Operating instruction

HBP 100

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1. Product description

The banknote puncher HBP 100 was developed as a punching machine to destroy bank notes.

The machine presents itself as a compact unit. The HBP 100 affords a big flexibility through his approved form multiplicity, as well as through his easy usage. The whole system was adjusted on a clean and quiet work environment.

2. Security measures

2.1 General user limit

The machine is designed for bank notes only, every other punched material could damage the machine.

In no case should the user try to throw anything else into the drawer of the filling opening, which is for bank notes only.

For every contact with the machine the motor has to be switched off. For every contact with the electrically parts, the voltage has to be switched off.

The maintenance and the fault repair of the machine have to be effected under strict observations of the manufacturer, according to the instructions, which are described in the section "maintenance", and it has to be operated by staffs, which are working with this operating instruction.

2.2 Before first use

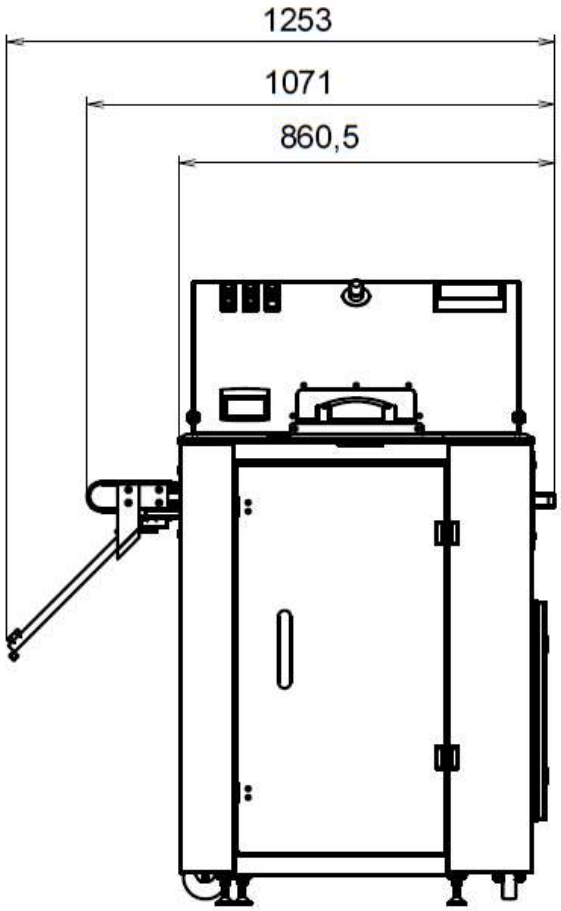
The machine has to be assembled on an even mat and needs to be connected to a electrical power network with 3x400 V /50-60 Hz.

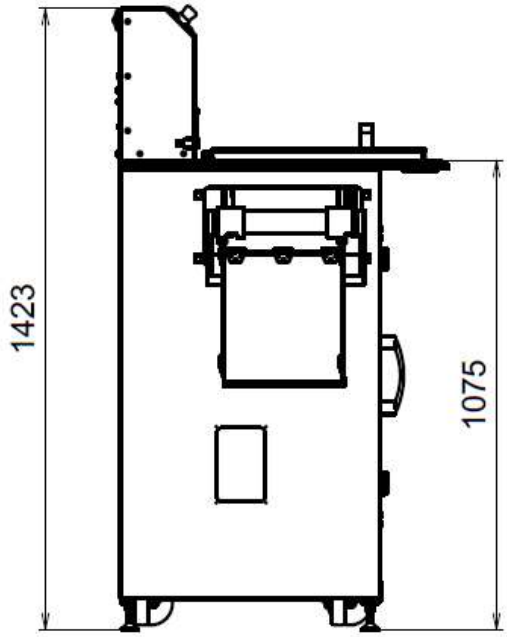
The dispose of the packing material, where the machine is installed, has to be happening under respect according to the local specifications for environment protection.

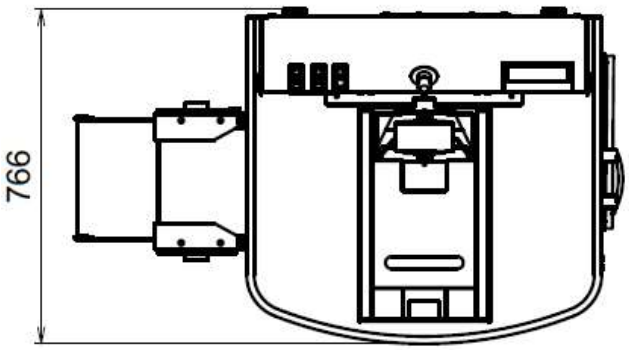
Attention! It is very important to check direction of rotation of motor of hydraulic system before first use. There is arrow on the motor. This arrow shows correct direction of rotation. Before first use start motor for very short time (press "MOTOR ON" and immediately "MOTOR OFF") and check direction of rotation by eyes(check rotation of fan blade of motor). It is better to remove back cover of punching machine to see fun blade. If fun blade rotate in opposite direction stop the machine immediately, disconnect from electric network and change phasing on main supply cable plug. Check rotation again.

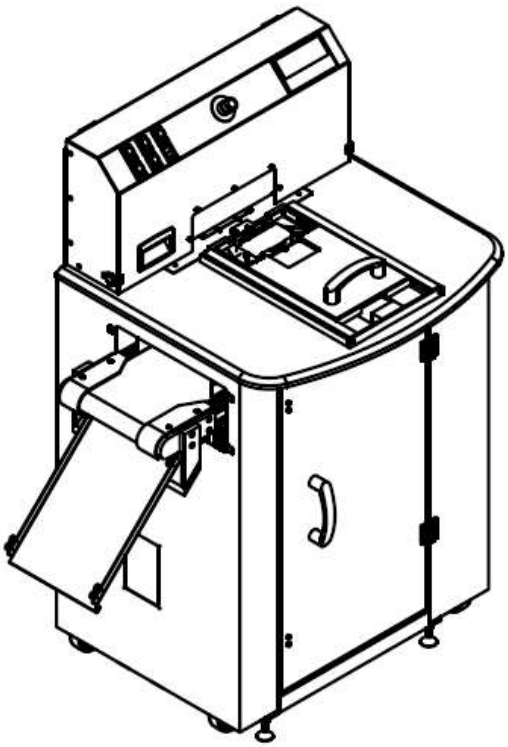
Running motor of hydraulic system for longer time in wrong direction can damage hydraulic unit!!!

2.3 Layout

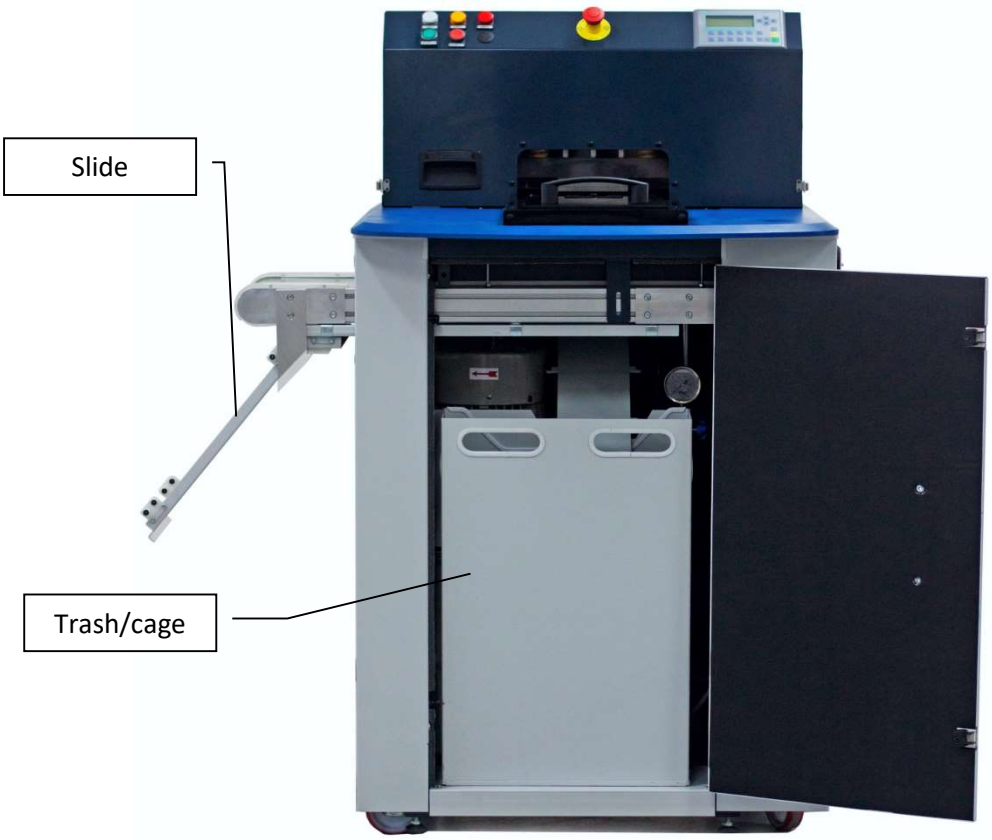








2.4 Machine description



3. Technical data

3.1 Required space

Width	766	[mm]
Total height	1423	[mm]
Working space height	1075	[mm]
Length without shelf	1071	[mm]
Weight	385	[kg]

3.2 Punching unit

Punching distance	30	[mm]
Maximum punching force	130	[kN]
Punching preload force	10	[kN]

3.3 Insertion unit

Minimum bank note size	130 x 65	[mm]
Maximum bank note size	200 x 100	[mm]
Maximum bank note bundle size	15	[mm]

3.4 Hydraulic unit

Operating pressure	175	[bar]
Electrical performance	4	[kW]
Wastage	11	[l/min]

3.5 Electrical connection

Connected load	3 x 400V 25A
Frequency	50 – 60 Hz

4. Conformity declaration

CONFORMITY DECLARATION « CE »

We — Hunkeler Systems AG, Wikon

confirm, that the — Bank note puncher Type
HBP 100
Supply 400V - 25A - 50 / 60 Hz
Weight 385kg
Year of construction 2017

Machine-No.: 26'115

suits with the corresponding regulation of the EG-directives
(Machinery directives EN 292-2 / EN 60204-1).

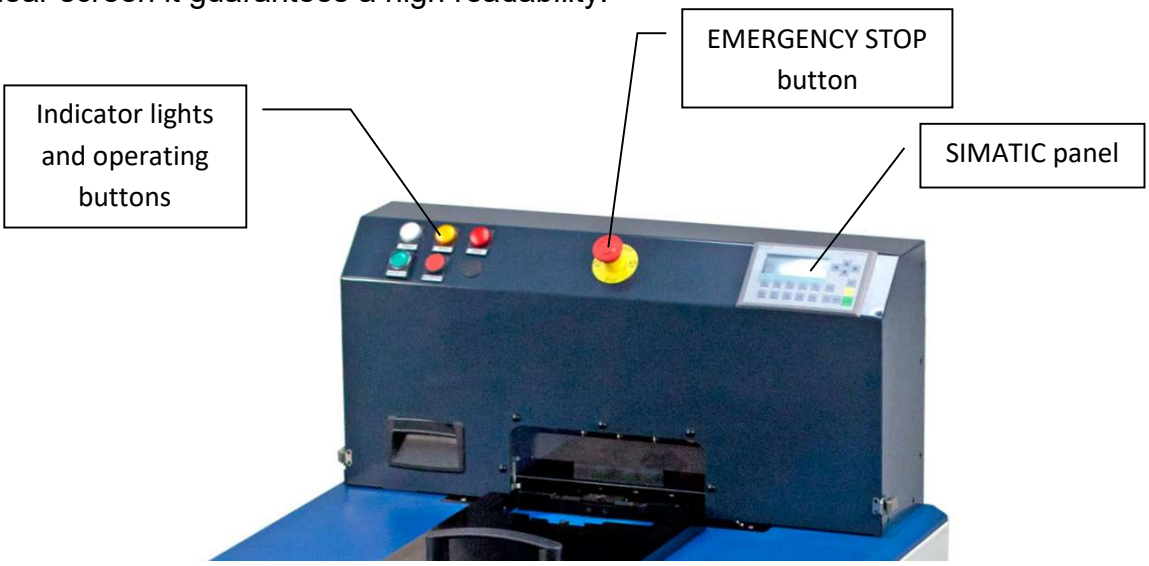
Geschäftsführer / director general / diretor geral / business manager

HUNKELER Systeme AG

5. Control panel

5.1 Control panel description

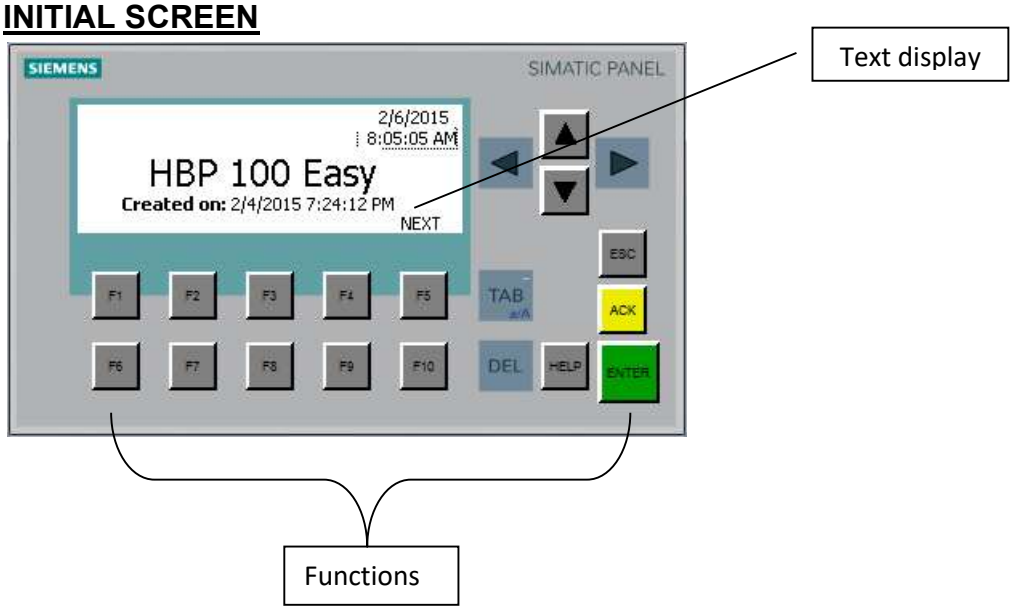
The main control and operating of the punching machine can be handled by the buttons, indicator lights and SIMATIC panel of the control panel. The display is arranged in an optimal position to support an easy accessibility and due to its clear screen it guarantees a high readability.



