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Operating Instructions

J630D
## Delivery data

<table>
<thead>
<tr>
<th>Model:</th>
<th>Surface and profile grinding machine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>J630D</td>
</tr>
<tr>
<td>Machine number:</td>
<td></td>
</tr>
<tr>
<td>Order number:</td>
<td></td>
</tr>
<tr>
<td>Registration number:</td>
<td>04-07-2002</td>
</tr>
</tbody>
</table>

## Customer data

| Inventory number: |                                      |
| Location:         |                                      |

## Manufacturer’s address

K. Jung GmbH  
Jahnstraße 80-82, 73037 Göppingen  
Postfach 640, 73006 Göppingen  
Germany  
Telephone: +49 (0)7161/612-0  
Telefax: +49 (0)7161/612-213

## Spare parts and customer service

See address above  
Service Department  
Telephone: +49 (0)7161/612-224  
Telefax: +49 (0)7161/612-169  
Hotline: +49 (0)7161/612-131 or +49 (0)7161/612-207  
Spare parts: +49 (0)7161/612-125  
Overhauls / repairs: +49 (0)7161/612-151
Dear customer,

The machine you just have purchased is a quality product from K.Jung GmbH.

The aim of these Operating Instructions is to help familiarize you with the machine and the various applications for which it is intended.

The relevant national requirements relating to accident prevention and environmental protection must also be heeded in addition to the instructions contained in these Operating Instructions. The respective legally binding rules and regulations governing safe and proper work practices in the country in which the machine is used, as well as at its operating location, must likewise be observed.

The owner of the machine must prepare Instructions for Use in accordance with UVV ZH I/172 (Safety Through Instructions), taking account of the technical documentation and all statutory requirements.

The descriptions and specifications contained in these Operating Instructions are subject to change in the event of technical modifications that are necessary to improve the machine.

The electrical documentation can be found in the control cubicle of the machine.

We want to know what you think:

We continuously strive to improve the quality and safety of our products, including the Operating Instructions supplied with our machines. Please notify us of any defects or errors you discover in our products.

You can send us your comments, criticisms or suggestions for improvements by post or by fax. Please use the form contained in the Appendix.
0.1 Safety of the machine

The J630D machine has been designed in line with the present state of the art in engineering as well as generally recognized safety rules and regulations. It complies with the EU Machinery Directive. The X-radiation generated by the monitor is adequately shielded in accordance with statutory requirements. Nevertheless, the risk of personal injury (or in extreme cases death) to the operator or third parties as well as damage to the machine or other equipment cannot be ruled out completely.

The machine is equipped with various safety devices intended to protect the user and other persons. Safe operation is not dependent on mechanical / electrical functions alone however, but also on

- Your own sense of personal responsibility
- Correct handling in accordance with regulations
0.2 Measures to be taken in the event of damage incurred during transit

Any damage to the exterior or losses must be recorded in the appropriate manner on the freight note before the machine/system is accepted and reported immediately to the insurer and K.Jung GmbH.

In the event of damage that has occurred not being detected until the machine/system is unpacked, leave the machine/system as you found it and notify the carrier in writing that confirmation of the damage incurred is required. Complaints in this case must be made within 6 days of receiving the consignment.
0.3 General terms and conditions of delivery

Prices
We reserve the right to charge the prices valid on the day of delivery.

Reservation of title
We retain full title to all deliveries pending settlement of all payments due on this supply contract. Our deliveries may only be pledged subsequent to full payment of all claims arising from the delivery.

Passage of risk
The risk for our delivery shall pass to the ordering party immediately following dispatch of the delivery from the works, including in those cases in which carriage prepaid delivery is agreed. Should shipment be delayed at the request of the ordering party, the full risk shall pass to our customer on the day on which readiness for dispatch is notified.

Liability for defective delivery
We provide a 6-month warranty on all deliveries made by us, whereby we undertake to remedy all defects and damages to the supplied goods at no charge, to the extent that such defects and damages are verifiably caused by defective materials or faulty work performed in the workshop. The 6-month warranty period always commences on the day on which the risk passes to the customer.

JUNG spare parts installed by other companies or by the customer are not subject to warranty or warranty claims.

Special conditions for new machines
We furnish a full 12-month warranty on all new JUNG grinding machines delivered for one-shift operation up to a maximum of 2000 operating hours. The warranty period shall terminate as soon as the stipulated number of operating hours has been exceeded.

We shall repair defects and damages to our new machines at no charge within the warranty period.

The warranty period always commences on the day on which the risk passes to the customer; should machines be commissioned by K. JUNG Service, this is the day on which the commissioned machinery is transferred to the customer.

General limitations
All defects detected shall be notified to us immediately.

No warranty is assumed under any circumstances for ensuing damages or for damages due to extraneous causes. No warranty is assumed, goodwill services due, extended liability applicable or compensation paid for defects and damages arising as a result of improper operation. This disclaimer also applies to defects arising due to the use of incorrect technology, unsuitable tools, coolants and machining parameters or ambient temperature or vibration conditions which prevent the machinery from functioning or being used to the required level of precision. Notwithstanding the customer’s right to rectification of defects at no charge, the customer shall not be entitled to assert any claims or rights on the basis of disadvantages suffered, regardless of the legal standing of the same. Our warranty
expires as soon as the customer takes action to remedy an identified defect itself

to the extent that such action is undertaken without the written authorization of K.
JUNG GmbH. This applies in particular to manipulation of the operating hours me-
ter. In such cases, all reworking costs incurred as a result shall be borne by the

customer and performance of the requisite work shall be contingent on written
acknowledgment of this proviso.

The successful operation of the supplied machinery is dependent on the deploy-
ment of specialist trained operators and regular professional maintenance and

servicing appropriate to the specific use made of the machinery. The customer be-
ars sole responsibility for selecting the correct machining technology as well as for

high-quality machining results.

Other provisions

Warranty rights only apply to the agreed place of delivery and may not be trans-
ferred to third parties. Installation and customer service work is subject exclusively
to our general installation terms, conditions and rates. We will gladly send details
on request. Unless otherwise agreed in writing, all further details are governed by
the latest version of our Terms and Conditions of Delivery VDW 502 / ORGALIME
/ ECE or INCOTERMS. These Terms and Conditions of Delivery are thus a con-
stituent part of the purchase or supply contract and no other terms and conditions
are recognized by us.

K.JUNG GmbH
1. Safety

1.1 Symbols used in these Operating Instructions

⚠️ **Warning**

*Draws attention to a potentially dangerous situation which could result in serious personal injury or death.*

⚠️ **Caution**

*Draws attention to a potentially dangerous situation which could result in minor personal injury. This symbol is also used if there is a risk of damage to the machine or equipment.*

 предостережение

**Important**

*Draws attention to a potentially problematic situation in which either the product itself or an object in its vicinity could be damaged.*

*Also used to indicate important information.*

**Information**

*Instructions for using the machine or other useful information.*
1.2 Use for the intended purpose

The surface and profile grinding machine is a machine tool which is installed at a fixed location (stationary grinding machine). It is designed solely for machining workpieces with suitable grinding wheels. The grinding wheel and the workpiece are continuous path-controlled, in other words the grinding process is positively guided. The workpieces must be secured in position on the machine table using suitable clamping devices, and appropriate steps taken to prevent them from moving, slipping or flying off. Failure to take such precautions means you run the risk of the grinding wheel bursting as a result of workpieces toppling over or flying off. In addition, workpieces or wheel fragments may be catapulted out of the machine's working envelope.

'Use for the intended purpose' also includes:
- Careful attention to the instructions contained in the Operating Instructions, and in particular to all other information provided in the safety section and on the machine's safety plates.
- Compliance with all national and international safety and protection regulations, standards, codes of practice and statutory requirements applicable to activities of any kind on or with the machine.
- Observance of all servicing and maintenance intervals.

All other forms of use which deviate from the above, and in particular failure to heed the information contained in the Operating Instructions or comply with the statutory requirements for machine owners as well as with any other safety regulations, are considered to be contrary to the intended purpose.

Dressing the grinding wheels with a manually guided diamond is not considered to be in accordance with the intended purpose of the machine.

Workpieces must not under any circumstances be positioned at the grinding wheel by hand, for example in order to grind the edges as with a grinding pedestal.

**Warning**

**Misuse or use contrary to the intended purpose can result in either the machine itself and/or products in its vicinity being damaged or destroyed. Personal injury or, in extreme cases, death may ensue if the danger zone around the machine is not kept clear.**

**Important**

No liability for injuries to persons or damage to property of any kind will be assumed by the manufacturer if the machine:

- is not used in accordance with its intended purpose,
- is not maintained correctly or adequately,
- is not operated correctly,
- is operated or used by persons without suitable qualifications,
- is not operated in accordance with the safety instructions contained in this section and in the other relevant sections of the Operating Instructions.
1.3 General safety regulations

No liability will be assumed by the manufacturer, and no claims for damages accepted, if the machine is operated incorrectly or if the safety regulations are ignored. The owner of the machine will be held solely responsible for any damage or injury that may ensue in this case.

When delivered, the machine conforms to the EU Machinery Directive and is safe to operate.

Always operate the machine in accordance with its intended purpose and only in perfect condition, while maintaining an appropriate awareness of the safety aspects and risks associated with it and heeding the information contained in the Operating Instructions.

Heed all safety information and warnings and make sure that the safety plates on the machine are always legible. These safety plates must be inspected by the safety officer appointed by the machine owner when the machine is accepted, to ensure that they are complete. Any deficiencies must be notified to the manufacturer immediately. The machine is not allowed to be started up until these deficiencies have been rectified.

The mechanical design, the software, the control systems and all other parts or features of the machine are not allowed to be modified without the prior written approval of the manufacturer, or the latter will no longer be liable for any damage that may result (see EU Machinery Directive).

The operator must be suitably qualified and be familiar with, among other things, the following procedures:
- Aligning and clamping workpieces or fixtures
- Setting up, operating and monitoring the grinding machine
- Selecting and using grinding wheels
- Fastening and dressing grinding wheels
- Entering workpiece machining data and optimizing the machining process
- Special hazard precautions and safety requirements
- Any special procedures or machining processes which are necessary

All persons who are required to transport, repair, maintain or operate the machine, or to carry out any other form of activity in connection with it, must have the appropriate competence and authorization and be suitably trained and familiar. All persons charged with carrying out activities of any kind either on or with the machine must also be aware of the hazards arising from these activities and know how to avoid them.

The owner of the machine is under an obligation to check that the safety instructions and the information regarding potential hazards outlined in these Operating Instructions are heeded by all machine operators.

The owner of the machine must designate one person to bear overall responsibility for it. This person must be given the necessary competence to refuse to comply with instructions from third parties should they be liable to endanger safety.

During a grinding cycle, the machine is only allowed to be operated by one person. Only this one operator is allowed to remain inside the working envelope of the machine.
Dangerous situations can arise when the machine table of an open-type machine is extended laterally in the X-axis. You are liable to suffer bruising or other types of injury. You can avoid such situations by marking the danger zone on the floor on either side of the machine. There must be a safety clearance of at least 19.7 inch on both sides between the fully extended machine table and the wall or any other objects or machines. No objects of any kind are allowed to be set down inside this zone, nor are any persons permitted to stand in it while the machine is operating.

1.3.1 Important information about the Operating Instructions

It is imperative that these Operating Instructions (including the transportation instructions, installation instructions, maintenance instructions and operating instructions) be

- read carefully and
- understood

by the operator before the machine is transported, operated, maintained, repaired or used in any other way in accordance with its intended purpose. In the event that the machine operator does not fully understand any part of the Operating Instructions or the safety information, he or she must consult with the manufacturer immediately.

Please study both the "Safety" section and the safety information contained in all other sections carefully. Heed the instructions they contain at all times.

We recommend that you, as the owner of the machine, request conformation of this in writing (using the form contained in the Appendix).

Make sure you are familiar with the safety instructions for the machine prior to using it. Study and heed the information contained in the Operating Instructions, as well as all generally valid statutory and non-statutory requirements concerning safe operation of the machine. Dangerous situations can arise for all persons or objects present in the machine's working envelope if the machine is used incorrectly or contrary to its intended purpose, or if the information contained in the Operating Instructions is not heeded.

Moreover, the recognized rules, practices and legislation relating to occupational safety must be studied and heeded.

The Operating Instructions must be kept close to the machine throughout their entire service life.

The Operating Instructions must be readily available to all operating personnel at all times. We recommend that they be kept directly at the machine.

If the machine later undergoes a change of ownership, the Operating Instructions must be passed on without fail to the new owner, to whom their importance should be stressed. Furthermore, it is vital for these Operating Instructions to be made available without restriction, and their importance stressed, if a different operator works on the machine or if it is loaned to other persons.
1.3.2 Protective and safety equipment

All machine parts, and in particular all safety and protective devices which are capable of being dismantled, are only allowed to be dismantled after the machine has been switched off and suitable steps taken to prevent it from being switched on again accidentally. The machine must not be started up again until all dismantled parts have been re-installed completely and properly, and checked to ensure that they are functioning correctly.

**Never operate the machine:**
- **Without the safety and protective devices**
- **With the safety and protective devices deactivated or otherwise bypassed**

The machine must always be operated with the safety guard and the guard doors closed.

1.3.3 Transport

All national statutory requirements must be studied and heeded in the event that the machine needs to be transported (e.g. accident prevention regulations).

Study and heed the original instructions provided by the manufacturer before transporting accessories or other items of equipment (e.g. coolant systems, clamping fixtures, extraction devices, dividing heads, etc.).

The machine is only allowed to be transported by persons who are competent, trained, experienced and reliable. A further person should always be present to marshal the transport (either visible to or at the very least within hearing range of the driver).

Drain off all liquids (e.g. coolants and oils) in accordance with the statutory conditions and regulations applicable in your particular country prior to transporting the machine, bearing in mind the need to comply with environmental protection requirements.

Suitable protective equipment, e.g. a helmet and safety shoes, must be worn at all times.

Do not stand underneath suspended or raised loads.

Always use a suitable means of transportation which is in perfect technical condition and has a sufficient lifting capacity.

Check the transport harness for damage before attaching it to the machine. Never use a harness which is damaged, defective, severely fouled by oil or dirty.
1.3.4 Commissioning

The machine is only allowed to be installed and connected by competent, authorized persons with appropriate experience. The manufacturer cannot under any circumstances be held liable for damage resulting from inexpert installation. Please also study and heed the original manuals for all accessories and other optional equipment.

The electrical connections must always be made by a competent and qualified electrician in accordance with the local regulations applicable in the country in which the machine is to be used as well as with the generally recognized rules of sound electrical practice.

1.3.5 Machining

The machine is not suitable for grinding materials which are liable to generate a risk of fire or explosion. If in doubt, you must request further information from your local government agencies / public authorities before attempting to machine materials of this kind. The following materials must never be machined, because your particular machine is not fitted with the necessary fire and explosion protection devices:

- Aluminium and all alloys with at least 70 percent aluminium by weight,
- Magnesium and all alloys with at least 80 percent magnesium by weight.

No liability will be accepted by K.Jung GmbH if you fail to comply, and all warranty claims will be refused.

**Warning**

If low-alloy aluminium and magnesium are machined alternately, the grinding dust must not be exhausted when dry, because this represents a potential explosion hazard.

Please request further information from your local government agencies or public authorities (e.g. employers' liability insurance association or trade and factory inspectorate) before attempting to grind spark-emitting materials and make sure that they are capable of being exhausted and cooled safely.

1.3.6 Maintenance / malfunctions / faults / repairs

All work on the machine’s electrical equipment must be carried out by a competent and qualified electrician in accordance with the generally recognized rules of sound electrical practice.

Always use insulated tools when working on the machine’s electrical equipment.

All work on the machine’s hydraulic / pneumatic equipment must be carried out by a competent and qualified person with suitable training and experience.
Always observe the stipulated maintenance and servicing intervals. This applies likewise to all optional equipment and to all intervals specified in the documentation of other manufacturers.

Check the machine for damage each time it is used. Check the protective devices to make sure that they function both correctly and in accordance with their intended purpose. Never use a machine which is faulty or defective, nor a machine with faulty or defective protective or safety devices.

Report all malfunctions, damage, defects, leaks and any other form of imperfection immediately to the person charged with overall responsibility for the machine.

Repairs must always be carried out either by K.Jung GmbH or by another person or firm appointed and authorized by K.Jung GmbH.

Use only "original JUNG parts" when carrying out repair work.

Never use compressed air, high-pressure cleaners or aggressive detergents to clean the machine. If grinding dust or dirt of any other kind is whirled up, it may get into guides or bearings and cause them to wear out within a very short time. Aggressive detergents may corrode and destroy the paint or other coating or the safety plates.

Keep all grips, steps, railings, floors, windows and safety devices free from dirt and other forms of contamination, such as coolant residues, oil or grinding dust. Failure to do so may cause your view to be obstructed and/or result in slippery surfaces.

If any error messages are displayed, you must rectify the fault first and then acknowledge the message. Only then will you be able to continue working.

1.3.7 Disposal

Please consult the appropriate government agencies (e.g. the Refuse Department) for all information regarding possible methods for disposing of wastes generated during the service life of the machine (e.g. coolants, used oils, etc.).

Coolants, filter paper, grinding dust and used oil must be disposed of in an environmentally compatible manner and in accordance with the relevant local statutory requirements.

1.3.8 Grinding wheels

When using grinding wheels, observe the accident prevention regulations and all other statutory requirements valid in the country in which the machine is to be used (BGV D12 in Germany). Heed all the instructions they contain.

Observe all the requirements specified by the wheel manufacturer.

Always use grinding wheels which comply with the European standard EN 12413 and which bear the following information as a minimum:
- Name of the manufacturer
- Type of bond
- Wheel dimensions
- Permissible peripheral speed and/or speed of the new wheel. Please note the colour markings.
Some grinding wheels have bore holes with DIN dimensions, while others have dimensions according to ISO. Similarly, there are grinding wheel flanges with DIN mounts and ones with ISO mounts. Make sure that you always use the correct grinding wheels for your particular flanges. If your wheels fit onto the flange mount too loosely or if the bore holes in them are too small, they are unsuitable and you must not use them under any circumstances. Failure to heed this warning could lead to wheel breakage. The diameter of the grinding wheel mount is specified on all wheel flanges from K.Jung GmbH. Always use flanges which are approved for your place of installation together with matching, approved grinding wheels. We cannot accept any liability for flanges supplied by other manufacturers. Please heed the international standard DIN ISO 666 when mounting straight grinding wheels with the aid of flanges.

Always use grinding wheels which are approved for the maximum peripheral speed of your grinding spindle drive. Only specially identified wheels are allowed to be used at peripheral speeds > 35 m/s.

Wheel peripheral speeds > 50 m/s are only allowed with fully enclosed machines.

If you need to use spacers to clamp thin grinding wheels onto a flange, you must only fit them onto the front of the wheels. The back of a wheel must always be in direct contact with the flange. Only the thin, plastic spacing layers stipulated by the wheel manufacturer are allowed to be inserted between the flange and the wheel.

Always enter your actual grinding wheel diameter correctly in the tool management mask for CNC machines. Always adjust the dressing diamond and / or your follower to the diameter of your actual grinding wheel for all machines. Caution! If the dressing diamond / follower is not adjusted correctly, or if the grinding wheel diameter is entered incorrectly, the cutting speed which is selected and displayed will not be the same as the true cutting speed. This will result in an increased risk of accidents caused by bursting wheels.

Always choose a grinding wheel which is suitable for the intended work process. Only suitable wheels will produce the desired grinding result. Using wheels which are unsuitable results in an increased risk of bursting. Never work with wheels which are not suitable.

Grinding wheels must always be transported very carefully. Avoid all shocks and vibrations. They could cause the wheels to crack or suffer other kinds of damage, with the result that they may burst during the trial run or an actual grinding cycle.

It is advisable to lay thin grinding wheels down flat for storage.

Grinding wheels must not come into contact with oil, grease or coolants while in storage. They could cause the wheels to crack or suffer other kinds of damage, with the result that they may burst during the trial run or an actual grinding cycle.

The grinding wheels must be checked for damage before they are used. Carry out a sounding test for conventional (ceramically bonded) wheels. The wheels must be dry for this purpose. A defective grinding wheel which is cracked has a dull ring. There is no point in carrying out a sounding test on CBN or diamond grinding wheels with a metal or synthetic resin-bonded structure. Instead, you should check the active layer for cracks and make sure it is bonded to the structure correctly.

Never use a damaged grinding wheel!

Warning! Danger of bursting
Make sure that all grinding wheels are properly balanced.
Carry out a trial run for at least one minute at the maximum permissible speed before you use a grinding wheel for the first time. Remember to cordon off the danger zone.
Changing a grinding wheel entails a risk of injury from abrasive grit with sharp edges. You should therefore always wear protective gloves to do so.

1.3.9 Magnetic chucks

Study and heed all the information contained in section 5.1 before using magnetic chucks.
All persons required to work with magnetic chucks must have received suitable instruction from the owner of the machine regarding the risks and dangers involved.
Please observe the following limit values for high, static magnetic fields. They apply to all work in the exposure area.
These values are only measured in the immediate vicinity of the clamping systems (£100 mm above them and on either side).

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Magnetic flux density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak value for head and torso</td>
<td>2 T</td>
</tr>
<tr>
<td>Mean value for 8 h (whole-body exposure)</td>
<td>212.2 mT</td>
</tr>
<tr>
<td>Peak value for extremities</td>
<td>5 T</td>
</tr>
</tbody>
</table>

All persons required to work in this area must first undergo a medical aptitude test, which should be repeated at regular intervals.
Whether or not persons with active implants or ferromagnetic foreign bodies should be allowed to work in this area must be decided on a case-to-case basis. Persons wearing a pacemaker are not allowed to work in this area. The machine operator is responsible.
Keep all electronic devices, medical equipment, computers, wrist watches, data carriers, credit cards, cheque cards, ID cards, etc. well away from magnetic chucks. They could be damaged or deactivated.
There is a danger of crushing and similar injuries. You should therefore keep all iron, steel or nickel objects and all magnetic tools well away from a magnetic chuck while it is switched on. Use non-magnetic tools wherever possible.

1.3.10 Coolants

Please also study section 7.3, Coolants, and heed all the instructions it contains.
Ask your coolant dealer to provide you with the DIN Material Safety Sheet and an inspection report for water-miscible coolants. Observe the manufacturer’s specifications.
Never use flammable coolants. All machines for which flammable coolants are to be used are required to be fitted with fire and explosion protection devices.
Do not use coolants that are detrimental to health. Coolants may become toxic if they are contaminated with certain substances. You should therefore check your coolant regularly to ensure that it complies with the requirements specified in the Material Safety Sheet supplied by the manufacturer. If any of the values exceeds the permissible tolerance, the coolant must be disposed of in accordance with the relevant local statutory requirements.

Special coolants are necessary to grind hard metals. Cobalt must be prevented from dissolving out, because it is detrimental to health. Please consult your coolant supplier before machining hard metals.

The machine is not intended for grinding with oil. If you convert your machine for grinding with oil **yourself**, you must comply with all statutory requirements, such as those designed to protect the health of the operator or to guard against fire and explosion. You must never operate an electromechanical balancer in a potentially explosive atmosphere. Certain grinding oils may cause plastics and non-ferrous metals to corrode and decompose. Please heed the Material Safety Sheet supplied by the oil manufacturer.

**All liability and warranty claims vis-à-vis K.Jung GmbH are excluded.**

### 1.3.11 Other accessories / work equipment

As the owner of the machine, you must fit an extraction device if the quantity of dust and/or smoke and/or mist produced during grinding is such that it could represent a health hazard. Arrange for your emissions to be measured by an approved state testing authority, such as the employers’ liability insurance association.

Suitable extraction devices and other cleaning systems, for example for coolants, can be supplied by K.Jung GmbH as accessories.

### 1.3.12 Personal protective equipment / work clothing

The owner of the machine must make sure that all the necessary protective and safety equipment (e.g. goggles, safety shoes, safety gloves, etc.) is available to the machine operator and that he or she uses it for the duration of all work on the machine.

All persons working on machines which are not totally enclosed must wear goggles. There is a risk that particles from grinding wheels or other parts could fly out of the machine. The rule regarding goggles also applies to all persons working on enclosed machines if the machine is set up in setting-up or semi-automatic mode, or operated manually in manual mode, with the guard open. It applies likewise to all other persons who enter the danger zone around the machine.

Always wear suitable work clothing. This means close-fitting protective clothing and safety shoes. Avoid baggy clothing and jewellery. Wear a net if you have long hair. You could otherwise become caught up in moving parts.
1.3.13 Operator qualifications

- All work performed on or with the machine at any time during its entire service life must be carried out by persons with the necessary competence, qualifications and experience.

- Only persons with the appropriate competence, training and instruction, and who are reliable and suitably qualified or otherwise familiar with the specific procedures on or with the machine, are allowed to perform this work. In particular, these persons must comply with all safety regulations and information described in the Operating Instructions as well as with the relevant statutory and general requirements valid in the country in which the machine is to be used.

All persons who have not yet received the appropriate training or instruction, or who have not yet completed their apprenticeship, must not be allowed to carry out work on the machine except under the constant supervision of a suitably trained and experienced operator.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Personnel</th>
<th>Persons with technical training who have also received special instruction concerning the machine</th>
<th>Persons trained as electricians</th>
<th>Management staff with appropriate competence, safety officers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Operation</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance and repair work, rectifying electrical faults</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance and repair work, rectifying mechanical faults</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Inspection, instruction, responsibility</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
## 2. Technical data / transportation / commissioning

### 2.1 Technical data

<table>
<thead>
<tr>
<th>Table</th>
<th>Standard</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table working surface</td>
<td>inch 23.62 x 9.84</td>
<td>Others on request</td>
</tr>
<tr>
<td>Grindable workpiece area including 0.984 inch wheel width</td>
<td>inch 23.62 x 11.81</td>
<td></td>
</tr>
<tr>
<td>Grindable workpiece area with VJCE guard including 0.984 inch wheel width</td>
<td>inch 23.62 x 11.42</td>
<td></td>
</tr>
<tr>
<td>Distance between top of table upper limit switch (Y) with wheel diameter 9.84 inch</td>
<td>inch 14.41</td>
<td></td>
</tr>
<tr>
<td>Maximum load including magnetic chuck</td>
<td>kg 130</td>
<td></td>
</tr>
<tr>
<td>Height above floor</td>
<td>inch 42.72</td>
<td></td>
</tr>
</tbody>
</table>

### Main spindle drive

<table>
<thead>
<tr>
<th>Speed range</th>
<th>RPM 800 - 4200</th>
<th>Others on request</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor power</td>
<td>KW 5 at max. RPM 10 at max. RPM</td>
<td></td>
</tr>
<tr>
<td>Cutting speed</td>
<td>ft/s 114.8</td>
<td>Others on request</td>
</tr>
</tbody>
</table>

### Grinding wheel

| Diameter                             | inch 11.81     | 9.84                      |
| Width                                | inch 0.98 / 1.18 | 1.97                      |
| Bore hole                            | inch 3         | 2 / 2.01 on request       |
| Radial wear                          | inch 1.77      |                           |

### X-axis (longitudinal table motion)

| Traversing speed for reciprocating grinding, hydraulic, steplessly adjustable | inch/min 39.37 - 944.88 |
| Traversing speed for creep-feed grinding with AC servo motor                | inch/min 0.2 - 39.37  |
| Traverse path between limit switches                                         | inch 25.98           |
| Effective reciprocating stroke                                               | inch 24.8            |
### Y-axis (vertical motion)
- **Traversing speed**: inch/min, Standard: 0.0039 - 78.74
- **Traverse path between limit switches**: inch, Standard: 14.17
- **Resolution of measuring system**: mm, Standard: 0.0002

### Z-axis (cross motion)
- **Traversing speed**: inch/min, Standard: 0.0039 - 78.74
- **Traverse path between limit switches**: inch, Standard: 11.01 / 10.83
- **Traverse path between limit switches with JC/ JCE guard**: inch, Standard: 10.63 / 10.43
- **Resolution of measuring system**: mm, Standard: 0.0002

### Installation data
- **Width**: inch, Standard: 133.86
- **Depth (without machine controller)**: inch, Standard: 106.3
- **Height (depending on equipment) with PA 31K**: inch, Standard: 96.06
- **Weight (machine, without enclosure and control cubicle)**: kg, Standard: 3000
- **Weight (machine, full enclosure and control cubicle)**: kg, Standard: 3700

### Electrical data
- **Voltage**: V AC, Standard: 400 -5% to + 10%
- **Frequency**: Hz, Standard: 60, Optional: 50
- **Control voltage**: V AC, Standard: 230
- **Control voltage**: V DC, Standard: 24
- **Power requirement (with 5 / 10 kVA grinding power)**: kVA, Standard: 13.5
- **Fuse protection**: A, Standard: 35
2.2 Noise measurement

The emission value at the place of work, calculated in accordance with DIN 45 635, Parts 1 and 16, is less than 70 dB(A) when the machine is idling (idle reciprocating motion with grinding spindle motor active).

The value may increase to 75 dB(A) during grinding if the machine is equipped with a coolant pump and an extraction device.

It is not necessary to measure the sound pressure level because the values are relatively low.
2.3 Floor space drawing
2.4 Transport dimensions (machine only)
2.5 Transport instructions

- **Warning**
  - The machine is only allowed to be transported by trained persons who have also received special instruction. The utmost diligence and conscientiousness are essential when transporting the machine.
  - Do not stand underneath suspended loads.
  - Suitable protective equipment, such as a helmet and safety shoes, must be worn at all times.
  - All national statutory requirements must be observed when the machine is transported (e.g. accident prevention regulations)!
  - Drain off all liquids (e.g. coolants and oils) before transporting the machine.
  - The machine must always be suspended straight.
  - Avoid vibrations and shocks when transporting the machine, and take steps to prevent the load from swinging freely.
  - Always reduce the speed before raising or lowering the load.
  - The load must always be lowered onto a level, horizontal surface. This surface must be capable of supporting the weight of the machine.
  - The chains must not be allowed to touch any part of the machine, because of the risk that it may be damaged or tilted.
  - Study and heed the original instructions provided by the manufacturer before transporting accessories or other items of equipment (e.g. coolant systems, extraction devices, etc.).

