

KENOVA set line V9xx(-S)



Translation of the Original Operating Instructions KENOVA set line V9xx(-S)

BA - Version 1.0

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1 Product liability and warranty

1.1 General

These Operating Instructions are important in order to operate the appliance safely, correctly and efficiently. Observance of them assists in avoiding hazards, reducing repair costs and down times and increase the reliability and service life of the complete machine.

The Operating Instructions, in particular the Chapter “Safety”, must be read and applied by all persons who are commissioned to work with and on the appliance:

Operating

including setting up, fault rectification during the operating cycle, disposal of production waste, care, disposal of operating and consumable materials

Servicing

Maintenance, inspection, overhaul

Transport

In addition to the applicable regulations for accident prevention in the Operating Instructions and country of use, also observe the recognized technical regulations for safety and correct operation, as well as the respective workshop-specific regulations.

If uncertain, the company **KELCH GmbH** are gladly at your disposal for queries:

KELCH GmbH

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		640	Service
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Internet:			www.kelch.de

1.2 Warranty

It is anticipated that the appliance will remain efficient, safe to operate and operate accurately for many years. However, this can only be ensured when the rules for operation, maintenance and servicing are maintained.

During the warranty period, malfunctions that occur will be rectified by **KELCH GmbH** in accordance with the warranty conditions. All consequences of unauthorized conversions and modifications shall be incurred by the operating company. This is particularly applicable to modifications that impair the safety of the unit.

Warranty is exclusively accepted for **original spare parts**.

Contravening this results in **KELCH GmbH** declining all liability.

Immediately check the completeness of the delivery on receipt, according to the order confirmation / delivery note.

These Operating Instructions do not broaden the scope of the **KELCH GmbH** Terms and Conditions of Purchase and Delivery!

1.3 Servicing

It is highly recommended to keep a stock of the most important spare and expendable parts (refer to the Spare Parts List in the documentation file) at the location of use to maintain operational readiness of the appliance.

For comprehensive repair and overhaul tasks on the appliance, **KELCH GmbH** are at your disposal. For all written or telephone inquiries or orders, state:

The module affected

Serial number and **year of manufacture** of the appliance:

This data is located on the appliance nameplate.

1.4 Intended Use



Figure 1: Left: KENOVA set line V9xx with base frame and peripherals carrier, right: KENOVA set line V9xx-S with base frame and peripherals carrier

The tool setting device **KENOVA set line V9xx** is used for the gauging of tools. If you have decided on a **KENOVA set line V9xx(-S)**, the device can also be used to shrink tools in the shrink chuck provided for this purpose and cool this by means of a cooling system. With 'tool', we mean in the following the **complete tool**, i.e. a tool in its adapter.

The temperature of tools must correspond roughly to the room temperature. Especially tools, which have been previously heated up, must be cooled down before the gauging.

Use for any other purpose is considered to be an improper use. **KELCH GmbH** accept no liability for damage resulting from this. The risk shall be borne solely by the operator.

Intended use also includes observance of the Operating Instructions, as well as adherence to the inspection and maintenance intervals prescribed by **KELCH GmbH**.

1.5 Disposal of the appliance

Where possible, during the design of the appliance it was ensured that no composite materials were used. This design concept permits a high degree of hardware recycling after reaching the end of its service life. Thus, we also offer to take back the appliance for correct disposal at a fee. Moreover, we wish draw attention to the fact that the requirements of the electronic scrap provisions for disposal must be adhered to.

2 Safety

2.1 Warnings and hazard symbols

The following designations and symbols are used in these Operating Instructions for particularly important tasks:



Warning!

Danger of death or serious bodily injury!

By non-observance, risk of possible or direct serious injury or death.



Caution!

Risk of light bodily injury or damage to property!

By non-observance, low risk of bodily injury or damage to property!



Warning!

Warning of non-ionizing electromagnetic radiation!

Do not expose interference-sensitive appliances and persons with active and, in certain cases, also passive medical implants to the system electromagnetic field.



Warning!

Warning of hazardous electric voltage!

The appliance must not be used if damage occurs such as: loose cable connections, defective insulation, burnt cables and other damage that impairs the electrical safety of the appliance.



Warning!

Warning of toxic substances!

During shrinking, residual cooling lubricants, oils or greases can vaporize. Do not inhale oil mist! Oil mist is harmful to health and can contain carcinogenic substances.



Warning!

Warning of hot surface!

During the shrinking procedure, do not reach into the induction coil or take objects into the vicinity of the coil. Risk of injury due to burns from hot parts!



Warning!

Warning of explosive and combustible substances!

The shrink fit device (if present) must not be operated in potential fire or explosion environments or in the vicinity of combustible, flammable or explosive substances.



Warning!

Warning of being drawn in by rotating equipment!

Care has to be taken that no loose objects such as jewellery are worn when operating the machine. When filling the cooling system with cooling water, loose items can get caught up in the rotor of the cooling unit. The same applies to the rotational axis of the setting device.



Prohibited!

Prohibited for persons with medical implants!

Staff with active medical implants are not permitted to work with this appliance and, for safety reasons, must not go nearer than 3 m to the appliance.



Note!

Particular information as a reminder or something taken from our experience. For example as a tip, in order to carry out an action with particular efficiency.

2.2 Fundamental safety rules

The appliance is designed in accordance with state-of-the-art technology and applicable safety regulations.

All linear axes are fitted with Uhing shafts to prevent crushing as the linear axes slip at a force of approx. 80 N. For this reason, no particular protection measures such as automatic linear axis travel are necessary to prevent crushing.

Nevertheless, the appliance can pose special hazards if insufficiently trained personnel carry out the installation, the appliance is incorrectly used, or not used as intended.

Observe the following accident prevention regulations:

- The company accident prevention regulations
- UVV accident prevention regulations
- VDE safety regulations

2.3 Spare parts, accessories

Only accessories and spare parts authorized by **KELCH GmbH** must be used. Such parts have been checked and released by **KELCH GmbH**. Otherwise the active and passive safety of the appliance can be impaired!

KELCH GmbH excludes all liability and warranty claims for damage that occurs if original parts and accessories are not used.

