

# **FIDES**

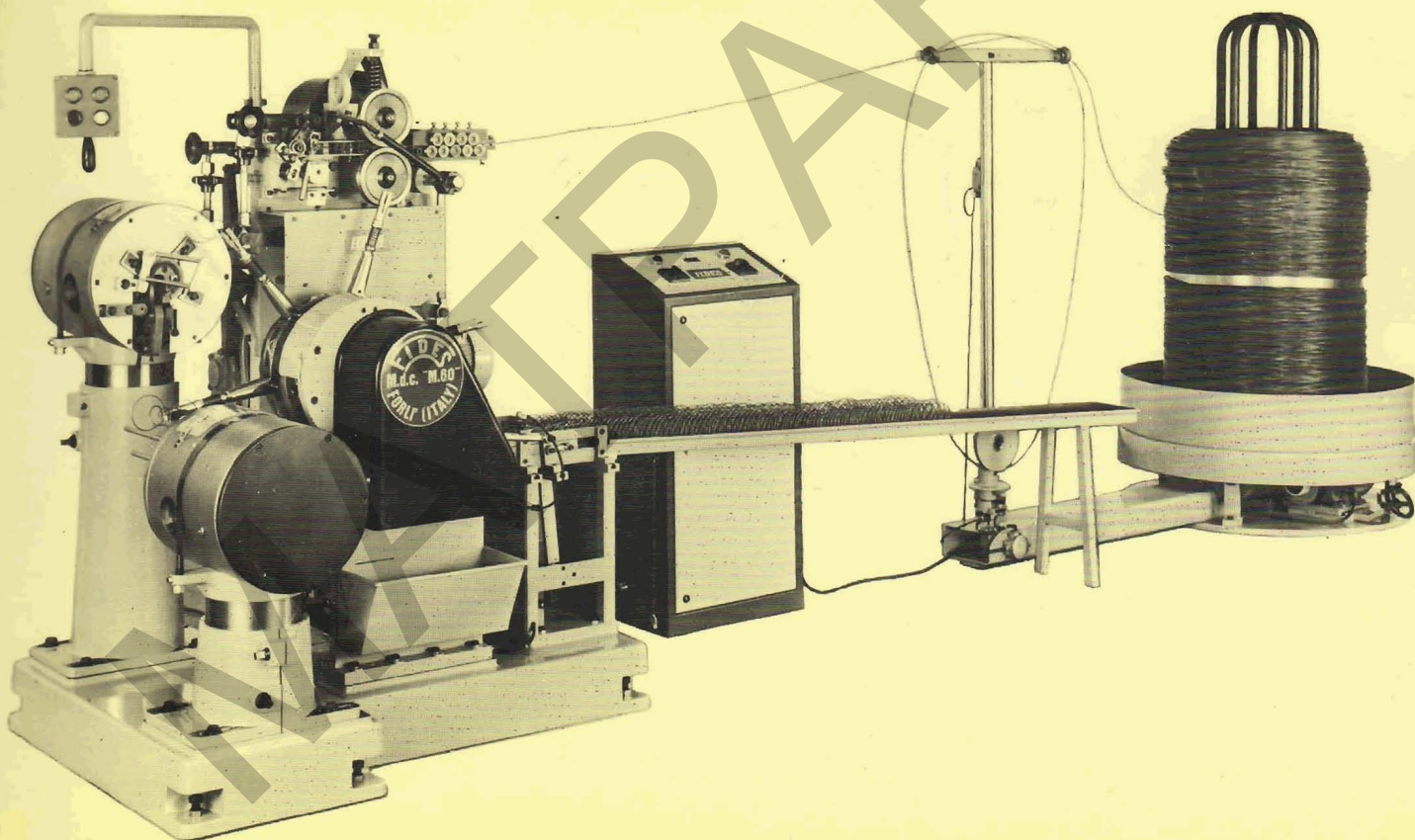
# **COSTRUZIONI MECCANICHE**

47100 FORLÌ (Italia) - Via A. Righi - Tel. (0543) 72.20.63

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**MACCHINA AUTOMATICA M.D.C. 60  
PER MOLLE A CHIUSURA ANNODATA**

**AUTOMATIC MACHINE M.D.C. 60  
FOR SPRINGS WITH KNOTTING CLOSING**



**ATTREZZATURA PER LA CONFEZIONE DI MATERASSI A MOLLE**

**EQUIPMENT FOR THE MANUFACTURE OF SPRING MATTRESSES**

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# FIDES

## M.D.C. 60

AUTOMATIC ROTATING  
ELECTROMECHANICAL

47100 FORLI (ITALIA) Via Augusto Righi 22 Tel.0543/722063  
TLX 551287 PPFSU ATT.FIDES - FAX 0543/725230

MACHINE FOR WINDING, KNOTTING,  
HEAT-TREATING AND PACKING SPRINGS  
FOR MATTRESSES AND THE LIKE.

PART NUMBER \_\_\_\_\_

(On the main upright,  
above on the right hand)

Speed control ratio _____	Construction _____	Motor _____	Type _____
		Reduction unit _____	Type _____
Part number _____	Motor _____		Power Kw. _____
	Reduction unit _____		

### UNWINDER

Speed control ratio _____	Construction _____	Motor _____	Type _____
		Reduction unit _____	Type _____
Part number _____	Motor _____		Power Kw. _____ Volt. _____
	Reduction unit _____		

### ELECTRICAL PANEL

Transformer 220-380/24V.

Three-phase contactors \_\_\_\_\_

Relay \_\_\_\_\_

Electrothermic Transformer Power 6 KWA 5 SC.

### WARRANTY OF THE MACHINE

The machine is warranted for six months from the delivery.  
The firm "FIDES" guarantees to repair or to replace free, within  
the warranty period, the parts which should be defective because  
of manufacturing faults, except for parts not made by the "FIDES"  
or any other indemnity.

TESTED ON \_\_\_\_\_

DELIVERY DATE \_\_\_\_\_

CUSTOMER (signature) \_\_\_\_\_

FROM THE "FIDES" \_\_\_\_\_

NOTICE

"F I D E S" AUTOMATIC SPRING COILING MACHINE MODEL  
 =====

M.D.C. 60 AND M.D.C. 80  
 =====

(for mattresses and the like)

GENERAL INFORMATION

FIDES coiler model M.D.C. 60 grants an output of 60 springs per minute with prime steel and well kept wire.

FIDES coiler model M.D.C. 80 grants an output of 75 springs per minute.

In order to pass from 5 turns springs to 4 turns ones or vice versa, you have only to replace the programmer cam unit (ref. B16M1, TAB.6) and, obviously, to make the different adjustments of sizes.

In order to obtain larger or smaller diameters of the base rings, you have to replace the dies (ref. D18M1, TAB.4); then, adjust the three jaws (ref. D23M1, TAB.4), and together with them the jaws ref. D19M1 /M2, TAB.11) according to the measures indicated on the respective schedule (TAB.18).

The operator is not required to stay by the machine the whole time; in fact, in case of faulty output or abnormal working it will stop automatically.

Troubles are detected by low tension electrical microcontacts, which can be easily put in the most critical points, shunting them from the board-terminal no.9 (TAB.1), or from the already working contacts.

