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INNOVATIVE TECHNOLOGIES

SHEAR
CNC HGS SERIES



CNC HGS SERIES

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TABLE OF CONTENTS

WARRANTY **2**

CNC HGS TECHNICAL FEATURES **1**

1. INTRODUCTION **2**

2. CNC HGS COMPONENTS AND OPERATING PRINCIPLES **2**

2.1. CNC HGS OPERATING PRINCIPLES 2
2.1.1 GENERAL SPECIFICATIONS OF CNC HGS 3
2.1.2 CNC HGS STANDARD AND OPTIONAL ACCESSORIES 4
2.2. THE COMPONENTS OF CNC HGS 6

3. TRANSPORTING CNC HGS **7**

3.1. CNC HGS SHIPMENT 9

4. CNC HGS INSTALLATION INSTRUCTIONS (ASSEMBLY) **10**

4.1. CNC HGS LAYOUT PLAN 10
4.1.1. PLACING CNC HGS ON THE WEIGHING MACHINE 14
4.2. CNC HGS ELECTRICAL CONNECTION 17
4.2.1. ENGINE ROTATION DIRECTION 18
4.3. FIRST START 18
4.4. OPERATING AREA OF MACHINE 19
4.5. ASSEMBLY OF CNC HGS PROTECTION CAGES 19

5. SECURITY INSTRUCTIONS AND PRECAUTIONS **24**

5.1. SAFE OPERATION OF MACHINE 24
5.1.1. OPERATIONAL SAFETY 24
5.1.2. MACHINE REPAIR 24
5.1.3. PROTECTIVE CLOTHES 25
5.1.4. EMERGENCY STOP PROCEDURE FOR MACHINE 25
5.1.5. USE OF APPROVED SPARE PARTS AND AUXILIARY UNITS 25
5.1.6. TURNING ON-OFF PROCEDURE OF THE MACHINE 26
5.1.7. SOUND LEVEL OF THE MACHINE 26
5.1.8. OVERVIEW OF DANGERS 26
5.2. VIEW OF WARNING AND INFORMATION LABELS 27

6. GENERAL STRUCTURE OF CNC HGS SHEAR **33**

6.1. CNC HGS 33
6.2. CNC HGS HYDRAULIC SYSTEM UNIT 34
6.3. CNC HGS SHEAR OIL COOLING AND HEATING UNITS (OPTIONAL) 36
6.3.1. SHEAR OIL COOLING UNIT 36
6.3.2. SHEAR OIL HEATING UNIT (OPTIONAL) 37
6.4. FEELER GAUGE ADJUSTMENT SYSTEM 37
6.5. PNEUMATIC REAR SHEET METAL SUPPORT SYSTEMS (OPTIONAL) 38
6.5.1. PNEUMATIC LEVER TYPE REAR SHEET METAL SUPPORT SYSTEM 38
6.5.2. PNEUMATIC UNIFORM TYPE REAR SHEET METAL SUPPORT SYSTEM 39
6.6. CNC HGS SHEAR CONTROL PANEL 40
6.7. CNC HGS REAR REST SYSTEMS 41
6.8. FRONT LEVERS AND SHEET METAL SYSTEMS 42
6.8.1. STANDARD FRONT LEVERS AND SHEET METAL SYSTEM 42
6.8.2. ANGLE ADJUSTED LEFT SIDE T-SQUARE SYSTEM (OPTIONAL) 43
6.10. CNC HGS TURNING ON - OFF PROCEDURE 44
6.10.1. SHEAR TURNING ON PROCEDURE 44

6.10.2. SHEAR TURNING OFF PROCEDURE 44

7. CNC HGS OPERATION INSTRUCTIONS AND SETTINGS 45

7.1. PROHIBITED USE 45
7.2. INCORRECT USE 45
7.3. OPERATING CNC HGS (PREPARING FOR CUTTING PROCESS) 46
7.4. ELECTRIC PANEL AND CONTROL PANEL 47
7.5. PEDESTAL CONTROLLER 48
7.6. PRESSURE SETTING 48
7.7. STROKE ADJUSTMENT 48
7.8. CHANGING, ROTATING AND SHARPENING THE BLADE 48
7.9. MECHANIC SETTINGS OF THE REAR REST 51
7.10. FINGER PROTECTION SETTINGS 53
7.10.1. FRONT LASER LIGHT FINGER PROTECTION SETTING (OPTIONAL) 54

8. CONTROL PANEL AND DATA ENTRY IN CNC HGS 55

9. FEELER GAUGE CLEARANCE TABLE 57

10. MAINTENANCE 58

10.1. GENERAL MAINTENANCE 58
10.1.1. AIR-CONDITIONER MAINTENANCES 59
10.2. HYDRAULIC SYSTEM 59
10.3. CHANGING OIL 59
10.4. EQUIVALENT HYDRAULIC OILS 61
10.5. HYDRAULIC TANK OIL LEVEL AND TEMPERATURE INDICATOR 62
10.6. GREASING 63
10.7. STORAGE CONDITIONS 65

11. TROUBLESHOOTING 66

12. SECURITY 68

12.1. SAFETY PRECAUTIONS 68
12.2. SAFETY SIZE 69
12.3. AVOIDABLE RISKS 69
12.4. SYSTEMS USED ON AVOIDING DANGERS CAUSED BY MACHINE 69
12.5. SECURITY MEASURES OF OPERATOR 70
12.5.1. RESCUE OPERATION FOR USER 70
12.5.2. EAR PROTECTION 70
12.5.3. EYE PROTECTION 70
12.5.4. FOOT PROTECTION 70
12.5.5. HAND PROTECTION 70
12.5.6 ELECTRICAL PROTECTION 70
12.6. SECURITY SYSTEMS RELATED TO HYDRAULIC 70
12.7. LOCATIONS OF SHEAR EMERGENCY STOP BUTTONS 71
12.8. SHEAR SECURITY SYSTEMS AND THEIR LOCATIONS 72
12.9. SHEAR SECURITY SYSTEMS 74

13. WEARING PARTS AND CONSUMABLES LIST THAT MAY BE REQUIRED 76

14. THE DETAILS OF CNC HGS SYSTEMS 77

14.1. UPPER JAW DETAILS 78
14.2. FRONT TABLE ASSY DETAILS 79
14.3. REAR REST ASSY DETAILS 80
14.3.1. LEFT REAR REST ASSY DETAILS 81
14.3.2. RIGHT REAR REST ASSY DETAILS 83
14.4. OIL TANK AND PUMPING ASSY DETAILS 85
14.4.1. OIL TANK ASSY DETAILS 85
14.4.2. ENGINE PUMP AND DRUM ASSY DETAILS 86

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Telefon : +90 (224) 294 75 00 - Faks : +90 (224) 294 75 49

14.5. MAIN CYLINDER ASSY DETAILS 87
14.5.1. 6 MM MAIN CYLINDER ASSY DETAILS 87
14.5.2. 8 MM MAIN CYLINDER ASSY DETAILS 88
14.6. PRESS CYLINDER ASSY DETAILS 89
14.7. FEELER GAUGE ADJUSTMENT CYLINDER ASSY DETAILS 90
14.8. FEELER GAUGE ADJUSTMENT ASSY DETAILS 90
14.9. RETURN SPRING ASSY DETAILS 94

15. THE DETAILS OF CNC HGS OPTIONAL SYSTEMS 96

15.1. LEVER TYPE PNEUMATIC SHEET METAL SUPPORT SYSTEM DETAILS 96
15.1.1. 6-8 MM LEVER TYPE PNEUMATIC SHEET METAL SUPPORT SYSTEM DETAILS 96
15.2. UNIFORM TYPE PNEUMATIC SHEET METAL SUPPORT SYSTEM DETAILS 98

16. CNC HGS HYDRAULIC CIRCUIT DIAGRAMS AND MATERIAL LISTS 101

16.1. CNC HGS 6-8 MM HYDRAULIC CIRCUIT DIAGRAM 101

16. BOLT TIGHTENING TORQUE VALUES 103

17. QUALITY CERTIFICATES 104

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ORIGINAL LANGUAGE IS TURKISH!!!

The text and graphic sections of this user's manual are prepared with special care. However, no responsibility is accepted due to the possible faults and their results.

WARRANTY

The machine shall be under the service-maintenance warranty of the manufacturer company against all production failures for 2 (two) years as of the date of delivery.

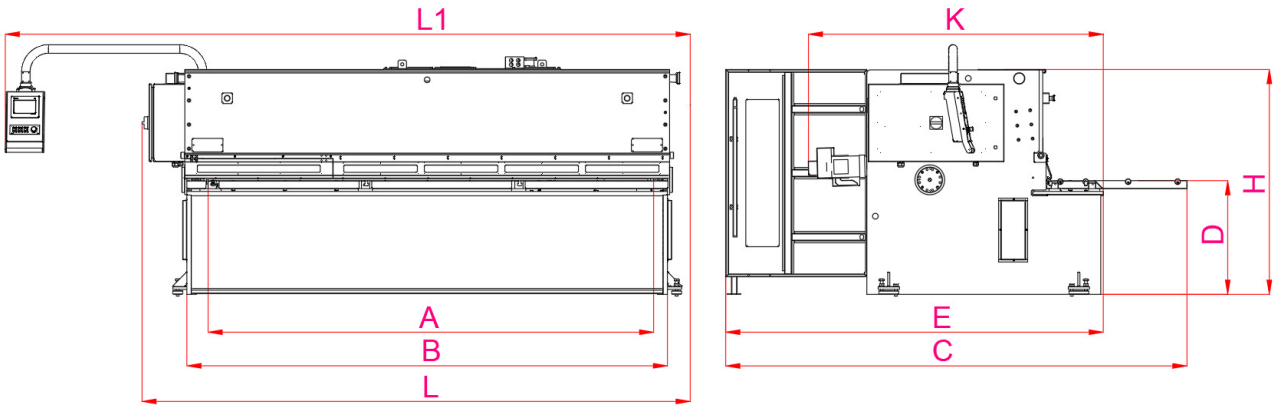
The information related to the out-of-warranty cases are detailed below.

- The warranty period is 2 years as of the date of delivery.
- The warranty period shall expires in the presence of the interferences made by the parties other than the authorities of the manufacturer company or without the approval of the manufacturer.
- Possible failures that may result from falling in default to comply with the maintenance instructions and cleaning shall be out of the warranty.
- The operation of the machine by unauthorized personnel and the operation of the machine beyond its objective may cause failures and these failures are out of warranty. The manufacturer company or the authorized service grants certificate to authorize the dealer operators to offer service.
- The original parts and accessories are particularly designed for this machine. Replacing these original parts with the others and the parts other than the ones provided by the machine manufacturer are not controlled and approved by the manufacturer. Therefore, such purchases and/or products have negative impacts on the operation of the machine and weakens the safety. At the same time, the failures result from the stated reasons are out of warranty.
- The unapproved changes, turning off the safety tools or the improvement of the machine's equipment by the owner or the operator are definitely prohibited. The manufacturer shall not be kept liable for the injury of any person or the damage and failure of the materials to result from this. At the same time, the failures result from the stated reasons are out of warranty.
- The failures that may result from not turning on and off the machine correctly are out of warranty.
- The operator receives training following the assembly of the machine. Upon request, the additional training requests are evaluated as out of warranty.

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- The failures that may occur due to different values required for the operation of the machine (electric-air, etc.) other than the values stated in the user's manual are out of warranty.
- The failures that may occur as a result of fixing the machine to the ground with connecting bolts are out of warranty.
- The failures that may occur as a result of feeding the machine with an electric voltage other than the one stated in the user's manual are out of warranty.
- The machine will be out of warranty in case the parts that should be periodically replaced, such as the oil and air filter, are not replaced.
- The failures that may occur due to non-lubrication of the parts indicated in the user's manual are out of warranty.
- The damages that occur as a result of entering tonnage (pressure) more than the value calculated by the CNC operator are out of warranty.
- The damages that occur as a result of the strains on the maximum capacity of the axis are out of warranty.
- All materials damaged or harmed due to the incorrect operation of the machine are out of warranty.
- The machine will be out of warranty in case a part or parts are welded on the machine.
- The part that is replaced during the warranty period of the machine (except the consumables) are under warranty until the expiry of the warranty term of the machine.
- The lower and upper blades used on the machine are under consumables category and are out of warranty.
- The failures that may occur due to the natural disasters (lightning strike, etc.) and
- electrical materials are out of warranty.
- Any repair on the machine will cause the machine to be out of warranty.

CNC HGS TECHNICAL FEATURES



TYPE	(A) CUTTING LENGTH	CUTTING CAPACITY (45kgf/mm²)	CUTTING CAPACITY (70kgf/mm²)	CUTTING ANGLE	CUTTING COUNT PER MINUTE	PRESS CYLINDER COUNT	MAIN ENGINE	REAR REST ENGINE	OIL CAPACITY	BLADE CLEARANCE ADJUSTMENT	REAR REST STROKE	REAR REST SPEED	SHEET METAL REST LEVER COUNT	(B) TABLE LENGTH	(C) MACHINE WIDTH	(D) TABLE HEIGHT	(E) WIDTH	(K) SHIPMENT WIDTH	(H) HEIGHT	(L) LENGTH	(L1) LENGTH	STANDARD WEIGHT	UNIFORM WEIGHT
	mm	mm	mm	(°)	1/min.	pcs.	kW	kW	lt	mm	mm	mm/s	pcs.	mm	mm	mm	mm	mm	mm	mm	mm	kg	kg
CNC HGS 2100-6	2100	6	4	1.2	28	11	11	0.75	150	0.05-0.8	1000	110	2	2415	3275	800	2685	2100	1640	3000	3816	4500	5000
CNC HGS 2600-6	2600	6	4	1.2	24	12	11	0.75	150	0.05-0.8	1000	110	2	2900	3275	800	2685	2100	1640	3500	4250	5150	5700
CNC HGS 3100-6	3100	6	4	1.2	20	14	11	0.75	150	0.05-0.8	1000	110	2	3400	3275	800	2685	2100	1640	4000	4857	5700	6300
CNC HGS 4100-6	4100	6	4	1.2	15	18	11	0.75	150	0.05-0.8	1000	110	3	4430	3275	800	2685	2100	1650	5000	5755	8100	8750
CNC HGS 2100-8	2100	8	5	1.5	20	11	15	0.75	200	0.05-1	1000	110	2	2435	3275	800	2685	2100	2000	3025	3816	5500	6100
CNC HGS 2600-8	2600	8	5	1.5	18	12	15	0.75	200	0.05-1	1000	110	2	2935	3275	800	2685	2100	1700	3525	4250	6300	6900
CNC HGS 3100-8	3100	8	5	1.5	16	14	15	0.75	200	0.05-1	1000	110	2	3435	3275	800	2685	2100	1700	4025	4857	7150	7750
CNC HGS 4100-8	4100	8	5	1.5	8	18	15	0.75	200	0.05-1	1000	110	3	4435	3405	950	2865	2150	1950	5050	5755	10800	11500

1. INTRODUCTION

This document is prepared to facilitate the operation of the machine, remind the operation methods of the functions in necessary cases and shorten the period to get used to operate the machine.

This manual is prepared to contain the information including the techniques necessary to operate the machines, which serve you, our valuable customers, in a more active and efficient manner

Our products, for which we minimized the operation costs, shall be at your service for long years if you pay the necessary attention to and perform the periodical maintenances.

This manual should be read by you, the operating authorities, as well as the personnel working with the machines at least for once. It is important to keep the manual near the machine in terms of preventing possible failures.

Our factory is entitled to make the necessary innovations according to the advanced technology without applying to any entity.

2. CNC HGS COMPONENTS AND OPERATING PRINCIPLES

2.1. CNC HGS OPERATING PRINCIPLES

CNC controller automatically displays the cutting order, rear rest positions and the cutting amount to be applied by the machine when the general dimensions, strength values, lower and upper blade set and cutting angles of the material to be cut are entered.

In the meantime, it is possible to monitor all strokes throughout the cutting process.

When the upper jaw is in upper position, the oil suctioned from the tank via Pump is sent to the press cylinders at first and then to the left main cylinder respectively in a pressurized state by the help of the block. Since the oil discharged from the left cylinder is transferred to the right cylinder, two cylinder upper jaws move synchronously. When the upper blade comes down, the plate between the blades is cut. Following the cutting phase, the direction valve in the hydraulic system changes its direction and the pressurized oil is transferred to the tank via

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return process. Pistons and upper jaw go upwards by the help of return springs available at the bottom of the cylinder. (return phase)

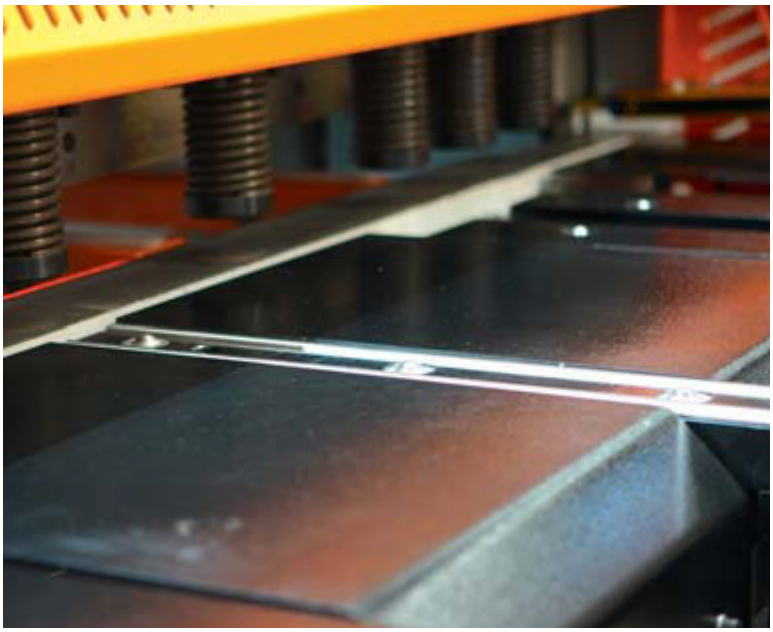


Figure 2.1 Blade View

2.1.1 GENERAL SPECIFICATIONS OF CNC HGS

- The machine is manufactured with very sensitive tolerances with advanced technology and the voltage removal has been made in all welded components. All tension points have been designed with wide radius and the possible weld cracks have been eliminated.
- The lower jaw and upper jaw heights have been designed at normal values for minimum deflection.
- The upper jaw has been positioned vertically and the cylinder beds, piston beds and felts have been designed as to take the vertical loads on.
- The hydraulic cylinders have been designed and honed as one-sided. So the minimum abrasion resistance has been obtained for the felts. The cylinder housings have been made as hammered with C 1040 material.
- Piston: Omegat type felts have been equipped with wide bronze beds and semi-angled bedding bands.
- The pistons have been coated with sensitive stoned and rigid chrome. The purpose of this is to obtain low friction and abrasion resistance while the piston passes from the felts.

- The hydraulic system is continuously and safely protected from over-load by means of pressure limits. This is provided by the over-pressure safety limits in CNC program.
- The status (active and inactive) of the hydraulic and electrical functions that control the PLC machine functions can be monitored and the input and output data can be easily monitored on the screen. The diagnosed failures are displayed as error message.
- The automatic power method of the main engine and hydraulic assy consumes power equal to the power to be used.

2.1.2 CNC HGS STANDARD and OPTIONAL ACCESSORIES

STANDARD ACCESSORIES

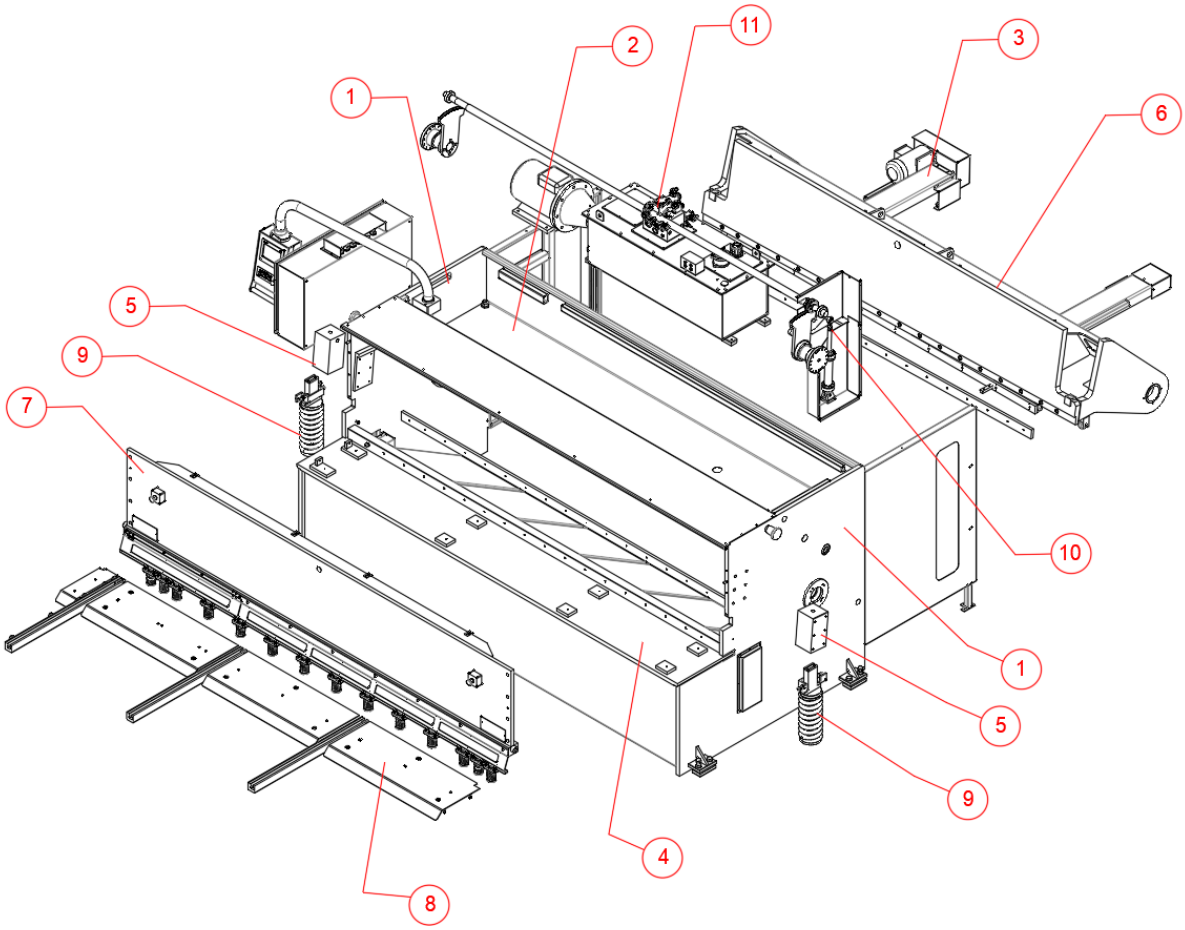
- Wear resistant blades.
  - Upper blade = 2 cutting edges
  - Lower blade = 4 cutting edges
- Portable foot pedal eligible for single and automatic cutting.
- CNC controlled hydraulic blade feeler gauge adjustment system.
- CNC controller (ERCUT 7)
- CNC controlled motorized rear rest system.
- 1000 mm CNC rear rest system with 0.1 mm accuracy.
- T channelled front support levers with measuring rod
- Front lever with T-square.
- Metric and inch gauges.
- Cutting line light and ghost wire.
- Emergency stop buttons.
- Foldable rear rest.
- Front finger protection sheet plate with electronic switch, which can be opened 1 m. from the left side and has been designed according to CE norms.
- Rear sheet metal slider plates.
- Front sheet metal plates with ball bearings on desktop.
- Portable control panel arm.

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OPTIONAL ACCESSORIES

- Pneumatic sheet metal support system for thin sheet metal.
  - Lever type pneumatic sheet metal support system.
  - Mono-block table type pneumatic sheet metal support system.
- 0° - 180° degrees T-square.
- Front sheet metal support system with T-square up to 6 m length.
- Oil cooler.
- Oil heater.
- Laser cutting line.
- Moving front levers.
- Illuminated finger protection guard.
- Different colour options.
- Dynamic servo rear rest.
- Installation on cooling or heating fan to electrical panel according to operation environment.
- Stainless blades.
- Solid table
- Optionally, it can be mounted on the right side of controller panel or electric panel.

2.2. THE COMPONENTS OF CNC HGS



Şekil 2.2 The Components of Shear

1. RIGHT/LEFT LEG BODIES
2. OIL TANK CARRIER PLATFORM
3. REAR REST SYSTEM
4. LOWER JAW
5. RIGHT / LEFT MAIN CYLINDER HOUSINGS
6. UPPER JAW
7. FRONT TABLE
8. FRONT SHEET METAL AND FRONT SUPPORT LEVERS
9. SYSTEM WITH RETURN SPRING
10. FEELER GAUGE ADJUSTMENT SYSTEM
11. HYDRAULIC SYSTEM

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3. TRANSPORTING CNC HGS

Each lifting steel rope to be used during the handling of the machine elements should have a lifting capacity of at least 15 tons. The maximum angle between the chains or lifting ropes should be 90°. Please select the length of the cords and chains according to the requirement. The correct lifting method should be used while lifting the machine and the chains should be selected per this.

- Our machines are wrapped in nylon folio and canvas to minimize the impact of the environmental conditions during the handling and storage.
- The crane, hoist, lifter, etc. vehicles should be ready, the selection of the location of positioning should be completed and the appropriate environmental conditions should be available when the machine arrives to the point of operation and storage.
- Please ensure that there is no crack and the ground is flat by checking the ground where the machine will be installed.
- Before bringing the machine to its final position, check the anchorage bolts and ensure that these bolts are at their place.
- There are two lifting points as one in the right and one in the left on the upper points of side bodies.
- The centre of gravity is in the centre of the machine towards X axis and the Y axis is variable according to the rear rest position. Therefore, this should be considered during lifting.
- Never attempt to lift the machine by using an oil tank, rear rest or cylinder assy. Always use the lifting points.
- If there is no rope with sufficient lifting capacity, then the chains and connections should be appropriate for the tonnage of the machine.

Please pay attention to the following when you receive the machine:

- Please ensure that no damage happened during transportation.
- Please check whether there is any missing part or not.
- Please ensure that the machine or any of its part did not lose its functionality.
- If it is necessary to re-transport it by another vehicle, then please pay attention to locate the machine according to the load balance of the vehicle to be transported and to fix it to the vehicle with wooden wedges to prevent sliding.

Removal of package:

The machine and its parts are delivered to the receiver as packed to prevent any damage during transportation. Please remove the package carefully after the receipt without damaging the machine.

