Ralco s.r.l.

UNI EN ISO 9001

CSQ MED UNI CEI EN 46001

e:_documentazione\manuali_produzione\503-a\r503mlp-a_rev_d_ing.doc

MODEL
R 503 MLP/A

MOTORISED
X-RAY COLLIMATOR WITH LIGHT AND POTENTIOMETERS

CE 0051

INSTRUCTIONS MANUAL - MTR503MLP/A-ING.

Translated from the original document MTR503MLP/A

Date of issue:	Date of last Revision:	Issued by:
March 2000	**August 2005**	RALCO DIR RALCO AQ RALCO M.T.

DOCUMENT EFFECTIVITY

REVISION N.	DATE	COMMENTS
A	10.01.2003	MRD/002/03 - General Updating Of Manuals - Chapters Updated: Front Matter, Specifications, Substitutions; Warranty, Safety/Responsibility
B	10/10/2003	MRD/014/03 - improved descriptions for mounting, validations and warranty
C	12.10.2004	MRD/011/04 - Improved mechanical installation instructions
D	29.08.2005	MRD/021/05 – Electric waste label – See symbols and End of life Disposal

CONTENTS

LIST OF FIGURES AND DIAGRAMS

FRONT MATTER

TO THE USER OF THIS MANUAL

THE USER OF THIS MANUAL IS DIRECTED TO READ AND CAREFULLY REVIEW THE INSTRUCTIONS AND CAUTIONS CONTAINED HEREIN EVEN IF THE PERSON IS PERFECTLY CONVERSANT WITH THE INSTALLATION OF X-RAY COLLIMATOR.
COLLIMATOR INSTALLATION AND SERVICE IS TO BE PERFORMED BY PERSONNEL AUTHORISED BY THE MANUFACTURE OF THE X-RAY EQUIPMENT OR BY RALCO srl.
PERSONNEL MUST BE FAMILIAR WITH THE SAFETY STANDARDS COVERING ELECTROMEDCAL EQUIPMENT

THIS DOCUMENT WAS TRANSLATED FROM THE ORIGINAL ITALIAN VERSION MTR503MLP-A, ISSUED AND DISTRIBUTED BY RALCO srl MANUFACTURER OF THE X-RAY COLLIMATOR DESCRIBED. ADDRESS ENQUIRIES TO:

RALCO SRL
VIA DEI TIGLI 13/G
20046 BIASSONO (MI) - ITALIA
FAX: ++39-039-2497.799
EMAIL: RALCO@RALCO.IT

WARNING:
X-RAYS ARE DANGEROUS TO BOTH OPERATOR AND OTHERS IN THE VICINITY UNLESS ESTABLISHED SAFE EXPOSURE PROCEDURES ARE STRICTLY OBSERVED.
THOSE AUTHORISED TO OPERATE OR SERVICE THE EQUIPMENT MUST BE THOROUGHLY FAMILIAR WITH THE PROCEDURES REGARDING RADIATION PROTECTION..

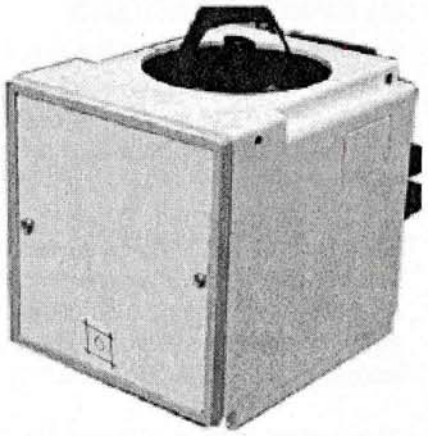
WARNING

THE COLLIMATOR DESCRIBED HEREIN CONFORMS TO THE REQUISITES DESCRIBED IN ATTACHMENT 1 OF CEE 93/42/CEE DIRECTIVE AND IS CLASSIFIED CLASS IIB ACCORDING TO ATTACHMENT IV OF THE SAME DIRECTIVE.
THE COLLIMATOR CONFORMS TO STANDARDS IEC 60601-1, IEC 60601-1-2, IEC 60601-1-3.
CONFORMITY IS ENSURED ONLY IF THE COLLIMATOR IS INSTALLED AND USED AS INDICATED IN THIS MANUAL.

THE COLLIMATOR IS TO BE INSTALLED ON A GENERAL PURPOSE RADIOLOGY UNIT CONFORMING TO DIRECTIVE CEE 93/42.
PROPER INSTALLATION, OPERATION AND MAINTENANCE OF THE COLLIMATOR SHOULD EXCLUDE OPERATION PROBLEMS OF THE COLLIMATOR AND OF THE SURROUND EQUIPMENT SINCE RALCO HAS SUCCESSFULLY PASSED EMC TESTING.
TEST THE GENERAL SYSTEM SAFETY IMMEDIATELY AFTER ITS INSTALLATION.
WHENEVER THE COVERS REQUIRE TO BE REMOVED CARE MUST BE TAKEN TO REMOUNT THEM CORRECTLY - SEE CHAPTER G) MAINTENANCE.

THE INSTRUCTIONS MANUAL SUPPLIES INDICATIONS ON STANDARD OPTIONAL MATERIAL. SPECIFIC DATA REGARDING THE VERSION PURCHASED IS PROVIDED BY THE LABEL OR BY ANNEXED DOCUMENTATION

A) DESCRIPTION



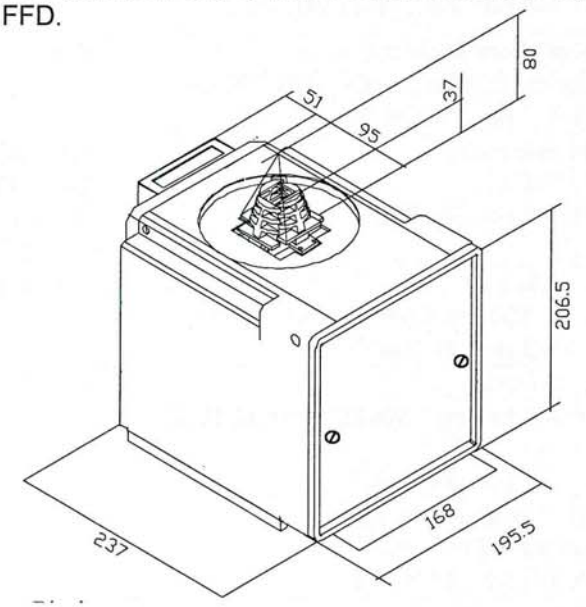
With a view to improving the appearance of the collimator, modification "A" entails the substitution of the metal cover with an ABS fire-retardant plastic cover.

Radiation leakage is controlled by lead-plating the collimator and, in part, the cover.
Multilayer, square field X-ray collimator.

Round and square-field X-Ray collimator for use in connection with an Image Intensifier, a Spot Film Device and a Potter Bucky. The square field is multilayered while the round field is single-layered.
The round field is defined by 12 lead shutters and is located between the two sets of square shutters positioned approximately half-way within the collimator casing. The square field is defined by six pairs of lead-lined shutters. Two pairs of shutters are positioned near the focus, two near the entrance window of the collimator and two pairs near the exit window of the collimator.

SPECIFICATIONS:

- Maximum X-Ray rating is 150 k V p;
- Minimum inherent filtration 2 mm. Aluminium equivalent. (1mm on request)
- High luminosity provided by a quartz iodide lamp.
- Timer limiting protection lamp exposure time to 30 seconds thus extending lamp life and preventing overheating.
- Mirror regulation is effected externally.
- Movement of shutters is motorised and shutter positioning is controlled by potentiometers.
- Continuos film coverage: square field from 0x0 to 43x43 cm at 100 cm FFD; round 10 cm (4") to 43cm(16") at 100 cm FFD.



B) SPECIFICATIONS

Square and round field X-ray collimator, designed for installation on **rotating or fixed anode X-ray tubes (EN 60601-1-3 par 29.202.3),** provides the motorised stepless adjustment of the x-ray field dimension to the size of the image receptor or to that of the anatomical area of interest. Adjustment is also possible from the collimator itself if the version is provided with a remote control.

Six pairs of lead-lined shutters, moved into the beam at right angles to each other, collimate the square field. Two pairs of lead-lined shutters are positioned near the X-ray and limit secondary radiation; two pairs are located at the x-ray beam inlet port and the other two pairs of shutters are positioned at the X-ray beam outlet port of the collimator and accurately limit the X-ray field.

The round field is defined by Twelve lead shutters, iris-arranged, move within the X-ray beam in a circle to collimate the circular field. All twelve shutters are positioned between the two sets of square shutters approximately midway in the collimator housing.

The direct visualisation of the X-Ray field is given by a light beam which correspond to the X-Ray beam, within a tolerance of two percent of the selected distance. The light-field centre is provided by the intersection of two perpendicular silk-screened lines into the Lexan window and projected on the light field by the light beam.

Field illumination is provided by a quartz iodide lamp (150W-24V) switched on by an electronic timer of through a remote control is this is available. Illumination time is limited to 30 seconds .
Average illumination is not less than 160 lux (16 foot-candles); edge contrast ratio is four to one.

Rev.A

• Inherent filtration Al. equivalent : x-ray beam = 75 kV EN 60601-1-3 par. 29.201.6 / 29.201.7	**Min. 2.0 mm. Al.**
• Limitation of Extra focal radiation: focus distance 80 mm , FFD (SID) 100 cm EN 60601-1-3 par.29.202.3	**< 150 mm**
• X-ray field selection : 100 cm FFD (SID) EN 60601-1-3 par. 29.202.4	**Min: 00 x 00 mm** (± 1% D.F.F.) **Max. 430 x 430 mm** (± 1% D.F.F.) **Round Field:** from Ø10cm to Ø60 cm (± 1% D.F.F.)
• Light field indicator: luminosity at 100 cm from the focus: EN 60601-1-3 par. 29.202.7.	**> 160 lx**
• Light field indicator : edge contrast setting 350x250 mm at 1000 mm FFD EN 60601-1-3 par. 29.202.7	**> 4 : 1**
• X-ray field indication precision: settings on an index scale EN 60601-1-3 par. 29.202.8	**< 2 % D.F.F.**

• Light field indicator precision : Light field/x-ray field correspondence: EN 60601-1-3 par. 29.202.9	**< 1 % D.F.F:**
• FDD (SID) : (optional) Precision of measurement with retractable tape EN 60601-1-3 par. 29.203.2	**< 2% D.F.F.**
• Leakage radiation : x-ray beam = 150 kVp / 4 mA EN 60601-1-3 par. 29.204.3	**< 40 mR/h**
• Lamp power supply: Standard lamp 24V 100 W OSRAM HLX 64638	**24V DC/AC** **50/60 Hz** **6.5A**
• Fuse, lamp	**4 Amp** delayed certified
• Power supply for standard motor	**24VDC - 0.5A**
• Fuse, motor	**315 mA** Delayed certified
• Potentiometers	1 turn 5Kohm long/cross 3 turns 5Kohm iris
• Weight:	11 kg
• Guides for accessories	Maximum load: • Static load **70N** (about 7.1Kg) • Dynamic load **15Nm** (about 3.06Kg)

Validation of specification data:

- Validation of **minimum filtration** of the radiation unit (x-ray tube, collimator and possible filters) must be performed on a completely installed system by the person responsible for the installation.
- Validation of **light field luminosity** is to be performed by determining average luminosity at four points in the field centre. Measurement of contrast ratio is obtained starting from the field edge by measuring 3mm inside the field and 3mm outside the field at a 1mm aperture.
- Validation of system **x-ray leakage** is to be performed following the installation of the system components.

Ralco is available to provide any information required regarding the validation methods described above.

WARNING
GUIDES FOR ACCESSORIES

PRIOR TO INSERTING ACCESSORIES IN THE GUIDES CHECK ON THE PERFECT FIT OF THE SUPPORT WITH THE MOUNTING SLOT ON THE COLLIMATOR (TOLERANCE MAX. ± 0,2 MM). A FAULTY FIT COULD BE DANGEROUS AND IT COULD CAUSE THE FALL OF ACCESSORIES.

Classification: EN 60601-1 par. 5

- Protection against electric hazards: **"Class I"** equipment
- Protection against direct and indirect contacts: **Type B** equipment with applied parts.
- Protection against water seepage : **"Common equipment"**
- Safety of operation in the presence of inflammable anaesthetics with air or oxygen or nitrous oxide: **Equipment not suited to application in the presence of inflammable anaesthetic mixtures containing air o oxygen of nitrous oxide.**.
- Operation conditions: **Equipment for continuous operation at intermittent loads .- See Operation Instructions on page F-1.**

Should label data on the collimator not correspond to the specifications herein, please inform Ralco of the non conformity.
Verifications of the specifications are to be performed according to the indicated equipment standards.