The current operating mode will be signalized by indicator lights.

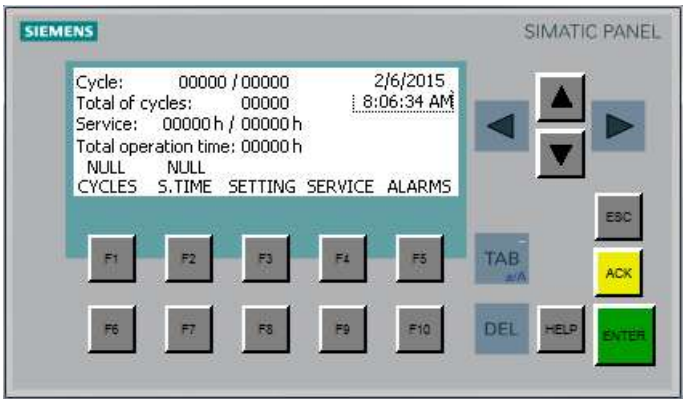
5.2 SIMATIC panel description

INITIAL SCREEN



- to continue by pressing F5 [NEXT]

MAIN SCREEN



Cycle: [quantity of cycles] / [quantity of cycles to fill the cage]

- The first number shows quantity of cycles, since last null position (with button F1). The second number shows quantity of cycles to fill the cage. This value can be changed in SETTINGS SCREEN - Fill cage cycle. If the first number quantity of cycles exceed this value warning message "Depleting the cage" will be generated.

Total of cycles: - Total quantity of machine cycles

Service: [function hours] / [service hours]

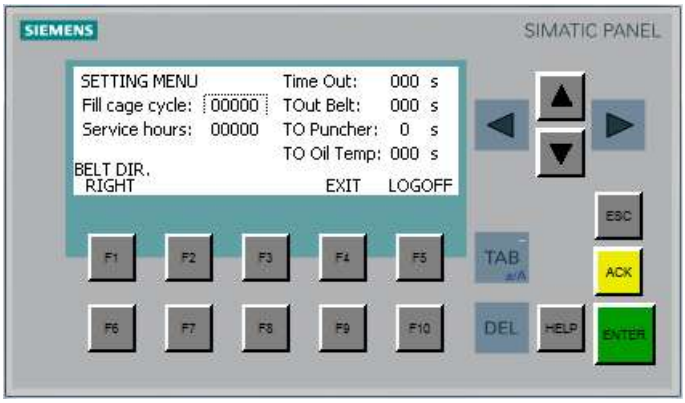
- The first number shows the function hours of the machine, since last null position (with button F2). The second number shows the function hours, which are between two cycles of the service maintenance. This value can be changed in SETTINGS SCREEN - Service hours. If the first number function hours exceed this value warning message "Operating hours attained" will be generated.

Total operation time: - Total machine operation time (total working hours of hydraulic system, when motor of hydraulic system is stopped this timer doesn't increase)

Buttons of MAIN SCREEN:

F1 - NULL CYCLES . . . null quantity of cycles
F2 - NULL S. TIME . . . null function hours
F3 - SETTINGS . . . to SETTINGS SCREEN (password login necessary)
F4 - SERVICE . . . to SERVICE SCREEN (for advanced users, password login necessary)
F5 - ALARMS . . . to ALARM SCREEN

SETTINGS SCREEN



Access to SETTINGS SCREEN only through password. Password is 2288.

Fill cage cycle: - Number of cycles to fill the cage.

Service hours: - Number of function hours between two cycles of service maintenance.

Time Out: - Time out to switch off hydraulic system if machine is not used.

TOut Belt: - Time out to switch off belt feeding if machine is not used.

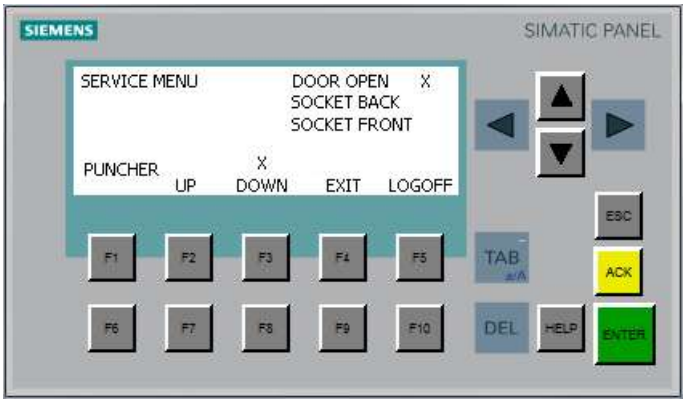
TO Puncher: - Time out to automatically stop punching cycle if system fail to reach TOP or BOTTOM position of punching mechanism during punching cycle.

TO Oil Temp: - Time to switch off hydraulic system when oil temperature is high.

Buttons of SETTINGS SCREEN:

F1 - BELT DIR. RIGHT/LEFT . . . belt direction option
F4 - EXIT . . . back to MAIN SCREEN (password will be log off automatically after next 5 min.)
F5 - LOGOFF . . . back to MAIN SCREEN with log off

SERVICE SCREEN



Access to SERVICE SCREEN only through password. Password is 2975. Usage of SERVICE MENU is only for advanced users or service technicians.

DOOR OPEN	- Signalization of top cover door sensor.
SOCKET BACK	- Signalization of back sensor of socket for feeding bank notes.
SOCKET FRONT	- Signalization of front sensor of socket for feeding bank notes.
UP	- Signalization of top sensor of punching mechanism position.
DOWN	- Signalization of bottom sensor of punching mechanism position.

Buttons of SERVICE SCREEN:

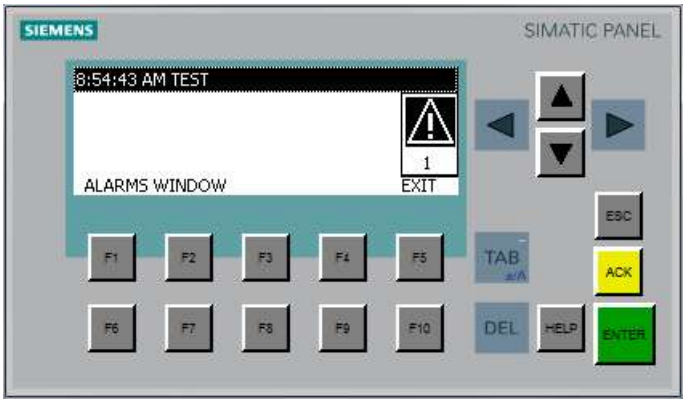
F2 - UP . . . when keep pressing F2 punching mechanism moving up
F3 - DOWN . . . when keep pressing F3 punching mechanism moving down

Attention!: When keep pressing UP or DOWN button punching mechanism still moving till it reaches mechanical end of movement even TOP END sensor or BOTTOM END sensor were already reached.

Movement is possible only when motor of hydraulic system was ON before entering to SERVICE SCREEN. There are not generated ALARMS for not reached TOP END sensor, BOTTOM END sensor and for TOP COVER DOOR sensor in SERVICE SCREEN.

F4 - EXIT . . . back to MAIN SCREEN (password will be log off automatically after next 5 min.)
F5 - LOGOFF . . . back to MAIN SCREEN with log off

ALARM SCREEN



Screen shows error/alarms and warning messages. If showed symbol exclamation mark inside of triangle on the right side of screen it means there is some error/alarm or warning message. There is showed also number bellow triangle symbol. This number means numbers of warning and error/alarm messages. To check massages by pressing F5 - ALARMS from MAIN SCREEN.

How to remove symbol "exclamation mark inside of triangle" from screen. It is necessary to go to ALARM SCREEN by pressing F5 - ALARMS from MAIN SCREEN then check all messages and by pressing yellow button "ACK" to accept all messages. It is necessary to press "ACK" several times to accept all messages. When problems for which previous messages were generated remains, messages will be generated again.

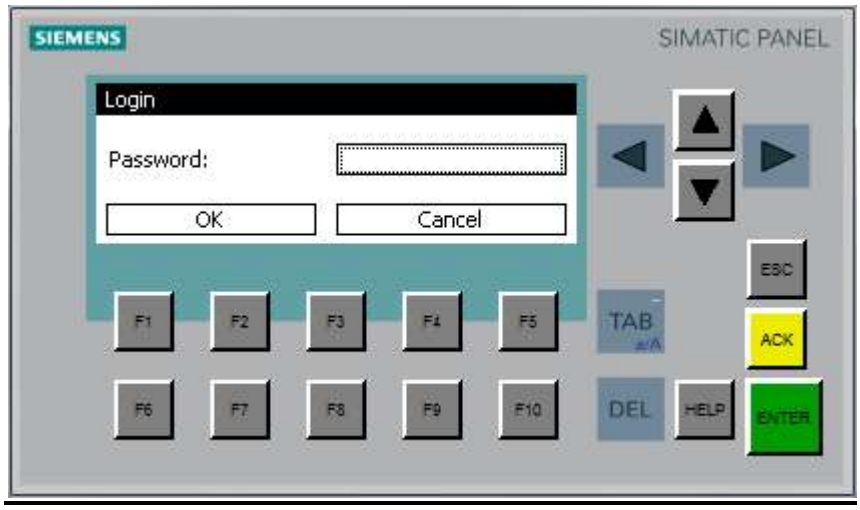
Errors/ Alarms:

- Motor Protection - motor current protection
- Total Stop - Emergency button pressed
- Door open - top cover door open
- Belt Fault - belt problem
- High Oil Temperature - temperature of hydraulic oil too high
- Can´t reach upper position - TOP sensor position not reached
- Can´t reach lower position - BOTTOM sensor position not reached

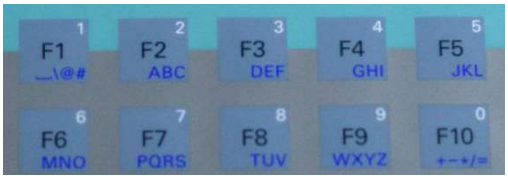
Warnings:

- Depleting the cage - cage necessary to deplete
- Operating hours attained - service maintenance necessary
- High Oil Temperature - temperature of hydraulic oil too high

PASSWORD SCREEN



There are two software buttons [OK, Cancel] and one text field for password on the screen. It is possible to move between these buttons and field by Arrow buttons on the right side of SIMATIC PANEL. By green ENTER button to enter to text field and by F1-F10 buttons to enter password. Each F button represent some letters and numbers as you can see on picture bellow. When password entered confirm by pressing green button ENTER and by arrows move to OK on the screen end again green ENTER button.



Letters and numbers for each F key.

5.3 Indicator lights and operating buttons

There are 2 operating light buttons and 3 indicator lights. According to operating state of the punching machine appropriate lamp will flash or blink. The green a red operating buttons are used to switch ON or turn off motor of hydraulic system.

"POWER" *white indicator*

- Emit blue light when machine is connected to electrical power network and main switch of the machine is ON.

"CYCLE" *yellow indicator*

- Emit continuous yellow light when punching cycle is running.
- Blink with interval 0,5s when socket is removed from its back punching position before finishing the cycle.
- Blink with interval 1s when warning message "Depleting the cage" is generated.

"ERROR" *red indicator*

- Emit red light when any error/alarm message is generated. It is necessary to check type of message on ALARM SCREEN of SIMATIC panel.

"MOTOR ON" *operating button* - by pressing motor of hydraulic system is ON. Motor is automatically stopped when machine is not used for time period given by adjusted value on SIMATIC panel - SETTING SCREEN - Time out.

- Emit green light when punching cycle is running.
- Blink when operating hours attained. Warning message generated.

"MOTOR OFF" *operating button* - by pressing to turn off motor of hydraulic system manually.

Attention!: When pressing "MOTOR ON" if position of punching mechanism is not on the utmost top position (top switch) mechanism will start to move up automatically. When top switch reached mechanism will stop.

