

Regulator of error limit value

It ensures that 00 is displayed on the “CAL” position (although it is closely linked to the ambient temperature). If it is not correct, the descending part on the upper punch is modified. The nut is screwed off and the screw is rotated (upper part of DCH on the machine)

For this purpose, the “L1” error limit value and the controls on the L1 position are set up through the potentiometer (approximately 25%). The “L1” error limit value is set up in same mode. Only the controls are changed to L2. The recommended average value is 20%.

Note: The percentage shall be always determined according to the machine speed and specification.

The L1 Controls indicate the maximum ideal temperature of friction component however L2 controls reflect the minimum ideal temperature.

Any problems will not be occurred in the operation of machine only the blue key (closing) is just used to cancel the error control.

Roller guide

There is a roller guide of upper punch and it always shall correspond to the thickness of tablet to be produced (lower part at the front end):

0.5~8 inches (plug-in)

4.5~12 inches

8~16 inches

Note: the ideal thickness cannot be obtained if the guide is installed improperly.

If No.4 indicator lights up, the oil level shall be controlled (Upper oil pump at the left lower part)

If the red light on the pump lights up and it also will not be turned to yellow after the additional button is pressed, it shall be checked if the motor pump operate normally or not or the time adjustment of timer is correct or not.

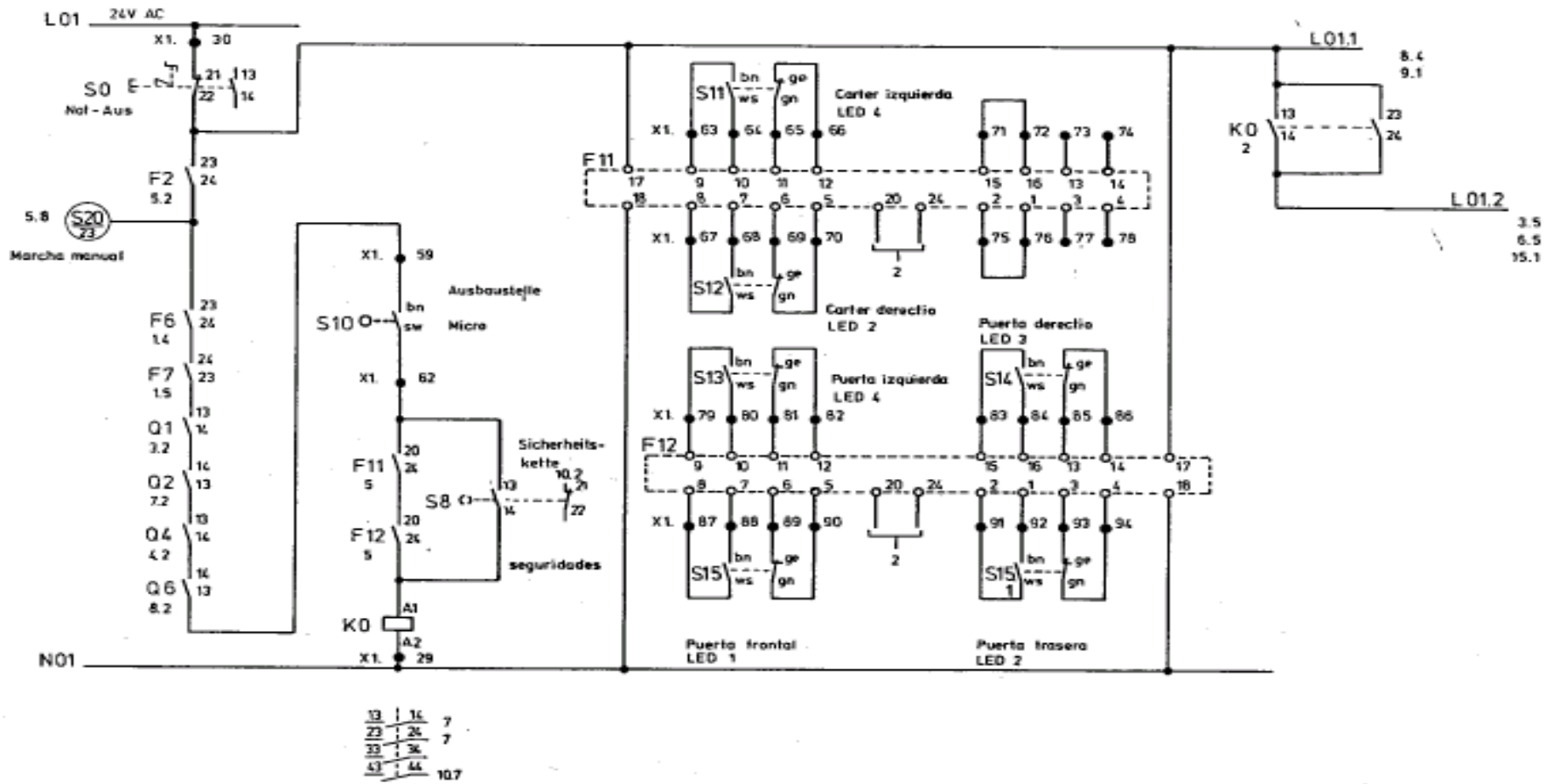
Control abnormal phenomenon

1. If this controller lights up, it means that the main engine is not started.
2. It indicates that the lower channel in the lower punch is not clean. It shall be cleaned (it is located at the DCH position of machine, lower part)
3. It indicates that there is something wrong with the pressure of press. Either the punching tonnage and the digital control is not correct or all press dimensions are not correct. Please remember that the pressure gauge shall be checked frequently.
4. This control is always related to the good lubrication.

Controls in 2 and 3 are realized under the Shutdown State.

Control limit of tablet quantity in the unit time

The reference value of yield (tablet quantity per hour) can be obtained according to the position of power wheel (left lower side). This value is reflected on the display and it indicates that it is high limit or lower limit. At present, it is the high limit (maximum value). These wheels shall be changed so that it is convenient for wheel to operate at the low limit. However, it shall be always according to diameter of press and product size at starting period.



