isel flat bed installation

GFV	44/33
GFV	44/73
GFV	68/52
GFV	102/62
GFV	142/102
GFV	142/162
GFV	142/232

GFV 142/102
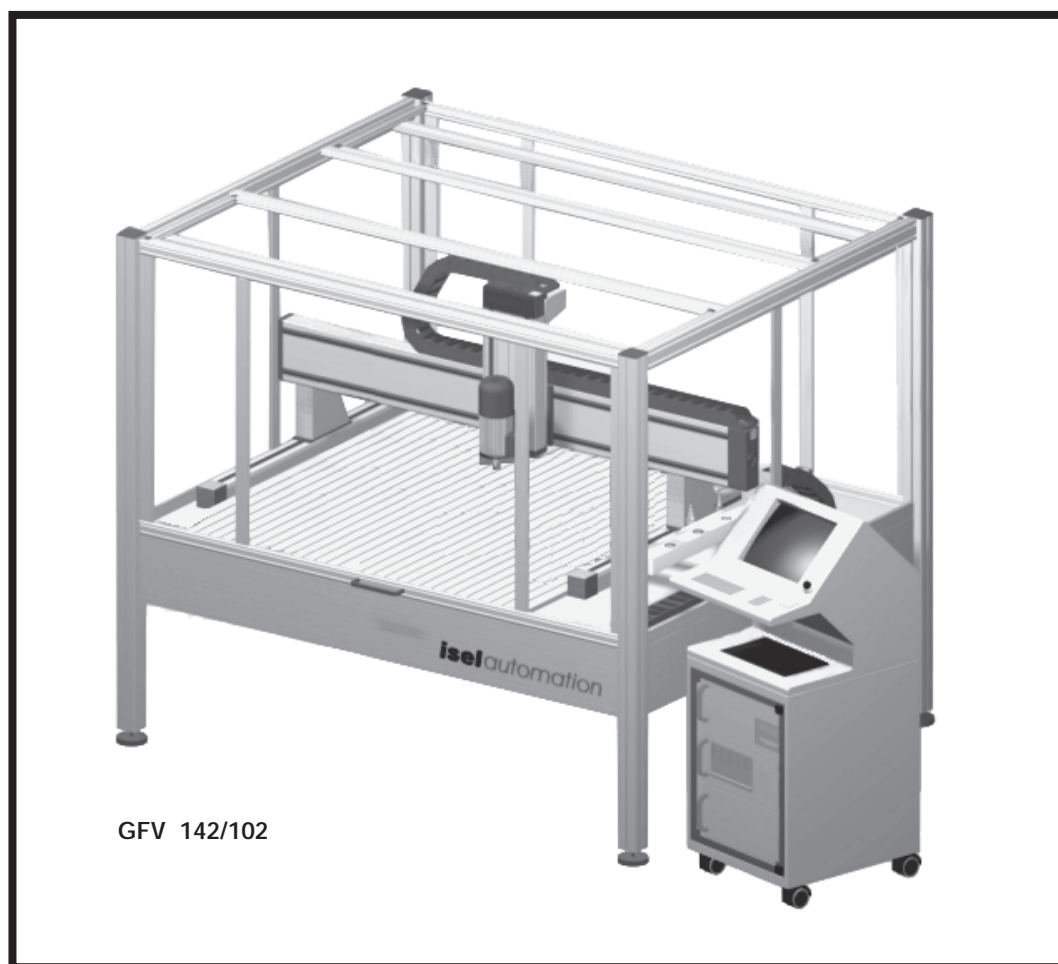
Operating and Maintenance Instruction

Order-number: _____

Serial-number:_____

isel

On this Manual

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

Danger	Caution	Note	Example	Additional Information

Despite all care, printing errors and mistakes cannot be ruled out completely.
Suggestions for improvement and notes on errors are always welcomed.

isel machines and controllers are CE compliant and are marked accordingly.
Any other machine parts and components subject to the CE safety guidelines may not be commissioned unless all relevent standards are fulfilled.

*isel*automation shall not accept any liability for any modifications on the device by the customer.

The limit values specified in the Certificate of Conformity only apply to the original configuration from works.

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Contents

1 Introduction

The *isel* GFV Flat Bed Machining Systems are proven CNC machines that offer an abundance of possibilities for three-dimensional processing of work pieces.

The machines are built and equipped in various sizes and designs. Tailored standard sections and drive elements that are combined according to requirements form the basis. Therefore, the external appearance of the machines can be very diverse.

The internal life, therefore the substantial set-up of mechanics and the electrical control is common to all machines. Before delivery, every individual machine is tested and run-in in detail for many hours.

As a requirement for your work you need basic knowledge in CNC technology and PC application, a computer, and the control electronic, an electrical outlet and some creativity.

Please take note of this short instruction now so that you

· set up the installation properly,

· can work surely, quickly and effectively,

· keep away dangers of persons

· and thus exploit the full potential.

The explanations in this instruction are based on a standard scope of delivery with which the machine is ready for operation. You can simply skip explanations that do not concern your machine (e.g. in case of accessories and software).

