authorised** to compile the technical documentation: **Christian Bley (CE coordinator, isel Germany AG)**

place, date: Eichenzell, 06. October 2016



Werner Kister, chair

16.2 Declaration of Incorporation for (partly completed) base machines

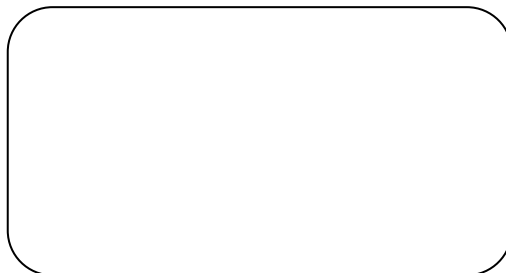
Declaration of Incorporation in accordance with EC Machinery Directive 2006/42/EC, Annex II B

The manufacturer **isel** Germany AG
Bürgermeister-Ebert-Straße 40
D-36124 Eichenzell

hereby declares that the following product:

Product designation: **CNC-Machine Gantry OverHead M**
Base machine type: **Gantry OverHead M20** Item-no: 275223 56165
Gantry OverHead M30 Item-no: 275233 56165
Gantry OverHead M40 Item-no: 275243 56165
Gantry OverHead M50 Item-no: 275253 56165

type label:
- designation
- part number.
- serial number
- date of construction



conforms to the requirements of the Directive identified above, including the applicable amendments at the time of the declaration.

The following harmonised standards have been applied:

EN ISO 12100:2010	Safety of Machinery - Safety of machinery -- General principles for design -- Risk assessment and risk reduction
EN ISO 13850:2015	Safety of machinery -- Emergency stop -- Principles for design
EN 60204-1:2006	Safety of machinery. Electrical equipment of machines - Part 1: General requirements

The following additional EU Directives which are relevant for this product were applied:

EMC Directive	2014/30/EC
Low Voltage Directive	2014/35/EC

The **special technical documentation** for this machine has been compiled in accordance with Annex VII, Part B. The manufacturer is obligated to electronic submission of this technical documentation to the national competent authorities upon request. **Person authorised** to compile the technical documentation: **Christian Bley** (CE coordinator, isel Germany AG)

The product (partially completed machine) is intended for incorporation into a machine or combination with other partially completed machinery to form a machine in the sense of **Machinery Directive 2006/42/EC**, Article 1, Section (1), Letter a.

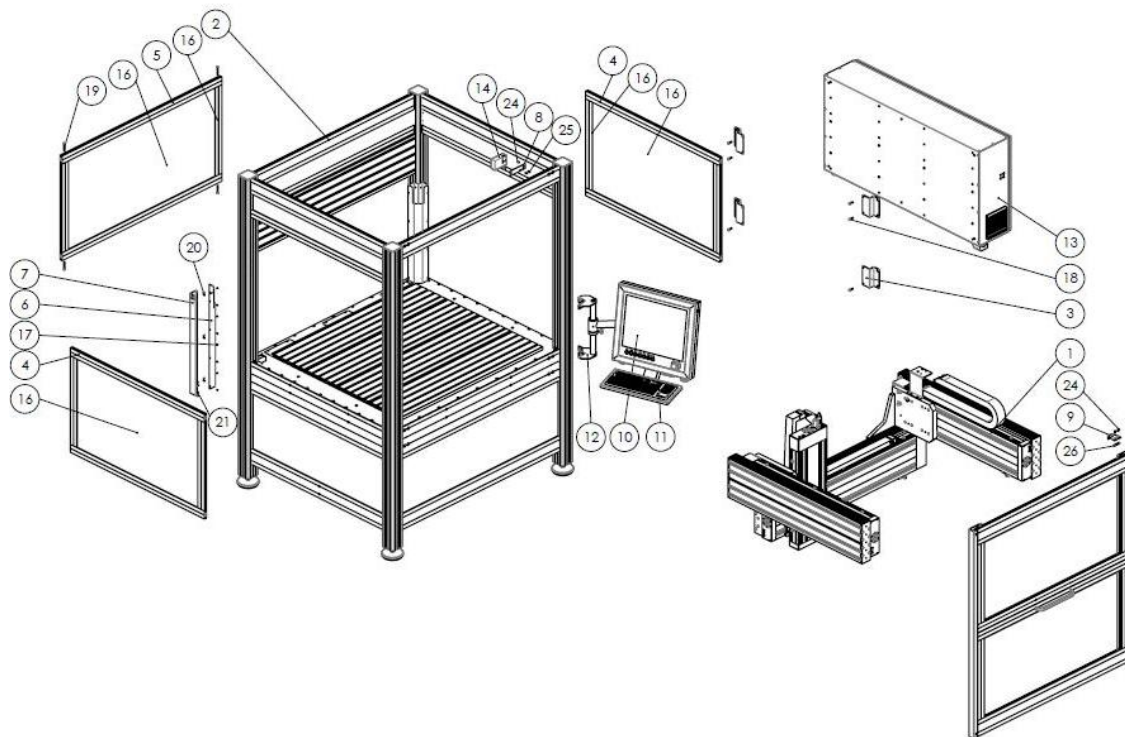
The commissioning of the complete machine (product) is prohibited until the machine into which this product has been incorporated or of which it is a component complies with the provisions of all relevant directives (particularly Machinery Directive 2006/42/EC) and this (complete) machine has been provided with a CE mark.

place, date: Eichenzell, 06. October 2016

Werner Kister, chair

17 Exploded views / spare parts lists

17.1 Gantry OverHead M20

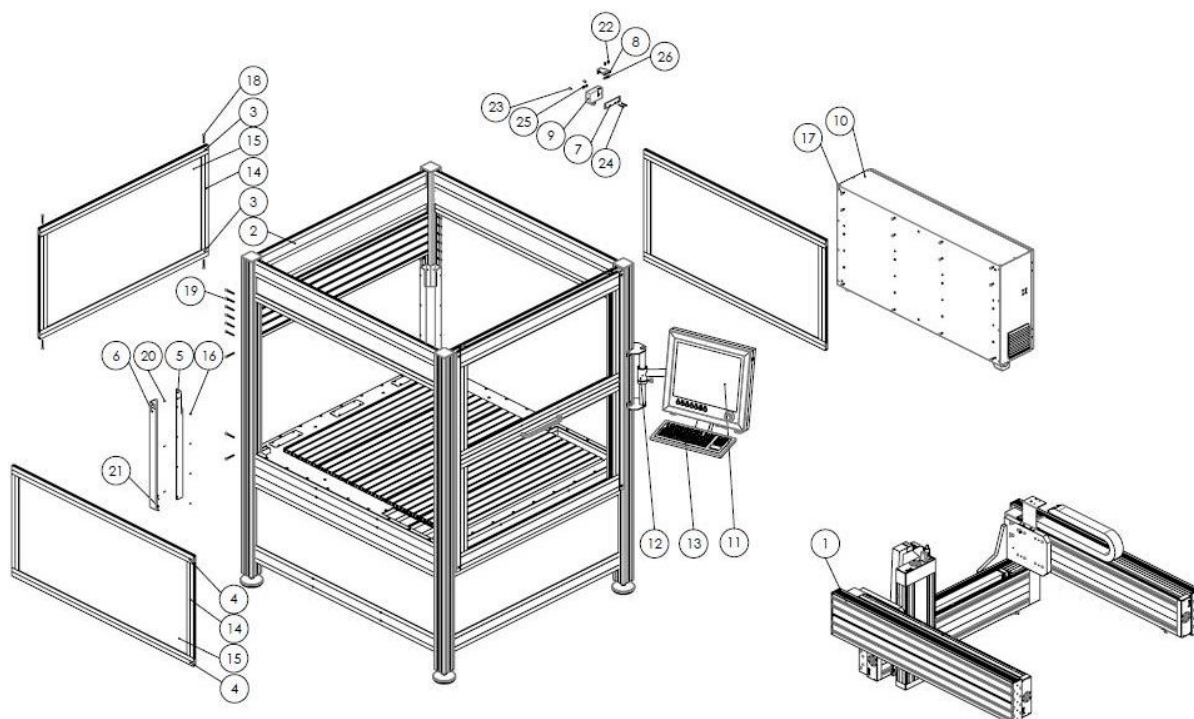


picture 14: Exploded view CNC Base machine Gantry OverHead M20 (without tool)

