Operating Manual

Autom. Float Glass Cutting Line

RF 4635
OPTIMAX 6133 ES Plus Twin
LKB 7237

Manufactor:	HEGLA GmbH & Co. KG
Machine No:	27639 (RF) / 6302 (OPTIMAX) / 15696 (LKB)
Year Built :	2005
Order No.:	32513
Customer:	

Rev. 0
Stand: 06/05
DB-32513-gb.doc

0 Introduction

0.1 Index

0.2 Foreword to the operating instructions

These operating instructions are designed to familiarize the user with the machine/plant and its designated use.

The instruction manual contains important information on how to operate the machine/plant safely, properly and most efficiently. Observing these instructions helps to avoid danger, to reduce repair costs and downtimes and to increase the reliability and life of the machine/plant.

The instruction manual is to be supplemented by the respective national rules and regulations for accident prevention and environmental protection.

The operating instructions must always be available wherever the machine/plant is in use.

These operating instructions must be read and applied by any person in charge of carrying out work with and on the machine/plant, such as

- Operation: including setting up, troubleshooting in the course of work, evacuation of production
  waste, care and disposal of fuels and consumables.
- Maintenance: (servicing, inspection, repair) and/ or
- Transport: is assigned.

In addition to the operating instructions and to the mandatory rules and regulations for accident prevention and environmental protection in the country and place of use of the machine/plant, the generally recognized technical rules for safe and proper working must also be observed.

We reserve the right to make any technical changes, required to improve the machine, to the diagrams and information provided in this operating manual.

0.3 General Information

0.3.1 Application

Before the machine is used for purposes beyond the contractual application field, the customer service of must be notified and consulted, otherwise our guarantee expires.

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0.3.2 Copyright

This manual is to be used by the assembly engineers, machine operators and security personnel. The manual describes technical regulations, technology and shows drawings, that may not be reproduced or translated, stored in a database or retrievel system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise; any transactions with competitors or others are prohibited.

0.3.3 Warranty

Disregarding this manual or any means of poor maintenance, care and upkeep the warranty of the machine expires. Wear and tear parts are not subject to this warranty.

1 Fundamental safety instructions

1.1 Warnings and symbols

The following signs and designations are used in the manual to designate instructions of particular importance.

	**Important**	**refers to special information on how to use the machine/ plant most efficiently**
	**Attention**	**refers to special information and/or orders and prohibitions directed towards preventing damage**
	**Danger**	**refers to orders and prohibitions designed prevent injury or extensive damage**

1.2 Basic operation and designated use of the machine/plant

- The machine/plant has been built in accordance with state-of-the-art standards and the recognized safety rules. Nevertheless, its use may constitute a risk to life and limb of the user or of third parties, or cause damage to the machine and to other material property.
- The machine/plant must only be used in technically perfect condition in accordance with its designated use and the instructions set out in the operating manual, and only by safety-conscious persons who are fully aware of the risks involved in operating the machine/plant. Any functional disorders, especially those affecting the safety of the machine/plant, should therefore be rectified immediately.
- The machine/plant is designed exclusively for the manual breakout of scored glass sheets. Using the machine/plant for purposes other than those mentioned above (such as for) is considered contrary to its designated use.
  The manufacturer/supplier cannot be held liable for any damage resulting from such use. The risk of such misuse lies entirely with the user.
- Operating the machine within the limits of its designated use also involves observing the instructions set out in the operating manual and complying with the inspection and maintenance directives.

1.3 Organizational measures

- The operating instructions must always be at hand at the place of use of the machine/plant, e.g. by stowing them in the tool compartment or tool-box provided for such purpose.
- In addition to the operating instructions, observe and instruct the user in all other generally applicable legal and other mandatory regulations relevant to accident prevention and environmental protection.
- These compulsory regulations may also deal with the handling of hazardous substances, issuing and/or wearing of personal protective equipment, or traffic regulations.
- The operating instructions must be supplemented by instructions covering the duties involved in supervising and notifying special organizational features, such as job organization, working sequences or the personnel entrusted with the work.
- Personnel entrusted with work on the machine must have read the operating instructions and in particular the chapter on safety before beginning work. Reading the instructions after work has begun is too late. This applies especially to persons working only occasionally on the machine, e.g. during setting up or maintenance.
- Check - at least from time to time - whether the personnel is carrying out the work in compliance with the operating instructions and paying attention to risks and safety factors.
- For reasons of security, long hair must be tied back or otherwise secured, garments must be close-fitting and no jewellery - such as rings - may be worn. Injury may result from being caught up in the machinery or from rings catching on moving parts.
- Use protective equipment wherever required by the circumstances or by law.
- Observe all safety instructions and warnings attached to the machine/plant.
- See to it that safety instructions and warnings attached to the machine are always complete and perfectly legible.
- In the event of safety-relevant modifications or changes in the behaviour of the machine/plant during operation, stop the machine/plant immediately and report the malfunction to the competent authority/ person.
- Never make any modifications, additions or conversions which might affect safety without the supplier's approval. This also applies to the installation and adjustment of safety devices and valves as well as to welding work on load-bearing elements.
- Spare parts must comply with the technical requirements specified by the manufacturer. Spare parts from original equipment manufacturers can be relied to do so.
- Never modify the software of programmable control systems.
- Replace hydraulic hoses within stipulated and appropriate intervals even if no safety-relevant defects have been detected.
- Adhere to prescribed intervals or those specified in the operating instructions for routine checks and inspections.
- For the execution of maintenance work, tools and workshop equipment adapted to the task on hand are absolutely indispensable.
- The personnel must be familiar with the location and operation of fire extinguishers.
- Observe all fire-warning and fire-fighting procedures.

1.4 Selection and qualification of personnel - Basic responsibilities

- Any work on and with the machine/plant must be executed by reliable personnel only. Statutory minimum age limits must be observed.
- Employ only trained or instructed staff and set out clearly the individual responsibilities of the personnel for operation, set-up, maintenance and repair.
- Make sure that only authorized personnel works on or with the machine.
- Define the machine operator's responsibilities - also with regard to observing traffic regulations - giving the operator the authority to refuse instructions by third parties that are contrary to safety.
- Do not allow persons to be trained or instructed or persons taking part in a general training course to work on or with the machine/plant without being permanently supervised by an experienced person.
- Work on the electrical system and equipment of the machine/plant must be carried out only by a skilled electrician or by instructed persons under the supervision and guidance of a skilled electrician and in accordance with electrical engineering rules and regulations.
- Work on gas-fuelled equipment (gas consumers) may be carried out by specially trained personnel only.
- Work on the hydraulic system must be carried out only by personnel with special knowledge and experience of hydraulic equipment.

1.5 Safety instructions governingspecific operational phases

1.5.1 Standard operation

- Avoid any operational mode that might be prejudicial to safety.
- Take the necessary precautions to ensure that the machine is used only when in a safe and reliable state.
  Operate the machine only if all protective and safety-oriented devices, such as removable safety devices, emergency shut-off equipment, sound- proofing elements and exhausters, are in place and fully functional.
- Check the machine/plant at least once per working shift for obvious damage and defects. Report any changes (incl. changes in the machine's working behaviour) to the competent organization/person immediately. If necessary, stop the machine immediately and lock it.
- In the event of malfunctions, stop the machine/plant immediately and lock it. Have any defects rectified immediately.
- During start-up and shut-down procedures always watch the indicators in accordance with the operating instructions.
- Before starting up or setting the machine/plant in motion, make sure that nobody is at risk.
- The selector switch must be set to Normal" and locked.
- Never switch off or remove suction and ventilation devices when the machine is in operation.
- Special work in conjunction with utilization of the machine/plant and maintenance and repairs during operation; disposal of parts and consumables
- Observe the adjusting, maintenance and inspection activities and intervals set out in the operating instructions, including information on the replacement of parts and equipment. These activities may be executed by skilled personnel only.
- Brief operating personnel before beginning special operations and maintenance work, and appoint a person to supervise the activities.
- In any work concerning the operation, conversion or adjustment of the machine and its safety- oriented devices or any work related to maintenance, inspection and repair, always observe the start-up and shut-down procedures set out in the operating instructions and the information on maintenance work.
- Ensure that the maintenance area is adequately secured.
- If the machine/plant is completely shut down for maintenance and repair work, it must be secured against inadvertent starting by:
  - locking the principal control elements and removing the ignition key and/or
  - attaching a warning sign to the main switch.
- To avoid the risk of accidents, individual parts and large assemblies being moved for replacement purposes should be carefully attached to lifting tackle and secured. Use only suitable and technically perfect lifting gear and suspension systems with adequate lifting capacity. Never work or stand under suspended loads.
- The fastening of loads and the instructing of crane operators should be entrusted to experienced persons only. The marshaller giving the instructions must be within sight or sound of the operator.

- For carrying out overhead assembly work always use specially designed or otherwise safety-oriented ladders and working platforms. Never use machine parts as a climbing aid. Wear a safety harness when carrying out maintenance work at greater heights.
  Keep all handles, steps, handrails, platforms, landings and ladders free from dirt, snow and ice.
- Clean the machine, especially connections and threaded unions, of any traces of oil, fuel or preservatives before carrying out maintenance/repair. Never use aggressive detergents. Use lint-free cleaning rags.
- Before cleaning the machine with water, steam jet (high-pressure cleaning) or detergents, cover or tape up all openings which - for safety and functional reasons - must be protected against water, steam or detergent penetration. Special care must be taken with electric motors and switchgear cabinets.
- Ensure during cleaning of the machine that the temperature sensors of the fire-warning and fire-fighting systems do not come into contact with hot cleaning agents as this might activate the fire-fighting system.
- After cleaning, remove all covers and tapes applied for that purpose.
- After cleaning, examine all fuel, lubricant and hydraulic fluid lines for leaks, loose connections, chafe marks and damage. Any defects found must be rectified without delay.
- Always tighten any screwed connections that have been loosened during maintenance and repair.
- Any safety devices removed for set-up, maintenance or repair purposes must be refitted and checked immediately upon completion of the maintenance and repair work.
- Ensure that all consumables and replaced parts are disposed of safely and with minimum environmental impact.

1.6 Warning of special dangers

1.6.1 Electric energy

- Use only original fuses with the specified current rating. Switch off the machine/plant immediately if trouble occurs in the electrical system.
- Work on the electrical system or equipment may only be carried out by a skilled electrician himself or by specially instructed personnel under the control and supervision of such electrician and in accordance with the applicable electrical engineering rules.
- If provided for in the regulations, the power supply to parts of machines and plants, on which inspection, maintenance and repair work is to be carried out must be cut off. Before starting any work, check the de-energized parts for presence of power and ground or short-circuit them in addition to insulating adjacent live parts and elements.
- The electrical equipment of machines/plants is to be inspected and checked at regular intervals. Defects such as loose connections or scorched cables must be rectified immediately.
- Necessary work on live parts and elements must be carried out only in the presence of a second person who can cut off the power supply in case of danger by actuating the emergency shut-off or main power switch. Secure the working area with a red-and-white safety chain and a warning sign. Use insulated tools only.
- Before starting work on high-voltage assemblies and after cutting out the power supply, the feeder cable must be grounded and components, such as capacitors, short-circuited with a grounding rod.

1.6.2 Gas, dust, steam and smoke

- Carry out welding, flame-cutting and grinding work on the machine/plant only if this has been expressly authorized, as there may be a risk of explosion and fire.
- Before carrying out welding, flame-cutting and grinding operations, clean the machine/plant and its surroundings from dust and other inflammable substances and make sure that the premises are adequately ventilated (risk of explosion).
- Observe any existing national regulations if work is to be carried out in narrow rooms.

1.6.3 Hydraulic and pneumatic equipment

- Work on hydraulic equipment may be carried out only by persons having special knowledge and experience in hydraulic systems.
- Check all lines, hoses and screwed connections regularly for leaks and obvious damage. Repair damage immediately. Splashed oil may cause injury and fire.
- Depressurize all system sections and pressure pipes (hydraulic system, compressed-air system) to be removed in accordance with the specific instructions for the unit concerned before carrying out any repair work.
- Hydraulic and compressed-air lines must be laid and fitted properly. Ensure that no connections are interchanged. The fittings, lengths and quality of the hoses must comply with the technical requirements.

1.6.4 Noise

- During operation, all sound baffles must be closed.
- Always wear the prescribed ear protectors.

1.6.5 Oil, grease and other chemical substances

- When handling oil, grease and other chemical substances, observe the product-related safety regulations.
- Be careful when handling hot consumables (risk of burning or scalding).

1.7 Movable machines

(with frequent change of operating location)

- When carrying out loading work, always use lifting gear and load suspension devices with sufficient carrying capacity!
- Appoint expert directors for the lifting process!
- Always lift machines correctly with hoists, in accordance with the instructions provided in the operating manual (sling points for load suspension devices etc.)!
- Always use suitable transport vehicles with sufficient carrying power!
- Secure the load reliably. Use suitable sling points!
- Before or immediately after the end of the loading work, fit the machine/system with recommended/provided devices to protect against unintended change of position! Affix appropriate warning sign! Make sure devices are properly removed before re-commissioning!
- Before re-commissioning, carefully replace and secure parts that have been dismounted for transport purposes!
- Even if making only a slight change in location, disconnect the machine or system from all external power supplies! Before re-commissioning, reconnect the machine properly to the mains!
- The machine must be re-aligned after transportation, taking account of the floor condition. Do not exceed permissible carrying capacities!
- Only move according to the operating instructions when re-commissioning!

2 Machinery description

2.1 General description – RF 4635

The HEGLA RF serves as an extension conveyor between the transfer and laydown table and the shape cutting machine.

Any other usage of the machine shall be deemed as not complying with its intended purpose. HEGLA accepts no liability whatsoever for any damage resulting from such usage.

The design of this HEGLA product is based on many years of pratical experience, incorporating the results of wide ranging research and development studies.

2.2 Techn. Data

Dimensions	
Length	4600 mm
Width	3500 mm
Working height	920 mm (+/- 25 mm)
Max. Glass sizes	6000 x 3210 mm
Glass thickness	3 to 19 mm

Electrical Energy Supply	
Voltage	3x 400 V / PE
Frequency	50 Hz

2.3 Structure and function

2.3.1 Design and Construction

- Heavy duty warp free underframe made out of welded tubing
- Power driven transport rolls
- Shaft distance: 400 mm
- Roll distance: 300 mm

2.4 General description – OPTIMAX 6133 ES Plus Twin

The HEGLA OPTIMAX is a fully automatic shape cutting machine with integrated edge deletion.