CORRECT

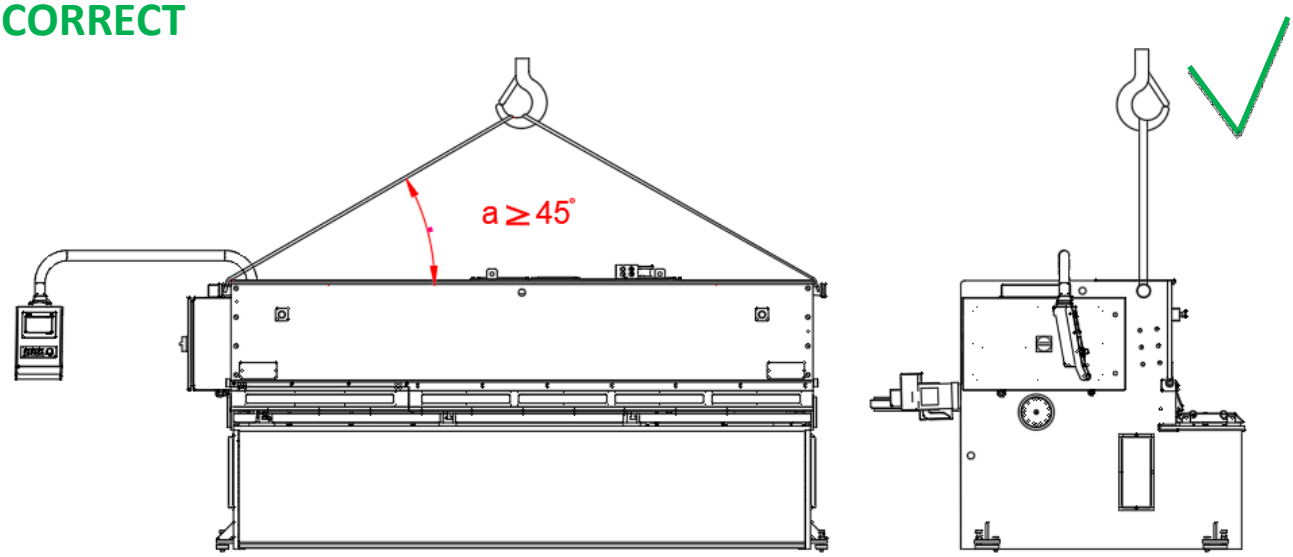


Figure 3.1 Shear Transportation Image CORRECT

INCORRECT

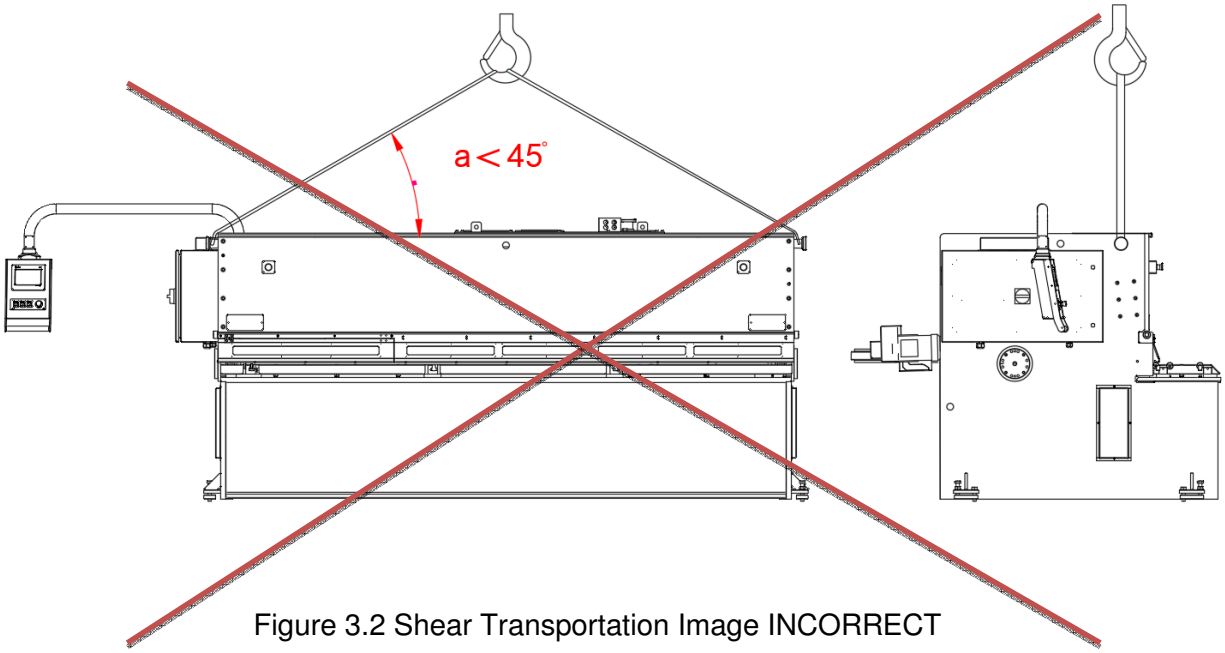
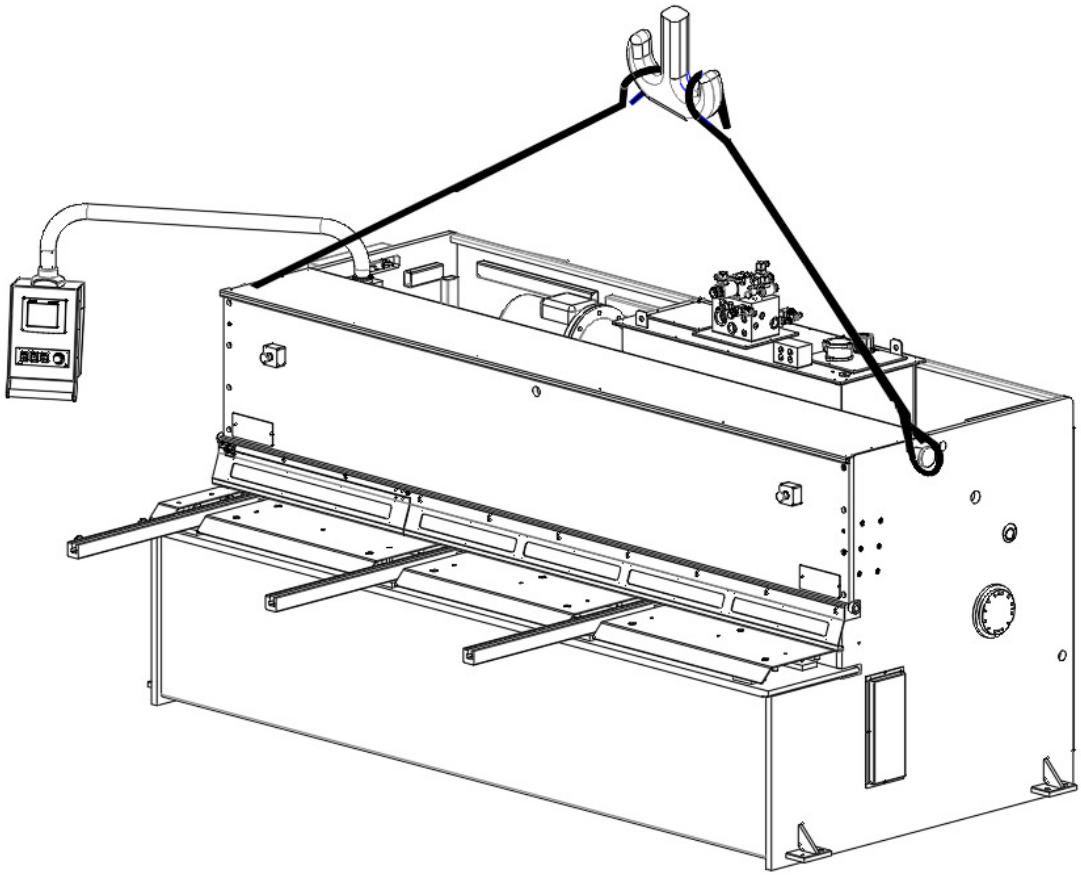


Figure 3.2 Shear Transportation Image INCORRECT

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3.1. CNC HGS SHIPMENT



The transportation of the machine should be as shown in the figure.

Figure 3.3 Image for the Transportation of Unbreakable Machines Between 2100-4100 mm

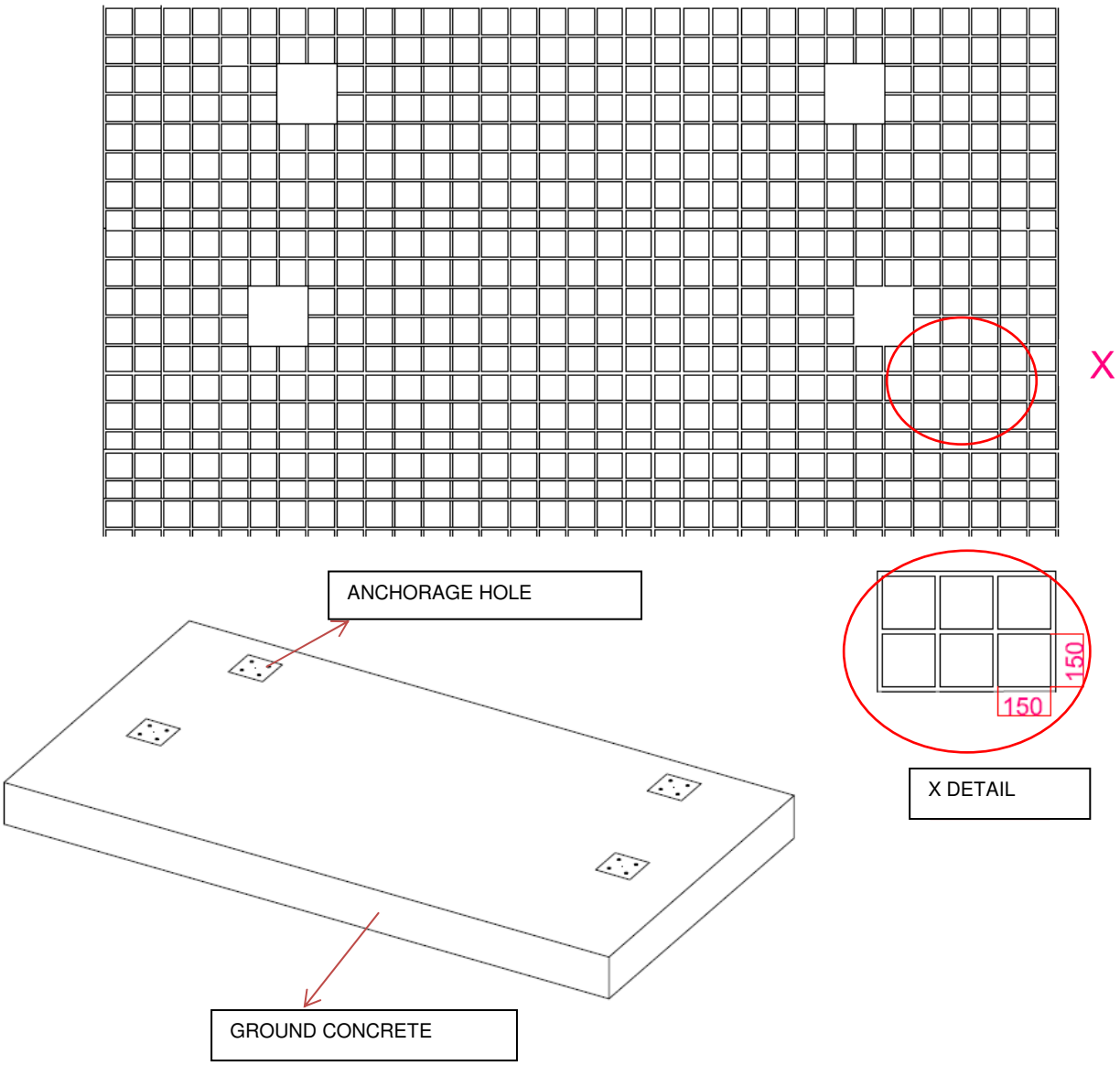
4. CNC HGS INSTALLATION INSTRUCTIONS (ASSEMBLY)

The point that should be considered is that the manufacturer company cannot be kept liable for the damages resulting during the loading-unloading or from not paying attention.

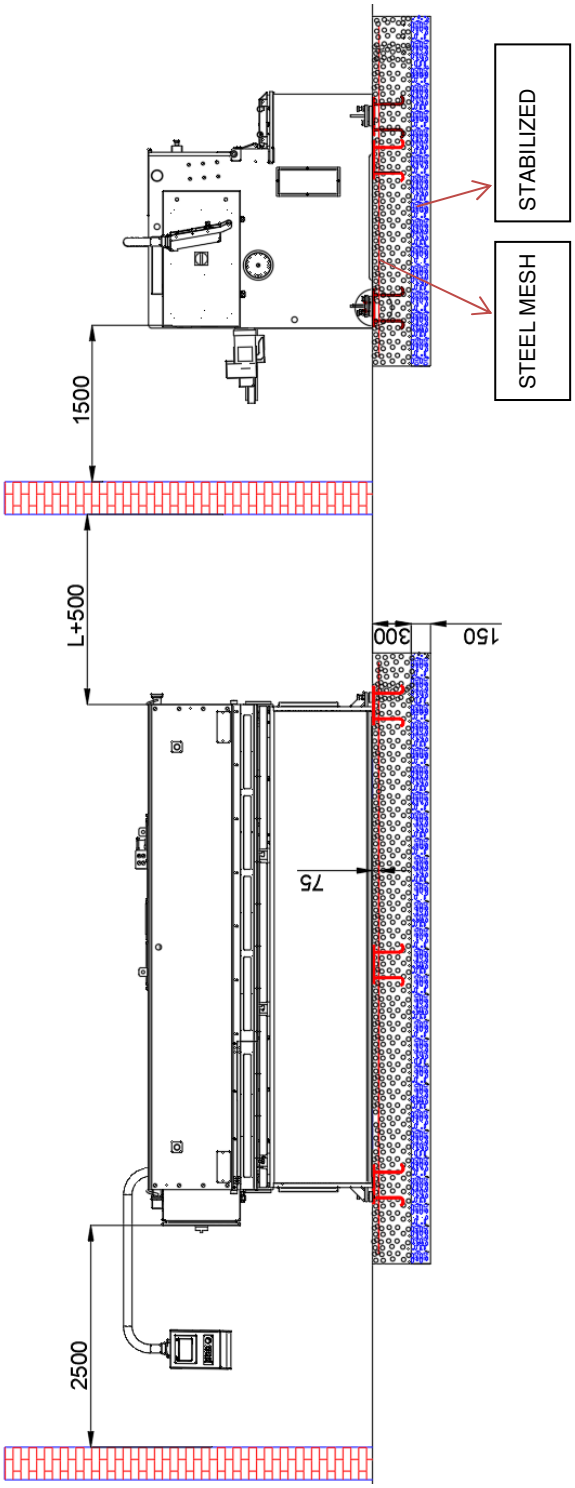
Your machine should be engaged by expert persons. Please contact to ERMAKSAN MAKİNA A.Ş. or the related sales company for the engagement of your machine.

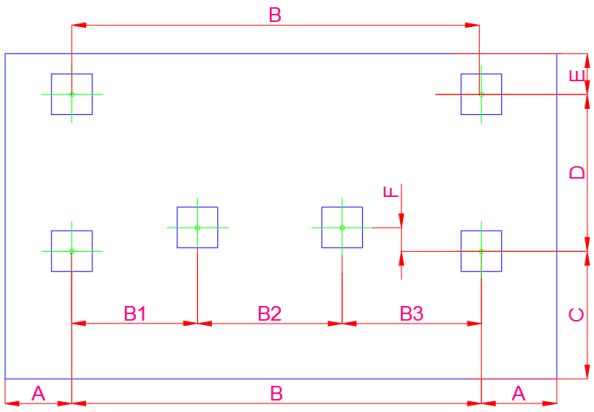
4.1. CNC HGS LAYOUT PLAN

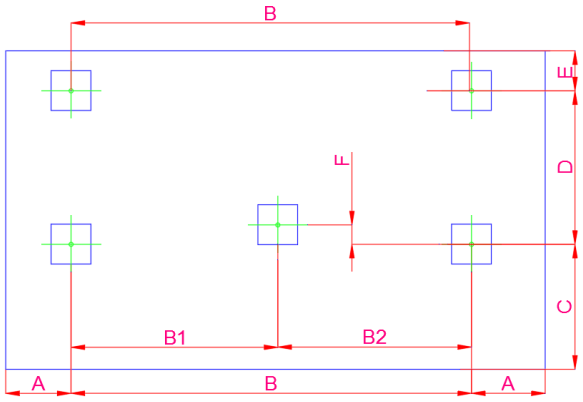
The dimensions stated in the layout should be taken into consideration during the selection of the place of the machine. The anchorage holes and foundation are prepared according to the figure. (Figure: 4.1)



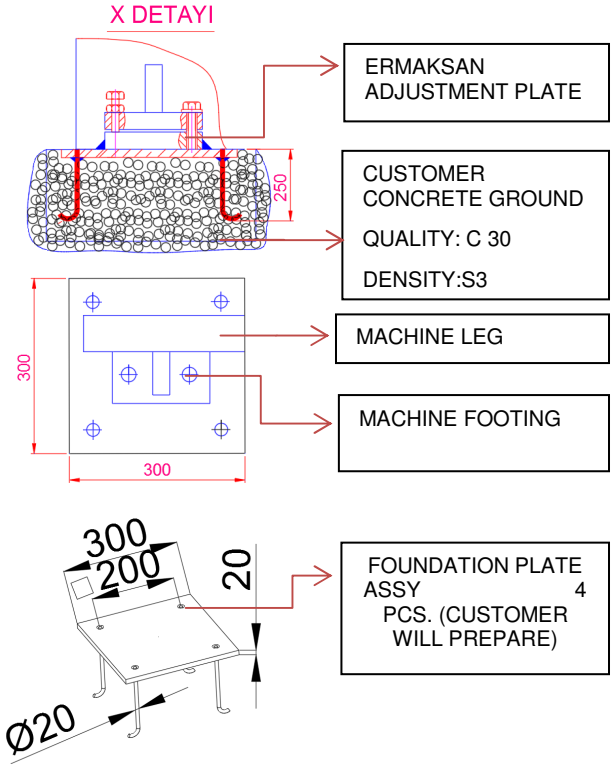
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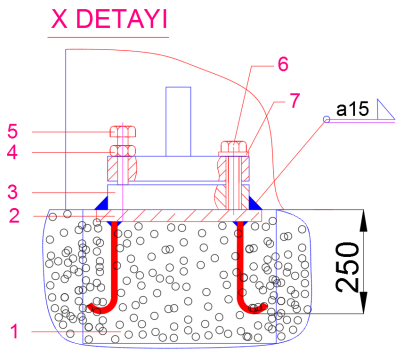

STABILIZED
STEEL MESH
1500
L+500
300
150
75
2500


B
E
D
F
C
B1
B2
B3
A
B
A


B
E
D
F
C
B1
B2
A
B
A

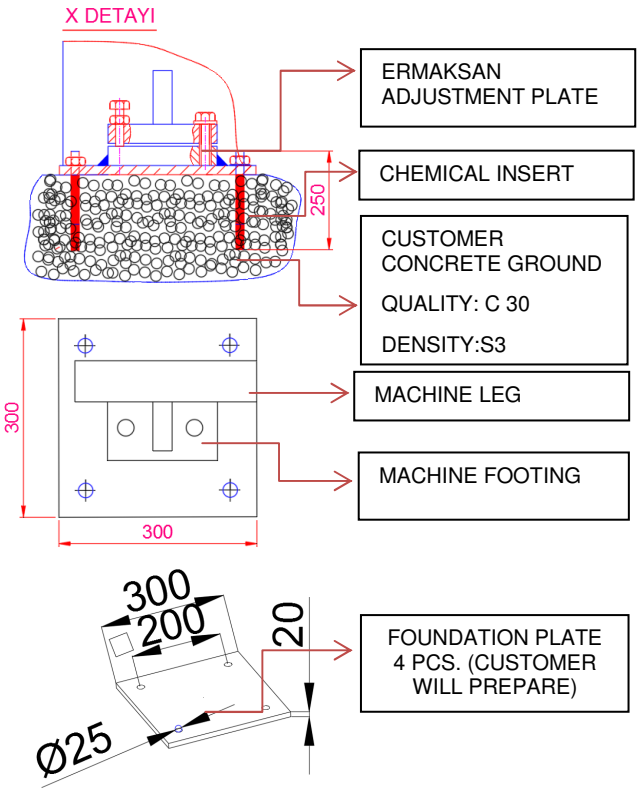
VERSION 1 | **FIXING THE MACHINE ON THE GROUND CONCRETE READY OR TO BE READY WITH ANCHORAGE**

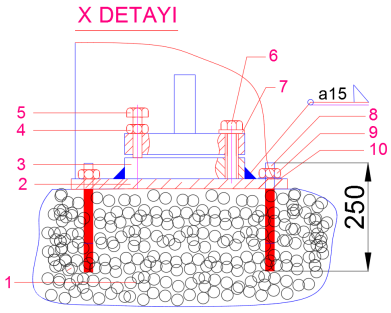




1- Anchorage hole
2- Foundation plate assy
3- Adjusting plate
4- Nut DIN 934
5- Adjusting Bolt DIN 933
6- Fixing Bolt DIN 933
7- Washer DIN 128 FSt

VERSION 2 | **FIXING THE MACHINE ON CURRENT GROUND CONCRETE WITH CHEMICAL INSERT**





1- Anchorage hole
2- Foundation plate assy
3- Adjusting plate
4- Nut DIN 934
5- Adjusting Bolt DIN 933
6- Fixing Bolt DIN 933
7- Washer DIN 128 FSt
8- Chemical insert + thrust
9- Nut
10- Washer

Figure 4.1 Layout Plan General Views

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DIMENSIONS OF STANDARD PLACEMENTS

TYPE	A	B	B1	B2	B3	C	D	E	F
2100 - 6	800	2530	1320	1310		800	1345	500	400
2100 - 8	800	2565	1315	1250		800	1280	500	350
2600 - 6	800	3030	1515	1515		800	1330	500	400
2600 – 8	800	3065	1520	1545		800	1265	500	350
3100 - 6	800	3530	1765	1765		800	1345	500	400
3100 – 8	800	3565	1780	1785		800	1250	500	360
4100 - 6	800	4540	1475	1590	1475	800	1275	500	370
4100 - 8	800	4565	1415	1600	1550	800	1535	500	450

Table 4.1 Layout Plan Dimensions

DIMENSIONS OF PLACEMENTS OF UNIFORM TABLES

TYPE	A	B	B1	B2	B3	C	D	E	F
2100 - 6	800	2530	1320	1310		800	1345	500	400
2100 - 8	800	2565	1315	1250		800	1280	500	350
2600 - 6	800	3030	1515	1515		800	1330	500	400
2600 – 8	800	3065	1520	1545		800	1265	500	350
3100 - 6	800	3530	1765	1765		800	1345	500	400
3100 – 8	800	3565	1780	1785		800	1250	500	360
4100 - 6	800	4540	1475	1590	1475	800	1275	500	370
4100 - 8	800	4565	1415	1600	1550	800	1535	500	450

4.1.1. PLACING CNC HGS ON THE WEIGHING MACHINE

Ground connection bolts of the machine are supported with scaler shoes. The machine should be fixed on the ground with anchorage plate. The compliance of the concrete should be provided before fixing. The machine should be controlled with a balancing equipment (water balance). The recommended balancing point is the centre of the table. The front and rear balance adjustments of the machine are performed by placing the balancing equipment in the centre of the table. The scale of the machine is adjusted by tightening or loosening the bolts separately found on each foot.

THE BODY OF THE MACHINE SHOULD NEVER BE EXPOSED TO TORSION.

! The machine should be fixed to the ground in a good manner.

! After the machine is put on the scaler, it is recommended to check the feeler gauge setting.

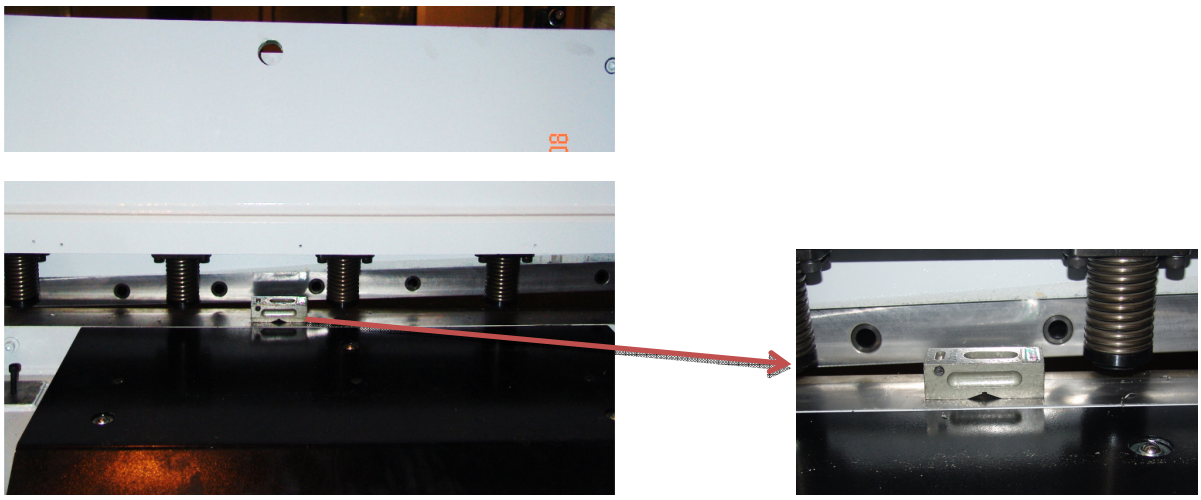


Figure 4.2 View of Water Balance Placement

The water balance is located in the centre of the lower jaw of the machine.

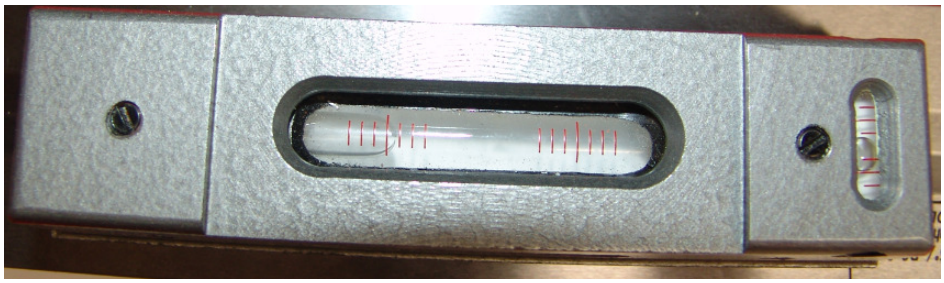


Figure 4.3 View of Water Balance

If the air bubble is on the left side of the lateral balance as shown in the figure when the balance is in the centre of the lower table, then the bolt of the front right balance foot of the machine is tightened and lifted.

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Figure 4.4 Front Adjustment View of Water Balance

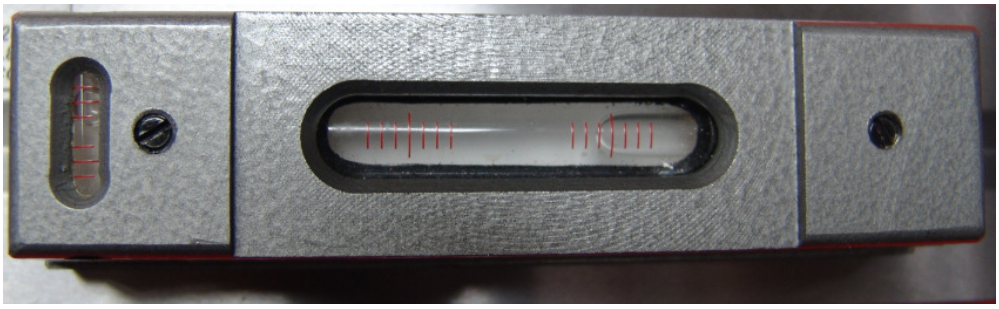


Figure 4.5 View of Water Balance

If the air bubble is on the right side of the lateral balance as shown in the figure when the balance is in the centre of the lower mould, then the bolt of the front left balance foot of the machine is tightened and lifted.

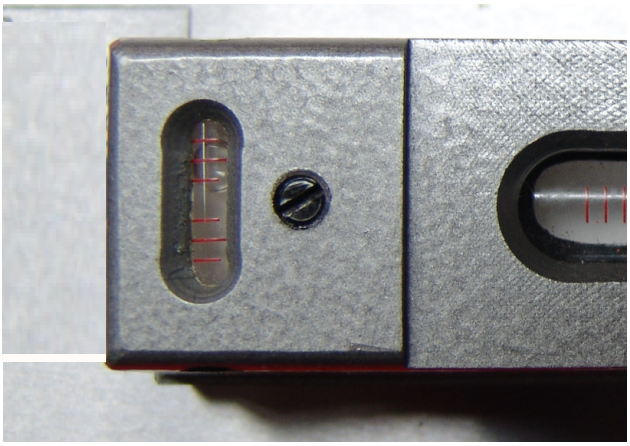


Figure 4.6 View of Vertical Water Balance

As the second phase, as shown in the figure, when the balance is in the centre of the lower mould, the air bubble in the vertical balance is obtained with the aid of the balance foots in the rear side of the machine.

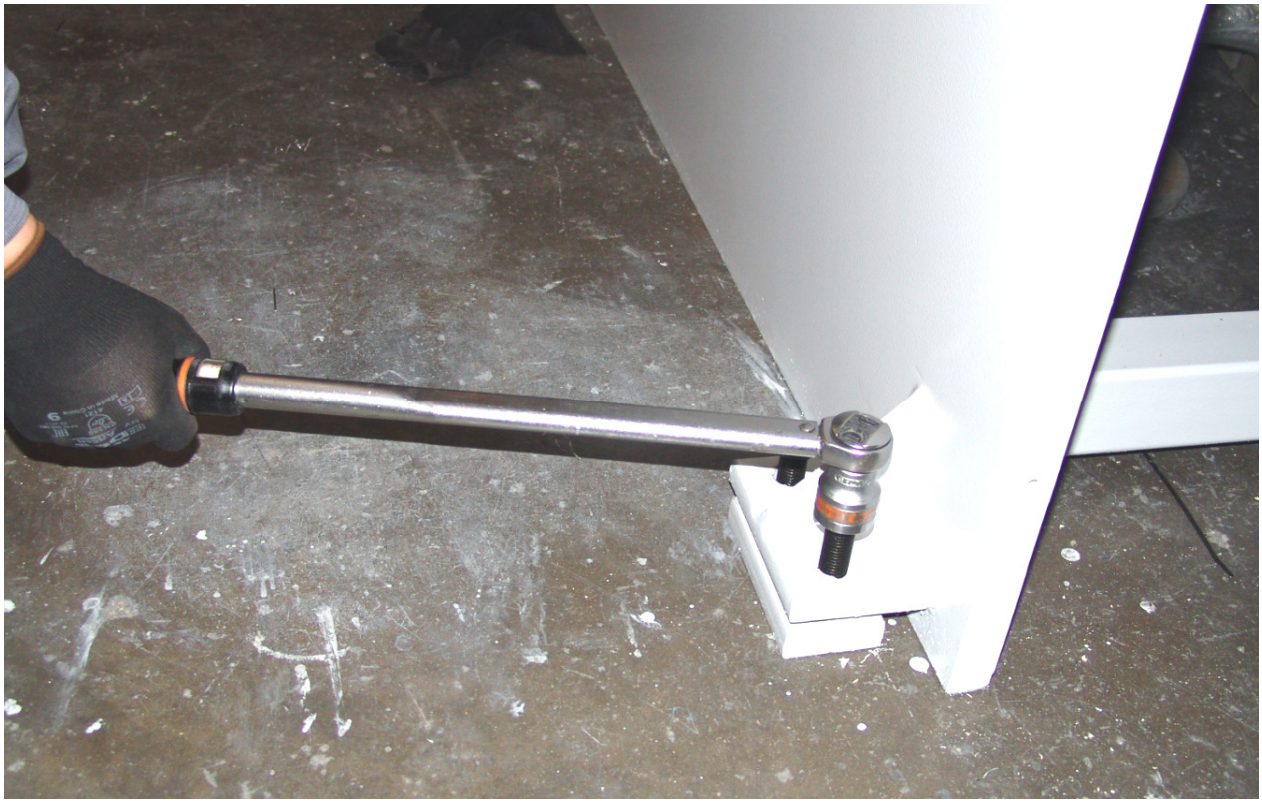


Figure 4.7 Rear Adjustment View of Water Balance

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4.2. CNC HGS ELECTRICAL CONNECTION

The connection of the machine to the electric network should be done by experts.

⚠ Initially the appropriateness of the voltage should be controlled. (See electric project).

⚠ The section of the power input cable should be selected according to the power of the machine (See electric project).

The power input cable is passed from the hole under the electrical panel as shown in Figure 4.8.