### TECHNICAL NUMERICAL DATA

- Spring prime steel wire : dia. 1.9 mm to 2.4 mm; strength of 160/180 kgs/square mm.; roll inside dia. :400 mm, outside dia. : 700 mm.
- Conveyer arms : length ( see TAB.17), inclination (see TAB.14)
- Dinstance between cutter and just cut wire : 2 mm to 8mm max. (TAB.14).
- Pitch retractor inclination (TAB.13).
- Wire feeding rollers ref. B13M1 : when the top one is up (i.e., when the spring has just been cut) the opening between the two rollers must be of 0.8 mm - 0.9 mm; instead, when the rollers are drawing the wire, the opening between the two must be of 0.4 mm. Remember that the standard minimum value is 0.2 mm; therefore, under this value the two rollers need to be replaced.
- Heat treatment : extreme limit 232° / 288°, average 270°.

### INSTALLATION

Locate the machine in a dry and well lighted place, respecting the floor space as indicated on TAB.1.

Check that the voltage preset in the machine corresponds to the workshop one.

Insert the numbered electrical cables in the relating numbers of the terminal board, in the panel (TAB.20).

Keep in mind that in no.13 terminal there will be two cables

Connect the cables of the workshop electric wiring with the terminal board RST. Switch on and through the black push-button (IMP., TAB.1) check if the machine runs in the proper direction, i.e. right to left; if not, invert two cables

in the terminal board RST. Check the running of the swift by operating on the yellow push-button (ATTENTION ! insert the tap in the electrical panel). Check that the load is well balanced (no oscillations), with the machine and swift bases screw bolts and set nuts in.

#### DEVICES FOR PERSONNEL SAFETY

Switch off the current in the panel, before you put your hands in any machine-members.

Don't get too near the swift when it works.

ATTENTION! when you put the wire roll on the movable platform, do not upset its turns; take care that the base of the platform doesn't block up the turns, which could be entangled with very dangerous situations, in the end of the roll.

#### MAINTENANCE

The machine must be cleaned thoroughly every working day, and lubricated using the endowed oil gun once a week.

The speed variator and the swift motor-reducer need the oil change after about 2000 working hours.

#### SUBJECTS

Insert the swift in the wire roll lifting it vertically, so that you can drop it in the centre of the movable platform; then, adjust the three bars which assure its adhesion and its centering during the rotation.

Bring the top roller (ref. B13M1, TAB.4) in the high position, turning it in the clockwise direction by a 27 mm wrench into the roller set nut.

Make sure the wire pass through the holes of the two small brackets of the swift control column, and through the groove of the slider control wheel (see TAB.1).



Make the wire pass through the wire straightener; ATTENTION! the said straightener must be adjusted according to the thickness of the wire you use.

Turn again the roller by hand, using the 27 mm wrench, till the wire passes on the pitch retractor pin (ref. B29M4, TAB.4), but just touching on it; if the wire does not appear (this may depend on the hardness of the wire), you have to adjust the coiling wheel (ref. B21M3, TAB. 4), using a 22 mm wrench for its set nut and a 17mm wrench for its nut. Then, screwing slightly the wire gets away from the pitch retractor (ref.B29M4), vice versa (unscrewing) it gets near.

Afterwards, by using the black push-button try to run the machine on impulses, and adjust the length of the wire through the knob ref. B25M1,TAB.5 and the pitch through the knob ref.B25M2, TAB.6; go on like this until the spring has a well looking shape.

If you continue giving impulses by the black push-button, possibly the swift won't be stressed enough to turn; therefore, the slider will go up, acting on a microswitch, and disconnect the current. In this case, pushing the yellow button (swift, see TAB.1), the swift will be able to turn and the slider to come down, connecting the current again.

In order to make the various adjustments easier, run the machine at a low speed, that is at about 45 springs/min., operating on the handwheel (V., TAB.2) and setting it on no.4,5 position.

Remember that if the machine runs slowly, even the time for the heat treatment changes by increasing; therefore, you have to set the 5-trip switch of the electrical panel on no.1 position.

When the spring arrives at the first knotter, this might jam, because of the running by impulses that could have put the knotting wheel ref. D16M3 out of phase. Then, to release

the machine, tighten the nut of the lower roller ref. B13M1, TAB.4 using the 27 mm wrench; afterwards, press the lever ref. D17/1M1 that allows the release of the knotting wheel, and make it turn by hand until its slit is in the upper side, so that the spring can enter freely.

The same adjustments will have to be made for the second knotter.

## S P E C I F I C P A R T =====

### CUTTING-NIPPERS

To reduce the inertia of the cutting-nippers, the cutters must be open the minimum enough to give way to the turn in coiling (about 6 mm).

The movable cutter must draw near the fixed one the minimum enough to secure a complete cut, without useless running. To adjust the movable cutter: screw or unscrew the thrust head ref. B28M4, TAB.6 that bears the pin of the cutting-nippers lever.

To sharpen the blades, put the cutting-nippers in the cutting position, then remove the cutters one at a time not to lose the right position (see TAB.4); remember to sharpen in parallel only on the oblique plane of the cutting edges.

### CONVEYER

A "MALTESE CROSS" mechanism with six radial cables makes the spring conveyer arms turn on intermittent motion. The rotation begins immediately after the cutting of the spring, and stops in correspondence with the two knotters, where an articulated quadrilateral (TAB.9) makes them (the arms) diverge to the knotting devices.



That quadrilateral is controlled by a cam (ref.C16M1) splined to the main shaft and synchronized with the "MALTESE CROSS". After the knotting, the arms go back to the rotation plane to alternate with the rotation of the knotting wheels (ref.D16M3, TAB.8). The articulated tension rod (ref. C19M4, TAB.9) need never to be tampered except in case of certain and verified unevenness, and then only by a qualified technician. This rod is to keep the fork (ref. C19/1M1, TAB.9) set, by the arm idle pin; the above fork is to keep the arms open wide towards the knotters.

Remember that the forks ref. C19/1M1, C19/1M2, C19/1M3 TAB.9, in rest position, must be always in connection with the ring-like track of the plate ref. C11M1, TAB.9.

If you think it is necessary to change the length of the conveyer arms (possibly, if you want to make springs with diameters quite different from the ones the machine is adjusted for), you need to take off the clamp ref. C14M1, TAB.8, after loosening and unscrewing the respective check nut.

You have really to change only the length of the hook bearing rod ref. C14M4 TAB.8 by the adjustment of the tappet; and to do that in the right way, you have to keep in mind the number of turns made to let the clamp out. In fact, if you want to lengthen the above hook bearing rod for instance of 6 mm, unscrew the tappet on it making 6 turns, as the pitch is 1 mm and  $1 \times 6 = 6$  mm; then, screw the clamp making 4 turns less than the counted ones to unscrew it, as the pitch is 1.5 mm and  $1.5 \times 4 = 6$  mm.

The inclination, with the spring into the clamp, must be parallel to the rotation axis (TAB.14). If the springs coming out of the coiler are not grasped by the clamp hook, you have to check the cap (spoon) ref. C30M1, TAB.2 adjusting it so that it rests on two coils and makes the spring contact

the bottom of the clamp slot (ref. C14M1, TAB.4); Keep in mind that the clamping of the hook must be a little bit before the spoon (ref. C30M1, TAB.2) lifting.

This race must be adjusted using a 13 mm wrench to retard or to advance the cam unit for the spoon (ref. C34M1). If the spring falls down on this side or on the other of the conveyer clamp, the adjustment can be made operating with a 8 mm Allen wrench to loosen the four screws on the coiling unit (ref.B01M1, TAB.5), and moving it forward or backward according to the needs.