Standard mit Etobau

			Datum						
			Bearb.	Schroth					
			Gepr.						
Anderung	Datum	Name	Norm						

Kilian & Co GmbH
5000AND 60
Maschinenfabrik

Stromauplan, Circuit diagram

TX 30

Numero

E170 S368

Blatt 2

KILIAN

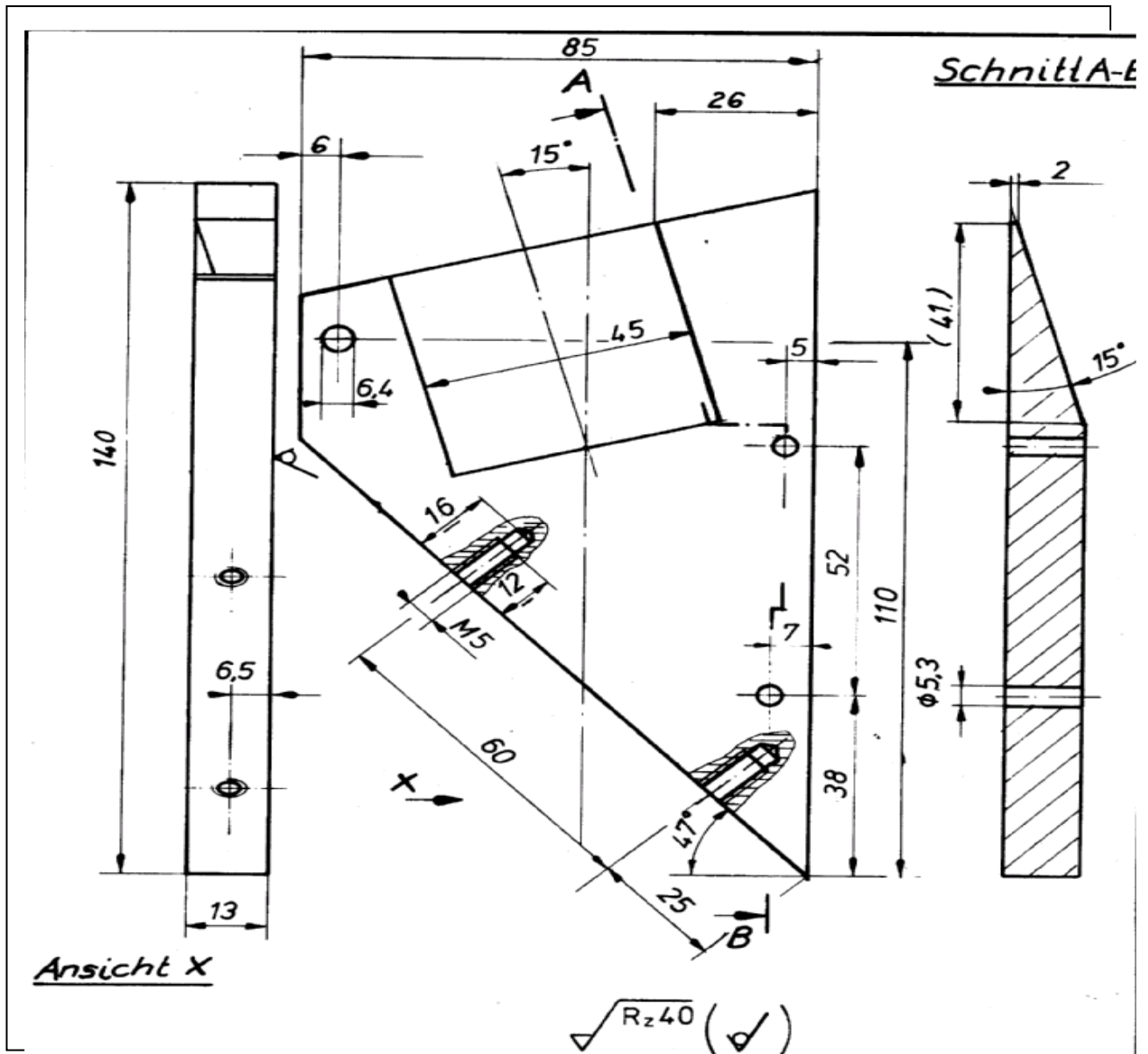
TABLETTIERTECHNIK

Type

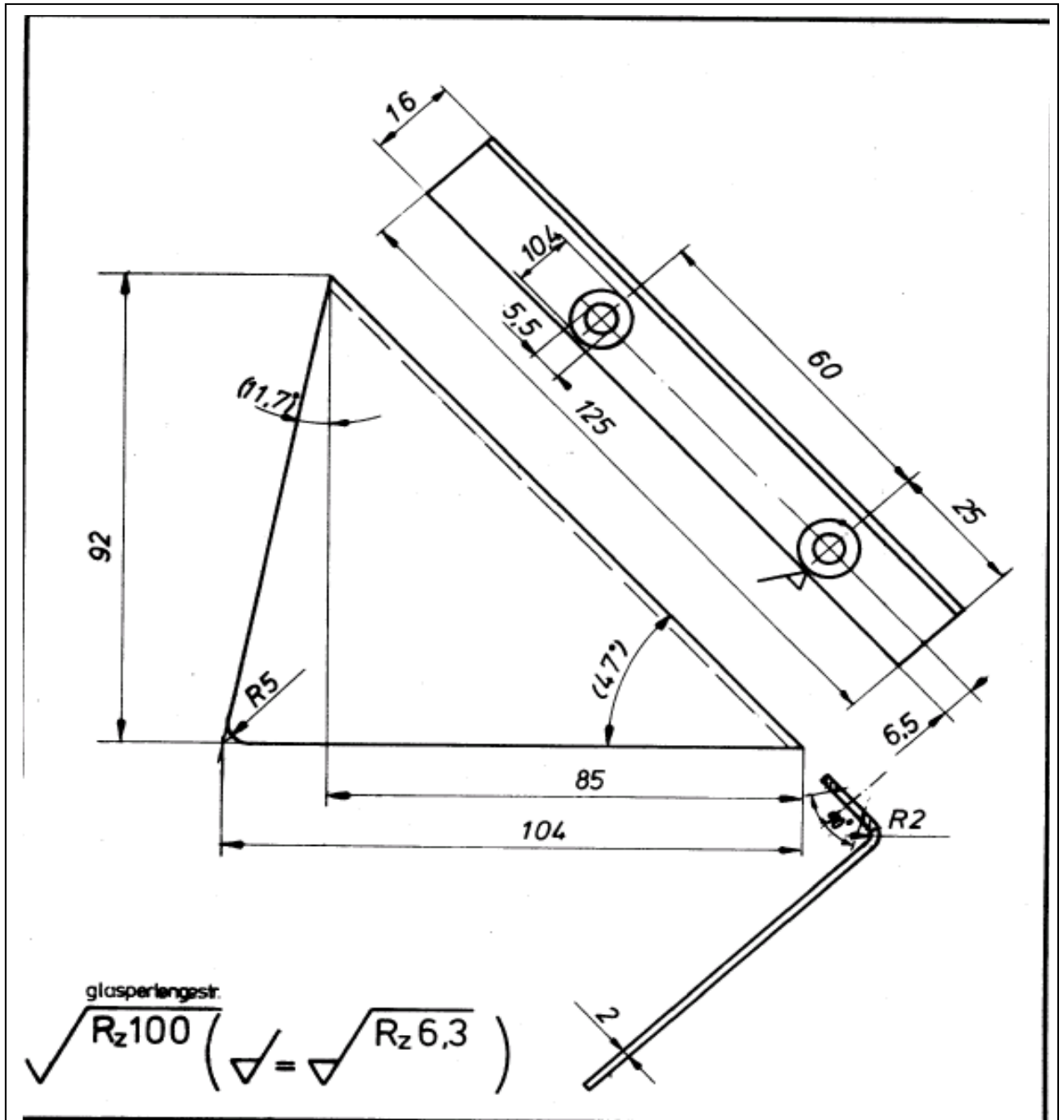
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Ordering number:

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注意根据德国工业标准 34 的防护规定	根据德国工业标准 7184 的形状和位置公差		>0.5	>6	>30	>120	>400	>1000
	根据德国工业标准 7168-m 的一般公差		---6	--30	--120	--400	--1000	--2000
可允许的最大表面粗糙度	根据德国工业标准 6784 的工件角		+/-0.1	+/-0.2	+/-0.3	+/-0.5	+/-0.8	+/-1.2
	日期:	名字	比例尺 1:1			Rohl-/Matr-编号		
	21.07		材料: S					
			名字:					页数
	Kilian & CO		部件编号: 127287					1
Mikr. Zust. 变化 Dat. Gepr.	Urspr.		Ers.					



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	Kilian & CO	部件编号: 127288					1
Mikr. Zust. 变化 Dat. Gepr.	Urspr.	Ers.					