Operation environment:

- Ambient temperature = from 10°C to 40°C
- Relative Humidity = from 30% to 75%
- Atm. Press. = from 700 to 1060 hPa.

Accessories Included with the collimator

- Two guides to accommodate accessories
- Instructions Manual

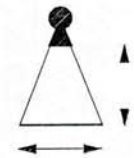
Optional Items:

- **RO 001** - Mounting flange, 20mm thickness
- **RO 002** - Spacers for mounting flange, 1,5mm thickness
- **RO 126** - Mylar mirror for 0,3mm Al, inherent filtration.
- **RO 161** - Guide spacers for ionisation chamber.
- **RO 175** - Glass mirror, 0,8mm thickness (2mm AL inherent filtration

Symbols:

SIMBOLI/ SYMBOLS	DESCRIZIONE /DESCRIPTION.	NO.	RIF.CEI
~	Corrente Alternata/Alternating Current	01-14	417-IEC 503
⎓	Corrente Continua/Direct current	01-18	417-IEC 5031
≂	Corrente continue e Alternata/Both direct and alternating current	01-19	417-IEC 5033
⏚	Terra di protezione/protective earth	01-20	417-IEC 5019
+	Più; polarità positiva/Plus; positive polarity	01-27	417-IEC 5005
−	Meno; polarità negativa/ Minus; negative polarity	01-28	417-IEC 5006

SIMBOLI/ SYMBOLS	DESCRIZIONE /DESCRIPTION.	NO.	RIF.CEI
	Entrata/ Input	01-36	417-IEC 5034
	Uscita/ Output	01-37	417-IEC 5035
	Controllo a distanza/Remote Control	01-38	-
	Controllo manuale/Manual control	01-45	ISO 7000-096
	Controllo automatico/ Automatic control (closed loop)	01-46	ISO 7000-0017
	Diaframma a iride aperto/ Iris diaphragm:open	01-69	417-IEC 5323
	Diaframma a iride: chiuso/ iris diaphragm: closed	01-70	417-IEC 5324
	Attenzione, consultare i documenti di accompagnamento/ Attention, consult accompanying documents	03-02	IEC 601-1
	Filtro di radiazione oppure filtrazione / Radiation filter or filtration	04-51	417-IEC 5381
	Indicatore luminoso del campo di radiazione/ Light indicator of the radiation field	04-54	417-IEC 5384
	Dispositivo di limitazione fascio: aperto/ Beam limiting device: open	04-55	417-IEC 5385
	Dispositivo di limitazione fascio: chiuso Beam limiting device: closed	04-56	417-IEC 5386
	Dispositivo di limitazione fascio con apertura separata della lamelle. Beam limiting device with separate opening of the shutters	04-57	417-IEC 5387
	Dispositivo di limitazione fascio con chiusura separata della lamelle. Beam limiting device with separate closing of the shutters	04-58	417-IEC 5388
	Apparecchio tipo B/type B unit		878-02-02
	Attenzione radiazione Laser/Caution Laser Radiation		60825-1
	Dispositivo sensibile all'energia elettrostatica/Electrostatic sensitive device		

SIMBOLI/ SYMBOLS	DESCRIZIONE /DESCRIPTION.	NO.	RIF.CEI
	Dispositivo impostazione dimensione cassetta/ Cassette size setting.		
	Dispositivo che richiede un corretto smaltimento DEVICE REQUIRING PROPER DISPOSAL	ATTCH.4	2002/ 95/CE

COMPATIBILITY WITH X-RAY TUBE HOUSING ASSEMBLIES:

Compatibility is determined by the possibility of complying mechanically with the dimensional drawing of Figure 1 - page O-1.

The tube housing assembly must have a minimum inherent filtration of 1 mm. Al. equivalent and a maximum radiation leakage of 30 mr/hour measured at one meter from the source when operating at its leakage technique factors (150 kVp at 4 mA).

Source values (tube housing-collimator) must not be less than 3mmm Al for filtration and must never exceed 100 mR/hr for radiation leakage.

Warning: Whenever the outer covers and the inner partitions require to be removed, re-mount with utmost care making sure they fit perfectly.

C) MOUNTING THE COLLIMATOR TO THE X-RAY TUBE:

WARNING

CAREFULLY FOLLOW THE MOUNTING INSTRUCTIONS AND MAKE SURE THAT THE COLLIMATOR IS CORRECTLY ASSEMBLED. INCORRECT MOUNTING COULD BE DANGEROUS: IT COULD CAUSE THE COLLIMATOR TO FALL OR TO OPERATE INACCURATELY

1. Determine the distance from the focal spot to the tube port face from the X-ray tube housing literature.

2. Subtract the resulting distance from 80 mm. (3.15") and determine how many 1.5 mm spacers combined with the 20 mm thickness of the mounting flange will be required to make up the difference. The outer face of the collimator mounting flange must be at 80 mm. (3.15") from the focal spot. Allowable tolerance is 1 mm. (0.009").

3. Select four bolts of suitable thread (M6) and of such a length that they protrude through the flange and spacers far enough to engage at least 5 threads into the tube port face. Securely bolt the flange to the tube port face.

4. Make sure that the flange is a Ralco item or that it is perfectly compatible. Figure 6 page O-6

IMPORTANT: to safeguard the operator and patient against the hazard of a falling collimator, the following indications are to be respected.

5. Unscrew the four mounting and centering adjustment Allen screws until the four tongues are withdrawn from the collimator top opening.

Note: when unscrewing the Allen screws that control the tabs do not use force exceeding 0,55 Nm.
Unscrew with care so as not to damage the fixing tabs

6. Manually adjust the collimator shutters to their widest setting. Carefully couple the collimator with the tube to ascertain that the primary shutters have clearance to move in the port opening.

Place the collimator on the flange. Tighten the four mounting screws equally until the collimator is held firmly on the tube housing, see Figure.. 1 – page O-1. The fixing tabs must conform to EN 60601-1 par. 28.4.. Ralco recommends an appropriate force which ensures safe locking of the tabs (± 5 cNm)

IMPORTANT: make sure to tighten the M6 Allen screws securing the control tabs. Appropriate tightening of the 4 Allen screws ensures secure mounting of the collimator. Tightening force used must not exceed 0.50 Nm.
Note: if the collimator is to be mounted on a ROTATING flange, use a tightening force between min. 0,50 Nm and max. 0.75 Nm.

7. Check to see that the distance from the collimator housing to the mounting flange is equal in all directions and that the collimator face is parallel to the axis of the table.

8. Should it be necessary, repeat the procedure.

D) POWER CONNECTION

THE VERSION SUPPLIED IS INDICATED ON THE LABEL.

WARNING

COLLIMATOR SUPPLY IS NOT PROTECTED BY A FUSE. CHECK THAT THE COLLIMATOR IS PROTECTED BY AN EXTERNAL FUSE PRIOR TO CONNECTION.

FUSE REQUIREMENTS: 8A DELAYED FOR THE 12V VERSION
4A DELAYED FOR THE 24V VESION

CABLES AND TERMINALS USED FOR THE INTERNAL CONNECTION OF THE COLLIMATOR MUST BE SUITABLE FOR OPERATION AT TEMPERATURES OF 70° C AND COLLIMATOR CURRENT ABSORPTION.

Collimator supply must conform to MDD 93/42

Collimator supply connection:

- Unscrew the three screws on the back cover and remove the cover.
- Loosen the free part of the cable clamp.
- Connect The AMP connector to the connector on the collimator.
- Tighten the cable clamp and screws to immobilise the cable.
- Reassemble the back cover.

WARNING

INCORRECT POWER SUPPLY COULD DAMAGE THE ELECTRONIC TIMER AND/OR THE LAMP.
SUPPLY TO THE QUARTZ IODIDE LAMP AND TIMER MAY BE EITHER IN ALTERNATE CURRENT OR DIRECT CURRENT - IN THE LATTER CASE MAKE CERTAIN THE POLARITY IS RESPECTED.

E) COLLIMATOR CALIBRATION

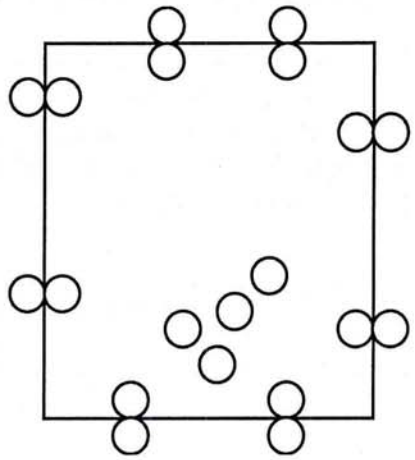
WARNING:
THE FOLLOWING PROCEDURES REQUIRE THAT X-RADIATION BE PRODUCED. TAKE ADEQUATE PRECAUTIONS TO SEE THAT NO PART OF THE HUMAN BODY IS EXPOSED TO X-RADIATION, DIRECT OR INDIRECT.

Centering of the X-ray beam

Place a 35x43 cm. (14x17") cassette on the table top or other flat, horizontal surface and position the x-ray tube/collimator assembly with the focal spot at 1 meter (40") above and with the x-ray beam perpendicular to the cassette surface. Do not use equipment scales for reference, but measure the distance from focal spot to cassette surface.

Note: if one meter FFD (SID) cannot be obtained, use the obtainable FFD that is closest to one meter and calculate the measurement tolerances as the appropriate percentages of the distance.

If the X-Ray beam cannot be oriented vertically, then make provision by using clamps, masking tape, etc. as required to place the test objects and image receptor at the specified FFD (SID) and perpendicular relative to the X-Ray beam as described in the following procedures.



- Use the collimator light to centre the cassette in the field.
- Mark the location of the cassette with masking tape or other means so that it may be removed and replaced in the same position.
- Place white paper on top of the cassette to provide maximum contrast for the light field.
- Set the collimator to provide a field size of 35x35 cm. (14x14") at one meter (40").
- Activate the light field and use it to position 20 coins as shown in the diagram.
- Position each pair of coins touching one another so that the inner coin is lighted as much as possible and the outer coin is lighted as little as possible.
- The points of tangency will define the edges of the light field. The extra four coins in the lower left corner will provide the means for orienting the film.
- Set the technique factors at the X-Ray generators to produce a density of about 1 (about 50 kVp, 5 mAs).
- Make an exposure. Remove the cassette and process the film. Use the test film to check the alignments: described in the following paragraphs.

Collimator to Focal Spot Alignment (Primary shutter Cut-off).

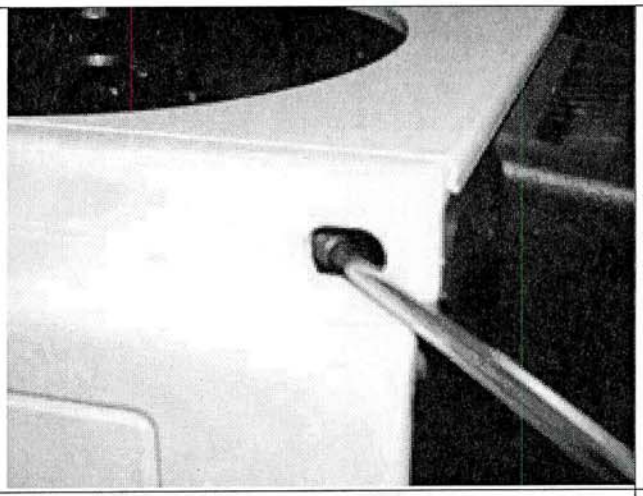
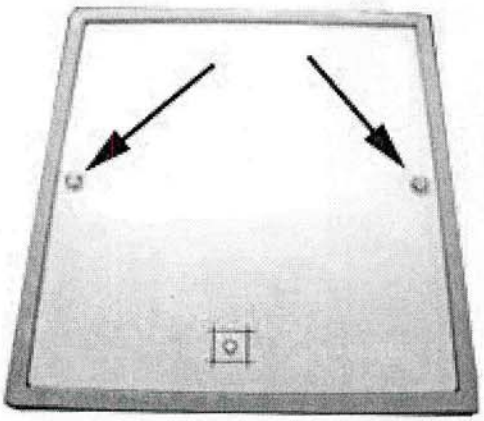
Inspect the four images of the four collimator shutters which form the edges of the X-Ray field. A definitely ill-defined edge indicates that the primary shutter, close to the focal spot, is the one forming the line, rather than the outermost shutter.

