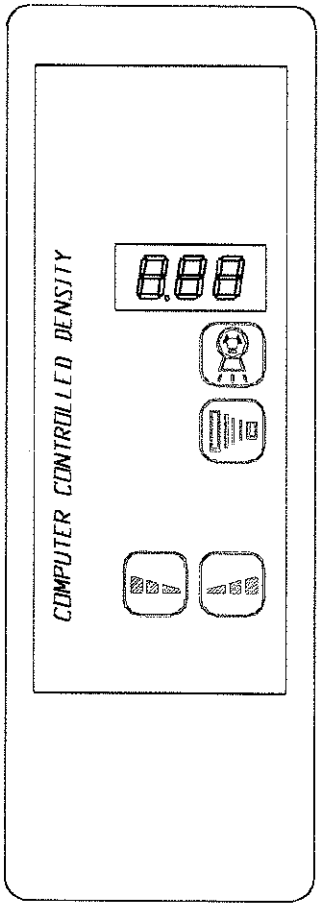
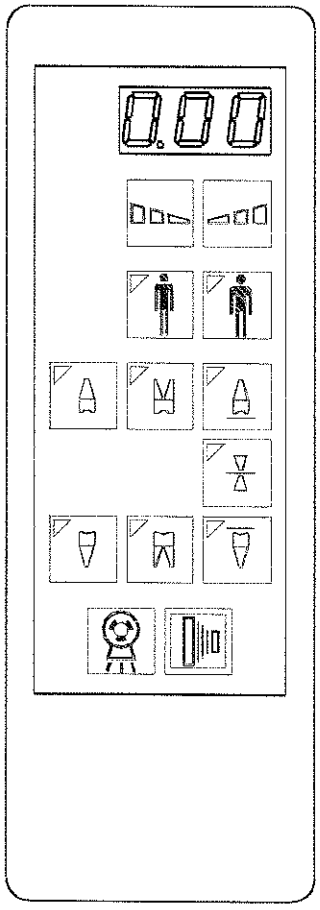
VILLA
SISTEMI
MEDICALI

EXPLOR-X 65
EXPLOR-X 70





INSTALLATION MANUAL

Release 1 **Januray 26, 1998**

TABLE OF CONTENTS

1. INTRODUCTION

This manual is aimed at providing all necessary instructions for correct installation of the EXPLOR X 65 or 70 intra-oral x-ray equipment.

The equipment must be used according to the procedures described in the Operator's Manual and must never be used for purposes different from those for which it has been designed and produced.

The equipment can be used by qualified personnel only, having the necessary knowledge in x-ray protection.

Users are held responsible for compliance with regulations on equipment installation and use.

In case the equipment is not correctly used and no proper maintenance is carried out, the manufacturer cannot be held responsible of possible faults, misfunctioning or damage to persons.

This page has been intentionally left blank

2. GENERAL SAFETY REGULATIONS

⇒ Technical interventions on the equipment must be effected only by Villa Sistemi Medicali engineers or by other engineers, expressly authorised by Villa.

⇒ Disconnect equipment from electrical supply before cleaning and disinfecting it.

⇒ Tubehead removal from the relevant support can be effected by qualified personnel only, expressly authorised by Villa.

⇒ Do not touch tubehead cover or the relevant cone-collimator assembly during x-ray emission.

⇒ For security reasons, do not hang objects on extension arms.

⇒ **Do not pour water or other fluids on the equipment in order to avoid short-circuits and corrosion of internal parts..**

⇒ **The equipment has not been designed to be used in the presence of gases and explosive fumes.**

This page has been intentionally left blank

3. DESCRIPTION

3.1 GENERAL FEATURES

Explor-X 65kV or 70kV intra-oral x-ray equipment is able to perform top quality x-ray examinations, through examination repeatability coupled with reduced focal spot dimensions.

The equipment displays the following features:

- Top quality x-ray images
- user-friendliness
- ergonomic design

The equipment functioning is microprocessor-controlled, thus allowing high repeatability of exposure times. The microprocessor is composed by the following parts:

a) Extension arm and Scissors arm (square or oval)

b) Tubehead with Collimator

c) Timer: CCD or DIAMATIC AP models

a) Extension arm and Scissors arm (square or oval)

It is made up of an arm with double joints, which allows linear and upwards extensions.

The tubehead is balanced in all positions; if the angle between vertical axis and the first scissors arm is smaller than 15°, balancing is unstable.

Another horizontal extension arm can also be added to ease the different arm/tubehead ratios.

Both scissors and extension arm can be either square or oval.

N.B.: Square extension arms can be applied only to square scissors arms. The same holds true for oval arms.

b) Tubehead

The Tubehead displays an innovative design. The 65 kV or 70 kV tension and 8 mA current reduce exposure times and the quantity of radiation absorbed by patients. The x-ray tube is equipped with a collimator with 20 cm (8") focus-skin distance and 6 cm (2 3/8") ray diameter. The tubehead is connected to the arm by means of a support, allowing 360° horizontal rotation and 290° vertical rotation.

c) Timer

Explor-X 65kV or 70kV can be equipped with two different kinds of timers, having the following features:

CCD Model

The CCD timer is a microprocessor-controlled digital timer with manual time selection. This timer allows to choose among 31 exposure time options, from a minimum of 0,03 seconds to a maximum of 3 seconds.

The main feature of this timer is automatic time compensation with respect to tension fluctuations in the supply line, within a ±10% range. The CCD resorts to a complex algorithm to compensate tension fluctuations in the line by adjusting exposure times, thus obtaining constant contrast; hence the name of *Computer Controlled Density* or CCD.

The CCD can be used with a nominal tension of 220 V (120 and 240V upon request).

DIAMATIC AP Model

DIAMATIC AP is a digital, microprocessor-controlled timer equipped with manual selection and offering two possibilities for automatic selection of exposure times. There are 31 fixed times available for manual selection, ranging from a minimum of 0.03 seconds to a maximum of 3.00 seconds.

The major feature of this timer is automatic compensation of exposure times according to fluctuations in line tension, up to variations of ±10% of the nominal network tension. This timer can also function with different tensions: 120/220/240 Volt .

The Timer is compatible with any kind of intra-oral Explor-X x-ray equipment and can be applied to the Flash Dent visual system

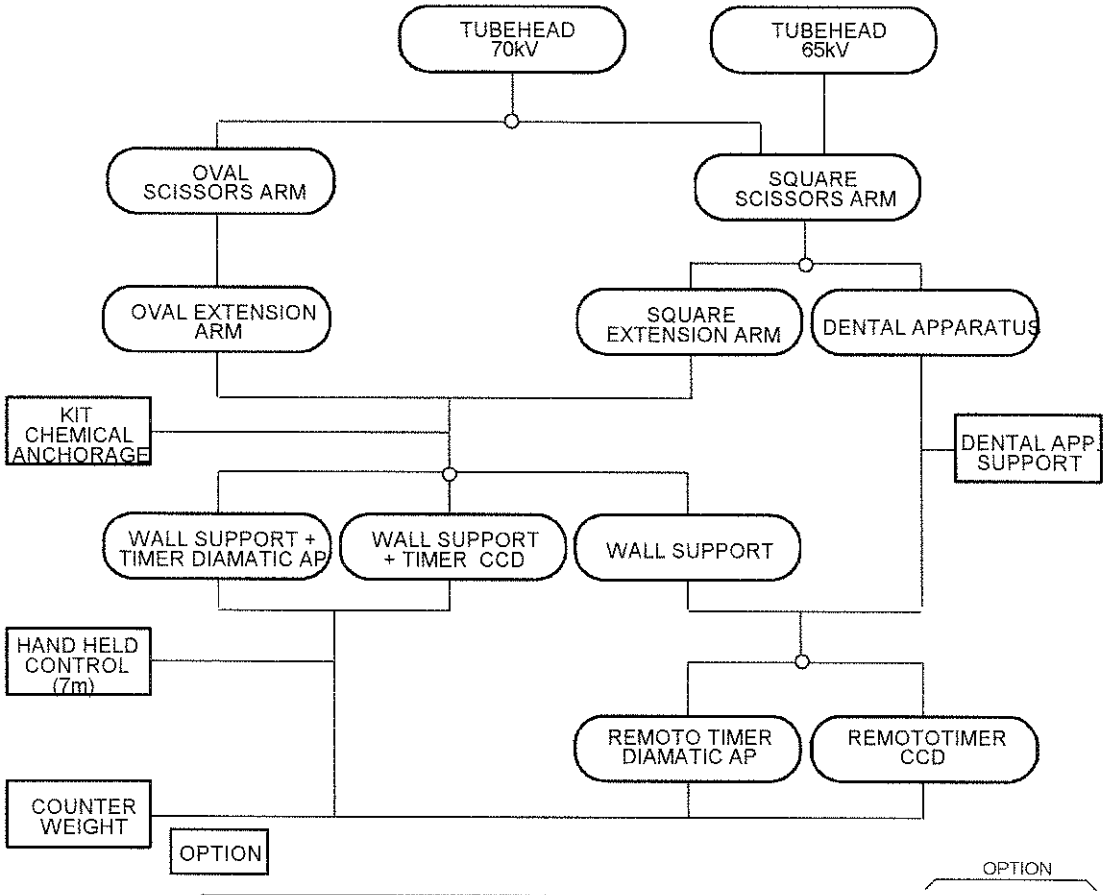
By means of 6 dip switches located inside the hand remote control, DIAMATIC allows to adjust some of the factors which determine total exposure time. These factors are:

- 2 different selections of tubehead high tension (kV);
- 7 different film sensitivity;
- 4 different pre-heating times

N.B: The different supply tensions have no influence on the timer (either CCD or Diamatic AP), which, in any case, must be applied to a tubehead with proper nominal tension.

3.2 CONFIGURATIONS

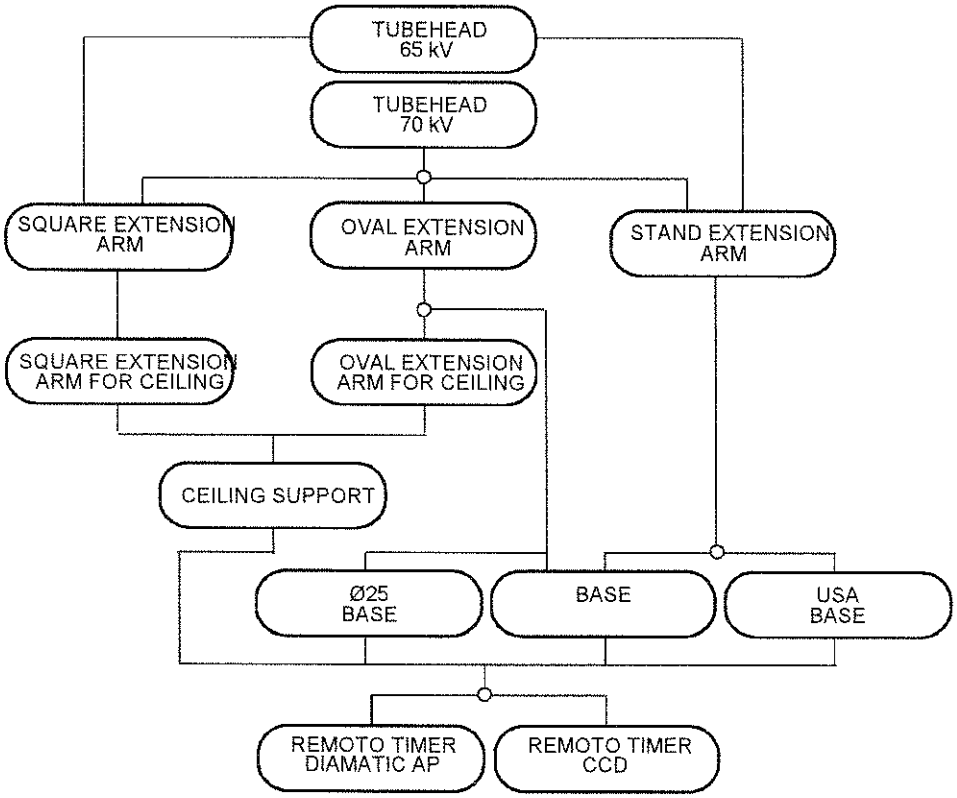
Intra-oral x-ray equipment are available in different configurations. Possible equipment kits are displayed in Tables 3-1 and 3-2 and in the following pages.



CONFIGURATION	TUBEHEAD 65 kV 84604294 - 120V 84604293 - 220V 84604297 - 240V	TUBEHEAD 70 kV 84604295 - 120V 84604290 - 220V 84604291 - 240V	Square scissors arm 81602060	Oval scissors oval 81602502	Square Extension arm 82602096 - 55cm 82602097 - 75cm 82602098 - 90cm	Oval Extension arm 82602503 - 60cm 82602504 - 75cm 82602505 - 90cm	Extensione arm for Dental 82602056 - 30cm	OPTION: Wall Support + Timer Diamatic AP 83603316 - 120V 83603315 - 220/240V	OPTION: Wall Support + Timer CCD 83603535 - 120V 83603365 - 220/240V	Wall support 81601300	OPTION: Remoto Timer Diamatic AP 83603305 - 120V 83603300 - 220/240V	OPTION: Remoto Timer CCD 83603537 - 120V 83603538 - 220/240V	OPTION: Counterweight 81601135	OPTION: Hand Held Control 7m 66603359	OPTION: Chemical anchorage 66601320	OPTION: Dental apparatus support 81601001
WALL 65 kV	●		●		●			▨	▨				●	●	●	
WALL 70 kV		●	▨	▨	▨	▨		▨	▨				●	●	●	
REMOTO WALL 65 kV	●		●		●					●	▨	▨	●		●	
REMOTO WALL 70 kV		●	▨	▨	▨	▨				●	▨	▨	●		●	
DENTAL APPARTUS	▨	▨	●				●				▨	▨				●

▨ ALTERNATIVE

Table 3-1



CONFIGURATION	TUBEHEAD 65 kV 84604294 - 120V 84604293 - 220V 84604297 - 240V	TUBEHEAD 70 kV 84604295 - 120V 84604290 - 220V 84604291 - 240V	Square scissors arm 81602060	Oval scissors arm 81602502	Mobile scissors arm 81602085	Square extension Arm - 30cm 81602058	Oval extension Arm - 30cm 82602545	Ceiling support 82601187	Ø25 Base 81601029	Base 81601171	USA Base 81601172	Remoto Timer Diamatic AP 83603305 - 120V 83603300 - 220/240V	Remoto Timer CCD 83603537 - 120V 83603538 - 220/240V
CEILING 65 kV	●		●			●		●				▨●	▨●
CEILING 70 kV		●	▨●	▨●		▨●	▨●	●				▨●	▨●
OVALE MOBILE		●		●					●			▨●	▨●
MOBILE 65 kV	●				●					▨●	▨●	▨●	▨●
MOBILE 70 kV		●		▨●	▨●	▨●	▨●			▨●	▨●	▨●	▨●

▨ ALTERNATIVE

Table 3-2

Standard configuration

1. Tubehead
2. Scissors arm
3. Extension arm
4. Wall plate + Timer
5. Hand remote control

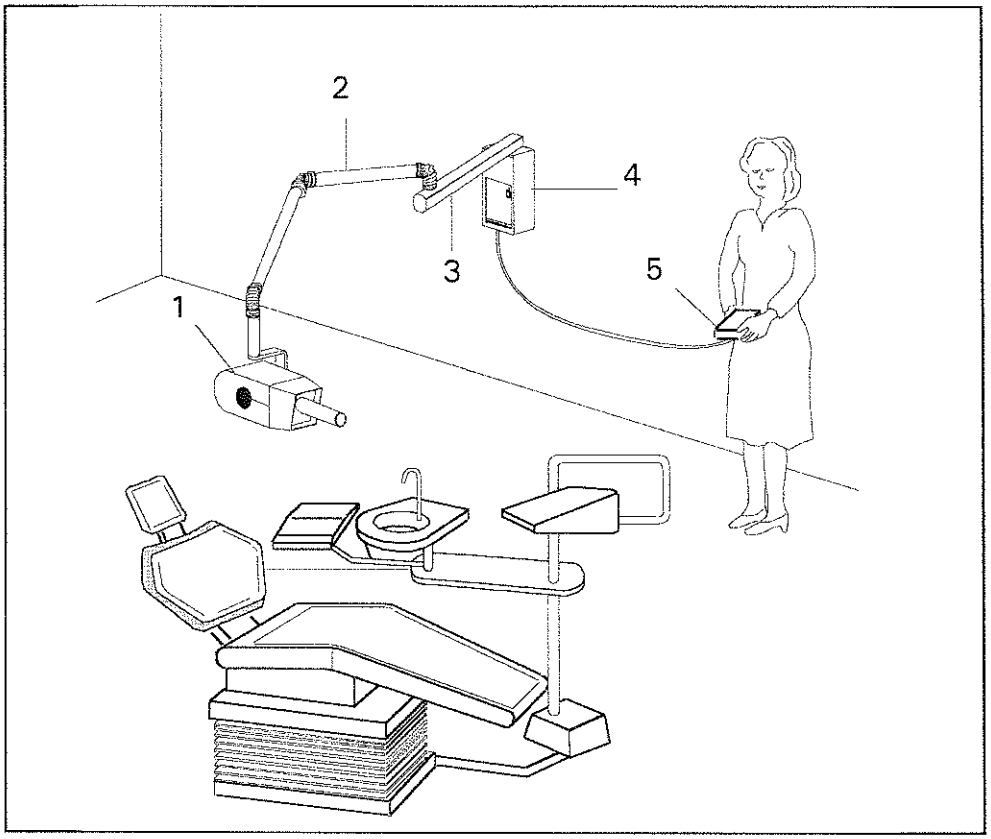


Figure 3-1

Remote timer configuration

1. Tubehead
2. Scissors arm
3. Extension arm
4. Wall plate
5. Remote timer
6. Hand remote control

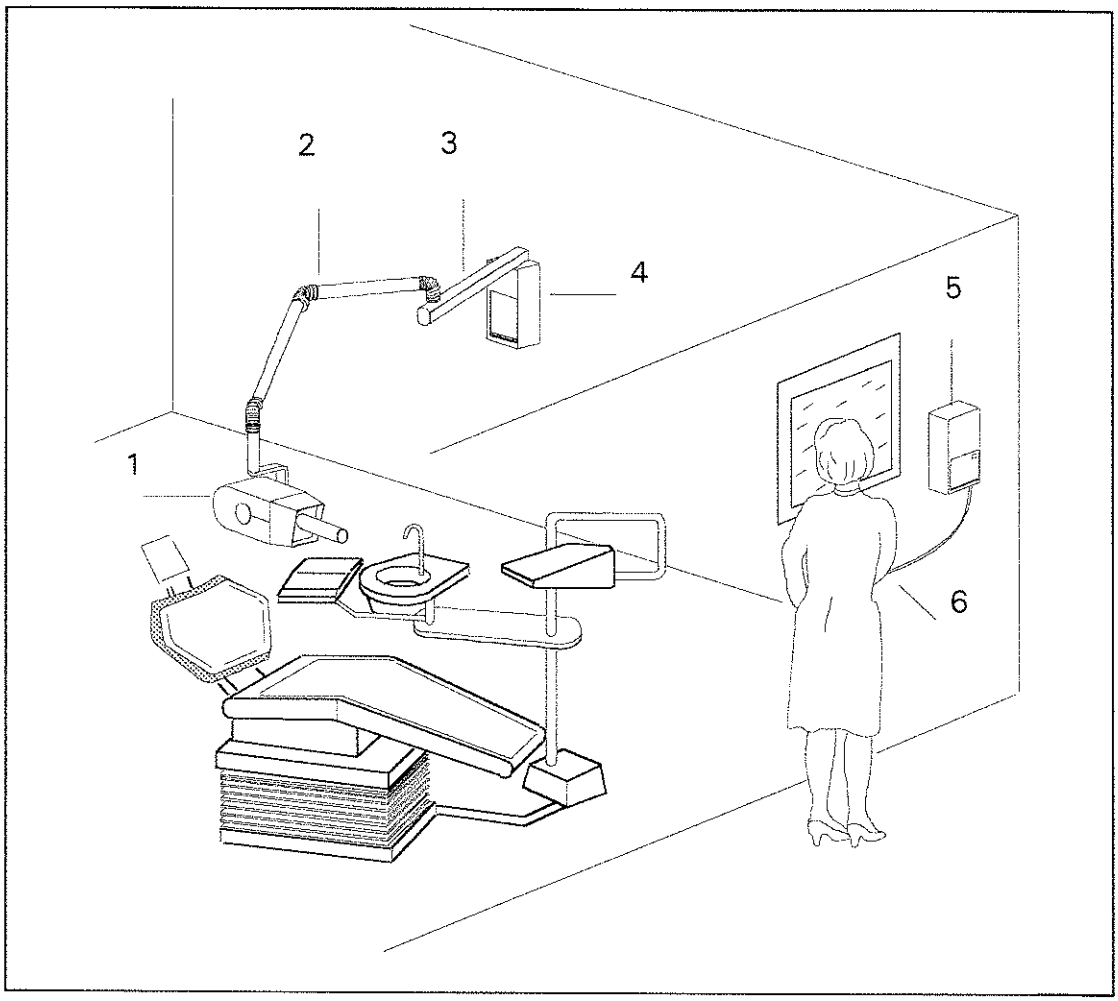


Figure 3-2

Configuration for dental chair

1. Tubehead
2. Scissors arm
3. Extension arm for dental chair
4. Joint for dental chair
5. Remote timer
6. Hand remote control

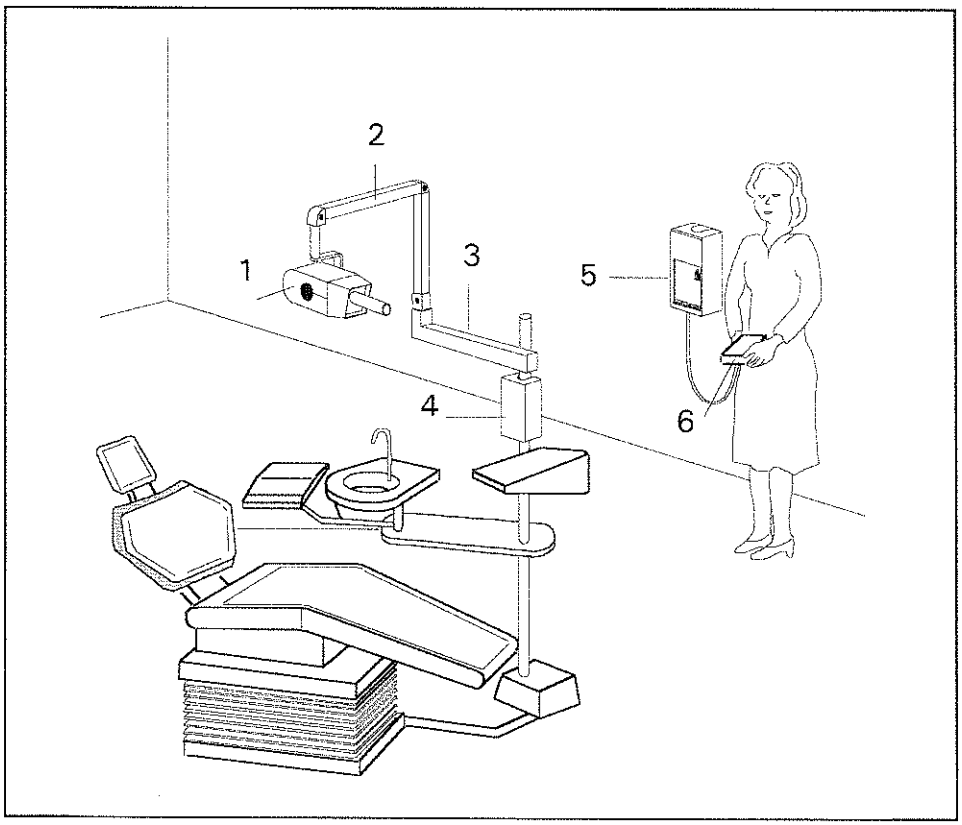


Figure 3-3

Ceiling-mounted configuration

1. Tubehead
2. Scissors arm
3. ceiling extension arm
4. ceiling suspension support
5. Remote timer
6. Hand remote control