The knotters are assembled parallel to the rotation axis of the conveyer arms; for need of alignment of the knots or for some other reasons the knotters can be moved in any direction, but remember you have to make the necessary adjustments to allow the springs to fit perfectly the dies ref.D18M1, TAB.4.

#### MECHANICAL PARTS CONTAINED IN THE KNOTTER BOXES

##### ON THE BACK PIN REF. D10M2, TAB.12

D15M1 Knotting devices holding lever  
 D14M1 Three-arms lever for collet and truing jaws  
 D26M1 Spring straightener and wire adjusting control lever

##### ON THE CAM SHAFT, REF. D10M1

D13M1 Front race cam lever (D16M1) control  
 D17M1 Plate cam unit for knotting wheel (D16M3) locking  
 D21M1 Gear sector cam unit  
 D24M1 Roller and gear cam unit

#### CHECKS

In case of blockage of the knotters: take the endowed 27mm wrench and operate on the lower roller (ref.B13M1, TAB.4) nut; if by chance the knotters don't release, it is necessary

to detach the jointed shaft ref.D05/1M1, TAB.4 and 5, loosening the four respective screws by a 13 mm wrench; then, using the 16 mm Allen wrench into the cam shaft ref. D10M1 TAB.12 and shaking it, you'll be able to release the knotters from the obstacle. Reassemble the screws of the jointed shaft D05/1M1 in compliance with the phase red marks.

Make sure that the dies ref. D18M1, TAB.4 and the knotting wheels ref. D16M3, TAB.8 have been assembled according to the due spring dia. and wire thickness.

Check, by measuring with a gauge, the size of the fixed jaw ref. D19M1 TAB.11, that must be in compliance with the sizes indicated on the diagram of TAB.18.

Run the machine until the knotting wheel holding shell (ref.D16M2 TAB. 11) is in the higher position; set the jaws ref.D23M1 to the dies ref. D18M1; set the movable jaw ref. D19M2 to the fixed jaw ref.D19M1, TAB.11.

Check, by measuring with a gauge, the distance from the die (D18M1) to the knotting wheel (D16M3), as per the diagram of TAB.8. To obtain the right measure it is necessary to disassemble the back covering of the knotters, and using a 17 mm wrench to loosen the two bolts (A., TAB.12); then, using a 6 mm tap wrench, operate on the screws (B): loosening the back one and tightening the second one, the knotting wheel goes up; otherwise, it lowers until it finds the right measure as per TAB.18.

Once the right measure is reached, tighten well the 2 bolts (A, TAB. 12).

To adjust the length of the wire after the knotting, you need to act on the connecting-rod ref.D27M6, TAB.10 : block the hexagonal rod using a 17 mm wrench; then, using a 13 mm wrench loosen the two set nuts (the left upper one and the right lower one); if you turn the connecting-rod from left to right, you'll act on the knurled plate ref. D27M3 (which gets near the knotting wheel holding shell ref.D16M1),

and shorten the wire. If you make the opposite operations, you'll lengthen the wire.

In case the knot isn't well tight, you need to loosen (use a 13 mm wrench) the three bolts that block the knotting wheel holding shell ref.D16M1/M2, TAB.4; pushing it slightly forward the knot is tighter, on the contrary pulling it backward the knot loosens. Keep in mind that if the knot is too tight, the inside part of the spring base will be tending to close, and it will generate troubles both in going out of the dies and in the packer.

#### HEAT TREATMENT

The heat treatment is applied to the spring immediately after its making in order to eliminate the work-hardening and to reset the due elasticity.

The heating is given by a several grading transformer, with about 6 Kw. The average temperature of the spring is between 252° - 288° C. In order to modify the temperature, operate at first on the commutator of the electrical board (TAB.1). Remember that with large dia. wire, for instance 2.4 mm, it is possible to increase the active arc of the cam unit, which is part of the gear inside the crankcase, in front of the operator.

If you want to manufacture 4 turns springs, you must disassemble the long piece of the arc cam unit.

#### PACKER

The packer consists of an horizontal trough with divergent side panels, and adjustable in width to facilitate the springs to slide.

Each spring, after being released from the conveyer arms, remains suspended at the beginning of the side panels, between the two steel treated plates, waiting for two vertical bars

in horizontal reciprocating motion to bump into the two end rings of the staying spring, above their centre-line, making the spring roll forward to insert it into the already packed ones.

The rolling is aided by a steel plate which pushes the spring on the knot.

MATPARTS

HOW TO GET SPRINGS 150 M/M HIGH

1. Slightly tighten the screw which holds the coiling wheel (ref.B21M3, TAB.13) in order to increase the pitch.
2. Rectify the pitch retractor (ref.B29M4, TAB.1) inclination; obviously, you have to give it more inclination making sure that the wire passes over it.
3. Loosen the arm moving screw (ref.C19M3, TAB.9) at the most.
4. Operate on the pitch adjusting knob (ref.B25M2) until the springs fall in the centre of the conveyer clamp.
5. Then, adjust the top and bottom knotters, in order to allow the free entry of the springs.
6. Open proportionally the columns for the heat treatment electrodes.
7. Adjust the packer, according to the due size.

HOW TO PASS FROM 5 TURNS SPRINGS TO 4 TURNS ONES AND VICE VERSA

1. Remove the heads ref.C14/1M on the clamps, because the 4 turns springs could not pass touching the side parts of the above mentioned heads.
2. Remove the plastic crankcase which is on the cam unit.
3. Run the machine till the roller handle (ref.C20M1,TAB.16) is on the horizontal plane, otherwise the cam unit couldn't come out.
4. Loosen the fastening bolt of the cam unit, using the 8mm Allen wrench.
5. Loosen the fastening bolt for the lifting rod of the top roller (ref.B14M1, TAB.16) using the 22 mm wrench.
6. Draw the cam unit out, keeping high the idle pins of the pitch lever (ref.B22M1) and of the dia.( ref.B20M1,TAB.16).
7. Fit the other cam unit up tightening the bolts you had loosened before.
8. Using the 6 mm Allen wrench, move the packer by loosening the three screws on the side in front of the operator, and put it on the indicating marks.
9. Using the 6mm Allen wrench ( "T" shaped), loosen the control rod of the heat treatment pliers; using the 8mm Allen wrench, loosen the two bolts under the plate on the right hand side and set the required size up. Then, tighten the two above bolts and the rod. Afterwards, using the "T" shaped wrench, lift the right pliers in order to insert the endowed 2mm small plate under the above pliers, and the 1 mm small plate under the left side pliers; loosen again the control rod until you realize the 1mm plate is tighten, then well screw the control rod.



10. Bring the lower knotted ahead, inclining it of about  $15^{\circ}$ , in order to allow the springs to enter well.
11. Keep in mind that, since the wire length is about 15cm less and one turn less, from the cam unit that controls the microswitch and that is located in the keyed gear (main shaft) inside the plastic crankcase in front of the operator, you will have to remove the long arc shaped piece in order to have less time for current, and therefore less heat.