POS-NR.	Item no	quantity	description	Drawing no	Part type
1		1	DZ6661 - Achsaufbau - Gantry Overhead M	DZ6661	
2	675012 6662	1	DZ6662 - Grundgestell - Gantry Overhead M20	DZ6662	
3	675012 6696	4	DZ6696 - Befestigungsblech 1 - Schaltschrank 1200	DZ6696	eloxiert
4	675012 6700	4	DZ6700 - Paneelprofil PP50 L=1039,5	DZ6700	
5	675012 67001	2	DZ6700 - Paneelprofil PP50 L=1239	DZ6700	
6	675012 7282	2	DZ7282 - Kabelkanal 2 - Gantry OverHead	DZ7282	eloxiert
7	675012 7283	2	DZ7283 - Kabelkanal 1 - Gantry OverHead	DZ7283	eloxiert
8	675012 2461	1	EZ2461 - IGF703_IGF707 - Rahmen Befestigung Schmersal	EZ2461	
9	675012 4450	1	TE4450 - Fensterelement - Verschlussstück	TE4450	verzinkt
10	371100 1000	1	DZ6540 - Bedienpanel iOP-19 - RAL 3011	DZ6540	
11	371200 0001	1	Tastatur iOP-19 - RAL 3011 GER		
12	371050 2040	1	Schwenkarm i-OP mit Montagewinkel an PS80	DZ5930	
13	376112 0400	1	Schaltschrank 1200x600x250 - Modell 2012		
14	567175 0800	1	Sicherheitsverriegelung Schmersal AZM 170 mit Anschlussleitung		
15		1	Bausatz Scheiben		Bausatz Art.Nr.: 675012 0084
16	201040 0564	6	Zuschnitt Paneelprofil PP50 - L564		
17	891201 0061	16	Linsensenkschraube DIN 966 4.8 VZ M 3 x 6		
18	891124 0221	6	Zylinderschraube DIN 6912 8.8 M 6 x 22		
19	891124 0451	12	Zylinderschraube DIN 6912 8.8 M 6 x 45		
20	891591 0081	12	Linsenkopfschraube DIN 7380 M 3 x 8		
21	891591 0051	4	Linsenkopfschraube DIN 7380 M 4 x 5		
24	891594 0101	4	Linsenkopfschraube DIN 7380 M 6 x 10		
25	891132 0121	2	Senkschraube DIN 7991, M 4 x 12		
26	890315 0002	1	Gleitmutter 2xM6 - L45xB10xH3,5mm	TE0162	
27	392760 0300	1	Motorleitung universal L=3m		nicht dargestellt
28	392760 0400	1	Motorleitung universal L=4m		nicht dargestellt
29	392760 0500	1	Motorleitung universal L=5m		nicht dargestellt
30	392760 0600	1	Motorleitung universal L=6m		nicht dargestellt
31	392740 0300	1	Encoderleitung L=3m		nicht dargestellt
32	392740 0400	1	Encoderleitung L=4m		nicht dargestellt
33	392740 0500	1	Encoderleitung L=5m		nicht dargestellt
34	392740 0600	1	Encoderleitung L=6m		nicht dargestellt
Scheiben		1	1159 x 584 x 4		
		2	960 x 584 x 4		

Table 1: Spare part list CNC Base machine Gantry OverHead M20 (without tool)

17.2 Gantry OverHead M30

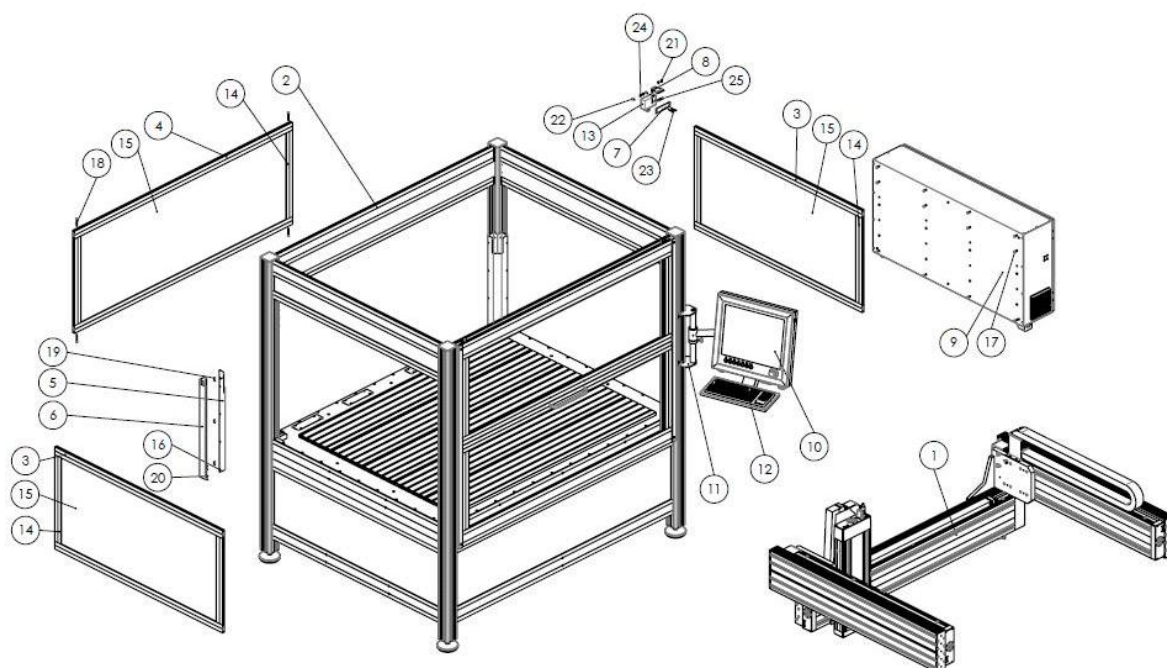


picture 15: Exploded view CNC Base machine Gantry OverHead M30 (without tool)

POS-NR.	Item no	quantity	description	Drawing no	Part type
1		1	DZ6661 - Achsaufbau - Gantry Overhead M	DZ6661	
2	675012 7281	1	DZ7281 - Grundgestell - Gantry Overhead M30	DZ7281	
3	675012 67001	2	DZ6700 - Paneelprofil PP50 L=1239	DZ6700	
4	675012 67002	4	DZ6700 - Paneelprofil PP50 L=1339,5	DZ6700	
5	675012 7282	2	DZ7282 - Kabelkanal 2 - Gantry OverHead	DZ7282	eloxiert
6	675012 7283	2	DZ7283 - Kabelkanal 1 - Gantry OverHead	DZ7283	eloxiert
7	675012 2461	1	EZ2461 - IGF703_IGF707 - Rahmen Befestigung Schmersal	EZ2461	
8	675012 4450	1	TE4450 - Fensterelement - Verschlussstück	TE4450	verzinkt
9	567175 0600	1	Schmersal - AZM 170 mit Leitung 6m		
10	376112 0400	1	Schalttschrank 1200x600x250 - Modell 2012		
11	371100 1000	1	DZ6540 - Bedienpanel iOP-19 - RAL 3011	DZ6540	
12	371050 2040	1	Schwenkarm i-OP mit Montagewinkel an PS80	DZ5930	
13	371200 0001	1	Tastatur iOP-19 - RAL 3011 GER		
14	201040 0564	6	Zuschnitt Paneelprofil PP50 - L564		
15		1	Bausatz Scheiben		Bausatz Scheiben 675012 0135
16	891201 0061	16	Linsensenkschraube DIN 966 4.8 VZ M 3 x 6		
17	891124 0221	12	Zylinderschraube DIN 6912 8.8 M 6 x 22		
18	891124 0451	12	Zylinderschraube DIN 6912 8.8 M 6 x 45		
19	891124 0551	32	Zylinderschraube DIN 6912 8.8 M 6 x 55		
20	891591 0081	12	Linsenkopfschraube DIN 7380 M 3 x 8		
21	891591 0051	4	Linsenkopfschraube DIN 7380 M 4 x 5		
22	891594 0101	2	Linsenkopfschraube DIN 7380 M 6 x 10		
23	891594 0121	2	Linsenkopfschraube DIN 7380 M 6 x 12		
24	891132 0351	2	Senkschraube DIN 7991, M 4 x 35		
25	890303 0002	2	4kt Mutter M4 - Hausnorm 10x10x3		
26	890315 0002	1	Gleitmutter 2xM6 - L45xB10xH3,5mm	TE0162	
27	392760 0300	1	Motorleitung universal - 3m		nicht dargestellt
28	392760 0400	1	Motorleitung universal - 4m		nicht dargestellt
29	392760 0600	2	Motorleitung universal - 6m		nicht dargestellt
30	392740 0300	1	Encoderleitung - 3m		nicht dargestellt
31	392740 0400	1	Encoderleitung - 4m		nicht dargestellt
32	392740 0600	2	Encoderleitung - 6m		nicht dargestellt
Scheiben		1	1159 x 584 x 4		
		2	1260 x 584 x 4		