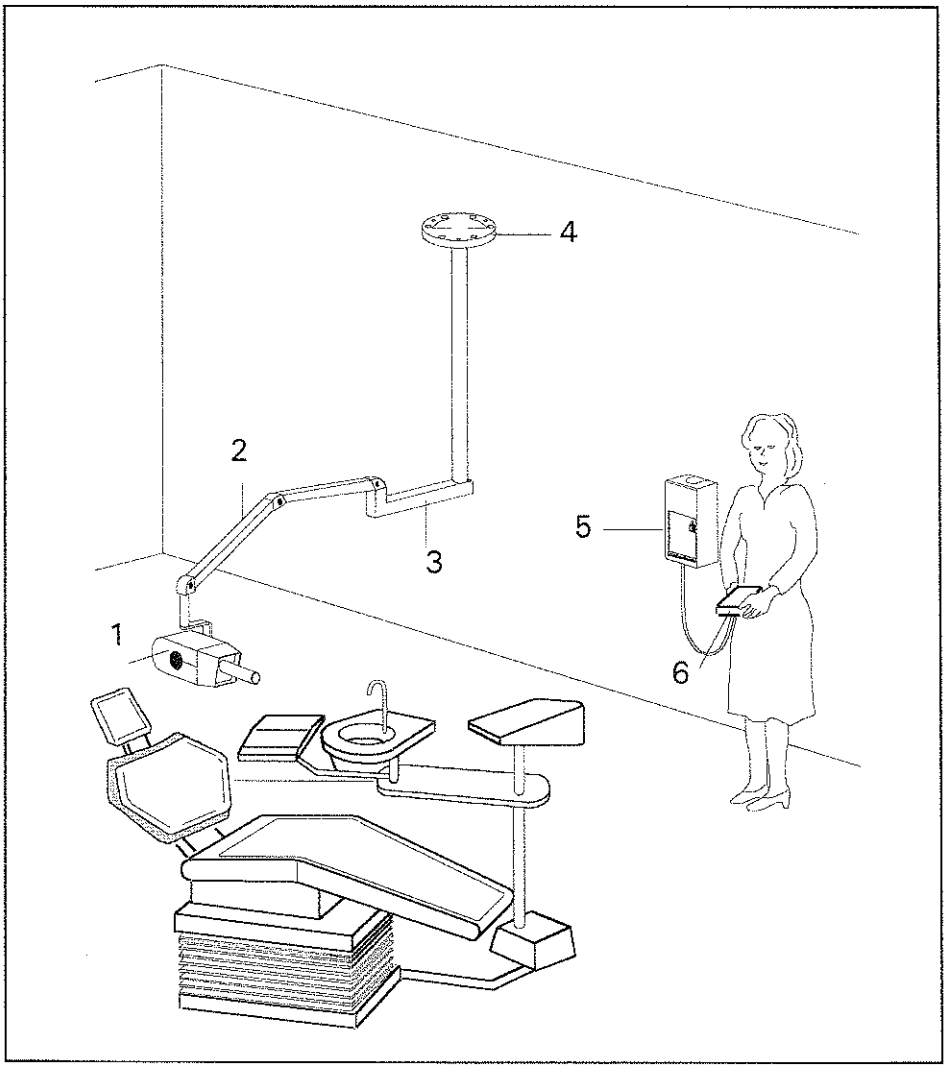


Figure 3-4

Mobile stand configuration

1. Tubehead
2. Scissors arm for mobile stand
3. Stand
4. Timer
5. Hand remote control

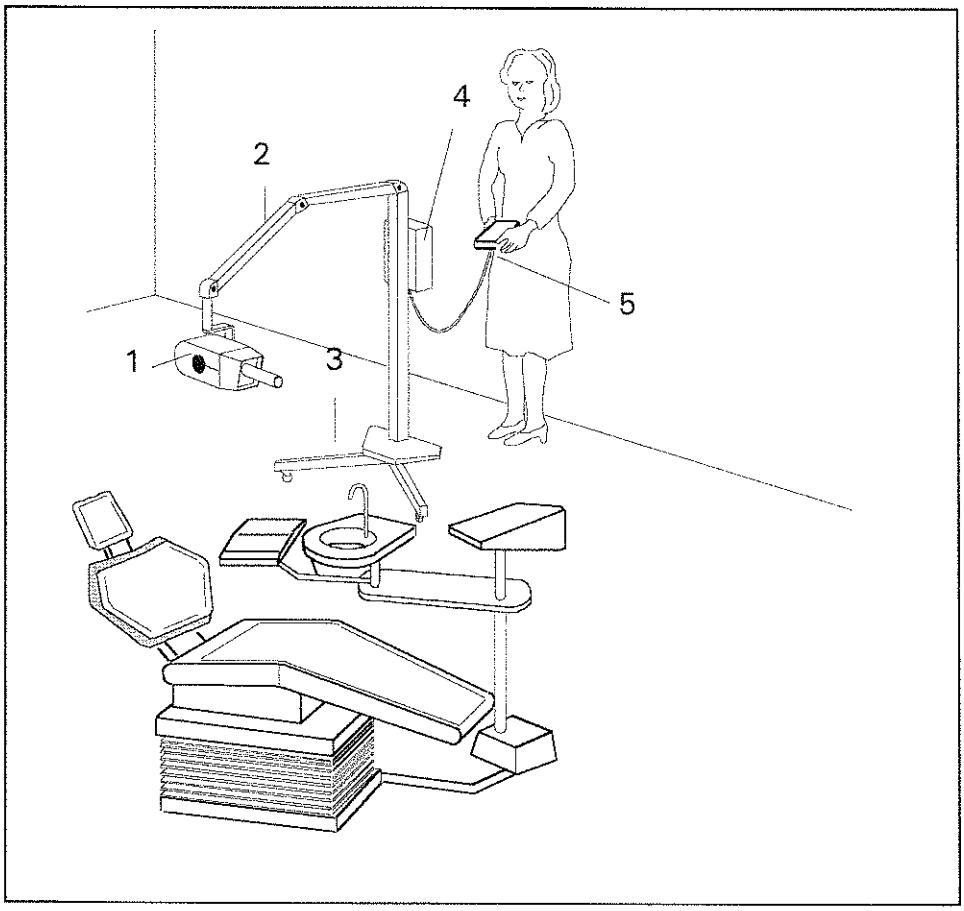


Figure 3-5

Remote control configuration

1. Hand remote control

This version is available with all the above described configurations.

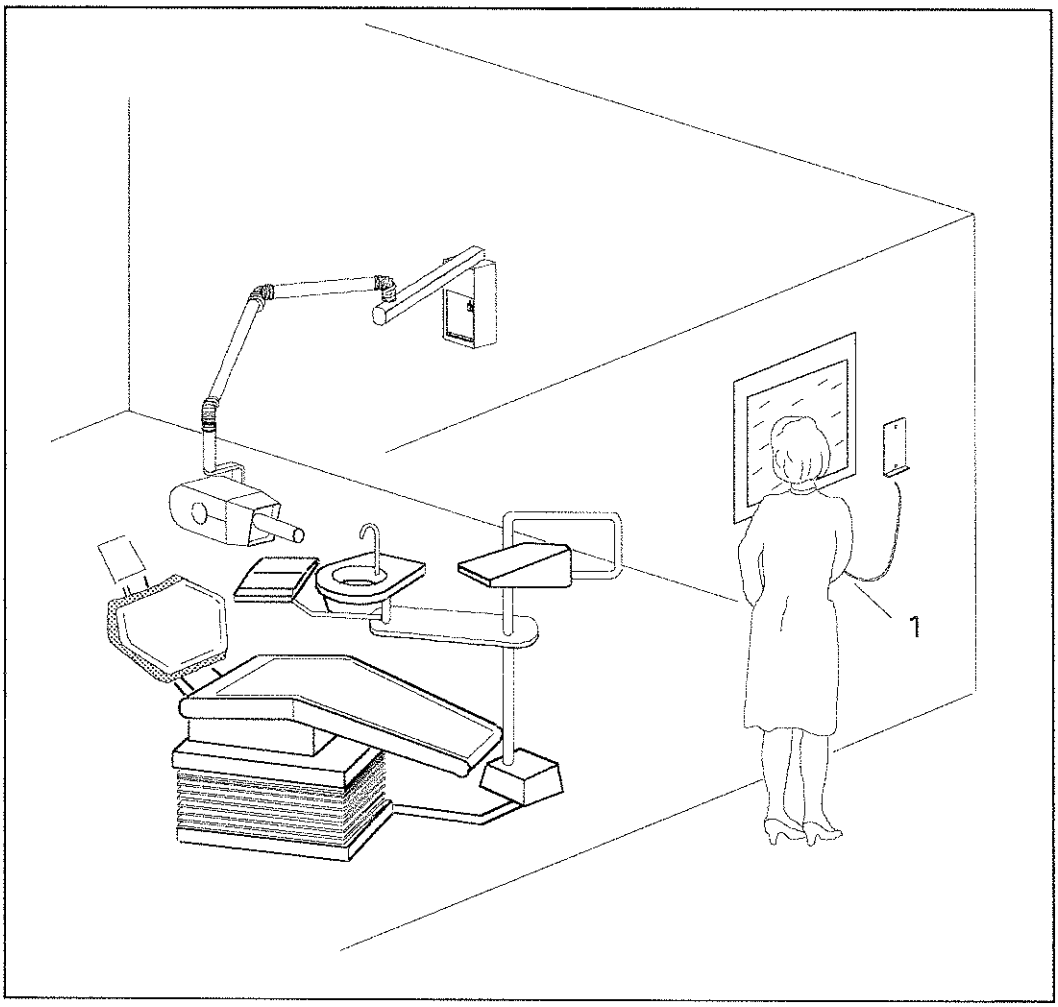


Figure 3-6

4. TECHNICAL DATA

4.1 TECHNICAL FEATURES

CARATTERISTICHE GENERALI		
APPARATUS	Explor X 70 **or** Explor X 65	
Manufacturer	Villa Sistemi Medicali S.p.A. Buccinasco (MI) Italia	
Class	I type B	
Line Voltage	120 - 220 - 240 V ±10%	
Line Frequency	50/60 Hz	
Rated Current	6 A (120 V) 3 A (220-240V) -	
Power Consumption	0.8 kVA	
Apparent Line Resistance	0.8 Ω max. 220 0.9 Ω max. 240 V 0.2 Ω max. 120 V	
Main fuse	10 A F (120 V) 6,3 A F(220-240V)	
Factory setted pre-ignition time (STD)	10 A F (120 V) 6,3 A F(220-240V)	
Optional pre-ignition times	0.23s (dip-switch)	
X-RAY CONTROL	0.20 - 0.27 - 0.30s (dip switch for Diamatic AP) 0÷0.3s (Software setting for CCD)	
Manufacturer		
Model	Villa Sistemi Medicali S.p.A. Buccinasco (MI) Italia	
Exposures Times	Timer **CCD** (Computer Controller Density)	Timer **DIAMATIC AP**
Expoure times accuracy	- 31 times in manual selection (0,03 ÷ 3 s)	-14 times radiographic mode with anatomical selection - 31 times in manual selection (0,03 ÷ 3 s)
Exposures control	± 5% or 30 ms (whichever is greater)	
Timer box dimensions	Microprocessor controlled Timer, with automatic compensation of line voltage fluctuation	
Remote Hand Control Dimensions	310 x 170 x 100 mm (12 x 14 x 4 inches)	
	175 x 60 x 25 mm (7 x 2.5 x 1 inches)	

TUBEHEAD		
Manufacturer	Villa Sistemi Medicali S.p.A. Buccinasco (MI) Italia	
Rated Voltage	70 kV ± 7 % (Explor X 70) **or** 65 kV ± 7 % (Explor X 65)	
Hight Voltage Circuit	Single-phase self-rectifying	
Tubehead Current	8 mA ± 15 %	
Rated Power	0.415kW (Explor X 70) **or** 0.390kW (Explor X 65)	
Total Filtration	2 mm Al eq.	
Transformer Insulation	Oil bath	
Cooling	Environmental	
Minimum focal spot to skin distance	20 cm (7 7/8")	
X ray beam diameter	6 cm (2 3/8")	
Radiation leakage at 1 m	< 25mGy/h	
Technique factors for radiation leakage	70kV, 8mA, 1s **or** 65kV, 8mA, 1s	
Exposure interval	1/60 duty cycle	
X-RAY TUBE		
Type	OCX 60 (Explor X 65)	OX 70 (Explor X 70)
Manufacturer	IEC - Bologna Italy	
Focal spot	1 mm (IEC 336)	
Inherent Filtration	0.5 mm Al eq.	

WARNING	
The duty cycle of 1/60 has to be intended as follows:	
Exposure time	Interval Time between exposures
from 0.03 to 0.1 second	10 seconds
from 0.12 to 1.00 second	1 minute
from 1.20 to 3.00	3 minutes
The interval time between exposures has to be respected in order to assure the proper tubehead life.	

HOW TO ASSESS TECHNICAL FACTORS

kV kV are assessed with a non-invasive instrument having a ± 2% inaccuracy, at a nominal input line voltage

mA Tube current is measured with a digital voltmeter measuring the DC voltage drop on the terminals of 1k Ohm , 1% resistance mounted on the Tubehead. To access the resistance, remove the tubehead plastic cover. The voltmeter has to be connected in parallel to the resistance (DC, 10V range 1mA = 1V).

t Exposure times are checked by means of an electronic impulse counter (inaccuracy ± 1 pulse) connected to terminals L2 and N2 of the Main Board.

The time measured in this manner is the total energization time, that is the time during which the line voltage is applied to the tube-head. The value measure is the sum of Pre-heating time and Exposure one.

Measuring exposure time with non invasive instruments can lead to a systematic and not quantifiable errors on the measured time.

IMPORTANT NOTES:

Explor X 65/70 is a system where the High Voltage to the X-Ray tube and to the filament are switched on at the same time, so the tube current will reach its nominal value only once the emission temperature of the filament is reached. This time is the so called "**pre heating time**" and can vary, from tube to tube, between 210 and 250 msec.

The "pre-haeting" time is the time needed to reach the 60% of the tube current.

1. The pre heating time is not part of the exposure time and is not diplayed on the system.
2. During the pre heating time kVp and mA vary. Their values must be measured during the steady state condition.
3. The loading factors have to be measured only at nominal voltage.

4.2 TUBE CHARACTERISTICS

The following figures are the main characteristics of the X-Ray tubes (OCX 60 and OX 70) used on the Explor-X 65 and 70 respectively.

OCX 60

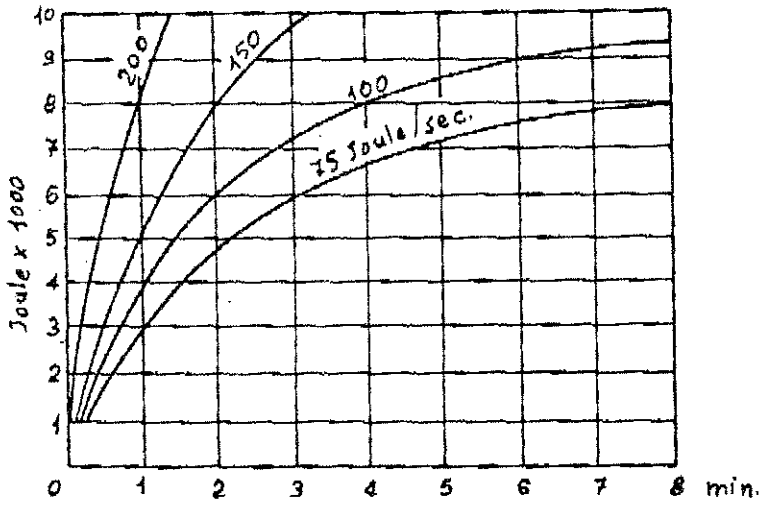


Figure 4.1a ANODE COOLING CURVE

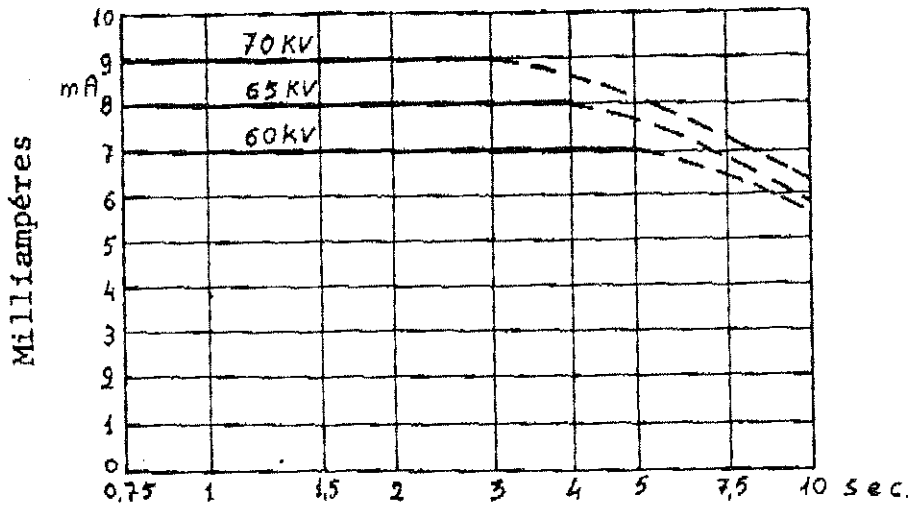


Figure 4.1b: RATINGS

OX 70

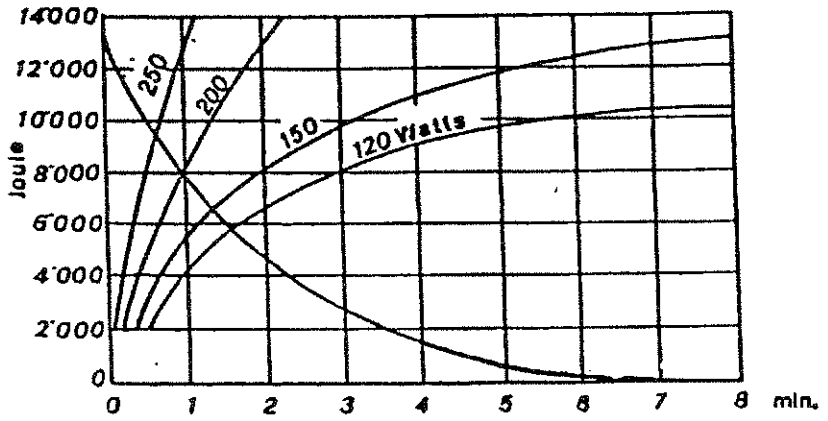


Figure 4.2a ANODE COOLING CURVE

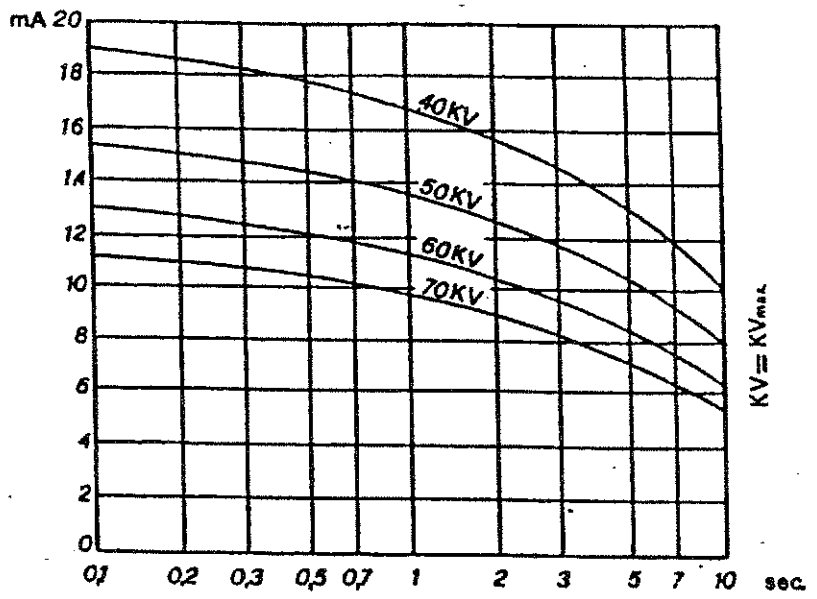


Figure 4.2b: RATINGS

4.3 DIMENSIONS

Wall-mounted configuration - Square arms

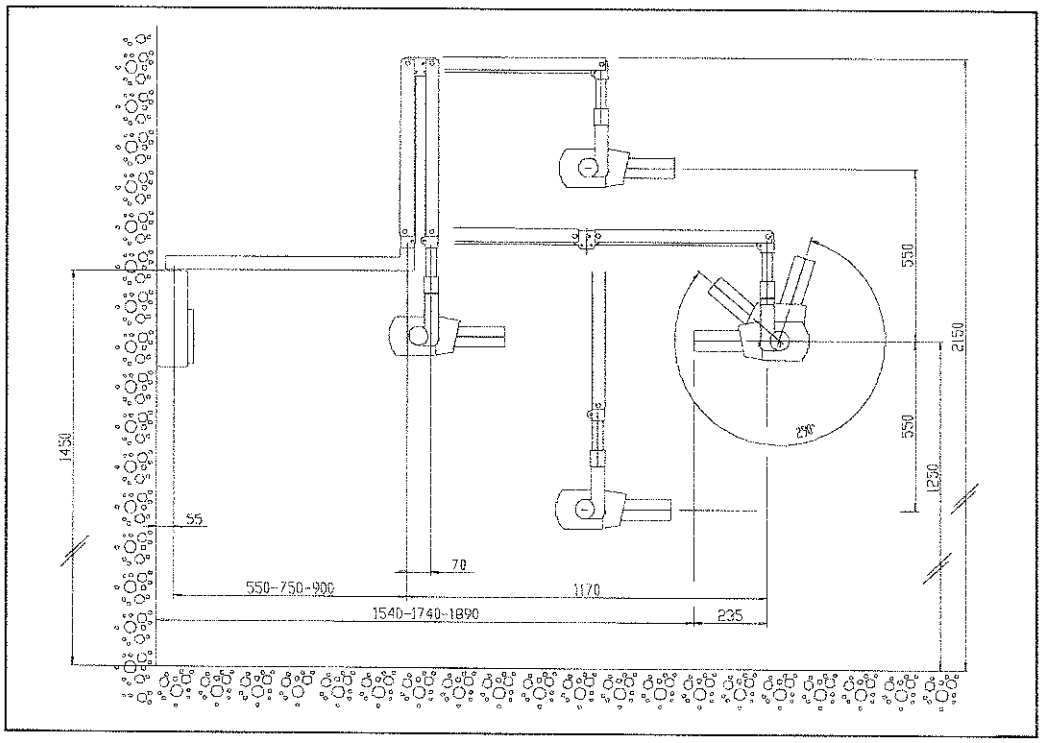


Figure 4-7

Wall-mounted configuration - Oval arms (for 70kV tubehead only)