Rolling machineer TX

Operating instruction

Operating guide

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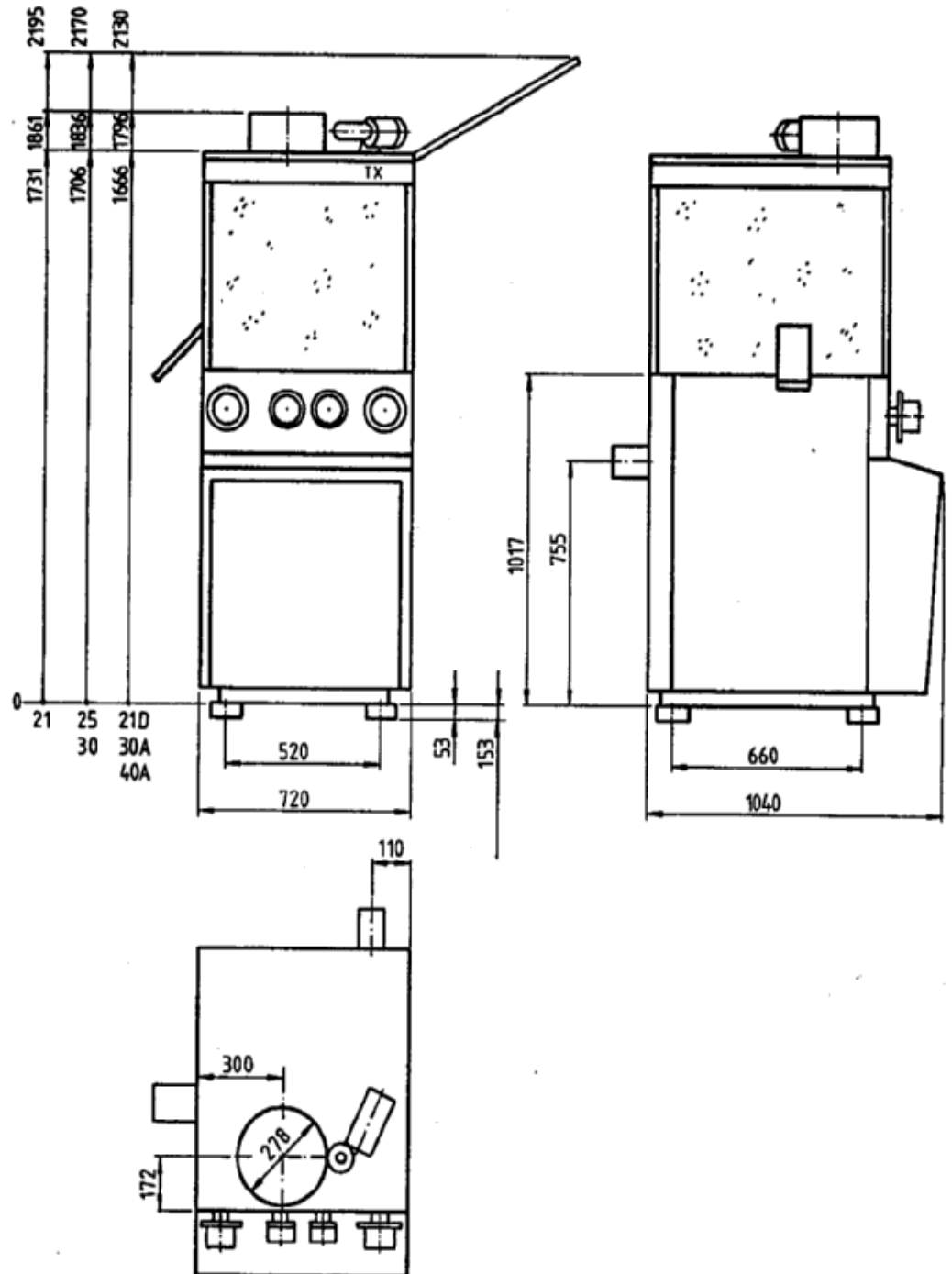
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1. 1 Different technical characteristics of various types of presses for TX series

Type	TX40	TX30	TX30A	TX25	TX21
Quantity of press	40	30	30	25	21
Hourly capacity: Max. Min.	50000-252000	189000	189000	157500	113400
	26400-150000	19800	19800	16500	13860
revolutions of main wheel per minute (rpm)	11-105	11-105	11-105	11-105	11-90
Maximum diameter of tablet (mm)	2-13	2-16	2-16	2-20	2-28
Press diameter (mm)	~24	30	~30	35	45
Filling range (mm)	0.5—8 4.5—12 8.5—16 12.5—20				
Engine power (Kw)	4				
Maximum punching force (Kn) (10Kn Approx. 1000kp)	80	100	80	100	100
Maximum pre-punching force (Kn)	Approx. 13	Approx. 16	Approx. 13	Approx. 16	Approx. 16
Installation condition of multi-function tool	According to requirement	With	According to requirement	With	With
Weight (kg)	1450				1500

TX rolling machineing

1. 2 Dimension



General:

This is a disc puncher with a pair of compressor rollers acted on punching operation every time. Regardless of pre-punching operation or main punching operation, it is specially designed to complete the high-speed punching operation.

1. 3

1. 4 The guiding device for press is equipped with a transition cam--acted on the upper punch—as well as a descending unit. It is replaced easily. It is equipped with the filling range piece and the filling range piece is turned over one another. For different components of lower cam, various steps can be adjusted automatically. When a certain lower punch cannot operate smoothly, this condition can be displayed through a control unit. A connecting device controlled by hydraulic-electrical system will decrease the filling amount during the start-up process and process that the punching die carrier stops. Some easily removed protective surface piece can enable the personnel concerned to access in the lower part of punching die carrier easily.
1. 5 The upper and lower roller producing the pre-pressure can move along the vertical direction. Both upper and lower roller can either move together or move separately. The hydraulic pressure applied is originated from main pressure and it can be upgraded automatically.
1. 6 The large-size roller acted on the main pressure rotates depending on the bearing. If the pressure exceeds the limit, the upper roller will deviate and the corresponding notification signal will be sent out. The punching pressure is calibrated by one hydraulic unit. If the thickness of tablet is adjusted, the vertical position of lower compressor roller shall be adjusted. The position of tablet on the punch die can be adjusted up or down through moving the upper and lower compressor roller simultaneously (adjustment of punching area).
1. 7 The start-up of punch die carrier is realized by the center shaft

started by the speed regulator. The speed regulator is operated by topless screw installed on the support leg of machine. The screw also can prevent the dust and oil from accessing in the machine. Of course, the speed regulator can be readjusted. A special speed regulator can change the rotational speed in operation by rate of 1:6 under the condition that the machine is still running. The calibration range can be enlarged to 9.5 by interchanging the belt pulley. The special speed regulator is connected with the topless screw speed regulator by gear and belt as well as electrical coupling.

1. 8 The electrical part is installed in another individual cabinet and it is coupled with the support leg of machine in the fixed mode. All control systems are installed in the electrical control cabinet: main & jack engine and coupling as well as operation and control unit for hydraulic unit and central lubrication as well as filling piece.

The micro switch installed on the protective cover, press disassembly system, lower punch and overpressure control device can protect the machine and operator against damage and injury caused by accident.

1. 9 Hydraulic unit

A unit consists of motor pump and oil tank as well as control valve by adjustable form. The function is as follows:

- Calibrate the pre-pressure and main pressure for punching
- Control of filling reduction process during the start-up and stop process of punch die carrier.

1. 10 The blade with double-shaft agitating piece is used to ensure the quality of filling piece. The type of blade is that the material is fed from the middle part (F II C type)

At same time, the possibility that other filling systems is used for connection is also ready.

Key operating factor corresponding to 1.11

1. 11 Key operating factor

1. 11. 1 Start-up

1. Main switch
2. Main engine—switching on
3. Main engine—Switching off
4. Ready: lamp—pointer (white)
5. Ampere meter
6. Tachometer
7. Punching speed: Quick—Slow
8. Coupling: intermittent operation
9. Coupling: switching off
10. Coupling: switching on
11. Working timer
12. Steering-wheel used to rotate the punch die carrier
13. Abnormality indicator
 - Abnormal—Contact
 - Machine—shutdown
 - Abnormal—MC
 - Abnormal—Door
 - Difficult movement of upper punch
 - Abnormal—Disassembly point
14. Switch used to clear off the safety switch
15. Emergency stop
16. Abnormality of lubricating system
17. Over safety pressure
18. Difficult movement of lower punch

1. 11. 2 Filling

20. Filling (dosage)
21. Revolution calibration of agitating blade
22. Adapter—Selector of filling-piece Loading sheet stating engine.
23. Dosage—Stop
24. Calibration instrument (MC/ROP)
25. Deviation—Loss

1. 11. 3 Punching pressure

30. Pre-pressure
31. Tablet thickness
32. Start-up of upper roller for pre-pressure
33. Adjustment of punching area
34. Pressure measuring instrument
35. Punching force & up-down swinging button
36. Measuring point of punching pressure
37. Connection with ROP calibration instrument
38. Indicator of low-pressure measuring limit value
39. Indicator of drawing-force measuring limit value
40. Prize open

2. Installation & connection of main-branch connector shaft joint

2. 1 Cleaning

After the machine is unpacked, the serious cleaning needs to be performed. All materials for safety protection and corrosion protection shall be cleaned up carefully. Afterwards, the lubricating oil is slightly put on all polished positions.

2. 2 The machine is installed on 4 buffer legs fixed on the undercarriage. It is not necessary to fix the machine on the floor. The buffer leg can be adjustable so that the machine can be kept in perfect level. The vibration force of machine is absorbed by the buffer leg.

2. 3 The electrical part is connected by small connector (the door in front of machine is opened). 5 connectors (L1-L2-L3-N-PE) are prepared. The cable shall be conformed to the local current regulation and standard.

Before starting the engine, it ensures that the characteristic of supply current is identical to the current characteristic required for machine operation.

2. 4 The correct rotation direction of punch die is always from left to right.

Verification: Switch on the engine (As per the instruction in 3.1). the side door at left lower corner is opened. The rotation direction of pulley can be seen from observing the rotation of engine before it stops running completely. It means that it always rotates in clockwise direction. Only the interchange of two poles, which is carried out in order to change the rotation direction, can be completed by interchanging the L1-L2-L3 connector.