Please note the additional reference manuals and instructions for the installation and commissioning of software and accessories.

We wish you much success and pleasure for the future work with the flat bed installation.

2   Intended use

The flat bed equipment is a machine tool with several linear axes and a rotary axis. Motors and switches of the driving axes can be driven via computer. By default*, the complete control and power electronics of all axes are located in the external 19" *Penguin II* data terminal.

- The CNC machine is designed for use in dry areas, business areas, schools, in laboratories, and industrial plants (min 10 °C / max. 40 °C).

- The machine is suitable for milling, drilling, cutting, engraving, dosing, measuring, positioning and many similar uses.

- You can attach the most different suitable machining tools or measuring instruments, appropriate to the above above-mentioned applications.

- Suitable processing materials are aluminium, PVC, wood, glass, printed circuit board materials a. o.
  Materials releasing gases that endanger health are not permitted for processing.

- The machine is prepared for an exhaust system. This exhaust is preferably suited for dry dusts (wood, printed circuit boards etc.)

* the systems are customer specifically set-up.

3   Safety notes

- The machine may not be operated in an explosive atmosphere.

- The machine is encased all around. The enclosure protects you against moving tools, decreases the operating noise level, and restrains the chips.
  During processing, the hood is bolted and can not be opened.
  You may neither remove nor change this safety device.

- Always ensure that the workpieces are properly secured.

- For cases of emergency, you find an Emergency-Stop switch on the service console and at the power unit; it interrupts the voltage supply for the power electronics and to the main spindle drive.

- Expert and trained personnel may only handle the key-operated switch since an increased injury danger exists in test operation.
  Please keep the replacement key under lock and key.

- The persons, who control the machines, must be 18 years old!
  All persons, particularly under eighteen years, must be constantly supervised by the training!

- Ensure sufficient ventilation when machining material releasing dust or gas.

- No liquid water may be used for cooling but only a spraying/cooling device with which a water fog causes the cooling action (see accessory). No drops may be formed and flow under the bottom plate.

4 Scope of delivery

The <u>standard</u> scope of delivery of the flat bed installations includs:

- Aluminum basic rack including
  - enclosure
  - suction tube and connection adapter

- Driving axes including limit switches

- Operating console

- Triangular key for unlocking the hood switch

- Penguin II 19" data terminal including
  - 14" or 17" monitor
  - keyboard
  - power cable
  - cable tubing with penguin <—> connecting cables
  - power unit
  - CNC servo controller
  - safety circuit module (SK module) with power supply unit

- ISELDRV machine driver

- REMOTE machining software

- and this operating and maintenance instruction

Please, refer to you delivery note for the precise scope of accessories of your machine.

5   Setting up and connection

5.1   Spacial requirements

The spacial requirements of the machine are limited to the external dimensions of the machine and the Penguin and sufficient free space is available in front of or at the side of the machine in order to operate and install it. Normally, the cover of the enclosure turns upwards. Thus, you must keep approx. 50 to 60 cm of free space in addition.
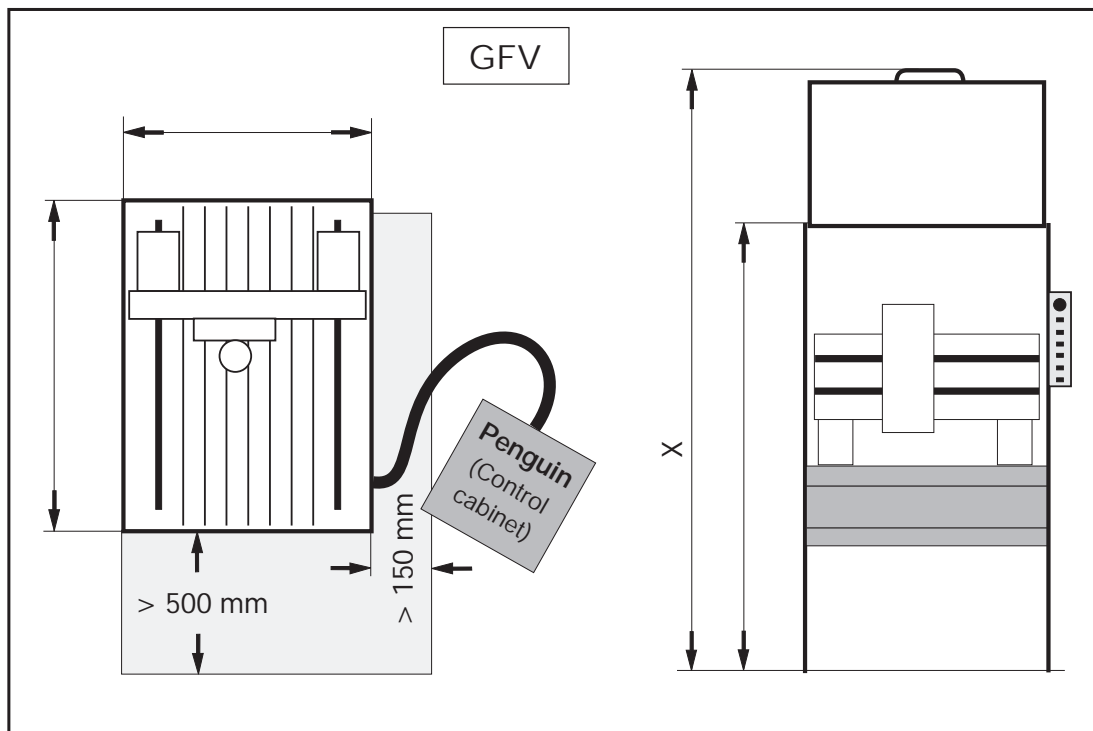
Dimensions and spacial requirements