Set the machine down on two wooden beams (minimum dimensions 6.7 x 6.7 x 39.4) after it has been transported to its destination and screw the four levelling screws into the machine bed from underneath.
2.5.1 Transport by crane

The maximum carrying capacity of the crane must be greater than the weight of the machine plus the weight of the transport accessories.

- **Weight**: 3000 kg (without control cubicle)
- **Overall weight**: 3700 kg (with control cubicle)

---

- Adjust the cross slide (Z-axis) to the front position for transport.
- Centre the reciprocating table (Y-axis) (it is fixed in position on new machines by means of a connecting rod safeguard).
- The X-dimension varies according to the machine equipment.

---

**The machine must be level when suspended!**

**Accessories necessary for crane transport**
- 4 threaded bolts 1 HF 50 - 1624
- 4 ring nuts M 30 x 2 DIN 582
- * 2 steel pipes (or rods), outside diameter 1.97 x 0.2 x 51.18 inch
- * 4 continuous poly hoisting slings 196.85 inch
- * 8 positioning safeguards (retaining rings or driving dogs)

* Not included in scope of supply
Instructions

- Remove the plastic plugs from the machine bed.
- Screw in the threaded bolts.
- Insert the steel pipes (rods) through the eyes of the threaded bolts.
- Take steps to prevent the steel pipes (rods) from being moved accidentally.
- Suspend the machine as shown in the "Transport by crane" diagram and make sure that the hoisting slings are not touching any part of the machine.
2.5.2 Transport by fork-lift truck

The maximum carrying capacity of the fork-lift truck must be greater than the weight of the machine plus the weight of the transport accessories.

- Weight: 3000 kg (without control cubicle)
- Overall weight: 3700 kg (with control cubicle)

Transport by fork-lift truck

- Transport the machine as shown in the "Transport by fork-lift truck" diagram.
2.6 Preparation for commissioning

The machine is only allowed to be installed and connected by trained, authorized persons. The manufacturer cannot under any circumstances accept liability for damage resulting from inexpert installation. Please also study and heed the original instructions provided by the suppliers of accessories.

If you do not intend to install the machine immediately, please read the instructions contained in the “Temporary storage” section carefully.

- Unpack the machine carefully. Damaged packaging materials cannot be returned.

- Check that the machine accessories are complete.

Always follow the transport instructions when raising or transporting the machine. See section 2.5 “Transport instructions” on page 33.

Never stand underneath the raised machine. Risk of fatal injury.

- Stand the machine up carefully onto its feet.

- Align the machine carefully using the levelling screws and a spirit level.

- Position the machine where you want to install it and remove the transportation safeguards (see sketch below).
  - Loosen the transportation safeguard for the grinding head.
  - Remove the transportation safeguard for the reciprocating table (X-axis)

- Charge the machine with lubricant. Heed the safety instructions concerning the use of oil.

- Plug in the electrical connectors and connect the power supply. This step must always be carried out by a qualified electrician in accordance with the generally recognized rules of sound electrical practice. See section 2.8 “Electrical connections” on page 43.
Transportation safeguards

- Mount the enclosed accessories on the machine after studying the original instructions provided by the manufacturers. These accessories include:
  - Magnetic chuck
  - Coolant cleaning system
  - Grinding mist extractor
  - Dressers
  - etc.
2.6.1 Transportation safeguards on the PA 31K (optional)

*Important*

Remove the transportation safeguards prior to commissioning the PA 31K dresser.

You must remove the two transportation safeguards after installing the dresser.

- To do so, unscrew the two hexagon socket bolts in each safeguard and remove the locking elements.

Keep the locking elements in a safe place in case you need to transport the dresser again at any time in the future.
2.7 Storage

2.7.1 Temporary storage

*Important*

*If the machine is to be installed by Jung personnel, please store it in accordance with the conditions described below.*

The following points should be noted in the event that the machine needs to be stored temporarily prior to installation:

- Do not remove the machine from the packaging or crate.
- See transportation dimensions for storage dimensions.
- The permissible floor load must not be exceeded.
- The storage location must also fulfil the following requirements:
  - Dry
  - Under cover
  - Protected against moisture condensation
  - Storage temperature between +10°C and +30°C
  - Vibration-free

2.7.2 Installation

*Important*

*Please heed the points listed below. They are essential in order to ensure good grinding results and a long machine service life.*

- Note the permissible floor load.
- Connection and installation requirements. See section 2.1 “Technical data” on page 25.
- Make sure sufficient floor space is available. See section 2.3 “Floor space drawing” on page 29.
- Ensure adequate lighting.
- The machine must always be installed on a stable, level base. This base must be free from extraneous vibrations and abrupt shocks of any kind.
- Keep the machine away from draughts as well as from hot air streams discharged by other machines.
- Do not expose the machine to direct sunlight.
2.8 Electrical connections

The electrical connections must always be made by a qualified electrician in accordance with the recognized rules of sound electrical practice.

Please study section 1.0 "Safety" carefully beforehand and make sure you have fully understood the instructions it contains.

The plug-in electrical connectors are clearly marked and must be connected in accordance with the circuit diagram supplied together with the machine. The locking screws provided at these connections must always be tight.

Check the direction of rotation of the motors after making the electrical connections, in order to determine whether the phases have been connected the right way round.

If a connected load of more than 7 kW is required for wet grinding equipment, a second connecting cable must be used.

The supply voltage is 400 V (maximum tolerance: -5% to +10%). If your mains voltage deviates from this value, you must connect a series transformer upstream.

- Check all the electrical terminals in the control cubicle and on the machine prior to commissioning.

  **Three-phase connection:** L1-L2-L3 must be connected correctly in the rotary field.

- **Earth connection:** PE (yellow/green). This connection is designed for a four-wire system.

- Always use original fuses with the specified amperage. In the event of a fault in the electrical power supply, switch off the machine immediately.

- Check/inspect the electrical components of the machine at regular intervals. Any defects, such as loose connections or scorched cables, must be remedied immediately.

- The electrical connections must comply both with statutory requirements and with local electricity rules.

- Should any work be necessary on live parts, start by switching off the power supply. If this is not possible for technical reasons, or if it makes no sense to do so, ask for assistance from a second person, who can then press the EMERGENCY STOP button or the main switch to release the voltage in an emergency. Cordon off the working area with a red and white chain and a warning sign. Always use insulated tools.
2.8.1 Connection to power systems with an r.c.c.b. circuit-breaker

The machine is designed with a six-pulse, three-phase bridge connection. This means that direct currents can flow in the event of a fault. Consequently, safe operation cannot be guaranteed with conventional residual-current-operated circuit-breakers.

You must install current-sensitive r.c.c.b. circuit-breakers as shown in the circuit diagram below.

Connection of the r.c.c.b. circuit-breaker

The following residual-current-operated circuit-breaker is recommended by Siemens.

5 SZ6468-0kGOO
2.9 Definition of machine axes

*The machine axes of the J630D are based on a clockwise system of coordinates. A positioning tool is assumed. In the Y-axis, which positions the grinding head, this is actually the case. Since, on the other hand, it is the workpiece that is traversed in the X and Z-axes, the positioning motion in these axes is counter to the coordinate direction.*

**Machine axes**

- **X'-axis** = Longitudinal motion of the grinding table  
  - left  
  + right
- **Y-axis** = Vertical motion of the grinding head  
  - down  
  + up
- **Z'-axis** = Cross motion of the grinding table  
  - backwards  
  + forward
- **A1-Axis (optional)** = Rotary axis of a dividing head  
  - backwards (clockwise)  
  + forward (anti-clockwise)

**Machine axes - dressing head (optional)**

- **V-axis** = Axis of the dressing sleeve  
  - downwards towards the grinding wheel  
  + upwards away from the grinding wheel
- **E-axis** = Rotary motion of the dressing arm (PA 31K)  
  - forward  
  + backwards
- **U-axis** = Infeed motion of the dressing diamond (PA 31K)  
  - towards the grinding wheel  
  + away from the grinding wheel
- **W-axis** = Cross motion of the dressing head  
  - backwards  
  + forward
Definition of axes

Definition of coordinates:

- The tool (grinding wheel) is traversed in the Y-axis.
- The workpiece is traversed in the X and Z-axes.
- The tool reference point is located on the front edge of the grinding wheel.

⚠️ **Warning**

*Please remember when you program the positioning paths in the X-axis that, from the point of view of the operator, the workpiece positions in the opposite direction to that shown in the diagram above. The value you program on the right-hand side of the workpiece must always be less than the value on the left.*
3. Machine control unit / remot control panel

3.1 Control unit

A) Horizontal softkey row

<table>
<thead>
<tr>
<th>Keys</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Key for returning to main screen</td>
</tr>
<tr>
<td>2</td>
<td>Key for returning one screen at a time</td>
</tr>
<tr>
<td>3-10</td>
<td>Horizontal softkey row</td>
</tr>
<tr>
<td>11</td>
<td>Shift key for activating second horizontal softkey row</td>
</tr>
</tbody>
</table>
| 12   | Dual-function key:  
      - “Change module” key: click this key once to return to the main screen (displayed after traversing to the reference point).  
      - Double-click this key to toggle between the MMC area and the last active NC screen. |

B) Vertical softkey row

<table>
<thead>
<tr>
<th>Keys</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-8</td>
<td>Vertical softkey row</td>
</tr>
</tbody>
</table>
### C) Alphanumeric key block

![Alphanumeric key block image]

<table>
<thead>
<tr>
<th>Keys</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7/A</td>
</tr>
<tr>
<td>2</td>
<td>8/B</td>
</tr>
<tr>
<td>3</td>
<td>9/C</td>
</tr>
<tr>
<td>4</td>
<td>//D</td>
</tr>
<tr>
<td>5</td>
<td>(/E</td>
</tr>
<tr>
<td>6</td>
<td>4/F</td>
</tr>
<tr>
<td>7</td>
<td>5/G</td>
</tr>
<tr>
<td>8</td>
<td>6/H</td>
</tr>
<tr>
<td>9</td>
<td>*/I</td>
</tr>
<tr>
<td>10</td>
<td>)/J</td>
</tr>
<tr>
<td>11</td>
<td>1/K</td>
</tr>
<tr>
<td>12</td>
<td>2/L</td>
</tr>
<tr>
<td>13</td>
<td>3/M</td>
</tr>
<tr>
<td>14</td>
<td>-/N</td>
</tr>
<tr>
<td>15</td>
<td>[/O</td>
</tr>
<tr>
<td>16</td>
<td>=/P</td>
</tr>
<tr>
<td>17</td>
<td>0/Q</td>
</tr>
<tr>
<td>18</td>
<td>./R</td>
</tr>
<tr>
<td>19</td>
<td>+/S</td>
</tr>
<tr>
<td>20</td>
<td>]/T</td>
</tr>
</tbody>
</table>
D) Cursor and control block

<table>
<thead>
<tr>
<th>Keys</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>\ / U</td>
</tr>
<tr>
<td>2</td>
<td>, / V</td>
</tr>
<tr>
<td>3</td>
<td>Change channel / W</td>
</tr>
<tr>
<td>4</td>
<td>Acknowledge alarm / X</td>
</tr>
<tr>
<td>5</td>
<td>Help / Y</td>
</tr>
<tr>
<td>6</td>
<td>; / Z</td>
</tr>
<tr>
<td>7</td>
<td>Change input area / ?</td>
</tr>
<tr>
<td>8</td>
<td>Cursor up /</td>
</tr>
<tr>
<td>9</td>
<td>Scroll up / ’</td>
</tr>
<tr>
<td>10</td>
<td>Delete to left</td>
</tr>
<tr>
<td>11</td>
<td>Blank (space bar) / -</td>
</tr>
<tr>
<td>12</td>
<td>Cursor left / &lt;</td>
</tr>
<tr>
<td>13</td>
<td>Select key (advance through marked area, select) / &gt;</td>
</tr>
<tr>
<td>14</td>
<td>Cursor right / “</td>
</tr>
<tr>
<td>15</td>
<td>Change data</td>
</tr>
<tr>
<td>16</td>
<td>Shift (upper case)</td>
</tr>
<tr>
<td>17</td>
<td>Tabulator</td>
</tr>
<tr>
<td>18</td>
<td>Cursor down / $</td>
</tr>
<tr>
<td>19</td>
<td>Scroll down / %</td>
</tr>
<tr>
<td>20</td>
<td>Confirm input (accept in memory)</td>
</tr>
</tbody>
</table>
3.2 Machine control unit

<table>
<thead>
<tr>
<th>Keys</th>
<th>Electrical destination</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-S30</td>
<td>Adjusts the programmed cutting speed in steps</td>
</tr>
<tr>
<td>2</td>
<td>1-S2</td>
<td>Grinding spindle motor <strong>OFF</strong></td>
</tr>
<tr>
<td>3</td>
<td>1-S1</td>
<td>Grinding spindle motor <strong>ON</strong> (for optional cutting speeds greater than 35 m/s you must first reset the key-operated switch to the position for high cutting speeds and then press this key twice)</td>
</tr>
<tr>
<td>4</td>
<td>8-S1</td>
<td>Adjusts the magnetic gripping force in steps</td>
</tr>
<tr>
<td>5</td>
<td>8-S3</td>
<td>Magnetic gripping force <strong>OFF</strong></td>
</tr>
<tr>
<td>6</td>
<td>8-S2</td>
<td>Magnetic gripping force <strong>ON</strong></td>
</tr>
<tr>
<td>7</td>
<td>0-S3</td>
<td><strong>EMERGENCY STOP</strong> button</td>
</tr>
<tr>
<td>8</td>
<td>0-S2</td>
<td>Control unit <strong>OFF</strong></td>
</tr>
<tr>
<td>9</td>
<td>0-S1</td>
<td>Control unit <strong>ON</strong></td>
</tr>
<tr>
<td>10</td>
<td>12-S30</td>
<td>Override switch for the sum of the grinding axes Y and Z during a grinding cycle. The programmed axis speeds can be reduced by setting a percent value</td>
</tr>
<tr>
<td>11</td>
<td>12-S31</td>
<td>Override switch for the X-axis. The programmed axis speed can be reduced by setting a percent value</td>
</tr>
<tr>
<td>12</td>
<td>12-S32</td>
<td>Override switch for the sum of the dressing axes during a dressing program. The programmed axis speed can be reduced by setting a percent value</td>
</tr>
<tr>
<td>13</td>
<td>3-S10</td>
<td>Adjusts the coolant supply (left to reduce, right to increase)</td>
</tr>
<tr>
<td>Keys</td>
<td>Electrical destination</td>
<td>Function</td>
</tr>
<tr>
<td>------</td>
<td>------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>14</td>
<td>3-S11</td>
<td>Coolant pump for creep-feed grinding <strong>ON/OFF</strong></td>
</tr>
<tr>
<td>15</td>
<td>3-S12</td>
<td>Coolant pump for reciprocating grinding <strong>ON/OFF</strong></td>
</tr>
<tr>
<td>16</td>
<td>3-S13</td>
<td>Solenoid valve for dressing coolant <strong>OPEN/CLOSED</strong></td>
</tr>
<tr>
<td>17</td>
<td>4-S10</td>
<td>Extraction device <strong>ON/OFF</strong></td>
</tr>
<tr>
<td>18</td>
<td>9-S10</td>
<td>Activates the central lubrication unit</td>
</tr>
</tbody>
</table>
| 19   | 10-S10                 | Dual function:  
- lamp test  
- machine illumination **ON/OFF** |
<p>| 20   |                        | Dressing roller (optional) in down cut <strong>ON/OFF</strong> |
| 21   |                        | Dressing roller (optional) in up cut <strong>ON/OFF</strong> |
| 22   |                        | |
| 23   |                        | |
| 24   |                        | |
| 25   |                        | |
| 26   | 12-S8                  | Interrupts a program cycle (traverse clear in Y-axis and continue machining at breakpoint) |
| 27   | 12-S7                  | Cancels a function |
| 28   | 12-S6                  | Measurement |
| 29   | 12-S5                  | Traverses to the grinding wheel change position |
| 30   | 12-S4                  | Traverses to the workpiece change position |
| 31   | 12-S20                 | Key-operated switch for changing the mode, <strong>semi-automatic mode</strong> position; if one channel is active, <strong>close the guard door (if one is fitted) before changing the mode</strong> |
| 32   |                        | Key-operated switch for changing the mode, <strong>setting-up mode</strong> position; if one channel is active, <strong>close the guard door (if one is fitted) before changing the mode</strong> |
| 33   |                        | Key-operated switch for changing the mode, <strong>automatic mode</strong> position; if one channel is active, <strong>close the guard door (if one is fitted) before changing the mode</strong> |
| 34   | 12-S9                  | not activ |
| 35   | 12-S2                  | Start dressing program |</p>
<table>
<thead>
<tr>
<th>Keys</th>
<th>Electrical destination</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>12-S3</td>
<td>NC reset (stop program)</td>
</tr>
<tr>
<td>37</td>
<td>12-S1</td>
<td>Start automatic program (all selected programs and automatic cycles, e. g. traverse to reference point, are started with this key)</td>
</tr>
<tr>
<td>38</td>
<td>12-S21</td>
<td>Key-operated switch for control unit – 1 position (not relevant for the operator)</td>
</tr>
<tr>
<td>39</td>
<td></td>
<td>Key-operated switch for control unit – 2 position (not relevant for the operator)</td>
</tr>
<tr>
<td>40</td>
<td></td>
<td>Key-operated switch for control unit – 0 position (not relevant for the operator)</td>
</tr>
<tr>
<td>41</td>
<td></td>
<td>cover plate</td>
</tr>
</tbody>
</table>
3.3 Remote control panel

<table>
<thead>
<tr>
<th>Keys</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>EMERGENCY STOP</strong> button</td>
</tr>
<tr>
<td>2</td>
<td>Display for current position in selected axis</td>
</tr>
<tr>
<td>3</td>
<td>not activ</td>
</tr>
<tr>
<td>4</td>
<td>Handwheel increments of 0.00001 inch</td>
</tr>
<tr>
<td>5</td>
<td>Rapid traverse key, in combination with a direction key (+ or -)</td>
</tr>
<tr>
<td>6</td>
<td>Handwheel increments of 0.0001 inch</td>
</tr>
<tr>
<td>7</td>
<td>not activ</td>
</tr>
<tr>
<td>8</td>
<td>Handwheel increments of 0.001 inch</td>
</tr>
<tr>
<td>9</td>
<td>not activ</td>
</tr>
<tr>
<td>10</td>
<td>not activ</td>
</tr>
<tr>
<td>11</td>
<td>PA 31K axes to parking position</td>
</tr>
<tr>
<td>12</td>
<td>Teach key, in combination with a direction key + or - (only for X-axis)</td>
</tr>
<tr>
<td>13</td>
<td>Key-operated switch, not active</td>
</tr>
<tr>
<td>14</td>
<td>Override switch, not active</td>
</tr>
<tr>
<td>15</td>
<td>Confirm buttons</td>
</tr>
<tr>
<td>16</td>
<td>Electronic handwheel</td>
</tr>
</tbody>
</table>

The **+ and - buttons** position the selected axes (X / Y / Z / V / U / W / E / A / W1) in the corresponding directions.
4. Functional description of the operating modes

4.1 Changing the operating mode: important instructions and safety regulations

No functions or programs are allowed to be active when you change the operating mode.

Exception: If a guard door is fitted and you close it before changing the operating mode, the function or program is not interrupted.

Safety regulations

⚠️ Warning

There is a risk of collision when the axes are positioned. Keep workpieces and other objects of all kinds clear of the danger zone around the axes.

Keep your hands well away from moving parts of the machine or axes while they are being positioned!

Protective goggles must be worn at all times when the guard door is open!
4.2 Setting-up mode

- Set the key switch to setting-up mode (32).

**The machine axes can be positioned in setting-up mode with the remote control panel if the guard door is open.**

**The rapid traverse function is not available in setting-up mode.**

**The V and W-axes cannot be positioned using the electronic handwheel.**

**Positioning the axes with the + and - keys**
- Maximum feed rate (78.74 inch/min) in the X-axis.
- Up to 39.37 inch/min when positioning downwards (-) in the Y-axis.
- Up to 78.74 inch/min when positioning upwards (+) in the Y-axis.
- Up to 78.74 inch/min in the Z-axis.
- Maximum feed rate 19.69 inch/min in the U and W-axes (optional PA 31K dresser).

- Select the axis you want to position on the remote control panel.

- Press the + or - key to position the axis in the required direction.

**Positioning the axes with the electronic handwheel**

- Select the axis you want to position on the remote control panel.

- Select the infeed value per handwheel increment on the remote control panel (4 = 0.00001 inch, 7 = 0.0001 inch or 9 = 0.001 inch). See section 3.3 “Remote control panel” on page 55.

- Turn the electronic handwheel in the required direction (minus = anti-clockwise, plus = clockwise).

**Other conditions and restrictions**

- You are allowed to set the actual values, but they are not updated on the display. You can only display the current actual values in automatic mode.

- Reciprocation in the X-axis is not possible.

- The grinding wheel can only be run at half the normal peripheral speed. If the normal peripheral speed is greater than 114.8 ft/s, the maximum setting-up speed is 55.77 ft/s.
4.3 Semi-automatic mode

- Set the key switch to semi-automatic mode (31).

**Warning**

- All axis motions can be executed in semi-automatic mode with the guard door open. You must start each axis motion and any other control functions individually by hand. As the operator/person responsible for the machine, you should remain aware of the risks of working in this mode at all times. Please bear the potential hazards and the safety regulations in mind while working on the machine.
- When you probe a workpiece, do not approach it with increments which are too large, as this entails a number of risks:
  - The probing operation may not be sufficiently exact,
  - The grinding wheel may be knocked and damaged (it could burst apart),
  - The grinding spindle may be damaged,
  - The workpiece may fly out of the magnetic chuck or the clamping fixture or
  - Wheel particles are catapulted out of the machine's working envelope.

4.3.1 Control functions and restrictions

4.3.1.1 Switching the grinding spindle motor on

- Press key 3 (grinding spindle motor ON) on the machine control unit. See section 3.2 “Machine control unit” on page 51.
  - The grinding spindle rotates at the programmed peripheral speed. Condition: The override switch (1) must be set to 100 %.

**Important**

If the grinding spindle drive is optionally equipped for cutting speeds of more than 114.8 ft/s, you must carry out the following procedure in order to set these high speeds:

- First reset the key switch to the position for high cutting speeds.
- Then press key 3 (grinding spindle motor ON) twice.
4.3.1.2 **Switching the grinding spindle motor off**

- Press key 2 (grinding spindle motor OFF) on the machine control unit. See section 3.2 "Machine control unit" on page 51.

4.3.1.3 **Positioning the axes at the normal feed rate or in rapid traverse mode**

- Maximum feed rate (393.7 inch/min) in the X-axis.
- Up to 39.37 inch/min when positioning downwards (-) in the Y-axis.
- Up to 78.74 inch/min when positioning upwards (+) in the Y-axis.
- Up to 78.74 inch/min in the Z-axis.
- Maximum feed rate 78.74 inch/min in the U and W-axes (optional PA 31K dresser).
- Maximum feed rate 196.85 inch/min in the E-axis (optional PA 31K dresser).

- Select the axis you want to position on the remote control panel.

- Press the + or - key to position the axis in the required direction.

*If you press the rapid traverse key simultaneously with the direction key, you should make first sure that your intended traverse path is clear of obstacles and objects of all kinds.*

**Recommendation:** Start by pressing the required direction key. When you are sure that the axis is positioning in the right direction, you can then press the rapid traverse key (5) as well.

- If you want to position at the rapid traverse speed, you must press the rapid traverse key (5) in addition to the direction key.
  - As soon as you release the rapid traverse key (5), the axis will continue positioning at the normal feed rate.
  - If you release the direction key (+ or -), the axis will stop immediately.

4.3.1.4 **Positioning the axes incrementally**

**You cannot position the V and W-axes of the optional AF65 dresser using the electronic handwheel.**

- Positioning the V-axis (optional AF65 dresser)
- You can position the V-axis incrementally with the + or - key.
- Select the V-axis on the remote control panel.
- Select the infeed value per handwheel increment on the remote control panel (4 = 0.00001 inch, 7 = 0.0001 inch or 9 = 0.001 inch). See section 3.3 “Remote control panel” on page 55.
- Press the + or - key on the remote control panel.
  - The V-axis is positioned one increment in the corresponding direction each time you press the + or - key.
Positioning the X, Y, Z, U, W and E-axes

- Select the axis you want to position (X, Y or Z on the machine / U, W or E on the optional PA 31K) on the remote control panel.

- Select the infeed value per handwheel increment on the remote control panel (4 = 0.00001 inch, 7 = 0.0001 inch or 9 = 0.001 inch). See section 3.3 “Remote control panel” on page 55.

- Turn the electronic handwheel in the required direction (minus = anti-clockwise, plus = clockwise).

4.3.1.5 Starting the automatic reciprocating function

- Select the required reciprocating axis on the remote control panel.

- Press the key 37 (start automatic program). See section 3.2 “Machine control unit” on page 51, position 37.
  - The reciprocating axis starts to oscillate between the reversing positions.

The automatic reciprocating function can be activated in the W, X and Z-axes. Please note the risk of collision between the dressing diamond and the grinding wheel.

4.3.1.6 Stopping the automatic reciprocating function

- Press key 36 (NC reset). See section 3.2 “Machine control unit” on page 51, position 36.
  - The reciprocating motion in the X- Z-axis stops immediately
  - The reciprocating W-axis traverses to the start position before stopping.

You can also stop the reciprocating motion in the X- and Z-axis. First select this axis you want to stop.

- If you want to stop the X-axis then pressing and holding down the + direction key. The table traverses in the X-axis to the stopping position.

- If you want to stop the Z-axis then pressing the + direction key. The Z-axis is stopping at the next +reversing position.

4.3.1.7 Activating a manual infeed during an automatic reciprocating motion

- Select the Y-axis (7) on the remote control panel.

- Select the infeed value per handwheel increment on the remote control panel (4 = 0.00001 inch, 7 = 0.0001 inch or 9 = 0.001 inch). See section 3.3 “Remote control panel” on page 55.

- Turn the electronic handwheel.
4. Functional description of the operating modes

4.3.1.8 Setting the reversing positions for the reciprocating motion in the X-axis directly

- You can infeed in increments in the plus (clockwise) or minus (anti-clockwise) direction.

You can enter the current position values for the reciprocating X-axis in the input boxes directly by pressing the "Teach Pos. +", "Teach Pos. -" and "Teach Stoppos." softkeys.

Alternatively, you can set the values for the reciprocating X-axis using the scroll-bars.

- Set the right-hand reversing position (X+) with the top slider control.
- Set the left-hand reversing position (X-) with the middle slider control.
- Set the X-stop position with the bottom slider control.

You can advance directly to the next option by pressing the arrow right key (See section 3.1 “Control unit” on page 47, position D14). This input procedure is described below under “Alternatives”.

Alternatives:

- You can enter settings with 1.18 inch + or - increments using the scroll keys (See section 3.1 “Control unit” on page 47, position D9, D19).
• You can enter settings with 0.01 inch + or - increments using the arrow up and arrow down keys (See section 3.1 “Control unit” on page 47, position D8, D12, D18, D20).

• You can also enter these settings using the mouse.

When you have finished entering the settings, press the "Accept Values" softkey. The new values are not activated until you do so.

4.3.1.9 Setting the reversing positions for the reciprocating motion in the Z-axis directly

• Press the "Recip. Value Z-Axis" softkey.

You can enter the current position values for the reciprocating Z-axis in the input boxes directly by pressing the "Teach Pos. +", "Teach Pos. -" and "Teach Stop-pos." softkeys.

Alternatively, you can set the values for the reciprocating Z-axis using the scroll-bars.

• Set the back reversing position (Z+) with the top slider control.

• Set the front reversing position (Z-) with the middle slider control.

• Set the Z-stop position with the bottom slider control.

• You can advance directly to the next option by pressing the arrow right key (See section 3.1 “Control unit” on page 47, position D14). This input procedure is described below under “Alternatives.”
Alternatives:

- You can enter settings with 0.52 inch + or - increments using the scroll keys (See section 3.1 “Control unit” on page 47, position 9D, 19D).

- You can enter settings with 0.01 inch + or - increments using the arrow up and arrow down keys. (See section 3.1 “Control unit” on page 47, position D8, D12, D18, D20).

- You can also enter these settings using the mouse.

When you have finished entering the settings, press the "Accept Values" soft-key. The new values are not activated until you do so.

4.3.1.10 Teaching an X- or Z-axis reversing position with the remote control panel

- Traverse to a future reversing position with the X- or Z-axis.

- Press the teach key (See section 3.3 “Remote control panel” on page 55, position 12) on the remote control panel and then one of the direction keys (+ or -) depending on whether you want to teach the + or - reversing position.

- Traverse to the second reversing position.

- Press the teach key (See section 3.3 “Remote control panel” on page 55, position 12) again and then the other direction key (+ or -), in order to teach the second position.

*Diagram of axis positions*

If you want to save the positions you have entered with the teach function in an automatic program, you must press the "Read NCU Data" softkey subsequently in the “Program Jung” module.
4.4 Automatic mode

- Set the key switch to automatic mode (33).

**Control functions and restrictions**

All automatic programs and program cycles can be created and started in automatic mode, e.g.:
- Dressing programs
- Grips (Contour programs)
- Automatic programs
- DIN programs

*Important*

**Automatic programs can only be started when the guard door is closed.**

*Information*

You can also create standard grinding programs or Grips geometry programs while an automatic program is executing.

4.4.1 Special functions in automatic mode

4.4.1.1 Interrupting a program cycle (26) and continuing machining at the breakpoint (not possible with creep-feed grinding technology)

- Press key (**interrupt program cycle**) (See section 3.2 “Machine control unit” on page 51, position 26) during an automatic program cycle.
  - The program is interrupted immediately.
  - The Y-axis (grinding head) is traversed to the safety position.

- If you want to continue machining at the breakpoint, you must press key (**start automatic program**) (See section 3.2 “Machine control unit” on page 51, position 37).
  - The following message appears on the screen: **“Continue machining at the breakpoint?”**

- If you want to continue: press key (**start automatic program**) (See section 3.2 “Machine control unit” on page 51, position 37) again.
  - The program is executed.