3. Operating performance of machine

After there is any change in preparation or the tool is changed and before the machine is switched on at first time, the machine is started by manual steering wheel to verify that all movable components can function in their own ways flexibly. All operating elements are located in front of the machine.

3.1 Engine connection

The display has been ready for operation. The green signal lamp installed on the operation console will light in following cases:

- Replaceable storage device in the lower punch is installed properly
- All parts on the protective cover have been switched off upon request.
- The main switch has been switched on, and
- Converter—selector used for filling-piece control is located at “Automatic” position (=Automatic circulation).

The engine can be switched on only after the green signal lamp lights up. The green signal lamp is off and the white signal lamp lights up when starting the engine.

3. 2 Coupling connection

It acts in two modes.

3. 2. 1 Intermittent coupling (T button)

The coupler is kept in the connecting state when the corresponding button is pressed. At this time, the filling piece is working. After the button is released, the coupler is disconnected.

3. 2. 2 Continuous coupling (∇ button)

The machine can operate continuously after this button is pressed.

3. 2. 3 Note:

This machine is equipped with a limiting device for twablet thickness. This device can prevent the punching surface between upper and lower punch from heavy collision. For all this, the idle running of machine shall be avoided as far as possible or there is no product to press. If the idle running has to be performed, the filling amount shall be pre-adjusted and the tablet thickness is adjusted to be above 4mm.

3. 3 Calibration of filling amount

The height of dosing apparatus can be adjusted by the second steering wheel located at the right side of operation console. The accuracy marked by grading drum can be up to 1/100mm as it is equipped with the pawl and accuracy adjusting ring. In various descending devices (0-5, 4-12 and 8-16mm), the descending device closest to the required average value of filling amount is installed (please refer to section 3.10).

The calibration range of dosing apparatus is limited within the corresponding value automatically after installing the descending device.

3. 4 Tablet pressure & thickness

The preload of punching pressure is generated by the hydraulic system and it is calibrated through the operating table with swinging converter (KN \pm). The calibrated preload is marked on the external scale of pressure gauge. The unit is KN. The allowable pressure is determined depending on the size and form of punching

tool. (please see page 5.4).

The actual punching pressure is calibrated by steering wheel (31) located at the left side of operating console. The steering wheel is rotated in “+” direction so that the maximum pressure can be obtained (=minimum tablet thickness). The separation of contact surface between presses is indicated on the drum-type graduator in mm. The pawl and accuracy adjusting ring can adjust the accuracy up to 1/100mm.

3. 5 Pre-pressure

The pre-filling amount conveyed to the pre-pressure by the hydraulicsystem is calibrated automatically together with main pressure. It can be read out from the scale in the pressure gauge. The unit is KN. The actual pre-pressure (=separate the upper and lower roller determining the pre-pressure) by the second steering wheel (30) located at the left side of operating console.

3.5.1 Proper pressure calibration guideline

The pre-pressure function is to clear the filling amount of product on the punch to reduce the main punching process. This will increase the production benefit of machine considerably. This effect can be obtained from a relatively lower pre-stamping force. As the relatively larger pre-stamping force cannot make any effects on the machine generating the high benefit and there is a negative effect on the noise and mechanical component and these components loss from other hand, we suggest that the calibration can be performed in following modes:

- The insertion depth adjusted by the upper roller shall be equal to the depth of main pressure obtained by the roller or 0.5~1mm less. Once the locking screw is loosened, the bolt is rotated by necessary movement. The calibrated depth is indicated.

- The steering wheel is turned left to reduce the pre-stamping force until the upper roller no longer rotates. The machine is always operating during the whole process.
- Then, the steering wheel is turned right slightly until the upper roller is driven by wheel again.
- The calibration shall be performed according to the specified mode when replacing the tablet specification every time.
- The marking value corresponding to the upper and lower roller position with corresponding tablet quality shall be recorded so that it is easy for same size of tablet can be used while in reproduction. Thus, the required time for machine repair is reduced considerably.

3. 6 Overpressure prevention safety device

The pressure value indicated on the pressure gauge cannot be exceeded. The reason is that the upper compressing roller deviates the original position with assistance of a air cushion once this pressure is reached. This air cushion is involved in the preload through the hydraulic system. The machine records this type of deviation result and it means that the filling amount is double and then it is prompted as “Overpressure”. The flesh red signal lamp located on the operating console prompts (The flash button is pressed and the machine will stop automatically). On the other hand, the person will feel that the noise is more severe when the pressure exceeds the specified pressure. In this case, the steering wheel (31) must be rotated in “-“ until the machine is resumed to the normal operating state. We suggest that a pressure which does not exceed the actual pressure required for production to reduce the machine and tool loss. When the actual stamping pressure is 10 KN less than the pre-pressure, the consumption and working smoothness can be reached to the optimum index.

3. 7 Adjustment of stamping area

The insertion depth of upper punch on the die can be modified by the steering wheel located at the right side of operating console. This operation cannot change the tablet thickness and it also can be finished during the stamping process.

The normal position is 2.5mm. for some products, the working efficiency can be improved by changing the insertion depth.

3. 8 The rotational speed of driving wheel for punch die can be changed.

The change is performed during the working process of machine other than shutdown state. It only acts on the “Tablet per hour +-“pendular switch. The related value is shown on the operating console electrically to indicate the tablet quantity per hour. The quantity is always obtained by using the simple tool. The external scale represents the dtransmission value table set by the manufacturer. If the rotational speed range needs to be increased, the conveying pulley (1.7) can be interchanged. The following reading shall be reflected on the internal scale.

3. 9 Tool change

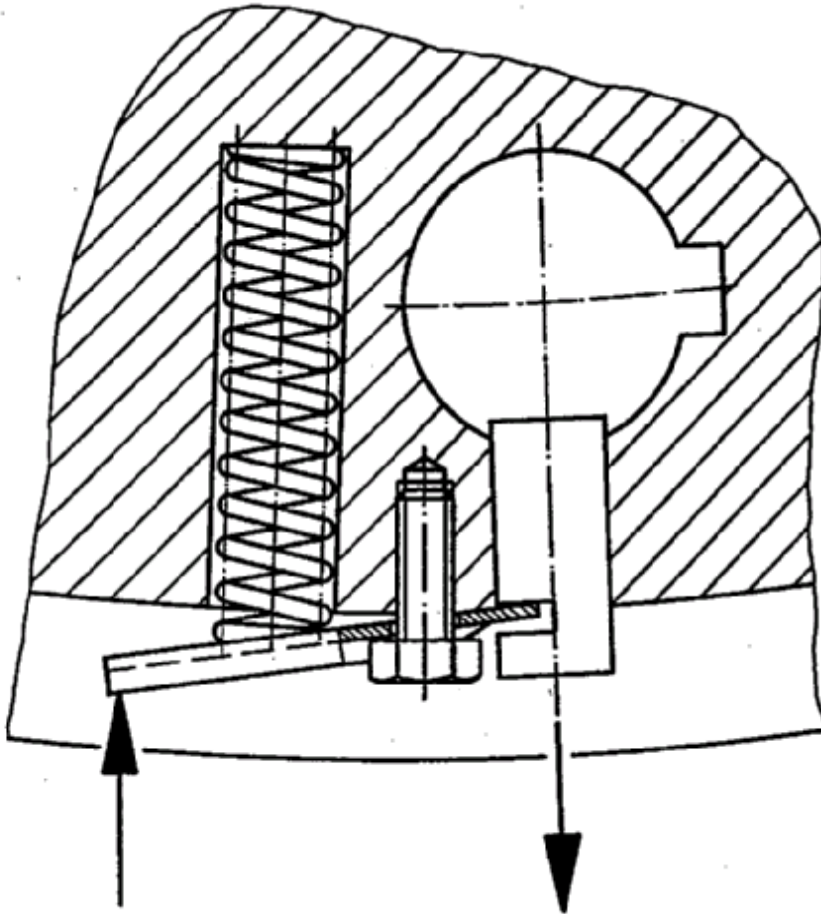
The personnel concreded can access in various positions of this machine easily so thatit is very conveyinet to change the tool.

3. 9. 1 The window shall be opened to remove the upper punch. After the protective cover of punch is removed, the punch is just lifted.

