USER´ MANUAL

HYDRAULIC SHEAR

MODEL HGL

Machine Types: HGL CXXXXX-Xxx
HGL SXX0XX-Xxx

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MACHINE TYPE DESCRIPTION

	STANDARD	SUPPLY VOLTAGE	BACK GAUGE CONTROLLER	BAKCSIDE SAFETY	BLADE GAP ADJUSTMENT SYSTEM	HYDRAULIC BLOCK	ACCESSORIES
HGL	**X**	**X**	**X**	**X**	**X**	**X ----**	**XXX**
	C – CE S – STAND.	1 – 220 2 – 230 3 – 240 4 – 400 5 – 415 6 – 440 7 – 480 8 – 600 9 – 220/400	1 – PRG 911 2 - ELGO 9521 3 – S3	0 – NO SAFETY 1 – LE 20 (SICK) 2 - PHOTOCELL	1 – MANUAL 2 - MOTORIZED	1 – BOSH 2 – REXTROTH 3 – BOSH – REXTROTH	1 – PNEUMATIC A - Type B – Type 2- REMOVEBALE FINGER PROTECTION

!

NOTE:

In order to SEE THE TYPE OF YOUR MACHINE, please see the electric circuit diagram in APPENDIX C. It is written in the left bottom side of the diagram.

! ATTENTION

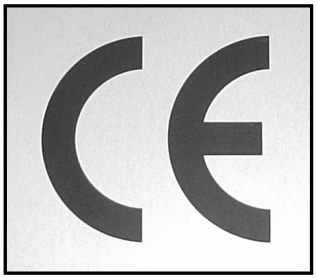
PUMP ROTATION MUST BE IN ARROW DIRECTION, OTHERWISE THE PUMP WILL BE DAMAGED

INFORMATION AND WARNING LABELS

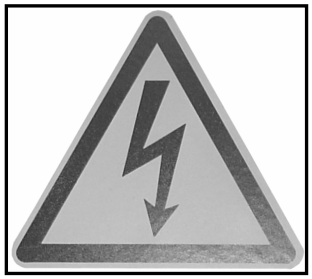
DESIGNATION PLATE

Manufacturer		BAYKAL Mak. San. Tic. A.Ş. Bursa / TÜRKİYE
Machine		Hydraulic Shear
Type		HGL
Model		
Serial No		
Cutting Capacity	ton	
Cutting length	mm	
Main voltage	V/Hz/Ph	
Motor Power	kW	
System Pressure	bar	
Stroke per minute	mm	
Machine weight	kg	
Length	mm	
Width	mm	
Height	mm	

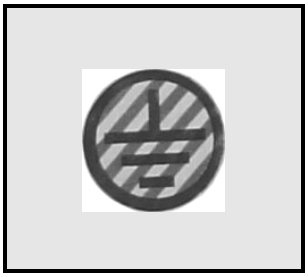
DESIGNATION PLATE



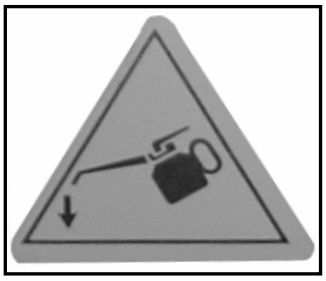
CE CONFIRMATION



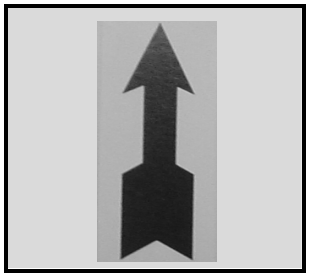
DANGER: ELECTRIC SHOCK



GROUND



LUBRICATION POINT



PUMP ROTATION

C O N T E N T S:

1. GENERAL MACHINE INFORMATION

1.1. Registered trademark
1.2. Machine type
1.3. Serial number
1.4. Year of manufacturer
1.5. Address of the manufacturer
1.6. Address of the authorized dealer

2. IMPORTANT INFORMATION

2.1. Safety features of your shear
2.2. Important safety information & instructions
2.3. Noise Measurement

3. OVERALL DRAWING OF THE MACHINE

4. LIFTING & TRANSPORTATION

5. UNPACKING & INSTALLATION

6. OPERATING AND MAINTENANCE INSTRUCTIONS

6.1. Technical data
6.2. Description of shear applications
6.3. Prohibited uses of the shear
6.4. Incorrect uses of the shear
6.5. Using the shear
6.6. Maintenance and inspection
6.7. Troubleshooting
6.8. Conditions of storage, re-utilization and scrapping

7. LUBRICATION CHART

APPENDIX

A. SPARE PARTS LIST

B. HYDRAULIC CIRCUIT DIAGRAM

C. ELECTRIC CIRCUIT DIAGRAM

D. DIGITAL CONTROLLER PARAMETER

E. FREQUENCY INVERTER PARAMETERS

ADDITIONAL MANUALS

A. DIGITAL CONTROLLER MANUAL (to control backgauge)

B. DIGITAL CONTROLLER MANUAL (for motorized blade gap adjustment) ***(optional)***

1. GENERAL MACHINE INFORMATION

1.1.	Registered trademark	: BAYKAL
1.2.	Machine type	: HGL
1.3.	Serial number	:
1.4.	Year of manufacture	:
1.5.	Address of manufacturer:	
1.6.	Address of the authorized dealer:	

2. IMPORTANT INFORMATION

2.1. Safety features of your shear:

- The electrical and hydraulic circuits of your shear are designed to allow operation with maximum safety. The following precautions are available on the machine for enhanced safety.
- Emergency stop buttons (engaging type) are available on the electrical cabinet, on the foot switch control unit and on the right-hand side of the upper frame of the machine, all of which are easily accessible.



Figure 2.1

- When the foot-switch is released in case of an emergency, the cutting beam will retract automatically by design of the shear.
- To prevent operator or other persons from accidental contact with cutting blades or holddowns, a finger protection grid is fitted in front of the machine alongside the blade length.

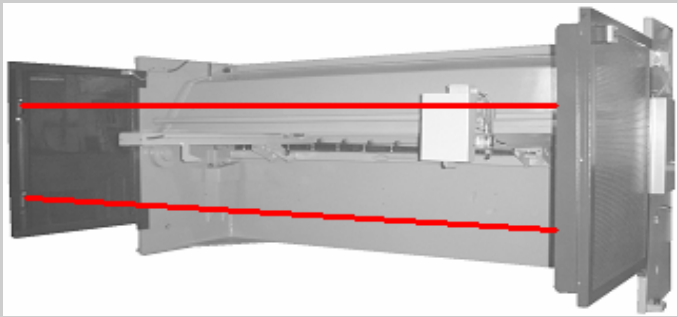


Figure 2.2

- The rear of the shear is covered by a photocell operated fence system against any careless access into the back-gauge area. If the light from sensor to reflector is cut for any reason when the cutting beam is down-stroking, the beam will stop at a standstill. If the light from sensor to reflector is cut for any reason before operation, the machine will be inactive.

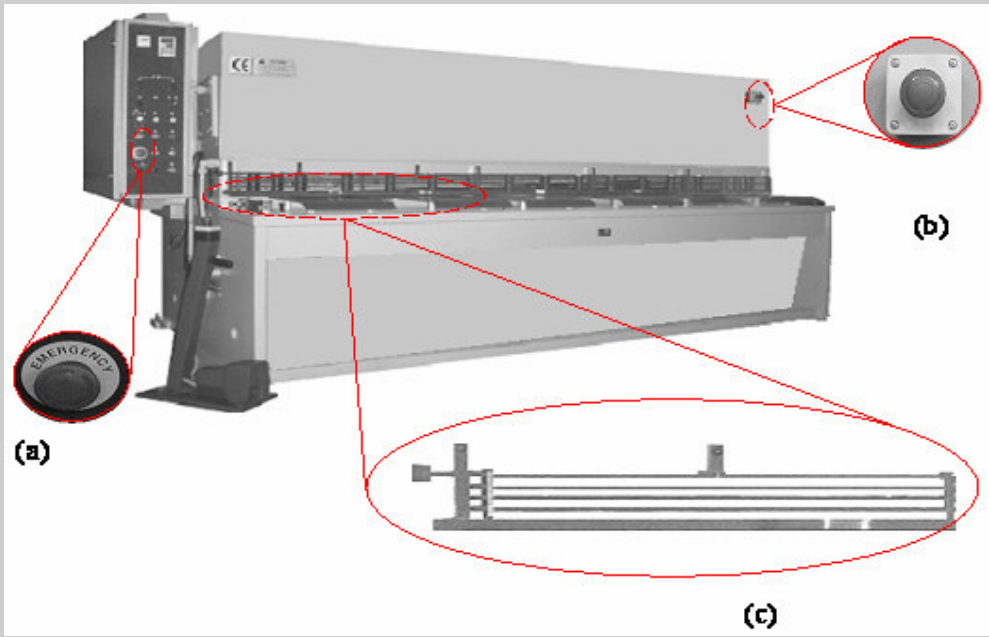
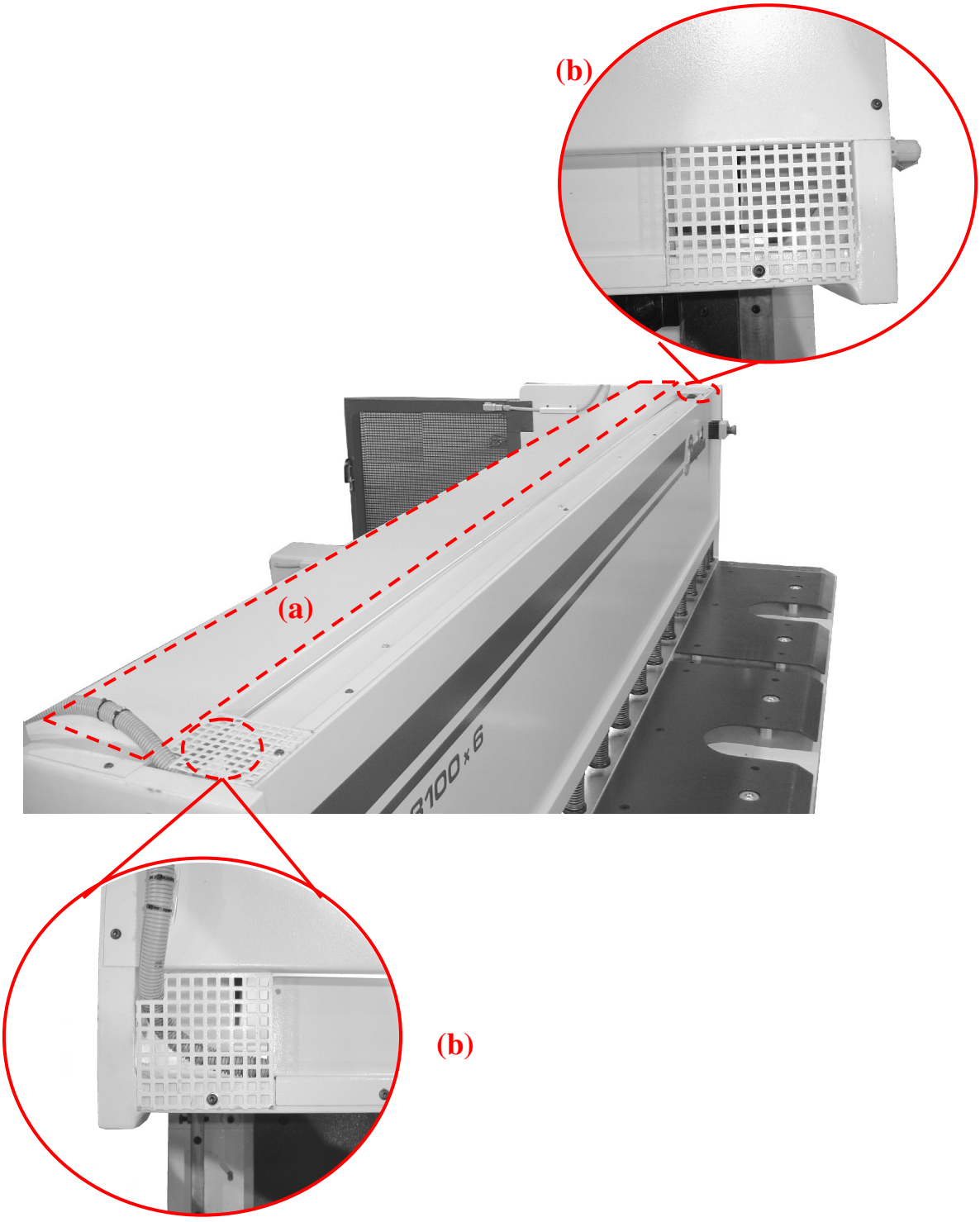


Figure 2.3

- The cylinder and piston group is located inside the frame of the machine by design to avoid any damage to operator or other persons within vicinity of the shear.
- The lifting springs of the top beam are covered by fixed cover plates
- In case of a power supply failure during operation, the beam will stop at a standstill. When power supply is recovered, it is NOT possible to start the machine without resetting.



The plate **(a)** and grid **(b)** are used to protect the operator from accidental contact while the cutting beam is moving upward and downward

2.2. Important safety information & instructions:

1.	The machine must NOT be operated before reading this User‘s Manual. Operate the machine only if it is in a perfect condition and in accordance with the work regulations of your factory and operating instructions of this manual.
2.	**TRANSPORTATION!** The lifting points are shown in the Lifting Diagram attached. The dimensions and the weight of the machine are given in section 6.1.1.of this manual.
3.	**INSTALLATION!** The shear is delivered in complete assembled execution. It must be leveled and firmly stationed on the floor where it is to be used, according to the Installation Diagram attached. Indoor installation and a dry working environment without danger of fire and explosion is necessary.
!	*The permissible floor load, where the machine is to be installed, must be accounted for.*
4.	The machine must be operated only by authorized and trained personnel. Operation by unauthorized and untrained Personnel in a way that does not comply with the instructions and regulations may lead to dangerous situations and is strictly FORBIDDEN.
5.	In case of any emergency, push the emergency stop buttons and follow the emergency rules of your factory.
6.	The shear is designed that it can be operated by a single operator. Using the machine with more than one operator is forbidden, except for certain maintenance situations. (See Section 6.6.)
7.	The following instructions must be born in mind and be adhered to for safe operation and maintenance of your shear :

!	*This shear is designed for cutting only within the meaning of section 6.2. of this manual regarding shear applications. Prohibited uses of the machine are dealt with in section 6.3. of this manual.*
!	*DO NOT remove the ″finger protection grid″ in front of the machine under any circumstances while the machine is in an operational mode.*

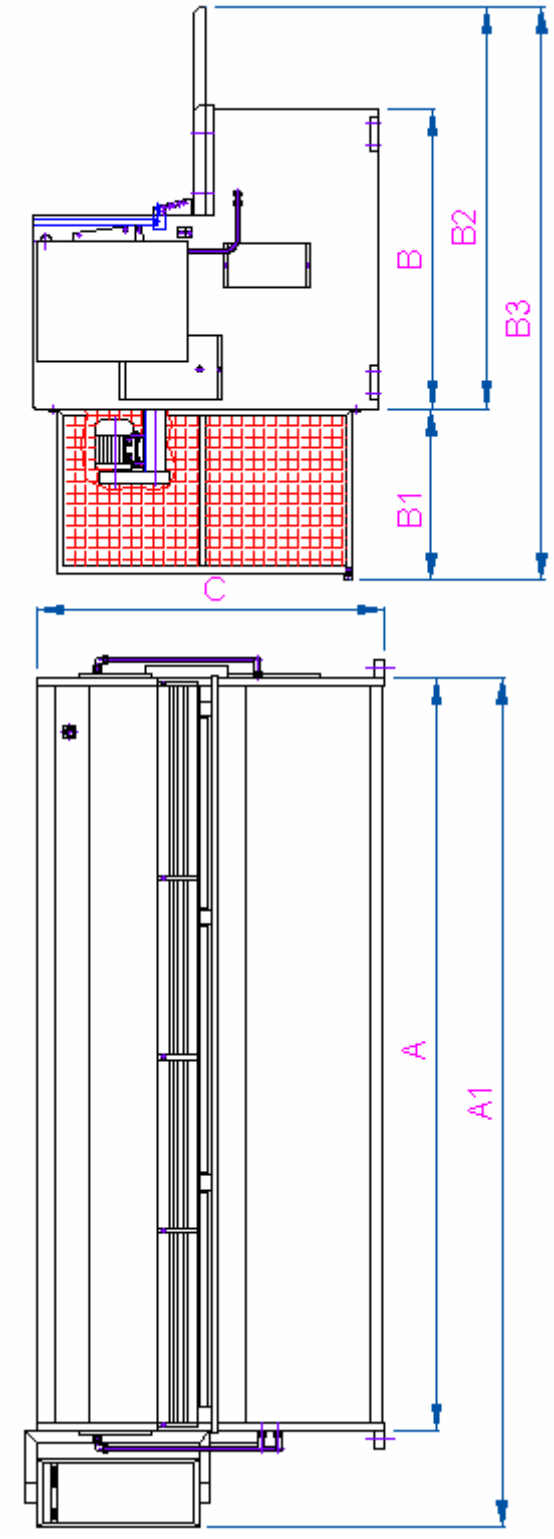
!	*DO NOT operate the machine without proper blade gap adjustment according to sheet thickness.* *(See section 6.5.5.)*
!	*DO NOT use cutting blades which are excessively blunted.*
!	*Check the machine daily for recognizable external damages and defects.*
!	*Operate the machine only if all protective devices and guarding are mounted and effective.*
!	*Take notice of any warning labels on the machine and do not remove them.*
!	*In case of malfunction, immediately shut down and secure the machine. All troubles must be eliminated before re-starting.*
!	*Avoid any operation which may endanger other persons and immediately shut down the machine when a danger is noticed.*
!	*Shut off the machine completely before any repair work is carried out.*
!	*DO NOT access into the backgauge area, while the machine is working.*
!	*DO NOT bridge the safety limit switch of the rear protective fence.*
!	*DO NOT use side squaring arm and front support arms for intermediate storage of workpieces.*
!	*During the shearing process, the workpiece may slide or move unexpectedly. Therefore, the material must be handled carefully.*
!	*All connecting bolts on the machine must be checked periodically and be re-tightened if necessary.*
!	*DO NOT change the default settings of the hydraulic valves.*
!	*When changing oil the illustration in Figure 1 of this manual must be referred to. Make sure that dirty filters are disposed separately.*
!	*The operating temperature range of the oil is : (10°C - 65°C)*

!	*Any fire in the electric control system must be quenched using a CO^2 fire extinguisher.*
!	*Any burning oil must be quenched using a CO^2 or powder extinguisher.*
!	*All regulations concerning surface facilities designed for the use of water polluting liquids must be observed in operation and maintenance of this shear.*
!	*All environmental regulations effective must be observed in use of this shear.*
8.	In the operation of the shear no special personal safety equipment is necessary. It is however recommended to use working gloves when handling the work-pieces.
9.	General maintenance of the shear can be carried out by universal tools and equipment while the machine is at a standstill.
10.	The manufacturer is free of any responsibility in case of any unapproved modifications made on the machine and/or any replacement of the original safety and protective devices by unoriginal ones.
11.	The machine is to be serviced and/or be repaired only by the authorized personnel of Baykal or its appointed representatives.

2.3. Noise measurement:

The sound pressure level of the shear at operator ′s working position is under 70 dB(A).

3. OVERALL DRAWING



Mak. Tip	A	A1	B	B1	B2	B3	C
HGL 2600X6	2760	3190	1260	1200	1740	2940	1560
HGL 3100X6	3260	3740	1320	1200	1800	3000	1576
HGL 3100X8	3305	3735	1450	1200	1930	3130	1650
HGL 3700X6	3965	4395	1450	1200	1930	3130	1650
HGL 4100X6	4305	4735	1560	1200	1990	3190	1750

4. LIFTING & TRANSPORTATION

The following points should be taken into account:

- The lifting points are illustrated in the Lifting Diagram attached. The dimensions and the weight of the machine are given in section 6.1.1.of this manual.
- Make sure that the lifting rope or chain has sufficient capacity for the lifting operation.