HOW TO PASS FROM THE WIRE OF 2 M/M DIA. TO A WIRE OF LARGER DIA  
AND VICE VERSA

1. Using a 27 mm wrench, loosen the roller (ref.B13M1, TAB.4) nuts and reverse or replace them (the rollers), according to the dia. of the wire.
2. Adjust the wire-out-guiding device (ref.B15M3), according to the dia. of the wire to use.
3. Replace the two knotting wheels (ref.D16M3,TAB.8) with the right ones, according to the dia. of the wire.
4. Adjust the wire-straightener (ref.B10M, TAB.4) till the wire comes out straight.
5. Insert the wire and check its length, as explained on TAB.18.
6. Operate on the coiling wheel (ref.B21M3, TAB.4) till the wire passes lightly on the pitch retractor (ref.B29M4,TAB.4).
7. Check that the spring bases dia. is the same; if not, operate on the dia. cam unit (TAB.15). As regards the pitch, consider valid the above operations again.
8. Adjust the length of the wire at the knot, operating on the rod ref. D27M6, TAB.10.
9. Check that the spring comes out straight, adjusting the stem ref. D19M3, TAB.11 located on the movable jaw (ref.D19M2)
10. Control the heat treatment device, adjusting the calorie on the 5-trip switch of the electrical panel.

WEIGHTS AND PRODUCTION DIAGRAM FOR 5 TURNS SPRINGS							
SPRING $\varnothing$ 90 x 130 WIRE DEVELOPMENT mm.1100	SPRING WEIGHT WITH DIFFERENT DIAMETER WIRE	SPRINGS PER MINUTE	WEIGHT IN kgs PER HOUR	SPRINGS PER MINUTE	WEIGHT IN kg. PER HOUR	SPRINGS PER MINUTE	WEIGHT IN kgs PER HOUR
		$\varnothing$ 1,90 gr. 25,00	<b>50</b>	75	<b>55</b>	82,5	<b>60</b>
	$\varnothing$ 2,00 gr. 27,75		83		91,5		99,5
	$\varnothing$ 2,10 gr. 30,60		91		100		110
	$\varnothing$ 2,20 gr. 33,58		100,5		110,5		120,5
	$\varnothing$ 2,30 gr. 36,70		110		121		132
	$\varnothing$ 2,40 gr. 39,83		119,5		131,5		143
SPRING $\varnothing$ 92 x 130 WIRE DEVELOPMENT mm.1120	$\varnothing$ 1,90 gr. 25,50	<b>50</b>	76,5	<b>55</b>	84	<b>60</b>	91
	$\varnothing$ 2,00 gr. 28,26		84,5		93		101
	$\varnothing$ 2,10 gr. 31,15		93		102,5		112
	$\varnothing$ 2,20 gr. 34,19		102,5		112		123
	$\varnothing$ 2,30 gr. 37,36		112		123		134,5
	$\varnothing$ 2,40 gr. 40,55		121,5		133,5		145,5
	SPRING $\varnothing$ 80 x 130 WIRE DEVELOPMENT mm. 990	$\varnothing$ 1,90 gr. 22,35	<b>50</b>	67	<b>55</b>	73,5	<b>60</b>
$\varnothing$ 2,00 gr. 24,75			74		81		89
$\varnothing$ 2,10 gr. 27,30			82		90		98
$\varnothing$ 2,20 gr. 30			90		99		108



TAB.A - BASE, COLUMNS AND THEIR FITTINGS

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
AO1M1	Base	1
AO2M1	Main column	1
AO3M1	Lower column	1
AO4M1	Column of the first knotter	1
AO4/1M1	Column of the second knotter	1
AO4/2M1	Adjustable support for the knotters	2
AO4/3M1	Height adjusting screw	2
AO4/3M2	Adapter for the reduction shaft	2
AO4/3M3	Set screw for the adjustable support	2
AO4/3M4	Clamping ring for the knotters	2
AO4/3M5	Ring terminal screw	4
AO4/3M6	BONFIGLIOLI reducer VF. 44 F R. 1/7	2
AO5M1	Main column sleeve (first and second)	1
AO6M1	Longer shaft for the first sleeve	1
AO6/1M1	Shaft for "MALTA CROSS" and spoon cam	1
AO6/2M1	Perpendicular transmission shaft	1
AO7M1	Main column perpendicular transmission sleeve	1
AO7/1M1	Lower column perpendicular transmission sleeve	1
AO8M1	Perpendicular transmission shaft for the lower column	1
AO8M2	Packer control crank	1
AO9M1	Double ring gear 1/2" X 5/16" Z = 48	1
AO9M2	Double pinion 1/2" X 5/16" Z = 15	1
AO9M3	Double pinion 1/2" X 5/16" Z = 16	1
AO9/1M1	Main column chain tightener	1
AO9/1M2	Bearing for the main column chain tightener	1
AO9/1M3	Double chain 1/2" X 5/16"	1
A10M1	Lower sleeve for the wire feeding rollers	1
A10M2	Upper sleeve for the wire feeding rollers	1
A10/1M1	Shaft for the lower sleeve (roller)	1
A10/1M2	Shaft for the upper sleeve	1
A11M1	Sleeve for the longer shaft of the lower column	1

TAB.A - BASE , COLUMNS AND THEIR FITTINGS

<u>Ref.</u>	<u>Description</u>	<u>QTY.</u>
A12M1	Double ring gear 5/8" X 3/8" Z = 30	1
A12M2	Double ring gear for the bevel pinion	1
A12M3	Double pinion for chain tightener 5/8X3/8 Z = 14	1
A12M4	Lower column chain tightener	1
A12M5	Double chain of 5/8 X 3/8 (lower column)	1
A15M1	Top and bottom nylon gear	2
A15M5	Ring gear of 5/8" Z = 24 ( handle )	1
A15M5bis	Hub for the gear ref. A15M5	1
A15M6	Ring gear of 5/8" Z = 24 (main shaft)	1
A16/1M	Cutter control disk	1
A15/2M1	Ring gear of 5/8" Z = 24 (bevel pinion)	1
A15/1M2	Helical bevel pinion for gears	2
A15/2M2	Helical bevel pinion for jointed shaft	2
A16/1M1	Quadruple gear 5/8" Z = 24	1
A15/3M1	Ring gear of 5/8" (torque limiting device)	1
A15/3M2	Torque limiting device without ring gear	1
A15/3M4	Lining disk for the torque limiting device	2
A16/1M2	Quadruple gear shaft	1
A16/1M3	Chain tightener for secondary transmission	1
A12M3	Pinion of 5/8" Z = 14 (chain tightener)	1
A16M1	Wire gripping bracket (roller pressure)	1
A16M2	Pressure spring	1
A16M3	Counter spring block	1
A16M4	Pressure adjusting screw	1
A17M1	Wire-straightener support	1
A18M1	Motor reducer support	1
A18M2	STOBER motor reducer R. 47/W3-2000 NK HP. 3	1