| Model	B	T	H	X
GFV 44/33	760	1010	1750	2300
GFV 44/73	1160	1010	1750	2300
GFV 68/52	1410	1260	1880	2480
GFV 102/62	1810	1410	1880	2480
GFV 142/102	2210	1810	1880	2480
GFV 142/162	2210	2410	1880	2480
GFV 142/232	2210	3110	1880	2480
Penguin without feet	550	675	1380	-

Dimensions in [mm]

Consider the total overall height (X) with the hood opened.
In case of the special sizes with increased portal, the enclosure increases by approx. 300 mm (H + 300 and X. + 300) by default.

5.2 Transportation

Remove the transport safeguards at the rack feet.

Use only suitable lifting devices (fork-lift truck, lifting truck, see figure). Only raise the machine from below. Do not pull it up at the cover.
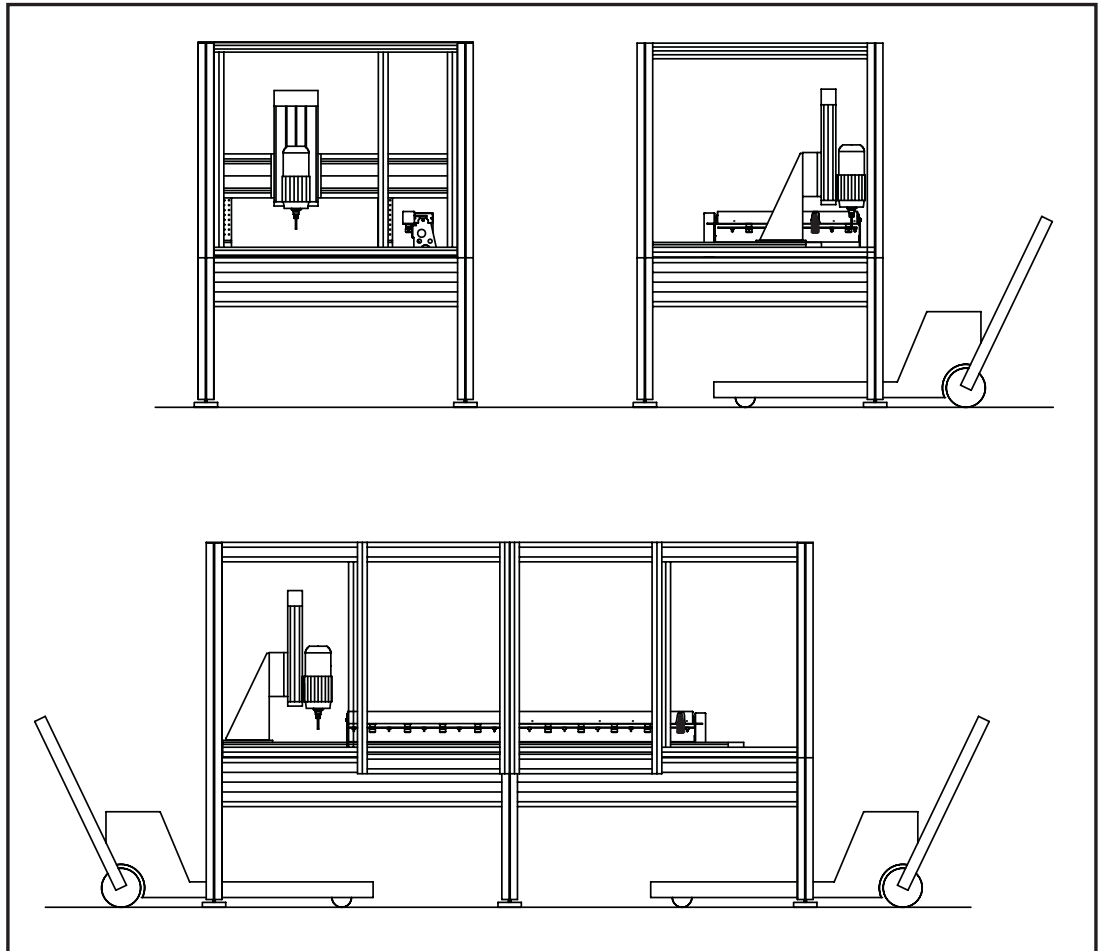
During a later transportation, please ensure that the voltage supply and connection cables are not damaged. Remove all cables before any transportation or transport machine and penguin simultaneously, e. g. on <u>one</u> pallet.