! *The machine must be handled with extreme caution when lifting and installing to prevent it from inclining forward, or even falling down.*

! *Make sure that the machine is not subjected to impact during loading or unloading.*

! *The crane to lift the machine must be controlled by a single operator.*

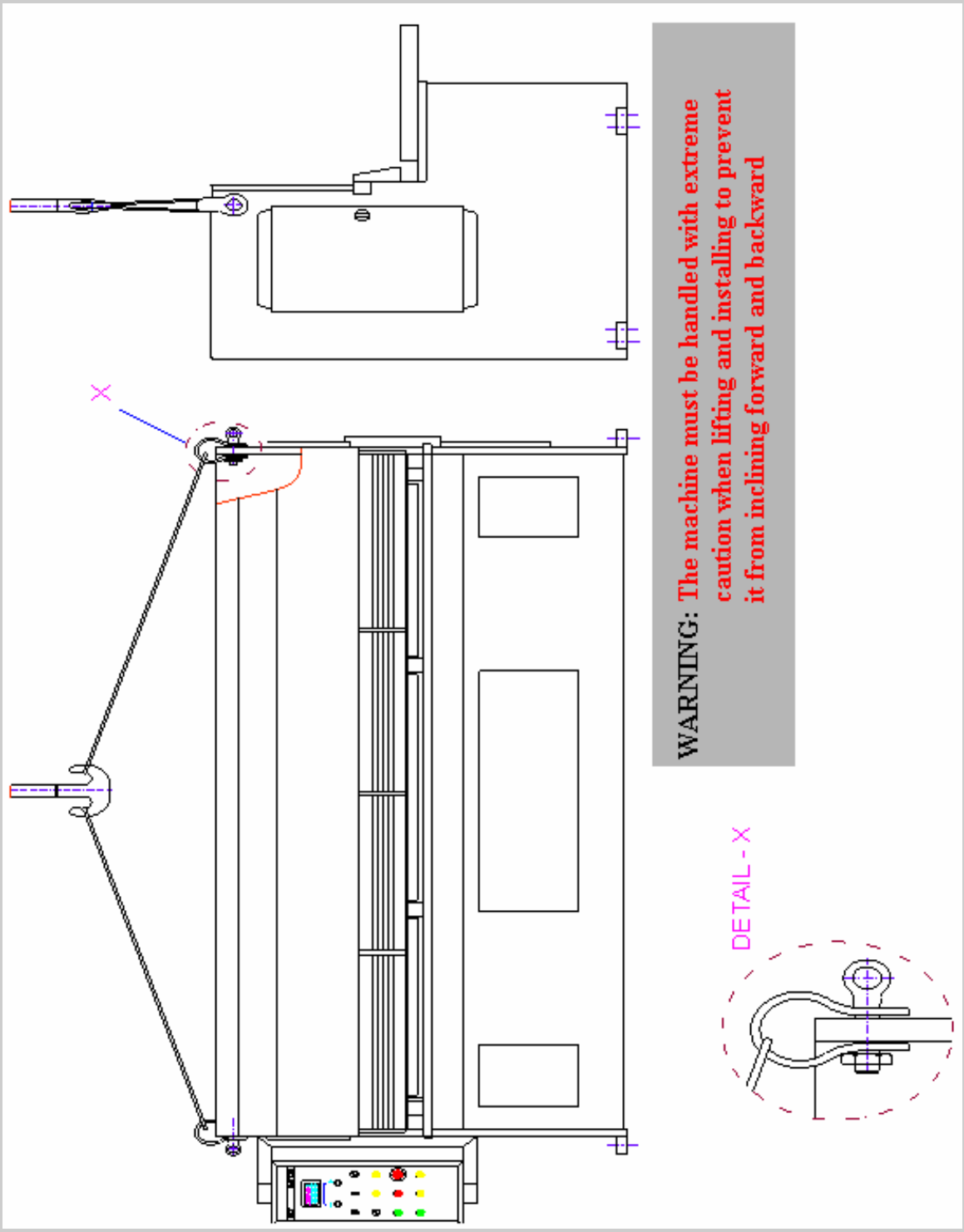

WARNING: The machine must be handled with extreme caution when lifting and installing to prevent it from inclining forward and backward
X
DETAIL - X

Figure 4.1

5. UNPACKING & INSTALLATION

- The shear is packed inside a nylon cover, and is bolted on wooden crates.

! Prior to installation, dispose nylon and wooden crate separately and safely in accordance with environmental regulations.

- After unpacking, check the machine visually against any damage during transport.

- Install the machine in an indoor area which is free from humidity and excessive dust.

! Make sure that the machine is installed in accordance with the work and maintenance space indicated in the enclosed Installation Diagram to enable the operator to visualize the work area without obstruction. Therefore, the hazardous situations regarding the operator, other persons, or materials due to incorrect installation will be reduced.

- To facilitate collection of the sheared material from the rear of the machine, sufficient space must be provided at the rear and by at least one side of the shear during installation phase.

- Floor conditions for installation: Flat and concrete surface (BS 25).

- Station the machine on the floor by anchorage bolts or steel expansion inserts as illustrated in the Installation Diagram.

- Level the machine by using a water level.

- Mount the side squaring arm and the front support arms as illustrated in the Installation Diagram.

- As the top and bottom blades are already fitted, the machine is now ready to connect to an electricity supply.

INSTALLATION DIAGRAM

6. OPERATING AND MAINTENANCE INSTRUCTIONS

6.1. Technical Data

6.1.1. Specification:

1.	Shearing length		mm
2.	Shearing capacity (≤ 450 ν /mm)		mm
3.	Rake angle		°
4.	Length		mm
5.	Width		mm
6.	Height		mm
7.	Weight		kg
8.	System pressure		kg/cm²
9.	Number of holddowns		pcs
10.	Strokes per minute		cuts/min
11.	Pump flow rate		cm³/rev.
12.	Oil tank volume		lt.
13.	Back-gauge range		mm
14.	Main motor, 3 phase 220V 60Hz		kW
15.	Back-gauge, 3 phase 220V 60Hz		kW

6.1.2. Standard Equipment:

- Electric motor: 220V 60Hz 3phase
- Top and bottom blades
- Back-gauge position controller
- Finger protection grid
- Side squaring arm
- Front support arms
- 750 mm. power back-gauge
- Oil tank level indicator
- Rear fence guarding (*If the machine has CE confirmation*)
- Footswitch

6.1.3. List of parts subject to rapid wear:

No.	Part name	Size specification	Qty.
1.	Bottom Blade	-	1
2.	Top Blade	-	1
3.	Piston Seal		2
4.	Rod guide ring		2
5	Rod guide ring		4
6.	Holddown Seal		17
7.	O-Ring (Holddowns)		17
8.	O-Ring (Pump-Suction)		1
9.	O-Ring (Pump-Pressure)		1
*10.	Holddown Bumper		17

Warning:*Out of warranty

6.1.4. List of bearings and special parts:

No	Parta Name	Part no / description	Qty.	Location on machine
1.	Self-aligning roller bearing	GE 60 ES	2	Top Beam
2.	Bearing	16006	4	Blade Gap
3.	Bearing	6002	2	Back-Gauge
4.	Bearing	3304	2	Back-Gauge
5.	Bearing	6204 ZZ	2	Back-Gauge
6.	Small pulley / belt	1400 H 100	1	Back-Gauge
7.	Pulley / belt	Z = 14, t = 1/2″	2	Back-Gauge
8.	Large pulley / belt	Z = 60, t = 1/5″	1	Back-Gauge
9.	Small pulley / belt	Z =30, t = 1/5″	1	Back-Gauge
10.	Small pulley / belt	220 XL 0.62	1	Back-Gauge
11.	Digital readout	-	1	Back-Gauge

6.2. Description of shear applications:

Your shear is designed and constructed for cutting of flat metal material up to **3060** mm in length and of maximum **6** mm thickness in case of (≤ 450 ν /mm)steel-plate.

The HGL shear features a box-type construction meaning that there are no throat gaps on the sides of the machine. The cutting beam movement is one of ″swinging″ type as opposed to ″guillotine″ type. The cutting beam is actuated by two hydraulic cylinders, and retracts by a spring system.

A set of top and bottom blades, which are made of specially hardened steel material, execute the shearing process. The gap between blades varies according to workpiece thickness and this procedure is further explained in section 6.5.5. of this manual. Blade gap adjustment is a very important part of the shearing process as it directly affects the quality of the cut, and the correct use of your machine.

The HGL shear is designed for feeding material from the front of the machine. A front squaring-arm is available to assist in guiding and squaring the material to the blade.
The back-gauge system provides the means to position material under the cutting blade at a predetermined distance.

6.3. Prohibited uses of the shear

The shear should not be used in the following circumstances:

!	If there is ANYTHING OTHER THAN THE WORKPIECE, inserted, extended, put or placed in the working area between top and bottom blades.
!	When any of the protective devices or guarding of the machine are NOT mounted or NOT functioning.
!	For shearing operations involving non-flat metals (at origin) e.g. rods, bars, tubes, pipes.
!	For shearing hardened materials.
!	For cutting ceramic or glass-originated materials.
!	*The manufacturer does not accept responsibility for personal safety and for damage to the machine if the machine is used in prohibited ways.*

6.4. Incorrect uses of the shear

During normal operation of the shear, the following incorrect uses must be avoided. The likely consequences of such incorrect uses also explained below:

1.	**Incorrect use:**	Cutting material without blade gap adjustment according to sheet thickness
	Consequence:	***a)*** *Blade gap is smaller than necessary:*
		• Blades get blunted and may break due to overlapping
		• Bad material surface
		b) *Blade gap is greater than necessary:*
		• Blades get blunted and may break
		• The sheared material may get jammed between blades
		• The sheared material edge is burred
2.	**Incorrect use:**	Cutting over-capacity material
	Consequence:	• No cutting possible
3.	**Incorrect use:**	Cutting material having a width which is less than (sheet thickness x 15)
	Consequence:	• The sheared material is twisted
4.	**Incorrect use:**	Shearing flame-cut material.
	Consequence:	• Blades get blunted and may break
5.	**Incorrect use:**	Cutting sheet-plates in layers of two or more
	Consequence:	• Normal cutting not possible
		• Blades get blunted and may break
		• One of the sheet-plates may get jammed between blades

!	**Non-recommended use:** Cutting high-silica and high-carbon material
	Consequence: Blades get blunted

6.5. Using the shear:

6.5.1. Requirements for the initial test and examination

- Check the machine visually against any transport damage.
- Clean the oil tank and the suction filter.
- Fill the oil tank up the level indicator with one of the oil types recommended in the Lubrication Diagram.
- Check that the rear guard is functioning mechanically in proper.
- Check that the blades are rigidly fixed in their places.
- Make sure that the cables are not damaged.
- Check the components and terminal ends inside the electrical cabinet against any loosening.
- Make sure that switches and buttons are not damaged.
- Carry out the electrical connections according to section 6.5.2 and then proceed with initial testing and start-up according to instructions in section 6.5.4.
- During test run check that:

a) All switches and buttons are fulfilling their functions.(in particular, emergency buttons, safety and limit switches)

b) There is no oil leakage in cylinders, valves, pipes and hoses.

6.5.2. Electrical connections

! ***All electrical connections, however simple, must be carried out by qualified electricians.***

Machine must be placed as close as possible to an electricity supply point. In cases where this is not possible, it is recommended to bring an auxiliary supply duct alongside the machine. Electricity should be connected by supply cable with correct diameter.

! ***EARTHING*** *connection is strictly necessary.*

Voltage and power requirements are labeled on the machine. First class components are used in the electrical cabinet, all electric wires are numbered according to electric circuit diagram and all components confirm the established standards. Cartridge fuses are used in the control circuit.

As the footswitch connection is already made in the factory, your shear is ready for initial start-up.

A. Foot switch connections:

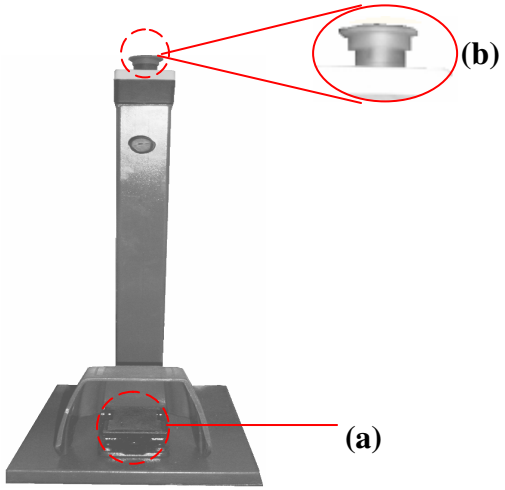


Figure 6.5.2.1

Figure	Label (Electrical Diagram)	Description
(a)	**4S2**	Foot switch
(b)	**2S1**	Emergency stop button

B. Light barrier connections and main switch:

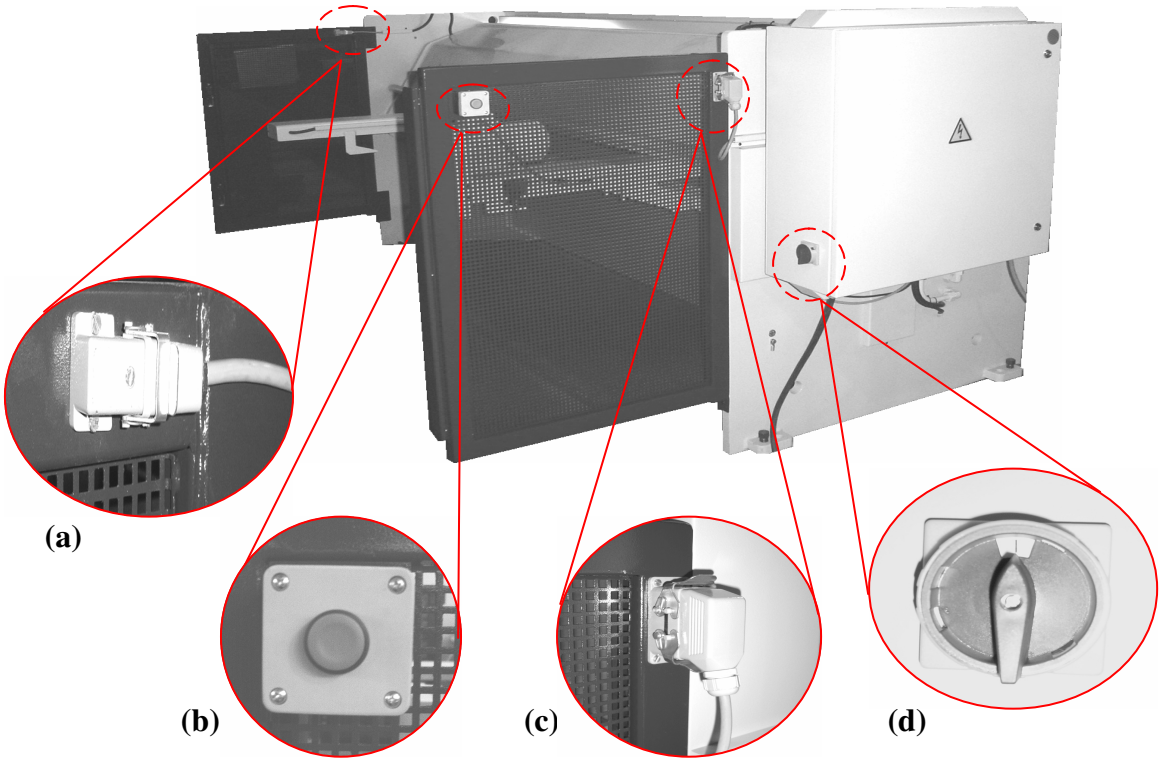


Figure 6.5.2.2

Figure	Label (Electrical Diagram)	Description
(a)	**-**	Light guard connector
(b)	**2S5**	Reset button
(c)	**-**	Light guard connector
(d)	**1Q1**	Main switch

C. Back-gauge connections and the top-bottom limit switches:

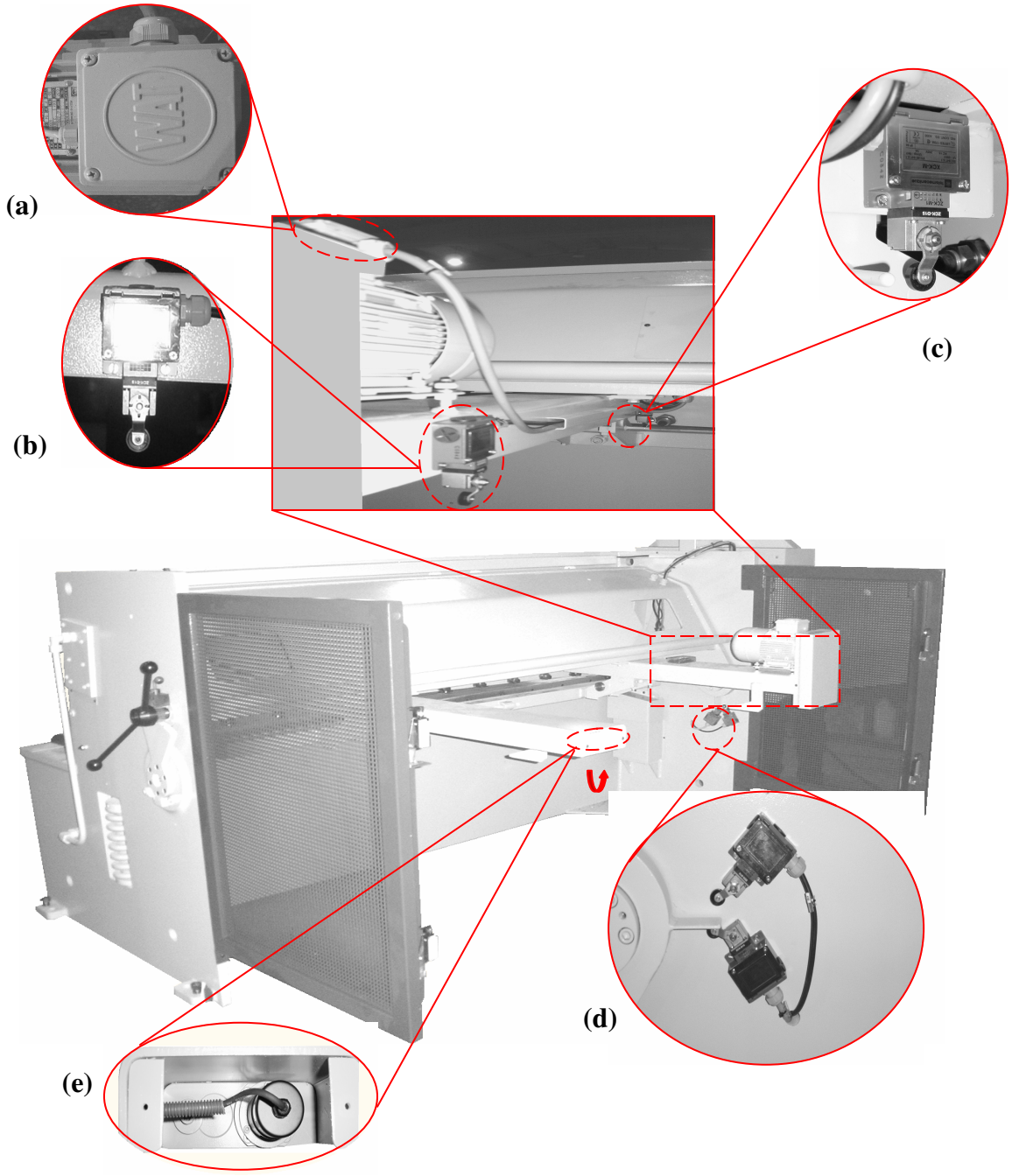


Figure 6.5.2.3

Figure	Label (Electrical Diagram)	Description
(a)	**1M5**	Back-gauge motor connection
(b)	**3S8**	Back-gauge +limit switch
(c)	**3S7**	Back-gauge –limit switch
(d)	**4S6 / 4S5**	Beam maximum/minimum switch
(e)	**3B1**	Encoder

D. Blade Gap Adjustment Motor and connections:

Blade gap adjustment motor is on the right side of the machine, ***if the machine has Motorized blade gap adjustment system.***

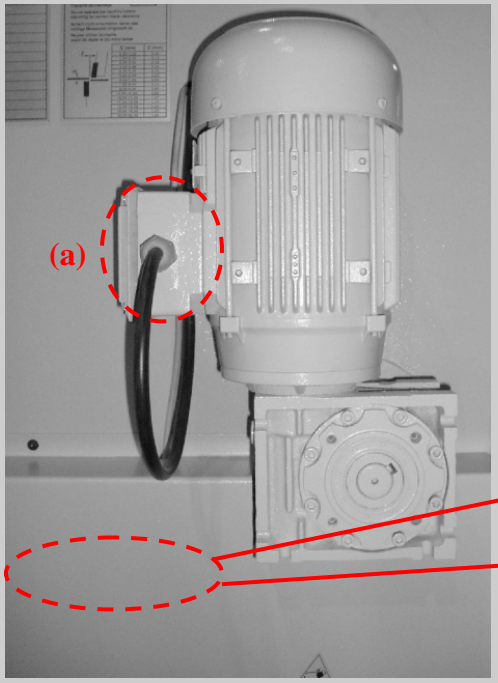


Figure 6.5.2.4

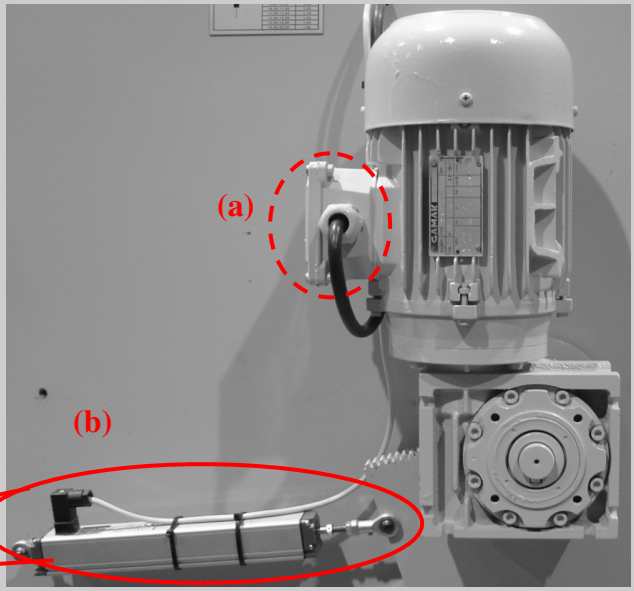


Figure 6.5.2.5

Figure	Label (Electrical Diagram)	Description
(a)	**1M7**	Blade gap adjustment motor and its power connection
(b)	**1K5**	Potentiometer of the blade gap adjustment system and its connection.