- If not: press the key (**NC reset**) (See section 3.2 “Machine control unit” on page 51, position 36).
  - The program is terminated.
4.4.1.2 Program cycle interrupted during a dressing cycle

If you press key (Interrupt program cycle), (See section 3.2 “Machine control unit” on page 51, position 26) during a dressing cycle and then attempt to start a new program, a message will appear on the display telling you to restart the dressing program (start dressing program), (See section 3.2 “Machine control unit” on page 51, position 35). Until you do so, you will not be able to continue machining at the breakpoint and complete the program.

This operation is prevented by the control unit for safety reasons, because the Y-compensation dimensions are re-calculated.

4.4.1.3 Cancelling a function

The ‘cancel function key’ (See section 3.2 “Machine control unit” on page 51, position 27) has a special meaning if you are dressing with an MA65 (optional) or a diaform DG 5/1 grinding wheel profile dresser (optional) See also chapters 5.6.7 / 5.6.8.

4.4.1.4 Measurement

The ‘measurement’ function is not active for stationary plunge grinding, creep-feed grinding or X-Y continuous path grinding. You can activate this function for all other programs by pressing the 'Measurement' key. See section 3.2 “Machine control unit” on page 51, position 28.

To activate the measurement function

- Press the "Measurement" key during the program following which you want to measure.
  - "Measurement cycle is active" appears on the display when the programmed end position is reached.
When the programmed end position is reached (YE for surface and plunge grinding, ZE for face grinding), you can enter the required correction value next to "Correct measurement".

**Information**

If you enter a negative value, the active grinding cycle will continue the specified amount.

It only makes sense to enter a positive value if you are grinding several grooves or surfaces. In this case, all subsequent grooves or surfaces will be ground shallower according to the specified amount.

- Then press the "Confirm input" key. See section 3.1 “Control unit” on page 47, position D28.
- Click on the "Grind" softkey.
  - The active grinding program continues according to the specified amount.
- If you do not want to correct the measurement, click on the "End" softkey.

### 4.4.2 Sequence of operations in an automatic program cycle

**Example:** You want to grind a groove with a profile in a workpiece of any shape using a new grinding wheel.

- Switch the master switch ON.
- Press the control unit ON key.
- Traverse to the reference point.
• Check the dressing diamond (wear, correct radius and angle) and mount it in the dresser.

• Check that you have selected the correct dresser.

• Enter the diamond data in the tool management mask.

• Select a grinding wheel.

• Prepare the grinding wheel [flange on, balance, pre-dress at the perimeter and the faces, re-balance (preferably dynamically) and measure].

• Enter the grinding wheel data in the tool management mask.

• Create a contour program (Grips with swivel angle calculation, etc.).

• Position the grinding wheel at the dressing diamond (table dresser) or vice versa (head dresser).

• Run the Actual Values Dressing function.

• Create the dressing technology.

• Start the dressing program (a contour negative is created for the grinding wheel).

• Measure the workpiece (in order to enter the grinding geometry).

• Fix the workpiece onto the grinding table (magnetic table, vice, etc.).

• Probe the workpiece with the dressed grinding wheel (possibly automatically on the basis of the structure-borne noise).

• Run the Actual Values Grinding function.

• Create the grinding technology (reciprocating plunge grinding or creep-feed grinding) and the grinding geometry.

• Adjust the coolant nozzles correctly.

• Make sure that the automatic program can be executed safely (traverse paths clear, guard doors closed, all safety devices active).

• Start the automatic program.

Possible ways to intervene during a program cycle
  – Program stop
  – Measurement
  – Start a dressing program manually by pressing a key
5. Functions of the machine

5.1 Functions of the control unit / machine

The screenshots from pictures of the control unit in this chapter are taken from a control unit with a metric measuring system.

The control unit is programmed with Windows functionality and can be operated either by means of the integrated "mouse" or using the keypad.

If a green box containing a + or - sign is lit to the left of one of the axis displays, this axis is in the process of being positioned in the corresponding direction. If the box containing the + or - sign is red, the axis is attempting to position in the indicated direction, but cannot do so because the override switch is closed.

You can activate and deactivate check boxes by pressing the space bar. see section 3.1 “Control unit” on page 47, D11.

If the input field for changing the reciprocating values in the X and Z-axes has a red background, the value contained in it is not the same as the currently active value.

You can change to another input area by pressing the "END key". see section 3.1 “Control unit” on page 47, D17.

The active input area is marked with a yellow border.

You can change to another line within an input area by pressing the "END key". see section 3.1 “Control unit” on page 47, D17).

The active input line has a yellow background, while the value field in this line has a blue background.

The dialog line of the display contains a short description of the selected input line.

Some of the softkeys and other functions are disabled when certain functions or programs are running.

In this case, the name of the disabled softkey or function has a grey background instead of a black one.

You can use the "Value to clipboard" and "Value from clipboard" softkeys to copy data to the clipboard temporarily and then paste it elsewhere.

You must press the "Selection" softkey first whenever you make any entries or changes in the input fields on all the display screens. Then press the "Write act. data" softkey to copy the data to the NCU.

All the values and inputs shown in the various fields on the screenshots are arbitrary. Those which are important are referred to and marked explicitly.

When you switch off the master switch of the machine, you must wait at least 10 seconds before you can switch it on again.

When you switch on the machine or make any changes in the tool management mask, the "Confirm wheel perimeter" message is displayed. Check this message and confirm it by pressing the “OK” softkey.
5.1.1 Important warning for all programs

Caution

Moving axes are dangerous. Keep workpieces and other objects of all kinds clear of the axis traverse paths. Keep your hands well away while the axes are being positioned.
5.1.2 Function tree structure of the Machine Jung module in setting-up and semi-automatic mode
5.1.3 Function tree structure of the Machine Jung module in automatic mode
5.1.4 Machine Jung module

When you traverse to the reference point, the "Machine Jung" module is activated automatically. You can work in "semi-automatic mode" in this module.

You can also select the following functions:
- "Set dress. table" (see section 5.4.1 "Setting actual values for table dressing" on page 109).
- "Set dress head" (see section 5.4.2 "Setting actual values for the AF65 dressing head (optional)" on page 114).
- "Act. values grinding" (see section 5.4.4 "Setting actual values for grinding" on page 117).
- "Batch mode" (see section 5.10 "Batch mode" on page 185)
- "Warm-up / follow-up" (see section 5.11 "Warm-up/follow-up program" on page 189).
- "Settings / change positions"
- "Recip. value X-axis" (see section 4.3 "Semi-automatic mode" on page 61). The reciprocating values for the Z-axis can only be selected and entered in semi-automatic mode.
- "AC correction" (see section 5.5.5.2 "Creep-feed grinding technology (optional)" on page 133).
- "Special programs" (see section 5.5.14.1 "Special multiple plunge grinding program (optional)" on page 159).

The active status (technology and geometry) is shown in the "Program status" column.

You can display a list of the subroutines by pressing the "Program overview" softkey.

If you press the softkey shift key the following screen appears:
You can toggle between the nominal positions and the residual travel by pressing the "Nominal pos. indication" or "Dist.-to-go indication" softkey, whichever is currently active.

If you press the "MCS" softkey (machine coordinate system), the distance from the reference point of the NC axes is displayed as an absolute value. If you press the "WCS" softkey (workpiece coordinate system), the distance from the zero point after the actual values have been set is displayed. If "MCS" is displayed, the "WCS" softkey is active and vice versa.

By pressing the "Settings Changepos." softkey, you can display the workpiece change position, the wheel change position and the dresser change position.
All the values you enter here are absolute positions referred to the machine coordinate system (MCS):

You can also teach the actual value of the current axis if the softkey „Teach current value“ is actual.

Finally, press the "Accept values" softkey.
– The values you have entered are now transferred to the NCU.

### 5.1.4.1 System data

You can set the date and time, reinitialize the system and display the current software version on the "System data" screen.

- Press the "System data" softkey on the extended screen of the "Machine Jung" module.
You can set the date and time by pressing the "Set date and time" softkey.

The "System init. start" softkey resets various values, e.g. the wheel number, to their defaults.

If you press the "Software version" softkey, the current software version is displayed.

5.1.4.2 Statistics

*The time-recording function is merely provided for information purposes and is not intended to be used for machining time calculations or for timeouts.*

- Press the "Statistic" softkey in the "Machine Jung" module.
You can display the machining times for grinding and dressing here as well as the total time, and reset them again by pressing the "Clear old data" softkey.

### 5.1.4.3 Simulation

If you press the "Simulation OFF/ON" softkey, the dressing operation defined by the currently active dressing program is represented on a graph.

- Press the "Simulation OFF/ON" softkey in the "Machine Jung" module.
You can enlarge the scale to 2:1 by activating the check box at the bottom of the screen. To reduce the scale to 1:1 again, simply deactivate the check box.

You can return to the original screen by pressing the "Simulation OFF/ON" soft-key again.

Since the simulation function shows the actual motion, it must be selected before the dressing program starts. If you select this function while the dressing program is running, the simulation will not be displayed.

5.1.4.4 Program overview

You can select a machining program on the program overview screen. It is active if it appears above in the program overview.

- Press the "Program overview" softkey in the "Machine Jung" module.
To reload the overview, press the "Load overview" softkey.

- Select a machining program and press the "Program selection" softkey.
  - The selected program is now active.
5.1.5  Function tree structure of the Program Jung module

The various subordinate branches of the "Grinding program", "Dressing program" and "File" modules are illustrated in detail in the relevant chapters.
5.1.6 Program Jung module

You can create **grinding** and **dressing programs** in the "Program Jung" module. These programs are then copied to the NCU.

If you press the "Read NCU data" softkey, all the NCU data is copied to the MMC. Active programs may be corrected or modified as a result.

If you press the "Write NCU data" softkey, the active program data in the MMC is copied to the NCU. All the data you enter via the programming interface is thus transferred to the NCU. This is also possible during a machining operation, in other words you can make changes to programs while they are running.

Press the "Grinding program" softkey to create a grinding program (chapter 5.5).

Press the "Dressing program" softkey to create a dressing program (chapter 5.6).

You can display the current software version by pressing the "Software version" softkey.

You can display the File Manager screen by pressing the "File" softkey.
5.1.6.1 **Function tree structure of the File Manager**

![Function tree diagram]

- **Program: Jung**
  - Grinding program
  - Dressing program
- **File**
  - File new
  - Value to clipboard
  - Value from clipboard
  - File manager: open
    - Load NCU
    - Unload NCU
    - Cancel
    - Open
  - File manager: save
    - Software version
    - Read NCU data
    - Write NCU data
    - Load NCU
    - Unload NCU
    - Cancel
    - Save
5.1.6.2 **File manager**

The File Manager contains the functions for copying files from the NCU to the hard disk (MMC) and vice versa. You can open files and save them. Files can be deleted in the "Services" menu.

*If you want to make changes to a file that already exists, you must open it first ("Filemanag. open" softkey). Enter your changes and then save the file again under the same name in the same folder ("Filemanag. save" softkey).*

- Press the "File" softkey in the "Program Jung" module.

Create a new file

- Press the "File new" softkey.
All the parameters (input data) for the active grinding and dressing programs are reset (set to 0). You can also enter a comment for the new file if you wish.

**Opening a file**

- Press the "Filemanag. open" softkey.

- Select either **NCU** or **Hard disk (MMC)** here.
  - A list of the files stored in the NCU or on the hard disk (MMC) then appears.
If you select a file in the NCU and then press the "Unload NCU" softkey, this file is moved from the NCU to the hard disk (MMC). The "Load NCU" softkey is not active here (it is greyed).

If you select a file on the hard disk (MMC) and then press the "Load NCU" softkey, this file is moved from the hard disk to the NCU. The "Unload NCU" softkey is not active here (it is greyed).

Select the file you want to open in the NCU or on the hard disk (MMC) and press the "Open" softkey.

**Saving a file in "BATCH 1"**

Press the "Filemanag. save" softkey.

- Select either NCU or Hard disk (MMC) here.
  - A list of the files stored in the NCU or on the hard disk (MMC) then appears.

- If you select a file in the NCU and then press the "Unload NCU" softkey, this file is moved from the NCU to the hard disk (MMC). The "Load NCU" softkey is not active here (it is greyed).

- If you select a file on the hard disk (MMC) and then press the "Load NCU" softkey, this file is moved from the hard disk to the NCU. The "Unload NCU" softkey is not active here (it is greyed).

- You can save a file under a defined name (program) in any folder (workpiece) on the NCU or the hard disk (MMC). Select either the NCU or the hard disk.
(MMC). Then select the folder (workpiece) in which you want to save the file and enter a file name (program). Press the "Save" softkey.

**Important**

*Please adhere to the following rule, in order to prevent name conflicts: use an _ (underline) as the third character of all batch program names to differentiate them from other programs.*
5.1.7 Bereich Dienste Bedienbaum-Struktur
5.1.8 Service module

If you do not have enough memory to create new standard contours, you must either unload or delete some of your existing standard geometries.

- Press the "change module" key (see section 3.1 “Control unit” on page 47, position 12).
- Press the "Services" softkey.
- Press the "Manage data" softkey.

- Open the "Workpieces" folder.
- Then open the "STD_GEO" folder.
  - You can load, unload, delete or copy existing files here and create new ones.
  - The "Unload" key only removes the standard geometries from the NCU memory.
  - The "Delete" key deletes the standard geometries from the MMC and NCU memories.

Never delete the "Perimeter" or "Face" geometries. If you do, the peripheral and face dressing functions will no longer work.

- If the selected program is not saved as an "SPF" file in the "Type" box, you must press the "Properties" softkey.
• Select "Subprogram-(SPF)" here in the "Type" box.

• Press the "OK" softkey.

• Then press the "Load" softkey on the "Manage data" screen.
  – This geometry program is now saved as a loaded SPF program, and you can select and start it at any time in the appropriate menu.
5.2 Traversing to the reference point

The axes cannot be positioned in rapid traverse mode until you have traversed to the reference point.

*Important*

"Traversing to the reference point" means that the NC axes (X, Y, Z plus U and W in the case of the optional PA31K) are positioned to the reference point and set to zero. All the most recently active positions are saved relative to the reference point, so that you can return to them again at any time after traversing to this reference. After the machine is switched on, it is not possible to start a program without traversing to the reference point.

It is no longer essential to traverse to the reference point for the E-axis (PA31K rotary axis option) because an absolute encoder is used. It is only necessary to adjust the axis and the encoder when the machine is commissioned or if the encoder or the motor is replaced. This adjustment should be carried out by the JUNG SERVICE department.

We have assumed that you have already switched on the machine and traversed to the reference point in all the chapters below that deal with the machine functions.

*Information*

If you attempt to traverse the machine to the reference point with the override switches set to 0 (see section 3.2 “Machine control unit” on page 51, position 10, 11 und 12), you will not be able to do so in the corresponding axes.

You can use the override switches to control the traversing speed of the axes up to the hardware cams. The traversing speed from the cams back to the reference marks is fixed and cannot be altered with the override switches.

If the override switch for the axis that is currently traversing from the hardware cam to the reference mark is completely disabled (i.e. set to 0), the traverse to the reference point is terminated with an error message ("10227 : Channel 1 : Command cancelled"). You must confirm the error message by pressing RESET (see section 3.2 “Machine control unit” on page 51, position 36), and then restart the traverse to the reference point.

To realize traversing to the reference point

- Switch the master switch on the machine on.
  - Wait until the control unit has booted up (approx. 2-3 min).
  - The message "Important! Traverse to machine reference point" then appears on the display of the control unit.
• Switch the **machine control unit on** (see section 3.2 “Machine control unit” on page 51, position 9).

• Set the **key switch** for changing the operating mode to the **automatic** position (see section 3.2 “Machine control unit” on page 51, position 33).
  – The message "Wheel radius OK" appears.

• Check this message and confirm it by pressing the "OK" softkey.

• If a guard door is fitted, close it.

• Press the "**RESET**" key (see section 3.2 “Machine control unit” on page 51, position 36).

• Press **NC-Start** (see section 3.2 “Machine control unit” on page 51, position 37).
  – The **NC axes of the machine are traversed to the reference point one at a time. A green bar marks the axis that is currently being referenced.**

After you have traversed to the reference point, the main "**Machine Jung**" screen is displayed. You can change to a different module by pressing the "change module" key (see section 3.1 “Control unit” on page 47).
5.3 Tool management

5.3.1 Function tree structure

Structure if grinding wheel management is selected

Structure if dresser management is selected
5. Functions of the machine

5.3.2 Tool management generally

The tool management mask contains all the management information relating to the grinding wheel and the dressing diamond. The grinding wheel data and the dresser data is entered here. You must always check, and if necessary update, this data before setting the actual values.

**Minimum grinding wheel radius = 4.13 inch.**

- After you have traversed to the reference point, press the "change module" key (see section 3.2 “Machine control unit” on page 51, position A12).
- Now press the "Tool Management" softkey.
  - The main tool management screen is then displayed. You can select either grinding wheel or dresser management here.

If the grinding wheel management mask was active the last time you closed the tool management menu, this mask will be activated again automatically the next time you open the menu. The same applies analogously to the dresser management mask.

5.3.3 Grinding wheel management

You can manage up to 100 different grinding wheels in the grinding wheel management mask.

**No contours are entered for the grinding wheels. If you want to change a wheel, you must check whether the contour needs to be adapted as well.**

- Press the "Grinding wheels" softkey in the "Tool Management" module.
Press the "New" softkey if you want to create a "New grinding wheel" record.

You can copy or delete grinding wheel records with the "Copy" and "Delete" softkeys.

The value shown in the "Diameter" column is the diameter of the new grinding wheel and not the active wheel diameter.

Enter the data for the new grinding wheel in the "New grinding wheel" mask.

You must always enter number 401 for the "Tool type" parameter in the "New grinding wheel" mask. This ensures that the grinding wheel is calculated and compensated correctly.

The "Parameter grinding wheel" screen is displayed when you press the "Selection OK" softkey in the grinding wheel management mask.

- The data of the selected grinding wheel and the active grinding wheel is displayed here. You can modify this data if necessary.
The wheel that is selected in the grinding wheel management mask is not necessarily the same as the wheel that is active in the program. You can make the "selected grinding wheel" the "active grinding wheel" by pressing the "Start change" softkey here.

You can only change the actual value of the grinding wheel diameter by pressing the "Actual = New" softkey.

The dressing datum is set once and does not change ("Actual = new" softkey). It is not shifted parallel to the actual wheel width (B act) if values are entered in Z1 and Z2.
Example: Entering wheel data for face grinding

- Change $B_{\text{new}}$ to 23 on the "Parameter grinding wheel" screen.

*You can only change the grinding wheel actual value $B_{\text{act}}$ by pressing the "Actual = new" softkey.*

- Press the "Actual = new" softkey.
  - This causes the $B_{\text{new}}$ value to be copied to $B_{\text{act}}$ and $Z_1$ and $Z_2$ to be set to 0. The new grinding wheel width ($B_{\text{new}}$) is the actual wheel width ($B_{\text{act}}$) + the dressing sum ($Z_1 + Z_2$).

*Important*

- If you press the "Actual = new" softkey, the dressing sum $Z_1 + Z_2$ in the "Face/path" column is set to 0. You should therefore only do so in a few specific situations, for example if you are mounting a new grinding wheel. If you are likely to need the dressing values displayed for $Z_1$ and $Z_2$ again later on, you should make a note of them first so that you can re-enter them subsequently. Otherwise, they will be lost.

- Now press the "Start change" softkey.

- Next, set $Z_1$ to 1 and $Z_2$ to 1 in the "Face/path" column on the "Parameter grinding wheel" screen.

<table>
<thead>
<tr>
<th>Wheel width $B_{\text{new}}$</th>
<th>$B_{\text{act}}$</th>
<th>$Z_1$</th>
<th>$Z_2$</th>
<th>$= 25$</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>+1</td>
<td>+1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You are now ready to start face pre-dressing.
Always proceed in the order described above!

- After you have changed the grinding wheel, the SUG confirmation screen should be displayed. If it is not, please press the "Confirm SUG" softkey.
Check the values, then press "OK" to confirm or "Cancel" if you want to change any of the settings again.

5.3.4 **Dresser management**

You can manage up to 30 different dressers in the dresser management mask.

*The correction values you enter in the dresser management mask are not valid for pre-dressing. The diamond data specified in the standard geometries is taken for this operation instead.*

- Select dresser management in the tool management menu.
Press the "New" softkey if you want to create a "new dresser record".

**You can create up to 30 different data records for each dresser.**

- You can copy or delete records with the "Copy" and "Delete" softkeys.

- The "Parameter dresser" screen is displayed when you press the "Selection OK" softkey.
The data for the selected dressers and the active dressers is displayed here. You can modify this data if necessary.

**Caution**

The pre-dressing data in "Grips" is always valid for the pre-dressing operation. The values you enter here must never be higher than the diamond values entered in the Grips program for calculating the swivel angle. If you ignore this warning, a collision will occur. It is best to use the same values as in Grips.

**Important**

The dresser that is selected in the dresser management mask is not necessarily the same as the dresser that is active in the program. You can make the "selected dresser" the "active dresser" by pressing the "Start change" softkey here.
5.4 Setting actual values

Before setting the actual values, you must enter the correct diamond and grinding wheel data in the "Tool Management" mask. At the very least, you should check this data prior to activating the "actual values" function.

You can only set the actual values in the "reset" state (i.e. no programs must be executing).

The function tree structure for setting actual values is shown in chapters 5.1.1 and 5.1.2 for all operating variants.

The full "actual value setting" functionality is only available in automatic mode. In semi-automatic mode the new values are not displayed immediately. You must first change over to automatic mode and then press the "Select Area" softkey before the values are updated on the screen.

If you set the actual values in "Automatic" mode, you must close the guard door first (if one is fitted). Otherwise, the new values will not be displayed on the screen immediately.

If you set the actual values with contour diamonds, the entered diamond radius is added on automatically.

5.4.1 Setting actual values for table dressing

The "Actual values table dressing" function defines the dimensional relationship between the grinding wheel and a dressing diamond. A grinding wheel is positioned to an exactly adjusted dressing diamond before the actual values are set. This is a basic prerequisite of all automatic program cycles.

It is a good idea to reference all the dressing diamonds using the same grinding wheel (reference wheel). Otherwise, the diamond positions may be incorrect in relation to one another if you make a mistake. You can correct the diamonds individually in the tool management mask.

Activating table dressing

- Press the "Set dress. table" softkey in the softkey row on the right of the "Machine Jung" screen.
5. Functions of the machine

5.4.1.1 Setting actual values with a single diamond /PA30/130T (optional)

- Select either the "front" or the "back wheel edge" using one of the arrow keys (see section 3.1 “Control unit” on page 47, position 8, 12, 14 or 18).
  - The diamonds are calculated in relation to this wheel edge.

- Then change to the dressing station area (various dressers are available as options) by pressing the "END" key (tab key, see section 3.1 “Control unit” on page 47, position D 17).
  - The active input field has a yellow background, while the numeric field inside it, containing the dresser, has a blue background.

- Select the dressing tool you want to set.

- Confirm your choice of dressing tool by pressing the "Select diamond + station" softkey.

- Now probe the grinding wheel with the selected dressing tool (diamond/diamondroll).
  - First position the X-axis under the middle of the grinding wheel (grinding spindle centre point). Then press the "Set X-Axis" softkey.
  - In order to set the diamond/diamondroller in the Y-axis, you must probe it with the perimeter side of the grinding wheel. Now press the "Set Y-axis" softkey.
  - In order to set the diamond/diamond roller in the Z-axis, you must probe it with the front or back edge of the grinding wheel. Now press the "Set Z-Axis" softkey.
Setting actual values with an AT35/70 (optional)

- Select either the "front" or the "back wheel edge" using one of the arrow keys (see section 3.1 “Control unit” on page 47, position 8, 12, 14 or 18).
  - The diamonds are calculated in relation to this wheel edge.

Diamond 1 is always used to set the actual values on the front edge of the grinding wheel. Diamond 2 is always used for the back edge. The wheel edge that is selected on the "Set actual values, table dressing" screen is irrelevant.

- Then change to the dressing station area (various dressers are available as options) by pressing the "END" key (tab key-Taste, see section 3.1 “Control unit” on page 47, position D 17).
  - The active input field has a yellow background, while the numeric field inside it, containing the dresser, has a blue background.

- Select "Diamond 1".

- Confirm your choice of dressing tool by pressing the "Select diamond + station" softkey.

- Now probe the grinding wheel with the selected dressing tool (diamond 1).
  - First position the X-axis under the middle of the grinding wheel (grinding spindle centre point). Then press the "Set X-Axis" softkey.
  - In order to set the diamond 1 in the Y-axis, you must probe the dressing tool with the perimeter side of the grinding wheel. Now press the "Set Y-axis" softkey.
  - In order to set the diamond 1 in the Z-axis, you must probe it with the front edge of the grinding wheel. Now press the "Set Z-Axis" softkey.

- Now select "Diamond 2".

- Confirm your choice of dressing tool by pressing the "Select diamond + station" softkey.

- Now probe the grinding wheel with the selected dressing tool (diamond 2).
  - First position the X-axis under the middle of the grinding wheel (grinding spindle centre point). In practice, the same X-axis position is normally used as for diamond 1. Then press the "Set X-Axis" softkey.
  - In order to set the diamond 2 in the Y-axis, you must probe the dressing tool with the perimeter side of the grinding wheel. Now press the "Set Y-axis" softkey.
  - In order to set diamond 2 in the Z-axis, you must probe the back edge of the grinding wheel with it and dress this edge slightly. Then measure the wheel width and compare it with the value entered in the grinding wheel management mask. Correct the difference by adjusting the Z-axis in the plus or minus direction. Now press the "Set Z-Axis" softkey.

The actual values for a second station can be set in the same way as for the first station.
5.4.1.2 Probing control in the AT Y-axis and the AT Z-axis (optional)

The probing control allows you to probe either manually with confirmation or automatically by deactivating the probing infeed.

If you select automatic probing with the probing control, there is a probing travel of 0.079 inch. You must receive the probing signal during these 0.079 inch, or an error message will be output. You can carry out the probing operation manually using the electronic handwheel. The infeed motion with the handwheel is blocked as soon as the probing signal is detected.

You can set the sensitivity of the probing control directly. Please study the original instructions provided by the manufacturer.

Probing manually with confirmation

In order to probe manually, you must be in either setting-up or semi-automatic mode.

- Press the "AT ON" softkey on the "Set dress. table" screen.
  - The "Status probing control" field then appears in the bottom right-hand area.

- If you probe a diamond manually with the grinding wheel using the electronic handwheel, and in doing so trip the probing signal, the colour of the box in the "Status probing control" field will change from green to red.

You can continue positioning with the electronic handwheel.

- Now set the actual values for the axis in which you have just probed.

- You can deactivate the "Status probing control" field again by pressing the "AT OFF" softkey.

Probing automatically with the electronic handwheel

Ult is only possible to probe automatically in automatic mode.

The functions and values contained in the "Probe before grinding" field in the "Grinding program functions" menu are ignored when the machine probes before setting actual values.

If you also want the automatic probing operation to be signalled visually, you can activate the "Status probing control" field by pressing the "AT ON" softkey.

- Press the "AT Y-Axis NC Start" or "AT Z-Axis NC Start" softkey on the "Set dress. table" screen, depending on the axis in which you want to probe first.

- You can thus probe a dressing diamond with the grinding wheel in the selected axis using the electronic handwheel. The handwheel is deactivated as soon as the probing signal is tripped.
If you have also selected "Status probing control", the colour of the box changes from green to red.

Now set the actual values for the axis in which you have just probed.

Proceed to the next axis.

To change the default values for probing with the machine before setting actual values:

- Press the Change module key (see section 3.1 “Control unit” on page 47, position 12).
- Press the "Services" softkey.
- Press the "Manage data" softkey.

The "Subprograms" directory contains two programs called AT_Y.SPF and AT_Z.SPF. AT_Y.SPF is shown here as an example.

The values which appear on the display are preselected as default.

\[
\text{RS}[129] = 2 \quad \text{For AT_Y.SPF program (please do not alter)}
\]
\[
3 \quad \text{For AT_Z.SPF program (please do not alter)}
\]

\text{RS}[129] \text{ is preset either to 2 for AT_Y or to 3 for AT_Z, depending on the selected program. You are not allowed to change it here.}

\[
\text{RS}[132] = 0 \quad \text{No probing correction}
\]
If a value is entered, the grinding head positions upwards by this amount (value in m) as soon as a probing signal is received.

RS[133] = -2 Maximum probing travel. Important: The sign determines the direction in the Z-axis!

RS[134] = 0 Handwheel active.
If a value is entered, it is used as the active feed rate (in mm/min)

5.4.2 Setting actual values for the AF65 dressing head (optional)

The "Actual values dressing head AF65" function defines the dimensional relationship between the grinding wheel and the dressing diamond. The dressing diamond is positioned to the grinding wheel before the actual values are set. This is a basic prerequisite of all automatic program cycles.

It is a good idea to reference all the dressing diamonds using the same grinding wheel (reference wheel). Otherwise, the diamond positions may be incorrect in relation to one another if you make a mistake.

Activating head dressing

- Press the "Set dress head" softkey in the softkey row on the right of the "Machine Jung" screen.

- Select either the "front" or the "back wheel edge" using one of the arrow keys (see section 3.1 “Control unit” on page 47, position 8, 12, 14 or 18)
  - The diamond is calculated in relation to this wheel edge.
5. Functions of the machine 26.7.02 115

- Probe the perimeter side of the grinding wheel in the V-axis with the dressing diamond.

- Press the "Set V-Axis" softkey.

5.4.2.1 Probing manually with confirmation

The probing control allows you to probe manually with confirmation.

In order to probe manually, you must be in either setting-up or semi-automatic mode.

- Press the "AT ON" softkey on the "Set dress. table" screen.
  - The "Status probing control" field then appears in the bottom right-hand area.

- If you probe the grinding wheel with the V-axis of the dresser (sleeve with dressing diamond), and in doing so trip the probing signal, the colour of the box in the "Status probing control" field will change from green to red.

- Now set the actual values for the V-axis.

- You can deactivate the "Status probing control" field again by pressing the "AT OFF" softkey.

5.4.3 Setting actual values for the PA 31K dressing head (optional)

The "Actual values dressing head PA 31K" function defines the dimensional relationship between the grinding wheel and the dressing diamond. The dressing diamond is positioned to the grinding wheel before the actual values are set. This is a basic prerequisite of all automatic program cycles.

It is a good idea to reference all the dressing diamonds using the same grinding wheel (reference wheel). Otherwise, the diamond positions may be incorrect in relation to one another if you make a mistake.