☞ **Above all, always keep the three triagular key outside of the machine during transport.**

5.3 Setting-up

Ex works, the worktable and all axes are exactly aligned right-angled.
Never loosen the fastenings of the axes or the angular brackets. Otherwise, you must re-adjust the axes again.

Place the machine onto a plane and solid surface. You can balance small unevennesses of the floor using the feet.

17 mm
13 mm
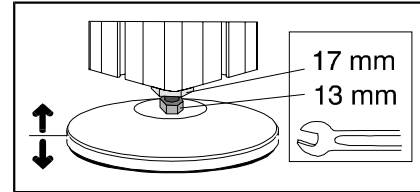
To level the machine accuratetly, you need a spirit level with a minimal precision of 0,5 mm/m.
1. Put the spirit level onto the machine table and adjust the feet until the machine is leveled at least 0,5 mm/m lengthwise and crosswise.
2. Fix the height of the maschine feet with the lock nut.

5.4   Enclosure

For repairs or extensive maintenance and cleaning tasks, the enclosure can be unscrewed separately. Every column is fixed by a threaded rod in the lower part. From the top, loosen the two nuts and the threaded rod. If you pull out the rod, the cover can be completely removed as one part (up to the size of 102/62). At larger machines, the cover consists of several parts.

SW 13

bottom   **top**
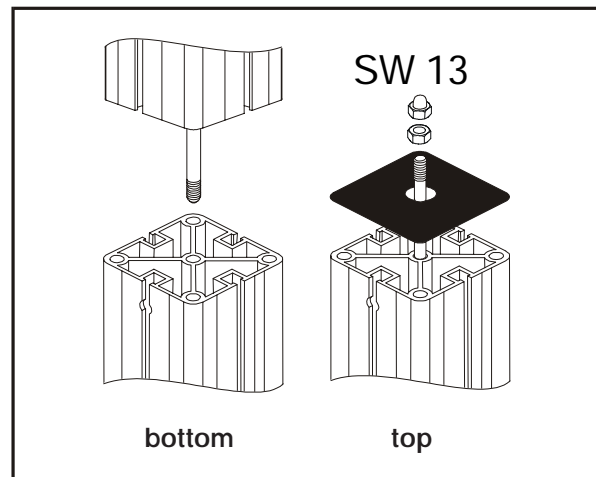
⚠️ **Without cover, the machine must never be put into operation.**

5.5   Wiring

The CNC machine is driven by an IBM compatible computer and power electronics for the motors. Integrated into one control cabinet (Penguin II), the controller is completety wired and connected to the machine.

You find a detailed overview of the wiring in the instruction of the CNC servo-controller.

Connect the power cable to the control cabinet (Penguin II) only if the machine is ready for commissioning.

! Route all cables exclusively through the cable tube of the penguin to the machine and ensure that both ends are always screwed on firmly (strain relief).

6 Commissioning

6.1 Preliminary notes

This figure present an overview of the electronic components in the Penguin.

① Emergency-Stop
   (at the operating console)
② Monitor
③ Keyboard
④ Control computer
⑤ Power unit
⑥ Blank sheet metal
⑦ Mouse interface
⑧ Main switch (on the rear side)
⑨ SK module (internal)
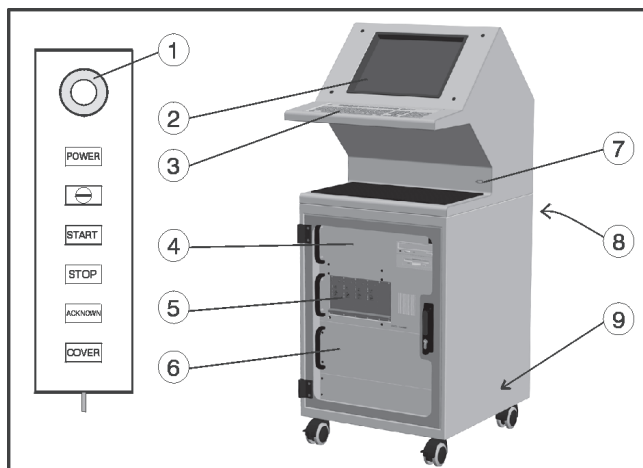
Coordinate system

The coordinate system of the machine is defined as shown in the figure. Nevertheless, you can select the P0 workpiece zero point unrestrictedly via software (offset).
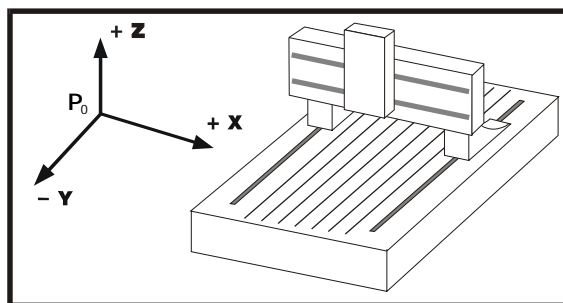

Stickers on the machine identify the axes.

