

OPERATION MANUAL



BUSBAR PROCESSING SITE TYPE SH600

#VSH600EL191212

ERKO sp.j.

PL 11-042 Jonkowo, Hanowskiego 7 ☎/📠 +48 89 522 10 22 ✉ erko@erko.pl

ERKO sp.j. Oddział w Czeluńcu

PL 38-204 Tarnowiec, Czeluńska 80 ☎/📠 +48 13 445 55 88 ✉ oddzial.czelusnica@erko.pl
www.erko.pl

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**Thank you for buying our product.
Before using this equipment, please carefully read the user and the
maintenance manuals.**

* ERKO has the right to introduce construction modifications due to equipment modernization.



**ISO 9001
ISO 14001**

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Before using this equipment, please read the user and the safety manuals.

The equipment can be used only with Al and Cu rails.

1. APPLICATION

The SH600EL machine can be used for punching holes and bending copper and aluminum rails. It is equipped with electronic measurement of the angle and the distance between the hole and the front of the rail, equipped with a touch display.

The basic features which ensure the efficient and precise operation of the equipment include:

- Programmable sensor of the bending angle (accuracy 0.1°)
- Built-in measurement bar for positioning within an accuracy of 0.1 mm.
- Precise regulation of the height of the hole cutting head (accuracy 0.1 mm)
- Making round and oval holes without burrs
- Pedal control

2. TECHNICAL DATA

Station weight	125kg (bez wyposażenia)
Max dimensions L x W x H	790 x 530 x 450
Max table dimensions	675x 454
Working pressure	630 bar
Power supply	230 V 50 Hz, 40W
Control	24V DC
Supply plug	16A 2P+E IP44
Protection degree	IP40
Busway machining (Cu, Al) (thickness X width.)	12 x 125 mm
Bending range	0÷96°

3. ACCESSORIES

Standard versions of the SH600PLCstation		SH600-SILVER	SH600-GOLD	SH600-PLATINUM
Accessories	Code			
Electric control cable (to work with AH500 or AH550)	SH 610	+	+	+
Electric adjustable angle indicator	SH 611		+	+
Electronic control of operation selection and processing cycle	SH 612		+	+
A precision bending insert (built-in encoder)	SH 401PLC-E		+	+
Insert for repeatable bending (built-in switch)	SH 401PLC-K	+		
Rail offsetting insert	SH 406PLC	0	0	0
Round hole cutter (dimensions as per the catalogue)	SH 403	0	0	0
Oval hole punch (dimensions as per the catalogue)	SH 404	0	0	0
Rectangular hole punch (measurements by Customer's order: max diagonal 21 mm)	SH 409	0	0	0
Insert for forcing in nuts	SH 407	0	0	0
Additional busbar support	SH 408	0	0	0
Shelves		+	+	+
Table	SH 613	0	0	+

+ standard accessories

o additional accessories ordered individually by a customer

4. MACHINE INSTALLATION

- The station should be positioned on hard and even foundation, so that it will securely lean on all four wheels
Operation of the station on an unadapted foundation may result in accelerated wear and in some cases it can be a cause of a defect or destruction of the station
- Connect SH600EL to the electric hydraulic unit using additional electric wire (missing to connect the station to the electric hydraulic unit after the station is switched on may lead to the damage of the station)
- Connect cylinder SH600 to hydraulic hose of electric hydraulic unit
- Connect the equipment to the electrical power supply.

5. CONTROL PANEL

The control panel consists of the following elements:

- The main switch Q1 – used for starting the station
- A white diode L1 indicates that the engine has been switched on.
- LCD panel with a touch screen – contains technological software
- Emergency stop switch Q2.

- Foot switch (integral part of hydraulic unit AH500/AH550) – acts as an operational switch-key.
- Body height regulating crank S1.