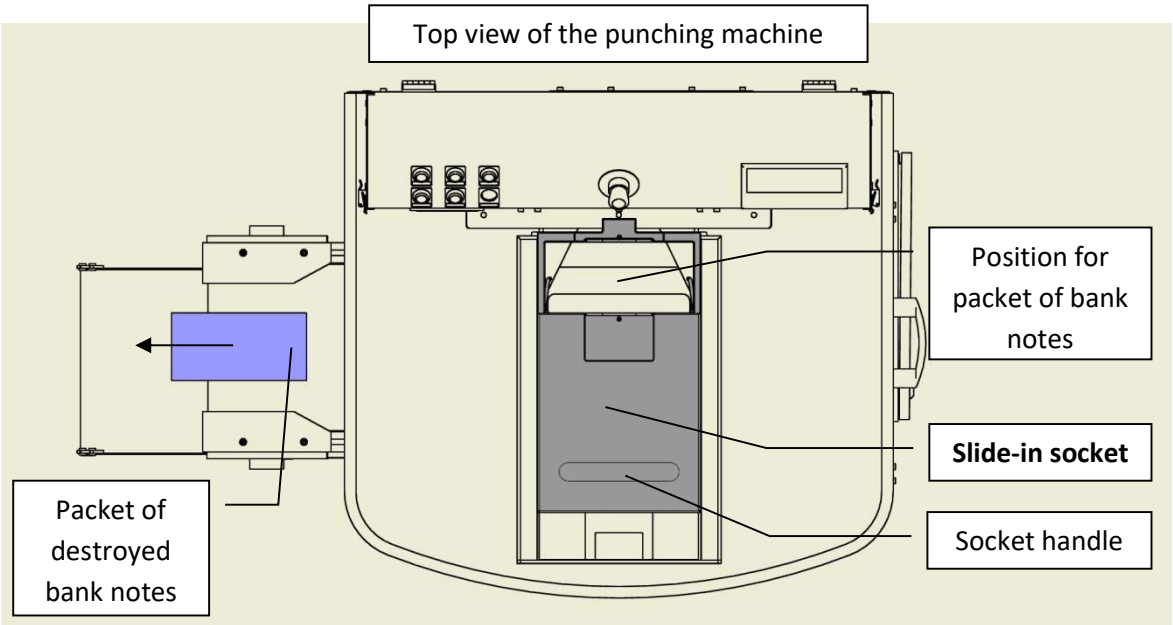
6. Operating punching machine

6.1 Switch on/off machine

Main switch of the punching machine is located on the right side of the machine. When machine is connected to electrical power network an main switch turned ON the "POWER" indicator emit light. It take some short time to start up SIMATIC panel. When INITIAL SCREEN appears press F5[NEXT] to reach MAIN SCREEN. If there is symbol "exclamation mark inside of triangle" please check ALARM SCREEN and solve or accept alarm/warning messages. If you see MAIN SCREEN without any error alarms machine is ready.

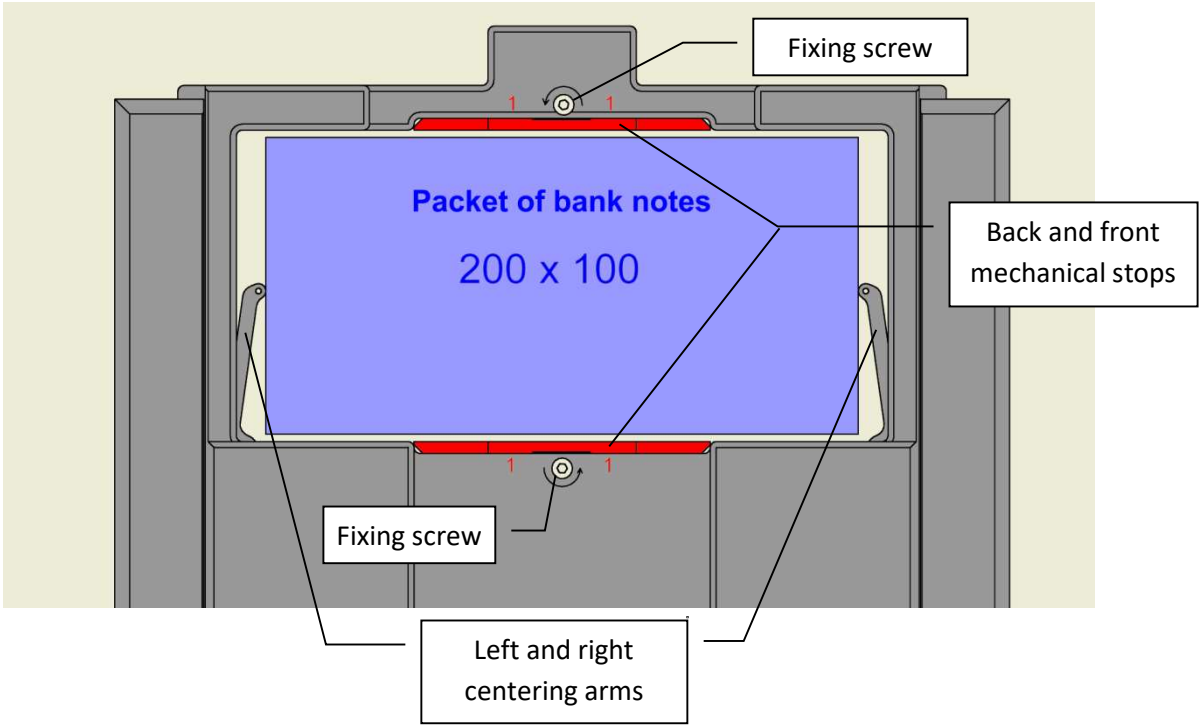
To switch off machine press "MOTOR OFF" to switch off motor of hydraulic system if still running and then switch off main switch.

6.2 Setting of slide-in socket for bank notes

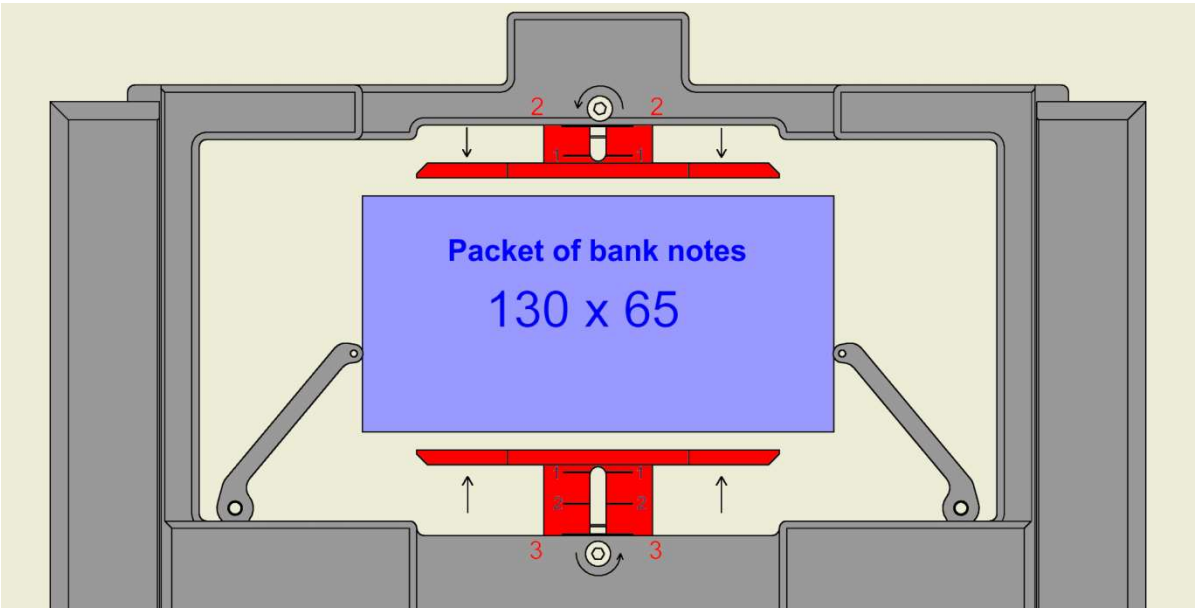


There is top view of the punching machine on the picture above. The slide-in socket is solid by gray color. Socket has 2 pressure arms on the left and right side. These arms automatically move packet of bank notes to the center of the socket when socket is moving by handle into the punching mechanism.

Packet is automatically centered in the direction between sides but it is necessary to adjust 2 mechanical stops (front and back stop) according to the size of bank notes packet. See pictures below.



Back and front mechanical stops should be adjusted according to size of used bank notes packets. There are 2 fixing screws. When screws are loosen it is possible to adjust position of stops. Adjust stops according to size of packets (keep small 1-2mm gap from each side) and tighten screws.



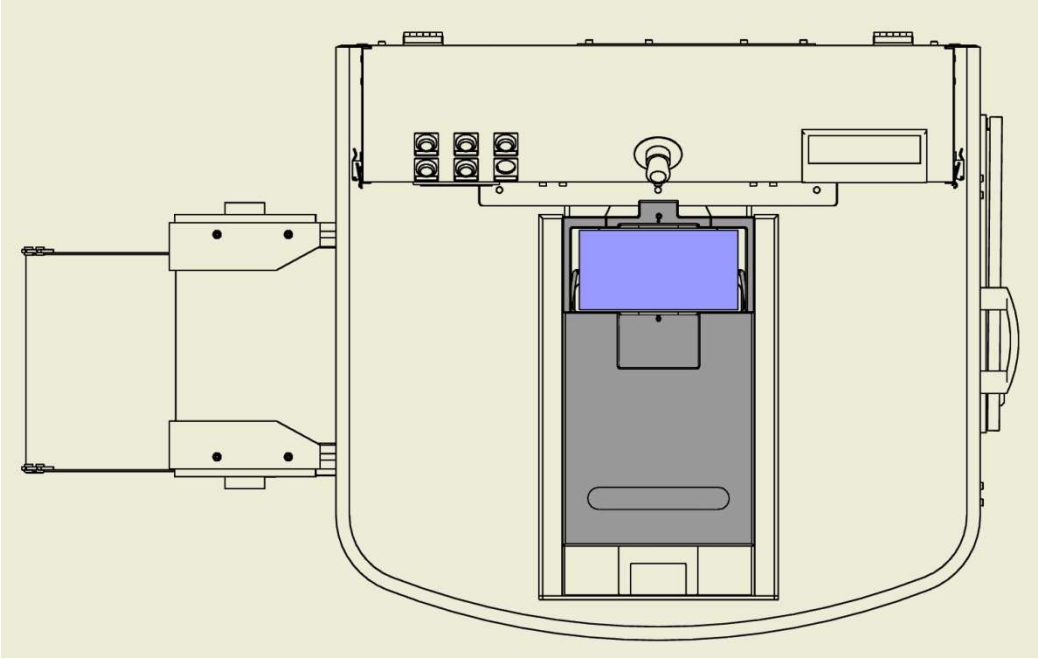
When used smallest packets of bank notes size 130 x 65 mm it should be adjusted top stop to number "2" and bottom stop to position number "3" as it is showed on picture above. **Attention!:** It can be dangerous to adjust top stop to position "3" - there can be collision possibility of plastic stop with punching mechanism.

6.3 Punching cycle

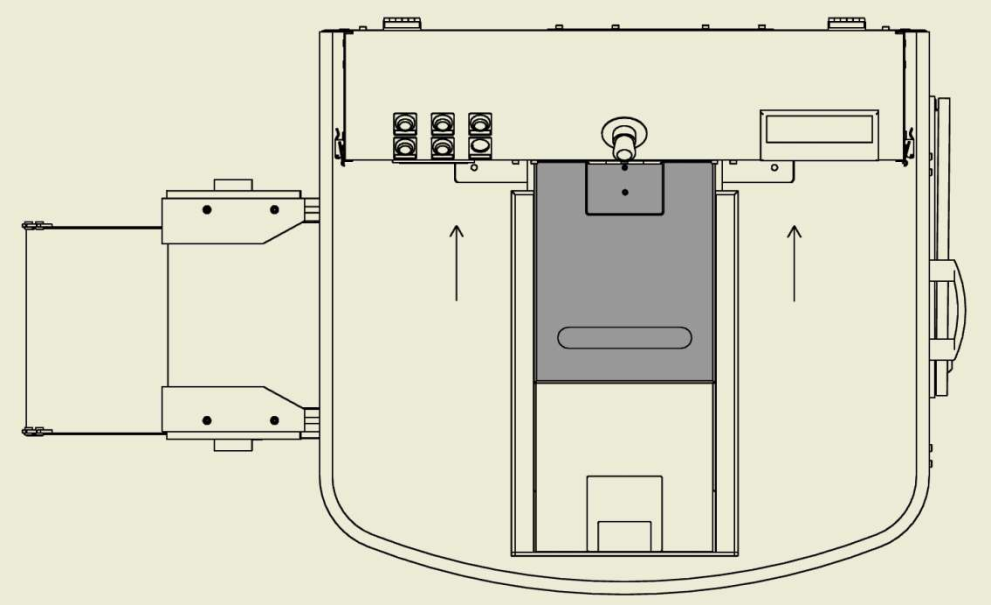
When slide-in socket is adjusted for used packets of bank notes it is possible to start destroying of bank notes.

If machine is ON ("POWER" indicator light) and motor of hydraulic system is ON ("MOTOR ON" green light button) then it is possible to start punching cycle.

Put packet of bank notes into correct position of socket and by socket handle plug-in socket into the punching mechanism to utmost front position and keep the socket in this position. Punching cycle starts automatically when socket hold in the position at least 0.3 sec. Punching mechanism will move down to punch packet and immediately move up to top position. When cycle finished pull out socket and move it by handle to utmost back position. Motor of belt will start running and punching cycle will be finished when utmost back position reached. Without reaching this position cycle is not finished and it is not possible to start next cycle.