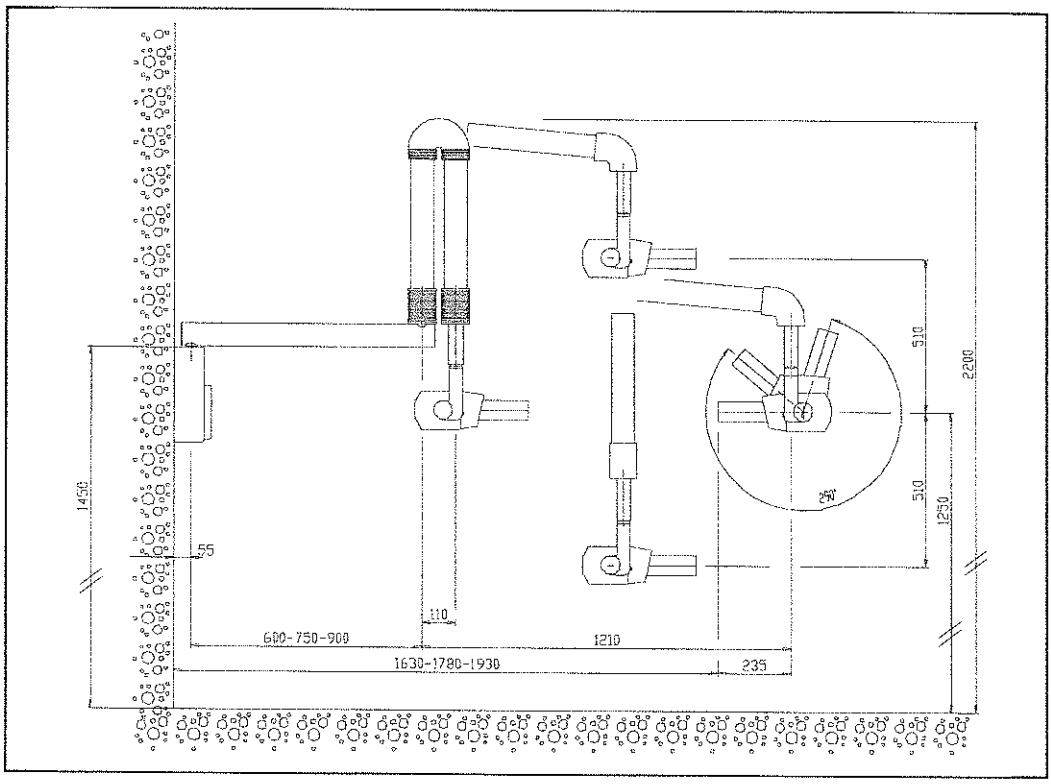


Figure 4-8

Iceland-mounted configuration

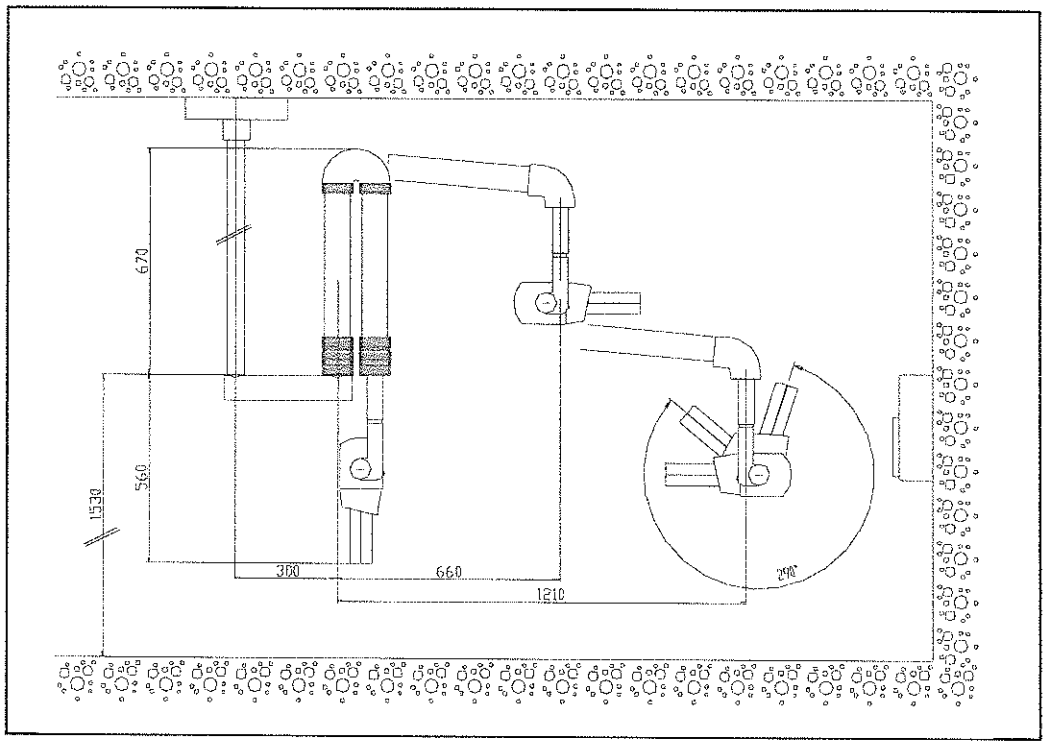


Figure 4-9

Mobile stand configuration

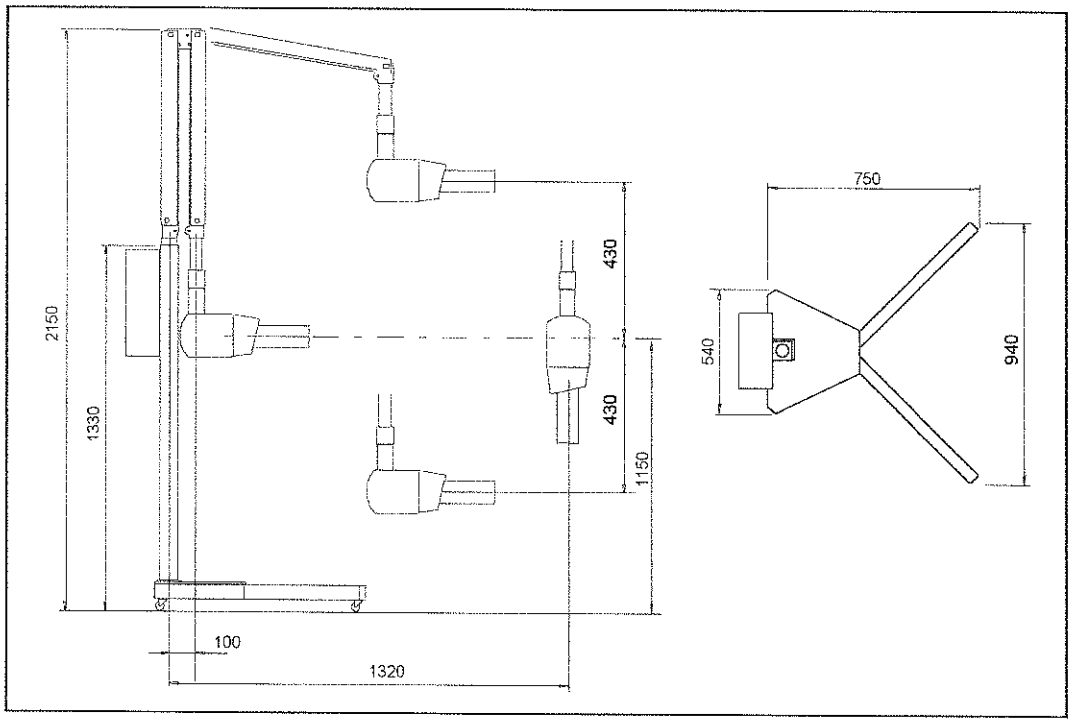


Figure 4-10

This page has been intentionally left blank

5. PRE-INSTALLATION

EXPLOR X does not require specific pre-installation procedures; compliance with the rules stated in Chapter 5.1 is the only requirement.

If one wishes to effect subtrace connection, it is avaisable to have had them already carried out when the oral X-Ray equipment is installed, considering dimensions and suggested distance from floor as stated in chapter 4.3.

The manufacturer or its agents are able to guarantee the necessary technical assistance and support already in the pre-installation phase; wall building and pre-installation are at customer's charge.

IMPORTANT: The Timer, supply plate, hand remote control and connection cable assembly supplied by the manufacturer must be kept unaltered. Exchange with other parts of a different supply requires new system calibration.

Note: Assessment of wall solidity is left to the person in charge of installation

Fixing bosses to be used for each type of wall are the following:

- paviors: expansion bosses provided in installation kit
- wood walls: self-threading screws provided in installation kit
- hollow bricks: chemical bosses, optional (VSM code 66601320) (see paragraph 6.5.3)

5.1 ELECTRICAL FEATURES

The supply line must comply with the following values:

Single-phase mains voltage + ground	120/220/240V ±10%
Frequency	50-60Hz
Absorbed current	6A (120V), 3A (220/240V)
Apparent line resistance	0,2Ω max. (120V), 0,8Ω max. (220V), 0,9Ω max. (240V)

Connection of the equipment requires a magnetic-thermical switch (IEC regulation number 64-4), having the following characteristics:

Nominal current	6A
Differential sensibility	30mA

The equipment must be connected to a system provided with correct grounding, in compliance with IEC regulations..

Maximum distance between electrical panel and supply terminal block varies according to the section of supply wires and is reported in Table 5-1.

	Distance		
Supply	0-15m	15-22,5m	22,5-37,5
120V/60Hz	4mm^2 (12 AWG)	6,3mm^2 (10 AWG)	10mm^2 (8 AWG)
220-240V/50Hz	2,5mm^2 (14 AWG)	4mm^2 (12 AWG)	6,3mm^2 (10 AWG)

Tale 5-1

N.B.: For 220/240V supply, we recommend to use wires whose section is not lower than 2,5mm^2 (14 AWG).
For 120V supply, we recommend to use wires whose section is not lower than 4mm^2 (14 AWG).

For standard configuration (Fig. 3-1) and for mobile stand configuration (Fig. 3-5), the supply terminal block is the same as that of the Timer (Diamatic AP or CCD); for other configurations, the Timer's supply terminal block is only a "link" between the electrical panel and the supply terminal block of the arms support.

5.2 ENVIRONMENTAL CONDITIONS

For correct functioning, the equipment must be installed in air-conditioned environments, having the following characteristics:

Relative humidity	50 - 75% (not condensing)
Temperature	18 - 28°C

6. INSTALLATION

SUMMARY OF PARAGRAPHS FOR QUICK REFERENCE

	Timer and wall-mounting supports installation					Extension arm with scissors arm installation			
	See Paragraph					See Paragraph			
CONFIGURATIONS	6.1.1	6.1.2	6.1.3	6.1.4	6.1.5	6.2.1	6.2.2	6.2.3	6.2.4
Standard - 70 kV	●					■	■		
Standard - 65 kV	●					●	●		
Remote Timer - 70 kV		●				■	■		
Remote Timer - 65 kV		●				●			
Dental chair - 70 kV			●			●			
Dental chair - 65 kV			●			●			
Ceiling - 70 kV				●				■	■
Ceiling - 65 kV				●				●	
Mobile Stand - 70 kV					●				
Mobile Stand - 65 kV					●				

■ OTHER OPTIONS

	Arms mounting on support (thimble)				Tubehead Mounting		Options			Electrical connection		Final functioning tests	
	See paragraph				See paragraph		See paragraph			See paragraph		See paragraph	
CONFIGURATIONS	6.3.1	6.3.2	6.3.3	6.3.4	6.4.1	6.4.2	6.5.1	6.5.2	6.5.3	6.6.1	6.6.2	6.7.1	6.7.2
Standard - 70 kV	●				■	■	●	●	●	●		■	■
Standard - 65 kV	●				●		●	●	●	●		■	■
Remote Timer - 70 kV	●				■	■	●		●		●	■	■
Remote Timer - 65 kV	●				●		●		●		●	■	■
Dental chair - 70 kV		●			■	■					●	■	■
Dental chair - 65 kV		●			●						●	■	■
Ceiling - 70 kV			●		■	■					●	■	■
Ceiling - 65 kV			●		●						●	■	■
Mobile Stand - 70 kV				●	■	■				●		■	■
Mobile Stand - 65 kV				●	●					●		■	■

■ OTHER OPTIONS

6.1 WALL-MOUNTING INSTALLATION

6.1.1 Wall plate + Timer (Standard configuration)

Note **Assessment of wall solidity is left with the person responsible for installation, keeping into account the fact that load on top bosses is 200 kg (440 lb) each. For less resistant walls a counterplate (see par. 6.5.1) or chemical bosses (See par. 6.5.3) will have to be used.**

1. Remove wall plate/Timer external cover by loosening the two screws (**1**) located in the bottom part of the plate.
2. Loosen internal screw (**2**) fixing the components plate and rotate the plate by 90°.
3. Mark the 3 holes for wall plate mounting on wall in the selected position, at a distance of 1450 mm (57") from floor, by using the template provided in the installation kit.
4. Make holes in wall, insert the expansion bosses provided in the installation kit or optional chemical bosses (code 66601320).
5. Secure wall plate to wall by using the screws (**3**), inserting the counterplate between the two (**4**) and check that top plane is levelled (using a level).

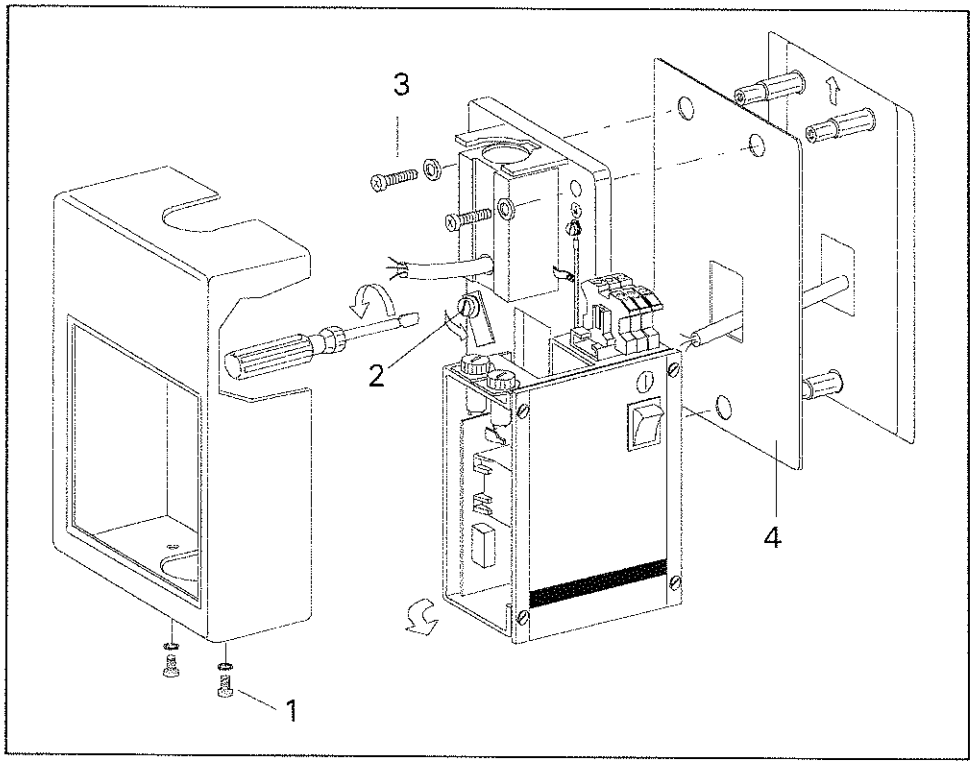


Figure 6-1

6.1.2 Wall plate (configuration with Remote Timer)

Note **Assessment of wall solidity is left with the person responsible for installation, keeping into account the fact that load on top bosses is 200 kg (440 lb) each. For less resistant walls a counterplate (see par. 6.5.1) or chemical bosses (See par. 6.5.3) will have to be used.**

1. Remove wall plate external cover by loosening the two screws (**1**) located in the bottom part of the plate.
2. Remove internal cover fixing screws (**2**).
3. Mark the 3 holes for wall plate mounting on wall in the selected position, at a distance of 1450 mm (57") from floor, by using the template provided in the installation kit.
4. Make holes in wall, insert expansion bosses provided in the installation kit or optional chemical bosses.
5. Secure wall plate to wall by using the screws (**3**), inserting the counterplate between the two (**4**) and check that top plane is levelled (using a level).

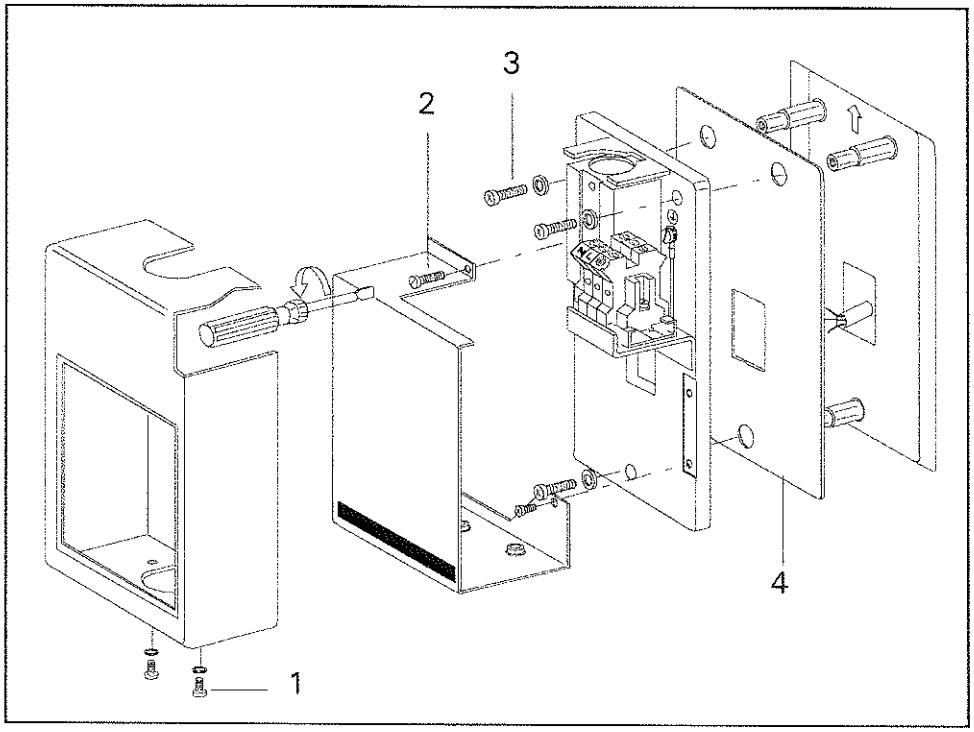


Figure 6-2

6.1.3 Timer Plate

1. Remove Timer external cover by loosening the two screws (**1**) located in the bottom part of the timer.
2. Loosen internal screw (**2**) fixing the components plate and rotate by 90°.
3. Mark the 3 holes for timer mounting on wall in the selected position, at a distance of 1450 mm (57") from floor, by using the template provided in the installation kit.
4. Make holes in wall, insert the bosses provided in the installation kit.
5. Secure Timer wall plate to wall by using the screws (**3**) and check that top plane is levelled (using a level).

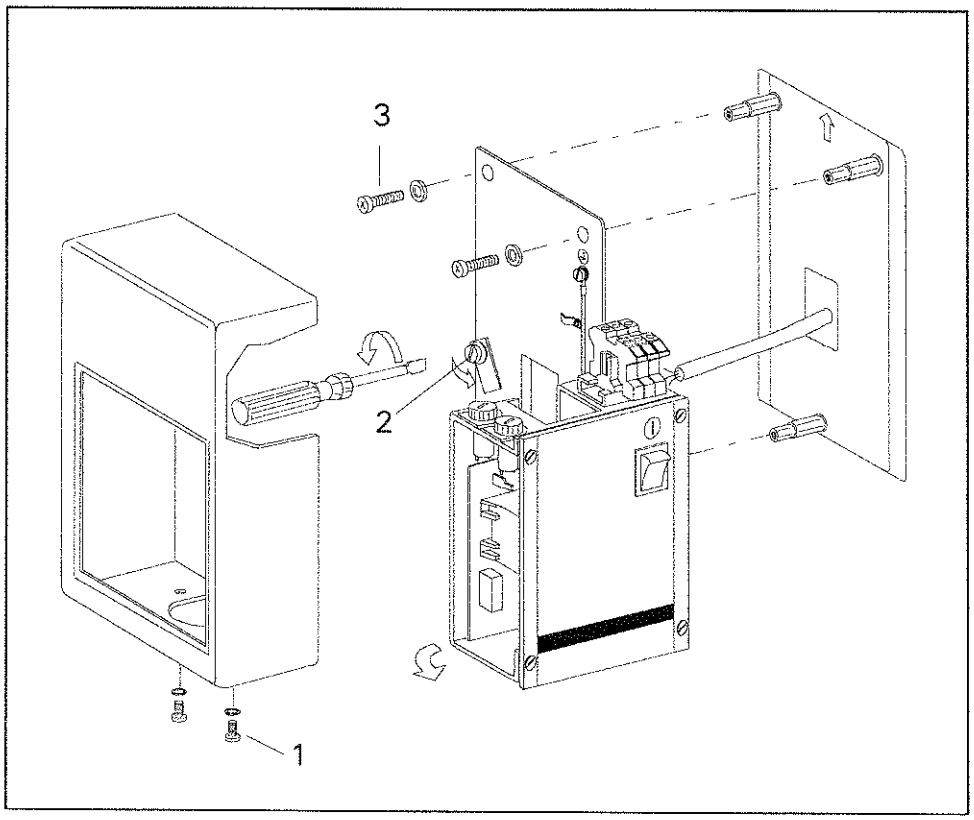


Figure 6-3

6.1.4 Ceiling suspension plate installation

In the case of ceiling suspension version, install ceiling suspension plate and stand, taking into account the fact that distance from the timer must not exceed 4m.

We recommend to install remote Timer and connection wires (external in duct or backwiring-dry wall) first.

1. Mark the 6 holes on ceiling using the template provided in the installation kit.
2. Make holes in ceiling and insert the bosses provided in the installation kit.
3. Screw ceiling suspension plate (**1**) to the ceiling by using the relevant screws (**2**).
4. Insert connection wires in the hole in the centre of the plate and drive them through the stand (**3**) (see Fig. 6-5 Page 30).
5. Screw stand (**3**) to ceiling plate using the two screws (**4**) provided in installation kit (See Fig. 6-6 Page 30).
6. Check levelling of the assembly and, if necessary, adjust by means of the ceiling plate fixing screws.
7. Install plate cover (**5**) and fix it with the four relevant screws (**6**).