TAB. B - COILER

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
B01M1	Coiling block	1
B10M	Wire-straightener unit (without rollers)	1
B10M3	Grooved idle rollers	6
B10M4	Adjusting screws	2
B13M1	Wire feeding rollers	2
B13M2	Rollers and gear wheels locking washer	10
B14M1	Top roller lifting lever	1
B14M2	Oilless bush for the lever ref. B14M1	2
B14M3	Pin for the lever ref. B14M1	1
B14M4	Pin for the auxiliary lever ref. B14/1M1	1
B14/1M1	Auxiliary lever for top roller lifting	1
B14/1M3	Oilless bush for the lever ref. B14/1M1	1
B14/1M4	Wheel (NADELLA FG.12 - 32 EE)	1
B14/1M5	Steel bush for lever (B14/1M1) pin	2
B14/1M6	Wheel pin (FG.12 - 32 EE)	1
B14M5	Hexagonal threaded R. & L. bar	1
B14M6	Steel ball-and-socket joint $\varnothing$ 14 R.& L.	2
B15M1	Wire in-guiding device (wire $\varnothing$ 1.9mm to 2.4mm)	1
B15M2	Centre wire guiding device ( " " " " )	1
B15M3	Universal adjustable wire guiding device (1.9 To 2.4)	1
B15M4	Cores for the wire in-guiding and centre device	2
B16M1	Cam bearing unit (coiler control)	2
B16M2	Cam topped screw stem for lever ref. B20M1	2
B17M1	Wire length adjusting cam (5 turns)	1
B17/1M1	" " " " (4 turns)	1
B18M1	Pitch adjusting cam for 5 turns springs	1
B18/1M1	" " " " 4 " "	1
B19M1	Dia. adjusting cam " 5 " "	1
B19/1M1	" " " " 4 " "	1



TAB. B - COILER

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
B20M1	Dia. coiling lever	1
B20M2	Oilless bush for the lever B20M1	2
B20M3	Pin of the lever B20M1	1
B20M4	Lever control idle pin $\varnothing$ 26 mm	1
B21M1	Coiling wheel lever	1
B21M2	Oilless lever bush	2
B21M3	Coiling wheel (with bearings)	1
B21M4	Coiling wheel pin	1
B22M1	Lever arm of the pitch spacer control	1
B23M1	Lever arm for pitch adjustment (outer side)	1
B23M2	Hub for the pitch adjusting lever	1
B23M3	Oilless bush for the hub ref. B23M2	2
B24M1	Upper pitch adjusting lever unit	1
B24M2	Pin for the lever unit ref. B24M1	1
B24M3	Oilless bush for the lever unit ref. B24M1	2
B25M1	Tension rod with dia. adjusting wheel	1
B25M2	Tension rod with pitch adjusting wheel	1
B26M1	Bearing for the cutting nippers lever	1
B26/1M1	Auxiliary bearing for the cutting nippers lever	1
B27M1	Rocking lever for the cutting nippers	1
B27M2	Oilless bush for the lever	2
B27M3	Pin for the lever	1
B27M4	Top idle pin KRV pp. $\varnothing$ 30mm	1
B27M5	Bottom idle pin ( 40 X 13)	1
B27M6	Projecting part of the rocker lever control (B27M1)	1
B28M1	Pitch retractor bearing shaft	1
B28M2	Cutting nippers blade bearing shaft	1
B28M3	Thrust head of the retractor shaft	1
B28M4	Thrust head for the cutting nippers shaft	1
B28M5	Pitch spacer fastening block	1

TAB. B - COILER

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
B28M6	Thrust washer for the pitch retractor spring	1
B28M7	Supporting washer for the cutting nippers spring	1
B29M1	Fixed blade for the cutting nippers	1
B29M2	Traveling blade	1
B29M3	Pitch spacer bearing clamp	1
B29M4	Cylinder for the pitch spacer	1
B29M5	Widia rest plate for the wire end	1
B30M1	Coiling lever pin	1
B30M3	Pitch lever pin	1

TAB. C - CONVEYER

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
C11M1	Fixed wheel for arm diverging	1
C11M2	Bushing for the fixed wheel	1
C11M3	Spacer pin for the levers ref.C17-C18-C19	3
C11M4	Wheel spacer	1
C12M1	Hub for the conveyer device	1
C12M2	"MALTESE CROSS" disk	1
C12/1M1	" " stopping disk	1
C12/1M2	Idle pin for the disk krp pp $\varnothing$ 26	6
C12/1M3	Spacer for the disk	1
C12/3M	Arm supporting disk	1
C13M1	Rocking base for the arm	<u>6</u>
C13M2	Base adjustment foot	6
C13M3	Spheric idle pin (NADELLA, special)	6
C13M7	Pin for the arm blockage	12
C13M8	Gauged washer for the rocking base	12
C13M9	Combined bearings (NADELLA RAX 715)	12
C13M10	Nut with set screw (NADELLA IM-12-15-16)	12
C13M11	Counter-thrustbearing (NADELLA CP. 15-28)	12
C14/1M	Auxiliary head for clamp	6
C14M1	Core of the conveyer clamp	6
C14M2	Threaded sleeve for the clamp junction	6
C14M3	Clamp hook	6
C14M4	Hook rod	6
C14M5	Bottom tappet rod	6
C14M6	Spring cap	6
C14M7	Tappet cuphead screw	12
C14M8	Hook closing spring	6
C14M9	Sleeve adjustment nut	12
C14M10	Hook check pin	6
C14M11	Hook operation pin	6
C14M12	Knob for the hook release	6

TAB. C - CONVEYER

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
C15M1	Clamp control rocker lever	1
C15M2	Clamp release cam	1
C15M3	Roller bush for the rocker lever (NADELLA 18-16)	4
C15M4	Pin for the rocker lever	2
C15M5	Rocker lever screws M. 6X20	2
C15M6	Rocker lever lock washer	2
C15M7	Rocker lever with counter-balance	1
C16M1	Arm diverging cam	1
C16/1M1	Hub for the diverging cam	1
C16/1M2	Spacer sleeve for the diverging cam	1
C17M1	Three-arm-lever for the diverging control	1
C17M2	Idle pin KRV pp $\varnothing$ 30	1
C17M3	Oilless bush for the lever ref. C17M3	2
C18M1	Guided lever with two arms for the diverging action	1
C18M2	Oilless bush for the lever ref. C18M1	2
C19M1	Clamp position adjustment lever	1
C19M2	Oilless bush for the lever ref. C19M1	2
C19M3	Lever (C19M1) ADJUSTMENT SCREW	1
C19M4	Jointed head connecting rod for the lever junction	1
C19/1M1	Bottom arm diverging sector	1
C19/1M2	Central " " "	1
C19/1M3	Top " " "	1
C20M1	Roller crank for the "MALTESE CROSS" control	1
C20M2	Idle pin KRV pp $\varnothing$ 26	1
C30M1	Spring guiding spoon	1
C31M1	Spoon forearm	1
C31M2	Spoon arm	1

TAB. C - CONVEYER

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
C32M1	Sleeve for the spoon hub	1
C32M2	Roller bearings (SKF NKI 25/20 AND 30/20)	2
C32M3	Lever on the spoon control shaft	1
C33M1	Main lever for spoon operation	1
C33/1M2	Pin for the lever	1
C33M3	Oilless bush for the lever ref. C33M1	2
C33/1M4	Tension rod for spoon operation	1
C33M4	Idle pin KRV pp $\emptyset$ 26	1
C34M1	Spoon control cam	1
C34M2	Cam locking hub	1
C32M4	Lever arm	1