The tips should be connected to the connector terminal located in the upper part of the electric panel as shown in the 1st page of the electric project. Insert the jack plug of the pedestal controller into the jack socket on the electrical panel. (Figure 4.8)

⚠ **The electrical installation of the machine should be grounded.**

CAUTION: The main feeding cable sizes and the input sizes should be at the values shown in the table. These are minimum values and the section can be enlarged according to the length of the cable.

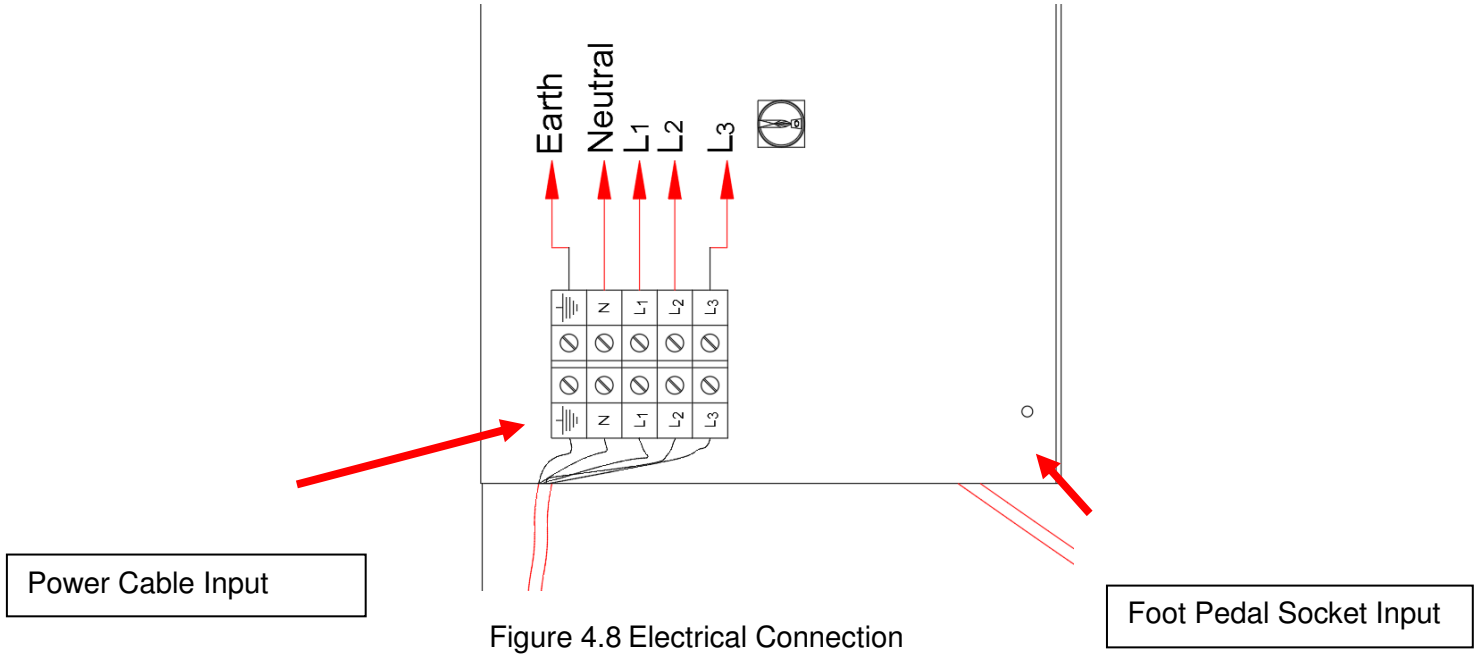


Figure 4.8 Electrical Connection

⚠ **Correct performance of the electrical connection can be understood from the simultaneous lighting of the green and orange leds of the Phase Control Relay within the electric panel. If only the green led lights, then change the phase directions!**

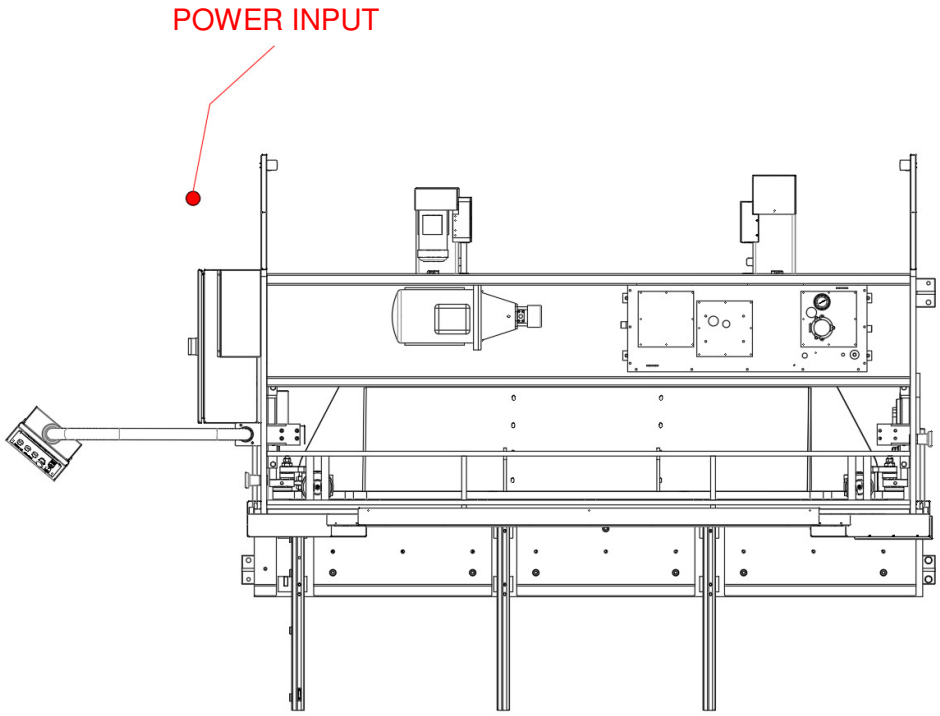


Figure 4.9 Electric Input Point

It is recommended to bring the power cable of the machine to the board by cable channels from underground or over the machine as to prevent any damage.

4.2.1. ENGINE ROTATION DIRECTION

The engine rotation direction should be as stated with an arrow on the label. The propeller direction of the engine should be controlled. Started with Hyd. Pump Start button for a short period to determine the rotation direction of the engine and then stopped with Hyd. Pump Stop button. If the rotation direction is incorrect, then should be stopped immediately.

To change the rotation direction of the engine, the machine **SHOULD BE COMPLETELY INSULATED** and the phase coming to the machine should be cut. This process should be completed by an experienced person. Please consider the warning label about the rotation direction of the engine.

4.3. FIRST START

⚠ Please read the user's manual before you operate the machine.

Select among the oil types recommended in Table 3 and fill the tank.

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Check the oil level in the tank with the oil level indicator located in the back of the tank.

The stoned surfaces of the blades have been medicated with a special protector against corrosion. The protector can be easily cleaned with an appropriate cleaning agent.

Cleaning operation: Wrap the blades with a damp cloth, wait for 10 minutes and then wipe with a clean cloth. Thinner can be used.

⚠ Check the fixity of the guards and switches.

Bring the 1Q1 main switch on the electric panel from position 0 to position 1. In this case, 3H1 numbered lamp should light on the main switch. If the lamp is not lighting, then replace the phases of the lead wire.

⚠ Apply the opening procedure stated in Section 5 for the first running of the machine.

4.4. OPERATING AREA OF MACHINE

An operating area of the machine as shown in the figure is found appropriate for removing the movement restrictions during the maintenance and bending processes.

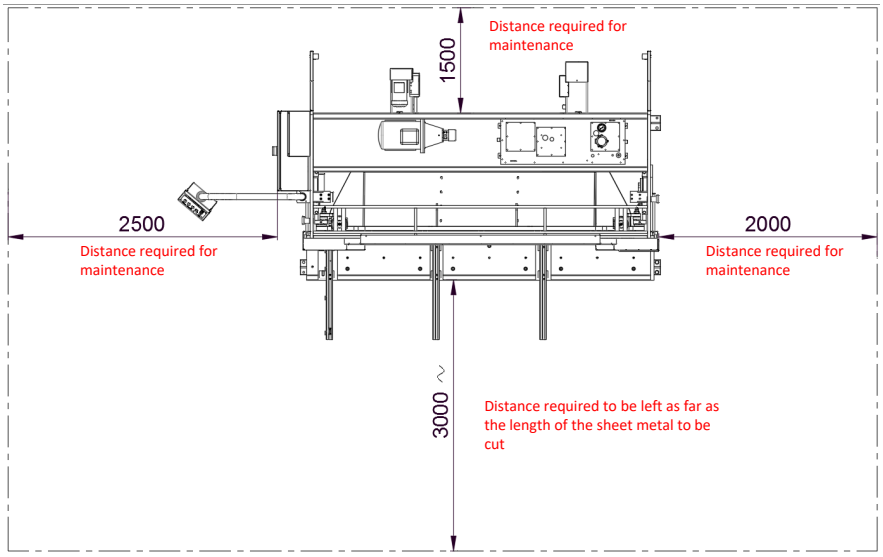


Figure 4.10 Operating Area of Standard Machine

4.5. ASSEMBLY OF CNC HGS PROTECTION CAGES

The protection cages and housing sheet metals of the machine should be delivered as packed on the front support system to avoid any damage during the transportation.



The bolt, nut, etc. used in the assembly of all covers are placed within the electric panel.

Figure 4.11 Cover Assembly Apparatuses



Figure 4.12 Finger Protection Connection Mode

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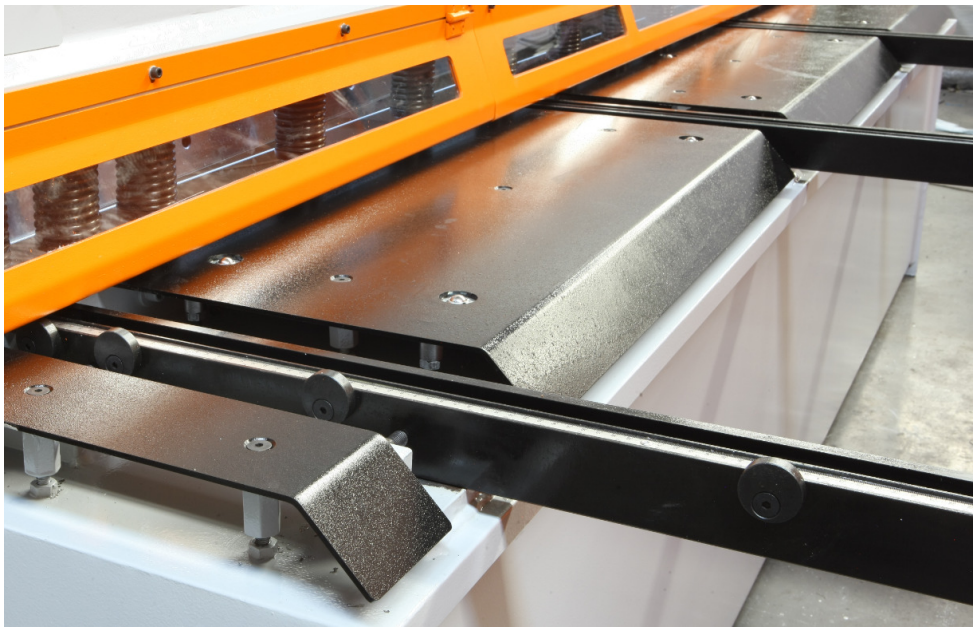


Figure 4.13 Front Levers Connection Mode

From the beginning of the cutting process, T-square lever and other resting levers are mounted.







Figure 4.14 Left Rear Cage Connection Mode

While the left rear cage is mounted, it is mounted on the left foot of the machine as the first step. As the second step, the cable is passed through hiding channels within the cage and the socket of the light curtain is plugged in.

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Figure 4.15 Middle Sheet Metal Connection Mode

While the right rear cage is mounted, it is mounted on the right foot of the machine as the first step. As the second step, electric terminal connections are made as they are in the project with the cables in the junction box and on the cage.

5. SECURITY INSTRUCTIONS AND PRECAUTIONS

5.1. SAFE OPERATION OF MACHINE

Machine information label (Label 1) shows the main technical specifications and machine's serial number. When you want to contact Ermaksan for the machine, please provide this information to have quick answer.

The information on the safety and operation of this machine are defined in full under this topic.

5.1.1. OPERATIONAL SAFETY

The machine has an advanced designed and manufactured for safe operation.

In addition to this, if this machine is operated by untrained personnel or operated in an incorrect manner, a danger might occur. Unauthorized use

- will jeopardize the operator
- will damage the machine and
- machine equipments, as well as machine's efficiency.

The machine should only be operated by personnel being authorized and trained by Ermaksan. The operators should have information on the operator's manual, safety warnings and labels.

At the same time, it is the duty of the personnel authorized in the factory where the machine is used to ensure that only authorized people are allowed to operate the machine.

Before operating the machine, the operator should guarantee that all personnel are removed from the danger zone.

5.1.2. MACHINE REPAIR

The improvement or unapproved replacements of the machine's equipments is prohibited. The manufacturer shall not be kept liable due to the material damage or injury resulting from this. Inactivation or removal of a security system available on the machine is not allowed by the manufacturer in terms of security standards and user's security and the right to act is reserved.

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5.1.3. PROTECTIVE CLOTHES

Before operating the machine in question, the entity should provide the necessary clothes and equipments for safe operation. (glove, goggle, work cloth, steel toe shoe, etc.)

5.1.4. EMERGENCY STOP PROCEDURE FOR MACHINE

The machine took the precautions to provide the operator's safety at the highest level. There are 3 emergency stop buttons in a standard machine (2 of them are on the right and left sides of the front table and 1 of them is on the mobile foot pedal). For the control unit, pressing on one of these buttons at fixed 24 V stops the cutting process. (may be different in special machines)

If the left finger guard of the machine is requested to be opened during the cutting process, the system shall stop working and cutting process by cutting off the switch connection and also stop the movement of axes as a security precaution.

There are Laser Light Curtains in the front (optional) and rear parts (standard) of the machine. This is a security system used to avoid collateral accidents during the cutting process.

FINGER PROTECTION WITH FRONT LIGHT CURTAIN (OPTIONAL): The front light protection system is activated when an obstacle is recognized during the movement of the upper jaw. The cutting functions stops as long as the obstacle remains. When the obstacle is removed, pressing TEST and START buttons on the control panel shall operate the pump engine. When the engine is operated, the upper jaw shall go upwards from the position it has been left. When the pedal is pressed again, cutting process shall continue.

SWITCH PROTECTION SYSTEM: Finger guard sheet metal has been put to prevent it from beginning to cutting process when it is forgotten open during the narrow sheet metal cuts.

PROTECTION WITH REAR LIGHT CURTAIN: If someone violates the protection equipment on the machine, the system stops the cutting process. After it is stopped, if you want to resume operating, then you should press the test button on the rear part of the machine. After that, START button is pressed and pump engine is operated. When the engine is operated, the upper jaw shall go upwards from the position it has been left. When the pedal is pressed again, cutting process shall continue.

5.1.5. USE OF APPROVED SPARE PARTS AND AUXILIARY UNITS

The original parts and accessories are particularly designed for this machine. The replacement of these original parts and accessories, which are provided by the machine's manufacturer, with the new ones are not controlled and approved by the manufacturer. Therefore, such

purchases and/or products have negative impacts on the operation of the machine and weakens the safety.

5.1.6. TURNING ON-OFF PROCEDURE OF THE MACHINE

Please see section 6.10 for detailed information.

5.1.7. SOUND LEVEL OF THE MACHINE

The sound level during the operation of the machine is maximum 70 dB. In case of a problem, the sound level can be increased for a moment. The operator should control the machine according to the sound level.

5.1.8. OVERVIEW OF DANGERS

The following overview is an abstract of the dangers that may result from a potential machine in terms of life or health. The design and structure of the machine eliminates the dangers for the people with the security equipments installed in compliance with the machinery security regulation. All precautions that will be taken by the user of the machine to minimize the remaining dangers are mentioned in the following overview.

Type of danger	Source of danger	Danger	Additional precautions
Mechanic Danger •Break, cut, strokes	Movement of axes Hand jamming in press cylinder Rear rest Sheet metal loading-removal unit	Danger of physical injury	-Control of security systems
Electrical danger •Due to electric contact Proceedings in electrical panel	•Direct contact with normal operating parts • Indirect contact under failure with live parts Unlocked electrical panel	Lethal danger Lethal danger	--
Thermal danger •Burn or by contact	•Cases within the board •Hot work piece	Danger of physical injury Danger of physical injury	Protective cloth and glove should be provided to the personnel (CE EN 388 leather supported) - Fan can be installed to the

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			board
Fire hazard	•Cases within the board	Danger of physical injury	The customer should always have portable fire extinguisher against metal fires. Fan can be installed to the board
Danger from dangerous substances •Toxic fluids, contact with dust	•Dust, spray •Cutting lubricants Various oils	Health hazard	Appropriate ventilation should be provided in the work place. Please observe all information in this operator's manual.

Table 5.1 General Dangers

5.2. VIEW OF WARNING AND INFORMATION LABELS

5.2.1. WARNING LABELS ON THE MACHINE

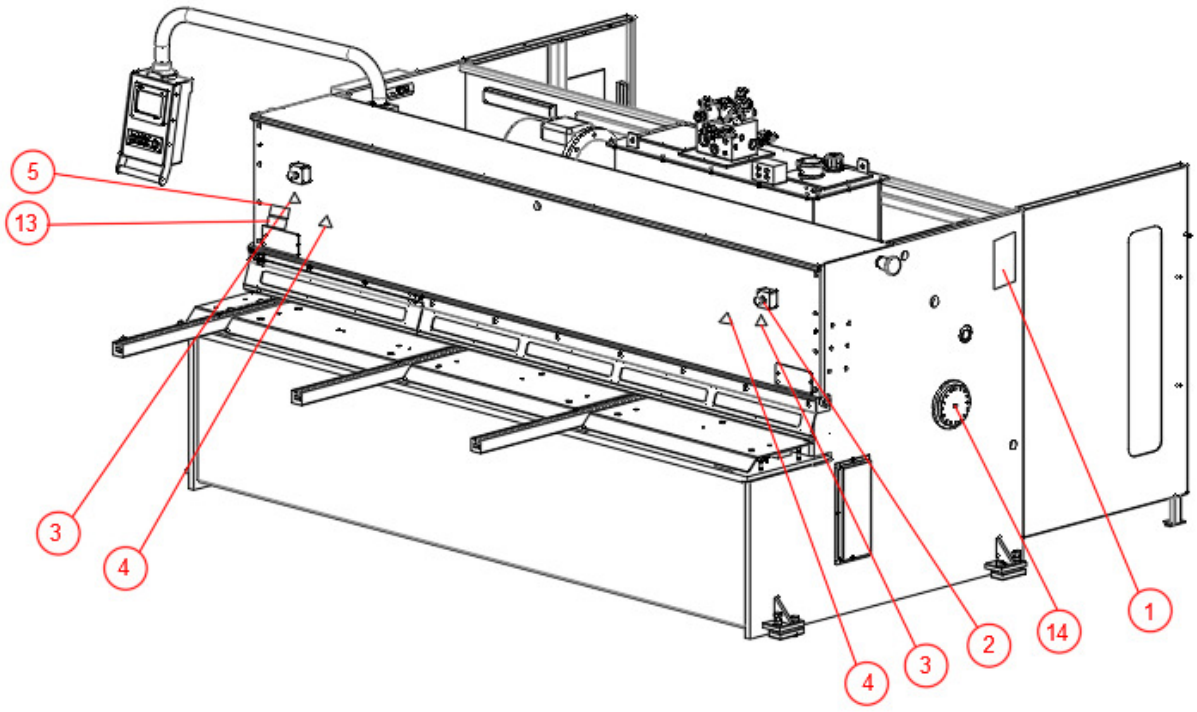


Figure 5.1 View of Shear Label

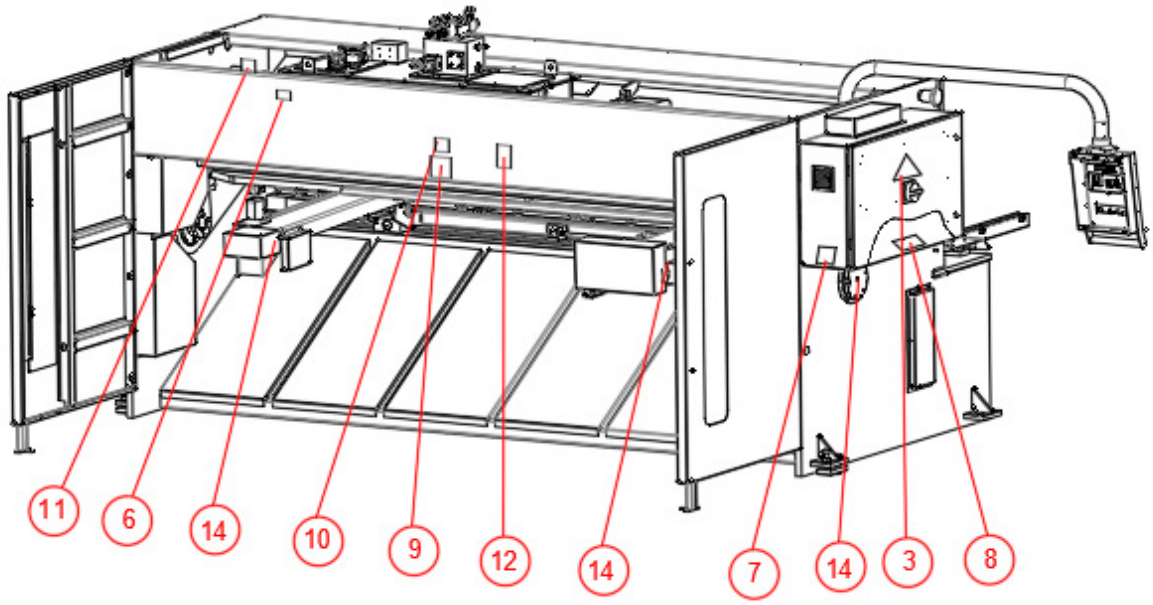
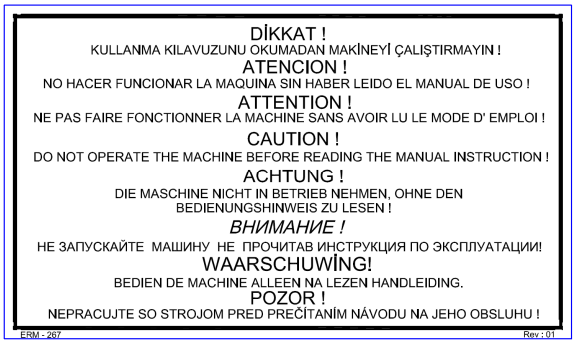


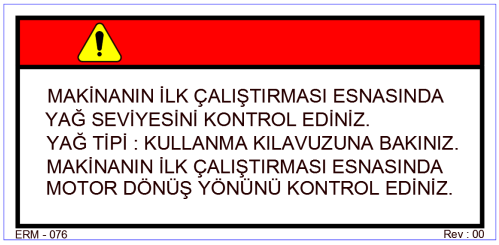
Figure 5.2 View of Shear Label

Label 1 The label showing the technical specifications of the machine	

Label 2 The label indicating the location of emergency stop	
Label 3 Electric shock label	
Label 4 The label indicating that the hands may be jammed	
Label 5 The label indicating that the front cage complies with CE norm	

Label 6 The label for not performing any hydraulic valve setting	
Label 7 Electric values information label	
Label 8 Machine operating personnel information label	
Label 9 The label for the issues to be considered during the first run of the machine	

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Label 10 The label for the issues to be considered during the first run of the machine	
Label 11 Pump pressure label	
Label 12 The label indicating that sheet metal may hit the feet	
Label 13 The label of personnel authorized to use the machine The label showing there is magnet in the tank	

Label 14 Regions to be lubricated label	

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6. GENERAL STRUCTURE OF CNC HGS SHEAR

6.1. CNC HGS

It is the component where the hydraulic system, cutting blades, rear rest system and control panel are present and the process is performed mainly, as well we can define as the skeleton of the system.



Figure 6.1 General View

6.2. CNC HGS HYDRAULIC SYSTEM UNIT

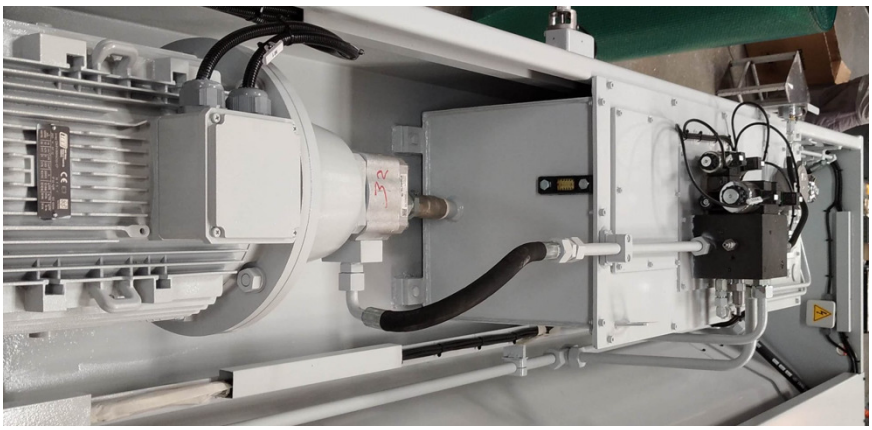


Figure 6.2 Hydraulic System Unit

It is the hydraulic system that plays a significant role in the operation of the machine. The hydraulic system enables the downward movement by filling the oil into the cylinders with its own components.. So the cutting process of the machine is performed.

The hydraulic pump that is connected to the electric motor sends the oil suctioned from the tank to the main block on the tank.

The hydraulic liquid (oil), for which is pressure is adjusted and the control is done by the "proportional pressure control valve" within the main block, is directed from here to the press cylinders, then to the main cylinders. And waited here to form pressure during the cutting.

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6.2.1. OIL TANK AND HYDRAULIC ELEMENTS

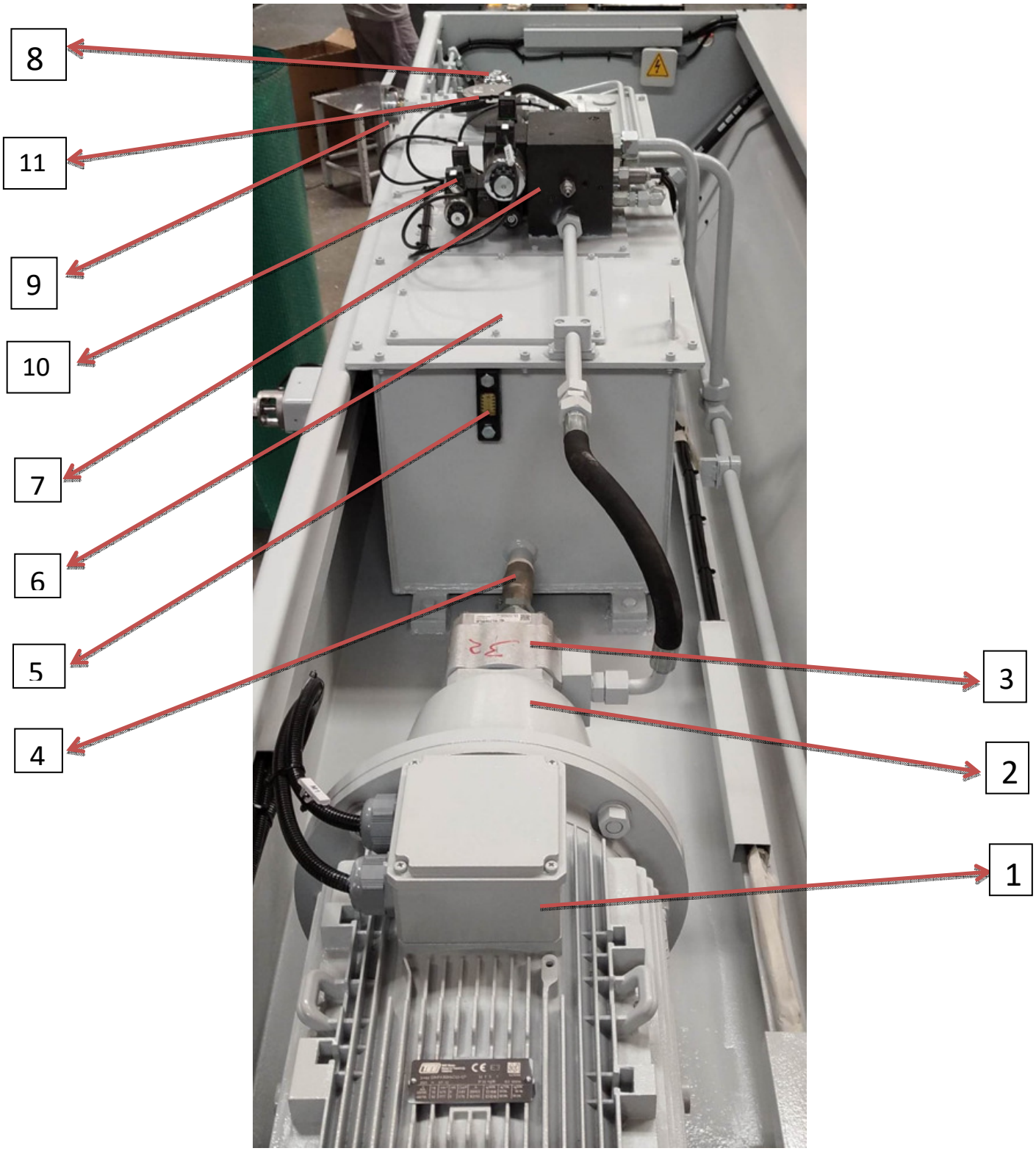


Figure 6.3 Shear Oil Tank Hydraulic Elements

NO.	COMPONENTS LIST:
1	MAIN ENGINE
2	DRUM + COUPLING
3	PUMP
4	PUMP SUCTION VALVE
5	OIL TANK LEVEL AND TEMPERATURE INDICATOR
6	CLEANING COVER
7	BLOCK
8	VENTILATION FILTER
9	MANOMETER
10	FEELER GAUGE ADJUSTMENT VALVE
11	RETURN FILTER

Table 6.1 Oil Tank Hydraulic Element List

6.3. CNC HGS SHEAR OIL COOLING AND HEATING UNITS (OPTIONAL)

6.3.1. SHEAR OIL COOLING UNIT

The hydraulic oil cooling unit is exposed to a certain temperature increase due to the pipes of the pressured oil coming from the hydraulic pump, the block and the friction during the movement of the cylinder. This temperature increase causes the deformation of the cylinder seals and the reduction of the viscosity of the oil.