Any other usage of the machine shall be deemed as not complying with its intended purpose. HEGLA accepts no liability whatsoever for any damage resulting from such usage.

The design of this HEGLA product is based on many years of pratical experience, incorporating the results of wide ranging research and development studies.

2.5 Techn. Data

Dimensions	
Length	7650 mm
Width	4560 mm
Working height	940 mm (+/- 25 mm)
Max. Glass sizes	6000 x 3210 mm
Min. Glass sizes	1500 x 1200 mm (for alignment)
Glass thickness	3 to 19 mm
Cutting accuracy	+/- 0,2 mm (4 mm glass thickness at 1 m)
Cutting speed	v=160 m/min

Electrical Energy Supply	
Voltage	3x 400 V / PE
Frequency	50 Hz
Power	24 kW

Pneumatical Energy Supply	
Working pressure	6 to 8 bar
Max. Air consumption	approx. 1,0 Nm^3/h
Connection with quick-release coupling	NW 1/2“

2.5.1 Cutting tolls

Cutting wheels with a diameter of 4,1 mm or 5,6 mm can be fitted. Both cutting wheel types are offered with different angles. When ordering please state the required diameter and angle.

2.6 Edge Deletion

2.6.1 Grinding wheel

- According to standard the machine is equipped with grinding wheels of the company Norton, or when desired with grinding wheels of the company Tyrolit. In connection with the low-e coating, the grinding wheel is to be selected in accordance to the specifications of the coating manufacturer.

	Type designation	Diameter	Width	Order-Number
Nortn	RD-D18SF	200 mm	10 mm	31-4067-5100
	RD-D18S	200 mm	20 mm	31-4067-5200
Tyrolit	89A807-BE14TF	200 mm	10 mm	31-4067-0100
	89A807-BE14TF	200 mm	20 mm	31-4067-0220

2.6.2 Grinding data

- The grinding speed is layer and grinding wheels dependently.

	Type designation	Grinding speed (Depending on Low-E coating)	Edge deletion
Nortn	RD-D18SF	max. v = 120 m/min	4 axis
	RD-D18S	max. v = 120 m/min	4 axis
Tyrolit	89A807-BE14TF	max. v = 120 m/min	4 axis
	89A807-BE14TF	max. v = 120 m/min	4 axis

The max. allowed speed must not be exceeded. The machine's parameter must be correctly adjusted.

2.7 Structure and function

2.7.1 Design and Construction

- Heavy duty warp free underframe made out of welded tubing with integrated air cushion
- The top surface of the table is covered with felt
- Automatically movable cutting bridge
- Bridge guide positioned on both sides of the table
- Cutting head guidance via prism trackage
- Single cutting head system for contour and shape cuts, turnable 360°
- Fully automatic shape cutting system with CNC-controlled positioning drive (digital drive)
- Control cabinet incl. integrated PC 17“ Colour Monitor and 3 ½“ disk drive
- Snapping pattern optimisation via efficient and fully graphical software package
- Storage possibility of 999 customer models and 250 snapping patterns in the long term memory. Furthermore there can be 250 different sizes (type of glass, measurement, storage place) and appertaining cutting parameters deposited (cutting pressure, cutting speed)
- Shape cuts according to the HEGLA Shape Catalog
- The cutting pressure is pneumatically adjustable – 2 pressure phases
- Automatic aligning stops (1x Y- / 4x X-axial) adjusting range 100 mm
- Air cushion generation via high-duty blower with sound absorber
- Central cutting oil supply (2 litres)
- Belt transport (4 belts – belt speed: 60 m/min)
- Network card
- Air cushion segment
- Snapping pattern display Cutshow
- Mechanical turning column
- Analogue modem for online service
- 4-Axes for edge deletion
- Wear-dependent speed adjustment of the grinding wheel
- Width of grinding wheel 20 mm and 10 mm at Twin.
- Extraction device with filter cartridge

2.8 General description – LKB 7237

The HEGLA LKB is used for breaking of the glass.

Any other usage of the machine shall be deemed as not complying with its intended purpose. HEGLA accepts no liability whatsoever for any damage resulting from such usage.

The design of this HEGLA product is based on many years of pratical experience, incorporating the results of wide ranging research and development studies.

2.9 Techn. Data

Dimensions	
Length	7200 mm
Width	3700 mm
Working height	940 mm (+/- 20 mm)
Max. Glass sizes	6000 x 3210 mm
Glass thickness	3 to 19 mm
Number of traversal breakout bar	3 pieces
Number of longitudinal breakout bar	2 pieces

Electrical Energy Supply	
Voltage	3x 400 V / PE
Frequency	50 Hz
Power	6 kW

Pneumatical Energy Supply	
Working pressure	6 to 8 bar
Max. Air consumption	approx. 1,0 Nm^3/h
Connection with quick-release coupling	NW 1/2“

2.10 Structure and function

2.10.1 Design and Construction

- Heavy duty warp free underframe made out of welded tubing with integrated air cushion
- The top surface of the table is covered with felt
- Air cushion generation via high-duty blower with sound absorber
- 3 traversal breakout bars and 2 longitudinal breakout bars
- Pneumatically throttle valve
- Surrounding hardwood strip
- 3 electromechanical tilting arms on the operator side

3 Transport and Locational requirements

3.1 Transport

The method of transportation determines how the equipment is packaged. Unless other arrangements are made, the packaging will conform with the packaging guidelines “HPE” laid down by the German professional associations Bundesverband Holzmittel, Paletten, Exportverpackung e.V. and Verein Deutscher Maschinenbauanstalten.

- Follow warning and directional signs on the packaging.
- During packing and unpacking caution is to be used so that the machine is not damaged due to use of unnecessary force.
- When transporting and temporarily storing the equipment, avoid the formation of condensation due to temperature changes and avoid jolts.
- Handle machine carefully, do not store out side or exposed to the elements.
- The completeness of the machine is to be checked against the bill of lading.
- In case of transport damages and/or missing parts a written complaint must be sent to right away.

3.2 Locational requirements

The machine works without problems when having a temperature between +5°C and +40°C (41°F and 104°F). The relative atmospheric humidity should not exceed 60%.

The machine must be located in a dry building with a sturdy floor that is capable of the supporting the weight of the machine.

4 Assembley and Initial operation

4.1 Assembley of the machine

The assembley and test running of the machine should be executed by supervised personnel only!

Electrical and pneumatical labour should only be accomplished by trained personnel only!

Observe safety regulations!

- The machine is fixed to the floor.
- Erect base frame at the preselected location and align using the adjustable feet. Secure feet with hexagonal nuts.
- Remove all transport safety devices

4.2 Initial operation

All main and operating switches should be turned OFF and secured, before the compressed-air and electrical supplies are connected to the system.

Before operating all connecting cables must be in dead circuit.

Uttermost attention must be given to security regulations!

4.2.1 Compressed-air supply

Compressed-air supply via in-line quick couplings.

A minimum pressure of 6 bar (87 PSI) must be at hand.

It must be ensured, that the compressed-air is filtered and without condensate.

4.2.2 Electrical supply

The HEGLA machines will be connected to the electrical network at assembley.

The electrical utilities must be placed at the disposal of HEGLA by the customer.

4.2.3 Initial operation

The initial operation will be accomplished by the HEGLA Customer Service. It includes the installation of the machine as well as test running and briefing of the opertaing personnel.

- Check if all transport safety devices have been removed.
- The operation of the machine is described in chapter 5.

5 Operating the machine

5.1 Visual inspection – OPTIMAX 6133 ES Plus Twin

Carry out a visual inspection before each start-up.

Check the light barrier is functioning correctly before each start-up and after a fault has occurred.

A visual inspection should be carried out before the machine is commissioned. Take note of the following points:

- Check the functions of the warning elements and the safety facilities.
- Check that all tubes, cables and mountings are tight.
- Check that the machine is not bent, ripped or leaking.
- Check that there is nobody in the danger area (inside of the safety barrier).
- Remove any objects which are not necessary for the immediate operation of the system from the working and danger area.
- Check the level of all oils and greases.
- Check the compressed air maintenance valve.

If defects are discovered with the visual control, the machine may be taken not in operation. Eliminate defective ones immediately.

5.2 Controls

The controls that are necessary for normal operation of the machine are all located in the switch cabinet and the operating console. Additional pushbutton switches may also be fitted to the base frame and the bridge.

5.2.1 Operating console

The valves for adjusting and setting the working pressure and for filling the cutting oil are all located in the operating console. The cutting oil tank is fitted at the foot of the console. The factory settings are given in chapter 5.4.

5.2.2 Controls mounted on the switch cabinet

5.2.2.1 Main switch of the machine

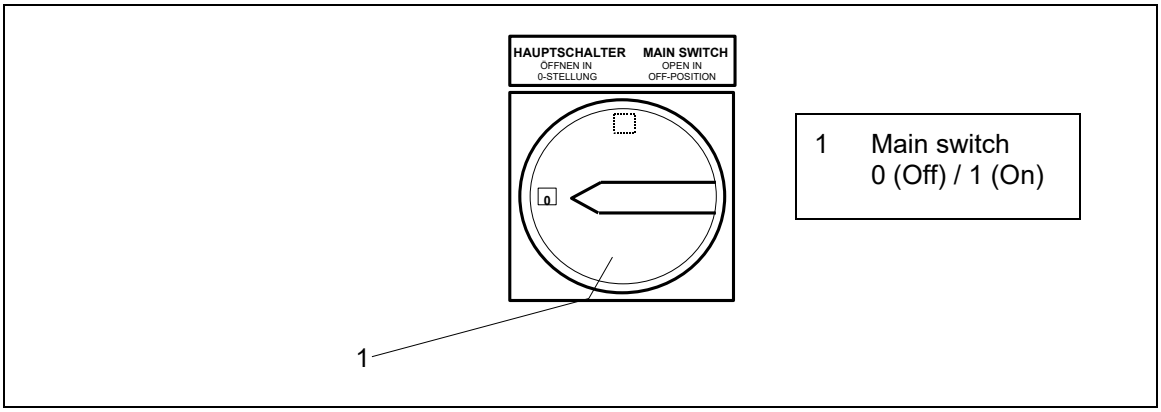


Fig. 5.1: Main switch of the machine on switch cabinet

5.2.2.2 Button and switch functions

LABEL	MEANING	USE
Main switch 0 (Off) / 1 (On)	The main switch is used to turn the machine On or Off. The PC is switched On and Off at a separate switch.	Turn to select the desired operating status. **This switch must always be in position O when carrying out maintenance work.**

LABEL	MEANING	USE
RESET SERVOS	When a safety circuit (e.g. a light barrier) has been broken during a cutting operation, the pushbutton must be pressed on restart.	Press the button once. **ATTENTION!** **Follow safety procedures when restarting the machine!**

5.2.2.3 Switches mounted on the side of the switch cabinet

LABEL	MEANING	USE
CONTROL ON	This switches on the control system.	Press the button once. The integral lamp illuminates.
CONTROL OFF	This switches off the control system.	Press the button once. The lamp in the „Control On“ button extinguishes.
EMERGENCY STOP RESET	Pressing the „EMERGENCY STOP“ button triggers an immediate shutdown. To gaurd against accidentally restarting the machine, the EMERGENCY STOP function must be cancelled by pressing the „EMERGENCY STOP RESET“ button. **Before cancelling „EMERGENCY STOP“ ensure that no personnel or objects are within the working zone.**	Press the button once. **ATTENTION!** **Follow safety procedures when restarting the machine!**
SAFETY AREA RESET	Using this function it is confirmed that there are no persons or objects in the hazard area of the machine and that the safety guards are closed.	Press the button once. **ATTENTION!** **Follow safety procedures when restarting the machine!**
START	Starts the automatic process.	Press the button once.
STOP	Stops the automatic process.	Press the button once.
BLIND CUT	A blind cut is executed, i.e., heads move without cutting.	Press the button once.
GRINDING OFF / ON	Turning the selector switch selects the relevant function.	Select the desired operating mode by adjusting the position of the switch.

LABEL	MEANING	USE
EMERGENCY STOP	By pressing the „Emergency Stop“ the machine is brought to a standstill as fast as possible. The energy supply to the drives, the dangerous elements either to the machine or the operator, are brought to a standstill as fast as possible without creating any dangerous situations.	Press the button once.

5.2.3 Switches mounted on the bridge

LABEL	MEANING	USE
RESET CUTTING HEAD	For resetting when the cutting head travels on felt.	Press the button once.

5.3 Operating the machine

The instructions in this chapter assume that the machine has already been properly sited, bolted down and commissioned.

Carry out a visual inspection before starting the machine and after each EMERGENCY STOP.

Ensure that nobody is the wrong side of the guards.

No safety devices may be removed when operating the machine.

Follow the safety regulations and safety notices on the machine.

Do not enter the hazard zone while the machine is operating.

Take care when handling glass.

Take care when handling glass. Wear personal protective clothing!

5.3.1 Switching on the machine

- Switch on at main switch (0 ⇨ 1)
- Press "**Control ON**" button.

  The control circuit energises. Acknowledge any fault messages concerning, e.g. lack of compressed air, by pressing ENTER.

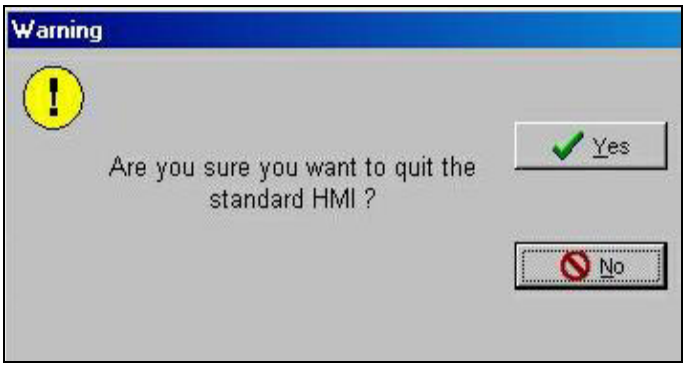
- After approx. 5 seconds, press „**EMERGENCY STOP RESET**" button.