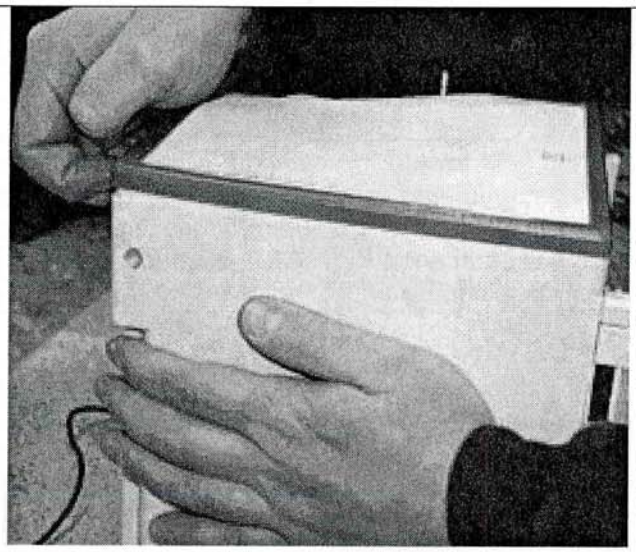
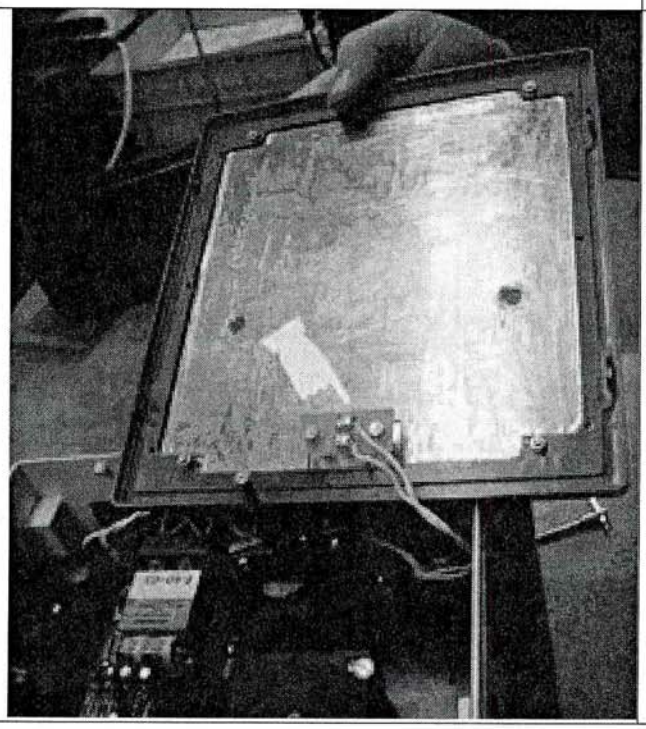
To correct the condition, use the four mounting/centering adjustment screws to shift the collimator in the direction of the ill-defined line.
Repeat the test film exposure after making the adjustment.

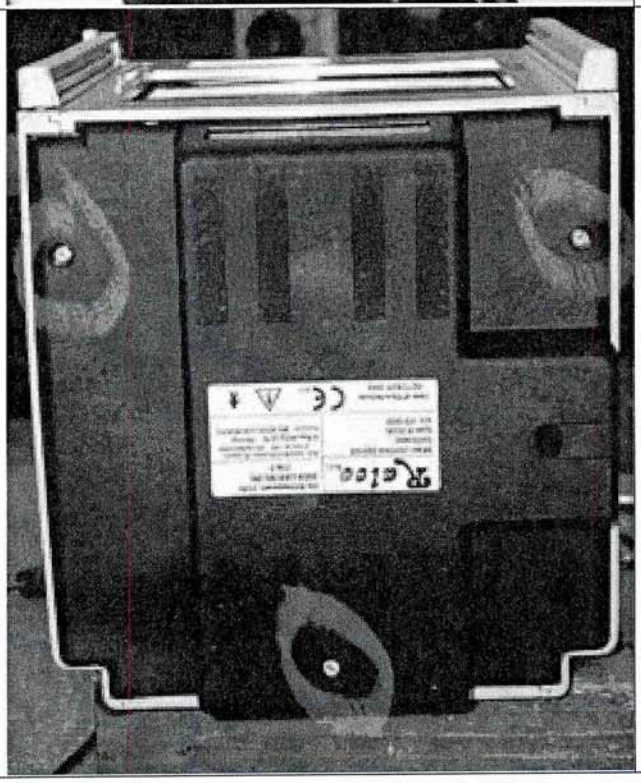
NOTE: The heel effect will cause the field toward the cathode to be slightly less sharp than on the other three sides . This is normal and cannot be corrected by adjustment. In addition, an X-Ray tube of 12 ° or less target angle will produce an asymmetrically shaped field when a large field size is used at short FFD (SID), because of anode cut-off effect. This is normal and may not be corrected by adjustment.

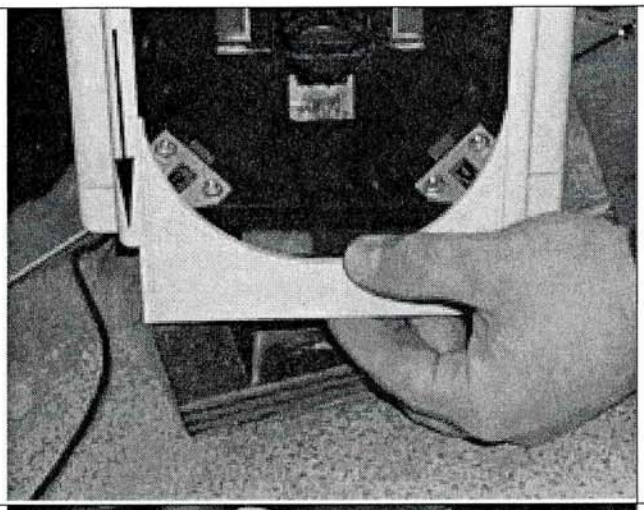
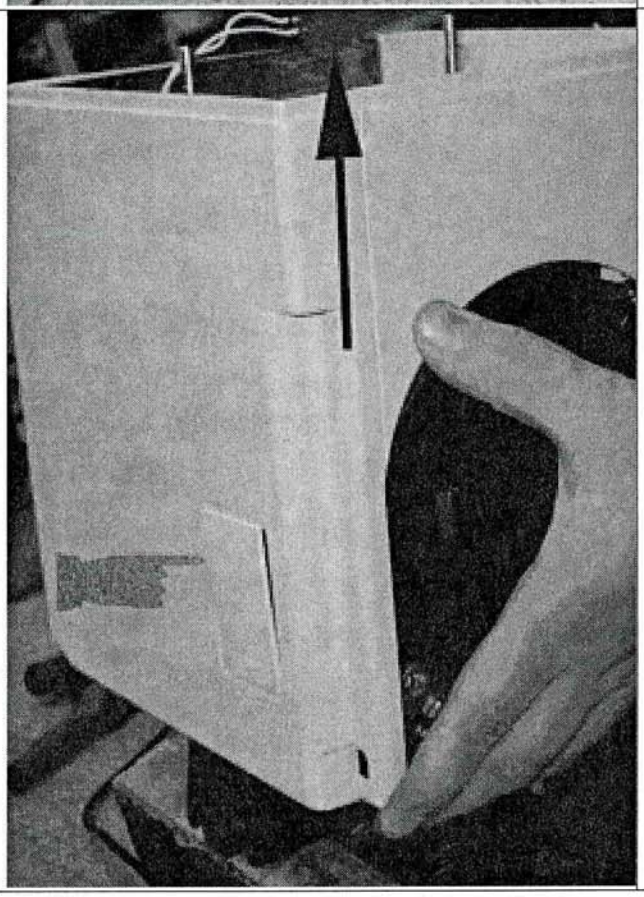
Cover removal

Rev.B

1		TIGHTEN THE FOUR ALLEN SCREWS TO FREE THE OPENING AND FACILITATE COVER REMOVAL.
2		UNSCREW THE TWO SCREWS ON THE FRONT PANEL.

3		REMOVE THE SNAP-FIT FRONT PANEL BY PRISING IT OFF AS SHOW IN THE PHOTOGRAPH.
4		UNSOLDER THE TWO WIRES INDICATE IN THE PHOTO.

5		TURN THE COLLIMATOR OVER AND UNSCREW THE FOUR SCREWS.
6		REMOVE THE REAR COVER BY UNSCREWSING THE 3 SCREWS.

7		PLACE THE COLLIMATOR LOWER SIDE DOWN AND SLIGHTLY RAISE. SLIP THE SEMI-CIRCLE OUT.
8		LIFT THE COVER UPWARDS GENTLY. THIS WILL ALSO RELEASE THE SMALL PANEL.

Light field to X-Ray Field Alignment.

EN60601-1-3 par 29.202.9

Regulations state that the total misalignment of the light field to the x-ray field in either the X (cross table) or Y (long table) direction must be less than 2% of the FFD. In this case, that is less than 20 mm (0.80"). If the test film shows that the light field, shown by the coin shadows, is congruent with the X-Ray field, shown by the shadow of the collimator shutters,

to within one coin diameter, if the diameter is less than 20 mm., then the alignment complies with the regulations.

However, the degree of precision required by Regulations is of a low order: A far greater precision of congruency can be obtained. The recommended maximum deviation is one fourth. You are urged to adjust for the greatest obtainable degree of congruency.

If misalignment is detected in both X and Y directions, check that the spacing from the focal spot to the collimator mounting surface is 80 mm. +/- 1 mm. (3.15" +/- .039"). If the spacing requires adjustment, repeat the test film exposure after the adjustment.
If the collimator mount spacing is correct, but adjustment is still necessary, do not move the collimator relative to the x-ray tube, but proceed as follows:

- Place the test film on the face of the cassette over the white paper and place the cassette in the position originally marked.
- Check the correct orientation of the film by the coin shadows.
- Using the images of the collimator shutters as the reference for the shape and size of the x-ray field, adjust the light field to be congruent to it.
- To move the light field in the cross table direction, first remove the plate from the right side of the collimator. Loosen the locking screws sufficiently to permit turning of the adjuster cam and allow mirror positioning, (Figures. 1 and 2 pages O-1 and O-2 respectively).
- Lock mirror screws and fixing cam into position after adjusting the mirror position. Remount the plate.
- To move the light field in the long table direction, remove the collimator rear and dissipator.

WARNING: DO NOT TOUCH THE LAMP, THE SOCKET, OR THE LAMP BRACKET WITH YOUR FINGER. THEY CAN BE VERY HOT AND CAUSE SEVERE BURNS.

- Loosen the four lamp-support fixing screws and using the hexagonal screw on the side of the lamp, adjust the lamp to make the two fields coincide (Figure 3– page O-3). The X-ray tube focus is not always in the same position; standard tolerance is ± 1mm.
- Use the countersink screw to correct this error – by loosening and tightening this screw the lamp filament travels toward or away from the mirror (see Figure 3 – page O-3)

WARNING:
DO NOT TOUCH THE LAMP, THE SOCKET, OR THE LAMP BRACKET WITH YOUR FINGER. THEY CAN BE VERY HOT AND CAUSE SEVERE BURNS.

Do not touch the lamp with your fingers, even when it is cold. Oil from your skin will cause the lamp to crack and possibly explode. If you have touched the lamp, wash off the surface with alcohol, then handle the lamp with a piece of paper.

1. Round- to-square field alignment

- Use fluoroscopy to align the round to square field alignment.
- Open the iris about 6" and close the square field until the shutter touch the round field.

- If the square is not centered on the circle, remove the cover from the adjustment screws; loosen the four screws and shift the iris assembly as required to centre it over the square.
- See Figure 4 - page O-4.

2. Crosshair alignment

- Activate the light field.
- Close the shutters to obtain a narrow strip of light See that the crosshair line is centered in the narrow light-line in each direction.
- If adjustment is required, remove the lower cover to gain access to the adjustment screws.
- Loosen the four screws and position the plastic panel to centre the crosshair lines in the light-lines. Tighten the screws

3. Friction brake adjustment

- If the shutters fail to hold their position or are to difficult to move, clutch adjustment is required to obtain adequate friction – Figure 3 on page O-3
- Remove the front plate to gain access to the adjustment point (Figure 3 - page O-3).
- Tighten, or loosen, alternatively by an equal number of turns, the two screws placed on the disk holding the spring. Remount the front panel.

