EA-76GE-10
(企画課に同じものあり).

ALTA TECNOLOGIA ITALIANA
HIGH ITALIAN TECHNOLOGY

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USE AND MAINTENANCE INSTRUCTIONS BOOK

ELECTRIC / DIGITAL BENDING MACHINES
MOD. UNI 42A/UNI60A - UNI 42A1/UNI60A1

Serial No.:

Construction date:

Manufacturer: C.B.C S.p.A.

Address: Via L. Einaudi, 3
Z.I. San Giacomo
42016 Guastalla (RE)
ITALY

READ CAREFULLY THIS INSTRUCTION MANUAL BEFORE OPERATING THE MACHINE AND ITS TOOLS IN ANY WAY.

CE

ALTA TECNOLOGIA ITALIANA
HIGH ITALIAN TECHNOLOGY

DICHIARAZIONE DI CONFORMITA ALLA DIRETTIVA " MACCHINE"
DECLARATION DE CONFORMITE A LA DIRECTIVE " MACHINES"
DECLARATION OF CONFORMITY TO THE "MACHINES" DIRECTIVE
KONFORMITÄTSERKLÄRUNG NACH DER RICHTLINIE "MASCHINEN"
DECLARACION DE CONFORMIDAD A LA DIRECTIVA "MAQUINAS"

C.B.C. SpA - Via L. Einaudi, 3 - 42016 Guastalla (RE) - ITALIA

Dichiara che la macchina qui riportata
Déclare que la machine désdignée ci-dessous
Declares that the machine described below
Erklärt hiermit, dass die unten aufgeführte Maschine
Declara que la maquina abajo indicada

CURVATUBI ELETTRICA/DIGITALE MONOFASE MOD. UNI42A-A1 / UNI60A-A1
CINTREUSES ELECTRIQUE/DIGITAL MONOPHASE MOD. UNI42A-A1 / UNI60A-A1
ELECTRIC/DIGITAL BENDING MACHINES SINGLE PHASE MOD.UNI42A-A1/UNI60A-A1
ELEKTRISCHE/DIGITAL ROHRBIEGEMASCHINEN MOD. UNI42A-A1 / UNI60A-A1
CURVADORAS ELECTRICA/DIGITAL MONOFASICA MOD. UNI42A-A1 / UNI60A-A1

E' conforme alle disposizioni della Direttiva "Macchine" modificata 89/336/CEE, 89/392/CEE, 7323/CEE, nonchè alle norme EN 50144 D.L. 277/91 e alla sua trasposizone per le leggi nazionali.
Est conforme aux dispositions de la Directive "Machines" modifiée 89/336/CEE, 89/392/CEE, 7323/CEE, aux normes EN 50144 D.L. 277/91 et aux législations nationales la transposant
Conforms to the requirements of the "Machines" Directive 89/336/CEE, 89/392/CEE, 7323/CEE, EN 50144 D.L. 277/91 and to relevant national legislation applicable to the Directive
Mit den Bestimmungen der überarbeiteten Richtlinie "Maschinen" 89/336/CEE, 89/392/CEE, 7323/CEE, EN 50144 D.L. 277/91 und mit den zu deren Umsetzung erlassenen nationalen Gesetzgebungen konform ist
In overeenstemming is met de bepalingen van de nachinerichtlun 89/336/CEE, 89/392/CEE, 7323/CEE, EN 50144 D.L. 277/91 zoals laatsteluk gewuzigd en met nationale bepalingen
Es conforme a las disposiciones de la Directiva "Maquinas" modificada 89/336/CEE, 89/392/CEE, 7323/CEE, EN 50144 D.L. 277/91 y a las legislaciones nationales que la transponen

Basi Ermanno
President

SUMMARY

TRANSPORT AND INSTALLATION

1.1 DIMENSIONS AND WEIGHT

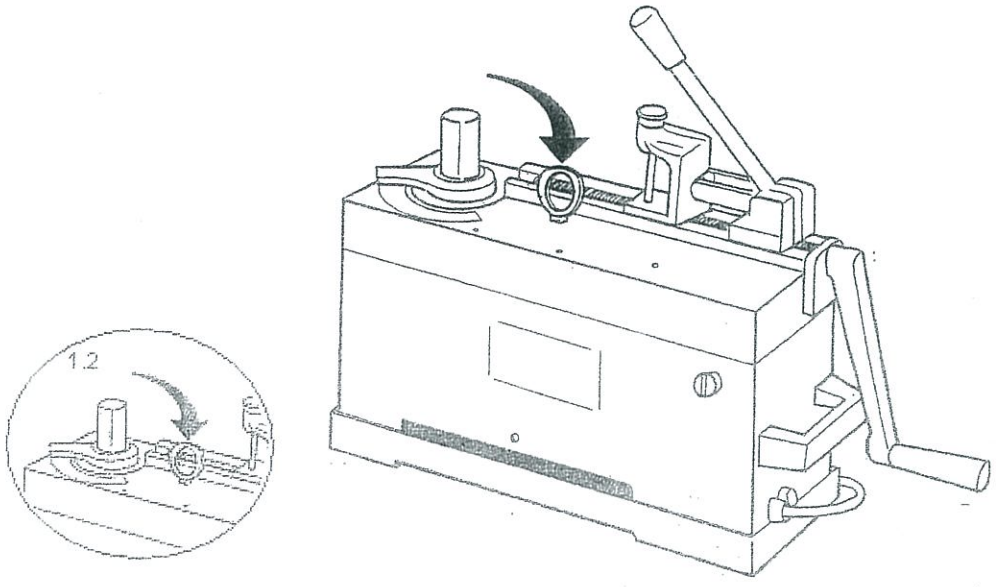
	UNI 42A - A1	UNI 60A - A
Weight kg. about	35	60
Length mm.	520	580
Width mm.	170	210
Height mm.	350	410

1.2 LOAD CENTRE FOR LIFTING

- The load centre of the machine must be set using the lifting eyebolt to be screwed the top casing.
- **The lifting eyebolt must be removed after its installation before operating becau it hampers the working space on the machine.**
- The machine is provided with knobs for the manual movement.

1.3 STORAGE CONDITIONS

- The machine is packed in a carton.
- The machine must be kept in vertical position.
- The vertical position is pointed out on the packing with appropriate diagrams.
- After the machine has been unpacked, use the procedures described in point 1.2, it c be now placed on a flat surface with or without the stand and the universal base (whi are optionals).
- The machine must be placed in a covered and dry place and it is recommended to keep inside the package until the product is delivered or used.



Picture 1.2

2.1 INSTALLATION

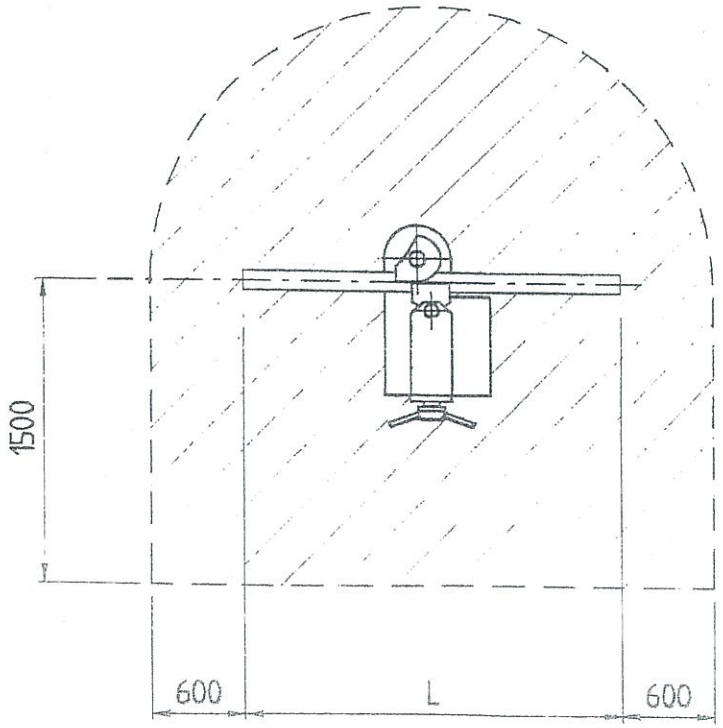
- The machine can be placed on a working table, on the stand or on the universal standard accessories.
- Remove the lifting eyebolt (1.2), from the top casing of the machine after the installation.

2.2 SPACE REQUIREMENTS

- The required area and the safety space of the machine are represented in the drawing.
- Furthermore, it is necessary to foresee the necessary deposit area for the pipes which must be bent and pipes which have already been bent.

2.3 ELECTRIC CONNECTION

- Installed motor on the UNI 42A - A1 ⇒ 0,55 KW
- Installed motor on the UNI 60A - A1 ⇒ 1 KW
- The main power supply is reported on the embossed plate on the machine.
- The outlet cable type SG3 x 1,5 is provided with a die-casting SHUKO pin.
- Before connecting the plug, verify that the power outlet corresponds to the same voltage of the machine.



Picture 2.2

L = MAX. LENGTH OF THE PIPE IN THE MOST CUMBERSOME POSITION

3.0 FUNCTIONAL DESCRIPTION

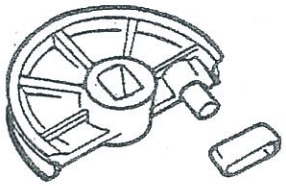
The UNI42A/UNI42A and UNI 42A1/UNI 60A1 electric benders are portable mach suitable to bend metal pipes with bending angles from 0° up to 180°. The are made up reduction gearbox driven by electric motor with outlet shaft on which bending forr are mounted (one for each tube outside diameter) and of a quick positioning de suitable to position the conterformer to tighten and compress the pipe against former.
By operating the motor, the special former mounted on the outlet shaft makes programmed rotation which corresponds to the required bending angle of the pipe.
The machine is provided with several accessories whose functional description is stated in point 3.2. The machine various operations are described in point 4.2.

3.1 STRUCTURE

* Fusion reduction gear boxes contain a gear reduction ratio of about 4000 : 1
* Asyncronous induction motor 220V. 50 Hz. input.
* Metric holder shaft outlet.
* Quick-positioning device: it is used for bending without mandrel to make counterformer or guide for rolls, lock and unlock quicker.

3.2 ACCESSORIES DESCRIPTION

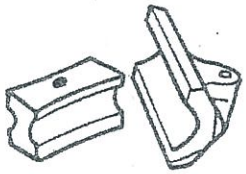
3.2.1 FORMER OR BENDING DIE + RING



Former in aluminium or in cast-iron complete with ring for bending without mandrel with standard radii(3 or 4xO.D.). Each former is marked:

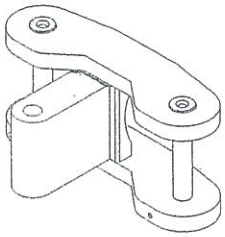
- External diameter of the pipe in mm./inches/GAS inches
- Centreline bending radius in mm.

3.2.2 COUNTERFORMER



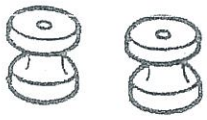
It is used for bending thin-wall pipes. Each counterformer is marked with pipe's diameter in mm./inches/Gas inches.

3.2.3 GUIDE FOR TWO ROLLS:



The special guide for rolls must be used for bending pipes with thickness over 2.5 mm. (it must be used with 2 rolls according to pipe's diameter). This special guide avoids pipe's exterior flattening and places less strain on the bending system.