The viscosity is the measurement of the density of an oil in the simplest meaning. The Viscosity Index is used to show how the oil is fluent at a certain temperature. Generally, if the density of an oil is high, the viscosity will be high too and if the density is low, then the viscosity will be low too. The viscosity index shows us how much the oil will get thinner when exposed to a heat. As the value increases, the oil get thinner during exposure to heat. If the value is low, the viscosity of the oil will be low, if it is high, then the viscosity will be high. The viscosity index also shows how the oil will act under certain conditions.

The heated oil received from the tank is absorbed by the pump and directed to the inlet of the radiators. The temperature of the oil is dropped by means of the fan that provide rapid air circulation during the transition of the oil from the radiator cores.

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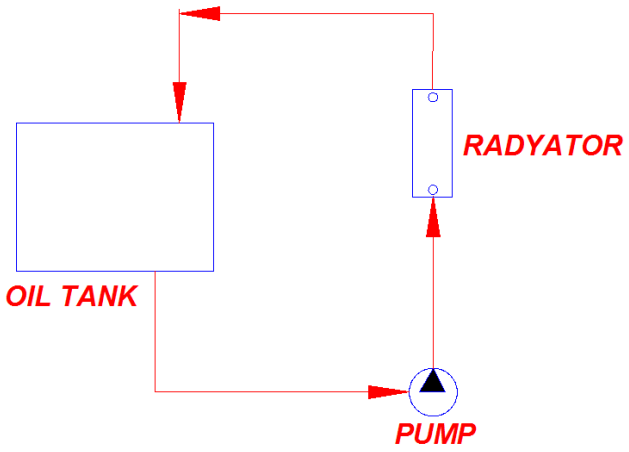


Figure 6.4 Connection View of Oil Cooling Unit

6.3.2. SHEAR OIL HEATING UNIT (OPTIONAL)

The oil, which is cold and whose viscosity is low in the tank, shall be heated up to the suitable operating temperature via the resistance that has been placed. Via the thermostat on the input adapter connected to the pump, it is ensured that the oil in the tank reaches a suitable temperature. This system is recommended to be used in the colder regions.

6.4. FEELER GAUGE ADJUSTMENT SYSTEM

This shear has been designed in a way that it would make a feeler gauge adjustment automatically. It adjusts the clearance between the blades and cutting angle itself when the sheet metal to be cut (steel, stainless steel) and its thickness are entered. The clearance between the blades is adjusted when the feeler gauge cylinder moves the flag gear. The clearance between the blades should not be smaller than 0,05 mm.



Figure 6.5. Feeler Gauge System

6.5. PNEUMATIC REAR SHEET METAL SUPPORT SYSTEMS (OPTIONAL)

Pneumatic rear sheet metal support systems are used for cutting thin and long sheet metals in a parallel form and according to the desired sizes via a buffer. Thin and long sheet metals sag down during cutting process, in this case, buffer loses its functionality and causes wrong sheet metal cutting.

6.5.1. PNEUMATIC LEVER TYPE REAR SHEET METAL SUPPORT SYSTEM

This system ensures that more precise cuts are achieved by the help of pneumatic levers which prevent sagging of wide and thin sheet metals.

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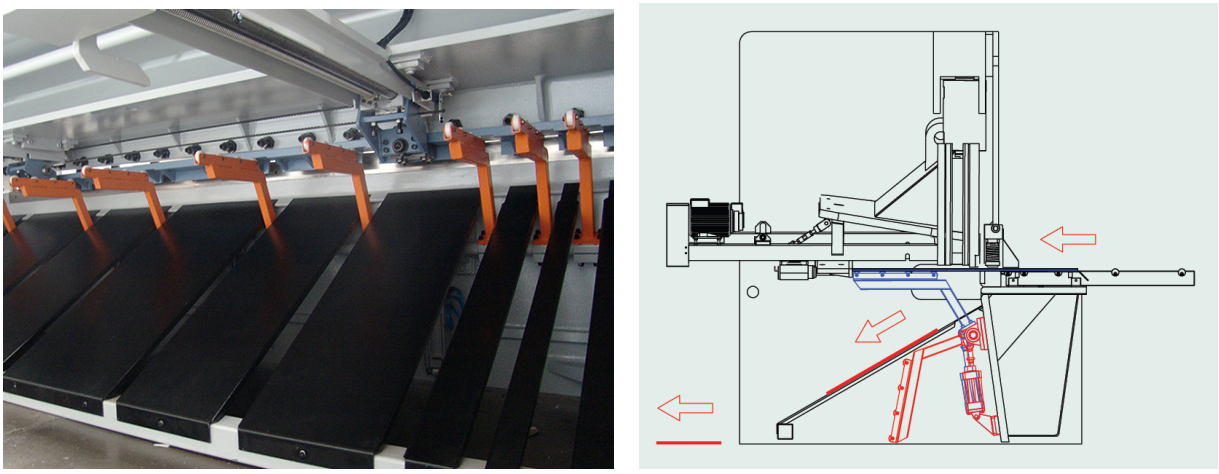


Figure 6.6 Pneumatic Lever Type Support System

6.5.2. PNEUMATIC UNIFORM TYPE REAR SHEET METAL SUPPORT SYSTEM

During thin sheet metal cutting process, it ensures that rear rest is used at max. stroke. It is a system which ensures that more precise cuts are achieved by preventing wide and thin sheet metals from sagging down by the help of pneumatic table.

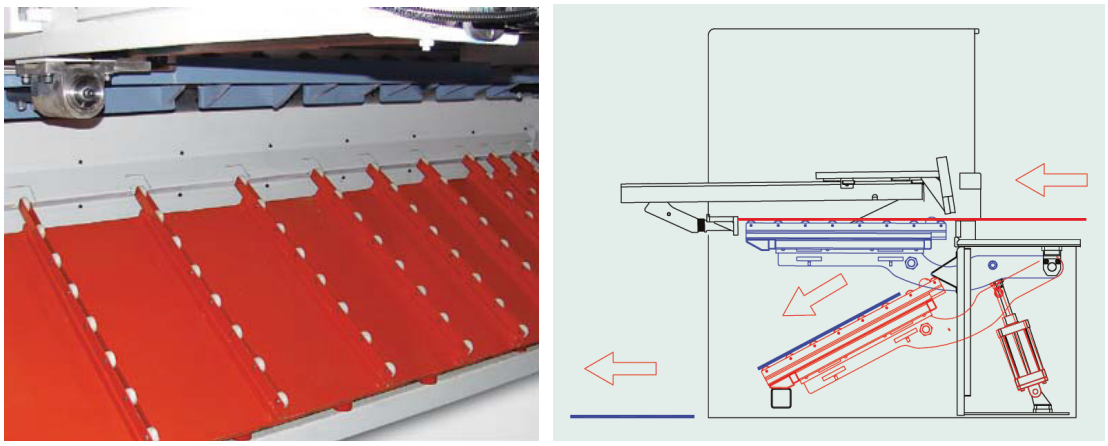


Figure 6.7 Pneumatic Uniform Type Support System

6.6. CNC HGS SHEAR CONTROL PANEL

It is the panel that controls shear and operates the functions according to the commands of the user. The control panel unit may be different according to the machine or request of the customer. With the panel handle as assembled on the body, it can move to the front and back of the machine.

It is a component which consist of the touch-screen, emergency stop buttons, stop and start buttons, test button.



Figure 6.11 Example Control Panel

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6.7. CNC HGS REAR REST SYSTEMS

6.7.1. STANDARD REAR REST

Rear rest system enables the sheet to be cut to be available at the cutting distance in the most sensitive and correct manner. Max. 1000 mm standard cutting can be made by using a buffer. Thanks to the standard folding feature of the rear rest, the sheet metals longer than 1000 mm can be cut without using a buffer. Since they would sag down as they go away from the cutting area of the sheet metal during the cutting of thin and long sheet metals, it is recommended to use pneumatic rear sheet metal support systems.

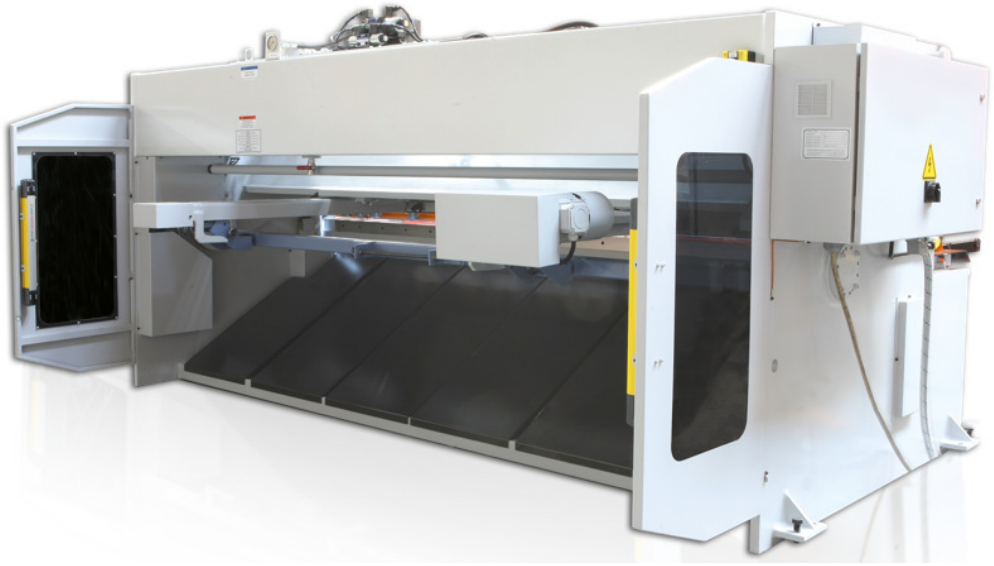
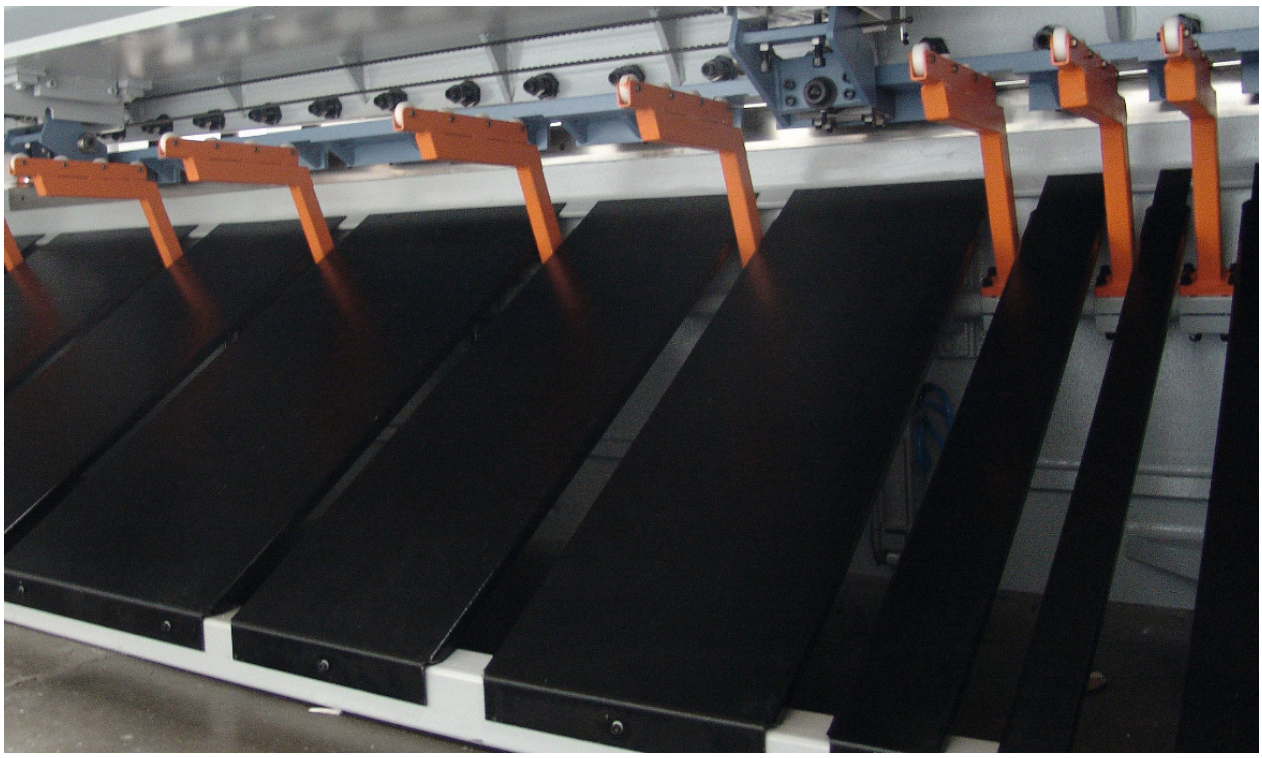


Figure 6.13 Standard Rear Rest system

6.7.2. PNEUMATIC REAR REST (OPTIONAL)

When thin and long sheet metals are requested to be cut, this system should be preferred. In this system, some discharges have been performed in order not to prevent the operation of the rear rest on the buffer.



Şekil 6.14 Pneumatic Rear Rest system

6.8. FRONT LEVERS AND SHEET METAL SYSTEMS

6.8.1. STANDARD FRONT LEVERS AND SHEET METAL SYSTEM

Front levers and sheet metal housings are the front supports that act as the table on where the sheets to be cut are placed before the cutting process. These supports are available on the front part of the machine according to the length of the sheet metal. With this system, the deformation of the sheet by being fluctuated is minimized.

The front handle carriage capacity is calculated according to the weight of the heaviest sheet to be bended in the machine.

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Figure 6.16 Front Levers and Sheet Metal System

6.8.2. ANGLE ADJUSTED LEFT SIDE T-SQUARE SYSTEM (OPTIONAL)

When an angled cutting is requested to be performed, a cutting can be made by bringing it to a desired angle on the system. This system can be moved throughout left lateral T-square in addition to its capability of making a manual angle.



Figure 6.17 Angle Adjusted T-Square System

6.10. CNC HGS TURNING ON - OFF PROCEDURE

6.10.1. SHEAR TURNING ON PROCEDURE

The process for turning on should be realized in the following order.



The switch on the electric panel of the machine is brought from 0 (OFF) position to I (ON) position.





C2000 rear protectors are reset with C2000 TEST OKAY button located between the legs of the machine.

! TEST button on the control panel is pressed..

Figure 6.19 Shear Turning On Procedure

6.10.2. SHEAR TURNING OFF PROCEDURE

The main motor is stopped and the switch is turned off before turning off the machine.

NOTE: If there is a pneumatic support system in the machine, the turning off procedure will be applied after it is brought to the off position from the control panel.

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7. CNC HGS OPERATION INSTRUCTIONS and SETTINGS

7.1. PROHIBITED USE

Shear should not be used in the following conditions!

- Presence of a material other than the material that should be cut between the lower and upper blades.
- Vertical positioning of the material to be cut
- Inactivation of the protections and switches
- Cutting, crushing, drilling, pressuring processes.
- A connection other than the electrical scheme should not be made and the materials other than the materials stated in the scheme should not be used.
- Do not operate or cause the operation of the machine when the cover of the board is opened.
- Cutting the sheet metal that has been cut by the gas breaker or the one that has been combined by welding.

7.2. INCORRECT USE

1- If the upper blade or lower blade has become blunt;

- Burring in the sheet metal surface that has been cut.
- Damage or break in the blades.
- Break in the axes connecting the piston and the upper jaw.

2- If the thickness and material of the sheet metal to be cut have not been chosen suitably;

- Burring in the sheet metal surface that has been cut.
- Damage or break in the blades.
- Incompletion of cutting process.
- Permanent damage in the feeler gauge adjustment system
- Being jammed or stretched between two blades in the sheet metal

3- If there are foreign parts (bolt, pin, switch, etc.) between two blades during the adjustment or operation of the machine;

- The blades may be damaged.
- The splashed parts may cause an accident.

7.3. OPERATING CNC HGS (PREPARING FOR CUTTING PROCESS)

The machine should be operated by trained personnel. The machine is delivered as all adjustments are made at our factory.

The lower and upper blades should be lubricated before starting the cutting process.

To operate the machine, the main switch (1Q1) on the electrical panel should be brought to position 1. 3H1 lamp will light.

IF IT IS TOUCH 8: When we press on Start button on the panel, the main engine will be activated and when the pedal is pressed, the upper jaw is ensured to be referenced with the downwards and upwards movement of it and becomes ready to be cut.

IF IT IS ERTOUCH 7-DELEM DAC 360: When we press on Start on the panel, the main engine will be activated. The rear rest will take reference when we press START via CNC control again.

IF IT IS ESA 625: It can be operated directly by pressing on START button on the control panel.

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7.4. ELECTRIC PANEL AND CONTROL PANEL

7.4.1. SHEAR ELECTRIC PANEL and CONTROL PANEL COMPONENTS

It is one of the most significant components for the machine since all machine related electrical connections are made and the drivers, contactors and fuses are located here.



Figure 7.1 Example View of Shear Electric Panel

1- **MACHINE READY:** Machine is ready.
2- **MACHINE NOT READY:** Machine is not ready.
3- **OIL HEATING SELECTION SWITCH:** Oil heater selection switch.
4- **PANEL HEATING SELECTION SWITCH:** Panel heater selection switch.
5- **DIGITAL THERMOSTAT:** EMKO ESM 9920
6- **EMERGENCY STOP:** Stops the machine in case of any danger**.**
7- **MAIN SWITCH:** Power ON-OFF switch of the machine.
8- **START BUTTON:** Pump engine start button.
9- **STOP BUTTON:** Pump engine stop button.
10- **TEST BUTTON:** This button should be pressed before starting the machine. If the lamb located on it is activated when this button is pressed, then this will mean that the security equipments of the machine are activated and the machine is ready to operate.

7.5. PEDESTAL CONTROLLER

A pedestal control unit with a single pedal is used. When the pedal is held down, it will complete its movement thanks to the upper jaw lower and upper limit switches. When we remove our foot from the pedal, the upper jaw moves and returns from the point where it has been. During automatic cuts, when AUTOMATIC CUT option is chosen via CNC controller, the upper jaw will move downwards and upwards as long as our foot is on the pedal.



Figure 7.2 View of Shear Foot Pedal

7.6. PRESSURE SETTING

OPERATOR SHOULD NOT PERFORM PRESSURE SETTING.

The valves that limit the pressure have been adjusted at our factory as to be 110% of the pressure and the user should never make pressure setting on the distribution block.

When you enter the thickness and length of the sheet that you want to cut in the machine into the CNC controller, the pressure necessary for cutting the sheet will be automatically set by the CNC controller. The user should not make any setting about the pressure.

7.7. STROKE ADJUSTMENT

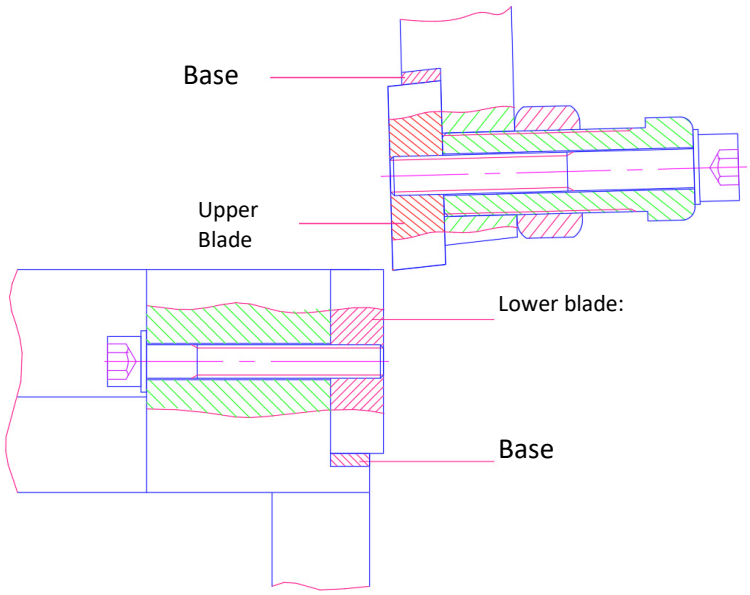
The machine adjusts the stroke itself according to the cutting program.

7.8. CHANGING, ROTATING AND SHARPENING THE BLADE

The blades become blunt in time. The sharpness of the blades should be checked at regular intervals. While upper blade is angled and its two corners can be used, lower blade does not have an angle and its four corners can be used. Two surfaces of the upper blade and four

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surfaces of the lower blade can be sharpened. In few uses, wide surfaces should be sharpened, in many uses, narrow surfaces should also be sharpened. After the sharpening the blades, resulting clearance should be fed. Otherwise, the blade and the bolts may get damaged. Feeding part should be steel and have the same sizes with the blade. After sharpening the blades and mounting them in their place, the feeler gauge adjustment should be checked.



7.8.1. ROTATING LOWER AND UPPER BLADES

For rotating the upper and lower blades, initially the upper jaw of the machine should be taken to upwards position and then should be turned off according to the turning off procedure of the machine.

After the machine is turned off, firstly, imbus headed mounting bolts on the blades are removed by leaving one at the beginning and one at the end. Then, two people remove the bolts left at the beginning and end of the blade by holding it carefully and move the blade downwards. After checking the blade surface, it is rotated 180 degrees and mounted in place carefully.

⚠ Attention should be paid that the upper blade does not fall during replacement and the necessary occupational safety measures should be taken.

THE SAME PROCESS CAN BE PERFORMED WITHIN THE LOWER BLADE.

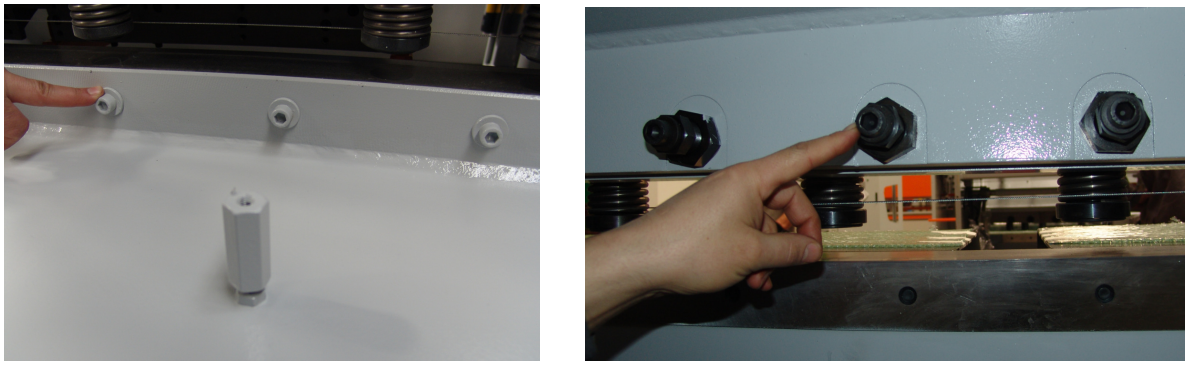


Figure 7.3 Upper and Lower Blade Replacement

7.8.2. REPLACING LOWER AND UPPER BLADES

For replacing the upper and lower blades, initially the upper jaw of the machine should be taken to upwards position and then should be turned off according to the turning off procedure of the machine.

After the machine is turned off, firstly, imbus headed mounting bolts on the blades are removed by leaving one at the beginning and one at the end. Then, two people remove the bolts left at the beginning and end of the blade by holding it carefully and move the blade downwards. After checking the surface of the blade, which will be newly mounted, it shall be mounted in place carefully.

⚠ Attention should be paid that the upper blade does not fall during replacement and the necessary occupational safety measures should be taken.

⚠ NOTE: FOR TECHNICAL INFORMATION ABOUT REPLACING THE BLADES AND IN CASE OF RELATED PROBLEMS, GET IN TOUCH WITH THE TECHNICAL SERVICE.

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7.9. MECHANIC SETTINGS OF THE REAR REST

The rear rest system has been adjusted in our factory. Adjustment disruptions that may arise in the Rear Rest system and the processes that can be performed are as follows:

- **The disruption of parallelism between Rear Rest bodies numbered 1 and 2;** The parallelism between both of the rear rest bodies is provided by the adjustment bolts numbered 3. (Figure: 7.4) In case the parallelism adjustment is disrupted, the adjustment of the rest body numbered 1 will not be disrupted since it is stable.
Thanks to the adjustment bolts available on the body numbered 2, the bolts are tightened after the parallelism between the bodies numbered 1 and 2 are adjusted.

- **Adjustment of the belt tension;** the belt can be adjusted to the desired tension by pushing and pulli the carriage numbered 2, after loosening the adjustment bolts numbered 3.

- **If the parallelism between the buffer and lower blade (longitudinal parallelism) is unadjusted;** Buffer is approximated to the lower blade by operating the rear rest system. The bolt numbered 6 and the adjustment nut numbered 7 are loosened (0,5 - 1 mm clearance is left) (Figure: 7.5) The buffer is rested on the lower blade. The nut numbered 7 is tightened. Then, the bolt numbered 6 is tightened.

- **If the parallelism between the buffer and lower blade (latitudinal parallelism) is unadjusted;** Buffer is approximated to the lower blade by operating the rear rest system. The latitudinal parallelism of the buffer is adjusted by loosening or tightening the bolt numbered 5 (0,5 - 1 mm clearance is left). (Figure: 7.5)

- **If the parallelism between the buffer and lower blade (longitudinal and latitudinal parallelism) is unadjusted; (Parallelism disruption is very small);** There are Imbus bolts (8) and Set screws (9) on the front surface of the rear rest buffer. (Figure: 7.4) The parallelism between the buffer and lower blade is adjusted by pushing and pulling via Bot and Set screws.

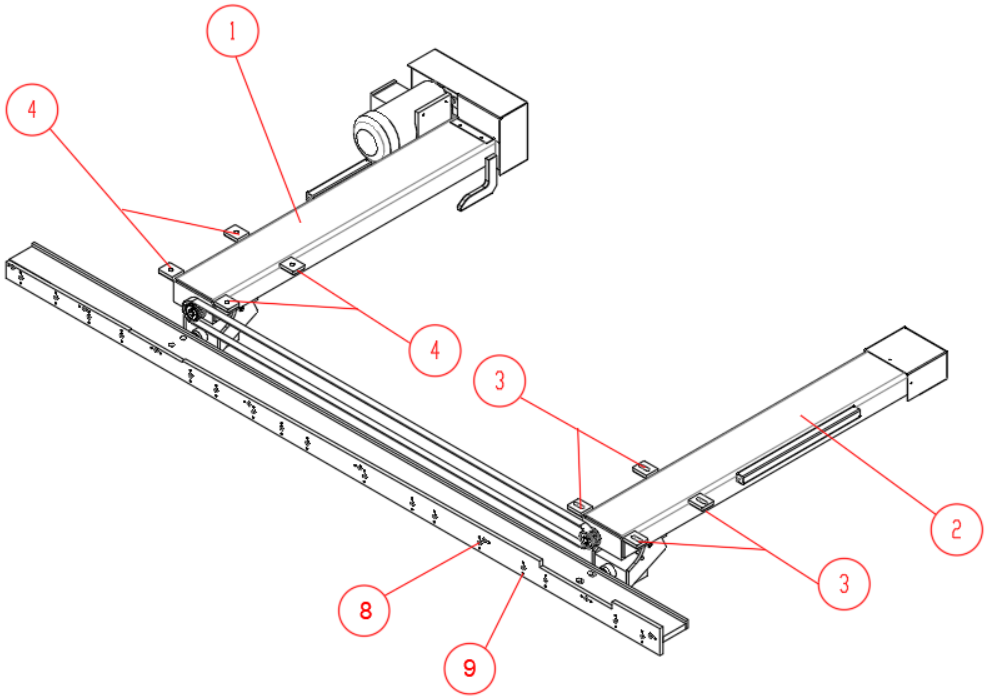


Figure 7.4 Rear Rest System

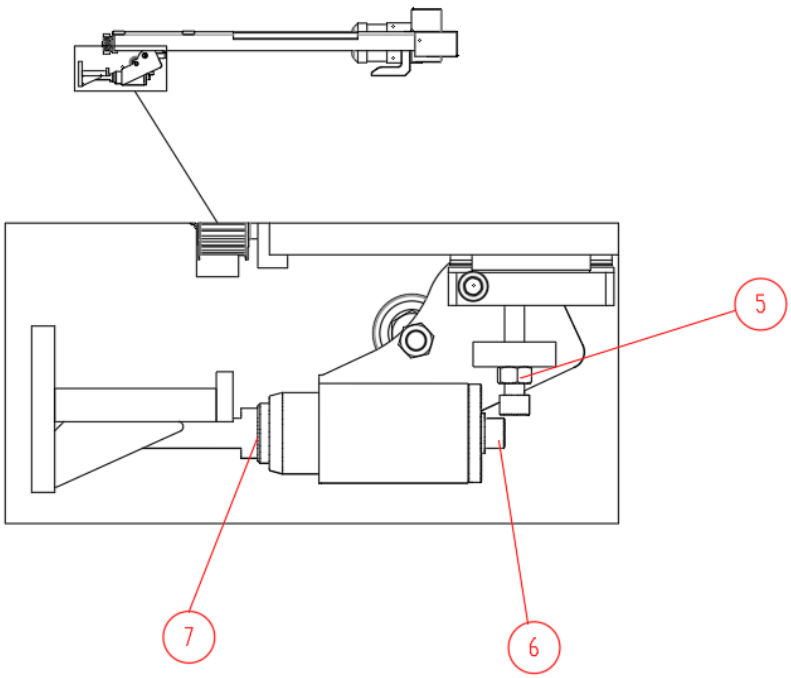


Figure 7.5 Rear Rest System

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7.10. FINGER PROTECTION SETTINGS

This security system is provided as factory adjusted. In case that any change happens or setting is disrupted, you can make adjustment by using the table below.