Please, read the manual of the iseldrv.exe driver if you must modify the configuration of the coordinates. Contact our technical service in case of questions.

Reference point and home position

Ex works, the reference point of the machine (machine zero point) and the home position are pre-set to the corner on the upper left at the back (seen from the front). This location of the home position is signaled to the controller using an electromagnetic switch contact. As a pulse generator, the magnet is fixed to the enclosure. Without havng a physical contact, the reading contact on the Z-axis recognizes the home position if it recognizes the magnetic pulse.
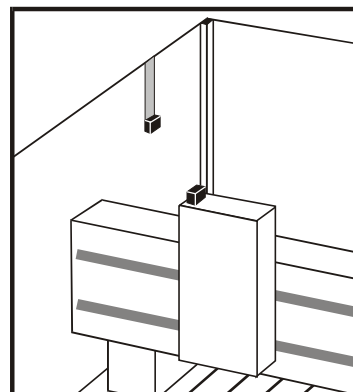
Memory

For the computer to work error-free, approx. 600 Kbytes of conventional main memory and approx. 140 kilobytes of high memory should be available.
You can check your memory when calling the *Memmaker* DOS program.
There, enter: *EMS —> no* and *Search high memory area*.
Thus, sufficient memory should be available.

Workpiece clamping

Use only suitable secure jigs if you set up your machine.
Always pay attention to a fixed seating of the workpieces.

6.2   Cover interlocking

- Basically, the machine must be in the home position (reference point) in order to open the cover. An exception is if the machine is in the test mode or you bypassed the safety function using the triangular key.

- The spindle can turn only if the cover is interlocked (exception in the TEST mode).

- For special occasions (if a switch is defective or in case of a power failure etc.), you can open the cover bolting device manually using the triangular key.
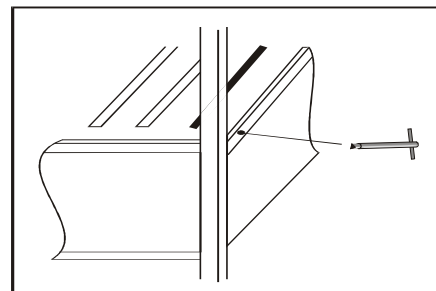
1. Power-down the machine.

2. Without using excessive force, turn the triangular key half a revolution to the left and open the cover.

    You may not operate the machine in this state.

    The processing machine remains de-energized.

3. Turn the triangular key again to the right.

6.3   Operating console

The operation of the GFV is performed using a movable operating console. It helps to install the machine in an user-friendly manner.

① **Emergency-Stop**
   ... removes power from the drive controller.
   Unlatching by turning to the right.

② **POWER**
   ... to switch on the power electronics.
   The power stage can only be switched on if
   Emergency-Stop is unlatched and the cover is closed.

③ **Key-operated** switch
   ... using the key you can select between the AUTO or TEST operation modes.

      AUTO = machining mode
      TEST = debug mode

   In debug mode, you can open the cover at any time.

④ **START**
   ... continues a stopped movement.
   The machine continues exactly at the place where it was interrupted by the STOP key if machining was not completed via software.

⑤ **STOP**
   ... stops the current program immediately and remains at the present (program) location. The machine remains powered-up and the cover is locked.

⑥ **ACKNOWN** switch
   ... in the TEST operation mode and while moving the axes, the push-button must be activated for as long as the cover is opened.
   The SK module removes power from the drive controller (power module) if the key is released with the cover being open.

⑦ **COVER** push-button
   ... causes the deactivation of the safety locking device if pressed and allows thus the opening of the cover provided that all corresponding conditions of the SK module are met. The pushbutton is only operable if it lights up.
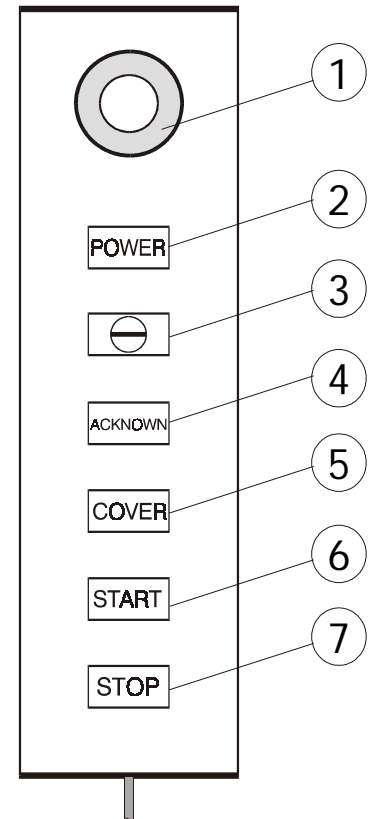
6.4   Activating the software

The *iseldrv.exe* machine driver is already installed (DOS) on the control computer (CNC servo controller). You only have to load it before any start of the machining software.