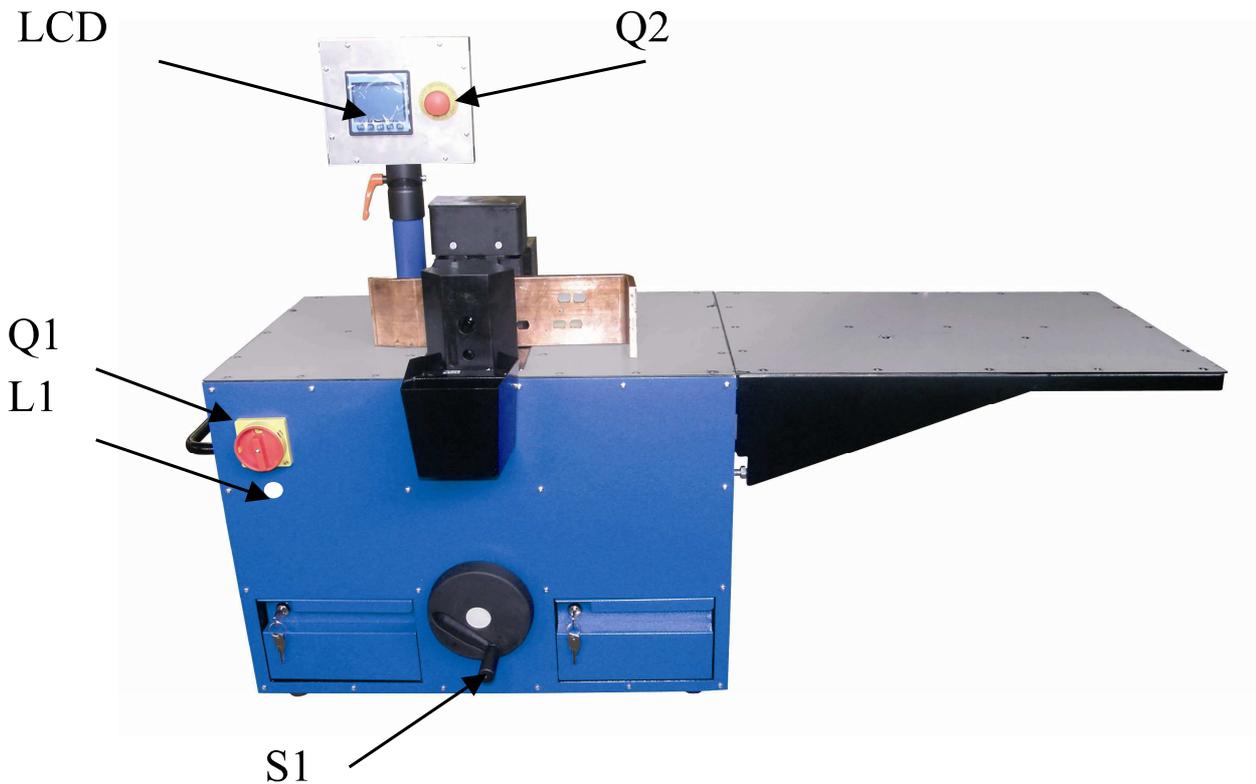


Fig.1.

6. PREPARATION FOR WORK

NOTE:

In specific cases the software may deviate from that presented below.

Connecting and disconnecting the communication cord of the bending insert (SH401PLC-E) is allowed only when the station power supply is disconnected.

If it is necessary to remove the measuring insert frequently, place it in the immediate storage area [1] (Fig.2) without disconnecting the communication cord [2].

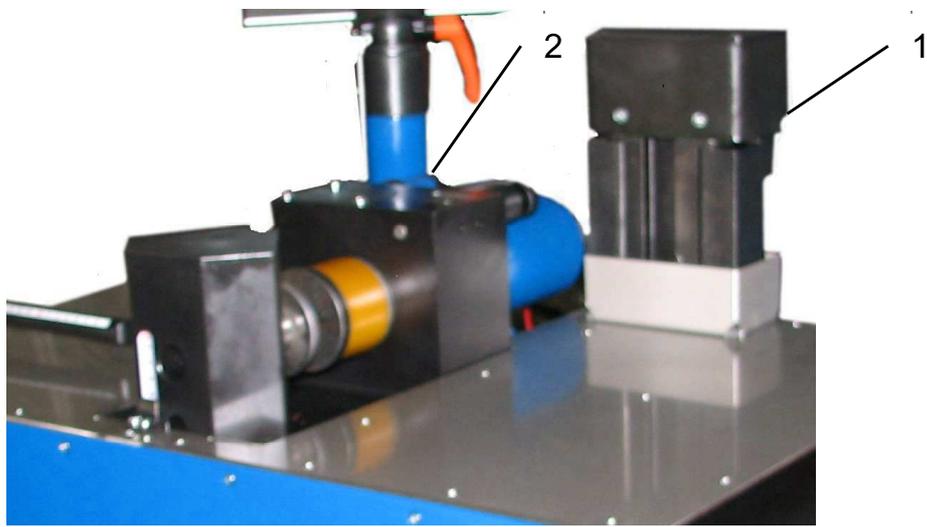


Fig. 2

In order to start the station, switch on the main switch Q1 to position I. Then a panel screen will appear (Fig. 3.) where you will be asked to choose the user interface language by clicking the appropriate flag.