3.2.4 PAIR OF ROLLS

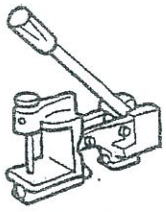


A pair of rolls is used together with the special guide for rolls (two for each diameter).

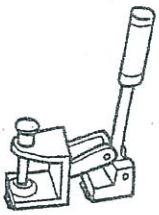
3.2.5 REINFORCING TIE-ROD

It is used for connecting strictly the former axis with the pipe's axis or the counterformer during operations which involve high stress.
(Only for mod. UNI 60A and UNI60A1).

3.2.6 QUICK COUNTERFORMER POSITIONING DEVICE



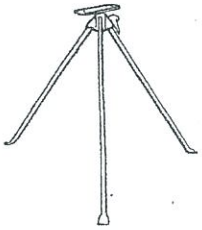
Mod. UNI 42A -A1

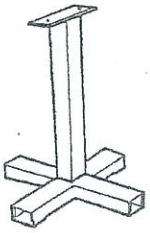


Mod. UNI 60A- A1 (1 hole)

Quick counterformer positioning device: it is used to make the counterformer or roll lo and unlock faster.

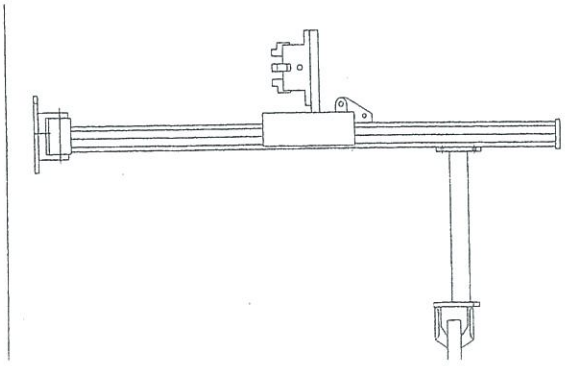
3.2.7 FOLDING STAND AND UNIVERSAL BASE





The folding stand in metal profile and the universal base are used for a corre installation of the bending machine.

3.2.8 POSITIONING LENGTH AND PLANE STOPS TABLE.



The moving arm complete with chuck, to be used for doing bends in sequence different planes at different legt which need to be repeated for more th one time. It is supplied with stops control the required planes and distanc between bends.

3.3 ELECTRIC CONTROLS (6.2)

3.3.1 POWER PANEL 220V 50HZ PROTECTION DEGREE IP 55

It is fitted inside the reducer boxes bed.

3.3.2 CONTROL BOARD

Electronic card fitted inside the reduction gear box.

3.4 RISKS ANALYSIS AND ADOPTED SOLUTIONS

3.4.1 ELECTRIC FIGARATION

The panel (described in point 3.3) is designed and built in conformity with the normative law of electromagnetic compatibility. Other measures are described in point 4.6.6.

3.4.2 HAND CRUSHING

Measure described in points 4.2A, 4.6.5.

3.4.3 ENTRAPMENT OF CLOTHES AND HAIR

Measure described in points 4.6.8.

3.4.4 NOISE POLLUTION

Some devices such as the induction motor, which makes a max. interior noise of 85 dB (A), have been adopted during the planning stages.

3.4.5 RETURN OF THE COUNTERFORMER DURING THE BENDING

Measure described in point 4.6.2.

3.4.6 NOT CORRECT POSITIONNING OF THE GUIDE OR THE ROLLER

Measure described in point 4.6.3.

3.4.7 SPRING BACK OF THE PIPE AFTER THE BENDING

Measure described in point 4.6.4.

4.1 BENDING CAPACITY

It is reported in the table 4.1 first.
The equipment must be used according to the specifications described in the followi tables:

4.1 second	pipes with dimensions in mm
4.1 third	pipes with dimensions in inches
4.1 fourth	pipes with dimensions in Gas inches
4.1 fifth	pipes with small radii

IMPORTANT

The reinforcing tie-rod point 3.2.5, (only for mod. UNI 60A-A1), is used when t diameter of the pipe to bend is equal or bigger than the result obtained from t difference between the maximum bending capacity stated in the table 4.1 first (also the basis of the type of pipe) and the fixed value of 15 mm.

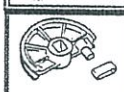
⇒ **Example**: STAINLESS steel pipe with maximum diameter 48mm. (48-15) = 33 mm; t tie-rod must be used from diameter 33 up to diameter 48.

BENDING CAPACITY UNI42A -A1	Table	4.1 first
TYPE OF PIPE	Ø < / = mm	THICKNESS < / = mm
Hard and soft copper pipes, annealed brass pipe	42	1,5
Electrical conduit	38	-
Stainless steel AISI 304/316	35	2
Hydraulic steel pipes ST. 35,4 for hydraulic plants	42	-
Furniture tube	42	1,5
PE Boiler pipes	42	1,5
Aluminium pipes	42	1,5
	63	standard
Gas pipes UNI 5745	1"1/4	standard
Standard centreline bending radius	3 to 4 times Ø	

BENDING CAPACITY UNI 60A - A1	Table	4.1 first
TYPE OF PIPE	Ø < / = mm	THICKNESS < / = mm
Hard and soft copper pipes, annealed brass pipe	54	4
Electrical conduit	54	2
Stainless steel AISI 304/316	48	3
Hydraulic steel pipes ST. 35,4 for hydraulic plants	54	4
Furniture tube	54	3
PE Boiler pipes	54	4
Aluminium pipes	54	5
	63	standard
Gas pipes UNI 5745	1"1/2	standard
Standard centreline bending radius	3 to 4 times Ø	

NOTE: FORMER RADIUS IS EXPRESSED AS CENTRELINE RADIUS

Table 4.1 Second

 Ø mm	R	 (mm.) min.	max.		 min.	(mm.) max.	
6	30	1	2	/	2,5	> 2,5	/
8	30	1	2	/	2,5	> 2,5	/
10	30	1	2	/	2,5	> 2,5	/
10	40	1	2	/	2,5	> 2,5	/
12	36	1	2	/	2,5	> 2,5	/
12	48	1	2	/	2,5	> 2,5	/
14	42	1	2	/	2,5	> 2,5	/
14	56	1	2	/	2,5	> 2,5	/
15	45	1	2	/	2,5	> 2,5	/
15	60	1	2	/	2,5	> 2,5	/
16	48	1	2	/	2,5	> 2,5	/
16	64	1	2	/	2,5	> 2,5	/
17	51	1	2	/	2,5	> 2,5	/
17	68	1	2	/	2,5	> 2,5	/
18	54	1	2	/	2,5	> 2,5	/
18	72	1	2	/	2,5	> 2,5	/
19	57	1	2	/	2,5	> 2,5	/
19	76	1	2	/	2,5	> 2,5	/
20	60	1	2	/	2,5	> 2,5	/
20	80	1	2	/	2,5	> 2,5	/
22	66	1	2	/	2,5	> 2,5	/
22	88	1	2	/	2,5	> 2,5	/
24	72	1	2	/	2,5	> 2,5	/
24	96	1	2	/	2,5	> 2,5	/
25	75	1	2	/	2,5	> 2,5	/
25	100	1	2	/	2,5	> 2,5	/
26	78	1	2	/	2,5	> 2,5	/
26	104	1	2	/	2,5	> 2,5	/
28	84	1	2	/	2,5	> 2,5	/
28	112	1	2	/	2,5	> 2,5	/
30	90	1	2	/	2,5	> 2,5	/
30	120	1	2	/	2,5	> 2,5	/
32	96	1	2,5	/	3	> 3	/
32	128	1	2,5	/	3	> 3	/
34	102	1	2,5	/	3	> 3	/
34	136	1	2,5	/	3	> 3	/
35	105	1	2,5	/	3	> 3	/
35	140	1	2,5	/	3	> 3	/
37	111	1	2,5	/	3	> 3	/
37	148	1	2,5	/	3	> 3	/
38	114	1	2,5	/	3	> 3	/
38	152	1	2,5	/	3	> 3	/
40	120	1	2,5	/	3	> 3	/
40	160	1	2,5	/	3	> 3	/
42	126	1	1,5	/	2	> 3,5	/
42	168	1	1,5	/	2	> 3,5	/
45	135	1	1,5	/	2	> 3,5	/
45	180	1	1,5	/	2	> 3,5	/
50	150	1	1,5	/	2	> 3,5	/
50	200	1	1,5	/	2	> 3,5	/
54	162	1	1,5	/	2	> 3,5	/
54	216	1	1,5	/	2	> 3,5	/
63	240	standard		/	-	-	-

ATTENTION

- Formers in aluminium must be used **only** with counterformers. They are used for bending hard and soft copper pipes, aluminium, annealed brass pipes and electrical conduits.
- Cast-iron formers can be used either with the counterformers or guide for rolls and are used for bending hard copper, steel, stainless steel hydraulic, furniture tube and GAS pipe.

Table 4.1 Third

Ø "	R (mm)	mm. min.	mm. max.		mm. min.	mm. max.	
1/4	R 3D (6,35)	1	2	/	2,5	> 2,5	/
5/16	R 3D (7,94)	1	2	/	2,5	> 2,5	/
3/8	R 3D (9,52)	1	2	/	2,5	> 2,5	/
1/2	R 3D (12,70)	1	2	/	2,5	> 2,5	/
1/2	R 4D (12,70)	1	2	/	2,5	> 2,5	/
5/8	R 3D (15,88)	1	2	/	2,5	> 2,5	/
5/8	R 4D (15,88)	1	2	/	2,5	> 2,5	/
3/4	R 3D (19,05)	1	2	/	2,5	> 2,5	/
3/4	R 4D (19,05)	1	2	/	2,5	> 2,5	/
7/8	R 3D (22,22)	1	2	/	2,5	> 2,5	/
7/8	R 4D (22,22)	1	2	/	2,5	> 2,5	/
1"	R 3D (25,40)	1	2	/	2,5	> 2,5	/
1"	R 4D (25,40)	1	2	/	2,5	> 2,5	/
1"1/8	R 3D (28,58)	1	2	/	2,5	> 2,5	/
1"1/8	R 4D (28,58)	1	2	/	2,5	> 2,5	/
1"1/4	R 3D (31,75)	1	2,5	/	3	> 3	/
1"1/4	R 4D (31,75)	1	2,5	/	3	> 3	/
1"3/8	R 3D (34,92)	1	2,5	/	3	> 3	/
1"3/8	R 4D (34,92)	1	2,5	/	3	> 3	/
1"1/2	R 3D (38,10)	1	2,5	/	3	> 3	/
1"1/2	R 4D (38,10)	1	2,5	/	3	> 3	/
1"5/8	R 3D (41,28)	1	1,5	/	2	> 3,5	/
1"5/8	R 4D (41,28)	1	1,5	/	2	> 3,5	/
1"3/4	R 3D (44,45)	1	1,5	/	2	> 3,5	/
1"3/4	R 4D (44,45)	1	1,5	/	2	> 3,5	/
1"7/8	R 3D (47,62)	1	1,5	/	2	> 3,5	/
1"7/8	R 4D (47,62)	1	1,5	/	2	> 3,5	/
2"	R 3D (50,80)	1	1,5	/	2	> 3,5	/
2"	R 4D (50,80)	1	1,5	/	2	> 3,5	/
2"1/8	R 3D (53,98)	1	1,5	/	2	> 3,5	/
2"1/8	R 4D (53,98)	1	1,5	/	2	> 3,5	/

