



CML International S.p.A.



Instruction Manual

Medi Bender Art. 070

Medi Bender Special Art. 071

User Guide EN
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Fields of use

MECHANICAL – HYDRAULIC – METAL FABRICATION – MARINE ENGINEERING
– ELECTRICAL GENERAL INSTALLATION



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Ercolina® Digital Medi Bender Art. 070
Electric Metal Bending Machine.

Ercolina® Digital Medi Bender “Special” Art. 071
Electric Metal Bending Machine.

CE 1995 (In conformity with Dir. EEC 392/89)



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The Manufacturer is not liable for any damages due to the use of not original Ercolina® tooling

Congratulations for the purchase of your Medi Bender. Observe the following instructions and your Medi Bender will become a simple and useful working tool.

Note: this manual supplies the necessary instructions for the Digital Medi Bender (Art. 070), the Digital Medi Bender Special (Art. 071). If not otherwise specifically indicated, these instructions are valid for the three models.

Remember: read this manual and keep it in a safe place for future reference!

EC Conformity

The three Medi Bender versions are in conformity with Machine Directive EEC 392/89.



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SECTION I

GENERAL RULES

1.1 GENERAL SAFETY RULES



Pay attention to this symbol; it indicates a possible dangerous situation



Pay attention to this symbol; it indicates a forbidden action for the Operator/User



Pay attention to this symbol; it indicates a mandatory action for the Operator/User



MANDATORY

Read carefully the USE AND MAINTENANCE MANUAL before using the machine



WARNING

The Manufacturing Company is not liable for any accident, damage or machine malfunction due to non-observance of instructions included in the machine USE AND MAINTENANCE MANUAL, section II: safety and prevention, or to safety device tampering.



1.1.1 TERMINOLOGY USED

Some recurrent definitions are explained below:

USER

THE PERSON OR BODY OR COMPANY THAT HAS BOUGHT OR RENTED THE MACHINE AND THAT INTENDS TO USE IT ACCORDING TO ITS EXPECTED USE AND SCOPE; MACHINE USE AND OPERATING PERSONNEL TRAINING IS HIS/HER RESPONSIBILITY.

DANGEROUS AREA

ANY AREA INSIDE AND/OR NEAR TO A MACHINE WHERE THE PRESENCE OF AN EXPOSED PERSON, CONSTITUTES A SAFETY AND/OR HEALTH RISK FOR THE PERSON HIMSELF/HERSELF.

EXPOSED PERSON

ANY PERSON THAT IS ENTIRELY OR PARTIALLY WITHIN THE DANGEROUS ZONE.

OPERATOR

PERSON IN CHARGE OF INSTALLING, OPERATING, REGULATING, MAINTAINING, CLEANING, HANDLING OR DEMOLISHING THE MACHINE. HE/SHE IS NOT AUTHORIZED/ENABLED TO PERFORM ELECTRICAL INTERVENTIONS WITH VOLTAGE SUPPLIED.

QUALIFIED PERSONNEL

PERSONS THAT HAVE BEEN SPECIFICALLY TRAINED AND ENABLED TO PERFORM MAINTENANCE OR REPAIRING OPERATIONS THAT REQUIRE A PARTICULAR MACHINE OPERATING, SAFETY AND INTERVENTION MODALITY KNOWLEDGE AND THAT ARE ABLE TO RECOGNIZE DANGERS CAUSED BY MACHINE USE AND TO CONSEQUENTLY AVOID THEM.

AUTHORIZED SERVICE CENTER

BODY THAT HAS BEEN LEGALLY RECOGNIZED BY THE MANUFACTURING COMPANY AND THAT HAS QUALIFIED AND AUTHORIZED PERSONNEL TO PERFORM ALL SIMPLE OR COMPLEX SERVICE, MAINTENANCE AND REPAIRING OPERATIONS THAT ARE NECESSARY TO KEEP THE MACHINE IN PERFECT EFFICIENCY CONDITIONS.

1.1.2 GENERAL WARNINGS

- ❗ Read Carefully the MACHINE USE AND MAINTENANCE MANUAL before using the machine;
- ❗ The User must only assign the machine to specifically trained and qualified personnel;
- ❗ The User must take all the necessary measures to prevent unauthorized personnel from accessing the machine;
- ❗ The User must suitably inform the personnel on safety rules observance and application; for this scope he/she must guarantee that anybody, according to his/her own responsibilities, knows machine use instructions and the relevant safety instructions;
- ❗ The User must inform the Manufacturing Company if he/she finds any safety device defect or malfunction, as well as any potentially dangerous situation;
- ❗ The Operator must always use the DPI Individual Protection Devices (gloves, safety shoes and specific clothes) and must observe the instructions of this manual;
- ❗ The Operator must observe all danger, warning and caution instructions indicated on the machine;
- ⊘ The Operator must not perform any operation or intervention that does not lie within his/her competence;
- ❗ The Operator must inform his/her own Supervisor on every problem or dangerous situation that may arise;
- ⊘ The User must not allow that parts of other brands are assembled on the machine, since testing has been performed with parts included in the machine at the time of the supply of the machine and this or other changes may vary its characteristics and compromise operating safety; any accessory modification and/or addition must be specifically approved and/or made by the Manufacturer;
- ❗ The machine must only be used observing the purposes of use it was designed for;
- ⊘ During operation you may find: live electrical parts, mechanical parts in motion. So do not remove any guard and do not loose screws or fastenings since serious damage can be caused to things or persons.