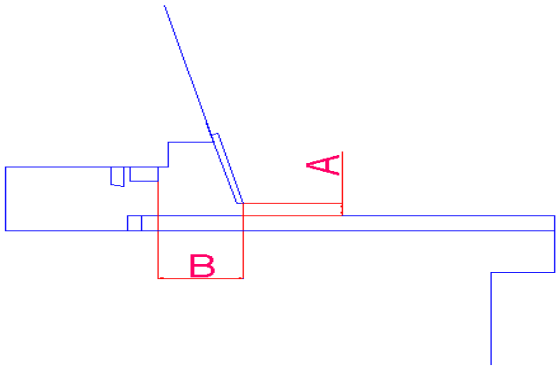


Figure 7.6 The View of Front Finger Protection Setting

ALL SHEARS SAFETY DISTANCES COMPLYING WITH CE FOR FRONT FINGER PROTECTION SHEET METALS		
CUTTING CAPACITY OF THE MACHINE	**A - Required height (mm)**	**B - Minimum safety distance (mm)**
6mm	8	20
8mm	10	40

Table 7.1 The Front Finger Protection Setting list

7.10.1. FRONT LASER LIGHT FINGER PROTECTION SETTING (OPTIONAL)

This security system is provided as factory adjusted. In case that any change happens or setting is disrupted, you can make adjustment by using the table below.

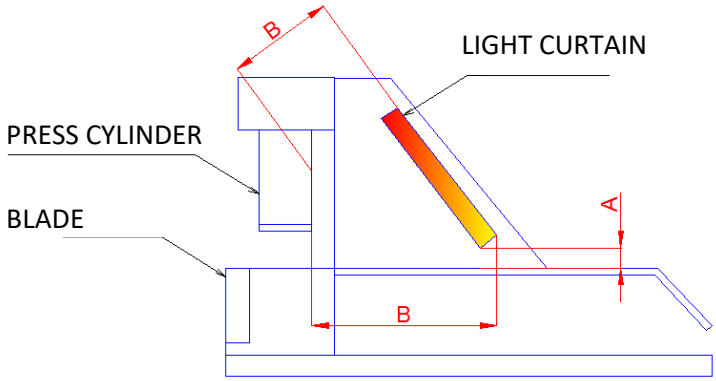


Figure 7.7 The View of Front Laser Light Protection Setting

ALL SHEARS SAFETY DISTANCES COMPLYING WITH CE FOR FRONT LIGHT CURTAIN		
CUTTING CAPACITY OF THE MACHINE	**A - Required height (mm)**	**B - Minimum safety distance (mm)**
6mm	14	100
8mm	14	100

Table 7.2 The Front Light Protection Setting list

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8. CONTROL PANEL AND DATA ENTRY IN CNC HGS

The tool that we use to provide communication with CNC Shear is the control panel of that machine. We communicate by sending commands to the machine from the control panel. Like in the computers, the machine does what we send as a command. Therefore, we should well-know what and how to do while working with CNC shear, as well as the process order.

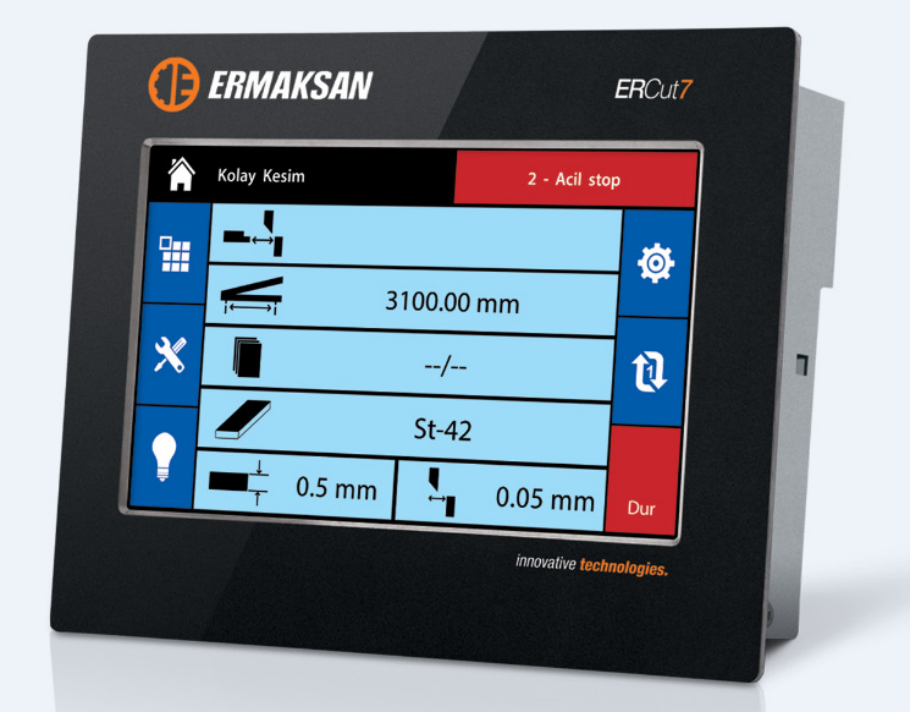


Figure 8.1 Example Controller

Various control panels are used in CNC shears and these control panels vary according to the specifications of the machines and the software used by the companies manufacturing the machine. CNC shears have a common data entry. Therefore, regardless from the brand of the machine, we will go over these common machine data entry principles in this module.

The information entered into the control panel are saved in a file. Each work we do should have a file. There should be information about the parts to be cut and other parameters in this file.

The data required to be entered into CNC shear;

1- Type of the material to be cut

3- Thickness of the material to be cut

4- Width of the material to be cut

5- Length of the material to be cut

6- Part amount

7- Other special parameters

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9. FEELER GAUGE CLEARANCE TABLE

SHEET METAL THICKNESS	CARBONACEOUS STEELS			STAINLESS STEELS			ALUMINIUM SOFT	ALUMINIUM ALLOYS			COPPER AND COPPER ALLOYS (BRASS)		
	330 ÷ 370	370 ÷ 500	500 ÷ 700	450 ÷ 660	600 ÷ 800	800 ÷ 950	90 ÷ 110	110 ÷ 250	250 ÷ 350	350 ÷ 510	210 ÷ 350	350 ÷ 550	550 ÷ 710
	350 N/mm²	450 N/mm²	600 N/mm²	550 N/mm²	700 N/mm²	850 N/mm²	100 N/mm²	200 N/mm²	300 N/mm²	450 N/mm²	300 N/mm²	450 N/mm²	650 N/mm²
	SAE 1005	SAE 1015	SAE 1040	430	316	301	Al 99.0	AlMn1Cu	AlMg3	AlZn6MgCu	Cu-ETP	CuAg 0.1(P)	CuSn8
	St 33	St 37	St 60	304	305	431	Al 99.5	AlMg1	AlMg4	AlCu4SiMg	Cu-DLP	CuCr1	CuAl8
0.25	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.02	0.02
0.50	0.03	0.03	0.04	0.04	0.04	0.05	0.02	0.02	0.03	0.03	0.03	0.03	0.04
0.80	0.05	0.05	0.06	0.06	0.07	0.07	0.02	0.04	0.04	0.05	0.04	0.05	0.06
1.00	0.06	0.07	0.08	0.07	0.08	0.10	0.03	0.05	0.06	0.07	0.06	0.07	0.08
1.50	0.09	0.10	0.12	0.11	0.13	0.14	0.05	0.07	0.08	0.10	0.08	0.10	0.12
1.80	0.11	0.12	0.14	0.13	0.15	0.16	0.06	0.08	0.10	0.12	0.10	0.12	0.14
2.00	0.12	0.13	0.16	0.15	0.17	0.18	0.06	0.09	0.11	0.13	0.11	0.13	0.16
2.50	0.15	0.17	0.19	0.19	0.21	0.23	0.08	0.11	0.14	0.17	0.14	0.17	0.20
3.00	0.18	0.20	0.23	0.22	0.25	0.25	0.10	0.13	0.16	0.20	0.16	0.20	0.24
4.00	0.30	0.34	0.39	0.37	0.42	0.47	0.16	0.22	0.27	0.34	0.27	0.34	0.40
5.00	0.42	0.47	0.54	0.52	0.58	0.59	0.22	0.31	0.38	0.47	0.38	0.47	0.59
6.00	0.53	0.60	0.70	0.65	0.75	0.85	0.28	0.40	0.49	0.60	0.49	0.60	0.75
7.00	0.65	0.74	0.85	0.81	0.92	1.03	0.35	0.49	0.60	0.74	0.60	0.74	0.92
8.00	0.78	0.87	1.01	0.95	1.10	1.25	0.41	0.58	0.71	0.87	0.71	0.87	1.16

In CNC Shears, CNC controller is adjusted automatically according to the material type, whose feeler gauge clearances to be cut.

Figure 9.1. Feeler Gauge Clearance Table

10. MAINTENANCE

10.1. GENERAL MAINTENANCE

If the machine will not be used for a long time, then the surfaces available for corrosion should be lubricated with a protecting oil (Table 10.5).

The electrical connection of the machine should be cut before making all maintenance processes.

All maintenance processes should be made when the upper table is at the lower point.

Lubricate the lubrication points with suitable oils stated in lubrication table as much as required.

The oxidized burr and parts that result from the sheets during the cutting of the sheet may stick on the working surfaces of the lower and upper blades and demolish the blades. For this reason, the burrs should be cleaned frequently in a way that they will form a thin, oil layer.

Control	Frequency	Responsible
Greasing	See Section 10.6	Operator
Lubricating the tools	Daily	Operator
Damage in protectors	Daily	Operator
Oil leak in cylinders	Daily	Operator
Hydraulic oil level	Weekly	Operator
Looseness of cylinder foot connection bolts	Monthly	Operator
Oil leak on the hydraulic materials and connections	Weekly	Operator
Electrical connections	Periodically	Electric Technician
Hydraulic system filter elements contamination control	Periodically	Operator
Hydraulic oil quality control	Periodically	Operator
Cylinder – upper jaw connection bolts looseness	Monthly	Operator
Control of table connections	Weekly	Operator
Automatic grease pump grease level control (Ops)	Daily	Operator

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10.1.1. AIR-CONDITIONER MAINTENANCES

In the outside air inlet of the air circulating within the board and of the unit, there are filters to retain dusts at small microns. During the maintenance of the device, it is sufficient to clean the filters or replace with the new one if abraded. Since the filters are capable of retaining dusts at small microns, their cleaning should be made at correct periods.

10.2. HYDRAULIC SYSTEM

Check the hydraulic oil level regularly. Clean the hydraulic circuit materials. No dust and dirt should enter into the hydraulic system during the control period. Replace the fuse bolts, damaged and abraded parts.

⚠ The hydraulic system settings are done at the factory. Do not change the hydraulic system settings.

10.3. CHANGING OIL

First replacement of the oil in the tank shall be performed after 1000 hours of operation. Further replacements shall be performed after 2500 hours of operation. Hydraulic oil may get dirty and old in time. In this case, it must be changed. Blurry oil with sediments shall be replaced. Bring the position to 3. Lower the top beam. Place the upper jaw to the lower mould. Then turn the power off. Place a barrel under the tank to drain the oil from the tank. Then, drain the oil to the barrel with a hose. Open one of the covers of the tank to accelerate draining. Prevent ingress of dust and dirt. Clean the tank after draining the oil. Close the drain cover. Fill tank with oil.

⚠ Warning lamp on the panel is illuminated when the pressure filter is dirty.

Waiting period of the hydraulic oil shall be considered if the machine is not operated continuously, if it is operated again after it is not operated for 3 to 5 months. This varies according to the brand and type of the oil used. You shall contact the hydraulic oil supplier and have the oil used in the machine tested in such a case. However, oil sample that shall be taken from the machine for testing shall be taken at least after 1 hour of machine operation. The organization that performs the test shall declare if the oil is suitable for use or not according to test results by comparing the specifications of the standard oil and the oil sample. An ‘ISO4406 or NAS1638’ pollution value is obtained as a result of the test. NAS value of the hydraulic oil used in the machine shall be lower than 9. NAS 7 is a suitable value.

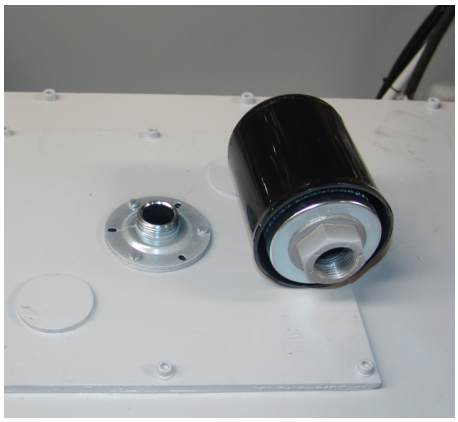
⚠ The magnet inside the tank serves to trap the burrs and the iron particles mingled inside the hydraulic installation. It shall be cleaned from the dirts on it and replaced again after each oil replacement.

Draining Oil

As shown above, the air filter shall be removed first, and as a second step, it shall be drained into a container of the appropriate size with a hose connected to the valve under the tank.

- It shall first be filled to the half of the level indicator, which is also used as a temperature indicator, and then it shall be filled to the maximum level by bringing the machine to the top dead center after the machine is operated.
- If it is filled more than this level, oil may overflow from the filler cap and the upper cover when the machine is operated.
- It is also wrong to fill under the red line on the level indicator. The red line is the minimum level
- After filling, the cap shall be tightened to its place.

Step 1



Step 2



Fig. 10.1 Indication of Draining of Oil

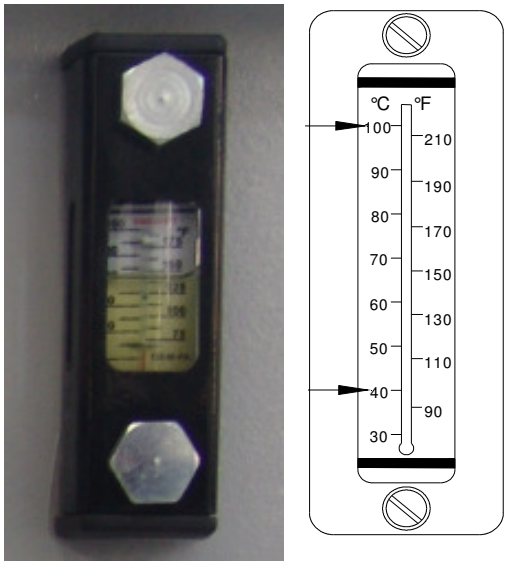
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10.4. EQUIVALENT HYDRAULIC OILS

HYDRAULIC OIL	IF THE AMBIENT TEMPERATURE IS LOWER THAN 20℃	IF THE AMBIENT TEMPERATURE IS BETWEEN 20℃ AND 40 ℃	IF THE AMBIENT TEMPERATURE IS ABOVE 40℃
Standard norm	Iso Vg 32	Iso Vg 46	Hydro Oil Hd 68
Aral	Vitan Gf 32	Vitan Gf 46	
B.P.	Hlp-Hm 32	Hlp-Hm 46	Hlp-Hm 68
Caltex-Texaco	Rando Oil 32	Rando Oil 46	
Esso	Nuto H 32	Nuto H 46	
Purfina France	Hydran 32	Hydran 46	
Huile Renault-Elf	Olna 32	Olna 46	
Shell	Tellus 32	Tellus 46	Tellus 68
Valvoline	Ultramax 32	Ultramax 46	
Veedol	Andrain 32	Andrain 46	
Yacco	Transhyd 32	Transhyd 46	
Gulf	Harmony 32 Aw	Harmony 46 AW	
Castrol	Aws 32	Aws 46	Hyspin Aws 68
Mobil	Dte 24	Dte 25	Dte 26
Petrol Ofisi	Super Hydro Oil HD 32	Super Hydro Oil HD 46	

Table 10.1 Oil Information

10.5. HYDRAULIC TANK OIL LEVEL AND TEMPERATURE INDICATOR



The hydraulic tank oil level indicator, which is also used as a thermometer, shall be filled with oil up to the 100° C line level.

When the oil level is below the 40°C, always add oil to the hydraulic tank.

Şekil 10.2 Oil Indicator

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10.6. GREASING

10.6.1. SHEAR LUBRICATING ZONES

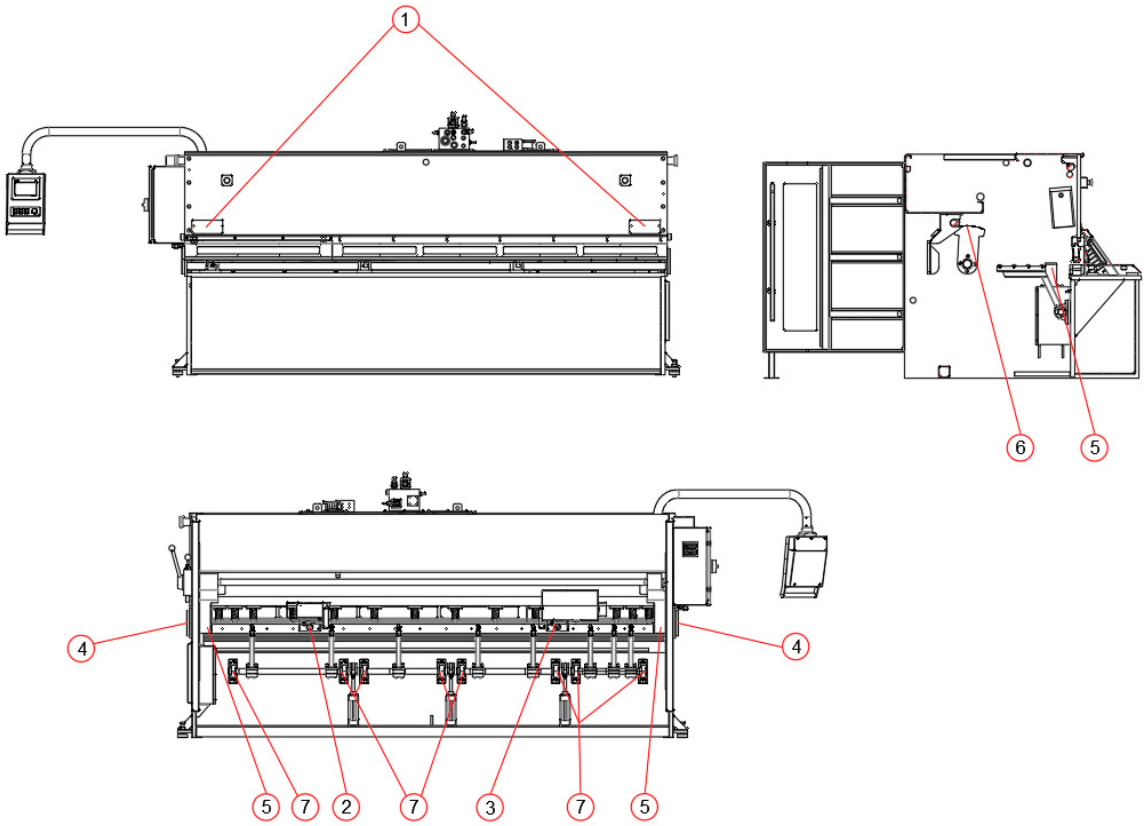


Figure 10.3 Shear Lubrication Zones

NO.	QTY	PART NAME	FREQUENCY	OIL TYPE
1	2	PISTON ROD	ONCE EVERY MONTH	BELGİN GRESON LIT EP 2 MOBILE MOBİLUX EP2 NLGI 2
2	2	LEFT REAR REST BALL SCREW-CARRIAGE	ONCE EVERY MONTH	MUSCLE PL - 10
3	4	RIGHT REAR REST BALL SCREW-CARRIAGE	ONCE EVERY MONTH	MUSCLE PL - 10
4	2	PERNO	ONCE IN A WEEK	BELGİN GRESON LIT EP 2 MOBILE MOBİLUX EP2 NLGI 2
5	2	UPPER PRESS WHEEL ASSY	ONCE EVERY MONTH	BELGİN GRESON LIT EP 2 MOBILE MOBİLUX EP2 NLGI 2
6	2	FLAG-PINION GEAR	ONCE EVERY MONTH	BELGİN GRESON LIT EP 2 MOBILE MOBİLUX EP2 NLGI 2
7	4-10	BEARING	ONCE EVERY MONTH	BELGİN GRESON LIT EP 2 MOBILE MOBİLUX EP2 NLGI 2

Figure 10.2 Shear Lubrication Periods List

10.6.2. OIL TYPES TO BE USED AS PER THE LUBRICATION AREA

LUBRICATION REGIONS	OIL TO BE USED
LEG SLIDE BODIES	MUSCLE PL 10
UPPER JAW SLIDE BODIES	MOBILUX EP 2
LOWER - UPPER BLADES	HYDRAULIC OIL
AUTO GREASING	MOBILGREASE SPECIAL
TROLLEYS	MOBILUX EP 2
RAILS	MOBILUX EP 2
BEARINGS	MOBILUX EP 2
PROTECTIVE OIL	ISOTECT 9779 DRACOR OB 220

Table 10.3 Oil Type to be Used as per the Regions to be Lubricated

10.6.5. AUTOMATIC LUBRICATION (OPTIONAL)

The automatic greasing unit is one of the most important factors that provides the best operation of our machine. The automatic lubrication unit is a system that lubricates the region we want by means of the grease pump, distributor and hoses at certain periods with the oil located inside its chamber. The grease level in the grease chamber should be checked once in 24 hours. Addition should be made if the grease level is deficient.

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Figure 10.4 Automatic Lubrication

⚠ If shear and all special systems will not be used for a long time and in case they should be transported due to any reason, then all regions with possible corrosion risk (processed surfaces, lower and upper moulds, etc.) should be lubricated well with a protecting oil (Table 10.5).

10.7. STORAGE CONDITIONS

The machine should be secured and delivered as to avoid any damage during transportation.

If the machine will be stored for more than one month, then the following issues should be considered:

- During the delivery, the upper mould of the machine is settled on the V channel of the lower mould. The machine should maintain this position.
- If the machine will be stored in a humid environment, then dehumidifier substances should be placed on the electrical panel and hydraulic control block and the impact of humid on the electrical components should be prevented.
- Protective oil should be used to prevent the corrosion of the lower and upper blades.
- The machine should be protected against over-sunlight.
- Outdoor storage (under rain) should not be made. Valve sockets may break down or the electrical components may be damaged.

11. TROUBLESHOOTING

PROBLEM	CAUSES	REMEDY
The parts that have been cut have burrs.	-Feeler gauge adjustment is not suitable	-Make the feeler gauge adjustment
	-Blade edges are blunt	-Sharpen the blades
Upper jaw does not come down. (there is a low pressure or no pressure in the cylinder)	- Pump defective	-Repair the malfunction or replace the pump
	-Suction filter is blocked	-Clean the filter
	-The pressure relief valve is blocked	-Clean the valve
	-The pressure relief valve is malfunctioned	-Replace the valve
	-Direction of the valve is blocked	-Clean the valve
	-Direction valve coil is burnt	-Replace coil
	-There is a leakage in the pipelines or cylinders	-Find the leakage and remove it
Upper Jaw does not stop while it strokes downwards or upwards.	-Switches are malfunctioned.	-Lower Limit Switch (5S2) and Upper Limit Switch (5S1) should be checked. When they see the metal object, the light should be lit and stop the upper jaw. Lower and Upper Limit Switches should not be moved.
	-Switches may be dislodged.	
Oil leaks from under the cylinder.	-Cylinder seals are damaged	-Replace the seals
Oil leaks from the press cylinders.	-Press seals are damaged	-Replace the seals
	-O-ring on the duct is malfunctioned	-Replace the O-ring
There is an oil leakage in the sleeves.	-The sleeves are loosened.	-Tighten them
When “START” Button is pressed, Main Engine does not operate.	-Thermic may have blown.	-Thermic should be brought to ON position. It should be brought to a suitable setting stage (1Q1)
	-Front Guard Switches may have no contact. (5LS9) (5LS10)	-You should check the switches.
	Energy Input Tension and Engine Tension may be different.	-Input tension and Engine Tension should be checked.
The light is not lit although “TEST” Button is pressed.	-Phase sequencing should be checked	-Phase Sequencing Relay (1F6) on the electric panel should be checked. If the green light is lit, there is no problem in Phase Sequencing Relay. If the light is not lit, among energy input terminals, any two phases may be interchanged. Energy is supplied again and it is seen that the light is illuminated.
	-Input Energy tensions are not suitable.	-The tensions at the energy input are measured. 380 V should be used for 3 Phase and 220 V should be used between Phase - Neutral.
	-Photocells do not see each other or Photocells do not receive an energy with a suitable tension.	-Photocells are checked. They should see each other mutually and red lights should be illuminated. There should be no Object between them. 3K1 Relay should be checked.
	-You may have pressed on an Emergency Stop.	-Emergency Stops should be checked. 3A1 Relay should be checked.

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PROBLEM	CAUSES	REMEDY
If Engine does not make Cutting Angle Adjustment and Feeler Gauge Adjustment although it operates	-	-Machine should be disconnected and operated again.
		-You should refer to User Manuals of The Machine and The Controller.
If Rear Rest does not move although “START” button is pressed	-Driver Fuse may be turned off.	-Driver Fuse is brought to the position 1.
	-Driver may be under the error condition.	-Its fuse is turned off, the energy is cut off and energy is supplied again after waiting for 10 seconds.
	-There may be a loose contact in the connections.	-Driver Parameters and Rear Rest Engine circuit should be checked.
	-There may have been negative changes in the parameters.	
	-The brake in the engine does not operate.	-Check brake connection.
		-Check whether the brake lining is stuck on or not.

Table 11.1 Possible Malfunctions and Remedies

12. SECURITY

12.1. SAFETY PRECAUTIONS

⚠ The machine can only be used by trained personnel. The machine operator should have been authorized both for operating the machine and for security. If another operator will work with the machine, then should receive these trainings and be authorized.

⚠ No security system should be deactivated in the machine.

⚠ The secure working distance of the machine is at least 1.5m.

⚠ The security equipments of the machine should not be removed.

⚠ Pay attention to the warning signs on the machine. Never dismantle them.

⚠ Press emergency stop button in emergency cases.

⚠ Do not insert your hands between the cutting blades of the operating machine.

⚠ Wear glove and protective shoe to prevent possible injuries during the cutting of sheet metal. Do not wear loose clothes.

⚠ Stop the machine immediately and secure it in case of operating malfunctions.

⚠ Stop the machine and inform with warning signs before any maintenance and repair work.

⚠ Do not leave any material on the front rests.

⚠ Check connection elements and tighten if necessary.

⚠ Operate the machine with appropriate blades.

⚠ Do not use the parts that are not appropriate for the machine.

⚠ Do not remove all limit switches located in the system and do not change the settings.

⚠ Do not make repair while the engine is open.

⚠ Consult to the authorized, experienced and trained personnel for service and maintenance.

⚠ Do not change the settings of the hydraulic valves for safety purposes.

⚠ Keep third persons away from the working area.

⚠ Keep the working area tidy. Irregularity in the working area causes mistake and danger and limits your movements.

⚠ Do not allow persons other than the authorized personnel to provide service.

⚠ Make the grounding of the machine by using copper grounding cable.

⚠ The machine has been designed to be operated by one (1) operator.

⚠ Do not open the rear rest, front finger protection and side protection cages while the machine is operating. The cages can only be opened during maintenance.

⚠ Do not exceed the maximum pressure values stated on pressure label.

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⚠ The illumination has been provided on the necessary regions of the machine. The place where the machine will be operated should be illuminated well and there should be no obstacle within the working area.

⚠ Before using the machine, check whether the security equipments function correctly or not.

⚠ Do not try to open the electrical panel while the machine is operating. Cut the power of the machine before opening the electrical panel.

⚠ The operator should work with steel toe shoe to be protected against a crush hazard that may occur as a result of the falling of a work piece.

⚠ Only one operator can work on one machine at the same time (unless otherwise is stated). Simultaneous working of two operators is not appropriate. The operations other than this may cause inappropriateness and danger.

⚠ Cutting can be performed only in the front part of the machine. It is prohibited to perform cutting in the rear and side parts.

12.2. SAFETY SIZE

The safety distance is 1500 mm.

12.3. AVOIDABLE RISKS

- Assembly of pedestal controller protection pipe for the purpose of protecting the buttons against external impacts.
- Assembly of protection covers to prevent access to the inside of the machine during the operation of the machine.
- Assembly of the side protection covers to prevent being cut between the blades from the sides of the machine.
- Using emergency stops to stop the machine in emergency cases.
- The sharp edges have been chamfered against possible injuries.

12.4. SYSTEMS USED ON AVOIDING DANGERS CAUSED BY MACHINE

- CE certified hydraulic block
- Foot pedal protection housing.
- Security systems (See 12.8)
- CNC control (during automatic operation)

12.5. SECURITY MEASURES OF OPERATOR

12.5.1. RESCUE OPERATION FOR USER

There is a security system in the machine. In case of any negative (emergency) situation, you should press on the nearest Emergency STOP button immediately. When Emergency STOP button is pressed, the upper jaw will stay in its same position. After that, necessary interventions can be made.

12.5.2. EAR PROTECTION

The sound released during the operation of the machine is under 70dB and is appropriate for the security norms. It is recommended to use ear buds in more noisy environments.

12.5.3. EYE PROTECTION

The operator should use goggle while operating the machine.