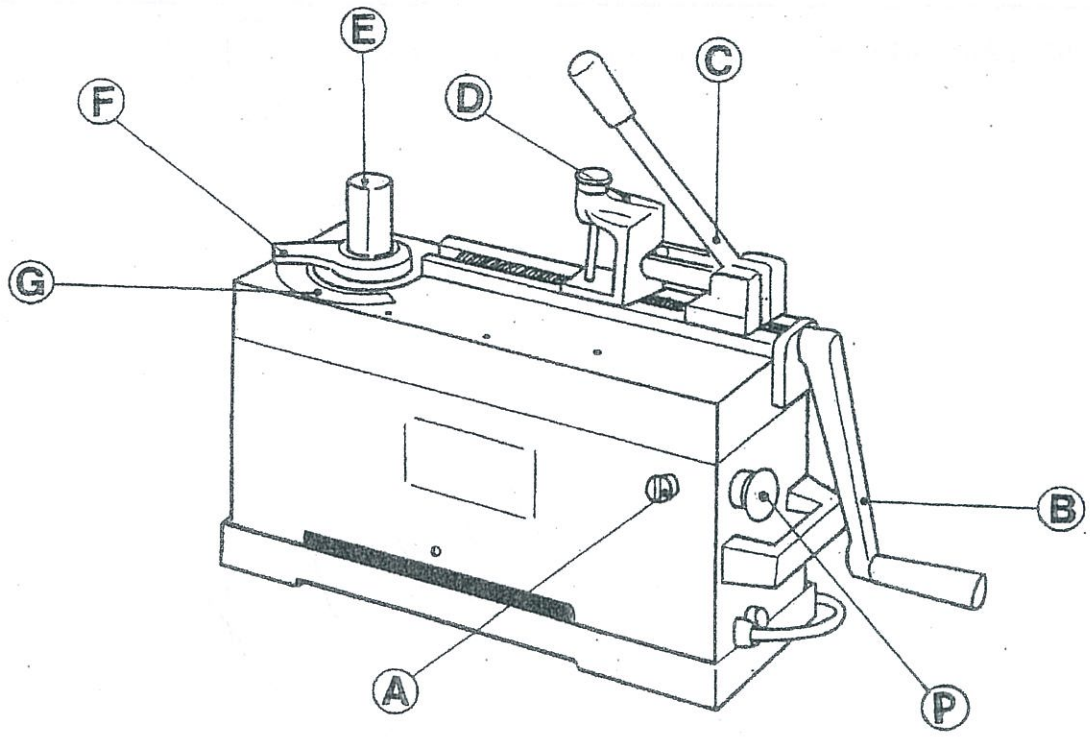
Table 4.1 fourth

Ø " GAS	mm	mm
1/4	47	13,72
3/8	53,5	17,2
1/2	59	21,3
3/4	78	26,9
1"	100	33,70
1"1/4	157	42,25
1"1/2	199,5	48,2

Table 4.1 finfth

Ø mm min.	Ø mm max.	min.	max (mm)
12	20	2D	43
22	30	2D	61
32	38	2D	76
40	42	2D	91
42	45	2D	128

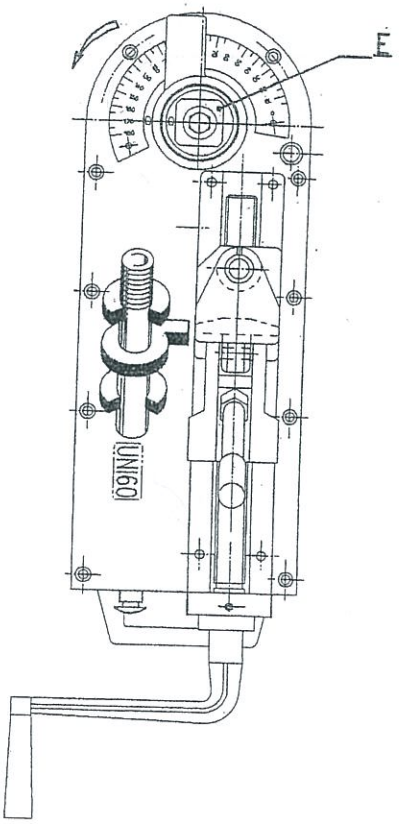
4.2 DRIVES DESCRIPTION



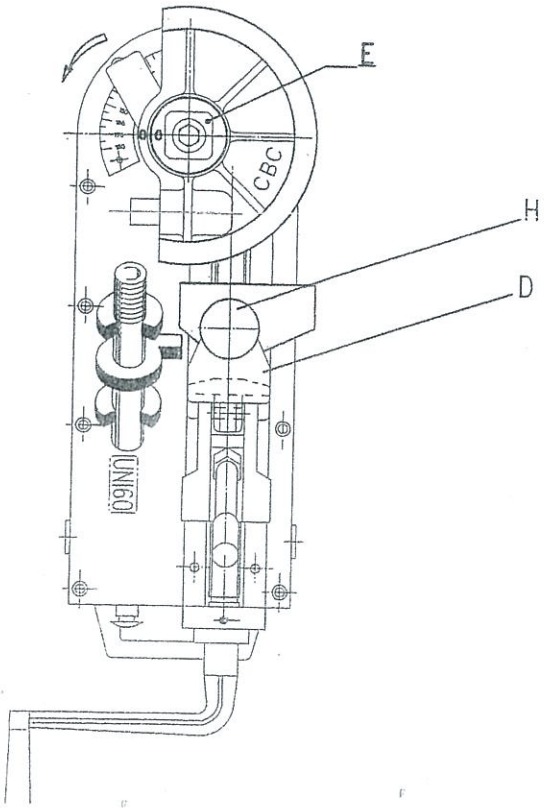
DRIVES ARE:	
A	2-hands security button for cycle control, the button must be kept pressed during all the bending stages. The return to the control-die pin in the starting position is driven with an impulse on the 2-hand drive buttons. The former is placed back in the starting position by hand.
B	Roll or counteformer adjustment hand-wheel
C	Quick-positioning lever of the counterformer or support of roll
D	Guide support for roll
E	Outlet shaft and former-clutch
F	Bending angle positioning stop
G	Angle of bend degree reader
P	Emergency stop button

4.3 BENDING OF THIN-WALL PIPES - USE WITH COUNTERFORMER

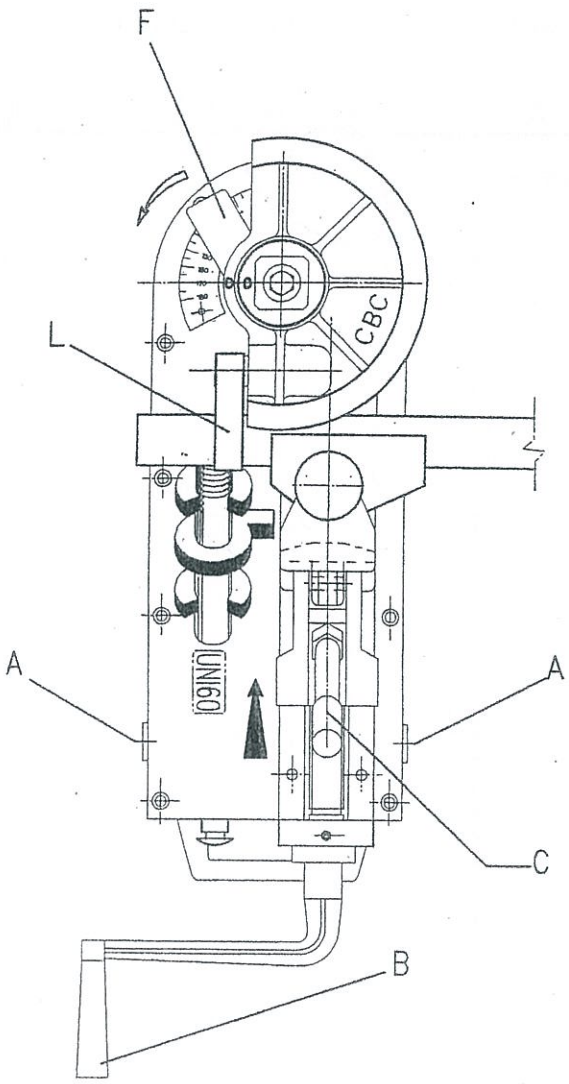
Designed to bend hard copper and thin pipes (max. thickness 1,5 mm.)



- Turn shaft "E" anticlockwise till st
  end.



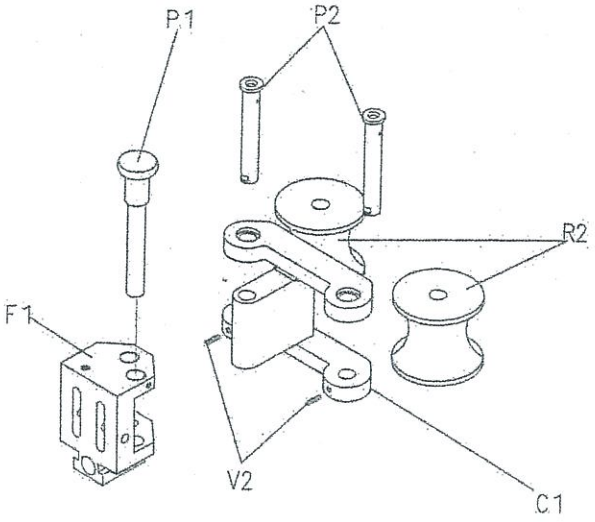
- Place the former, according to desired size, on the shaft "E".
- Place the counterformer into jaw and insert the pin H.
- Make sure that "0" on the for matches the "0" on the shaft



- Push lever "C" forward in the direction of arrow.
- Bring the counterformer closer to the former rotating the crank-lever "B" , leaving a gap for inserting the pipe.
- Place the pipe as shown; insert the locking ring "L" into the pipe and former pin.
- For a good bending result, move the counterformer forward against the pipe, to get rid of any play among former, pipe and counterformer.
- Select the desired bending angle using the ring with indicator "F", situated on the graduated angle of bend scale.
- Push simultaneously the 2 start-buttons "A" till the end of the bending cycle. By keeping the 2 buttons pressed for some seconds, the machine will automatically return to its starting position.
- Unlock the bent pipe; then release the counterformer in the starting position using the lever "C".
- Remove the pipe and bring the former to its starting position by manually turning it anticlockwise.