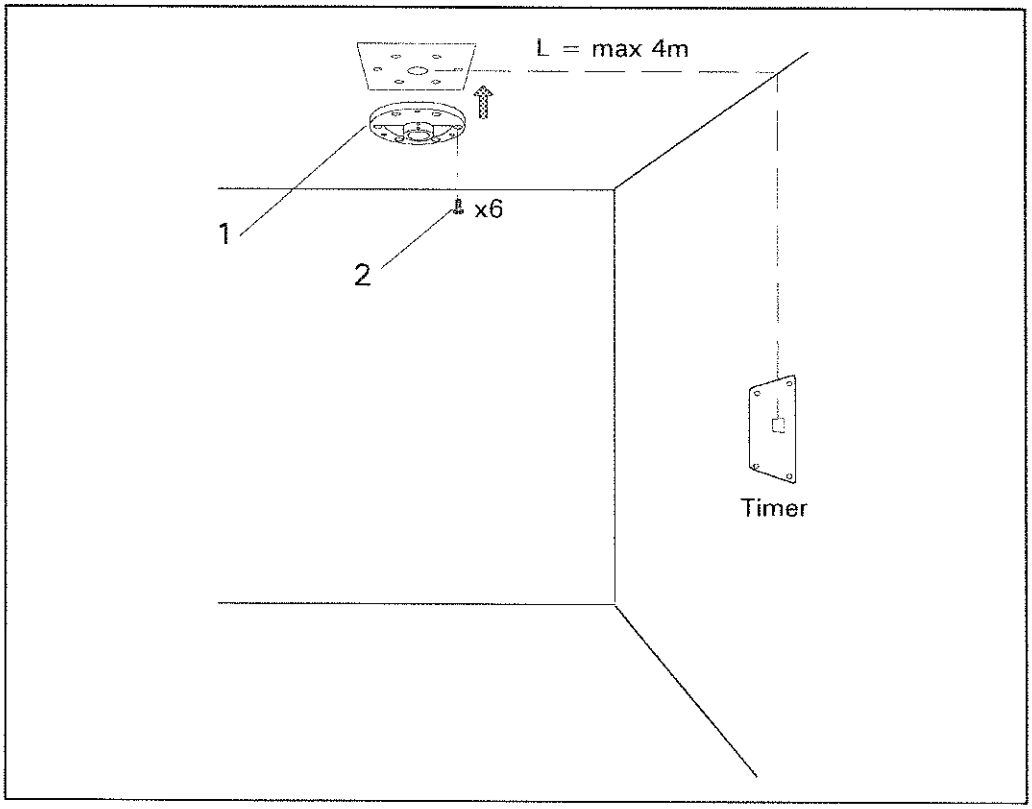


Figure 6-4

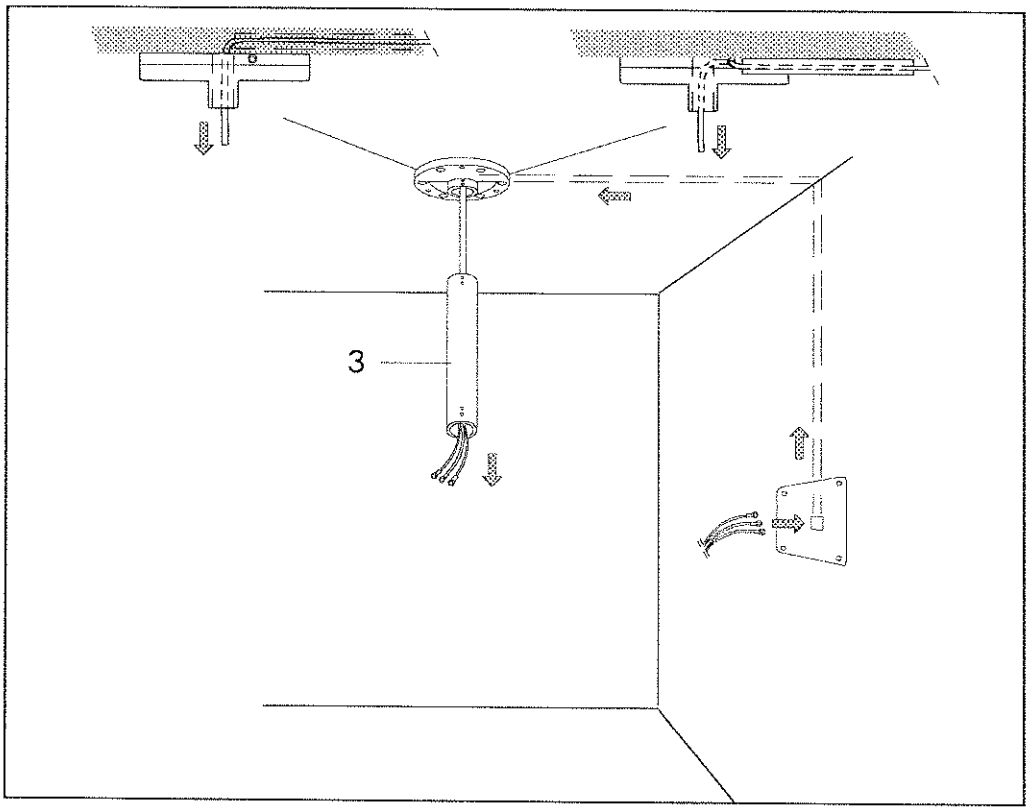


Figure 6-5

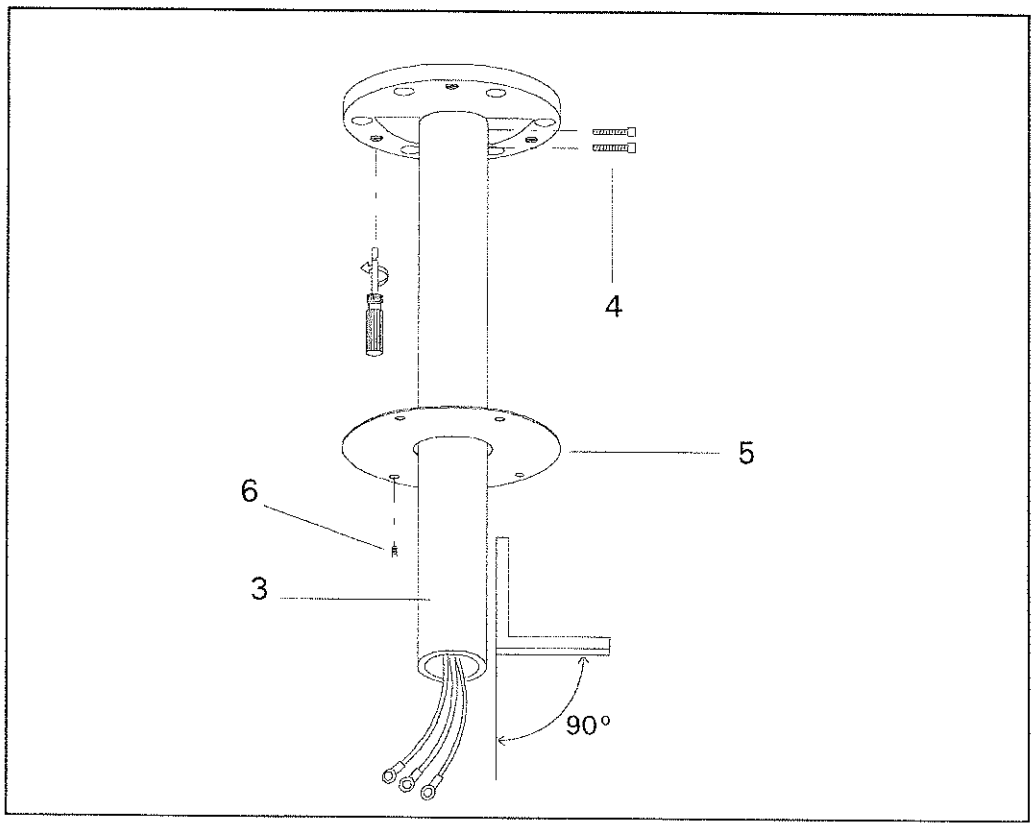


Figure 6-6

6.1.5 Mobile stand mounting and Timer installation

1. Cross the two base tubes (**1**) in the relevant slot, and fix them together by means of the screw (**2**) and the relevant nut (**3**).
2. Position base plate (**4**) and secure it by means of the four relevant screws (**5**).
3. Mount column stand (**6**) on base plate (**4**) by means of the four relevant screws (**7**).
4. Remove Timer's external cover by loosening the two screws located in the bottom part of the timer (**8**).
5. Loosen the components plate fixing screw (**9**) and rotate the plate by 90°.
6. Fix Timer (**10**) on the back side of column stand (**6**) by means of the two relevant screws (**11**) and check that top plane is levelled (using a level).

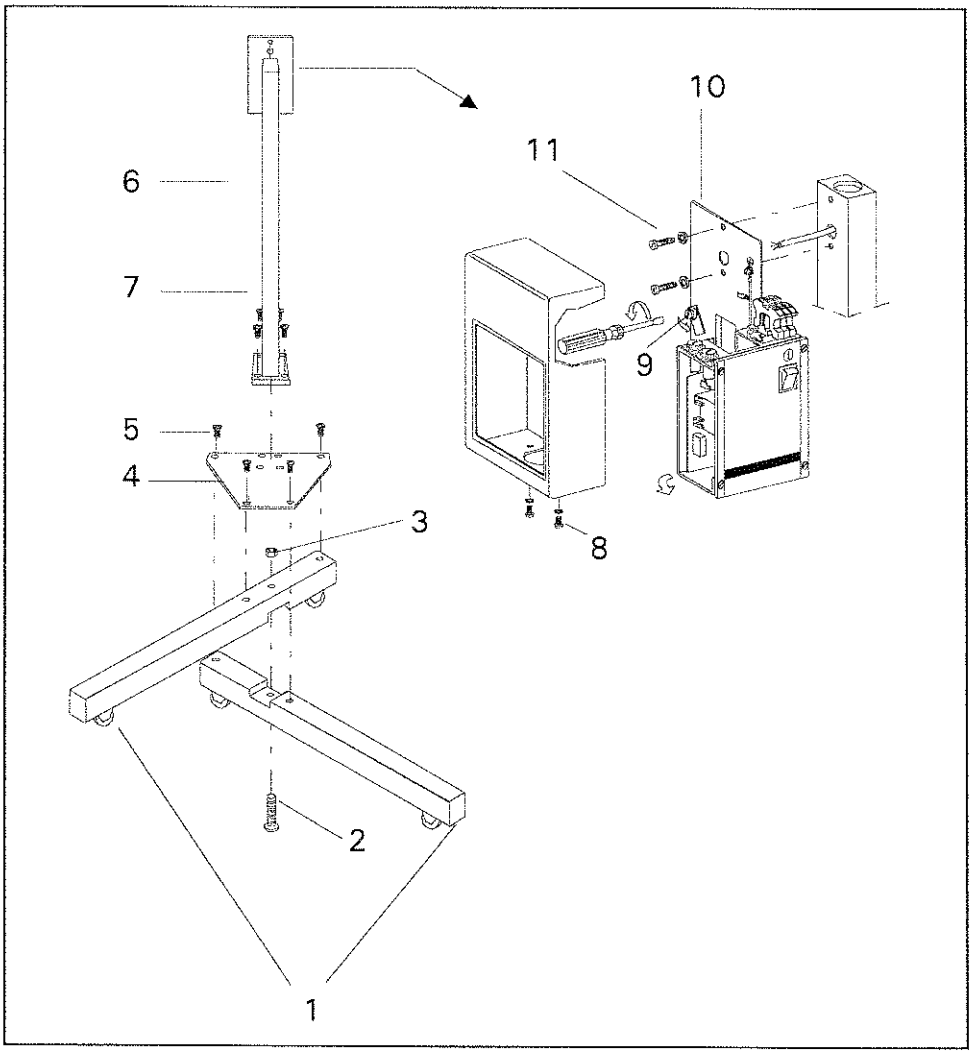


Figure 6-7

6.2 SCISSORS ARM AND EXTENSION ARM MOUNTING

6.2.1 Preparation of square arms

Note To ease this operation, we recommend not to remove scissors arm from pack and perform the whole phase on bench.

1. By means of tape, put the single pantograph arm cable and extension arm traction wire together. Pull wire until cable appears, then separate cable from traction wire.
2. Turn out the safety screw "A" (Figure 4) and introduce Scissors Arm pivot into Extension Arm (Figure 2).
3. Insert cable extremity in the relevant hole on extension arm and pull cable through rotation pivot.
4. Close hole on extension arm by means of the plastic plug provided in installation kit.
5. Lock the screw "A" to avoid the scissors arm to exit.

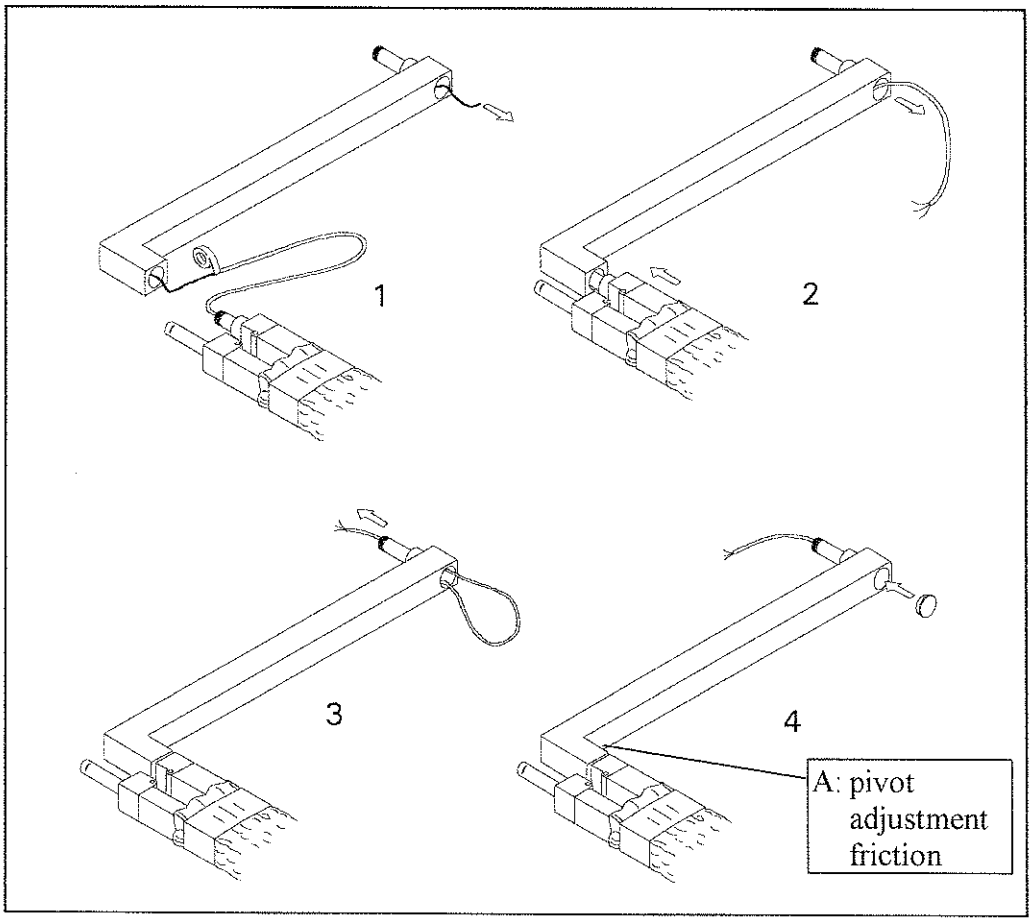


Figure 6-8

Note: At the end of operation please procede with friction adjustment as described at page 56

6.2.2 **Preparation of oval arms** (for Explor-X 70 only)

Note To ease this operation, we recommend not to remove scissors arm from pack and perform the whole phase on bench.

1. To easily pull cable through extension arm, remove cover of the first arm by means of the relevant screw (**a**). Then remove the rotation pivot by loosening the two fixing screws (**b**).
2. By means of tape, put single pantograph arm tubehead cable and extension arm traction wire together. Pull wire until cable appears, then separate cable from traction wire.
3. Insert scissors arm pivot in the relevant hole on extension arm.
4. Place rotation pivot and cover back on extension arm, performing the operations described at point 1 in reverse order.

Warning Wrong pivot positioning can negatively affect the equipment's operational radius.

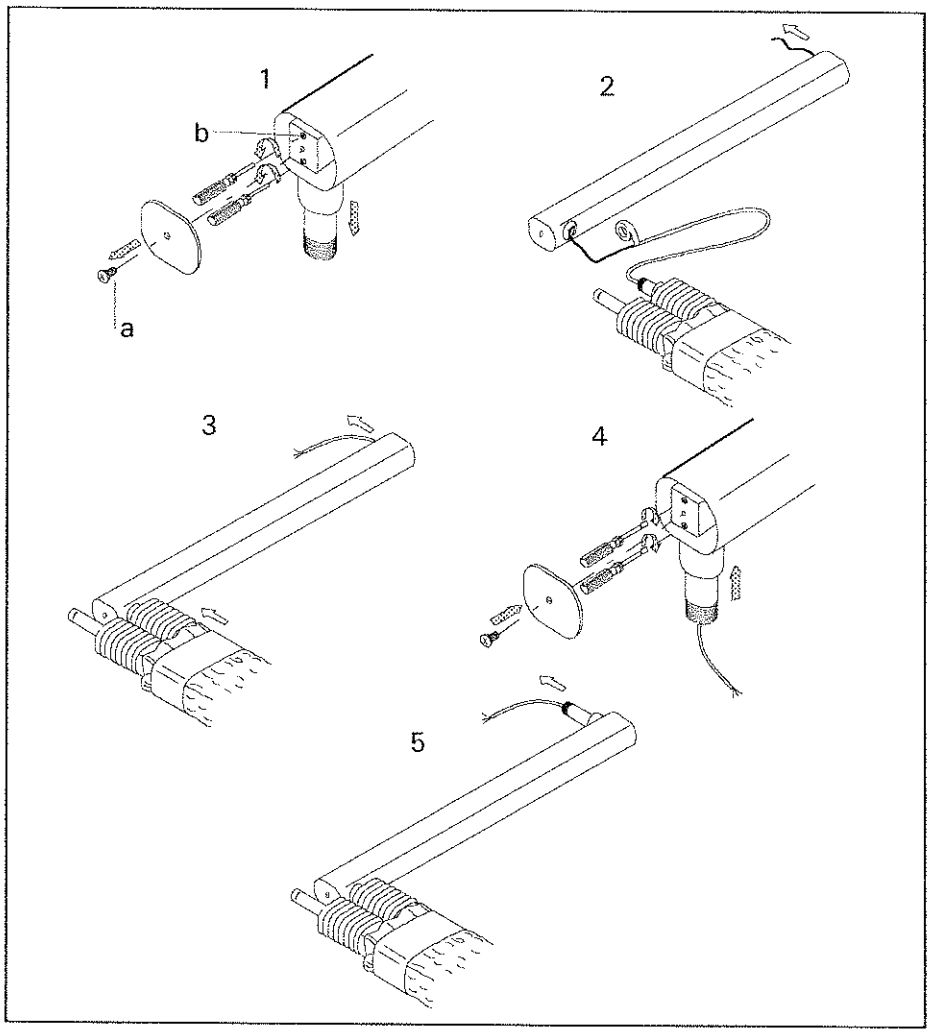


Figure 6-9

6.2.3 Preparation of square arms for ceiling mounting

Note To ease this operation, we recommend not to remove scissors arm from pack and perform the whole phase on bench.

1. By means of tape, put single pantograph arm cable and extension arm traction wire together. Pull wire until cable appears, then separate cable from traction wire.
2. Insert scissors arm pivot in the relevant hole on extension arm.
3. Insert cable extremity in the relevant hole on extension arm and pull cable through rotation pivot.
4. Close hole on extension arm by means of the plastic plug provided in installation kit.

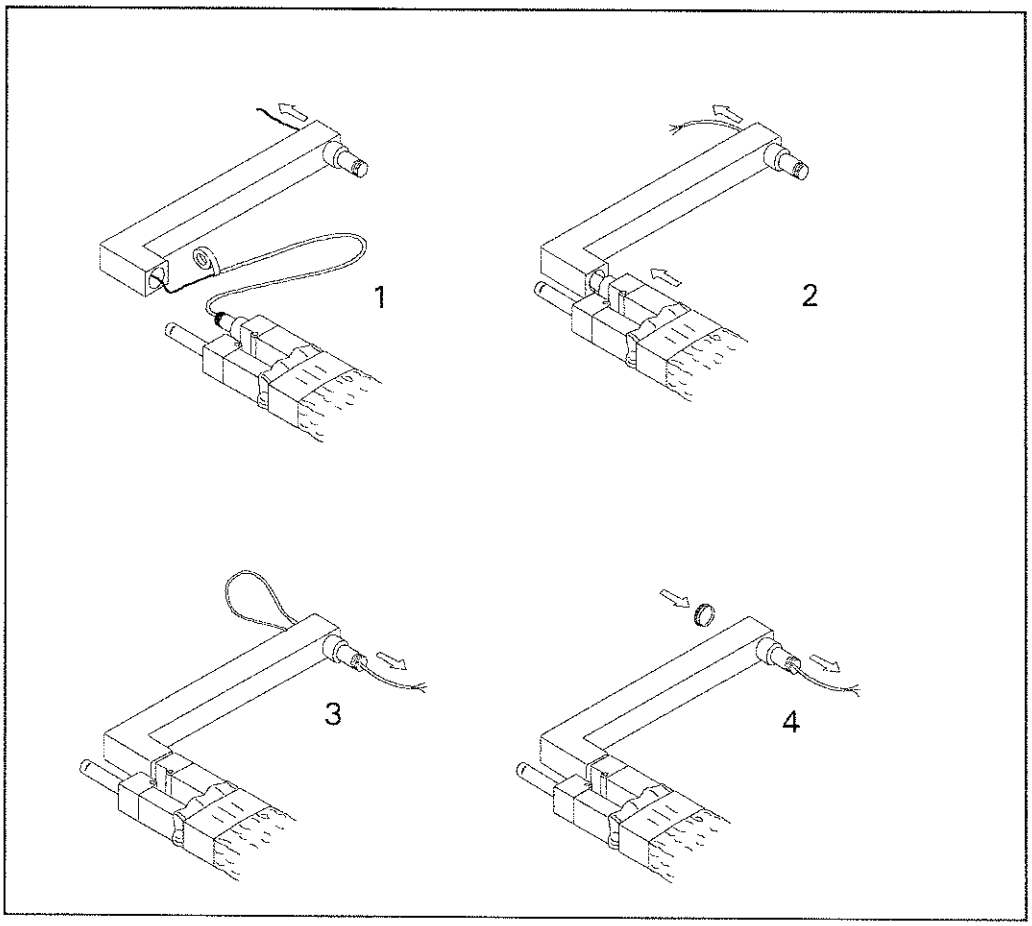


Figure 6-10

6.2.4 **Preparation of oval arms for ceiling mounting** (for Explor-X 70 only)

Note To ease this operation, we recommend not to remove scissors arm from pack and perform the whole phase on bench.

1. By means of tape, put single pantograph arm tubehead cable and extension arm traction wire together. Pull wire until cable appears, then separate cable from traction wire.
2. Insert scissors arm pivot in the relevant hole on extension arm.
3. Wedge thimble on extension arm rotation pivot (pulling through it also tubehead supply cable).
4. Secure thimble by means of safety ring.

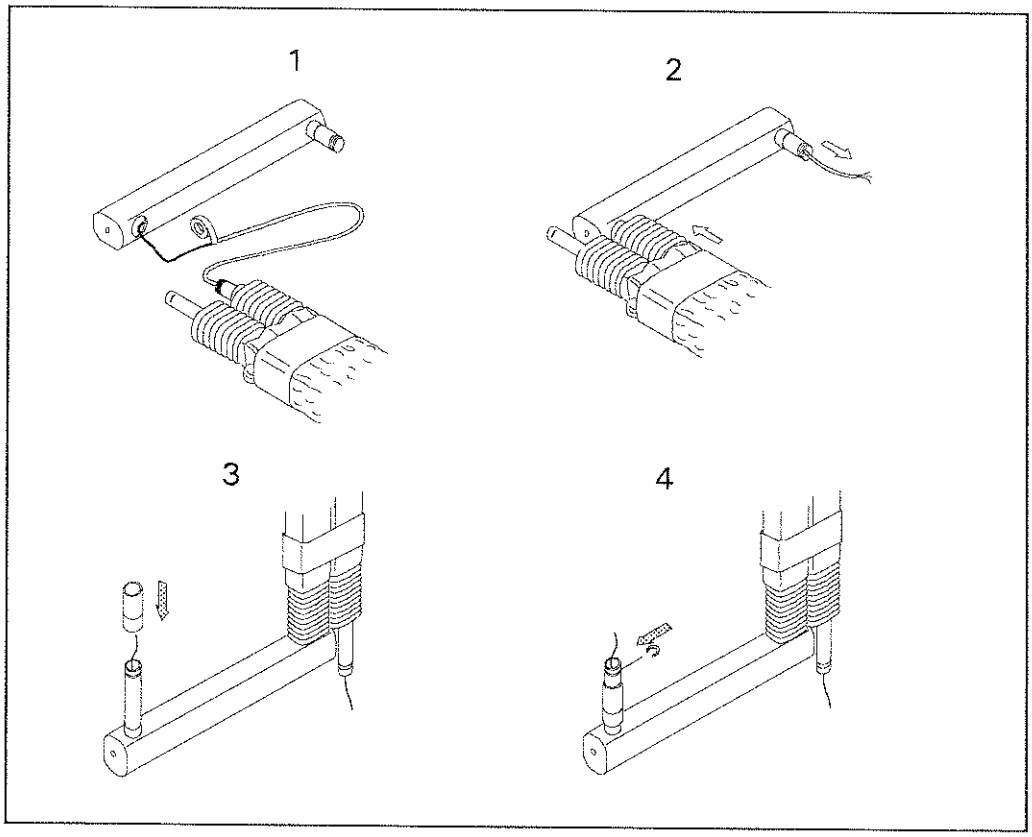


Figure 6-11

6.3 ARMS MOUNTING ON SUPPORT

6.3.1 Wall mounting of arms assembly

1. Mount complete extension arm on wall plate, by inserting rotation pivot in the relevant thimble.

   Note 1 To insert extension arm rotation pivot, keep arm in orthogonal position with respect to plate.

   Note 2 Do not free scissors arms from holding pack.