Activating head dressing

- Press the "Set dress head" softkey in the softkey row on the right of the "Machine Jung" screen.
Select "front wheel edge" using any of the arrow keys (see section 3.1 “Control unit” on page 47, position 8, 12, 14 or 18)
   – The diamonds are calculated in relation to this wheel edge.

Then change to the dressing tools box (various dressers are available as options) by pressing the "END" key (tab key, see section 3.1 “Control unit” on page 47, position D17).

The active input field has a yellow background, while the numeric field inside it for selecting the dressing tool has a blue background.

Select the required dressing tool (PA 31K D7, D8, D9 or D10 Station1).

Confirm your chosen dressing tool by pressing the "Select dia + station" softkey.

Then probe the grinding wheel with the selected dressing tool (PA 31K D7, D8, D9 or D10 Station1).
   – *In order to set a diamond in the U-axis, you must probe the circumference of the grinding wheel with this diamond and press the "Set U-axis" softkey.*
   – *In order to set a diamond in the W-axis, you must probe the front or back edge of the grinding wheel with this diamond and press the "Set W-axis" softkey.*
5.4.4 Setting actual values for grinding

The "Actual values grinding" function defines the dimensional relationship between the grinding wheel and a workpiece or the magnetic table. The workpiece is probed with a dressed grinding wheel before the actual values are set. This is a basic prerequisite of all automatic program cycles.

Activating setting actual values for grinding

- Press the "Actual values grinding" softkey in the softkey row on the right of the "Machine Jung" screen.

- Enter an area (1 - 9) and press the "Select area" softkey. This area must be the same as the machining area you selected on the main "Grinding program" screen.
  - This input selects the actual value system for grinding.

- Select either the "front" or the "back wheel edge" using one of the arrow keys (see section 3.1 “Control unit” on page 47, position 8, 12, 14 or 18).
  - This is the grinding wheel edge that is used to probe the workpiece. The program is always calculated in relation to the front wheel edge.

If you select the special "Multiple plunge grinding" program (see section 5.5.14.1 “Special multiple plunge grinding program (optional)” on page 159) only the "front" wheel edge is active. It is activated automatically.

- Then change to the input values area (various dressers are available as options) by pressing the "END" key (tab key, see section 3.1 “Control unit” on page 47, position D 17).
5. Functions of the machine

– The active input field has a yellow background, while the numeric field inside it has a blue background. Enter the required value here.

- Press the "END" key (tab key, see section 3.1 “Control unit” on page 47, position D 17) again to advance to the input fields for the other axes. Enter the required values in the same way.

- Now press the softkeys for the axes you want to set ("Set X-Axis", "Set Y-Axis" and "Set Z-Axis").
  – The actual values for grinding are then set.

- You can also teach the current value for a selected axis if the "Teach current value" softkey is active (black lettering).

5.4.4.1 Probing control in the AT Y-axis and the AT Z-axis (optional)

The probing control allows you to probe either manually with confirmation or automatically by deactivating the probing infeed.

If you select automatic probing with the probing control, there is a probing travel of 0.079 inch. You must receive the probing signal during these 0.079 inch, or an error message will be output. You can carry out the probing operation manually using the electronic handwheel. The infeed motion with the handwheel is blocked as soon as the probing signal is detected.

You can set the sensitivity of the probing control directly. Please study the original instructions provided by the manufacturer.

Probing manually with confirmation

In order to probe manually, you must be in either setting-up or semi-automatic mode.

- Press the "AT ON" softkey on the "Act. Values grinding" screen.
  – The "Status probing control" field then appears in the bottom right-hand area.

- If you probe a workpiece manually with the grinding wheel using the electronic handwheel, and in doing so trip the probing signal, the colour of the box in the "Status probing control" field will change from green to red.

- Now set the actual values for the axis in which you have just probed.

- You can deactivate the "Status probing control" field again by pressing the "AT OFF" softkey.
Probing automatically with the electronic handwheel

**It is only possible to probe automatically in automatic mode.**

The functions and values contained in the "Probe before grinding" field in the “Grinding program functions” menu are ignored when the machine probes before setting actual values

**If you also want the automatic probing operation to be signalled visually, you can activate the "Status AT Control" field by pressing the "AT ON" softkey.**

- Press the "AT Y-Axis NC Start" or "AT Z-Axis NC Start" softkey on the "Actual values grinding" screen, depending on the axis in which you want to probe first.

- You can thus probe a workpiece with the grinding wheel in the selected axis using the electronic handwheel. The handwheel is deactivated as soon as the probing signal is tripped.

- If you have also selected "Status probing control", the colour of the box changes from green to red.

- Now set the actual values for the axis in which you have just probed.

- Proceed to the next axis.

**To change the default values for probing with the machine before setting actual values:**

- Press the Change module key (see section 3.1 “Control unit” on page 47, position 12).

- Press the "Services" softkey.

- Press the "Manage data" softkey.

The "Subprograms" directory contains two programs called AT_Y.SPF and AT_Z.SPF. AT_Y.SPF is shown here as an example.
The values which appear on the display are preselected as default.

**RS[129]** =
- 2 For AT_Y.SPF program (please do not alter)
- 3 For AT_Z.SPF program (please do not alter)

**Important**

**RS[129]** is preset either to 2 for AT_Y or to 3 for AT_Z, depending on the selected program. You are not allowed to change it here.

**RS[132]** = 0 No probing correction
- If a value is entered, the grinding head positions upwards by this amount (value in m) as soon as a probing signal is received.

**RS[133]** = -2 Maximum probing travel. Important: The sign determines the direction in the Z-axis!

**RS[134]** = 0 Handwheel active.
- If a value is entered, it is used as the active feed rate (in inch/min)
5. Functions of the machine

5.5 Creating and modifying grinding programs

- You can select any machining area (1 - 9) for each grinding program. Programs with different machining areas can be linked together in a batch program.

- You can grind up to 999 grooves or surfaces with the technology input for "grooves or surfaces with regular spacing".

- You can optionally grind up to 40 grooves or surfaces with the technology input for "grooves or surfaces with irregular spacing".

- If you change the geometry or technology data during a program cycle, you can cause it to take effect immediately in the active program by pressing the "Write act. data" softkey.

5.5.1 Grinding program functions

You can enter various general settings that are valid for all grinding programs with "Program functions" in the "Grinding program" mask.

- Press the "Grinding program" softkey in the "Program Jung" module.

- Press the "Program functions" softkey.

- Select the required functions for your grinding programs here, then press the "Write act. data" softkey.

**Important**

Any changes you make to the program functions do not take effect until you press the "Write act. data" softkey.
5.5.1.1 **Automatic probing in the grinding program**

The values you enter for the program functions in the "Probe before grinding" block only refer to automatic probing in a grinding program.

*If you set actual values with automatic probing functions, the functions and values you select or enter here will be ignored.*

- If you want to probe automatically in the grinding program, select "Automatically with probing cont."

- Enter the required "Prob. feed rate" in inch/min and if necessary a suitable "Probing correction" value in 0.00001 inch.

- Then press the "Write act. data" softkey. These values take effect immediately and apply to all automatic grinding programs until you select automatic probing "OFF".
5.5.2 Function tree structure for surface grinding
### 5.5.3 Surface grinding

The reciprocating surface grinding function is used to grind the surface of a workpiece (e.g. on a magnetic work table). The X-axis (grinding table) effects a longitudinal, oscillating motion between adjustable, reciprocating cams. The Z-axis (grinding table in the cross direction) effects either a continuous or an incremental oscillating motion between similarly adjustable cams. The infeed motion is controlled via the Y-axis (vertical axis of the grinding head). It is effected at the cams in the Z-axis.

**Activating surface grinding**

- Set the key switch to the *automatic* position (see section 3.2 “Machine control unit” on page 51, position 33).
- Press the "change module" key (see section 3.1 “Control unit” on page 47, position 12).
- Press the "Program Jung" softkey.
- Press the "Grinding program" softkey.
- Press the "Surface grinding" softkey.
  - You can now enter the geometry data on the "Surfaces unif. spacing" screen.

You can change to the geometry area for "Surface irregular spacing" by pressing the "Irregular spacing" softkey.
Enter the required geometry data on the "Surfaces unif. spacing" or "Surfaces irregular spacing" screen.

You can also teach the current value for a selected axis if the "Teach current value" softkey is active (black lettering).

Press the "Selection" softkey.

Now press the "Write act. data" softkey.

Press the "Technology r. surface" softkey.

If you activate the check box for "Change reference edge", the reference edge of the grinding wheel changes automatically between the front and back reversing positions during reciprocating surface grinding. Example: In the front reversing position, the back wheel edge is the reference edge. If the reference edge is changed, the front wheel edge becomes the reference edge in the back grinding position. Consequently, there is no need to take account of the width of the grinding wheel when calculating the traverse path in the Z-axis.
Enter the required technology data.

Information

**Meaning of the "Dr. after N." input field**

- **Input 0** = Dressing in the roughing area (according to the roughing depth)
  
  Dressing at the roughing/finishing transition (according to the Y/S allowance)

- **Input 1** = Dressing after every surface

- **Input 2** = Dressing after every second surface, etc.

- Press the "Selection" softkey.

- Now press the "Write act. data" softkey.
5.5.4 Function tree structure for plunge grinding

- Program Jung
  - Grinding program
    - Surface grinding
    - Plunge grinding
      - Technology r. plunge
        - Uniform spacing
        - Irregular spacing
      - Technology creep feed
        - Uniform spacing
        - Irregular spacing
      - Irregular spacing
        - Uniform spacing
        - Value from clipboard
        - Value to clipboard
        - Write act. data
      - Dressing program
        - Write act. data
        - Main screen
        - Selection
      - Write act. data
  - Face grinding
  - Stat. Plunge grinding
  - Recip. path Z-Y
  - Recip. path X-Y
  - Program functions
    - Chapter 5.5.1
      - Write act. data
      - Act grind. geometry
      - Act grind. technology
    - Dressing program
      - Return to Program Jung
5.5.5 Einstechschleifen

There are two possible plunge grinding technologies.

**Reciprocating plunge grinding** is used, for example, to grind a groove in a workpiece by means of an oscillating, reciprocating motion in the X-axis (reciprocating table) and an automatic infeed motion in the Y-axis (grinding head).

**Creep-feed grinding** entails probing a workpiece with the grinding wheel. This is followed by a large infeed motion (often a few millimetres) in the Y-axis (grinding head). A groove is then ground in the workpiece by means of a relatively slow table motion in the X-axis (longitudinal axis). An optimum coolant supply is essential. This method permits a relatively large quantity of material to be cut within a short time.

**Activating plunge grinding**

- Set the key switch to the automatic position (see section 3.2 “Machine control unit” on page 51, position 33).

- Press the "change module" key (see section 3.1 “Control unit” on page 47, position 12).

- Press the "Program Jung" softkey.

- Press the "Grinding program" softkey.

- Press the "Plunge grinding" softkey.
  - You can now enter the geometry data on the “Groove unif. spacing” screen.

You can change to the geometry area for "Groove irregular spacing" by pressing the "Irregular spacing" softkey.
Enter the required geometry data on the "Groove unif. spacing" or "Groove irregular spacing" screen. You can also teach the current value for a selected axis if the "Teach current value" softkey is active (black lettering).

- Press the "Selection" softkey.
- Now press the "Write act. data" softkey.
- Now select the required grinding technology, namely "reciprocating plunge grinding" or "creep-feed grinding" (optional).

### 5.5.5.1 Reciprocating plunge grinding technology

*If you select a very short reciprocating motion in the X-axis, the grinding head infeed (Y-axis) will be so slow that it can no longer be effected at every reversing position. The infeed motions will consequently be irregular.*

- Press the "Technology r. plunge" softkey.
Enter the required technology data.

**Meaning of the "Dr. after N." input field**

**Input 0** = Dressing in the roughing area (according to the roughing depth)

Dressing at the roughing/finishing transition (according to the Y/S allowance)

**Input 1** = Dressing after every groove

**Input 2** = Dressing after every second groove, etc.

- Press the "Selection" softkey.
- Now press the "Write act. data" softkey.

### 5.5.5.2 Creep-feed grinding technology (optional)

Set the optimum coolant supply and clamp the workpiece securely onto the grinding table. The forces acting on the workpiece during creep feed grinding may be considerable.

The gripping force of the magnet must be adjusted to the maximum value.

- Press the "Technology creep feed" softkey.
Enter the required technology data.

Activate AC regulation by marking the "AC-regulation" check box.

**Principle of AC regulation**

AC regulation is only active in conjunction with a roughing feed motion. The preselected power limit (P max.) cannot be exceeded.

If you have selected a roughing feed value (Fx roughing) which causes the grinding spindle drive to reach the preselected power limit of the grinding spindle motor (P max.), this feed is automatically reduced. If the load on the grinding spindle drive is reduced slightly, the roughing feed is increased again proportionally up to the preselected maximum limit. The roughing feed is in other words controlled as a function of the preselected power limit of the grinding spindle motor.

**Description of the most important input fields**

Dr. after N.

- **Input 0** = Dressing in the roughing area (according to the roughing depth)
- **Input 1** = Dressing at the roughing/finishing transition (according to the Y/S allowance)
- **Input 2** = Dressing after every groove, etc.

**P max.** = Maximum power of the grinding spindle motor as a percentage of the maximum possible power.

**F_ACstart** = Starting feed as a percentage of the programmed feed. Effective from the set cam until the point at which the grinding wheel penetrates the workpiece and consumes a current of 3 A. Only then is the AC regulation function activated.
- Press the "Selection" softkey.
- Then press the "Write act. data" softkey.

**To correct the nominal value for the grinding spindle current consumption**

- Press the "Change module" key (12 on the control unit).
- Press the "Machine Jung" softkey.
- Press the "AC correction" softkey.

You can change the nominal value for the current consumption in increments by pressing the four softkeys (+0.1 / +1 / -0.1 / -1). You can also do so while the program is running. If the green bar that indicates the nominal value changes to a red bar, you have exceeded the limit value.
5.5.6 Function tree structure for face grinding (optional)
5.5.7 Face grinding (optional)

Face grinding is used to grind an end face in a groove or a side face on a workpiece, using a back-sloping grinding wheel. The infeed motion is controlled via the Z-axis.

"Face with irregular spacing" is the only geometry allowed for face grinding.

Activating face grinding

- Set the key switch to the automatic position (see section 3.2 “Machine control unit” on page 51, position 33).
- Press the "change module" key (see section 3.1 “Control unit” on page 47, position 12).
- Press the "Program Jung" softkey.
- Press the "Grinding program" softkey.
- Press the "Face grinding" softkey.
  - You can now enter the geometry data on the "Face with irregular spacing" screen.
  - Enter the required geometry data.
  - You can also teach the current value for a selected axis if the "Teach current value" softkey is active (black lettering).
  - Press the "Selection" softkey.
- Now press the "Write act. data" softkey.
- Press the "Technology r. face" softkey.

Enter the required technology data.

**Meaning of the "Dr. after N." input field**

**Input 0** = Dressing in the roughing area (according to the roughing depth)  
Dressing at the roughing/finishing transition (according to the Y/S allowance)

**Input 1** = Dressing after every face

**Input 2** = Dressing after every second face, etc.

- Press the "Selection" softkey.
- Now press the "Write act. data" softkey.
5. Functions of the machine

5.5.8 Function tree structure for stationary plunge grinding (optional)

Diagram:
- Program Jung
  - Grinding program
    - Surface grinding
    - Plunge grinding
    - Face grinding
    - Stat. Plunge grinding
      - Technology
        - Uniform spacing
        - Irregular spacing
      - Recip. path Z-Y
      - Recip. path X-Y
    - Recip. path
      - Irregular spacing
      - Uniform spacing
    - Dressing program
      - Value to clipboard
      - Value from clipboard
      - Write act. data
      - Main screen
      - Selection
    - Write act. data
    - Act grind technology
    - Act grind geometry

Back to Program Jung
5.5.9 Stationary plunge grinding (optional)

This form of plunge grinding entails infeeding the grinding head (Y-axis) continuously at a programmable rate. It takes place without an oscillating, reciprocating motion in the X-axis, in other words the X-axis is stationary. You must enter identical values for X+ and X-.

Activating stationary plunge grinding

- Set the key switch to the automatic position (see section 3.2 “Machine control unit” on page 51, position 33).
- Press the "change module" key (see section 3.1 “Control unit” on page 47, position 12).
- Press the "Program Jung" softkey.
- Press the "Grinding program" softkey.
- Press the "Stat. plunge grinding" softkey.
  - You can now enter the geometry data on the "Plunge N. unif. spacing" screen.

You can change to the geometry area for Plunge N. irregular spacing by pressing the "Irregular spacing" softkey.
Enter the required geometry data on the "Plunge N. unif. spacing" or "Plunge N. irregular spacing" screen.

You can also teach the current value for a selected axis if the "Teach current value" softkey is active (black lettering).

- Press the "Selection" softkey.
- Now press the "Write act. data" softkey.
- Press the "Technology plunge" softkey.
Enter the required technology data.

If you have set identical values for "X+" and "X-" in the geometry data, an oscillating, reciprocating motion cannot be effected in the X-axis. Consequently, you cannot enter values for "Y rough. infeed", "Y fin. infeed" or "Fy", and these fields are greyed out. The values that appear there are calculated automatically by the control.

If you have set different values for "X+" and "X-" in the geometry data, a corresponding oscillating, reciprocating motion will be effected in the X-axis. In this case, you are not allowed to enter values for "Fy finishing" and "Fy roughing", and these fields are greyed out. The values that appear there are calculated automatically by the control.

Since the values are calculated from the reciprocating travel, the Fx feed rate and the Y infeed, the feed rates in the Y-axis will only be correct if the reciprocating axis is not a hydraulic axis.

Make sure you enter the correct signs for the reciprocating values, or negative feed rates will be calculated.
Meaning of the "Dr. after N." input field

Input 0 = Dressing in the roughing area (according to the roughing depth)
         Dressing at the roughing/finishing transition (according to the Y/S allowance)

Input 1 = Dressing after every groove

Input 2 = Dressing after every second groove, etc.

- Press the "Selection" softkey.
- Now press the "Write act. data" softkey.
5.5.10 Function tree structure for Z - Y reciprocating path grinding (optional)
5.5.11 Z - Y reciprocating path grinding (optional)

Z - Y path grinding entails machining a contour over the entire Z-axis by interpolating the Z and Y-axes. This contour is also dependent on the radius at the circumference of the grinding wheel.

*You must enter the radius at the circumference of the grinding wheel on the grinding wheel management screen (see section 5.3.3 “Grinding wheel management” on page 101).*

Activating Z - Y reciprocating path grinding

- Set the key switch to the **automatic** position (see section 3.2 “Machine control unit” on page 51, position 33).

- Press the "**change module**" key (see section 3.1 “Control unit” on page 47, position 12).

- Press the "**Program Jung**" softkey.

- Press the "**Grinding program**" softkey.

- Press the "**Recip. path Z - Y**" softkey.
  - The "**Z - Y path geometry**" mask is now displayed and you can enter the geometry data.

- Enter the required geometry data.

You can also teach the current value for a selected axis if the "**Teach current value**" softkey is active (black lettering).

- Click on the "**Open file list box**" button.
– This opens a list box in which you can either load a file from a contour directory or unload a loaded file.

- Press the "Selection" softkey.
- Then press the "Write act. data" softkey.
- Press the "Technology r. path Z - Y" softkey.

Enter the required technology data.

**Description of the most important input fields**

**Possible selections in the machining mode area**

**Plus** = The path is only machined in the plus direction, in other words from the front of the workpiece to the back. The grinding head is then positioned in the Y-axis either to the relative relief value or to the workpiece change position, depending on the settings in the "Grinding program functions" menu. It is always positioned via the maximum workpiece height for safety reasons. If path cycles still have to be executed, it is then repositioned to the start position in the Z-axis and to the grinding height of the next path cycle in the Y-axis. The next path cycle is executed.

**Minus** = The path is only machined in the minus direction, in other words from the back of the workpiece to the front. The machining cycle continues as described above for the plus direction, except that the opposite directions apply.

**2-dir** = The path is machined in both directions, starting with the plus direction.
**Fb roughing** = Path infeed during the roughing cycle outside the workpiece in the region of the reversing position.

**Fb finishing** = Path infeed during the finishing cycle outside the workpiece in the region of the reversing position.

**Tx+ / Tx-** = Precision stop at the X+ or X- reciprocating position

-2 = OFF

**Value** = Dwell time in seconds

**Path infeed** ✓ (selected) = doppelte Zustellung

**Path infeed** ☐ (not selectd) =einfache Zustellung

- Press the "Selection" softkey.
- Then press the "Write act. data" softkey.
5.5.12  Bahnpendelschleifen X - Y (Option) Bedienbaum-Struktur

Program Jung

Dressing program

Value to clipboard
Value from clipboard
Write act. data
Main screen
Selection

Surface grinding
Plunge grinding
Face grinding
Stat. Plunge grinding
Recip. path Z-Y
Recip. path X-Y

Dressing program
Technology r. path X-Y

Chapter 5.5

Chapter 5.5.13

Write act. data
Act. grind. technology
Write act. data

Programm functions
Act. grind. geometry

back to Program Jung
5.5.13 X - Y reciprocating path grinding (optional)

X - Y path grinding entails machining a contour over the X-axis by interpolating the X and Y-axes. This contour is also dependent on the diameter of the grinding wheel.

**Important**

You must enter the radius of the grinding wheel absolutely exactly beforehand on the grinding wheel management screen (see section 5.3.3 “Grinding wheel management” on page 101). You can correct the radius on the “Parameter grinding wheel” screen with the “Rcorr” input parameter in the “FRK radius” menu.

Activating X - Y reciprocating path grinding

- Set the key switch to the automatic position (see section 3.2 “Machine control unit” on page 51, position 33).
- Press the "change module" key (see section 3.1 “Control unit” on page 47, position 12).
- Press the "Program Jung" softkey.
- Press the "Grinding program" softkey.
- Press the "Recip. path X - Y" softkey.
  - The "X - Y path geometry" mask is now displayed and you can enter the geometry data.

![Diagram](image-url)
• Enter the required geometry data.

The start value in the X-axis (XS) always refers to machining in down-cut mode. XS is always on the left-hand side of the workpiece as seen by the operator.

You can also teach the current value for a selected axis if the "Teach current value" softkey is active (black lettering).

• Click on the "Open file list box" button.
  – This opens a list box in which you can either load a file from a contour directory or unload a loaded file.

• Press the "Selection" softkey.

• Then press the "Write act. data" softkey.

• Press the "Technology r. path X - Y" softkey.

• Enter the required technology data.

Description of the most important input fields

**Fb roughing** = Path feed rate (inch/min) during the roughing cycle.

**Fb finishing** = Path feed rate (inch/min) during the finishing cycle.
Possible selections in the machining mode area

– **Down-cut** = The path is machined in down-cut mode. This means that the X-axis is positioned from left to right at the programmed feed rate.

![Down-cut diagram]

– **Up-cut** = The path is machined in up-cut mode. This means that the X-axis is positioned from right to left at the programmed feed rate.

![Up-cut diagram]

– **Both** = The path is machined in both directions, starting in down-cut mode.

![Both diagram]

**CD-dressing ☑ (selected) =** If CD dressing is activated, the dressed value is compensated outside the path before the next path is ground.

**Cd-dressing ☐ (not selected) =** No CD dressing

**Program STOP ☑ (selected) =** The program stops after every pass. The next pass is started with NC start.

**Program STOP ☐ (not selected) =** The program runs continuously.

**Fillet ☑ (selected) =** Positioning without precision stop.

**Fillet ☐ (not selected) =** Positioning with precision stop at the programmed coordinates.
Feed rate optimization  (selected) = Feed rate at the inside radii referred to the wheel perimeter, otherwise to the wheel centre.

Feed rate optimization  (not selected) = Feed rate always referred to the wheel centre.

- Press the "Selection" softkey.
- Then press the "Write act. data" softkey.

5.5.14 Special programs (optional)

Activating special programs

- Press the "Special programs" softkey in the "Machine Jung" module.

Information

The special programs selection screen shown below only appears if you have two or more special programs. If your machine just has one special program, this screen is skipped and you can enter the special program geometry directly.

- Press the softkey for the required special program.
5.5.14.1 Special multiple plunge grinding program (optional)

When you set the actual values for grinding (see section 5.4.4 “Setting actual values for grinding” on page 117) the system automatically activates only the "front" wheel edge.

Please refer to the "Machine Jung" module for the structure of the function tree (see section 5.1.3 “Function tree structure of the Machine Jung module in automatic mode” on page 75).

This special program combines plunge grinding (either reciprocating plunge grinding or creep-feed grinding) with reciprocating surface grinding and the corresponding dressing cycles. The plunge grinding operation roughs the workpiece and the reciprocating surface grinding operation finish-grinds it.

Advantages of the program
This special program benefits from the high cutting performance of plunge grinding and the good surface quality of reciprocating surface grinding as well as offering optimum machining times.

General functional description

- First program step (roughing):
  - Depending on the width of the surface to be machined and the effective width of the grinding wheel, several parallel recesses are plunge-ground in order to cut as much material as possible within a short period.

- Second program step (finish-grinding):
  - The machined surface is then reground in a reciprocating surface grinding cycle in order to achieve the optimum surface quality.

You can assign the appropriate dressing technology to each of these program steps.

Activating special multiple plunge program (optional)

- Press the "Special programs" softkey in the "Machine Jung" module.

If your machine has two or more special programs, you will now see a selection screen. When it appears, press the "Multiple plunge grinding" softkey.
Mark the check box for "Activate multiple plunge grinding".

Select the required surface type.

**OUTSIDE** | **SHOULDER LEFT** | **INSIDE** | **SHOULDER RIGHT**
---|---|---|---

**Description of the most important input fields**

**Zu** = Enter the minimum overlap of the recesses here. This overlap is always ground again simultaneously with the next recess. The purpose of this is to compensate the wear on the wheel edges, among other things. The true overlap value may be slightly higher than the value programmed here. The control unit calculates an equivalent overlap value on the basis of the surface to be ground and the number of grinding passes. This value is then added to the overlap value entered here.

**Uel** = Overtravel of the grinding wheel beyond the surface during finish-grinding (reciprocating surface grinding). If you are grinding against a shoulder (left or right), this is the distance away from it up to which the machine positions (safety clearance).
BN/RS = No entries allowed.

Yaf = Finishing allowance for finish-grinding in reciprocating surface mode.

- After you have entered the geometry data, press the "Accept values" softkey.

- Press the "Tech. data multi. plunge" softkey.

Description of the most important input fields

- Select the required plunge grinding technology.
  - Choose either "Recip. plunge" for reciprocating plunge grinding or "Creep feed" for creep-feed grinding.
  - Either "Recip. plunge grinding data" or "Creep feed grinding data" appears, depending on your selection. Enter your technology data here.

Dr.Tech.No. = This input technology appears for both plunge grinding and reciprocating surface grinding. You can thus assign a suitable dressing technology to each of these program steps. Select one dressing technology here for plunge grinding and one for reciprocating surface grinding (chapter 5.6.5).

Add.Dr.Tech = Additional dressing technology at the roughing/finishing transition of the final groove.

Ret. mot. Y = This input technology appears for both plunge grinding and reciprocating surface grinding. You can thus assign an equivalent wheel wear to each of these program steps. Enter the amount you do not want to be compensated as a percentage of the dressing value (wheel wear).

- After you have entered the technology data, press the "Accept values" softkey.
Special case: Machining one groove only with multiple plunge grinding for one of the four surface types

The multiple plunge grinding option allows you to make use of the following advantage for one groove only. Rough-grind your groove in creep-feed mode, then clean the surface by reciprocating with the same, newly dressed wheel. This combines the benefits of creep-feed grinding (short machining times) with the advantages of reciprocating grinding (better surface).

**You must enter the following input parameter values for the geometry data, depending on the surface type.**

<table>
<thead>
<tr>
<th>OUTSIDE</th>
<th>SHOULDER LEFT</th>
<th>INSIDE</th>
<th>SHOULDER RIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
<td><img src="image3.png" alt="Diagram" /></td>
<td><img src="image4.png" alt="Diagram" /></td>
</tr>
<tr>
<td>Only meaningful if workpiece = max. wheel width Zu = 0</td>
<td>Zu = 0, Warning: Shoulder Zu = 0</td>
<td>Zs-Ze = Wheel width or less</td>
<td>Zu = 0, Warning: Shoulder Zu = 0</td>
</tr>
<tr>
<td>Uel = Left and right overtravel freely selectable</td>
<td>Zs = Plunge position, Warning: Shoulder</td>
<td>Zs-Ze = Wheel width or less</td>
<td>Ze = Plunge position, Warning: Shoulder</td>
</tr>
<tr>
<td>Zs-Ze = Wheel width or less</td>
<td></td>
<td></td>
<td>Ze = Wheel width or less</td>
</tr>
</tbody>
</table>

5.5.14.2 Special multiple plunge grinding

**Information**

Please refer to the “Machine Jung” module for the structure of the function tree. (see section 5.1.3 “Function tree structure of the Machine Jung module in automatic mode” on page 75).

This special program allows you to machine four different areas using either the same technology or different technologies in just one program.

**Advantages of the program**

You can write a program with up to four different areas. This is easier and quicker than writing a batch program. You can also optimize the chronological sequence of the program steps.
Activating special multiple plunge grinding

- Press the "Special programs" softkey in the "Machine Jung" module.

**If your machine has two or more special programs, you will now see a selection screen. When it appears, press the "Multiple plunge grinding" softkey.**

- Mark the check box for "Activate multiple plunge grinding".
This option allows you to machine areas with different heights. At the same time, however, there is a risk of collision between the grinding wheel and the workpiece or other obstacles.

Set the "Rel. relief value" field in the "Grinding program functions" menu (see section 5.5.1 “Grinding program functions” on page 121) to a sufficiently high value. This value should be high enough for the grinding head with the grinding wheel always to be positioned above the highest workpiece or the highest other obstacle.

Enter a sufficiently high value for the workpiece change position (see section 5.1.4 “Machine Jung module” on page 76, main "Machine Jung" screen, softkey shift key, "Settings/change positions" softkey). Mark the check box for "Retract to workpiece change position Y-axis" in the "Grinding program functions" menu (see section 5.5.1 “Grinding program functions” on page 121).