4.4 BENDING OF THICK-WALL PIPE - USING THE GUIDE FOR 2 ROLLS

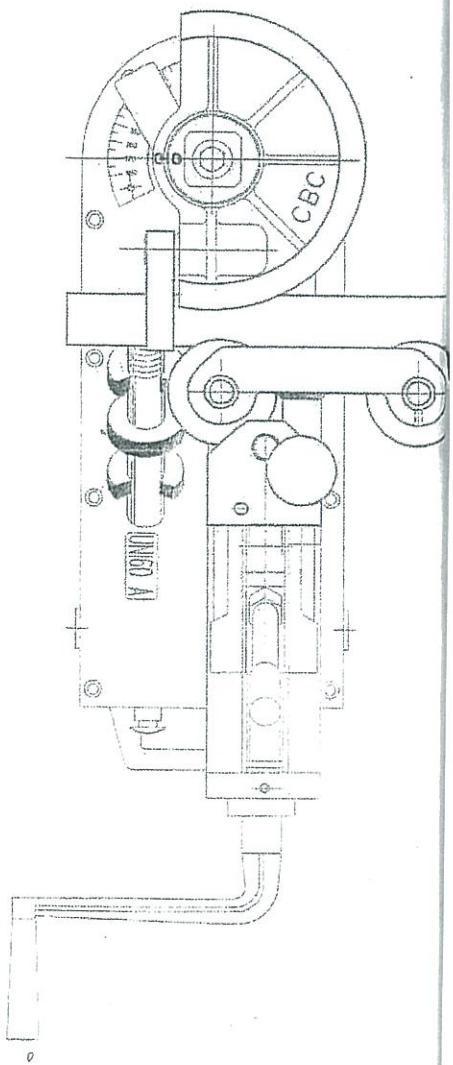
Designed to bend hydraulic or gas pipes, and pipes with min. thickness 2 mm.



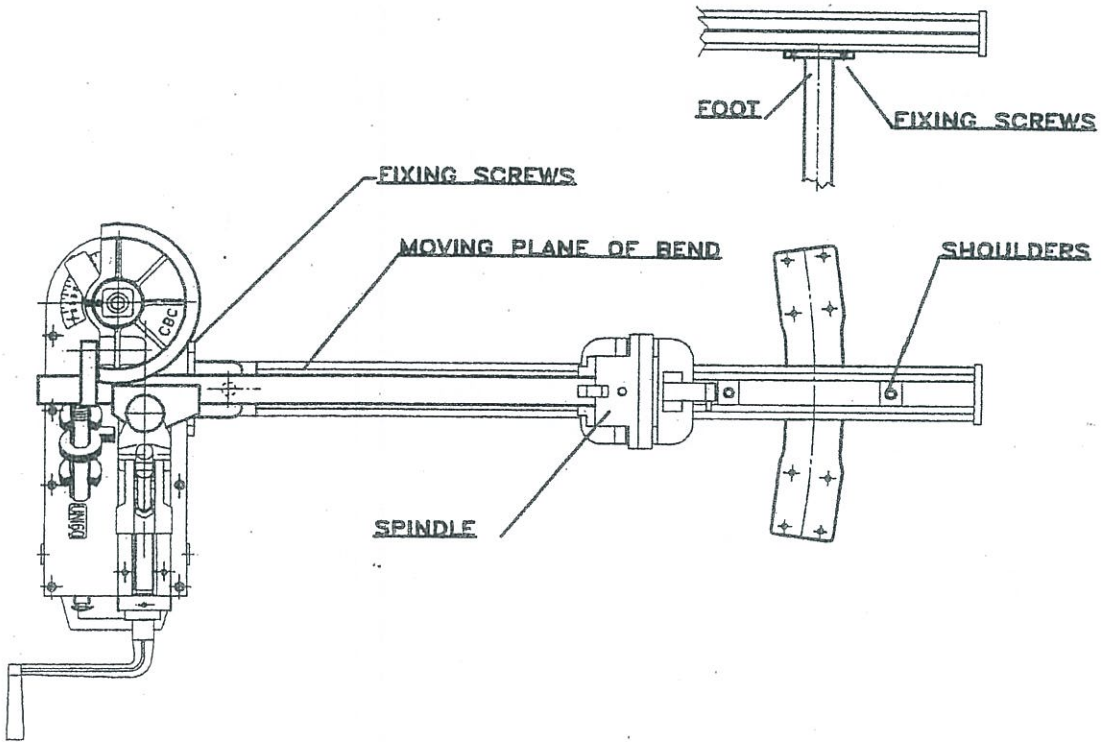
Put rolls (R2) in the special guide's boc
(C1) and fix them through the pins (P2) t
be screwed with 2 screws (V2). Put th
complete guide in the counteforme
support hole (F1) and fix it with the pi
(P1).

When special guide for two rolls is ready for use, bring it close to the pipe without applying any pressure.

Now the machine is ready for the bending cycles.



4.5 BENDING WITH THE BENDS POSITIONING TABLE ACCESSORY



- Install the foot positioning it about 20/30 cm from the edge; fix it with screws.
- Fix the moving plane table on the right side of the machine using screws to be fitted in the opposite holes.

4.6 INFORMATION ON DANGERS

4.6.1

Verify that point "0" of the former fitted in the outlet shaft corresponds to its "0".

4.6.2

During the quick-approach of the counterformer support, verify that the lever is loc
(completely pressed down).

4.6.3

Verify that the pin for the counterformer (or for the special guide for two rolls
correctly fitted and the support hook is tight.

4.6.4

For thick-pipes, at the end of the bend cycle, the machine maintains a certain potei
energy due to the spring back of the pipe; in this case it is necessary to remove
counterformer rotating the crank lever.

4.6.5

Moving parts of the machine can be dangerous for the hands of the worker. Do not mo
the two hand button operation system.

4.6.6

Verify that the cable is not damaged.

4.6.7

The stated noise value of 75 dB is measured from 1 meter distance, and 1,6 m from
ground.

4.6.8

Do not wear loose clothes or ties and wear your hair very short or place them inside a
net.

4.7 NON-ALLOWED USES

- Do not exceed the pipes dimensions stated in the table 4.1 first; do not use bending equipment in a different way from that indicated on tables 4.1 second, 4.1 third, 4.1 fourth and 4.1 fifth.

- Do not use different procedures from those listed in points 4.3, 4.4,4.5.

4.8 PUTTING OUT SERVICE (DISCHARGE)

4.8.1

The machine must be installed and taken to an equipped area.
Dismount the machine separating the metallic parts according to the type of material (iron, aluminium, brass) from the electric parts. It is not necessary to recuperate the lubricants given, the fact is that they are of an insignificant quantity.

4.8.2

The metallic parts can be destined to foundries.

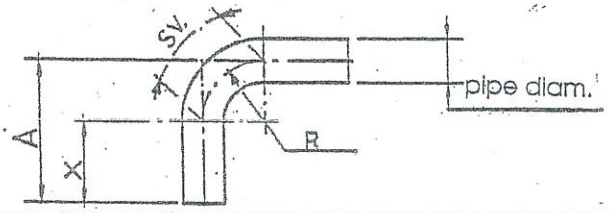
The electric part consisting of metals and plastic (motors, cables, instruments) must be destined to authorized discharging services.

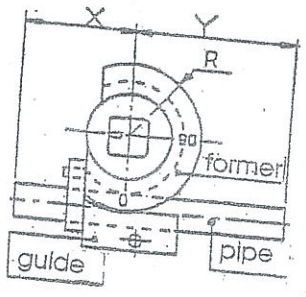
TABLE OF PIPE DEVELOPMENT ON BENDING RADII

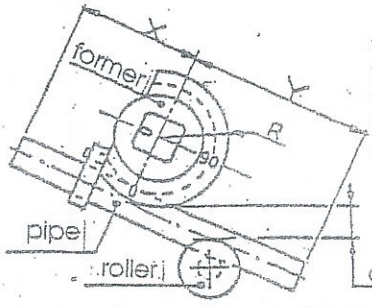
PIPE diam.	R= 2 x D	90° SV.	X	Y	R= 3 x D	90° SV.	X	Y	R= 4 x D	90° SV.	X	
Ø 10					30	47	A - 30	X + 47	40	63	A - 40	X +
Ø 12	24	37,5	A - 24	X + 37,5	36	56.5	A - 36	X + 56.5	48	75	A - 48	X +
Ø 14	28	44	A - 28	X + 44	42	66	A - 42	X + 66	56	88	A - 56	X +
Ø 15	30	47	A - 30	X + 47	45	70.5	A - 45	X + 70.5	60	94	A - 60	X +
Ø 16	32	50	A - 32	X + 50	48	75	A - 48	X + 75	64	100.5	A - 64	X +
Ø 17	34	53	A - 34	X + 53	51	80	A - 51	X + 80	68	106.5	A - 68	X +
Ø 18	36	56,5	A - 36	X + 56.5	54	84.5	A - 54	X + 84.5	72	113	A - 72	X +
Ø 19	38	59,5	A - 38	X + 59.5	57	89.5	A - 57	X + 89.5	76	119	A - 76	X +
Ø 20	40	62,5	A - 40	X + 62.5	60	94	A - 60	X + 94	80	125.5	A - 80	X +
Ø 22	44	69	A - 44	X + 69	66	103.5	A - 66	X + 103.5	88	138	A - 88	X +
Ø 24	48	75	A - 48	X + 75	72	113	A - 72	X + 113	96	150	A - 96	X +
Ø 25	50	78,5	A - 50	X + 78.5	75	117.5	A - 75	X + 117.5	100	157	A -100	X -
Ø 26	52	81,5	A - 52	X + 81.5	78	122	A - 78	X + 122	104	163	A -104	X -
Ø 27	54	84,5	A - 54	X + 84.5	81	127	A - 81	X + 127	108	169.5	A -108	X -
Ø 28	56	87,5	A - 56	X + 87.5	84	131.5	A - 84	X + 131.5	112	175.5	A -112	X -
Ø 30	60	94	A - 60	X + 94	90	141	A - 90	X + 141	120	188	A -120	X -
Ø 32	64	100	A - 64	X + 100	96	150	A - 96	X + 150	128	201	A -128	X -
Ø 34	68	106	A - 68	X + 106	102	160	A - 102	X + 160	136	213	A -136	X -
Ø 35	70	109,5	A - 70	X + 109.5	105	164.5	A - 105	X + 164.5	140	219.5	A -140	X -
Ø 37	74	116	A - 74	X + 116	111	174	A - 111	X + 174	148	232	A -148	X -
Ø 38	76	119	A - 76	X + 119	114	179	A - 114	X + 179	152	238	A -152	X -
Ø 40	80	125	A - 80	X + 125	120	188	A - 120	X + 188	160	251	A -160	X -
Ø 42	84	131,5	A - 84	X + 131.5	126	197,5	A - 126	X + 197.5	168	263.5	A -168	X -
Ø 45					135	212	A - 135	X + 212	180	282	A -180	X -
Ø 50									200	314	A -200	X -
Ø 54									216	339	A -216	X -
Ø 60									240	376.5	A -240	X -