Table 2: Spare part list CNC Base machine Gantry OverHead M30 (without tool)

17.3 Gantry OverHead M40

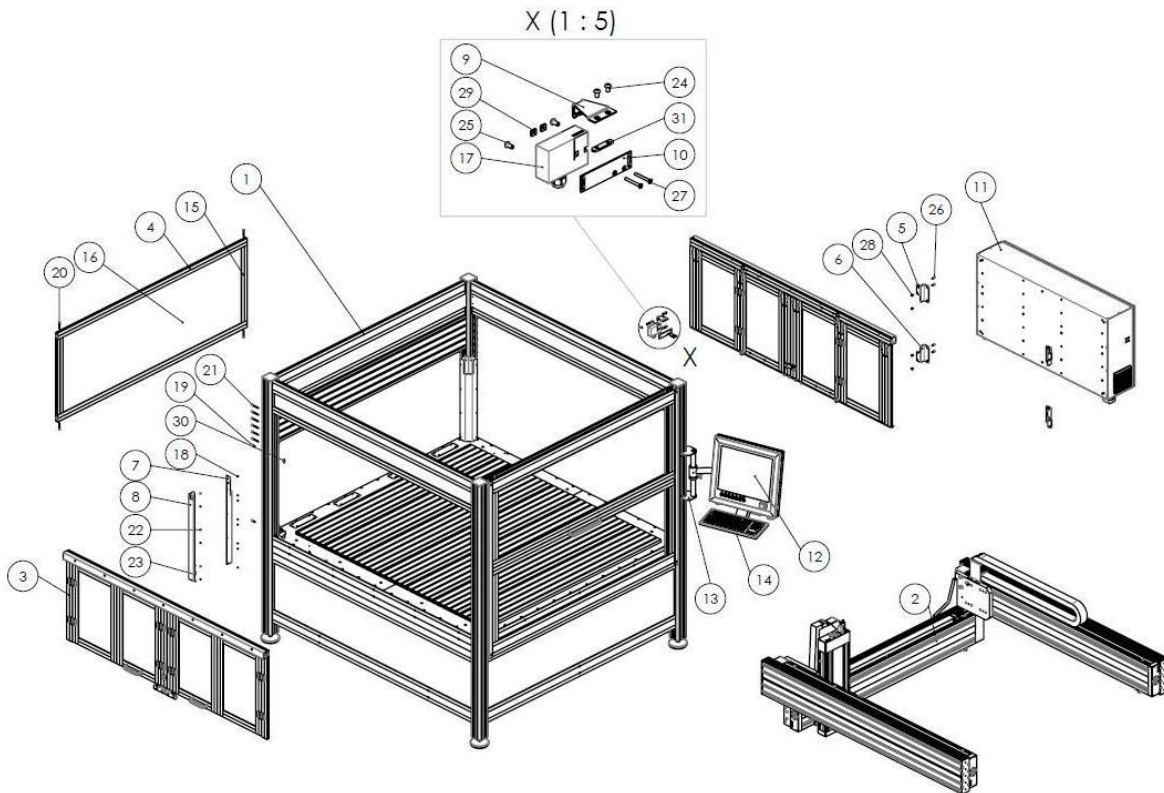


picture 16: Exploded view CNC Base machine Gantry OverHead M40 (without tool)

POS-NR.	Item no	quantity	description	Drawing no	Part type
1		1	DZ6661 - Achsaufbau - Gantry Overhead M	DZ6661	
2	675012 7261	1	DZ7261 - Grundgestell - Gantry Overhead M40	DZ7261	
3	675012 67002	4	DZ6700 - Paneelprofil PP50 L=1339,5	DZ6700	
4	675012 67003	2	DZ6700 - Paneelprofil PP50 L=1739	DZ6700	
5	675012 7282	2	DZ7282 - Kabelkanal 2 - Gantry OverHead	DZ7282	eloxiert
6	675012 7283	2	DZ7283 - Kabelkanal 1 - Gantry OverHead	DZ7283	eloxiert
7	675012 2461	1	EZ2461 - IGF703_IGF707 - Rahmen Befestigung Schmersal	EZ2461	
8	675012 4450	1	TE4450 - Fensterelement - Verschlussstück	TE4450	verzinkt
9	376112 0400	1	Schalttschrank 1200x600x250 - Modell 2012		
10	371100 1000	1	DZ6540 - Bedienpanel iOP-19 - RAL 3011	DZ6540	
11	371050 2040	1	Schwenkarm i-OP mit Montagewinkel an PS80	DZ5930	
12	371200 0001	1	Tastatur iOP-19 - RAL 3011 GER		
13	567175 0600	1	Schmersal - AZM 170-02zk - 2321		
14	201040 0564	6	Zuschnitt Paneelprofil PP50 - L564		
15		1	Bausatz Scheiben		Bausatz Scheiben 675012 0127
16	891201 0061	16	Linsensenkschraube DIN 966 4.8 VZ M 3 x 6		
17	891124 0221	12	Zylinderschraube DIN 6912 8.8 M 6 x 22		
18	891124 0451	12	Zylinderschraube DIN 6912 8.8 M 6 x 45		
19	891591 0081	12	Linsenkopfschraube DIN 7380 M 3 x 8		
20	891591 0051	4	Linsenkopfschraube DIN 7380 M 4 x 5		
21	891594 0101	2	Linsenkopfschraube DIN 7380 M 6 x 10		
22	891594 0121	2	Linsenkopfschraube DIN 7380 M 6 x 12		
23	891132 0351	2	Senkschraube DIN 7991, M 4 x 35		
24	890303 0002	2	4kt Mutter M4 - Hausnorm 10x10x3		
25	890315 0002	1	Gleitmutter 2xM6 - L45xB10xH3,5mm	TE0162	
26	392760 0300	1	Motorleitung universal L=3m		nicht dargestellt
27	392760 0500	2	Motorleitung universal L=5m		nicht dargestellt
28	392760 0600	1	Motorleitung universal L=6m		nicht dargestellt
29	392760 0800	1	Motorleitung universal L=8m		nicht dargestellt
30	392740 0300	1	Encoderleitung L=3m		nicht dargestellt
31	392740 0500	2	Encoderleitung L=5m		nicht dargestellt
32	392740 0800	1	Encoderleitung L=8m		nicht dargestellt
Scheiben		1	1660 x 584 x 4		
		2	1260 x 584 x 4		

Table 3: Spare part list CNC Base machine Gantry OverHead M40 (without tool)

17.4 Gantry OverHead M50

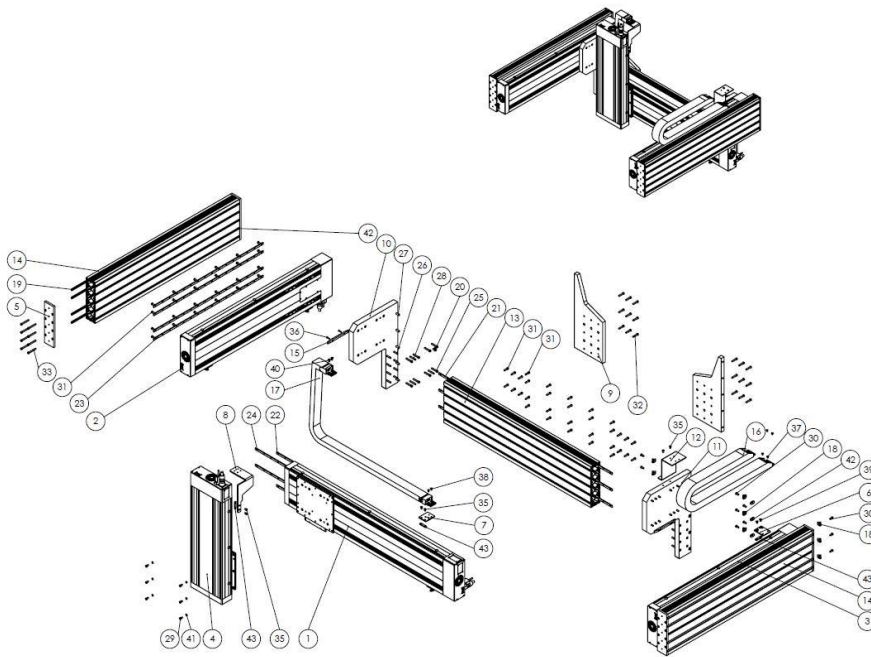


Picture 17: Exploded view CNC Base machine Gantry OverHead M50 (without tool)