One of these two alternatives must be saved for the selected program. If you attempt to select it afterwards, the setting will only take effect if you save the program again.

- If you mark the check box for "Technology from program", you can copy the technologies (grinding, dressing from the program stored in the "Workpieces\MFS" directory (see section 5.1.6.2 “File manager” on page 89). The geometry data is overwritten with the values you enter here in the "Start" and "End" rows on the "Special program: multiple plunge grinding" screen.

If you leave this check box unmarked the currently active standard technology is used instead.

- Mark the check boxes for the required area.

- If you have marked the check box for "Technology from program", you must now enter a program for each of the required technologies in the row to the right of the areas.
  - These programs must be stored in the "Workpieces\MFS" directory and loaded. The third character of the file name must be an _ (underscore).
  - Enter the appropriate geometry values for the areas in the "Start" and "End" rows.

You can also teach the current value for a selected axis if the "Teach current value" softkey is active (black lettering).

- After you have entered all the data, press the "Accept values" softkey.
5.6 Dressing

5.6.1 Function tree structure

- Program
  - Jung
  - Dressing program
    - Dressing techno. 1
    - Dressing techno. 2
    - Dressing techno. 3
    - Dressing techno. 4
    - Dressing techno. 5
  - Grinding program
    - Value to clipboard
    - Value from clipboard
    - Tool and geometry
    - Write act. data
    - Main screen
    - Selection
  - Geometry circumfer.
  - Geometry freefrm 01
  - Face geometry
  - Write act. data
  - Main screen
  - Selection
  - Grinding program
    - Value to clipboard
    - Value from clipboard
    - Act. grind.
      - Act. grind. geometry
      - Act. grind. technology
      - Act. dress. technology
      - Write act. data
      - Dressing OFF
  - Program functions
    - Write act. data
5.6.2 Description of dressing

"Dressing" a grinding wheel means either providing the wheel with a contour with the aid of a dressing tool (diamond) or simply truing its perimeter.

**Warning**

Position the grinding wheel over the workpiece, a short distance away from it, before you start a manual dressing operation (see section 3.2 “Machine control unit” on page 51, position 35). If you ignore this warning, there will be a risk of collision between the grinding wheel and the workpiece when you traverse to the dressing position or back to the start position.

**Information**

A dressing program can only be started in semi-automatic mode if the guard door is closed.

5.6.3 Dressing program functions

**Activating dressing program functions**

- Set the key switch to the **automatic** (see section 3.2 “Machine control unit” on page 51, position 33).
- Press the "**change module**" key (see section 3.1 “Control unit” on page 47, position 12).
- Press the "**Program Jung**" softkey.
- Press the "**Dressing program**" softkey.
- Press the "**Program functions**" softkey.
5. Functions of the machine

5.6.4 Setting up PA 31K (optional)

You can display the setting-up mask for the PA 31K by pressing the "Settings/change positions" key on the extended "Machine Jung" screen (see section 5.1.4 “Machine Jung module” on page 76).
Enter one of the three possible PA31K stations in the input field.

You can also teach the current value for a selected axis if the "Teach current value" softkey is active (black lettering).

Press the "Accept values" softkey.

- The selected station is then activated together with the data which is stored for it.

Press the "Dia-parkpos. NC-Start" softkey to traverse to the selected parking position. The parking position in the U-axis is relative to the workpiece (depending on the diameter of the grinding wheel), while in the W and E-axes it is an absolute value based on the reference point.

Press the "Change Dia-number" softkey to change to the diamond which is entered in the "New diamond number" field.

Press the "Adjust Diamond" softkey to swivel the active diamond 60°. The swivel range is -60° - 0° - +60°.

Press the "Change Dia-holder" softkey to disengage the diamond holder from the dressing arm.

**Important**

Keep a firm grip on the diamond holder to prevent it from falling onto the machine table.

- Finally, press the "Accept values" softkey.

  - The values you have entered are now transferred to the NCU.
5.6.5 Dressing technology input

You can select the dressing technology here.

*The various dressing tools described in this chapter are available as options.*

**Activating dressing technology**

- Set the key switch to the **automatic** position (see section 3.2 “Machine control unit” on page 51, position 33).
- Press the "**change module**" key (see section 3.1 “Control unit” on page 47, position 12).
- Press the "**Program Jung**" softkey.
- Press the "**Dressing program**" softkey.
- You can create and save five different dressing technologies here.
- To deselect a dressing program: Press the "**Dressing OFF**" softkey. Then press the "**Write act. data**" softkey.
Entering the technology data for one of the five dressing technologies

- Press one of the five dressing technology softkeys, for example "Dressing Technology 1".

- Enter the required dressing technology data here.
  - \( N \) = Number of dressing infeed motions
  - \( \text{Infeed} \) = Infeed value in inch
  - \( V\text{ Sp.} \) = Cutting speed of the grinding wheel
  - \( Qd \) = Speed relation dressing roll/grinding wheel
  - \( \text{Feed rate} \) = Dressing speed in inch/min

- Press the "Selection" softkey.

- Now press the "Write act. data".

The pre-dressing technology must be entered in the first input field of the pre-dressing line, not the number of dressing infeeds. The only valid inputs at present are 0 = "pre-dressing OFF" and 2 = "pre-dressing parallel to contour".

- Press the "Selection" softkey.

The input line for CD mode (optional) is described in CD mode (see section 5.6.5.1 “CD mode (optional)” on page 172).

Selecting the dressing tools and the dressing technology

- Press the "Tool/Geometry" softkey.
Select the required diamond number for each dressing station (roughing ✔, finishing ✔, idle cycles ❌ and pre-dressing ❌).

If you have selected the "Geometry circumference" softkey, only the circumference of the grinding wheel is dressed.

- If you want to dress a contour, enter its name (e.g. TEST) in the "Geometry" column. This name must be contained in the "Workpieces:STD_GEO" folder and marked there as loaded. If you want to pre-dress this contour, you must also enter its name in the bottom line of this column.

- Press the "Selection" softkey.
- Now press the "Write act. data" softkey.

5.6.5.1 CD mode (optional)

CD (continuous dressing) mode is possible during plunge grinding (reciprocating plunge grinding, creep-feed grinding) or continuous-path grinding. In CD mode the wheel is dressed without interrupting the grinding process. The CD option is therefore only allowed in conjunction with a CNC dressing head. The grinding wheel is always dressed during the roughing cycles. It is permanently sharp and the contour is exact. Larger infeed values can hence be achieved with, in some cases, higher feed rates. The time-consuming task of intermediate dressing and traversing to the dressing position can be dispensed with during the roughing cycle.

Description of the dressing principle

The grinding wheel is dressed continuously during the roughing cycle. When the dressing diamond has completed a dressing cycle, the wheel is adjusted in the Y-axis by this dressing value. This process continues up to the roughing/finishing
transition. When the roughing cycle has finished, the final CD cycle is executed. Continuous dressing is then deactivated during the finish-grinding cycle.

**Setting CD mode**

- Select the technology input screen (see section 5.5.5.1 “Reciprocating plunge grinding technology” on page 132, see section 5.5.5.2 “Creep-feed grinding technology (optional)” on page 133 or see section 5.5.11 “Z - Y reciprocating path grinding (optional)” on page 149).

**Entering the technology data for CD mode**

- Select a dressing technology (on the Dressing Technology screen).
- Enter your technology data in the CD line.

<table>
<thead>
<tr>
<th>CD</th>
<th>0</th>
<th>0</th>
<th>Fy</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
</table>

**PA31K only**

- Number of dressing cycles with the roughing diamond. These are followed by one dressing cycle with the finishing diamond. X times roughing diamond 1 times finishing diamond and so on until the roughing operation is complete.
- Infeed value per dressing cycle (inch).

**Creep-feed and continuous-path grinding only**

- Infeed speed (mm/min) in the Y-axis. For feeding in the dressed value.
- Feed rate of the active dressing diamond inch /min.

### 5.6.6 Selecting a geometry for face dressing

- Select the required face dressing option on the "Tool and geometry" screen and press the "Face geometry" softkey.
5.6.7 Dressing procedure with an MA65 (optional)

- The grinding program is interrupted at the programmed point.
- The dressing sleeve effects the programmed dressing infeed motion.
- The message "Operate MA65 manually / press Cancel key" appears on the display.
- Operate the dressing lever on the MA65 (W-axis).
- Press the Cancel Function key (see section 3.2 “Machine control unit” on page 51, position 27).
  - This starts the next infeed motion of the dressing sleeve (V-axis) automatically.
- The message "Operate MA65 manually / press Cancel key" appears on the display.

Operate the dressing lever on the MA65 (W-axis).
• Press the **Cancel Function key** (see section 3.2 “Machine control unit” on page 51, position 27).
  
  – *This starts the next infeed motion of the dressing sleeve (V-axis) automatically.*

• etc.

• Repeat this procedure until the message “Operate MA65 manually / press Cancel key” no longer appears on the display.

• After the dressing sleeve has effected the last infeed motion, and you have terminated the dressing operation and pushed the dressing lever back into its home position, you must press the **Cancel Function key** (see section 3.2 “Machine control unit” on page 51, position 27) again in order to finally complete the procedure.

• The grinding program continues or the dressing program is terminated.

**Information**

*You can also start a dressing operation with the MA65 at any time by pressing the Start Dressing Program key (see section 3.2 “Machine control unit” on page 51, position 35). The procedure is the same as that described above.*

*The automatic dressing infeed motions of the dressing sleeve are automatically compensated.*

5.6.8 Dressing procedure with a Diaform DG 5/1 grinding wheel profile dresser (optional)

Always wear suitable goggles when dressing or grinding with non-enclosed machine types! They are especially important if you are dressing with the machine cover partially open.

If you want to dress using the Diaform DG 5/1, you must select the AF 65/100 dresser on the "Tool and Geometry Dressing" screen. This is necessary to ensure that the dressed value is calculated and compensated in the Y-axis.

**Activating the Diaform DG 5/1 grinding wheel profile dresser**

• Set the key switch to the **automatic** position (see section 3.2 “Machine control unit” on page 51, position 33).

• Press the "**change module**" key (see section 3.1 “Control unit” on page 47, position 12).

• Press the "**Program Jung**" softkey.

• Press the "**Dressing program**" softkey.
• Press the "Dressing techno. 1" softkey.

• Press the "Tool and geometry" softkey.

• Select AF 65/100 for all dressing stations in the "Tool" column.

• Press the "Selection" softkey.

• Press the "Write act. data" softkey.

The Diaform DG 5/1 dresser is now selected.

There are three possible ways of starting a dressing program with the Diaform DG 5/1 dresser.

– By automatically interrupting the grinding program at the programmed point and then starting a dressing cycle.
– By pressing the "Start dressing program" key (see section 3.2 “Machine control unit” on page 51, position 35).
– By pressing the "Start dressing program" (see section 3.2 “Machine control unit” on page 51, position 35) at any time during a grinding program.
– If a grinding program is already active, it is interrupted and the message "Operate W-axis manually / press Cancel key" appears on the display.

• Open the right-hand dressing flap of the machine cover and dress the grinding wheel manually using the Diaform DG 5/1 dresser.

• Close the dressing flap.

• Press the Cancel Function key (see section 3.2 “Machine control unit” on page 51, position 27).
  – The dressed value is compensated in the Y-axis.
  – Either the grinding program continues up to the next dressing cycle or to the end or the dressing program is terminated.

The active grinding wheel radius is then displayed as the fourth (V) axis.
5.7 Dressing contours created in "Grips"

The dressing contours are created and edited in "Grips", the contour programming software. These contours are then transferred to the NC as a DIN program by means of a postprocessor run. They are saved and archived there under any name (in this example: "Test.SPF"). You must then copy this contour, paste it into the "Workpieces\STD_GEO" folder and load it.

Important

You will need Grips Version 1.93 or a higher version for this purpose.

5.7.1 Creating a contour, saving it and transferring it to the NC by means of a postprocessor run

1. Grips
2. File
3. New
4. Create a contour in "Grips" (Grips User Manual)
5. File
6. Save your contour in the folder called \C:\dh\wks.dir\contours.wpd
7. OK
8. File
9. Open (open the contour you saved above)
10. Services
11. Dress check
12. Postprocessor
13. DIN program
14. OK
15. TEST.SPF created
5.7.2 Loading a contour from the NC to the NCU

1. Services
2. Manage data
3. Mark the "TEST.SPF" contour in the folder called "Workpieces\CONTOUR-SCopy"
4. Open the "Workpieces STD_GEO" folder
5. Paste
6. Mark the "TEST.SPF" contour in the folder called "Workpieces\STD_GEO"
7. Load

**Important**

In order to dress a loaded contour program, you must enter it on the "Tool and geometry" screen (see section 5.6.5 “Dressing technology input” on page 170).

The contour program which is entered there can then be started by pressing the "Start dressing program" key on the machine control unit.

**Information**

You can only dress one loaded contour program at a time.

If you do not have enough free memory in the NCU, you can unload any contour programs you do not need for the time being. If you do not need them any more at all, you can also delete them.
5.8 Transferring data from an external "Grips computer" to the "OP31 control unit"

The contours are created and edited on the Grips computer. They are then transferred from the computer (V24 interface) to the OP31 (COM1). They are saved and archived there under their contour names and given an .spf extension.

**Important**

You will need Grips Version 1.93 or a higher version for this purpose.

5.8.1 Important setups on the "Grips computer"

Do not start the postprocessor run until you have checked and completed all the other settings. If you alter the settings subsequently, you will have to start a new postprocessor run.

- Open the "Dress check" window.
- Select the dresser which is mounted on your machine in the "Setups" / "Dressing tools" menu and press "OK".
- Select "Pre-dressing" in the "Setups" menu, enter your dressing data and press "OK".
- Select "V24" in the "Setups" menu. Then select "To NC", check the setups you have entered and press "OK".

Setups:

- **Baud rate**: 9600
- **Data bits**: 7
- **Stop bits**: 2
- **Parity**: Even
- **Port**: COM02 or COM01 (depending on your computer configuration)

- Select "840D" in the "Setups" / "NC type" menu and press "OK".
- Select "Parallel to axis" in the "Dressing" menu.
- Select "DIN program" in the "Postprocessor" menu. Confirm the number which is displayed by pressing "OK".
Preparing the data transfer

- Select "Export NC" in the "File" / "Transfer" menu. Then select a contour with the name entered there. If you have prepared the OP31 control unit for the data transfer, press "OK".

**Important**

After you have transferred a Grips contour, you should always close Grips properly by selecting "Exit service".

You can also check these setups in the "File Manager" ("Jung.ini" program in the "Windows" folder).

### 5.8.2 Important setups on the "OP31"

- Change to the "Service" module (see section 5.1.8 “Service module” on page 95).

- Press the "Data in" softkey.

- Press the "V24" softkey
  - The message "Set external device to transmit data" appears on the display.

**Important**

Now press "OK" on the "Grips computer" assuming you have prepared it as described in the section headed "Important setups on the Grips computer". Your data is transferred.

- The message "Timeout: Save file" appears on the control unit of the OP31 after the data has been transferred.

- Press the "Yes" softkey.
  - The message "Job is ready" appears at the bottom of the display.

- Press the "Log" softkey.

- Press the "Delete log" softkey.

- Press the "Manage data" softkey.

- Mark the transferred contour (e.g. TEST.SPF) in the "Workpieces" / STD_GEO" folder.

- Press the "Load" softkey.
  - If an "X" appears in the "Loaded" column next to the transferred contour (e.g. TEST.SPF), the load operation has finished and you can select the file.
in the dressing program (see section 5.6.2 “Description of dressing” on page 167).

**Important**

If you do not have enough free memory for this operation, you must unload any dressing programs you no longer need in the "STD_GEO" folder. Never delete or unload either complete folders or programs in other folders. If you do, you may have to re-commission the machine.

Deleting a contour in the "STD_GEO" folder

- Change to the "Services" module on the OP31 (see section 5.1.8 “Service module” on page 95).
- Press the "Manage data" softkey.
- Mark a contour (e.g. TEST.SPF) in the "Workpieces" / STD_GEO" folder and then press the "Delete" softkey.
- Press the "Yes" softkey.
- Press the "Delete log" softkey.
5.9 Important directory settings in GRIPS 32 (optional)

You must set the following directories in GRIPS 32 in order for the contours you create to be accepted by the machine control unit.

- Open the "Settings" menu in GRIPS 32 and select "Directories".

If your GRIPS 32 directories are not already defined automatically as shown above, you must change the settings manually. The "for geometry files" and "for SPF files" directories are particularly important. You are not allowed to set any other paths.
5.10 Batch mode

If you select batch mode, you can link together up to 30 different programs in the machining list to form one batch program. These machining cycles are then executed in the batch program one at a time without any interruption.

Please adhere to the following rule, in order to prevent name conflicts: use an _ (underline) as the third character of all batch program names to differentiate them from other programs.

5.10.1 Saving programs for batch mode

- Create any grinding or dressing program (see section 5.5 “Creating and modifying grinding programs” on page 121 / see section 5.6 “Dressing” on page 165).

- Press the "File" softkey in the "Program Jung" module (see section 5.1.6.2 “File manager” on page 89).

- Press the "Filemanag. save" softkey.

- Then select the hard disk (MMC).
  - A list of the files on the hard disk (MMC) is displayed.

- Select the folder called "Batch1" and save your program under any name.
  - To prevent name conflicts, please use an _ (underline) as the third character of all batch program names.

- Load all the programs you want to combine in your batch program in the NCU.
  - To do so, mark them and press the "Load NCU" softkey.
  - These programs are then listed in the "Available batch programs" column on the "Batch mode" screen.

Important

You should unload any programs you no longer need from the NCU in order to ensure that you have sufficient free memory.

Every now and then you should also delete any programs you will not need again from your hard disk (MMC) (see section 5.1.8 “Service module” on page 95).

5.10.2 Selecting batch mode

- Select the "Machine Jung" module (see section 3.1 “Control unit” on page 47, position 12).

- Press the "Batch mode" softkey.
Activate batch mode. Mark the check box and press the blank (space) key (see section 3.1 “Control unit” on page 47, D11).

Enter the "Start no." and the "End no." for the machining list.
- The batch program begins at the "Start no." and ends at the "End no.".

Generate the "Machining list" from the list of "Available batch programs".
- To do so, select an "available batch program" and press the "Value to clipboard" softkey. Then select the position (1 - 5) in the "Machining cycles" at which you want to insert the program and press the "Value from clipboard" softkey. The program is inserted (change input area, press "END" key, tabulator key, see section 3.1 “Control unit” on page 47, D17).

Do not attempt to save more than approximately 30 "available batch programs".

Select a "Machining type" for each program in the "Machining list".
- 0 = Grinding only,
- 1 = Dressing and grinding,
- 2 = Dressing only,
- 3 = Special.

Only those parts of the program which match the "Machining type" are subsequently called up.
Press the "Accept values" softkey.

Running a batch program places a heavy load on the NCU. All functions which access the NCU, e.g. read parameters, save programs on NCU, etc., may be very slow as a result or possibly not work at all if the load on the NCU is extreme. If this is the case, it is best to avoid parallel programming.

5.10.3 Dressing (reprofiling) and grinding a new contour in batch mode

Program 1 (with pre-dressing program)

- Enter a dressing contour on the "Tool and geometry" screen when you enter the dressing technology (see section 5.6.5 “Dressing technology input” on page 170).

- Activate the pre-dressing program (see section 5.6.5 “Dressing technology input” on page 170).

- Save this program in the "Batch" folder.

Program 2 (without pre-dressing program)

- Deactivate the pre-dressing program (see section 5.6.5 “Dressing technology input” on page 170).

- Enter new grinding data.

- Save the program in the "Batch" folder.

More steps for both programs

- Select "Batch mode" in the "Machine Jung" module.

- Activate batch mode.

- Enter 1 as the "Start no." and 2 as the "End no."

- Select your program 1 from the list of "Available batch programs" and copy it to the first line of the "Machining list". Specify 2 (dressing only) as the "Machining type".

- Select your program 2 from the list of "Available batch programs" and copy it to the second line of the "Machining list". Specify 1 (dressing and grinding) as the "Machining type".

You can now start the batch program.
5.10.4 Editing stored batch programs

Please also refer chapter "file manager" (see section 5.1.6.2 “File manager” on page 89).

- Press the "Program Jung" softkey.
- Press the "File" softkey.
- Press the "Filemanag. open" softkey.

- Select either the NCU or your hard disk here depending on where you have saved the programs.
- Select a program in the folder called "Batch1".
- Press the "Open" softkey.
  - The selected program is loaded.

- Press the "Previous" key (see section 3.1 “Control unit” on page 47, position 2).
  - The selected program is opened.
- Press the "Previous" key (see section 3.1 “Control unit” on page 47, position 2).
  - The main "Program Jung" screen is opened.

You can load the selected batch program again in the standard program by pressing the "Grinding program" and/or "Dressing program" softkey. It can then be edited and started in the same way as any other standard grinding or dressing program. In addition, you can save all changes as a batch program as described in chapter “Saving programs for batch mode (see section 5.10.1 “Saving programs for batch mode” on page 185).
5.11 Warm-up/follow-up program

The warm-up program incorporates various functions that allow you to warm up the machine automatically at a particular time on a particular day. The machine thus has the required operating temperature as soon as you start work. Better, more uniform grinding results can be obtained faster and more easily, because inaccuracies due to certain machine components warming up at a slower rate are largely avoided.

If the coasting program is activated, the grinding spindle drive waits for a specified time after the end of the program before switching off.

- Select the "Machine Jung" screen (see section 3.1 “Control unit” on page 47, position 12) an.

- Press the "Warm-up/follow-up" softkey.

- Select the warm-up program functions you want to activate.
  - If you activate "Function date OFF", the warm-up/follow-up program will be started every day.

- Set the date and the start time.

General OFF/ON is not active.

If you activate the "Function warm-up program OFF/ON" check box the warm-up program will be activated automatically after the automatic grinding or dressing cycle.

The “follow-up program ON/OFF function” causes the grinding spindle motor to coast for a short time after the normal program has ended. If you want to activate it, please select this function.

The power OFF function is not active.
• Enter the required delay for the coasting program.  
  – After the program has ended and the coolant pump has been switched off, the grinding spindle motor continues to coast for the time specified here before switching off as well.

• Press the "Accept values" softkey.

• The warm-up program is activated when you press the "Warming-up NC START" softkey. The activated warm-up functions are started at the specified time on the programmed day.

You are not allowed to switch off the machine and the control unit if you have selected the warm-up program.

Activating the warm-up program causes certain machine functions to be switched on at a programmed time on a programmed day. You must take the necessary precautions to ensure that the machine and its environment are adequately protected, and that the programmed functions can be started up without endangering either people or equipment. As the owner or operator of the machine, or as the person in charge of it, you are entirely responsible. No liability will be assumed by the manufacturer.

To exit the warm-up program

• Press "NC-Reset" (see section 3.2 "Machine control unit" on page 51, position 36).  
  – This terminates the warm-up program and you can then activate any other programs or functions.

If you do not want the warm-up/follow-up program to be activated again, you should deselect these functions on the "Warm-up/follow-up program" screen.
6. Dressers

6.1 Overview of dressers

Various types of table or head dresser can be used, depending on the machine configuration. These dressers are available as optional equipment.

<table>
<thead>
<tr>
<th>Table dressers</th>
<th>Head dressers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single diamond</td>
<td>MA 65</td>
</tr>
<tr>
<td>AT 35</td>
<td>AF 65</td>
</tr>
<tr>
<td>(automatic profile dresser)</td>
<td></td>
</tr>
<tr>
<td>Diaform DG 5/1</td>
<td></td>
</tr>
<tr>
<td>(manual profile dresser)</td>
<td></td>
</tr>
<tr>
<td>Optidress</td>
<td></td>
</tr>
<tr>
<td>(manual profile dresser)</td>
<td></td>
</tr>
<tr>
<td>PA 31K</td>
<td></td>
</tr>
<tr>
<td>(automatic profile dresser)</td>
<td></td>
</tr>
</tbody>
</table>

6.1.1 General rules for using dressers

The cover and the machine guard must always remain closed while grinding wheels are being dressed. The reason for this is to prevent wheel particles from flying off and coolant from spattering and causing injuries.

If an extraction device is installed, it must be activated before grinding wheels are dressed.

Always wear goggles when working on open machines!

Never attempt to dress a grinding wheel with a manually guided diamond. This is prohibited for safety reasons!

Switch off the grinding spindle motor and wait until the spindle has stopped rotating before replacing a dressing diamond. Make sure that the axes have stopped positioning.

Take precautions to prevent the machine from being switched on again accidentally while you are mounting the dressing diamond.
6.2 Single diamond (optional)

You can use this dresser to dress the perimeter side of the grinding wheel either manually or by numerical control.

The diamond block with the diamond holder can be mounted on either side of the machine table, depending on the application. It is usually mounted on the left-hand side of the magnet. You should adjust its height either to your particular magnet or, if necessary, to the workpiece you want to grind.

Mount the diamond block so that the dressing diamond can be positioned centrally underneath the grinding wheel in the X-axis (see diagram below).

1 = Grinding wheel  
2 = Diamond block with dressing diamond  
3 = Magnetic table
6.3 AT35 / AT35D (Option)

You can use this dresser to dress the outside contours by numerical control.

The diamond block with the diamond holders can be mounted on either side of the machine table, depending on the application. It is usually mounted on the left-hand side of the magnet.

If you are using the AT35D model (double station), the two stations must be mounted side by side. It is advisable to use the station mounted closer to the magnet as the finishing station.

Diamond nos. 1 and 2 of the roughing and finishing station are mounted in diamond holders at an angle of 45°. You can use these diamonds to dress the outer contours of the grinding wheel. You must remove the no. 3 diamonds of the roughing and finishing station, including the diamond blocks, beforehand.

The no. 3 diamonds of the roughing and finishing station are mounted vertically in the diamond holders. You can use these diamonds to dress the perimeter side of the grinding wheel. You may have to remove diamond nos. 1 and 2 beforehand, depending on the thickness of the wheel and the height of the diamonds.

If you use the AT35 / AT35D, the magnetic chucks must not be longer than 450 mm.

You should adjust the dressing height to the height of your magnet or workpiece by means of the intermediate plates supplied with the machine. The dressing height must never be greater than the grinding height.
Mounting the dresser

Mount the diamond block so that the dressing diamond can be positioned centrally underneath the grinding wheel in the X-axis (see diagram below). Align the diamond block as accurately as possible in the transverse position (Z-axis).

1 = Grinding wheel  
2 = Diamond block with dressing diamond  
3 = Magnetic table

Adjusting the height of the dressing diamonds

- Carefully mount the diamonds in their respective diamond holders.
- Adjust the overall height of the diamond block + diamond.
  - You must set the basic height (54 mm) + diamond radius for diamond nos. 1 and 2.
  
  Example: $54 \text{ mm} + 0.25 \text{ mm} = 54.25 \text{ mm}$
  
  The best way to set this value accurately is to use an optical setting device. If you cannot set it exactly, you must reset the actual values again every time you change the diamond.
- Mount the diamond holders in the diamond block with the correctly adjusted diamonds.
- Adjust diamond no. 3 only if you actually need to use it.
6.4 MA65 (optional)

You can use this dresser to dress the perimeter side of the grinding wheel manually. It is mounted on the left-hand side of the grinding head.

MA 65

1 = Dressing lever for manual motions in the W-axis (dressing axis)

6.4.1 Functions

If the dressing operation is started during an automatic program, the dressing sleeve (V-axis) automatically effects an infeed motion and the dressed value is automatically compensated. The cutting speed is then maintained at a constant value, also automatically, as the grinding wheel radius decreases.

If you traverse the dressing sleeve (V-axis) manually (+/- key on the remote control panel), there will be no compensation.

6.4.2 Dressing with MA65

The MA65 dresser is already mounted in the factory and is ready to use immediately.

You can use the dressing lever (1) to control the manual dressing motion in the W-axis.

Please refer to the description of the dressing procedure with an MA65 (see section 5.6.7 “Dressing procedure with an MA65 (optional)” on page 174).

6.4.3 Operating the MA65 with enclosed machines

You can only start a grinding or dressing program in automatic mode when the guard is closed.
Starting a dressing program

- Press the key "Start automatic program" (see section 3.2 "Machine control unit" on page 51, position 35).
  - The message "Operate W-axis manually" appears on the display.

- The guard is now unlocked. Open it and carry out the dressing procedure described for the MA65 (see section 5.6.7 “Dressing procedure with an MA65 (optional)” on page 174).

- When the dressing cycle has finished, close the guard again and press the "Start automatic program" key (see section 3.2 “Machine control unit” on page 51, Position 37).

Starting a dressing program during a grinding program

- Press the "Start automatic program" key (see section 3.2 “Machine control unit” on page 51, position 37).
  - The configured grinding program is run.
  - If a dressing cycle is required during the grinding program, the grinding program is interrupted and the message "Operate W-axis manually" appears on the display.

- The guard is now unlocked. Open it and carry out the dressing procedure described for the MA65 (see section 5.6.7 “Dressing procedure with an MA65 (optional)” on page 174).

- Then press the "Start automatic program" key again (see section 3.2 “Machine control unit” on page 51, position 37).
  - The grinding program continues up to the next dressing cycle.
6.5 Diaform grinding-wheel profiling tool DG5/1 (optional)

You can use the DG5/1 to profile grinding wheels according to a fixed contour template. By tracing around the template with a feeler, you can copy the contour to the grinding wheel with the aid of the pantograph (scale 10:1).

Please study the manufacturer's original operating manual enclosed with the Diaform profiling tool carefully before starting up the machine.

Technical data

If you dress using the DG5/1, you must open the right-hand side of the machine cover. Use a suitable extraction device to make sure that any grinding dust or mist is exhausted safely and effectively.

Always wear goggles when dressing with the Diaform profiling tool. Protect yourself against splashwater and grinding wheel dust.

<table>
<thead>
<tr>
<th>Pantograph ratio</th>
<th>10 : 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum profile width</td>
<td>32 mm</td>
</tr>
<tr>
<td>Maximum profile depth</td>
<td>13 mm</td>
</tr>
</tbody>
</table>
Procedure

If you want to dress using the Diaform DG 5/1, you must select the AF 65/100 dresser on the "Tool and Geometry Dressing" screen (see section 5.6.5 “Dressing technology input” on page 170). This is necessary to ensure that the dressed value is calculated and compensated in the Y-axis.