4. Mechanical Motion Stop Adjustment of shutters

- The purpose of these stops is to prevent excessively stressing the shutters control linkage at the two extremes of travel, by positively limiting the rotation of the control shafts.
- Adjustment of these stops will not be required unless:
  a) The shutters cannot be completely closed or opened to the largest size.
  b) A resilience is felt at one or both extremes of the travel:
  c) The shutters themselves appear to limit the motion rather than the stops.

Setting of the CLOSED stop:

- Loosen the Allen screw placed on the side of the stop - see Fig. 3 page O-3
- Temporarily remount the knob and use it to bring the shutters to the closed position. Take care to use just enough pressure and no more than is needed to see that the shutters are touching each other.
- Use the field light to ascertain that shutters are closed.
- Rotate the stop to a standstill.
- Tighten the Allen screw.
- Open and close the shutters several times and check the shutters close fully just as the cam can be felt to strike the stop

5. Adjustment of potentiometers

Potentiometers are located on the rear ad right sides. To gain access to potentiometers:

- Remove the rear lid and lower cover (See figures 2 and 3 pages O-2 and O-3 respectively)
- Adjustment is possible through the two potentiometers support fixing screws
- Potentiometer calibration is possible by loosening the gear pin and turning to potentiometer shaft – see figures 2 and 3 on pages O-2 and O-3 respectively)-

F) OPERATION INSTRUCTIONS

WARNING

PROLONGED LIGHTING WITHOUT ALLOWING THE LAMP TO COOL CAUSES THE COLLIMATOR TO OVERHEAT IN THE AREA NEAR THE LAMP –

FOR EMERGENCIES: MAXIMUM LIMIT ADVISED IS 5 SUCCESSIVE LAMP OPERATIONS. ALLOW THE COLLIMATOR TO COOL (ABOUT 10 MIN.)

THE OPERATE MUST AVOID OVERHEATING THE COLLIMATOR AND CARE MUST BE TAKEN NOT TO SCORCH HIMSELF OR THE PATIENT

The collimator is normally operated by activating the pushbutton on the front panel to switch the light field ON

The collimators has been designed to operate as follows:

- Supply constantly connected during operation of the equipment.
- Light ON time is adjustable from 15 to 45 seconds via the trimmer on the electronic board. The factory setting is 30s (tol.20%)
- A normal cycle of lamp ON / OFF of is established at 2 followed by 4 minutes to allow for cooling (i,e. 1 minute ON / 4 minutes OFF)
- A normal on/off cycle which includes the cooling period is set at 10 cycles.
- Rays are permitted by the external electronics that control the collimator.

Rev.B

G) ROUTINE MAINTENANCE

To ensure constantly safe performance of the collimator and its compliance with applicable regulations, a maintenance program is indispensable.

It is the Owner's responsibility to supply or arrange for this service.

Cleaning recommendations

- The collimator housing must be cleaned as prescribed by the Sanitary Regulations followed by the operator.
- Disconnect supply
- Use non abrasive cleaning products. Care must be taken to prevent liquid from entering the collimator. **N.B.** the collimator cover is not watertight.
- Do no re-apply power if liquids of any nature, inflammable or otherwise, have entered the collimator. . See the following Maintenance instructions

Recommended maintenance programme:

Ralco suggests a yearly servicing programme. However shorter intervals are advisable when the collimator is subject to heavy workloads.

Re-calibration of the collimator will be necessary whenever the x-ray tube is changed or at each substitution of the lamp used to simulate the light field. Calibration procedures must be performed as described in this manual.

1. Check that the screws and tabs which serve to secure the collimator to the flange/tube adapter are correctly tightened.
2. Remove the covers and panels from collimator. Inspect the moving parts for signs of wear or damage.
3. Check the electric system and substitute parts that show wear.
4. Check the Lexan panel and substitute if necessary.
5. Clean the collimator with a soft cloth paying particular attention to the Lexan window. **Do not** use abrasive or inflammable cleaning products.
6. Sparingly lubricate the moving parts using graphite oil.
7. Wipe away all excess oil.
8. Remount the cover.
9. Check that the screws fixing the covers and guides are properly tightened.

IMPORTANT: make sure to tighten the M6 Allen screws securing the control tabs. Appropriate tightening of the 4 Allen screws ensures secure mounting of the collimator. Tightening force used must not exceed 0.50 Nm.
Note: if the collimator is to be mounted on a ROTATING flange, use a tightening force between min. 0,50 Nm and max. 0.75 Nm.

H) TROUBLESHOOTING

Should the Collimator become faulty do not use it until completely repaired. The use of a faulty collimator might impair the safety of the operator and patient.
Before returning the collimator to Ralco for repair, please make sure that it isn't one of the following problems to cause the fault.

PROBLEM	CAUSE	SOLUTION
The lamp fails to switch on	The collimator is not supplied correctly	Check supply/ Tension/current/polarity/ Fuses
	The lamp is faulty	Check filaments - substitute if necessary. See **Substitution Of The Lamp** On Page I-1
	Timer is faulty	Check supply to the timer. If there is no output tension, substitute the timer. See **Substitution Of The Electronic** Timer on page I-1
	ON-Off button is faulty	Check contacts - substitute if necessary
The lamp fails to switch OFF	The timer is faulty.	Substitute the timer – see **Substitutions** on page I-1
	The pushbutton is faulty:	Substitute the pushbutton.
The collimator is not centred:	Mirror is not positioned correctly	See Chapter **Collimator Calibration** page E-1
Shutters fail to move	The motor is faulty	Check: Supplier/ voltage/ current/ fuses.
	Clutch is loose	See Friction brake adjustment page E-7
Shutters fail to position correctly	External electronics faulty	Consult Manual supplied with unit that controls the collimator.
	Potentiometers are faulty or incorrectly calibrated	See potentiometer adjustment procedures on page E-7or substitute the potentiometers as required – page I-1
The external housing is damaged:	**X-ray leakage hazard.**	Substitute housings
Light edge definition is not good.	Light screens not aligned correctly	Adjust the screens – Figure 3 page O-3

I) SUBSTITUTIONS, DISASSEMBLY, TRANSPORT

Substitutions:

The following operations must be performed by technically prepared and authorised personnel.

See Figure 5 –Illustrated parts breakdown - page O-5

Substitution of the lamp:

WARNING: DO NOT IMMEDIATELY TOUCH THE DISSIPATOR WITH YOUR FINGURES IT COULD BE HOT AND CAUSE SEVERE BURNS.

WARNING: DO NOT TOUCH THE LAMP, THE SOCKET, OR THE LAMP BRACKET WITH YOUR FINGER. THEY CAN BE VERY HOT AND CAUSE SEVERE BURNS.

- Disconnect supply
- Remove the back panel
- Remove the lamp protection dissipator
- Carefully remove the faulty lamp.
- Substitute the lamp with an identical lamp
- Make sure that the lamp pins are completely inserted in the lampholder
- Check on light field/x-ray field correspondence
- If necessary remove the lamp, rotate it 180° axially and re-insert.

Substitution of the motors

- Disconnect supply
- Remove the knobs and front panel
- Unsolder the connecting wire on the motor tabs; identify the cables and their position
- Unscrew the motor support from the front side
- Substitute the support with an identical part
- Remount the support with a new motor – do not tighten the screws.
- The plastic gears are not always uniform: a possible deformation could block or stiffen the movement. Check that shutters move from completely open to completely closed uniformly. Allow minimum play between gears.

Substitution of the electronic timer:

- Disconnect Supply
- Remove the knobs
- Remove the front panel.
- Remove the two screws holding the electronic timer.
- Identify the cables and their position on the terminal board.
- Disconnect the cables from the terminal board.
- Install the new timer by proceeding in a reverse order and pay particular attention to the connection of the cables to the 6-way terminal board.

Substitution of the potentiometers

- Disconnect supply to the collimator
- Remove the rear panel
- Remove the lower cover
- Unscrew the two potentiometer support fixing screws
- Unsolder the wires connecting the potentiometer pins; identify the cables and their position.
- Unscrew the two potentiometers stops and remove the gear on the potentiometer shaft.
- Substitute with an identical potentiometers and mount the fear on the shaft without tightening the screw.
- Solder the wires; remount the potentiometer support
- Calibrate the potentiometers – page E-5
- **Prior to remounting the front panel and knobs, close both shutters. Adjust the indicator to read correctly.**

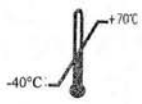
Disassembly

- Disconnect supply to the collimator.
- Remove the rear panel and disconnect the supply cables.
- Loosen the 4 fixing screws on the upper part of the collimator - **care must be taken not to let the collimator fall.**

Rev.A

Transport and storage:

- Suitable packing must be provided for the collimator.
- **Place the collimator in a plastic bag to avoid packing material from entering the collimator.**
- Use an appropriate box for transport, shipment or storage taking care to protect the collimator from rough handling. This will avoid damage to the collimator during transport shipment or storage.
- Limit Storage conditions:
  Ambient Temperature = from -40°C to +70°C
  Relative Humidity = from 10% to 95%
  Atm. Pressure = from 500 a 1060 hPa.



J) RECOMMENDED SPARE PARTS

NOTE: When ordering spare parts, the Client is requested to specify the model and Serial Number of the collimator concerned.

RO 001	Mounting flange, fixed
RO 002	Spacer, metal, 1,5mm thick.
RO 051	Mounting flange, rotating
RS 393	Antidust panel with cross.
RS 006	Lamp. 100 W 24V
RS 022	Motor "Minimotor" 12V r. 548:1 square fied
RS 023	Motor "Minimotor" 24V r. 548:1 square field
RS 033	Ceramic lamp-holder.
RS 036	Potentiometer, iris, - SP Electronic 533 1 Kohm
RS 045	Plastic pinion, round, for square field shutters.
RS 046	Clutch for square field shutters.
RS 047	Pushbutton
RS 061	Motor "Minimotor" 24V r. 308:1 for iris
RS 063	Electronic timer FM 338 24V
RS 092	Lamp100 W 12V
RS 098	Motor "Minimotor" 12V r. 308:1 for iris
RS 100	Potentiometer for iris - SP Electronic 533 5 Kohm
RS 101	Potentiometer for iris - SP Electronic 533 10 Kohm
RS 139	Clutch for iris shutters.
RS 204	Electronic timer FM 338 12V
RS 282	Potentiometer, servo, square field 1Kohm
RS 283	Potentiometer, servo, square field 5Kohm
RS 284	Potentiometer, servo, square field 10Kohm
RS 390	Cover
RS 394	Right guide for accessories
RS 395	Left guide for accessories
RS 402	Lateral panel, leaded
RS 403	Upper cover, semicircular
RS 404	Cover screws T.S. m3x22
RS 424	Plastic frame
RS 430	Rear cover, leaded
RS 431	Glass mirror, 1.5mm, with filter.
RS 432	Front panel, leaded, with light pushbutton.
RS 433	Front panel, leaded without light pushbutton.

Label:

K) REPAIRS

- Return the collimator to Ralco At the customer's expense if the unit is out of warranty.
- Provide the collimator with a detailed description (in Italian or English) of the functional problems and/or faults. It is important to indicate whether a repair or a complete overhaul is required.
- Our Quality Control will test the collimator.
- If the repair involved is extensive, Ralco will contact the customer to advise on the repair or possible substitution.

L) END OF LIFE DISPOSAL

Your collimator contains materials which can be recycled and reused.
Specialised companies can recycle your product to increase the amount of reusable materials and to minimise the amount of materials to be disposed of.

It is recommended that you observe Local Laws regulating the disposal of your old set. Should this prove impossible, return the collimator to Ralco at the purchaser's expense and Ralco will take care of its correct disposal.

The product requires correct disposal at the end of its life-cycle and according to the current standards; it cannot be considered as normal waste. The unit must be disposed of through certified environmental management concerns or, should you need to replace the unit with new equipment, returned to Ralco. Please contact us if you require further information.
The product contains lead which, if dispersed can be highly contaminating.
The symbol:

signifies that the products conforms to the environmental requirements of directives 202/95/EC, 2002/96/EC, 2003/108/EC; it must be disposed of correctly at the end of its life-cycle.
Ask you local authorities for disposal information. Failure to disposal of this product correctly is a breach of these provisions.

M) WARRANTY:

Rev.B

Ralco undertakes to replace and repair any collimator part during a period of 24 months from the date of invoice and cover the labour costs involved.
The warranty applies provided the product has been handled properly in accordance with its operating instructions; presentation is required of the original invoice indicating the date of purchase, the model and serial number as well as other documents originally supplied with the set.

The warranty does not apply if:

- The documents have been altered in any way or made illegible;
- The model or production number on the product has been altered, deleted, removed or made illegible;
- Repairs or product modifications and alterations have been performed by unauthorised persons;

- Damage is caused by misuse or neglect, incorrect installation or accidental damage including but not limited to lighting, water or fire.
- Use of unoriginal spare parts and accessories.