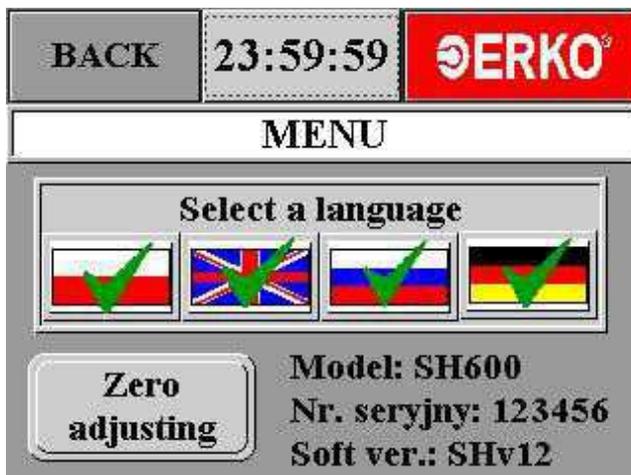


Fig. 3.



Fig. 4.

After the appropriate language has been selected, the type of operation will appear on the panel (Fig. 4)

7. OPERATION

7.1. BENDING

In order to start the bending operation:

1. Mount bending insert [1] (Fig.5).
2. Plug in the insert die [2] (Fig.5).
3. Adjust stamp [3] (Fig.5).
4. Choose bending option on the control panel.
5. The knob S1 should be turned so that the centre of the rail width will coincide with the centre of the bending stamp. Adjust the body height in relation to the busbar – use the ruler for this [4] (Fig.5).

6. By touching control panel enter the desired bending angle [1] and confirm it (Fig. 6)
7. Put the busbar to the working space. In order to define the distance use the measuring ruler [5] (Fig.5).
8. Press the pedal to start the process of bending. When the desired angle is reached, the operation is stopped. (By releasing the pedal and pressing it again, the process starts from the beginning).
9. In order to change the machine mode, go to main menu by pressing BACK on the control panel [2] (Fig.6). Dismantle the equipment.

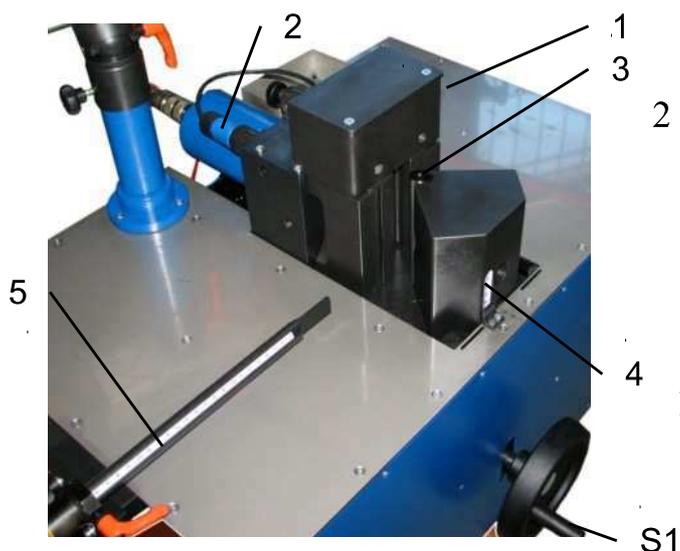


Fig. 5.