TAB. D - KNOTTERS

<u>Ref.</u>	<u>Description</u>	<u>QTY.</u>
DC5/1M1	Jointed shaft "ELBE"	2
DC5/1M2	Flange for the shaft junction	2
DC9M1	Knotting gears case	2
D1CM1	Shaft for the knotting cams	2
D1CM2	Pin for the knotting levers	2
D1C/1M1	Flange for the shaft junction to "ELBE" joint	2
D1C/2M	Roller bearing support for the cam shaft	4
D11M1	Resting disk for the knotting gears	2
D11/1M1	Cover for the knotter case	2
D12M1	Sector gear cam	2
D13M1	Knotter lever control cam	2
D13M2	Hub for the knotter lever control cam	2
D14M1	Wire gripping nippers lever	2
D14M2	Oilless bush for the levers ref. D14M1 AND D15M1	8
D14M3	Jaw control tension rod	2
D15M1	Bearing lever for the shell shaped knotter	2
D15/1M1	Adjustable arm for the shell bearing lever	2
D15/1M3	Lever adjusting cap	2
D16M1	Splined half-shell	2
D16M2	Half-shell without splining	2
D16M3	Knotting wheel	2
D16M4	Sliding wheel locking key	2
D17/1M1	Knotting wheel locking lever	2
D17/1M2	Bolt for the lever	2
D17/1M3	Idle pin KRV pp $\varnothing$ 19	2
D17/1M4	Roller set (NADELLA 13-12)	2
D17/1M5	Operating spring for the lever ref.D17/1M1	2
D17/1M6	Spring set screw	2
D17/1M7	Counter-key (ref.D16M4) screw	2
D18M1	Die (centering base)	2

TAB. D - KNOTTERS

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
D19M1	Fixed jaw for wire gripping nippers	2
D19M2	Traveling jaw	2
D19M3	Wire setting stem	2
D19M4	Threaded cap	2
D19M5	Shaped plate for threaded cap locking	2
D20M1	Jaw control gear lever	2
D20M2	Oilless bush for the lever ref. D20M1 and D21M1	8
D21M1	Jaw control double gear lever	2
D21/1M1	Pin for jaw control simple lever	2
D21/1M2	" " " " double "	2
D21/1M3	Base washer for D20M1 and D21M1	4
D21/1M4	Threaded blocks for jaw fastening	6
D22M1	Centre jaw control lever	2
D22M2	Oilless bush for the lever ref. D22M1	4
D22M3	Pin for the lever ref. D22M1	2
D22/1M1	Ball-and-socket joint for centre jaw lever control	2
D22/1M2	Screw of 9 X 1.5 M (ball-and-socket joint)	4
D22/1M3	Ball-and-socket base washer	4
D22/1M4	Roller bearings (NADELLA DL. 13-12)	4
D23M1	Spring end clamping jaw	6
D24M1	Gear and roller cam	2
D24M2	Hub for the gear and roller cam	2
D24/1M1	Wheel for cam (NADELLA FG. 5-16)	2
D25M1	Spring straightener operation lever	2
D25M2	Spring thruster	2
D25M3	Adjustable lever (D25M1) foot	2
D25M4	Stem for the spring thruster	2
D25M5	Adjustable fulcrum support	2



TAB. D - KNOTTERS

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
D25M6	Adjustable fulcrum for lever	2
D26M1	Wire-adjuster control lever	2
D26M2	Brass bearing in two parts	2
D26M3	Idle pin KRV pp $\emptyset$ 19	2
D27M1	Wire-adjusting lever	2
D27M2	Oilless bush for the wire setting lever	4
D27M3	Wire-thrusting knurled plate	2
D27M4	Pin for lever ref. D27M1	2
D27M5	Lever adjusting slider	2
D27M6	Ball-and-socket joint tension rod	2
D27M8	Lever (D27M1) return spring	2
D28M1	Top device for spring centering (1st knotter)	1
D28M2	Bottom " " " " (2nd knotter)	1

TAB. E - ELECTROTHERMIC UNIT

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
E1M1	Base of the unit	1
E2M1	Main column for the right electrode	1
E3M1	Column for the left electrode	1
E3M2	Brass bush for the columns	6
E3M3	Insulating plate	1
E4M1	Couple for the main right column	1
E4M/1	Ball-and-socket joining stem	1
E4M/2	Return equalizer	1
E4M/3	Stem adjusting clamp	1
E4M4	Clamp base washer	1
E4M3	Couple jaw for the main right column	1
E5M1	Couple for the lower left column	1
E5M2	Couple jaw for the lower left column	1
E5M3	Pin for pliers and equalizer	1
E6M1	Extensible tension rod with insulated joint	1
E6M2	Nut clamp for tension rod (till 1987 )	1
E6M3	Male strut with ball-and-socket joint	1
E6M4	Return spring for the lower column	1
E6M5	" " " " main "	1
E7M1	Main lever for the unit control	1
E7M2	Oilless bush for the lever ref. E7M1	2
E7M3	Eccentric pin for the lever	1
E8M1	Right spring guiding sheet	1
E8M2	Left " " "	1
E9M1	Right electrode	1
E9M2	Left electrode	1
E20M1	Connector block "ILME V 14"	1
E20M2	Cover for the connector block	1

TAB. F - PACKER

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
F1M1	Packer frame	1
F2M2	Support for bearing	2
F2M2a	Bearings (SKF 2202 = 15X35X14)	2
F3M1	Rocking bracket	1
F4M1	Bottom right and left fixed rod	1+1
F4M2	Conveying sliding rod (HEPCO)	2
F4M3	Top right and left fixed rod	1+1
F4M4	Steel slide ( HEPCO)	2
F4M5	Slide (HEPCO) bearings (JA7C)	8
F4M6	Terminal blade	2
F4M7	Ball joint rod for bracket linking	2
F4M8	Tension rod for the packer control	1
F5M1	Forward left bracket	1
F5M2	Centre " "	1
F5M3	Backward " "	1
F5M4	Forward right "	1
F5M5	Centre " "	1
F5M6	Backward " "	1
F6M1	Fixed spring check plate	1+1
F6M2	Plate shim(for F6M1)	4
F7M1	Left spring-guiding bar	1
F7M1 a	Right " " "	1
F7M2	Left spring feeding blade	1
F7M2a	Right " " "	1
F7M3	Spring guiding bracket	1
F8M1	Left support for steel strip	1
F8M2	Right " " " "	1
F8M3	Spring guiding steel strip	2
F10M2	Right and left spring opening prism	1+1

TAB. G - SWIFT

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
G1M1	Gear motor (reducer) SITI I 110 FBR R. 1:25	1
G2M1	Base	1
G2M2	Support for the swift control column	1
G2M3	Support for the wire guiding stake	1
G4M2	Motor support slide	1
G4M3	Base adjusting bolt	4
G5M1	Turning platform	1
G5M2	Swift centering guides for the platform	3
G5M3	Protection steel sheet for the platform	1
G6M1	Flanged platform support	1
G6M2	Left threaded bolt	1
G7M1	Swift control column $\varnothing$ 40	1
G7M2	Suspended wire supporting stem	1
G7M3	Micro stop stem	1
G7M4	Wire guiding brackets	2
G7M5	Column $\varnothing$ 40 for the adjustable wire-guiding device	1
G7M6	Column slider with widia wire-guiding device	1
G7M7	Swift control (AZ 6104) microswitch	1
G8M1	Wire control slider with ball bushes	1
G8M2	Static disk with ball bush	1
G8M3	Wire-guiding pulley for the slider	1
G9M1	Bush for the thrust-bearing	1
G9M2	Thrust bearing (SKF 51408)	1
G10M1	Support for the suspending wheels	3
G10M2	Pin for the Vulcon wheel	3
G10M3	Vulcon wheel with bearings	3
	Micro stop "PIZZATO FD 130"	1
	Motor "CARPANELLI" 1.5 HP	1
	Traveling pulley "VAR $\varnothing$ 160 ", hole $\varnothing$ 19/24	1
	Fixed pulley $\varnothing$ 160 X 28	1
	Belt "ROFLEX" - various 28X8X1250	1