  Lamp in illuminated pushbutton on switch cabinet extinguishes.

- After going through the reference point procedure, the machine switches into the main menu.

5.3.2 Switching off the machine

- All movements and operations should have been completed before you switch off the machine.
- Wait for approximately 1 minute before switching off the system control PC in order to ensure that all internal processes have been completed. The necessary procedure for shutting down is given for each machine.
- In the main menu, press keys **Shift + F4** together to activate the function **END** (exit programme). By pressing function keys Shift + F4, the programme can be exited and the computer can be shut down. To prevent accidental shutdown, a window appears asking you to confirm.



- ➢ The active button is highlighted by a dotted frame.
- ➢ You can toggle between the two buttons using the tab key (key with two arrows).
- ➢ By then pressing the return key (↵), the active selection is confirmed and executed.

To exit the programme, the button marked „**Yes**“ must be selected and confirmed. The programme and the computer operating system shut down. The computer turns itself off automatically.

- Press the “**Control OFF**“ once. The signal lamp in the „Control ON“ switch extinguishes.
- Turn the **Main Switch** to „**0**“.

5.4 Setting the working pressures

The working pressures are set using the control valves in the control console.

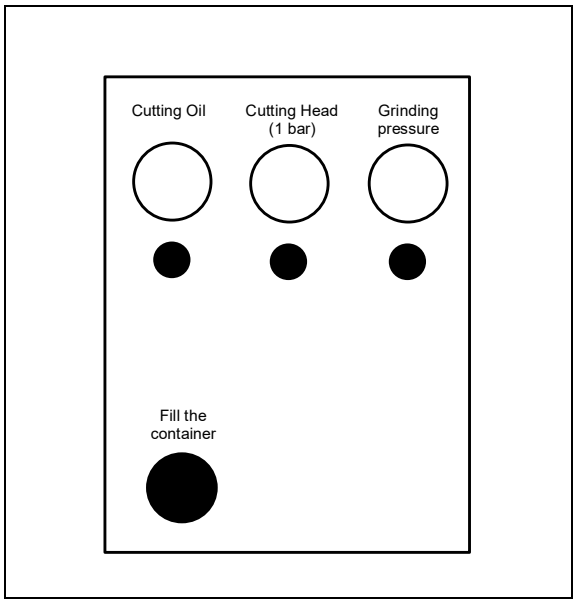


Fig. 5.2: Working pressure control panel (principle layout)

- To increase pressure: lift the handwheel and turn to the right until the desired pressure is shown on the manometer. Then push the handwheel downwards.
- To reduce pressure: lift the handwheel and turn to the left until the desired pressure is shown on the manometer. Then push the handwheel downwards.
- The factory settings are given in the table below.

5.4.1 Setting raised pressure

- The decision to work with raised pressure depends on the thickness of the glass and the cutting angle that has been selected.

Thickness of glass	
Up to 6 mm	- Normal cutting pressure
From 8 mm	- Raised cutting pressure

- Fine adjustment is made using the handwheels.

5.4.2 Recommended cutting angles and cutting pressures

OPTIMAX Shape cutting machine

Recommended cutting angles and working pressures

Thickness of glass	Cutting pressure (Normal)	Cutting pressure (Raised)	Cutting angle	Grinding pressure (Option)	Cutting oil	Cutting head (Up)
"Old Cutting Head"						
3 mm	0,6 – 0,8 bar		135°	1,1 - 1,3 bar	1 bar	2 bar
4 – 8 mm	0,6 – 1,0 bar		145°	1,1 - 1,3 bar	1 bar	2 bar
8- 12 mm		1,5 – 2,0 bar	152°	1,1 - 1,3 bar	1 bar	2 bar
15 - 19 mm		2,5 – 3,0 bar	158°	1,1 - 1,3 bar	1 bar	2 bar
"Optimised Cutting Head"						
3 mm	0,7 – 0,9 bar		135°	1,1 - 1,3 bar	1 bar	2 bar
4 – 8 mm	0,7 – 1,1 bar		145°	1,1 - 1,3 bar	1 bar	2 bar
8- 12 mm		1,6 – 2,1 bar	152°	1,1 - 1,3 bar	1 bar	2 bar
15 - 19 mm		2,6 – 3,1 bar	158°	1,1 - 1,3 bar	1 bar	2 bar

Remarks:

Important. The above settings are only user GUIDELINES.

The user must take into account variations that occur as a result of different sources of supply, ambient temperature or for other reasons and adjust accordingly !

Technical modifications and improvements reserved !

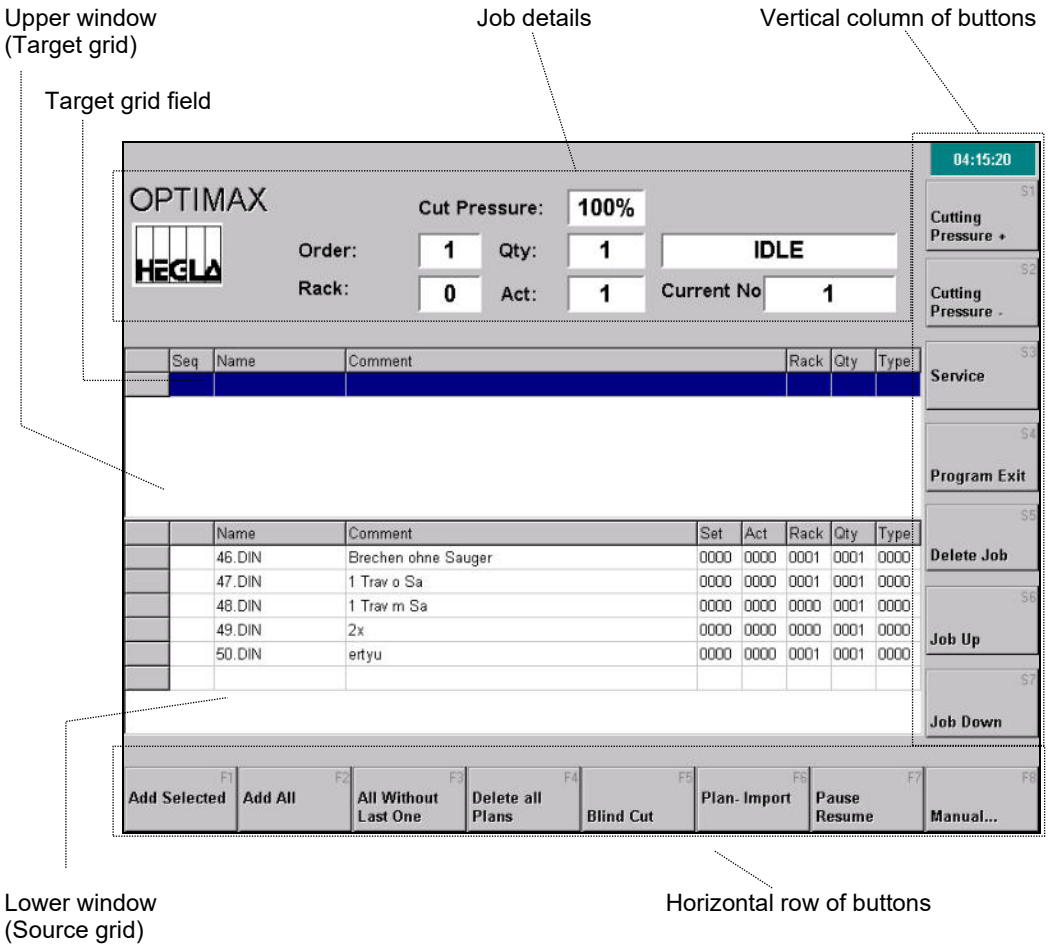
Tab. 5.2: workin pressures

5.5 Design of the on-screen workflow manager

- There is a horizontal row of buttons in the bottom section of the screen.
- There is a vertical column of buttons on the right hand side of the screen.
- While entering data, the machine is in idling mode; this is shown by the message „IDLE“. If the machine is running, the message changes to „RUN“.
- The sequential Job Number. (**Current-Nr.)** of the current job is shown beneath the machine status box. The other boxes in the top section of the screen give details of the **Order No**, **Type of glass** as well as nominal (**Set**) and actual (**Act**) values.
- The jobs are listed in tabular form in the two large windows on the screen.
  The selected jobs are shown in the upper of the two windows.
  (In the lower window all orders are shown for the selection, as well as cut, not cut and the active orders)

5.5.1 Using the on-screen workflow manager

- The tab key allows you to toggle between the windows. The current window is indicated by a yellow frame.
- Buttons can be activated by clicking the mouse/trackball or via the keyboard.



5.5.1.1 Mouse/Trackball

	• Move the mouse to bring the arrow pointer to the desired location (button) and click the mouse or trackball button to confirm/execute the desired command.

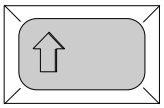
5.5.1.2 Keyboard (Horizontal row of buttons)

	• To operate buttons in the horizontal row via the keyboard, use the F-KEYS. The relationship between the F-keys and the on-screen buttons is sequential. This means KEY-F1 corresponds to the furthest left on-screen button and KEY-F8 corresponds to the furthest right on-screen button.

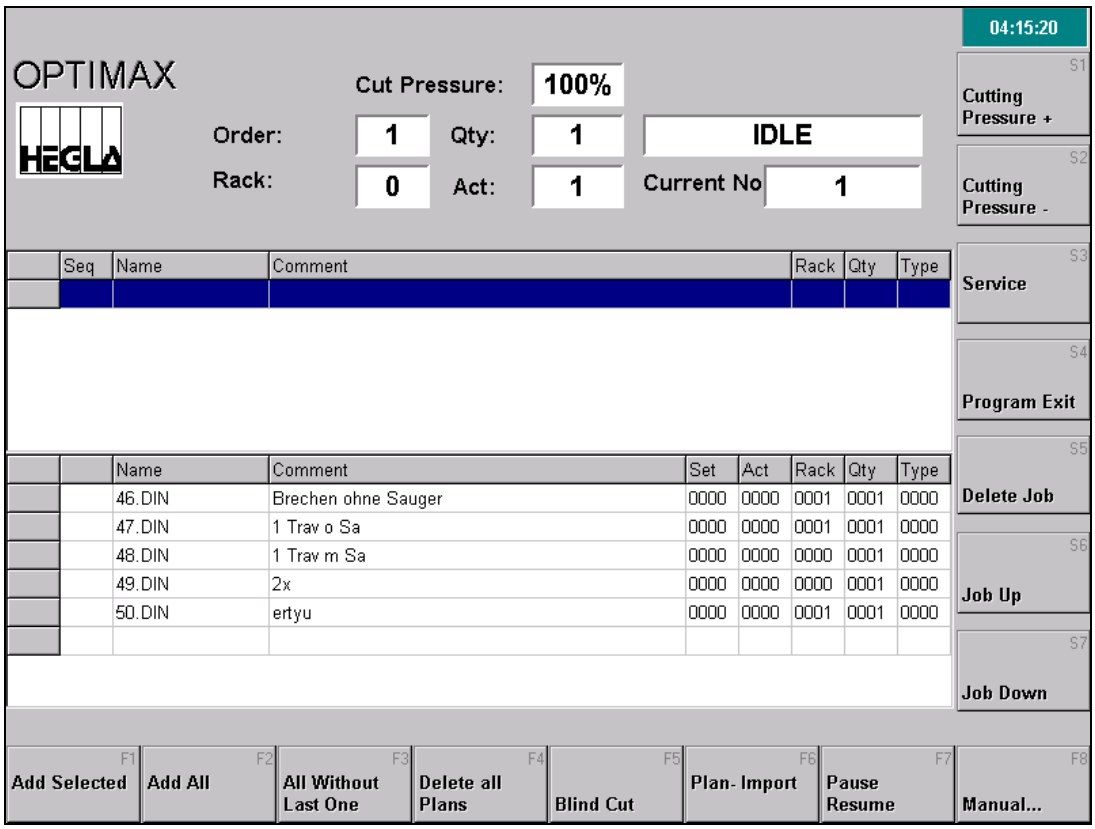
5.5.1.3 Keyboard (Vertical column of buttons)

	• To operate buttons in the vertical column via the keyboard, use the F-KEYS and SHIFT-KEY (⇧) simultaneously. In this case, key stroke combination SHIFT + F1 corresponds to the top on-screen button and key stroke combination SHIFT + F7 corresponds to the bottom on-screen button.

5.5.1.4 SHIFT-Key

	• Pressing the SHIFT – KEY brings up another, new row of commands. The SHIFT-KEY (⇧) is located to the bottom left of your keyboard, above the STRG-KEY. The available commands are activated pressing the keystroke combination SHIFT + F-KEY. Here too, the relationship between the key stroke combinations and the on-screen buttons is sequential. The furthest left on-screen button corresponds to keystroke combination SHIFT + F1 and the furthest right on-screen button corresponds to keystroke combination SHIFT + F8.