3. 9. 2 Once the replaceable storage device located at the lower part of tablet outlet is drawn out, the punch is pulled downward and drawn out. The side wall reaches to this storage device by bulk mode. It is very easy to disassemble the collecting groove so that this is convenient for person to access.
3. 9. 3 The die is disassembled after the lower punch is disassembled. At first, the tightening screw is removed and then the special tool is used to push the die and take out the die.
The die holder is adjusted completely to ensure that the machine can operate regularly.
You shall pay special attention especially when the die installation is started and thus it avoids damaging the housing when the a little oblique die is guided in.

TX rolling stamping

3.9.4 Brake pin of lower punch box



When installing the lower punch, the proper tool shall be used to hold down the left side and takeout the brake pin.

3. 9. 4 The tool installation is carried out in the same mode as the disassembly and the only difference is the subsequence is just opposite. The die is knocked slightly by special awl so that the die can engage with the upper part.

The screw on the die is tightened up by the special wrench and this wrench is supplied together with goods delivery. In order to avoid damaging the die-holding wheel, the arm of wrench must be extended (i.e. a sleeve is added) if the die-holding wheel is damaged caused by overexerting when tightening up the screw. When using the mechanical screwdriver (i.e. torque-indicating wrench and striking wrench, etc.), the couple shall be limited within 10Nm (1 kpm).

If it is required to install the lower punch, the proper tool (awl and screwdriver) shall be used to hold down the left side and then the brake pin is loosened.

3. 9. 5 For multi-function tool and formal tool, the special tool is provided for die installation (except the machine A)

3. 10 Replacement of descending device

Several types of machine are designed and the filling amount is different. The purpose is as follows:

- a) Keep the lower punch move in the minimum degree
- b) Minimum dosage and
- c) Keep the punch operate continuously

In most cases, the filling range between 4 and 12mm is adopted. For special thin tablet, the apparatus between 0 and 8mm is also provided. However, for thick tablet, the apparatus within the range 8-16mm and 12-20mm shall be used.

3.10.1 The assembly and disassembly is as follows:

- Remove the 8-12 lower punches (depending on the machine type);
- Screw off 2 fastener screws on the apparatus and remove 2 locating pins.
- The supporting plate swings by 90° and draw forward out the apparatus.
- Install new machine as per reverse subsequence.

The dosage has been adjusted according to the average value of filling range corresponding to the apparatus in advance. The limitation for dosage adjustment has been performed in the descending device actually. Therefore, the replacement is not necessary or it is not necessary to readjust other any parts in addition to the apparatus itself.

3. 11 Control of lower punch

The control unit on the track of lower punch indicates that the sliding of lower punch encounters the trouble through the terminal switch.

3.11.1 If the flesh pink” Difficult sliding” button on the operating console is pressed, the machine is disconnected and the flesh pink signal lamp lights up when the machine reaches to the first lower punch with difficult sliding. After the clutch is connected again, the red signal lamp goes out.

3.11.2 IF the this lamp button is not pressed, the flesh pink signal lamp only indicates that the lower punch is difficult to slide in flash mode and the machine continues to operate.

3. 12 Overpressure control

For the terminal switch in the hydraulic cylinder of main pressure, its function is to indicate that the upper compression roller deviates. (please refer to section 3.6). the working system is identical to the control system of lower punch (please refer to 3.11.1 and 3.11.2). only the relevant lamp button corresponds to the “Overpressure” button.

3. 13 Tablet deviation

During the start-up process of die-holding wheel and after coupling part is disconnected, the tablet in which the deviation exists will move to the position collecting defective tablets automatically.

3.13.1 After a ROP calibration instrument is switched on (please refer to section 3.15), the tablet in which the deviation exists stops at the rejection position of tablet until the calibration instrument sends out the signal that the tablet is acceptable.

3.13.2 When the blue switch in the control cabinet (“Deviation”) is switched on, the deviated tablet always stops at the rejection position. In this case, the corresponding blue lamp will light.

3. 14 Dosage reduction

During the start-up process of die-holding wheel and after coupling part is disconnected, the dosage machine will slide upward in small range automatically. The purpose is to avoid filling the die too much and thus the die-holding wheel rotates too slowly.

3.14.1 If the blue switch (“Dosage”) is switched on, the dosage cannot be reduced. In this case, the corresponding blue lamp will light up.

3. 15 Measuring device of pressure & warning device for machine

There is an elongation strip on the original machine and this strip is used to measure the stamping force in the main stamping area.

3.15.1 The machine can be connected with the KILIAN-ROP series of measuring instruments and warning instruments or calibration instruments. When it needs to operate together with the warning instruments or calibration instruments, the white switch “R” located on the operating console shall be switched on (The signal lamp lights up).

3. 16 Trial run scheme executed for production of certain tablet whose size is determined

3. 16. 1 The following information has been obtained:

- Tablet weight
- Tablet resistance (or thickness)

3. 16. 2 Preparation in the stopped state:

- The preset hydraulic load is calibrated according to the diameter and state of punch (please refer to the paragraph 1 in the section 3.9).
- The filling grade is adjusted according to the data in the table of “Filling grade of certain tablets with specified size” (please refer to section 5.5).

- The tablet thickness is adjusted according to the same data sheet.
- The pre-pressure shall be calibrated and it is equal to the filling data plus 3mm. For example, the pre-pressure is provided by 6mm filling amount is $6+3=9$ mm.

Note: these data are only reference data. These data shall be noted in order to avoid damaging the machine when starting the machine.

3. 16. 3 Start-up of machine

- After the feed hopper is full of materials, the filling piece Loading sheet operates for about 10s (please refer to 6.3.1.1).
- Switch on the machine and reduce the tablet thickness slowly until there are some tablets meeting the requirement from the machine.
- Weigh the tablet weight and modify the weight if necessary.
- Verify the tablet resistance (or tablet thickness) and carry out the necessary modification. It ensures that the maximum pressure value shall not be exceeded. (please refer to section 3.6).
- Finally, the pre-pressure is calibrated according to the detailed description in the section 3.5.1.

3. 17 Calibration of tablet separator

The distance between the separator and protruded lower punch shall be less than 0.1mm in order to avoid damaging.

4. Maintenance & lubrication

- 1 Check the sliding property of upper and lower punch periodically. The punch is lubricated through the central system. If the touching environment of upper punch is much dirty, the upper punch can only touch the a very thin layer of oil. Pay special attention that the

cleanliness of guide drill is always maintained.

4. 2 For other movable components, the lubrication shall be performed according to the indication on the lubrication scheme. The bearing is installed at all main supporting points. The basic maintenance is required. Other lubricating points not mentioned in the above scheme only need to be lubricated once for long time intervals.
4. 3 The bearing is lubricated through central system. The lubricating oil flowing to the head of lower punch through the roller and lubricating oil produced after the punch is lubricated is collected in the compression roller tank. After the tank is full of oils, the oil will overflow and flow in the oil-collecting tank. The collecting tank shall be emptied periodically.
4. 4 The oil level of gearbox operated by topless screw needs to be checked periodically. the oil change at first time shall be carried out after the machine operates for 200 hours. Subsequently, the oil shall be changed every 5000 hours under normal working condition. Which type of lubricating oil that can be used is mentioned in the lubrication scheme (Quantity demanded: 3l)
The topless screw assembly can be adjustable. After it works for long times, it can be adjusted only when the machine is at the working temperature if the readjustment is required.

4. 5 The central oil lubricating system (please refer to the scheme and section 5.2.) is only effective for machine of single-piston lubricating pump.

The pumping quantity from the pump has been adjusted in the factory. The working property of lubrication and oil level of oil tank is controlled automatically. When the flesh pink “Lubrication” signal lamp on the operating console lights up, it indicates that either there is less oil in the oil tank or the central lubricating system has the fault. The machine shall stop before troubleshooting (Please see the section 5.2 for details).

4. 6 Hydraulic unit

Check the oil level periodically. When there is no pressure in the machine (the reading indicated on the pressure gauge is less than 10 Kn). The oil level shall be reached to the upper level above therefrence point or exceeds maximum 5 cm. When the unit bears the maximum working pressure, the oil level always cannot be lower than reference point. When the oil level is recovered, the oil from hydraulic system shall be used. The viscosity of this oil at 50°C is about 26mm²/s.

4.7 Belt tension

When the intermediate idle position of belt is tensed, the belt will move leftward and rightward 1-2cm, this indicates that the tension roll has been adjusted.

4.8 Coupling

For the electromagnetic coupling, the maintenance is not necessary basically.

