TRANSLATION OF THE ORIGINAL INSTRUCTION MANUAL

Equipment No 113684
Consisting of: KKS 401 NA 1000 113684

76218-7900-002458

KALTENBACH

Contents

Safety instructions

General remarks

The safety devices of the KALTENBACH saws have a high standard and are constantly updated. All saws and peripheral components are designed for safe operation. However, machine operation can be dangerous. Therefore it is essential for the operator to run the machine attentively to avoid any unnecessary risks.

Each person who will be installing, operating, servicing or repairing the sawing system at customer's facility must read and understand the instruction manual.

Operating the system

Only instructed and authorized personnel should operate the sawing system.

Operation competence must be defined clearly and followed strictly. Working with the system is prohibited for any unauthorized personnel not belonging to the department.

Machine repairs or any changes of the machine or installations without specific instructions are prohibited.

The superior must be notified in case of any irregularities which might occur during machine operation.

1 Machine specifications

1.1 General description

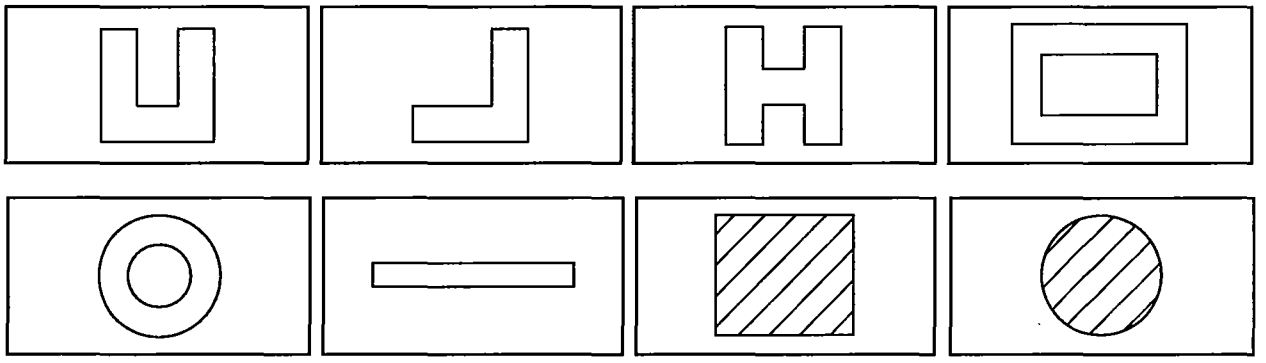
1.1.1 Main features

- KALTENBACH-principle of a vertical saw with upward cutting strokes and rotary sawing table for mitre cuts.
- Compact design with a mounted, torsion-rigid and vertical vise for clamping of the workpiece on both sides of the saw blade. Aluminium thrust piece for mitre cuts on each side.
- The complete cutting range is covered by saw blade positioning (patent applied).
- Torsion-rigid and fixed workpiece stop resting in two circular guides, enabling mitre cuts to the left and to the right. The stop does not have to be adjusted to the front, and stop plates do not have to be adjusted according to cutting angles. Therefore, setting periods for machine and peripheral components are not necessary anymore.
- Pivot of the workpiece stop and saw blade axis for mitre cuts free of length adjustment corrections.
- Long-stroke clamping cylinders with infinitely variable pressure-path-limitation OMNIPREST (patent applied). Especially designed for deformation-free sawing of thin-walled tubes and profiles.
- Hydraulic saw blade feed adjustable according to plan.
- High-speed saw blade return = shorter working cycles.
- Sawing unit consisting of gear, drive system and saw blade mounted beneath the rotary table and resting in a wear-resistant swivel axis.
- Saw gear with helical-toothed, hardened and ground gear wheels running in oil.
- The sawing unit can be positioned horizontally and infinitely variable by push button (hydraulically by mid-position valve, stroke up to 70 mm). Positioning is done according to material width and material position (patent applied).
- Rotary table made of high-strength, wear-resistant spheroidal graphite iron with ball bearing and circular sealing. Rotating range: 60° ccw - 60° cw. Angle measurement by gear ring and rotary encoder.
- Adjustment of the cutting angle according to digital information display integrated in control panel. Rotary table lock with control button and band brake. Index stops for the angles 45° ccw, 0° and 45° cw.
- Front panel of saw table made of cast aluminium, easy removal for servicing.

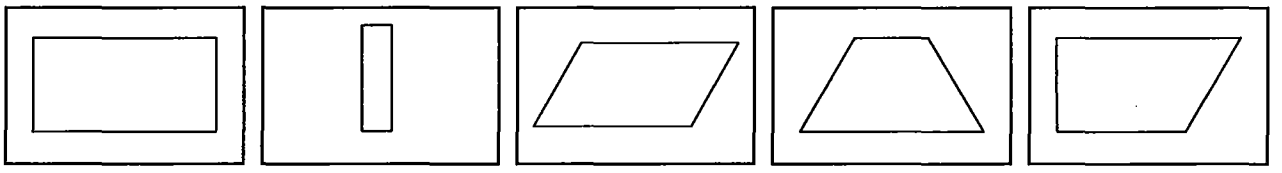
- Pivot of the rotary table lies in the same plane as the fixed workpiece stop and the cut-off side of the saw blade. Therefore, the measuring length does not have to be corrected for mitre cuts.
- Electronical cutting stroke guard with toothed segment and rotary encoder, adjustable via rotary encoder and LEDs.
- Both depth of cut (according to material dimensions) and saw blade position beneath the table are adjustable (necessary for varying saw blade diameters and reground saw blades).
- Motor load display with LED array and green, yellow and red ranges. Helps to prevent overload operation and recognize blunt saw blades.
- Large, electrically secured door located in the front part of the machine housing enables easy exchange of saw blades and chip remover.
- Chip drawer which can be rolled out to the front. Outlet channels for coolant and chips located in the sides of the sawing table. Chip removal outlets located in the rotary table.
- Machine safety cover with plexiglass window for full sight of working area. The cover can be moved up and down by pneumatic pressure springs, its movement is controlled by limit switches.
- Various safety installations and functions according to latest safety regulations.
- Electrical equipment according to VDE 0113 with attached compact electrical cabinet.
- PLC (Programmable Logical Control) made by Siemens. Control panel with ergonomically arranged operating push buttons as well as feed regulator and cutting stroke guard. The panel can be swung out for servicing.
- Main switch can be locked.
- Hydraulic unit (capacity 25 l/min.) in the rear side of the machine housing, covered with an insertable safety plate. Hydraulic unit can be removed completely for servicing.
- Cooler with pump.
- 400 mm segmental saw blade (425 mm maximum). Pin and roller chip remover. First filling up: hydraulic and gear lubricant and coolant. Basic tooling equipment supplied.

1.1.2 Application and operation features

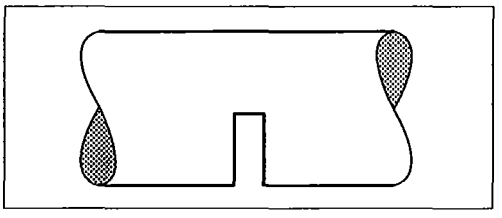
- Sawing of solid materials like steel, cast and nonferrous metals
- Sawing of profiles, tubes and flat material



- Vertical and mitre cuts up to ± 60°



- Sawing of slots



- Automatic sawing of small and large series by using the automatic material feed unit (optional).
- Sawing and measuring of long cut-offs by using the length stop (optional).
- Automatic sorting of cut-offs in containers by using the cut-off gripper (only model KKS 401, NA AB).

1.2 Technical data

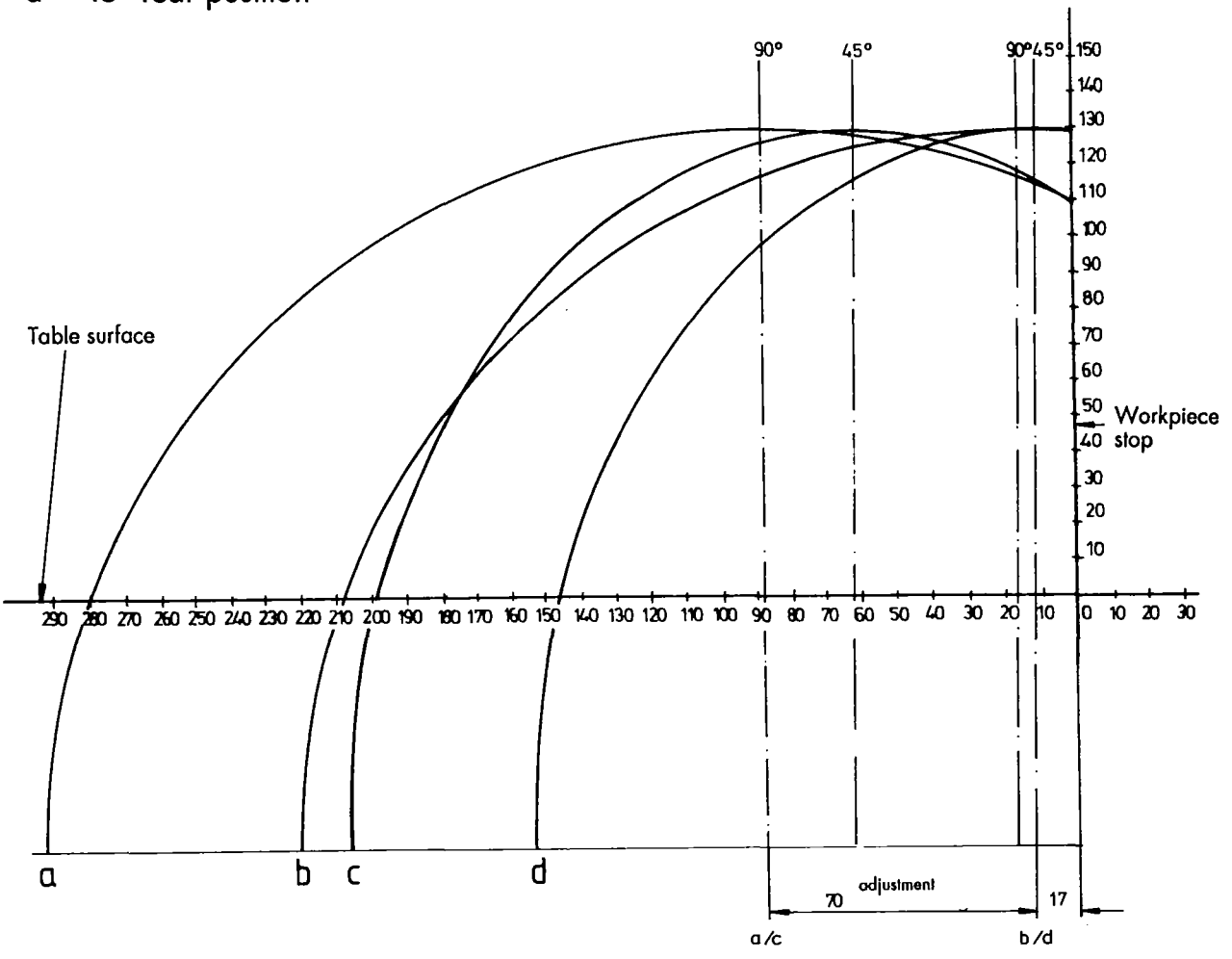
1.2.1 Sawing unit KKS 401

Weight	approx. 1350 kg
Dimensions length/width/height	1170/1070/1960 mm
Saw blade diameter 375 mm min. 425 mm max.	400 mm standard
Blade kerf	5 mm max.
Saw blade types HSS segmental saw blade	HSS solid steel saw blade
Saw blade mounting	according to DIN 8576
– Mounting borehole	50 mm
– Number of carrier bolts	4 pcs.
– Pitch circle of carrier bolts	80 mm
– Diameter of carrier bolts	13 mm
Feed speed rate of saw blade	0–1200 mm/min
Aperture stroke of vertical vise	
– with aluminium thrust piece (mitre cuts)	160 mm max.
– with steel thrust piece (straight cuts)	160 mm max.
Rotary table adjustment	
– NC-controlled	infinitely variable ± 60°
– with hydraulic motor against end stop	–45°/0°/ +45°
– manually	infinitely variable ± 60°
Cutting speed with blade of 400 mm diameter	
– two-stepped with chain	10/20 m/min
	13/26 m/min
	15/30 m/min
– two-stepped with pulley	20/40 m/min
	30/60 m/min
– regulated frequency	infinitely variable from 6 to 30 m/min
Electrical power requirement	
– regulated frequency	5,5 kW
– two-stepped with chain	1,7/2,6 kW
– two-stepped with pulley	3,7/4,5 kW

KALTENBACH

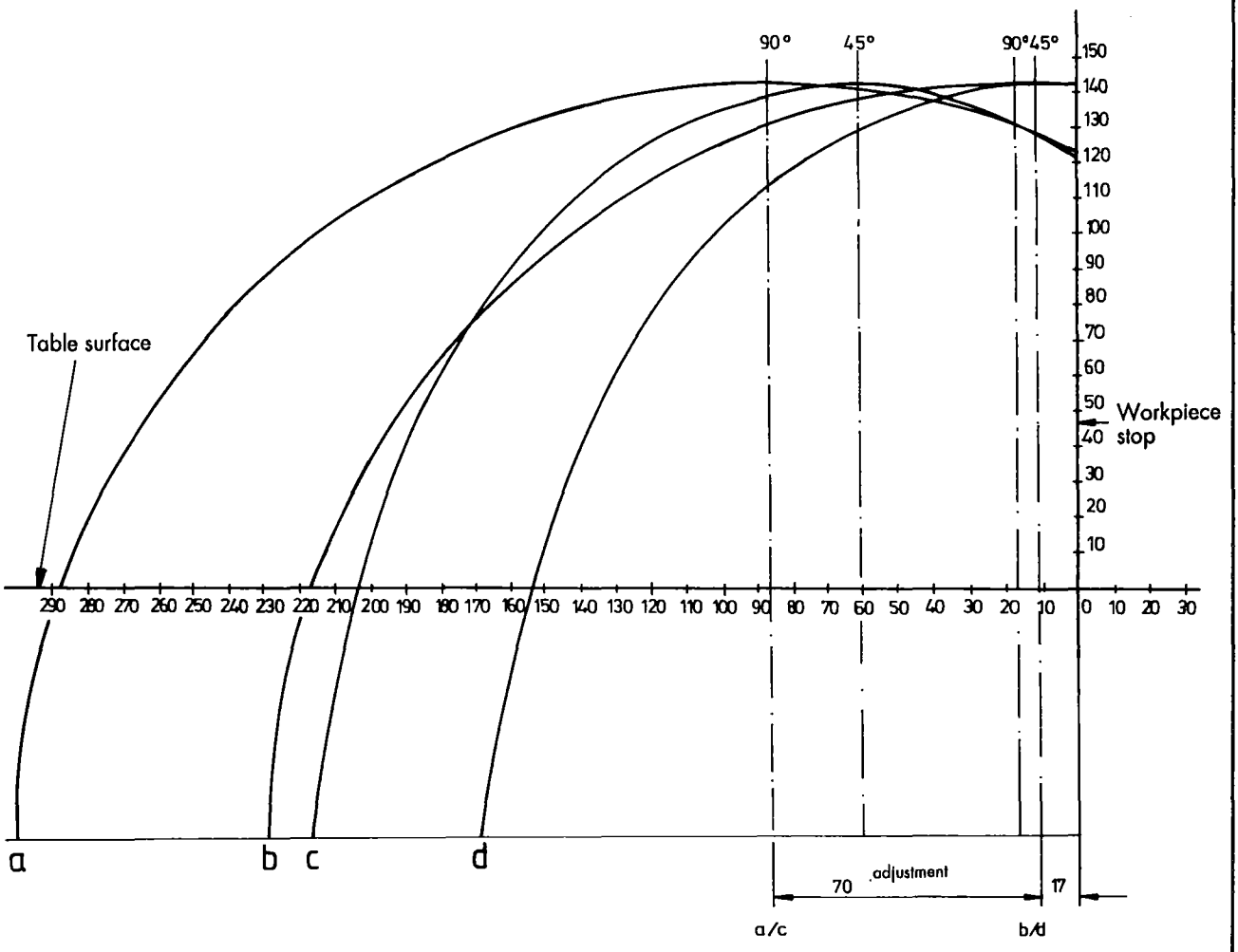
● Cutting range of saw blades with 400 mm diameter

a = 90° front position
b = 90° rear position
c = 45° front position
d = 45° rear position



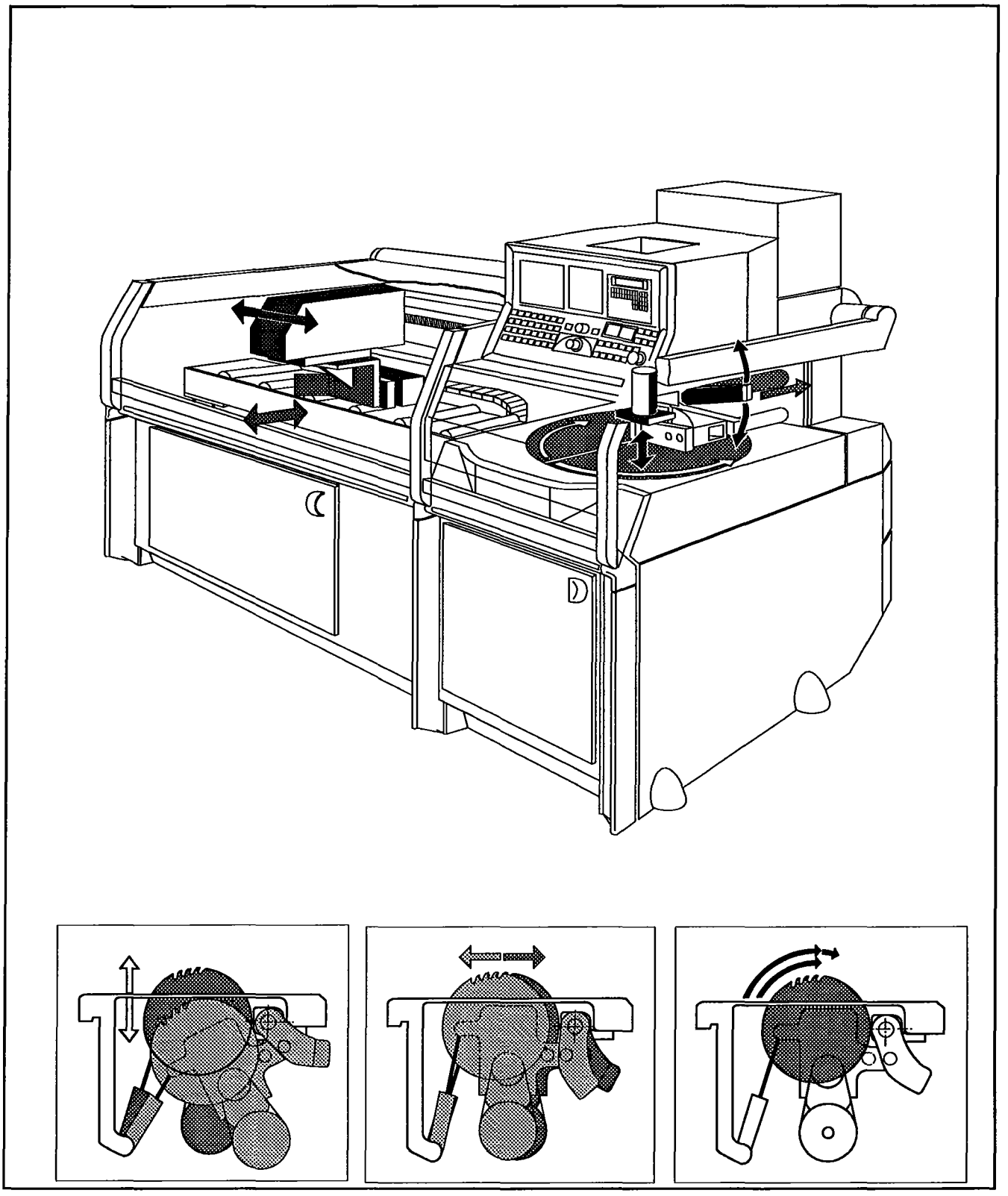
● Cutting range of saw blades with 425 mm diameter

a = 90° front position
b = 90° rear position
c = 45° front position
d = 45° rear position



KALTENBACH

1.3 General view



1.4 Safety devices

All KKS 401 saws are equipped with the following safety devices:

Safety devices	Functions
EMERGENCY-OFF switch	All sawing and peripheral functions are stopped immediately.
Safety cover and safety door	Automatic program execution is only possible when cover and safety door are closed.
Key-operated switch for set-up	Operation during set-up is only possible by key.
Electrical overload protection	Motors are switched off in case of overload.

Safety devices of the KALTENBACH saws have a high standard and are constantly updated. All saws and peripheral components are designed for safe operation. However, machine operation can be dangerous. Therefore it is essential for the operator to run the machine attentively to avoid any unnecessary risks.

Each person who will be installing, operating, servicing or repairing the sawing system at customer's facility must read and understand the instruction manual.

Operating the system

Only instructed and authorized personnel should operate the sawing system.

Operation competence must be defined clearly and followed strictly. Working with the system is prohibited for any unauthorized personnel not belonging to the department.

The system must only be used for its original designation, i. e. cutting of bars.

Machine repairs or any changes of the machine or installations without particular instructions are prohibited.

The superior must be notified in case of any irregularities which might occur during machine operation.

2 SITE OF INSTALLATION

2.1 Installation plan

- Keep any necessary access clear to the machine when installing the machine, especially :
  - to the chip conveyor (optional) for chip removal,
  - to the main cabinet,
  - to the safety door located in front and to the covers for opening and closing.

- Select and secure the site of installation to meet the following demands :
  - The working range is marked to avoid any hazards to the operator by other machines, cranes, stacking trucks etc.
  - The working area is illuminated sufficiently.
  - Any parts being transported out of the machine are collected in containers. Access to this part of the machine is secured accordingly (for machines equipped with automatic material feed unit).

- Load capacity of the system foundation must be sufficient (indicated in the installation plan).

see installation plan of quotation

2.2 Foundation

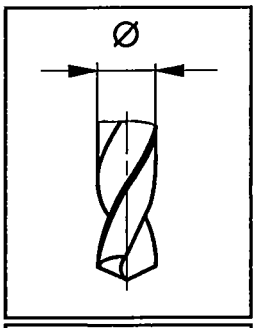
Anchorage

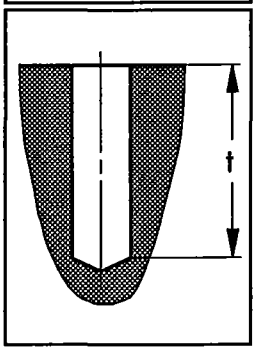
The saw and all peripheral components are fastened to the foundation by dowels or anchor bolts. We recommend the use of anchor bolts, since the holes can be drilled without lifting the machine once again.

Mounting of anchor bolts

- Drill hole :

	Threaded pin	Stone drill (Ø)	Depth of hole (t)
- Machine	M 12	14 mm	110 mm
- Roller conveyor/ Magazin	M 16	18 mm	125 mm





- Blow out drilled hole.
- Check cartridge of anchor bolt. The cattridge must be undamaged and the viscosity of the contents must be like honey.
- Insert anchor bolt into hole.
- Clamp threaded pin into impact drilling machine with the adap tor.
- Place the threaded pin into the drilled hole and drive pin in quickly, with light pressure and rotating and impact movement (250 - 500 rpm) until marking is reached.

NOTE: The cartridge might be emptied if drilling is done too long, thus causing faulty mounting.

Anchor bolts which are placed without using an impact drilling machine, for example driving in of threaded pins by a hammer, will not form a solid compound and assure sturdy support.

Anchor bolts are not supplied with the sawing system and must, therefore, be supplied by the builder.

- Immediately switch off impact drilling machine, still pressing lightly.

Drill hole temperature		Waiting period	
K	°C	Minutes	Hours
over 293	overr 20	10	–
283 - 293	10 - 20	20	–
273 - 283	0 - 10	–	1
268 - 273	-5 - 0	–	5

KALTENBACH

2.3 Environment

Temperature

Operation	+ 5 ... +40°C (temperature of air supply)
Storage/Transport	-40 ... +70°C

Variation of temperature

Operation	max. 10°C/h
Storage/Transport	max. 20°C/h

Relative humidity (according to DIN 40040) 15 ... 95 % (indoor, no condensation)

Pollutants

SO_2	≤ 0,5 ppm (relative humidity ≤ 60 %, no condensation)
H_2S	≤ 0,1 ppm (relative humidity ≤ 60 % no condensation)

The hydraulic units might not function correctly at temperatures below 0 °. The lubricant can be warmed by several idle strokes.

The builder must take special precautions in case of extreme climatic conditions, for example very high or low outside temperatures, maritime climate, dusty or sandy ambient air.

Floor vibrations

We recommend to place the sawing system on shock absorbers if machines causing strong vibrations are located in the near surroundings.

Magnetic fields

Strong magnetic fields can disturbe the function of electronical components. Therefore make sure that there are no strong magnetic fields in the direct surroundings when installing the sawng system (for example crane with an electrical lifting magnet).

Disposal of polluting materials

Use binder to absorb any oil which might have run out. Disposal according to community regulations. Any coolant, either diluted or undiluted, which ran out because of leaks or resulting from coolant exchange must be disposed of properly.

2.4 Safety

Besides general safety regulations, observe the following when selecting site of installation and mounting the saw and transporting equipment:

- Take care that the site of installation is sufficiently illuminated.
- Provide for a ramming protection device for any stacking trucks, cranes or other vehicles.
- Provide for suitable barriers to prevent unauthorized access to danger area.
- Secure working range where parts might be pushed out or dumped from the machine.

KALTENBACH

3. INSTALLATION

3.1 Storage and transportation

3.1.1 Sawing unit KKS 401

Packing

Standard packing:
- Machine or machine components packed on wooden pallets.
- Bright parts treated with rust preventive.
- Machine or machine components welded in plastic foil.
- Dessicant added.

Weight: 1350 kg

Dimensions length/width/height: 1500/1350/2200 mm

Seaworthy packing:
- Machine or machine components packed on wooden pallets.
- Bright parts treated with rust preventive.
- Machine or machine components welded in plastic foil.
- Dessicant added.
- Complete system packed in a wooden crate.

Weight: 1650 kg

Dimensions length/width/height: 1500/1350/2220 mm

Storage
- bright parts protected against rust
- dry storage
- upright position

NOTE: The wooden crate of seaworthy packing cannot be stacked.

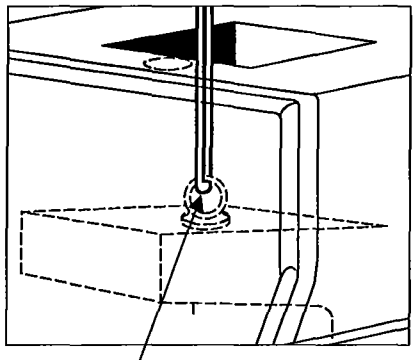
Transportation

By truck or low lift platform truck:
- Always in upright position.

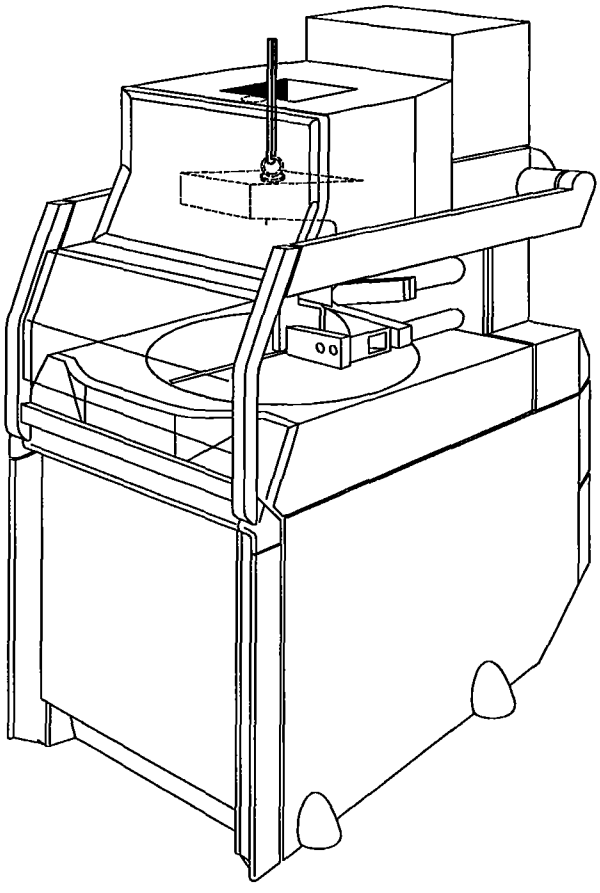
Transportation by crane:
- Mount threaded hook.
- Only use faultless suspension (hemp or polyamide ropes).

Never fasten suspension to machine cover !!

3.1.1 Points of suspension of the sawing unit KKS 401



Aperture 40 mm diameter



Only lift saw at the eyebolt,
never at the control panel or cover.

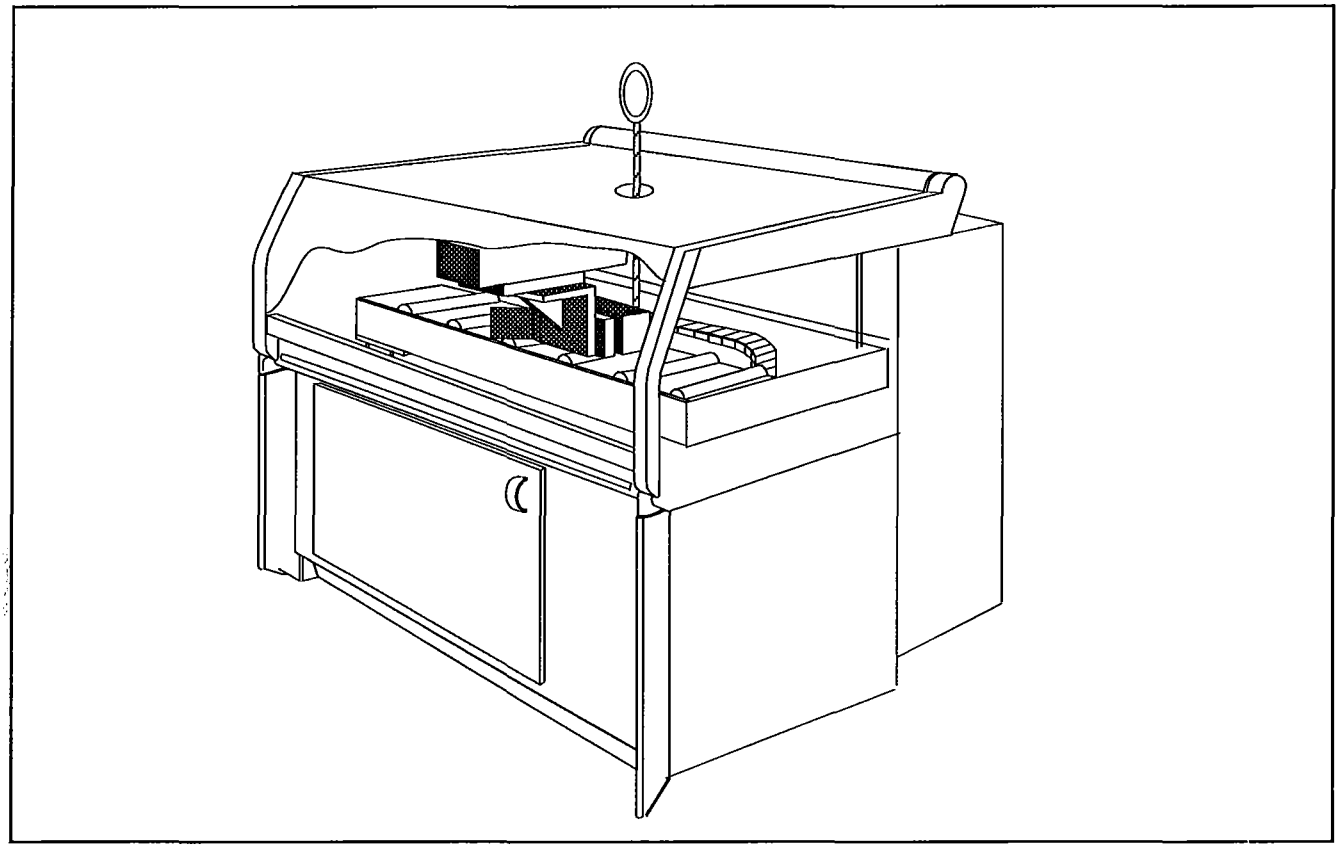
NOTE: Check automatic material feed unit NA 1000 for visible damages. Inform transporting agency immediately in case of damages.

Transportation

By truck or low lift platform truck :
- Always in upright position.

Transportation by crane:
- Mount threaded tie rod.
- Use faultless suspension (hemp or polyamide ropes).

Never fasten suspension to machine cover !!



Lead tie rod between material feed gripper and guide rails and fasten to the transportation plate by nut and lock nut.

3.2 Preparations for installation

3.2.1 Preparations for saw installation

- Transport saw to site of installation.
- Unpack saw.
- Check if delivery is complete (no parts missing).
- Check sawing unit for visible damages.
- Completely remove rust preventive from bright parts with a cloth. If necessary, use some artificial resin thinner.

Never use nitro thinner !!

If solvents are used, avoid contact with sealings, belts, insulations or lacquered surfaces.

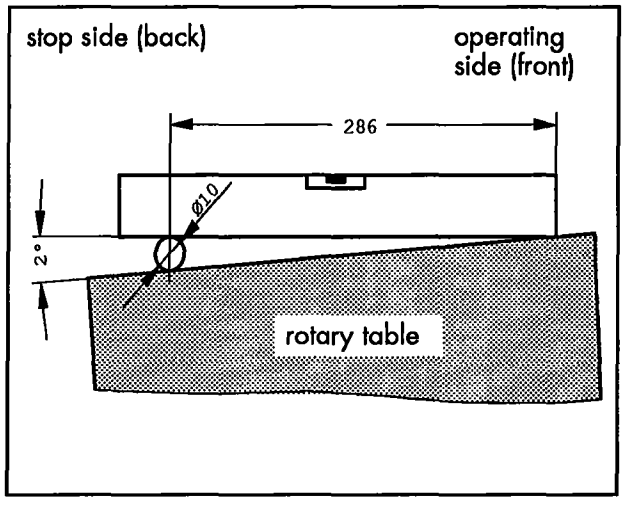
- Oil cleaned, bright surfaces with lubricant ☞ chapter maintenance instructions

3.3.1 Assembly and disassembly of the sawing unit KKS 401

● Assembly

Necessary:
- machine spirit level
- hammer drill
- stone drill Ø = 14 mm
- anchor bolts D12 or dowels

- Place saw on foundation according to plan.
- Align saw roughly.
- Lift saw and place ground plates underneath the saw. Lower saw.
- For machines with automatic material feed unit and magazine: tilt the saw 2° to the back by using the lifting screws (measure tilt with machine spirit level at rotary table).
- Set anchor bolts ☞ chapter 2.2.
- Relevel saw, if necessary.
- Attach automatic material feed unit and cut-off gripper (if available) ☞ chapter 3.3.2.



● Disassembly

- Disconnect saw from power supply.
- Disassemble automatic material feed unit and/or cut-off gripper (if available).
- Remove side covers at the fastening screws.
- Unscrew hexagonal nuts, remove washers.
- Lift saw and put it to the side.
- Remove ground plates.

NOTE: The threaded pins of the anchor bolts cannot be removed without damaging the foundation. Flush excess pins to foundation surface by using a right-angle grinder.

A tilt of 2° ensures correct positioning of the material against the workpiece stop or magazine stops as well as draining of the coolant to the back. The machine cannot be installed in a tilted position if the roller conveyors are not equipped with lateral stops.

3.3.1 Assembly and disassembly of the automatic material feed unit NA 1000/2000

● Assembly

NOTE: Mount cut-off gripper first, if both cut-off gripper and automatic material feed unit will be mounted to saw.

Necessary :
- machine spirit level
- hammer drill
- stone drill Ø = 14 mm
- anchor bolts or dowels
- dial gauge with magnetic holder
- ruler for NA 1000 : length 1500 mm
- ruler for NA 2000 : length 2500 mm

– Lock workpiece stop of saw in 0-position precisely.

– Place automatic material feed gripper next to saw, put ground plates beneath the saw.

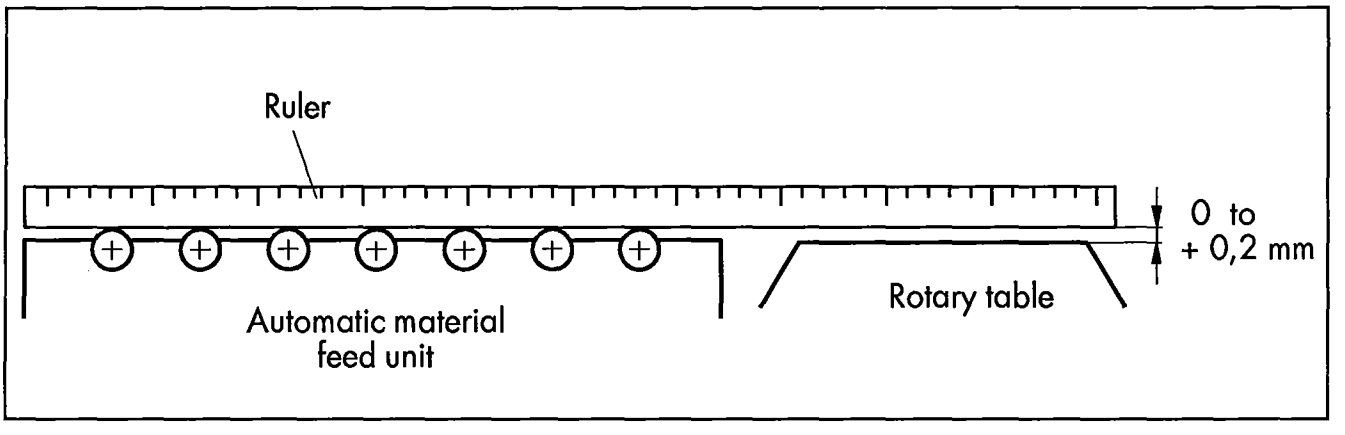
– Disassemble tool cabinet.

– Screw automatic material feed unit to the saw, do not tighten screws.

– Align automatic material feed unit with a backward tilt of 2° to the saw

☞ chapter 3.3.1, saw.

– Adjust height of automatic material feed unit.

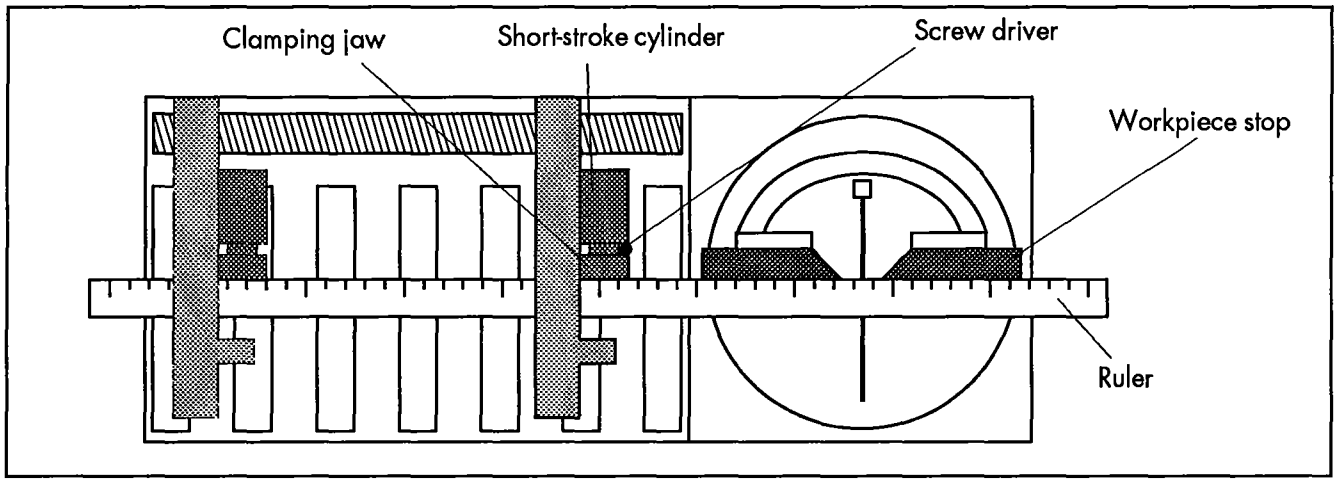


– Unscrew cover of spindle drive.

– Remove toothed belt.

– Turn ball bearing spindle manually until slide moves towards saw.

- Lift the clamping jaw at the short-stroke cylinder with a V-shaped tool until the front end position is reached, then fix.
- Place ruler against workpiece stop.
- Adjust automatic material feed unit so that the clamping jaw touches the ruler.



- Move slide to end position of material feed manually.
- Adjust automatic material feed unit until clamping jaw touches ruler.
- Tighten screws connecting the automatic material feed unit to the saw.

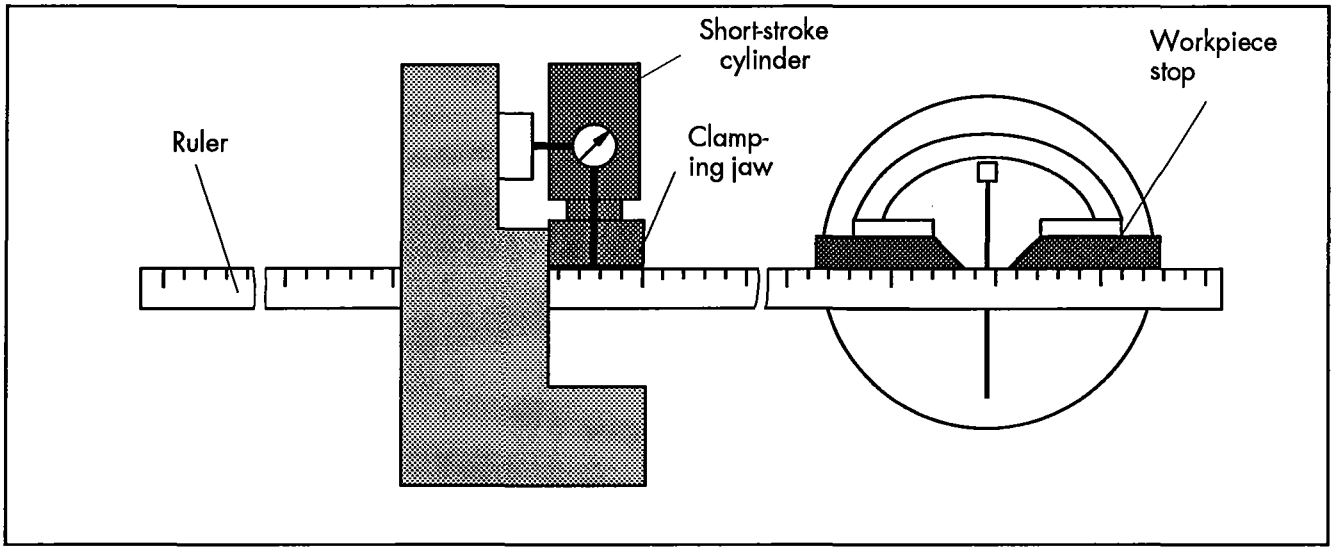
NOTE: The automatic material feed unit is fastened to the foundation by dowels or anchor bolts. We recommend the use of anchor bolts.
Description: ☞ chapter 2.2

- Drill holes through the fixing plates into the foundation.
- Drill-hole diameter 14 mm, drill-hole depth 125 mm.
- Control alignment after fixing. If necessary, correct position.
- Mount tool cabinet and front plate.

NOTE: Adjustment of the automatic material feed unit NA 1000/2000 by ruler is not sufficient. In addition, fine adjustment will be necessary.

Fine adjustment

- Drive slide manually to end position of saw.
- Place ruler against clamping jaw and workpiece stop.
- Remove screw driver from short-stroke cylinder.
- Mount dial gauge with magnetic holder on to slide.
- Place probe tip on to ruler.



- Drive slide with mounted dial gauge to end position.
- Measure alignment deviation; tolerance allowed : 0,2 mm.
- In case of deviations: unscrew the 8 fastening screws of the spindle holder and adjust finely by moving the spindle holder.
- Tighten fastening screws and repeat checking procedure.
- Mount toothed belt and fasten cover.
- Set up electrical and hydraulic connections to automatic material feed unit.

● Disassembly

- Proceed as for saw disassembly
  ☞ chapter 3.3.1

3.4 Initial operation

– Read instruction manual, especially chapter 4 (operation).

NOTE: For safety reasons, function testing during initial operation is done:
– without saw blade,
– without material,
– with closed coolant tap.

– Fill up with coolant ☞ chapter 7.2.
– Check oil level in saw gear, ☞ chapter 5.2.
– Check oil level of hydraulic unit, ☞ chapter 5.2.
– Check all push buttons for correct functioning (observe interlockings).
– Several idle strokes over the complete stroke length will vent all hydraulic cylinders.

● Sawing systems with MULTICOM

– Enter machine parameters at MULTICOM ☞ chapter 3.4.1.

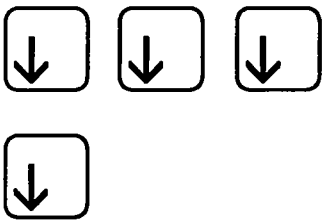
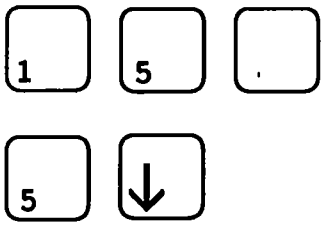
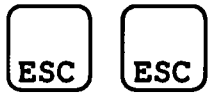
3.4.1 Input of machine parameters

● General description

Certain dimensions for the numerical control are preselected by machine parameters. They can differ according to machine configuration.

Programming of the control is described in chapter 4.4.

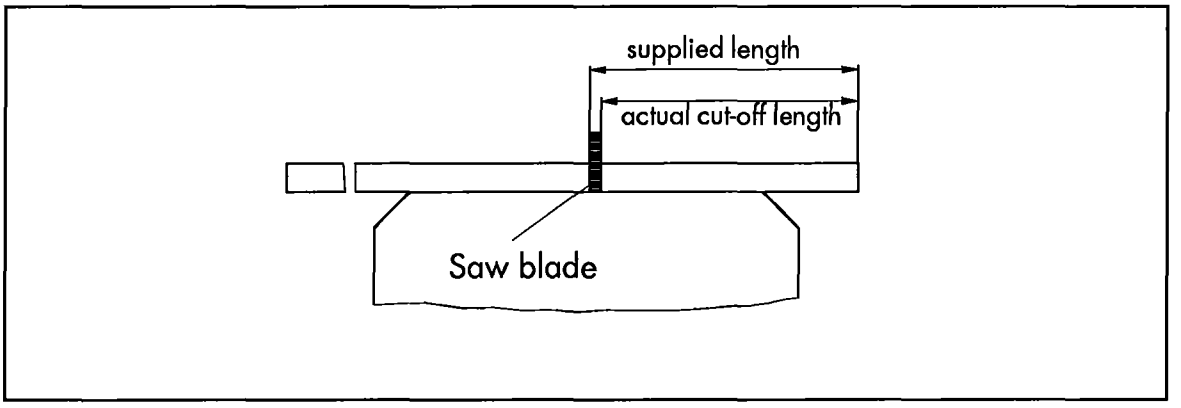
Control buttons	Display	Remarks
Turn on main switch.	manual/reference enter program delete program special function	
↑	manual/reference enter program delete program special function	
↵ ↓	test run machine data diagnos. EAI PMI control parameter	

Control buttons	Display	Remarks
	blade kerf : 4.0 ME travel limit. : 116.0 ME safety zone : 290.0 ME remnant stroke: 15.0 ME str.trim cut : 20.0 ME pos.angle(M19): 60.0 ME neg.angle(M18): -60.0 ME	
Example for modification: change trim cut length from 20,0 to 15,5 mm:		
	blade kerf : 4.0 ME travel limit. : 116.0 ME safety zone : 290.0 ME remnant stroke: 15.0 ME str.trim cut: 20.0 ME pos.angle(M19): 60.0 ME neg.angle(M18): -60.0 ME	
	blade kerf : 4.0 ME travel limit. : 116.0 ME safety zone : 290.0 ME remnant stroke: 15.0 ME str.trim cut : 15.5 ME pos.angle(M19): 60.0 ME neg.angle(M18): -60.0 ME	The entered parameter is accepted when leaving the input section. Other parameters are changed in the same way.
	manual/reference enter program delete program special function	

3.4.1 Definition of machine parameters

● Saw blade

While cutting is performed, material in saw blade width is lost in form of chips. Therefore, the control must supply more material in order to achieve the defined actual cut-off length.



Standard values

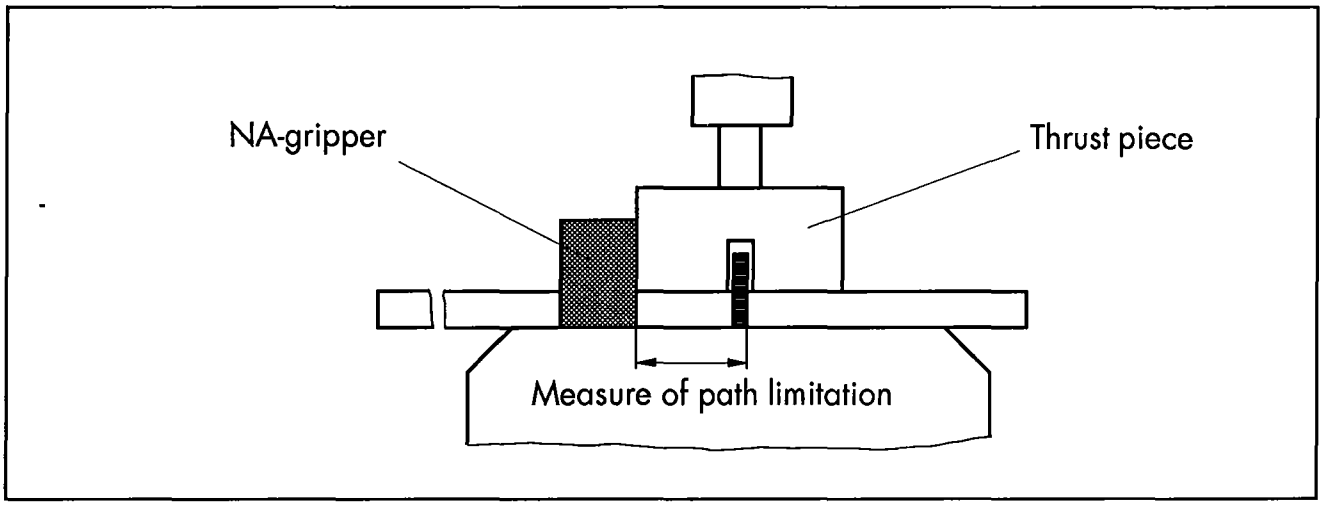
HSS segmental saw blade	d = 370 mm	Blade kerf:	3,5 mm
HSS segmental saw blade	d = 400/425 mm	Blade kerf:	4,0 mm
HSS solid steel saw blade	d = 400 mm	Blade kerf:	3,5 mm

If the mitre angle is known to the machine control (NC-controlled rotary table DRNC or automatic rotary table DRA) the tilt of the saw blade is automatically considered for calculation.

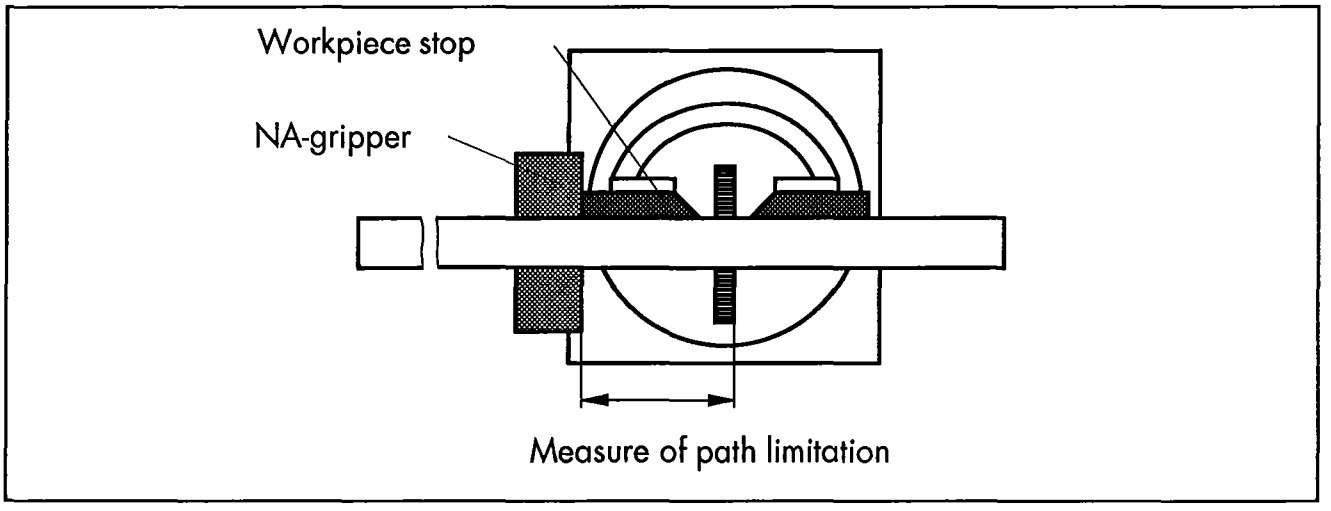
For rotary tables without automatic operation, the tilt of the saw blade must be considered when entering the cut-off length or the machine parameter "Saw blade".

● Path limitation

The path limitation is an edge located at the saw which stops the path of the automatic material feed unit in the direction of the saw blade. This might be an edge of the vertical thrust piece or the workpiece stop.



Thrust piece = machine path limitation



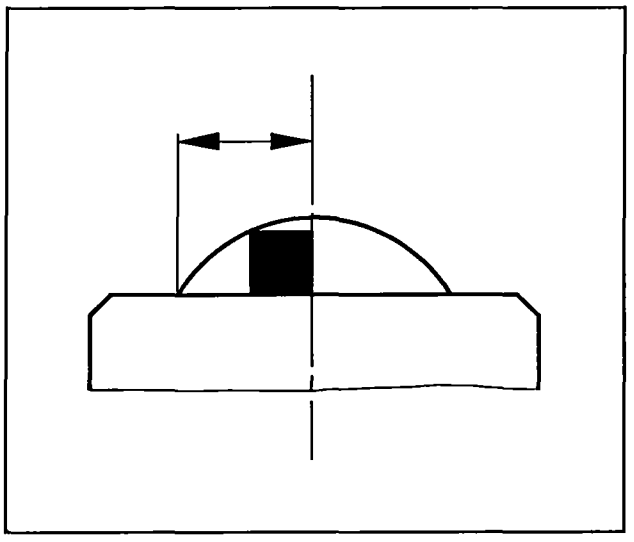
Workpiece stop = machine path limitation

Workpiece stop on one side and aluminium thrust piece:	= 125 mm
Workpiece stop on one side and steel thrust piece (0° only) :	= 56 mm
Workpiece stop on both sides:	= 190 mm

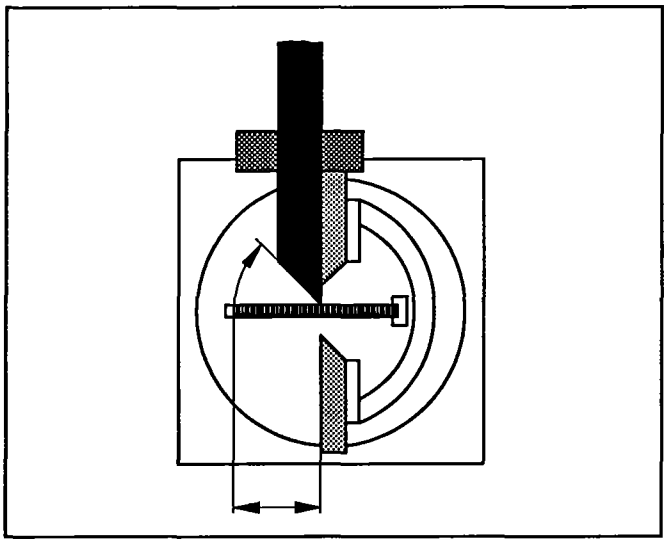
● Safety zone

The safety zone is defined as the distance between the workpiece stop and the front position of the saw blade protruding out of the rotary table surface.

The safety zone is needed to avoid collisions between the automatic material feed gripper and saw blade in case of negative mitre angles.



Side view

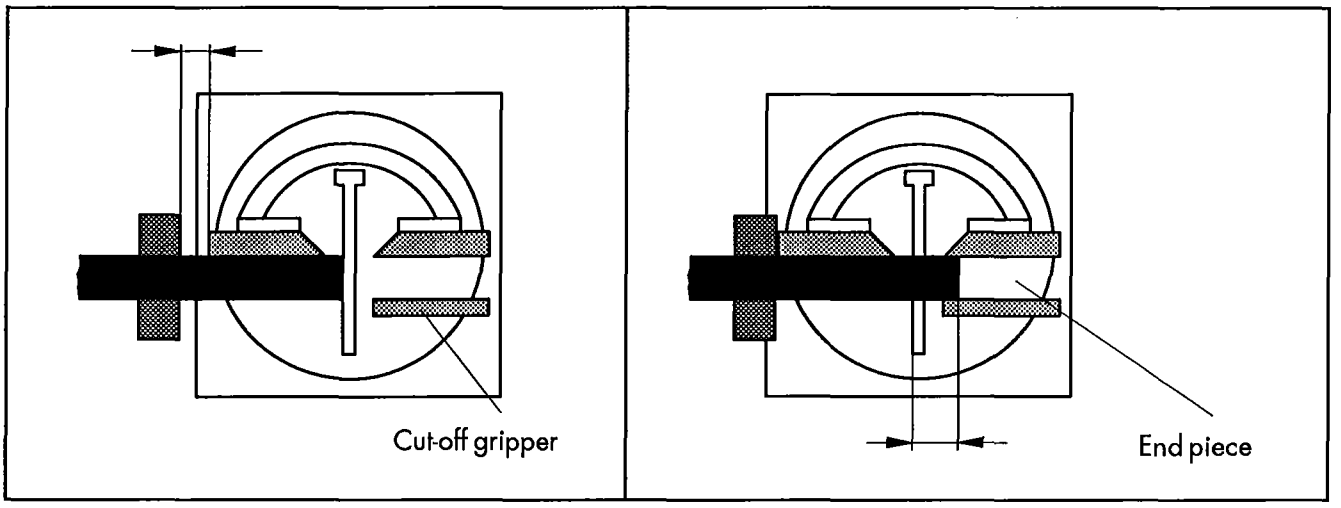


View on top

Saw blade diameter 425 mm,
gear in front position: Max. safety zone = 290 mm

● Push over path

Push over path = the path needed to push the end piece after cutting of the last actual cut-off towards the cut-off gripper until it can be gripped firmly.

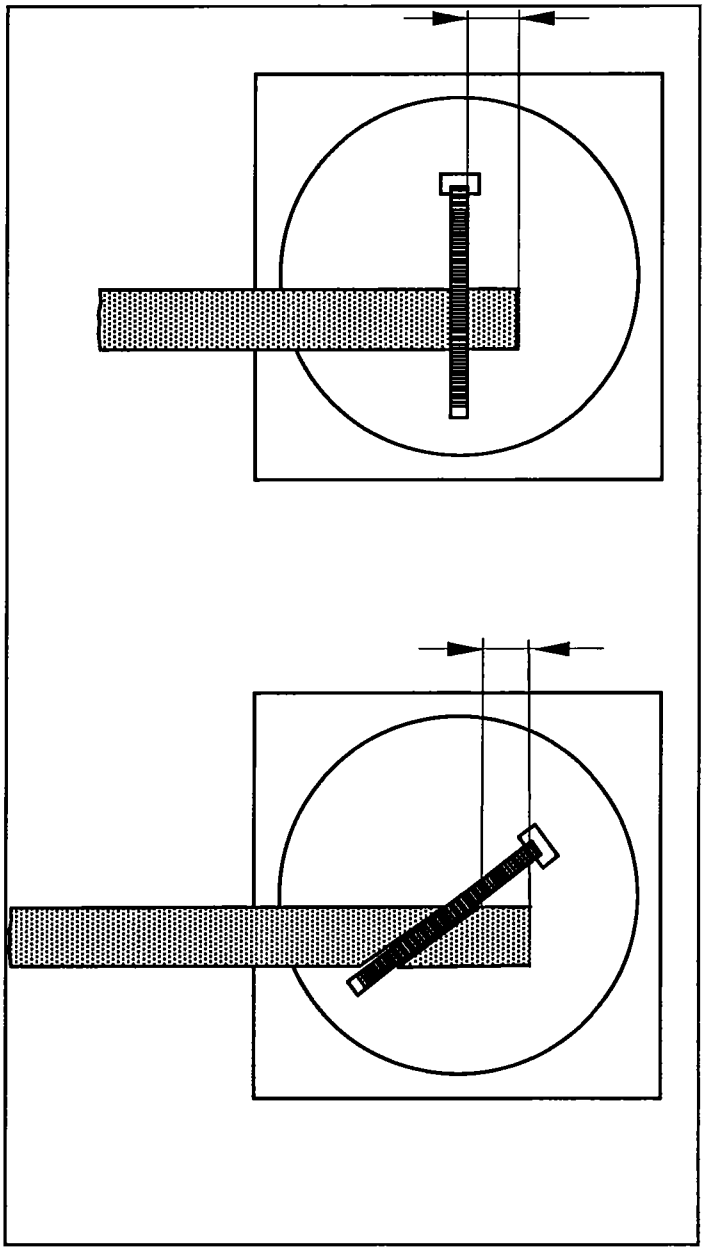


Standard values for saws with cut-off gripper: 20 mm
Standard values for saws without cut-off gripper: 0 mm

● Straight trim cut

The front surface of each material bar might have deformations caused by premachining or other influences. A trim cut is made to obtain a clean cut surface for the first actual cut-off.

The length of the straight trim cut is the same for each program.



NOTE:
The trim cut length is automatically extended for positive mitre angles, depending on the max. material width and size of mitre angles (only for the NC-rotary table DRNC).

● Positive/negative angle:

A rectangular cut is defined as 0°.

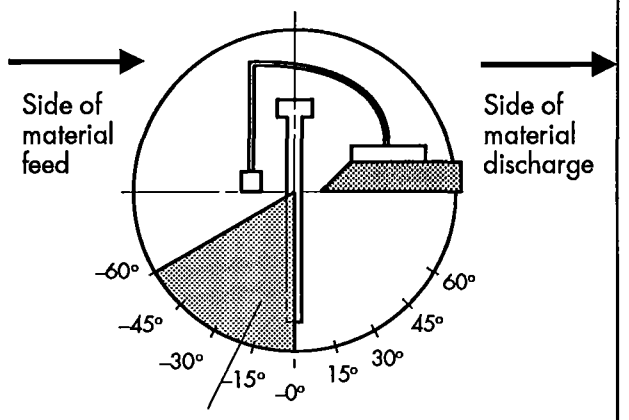
If the saw blade is turned towards the side of material feed, the mitre angles receive a negative sign.

The values to be set depend on the type of workpiece stop and thrust piece.

The figure shows the machine parameters:

- max. positive angle: 0°
- max. negative angle: – 60°

Angles beyond this range cannot be positioned.



Permissible rotation area for workpiece stop on one side.

For machines with an automatic rotary table DRA, adjust the machine parameters according to the preselected index stops (- 45°, 0°, 45°). The angle value of the DRA is entered in AdF 18/19 shown in the program. The calculation of the cutting widths for mitre angles are dependent on the parameters entered in "Pos./neg.angle".

A maximum of ± 60° can be entered for machines with NC-controlled rotary table DRNC (consider workpiece stop!).

NOTE:

In the automatic operating mode, position the mitre angles only within +/- 45°. Otherwise, apex angles can cause the material to slip away in feed direction. If necessary, the clamping aid of the automatic material feed unit (AdF = 17) can be used to keep the workpiece clamped in the gripper until cutting is finished.

MULTICOM display in inches

MULTICOM normally displays length dimensions in millimeters (mm). Except for material width, they can also be displayed in inches.
The display is reversed by changing the machine parameters for axis '**1L**' (automatic material feed unit).

Metric display, one decimal:

```
        geometry
axis        : 1L
dir. manual:  1
slots       :250
factor 1    :  1,0000 ME
factor 2    :100,0000 ME
decimals    :  1
```

Display in inches, three decimals:

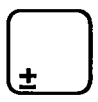
```
        geometry
axis        : 1L
dir. manual:  1
slots       :250
factor 1    : 25,4000 ME
factor 2    :100,0000 ME
decimals    :  3
```

A higher number of decimals reduces the maximum measuring length. Programmed set and machine data are converted automatically and displayed in inches.

```
     enter program
program No.:    7
# bars:0    width:50mm
clear cut-off counter : <DEL>
```

Note:
Always enter material width in millimeters!

KALTENBACH

Control buttons	Display	Remarks
	manual/reference enter program delete program special function	
	test run machine data diagnos. EAI PMI control parameter	The safety code prevents unauthorized parameter changes.
	parameter code pls enter code 12312	 Machine parameters should only be changed by KALTENBACH service personnel. Faulty inputs might cause severe damage to the machine!
 ...	Machine parameter machine configuration drive param. drive ctrl par special pos. geometry data system config. select lang.	
...  		
  		
		
Axis selection: 	geometry axis :1L dir.manual: 1 slots : 250 factor 1 : **25,4000** factor 2 : 40,0000 decimal : **3**	Axis 1L= Automatic material feed unit If desired, only 2 decimals can be entered.

KALTENBACH

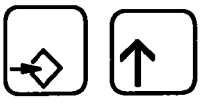
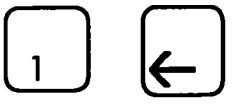
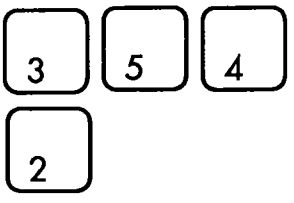
● Input of configuration number

With the range of configuration and the calculated configuration number (☞ DE6534-1501..) the control device MULTICOM is informed about the precise specification of the connected machine.

Control button	Display	Remarks
↑	manual / reference enter programm delete programm special function	
→ ↑	test run machine data diagnose EAI PMI control parameter	
→ 1 2 3 1 2	parameter code pls. enter code 12312	

KALTENBACH

Input of configuration number/MULTICOM

Control button	Display	Remarks
	machine parameter machine configuration drive parameter drive ctrl.par. special pos. geometry data system configuration select lang.	
	machine configuration faktor feed rate : 1.0000 cutting speed : 1.0000 cutting hight : 1.0000 record : 0 mach.conf..: 0 0	Enter range of configuration 1 or 2
	machine configuration faktor feed rate : 1.0000 cutting speed : 1.0000 cutting hight : 1.0000 record : 0 mach.conf.: 0 1	
z.B. 	machine configuration faktor feed rate : 1.0000 cutting speed : 1.0000 cutting hight : 1.0000 record : 0 mach.conf.: 3542 1	Enter configuration number and confirm by pressing push button ENTER

KALTENBACH

Input of configuration number/MULTICOM

Control button	Display	Remarks
ESC ESC ESC	manual/ reference enter program delete programm special function	

After modification of configuration number the main switch of the machine has to be switched OFF. The new values are accepted by main switch ON.

KALTENBACH

● Calculation of configuration number range 1

two distribution positions	4096
three distribution positions	8192
four distribution positions	12288

without sorting device	0
Sorting device only to front	1024
Sorting device only to rear	2048
Sorting device to both sides	3072

without cut-off gripper, without roller conveyor	0
with cut-off gripper, without roller conveyor	256
with cut-off gripper, with roller conveyor	768

without frequency converter	0
with frequency converter	128

without trim cut device	0
with trim cut device	64 *

without magazine, without acknowledgement button	0
without magazine, with acknowledgement button	8
with bundle magazine (VM)	16
with flat magazine (FMA,FMH)	32 *
with flat magazine with autom. tracing back (FMNC)	40
with loading magazine	48

without rotary table (RKS)	0
Rotary table hydraulic,automatical (DRA)	1
Rotary table manual	2
Rotary table hydraulic, maueal(DRH)	4
Rotary table NC (DRNC)	6 *

Sum

*Example of calculation for configuration number 1:

Machine type: KKS 401 NA DR NC with trim cut device and flat magazine FMA

Configuration number = 64 + 32 + 6 = 102

● Calculation of configuration number range 2

with NC - gear adjustment	32	
with NC - cutting height	16	
with NC - feed	8	
without NC - cutting parameter adjustment	0	
Feeding conveyor speed 24 m/min	4 *	
Feeding conveyor speed 12 m/min	0	
with feeder NA 2000	2 *	
with feeder NA1000	0	
with personal computer (PC)	1	
without personal computer (PC)	0	
	Sum	

*Example of calcualtion for configuration number:
Machine type: KKS 401 NA 2000 and an feeding conveyor speed 24 m/min
Configuration number = 2 + 4 = 6

3.5 Safety

● Assembly

Besides safety instructions, please observe the following for machine installation:

- The saw, peripheral components and electrical and hydraulic connections should only be installed, assembled, operated or set up by qualified personnel.
- Only use unfaulty suspensions.
- Lift saw and peripheral components only at the provided points of suspension.
- Never stand beneath hanging loads!
- The mechanical assembly must be completed before electrical and hydraulic connections are set up.

● Disassembly

- Pump out coolant and dispose of coolant properly.
- Remove chips, dirt and coolant from machine.
- Disconnect the machine from the mains.
- If necessary, mark electrical and pipe connections before they are disconnected.
- Disassemble chip conveyor, if necessary.
- Disconnect hydraulic connections of machine parts.
- Seal hydraulic connections with blind plugs.
- Attach transporting hook.
- Remove nuts from anchor bolts.
- Loosen screws connecting the machine parts.

4 Operation

Safety Instructions and Danger Indications

Safe operation of the system depends on appropriate and professional handling of the system.

The machine should be operated by authorisized, trained and instructed personnel only.

Before the machine is turned on, all protecting devices should be closed and all covers mounted. The doors of the control cabinet must be closed.

Make sure no unauthorisized persons are in the danger area of the machine before turning the machine on.

It is prohibited to operate the machine if protecting devices were removed. Safety devices should not be removed.

For set up and maintenance/repair work, the machine must be turned off at the main switch and secured. Make sure the machine cannot be turned on unintentionally.

Failure or incorrect performance of maintenance work in regular intervals may lead to machine damages.

The machine operator is responsible for observing the safety regulations and for instructing the remaining personnel in these regulations.

The operator is obliged to immediately report any trouble with the machine to his superior.

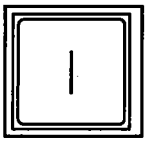
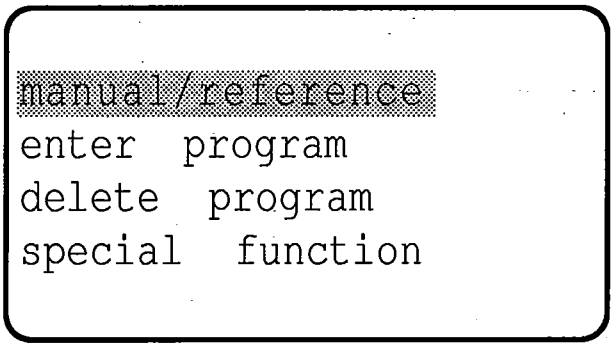
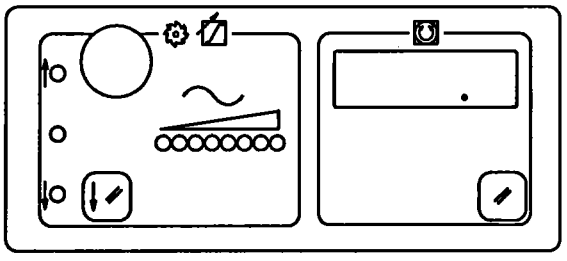
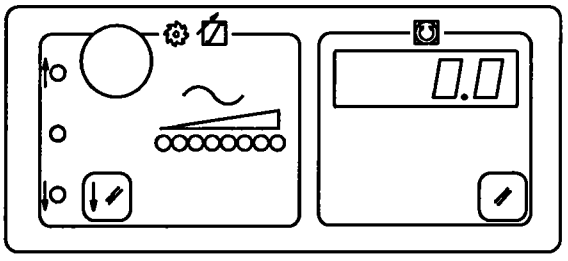
The operator must make sure that no unauthorisized person is in danger area of the system before and while operating the roller convoyor or the discharge unit

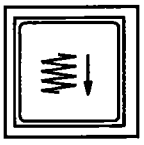
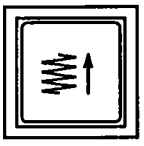
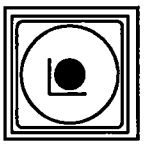
Do not interfere in the danger area of the machine. Danger of injuries!

4. OPERATION

4.1 Start

If the main switch was turned OFF, the reference points for rotary table and saw blade were deleted and have to be reset:

Control buttons	Display/functions	Remarks
–Turn on main switch. –Turn key-operated switch to horizontal position. –Press push button *SYSTEM ON* (green light). 	– Push button SYSTEM ON lights up. – Hydraulic unit is turned on. – The main menu will appear on the display. 	horizontal = set-up position
Set reference point for rotary table (not necessary for NC rotary table)		
–Open table clamping. –Position rotary table precisely to 0° (use stop). –Press reference button. 	 	Display of angles will not appear if reference point is not set. By pressing the reference button the counter is set to 0.0. Pressing the reference button three times will reset the reference point.

Control buttons	Display/functions	Remarks
Set reference point for saw blade		
 	Drive saw blade to lowest position. Adjust height of saw blade until the upper saw blade edge is located approx. 2 mm beneath the rotary table surface.	
– Press push button RESET 	– Hydraulic unit is turned off. – Reference point is set.	Now the key-operated switch can be turned to "Operation" (vertical position).
– Turn key-operated switch to vertical position. 	– Standard operation is activated. – Push button SYSTEM ON (green) lights up.	

NOTE: Before the reference points are set, the main functions are interlocked except for the following:

- Lift and lower saw blade.
- Advance and retract saw blade (only in lower limit position).
- Clamp, unclamp and move rotary table.

Reference point approach of the NC axes

If the power supply is turned off by the main switch, the MULTICOM control information on axes positions is lost. Therefore, the reference point must be approached before positioning is possible.

Before starting the reference point approach, make sure that all material is removed from the saw and the safety cover is closed.

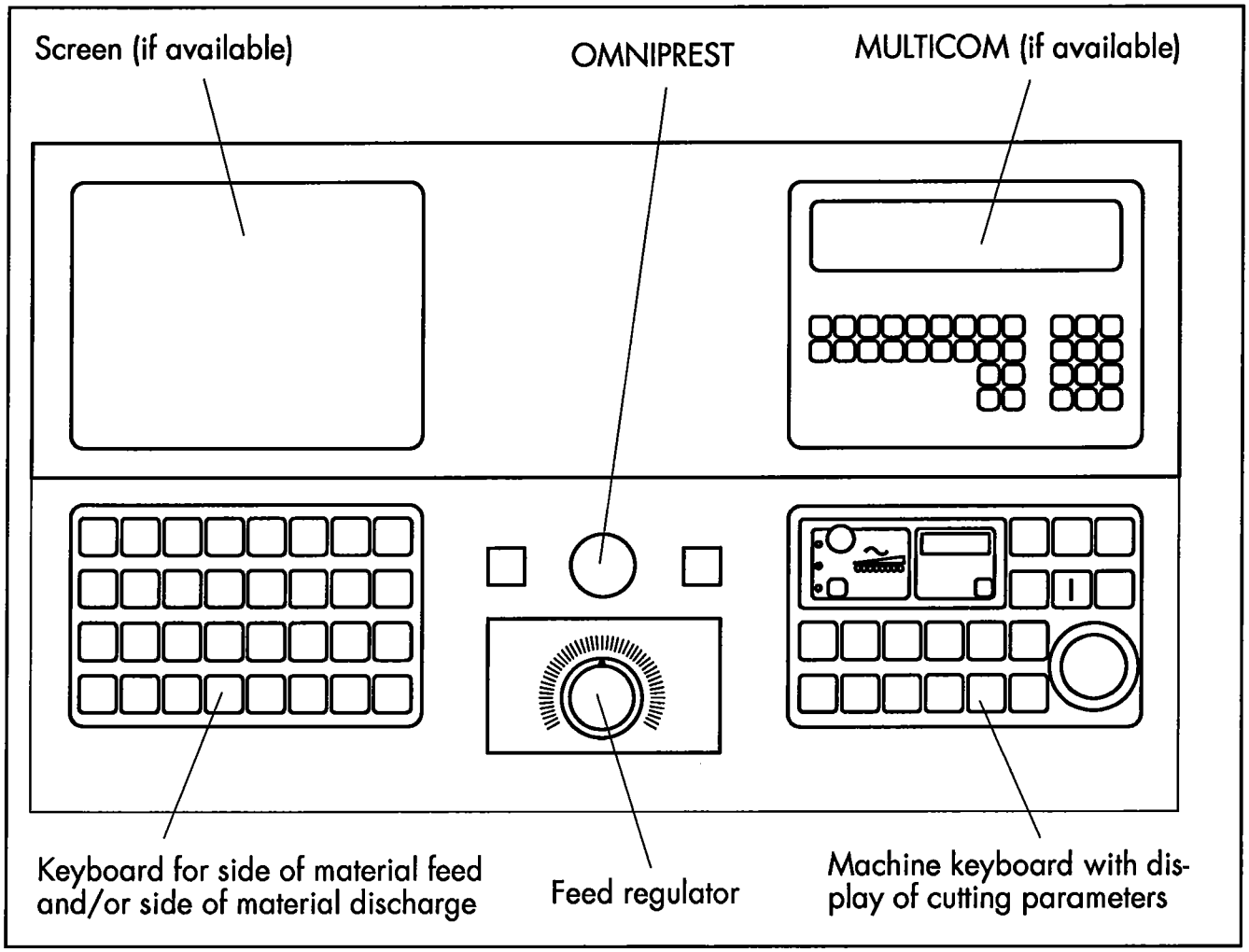
Control buttons	Display	Remarks
Turn on main switch.	manual/reference enter program delete program special function	
	ACT NOM MAN 1L 0.0 0.0 R 2W 0.0 0.0 R 3A 0.0 0.0 R	Only one axis (1L) is displayed, depending on machine equipment.