1.1.3 GENERAL INSTRUCTIONS

The **MEDI BENDER** machine has been manufactured according to the most modern technology and observing the officially recognized safety rules. However, the machine may be source of risk for the user and/or third persons if improperly or incorrectly used. For this reason, it is fundamental to read and apply the following safety rules:

- ❗ The machine must be exclusively used as intended by design and observing general safety and risk prevention rules. The Manufacturer is not liable for damages to things or persons due to an improper machine use;
- ❗ Check that power supply observes the necessary voltage for the Medi Bender;
- ❗ Only assign qualified personnel to the machine;
- ⊘ Do not use the machine in environments containing inflammable gas or fluids;
- ⊘ Do not expose the machine to rain;
- ❗ Keep the machine in a safe and dry place;
- ❗ Keep unassigned personnel at a safety distance during machine work and stop phases;
- ⊘ Do not touch parts in motion;
- ❗ Keep a safety distance when the machine is operating;
- ⊘ Do not ever stay near the machine at the machine control panel's opposite side;
- ❗ Avoid accidental starting-up;
- ⊘ For safety reasons and to keep warranty validity, do not tamper with electronic and disk circuits;
- ❗ Unplug machine from power supply before transportation;
- ⊘ Do not ever handle the machine pulling the supply cable;
- ⊘ Do not modify the machine structure.
- ❗ Only use Ercolina® accessories. Machine tampering implies warranty invalidation. The Manufacturer may not supply accessories or spare parts if the machine has been tampered with;
- ❗ Hold the heaviest formers from the groove when applying them to avoid finger crushing;

- ❗ Check periodically the hexagon wearing;
- ❗ Only one person at a time must use the machine.

1.1.4 TRANSPORTATION



WARNING

BEFORE TRANSPORTING THE MACHINE :

- ◆ Unplug power supply;
- ◆ Disconnect the pedal switch;
- ◆ Remove all the accessories assembled on the machine.



WARNING

DURING MACHINE TRANSPORTATION:

- ◆ Pay attention to the machine weight: 23 Kg;
- ◆ Use the handle;

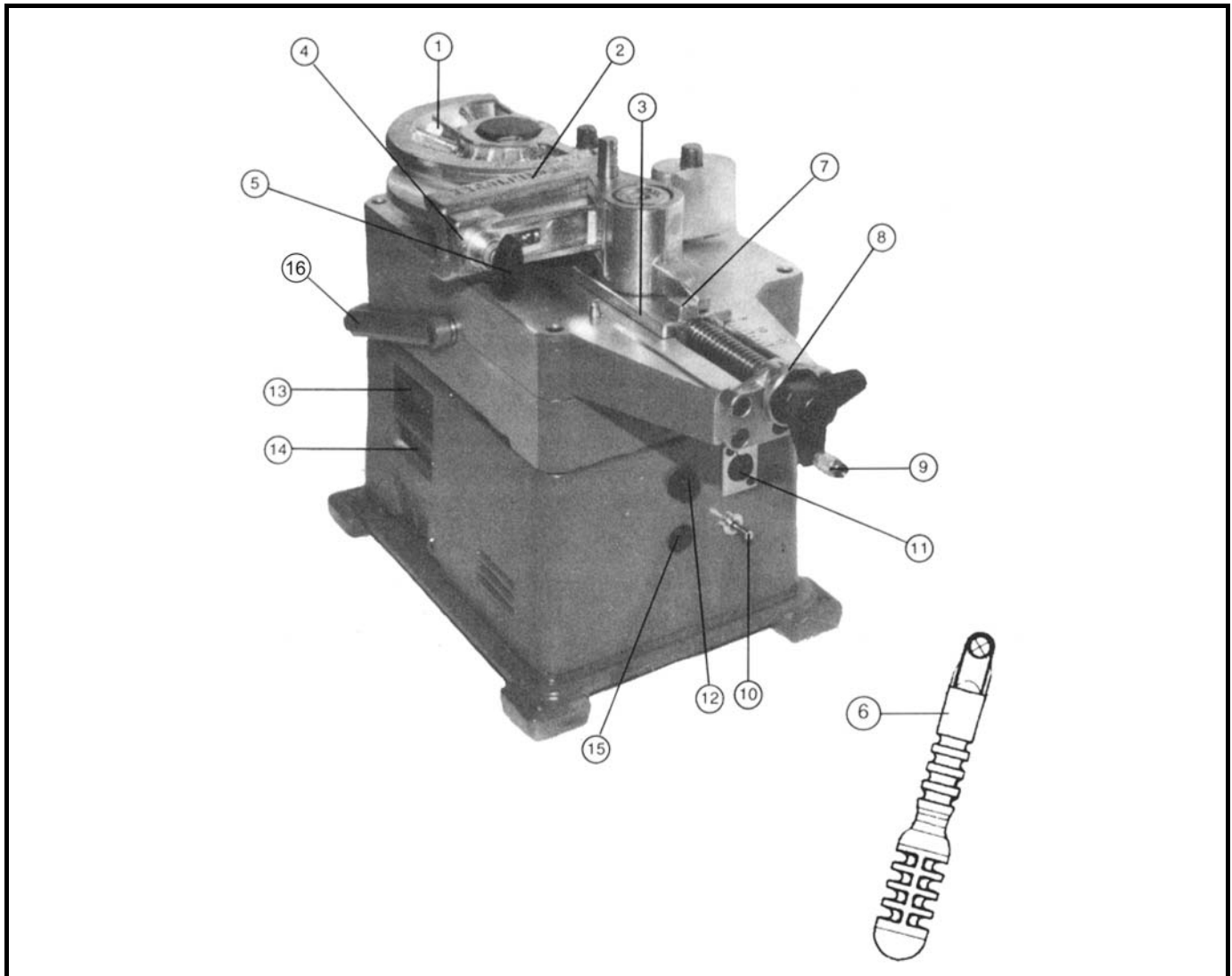
1.2 NOTES ON THE OPERATION

During the first 15/20 bends the machine is in a running-in phase, so it could not be able to bend tubes of maximum capacity. After the running-in phase, the machine may be used for all tubes included in the table.