Blade gap limit switches is present on the rear of the electrical cabinet on the left side of the machine, ***if the machine has Motorized blade gap adjustment system.***

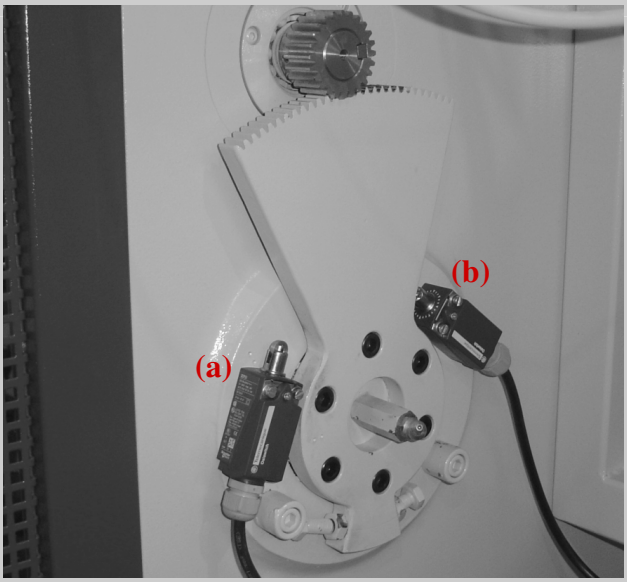


Figure 6.5.2.6

Figure	Label (Electrical Diagram)	Description
(a)	**7S8**	Blade gap minimum limit switch
(b)	**7S7**	Blade gap maximum limit switch

D. Hydraulic Valve connections:

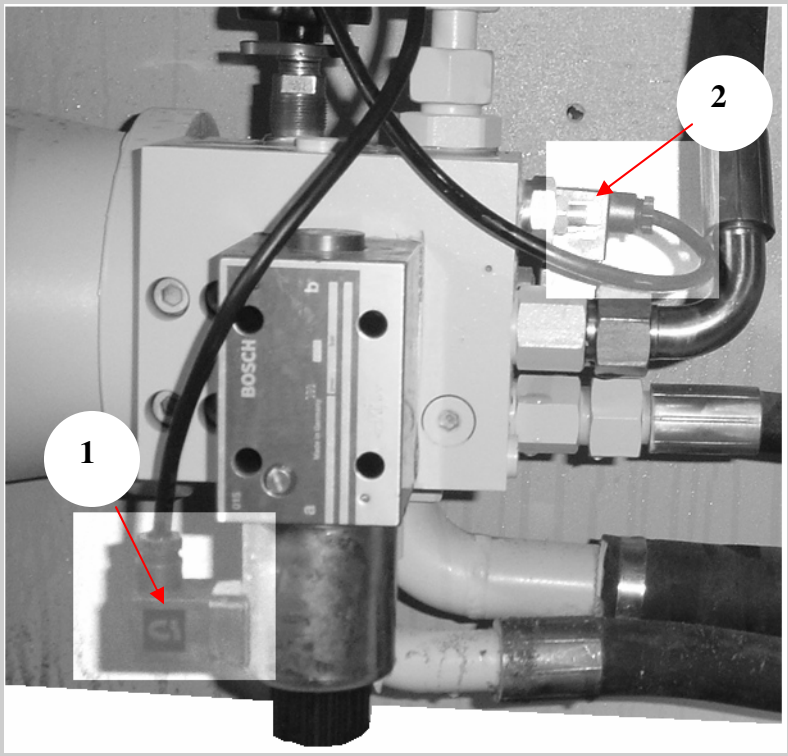


Figure 6.5.2.7

No	Name	Description
1	**Directional Valve**	It controls downward movement of the beam
2	**Directional Valve**	It controls upward movement of the beam

6.5.3. Electrical Cabinet and Control Units

6.5.3.1. Control Units

1. Control Unit with PRG 911 digital controller:

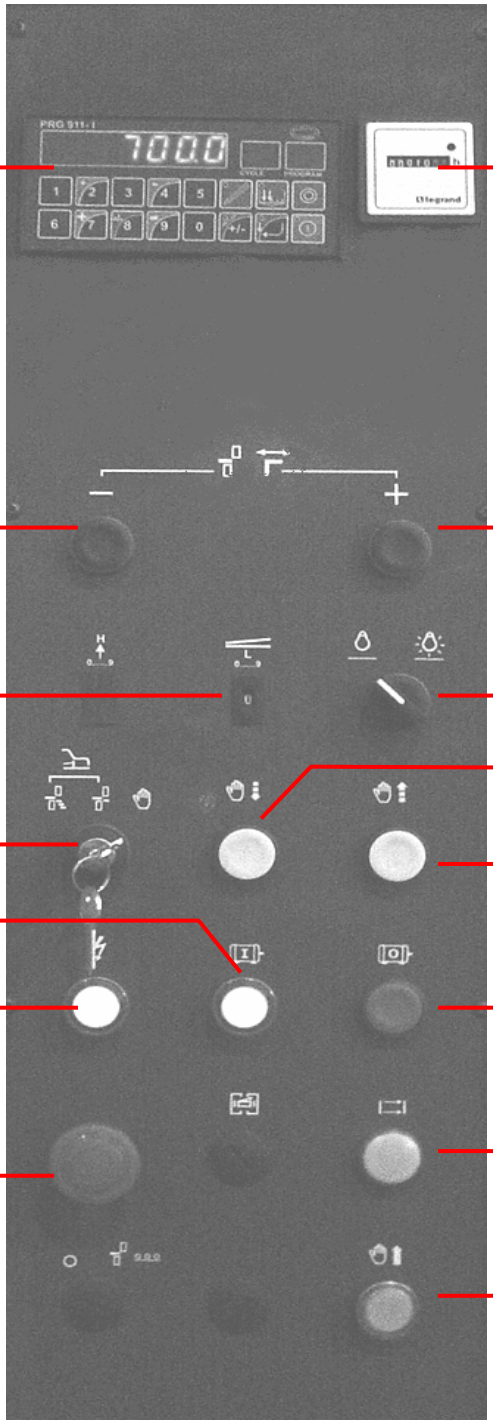


Figure 6.5.3.1

Label (Electrical Diagram)	Designation	Function (Figure 6.5.3.1)
7A2	Digital Controller	It controls back-gauge distance from the table. This distance decides the cutting width.
2H3	Hourcounter	It shows total working time
3S9	Back-gauge backward button	When this button is pressed, the backgauge moves backward
3S10	Back-gauge forward button	When this button is pressed, the backgauge moves forward
4K1	Stroke adjustment timer	It set the cutting length
4S1	Cutting Control Switch	**Position 1.**  Series or repetitive cutting **Position 2.**  One-off cut (single) **Position 3.**  Manual cutting (Inching)
4S4	Beam-up button	It is used for raising the beam
4S5	Beam-down button	It is used for lowering the beam
3S4	Pump-stop button	When pressing, the main pump stops
3S5	Pump-start button	When pressing, the main pump starts up.
2S2	Front Emergency stop button	In case of emergency, when pressing, all machine functions and controls will be inactive and the main pump will stop.
2S3 **2H1**	Control on	After emergency stop button is pressed, in order to operate the machine, the button must be pressed. The button initializes the emergency stop module.
2H2	Reset lamp (Safety switch)	It indicates that the rear light guard should be reset. When it illuminates, press the reset button on the light guard transmitter branch.
4H1 **2S5**	Reset button (Beam-up) and lamp	Because of any reason (power failure etc.) If the beam standstills at anywhere, this button must be pressed in order to operate the machine again. When this button is pressed the beam goes to its upper point.
3S11	Inside illumination switch	When turning on, lamp inside the machine will lit up.

2. Control Unit with PRG 911 digital controller and Pneumatic Sheet Holder:

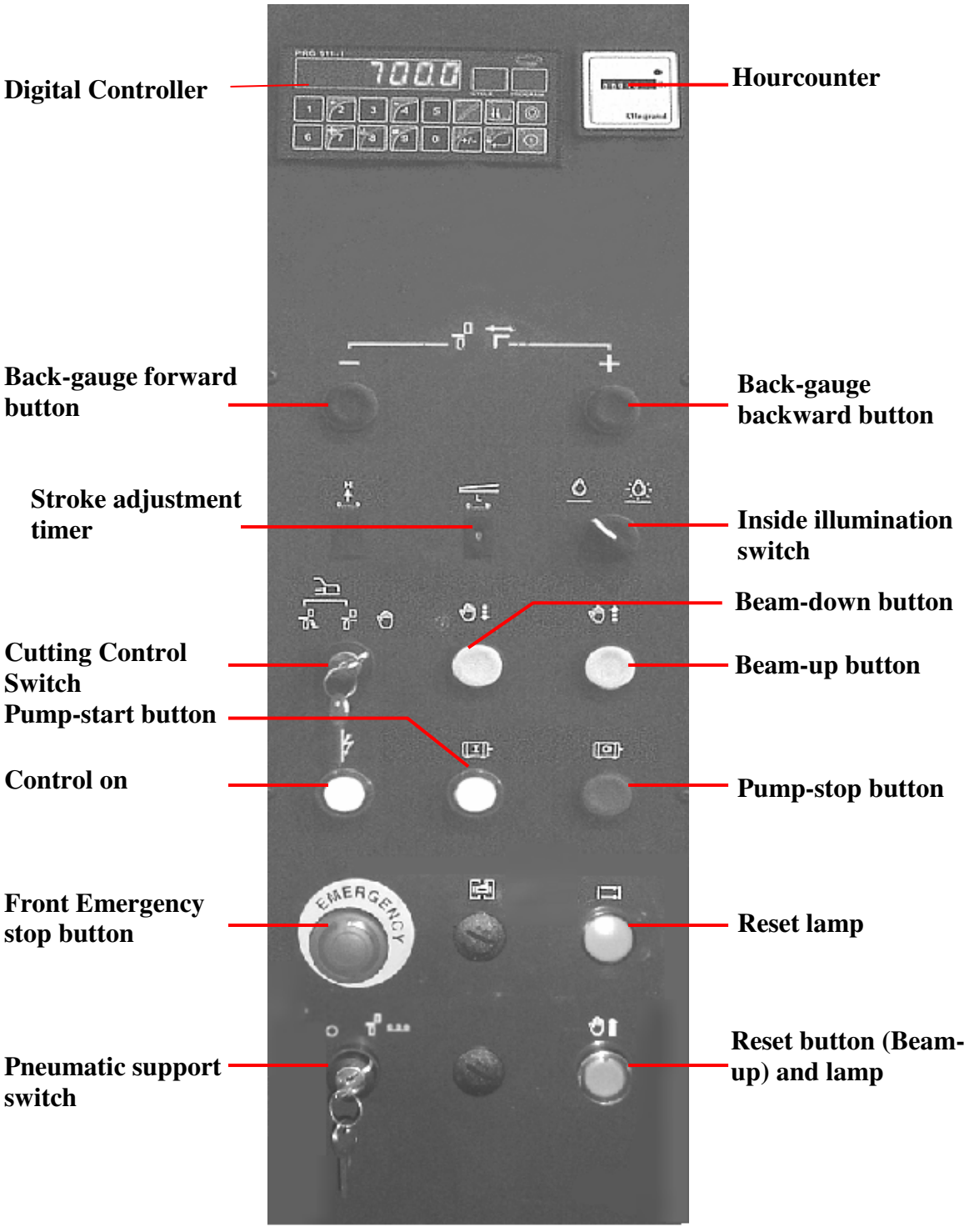


Figure 6.5.3.2

Label (Electrical Diagram)	Designation	Function (Figure 6.5.3.2)
7A2	Digital Controller	It controls back-gauge distance from the table. This distance decides the cutting width.
2H3	Hourcounter	It shows total working time
3S9	Back-gauge backward button	When this button is pressed, the backgauge moves backward
3S10	Back-gauge forward button	When this button is pressed, the backgauge moves forward
4K1	Stroke adjustment timer	It set the cutting length
4S1	Cutting Control Switch	**Position 1.**  Series or repetitive cutting **Position 2.**  One-off cut (single) **Position 3.**  Manual cutting (Inching)
4S4	Beam-up button	It is used for raising the beam
4S5	Beam-down button	It is used for lowering the beam
3S4	Pump-stop button	When pressing, the main pump stops
3S5	Pump-start button	When pressing, the main pump starts up.
2S2	Front Emergency stop button	In case of emergency, when pressing, all machine functions and controls will be inactive and the main pump will stop.
2S3 **2H1**	Control on	After emergency stop button is pressed, in order to operate the machine, the button must be pressed. The button initializes the emergency stop module.
2H2	Reset lamp (Safety switch)	It indicates that the rear light guard should be reset. When it illuminates, press the reset button on the light guard transmitter branch.
4H1 **2S5**	Reset button (Beam-up) and lamp	Because of any reason (power failure etc.) If the beam standstills at anywhere, this button must be pressed in order to operate the machine again. When this button is pressed the beam goes to its upper point.
3S11	Inside illumination switch	When turning on, lamp inside the machine will lit up.
5S1	Pneumatic support switch	It switches on/off pneumatic support system

3. Control Unit with PRG 911 and P400 digital controller:

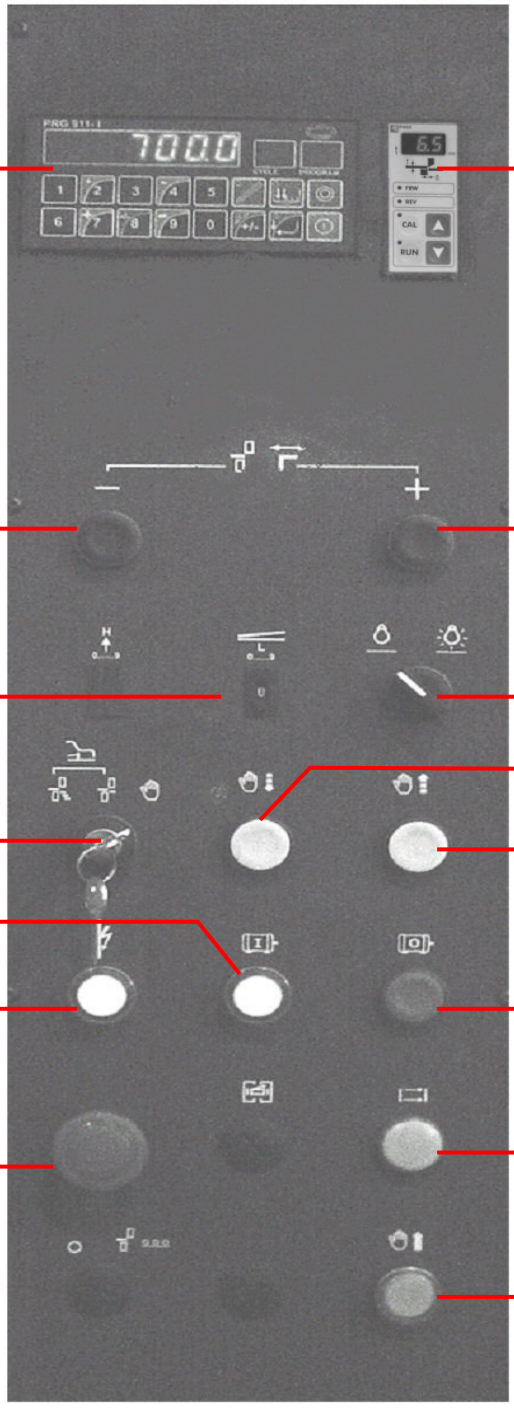


Figure 6.5.3.3

Label (Electrical Diagram)	Designation	Function (Figure 6.5.3.3)
7A2	Digital Controller	It controls back-gauge distance from the table. This distance decides the cutting width.
10A2	Digital Controller P400	It adjust blade gap for determining cutting thickness
3S9	Back-gauge backward button	When this button is pressed, the backgauge moves backward
3S10	Back-gauge forward button	When this button is pressed, the backgauge moves forward
4K1	Stroke adjustment timer	It set the cutting length
4S1	Cutting Control Switch	**Position 1.**  Series or repetitive cutting **Position 2.**  One-off cut (single) **Position 3.**  Manual cutting (Inching)
4S4	Beam-up button	It is used for raising the beam
4S5	Beam-down button	It is used for lowering the beam
3S4	Pump-stop button	When pressing, the main pump stops
3S5	Pump-start button	When pressing, the main pump starts up.
2S2	Front Emergency stop button	In case of emergency, when pressing, all machine functions and controls will be inactive and the main pump will stop.
2S3 **2H1**	Control on	After emergency stop button is pressed, in order to operate the machine, the button must be pressed. The button initializes the emergency stop module.
2H2	Reset lamp (Safety switch)	It indicates that the rear light guard should be reset. When it illuminates, press the reset button on the light guard transmitter branch.
4H1 **2S5**	Reset button (Beam-up) and lamp	Because of any reason (power failure etc.) If the beam standstills at anywhere, this button must be pressed in order to operate the machine again. When this button is pressed the beam goes to its upper point.
3S11	Inside illumination switch	When turning on, lamp inside the machine will lit up.

4. Control Unit with PRG 911 - P400 digital controllers and Pneumatic Sheet Holder (CE):

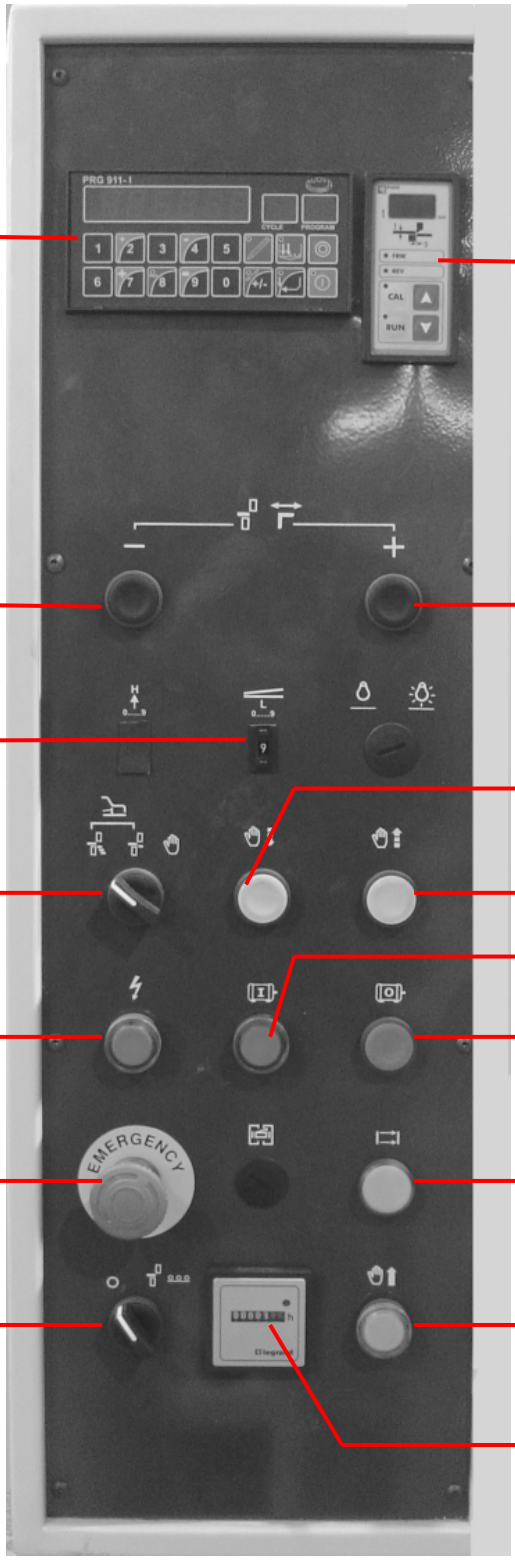


Figure 6.5.3.4

Label (Electrical Diagram)	Designation	Function(Figure 6.5.3.4)
7A2	Digital Controller PRG911	It controls back-gauge distance from the table. This distance decides the cutting width.
10A2	Digital Controller P400	It adjust blade gap for determining cutting thickness
2H3	Hourcounter	It shows total working time
3S9	Back-gauge backward button	When this button is pressed, the backgauge moves backward
3S10	Back-gauge forward button	When this button is pressed, the backgauge moves forward
4K1	Stroke adjustment timer	It set the cutting length
4S1	Cutting Control Switch	**Position 1.**  Series or repetitive cutting **Position 2.**  One-off cut (single) **Position 3.**  Manual cutting (Inching)
4S4	Beam-up button	It is used for raising the beam
4S5	Beam-down button	It is used for lowering the beam
3S4	Pump-stop button	When pressing, the main pump stops
3S5	Pump-start button	When pressing, the main pump starts up.
2S2	Front Emergency stop button	In case of emergency, when pressing, all machine functions and controls will be inactive and the main pump will stop.
2S3 **2H1**	Control on	After emergency stop button is pressed, in order to operate the machine, the button must be pressed. The button initializes the emergency stop module.
2H2	Reset lamp (Safety switch)	It indicates that the rear light guard should be reset. When it illuminates, press the reset button on the light guard transmitter branch.
4H1 **2S5**	Reset button (Beam-up) and lamp	Because of any reason (power failure etc.) If the beam standstills at anywhere, this button must be pressed in order to operate the machine again. When this button is pressed the beam goes to its upper point.
5S1	Pneumatic support switch	It switches on/off pneumatic support system