2. Check that extension arm is leveled, by means of a level; should this not be the case, adjust it by operating on regulation screws, as described below:

   - extension arm with angle wider than 90°: operate on top screws (**B**)
   - extension arm with angle narrower than 90°: operate on bottom screws (**A**)

   Note Since, in this phase, extension arm must not support tubehead weight, we recommend to keep the angle slightly wider than 90°, thus allowing a full-load flexion of about 4 mm with a 900 mm extension arm.

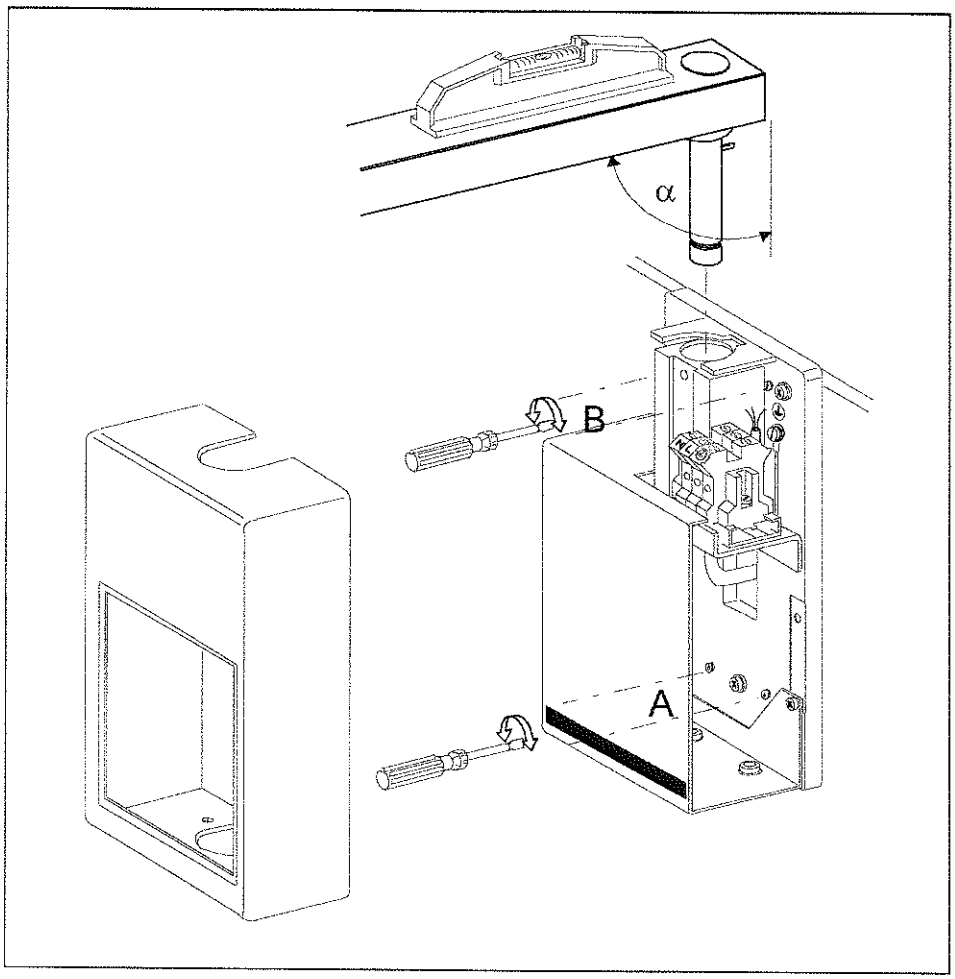


Figure 6-12

6.3.2 Mounting of arms assembly on dental chair's operation desk

1. Mount complete extension arm in dental chair stand, by inserting rotation pivot in the relevant thimble.

   Note 1 The stand is not supplied by Villa Sistemi Medicali; the internal diameter of its thimble must be 28 mm.

   Note 2 To insert extension arm rotation pivot in thimble, keep arm in orthogonal position with respect to stand.

   Note 3 Do not free scissors arms from holding pack.

2. Check that extension arm is leveled, by means of a level.

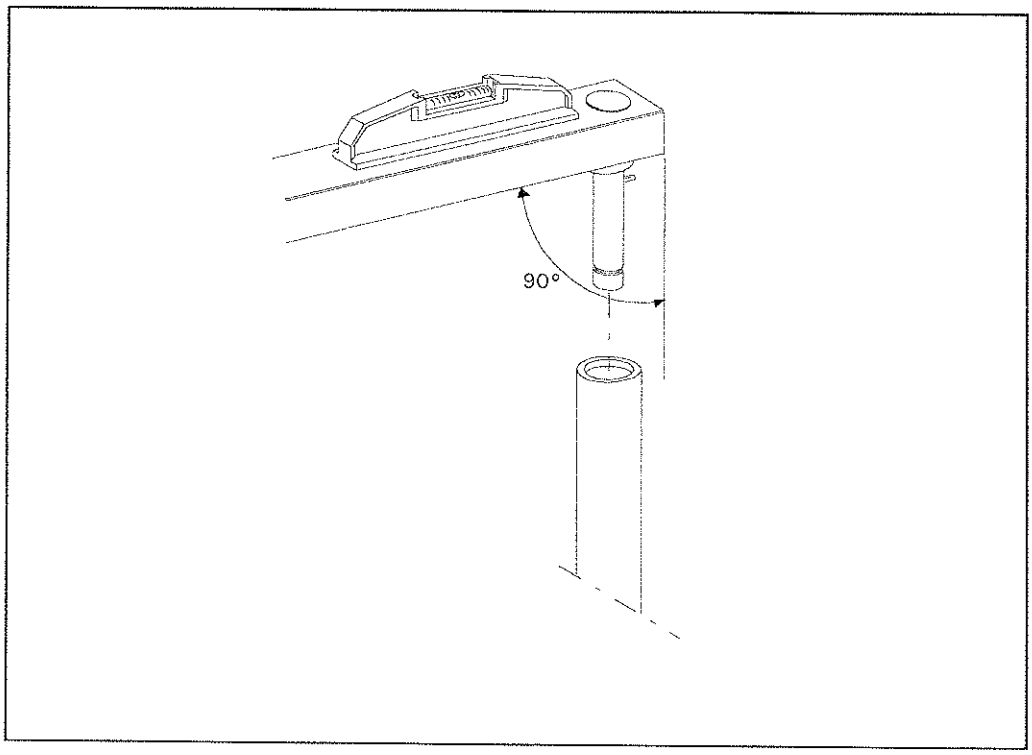


Figure 6-13

6.3.3 Ceiling mounting of arms assembly

1. Connect extension arm cables with stand cables, then insert extension arm pivot in the stand and secure it with two screws.

   Note 1 To insert extension arm rotation pivot, keep arm in orthogonal position with respect to plate.

   Note 2 Do not free scissors arms from holding pack.

2. Check that extension arm is leveled, by means of a level; should this not be the case, assess that ceiling suspension stand is perpendicular with respect to the floor and that extension arm pivot is correctly installed.

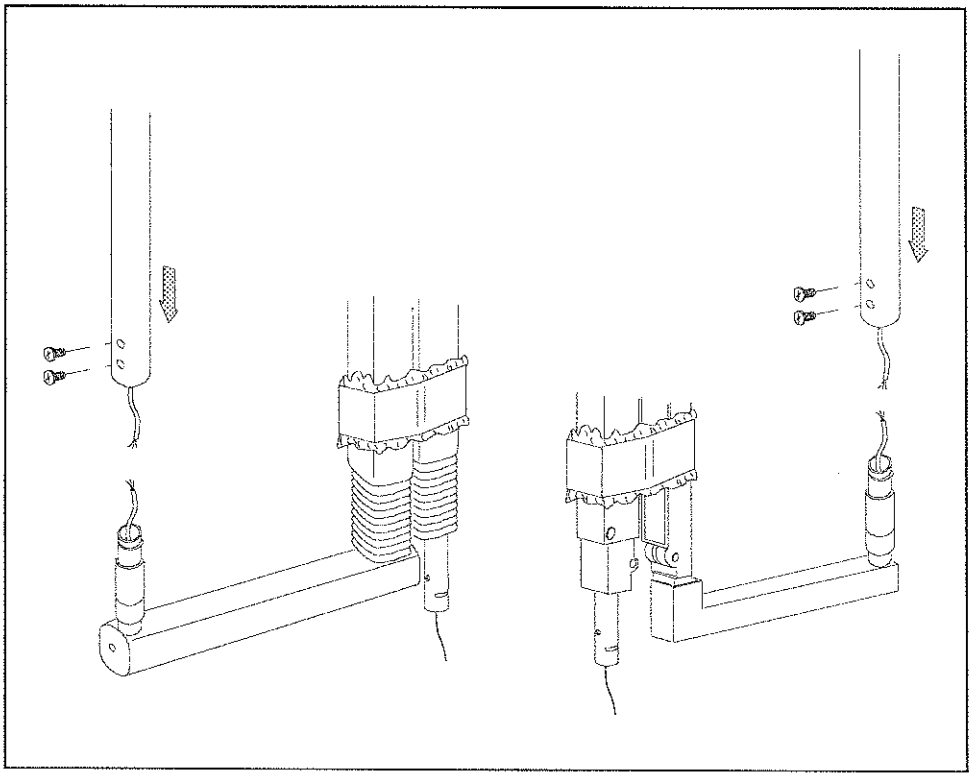


Figure 6-14

6.3.4 Stand mounting of arms assembly

1. Mount scissors arm (extension arm is absent in this configuration) on stand, by inserting rotation pivot in the relevant thimble.

   Note 1 To insert extension arm rotation pivot in thimble, keep arm in orthogonal position with respect to stand.

   Note 2 Do not free scissors arms from holding pack.

2. Check that extension arm is leveled, by means of a level.

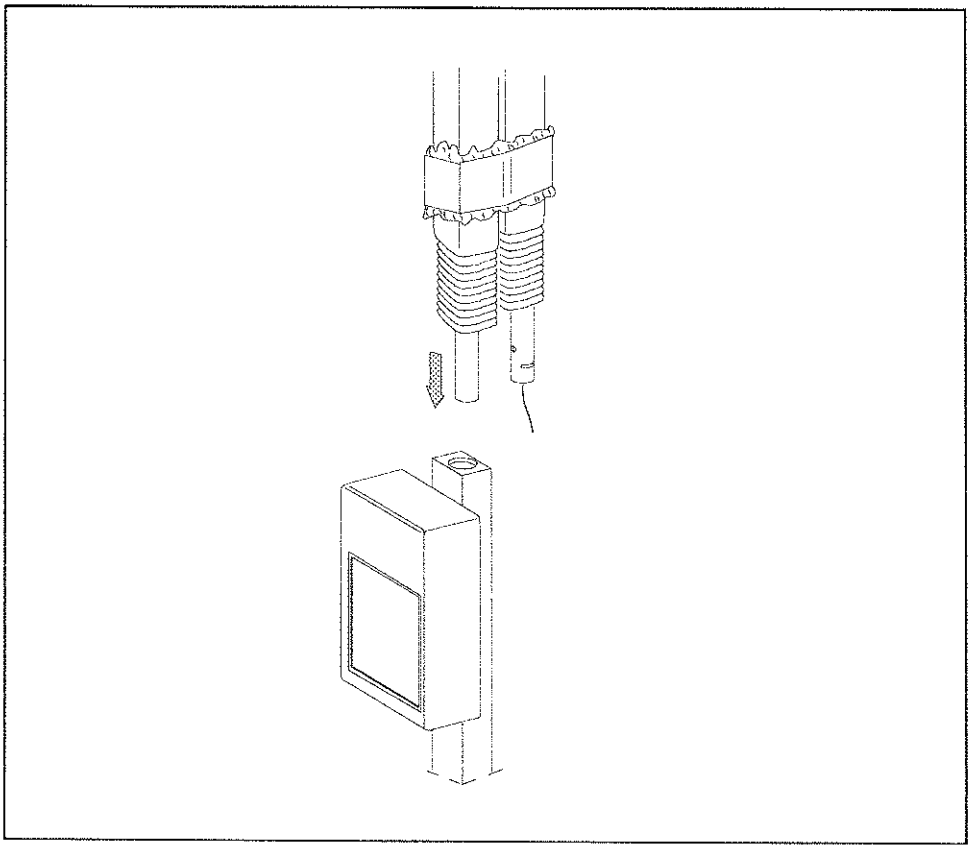


Figure 6-15

6.4 TUBEHEAD MOUNTING

6.4.1 On square arms

1. Remove safety screw (**1**) located on joint.
2. Keep arm articulation at maximum height and wedge safety cover (**2**) on joint.
3. Insert tubehead rotation pivot on joint for about half of its length and insert eleastic ring (**3**) in the two relevant transversal slots.

   Note The elastic ring must be inserted on the same side as the screw, in order to avoid excessive movement of safety cover.

4. Completely insert rotation pivot, so that safety ring fits the relevant slots on the pivot. Only after this has been carried out, the scissors arms holding pack can be removed.
5. Lower cover on leastic ring and screw safety screw back (**1**).

   Note The function of the cover is to avoid that security ring leaves the relevant seat. Therefore, cover (**2**) must be held in the right position by means of the relevant holding screw (**1**).

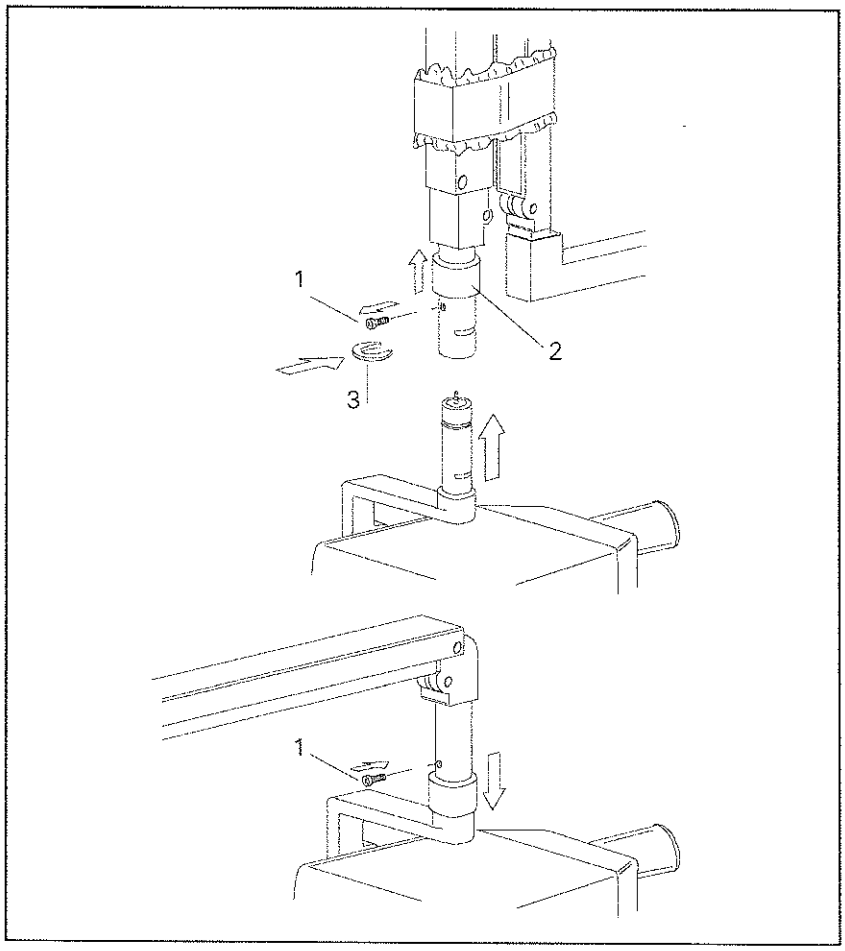


Figure 6-16

6.4.2 **On oval arms** (for Explor-X 70 only)

1. Remove safety screw (**1**) located on joint.
2. Lift joint protection cover (**2**) to see the safety elastic ring (**3**) insertion slot. Insert a pivot - whose dimeter shall not exceed 3 mm (e.g., a screwdriver) - in the hole left empty by safety screw, in order to keep protection cover lifted and see safety ring slot.
3. Insert tubehead rotation pivot on joint for about half of its length and insert eleastic ring (**3**) in the two relevant transversal slots.

   Note The elastic ring must be inserted on the same side as the screw, in order to avoid excessive movement of safety cover.
4. Completely insert rotation pivot in the joint, secure it with safety ring (**3**) and lower protection cover (**2**). Only after this has been carried out, the scissors arms holding pack can be removed.
5. Lower cover on leastic ring and screw safety screw back (**1**).

   Note The function of the cover is to avoid that security ring leaves the relevant seat. Therefore, cover (**2**) must be held in the right position by means of the relevant holding screw (**1**).

Note 2 All operations for extension arm friction regulation must be performed as described in paragraph 7.2.1 (page 52).

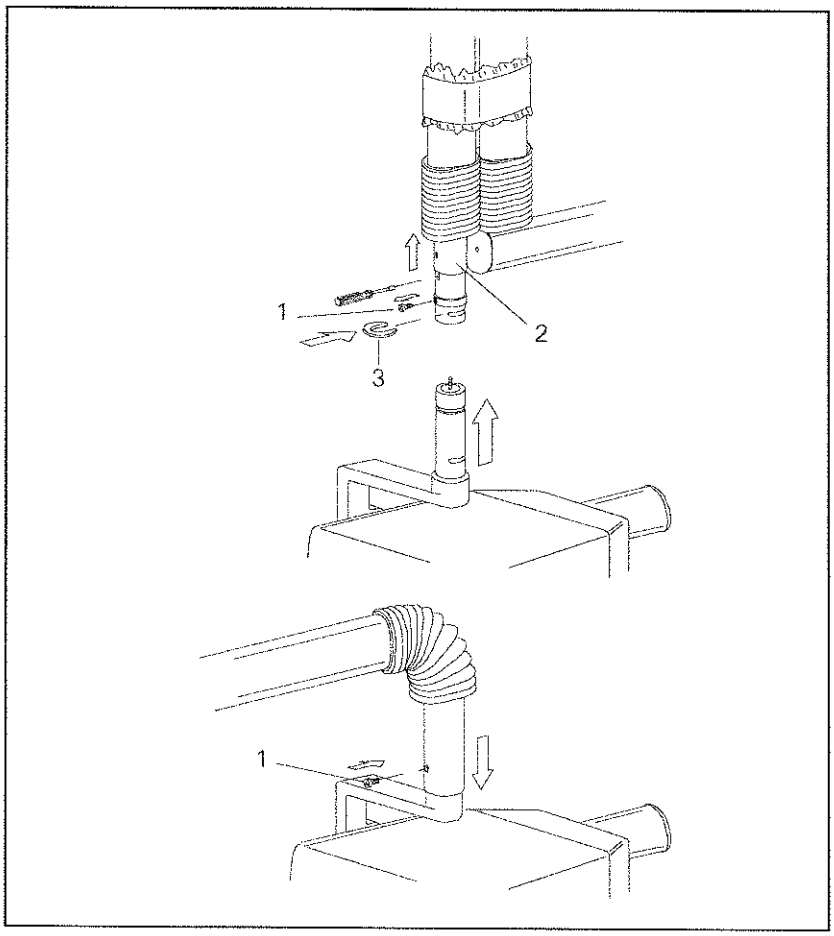


Figure 6-17

6.5 INSTALLATION OF OPTIONS

6.5.1 Counterplate

In case of utilisation on low-resistance walls, a counterplate must be used, on which the requested wall plate will be fixed (e.g., 16" , USA-type modular walls).

1. Mark the 4 holes for counterplate mounting on wall in the selected position, at a distance of 1450 mm (57") from floor, by using the template provided in the installation kit.
2. Make holes in wall in the selected points and insert the releavnt bosses.
3. Secure counterplate (**1**) to the wall by means of the relevant screws (**2**), and assess that top plane is leveled (by means of a level).
4. Apply finishing panel (**3**) on counterplate.
5. Mount wall plate on counterplate by means of the relevant screws, provided in the installation kit (**4**).

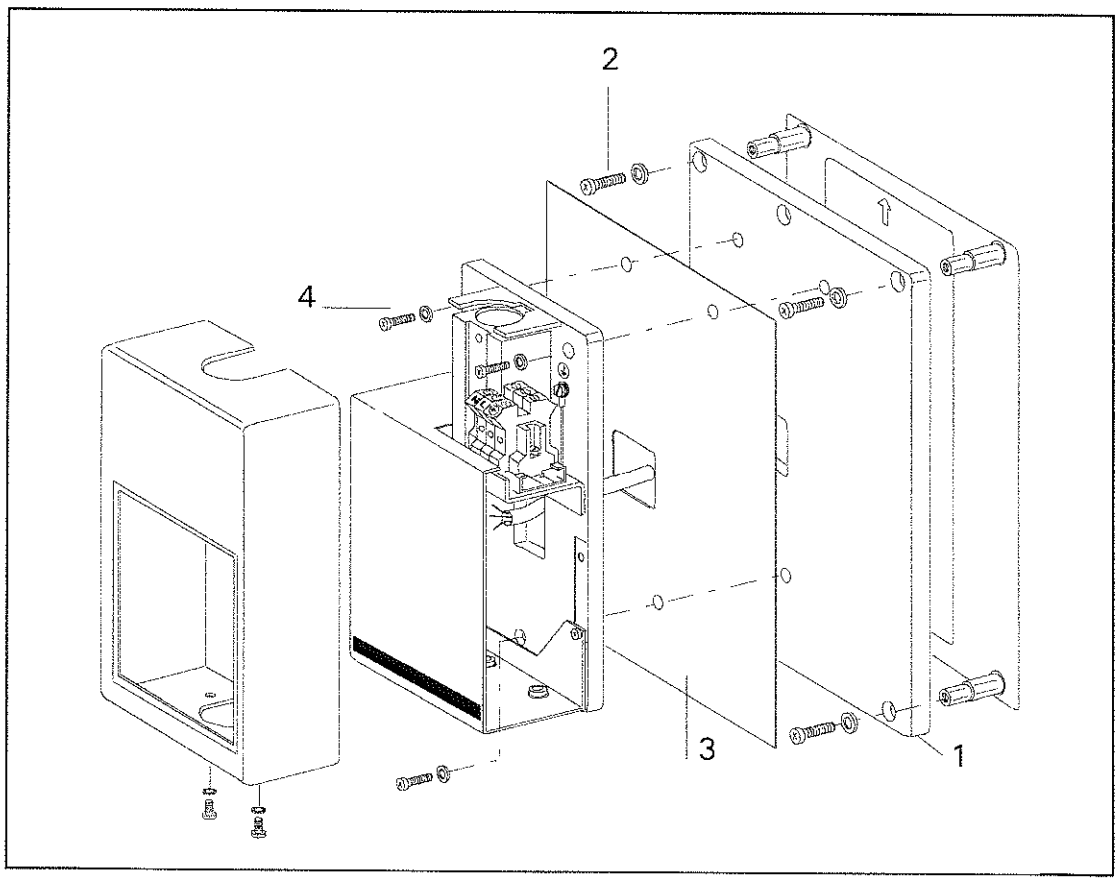


Figure 6-18

6.5.2 Hand remote control

Note The cable connecting Timer and hand remote control, either external or subtrace, must always be inserted into an iron cable run to avoid disturbances to signals inside the cable.

The cable may have a maximum length of 7 meters and, consequently, the distance between Timer and hand remote control must be smaller than this length.

1. Mark the holes for hand remote control support plate (**1**) mounting on wall in the selected position, at a distance of 1450 mm (57") between hand remote control top and floor, then make holes.
2. Insert the two fixing bosses (**2**) provided in installation kit (fisher) in wall and secure plate by means of the relevant screws. (**3**).