POS-NR.	Item no	quantity	description	Drawing no	Part type
1	675012 7456	1	DZ7456 - Grundgestell - Gantry Overhead M50	DZ7456	
2		1	DZ6661 - Achsaufbau - Gantry Overhead M	DZ6661	
3	675012 7441	2	DZ7441 - Schiebetür - Gantry Overhead M50	DZ7441	
4	675012 67003	2	DZ6700 - Paneelprofil PP50 L=1739	DZ6700	
5	675012 7465	2	DZ7465 - Befestigungswinkel - Schaltschrank - Gantry Overhead M50	DZ7465	eloxiert
6	675012 7466	2	DZ7466 - Befestigungswinkel 2 - Schaltschrank - Gantry Overhead M50	DZ7466	eloxiert
7	675012 7282	2	DZ7282 - Kabelkanal 2 - Gantry Overhead	DZ7282	eloxiert
8	675012 7283	2	DZ7283 - Kabelkanal 1 - Gantry Overhead	DZ7283	eloxiert
9	675012 4450	1	TE4450 - Fensterelement - Verschlussstück	TE4450	verzinkt
10	675012 2461	1	EZ2461 - IGF703_IGF707 - Rahmen Befestigung Schmersal	EZ2461	
11	376212 0405	1	Schaltschrank 1200x600x250 - Modell 2012		
12	371100 1000	1	DZ6540 - Bedienpanel iOP-19 - RAL 3011	DZ6540	
13	371050 2040	1	Schwenkarm i-OP mit Montagewinkel an PS80	DZ5930	
14	371200 0001	1	Tastatur iOP-19 - RAL 3011 GER		
15	201040 0564	2	Zuschnitt Paneelprofil PP50 - L564		
16		1	Zuschnitt Scheibe 1660x584x4		
17	567175 0600	1	Schmersal - AZM 170-02ZK - 2321		
18	891201 0061	16	Linsensenkschraube DIN 966 4.8 VZ M 3 x 6		
19	891124 0251	8	Zylinderschraube DIN 6912 8.8 M 6 x 25		
20	891124 0451	4	Zylinderschraube DIN 6912 8.8 M 6 x 45		
21	891124 0551	28	Zylinderschraube DIN 6912 8.8 M 6 x 55		
22	891591 0081	12	Linsenkopfschraube DIN 7380 M 3 x 8		
23	891591 0051	4	Linsenkopfschraube DIN 7380 M 4 x 5		
24	891594 0101	2	Linsenkopfschraube DIN 7380 M 6 x 10		
25	891594 0121	2	Linsenkopfschraube DIN 7380 M 6 x 12		
26	891594 0205	8	Linsenkopfschraube DIN 7380 M 6 x 20		
27	891132 0351	2	Senkschraube DIN 7991, M 4 x 35		
28	891134 0121	8	Senkschraube DIN 7991, M 6 x 12		
29	890303 0002	2	4kt Mutter M4 - Hausnorm 10x10x3		
30	890325 0002	8	Gleitmutter M6 - L25xB10xH3,5mm	TE0163	
31	890315 0002	1	Gleitmutter 2xM6 - L45xB10xH3,5mm	TE0162	
32	890605 0301	7	Distanzbolzen 1116-30 (M6) Fa Schaefer		
33	392760 0400	1	Motorleitung universal		nicht dargestellt
34	392760 0600	2	Motorleitung universal		nicht dargestellt
35	392760 0800	1	Motorleitung universal		nicht dargestellt
36	392740 0400	1	Encoderleitung		nicht dargestellt
37	392740 0600	2	Encoderleitung		nicht dargestellt
38	392740 0800	1	Encoderleitung		nicht dargestellt

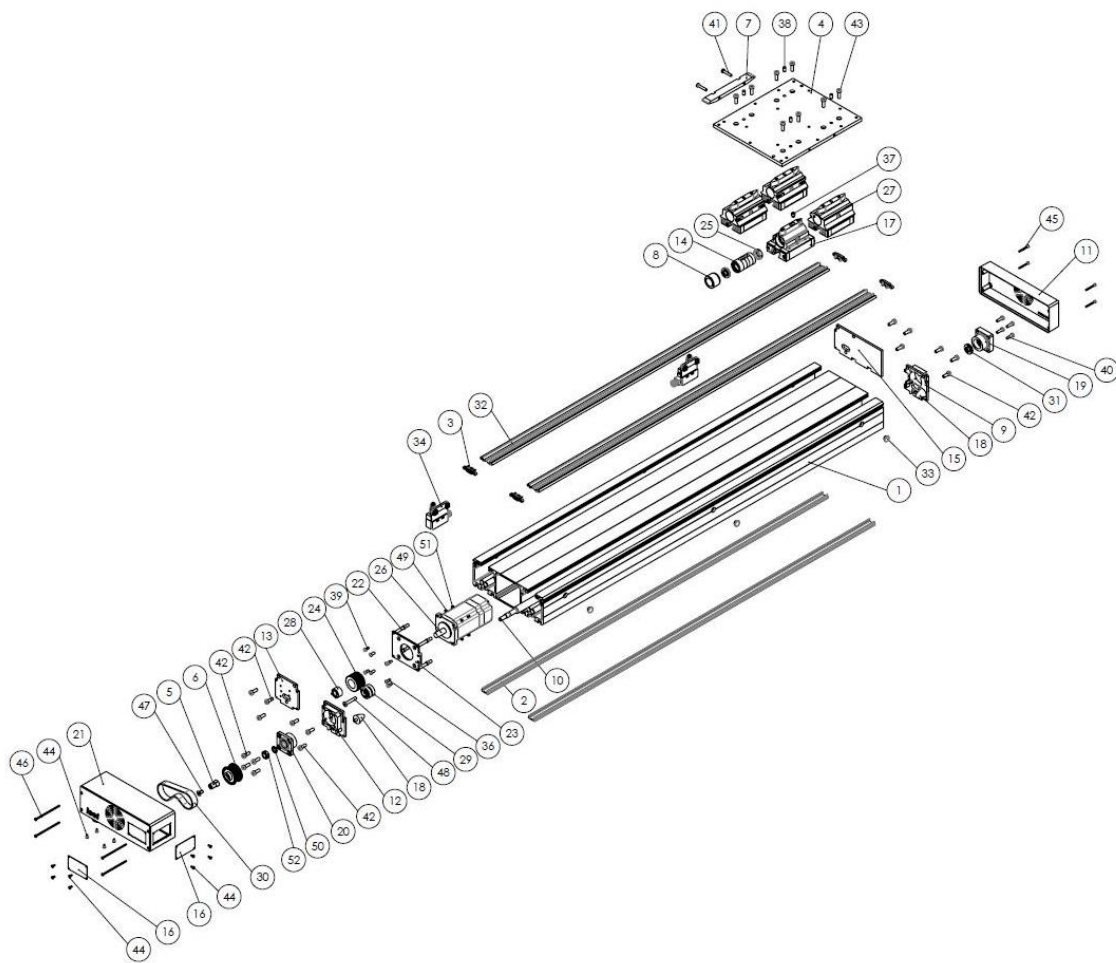
Table 4: Spare part list CNC Base machine Gantry OverHead M50 (without tool)

17.5 Construction of the axes



Picture 18: Exploded Gantry OverHead M – axis system

POS-NR.	Item no	quantity	appellation	Drawing no
1	234424 9035	1	DZ6690 - X-Achse - LES5 - EC60 - L=1590 - GHO	DZ6690
2	234424 9030V01	1	DZ6674 - Y-Achse links - LES5 - EC60 - L=1190 - GOH	DZ6674
3	234424 9032V01	1	DZ6675 - Y-Achse rechts - LES5 - EC60 - L=1190 - GOH	DZ6675
4	234423 0059V05	1	TE2478 - Z-Achse - LES5 - EC60S - L=590	TE2478
5	675012 6678	4	DZ6678 - Adapterplatte RE65-250 - GOH	DZ6678
6	675012 6680	1	DZ6680 - E-Kettenhalteblech-1 - X-Achse - GOH	DZ6680
7	675012 6681	1	DZ6681 - E-Kettenhalteblech-2 - Z-Achse - GOH	DZ6681
8	675012 6682	1	DZ6682 - Montagewinkel - Energieführungskette 9 - GOH	DZ6682
9	675012 6683	2	DZ6683 - Querstrebe - Seitenwange GOH	DZ6683
10	675012 6684	1	DZ6684 - Seitenwange -2- GOH	DZ6684
11	675012 6685	1	DZ6685 - Seitenwange GOH	DZ6685
12	675012 6686	1	DZ6686 - E-Kettenwinkel - 1 - GOH	DZ6686
13	675012 66871	1	DZ6687- RE 65x250 - L=1539 - GOH	DZ6687
14	675012 66881	2	DZ6688 - RE 65x250 - L=1320 - GOH	DZ6688
15	623092 7258	2	DZ7258 - Schiffchen für Überfahrendschalter - Y-Achse - GOH	DZ7258