5. Control Unit with Elgo P9521 digital controller:

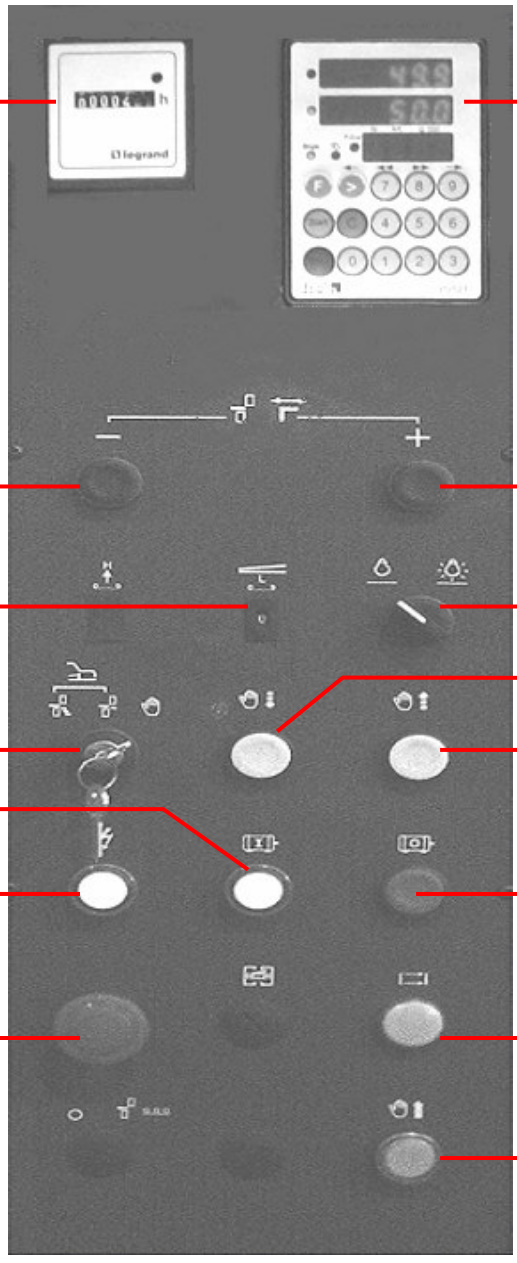


Figure 6.5.3.5

Label (Electrical Diagram)	Designation	Function (Figure 6.5.3.5)
7A2	Digital Controller	It controls back-gauge distance from the table. This distance decides the cutting width.
2H3	Hourcounter	It shows total working time
3S9	Back-gauge backward button	When this button is pressed, the backgauge moves backward
3S10	Back-gauge forward button	When this button is pressed, the backgauge moves forward
4K1	Stroke adjustment timer	It set the cutting length
4S1	Cutting Control Switch	**Position 1.**  Series or repetitive cutting **Position 2.**  One-off cut (single) **Position 3.**  Manual cutting (Inching)
4S4	Beam-up button	It is used for raising the beam
4S5	Beam-down button	It is used for lowering the beam
3S4	Pump-stop button	When pressing, the main pump stops
3S5	Pump-start button	When pressing, the main pump starts up.
2S2	Front Emergency stop button	In case of emergency, when pressing, all machine functions and controls will be inactive and the main pump will stop.
2S3 **2H1**	Control on	After emergency stop button is pressed, in order to operate the machine, the button must be pressed. The button initializes the emergency stop module.
2H2	Reset lamp (Safety switch)	It indicates that the rear light guard should be reset. When it illuminates, press the reset button on the light guard transmitter branch.
4H1 **2S5**	Reset button (Beam-up) and lamp	Because of any reason (power failure etc.) If the beam standstills at anywhere, this button must be pressed in order to operate the machine again. When this button is pressed the beam goes to its upper point.
3S11	Inside illumination switch	When turning on, lamp inside the machine will lit up.

6. Control Unit with Elgo P9521 and P400 digital controllers:

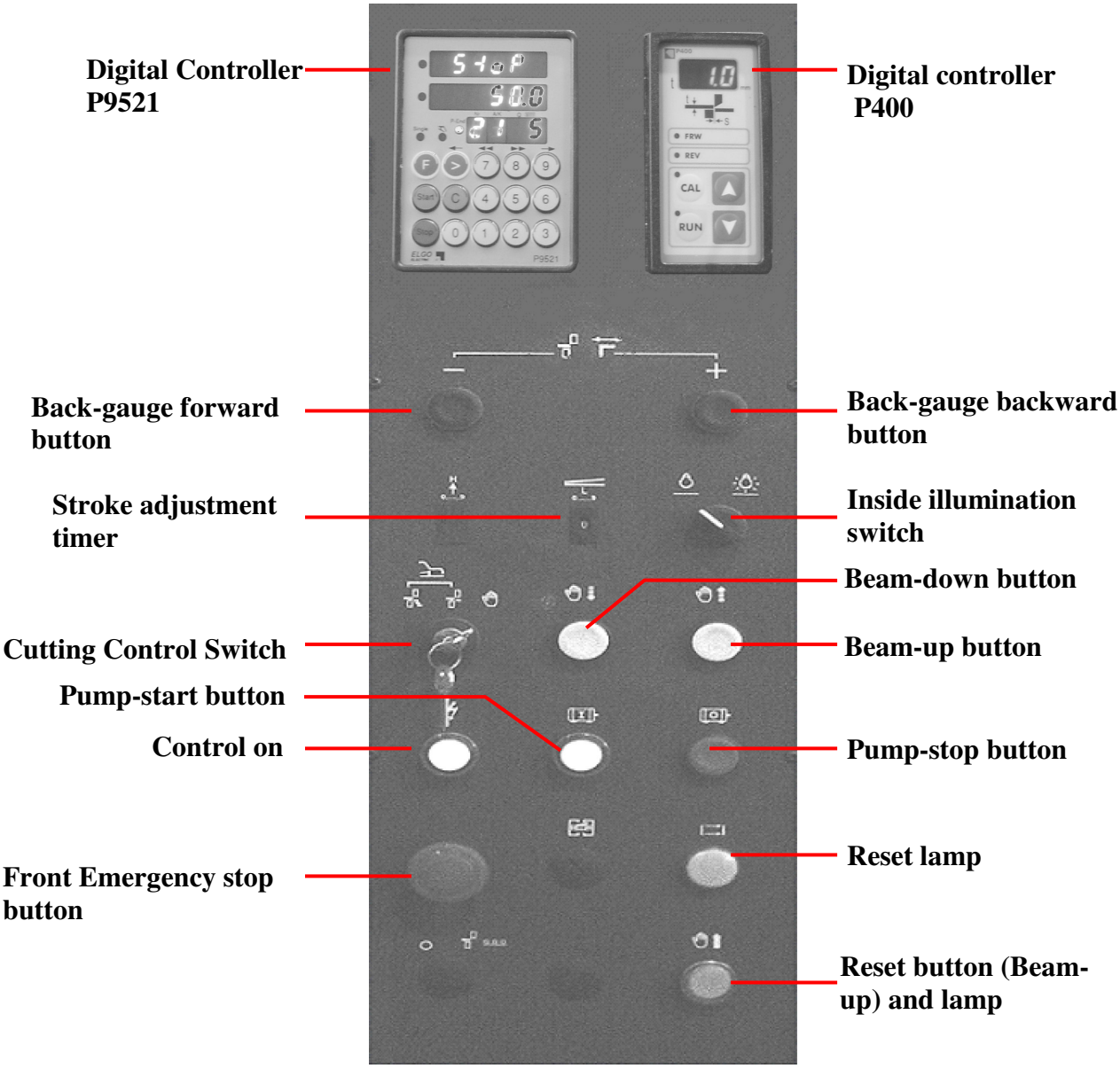


Figure 6.5.3.6

Label (Electrical Diagram)	Designation	Function (Figure 6.5.3.6)
7A2	Digital Controller P9521	It controls back-gauge distance from the table. This distance decides the cutting width.
10A2	Digital Controller P400	It adjust blade gap for determining cutting thickness
3S9	Back-gauge backward button	When this button is pressed, the backgauge moves backward
3S10	Back-gauge forward button	When this button is pressed, the backgauge moves forward
4K1	Stroke adjustment timer	It set the cutting length
4S1	Cutting Control Switch	**Position 1.**  Series or repetitive cutting **Position 2.**  One-off cut (single) **Position 3.**  Manual cutting (Inching)
4S4	Beam-up button	It is used for raising the beam
4S5	Beam-down button	It is used for lowering the beam
3S4	Pump-stop button	When pressing, the main pump stops
3S5	Pump-start button	When pressing, the main pump starts up.
2S2	Front Emergency stop button	In case of emergency, when pressing, all machine functions and controls will be inactive and the main pump will stop.
2S3 **2H1**	Control on	After emergency stop button is pressed, in order to operate the machine, the button must be pressed. The button initializes the emergency stop module.
2H2	Reset lamp (Safety switch)	It indicates that the rear light guard should be reset. When it illuminates, press the reset button on the light guard transmitter branch.
4H1 **2S5**	Reset button (Beam-up) and lamp	Because of any reason (power failure etc.) If the beam standstills at anywhere, this button must be pressed in order to operate the machine again. When this button is pressed the beam goes to its upper point.
3S11	Inside illumination switch	When turning on, lamp inside the machine will lit up.

7. Control Unit with Elgo P9521 digital controller and Pneumatic Sheet Holder:

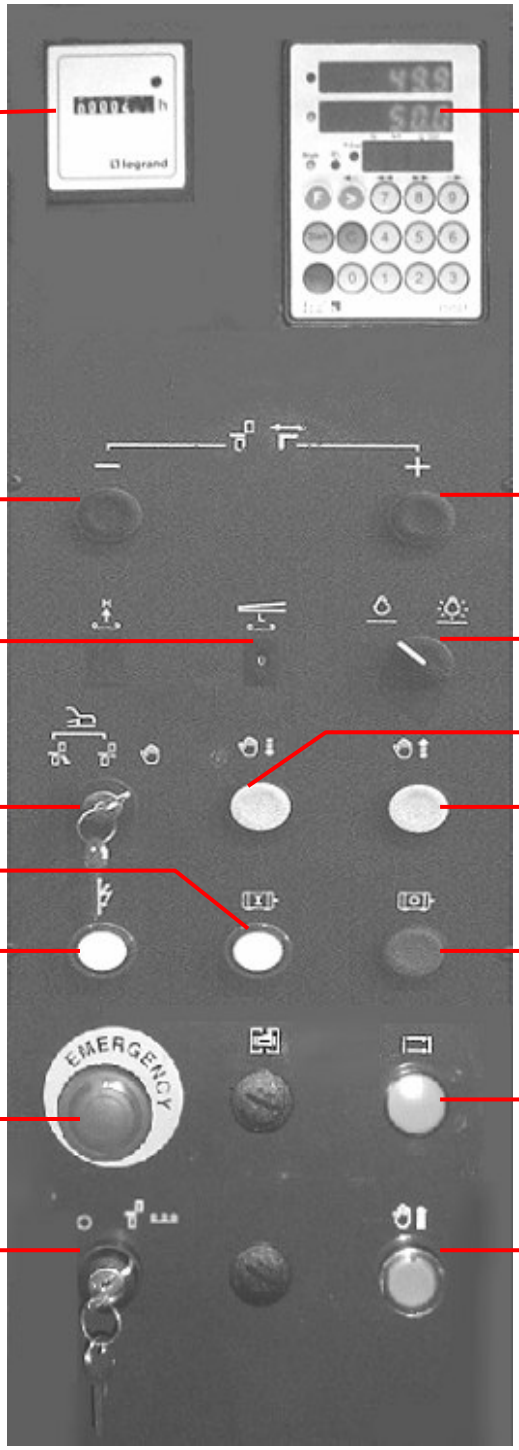
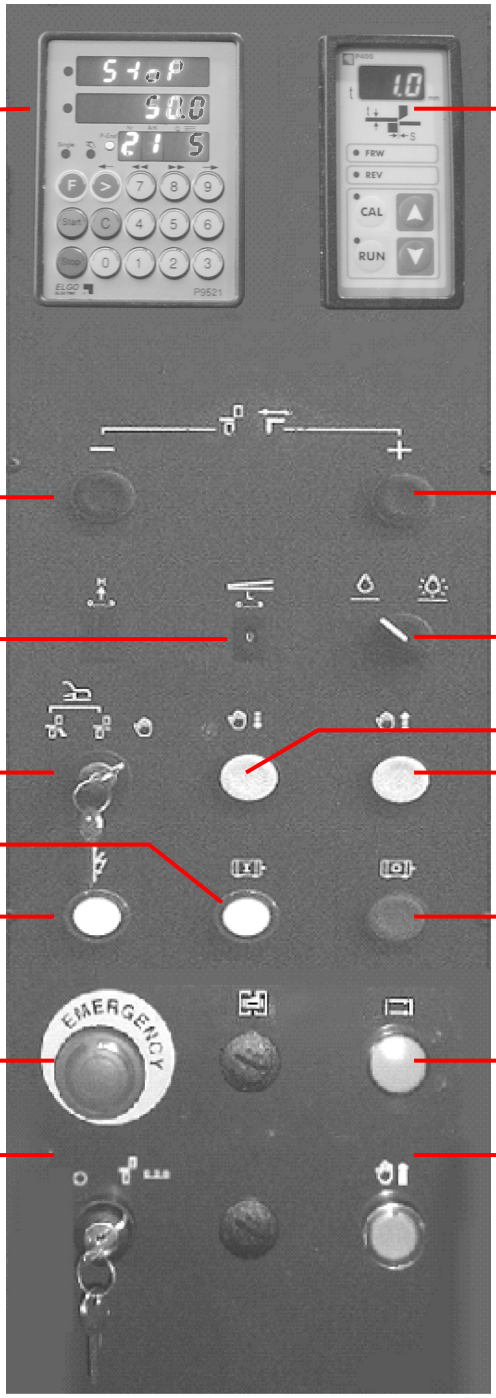


figure 6.5.3.7
Pneumatic support switch

(Figure 6.5.3.7)

Label (Electrical Diagram)	Designation	Function (Figure 6.5.3.7)
7A2	Digital Controller	It controls back-gauge distance from the table. This distance decides the cutting width.
2H3	Hourcounter	It shows total working time
3S9	Back-gauge backward button	When this button is pressed, the backgauge moves backward
3S10	Back-gauge forward button	When this button is pressed, the backgauge moves forward
4K1	Stroke adjustment timer	It set the cutting length
4S1	Cutting Control Switch	**Position 1.**  Series or repetitive cutting **Position 2.**  One-off cut (single) **Position 3.**  Manual cutting (Inching)
4S4	Beam-up button	It is used for raising the beam
4S5	Beam-down button	It is used for lowering the beam
3S4	Pump-stop button	When pressing, the main pump stops
3S5	Pump-start button	When pressing, the main pump starts up.
2S2	Front Emergency stop button	In case of emergency, when pressing, all machine functions and controls will be inactive and the main pump will stop.
2S3 **2H1**	Control on button	After emergency stop button is pressed, in order to operate the machine, the button must be pressed. The button initializes the emergency stop module.
2H2	Reset lamp (Safety switch)	It indicates that the rear light guard should be reset. When it illuminates, press the reset button on the light guard transmitter branch.
4H1 **2S5**	Reset button (Beam-up) and lamp	Because of any reason (power failure etc.) If the beam standstills at anywhere, this button must be pressed in order to operate the machine again. When this button is pressed the beam goes to its upper point.
3S11	Inside illumination switch	When turning on, lamp inside the machine will lit up.
5S1	Pneumatic support switch	It switches on/off pneumatic support system

8. Control Unit with Elgo P9521 and P400 digital controllers and Pneumatic Sheet Holder:



Label (Electrical Diagram)	Designation	Function (Figure 6.5.3.8)
7A2	Digital Controller	It controls back-gauge distance from the table. This distance decides the cutting width.
10A2	Digital Controller P400	It adjust blade gap for determining cutting thickness
3S9	Back-gauge backward button	When this button is pressed, the backgauge moves backward
3S10	Back-gauge forward button	When this button is pressed, the backgauge moves forward
4K1	Stroke adjustment timer	It set the cutting length
4S1	Cutting Control Switch	**Position 1.**  Series or repetitive cutting **Position 2.**  One-off cut (single) **Position 3.**  Manual cutting (Inching)
4S4	Beam-up button	It is used for raising the beam
4S5	Beam-down button	It is used for lowering the beam
3S4	Pump-stop button	When pressing, the main pump stops
3S5	Pump-start button	When pressing, the main pump starts up.
2S2	Front Emergency stop button	In case of emergency, when pressing, all machine functions and controls will be inactive and the main pump will stop.
2S3 **2H1**	Control on button	After emergency stop button is pressed, in order to operate the machine, the button must be pressed. The button initializes the emergency stop module.
2H2	Reset lamp (Safety switch)	It indicates that the rear light guard should be reset. When it illuminates, press the reset button on the light guard transmitter branch.
4H1 **2S5**	Reset button (Beam-up) and lamp	Because of any reason (power failure etc.) If the beam standstills at anywhere, this button must be pressed in order to operate the machine again. When this button is pressed the beam goes to its upper point.
5S1	Inside illumination switch	When turning on, lamp inside the machine will lit up.
	Pneumatic support switch	It switches on/off pneumatic support system

6.5.3.2. Electrical Cabinets:

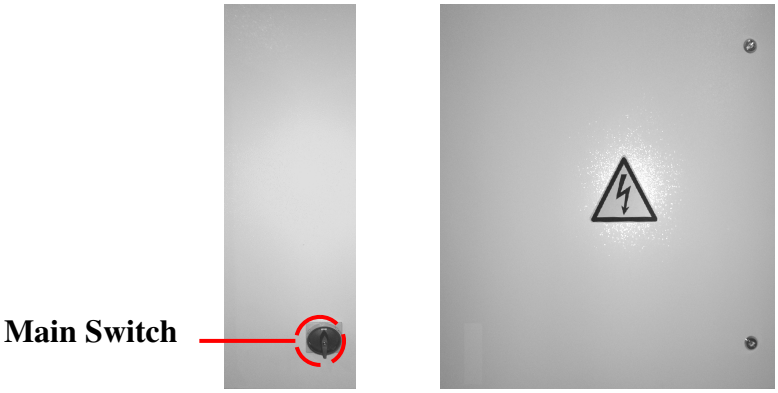


Figure 6.5.3.9

Label (Elect. Diag.)	Name	Description
1Q1	Main Switch	It switches on/off the machine

2. Main switch on the cover of Electrical Cabinet:

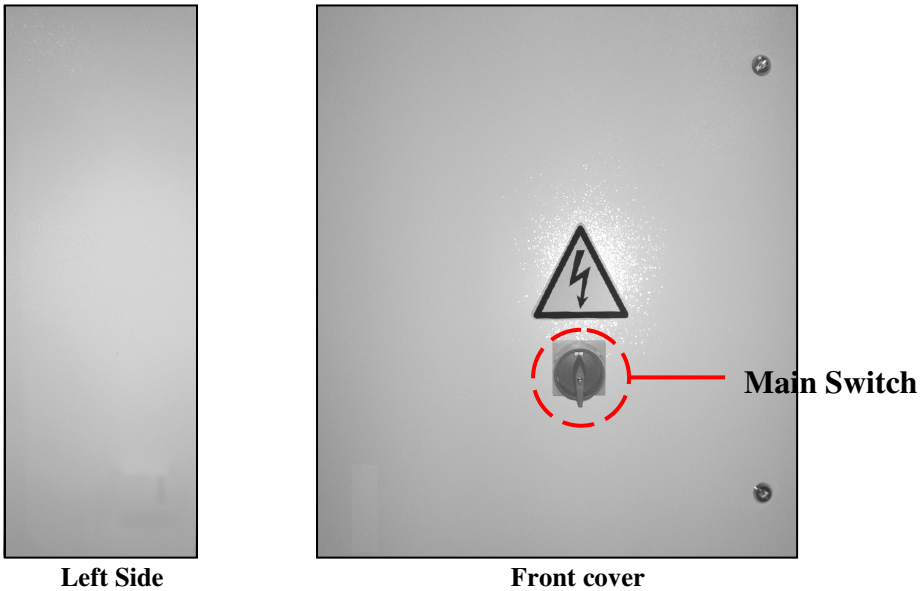


Figure 6.5.3.10

Label (Elect. Diag.)	Name	Description
1Q1	Main Switch	It switches on/off the machine

6.5.4. Operating the machine

6.5.4.1. First start-up and getting ready to work:

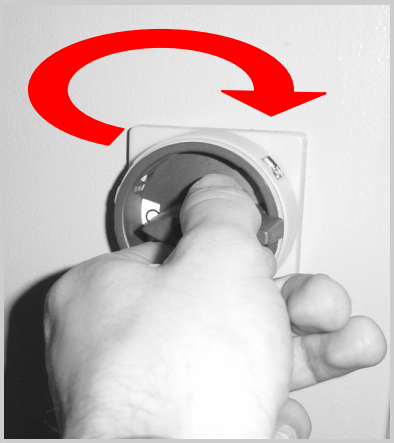


Figure 6.5.4.1

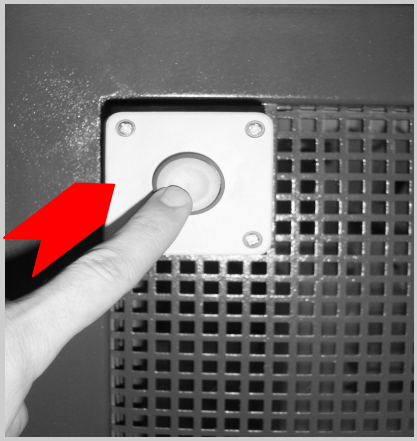


Figure 6.5.4.2

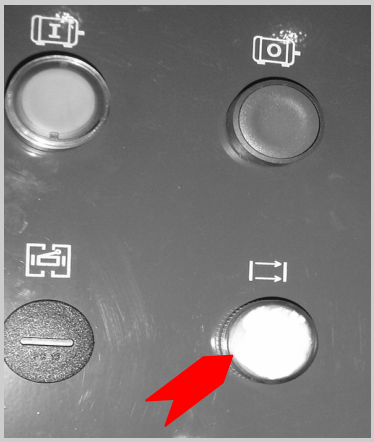


Figure 6.5.4.3

! ***The machine must be first started-up and be put into service by authorized and qualified personnel.***

PROCEDURE:

Before putting the machine into service, perform following items sequentially.

a) Switch on the main switch in the way shown in the **Figure 6.5.4.1**. **The reset lamp** shown in **Figure 6.5.4.3** will lit. (If not, there is either a bulb failure or a disconnection in the electrical circuitry).

b) Check the rear side of the machine and make sure that the safety switch of the rear fence is engaged. Push the **rear reset button** shown in **Figure 6.5.4.2**; **the reset lamp** will be off. (If it remains lighted, check the back gauge area against anything that prevents the transmitter and the receiver from contact.)