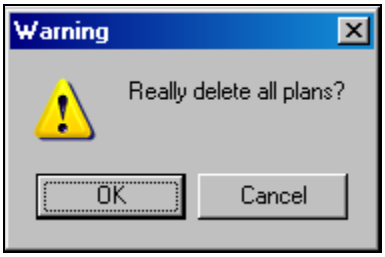
5.6 Main menu



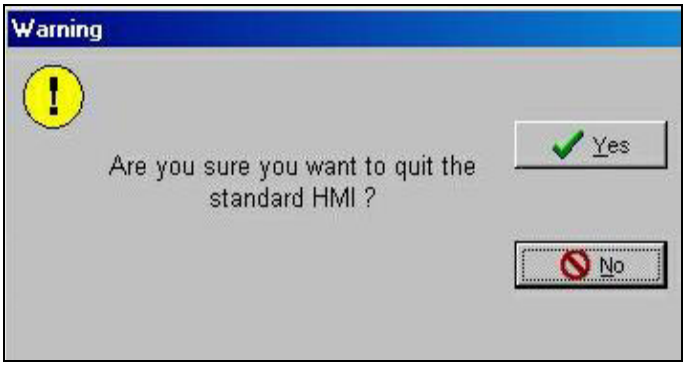
Main Menu

5.6.1 Allocation of function keys F1 to F8

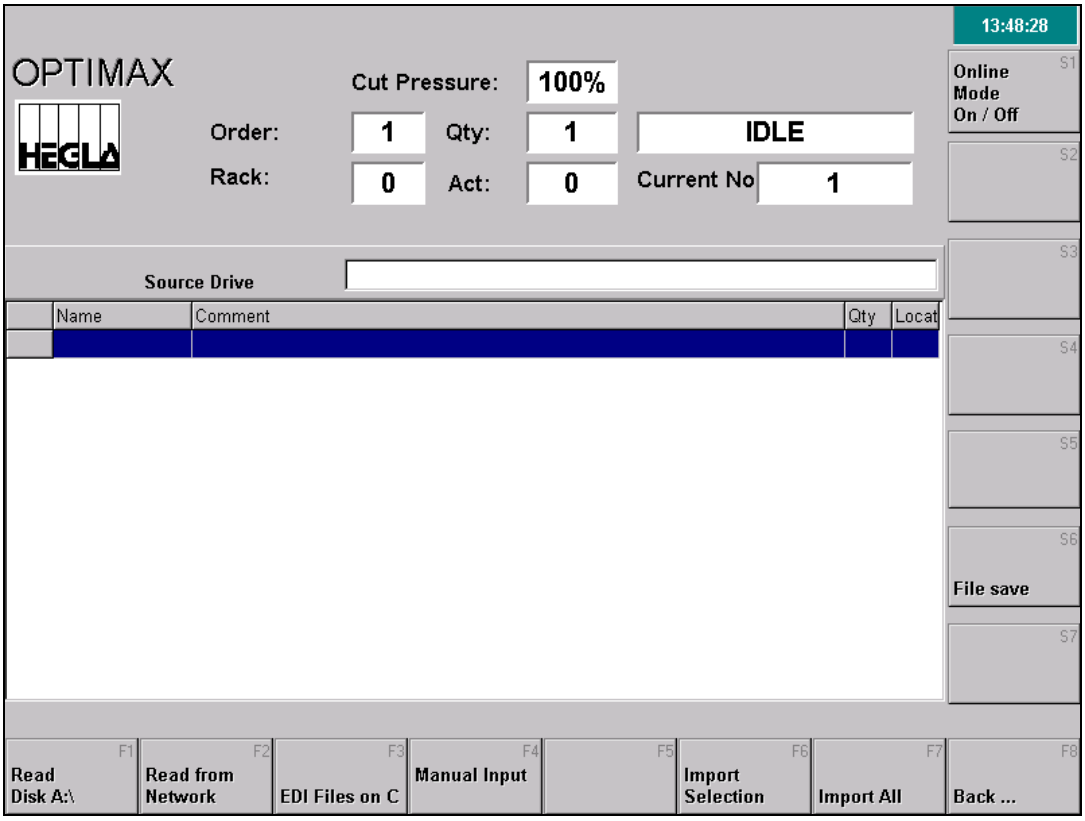
Key	Label	Function
F1	Add Selected	Transfers data of the job selected in the source grid to the target grid.
F2	Add All	Transfers data of all jobs in the source grid to the target grid.
F3	All Without Last One	Transfers data of all jobs, except the last, to the target grid.

Key	Label	Function
F4	Delete All Plans	Deletes all plans from the source grid. In order to delete plans from the source grid, the target grid field must be “empty”.
		
F5	Blind Cut	This function prevents the cutting head from being placed on the surface of the glass. (The button changes colour to yellow when Blind cut is in operation.
F6	Plan-Import	Calls up an additional menu for file import and manual input.
F7	Pause / Resume	Pauses work on the current job. Pressing the button again causes work to continue from the point at which it was interrupted. The button changes colour to red when the glass stops have been positioned.
F8	Manual...	Calls up an additional menu with manual functions.

5.6.2 Allocation of function key stroke combinations Shift+F1 to Shift+F7

Key stroke combination	Label	Function
Shift + F1	Cutting pressure +	Raised up the cutting pressure.
Shift + F2	Cutting pressure -	Reduced the cutting pressure.
Shift + F3	Service	This function key serves to open the password protected service-area and is for the operation without meaning.
Shift + F4	Program Exit	**This function allows you to exit the programs and shut down the computer. To prevent accidental exiting, another dialog box appears on the screen.**
		
Shift + F5	Delete Job	Clears the selected job from the target grid. (This function is only possible if the order is not active)
Shift + F6	Job Up	Moves the selected job in the target window up one row.
Shift + F7	Job Down	Moves the selected job in the target window down one row.

5.7 Plan-Import



Plan-Import

5.7.1 Allocation of function key F1 to F8

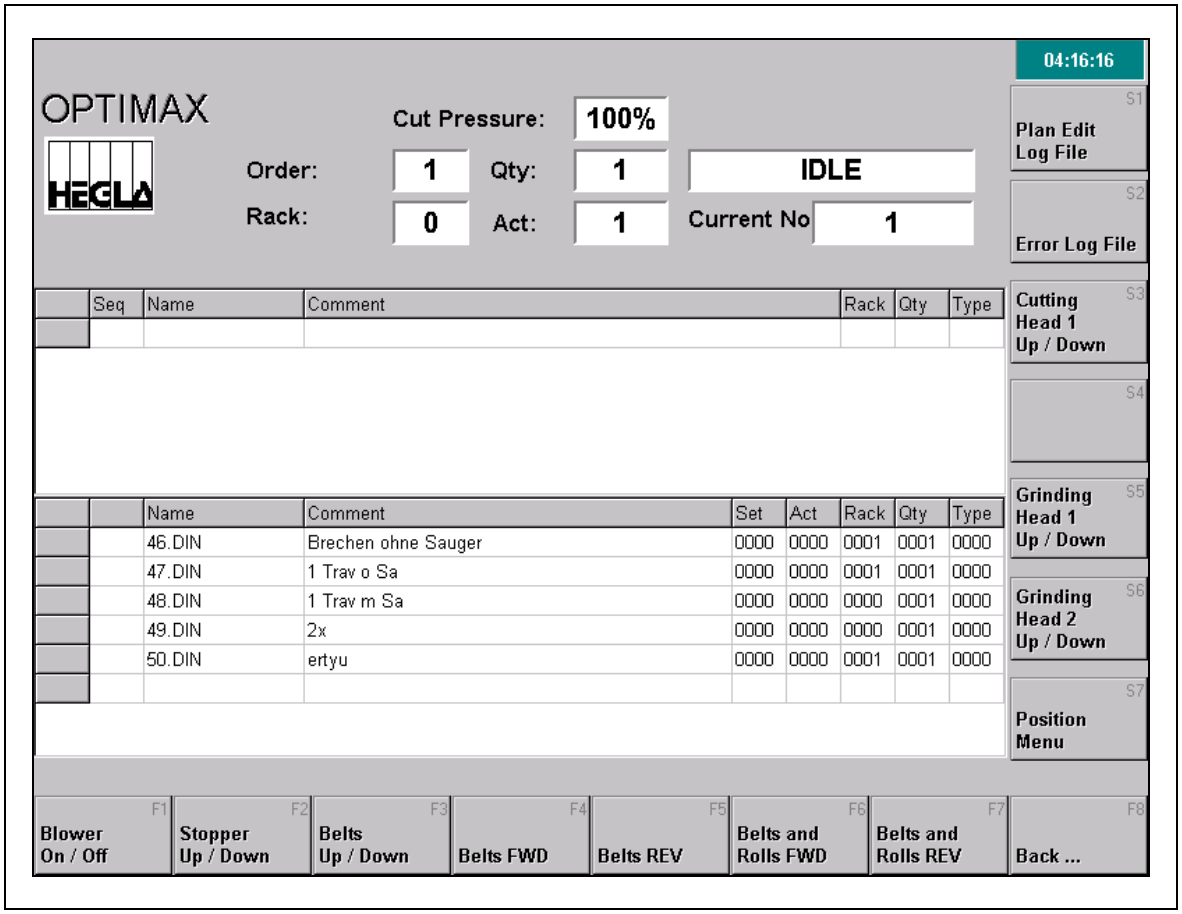
Key	Label	Function
F1	Read Disk A:\	Lists all *.EDI files on drive a:\ and displays them after the processing in the source grid.
F2	Read from Network	Lists all *.EDI files on network drive and displays them after the processing in the source grid.
F3	EDI Files on C	Lists all *.EDI files on drive C and displays them after the processing in the source grid.
F4	Manual Input	Launches the A&W Hegla Cut (PlanEdit) programme.

Key	Label	Function
F6	Import Selection	Transfers the **selected** jobs for processing to the source grid.
F7	Import All	Transfers **all** jobs for processing to the source grid.
F8	Back....	Brings up the main menu page.

5.7.2 Allocation of function key stroke combination Shift+F1 and Shift+F6

Key stroke combination	Label	Function
Shift + F1	Online Mode On / Off	Automatic operation as determined by process planning.
Shift + F6	File save	All files located in the source grid can be saved with this function.

5.8 Manual functions



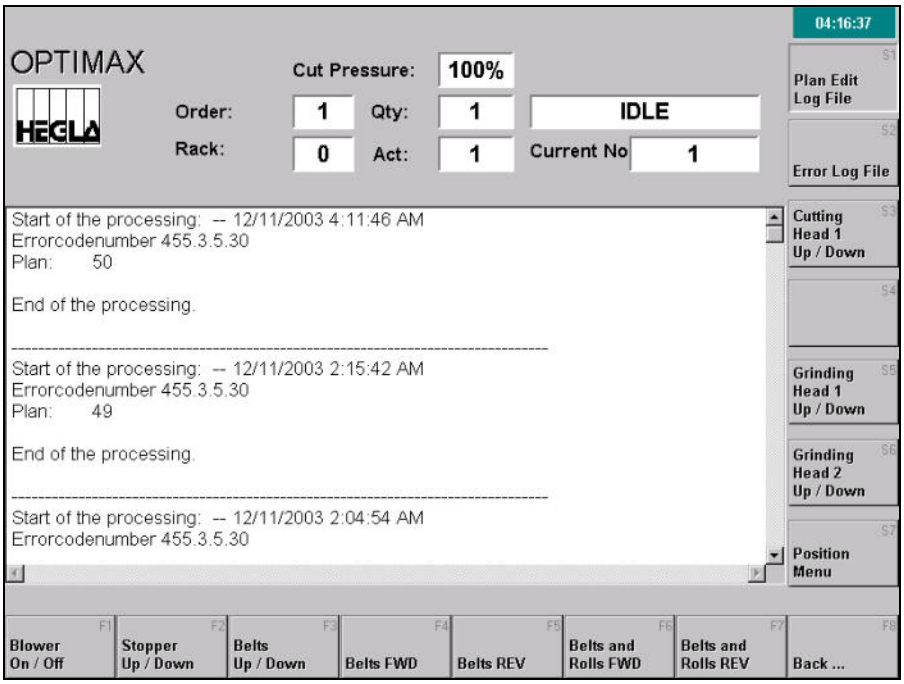
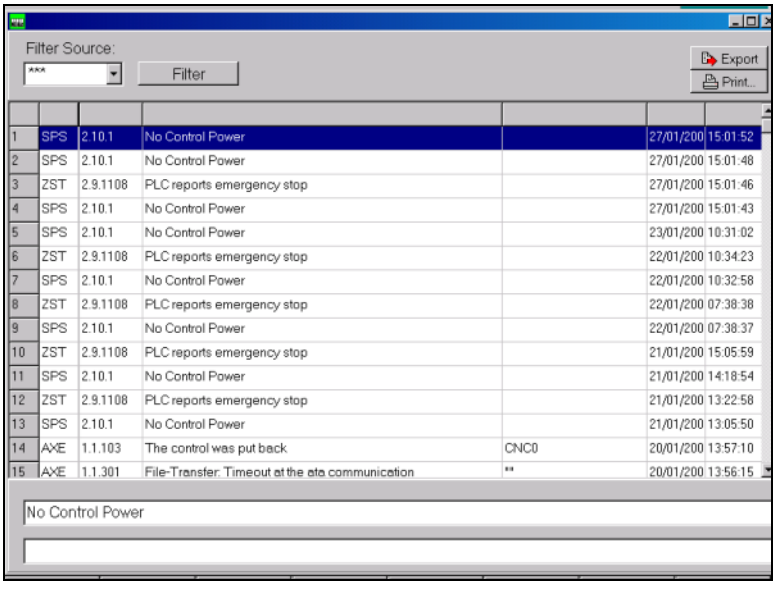
Manual functions

5.8.1 Allocation of function keys F1 to F8

Key	Label	Function
F1	Blower On / Off	Switches the blower On or Off. The button changes colour to green when the fan is switched On.
F2	Stopper Up / Down	Moves the stopper up or down. The button changes colour to green when the glass stops have been positioned.
F3	Belts Up / Down	Moves the belts up or down. (The button changes colour to green when the belts have been positioned.)