Control buttons	Display	Remarks
	ACT NOM MAN 1L 0.0 0.0 R 2W 0.0 0.0 R 3A 0.0 0.0 R	The symbol "R" in the right column indicates that the reference point of the respective axis was not set. The following abbreviations stand for: 1L : Automatic material feed unit 2W: Rotary table DRNC* 3A : Length stop NC *optional
 Start	ACT NOM MAN 1L 981.0 981.0 2W 0.0 0.0 R 3A 0.0 0.0 R	By pressing the button "Start" the material feed slide moves to its reference point. After reaching the reference point the reference value (in this example 981.0) is accepted, the symbol "R" will disappear.
		Interruption is possible at any time by pressing the button "Stop":
 Start	ACT NOM MAN 1L 981.0 981.0 2W 0.0 0.0 R 3A 0.0 0.0 R	 Stop The same procedure is repeated for all axes available.
• • •		
		

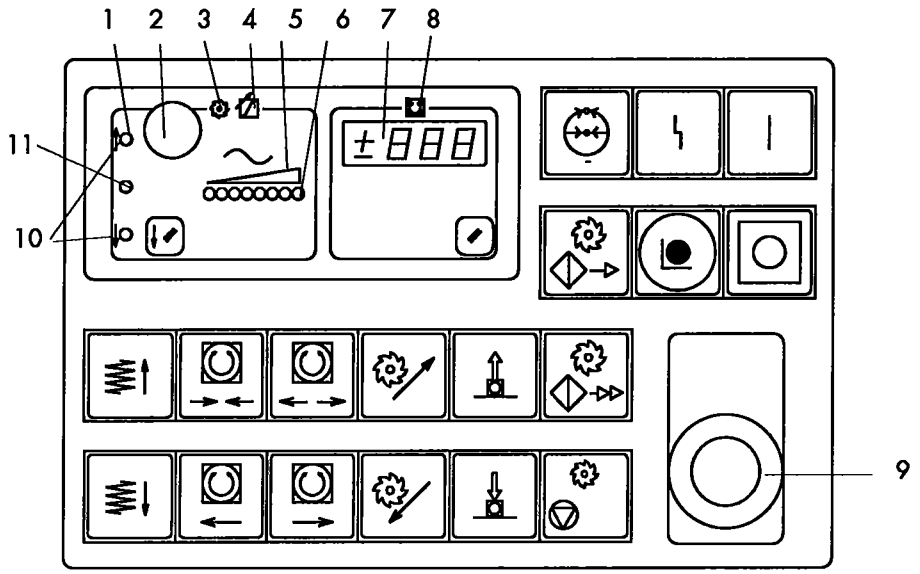
4.2. Control devices

All control devices necessary for operating the sawing unit and peripheral components are integrated in the control panel of the saw.

The control panel has different control devices according to machine configuration.

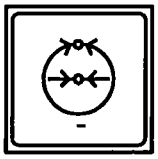
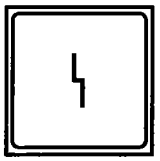


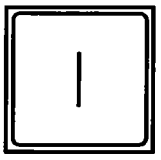
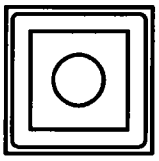
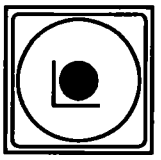
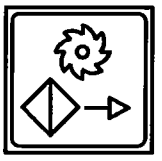
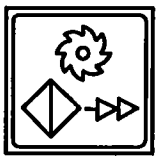
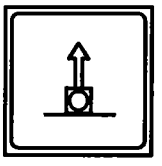
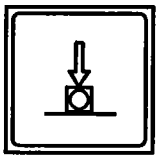
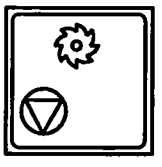
4.2.1 Machine keyboard with display of cutting parameters

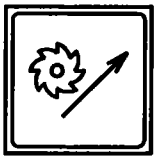
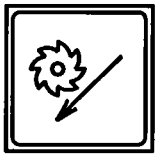
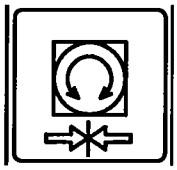
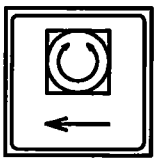


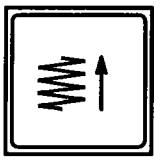
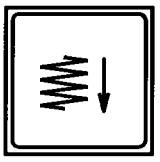
No/Symbol	Name	Functions
1	Display (yellow) upper end position	Lights up if – the saw blade reaches the adjusted upper end position (LED).
2	Control knob	Turn control knob: – upper saw blade position is set.
3	Symbol	Symbol for saw blade.
4	Symbol	Symbol for infinitely variable adjustment of saw blade stroke.
5	Symbol	Symbol for infinitely variable increase.
6	Display of motor current	Lights up green if – charging rate of the electrical motor for saw blade motor lies in a normal range, Lights up green and yellow if – overload capacity of the electrical motor is reached, Lights up green, yellow and red if – the electrical motor is overloaded.

Machine keyboard with display of cutting parameters

No/Symbol	Name	Functions
7	Display	Display for – cutting angles –60° to +60°; indicates the angle adjustment of the saw blade. Right angle: 0.0 °.
8	Symbol	Symbol for – rotary table.
9	EMERGENCY STOP	Press EMERGENCY STOP: – System stops all operations. – Switch remains pressed. Pull EMERGENCY STOP: – System can be restarted. – In the set-up mode, move saw blade to lower end position. – Restart automatic mode.
10	Display (yellow) Lower and upper end position	Lights up if – the saw blade has reached the upper or lower end position (LED).
11	Display (green) In cutting range	Lights up – during up- and downward stroke of the saw gear.
	RESET push button table	Quickly press button 3 times: – Previous value in angle display is deleted, 0.0 is set. Condition: – set-up mode.
	RESET push button blade	Press push button: – Previous cutting depth value is deleted. – New value is set. Condition: – set-up mode.
	Indicator (yellow) material deformation	Lights up if: – Material deformation has reached the value stored in OMNIPREST.
	Indicator (red)	Lights up if – EMERGENCY STOP switch is pressed. Blinking if – locking devices are not closed, for example safety door and/or cover.

No/Symbol	Name	Functions
	System on (green)	Press push button: – System is switched on (hydraulic unit is operating audibly). Button lights up if – system is switched on. Button blinks if – key-operated switch is in horizontal position.
	Indicator (red)	Lights up if – main switch on, system on. Does not light up if – main switch on, system off.
	Key-operated switch	Key position horizontal: – set-up mode. Key position vertical: – automatic mode or sawing operation.
	Saw motor cutting speed 1	Press button: – 1st cutting speed of saw motor is activated. Function only possible if: – Cover is closed. – Front safety door is closed. – Saw gear is located in the lowest adjusted position. – Rotary table is clamped. – Vise is in top position.
	Saw motor cutting speed 2	Press button: – 2nd cutting speed of saw motor is activated. Function only possible if: – All requirements of speed 1 are fulfilled.
	Unclamp vise	Press push button: – Vise is driven upwards as long as push button remains pressed.
	Clamp vise	Press push button: – Vise is driven downwards as long as push button remains pressed.
	Saw motor OFF (red)	Press push button: – Saw motor is turned off.

No/Symbol	Name	Functions
	Push button Gear adjustment	Press: – Saw gear is adjusted to the back as long as the button remains pressed. Condition: – Saw gear in the lower end position. – Key-operated switch in horizontal position.
	Push button Gear adjustment	Press: – Saw gear is adjusted to the front as long as the button remains pressed. Condition: – Saw gear in lower end position. – Key-operated switch in horizontal position.
	Push button indicator Unclamp rotary table*	Press: – Rotary table is unclamped.
	Push button indicator Clamp rotary table*	Press: – Rotary table is clamped hydraulically.
	Push button indicator Rotary table movement cw*	Press: – Rotary table is turned cw hydraulically as long as button remains pressed.
	Push button indicator Rotary table movement ccw*	Press: – Rotary table is turned ccw hydraulically as long as button remains pressed.
* These push buttons are not defined for all machine types.		

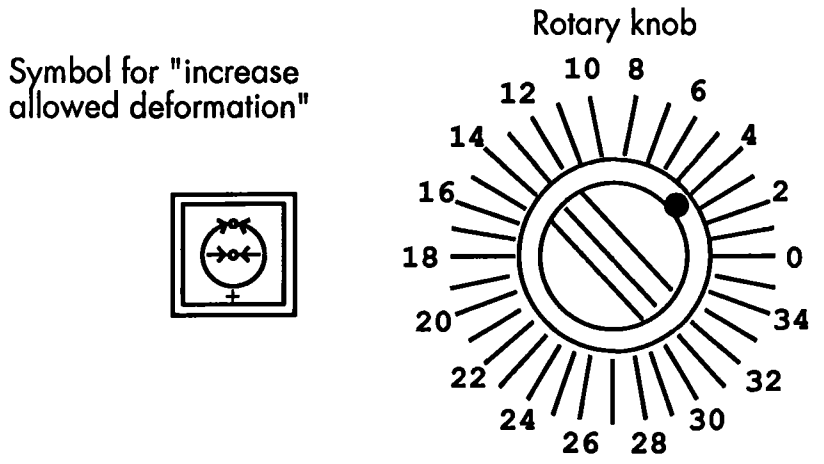
No/Symbol	Name	Functions
	Lift saw gear	Set-up mode: (horizontal key position) Press push button: – Saw gear is lifted as long as button remains pressed. Operation: (vertical key position) Press push button: – Sawing is started. Condition: – Saw motor is ON.
	Lower saw gear	Set-up mode: Press push button: – Saw gear is lowered as long as button remains pressed.

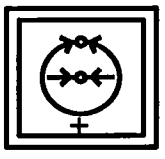
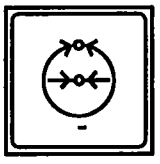
4.2.1 OMNIPREST

General description

The machine series KKS 401 is equipped with an innovative clamping system called OMNIPREST. OMNIPREST is made for safe clamping of solid materials as well as thin-walled profiles.

Decisive advantages are:
- automatic adjustment to material width by long-stroke clamping cylinders
- formed jaws and expensive resetting of different tube diameters are not necessary anymore
- quick clamping procedure, even for thin-walled profiles
- infinitely variable maximum deformation value of profiles
- full counterforce of the vertical vise also for thin-walled profiles

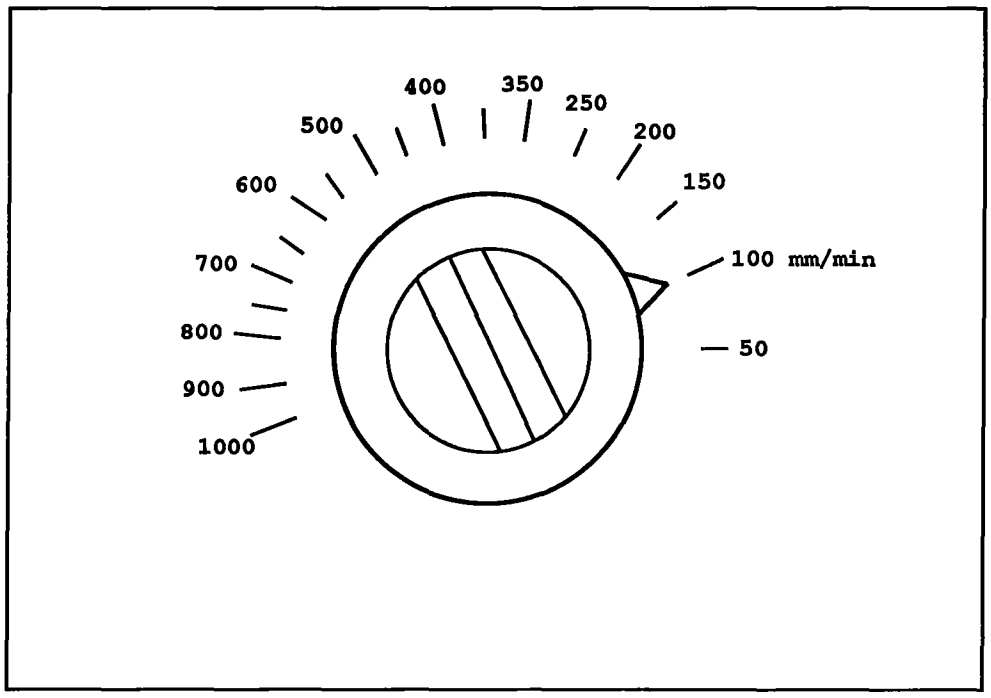


Symbol	Functions	Remarks
	Increase allowed deformation: For clamping of solid materials, turn knob ccw to end position (≈ 34).	
	Reduce allowed deformation: The allowed deformation value can be reduced according to the diameter and wall-thickness of the profile. **NOTE** : Minimal clamping pressure : 2000 N !	Yellow signal lamp "material deformation" lights up if the adjusted value is reached.

4.2.1 Feed regulator

General description

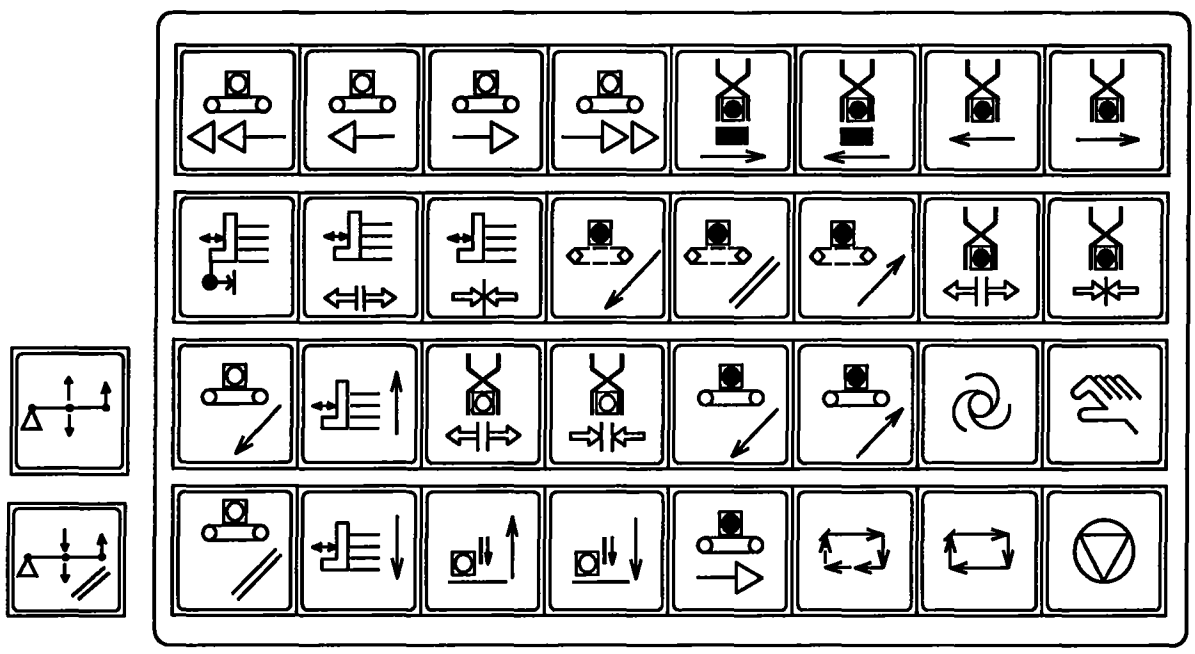
The vertical infeed of the saw blade is infinitely variable by the feed regulator. Infeed can be regulated at any time, even while sawing is being done.



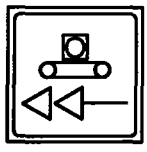
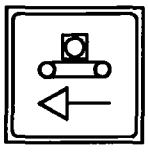
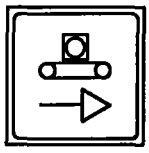
NOTE : Feed speed regulation may directly affect the charging rate of the electrical motor for the saw blade motor.

Observe display of motor current. Infeed rate is reduced if lubricant does not have operating temperature.

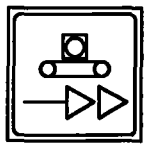
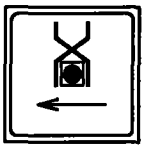
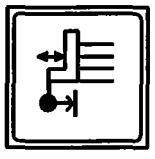
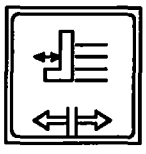
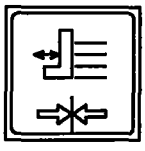
Keyboard for material feed and material discharge



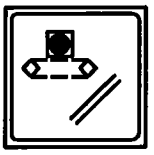
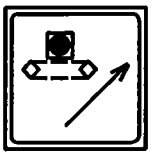
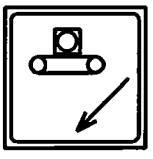
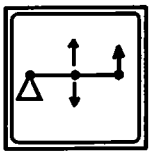
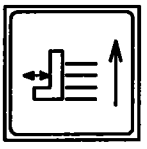
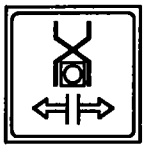
NOTE: The keyboard for material feed and material discharge is designed differently according to machine type. The push buttons are co-ordinated with the machine configuration.
You will find all possible push buttons of the saw listed and explained below.
The push buttons might be located differently than shown in the figure above.

Symbol	Name	Functions
	Roller conveyor, fast retraction	The roller conveyor quickly rolls to the end position of the magazine feed attachment; material is retracted.
	Roller conveyor, slow retraction	The roller conveyor slowly rolls to the end position of the magazine feed attachment; material is retracted.
	Roller conveyor, slow supply	The roller conveyor slowly rolls to the end position of the saw; material is supplied.

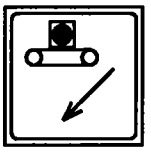
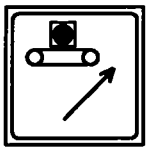
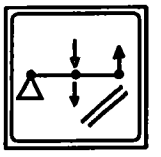
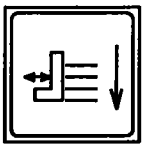
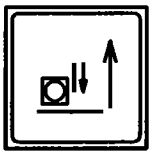
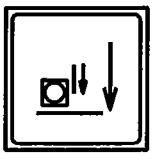
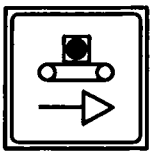
Keyboard for material feed and material discharge

Symbol	Name	Functions
	Roller conveyor, fast supply	The roller conveyor quickly rolls to the end position of the saw, material is supplied.
	Cut-off gripper, front jaw	The front jaw of the cut-off gripper moves to the end position of the saw (rectangular cut).
	Cut-off gripper, front jaw	The front jaw of the cut-off gripper moves to the end position of material discharge (mitre angle > 0°).
	Complete cut-off gripper to saw	The cut-off gripper moves in saw direction.
	Complete cut-off gripper to side of material discharge	The cut-off gripper moves in direction of material discharge. Condition: the sorting device must be in mid-position.
	spacer	ON: spacer is placed on the stop plate (L < 750 mm)
	Unclamp length stop	Unclamp the length stop before positioning is done.
	Clamp length stop	Clamp the length stop after positioning.

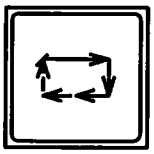
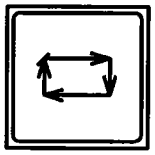
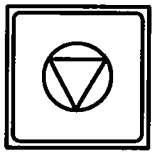
Keyboard for material feed and material discharge

Symbol	Name	Functions
	Distribution of cut-offs - advance movement	Distributing table is advanced, the parts are sorted to the back side.
	Distribution of cut-offs - home position	The distributing table moves to mid-position.
	Distribution of cut-offs - retracting movement	The distributing table is retracted, the parts are sorted to the front side.
	Open cut-off gripper	The cut-off gripper opens.
	Close cut-off gripper	The cut-off gripper closes and clamps the workpiece.
	Next bar on roller conveyor	The magazine moves by one position and transports a new bar on to the roller conveyor. Symbol for loading magazines: 
	Lift length stop	Lift length stop before positioning.
	Open material feed gripper	The clamping cylinder of the material feed gripper opens and the workpiece is released.
	Close material feed gripper	The clamping cylinder of the material feed gripper is closed and the workpiece is clamped.

Keyboard for material feed and material discharge

Symbol	Name	Functions
	Distribution of cut-offs to the front	The cut-off distributor moves the cut-offs by the transfer chain to the front.
	Distribution of cut-offs to the back	The cut-off distributor moves the cut-offs by the transfer chain to the back.
	Automatic operating mode	The system switches to the automatic operating mode, the push button will light up when the automatic mode is activated.
	Manual operating mode	The system switches to the manual operating mode, the push button will light up when the manual mode is activated.
	Verification: material on roller conveyor	Material is located on the roller conveyor. Symbol for loading magazines: 
	Lower length stop	Length stop is moved in working position.
	Lift trim cut stop	The trim cut stop is turned up to the end position. Condition: The gripping slide of the automatic material feed unit is standing in the end position of the side of material feed.
	Lower trim cut stop	The trim cut stop is turned down to its resting position.
	Roller conveyor discharge	The roller conveyor rolls to the side of material discharge; material is removed.

Keyboard for material feed and material discharge

Symbol	Name	Functions
	Interrupt automatic operating mode (yellow light)	The automatic operating mode is interrupted after the cycle is finished - the push button will light up yellow.
	Start automatic operating mode (green light)	Automatic mode is started, the push button lights up green. Condition: Push button "automatic operation" lights up.
	Stop automatic operating mode (red light)	Automatic mode is quit.

NOTE: In the automatic operating mode, alll push buttons are inactive except for the following:

- Emergency-Off
- Manual operation
- Interrupt automatic operating mode
- Start automatic operating mode
- Stop automatic operating mode

4.3 Set-up

Saw blade exchange:

- Turn key-operated switch to "set-up" mode (horizontal position).
- Push button "manual operation" lights up.
- Move saw gear to the lowest end position as follows:
- Press push buttons "RESET" and "lower saw motor" simultaneously.
- Adjust mitre angle of approx. – 15 °.
- Turn off saw.
- Loosen pin chip remover and turn to the side.
- Loosen central screw and remove screw with the loose flange.
- Remove saw blade from the centering pin.
- Clean gear flange and loose flange.
- Place new saw blade on to the mounting pin.

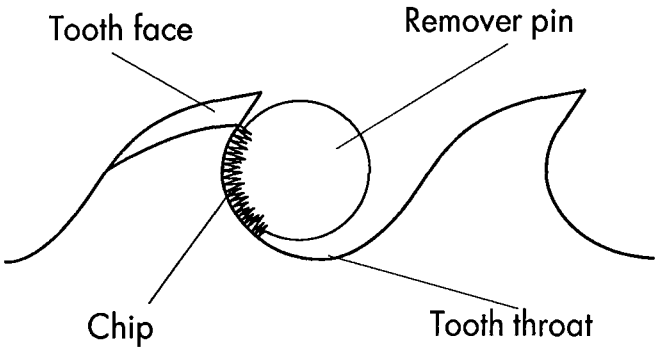
Observe direction of saw blade rotation!

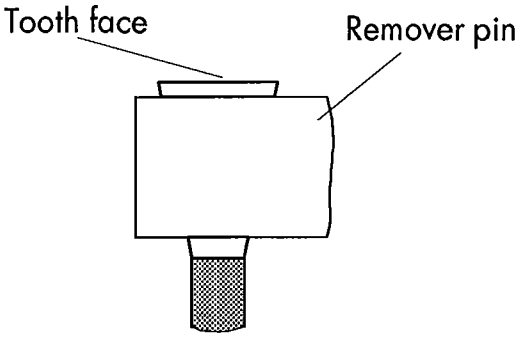
- Replace loose flange and fasten it loosely.

Adjust pin chip remover:

- Check pin chip remover:
  - o Does the spacing fit the saw blade?
  - o Wear of chip remover and VULKOLLAN roll?

- Adjust height and working area of pin chip remover so that the pin plunging into the spacing removes the chips clinging to the tooth face.

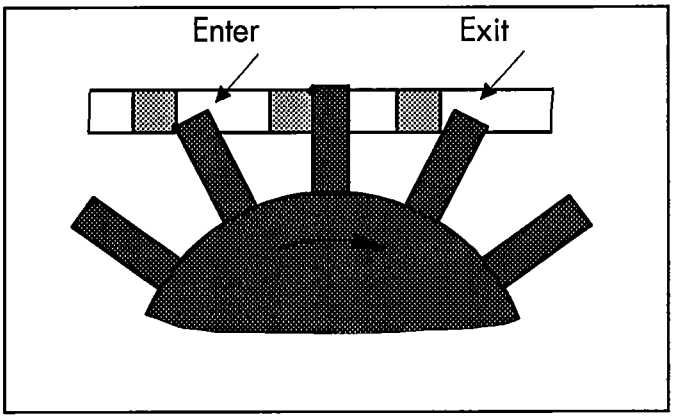




NOTE: – The pin must cover the complete saw blade width.
– The pin chip remover must fit the tooth face.
– The tooth throat should never be touched.

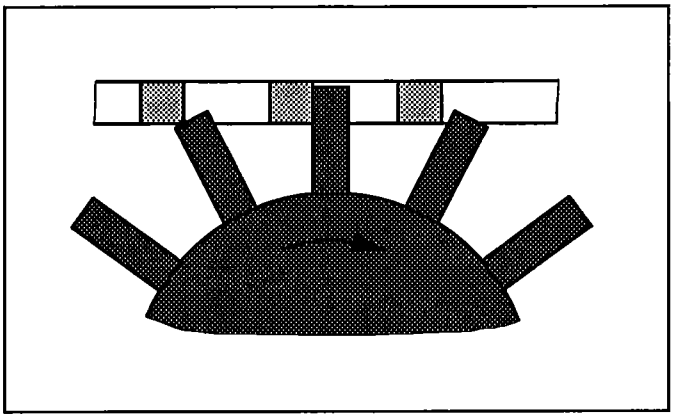
Correct adjustment:

- Pin is carried by one tooth of the saw blade at a time.



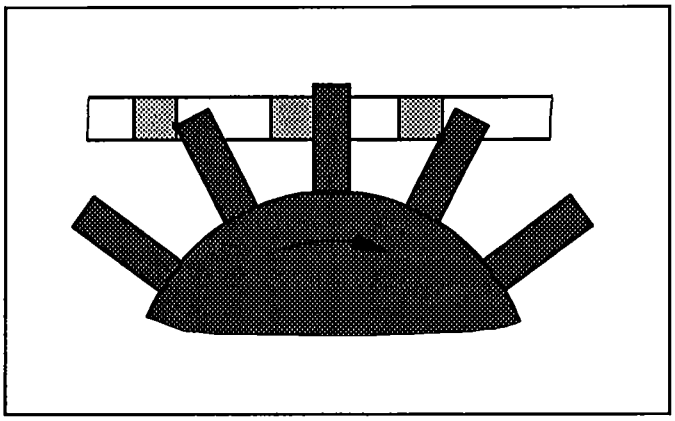
Flat plunging:

- Pin hits the saw blade from the side, saw blade is damaged.
- Chip is not removed completely.



Deep plunging:

- The pin chip remover jams because the pin is carried by two saw blade teeth at once.



- Fasten pin chip remover manually.
- Remove loose flange, turn saw blade manually and check correct entrance of pin chip remover.
- Tighten pin chip remover.
- Replace loose flange.

Place saw blade against carrier bolt opposite to rotating direction !

- Tighten loose flange.
- Press VULKOLLAN roll lightly against saw blade.
- Turn on saw.
- Turn key-operated switch to "set-up" (horizontal position).
- Check correct run of pin chip remover while pressing push button "saw blade ON".
- Turn off saw before readjusting the pin chip remover !

NEVER adjust while saw blade is rotating !

- Close front safety door.

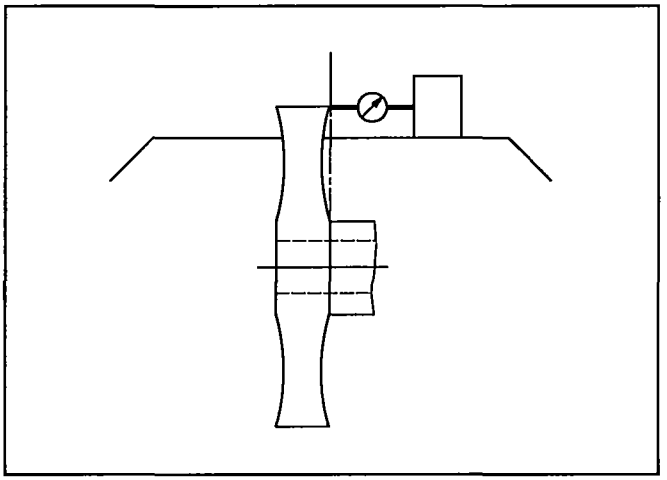
The position of the right saw blade edge to the pivot of the saw changes if other saw blade types, for example segmental saw blades or solid steel saw blades, are used. If a length stop or an automatic material feed unit are used, the cut-off length might change slightly.

For the model KKS 401, the saw gear can be moved axial to the 0-position to compensate the change in length.

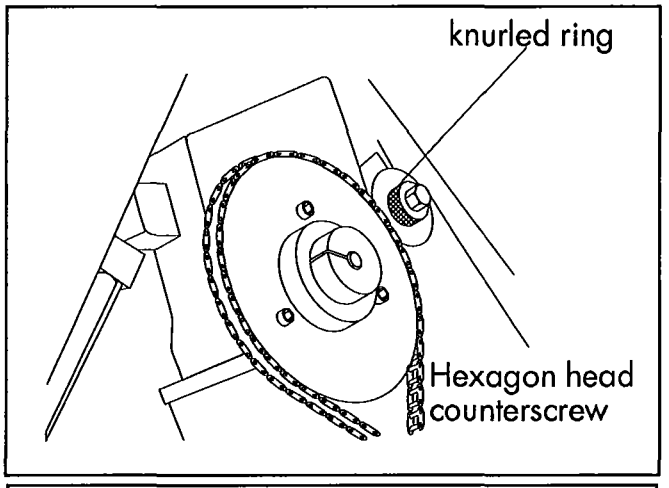
Valid for solid steel saw blades :	Blade kerf = main blade width
Mostly valid for segmental saw blades:	Blade kerf = 4 mm Main blade width = 3 mm

Adjust saw blade edge to axis of rotary table:

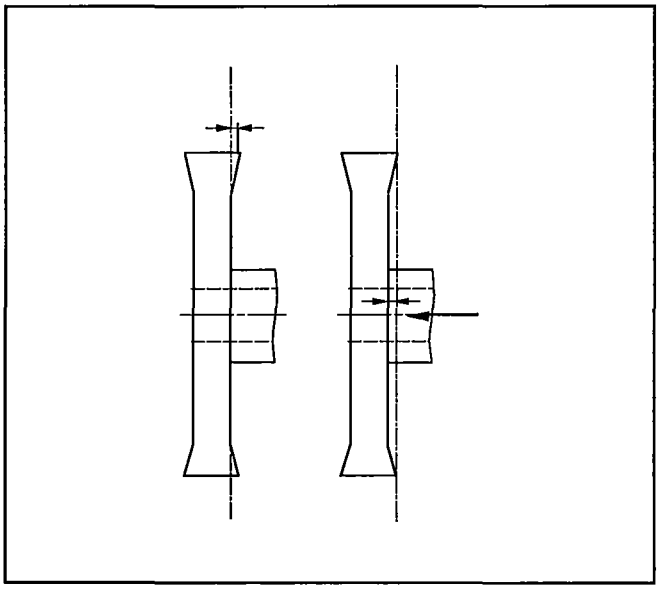
Only necessary if solid steel saw blades are replaced by segmental saw blades (or vice-versa), and for high accuracy requirements.



- Position saw blade approx. 20 mm above rotary table.
- Adjust saw gear to – 45 °.
- Place dial gauge located on the rotary table surface against the upper edge of the saw blade.
- Measure zero position.



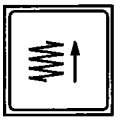
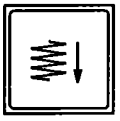
- Loosen hexagon head counterscrew at the swivel axis of the saw gear.
- Adjust saw gear by the desired measure in axial direction by turning the knurled ring.
- Check adjustment via dial gauge.
- Tighten hexagon head counterscrew.
- If necessary, adjust linear measuring systems to the new saw blade edge.



Saw blade edge is not in located in the pivot

Saw blade after correction

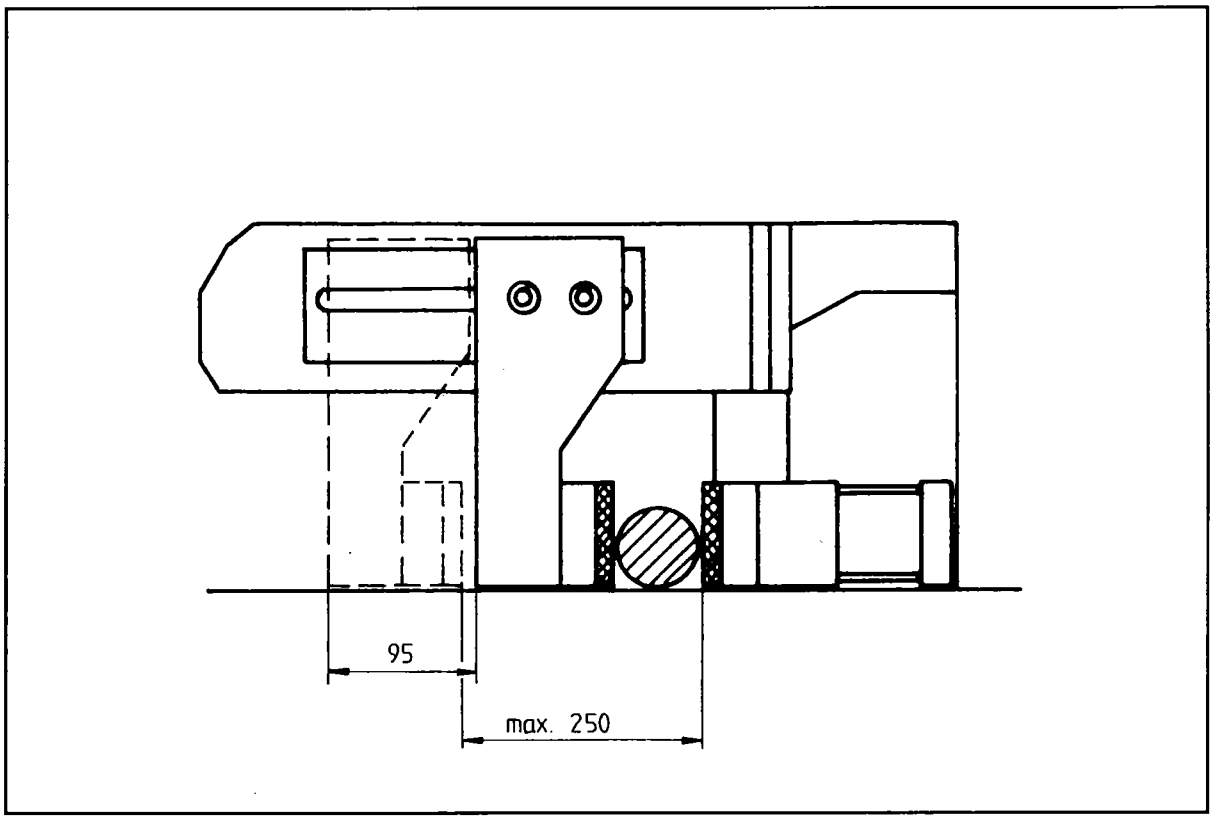
Initial position adjustment of saw blade

Control buttons	Functions
– Turn key-operated switch to "set-up" (horizontal position).	Push button "SYSTEM ON" is blinking.
– Turn control button for max. saw blade height to the very right position.	
– Press push button until the saw blade is located 2 mm below the rotary table surface. 	The saw gear moves upwards by the adjusted speed as long as the push button "lift saw gear" is pressed. The initial position for the following sawing operation is determined.
– Press push button RESET. 	
NOTE: After the initial position is adjusted the upper end position has to be reset ☞ chapter 4.4.1.	
– Press push buttons "RESET" and "Lower saw blade" simultaneously to return below the initial position.  	Push button "system on " lights up.
– Key-operated switch turned to "operation" (vertical position).	

4.3.2 Adjustment of the material feed gripper to material width

The material feed gripper has a clamping stroke of 155 mm. When selecting a material width where the clamping stroke and the opening of the material passage is not sufficient, the front gripper jaw must be adjusted accordingly. Maximum adjusting path: 95 mm.

The clamping pressure is regulated by a pressure-reducing valve for workpieces which might be deformed by clamping pressure.

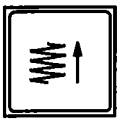
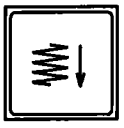
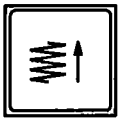


KALTENBACH

4.4 Programming and set-up

4.4.1 Set-up

Adjust saw blade height

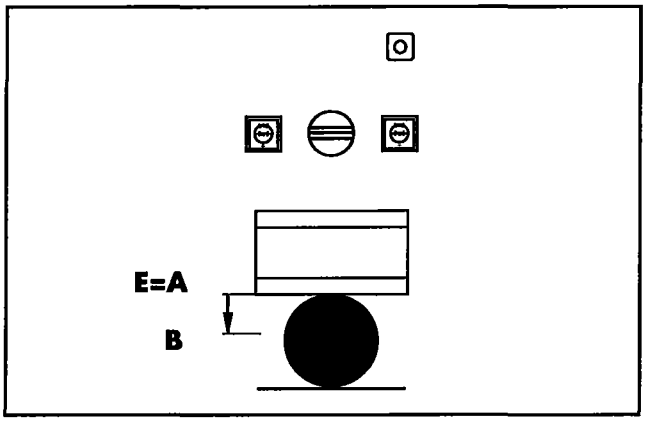
Control buttons	Functions
– Stop saw blade movement. – Move material to be cut up to the sawing slot in the rotary table. – Turn control button for maximum saw blade height to the very right position. – Press push button "lift saw gear". 	Saw gear will move upwards by the adjusted speed as long as the push button is pressed.
– Release push button if saw blade is positioned higher than the material.	Saw blade will remain in this position.
– Turn control button for maximum saw blade height to the left position until the upper yellow LED lights up.	The green light signalizing "saw in operation" will go out, the yellow light signalizing "upper end position" lights up.
– Carefully turn control button to the right until the green LED just lights up.	Now the upper end position of the saw blade is set.
Check adjustment: – Press push button "Lower saw gear" 	Saw gear is lowered.
– Press push button "Lift saw gear" 	The saw gear is lifted. The saw blade must reach the preselected height and stop automatically.

Adjust OMNIPREST

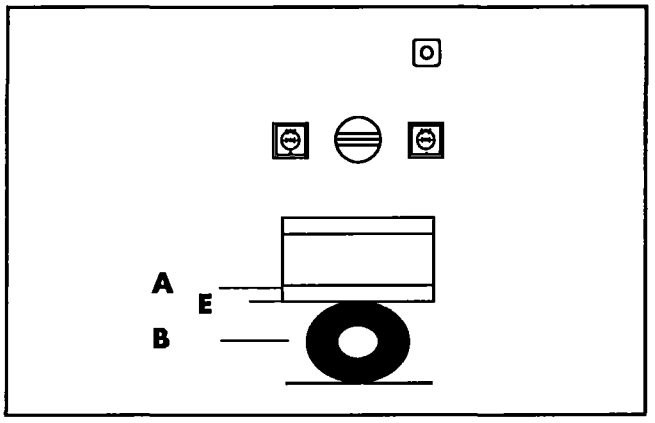
The clamping system OMNIPREST adjusts itself automatically by long-stroke cylinder to the material thickness. Opposite to conventional clamping cylinders, OMNIPREST can clamp thin-walled profiles without damaging them.

The allowed material deformation can be adjusted and, therefore, restricted:

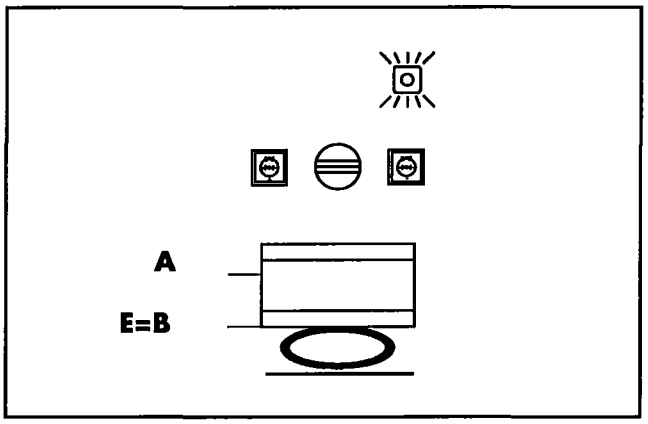
Mode of operation (see diagrams below)



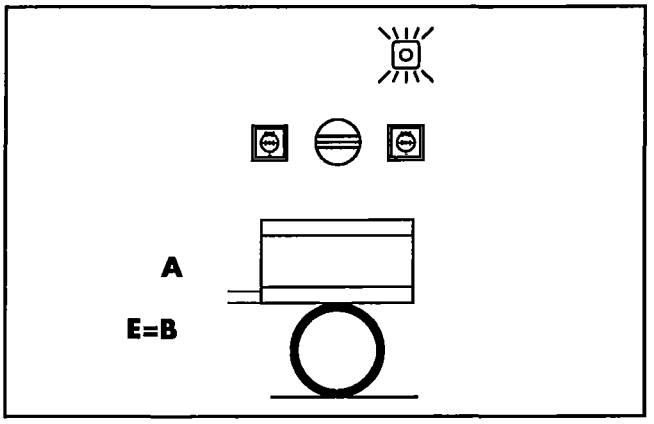
Material : solid bars
OMNIPREST : adjust max. clamping force
Limitation: not reached,
no deformation



Material : thick profile
OMNIPREST : adjust max. clamping force
Limitation : not reached,
elastic deformation



Material : thin profile
OMNIPREST : clamping force too strong
Limitation: reached (alarm light),
profile damaged

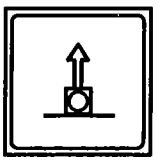
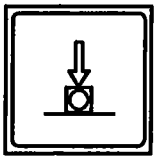


Material : thin profile
OMNIPREST : clamping force reduced
Limitation: reached (alarm light), profile deformation still elastic

A = contact point on the material **B** = limitation **E** = end position after clamping

NOTE:
- OMNIPREST cannot be adjusted when clamping is performed.
- Minimum clamping force: 2000 N.

Vise adjustment for thin-walled profiles

Control buttons	Functions
– Turn control button to the very right.	– Minimum deformation is adjusted.
– Clamp tube. 	– Vertical vise is lowered and clamps the material.
– Observe tube deformation. – Unclamp vise. 	– Stop here if the allowed tube deformation is reached.
– Turn OMNIPREST-control button slightly to the left. – Clamp tube. 	– Allowed tube deformation is increased.
– Observe tube deformation.	– Repeat procedure until desired deformation range is reached. Higher clamping forces = higher cutting forces.

NOTE: The minimum clamping force is approx. 0.2 t (2000 N).
Special formed jaws might be necessary for extremely thin-walled profiles.

Z		⌀ 15.75inch			inch					
					8	6	6	5	4	tps
					.385	.515	.515	.620	.770	inch
					○	○	○	○	○	
Z			sfm		3/4	1 1/2	3	5	7	max. inch
○	98	▷	40	high tensile steel	120	90	75	60	65	
○	98	▷▷	80	medium steel	340	255	165			
○	72	▷	50	high tensile steel	170	140	100	80	90	
○	72	▷▷	100	medium steel	455	345	250			
○	59	▷	60	high tensile steel						
○	59	▷▷	120	mild steel						
					1 1/2	4	7	9	9	max. inch
○	98	▷	40	high tensile steel	140	120	120	75	70	
○	98	▷▷	80	medium steel	405	255	255	215	165	
○	72	▷	50	high tensile steel	185	140	140	120	95	
○	72	▷▷	100	medium steel	420	320			210	
○	59	▷	60	high tensile steel	250	190	190	155	120	
○	59	▷▷	120	mild steel	500					
					10	8	6	6	5	tps
					.306	.385	.515	.515	.620	inch
					○	○	○	○	○	
Z			sfm		1x .083	2x .120	2x .156	3x .219	5x .313	max. inch
○	98	▷	40	high tensile steel	165	140	120	120	80	
○	98	▷▷	80	medium steel	430	405	255	255	210	
○	72	▷	50	high tensile steel	210	185	140	140	105	
○	72	▷▷	100	medium steel	515	420	320	320	260	
○	59	▷	60	high tensile steel	310	250	190	190	155	
○	59	▷▷	120	mild steel	620	500	380	320	210	

4-2999-641410

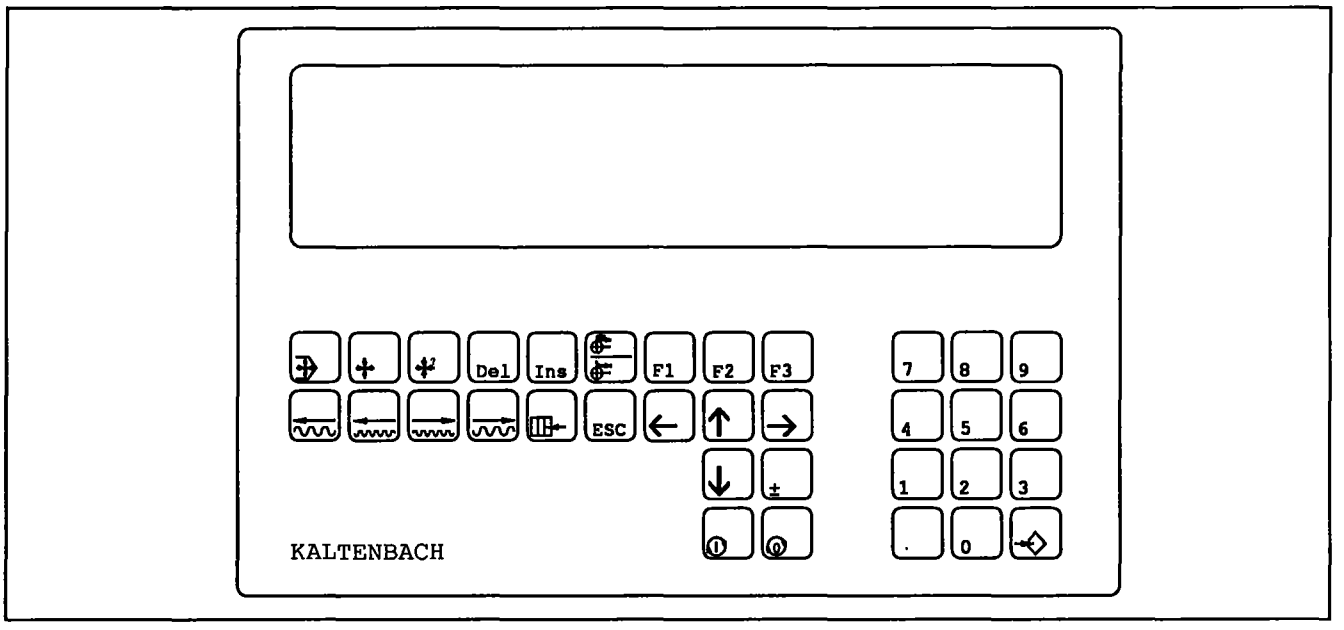
4.4.4 MULTICOM

Functions

The MULTICOM control unit has the following functions:

- Positioning of the machine axes cut-off length and cutting angles (optional).
- Quantity control.
- Storage of programmed data for later access.
- Display of axes positions for diagnostic purposes.
- Activation of special functions.

Keyboard description



Buttons	Name	Functions
Push buttons for reverse of set display		
	Enter program	Program editing (INP) and program or set selection in the automatic mode.
	Display ACTUAL VALUE	Actual value of the recently executed set and for manual operation.
	Display NOMINAL VALUE	Nominal value of the recently executed set.

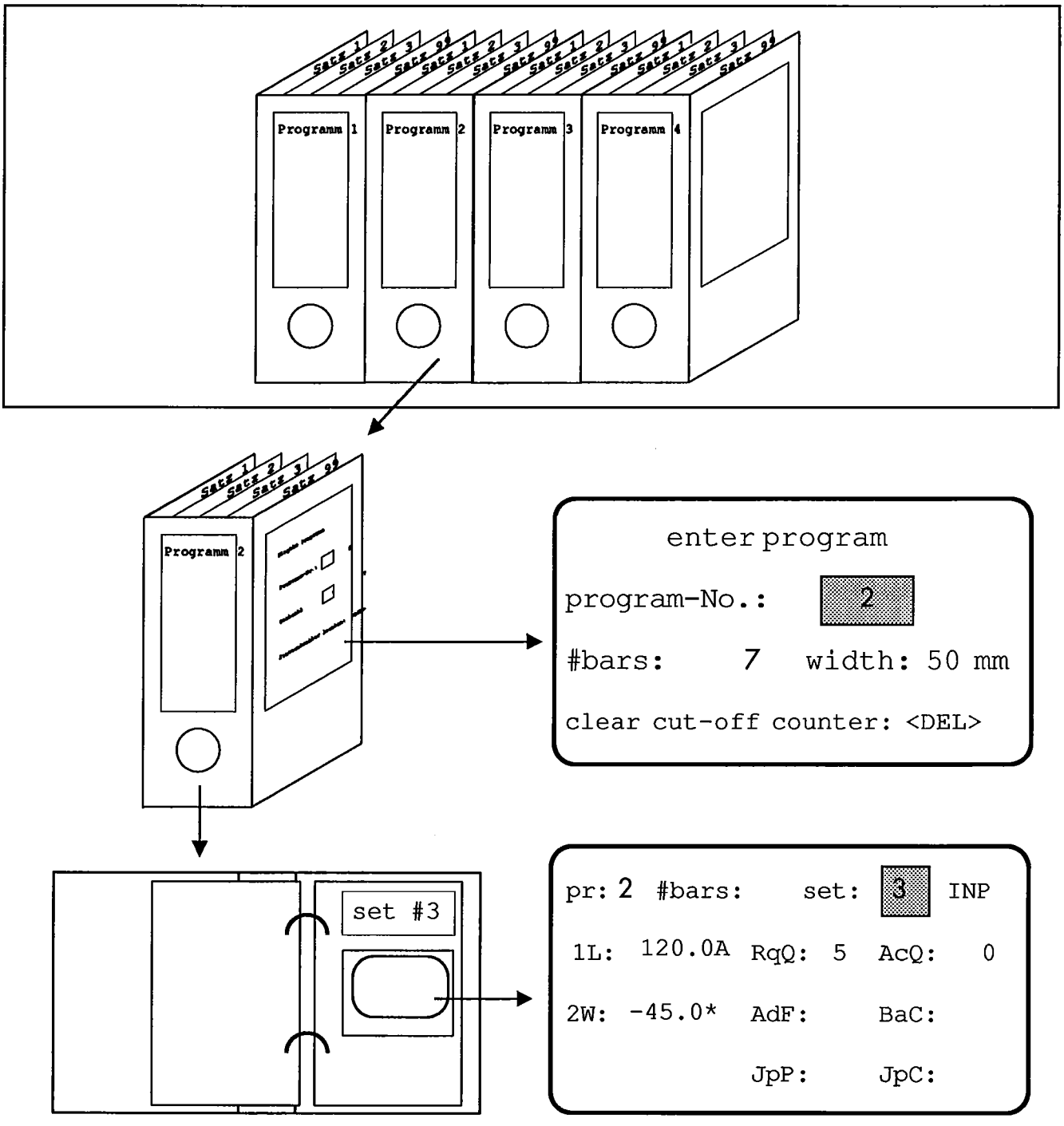
Buttons	Name	Functions
Push buttons for programming		
Del	Push button DELETE	Deletes programs and sets, resets counters to 0.
Ins	Push button INSERT	Sets can be inserted.
	Mode of traverse	Select: A = absolute measure K = incremental measure * = void value, not used for positioning
Function push buttons (optional)		
F1	Function push button 1	Select additional functions: - gear adjustment - cutting height - feed rate - cutting speed
F2	Function push button 2	not defined
F3	Function push button 3	not defined
Push buttons for manual operation (only active for ACTUAL VALUE display or in the manual mode.		
	Fast axis retraction	The axis shown in the display ACTUAL VALUE slowly moves in negative direction.
	Slow axis retraction	The axis shown in the display ACTUAL VALUE quickly moves in negative direction.
	Slow axis advance	The axis shown in the display ACTUAL VALUE quickly moves in positive direction.
	Fast axis advance	The axis shown in the display ACTUAL VALUE slowly moves in positive direction.
Push buttons for programming		
	Input correction	Deletes the previously entered digit.
ESC	Push button ESCAPE	Return to a superior menu.

Buttons	Name	Functions
	Push button CURSOR	cursor to the left — Selection of a different input section.
	Push button CURSOR	cursor upwards — By pressing the push button, the value marked by the cursor is entered, too.
	Push button CURSOR	cursort to the right
	Push button CURSOR	cursor downwards
	Push button SIGN	– for sign changes of numerical inputs – cursor in section "Set": set display shows the next set No. ("set + 1") – cursor in section "Program": the next defined program is located
	Push button START	Axis is activated for reference approach and for manual positioning.
	Push button STOP	Stops reference approach or any manual or automatic positioning.
	Push button ENTER	The previously entered value is accepted.
	Numerical push buttons 0 bis 9	For numerical inputs.
	Push button POINT	Decimal point for numerical inputs.

Internal data management

Internal data management consists of programs and sets. One set contains the complete value section of the MULTICOM display as well as any additional data which can be called for by the button F1.

A program can consist of up to 99 sets. MULTICOM can store up to 99 programs and a maximum of 400 sets.



4.4.5 Manual functions of the MULTICOM

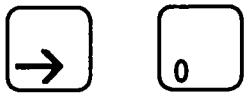
Moving the NC-axes (gripper slide of the automatic material feed unit, NC-rotary table, L46 NC length stop) is only possible by the MULTICOM control.

Initial position:
- saw turned on
- manual operating mode
- reference point approach finished

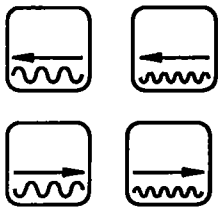
1L-axis (automatic material feed unit):
- trim cut stop lowered

2W -axis (rotary table):
- rotary table not clamped
- saw blade below rotary table surface
- vertical vise open

3A-axis (NC-length stop):
- length stop in upper position, unclamped

Control buttons	Display	Remarks
Turn on main switch. 	manual/reference enter program delete program special function	
  	ACT NOM MAN 1L 981.0 775.0 2W 0.0 0.0 3A 0.0 0.0	The cursor is moved to the nominal section of the desired axis and the desired new position (not length!) is entered.

KALTENBACH

Control buttons	Display	Remarks
	ACT NOM MAN 1L 775.0 775.0 2W 0.0 0.0 3A 0.0 0.0	By pressing the button "Start" the axis moves to the defined position. (Positioning can be stopped at any time by pressing the button "Stop".)
	ACT NOM MAN 1L 981.0 775.0 2W 0.0 0.0 3A 0.0 0.0	The same procedure is used for the other axes (if available).
		The push buttons for the manual mode can be used for direct movement of the axes. The resp. axis which is indicated by the cursor is moved.
	manual/reference enter program delete program special function	

4.4.6 MULTICOM programming

The control unit MULTICOM can also be programmed while in the automatic operating mode. Exception: the program which is being executed at the time being as well as machine parameters.

One program containing different sets controls the cutting of actual cut-offs with the same diameter, but different lengths and angles.

Control buttons	Display	Remarks
Turn on main switch.		
↓	manual/reference enter program delete program special function	The example shows the installation of program No. 7. Jump to the next defined program by pressing the push button "±".
→ 7 → ↓ 0 → 5 0	enter program program No.: 7 #bars:0 width:50 mm clear cut-off counter: <DEL>	For the single execution of sets ("quantity-oriented cutting"), enter #bars = 0. This value cannot be ignored. Material width is important for the trim cut length of mitre cuts and end pieces.
Del →	pr:1 #bars:0 set: 1 INP 1L: 0.0* RqQ: 0 AcQ: 0 2W: 0.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	By pressing the button DEL all cut-off counters (AcQ) and jump counters (JpC) are reset.

Explanation of the input sections:

pr	Program No.
#bars	Number of bars (for bar-oriented cutting), otherwise = 0
set	Set No. of the program
INP	Indicates value input
1 L	Feed length [mm] of the automatic material feed unit*
2W	Angle (°) of NC rotary table*
3A	Position of the NC length stop (mm) *
RqQ	Required quantity
AcQ	Actual quantity (cut-off counter)
AdF	Additional function: 0 : inactive Distribution position of the cut-off depending on the periphery:* 1,3,5,7... : to rear position 2,4,6,8... : to front position 1...6 : Material discharge gripper 7 -14 : Sorting device 17 : Clamping aid: The bar remains clamped by the material feed gripper until the material feed has reached the upper end position. M17 must be entered once at the beginning of the program and will be maintained during complete program execution. 21 : Bar-oriented cutting (see special chapter) 22 : automatic bar change for remnants < 500 mm
BaC	Batch counter (only for cut-off gripper) indicating the amount of actual cut-offs to be sorted by the AB (shorter cycle for short lengths, optional)
JpP	Jump position indicating the next set No. to be executed (0 = next set is executed, no jump)
JpC	Jump counter indicating how often a jump defined in JpP should be executed. Attention: The number of parts is increased by one for the first cycle.

* if available

Control buttons	Display	Remarks
→ 1 2 0 . 5	pr:7 #bars:0 set:1 INP 1L: 120.5* RqQ: 0 AcQ: 0 2W: 0.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	The section to be changed is selected by the cursor (arrow push buttons). The cut-off length for the automatic material feed unit is entered in the section "1L".
→	pr:7 #bars:0 set:1 INP 1L: 120.5* RqQ: 0 AcQ: 0 2W: 0.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	The entered value is accepted when the cursor leaves the section.
	pr:7 #bars:0 set:1 INP 1L: 120.5A RqQ: 12 AcQ: 0 2W: 0.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	Positioning can only be performed if the mode of traverse (A or K) is entered.

Mode of traverse A,K 

"**A**" behind a numeric value means:
the programmed value is positioned as an **absolute measure** – normal case.

"**K**" behind a numeric value means:
the programmed value is positioned as an **incremental measure** ☞ chapter "Positioning of the automatic material feed slide" with incremental measures.

"*" behind a numeric value means:
The value is **not positioned** (for example the length of a trim cut set).

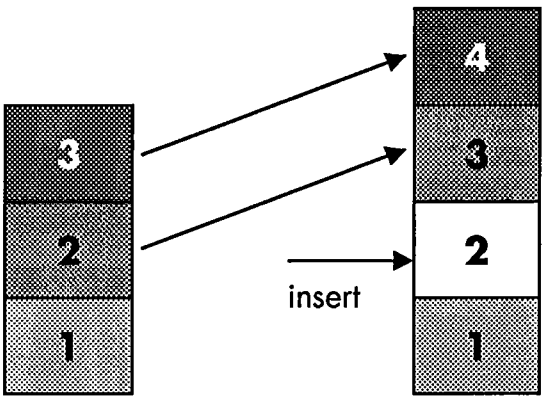
By pressing the push button "Mode of traverse" once again, "K" will appear behind "A", repressing the button will display "*".

Control buttons	Display	Remarks
→ 2 5	pr:7 #bars:0 set:1 INP 1L: 120.5A RqQ: 25 AcQ: 0 2W: 0.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	Enter desired quantity, for example 25.
→	pr:7 #bars:0 set:1 INP 1L: 120.5A RqQ: 25 AcQ: 0 2W: 0.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	Enter actual quantity. For new programming, enter 0 or skip this section. The display might show > 0 if the set was partially executed. RqQ = AcQ after the set is finished.
→ ± 1 5	pr:7 #bars:0 set:1 INP 1L: 120.5A RqQ: 25 AcQ: 0 2W: -15.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	Enter mitre angle of 15° to the left. By pressing the button ± the sign will alter.
→	pr:7 #bars:0 set:1 INP 1L: 120.5A RqQ: 25 AcQ: 0 2W: -15.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	

Control buttons	Display	Remarks
	pr:7 #bars:0 set:**1** INP 1L: 120.5A RqQ: 25 AcQ: 0 2W: -15.0**A** AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	"A" confirms the angle value, and positioning is done as an absolute measure.
	pr:7 #bars:0 set:**1** INP 1L: 120.5A RqQ: 25 AcQ: 0 2W: -15.0A AdF: **0** BaC: 0 3A: 0.0* JpP: 0 JpC: 0	Proceed as described for all further inputs.
		The push button ENTER can be used instead of the cursor to change to the next section.
 etc. until end of set	pr:7 #bars:0 set:**1** INP 1L: 120.5A RqQ: 25 AcQ: 0 2W: -15.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: **0**	
	pr:7 #bars:0 set: **2** INP 1L: 120.5A RqQ: 25 AcQ: 0 2W: -15.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	After entering a value in the last section "JpC", ENTER **must** be pressed to automatically get to the next section. The values are defined by 0.0. The following sets are programmed accordingly.

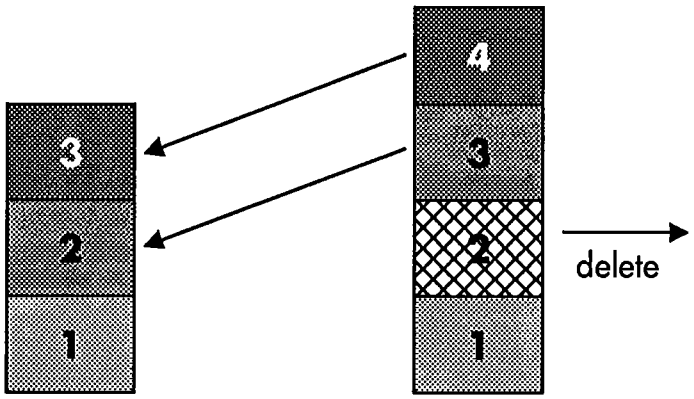
Insertion of sets		
Control buttons	**Display**	**Remarks**
Ins	initial set No.2 pr:7 #bars:0 set: 2 INP 1L: 20.5A RqQ: 1 AcQ: 0 2W: 45.0A AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	Additional sets without defined parameters can be inserted if the cursor is located in the section "Set".

By pressing > INS < a new set without defined parameters is inserted above the actual set. The previous parameters of set No. 2 are now located below set No. 3. Sets with higher numbers are automatically moved upwards by one.



Ins	new set No. 2 pr:7 #bars:0 set: 2 INP 1L: 0.0* RqQ: 0 AcQ: 0 2W: 0.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	If no valid parameters are entered, the inserted set is automatically cancelled.

Deletion of sets		
Control buttons	**Display**	**Remarks**
2 →	pr:7 #bars:0 set:**2** INP 1L: 20.0A RqQ: 3 AcQ: 0 2W: 0.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	The set number is selected, the resp. set is displayed.
Del	pr:7 #bars:0 set:**2** INP 1L: 134.0* RqQ: 9 AcQ: 0 2W: 45.0A AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	By pressing the push button > DEL < the parameters of the displayed set are deleted and the parameters of all following sets are moved down by one set.
	Set No. 3 is now set No. 2	



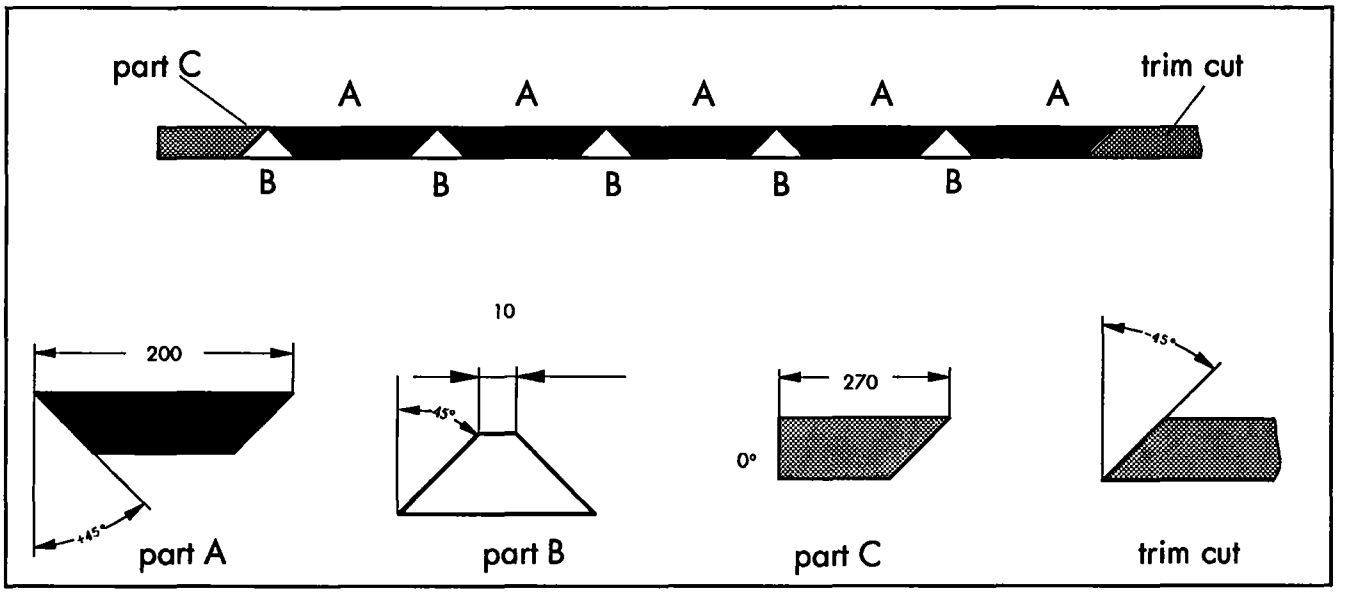
Deletion of complete programs

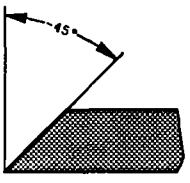
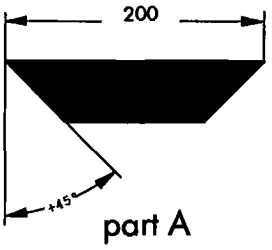
Control buttons	Display	Remarks
ESC	manual/reference enter program delete program special function	Return to main menu by pressing ESC (if necessary, more than once).
↓ ↓	manual/reference enter program delete program special function	
→ 7	delete program program No.: 7	 All programs are finally deleted by pressing ENTER.
→	manual/reference enter program delete program special function	Cancel this function by pressing the push button ESC. The program will not be deleted. ESC

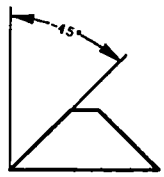
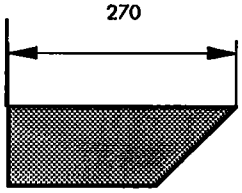
Cycle programming

Cycles are programmed if certain lengths and angles are to be repeated.

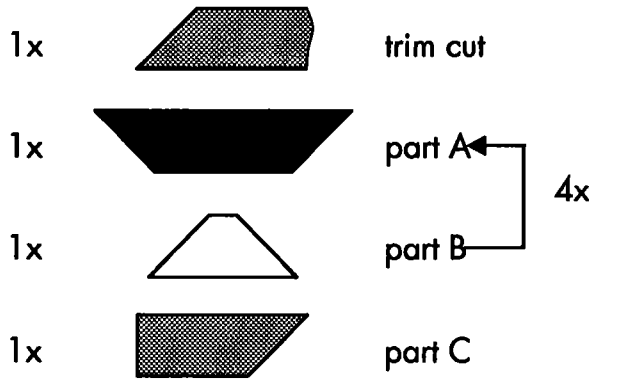
Example:



Control buttons	Display	Remarks
 trim cut	pr: 1 #bars: 1 set: 1 INP 1L Ø.Ø * RqQ: 1 AcQ: Ø 2W –45.Ø A AdF: Ø BaC: JpP: JpC:	*at 1L indicates a trim cut. The programmed length value is not important. Only the angle is positioned (trim cut length + machine parameter).
 part A	pr: 1 #bars: 1 set: 2 INP 1L 2ØØ.Ø A RqQ: 1 AcQ: Ø 2W 45.Ø A AdF: 2 BaC: Ø JpP: Ø JpC: Ø	RqQ:1 means: After cutting of one part, the program jumps to set No. 3 automatically.

Control buttons	Display	Remarks
 part B	pr: 1 #bars: 1 set: **3** INP 1L 1Ø.Ø A RqQ: 1 AcQ: Ø 2W –45.Ø A AdF: Ø BaC: 1 JpP: 2 JpC: 4	JpC: 5 means: before positioning is done the jump counter is reduced by 1. As long as the jump counter is > 0 and set No. 3 is executed, the program continues with set No. 2 shown in the section JpP.
 part C	pr: 1 #bars: 1 set: **4** INP 1L 27Ø.Ø A RqQ: 1 AcQ: Ø 2W Ø.Ø A AdF: 4 BaC: 1 JpP: Ø JpC: Ø	Cutting of part C is done in position AdF: 4. After cutting part C, the remaining material bar can be cut into any desired amount of pieces.

Scheme of cycle programming

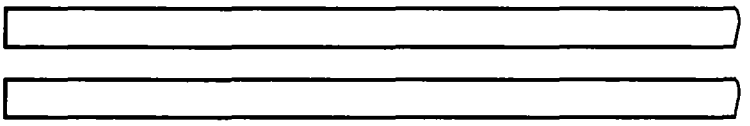


Bar-oriented cutting

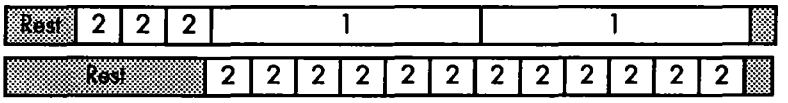
Opposite to quantity-oriented cutting, bar-oriented cutting means that after each bar change, the program is started with set No. 1, regardless of complete set execution, and if materail bars are cut in the same set sequence.

programmed lengths: 2 x part 1 [1]
15 x part 2 [2]

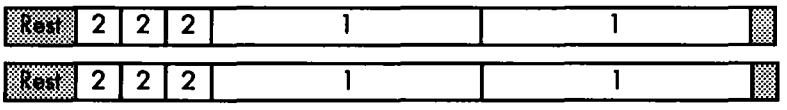
initial bar length: 2 bars



quantity-oriented



bar-oriented



Control buttons	Display	Remarks
trim cut	pr: 2 #bars: 2 set: 1 INP 1L Ø.Ø * RqQ: 1 AcQ: Ø 2W * AdF: 21 BaC: Ø JpP: Ø JpC: Ø pr: 2 #bars: 2 set: 2 INP 1L Ø.Ø * RqQ: 1 AcQ: Ø 2W Ø.Ø **A** AdF: Ø BaC: Ø JpP: Ø JpC: Ø	A so-called "control block" is inserted before a trim cut is executed to indicate a bar-oriented program (display AdF: 21). The other sections remain empty.

Control buttons	Display	Remarks
[ ] 2 x part 1	pr: 2 #bars: 2 set: 3 INP 1L **2ØØ.Ø** **A** RqQ: **2** AcQ: Ø 2W **Ø.Ø** **A** AdF: 2 BaC: 1 JpP: Ø JpC: Ø	
[ ] 15 x part 2	pr: 2 #bars: 2 set: 4 INP 1L **3Ø.Ø** **A** RqQ: **15** AcQ: Ø 2W **Ø.Ø** **A** AdF: 4 BaC: Ø JpP: Ø JpC: Ø	

NOTE: The material bar is exchanged if the bar is longer than necessary for cutting the programmed cut-off lengths, and the end piece length is < 500 mm and a control set (see set 1) with AdF = 22 is programmed.

The automatic operation is interrupted for bar exchange if the end piece is longer than 500 mm.

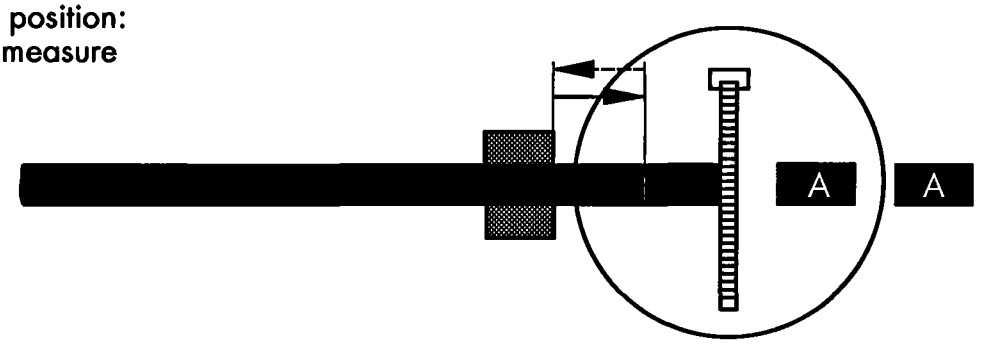
Long end pieces are transported to the end piece storage of the magazine automatically.

Positioning of the automatic material feed slide in incremental measures

Positioning in incremental measures = the automatic material feed slide moves to various positions successively without opening the clamping jaws between each step and moving back to the side of material feed.

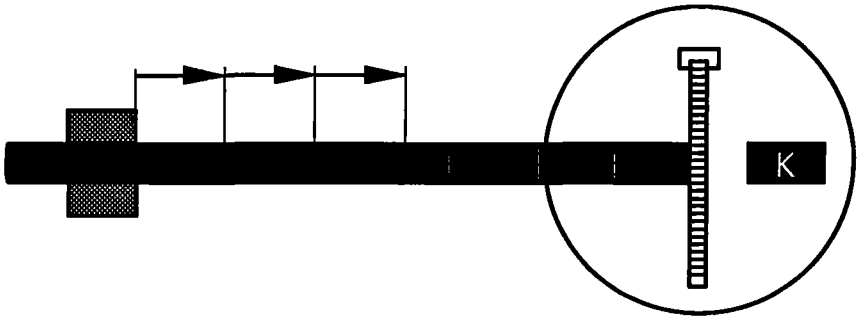
Advantages:
- Length tolerances are reduced since additional clamping is avoided.
- Cycle time is reduced for short cutting periods.

Standard position:
Absolute measure



Control buttons	Display	Remarks
 part A	pr: 3 #bars: 1 set: 1 INP 1L 3Ø.Ø **A** RqQ: 3 AcQ: Ø 2W Ø.Ø A AdF: 2 BaC: 1 JpP: Ø JpC: Ø	The letter > **A** < behind the length value indicates the absolute measure of the cut-off length.

Example for incremental measure



Control buttons	Display	Remarks
  part K	pr: 3 #bars: 1 set: 1 INP 1L 3Ø.Ø K RqQ: 3 AcQ: 1 2W Ø.Ø A AdF: 2 BaC: 1 JpP: Ø JpC: Ø	By pressing the push button "mode of traverse" the system is switched to the mode "incremental measure".

NOTE: Select incremental measure for axis 1L. only.
Always use the absolute measure (A) or (*) for the axis 2W (rotary table).

Automatic bar exchange

The exact length of the end piece of a bar which was processed is normally not known. The control stops program execution at the end of a material bar to enable safe removal of the end piece.

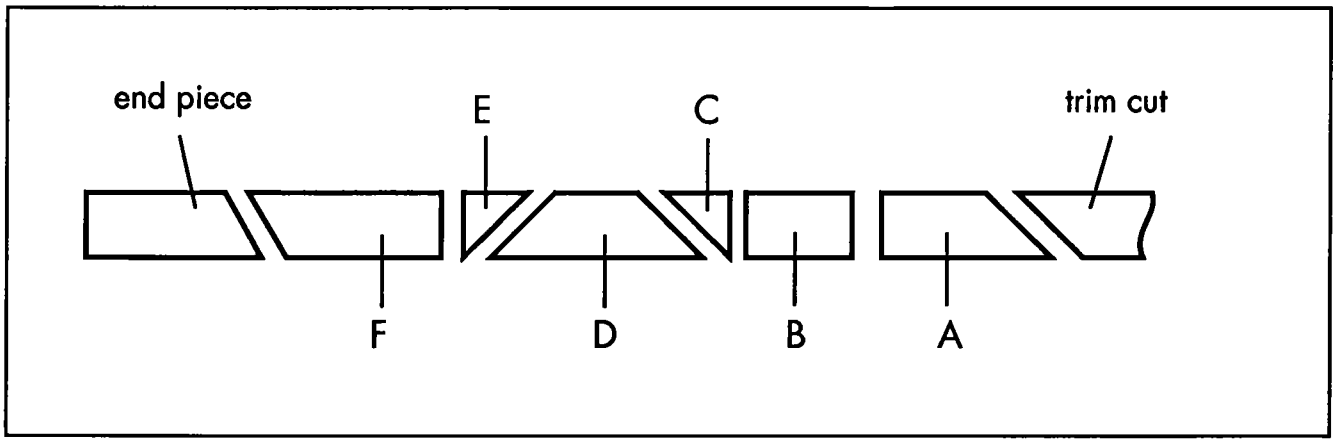
If the end piece should not be removed manually, the "program" set with AdF = 22 and RqQ = 1 must be entered before the "actual cut-off" set is entered. Other values remain undefined:

```
pr:  #bars:0   set:1  INP
1L:   0,0 *    RqQ:  1  AcQ: 0
2W:   0,0 *    AdF: 22  BaC: 0
3A:   0,0 *    JpP:  0  JpC: 0
```

The control stops in any case if end piece lengths are > 500 mm.