Picture 19: Exploded view X-axis, DZ6690

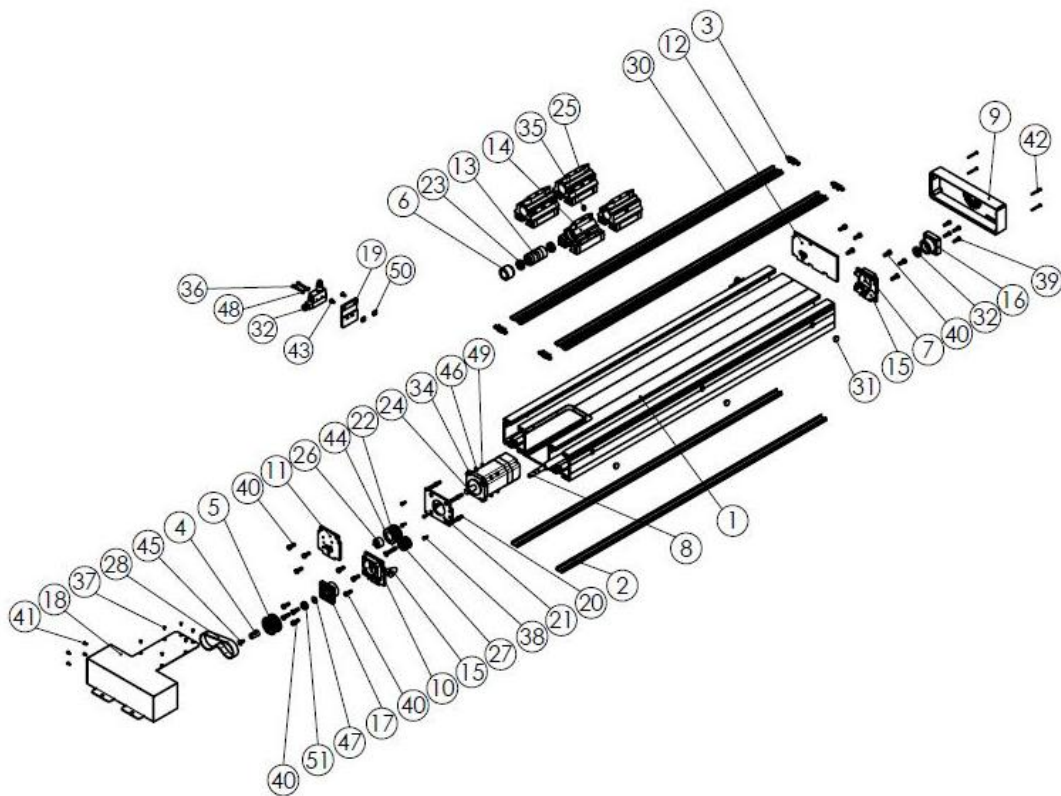
POS-NR.	Item no	quantity	appellation	Drawing no	POS-NR.
1	siehe Tabelle	1	Linearführung LFS12-5		
2	632505	2	TE0275 - Abdeckprofil	TE0275	
3	693001	4	TE0398 - Endfassung für Dichtlippe	TE0398	
4	623027 0001	1	TE0545 - Schlittenplatte PS4	TE0545	brüniert

Table 5: Spare part list Gantry OverHead M - axis system

5	635001	1	TE0561 Spannzange 8mm	TE0561	
6	616002	1	TE0562 - Zahnriemenrad Z25 AT5 für Spannzange D=8mm	TE0562	
7	674500 0161	1	TE1193-4 Profil für Schiffchen 150mm	TE0647	trovalisieren
8	623065 0001	1	TE1972 - Feststellmutter für KG-Mutter ø16	TE1972	brüniert
9	623051 1000	1	TE1999 - Endplatte Direktantrieb und Gegenlagerseite (LF4 5 6) rechts	TE1999	
10	siehe Tabelle	1	TE2305 - KG - Spindel	TE2305	
11	623059 1000	1	TE2334 - Abdeckhaube 225x75x33	TE2334	VDI3400 (24) - 27
12	623051 2000	1	TE2342 - Endplatte Direktantrieb und Gegenlagerseite (LF4 5 6) links	TE2342	
13	623052 1000	1	TE2435 - Abdeckblech 72x72x5 für LF 4-6	TE2435	trovalisieren
14	613110 0001	1	TE2456-3 Kugelgewindemutter Variante 3 - 16x10mm	TE2456	
15	623052 1001	1	TE2436 Abdeckblech 150x72x5 für LF 4-6	TE2436	trovalisieren

POS-NR.	Item no	quantity	description	Drawing no	POS-NR.
16	610110 2471	2	TE2471 - Blindplatte für Abdeckhaube 225x75x80	TE2471	Edelstahl
17	623072 0014	1	TE2797 - Wellenschlitten WS5 für KG - Mutter	TE2797	
18	632126 2816	2	TE2816 - Schwingmetall Parabelfeder - ArtNr632126 2816	TE2816	
19	623065 0104	1	TE2932 - Gegenlagerflansch (LF4-6)	TE2932	
20	623065 0102	1	TE2935 - Flansch für Riementrieb (LF4-6)		
21	623058 6679	1	DZ6679 - Abdeckhaube 225x75x80	DZ6679	
22	634500 9012	4	SZ0789 P524 Distanzstück	SZ0789	verzinkt
23	674501 07901	1	SZ0790 - Motoradapterblech	SZ0790	verzinkt
24	616001 0002	1	SZ2789 P5xx Zahnriemenrad Z25 AT5 D=11mm	SZ2789	
25	613502	1	TP0104 - Abstreifer KG-Mutter	TP0104	
26	396423 1060	1	Servoantriebsmodul EC60 L		
27	623010 0011	3	Stahlschlitten LS 2 - ohne KG-Mutter		
28	898122 2131	1	Spannbuchse 12-22-13(Mädler; 615712 00)		
29	616400	1	Spannrolle für Zahnriemen LF4-LF5		
30	616503 0280	1	Zahnriemen 16AT5-280 - EC60 1_1 - 616503 0280 ¹		
31	893400 0017	1	Wellendichtung mit Feder 12 x 24 x 4,5		
32	630900	4	Dichtlippe	TE2951	
33	610016	6	Kapsto-Abdeckung GPN 300 F-Type 300 F4_9_2 14 6_5		
34	216460 0002	1	Endschalter-Anbausatz für LES 5 - Art.Nr. 216460 0002		
35	611999 2000	1	Spindelunterstützung		nicht dargestellt (ab L1490)
36	890133 0121	4	TE0174 - Senkschraube mit Torx 20 M5x12	TE0174	
37	622002 0001	1	TE1409 Stiftschraube M8x0,75x10mm mit Kegel (ersetzt TP0150-4)	TE1409	brüniert
38	895025 0126	4	Zylinderstift DIN 6325 d6x 12		
39	891122 0101	4	Zylinderschraube DIN 6912 8.8 M 4 x 10		
40	891123 0161	4	Zylinderschraube DIN 6912 8.8 M 5 x 16		
41	891123 0251	2	Zylinderschraube DIN 6912 8.8 M 5 x 25		
42	891124 0161	16	Zylinderschraube DIN 6912 8.8 M 6 x 16		
43	891124 0181	8	Zylinderschraube DIN 6912 8.8 M 6 x 18		
44	891181 0061	12	Linsenschraube DIN 7985 4.8 VZ M 3 x 6		
45	891181 0281	4	Linsenschraube DIN 7985 4.8 VZ M 3 x 28		
46	891181 0751	4	Linsenschraube DIN 7985 4.8 VZ M 3 x 75		
47	891134 0121	1	Senkschraube DIN 7991, M 6 x 12		
48	891134 0301	1	Senkschraube DIN 7991, M 6 x 30		
49	893051 0001	4	Scheibe DIN 125 ST 4,3		
50	893307 0000	1	Scheibe DIN 988 ST 10 x 1		
51	892023 0002	4	Sechskantmutter DIN 934 8 M 4		
52	890257 0011	1	Nutmutter DIN 981 M10x0,75		

table 6: Spare part list X-axis, DZ6690
¹ Wearing part – annual exchange recommended