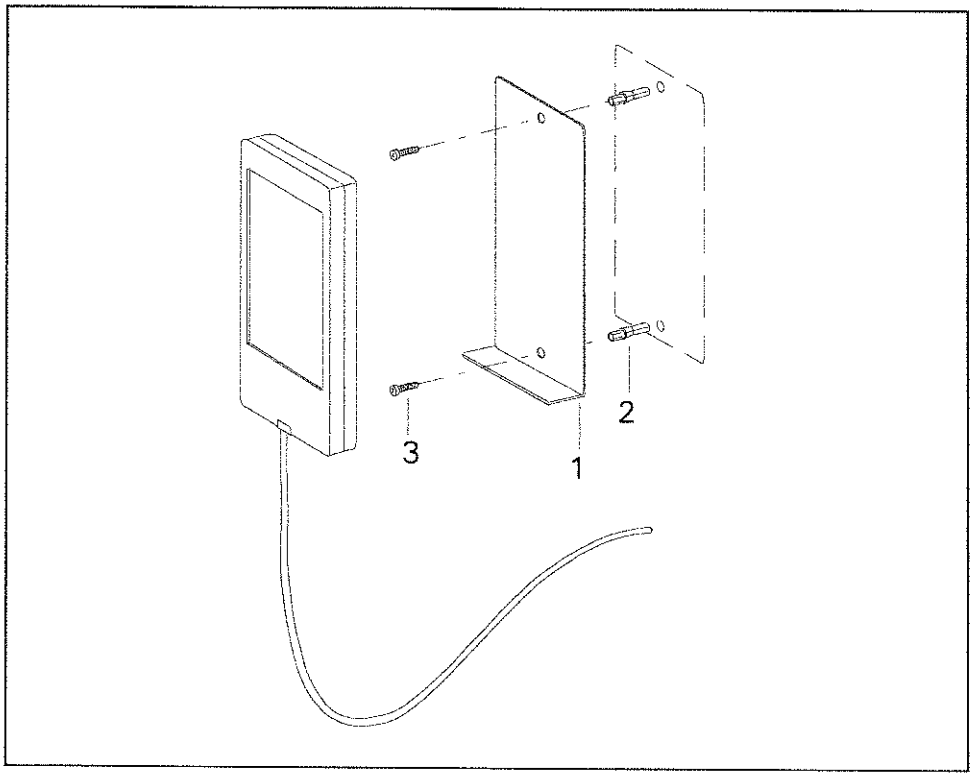


Figure 6-19

6.5.3 Installation of chemical bosses

Installation with chemical bosses is recommended for hollow bricks.

To install chemical bosses, follow the instructions enclosed in the installation kit.

6.6 ELECTRICAL CONNECTIONS

After setting the various phases on time switch, proceed to electrical connection referring to the electrical scheme presented in chapter 9.

Time switch must be connected to a system equipped with adequate grounding, in compliance with IEC regulations.

Note: The installations must be in compliance with IEC regulation; a differential switch must be installed before the x-ray with the following caracteristics:

Nominal current	6A (220-240V) 10A (120V)	Differential sensitivity	0,03A

6.6.1 Electrical connection for standard versions

1. Perform connection between main switch and Timer terminal block by means of a bipolar cable + ground, whose minimum section must be of 2.5mm^2 (14 AWG); close cable on Timer side with the relevant prod terminals provided in installation kit. Secure cable to terminal block, **respecting indicated positions** (L = line - brown cable, N = neutral - blue cable, Ground = yellow/green cable).
2. Connect tubehead cable to supply board, closing clables with the relevant terminals provided in installation kit, **respecting indicated positions** (N2 = blue cable, L2 = brown cable, Groud = yellow/green cable on point of frame). If wires L1 and L2 are black, follows the reference given by the tags attached to the wires themselves for proper identification.
   If the reference tags are not found, wires can be identified by using a ohm-metr as follows:
   - connect one test probe of an ohm-meter to the central pin of the female sliding contact (on the arm)
   - connect the other test probe of an ohm-meter to one of the two wires to identify
   - wire L2 is the one which shows continuity with the above mentioned central contact

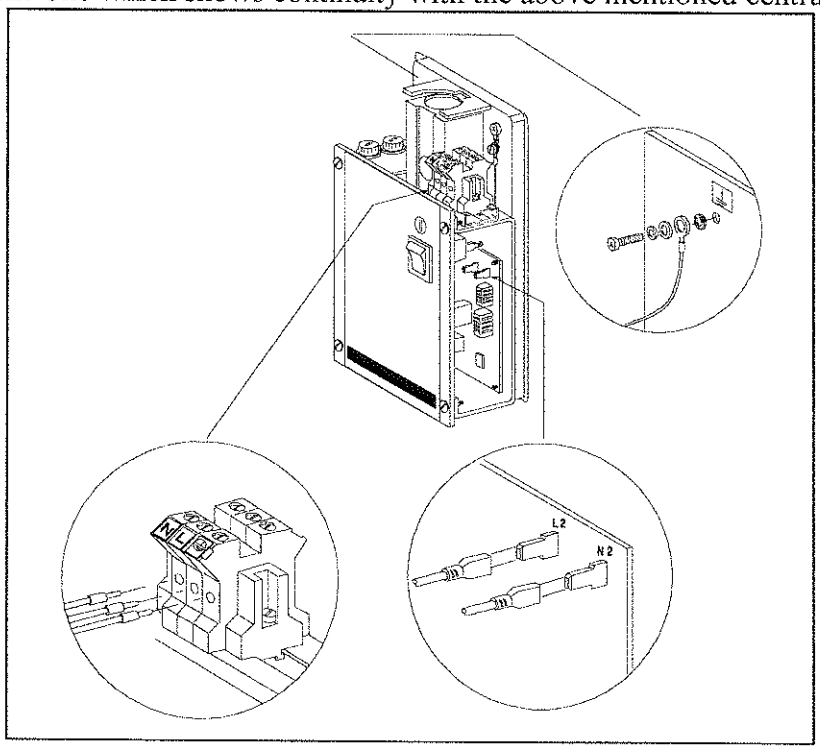


Figure 6-20

6.6.2 Electrical connection for versions equipped with remote Timer

1. Perform connection between main switch and remote Timer terminal block by means of a bipolar cable + ground, whose minimum section must be of 2.5mm^2 (14 AWG); close cable on Timer side with the relevant prod terminals provided in installation kit. Secure cable to terminal block, **respecting indicated positions** (L = line - brown cable, N = neutral - blue cable, Ground = yellow/green cable).
2. Connect **L2, N2 and Ground Timer cables to terminal block L, N and Ground** respectively on wall plate terminal block, using the terminals provided in the installation kit.
3. Connect tubehead cable to wall plate terminal block, closing clables with the relevant prod terminals provided in installation kit, **respecting indicated positions** (N2 = blue cable, L2 = brown cable, Groud = yellow/green cable on point of frame).

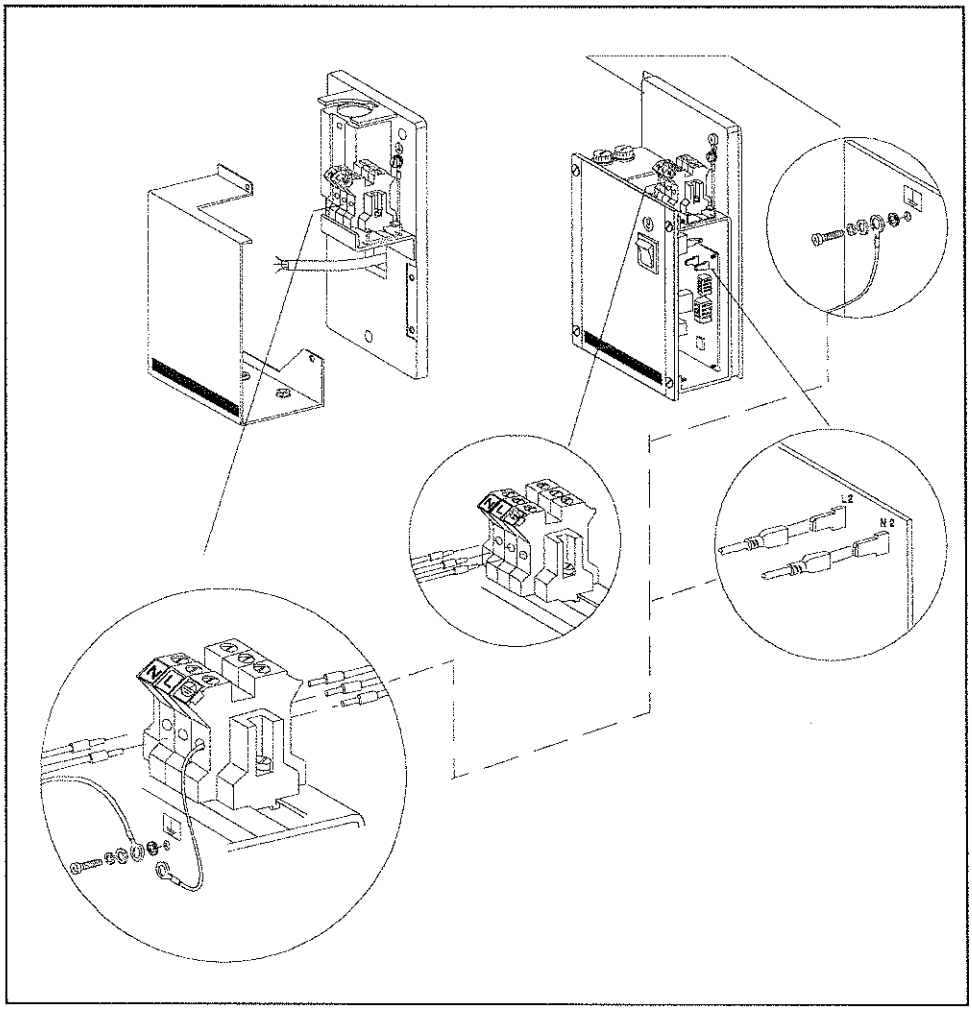


Figure 6-21

Warning:	For all versions, correct connection of tubehead and supply board must be strictly respected, because a special safety circuit for high-tension overload in x-ray tube is inserted int he board itself. Wrong connections can cause abnormal current absorption, thus inducing a drop in tubehead performance and, in some cases, interruption of network fuses.

Warning:	Before proceeding to time switch supply, check that the connecting plate for network mains voltage selection, located on supply board, is adjusted according to the required supply mains voltage value.

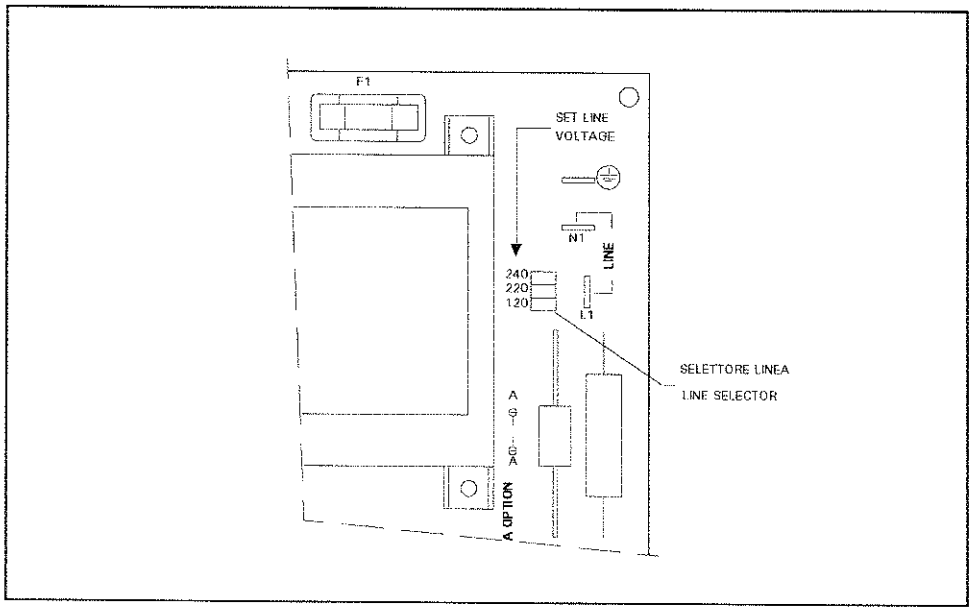


Figure 6-22

6.7 FINAL FUNCTIONING TESTS

6.7.1 DIAMATIC AP Timer

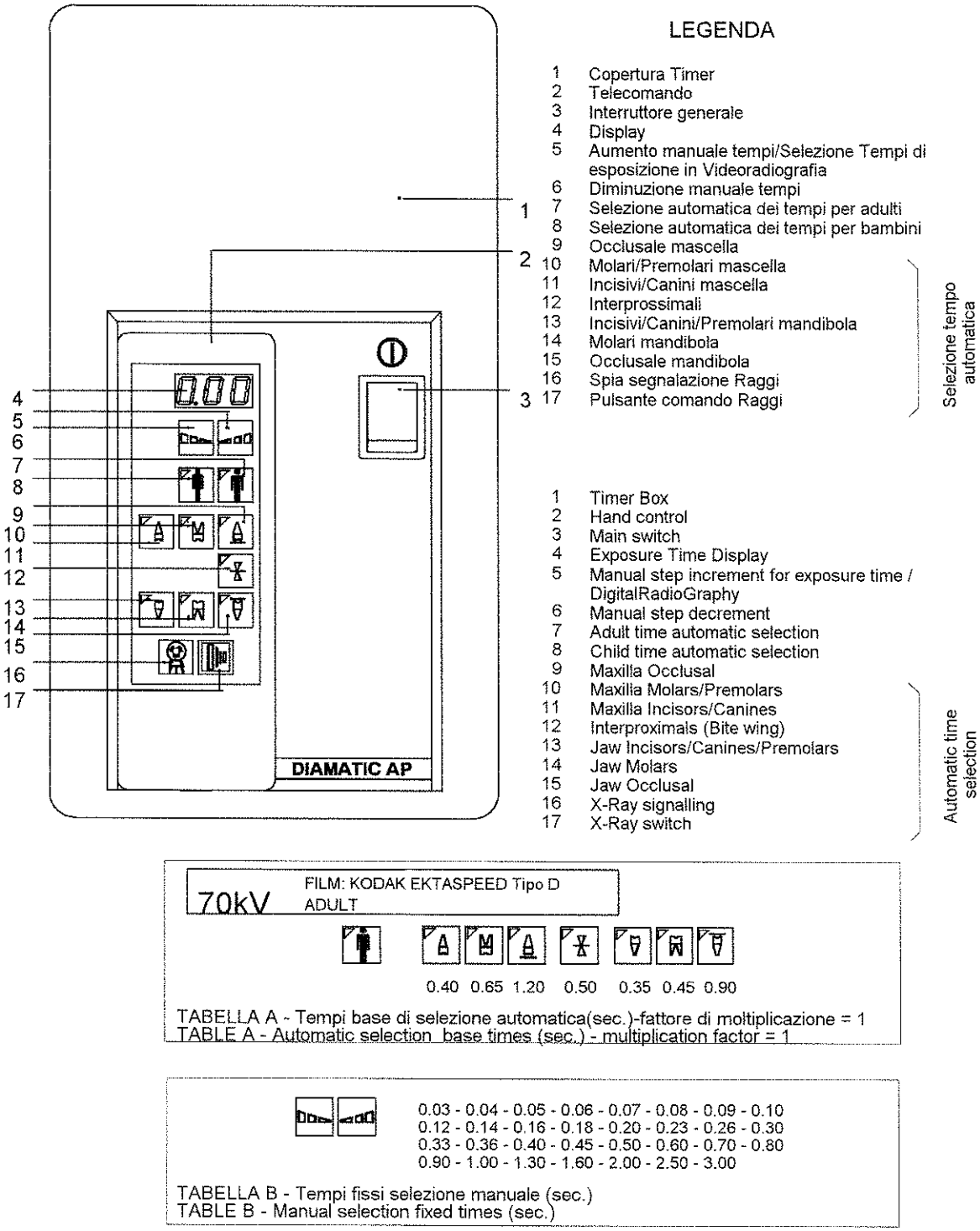


Figure 6-23

All equipment functions are aet at standard values and are tested in the factory during final tests. However, some of the functions may be regulated by Service engineers only after installation has been completed or according to specific requirements. (See Chapter 8).

After equipment has been connected to network mains voltage, perform the following functional tests:

1. Put network switch (**3**) on **ON** position and check that light on the switch turns on and that hand remote control is set on automatic function selection mode for keys **7** and **11** (the relevant LEDs are on).
2. Check correct functioning in automatic mode by pressing function selection keys **7** to **15** in sequence (the relevant LEDs turn on); the display will visualize the relevant basic exposure times (see Table A on Fig. 6-23).
3. Select manual function by pressing keys **5** (increase) and **6** (decrease) and check that display visualizes the different manual exposure times (see Table B on Fig. 6-23).

Warning: The following test implies x-ray emission; please follow all measures envisaged by local safety regulations.

4. Position fluorescent screen for radiation visualisation at extreme end of collimtaor, press key **17** and check simultaneous switching on of LED **16** and generation of acoustic signal accompanying x-ray emission. Keeping key **17** pressed, the display will visualise the real exposure time (DIAMATIC AP Timer compensates exposures times according to fluctuations in network mains voltage during exposure).

Error messages

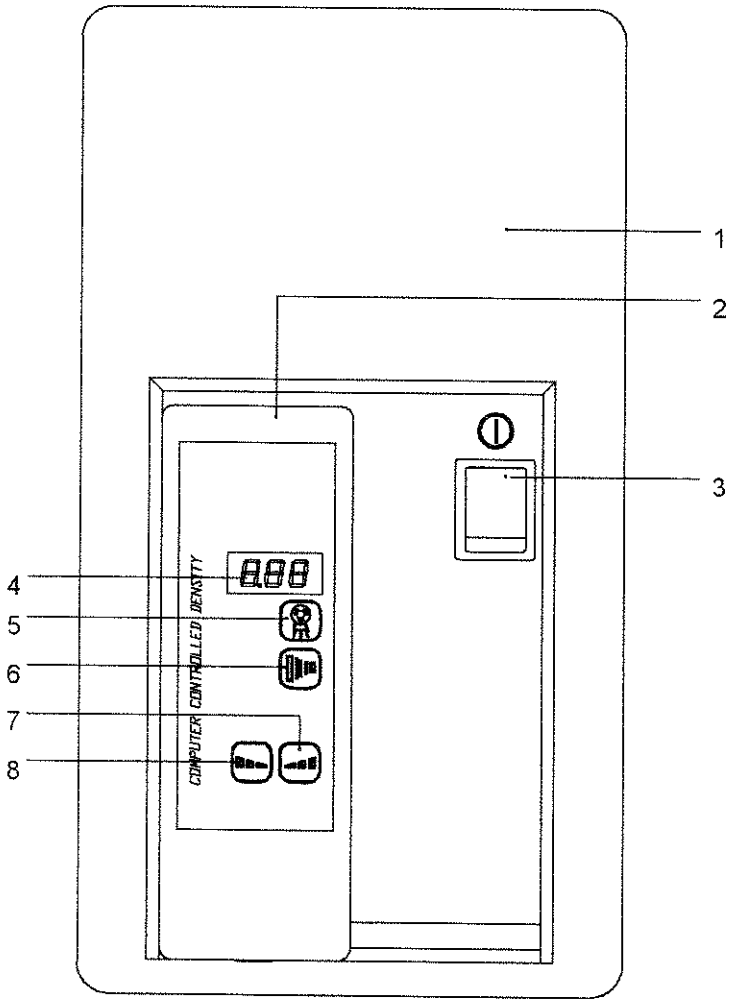
- Error message **LLL** on display means that netwok input voltage is too low and not within the accepted limit of -10%.
- Error message **HHH** on display means that network input voltage is too high and exceeds the accepted limit of +10%.
- In case calculated exposure time is higher that 4s, no exposure will be performed.

If these error messages are frequently displayed, adjust inout mains voltage as indicated in Chapter 8.

Once these checks have been successfully completed,

EQUIPMENT IS READY FOR USE.

6.7.2 CCD Timer



LEGENDA

1	Timer
2	Telecomando
3	Interruttore generale
4	Display
5	Spia segnalazione Raggi
6	Pulsante comando Raggi
7	Aumento manuale dei tempi
8	Diminuzione manuale di tempi

1	Timer
2	Hand control
3	General switch
4	Display
5	X-Ray signalling
6	X-Ray switch
7	Exposure time step Increment
8	Exposure time step Decrement

0.03 - 0.04 - 0.05 - 0.06 - 0.07 - 0.08 - 0.09 - 0.10
0.12 - 0.14 - 0.16 - 0.18 - 0.20 - 0.23 - 0.26 - 0.30
0.33 - 0.36 - 0.40 - 0.45 - 0.50 - 0.60 - 0.70 - 0.80
0.90 - 1.00 - 1.50 - 2.00 - 2.50 - 3.00

TABELLA A - Tempi fissi di esposizione (sec.)
TABLE A - Exposure fixed times (sec.)

Figure 6-24

All equipment functions are aet at standard values and are tested in the factory during final tests. However, some of the functions may be regulated by Service engineers only after installation has been completed or according to specific requirements. (See Chapter 8).

After equipment has been connected to network mains voltage, perform the following functional tests:

1. Position main switch on **ON** position and check that light on the switch turns on and hand remote control is activated.
2. Press keys **7** and **8** (Fig. 6-24) and check that display visualises all times indicated in Table A (Fig. 6-24).

Warning: The following test implies x-ray emission; please follow all measures envisaged by local safety regulations.

3. Position fluorescent screen for radiation visualisation at extreme end of collimtaor, press key **6** and check simultaneous switching on of LED **5** and generation of acoustic signal accompanying x-ray emission. Keeping key **6** pressed, the display will visualise the real exposure time (CCD Timer compensates exposures times according to fluctuations in network mains voltage during exposure).

Error messages

- Error message **666** on display means that netwok input voltage is too low and not within the accepted limit of -10%.
- Error message **999** on display means that network input voltage is too high and exceeds the accepted limit of +10%.
- In case calculated exposure time is higher that 4s, no exposure will be performed.

If these error messages are frequently displayed, adjust inout mains voltage as indicated in Chapter 8.

Once these checks have been successfully completed,

EQUIPMENT IS READY FOR USE.

7. MAINTENANCE

7.1 GENERAL FEATURES

Like all electrical equipment, this unit requires not only correct use, but also regular maintenance and checks. Such measures will guarantee safe and effective equipment functioning and will prevent any risk for both patient and operator.

Preventive maintenance consists of checks performed directly by operator, as reported in Table 7-1, and of periodical maintenance interventions to be performed by Service engineers only.

In case some components, having direct or indirect impact on safety are replaced, we recommend to use original components only and to have them replaced by qualified personnel, authorised by the manufacturer.

Warning Before operating the unit, check that no evident faults are present in the equipment. In case of irregular functioning or faults, immediately address Technical Service.

Frequency	Test type
Annual	- check that tags are intact and correctly secured - check that no oil traces are present on tubehead - check that hand remote control cable does not reveal signs of interruption or abrasion - check that equipment does not reveal external signs of damage which could affect safety protection fron x-ray - check scissors arm balancing
Evry two years	- check x-ray beam centering - check tube current absorption

Table 7-1

7.2 ARMS REGULATION

Note: Arms regulation does not require removal of tubehead.
In case this operation is considered useful or necessary, before removing tubehead bring scissors arm in closed position and secure it with safety fixing device. This operation is necessary to avoid damage to people and to the arm.

7.2.1 Oval arms

Arms regulation may be necessary in the following cases:

- the simultaneous movement of scissors and extension arms is not ergonomic; in this case, operate on extension arm friction regulation.
- scissors arm is not perfectly balanced; in this case, operate on spring regulation.

Extension arm friction regulation

1. Remove logo label located on extension arm cover.
2. Remove extension arm front cover by loosening the relevant screw.
3. Regulate friction by means of a 4mm exagonal wrench and checking arm rotation.

   Note The purpose of friction is also to avoid disconnection of scissors arm; hence it must not be loose.
4. Place cover and logo label back in the original position.