SECTION II

TECHNICAL DATA

2.1 PART IDENTIFICATION



1	Former	9	Knob
2	Counterbending die	10	Switch
3	Swivelling bracket	11	Foot switch connection
4	Counterbending die support	12	Fuse holder
5	Tightening screw	13	Degree selector
6	Lever	14	Display
7	Stop	15	Overload led
8	Reset ring	16	Handle

Table 2.1.1 – Part identification

2.1.1 FORMER

The information included in the former is:

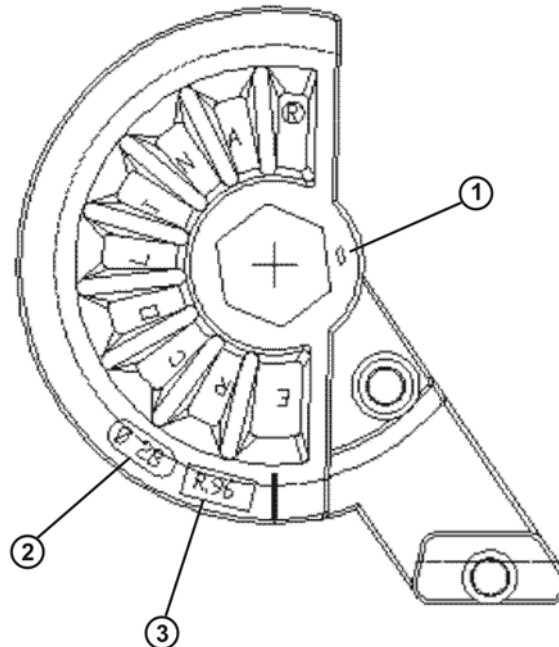
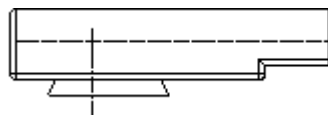


Figure 2.1.1 – Former

- 1 Point of reference “0” for placing the former
- 2 Tube diameter for which the former has been designed
- 3 Former bending radius

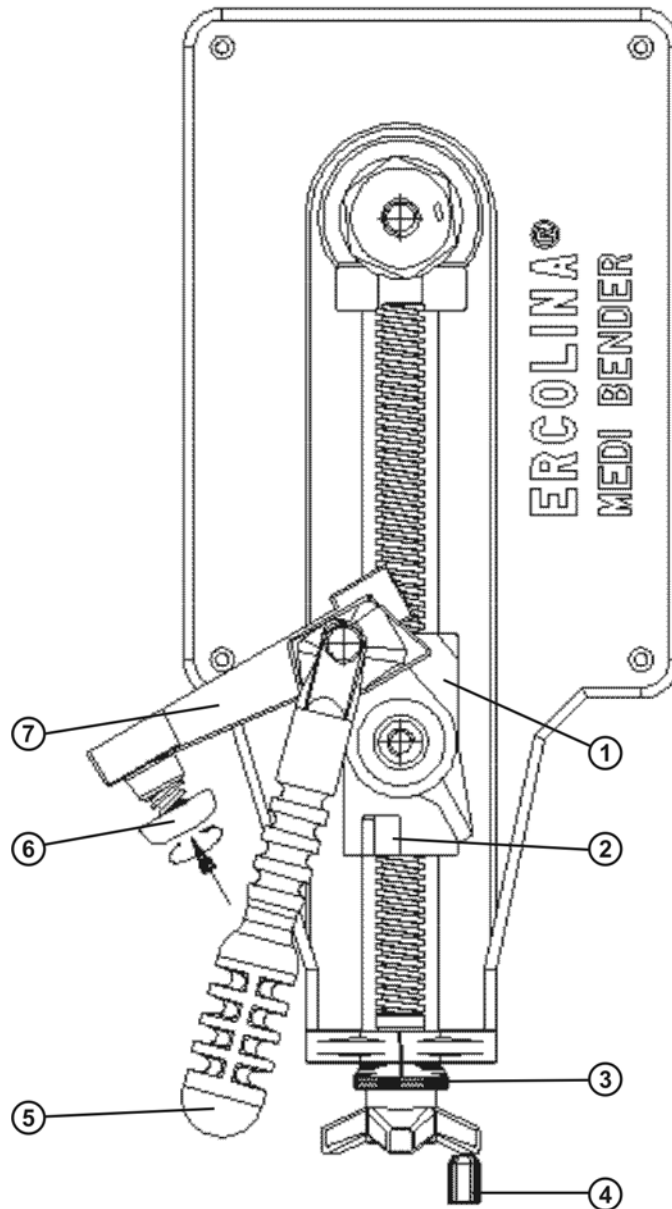
2.1.2 COUNTERBENDING DIE

The information stamped on the counterbending die is regarding the tube dimensions it was designed for.



2.1.3 SLIDER – COUNTERBENDING DIE UNIT

Slider-counterbending die unit elements are indicated in the following figure:



- 1 Swivelling bracket
- 2 Stop
- 3 Reset ring
- 4 Knob
- 5 Lever
- 6 Counterbending die tightening screw
- 7 Counterbending die support

2.2 TECHNICAL DATA

The following data refers to machines:

- ◆ Digital Medi Bender Art. 070;
- ◆ Digital Medi Bender Special Art. 071.

2.2.1 *WORKING CAPACITY*

The machine can bend materials included in the table starting from a minimum diameter of 5 mm, with minimum radius depending on material used, diameter and thickness.

Note: The machine can only bend material types included in the table. The same table indicates maximum capacities.

2.2.2 *MAXIMUM BENDING ANGLE*

The machine is equipped with an electronic system that manages bending operations in an accurate and precise way, saving the set bending angle.

The maximum allowed bending angle on the machine is 180°.

2.2.3 MACHINE CAPACITY

The following table indicates the maximum bending capacity of the Digital Medi Bender Art. 070 and of the Digital Medi Bender Special Art. 071.

The information reported below is approximate and may vary according to the material chemical composition.