The procedure for dressing with the Diaform DG 5/1 is described in chapter "Dressing procedure with a Diaform DG 5/1 grinding wheel profile dresser" (see section 5.6.8 “Dressing procedure with a Diaform DG 5/1 grinding wheel profile dresser (optional)” on page 175.
6.6 Optidress-E optical profile dressing system (optional)

You can use the Optidress-E to profile grinding wheels optically according to a contour that is visible with a microscope.

Please study the manufacturer's original operating manual enclosed with the Mafra profiling system carefully before starting up the machine.

If you dress using the Optidress-E, you must open the right-hand side of the machine cover. Use a suitable extraction device to make sure that any grinding dust or mist is exhausted safely and effectively.

Always wear goggles when dressing with the Optidress-E profiling system. Protect yourself against splashwater and grinding wheel dust.
6.7 AF65 (optional)

You can use this dresser to dress the perimeter side of the grinding wheel automatically. It is mounted on the left-hand side of the grinding head.

**AF65**

1 = Adjustable gib for setting the dressing stroke (W-axis).
Maximum dressing stroke approx. 65 mm

The dresser axes can also be positioned using the mobile remote control panel.

**Exceptions:**

*The W-axis cannot be positioned with the electronic handwheel.*

*The V-axis can only be traversed clear of the plus limit position by pressing the minus key.*

Before you start a dressing program, the dressing diamond must be positioned against the wheel in the V-axis and the W-axis set to the parking position (at the back).
6.8 PA 31K (optional)

6.8.1 General description

You can use the PA 31K to dress contours by numerical control. Since the dresser is mounted on the grinding head, the working envelope is unrestricted.

![PA 31K](image)

Technical data

<table>
<thead>
<tr>
<th>Working envelope:</th>
<th>Profile width:</th>
<th>50 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Profile depth, inside/outside:</td>
<td>15/20 mm</td>
</tr>
<tr>
<td></td>
<td>Contour precision:</td>
<td>± 0.0025 mm</td>
</tr>
<tr>
<td>Traverse paths:</td>
<td>W-axis:</td>
<td>55 mm</td>
</tr>
<tr>
<td></td>
<td>U-axis:</td>
<td>60 mm</td>
</tr>
<tr>
<td></td>
<td>E-axis:</td>
<td>± 60°</td>
</tr>
</tbody>
</table>

Max. dressing speed: 2000 mm
Max. diamond angle: 40°

**Important**

The maximum permitted diamond angle is 40°.

The diamonds in the diamond holder have been set in the factory using the presetting device. You must check them and readjust them exactly after mounting them in the dressing arm.
6.8.2 Installation and commissioning

The machine is only allowed to be installed, commissioned and connected to the mechanical components of the PA 31K by the Jung Customer Service department. K.Jung GmbH cannot under any circumstances accept liability for damage resulting from failure to comply and no warranty claims will be allowed.

6.8.3 Calculating the basic dimension on the PA 31K

- Position the turret head close to the limit positions in the U+ and W+ axes.

- Insert the dividing head into the turret head with the single-diamond holder mounted on it, then tighten it.
  - The calibrated ball insert enclosed with the dresser has already been completely adjusted in the factory.

- Press the "Adj. diam. NC start" softkey; the diamond swivels about the radius midpoint in the E-axis.

- Check this motion for deviations using a dial gauge.

- If the gauge indicates a deviation, you must correct it by means of the single-diamond holder.
  - If it is not possible to adjust the single-diamond holder so that it is exactly concentric, the calibrated ball insert is misaligned. You must first preset it to the reference dimension (47.5 -0.1 - -0.2) and then adjust the length exactly.

- Now swivel the dividing head 2 x 90° by pressing the "Diamond ch. NC start" softkey twice.

- Then tighten the fastening screws more firmly and repeat the measurement.
6.8.4 Transferring the basic dimension to the VG2 presetting device

The base of the dial gauge must be aligned exactly in the vertical direction.

- Fit the dividing head into the central mount of the VG2 presetting device and screw it tight.

- Check the radius midpoint by swivelling the dial gauge.
  - If the gauge indicates a deviation, you must first of all loosen the four M6 hexagon socket bolts in the axial mount. Then adjust the axial mount by tapping it gently and re-tighten the bolts.

- Set the dial gauge to zero = BASIC DIMENSION.

- Check the adjustment by inserting the dividing head into the turret head of the PA 31K again and swivelling it 2 x 90° as described above.

6.8.5 Adjusting the diamond reference dimension

- Swivel the dividing head 180° and mount it in the VG2 again. The gauge block should now be parallel to the dial gauge.

- Tighten the fastening screw again.

- Calculate the reference dimension for a calibrated ball diameter of 6 mm, with a gauge block of 3 mm minus the radius of the diamond that is to be used. Adjust the gauge block so that the dial gauge shows the basic dimension again.

- Now remove the gauge block and set the dial gauge to zero.
6.8.6 Mounting the diamond in the single-diamond holders

- The maximum permitted diamond length is 45 mm.
- If you need to shorten the diamond, be careful not to remove the shank completely.
- Remember when you install the diamonds that the cutting edge must always be perpendicular.
- Fasten the diamond with the two screws provided.

6.8.7 Adjusting and mounting the single-diamond holders with the diamonds

- Mount the dividing head with diamond no. 7 facing the dial gauge on the VG2.
- Mount single-diamond holder no. 7 on the dividing head.
- Remember to fit two disc springs underneath each screw (the holder and fitting position are marked).
You can only correct the diamond length by displacing the diamond in the holder. To do so, loosen the clamping screws a little, then adjust the position of the diamond slightly by tapping it gently.

**Do not under any circumstances tap the diamond point!**

- In order to align the lateral position, you must first loosen the two fastening screws of the single-diamond holder slightly.
- Then adjust the single-diamond holder to the required position by tapping it gently.

**Before you tap the single-diamond holder, swivel the dial gauge so that it is positioned counter to the tapping direction.**

- We recommend using a small copper pin to tap the holder.
- When the single-diamond holder is aligned exactly in position, tighten the clamping screws again carefully.
- Now re-check the diamond.

- Adjust the other three diamonds in the same way.
  - Adjust them in anti-clockwise order, i.e. 8 - 9 - 10.

**When you adjust diamond no. 10, you will have to dismantle holder no. 7, or you will not be able to loosen the clamping screws.**

After you have re-mounted holder no. 7, you must align it again laterally. Once adjusted, the single-diamond holders are not interchangeable.
6.8.8 Fitting the clamping bolt

After you have preset the diamonds, you must screw the clamping bolt into the dividing head.

Fit the double edge of the clamping bolt exactly in the centre.

The mark on the dividing head must point in the same direction as the check bolt of the clamping bolt.

- Tighten the M8 bolts securely.
  - The clamping bolt has a certain amount of axial freedom, in order to enable any angular errors to be compensated.

- Tighten the check bolt on the side.

6.8.9 Changing the diamond holder

If you have changed a diamond holder by pressing the "Holder ch. NC start" softkey, the following message will appear on the display: "5115 Important! Diamond holder clamped".

- After reading off the diamond number, mount the diamond holder at the centre point of the swivel axis of the PA 31K arm and press the Start Dressing Program key (F7 on the control unit).
  - The diamond holder is clamped again.

- Press the Start Dressing Program key (F7 on the control unit) a second time to return the dressing arm to its original position.

If the active diamond holder is not the same as the holder displayed on the control unit, it must be updated.

- Now check all the diamonds in the holder once again by pressing the "Diamond ch. NC start" softkey.
6.8.10 Changing the Erowa plate

If you change the Erowa plate, you must also readjust the diamonds in the presetting device.
7. Accessories

7.1 Permanent electromagnetic chucks

Before using the magnetic chucks, please also study and heed all the safety information contained in section 1, “Safety” that refers to permanent electromagnetic chucks.

Only magnetizable workpieces can be clamped on the magnetic chuck.

Take suitable precautions to prevent the workpieces from accidentally slipping and/or tilting (e.g. by fitting shims). This applies particularly to workpieces that are clamped with a reduced clamping force or that only have a very small locating surface. If such workpieces are allowed to tilt or fly off the magnetic table, the grinding wheel may burst apart.

Do not under any circumstances reduce the clamping force while you are still grinding.

Make sure that magnets with 210 V DC voltage are always connected to a 210 V DC supply. Magnets with 360 V DC voltage are only allowed to be connected to a 360 V DC supply. If you ignore this warning, it is possible that the workpieces will not be sufficiently gripped by the magnet or that the magnet will be destroyed.

If the connecting cable or socket is defective, or if you notice any other form of damage, you must remove the magnetic chuck from service immediately. Safety-critical malfunctions may occur if moisture is allowed to penetrate.

The magnetic chuck must not be modified in any way without prior consultation with the manufacturer. Failure to comply will render your warranty invalid and no further liability will be assumed by the manufacturer.

Always use the built-in pulse control (installed in the factory) to operate the magnetic chuck. Only a short pulse is required to activate the magnet. If you apply a sustained pulse, you will soon destroy it.
7.1.1 Activating the gripping force

- Switch the main switch on the machine **ON**.
- Switch the control unit **ON** (see section 3.2 “Machine control unit” on page 51, position 9).
- Traverse to the reference point (see section 5.2 “Traversing to the reference point” on page 97).
- Set the magnetic gripping force with the 16-step switch (see section 3.2 “Machine control unit” on page 51, position 4).
- Press the „Magentic gripping force **ON**“ key (see section 3.2 “Machine control unit” on page 51, position 6).
- Press the „Magentic gripping force **OFF**“ key (see section 3.2 “Machine control unit” on page 51, position 5).

7.1.2 Mounting instructions

- You should not regrind the base of any new magnetic chucks supplied by K.Jung GmbH. They have already been ground in the factory so that they are slightly concave. They must simply be cleaned and possibly honed with a fine oil stone.
- Older magnetic chucks which have rust deposits on the base or which have become high-faced should be reground before they are mounted.
- Moisten the machine table with an anti-corrosive agent prior to mounting the magnet.
- Align the magnet in the longitudinal axis (X-axis) with the machine axis using a precision dial gauge.
- Secure the magnetic chuck with the clamping jaws.

7.1.3 Regrinding a magnetic chuck

*The base must be reground without activating the magnetic clamping force.*

- Lay the magnetic chuck down on the machine table with the pole face underneath.
- Secure the magnet with a clamping element at both ends, so that it is unable to move but is not strained.
- Regrind the base.
- Mount the magnetic chuck on the grinding table with the base facing down and regrind the active magnetic pole face.
7.2 Coolant cleaning systems (optional)

**Check the coolant in accordance with the intervals and at the latest each time it is topped up, to ensure that it contains no impurities and that it has the concentration recommended by the manufacturer see section 7.3 “Coolants” on page 221).**

*Make sure you insert the paper filter the right way round (see manufacturer’s instructions).*

Coolant which has been attacked by fungi, bacteria, toxicants and/or other impurities may cause permanent damage to human health.

Your machine and workpieces may also suffer considerable damage if poor quality or contaminated coolant is used. Machine components or workpieces may be severely corroded or stick together, for example, or the enamel or varnish may become pitted.

*Make sure that no coolant comes into contact with the stationary grinding wheel.*

Always empty the coolant cleaning system before transporting the machine.

Please study and heed the original operating manual provided by the manufacturer of the coolant system when you replace the coolant.

<table>
<thead>
<tr>
<th></th>
<th>NS 60Cp</th>
<th>NS 100CP/CS</th>
<th>NS 150CP/CS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length (mm)</strong></td>
<td>1285</td>
<td>1465</td>
<td>1790</td>
</tr>
<tr>
<td><strong>Width (mm)</strong></td>
<td>620</td>
<td>820</td>
<td>820</td>
</tr>
<tr>
<td><strong>Height (mm)</strong></td>
<td>770</td>
<td>770</td>
<td>1040</td>
</tr>
<tr>
<td><strong>Weight (kg)</strong></td>
<td>135</td>
<td>180</td>
<td>200</td>
</tr>
<tr>
<td><strong>Capacity (l)</strong></td>
<td>140</td>
<td>210</td>
<td>500</td>
</tr>
<tr>
<td><strong>Filter paper width (mm)</strong></td>
<td>440</td>
<td>710</td>
<td>710</td>
</tr>
<tr>
<td><strong>Filter capacity (l/min)</strong></td>
<td>60</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Pump 1 (l/min / bar)</strong></td>
<td>64 / 0.1</td>
<td>80 / 210 / 0.1 / 7.5</td>
<td>80 / 210 / 0.1 / 7.5</td>
</tr>
<tr>
<td><strong>Pump 2 (l/min/ bar)</strong></td>
<td>- / -</td>
<td>48 / 0.1</td>
<td>48 / 0.1</td>
</tr>
</tbody>
</table>

- Charge the coolant tank up to the maximum level mark with the coolant circulation switched off.

**Available as options:** A float switch which sends an error message to the display if the water level is too low, a magnetic separator, a cyclone filter and a continuous loop of filter paper.
7.2.1 Activate the colant cleaning system

- Switch the main switch on the machine ON.
- Switch the control unit ON (see section 3.2 “Machine control unit” on page 51, position 9).
- Traverse to the reference point (see section 5.2 “Traversing to the reference point” on page 97).
- Activate the grinding spindle drive.
- Press the key for
  - creep-feed coolant (see section 3.2 “Machine control unit” on page 51, position 14),
  - reciprocating grinding coolant (see section 3.2 “Machine control unit” on page 51, position 15)
  - or dressing coolant (see section 3.2 “Machine control unit” on page 51, position 16).
- Set the required coolant flow rate with the switch for adjusting the coolant supply (see section 3.2 “Machine control unit” on page 51, position 13).
- The necessary pumps and solenoid valves are started or opened automatically during a program cycle.

7.2.2 Functional description

This system cleans the circulating coolant continuously.

A special type of paper, which is carried on a wire mesh conveyor, is used for the filter. The filter and conveyor together form a trough, which permits the filtered coolant to flow through into the coolant tank. When the filter paper becomes saturated, it is drawn along automatically; this process is controlled by an adjustable float switch. The dirty filter paper is deposited in an open bin, from which it can be removed without interrupting the filtration process.

Please dispose of the saturated filter paper and the coolant in a proper and environmentally compatible manner. Any statutory requirements must be observed.
7.2.3 Connection to the central coolant cleaning system for the optional NS - ZS3

Your central coolant system must have three connections for the optional NS - ZS3.

2 connections with 1" couplings
1 connection with 1/2" coupling

Alternative:
Threaded reducers are supplied for the following connections:
2 connections with 3/4" couplings
1 connection with 3/8" coupling

We recommend setting a pressure of at least 3 bar at the coolant pipe connection for creep-feed grinding.

Important

Transparent coolant additives are only allowed to be mixed with ordinary tap water. Do not use decalcified water or water which has been treated in any other way.

Use only acid-free coolant additives, as all acids are likely to damage the machine.

The purity of the coolants is extremely important for the high surface quality of the workpieces.
7.3 Coolants

Never use flammable coolants.

Coolant which has been attacked by fungi, bacteria, toxicants and/or other impurities may cause permanent damage to human health.

Wear personal protective equipment (e.g. gloves, goggles, rubberized apron, etc.) at all times when working with coolants.

Dirty or clogged coolant pipes may cause
  – Coolant to overflow or leak
  – Defective pumps
  – Other grinding problems

7.3.1 General rules for working with coolants

- Check and clean the coolant pipes, and particularly the drain pipes, at regular intervals.
- Do not store the coolant concentrate for longer than six months.
- Store the coolant concentrate at a location where it is not exposed to frost or heat.
- Prepare the emulsion in a clean container away from the machine.
- Always add the concentrate to the water, not the other way round.
- Avoid using coolants which contain the following:
  – Chloro-organic substances
  – Nitrite
  – Secondary amines
  – Free formaldehyde

Do not eat, drink or smoke at your place of work.

Leaked coolant is slippery. Wipe it away immediately to avoid accidents!

Requirements for the water used to prepare emulsion

- The nitrate content should be less than 50 mg/l.
- The temperature should be approximately 20°C.
- The hardness should be between 4 dH and 25 dH.
Rules for a long coolant life

- Do not leave the coolant standing for long periods of time; ideally, it should be circulated continuously.

- Do not throw foreign bodies, such as oil, food left-overs, cigarette ends etc., into the coolant.

- Do not dilute used coolant with pure water.

- The emulsion temperature should not exceed 30°C.

Measurements

Carry out the measurements below at regular intervals.

<table>
<thead>
<tr>
<th>Interval</th>
<th>Measurement</th>
<th>Limit value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>Concentration</td>
<td>See manufacturer’s specifications</td>
<td>Concentration too low = risk of corrosion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Concentration too high = machine becomes mis-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-    lime and sticky</td>
</tr>
<tr>
<td>Weekly</td>
<td>pH value</td>
<td>8.5 - 9.5</td>
<td>Value too low = risk of corrosion and micro-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-    bial contamination</td>
</tr>
<tr>
<td></td>
<td>Nitrate content</td>
<td>Less than 50 mg/l</td>
<td>Increased risk of cancer</td>
</tr>
<tr>
<td></td>
<td>Nitrite content</td>
<td>Less than 20 mg/l</td>
<td>Increased risk of cancer</td>
</tr>
<tr>
<td>Monthly</td>
<td>Bacteria count, yeast / fungus</td>
<td>Less than $10^4$</td>
<td>- Odour</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Reduced protection against corrosion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Skin irritation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Inflammation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Reduced filtration and chip removal effec-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-    tiveness</td>
</tr>
<tr>
<td></td>
<td>Bacteria count, other bacteria</td>
<td>Less than $10^6$</td>
<td>See above</td>
</tr>
</tbody>
</table>

Coolant emissions

A standard limit value, along the lines of the maximum allowable concentration at the place of work, is not defined, owing to the complex composition of the coolant. The following tolerances are specified for the ambient air by the BIA (Institute for Work Safety of the Employer's Liability Insurance Association).

<table>
<thead>
<tr>
<th>Interval</th>
<th>Measurement</th>
<th>Limit value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nitrosamine</td>
<td>1 microgram/m³</td>
<td>Official recommended concentration. Must not be exceeded under any circumstances.</td>
</tr>
<tr>
<td></td>
<td>Aerosol concentration</td>
<td>5 mg/m³</td>
<td>Hazard from toxic substances</td>
</tr>
<tr>
<td></td>
<td>Sum of aerosol and vapourconcen-</td>
<td>20 mg/m³</td>
<td>Hazard from toxic substances</td>
</tr>
<tr>
<td></td>
<td>tration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Disposing of coolant

Coolant must be disposed of in accordance with the relevant, statutory waste disposal regulations (e.g. Abf. Sch. Nr. 54 402).

Useful life

The coolant has a useful life of approximately 6 to 24 months, depending on the level of contamination and the care with which it is treated, as well as on maintenance and operating conditions.

Manufacturer’s specifications

All information about possible hazardous substances must be made available by the manufacturer of the coolant concentrate (§ 16 Dangerous Goods Order).

Ask the coolant manufacturer for the DIN Material Safety Sheet whenever you place an order.

Skin protection

Draw up a skin protection plan for your own personal hygiene in consultation with the manufacturers of the coolant and the skin protection cream. The employer is responsible for ensuring that this skin protection plan is actually observed. He is also under an obligation to supply all the materials necessary to enable staff to comply with the plan.

7.3.2 Skin protection plan

- Apply special skin protection cream to your hands and forearms before starting work (“Hautschutz in Eisen und Metallbetrieben” (Skin Protection in the Iron and Metalworking Industry), ZH 1/467).

- Wash your hands and forearms with warm water and a gentle, non-scouring cleaning agent before all breaks and after you have finished work. Then apply the skin protection cream again.

Important

Attach the Material Safety Sheet and the inspection report for water-miscible coolants to the machine or the coolant tank so that they are clearly visible.

- All information about possible hazardous substances must be made available by the manufacturer of the coolant concentrate (§ 16 Dangerous Goods Order).

- Ask the coolant manufacturer for the DIN Material Safety Sheet whenever you place an order.

Caution

Appropriate countermeasures must be taken by the owner if the limit values specified above are exceeded. These measures must be approved by the coolant manufacturer, the BIA (Institute for Work Safety of the Employer’s Liability Insurance Association) and the Gewerbeaufsichtsamt (Factory and Shop Inspectorate).

The owner must ensure that coolant mixed with water is checked by an authorized expert in accordance with the inspection plan and that the necessary measures are taken on the basis of the results recorded.
• Wash and dry your skin, and apply the skin protection cream, each time you take a break.

• Keep direct contact between your skin and the coolant to a minimum by observing the following rules:
  – Always wear gloves when handling coolant concentrates (e.g. when mixing the coolant).
  – Never clean your hands with coolant.
  – Change all clothing that is wet with coolant immediately and have it cleaned. If necessary, wear a form of splash protection or a rubberized apron.
  – Do not touch your mouth, eyes or nose with your hands after they have come into contact with coolant.
  – Use only disposable paper towels. Do not put paper towels that are wet with coolant into your pocket.
  – Do not eat, drink or smoke at your place of work.
  – Do not throw any food left-overs or other waste into the coolant system.

**Important**

You should also comply with the skin protection plan when handling oils.
7.4 Grinding mist extractor (optional)

Please study and heed the original operating manual provided by the manufacturer (Airtech). This manual contains detailed technical information and important safety instructions.

Grinding mist extractor
1 = Silencer
2 = Door for filter elements
3 = Differential pressure gauge
4 = Siphon

Functional description
The crude gas is drawn into the coarse filter chamber via the suction flange. It is then filtered in three separate stages. The liquid which is separated out collects in the drip pan, and is then pumped back to the coolant tank by means of a siphon.
Filter elements

1st filter stage:

2nd filter stage:
– Synthetic microfilter mat to DIN 53 438, class EU 5, in aluminium frame.

3rd filter stage:
– Compact filter cell to DIN 24 184, filter class -S-, separation efficiency 99.99 %.
– Pleated filter medium cast in a stable frame. This filter element is specially designed for separating liquid aerosols, e.g. aqueous emulsions, oil mist and vapours.

Safety precautions

Never open the unit when it is switched on or operating.

Before cleaning or carrying out any maintenance work, make sure that the unit is switched off and take steps to prevent it from being switched on again accidentally.

If vapours, gases, dusts, aerosols or oil mist occur in such large quantities that they represent a health hazard, the owner is under an obligation to ensure that they are extracted.

Never operate the grinding mist extractor without a filter or with a filter that is defective.

Do not extract any substances that could have a corrosive effect on aluminium or other metals, plastics or paints.

Do not extract any highly inflammable or explosive substances (flash point < 120°C).

Please refer to the EU Material Safety Sheet provided by your coolant supplier for the flash point of your particular coolant.

Starting and stopping the extractor manually

• To switch on the extractor, press the "Extraction device ON/OFF" key (see section 3.2 “Machine control unit” on page 51, position 17).

• To switch off the extractor, press the "Extraction device ON/OFF" key again (see section 3.2 “Machine control unit” on page 51, position 17).

Starting and stopping the extractor automatically during a program cycle

The extractor is switched ON and OFF automatically during a program cycle.
7.5 Cross-slide cooling system

*Important*

Please study and heed the original operating manual provided by the manufacturer (Airtech). This manual contains detailed technical information and important safety instructions.

The system operates with a pump which is not self-priming. It is essential to fill this pump prior to commissioning, after prolonged downtimes and after the cooling circuit has been opened and subsequently re-closed.

If the system operates with a frequency of 50 Hz, you must add 0.5 % anti-corrosive agent. If the system operates with a frequency of 60 Hz, you must not add any anti-corrosive agent.

Do not under any circumstances alter the factory settings of the thermostats.

Do not obstruct the air inlet and outlet of the condenser.

The ambient temperature must not exceed 32 °C.

View of the "control and maintanance side"
**Principle of operation**

The equipment is switched on and off positively by means of the machine's master switch (ON/OFF).

The temperature of the machine cross slide is monitored constantly. If it exceeds the value preset in the factory, the cooling system is switched on automatically. The cooling system is switched off again automatically when the value drops below the value preset in the factory.

**Commissioning**

*The system is normally commissioned by JUNG Service.*

Install the equipment in its intended operating position. Allow a minimum clearance of 12 inch between the suction screen on the end and all other objects or walls.

- Connect the discharge line for the cooling circuit.
- Fill the coolant tank up to the upper mark (approx. 90 l).

<table>
<thead>
<tr>
<th>Systems with 50 Hz</th>
<th>Systems with 60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add 0.5 % anti-corrosive agent. Remember to add more of this agent in the same ratio each time you top up the level. &quot;Varidos KK&quot; anti corrosive agent is included in the scope of supply in the necessary to fill the system for the first time.</td>
<td></td>
</tr>
<tr>
<td>You must not add any anti-corrosive agent.</td>
<td></td>
</tr>
</tbody>
</table>

**Anti-corrosive agent:** **Varidos KK**

**Manufacturer:** Schilling Chemie GmbH
Postfach 1136
D-71691 Freiberg
Filling the pump

- Remove the stainless-steel equipment cover by loosening the six hexagon bolts on the long side.

![Top view (stainless-steel cover removed)](image)

- Open the filler valve on the inlet line of the pump (lever 1 vertical).
- Fill the pump with coolant using a hose or a funnel.
- Close the filler valve on the inlet line of the pump (lever 1 horizontal).
- Immerse the return hose in the tank.
- Carry out a trial run until the coolant emerges without any bubbles.
- Re-fill the pump if necessary.
- Fasten the return hose to the stub provided, then start the pump again immediately. This causes the cooling coil and the complete circuit to be vented.
- Finally, switch off the pump again and re-fit the stainless-steel cover on the equipment.

7.5.1 Maintenance

- Clean the condenser once every month and check the coolant level regularly.
7.6 Grinding wheel flange (optional)

*Important*

*The flange nuts must not be interchanged.*

Mounting the grinding wheel flange on the grinding spindle

Unscrew the locking bolt as far as the limit stop (clockwise direction).

Fit the spindle nut (anti-clockwise direction).

Apply counter-pressure with the locking bolt (anti-clockwise direction).
7.6.1 Flanging and balancing a grinding wheel

Check to make sure that the grinding wheel has been approved for the peripheral speed of the grinding spindle. Take account of the information provided by the manufacturer (code). Do not use grinding wheels without a code or with only an illegible code.

Check the grinding wheel for damage (sounding test). Do not use a damaged grinding wheel.

Grinding wheels must always be flanged and balanced by suitably trained and experienced persons.

Make sure you comply with all accident prevention regulations when handling grinding wheels.

7.6.1.1 Flanging a grinding wheel

- Clean the flanges and the clamping surfaces of the grinding wheel.
  - The clamping surfaces of the grinding wheel must be flat (plane-parallel).

- Make sure that the balancing weights in the flange guides are movable (you may be able to remove them, depending on the balancing technique).

- Check the grinding wheel for damage and perform a sounding test.

- Clamp the grinding wheel in the flange using the spacers recommended by the wheel manufacturer.
  - The grinding wheel should slide onto the flange easily without sticking.

- Hand-tighten the six M6 hexagon socket bolts.

- Balance the flanged grinding wheel on a balancing stand or a gravitational balancer.

- Mount the flanged, pre-balanced wheel on the grinding spindle.

- Dress the flanged grinding wheel at the outside diameter and the flanks at approximately half speed until it runs absolutely true.

- If you have a grinding machine with a dynamic balancer, you can now fine-balance the wheel on the grinding spindle at working speed.

- The wheel does not need to be balanced again statically.

- Carry out a trial run of the grinding wheel, taking account of any national or statutory requirements (e.g. accident prevention regulations).

- Remove the grinding wheel from the grinding spindle.
Well-balanced grinding wheels significantly improve the quality of the ground workpiece surfaces. They are also vital for a long service life not only of the grinding spindle bearing, but also of the entire machine.

7.6.1.2 Balancing a flanged grinding wheel statically

There are a number of different methods of balancing a grinding wheel. It does not matter which one you use, providing the wheel is balanced properly.

- Set up your balancer carefully and adjust it in accordance with the instructions provided by the manufacturer.
- Make sure that the three balancing weights on the grinding flange are movable and fasten them 120° apart.
- Guide the balancing arbour into the wheel flange.
- Lock the weighing frame of your balancing stand in position.
- Fit the flanged grinding wheel into the balancing stand.
- Unlock the weighing frame.
- Rotate the grinding wheel slowly until the stand is balanced.
  - The imbalance is now in the perpendicular (top or bottom).
- Mark the perpendicular.
- Rotate the grinding wheel 90° anti-clockwise.
  - If the balancing stand inclines towards the left (anti-clockwise), the heaviest point of the grinding wheel was at the top.
  - If the balancing stand inclines towards the right (clockwise), the heaviest point of the grinding wheel was at the bottom.
- Mark the heaviest point of the grinding wheel.
- Lock the weighing frame of your balancing stand in position.
- Loosen the balancing weights on the clamping flange and fasten the middle weight exactly opposite the heaviest point of the grinding wheel.
- Fasten the other two weights approximately 120° on either side of the first weight.
- Unlock the weighing frame.
- Watch the inclination of the balancing stand.
- Lock the weighing frame of the balancing stand in position.

- Loosen the two balancing weights that are fastened symmetrically with the weight opposite the heaviest point of the grinding wheel.

- Adjust the position of these weights symmetrically according to the inclination of the balancing stand.

- Unlock the weighing frame.

- Watch the inclination of the balancing stand.

- Repeat this procedure until the stand is properly balanced.

- Lock the weighing frame of the balancing stand in position.

- Rotate the grinding wheel another 90° and repeat the complete balancing procedure.

The balancing procedure is complete when the grinding wheel is properly balanced all round (in 90° steps).
7.7 Grinding wheel flange in conjunction with a manual HSK tool-holder (optional)

7.7.1 Clamping the flange onto the grinding spindle

*Important*

*Clean the taper and the face surface of the flange / spindle thoroughly before clamping the flange.*

- Fit the wheel flange carefully onto the spindle.
  - *The long lug must be inserted in the deep groove.*

- Position the ejectors on the screwed clamping mechanism.
  - *To do so, you must unscrew the clamping bolt (hexagon socket bolt, a/f 5) 1.5 turns clockwise, starting at the backward limit position.*
• Screw the clamping mechanism into the grinding spindle as far as the limit stop on the face side.