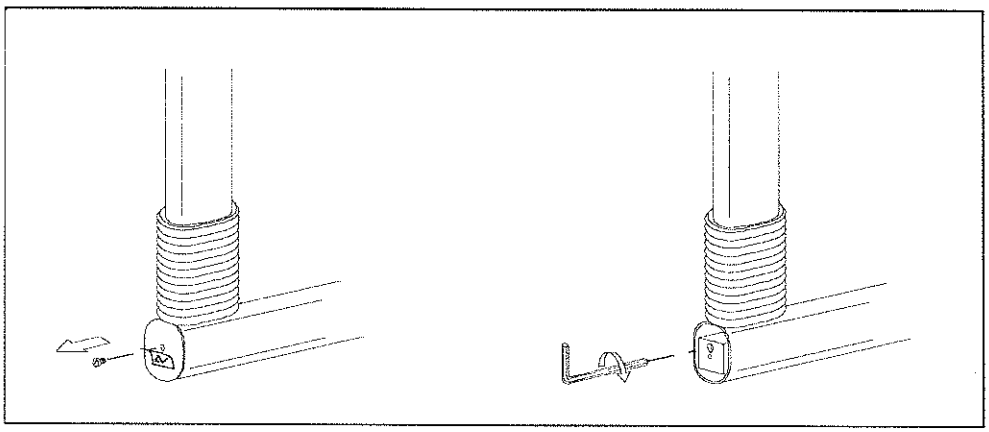


Figure 7-1

Scissors arm regulation: second arm

To proceed to scissors arm regulation, proceed as follows:

- Friction regulation (Figure A)
  1. Move bellows aside to uncover friction.;
  2. Operate with one wrench n. 10 and one n. 13, regulate friction by rotating the wrenc n. 13 ¼ of a turn at a time;
  3. Once regulation has been completed, place bellows back in the original position.

- Spring regulation (figure B)

  In case friction regulation is not sufficient, operate on spring regulation system:
  1. Move bellows aside and bring arm in horizontal position;
  2. By means of an exagonal wrench n. 8 rotate clockwise in case arm tends to lower with respect to release position, or counter-clockwise if arm tends to rise;
  3. Once regulation has been completed, place bellows back in the original position.

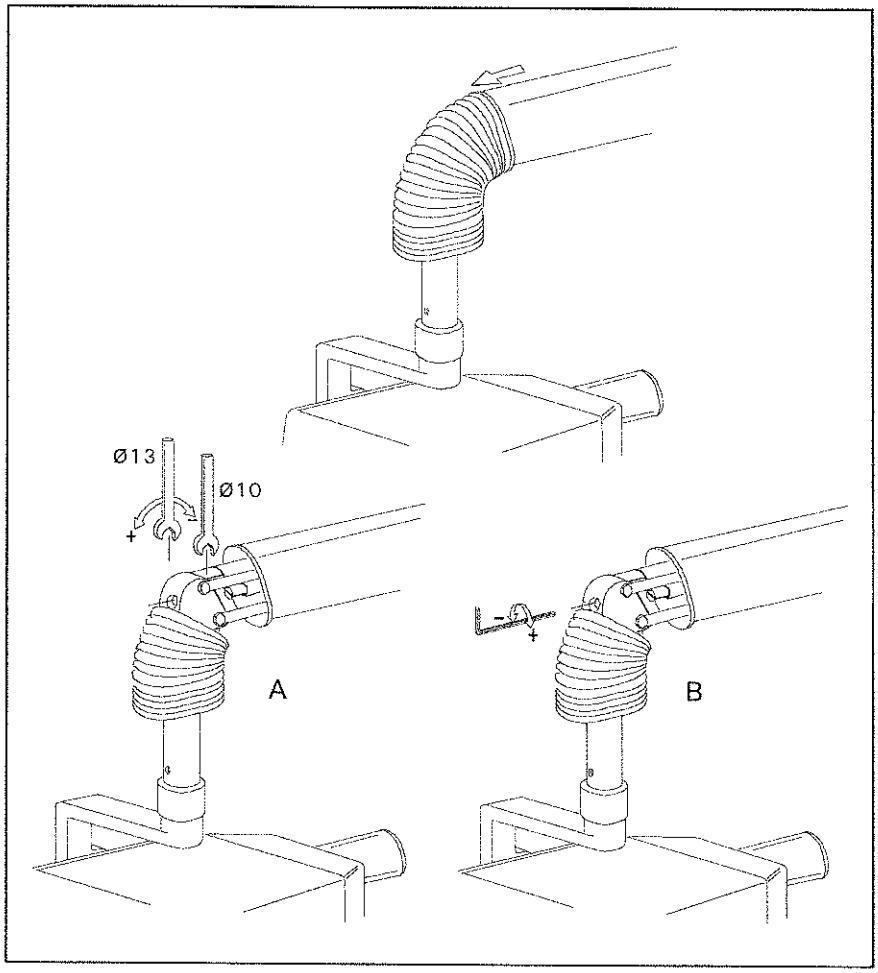


Figure 7-2

Single pantograph arm regulation: first arm

In case first arm regulation is required:

- Friction regulation
  1. Move bellows aside and bring second arm in vertical position;
  2. Operate with one wrench n. 10 and one n. 13, regulate friction by rotating the wrenc n. 13 ¼ of a turn at a time;
  3. Once regulation has been completed, place bellows back in the original position.

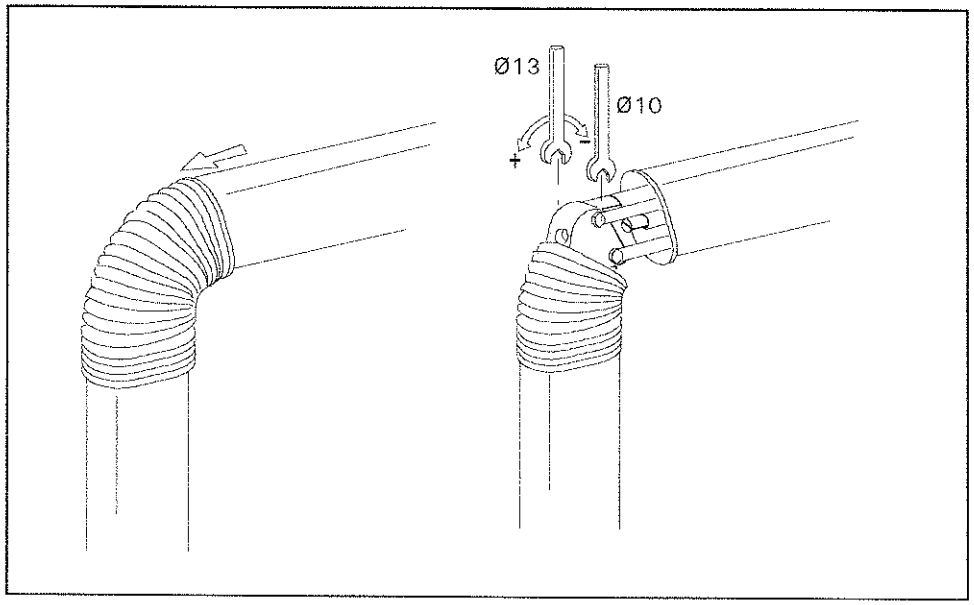


Figure 7-3

7.2.2 Square arms

After a certain time, arms balancing springs may sag.

Should this happen, tubehead will no longer be balanced in all positions and spring calibration will be required.

Balancing of second arm

1. Keep first arm in vertical position.
2. Remove screw and pivot, then lift carter to allow regulation operations.
3. Insert an exagonal pivot - whose diameter must not be over 4mm - in the holes on spring regulation thimble. Rotate pivot clockwise in case tubehead tends to lower, or counter-clockwise if tubehead tends to rise.
4. Once correct balancing has been found, place pivot back in the original position and secure it with the relevant screw.

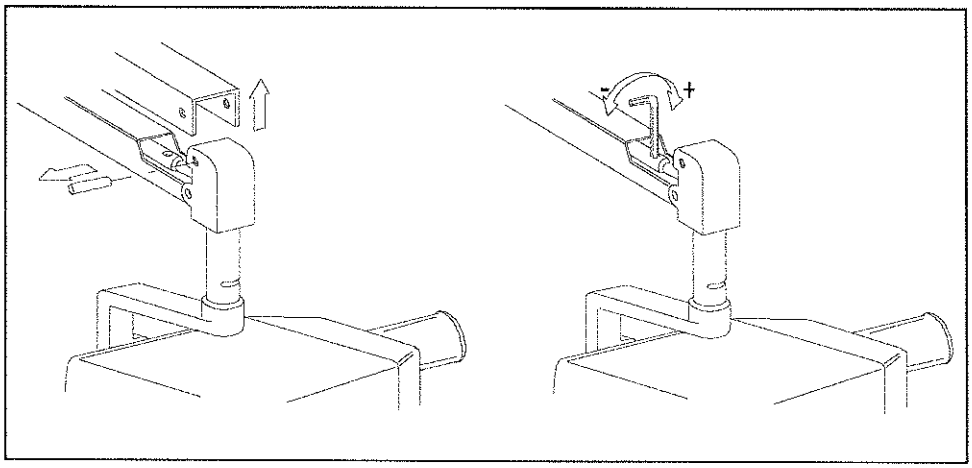


Figure 7-4

Balancing of first arm

Should balancing of first arm be necessary:

1. Place arm in horizontal position.
2. Lift arms assebly so as to reduce load on pivot, then remove screw and pivot.

   Warning At this stage the arm is no loger balanced; therefore, be very careful when proceeding with the operation.
3. Lift carter to allow regulation operations.
4. Insert an exagonal pivot - whose diameter must not be over 4mm - in the holes on spring regulation thimble. Rotate pivot clockwise in case tubehead tends to lower, or counter-clockwise if tubehead tends to rise.
5. Once correct balancing has been found, place pivot back in original position and secure it with the relevant screw.

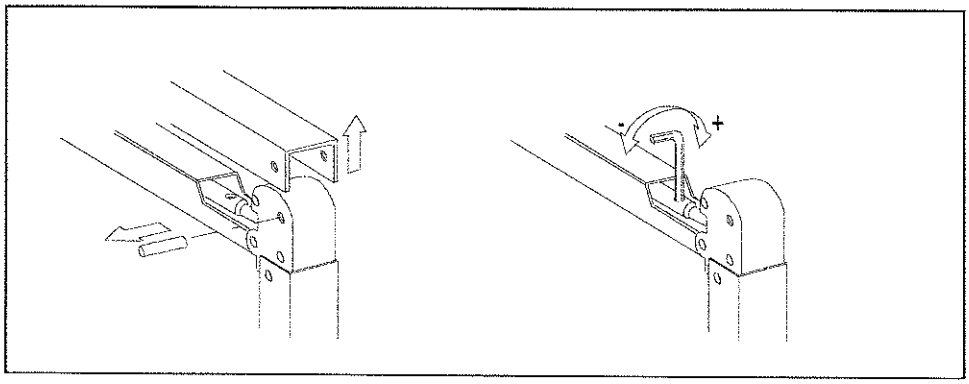


Figure 7-5

Extension arm friction adjustment

Adjust friction by means of a 4mm exagonal wrench and checking arm rotation.

Note The purpose of friction is also to avoid disconnection of scissors arm; hence it must not be loose.

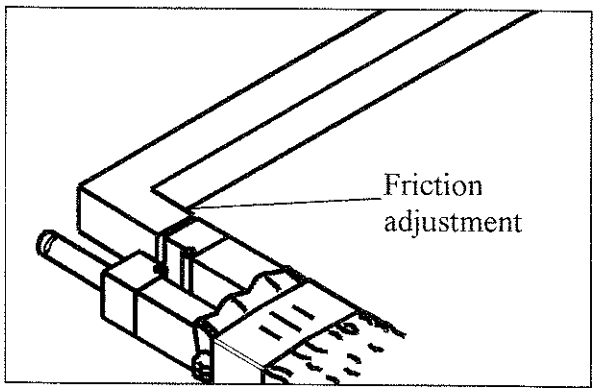


Figura 7-6 Extension arm friction

8. CHECKS AND CALIBRATIONS TO BE PERFORMED BY SERVICE ENGINEERS

8.1 DIAMATIC AP TIMER

8.1.1 Presetting of functions

A set of dip switches is located inside hand remote control; these are used to preset a number of fucntions.

Warning Dip switch presetting and voltage calibration must be performed and checked each time hand remote control is replace, in order to keep previous conditions unaltered.

To proceed to presetting, remove the 4 screws located on hand remote control back and remove front cover.

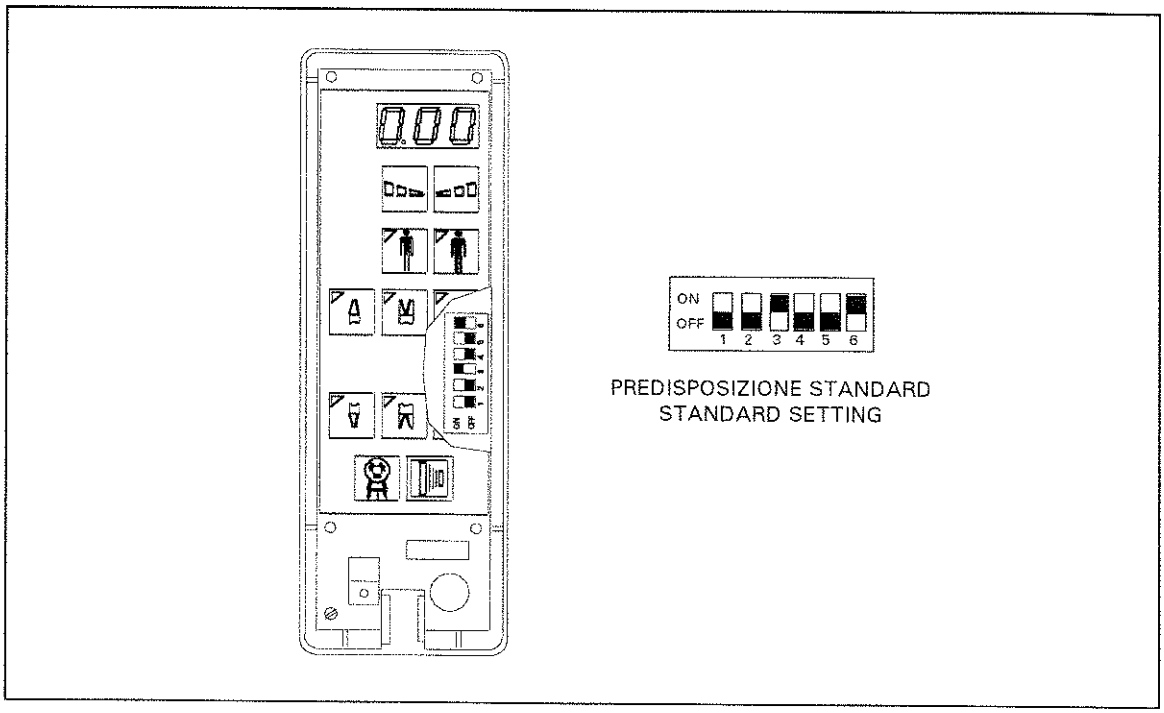


Figure 8-1

The following table shows possible presetting; the standard configuration is indicated in bold/italics.

		Dip switch					
		1	2	3	4	5	6
Tubehead type	***65kV***	***OFF***					
	70kV	ON					
Pre-ignition times	***0.23s***		***OFF***	***ON***			
	0.28s		ON	ON			
	0.27s		ON	OFF			
	0.30s		OFF	OFF			
Film type selection	0.40				ON	ON	ON
	0.60				OFF	ON	ON
	0.80				ON	OFF	ON
Multiplying factor	***1.00***				***OFF***	***OFF***	***ON***
	1.40				ON	ON	OFF
	2.00				OFF	ON	OFF
	3.00				ON	OFF	OFF

Table 8-1: Presetting Dip switches

Switch 1 : Tubehead type

This operation must be performed in case hand remote control is replaced and dip switch 1 is not in the position detected by the old remote control, or in case the position of that dip switch has not been reported.

The ON/OFF positions are indicated in the table according of the type of tubehead installed (See tag located on tubehead).

Switches 2-3 : Pre-ignition times calibration

The following operation must be performed when hand remote control is replaced and dip switches n. 2 and 3 are not in the position detected by the old remote control, or when the positions of those dip switches have not been reported.

The ON/OFF position and the relevant fixed pre-ignition time of dip switches n. 2 and 3 is detactable from the tag located on tubehead; in case this value is not readable, proceed following the instructions below.

Since intra-oral tubeheads have a relativelt simple manufacturing, the high voltage of the x-ray tube is applied together with filament mains supply. This operation requires some extra time to allow the filament to reach correct emission temperature (preheating time).

The time between the beginning of supply and the reaching of 60% of tubehead nominal current is considered as preheating time; it is not taken into account when calculating x-ray emission time and is not visualised on the display.

To change pre-ignition times, change the ON/OFF position of dip switches n. 2 and 3, as shown in the releavnt table.

Those times will be added both to automatic selection and to manual selection times.

Note Pre-ignition times must never be changed without a prior and thorough assessment of the real pre-ignition time of x-ray tube, connected to DIAMATIC AP timer, which is to be effected with proper instruments.

Switches n. 4-5-6 : Exposure time calibration according to type of film

Exposure times for automatic selection, set on hand remote control, are calibrated for ULTRA RAPIDE films Type D (e.g., Kodak Ultra Speed).

The position of dip switches n. 4, 5, 6 (which are usually in OFF, OFF, ON position respectively) determine the multiplying factor applied to automatic exposure base timesindicated in the relevant figures; such presetting must be effected when ULTRA RAPIDE films are not being used. Please consult the instructions provided by film manufacturer.

Note In radio-visual FLASH-DENT mode (diaplay visualises F.LA message), standard times remain unchanged and do not depend o the position of dip switches n. 4, 5 and 6, because no film is used in this mode..

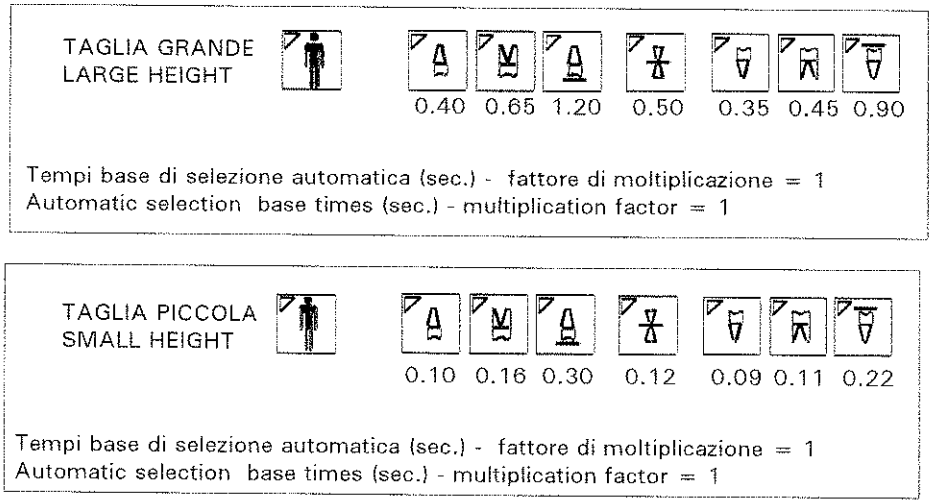


Figure 8-2

8.1.2 Supply board/Timer calibration

In case supply board (code 58601311), connection cable (max 7 m) and hand remote control replacement is required, proceed first to a new calibration of the sistem, according to the following instructions:

1. Remove Timer front cover.
2. Remove hand remote control front cover.
3. Record position (ON/OFF) of the 6 dip switches; position them all in "OFF" position, so as to prepare remote control to fucntion as network voltmeter.
4. Connect digital voltmeter in parallel to supply terminal block.

5. Supply the system and bring voltage displayed on hand remote control to the value detected by digital voltmeter (±1 V) by operating on trimmer **P1**.

   Note: the display will visualise the real voltage value only if network nominal tension is 220V; in all other cases, a multiplying factor must be applied to the value measured on the digital voltmeter, which is:

   1.83 for 120V nominal tension

   0.92 for 240V nominal tension

   Such factor must be applied to the value on remote control display.

EXAMPLES OF SYSTEM CALIBRATION WITH 120V NOMINAL TENSION

Ex. 1: If the digital voltmeter connected to network tension displays a value of 120V, the value on remote control display will be: 120 x 1.83 = 220V.

Ex. 2: For a value of 110V the value on remote control display will be: 110 x 1.83 = 201V.

EXAMPLES OF SYSTEM CALIBRATION WITH 240V NOMINAL TENSION

Ex. 1: If digital voltmeter connected to network tension dsipalys a value of 240V, the value on remote control display will be: 240 x 0.92 = 220V.

Ex. 2: For a value of 260V the value on remote control will be: 260 x 0.92 = 239V.

6. Turn Timer off, remove digital voltmeter and bring the 6 dip switches back to their original position.

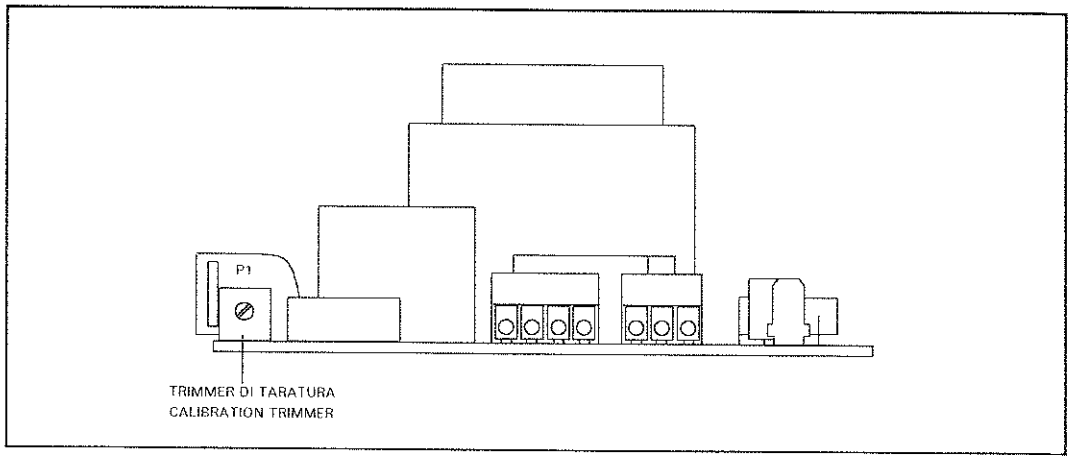


Figure 8-3

8.2 CCD TIMER

8.2.1 Supply board/Remote control calibration

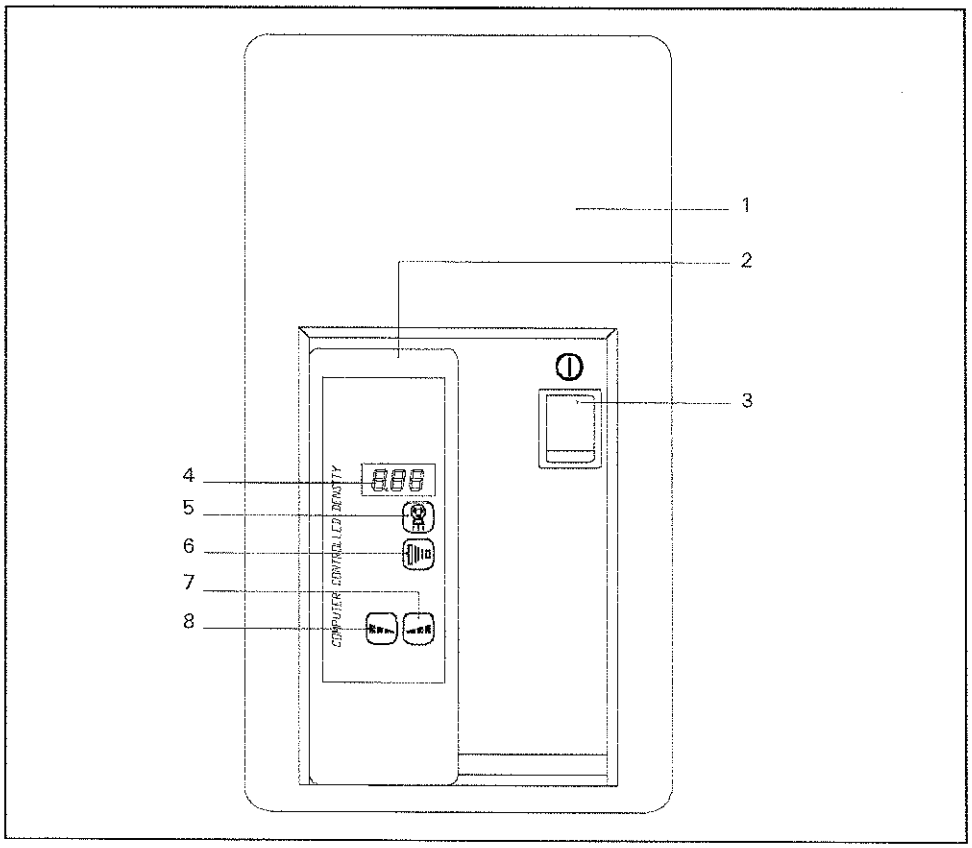


Figure 8-4

1. Turn unit off by putting main switch (**3**) in OFF position.
2. Keeping keys n. **7** and **8** pressed, turn unit on by putting main switch (**3**) in **ON** position.
3. The system will perform an auto-test and will display a number.
4. Connect a digital voltmeter in parallel to supply terminal block.
5. The first value dispalyed is "0.25" (equal to 250 ms). Bring this value (pre-ignition time) to "0.23" by operating on increase or decrease keys n. **7** and **8**.