In-warranty spares will be available only upon return to Ralco, at the customer's expense, of the parts considered to be faulty to allow assess the cause of the fault.

Components not covered by this warranty:

- Consumable items such as lamps.
- Items not produced by Ralco; these items will be accorded to warranty granted by the constructor:
  - Motors - 1 year
  - Potentiometres: 1 year
  - Electronic boards: 1 year
  - Laser 12 months

Ralco reserves the right to decide if the collimator is to be repaired or substituted.
Defective material is to be sent to:

RALCO SRL
VIA DEI TIGLI 13/G
20046 BIASSONO (MI) - ITALIA
FAX: ++39-039-2497.799
EMAIL: RALCO@RALCO.IT

N) SAFETY/RESPONSIBILITY

Rev.A

Ralco adheres to the directives governing manufacturers of electro-medical equipment:
Directive 93/42 CEE para.10
Legislative Decree n° 46 para.10

Ralco shall not be held responsible when instructions provided in the present manual are not complied with.

Ralco shall not be held responsible if the collimator relates to one or several of the following instances:

- The unit is of Ralco construction to client specifications (no CE marking)
- The unit has been modified by the OEM or end user.
- The unit has been installed without respecting the instructions provided in this manual.
- The unit is used without respecting the instructions provided in this manual.
- The unit has not been subject to routine functional inspection.
- The unit has not been subject to routine maintenance.
- The unit has been repaired with unoriginal spare parts.
- Ralco shall decline all responsibility for any damage, direct or indirect, caused to persons or things by inappropriate accessories.

INFORMATION REGARDING ACCIDENTS THAT HAVE OCCURED WHILE USING THE RADIOLOGICAL COLLIMATOR MUST BE REPORTED IMMEDIATELY TO RALCO SRL.

O) FIGURES, DIAGRAMS, TABLES

NOTE: SHOULD THE ELECTRIC DIAGRAM REQUESTED BY YOU DIFFER FROM THE STANDARD UNIT SUPPLIED – PLEASE SEE THE ATTACHMENTS.

Figure 1

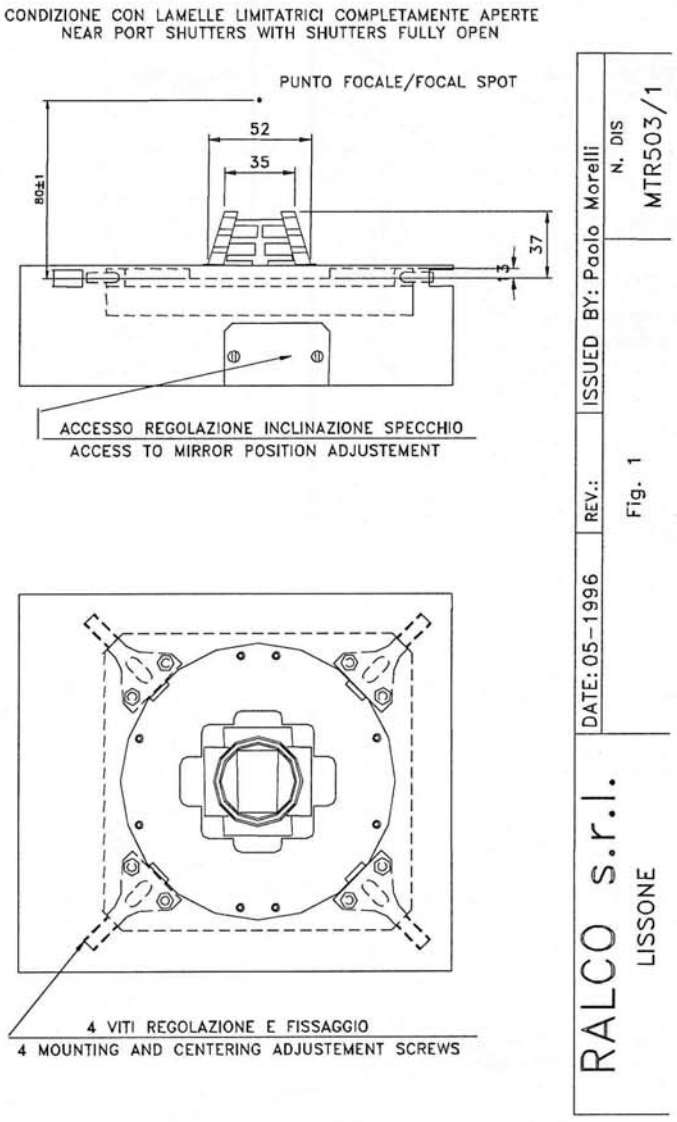
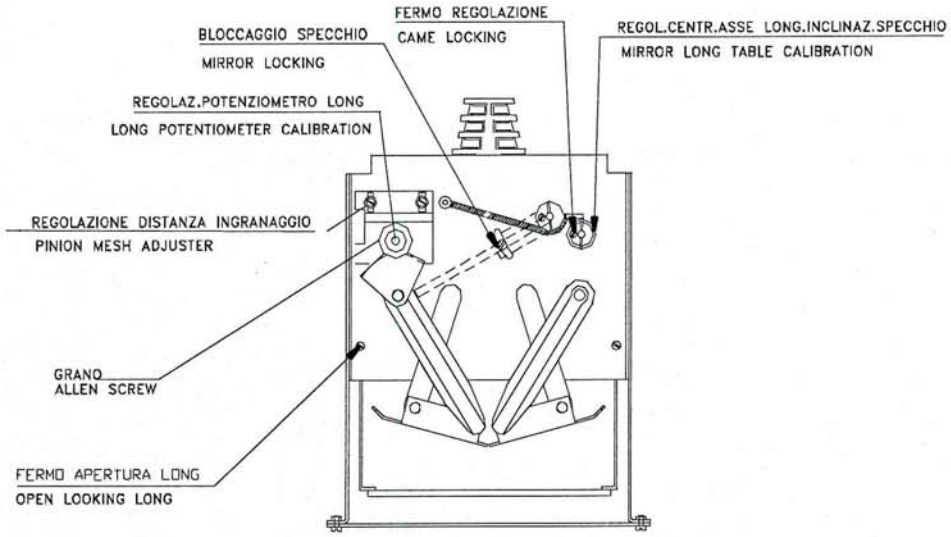


Figure 2



MTR503/2A

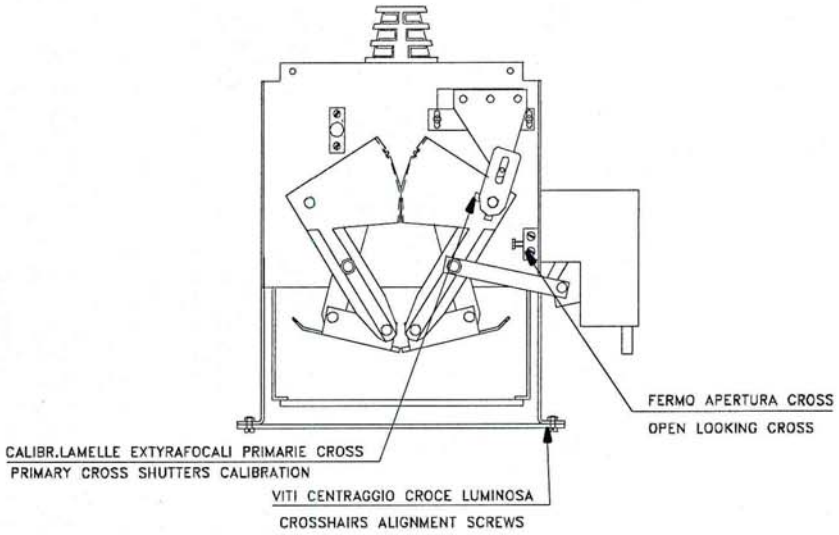


Figure 3

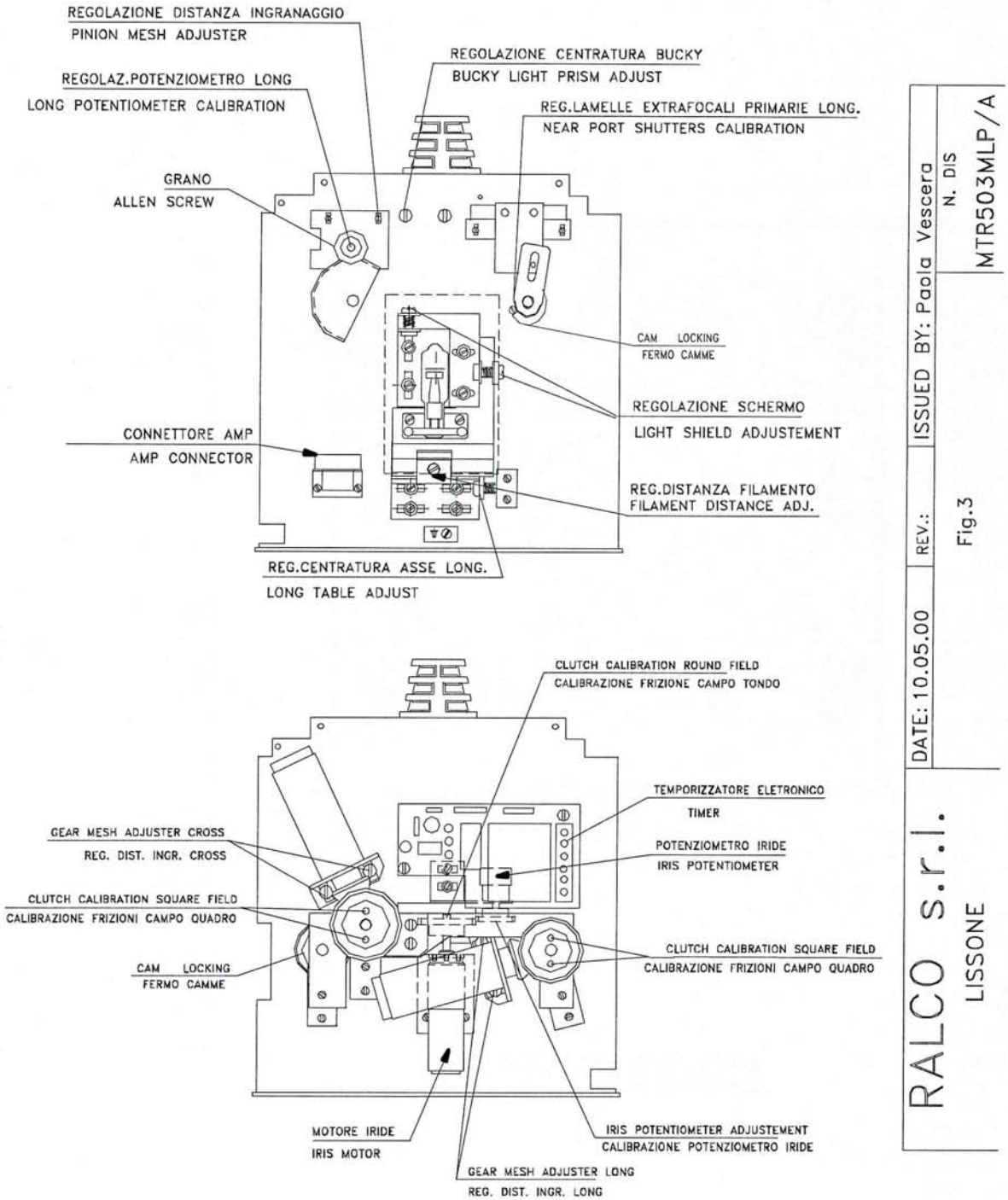

REGOLAZIONE DISTANZA INGRANAGGIO
PINION MESH ADJUSTER
REGOLAZIONE CENTRATURA BUCKY
BUCKY LIGHT PRISM ADJUST
REGOLAZ.POTENZIOMETRO LONG
LONG POTENTIOMETER CALIBRATION
REG.LAMELLE EXTRAFOCALI PRIMARIE LONG.
NEAR PORT SHUTTERS CALIBRATION
GRANO
ALLEN SCREW
CAM LOCKING
FERMO CAMME
REGOLAZIONE SCHERMO
LIGHT SHIELD ADJUSTEMENT
CONNETTORE AMP
AMP CONNECTOR
REG.DISTANZA FILAMENTO
FILAMENT DISTANCE ADJ.
REG.CENTRATURA ASSE LONG.
LONG TABLE ADJUST
CLUTCH CALIBRATION ROUND FIELD
CALIBRAZIONE FRIZIONE CAMPO TONDO
TEMPORIZZATORE ELETRONICO
TIMER
GEAR MESH ADJUSTER CROSS
REG. DIST. INGR. CROSS
POTENZIOMETRO IRIDE
IRIS POTENTIOMETER
CLUTCH CALIBRATION SQUARE FIELD
CALIBRAZIONE FRIZIONI CAMPO QUADRO
CAM LOCKING
FERMO CAMME
CLUTCH CALIBRATION SQUARE FIELD
CALIBRAZIONE FRIZIONI CAMPO QUADRO
MOTORE IRIDE
IRIS MOTOR
IRIS POTENTIOMETER ADJUSTEMENT
CALIBRAZIONE POTENZIOMETRO IRIDE
GEAR MESH ADJUSTER LONG
REG. DIST. INGR. LONG
DATE: 10.05.00
REV.:
ISSUED BY: Paola Vescera
N. DIS
MTR503MLP/A
Fig.3
RALCO s.r.l.
LISSONE