2.4 Requirements on the operating and maintenance personnel

Before carrying out tasks, every person engaged with the setting up, installation, commissioning, operation and servicing of the appliance must have read and understood these Operating Instructions, in particular the **Chapters; “Safety” “Commissioning”** and **“Operating and setting the language”**. This applies in particular to persons who only occasionally carry out tasks on the appliance.

The operating company is obliged to instruct the operating and servicing personnel about operating and servicing the appliance, taking all safety regulations into consideration.

Only persons can be deployed to operate and service the appliance who have had the appropriate training for such tasks. This applies particularly to tasks on the electrical, pneumatic and mechanical equipment of the appliance.

Persons being trained, instructed or personnel within the framework of general training are permitted to carry out tasks on the appliance but only under constant supervision of an experienced person!

If more than one person carries out a task on the appliance, the responsibilities of the individual tasks must be clearly defined and adhered to. From a safety viewpoint, spheres of responsibility must be clearly defined!



Note!

Before carrying out special and servicing tasks, inform the operating personnel. Nominate a supervisor!

2.5 Safety measures

To avoid accidents, it is mandatory to observe the company **regulations!**

For operating personnel who work with the appliance, the following safety measures are **mandatory**:



Hands

Wear hand protection!

Possible sharp edges or swarf deposited on the tool can cause cuts. Furthermore, burns can come from the heated shrink chuck (if present).

Risk of injury due to crushing when inserting the tool.

Thus, wear protective gloves!



Feet

Wear foot protection!

A possible falling tool can cause injuries to the feet. Thus, wear safety shoes with steel toe caps!



Head

Wear head protection!

Fundamentally, if there is a risk of head injuries, in particular from falling objects, for assembly and disassembly procedures overhead, as well as for tasks using the crane, wear a safety helmet.



Eyes

Wear eye protection!

If there is a possibility of harmful influences, such as strong light, chemicals, swarf, oil or dirt, it is always recommended to wear safety goggles.



Hair

Wear a hair net!

Long hair can get caught, just as easily as necklaces, in rotating machinery such as the spindle of rotor of the cooling unit. So always wear a net to keep hair put of the way and remove any loose items such as jewellery.

2.6 Safety decals on the appliance

All safety and hazard instructions on the appliance must be maintained in a legible condition and be observed!



Warning!

Warning of non-ionizing electromagnetic radiation!

Do not expose interference-sensitive appliances and persons with active and, in certain cases, also passive medical implants to the electromagnetic field of the system.



Prohibited!

Prohibited for persons with medical implants!

Staff with active medical implants are not permitted to work with this appliance and, for safety reasons, must not go nearer than 3m to the appliance.



Warning!

Indirect danger to life in the switch cabinet!

The switch cabinet is constructed to current standards, also in terms of contact safety within the cabinet. Nevertheless, it would be possible with the help of suitable tools (e.g. measuring probes, screwdrivers) to make contact with voltages of 90 to 260 VAC!

The switch cabinet may therefore only be opened, when the device has been made potential free by opening the main switch. A key is necessary to open the safety lock.



Note!

The switch cabinet contains no operating elements or manually operable fuses. Opening the cabinet is therefore not necessary in the normal case.

2.7 Dangerous areas on the appliance and during operation

Item	Dangerous area	Hazard	Safety instructions
1	Tool	Cuts	Wear gloves
2	Take-up spindle	Crushing, danger of being drawn in	Avoid getting fingers jammed when inserting and loosening the tool! Wear clean gloves. No loose objects such as necklaces or other hanging jewellery may be worn as they can become jammed and draw the operator into the machine.
3	Induction coil (only with V9xx-S)	Electro- magnetic radiation	Do not permit persons with active (e.g. pacemaker) and, in certain cases, also passive medical implants, to work on this appliance, or allow interference-sensitive appliances to be exposed to the electromagnetic field of the system. For safety reasons, these persons must not go nearer than 3 m to the appliance.
4	Induction coil (only with V9xx-S)	Vapours harmful to health	During shrinking, residual cooling lubricants, oils or greases can vaporise or create dust. These vapours can contain carcinogenic substances and are harmful to health. Therefore keep a safe distance and do not inhale these!
5	Shrink chuck (only with V9xx-S)	Burns	Wear thermally insulating gloves
6	Cooling unit, motor housing, refrigerant pressure lines (only with V9xx-S)	Burns	Continuous operation can give rise to high temperatures on the motor housing and the refrigerant pressure lines. So always wear protective gloves when filling the unit.

Item	Dangerous area	Hazard	Safety instructions
7	Induction coil (only with V9xx-S)	Burns	Do not reach into the coil during heating. Do not allow objects (e.g. metal parts) to get into the induction coil.

Table 1: Dangerous areas on the appliance

2.8 Danger from electrical power /voltage



Warning! Indirect danger to life if the appliance is incorrectly handled!

- The appliance may not be operated if the housing is open.
- The appliance housing must only be opened by specialists from **KELCH GmbH!**
- The appliance must not be operated in a potentially explosive environment.
- The appliance may not be exposed to condensation or liquids.
- The device must be switched off immediately when damage such as the following occurs;
 - loose cable connections,
 - defective insulation,
 - burnt cables,
 - other damage that impairs the safety of the device.
- Pull out the main connector of the tool setting device / cooling unit (only with the V9xx-S) before performing any maintenance, cleaning or repair work!
- Electric shock still possible when the device is switched off. Wait for five minutes after switching off on all poles (capacitor charge!) before touching the equipment.
- Only operate again after all damage has been rectified.
- Electrical connection of the appliance to the mains supply, as well as carrying out tasks on the electrical equipment, must only be carried out by a qualified specialist. Thereby, observe the corresponding VDE guidelines and guidelines and regulations applicable at the location of installation.

2.8.1 Danger from electromagnetic radiation

When the system is used as intended, there are no electromagnetic radiation effects on the environment. If the induction heating is started with no shrink chuck in the coil, the magnetic field affects the immediate area in the coil.



Caution!

Risk of damage to property!

Do not bring any interference-sensitive devices into the vicinity of the system!



Prohibited!

Danger of injury!