Note: Since intra-oral tubeheads have a relativelt simple manufacturing, the high voltage of the x-ray tube is applied together with filament mains supply. This operation requires some extra time to allow the filament to reach correct emission temperature (preheating time).
The time between the beginning of supply and the reaching of 60% of tubehead nominal current is considered as preheating time; it is not taken into account when calculating x-ray emission time and is not visualised on the display.

Pre-ignition times must never be changed without a prior and thorough assessment of the real pre-ignition time of x-ray tube, connected to CCD timer, which is to be effected with proper instruments.

6. Confirm value by pressing x-ray emission key n. **6** (no x-rays are emitted during this calibration phase).
7. The system moves on to the second phase (network voltage calibration) and displays supply input voltage.

Note: the display will visualise the real voltage value only if network nominal tension is 220V; in all other cases, a multiplying factor must be applied to the value measured on the digital voltmeter, which is:

1.83 for 120V nominal tension

0.92 for 240V nominal tension

Such factor must be applied to the value on remote control display.

EXAMPLES OF SYSTEM CALIBRATION WITH 120V NOMINAL TENSION

Ex. 1: If the digital voltmeter connected to network tension displays a value of 120V, the value on remote control display will be: 120 x 1.83 = 220V.

Ex. 2: For a value of 110V the value on remote control display will be: 110 x 1.83 = 201V.

EXAMPLES OF SYSTEM CALIBRATION WITH 240V NOMINAL TENSION

Ex. 1: If digital voltmeter connected to network tension dsipalys a value of 240V, the value on remote control display will be: 240 x 0.92 = 220V.

Ex. 2: For a value of 260V the value on remote control will be: 260 x 0.92 = 239V.

8. By means of keys n. 7 and **8**, change the value displayed in order to have it coincide with the value measured on the voltmeter, multiplied by the relevant factor.
9. Confirm by pressing key n. **6** and move on to the following function.
10. Now hand remote control behaves as a digital voltmeter and the display visualises the current network voltage value.
11. Press key n. **6** to proceed to the last function (minimum exposure time).
12. The default value for minimum exposure time is 30ms (0.03 on display); the value can be set between 30 and 70 ms by operating on keys n. 7 and **8**.
13. Press key n. **6** to confirm choice.
14. Turn unit off by putting main switch in OFF position.

Warning The calibration procedure is now completed. Any further attempt to re-enter the calibration phase, even if only for a check, causes the equipment to resume function default values and raises the need to start a new calibration procedure from the beginning.

9. ELECTRICAL SCHEMES

GENERAL ELECTRICAL SCHEME FOR DIAMATIC AP/F.D SYSTEM

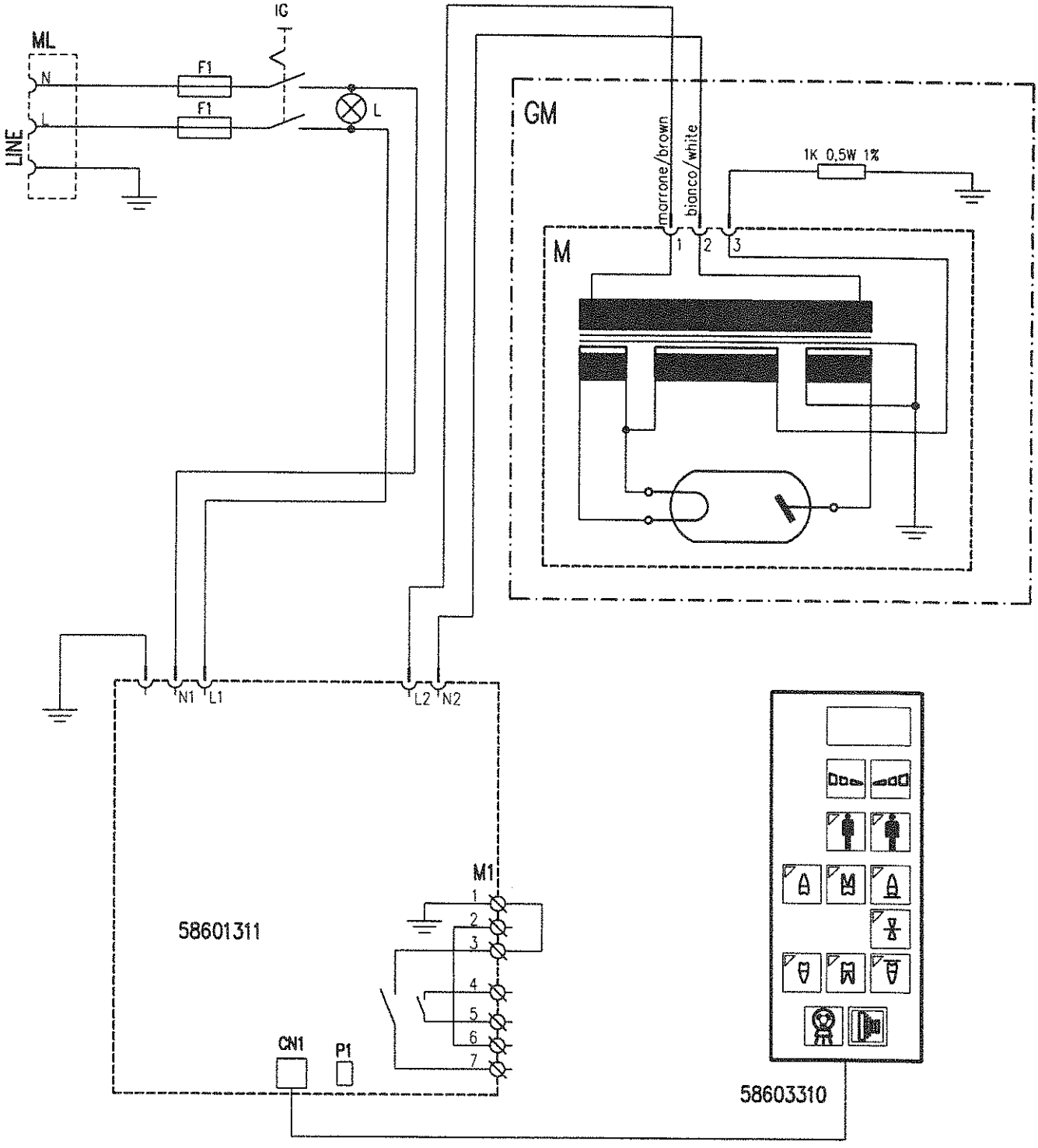
ELECTRICAL SCHEME FOR DIAMATiC AP/F.D SUPPLY BOARD

ELECTRICAL SCHEME FOR DIAMATIC AP/F.D TIMER REMOTE CONTROL.

GENERAL ELECTRICAL SCHEME FOR CCD SYSTEM

CCD TIMER ELECTRICAL SCHEME (2 SHEETS)

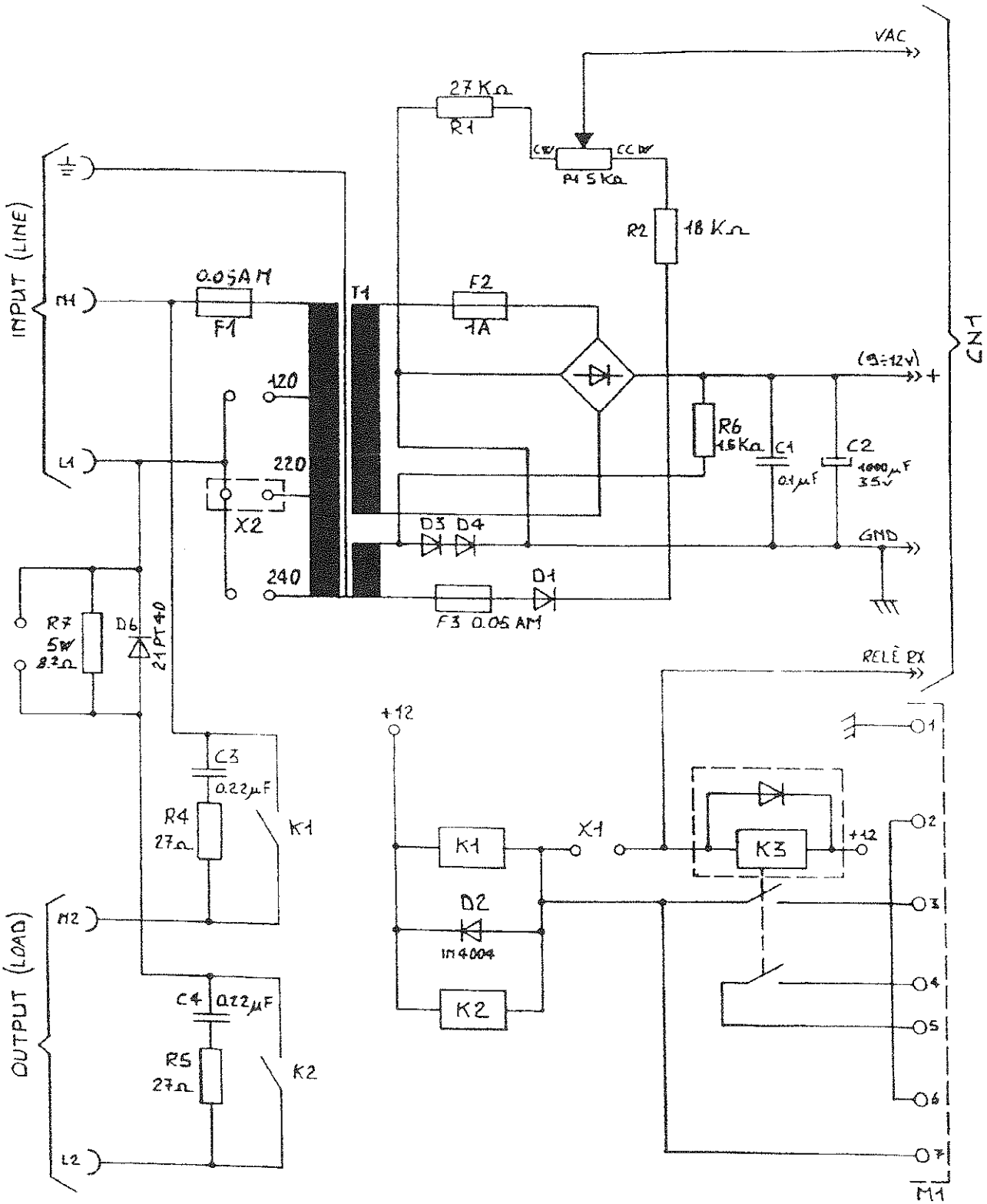
This page has been intentionally left blank

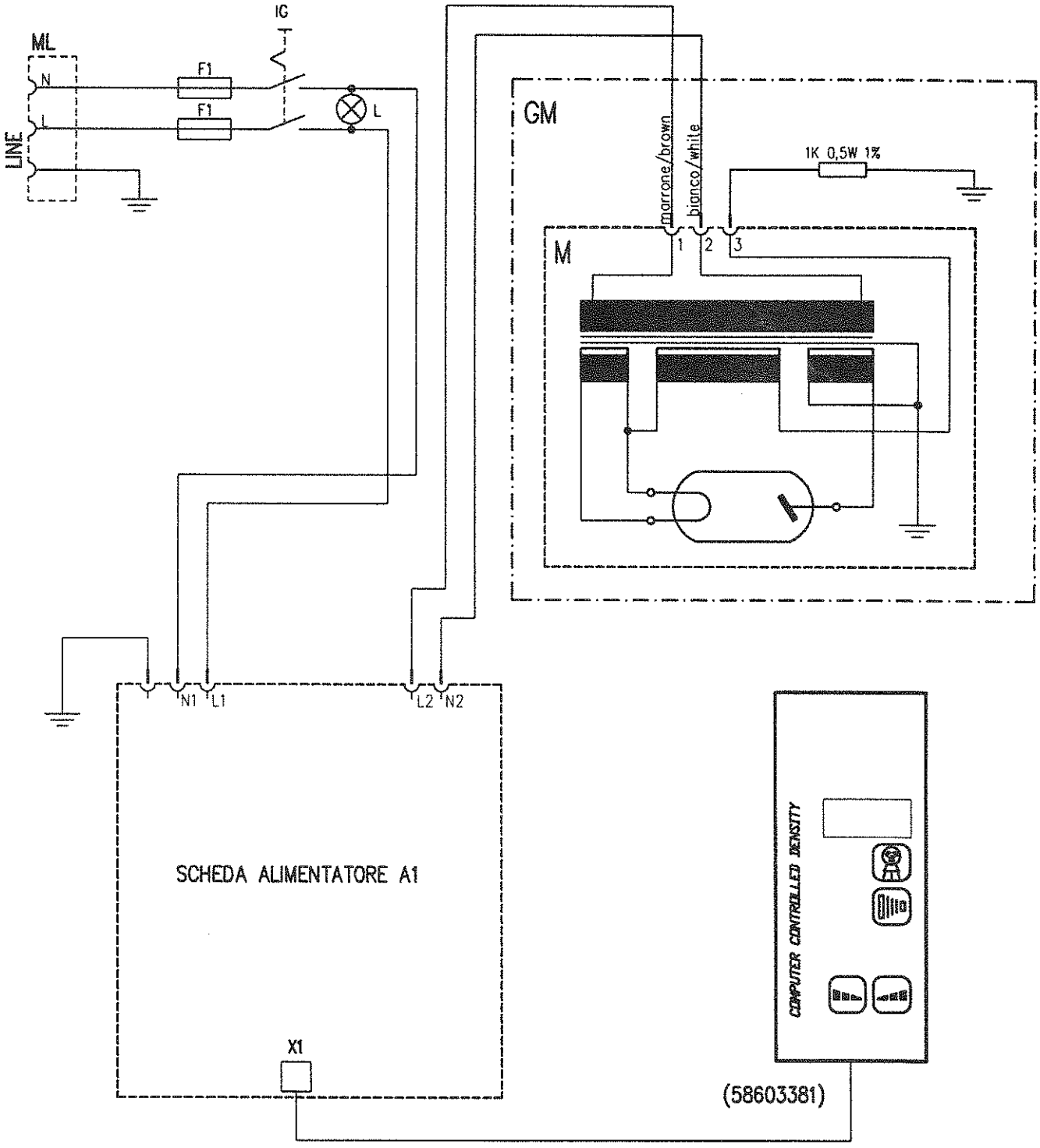


DIAMATIC AP

SCHEMA ELETTRICO GENERALE SISTEMA DIAMATIC AP/F.D.

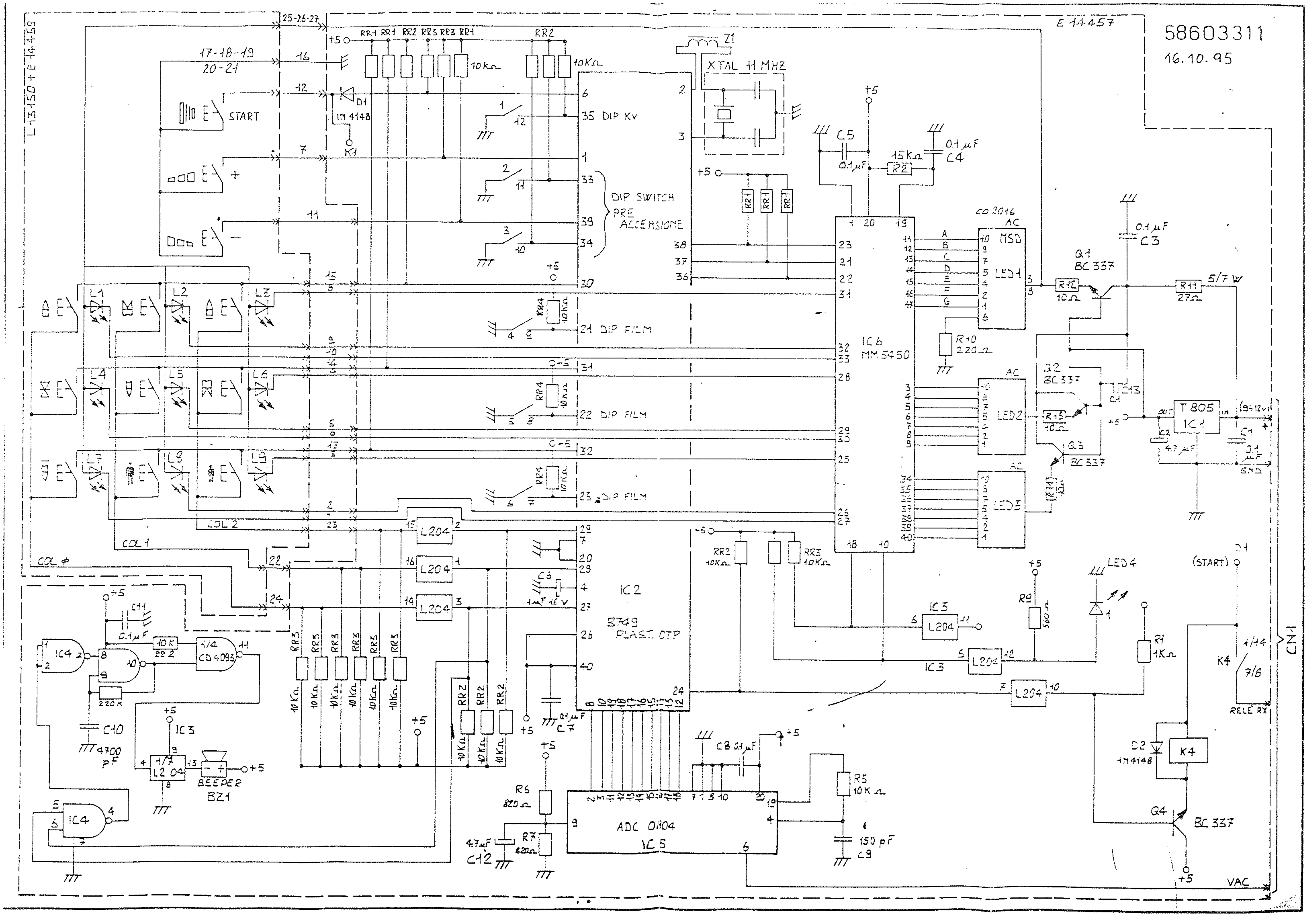
SCHEMA ELETTRICO SCHEDA ALIMENTATORE DIAMATIC AP/F.D.





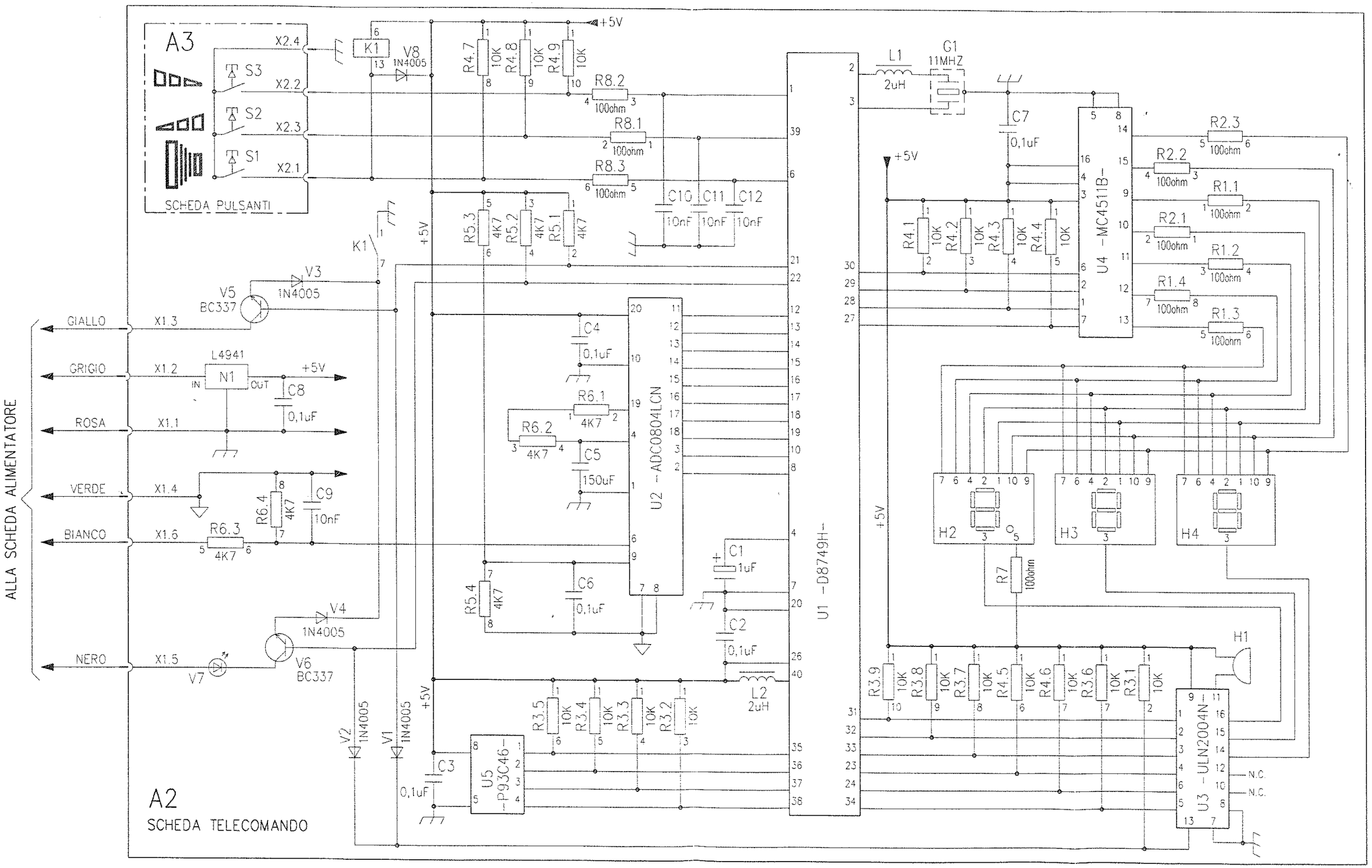
TIMER CCD

SCHEMA ELETTRICO GENERALE SISTEMA CCD



58603311
16.10.95
E 14457
L 13150 + E 14459
XTAL 11 MHZ
START
DIP SWITCH PRE ACCENSIONE
DIP Kv
DIP FILM
IC 6 MM 5450
CD 2016
MSD
LED 1
LED 2
LED 3
LED 4
Q1 BC 337
Q2 BC 337
Q3 BC 337
Q4 BC 337
T 805 IC 1
IC 2 8749 PLAST. OTP
ADC 0804 IC 5
CD 4093
BEEPER BZ1
L 204
K4
RELE RX
VAC
GND
CN1
COL 0
COL 1
COL 2
1N 4148

SCHEMA ELETTRICO TIMER CCD VERSIONE EMC (2/2)



SCHEMA ELETTRICO TIMER CCD VERSIONE EMC (1/2)