MAXIMUM BENDING CAPACITY WITH MINIMUM RADIUS EQUAL TO TWICE THE TUBE Ø					
SECT	MATERIALS	MEDI BENDER ART. 070		MEDI BENDER ART. 071	
		Ø MAX x THICKNESS (mm)	Ø MAX x THICKNESS (inches OD)	Ø MAX x THICKNESS (mm)	Ø MAX x THICKNESS (inches OD)
	Boiler tube	34 x 3	1" gas x 1/8"	22 x 3	1/2" gas x 1/8"
	Mild steel tube	35 x 2,5	1" 3/16 x 7/64"	25 x 2,5	1" x 7/64"
	Soft brass tube	32 x 3	1" 1/4 x 1/8"	28 x 3	1" 3/8 x 1/8"
	Stainless steel	35 x 1,5	1" 3/8 x 1/16"	28 x 1,5	1" 1/8 x 1/16"
	Welded furniture tubing	32 x 1,5	1" 1/4 x 1/16"	28 x 1,5	1" 1/8 x 1/16"
	St35 hydraulic steel tube	35 x 3	1" 3/8 x 1/8"	28 x 1,5	1" 1/8 x 1/16"
	Stainless steel hydraulic tube	35 x 2	1" 3/8 x 5/64"	28 x 1,5	1" 1/8 x 1/16"
	Hard copper and aluminum	42 x 1,5	1" 5/8 x 1/16"	28 x 3	1" 1/8 x 1/8"
	Mild steel solid round profile	20	3/4"	16	5/8"
	Mild steel solid flat profile	10 x 25	3/8" x 1"	----	----
	Mild steel rectangular profile	15 x 25 x 3	5/8" x 1" x 1/8"	----	----
	Mild steel solid square profile	20 x 20	3/4" x 3/4"	----	----
	Mild steel hollow square profile	25 x 25 x 3	1" x 1" x 1/8"	----	----
	Mild steel T profile	30 x 30 x 5	1" 3/16 x 1" 3/16 x 3/16"	----	----
	Mild steel U profile	30 x 15 x 5	1" 3/16 x 1" 5/8 x 3/16"	----	----

Table 2.2.1 – Machine Capacity

2.2.4 HEXAGONAL SHAFT SPEED

The hexagonal shaft speed of the Digital Medi Bender machine is:

Machine	Hexagonal Shaft Speed
Digital Medi Bender Art. 070	2.9 rpm
Digital Medi Bender Special Art. 071	9.0 rpm

Table 2.2.2 – Hexagonal Shaft Speed

2.2.5 ELECTRICAL DATA

Machines must be connected to the power supply it was intended for by design.

Power supply:

Voltage	Frequency	Power	Current
220V	50/60Hz	1000W	5A
110V	50/60Hz	1000W	10A

Table 2.2.3 – Supply Voltage

Insulation level: 1

Motor: electrical motor with double insulation in conformity with EC standards

Protection: protection system with fuses

Model	Fuse	
	General Protection	Electronic Circuit
220V	8A gG	315mA gG
110V	16A gG	630mA gG

Table 2.2.4 – Protection Fuses

Motor overloading protection: automatic electronic blocking at 1000W on all models

2.2.6 DIMENSIONS AND WEIGHT

Machine body:

Machine body	
Machine body without accessories	23Kg
Width	260mm
Length	600mm
Height	900mm

Table 2.2.5 – Dimensions and Weight

Maximum usable former weight: 10Kg

2.2.7 NOISE LEVEL

Emission values on working areas: 82dB(A)

EC DIR. 392/89 – I, 1, 7, 4, F

2.2.8 TECHNICAL NOTES

Machine design and technical specifications may be modified without advice.

SECTION III

MACHINE USE

3.1 MAIN CONCEPTS

Bending angle: Tube bending angle expressed in degrees

Spring back angle: Due to the material elasticity effect the tube tends to “spring back” to its original shape when it is bent

Bending radius: It must not be confused with the angle, it is measured from the tube center to the bending center

The Ercolina system is able to correct the bending angle according to the material used

3.2 ACCESSORIES

Formers and counterbending dies are made of aluminum and steel according to the material to bend. Ask your dealer.

For part identification refer to *Table 2.1.1* included on page 10.

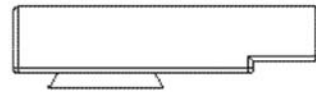
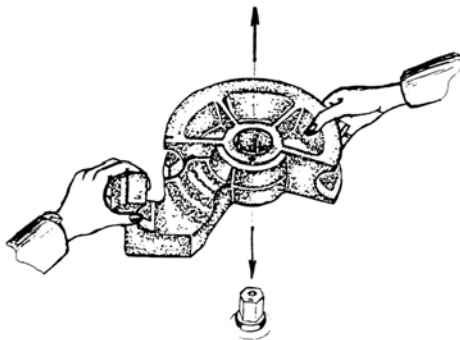
3.2.1 ACCESSORY CHOICE

Choose the correct former and counterbending die to bend your tube. Verify that the external diameter is exactly equal to the one stamped on the former and on the counterbending die.

3.2.2 ACCESSORY ASSEMBLY

Insert former and counterbending die on their respective positions.

Pay attention when installing steel formers: hold the formers from their edge side and NOT from the bottom. Make sure the former point of reference is aligned with the hexagonal shaft point of reference and fix the counterbending die to the support by rotating the small knob.



3.2.3 MACHINE TURNING-ON

The machine turns on as soon as it is connected to a power supply (220 V or 110 V).

Warning: Check that power supply voltage observes the machine design voltage before plugging it to the power supply.

3.2.4 MACHINE PREPARATION

Insert the tube and prepare the swivelling bracket.

Tightly close the tube between the former and the counterbending die using the knob. Align locknut and machine movements without rotating the knob. The indicated position constitutes a point of reference for adjusting clamping.