Figure 4

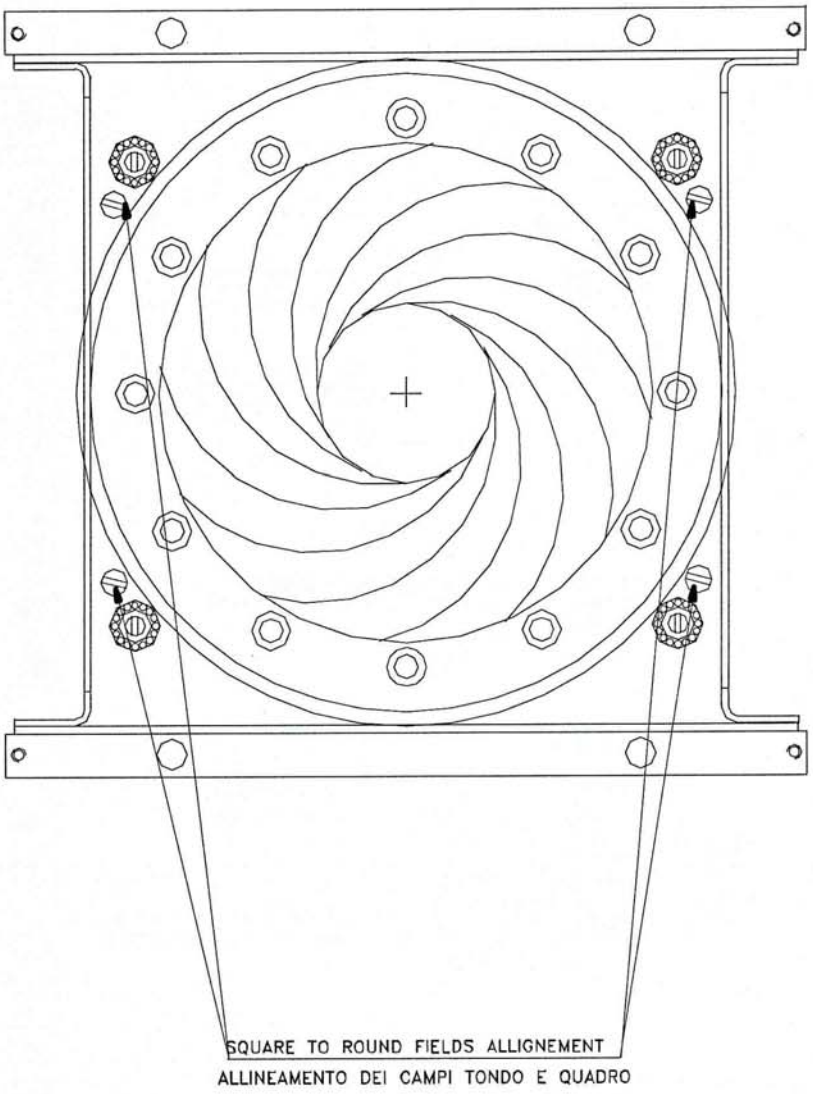

SQUARE TO ROUND FIELDS ALLIGNEMENT
ALLINEAMENTO DEI CAMPI TONDO E QUADRO
RALCO s.r.l.
LISSONE
DATE: 10.05.00
REV.:
ISSUED BY: Paola Vescera
N. DIS
MTF503MP/A/4
Fig.4

Figure 5 - Illustrated Parts Breakdown

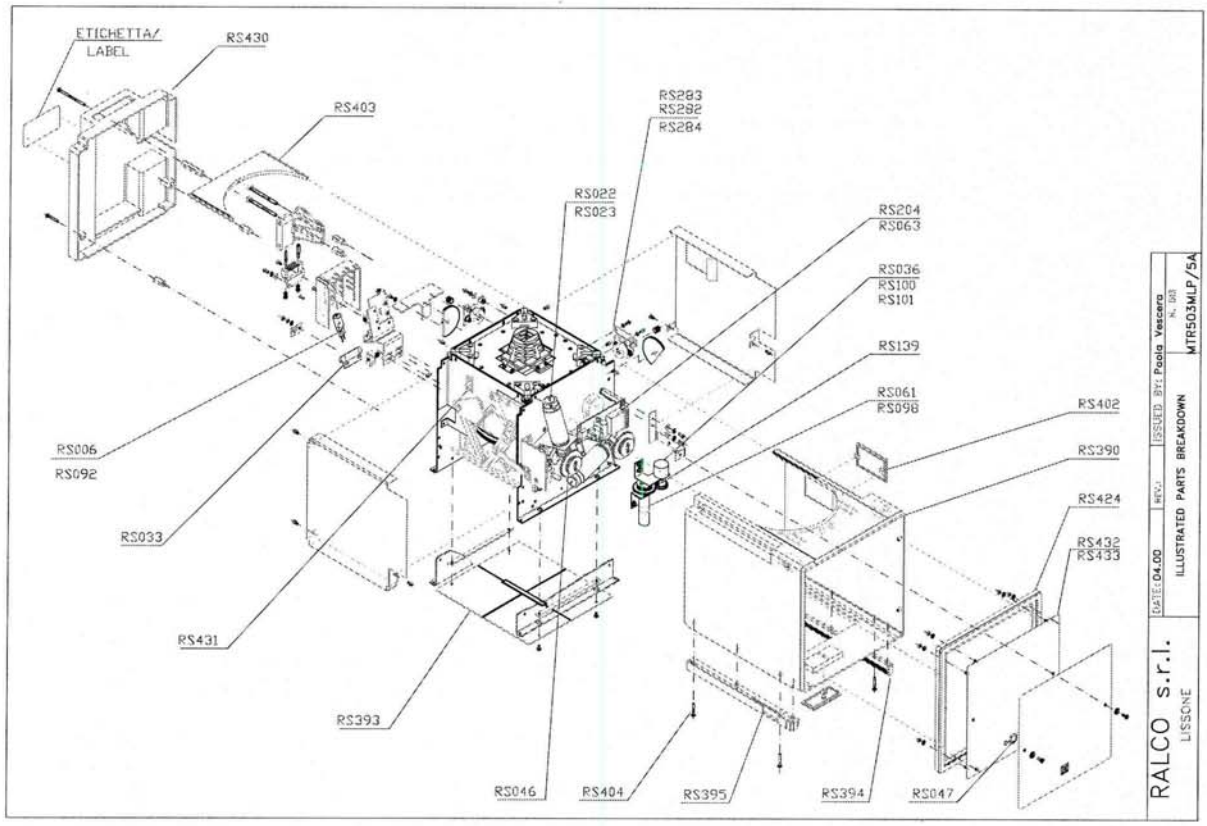


Figure 6

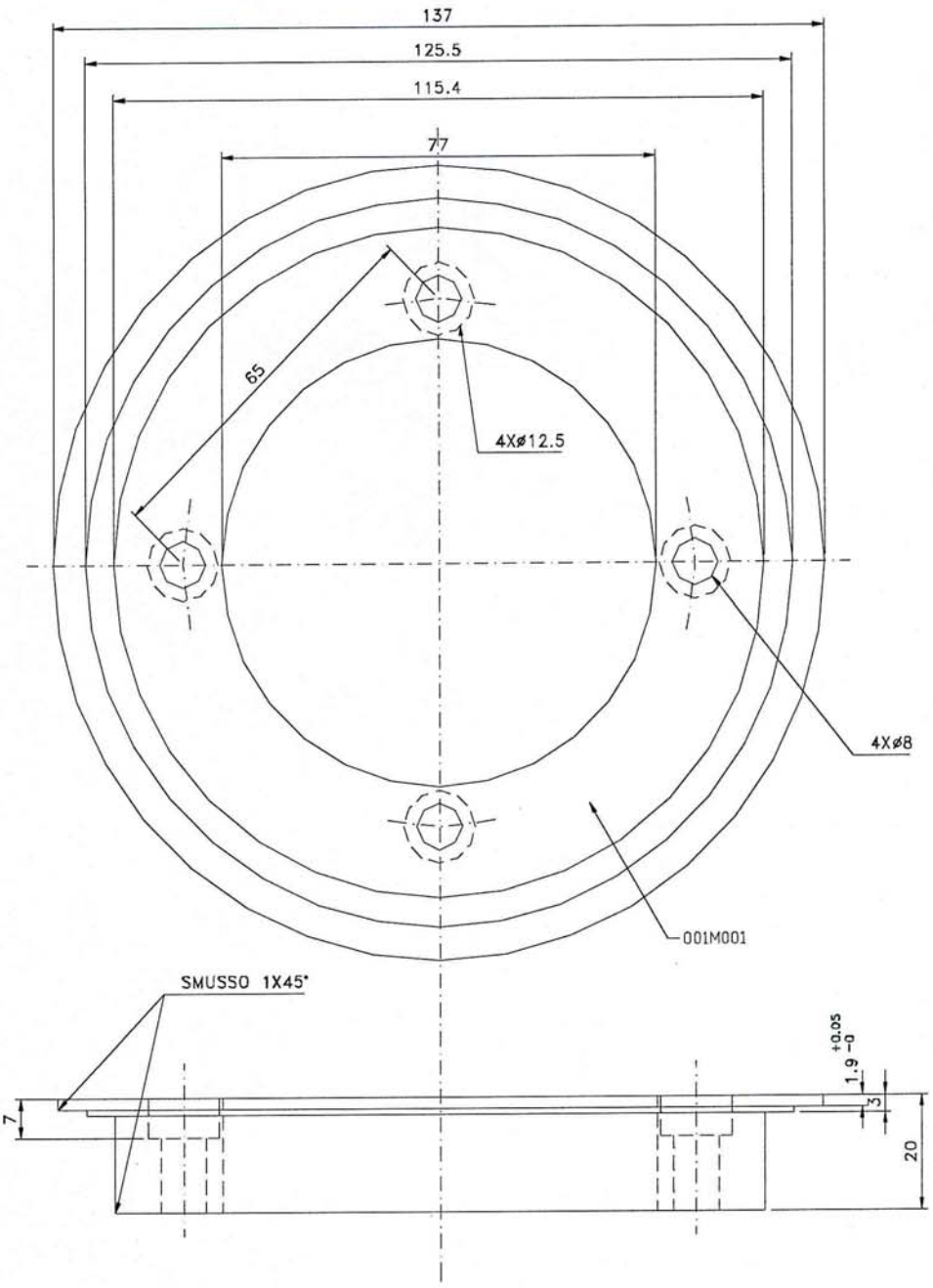
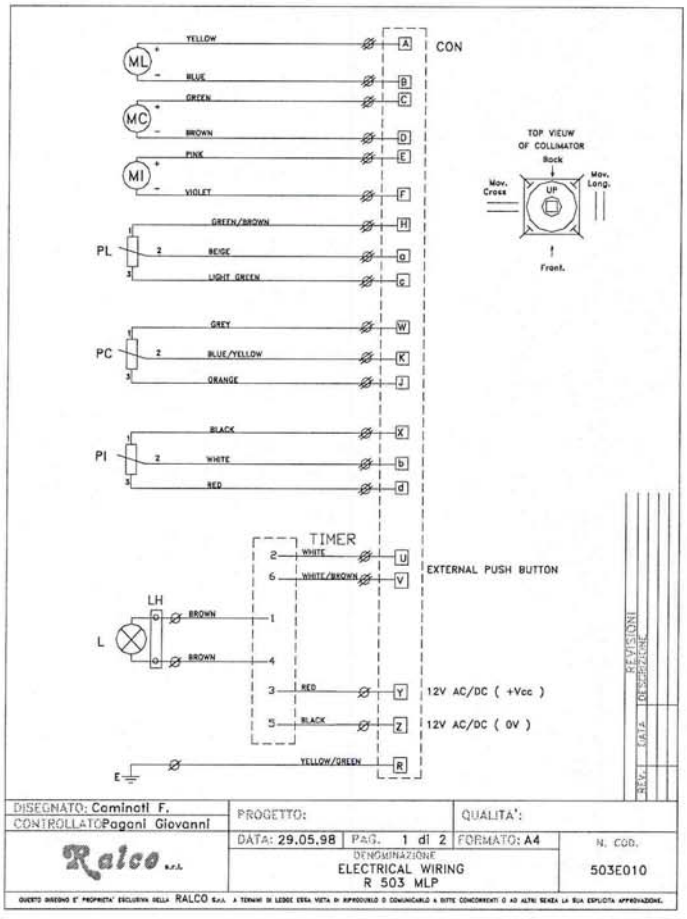