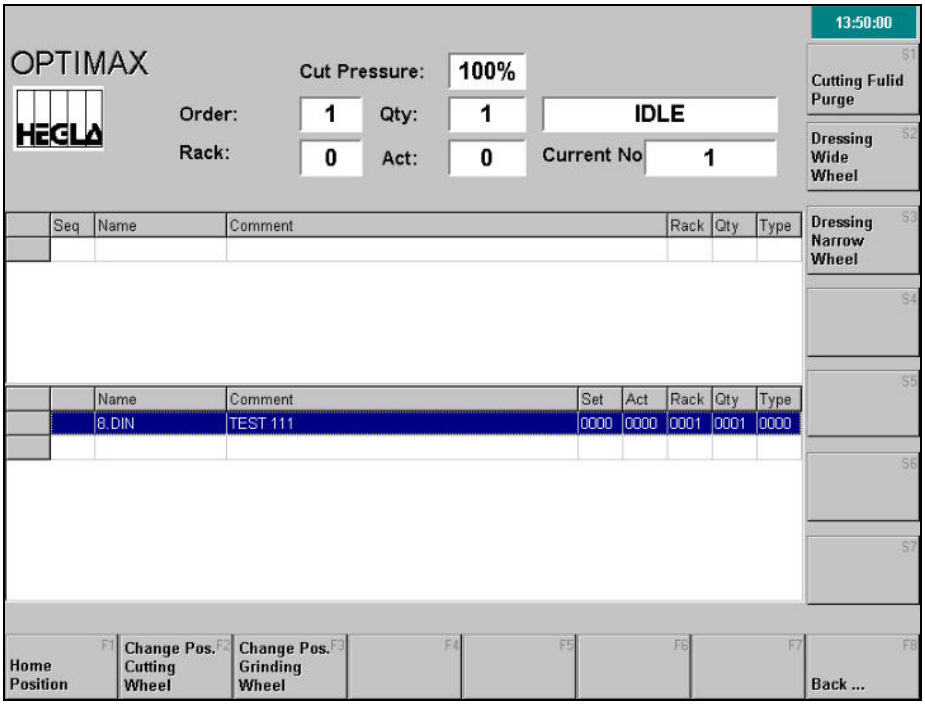
Key	Label	Function
F4	Belts forwards	Moves the belts forwards or switchs them off. (The button changes colour to green when the belts forwards have been positioned.) Cannot be activated at the same time as “Belts backwards”.
F5	Belts backwards	Moves the belts backwards or switchs them off. (The button changes colour to green when the belts backwards have been positioned.) Cannot be activated at the same time as “Belts forwards”.
F6	Belts and Rolls forwards	Moves the belts + rolls forwards or switchs them off. (The button changes colour to green when the belts forwards have been positioned.) Cannot be activated at the same time as “Belts + Rollers backwards”.
F7	Belts and Rolls backwards	Moves the belts + rolls backwards or switchs them off. (The button changes colour to green when the belts backwards have been positioned.) Cannot be activated at the same time as “Belts + Rollers forwards”.
F8	Back...	Changing back to the main menu.

5.8.2 Allocation of function key stroke combinations Shift+F1 to Shift+F7

Key stroke combination	Label	Function
Shift + F1	Plan Edit Log File	With this function the processing of the cutting plans is documented.
	
Shift + F2	Error Log File	This function key calls up a list of all error messages of the control.
	

Key stroke combination	Label	Function
Shift + F3	Cutting head 1 Up / Down	Moves the cutting head 1 up or down. (The button changes colour to red when the cutting head is lowered onto the glass)
Shift + F5	Grinding head 1 up / down	Moves the grinding head 1 up or down. (The button changes colour to red when the cutting head is lowered onto the glass)
Shift + F6	Grinding head 2 up / down	Moves the grinding head 2 up or down. (The button changes colour to red when the cutting head is lowered onto the glass)

Key stroke combination	Label	Function
Shift + F7	Position Menu	The bridge and cutting head move to their reference locations.



F1	Home Position	The bridge drives into the basic position (Home position).
F2	Change Pos. Cutting Wheel	This button drives the bridge on a freely definable position. E.g. cutting wheel can be exchanged.
F3	Change Pos. Grinding Wheel	This button drives the bridge on a freely definable position. E.g. grinding wheel can be exchanged.
F8	Back...	Changing back to the manual functions.
Shift + F1	Cutting Fluid Purge	Open the cutting oil valve in the stop (e.g. to ventilate of the lines).
Shift + F2	Dressing Wide Wheel	The wide grinding wheel is trained. For it the glass sheet must lie aligned on the table. (The button changes colour to yellow)
Shift + F3	Dressing Narrow Wheel	The narrow grinding wheel is trained. For it the glass sheet must lie aligned on the table. (The button changes colour to yellow)

5.9 PLC manual functions

5.9.1 Blower On / Off button

- No NC programmes are allowed to be running.
- Press „Blower On / Off“ button.
- Press „Blower On / Off“ button again to switch off the fan.

5.9.2 Stopper Up / Down button

- Press “Stopper Up / Down” button.
- The stops move out and the glass can be/is positioned.
- Pressing the button again causes the stops to move to their reference position.

5.9.3 Belts Up / Down button

- Press “Belts Up / Down” button.
- The belts can be raised and lowered.

5.9.4 Belts forwards

- Press “Belts forwards” button.
- The belts are automatically set in motion and run forwards.
- The button must remain activated during this operation.

5.9.5 Belts backwards

- Press “Belts backwards” button.
- The belts are automatically set in motion and run backwards.
- The button must remain activated during this operation.

5.9.6 Belts and Rolls forwards

- Press “Belts and Rolls forwards” button.
- The feeder rollers and the cutting machine belts run forwards simultaneously to transport the sheet of glass.
- Clicking on this button again switches the function off.

5.9.7 Belts and Rolls backwards

- Press “Belts and Rolls backwards” button.
- The feeder rollers and the cutting machine belts run backwards simultaneously to transport the sheet of glass.
- Clicking on this button again switches the function off.

5.10 General PLC functions

5.10.1 Cutting head on felt

If input „Cutting head on felt“ is triggered, the machine stops immediately and switches into Pause mode.
A window with fault message „Cutting head on felt“ also appears.

5.10.2 Compressed air not OK

If the machine is not supplied with sufficient compressed air, fault message „Compressed air not OK“ appears. The machine stops and the active process is immediately interrupted.

5.11 Visual inspection – LKB 7237

Carry out a visual inspection before each start-up.

Check the light barrier is functioning correctly before each start-up and after a fault has occurred.

A visual inspection should be carried out before the machine is commissioned. Take note of the following points:

- Check the functions of the warning elements and the safety facilities.
- Check that all tubes, cables and mountings are tight.
- Check that the machine is not bent, ripped or leaking.
- Check that there is nobody in the danger area (inside of the safety barrier).
- Remove any objects which are not necessary for the immediate operation of the system from the working and danger area.
- Check the level of all oils and greases.
- Check the compressed air maintenance valve.

If defects are discovered with the visual control, the machine may be taken not in operation. Eliminate defective ones immediately.

5.12 Controls

5.12.1 Keys and switch functions

LABEL	MEANING	USE
BLOWER ON	With this function the blower is turned ON.	Press the button once.
BLOWER OFF	With this function the blower is turned OFF.	Press the button once.
BREAKING TABLE FREE	With this function the next available sheet is requested, but the breaking table must be free!	Press the button once.
TILTING ARMS UP	With this function the tilting arms are moved into the unloading position. **Caution! Risk of crushing!** **Do not reach into the swivelling range of the tilting arms! Remove all objects or persons from the danger area of the machine!**	Pull out the tilting arms manually. Press the button „Tilting arms up“ once. This function is carried out as long as the button is actived.
TILTING ARMS DOWN	With this function the tilting arms are moved back into the home position. **Caution! Risk of crushing!** **Do not reach into the swivelling range of the tilting arms! Remove all objects or persons from the danger area of the machine!**	Press the button „Tilting arms down“ once. This function is carried out as long as the button is actived. Push in the tilting arms manually.
EMERGENCY STOP	Pressing the "EMERGENCY STOP" key rapidly shuts down the machine. The power supply to the machine drives which can give rise to hazardous conditions for the machine or operator is deactivated as quickly as possible without creating further hazard sources.	Press the button once.

LABEL	MEANING	USE
SUB-PALTE FWD	The sub-plate can be moved forward.	This function is carried out as long as the button is actived.
SUB-PALTE REV	The sub-plate can be moved backward.	This function is carried out as long as the button is actived.
SHEET FWD	With this button the sheet can be moved forward.	This function is carried out as long as the button is actived.
SHEET REV	With this button the sheet can be moved backward.	This function is carried out as long as the button is actived.

6 Malfunctions – Causes – Repair

6.1 Actions by Erros

The local safety regulations shall apply in all cases independently of the following instructions for operation of HEGLA machines / systems.

- End work cycle and switch off the machine. Disconnect all electrical and pneumatical power supply.
- Follow all safety rules and regulations.
- Resolve error.

6.2 Restart after Malfunction

Please pay uttermost attention to the „Fundamental Safety Instructions“ in chapter 1.

Before starting any maintenance or servicing procedures the electrical and compressed-air supply must be cut off (Turn main switch OFF, disconnect electrical and compressed-air supply).

The electrical supply may be reconnected after securing that nobody is in nor has access to the danger zone of the machine.

Maintenance work should be executed by supervised personnel only!

6.3 Cutting head on felt

If the cutting head comes into contact with felt, the machine stops and displays an error message on the monitor. To eliminate the error:

- Press “Cutting head Reset“ button on the bridge.
- Press “Blind cut“ button in the switch cabinet.
- The “Continue“ function is visible on the screen. Press the relevant key. Then check machine. When the cutting head is located over the glass again, end the blind cut function by pressing the “Blind cut“ button.

6.4 Trouble shooting SEW gear motor

(extract from the SEW operating instructions)

6.4.1 Gear problems

Problem	Possible cause	Repair
Unusual, regular motor rumble	a) unreeling/grinding rumble: bearing damage b) knocking rumble: irregularity in the gear tooth system	call the customer service
Unusual, irregular motor rumble	foreign particles in the grease	change grease stop the motor and call the customer service
Leakage of grease - at the motor flange - at the check ring of the motor shaft - at the gear shaft - at the output shaft packing	a) defective sealing b) gear is not vented	cf. a) call the customer service cf. b) gear venting

6.4.2 Engine brake problems

Problem	Possible cause	Repair
Brake does not ventilate	incorrect voltage of the control device for the brake	set the right voltage (cf. capacity plate)
	defective control devices for brakes	change the control device, check the brake coil (resistance), check the switching device
	max. air gap insurance is exceeded because the break covering is worn out	check the air gap insurance
	fall of voltage in the supply line >10 %	see to the right voltage
	insufficient cooling, brake gets hot	replace the brake rectifier type BG by BGE
	earth fault or internal short-circuits of the brake coil	change the complete brake and the control device (specialized shop), check the switching device
Motor does not brake	incorrect air gap insurance	check the air gap insurance
	brake covering is worn out	change the complete covering carrier
	wrong braking moment	change the braking moment
	BM(G) only: air gap insurance is so big that the checking nuts bear against the carrier	check the air gap insurance
	BM(G) only: incorrect setting of the hand-operated ventilator	set the checking nuts
Retarded braking	brake is connected on the side of the alternating-current voltage	connect with direct-current and alternating-current voltage (e.g. BSR); please heed the circuit label
Noise in the brake area	worn-out gear tooth system caused by jerkily starting	check the construction
	swinging/pendulum moments through incorrectly set static frequency converter	check/correct the setting of the static frequency converter according to the operating instructions

6.4.3 Motor problems

Problem	Possible cause	Repair
Motor does not start	interrupted supply line	check/justify the connections
	blown out fuse	replace fuse
	response of the engine contactor	check the setting of the engine contactor and correct if necessary
	engine contactor does not switch, fault in the control	check the control of the engine contactor and eliminate the error if necessary
Motor does not start at all or only with problems	starting capacitor does not synchronize or is too small (single-phase motor)	correct synchronization; choose a larger starting capacity
	motor constructed for data connection, but connected as star connection	correct connection
	when switching on, voltage or frequency differ considerably from the nominal value	see to better power conditions; check the cross section of the supply line
Motor does not start in star connection, only in delta connection	insufficient torque with star connection	if the delta starting current is not too high, switch on directly, otherwise use larger motor or special motor (on consultation)
	contact error at the star-delta switch	eliminate the error
Wrong direction of rotation	incorrect connection of the motor	exchange two phases
Motor is humming and high current consumption	defective winding	return motor to a specialized shop to be repaired
	touching rotor	
Fuses response or immediate release of engine contactor	short-circuit in the system	eliminate short-circuit
	short-circuit in the motor	leave error elimination up to a specialized shop
	wrong connection of the lines	correct connections

Problem	Possible cause	Repair
Considerable RPM loss while charging	earth fault of the motor	leave error elimination up to a specialized shop
	overloading	performance measurement, use more powerful motor or reduce load if necessary
	voltage drop	enlarge cross section of the supply line
Motor gets to hot (take temperature)	overloading	performance measurement and use a larger motor or reduce the load if necessary
	insufficient cooling	modify supply of cooling air and/or clear the ways for cooling air; retrofit the forced ventilation if necessary
	static air temperature is too high	reduce performance
	starting capacitor does not switch off (single-phase motor)	check the connection and correct if necessary
	split-phase failure (single-phase motor)	check the connection and auxiliary winding and correct if necessary
	motor in delta connection instead of star connection	correct connection
	intermittent contact of the supply line (temporary two-phase connection)	eliminate intermittent contact
	blown out fuse	trouble shooting and eliminate cause (see above), replace fuse
	line voltage differs from the constructed voltage by more than 10%. A high voltage has negative effects especially on high-pole motors because even with normal voltage the no-load current of these motors is already very close to the calibration current.	adjust the motor to the supply voltage
	rated operating mode (S1 to S9, DIN 57530) is exceeded e.g. by a too high switch frequency	adjust the rated operating mode of the motor to the actual operating conditions; ask trained personnel to determine the right gear
High noise intensity	split, soiled, or damaged roller bearing	re-align the motor, inspect the roller bearing and change it if necessary
	vibration of the rotating parts	eliminate the cause, the imbalance if necessary
	foreign particle in the cooling system	clean the cooling system

7 Spare Parts - Customer Service

7.1 Customer Service

Our customer service will gladly assist you during the installation, mainetance and after-sales servicing of the machine.

The address of our customer service is as follows:

HEGLA
GmbH & Co. KG
Wartung und Service
Industriestraße 21

D-37688 Beverungen

Tel.: +49 (0) 52 73 / 9 05-2 80
Fax: +49 (0) 52 73 / 9 05-2 57

Internet: www.hegla.de
Email: service@hegla.de

7.2 Spare part purchase orders

- Keeping the most important wear and tear parts in stock on-scene (at your company) is a necessity to provide constant functioning and operating of the machine.
- Per order we will supply technical innovated spare parts and accessories according to the latest legal regulations.
- We only grant warranty on our original supplied spare parts and accessories.
- We draw to your attention, that spare parts and accessories that are delivered by other suppliers have not been tested nor controlled by HEGLA. Due to this, - in certain circumstances - the mounting and/or usage of such productes can constructionally change the determined operation of the machine in a negative way. To this extent, the active and passive securtiy and functioning of the unit can be affected.
- Liability and garanty coverage is not granted for damages, that are caused by the usage of NOT-Original-HEGLA Spare Parts and Accessories.
- Please note, that special operation and delivery specifications for spare parts and accessories are enclosed in this manual.
- We deliver spare parts and accessories after the newest state of the technic and according to the newest regulations of the legislator.
- The following information must be stated when ordering: Machine-Type, Machine-No., Article-No., Article Description, Pos.-No. and Amount.