Figure 6.5.4.4



Figure 6.5.4.5



Figure 6.5.4.6

c) Push **the front reset button** shown in **Figure 6.5.4.4**. The button lamp will be on. If the lamp does not lit (except for reasons of bulb failure), it indicates that one of the three or all of the emergency stop buttons are left depressed. Disengage the emergency stop button (s), and push **the reset button** again.

!

d) Check the motor rotation by pushing **motor start button** shown in **Figure 6.5.4.5**, and immediately after, **motor stop button** shown in **Figure 6.5.4.6** on the control panel. The motor must be rotating in the direction of **"arrow"** marked. If it is rotating in the reverse direction, change any two phases in the electricity supply point. After pushing **motor start button**, **the lamp** of **the reset button** shown in **Figure 6.5.4.3** will lit for a short while and will be off after, indicating the beam is ready for up-down movement.



Figure 6.5.4.7



Figure 6.5.4.8



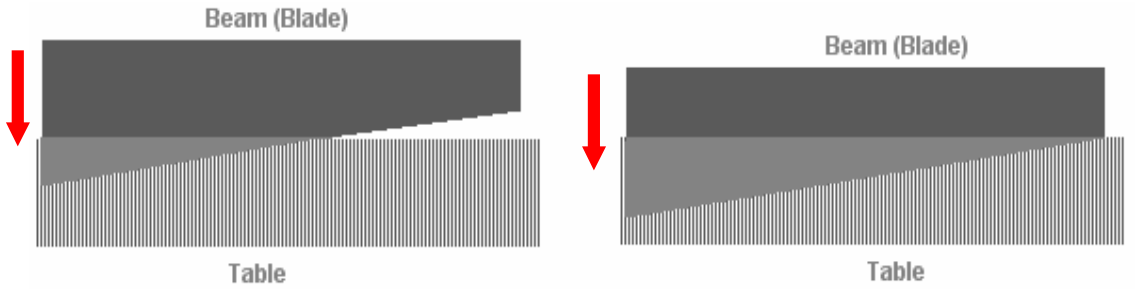
Figure 6.5.4.9

e)	Turn **the cutting control switch** to the position 1 (Manual cutting or inching) shown in **Figure 6.5.4.7**. Check whether the beam goes up and down by using **Beam up button** and **Beam down button** (shown in **Figure 6.5.4.8** and **Figure 6.5.4.9**) respectively or not. If they work properly, your machine is now ready for selecting a working position. Follow the instructions in **section 6.5.4.2.**

6.5.4.2. Cutting Control Modes of the Shear:

Your shear is capacity-tested prior to dispatch, and blade gap adjustment is made.

The operation of the machine depends on two different positions of the cutting beam; namely (A) the beam is at the top-most point of its stroke shown in **Figure 6.5.4.10.b** there is contact with **the top limit switch** shown **in Figure 6.5.2.3.d** (upper one), or (B) the beam is in a lower position than top-most stroke shown in **Figure 6.5.4.10.a** (no contact with switch 4S6).



(a) **(b)**

Figure 6.5.4.10

A. The beam is at the topmost point of its stroke:

a) **Single and Continuous cutting mode:** Select a cutting mode by turning the **cutting control switch** shown in **Figure 6.5.4.7** in CCW. You can select single cutting or continuous cutting mode.

Initial settings…..

1. Press **Control on button** (shown in **Figure 6.5.4.4**). The lamp of **the reset button** (shown in **Figure 6.5.4.3**) will lit for a short while, and will be off after. This button sets emergency stop module and energies (or activate) machine control.

2. Adjust the blade gap according to the instruction in **section 6.5.5**

3. Select the value **9** on **the stroke timer** by pushing on the small button on it

4. Set back-gauge range on the digital controller according to the instruction in **section 6.5.6**

After completing the procedure above, your machine is ready for cutting.

Feeding…..

5. Put the plate on the work-table and feed it until touching the back-gauge arms (see **Figure 6.5.4.11**). For correct cutting, the plate must touch the back-gauge arm at least minimum two points.

! Do not push the plate excessively. In some thickness, plate can be bent resulting unwilling or incorrect cutting width.

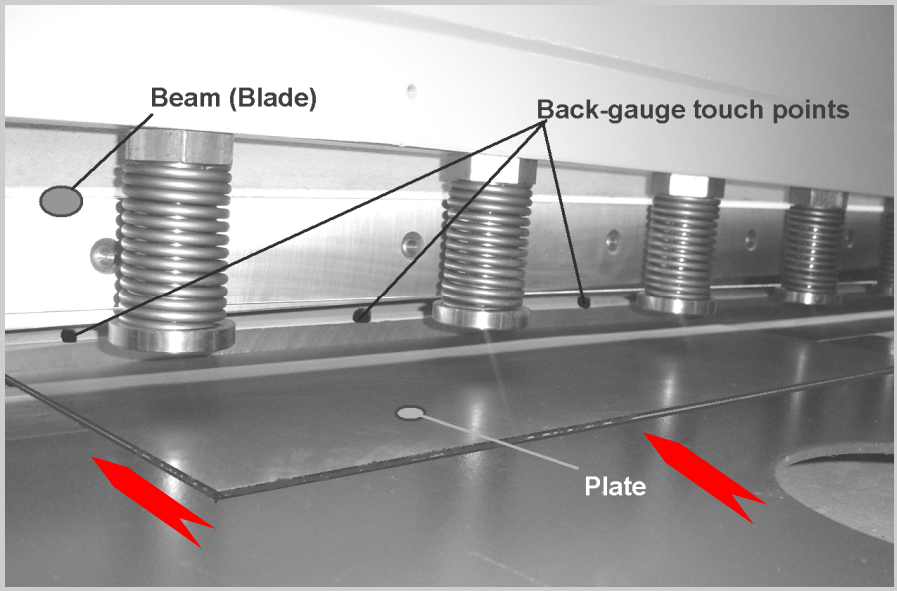


Figure 6.5.4.11

Pressing pedal …

6. After being sure of putting the plate on its place, press the footswitch (see **Figure 6.5.4.12**). Keep it pressed until the beam finishes its down-up movement cycle. **If you release footswitch at any moment of this cycle, the beam suddenly will retract (or rise) from its position to the top standstill point.**

In continuous cutting mode, if you keep the footswitch pressed the beam repeats down-up cycle for the pre-determined value on the digital controller. How much time the beam will wait at the top standstill point is determined by the time relay inside the electrical cabinet.

In single cutting mode, keep the footswitch pressed until the beam finishes its down movement (stroke). After finishing down movement you can release the footswitch.

! **At the topmost stroke, the beam goes down until it touches the bottom limit switch shown in Figure 6.5.2.3.d**

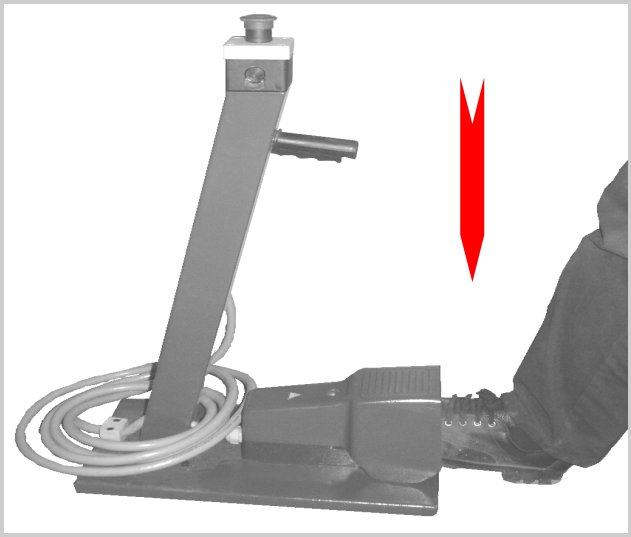


Figure 6.5.4.12

During cutting….

After pressing the foot switch, the beam starts the down movement and the hold down cylinders compress the plate on the work table (**see Figure 6.5.4.13**).

! **The cutting process occurs from the left to the right side of the plate**

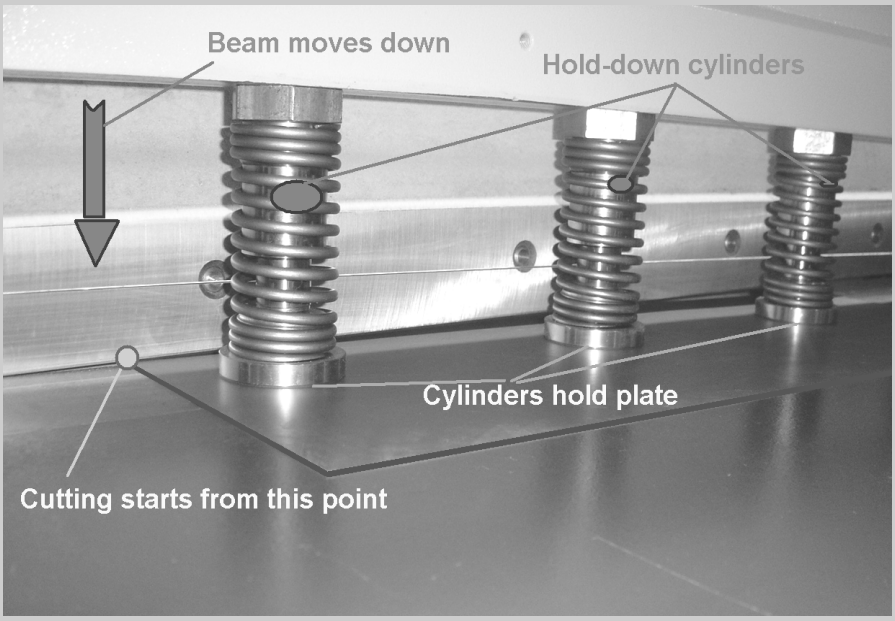


Figure 6.5.4.13

After cutting….

After the beam (blade) completes its stroke (down movement), the sheared part of the plate falls down from the backside of the machine.

WARNING! **Always switch off the main switch 1Q1 to ″0″ when inside the danger zone (backgauge area) of the shear for any reason.**

b) **Manual (inching) mode:** Select manual (inching) mode by turning the **cutting control switch** in CW (see **Figure 6.5.4.7**)

1. Push **Control on button (**shown in **Figure 6.5.4.4**). The lamp of the reset button **(**shown in **Figure 6.5.4.3)** will lit for a short while, and will be off after.

2. The beam can be made to travel down or up manually by pushing the **Beam down button** or **Beam up button** respectively. The beam travel will stop if the button is released. Pushing the button again, the beam will continue to travel as long as the button is pushed on.

Inching operation is NOT the fundamental working mode of the machine, and should be used only for making the beam travel up or down for blade gap adjustment and fine adjustment of top blade.

B. The beam is in lower position than top-most stroke:

	All settings and cutting procedure are as in **section A**. Only difference is the stroke adjustment.
	Stroke adjustment: Select a value between **0** and **8** (including 0 and 8) in **the stroke timer** by pushing on the small button on it.
	This timer controls down movement of the beam and stops the movement before the beam wouldn't reach to the bottom limit switch shown in **Figure 6.5.2.3.d**
!	**The stroke timer is used for selecting the plate length to be sheared.**
	For inching and cutting operation, repeat the procedure explained in **section A.**

6.5.5. Blade Gap Adjustment

A. Manual Blade Gap Adjustment

Blade gap adjustment on the shear is necessary to obtain a perfect cutting quality.

Blade gap is adjusted by means of the steering handle shown **in Figure 6.5.5.1** located on the left hand side of the machine:



Figure 6.5.5.1

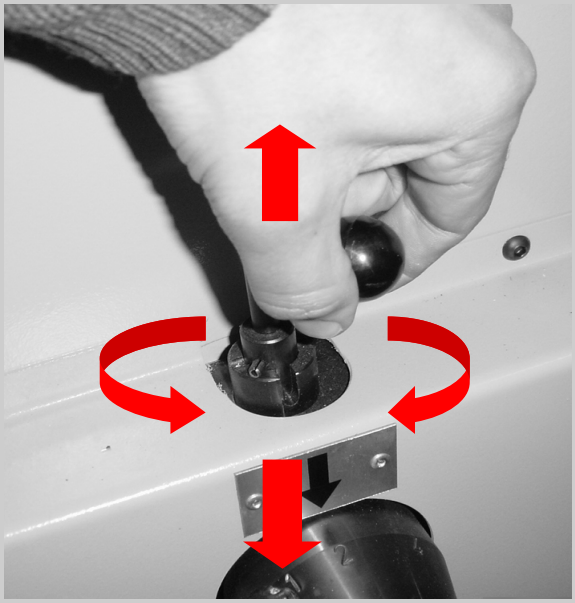


Figure 6.5.5.2

1 Pull up the fixing spindle shown **in Figure 6.5.5.2** so that the steering handle is free for adjustment.

2 Set the handle shown **in Figure 6.5.5.1** to required material thickness utilizing the pointer (the black arrow directed downward) and the thickness scale (the scale on the steering handle center indicating numbers from 1 to 4).

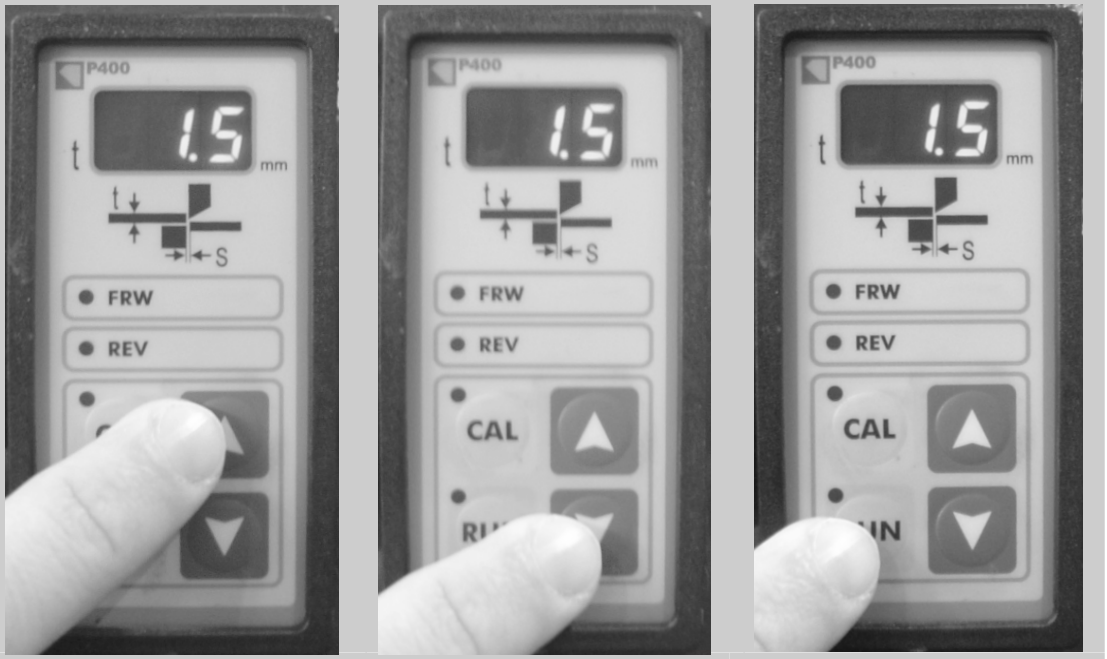
3 Retighten the fixing spindle shown **in Figure 6.5.5.2**.

4 To set the correct gap between blades, refer to the blade gap chart labeled on the machine.

B. Motorized Blade Gap adjustment

Blade gap adjustment on the shear is necessary to obtain a perfect cutting quality.

Blade gap is adjusted by means of the digital controller on the control panel as shown **in Figure 6.5.5.3 below**



(a) **(b)** **(c)**

Figure 6.5.5.3

1 Enter required material thickness by using **Up/Down** keys on the digital controller (See in **Figure 6.5.5.3.a and Figure 6.5.5.3.b**)

2 Then, press RUN key to set correct gap between blades (See in **Figure 6.5.5.3.c**).

NOTE: ***If the motorized blade gap adjustment fails for any reason, the manually blade gap adjustment can be used temporarily.***

6.5.6. Adjustment of back-gauge range (Adjustment of cutting width)

Your shear is equipped with a power back-gauge system. Its range can be set by entering the desired amount to the digital control unit on the electrical panel. It is also possible to set the range manually using the pushbuttons **Backgauge forward button** and **Backgauge backward button** on the control panel. In **HGL** machines three type digital controllers, namely **PRG 911**, **Elgo 9521** and **S3** are used. These controllers are explained below

PRG 911

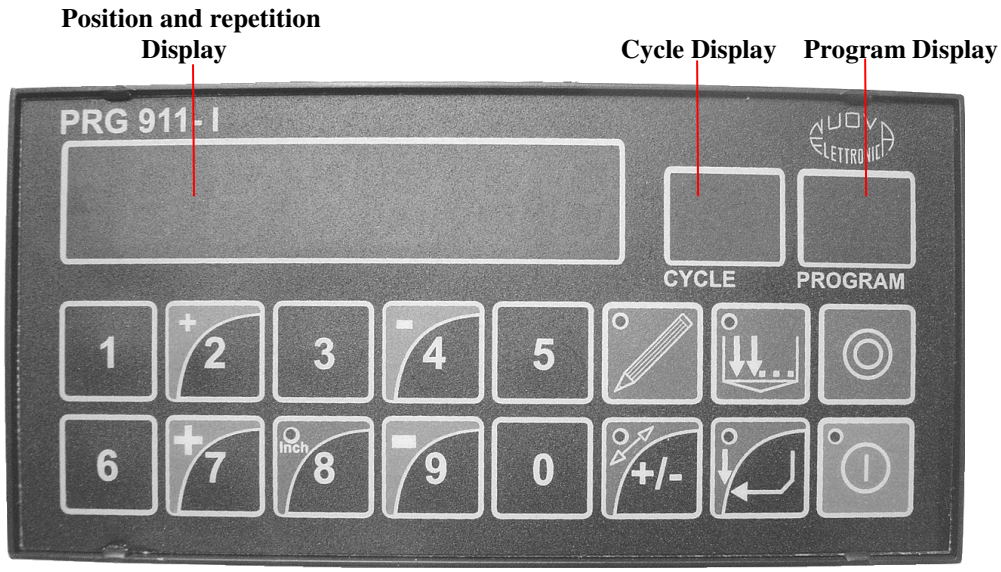
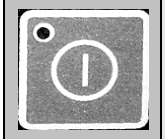
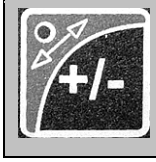


Figure 6.5.6.1

Keys and Functions:

KEY	NAME	DESCRIPTION
	**Jog +**	Fast forward jogging key
	**Jog –**	Fast reverse jogging key

	**Jog +**	Slow forward jogging key
	**Jog –**	Slow reverse jogging key
	**Start**	Start key to start the movement
	**Stop**	Stop key to stop the movement
	**Enter and Semi-automatic mode selection**	Enter and Semi-automatic mode selection key
	**Automatic mode selection**	Automatic mode selection key
	**Programming**	Programming mode selection key
	**Inch-metric selection**	Inch-metric selection key
	**Deviation**	Deviation

Manual Mode:

When machine is **switched on**, **PRG 911I** is ready for manual mode. In this mode, only position display is active. The back-gauge movement can be controlled by means of four jog keys (Jog + fast, Jog – fast, Jog + slow, Jog – slow). This mode is not an operating mode. You should use jog keys for service operations such as observing back-gauge movement, checking limit switch activity and measuring positioning correctness.

Semi-automatic mode:

When you select the semi-automatic mode in the digital controller, you can operate the machine in **single** and **continuous cutting mode**.

1. In order to work with this mode;

Press the semi-automatic selection  button (enter button at the same time) shown in **Figure 6.5.6.2**. The small led on the upper left corner of the key will lit up. The position display starts flashing and shows 0000.0 which means it is ready to read any numerical value among limit conditions from keyboard. That is you can write the plate width to be sheared.