137
125.5
115.4
77
65
4XØ12.5
4XØ8
001M001
SMUSSO 1X45°
+0.05
1.9 -0
3
7
20

Diagram 1– Wiring 12 V



POSIZ.	DENOMINAZIONE	N° PEZZI	N° DISEGNO
	AMP MALE CONTACT 16/18 AWG	5	MPT1407
	AMP MALE CONTACT 22/24 AWG	17	MPT1405
	sez 1 mmq ELECTRIC WIRING	5	MPT1120
	sez 0.35 mmq ELECTRIC WIRING	17	MPT1090
TIMER	ELECTRIC TIMER FM 338 12V	1	GE00036
CONN	CONNECTOR AMP 200512/2 (PIN GUIDA MASCHIO IN A)	1	GE00505
E	PROTECTION EARTH	1	MPT1772
L	ALOGEN LAMP 12V 100W	1	MPT1736
LH	LAMP HOLDER 905/1	1	MPT1720
PI	POTENTIOMETER SP 533-B-1 Kohm	1	MPT1815
PC	POTENTIOMETER SP 157-S-1 Kohm	1	MPT1810
PL	POTENTIOMETER SP 157-S- 1 Kohm	1	MPT1810
MI	MOTOR C/C 2225 12V 308:1	1	MPT1875
MC	MOTOR C/C 2233 12V 548:1	1	MPT1883
ML	MOTOR C/C 2233 12V 548:1	1	MPT1883

Diagram 2 - Timer FM 338 12 V – Electric

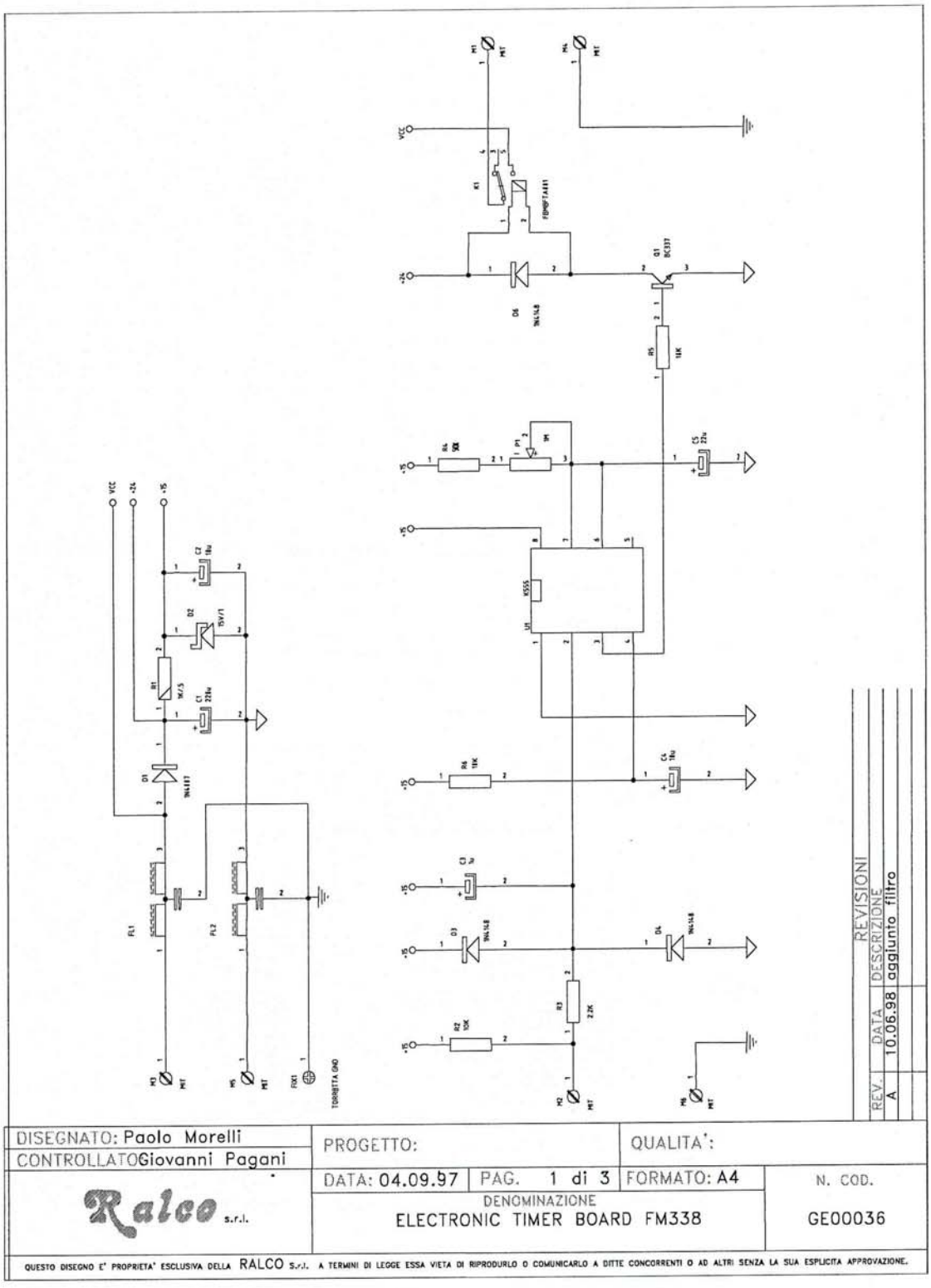


Diagram 3– Timer FM 338 12 V – Layout

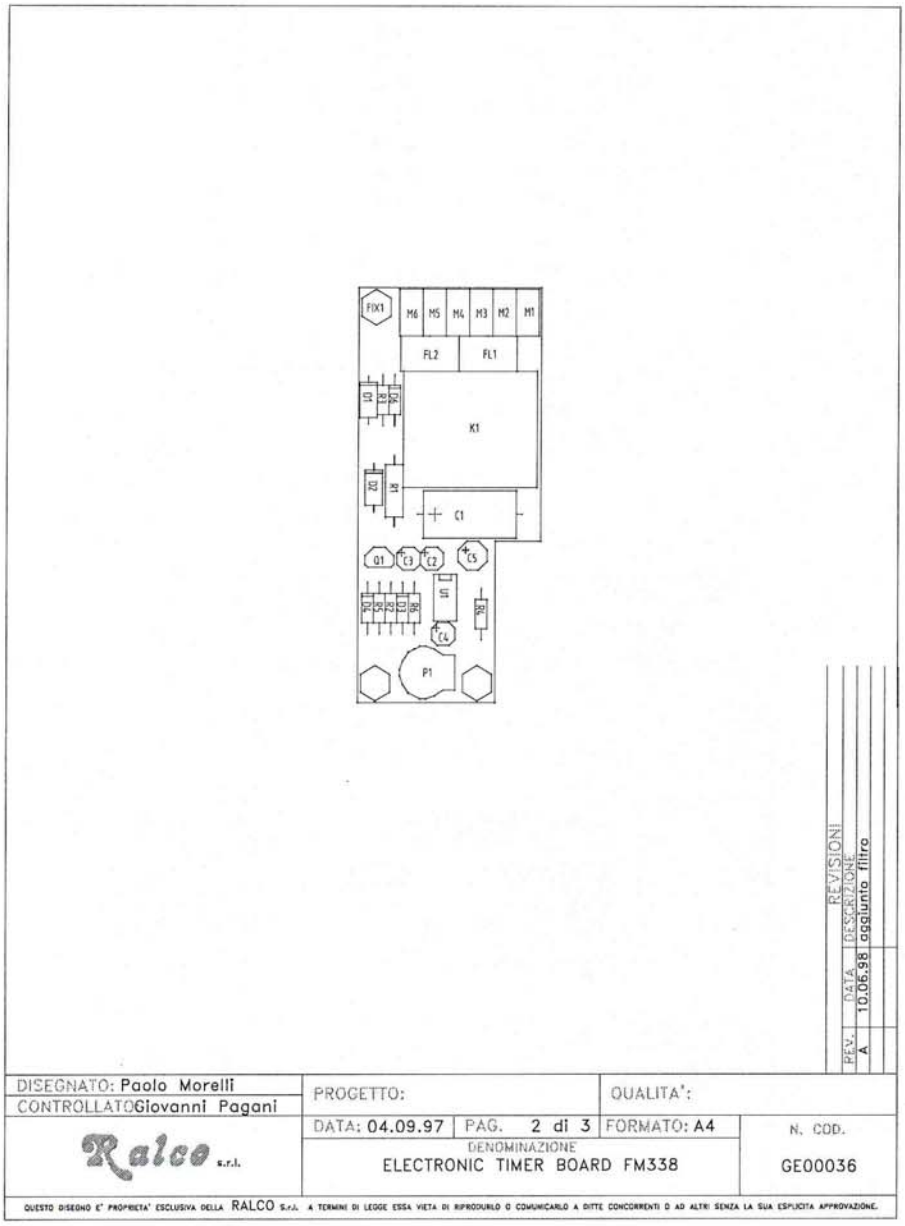
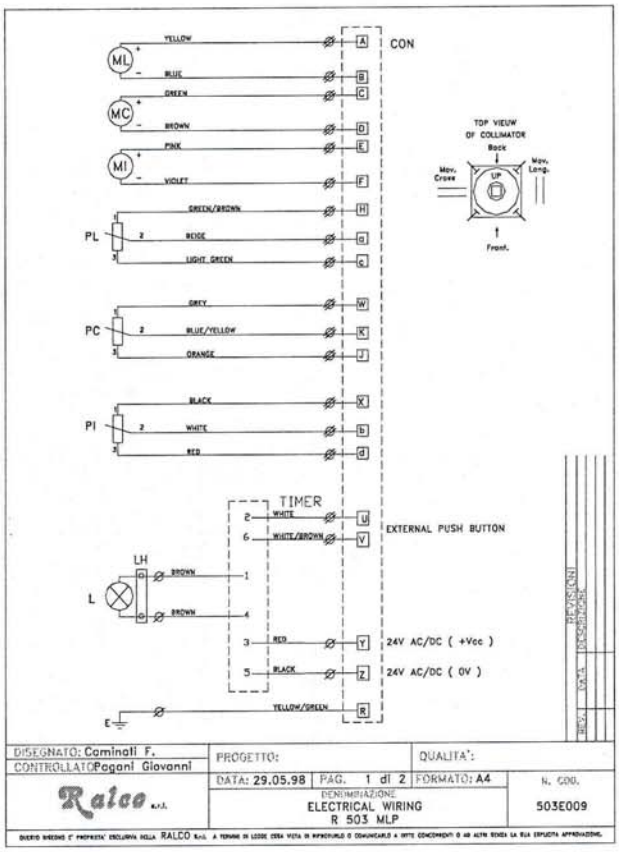


Diagram 4 – Wiring 24V



POSIZ.	DENOMINAZIONE	N° PEZZI	N° DISEGNO
	AMP MALE CONTACT 16/18 AWG	5	MP11407
	AMP MALE CONTACT 22/24 AWG	17	MP11405
	sez 1 mmq ELECTRIC WIRING	5	MP11120
	sez 0.35 mmq ELECTRIC WIRING	17	MP11090
TIMER	ELECTRIC TIMER FM 338 24V	1	GE00037
CONN	CONNECTOR AMP 200512/2 (PIN GUIDA MASCHIO IN A)	1	GE00505
E	PROTECTION EARTH	1	MP11772
L	ALOGEN LAMP 24V 100W	1	MP11737
LH	LAMP HOLDER 905/1	1	MP11720
PI	POTENTIOMETER SP 533-B-1 Kohm	1	MP11815
PC	POTENTIOMETER SP 157-S-1 Kohm	1	MP11810
PL	POTENTIOMETER SP 157-S-1 Kohm	1	MP11810
MI	MOTOR C/C 2225 24V 308:1	1	MP11876
MC	MOTOR C/C 2233 24V 548:1	1	MP11884
ML	MOTOR C/C 2233 24V 548:1	1	MP11884

REVISIONI — REV. — DATA — DESCRIZIONE

DISEGNATO: Caminati F.
CONTROLLATO Pagani Giovanni
PROGETTO:
QUALITA':
DATA: 28.05.98
PAG. 2 di 2
FORMATO: A4
N. COD.
DENOMINAZIONE
ELECTRICAL WIRING
R 503 MLP
503E009
Ralco s.r.l.
QUESTO DISEGNO E' PROPRIETA' ESCLUSIVA DELLA RALCO S.r.l. A TERMINI DI LEGGE ESSA VIETA DI RIPRODURLO O COMUNICARLO A DITTE CONCORRENTI O AD ALTRI SENZA LA SUA ESPLICITA APPROVAZIONE.