• Now unscrew the clamping bolt as far as possible anti-clockwise.
  – *The ejectors are retracted again.*

• If possible, turn the complete screwed clamping mechanism slightly farther in the clockwise direction.

• Tighten the clamping bolt firmly in the clockwise direction.
  – *Recommendation: Use a socket spanner with a T-shaped grip and a width across the flats of 5 mm, and tighten the clamping bolt to approximately 20 Nm.*

7.7.2 Unclamping the flange from the spindle

• Loosen the clamping bolt in the anti-clockwise direction as far as the backward limit stop.
  – *The clamping pistons are withdrawn and the ejectors are retracted.*

• Unscrew the clamping mechanism anti-clockwise as far as the limit stop.

• Now hold the grinding wheel firmly and unclamp the locating flange from the spindle by jerking it anti-clockwise.

• Unscrew the clamping bolt 1.5 turns clockwise.
  – *The ejectors are positioned again.*

• Remove the locating flange from the spindle.

7.7.3 Important note: clamping bolt

If you are unable to unclamp the screwed clamping mechanism from the spindle again because the hexagon socket of the clamping bolt is too worn, you can follow the procedure described below:

• Loosen and remove the two countersunk bolts on the end face of the screwed clamping mechanism.

• Turn the knurled sleeve 180°.
  – *The first clamping bolt is now concealed by the sleeve, and the second bolt is accessible through the hole in it.*

• Screw in the two countersunk bolts again.
  – *You can now use the second clamping bolt with the intact hexagon socket instead.*

*This second clamping bolt has exactly the same function as the first. The only difference is that it is turned in the opposite direction.*
7.8 Semi-automatic balancers (optional)

Flange the grinding wheels in accordance with the instructions set out above and balance them statically on an external balancer. If they are not balanced properly, there is a risk that they will burst apart when the grinding spindle motor is started.

Never attempt to start a grinding program with a grinding wheel that has not been balanced.

Take all the statutory precautions to prevent accidents before you start the grinding spindle motor.

Please study and heed the original operating manual provided by the manufacturer. This manual contains detailed technical information and important safety instructions. You can find all information you require to commission and operate the balancer there.

Re-balance your grinding wheel as soon as an imbalance outside the tolerance range is indicated.

Semi-automatic balancing

The balancer indicates an imbalance outside the tolerance range.

• Select the automatic balancing menu on the display of the unit.

• The grinding wheel can be balanced dynamically within the preselected tolerance range by pressing the appropriate key.

Manual balancing

The balancer indicates an imbalance outside the tolerance range.

• You can adjust the balancing weights manually in various directions by pressing the direction keys on the control unit of the balancer.
  – Keep the keys pressed down until your grinding wheel is within the preselected tolerance range again.
7.9 Dividing heads (optional)

![Warning]

Your hand is inside the machine's danger zone when you clamp or unclamp a workpiece. Make sure that the machine axes are not being traversed at the same time and that the grinding wheel is not rotating.

Make sure that the workpieces are clamped securely.

Always switch off the main switch on the machine before disconnecting the plug of the dividing head.

![Important]

Please study and heed the original operating manual provided by the manufacturer. This manual contains detailed technical information and important safety instructions. You can find all information you require to commission and operate the dividing head there.

If an automatic cycle is interrupted, you must press the Reset key (see section 3.2 “Machine control unit” on page 51, position 36) and restart at the home position.
7.10 Grinding spindle drive with a second speed range up to 206,7 ft/s (optional)

The second speed range for cutting speeds of up to 206,7 ft/s is only possible in automatic mode. The maximum cutting speed in setting-up mode and semi-automatic mode is 114,83 ft/s.

The higher cutting speed in the second speed range (up to 206,7 ft/s) also means an increased risk of accidents as a result of grinding wheels bursting apart or workpieces flying off the clamping system. Always use grinding wheels that are approved by the manufacturer for these cutting speeds and identified accordingly. Make sure that your workpieces are properly clamped and secured.

7.10.1 Changing the speed

When you change the speed range, no programs are allowed to be active and the grinding spindle drive must be switched off.

To change the speed range, reset the position of key switch 1-S6 from 0 = max. 114,83 ft/s to 1 = max. 206,7 ft/s. This switch is located on the rear of the control cubicle underneath the master switch and key switch 8-S4 (grinding without a magnet).

If you attempt to program a cutting speed of more than 114,83 ft/s when key switch 1-S6 is set to 0, the following message will be displayed: "700050 Cutting speed too high ??".

Do you really want to cut at this high speed and are all the conditions for doing so satisfied? If so, set key switch 1-S6 to 1, and acknowledge the error message. You can now cut at the selected high speed in automatic mode.
8. Error and status messages

8.1 NC error messages: from 65000 to 65999

**65000**  
Invalid grinding geometry programmed !!!

<table>
<thead>
<tr>
<th>Situation:</th>
<th>After Machining Grinding START.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>Machining Grinding is interrupted.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>When you start Machining Grinding, the system checks whether or not the technology is compatible with the geometry. If not, error message 65000 is displayed.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Select a valid grinding geometry in Grinding Program.</td>
</tr>
</tbody>
</table>

**65001**  
No dressing technology programmed !!!

<table>
<thead>
<tr>
<th>Situation:</th>
<th>After Machining Grinding/Dressing START.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>Machining Grinding/Dressing is interrupted.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>You did not select a valid dressing technology in Dressing Program.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Either select a valid dressing technology or deselect dressing mode.</td>
</tr>
</tbody>
</table>

**65002**  
No grinding technology programmed !!!

<table>
<thead>
<tr>
<th>Situation:</th>
<th>After Machining Grinding START.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>Machining Grinding is interrupted.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>You have programmed a geometry without a grinding technology.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Select a valid grinding technology and press the „Select“ softkey in Grinding Program.</td>
</tr>
</tbody>
</table>

**65003**  
Initialize system !!!

<table>
<thead>
<tr>
<th>Situation:</th>
<th>After Machining Grinding/Dressing START.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>Machining is interrupted and cannot be continued.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>You interrupted NC processing with an error or a reset, either during machining or during a tool change. The internal data is partly no longer valid and needs re-initializing.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Press the „Initialize System“ softkey in Jung Commissioning, then set up the entire machine again.</td>
</tr>
</tbody>
</table>
### 65004  Machining stopped: restart dressing

<table>
<thead>
<tr>
<th>Situation:</th>
<th>During a grinding operation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>Grinding is locked.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>Since the profile of the wheel is incomplete and its condition is not properly defined, it is not possible to continue grinding.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Restart dressing and run the complete program again.</td>
</tr>
</tbody>
</table>

### 65005  Machining stopped: reset Actual Values Grinding

<table>
<thead>
<tr>
<th>Situation:</th>
<th>Machining Grinding/Dressing..</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>Machining Grinding/Dressing is locked.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The dressing operation was interrupted when you updated the tool data. The workpiece datum and the tool data are no longer valid as a result.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Check the tool data for the active wheel and re-enter it if necessary; run the “Actual Values Grinding” function again.</td>
</tr>
</tbody>
</table>

### 65006  Machining stopped: reset Actual Values Dressing

<table>
<thead>
<tr>
<th>Situation:</th>
<th>Machining Grinding/Dressing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>Machining Grinding/Dressing is locked.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The dressing operation was interrupted when you updated the tool data. The dressing datum and the tool data are no longer valid as a result.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Check the tool data for the active wheel and re-enter it if necessary; run the “Actual Values Dressing” function again.</td>
</tr>
</tbody>
</table>

### 65007  Invalid batch program no.

<table>
<thead>
<tr>
<th>Situation:</th>
<th>When a batch file is initialized.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>The batch file is not initialized correctly.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The program checks for numbers from 1 to 2999.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Enter the correct batch program number.</td>
</tr>
<tr>
<td>Code</td>
<td>Error Message</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>65008</td>
<td><strong>Change wheel: Y limit reached !!!</strong></td>
</tr>
<tr>
<td>65009</td>
<td><strong>Change wheel: Z limit reached!!!</strong></td>
</tr>
<tr>
<td>65010</td>
<td><strong>Change diamond: limit not reached</strong></td>
</tr>
<tr>
<td>65011</td>
<td><strong>Invalid diamond no.</strong></td>
</tr>
<tr>
<td>Error Code</td>
<td>Error Message</td>
</tr>
<tr>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td>65012</td>
<td><strong>Measured value overflow:</strong> diamond measurement PA 31K !!!</td>
</tr>
<tr>
<td><strong>Situation:</strong></td>
<td>When the PA 31K diamond is measured.</td>
</tr>
<tr>
<td><strong>Consequences:</strong></td>
<td>The measuring program is interrupted.</td>
</tr>
<tr>
<td><strong>Meaning:</strong></td>
<td>The measuring position has not been initialized correctly. Either the diamond has been knocked out or the wear exceeds 0.125 mm.</td>
</tr>
<tr>
<td><strong>What to do:</strong></td>
<td>Check the measuring position of the reference diamond. Check the diamond wear and replace the diamond if necessary.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Error Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>65013</td>
<td><strong>Please mount reference diamond</strong></td>
</tr>
<tr>
<td><strong>Situation:</strong></td>
<td>When the PA 31K diamond is measured.</td>
</tr>
<tr>
<td><strong>Consequences:</strong></td>
<td>The search for the measuring position is interrupted.</td>
</tr>
<tr>
<td><strong>Meaning:</strong></td>
<td>The measuring position can only be found with the reference diamond.</td>
</tr>
<tr>
<td><strong>What to do:</strong></td>
<td>Either mount the reference diamond or enter the diamond number in the tool management mask.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Error Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>65014</td>
<td><strong>Cannot dress grinding wheel</strong></td>
</tr>
<tr>
<td><strong>Situation:</strong></td>
<td>Machining Dressing.</td>
</tr>
<tr>
<td><strong>Consequences:</strong></td>
<td>The dressing operation is interrupted.</td>
</tr>
<tr>
<td><strong>Meaning:</strong></td>
<td>The grinding wheel has been defined as „not dressable“ in the tool management mask. The dressing operation was started with the corresponding technology.</td>
</tr>
<tr>
<td><strong>What to do:</strong></td>
<td>Mount a dressable wheel and define it as dressable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Error Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>65015</td>
<td><strong>Lower Y or Z wheel limit exceeded</strong></td>
</tr>
<tr>
<td><strong>Situation:</strong></td>
<td>Machining Dressing.</td>
</tr>
<tr>
<td><strong>Consequences:</strong></td>
<td>The dressing operation is interrupted.</td>
</tr>
<tr>
<td><strong>Meaning:</strong></td>
<td>The wheel cannot be dressed without exceeding the lower limit values.</td>
</tr>
<tr>
<td><strong>What to do:</strong></td>
<td>Change the wheel and update the tool data in the tool management mask. Copy the wheel to the working wheel with Activate Data.</td>
</tr>
</tbody>
</table>
### 65016 Invalid wheel radius for S output

**Situation:** Machining Dressing, Tool Management-Spindle Speed-Output.

**Consequences:** The machining operation is interrupted.

**Meaning:** The radius for the spindle speed output has been entered incorrectly (limit values) !!

**What to do:** Check the limit values and change them if necessary. Enter the wheel radius for the spindle speed output in the tool management mask.

### 65017 No probing control data

**Situation:** Machining Probe.

**Consequences:** The actual-value setting function is interrupted. The grinding operation does not start.

**Meaning:** Either the feed rate data or the probing control data is missing.

**What to do:** Enter the data.

### 65018 No probing control signal

**Situation:** Probing while setting actual values. Probing during plunge grinding.

**Consequences:** Machining Actual Values or the grinding operation is interrupted.

**Meaning:** The probing path is too short, the direction is incorrect or the device is defective: the settings must be checked.

**What to do:** Check the probing path and the device function.

### 65019 Cannot find probe

**Situation:** When the PA 31K diamond is measured.

**Consequences:** The search for the measuring position is interrupted.

**Meaning:** The V and W-axes must be set roughly to the measuring position < 0.5 mm before you press “Find Meas. Pos.”.

**What to do:** Set the diamond roughly to the measuring position. Start the program again. Check the function of the measuring device; the probe may be defective.
### 65020
*Start dimension entered incorrectly for side 2*

<table>
<thead>
<tr>
<th>Situation</th>
<th>JR 350 after end of side 1.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences</td>
<td>NC stop.</td>
</tr>
<tr>
<td>Meaning</td>
<td>The dimensions for sides 1 and 2 have not been entered correctly.</td>
</tr>
<tr>
<td>What to do</td>
<td>Enter the correct geometries for side 1 and/or 2.</td>
</tr>
</tbody>
</table>

### 65027
*Invalid postprocessor code for path grinding*

<table>
<thead>
<tr>
<th>Situation</th>
<th>Machining Reciprocating Path Grinding.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences</td>
<td>The grinding operation is interrupted.</td>
</tr>
<tr>
<td>Meaning</td>
<td>If the path contour is defined externally, its geometry can take the form either of a parameter record or of a traversing block program. The two types of geometry are distinguished by means of a postprocessor code.</td>
</tr>
<tr>
<td>What to do</td>
<td>Set the correct code for continuous-path grinding in accordance with the postprocessor specification.</td>
</tr>
</tbody>
</table>

### 65039
*Invalid dressing geometry no. in tool management mask*

<table>
<thead>
<tr>
<th>Situation</th>
<th>Machining Dressing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences</td>
<td>The machining operation is cancelled.</td>
</tr>
<tr>
<td>Meaning</td>
<td>The dressing geometry number must be between 1 and 2999. The number must always be set to 3000 for face grinding.</td>
</tr>
<tr>
<td>What to do</td>
<td>Check the entry in the tool management mask and change it if necessary. Take account of the active wheel and the working wheel.</td>
</tr>
</tbody>
</table>

### 65043
*Invalid postprocessor code for geometry dressing*

<table>
<thead>
<tr>
<th>Situation</th>
<th>Machining Dressing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences</td>
<td>The machining operation is cancelled.</td>
</tr>
<tr>
<td>Meaning</td>
<td>If the contour is defined externally, its geometry can take the form either of a parameter record or of a traversing block program. The two types of geometry are distinguished by means of a postprocessor code.</td>
</tr>
<tr>
<td>What to do</td>
<td>Set the correct code for the dresser in accordance with the postprocessor specification.</td>
</tr>
<tr>
<td>Error Code</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td>65044</td>
<td>Invalid angle calculated for active diamond data</td>
</tr>
<tr>
<td>65045</td>
<td>Input error: dressing technology</td>
</tr>
<tr>
<td>65052</td>
<td>G54 / G55 not selected</td>
</tr>
<tr>
<td>65055</td>
<td>No wheel side selected for face dressing</td>
</tr>
</tbody>
</table>
### 65056 | **Option not available**

**Situation:** All machining operations.

**Consequences:** The machining operation is cancelled.

**Meaning:** You have attempted to activate a machine option which is either not available or not active.

**What to do:** Check your inputs and actions and correct them if necessary.

### 65059 | **Angle entered for face geometry too large**

**Situation:** Machining Face Dressing.

**Consequences:** The machining operation is cancelled.

**Meaning:** The angle you entered in Face Dressing Geometry is too large. All inputs greater than 5 degrees are invalid.

**What to do:** Check the angle you entered in Face Geometry and change it if necessary.

### 65060 | **Angle entered for face geometry negative or zero**

**Situation:** Machining Face Dressing.

**Consequences:** The machining operation is cancelled.

**Meaning:** The angle you entered in Face Dressing Geometry is either negative or zero.

**What to do:** Check the angle you entered in Face Geometry and change it if necessary.

### 65062 | **Re-initialize diamond no.**

**Situation:** When the PA 31K diamond is changed.

**Consequences:** The machining operation is cancelled.

**Meaning:** The diamond change has been interrupted. The system no longer knows which diamond you are using.

**What to do:** Enter the number of the diamond you are currently using, together with the station number. Initialize the diamond and the station in the “Set Actual Values Head Dressing” menu.
<table>
<thead>
<tr>
<th>65063</th>
<th><strong>Reciprocating X-axis active !!!</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation:</td>
<td>When actual values are set in the X-axis.</td>
</tr>
<tr>
<td>Consequences:</td>
<td>The X-axis is not set.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The X-axis can only be set while it is stationary.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Traverse in the X-axis to the position you want to set.</td>
</tr>
</tbody>
</table>
### 8.2 NC status messages: from 67000 to 67999

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Situation</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>67005</td>
<td>Do you really want to delete this area ???</td>
<td>Set Actual Values Grinding &quot;Delete Area&quot;.</td>
<td>Press Reset to cancel.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Press NC START to delete the area.</td>
</tr>
<tr>
<td>67006</td>
<td>Do you really want to delete the wheel data ???</td>
<td>Wheel management.</td>
<td>Press Reset to cancel.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Press NC START to delete the wheel data.</td>
</tr>
<tr>
<td>67007</td>
<td>Change wheel: residual sum Y &lt;SE419</td>
<td>Machining Dressing.</td>
<td>Dressing Start.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This advance warning tells you that the residual sum Y is less than the value set in SE data 419.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>This advance warning tells you that the residual sum Z is less than the value set in SE data 420.</td>
<td></td>
</tr>
<tr>
<td>67015</td>
<td>Important! Secure diamond holder</td>
<td>Change Holder Program.</td>
<td>Dressing Start.</td>
</tr>
<tr>
<td>Code</td>
<td>Message Description</td>
<td>Situation</td>
<td>Response</td>
</tr>
<tr>
<td>-------</td>
<td>----------------------------------------------------------</td>
<td>-----------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>67016</td>
<td><strong>Important ! Diamond holder clamped</strong></td>
<td>Change Holder Program.</td>
<td>Dressing Start.</td>
</tr>
<tr>
<td>67017</td>
<td><strong>Important ! PA 31K traversing to old position</strong></td>
<td>Change Holder Program.</td>
<td>Dressing Start.</td>
</tr>
<tr>
<td>67019</td>
<td><strong>Important ! E-axis traversing to 0 deg</strong></td>
<td>Adjust Diamond.</td>
<td>Dressing Start.</td>
</tr>
<tr>
<td>67020</td>
<td><strong>Important ! E-axis traversing to -60 deg</strong></td>
<td>Adjust Diamond.</td>
<td>Dressing Start.</td>
</tr>
<tr>
<td>67021</td>
<td><strong>Important ! E-axis traversing to +60 deg</strong></td>
<td>Adjust Diamond.</td>
<td>Dressing Start.</td>
</tr>
<tr>
<td>67022</td>
<td><strong>Important: Machining next surface / groove !</strong></td>
<td>Machining Grinding.</td>
<td>Grinding Start.</td>
</tr>
<tr>
<td>67023</td>
<td><strong>Is entered radius really OK ?</strong></td>
<td>When the wheel radius is adjusted for the spindle speed output in the tool management mask for the grinding wheel.</td>
<td>Grinding Start / Reset.</td>
</tr>
</tbody>
</table>
### 67024

**Important: New radius now active !!**

| Situation: | 2nd system query cf. 5123; the new radius takes effect as soon as you confirm it. |
| Response:  | Grinding Start / Reset. |

### 67025

**Machining of 1st side complete: please turn part over**

| Situation: | When the machining operation on the first side is completed. |
| Response:  | NC start. |
### 8.3 Channel 1 messages: from 510000 to 511315

#### 8.3.1 Feed lock and halt dwell time 510100 - 510131

<table>
<thead>
<tr>
<th>Code</th>
<th>Message Description</th>
<th>Situation</th>
<th>Consequences</th>
<th>Meaning</th>
<th>What to do</th>
</tr>
</thead>
</table>
| 510100 | No “WGE ready” signal !!!                  | Any       | A feed lock is active in all the NC axes and a halt dwell time is active for the NC blocks. | - The motor circuit-breakers at the wet grinding equipment have tripped.  
- The master switch on the wet grinding equipment is not switched on. | • Check the motor circuit-breakers.  
• Switch the master switch on. |
| 510101 | Fault in fuse / motor circuit-breaker !!!  | Any       | A feed lock is active in all the NC axes and a halt dwell is active for the NC blocks. | A fuse or a motor circuit-breaker in the control cubicle has tripped.  | Check the fuses and the motor circuit-breakers in the control cubicle. |
| 510103 | No “axis drive ready” signal !!!           | Any       | A feed lock is active in all the NC axes and a halt dwell time is active for the NC blocks. | No system ready signal has been received from the axis drive.          | • Check the module connections.  
• Replace the module if defective. |
### 510104 Maximum spindle field voltage exceeded !!!

<table>
<thead>
<tr>
<th>Situation:</th>
<th>After spindle ON.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>A feed lock is active in all the NC axes and a halt dwell time is active for the NC blocks.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The spindle drive reports that the maximum field voltage has been exceeded.</td>
</tr>
</tbody>
</table>
| What to do: | • Switch the machine OFF and the ON again.  
• Check the module connections.  
• Replace the module if defective. |

### 510105 No “spindle drive ready“ signal !!!

<table>
<thead>
<tr>
<th>Situation:</th>
<th>Any.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>A feed lock is active in all the NC axes and a halt dwell time is active for the NC blocks.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>No system ready signal has been received from the spindle drive.</td>
</tr>
</tbody>
</table>
| What to do: | • Switch the machine OFF an then ON again.  
• Check the module connections.  
• Replace the module if defective. |

### 510116 Activate magnetic chuck !!!

| Situation: | Automatic mode: when an NC program is started.  
Semi-automatic mode: when the X-axis starts a reciprocating motion. |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>A feed lock is active in all the NC axes and a halt dwell time is active for the NC blocks.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The electromagnetic chuck is not active.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Activate the electromagnetic chuck.</td>
</tr>
</tbody>
</table>

### 510117 Magnetic chuck not set to full gripping force !!!

<table>
<thead>
<tr>
<th>Situation:</th>
<th>During creep-feed grinding.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>A feed lock is active in all the NC axes and a halt dwell time is active for the NC blocks.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The rotary switch for the chuck gripping force is not set to 16.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Set the rotary switch to 16.</td>
</tr>
</tbody>
</table>
### 510118 **Activate spindle !!!**

**Situation:** After Grinding Program START.

**Consequences:** A feed lock is active in all NC axes and a halt dwell time is active for the NC blocks.

**Meaning:** The spindle is not active.

**What to do:** Activate spindle.

---

### 510119 **Oil pressure too low to lubricate X-axis !!!**

**Situation:** During lubrication.

**Consequences:** A feed lock is active in all NC axes and a halt dwell time is active for the NC blocks.

**Meaning:** The system checks whether or not oil pressure is built up during lubrication.

**What to do:**
- Not enough oil: top up.
- Break in the lubricant piping: repair.
- Air in the lubricant piping: bleed.

---

### 510120 **Oil pressure too low to lubricate Z-axis !!!**

**Situation:** During lubrication.

**Consequences:** A feed lock is active in all NC axes and a halt dwell time is active for the NC blocks.

**Meaning:** The system checks whether or not oil pressure is built up during lubrication.

**What to do:**
- Not enough oil: top up.
- Break in the lubricant piping: repair.
- Air in the lubricant piping: bleed.

---

### 510121 **Not enough water for creep feed !!!**

**Situation:** During creep-feed machining (optional).

**Consequences:** A feed lock is active in all NC axes and a halt dwell time is active for the NC blocks.

**Meaning:** The flow indicator for the abrasive lubricant shows too little water.

**What to do:**
- Top up the water level.
- Increase the opening of the shut-off valve.
8.3.2 NC-start locked 510300 - 510315

<table>
<thead>
<tr>
<th>510300</th>
<th>Oil level too low !!!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation:</td>
<td>Any.</td>
</tr>
<tr>
<td>Consequences:</td>
<td>The NC program cannot be started.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The oil level in the tank is too low.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Top up with oil.</td>
</tr>
</tbody>
</table>
8.4 Axis error messages 600100 - 600815

8.4.1 Axis 1, 600100 - 600115

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Situation</th>
<th>Consequences</th>
<th>Meaning</th>
<th>What to do</th>
</tr>
</thead>
</table>
| 600100 | X-axis in limit position !!!                     | Any       | It is no longer possible to traverse in the X-axis.         | You have already traversed in the X-axis as far as the mechanical hardware limit switch. | Traverse clear in this axis (see Operating Manual).  
- Check the hardware limit switch.  
- Check the software limit switch.  
- Switch on the machine and traverse to the reference point. |
| 600101 | Maximum temperature exceeded in X-axis !!!      | Any       | It is no longer possible to traverse in the X-axis.         | Overtemperature in the linear motor of the S320 machine.               | Switch off the machine and call customer service. |
| 600108 | Alter setting of key switch                     | When traversing clear of the hardware limit position.  | It is no longer possible to traverse in the X-axis.               | The key-operated switch 6-S2 in the control cubicle is set to ON, but the axis is not in the limit position. | Alter the setting of the key-operated switch 6-S2. |
### 8.4.2 Axis 2, 600200 - 600215

<table>
<thead>
<tr>
<th>600200</th>
<th>Y-axis in limit position !!!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation:</td>
<td>Any</td>
</tr>
<tr>
<td>Consequences:</td>
<td>It is no longer possible to traverse in the Y-axis.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>You have already traversed in the Y-axis as far as the mechanical hardware limit switch.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Traverse clear in this axis (see Operating Manual). – Check the hardware limit switch. – Check the software limit switch. – Switch on the machine and traverse to the reference point.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>600208</th>
<th>Alter setting of key switch !!!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation:</td>
<td>When traversing clear of the hardware limit position.</td>
</tr>
<tr>
<td>Consequences:</td>
<td>It is no longer possible to traverse in the Y-axis.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The key-operated switch 6-S2 in the control cubicle is set to ON, but the axis is not in the limit position.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Alter the setting of the key-operated switch 6-S2.</td>
</tr>
</tbody>
</table>
8.4.3 Axis 3, 600300 - 600315

**600300**  | *Z-axis in limit position !!!*
---|---
**Situation:** Any.
**Consequences:** It is no longer possible to traverse in the Z-axis.
**Meaning:** You have already traversed in the Z-axis as far as the mechanical hardware limit switch.
**What to do:**
- Traverse clear in this axis (see operating Manual).
- Check the hardware limit switch.
- Check the software limit switch.
- Switch on the machine and traverse to the reference point.

**600308**  | *Alter setting of key switch !!!*
---|---
**Situation:** When traversing clear of the hardware limit position.
**Consequences:** It is no longer possible to traverse in the Z-axis.
**Meaning:** The key-operated switch 6-S2 in the control cubicle is set to ON, but the axis is not in the limit position.
**What to do:** Alter the setting of the key-operated switch 6-S2.

8.4.4 Axis / spindle 4, 600400 - 600415

**600400**  | *Maximum spindle speed exceeded !!*
---|---
**Situation:** After spindle ON
**Consequences:**
- The spindle is deactivated.
- If a program is running, it is cancelled
**Meaning:** The spindle speed monitor has been tripped.
**What to do:** Check the sensors of the speed monitor.

**600401**  | *Spindle I/T overload !!!*
---|---
**Situation:** After spindle ON:
**Consequences:** An error is indicated.
**Meaning:** An overcurrent condition occurred when the spindle was activated.
**What to do:** Press the Reset key.
<table>
<thead>
<tr>
<th>600402</th>
<th>Spindle module error FC18 !!!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situation:</td>
<td>After spindle ON or OFF.</td>
</tr>
<tr>
<td>Consequences:</td>
<td>An error is indicated.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>An error occurred when the spindle was activated or deactivated manually.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Press the Reste key.</td>
</tr>
</tbody>
</table>
### 8.5 User error and status messages 700000 - 700063

<table>
<thead>
<tr>
<th><strong>700000</strong></th>
<th><strong>No “control cubicle cooler ready“ signal !!!</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Situation:</strong></td>
<td>Any.</td>
</tr>
<tr>
<td><strong>Consequences:</strong></td>
<td>An error is indicated.</td>
</tr>
<tr>
<td><strong>Meaning:</strong></td>
<td>No system ready signal has been received from the control cubicle cooler.</td>
</tr>
<tr>
<td><strong>What to do:</strong></td>
<td>Replace the filter mat.</td>
</tr>
<tr>
<td></td>
<td>Replace the cooler if defective.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>700002</strong></th>
<th><strong>Data write error FB3 !!!</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Situation:</strong></td>
<td>After a data transfer is initiated.</td>
</tr>
<tr>
<td><strong>Consequences:</strong></td>
<td>An error is indicated.</td>
</tr>
<tr>
<td><strong>Meaning:</strong></td>
<td>Data is being written to the NC.</td>
</tr>
<tr>
<td><strong>What to do:</strong></td>
<td>• NC reset.</td>
</tr>
<tr>
<td></td>
<td>• Switch the machine OFF and then ON again.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>700003</strong></th>
<th><strong>Data read error FB2 !!!</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Situation:</strong></td>
<td>After a data transfer is initiated.</td>
</tr>
<tr>
<td><strong>Consequences:</strong></td>
<td>An error is indicated.</td>
</tr>
<tr>
<td><strong>Meaning:</strong></td>
<td>Data is being read from the NC.</td>
</tr>
<tr>
<td><strong>What to do:</strong></td>
<td>• NC reset.</td>
</tr>
<tr>
<td></td>
<td>• Switch the machine OFF and the ON again.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>700004</strong></th>
<th><strong>Error traversing clear FC15 !!!</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Situation:</strong></td>
<td>When traversing clear in the Y-axis.</td>
</tr>
<tr>
<td><strong>Consequences:</strong></td>
<td>• An error is indicated.</td>
</tr>
<tr>
<td></td>
<td>• The machine stops traversing clear in this axis.</td>
</tr>
<tr>
<td><strong>Meaning:</strong></td>
<td>The traversing-clear motion in this axis has been interrupted due to an override zero or a reset.</td>
</tr>
<tr>
<td><strong>What to do:</strong></td>
<td>NC reset.</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>700005</td>
<td><strong>PI utilities error !!!</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>700006</td>
<td><strong>No “V-axis SM driver ready” signal !!!</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>700032</td>
<td><strong>Guard door closed ???</strong></td>
</tr>
<tr>
<td>700033</td>
<td><strong>Cover closed ???</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 700036

**Important: Traverse machine to reference point !!!**

<table>
<thead>
<tr>
<th>Situation:</th>
<th>After machine ON.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>It is only possible to position the axes at the normal feed rate.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>You must traverse the machine to the reference point before you can start a grinding program.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Traverse to the reference point.</td>
</tr>
</tbody>
</table>

### 700037

**Continue machining at breakpoint !!!**

<table>
<thead>
<tr>
<th>Situation:</th>
<th>When you attempt to traverse clear in the Y-axis then start an NC program.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>An error is indicated.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>After you have traversed clear in the Y-axis and started an NC program, you must decide whether or not you want to continue machining at the breakpoint. If so, start the NC program again. If not, press the Reset key.</td>
</tr>
<tr>
<td>What to do:</td>
<td>NC start or NC reset.</td>
</tr>
</tbody>
</table>

### 700038

**Control lever for X-axis open ??**

<table>
<thead>
<tr>
<th>Situation:</th>
<th>During a hydraulic motion in the X-axis.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>No reciprocating motion in the X-axis.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The control lever for adjusting the speed in the X-axis is set to 0.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Open the control lever.</td>
</tr>
</tbody>
</table>

### 700039

**V-axis in limit position !!!**

<table>
<thead>
<tr>
<th>Situation:</th>
<th>When traversing in the V-axis.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>It is no longer possible to traverse in the V-axis.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The axis has collided with a limit switch.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Traverse clear in the opposite axis direction.</td>
</tr>
<tr>
<td>Code</td>
<td>Message</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>700040</td>
<td><strong>W-axis not in start position !!!</strong></td>
</tr>
<tr>
<td>700041</td>
<td><strong>Confirm wheel diameter !!!</strong></td>
</tr>
<tr>
<td>700042</td>
<td><strong>Operate W-axis manually / press Cancel key !!!</strong></td>
</tr>
<tr>
<td>700043</td>
<td><strong>Warm-up program active !!!</strong></td>
</tr>
<tr>
<td>700044</td>
<td><strong>No “cross slide cooler ready“ signal !!!</strong></td>
</tr>
</tbody>
</table>
### 700045 Fault in spindle cooling system !!!