Depending on its shape, the end piece might jam when using AdF = 22 because the end piece is pushed across the table without being guided.

Programming example

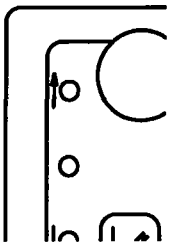
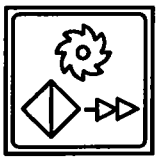
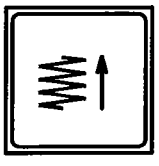


Operation	Display	Remarks
	enter program programm-No.: 1 # bars:0 width: 50 mm clear cut-off counter: <DEL>	For the automatic calculation of the length of the waste piece, the exact material width must be entered.
trim cut	pr:1 #bars:0 set:1 INP 1L: 0.0* RqQ: 1 AcQ: 0 2W: 45.0A AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	The trim cut is defined by * in section 1L and by a programmed angle value in section 2W. Trim cut length is defined by machine parameters.
part A	pr:1 #bars:0 set:2 INP 1L:200.0A RqQ: 1 AcQ: 0 2W: 0.0A AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	Enter the resp. distribution position into the section AdF when using a cut-off gripper.

Operation	Display	Remarks
part B	pr:1 #bars:0 set:3 INP 1L:150.0A RqQ: 1 AcQ: 0 2W: 0.0A AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	RqQ:1 means that after-cutting of one part, the control jumps automatically to the next set, in this case No. 4.
part C (waste piece)	pr:1 #bars:0 set:4 INP 1L: 0.0* RqQ: 1 AcQ: 0 2W: 45.0A AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	A waste piece is defined by * in section 1L and aprogrammed angle value in section 2W.
part D	pr:1 #bars:0 set:5 INP 1L:300.0A RqQ: 1 AcQ: 0 2W:-45.0A AdF: 0 BaX: 0 3A: 0.0* JpP: 0 JpC: 0	
part E (waste piece)	pr:1 #bars:0 set:6 INP 1L: 0.0* RqQ: 1 AcQ: 0 2W: 0.0A AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	
part F	pr:1 #bars:0 set:7 INP 1L:350.0A RqQ: 1 AcQ: 0 2W: 45.0A AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	

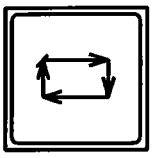
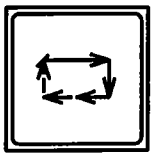
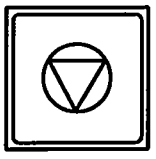
Performance of single cuts

Start cutting operation only if the safety cover is closed! The key-operated switch is turned to "operation", the saw blade is located beneath the rotary table.

Button	Name	Function
	Turn rotary table to correct angle position and clamp.	– (depending on machine type: manual, automatic or numerical control).
	Adjust clamping device OMNI - PREST and sawing height.	–depending on material diameter.
	Adjust saw feed.	– depending on material diameter and type of material and tools used.
	Select cutting speed (step 1 or 2).	–The saw blade will rotate at the selected speed.
	Insert material into saw and position (length stop). Ensure proper fitting at the rear workpiece stop. Adjust horizontal vise accordingly (not necessary for cut-off gripper).	
	Start cutting procedure.	–Cover is closed. – Vise is clamped. – Saw feed is activated.

Automatic program execution

The first cut is performed as a single cut. Automatic execution can be started simultaneously.

Buttons	Name	Functions
Start execution		
	push button indicator (red) Automatic mode "ON"	Switch from manual to automatic mode.
	push button indicator (green) Start automatic cycle	The cut-off gripper moves to the first actual cut-off length. The program is now executed automatically. **NOTE:** A first trim cut set (1L = ...*) displayed by MULTICOM is disregarded and is only essential for automatic material bar exchange.
Interrupt execution		
	push button indicator (yellow) Interrupt automatic cycle	Execution is stopped after the current cutting procedure is finished. The saw remains in the automatic mode until execution is restarted. Restart with green push
Finish execution		
	push button indicator (red) Stop automatic cycle	button. Execution is stopped after the current cutting procedure is finished and the manual
Immediately stop execution		
	push button indicator (white) Manual mode	mode is activated. Any current sawing or positioning procedures are stopped, the system switches to the manual mode immediately.

Selection of the program set

Automatic execution always starts with the set which is displayed by the MULTICOM control. If no set or program was selected, the program starts with the first set of the previously executed (not programmed!) program.

At bar-oriented cutting (see chap. DD6544-61.. ..; AdF: 21) the flow starts always with the first set of the program.

Display	Remarks
pr2 #bars:0 set: **1** INP 1L: 120.0 A RqQ: 3 AcQ: 0 2W: 0.0* AdF: 0 BaC: 0 3A: 0.0* JpP: 0 JpC: 0	The program can be started with any valid set desired, not necessarily with the first set of the program.
	The integrated actual cut-off counter (AcQ) which counts the cut-offs of previous set execution is not automatically reset to 0, but continues counting.
enter program program No.: 2 #bars: 0 width: **50** mm clear cut-off counter:<DEL>	The integrated counter AcQ can be reset to "0" by pressing the button DEL before a program set is selected.
	If a program is started with a set containing RqQ = AcQ, the message "invalid program" will appear. In this case, set AcQ to 0.

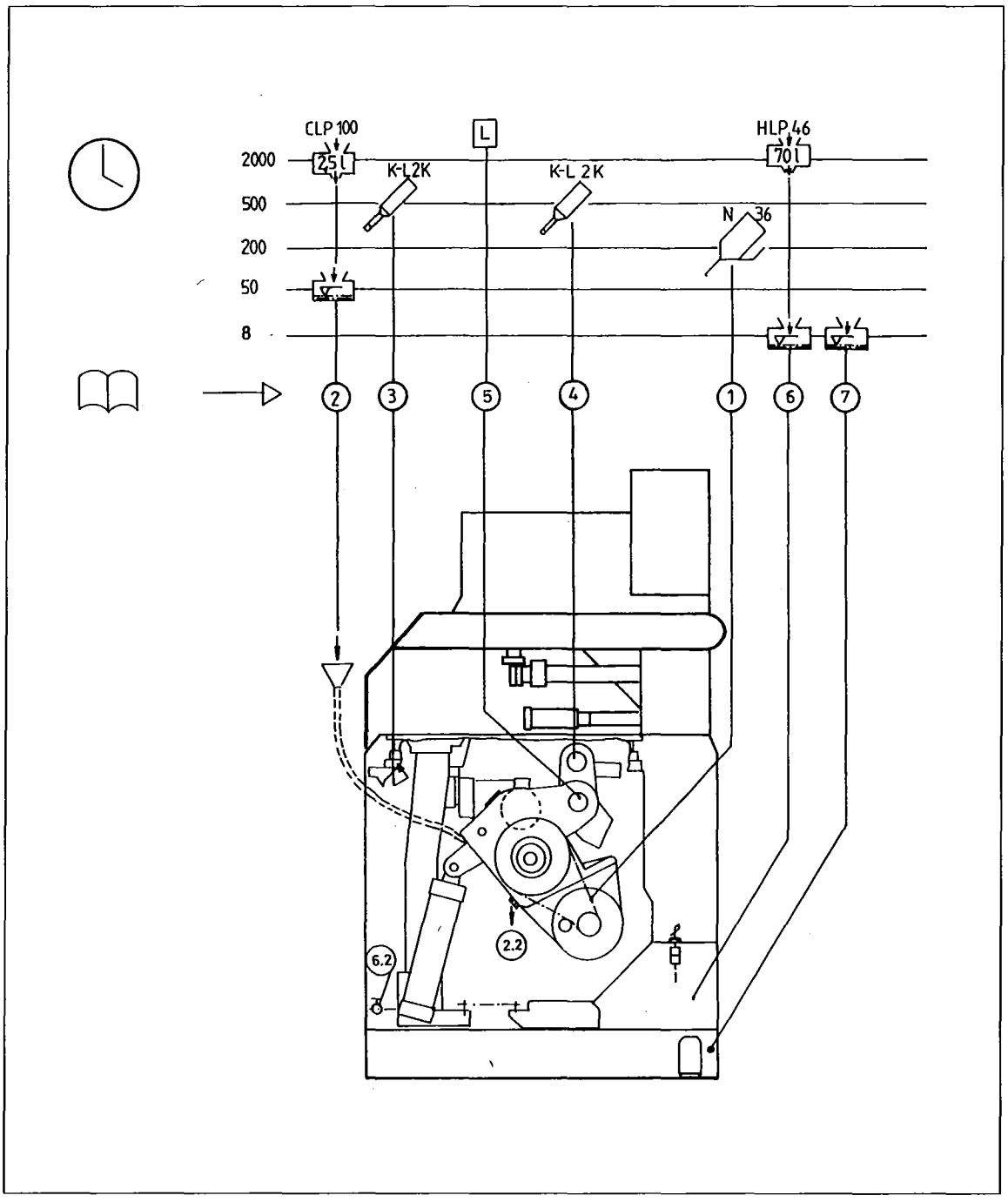
5.1 Servicing

Dirt and chips should be removed from the machine daily.The chip drawer can be pulled out completely to the front. Use a hand-brush to remove the chips.

NOTE:
Never use compressed air to clean the machine. Guides, sealings or other functional surfaces can be damaged by flying chips.

3% -Cutol emulsion can be used to remove dirt or chips sticking to the machine.

NOTE:
If other cleaners are used, make sure they do not affect lacquer or rubber or plastic parts.
Never contaminate coolant with cleaner!



1 - Drive chain
2 - Gear
3 - Rotary table
4 - Swivelling axle
5 - Horizontal gear adjustment
6 - Hydraulic unit
7 - Cooler

5.2 Lubrication and maintenance instructions

Drive chain
- Lubricate if necessary.
- Check chain tension after 100 working hours. If necessary, tighten chain. Further checks approx. every 1000 working hours.

Gear
- First oil filling is done by the supplier.
- First oil change after 200 working hours, then every 2000 working hours. Filling capacity 2.5 l, gear oil type CLP-100 (ISO-VG).
- Drain oil (2.2) by opening the oil drain plug (lower gear position).
- Refill with oil by inserting the funnel tube into the filling hole (lower gear position).
- The oil level can be controlled by the oil level glass (lower gear position).

Rotary table
- Both lubricating nipples are located at the bottom side of the rotary table.
- Turn rotary table cw or ccw to approx. 45° and grease with lever grease gun. Clean nipple head before greasing.
- For motorized table movement: remove front cover and lubricate chain, if necessary.

Swivelling axle
- provided with life-lasting lubrication.

Horizontal gear adjustment
- Lubricate every 500 working hours with lubricant KL2K
- Ratary table position 45° right and left
- Clean nipple head before greasing.

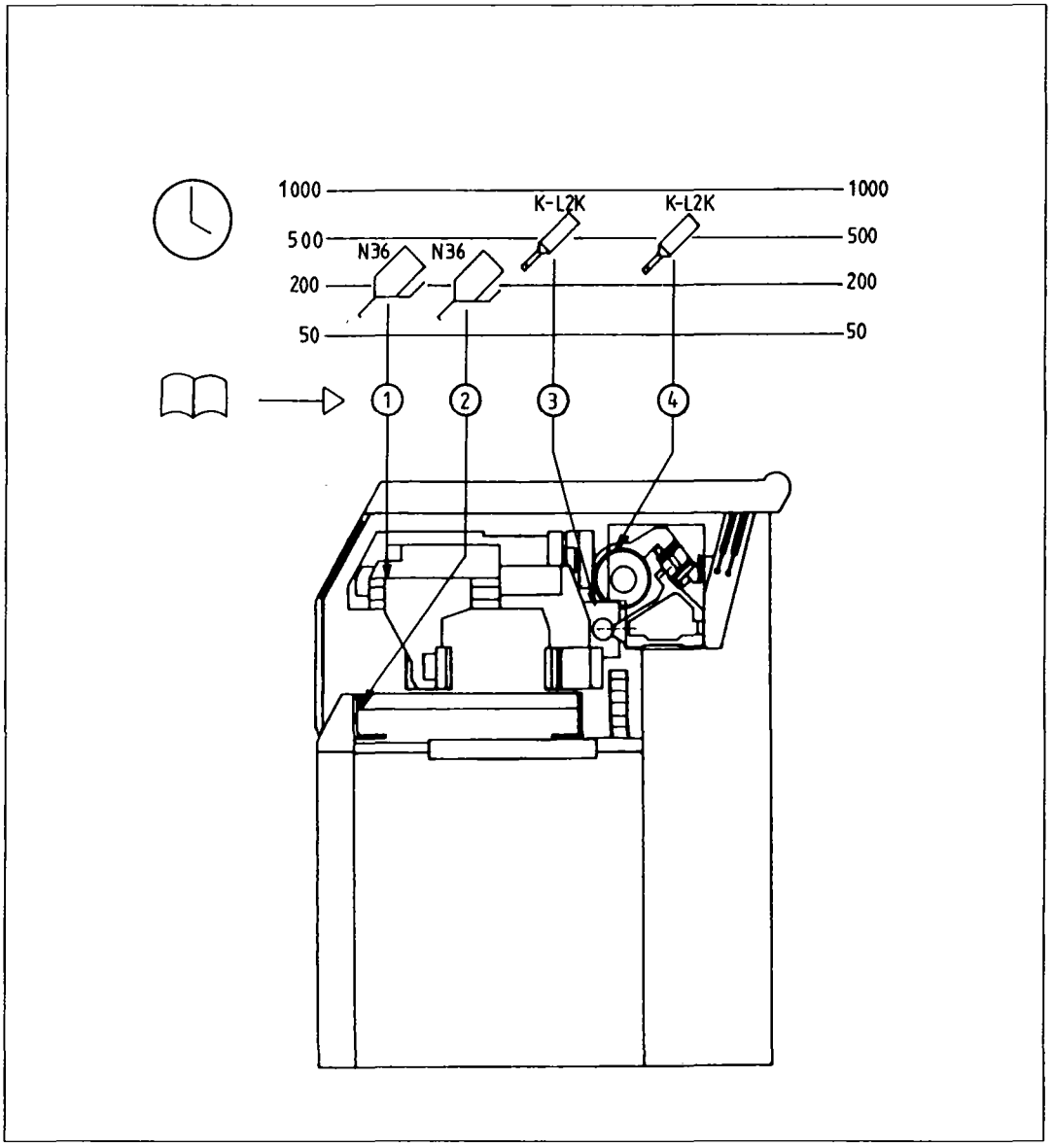
Hydraulic unit
- First hydraulic oil filling is done by the supplier.
- Remove rear safety cover to check oil level. Oil level can be read from oil dip stick.
- Change oil after 2.000 working hours or after contamination. Filling capacity approx. 70 l, hydraulic oil type H LP-46 (ISO-VG).
- Replace oil filter after 2000 working hours or contamination.

Saw blade cooler
- Use coolant **Kaltenbach Cutol 2000 Biostabil.** Mixture ratio with water: 1:20.
- The coolant tank is located in the machine box of the chip container.
- The amount of coolant running to the saw blade can be regulated by a valve (6.2).

Lubrication chart

	Gear oil C-LP 100	Hydraulic oil H-LP 46	Lubricant N 36	Grease KL 2 K
CASTROL	Alpha ZN	Hypsin AWS	Mayna BD	Spheerol AP 2
ESSO	Spartan EP	Nuto H	Febis K	Multi purpose gr
SHELL	Omala Oil	Tellus Oil	Tonna T	Alvania R 2

The indicated gear oil types (C-LP 100) and hydraulic oil types (H-LP 46) are suitable for tempered climate zones. For tropical or arctic climate zones, use the respective thick- or thin-bodied oils.
The sequence of the named manufacturers is not graded by quality - any equivalent oil or lubricant can be used.



1 Gripper guides
- Lubricate if necessary, lubricant type N 36.

2 Chain of roller conveyor (only for driven rollers)
- Lubricate if necessary, lubricant type N 36.

3 Linear and circular guides
- Clean lubricating nipples.
- Use just enough lubricant to enable faultless ball rotation.
- Lubricant according to DIN 51 818.

4 Ball bearing spindle
- Use just enough lubricant to fill up the cavities halfway.
- Never use graphite or MoS2 additives !
- Lubricant according to DIN 51 818l.

6. Technical data

6.1 General remarks

The technical data contains all necessary specifications of components for easy identification and exchange of spare and wearing parts.
We recommend the exclusive use of original spare parts. The use of other brands may endanger safe system operation.

To order spare parts, please indicate the following specifications:

Machine type	(for example KKS 401 NA)
Machine No.	(for example 123.456)
Name of spare part	(for example "aluminium thrust piece")
Order No. of spare part	(for example 3-1089-183011)
desired mode of delivery	(for example express transport by rail)

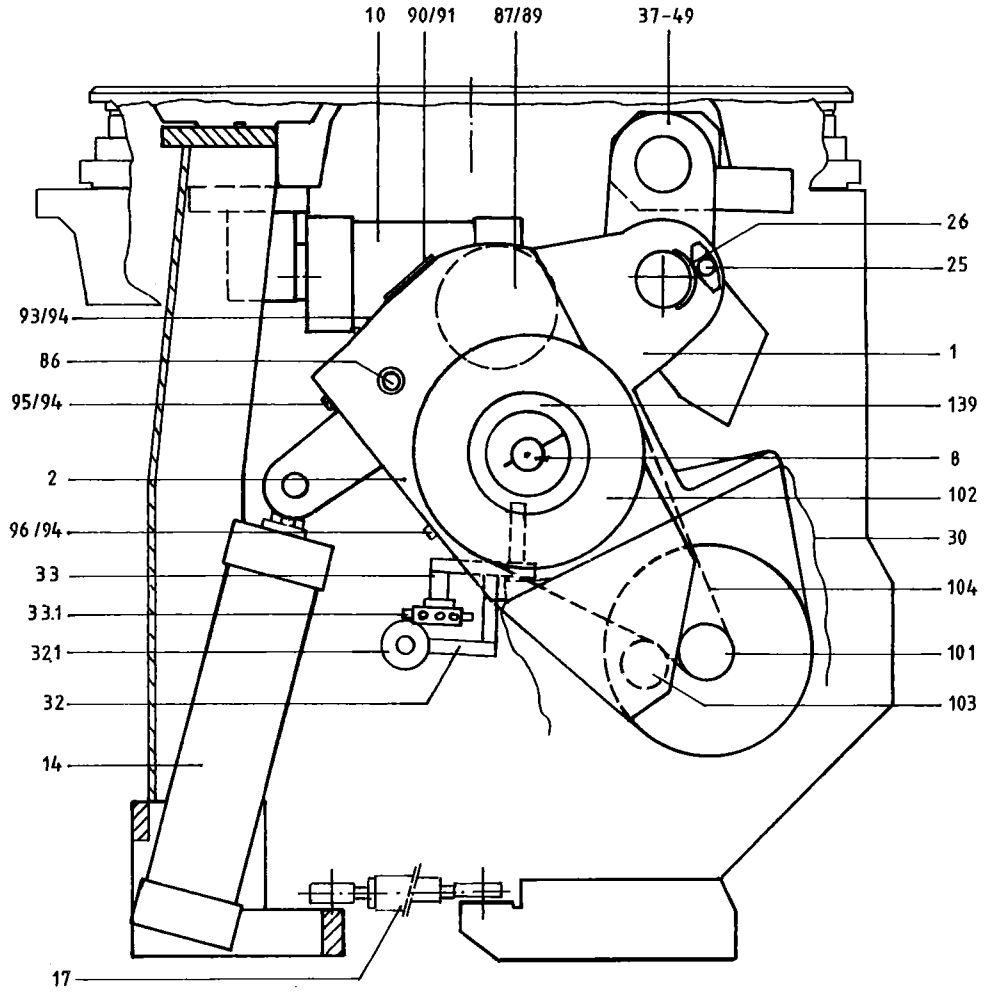
6.2 Saw blades and chip remover

Saw blade holding fixture according to DIN 8576 :
- bore D = 50 H7
- 4 carrier bolts D = 13
- pitch circle of carrier bolts D = 80

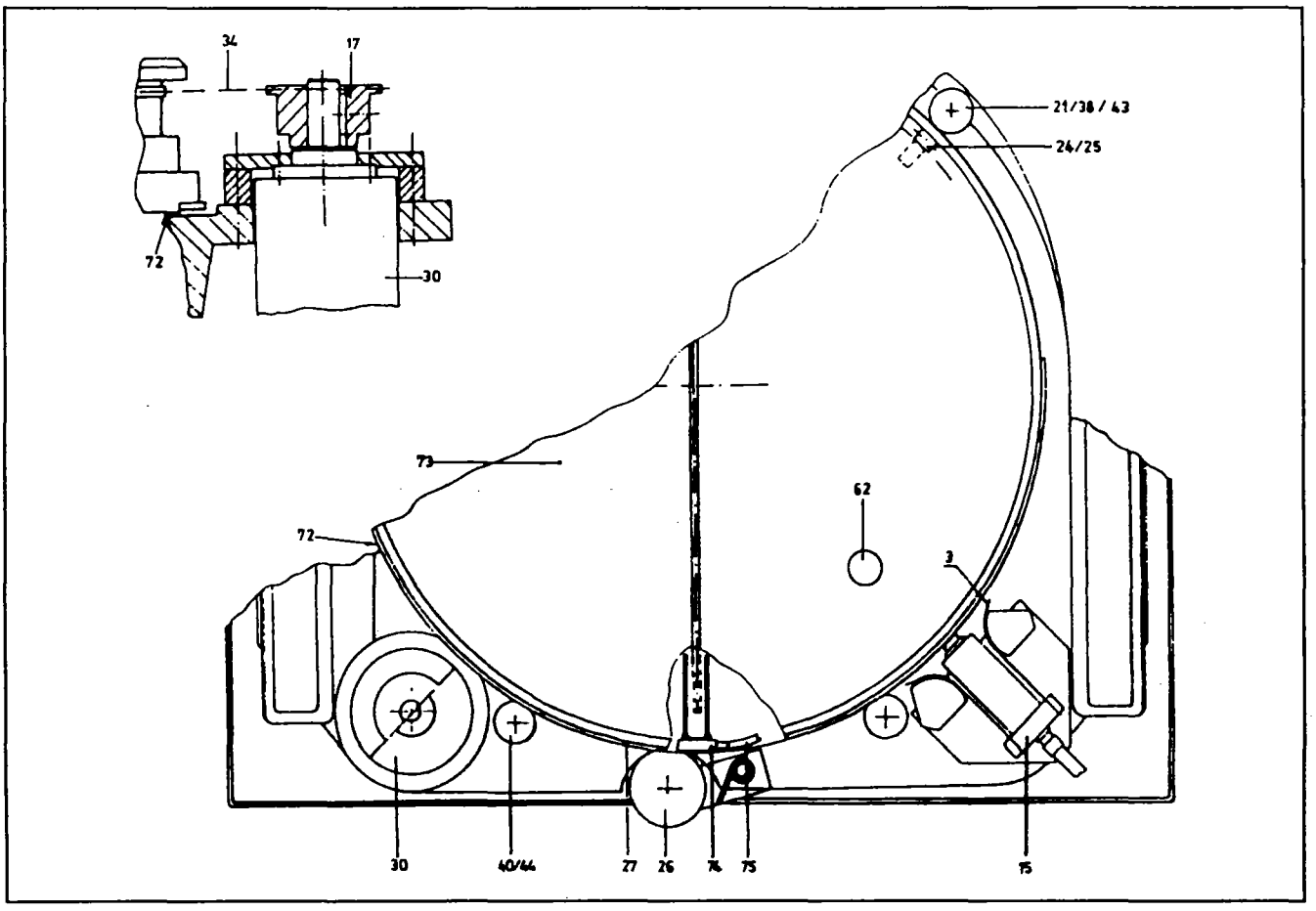
HSS segmental saw blades		Spacing		Pin chip remover* for spacing (mm)				
Diameter	Sprockets per segment	new	min	Order-No.	Pins	T	max.	min.
400	Z 3	26,2	23,9	8-9001-10012	12	P	27,5	25,2
				8-9001-09513	13	P	25,1	23,2
	Z 4	19,6	17,9	8-9005-07017	17	P	19,5	18,0
	Z 5	15,7	14,3	8-9005-06021	21	P	15,8	14,6
				8-9005-05522	22	P	15,0	14,0
	Z 6	13,1	11,9	4-2060-02617	25	G	13,1	12,1
				8-9001-04527	27	P	12,1	11,1
425	Z 3	24,7	22,7	8-9001-09513	13	P	25,1	23,2
				8-9005-09014	14	P	23,7	21,9
	Z 4	18,5	17,0	8-9005-07018	18	P	18,4	17,0
	Z 5	14,8	13,6	8-9005-05522	22	P	15,0	13,9
	Z 6	12,4	11,3	8-9005-04527	27	P	12,3	11,4

P : polyamide
G : cast

*Delivery in sets of 4 pieces each

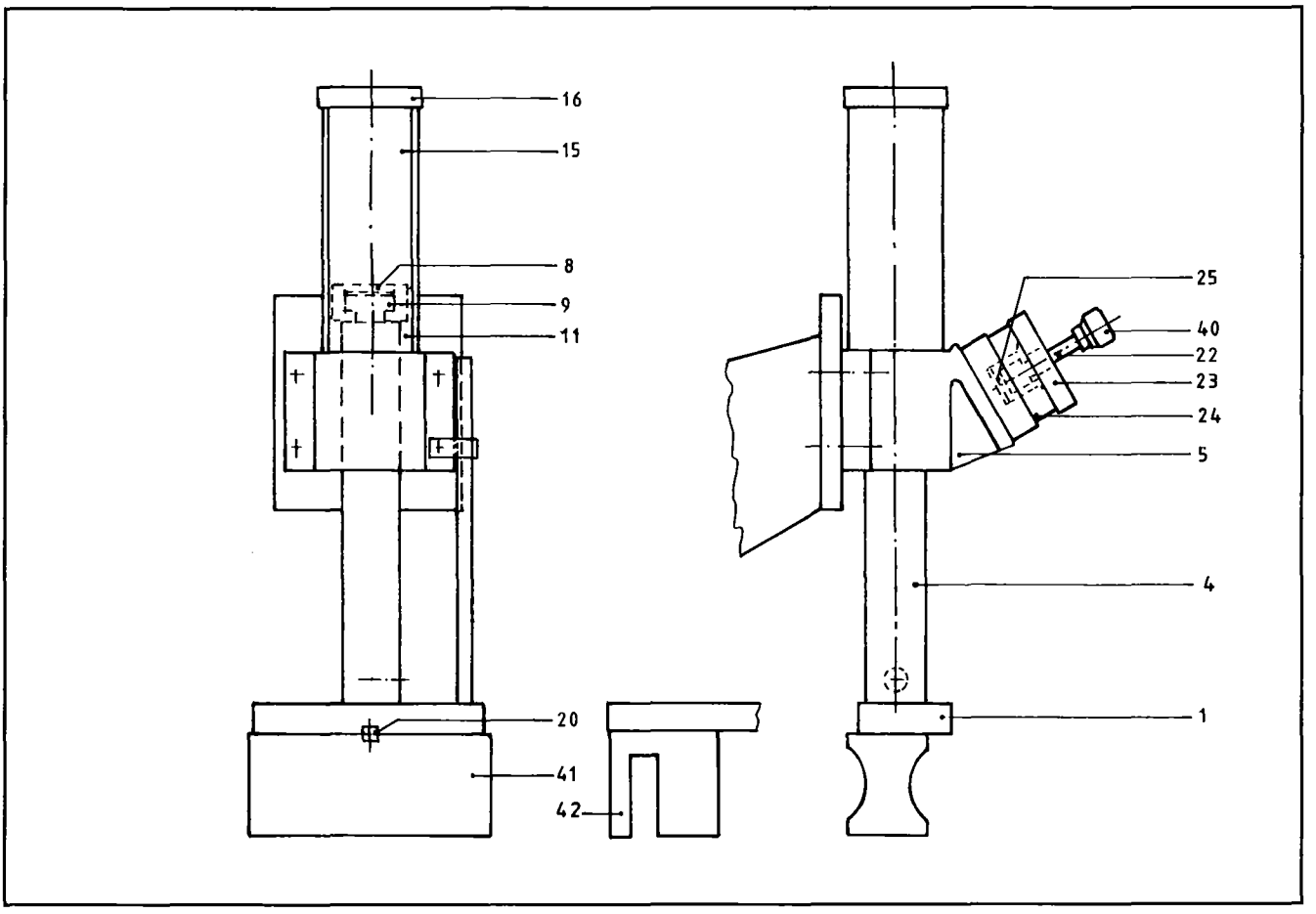

10
90/91
87/89
37-49
26
25
93/94
1
86
139
95/94
8
2
102
96/94
30
33
104
33.1
32.1
101
32
103
14
17

Pos.	Quantity	Name		Order-No.
1	1	complete gear		0-6510-004200
2	1	gear lid		1-6510-001810
8	1	driving pinion Z13		3-6510-002010
	1	sealing ring		8-2330-03004
	1	interior ring		7-0620-25170
	1	deep groove ball bearing		7-0625-25170
	1	needle bearing		7-0617-02501
	1	O-ring		8-2300-06200
	1	O-ring		8-2300-02500
	1	guard ring		7-0472-03700
10	1	complete pitchoperating cylinder		2-6510-001200
	1 set	sealing		2-6510-001200/1
14	1	feed cylinder		2-6510-000700
	1 set	sealing		2-6510-001200/1
17	1	support		4-6510-005910
25	1	rotary encoder		8-4620-30040
26	1	tooth segment		4-6501-003310
30	1	plastic safety cover		3-2307-014010
32	1	VULKOLLAN roll holder		2-6510-012000
33	1	holder for pin chip remover D = 20		3-6510-009700
		OPTION : holder for pin chip remover D = 12		3-6510-0097A0
37	1	swivel axis		3-6510-005310
38	1	regulating handle		3-6510-005110
41	1	guard plate		8-1102-05000
48	2	needle bearing		7-0912-05007
49	3	sealing ring		8-2325-50003
86	1	oil level glass		8-2250-60000
87	1	loose flange		4-1045-110000
89	1	screw M 16 x 50		7-0933-16502
90	1	cover plate for gear		3-1045-106010
91	1	ABIL sealing		4-1045-107010
93	1	screw plug		4-1045-037000
94	3	copper sealing ring		8-2335-16200
95	1	screw plug		7-0910-16000
96	1	magnetic screw plug		7-0910-16002
101	1	sprocket wheel Z 16		3-6510-003220
102	1	sprocket wheel Z 98 (at 10/20 m/min)		3-6510-003110
	1	sprocket wheel Z 72 (at 13/26 m/min)		3-6510-003130
	1	sprocket wheel Z 59 (at 15/30 m/min)		3-6510-003140
103	1	sprocket wheel tightener Z 15 (complete)		4-6510-003310
104	1	chain (at 10/20 m/min)		8-1141-10110
	1	chain (at 13/26 m/min)		8-1141-10092
	1	chain (at 15/30 m/min)		8-1141-10084
139	1	sprocket wheel flange		3-6510-003010



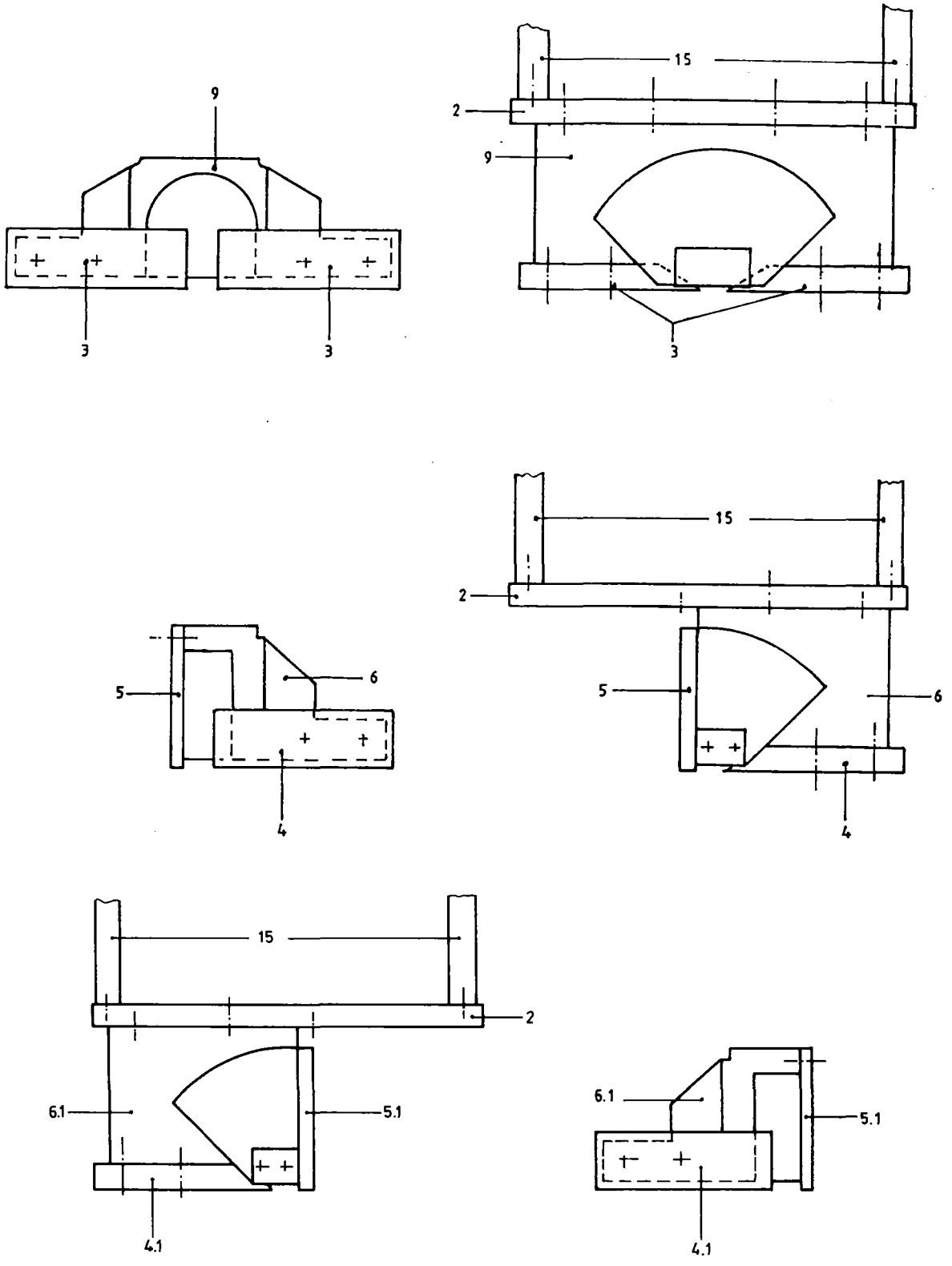
Pos.	Quantity	Name		Order-No.
3	1	clamp fitting		0-6508-000430
15	1	clamping device		5-6508-005400
17	1	sprocket wheel Z 22		4-6508-003110
21	2	eccentric box		4-6508-002610
24	2	pin for chain fastening		4-6508-003910
25	2	clamp bolt		4-6508-003810
26	1	impulse encoder		3-6508-004300
26.1	1	transmitting pinion		4-6508-004910
26.2	1	leg spring		4-6508-002410
27	1	toothed segment		2-6508-003710
30	1	servo gear motor		8-4080-09901
34		chain 3/8"		8-1140-10000
	2	connector link 3/8"		8-1143-06000
38	2	deep groove ball bearing 6203-2Z		7-0625-17122
40	2	rollers RL 202 NPP		8-1030-15110
43	2	dowel bolt M 10 x 100		7-0609-10001
44	2	dowel bolt M 14 x 50		7-0610-14500
62	1	machine handle D 32		8-3310-32000
72	253	balls 5/16"		7-5401-07938
73	1	rotary table (standard, material feed left side)		1-6508-000310
		rotary table (tempered, material feed left side)		1-6508-000320
74	1,5 m	cooler		3-6510-009400
75		hose		8-2600-10020

Complete clamping device



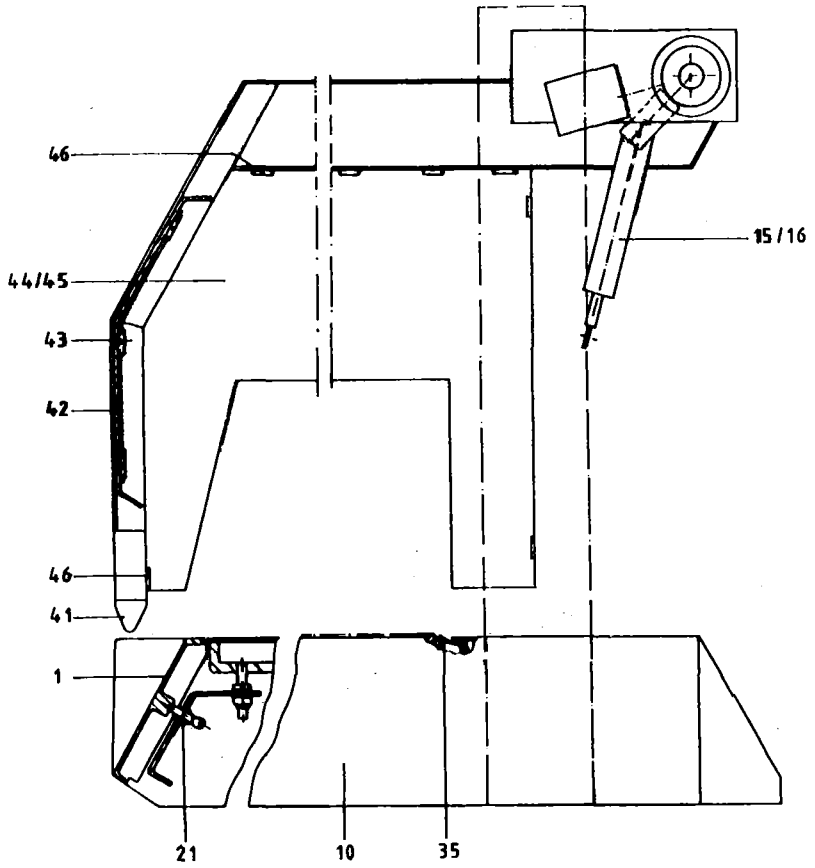
Pos.	Quantity	Name		Order-No.
		Complete clamping device		0-6520-002000
1	1	thrust piece holder		3-6520-000400
4	1	piston rod		3-6520-000310
5	1	holder for clampig device		1-6520-002110
8	1	upper part of piston		4-6520-01010
9	1	lower part of piston		4-6520-001110
11	1	SIMKO piston		8-2315-08000
15	1	cylinder tube		4-6520-000510
16	1	upper cover		4-6020-006020
20	1	adjusting spring		4-6520-002B10
22	1	setting spindle		4-6520-001310
23	1	cylinder cover		4-6520-002310
24	1	cylinder tube		4-6520-001410
25	1	piston		4-6520-001510
40	1	knurled knob		8-3312-03410
41		aluminium thrust piece		3-1089-183011
42		steel thrust piece (only for automatic material feed unit)		4-6520-000800
	1 set	sealing		0-6520-002000/1

KALTENBACH


9
3
3
15
2
9
3
15
2
5
6
4
5
6
4
15
2
6.1
5.1
4.1
6.1
5.1
4.1

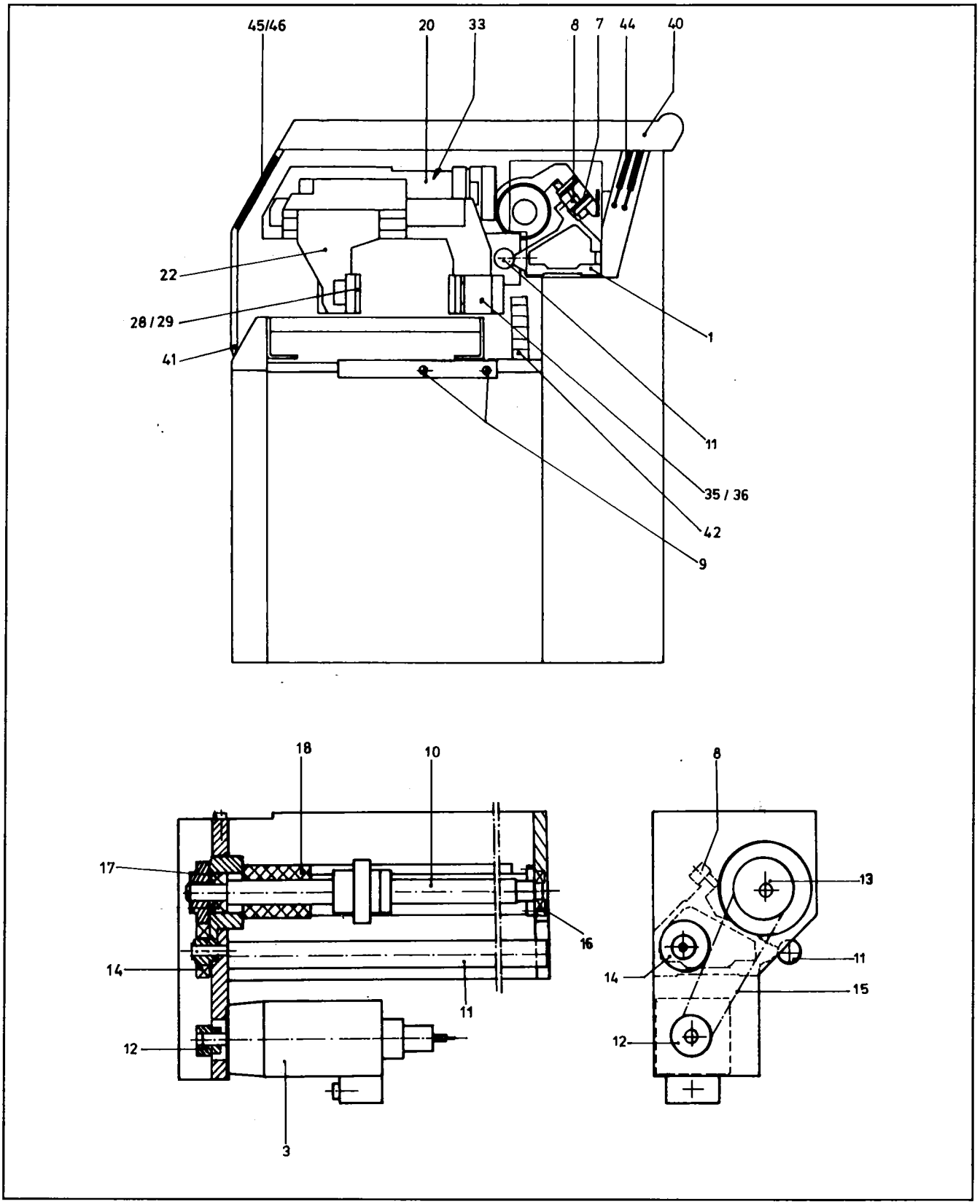
Pos.	Quantity	Name		Order-No.
Stop for cw and ccw rotation:				
2	1	guide rail complete		4-6520-005800
3	1 set	stop plates		3-6520-003500
9	1	cover of workpiece stop		1-6520-002830
15	2	guide piece		4-6589-005810
Stop for rotation in one direction - mat. feed left side:				
4	1	stop plate		3-6520-003510
5	1	stop plate		4-6520-003610
6	1	cover of workpiece stop		1-6520-002910
Stop for rotation in one direction - mat. feed right side:				
4.1	1	stop plate		3-6520-003510
5.1	1	stop plate		4-6520-003620
6.1	1	cover of workpiece stop		1-6520-003010

Table covering and protection cover

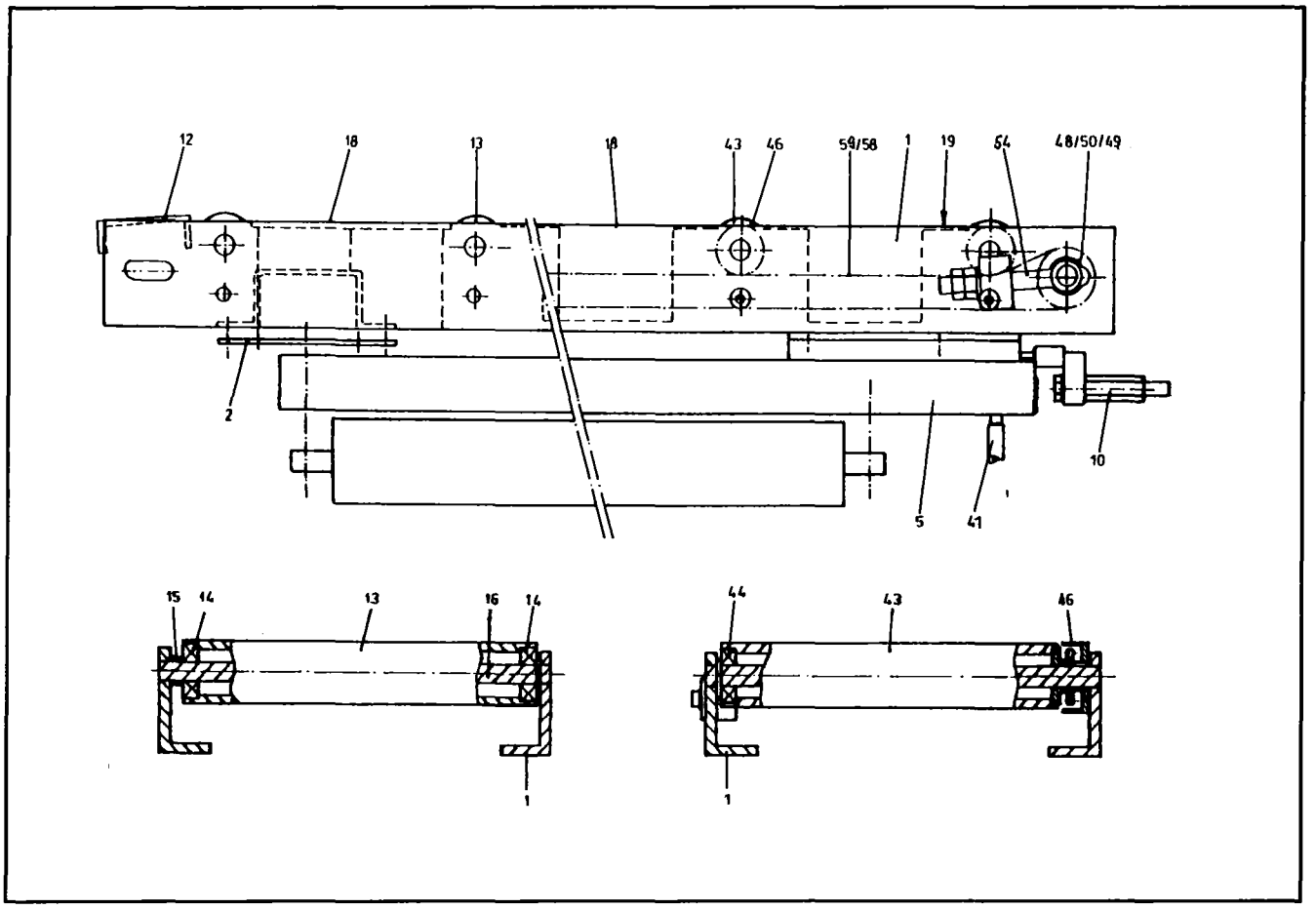


Pos.	Quantity	Name		Order-No.
1	1	Table covering		0-6508-006500
		front cover (without opening)		0-6508-003310
	1	front cover (with opening)		0-6508-003330
21	2	spring shackle		8-3341-13657
35	1	brush stripe		8-0285-71012

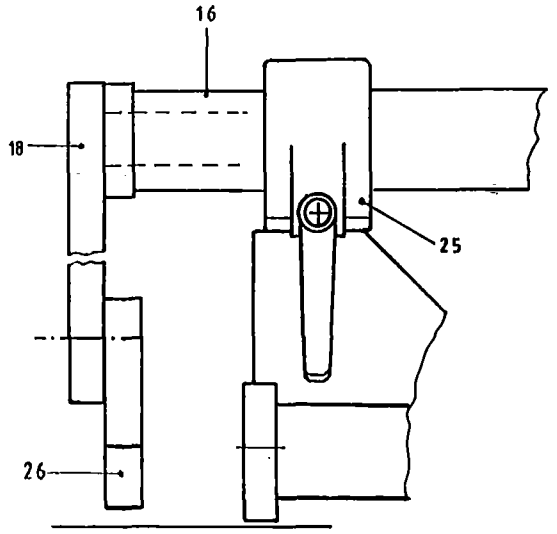
Pos.	Quantity	Name		Order-No.
	1	complete safety		1-6589-003300
15	1	pneumatic spring 085790 (dep. on type)		8-3450-13100
		pneumatic spring 085812 (dep. on type)		8-3450-17100
16	1	lifting cylinder (dep. on type)		8-2230-02000
41	1	safety plug		4-6589-00591
42		front window of cover		3-6589-006010
43	6	fixing clamps DUK 14908		8-0309-26000
44	1	window pane (right side)		2-6589-007520
45	1	window pane (left side, not for automatic material feed unit)		2-6589-007510
46		fixing clamps		8-3345-00002

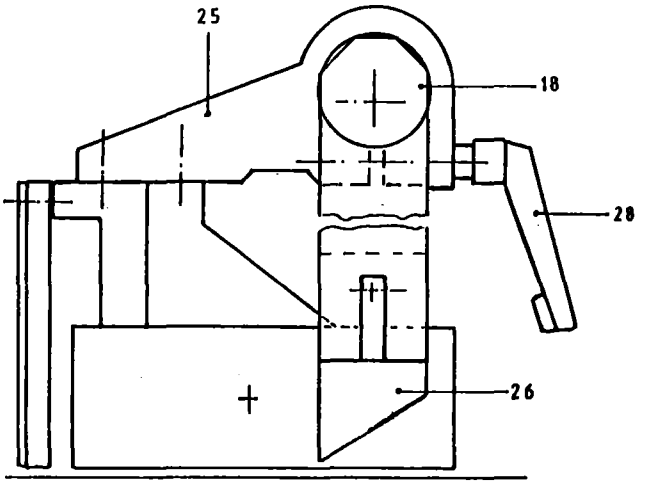

45/46
20
33
8
7
44
40
22
28/29
41
1
11
35/36
42
9
18
10
17
16
14
11
12
3
8
13
11
14
15
12

Pos.	Quantity	Name		Order-No.
1	1	guide holder		0-6540-001300
3		positioning motor		
7	1 set	stripper		4-6540-013110
8	1	roller ledge		3-6540-003710
9	2	connecting bolts		4-6540-012110
10	1	ball bearing spindle P20		3-6128-015510
11	1	linear/circular guides		3-6128-015810
12	1	toothed belt disk Z15		4-6540-005910
13	1	toothed belt disk		4-6540-005810
14	1	eccentric roller 6208 2 Z		7-6125-40182
15	1	toothed belt 16 T 10/720		8-1180-72080
16	1	four-point-bearing QJ 305 TVP		7-0628-25062
17	1	ball bearing 6305 2 Z		7-0625-25172
18	1	rubber spring		4-6540-011510
20	1	complete gripper unit		0-6540-009500
22	1	slide		1-6540-00100
28	1	clamping plate		4-6540-0007410
29	1	spring plate		3-6128-015610
33	1	hydraulic cylinder		2-6128-015410
35	1	rear gripping cylinder		2-6540-015400
36	1	clamping plate		4-6121-113011
40	1	safety cover		0-6540-010000
41	2	safety plug		4-6589-005910
42	1	flexible cable-guiding chain 0450.40, 22 Gl.		8-2071-40200
44	2	pneumatic spring		8-3450-13100
45	1	window for cover		3-6589-006020
46	6	fixing clamps DUK 14908		8-0309-26000



Pos.	Quantity	Name		Order-No.
1	2	roller conveyor angle		2-6540-027710
4	1	mounting plate		1-6540-007900
5	1	drip pan		2-6540-027900
10	2	connecting bolts		4-6540-012110
12	1	cover for proximity switch		3-6540-012410
13		rollers (without drive)		3-6701-177010
14	2	deep groove ball bearing 6304.2Z		7-0625-20162
15	1	distance washer		3-6701-175010
16	1	axis (RB 390)		4-6701-007020
18	4	inserted plate		1-6703-009210
19	1	cover for proximity switch		3-6703-004100
41		plastic hose 10 x 2		8-2600-10020
43		roll with sprocket wheel		3-6701-1760A0
44	1	deep groove ball bearing		7-0625-20162
46		cover for sprocket wheel		3-6703-002310
48		sprocket wheel		4-6703-002510
49		pivot pin		4-6703-002810
50	2	needle bearing NKJ 251 30		7-0617-03012
54	2	clamping screw		7-0444-16303
58		chain 1/2"		8-1140-21000
59		chain link 1/2"		8-1100-08100





Pos.	Quantity	Name		Order-No.
	1	complete horizontal vise		2-6520-004700
16	1	cylinder tube		3-6020-05001
	1 set	sealing		0-6020-ß68ßB0/1
18	1	piston rod		3-6020-057000
25	1	clamping piece		2-6520-004310
26	1	clamping plate		4-6520-004810
28	1	tilt and clamp lever		8-3300-31200

KALTENBACH

Vorschubzylinder
70/40x240

20
2-6510-000700
L2
8-2059-10180
L1
8-2059-10190
L5
8-2060-16145
21
8-2102-00020
L3
8-2059-10190
L4
8-2060-16085
22
8-2101-04006
A1
B1
A
B
23
8-2125-00005
a
b
P
T

Klemmzylinder
30x6

40
3-6508-001100
L10
8-2059-06095
41
8-2125-00040

Greiferzylinder NA 1000

100
2-6540-015400
101
2-6128-015410
104
8-2143-00001
102
8-2102-01510
105
8-2102-000008
103
8-2102-01520
L25
8-2060-10220
L26
8-2060-10220
106
8-2125-00030

Horizontal-
Spannzylinder

62
2-6520-004700
62
2-6520-004700
L8
8-2059-06070
L13
8-2059-06070
L9
8-2059-06070
L14
8-2059-06070

Spannzylinder
80/55x160

60
0-6520-002000
A
P
3bar
L19
8-2059-100850
25bar
63
8-2102-04001

Verdrängerzylinder
80/55x10

Verstellzylinder
70/40x240

50
2-6510-001200
L11
8-2059-06180
L12
8-2059-06180
L15
8-2059-06045
L16
8-2059-06045
51
8-2101-00060
52
8-2125-00030

L17
8-2059-100850
L18
8-2060-16075
65
8-2101-04007
66
8-2125-00005

11
8-2150-10002
Q = 25 l/min
P = 1,5 kW
p = 30 bar
n = 1405 U/min
L22
8-2033-04003
15
8-2100-18000
14
8-2200-10001
10
8-2210-22514
M
13
8-2240-09401
12
0-6530-000600
V = 70 l
46mm²/s bei 40°C
(Hydr.aggregat 0-6530-001310)

80
0-5035-017010
84 2x
8-2300-03030
81
0-5035-017130

Pos.	Ident.-Nr.
62.1	0-6020-0680B0/1
60.1	0-6520-002000/1
50.1	2-6510-001200/1
20.1	2-6510-001200/1

Übergeordnete Baustufe	
Freimaßtoleranzen nach DIN 7168m	
Schweißbaugruppen nach B DIN 8570	
Abweichend Längentoleranzen	
< 30	± 0.3
30-100	± 0.5
>100	± 1
Für diese technische Unterlage behalten wir uns alle Rechte vor.	

Ind	Änd.Nr.	Datum	Name	Änderungsvorgang

Erzeugnis: KKS 401

	Datum	Name
Gez:	16-JAN-90	LORENZ
Gepr:		
Norm:		

Benennung: Hydraulikplan
NA 1000 Ausbaustufe 1
(Klemmung)

Maßstab: %

HANS KALTENBACH
Maschinenfabrik GmbH+Co.
7850 Lörrach

Nummer: 2-6531-002000
Blatt 1 von 1
Ursprungsoriginal DIN A

Ers. für: Ers. durch:

MULTICOM displays the following error messages in clear text:

Message	Remedy
EMERGENCY STOP activated	Check all EMERGENCY STOP buttons of the system. If necessary, release any activated buttons.
Motor protection activated	Check all motor protection switches of the automatic material feed unit, saw drive, coolant pump, chip conveyor, transformer of the regulator etc. Eliminate cause of overload
No release signal for saw motor regulator	Does the frequency converter signalize an error?
Saw motor overload	Saw blade blunt? Feed rate too high? Tooth spacing too narrow?
Safety door open	Lock safety door. Check limit switch of safety cover. - S143 E72.2.
Safety cover open	Close cover. Check its limit switch. - S144 E72.3.
Vertical vise without pressure	Check pressure of system (30 bar) and pressure switch. -F141 E72.0.
Vertical vise closed	Check home position of machine and vertical vise manually. S5-program.
Saw not located beneath the table	Drive saw blade to home position.
Machine not in set-up mode	Check key-operated switch -S118 E65.7.
Machine in set-up mode	Check key-operated switch -S118 E65.7.
Trim cut stop in upper position	Lower trim cut stop. Check proximity switches -B247 E9.2 (trim cut stop in upper position) and -B248 E9.7 (trim cut stop in lower position).
Material feed axis in end position	Check limit switches -S242 E9.1 and -S243 E9.2 , end position of the material feed unit and the programmed end position. Check reference point of axis 1L.
No valid cutting program	Check MULTICOM program (for example: actual cut-off counter = nominal cut-off counter)
No material in material feed gripper	Check proximity switch -B244 E9.3 (material located in material feed gripper).
End piece proximity switch = 1 and gripper proximity switch = 0	Check proximity switch of material feed gripper -B244 and surface proximity switch -B245 for end pieces < 500 mm. Are any chips located on the surface proximity switch?

Message	Remedy
Material on roller conveyor	Proximity switch -B245 is occupied. Clear switch.
MULTICOM error	Exchange MULTICOM (program, system oder???)
End piece > 500 mm	Remove piece manually. (by hand). Check proximity switch -B245 "end piece < 500 mm".
Automatic mode - time limit exceeded	Program execution was blocked for more than 3 minutes. Error in program execution control.
Saw motor rpm not indicated	Select speed 1 or 2 by pressing the push buttons -S105 or -S106.

6.6 Electrical connections

The electrical wiring diagrams correspond to DIN 40 719.

Cross references in the diagram indicate the page number (lower right hand side), the number of the circuit path (0 ... 9, upper margin) and - if necessary - the position within the path (A ... F, right margin).

Since the diagram was layed out for a fully equipped machine version, some diagram pages of special machine versions might be empty.

Diese CAD-erstellte Zeichnung darf nur am Bildschirm geaendert werden.

line	drawing - number: producer	modif.	operateur	mofif.	number of sheets	sheet: first	sheet: last	designation	neutral marks: plan	neutral marks: plant/place marks	neutral marks: plan - marks
1	0K2102-000101				1	1	1	Inhaltsverzeichnis	INH*		
2	*	*	*		*	*	*	*	*	*	*
3	0K2102-000101				2	1	2	KABELUEBERS./cable generalpl./cablage	KUE		
4	*	*	*		*	*	*	*	*	*	*
5	0K2102-000101				2	1	2	MASCHINENUEBERS./generalpl./ensemble	MUE		
6	*	*	*		*	*	*	*	*	*	*
7	0K2102-000101				1	1	1	BEDIENPULT/operat.panel/pupitre com.	OB		
8	*	*	*		*	*	*	*	*	*	*
9	0K2102-000101				1	1	1	MASCHINE/machine/machine	OM		
10	*	*	*		*	*	*	*	*	*	*
11	0K2102-000101				2	1	2	SCHALTSCHRANK/contr.cab./armoire elec.	OS		
12	*	*	*		*	*	*	*	*	*	*
13	0K2102-000101				20	1	20	STROMLAUFPLAN/wiring scheme/schema	STR		
14	*	*	*		*	*	*	*	*	*	*
15	0K2102-000101-A191/ST2B				1	1	1	Kabel -W190.1M1 - -W190.1M1	VKB	-A191/	ST2B
16	0K2102-000101-A191/ST3B				1	1	1	Kabel -W195.1M1 - -W195.1M1	VKB	-A191/	ST3B
17	*	*	*		*	*	*	*	*	*	*
18	0K2102-0001011S1-0X0				1	1	1	Kabel -W11.1S1 - -W11.1S1	VKB	1S1-0X	0
19	*	*	*		*	*	*	*	*	*	*
20	0K2102-0001011S1-1X0				1	1	1	Kabel -W14.1M1 - -W14.1M1	VKB	1S1-1X	0
21	*	*	*		*	*	*	*	*	*	*
22	0K2102-0001011S1-A151				3	1	3	Kabel -W81a.1M1 - -W85b.1M1	VKB	1S1-A1	51
23	*	*	*		*	*	*	*	*	*	*
24	0K2102-0001011S1-X0				1	1	1	Kabel -1W0.1S1 - -1W0.1S1	VKB	1S1-X0	
25	*	*	*		*	*	*	*	*	*	*
26	0K2102-0001011S1-X3				3	1	3	Kabel -W100.1B1 - -W100.1B1	VKB	1S1-X3	
27	*	*	*		*	*	*	*	*	*	*
28	0K2102-000101+1S1-A151				3	1	3	Klemmleiste +1S1 -A151	VKL	+1S1	-A151
29	0K2102-000101+1S1-X0				1	1	1	Klemmleiste +1S1 -X0	VKL	+1S1	-X0
30	0K2102-000101+1S1-X3				2	1	2	Klemmleiste +1S1 -X3	VKL	+1S1	-X3
31	0K2102-000101+1S1-X3.1				1	1	1	Klemmleiste +1S1 -X3.1	VKL	+1S1	-X3.1
32	*	*	*		*	*	*	*	*	*	*
33	*	*	*		*	*	*	*	*	*	*
34	*	*	*		*	*	*	*	*	*	*
35	*	*	*		*	*	*	*	*	*	*
36	*	*	*		*	*	*	*	*	*	*
37	*	*	*		*	*	*	*	*	*	*
38	*	*	*		*	*	*	*	*	*	*
39	*	*	*		*	*	*	*	*	*	*
40	*	*	*		*	*	*	*	*	*	*
41	*	*	*		*	*	*	*	*	*	*
42	*	*	*		*	*	*	*	*	*	*

KABEL/cable
KLEMMLEISTE/connecting bloc

	modif.	date		
date			23.09.91	
proc.			HOLLERBACH	
insp.		26.06.91		
norm				

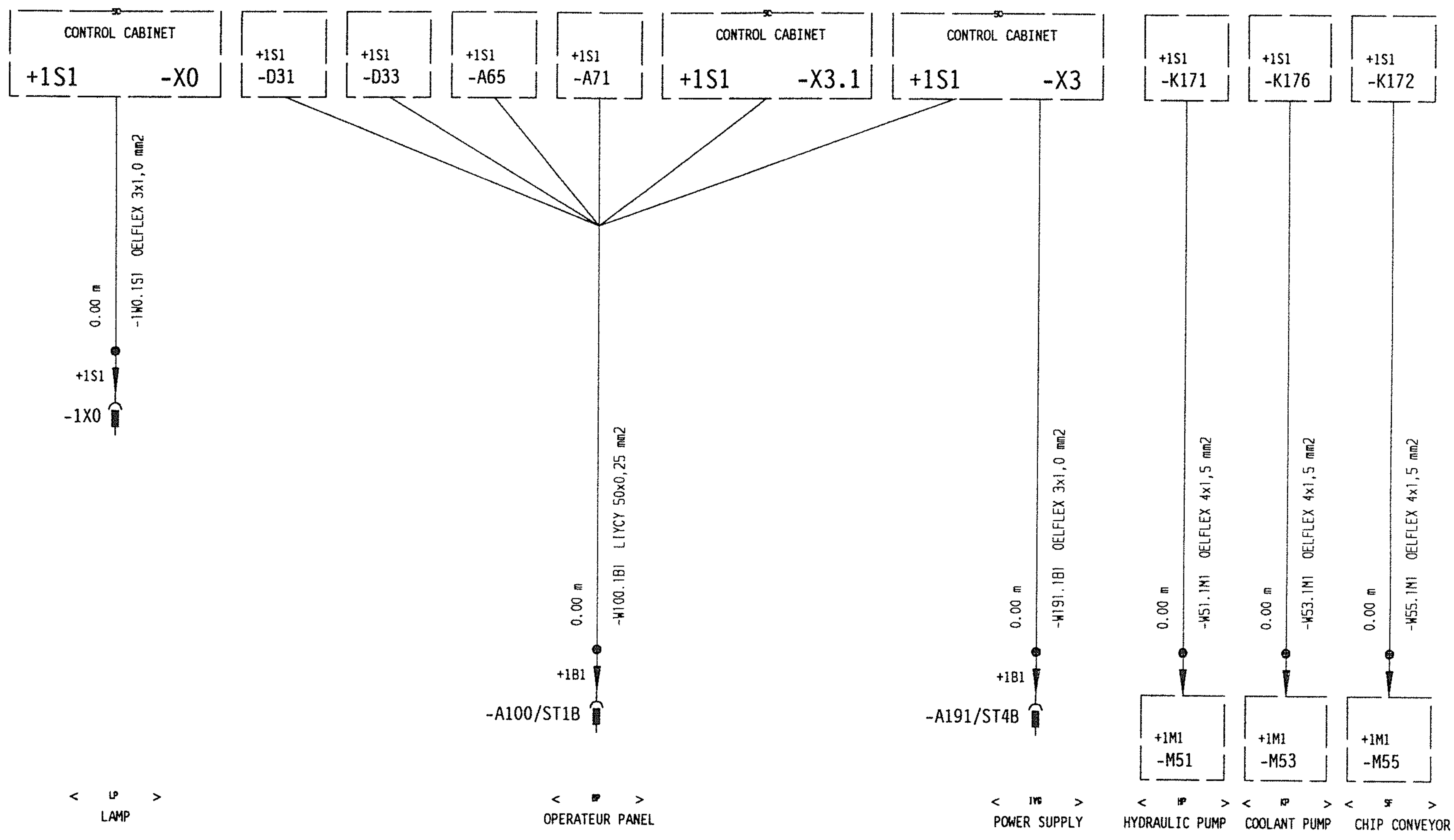
KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

Inhaltsverzeichnis
index

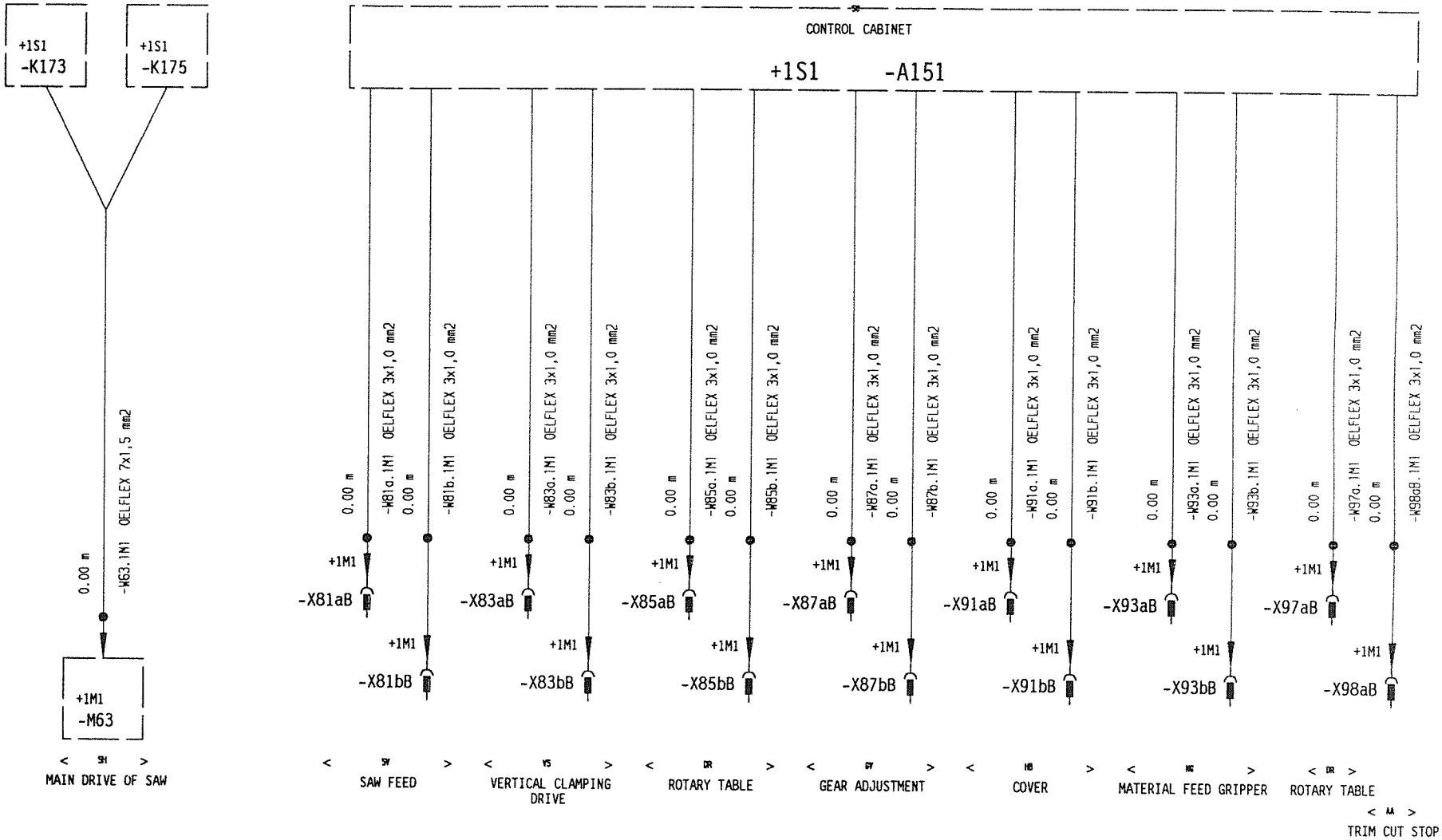
0K2102-000101 INH* *

KKS401 H

1
1 sh.



date	04.06.91	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: CABLE GENERAL PLAN	number: 0K2102-000101
proc.	HOLLERBACH			Local mark of sheet
insp.				information-class: KUE
norm				project: KKS401 H
modification date				1 / 2 sh.



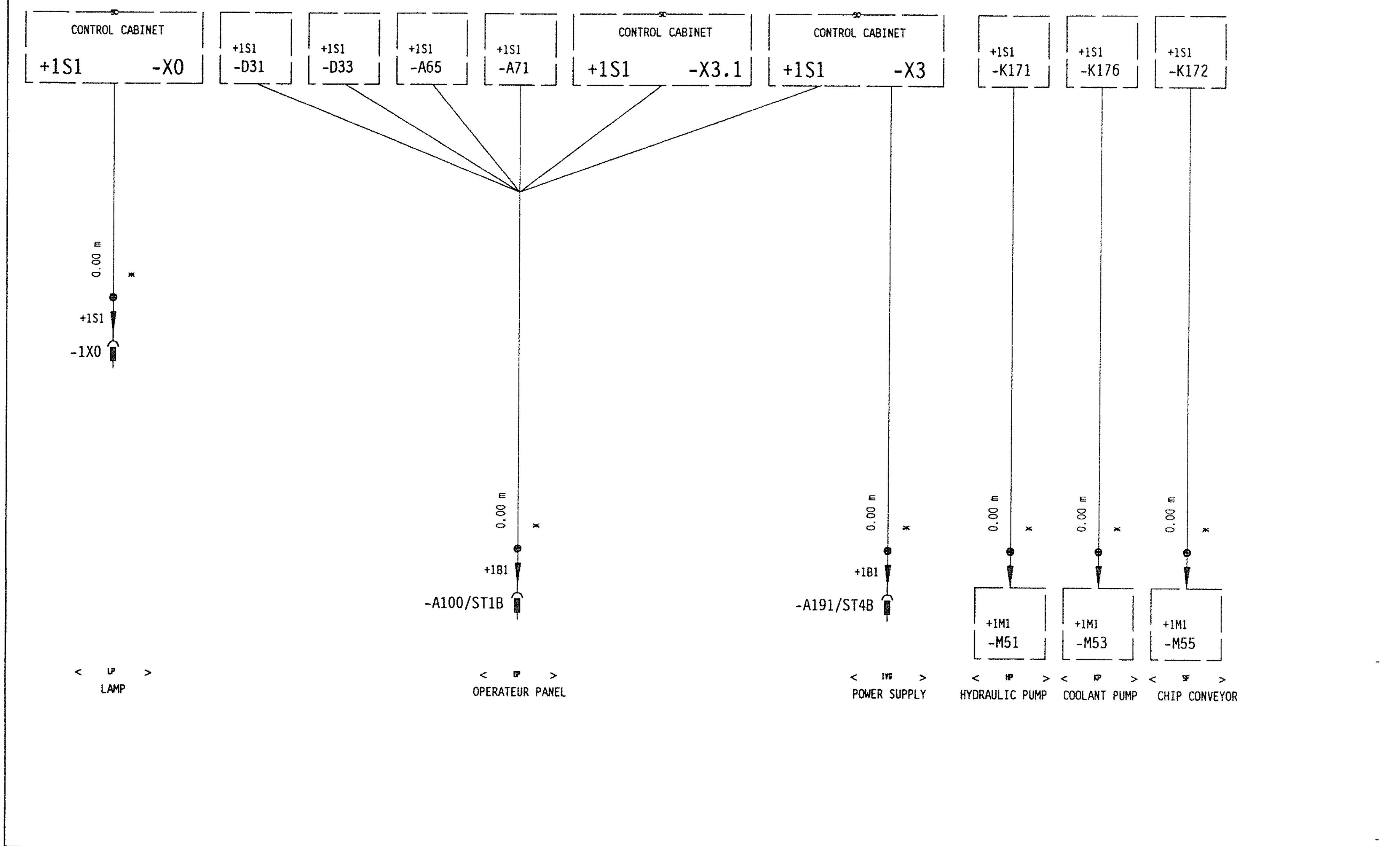
modification	date		date	04.06.91	
			proc.	HOLLERBACH	
			insp.		
			norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7880 LOERRACH

designation:
CABLE GENERAL PLAN

number :
0K2102-000101

local mark of sheet
information-class KUE
project : KKS401 H
2
2 sh.



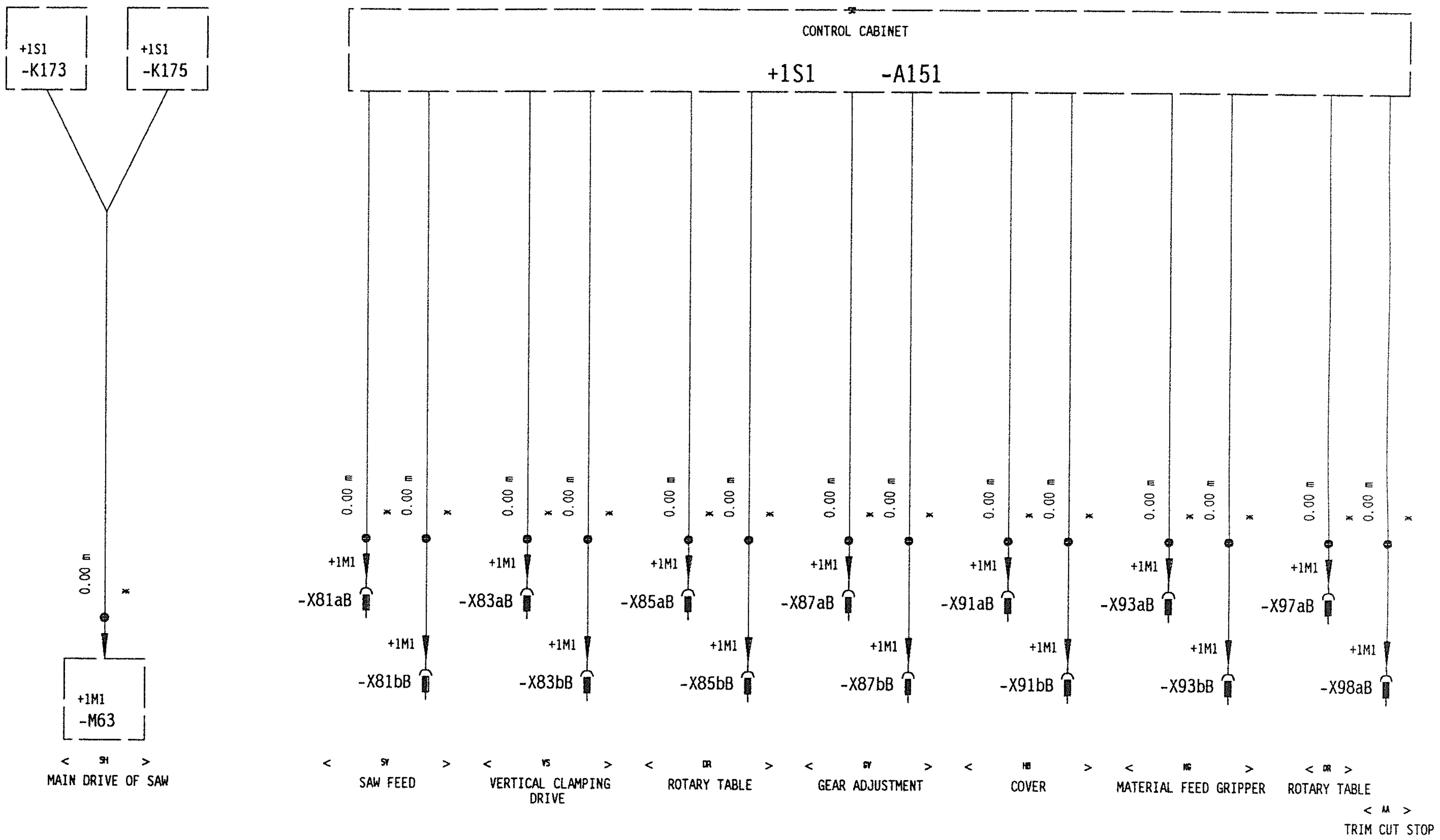
date	04.06.91		
proc.	HOLLERBACH		
insp.			
modification	date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

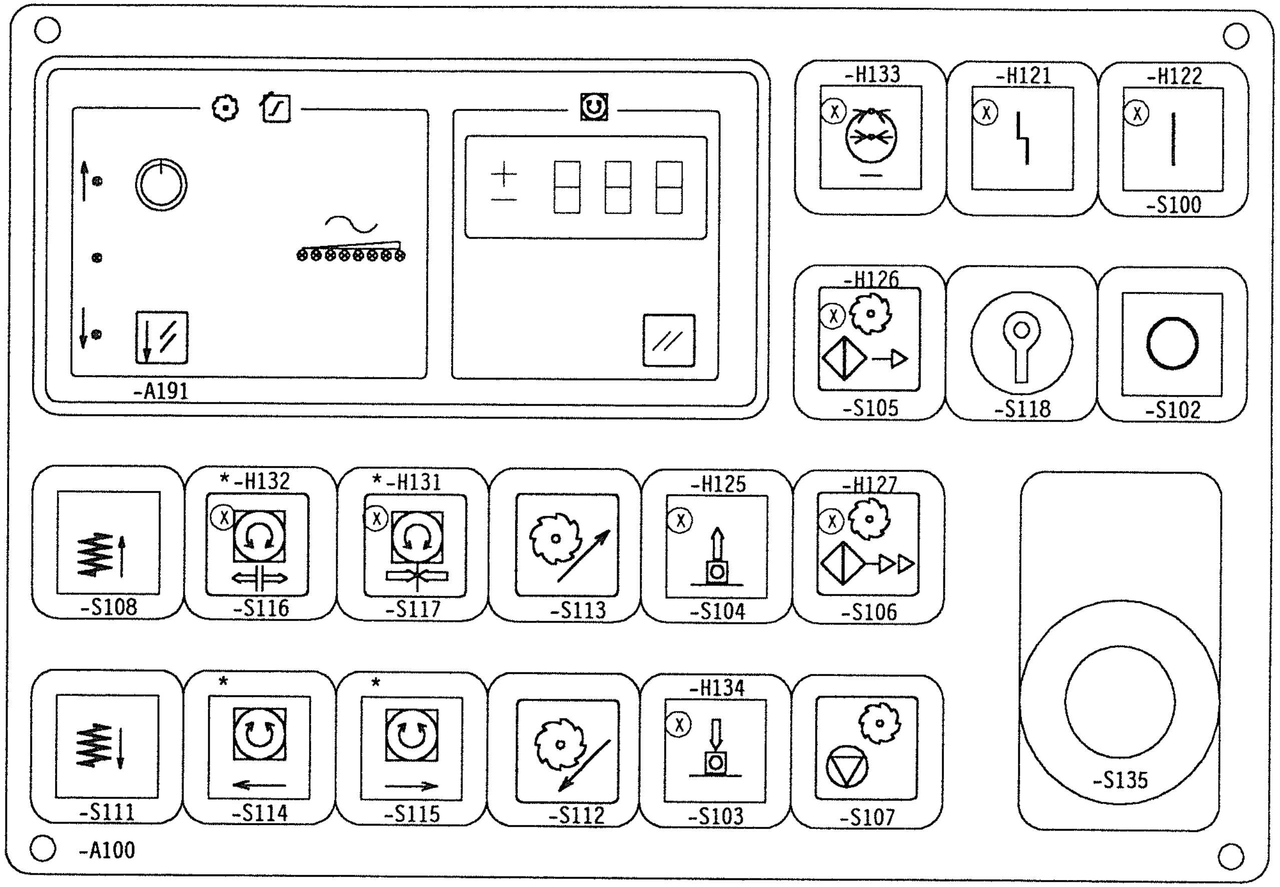
designation:
MACHINE GENERAL PLAN

number: 0K2102-000101

local mark of sheet
information-class MUE
project: KKS401 H
1
2 sh.