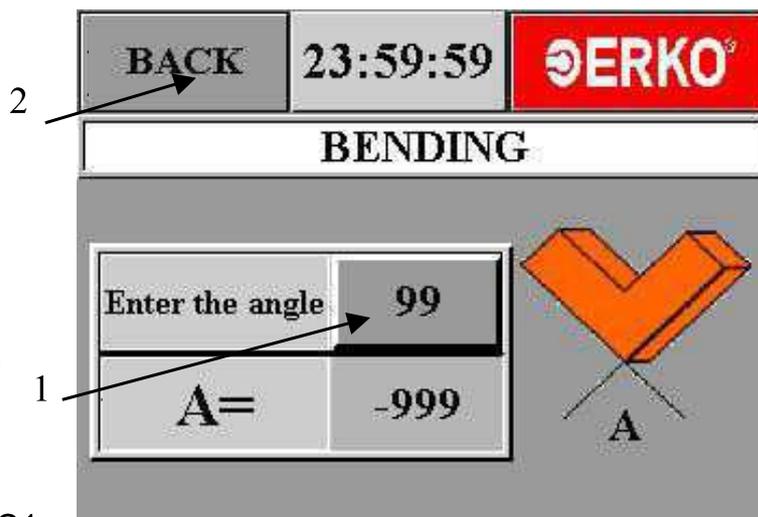


Fig. 6.

The mechanical properties of copper or aluminum busbars may vary - different cross sections have different moment of inertia; this may result in different bending angles. The property is particularly linked to the moment of inertia of a cross section. In order to perform precise bending, bend a busbar by an angle which is smaller by 5-10° from the target value and measure the angle with a measuring insert. Calculate the difference between the desired and the obtained angle. Then bend the busbar again, adding the calculated adjustment value to the target angle.

There is a risk of damaging the piston rod if the bending procedure is started before the station is properly equipped.

In case bending angle reading is incorrect, please zero adjust bending insert (see 8.2)

7.2. Offsetting

In order to start the offsetting operation:

1. Mount offsetting insert [1] (Fig.7).
2. Choose offsetting option on the control panel (Fig. 4)
3. Turn the knob S1 so that the centre of the rail width coincide with the centre of the offsetting insert. For adjusting use the measurements ruler [3] (Fig.7).
4. Settle the value of offsetting using the knob [2] (Fig.7).
5. Put the busbar to the working space and in order to define the distance use the measuring ruler [4] (Fig. 7).
6. Press the pedal to initiate the process of offsetting. When offsetting desired value is reached, the operation is stopped. (By releasing the pedal and pressing it again, the process starts from the beginning)
7. In order to change the machine mode, go to main menu by pressing BACK on the control panel [1] (Fig. 8). Dismantle the equipment.

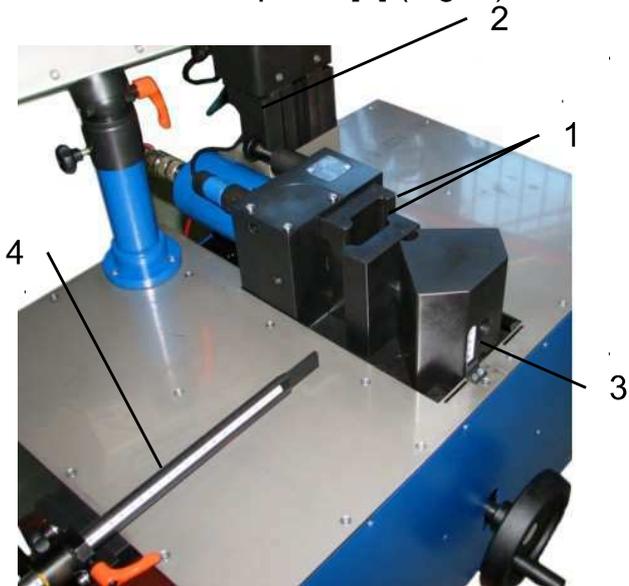


Fig. 7.