Staff with active medical implants are not permitted to work with this appliance and, for safety reasons, must not go nearer than one metre to the appliance.



Warning!

Warning of toxic substances!

During shrinking, residual cooling lubricants, oils or greases can vaporize. Do not inhale oil mist! Oil mist is harmful to health and can contain carcinogenic substances.

2.9 Pneumatic supply

Work on the pneumatic system may only be carried out by specialists, taking the guidelines and regulations which apply at the installation site into consideration. If this is not complied with, **Kelch GmbH** will decline any liability.

2.9.1 Dangers arising from hydraulic and pneumatic power



Caution!

Risk of damage to property!

If damage to pressure hoses and pipes as well as screwed connections is detected (e.g. abrasion marks or leaks), the tool pre-setter with combined shrink fit must be switched off immediately and may not be brought into operation again till the defects have been remedied.



Caution!

Danger of injury!

Danger of injury from leaks of high-pressure media

2.9.2 Danger from lubricants



Warning!

Do not inhale oil mist!

Oil mist is harmful to health and can contain carcinogenic substances.



Warning!

Danger of slipping!

Hydraulic oils and lubricants on the floor and on machine parts can easily result in slipping. These, together with sharp tools, form a significant risk of injury. In order to prevent accidents, make sure of scrupulous cleanliness when handling these liquids.



Caution!

Danger of burns and scalding!

Caution when handling hot operating and auxiliary substances! When handling oils, greases and other chemical substances, observe the safety regulations applicable to the product!

2.10 Opening the housing

The tool setter housing may only be opened by specialists from KELCH GmbH! Contravening this results in KELCH GmbH declining all liability.

3 Commissioning

3.1 Transportation / Packaging / Storage

The appliance is dispatched in sturdy boxes. The considerable weight can result in injury if the box falls.



Caution!

Risk of injury!

If a box falls, it can cause injuries! Always make sure that the appliance stands firmly and is well secured during all stages of transportation!

Caution during unloading! It is essential to prevent knocks to machine components and that they are not dropped!

Make sure that the rated load capacity of the crane is sufficient!

Chains, ropes, hooks and lifting eyes must be fully serviceable and also designed for the weight of the appliance.

For the weight data, refer to the table in the Technical Data in these instructions. If there is no suitable hoisting equipment available, unloading must be carried out by an appropriate haulage company.

Do not lift the machine parts in jerks!

It is forbidden to remain below a suspended load, it is a danger to life!

Securing means must be installed for transportation.

If the appliance is delivered in the transportation container (shipping crate), all information required for unloading (hoisting points, crane load) must be printed on the outside of the crate.

If the appliance is sealed in film, the film must not be damaged during storage! Otherwise, warranty claims against **KELCH GmbH** are invalid!

3.2 Scope of delivery:

Upon receipt, immediately check the completeness of the delivery based on the dispatch documents and packaging lists. The haulage company is liable for any damage during transportation!

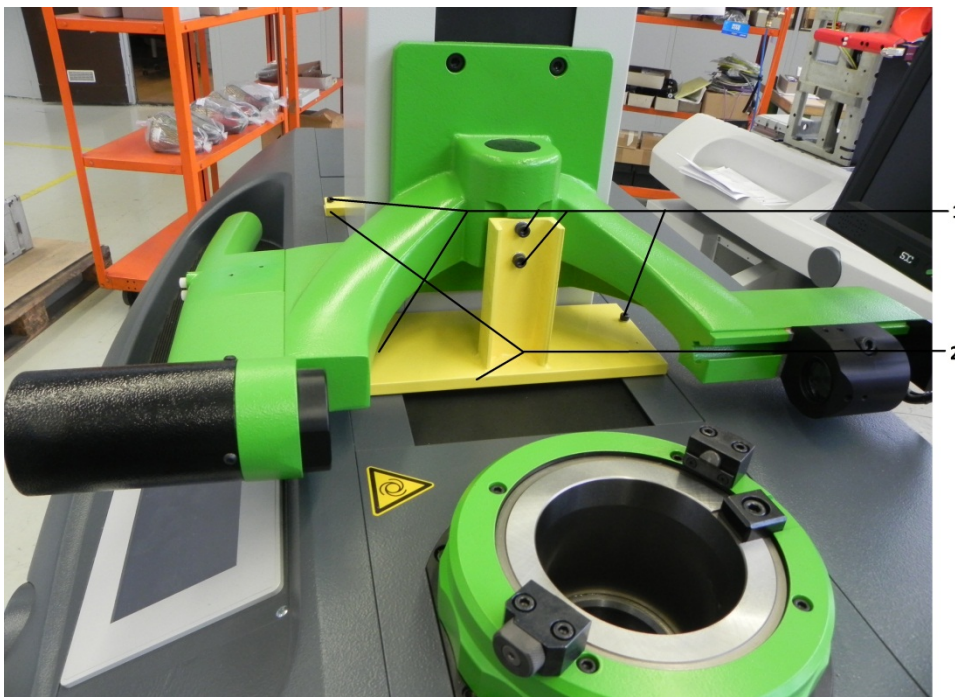
3.3 Securing for transport

To ensure secure transportation, the equipment is secured at three points; this is raised to four points in the case of the V9XX-S. The transport securing means must be removed before the commissioning is started. The order is important – first loosening the securing of the counterweight and then the removal of the other holding brackets.