Diagram 5 Timer FM338 24V - Electric

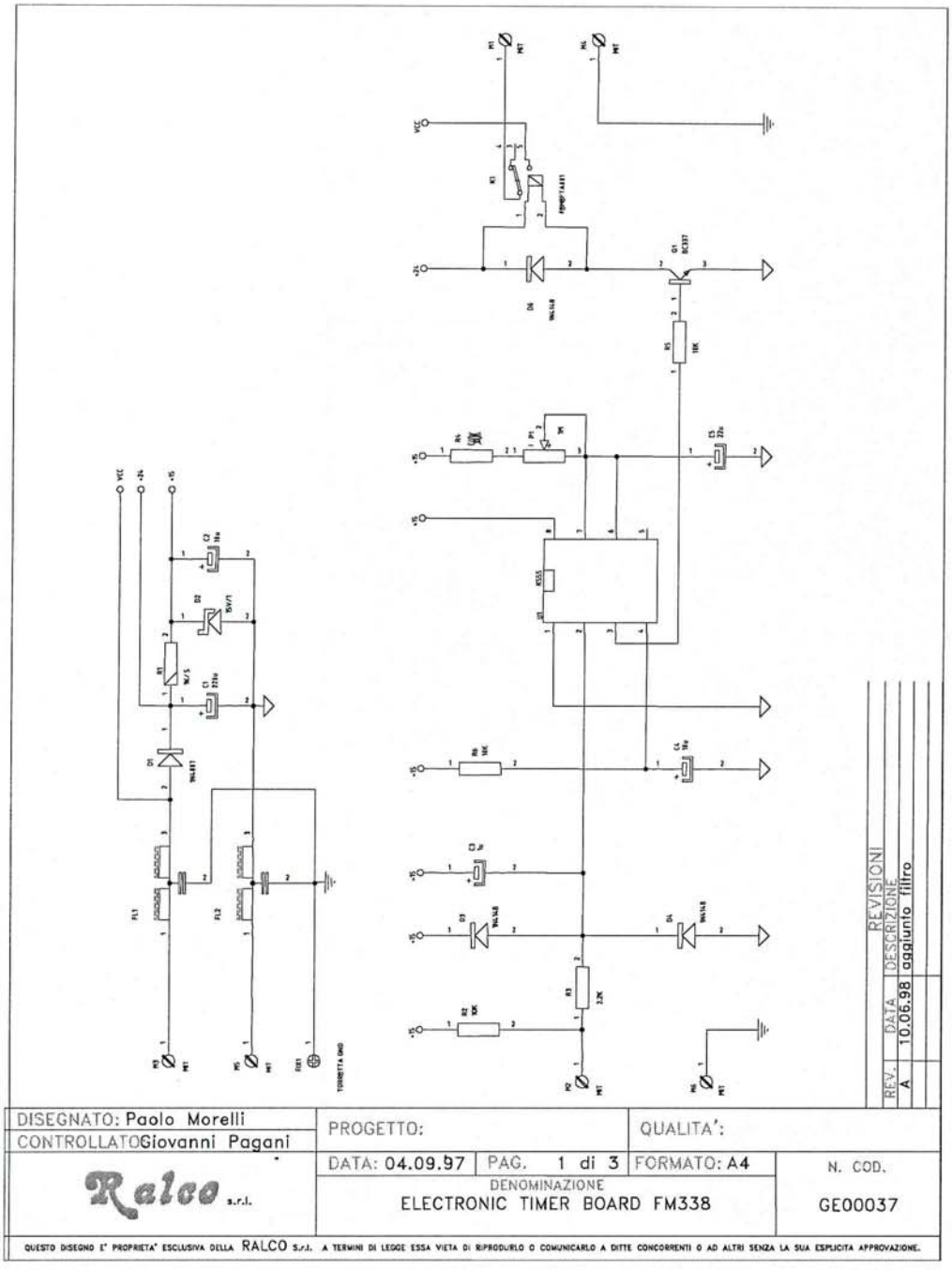
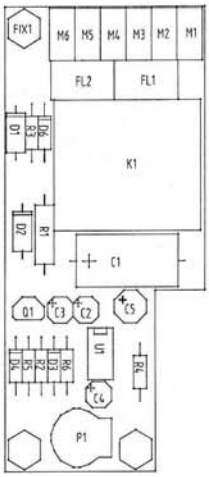
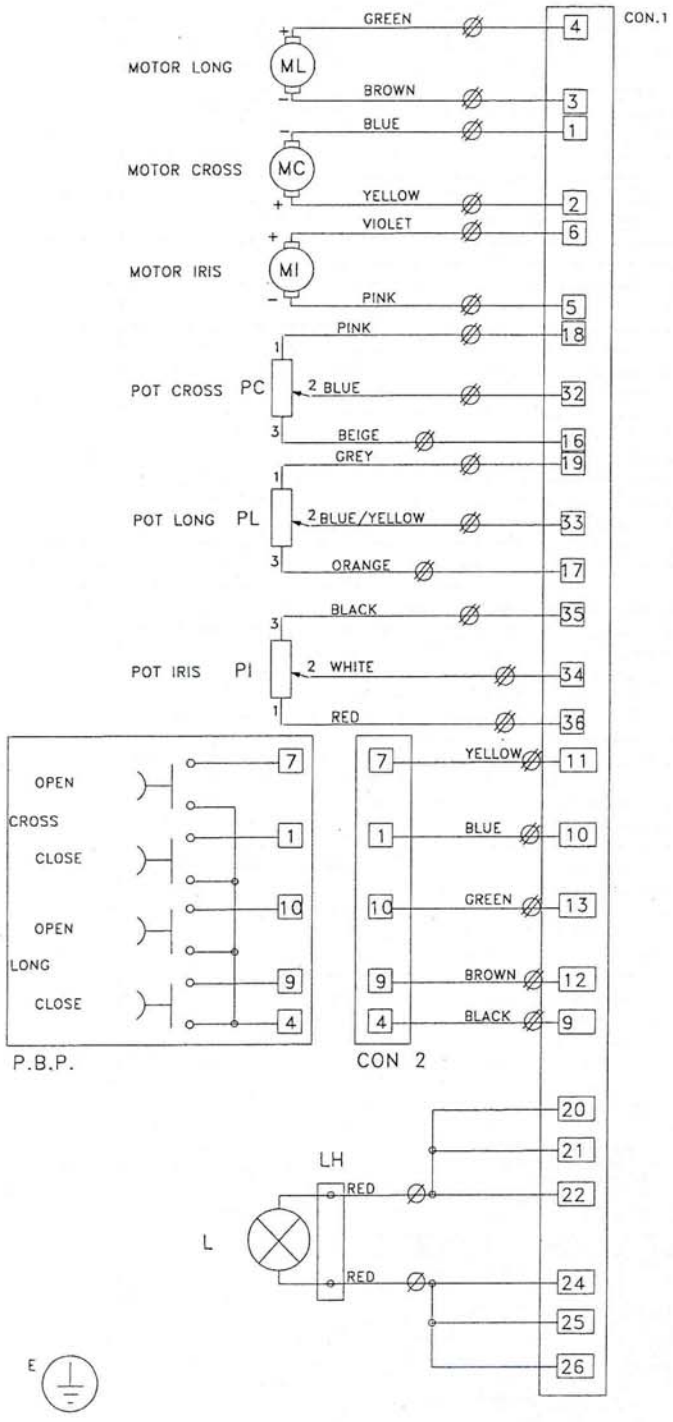


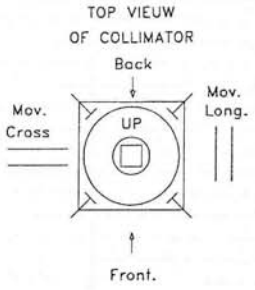
Diagram 6 – Timer FM 338 24V - Layout



REVISIONI		
REV.	DATA	DESCRIZIONE
A	10.06.98	aggiunto filtro

DISEGNATO: Paolo Morelli CONTROLLATOGiovanni Pagani	PROGETTO:	QUALITA':	
Ralco s.r.l.	DATA: 04.09.97 PAG. 2 di 3	FORMATO: A4	N. COD.
	DENOMINAZIONE ELECTRONIC TIMER BOARD FM338		GE00037





REVISIONI

REV.	DATA	DESCRIZIONE

DISEGNATO: Caminati F. CONTROLLATO: Pagani Giovanni	PROGETTO: C. RALCO 2 Q.	QUALITA': RALCO AQ	
Ralco s.r.l.	DATA: 06.10.98	PAG. 1 di 3	FORMATO: A4
	DENOMINAZIONE ELECTRICAL WIRING R 503 MLP/134		N. COD. 503E015

POSIZ.	DENOMINAZIONE	N° PEZZI	N° DISEGNO
Ø	ø1.5 mmq ELECTRIC WIRING	2	MP11130
Ø	ø0.35 mmq ELECTRIC WIRING	20	MP11090
L	ALOGEN LAMP 24 V 100 W	1	MP11737
LH	LAMP HOLDER 905/1	1	MP11720
	AMP MICROCONTACT FEMALE 182206	5	MP11401
CON 1	CONNECTOR DELTA 37 WAYS MALE	1	MP11536
E	PROTECTION EARTH	1	MP11772
CON 2	AMP CONNECTOR FEMALE 10 WAYS	1	MP11449
P.B.P.	MERCURY PLUS PUSH BUTTON PANEL	1	MP11641
PI	POTENTIOMETER SP 533-0-103 10 Kohm	1	MP11817
PC	POTENTIOMETER SP 157 SERVO 10 Kohm	1	MP11814
PL	POTENTIOMETER SP 157 SERVO 10 Kohm	1	MP11814
MI	MOTOR C/C 2225 24V 308:1	1	MP11876
MC	MOTOR C/C 2233 24V 548:1	1	MP11884
ML	MOTOR C/C 2233 24V 548:1	1	MP11884

REVISIONI

REV.	DATA	DESCRIZIONE

DISEGNATO: Paolo Morelli

CONTROLLATO: Pagani Giovanni

PROGETTO: C. RALCO 2 Q.

QUALITA': RALCO AQ

DATA: 06.10.98 | PAG. 2 di 2 | FORMATO: A4

Ralco s.r.l.

DENOMINAZIONE
ELECTRICAL WIRING
R 503 MLP/134

N. COD.
503E015

INFORMATION FOR THE MANUFACTURER

THE FOLLOWING FORM IS PROVIDED FOR YOUR COMMENTS AND SUGGESTINGS WITH REGARDS TO THE COLLIMATOR SO THAT WE MAY ENSURE AND IMPROVE THE QUALITY OF OUR PRODUCTION.

SHOULD YOU HAVE ANY COMMENTS AND/OR SUGGESTIONS, PLEASE MAIL THE FORM, POST-FREE, TO Ralco... VIA DEI TIGLI 13/G, 20046 BIASSONO (MI) - ITALIA

DATA:

CUSTOMER:
ADDRESS:

INFORMATION REGARDING POSSIBLE ACCIDENTS THAT MAY HAVE OCCURRED WHILE USING THE COLLIMATOR.

DIRECTIVE 93/42/CEE STATES THAT ACCIDENTS (SUCH AS DEATH OF GREVIOUS INJURY) THAT INVOLVE THE COLLIMATOR DESCRIBED HEREIN, MUST BE REPORTED TO THE MINISTRY OF HEALTH AND TO THE MANUFACTURER.

THE PRESENT FORM IS PROVIDED TO REPORT TO Ralco... , POST-FREE, ACCIDENTS OF THE TYPE STATED IN THE DIRECTIVE.

DATE:
CUSTOMER: ADDRESS