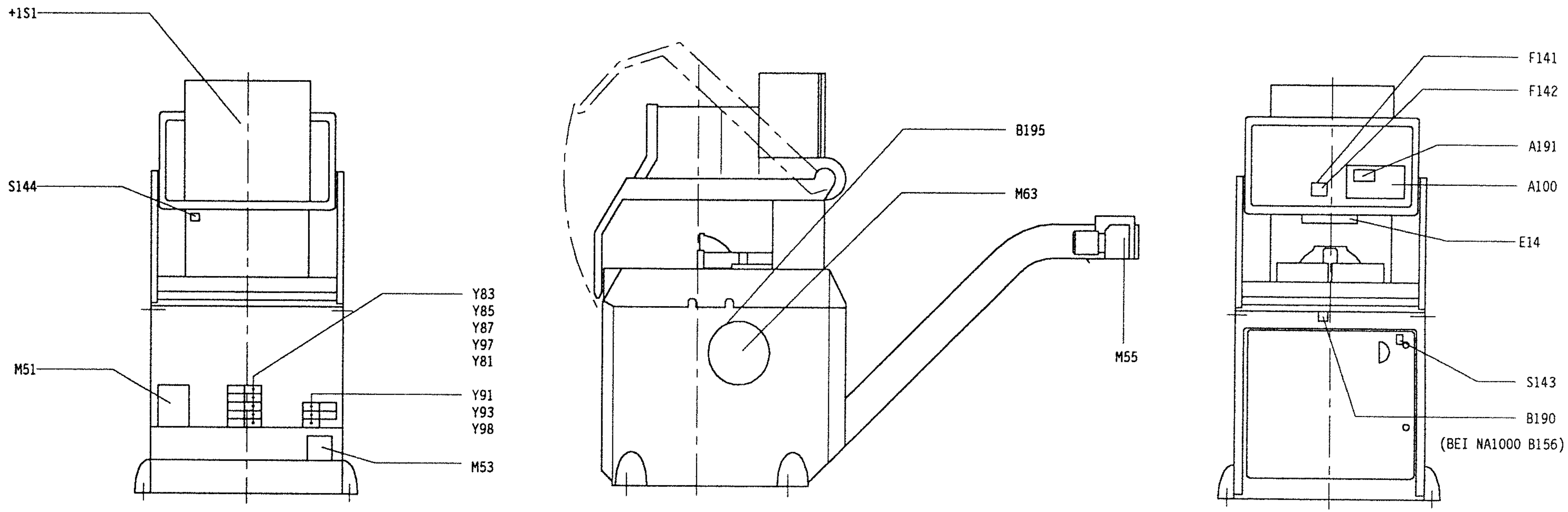


date	04.06.91	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: MACHINE GENERAL PLAN	number : 0K2102-000101	local mark of sheet
proc.	HOLLERBACH				information-class MJE
insp.					project : KKS401 H
modification date norm					2 / 2 sh.



* MIT TASTENSPERRE VER-
SEHEN, WENN DR MANUELL

	date	04.06.91	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: OPERATEUR PANEL	number : 0K2102-000101
	proc.	HOLLERBACH			local mark of sheet
	insp.				information-class 08
modification date	norm	DIN			project : KKS401 H	1	* sh.



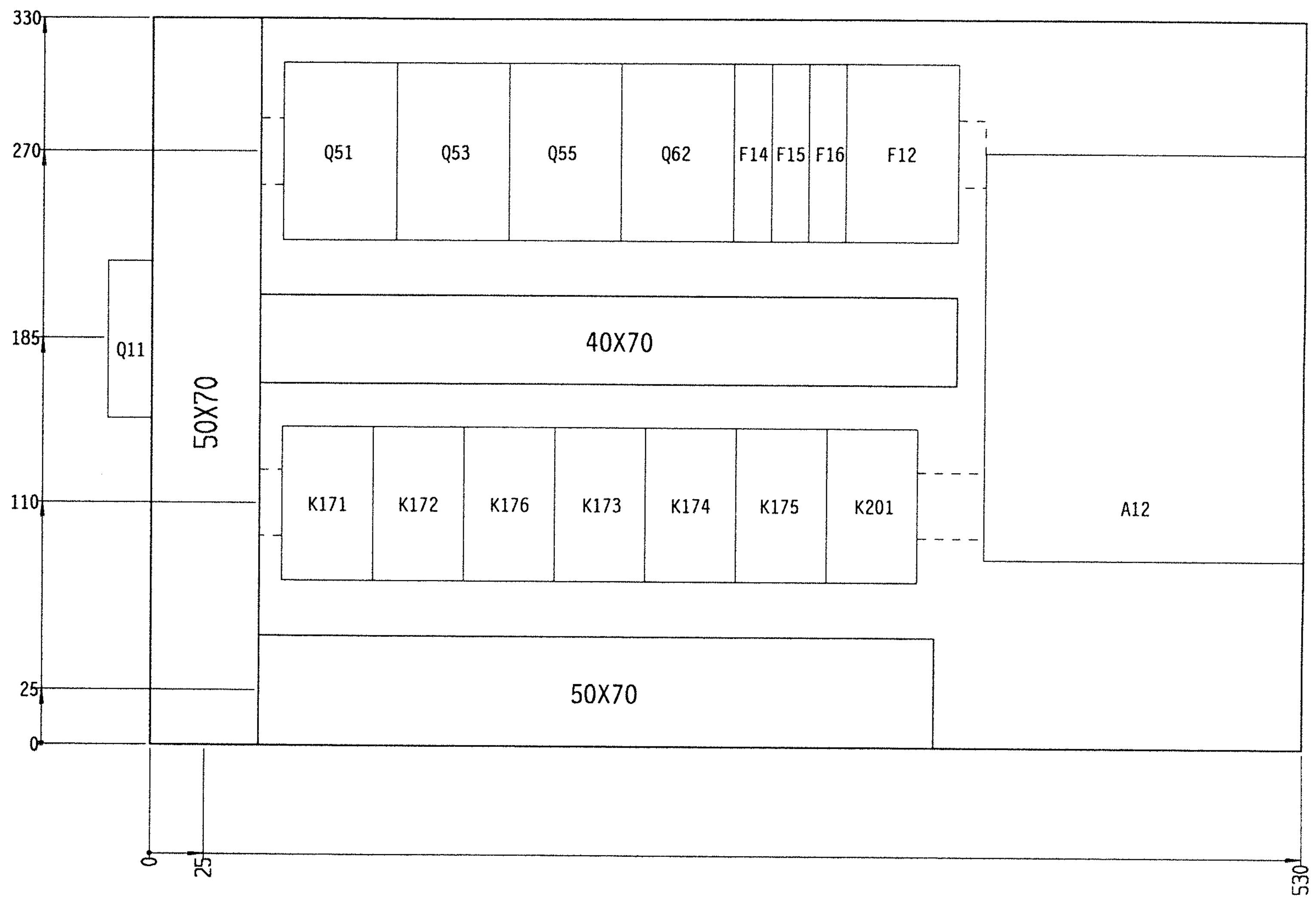
				date	04.06.91
				proc.	HOLLERBACH
				insp.	
	modification	date		norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
MACHINE

number : 0K2102-000101

local mark of sheet
information-class OM
project : KKS401 H
1
1 sh.



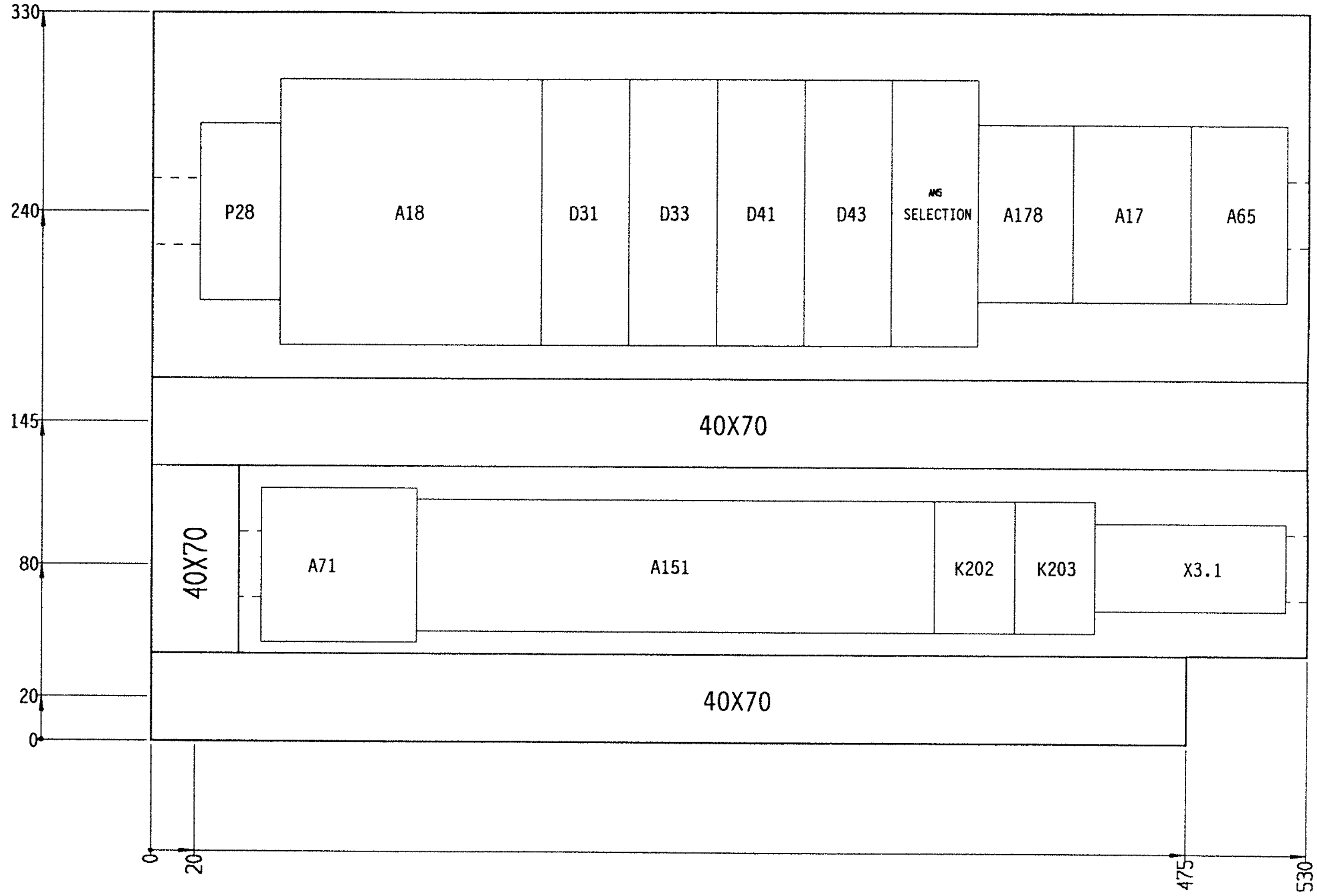
date	04.06.91	
proc.	HOLLERBACH	
insp.		
modification / date	norm	DIN

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

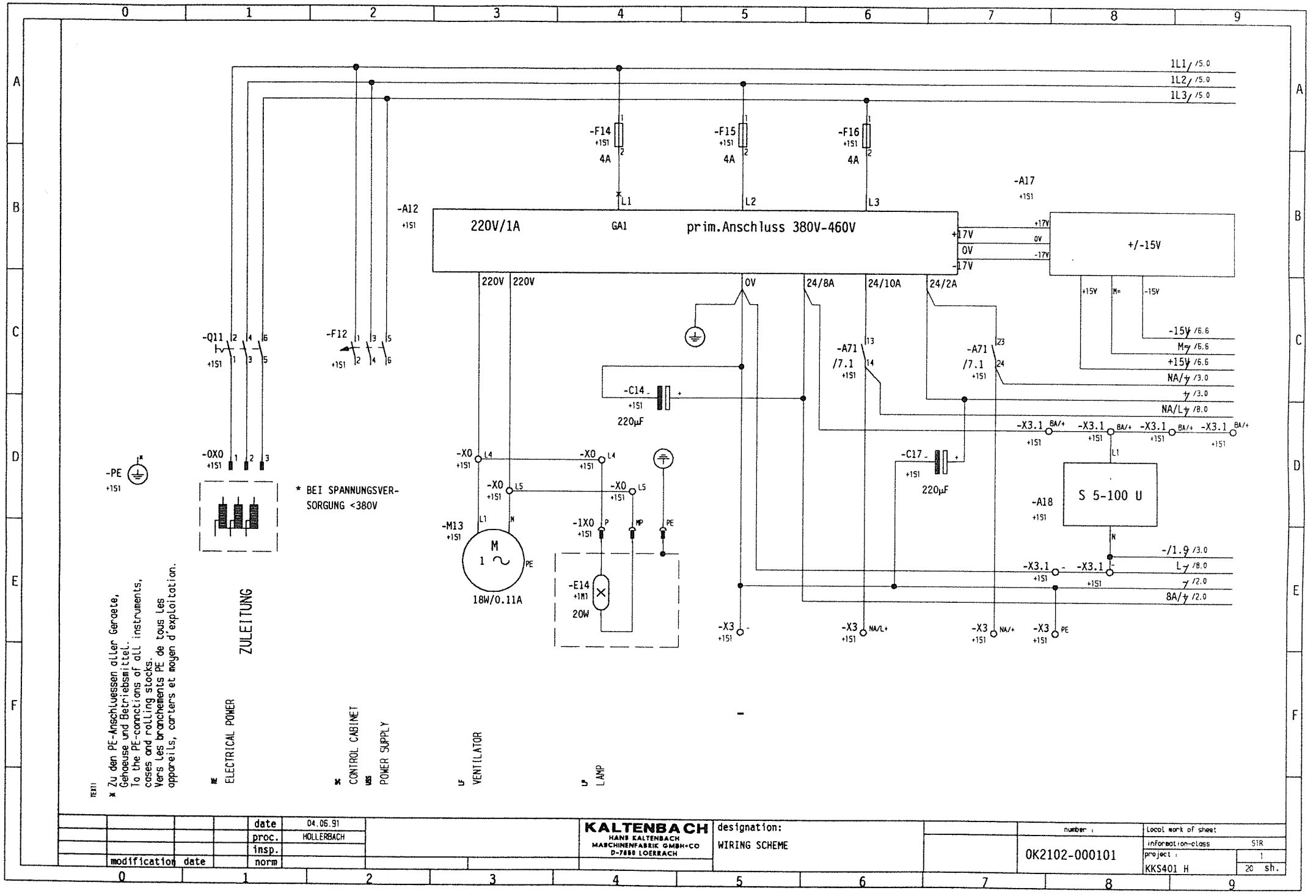
designation:
CONTROL CABINET

number: 0K2102-000101

local mark of sheet
information-class: 05
project: KKS401 H
1 sh.



date	04.06.91	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: CONTROL CABINET	number :	local mark of sheet		
proc.	HOLLERBACH			0K2102-000101	information-class	OS	
insp.					project : KKS401 H	2	
modification date	norm	DIN					x sh.



* Zu den PE-Anschluessen aller Geraete, Gehaeuse und Betriebsmittel.
To the PE-connections of all instruments, cases and rolling stocks.
Vers les branchements PE de tous les appareils, carters et moyen d'exploitation.

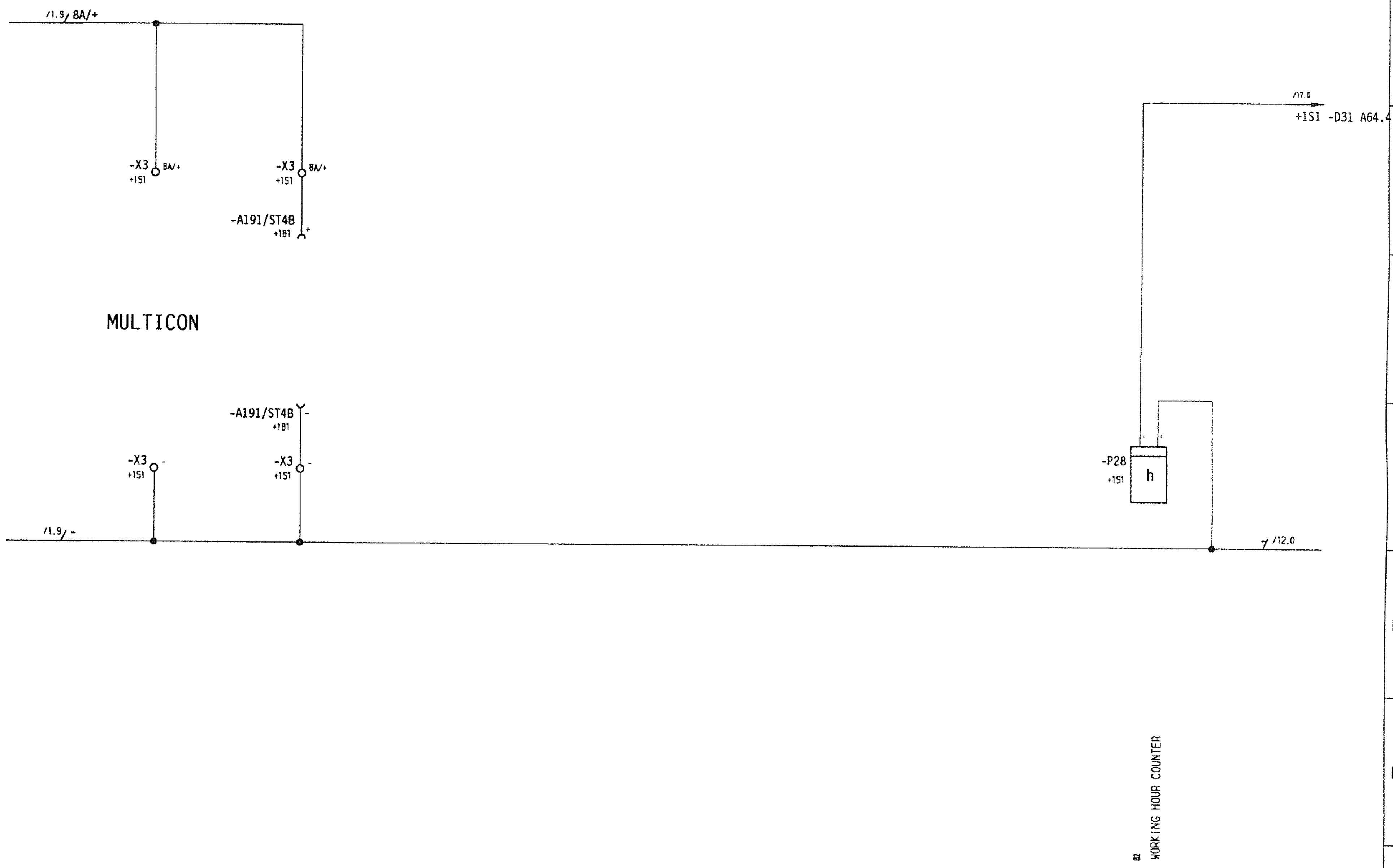
			date	04.06.91	
			proc.	HOLLERBACH	
			insp.		
modification	date		norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7880 LOERRACH

designation:
WIRING SCHEME

number :
0K2102-000101

Local work of sheet:
information-class STR
project : 1
KKS401 H 20 sh.



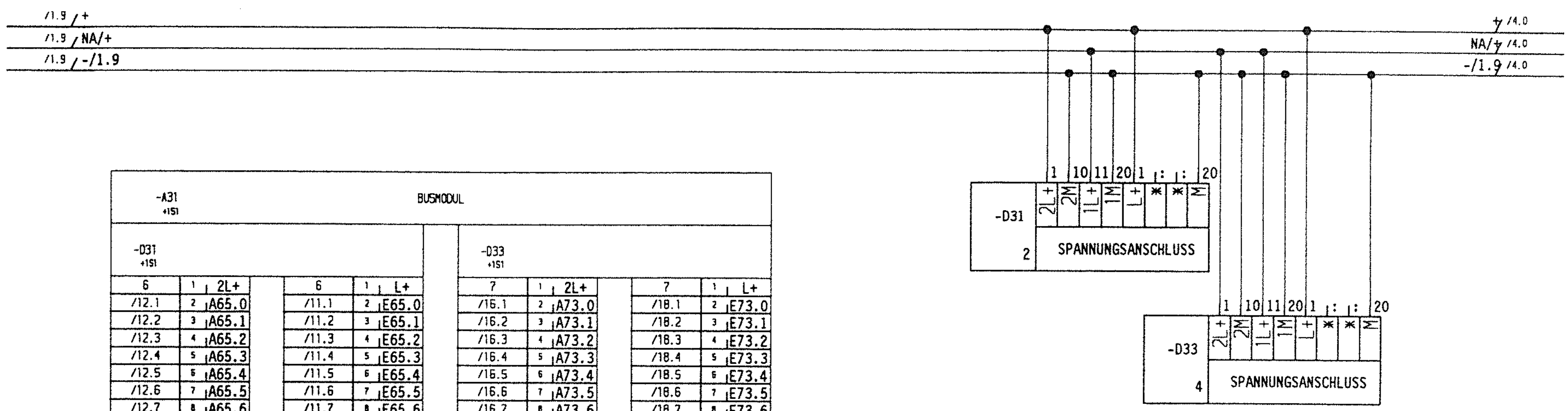
modification	date	date	04.06.91
		proc.	HOLLERBACH
		insp.	
		norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
POWER SUPPLY

number : 0K2102-000101

local mark of sheet	
information-class	STR
project :	2
KKS401 H	20 sh.



-A31 +151 BUSMODUL

-D31 +151						-D33 +151					
6	1	2L+	6	1	L+	7	1	2L+	7	1	L+
/12.1	2	A65.0	/11.1	2	E65.0	/16.1	2	A73.0	/18.1	2	E73.0
/12.2	3	A65.1	/11.2	3	E65.1	/16.2	3	A73.1	/18.2	3	E73.1
/12.3	4	A65.2	/11.3	4	E65.2	/16.3	4	A73.2	/18.3	4	E73.2
/12.4	5	A65.3	/11.4	5	E65.3	/16.4	5	A73.3	/18.4	5	E73.3
/12.5	6	A65.4	/11.5	6	E65.4	/16.5	6	A73.4	/18.5	6	E73.4
/12.6	7	A65.5	/11.6	7	E65.5	/16.6	7	A73.5	/18.6	7	E73.5
/12.7	8	A65.6	/11.7	8	E65.6	/16.7	8	A73.6	/18.7	8	E73.6
/12.8	9	A65.7	/11.8	9	E65.7	/16.8	9	A73.7	/18.8	9	E73.7
6	10	2M		10	(NC)	7	10	2M		10	(NC)
6	11	1L+		11	(NC)	7	11	1L+		11	(NC)
/13.1	12	A64.0	/10.1	12	E64.0	/15.1	12	A72.0	/14.1	12	E72.0
/13.2	13	A64.1	/10.2	13	E64.1	/15.2	13	A72.1	/14.2	13	E72.1
/13.3	14	A64.2	/10.3	14	E64.2	/15.3	14	A72.2	/14.3	14	E72.2
/13.4	15	A64.3	/10.4	15	E64.3	/15.4	15	A72.3	/14.4	15	E72.3
/17.1	16	A64.4	/10.5	16	E64.4	/15.5	16	A72.4	/14.5	16	E72.4
/17.2	17	A64.5	/10.6	17	E64.5	/15.6	17	A72.5	/14.6	17	E72.5
/17.3	18	A64.6	/10.7	18	E64.6	/15.7	18	A72.6	/14.7	18	E72.6
/17.4	19	A64.7	/10.8	19	E64.7	/15.8	19	A72.7	/14.8	19	E72.7
6	20	1M	7	20	M	7	20	1M	8	20	M
OUTPUT 16XDC 24V			INPUT 16XDC 24V			OUTPUT 16XDC 24V			INPUT 16XDC 24V		

modification	date	date	04.06.91
		proc.	HOLLERBACH
		insp.	
		norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: POWER SUPPLY

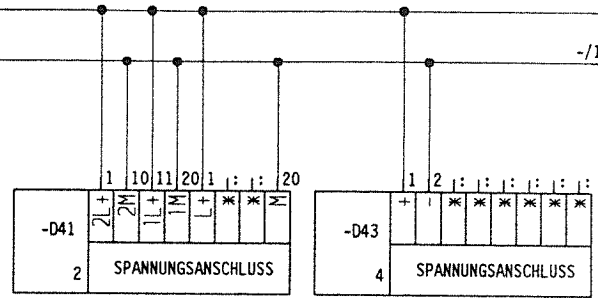
number: 0K2102-000101

Local mark of sheet
information-class STR
project: KKS401 H
3
20 sh.

/3.9 / +
/3.9 / NA/+
/3.9 / -/1.9

-X3.1 NA/+ +151

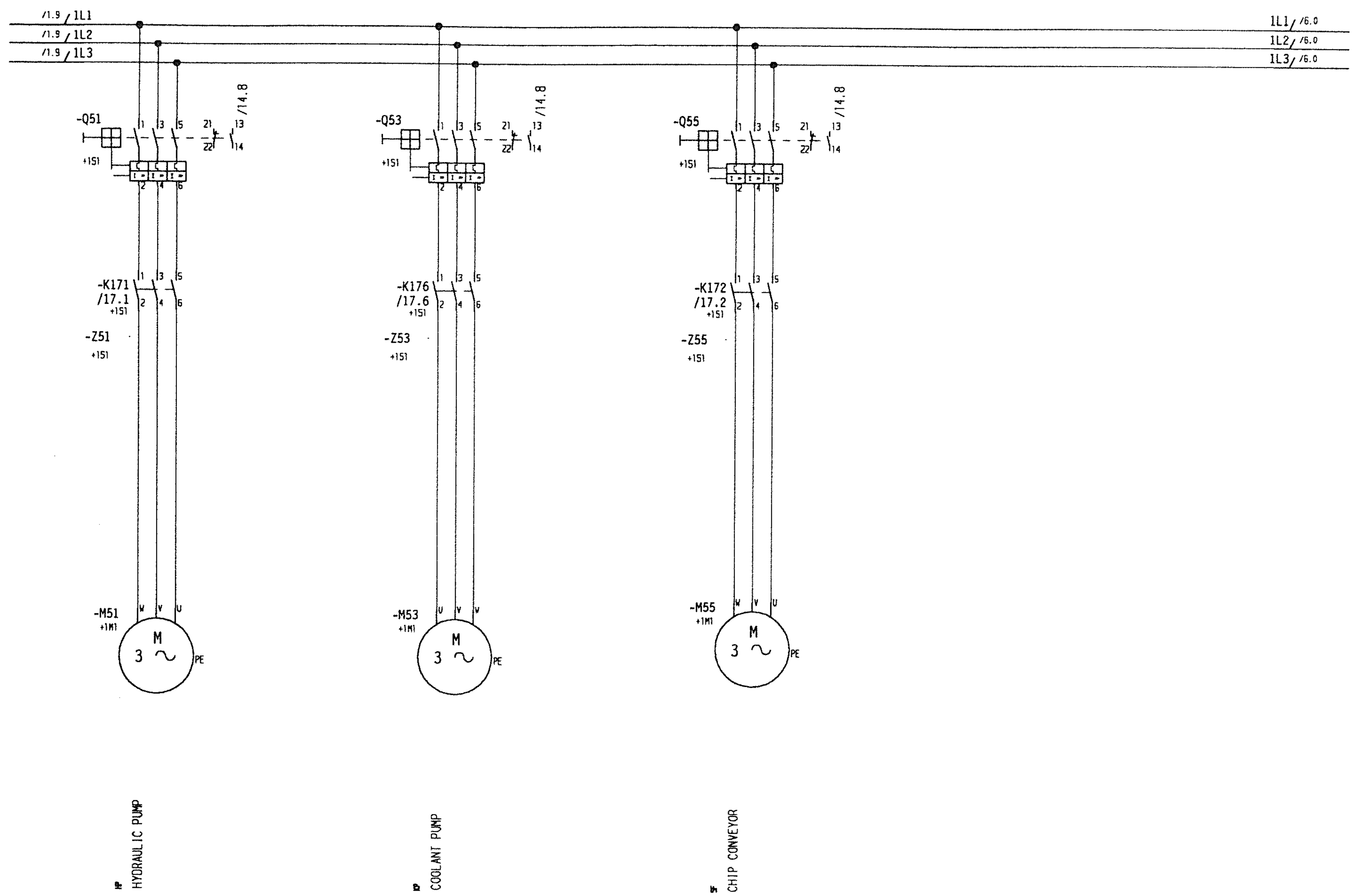
/7.0
-/1.9 /7.0



-A41 +151 BUSMODUL

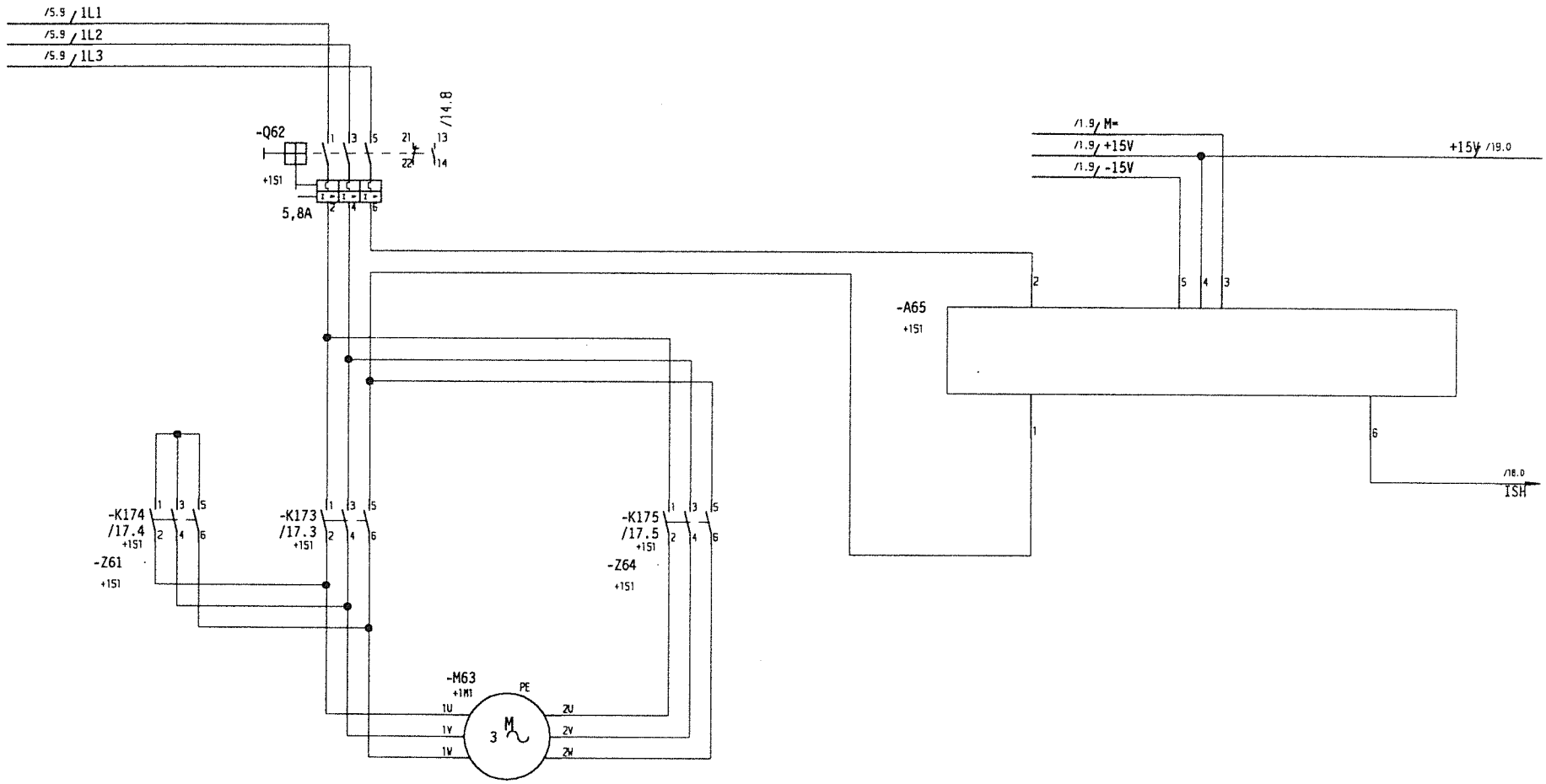
-D41 +151			-D41 +151			-D43 +151			-D43 +151		
6	1	2L+	7	1	L+	8	1	+	8	1	*
	2	A81.0		2	E81.0	8	2	-	8	2	*
	3	A81.1		3	E81.1		3	A88.0	8	3	*
	4	A81.2		4	E81.2		4	A88.1	8	4	*
	5	A81.3		5	E81.3		5	A88.2	8	5	*
	6	A81.4		6	E81.4		6	A88.3	8	6	*
	7	A81.5		7	E81.5		7	A88.4	8	7	*
	8	A81.6		8	E81.6		8	A88.5	8	8	*
	9	A81.7		9	E81.7		9	A88.6	8	9	*
6	10	2M		10	(NC)		10	A88.7	8	10	*
6	11	1L+		11	(NC)	8	11	*	8	11	*
	12	A80.0		12	E80.0	8	12	*	8	12	*
	13	A80.1		13	E80.1	8	13	*	8	13	*
	14	A80.2		14	E80.2	8	14	*	8	14	*
	15	A80.3		15	E80.3	8	15	*	8	15	*
	16	A80.4		16	E80.4	8	16	*	8	16	*
	17	A80.5		17	E80.5	8	17	*	8	17	*
	18	A80.6		18	E80.6	8	18	*	8	18	*
	19	A80.7		19	E80.7	8	19	*	8	19	*
6	20	1M	7	20	M	8	20	*	8	20	*
OUTPUT 16XDC 24V			INPUT 16XDC 24V			OUTPUT 16XDC 24V			INPUT 16XDC 24V		

				date	04.06.91	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: POWER SUPPLY		number : 0K2102-000101	local mark of sheet	
				proc.	HOLLERBACH					information-class	STR
				insp.						project : KKS401 H	4
	modification	date		norm							20 sh.



	date	04.06.91	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: DRIVES
	proc.	HOLLERBACH		
	insp.			
modification date	norm			

number :	local mark of sheet	
0K2102-000101	information-class	STR
	project :	5
	KKS401 H	20 sh.



SN MAIN DRIVE OF SAW

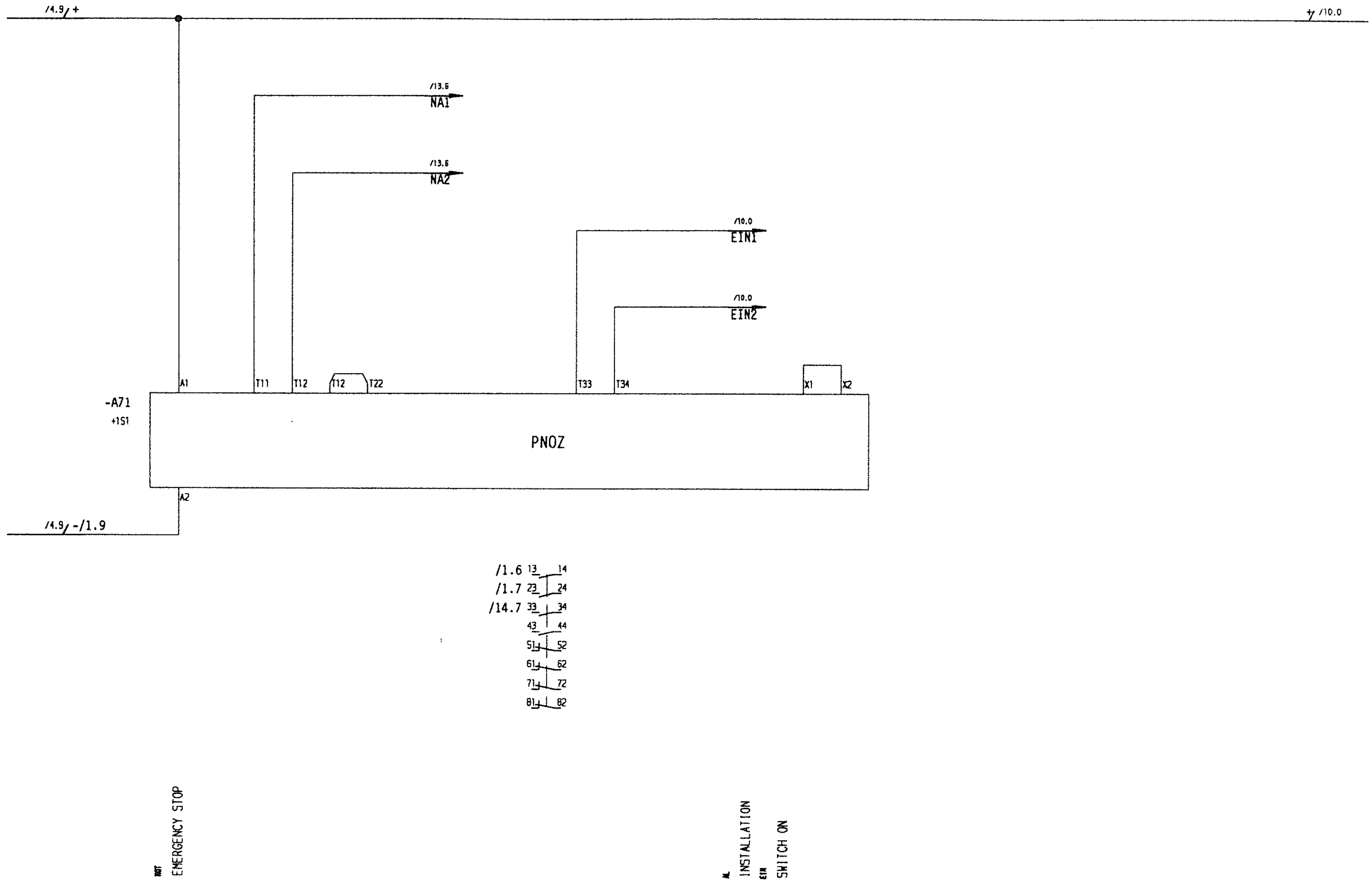
			date	04.06.91	
			proc.	HOLLERBACH	
			insp.		
modification	date		norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

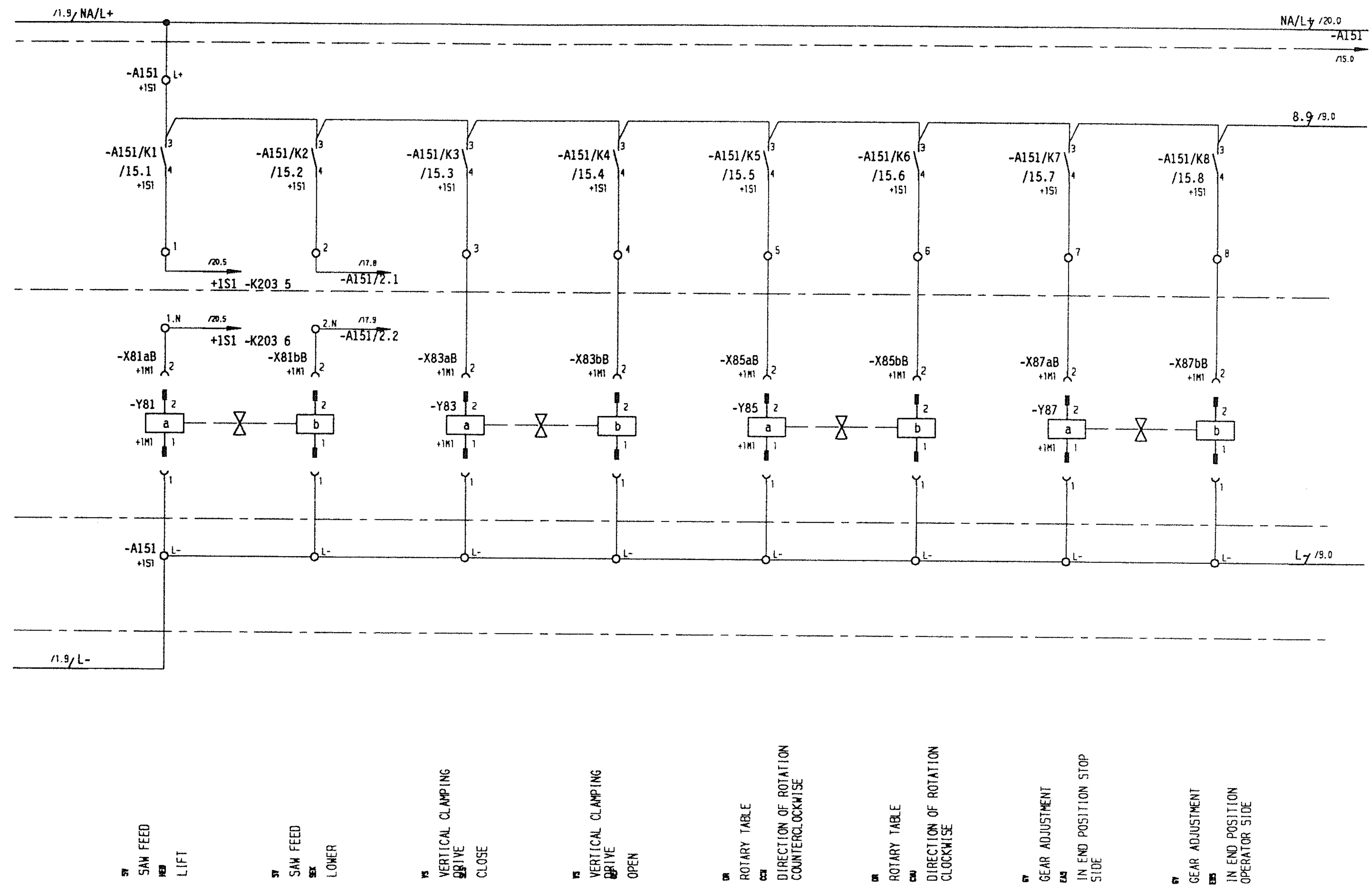
designation:
DRIVES

number :
0K2102-000101

Local mark of sheet
information-class STR
project : KKS401 H
6
20 sh.



date	04.06.91	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: EMERGENCY STOP	number : 0K2102-000101	Local mark of sheet
proc.	HOLLERBACH				information-class STR
insp.					project : KKS401 H · 7
modification · date · norm					20 sh.



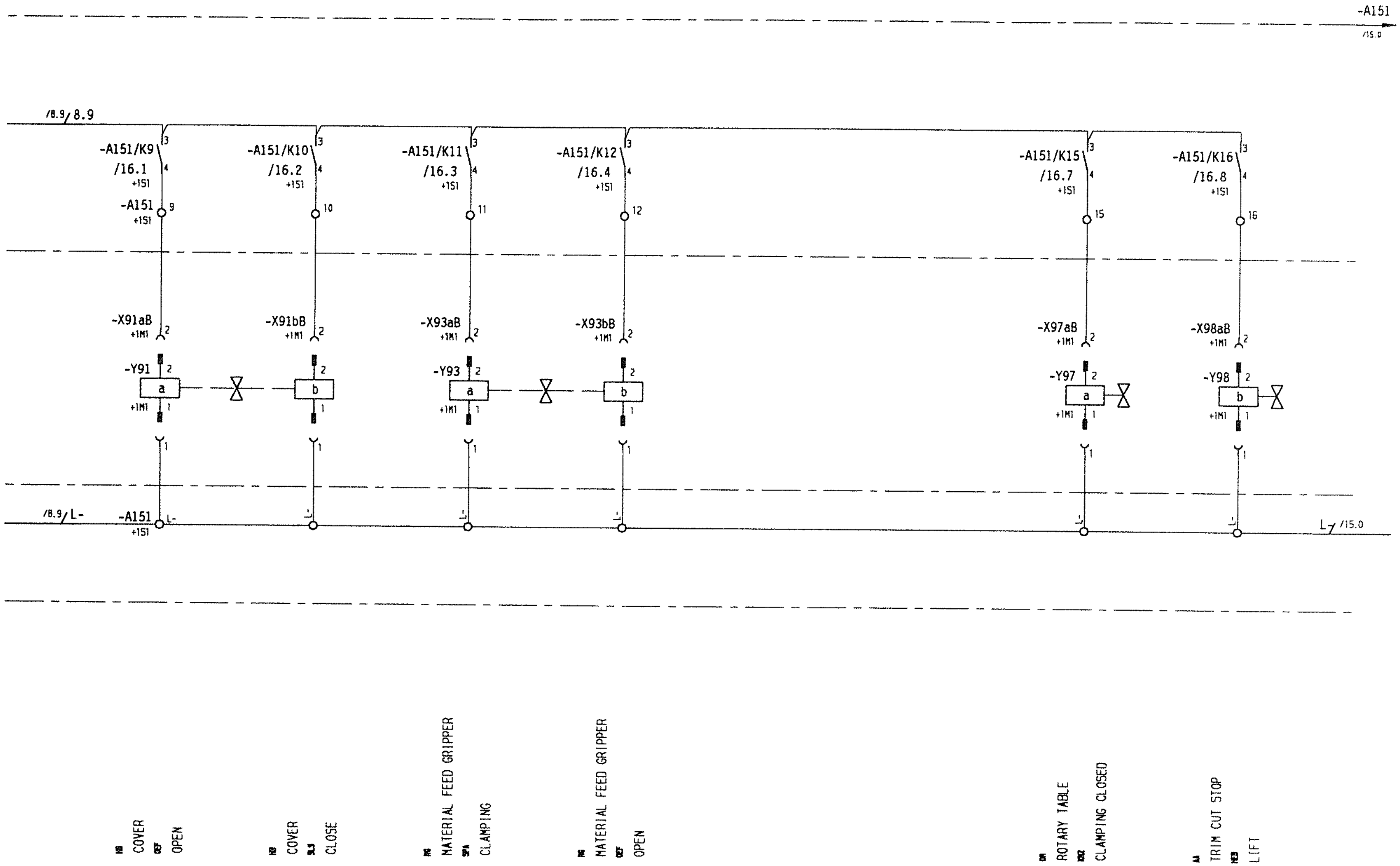
date	04.06.91		
proc.	HOLLERBACH		
insp.			
modification date	norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
(ELECTRIC) VALVE CIRCUIT

number : 0K2102-000101

local mark of sheet
information-class: STR
project : KKS401 H
8
20 sh.



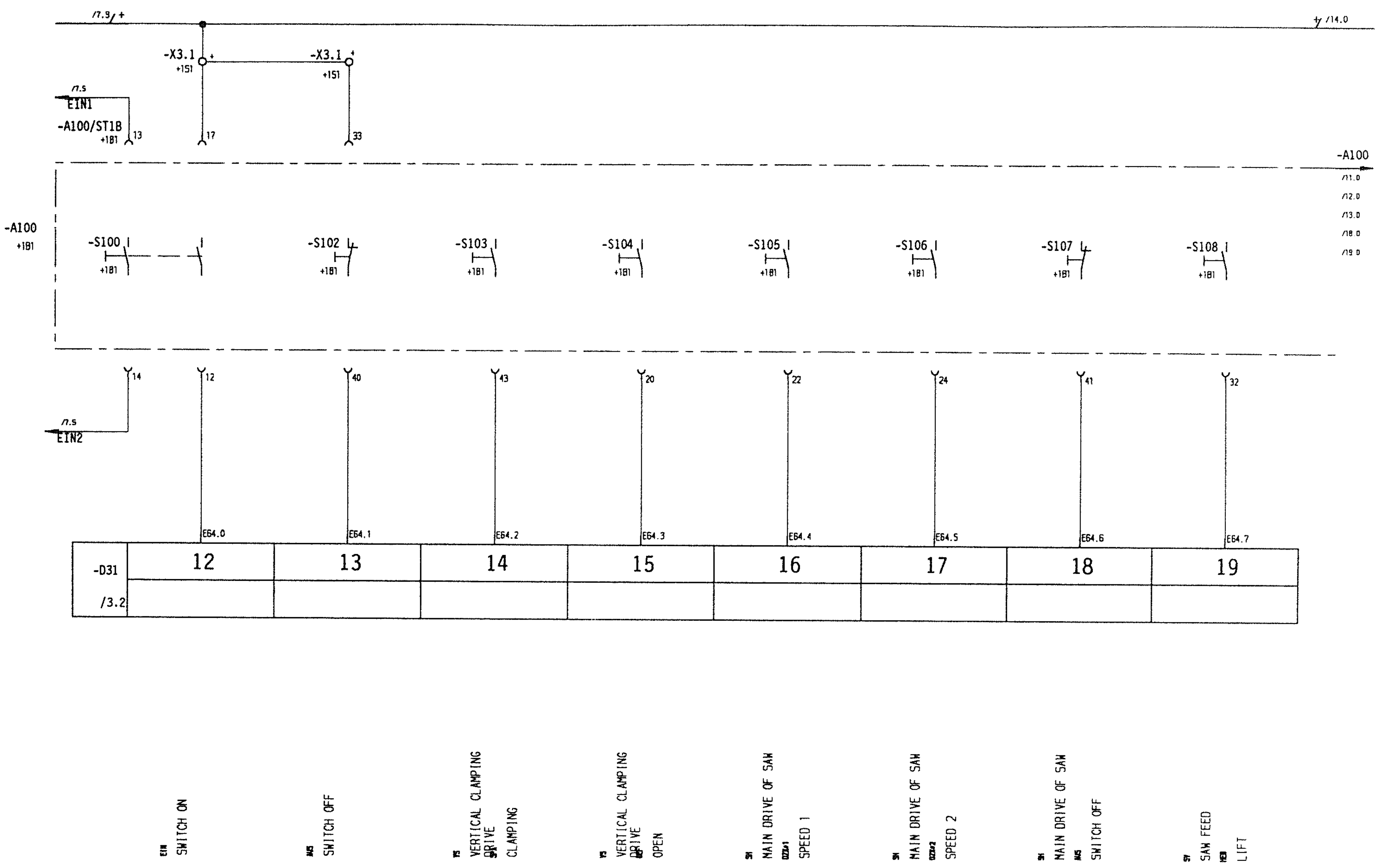
		date	04.06.91
		proc.	HOLLERBACH
		insp.	
modification	date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
(ELECTRIC) VALVE CIRCUIT

number: 0K2102-000101

Local mark of sheet	
information-class	STR
project:	9
KKS401 H	20 sh.



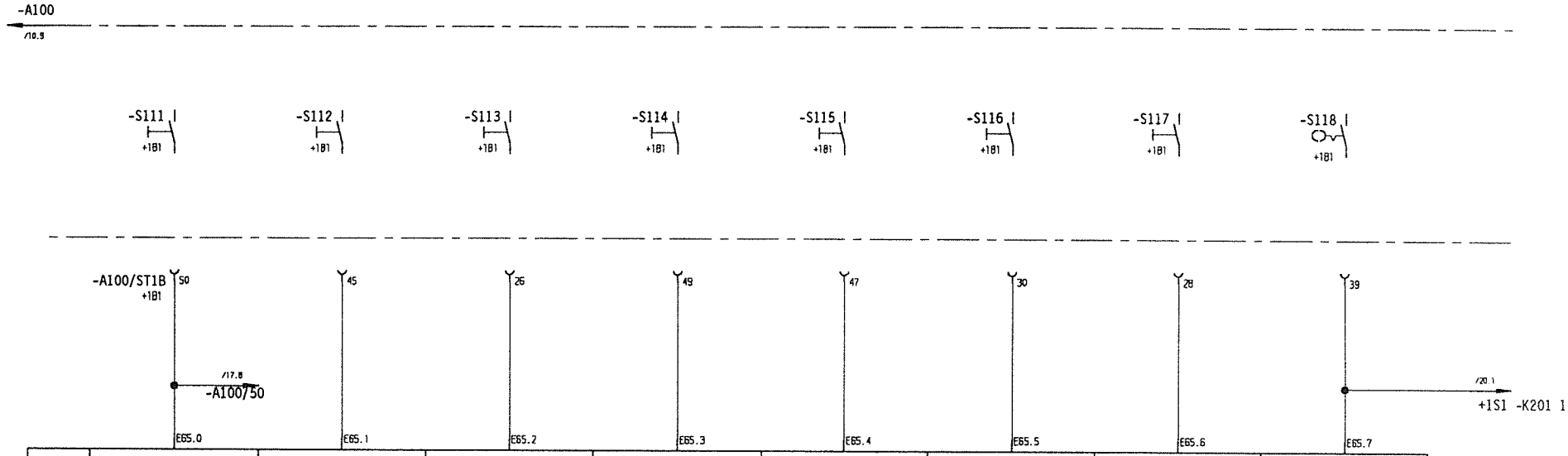
date	04.06.91	
proc.	HOLLERBACH	
insp.		
norm		
modification	date	

KALTENBACH
HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH

designation: OPERATEUR PANEL

number: 0K2102-000101

Local mark of sheet
information-class: STR
project: KKS401 H
10
20 sh.



-D31	2	3	4	5	6	7	8	9
/3.2								

STR SAW FEED
SEK LOWER

GY GEAR ADJUSTMENT
ESR IN END POSITION OPERATOR SIDE

GY GEAR ADJUSTMENT
EAS IN END POSITION STOP SIDE

DR ROTARY TABLE
CRU DIRECTION OF ROTATION CLOCKWISE

DR ROTARY TABLE
CCR DIRECTION OF ROTATION COUNTERCLOCKWISE

DR ROTARY TABLE
KMO OPEN CLAMPING

DR ROTARY TABLE
KLE TERMINAL

BA MODE OF OPERATION
EIR SET-UP

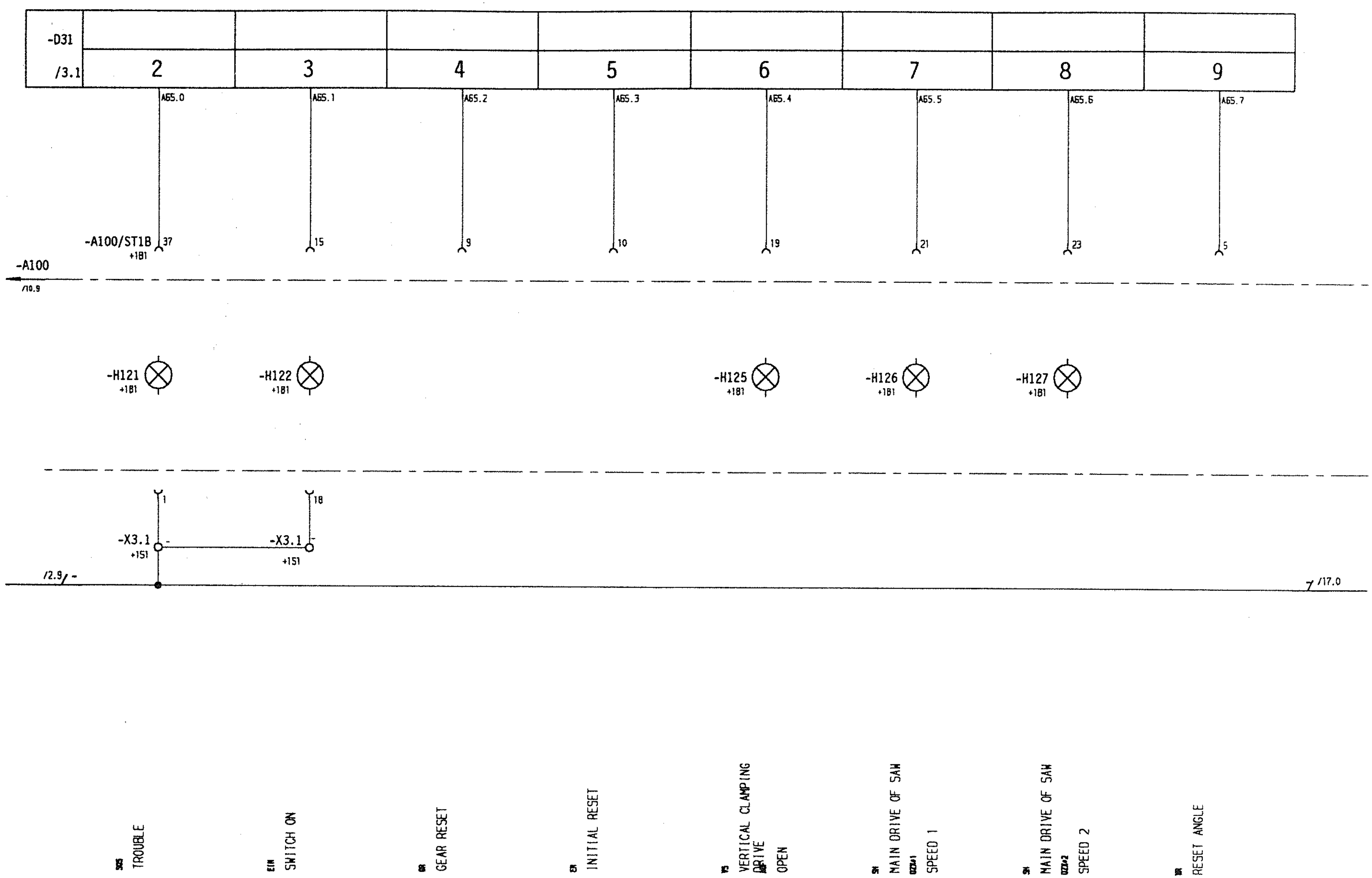
				date	04.06.91
				proc.	HOLLERBACH
				insp.	
	modification	date		norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
OPERATEUR PANEL

number :
0K2102-000101

Local mark of sheet
information-class STR
project : KKS401 H
11
20 sh.



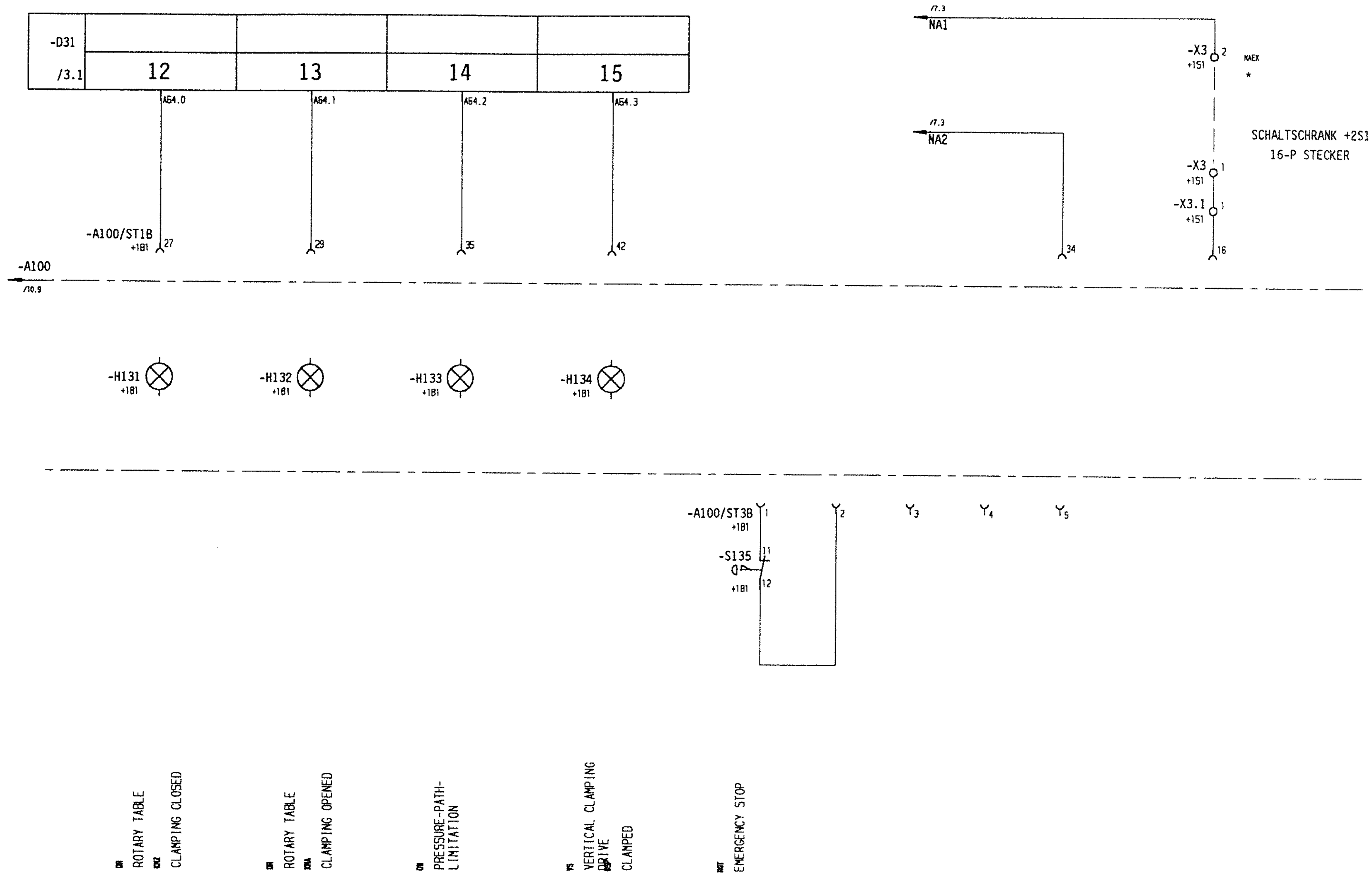
date	04.06.91		
proc.	HOLLERBACH		
insp.			
modification	date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
OPERATEUR PANEL

number :
0K2102-000101

Local mark of sheet	
information-class	STR
project :	12
KKS401 H	20 sh.



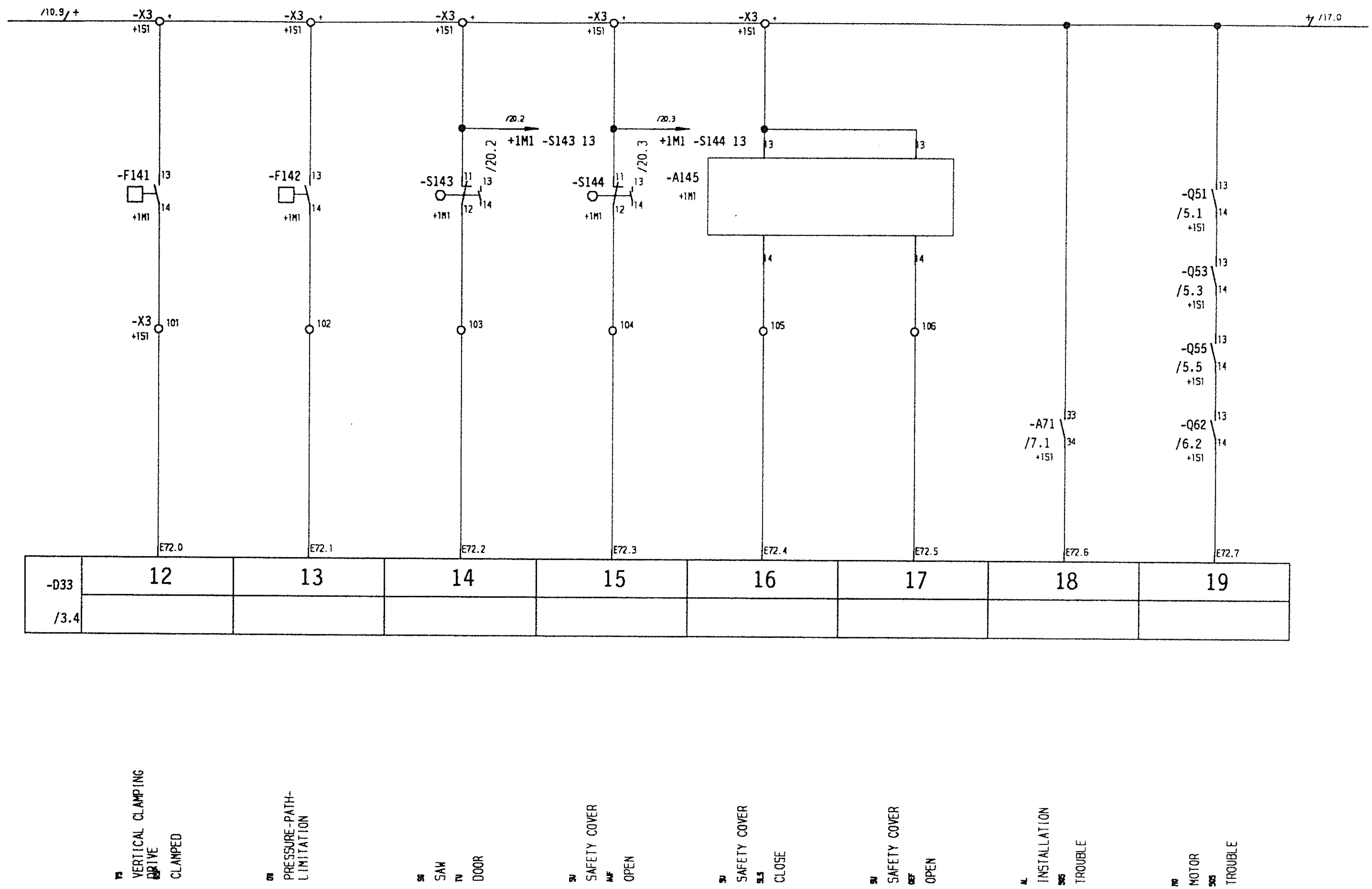
modification	date	date	04.06.91
		proc.	HOLLERBACH
		insp.	
		norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
OPERATEUR PANEL

number : 0K2102-000101

local mark of sheet
information-class STR
project : KKS401 H
13
20 sh.



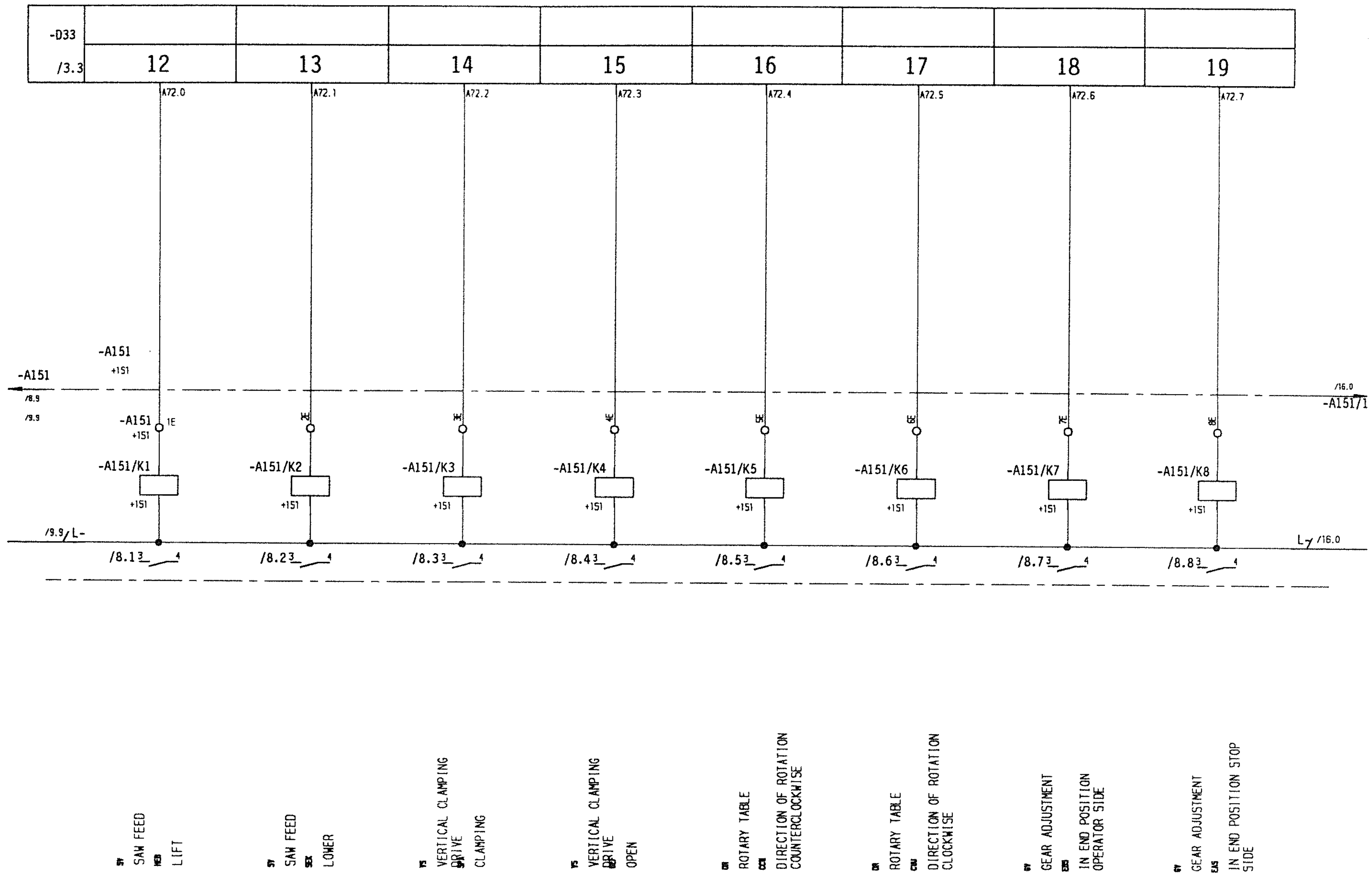
modification	date	
date	04.06.91	
proc.	HOLLERBACH	
insp.		
norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: INPUTS

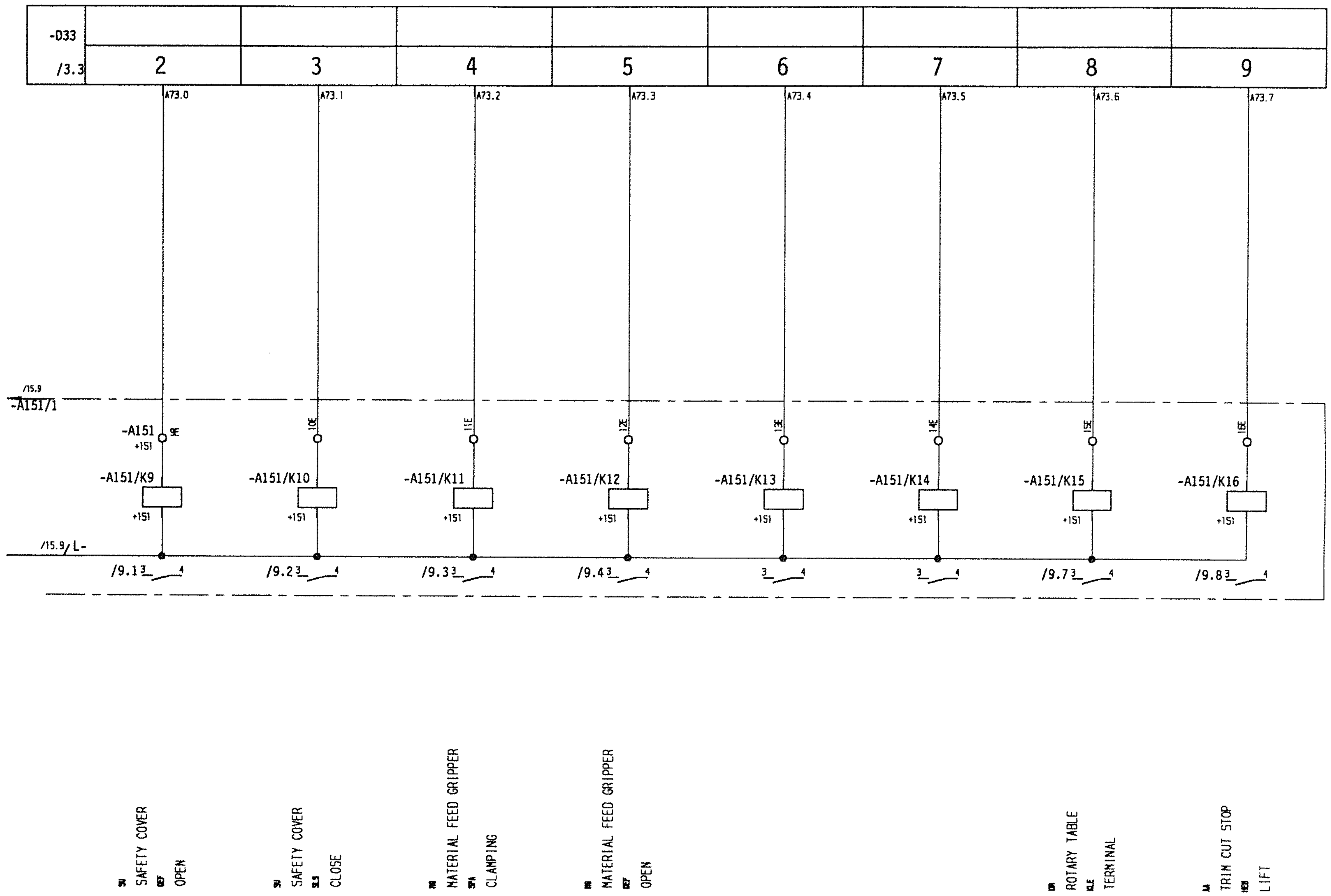
number: 0K2102-000101

Local mark of sheet
information-class STR
project: KKS401 H
14
20 sh.



date	04.06.91	designation:	OUTPUTS
proc.	HOLLERBACH	number	0K2102-000101
insp.		information-class	STR
norm		project	KKS401 H
modification	date	local mark of sheet	15 / 20 sh.