1. Transport securing for counterweight (Z-axis)

Figure 2: Transport securing, counterweight



1. Fixing screws
2. Transport securing means for the axes

Figure 3: Transportation securing, axes

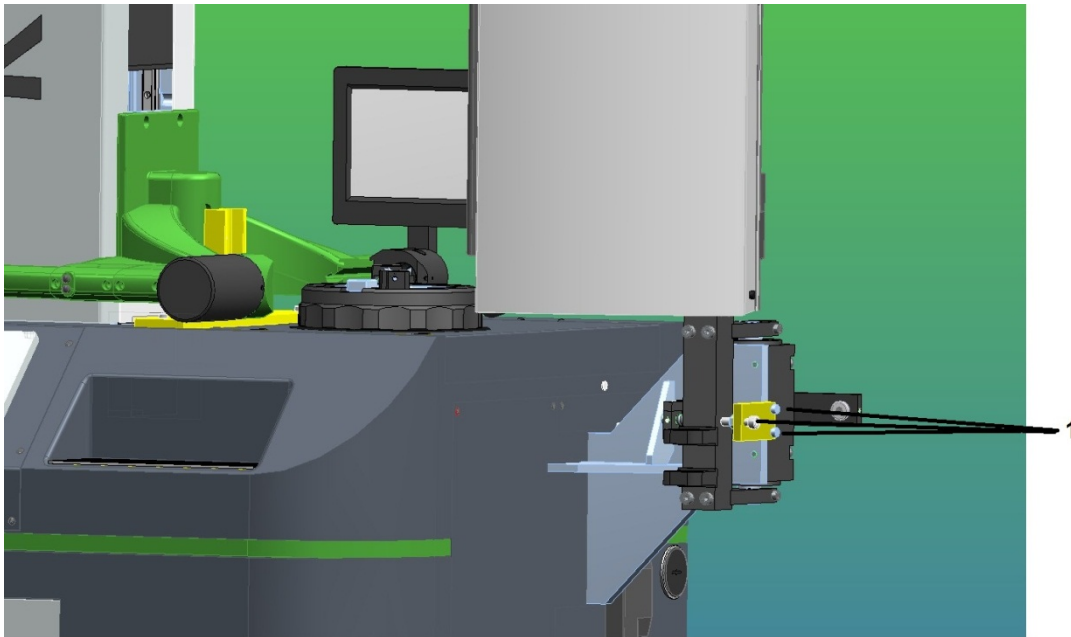


Figure 4: (1) Transport securing means of the shrink tower for the KENOVA set line V9xx-S

3.4 Installation

The machine as delivered is already assembled. Horizontal adjustment during the installation is necessary.

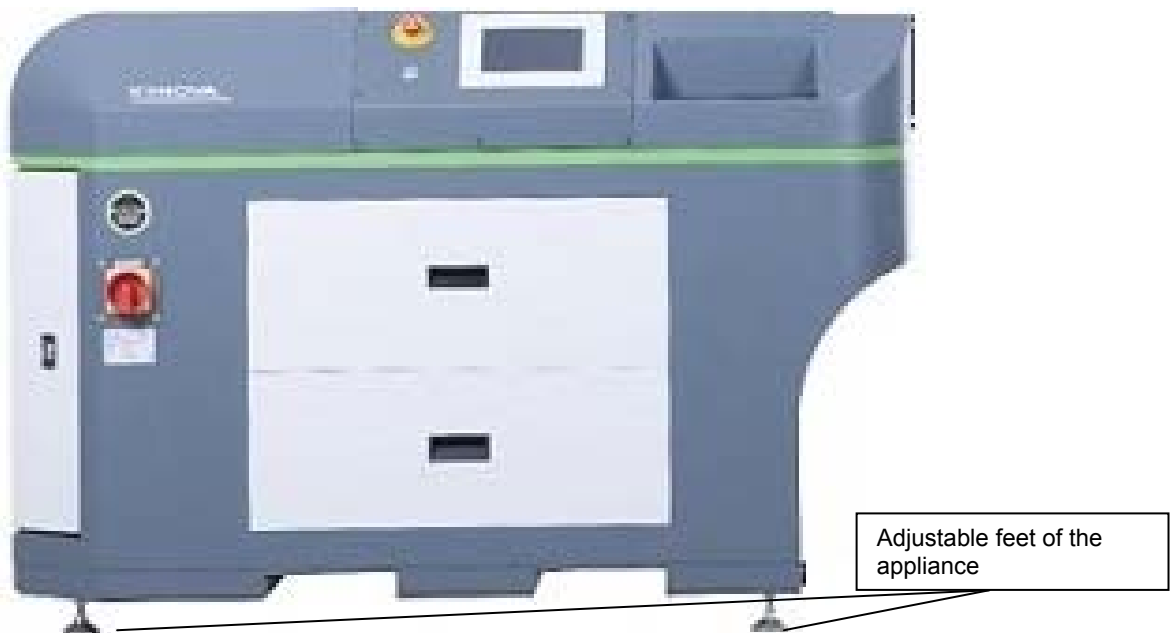


Figure 5: Base frame KENOVA set line V9xx(-S)



Note!

With the help of the adjustable feet and a spirit level on the flat surface of the spindle, ensure that the base is horizontal (0.05/1000 mm) in both directions (swing spirit level horizontally through 90 °).

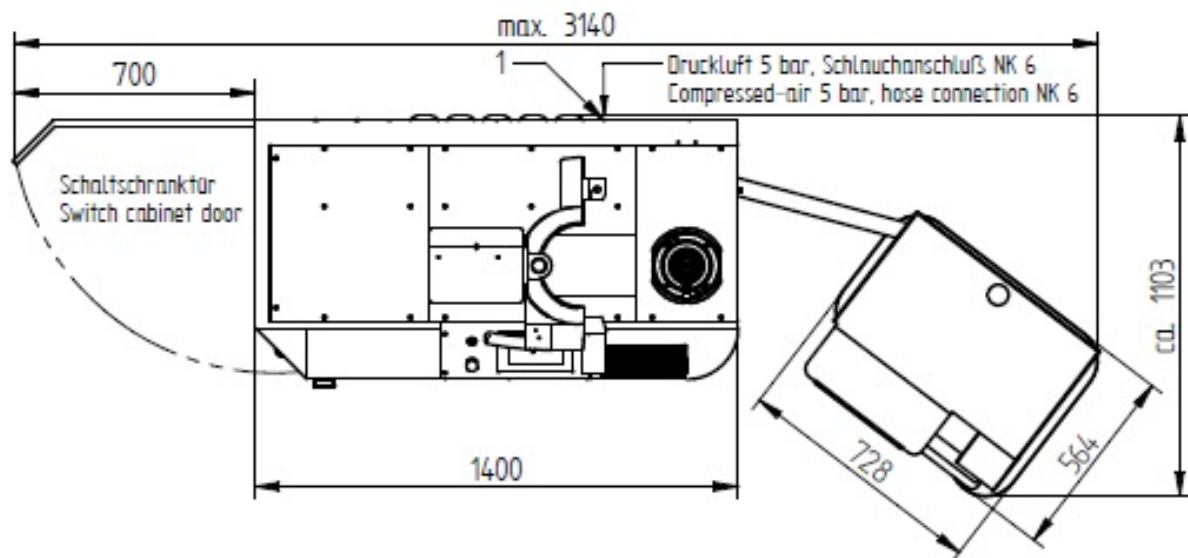


Figure 6: Schematic representation of KENOVA set line V9xx(-S)