Picture 20: Exploded view Y-axis left, DZ6674

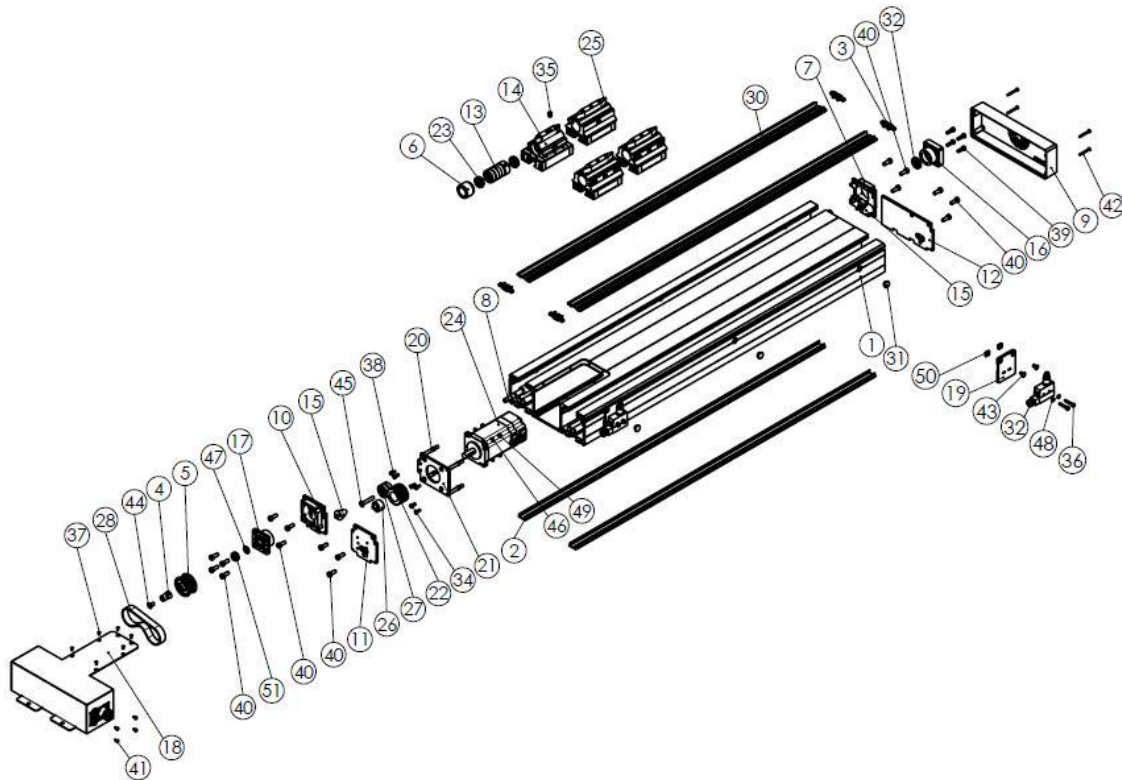
POS-NR.	Item no	quantity	appellation	Drawing no	POS-NR.
1	See table	1	Linearführung LFS12-5	DZ6689	
2	632505	2	TE0275 - Abdeckprofil SK593 P10_4	TE0275	
3	693001	4	TE0398 - Endeinfassung für Dichtlippe	TE0398	
4	635001	1	TE0561 Spannzanze 8mm	TE0561	
5	616002	1	TE0562 - Zahnriemenrad Z25 AT5 für Spannzanze D=8mm	TE0562	
6	623065 0001	1	TE1972 - Feststellmutter für KG-Mutter ø16	TE1972	brüniert
7	623051 1000	1	TE1999 - Endplatte Direktantrieb und Gegenlagerseite (LF4 5 6) rechts	TE1999	
8	See table	1	TE2305 - KG-Spindel 16 x 10	TE2305	
9	623059 1000	1	TE2334 - Abdeckhaube 225x75x33	TE2334	VDI3400 (24) - 27
10	623051 2000	1	TE2342 - Endplatte Direktantrieb und Gegenlagerseite (LF4 5 6) links	TE2342	
11	623052 1000	1	TE2435 - Abdeckblech 72x72x5 für LF 4-6	TE2435	trovalisieren
12	623052 1001	1	TE2436 Abdeckblech 150x72x5 für LF 4-6	TE2436	trovalisieren
13	613110 0001	1	TE2456-3 KugelgewindeMutter Variante 3 - 16x10mm	TE2456	
14	623072 0014	1	TE2797 - Wellenschlitten WS5 für KG - Mutter	TE2797	
15	632126 2816	2	TE2816 - Schwingmetall Parabelfeder - ArtNr632126 2816	TE2816	
16	623065 0104	1	TE2932 - Gegenlagerflansch (LF4-6)		
17	623065 0102	1	TE2935 - Flansch für Riementrieb (LF4-6)		
18	675012 6676	1	DZ6676 - Abdeckung Y-Achse links	DZ6676	pulverbesch.

POS-NR.	Item no	quantity	appellation	Drawing no	POS-NR.
19	675012 7257	2	DZ7257 - Befestigungsblech Überfahrendschalter GOH - Y-Achse	DZ7257	trovalisieren
20	634500 9012	4	SZ0789 P524 Distanzstück	SZ0789	verzinkt
21	674501 07901	1	SZ0790 - Motoradapterblech	SZ0790	verzinkt
22	616001 0002	1	SZ2789 P5xx Zahnriemenrad Z25 AT5 D=11mm	SZ2789	
23	613502	2	TP0104 - Abstreifer KG-Mutter	TP0104	
24	396423 1060	1	Servoantriebsmodul EC60L		
25	623010 0011	3	Stahlschlitten LS 2 - ohne KG-Mutter		
26	898122 2131	1	Spannbuchse 12-22-13(Mädler; 615712 00)		
27	616400	1	Spannrolle für Zahnriemen LF4-LF5		
28	616503 0280	1	Zahnriemen 16AT5-280 - EC60 1_1 - 616503 0280 ²		
29	893400 0017	1	Wellendichtung mit Feder 12 x 24 x 4,5		
30	630900	4	Dichtlippe	TE2951	
31	610016	6	Kapsto-Abdeckung GPN 300 F-Type 300 F4_9_2 14 6_5		
32	562303	2	Endlagenschalter		
33	611999 2000	1	Spindelunterstützung		nicht dargestellt (ab Länge 1490)
34	890133 0121	4	TE0174 - Senkschraube mit Torx 20 M5x12		
35	622002 0001	1	TE1409 Stiftschraube M8x0,75x10mm mit Kegel (ersetzt TP0150-4)	TE1409	brüniert
36	891102 0221	4	Zylinderschraube DIN 912 8.8 VZ M4 x 22		
37	891191 0061	6	Senkschraube DIN 965 4.8 VZ M 3 x 6		
38	891122 0101	4	Zylinderschraube DIN 6912 8.8 M 4 x 10		
39	891123 0161	4	Zylinderschraube DIN 6912 8.8 M 5 x 16		
40	891124 0161	16	Zylinderschraube DIN 6912 8.8 M 6 x 16		
41	891181 0061	4	Linsenschraube DIN 7985 4.8 VZ M 3 x 6		
42	891181 0281	4	Linsenschraube DIN 7985 4.8 VZ M 3 x 28		
43	891133 0101	4	Senkschraube DIN 7991, M 5 x 10		
44	891134 0121	1	Senkschraube DIN 7991, M 6 x 12		
45	891134 0301	1	Senkschraube DIN 7991, M 6 x 30		
46	893051 0001	4	Scheibe DIN 125 ST 4,3		
47	893307 0000	1	Scheibe DIN 988 ST 10 x 1		
48	893161 0001	4	Zahnscheibe DIN 6797 Ø4,3		
49	892023 0002	4	Sechskantmutter DIN 934 8 M 4		
50	890304 0002	4	4kt Mutter M5 - Hausnorm 10x10x3		
51	890257 0011	1	Nutmutter DIN 981 M10x0,75		

Table 7: Spare part list Y-axis left, DZ6674

	model	Pos. 1	Pos. 8	Pos. 2 / 30
GOH M20	L = 890 - Art.Nr.234424 9029V01	635500 6689	L = 968 - Art.Nr.211135 5096	L = 890
GOH M30-40	L = 1190 - Art.Nr.234424 9030V01	635500 66891	L = 1268 - Art.Nr.211135 5126	L = 1190
GOH M50	L = 1690 - Art.Nr.234424 9036V01	635500 66892	L = 1768 - Art.Nr.211135 5176	L = 1690