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH



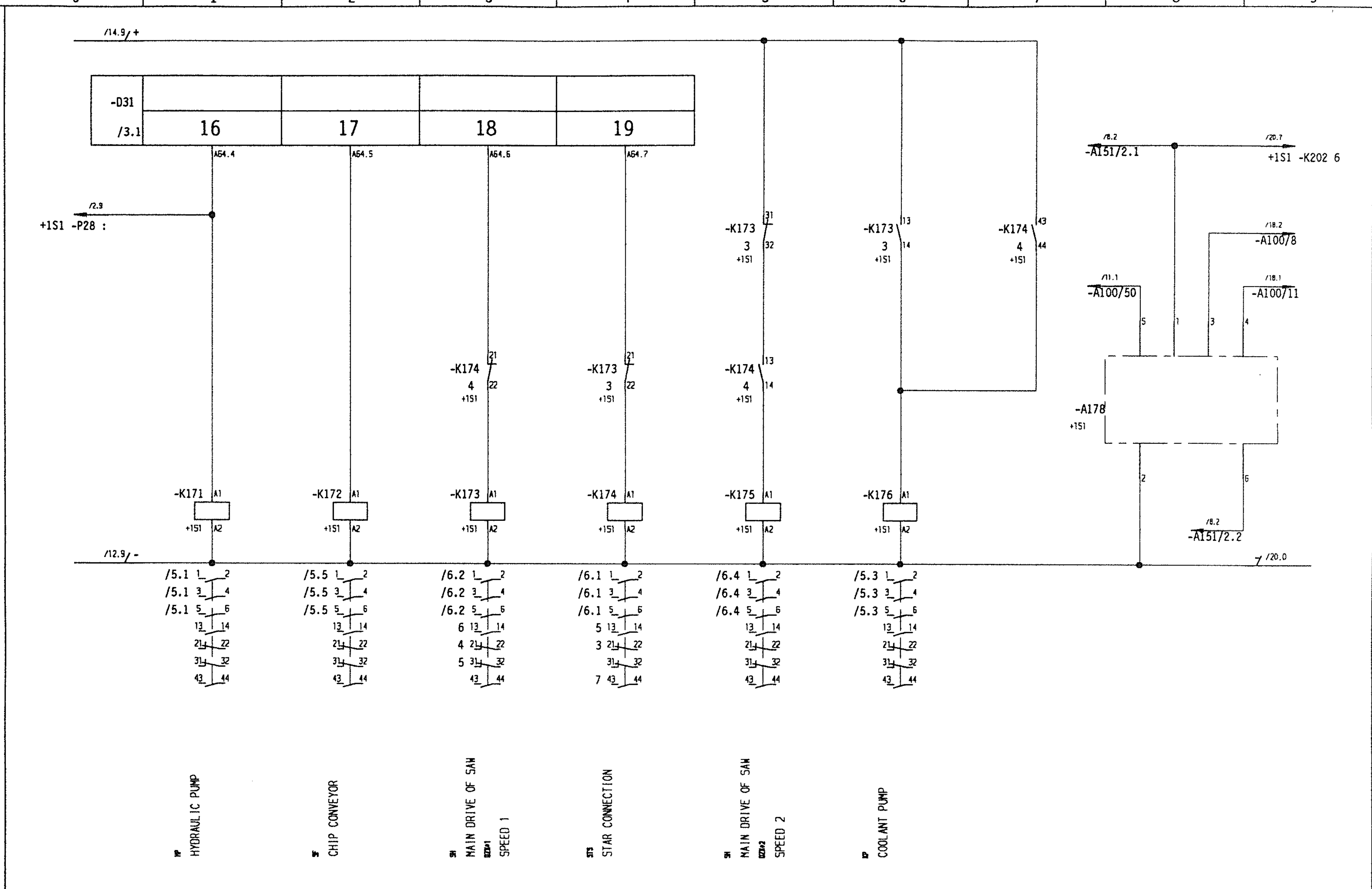
		date	04.06.91
		proc.	HOLLERBACH
		insp.	
modification	date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: OUTPUTS

number : 0K2102-000101

local mark of sheet
information-class STR
project : KKS401 H
16
20 sh.



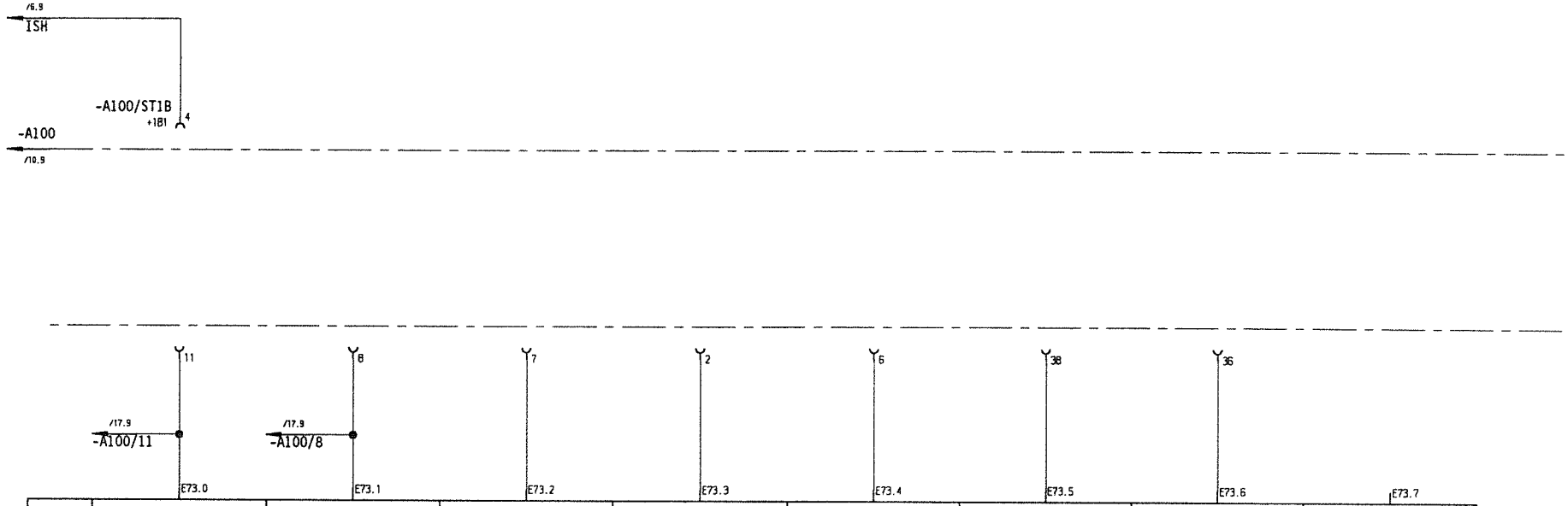
modification	date		date	04.06.91
			proc.	HOLLERBACH
			insp.	
			norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

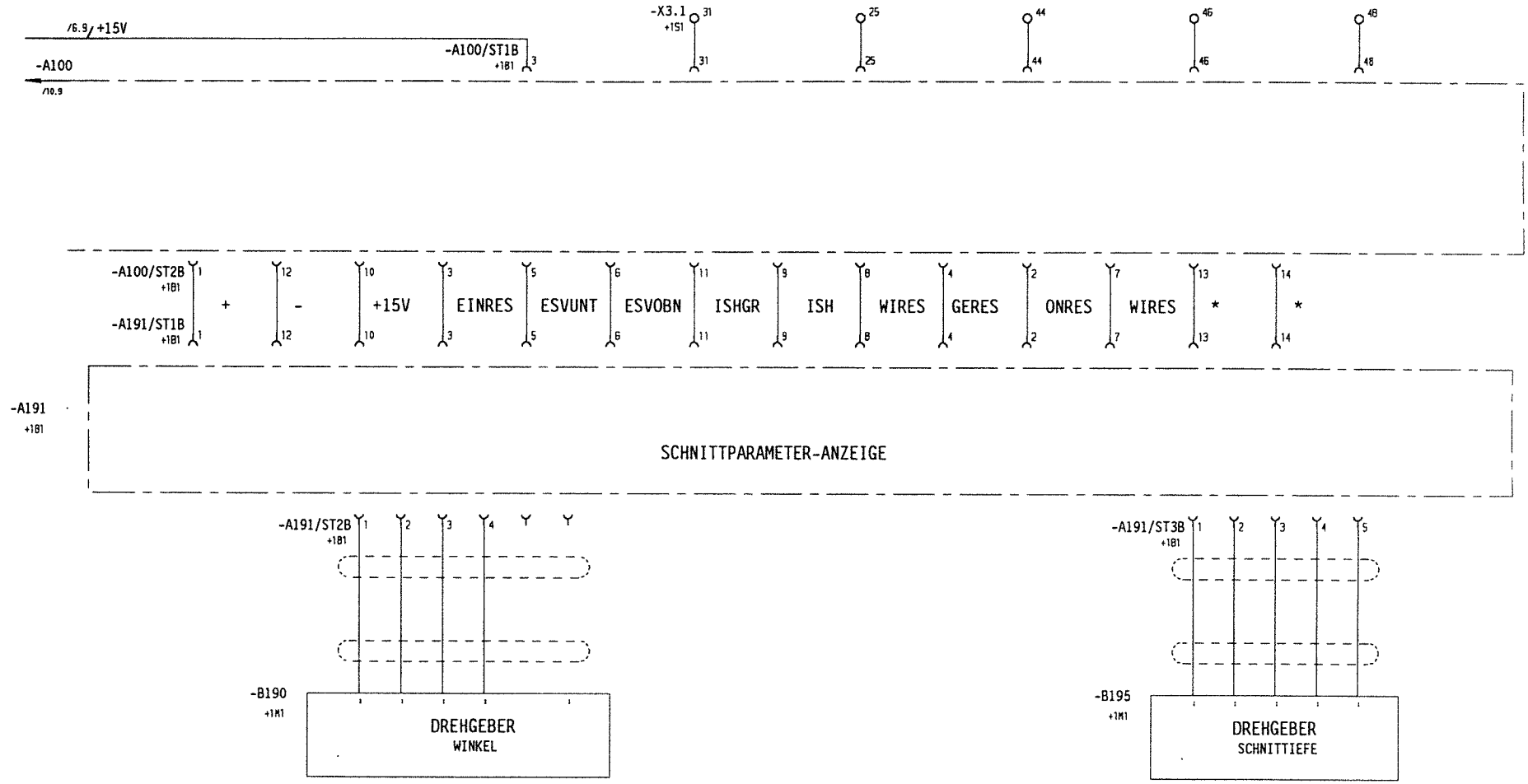
designation: OUTPUTS

number: 0K2102-000101

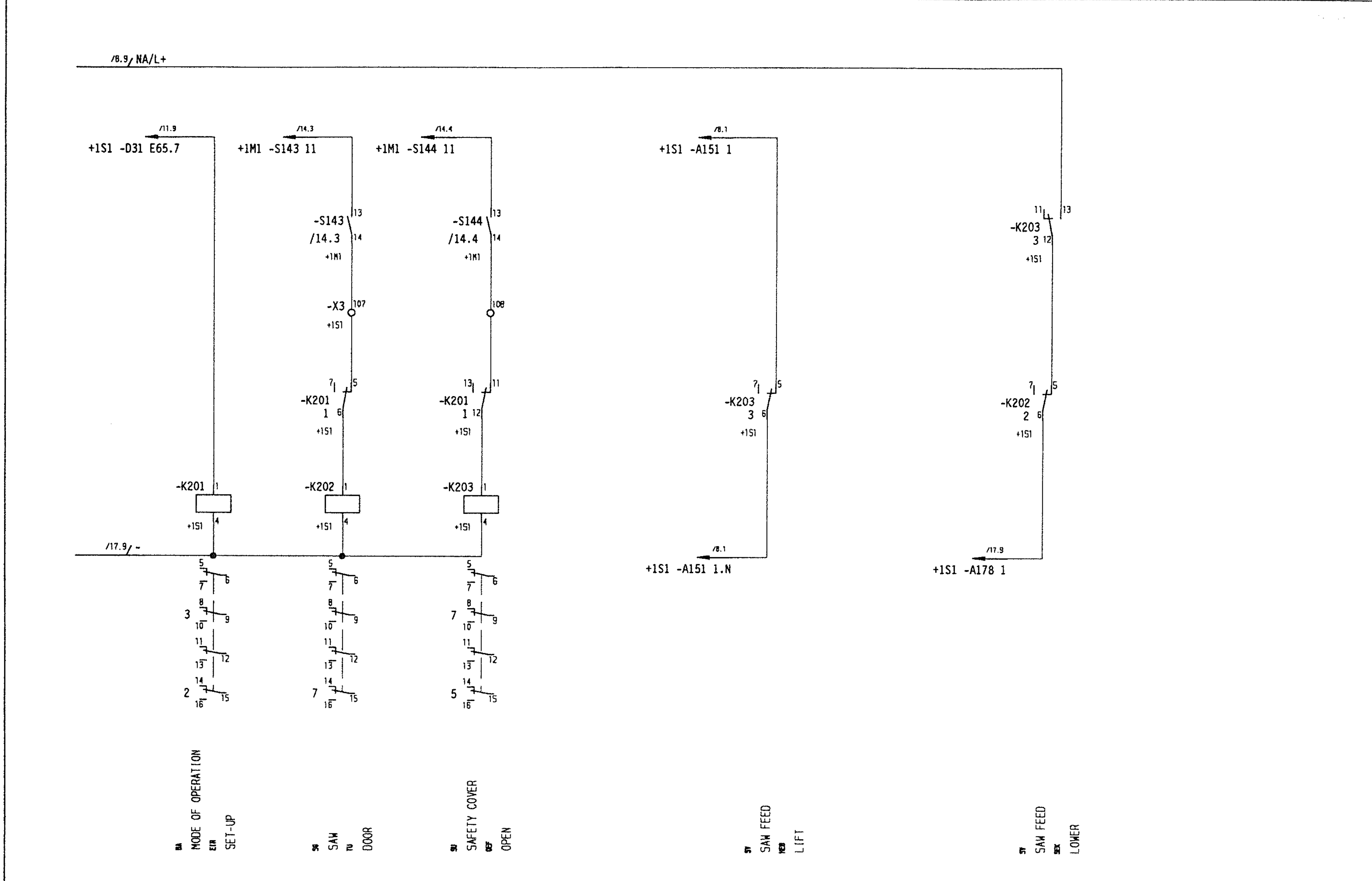
local mark of sheet
information-class STR
project: KKS401 H
17
20 sh.



				date	04.06.91	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7880 LOERRACH	designation: INPUTS		number : 0K2102-000101	local mark of sheet	
				proc.	HOLLERBACH					information-class	STR
				insp.						project : KKS401 H	18
	modification	date		norm							20 sh.



				date	04.06.91	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7880 LOERRACH	designation: CONTROL		number : 0K2102-000101	Local mark of sheet	
				proc.	HOLLERBACH					information-class	STR
				insp.						project : KKS401 H	19
	modification	date		norm							20 sh.



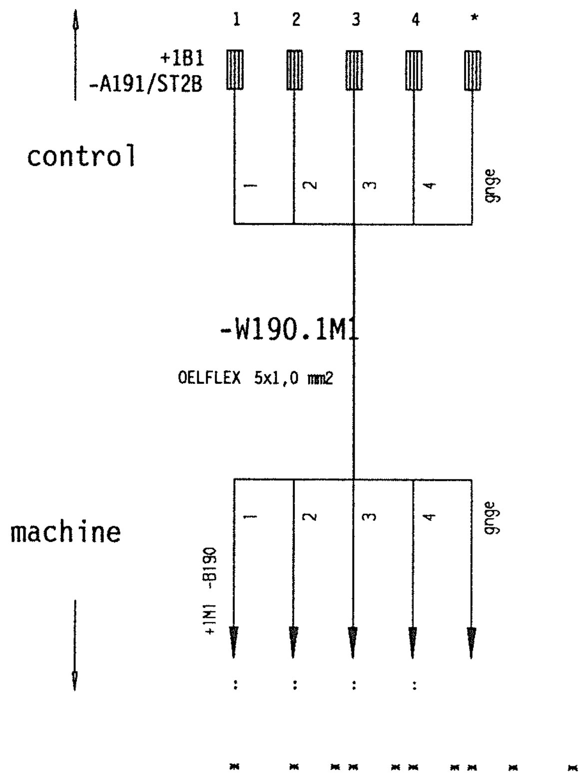
date	04.06.91
proc.	HOLLERBACH
insp.	
norm	
modification date	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: CONTROL

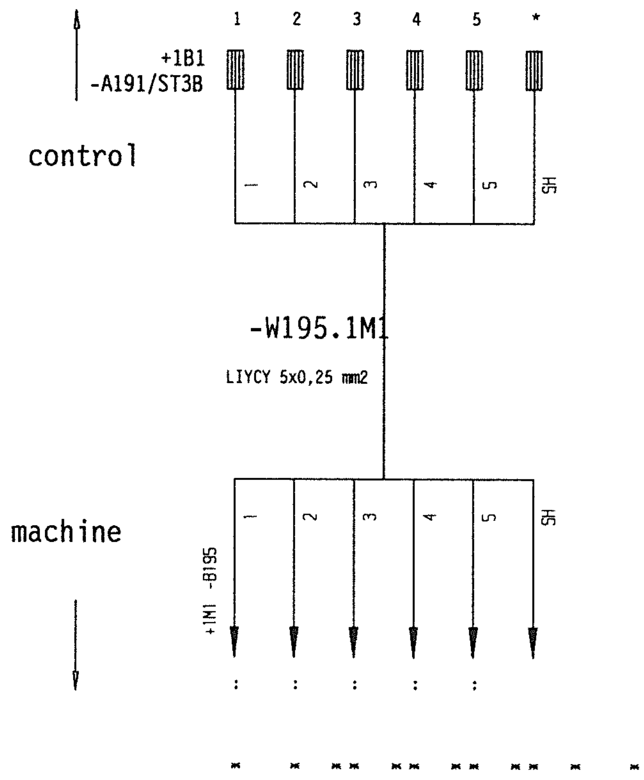
number: 0K2102-000101

local mark of sheet
information-class STR
project: KKS401 H
20
20 sh.



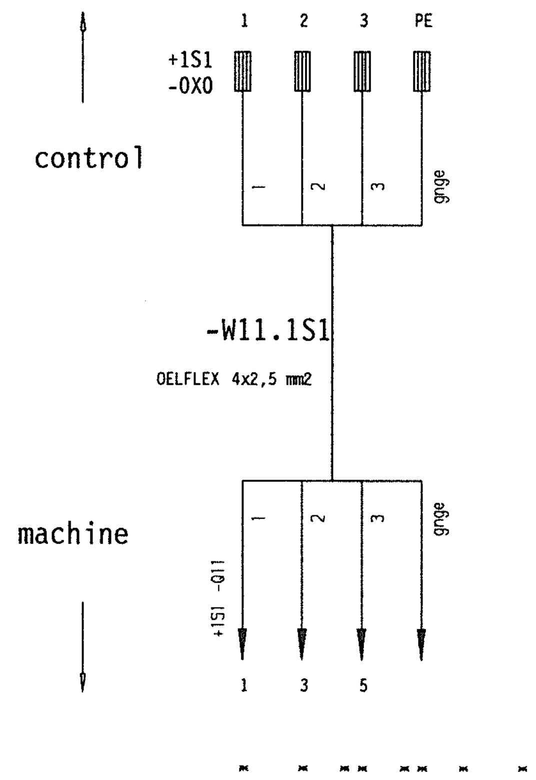
date	04.06.91	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Kabel / cable -W190.1M1 - -W190.1M1
proc.	HOLLERBACH		
insp.			
norm			
modification date			

place-terminal/plug	number :	local mark of sheet	*
-A191/.ST2B	0K2102-000101	information-class	VKB
		project : KKS401 H	1
			1 sh.



date	04.06.91	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	place-terminal/plug	number :	local mark of sheet	x
proc.	HOLLERBACH		Kabel -W195.1M1 - -W195.1M1 cable	-A191/.ST3B	0K2102-000101	information-class	YKB
insp.						project :	1
norm						KKS401 H	1 sh.

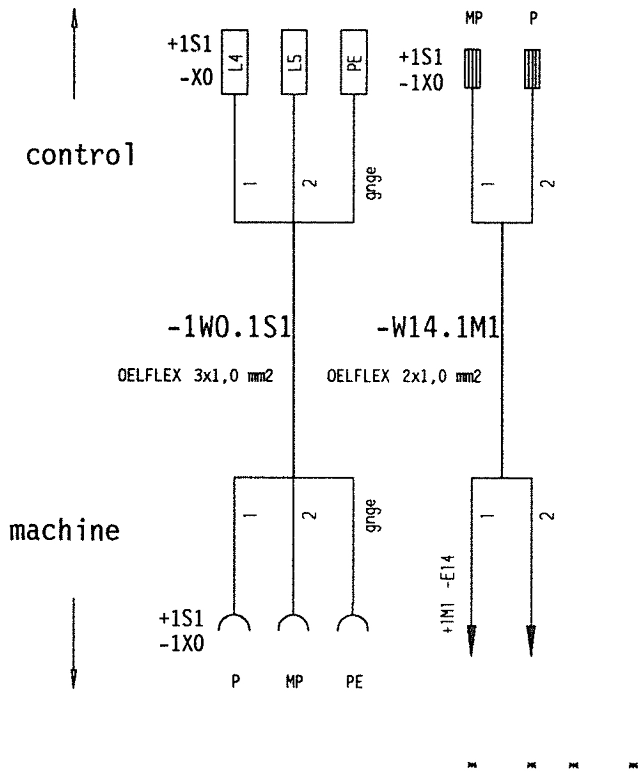
modification date



date	04.06.91	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Kabel / cable -W11.1S1 - -W11.1S1	place-terminal/plug: 1S1-0X.0	number: 0K2102-000101
proc.	HOLLERBACH				
insp.					
norm					

Local mark of sheet	x
information-class	VKB
project : KKS401 H	1
	1 sh.

modification date

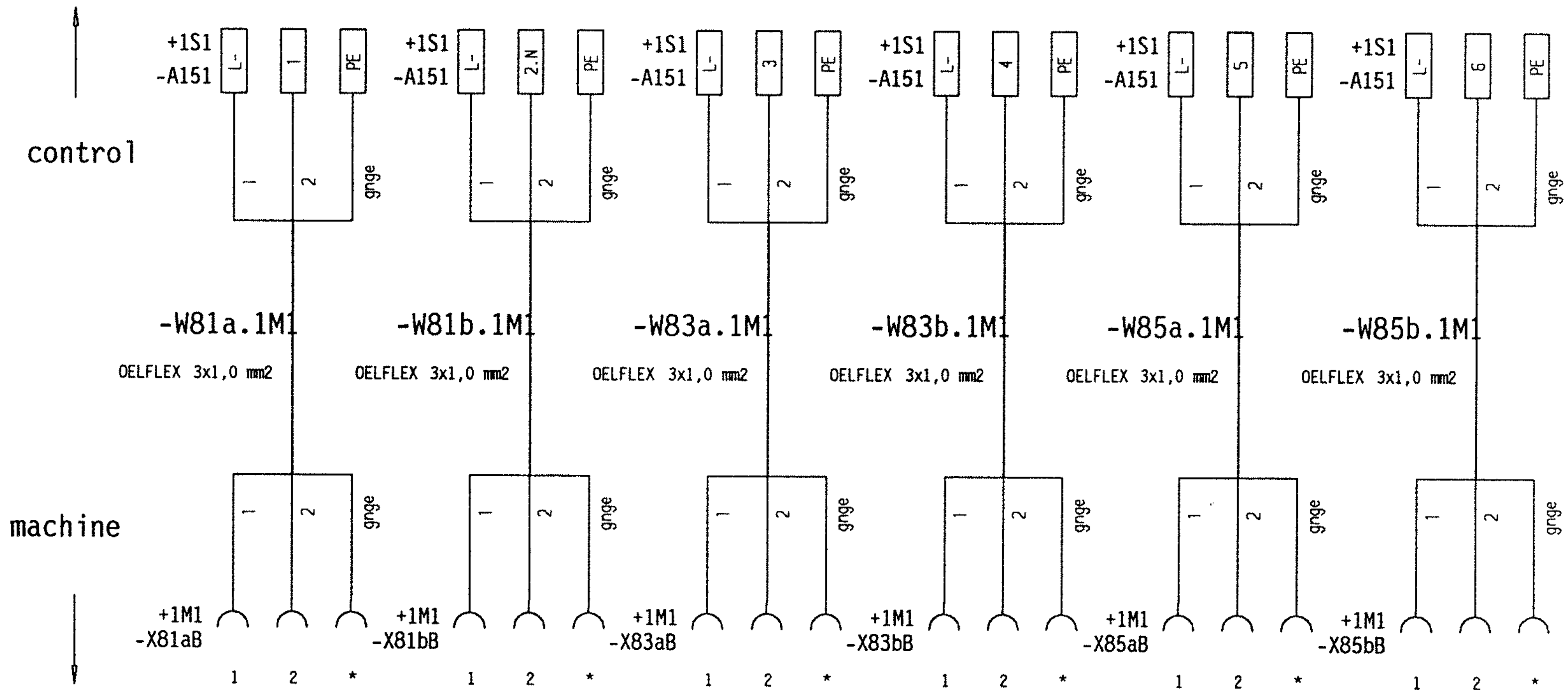


date	04.06.91
proc.	HOLLERBACH
insp.	
norm	
modification date	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

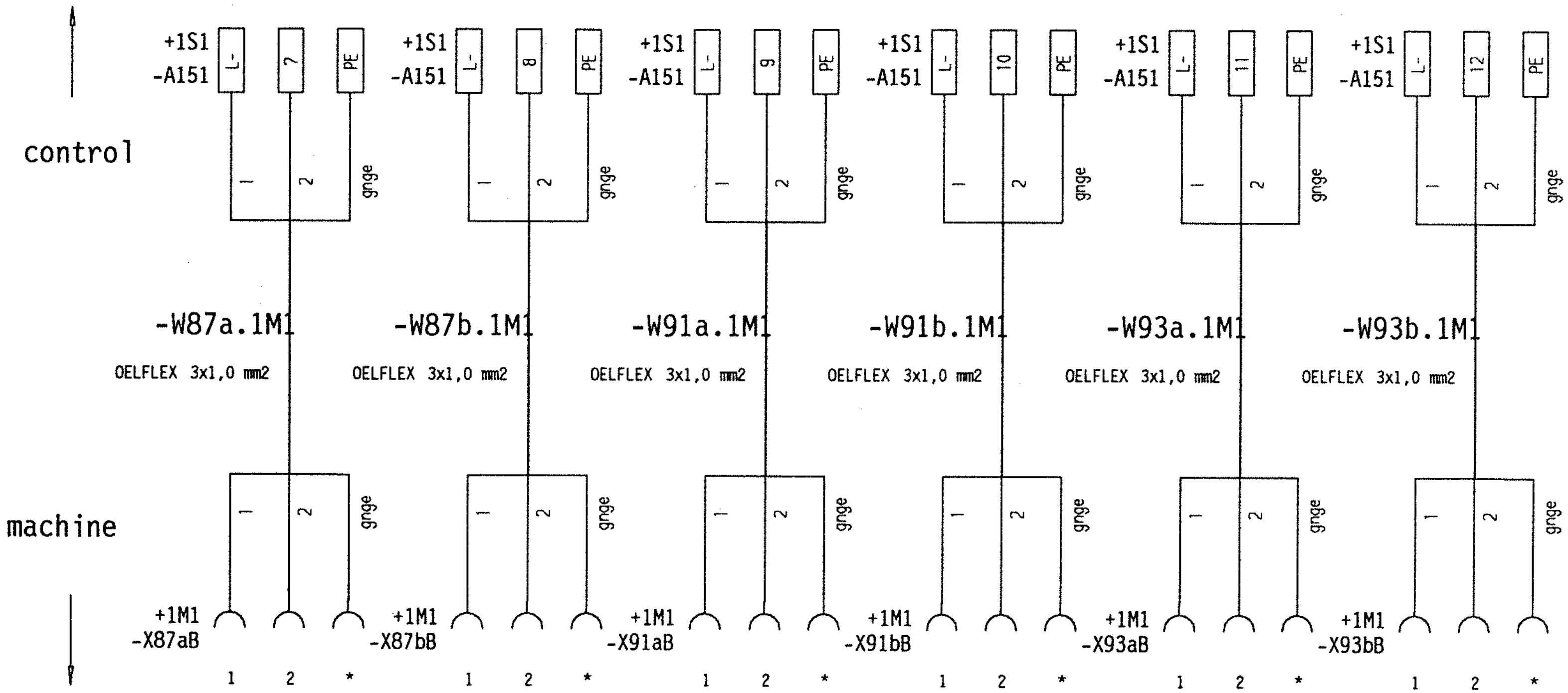
designation: Kabel / cable -W14.1M1 - -W14.1M1

place-terminal/plug	number :	local mark of sheet	x
1S1-1X.0	0K2102-000101	information-class	VKB
		project : KKS401 H	1 / 1 sh.



date	04.06.91	designation: Kabel / cable -W81a.1M1 - -W85b.1M1	place-terminal/plug: 1S1-A1.51
proc.	HOLLERBACH	number: 0K2102-000101	local mark of sheet: x
insp.		information-class: VKB	project: KKS401 H
norm		sheet: 1	3 sh.
modification	date		

KALTENBACH
HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH

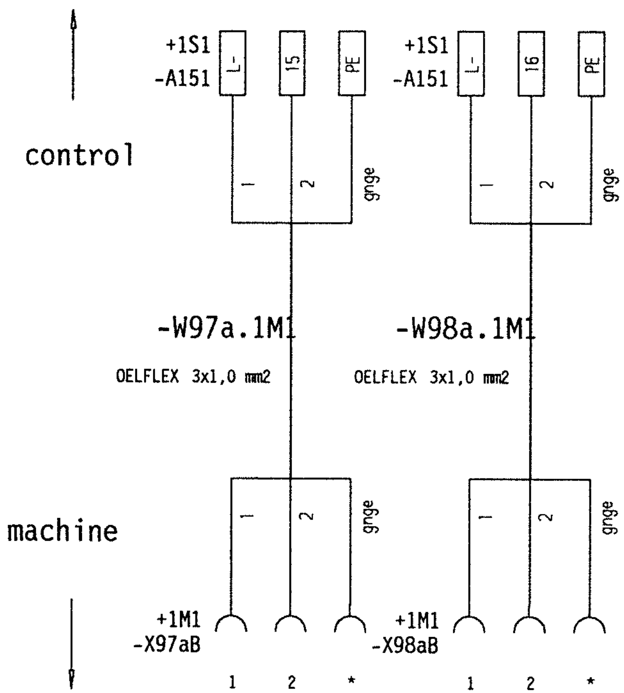


date	04.06.91	
proc.	HOLLERBACH	
insp.		
norm		
modification	date	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

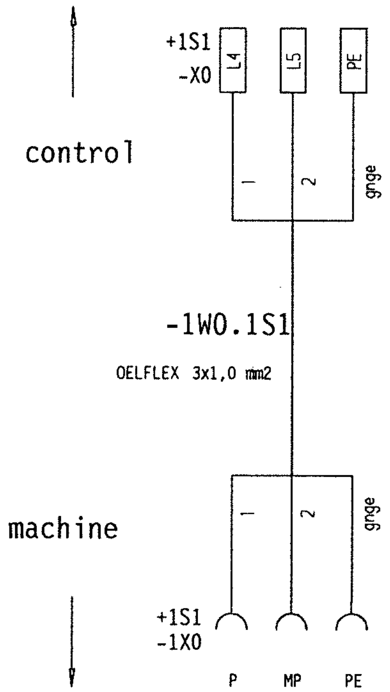
designation:
Kabel
Cable -W87a.1M1 - -W93b.1M1

place-terminal/plug	number :	local mark of sheet	*
1S1-A1.51	0K2102-000101	information-class	VKB
		project :	2
		KKS401 H	3 sh.

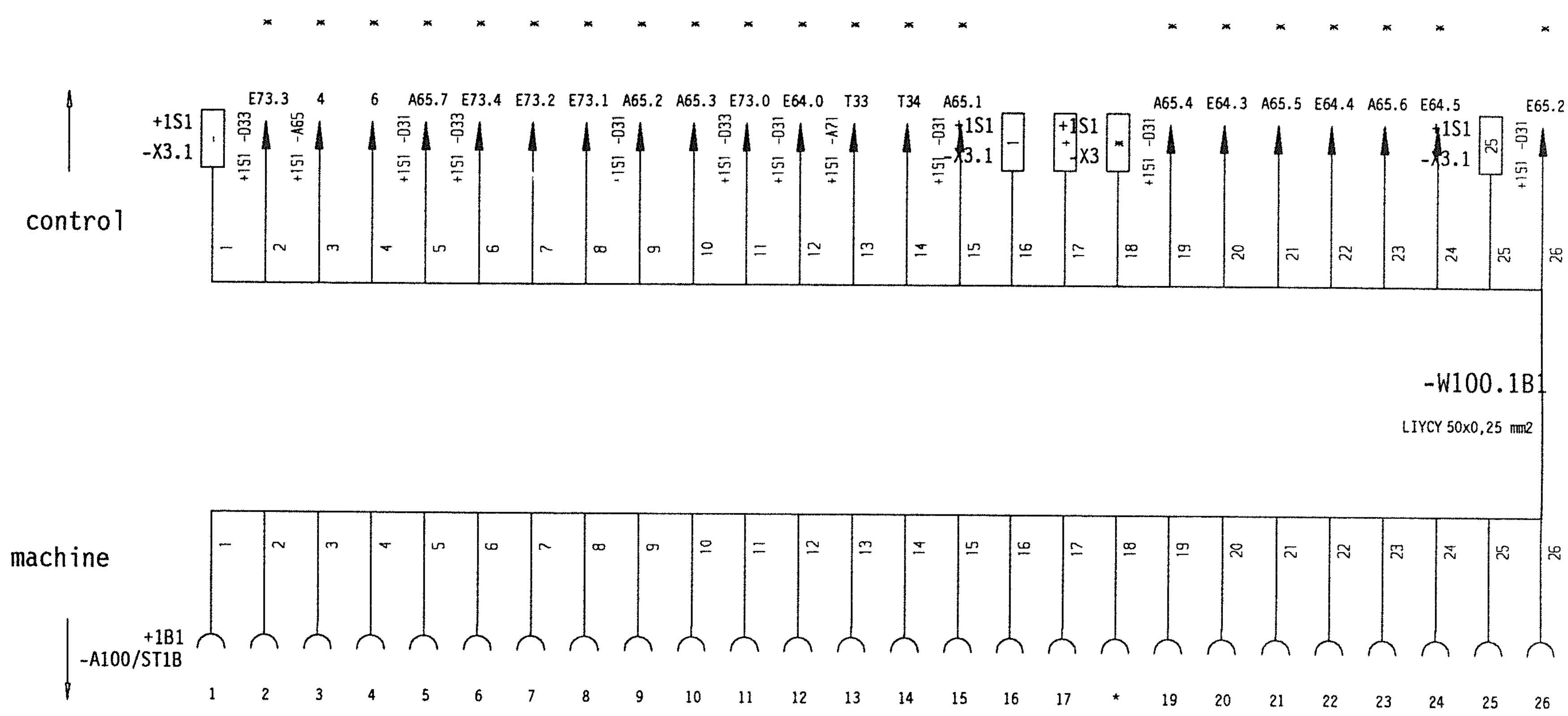


date	04.06.91	designation:	Kabel / cable -W97a.1M1 - -W98a.1M1
proc.	HOLLERBACH	place-terminal/plug	1S1-A1.51
insp.		number :	0K2102-000101
norm		local mark of sheet	x
modification	date	information-class	VKB
		project :	KKS401 H
		sheet	3
		sh.	3

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH



date	04.06.91	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	place-terminal/plug	number :	Local mark of sheet	x
proc.	HOLLERBACH		Kabel cable -1W0.1S1 - -1W0.1S1	1S1-X0	0K2102-000101	information-class	VKB
insp.						project :	1
norm						KKS401 H	1 sh.
modification	date						

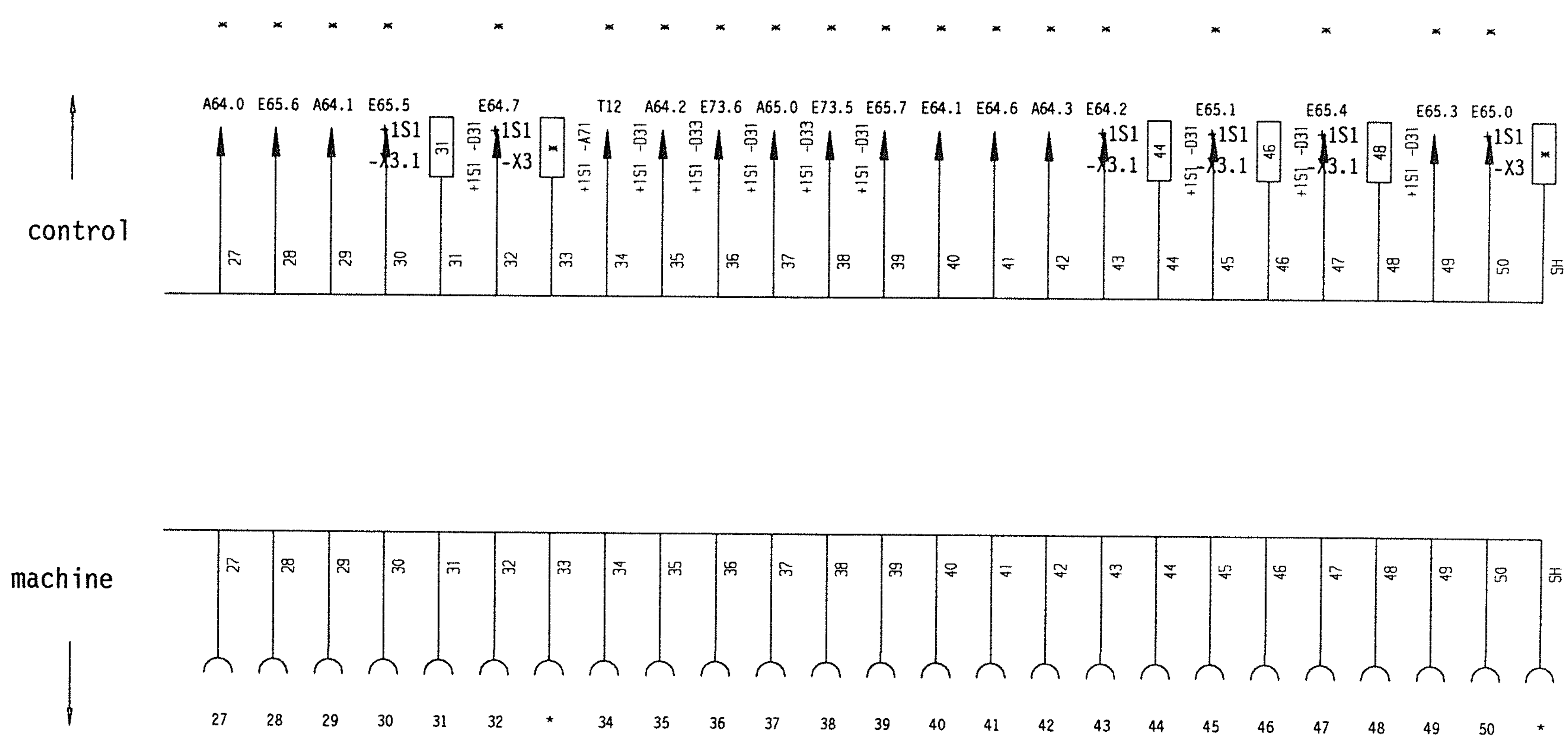


date	04.06.91
proc.	HOLLERBACH
insp.	
norm	
modification	date

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Kabel / cable -W100.1B1 - -W100.1B1

place-terminal/plug	number :	local mark of sheet	x
1S1-X3	0K2102-000101	information-class	YKB
		project : KKS401 H	1 / 3 sh.

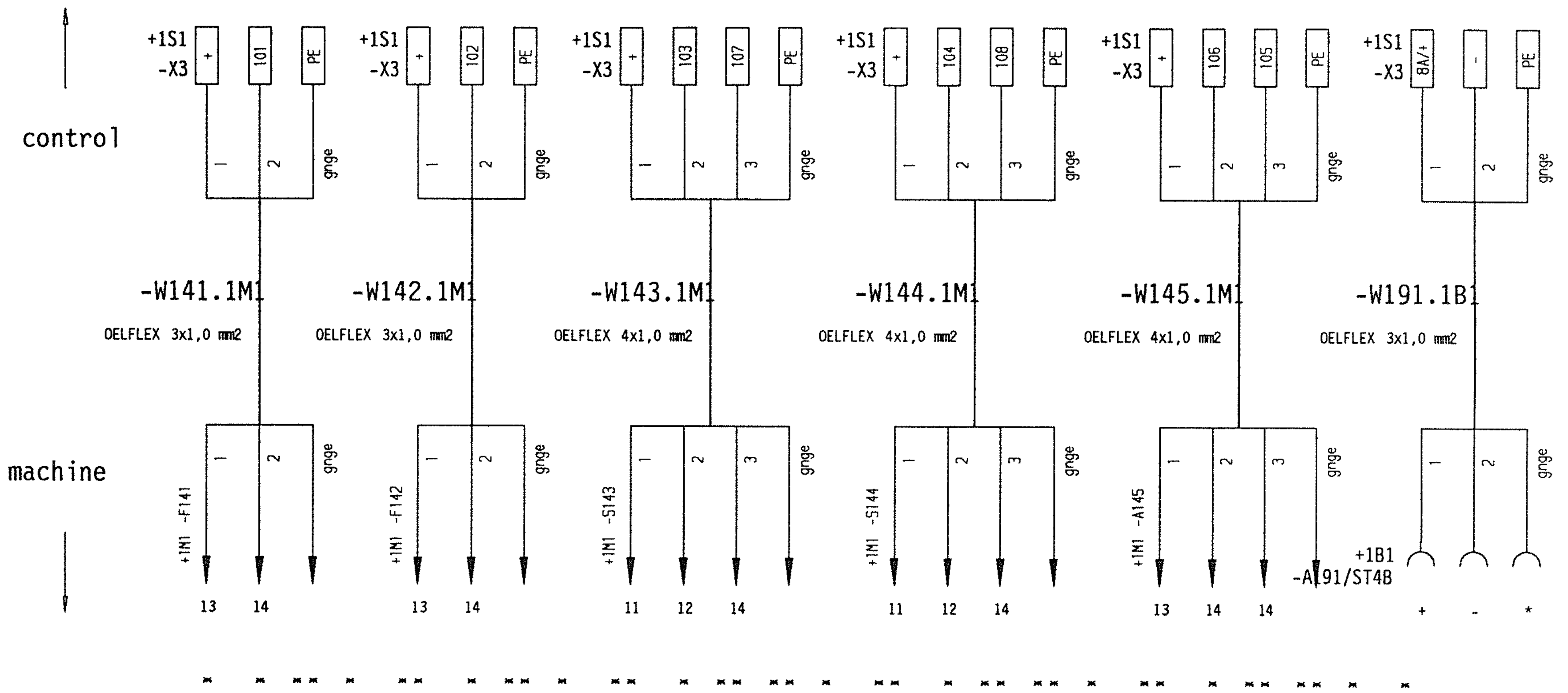


date	04.06.91		
proc.	HOLLERBACH		
insp.			
norm		modification	date

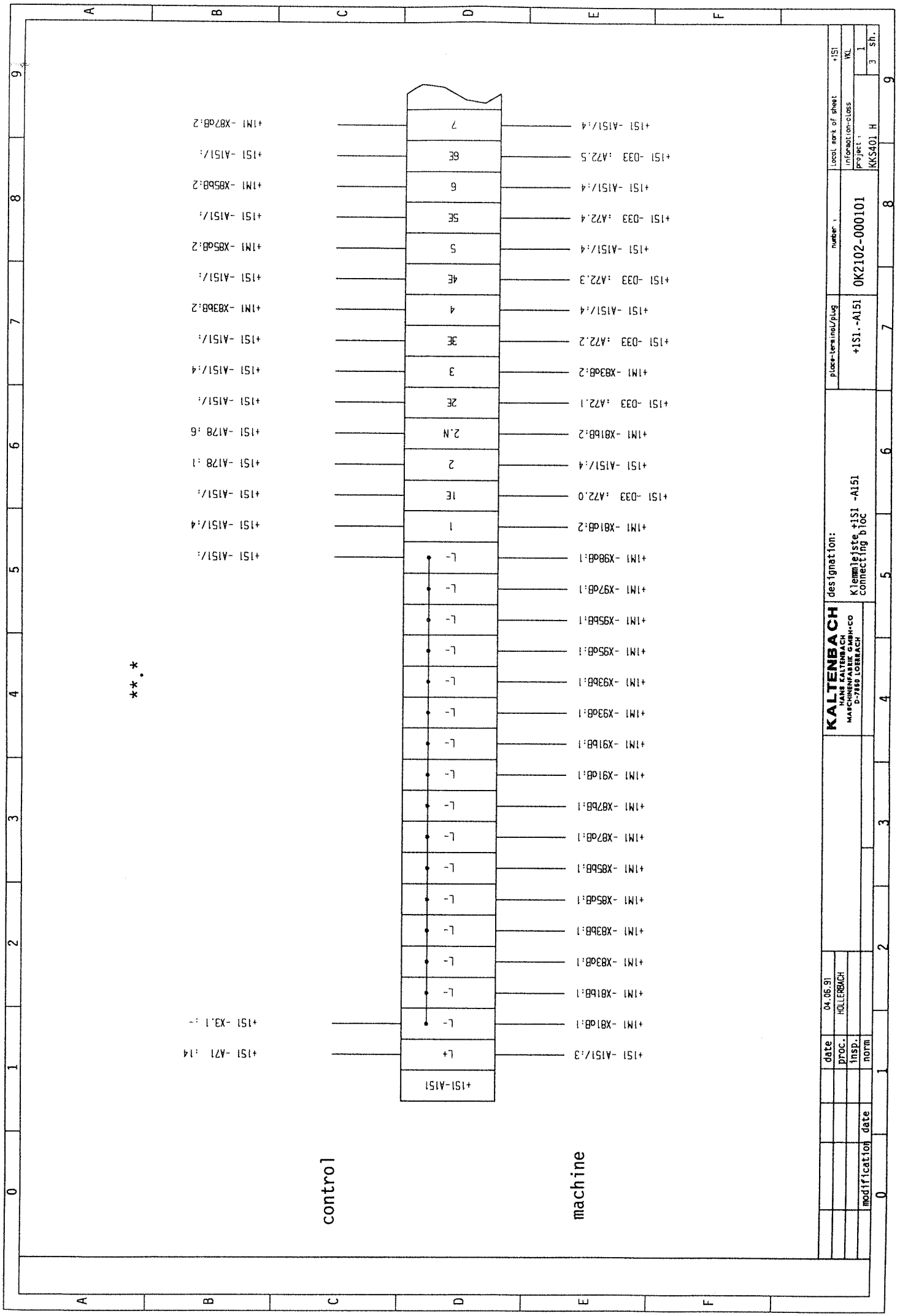
KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Kabel / cable -W100.1B1 - -W100.1B1

place-terminal/plug	number :	local mark of sheet	x
1S1-X3	0K2102-000101	information-class	VKB
		project : KKS401 H	2 / 3 sh.



date	04.06.91	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Kabel / cable -W141.1MI - -W191.1B1	place-terminal/plug 1S1-X3	number : 0K2102-000101	local mark of sheet x; information-class VKB; project : KKS401 H; 3 / 3 sh.
proc.	HOLLERBACH					
insp.						
norm						
modification	date					


+1S1-A1S1
L+
L-
7
6E
6
5E
5
4E
4
3E
3
2E
2.N
2
1E
1
+1S1 -A1S1/.3
+1M1 -X81dB:1
+1M1 -X81bB:1
+1M1 -X83dB:1
+1M1 -X83bB:1
+1M1 -X85dB:1
+1M1 -X85bB:1
+1M1 -X87dB:1
+1M1 -X87bB:1
+1M1 -X91dB:1
+1M1 -X91bB:1
+1M1 -X93dB:1
+1M1 -X93bB:1
+1M1 -X95dB:1
+1M1 -X95bB:1
+1M1 -X97dB:1
+1M1 -X98dB:1
+1S1 -X3.1 :-
+1S1 -A71 :14
+1S1 -A1S1/.4
+1S1 -033 :A72.5
+1S1 -A1S1/.4
+1S1 -033 :A72.4
+1S1 -A1S1/.4
+1S1 -033 :A72.3
+1S1 -A1S1/.4
+1S1 -033 :A72.2
+1M1 -X83dB:2
+1S1 -033 :A72.1
+1M1 -X81bB:2
+1S1 -A1S1/.4
+1S1 -033 :A72.0
+1M1 -X81dB:2
+1S1 -A1S1/.4
+1S1 -A178 :1
+1S1 -A178 :6
+1S1 -A1S1/.4
+1M1 -X83bB:2
+1S1 -A1S1/.4
+1M1 -X85dB:2
+1S1 -A1S1/.4
+1M1 -X85bB:2
+1S1 -A1S1/.4
+1M1 -X87dB:2
control
machine
***
KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7880 LOERRACH
designation:
Klemmleiste +1S1 -A1S1
connecting bloc
placer-terminal/plug
+1S1.-A1S1
number :
0K2102-000101
local mark of sheet
+1S1
information-class
WKL
projet :
KKS401 H
1
3 sh.
date
04.06.91
proc.
HÜLLERBACH
insp.
norm
modification
date

**.*

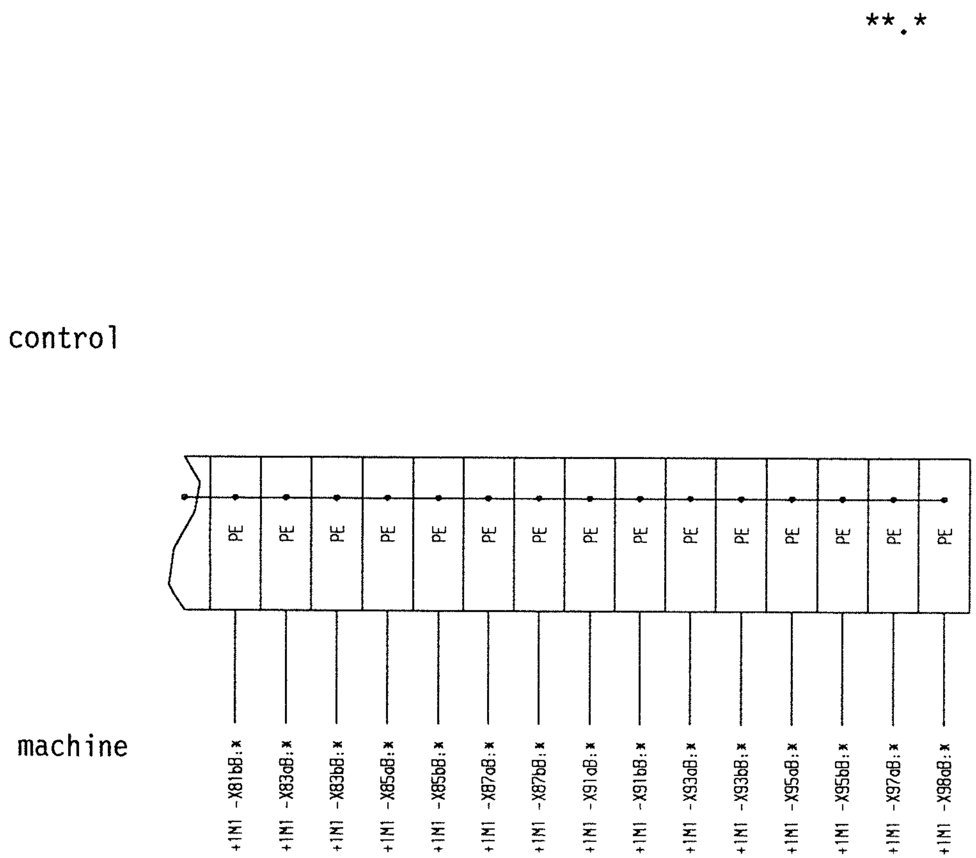
control	terminal	machine
+1S1 -A151/:	7E	+1S1 -D33 :A72.6
+1S1 -A151/:4	8	+1M1 -X87bB:2
+1S1 -A151/:	8E	+1S1 -D33 :A72.7
+1S1 -A151/:4	9	+1M1 -X91aB:2
+1S1 -A151/:	9E	+1S1 -D33 :A73.0
+1S1 -A151/:4	10	+1M1 -X91bB:2
+1S1 -A151/:	10E	+1S1 -D33 :A73.1
+1S1 -A151/:4	11	+1M1 -X93aB:2
+1S1 -A151/:	11E	+1S1 -D33 :A73.2
+1S1 -A151/:4	12	+1M1 -X93bB:2
+1S1 -A151/:	12E	+1S1 -D33 :A73.3
+1S1 -A151/:4	13	+1M1 -X95aB:2
+1S1 -A151/:	13E	+1S1 -D33 :A73.4
+1S1 -A151/:4	14	+1M1 -X95bB:2
+1S1 -A151/:	14E	+1S1 -D33 :A73.5
+1S1 -A151/:4	15	+1M1 -X97aB:2
+1S1 -A151/:	15E	+1S1 -D33 :A73.6
+1S1 -A151/:4	16	+1M1 -X98aB:2
+1S1 -A151/:	16E	+1S1 -D33 :A73.7

modification	date	date	04.06.91
		proc.	HOLLERBACH
		insp.	
		norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Klemmleiste +1S1 -A151
connecting bloc

place-terminal/plug	number :	local mark of sheet	+1S1
+1S1.-A151	0K2102-000101	information-class	VKL
		project : KKS401 H	2 / 3 sh.



date	04.06.91
proc.	HOLLERBACH
insp.	
norm	

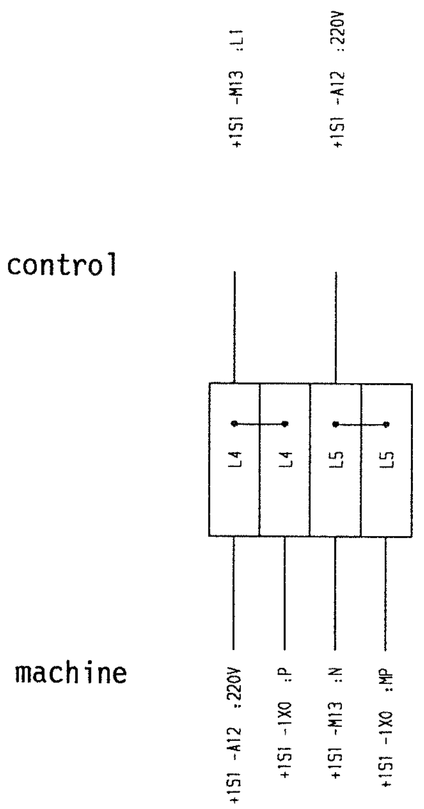
modification date

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

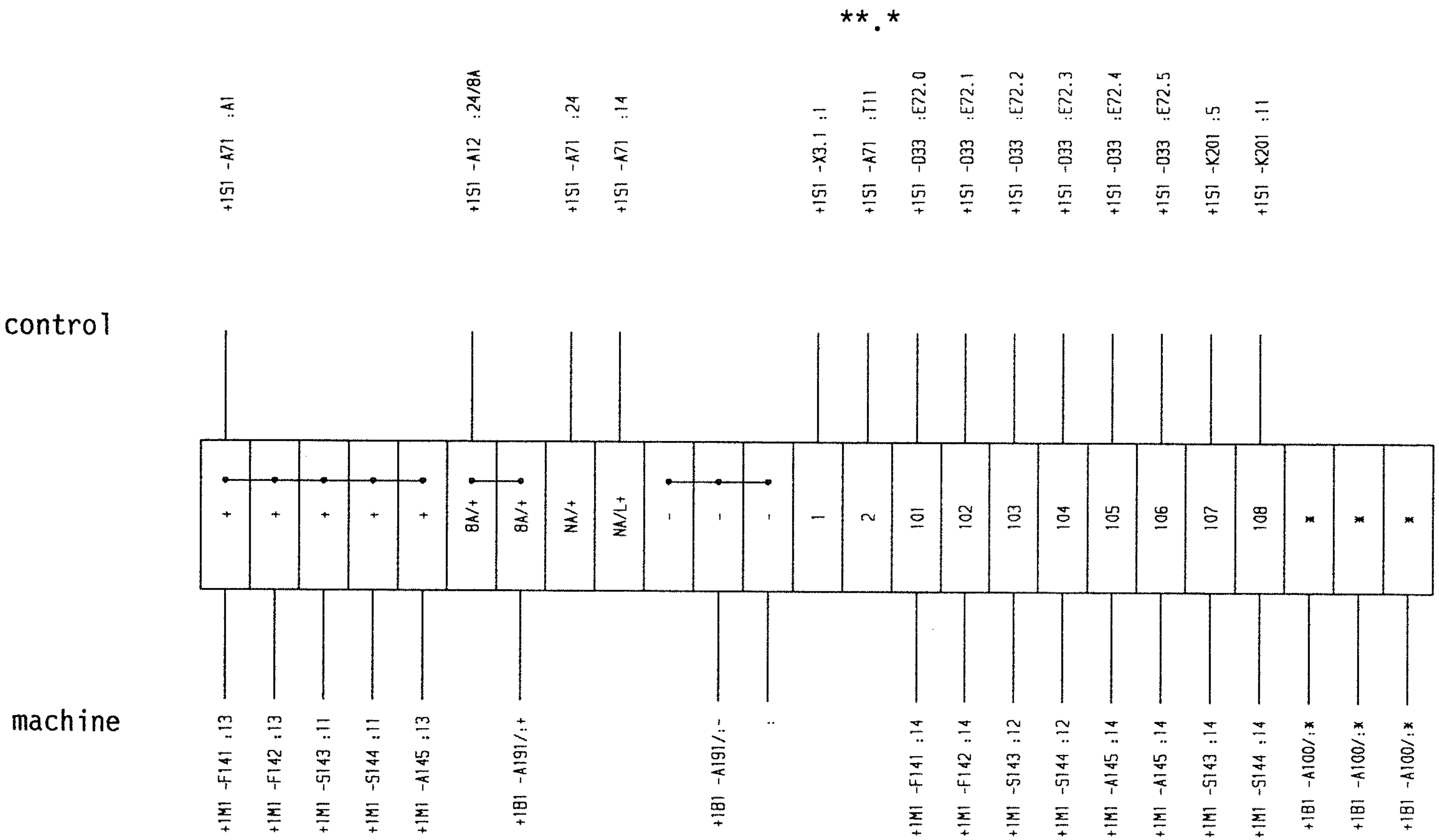
designation:
Klemmleiste +1S1 -A151
connecting bloc

place-terminal/plug	number :	local mark of sheet	+1S1
+1S1.-A151	0K2102-000101	information-class	VKL
		project :	3
		KKS401 H	3 sh.

**.*



date	04.06.91	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Klemmleiste +1S1 -X0 connecting bloc	place-terminal/plug: +1S1.-X0
proc.	HOLLERBACH		number: 0K2102-000101	local mark of sheet: +1S1
insp.				information-class: VKL
norm				project: KKS401 H — 1 — 1 sh.
modification	date			



		date	04.06.91
		proc.	HOLLERBACH
		insp.	
modification	date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

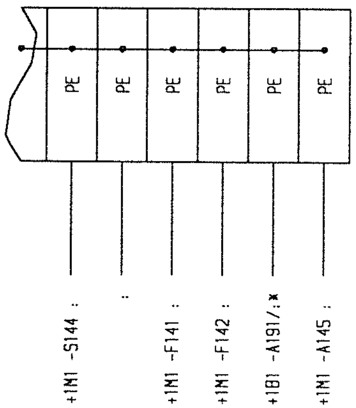
designation:
Klemmleiste +1S1 -X3
connecting bloc

place-terminal/plug	number :	Local mark of sheet	+1S1
+1S1.-X3	0K2102-000101	information-class	VKL
		project : KKS401 H	1
			2 sh.

**.*

control

machine



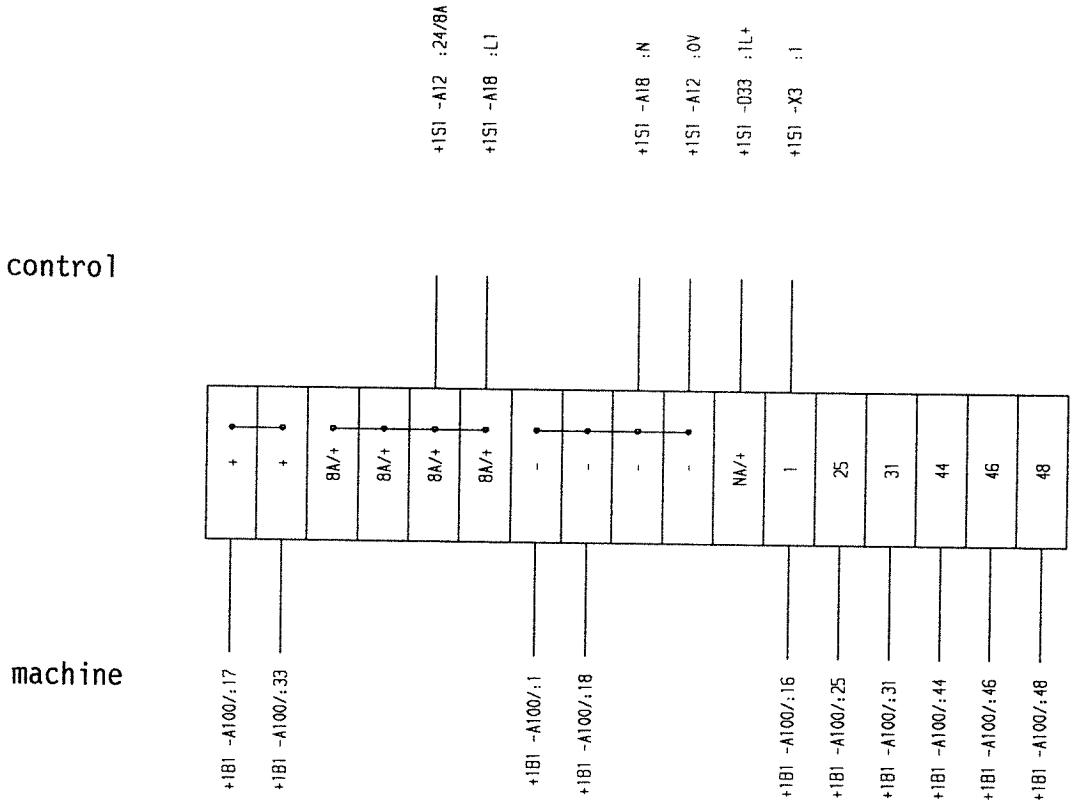
date	04.06.91	
proc.	HOLLERBACH	
insp.		
modification	date	norm

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Klemmleiste +1S1 -X3
connecting bloc

place-terminal/plug	number :	local mark of sheet	+1S1
+1S1.-X3	0K2102-000101	information-class	VKL
		project :	2
		KKS401 H	2 sh.

**.*



			date	04.06.91	
			proc.	HOLLERBACH	
			insp.		
modification	date		norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Klemmleiste +1S1 -X3.1
connecting bloc

place-terminal/plug	number :	local mark of sheet	+1S1
		information-class	VKL
+1S1.-X3.1	0K2102-000101	project : KKS401 H	1
			1 sh.

Diese CAD-erstellte Zeichnung darf nur am Bildschirm geaendert werden.

line	drawing - number: producer	modif.	operateur	mofif.	number of sheets	sheet: first	sheet: last	designation	neutral marks: plan	neutral marks: plant/place marks	neutral marks: plan - marks
1	0K2104-000300	**			2	1	2	Inhaltsverzeichnis	INH*		
2	*	*	*		*	*	*	*	*	*	*
3	0K2104-000300				2	1	2	KABELUEBERSICHT	KUE		
4	*	*	*		*	*	*	*	*	*	*
5	0K2104-000300				2	1	2	MASCHINENUEBERSICHT	MUE		
6	*	*	*		*	*	*	*	*	*	*
7	0K2104-000300				2	1	2	BEDIENTAFEL	OB		
8	*	*	*		*	*	*	*	*	*	*
9	0K2104-000300				1	1	1	UEBERSICHT MASCHINE	OM		
10	*	*	*		*	*	*	*	*	*	*
11	0K2104-000300				1	1	1	AUFBAUPLAN SCHALTSCHRANK	OS		
12	*	*	*		*	*	*	*	*	*	*
13	0K2104-000300				27	1	27	SCHNITTSTELLE SPS-NC (E/A)	STR		
14	*	*	*		*	*	*	*	*	*	*
15	0K2104-000300-A100/ST4S				1	1	1	Kabel -2W101.1M2 - -2W101.1M2	VKB	-A100/	ST4S
16	*	*	*		*	*	*	*	*	*	*
17	0K2104-000300-A11/ST1B				1	1	1	Kabel -1OW3.1B1 - -1OW3.1B1	VKB	-A11/	ST1B
18	0K2104-000300-A11/ST5S				1	1	1	Kabel -W126.1M2 - -W126.1M2	VKB	-A11/	ST5S
19	0K2104-000300-A11/ST7S				1	1	1	Kabel -W156.1M1 - -W156.1M1	VKB	-A11/	ST7S
20	*	*	*		*	*	*	*	*	*	*
21	0K2104-000300-A130/ST4S				1	1	1	Kabel -2W131.1M1 - -2W131.1M1	VKB	-A130/	ST4S
22	*	*	*		*	*	*	*	*	*	*
23	0K2104-0003001M1-X3				1	1	1	Kabel -W141.1M1 - -W3.1M1	VKB	1M1-X3	
24	*	*	*		*	*	*	*	*	*	*
25	0K2104-0003001M2-X3				1	1	1	Kabel -W241.1M2 - -W3.1M2	VKB	1M2-X3	
26	*	*	*		*	*	*	*	*	*	*
27	0K2104-0003001M3-2X3				2	1	2	Kabel -2W3.1M3 - -2W3.1M3	VKB	1M3-2X	3
28	*	*	*		*	*	*	*	*	*	*
29	0K2104-0003001S1-X3				2	1	2	Kabel -1W11.1B1 - -1W11.1B1	VKB	1S1-X3	
30	*	*	*		*	*	*	*	*	*	*
31	0K2104-0003002M2-6X3				1	1	1	Kabel -W251.2M2 - -W251.2M2	VKB	2M2-6X	3
32	*	*	*		*	*	*	*	*	*	*
33	0K2104-0003002M2-X3				2	1	2	Kabel -W245.2M2 - -W248.2M2	VKB	2M2-X3	
34	*	*	*		*	*	*	*	*	*	*
35	0K2104-0003002S1-1X0				1	1	1	Kabel -1WO.2S1 - -1WO.2S1	VKB	2S1-1X	0
36	*	*	*		*	*	*	*	*	*	*
37	0K2104-0003002S1-1X1				1	1	1	Kabel -W163.1M3 - -W163.1M3	VKB	2S1-1X	1
38	*	*	*		*	*	*	*	*	*	*
39	0K2104-0003002S1-1X3				2	1	2	Kabel -W180.1B1 - -W180.1B1	VKB	2S1-1X	3
40	*	*	*		*	*	*	*	*	*	*
41	0K2104-0003002S1-2X0				1	1	1	Kabel -2WO.2S1 - -2WO.2S1	VKB	2S1-2X	0
42	*	*	*		*	*	*	*	*	*	*

KABEL/cable
KLEMMLEISTE/connecting bloc

			date	03.07.91	
			proc.	HOLLERBACH	
	**	26.02.91	insp.	**	
	modif.	date	norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

Inhaltsverzeichnis
index

0K2104-000300 INH*

DRNC/NA/RB/FM

1
2 sh.

Diese CAD-erstellte Zeichnung darf nur am Bildschirm geaendert werden.

line	drawing - number: producer	modif.	operateur	mofif.	number of sheets	sheet: first	sheet: last	designation	neutral marks: plan	neutral marks: plant/place marks	neutral marks: plan - marks
1	0K2104-0003002S1-2X1				1	1	1	Kabel -W168.1M3 - -W168.1M3	VKB	2S1-2X	1
2	*	*	*		*	*	*	*	*	*	*
3	0K2104-0003002S1-2X3				1	1	1	Kabel -2W11.1B1 - -2W11.1B1	VKB	2S1-2X	3
4	*	*	*		*	*	*	*	*	*	*
5	0K2104-0003002S1-4X3				1	1	1	Kabel -3W11.1B1 - -3W11.1B1	VKB	2S1-4X	3
6	*	*	*		*	*	*	*	*	*	*
7	0K2104-0003002S1-8X3				1	1	1	Kabel -W3.1M1 - -W3.1M1	VKB	2S1-8X	3
8	*	*	*		*	*	*	*	*	*	*
9	0K2104-0003002S1-A98				1	1	1	Kabel -W98.2S1 - -W98.2S1	VKB	2S1-A9	8
10	*	*	*		*	*	*	*	*	*	*
11	0K2104-0003002S1-X1				1	1	1	Kabel -1W101.1M2 - -1W131.1M1	VKB	2S1-X1	
12	*	*	*		*	*	*	*	*	*	*
13	0K2104-0003002S1-X3				2	1	2	Kabel -W3.1M2 - -W3.2M2	VKB	2S1-X3	
14	*	*	*		*	*	*	*	*	*	*
15	0K2104-000300+1M1-X3				1	1	1	Klemmleiste +1M1 -X3	VKL	+1M1	-X3
16	*	*	*		*	*	*	*	*	*	*
17	0K2104-000300+1M2-X3				1	1	1	Klemmleiste +1M2 -X3	VKL	+1M2	-X3
18	*	*	*		*	*	*	*	*	*	*
19	0K2104-000300+1S1-X3				1	1	1	Klemmleiste +1S1 -X3	VKL	+1S1	-X3
20	*	*	*		*	*	*	*	*	*	*
21	0K2104-000300+2M2-X3				1	1	1	Klemmleiste +2M2 -X3	VKL	+2M2	-X3
22	*	*	*		*	*	*	*	*	*	*
23	0K2104-000300+2S1-1X0				1	1	1	Klemmleiste +2S1 -1X0	VKL	+2S1	-1X0
24	0K2104-000300+2S1-1X1				1	1	1	Klemmleiste +2S1 -1X1	VKL	+2S1	-1X1
25	0K2104-000300+2S1-2X0				1	1	1	Klemmleiste +2S1 -2X0	VKL	+2S1	-2X0
26	0K2104-000300+2S1-2X1				1	1	1	Klemmleiste +2S1 -2X1	VKL	+2S1	-2X1
27	0K2104-000300+2S1-8X3				1	1	1	Klemmleiste +2S1 -8X3	VKL	+2S1	-8X3
28	0K2104-000300+2S1-X0				1	1	1	Klemmleiste +2S1 -X0	VKL	+2S1	-X0
29	0K2104-000300+2S1-X1				1	1	1	Klemmleiste +2S1 -X1	VKL	+2S1	-X1
30	0K2104-000300+2S1-X3				3	1	3	Klemmleiste +2S1 -X3	VKL	+2S1	-X3
31	*	*	*		*	*	*	*	*	*	*
32	*	*	*		*	*	*	*	*	*	*
33	*	*	*		*	*	*	*	*	*	*
34	*	*	*		*	*	*	*	*	*	*
35	*	*	*		*	*	*	*	*	*	*
36	*	*	*		*	*	*	*	*	*	*
37	*	*	*		*	*	*	*	*	*	*
38	*	*	*		*	*	*	*	*	*	*
39	*	*	*		*	*	*	*	*	*	*
40	*	*	*		*	*	*	*	*	*	*
41	*	*	*		*	*	*	*	*	*	*
42	*	*	*		*	*	*	*	*	*	*

KABEL/cable

KLEMMLEISTE/connecting bloc

			date	03.07.91	
			proc.	HOLLERBACH	
	**	26.02.91	insp.	**	
	modif.	date	norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

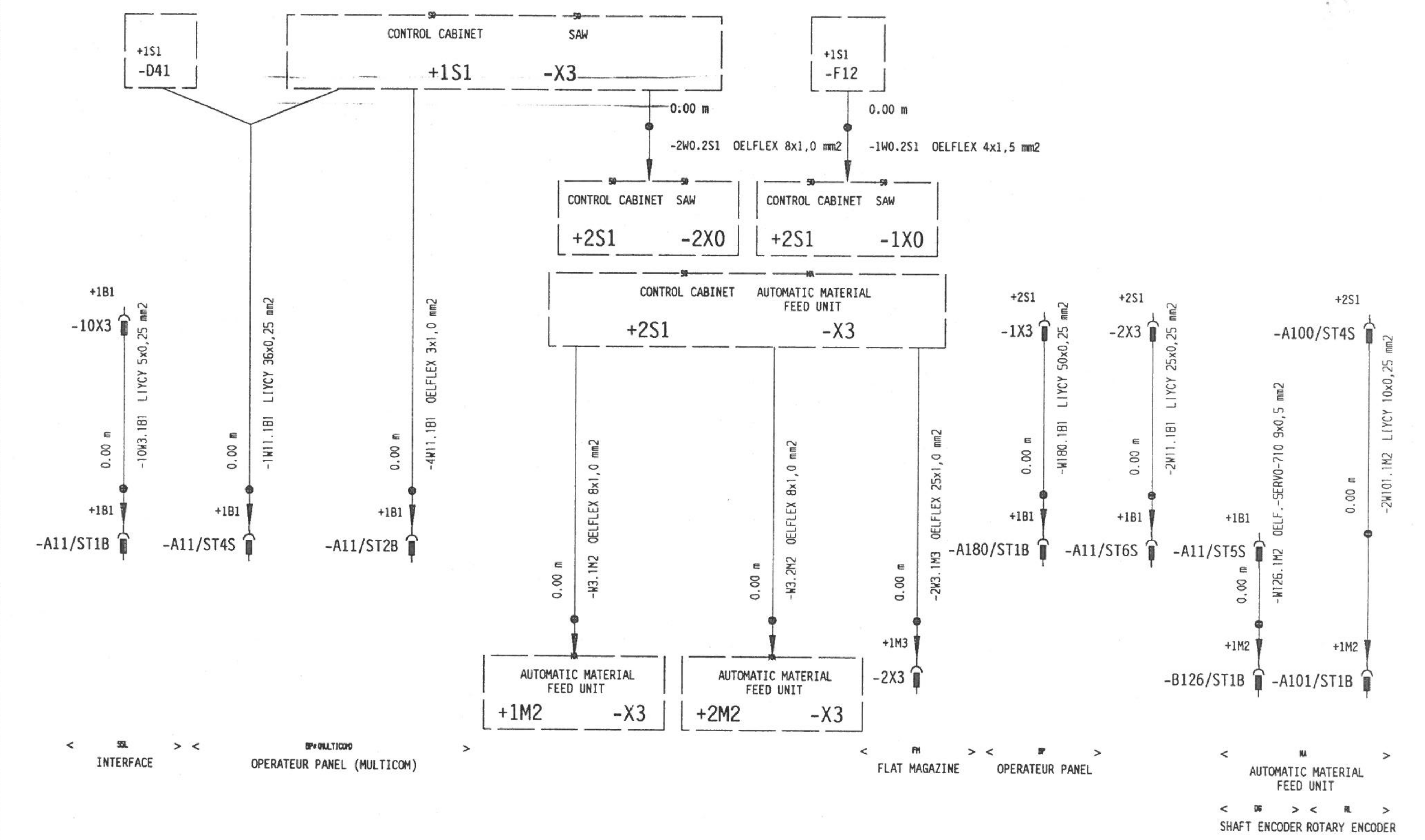
Inhaltsverzeichnis
index

0K2104-000300

INH* + *

DRNC/NA/RB/FM

2
2 sh.



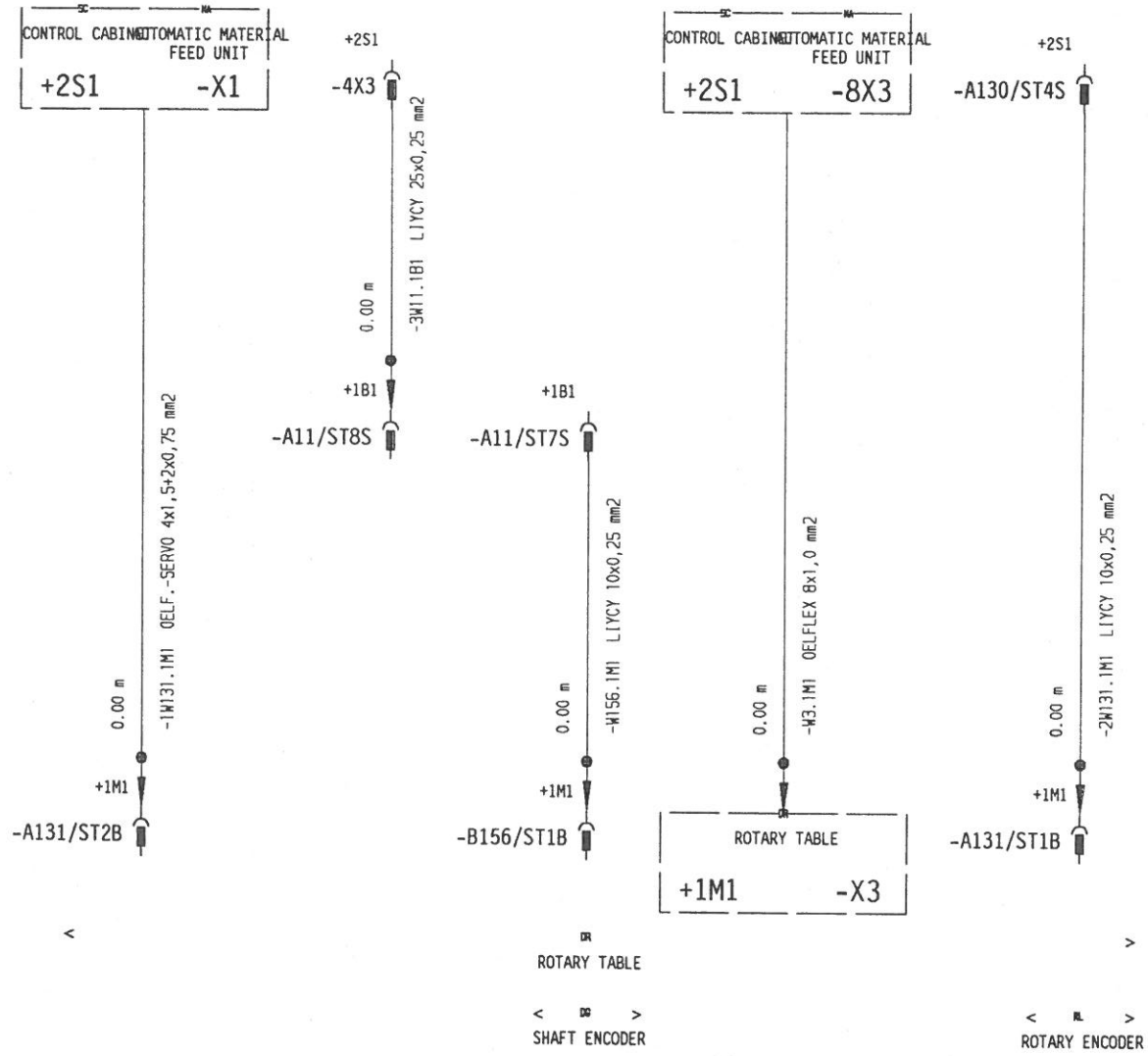
date	21.02.91	
proc.	HOLLERBACH	
insp.		
modification date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: CABLE GENERAL PLAN

number: 0K2104-000300

Local mark of sheet	
information-class	KUE
project:	1
DRNC/NA/RB/FM	2 sh.