Power cable to the KENOVA set line V9xx(-S):

Setter:

Europe single phase 1~, N, PE 230 V, 50 – 60 Hz; 2.5 kW (L1, N, PE),
3-pin earthed plug

England UK single phase 1~, N, PE 230 V, 13 A; 50 – 60 HZ, 1 kW,
3-pin PD1 – 13 A

USA single phase 1~, N, PE 115 V, 15 A, 50 – 60 Hz; 1.7 kW (L1, N, PE),
3-pin NEMA 5 – 15 P UL817/CSA22-2 (125 V / 15 A)

Induction coil (only in KENOVA set line V9xx-S variant):

Europe three-phase 3~ 400 V; 50 – 60 Hz; 11 kW (L1,L2,L3,PE)
Red 5-pin CEE plug, 16 A, 6h

USA three-phase 3~480 V; 50 – 60 Hz, 11 kW (L1,L2,L3,PE)
Black 5-pin CEE connector; 16 A, 6h

Cooling unit (only in KENOVA set line V9xx-S variant):

Europe single phase 1~, N, PE 230 V, 50 – 60 Hz; 1 kW (L1, N, PE),
3-pin earthed plug

England UK single phase 1~, N, PE 230 V, 13 A; 50 – 60 HZ, 1 kW,
3-pin PD1 – 13 A

USA single phase 1~, N, PE 115 V, 15 A, 50 – 60 Hz; 1.7 kW (L1, N, PE),
3-pin NEMA 5 – 15 P UL817/CSA22-2 (125 V / 15 A)

Cooling unit and induction coil can each be switched off via their own main switches

3.5 Pneumatic connection

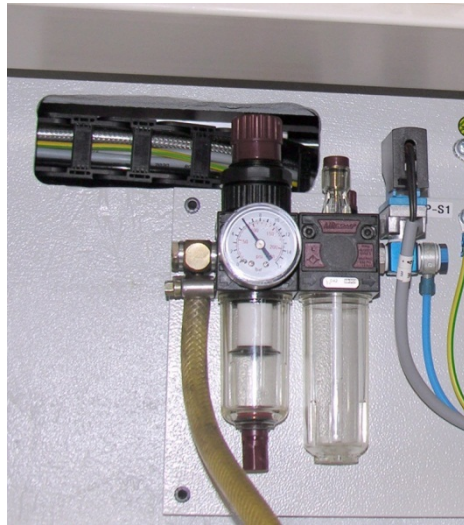


Figure 7: Maintenance unit with pressure reducer

- Connect the pneumatics connector to the compressed air supply (4-6 bar pre-cleaned, NK 6 hose connector with hose clamp)
- Set working pressure to 5 bar



Note!

The maintenance unit with filter and pressure control valve belong to the scope of supply. Do not add any oil!



Note!

You will find wiring diagrams and pneumatics diagram in the documentation folder for your KENOVA set line V9xx(-S)

3.6 Electrical connection

The device is connected via a country-specific (e.g. Europe/USA) connector to the mains supply of the workshop.

The ancillary devices (monitor, measurement control unit) are supplied via the peripherals carrier.



Note!

The main switch on the switch cabinet disconnects the entire equipment from the power supply.



Note!

Wiring diagrams and pneumatics diagram are to be found in the documentation folder for your KENOVA set line V9xx(-S).

Load ratings

Power supply 90 – 260 V, 47 – 60 Hz, grid standard back-up fuse 16 A, Load rating approx. 2 kW with PC and printer.

3.6.1 Connecting cables for the peripheral devices

The PC is already cabled up on delivery, the connecting cables for the peripheral devices are led out and labelled

3.6.2 Procedure when cabling up

- Make sure that the main switch is off.
- Position peripheral devices on the peripherals carrier (see cover page for example).
- Connect up the power cable to the peripheral devices to the mains. Follow the documentation on this that is supplied with the peripheral devices. Later, the peripheral devices are switched on together via the main switch.
- Connect the data cables, according to the labelling, with the peripheral devices.
- Connect the printer cable to the printer.
- Plug the low-voltage cable of the printer mains adapter into the printer.
- Put the power switch of the printer to “I” (On).
- Proceed in the same way with any other printers in the scope of supply.
- Connect the mouse and keyboard to the hub.
- Connect the power cable of the KENOVA set line V9xx(-S) to the mains.

3.7 Acceptance test

After the commissioning, the KENOVA set line V9xx(-S) must be checked by specialists from **Kelch GmbH** that the geometry has been adhered to. Adhesive maintenance labels and data protocol are then handed over.



Note!

Without a valid data protocol, **Kelch GmbH** assumes no responsibility for the specified measuring precision of the appliance!