12.5.4. FOOT PROTECTION

Work shoes should be worn to avoid injury of the foot in case a work piece falls on the foot of the operator during the cutting of sheet metal. In addition to this, the foot pedal has been covered with a housing.

12.5.5. HAND PROTECTION

Work gloves should be used to avoid the injury of the operator's hands during the operation. The side, rear and top protection covers have been assembled to the machine to avoid work accidents.

12.5.6 ELECTRICAL PROTECTION

The machine should be grounded as stated in section 4.2 in details with the power cable supplied with. Grounding has been done within the machine and all cables have been taken into the cable channels. The outer cables have been taken into thick spiral protectors against risk of crush.

12.6. SECURITY SYSTEMS RELATED TO HYDRAULIC

- CE certified hydraulic block has been used.
- Safety valves have been used in the hydraulic system.
- The machine's cutting speed is controlled with proportional direction valves and CNC controller.

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12.7. LOCATIONS OF SHEAR EMERGENCY STOP BUTTONS

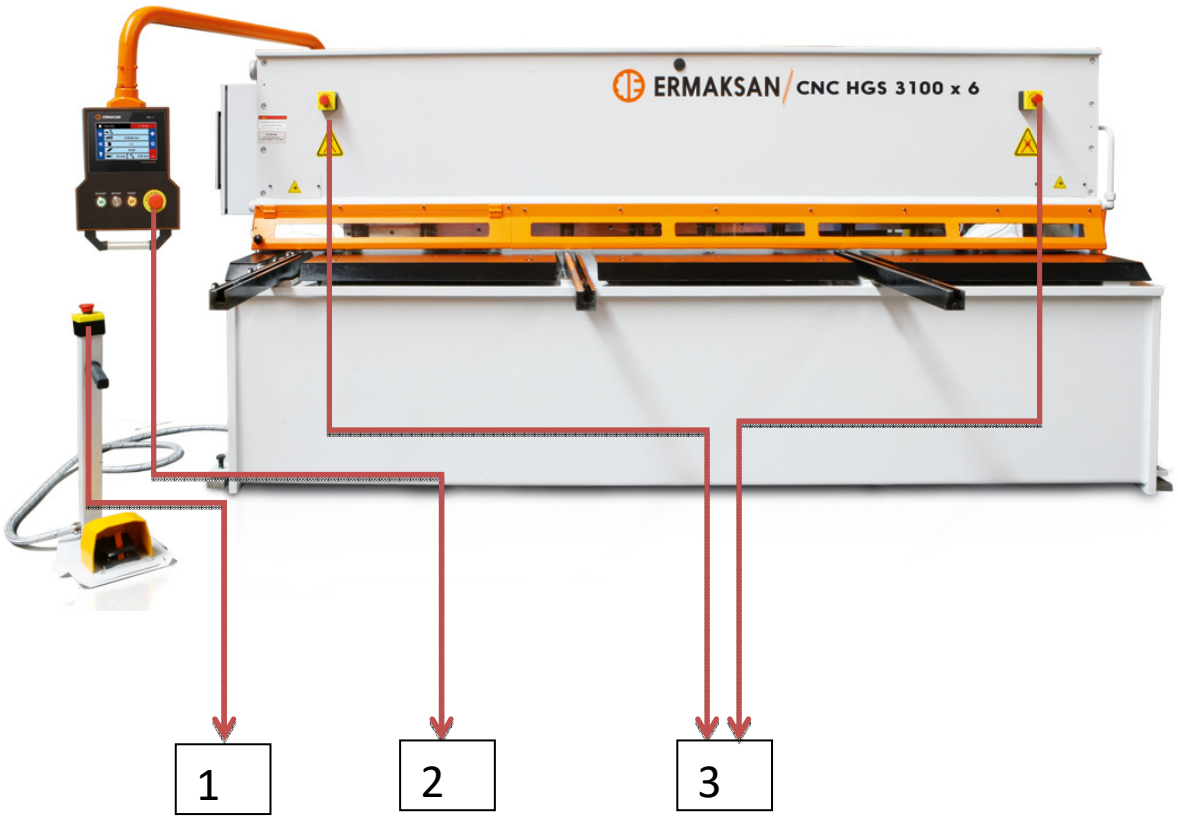


Figure 12.1 Locations of Shear Emergency Stop Buttons

1- Located on the foot pedal of the machine.

2- Located on the control panel of the machine.

3- Located on the upper jaw.

12.8. SHEAR SECURITY SYSTEMS AND THEIR LOCATIONS

If There Are Duct Guard, Front Finger Protection + Switch and Rear Cage + Light Barrier in The Machine;

Fig 1

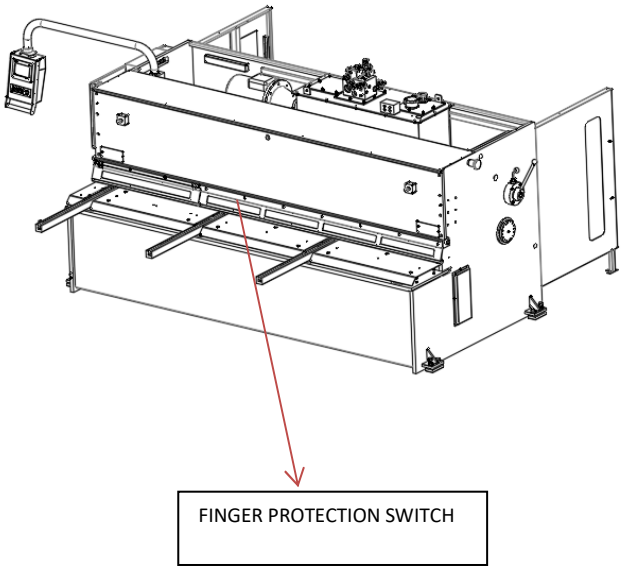
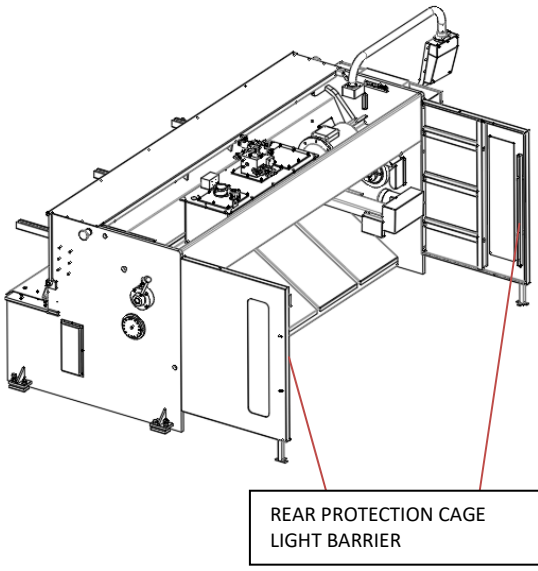


Figure 2



Finger Protection Switch: If the hinged part of the finger protection is opened during the operation of the machine, then the upper jaw stays in its position. In this case, please close the finger protection first and then press RESET button to reactivate the machine. Then, you should press on START button available on the panel. As the last step, pressing START button on the control screen shall make the machine ready for cutting process.

(See: Figure 1)

Rear Protection Light Barrier: When the rear light barrier detects an object during the operation of the machine, then the upper jaw stays in its position. In this case, please press RESET button on the rear protection first and then press RESET button on the panel to reactivate the machine. Then, you should press on START button available on the panel. As the last step, pressing START button on the control screen shall make the machine ready for cutting process.

(See: Figure 2)

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If there are Front and Rear Light Barriers in the Machine;

Figure 3

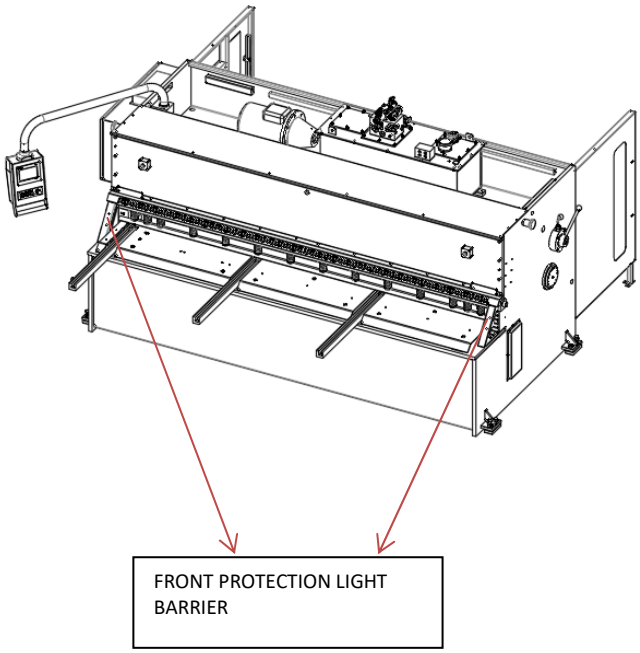
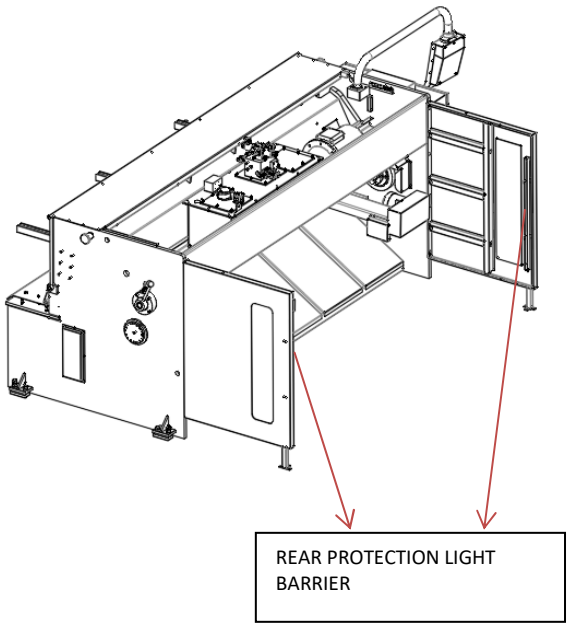


Fig 4



Front Protection Light Barrier: When the front light barrier detects an object during the operation of the machine, then the upper jaw stays in its position. In this case, press on RESET button on the panel to operate the machine again. Then, you should press on START button available on the panel. As the last step, pressing START button on the control screen shall make the machine ready for cutting process.

(See: Figure 3)

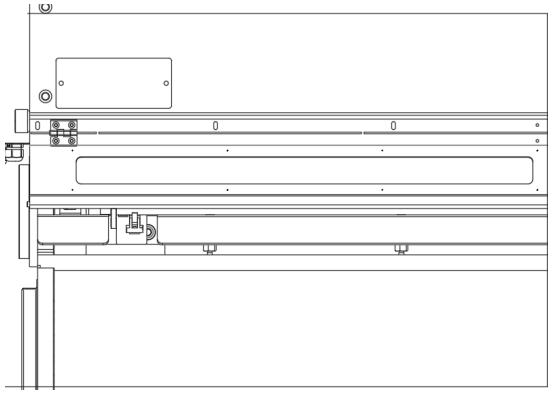
Rear Protection Light Barrier: When the rear light barrier detects an object during the operation of the machine, then the upper jaw stays in its position. In this case, please press RESET button on the rear protection first and then press RESET button on the panel to reactivate the machine. Then, you should press on START button available on the panel. As the last step, pressing START button on the control screen shall make the machine ready for cutting process.

(See: Figure 4)

12.9. SHEAR SECURITY SYSTEMS

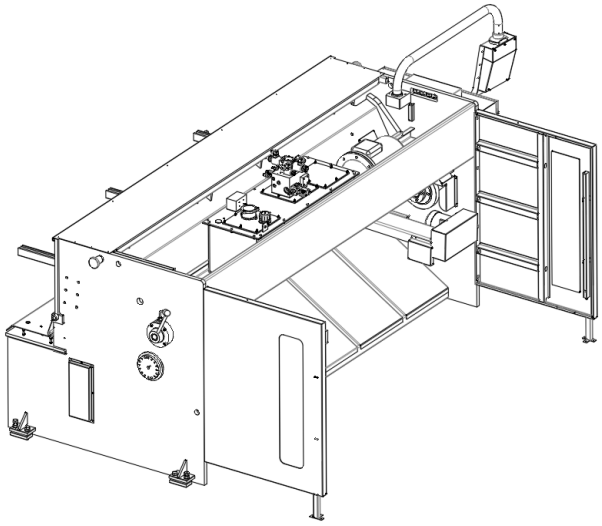
FINGER PROTECTION:

It has been designed to prevent the work accidents that may occur during the movement of the cylinders.



REAR PROTECTION CAGES:

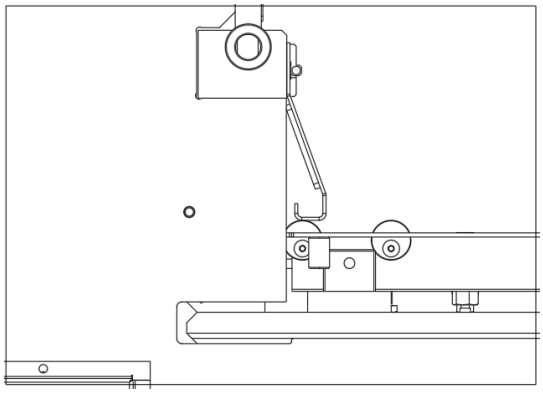
During the operation of the machine, blocking the entrance from the rear side has been designed to immobilize the security systems that have been mounted on it

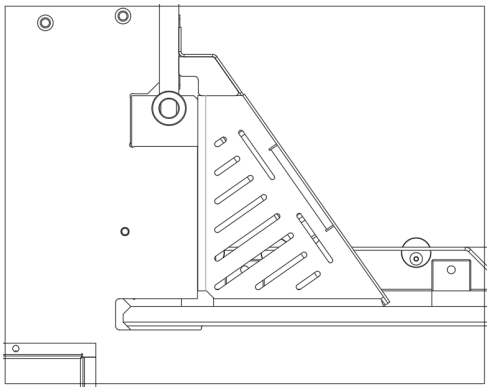


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FRONT SECURITY SYSTEMS:

They are the front laser security systems assembled to prevent the work accidents that may occur on the front side during the operation of the machine.



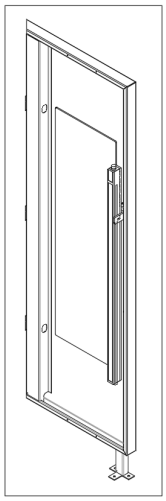


REAR LASER SECURITY SYSTEM:

They are the rear laser security systems assembled to prevent the work accidents that may occur on the rear side during the operation of the machine.

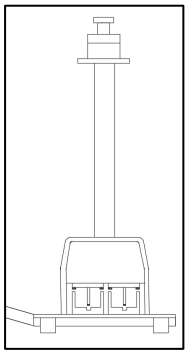
rear side during the operation of the

machine.



FOOT PEDAL SECURITY SYSTEM:

This security system has been mounted to prevent the accidents that may happen as a result of pressing on the pedals due to falling of the sheet metal during the machine operation or due to different reasons.



13. WEARING PARTS AND CONSUMABLES LIST THAT MAY BE REQUIRED

CNC HGS WEARING PARTS				
PART NAME / DESCRIPTION	**FIGURE NO/STANDARD NO**	**QTY.**	**STOCK CODE**	**USAGE LOCATION**
LOWER - UPPER BLADE		2		LOWER JAW - UPPER JAW
SEALING ELEMENTS KIT	KASTAŞ			SHEAR RIGHT-LEFT MAIN CYLINDER, PRESS CYLINDER, FEELER GAUGE CYLINDER
HYDRAULIC PUMP	ECKERLE	1		ENGINE PUMPING ASSY
TRANSFER TIME BELT		1		REAR REST
ENGINE TIME BELT		1		REAR REST
SUCTION FILTER	GEM-FA	1		OIL TANK
RETURN FILTER	GEM-FA	1		OIL TANK

Table 13.1 Wearing Parts Material List

CNC HGS WEARING ROLLER BEARING PARTS				
PART NAME / DESCRIPTION	**FIGURE NO/STANDARD NO**	**QTY.**	**STOCK CODE**	**USAGE LOCATION**
GLOBAL ROLLER BEARING	GE XXX ES	4		ECCENTRIC BEARING
MALE ROD EYE		2		FEELER GAUGE ADJUSTMENT CYLINDER
FEMALE ROD EYE		2		FEELER GAUGE ADJUSTMENT CYLINDER
FIXED BALL BEARING		4		REAR REST

Table 13.2 Wearing Bearing Parts Material List

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14. THE DETAILS OF CNC HGS SYSTEMS

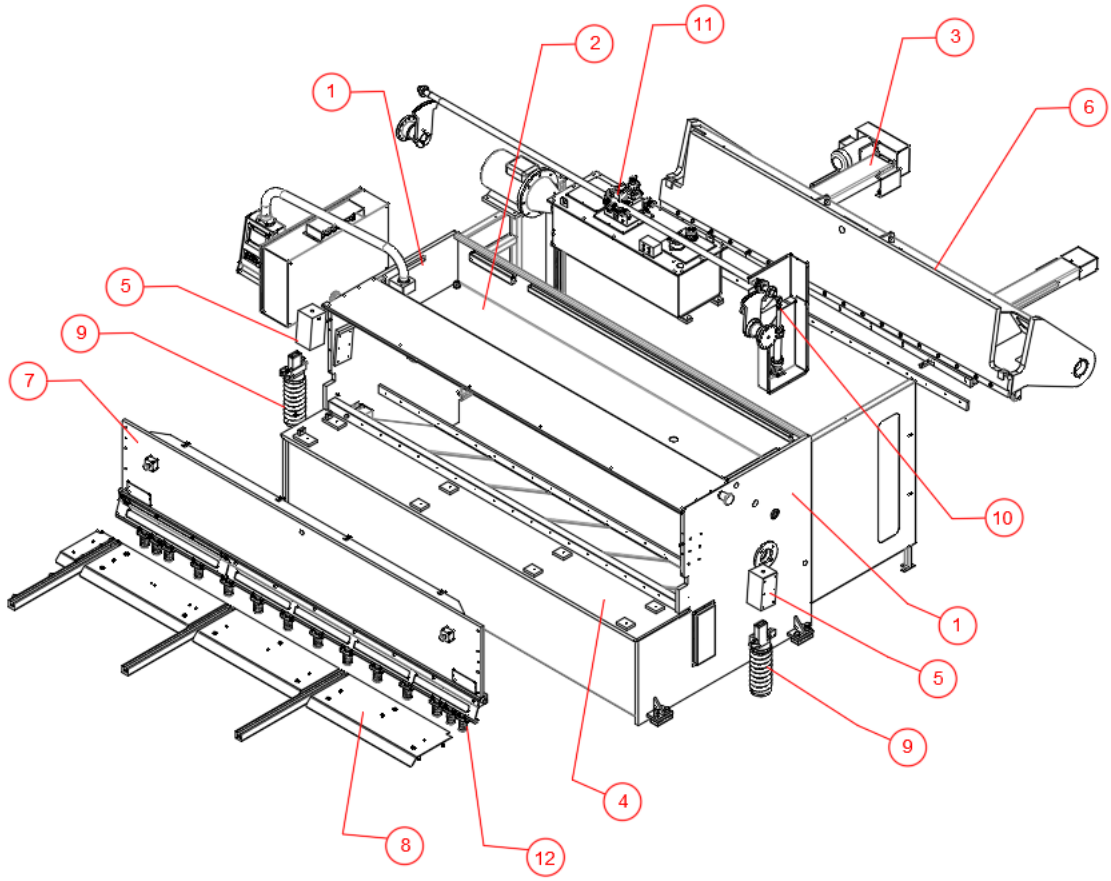


Figure 14.1 General View

NO.	PART NAME	DRAWING NO /STANDARD NO
1	BODY	-
2	TRAY	-
3	REAR REST SYSTEM	-
4	LOWER JAW	-
5	MAIN CYLINDERS	-
6	UPPER JAW	-
7	FRONT TABLE	-
8	FRONT LEVER AND SHEET METAL SYSTEM	-
9	RETURN SPRING	-
10	FEELER GAUGE ADJUSTMENT SYSTEM	-
11	OIL TANK	-
12	PRESS CYLINDERS	-

Table 14.1 Main Parts

14.1. UPPER JAW DETAILS

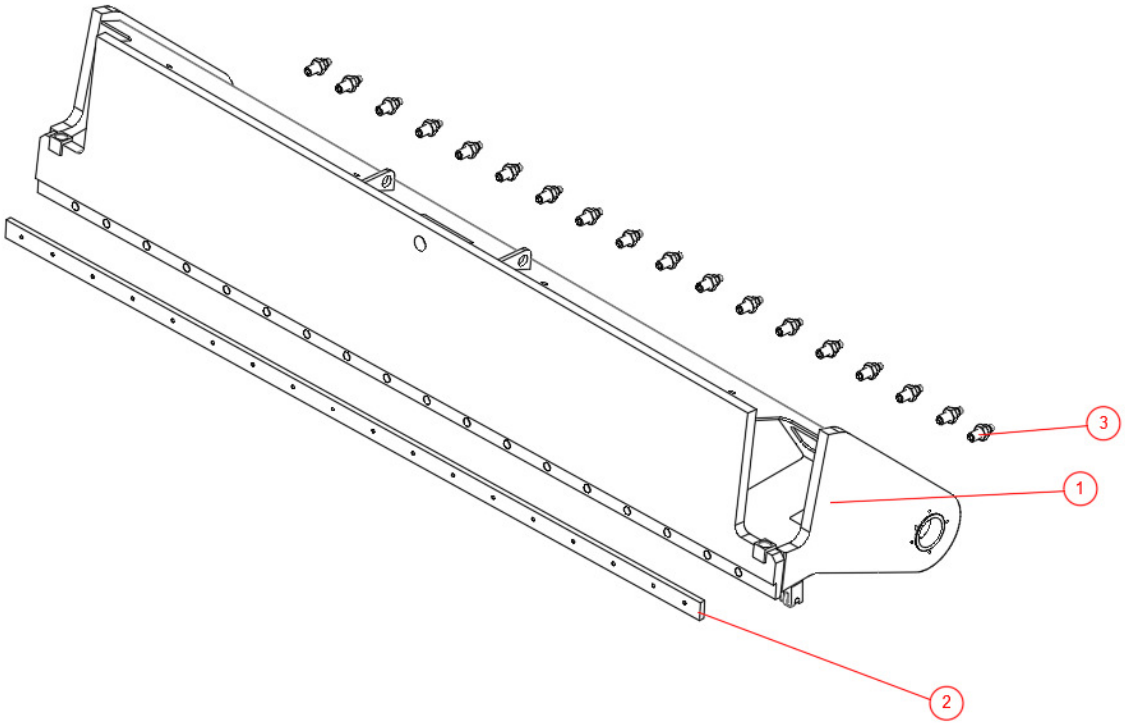


Figure 14.2 Shear Upper Jaw Details

NO.	PART NAME	DRAWING NO /STANDARD NO
1	UPPER JAW	---
2	ADJUSTMENT BOLT	---
3	UPPER BLADE	---

Table 14.2 Shear Upper Jaw Elements

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14.2. FRONT TABLE ASSY DETAILS

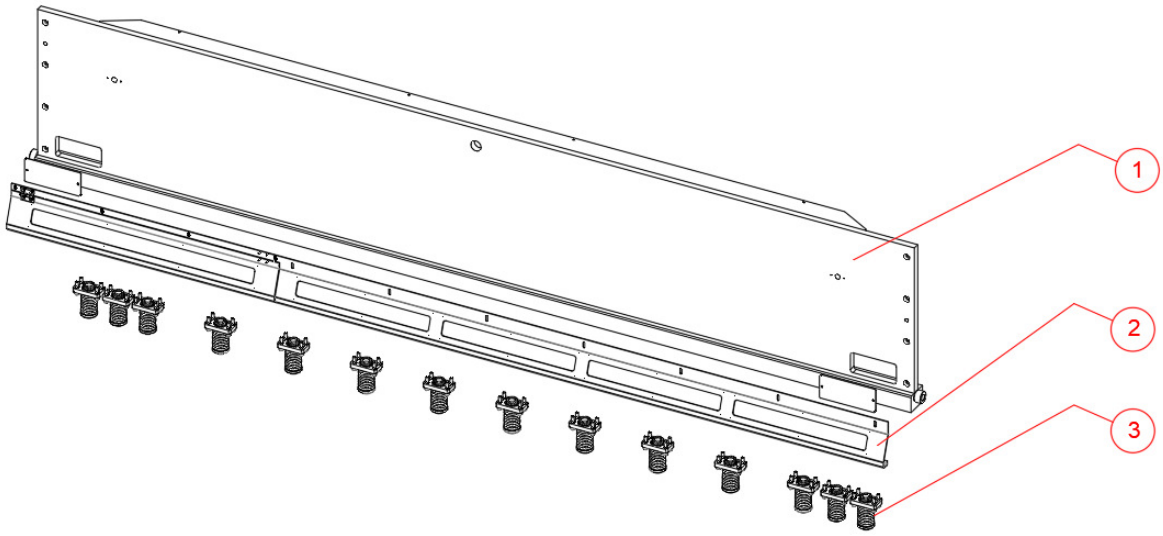


Figure 14.3 Front Table Assy Details

NO.	PART NAME	DRAWING NO / STANDARD NO
1	FRONT TABLE SHEET METAL	-----
2	FRONT HOUSING SHEET METAL	-----
3	PRESS CYLINDERS	-----

Table 14.3 Front Table Assy Elements

14.3. REAR REST ASSY DETAILS

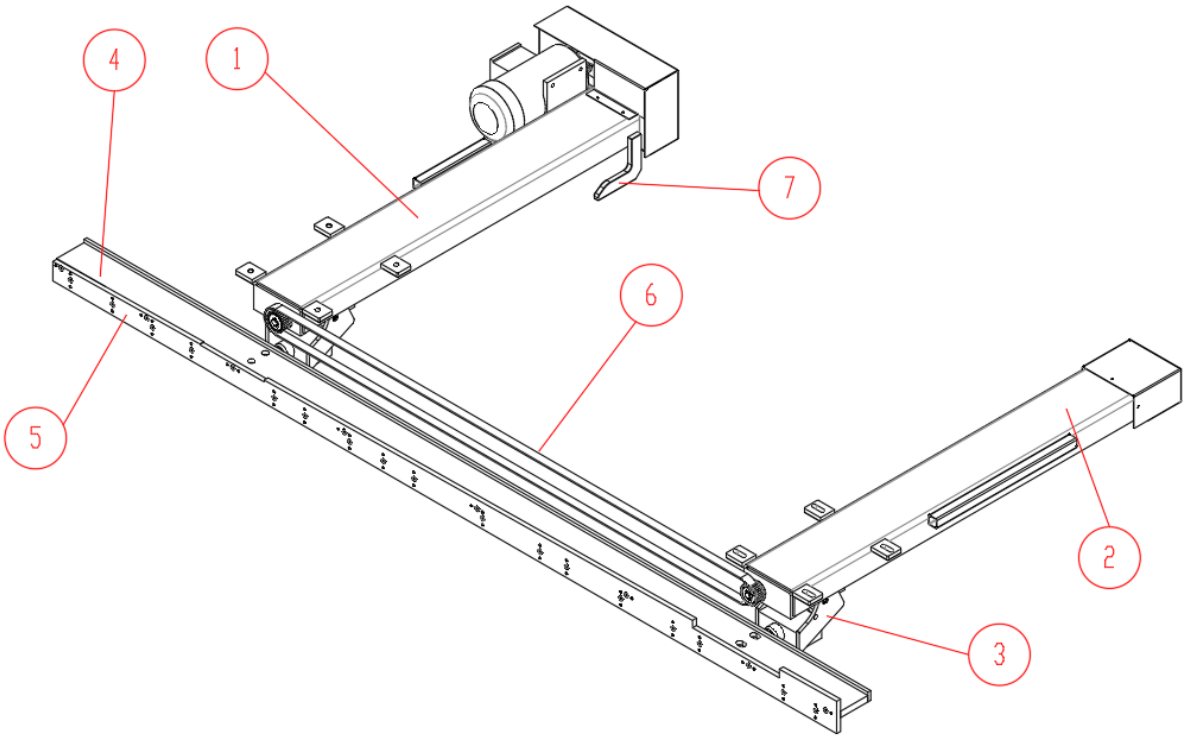


Figure 14.4 Rear Rest Assy Details

NO.	PART NAME	DRAWING NO / STANDARD NO
1	LEFT REAR REST ASSY	-----
2	RIGHT REAR REST ASSY	-----
3	CONVEYOR LEVER ASSY	-----
4	BUFFER ASSY	----
5	SHEET METAL REST PLATE	---
6	TIME BELT	---
7	BUFFER LIFTING PART	-----

Table 14.4 Rear Rest Assy Elements

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14.3.1. LEFT REAR REST ASSY DETAILS