It is recommended to load the driver using the *drv.bat* batch file. (You activate the program and inform the computer where the default settings are stored for your machine.) If the file does not exist yet you can easily generate it yourself (edit drv.bat).
The content of the batch file is: *LH \servo\iseldrv \servo\servo.ini*

Enter 'drv' and ◄— (return). The driver prompts you to power-up the machine (press the POWER button).
Next, start the machining software (REMOTE, ISY etc.) provided that the programs are already installed.

As a example: Start the REMOTE program by changing to the c:\remote
                directory and enter 'remote' ◄—.
                Alternatively, you can also use a batch file
                (refer to the *REMOTE machining examples* manual).

Please, refer to the corresponding manuals and/or readme files on the installation floppy disks for further notes on the software.

You find all descriptions regarding the handling of the software in the enclosed manuals.

The software contained in your scope of delivery, e.g. ISY or ProLeiSys, is stored on a CD or floppy disk. The manuals are also included.

6.5   Operating modes

- Auto

In the AUTO operating mode, a loaded program is automatically executed and thus your workpieces are machined. During processing, the cover is locked. You can only open the cover after the machine has reached the HOME position and the machine (spindle) is switched off.

Press the COVER key before opening the cover. After closing, the cover is automatically locked again.

- Test

For testing and checking, you can run the machining program with the cover open if you turn the key-operated switch to the right (test mode). Now, the program is only processed for the time the ACKNOWN key is pressed.

The test operation has no influence on the machine, it remains powered-up.

⚠ Injury hazard!

This key may only be used by expert and authorized personnel since no protection against moving machine elements is guaranteed in the test operation after opening the cover.

7   Accessories

You can order the following matching accessories for the GFV:

- Clamping set (bolt lever, 2 dead stop rails, hollow wrenches)

- Supplementary mounting material for the T-slot plate

- Supplementary collets for the spindle:
  1 to 5 mm in 0,5 mm steps, 6 mm and 1/8"

- Tool kit

- Three different tool changers with high-frequency spindle (MA 2.11)
  including software, option: length sensor

- Rotary axes

- MA main spindle drivers, collets to 6,35 mm
  Spindle motor MA 2.05 + frequency converter, 650 W, 0 - 20,000 r.p.m.
  Spindle motor MA 4.05 + frequency converter, 400 W, 0 - 6,000 r.p.m.

- MA main spindle drivers, collets up to 10 mm
  Spindle motor MA2.11 + frequency converter, 1,100 W, 0 - 15,000 r.p.m.
  Spindle motor MA 4.11 + frequency converter, 1,100 W, 0 - 6,000 r.p.m.

- Kress processing machine, 900 W, 8 000 - 20 000 r.p.m.

- Exhaust system

- Industry vacuum cleaner

- Engraving spindle

- Engraving basis

- Spraying/cooling device, coolants

- Grease gun

- 19" Penguin II data terminal including 17" monitor, mains cable and
  cable tubing with connecting cables: Penguin <--> machine

- Complete control electronics (CNC servo controller + power unit)

- Interpreter for isel REMOTE intermediate format

- PRO-PAL CNC software

- PRO-DIN CNC software

- ProLeiSys CNC software (isolation milling)

- ISY CAD/CAM software

Pay attention to an expert mounting with every accessory and consider the valid standards and safety regulations.

For further information and/or purchase orders please contact

Technical consultation **phone** +49-6672-898-218, -489, -215
fax +49-6672-898-176.

Exhaust system

For an exhaust system, a suction tube with a connecting piece for the standard diameters 32, 35 and 38 mm is pre-installed. Connect a vacuum cleaner here.

The other end of the suction tube ends at the Z-axis. You can connect a exhausting device here. For the Kress processing machine (900 W), an exhaust system is available.
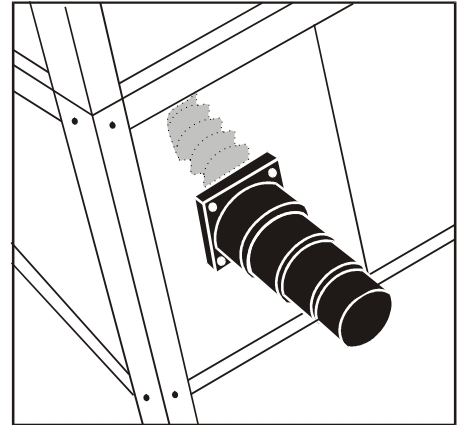
Spraying/cooling device

The spraying/cooling device is pre-installed ex works. You need only to apply the refrigerant. The compressed air is enabled by the maintenance unit for compressed air. The entrance air pressure of the maintenance unit can be 4 to 10 bars. The maximum permissible pressure of the spraying device is 7 bars. Partially, the working pressure is far below.