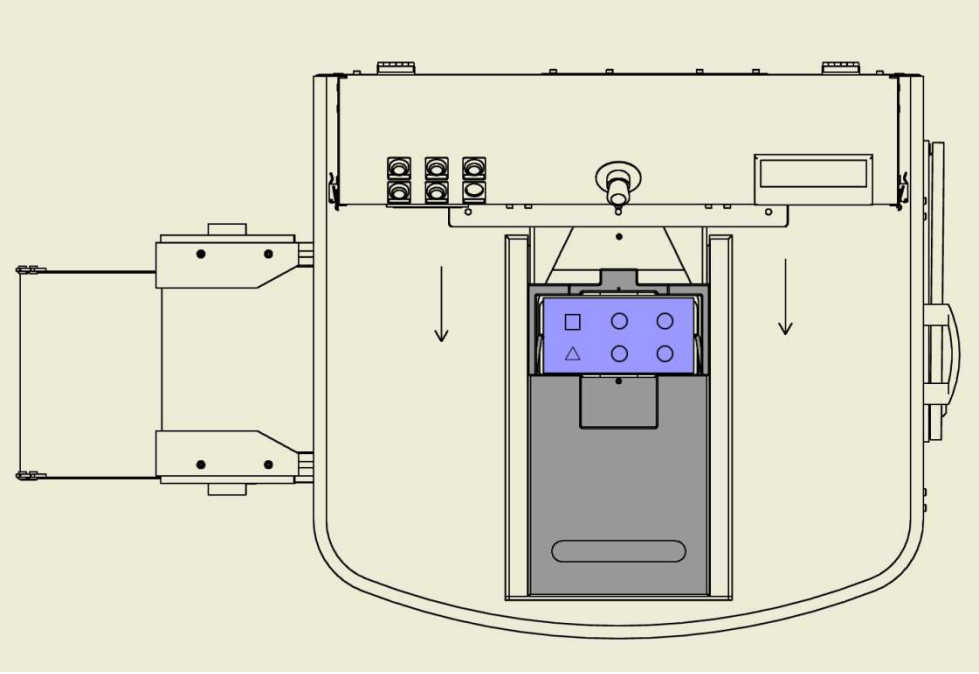


1. *Put packet of bank notes into socket*



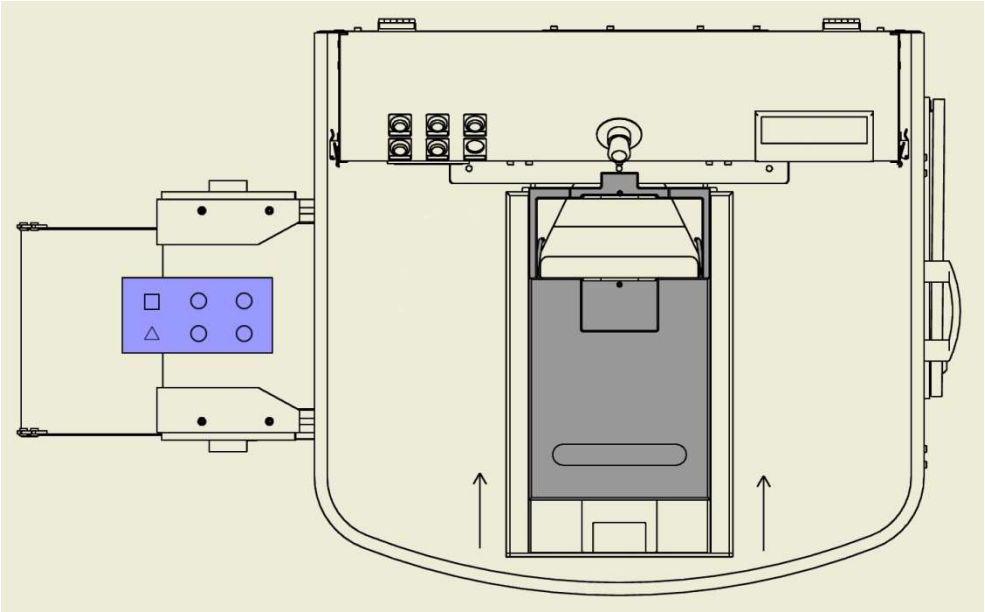
***2.** Plug-in socket into punching mechanism to utmost front position and keep it*

Punching cycle will start (Cycle takes about 3 sec.).



***3.** Pull out socket into utmost back position*

Packet of bank notes will fall down to belt, belt will start running and cycle will be finished. Without moving of socket to utmost back position cycle is not finished and next cycle could not be started even socket plug in again into punching mechanism with next packet of bank notes.

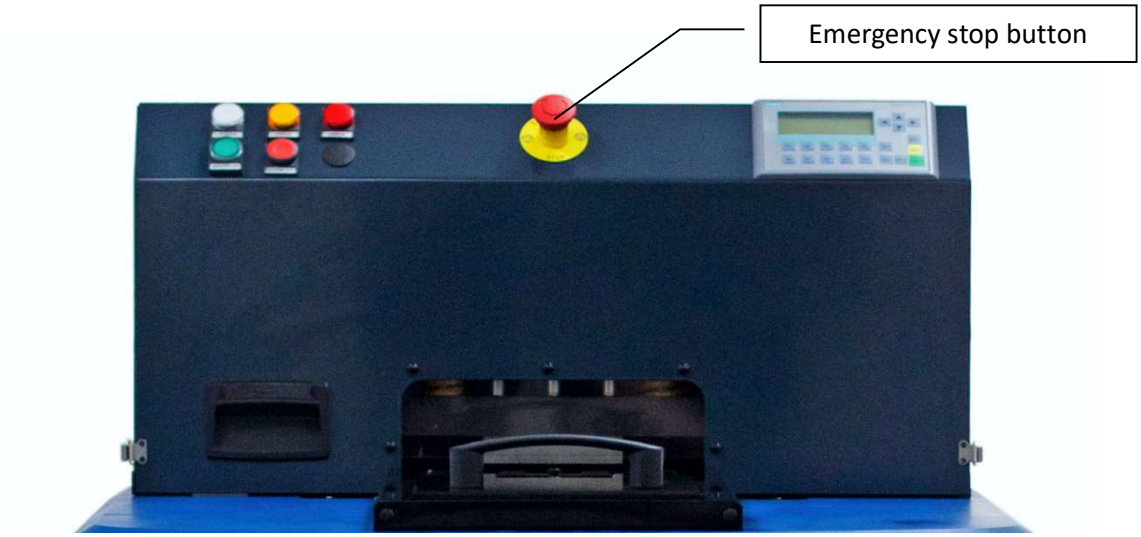


***4.** Move socket to original center position*

Socket is able to move from utmost back position to original center position by itself. There is system of the springs inside of socket which can move it automatically to its original center position.

6.4 Emergency stop

Emergency stop button should be used in any case of troubles (electrical shock, strange unusual noise etc.). It will cut off electrical feeding to machine. Punching mechanism will stay in current position or will be moved by pressing springs according to current position of the springs.



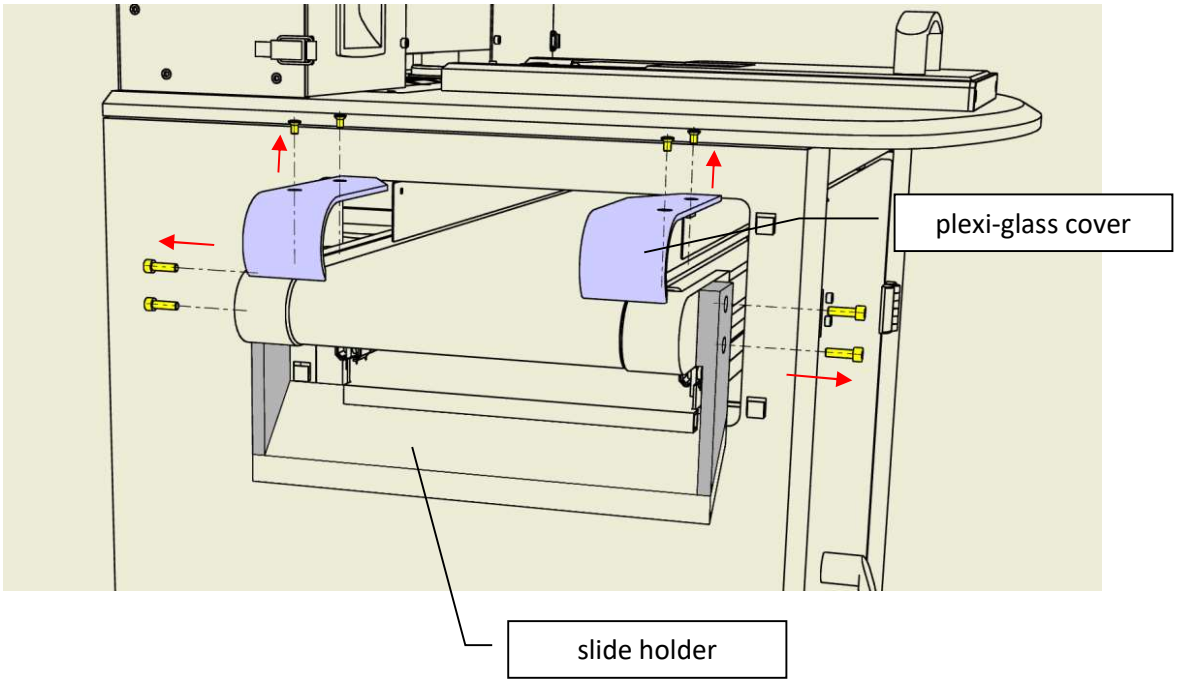
6.5 Belt orientation

Orientation of output belt is originally set to left side of the machine. There is possibility to rebuild machine output to right side of the punching machine.

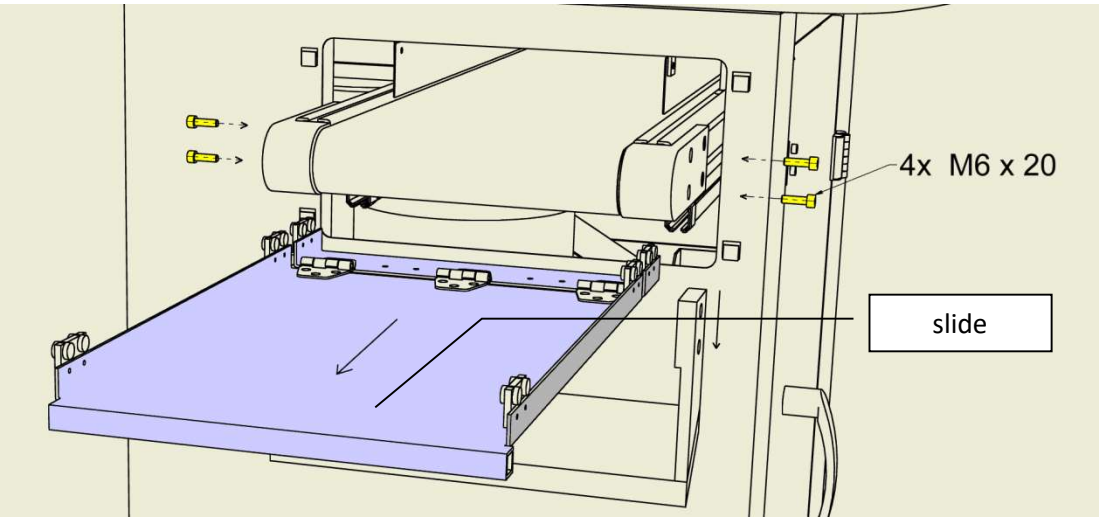
6.6 Belt orientation rebuilding

Before rebuilding of belt orientation please switch off punching machine and disconnect from electric power network.

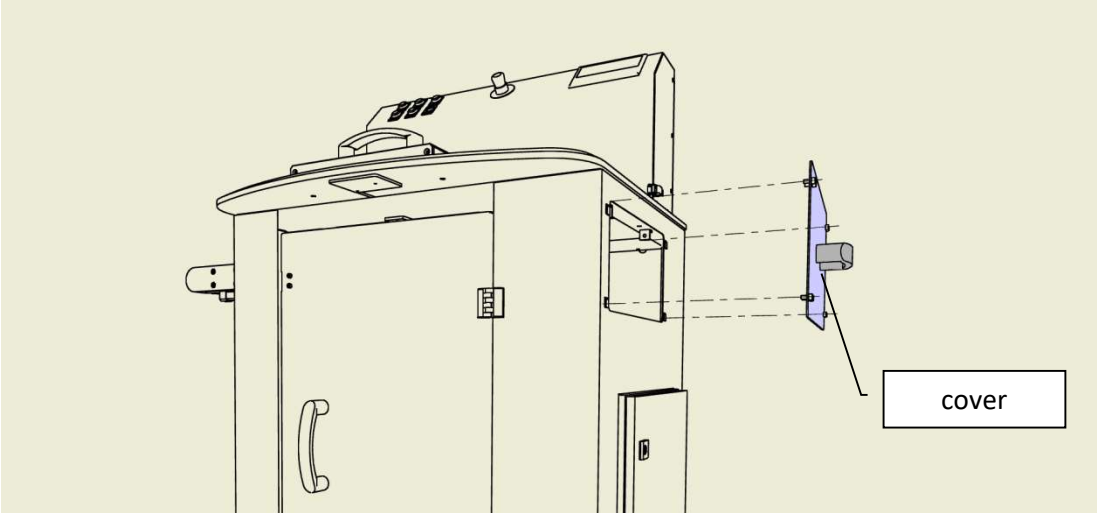
- *Remove slide holder by removing 4 side screws.*
- *Remove plexi-glass cover by removing 4 top screws.*
  (after removing plexi-glass cover remove 4 nuts from mortises)