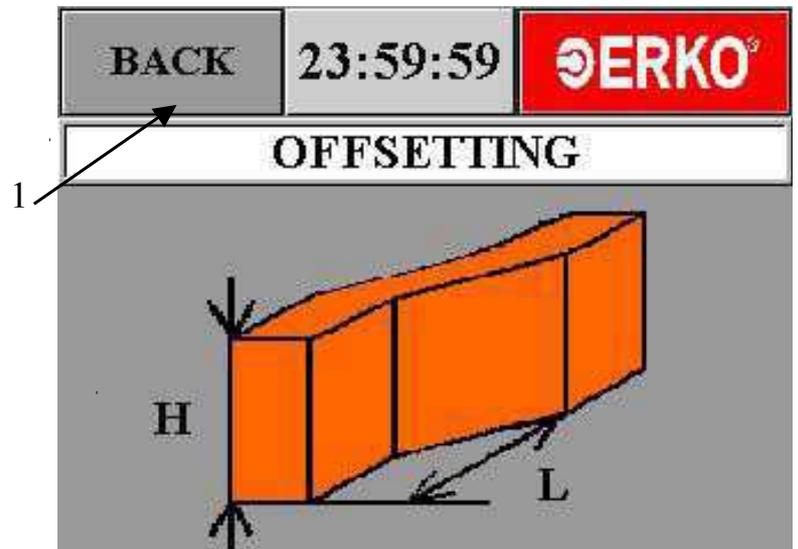
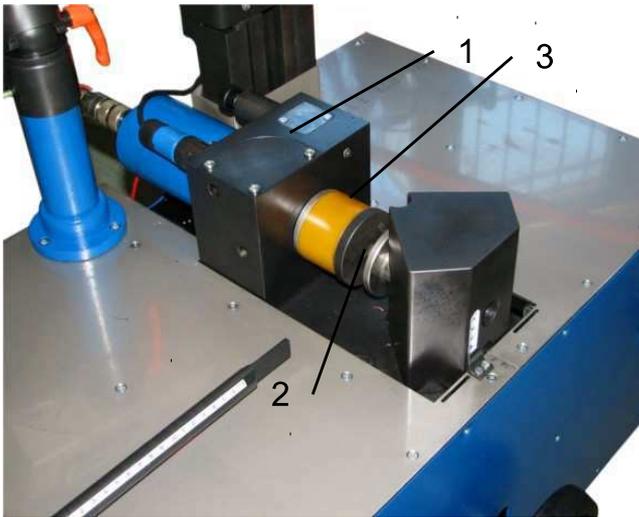


Fig. 8

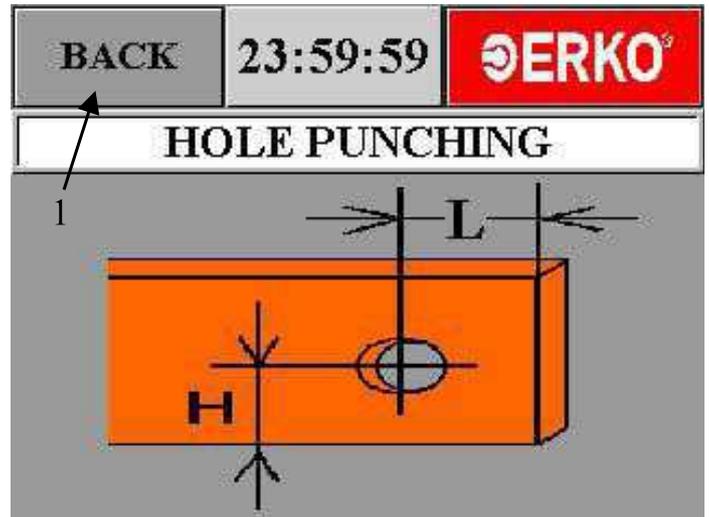
7.3. Punching

In order to start the punching operation:

1. Insert the punching head [2] into the body [1] (Fig.9).
2. Set the required punching die on the positioning pin [3].
3. Choose punching option on the control panel (Fig.4)
4. Set profiling segment at the required height with the use the knob S1 according to the ruler [4] (Fig.5).
5. With the vertical ruler set the hole distance from the bar end [5] (Fig.5).
6. Put the busbar to the working space.
7. Press the pedal of the electric hydraulic unit; after the operation is complete, the piston rod will return to its starting position (in order to repeat the process, release the pedal and press it again)
8. In order to change the machine mode, go to main menu by pressing BACK on the control panel [1] (Fig.10).
9. Dismantle the equipment.



Rys. 9.

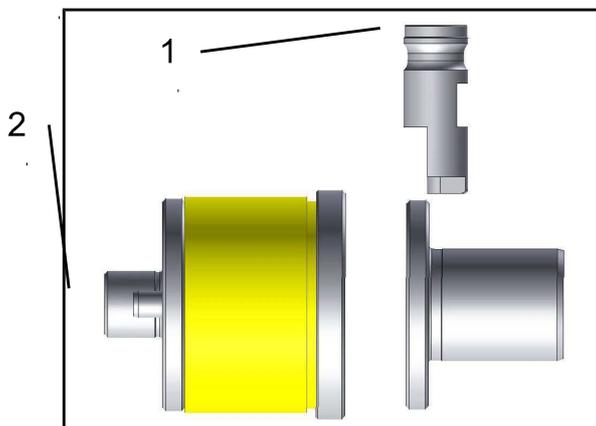


Rys. 10.