4.9 Planetary gear transmission

4.9.1 Structure

The planetary gear transmission that can be adjustable under the state of non-stopping continuous operation is a entire metal friction-type gearbox. The high-precision quenching and mechanical component rotates by engagement one by one in the oil lubrication. For all friction components and supporting joints, the oil supply is realized automatically. The oil supply mode shall be either oil immersion or centrifugal mode. The planetary gear is immersed in the oil by rotating one cycle. Afterwards, the oil flows in various positions where the lubrication is required by centrifugal mode.

4.9.2 Installation of gearbox

The gearbox shall be always installed at the well ventilated place to meet the cooling demand.

The engine-gearbox assembly on the TX machine is the air-cooling assembly. The air blow is performed by fan.

The inlet and outlet of air-blow chanel is located at the rear wall of machine and they must be always kept smooth so that the air can flow through without any obstruction.

4.9.3

The gearbox shall be in the running state when modifying the revolution. The electrical connection with the engine provides the guarantee for this condition.

Two terminal switches on the calibration screw rods can limit the calibration range.

February, 2nd, 1987

Atten:Mr. ENRIQUE FERNANDEZ

Subject: Compressor=KILIAN

The supplier of oil used on the ship in Spain is:

ACCIONAMIENTOS Y TRANSMISIONES Co., Ltd.

No. 94 BAJOS CASTELLDEFELS ☒ LA CONSTITUCION Ave.,
Barcelona

Tel: 93-6641403

Telex: 54981

Oil quantity of gearbox: 1.5l

Hope that the above information can answer your inquiry.

Best regards,

OLAVE / CASOS

4. 9. 4 Lubrication (gearbox)

The lubricating oil for gearbox is provided for lubrication demand during whole operating period. Therefore, it is not necessary to change any oils.

The oil level shall be checked periodically.

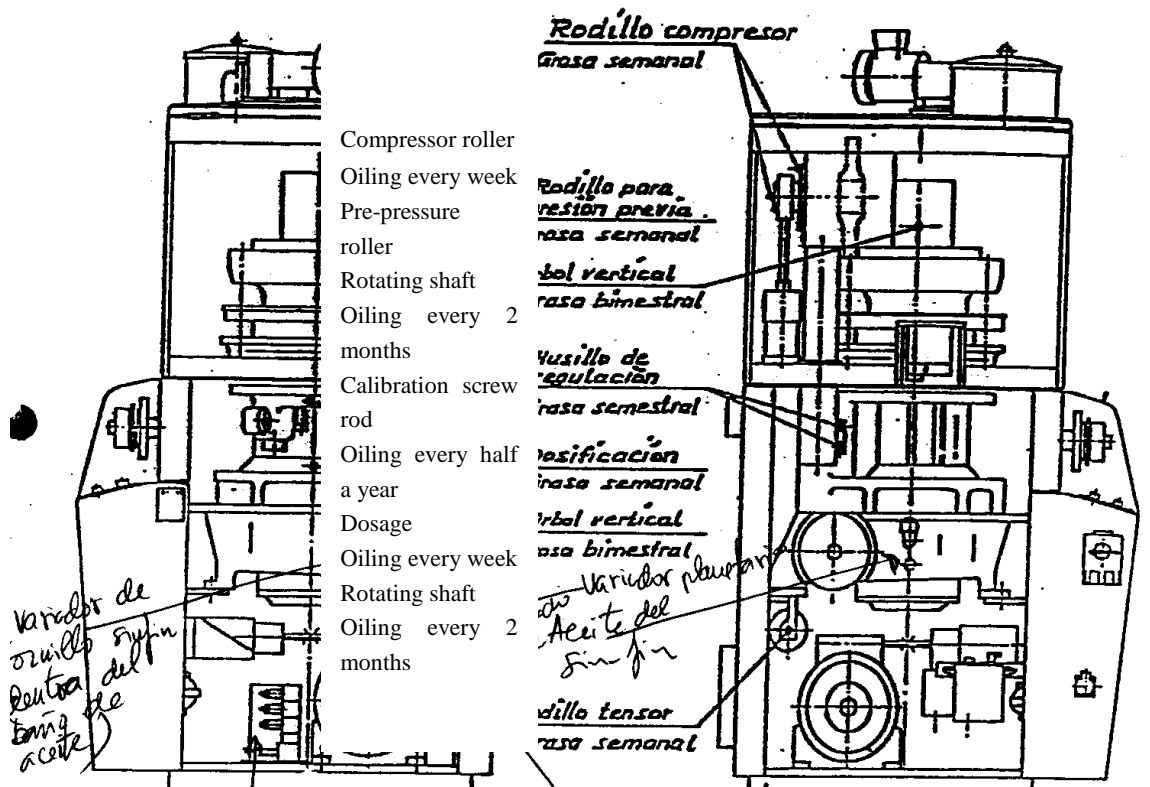
When it is required to refill the oil, please only use No. DISCO-01 74 oil.

Other recommended oils in available:

These following recommended oils also can be used. It must be changed every 1000 working hours. When a certain type of oil is used at first time, the residual DISCO-01 74 shall be removed entirely.

Manufacturer	Name of oil
ARAL	ARAL Oel HTU ARAL Oel BG 4
BP	BP ENERGOL HP 15
CASTROL	CASTROL HYPIN 70 CASTROL HYPIN AWS 32
SHELL	SHELL DONAX T 6 SHELL TEGULA OEL 27
ESSO	ESSO 43, ESSTIC 42
MOBIL	MOBIL D.T.E., light oil
SUN OIL	SUNVIS 816 W-R, SUNVIS 916
DEA/TEXACO	TEXACO REGAL OIL AR & O

The viscosity of these oils are about $21\text{mm}^2/\text{s}$ at 50°C .



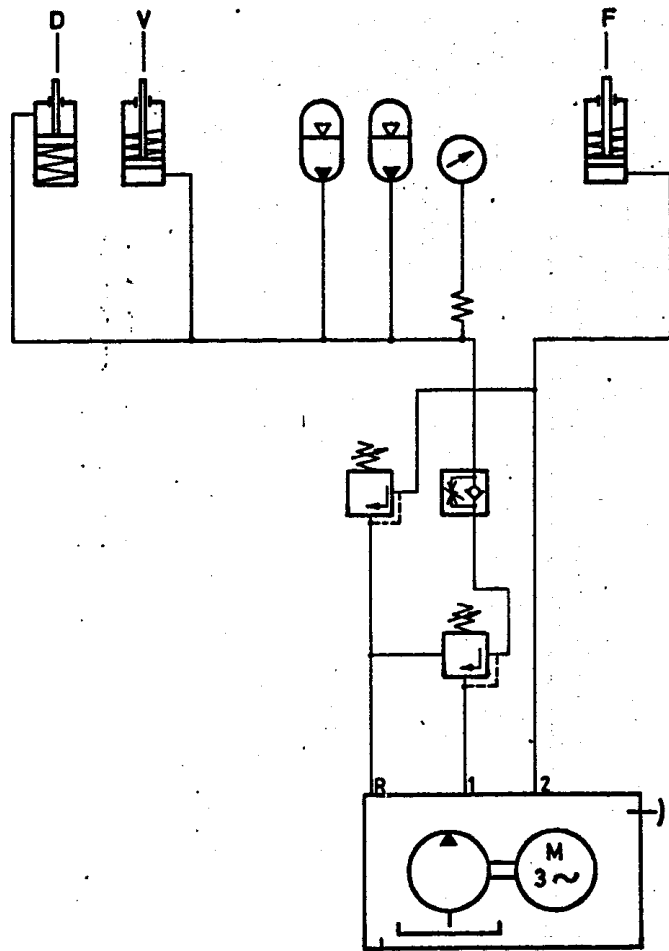
Recommended lubricating oil

Supplier	Conventional hydraulic pressure	Drop hydraulic pressure	Topless screw & conventional lubrication	Oiling
Kluber-Lubrication			Lamora 220	
TEXACO	RANDO Oil DH C	RANDO Oil HD F		GLISSANDO FL30
mm ² /s at 50°C	35 mm ² /s	49.8 mm ² /s	127 mm ² /s	

Other alternative lubricating oil

BP	Energol CS100	Energol CS125	Energol GR-XP 220	Energrease LS3
ESSO	Esstic 50	Esstic 55	Spartan EP 220	Beacon 3
SHELL	Tellus Oel 933	Tellus Oel 937	Omala c-LP 114	Alvania R3
TOTAL	Azolla 46		Carter EP 220	Multis 31
Soprograsa			Supergras CLP 220	