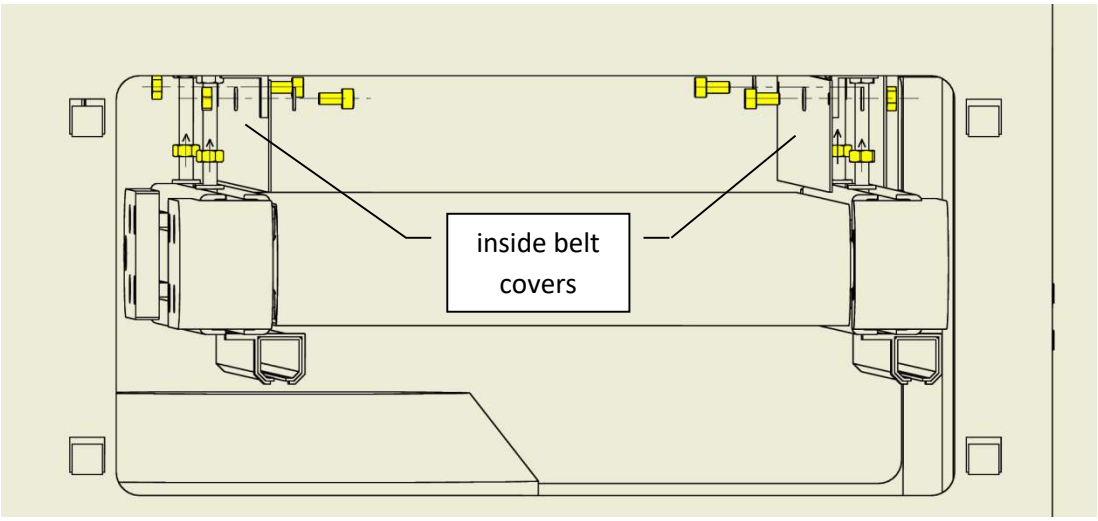
- *Screw on back 4 side screws and remove out slide.*



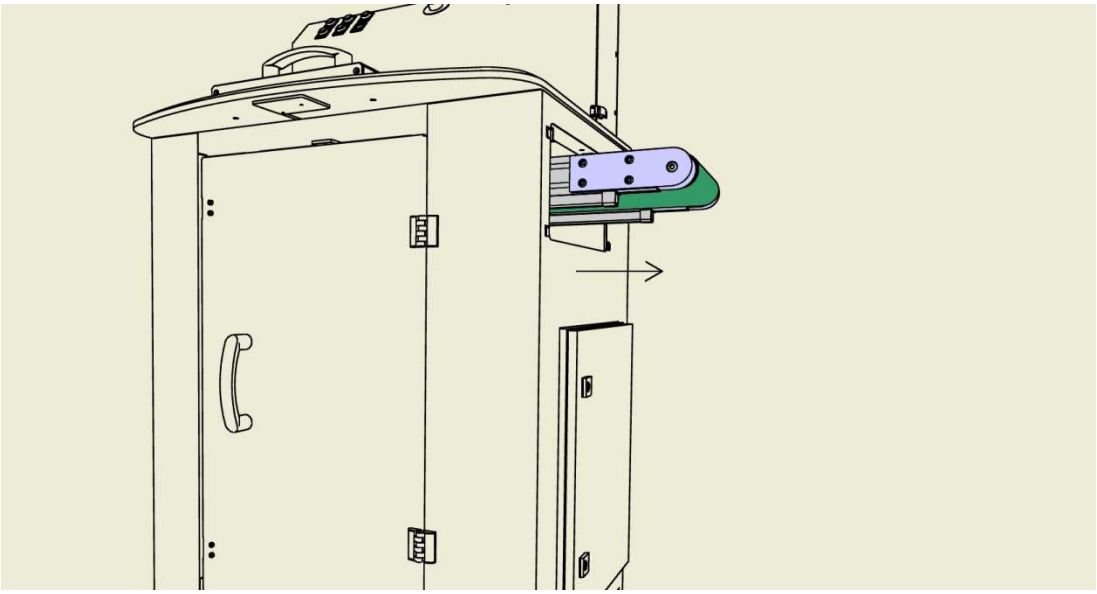
- *Remove cover.*



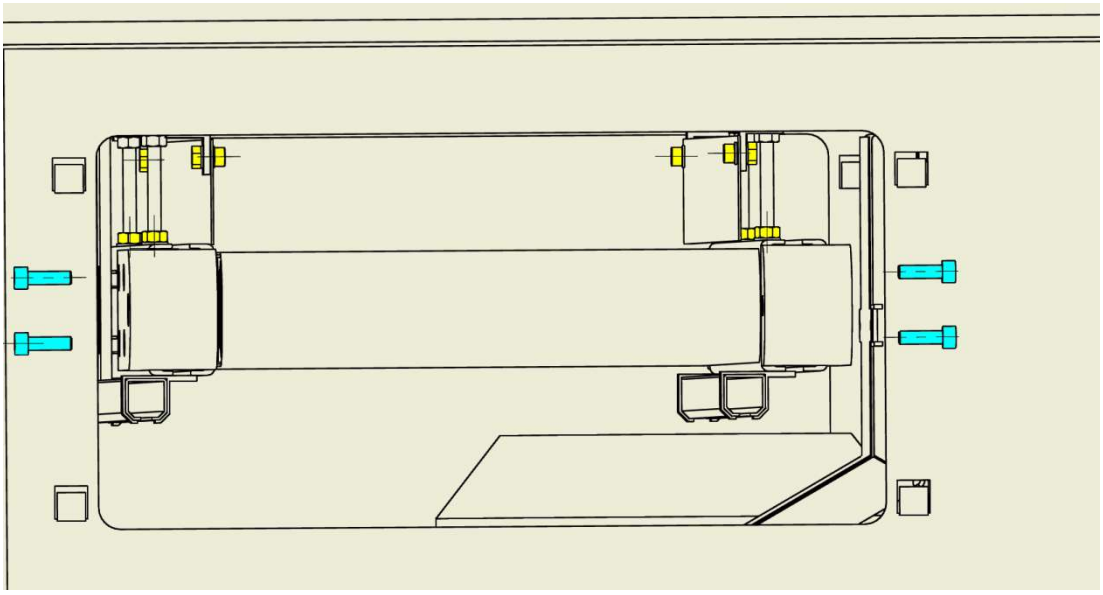
- *It is necessary to loosen bottom nuts. To be able to do it, it is better to remove inside covers of belt.*



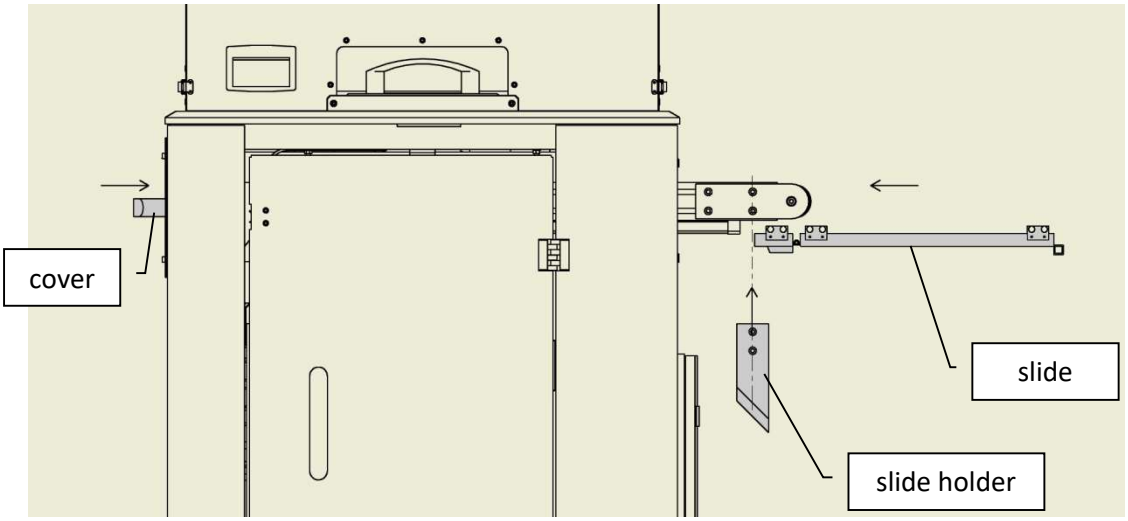
- *Move belt to other side of punching machine.*



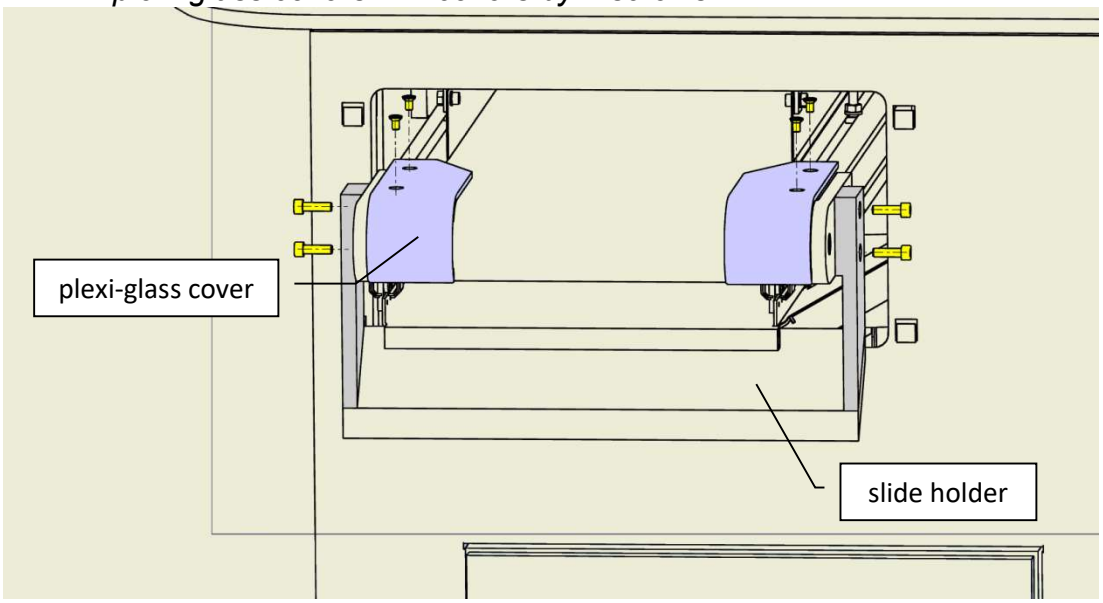
- *Fix bottom nuts and insert inside covers of belt. Remove 4 side screws.*



- *Install cover to original side of punching machine. Insert slide below belt and install slide holder.*



- *Fix slide holder by 4 side screws. Put nuts into mortises and install plexi-glass covers. Fix covers by 4 screws.*



By this procedure is belt orientation changed. To complete it is necessary to change orientation of motor of belt in SETTINGS SCREEN (see chapter "5.2 SIMATIC panel description")

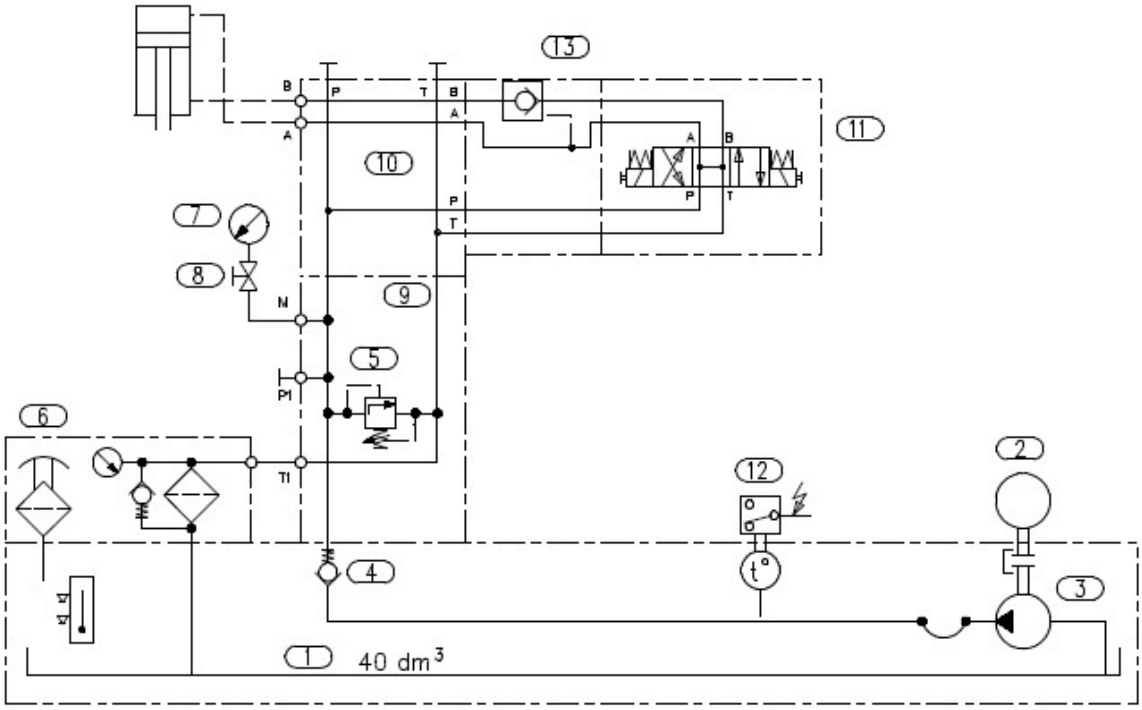
7. Hydraulic system

7.1 Service for the hydraulic group

To maintain the hydraulic group is essential for a problem-free operation as well as a support for a longer life of the moving parts.

To avoid any problems hydraulic fluidity and the filters must be changed every year. (Please have a look on the enclosed user manual of the manufacturers of these parts).