TAB. H - ELECTRICAL EQUIPMENT

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
H22M1	Adjustable push-button panel	1
H22M2	Support for the adjustable arm	1
H22M3	Adjustable arm for the push-button panel	1
H23M1	Fixed cam unit for heat treatment	1
H23M2	Adjustable cam unit for heat treatment	1
H23M3	Microswitch support	1
H24M1	Stem for the emergency contact of the electroth. U.	2
H24M2	Insulating block for the stem	2
	Complete panel unit	1
	Complete electric wiring	1
	Heat treatment transformer, 6 Kw	1
	Transformer "ERC type 800762" , 220/380/24 V	1
	"OIL METER CAF 15" albero fermo control	1
	Device for "OIL METER" albero fermo control	1
	Swift delaying device "CROUZET 88.810.0"	1
	Electric spring counter "AC-NEA"	1
	Remote starter for the heat treatment B.30-30-0	1
	Remote control starter for the swift B.25-30-10	1
	Main remote control starter B.25-30-10+2 (contacts)	1
	5-trip switch "BREMAS"	1
	Main switch "BREMAS"	1
	Swift and heat treatment microswitch AZ 6104	2
	Swift limit switch "PIZZATO FD 130"	1
	Relays "CMRON"	2
	Fuses	6
	Pilot lamps	2

TAB. X - PROTECTION BOXES, CRANKCASES AND SPRINGS

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
X1M1	Transformer cover	1
X1M2	Terminal for the transformer cover	1
X3M1	Crankcase for the main column gears	1
X3M2	" " " lower " "	1
X3M3	" " lower column and diverging disk	1
X4M1	Oil protection steel sheet	1
X4M2	Front protection crankcase	1
X5M1	Hook connection for machine lifting	1
X6M1	Spring trough	1
X6M2	Steel plate for the trough junction	1
X7M1	Knotter cover	2
X8M1	Crankcase for the arm holding flange	1
X9M1	Tools container	1
X10M1	Spoon return spring	1
X10M2	Roller pressure spring	1
X10M3	Arm adjusting spring (on the disk)	1
X10M4	Back spring for the knot wire length adjuster	2
X10M5	Sliding key spring	2
X11M1	Traveling cutter return spring	1
X11M2	Pitch spacer spring	1
X11M3	Clamp hook spring	6
X11M4	Spring for the heat treatment lower column	1
X11M5	" " " " " main column	1
X11M6	Swift microswitch adjusting spring	1
X11M7	Knotter base spring	2
X12M	Arm running adjustment spring	1
X12M1	Spring for the jaw control tension rod	2
X12M2	Arm return adjustment spring	1
X12M3	Coiling wheel spring	1
	Lever greaser	1

TAB. X - PROTECTION BOXES, CRANKCASES AND SPRINGS

<u>Ref.</u>	<u>Description</u>	<u>Qty.</u>
	Pressure greaser	1
	Spray greaser for gears	1
	Spray greaser for chain	1

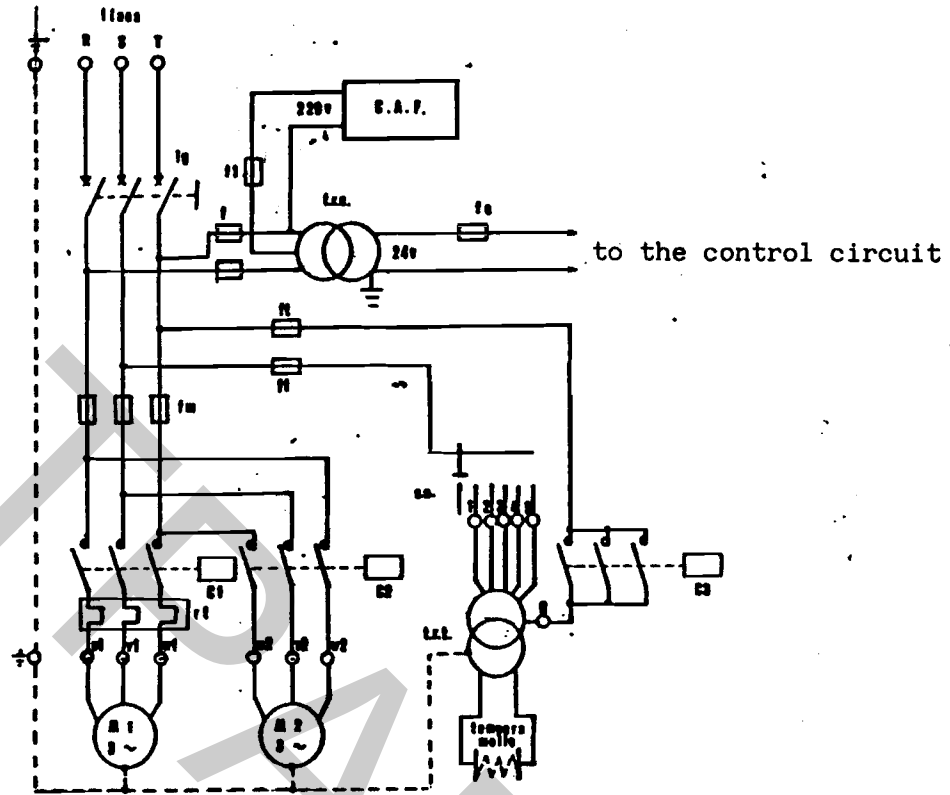
MATPARTS



L E G E N D

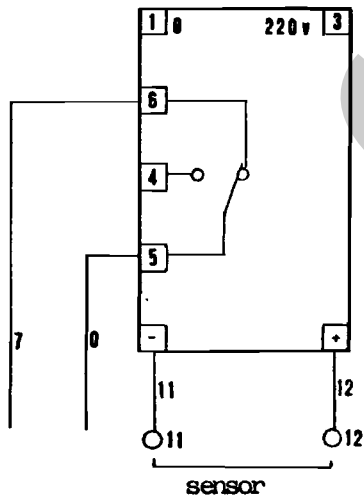
CONTROL AND PROTECTION BOARD FOR 380/415 ELECTRIC INSTALLATION ON COILING MACHINE