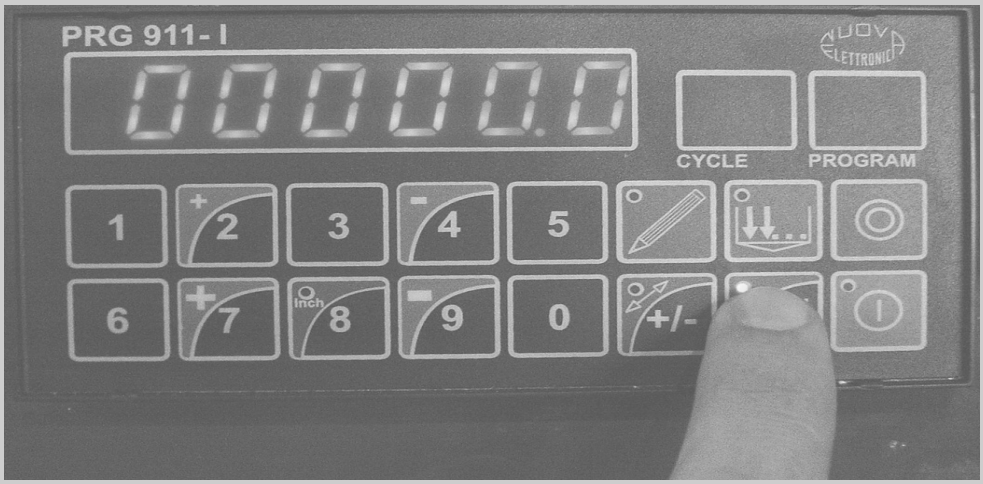


Figure 6.5.6.2

2. After writing back-gauge position value (it means plate width) shown in **Figure 6.5.6.3,** you can enter repetition value. Repetition means how many plates you will cut. To do so;

a. Press the  key again. Position (or repetition) display shows the value 01. You can write any value between 01 and 99 which means you can cut as many parts as up to 99.

! If you select continuous  cutting mode by working **mode selector switch**, you cut all plate parts by pressing the pedal continuously (without releasing the pedal).

If you select single  cutting mode by working **mode selector switch,** you cut all plate parts by pressing the pedal sequentially (one after another).

b. If you want a single cut, write 01 for repetition value.

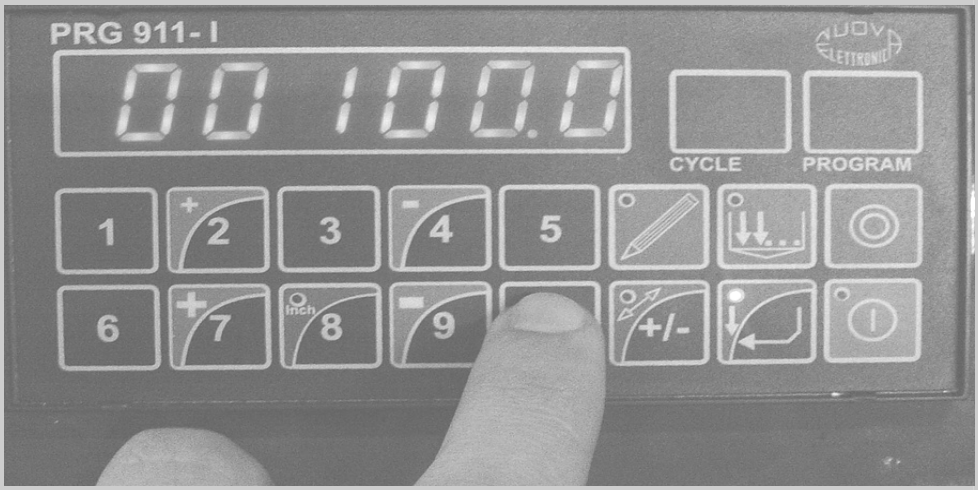


Figure 6.5.6.3

Writing position value



Figure 6.5.6.4

After writing position value, press the  **key and enter repetition value.**

3. After entering position and repetition values, press start key  (see **Figure 6.5.6.5**). As soon as pressing the start key, the back-gauge will begin to move to the entered position and at this moment the position display will begin to show changing values. Furthermore the small led on the upper left corner of the start key will lit up. Finally the back-gauge will arrive at the position and stop. After that moment, you can press the footswitch and cut the material.

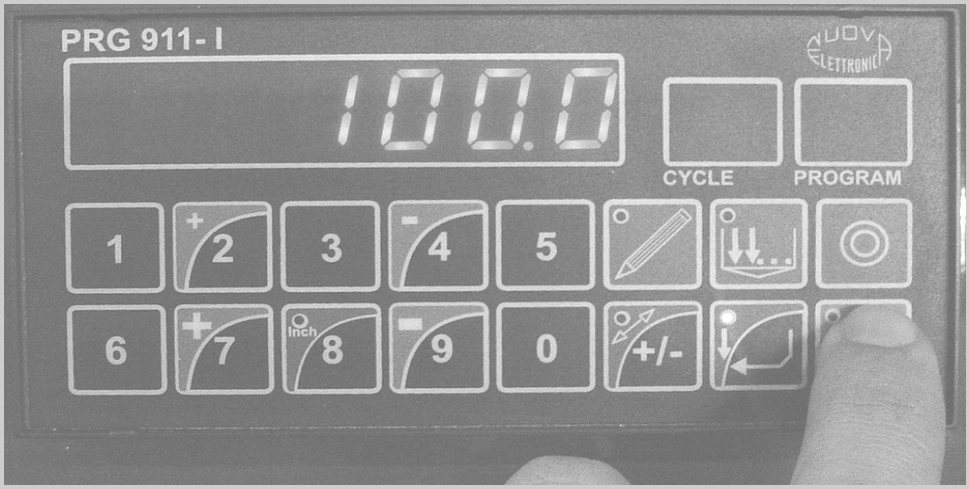


Figure 6.5.6.5
After entering position and repetition values, starting the back-gauge movement.

! If positioning DOES NOT occur within the limits of tolerance entered in parameters, PRG 911I will try and try again at most three times to perform it. After the last attempt if it does not achieve to perform positioning, the led on the start key will begin to flash which means a problem exists.

Automatic mode:

In automatic mode, it is possible to execute the programs previously stored. You can also operate the machine in **single** and **continuous cutting mode** when you select the automatic mode in digital controller. Before explaining automatic mode, you should understand programming principles of the controller completely.

Programming of the digital controller:

1. Press the programming key  . The led on the key will lit up and the program display will show the first empty program number. Press enter key  You will see 0000 in position display and 01 in the cycle display.



Figure 6.5.6.6

2. If you want to change the program number, write new program number by using numerical buttons and press the **enter** key (see **Figure 6.5.6.7**).

! If entered program number shows a empty program (programmable section), the led on the programming key will begin to flash.

Thus while the position display will indicate 0000.0, cycle display will indicate 01 (see **Figure 6.5.6.7**).



Figure 6.5.6.7

3. Write the position using numerical keys and press enter key.

! **If you make any mistake when writing the position, press zero key 0 sequentially (toggle) and so set all digits to 0. Write the position again and press the start key.**



Figure 6.5.6.8

4. Now the position display indicates repetition value 01. Write a repetition value using numerical keys and press the enter key.

! You can write any number between 01 and 9999 for repetition value. But it **does not** exceed **9999.**



Figure 6.5.6.9

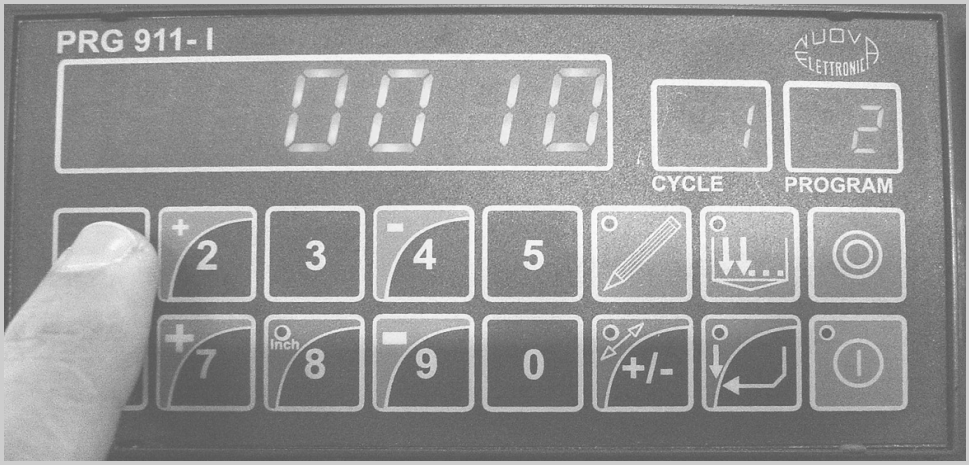


Figure 6.5.6.10

5. After writing the repetition and confirming with the enter key, you will see 02 in cycle display which means you are in second cycle of the programming procedure. If you want to continue programming, repeat the items 1,2,3,4 and so on.

! **You can write 20 cycles at most.**

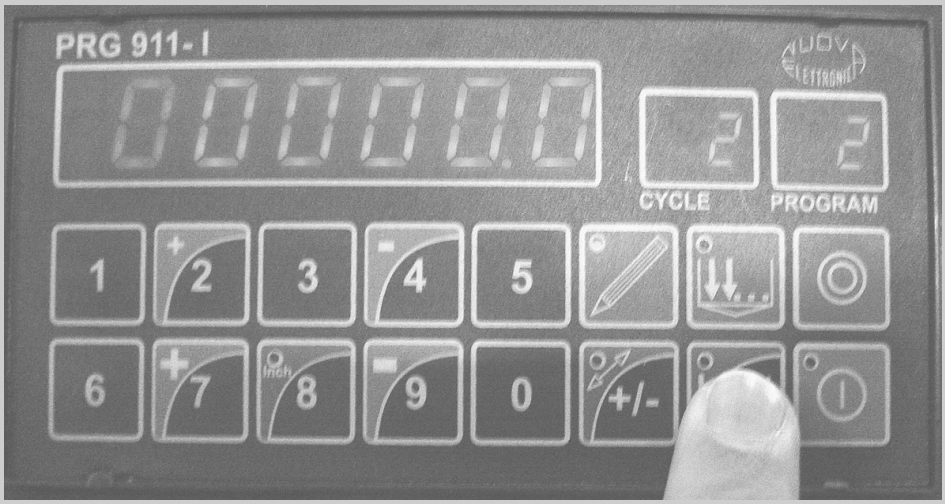


Figure 6.5.6.11

Write the position value of the second cycle. Press enter.



Figure 6.5.6.12

Write the repetition value of the second cycle. Press enter.



Figure 6.5.6.13

You will see the third cycle of your program. You can continue up to the 20th cycle.

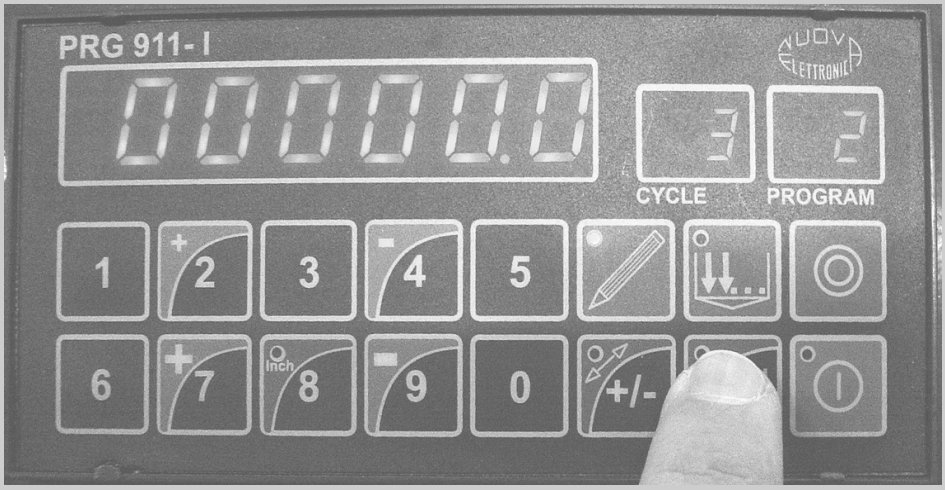


Figure 6.5.6.14

OR !

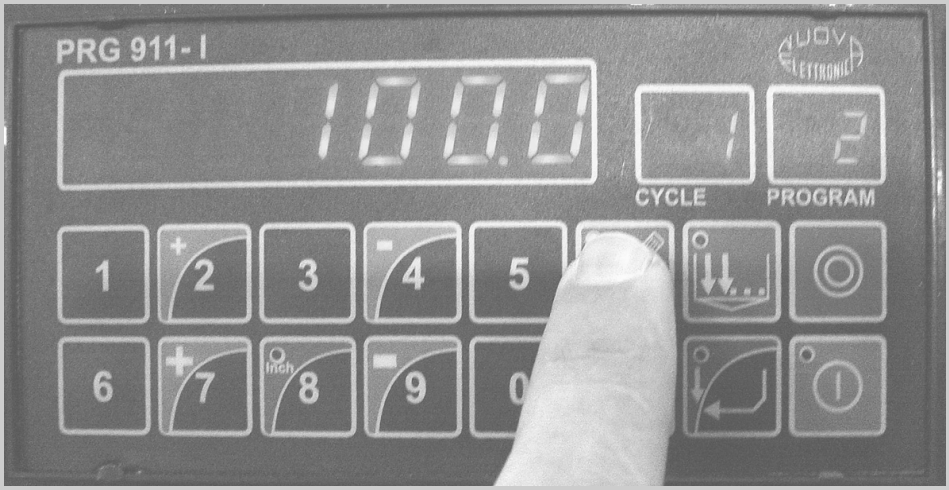


Figure 6.5.6.15

6. If you want to finish programming, press the programming key. Thus the led on the key will stop flashing and the position display will indicate the first position you have written in the cycle 01.
Now you are in the program reading phase.

By pressing enter key, you can see all positions, repetitions and cycles you have written.

! **If you want to change any position;**
a. Using the enter key, select the position or repetition in any cycle.
b. Press the programming key . The display will begin to flash
c. Write the new value.
d. Press enter key.

! **If you want to cancel the program;**
a. Using enter key, select the repetition in the first cycle.
b. Press the programming key
c. Write 00 for repetition
d. Press enter key.

! **If you want to cancel one or more cycles, in that cycle, press the programming key and write 00 for repetition value. Press enter key**

7. **Congratulations!!!** You have finished writing program.

Press stop key. You will see the next empty program (programmable

section no or program no). If you want to exit programming, press stop key again. Thus PRG 911I will be back to the manual mode.

8.

Warning!!!

In order to delete all program memory (all of the programs), in programming mode, press the programming key for 5 sec. PRG 911I will start deleting all the programs.

Operating the machine in automatic mode:

1. Press the **automatic mode**  **key** in manual mode. Now the digital controller is in the automatic mode. The led on the automatic mode key will lit up and the program display indicate the last executed program.

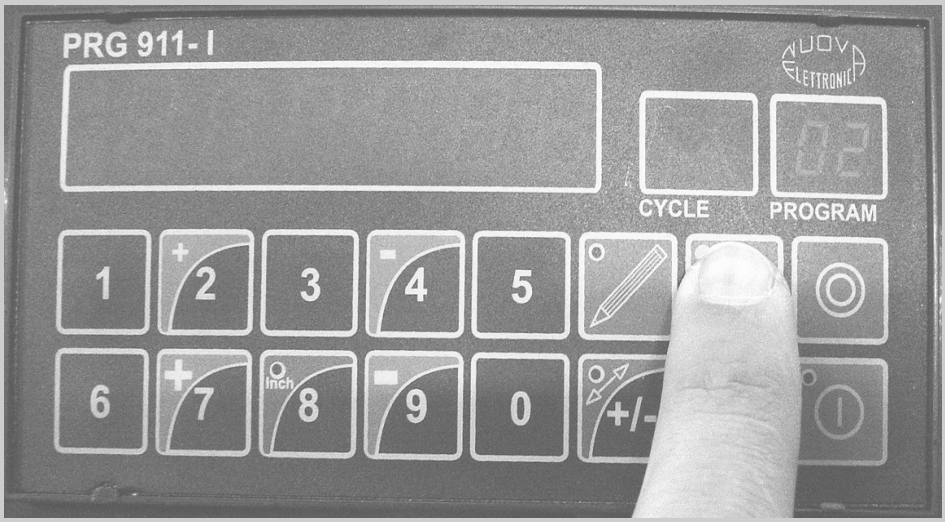


Figure 6.5.6.16

2. Write the desired program number by using numerical keys and press enter  key. The controller is ready to execute the program you have written before. You will see the position of the first cycle of the program in the position display.

! If you press  enter again, you will see the second cycle. If you go on pressing enter key , you will see the next cycle and so on.

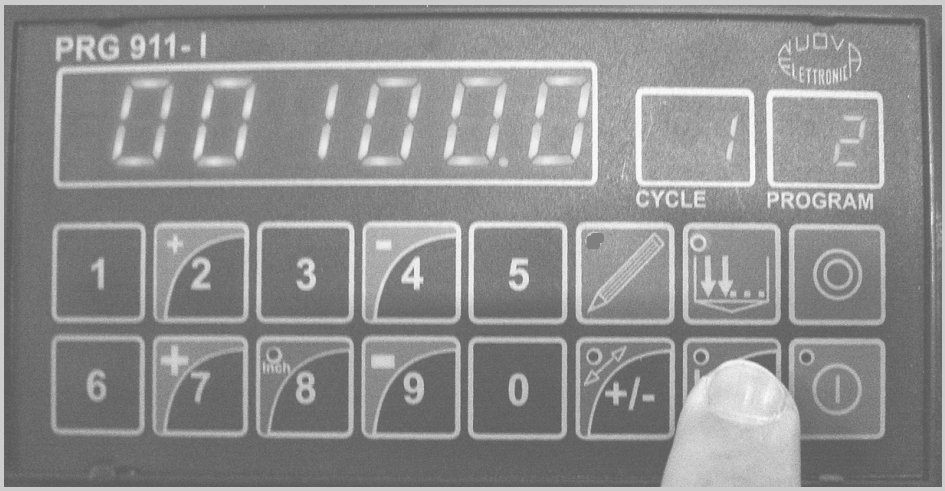


Figure 6.5.6.17

3. Press start key. Positioning will start.

! While you are visualizing the cycles as in the item 2 above, if you press start key in any cycle of the program, the positioning will start from that cycle (current visualized cycle).



Figure 6.5.6.18

4. If you press the **automatic mode key** before pressing start key or during positioning, the led on the automatic key will start flashing. It means that your program will start again automatically after execution. That is an infinite execution loop will exist. In order to exit of this endless loop, press the automatic key again. Thus you will see that the led on the key will stop flashing and after execution the controller will finish the program.



Figure 6.5.6.19



Figure 6.5.6.20

5. **Cutting…**
After positioning is completed, you can start cutting procedure explained in **section** .

Elgo P9521

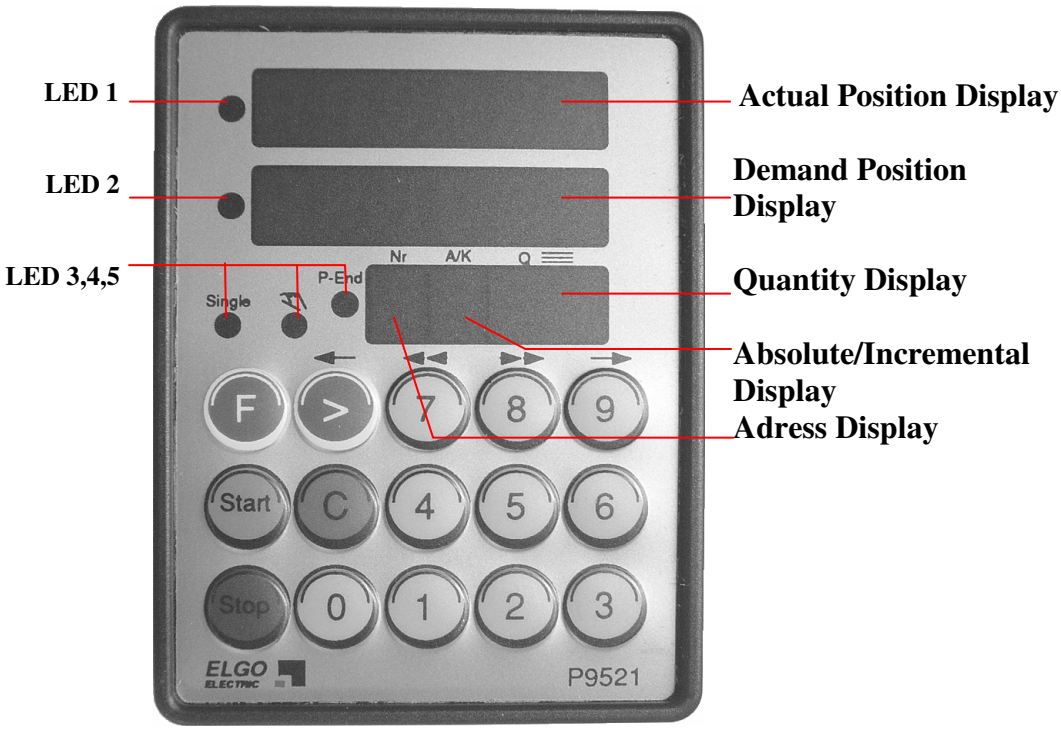


Figure 6.5.6.21

Key	Description
F	Pressing this button, will sequentially select Single, Manual or Programme mode. Depressing this button for 3 sec will switch the controller from Operation to Parameter setting mode.
>	The Cursor Button will :- In Prog mode selects: Address Absolute/Incremental Quantity Functions In Parameter setting mode selects alternately and sequentially Parameter Number Parameter Value For Jog operations Slow backwards
C	Clears selected function or parameter value. Also clears Demand Value in Single and Programme modes
Start	Start positioning action. Start is inactive in Parameter setting mode and manual mode.