7.2 Hydraulic diagram and technical data



1.	Tank	40C	40 dm^3
2.	Electric motor	MA-AL112M 400/230V	4 kW
3.	Hydroelectric generator	T3-8R-R1C1-SG03G03-N	8 cm^3/rot.
4.	Single-direction valve	VJ3-010-005	
5.	Bypass valve	VPP2-06/25S	17 MPa
6.	Waste filter	FR072-166+DG200	
	filter insert	V3.0520-56	
7.	Manometer	0-250 bar	
8.	Valve	FPE1- G1/4	
9.	Main block	ZB06L1-A	
10.	Mainline panel	PD06A1-AI	
11.	Switchboard	RPE3-063H11/02400E1K1	24 VDC
12.	Thermostat	TH143	
13.	Hydraulic lock	2RJV1-06MB	

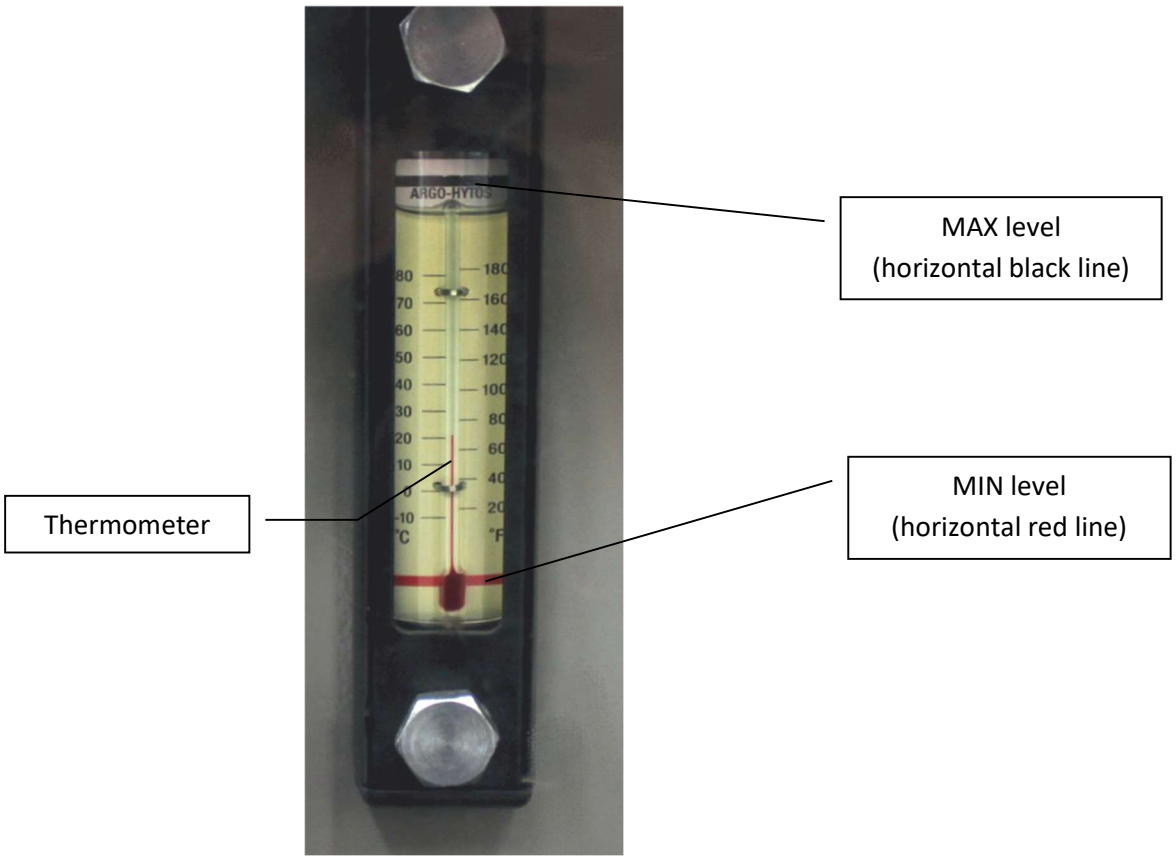
Inside threads of outputs: A, B, P - G3/8"
T - G1/2"

Technical data

Producer:	**ULBRICH**
Q:	**11 dm^3/min**
Rotation speed:	**1440 rot./min**
p_{max}:	**17,5 MPa**
P:	**4 kW**

7.3 Maintenance of hydraulic system

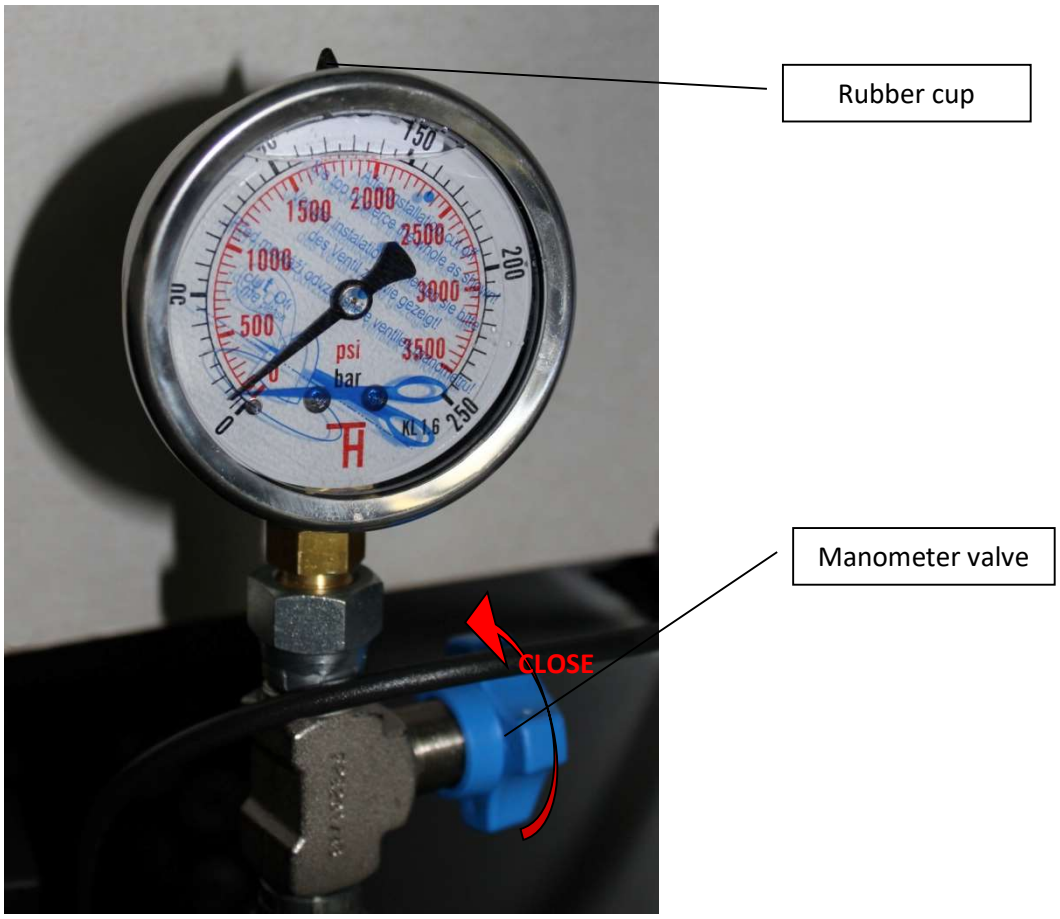
It strictly prohibited to run hydraulic unit without oil fill. Please check oil gauge through small window located on the left side of punching machine. Indication level of oil should be between MIN and MAX gauge.



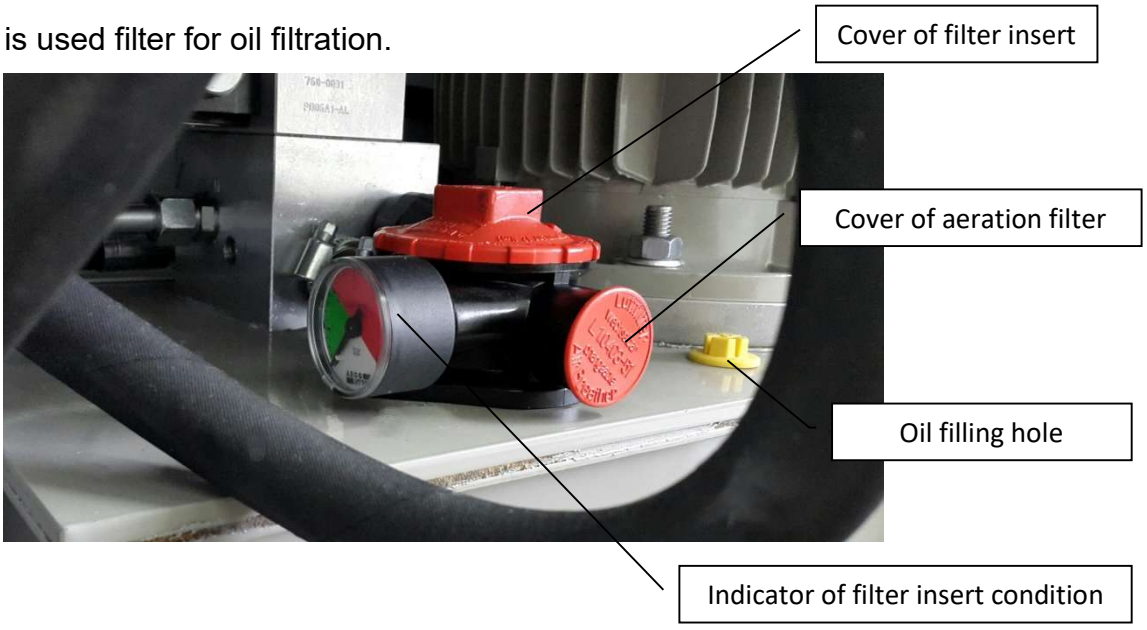
There is thermometer of oil in the middle of oil gauge.

Oil specification:	Mineral oil ISO VG 46 (HM 46)
Oil operation temperature:	30 - 45°C
Viscosity:	25 - 50 mm^2/s^{-1}

Manometer valve must be closed during switching on of motor of hydraulic unit (to protect manometer from pressure peaks). It is recommended to keep this valve closed. We recommend to open manometer valve only for pressure adjustment purposes by service technician. The pressure is set to 17 Mpa (170 bars) from production. Rubber cup should be cut away after installation of machine.



There is used filter for oil filtration.



The indicator of filter condition has green and red area. This indicator indicates condition of main filter insert. When it is indicated in green area oil filter is in good condition, when it is indicated in red area oil insert should be exchanged.

Exchanging of filter insert:

- switch off punching machine
- disconnect machine from electric network
- open back cover
- remove red cover of filter by side wrench 27 mm
- exchange new filter

Weekly maintenance: Check level of oil, check indicator of condition of filter insert.

Yearly maintenance (or 6000 working hours):
Exchanging of oil. Exchanging of filter insert and aeration filter.

filter insert	- order num. V3.0520-56
aeration filter	- order num. L1.0403-51 (2 CL)

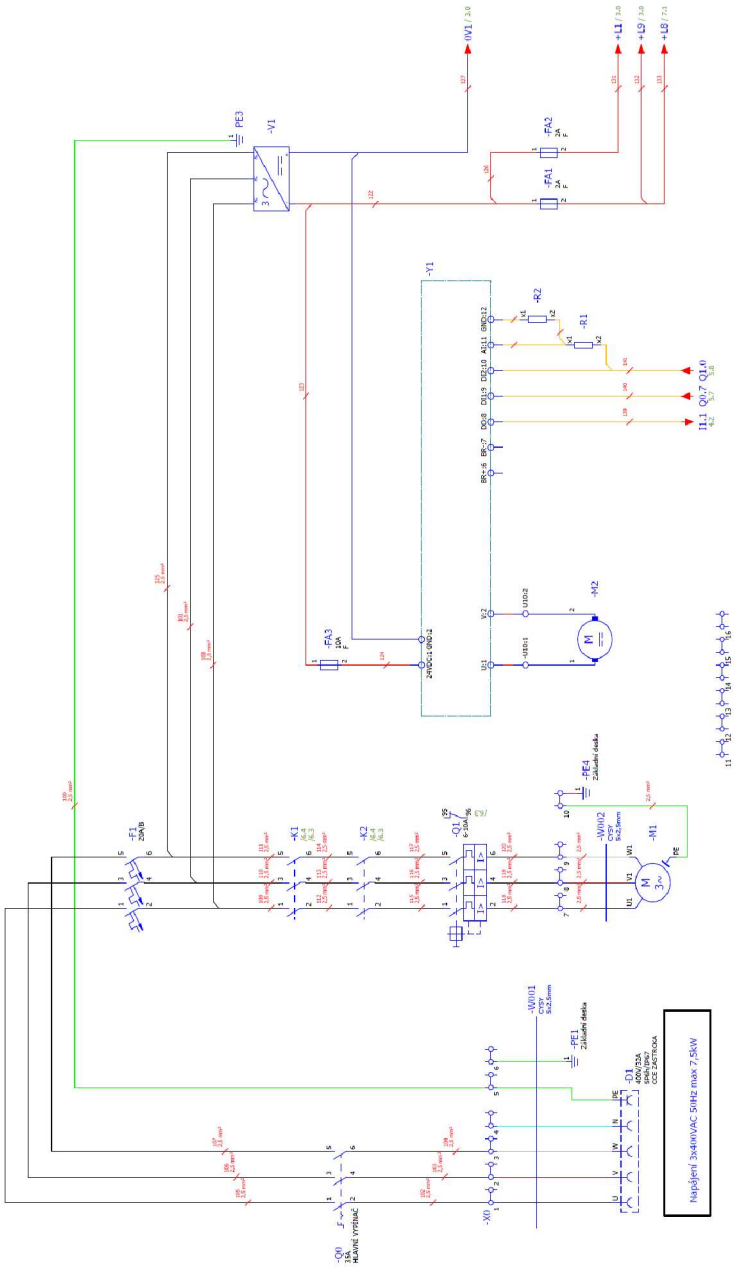
7.4 Hydraulic petroleum oils

Power class HM oils according to European specification CETOP RP 91H in viscosity class ISO VG 46.