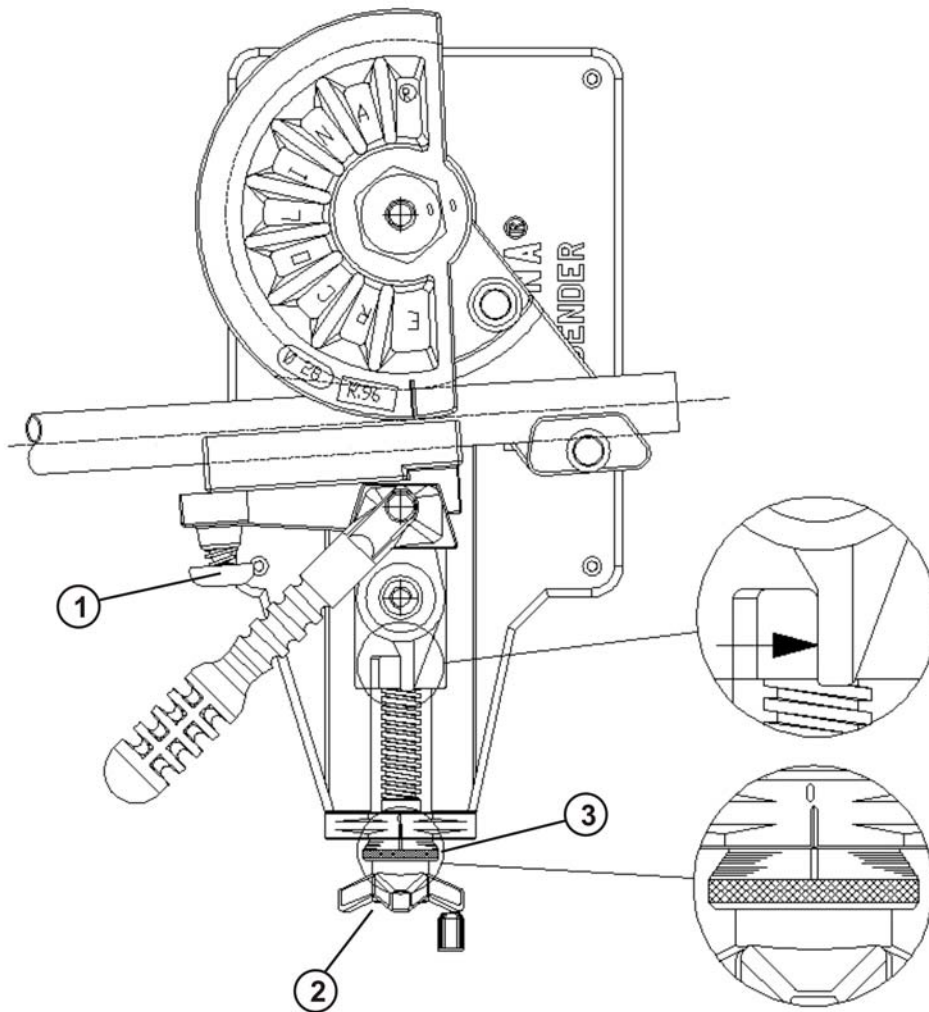


Figure 3.2.3 – Bracket Unit

- 1 Counterbending die insertion handle
- 2 Attaching handle for slider set
- 3 Reset ring

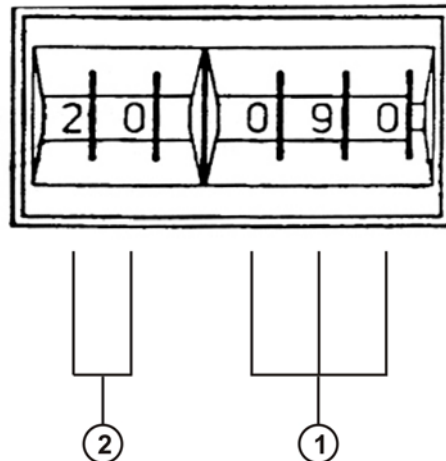
*Note: Press and rotate rightwards to hold.
Rotate leftwards to loosen counterbending die.*

Note: Use the brass knob to speed up the approach

3.3 PROGRAMMING A BEND ON DIGITAL MODELS – ART. 070 AND 071

NOTE. Only for Digital Medi Bender Art. 070 and 071.

Make sure that the hexagonal shaft and the assembled former are set to the reference point. Program the desired angle by setting the central degree setting unit. Once this is done, the machine is ready to perform an angle. If material elasticity is known, also the spring back angle can be programmed on the first two degree selectors. If such value is not known it will be saved later.



- 1 Bending angle selector
- 2 Spring back angle selector

3.4 BENDING OPERATIONS WITH DIGITAL MODELS – ART. 070 AND 071

NOTE. Only for Digital Medi Bender models Art. 070 and 071.

The machine is now ready to bend. To bend observe the following instructions:

- a. Press the switch rightwards [Bend] or press the pedal [Bend]. The former will rotate and the tube will be bent to the angle value. As soon as the bending will be completed the machine will automatically stop and the display will show the bending angle value and the spring back angle value (selected values will be kept in memory even if the machine is turned off).
- b. Press the bend/return switch leftwards [Return] or press the foot switch pedal [Return] and the former will rotate on the other sense returning to the point of reference position, allowing to remove the bent tube.

3.4.1 HOW TO REGAIN THE SPRING BACK ANGLE

Observe the following procedure if the spring back angle has not been selected:

- a. Push the bend/return switch rightwards [Bend] by impulses, or press the pedal [Bend] by impulses until the tube visibly starts to bend.
- b. Stop the bending process and read the angle value shown in the display.
- c. Select the value read on the first two selectors, this is the spring back angle.

- d. Continue the bending process by pressing the bend/return switch rightwards [Bend]. As soon as the bend will be completed the machine will automatically stop and the display will show the bent angle value and the spring back angle (the selected values will be kept in memory even if the machine is turned off).
- e. Press the bend/return switch leftwards [Return] or press the foot switch pedal [Return] and the former will rotate in the other sense returning to the point of reference, allowing the operator to remove the bent tube.