	Stop positioning action. In programming mode, sets end-of-programme.
	Fast backwards (For Jog operations)
	Fast forwards (For Jog operations)
	Slow forwards (For Jog operations)

Displays:

1.	**Actual Position**	Shows the actual position of the axis
2.	**Demand Position**	Shows the required position you can enter
3.	**Quantity**	Shows how many pieces are left to be cut or how many incremental moves yet to be completed
4.	**Adress Number**	Shows which adress is operating
5.	**Absolute/Incremental**	Indicates condition of Demand position If ; 0 = Absolute value 1 = Incremental +ve value 2 = Incremental –ve value
6.	**LED 1**	Negative sign symbol and also illuminates when Parameter entry mode selected
7.	**LED 2**	Illuminates when Demanded position or Parameter input can be entered
8.	**LED 3,4,5**	Illuminates to indicate function Single/Manual/Prog as selected by Button F

Using the controller

Manual mode:

1.	Press the key  sequentially and select manual mode (see **Figure 6.5.6.22**). When  LED 4 lit up, you will be in manual mode.

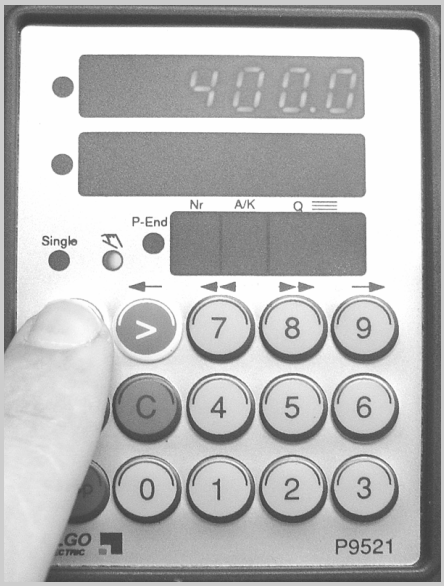


Figure 6.5.6.22

2.	Use the keys  ,  ,  ,  for jog operation (see **Figure 6.5.6.23**)

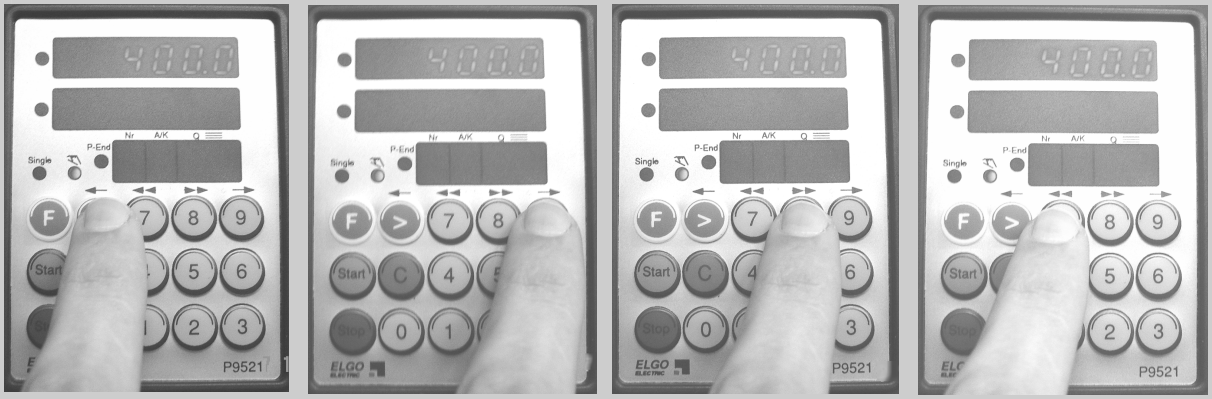


Figure 6.5.6.23

Single mode:

1. Press the key 

sequentially and select single mode (see **Figure 6.5.6.24**). When 

LED 3 and LED 2 lit up, you will be in single mode.

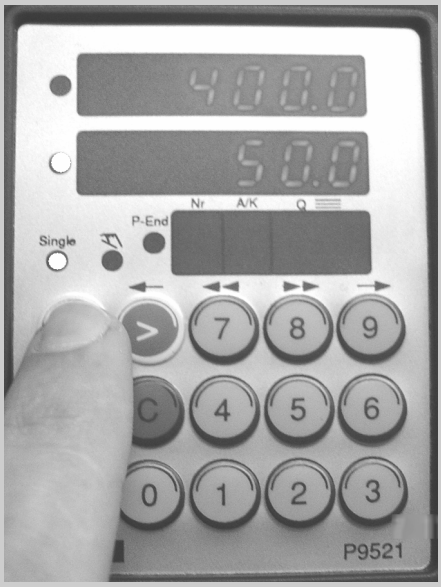


Figure 6.5.6.24

2. Using the numerical keys, enter the position (plate width) into Demand Display (see **Figure 6.5.6.25**)

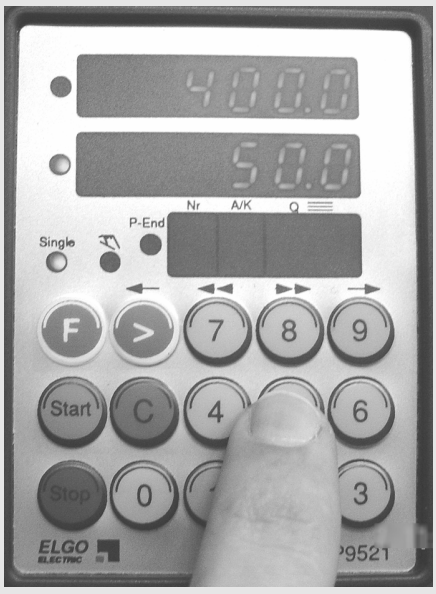


Figure 6.5.6.25

3.	Press the start  key so that positioning can take place. (see **Figure 6.5.6.26**)

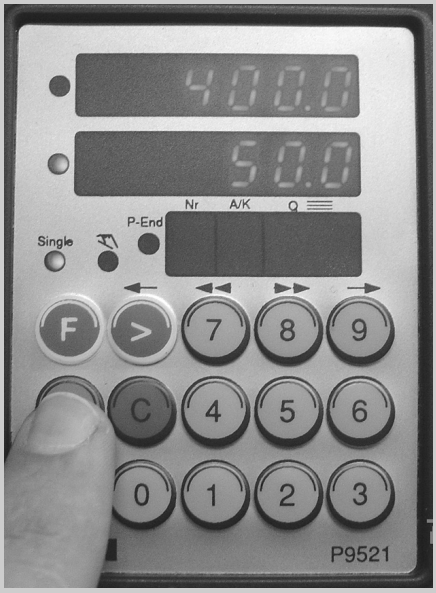


Figure 6.5.6.26

Programming mode:

1.	Press the  key sequentially. When the LED 5  lit up (see **Figure 6.5.6.27**), you will be in programming mode.



Figure 6.5.6.27

2. Write 0 to the address display (All programs always start at 0) (see **Figure 6.5.6.28**). You have 10 addresses at most in your programs. The biggest program starts from address 0 and ends at address 9. You don't have to program all addresses. At first, start from address 0 and end at any address. It depends on your needs.

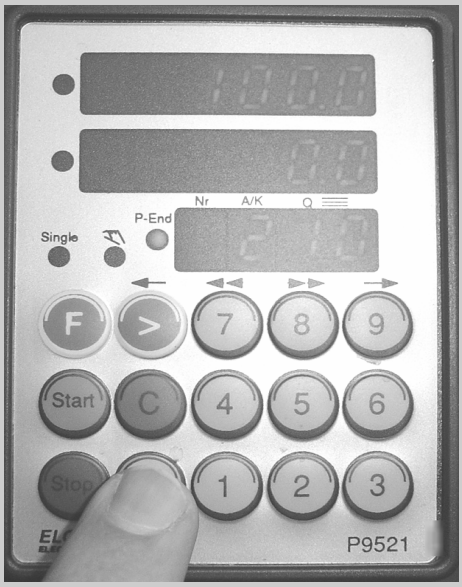


Figure 6.5.6.28

! If you need to delete some data in any display, use the cancel button 

.

3. Press the cursor button 

. A/I (Absolute/Incremental) display will flash (see **Figure 6.5.6.29**). Using numerical keys write (see **Figure 6.5.6.30**);
0 = Absolute
1 = Incremental +ve
2 = Incremental –ve

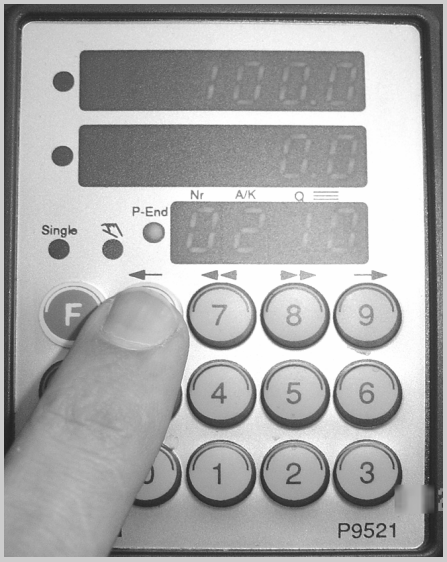


Figure 6.5.6.29

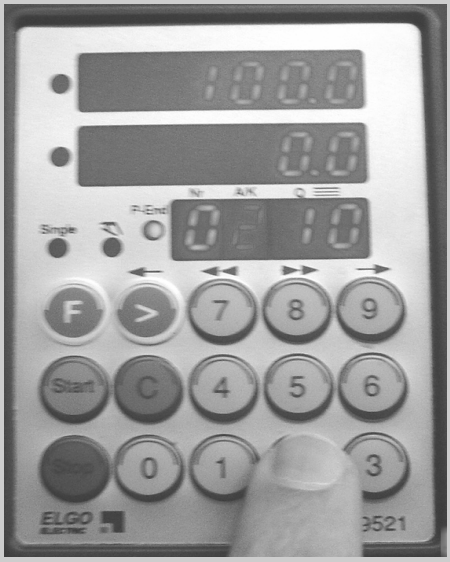


Figure 6.5.6.30

4. Press the cursor key  to select the quantity display (see **Figure 6.5.6.31**). When the quantity display flashes, write the plate quantity to be cut.

! If you need to delete some data in any display, use the cancel button  .



Figure 6.5.6.31

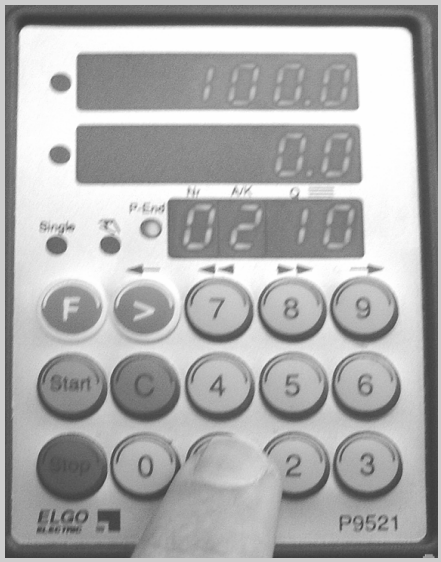


Figure 6.5.6.32

5. Press the cursor key > to select the Demand position display (see **Figure 6.5.6.33**). When the Demand display flashes, write the position (plate width).

! If you need to delete some data in any display, use the cancel button C.



Figure 6.5.6.33



Figure 6.5.6.34

6. Press the cursor key > to select the address display (see **Figure 6.5.6.34**). When the address display flashes, write the new address (the second address is 1).

7. Continue programming procedure explained in items 2,3,4,5 above.

8. At the end of your program, press stop Stop key to end the program at that address.

9. After programming procedure ends, press start Start key. Your program will begin to be executed from the address 0. Thus you can apply cutting methods explained in **section**.

NOTE:
Programming of the digital controller ELGO-9521 is executed in position II (PROG.) of the switch which is located **inside the electrical panel**. Position (I) also enables programming with the additional facilities for fixing and storing the program. For the reference or ″zero-setting″ procedure the (REF.) button on the right hand side of the (PROG.) button is used.

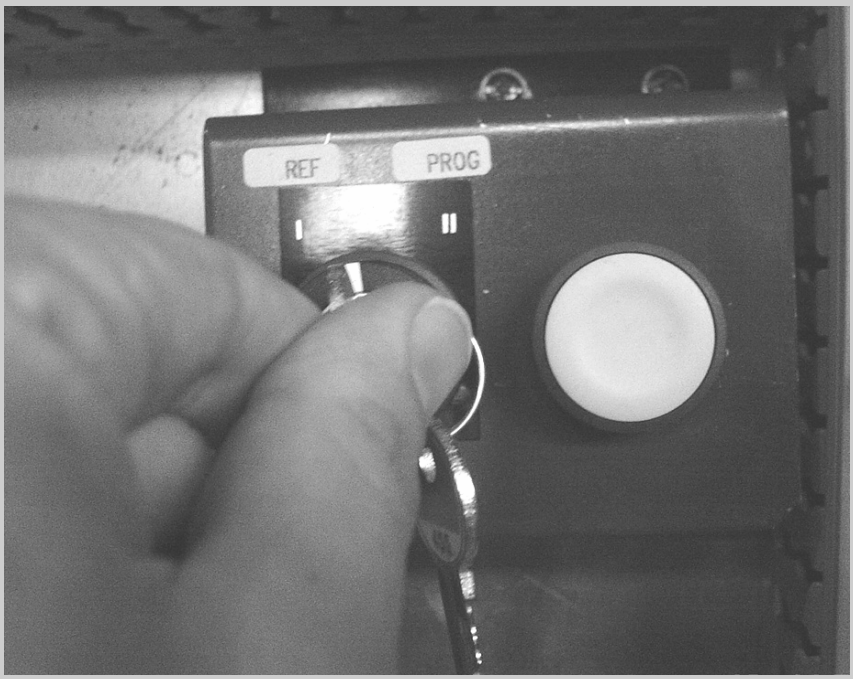


Figure 6.5.6.35

S3 Position Controller



Position and Quantity Display

Figure 6.5.6.36

Key	Description
SET	Set key display shows
COUNT	Quantity counter set key
CAL	Calibration Key
C	Clear key
START	Start and Enter key
STOP	Stop and Cancel key

How to position the back-gauge

1. Press set SET key. The display will show 00000.

2. Write desired position to the display by using numerical keys.

3. Press start START key. The back-gauge will move the desired position.

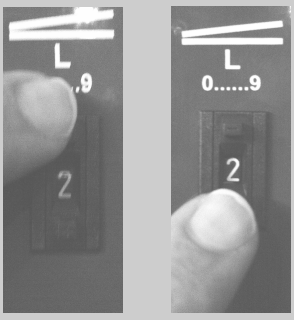
How to enter quantity

1. Press set SET key. The display will show 00000.

2. Write desired position to the display by using numerical keys.

3.	Press count COUNT key. Display shows ≡ 000.
4.	Write desired quantity to the display by using numerical keys.
5.	Press start START key. The back-gauge will move the desired position.

6.5.7. Adjustment of cutting length



(a) **(b)**

Figure 6.5.7.1

1.	Use **the stroke timer** on the control panel to adjust the cutting length.(Between 0-9, while 9 is the full length). In order to increase cutting length, press the upper small button on the timer (see **Figure 6.5.7.1.a**)
2.	To decrease cutting length, press the lower small button on the timer (see **Figure 6.5.7.1.b**)

6.5.8. Illumination facility



Figure 6.5.8.1

For shadowing the cutting line, you can make use of **the illumination switch** on the control panel which activates the florescent light inside the machine frame.

.5.9. Cutting speed adjustment

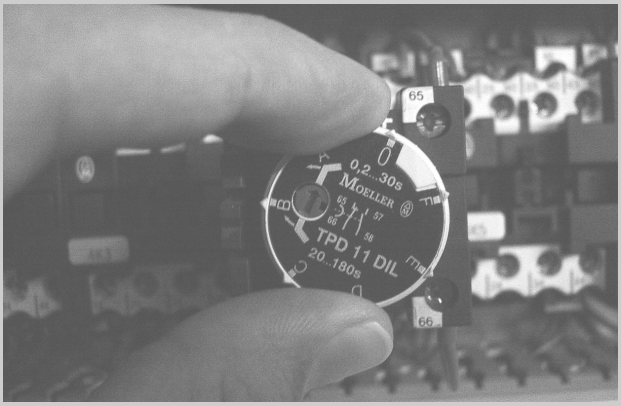


Figure 6.5.9.1

The timer inside the electrical cabinet actually sets the waiting time of the beam at top position. If you decrease the waiting time at the top, the beam will make more up-down movement in a minute. Thus you will increase the cutting speed.

TIM-2: Timer for waiting time of holddowns in top position could be adjusted with this button.

6.6. Maintenance & Inspection:

> **!** ***General maintenance and cleaning of the shear requires careful attention. Therefore the machine must be shut-off before starting any maintenance work.***

6.6.1. Type and frequency of inspections

Inspection	Period	Responsibility
Lubrication	See: Lubrication Diagram	Operator
Lubrication of blades	Daily	Operator
Guards against any physical damage	Daily	Operator
Blade fixing bolts against loosening	Weekly	Operator
Oil leakage in cylinders	Weekly	Operator
Oil leakage in pipes, hoses and hydraulic elements	Weekly	Operator
Hydraulic fluid level	Weekly	Operator
Cylinder connections bolts against loosening	Weekly	Operator
Safety & limit switches against loosening, damage	Weekly	Operator
Terminal connections of the electrical installation	Annually	Electrician

6.6.2. Hydraulic System

All precautions must be taken to keep the hydraulic system clean at all circumstances.

6.6.3. Changing oil

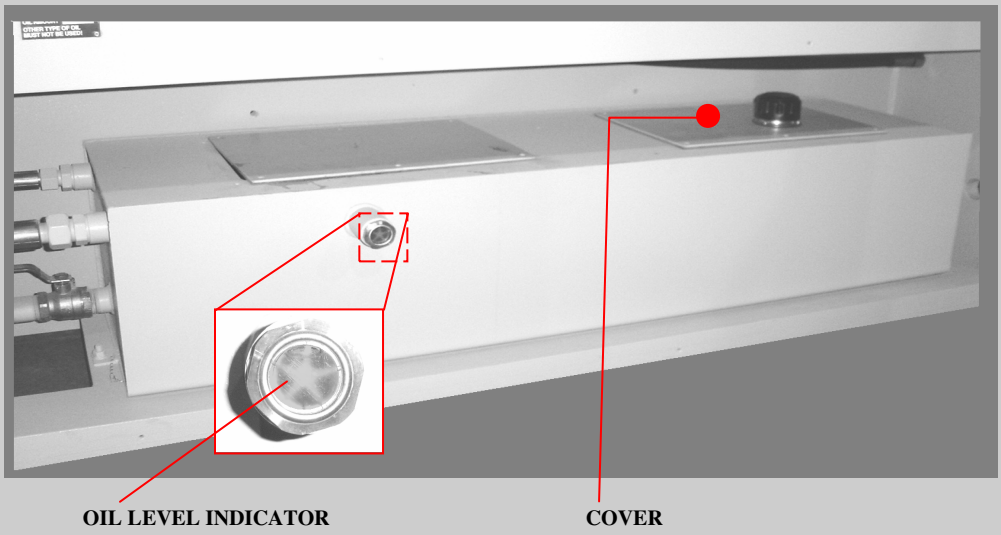


Figure 6.6.3.1

1. Remove the oil tank cover after pulling out the screws.

2. Using an appropriate pump, drain out the old oil completely. Be sure nothing is left

3. Using a pump or proper equipment, fill in new oil from the same place.
Oil level must be seen in the middle of the oil indicator. Observe the oil level from this indicator. Always keep the oil in same level.

! When changing oil, keep the oil thank clean.

! Oil must be changed after first 200 working hours of use, and then every 1000 working hours. (See: Lubrication Diagram).

6.6.4. Changing the filter

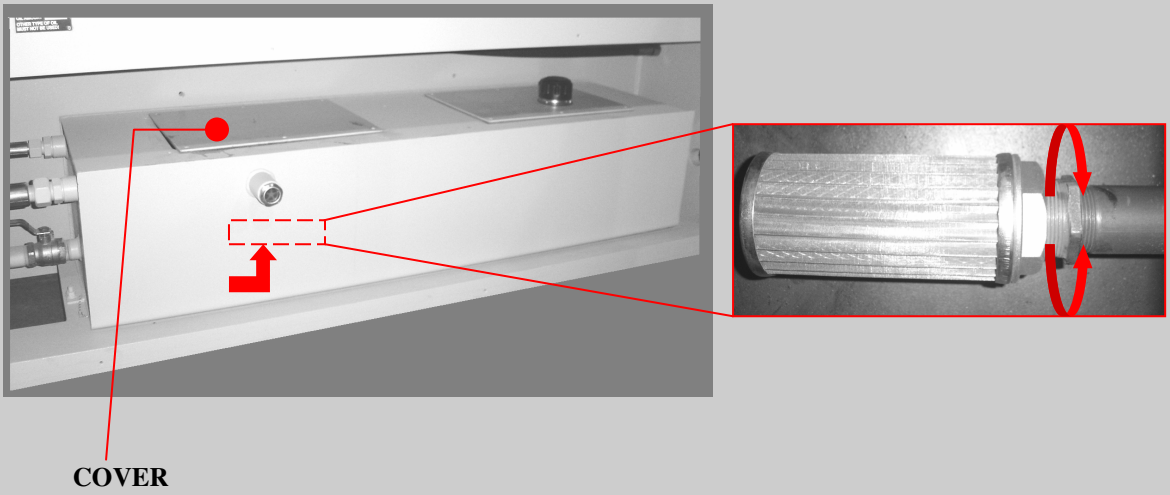


Figure 6.6.4.1

1.	Remove the cover on the oil tank after loosing and pulling out the screws.
2.	Remove the old filter from its place inside oil tank by turning in CW.
3.	Fix the new filter into its place by turning in CCW.