$X = A - R.$

$Y = A - R. + SV.$





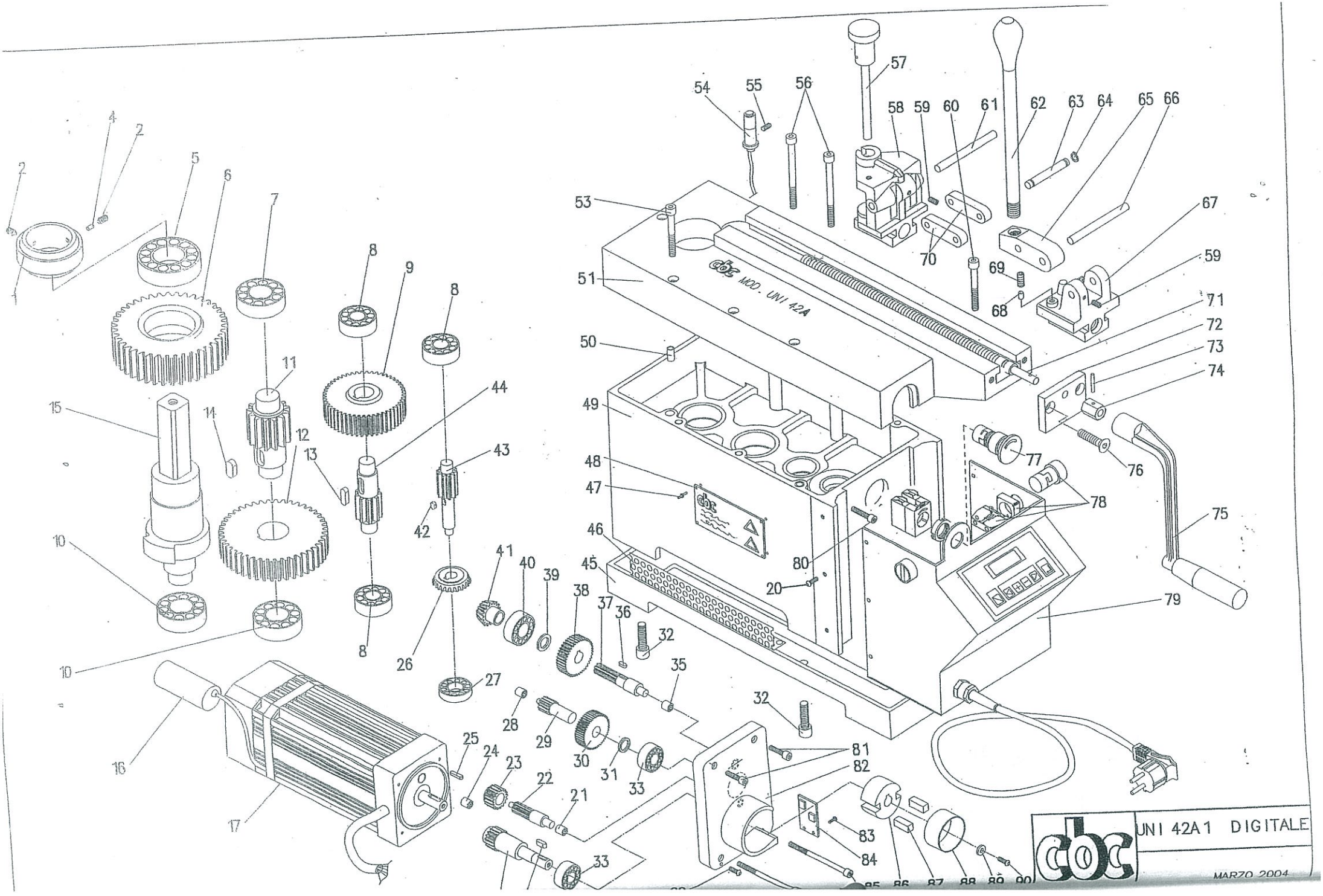


for thick steel pipe
from Ø 14 up Ø 18 min. thickness 2 mm
from Ø 19 up Ø 22 min. thickness 2,5 mm
from Ø 24 up Ø 42 min. thickness 3 mm
with R=2xD use **only** ROLLER

distance = pipe diameter (minimum)

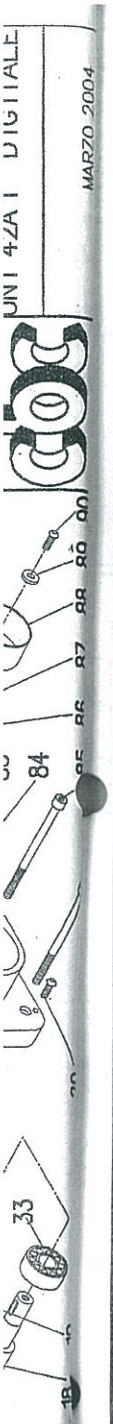
SPARE PARTS LIST - ELECTRIC BENDING MACHINE MOD. UNI42/A (03/2004)

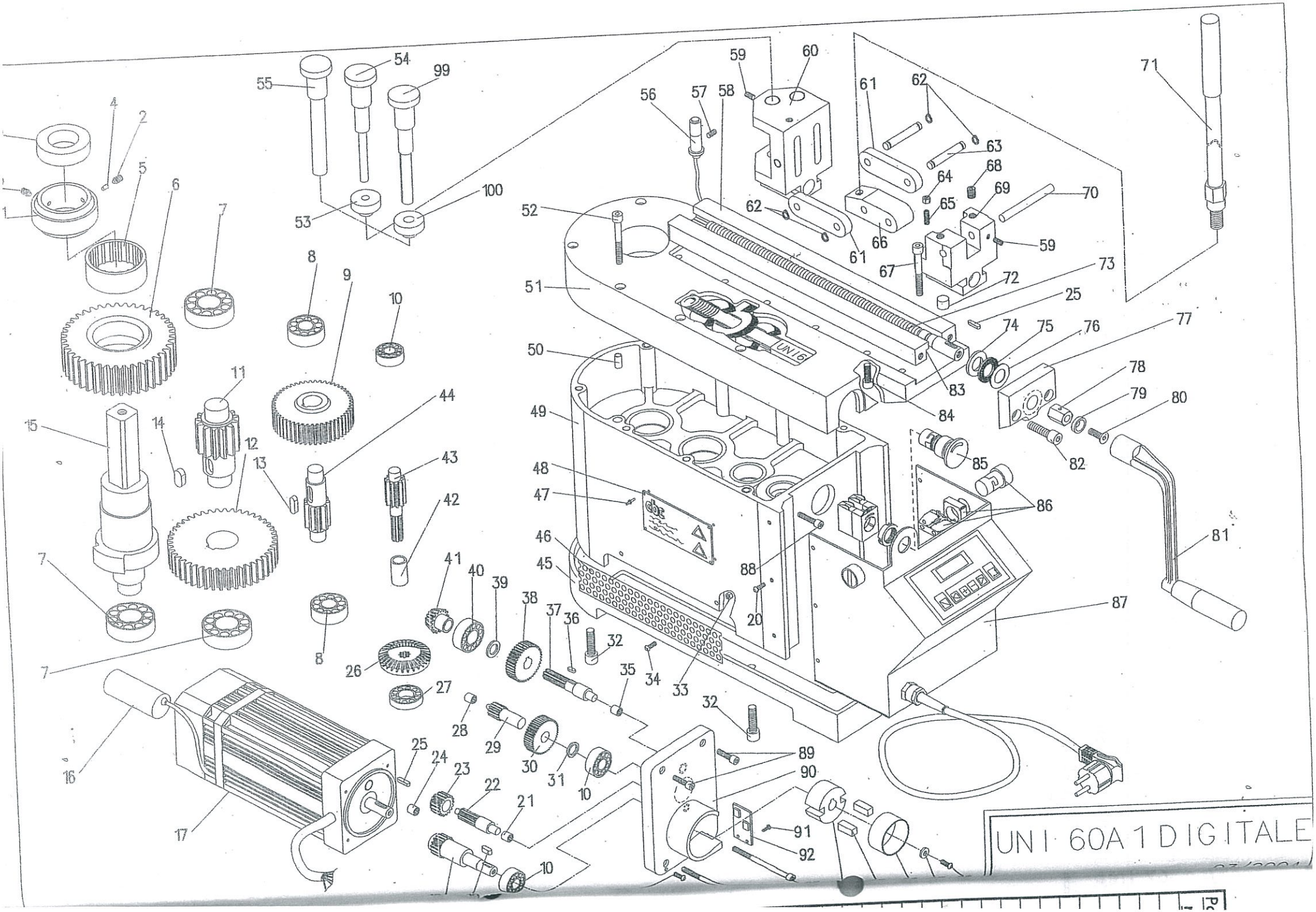
Part. Nr.	Code	Description	Q.ty	Part. Nr.	Code	Description	Q.ty
1	500067	position ring	1	44	544075	pinion	1
2	019017	socket dowel	2	45	110055	reduction box base	1
4	701017	clutch pad	1	46	601003	protection plate	1
5	001004	bearing	1	47	024005	rivet	4
6	544298	gear outlet	1	48	025021	name plate	1
7	001098	bearing	1	49	110131	reduction box	1
8	001001	bearing	4	50	595085	bush	2
9	544074	crown gear	1	51	110132	reduction box cover	1
10	001003	bearing	2	52	025020	graduated ring	1
11	544077	pinion	1	53	015003	screw	1
12	544076	crown gear	1	54	008125	sensor	2
13	020008	key	1	55	019007	socket dowel	2
14	020009	key	1	56	015037	screw	2
15	544326	outlet shaft	1	57	500318	counterform support pin Ø 10	1
16	008260	capacitor	1	58	220498	counterform support	1
17	007105.1	motor with brake	1	59	019034	socket dowel	2
18	544307	motor's pinion	1	60	015038	screw	5
19	021015	washer	1	61	018078	dowel	1
20	015057	screw	10	62	515227	lever	1
21	001077	bearing	1	63	526044	bolt with seeger	1
22	544067	motor's pinion	1	64	023048	seeger	2
23	544308	motor's crown gear	1	65	514339	lever's connecting rod	1
24	001030	bearing	1	66	018080	dowel	1
25	020026	key	1	67	220462	quick-guide positionning's suppot	1
26	534039	crown gear	1	68	701017	clutch's pad	2
27	001006	bearing	1	69	019018	socket dowel	2
28	008006	bearing	1	70	515354	quick-guide positionning's connecting rod	2
29	544368	bevel pinion	1	71	524019.1	counterform support adjusting screw	1
30	544068	crown gear	1	72	515483	adjusting screw's flange	1
31	115002	spacer	1	73	018002	dowel	1
32	015016	screw	4	74	515482	adjusting screw's hexagon	1
33	001039	bearing	1	75	000955	crank-lever	1
35	001030	bearing	1	76	016042	screw	2
36	020002	key	1	77	008304	compl. emergency stop button	1
37	544284	keyed shaft	1	78	008155	switch complete with running device	2
38	544070	crown gear outlet	1	79	0001062	complete electric card	1
39	595010	bush	1	80	015035	screw	2
40	001008	bearing	1	81	015008	screw	2
41	534025	pinion	1	82	135165	flange	1
42	020004	key	1	83	015003	screw	2
43	544283	pinion outlet	1				


MOD. UNI 42A
UNI 42A1 DIGITALE
MARZO 2004

SPARE PARTS' LIST - BENDING MACHINE MOD. UNI60/A SINGLE PHASE
(03/2004)