Tool changer

The tool changer (with 4, 5 and/or 10 tool positions) is connected ex works and ready for immediate use.
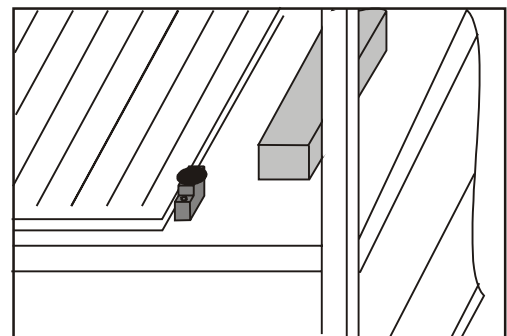The working pressure is approx. 8 bars.
Compressed air must be supplied via the maintenance unit.
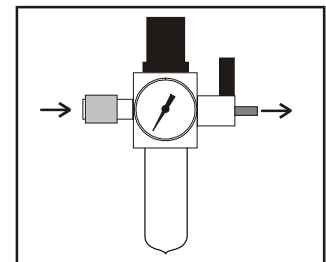
Consider the ITC commissioning manual (isel tool change).
The length sensor (optional) for the tool changer is mounted at the front to the right beside the clamping plate.

8   Cleaning/maintenance

⚠ **Turn off the mains switch before every cleaning and maintenance operation and pull the power plug in order to prevent the machine from starting inadvertently.**

- Clean the machine regularly with a broom or vacuum cleaner to remove all chips (no compressed air). That protects the mechanics of the machine against early wear.

- The sealing lips contain a Teflon component and do not require special servicing.

- Clean the perspex windows with a non-abrasive liquid cleaner.

- A compressed air system can constantly blow air into axes to essentially prevent dirt getting into the axes.
  You must, however, provide a compressed air system for this purpose. The compressed air hose is attached to one of the drillholes that also serves as access to a lubricating nipple.

- Ex works, the guideways and drive shafts are equipped with long-term lubrication.
  Depending on the strain put on them, you should lubricate the guideways and drive shafts approx. every 500 - 1,000 operating hours. Use normal roller bearing grease for this purpose.
  If you are lubricating with oil then do this every 100 - 200 operating hours.
  In the works, the guideways and shafts are lubricated with the sodium soap grease GP00/000F-20 according to DIN 51 502.
  Do not lubricate to much at one time. The shafts and the steel rails must not be flooded with lubricant.
  If you want to lubricate, first of all run a reference cycle, open the cover and then turn off the machine at that point.

! - If you need to undertake extensive maintenance it is easier to remove the enclosure.
  Do not misuse this possibility for normal operation because you would be abusing all of the built-in safety measures.

You will find two black plastic stoppers on the side of the Z-axis. Beneath these, the lubricating nipples are to be seen when the slide is located at the upper or lower end limiting switch position.

Remove the stoppers, push or move the slide to the end limiting switch position* and lubricate through the now visible lubricating nipples (S) (two above, two below).

Ⓢ in all drawings, this shows a lubricating nipple or the access to the lubricating points.
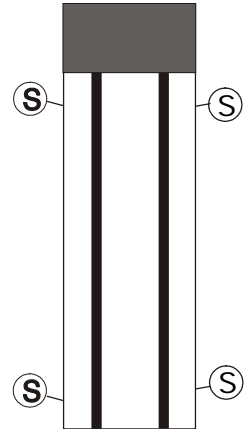
The Y-axis is built up as the Z-axis. Grease on the right and on the left side through the lubricating nipples.

If you loosen the incoming feed tubes to the right in the cable duct, in order to obtain better access to the lubricating nipple, you must also tighten them up again afterwards.
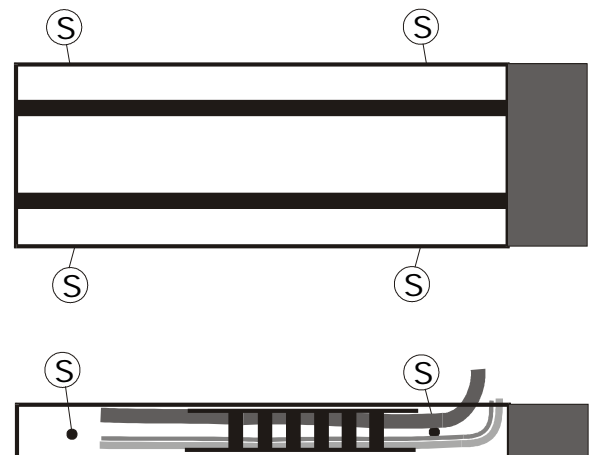
With the X-axis, the linear driving mechanism is located on the work top.

Remove the plastic stoppers on the inside and lubricate in the same way as the other axes (once each in the front and at the back).
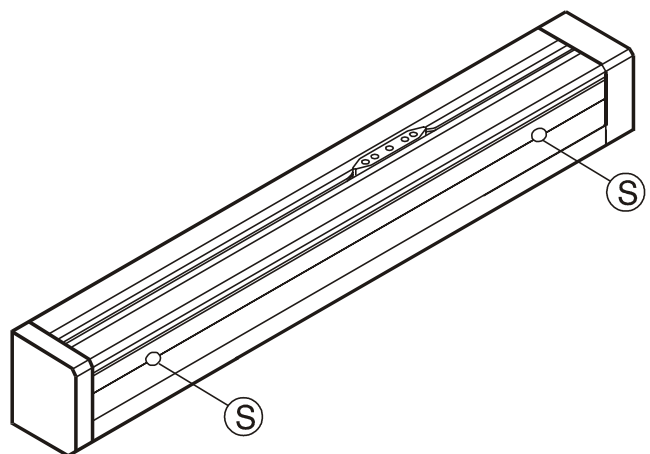
The angular gears below the work top are maintenance-free.