5. 1 Electricschematic cdiagram of hydraulic unit



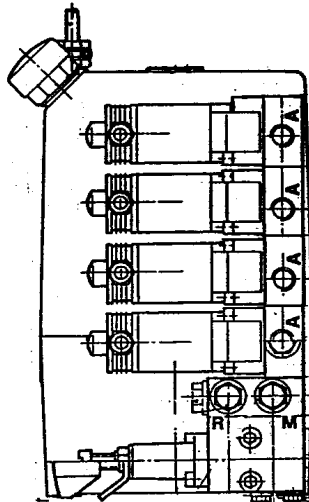
D=Stamping pressure
 V=Pre-pressure
 F=Fillinamount/dosage

Approximate maximum volume of oil
 tank: 0.9l

Approximate avialable volume: 0.55l

TX Rolling machine

Hydraulic Hydraulic control unit



Solenoid valve:

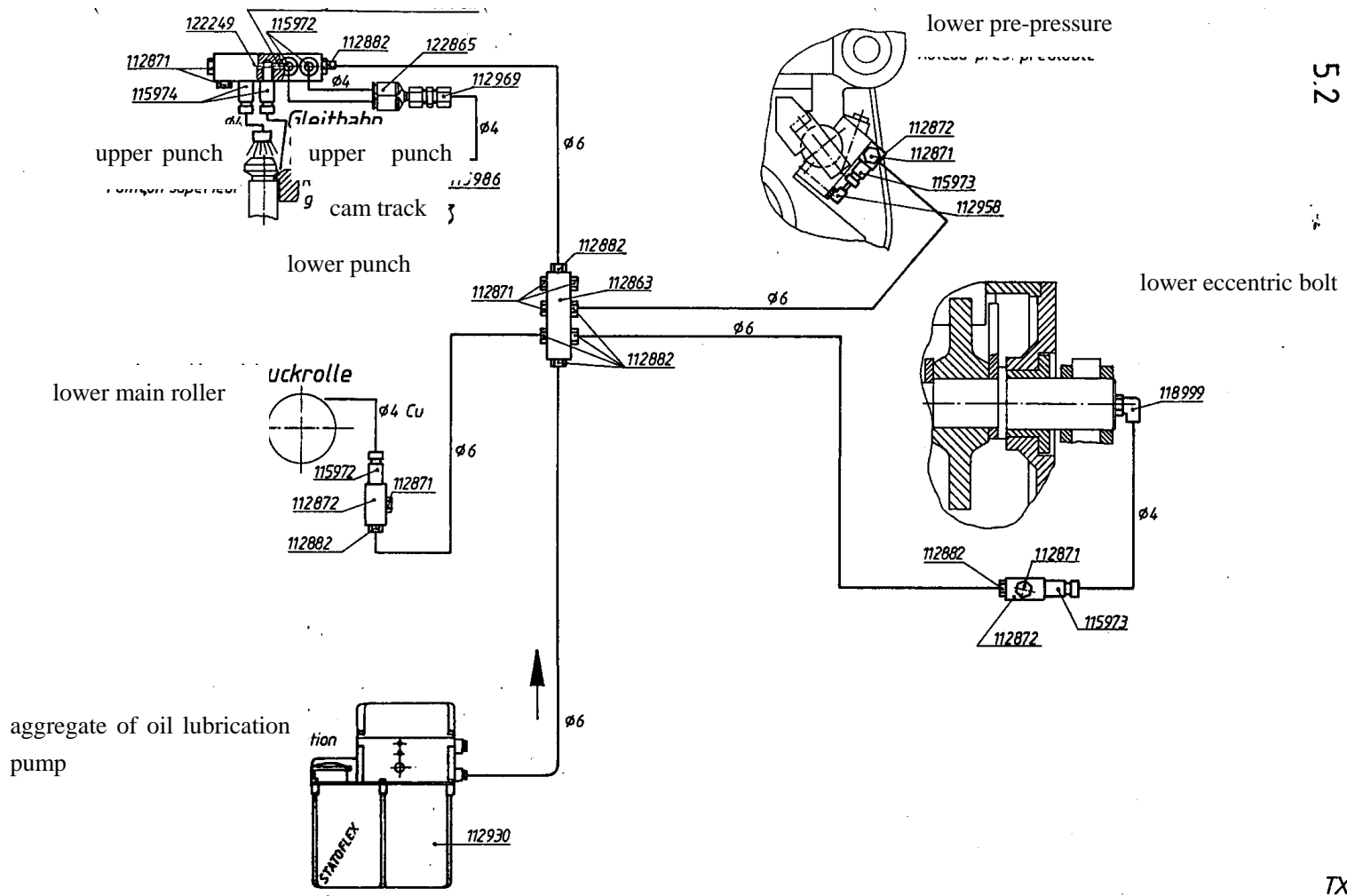
GR 2-0R y5

GR 2-0 y4

GR 2-0R y8

GS 2-0 y7

PressureLimit valve:



5.2

Autom. Schmierung, Standard

TX
122866

KILIAN & CO	Die holding pulley									
	rpm, the speed unit is m/s measured on the original diameter									
	TX40		TX30		TX25		TX24		TX21	
Hourly capacity	rpm	m/s	rpm	m/s	rpm	m/s	rpm	m/s	rpm	m/s
10000										
20000			11.11	0.22	13.33	0.26	13.88	0.27	15.87	0.31
30000	12.5	0.24	16.66	0.32	20	0.39	20.83	0.4	23.81	0.46
40000	16.6	0.32	22.22	0.43	26.66	0.52	27.77	0.54	31.75	0.62
50000	20.8	0.4	27.77	0.54	33.33	0.65	34.72	0.67	39.68	0.77
60000	25	0.48	33.33	0.65	40	0.77	41.66	0.81	47.62	0.92
70000	29.16	0.56	38.88	0.75	46.66	0.9	48.6	0.94	55.55	1.08
80000	33.33	0.65	44.44	0.86	53.3	1	55.55	1.08	63.49	1.23
90000	37.5	0.73	50	0.97	60	1.16	62.5	1.2	71.43	1.38
100000	41.6	0.81	55.55	1.08	66.66	1.29	69.44	1.35	79.36	1.54
110000	45.8	0.89	61.11	1.18	73.33	1.42	76.38	1.48	87.3	1.69
120000	50	0.97	66.66	1.29	80	1.55	83.33	1.6	95.24	1.85
130000	54.16	1.05	72.22	1.39	86.66	1.68	90.27	1.75	103.17	1.99
140000	58.3	1.13	77.77	1.51	93.33	1.81	97.22	1.88		
150000	62.5	1.21	83.33	1.6	100	1.94	104.16	2		
160000	66.66	1.29	88.88	1.72	106.66	2.07				
170000	70.83	1.37	94.44	1.83						
180000	75	1.45	100	1.94						
190000	79.16	1.53	105.55	2.04						
200000	83.33	1.61								
210000	87.5	1.69								
220000	91.66	1.78								
230000	95.83	1.86								
240000	100	1.94								
250000	104.16	2.02								

TX Rolling machine

5. 4 Maximum stamping force

Dia. mm	Area mm ²	1 mm ² =0.8kn Plane & slight concave	1 mm ² =0.5kn Standard concave & oblique cutting;	1 mm ² =0.3kn Special concave & hemispherical shape
3	7.07	5.65	3.53	2.12
4	12.57	10.05	6.28	3.77
5	19.63	15.71	9.82	5.89
6	28.27	22.62	14.14	8.48
7	38.48	30.79	19.24	11.55
8	50.27	40.21	25.13	15.08
9	63.62	50.89	31.81	19.09
10	78.54	62.83	39.27	23.56
11	95.03	76.03	47.52	28.51
12	113.10	90.48	56.55	33.93
13	132.73	106.20	66.37	39.82
14	153.94	123.2	76.97	46.18
15	176.71	141.4	88.36	53.01
16	201.06	160.8	100.5	60.32
17	226.98	181.6	113.5	68.09
18	254.47	203.6	127.2	76.34
19	283.53	226.8	141.8	85.06
20	314.16	251.3	157.1	94.25
21	346.36	277.1	173.2	103.9
22	380.13	304.1	190.1	114.0
23	415.48	317.9	207.7	124.6
24	452.39	361.9	226.2	135.7
25	490.87	392.7	245.4	147.3