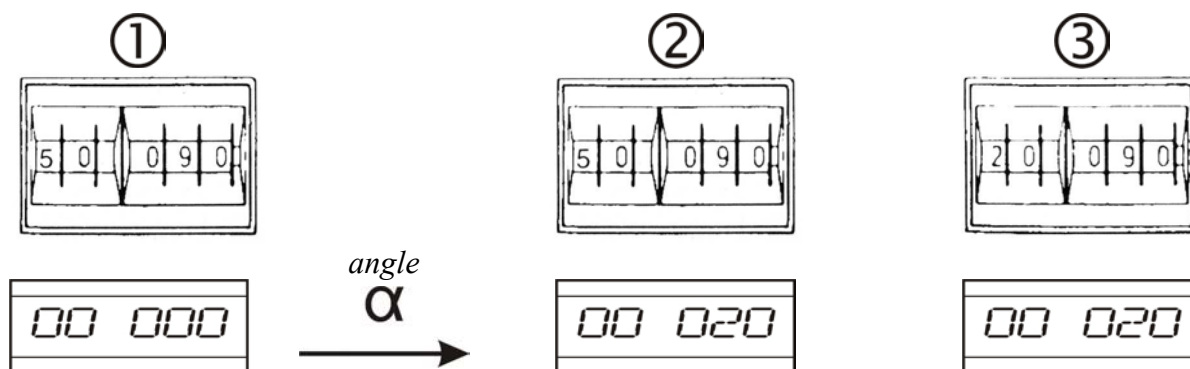
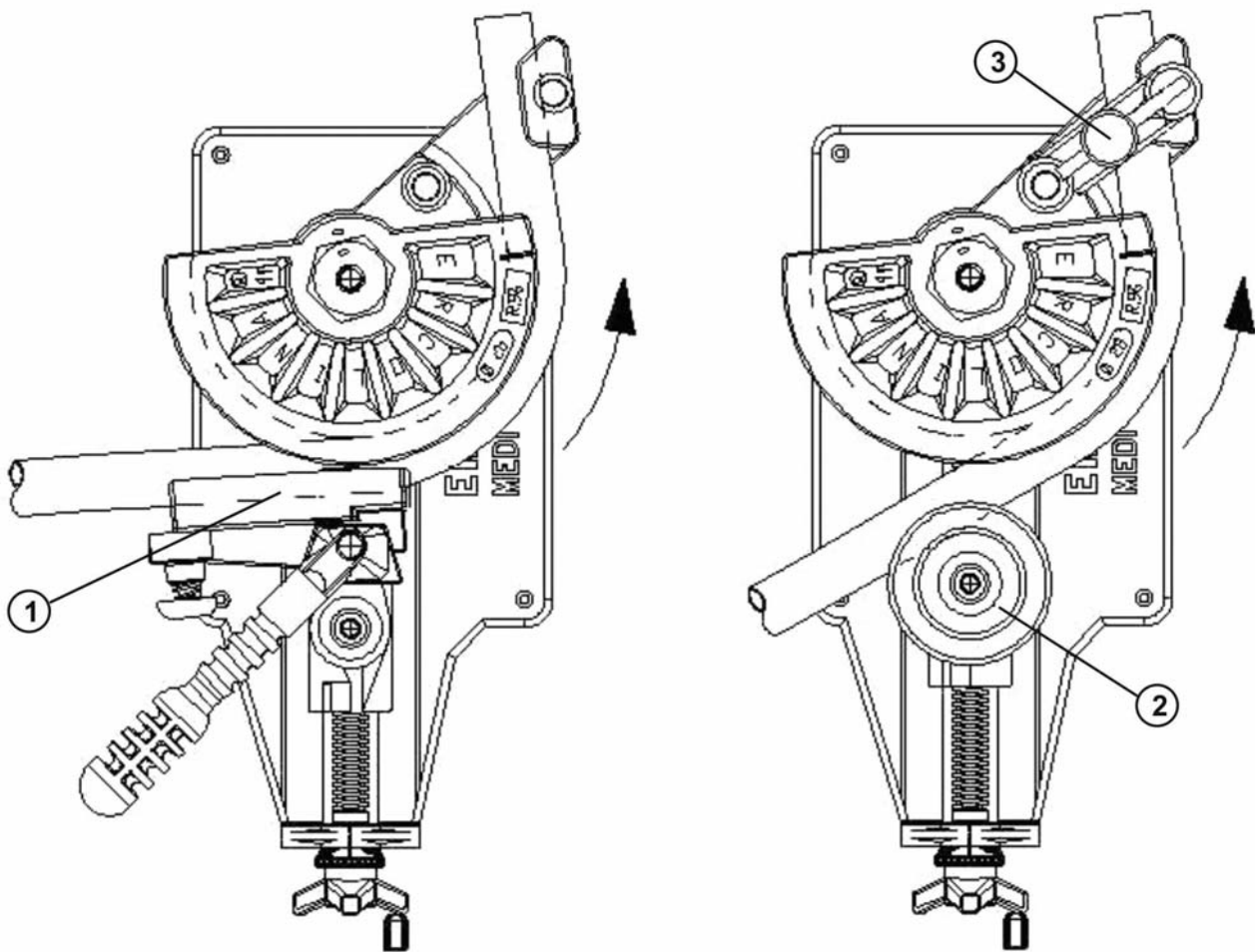


Table 3.4.1 – Spring back angle setting

- 1** Set the bending angle (3 digits to the right of the numerator) ex. 90° and the exceeding spring back angle to 50° (2 digits to the left of the numerator)
- 2** Start the machine until the tube deformation starts (bending starts) and stop the machine
- 3** Read the α angle value on the display (ex. 20°) and copy it on the two digits to the left of the numerator

3.5 EXAMPLES OF CORRECT BENDING WITH THE MEDI BENDER



- 1 Counterbending die
- 2 Roll
- 3 Reinforcement bracket

Note: Only for the roll use!

Rotate the former approximately 30°. Insert the tube. Place the roll on the tube without forcing and then bend.



3.6 MAINTENANCE

Digital Medi Bender – Art. 070

Digital Medi Bender Special – Art. 071

Ordinary Maintenance:

Grease the machine gear box with a greasing pump every 24 working hours.

Extraordinary Maintenance:

Control brush wearing every 800 working hours or at least every 6 months. In case of wear use exclusively spare parts supplied by the manufacturer when replacing them.