4 Operating

4.1 General remarks on operating the electronic measuring equipment

- The electronic equipment is completely wired up
- Any connectors for the peripherals are located at the rear
- The electronic measurement equipment is fitted with interference suppression filters
- Measurement cables and other connectors are labelled precisely
- Do not install the tool setter in the immediate vicinity of:
 - o Spark erosion machines
 - o Electric welding systems
 - o Cable contactors and circuit breakers
 - o Electrostatic painting systems and similar facilities

4.2 Components

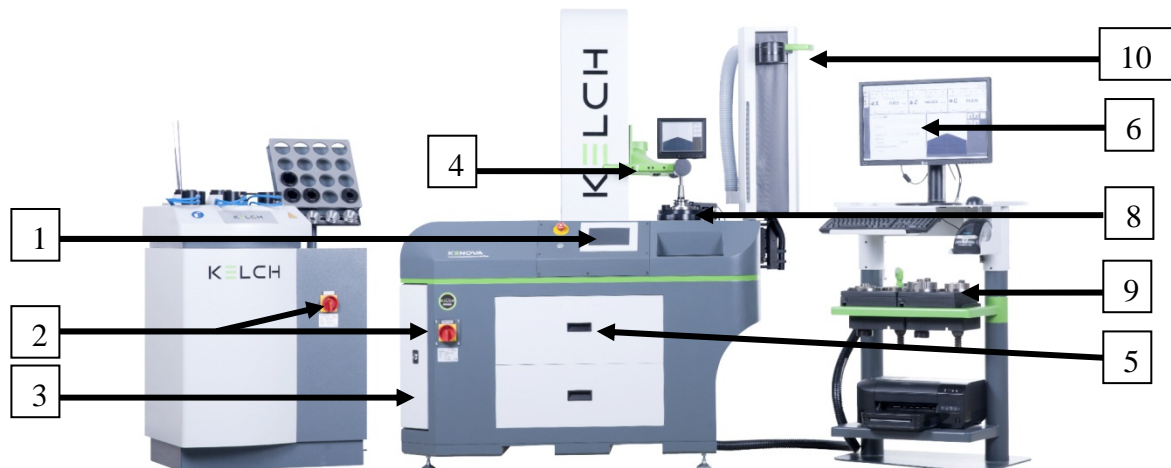


Figure 8: Components KENOVA set line V9xx(-S)

1. Operating panel with touch screen	6. Screen for measurement control unit
2. Main switch	7. Cooling system (only with V9xx-S)
3. Switch cabinet	8. Take-up spindle
4. Camera carrier with one-hand operation	9. Storage tray for spindle inserts
5. Drawer for storage	10. Shrink tower (only with V9xx-S)

4. Operating

4.3 Measuring

4.3.1 Operating panel

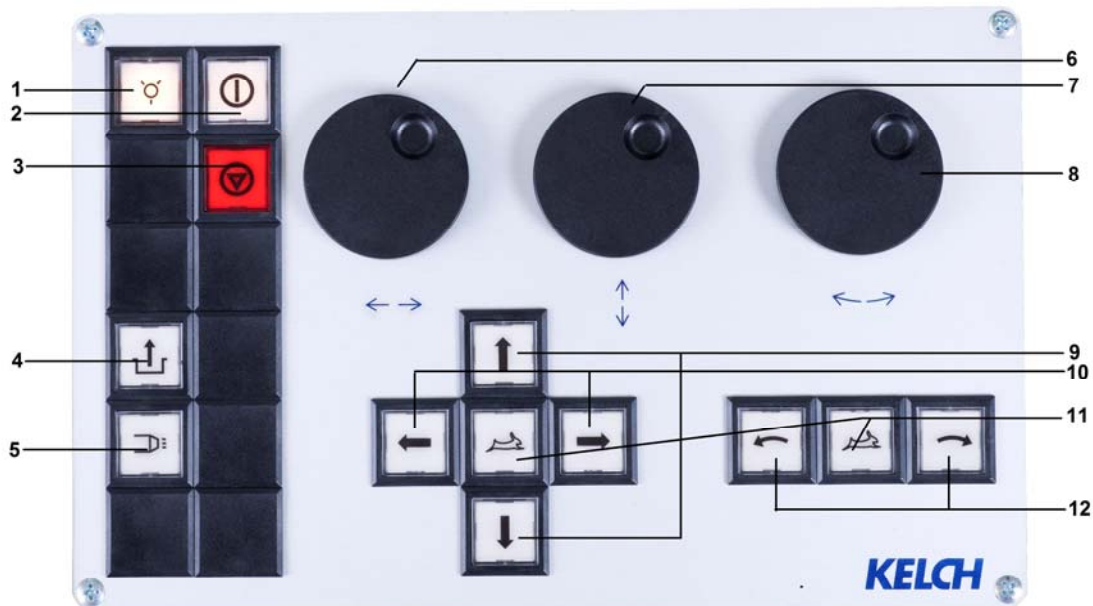


Figure 9: Operating elements of KENOVA set line V9xx(-S)

Functions of the buttons:

1	Tool clamping / releasing	7	Handwheel for fine adjustment Z-Axis
2	Lamp test	8	Handwheel for fine adjustment C-Axis
3	Axis Stop	9	Navigation buttons for Z-Axis
4	Activate / release spindle brake	10	Navigation buttons for X-Axis
5	Blow the tool out of the spindle to facilitate the removal of the complete tool	11	Additional button for fast movement of Axis
6	Handwheel for fine adjustment X-Axis	12	Navigation buttons for C-Axis

4.3.2 Axis travel

The axes of the KENOVA set line V9xx(-S) can be moved in number of different ways:

- Manual driving of the linear axes with the selective one-hand operation:
 - o The upper button (on the camera carrier) releases only the Z-axis
 - o The lower button (on the camera carrier) releases only the X-axis
 - o Both buttons can also be pressed simultaneously
- Manual rotation of the C-axis (spindle)
 - o Release of the spindle with the button “release spindle coupling” allows this to be rotated to any desired position

- Motor-driven axis travel
 - o Both the linear axes and the C-axis can be driven by operating the travel axes
 - o Pressing the “Fast” button together with the appropriate axis button causes the movement to be made rapidly
- Manual fine adjustment
 - o All motor-driven axes can be moved by operating the electronic hand wheels. This is particularly useful in fine adjustment as the linear axes move in the μm range.

4.3.3 Travel to reference points

The reference points of the axes are driven over after each restart of the setter appliance. This is done as follows:

- Put the main switch of the tool presetter to On
- Drive all three axes over the reference marks: Move the axes by 50 mm in each direction, up/down and left/right, and a half-turn for the rotation axis. This can be done manually or motor-driven.
- If the device – on switching off – is automatically driven to the park position, the reference points can also be automatically driven over. The appropriate prompt for this is to be confirmed with OK.