*   *If the machine is off, you can move the slides of the Y- and Z-axis manually to the limit switches.*

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9   Interferences

Defect	Cause	Solution
System can not be switched on	Mains connection is not available	Check circuit Plug in AC power connector
	Main switch not switched on	Switch on main switch
POWER push-button does not work	Cover not closed	Close cover
	Emergency stop not unlatched	Unlatch Emergency stop
Driving motor does not react	No voltage supply of the power stage, fuse is defective	Check fuse in power block Check fuse in power output stage
	Temperature protection of the power stage is active (LED Temp lights)	Check fan in the controller Check slots in the bottom plate
	Power stage is defective	Change power stage (send in)
	Connector has loosened	Check connector at the controller output and at the motor
	Cable break	Replace cable
Processing machine (spindle)	Not enabled by the software	Enable via software does not work
	Rotary switch at that machine is off (Kress)	Switch on the machine
	False driver installed	Use matching driver
	Machine is in home position	Move machine into work-space
	Cover bolting device is open	Close cover bolting device with the three edge key
	Safety device in the converter is defective	AC power connectors draw Refresh safety device

10 Technical data

Size table in [mm]

Template	B	T	H	Clamping table	Table height	Grid
GFV 44/33	760	1010	1750	900 x 375	750	50
GFV 44/73	1160	1010	1750	900 x 750	750	50
GFV 68/52	1410	1260	1880	1100 x 750	800	50
GFV 102/62	1810	1410	1880	1250 x 1125	800	50
GFV 142/102	2210	1810	1880	1650 x 1500	800	50
GFV 142/162	2210	2410	1880	2250 x 1500	800	50
GFV 142/232	2210	3110	1880	2950 x 1500	800	50

Traversing ranges in [mm]

Template	X-axis	Y-axis	Z-axis	Max. w. height	Weight* approx. [kg]	
GFV 44/33	330	440	160	200	130	
GFV 44/73	730	440	160	200	200	
GFV 68/52	680	520	220	240	450**	without Penguin
GFV 102/62	1020	620	220	240	500**	
GFV 142/102	1420	1020	220	240	800**	
GFV 142/162	1420	1620	220	240	820**	
GFV 142/232	1420	2320	220	240	850**	

* the weight varies depending
  on accessory
** with package

Sound pressure level	varies depending on the use and software tool without processing machine < 75, dB(A)
ELECTROMAGNETIC COMPATIBILITY test acc. to EN 60204, EN 50022 as well as EN 50082	

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

11   Appendix

Certificate of conformity

We   ***isel****automation* KG
             Im Leibolzgraben 16
             D-36132 Eiterfeld

hereby certify on our own and sole responsibility that the machines

Article Designation:		Article Numbers:
CNC-system GFV	**44/33**	**274400 8501 / 274400 8511**
CNC-system GFV	**44/73**	**274401 0001 / 274401 0011**
CNC-system GFV	**68/52**	**274504 0010 / 274504 4010**
CNC-system GFV	**102/62**	**274505 0010**
CNC-system GFV	**142/102**	**274506 0010 / 274506 4010**
CNC-system GFV	**142/162**	**274508 0010**
CNC-system GFV	**142/232**	**274507 0010**
CNC-system GFV	**142/222-0**	**274507 4010**

to which this Certificate refers have been developed, designed and manufactured
to comply with the

EC Directive 73/23/EEC   ~ 93/68/EEC
EC Directive 89/336/EEC   ~ 93/68/EEC
EC Directive 89/392/EEC   ~ 93/68/EEC

The following harmonised standards have been applied:

1. **EN 292 parts 1 and 2**
   Safety of machines, generic terms,
   general design directives

2. **EN 294**
   Safety distances against reaching danger-
   ous locations with the upper limbs

3. **EN 349**
   Safety of machines:
   - Minimum distances to avoid bruising of
     parts of the body

4. **EN 418**
   Safety of machines:
   - Emergency stop device, functional as-
     pects, design guidelines

5. **prEN 953**
   General demands on the design and of
   disconnecting protective devices

6. **prEN 954-1**
   Safety-related parts of control systems

7. **EN 60 204 part 1**
   Electrical equipment of industrial ma-
   chines, General requirements

8. **EN 55011 (VDE 0875)**
   Limit values and measuring methods for
   radio interference suppression of industri-
   al, scientific and medical HF devices (limit
   class B)

9. **EN 50082-1**
   Electromagnetic compatibility
   Basic Specification for noise emission
   Part 1: Living areas, business and trade-
            areas and small firms

10. **IEC 1000-4 (parts 2-5)**
    Testing and measuring methods for noise
    immunity

Eiterfeld, 25 Apr, 2001

Hugo Isert, General Partner