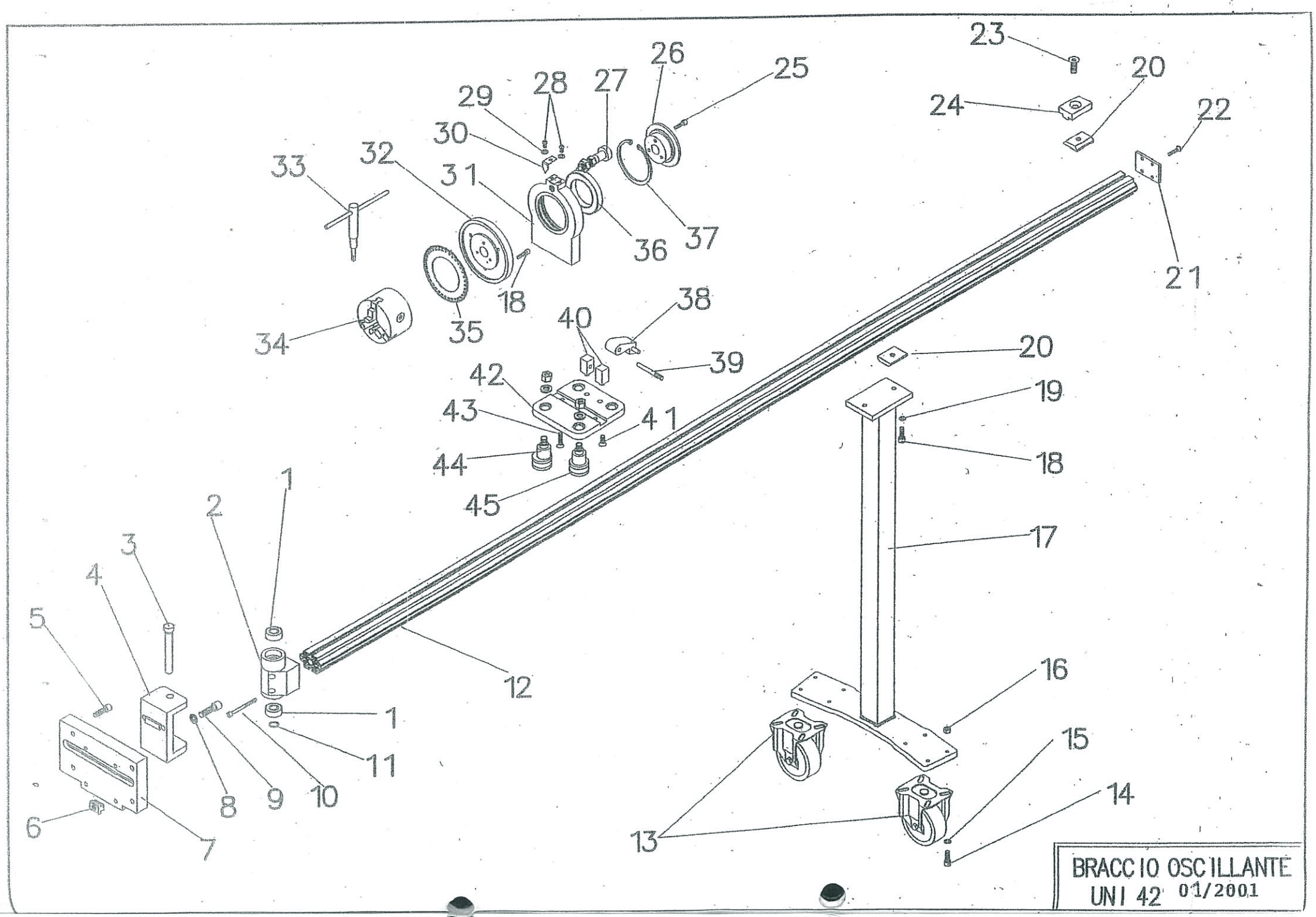
Part. no.	Code	Description	Q.ty	Part. no.	Code	Description	Q.ty
1	210034	positionning ring	1	51	110134	reduction box cover	1
2	019017	socket dowel	2	52	025020	graduated ring	1
3	517025	outlet shaft's spacer	1	53	015006	screw	8
4	701018	clutch's pad	1	54	008125	sensor	2
5	001029	bearing	1	55	019007	socket dowel	2
6	544352	outlet gear	1	56	514516	right counterform support slide	1
7	001021	bearing	3	57	019023	socket dowel	2
8	001003	bearing	2	58	220474	counterform's support	1
9	544076	plate wheel	1	59	015007	screw	2
10	001001	bearing	2	60	000660	counterform pin 18	1
11	544094	pinion	1	61	000453	counterform pin 18/10	1
12	544093	plate wheel	1	62	515183	lower ring	1
13	020009	key	1	63	524019	regulation screw	1
14	020011	key	1	64	001032	bearing	1
15	544351	outlet shaft	1	65	001034	ball cage	1
16	008261	capacitor	1	66	001033	bearing	1
17	007110.1	motor with brake	1	67	515483	regulation screw's flange	1
18	544307	motor's pinion	1	68	515482	screw's hexagon	1
19	021015	washer	1	69	515110	washer	1
20	015057	screw	5	70	016004	screw	1
21	001077	bearing	1	71	000955	crank-lever	1
22	544067	motor's pinion	1	72	015028	screw	3
23	544308	motor's plate wheel	1	73	514515	left counterform support slide	1
24	001030	bearing	1	74	015016	screw	12
25	020026	key	1	75	008304	complete emergency stop-button	1
26	534038	plate wheel	1	76	008155	complete switch	2
27	001006	bearing	1	77	0001063	complete panel 230V	1
28	008006	bearing	1	78	015009	screw	2
29	544285	pinion	1	79	015008	screw	2
30	544068	plate wheel	1	80	135165	flange	1
31	115002	spacer	1	81	015003	screw	2
32	014012	screw	3	82	515328	counterform pin 18/14	1
33	002034	nut	2	83	515329	lower ring	1
34	017007	screw	2	84	514518	counterformer support	1
35	001030	bearing	1	85	514061	crank	2
36	020002	key	1	86	023048	compression ring	4
37	544284	keyed shaft	1	87	526044	crank's pin	2
38	544070	plate wheel	1	88	002002	nut	1
39	515214	bush	1	89	019005	socket dowel	1
40	001008	bearing	1	90	514339	clamping lever's crank	1
41	534024	bevel pinion	1	91	019033	socket dowel	2
42	115004	spacer	1	92	220462	quick counterformer positioning device	1
43	544286	outlet pinion	1	93	526009	pin	1
44	544077	pinion	1	94	514326	clamping lever	1
45	110052	reduction box base	1	95	019005	clutch's pad	2
46	601004	protection plate	1				
47	024005	rivet	4				
48	025021	name plate	1				
49	110133	reduction box	1				
50	595086	bush	2				




UNI 60A 1 DIGITALE

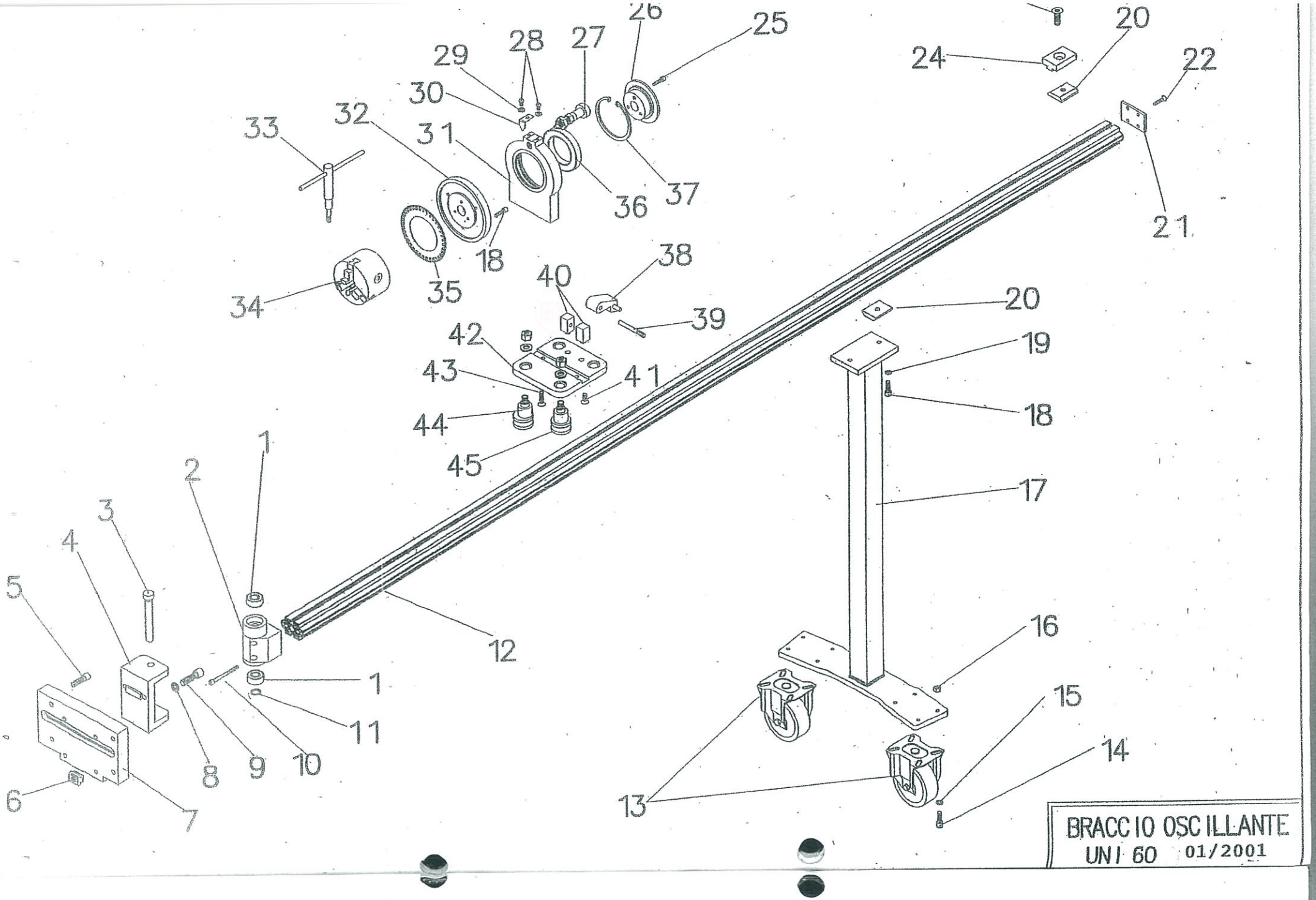
SPARE PARTS' LIST - DIGITAL ELECTRIC BENDING MACHINE MOD. UNI60/A1
(03/2004)