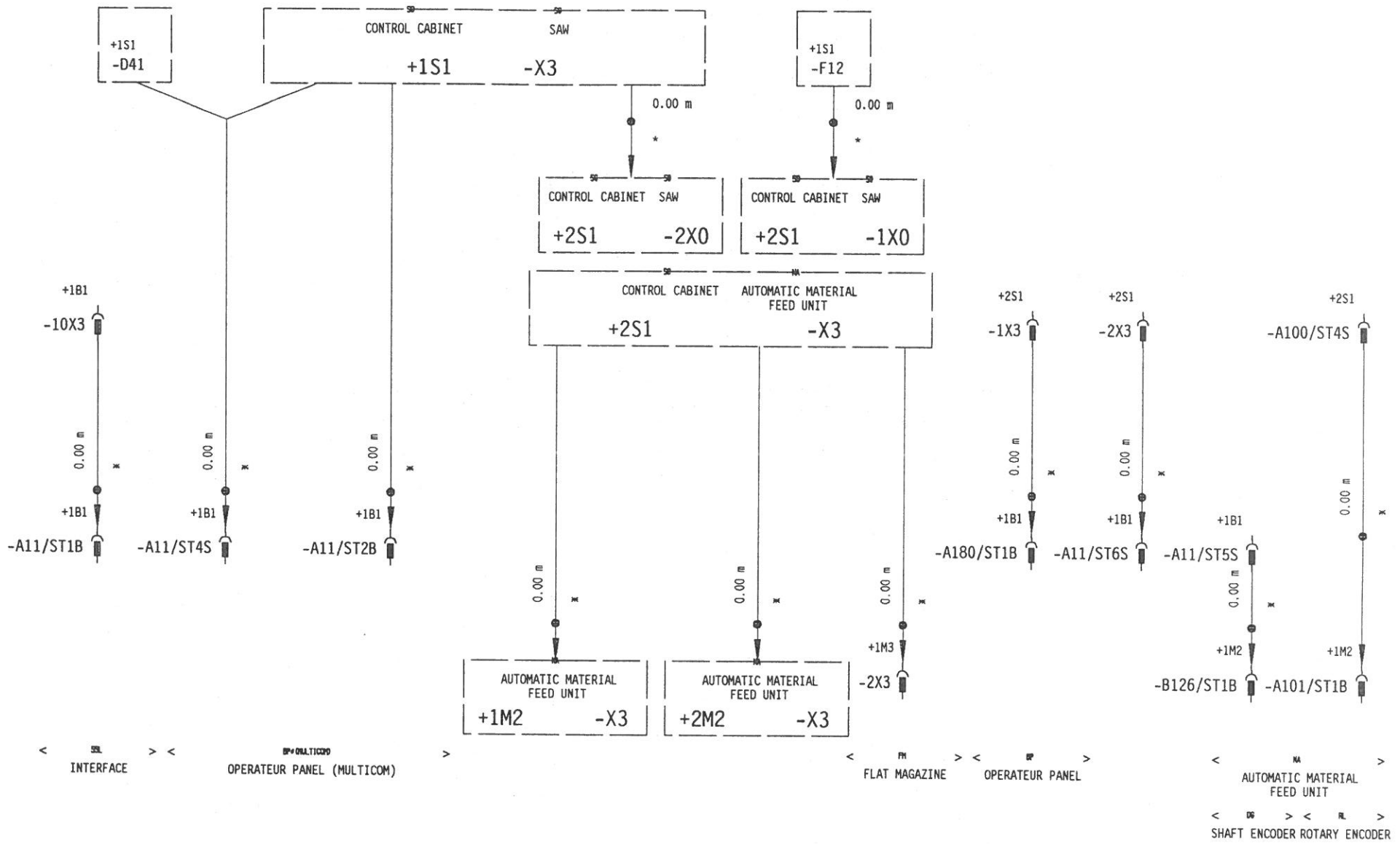
			date	21.02.91	
			proc.	HOLLERBACH	
			insp.		
	modification	date	norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
CABLE GENERAL PLAN

number :
0K2104-000300

local mark of sheet
information-class KUE
project : 2
DRNC/NA/RB/FM 2 sh.



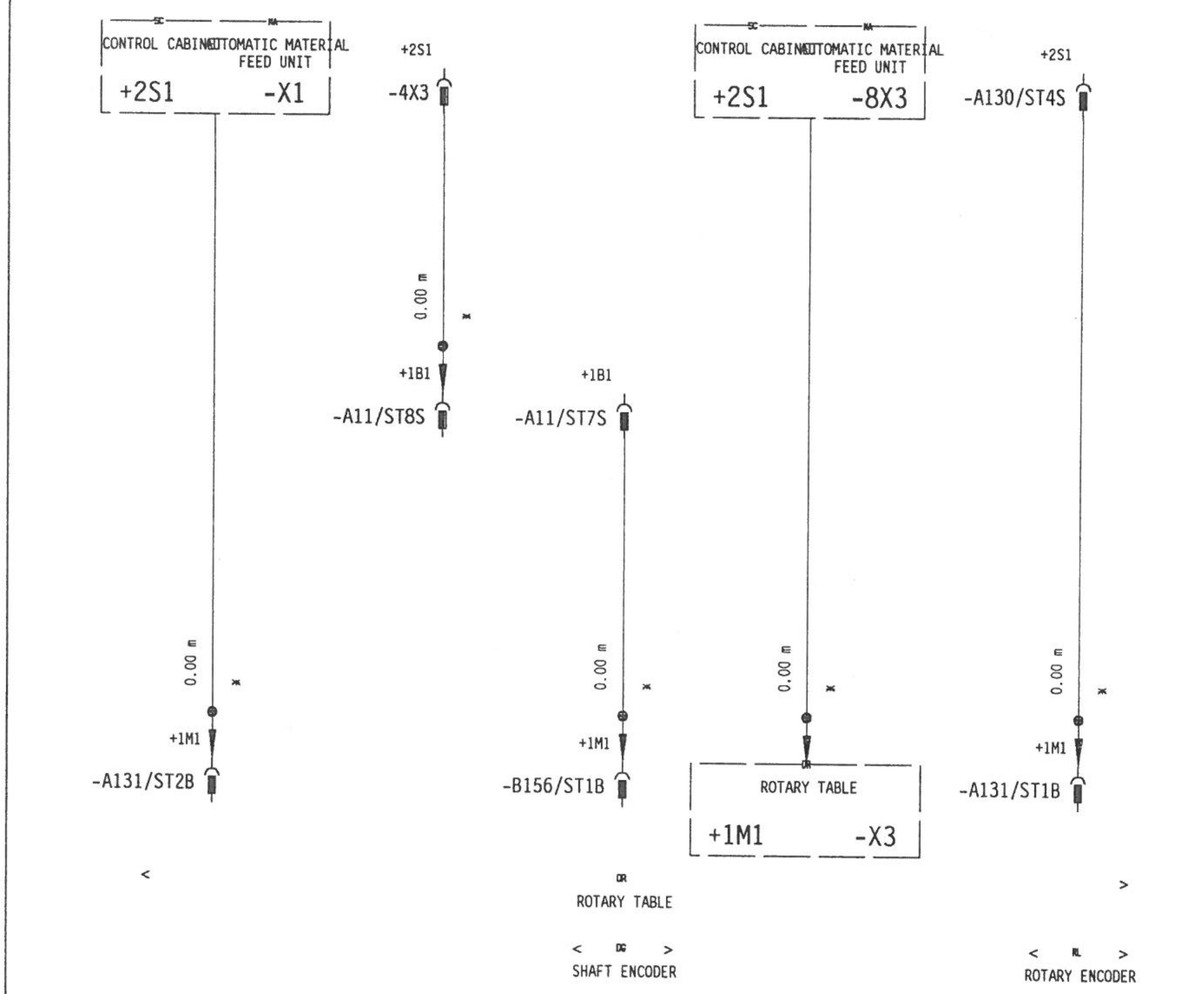
			date	21.02.91	
			proc.	HOLLERBACH	
			insp.		
modification	date		norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
MACHINE GENERAL PLAN

number :
0K2104-000300

local work of sheet
information-class MUE
project : 1
DRNC/NA/RB/FM 2 sh.



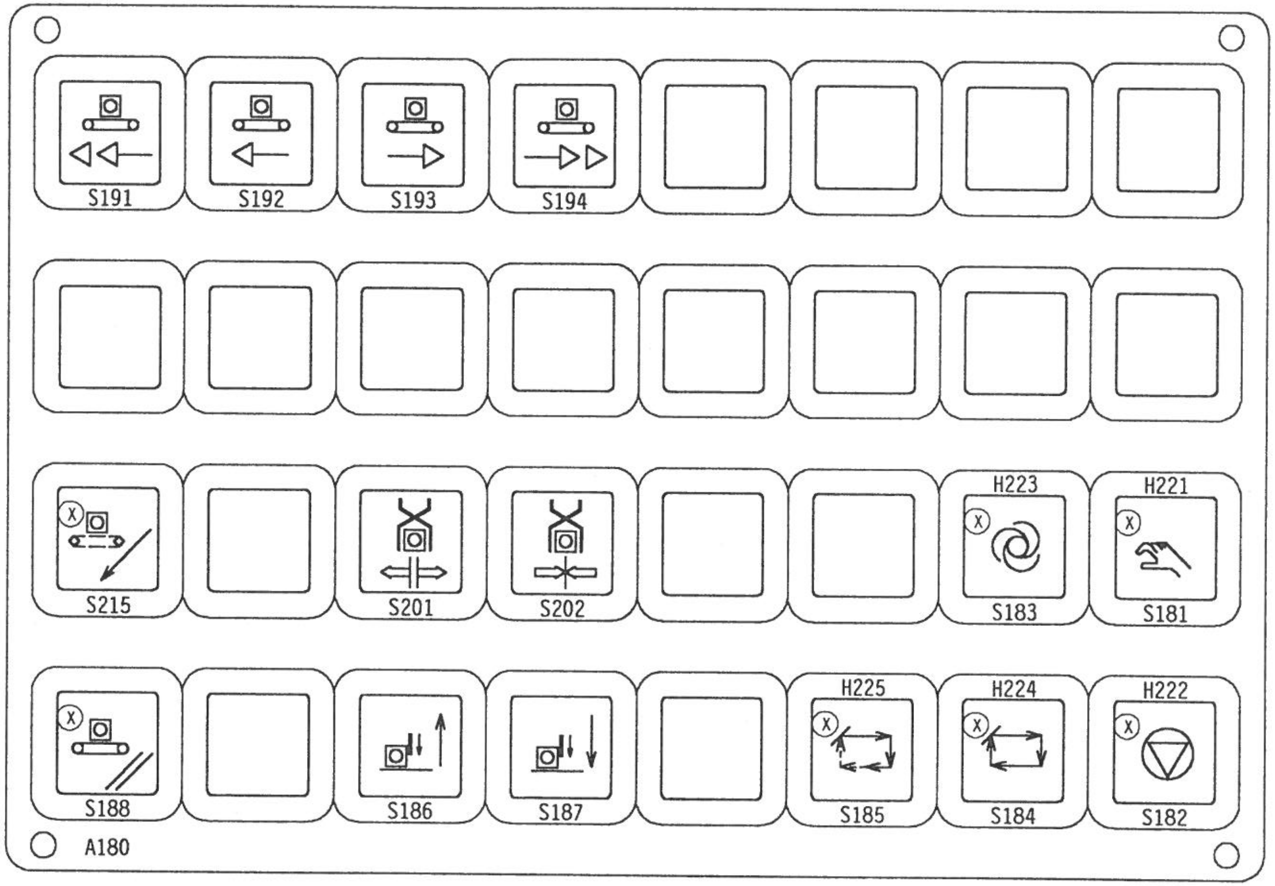
			date	21.02.91	
			proc.	HOLLERBACH	
			insp.		
modification	date		norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
MACHINE GENERAL PLAN

number: 0K2104-000300

local mark of sheet	
information-class	MUE
project:	2
DRNC/NA/RB/FM	2 sh.



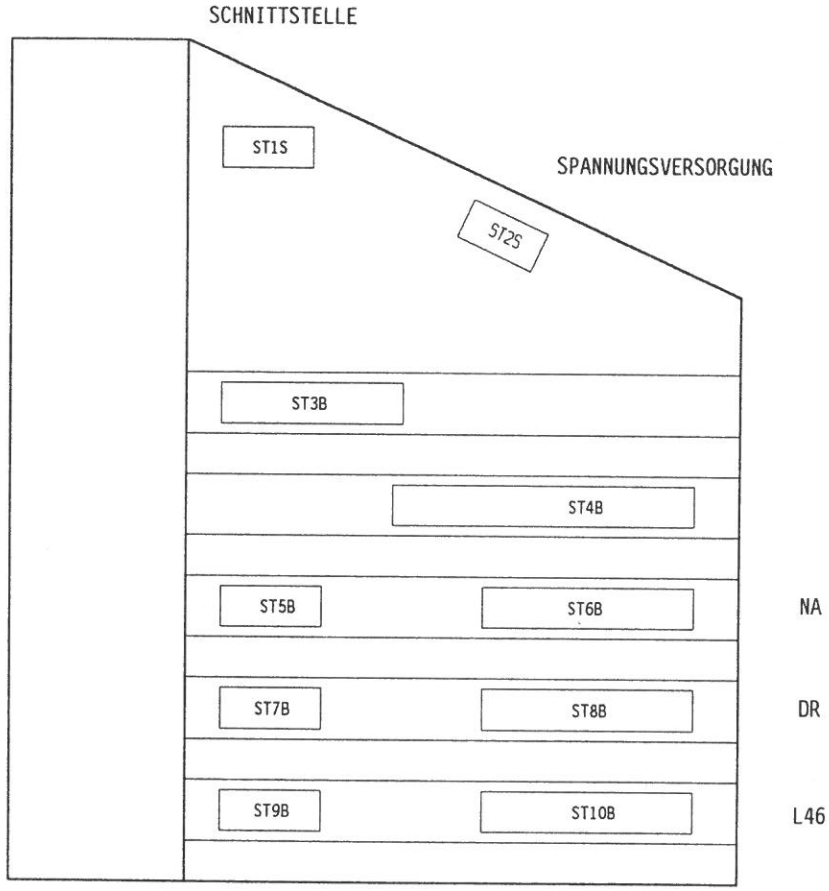
			date	21.02.91
			proc.	HOLLERBACH
			insp.	
modification	date		norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
OPERATEUR PANEL

number : 0K2104-000300

local mark of sheet	
information-class	08
project :	1
DRNC/NA/RB/FM	2 sh.



			date	21.02.91	
			proc.	HOLLERBACH	
			insp.		
	modification	date	norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
OPERATEUR PANEL

number :
0K2104-000300

local mark of sheet
information-class 08
project : 2
DRNC/NA/RB/FM 2 sh.

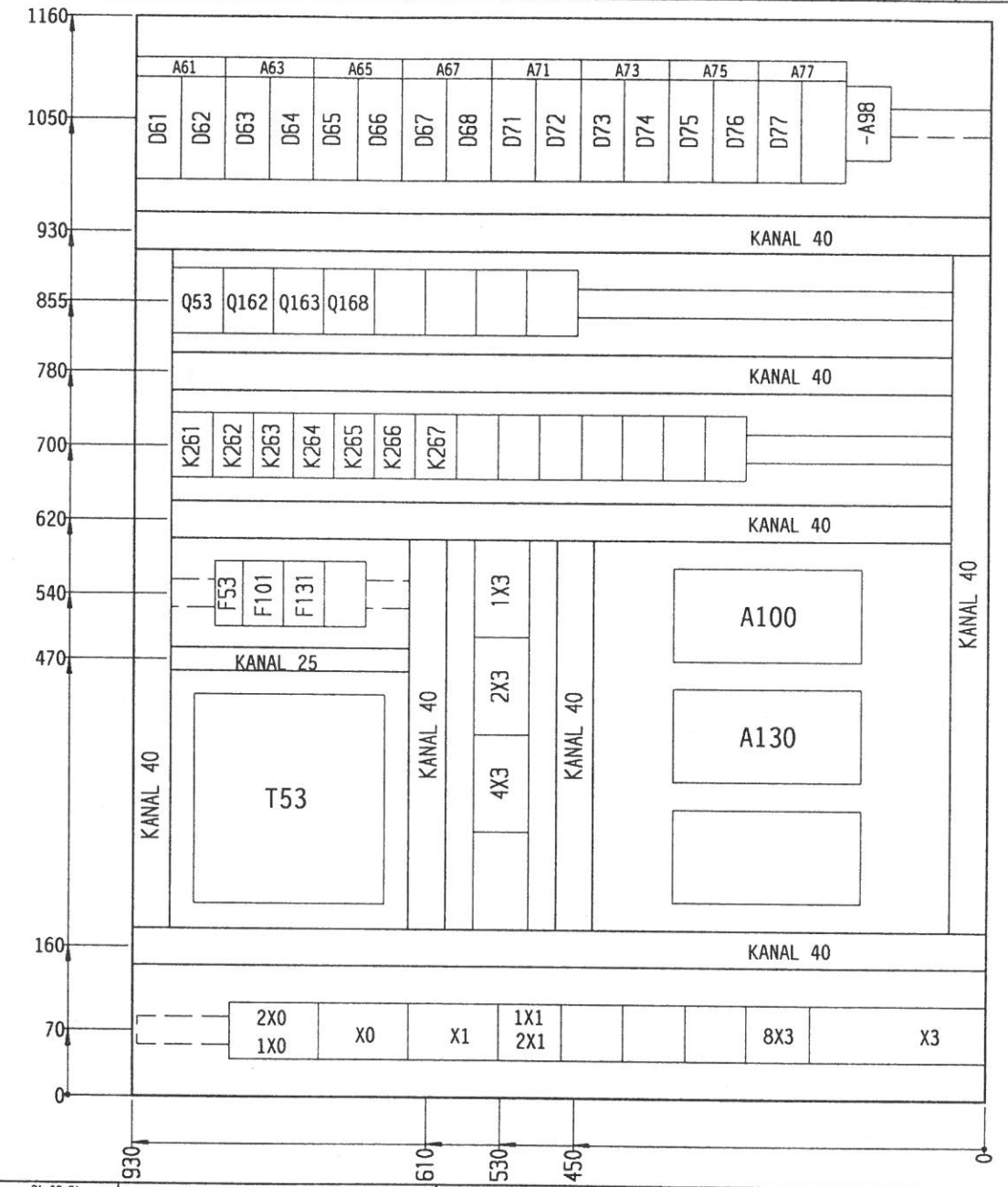
		date	21.02.91		
		proc.	HOLLERBACH		
		insp.			
modification	date	norm			

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
MACHINE

number : 0K2104-000300

Local mark of sheet	
information-class	OM
project :	1
DRNC/NA/RB/FM	1 sh.



			date	21.02.91	
			proc.	HOLLERBACH	
			insp.		
modification	date		norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
CONTROL CABINET

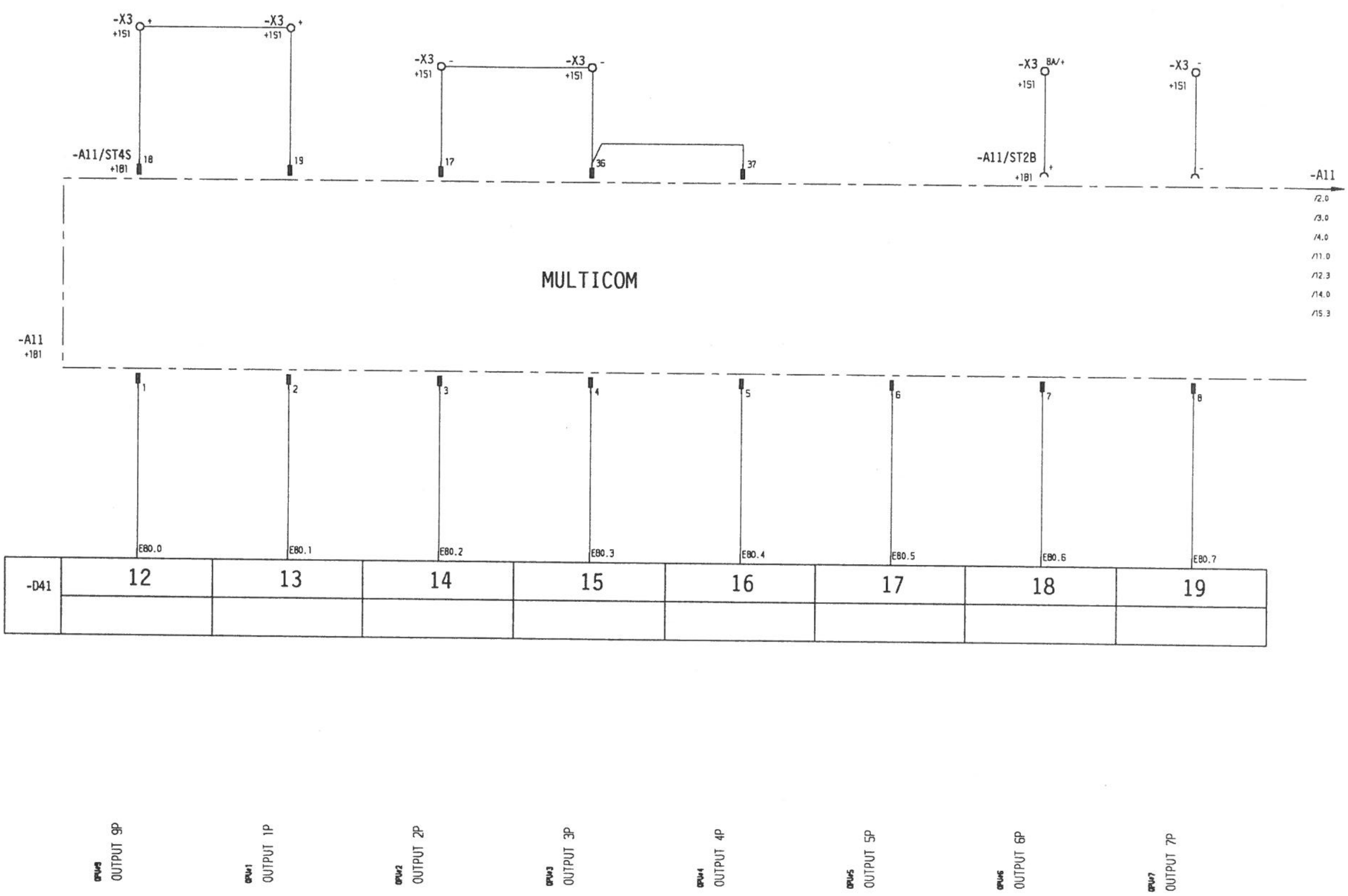
number :
0K2104-000300

Local mark of sheet

information-class 05

project : 1

DRNC/NA/RB/FM 1 sh.



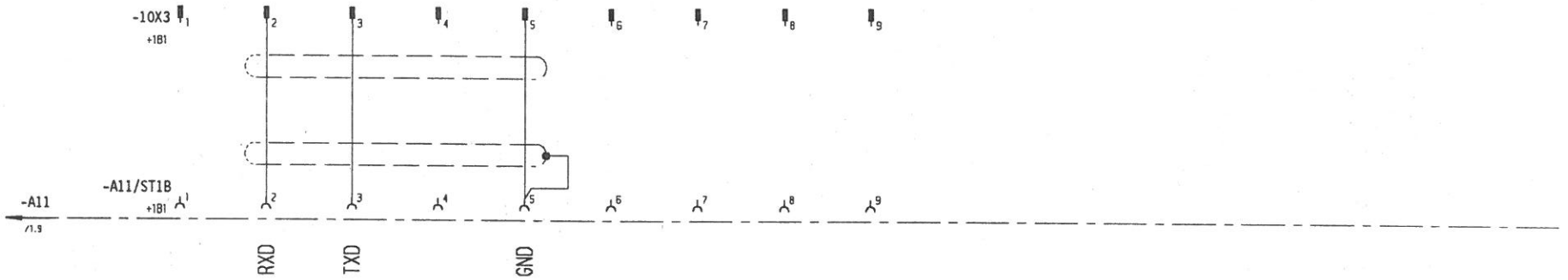
date	21.02.91	
proc.	HOLLERBACH	
insp.		
modification	date	norm

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

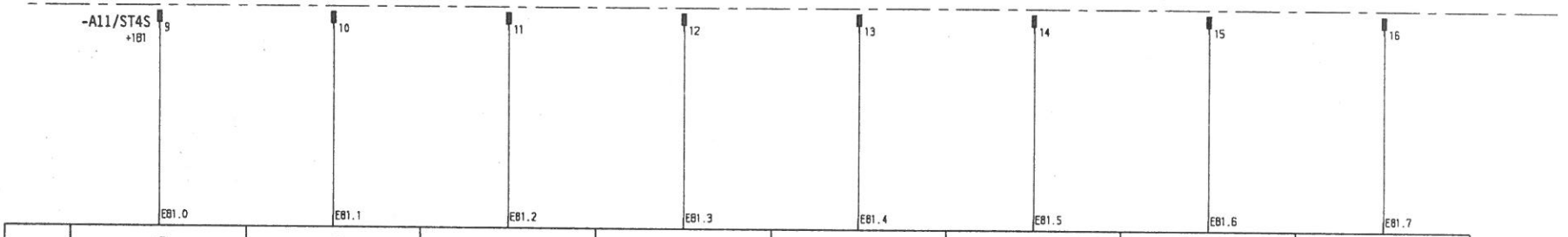
designation:
WIRING SCHEME

number : 0K2104-000300

local mark of sheet	
information-class	STR
project :	1
DRNC/NA/RB/FM	27 sh.



MULTICOM



-D41	2	3	4	5	6	7	8	9

OUTPUT 8P
OUTPUT 9P
OUTPUT 10P
OUTPUT 11P
OUTPUT 12P
OUTPUT 13P
OUTPUT 14P
OUTPUT 15P

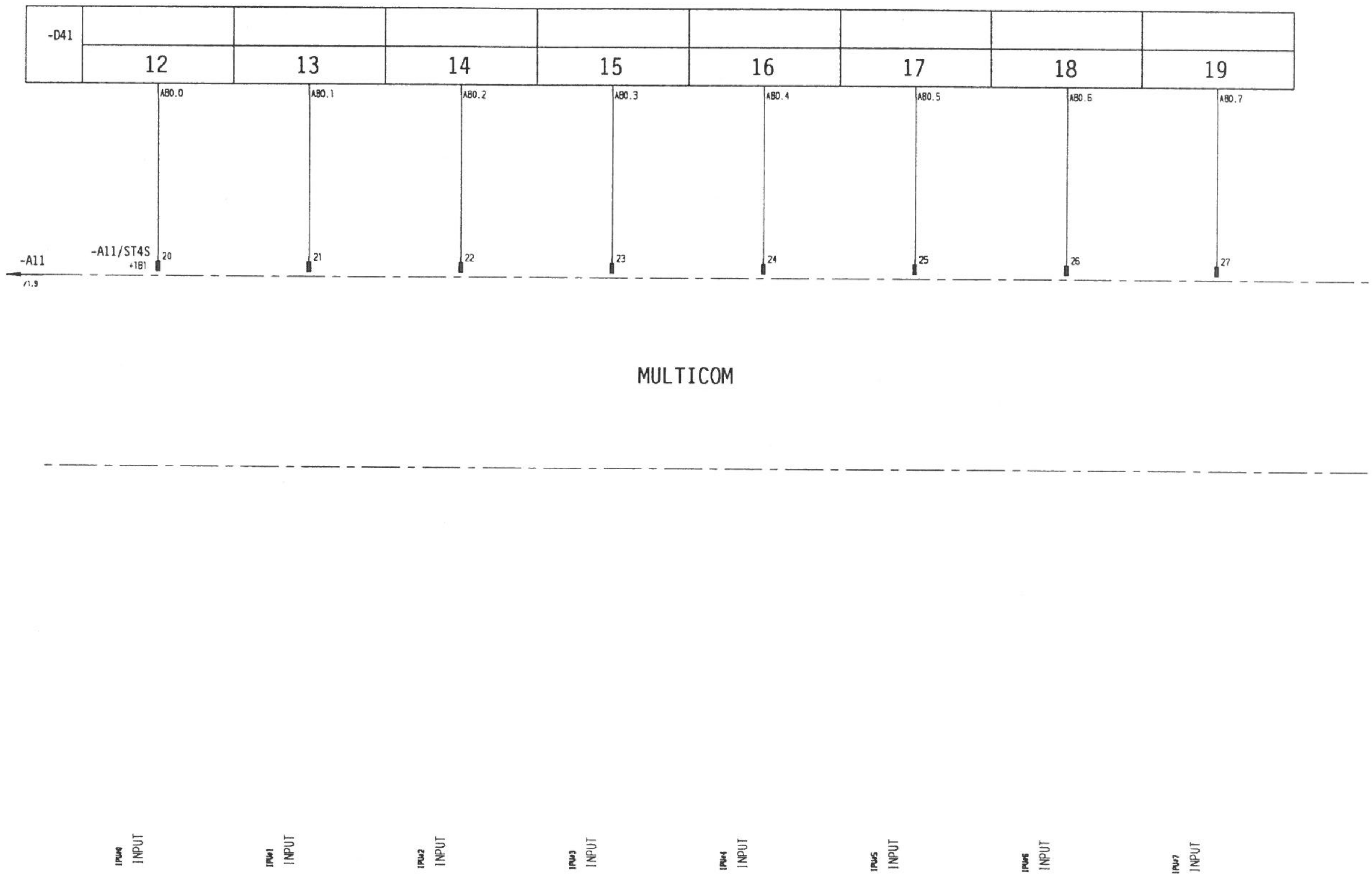
			date	21.02.91	
			proc.	HOLLERBACH	
			insp.		
modification	date		norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7880 LOERRACH

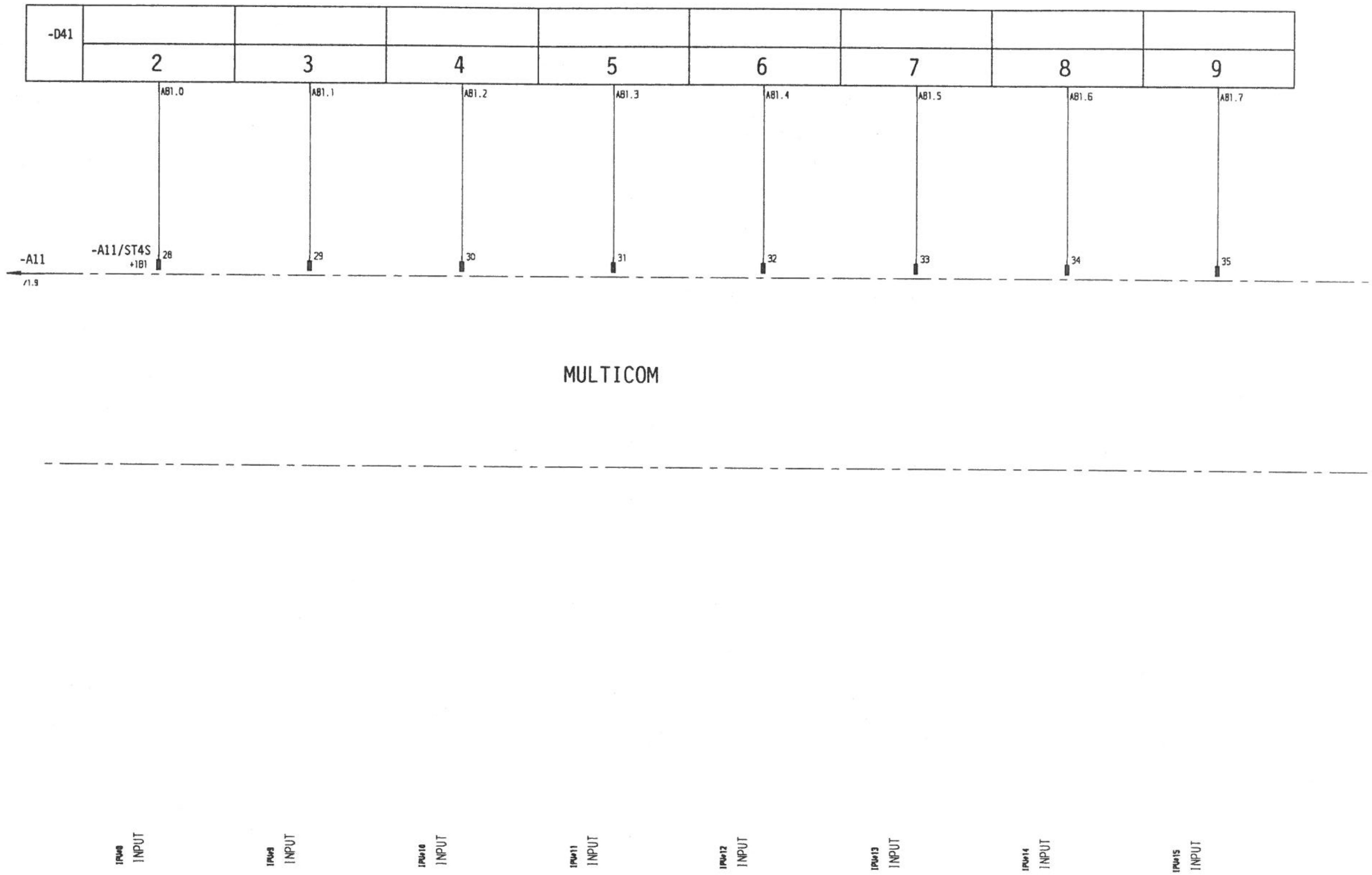
designation:
INTERFACE

number :
0K2104-000300

local mark of sheet
information-class STR
project : 2
DRNC/NA/RB/FM 27 sh.



date	26.02.91	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	number :	Local mark of sheet
proc.	HOLLERBACH		INTERFACE	0K2104-000300	information-class STR
insp.					project : 3
modification date norm					DRNC/NA/RB/FM 27 sh.



date	28.02.90
proc.	ORTLIEB
insp.	
norm	

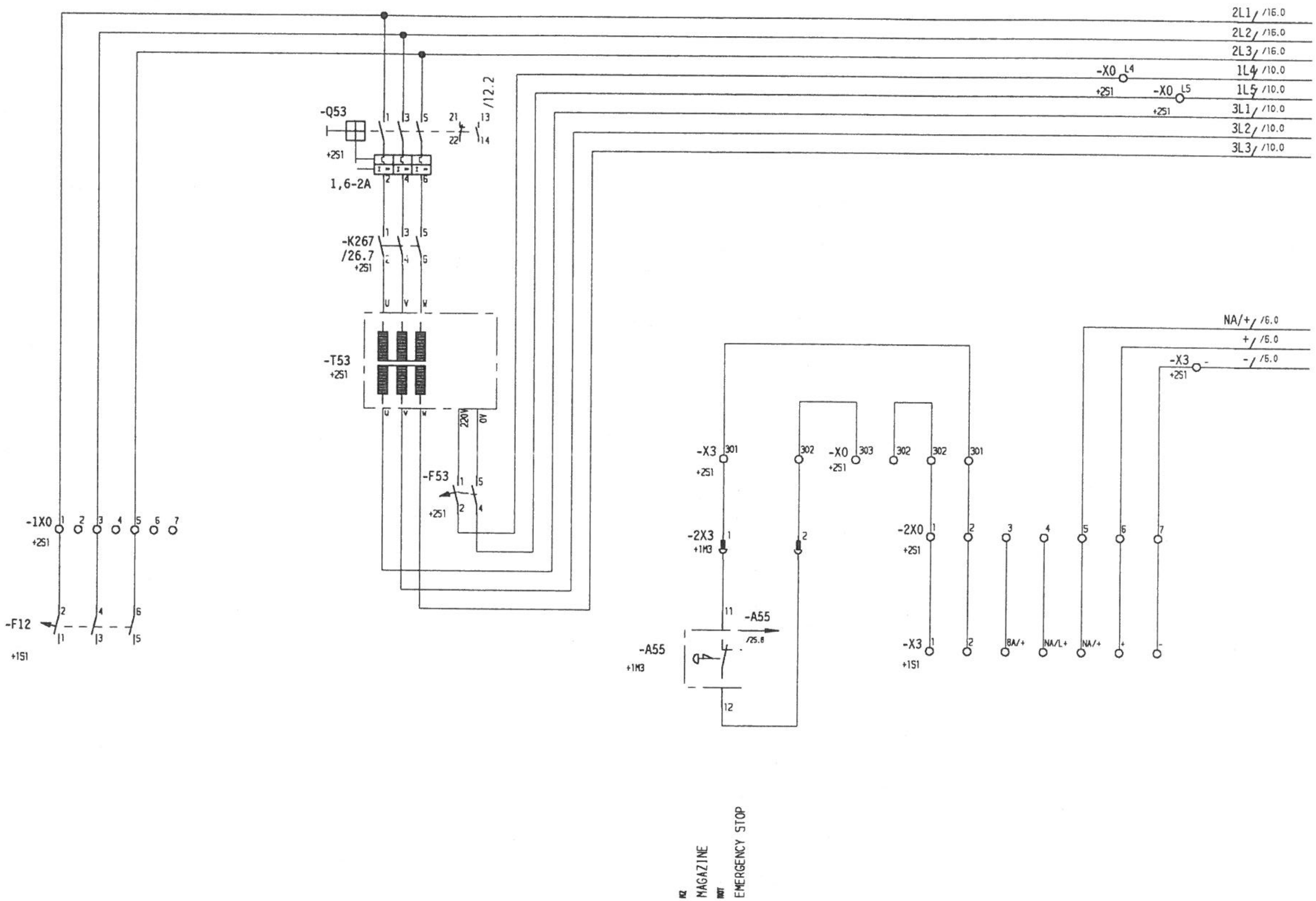
modification date

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: INTERFACE

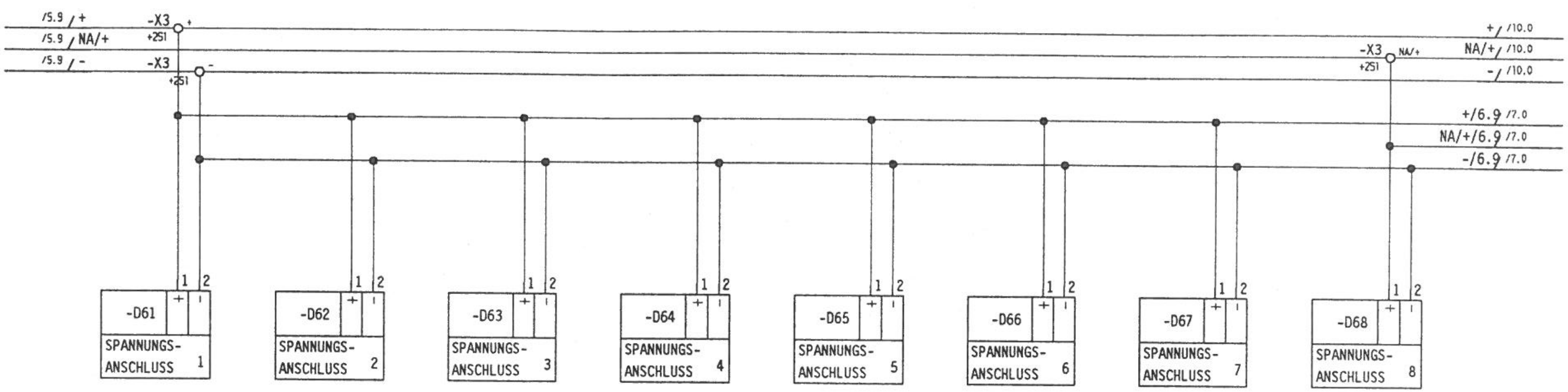
number : 0K2104-000300

Local mark of sheet
information-class STR
project : DRNC/NA/RB/FM
4
27 sh.



date	28.02.90	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: POWER SUPPLY
proc.	ORTLIEB		
insp.			
modification date	norm		

number :	0K2104-000300
local mark of sheet	
information-class	STR
project :	5
DRNC/NA/RB/FM	27 sh.



-A61 +251 BUSMODUL

-D61 +251			-D62 +251		
1	1	+	2	1	+
1	2	-	2	2	-
/18.1	4	E4.0	/19.1	4	E5.0
/18.2	3	E4.1	/19.2	3	E5.1
/18.3	6	E4.2	/19.3	6	E5.2
/18.4	5	E4.3	/19.4	5	E5.3
/18.5	8	E4.4	/19.5	8	E5.4
/18.6	7	E4.5	/19.6	7	E5.5
/18.7	10	E4.6	/19.7	10	E5.6
/18.8	9	E4.7	/19.8	9	E5.7
INPUT 8XDC 24V			INPUT 8XDC 24V		

-A63 +251 BUSMODUL

-D63 +251			-D64 +251		
3	1	+	4	1	+
3	2	-	4	2	-
/20.1	4	E6.0	/21.1	4	E7.0
/20.2	3	E6.1	/21.2	3	E7.1
/20.3	6	E6.2	/21.3	6	E7.2
/20.4	5	E6.3	/21.4	5	E7.3
/20.5	8	E6.4	/21.5	8	E7.4
/20.6	7	E6.5	/21.5	7	E7.5
/20.7	10	E6.6	/21.5	10	E7.6
/20.8	9	E6.7	/21.9	9	E7.7
INPUT 8XDC 24V			INPUT 8XDC 24V		

-A65 +251 BUSMODUL

-D65 +251			-D66 +251		
5	1	+	6	1	+
5	2	-	6	2	-
/22.1	4	A8.0	/24.1	4	E9.0
/22.2	3	A8.1	/24.2	3	E9.1
/22.3	6	A8.2	/24.3	6	E9.2
/22.4	5	A8.3	/24.4	5	E9.3
/22.5	8	A8.4	/24.5	8	E9.4
/22.6	7	A8.5	/24.6	7	E9.5
/22.7	10	A8.6	/24.7	10	E9.6
/22.8	9	A8.7	/24.8	9	E9.7
OUTPUT 8XDC 24V			INPUT 8XDC 24V		

-A67 +251 BUSMODUL

-D67 +251			-D68 +251		
7	1	+	8	1	+
7	2	-	8	2	-
/25.1	4	E10.0	/26.1	4	A11.0
/25.2	3	E10.1	/26.2	3	A11.1
/25.3	6	E10.2	/26.3	6	A11.2
/25.4	5	E10.3	/26.4	5	A11.3
/25.5	8	E10.4	/26.5	8	A11.4
/25.6	7	E10.5	/26.6	7	A11.5
/25.7	10	E10.6	/26.7	10	A11.6
/25.8	9	E10.7	/26.8	9	A11.7
INPUT 8XDC 24V			OUTPUT 8XDC 24V		

date	19.07.90
proc.	ORTLIEB
insp.	
norm	

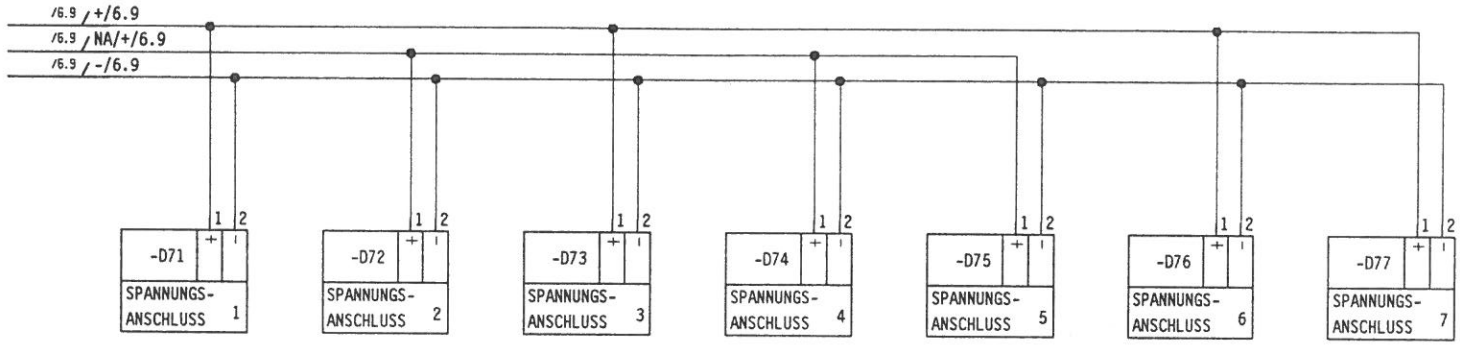
modification date

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: POWER SUPPLY

number : 0K2104-000300

Local mark of sheet
information-class STR
project : DRNC/NA/RB/FM
6
27 sh.



-A71 +251 BUSMODUL

-D71 +251			-D72 +251	
1	1	+	2	+
1	2	-	2	-
/12.1	4	E12.0	/11.5	A13.0
/12.2	3	E12.1	/11.6	A13.1
/12.3	6	E12.2	/11.7	A13.2
/12.4	5	E12.3	/11.8	A13.3
/15.1	8	E12.4	/14.5	A13.4
/15.2	7	E12.5	/14.6	A13.5
/15.3	10	E12.6	/14.7	A13.6
/15.4	9	E12.7	/14.8	A13.7
INPUT 8XDC 24V			OUTPUT 8XDC 24V	

-A73 +251 BUSMODUL

-D73 +251			-D74 +251	
3	1	+	4	+
3	2	-	4	-
	4	E14.0		A15.0
	3	E14.1		A15.1
	6	E14.2		A15.2
	5	E14.3		A15.3
	8	E14.4		A15.4
	7	E14.5		A15.5
	10	E14.6		A15.6
	9	E14.7		A15.7
INPUT 8XDC 24V			OUTPUT 8XDC 24V	

-A75 +251 BUSMODUL

-D75 +251			-D76 +251	
5	1	+	6	+
5	2	-	6	-
	4	A16.0		E17.0
	3	A16.1		E17.1
	6	A16.2		E17.2
	5	A16.3		E17.3
	8	A16.4		E17.4
	7	A16.5		E17.5
	10	A16.6		E17.6
	9	A16.7		E17.7
OUTPUT 8XDC 24V			INPUT 8XDC 24V	

-A77 +251 BUSMODUL

-D77 +251		
7	1	+
7	2	-
	4	E18.0
	3	E18.1
	6	E18.2
	5	E18.3
	8	E18.4
	7	E18.5
	10	E18.6
	9	E18.7
INPUT 8XDC 24V		

				date	19.07.90
				proc.	ORTLIEB
				insp.	
modification		date		norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
POWER SUPPLY

number : 0K2104-000300

Local work of sheet
information-class STR
project : 7
DRNC/NA/RB/FM 27 sh.

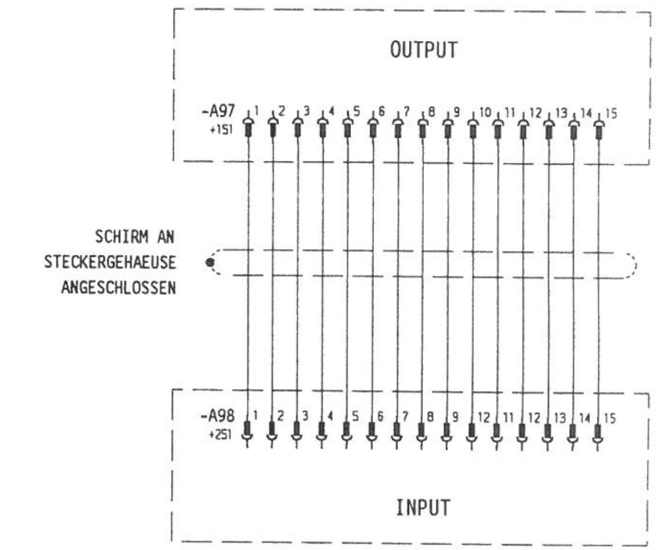
			date	19.07.90	
			proc.	ORTLIEB	
			insp.		
modification	date		norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
RESERVE

number : 0K2104-000300

local mark of sheet	
information-class	STR
project :	8
DRNC/NA/RB/FM	27 sh.

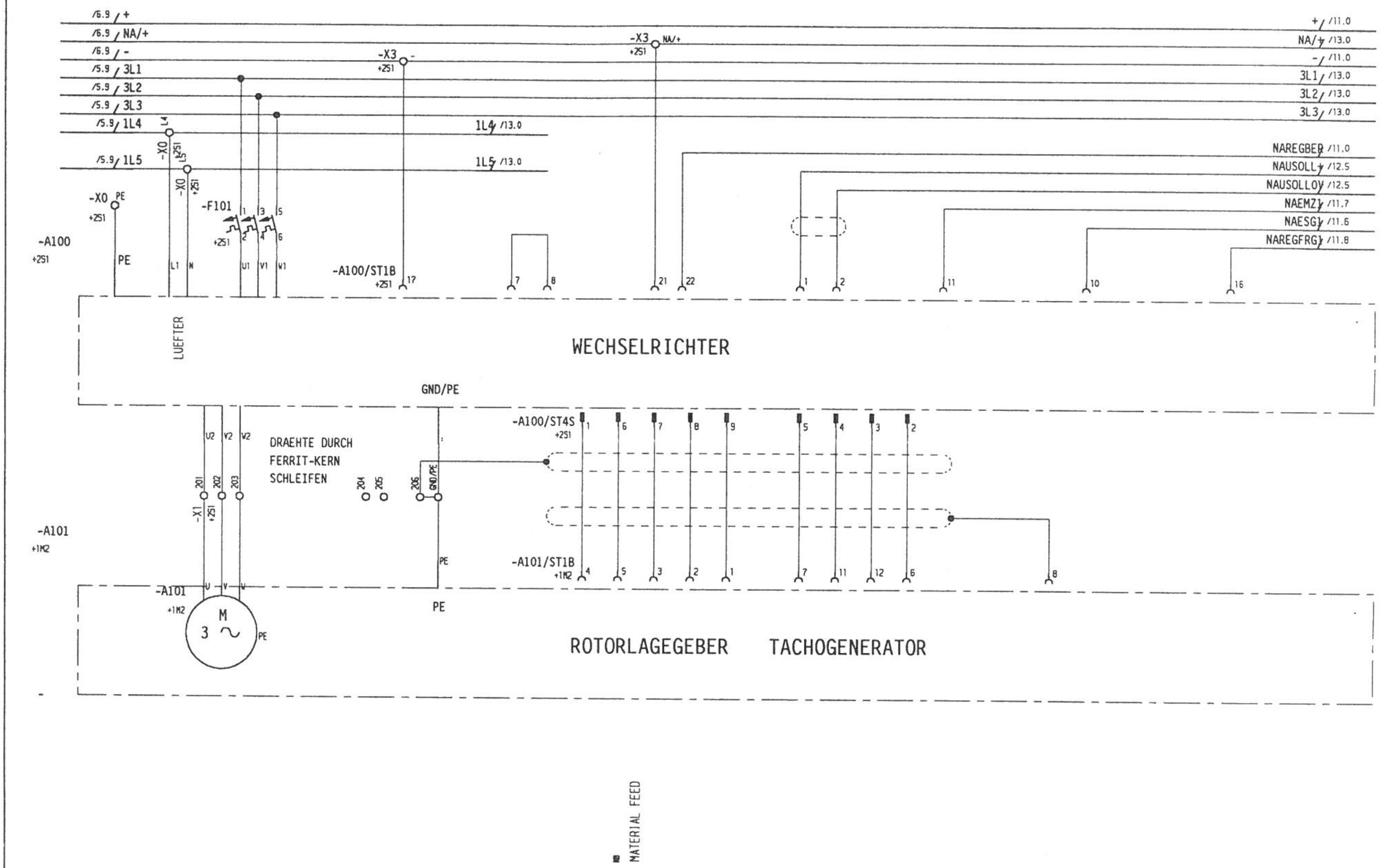


date	19.07.90	
proc.	ORTLIEB	
insp.		
norm		
modification	date	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
POWER SUPPLY

number :	local mark of sheet	
0K2104-000300	information-class	STR
	project :	9
	DRNC/NA/RB/FM	27 sh.



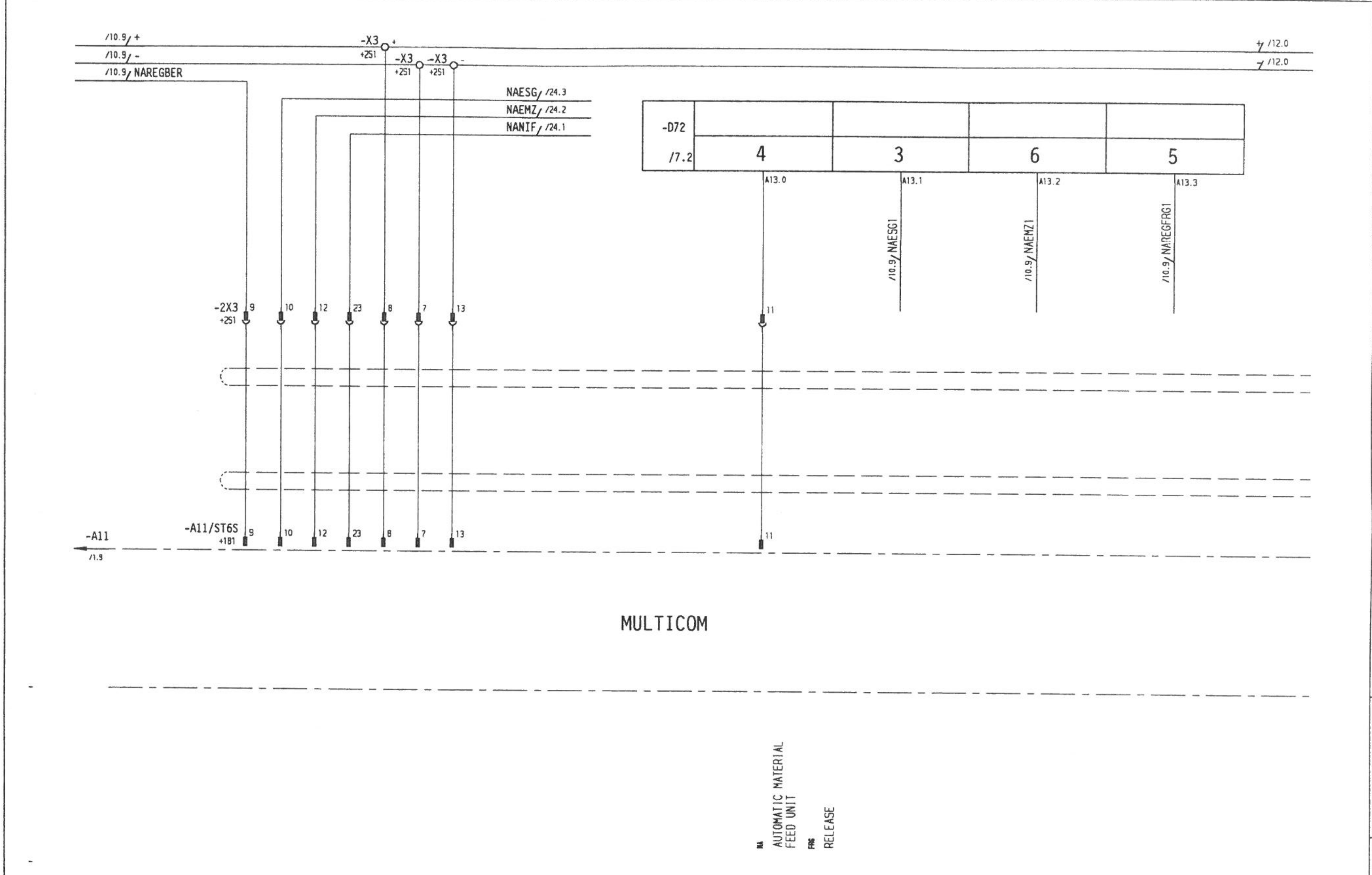
		date	28.02.90
		proc.	ORTLIEB
		insp.	
modification	date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
DRIVE AUTOMATIC MATERIAL FEED UNIT

number : 0K2104-000300

local mark of sheet	
information-class	STR
project :	10
DRNC/NA/RB/FM	27 sh.



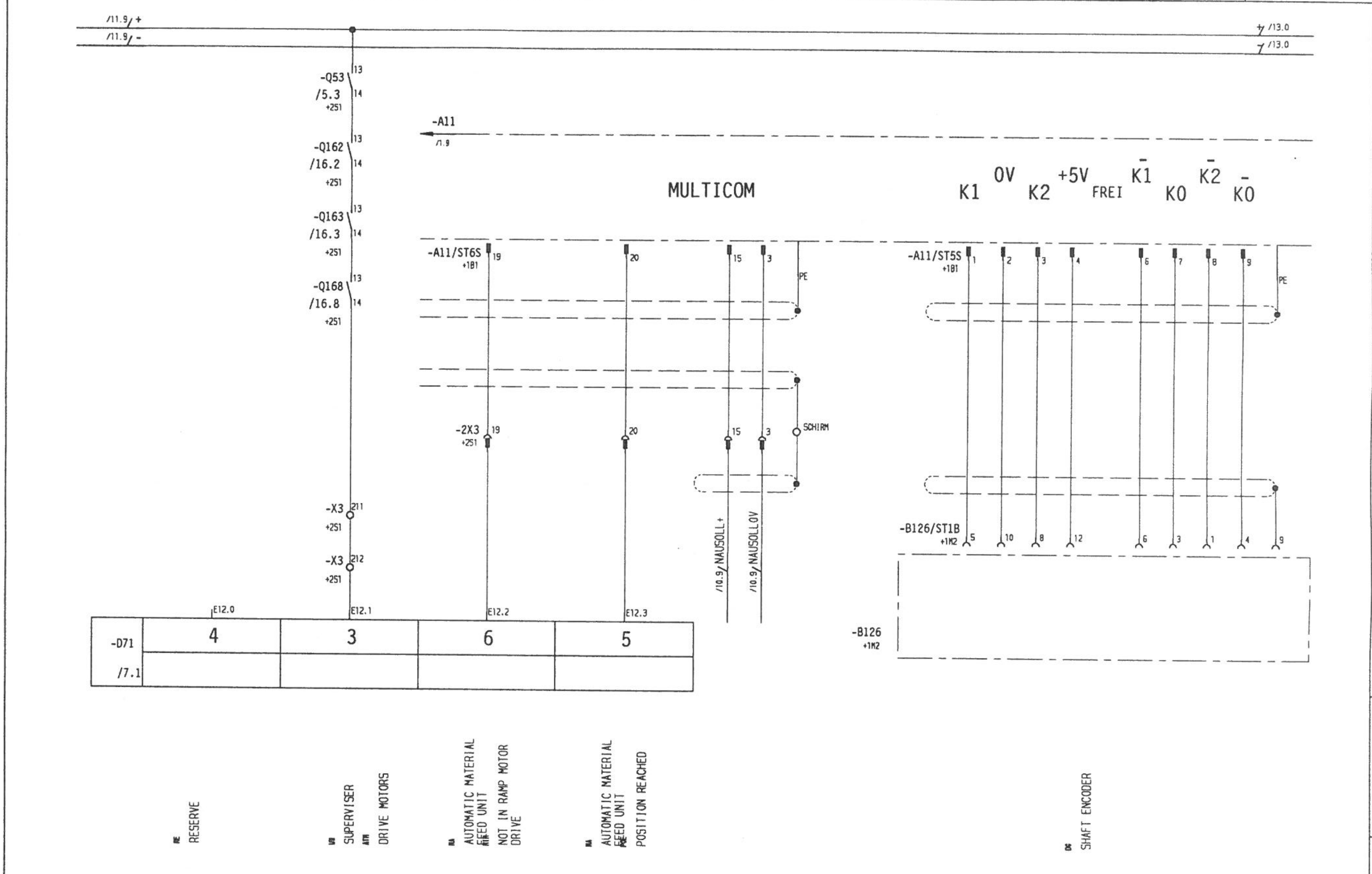
date	28.02.90		
proc.	ORTLIEB		
insp.			
modification	date	norm	

KALTENBACH
HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH

designation: CONTROL

number: 0K2104-000300

local mark of sheet
information-class STR
project: DRNC/NA/RB/FM
11
27 sh.



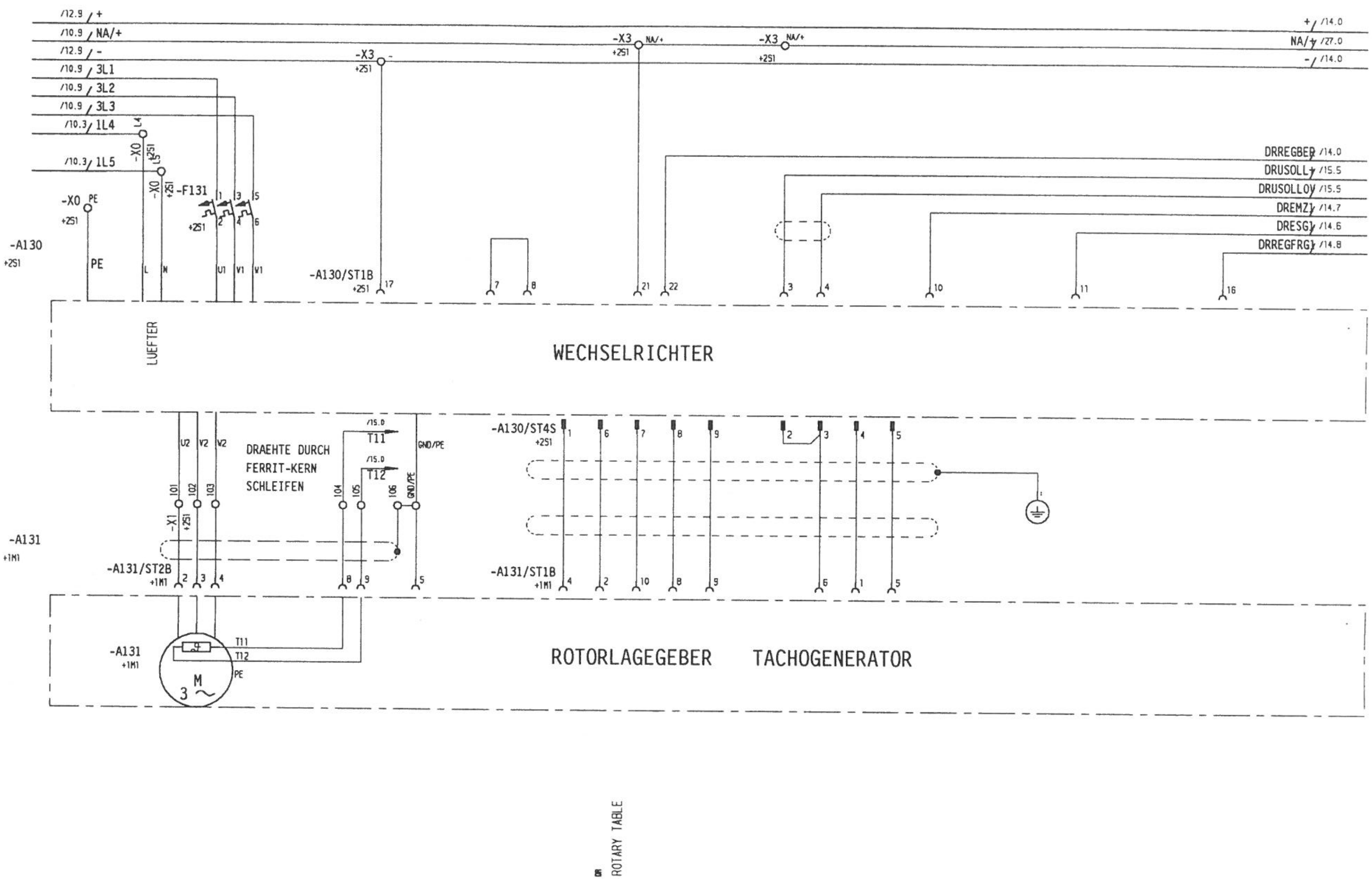
modification	date	date	28.02.90
		proc.	ORTLIEB
		insp.	
		norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

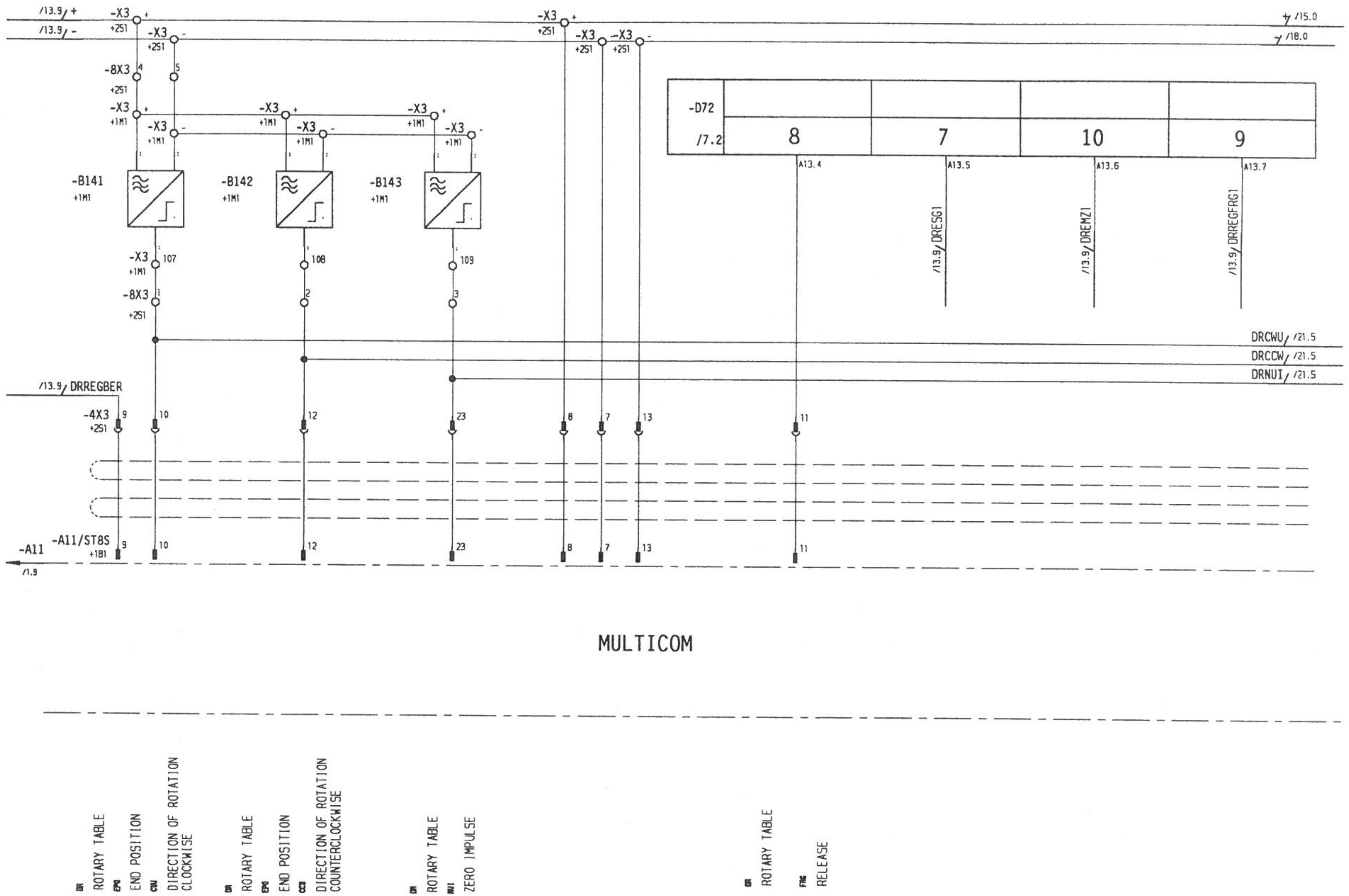
designation: CONTROL

number: 0K2104-000300

local mark of sheet
information-class STR
project: DRNC/NA/RB/FM
12
27 sh.



	date	28.02.90	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	number :	Local mark of sheet
	proc.	ORTLIEB		DRIVE ROTARY TABLE	0K2104-000300	information-class STR
	insp.					project : 13
modification date	norm					DRNC/NA/RB/FM 27 sh.



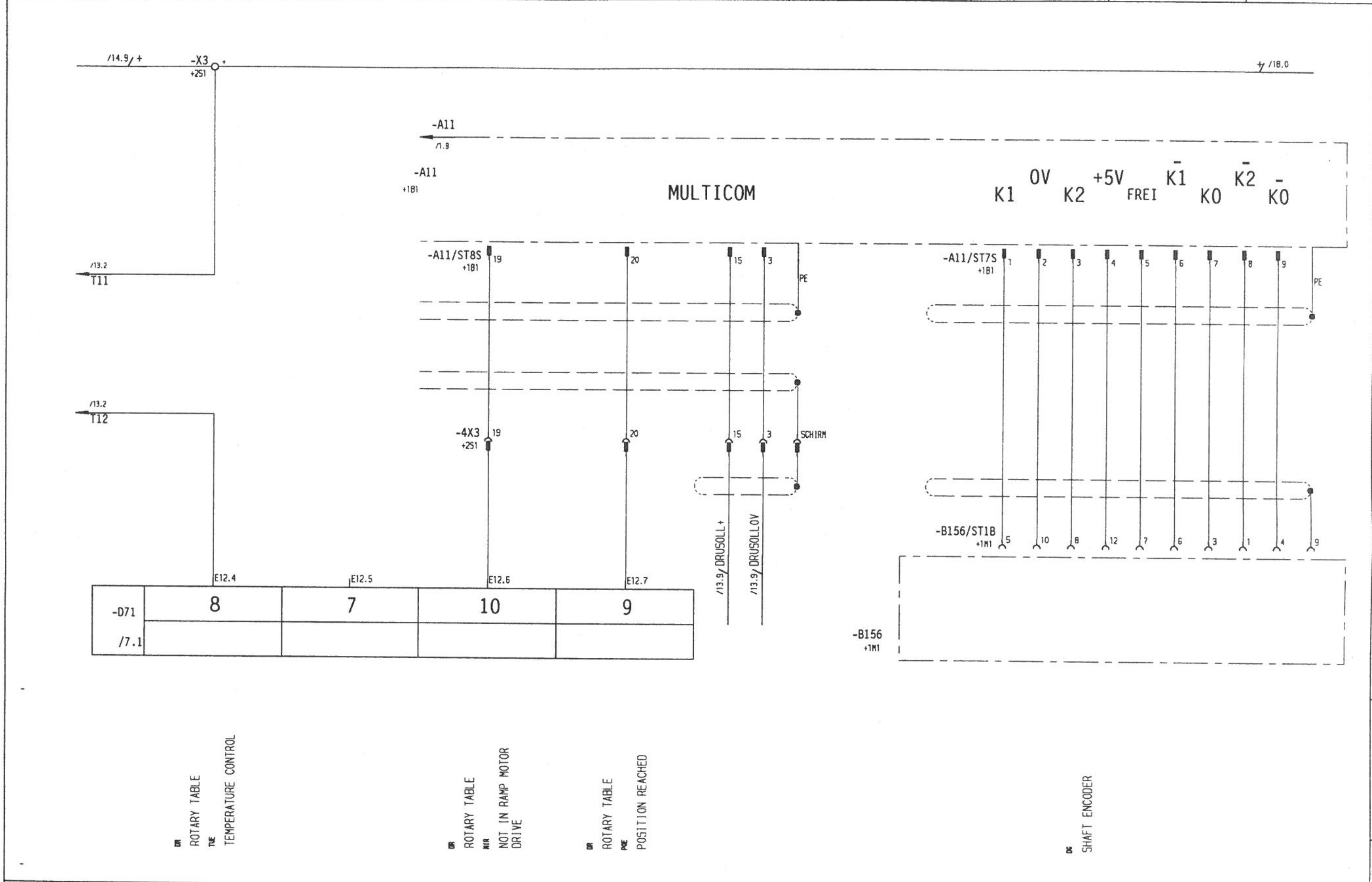
date	28.02.90		
proc.	ORTLIEB		
insp.			
modification	date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: CONTROL

number: 0K2104-000300

local mark of sheet
information-class STR
project: DRNC/NA/RB/FM
14
27 sh.



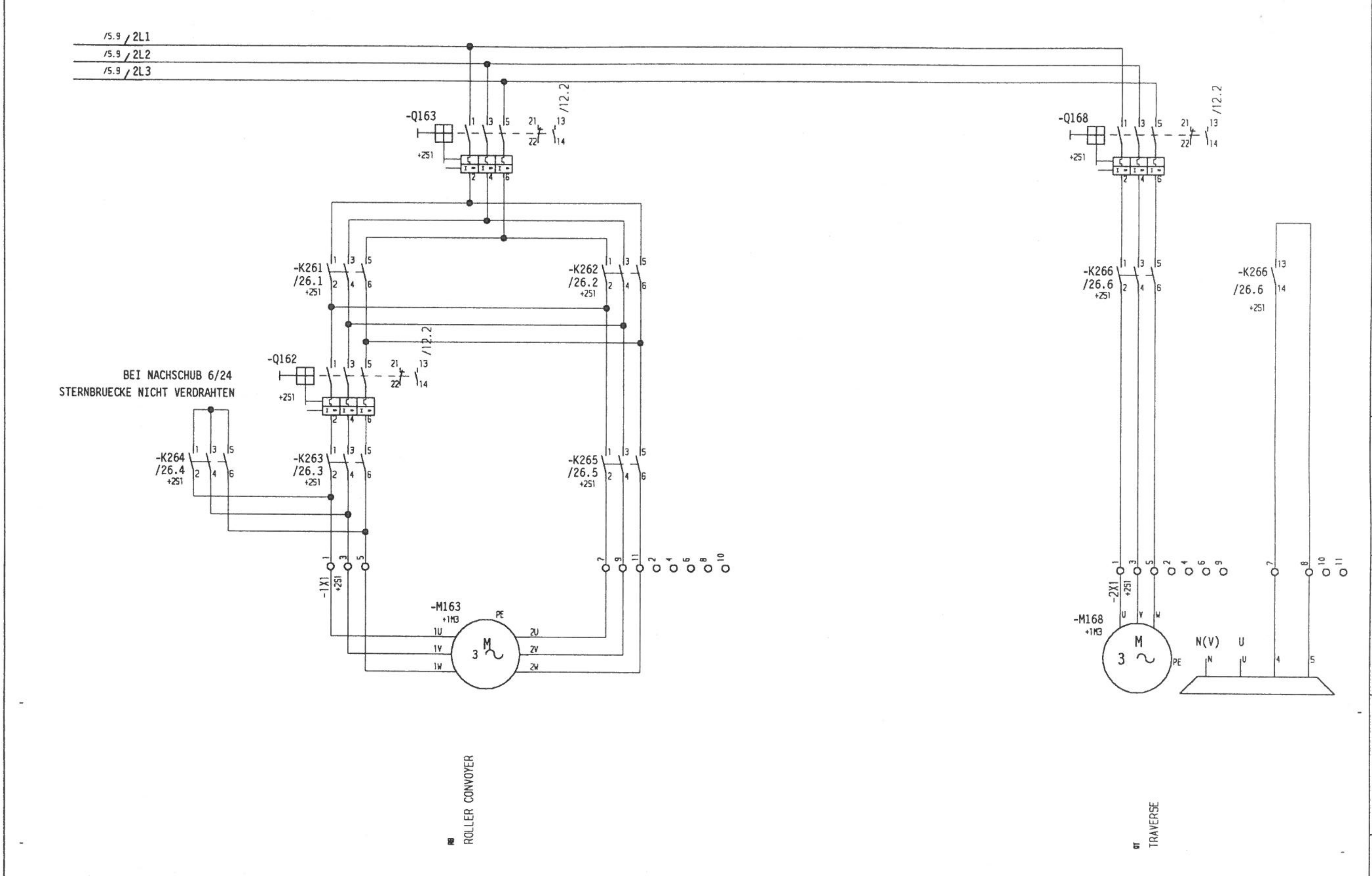
date	28.02.90	
proc.	ORTLIEB	
insp.		
modification date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: CONTROL

number: 0K2104-000300

Local mark of sheet	
information-class	STR
project : DRNC/NA/RB/FM	15
	27 sh.



				date	28.02.90
				proc.	ORTLIEB
				insp.	
modification	date			norm	

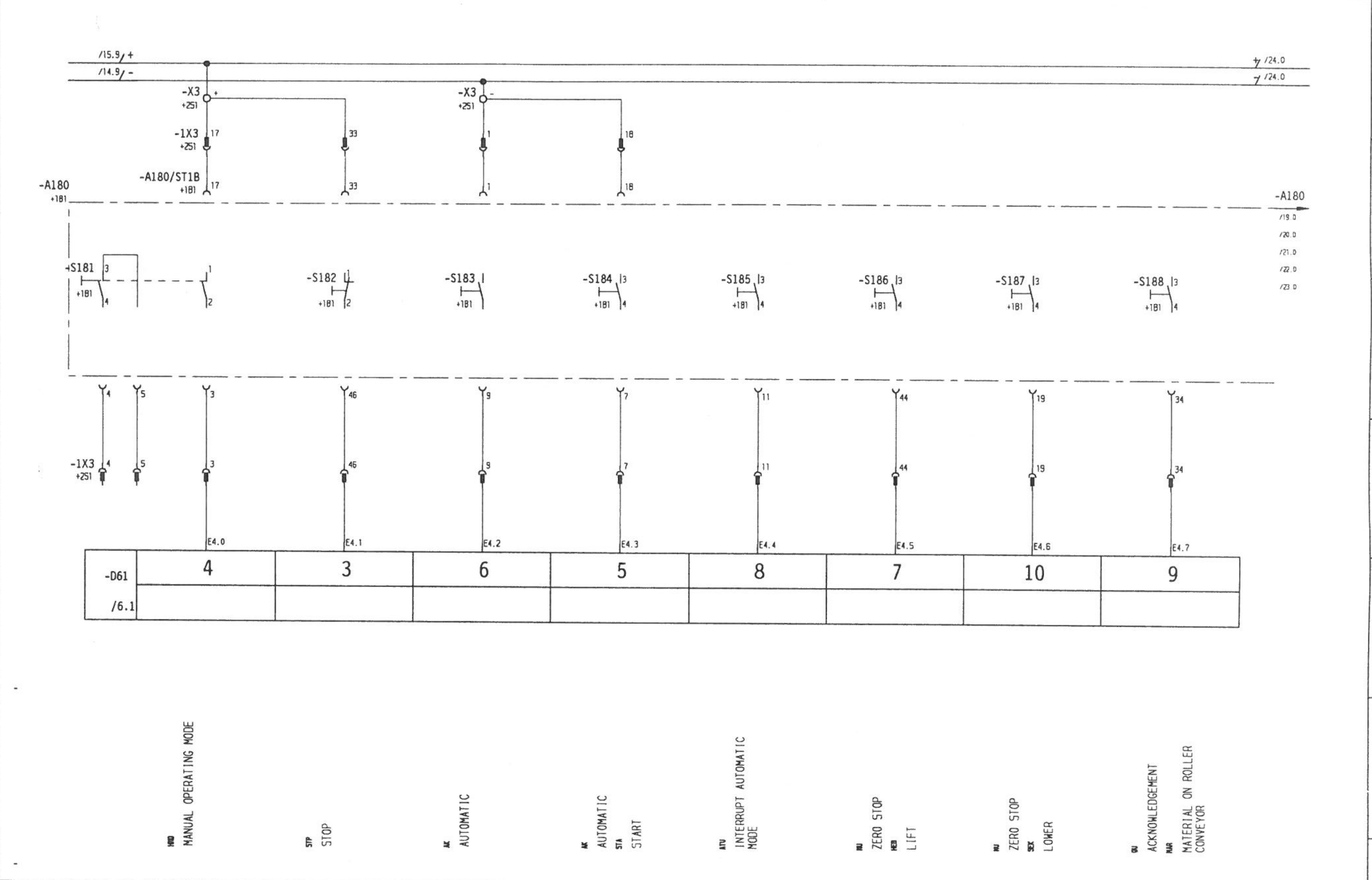
KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
DRIVE FLAT MAGAZINE

number: 0K2104-000300

Local mark of sheet	
information-class	STR
project:	16
DRNC/NA/RB/FM	27 sh.