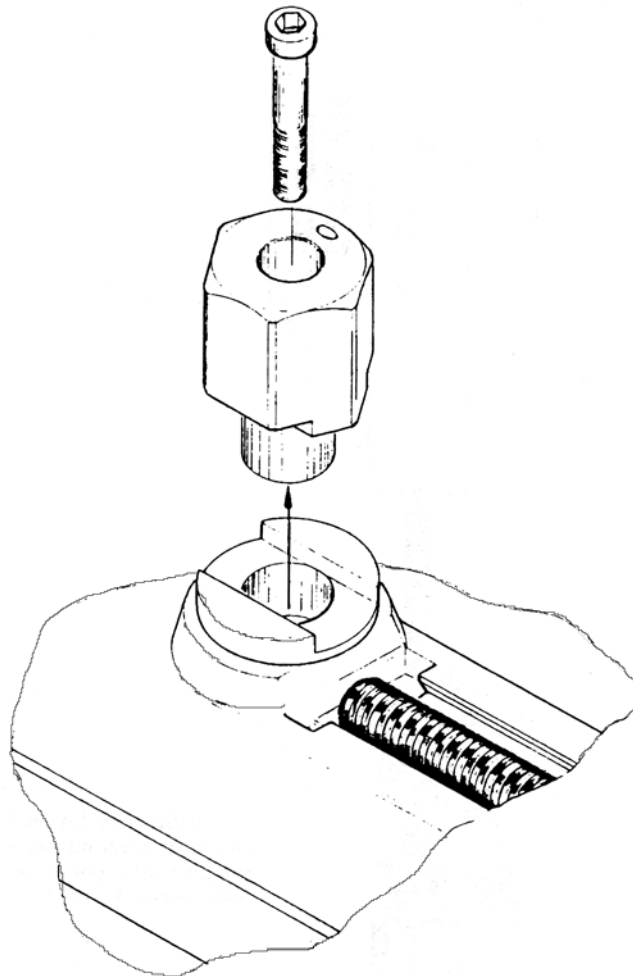
Warning: if brushes are not replaced the motor may be irreversibly damaged!

Any other internal or external machine part replacement or repairing must be only performed by qualified and/or authorized personnel.

The Manufacturer may not supply accessories or spare parts if the machine has been tampered with.

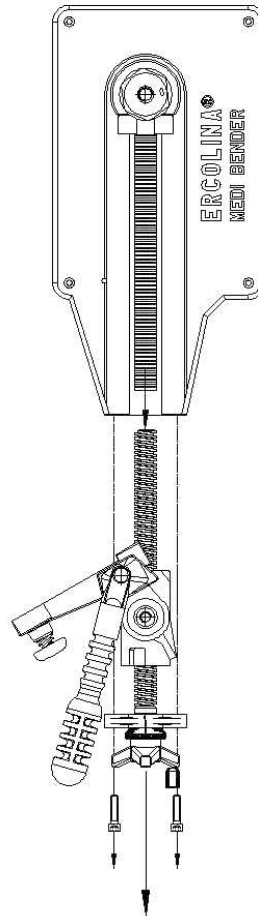
3.7 HOW TO FIT THE SPECIAL HEXAGONAL SHAFT

The special hexagonal shaft installation is only for the machine Art. 070.



Note: Small 10mm to 35mm.radius formers can be inserted by removing the shaft.

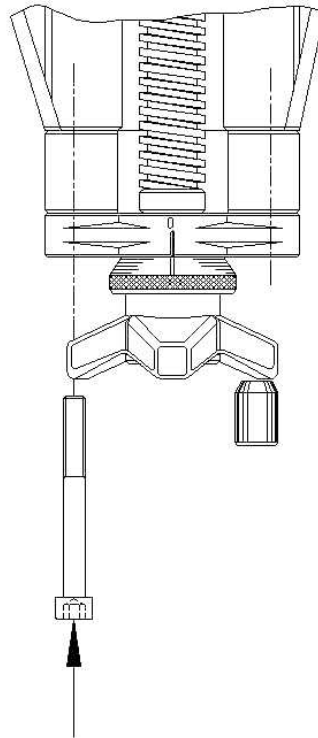
3.8 VICE ASSEMBLY (ACCESSORY)



To insert the vice: loosen the 5 screws and extract the bracket unit to insert the vice Art. 087.

3.9 SPACER FOR SPECIAL RADIUS

The optional spacer must be used to perform bends with special radius (from $R = 130\text{mm}$ to $R = 180\text{mm}$ max).



Loosen the 5 screws M6x55, insert the spacer and re-tighten the knob unit.

SECTION IV

APPENDIXES

4.1 APPENDIX 1

MACHINE OPERATION TROUBLESHOOTING

Note: where not otherwise specified, defects and solutions are valid for all machine models (art. 070 and 071)

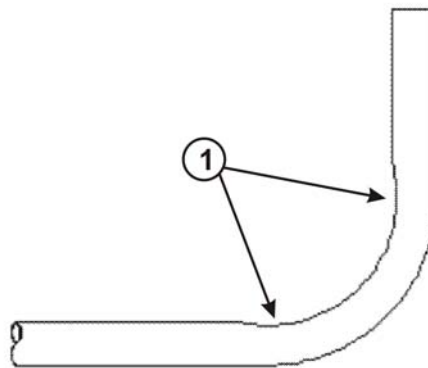
PROBLEM	CAUSE	SOLUTION
The machine does not switch on	Electrical connection	Check plug
The machine does not switch on	Electrical connection	Check electrical wire
The display (on art. 070 and 071) is completely turned off.	Electrical connection	Check plug
The display (on art. 070 and 071) is completely turned off.	Burnt fuse	Check fuse and replace it if necessary.
The machine does not work when the [Bend] button is pressed.	Bending angle not saved.	Select bending angle
The machine art. 070 is blocked and the red led turns on.	Vice power switching button pressed or jammed.	Unblock the vice switching button placed on the machine (to the left of the rack) making sure that it only works when it is pressed.
The machine is blocked and the red led turns on.	Machine in overload	Turn the machine off. Turn the machine on, press the pedal [Return] to release the tube. Use with tubes and materials within machine limits. Use correct tubes and equipment.
The machine (on art. 070 and 071) goes beyond the selected angle and the display shows values that differ from the ones set.	Faulty counter board.	Replace counter board.
The machine goes beyond the selected angle since it does not immediately stop when the selected value is reached.	Defective electronic braking system.	Try to move the former back to the point of reference: if it does not immediately stop when returning back to such position, the power control electronic card must be replaced.

4.2 APPENDIX 2

BENDING WITHOUT PROBLEMS

Bending correctly with the Ercolina system.