Attention:

When setting stamp and die for oval hole the following should be fulfilled:

1. Insert the setting die in the body using the bolt [1] (Fig.11)
2. Insert the appropriate stamp using positioning pin [2]



**When punching holes in aluminum busbars, lubricate punch with oil each time.
Recommended agent: HHS 2000 manufactures by WÜRTH**

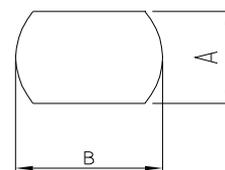
Accessories as per order

Hole punch type SH403 – hole for M6 – M20 screws (the set of stamp and die)
Standard dimensions

Symbol	Dimension [mm]	For screw M
SH403 6,6	∅ 6,6	6
SH403 8,5	∅ 8,5	8
SH403 11	∅ 11	10
SH403 13	∅ 13	12
SH403 17	∅ 17	16
SH403 21	∅ 21	20

Hole punches type SH403 with any dimension on the range from ∅ 6,6 to ∅ 21 mm are available on request.

Oval punches SH404 with dimension A and B (see the table)



Standard dimensions

Symbol	Dimension A [mm]	Dimension B [mm]	For screw M
SH404 8,5-12	8,5	12	8
SH404 11-16	11	16	10
SH404 13-18	13	18	12
SH404 17-21	17	21	16

Other dimensions A and B of oval punches type SH404 are available on the request, however the condition of $B/A < 2$ should be met

7.3. The service of the electric hydraulic unit

The electric hydraulic unit should be used according to its operation manual.

8. MAINTENANCE AND OPERATION RECOMMENDATIONS

The station should be cleaned every day – this considerably affects its durability
Maintain order at the work place. This will limit mechanical damage.

8.1. Lubrication of the lifting screw of the bending-punching segment (if needed).

- Remove the crank S1.
- Unscrew the shield
- Lubricate the screw with grease ŁT-46
- Fix the shield
- Install the crank S1

8.2. Zero adjusting of the insert for measurement of the bending angle

On the control panel in the main menu select „zero adjusting” (rys. 3)

In order to zero adjust:

- Make a move with the levers of the measurement insert [1] (Fig.13)
- Position the levers in a position parallel to the body of the measurement insert (use the ruler for this)
- Press the button of zero adjusting [1] Fig. 12 (Reading value with minus should appear on the control panel)
- To leave the service mode, press the button in the upper left corner [2] (Fig.12)

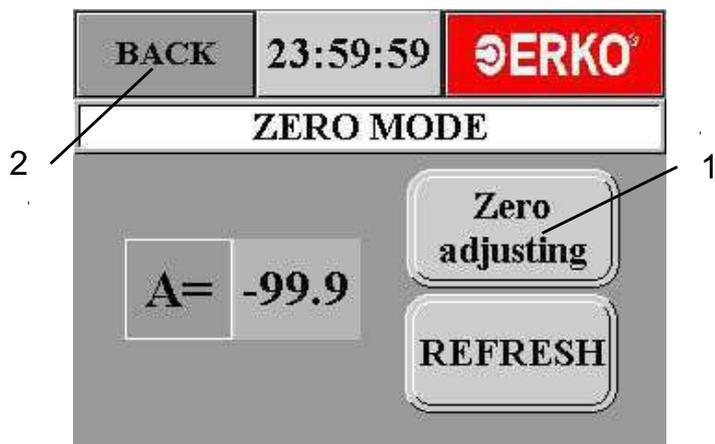


Fig.12

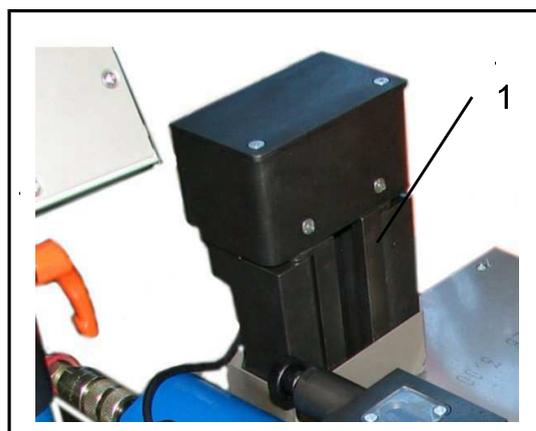


Fig.13

8.3. Defects