- IG - GENERAL SWITCH TYPE BREMAS ART. A 25.03/PL2 25A 500V
- CU - UNIPOLAR COMMUTATOR TYPE BREMAS ART. CS025MZ15/PL2 25A 500V
- TRC - TRANSFORMER FOR FEEDING THE CONTROLS TYPE ERC PN 160VA P 200-380/415V/S 24V
- TRT - TRANSFORMER FOR HEAT TREATMENT TYPE IDEOMAT PN 6KVA  
P380/415 S 14-15-16-17-18V
- CAF - SHAFT STOP CONTROL GRUPPO ISOIL SPA TYPE CAF15 220V
- C1 - MACHINE MOTOR CONTACTOR TYPE ABB ART.B25 30-10 11KW 380V AC3
- C2 - UNWINDER CONTACTOR TYPE ABB ART.B25-30-10 11KW 380V AC3
- C3 - HEAT TREATMENT CONTACTOR TYPE ABB ART.B30-30-00 15KW 380V AC3
- C4 - AUXILIARY RELAY TYPE OMRON ART. MK2P 24V AC
- C5 - AUXILIARY RELAY TYPE OMRON ART. MK2P 24V AC
- RT - THERMIC RELAY TYPE ABB ART. T25DU 3,5: 5A
- RIT - UNWINDER TIMER TYPE CROUZET ART.88810.0 0:264V AC:DC
- FC1 - SAFETY LIMIT SWITCH OF THE MACHINE TYPE PIZZATO ART.FD 130
- ES - MACHINE STOPPING ELECTRODES
- M - SPRING
- FC2 - UNWINDER LIMIT SWITCH TYPE MATSUSHITA ART.AZ 6104
- FC3 - HEAT TREATMENT LIMIT SWITCH TYPE MATSUSHITA ART.AZ 6104
- PR - STOP PUSH BUTTON TYPE BRETER ART. M6010R
- PG - UNWINDER CONTROL PUSH BUTTON TYPE BRETER ART.M6010G
- PV - MACHINE RUNNING PUSH BUTTON TYPE BRETER ART. M6010V
- PN - MACHINE JOGGING PUSH BUTTON TYPE BRETER ART. M6010N
- LG - HEAT TREATMENT SIGNAL, BULB E14 30V 15W
- LR - LINE SIGNAL, BULB E14 30V 15W
- FM - FUSE CARRIER TYPE CAFRULLO ART.4500/MSO 25A 500V  
FUSE TYPE NDZ-Z 13X50 16A
- FT - FUSE CARRIER TYPE CAFRULLO ART.2500/MSO 25A 500V  
FUSE TYPE NDZ-Z 13X50 25A
- FC - FUSE CARRIER TYPE CAFRULLO ART.4091/MSO 25A 500V  
FUSE TYPE NDZ-Z 13X50 6A
- F1 - FUSE CARRIER TYPE CAFRULLO ART.800V 10A 250V  
GLASS FUSE 5X20 2A
- F - FUSE CARRIER TYPE CAFRULLO ART.2500/MSO 25A 500V  
FUSE TYPE NDZ-Z 13X50 2A
- CP - PRODUCTION COUNTER TYPE HOKUY ART.AC-NEA6

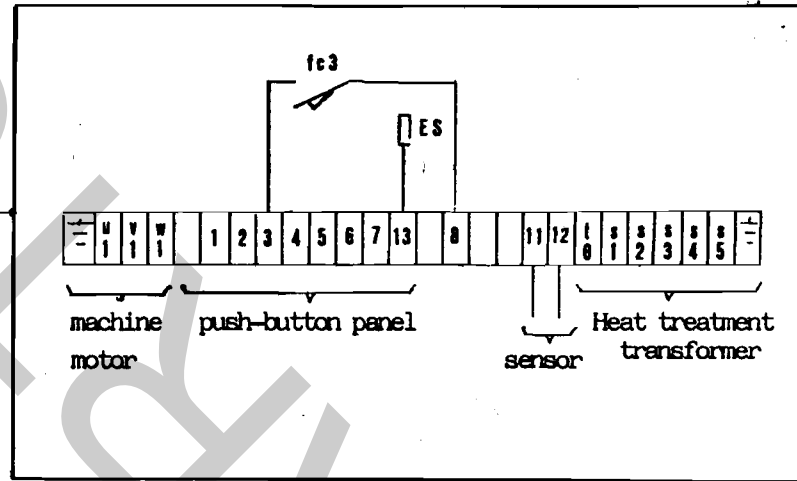


POWER DIAGRAM

detail of the shaft stop control



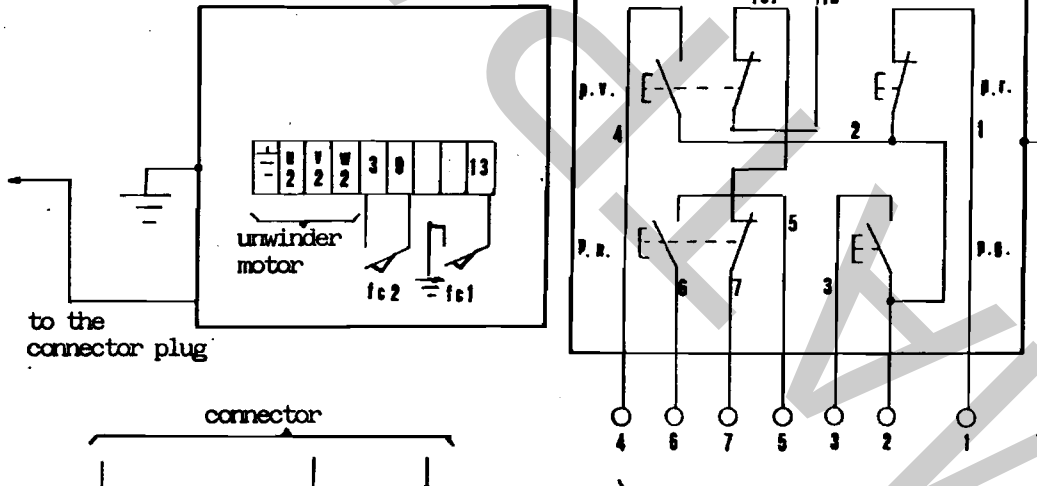
Detail of the first shunt box



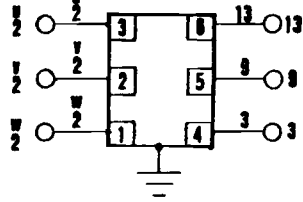
LEGEND

- l.g. General switch
- fc Control feeding transformer
- caf Shaft stop control 160VA, 24V feeding 220V
- f Fuses 2A
- f1 Fuse 2A
- fc Fuse 6A
- ft Fuses
- fm Fuses
- C1 Machine motor control contactor
- C2 Unwinder " " "
- C3 Heat treatment transformer control contactor
- C4 Auxiliary relay
- C5 " " "
- trt Heat treatment transformer
- rt Thermic relay
- rit Delaying device of the unwinder Jog
- fc1 Safety limit switch of the machine
- fc2 Jogging limit switch of the unwinder
- fc3 Jogging limit switch of the heat treatment transformer
- p.r. Red push button: STOP
- p.g. Yellow " " : UNWINDER JOG CONTROL
- p.v. Green " " : MACHINE RUNNING
- p.b. Black " " : MACHINE JOG CONTROL
- ⊗ Heat treatment jog signal
- ⊗ Line signal
- e.u. unipolar commutator with 5 positions, plus 0

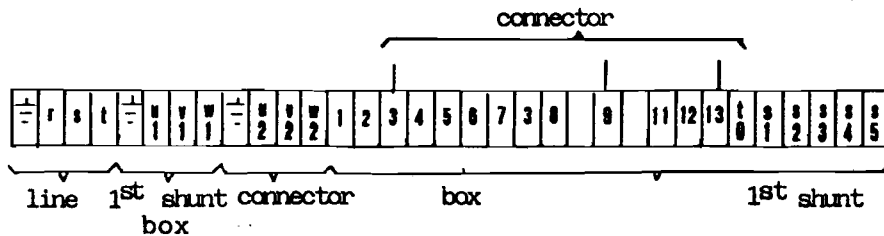
Detail of the second shunt box



detail of the connector



Detail of the main terminal board



Detail of the push-button panel