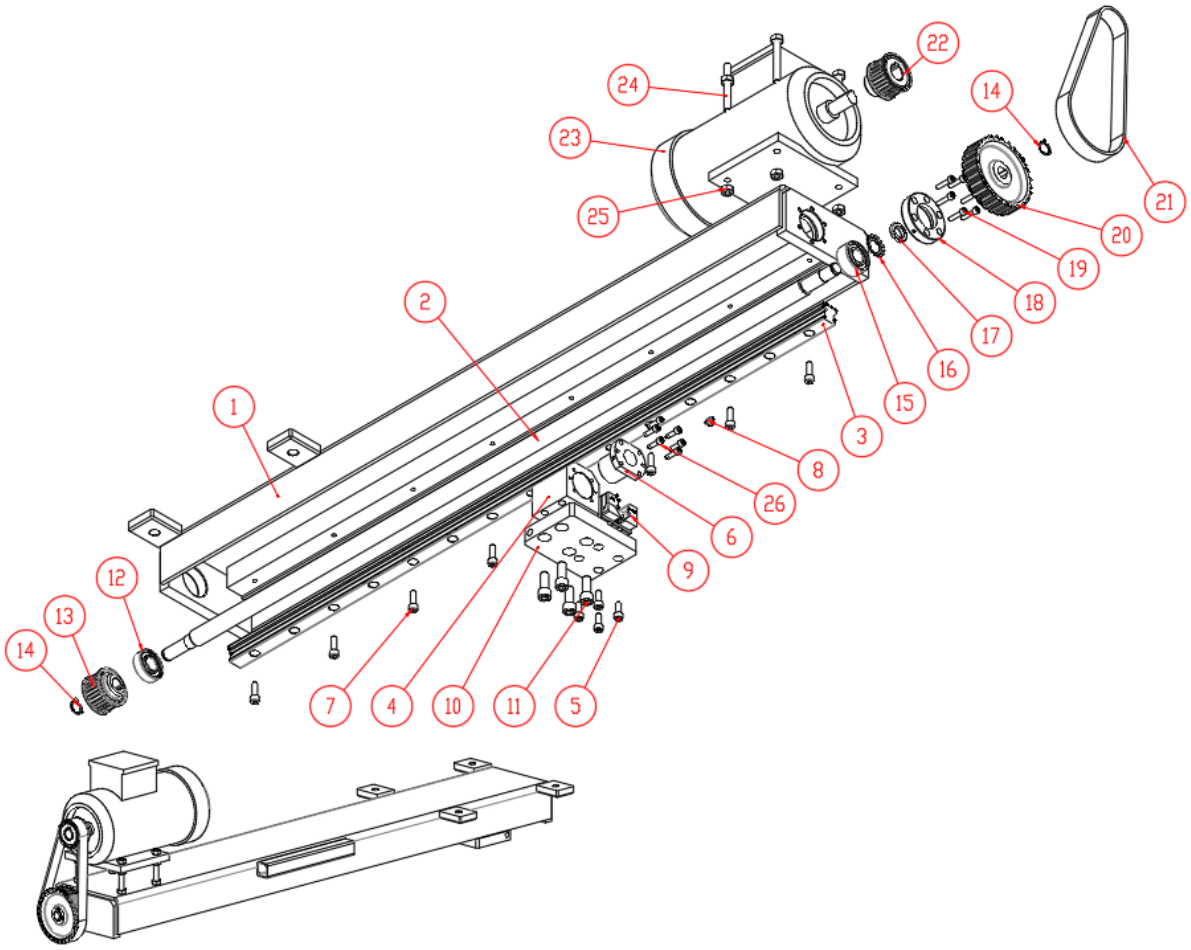


Figure 14.5 Left Rear Rest Assy Details

NO.	PART NAME	DRAWING NO /STANDARD NO
1	LEFT REAR REST BODY	2211.07.03.00.I
2	BALL SCREW - LEFT Ø25x5Rx3-4	2211.07.01.02
3	30 RAIL L=1200	ID=40 DA=80
4	MOBILE BEARING BODY	2211.07.00.10
5	IMBUS BOLT M8x20	DIN 912
6	BALL SCREW NUT	Ø25x5R
7	IMBUS BOLT M8x25	DIN 912
8	GREASE NIPPLE 90° M6	DIN 71412-C
9	NARROW CARRIAGE WITHOUT FLANGE	HR30MN
10	LEFT BUFFER HOLDER BODY	2211.07.03.05

11	IMBUS BOLT M12x30	DIN 912
12	BEARING Ø20xØ47x14	6204.2Z
13	TRANSFER PULLEY ASSY	2200.07.05.00
14	EXTERNAL SEGMENT Ø18x1.2	DIN 471
15	BEARING Ø20xØ47x14	3204
16	WASHER WITH TAB Ø20 (MB4)	DIN 5406
17	SLOTTED NUT M20x1 (KM4)	DIN 981
18	BEARING COVER	2200.07.00.05
19	IMBUS BOLT M6x25	DIN 912
20	INLET PULLEY	2300.07.06.03
21	TIME BELT	---
22	ENGINE PULLEY ASSY	---
23	BRAKED ENGINE	---
24	HEADLESS SET SCREW M10x80	DIN 913
25	HEXAGONAL NUT M10	DIN 934
26	IMBUS BOLT M6x20	DIN 912

Table 14.5 Left Rear Rest Assy Elements

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14.3.2. RIGHT REAR REST ASSY DETAILS

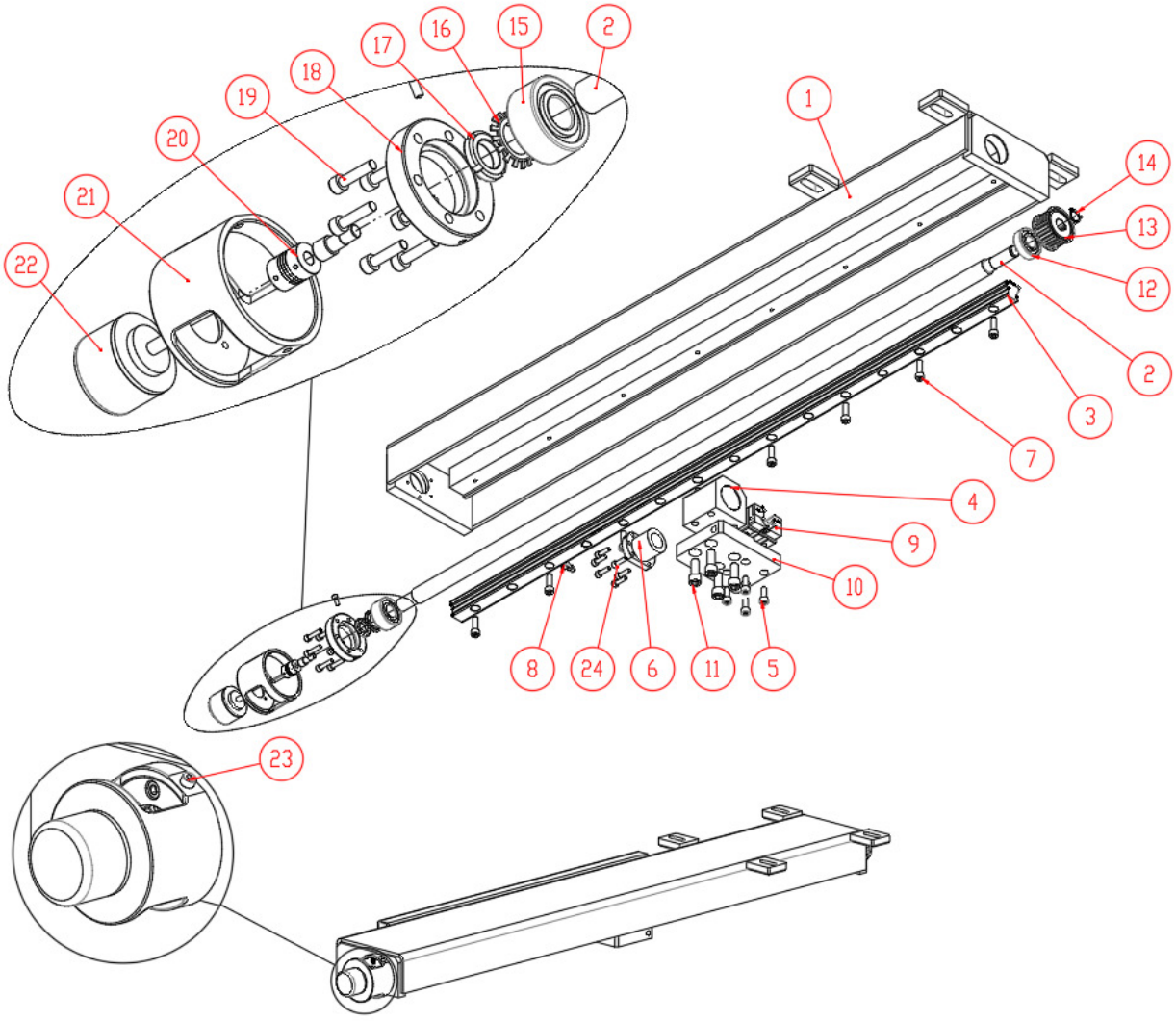


Figure 14.6 Right Rear Rest Assy Details

NO.	PART NAME	DRAWING NO /STANDARD NO
1	RIGHT REAR REST BODY	2211.07.04.00.I
2	BALL SCREW - LEFT Ø25x5Rx3-4	2211.07.02.02
3	30 RAIL L=1200	ID=40 DA=80
4	MOBILE BEARING BODY	2211.07.00.10
5	IMBUS BOLT M8x20	DIN 912
6	BALL SCREW NUT	Ø25x5R
7	IMBUS BOLT M8x25	DIN 912
8	GREASE NIPPLE 90° M6	DIN 71412-C

9	NARROW CARRIAGE WITHOUT FLANGE	HR30MN
10	RIGHT BUFFER HOLDER BODY	2211.07.04.05
11	IMBUS BOLT M12x30	DIN 912
12	BEARING Ø20xØ47x14	6204.2Z
13	TRANSFER PULLEY ASSY	2200.07.05.00
14	EXTERNAL SEGMENT Ø18x1.2	DIN 471
15	BEARING Ø20xØ47x14	3204
16	WASHER WITH TAB Ø20 (MB4)	DIN 5406
17	SLOTTED NUT M20x1 (KM4)	DIN 981
18	BEARING COVER	2200.07.00.05
19	IMBUS BOLT M6x25	DIN 912
20	ENCODER COUPLING	CC-0808
21	ENCODER FIXING PART	1000.08.00.07.I
22	ENCODER	ATEK ARS 5-500-TTL
23	IMBUS BOLT M5x20	DIN 912
24	IMBUS BOLT M6x20	DIN 912

Table 14.6 Right Rear Rest Assy Elements

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14.4. OIL TANK and PUMPING ASSY DETAILS

14.4.1. OIL TANK ASSY DETAILS

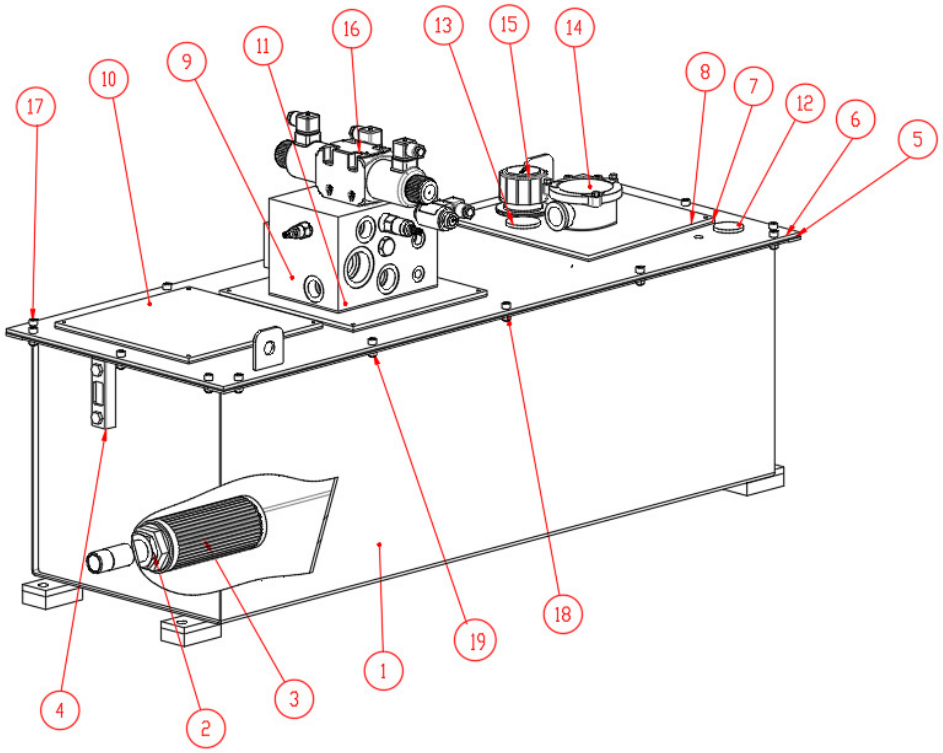


Figure 14.7 Oil Tank Assy Details

NO.	PART NAME	DRAWING NO /STANDARD NO
1	OIL TANK BODY	---
2	1½ - 1 REDUCTION_SHORT TYPE	---
3	OIL SUCTION FILTER	----
4	OIL LEVEL GAUGE	-----
5	TANK UPPER SHEET METAL GASKET	-----
6	TANK UPPER SHEET METAL	---
7	OIL TANK CAP RUBBER GASKET	---
8	OIL TANK CAP - RIGHT	---
9	HYDROBLOCK CON. PLATE	---
10	OIL TANK CAP	---
11	HYDROBLOCK RUBBER GASKET	----
12	Ø36 DUST SEPARATOR	---
13	Ø45 DUST SEPARATOR	---
14	RETURN FILTER	---
15	BLEEDER CAP	---
16	Ø15 DUST SEPARATOR COVER (PERFORATED)	---
17	IMBUS BOLT M8x20	---
18	WASHER M8	---
19	NUT M8	---

Table 14.7 Oil Tank Assy Elements

14.4.2. ENGINE PUMP AND DRUM ASSY DETAILS

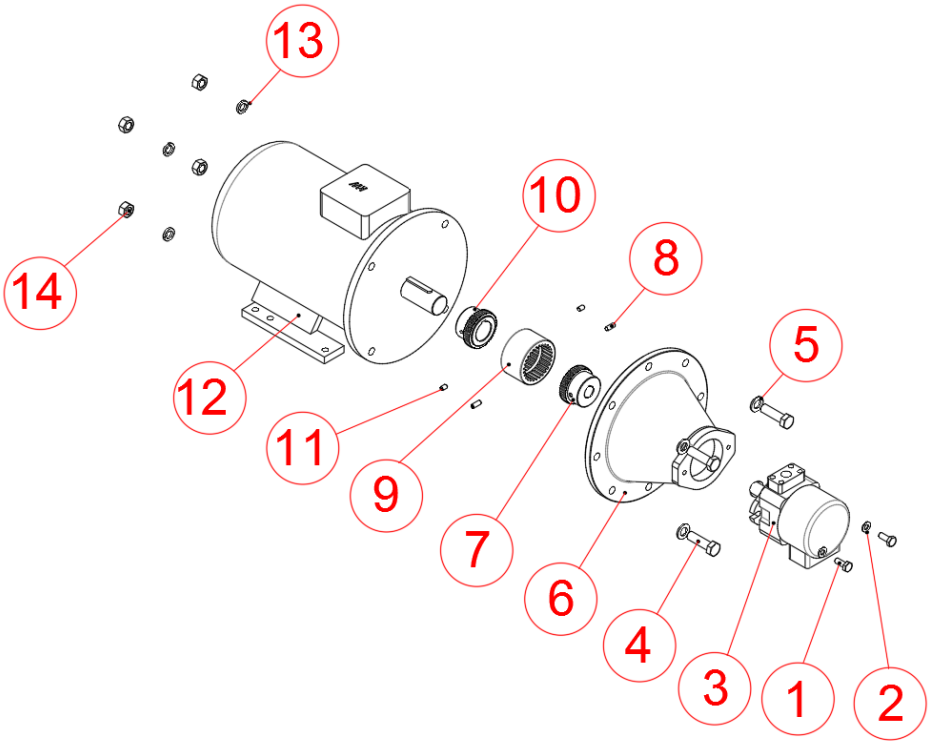


Figure 14.8 Engine Pump and Drum Assy Details

POS. NO:	PART NAME	DRAWING NO / STANDARD NO
1	PUMP SECURING BOLT	
2	WASHER	
3	PUMP	
4	DRUM SECURING BOLT	
5	WASHER	
6	DRUM	
7	PUMP COUPLING	
8	PUMP COUPLING SECURING SET SCREW	
9	COUPLING SPACER	
10	ENGINE COUPLING	
11	ENGINE COUPLING SECURING SET SCREW	
12	ENGINE	
13	WASHER	
14	NUT	

Table 14.8 Engine Pump and Drum Assy Elements

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14.5. MAIN CYLINDER ASSY DETAILS

14.5.1. 6 MM MAIN CYLINDER ASSY DETAILS

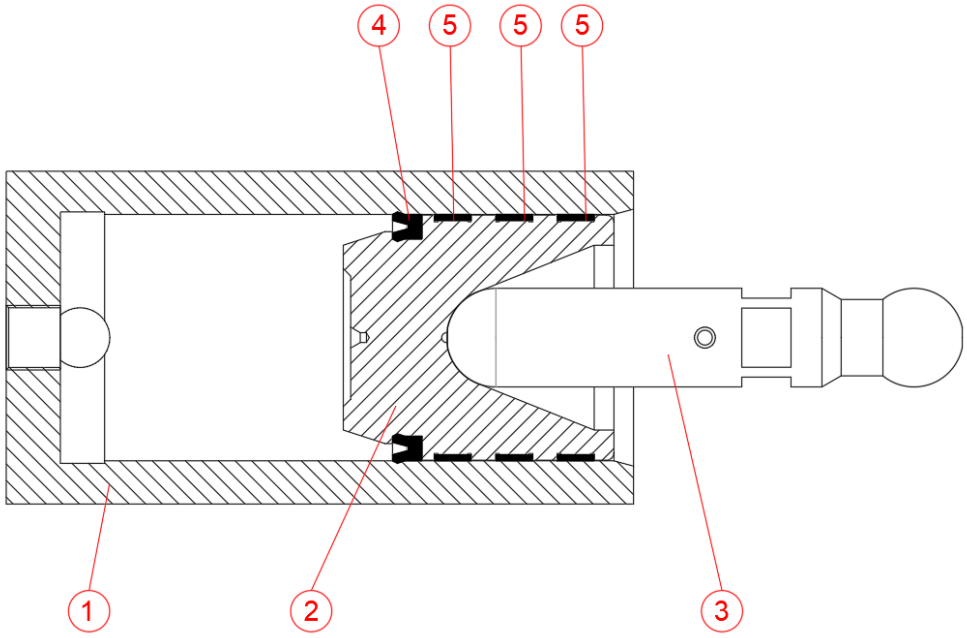


Figure 14.9 CNC HGS 6mm Cylinder Assy Details

POS. NO:	PART NAME	QTY.	DRAWING NO / STANDARD NO
1	CYLINDER BODY	1	---
2	PISTON	1	---
3	PISTON ROD	1	---
4	U CAP	1	Ø100X Ø 80x12
5	BEARING BAND	3	2.5x15x314

Table 14.9 CNC HGS 6mm Cylinder Assy Elements

14.5.2. 8 MM MAIN CYLINDER ASSY DETAILS

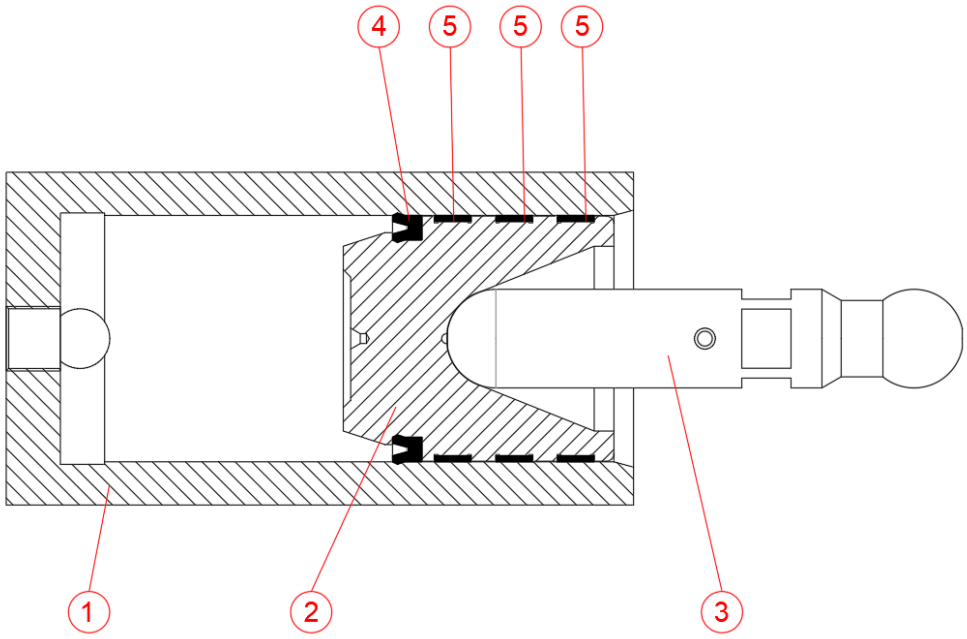


Figure 14.10 CNC HGS 8mm Cylinder Assy Details

POS. NO:	PART NAME	QTY.	DRAWING NO / STANDARD NO
1	CYLINDER BODY	1	---
2	PISTON	1	---
3	PISTON ROD	1	---
4	U CAP	1	Ø120X Ø 100x15
5	BEARING BAND	3	2.5x15x377

Table 14.10 CNC HGS 8mm Cylinder Assy Elements

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14.6. PRESS CYLINDER ASSY DETAILS

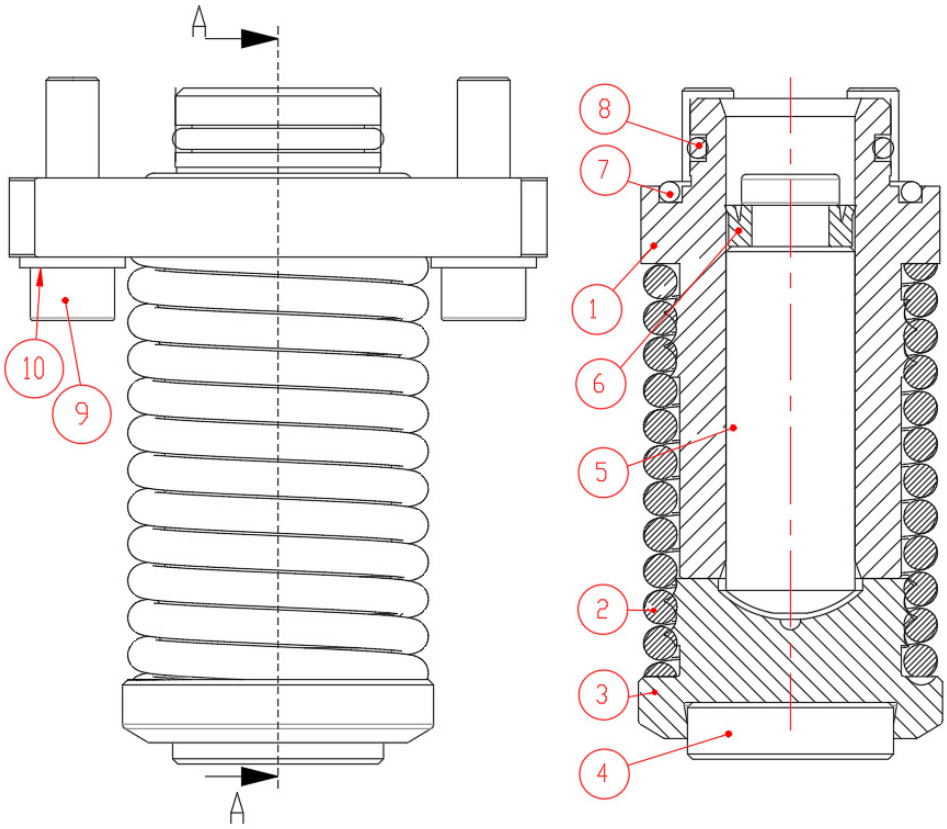


Figure 14.11 CNC HGS 6-8 mm Press Cylinder Assy Details

NO.	PART NAME	DRAWING NO / STANDARD NO
1	PRESS CYLINDER BODY	2211.03.03.01.FT
2	FLANGED TYPE PRESS SPRING	2211.03.03.02.FT
3	PRESS SHOE	2211.03.03.03.FT
4	PRESS BUFFER	2211.03.03.04
5	PRESS CYLINDER PISTON	2211.03.03.05
6	U CUP Ø25xØ15x8	KASTAŞ K21-015
7	O RING Ø43XØ4	KASTAŞ KO-0430040 İ
8	O ring Ø32xØ4	KASTAŞ KO-0320040 İ
9	M10x40 BOLT	DIN 912
10	M10 WASHER	DIN 128-A 12-FSt

Table 14.11 CNC HGS 6-8 mm Press Cylinder Assy Elements

14.7. FEELER GAUGE ADJUSTMENT CYLINDER ASSY DETAILS

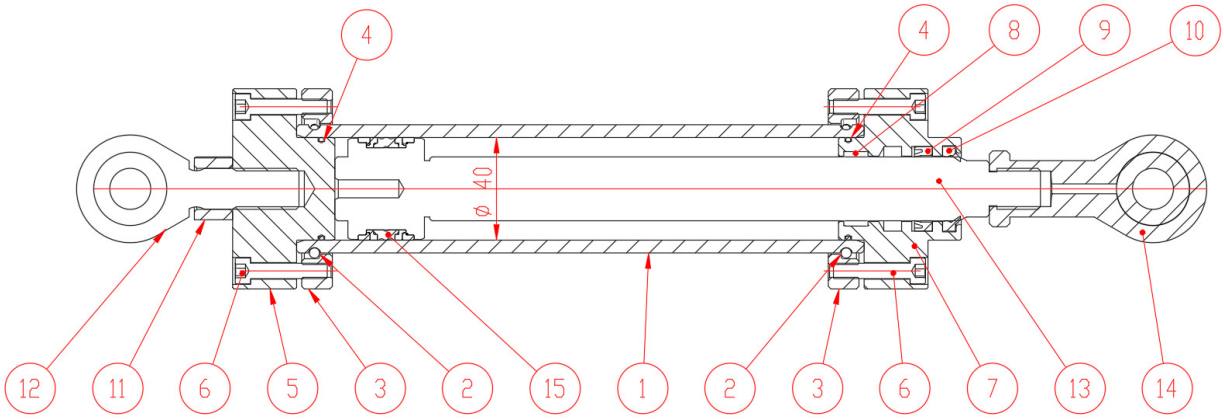


Figure 14.12 CNC HGS 6-8 mm Feeler Gauge Adjustment Cylinder Assy Details

NO.	PART NAME	DRAWING NO /STANDARD NO
1	FEELER GAUGE CYLINDER PUMP	2310.03.04.01
2	STEEL RING	2310.03.04.07
3	CONNECTION FLANGE	2310.03.04.02
4	O-RING (Ø36xØ2)	KASTAŞ - KO-0360020İ
5	FEELER GAUGE CYLINDER LOWER COVER	2310.03.04.03
6	BOLT M6x30	DIN 912
7	FEELER GAUGE CYLINDER UPPER COVER	2310.03.04.04
8	BEARING BAND	K68-025/1 (KASTAŞ)
9	U-CUP	K21-025/17 (KASTAŞ)
10	DUST SEAL - Ø25xØ33.6x7	K06-025 (KASTAŞ)
11	NUT M16	DIN 934
12	M16 MALE ROD EYE	ROD END POS16RSS
13	PISTON	2310.03.04.05
14	M16 FEMALE ROD EYE	ROD END PHS16RSS
15	PISTON SEAL - Ø40xØ32x15.5	KASTAŞ - K18 040-032

Table 14.12 CNC HGS 6-8 mm Feeler Gauge Adjustment Cylinder Assy Elements

14.8. FEELER GAUGE ADJUSTMENT ASSY DETAILS

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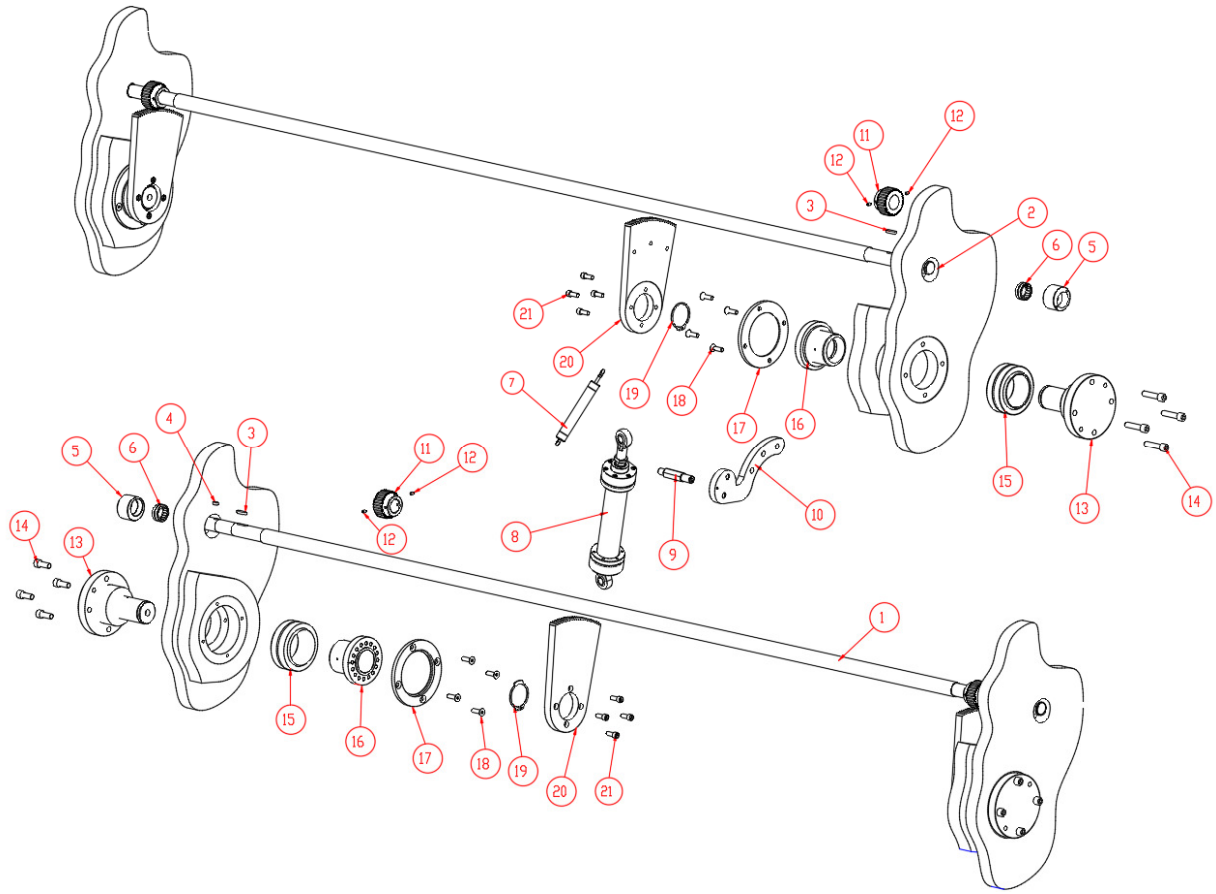