7.3 Fax Original - Spare part purchase orders

SPARE PART PURCHASSE ORDERS

Sender: Date: _____

_____

_____

_____

_____

HEGLA
GmbH & Co. KG
Wartung und Service
Industriestraße 21

D-37688 Beverungen

Tel.: +49 (0) 52 73 / 9 05-2 80
Fax: +49 (0) 52 73 / 9 05-2 57

Internet: www.hegla.de
Email: service@hegla.de

- Machine – Type: _____

- Machine – No.: _____

- Article – No.: _____

- Article description: _____

_____

- Pos. – No.: _____

- Amount: _____

Name : _____

Signature : _____

8 Maintenance

8.1 Information

All electrical and compressed air connections are to be disconected from the HEGLA machine before maintenance work is carried out!

All the given times are only for one shift work, if the machine has to run through more than one shift per day then the times must be shortened.

The maintenance should only be carried out by qualified workers!

When disposing of old and used oils think of the environment!

Please follow the seperate maintenance instructions for each machine (see appendix).

- During the inspection and maintenance work please follow the capital "Fundamental safety instructions".
- A malfunction that has resulted from not enough or incorrect maintenance is not only expensive but also can cost production time. A regular maintenance is therefor imperative.
- If the maintenance instructions are not followed the guarantee will be forfeit.
- The safety and the life expectancy of the HEGLA machine can also be positively influenced by a correct and regular maintenance.
- Our customer service will be pleased to help you, and to answer any questions you may have.

After the first 100 working hours:

Check that all the screws and bolts are tight.

Any liability and warranty by HEGLA is excluded for damages which result from using unsuitable grinding tools.

8.2 Regular maintenance instructions – RF 4635

8.2.1 Maintenance after 8 working hours

- Please check all safety facilities (e.g. barriers, warning signals) for function and tightness.

8.2.2 Maintenance after 40 working hours

All maintenance tasks after 8 operating hours, in addition to the following maintenance tasks:

- Check the tension of the driving chain.
- Check all cables, switches and sensors for damage.
- Remove and clean the dust filter in the switch cabinets, replace as necessary. Remove in addition the protective caps and blow out the filter mats.
  Clean the interiors of switch cabinets and operating panels with a vacuum cleaner.

8.2.3 Maintenance after 480 working hours

All maintenance tasks after 8 and 40 operating hours, in addition to the following maintenance tasks:

- Clean the driving chain, after-lubricate and check for wear (Spray oil HHS 2000, Fa. Würth).
- Grease all turning points (e.g. with machine oil SAE 80).
- Check all securing bolts for tightness.

8.2.4 Maintenance after 960 working hours

All maintenance tasks after 8, 40 and 480 operating hours, in addition to the following maintenance tasks:

- Check all limit switches for their fastening and if necessary tighten solved screws again.
- Check the supply lines (pneumatically/electrically) for damages (cracks, noises...).

8.3 Regular maintenance instructions – OPTIMAX 6133 ES Plus Twin

8.3.1 Maintenance after 8 working hours

- Read off the cutting oil level from the control window.
  The oil level must not fall below min. 1/3, and/or. 2/3 not exceed.
  (see separate Pneumatic-Operating panel)
- Control maintenance unit at the base frame.
  If necessary, drain and/or pour in oil. An oil consumption must be evident (approx. ½ filling per week). The compressed air must at least amount 6 – 8 bar.
  → see operating manual Fig. 8.1
- Please check all safety facilities (e.g. barriers, warning signals) for function and tightness.
- Clean tabletop and keep free of broken glass. The felt covering is to be cleaned thoroughly with a vacuum cleaner. Clean as often as required depending on soiling!
- Keep the guidings (guiding of the bridge and cutting head) free of glass splitters and grease lightly with an oily cloth (Rust protection-Spray or Rust protection-Fluid).
- Clean sensors with a cloth.

8.3.2 Maintenance after 40 working hours

All maintenance tasks after 8 operating hours, in addition to the following maintenance tasks:

- Clean the filter cartridge at the grinding head, replace as necessary.
- Clean the toothed racks and check them for wear and impurity.
- Clean the guide rail and check them for wear and impurity.
- Grease lightly the toothed racks with an oily cloth (Rust protection-Spray or Rust protection-Fluid).
- Grease lightly the guide rail with an oily cloth (Rust protection-Spray or Rust protection-Fluid).
- Clean the transport belts with a brush and check for damage and tension.
- Check the tension of the driving chain for the belt drive.
- Check the zero-stops for wear and condition.
- Check all cables, switches and sensors for damage.
- Check all pressure tubes, connections and valves for damage and leakage.
- Remove and clean the dust filter in the switch cabinets, replace as necessary. Remove in addition the protective caps and blow out the filter mats.
  Clean the interiors of switch cabinets and operating panels with a vacuum cleaner.

8.3.3 Maintenance after 480 working hours

All maintenance tasks after 8 and 40 operating hours, in addition to the following maintenance tasks:

- Clean the driving chain for belt conveyor, after-lubricate and check for wear (Spray oil HHS 2000, Fa. Würth).
- Grease the grease nipples of the cutting head, bridge guide and drive belt pulley.
  Caution: An excessive quantity of grease will destroy the guidings!
- Grease lightly the grease nipples of the ball-carriage in sliding with a grease gun.
  Caution: An excessive quantity of grease will destroy the guidings!
- Grease all turning points (e.g. with machine oil SAE 80).
- Check trailing cables for secure fastening and clean it.
- Check all securing bolts for tightness.

8.3.4 Maintenance after 960 working hours

All maintenance tasks after 8, 40 and 480 operating hours, in addition to the following maintenance tasks:

- Check all limit switches for their fastening and if necessary tighten solved screws again.
- Check the cutting oil filter below the cutting oil container, if necessary clean it. Place a collecting tank under the plastic control window and remove the control window
  - Caution: The container runs out!
  (see separate Pneumatic-Operating panel)
- Check gear motors after manufacturer data.
- Check the supply lines (pneumatically/electrically) for damages (cracks, noises...).
- Check all motor drives for tightness.
- Clean the blower. Unscrew the cover in the switched off condition and remove the dust/dirt with the vacuum cleaner.

8.4 Regular maintenance instructions – LKB 7237

8.4.1 Maintenance after 8 working hours

- Control maintenance unit at the base frame.
  If necessary, drain and/or pour in oil. An oil consumption must be evident (approx. ½ filling per week). The compressed air must at least amount 6 – 8 bar.
  → see operating manual Fig. 8.1
- Please check all safety facilities (e.g. barriers, warning signals) for function and tightness.
- Clean tabletop and keep free of broken glass. The felt covering is to be cleaned thoroughly with a vacuum cleaner. Clean as often as required depending on soiling!
- Clean the breakout bars and check them for wear, if necessary exchange.

8.4.2 Maintenance after 40 working hours

All maintenance tasks after 8 operating hours, in addition to the following maintenance tasks:

- Check all cables, switches and sensors for damage.
- Check all pressure tubes, connections and valves for damage and leakage.
- Remove and clean the dust filter in the switch cabinets, replace as necessary. Remove in addition the protective caps and blow out the filter mats.
  Clean the interiors of switch cabinets and operating panels with a vacuum cleaner.

8.4.3 Maintenance after 480 working hours

All maintenance tasks after 8 and 40 operating hours, in addition to the following maintenance tasks:

- Grease all turning points (e.g. with machine oil SAE 80).
- Check all securing bolts for tightness.

8.4.4 Maintenance after 960 working hours

All maintenance tasks after 8, 40 and 480 operating hours, in addition to the following maintenance tasks:

- Check all limit switches for their fastening and if necessary tighten solved screws again.
- Check gear motors after manufacturer data.
- Check the supply lines (pneumatically/electrically) for damages (cracks, noises...).
- Check all motor drives for tightness.
- Clean the blower. Unscrew the cover in the switched off condition and remove the dust/dirt with the vacuum cleaner.

8.5 After a long break in production

8.5.1 What to do before a long break

- Clean the machine.
- Conserve all naked parts (eg. with Tectyl 506 or a similar conservation means).
- Protect the machine from the damp.
- Release the water out of the maintanence valve.

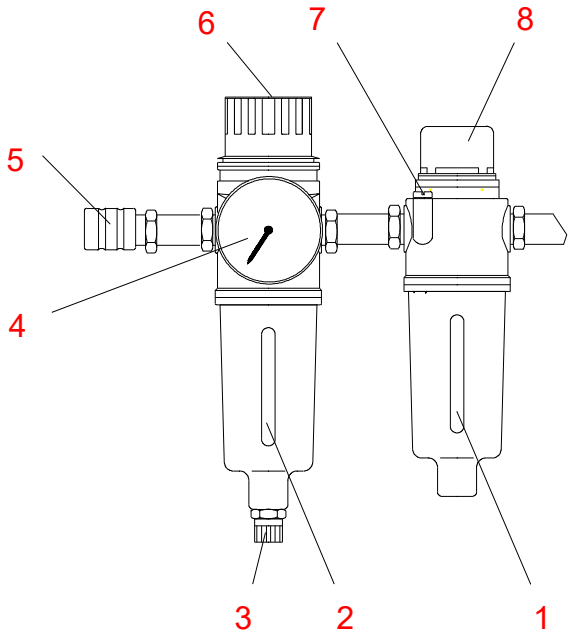
8.5.2 What to do after a long break

- Clean the machine and remove the means of conservation.
- Carefully start the machine (see Cap. 4 and 5). If you hear any strange noises or by malfunction switch the machine off immediately and eliminate the failure.

8.6 Compressed air maintenance valve

The pneumatic part is equipped with three construction units for compressed air maintenance:

Base frame: Compressed air maintenance valve consists of a filter control, compressed air oiler and a pressure guage.



Pos.1:	Oil level control window
Pos.2:	Control window for the water extractor
Pos.3:	Water release valve
Pos.4:	Pressure guage
Pos.5:	Slide valve to shut off the com. air
Pos.6:	Pressure control
Pos.7:	Filling screw for the oil
Pos.8:	Oil flow control

Fig. 8.1: Compressed air maintenance valve

8.6.1 Shut off the compressed air

Shut off the main switch during the maintenance.

The compressed air must be shut off before carrying out any repairs or maintenance. To do this you must:

- Open the slide valve.

8.6.2 Filter control

The machine must be switched off (main switch) and disconnected from the compressed air when carrying out maintenance on the filter control.

The filter control is a combination of pressure control and air filter. The filter cleans and dries the compressed air. With the pressure control you can regulate the working pressure of the machine.

- Setting the pressure: Unlock the pressure control (pull up) and turn the handle until the required pressure is shown. The pressure should be set to 6 bar. Lock the pressure control (push the handle down).
- The water in the water glass must not exeed the red line.
- Releasing the water: When the machine is disconnected from the compressed air the water will be automaticaly released from the filter control. A manuel release is possible (under pressure) by actuating the water release valve.
- To change or clean the filter follow the instructions.
  - Close off the pressure and disconnect. Open the slide valve.
  - Disconnect the water container (push up and turn).
  - Loosen the bracket for the filter and clean or change the filter.
  - Connect the water container.
  - Reconnect the air pressure and close the sliding valve.

8.6.3 Compressed air oiler

The oiler mixes a certain ammount of oil into the compressed air. The oiler requires the following maintenance:

Switch off the machine (main switch) and disconnect the compressed air before carrying out maintenance on the compressed air oiler.

Control the oil level every day, it must be between the two red lines.

- The ammount of oil in the air can be regulated by turning the control screw. The ammount can be seen through the oil flow control window.
  - Set the screw so that one drop of oil falls every minute during the production.
- How to clean and fill the oil container:
  - Disconnect the pressure.
  - Loosen the oil filling screw.
  - Fill the container up to the top mark with oil.
  - Replace the oil filling screw.
  - Reconnect the compressed air.

8.7 Cutting Oil Fill

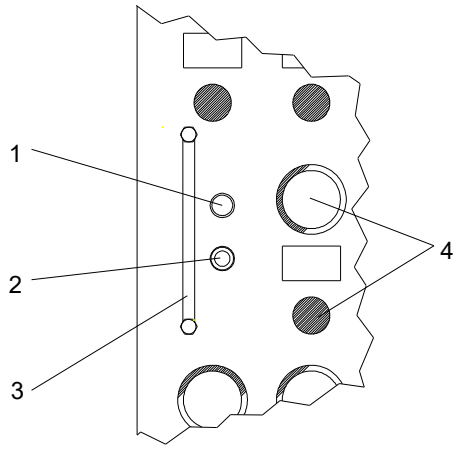
During the handling of cutting oil all safety and environmental laws andregulations must be followed.

Observe all data sheets for cutting oil.

Use only clean cutting oil.

The cutting oil filter is located below the cutting oil container. For recommended cutting oils see chapter 8.17.1

- The cutting oil level is not allowed so low as not be visible on the cutting oil display tube.
- To refill the cutting oil:
  - Place the supplied oil fill tube in the container with the attached filter end. Connect the other end on the refill connector.
  - Push and hold the oil fill button till the oil display tube shows full. The oil is drawn in through a vacuum.
  - Remove the oil filler tube and store in a clean place.