4.3.4 Clamping and releasing the tool

The KENOVA set line V9xx(-S) setter is fitted with a modular precision spindle. It is fitted with the insertion module for a particular tool size. The insertion modules can be exchanged; to do this, proceed as follows:

- Clean the adapter spindle, insertion module and tool
- Insert the tool, making sure of the correct groove position
- Press the “Clamp tool” button
- To release the tool, the operation can be assisted by the use of compressed air (“Release tool” button)

4.3.5 Camera carrier

KENOVA set line V9xx(-S) is supplied with a camera system.

The camera/optics carrier is so positioned during a measuring operation that the edge of the tool to be measured lies between the light source and the measuring optics.

The operation of the measurement control unit is described in a separate set of operating instructions.

4.3.6 Camera



Figure 10: Camera components

- | | |
|---------------------------------------|-------------------------------|
| 1 Camera/optics carrier | 4 CMOS camera with ring light |
| 2 Handle for quick adjustment of X, Z | 5 Back light |
| 3 Release buttons X, Z | |

With the camera, the checking of the measurement position is made via the screen of the measurement control unit. With the suitable choice of measurement program, it suffices to position the measured edge in the display range, then the edges can be automatically determined by the image processing software.



Note!

Here, observe the operating instructions for the measurement control unit!

4.3.7 Measurement preparation

- Drive the X-axis out of the range of the tool so that the working area is free.
- Ensure that the adapter sleeve matching the tool is used and that the correct adapter is selected for the measurement control unit (see “Store adapter”, Page 28).
- Various types of adapters, from simple reductions to adapters for non-rotating tools of the VDI type fit into the spindle.



Figure 11: Insertion of the tool (here an setting mandrel)

1. Tool
2. Adapter



Caution!

Possible damage to the setting drive!

Swarf, sand and other dirt can damage the setting drives for the X- and Z-axes.



Note!

Keep contact surfaces between tool (1) and adapter sleeve (2) absolutely clean!

The slightest dirt makes the measurement result unusable!



Note!

Measurement error due to thermal expansion can be avoided, when the tool is at the ambient temperature.

- Make sure that the main switch is On.
- Insert the tool from above into the adapter sleeve. When doing this, ensure that no swarf or other dirt gets onto the setter!

**Caution!****Inexpert operation can lead to personal injury and damage to equipment!**

Especially when the camera/optics carrier is in motion. Ensure that the entire path for the movement is unobstructed! To avoid injury from getting caught, do not reach into the path of motion! Objects that get caught can be destroyed and lead to damage of the setting drive of the appliance!

- Position and lock the tool with the help of the buttons on the operating panel (see also “Components”, Page 21):
 - The **Spindle brake** button switches the spindle brake on and off
 - The **Indexing** button switches the indexing (90° steps) of the spindle on/off
 - The **Spindle coupling** button releases the coupling of the spindle

**Caution!****Damage to the spindle is possible!**

Only rotate the engaged (clicked-in) spindle further when in the **Indexing** position!

- Rotate tool to the measuring position. In this, rotate the cutting edge (the ball in the example) into the sharp plane (X-direction).
- Fix the adapter with the help of the **Spindle brake** and **Indexing** buttons.
- *You can now measure the tool.*

4.4 Shrinking and setting (only with V9xx-S)

The KENOVA set line V9xx-S has a shrink tower, an associated cooling system and a fourth axis, the Y-axis. These components are used to set the tools in the length. This can take place in the cold condition – with hydro expansion chucks for example – but also by the addition of induction heating with shrink chucks

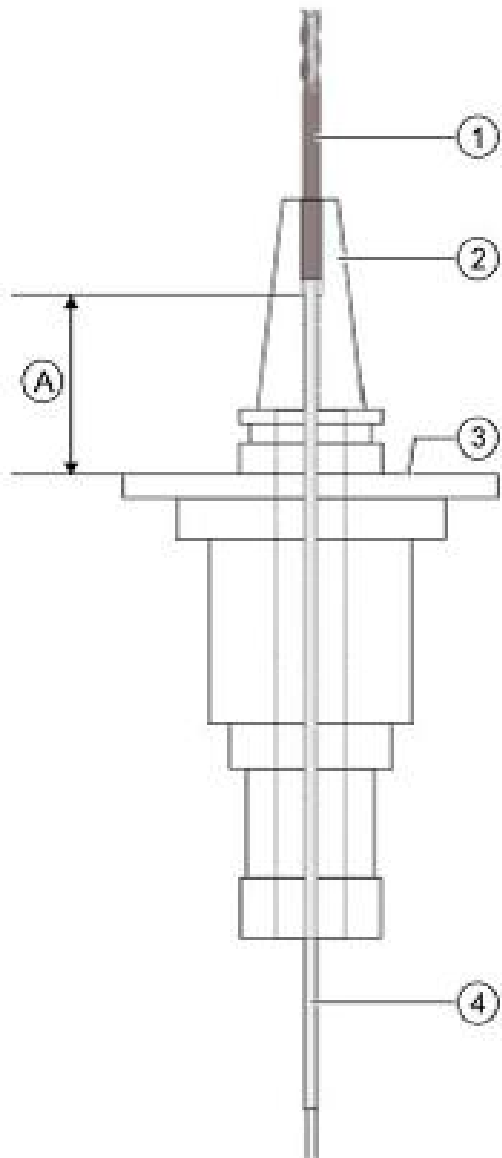
**Caution!****Possible damage to chuck and spindle!**

After the inductive shrink operation, the heated-up tool must be removed from the spindle as quickly as possible, even when the shrinking process was not successful. The shrink attempt can only be repeated when the shrink chuck has cooled down. Otherwise there is a risk of danger to the precision spindle. In addition, heat-resistant gloves must always be worn.

**Note!**

All shrink chucks acc. to DIN 69882-8, Form G can be shrunk and set to length. Other chucks require separate shrink parameters.

4.4.1 Length adjustment with end-stop pin



1. Tool
 2. Shrink depth of the tool
 3. Insertion module
 4. End-stop pin
- A. A-dimension shrink chuck

Figure 12: Length adjustment with end-stop pin

5 Maintenance and care

5.1 Safety measures

The following fundamental safety precautions have to be taken before beginning maintenance and repair work:

- Positioning the tool adapter so that the area to be worked on can be accessed without problem.
- If necessary, provide support for vertical slides and similar machine parts.
- Switch off the machine.
- Switch off at the main switch secure with a padlock against inadvertent restarting.
- Also switch off any external power supplies, if present.
- Depressurise hydraulic and pneumatic systems.
- Cordon off a generous repair area as required!