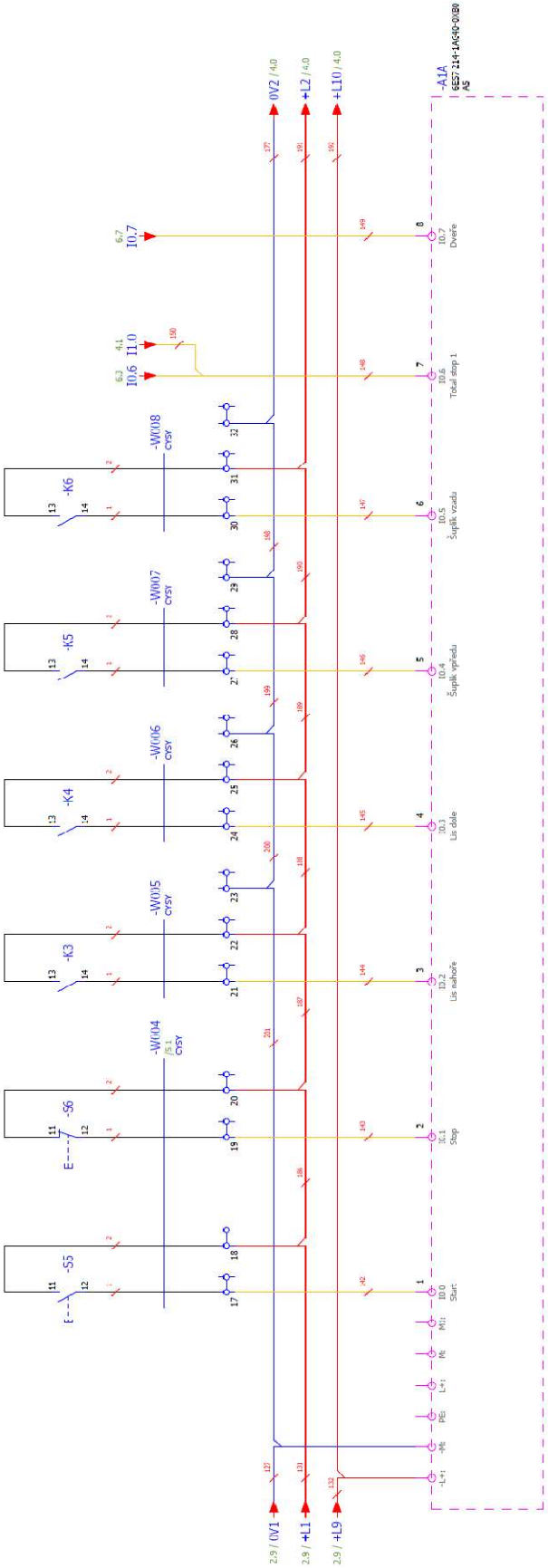
Producer	HM 46
AGIP	OSO 46
ARAL	VITAM GF 46
AVIA	AVILUB RSL 46
ČEPRO	MOGUL HM 46
BP	ENERGOL HLP 46
BULHARSKO	MX-M/46
CASTROL	HYSPIN AWS 46
DEA	ASTRON HLP 46
ELF	ELFOLNA 46
ESSO	NUTO H 46
FAM	HD 5040
FINA	HYDRAN 46
INA	HIDRAOL 46 HD
KLÜBER	LAMORA HLP 46
MAĎARSKO	HIDROKOMOL P 46
MOBIL	MOBIL DTE 25
ÖMV	HLP 46
POLSKO	HYDROL 30
RUMUNSKO	H 46 EP
RUSKO	IGP 30
SUN	SUNVIS 846 WR
SHELL	TELLUS OIL 46
TEXACO	RANDO HD B 46
VALVOLINE	ULTRAMAX AW 46