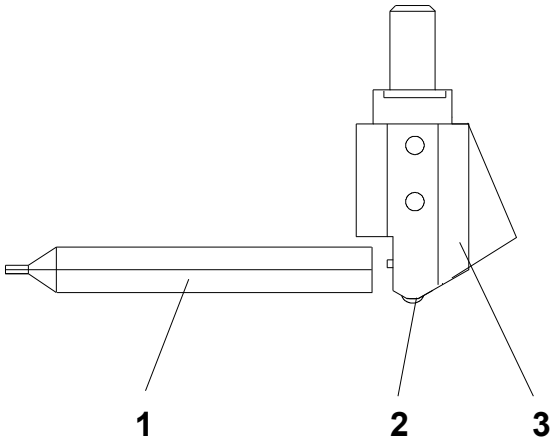


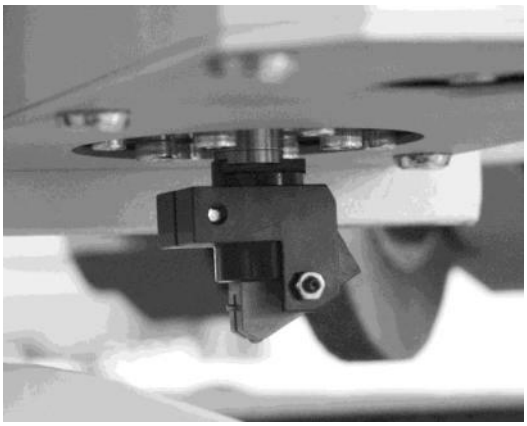
Pos. 1: Oil fill button
Pos. 2: Refill connector
Pos. 3: Cutting oil display tube
Pos. 4: Pressure gauge

Fig. 8.2: Cutting oil fill (principal layout)

8.8 Changing the cutting wheel

- Push the cutting wheel with the quick change application out of the cutting wheel holder by hand or using a screw driver.
- Push the axis out of the quick change application with the assembly tool.
- Change the cutting wheel and push the axis back in.
- Push the quick change application back into the cutting wheel holder as far as it will go (Fig. 8.3)





1 = Assembly tool
2 = Cutting wheel
3 = Cutting wheel holder

Fig. 8.3: Assembly aid for cutting wheel change

- The cutting wheels are available in two diameters (4,1 and 5,6 mm).
  - The Ø 4,1 mm diameter cutting wheels are ideal for general and shape cutting.
  - The Ø 5,6 mm diameter cutting wheels have a longer life expectancy.

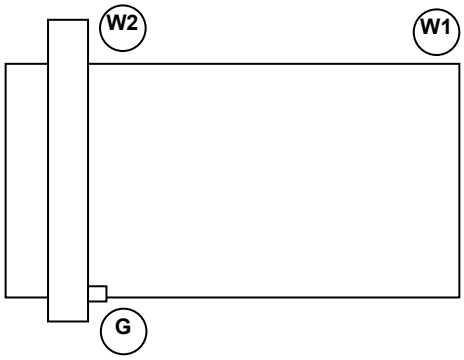
Cutting angle	Diameter	Article - No.
135°	4,1 mm	31-4058-0110
	5,6 mm	31-4058-0310
145°	4,1 mm	31-4058-0120
	5,6 mm	31-4058-0320
152°	4,1 mm	31-4058-0140
	5,6 mm	31-4058-0340
158°	4,1 mm	31-4058-0160
	5,6 mm	31-4058-0360

8.9 Changing the edge deletion grinding wheel

The machine or system has to be secured by a second person in case it is unintenionally turned on.

When turning the system back ON ensure that no personnel or equipment is in the danger area. This is especially important in light fence procetected areas.

- If a value is determined with automatic measuring of the grinding wheel, which makes necessary an exchange of the grinding wheel, then the machine drives into the change position automatically.



G = Basic position
W1 = Change position 1
W2 = Change position 2 (only in exceptional case)

- The stated postions can be mirror imaged if the direction of glass flow or the home position is reversed. Also, a position not shown can be defined if agreed upon.

8.9.1 Changes of the grinding wheel(s)

1. The wheel head has reached the change position.
2. When a machine is fenced in a operation stop will occur when the door is opened. On common safty fencing which includes another component (i.e. The Gantry Loader) an operational stop must occur.
3. The machine or system has to be secured by a second person in case it is unintenionally turned on.
4. The edge deletion wheel has to be held with one hand and the hex nut (M12) has to be loosened with an offset box wrench (19mm).
   On a twin head the wide wheel has to be loosened with an open ended wrench 19mm and the narrow wheel with a 10mm box wrench.
5. Remove and replace with a new wheel.
6. The tightening of the wheel takes place in reverse order, described in 4.
7. Leave the danger zone and make sure that there are no persons or objects left behind (lock doors and gates of the safety fence)!
8. The wheel change has to be input into the control. By acknowledging with the keys Ctrl + F6 the wheel change will be recognized.
9. Undo operational stop of the units in front. (OPTION)
10. The program will continue automatically (on older machines/controls a renewed start of the DIN program may be necessary).

8.9.2 Types of grinding wheels

- The grinding wheel is supplied in the widths 10 mm and 20 mm. According to standard the machine with grinding wheels of the companies is Norton, or when desired with grinding wheels of the companies Tyrolit, equipped.connection with the low-e coating, the grinding wheel is to be selected in accordance to the specifications of the coating manufacturer.

	Type designation	**Diameter**	**Width**	**Order-Number**
Nortn	RD-D18SF	200 mm	10 mm	31-4067-5100
	RD-D18S	200 mm	20 mm	31-4067-5200
Tyrolit	89A807-BE14TF	200 mm	10 mm	31-4067-0100
	89A807-BE14TF	200 mm	20 mm	31-4067-0220

8.9.3 Grinding data

- The grinding speed is layer and grinding wheels dependently.

	Type designation	**Grinding speed (Depending on Low-E coating)**	**Edge deletion**
Nortn	RD-D18SF	max. v = 120 m/min	4 axis
	RD-D18S	max. v = 120 m/min	4 axis
Tyrolit	89A807-BE14TF	max. v = 120 m/min	4 axis
	89A807-BE14TF	max. v = 120 m/min	4 axis

The max. allowed speed must not be exceeded. The machine's parameter must be correctly adjusted.

General legal requirements concerning non-polenting disposal of grinding dust are to be followed!
Clean the air filter and if necessary – replace it!
Clean the vacuum system!
The intervals should be carned out in accordance to the degree of contamination!

8.9.4 Change the filter cartridge

1. The grindig head moves into change position or is in home position.
2. When a machine is fenced in a operation stop will occur when the door is opened.
   On common safty fencing which includes another component (i.e. The Gantry Loader) an operational stop must occur.
3. The machine or system has to be secured by a second person in case it is unintenionally turned on.
4. Loosen the wing nut on the filter housing.
5. Afterwards remove the lid from the filter housing.
6. Loosen hex nut (M8) with a box wrench (13mm).
7. Remove filter unit. Inspect for dirt, and clean or replace according to condition.
8. Clean filter housing with cloth.
9. Replace filter unit and assemble in reverse order.
10. Leave the danger zone and make sure that there are no persons or objects left behind (lock doors and gates of the safety fence)!
11. Undo operational stop of the units in front. (OPTION)
12. The program will continue automatically (on older machines/controls a renewed start of the DIN program may be necessary).

8.10 Maintenance of the bridge guiding device

Switch off the main switch before starting the maintenance.

- Grease the grease nipples on the guiding bridge every 100 hours.
- Keep the toothed racks and guiding rails clean and grease lightly with an oily cloth (Rust protection-Spray or Rust protection-Fluid).

8.11 Maintenance of the Geared Motors

The Lenze / SEW electrodrives must regularly be checked upon. The maintenance should be as follows:

- Check the gear oil every six months or after 3.000 operating hours.
- Change the gear oil after 5.000 – 10.000 hours or every 2 years at the latest (This change depends on the oil temperature, see enclosed Lenze / SEW Info sheet as an annex).

The operating manuals for the motors are also enclosed in the annex.

8.12 Maintenance of control and frequency converter

- Control, frequency and drive converter are low-maintenance.
- In addition to the listed servicing information, the separate maintenance and operating instructions for control, frequency and drive converter in the appendix must be observed at all times.

8.13 Drive maintenance

8.13.1 Controlling the chain tension

- Chains can have a max. deflection of 1-2 % of the span distance.

Do not step under moving machinery.

Switch off the machine and disconnect the mains supply.

Follow the safety instructions.

Warning: Danger of being crushed between the chain and wheel!

Do not tension chain too tightly, as this will affect the motor and drive shaft bearings.

8.13.2 Lubricate the chain

- Check the grease of the driving chain on a weekly basis
- A light coating of grease that inhibits rust is sufficient.
- Grease the driving chain on an annual basis (for harsh environment more often).

8.13.3 Chain tension

- Loosen the bolts of drive motor.
- Push the motor in the direction of the arrow until the needed chain tension is reached.
- Tighten the bolts. Move the rollers for a short time and then recheck the chain tension. Repeat this process until the required chain tension is reached.

8.14 Transport belt maintenance

8.14.1 Belt cleaning

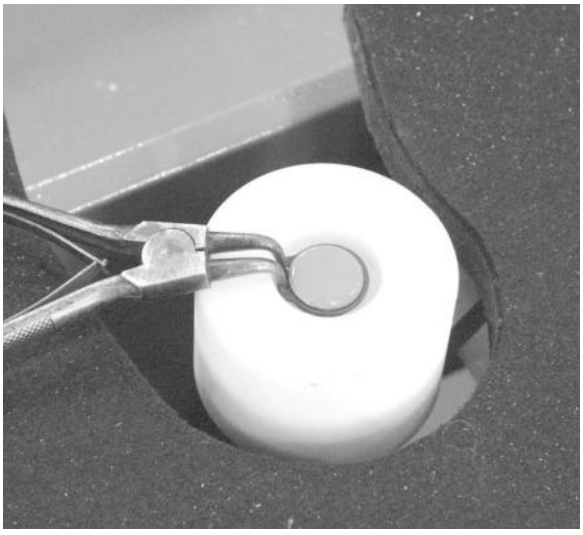
- For precision transporting the belts should be wiped down with a brush or damp cloth on 40 working hours basis (more often dependent on operating conditions).

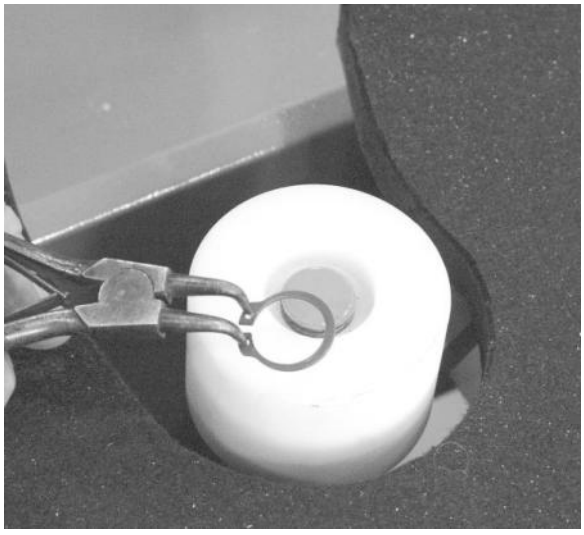
8.14.2 Belt tension

- During belt tightening do not stretch belt more than 0.1%. Make two marks on the belt 1000 mm apart. When belt is tensioned the distance between the marks is not to exceed 1 mm.

8.15 Replacement of stopping rollers

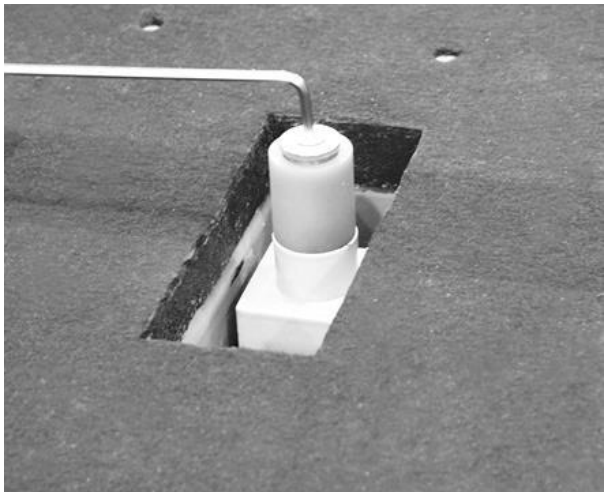
- Weared-off rollers can be turned around when needing a change the first time.To do this, remove the safety ring, pull out the roller and turn around. Now put the safety ring back in place.
- If the rollers have to changed for the second time, then new rollers must replace them.

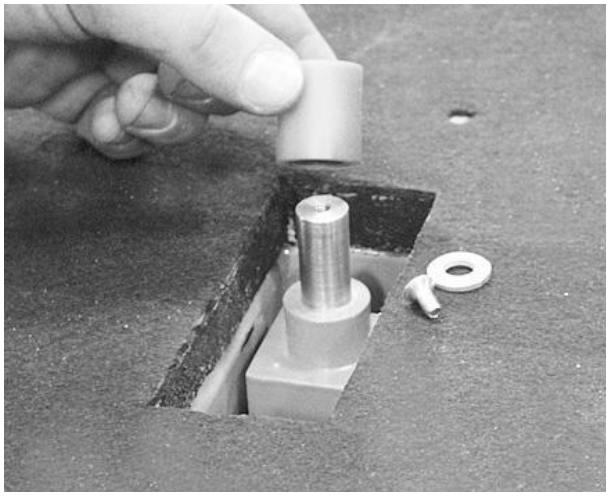




8.16 Changing the zero stops

- Weared-off zero stops can be turned once. For this loosen the protection screw, pull out the roll and turn. Attach the protection screw again.
- Already turned zero stops must be exchanged, when they are weared-off.





8.17 Operating fluids

8.17.1 Cutting oil

It is advisable to use one of the special oils for each of the areas. The following table has been tested in cooperation with the Aachener chemical works. The technical data pages for the listed products are in the appendix of this operating manual.

Before using of the cutting oil the area of application is to be coordinated with the manufacturer!

Cutting oil that can be washed off:

Cutting oil **ACECUT NT**
(Use for: laminated glass-thermal breaking)

Cutting oil **ACECUT 6000**
(Use for: Thick glass > 10mm, form cuts in building and automobil glass)

Evaporating cutting oil:

Cutting oil **ACECUT 5503**
(Standard product. for: Insulating glass production, XY - cuts for glass up to 10 mm)

Cutting oil **ACECUT 5250**
(same as ACECUT 5503 but evaporates quicker)

Both cutting oils have nearly the same cut and breaking qualities. Standard is ACECUT 5503 and - soft-coated laminated glass / evaporating.

8.17.2 Lubricants for the toothed racks

Spray the open gears and the toothed racks with an adhesive lubricant.