!	**The suction filter element must be changed after first 200 hours of use, and then every 1000 working hours.**

6.6.5. Re-adjustment of back-gauge (See spare parts list)

Back--gauge stop must be parallel to the table, and this is provided in the factory. If for some reason (e.g. transport), the parallelism is lost, set it again as follows (see spare parts list no.26 for back-gauge):

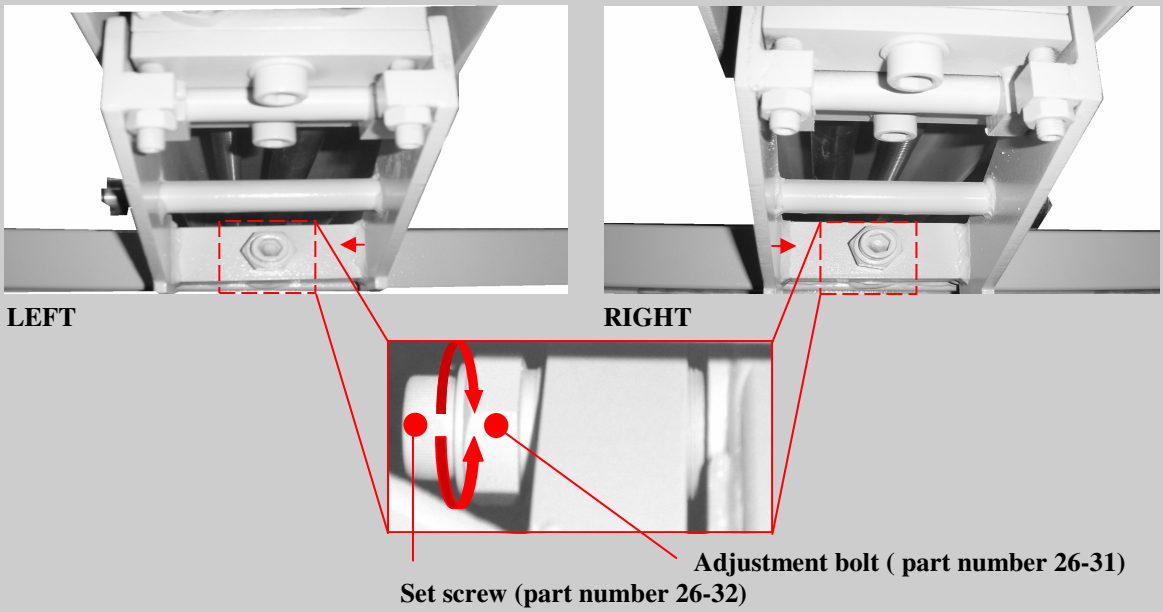


Figure 6.6.5.1

In case of existing a difference on one of the sides (left or right), loosen the set screw and adjust the parallelism by turning the back-gauge bolt (**see Figure 6.6.5.1**). Tighten the set screw.

6.6.6. Changing the blades (see spare parts list)

!	**To change the blades in a safe manner, at least TWO operators are required.**

!	*The procedure for changing the blades is potentially dangerous as operators fingers or hands can be cut. Therefore, leather-working gloves must be worn.*
!	*DO NOT touch the pre-adjusted limiting nuts and bolts (11-23 and 11-24). Otherwise the blades may overlap.*
!	*DO NOT touch the fine adjustment nuts and bolts (11-29 and 11-30) for any adjustment.*

6.6.6.1. Changing the top blade:

•	Lift the cutting beam to uppermost position.
•	Set the backgauge to maximum distance.
•	Turn off the main switch and lock it up.
•	Remove the finger protection grid and shadowing wire.
•	The operator and co-operator should be at the rear side of the shear.
•	Take out all blade fixing bolts (11-25 in **spare part list** and see in **Figure 6.6.6.1** below), EXCEPT one bolt on each of the edges. Slightly loosen these bolts on the edges.

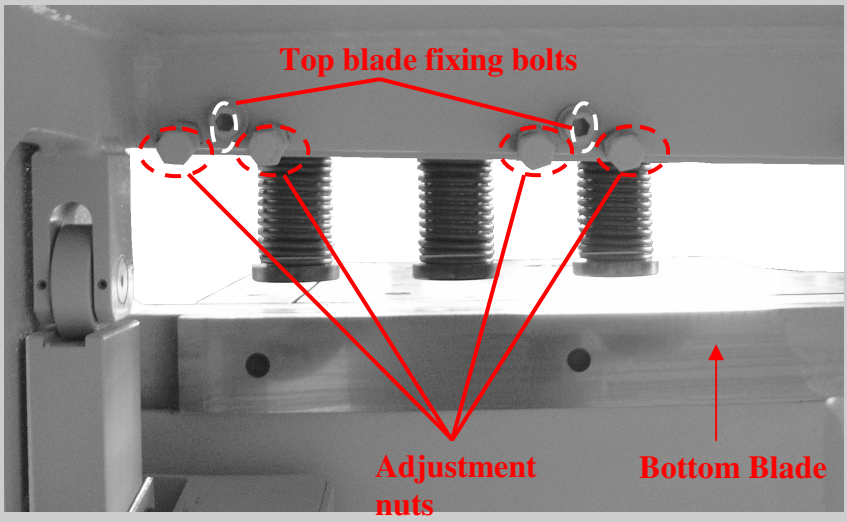


Figure 6.6.6.1

!	**DO NOT loosen the edge bolts excessively, as otherwise the blade may fall down causing injury.**

•	The operator and co-operator should hold the blade with one hand, while taking out the edge bolts completely with the other hand. The blade can now be taken away.
	NOTE: In re-fitting the top blade, the above procedure is applied in reverse order.

6.6.6.2. Changing the bottom blade:

•	Lift the cutting beam to uppermost position.
•	Set the backgauge to maximum distance.
•	Turn off the main switch and lock it up.
•	Remove the finger protection grid and shadowing wire.
•	Take out all blade fixing bolts (see in **Figure 6.6.6.2**) under the table in front of the machine, EXCEPT one bolt in the middle.
•	One of the operators, at the rear of the machine, should hold the blade in its place.
•	The other operator, in the front of the machine, should take out the center bolt and go to the rear of the machine.

•	The operators should hold the blade by the edges, and take it away.

NOTE: In re-fitting the bottom blade, the above procedure is applied in reverse order.

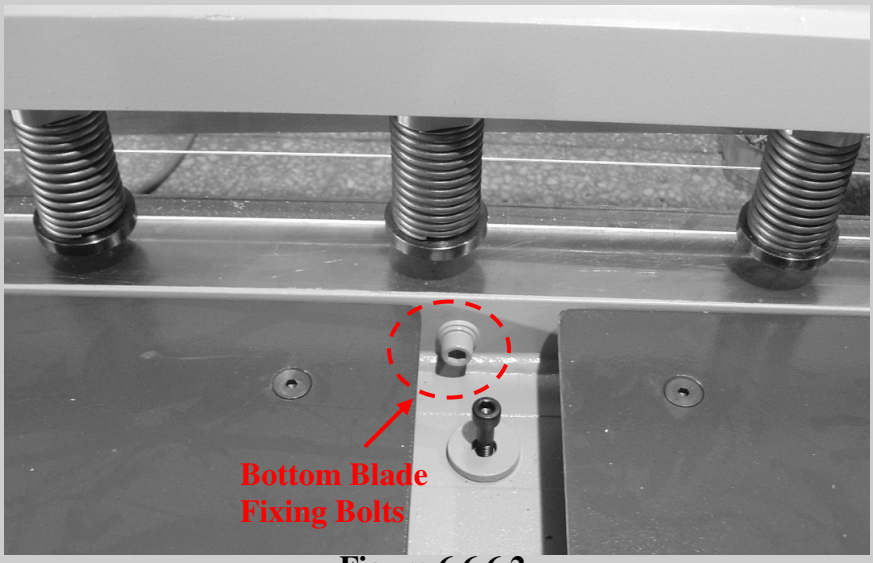


Figure 6.6.6.2

TO REMEMBER:

!	***It is recommended that top blade is not removed before bottom blade is removed.***
!	***It is recommended that bottom blade is not re-fitted before top blade is re-fitted.***
!	***Before re-fitted the blades, the blade housings and surfaces should be cleaned thoroughly.***

NOTES:	**a)**	If the blades are to be re-fitted after sharpening, the position of blade gap adjustment scale must be rearranged by means of adjusting bolts and nuts (11-23 and 11-24 in **spare part list**). This position is determined by blade gap adjustment procedure with the shear working in ″inching″ mode.
	b)	If the blades are excessively sharpened, the above rearrangement will not be possible. In this case, take out the bolts (11-05) and remove the geared plates on both sides. Rotate the both eccentric pivot pin (11-01) by a rod as much as necessary to adjust the blade gap using a ″filler gauge″. Align the geared plate (11-04) on the suitable holes of the eccentric pivot pin (11-01) and fix it by means of the bolts (11-05). Then correct the scale position.

6.6.7. Fine adjustment of top blade (see spare parts list)

Prior to dispatch from the factory, top blade of your shear has been fine-adjusted by means of the nuts and bolts (11-29 and 11-30 in **spare part list** or see in **Figure 6.6.7.1**).

! *Unless necessary, these nuts and bolts (11-29 and 11-30) should be left untouched.*

If the pre-adjusted positions of the (11-29 and 11-30) nuts and bolts have been changed for some reason, or in cases where it is not possible to obtain burr-free cuts in the center of the machine (tough on the edges the cut quality can be burr-free), a fine adjustment of the top blade is necessary.

The procedure below must be followed:

! *Fine adjustment of top blade is a hazardous procedure, which necessitates two qualified operators, and utmost care and attention. Otherwise, the operator may cut his hand.*

One of the operators should be at the rear side of the shear by informing the other operator.

! *During this procedure the operator behind the machine must be in charge for giving all the instructions to operate the machine.*

a) Switch on the machine, and lift up the cutting beam to uppermost position in ″inching″ mode.

b) Set the blade gap lever to 1 mm on the thickness scale, which should correspond to a gap of 0.1mm between top and bottom blades.

c) Move down the cutting beam such that top and bottom blades are edge to edge on the left-hand side of the machine. Check the blade gap again by a filler gauge and make sure that the gap is 0.1 mm by means of the blade gap adjustment lever.

d) Repeat the procedure in (c) on the right hand side of the machine.

e) Lift up the beam.

f) Move down the cutting beam such that top and bottom blades are edge to edge on the left side where the first adjusting bolts are. Check the blade gap by a filler gauge. If the gap is greater than 0.1 mm, loosen up the blade fixing bolts (11-25).Push-in the fine adjusting bolts (11-29) to obtain a blade gap of 0.1 mm and tighten the nuts (11-30). Re-tighten the bolts (11-25). If the gap is smaller than 0.1 mm, loosen up the nuts (11-30) and the bolts (11-29). Screw up the blade fixing bolts (11-25) to obtain a blade gap of 0.1 mm. Tighten the bolts (11-29) and the nuts (11-30).

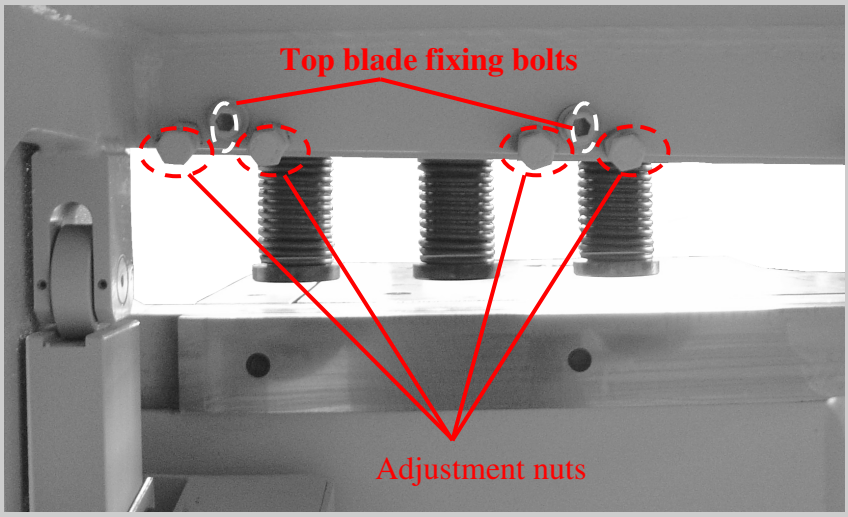


Figure 6.6.7.1

g) Repeat the procedure in (f) for all fine adjusting bolts alongside the blade length from left to right.

h) Test the cut quality by shearing a 1 mm thickness material. Where the cut is not burr-free alongside the blade length, repeat the procedure in (f) to attain a fine shearing quality.

Make sure that the blades do not overlap, when fine-adjusting the top blade.

6.6.8. Lifting Cylinders (see spare parts list)

This is shown in the spare parts list as number (15A).

Lifting cylinders must be checked periodically against any gas leakage. Pressure must be checked regularly to be at 35bar.

To refill the lifting cylinders SEE (Sec.7 Page 11/15). Before refilling gas in the cylinders, fill in 50gr hydraulic fluid to prevent seal from damaging. Both lifting cylinders must have the same pressure at 35 bar.

6.7. TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSES	CORRECTION
a) Sheared material is burred	• Blade gap is misadjusted • Blade edges are blunt	• Re-adjusted blade gap • Sharpen blades
b) Beam does not descent (Very little or no pressure in cylinder)	• Pressure relief valve is blocked • Failure is pressure relief valve • Directional valve is blocked • Spool of directional valve is burnt • Failure in directional valve • Suction filter is blocked • Failure in pump • Leakage in pipes or cylinder	• Clean valve • Change valve • Clean valve • Change spool • Change valve • Clean filter • Check pump, replace if necessary • Find out where leakage is and repair
c) Beam does not ascend	• Low pressure in lifting cylinders • Leakage lifting cylinders	• Refill gas (See spare part list) • Replace rod seal and refill gas
d) Oil leakage under cylinder	• Piston seal is torn out	• Change seal
e) Oil leakage in fittings	• Fittings are loose	• Tighten fittings
f) Oil leakage in holddowns.	• Holddown seals are torn out • O-ring is damaged	• Change seal or seals • Change o-ring

6.8. Conditions of storage, re-utilization and scrapping:

6.8.1. Storage

In cases where the machine is not be used for a long period of time, the following precautions must be taken:

- Disconnect electrical supply to the machine, and write so on the electric panel as a reminder for future use.
- The storage place of the shear must be indoor with protection against humidity, dust, and danger of fire.
- Lubricate top and bottom blades by an anti-rust lubricant.
- Empty the oil the tank.
- Lubricate pistons and all metal surfaces by an anti-rust lubricant
- Lubricate plastic hoses against cracking.
- Cover the machine by a nylon cover for protection against dust.

6.8.2. Re-utilization after storage

Take the following steps if the shear is to be re-utilized after a long period of storage:

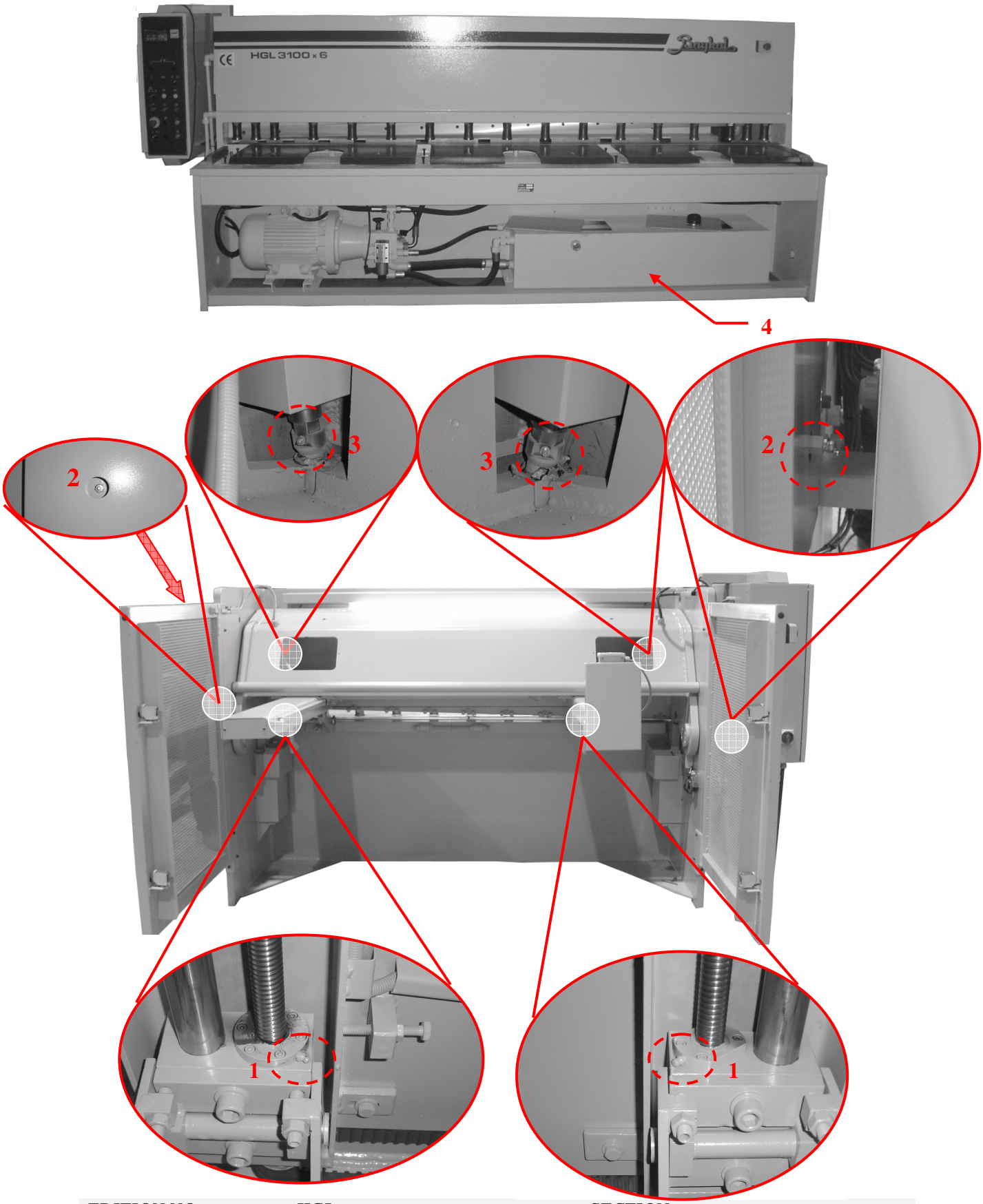
- To use the old machine oil, make sure that the physical and chemical properties of the liquid is intact. This should be verified by an expert body. Otherwise, fill the tank with new oil.

- All electrical components must be checked by a qualified electrician to make sure that all of them are properly functional. Replace the faulty components.
- The machine body and mechanical parts must be checked through by authorized and qualified personnel, and the machine must be prepared for operation according to the operating instructions.

6.8.3. Scrapping

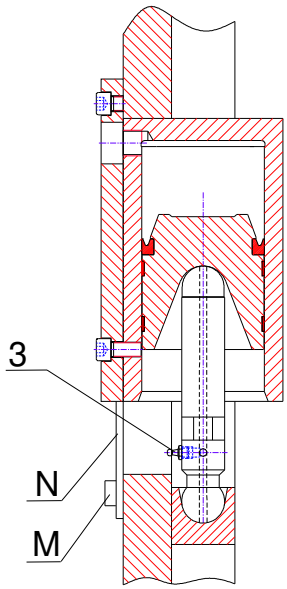
If the shear has completed its normal operating life, prior to scrapping all the oil in the tank and cylinders should be drained off, and the machine should be dismantled.

7. LUBRICATION DIAGRAM



3) LUBRICATION OF THE PISTON ARM HOUSINGS:

3.1- Make sure that the beam is at the top position.
3.2- Take the bolts (M) and the cover (N).
3.3- Move the beam downward manually until the lubricator on the piston arm is seen by the operator.
3.4- Switch off the main switch.
3.5- Grease the areas between piston - piston arm and piston arm - top beam from the lubricator (3) on the piston arm by using grease gun. (If the lubricator is not in the correct direction, turn the piston arm by using a wrench.)



PLACE OF LUBRICATION	NO	NUMBER OF LUBRICATION SPOTS	OIL TYPE PREFILLED IN FACTORY	EQUIVALENT OIL TYPES	LUBRICATION PERIOD
BACK-GAUGE NUT	1	2	DIN 52 825 / K2K	BP ENER GREASE C2	2-7 Days
ECCENTRIC HUB	2	2	GREASE No.2	BP ENER GREASE C2	60 Days
PISTON ARMS	3	2	GREASE No.2	BP ENER GREASE C2	90 Days
OIL TANK	4	1	t<10 ˚C – HLP 32 t>10 ˚C – HLP 46 t>30˚ C – HLP 60	RANDO OIL 32 TELLUS 32 RANDO OIL 46 TELLUS 46 RANDO OIL 68 TELLUS 68	MUST BE CHANGED AFTER FIRST 200 WORKING HOURS, NEXT CHANGE : AFTER 1000 WORKING HOURS.

APPENDIX

A. SPARE PART LIST

B. HYDRAULIC CIRCUIT DIAGRAM

C. ELECTRIC CIRCUIT DIAGRAM

ADDITIONAL MANUALS