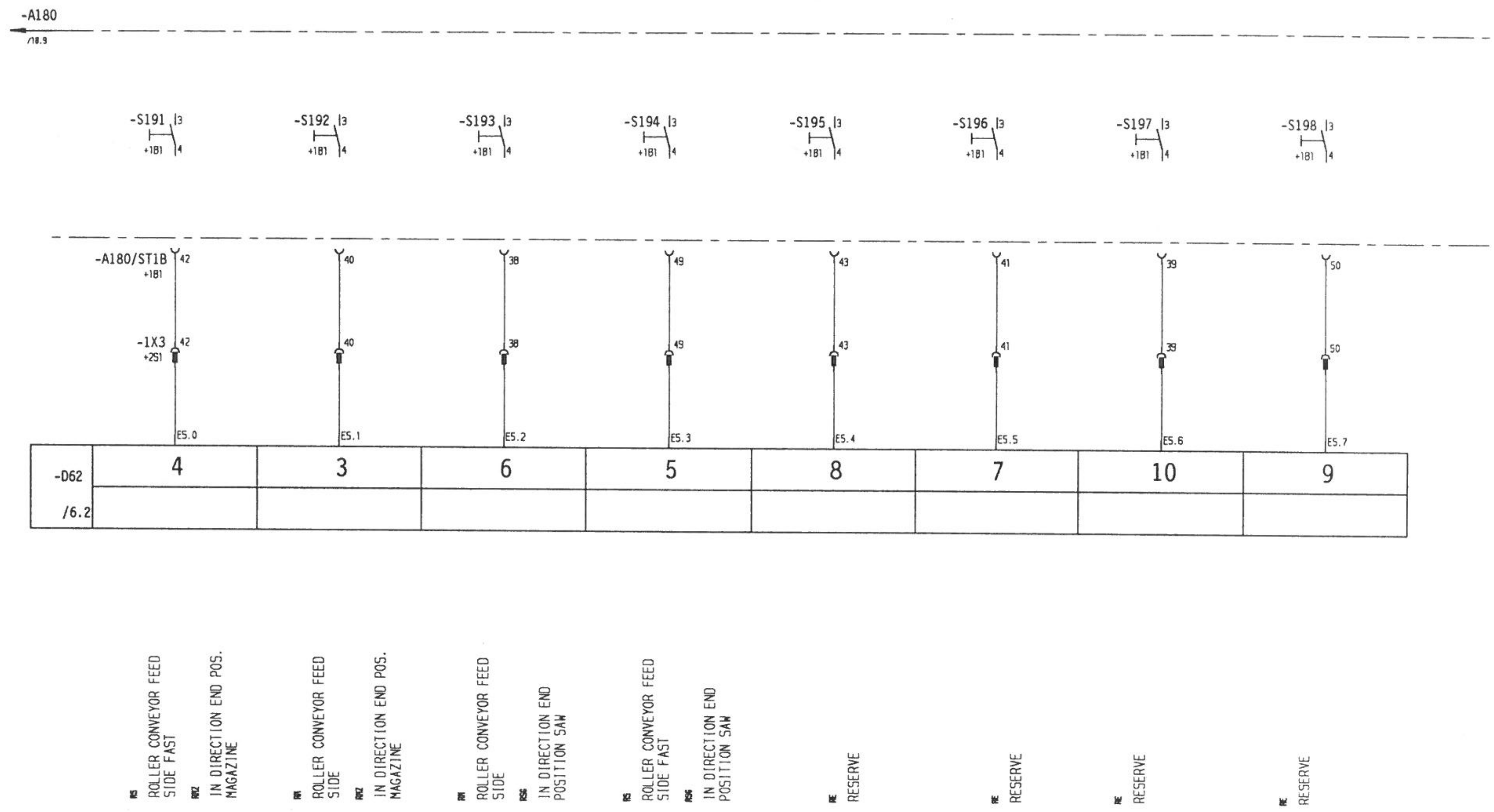
				date	28.02.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: RESERVE		number :	local mark of sheet	
				proc.	ORTLIEB					information-class	STR
				insp.					0K2104-000300	project :	17
	modification	date		norm						DRNC/NA/RB/FM	27 sh.



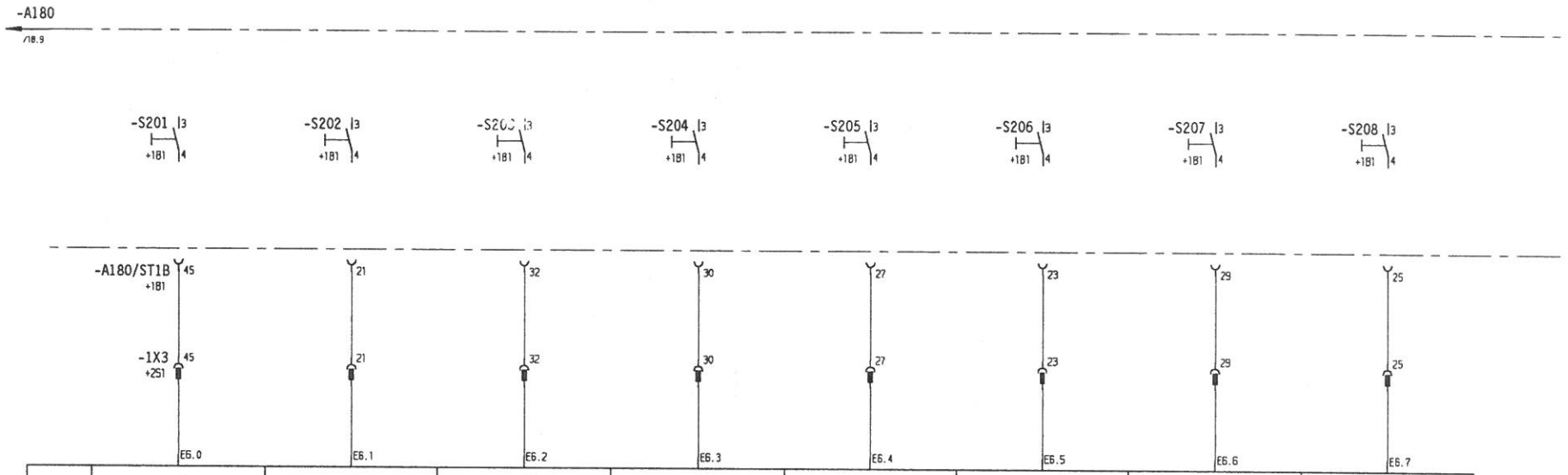
date	28.02.90	designation:	number :
proc.	ORTLIEB	INPUTS	0K2104-000300
insp.			
norm			
modification	date		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

local mark of sheet	
information-class	STR
project :	18
DRNC/NA/RB/FM	27 sh.



date	28.02.90	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: INPUTS
proc.	ORTLIEB	number : 0K2104-000300	Local mark of sheet
insp.			information-class STR
modification date norm			project : 19
			DRNC/NA/RB/FM 27 sh.



-D63 /6.3	4	3	6	5	8	7	10	9

MATERIAL FEED GRIPPER
OPEN

MATERIAL FEED GRIPPER
CLAMPING

CUT-OFF GRIPPER FRONT JAW
IN DIRECTION END POSITION SAW

CUT-OFF GRIPPER FRONT JAW
IN DIRECTION END POS. OF SIDE MATERIAL DISCHARGE

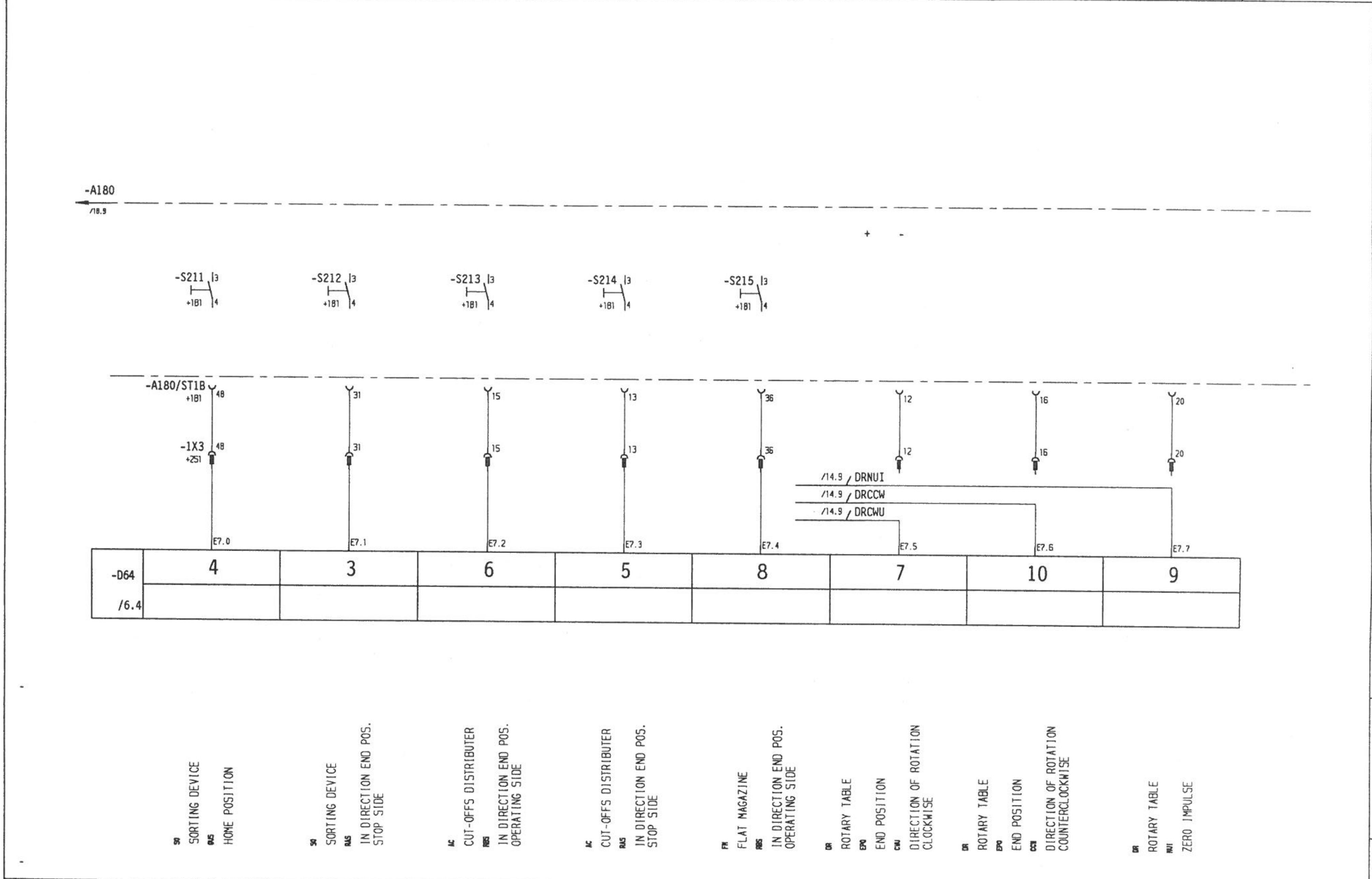
CUT-OFF GRIPPER
IN DIRECTION END POSITION SAW

CUT-OFF GRIPPER
IN DIRECTION END POS. OF SIDE MATERIAL DISCHARGE

CUT-OFF GRIPPER
OPEN

CUT-OFF GRIPPER
CLAMPING

				date	28.02.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: INPUTS	number : 0K2104-000300	local mark of sheet
				proc.	ORTLIEB				information-class STR
				insp.					project : DRNC/NA/RB/FM 20
	modification	date		norm					27 sh.



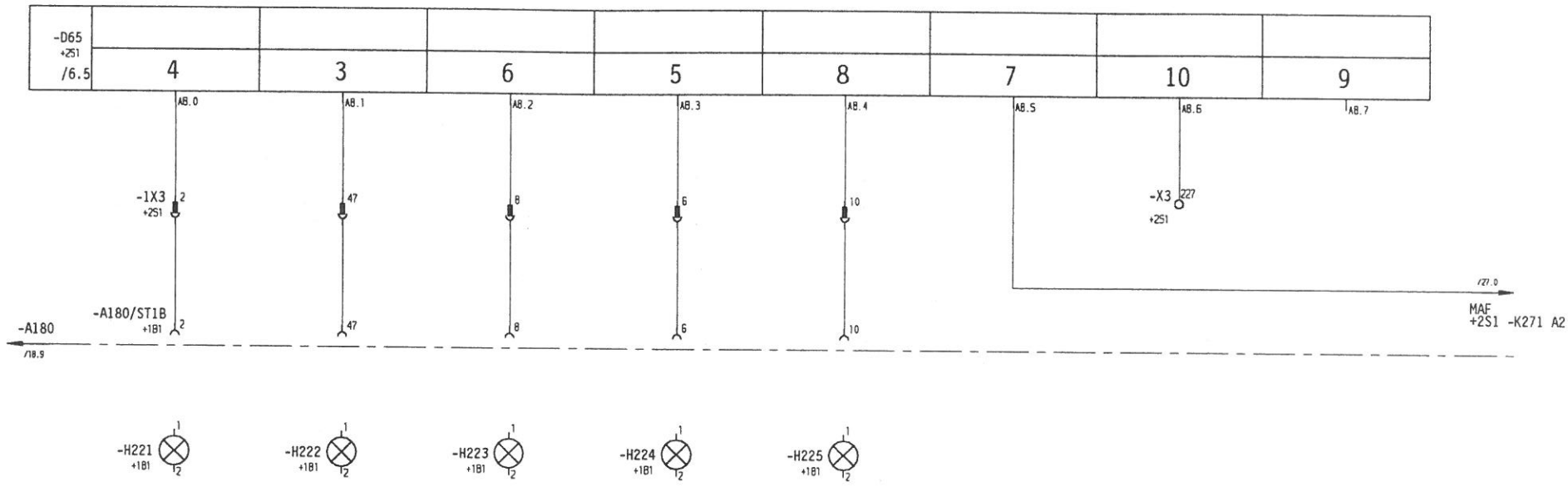
		date	28.02.90
		proc.	ORTLIEB
		insp.	
modification	date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
INPUTS

number : 0K2104-000300

Local mark of sheet	
information-class	STR
project :	21
DRNC/NA/RB/FM	27 sh.



HND MANUAL OPERATING MODE

STP STOP

AK AUTOMATIC

AK AUTOMATIC
STA START

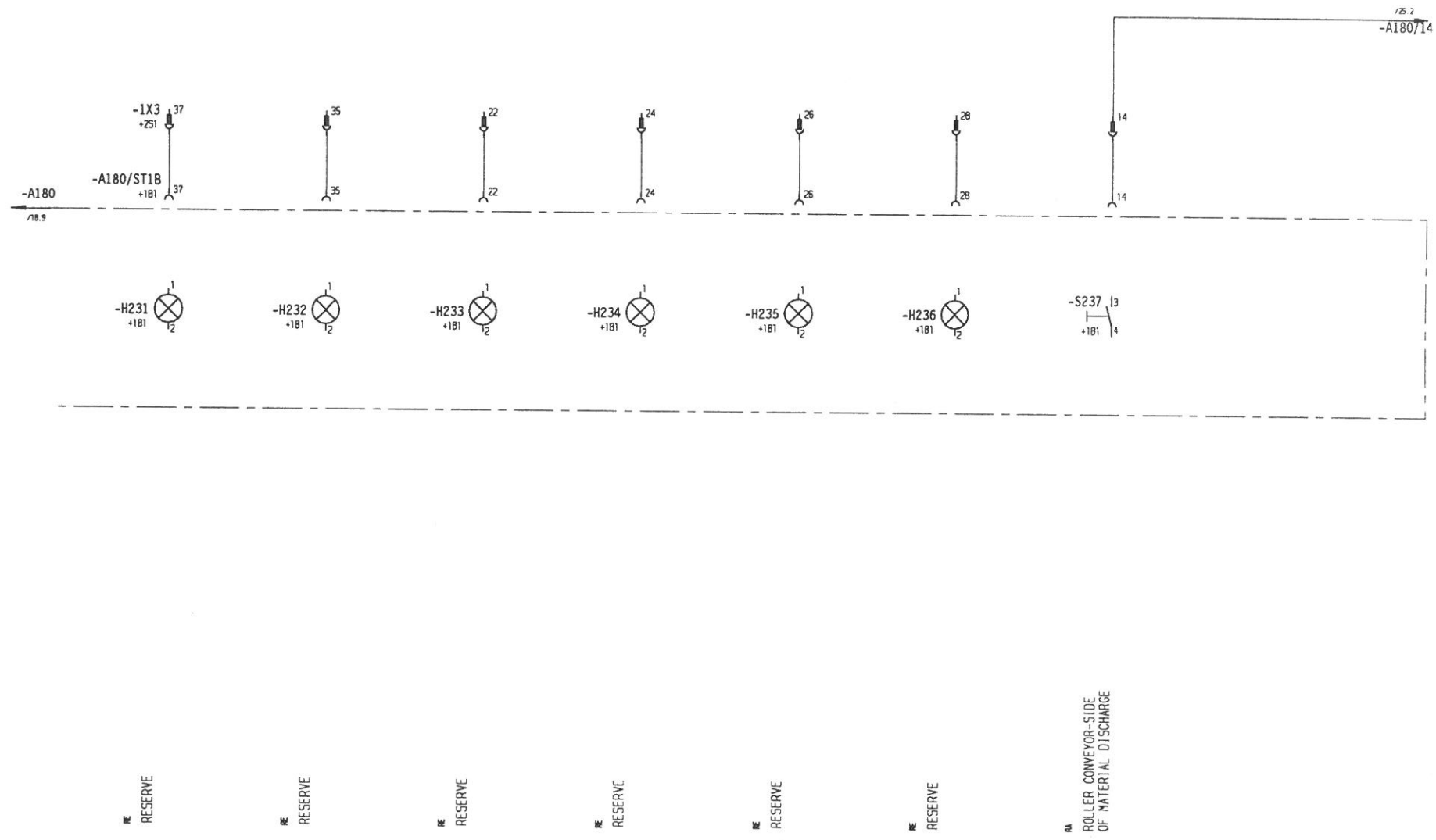
ATU INTERRUPT AUTOMATIC MODE

VM BUNDLE MAGAZINE
RAF REQUEST FOR MATERIAL

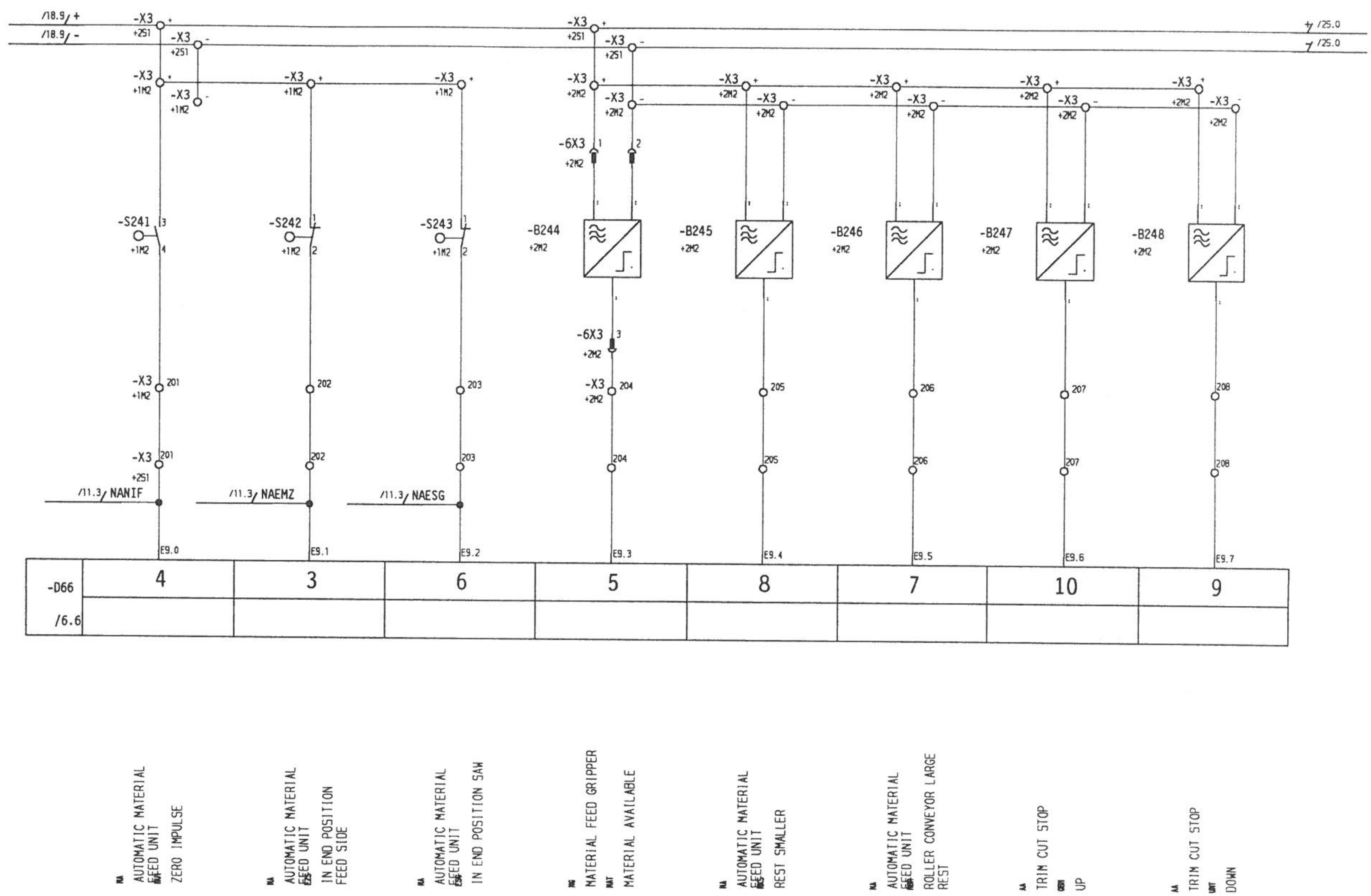
RSV RESERVED

RSV RESERVED

				date	28.02.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: OUTPUTS		number : 0K2104-000300	Local mark of sheet	
				proc.	ORTLIEB					information-class	STR
				insp.						project : DRNC/NA/RB/FM	22
	modification	date		norm							27 sh.



				date	28.02.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: CONTROL		number :	Local mark of sheet	
				proc.	ORTL1EB					information-class	STR
				insp.					0K2104-000300	project :	23
	modification	date		norm						DRNC/NA/RB/FM	27 sh.



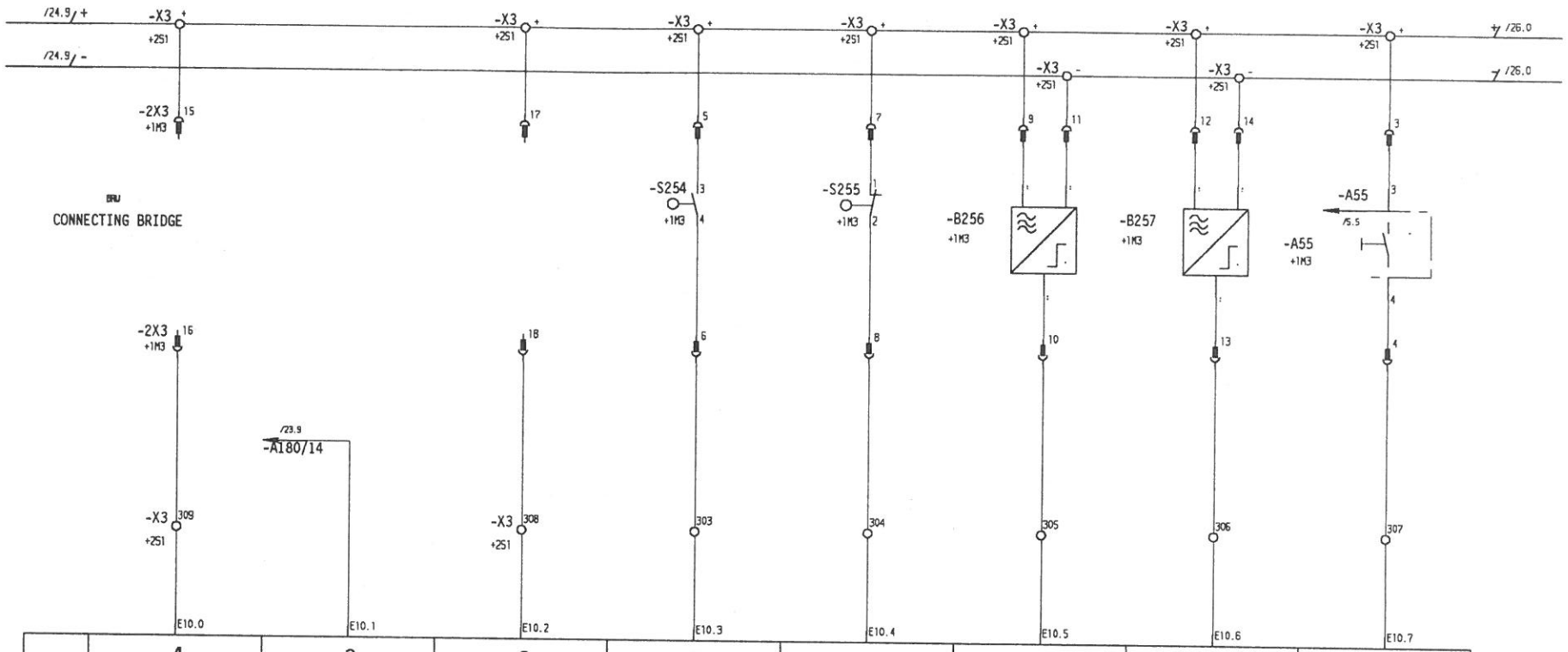
date	28.02.90	
proc.	ORTLIEB	
insp.		
modification date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: INPUTS

number: 0K2104-000300

Local mark of sheet
information-class STR
project: DRNC/NA/RB/FM
24
27 sh.



SHA BARRIER
RZ ROLLER CONVEYOR FEED SIDE

AG CUT-OFF GRIPPER
RA ROLLER CONVEYOR-SIDE OF MATERIAL DISCHARGE

VM BUNDLE MAGAZINE
MAT MATERIAL AVAILABLE

GT TRAVERSE
SEB STOP FOR SINGLE DEFINITION

GT TRAVERSE
SMS TROUBLE

MB MULTIPLE DEFINITION
EIN SWITCH ON

GT TRAVERSE
SMB STOP FOR MULTIBLE DEFINITIONS

GT TRAVERSE
RAS IN DIRECTION END POS. STOP SIDE

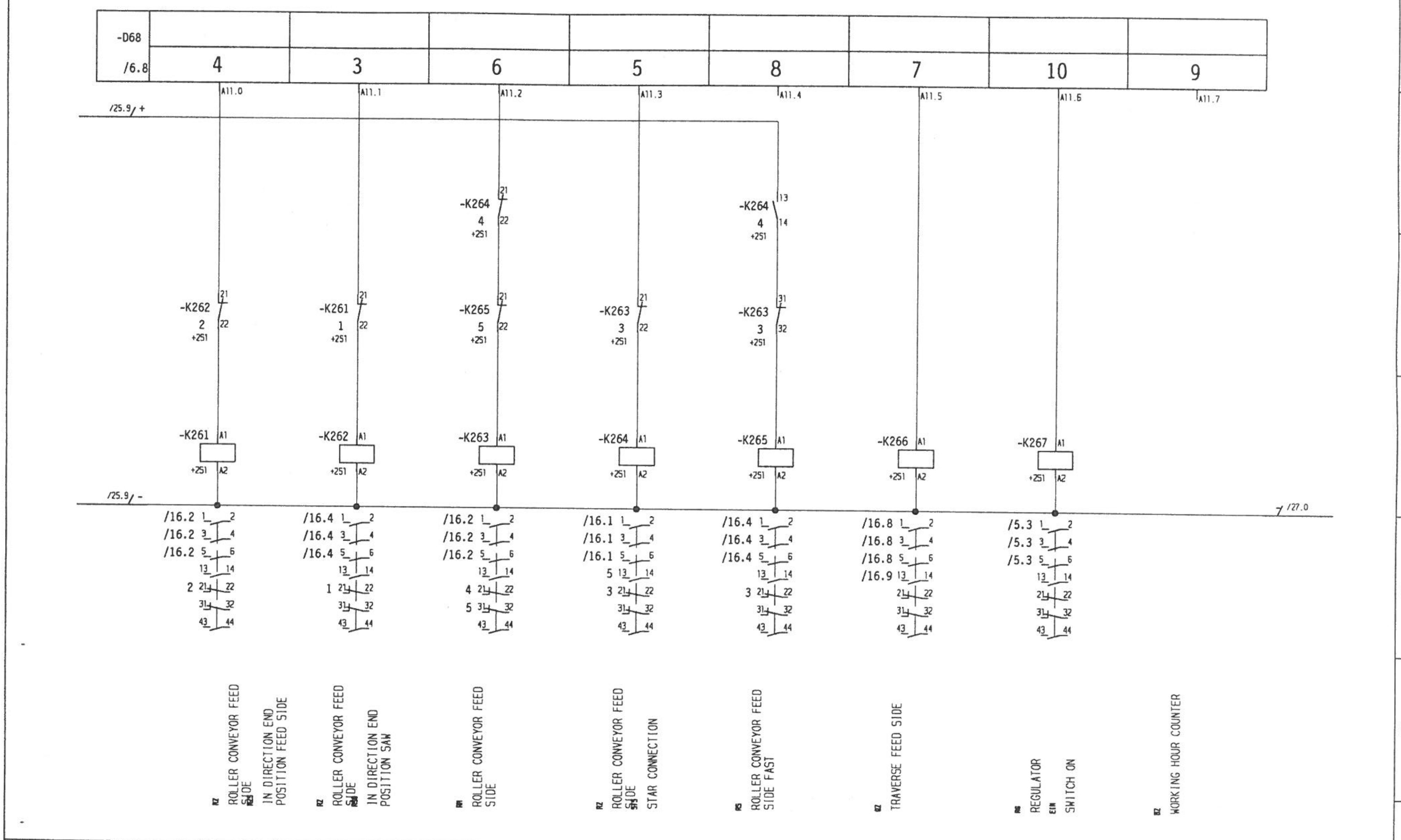
			date	28.02.90	
			proc.	ORTLIEB	
			insp.		
modification	date		norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
INPUTS

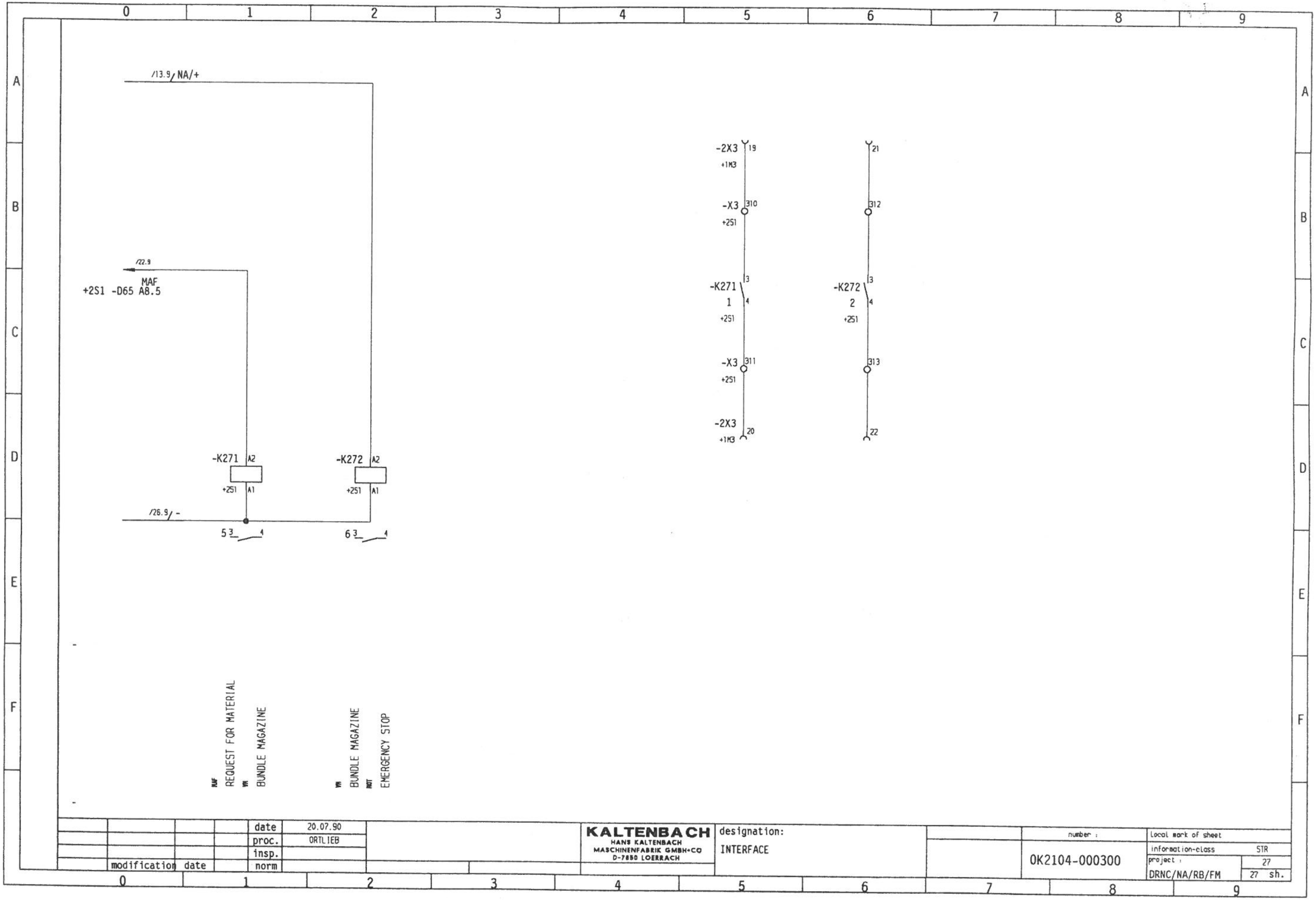
number :
OK2104-000300

Local mark of sheet
information-class STR
project : 25
DRNC/NA/RB/FM
27 sh.

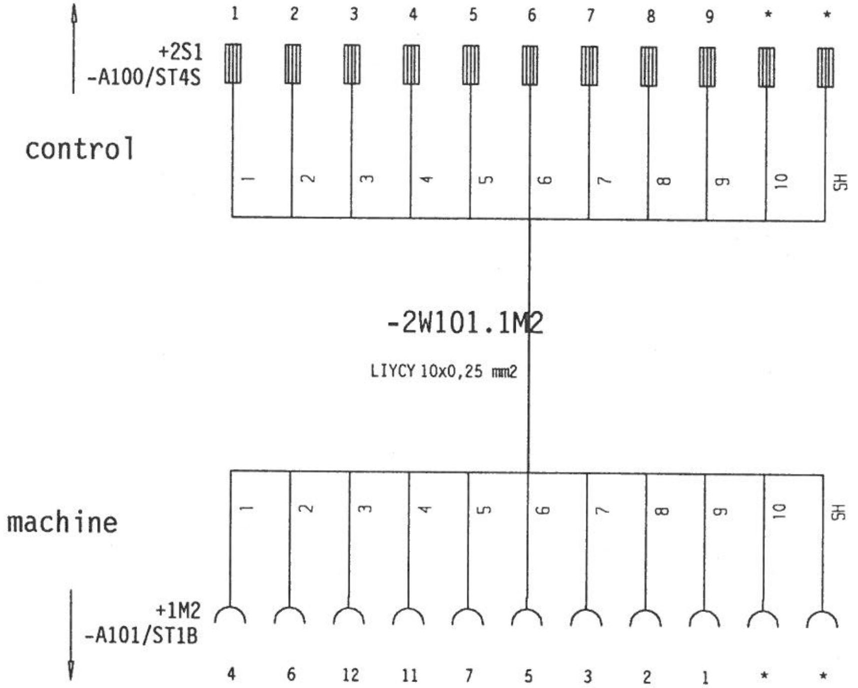


modification	date	date	28.02.90	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: OUTPUTS
		proc.	ORTLIEB		
		insp.			
		norm			

number : 0K2104-000300	local mark of sheet	
	information-class	STR
	project : DRNC/NA/RB/FM	26
		27 sh.

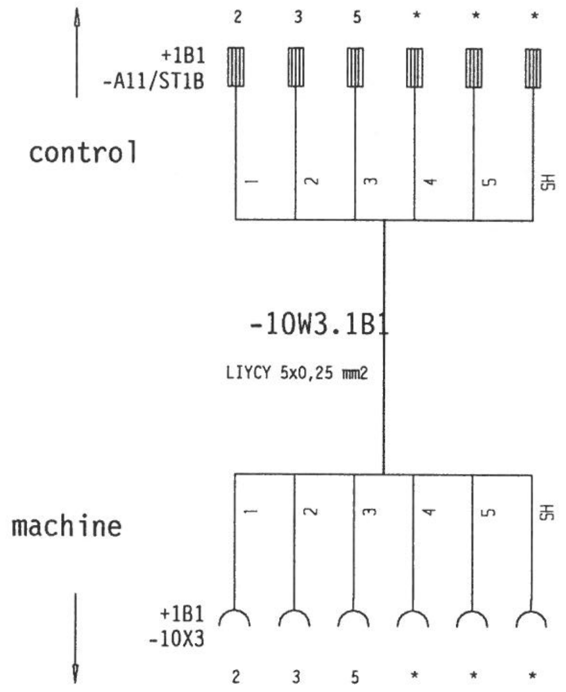


/13.9 NA/+
/22.9
MAF
+2S1 -D65 A8.5
/26.9 -
-K271
A2
A1
+2S1
5 3 4
-K272
A2
A1
+2S1
6 3 4
-2X3 19
+1M3
-X3 310
+2S1
-K271 3 4
1
+2S1
-X3 311
+2S1
-2X3 20
+1M3
21
312
-K272 3 4
2
+2S1
313
22
MAF REQUEST FOR MATERIAL
MA BUNDLE MAGAZINE
MA BUNDLE MAGAZINE
NOT EMERGENCY STOP
date 20.07.90
proc. ORTLIEB
insp.
norm
modification date
KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH
designation:
INTERFACE
number :
0K2104-000300
Local mark of sheet
information-class STR
project : 27
DRNC/NA/RB/FM
27 sh.



date	28.02.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Kabel -2W101.1M2 - -2W101.1M2 cable	place-terminal/plug -A100/.ST4S	number : 0K2104-000300
proc.	ORTLIEB				
insp.					
modification date / norm					

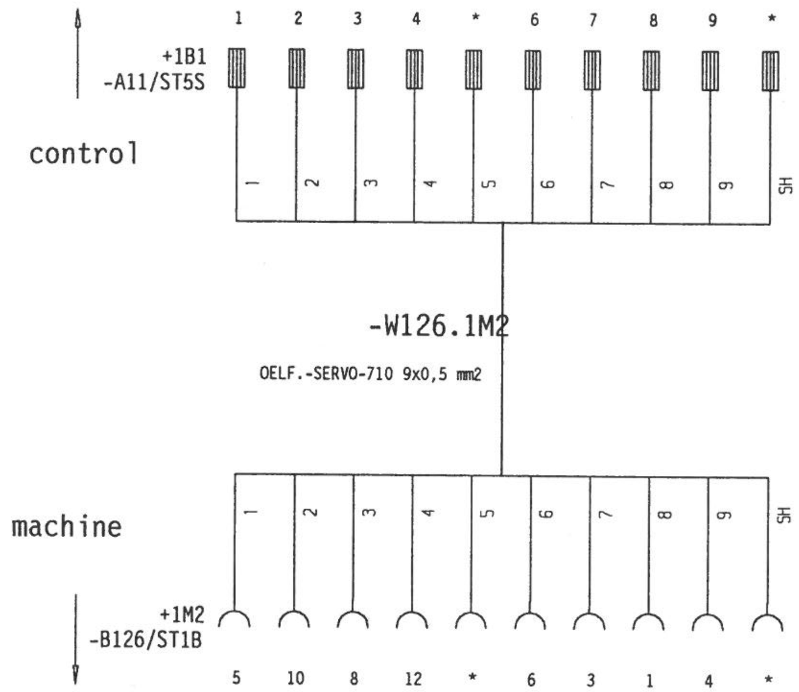
local mark of sheet	x
information-class	VKB
project :	1
DRNC/NA/RB/FM	1 sh.



modification	date		date	25.02.91
			proc.	HOLLERBACH
			insp.	
			norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

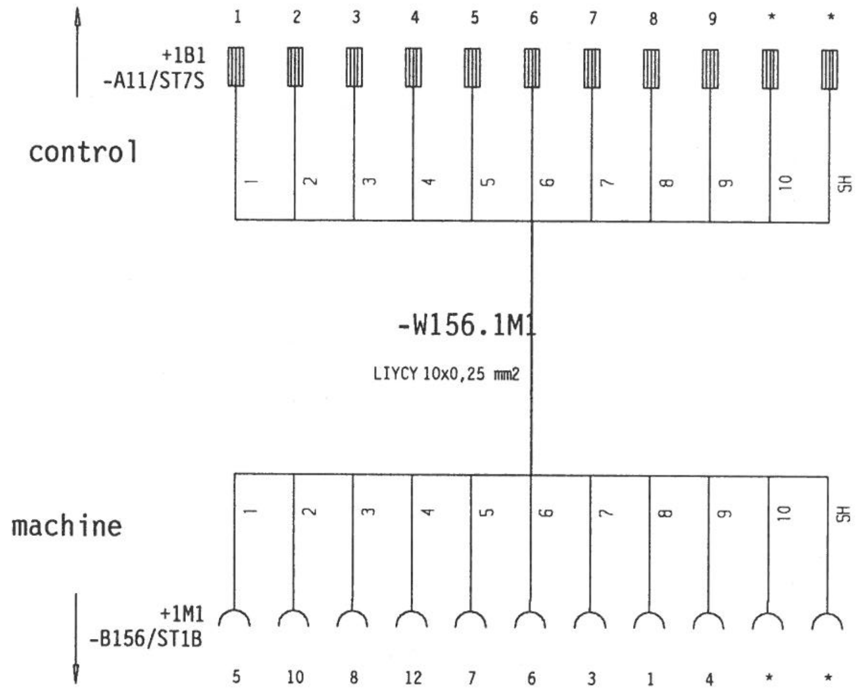
designation:	place-terminal/plug	number :	Local mark of sheet	*
Kabel / cable -10W3.1B1 - -10W3.1B1	-A11/.ST1B	0K2104-000300	information-class	VKB
			project :	1
			DRNC/NA/RB/FM	1 sh.



date	20.07.90	
proc.	ORTLIEB	
insp.		
modification	date	norm

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

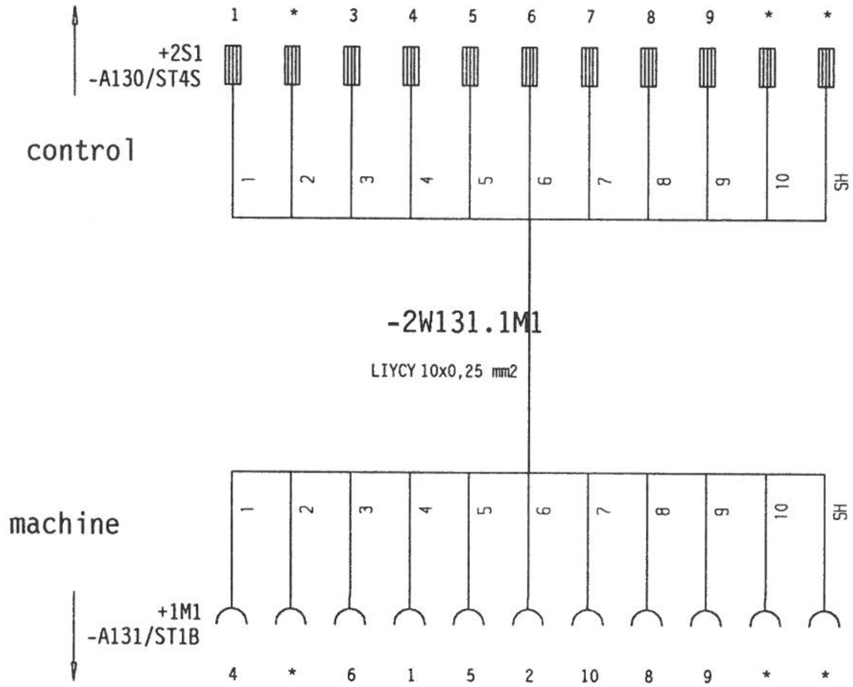
designation:	place-terminal/plug	number :	local mark of sheet	*
Kabel / cable -W126.1M2 - -W126.1M2	-A11/.ST5S	0K2104-000300	information-class	YKB
			project :	1
			DRNC/NA/RB/FM	1 sh.



date	20.07.90	designation:	
proc.	ORTLIEB	Kabel -W156.1M1 - -W156.1M1	
insp.		cable	
modification date	norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

place-terminal/plug	number :	Local mark of sheet	*
-A11/.ST7S	0K2104-000300	information-class	VKB
		project :	1
		DRNC/NA/RB/FM	1 sh.



date	01.03.90
proc.	ORTLIEB
insp.	
norm	
modification	date

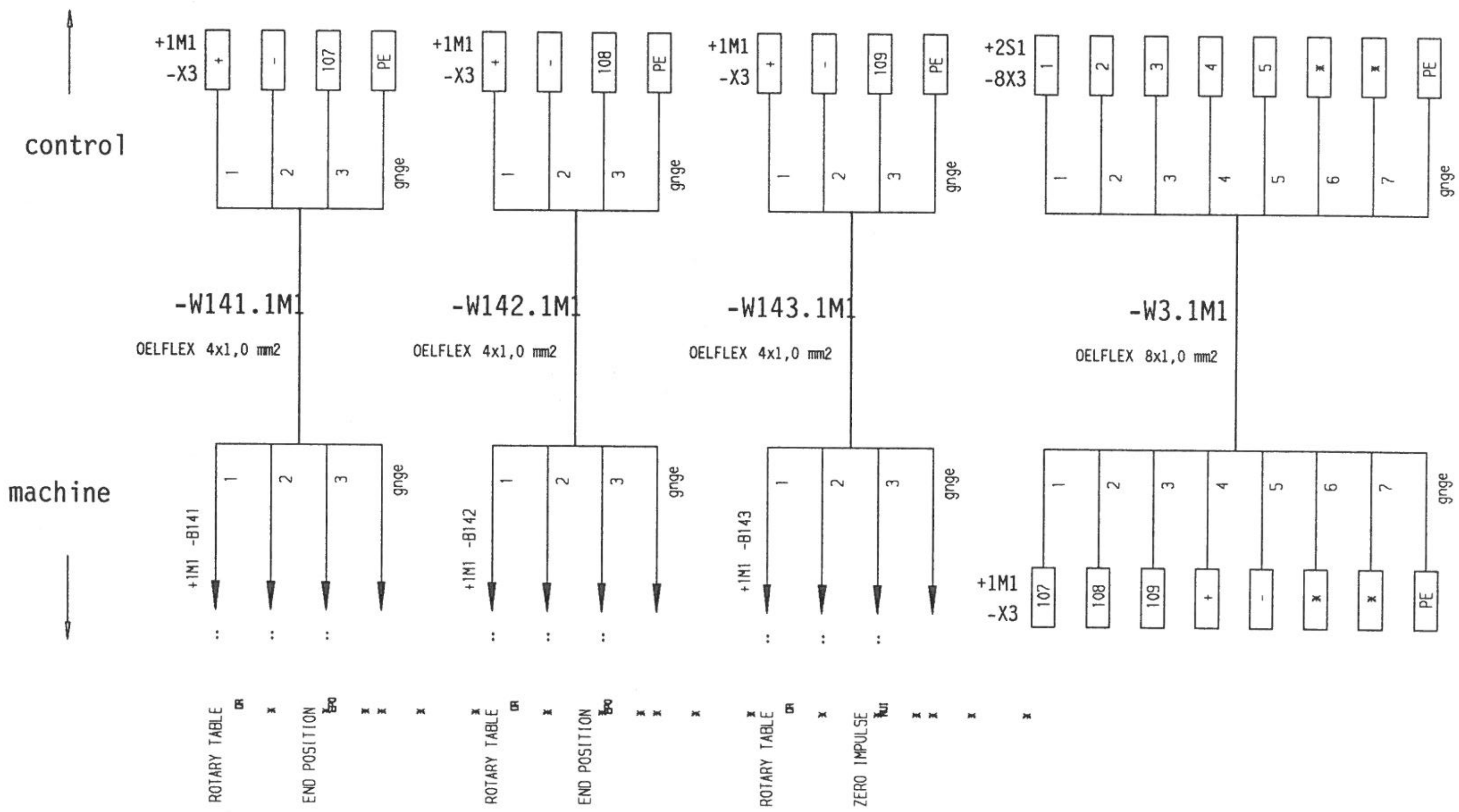
KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Kabel / cable -2W131.1M1 - -2W131.1M1

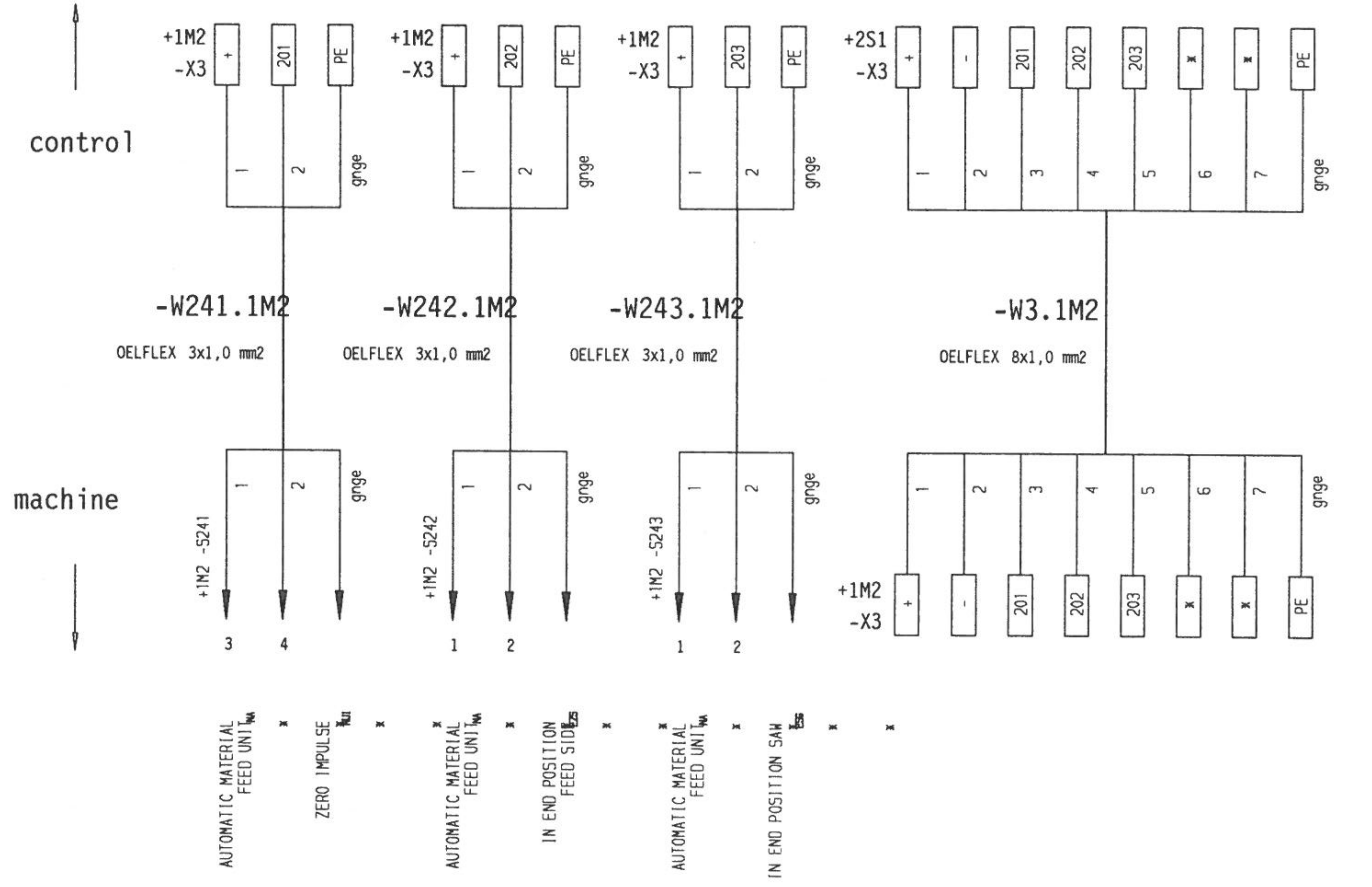
place-terminal/plug: -A130/.ST4S

number: 0K2104-000300

local mark of sheet: x
information-class: VKB
project: DRNC/NA/RB/FM
1
1 sh.



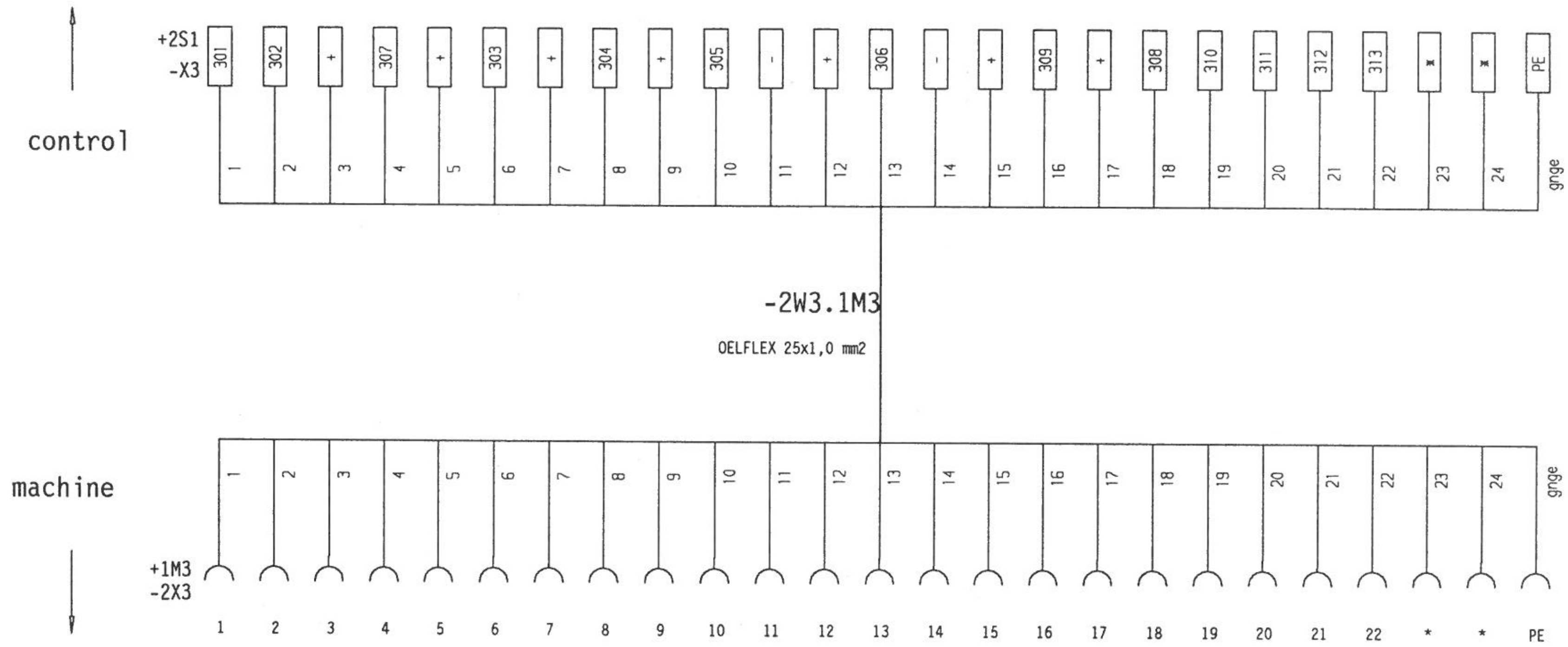
date	24.07.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Kabel cable -W141.1M1 - -W3.1M1	place-terminal/plug: 1M1-X3	number: 0K2104-000300
proc.	ORTLIEB				Local mark of sheet: x
insp.					information-class: VKB
modification / date / norm					project: DRNC/NA/RB/FM — 1 / 1 sh.



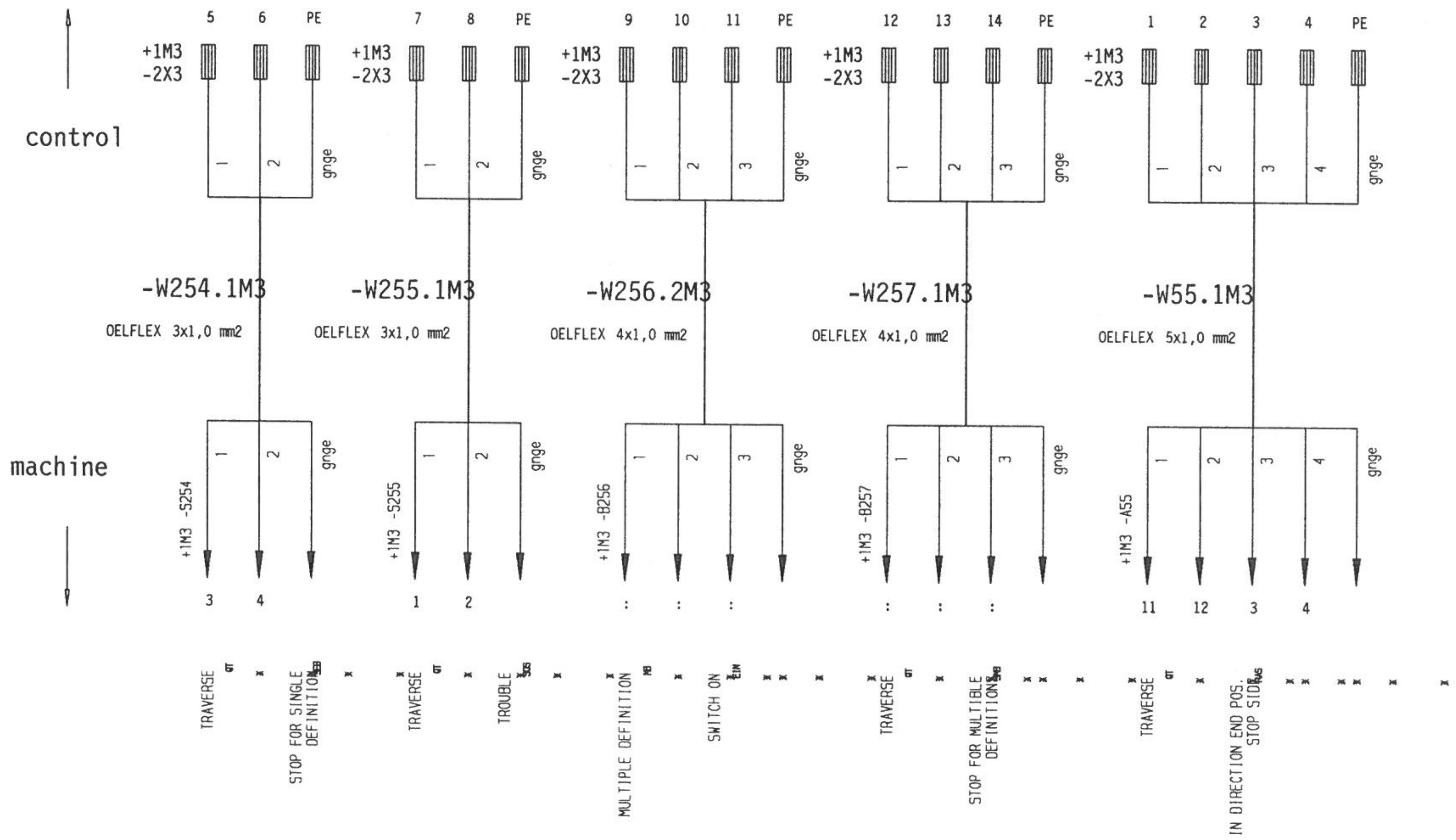
date	20.07.90	
proc.	ORTLIEB	
insp.		
norm		
modification	date	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:	place-terminal/plug	number :	local mark of sheet	x
Kabel / cable -W241.1M2 - -W3.1M2	1M2-X3	0K2104-000300	information-class	VKB
			project :	1
			DRNC/NA/RB/FM	1 sh.



date	25.02.91	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	place-terminal/plug	number :	local mark of sheet: x
proc.	ORTLIEB		Kabel / cable -2W3.1M3 - -2W3.1M3	1M3-2X.3	0K2104-000300	information-class: VKB
insp.						project : DRNC/NA/RB/FM
norm						1 / 2 sh.
modification date						

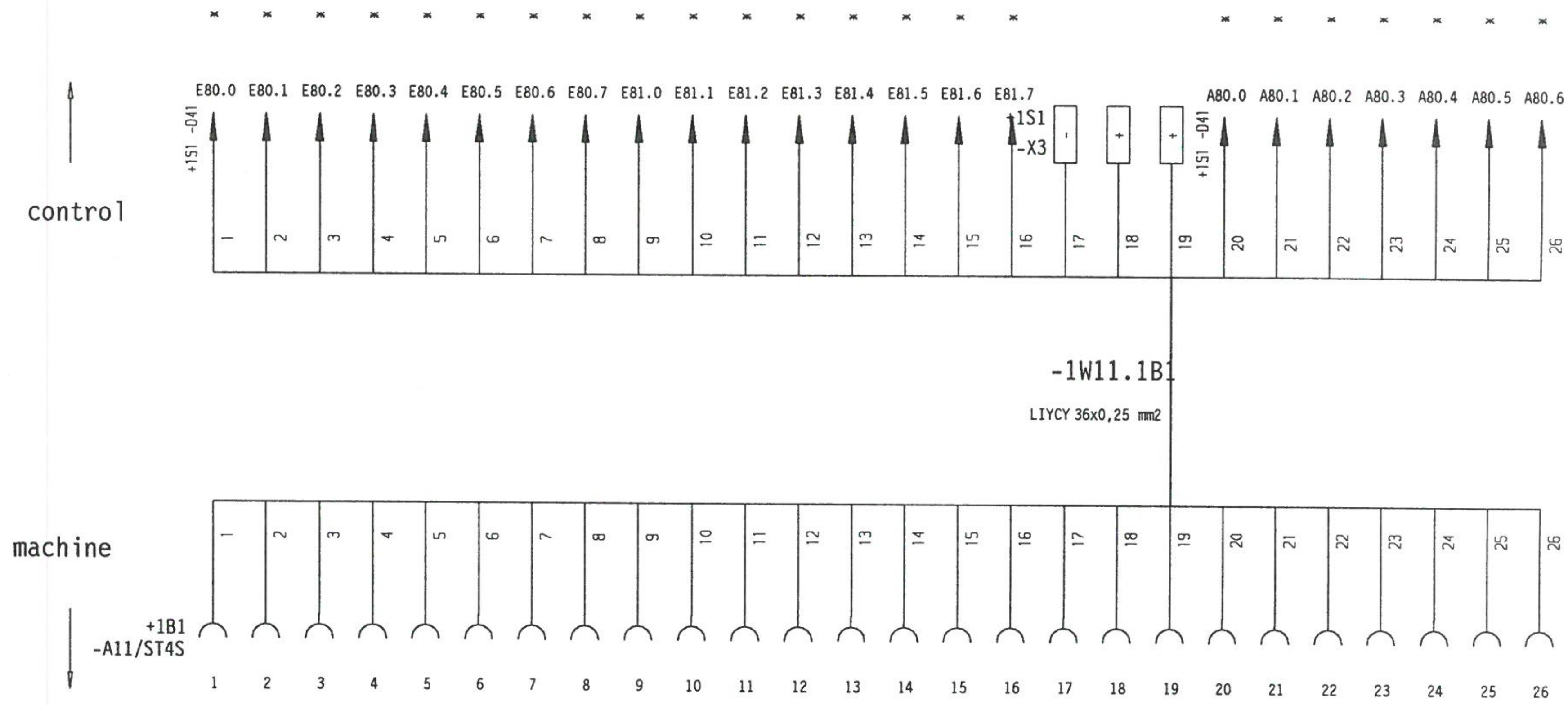


date	25.02.91		
proc.	ORTLIEB		
insp.			
modification date	norm		

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: Kabel / cable -W254.1M3 - -W55.1M3

place-terminal/plug	number :	local mark of sheet	*
1M3-2X.3	0K2104-000300	information-class	VKB
		project : DRNC/NA/RB/FM	2 / 2 sh.



date	20.07.90		
proc.	ORTLIEB		
insp.			
norm			
modification	date		

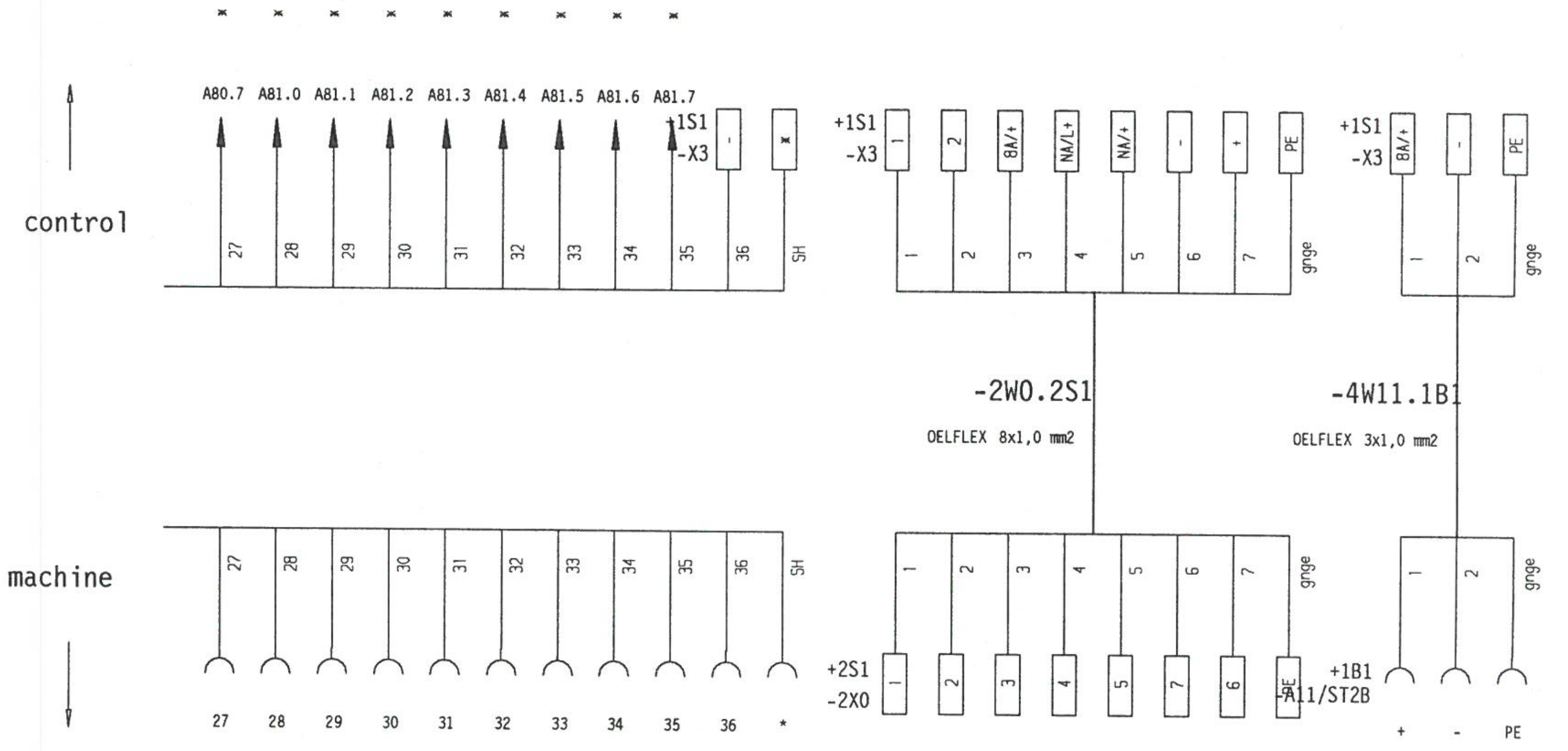
KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: Kabel / cable -1W11.1B1 - -1W11.1B1

place-terminal/plug: 1S1-X3

number: 0K2104-000300

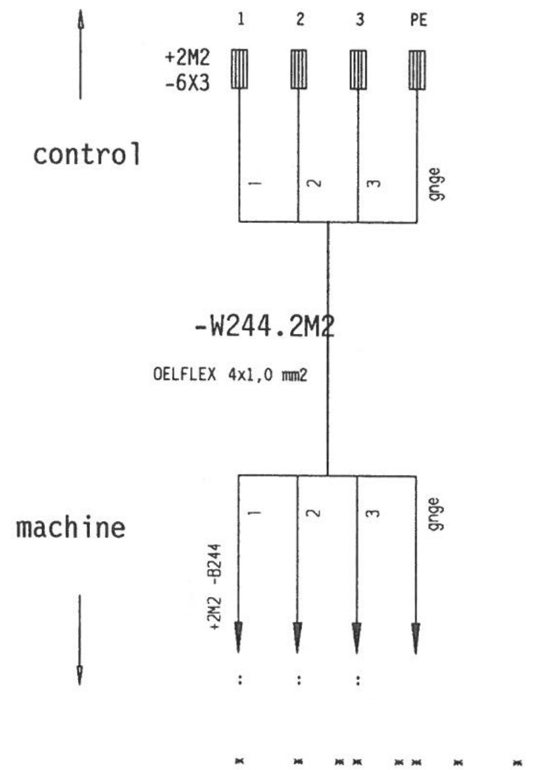
local mark of sheet: x
information-class: VKB
project: DRNC/NA/RB/FM
1
2 sh.



date	20.07.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	place-terminal/plug	number :
proc.	ORTLIEB		Kabel -1W11.1B1 - -1W11.1B1 cable	1S1-X3	0K2104-000300
insp.					
norm					

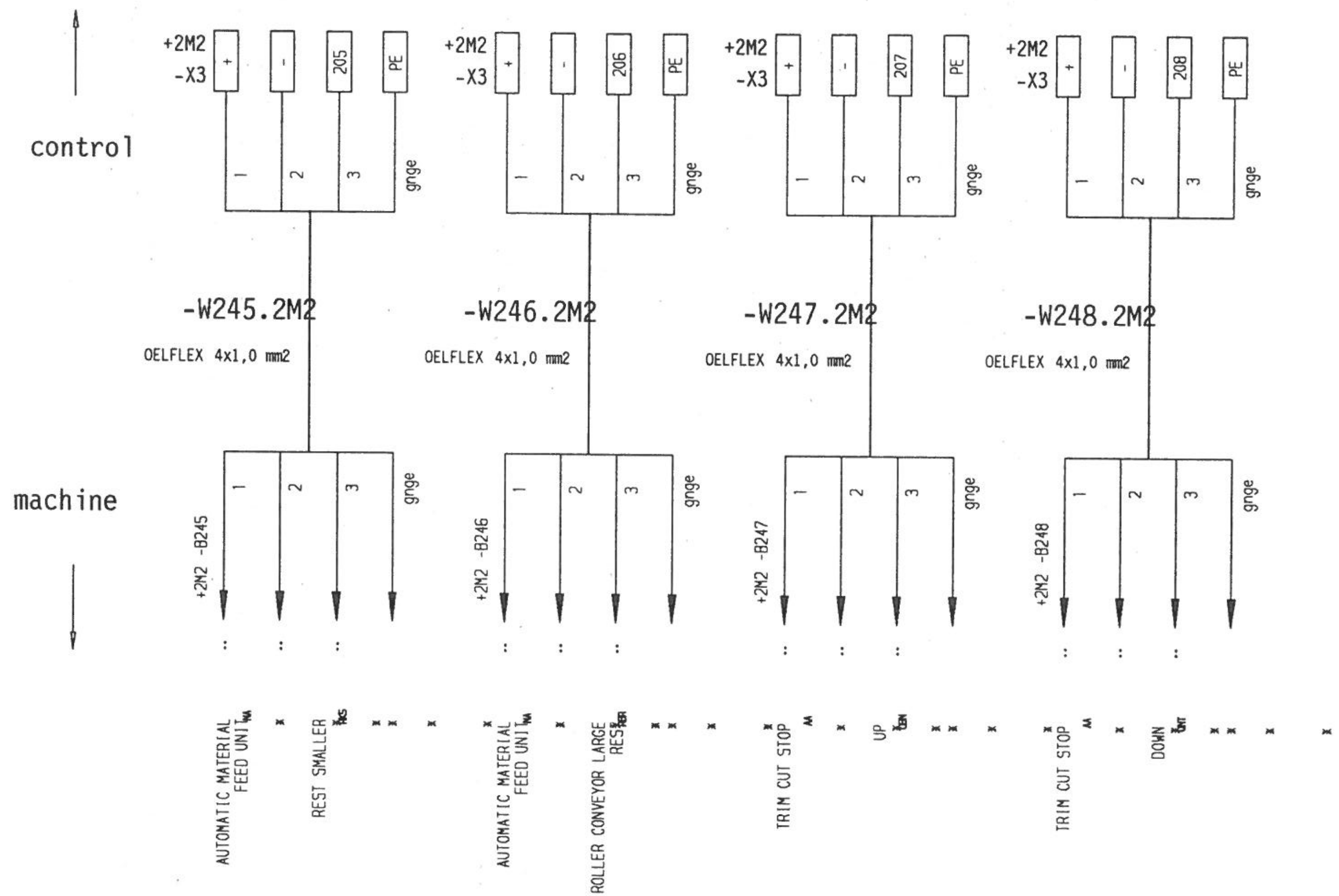
modification date

local mark of sheet	=
information-class	VKB
project :	2
DRNC/NA/RB/FM	2 sh.



date	28.02.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Kabel / cable -W251.2M2 - -W251.2M2
proc.	ORTLIEB	place-terminal/plug: 2M2-6X.3	number: 0K2104-000300
insp.		local mark of sheet: x	information-class: VKB
norm		project: DRNC/NA/RB/FM	1 / 1 sh.

modification date

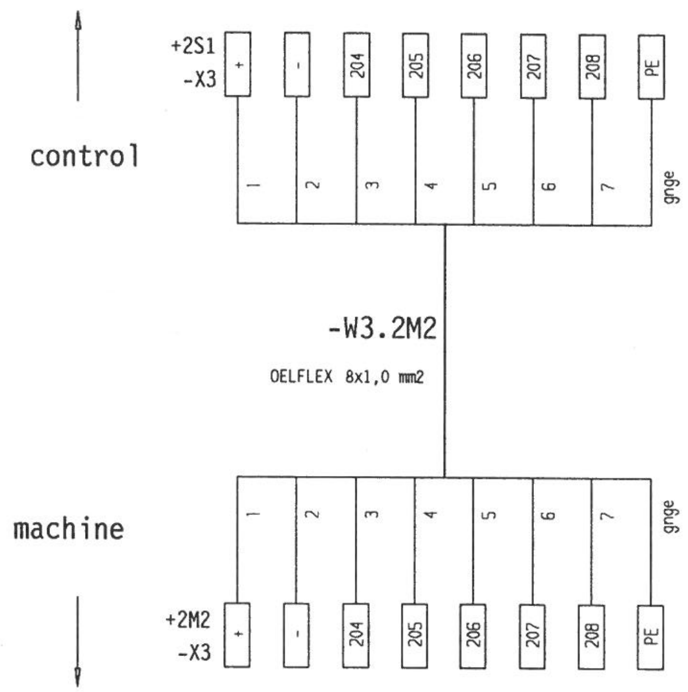


date	20.07.90
proc.	ORTLIEB
insp.	
norm	
modification	date

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: Kabel / cable -W245.2M2 - -W248.2M2

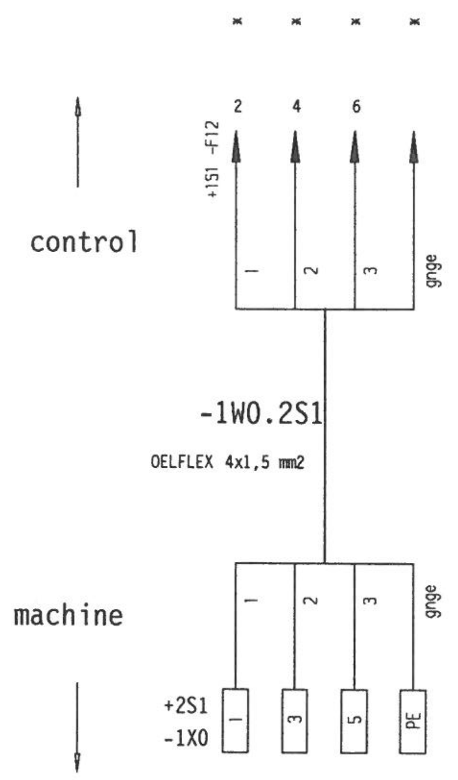
place-terminal/plug	number :	local mark of sheet	x
2M2-X3	0K2104-000300	information-class	VKB
		project :	1
		DRNC/NA/RB/FM	2 sh.



date	20.07.90	
proc.	ORTLIEB	
insp.		
norm		
modification	date	

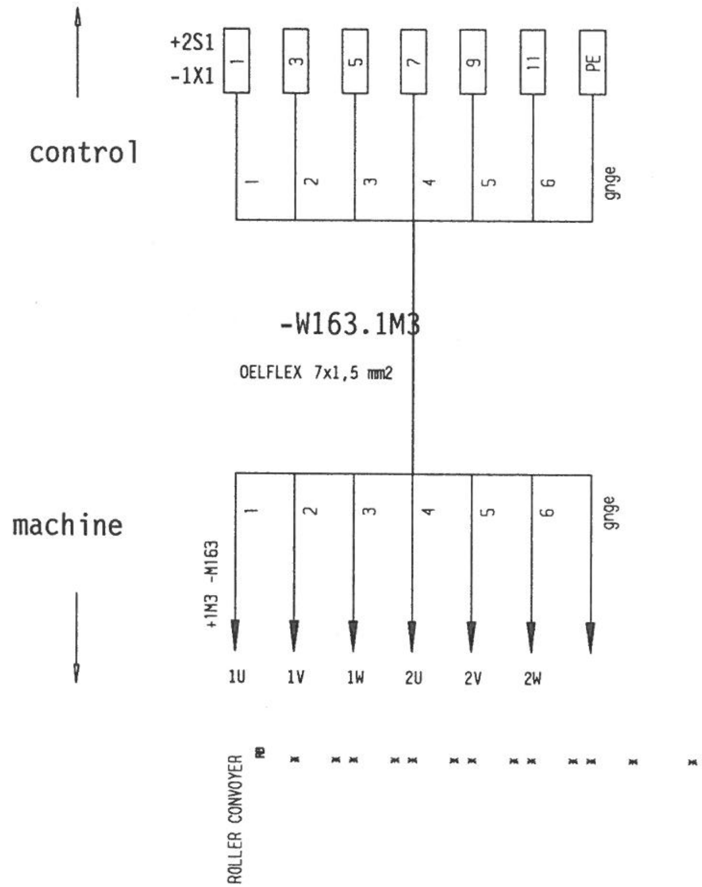
KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:	place-terminal/plug	number :	local mark of sheet	*
Kabel / cable -W3.2M2 - -W3.2M2	2M2-X3	0K2104-000300	information-class	VKB
			project :	2
			DRNC/NA/RB/FM	2 sh.



date	18.04.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	
proc.	ORTLIEB		Kabel -1W0.2S1 - -1W0.2S1 cable	
insp.				
norm				
modification	date			

place-terminal/plug	number :	local mark of sheet	*
2S1-1X.0	0K2104-000300	information-class	VKB
		project :	1
		DRNC/NA/RB/FM	1 sh.