Part. no.	Code	Description	Q.ty	Part. no.	Code	Description	Q.ty
1	210034	positioning ring	1	50	595086	bush	2
2	019017	socket dowel	2	51	110134	reduction box cover	1
3	517025	outlet shaft's spacer	1	52	015006	screw	8
4	701018	clutch's pad	1	53	515183	lower ring	1
5	001029	bearing	1	54	000453	Counterformer support pin 18/10	1
6	544352	outlet gear	1	55	000660	Counterformer support pin 18	1
7	001021	bearing	3	56	008125	sensor	1
8	001003	bearing	2	57	019007	socket dowel	1
9	544076	plate wheel	1	58	514516	right counterformer support slide	1
10	001001	bearing	2	59	019023	socket dowel	2
11	544094	pinion	1	60	514518	counterformer support	1
12	544093	plate wheel	1	61	514061	crank	2
13	020009	key	1	62	023048	compression ring	4
14	020011	key	1	63	526044	crank's pin	2
15	544351	outlet shaft	1	64	002002	nut	1
16	008261	capacitor	1	65	019005	socket dowel	1
17	007110.1	motor with brake	1	66	514339	clamping lever's crank	1
18	544307	motor's pinion	1	67	015007	screw	2
19	021015	washer	1	68	019033	socket dowel	2
20	015057	screw	5	69	220462	quick counterf. positioning device	1
21	001077	bearing	1	70	526009	pin	1
22	544067	motor's pinion	1	71	514326	clamping lever	1
23	544308	motor's plate wheel	1	72	019005	clutch's pad	2
24	001030	bearing	1	73	524019	screw	1
25	020026	key	1	74	001032	bearing	1
26	534038	plate wheel	1	75	001034	ball cage	1
27	001006	bearing	1	76	001033	bearing	1
28	008006	bearing	1	77	515483	regulation screw's flange	1
29	544285	pinion	1	78	515482	screw's hexagon	1
30	544068	plate wheel	1	79	515110	washer	1
31	115002	spacer	1	80	016004	screw	1
32	014012	screw	3	81	000955	crank-lever	1
33	002034	nut	2	82	015028	screw	2
34	017007	screw	2	83	514515	left counterformer support slide	1
35	001030	bearing	1	84	015016	screw	12
36	020002	key	1	85	008304	complete emergency stop-button	1
37	544284	keyed shaft	1	86	008331	complete switch	1
38	544070	plate wheel	1	87	0001061	complete digital panel 230V	1
39	515214	bush	1	88	015009	screw	2
40	001008	bearing	1	89	015008	screw	2
41	534024	bevel pinion	1	90	135165	flange	1
42	115004	spacer	1	91	017026	screw	2
43	544286	outlet pinion	1	92	008392.1	panel's decoder	1
44	544077	pinion	1	93	015003	screw	2
45	110052	reduction box base	1	94	135149	magnet's flange	1
46	601004	protection plate	1	95	008391	magnet	2
47	024005	rivet	4	96	008307	magnet's protective covering	1
48	025021	name plate	1	97	021015	washer	1
49	110133	reduction box	1	98	015071	screw	1
				99	515328	counterform pin 18/14	1
				100	515329	lower ring	1


BRACCIO OSCILLANTE
UNI 42 01/2001

MOVING PLANE OF BEND MOD. UNI 42

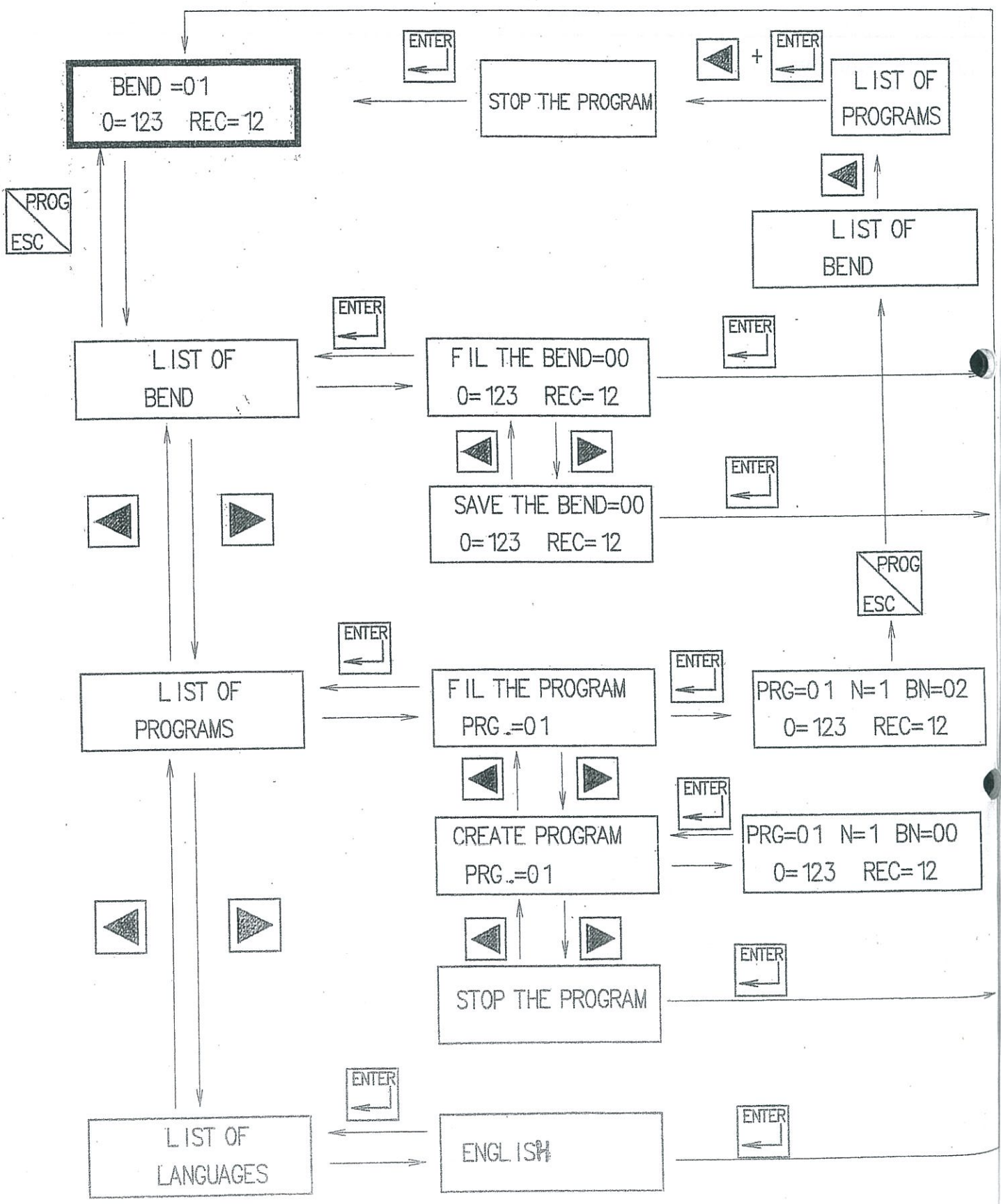
Part. Nr.	Code	Description	Quantity
1	001039	bearing	2
2	135152	joint	1
3	514461	pin	1
4	135153	fork	1
5	015016	screw	4
6	099023	fixing plate	2
7	135154	clamping plate	1
8	021018	washing	2
9	014035	bolt	2
10	015003	screw	4
11	515253	washing	1
12A	136010	1 mt. profile	1
12B	136011	2 mt. profile	1
12C	136013	3 mt. profile	1
12D	136012	4 mt. profile	1
13	004124	wheel	2
14	015031	screw	8
15	021011	washing	8
16	002011	nut	8
17	500189	support	1
18	015008	screw	5
19	021015	washing	2
20	514489	lower shoulders	7
21	135151	cover plate	1
22	017008	screw	4
23	016034	screw	5
24	514488	upper shoulders	5
25	015009	screw	3
26	135143	back centering	1
27	001109	spindle's rotation stop block	1
28	015071	screw	2
29	021015	washing	2
30	514946	reference mark	1
31	135157	spindle's support flange	1
32	524074	flange	1
33	000840	spindle's key	1
34	004094	spindle	1
35	025046	graduated ring	1
36	001104	bearing	1
37	023052	compression ring	1
38	535008	catch	1
39	018049	dowel	1
40	515469	catch's support	2
41	016007	screw	2
42	135155	sliding surface	1
43	016024	screw	2
44	004123	eccentric wheel	2
45	004122	fix wheel	2



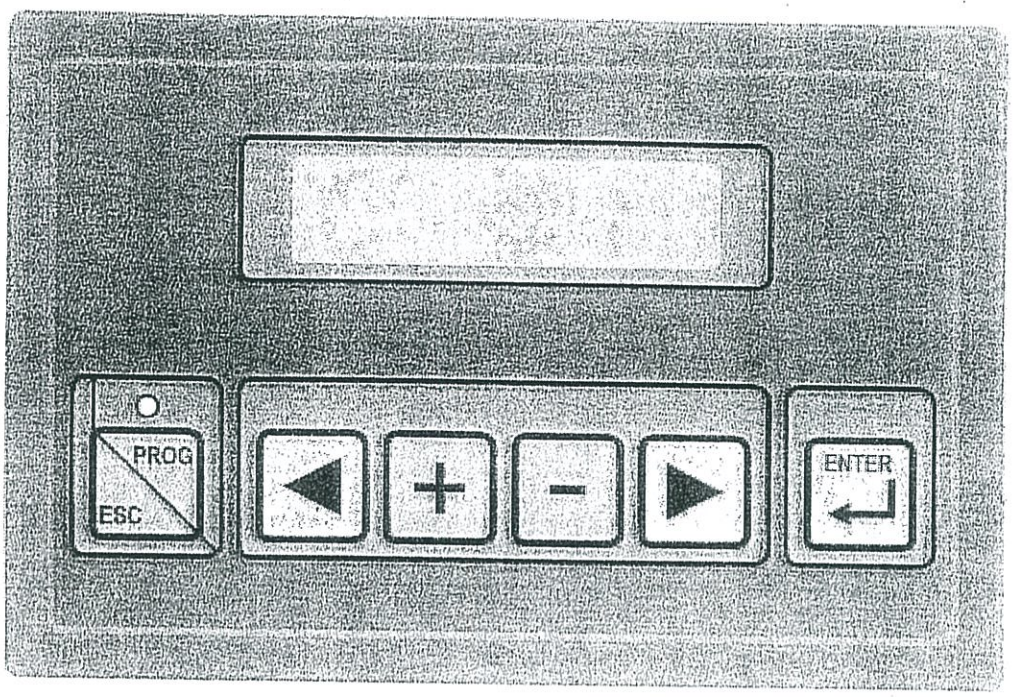
BRACCIO OSCILLANTE
UNI 60 01/2001

MOVING PLANE OF BEND MOD. UNI 60

Part. Nr.	Code	Description	Quantity
1	001039	bearing	2
2	135152	joint	1
3	514461	pin	1
4	135153	fork	1
5	015028	screw	4
6	099023	fixing plate	2
7	135154	clamping plate	1
8	021018	washing	2
9	014035	bolt	2
10	015003	screw	4
11	515253	washing	1
12A	136010	1 mt. profile	1
12B	136011	2 mt. profile	1
12C	136013	3 mt. profile	1
12D	136012	4 mt. profile	1
13	004124	wheel	2
14	015031	screw	8
15	021011	washing	8
16	002011	nut	8
17	500190	support	1
18	015008	screw	5
19	021015	washing	2
20	514489	lower shoulders	7
21	135151	cover plate	1
22	017008	screw	4
23	016034	screw	5
24	514488	upper shoulders	5
25	015009	screw	3
26	135143	back centering	1
27	001109	spindle's rotation stop block	1
28	015071	screw	2
29	021015	washing	2
30	514946	reference mark	1
31	135157	spindle's support flange	1
32	524074	flange	1
33	000840	spindle's key	1
34	004094	spindle	1
35	025046	graduated ring	1
36	001104	bearing	1
37	023052	compression ring	1
38	535008	catch	1
39	018049	dowel	1
40	515469	catch's support	2
41	016007	screw	2
42	135155	sliding surface	1
43	016024	screw	2
44	004123	eccentric wheel	2
45	004122	fix wheel	2


BEND =01
0=123 REC=12
ENTER
STOP THE PROGRAM
+
ENTER
LIST OF PROGRAMS
PROG
ESC
LIST OF BEND
ENTER
LIST OF BEND
ENTER
FIL THE BEND=00
0=123 REC=12
ENTER
SAVE THE BEND=00
0=123 REC=12
ENTER
PROG
ESC
ENTER
LIST OF PROGRAMS
ENTER
FIL THE PROGRAM
PRG.=01
ENTER
PRG=01 N=1 BN=02
0=123 REC=12
ENTER
CREATE PROGRAM
PRG.=01
PRG=01 N=1 BN=00
0=123 REC=12
ENTER
STOP THE PROGRAM
ENTER
LIST OF LANGUAGES
ENTER
ENGLISH
ENTER

6.2 PROGRAMMING INSTRUCTIONS FOR THE DIGITAL MODELS



GENERAL PRINCIPLES

- A bend is always made up of a bend angle and a recovery angle
- The maximum number of bends that can be stored is 99
- A program is made up of a succession of bends previously memorized
- The maximum number of bends found in a program is 9
- The maximum number of programs is 50
- The max. total angle memorised is 240° (Split in bend + recovery angle: e.g.: 234° + 6°)

REGULAR OPERATING MODE

When turning the machine on, it will automatically load the bend number 0, and the cursor will be set the "=" section of the screen:

BEND = 00
Ø=100 REC=15

PRESSING THE BUTTONS "<" and ">" The cursor will move from the angle "Ø" to the recovery angle "REC".
PRESSING THE BUTTONS "+" and "-" it will be possible to increase or decrease the set values

Once the bend insertion has been completed, the machine is ready to make a bend.