8.17.3 Lubricants for the bearings

The manufacturers recommend the following lubricants:

Shell Alvania R2
Aral HL2
BP Energrease LS 2
Esso Beacon 2
Mobil Mobilux 2

8.17.4 Oil for the maintenance valves

For the maintenance valve use an oil with the viscosity of 9 to 11 mm2/s by 40°C the ISO-Class VG 10 after ISO 3448. The following products fill these requirements:

AVIA Avilub RSL 10
BP Energol HLP 10
Esso Spinesso 10
Shell Tellus Öl C 10
Mobil DTE 21
Blaser Blasol 154

8.17.5 Lubricants for chains

The chains should be lubricated with a special lubricant eg. the same as is used for motor cycle chains.

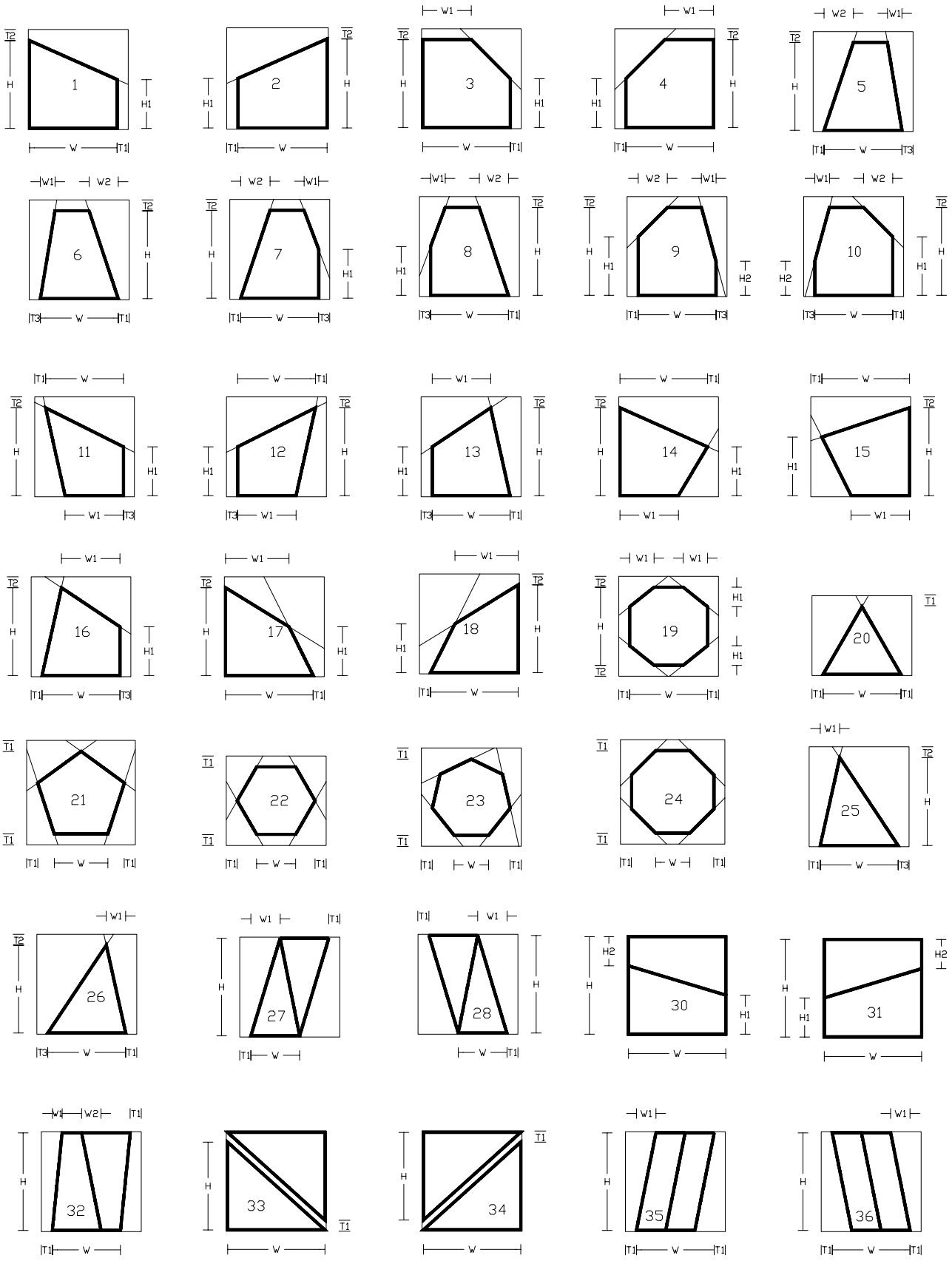
8.17.6 Lubricants for bolts and joints

All swinging and turning joints that have not allready been discribed should be sprayed with a resin free lubricant.

9 Shape catalog

9.1 Introduction

The following pictures give an overview of the shape catalog: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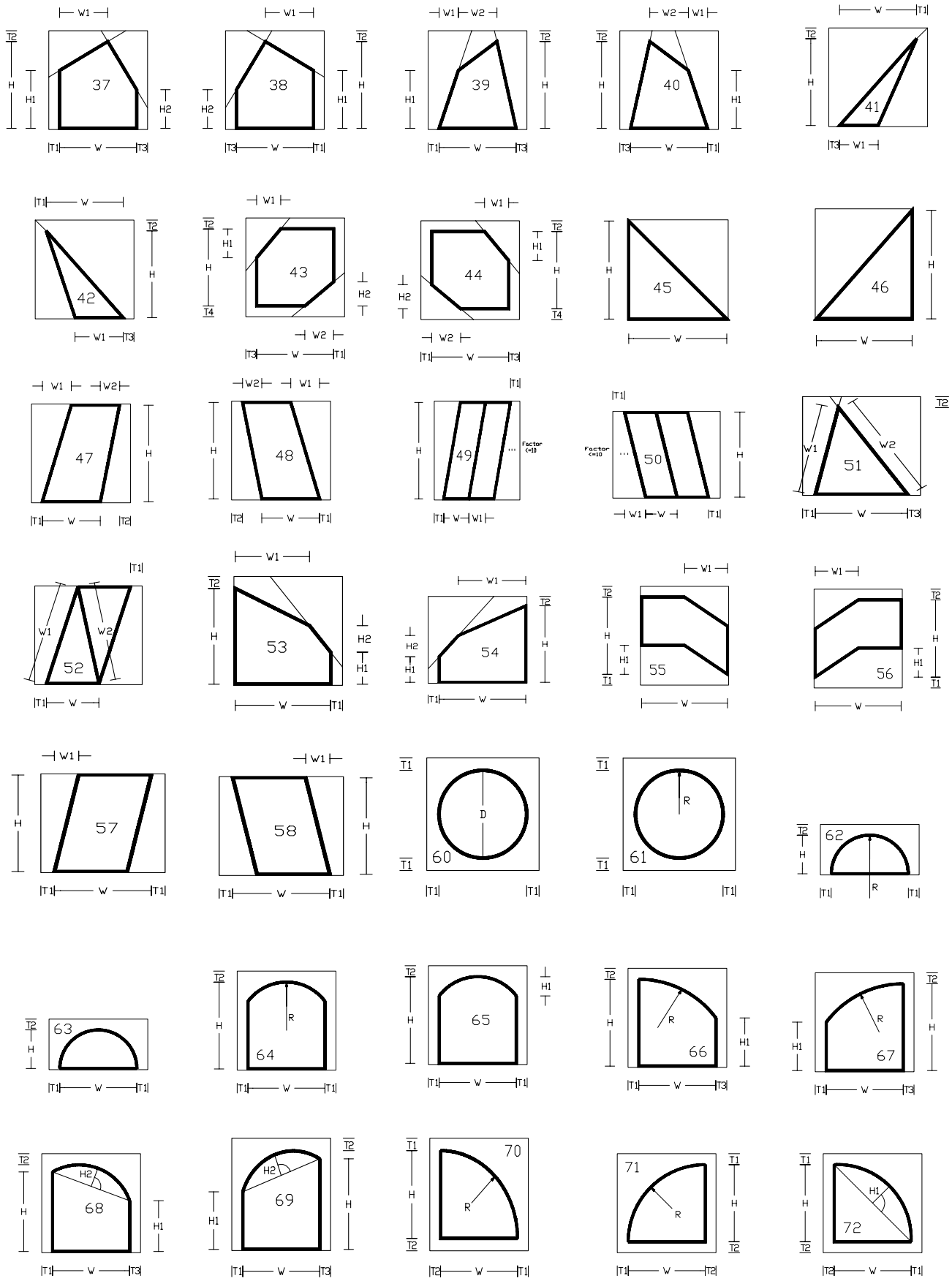
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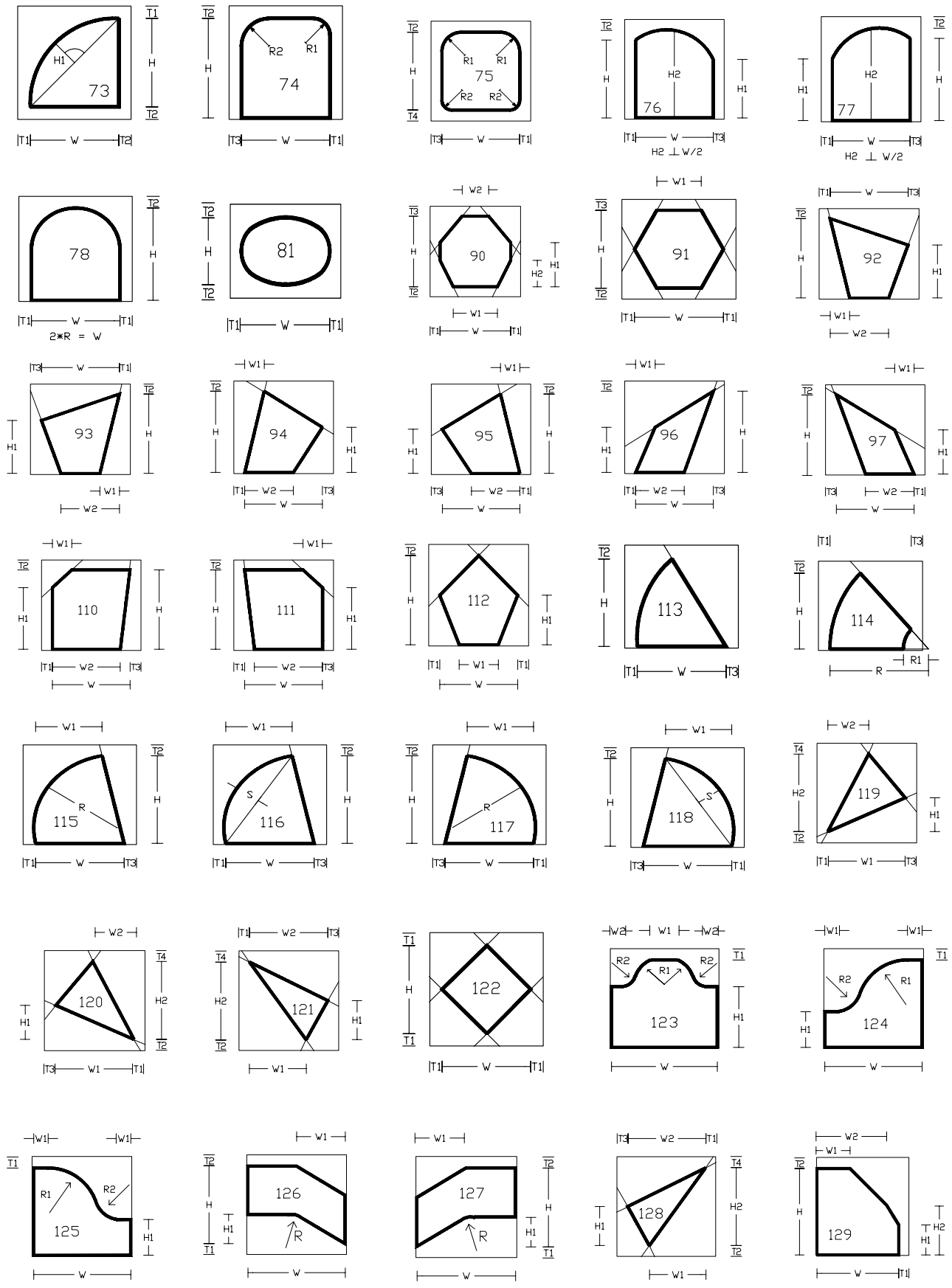
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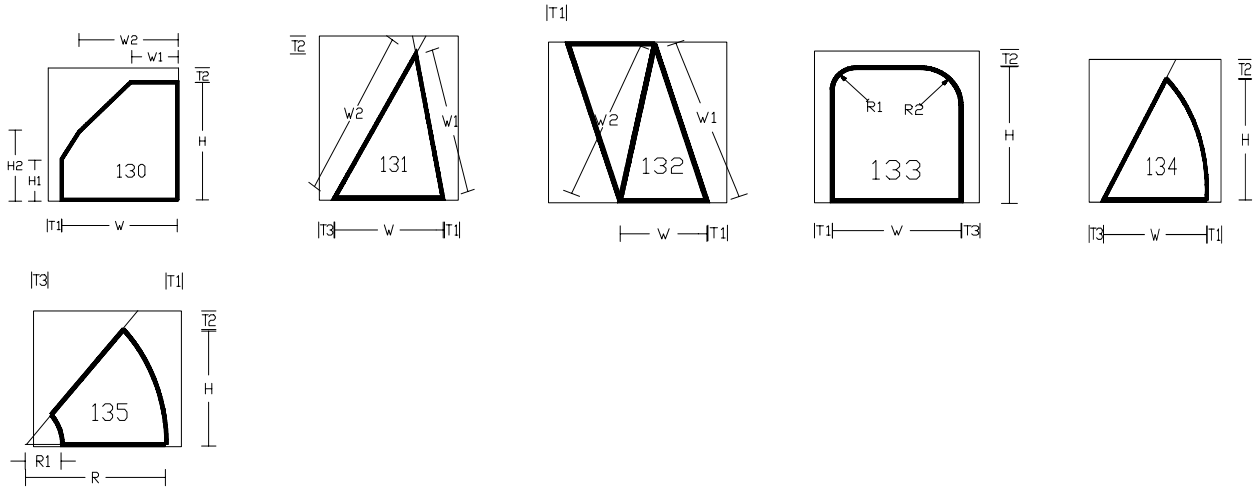
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10 Notice