During repair work:

- It should not be possible for movements to be carried out
- Media under pressure should not be present
- All electrical elements should be at zero potential

Maintenance and repair work may only be carried out by persons who have had expert training in the type of work to be carried out.

The setting, maintenance and inspection work at the prescribed intervals specified in these instructions for the replacement of operational materials and consumables are to be adhered to!

Before carrying out special and servicing tasks, inform the operating personnel. Nominate a supervisor!

When replacing larger modules, carefully fix and secure these to lifting gear.

The safety regulations in Chapter "Transport/packaging/storing" on Page 29 are to be observed!

For erection work above head-height, use ladders etc. provided, or any other safe means for ascent, and working platforms. Do not use parts of the machine as aids to climbing up!

Wear safety harness when carrying out maintenance work at a greater height. Keep all handles, railings, platforms, staging and ladders free from dirt and lubricants!

To carry out maintenance, workshop equipment adequate for the work is absolutely necessary.

Once the maintenance and repair work is finished, always tighten any screw connections that have become loose!

If protective cladding and safety devices have been removed to allow maintenance and repair work to be carried out, these must be replaced immediately after the work has been completed and checked that they are in working order. Before returning control to the operating personnel, i.e. switching from manual to automatic mode, all keys are to be withdrawn from the operating panel and taken into safekeeping!

This safety measure ensures that the machine functions cannot be activated by unauthorised persons.

5.2 Inspection

To detect possible occurrence of damage in good time and ensure uninterrupted production, a monthly visual inspection of the operational sequences is necessary.

5.3 Cleaning

Make sure that the functional parts on the appliance remain clear of swarf.

The functioning of the appliance can be ensured by regularly cleaning the appliance using a soft, lint-free cloth and lubricating metal surfaces with a little preservative agent such as silicone oil. A cold-cleaning agent is preferred for cleaning the machine components

For conspicuous contamination, cleaning can also be carried out using commercial glass cleaner.

Machine components, when delivered, are covered with a corrosion protection.

Chlorinated hydrocarbons such as PER, TRI or similar may not be used to clean machine components or remove the corrosion protection.



Caution!

Risk of damaging the appliance

Under no circumstances use a steam jet, water jet or compressed air! Here, there is the risk that contamination and cleaning agent can penetrate into the guides and seals. This can cause functions – in particular safety functions, limit switches or measurement systems – to be disabled.



Caution!

Danger of fire

If benzine is used, the cleaning must take place outdoors and special precautions must be taken.



Note!

The cleaning liquid that runs off must be collected and professionally disposed of.

5.4 Maintenance

All roller bearings have sealed-for-life lubrication.

Any grease nipples that may still be present are standard elements on the corresponding components. Further greasing is however not necessary because of the low loading. We recommend having maintenance work carried out by KELCH specialists to enable the expectations for long-term precision and outstanding quality to be met.



Note!

The yearly maintenance work may only be carried out by Kelch GmbH specialists!

Pressure hoses and lines as well as their screw fittings are to be inspected for damage at regular intervals and be replaced without delay – even at the slightest signs of damage.

5.4.1 Servicing Schedule

Copy the following servicing schedule and use it as a check list. At the end of the work, date and sign the filled-in page and save as a work report.

Maintenance Work	Servicing Interval					Result	
	Daily	Weekly	Monthly	Yearly	Every 2 years	OK	not OK
Check protective cover	X						
Check guide cover bands for damage	X						
Check the maintenance unit setting (5 bar)	X						
Inspect air lines and valves for seal tightness		X					
Clean or replace air filter (PC)			X				
Check the ropes, pulleys and axles of the counterweight for damage. Replace damaged components				X			
Check the run-out of the adapter				X			
Check the parallelism of the tapered holder to the longitudinal guide.				X			
Check the focus adjustment of the camera				X			
Check the setting of the light source; readjust if necessary.				X			
Check the rope of the counterweight. Check the shaft and pulley for wear. Replace parts if worn					X		
Inspect induction coil for damage			X				

Lack of, or poorly performed, maintenance of the system can have the following effect:

- Reduced operational reliability
- Unnecessary standstills
- Avoidable repair costs
- Shortened service life

We recommend that maintenance be carried out by specialists from Kelch GmbH

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Date: _____ Signature: _____

6 Technical Data

Designation		Data of KENOVA set line V9xx(-S)
Measurement range	Z-axis	0 to 400 / 600 / 800 / 1000 mm
	X-axis	- 50 to 430/ 530 / 830 / 1030 mm
Tool adapter		Modular precision spindle or universal tool spindle
Cutting edge scanning		Kelch MEGAVISION
Measurement control unit		EASY on the basis of an Industry-PC
Drive		4-axis CNC (X, Z, C → Rotation, Y)
Quick adjustment		CNC motor-driven or selective one-hand operation
Fine adjustment		μ-precision with CNC
Travel speed		< 2 m /sec, C-axis 8 rpm
Compressed air supply		4 - 6 bar, NK6 connection
Power supply		90 - 260 V, 50 / 60 Hz
Noise		Less than 70 dB(A)
Ambient temperature for storage		0 - 45 °C
Ambient temperature for operation		21 °C ± 1 °C
Relative air humidity		≤ 80 %
Space required	Width	2100 mm
Space required	Depth	1100 mm
Space required	Height	1800 mm (with 400 mm tower)
Space required	Height	2000 mm (with 600 mm tower)
Space required	Height	2200 mm (with 800 mm tower)
Space required	Height	2400 mm (with 1000 mm tower)
Weight		V9xx approx. 1200 kg, V9xx-S approx. 1400 kg
Ingress protection, appliance		IP 20
Ingress protection, operating panel		IP 54
Ingress protection, switch cabinet		IP 54

Table 2: Technical data of KENOVA set line V9xx(-S)