8. Electrical scheme

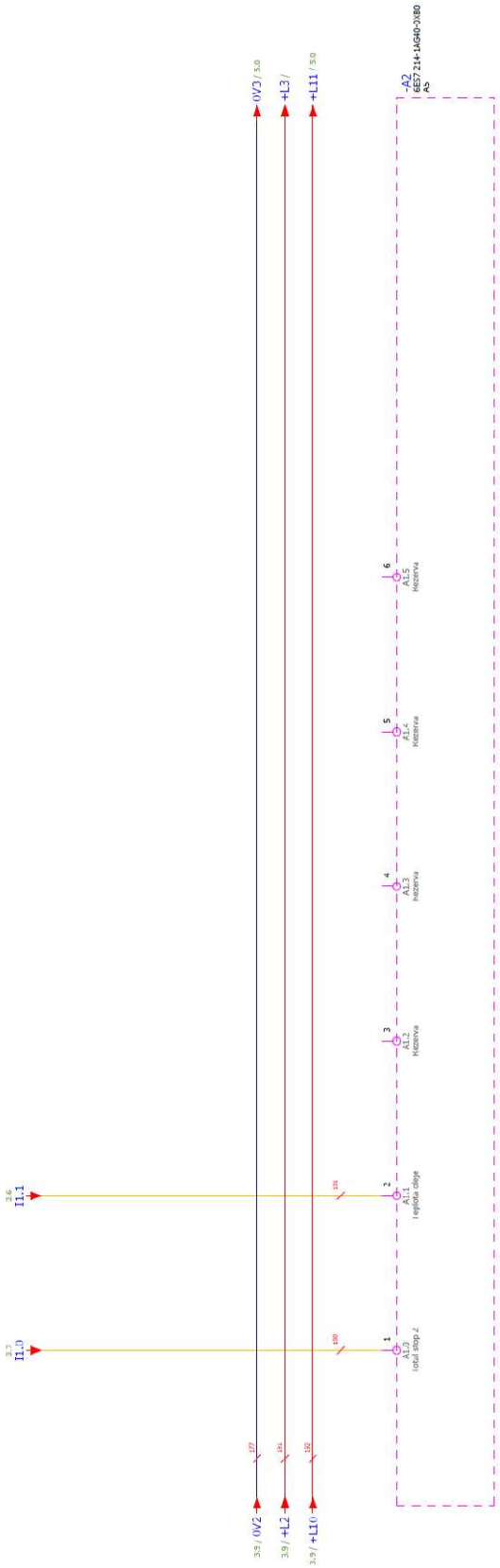
8.1. Power supply scheme

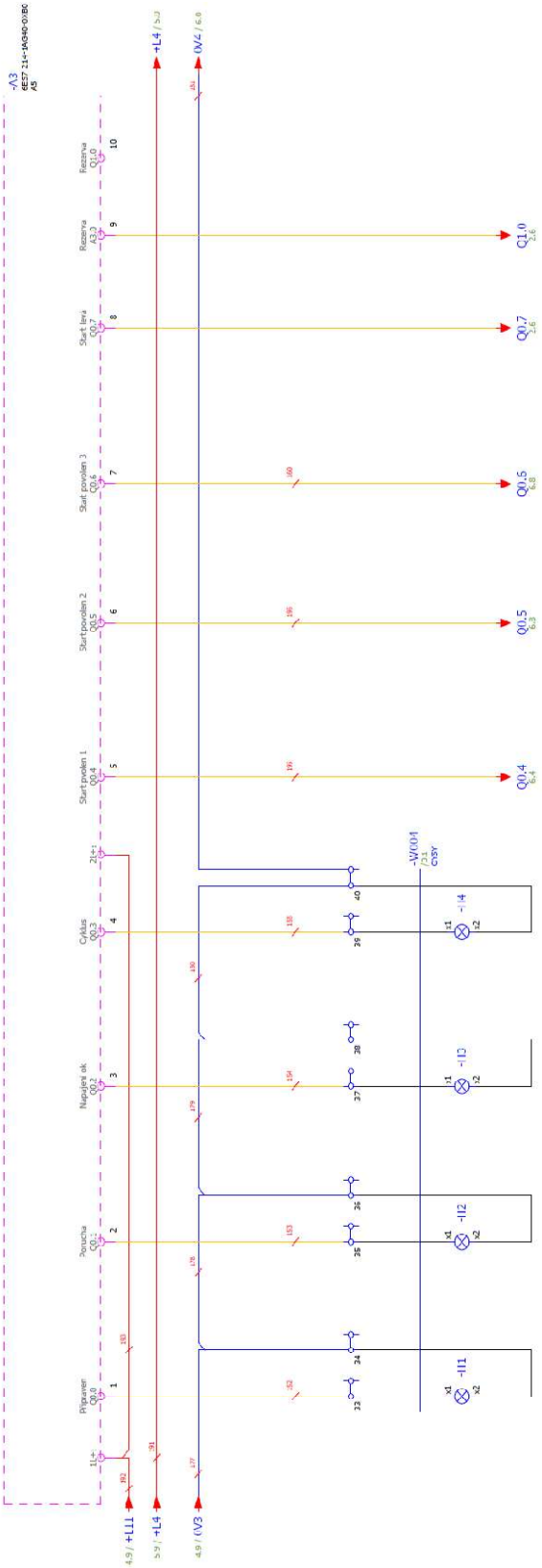


8.2. Input signals scheme

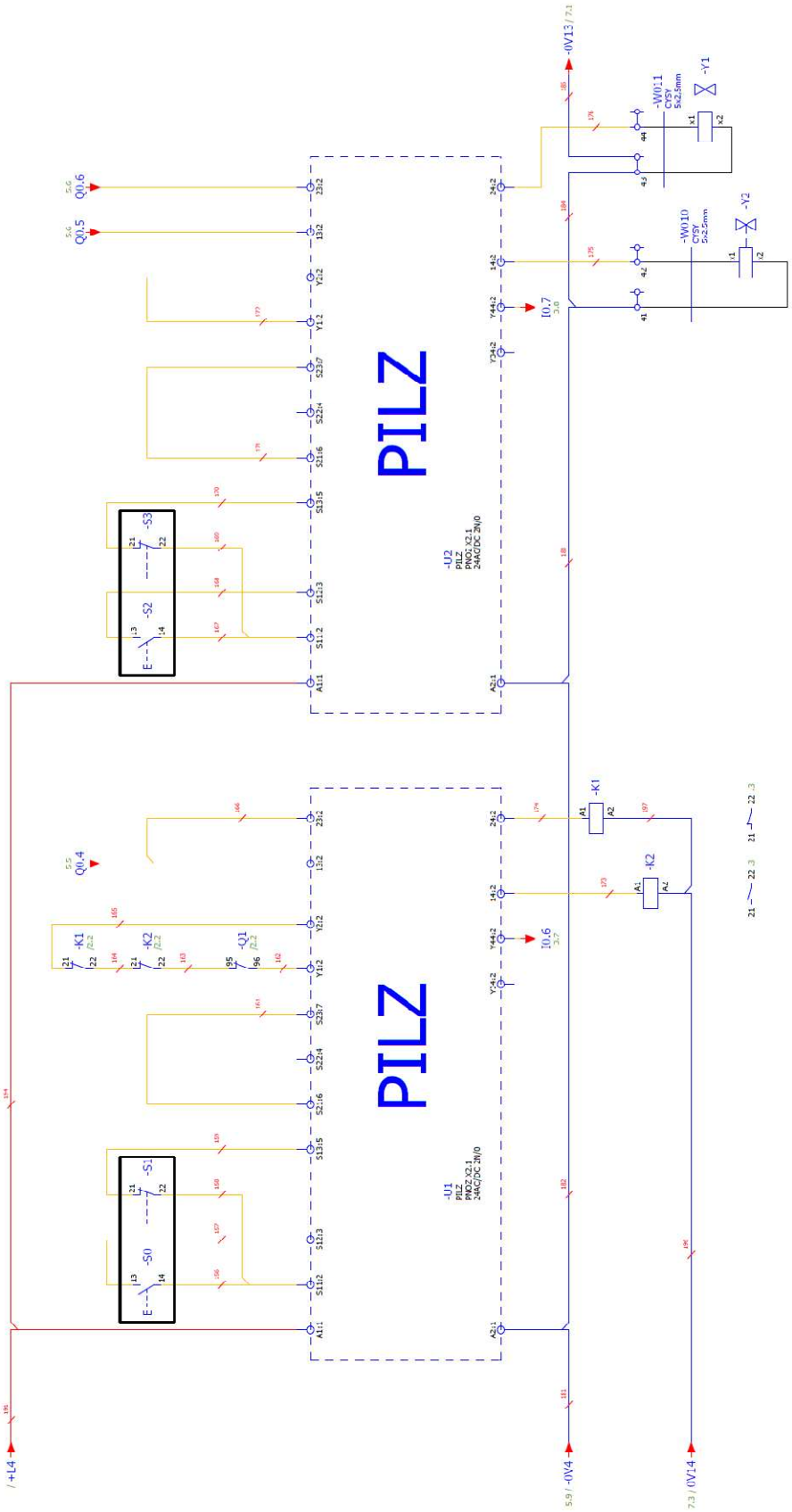


8.3. Output signals scheme

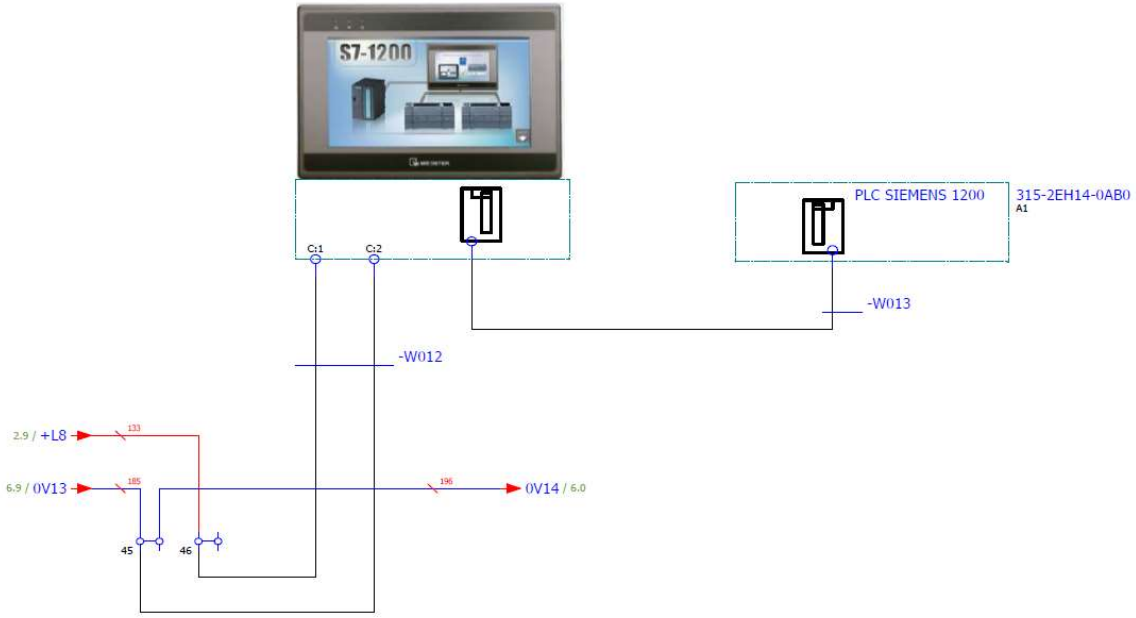




8.4. Protection circuits scheme



8.5. PLC scheme



9. Punching tool

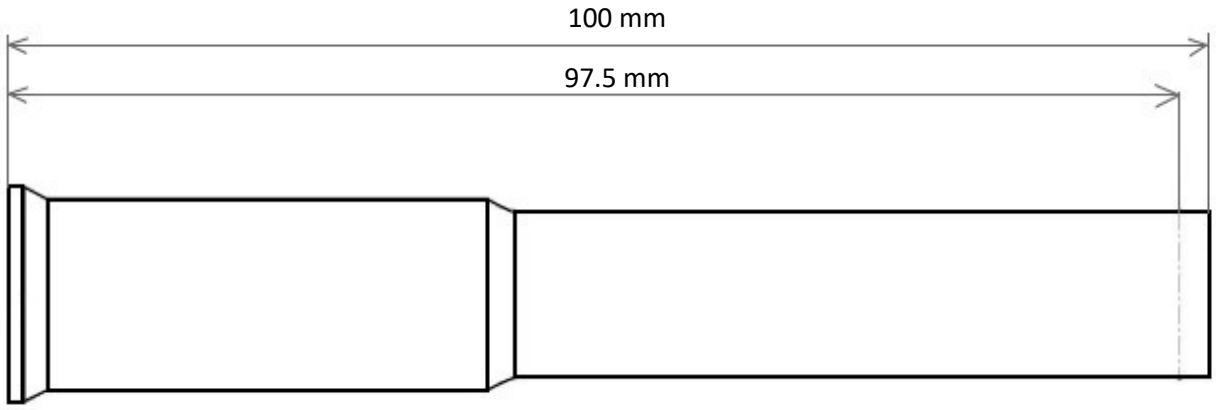
9.1 General

The punching tool has combined by a stamp and one form. Each tool is equipped with six punch dies in various forms. There exists round, rectangular and triangular kinds of punch forms.

9.2 Maintenance of the punching tool

To maintain the punching tool only needs to grind the punch dies. The original length of the dies is 100 mm. They might be grinded till reaching a length of 97.5 mm.

Minimum length of the punching dies	97.5 [mm]



It´s recommended to remove approx. 0.1 mm at each grinding. That means you will have to replace the punching dies after 25 grinding cycles.

Limit of grinding cycle of the die:

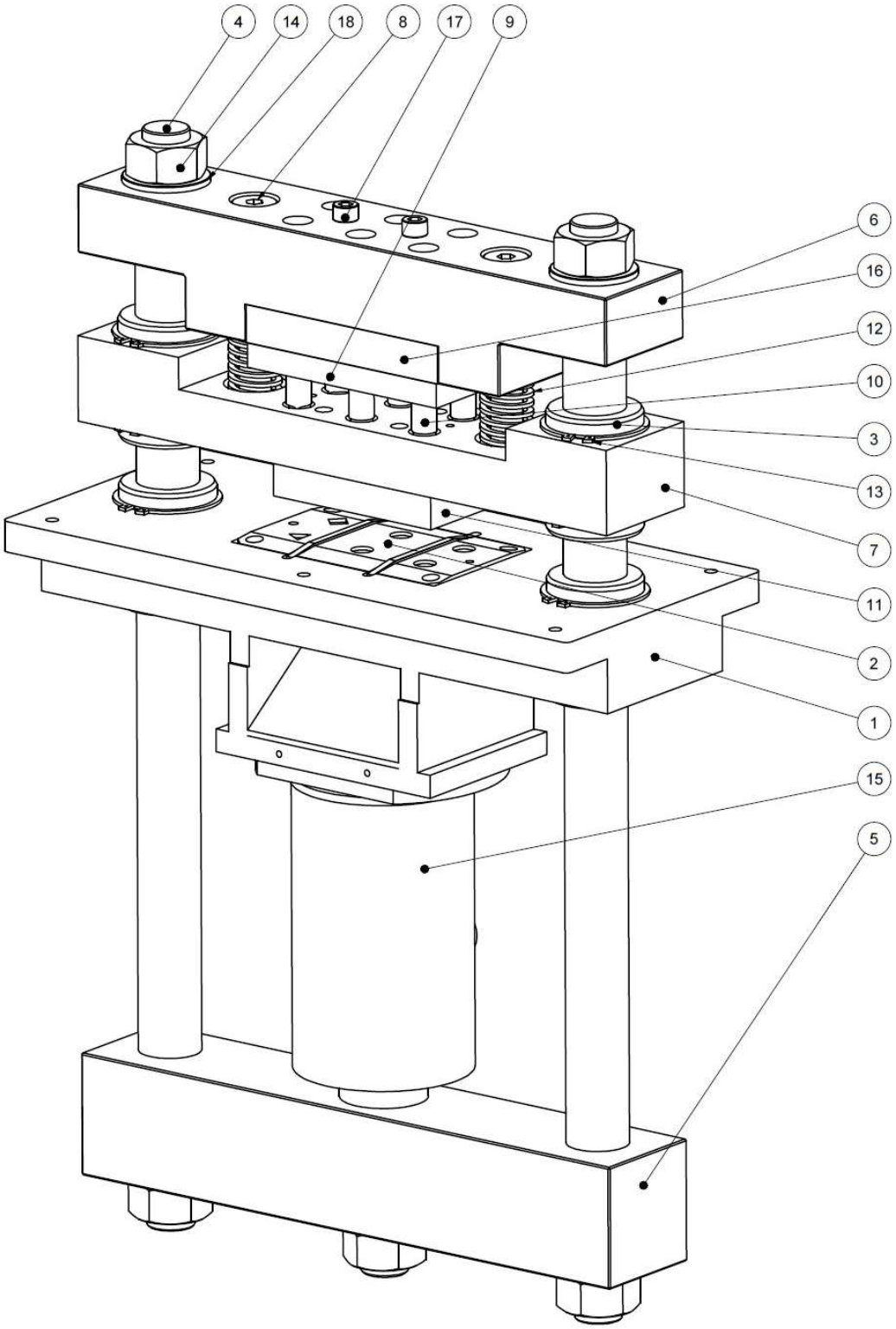
If the die reaches the same level like the bedding layer or there is no chamfer remaining, please replace the die.

The die have to permeate >0.5 mm into the matrix.

Service of punching tools:

Open the cover 1 times per day, check it and if necessary clean it (paper scraps). Lubricate every die with the recommended oil can. 1 drop oil per die (hydraulic oil) over the pressure pad. Check the interior machine room (Clean it if necessary and check on oil loss).

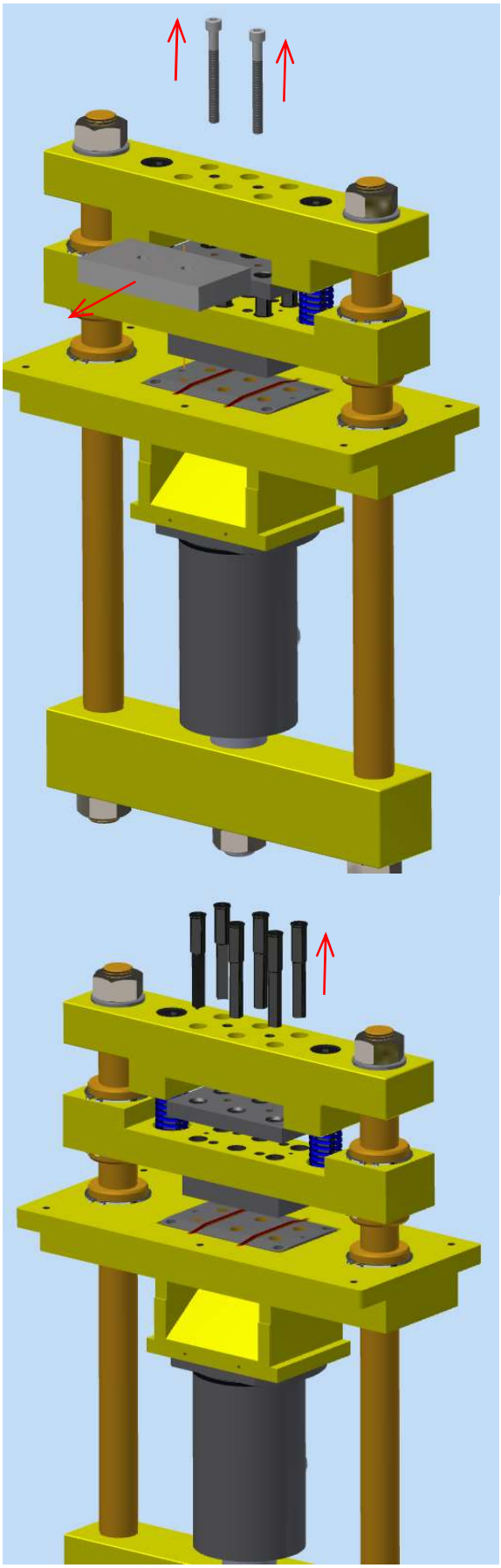
9.3 Replacement of the punching unit



Description of parts:

1.	Bloc a colonnes intermediaire	1
2.	Matrice Benghazi	1
3.	Roulement lineaire	4
4.	colonne	2
5.	Bloc a colonnes inf	1
6.	Bloc a colonnes sup	1
7.	Support presse papier	1
8.	vis ajustable a epaulement pour ressort	2
9.	Support poincons	1
10.	Poincon rond	4
11.	Presse papier Benghazi	1
12.	Ressort presse papier	2
13.	Cirlip diam.62	8
14.	ecrou M30	5
15.	Válec 100-56-65 Sorting	1
16.	Vložka lisu	1
17.	Šroub M10x95 imbus	2
18.	Podložka plochá pro M30	5

Used material and tools: Socket wrench 10
Grease SKF LGMT2 OU 3
Oil for the punching die and the punching tool



Disassembling

1. Switch off the punching machine
2. Open top cover
3. Remove 2 socket head screws
4. Remove supporting plate
5. Remove punching tools up

Note: Each punching tool has tapped hole above. It is possible to remove punching tool up by using special tool (threaded rod)

Reconstruction

Die

- Clean the slide face careful.
- The centering pins has to be replaced every disassembling.
- Lubricate the leads with grease SKF LGMT2 OU 3
- insert the punching dies into the fittings - pay attention to the form position. Insert the punching dies into the die and pay attention that they are slide correctly.
- insert supporting plate
- fix the plate and lead by screws

10. Recommended spare parts

Punching mechanism:	
Bloc a colonnes intermediaire	V 085 015
Matrice Benghazi	V 085 024
Roulement lineaire	N 085 087
colonne	N 085 085
Bloc a colonnes inf	V 085 020
Bloc a colonnes sup	V 085 014
Support presse papier	V 085 018
vis ajustable a epaulement pour ressort	N 085 088
Support poincons	V 085 016
Poincon rond	V 085 022
Poincon triangle	V 085 021
Poincon carre	V 085 023
Presse papier	V 085 019
Ressort presse papier	N 085 089
Cirlip diam.62	N 085 090
ecrou M30	N 085 091
Válec 100-56-65 Sorting	N 085 086
Vložka lisu	V 085 071
Šroub M10x95 imbus	N 085 092
Podložka plochá pro M30	N 085 093
Spikes 5 x 20 (kolík)	
Spikes 6 x 20 (kolík)	

Hydraulic system parts:	
Filter insert for hydraulic system	V3.0520-56
Aeration filter	L1.0403-51 (2 CL)
oil HM 46 (ISO VG 46)	HM 46