Figure 14.13 CNC HGS Feeler Gauge Adjustment Assy Details

NO.	PART NAME	DRAWING NO /STANDARD NO
1	FEELER GAUGE ADJUSTMENT ROD	-----
2	FEELER GAUGE ADJUSTMENT ROD HOUSING	-----
3	WEDGE 12x8x45	DIN 6885
4	WEDGE 12x8x20	DIN 6885
5	ECCENTRIC BUSHING	DIN 6885
6	NEEDLE BEARING	RNA 39/42
7	LINEAR MEASURING ROD	-----
8	HYDRAULIC FEELER GAUGE ADJUSTMENT CYLINDER	-----
9	PIVOT SHAFT	-----
10	FEELER GAUGE ADJUSTMENT FLANGE	-----
11	PINION GEAR	2231.04.00.07

12	HEADLESS SET SCREW M8x12	DIN 913
13	PERNO	-----
14	BOLT M16x70	-----
15	GE BEARING	-----
16	ECCENTRIC BEARING	-----
17	BEARING COVER	----
18	BOLT M12x40	---
19	UPPER JAW	---
20	FLAG GEAR	-----
21	BOLT M 12x30	DIN 912

Table 14.13 CNC HGS Feeler Gauge Adjustment Assy Elements

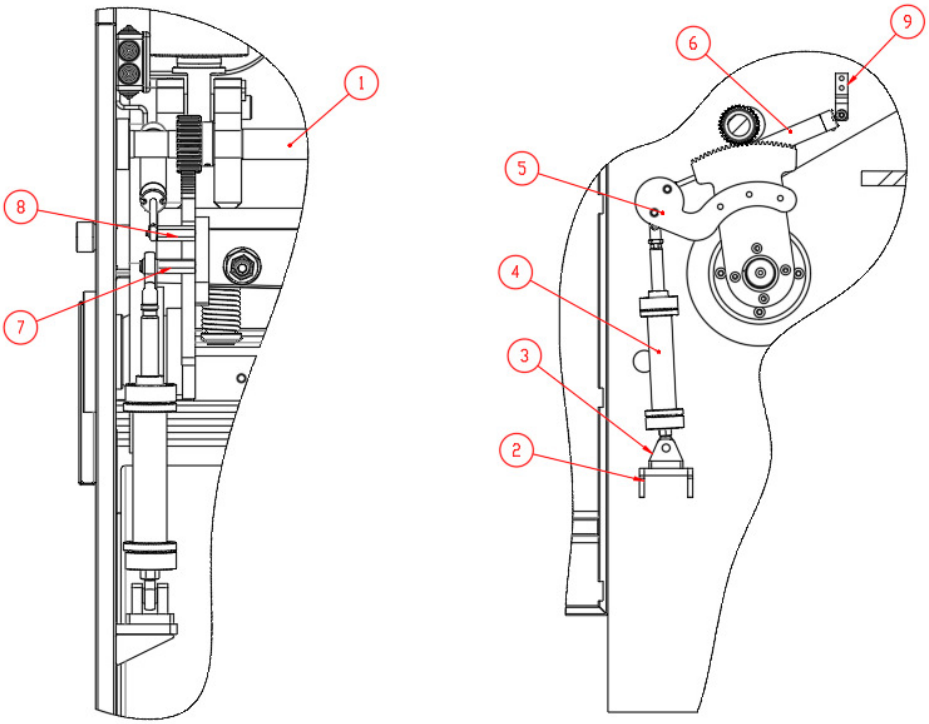


Figure 14.14 CNC HGS Feeler Gauge Adjustment Assy Details

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NO.	PART NAME	DRAWING NO /STANDARD NO
1	FEELER GAUGE ADJUSTMENT ROD	-----
2	FEELER GAUGE CYLINDER CONNECTOR SLEEVE	-----
3	CYLINDER CONNECTOR SLEEVE	-----
4	HYDRAULIC FEELER GAUGE ADJUSTMENT CYLINDER	-----
5	FEELER GAUGE ADJUSTMENT FLANGE	-----
6	LINEAR MEASURING ROD	-----
7	PIVOT SHAFT	-----
8	LINEAR MEASURING ROD PIVOT SHAFT	-----
9	LINEAR MEASURING ROD CONNECTOR SLEEVE	-----

Table 14.14 CNC HGS Feeler Gauge Adjustment Assy Elements

14.9. RETURN SPRING ASSY DETAILS

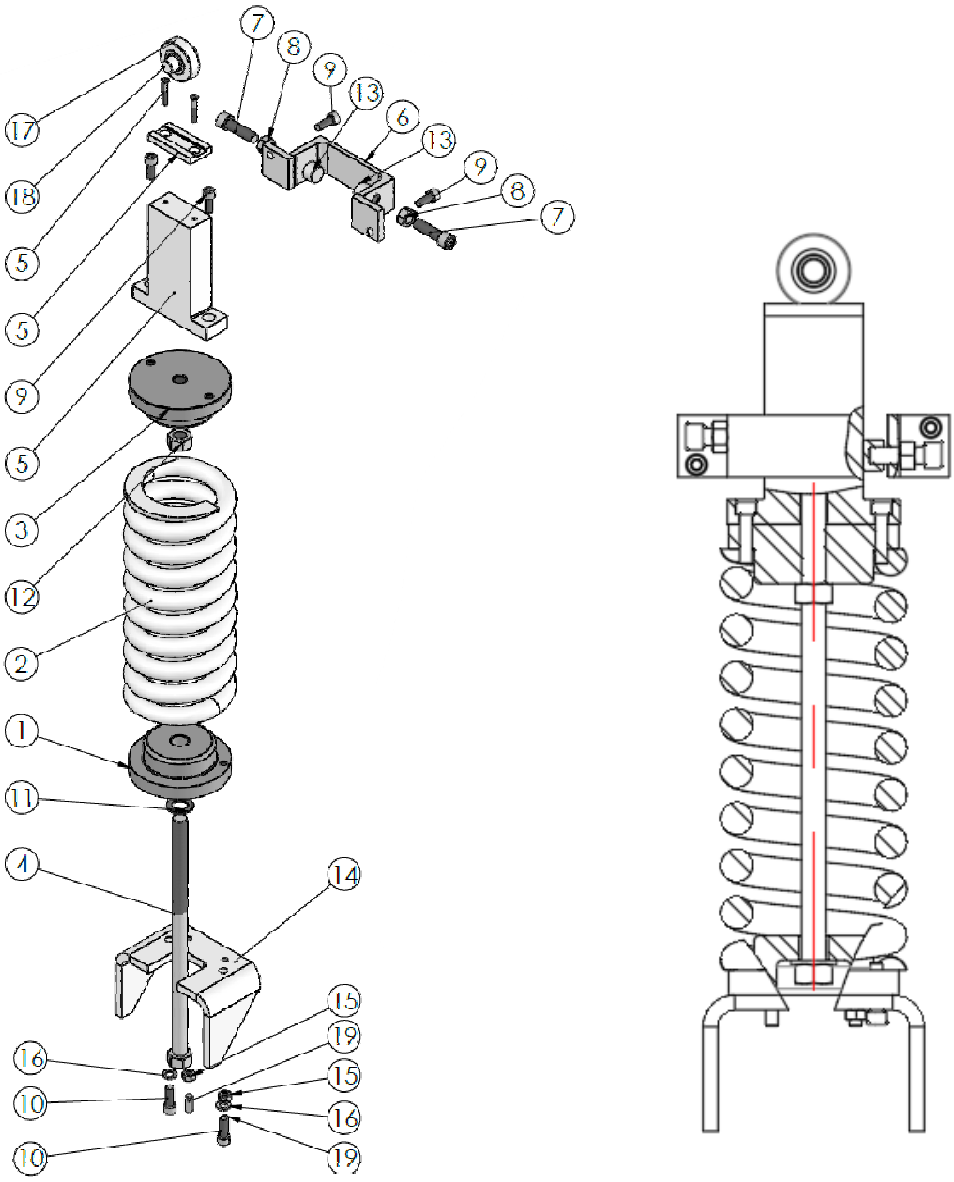


Table 14.15 CNC HGS Return Spring Assy Details

NO.	PART NAME	DRAWING NO /STANDARD NO
1	LOWER FLANGE	-----
2	RETURN SPRING	-----
3	UPPER FLANGE	-----
4	FLANGE CENTERING THRUST	-----
5	UPPER PRESS ASSY	-----
6	ADJUSTING BOLT CONVEYOR	-----
7	IMBUS BOLT - DIN 912 - M14x50 - 8.8	-----

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8	HEXAGONAL NUT - DIN 934 - M14x2 - 8.8	-----
9	IMBUS BOLT - DIN 912 - M10x25 - 8.8	-----
10	IMBUS BOLT - DIN 912 - M10x30 - 8.8	-----
11	M20 WASHER	-----
12	M20 NUT	-----
13	AQUAPLANING END	-----
14	CONSOLE UPPER TABLE	-----
15	HEXAGONAL NUT - DIN 934 - M10x1 - 8.8	-----
16	FLAT WASHER - DIN 125 - M10	-----
17	WHEEL	-----
18	WHEEL SHAFT	
19	HEADLESS SET SCREW - DIN 913 - M10x25 - 8.8	

Table 14.15 CNC HGS Return Spring Assy Elements

15. THE DETAILS OF CNC HGS OPTIONAL SYSTEMS

15.1. LEVER TYPE PNEUMATIC SHEET METAL SUPPORT SYSTEM DETAILS

15.1.1. 6-8 MM LEVER TYPE PNEUMATIC SHEET METAL SUPPORT SYSTEM DETAILS

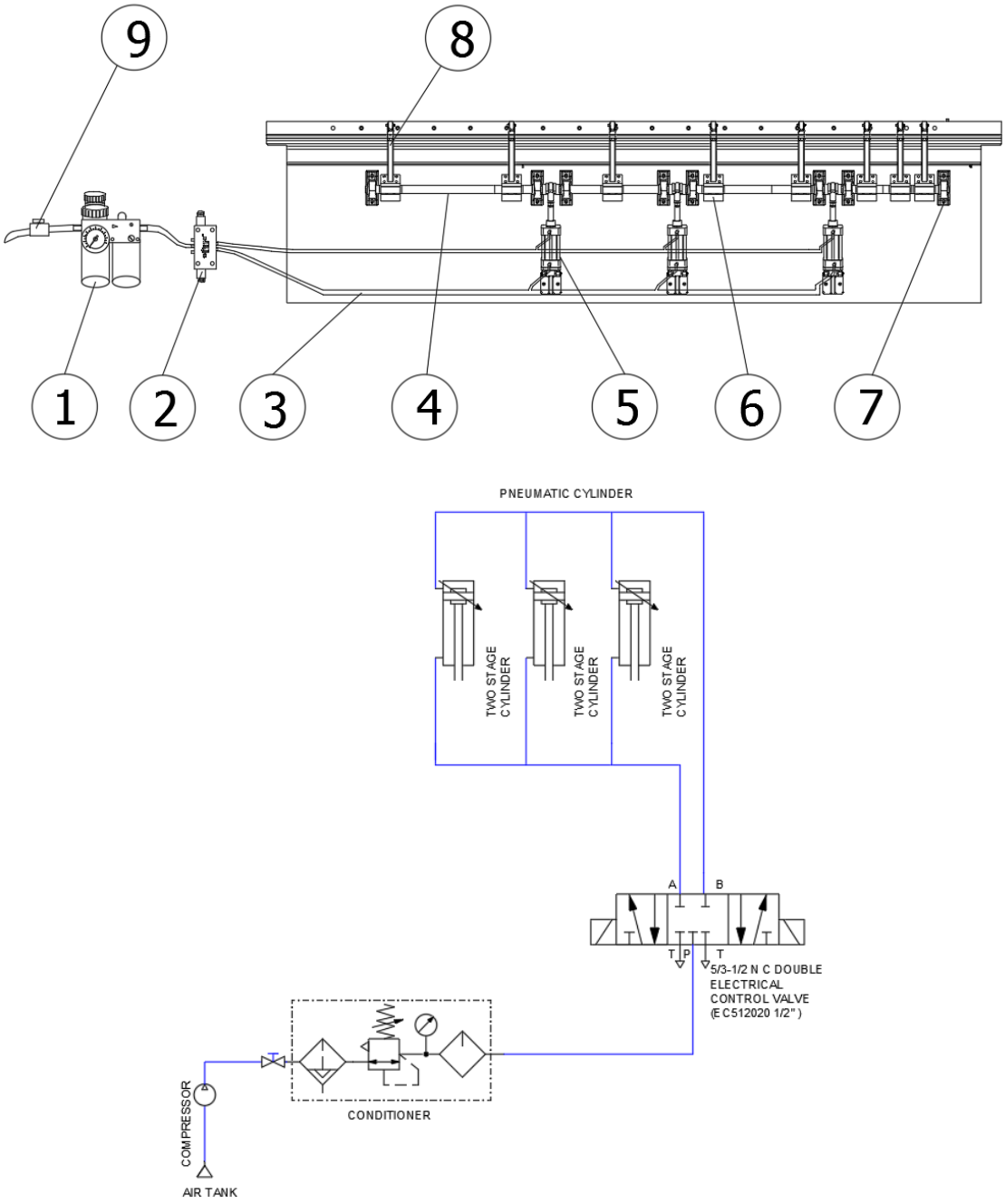


Figure 15.1 6-8 mm Lever Type Pneumatic Sheet Metal Support Assy Details

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NO.	PART NAME	DRAWING NO /STANDARD NO
1	FILTER	-----
2	VALVE	-----
3	AIR HOSE	-----
4	CONVEYOR SHAFT	----
5	PNEUMATIC PISTON	---
6	CONVEYOR LEVER BODY	---
7	ROLLER BEARING	-----
8	CONVEYOR LEVER	-----
9	VALVE	-----

Table 15.1 6-8 mm Lever Type Sheet Metal Support Assy Elements

15.1.2. FLOW RATE INFORMATION REQUIRED FOR CNC HGS LEVER TYPE PNEUMATIC SHEET METAL SUPPORT SYSTEMS

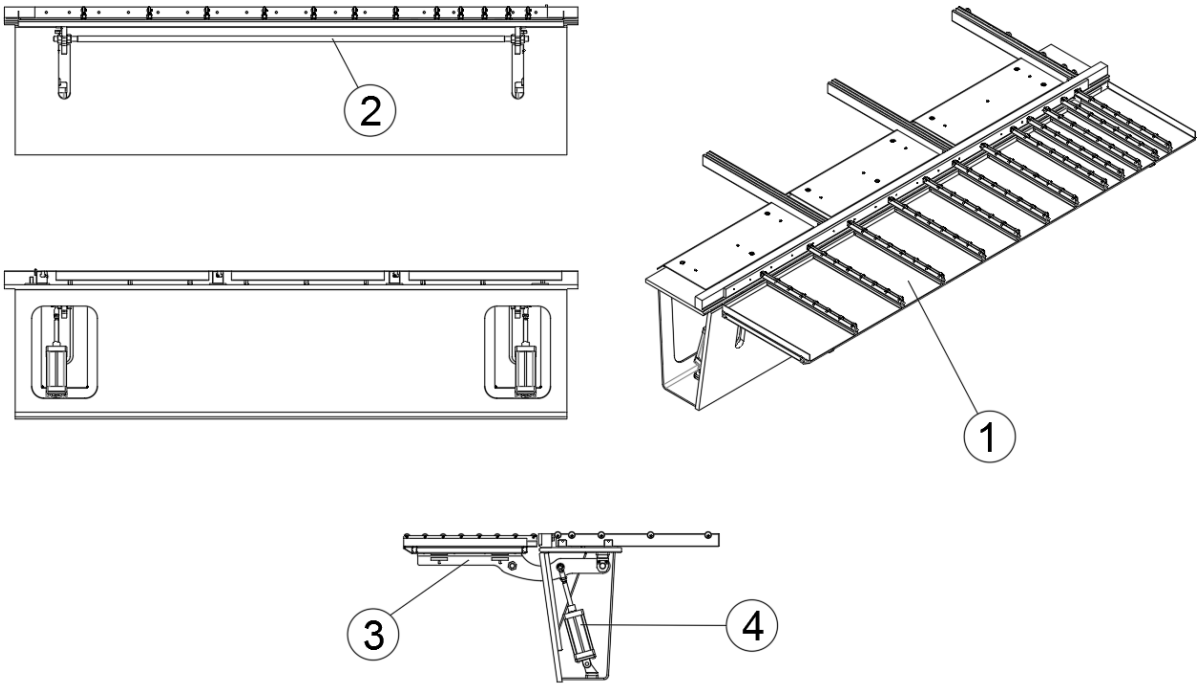
CNC HGS		
NO	**MACHINE**	**COMPRESSOR FLOW RATE (m^3/hour)**
1	CNC HGS 2100-6mm	9.1
2	CNC HGS 2600-6mm	15.7
3	CNC HGS 3100-6mm	19.6
4	CNC HGS 4100-6mm	14.7
5	CNC HGS 2100-8mm	6.5
6	CNC HGS 2600-8mm	11.7
7	CNC HGS 3100-8mm	15.7
8	CNC HGS 4100-8mm	15.7

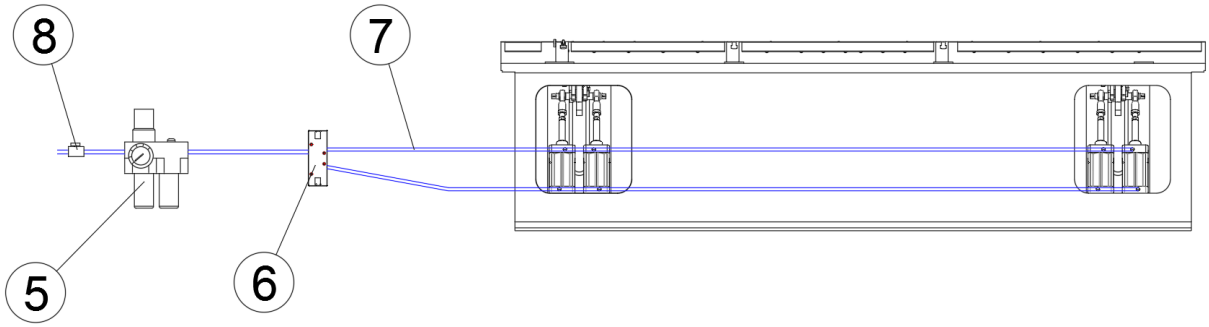
Table 15.2 CNC HGS Lever Type Pneumatic Air Flow Rate Table

THE POINTS TO BE CONSIDERED

1- **Operating pressure should be 6.5bar at maximum and 5.5bar at minimum!**
2- **There must be filtered and lubricated air!**
3- **Ambient temperature should be within nominal values!**
4- **Air flow rate should be within the values mentioned above!**

15.2. UNIFORM TYPE PNEUMATIC SHEET METAL SUPPORT SYSTEM DETAILS





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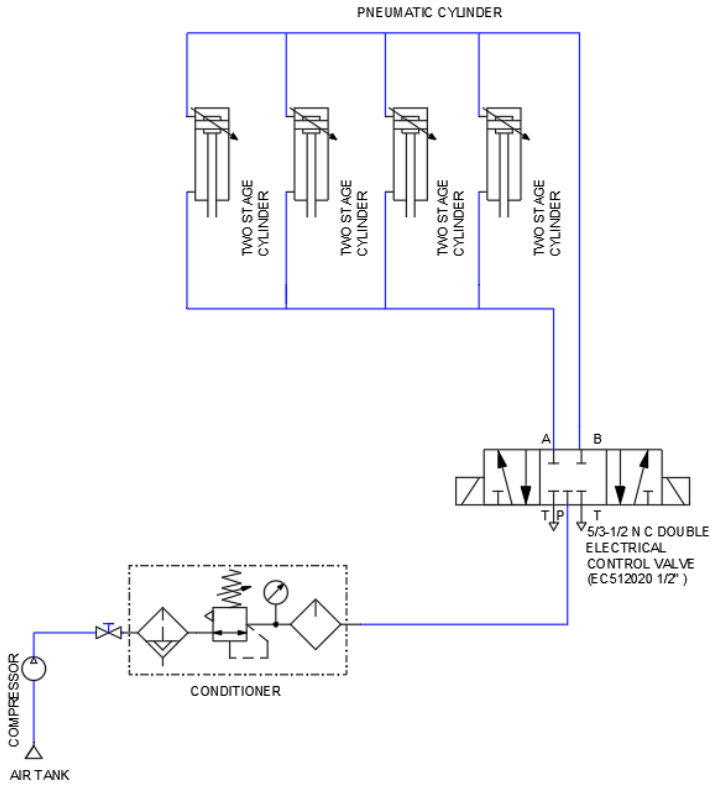


Figure 15.3 Uniform Type Pneumatic Sheet Metal Support Assy Details

NO.	PART NAME	DRAWING NO /STANDARD NO
1	SHEET METAL TABLE	-----
2	BREAST BEAM	-----
3	TABLE OPERATING LEVER	-----
4	PNEUMATIC CYLINDER	----
5	CONDITIONER	---
6	VALVE	---
7	PNEUMATIC HOSE	-----
8	VALVE	-----

Table 15.3 Uniform Type Pneumatic Sheet Metal Support Assy Elements

15.2.1. FLOW RATE INFORMATION REQUIRED FOR CNC HGS UNIFORM TYPE PNEUMATIC SHEET METAL SUPPORT SYSTEMS

CNC HGS		
NO	**MACHINE**	**COMPRESSOR FLOW RATE (m^3/hour)**
1	CNC HGS 2100-6mm	61.4
2	CNC HGS 2600-6mm	52.6
3	CNC HGS 3100-6mm	87.6
4	CNC HGS 4100-6mm	60.3
5	CNC HGS 2100-8mm	43.8
6	CNC HGS 2600-8mm	39.4
7	CNC HGS 3100-8mm	70.1
8	CNC HGS 4100-8mm	32.1

Table 15.2 CNC HGS Uniform Type Pneumatic Air Flow Rate Table

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16. CNC HGS HYDRAULIC CIRCUIT DIAGRAMS AND MATERIAL LISTS

16.1. CNC HGS 6-8 MM HYDRAULIC CIRCUIT DIAGRAM

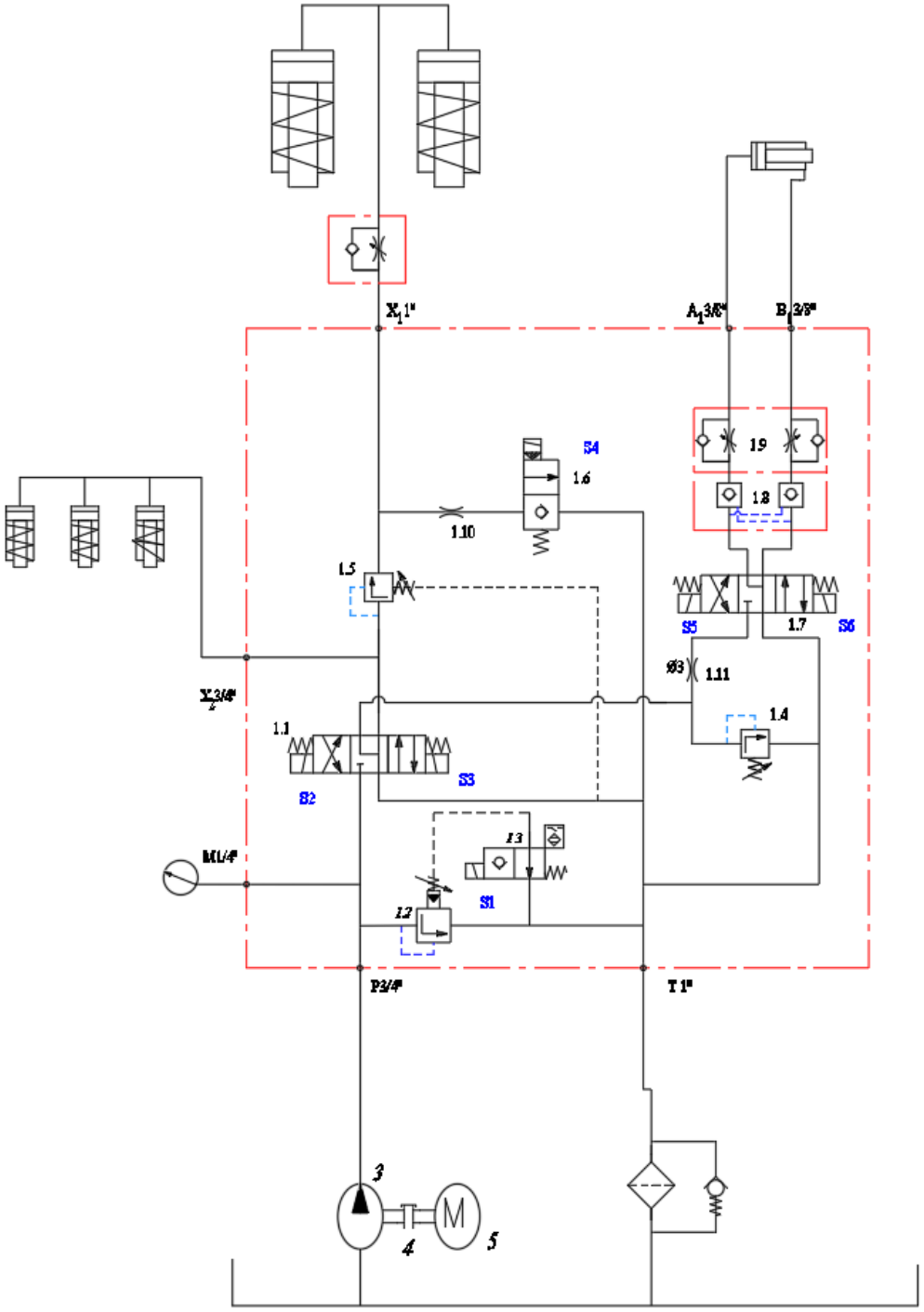


Figure 15.1 CNC HGS 6-8 MM Shear Hydraulic Circuit Diagram

6-8 MM MATERIAL LIST

POS. NO:	PART NAME	QTY.	CODE
1	1.0 CONTROL BLOCK	1	BTC BHB 4901/2022
2	1.1 NG 10 DIRECTION VALVE ABT	1	HAWE TCM380PC10P
3	1.2 PRESSURE SAFETY VALVE	1	WINNER RV 2-A 30 CL
4	1.3 ORIFICE	1	BTC Ø 1
5	1.4 PRESSURE SAFETY VALVE	1	WINNER RD 10-W 2A WL
6	1.5 PRESSURE SEQUENCING VALVE	1	WINNER SP 11-A 30 AL
7	1.6 POPPET VALVE + 24V.ROLLER	1	WINNER EP 12-W 2A01N05
8	1.7 NG 6 DIRECTION VALVE ABT	1	HAWE TCM380PC06P
9	1.8 NG 6 MODULAR TWIN LOCK	1	OCEAN DGMPC-03-W
10	1.9 NG 6 MODULAR SPEED ADJUSTMENT VALVE	1	OCEAN DGMTC-03-W
11	1.10 ORIFICE	1	BTC Ø 8
12	1.11 POPPET VALVE WITH SWITCH	1	HAWE IVN 222 BE 08 PD

	S1	S2	S3	S4	S5	S6
IDLE STANDBY	-	-	-	-	-	-
JAW DOWNWARD	+	+	-	-	-	-
JAW UPWARD	-	-	-	+	-	-
FEELER GAUGE FORWARD	+	-	+	-	-	+
FEELER GAUGE BACKWARD	+	-	+	-	+	-

Table 15.1 CNC HGS 6-8 MM Shear Hydraulic Circuit Material and Signalling List

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16. BOLT TIGHTENING TORQUE VALUES

METRIC BOLT TIGHTENING MOMENT (Nm)				
BOLT SIZE	GEAR STEP (mm.)	MATERIAL		
		8.8	10.9	12.9
		TIGHTENING TORQUE (Nm)		
M3	0.50	1.34	1.88	2.26
M4	0.70	3.36	4.30	5.16
M5	0.80	6.04	8.50	10.20
M6	1.00	10.37	14.59	17.51
M8	1.25	25.07	35.26	42.31
M10	1.50	49.52	69.64	83.56
M12	1.75	84.84	119.31	143.17
M14	2.00	135.13	190.02	228.03
M16	2.00	211.61	297.58	357.09
M20	2.50	412.78	580.47	696.56
M22	2.50	567.58	798.16	957.80
M24	3.00	713.68	1003.61	1204.33
M27	3.00	1050.16	1476.79	1772.15
M30	3.50	1428.97	2009.49	2411.39
M33	3.50	1940.86	2729.33	3275.19
M36	4.00	2496.81	3511.14	4213.37
M39	4.00	3241.92	4558.96	5470.75
M42	4.50	4010.93	5640.37	6768.44
M45	4.50	5039.09	7086.23	8503.47
M48	5.00	6036.23	8488.45	10186.14
M52	5.00	7801.04	10970.21	13164.25
M56	5.50	9648.80	13568.63	16282.36
M60	5.50	11985.42	16854.49	16282.36
M64	6.00	14470.27	20348.82	24418.58
M68	6.00	17516.48	24632.55	29559.06

1 kgf.m=9.81 Nm

17. QUALITY CERTIFICATES

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