TX Rolling machine

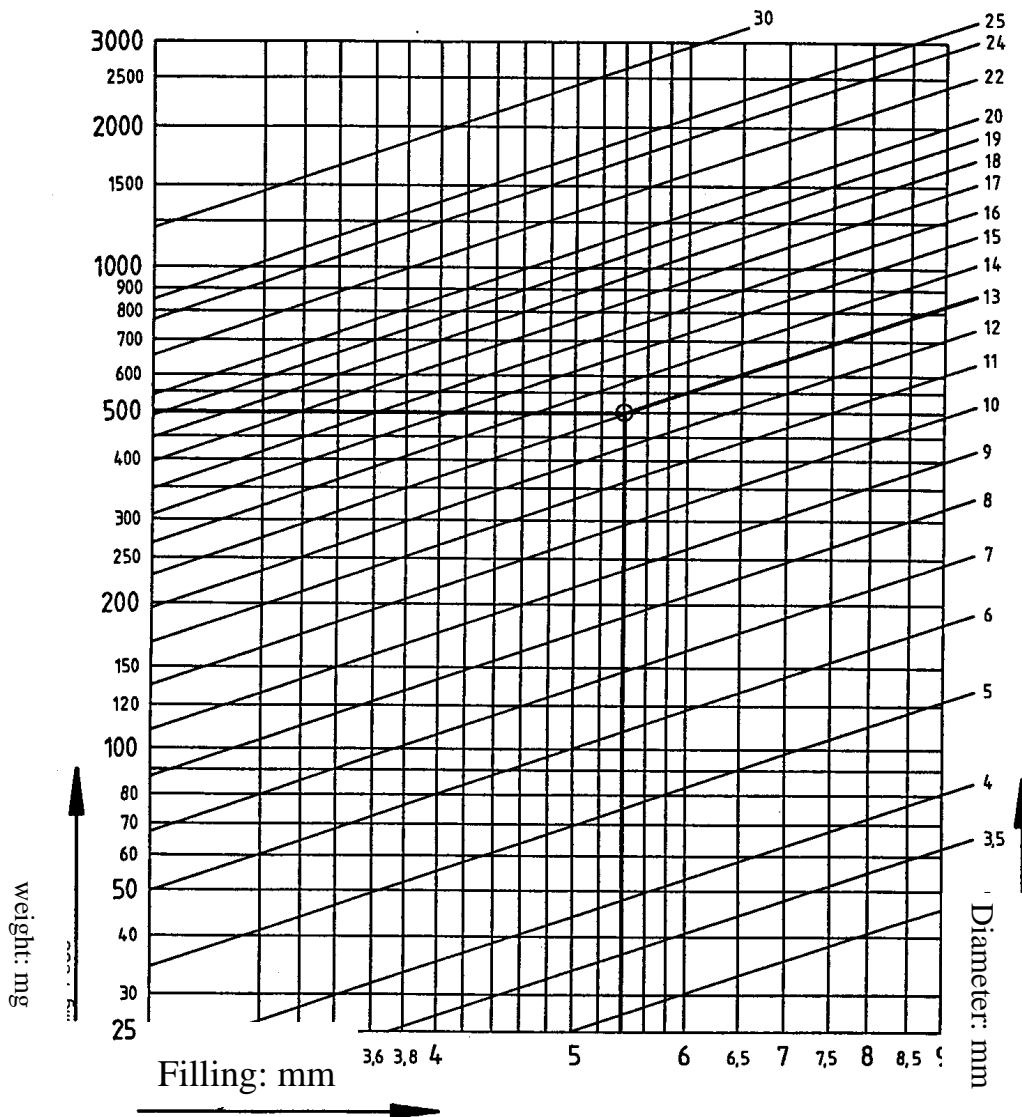
5. 5 Filling size

The density of material to be prepared is 0.7g/cm³. The following data calculation is only for plane tablet. For angular cut or convex tablet, the filling can be reduced to 20%.

TX Rolling machine

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The density of material to be prepared is 0.7g/cm³. The following data calculation is only for plane tablet. For angular cut or convex tablet, the filling can be reduced to 20%.



For example: the weight of tablet is 500 mg and the diameter is 13mm. The filling value can be obtained beginning at 500mg at the Y-coordinate and 13mm at inclined line to downwards. The filling value is 5.4mm. The value will be varied depending on the density of material to be prepared ad tablet shape.

6. Loading sheet Filling piece with FIIC agitating blade

6. 1 Summary

Loading sheet The filling piece is equipped with 2 agitating blades in vertical axis. The revolution direction is opposite one another. It is started by one power reducer. The rotational speed can be adjusted even if the machine is in the operating state and the speed is transmitted through the revolving shaft. The revolving shaft is equipped with the quick coupling device. The material to be stamped accesses into the filling piece Loading sheet through the intermediate position and 2 blades. The material is supplied automatically. Therefore, there are material to be stamped on the filling piece Loading sheet and the 80% of total capacity is kept.

Usually, the filling piece Loading sheet can operate as per either adjusted stamping speed. The filling accuracy mainly depends on the particle quality of material to be compressed.

6. 2 Structure

this part of unit is also equipped with the following components in addition to filling piece Loading sheet:

101 I The adjustable piece storage machine has the quick fixing and material outfeaturut feature.

301 Start-up reducer with revolving shaft

501 Feed hopper

Tablet wiper

401 Wiping part with support

405 Deflector

6. 3 Working property

(The key operating factors are listed in the corresponding drawing in section 1.11)

6.3.1 When the changeover-selector in 6.20 is located at the “Automatic” position, The switching on and off of filling piece Loading sheet is automatic operation and it is linked up with the coupling on-off.

6.3.1.1 Pre-filling and emptying

If these operations are intended to complete, the filling piece Loading sheet needs to be connected with the exchange-selector (“Manual” position) in 6.11. this connection still shall be continued even if the protective cover of machine is opened. However, in this case, the stamping start-up is locked.

If the filling piece Loading sheet is intended to empty, the sliding slot located at the upper part of filling piece Loading sheet storage device shall be drawn out

6.3.2 Speed regulation

the steering wheel on the power reducer is used to calibrate the revolution of agitating blade. For most common product, the optimum revolution shall be determined according to the stamping speed. Within the medium and lower range of machine capacity, the most ideal revolution is 20-25 cycles per minute. If it is at the upper limit of machine capacity (about above 1.6 m/s), the working speed is 30-50 cycles per minute. For small size of tablet, the rated revolution is much less. when the tablet size is large and the raw material to be used does not meet the requirement for die packing so much, the agitating blade shall rotate even larger.

6.4 Removal of filling pieceLoading sheet

Empty the hopper and filling pieceLoading sheet (please see the section 6.3.1.1). The exchange-selector is pushed to the “Automatic” position (the starting motor of filling pieceLoading sheet shall be disconnected).

The couplingshaft on two filling pieceLoading sheet are disconnected.

Raise the empty hopper.

Swing the connecting rod outwards.

Pull the filling pieceLoading sheet forward and remove it.

6.4.1 The installation of filling pieceLoading sheet is performed according to the above reverse subsequence.

6.5 Aligned placement of filling pieceLoading sheet

when exiting the factory, the filling pieceLoading sheet is aligned with the die-holding panel. there is about 0.05mm spacing in the middle. It is possible to readjust the position after operating for long time as the natural consumption damages the standard distance between these two parts or when the product has the trend of “oil sticking” (adhered on the metal component)

In the type 1 situation, the spacing shall be specified at the set standard (0.05mm). In the type 2 situation, this spacing shall be increased.

6.5.1 procedure as per following steps:

- Remove the filling pieceLoading sheet
- Check the spacing by knife ruler located at the storage plate.
- Loosen the reverse nut of tightening bolt at the storage of filling pieceLoading sheet and then adjust the spacing between these

bolts. If the sheet metal with proper thickness is inserted, this adjustment shall be much simpler. The sheet metal shall be placed between the knife ruler and die-holding wheel. (if necessary, the sheet metal also can be replaced by a tissue paper. It is just enough if it can move easily between the knife ruler and die-holding wheel.)

- After the reverse nut is screwed up again, the spacing shall be checked again from several different points.

-

6.5.2 In any cases, the spacing between filling pieceLoading sheet and die-holding wheel cannot be reduced. Otherwise, these two components will produce larger consumption in the future operation. This is the maximum inevitable allowable error in the machine manufacturing.

6.5.3 when a filling pieceLoading sheet loses the air tightness for die-holding wheel, the lowersurface of filling pieceLoading sheet shall be checked. If the consumption is found, the surface needs to be rectified to make it completely smooth.