² Wearing part – annual exchange recommended



Picture 21: Exploded view Y-axis right, DZ6675

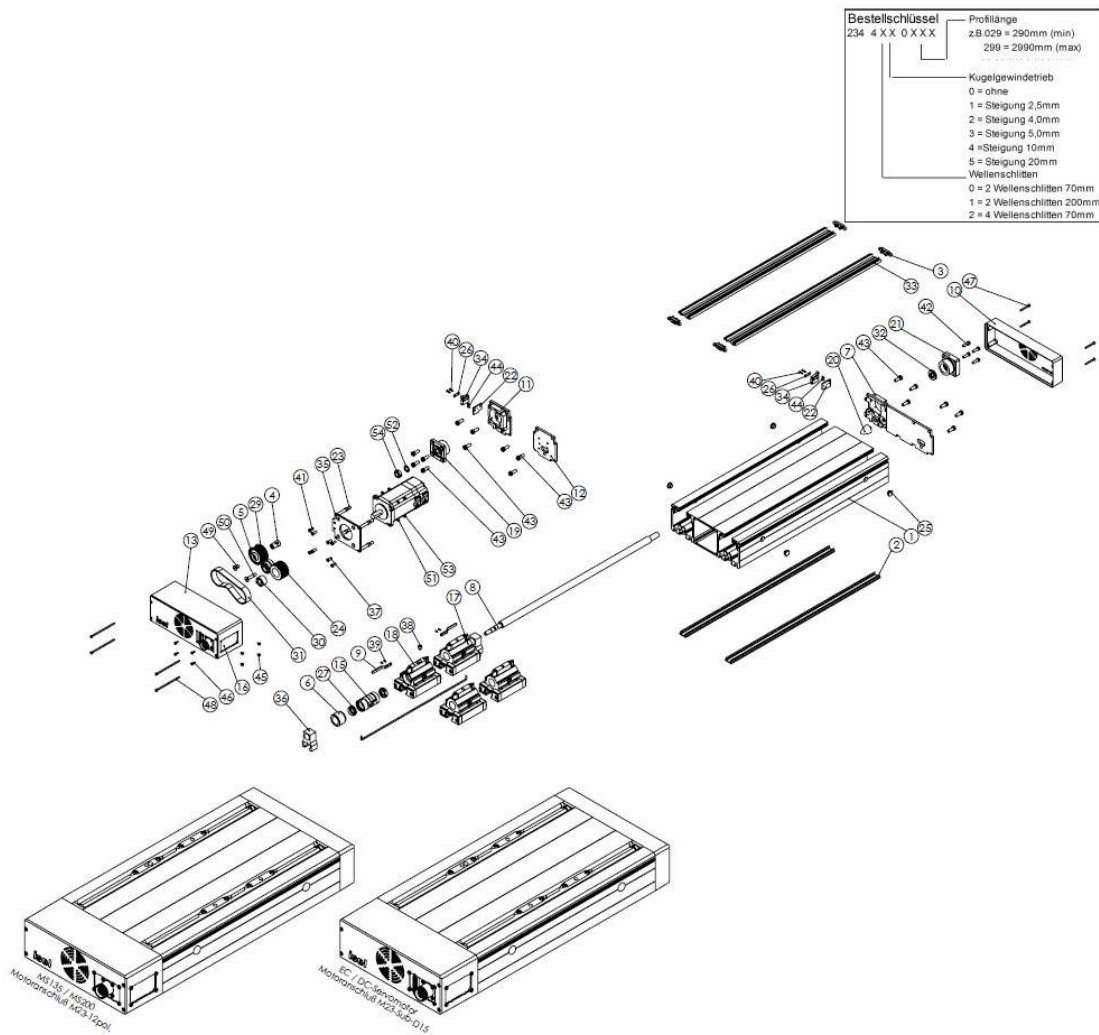
POS-NR.	Item no	quantity	appellation	Drawing no	POS-NR.
1	See table	1	Linearführung LFS12-5	DZ6689	
2	632505	2	TE0275 - Abdeckprofil SK593 P10_4	TE0275	
3	693001	4	TE0398 - Endfassung für Dichtlippe	TE0398	
4	635001	1	TE0561 Spannzange 8mm	TE0561	
5	616002	1	TE0562 - Zahnriemenrad Z25 AT5 für Spannzange D=8mm	TE0562	
6	623065 0001	1	TE1972 - Feststellmutter für KG-Mutter ø16	TE1972	brüniert
7	623051 1000	1	TE1999 - Endplatte Direktantrieb und Gegenlagerseite (LF4 5 6) rechts	TE1999	
8	See table	1	TE2305 - KG- Spindel 16 x 10	TE2305	
9	623059 1000	1	TE2334 - Abdeckhaube 225x75x33	TE2334	VDI3400 (24) - 27
10	623051 2000	1	TE2342 - Endplatte Direktantrieb und Gegenlagerseite (LF4 5 6) links	TE2342	
11	623052 1000	1	TE2435 - Abdeckblech 72x72x5 für LF 4-6	TE2435	trovalisieren
12	623052 1001	1	TE2436 Abdeckblech 150x72x5 für LF 4-6	TE2436	trovalisieren
13	613110 0001	1	TE2456-3 KugelgewindeMutter Variante 3 - 16x10mm	TE2456	
14	623072 0014	1	TE2797 - Wellenschlitten WS5 für KG - Mutter	TE2797	
15	632126 2816	2	TE2816 - Schwingmetall Parabelfeder - ArtNr632126 2816	TE2816	
16	623065 0104	1	TE2932 - Gegenlagerflansch (LF4-6)		
17	623065 0102	1	TE2935 - Flansch für Riementrieb (LF4-6)		
18	675012 6677	1	DZ6677 - Abdeckung Y-Achse rechts	DZ6677	pulverbesch.

POS-NR.	Item no	quantity	description	Drawing no	POS-NR.
19	675012 7257	2	DZ7257 - Befestigungsblech Überfahrendschalter GOH - Y-Achse	DZ7257	trovalisieren
20	634500 9012	4	SZ0789 P524 Distanzstück	SZ0789	verzinkt
21	674501 07901	1	SZ0790 - Motoradapterblech	SZ0790	verzinkt
22	616001 0002	1	SZ2789 P5xx Zahnriemenrad Z25 AT5 D=11mm	SZ2789	
23	613502	2	TP0104 - Abstreifer KG-Mutter	TP0104	
24	396423 1060	1	Servoantriebsmodul EC60 L		
25	623010 0011	3	Stahlschlitten LS 2 - ohne KG-Mutter		
26	898122 2131	1	Spannbuchse 12-22-13(Mädler; 615712 00)		
27	616400	1	Spannrolle für Zahnriemen LF4-LF5		
28	616503 0280	1	Zahnriemen 16AT5-280 - EC60 1_1 - 616503 0280 ³		
29	893400 0017	1	Wellendichtung mit Feder 12 x 24 x 4,5		
30	630900	4	Dichtlippe	TE2951	
31	610016	6	Kapsto-Abdeckung GPN 300 F-Type 300 F4_9_2 14 6_5		
32	562303	2	Endlagenschalter		
33	611999 2000	1	Spindelunterstützung		nicht dargestellt (ab Länge 1490)
34	890133 0121	4	TE0174 - Senkschraube mit Torx 20 M5x12		
35	622002 0001	1	TE1409 Stiftschraube M8x0,75x10mm mit Kegel (ersetzt TP0150-4)	TE1409	brüniert
36	891102 0221	4	Zylinderschraube DIN 912 8.8 VZ M4 x 22		
37	891191 0061	6	Senkschraube DIN 965 4.8 VZ M 3 x 6		
38	891122 0101	4	Zylinderschraube DIN 6912 8.8 M 4 x 10		
39	891123 0161	4	Zylinderschraube DIN 6912 8.8 M 5 x 16		
40	891124 0161	16	Zylinderschraube DIN 6912 8.8 M 6 x 16		
41	891181 0061	4	Linsenschraube DIN 7985 4.8 VZ M 3 x 6		
42	891181 0281	4	Linsenschraube DIN 7985 4.8 VZ M 3 x 28		
43	891133 0101	4	Senkschraube DIN 7991, M 5 x 10		
44	891134 0121	1	Senkschraube DIN 7991, M 6 x 12		
45	891134 0301	1	Senkschraube DIN 7991, M 6 x 30		
46	893051 0001	4	Scheibe DIN 125 ST 4,3		
47	893307 0000	1	Scheibe DIN 988 ST 10 x 1		
48	893161 0001	4	Zahnscheibe DIN 6797 Ø4,3		
49	892023 0002	4	Sechskantmutter DIN 934 8 M 4		
50	890304 0002	4	4kt Mutter M5 - Hausnorm 10x10x3		
51	890257 0011	1	Nutmutter DIN 981 M10x0,75		