HOW TO ENTER IN THE DATA ENTRY MODE

By pressing the button "PRG" the machine will enter the input data mode, and a light placed on this button will turn on,. The keys ">" and "<", "ENTER" will now be used to move and change the data contained in the various modes

HOW TO STORE A BEND ANGLE

Once the bend corresponds to the requirements :

- Press the button "PRG" to enter in the menu "LIST OF BENDS"
- Press the button "ENTER" to enter in the mode "LOAD BEND"
- Press the button ">" to enter in the mode "SAVE BEND"
- With the keys "+" and "-" select the number where you wish to memorize the bend then exit

HOW TO LOAD A BEND ANGLE

In order to load a bend angle act as follows :

- Press the button "PRG" to enter in the menu "LIST OF BENDS"
- Press the button "ENTER" to enter in the mode "LOAD BEND"
- With the keys "+" and "-" select which number of bend you want to load
- Press the "ENTER" button to confirm the bend angle and exit from the main menu.

HOW TO LOAD A PROGRAM

In order to load a program act as follows :

- Press the button "PRG" to enter in the menu "LIST OF BENDS"
- Press the button ">" to enter the menu "LIST OF PROGRAMS"
- Press the button "ENTER" to enter in the mode "LOAD PROGRAM"
- With the keys "+" and "-" select which number of program you want to load
- Press the "ENTER" button to confirm the bend angle and exit from the main menu.

NOTE : From this moment on, the software will be set in the programming mode, the only way to exit this mode is to enter the menu "STOP PROGRAM". In this mode it is possible to operate the machine as in normal bending mode, but all operations will corresponded from the programming mode (e.g.: if in the programming mode I enter the "LOAD BEND" mode, the bend will be added in the program in the same order as shown in the display), it is possible to change the bend angle and the number of the bend directly.

HOW TO EXIT FROM A PROGRAM

To exit from a program you must do as follows:

- Press the button "<" to enter in the mode "STOP PROGRAMS"
- Press the button "ENTER" to exit from the menu "LIST OF PROGRAMS"

HOW TO CREATE A PROGRAM

To create a program act as follows: :

- Press the button "PRG" to enter in the menu "LIST OF BENDS"
- Press the button ">" to enter in the menu "LIST OF PROGRAMS"
- Press the button "ENTER" to enter in the mode "LOAD PROGRAM"
- Pres the button ">" to enter in the mode "CREATE PROGRAM"
- With the keys "+" and "-" select the number of program to be created or modified
- Press the button "ENTER" to confirm and enter in the "DATA ENTRY MODE"
- With the keys "+" and "-" select the number of the bend
- Press the button "ENTER" to confirm the bend and to be ready to select the next bend
- To end the bend sequence after all the bends have been selected enter in the bend num. "0"
- (unexistant), press "ENTER" to end the program which will return to the mode "CREATE PROGRAMS"
- Press "ESC" to return to the main screen.

HOW TO CHANGE THE LANGUAGES

To change language act as follows :

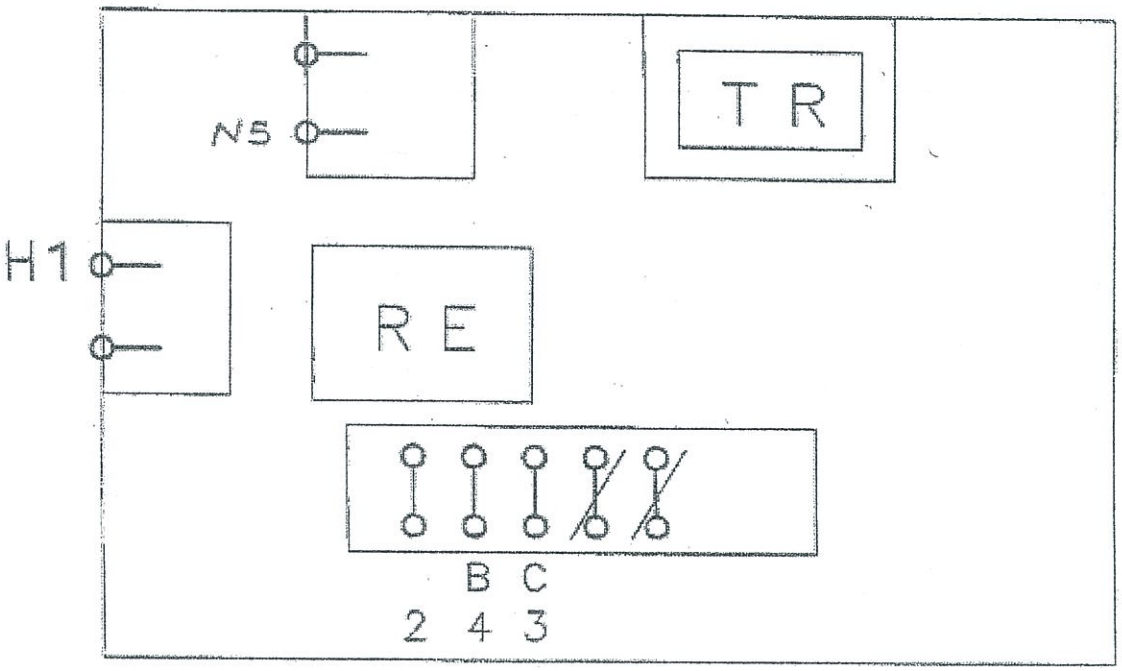
- Press the button "PRG" to enter in the menu "LIST OF BENDS"
- Press the button "<" to enter in the menu "LIST OF LANGUAGES"
- Press the button "ENTER" to enter in the mode "LANGUAGE"
- With the keys "+" and "-" select the desired language of communication
- Pres the button "ENTER" to confirm the choice and exit the mode.

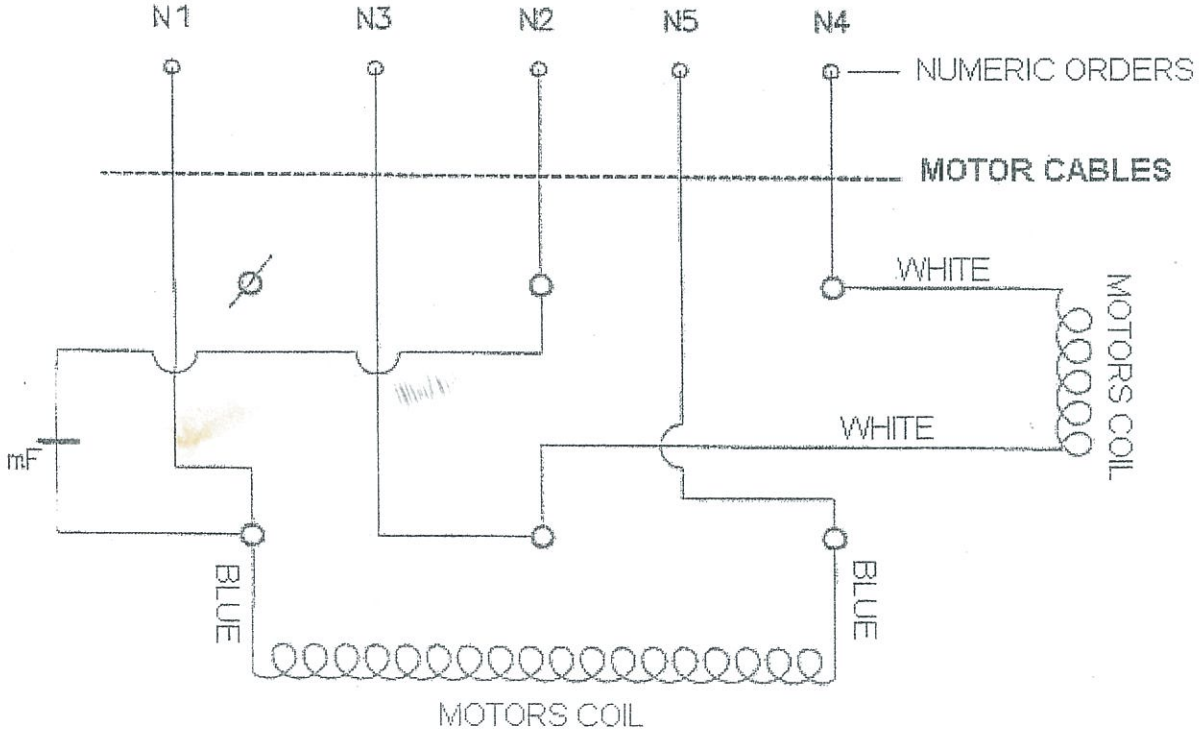
ALARMS

While the machine is operating correctly it automatically runs through a number of check in its system :

- If you try to enter the full angle (Bend angle + Recovery angle), from which the sum exceeds the 240° the machine will show "MAXIMUM ANGLE 240°" and the operation will not be allowed. Press the "**ESC**" button to exit and return to the normal operating system.
- Should the angle over 240° be accidentally memorized by the software due to a malfunction or corrupted memory; when pressing the two lateral bend buttons the display will indicate again "MAXIMUM ANGLE 240°". The machine will not begin working until the angle has been set properly. Press the "**ESC**" button to return to the normal operating system.
- If after approximately after 1,25 seconds the movement of the motor (forward/return), the encoder should not read (faulty encoder or the machine is blocked), the rotation will not occur and the display will show "EMERGENCY ENCODER". Pressing the "**ESC**" button, it will exit from the alarm
- If in the "RETURN" travelling mode the "0" stop will not be found (with a 20° margin from the original position), the motor will stop automatically and the message "EMERGENCY STROKE END". Pressing the "**ESC**" button, it will exit from the alarm.
- If while bending the machine should accidentally meet the "0" stop again due to the following: a malfunction of the rotation, encoder no reading properly, electromagnetic interruptions which confuse the reading components, or an incorrect electronic board has been assembled on a machine which different gear reductions (e.g.: a board designed for a UNI42A1 is placed in a UNI60A1); the message "EMERGENCY ENCODER" will appear and the machine will return to its original position. Pressing the "**ESC**" button, it will exit from the alarm.

6.3 MOTOR'S ELECTRIC SCHEMATIC EM 48 S CEG





6.4 ELECTRICAL MOTOR AND BOARD DIAGRAM FOR DIGITAL MODELS