<table>
<thead>
<tr>
<th>Situation:</th>
<th>Always.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>The spindle switched off and a feed lock is active in all axes.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>It is no longer possible to traverse in any of the axes or to activate the spindle.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Check the water level and the safeguards of the cooler.</td>
</tr>
</tbody>
</table>

### 700046 Air pressure monitoring !!!

<table>
<thead>
<tr>
<th>Situation:</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>A feed lock is active in all axes.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>It is no longer possible to traverse in any of the axes.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Switch on the air pressure.</td>
</tr>
</tbody>
</table>

### 700047 Used oil level: machine bed full ???

<table>
<thead>
<tr>
<th>Situation:</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>Display only</td>
</tr>
<tr>
<td>Meaning:</td>
<td></td>
</tr>
<tr>
<td>What to do:</td>
<td>Drain used oil from the machine bed.</td>
</tr>
</tbody>
</table>

### 700049 PA130T dressing roller speed too low !!!

<table>
<thead>
<tr>
<th>Situation:</th>
<th>Automatic dressing with PA 130T.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>A feed lock is active in all axes.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The speed of the dressing roller must be at least 800 rpm.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Check your inputs.</td>
</tr>
</tbody>
</table>

### 700050 Cutting speed too high ??

<table>
<thead>
<tr>
<th>Situation:</th>
<th>Automatic program cycle.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences:</td>
<td>A feed lock is active in all axes.</td>
</tr>
<tr>
<td>Meaning:</td>
<td>The programmed cutting speed is not the same as the speed preselected with the key switch.</td>
</tr>
<tr>
<td>What to do:</td>
<td>Check your inputs. Check the setting of the key switch.</td>
</tr>
</tbody>
</table>
### 8.6 NC Siemens system errors

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>Situation</th>
<th>Consequences</th>
<th>Meaning</th>
<th>What to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>10621</td>
<td><em>Channel --- axis --- at software switch</em></td>
<td>Always</td>
<td>It is no longer possible to traverse in this axis direction.</td>
<td>The axis concerned is positioned to the software limit switch.</td>
<td>Traverse clear of the software limit switch with the plus/minus key.</td>
</tr>
<tr>
<td>10720</td>
<td><em>Channel --- axis --- at software limit switch</em></td>
<td>After a program is started.</td>
<td>The program stops.</td>
<td>You have programmed a position beyond the software limit switch.</td>
<td>Check the geometry values you have entered.</td>
</tr>
<tr>
<td>25040</td>
<td><em>Axis --- idle</em></td>
<td>When the axis is idle.</td>
<td>The NC is not ready.</td>
<td>The axis concerned has been forced out of position.</td>
<td>NC reset.</td>
</tr>
</tbody>
</table>
9. Maintenance / servicing / disposal

9.1 Maintenance and servicing instructions

**Warning**

*Before carrying out any maintenance or servicing work, switch off the master switch and take steps to prevent the machine from being switched on again accidentally.*

**Important**

*Depending on the type of activity, several years training in the fields of mechanical and electrical engineering are required in order to be able to carry out the procedures described in this chapter. All persons charged with work on the electrical system or inside the control cubicle must be qualified electricians.*

*A knowledge of the general safety regulations and rules of conduct is also essential (these are not referred to specifically in the following).*

*If it is necessary to dismantle or deactivate safety or protective devices in order to carry out maintenance and servicing work, they must be completely re-assembled again and checked to ensure that they are functioning correctly prior to resuming operation.*

*The mechanical design and the control systems of the machine must not be modified in any way without the explicit consent of the manufacturer. The owner shall bear sole responsibility for all consequences.*

*Always observe the stipulated maintenance and servicing intervals. This also applies to all optional equipment and to all intervals stated in the documentation of other suppliers.*
## 9.1.1 Maintenance and service list

<table>
<thead>
<tr>
<th>Operating hours maintenance interval</th>
<th>Inspection point - activities</th>
<th>Auxiliary materials / equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>As and when required</strong></td>
<td>Check the transport harness for damage and proper functioning prior to transporting the machine.</td>
<td></td>
</tr>
<tr>
<td><strong>8h / daily</strong></td>
<td>Press the automatic lubrication key before starting work. Check that there is still sufficient filter paper; remove if necessary and empty the collecting tank. Check the socket and cables of the magnetic chuck (visual inspection). If they are damaged, switch OFF the machine immediately and have the damage repaired by a qualified electrician. Check the coolant concentration with the manufacturer’s specifications.</td>
<td></td>
</tr>
<tr>
<td><strong>40h / weekly</strong></td>
<td>Remove saturated filter paper and empty the collecting tank. Check the coolant pipes, and particularly the drain pipes, for deposits and dirt. Clean them if necessary. Apply 2 to 4 strokes of lubricant to points 1 and 2. Check lubricating point 12 (visual inspection) and if necessary top up with oil. Check the maintenance unit for optional equipment (visual inspection) and if necessary top up with oil. Apply lubricant to the appropriate points on all optional equipment. Please refer to the relevant Operating Manuals.</td>
<td>* Lubricating oil ** Hydraulic oil</td>
</tr>
<tr>
<td><strong>160h / monthly</strong></td>
<td>Check lubricating point 10 (visual inspection) and if necessary top up with oil. Remove used oil from collecting tanks 8 and 9. Check all safety devices (visual inspection). Check all bellows (visual inspection). Replace them immediately if damaged (Jung Customer Service).</td>
<td>** Hydraulic oil Collecting tanks</td>
</tr>
<tr>
<td><strong>500h / every 3 months</strong></td>
<td>Dismantle the magnetic chuck and remove any rust. Clean the hydraulic-fluid cooler / cooling system and perform a functional test. Apply crease to the lubrication points 1 and 2 off the optional profile dresser PA 31K (See section 9.3.9 “Lubricating points on the PA 31K (optional)” on page 283.</td>
<td>Hoisting gear / crane Compressed air / thermometer ***Crease</td>
</tr>
<tr>
<td><strong>1000h</strong></td>
<td>Inspect the machine in accordance with the checklist (Jung Customer Service).</td>
<td>Spare parts</td>
</tr>
<tr>
<td><strong>2000h</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 9.1.2 Maintenance and servicing instructions

**Checking the socket and cables of the magnetic chuck for damage**

If the cable or socket is damaged, please switch off the machine immediately and either contact the Customer Service department or have the damage repaired by an authorized, suitably qualified technician.

**Visual inspection of the safety devices**

Perform a visual inspection of the following safety devices:
- Emergency stop button
- Control and operating elements

Any defects must be rectified immediately, prior to starting up the machine.

**Functional test of the safety devices**

Check all the safety devices (e.g. emergency stop), to make sure they are functioning correctly. Any defects must be rectified immediately, prior to starting up the machine. Keep an inspection log book and record the results of all tests in it.

---

**Operating hours / maintenance interval**

<table>
<thead>
<tr>
<th>Inspection point - activities</th>
<th>Auxiliary materials / equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>every 12 months</strong></td>
<td><strong>Hydraulic oil</strong></td>
</tr>
<tr>
<td>Replace the coolant hoses. Perform a functional test for all safety devices (Jung Customer Service). If any defects, faults or damage are detected, switch OFF the machine immediately and have the damage repaired (Jung Customer Service). Replace the battery (control unit). Replace the hydraulic oil at lubricating point 10. (tank capacity 45 l).</td>
<td></td>
</tr>
</tbody>
</table>

#### Measuring equipment

**Every 2 years**

- Replace the coolant every two years at the latest. If necessary, it should be replaced much sooner (please also refer to the DIN Material Safety Data Sheet provided by the coolant supplier).

#### Measuring equipment

**Every 4 years**

- Check the complete electrical equipment.
### 9.1.3 Regular maintenance of the coolant system

**Warning**

*Appropriate countermeasures must be taken by the owner if the limit values specified below are exceeded. These measures must be approved by the coolant manufacturer, the BIA (Institute for Work Safety of the Employer's Liability Insurance Association) and the Gewerbeaufsichtsamt (Factory and Shop Inspectorate).*

<table>
<thead>
<tr>
<th>Interval</th>
<th>Measurement</th>
<th>Limit value</th>
<th>Result</th>
</tr>
</thead>
</table>
| **daily**  | Concentration                   | See manufacturer’s specifications                      | Concentration too low = risk of corrosion  
Concentration too high = machine becomes misted and sticky                                             |
| **weekly** | pH value                         | 8.5 - 9.4                     | Value too low = risk of corrosion and microbial contamination  
Value too high = skin irritation                                                                          |
|            | Nitrate content                 | Less than 50 mg/l             | Increased risk of cancer                                                                                                                                   |
|            | Nitrite content                 | Less than 20 mg/l             | Increased risk of cancer                                                                                                                                   |
| **monthly**| Bacteria count, yeast / fungus  | Less than $10^4$             | - Odour  
- Reduced protection against corrosion  
- Skin irritation  
- Inflammation  
- Reduction in filtration and chip removal effectiveness                                                 |
|            | Bacteria count, yeast / fungus  | Less than $10^6$             | See above                                                                                                                                                     |

**See manufacturer’s specifications**

- Nitrosamine  
  - Limit value: 1 Mikrogramm/m³  
  - Official recommended concentration. Must not be exceeded under any circumstances.
- Aerosol concentration  
  - Limit value: 5 mg/m³  
  - Hazard from toxic substances.
- Sum of aerosol and vapour concentration  
  - Limit value: 20 mg/m³  
  - Hazard from toxic substances.
9.2 Setting the table reversal and limit positions in the X-axis with hydraulic valves

The hydraulic valves for setting the limit positions and the table reversal are located on the left-hand side of the machine bed. These valves are set correctly in the factory and do not need to be adjusted for normal grinding operation. If it seems to you that the table reversal or the approach to the limit positions is too hard or too soft, you can correct it using these two valves.

Open the clamping bolt of the valve you want to adjust with a hollow hexagon wrench.

- Turn the table reversal valve anti-clockwise to make the reversal path shorter and harder. Turn it clockwise to make the reversal path longer and softer.

Always mark the original setting before adjusting either of these valves.

Be careful not to turn the valve too far clockwise, because this could make the reversal path so long that both limit switches are overtravelled when the table is reversed. A double infeed takes place as a result. A reversal path that is too hard and too short causes the machine to vibrate excessively. The machine may be damaged and your grinding results may deteriorate.
– Turn the limit position valve anti-clockwise to make the approach path shorter and harder. Turn it clockwise to make the approach path longer and softer.

**Important**

Be careful not to turn the valve too far clockwise, because this could make the approach path so long and soft that the table no longer travels to the limit positions correctly and cannot be started again when it reaches them. A limit position approach that is too hard and too short causes the machine to vibrate excessively. The machine may be damaged.

- Tighten the clamping bolt again after adjusting the valve.
9.3 Lubrication plan

9.3.1 Important instructions for working with oils

The machine must not be started up until the central lubrication system has been filled with one of the specified oils. No liability will be assumed by the manufacturer for any damage to the machine which results from failure to comply with this requirement.

Study and heed the general rules and requirements for working with oil.

Avoid direct contact between your skin and the oil by wearing personal protective equipment (gloves, special work clothing, etc.).

If oil comes into contact with your skin despite all precautions, you should immediately wash and rinse the affected areas thoroughly. See section 7.3.2 “Skin protection plan” on page 223.

Spilt or leaked oil is slippery. Wipe it away immediately to avoid accidents.

Please refer to the DIN Material Safety Sheets provided by the oil manufacturer for information about the safety-relevant characteristics of your particular oils (flash point, etc.).

Please dispose of used oil in a proper and environmentally compatible manner. Any statutory requirements must be observed.

9.3.2 Recommended lubricating oils

Standard designation: Lubricating oil CGLP 220 / ISO-L-G 220
JUNG designation: JUNG oil 220

9.3.3 Recommended hydraulic oils

Standard designation: Hydraulic oil HLP 22 / ISO-L-HM-22
JUNG designation: JUNG hydraulic oil 22

9.3.4 Recommended grease (for optional PA31K)

ISO FLEX NBU 15 (Klüber)
### 9.3.5 Lubrication instruction plate

![Diagram of lubrication instruction plate]

#### ISO Viskositätsklasse DIN 51519 Viskosität mm²/s bei 40°C

<table>
<thead>
<tr>
<th>Lubricating oils</th>
<th>OLP 220 DIN 8659</th>
<th>Hydraulic oils</th>
<th>HLP 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia</td>
<td>Liquid de graissage</td>
<td>Huiles hydrauliques</td>
<td></td>
</tr>
<tr>
<td>Manufacturer's recommendation: JUNG 220</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nr.</th>
<th>No. 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>check and refill</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40h</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil pressure,</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>40h</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200h</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>40h</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40h</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.7L</td>
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<td></td>
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<td></td>
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<tr>
<td>45 L</td>
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<td></td>
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<tr>
<td>0.1 L</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIN 8659</td>
<td>OLP 220</td>
<td></td>
<td>HLP 22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The diagram and table are in German and there may be additional notes in the margins regarding specific instructions or conditions.
9.3.6  Diagram of the central lubrication system

The oil level of the automatic central lubrication system is monitored by means of a float switch. If oil needs to be topped up, either the warning lamp on the machine control unit lights up or a message appears on the display.

**Important**

*Use only recommended lubricating oils.*
9.3.7 Drain valves for the used oil of fully enclosed machines (optional)

The drain valve for the used oil from the machine tables is in the bottom right-hand corner of the enclosure from the point of view of the operator.

The used oil from the column lubricating unit (item 9 in the lubrication plan) can be drained off at the bottom of the machine column as indicated in the lubrication plan. You must open the hole at the rear of the full enclosure for this purpose.

- You should in any case drain off the used oil (items 8 and 9 in the lubrication plan) at the latest once every month or after 160 operating hours.

**Please dispose of used oil in an environmentally compatible manner. Any statutory requirements must be observed.**

9.3.8 Maintenance unit for optional equipment

The maintenance unit is mounted on the back of the machine column. The pressure relief valve is set in the factory to 6 bar. This corresponds to approximately 1 drop of oil every 4 minutes.

**Charging**

- Use only oils with viscosity grade HLP 22
- Fill the unit up to the top level mark in the window
- Check the oil level after 40 hours operation at the latest
9.3.9 Lubricating points on the PA 31K (optional)

- Apply 2 to 4 strokes of lubricant to points 1 and 2 after 500 hours operation or after 3 months in single-shift duty.

Use the following grease:

*Klüber ISO Flex NBU 15 (Klüber)*

A grease gun with an extension and one tube of grease can be ordered as a standard accessory.
9.4 Hydraulic plan

Reciprocating table drive

Opening pressure 1 bar

15

Reciprocating

14

Creepeeed

13

Opening pressure 1 bar

Spring 8.7x0.5x28 JGN 1755

Set pressure 28 bar Operating pressure 22-25bar

P = 0.75 kW n = 880 U/min

Oil volume = 45 l

Aral Vitaom GF 22
BP Energol HLP 22
Esso NUTO H22
Mobil D.T.E. 22
Shell Tellus C22oder Voltol Gietol 22
Texaco Rand Oil HD A-22

Q = 11 cm³ / U min⁻¹
<table>
<thead>
<tr>
<th>No.</th>
<th>Qty.</th>
<th>Designation</th>
<th>Type designation</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>1</td>
<td>Once-through oil cooling</td>
<td>FRB. 5GXN2</td>
<td>Erba</td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>Cone non-return valve</td>
<td>RHV 8-PLR-ED 1 bar</td>
<td>Ermeto</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>Cone non-return valve</td>
<td>RHV 8-PLR-ED 1 bar</td>
<td>Ermeto</td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>Double, reversing lifting magnet</td>
<td>GHU 50 - 04 - 100 - 24H</td>
<td>Isilker</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>Cone non-return valve</td>
<td>RHD 10 L 1 bar</td>
<td>Ermeto</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>Cone non-return valve</td>
<td>RHD 10 L 1 bar</td>
<td>Ermeto</td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>Throttle valve</td>
<td>9 N - 600 - B - 11</td>
<td>Parker Hanifin</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>4/2-way valve NG 6</td>
<td>DG4V-3-2A-M-U-H7-60 0 810 090 469</td>
<td>Vickers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>4/2-way valve NG 6</td>
<td>0 810 090 469</td>
<td>Bosch</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>Cone non-return valve</td>
<td>RHD 10 L 1 bar</td>
<td>Ermeto</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>Pressure relief valve</td>
<td>US 18 - 70</td>
<td>Langen</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>Throttle valve</td>
<td>9 N - 600 - B - 11</td>
<td>Parker Hanifin</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Cylinder</td>
<td>Spec.</td>
<td>JUNG</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Valve block</td>
<td>Spec.</td>
<td>JUNG</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Hydr. pump</td>
<td>GPA 2-10 E 20</td>
<td>Vickers</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>High-pressure hose NW 10</td>
<td>JUNG No. 2HF50-667-3</td>
<td>Argus</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>High-pressure hose NW 10</td>
<td>JUNG No. 2HF50-667-2</td>
<td>Argus</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
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<td>Spec.</td>
<td>JUNG</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Valve block</td>
<td>Spec.</td>
<td>JUNG</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Hydr. pump</td>
<td>GPA 2-10 E 20</td>
<td>Vickers</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>Electric motor (standard motor DIN 42673)</td>
<td>Type of construction V1/AM 80 FY 6</td>
<td>AEG or SSW</td>
</tr>
</tbody>
</table>
9.4.1 Charging/extracting the hydraulic oil

*The hydraulic-fluid cooler must not under any circumstances be activated before it has been charged with hydraulic oil.*

Right-hand side of the machine bed without creep-feed grinding unit and hydraulic-fluid cooler

Right-hand side of the machine bed with creep-feed grinding unit and hydraulic-fluid cooler

Charging/extracting oil

If your machine is fitted with a creep-feed grinding unit and a hydraulic-fluid cooler:

- Remove the bracket from the coolant supply pipe (1)
- Remove the cover of the hydraulic-fluid cooler (2) (3 screws)

Additional steps which must always be carried out:

- Remove the side cover (3) (6 screws)
• Remove the cover of the hydraulic-fluid tank (4) (2 knurled screws)

• Charge the hydraulic-fluid tank until the window (6) indicates half-full (approx. 45 l).

• Close the hydraulic-fluid tank again and re-assemble the dismantled units in reverse order.

The hydraulic oil can be extracted again through the same opening if necessary.

Please refer to See section 9.3.3 “Recommended hydraulic oils” on page 279. for details of the hydraulic oils approved by K. Jung GmbH.
9.5 Pneumatic plan
9.6 Grinding spindle

9.6.1 Eliminating radial runout and releasing tension

An impact load, for example if the grinding wheel collides with the workpiece, may result in radial runout of the grinding spindle bearing.

Check the grinding spindle with the aid of a micro-gauge after it has suffered an impact load. If the runout of the grinding spindle is greater than 0.003 mm, you must release the tension.

- Screw two lock nuts onto the spindle (left-hand thread).
- Loosen the round nut (1) (left-hand thread) with a suitable pin-type spanner. Counter by holding a fork spanner against the lock nuts on the spindle.
- Rotate the spindle several times by hand.
- Tighten the round nut again. Counter by holding a fork spanner against the lock nuts on the spindle.
- Check the concentricity.

Repeat this procedure until the radial runout is less than 0.003 mm.
9.6.2 Removing and installing the grinding spindle

**Warning**

*Before removing or installing the grinding spindle, switch off the main switch on the control cubicle of the machine and take steps to prevent it from being switched on again accidentally.*

*Use a hoisting gear to remove and install the grinding spindle unit.*

**Important**

*Using a defective grinding spindle unit may also result in other forms of damage to the machine.*

The grinding spindle and the motor are two separate assemblies joined together by a plug-in connector.

Careful working in accordance with the proper procedures is essential in order to install the unit correctly.

If new rolling bearings are required, they must be installed by K. JUNG GmbH. The grinding spindle unit must be removed beforehand.

![Image of grinding spindle installation](image)

**Removing the grinding spindle**

- Remove the bracket from the coolant pipe. Remove the cover of the grinding wheel.
- Remove the wedge for the grinding spindle.
- Loosen the locking pins (1).
- Carefully pull out the grinding spindle towards you. Use a hoisting gear to do so.
Install the spindle in reverse order.

**Important**

*Do not tighten the locking pins too far.*
9.7 Traversing clear of the hardware limit switches in the X, Y and Z-axes

The door of the control cubicle must be opened in order to traverse clear of a hardware limit position. It is only allowed to be opened by a qualified electrician.

Danger: Live parts!

If you overrun the software limit switch in one of the axes, it will continue positioning up to the hardware limit switch. The drives are then switched off automatically. You must first traverse clear of the hardware limit switch in the axis concerned before you can re-activate the drives.

Traversing clear of a hardware limit position

- Open the door of the control cubicle and set the key-operated switch 6-S2 to the horizontal position (i.e. turn it to the left, roughly in the middle).
- Press the illuminated NC reset key.
- Traverse the axis clear of the limit position by pressing the appropriate direction key.
- The following message appears: "Key switch without limit position".
- Reset the key-operated switch 6-S2 in the control cubicle to its original position (vertical) and close the cubicle door.
- Press the illuminated NC reset key.
9.8 Traversing clear of a mechanical stop in the E, U and W-axes (optional PA 31K)

If you overrun the software limit switch in one of the axes, it will continue positioning up to the mechanical stop. The drive is switched off instantly owing to the increase in the current / torque. The following error message then appears: "Alarm axis 1 (axis 2, axis 3) limit position". This alarm cannot be acknowledged by pressing the "NC reset" key on the remote control panel.

You may also see the following error message: "Controller enable cancelled while running: contour monitoring". You can acknowledge this message by pressing "NC reset". In this case, however, the first error message is displayed again.

The servo motors can no longer be activated with the machine in this condition.

Correcting the error

- Select setting-up mode / semi-automatic mode with the key-operated switch on the machine control panel.
- Select the relevant axis (U, W or E) on the remote control panel.
- Then traverse clear of the mechanical stop by pressing the appropriate direction key (+ or -) on the remote control panel.
- The key for the wrong direction is automatically locked.
- Press the "NC reset" key on the remote control panel to acknowledge the error message.

This error may also occur if the current input of one axis drive exceeds a defined limit. This may be the case following a crash, for instance (e.g. if the dressing diamond is positioned too fast and too deep into the grinding wheel).
9.9 Replacing the battery (control unit)

The door of the control cubicle must be opened and the control unit switched on in order to replace the battery of the MMC 103 display. It is therefore only allowed to be replaced by a qualified electrician.

Do not attempt to reactivate a discharged battery either by heating it or by any other means. This could cause the battery to leak and/or explode. Failure to comply could result in physical injury or in damage to property.

The back-up voltage for the MMC 103 display and the NCU is monitored by the control unit. If the monitor function is tripped, you must replace the battery within six weeks.

You should replace the batteries once every two years at the latest for safety reasons.

When should the batteries be replaced?

A battery alarm appears on the display.
- Example: "2100 NCU battery voltage low" and the "BAF" LED in the control cubicle blinks.
- The buffered data is still intact.

- Do not switch off the control unit until you have replaced the battery.

- If you ignore the battery alarm, a battery fault will occur within the next six weeks.
  - Example: The message "2102 NCU battery alarm" appears on the display and the "BAF" LED in the control cubicle lights up.
  - The buffered data has been lost and you will have to restart the control unit after you have replaced the battery.

9.9.1 Replacing the battery for the MMC 103 display

If you are unable to acknowledge an error message relating to the MMC 103 battery, you must not switch off the control unit under any circumstances. Replace the batteries immediately.

Do not switch off the control unit until you have installed a new battery. If you do, all the buffered data will be lost and you will have to re-commission the unit.

The back-up battery for the MMC 103 display (1) is located at the back of the control unit.
• Open the door on the back of the MMC 103 display.

• Remove the battery and disconnect the connector from the socket (X11).

• Insert the connector of the new battery in the socket (X11) in exactly the same position as the connector of the old battery.

• Insert the new battery.

• Close the door on the back of the MMC 103 display.

<table>
<thead>
<tr>
<th>Battery designation</th>
<th>Jung order no.</th>
<th>Siemens order no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium battery</td>
<td>661414</td>
<td>6FC5 247-0AA18-0AA0</td>
</tr>
<tr>
<td>3 Volt 575332 TA</td>
<td></td>
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</tbody>
</table>

9.9.2 Replacing the battery for the NCU

Battery-backed SRAMs and clock chips are installed on the NCU. The back-up voltage is monitored by the NCU.

The battery/fan module in the NCU box can be replaced after the control unit has been switched off. The data remains stored for a period of approximately 15 minutes.

The battery/fan module is normally replaced as a complete unit. You can however also replace just the battery.
To replace the complete battery/fan module

The **battery/fan module must be reinstalled no later than 15 minutes after it is removed, as otherwise data may be lost.**

- Switch off the control unit.
- Pull out the battery/fan module.
  - To do so, press the catch (3) on the underside of the module upwards and grasp the module firmly.
- Install the new module.
- Switch on the control unit.
  - The battery alarm should have disappeared.

Siemens order number for the battery/fan module:

6FC5 247-0AA06-0AA0
To replace the battery

**The battery/fan module must be reinstalled no later than 15 minutes after it is removed, as otherwise data may be lost.**

- Switch off the control unit.
- Pull out the battery/fan module.
  - *To do so, press the catch (3) on the underside of the module upwards and grasp the module firmly.*
- Disconnect the battery connector from the socket and remove the battery.
- Insert the new battery and plug the connector into the socket in exactly the same position as the connector of the old battery.
- Install the battery/fan module again.
- Switch on the control unit.
  - *The battery alarm should have disappeared.*

<table>
<thead>
<tr>
<th>Battery designation</th>
<th>Jung order no.</th>
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<tr>
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<tr>
<td>3 Volt 575332 TA</td>
<td></td>
<td></td>
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</tbody>
</table>
9.10 Disposal

9.10.1 Disposal of the machine

Draining

- Dispose of old coolants.
- Drain off the oil, collect it, segregate it into types and dispose of it.
- Remove and dispose of the coolants in the hydraulic-fluid cooler.

Electronic scrap

- Dismantle into main assemblies (transformers, pc boards, cables, etc.) and dispose of in accordance with the relevant statutory and local requirements.
- Dispose of all old batteries.

Materials

- Segregate and dispose of metals, non-metals and composite and auxiliary materials.
10. Appendixes

10.1 We want to know what you think

We continuously strive to improve the quality of our operating instructions and welcome any comments and suggestions you may have. Please use the following form which you can return to us by fax or by post.

K.Jung GmbH
Abt. Dokumentation
Postfach 640
73006 Göppingen
Germany
Telefax: +49 (0)7161/612213

Operating instructions for: J630D
Registration number:

Please enter any errors, points requiring clarification, comments, criticisms, opinions, requests, suggestions for improvements, etc. in the table below.

<table>
<thead>
<tr>
<th>Section / Page</th>
<th>Description</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Overall assessment</th>
<th>Description</th>
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<tbody>
<tr>
<td>Very good</td>
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<tr>
<td>Good</td>
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<tr>
<td>Satisfactory</td>
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<tr>
<td>Unsatisfactory</td>
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<tr>
<td>Poor</td>
<td></td>
</tr>
<tr>
<td>Very poor</td>
<td></td>
</tr>
</tbody>
</table>
10.2 Form for signatures

Appropriate checks were carried out before commencing work by an authorized member of staff (e.g. superior, safety officer) to ensure that the operating personnel are sufficiently familiar with the relevant safety regulations and instructions for operating the machine.

The checks should be repeated every six months.

The “Safety” and “Coolants” sections must be read by every person who operates the machine.

I hereby confirm that I have read and fully understood the complete Operating Instructions.

<table>
<thead>
<tr>
<th>Date</th>
<th>Section</th>
<th>Last name, first name</th>
<th>Signature</th>
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10.3 Inspection protocol for coolants that can be mixed with water

Machine no.: .................................................. Machine type: ........................................ Volume of coolant: .........................
Coolant supplier: ........................................................................................................................................
Product designation: .....................................................................................................................................
Concentration (specified): ................. pH value (specified): ..........................................................
Nitrite max. 20 mg/m³, nitrate max. 50 mg/m³, no. of nuclei, yeast/fungus: less than 10⁴, no. of nuclei, bacteria: less than 10⁶

| Date | pH value | Concentration in % | Nitrite in mg/m³ | Nitrate in mg/m³ | No. of nuclei, yeast/fungus | No. of nuclei, bacteria | Top-up quantity | Signature |
|------|----------|--------------------|------------------|------------------|-----------------------------|------------------------|------------------|-----------|----------|