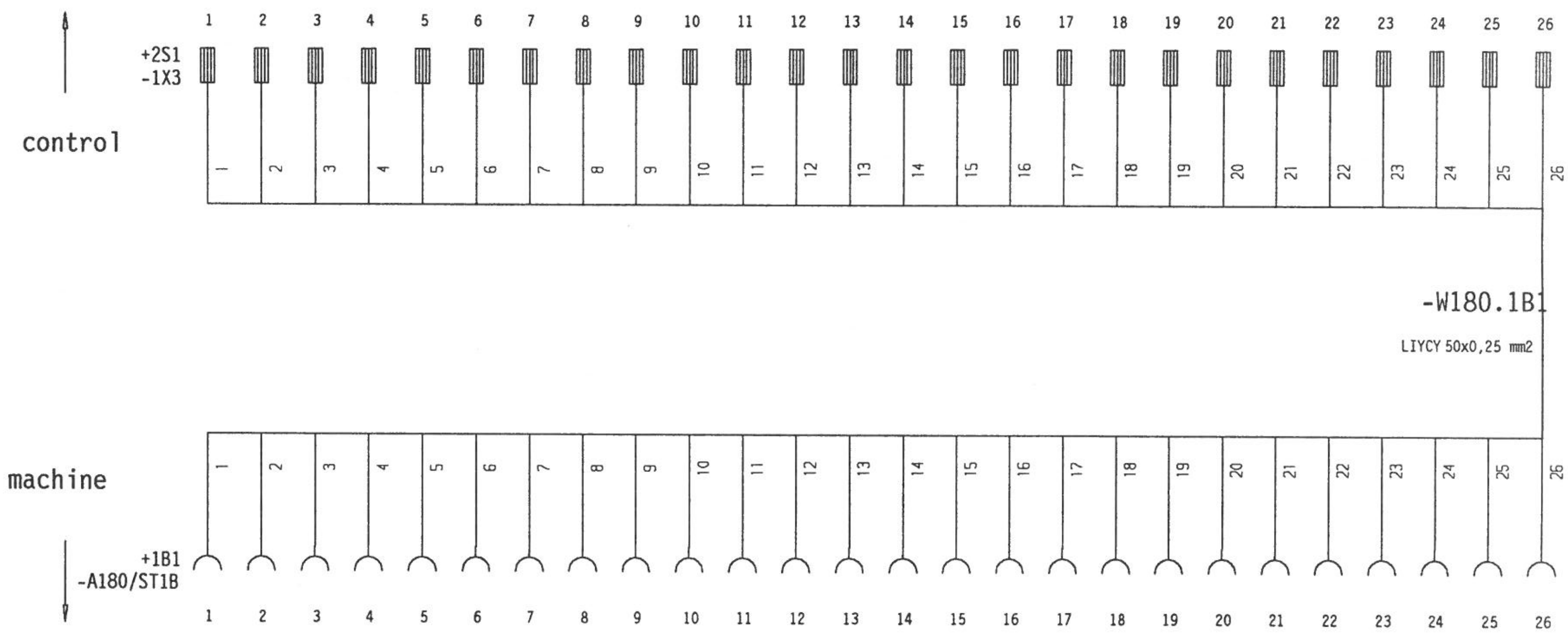


			date	18.04.90
			proc.	ORTLIEB
			insp.	
modification	date		norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

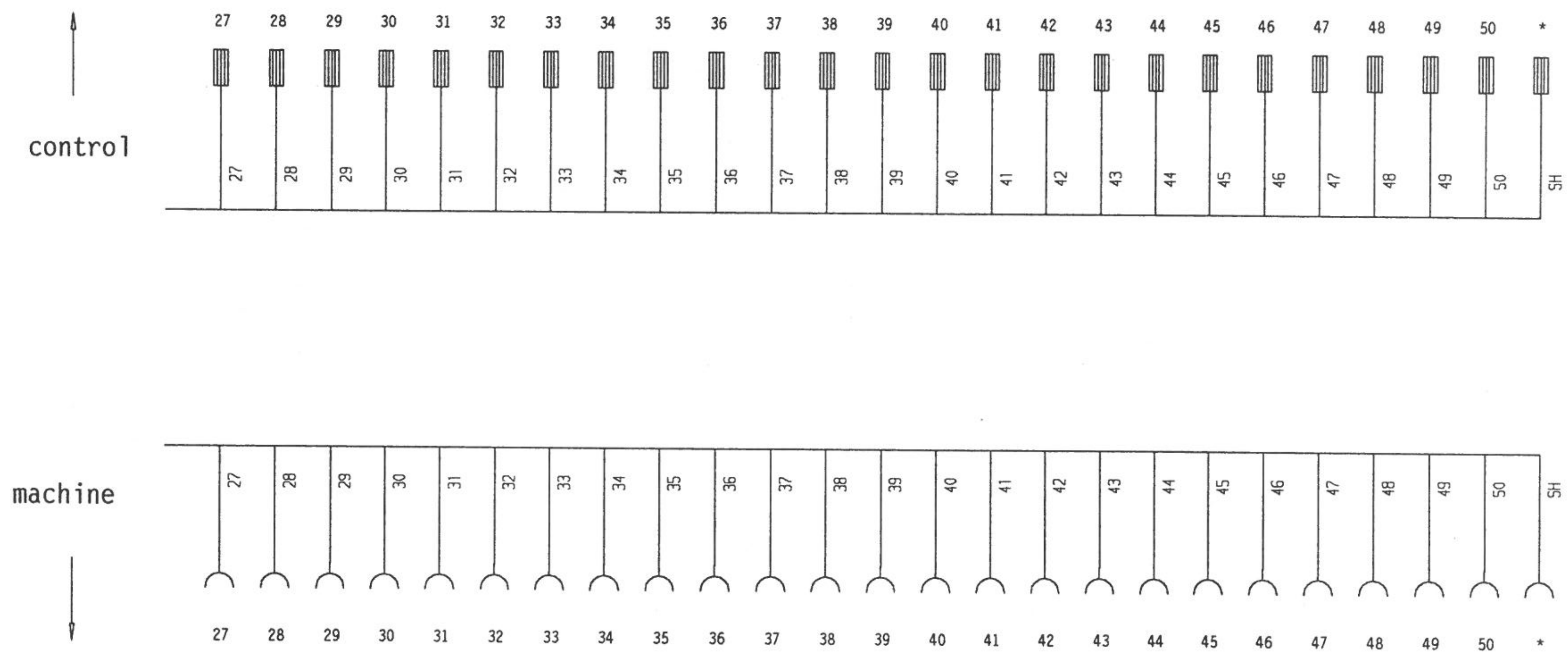
designation:
Kabel
cable -W163.1M3 - -W163.1M3

place-terminal/plug	number :	local mark of sheet	*
2S1-1X.1	0K2104-000300	information-class	VKB
		project :	1
		DRNC/NA/RB/FM	1 sh.



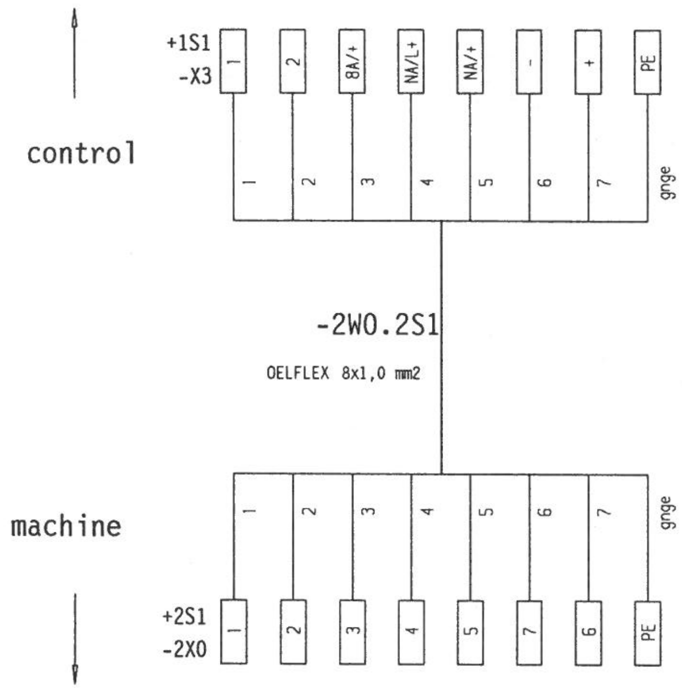
date	28.02.90	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7880 LOERRACH	designation:	place-terminal/plug	number :
proc.	ORTLIEB		Kabel -W180.1B1 - -W180.1B1 cable	2S1-1X.3	0K2104-000300
insp.					
modification date norm					

local mark of sheet	*
information-class	VKB
project :	1
DRNC/NA/RB/FM	2 sh.



date	28.02.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Kabel / cable -W180.1B1 - -W180.1B1	place-terminal/plug: 2S1-1X.3	number: 0K2104-000300
proc.	ORTLIEB				Local mark of sheet: *
insp.					information-class: VKB
norm					project: DRNC/NA/RB/FM 2 / 2 sh.

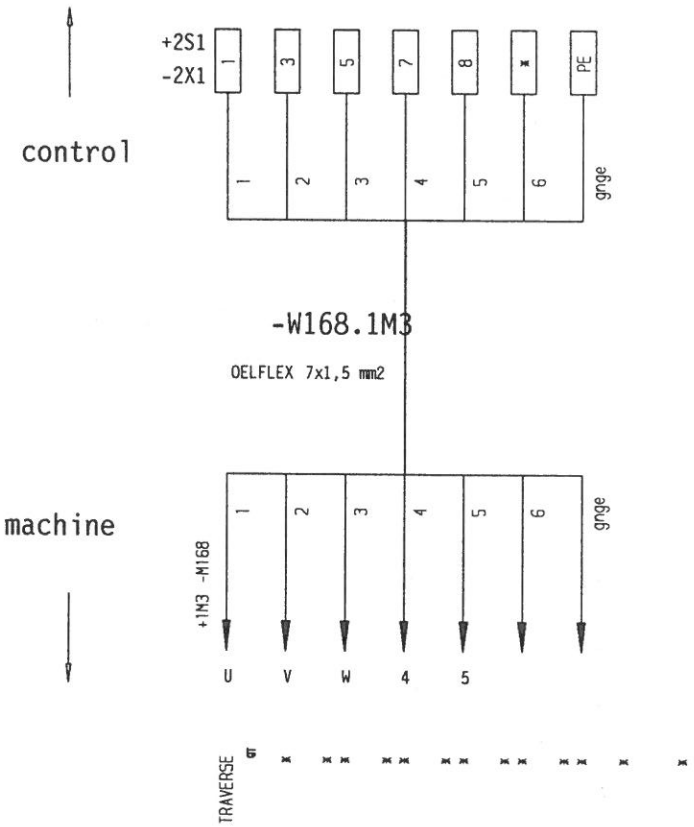
modification date



modification	date		date	18.04.90
			proc.	ORTLIEB
			insp.	
			norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:	place-terminal/plug	number :	local mark of sheet	*
Kabel / cable -2W0.2S1 - -2W0.2S1	2S1-2X.0	0K2104-000300	information-class	VKB
			project :	1
			DRNC/NA/RB/FM	1 sh.

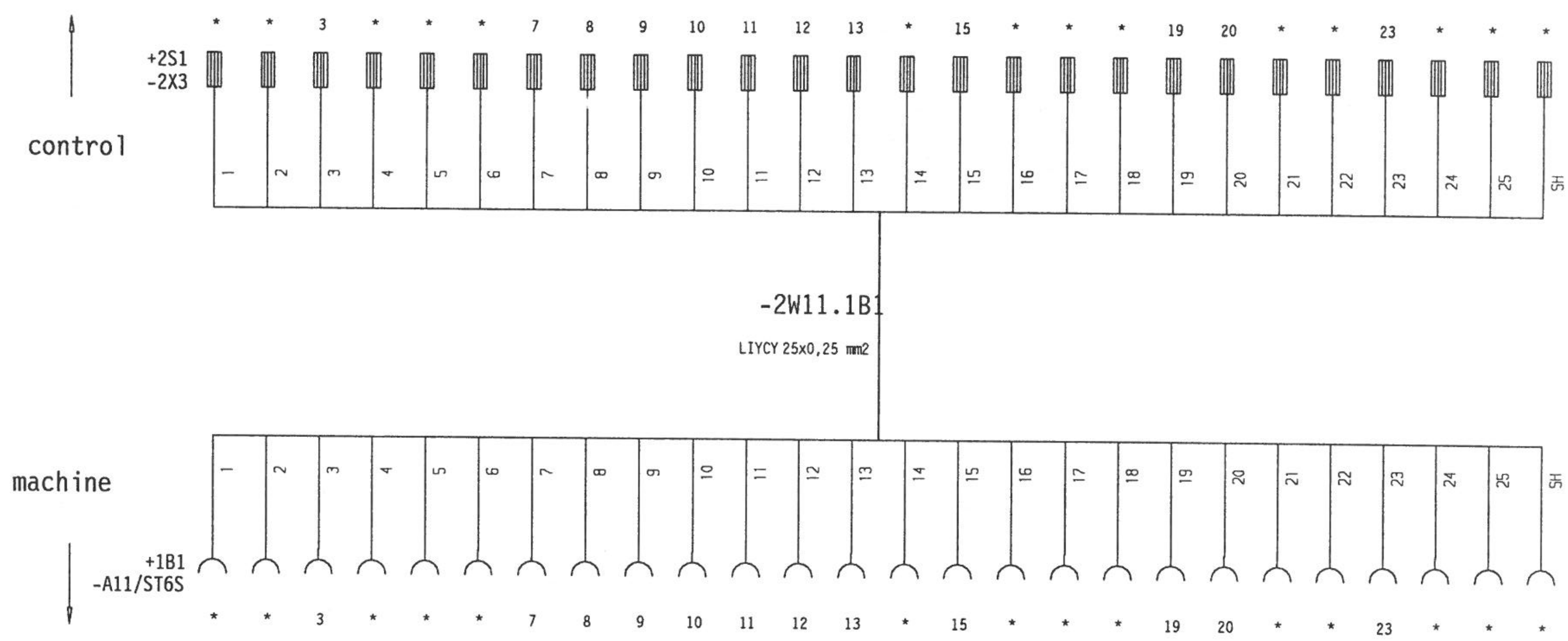


			date	03.07.91	
			proc.	ORTL1EB	
		25.02.91	insp.		
	modification	date	norm	x	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

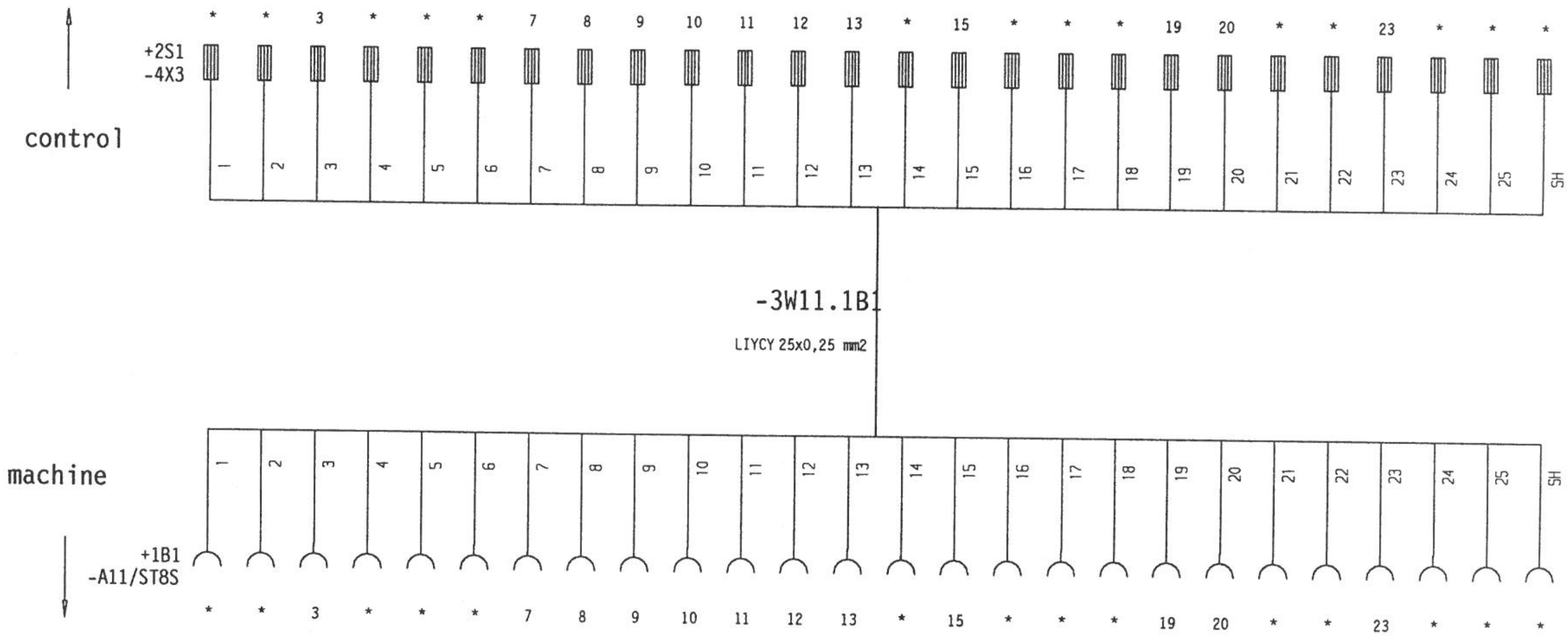
designation:
Kabel -W168.1M3 - -W168.1M3
cable

place-terminal/plug	number :	Local mark of sheet	x
2S1-2X.1	0K2104-000300	information-class	VKB
		project :	1
		DRNC/NA/RB/FM	1 sh.



date	20.07.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Kabel / cable -2W11.1B1 - -2W11.1B1	place-terminal/plug 2S1-2X.3	number : 0K2104-000300
proc.	ORTLIEB				local mark of sheet: *
insp.					information-class: VKB
norm					project : DRNC/NA/RB/FM — 1 — 1 sh.

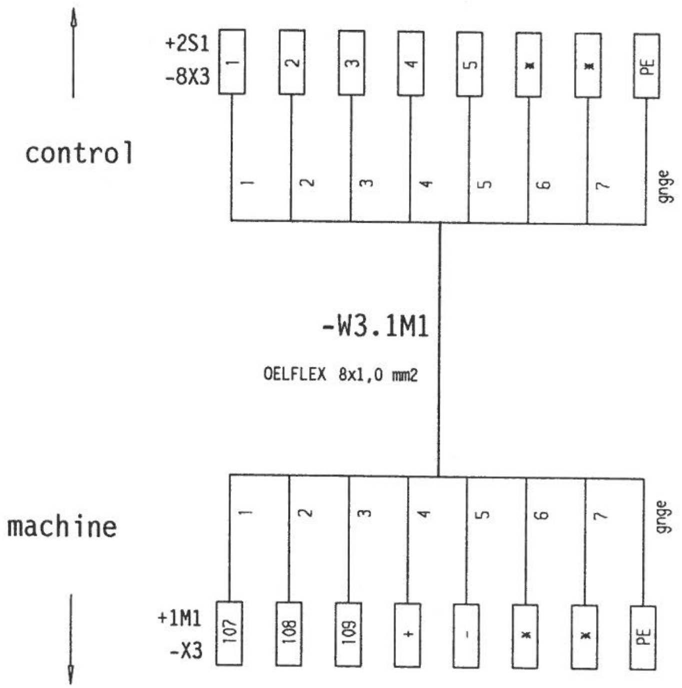
modification date



date	20.07.90	
proc.	ORTLIEB	
insp.		
modification	date	norm

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:	place-terminal/plug	number :	local mark of sheet	*
Kabel -3W11.1B1 - -3W11.1B1 cable	2S1-4X.3	0K2104-000300	information-class	VKB
			project :	1
			DRNC/NA/RB/FM	1 sh.

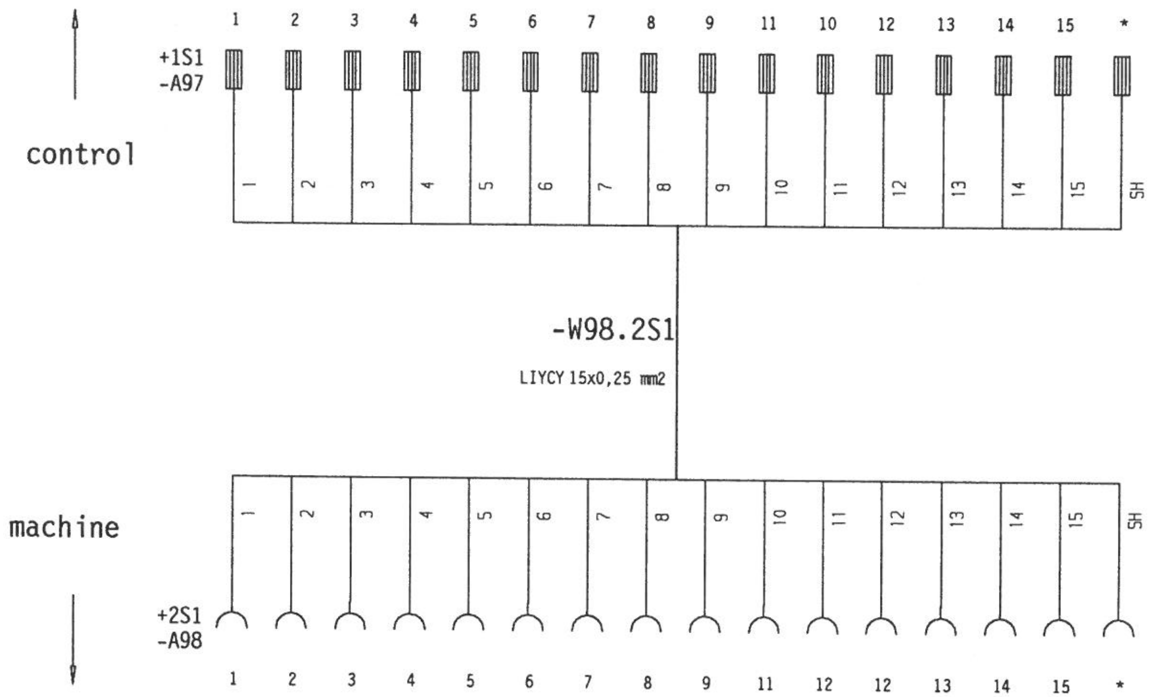


			date	24.07.90
			proc.	ORTLIEB
			insp.	
modification	date		norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Kabel -W3.1M1 - -W3.1M1
cable

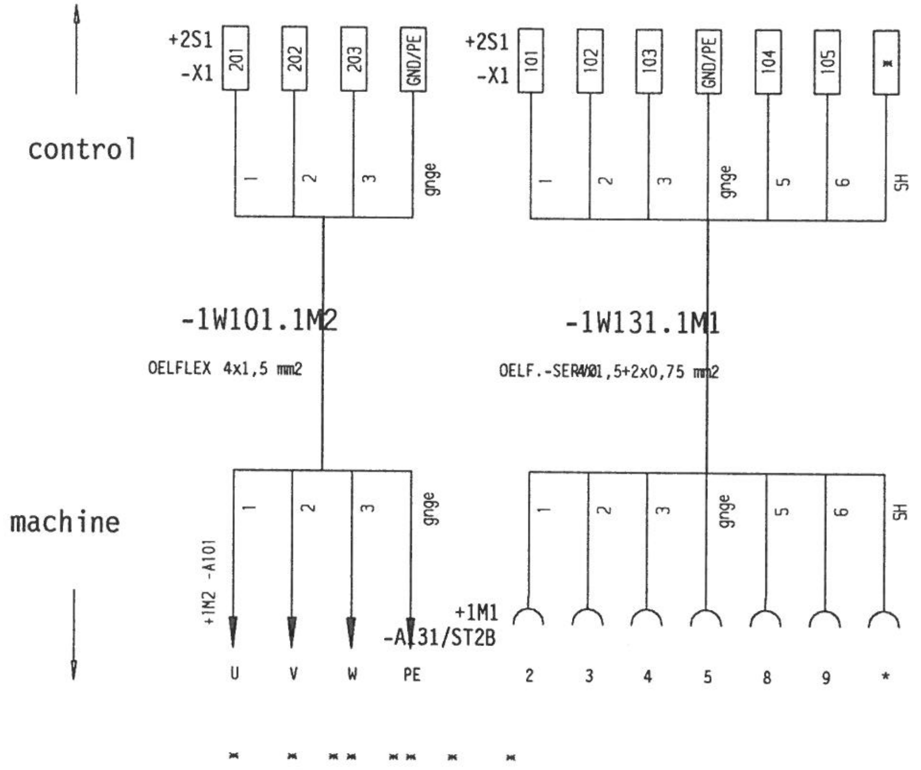
place-terminal/plug	number :	Local mark of sheet	*
2S1-8X.3	0K2104-000300	information-class	VKB
		project :	1
		DRNC/NA/RB/FM	1 sh.



date	18.04.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	place-terminal/plug
proc.	ORTLIEB		Kabel -W98.2S1 - -W98.2S1 cable	2S1-A9.8
insp.				
norm				

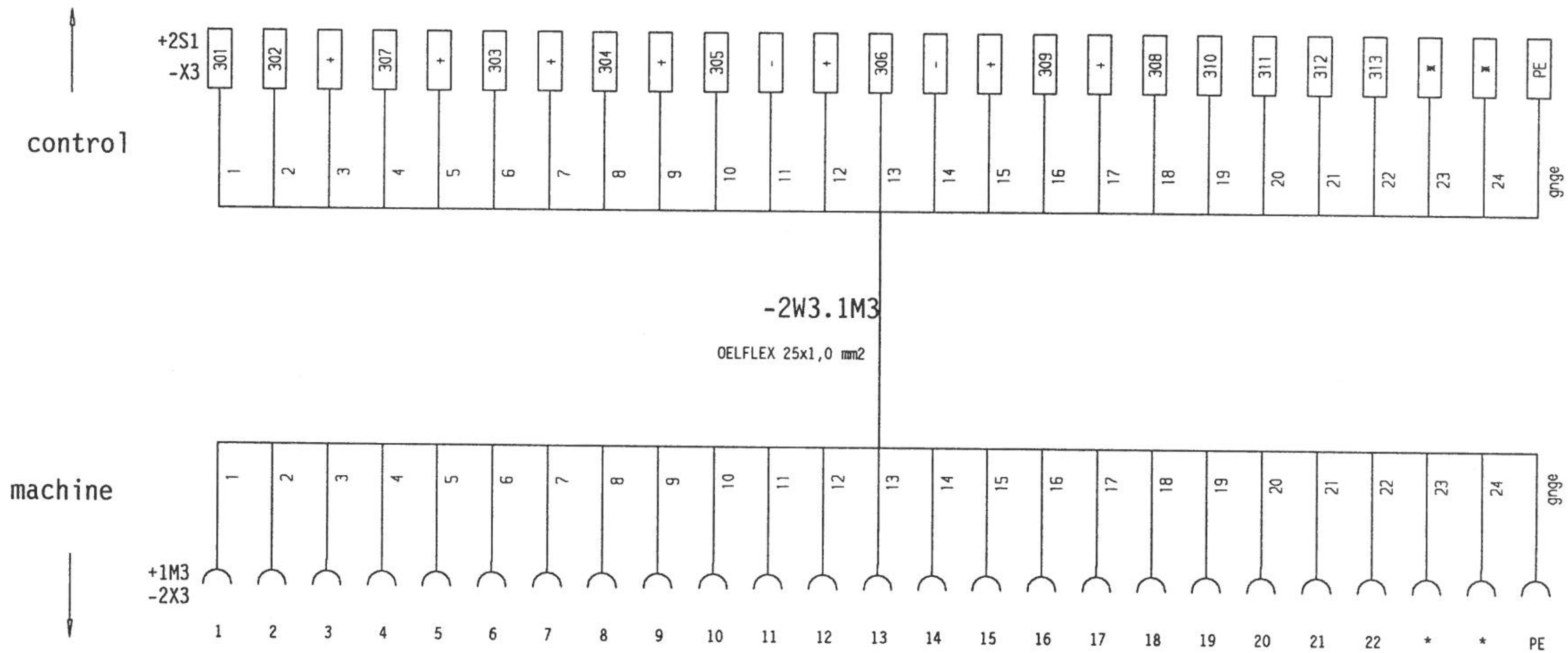
modification | date

number :	local mark of sheet	x
0K2104-000300	information-class	VKB
	project :	1
	DRNC/NA/RB/FM	1 sh.



date	25.02.91	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	place-terminal/plug	number :
proc.	ORTLIEB		Kabel / cable -1W101.1M2 - -1W131.1M1	2S1-X1	0K2104-000300
insp.					
modification date norm					

Local mark of sheet	*
information-class	VKB
project :	1
DRNC/NA/RB/FM	1 sh.

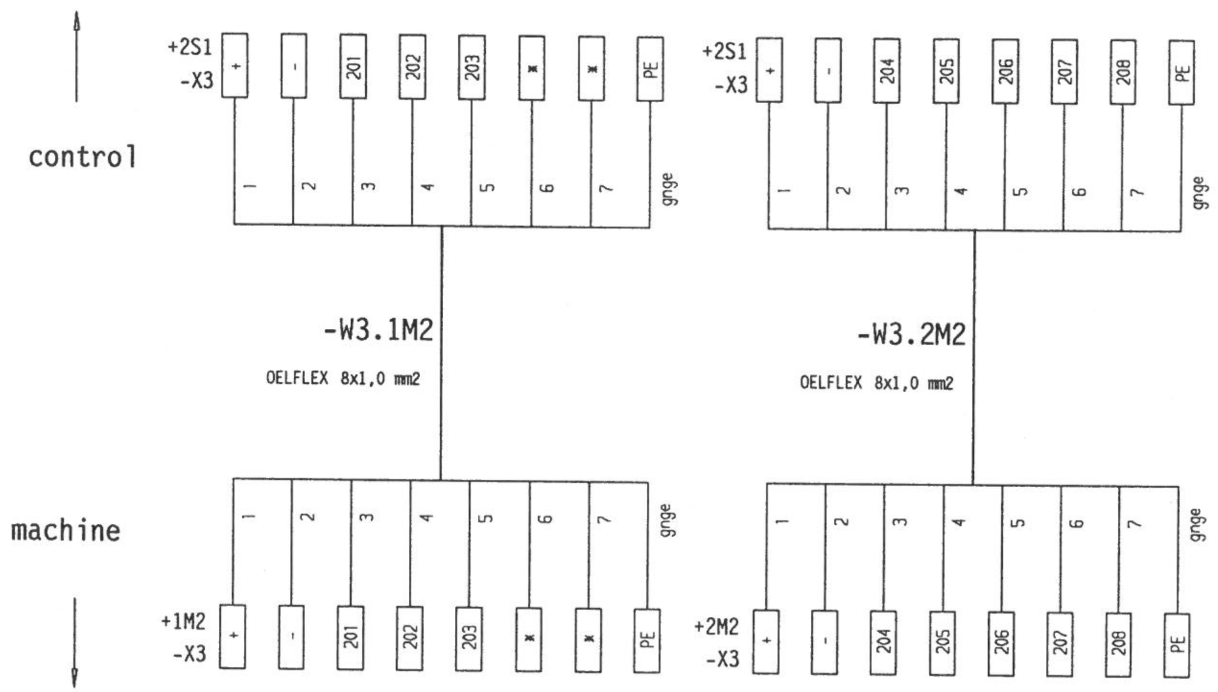


date	20.07.90	
proc.	ORTLIEB	
insp.		
modification date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Kabel -W3.1M2 - -W3.2M2
cable

place-terminal/plug	number :	local mark of sheet	*
2S1-X3	0K2104-000300	information-class	VKB
		project :	1
		DRNC/NA/RB/FM	2 sh.

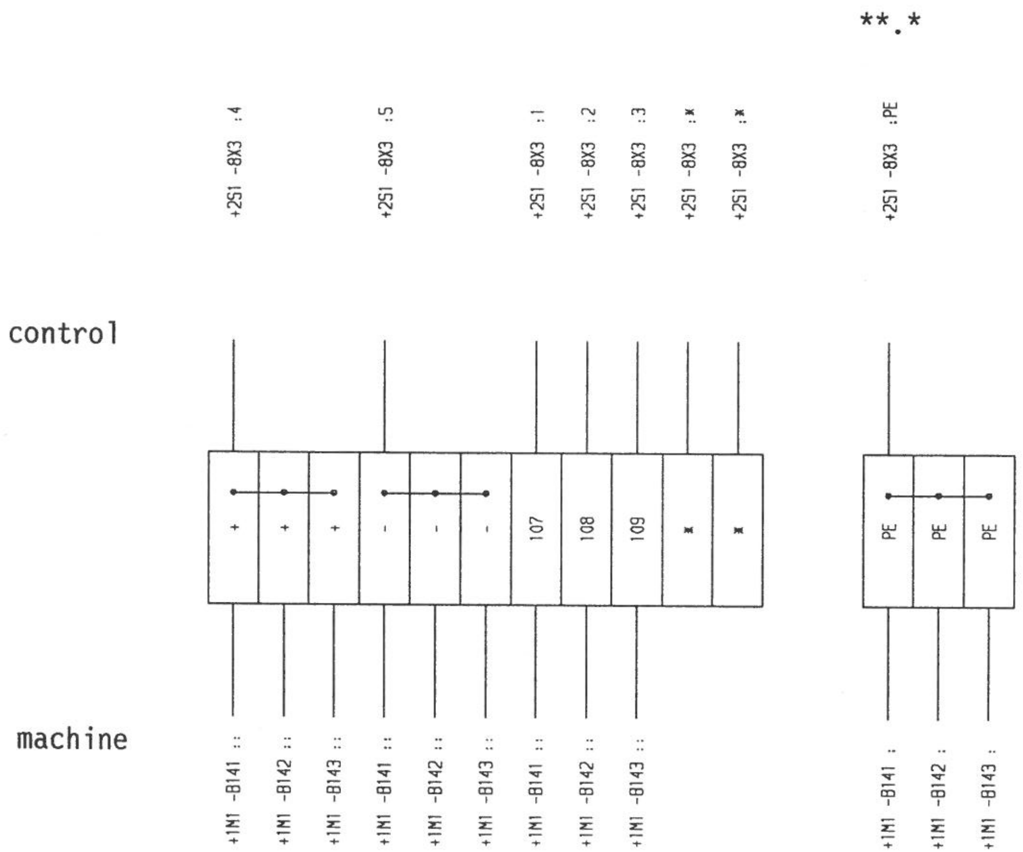


date	20.07.90	
proc.	ORTLIEB	
insp.		
modification date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Kabel -W3.1M2 - -W3.2M2
cable

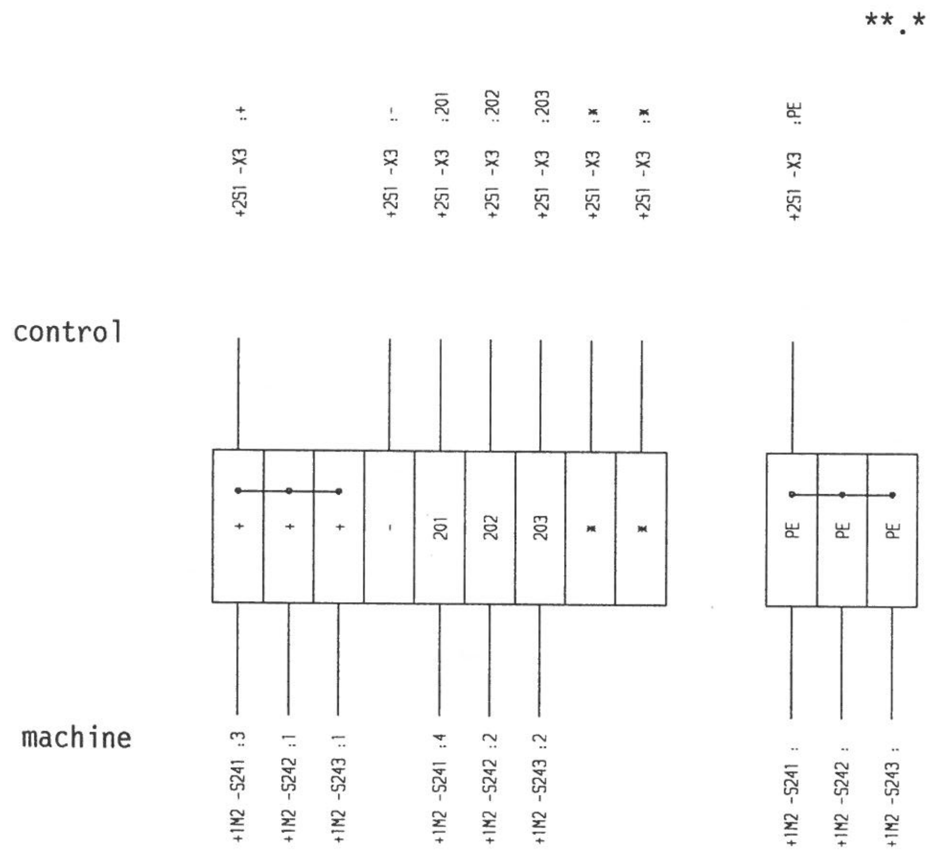
place-terminal/plug	number :	local mark of sheet	*
2S1-X3	0K2104-000300	information-class	YKB
		project :	2
		DRNC/NA/RB/FM	2 sh.



date	24.07.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	place-terminal/plug	number :
proc.	ORTLIEB		Klemmleiste +1M1 -X3 connecting bloc	+1M1.-X3	0K2104-000300
insp.					
norm					

modification date

local mark of sheet	+1M1
information-class	VKL
project :	1
DRNC/NA/RB/FM	1 sh.



date	20.07.90
proc.	ORTLIEB
insp.	
norm	

modification | date

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

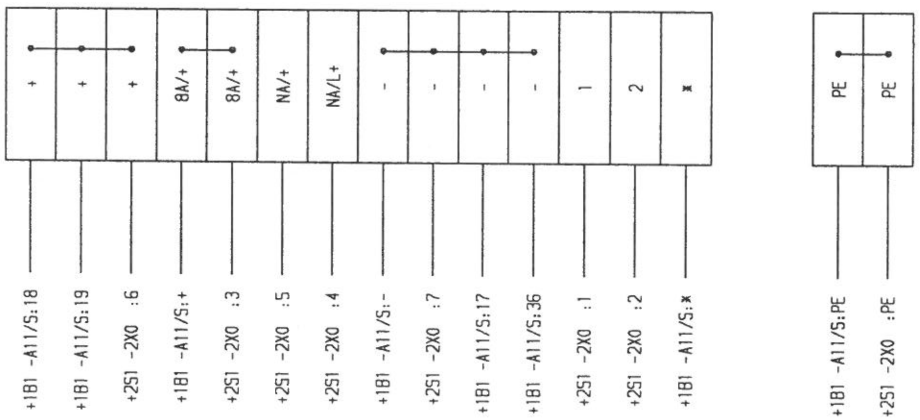
designation:
Klemmleiste +1M2 -X3
connecting bloc

place-terminal/plug	number :	local mark of sheet	+1M2
+1M2.-X3	0K2104-000300	information-class	VKL
		project :	1
		DRNC/NA/RB/FM	1 sh.

**.*

control

machine



modification	date	date	20.07.90
		proc.	ORTLIEB
		insp.	
		norm	

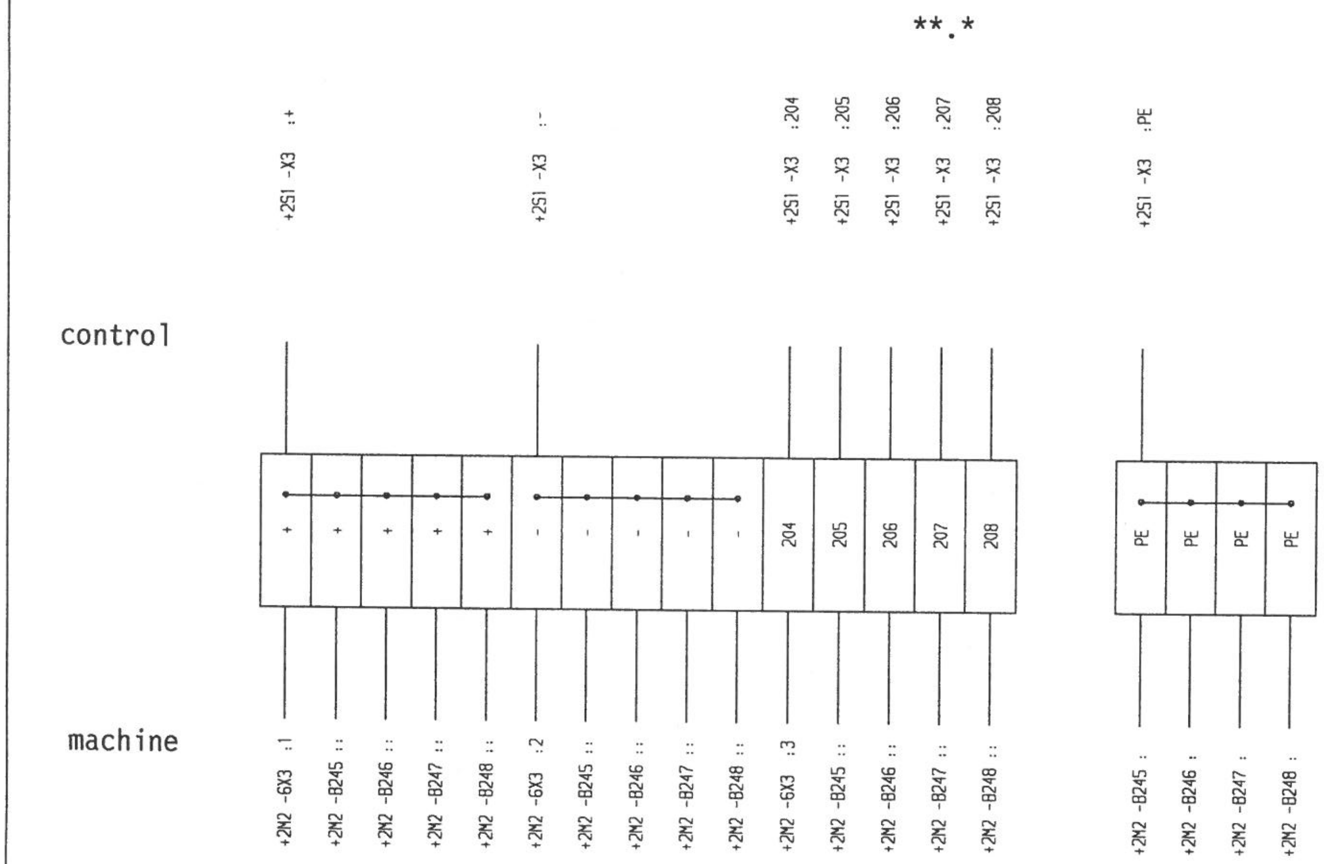
KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation: Klemmleiste +1S1 -X3 connecting bloc

place-terminal/plug: +1S1.-X3

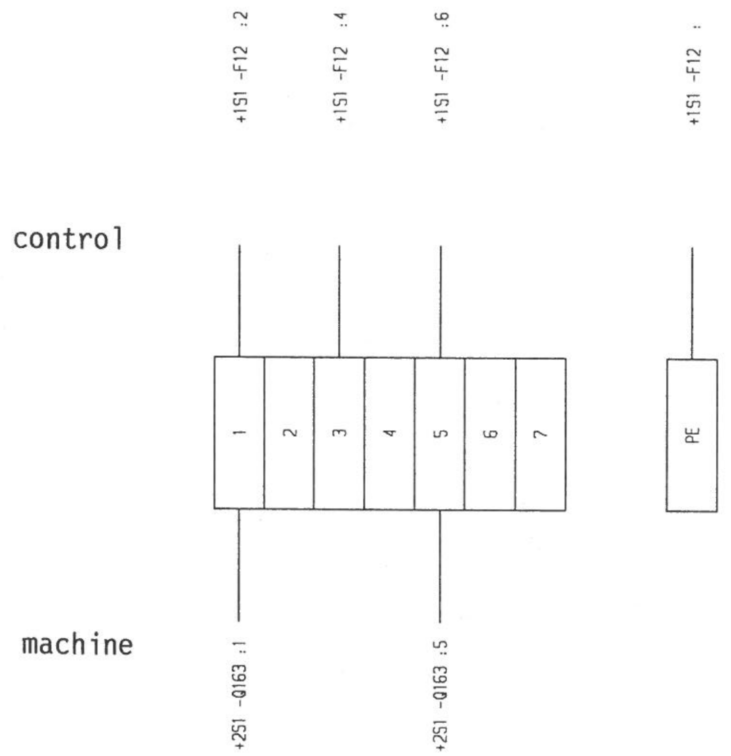
number: 0K2104-000300

local mark of sheet: +1S1
information-class: VKL
project: DRNC/NA/RB/FM
1
1 sh.



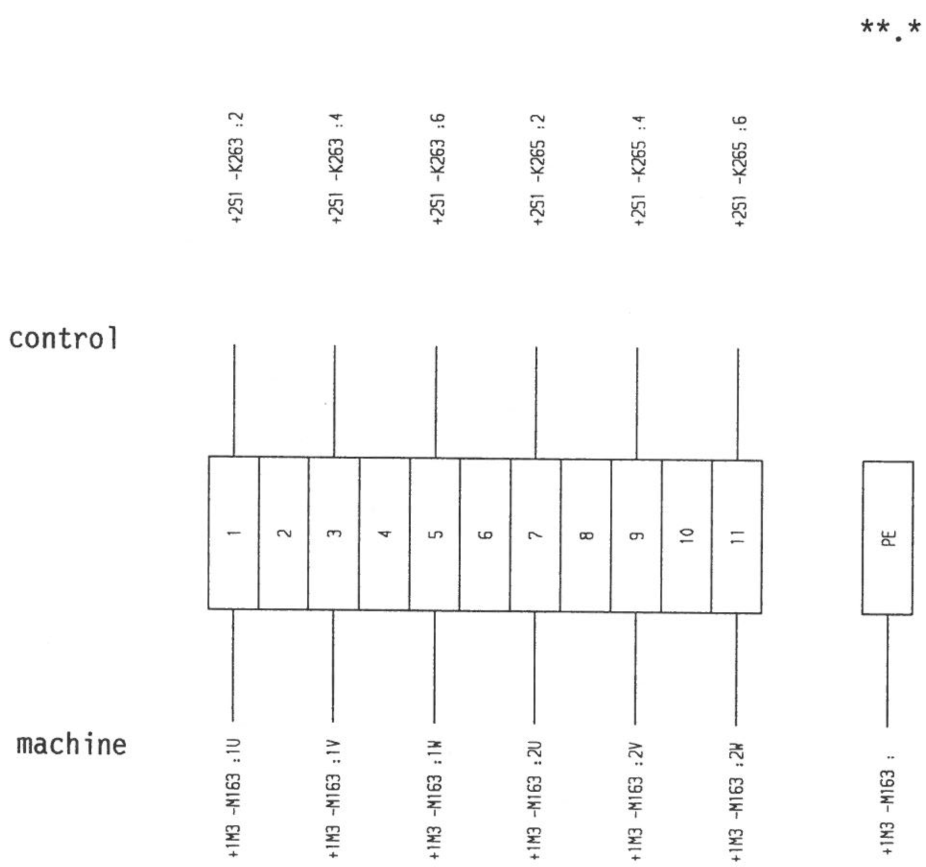
date	20.07.90	**KALTENBACH** HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	place-terminal/plug	number :	local mark of sheet: +2M2
proc.	ORTLIEB		Klemmleiste +2M2 -X3 connecting bloc	+2M2.-X3	0K2104-000300	information-class: VKL
insp.						project : 1
modification / date / norm						DRNC/NA/RB/FM 1 sh.

**.*



date	20.07.90	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Klemmleiste +2S1 -1X0 connecting bloc	place-terminal/plug +2S1.-1X0	number : 0K2104-000300
proc.	ORTLIEB				local mark of sheet +2S1
insp.					information-class VKL
norm					project : DRNC/NA/RB/FM 1 sheet.

modification date

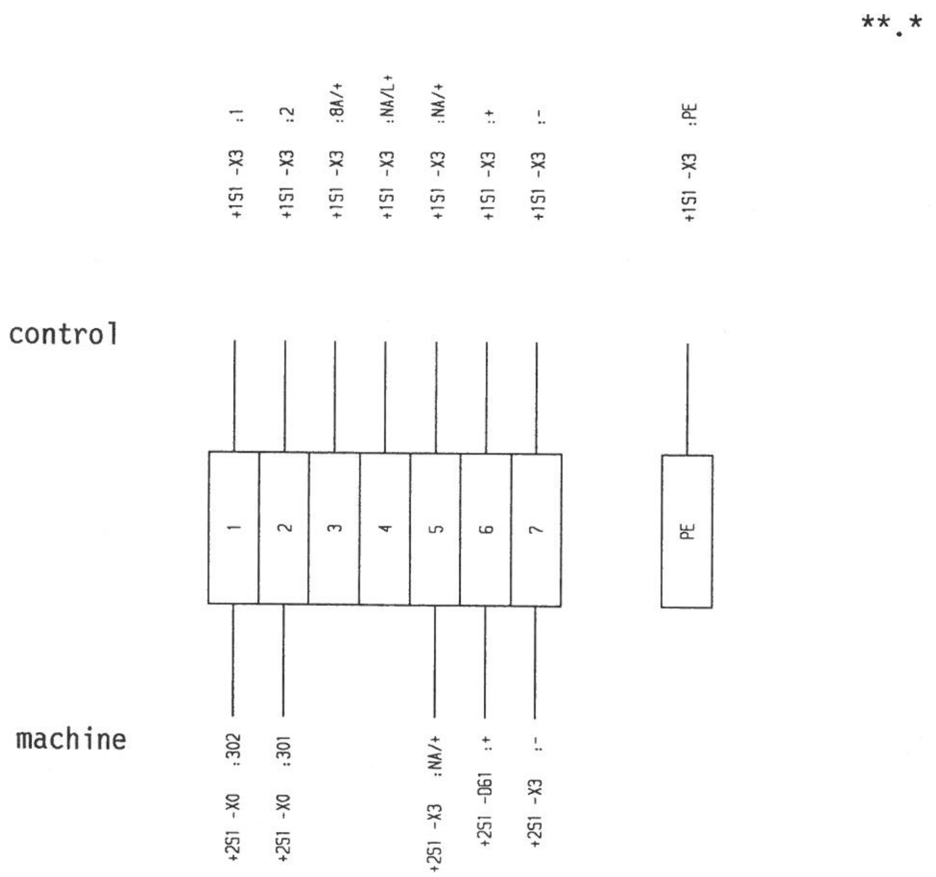


		date	20.07.90
		proc.	ORTLIEB
		insp.	
modification	date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Klemmleiste +2S1 -1X1
connecting bloc

place-terminal/plug	number :	local mark of sheet	+2S1
+2S1.-1X1	0K2104-000300	information-class	VKL
		project :	1
		DRNC/NA/RB/FM	1 sh.



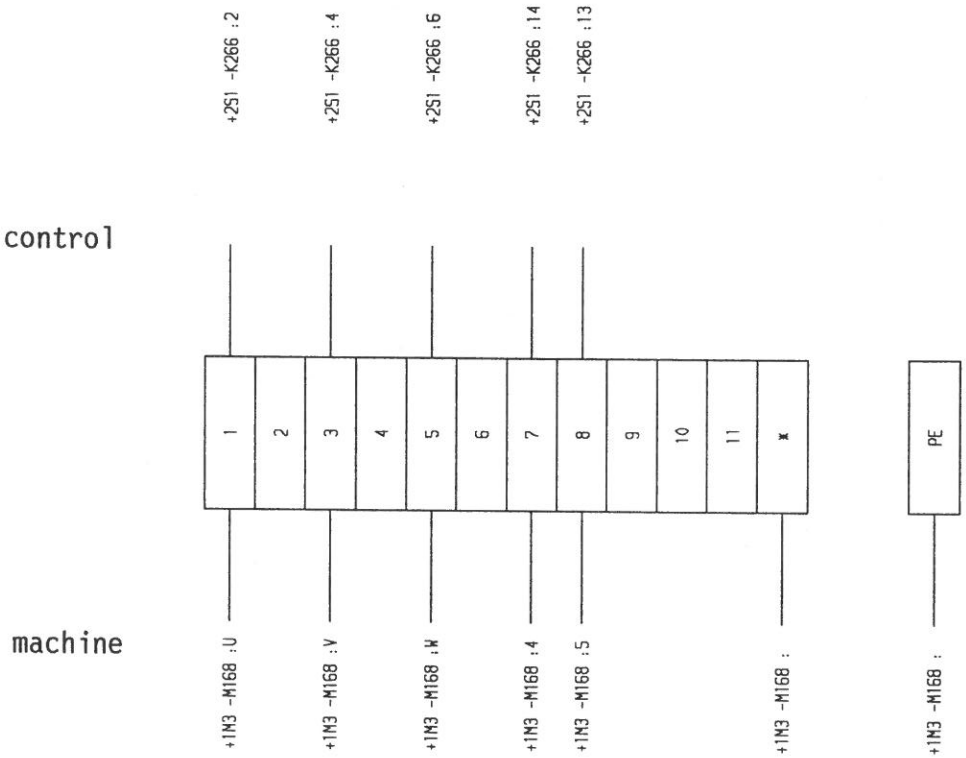
date	20.07.90		
proc.	ORTLIEB		
insp.			
modification	date	norm	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Klemmleiste +2S1 -2X0
connecting bloc

place-terminal/plug	number :	Local mark of sheet	+2S1
+2S1.-2X0	0K2104-000300	information-class	VKL
		project :	1
		DRNC/NA/RB/FM	1 sh.

**.*



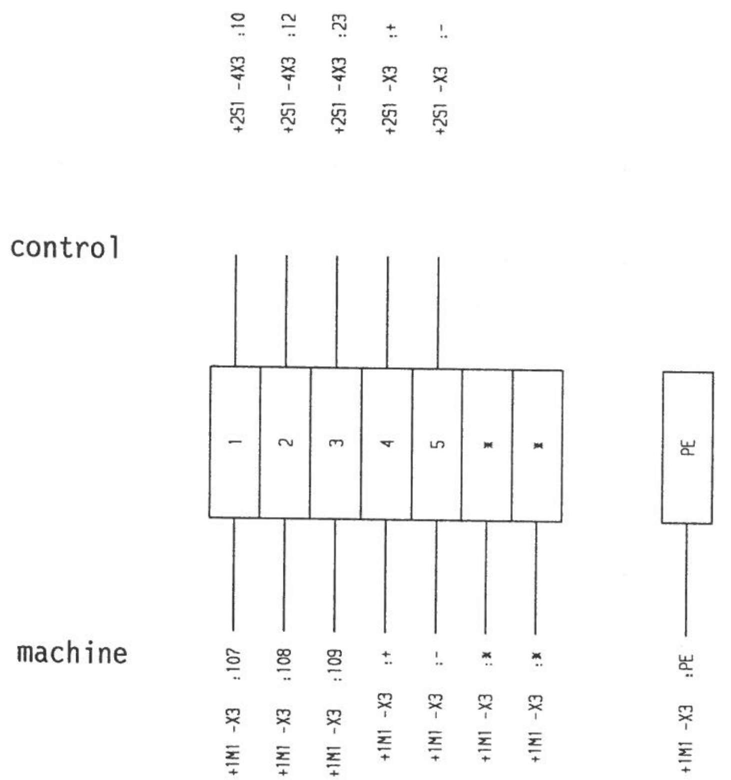
			date	03.07.91	
			proc.	ORTLIEB	
		25.02.91	insp.		
	modification	date	norm	*	

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

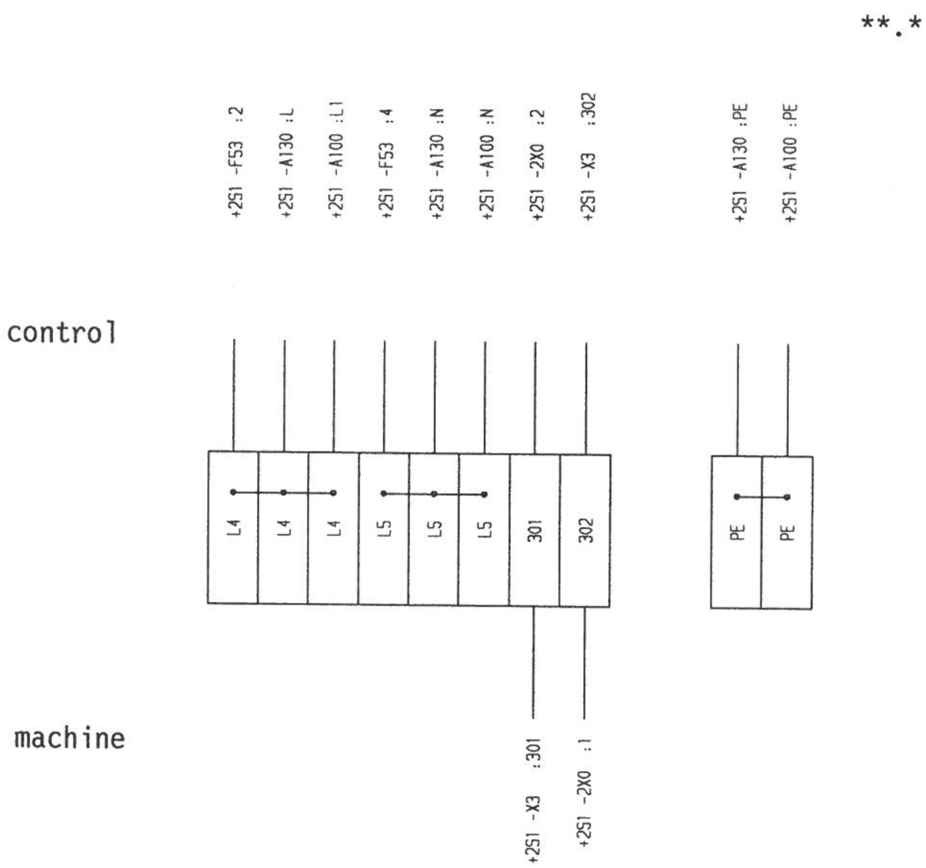
designation:
Klemmleiste +2S1 -2X1
connecting bloc

place-terminal/plug	number :	local mark of sheet	+2S1
		information-class	VKL
+2S1.-2X1	0K2104-000300	project :	1
		DRNC/NA/RB/FM	1 sh.

**.*



modification	date	date: 24.07.90 proc.: ORTLIEB insp.: norm:	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Klemmleiste +2S1 -8X3 connecting bloc	place-terminal/plug: +2S1.-8X3	number: 0K2104-000300	Local mark of sheet: +2S1 information-class: VKL	project: DRNC/NA/RB/FM 1 / 1 sh.

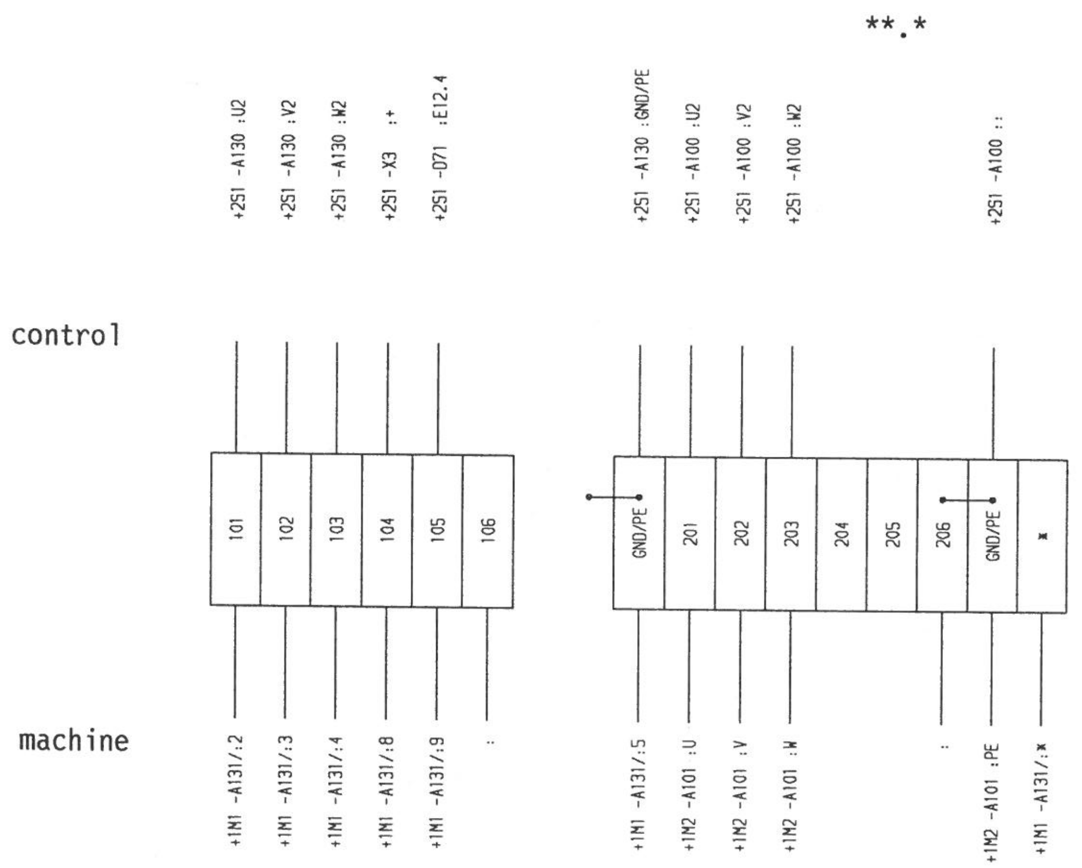


		date	20.07.90
		proc.	ORTLIEB
		insp.	
modification	date	norm	

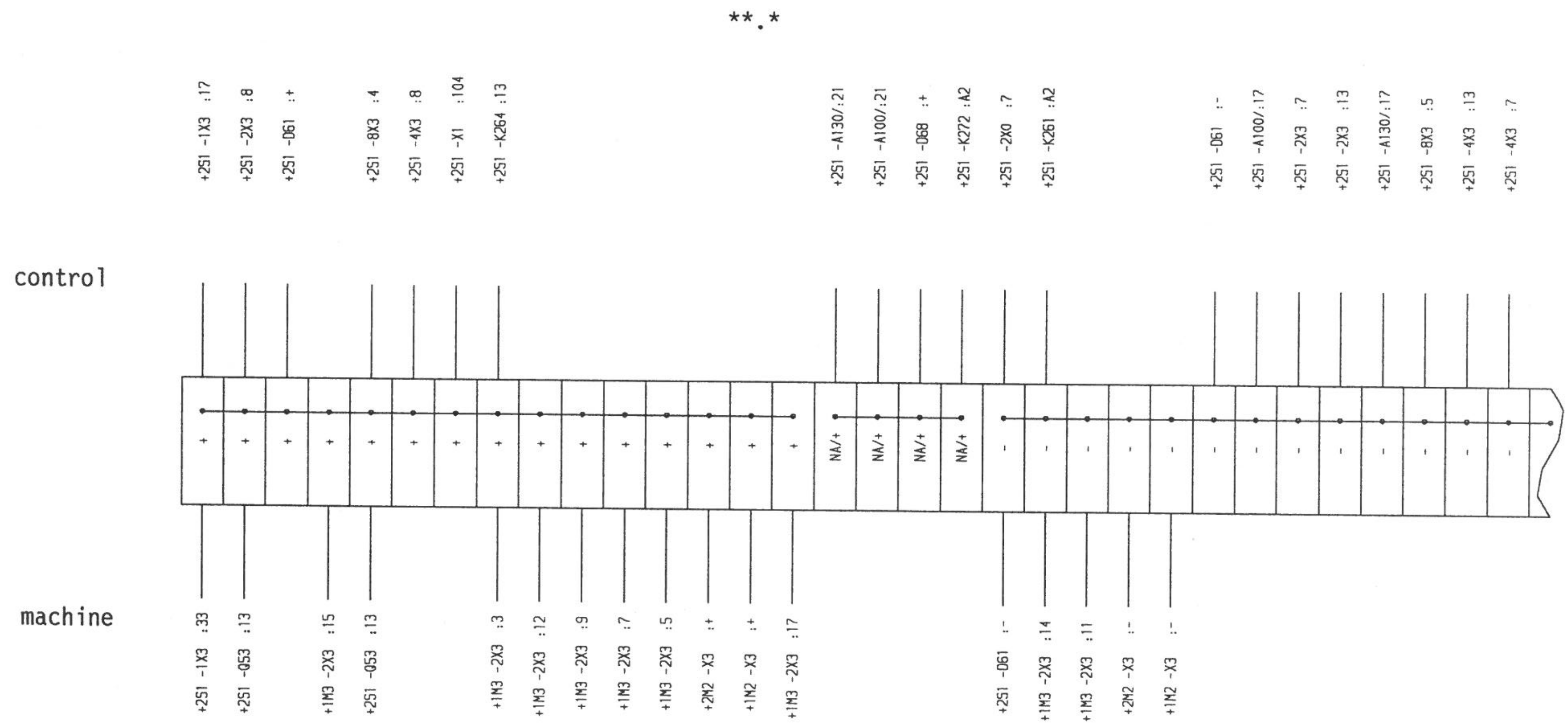
KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Klemmleiste +2S1 -X0
connecting bloc

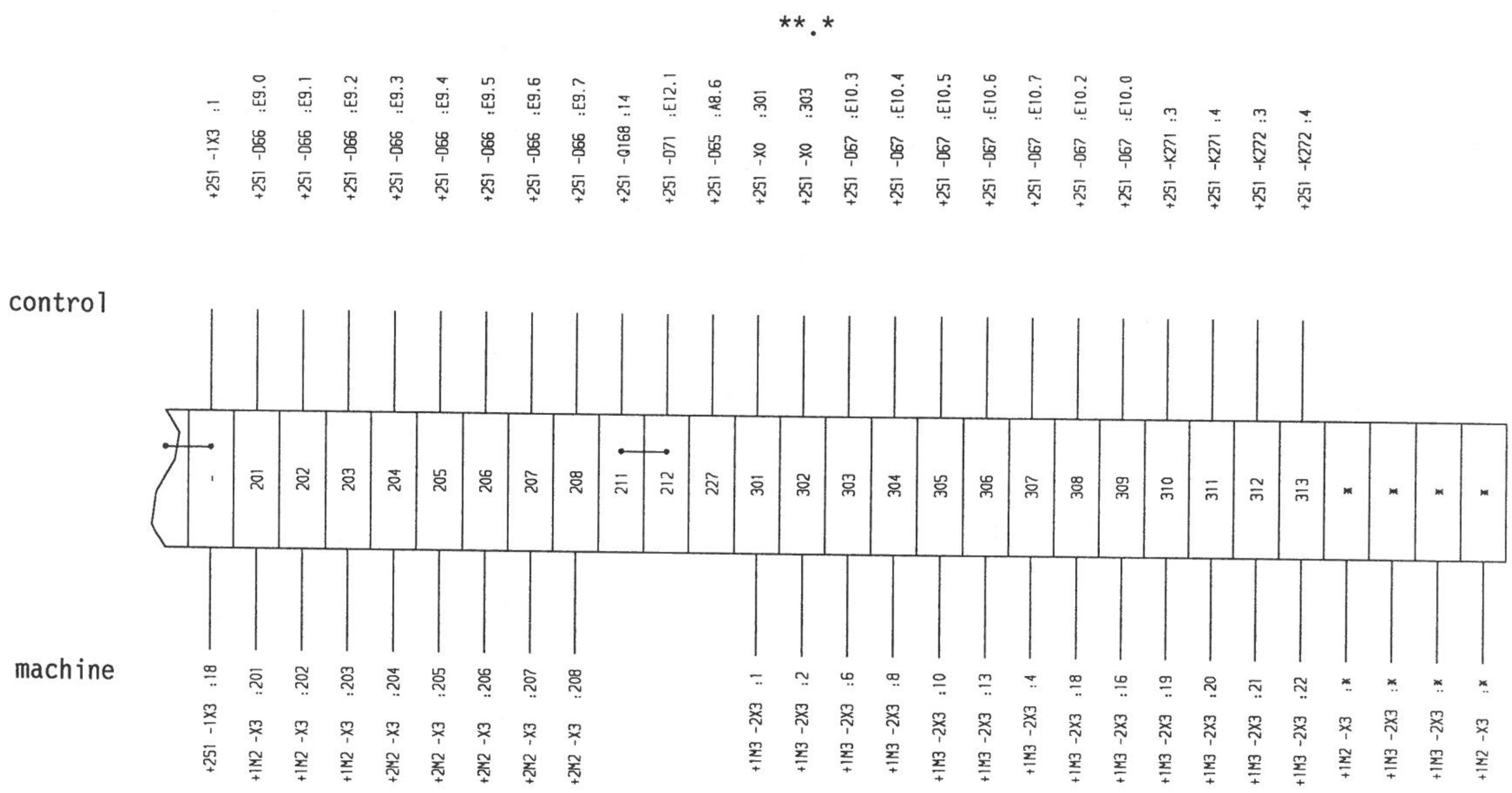
place-terminal/plug	number :	local mark of sheet	+2S1
+2S1.-X0	0K2104-000300	information-class	VKL
		project :	1
		DRNC/NA/RB/FM	1 sh.



modification date	date 25.02.91 / proc. ORTLIEB / insp. / norm	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation: Klemmleiste +2S1 -X1 connecting bloc	place-terminal/plug +2S1.-X1	number : 0K2104-000300	local mark of sheet +2S1 / information-class VKL / project : DRNC/NA/RB/FM / 1 / 1 sh.



date	25.02.91	KALTENBACH HANS KALTENBACH MASCHINENFABRIK GMBH+CO D-7850 LOERRACH	designation:	place-terminal/plug	number :	local mark of sheet: +2S1
proc.	ORTLIEB		Klemmleiste +2S1 -X3 connecting bloc	+2S1.-X3	0K2104-000300	information-class: VKL
insp.						project : DRNC/NA/RB/FM
modification / date / norm						1 / 3 sh.



date	25.02.91
proc.	ORTLIEB
insp.	
norm	

modification | date

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

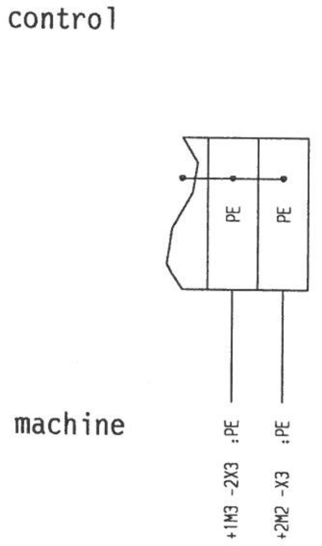
designation:
Klemmleiste +2S1 -X3
connecting bloc

place-terminal/plug: +2S1.-X3

number: 0K2104-000300

local mark of sheet: +2S1
information-class: VKL
project: DRNC/NA/RB/FM
2
3 sh.

**.*



date 25.02.91
proc. HOLLERBACH
insp.
norm
modification date

KALTENBACH
HANS KALTENBACH
MASCHINENFABRIK GMBH+CO
D-7850 LOERRACH

designation:
Klemmleiste +2S1 -X3
connecting bloc

place-terminal/plug: +2S1.-X3

number: 0K2104-000300

local mark of sheet: +2S1
information-class: VKL
project: DRNC/NA/RB/FM
3
3 sh.

DE6580-02 01 01

```
    enter  program
program-no:
#  bars:   width:   mm
clear cut-off counter: <DEL>
```

Programmation MULTICOM

speed rate : slow/fast
feed rate : mm/min
pitch blade : mm

KALTENBACH

```
pr: #bars:   set:4 INP
1L:        RqQ:    AcQ:   0
2W:        AdF:    BaC:
           JpP:    JpC:
```

```
pr: #bars:   set:1 INP
1L:        RqQ:    AcQ:   0
2W:        AdF:    BaC:
           JpP:    JpC:
```

```
pr: #bars:   set:5 INP
1L:        RqQ:    AcQ:   0
2W:        AdF:    BaC:
           JpP:    JpC:
```

```
pr: #bars:   set:2 INP
1L:        RqQ:    StI:   0
2W:        AdF:    BaC:
           JpP:    JpC:
```

```
pr: #bars:   set:6 INP
1L:        RqQ:    StI:   0
2W:        AdF:    BaC:
           JpP:    JpC:
```

```
pr: #bars:   set:3 INP
1L:        RqQ:    AcQ:   0
2W:        AdF:    BaC:
           JpP:    JpC:
```

HANS KALTENBACH MASCHINENFABRIK GMBH + CO. KG · POSTFACH 1740 · 79537 LÖRRACH
HAUSANSCHRIFT: BLASIRING 4–6 · 79539 LÖRRACH
TELEFON 07621/1750 · TELEFAX 07621/175–900 · TELETEX 762150

KALTENBACH

RECORD OF ACCEPTANCE

Customer: _____

_____

_____

_____

Machine/system/model : _____ No.: _____

Installation plan No.: _____

Location : _____

The machine/system was delivered, installed and put in operation according to the order confirmation in perfect condition. Delivery includes all necessary technical documents. The performance parameters agreed upon were checked and meet specifications. Machine operators were instructed according to the instruction manual. The machine/system was handed over. The warranty period according to our delivery conditions starts with this day. The machine/system is accepted herewith.

Customer : Kaltenbach :

_____ _____

City, date (signature) (signature)

Remarks:

.....

.....

.....

.....

.....

.....

.....

Enclosures: .....

DE0080-01 01 02
19.4.1993