Table 8: Spare part list Y-axis right, DZ6675

	Ausführung	Pos. 1	Pos. 8	Pos. 2 / 30
GOH M20	L = 890 - Art.Nr. 234424 9031V01	635500 6689	L=968 - Art.Nr.211135 5096	L=890
GOH M30-40	L = 1190 - Art.Nr. 234424 9032V01	635500 66891	L=1268 - Art.Nr.211135 5126	L=1190
GOH M50	L = 1690 - Art.Nr. 234424 9037V01	635500 66892	L=1768 - Art.Nr.211135 5176	L=1790

³ Wearing part – annual exchange recommended



Picture 22: Exploded view Z-axis, TE2478

POS-NR.	Item no	quantity	appellation	Drawing no	POS-NR.
1	635500 0XXX	1	LFS 12-5 Linearführungsschiene		
2	632505	2	TE0275 - Abdeckprofil SK593 P10_4 - L=490mm	TE0275	
3	693001	4	TE0398 - Endfassung für Dichtlippe	TE0398	
4	635001	1	TE0561 Spannzange 8mm	TE0561	
5	616002	1	TE0562 - Zahnriemenrad Z25 AT5 für Spannzange D=8mm	TE0562	
6	623065 0001	1	TE1972 - Feststelmutter für KG-Mutter ø16	TE1972	brüniert
7	623051 1000	1	TE1999 - Endplatte Direktantrieb und Gegenlagerseite (LF4 5 6) rechts	TE1999	
8	21113x 5xxx	1	TE2305 Zapfen 18x8 - 2-seitig bearbeitet - L568	TE2305	
9	635014 0002	2	TE2328 - Überfahrblech Endscharter LES4-5-6 - L=57	TE2328	
10	623059 1000	1	TE2334 - Abdeckhaube 225x75x33	TE2334	VDI3400 (24) - 27
11	623051 2000	1	TE2342 - Endplatte Direktantrieb und Gegenlagerseite (LF4 5 6) links	TE2342	
12	623052 1000	1	TE2435 - Abdeckblech 72x72x5 für LF 4-6	TE2435	trovalisieren
13	623058 1000	1	TE2337 - Abdeckhaube 225x75x80	TE2337	VDI3400 (24) - 27
14	623052 1001	1	TE2436 Abdeckblech 150x72x5 für LF 4-6	TE2436	trovalisieren
15	613110 0001	1	TE2456-3 KugelgewindeMutter Variante 3 - 16x10mm	TE2456	

POS-NR.	Item no	quantity	description	Drawing no	POS-NR.
16	610110 2471	1	TE2471 - Blindplatte für Abdeckhaube 225x75x80	TE2471	Edelstahl
17	siehe Tabelle 11	3	TE2796 Wellenschlitten WS5 - L=70 ohne KG-Mutter	TE2796	
18	siehe Tabelle 11	1	TE2797 - Wellenschlitten WS5 für KG - Mutter	TE2797	
19	623065 0102	1	TE2935 - Flansch für Riementrieb (LF4-6)		
20	632126 2816	1	TE2816 - Schwingmetall Parabelfeder - ArtNr632126 2816	TE2816	
21	623065 0104	1	TE2932 - Gegenlagerflansch (LF4-6)		
22	623056 1002	2	TE5925 - IGP 2520 - LES4 Riementrieb - Endplatte - Endscharterplatte	TE5925	
23	634500 9012	4	SZ0789 P524 Distanzstück	SZ0789	verzinkt
24	siehe Tabelle 10	1	SZ2789 P5xx Zahnriemenrad Z25 AT5 D=11mm	SZ2789	
25	610016	4	Kapsto-Abdeckung GPN 300 F-Type 300 F4_9_2 14 6_5		
26	610110 3745	2	SZ3745 P05xx - Montagblech Mirco-Schalter	SZ3745	
27	613502	1	TP0104 - Abstreifer KG-Mutter	TP0104	
28	474235 0048	1	EC-Servo bürstenlos - 60BLDS		
29	616400	1	Spannrolle für Zahnriemen LF4-LF5		
30	siehe Tabelle 10	1	Spannbuchse 12-22-13(Mädler; 615712 00)		
31	616503 0280	1	Zahnriemen 16AT5-280 Art.Nr.616503 0280 ⁴		
32	893400 0017	1	Wellendichtung mit Feder 12 x 24 x 4,5		
33	630900	4	Dichtlippe L - 480	TE2951	
34	562015 2001	2	Micro-Schnapschalter mit Rollenhebel		
35	674501 07901	1	SZ0790 - Motoradapterblech	SZ0790	verzinkt
36	611999 2000	1	Spindelunterstützung		ab Länge 1490
37	890133 0121	4	TE0174 - Senkschraube mit Torx 20 M5x12		
38	622002 0001	1	TE1409 Stiftschraube M8x0,75x10mm mit Kegel (ersetzt TP0150-4)	TE1409	brüniert
39	891371 0061	4	Gewindestift DIN 913 M 3 x 6		
40	891190 0101	4	Senkschraube DIN 965 4.8 VZ M 2,5 x 10		
41	891122 0101	4	Zylinderschraube DIN 6912 8.8 M 4 x 10		
42	891123 0161	4	Zylinderschraube DIN 6912 8.8 M 5 x 16		
43	891124 0161	16	Zylinderschraube DIN 6912 8.8 M 6 x 16		
44	891530 0071	4	Blehschraube DIN 7981 VZ 2,2 x 6,5		
45	891181 0041	4	Linsenschraube DIN 7985 4.8 VZ M 3 x 4		
46	891181 0081	4	Linsenschraube DIN 7985 4.8 VZ M 3 x 8		
47	891181 0281	4	Linsenschraube DIN 7985 4.8 VZ M 3 x 28		
48	891181 0751	4	Linsenschraube DIN 7985 4.8 VZ M 3 x 75		
49	891134 0121	1	Senkschraube DIN 7991, M 6 x 12		
50	891134 0301	1	Senkschraube DIN 7991, M 6 x 30		
51	893051 0001	4	Scheibe DIN 125 ST 4,3		
52	893307 0000	1	Scheibe DIN 988 ST 10 x 1		
53	892023 0002	4	Sechskantmutter DIN 934 8 M 4		
54	890257 0011	1	Nutmutter DIN 981 M10x0,75		

Table 9: Spare part list Z-axis, TE2478
⁴ Wearing part – annual exchange recommended

table 10:

Variante	Artikelnummer	Pos. 24	Pos. 30
MS135	396055 1060	616002	635001
MS200	396058 1060	616002	635001
MS200 mit Bremse	396058 1360	616002	635001
DC100	396112 1060	616002	635001
EC60S-156W / 48V	396415 1060	616001 0002	898122 2131
EC60S mit Bremse - 156W / 48V	396415 1260	616001 0002	898122 2131
EC60L-235W / 48V	396423 1060	616001 0002	898122 2131
EC60L mit Bremse - 235W / 48V	396423 1260	616001 0002	898122 2131
EC60L - 235W / 310V	396423 1070	616001 0002	898122 2131
EC60L mit Bremse - 235W / 310V	396423 1270	616001 0002	898122 2131

table 11:

Variante	Pos. 17	Pos. 18
2x - WS5 - L70	1x - 623072 0013 (TE2796)	1x - 623072 0014 (TE2797)
4x - WS5 - L70	3x - 623072 0013 (TE2796)	1x - 623072 0014 (TE2797)
2x - WS5 - L200	1x - 623072 0011 (TE2799)	1x - 623072 0012 (TE2798)
2x - LS2 - L70	1x - 623010 0011	1x - 623010 0010 (TE0305)
3x - LS2 - L70 + 1x - WS5 - L70	3x - 623010 0011	1x - 623072 0014 (TE2797)

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Manual for motor power amplifiers UVE8112 / IMD10 for Brushed DC Servomotors and Setup program DCSetup.exe;
isel Germany AG, 07/2009
- /1.2/ **Operating instruction positioning module IMD20/IMD40 with CANopen-Interface:**
Manual for motor power amplifiers IMD20 / IMD40 for Brushless DC Servomotors and Setup program ACSetup.exe;
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- /2/ **Operating instruction System module ISM10:**
Manual for System module ISM10;
isel Germany AG, 02/2010
- /3/ **Operating instruction Control computer ISR20:**
Manual for control computer (Control-PC) ISR20;
isel Germany AG, 02/2009
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Manual for CNC-Operating panel iBP10 / iBP17;
isel Germany AG, 07/2008
- /5.1/ **Wiring diagrams Control cabinet with isel-CAN-CNC Control (1-phase power supply 230 VAC):**
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isel Germany AG, 07/2009
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Manuals (parts 1 and 2) for Process automation software ProNC;
isel-automation 06/2005
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