1. Always use former and counterbending die of the correct size according to the tube to bend: for example, if the tube external diameter is 30mm, it must be bent with a 30 mm diameter former and 30mm diameter counterbending die.
2. Minimum radius: it depends on the material to bend, its external diameter and thickness. Normally, the minimum radius goes from 2 to 4 times the tube diameter depending on the type of material.
3. Correct tube tightening. Sufficient pressure must be applied to produce flawless bends. If flaws are produced in the inner part of the bend even with a greater pressure, use a former with a larger radius.
4. Verify that there is no flaw on the bent tube. In the contrary, increase the tightening force.
5. Former and counterbending die must never touch each other because the tube may break and the machine may get damaged.
6. Use the special Ercolina grease spray to avoid excessive friction of parts in motion and to improve results.



1 Wrinkles Inner Side Deformation

4.3 APPENDIX 3

BENDING TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
Wrinkles inner side	Low pressure on tube	Apply more pressure on the tube (the maximum pressure is obtained when former and counterbending die are almost touching each other)
Wrinkles inner side	Counterbending die and former touch each other	Move them apart to avoid contact
Wrinkles inner side	Counterbending die and former touch each other	Worn counterbending die. Replace it with a new one
Wrinkles inner side	Former radius is too small	Use a larger radius former
Excessive tube crushing (ovalization)	Excessive tube pressure	Decrease force or use a larger radius former
Excessive curve starting and ending compression	Excessive tube pressure	Decrease force or use larger radius former
The machine is not able to bend a tube because of its chemical composition and it is overloaded	Tube with chemical characteristics exceeding machine capacity	Try bending using the special Ercolina® roll

For any other technical problem regarding bending operations contact your Ercolina® dealer.

4.4 APPENDIX 4

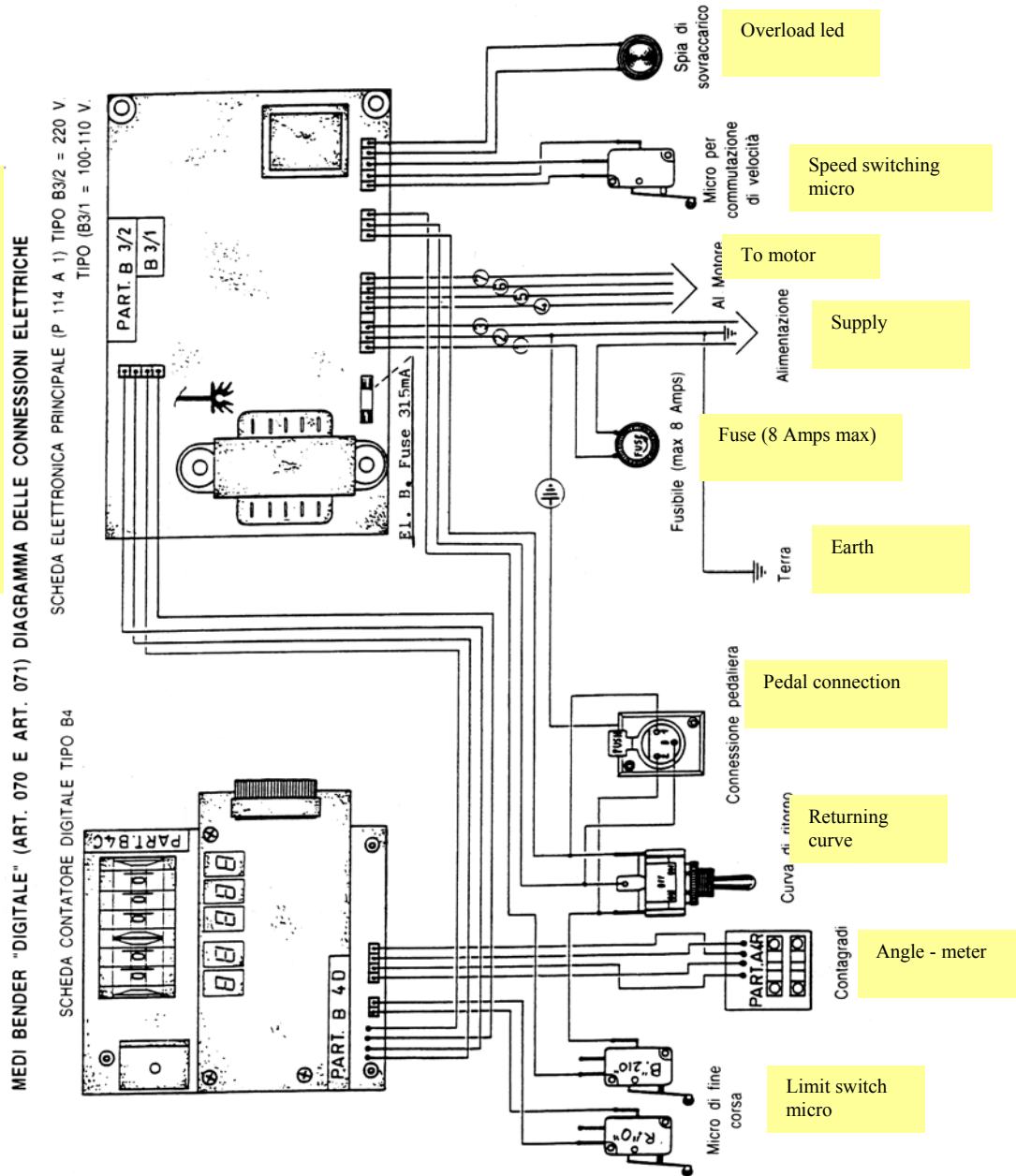
ELECTRICAL DIAGRAM

Digital Medi Bender (Art. 070 and Art. 071) Electrical connection diagram.

Digital counter card type B4.

Main Electronic Card (P114 A1) Type B3/2 = 220 V

Type B3/1 = 100. 110 V





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TUBE TYPE	Φ	WALL	ELASTICITY DEGREE OR SPRING BACK	BENDING RADIUS	
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DATABASE					
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DATABASE					
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<i>Notes</i>	

